Sea Turtle Interactions in the U.S. Pacific Longline and Drift Gillnet Fisheries

A Report Submitted to the Inter-American Tropical Tuna Commission as Required by the Resolution to Mitigate the Impact of Tuna Fishing Vessels on Sea Turtles (Resolution C-19-04)

Prepared by NOAA's National Marine Fisheries Service (NMFS)

West Coast Region

Long Beach, CA

with additional data provided by
Pacific Islands Fisheries Science Center, NMFS

June 2025

Sea Turtle Interactions in the U.S. Pacific Longline, Drift Gillnet and Deep-Set Buoy Gear Fisheries

Preface

Under the July 2019 IATTC *Resolution to Mitigate the Impact of Tuna Fishing Vessels on Sea Turtles* (Resolution C-19-04), Parties agreed to submit available information on interactions of vessels flying their respective flag with sea turtles in fisheries under the competence of the Inter-American Tropical Tuna Commission (IATTC). Additionally, Parties agreed to report on both progress in the development of technology to reduce sea turtle bycatch and the actions taken to provide their vessels with the necessary equipment for appropriate release of incidentally caught sea turtles. Therefore, the United States has prepared this annual report on the interactions of U.S. fishing vessels with sea turtles in and adjacent to the eastern Pacific Ocean (EPO). The report also discusses the conservation measures taken by the United States to reduce sea turtle bycatch.

The United States has limited the scope of fishery interaction data discussed in this report to longline and drift gillnet fisheries in the Pacific Ocean. Some of these fisheries, such as Hawaii-based longline fisheries, range across the Pacific Ocean and include fishing effort that occurs outside the IATTC Convention Area. Where possible, this report attempts to distinguish and highlight activities that specifically occur within the IATTC Convention Area, or EPO, although it is not always possible to do so. The United States is also monitoring takes of sea turtles by large purse seine vessels in the EPO, including entanglement in fish aggregating devices. However, we obtain these data from the IATTC staff; therefore, we do not include this fishery in this report, as there is no benefit in providing these data back to the IATTC.

Lastly, this report is an update to the report submitted in 2024 pursuant to Resolutions C-04-05 and C-07-03. Unchanged background information is not repeated here.

Fishery Interactions

Swordfish/Tuna Longline Fisheries

Please refer to pages 3-6 of the report submitted in 2014 for thorough background information on the operation and management of West Coast and Hawaii U.S. longline fisheries targeting tunas and swordfish. Updates are described here:

U.S. West Coast-Based Deep-set Longline (DSLL) Fishery

There were no observed sea turtle interactions in the DSLL fishery operating out of California in the IATTC Convention Area in 2024 (NMFS West Coast Region observer program). In 2024, 3 vessels over 20 meters in length were active in this fishery. During this time, NMFS observed 7 trips out of 19 (36 percent coverage).

Hawaii-based Pelagic Longline Fishery

Shallow-Set Longline (SSLL)

NMFS monitors the Hawaii-based shallow set (SSLL) longline fishery through a mandatory observer program at 100 percent coverage. Per regulations, all of these vessels utilize a 18/0 minimum size circle hook with offset that does not exceed 10 degrees and finfish bait. In 2024, the SSLL fishery interacted with four loggerhead (*Caretta caretta*) and two leatherback *(Dermocelys coriacea*) sea turtles within the IATTC Convention Area. In general, most sea turtles taken in this fishery are alive, as they can reach the surface to breathe and fishers are trained to de-hook and disentangle sea turtles. Currently there is no information on the fate of these sea turtles following their interactions.

Deep-Set Longline (DSLL)

The Hawaii-based deep set longline (DSLL) fishery is observed at approximately 13percent coverage. These vessels utilize circle hooks with a maximum wire diameter of 4.5 mm with a maximum 10 degree offset. Baits are either squid or finfish. In 2024, there were no observed interactions of any sea turtle species within the IATTC Convention area.

Table 1. Estimates of the number of incidental interactions of sea turtles for the Hawai'i deep-set longline fishery in 2024, which had approximately 13% observer coverage. Estimates are provided for all species with an observed interaction in 2024 and species of concern because of their endangered status and history of previous interactions. Estimates are given for the entire fishing grounds and for waters within the IATTC Convention Area.

Species of Sea Turtle	Observed Takes	Point Estimates	Standard Error
Total Fishing Grounds			
Loggerhead	0	0	7.0
Leatherback	7	54	18.8
Olive Ridley	12	86	27.7
Green	1	9	8.0
Unidentified Hardshell	0	0	7.0
Within IATTC Convention Area			
Loggerhead	0	0	1.1
Leatherback	0	0	6.0
Olive Ridley	0	0	6.0
Green	0	0	6.0
Unidentified Hardshell	0	0	1.1

Table 2. Number of observed incidental interactions of sea turtles for the Hawai'i shallow-set longline fishery in 2024 where the fishery had 100% observer coverage. Counts are provided for all species with an observed interaction in 2024 and species of concern because of their endangered status and history of past interactions. Counts are given for the entire fishing grounds and for waters within the IATTC Convention Area.

Species of Sea Turtle	Observed Takes
Total Fishing Grounds	
Loggerhead	39
Leatherback	9
Olive Ridley	2
Green	0
Unidentified Hardshell	0
Within IATTC Convention Area	
Loggerhead	4
Leatherback	2
Olive Ridley	0
Green	0
Unidentified Hardshell	0

Source: Tables 1 and 2 provided by Brett Cooper

Swordfish/Thresher Shark Drift Gillnet Fishery– West Coast

Please refer to pages 8-9 of the report submitted in 2014 for a thorough background on the operation and management of the U.S. drift gillnet fishery targeting swordfish and thresher shark. Updates are included here. In 2018, Senate Bill 1017 became law in the State of California. Regulations to implement the legislation establish a transition program for the drift gillnet fishery by providing funding to reimburse fishermen who surrender their permits and gear. In addition, on December 29, 2022, President Joseph Biden signed the Driftnet Modernization and Bycatch Reduction Act (Driftnet Act), which directs NMFS to "phase out the use of large mesh drift gillnets."

In 2024, there were no observed sea turtle interactions. Only 4 vessels were active in 2024. The use of large mesh drift gillnet gear off the U.S. West Coast will be prohibited after December 2027 under the Driftnet Act.

Deep-Set Buoy Gear Fishery

Deep-set buoy gear (DSBG) was tested off the West Coast under an exempted fishing permit (EFP) program beginning in 2015. Data from EFP fishing showed the gear to be highly selective for swordfish, with infrequent bycatch of bigeye thresher sharks and, rarely, other non-target species. On September 15, 2023, NMFS authorized the use of DSBG (including both standard and linked configurations) to target swordfish in federal waters off the U.S. west coast. This fishery was integrated into the Fishery Management Plan for West Coast Fisheries for Highly Migratory Species (88 Federal Register 29545). The regulations include information on active tending, gear deployment and retrieval timing, use of multiple gears on a single trip, species retention, and fishery monitoring. Generally, no more than 10 pieces of gear may be fished, and the gear must be actively tended, with all pieces of gear remaining within 5 nautical miles of the vessel at times. The table below shows total DSBG effort (in number of days fished) from 2015 through 2024. Each “day fished” corresponds to up to 10 pieces of gear and up to 30 hooks set over an 8-hour period; however, the actual number of buoys & hooks used in a given day is often lower than the allowed maximum.

Deep-set buoy gear effort, 2015-2024

Year	Days Fished	Active Vessels	Notes
2015	132	4	First EFPs issued to five vessels.
2016	283	7	
2017	324	5	
2018	626	27	EFP effort expanded to up to 60 permits.
2019	752	24	
2020	1082	27	
2021	675	27	
2022	411	29	
2023	434	26	DSBG authorized under the FMP in September.
2024	173	15	

No sea turtle interactions were observed in 2024.

Conservation Measures

Please refer to previous U.S. sea turtle reports for a thorough background on the history of sea turtle conservation and mitigation measures the United States has implemented in both the longline and drift gillnet fisheries. Those pages also include past trainings, outreach events, conferences, workshops, collaborations with other nations and organizations, as well as research publications.

Participation in Seminars, Meetings, Conferences, Symposiums, etc.

- A second IATTC Circle Hook Workshop was held virtually April 27-30, 2025. A minimum circle hook size was not agreed upon.

- Scientists from NOAA participated in a bilateral science and technology collaboration with New Zealand during the sixth U.S.-New Zealand Joint Committee Meeting to discuss leatherback sea turtle bycatch in longline fisheries, in Wellington, NZ on December 10-11, 2024.

- 3rd IATTC Ecosystem and Bycatch Working Group (EBWG) meeting: The meeting was held in La Jolla, California on May 26 and 27, 2025. With regards to the IATTC Sea Turtle conservation measure (C-19-04), the EBWG3 recommended that the SAC update the guidelines to the sea turtle best handling and release practices. The 43rd International Sea Turtle Symposium was held in Accra, Ghana, March 22-27, 2025.

- NMFS has included training on sea turtle safe handling, release, and identification as part of each Agreement on the International Dolphin Conservation Program (AIDCP) seminar for fishing captains. Attendance at this seminar is one of the requirements to receive an eastern tropical Pacific operator's permit and be placed upon the AIDCP list of qualified captains. Several workshops are offered each year, both in-person or via webinar.

- NMFS provides training to skippers and new observers on sea turtle safe handling, release, and resuscitation to participants in the California drift gillnet fishery, deep-set buoy gear and deep-set linked buoy gear targeting swordfish in the U.S. west coast EEZ, and the California-based and Hawaii-based longline fishery, when needed (i.e., new fishermen or refresher training).

- NMFS provides environmental compliance training to its scientists participating in research cruises, specifically, safe handling and resuscitation guidelines, sea turtle identification, and reporting requirements.

- During 2024, NMFS personnel participated in Western and Central Pacific Fisheries Commission (WCPFC) Scientific Committee (SC20), and co-convened the WCPFC SC's Ecosystem and Bycatch Theme section where conservation measures for all protected species, including sea turtles, were discussed.

Gear Experiments

NOAA NMFS Pacific Islands Fisheries Science Center scientists are involved in testing satellite tag attachment technologies on leatherback sea turtles to better understand post-release mortality after their release from fishing gear. During the past year, scientists successfully applied satellite tags using a direct application to the carapace of leatherback turtles that were nesting in the West Pacific Ocean (December 2024). The same technology was tested on turtles foraging off of North Carolina during Spring 2025.

Trials with artificial bait in longline fisheries are ongoing off the coast of Southern California. NOAA scientists have partnered with industry and NGOs to trial artificial baits to determine potential to reduce bycatch of sharks and other vulnerable species.

Recent Published Research from U.S. Government Scientists and Managers

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Fishery Interactions

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U.S. West Coast-Based Deep-set Longline (DSLL) Fishery

There were no observed sea turtle interactions in the DSLL fishery operating out of California in the IATTC Convention Area in 2023 (NMFS West Coast Region observer program). In 2023, there were 3 vessels over 20m in length and 3 vessels less than 20m in length fishing in this fishery. During this time, NMFS observed 8 trips out of 24 (33 percent coverage).

Hawaii-based Pelagic Longline Fishery

Shallow-Set Longline (SSLL)

NMFS monitors the Hawaii-based shallow set (SSLL) longline fishery through a mandatory observer program at 100 percent coverage. The majority of these vessels utilize a 18/0 circle hook with offset. In 2023, the Hawaii-based pelagic shallow-set longline fishery interacted with one loggerhead sea turtle within the IATTC Convention Area. In general, most sea turtles taken in this fishery are alive, as they can reach the surface to breathe and fishers are trained to de-hook and disentangle sea turtles. Currently there is no information on the fate of these sea turtles following their interactions.

Deep-Set Longline (DSLL)

The Hawaii-based pelagic DSLL fishery is observed at approximately 20 percent coverage. The majority of these vessels utilize a 15/0 circle hook with offset. In 2023, there was 1 observed leatherback interaction within the IATTC Convention area. The fate of the sea turtles following their interactions is unknown.

Table 1. Estimates of the number of incidental interactions of sea turtles for the Hawai'i deep-set longline fishery in 2023. This fishery had approximately 15% observer coverage in 2023. Estimates are provided for all species with an observed interaction in 2023 and species of concern because of their endangered status and history of previous interactions. Estimates are given for the entire fishing grounds and for waters within the IATTC Convention Area.

Species of Sea Turtle	Observed Takes	Point Estimates	Standard Error
Total Fishing Grounds			
Loggerhead	0	0	5.2
Leatherback	4	19	8.4
Olive Ridley	12	68	17.7
Green	2	10	6.7
Unidentified Hardshell	1	7	6.0
Within IATTC Convention Area			
Loggerhead	0	0	1.5
Leatherback	1	5	4.2
Olive Ridley	0	0	6.2
Green	0	0	6.2
Unidentified Hardshell	0	0	6.2

Table 2. Number of observed incidental interactions of sea turtles for the Hawai'i shallow-set longline fishery in 2023 where the fishery had 100% observer coverage. Counts are provided for all species with an observed interaction in 2023 and species of concern because of their endangered status and history of past interactions. Counts are given for the entire fishing grounds and for waters within the IATTC Convention Area.

Species of Sea Turtle	Observed Takes
Total Fishing Grounds	
Loggerhead	49
Leatherback	12
Olive Ridley	2
Green	0
Unidentified Hardshell	1
Within IATTC Convention Area	
Loggerhead	1
Leatherback	0
Olive Ridley	0
Green	0
Unidentified Hardshell	0

Source: Tables 1 and 2 provided by Marti McCracken and Brett Cooper

Swordfish/Thresher Shark Drift Gillnet Fishery– West Coast

Please refer to pages 8-9 of the report submitted in 2014 for a thorough background on the operation and management of the U.S. drift gillnet fishery targeting swordfish and thresher shark. Updates are included here. In 2018, Senate Bill 1017 became law in the State of California. Regulations to implement the legislation establish a transition program for the drift gillnet fishery by providing funding to reimburse fishermen who surrender their permits and gear. In addition, on December 29, 2022, President Joseph Biden signed the Driftnet Modernization and Bycatch Reduction Act (Driftnet Act), which directs NMFS to "phase out the use of large mesh drift gillnets."

In 2023, there was one observed loggerhead turtle taken. Only 6 vessels were active in 2023. Effort in this fishery continues to decline, and within five years from enactment of the Driftnet Act (December 2027), the use of large mesh drift gillnet gear off the U.S. West Coast will be prohibited.

Deep-Set Buoy Gear Fishery

On May 8, 2023, NMFS authorized the use of deep-set buoy gear (including deep-set linked buoy gear) to target swordfish from federal waters off the U.S. west coast. This fishery was integrated into the Fishery Management Plan for West Coast Fisheries for Highly Migratory Species (88 Federal Register 29545). The regulations include information on active tending, gear deployment and retrieval timing, use of multiple gears on a single trip, species retention, and fishery monitoring. Generally, no more than 10 pieces of gear may be fished, and the gear must be actively tended, with all pieces of gear remaining within 5 nautical miles of the vessel at times. There have been no sea turtle interactions observed with this gear.

Conservation Measures

Please refer to previous U.S. sea turtle reports for a thorough background on the history of sea turtle conservation and mitigation measures the United States has implemented in both the longline and drift gillnet fisheries. Those pages also include past trainings, outreach events, conferences, workshops, collaborations with other nations and organizations, as well as research publications.

Participation in Seminars, Meetings, Conferences, Symposiums, etc.

- 2ndst IATTC Ecosystem and Bycatch Working Group (EBWG) meeting: The meeting was held in La Jolla, California on June 5 and 6, 2024. With regards to the Sea Turtle conservation measure (C-19-04), the EBWG2 recommended that a follow-up (2nd) Circle Hook Workshop will be held, given the variable results regarding circle hook sizes and balancing the sea turtle bycatch mitigation efforts with socio economic needs.

- 42nd International Sea Turtle Symposium was held in Pattaya, Thailand, March 24-29, 2024. Many U.S. scientists and managers participated in the meeting, presenting in both oral and poster formats during the main session, and participating in pre-meeting regional meetings and workshops.

- NMFS has included training on sea turtle safe handling, release, and identification as part of each Agreement on the International Dolphin Conservation Program (AIDCP) seminar for fishing captains. Attendance at this seminar is one of the requirements to receive an eastern tropical Pacific operator's permit and be placed upon the AIDCP list of qualified captains. Several workshops are offered each year, both in-person or via webinar.

- NMFS provides training to skippers and new observers on sea turtle safe handling, release, and resuscitation to participants in the California drift gillnet fishery, deep-set buoy gear and deep-set linked buoy gear targeting swordfish in the U.S. west coast EEZ, and the California-based and Hawaii-based longline fishery, when needed (i.e., new fishermen or refresher training).

- NMFS provides environmental compliance training to its scientists participating in research cruises, specifically, safe handling and resuscitation guidelines, sea turtle identification, and reporting requirements.

- During 2023, NMFS personnel participated in Western and Central Pacific Fisheries Commission (WCPFC) Scientific Committee (SC19), and co-convened the WCPFC SC's Ecosystem and Bycatch Theme section where conservation measures for all protected species, including sea turtles, were discussed.

- NMFS and the US Fish and Wildlife Service participated in a national sea turtle program meeting in Scottsdale, Arizona from May 14-16, 2024 focused on developing guidance for priority strategies to advance sea turtle conservation at a national level. Identifying and developing these national approaches was intended to help foster alignment of scientific efforts and related guidelines while also recognizing regionally-specific needs. Three areas of particular importance were discussed in detail, including a: (1) national population assessment strategy; (2) national bycatch reduction strategy; and (3) climate change strategy.

Gear Experiments

Technical advice has been provided for ongoing and new studies on sea turtle bycatch mitigation experiments. Specifically, these studies are underway in Indonesia and the Philippines, with a focus on trials with net illumination in gillnet fisheries as a means to reduce sea turtle bycatch. In addition, there is ongoing work with the Chilean government to implement circle hooks in their longline fisheries.

Published Research from U.S. Government Scientists and Managers

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The United States has limited the scope of fishery interaction data discussed in this report to longline and drift gillnet fisheries in the Pacific Ocean. Some of these fisheries, such as Hawaii-based longline fisheries, range across the Pacific Ocean and include fishing effort that occurs outside the IATTC Convention Area. Where possible, this report makes an effort to distinguish and highlight activities that specifically occur within the IATTC Convention Area, or EPO, although it is not always possible to do so. The United States is also monitoring takes of sea turtles by large purse seine vessels in the EPO, including entanglement in fish aggregating devices. However, we obtain these data from the IATTC staff; therefore, we do not include this fishery in this report, as there is no benefit in providing these data back to the IATTC.

Lastly, this report is an update to the report submitted in 2022 pursuant to Resolutions C-04-05 and C-07-03. Unchanged background information is not repeated here.

Swordfish/Tuna Longline Fisheries

Please refer to pages 3-6 of the report submitted in 2014 for thorough background information on the operation and management of West Coast and Hawaii U.S. longline fisheries targeting tunas and swordfish. Updates are described here:

U.S. West Coast-Based Deep-set Longline (DSLL) Fishery

There were no observed sea turtle interactions in the DSLL fishery operating out of California in the IATTC Convention Area in 2022 (NMFS West Coast Region observer program). In 2022, there were less than 3 vessels fishing in this fishery, so any target catch data is confidential, but during this time, NMFS observed 87 out of 176 sets (49 percent coverage).

Hawaii-based Pelagic Longline Fishery

Shallow-Set Longline

NMFS monitors the Hawaii-based longline fishery through a mandatory observer program at 100 percent coverage. In 2022, the Hawaii-based pelagic shallow-set longline fishery interacted with 23 loggerhead sea turtles, 8 leatherbacks, and 2 olive ridleys within the IATTC Convention Area. In general, most sea turtles taken in this fishery are alive, as they can reach the surface to breathe

and fishers are trained to de-hook and disentangle sea turtles. Currently there is no information on the fate of these sea turtles following their interactions.

Deep-Set Longline

The Hawaii-based pelagic DSLL fishery is observed at around 20 percent coverage. In 2022, there were 2 observed loggerhead interactions, 0 observed leatherback interactions and 0 observed olive ridley interactions within the IATTC Convention area. The fate of the sea turtles following their interactions is unknown.

Table 1. Number of observed incidental interactions of sea turtles for the Hawaii shallow-set longline fishery in 2022 where the Hawaii shallow-set longline fishery had 100% observer coverage. Counts are provided for all species with an observed interaction in 2022 and species of concern because of their endangered species status and history of past interactions. Counts are given for the entire fishing grounds and for waters within the IATTC Convention Area.

Species of Sea Turtle	Observed Takes
Total Fishing Grounds	
Loggerhead	23
Leatherback	8
Olive Ridley	2
Green	0
Within IATTC Convention Area	
Loggerhead	6
Leatherback	0
Olive Ridley	0
Green	0

Table 2. Estimates of the number of incidental interactions of sea turtles for the Hawaii deep-set longline fishery in 2022. Estimates are provided for all species with an observed interaction in 2022 and species of concern because of their endangered species status and history of previous interactions. Estimates are given for the entire fishing grounds and for waters within the IATTC Convention Area.

Species of Sea Turtle	Observed Takes	Point Estimates	Standard Error
Total Fishing Grounds			
Loggerhead	3	19	9.8
Leatherback	5	24	9.8
Olive Ridley	10	48	13.7
Green	1	6	5.6
Within IATTC Convention Area			
Loggerhead	2	14	9.0
Leatherback	0	0	2.8
Olive Ridley	0	0	3.4
Green	0	0	1.6

Sources: Marti McCracken, PIFSC and Brett Cooper, Cooperative Institute for Marine and Atmospheric Research, University of Hawaii

Swordfish/Thresher Shark Drift Gillnet Fishery

Please refer to pages 8-9 of the report submitted in 2014 for a thorough background on the operation and management of the U.S. drift gillnet fishery targeting swordfish and thresher shark. Updates are included here. In 2018, Senate Bill 1017 became law in the State of California. Regulations to implement the legislation establish a transition program for the drift gillnet fishery by providing funding to reimburse fishermen who surrender their permits and gear. Transition program participants must also surrender their state drift gillnet permit, affirm that their net has been destroyed at an accredited facility, and affirm they will not fish under, transfer, or renew their federal permit. Any remaining state permits will be revoked on January

31, 2024. In addition, on December 29, 2022, President Joseph Biden signed the Driftnet Modernization and Bycatch Reduction Act (Driftnet Act), which directs NMFS to "consult with the Pacific Fishery Management Council on a strategy to phase out the use of large mesh drift gillnets and permit the use of alternate fishing methods to increase the economic viability of the U.S. West Coast-based swordfish fishery while minimizing bycatch to the maximum extent possible."

Table 3 shows the historical effort, observer coverage and observed sea turtle interactions in the drift gillnet fishery (2010-2021). There were no sea turtles observed taken in 2022, and there was 18.9% observer coverage (28 observed sets/148 estimated sets). Only 7 vessels were active in 2022. Effort in this fishery continues to decline, and within five years from enactment of the Driftnet Act (December 2027), use of large mesh drift gillnet gear off the U.S. West Coast will be prohibited.

Table 3: Sea Turtle Interactions observed in the U.S. West Coast Drift Gillnet Fishery 2010-2021. Sources: the West Coast Region Observer Program and Pacific Fishery Management Council SAFE reports, available at: https://www.pcouncil.org/summaries-of-commercial-fishery-catch-revenue-and-effort-pacfin-data/

Year	Active Vessels	Swordfish (mt)	Thresher shark (mt)	Observed Sets	Estimated Total Sets	% Observer Coverage	Observed Turtle Takes	Take per 100 obs. sets
2010	26	62	41	59	492	12.0	0	0
2011	21	119	55	85	435	19.5	0	0
2012	17	118	37	83	445	18.7	1†	1.20
2013	18	102	48	176	470	37.4	0	0
2014	21	127	26	113	379	29.8	0	0
2015	19	101	32	74	361	20.5	0	0
2016	21	183	32	134	737	18.2	0	0
2017	18	179	42	114	598	19.0	0	0
2018	21	148	26	130	513	25.3	0	0
2019	16	52	25	73	323	22.6	0	0
2020	12	35	31	51	230	22.2	0	0
2021	6	13	3	37	162	22.8	0	0

† Leatherback, released alive
All data are preliminary

Deep-set Buoy Gear Fishery

On May 8, 2023, NMFS authorized the use of deep-set buoy gear (including deep-set linked buoy gear) to target swordfish from federal waters off the U.S. west coast. This fishery was integrated into the Fishery Management Plan for West Coast Fisheries for Highly Migratory Species (88 Federal Register 29545). The regulations include information on active tending, gear deployment and retrieval timing, use of multiple gears on a single trip, species retention, and fishery monitoring. Generally, no more than 10 pieces of gear may be fished, and the gear must be actively tended, with all pieces of gear remaining within 5 nautical miles of the vessel at times. Given the gear configuration and operational requirements as well as information

collected on past trials (since 2015), NMFS does not anticipate that any species of sea turtles will interact with this gear.

Conservation Measures

Please refer to previous U.S. sea turtle reports for a thorough background on the history of sea turtle conservation and mitigation measures the United States has implemented in both the longline and drift gillnet fisheries. Those pages also include past trainings, outreach events, conferences, workshops, collaborations with other nations and organizations, as well as research publications. Recent developments include:

Species in the Spotlight – Pacific Leatherback

Of all the species NMFS protects under the Endangered Species Act (ESA), nine are considered to be among the most at-risk of extinction in the near future. As a result, the "Species in the Spotlight: Survive to Thrive" initiative was created - a concerted agency-wide effort to spotlight and save these highly at-risk species. One of these "Species in the Spotlight" is the Pacific leatherback sea turtle which are globally listed under the ESA as endangered.

Throughout the Species in the Spotlight campaign, NMFS engaged public and private sector partners in collaborative actions to spur recovery for these species. In 2016 and in a renewed initiative in 2021, NMFS released 5-Year Action Plans for the "Species in the Spotlight." These plans outline efforts vital for stabilizing their populations and preventing their extinction, and serve as road maps for their recovery. The 2021 action plan focuses on five critical areas to improve conservation efforts for Pacific leatherbacks: 1) reduce fisheries bycatch interactions and in-water harvest; 2) improve nesting beach protection and increase reproductive output through outreach and community support; 3) foster cooperation with international partners to implement conservation measures and established agreements; 4) support in-water research and monitoring to inform conservation efforts; and 5) raise awareness and education of actions the public can take to support leatherback turtle conservation. Actions #1 and #3 are most relevant to our work within the context of the IATTC and other regional fishery management organizations.

Under this special designation, leatherback sea turtles will be prioritized for directed funding and competitive grant award programs. One such program is the ESA Section 6 grant program which provides funds to the states and recognized tribes to support research and conservation programs that aide in the recovery of endangered species. The states of Washington, Oregon, and California have included leatherback sea turtles in their Section 6 Agreements and are eligible to submit proposals for this species.

In October 2021, NMFS and the U.S. Fish and Wildlife Service convened a working group to consider designating critical habitat for green sea turtles in U.S. waters. In the Pacific, four distinct population segments (DPSs) of green turtles exist within the U.S. exclusive economic zone: East Pacific DPS (threatened), Central North Pacific DPS (threatened), Central South Pacific DPS (endangered) and the Central West Pacific DPS (endangered). The first two DPSs may be found within the IATTC Convention Area. The biological report is currently being finalized, and has assigned conservation values to various areas. These areas and their conservation benefit have been assessed with respect to the economic costs of designating critical habitat as well as consideration of exemption of areas considered essential to military activities. A proposed rule is anticipated to be available to the public for comment in June 2023.

In 2018, NMFS developed a framework to assess the vulnerability of sea turtles to climate change in order to broadly evaluate the impacts across their entire life cycle and including a range of variables (e.g., beach incubation temperature, sea surface temperature, ocean acidification, and sea level rise). This assessment will help to characterize the sensitivity and adaptive capacity of sea turtles throughout the world, including those populations migrating and foraging in the eastern tropical Pacific Ocean. Sea turtle populations worldwide were evaluated (via scoring system) by experts based on the population's exposure and vulnerability to climate change to all life stages, and these results will be published in a peer-reviewed manuscript in 2023.

Participation in Seminars, Meetings, Conferences, Symposiums, etc.

- 1st IATTC Ecosystem and Bycatch Working Group (EBWG) meeting: The meeting was held in La Jolla, California on May 11 and 12, 2023. The EBWG recommended that a follow-up (2nd) Circle Hook Workshop will be held, given the variable results regarding circle hook sizes and balancing the sea turtle bycatch mitigation efforts with socio economic needs.
- On February 14-18, 2023, NMFS worked with artisanal fishers in the community of Bahia de Los Angeles, Baja California, Mexico to advance efforts of a bycatch reduction project. The project aims to study the effectiveness of low-profile and buoyless bottom-set gillnets for reducing sea turtle bycatch, ideas that local fishers have recommended. More information can be found at: www.marescomunidad.com
- 41st International Sea Turtle Symposium. This conference was held in Cartagena, Colombia, March 18-25, 2023. Many U.S. scientists and managers participated in the meeting, presenting in both oral and poster formats during the main session, and participating in pre-meeting regional meetings and workshops.
- On October 19-20, 2022, NMFS, in collaboration with the Aquarium of the Pacific in Long Beach, California, organized a first-ever symposium celebrating the recovery of the East Pacific green turtle in southern California. The first day of the symposium featured interactive workshops focused on important sea turtle themes such as community-based participatory science, as well as environmental education and outreach. The second day of the symposium included oral presentations and posters focused on current sea turtle research and conservation in the region. The symposium culminated with a keynote address and book signing by Dr. Wallace J. Nichols.
- NMFS has included training on sea turtle safe handling, release, and identification as part of each Agreement on the International Dolphin Conservation Program (AIDCP) Seminar for Fishing Captains. Attendance at this seminar is one of the requirements to receive an eastern tropical Pacific operator's permit and be placed upon the AIDCP list of qualified captains. Several workshops are offered each year, both in-person or via webinar.
- Throughout 2022, NMFS has provided training on sea turtle safe handling, release and resuscitation to participants in the California drift gillnet fishery, a longline exempted fishing permit targeting swordfish in the U.S. west coast EEZ (i.e., deep-set buoy gear and deep-set linked buoy gear), and the California-based and Hawaii-based longline fishery, when needed (i.e., new fishermen or refresher training).
- NMFS provides environmental compliance training to its scientists participating in research cruises, specifically, safe handling and resuscitation guidelines, sea turtle

identification, and reporting requirements.

- NMFS collaborated with colleagues in Peru to better understand the linkages between FAD trajectories and sea turtle habitats in the Eastern and Western Pacific Ocean. Work was done using both computer simulations and direct observations as a means to better predict potential for habitat degradation specific to Pacific Ocean turtles.
- NMFS collaborated with colleagues in Brazil on a study regarding sea turtle decompression sickness from turtles caught in trawl gear. Research was delayed during 2020 and 2021 due to Covid-19, yet resumed in January 2022.
- NMFS personnel participated in Western and Central Pacific Fisheries Commission (WCPFC) Scientific Committee (SC18), and co-convened the WCPFC SC's Ecosystem and Bycatch Theme section where conservation measures for all protected species were discussed.

Gear Experiments

Technical advice has been provided for ongoing and new studies on sea turtle bycatch mitigation experiments. Specifically, these studies are underway in Indonesia and the Philippines, with a focus on trials with net illumination in gillnet fisheries as a means to reduce sea turtle bycatch. In addition, there is ongoing work with the Chilean government to implement circle hooks in their longline fisheries.

Published Research from U.S. Government Scientists and Managers

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
Sustainable Fisheries Division
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802

August 18, 2022

Mr. Jean-François Pulvenis, Acting Executive Director
Director, Inter-American Tropical Tuna Commission
8901 La Jolla Shores Drive
La Jolla, California 92037-1509

Subject: Submission of United States sea turtle report

Dear Mr. Pulvenis:

NOAA's National Marine Fisheries Service (NMFS) has prepared the attached report summarizing the available information regarding interactions with sea turtles by U.S. longline and drift gillnet fishing vessels in the Eastern Pacific Ocean in 2021. This report is submitted pursuant to Resolution C-19-04 (*Resolution to Mitigate Impacts on Sea Turtles*).

The attached report addresses (1) observed and estimated bycatch rates for the U.S. Pacific longline fisheries and the U.S. west coast drift gillnet fishery; (2) information on efforts to reduce sea turtle bycatch and mortality in the longline and drift gillnet fisheries, including outreach activities, technical workshops, and gear research; and (3) an update on U.S. efforts to promote sea turtle conservation around the world.

Please contact William Stahnke at (562) 980-4088 or william.stahnke@noaa.gov with any questions.

Sincerely,

Lyle Enriquez
Highly Migratory Species Branch Chief

cc: David Hogan, U.S. Department of State
Ryan J. Wulff, NMFS, West Coast Region
Penny Ruvelas, NMFS, West Coast Region
Keith Bigelow, NMFS, Pacific Islands Fisheries Science Center
Administrative File: 150413SWR2013SF00161:WJS

Sea Turtle Interactions in the U.S. Pacific Longline and Drift Gillnet Fisheries

A Report Submitted to the Inter-American Tropical Tuna Commission as Required by the Resolution to Mitigate the Impact of Tuna Fishing Vessels on Sea Turtles (Resolution C-19-04)

Prepared by NOAA's National Marine Fisheries Service (NMFS)
West Coast Region
Long Beach, CA

August 2022

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There were no observed sea turtle interactions in the DSLL fishery operating out of California in the IATTC Convention Area in 2021 (NMFS West Coast Region observer program). In 2021, NMFS observed 210 out of 787 reported sea days for 27 percent observer coverage (3 vessels observed).

Hawaii-based Pelagic Longline Fishery

Shallow-Set Longline

NMFS monitors the Hawaii-based longline fishery through a mandatory observer program at 100 percent coverage. In 2021, the Hawaii-based pelagic shallow-set longline fishery interacted with 3 loggerhead sea turtles within the IATTC Convention Area.

Deep-Set Longline

The Hawaii-based pelagic DSLL fishery had nearly 18 percent observer coverage at the trip and set level in 2021. In 2021, there were no observed turtle takes in the IATTC Convention Area for this fishery.

Swordfish/Thresher Shark Drift Gillnet Fishery

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† Leatherback, released alive
All data are preliminary

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Under this special designation, leatherback sea turtles will be prioritized for directed funding and competitive grant award programs. One such program is the ESA Section 6 grant program which provides funds to the states and recognized tribes to support research and conservation programs that aide in the recovery of endangered species. The states of Washington, Oregon, and California have included leatherback sea turtles in their Section 6 Agreements and are eligible to submit proposals for this species.

In October 2021, NMFS and the U.S. Fish and Wildlife Service convened a working group to consider designating critical habitat for green sea turtles in U.S. waters. In the Pacific, four distinct population segments (DPSs) of green turtles exist within the U.S. exclusive economic zone: East Pacific DPS (threatened), Central North Pacific DPS (threatened), Central South Pacific DPS (endangered) and the Central West Pacific DPS (endangered). The first two DPSs may be found within the IATTC Convention Area. The biological report is currently being peer review by sea turtle experts, which has assigned conservation values to various areas. These areas and their conservation benefit will be assessed with respect to the economic costs of designating critical habitat as well as consideration of exemption of areas considered essential to military activities. A proposed rule is anticipated to be available to the public in June 2023.

In 2018, NMFS developed a framework to assess the vulnerability of sea turtles to climate change in order to broadly evaluate the impacts across their entire life cycle and including a range of variables (e.g., beach incubation temperature, sea surface temperature, ocean acidification, and sea level rise). This assessment will help to characterize the sensitivity and adaptive capacity of sea turtles throughout the world, including those populations migrating and foraging in the eastern tropical Pacific Ocean. Sea turtle populations worldwide were evaluated (via scoring system) by experts based on the population’s exposure and vulnerability to climate change to all life stages, and these results will be published in a peer-reviewed manuscript in late 2022 or early 2023.

Participation in Seminars, Meetings, Conferences, Symposiums, etc.

- 1st IATTC Circle Hook Workshop. The meeting was held virtually on March 7-8, 2022. The purpose of this workshop was to consider a recommendation to the IATTC to identify a minimum hook size to be used in longline fisheries through a revision to resolution C-19-04, paragraph 4c. The goal was to analyze scientific information regarding different circle hook sizes and their effectiveness at mitigating bycatch of sea turtles (and sharks, rays and seabirds) and target species. For sea turtles, the use of larger

hook sizes was identified to be more effective to both reduce catch rates and minimize post-release mortality. Participants did not recommend a minimum circle hook size, given the uncertainty in the effective capture of target species, such as dorado/mahi mahi and the consideration of socioeconomic needs of the fishing industry. Participants recommended the use of best practices, in particular, fishers should safely remove hooks where possible and remove as much of the line as practical.

- 11th IATTC Bycatch Working Group Meeting: The meeting was held virtually on May 10-11, 2022. The working group recommended that a follow-up (2nd) Circle Hook Workshop be held, given the variable results regarding circle hook sizes and balancing the sea turtle bycatch mitigation efforts with socio economic needs. They also recommended further research on the performance and feasibility of hook shielding devices and IATTC parties to implement full implementation of conservation and management measures in resolution C-19-04, particularly given the vulnerability of East Pacific leatherback turtles.
- Sea Turtle Bycatch Reduction Project: The U.S. participated in this Project, based in La Paz, Baja California Sur, Mexico, held on March 12-18, 2022. The U.S. worked with project partners and fishers in local communities in the region to develop strategies for sea turtle bycatch reduction in artisanal longline and driftnet fisheries. Known locally in Mexico as 'MarES Communidad', the Office of the U.S. Trade Representative-funded project focuses on reducing loggerhead and leatherback bycatch but will also benefit other sea turtle species. The project is currently conducting rapid bycatch assessments throughout Pacific Mexico, and this particular collaboration will help the project transition to the experimental fisheries phase. A fact sheet on the US-Mexico-Canada Agreement can be found at: https://ustr.gov/sites/default/files/2022.02.10_USMCA%20Sea%20Turtles%20IAA%20Fact%20Sheet.pdf
- 40th International Sea Turtle Symposium. This conference was based in Perth, Australia but held virtually from March 24-28, 2022. Many U.S. scientists and managers participated in the meeting, presenting in both oral and poster formats during the main session, and participating in pre-meeting regional meetings and workshops.
- NMFS has included training on sea turtle safe handling, release, and identification as part of each Agreement on the International Dolphin Conservation Program (AIDCP) Seminar for Fishing Captains. Attendance at this seminar is one of the requirements to receive an eastern tropical Pacific operator's permit and be placed upon the AIDCP list of qualified captains. Several workshops are offered each year, both in-person or via webinar.
- Throughout 2021, NMFS has provided training on sea turtle safe handling, release and resuscitation to participants in the California drift gillnet fishery, exempted fishing permit participants targeting swordfish in the U.S. west coast EEZ (i.e., deep-set buoy gear and deep-set linked buoy gear), and the California-based and Hawaii-based longline fishery, when needed (i.e., new fishermen or refresher training).
- NMFS provides environmental compliance training to its scientists participating in research cruises, specifically, safe handling and resuscitation guidelines, sea turtle identification, and reporting requirements.
- NMFS collaborated with colleagues in Peru to attach satellite tags on leatherback sea turtles to track movements, identify habitat use, and improve our understanding of turtles' post-release survival after interactions with fishing gear.

- NMFS collaborated with colleagues in Brazil on a study regarding sea turtle decompression sickness from turtles caught in trawl gear. Research was delayed during 2020 and 2021 due to Covid-19, yet resumed in January 2022.
- NMFS personnel participated in Western and Central Pacific Fisheries Commission (WCPFC) Scientific Committee (SC17), and co-convened the WCPFC SC's Ecosystem and Bycatch Theme section where conservation measures for all protected species were discussed.

Gear Experiments

Technical advice has been provided for ongoing and new studies on sea turtle bycatch mitigation experiments. Specifically, these studies are underway in Indonesia and the Philippines, with a focus on trials with net illumination in gillnet fisheries as a means to reduce sea turtle bycatch. In addition, there is ongoing work with the Chilean government to implement circle hooks in their longline fisheries.

Published Research from U.S. Government Scientists and Managers

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Jensen, M.P., Eguchi, T., FitzSimmons, N.N., McCarthy, M.A., Fuentes, M.M.P.B., Hamann, M., Limpus, C.L., Bell, I.P., & Read, M.A. 2022. Integrating climate change and management scenarios in population models to guide the conservation of marine turtles. Bulletin of Marine Science 98(2): 131-154. https://doi.org/10.5343/bms.2021.0033.

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Seminoff, J. A., L. M. Komoroske, D. Amorocho, R. Arauz, D. Chac´on-Chaverr´ı, N. de Paz, P. H. Dutton, M. Donoso, M. Heidemeyer, G. Hoeffer, T. Todd Jones, S. Kelez, G. E. Lemons, J. M. Rguez-Baron, L. Sampson, L. Santos Baca, T. Steiner, M. Vejar Rubio, P. Z´arate, A. Zavala-Norzagaray, and B. N. Popp. 2021. Large-scale patterns of green turtle trophic ecology in the eastern Pacific Ocean. Ecosphere 12(6):e03479. 10.1002/ecs2.3479

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
Sustainable Fisheries Division
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802

June 30, 2021

Mr. Jean-François Pulvenis, Acting Executive Director
Director, Inter-American Tropical Tuna Commission
8901 La Jolla Shores Drive
La Jolla, California 92037-1508

Subject: Submission of United States sea turtle report

Dear Mr. Pulvenis:

NOAA's National Marine Fisheries Service (NMFS) has prepared the attached report summarizing the available information regarding interactions with sea turtles by U.S. longline and drift gillnet fishing vessels in the Eastern Pacific Ocean in 2020. This report is submitted pursuant to Resolution C-19-04 (*Resolution to Mitigate Impacts on Sea Turtles*).

The attached report addresses (1) observed and estimated bycatch rates for the U.S. Pacific longline fisheries and the U.S. west coast drift gillnet fishery; (2) information on efforts to reduce sea turtle bycatch and mortality in the longline and drift gillnet fisheries, including outreach activities, technical workshops, and gear research; and (3) an update on U.S. efforts to promote sea turtle conservation around the world.

Please contact William Stahnke at (562) 980-4088 or william.stahnke@noaa.gov with any questions.

Sincerely,

Lyle Enriquez
Highly Migratory Species Branch Chief

cc: David Hogan, U.S. Department of State
Ryan J. Wulff, NMFS, West Coast Region
Penny Ruvelas, NMFS, West Coast Region
Keith Bigelow, NMFS, Pacific Islands Fisheries Science Center
Administrative File: 150413SWR2013SF00161:WJS

Enclosure

Sea Turtle Interactions in the U.S. Pacific Longline and Drift Gillnet Fisheries

A Report Submitted to the Inter-American Tropical Tuna Commission as Required by the Resolution to Mitigate the Impact of Tuna Fishing Vessels on Sea Turtles (Resolution C-19-04)

Prepared by NOAA's National Marine Fisheries Service (NMFS)
West Coast Region
Long Beach, CA

June 2021

Sea Turtle Interactions in the U.S. Pacific Longline and Drift Gillnet Fisheries

Preface

Under the July 2019 IATTC *Resolution to Mitigate the Impact of Tuna Fishing Vessels on Sea Turtles* (Resolution C-19-04), Parties agreed to submit available information on interactions of vessels flying their respective flag with sea turtles in fisheries under the competence of the Inter-American Tropical Tuna Commission (IATTC). Additionally, Parties agreed to report on both progress in the development of technology to reduce sea turtle bycatch and the actions taken to provide their vessels with the necessary equipment for appropriate release of incidentally caught sea turtles. Therefore, the United States has prepared this annual report on the interactions of U.S. fishing vessels with sea turtles in and adjacent to the eastern Pacific Ocean (EPO). The report also discusses the conservation measures taken by the United States to reduce sea turtle bycatch.

The United States has limited the scope of fishery interaction data discussed in this report to longline and drift gillnet fisheries in the Pacific Ocean. Some of these fisheries, such as Hawaii longline fisheries, range across the Pacific Ocean and include fishing effort that occurs outside the IATTC Convention Area. Where possible, this report makes an effort to distinguish and highlight activities that specifically occur within the IATTC Convention Area, or EPO, although it is not always possible to do so. The United States is also monitoring takes of sea turtles by large purse seine vessels in the EPO, including entanglement in fish aggregating devices. However, we obtain these data from the IATTC staff; therefore, we do not include this fishery in this report, as there is no benefit in providing these data back to the IATTC.

Lastly, this report is an update to the report submitted in 2020 pursuant to Resolutions C-04-05 and C-07-03. Unchanged background information is not repeated here.

Swordfish/Tuna Longline Fisheries

Please refer to pages 3-6 of the report submitted in 2014 for thorough background information on the operation and management of West Coast and Hawaii U.S. longline fisheries targeting tunas and swordfish. Updates are described here:

U.S. West Coast-Based Deep-set Longline (DSLL) Fishery

There were no sea turtle interactions in the DSLL fishery operating out of California in the IATTC Convention Area in 2020 (NMFS West Coast Region observer program).

Hawaii-based Pelagic Longline Fishery

Shallow-Set Longline

In 2020, the Hawaii-based pelagic shallow-set longline fishery interacted with 1 leatherback sea turtle within the IATTC Convention Area.

Deep-Set Longline

The Hawaii-based pelagic deep-set longline fishery had roughly 10% observer coverage at the trip and set level in 2020. This fishery typically maintains a 20% observer coverage rate, but was impacted by COVID-19. In 2020, observed turtle takes in the IATTC Convention Area for this fishery consisted of 1 loggerhead sea turtle. Extrapolated point estimates indicate that 6 loggerhead takes occurred with a standard error of 5.5.

Swordfish/Thresher Shark Drift Gillnet Fishery

Please refer to pages 8-9 of the report submitted in 2014 for a thorough background on the operation and management of the U.S. drift gillnet fishery targeting swordfish and thresher shark. Updates are included here.

Table 1: Sea Turtle Interactions observed in the U.S. West Coast Drift Gillnet Fishery 2010-2020. Sources: the West Coast Region Observer Program and Pacific Fishery Management Council SAFE reports, available at: https://www.pcouncil.org/summaries-of-commercial-fishery-catch-revenue-and-effort-pacfin-data/

Year	Active Vessels	Swordfish (mt)	Thresher shark (mt)	Observed Sets	Estimated Total Sets	% Observer Coverage	Observed Turtle Takes	Take per 100 obs. sets
2010	26	62	41	59	492	12.0	0	0
2011	21	119	55	85	435	19.5	0	0
2012	17	118	37	83	445	18.7	1†	1.20
2013	18	102	48	176	470	37.4	0	0
2014	21	127	26	113	379	29.8	0	0
2015	19	101	32	74	361	20.5	0	0
2016	21	183	32	134	737	18.2	0	0
2017	18	179	42	114	598	19.0	0	0
2018	21	148	26	130	513	25.3	0	0
2019	16	52	25	73	323	22.6	0	0
2020	12	35	31	22	147	17.6	0	0

† Leatherback, released alive
All data are preliminary

Conservation Measures

Please refer to previous U.S. sea turtle reports for a thorough background on the history of sea turtle conservation and mitigation measures the United States has implemented in both the longline and drift gillnet fisheries. Those pages also include past trainings, outreach events, conferences, workshops, collaborations with other nations and organizations, as well as research publications. Recent developments include:

Species in the Spotlight – Pacific Leatherback

Of all the species NMFS protects under the Endangered Species Act (ESA), nine are considered to be among the most at-risk of extinction in the near future. As a result, the "Species in the Spotlight: Survive to Thrive" initiative was created - a concerted agency-wide effort to spotlight and save these highly at-risk species. One of these "Species in the Spotlight" is the Pacific leatherback sea turtle which are globally listed under the ESA as endangered.

Throughout the Species in the Spotlight campaign, NMFS engaged public and private sector partners in collaborative actions to spur recovery for these species. In 2016 and in a renewed initiative in 2021, NMFS released 5-Year Action Plans for the "Species in the Spotlight." These plans outline efforts vital for stabilizing their populations and preventing their extinction, and

serve as road maps for their recovery. The 2021 action plan focuses on five critical areas to improve conservation efforts for Pacific leatherbacks: 1) reduce fisheries bycatch interactions and in-water harvest; 2) improve nesting beach protection and increase reproductive output through outreach and community support; 3) foster cooperation with international partners to implement conservation measures and established agreements; 4) support in-water research and monitoring to inform conservation efforts; and 5) raise awareness and education of actions the public can take to support leatherback turtle conservation. Actions #1 and #3 are most relevant to our work within the context of the IATTC and other regional fishery management organizations.

Under this special designation, leatherback sea turtles will be prioritized for directed funding and competitive grant award programs. One such program is the ESA Section 6 grant program which provides funds to the states and recognized tribes to support research and conservation programs that aide in the recovery of endangered species. The states of Washington, Oregon, and California have included leatherback sea turtles in their Section 6 Agreements and are eligible to submit proposals for this species.

In early 2018, NMFS and the U.S. Fish and Wildlife Service (USFWS) initiated a status review for the globally listed endangered leatherback sea turtles, to determine if distinct population segments (DPS) (i.e., discrete and significant subpopulations) exist and if so, given their status, to consider whether the listing (currently "endangered") should be changed for each DPS. The status review was peer-reviewed and was completed in 2020 (NMFS and USFWS 2020). While seven populations of leatherbacks were found globally distinct due to their genetic discontinuity, spatial differences (i.e., marked separation of the seven populations at nesting beaches), and separation due to physical factors, including land masses, oceanographic features and currents, all populations were found to be at risk of extinction. This is as a result of reduced nesting female abundance, declining nest trends, and numerous, severe threats. Therefore, the leatherback sea turtle remains globally endangered under the Endangered Species Act.

In 2018, NMFS developed a framework to assess the vulnerability of sea turtles to climate change in order to broadly evaluate the impacts across their entire life cycle and including a range of variables (e.g., beach incubation temperature, sea surface temperature, ocean acidification, and sea level rise). This assessment will help to characterize the sensitivity and adaptive capacity of sea turtles throughout the world, including those populations migrating and foraging in the eastern tropical Pacific Ocean. Sea turtle populations worldwide were evaluated (via scoring system) by experts based on the population's exposure and vulnerability to climate change to all life stages, and these results will be published in a peer-reviewed manuscript in 2021 or early 2022.

Participation in Seminars, Meetings, Conferences, Symposiums, etc.

- 9th IATTC Bycatch Working Group meeting. The meeting was held virtually on June 4, 2020. More than 80 delegates were represented along with members from the The Inter-American Convention for the Protection of Sea Turtles (IAC). The IAC, with support from members of Laud OPO network, collaborated on a project to assess the vulnerability of the Eastern Pacific leatherback turtle to fishing activities in the IATTC region. The document is available at: https://www.iattc.org/Meetings/Meetings2020/SAC-11/BYC-10/_English/BYC-10-INF-B_Leatherback%20turtles%20and%20EASI-Fish.pdf

- 10th IATTC Bycatch Working Group meeting. The meeting was held virtually on May 5, 2021. One of the agenda items was to resolve issues around circle hook size specific to Resolution to Mitigate Impacts on Sea Turtles (Resolution C-19-04). The proposal is to hold a Workshop hosted by the IATTC in the coming year to further identify a minimum hook dimension prior to the implementation of the Resolution in 2022.
- NMFS has included training on sea turtle safe handling, release, and identification as part of each Agreement on the International Dolphin Conservation Program (AIDCP) Seminar for Fishing Captains. Attendance at this seminar is one of the requirements to receive an eastern tropical Pacific operator's permit and be placed upon the AIDCP list of qualified captains. Several workshops are offered each year, both in-person or via webinar.
- Throughout 2020, NMFS has provided training on sea turtle safe handling, release and resuscitation to participants in the California drift gillnet fishery, exempted fishing permit participants targeting swordfish in the U.S. west coast EEZ (i.e., deep-set buoy gear and deep-set linked buoy gear), and the Hawaii-based longline fishery.
- NMFS provides environmental compliance training to its scientists participating in research cruises, specifically, safe handling and resuscitation guidelines, sea turtle identification, and reporting requirements.
- NMFS collaborated with colleagues in Peru, Colombia, and Spain to attach satellite tags on sea turtles to track movements and identify habitat use and preferred habitat for predictive purposes.
- NMFS collaborated with colleagues in Brazil, Italy, and Spain on a study regarding sea turtle decompression sickness from turtles caught in trawl gear.
- NMFS worked on the sea turtle resolution at the Western and Central Pacific Fisheries Commission (WCPFC) Scientific Committee (SC), and co-convened the WCPFC SC's Ecosystem and Bycatch Theme section.

Gear Experiments

Technical advice has been provided for ongoing and new studies on sea turtle bycatch mitigation experiments. Specifically, these studies are underway in Indonesia and the Philippines, with a focus on trials with net illumination in gillnet fisheries as a means to reduce sea turtle bycatch. In addition, there is ongoing work with the Chilean government to implement circle hooks in their longline fisheries.

Published Research from U.S. Government Scientists and Managers

Benson, S.R., Forney, K.A., Moore, J.E., LaCasella, E.L., Harvey, J.T., & Carretta, J. 2020. A long-term decline in the abundance of endangered leatherback turtles, Dermochelys coriacea, at a foraging ground in the California Current Ecosystem. Global Ecology and Conservation, e01371. https://doi.org/10.1016/j.gecco.2020.e01371.

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Pakiding, F., Zohar, K., Allo, J., Keroman, S., Lontoh, D., Dutton, P.H., and Tiwari, M.2020. Community Engagement: An Integral Component of a Multifaceted Conservation Approach for the Transboundary Western Pacific Leatherback. Frontiers in Marine Science, 7. https://doi.org/10.3389/fmars.2020.549570.

Parga ML et al. 2020. On-board study of gas embolism in marine turtles caught in bottom trawl fisheries in the Atlantic Ocean. *Scientific Reports 10:5561*.

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Seminoff, J.A. et al. 2021. Large-scale patterns of green turtle trophic ecology in the eastern Pacific Ocean. Ecosphere 12(6):e03479. 10.1002/ecs2.3479.

Swimmer, Y, Barceló, C. 2018. Blue shark and swordfish catch rates in Hawaii's shallow-set longline fishery: before and after regulations aimed to reduce sea turtle bycatch. *WCPFC-SC14-2018*/ EB-*IP*-06, Busan, Republic of Korea.

Swimmer, Y., E.A. Zollett and A. Guttierrez. 2020. Bycatch mitigation of protected and threatened species in tuna purse seine and longline fisheries. Endangered Species Research, Vol 43: 517-542. https://doi.org/10.3354/esr01069.

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Sea Turtle Interactions in the U.S. Pacific Longline and Drift Gillnet Fisheries

A Report Submitted to the Inter-American Tropical Tuna Commission as Required by the Resolution to Mitigate the Impact of Tuna Fishing Vessels on Sea Turtles (Resolution C-07-03)
and the
Consolidated Resolution on Bycatch (Resolution C-04-05)

Prepared by NOAA's National Marine Fisheries Service (NMFS)
West Coast Region
Long Beach, CA

June 2020

Sea Turtle Interactions in the U.S. Pacific Longline and Drift Gillnet Fisheries

Preface

Under the June 2007 *Resolution to Mitigate the Impact of Tuna Fishing Vessels on Sea Turtles* (Resolution C-07-03), and voluntarily under Resolution C-04-05 (*Consolidated Resolution on Bycatch*), Parties agreed to submit available information on interactions of vessels flying their flag with sea turtles in fisheries under the competence of the Inter-American Tropical Tuna Commission (IATTC). Additionally, Parties agreed to report on both progress in the development of technology to reduce sea turtle bycatch and the actions taken to provide their vessels with the necessary equipment for appropriate release of incidentally caught sea turtles. Therefore, the United States has prepared this annual report on the interactions of U.S. fishing vessels with sea turtles in and adjacent to the eastern Pacific Ocean (EPO). The report also discusses the conservation measures taken by the United States to reduce sea turtle bycatch.

The United States has limited the scope of fishery interaction data discussed in this report to longline and drift gillnet fisheries in the Pacific Ocean. Some of these fisheries, such as Hawaii longline fisheries, range across the Pacific Ocean and include fishing effort that occurs outside the IATTC Convention Area. Where possible, this report makes an effort to distinguish and highlight activities that specifically occur within the IATTC Convention Area, or EPO, although it is not always possible to do so. The United States is also monitoring takes of sea turtles by large purse seine vessels in the EPO, including entanglement in fish aggregating devices. However, we obtain these data from the IATTC staff; therefore, we do not include this fishery in this report, as there is no benefit in providing these data back to the IATTC.

Lastly, this report is an update to the report submitted in 2019 pursuant to Resolutions C-04-05 and C-07-03. Unchanged background information is not repeated here.

Swordfish/Tuna Longline Fisheries

Please refer to pages 3-6 of the report submitted in 2014 for a thorough background on the operation and management of West Coast and Hawaii U.S. longline fisheries targeting tunas and swordfish. Updates are described here:

U.S. West Coast-Based Deep-set Longline (DSLL) Fishery

There were no sea turtle interactions in the DSLL fishery operating out of California in 2018 (NMFS West Coast Region observer program, unpublished data, 2019). In 2019 the fishery interacted with 1 loggerhead sea turtle.

Hawaii-based Pelagic Longline Fishery

Shallow-Set

In 2018, the fishery interacted with 4 leatherback, 28 loggerhead, and no olive ridley or green sea turtles within the IATTC Convention Area. In 2019, the fishery interacted with 4 loggerhead sea turtles within the IATTC Convention Area.

Deep-Set

The deep-set fishery has roughly 20% observer coverage. In 2018, observed turtle takes in the IATTC Convention Area for this fishery consisted of 1 olive ridley, 2 green, and no leatherback or loggerhead sea turtles. Extrapolated point estimates indicate that 5 olive ridley takes occurred with a standard error of 4.8 and 11 green takes with a standard error of 7. In 2019, observed turtle takes in the IATTC Convention Area for this fishery consisted of 2 olive ridley sea turtles, and no green, leatherback, or loggerhead sea turtles. Extrapolated point estimates indicate that 6 olive ridley takes occurred with a standard error of 4.1.

Swordfish/Thresher Shark Drift Gillnet Fishery

Please refer to pages 8-9 of the report submitted in 2014 for a thorough background on the operation and management of the U.S. drift gillnet fishery targeting swordfish and thresher shark. Updates are included here.

Table 1: Sea Turtle Interactions observed in the U.S. West Coast Drift Gillnet Fishery 2009-2019. Sources: the West Coast Region Observer Program and SAFE reports 2006-2019, available at: https://www.pcouncil.org/safe-documents-2/

Year	Active Vessels	Swordfish (mt)	Thresher shark (mt)	Observed Sets	Estimated Total Sets	% Observer Coverage	Observed Turtle Takes	Take per 100 obs. sets
2009	35	258	38	101	761	13.3	1†	0.93
2010	26	62	41	59	492	12.0	0	0
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2012	17	118	37	83	445	18.7	1†	1.20
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2016	20	183	32	134	737	18.2	0	0
2017	17	179	42	114	598	19.0	0	0
2018	22	148	26	130	513	25.3	0	0
2019	14	52	25	73	323	22.6	0	0

† Leatherback, released alive
All data are preliminary

Conservation Measures

Please refer to previous U.S. sea turtle reports for a thorough background on the history of sea turtle conservation and mitigation measures the United States has implemented in both the longline and drift gillnet fisheries. Those pages also include past trainings, outreach events, conferences, workshops, collaborations with other nations and organizations, as well as research publications. Recent developments include:

Species in the Spotlight – Pacific Leatherback

Of all the species NMFS protects under the Endangered Species Act (ESA), eight are considered

to be among the most at-risk of extinction in the near future. As a result, the "Species in the Spotlight: Survive to Thrive" initiative was created - a concerted agency-wide effort to spotlight and save these highly at-risk species. One of these "Species in the Spotlight" is the Pacific leatherback sea turtle (*Dermochelys coriacea*) which are globally listed under the ESA as endangered.

Throughout the Species in the Spotlight campaign, NMFS will engage public and private sector partners in collaborative actions to spur recovery for these species. On February 10, 2016, NMFS released 5-Year Action Plans for the eight "Species in the Spotlight." These plans outline efforts vital for stabilizing their populations and preventing their extinction, and serve as road maps for their recovery. The action plan focuses on five critical areas to improve conservation efforts for Pacific leatherbacks: 1) reduce interactions in fisheries; 2) improve nesting beach protection and increase reproductive output through outreach and community support; 3) cooperate with international partners to implement conservation measures and established agreements; 4) understand migratory and pelagic threats to better implement mitigation measures; and 5) raise awareness and education of actions the public can take to support leatherback turtle conservation. Action #1 and #3 are most relevant to our work within the context of the IATTC and other regional fishery management organizations.

Under this special designation, leatherback sea turtles will be prioritized for directed funding and competitive grant award programs. One such program is the ESA Section 6 grant program which provides funds to the states and recognized tribes to support research and conservation programs that aide in the recovery of endangered species. The states of Washington, Oregon, and California have included leatherback sea turtles in their Section 6 Agreements and are eligible to submit proposals for this species.

In early 2018, NMFS and the U.S. Fish and Wildlife Service initiated a status review for the globally listed endangered leatherback sea turtles, to determine if distinct population segments (DPS) (i.e., discrete and significant subpopulations) exist and if so, given their status, to consider whether the listing (currently "endangered") should be changed for each DPS. The status review was peer-reviewed and is expected to be completed in the summer or fall of 2020.

In 2018, NMFS developed a framework to assess the vulnerability of sea turtles to climate change in order to broadly evaluate the impacts across their entire life cycle and including a range of variables (e.g., beach incubation temperature, sea surface temperature, ocean acidification, and sea level rise). This assessment will help to characterize the sensitivity and adaptive capacity of sea turtles throughout the world, including those populations migrating and foraging in the eastern tropical Pacific Ocean. Sea turtle populations worldwide were evaluated (via scoring system) by experts based on the population's exposure and vulnerability to climate change to all life stages, and these results will be published in a peer-reviewed manuscript in the next 1-2 years.

<u>Participation in Seminars, Meetings, Conferences, Symposiums, etc.</u>

- 39th International Sea Turtle Symposium. Charleston, South Carolina, February 2019.
- 9th IATTC Bycatch Working Group meeting. NMFS co-authored an IATTC paper on East Pacific leatherback turtle, which was presented at this meeting. La Jolla, California,

May 2019.

- NMFS worked on supporting an updated sea turtle resolution at IATTC, with result of adoption of C-19-04 during the 94th Annual IATTC meeting in Spain, July 2019.
- NMFS held a multi-day Sea Turtle Bycatch Reduction workshop to prioritize management and research for reducing fisheries bycatch of all sea turtles. Silver Spring, Maryland, September 2019.
- NMFS participated in the 11th Scientific Committee Meeting of The Inter-American Convention for the Protection and Conservation of Sea Turtles, St. Petersburg, Florida, September 2019.
- NMFS has included training on sea turtle safe handling, release, and identification as part of each Agreement on the International Dolphin Conservation Program (AIDCP) Seminar for Fishing Captains. Attendance at this seminar is one of the requirements to receive an eastern tropical Pacific operator's permit and be placed upon the AIDCP list of qualified captains. Several workshops are offered each year, both in-person or via webinar.
- Throughout 2019, NMFS has provided training on sea turtle safe handling, release and resuscitation to participants in the California drift gillnet fishery, exempted fishing permit participants targeting swordfish in the U.S. west coast EEZ (i.e., deep-set buoy gear and deep-set linked buoy gear, deep-set shortline, and deep-set and shallow-set longline), and the Hawaii-based longline fishery.
- NMFS provides environmental compliance training to its scientists participating in research cruises, specifically, safe handling and resuscitation guidelines, sea turtle identification, and reporting requirements.
- NMFS collaborated with colleagues in Peru, Colombia, and Spain to attach satellite tags on sea turtles to track movements and identify habitat use and preferred habitat for predictive purposes.
- NMFS collaborated with colleagues in Brazil, Italy, and Spain on a study regarding sea turtle decompression sickness from turtles caught in trawl gear.
- NMFS worked on the sea turtle resolution at the Western and Central Pacific Fisheries Commission (WCPFC) Scientific Committee (SC), and co-convened the WCPFC SC's Ecosystem and Bycatch Theme section.

Gear Experiments

Technical advice has been provided for ongoing and new studies (2019) on sea turtle bycatch mitigation experiments, underway in Indonesia and the Philippines, with focus on trials with net illumination.

Published Research from U.S. Government Scientists and Managers

Avens, L., L. R. Goshe, G. R. Zug, G. H. Balazs, S. R. Benson, H. Harris. 2020. Regional comparison of leatherback sea turtle maturation attributes and reproductive longevity. Marine Biology. 167.1: 4. https://doi.org/10.1007/s00227-019-3617-y

Banerjee, S.M., Allen, C.D., Schmitt, T., Cheng, B.S., Seminoff, J.A., Eguchi, T., Komoroske, L.M. (2019) Baseline health parameters of east Pacific green turtles at southern California foraging grounds. Chelonian Conservation and Biology 18 (2):163-174.

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Dutton, P.H., E. LaCasella, J. Alfaro-Shigueto, N. de Paz Campos, M. Donoso, and J.C. Mangel. 2019. Stock origin of leatherback, loggerhead and green turtles foraging in the southeastern Pacific: insights into their trans-oceanic connectivity. *In* Proceedings of the 36th Annual Symposium on Sea Turtle Biology and Conservation.

Fonseca, L.G, P. Saltidrián Tomillo, W.N. Villachica, W.M. Quirós, M. Pesquero, M. Heidemeyer, F. Joyce, P.T. Plotkin, J.A. Seminoff, and R.A. Valverde. 2018. High nest density of east Pacific green turtles (*Chelonia mydas*) in Costa Rica. Chelonian Conservation and Biology 17:169–176.

Hetherington, E. D., C. M. Kurle, S. R. Benson, T. T. Jones, and J. A. Seminoff. 2019. Re-examining trophic dead ends: stable isotope values link gelatinous zooplankton to leatherback turtles in the California Current. Marine Ecology Progress Series 632: 205–219.

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Liles, M.J., T.R. Peterson, J.A Seminoff, A.R. Gaos, E. Altamirano, A.V. Henríquez, V. Gadea, S. Chavarría, J. Urteaga, B.P. Wallace, and M.J. Peterson. 2019. Potential limitations of behavioral plasticity and the role of egg relocation in climate change mitigation for a thermally-sensitive endangered species. Ecology and Evolution 2019:1–20.

Parga, M.L., Crespo-Picazo, J.L., Monteiro, D. Y. Swimmer 2020. On-board study of gas embolism in marine turtles caught in bottom trawl fisheries in the Atlantic Ocean. Sci Rep 10, 5561. https://doi.org/10.1038/s41598-020-62355-7

Ramirez, M.D., J.A. Miller, E. Parks, L. Avens, L.R. Goshe, J.A. Seminoff, M. Snover, and S.S. Heppell. 2019. Reconstructing movement of marine megafauna using trace elements: a case study in sea turtles. Marine Ecology Progress Series 608:247–262.

Welch, H., E.L. Hazen, D. Briscoe, S, Bograd, M. Jacox, T. Eguchi, S. Benson, C.C. Fahy, T. Garfield, D. Robinson, J.A. Seminoff, and H. Bailey. 2019. Environmental indicators to reduce loggerhead turtle by-catch offshore southern California. Ecological Indicators 98:657-664.

Sea Turtle Interactions in the U.S. Pacific Longline and Drift Gillnet Fisheries

A Report Submitted to the Inter-American Tropical Tuna Commission as Required by the Resolution to Mitigate the Impact of Tuna Fishing Vessels on Sea Turtles (Resolution C-07-03)
and the
Consolidated Resolution on Bycatch (Resolution C-04-05)

Prepared by NOAA's National Marine Fisheries Service (NMFS)
West Coast Region
Long Beach, CA

June 2019

Sea Turtle Interactions in the U.S. Pacific Longline and Drift Gillnet Fisheries

Preface

Under the June 2007 *Resolution to Mitigate the Impact of Tuna Fishing Vessels on Sea Turtles* (Resolution C-07-03), and voluntarily under Resolution C-04-05 (*Consolidated Resolution on Bycatch*), Parties agreed to submit available information on interactions of vessels flying their flag with sea turtles in fisheries under the competence of the Inter-American Tropical Tuna Commission (IATTC). Additionally, Parties agreed to report on both progress in the development of technology to reduce sea turtle bycatch and the actions taken to provide their vessels with the necessary equipment for appropriate release of incidentally caught sea turtles. Therefore, the United States has prepared this annual report on the interactions of U.S. fishing vessels with sea turtles in and adjacent to the eastern Pacific Ocean (EPO). The report also discusses the conservation measures taken by the United States to reduce sea turtle bycatch.

The United States has limited the scope of fishery interaction data discussed in this report to longline and drift gillnet fisheries in the Pacific Ocean. Some of these fisheries, such as Hawaii longline fisheries, range across the Pacific Ocean and include fishing effort that occurs outside the IATTC Convention Area. Where possible, this report makes an effort to distinguish and highlight activities that specifically occur within the IATTC Convention Area, or EPO, although it is not always possible to do so. The United States is also monitoring takes of sea turtles by large purse seine vessels in the EPO, including entanglement in fish aggregating devices. However, we obtain these data from the IATTC staff; therefore, we do not include this fishery in this report, as there is no benefit in providing these data back to the IATTC.

Lastly, this report is an update to the report submitted in 2018 pursuant to Resolutions C-04-05 and C-07-03. Unchanged background information is not repeated here.

Swordfish/Tuna Longline Fisheries

Please refer to pages 3-6 of the report submitted in 2014 for a thorough background on the operation and management of West Coast and Hawaii U.S. longline fisheries targeting tunas and swordfish. Updates are described here:

U.S. West Coast-Based Deep-set Longline (DSLL) Fishery

There were no sea turtle interactions in the DSLL fishery operating out of California in 2018 (NMFS West Coast Region observer program, unpublished data, 2019).

Hawaii-based Pelagic Longline Fishery

Shallow-Set

In 2017, the fishery interacted with 3 leatherbacks, 5 loggerheads, 1 Olive Ridley, and no Green Sea Turtles within the IATTC Convention Area. In 2018, the fishery interacted with 4 leatherback, 28 loggerhead, and no Olive Ridley or Green sea turtles within the IATTC Convention Area.

Deep-Set

The deep-set fishery has roughly 20% observer coverage. In 2017, observed turtle takes in the IATTC Convention Area for this fishery consisted of 6 olive ridleys, no green, leatherback, or loggerhead sea turtles. As this fishery only has roughly 20% coverage, extrapolated point estimates indicate that 28 olive ridleys were taken with a standard error of 10.0. In 2018, observed turtle takes in the IATTC Convention Area for this fishery consisted of 1 olive ridley, 2 green, and no leatherback or loggerhead sea turtles. Extrapolated point estimates indicate that 5 olive ridley takes occurred with a standard error of 4.8 and 11 green takes with a standard error of 7.

Swordfish/Thresher Shark Drift Gillnet Fishery

Please refer to pages 8-9 of the report submitted in 2014 for a thorough background on the operation and management of the U.S. drift gillnet fishery targeting swordfish and thresher shark. Updates are included here.

Table 1: Sea Turtle Interactions observed in the U.S. West Coast Drift Gillnet Fishery 2009-2018. Sources: the West Coast Region Observer Program and SAFE reports 2006-2018, available at: http://www.pcouncil.org/highly-migratory-species/stock-assessment-and-fishery-evaluation-safe-documents/

Year	Active Vessels	Swordfish (mt)	Thresher shark (mt)	Observed Sets	Estimated Total Sets	% Observer Coverage	Observed Turtle Takes	Take per 100 obs. sets
2009	35	252	38	101	761	13.3	1†	0.93
2010	26	62	41	59	492	12.0	0	0
2011	22	119	55	85	435	19.5	0	0
2012	17	118	37	83	445	18.7	1†	1.20
2013	18	95	48	176	470	37.4	0	0
2014	15	127	26	113	379	29.8	0	0
2015	17	95	31	74	361	20.5	0	0
2016	20	171	28	134	737	18.2	0	0
2017	17	176	39	114	598	19.0	0	0
2018	22	145	27	130	513	25.3	0	0

† Leatherback, released alive
All data are preliminary

Conservation Measures

Please refer to previous U.S. sea turtle reports for a thorough background on the history of sea turtle conservation and mitigation measures the United States has implemented in both the longline and drift gillnet fisheries. Those pages also include past trainings, outreach events, conferences, workshops, collaborations with other nations and organizations, as well as research publications. Recent developments include:

Species in the Spotlight – Pacific Leatherback

Of all the species NMFS protects under the Endangered Species Act (ESA), eight are considered to be among the most at-risk of extinction in the near future. As a result, the "Species in the Spotlight: Survive to Thrive" initiative was created - a concerted agency-wide effort to spotlight and save these highly at-risk species. One of these "Species in the Spotlight" is the Pacific leatherback sea turtle (Dermochelys coriacea) which are globally listed under the ESA as endangered.

Throughout the Species in the Spotlight campaign, NMFS will engage public and private sector partners in collaborative actions to spur recovery for these species. On February 10, 2016, NMFS released 5-Year Action Plans for the eight "Species in the Spotlight." These plans outline efforts vital for stabilizing their populations and preventing their extinction, and serve as road maps for their recovery. In October, 2018, NMFS hosted California Leatherback Day in La Jolla, California, with over 200 participants.

Under this special designation, leatherback sea turtles will be prioritized for directed funding and competitive grant award programs. One such program is the ESA Section 6 grant program which provides funds to the states and recognized tribes to support research and conservation programs that aide in the recovery of endangered species. The states of Washington, Oregon, and California have included leatherback sea turtles in their Section 6 Agreements and are eligible to submit proposals for this species.

In early 2018, NMFS and the U.S. Fish and Wildlife Service initiated a status review for the globally listed endangered leatherback sea turtles, to determine if distinct population segments (DPS) (i.e., discrete and significant subpopulations) exist and if so, given their status, to consider whether the listing (currently "endangered") should be changed for each DPS.

In 2018, NMFS developed a framework to assess the vulnerability of sea turtles to climate change in order to broadly evaluate the impacts across their entire life cycle and including a range of variables (e.g., beach incubation temperature, sea surface temperature, ocean acidification, and sea level rise). This assessment will help to characterize the sensitivity and adaptive capacity of sea turtles throughout the world, including those populations migrating and foraging in the eastern tropical Pacific Ocean.

Participation in Seminars, Meetings, Conferences, Symposiums, etc.

- North Pacific Trilateral Loggerhead Recovery Plan Meeting. La Jolla, CA, January 2018

- U.S. - Mexico bilateral meeting. Discussions included a review of the status and conservation of Pacific leatherback turtles as well as current and potential collaboration efforts to recover this endangered species. Silver Spring, Maryland, February 2018

- 38th International Sea Turtle Symposium. Kobe, Japan, February 2018

- NMFS and USFWS held a multi-day workshop to prioritize management and research for Pacific leatherback sea turtles, including an outline of cost estimates, lead agencies/offices, and potential partners. La Jolla, California, March 2018

- 8th IATTC Bycatch Working Group meeting. La Jolla, California, May 2018

- California Leatherback Turtle Day at Monterey Bay National Marine Sanctuary. Santa Cruz, California, October 2018.

- NMFS has included training on sea turtle safe handling, release, and identification as part of each AIDCP Seminar for Fishing Captains. Attendance at this seminar is one of the requirements to receive an ETP operator's permit and be placed upon the AIDCP list of qualified captains. Several workshops are offered each year, both in-person or via webinar.

- Throughout 2018, NMFS has included training on sea turtle safe handling, release and resuscitation to participants in the California drift gillnet fishery, an exempted permitted fisheries targeting swordfish in the U.S. west coast EEZ (experimental deep-set buoy gear fishery and deep-set linked buoy gear), and the Hawaii-based longline fishery.

- NMFS collaborated with colleagues in Brazil and Spain on a study regarding sea turtle decompression sickness from turtles caught in trawl gear.

- NMFS collaborated with colleagues in Peru, Colombia and Spain to attach satellite tags on sea turtles to track movements and identify habitat use and preferred habitat for predictive purposes.

- NMFS worked with the The Inter-American Convention (IAC) for the Protection and Conservation of Sea Turtles.

- NMFS worked on the sea turtle resolution at the WCPFC SC, and co-chaired the WCPFC SC Ecosystem and Bycatch Theme.

Gear Experiments

Technical advice has been provided for ongoing and new studies (2018) on sea turtle bycatch mitigation experiments, underway in Indonesia, Brazil, Spain, Peru, and Chile.

Published Research from U.S. Government Scientists and Managers

Eguchi, T., S. McClatchie, C. Wilson, S.R. Benson, R.A. LeRoux and J.A. Seminoff. 2018. Loggerhead Turtles (Caretta caretta) in the California Current: Abundance, Distribution and Anomalous Warming of the North Pacific. Frontiers in Marine Science. Volume 5; Article 452; December 2018.

Harrison, A., D.P. Costa, A.J. Winship, S.R. Benson, S.J. Bograd, M. Antolos, A.B. Carlisle, H. Dewar, P.H. Dutton, S.J. Jorgensen, S. Kohin, B.R. Mate, P.W. Robinson, K.M. Schaefer, K.M. Gjerde and B.A. Block. 2018. Nature Ecology & Evolution. Vol. 2: 1571-1578. October 2018.

Hazen, E.L., K.S. Scales, S.M. Maxwell, D.K. Briscoe, H. Welch, S.J. Bograd, H. Bailey, S.R. Benson, T. Eguchi, H. Dewar, S. Kohin, D.P. Costa, L.B. Crowder, R.L. Lewison. 2018. A dynamic ocean management tool to reduce bycatch and support sustainable fisheries. Science Advances 2018; 4:eaar3001.

Jensen, M.P., C.D. Allen, T. Eguchi, I.P. Bell, E.L. LaCasella, W.A. Hilton, C.A.M. Hof, P.H. Dutton. 2018. Environmental warming and feminization of one of the largest sea turtle populations in the world. Current Biology. DOI:http://dx.doi.org/10.1016/j.cub.2017.11.057

Sampson, L., A. Giraldo, L.F. Payan, D.F. Amorocho, M.A. Ramos, and J.A. Seminoff. 2018. Trophic ecology of green turtle Chelonia mydas juveniles in the Colombian Pacific. Journal of the Marine Biological Association of the United Kingdom 98(7):1817–1829. DOI: 10.1017/S0025315417001400

Squires, D., V. Restrepo, S. Garcia and P. Dutton. 2018. Fisheries bycatch reduction within the least-cost biodiversity mitigation hierarchy: Conservatory offsets with an application to sea turtles. Marine Policy 93: 55-61. https://doi.org/10.1016/j.marpol.2018.03.018

Turner Tomaszewicz, C.N., J.A. Seminoff, L. Avens, L. Goshe, J.M. Rguez-Baron, S.H. Peckham, and C.M. Kurle. 2018. Expanding the coastal forager paradigm: long-term pelagic habitat use by green turtles Chelonia mydas in the eastern Pacific Ocean. Marine Ecology Progress Series. Vol. 587: 217-234.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
Sustainable Fisheries Division
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802

150413SWR2013SF00161:TD

Dr. Guillermo Compeán
Director, Inter-American Tropical Tuna Commission
8901 La Jolla Shores Drive
La Jolla, California 92037-1508

Re: Submission of sea turtle report

Dear Dr. Compeán:

NOAA's National Marine Fisheries Service (NMFS) has prepared the attached report summarizing the available information regarding interactions with sea turtles by U.S. longline and drift gillnet fishing vessels in the Eastern Pacific Ocean in 2016 as well as updated information for 2015. This report is submitted under both Resolution C-07-03 (Resolution to Mitigate the Impact of Tuna Fishing on Sea Turtles) and Paragraph 4 of Resolution C-04-05 (Consolidated Resolution on Bycatch).

The attached report addresses (1) observed and estimated capture and mortality rates for the U.S. Pacific longline fisheries; (2) observed bycatch and management in the drift gillnet fishery off the U.S. West Coast; (3) information on efforts to reduce sea turtle bycatch and mortality in the longline and drift gillnet fisheries, including outreach activities, technical workshops, and gear research; and (4) an update on U.S. efforts to promote sea turtle conservation around the world.

Please contact Taylor Debevec at 562-980-4066 or Taylor.Debevec@noaa.gov if there are any questions regarding the United States data reporting in accordance with Resolutions C-07-03 and C-04-05.

Sincerely,

Heidi Taylor

Heidi Taylor
Highly Migratory Species Branch Chief

cc w/ enclosure:
Barry Thom, U.S. Commissioner to the IATTC
David Hogan, U.S. Department of State
William Fox, U.S. Commissioner to the IATTC
Donald Hansen, U.S. Commissioner to the IATTC
Edward Weissman, U.S. Commissioner to the IATTC
Ryan J. Wulff, NMFS, West Coast Region
Penny Ruvelas, NMFS, West Coast Region
Christofer Boggs, NMFS, Pacific Islands Fisheries Science Center

Enclosure

Sea Turtle Interactions in the U.S. Pacific Longline and Drift Gillnet Fisheries

A Report Submitted to the Inter-American Tropical Tuna Commission
as Required by the Resolution to Mitigate the Impact of Tuna Fishing Vessels on Sea Turtles (Resolution C-07-03)
and the Consolidated Resolution on Bycatch (Resolution C-04-05)

Prepared by NOAA's National Marine Fisheries Service (NMFS)
West Coast Region
Long Beach, CA

June 2017

Preface

Under the June 2007 *Resolution to Mitigate the Impact of Tuna Fishing Vessels on Sea Turtles* (Resolution C-07-03), and voluntarily under Resolution C-04-05 (*Consolidated Resolution on Bycatch*), Parties agreed to submit available information on interactions of vessels flying their flag with sea turtles in fisheries under the competence of the Inter-American Tropical Tuna Commission (IATTC). Additionally, Parties agreed to report on both progress in the development of technology to reduce sea turtle bycatch and the actions taken to provide their vessels with the necessary equipment for appropriate release of incidentally caught sea turtles. Therefore, the United States has prepared this annual report on the interactions of U.S. fishing vessels with sea turtles in and adjacent to the eastern Pacific Ocean (EPO). The report also discusses the conservation measures taken by the United States to reduce sea turtle bycatch.

The United States has limited the scope of fishery interaction data discussed in this report to longline and drift gillnet fisheries in the Pacific Ocean. Some of these fisheries, such as Hawaii longline fisheries, range across the Pacific Ocean and include fishing effort that occurs outside the IATTC Convention Area. Where possible, this report makes an effort to distinguish and highlight activities that specifically occur within the IATTC Convention Area, or EPO, although it is not always possible to do so. The United States is also monitoring takes of sea turtles by large purse seine vessels in the EPO, including entanglement in fish aggregating devices. However, we obtain these data from the IATTC staff; therefore, we do not include this fishery in this report, as there is no benefit in providing these data back to the IATTC.

Lastly, this report is an update to the report submitted in 2016 pursuant to Resolutions C-04-05 and C-07-03. Unchanged background information from previous reports is not repeated here.

Swordfish/Tuna Longline Fisheries

U.S. West Coast-Based Deep-set Longline (DSLL) Fishery

There were no sea turtle interactions in the DSLL fishery operating out of California in 2016.

A new biological opinion for this fishery was completed in August of 2016. This report reviews the fishery's impact on species listed as endangered under the U.S. Endangered Species Act. The biological opinion concluded that the fishery will likely adversely affect Pacific leatherback, loggerhead, olive ridley, and green sea turtles but that it is not likely to jeopardize these species. The biological opinion also set incidental take levels for these species. If the fishery reaches any of these levels over ten years the fishery will close while its impacts are re-evaluated.

Table 1. Incidental take numbers for a ten-year time period, both entanglements and mortalities, for sea turtle species that interact with the west coast longline fishery.

Species	Entanglements -- Mortalities
green	Up to 1 -- 1
leatherback	4 -- 2
Olive ridley	6 -- 6
Loggerhead	1 -- 1

Hawaii-based Pelagic Longline Fishery

Tables 2 and 3 provide bycatch estimates for sea turtles for all longline trips landing in the specified years, 2015 or 2016. A fishing operation was considered within the IATTC Convention Area if at least one of the recorded locations (begin set, end set, begin haul, or end haul) was within the region.

A. Shallow-Set

Table 2. Number of observed incidental interactions of sea turtles for the Hawaii shallow-set longline fishery in 2015 and 2016, where the Hawaii shallow-set longline fishery had 100% observer coverage. Counts are provided for all species with an observed interaction in 2015 or 2016 and species of concern because of their endangered species status and history of past interactions. Counts are given for waters within the IATTC Convention Area.

Species of Sea Turtle	Year	Observed Takes
Loggerhead	2016	14
	2015	11
Leatherback	2016	2
	2015	2
Olive Ridley	2016	0
	2015	0
Green	2016	0
	2015	0

B. Deep-Set

Table 3. Estimates of the number of incidental interactions of sea turtles for the Hawaii deep-set longline fishery in 2015 and 2016. Estimates are provided for all species with an observed interaction in 2015 and 2016 and species of concern because of their endangered species status and history of past interactions. Estimates are given for waters within the IATTC Convention Area.

Species of Sea Turtle	Year	Observed Takes	Estimates	Standard Error
Loggerhead	2016	0	0	2.48
	2015	1	3	2.62
Leatherback	2016	0	0	2.82
	2015	0	0	3.69
Olive Ridley	2016	1	5	4.19
	2015	1	3	2.62
Green	2016	0	0	2.06
	2015	0	0	2.34
Unidentified Hard Shell	2016	0	0	2.06
	2015	0	0	1.67

Swordfish/Thresher Shark Drift Gillnet Fishery

New Regulations for Monitoring, Control, and Surveillance

NMFS published a final rule[1] to establish a vessel monitoring system by January 1, 2016, as required under IATTC Resolution C-14-02, to enforce time/area closures.

Table 4: Sea Turtle Interactions observed in the U.S. West Coast Drift Gillnet Fishery 2009-2016. Sources: the West Coast Region Observer Program and SAFE reports 2006-2016, available at: http://www.pcouncil.org/highly-migratory-species/stock-assessment-and-fishery-evaluation-safe-documents/

Year	Active Vessels	Swordfish (mt)	Thresher shark (mt)	Observed Sets	Estimated Total Sets	% Observer Coverage	Observed Turtle Takes	Take per 100 obs. sets
2009	35	252	38	101	761	13.3	1†	0.93
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2015	17	95	31	74	361	20.5	0	0
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† Leatherback, released alive
-- Not available
All data are preliminary

Conservation Measures

Please refer to previous U.S. sea turtle reports for a thorough background on the history of sea turtle conservation and mitigation measures the United States has implemented in both the longline and drift gillnet fisheries. Those pages also include past trainings, outreach events, conferences, workshops, collaborations with other nations and organizations, as well as research publications. Recent developments include:

Species in the Spotlight – Pacific Leatherback

Of all the species NMFS protects under the Endangered Species Act (ESA), eight are considered to be among the most at-risk of extinction in the near future. As a result, the "Species in the Spotlight: Survive to Thrive" initiative was created - a concerted agency-wide effort to spotlight and save these highly at-risk species. One of these "Species in the Spotlight" is the Pacific leatherback sea turtle (*Dermochelys coriacea*) which are globally listed under the ESA as endangered.

[1] 80 FR 60533, October 7, 2015 - https://www.gpo.gov/fdsys/pkg/FR-2015-10-07/pdf/2015-25474.pdf

Throughout the Species in the Spotlight campaign, NMFS will engage public and private sector partners in collaborative actions to spur recovery for these species. On February 10, 2016, NMFS released 5-Year Action Plans for the eight "Species in the Spotlight." These plans outline efforts vital for stabilizing their populations and preventing their extinction, and serve as road maps for their recovery. In October, 2016, NMFS hosted California Leatherback Day in La Jolla, California, with over 200 participants.

Under this special designation, leatherback sea turtles will be prioritized for directed funding and competitive grant award programs. One such program is the ESA Section 6 grant program which provides funds to the states and recognized tribes to support research and conservation programs that aide in the recovery of endangered species. The states of Washington, Oregon, and California have included leatherback sea turtles in their Section 6 Agreements and are eligible to submit proposals for this species.

Participation in Seminars, Meetings, Conferences, Symposiums, etc.

- 35th International Sea Turtle Symposium, Turkey (April, 2015).
  -Fisheries observer workshop with emphasis on sea turtle handling and release

- International Commission for the Conservation of Atlantic Tunas (ICCAT) Subcommittee on Ecosystems and Bycatch, Madrid, Spain (June 2015).

- Inter-American Convention on Sea Turtles in Vina del Mar, Chile, (October 2015).

- North Pacific Loggerhead Plan Meeting, La Jolla, CA, (January, 2016).

- 36th International Sea Turtle Symposium, Lima, Peru, (February, 2016).

- Areas Beyond National Jurisdiction (ABNJ, or Common Oceans) Tuna Project held a Joint RFMO Technical Working Group-Bycatch on sea turtle bycatch mitigation, Honolulu, Hawaii USA (February 2016 and November 2016).

- Yonat Swimmer served on the ICCAT Ecosystems and Bycatch Working Group to discuss sea turtle bycatch in ICCAT fisheries and attempts for mitigation. (September 2016).

- NMFS has included training on sea turtle safe handling, release, and identification as part of each AIDCP Seminar for Fishing Captains. Attendance at this seminar is one of the requirements to receive an ETP operator's permit and be placed upon the AIDCP list of qualified captains. Several workshops are offered each year, both in-person or via webinar.

- NMFS has included training on sea turtle safe handling, release and resuscitation to participants in the California drift gillnet fishery, an experimental deep-set buoy gear fishery, and the Hawaii-based longline fishery.

Gear Experiments

- Technical advice has been provided for ongoing and new studies (2016-2017) on sea turtle bycatch mitigation experiments, underway in Indonesia, Brazil, Spain, Peru, Chile, and Mexico. The following gear trials are ongoing:
    - Gillnet modification studies aimed to reduce turtle bycatch in Indonesia, Mexico, and Peru and Chile. (2015-2016)
    - Continuation of studies with the University of Central Florida regarding loggerhead and hawksbill turtle movements in relation to oceanic currents in the Atlantic.
- Research conducted in Peru, Chile, Indonesia and Mexico during 2015-2016 to test the influence of gillnet illumination on incidental capture rates of loggerhead sea turtles.
- Study in Baja California Sur, Mexico in 2015-2016 to test an acoustic deterrent device in a gillnet fishery to reduce sea turtle bycatch.

Sea Turtle Tracking Studies

- Sea turtle tracking studies have also provided information on turtles' high use areas in the Atlantic and Pacific Oceans, and have elucidated turtles' use of oceanic fronts and other environmental features such as chlorophyll *a* and sea surface temperatures.

Published Research from U.S. Government Scientists and Managers

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