

Unilateral and multilateral approaches to cetacean bycatch management: risk and potential under the U.S. Marine Mammal Import Provisions Rule for IOTC Members

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Abstract

The U.S. Marine Mammal Protection Act Import Provisions Rule is the first unilateral attempt to address cetacean bycatch at a global level by leveraging the U.S. market. The Rule requires that nations exporting certain fish and fish products to the U.S. apply for a “Comparability Finding” that demonstrates marine mammal bycatch policies are comparable to certain pillars in the U.S. legal scheme for marine mammal bycatch. It holds significant potential to both advance marine mammal conservation but also to disrupt trade of seafood – one of the world’s most highly traded commodities – as well as pose capacity burdens on many nations. The majority of IOTC Members have fisheries listed under the Import Rule, which may offer opportunities for improving bycatch management at the IOTC and vice versa. For some IOTC members, however, the Rule may pose significant financial, scientific, and political challenges for compliance. This paper reviews the scope of the MMPA Import Rule for IOTC Members, particularly for those with gillnet fisheries, and it discusses potential synergies between the Rule and IOTC bycatch reporting and monitoring. This preliminary review is one portion of an ongoing, broader analysis of unilateral and multilateral approaches the bycatch management in the Indian Ocean across multiple scales.

I. Introduction

Existing unilateral v. multilateral approaches to bycatch management

Cetacean bycatch in the Indian Ocean is expected to be very high, but existing information on bycatch rates, fishing effort, and cetacean distribution and abundance impede management (Anderson et al., 2020; Kiszka et al., 2021). Currently, there are three general approaches to bycatch governance in the Indian Ocean across national, regional, and global scales: 1) National policies and statutes; 2) Management at the Indian Ocean Tuna Commission via relevant Conservation and Management Measures, particularly Resolution 23/06 “On the Conservation of Cetaceans;” and 3) Voluntary, global initiatives, such as the FAO’s recent “Guidelines to prevent and reduce bycatch of marine mammals in capture fisheries” (FAO 2021) and other relevant treaties and agreements, like the UN General Assembly large-scale driftnet resolution (46/215).

On a regional and global scale outside of the RFMO context, most international-focused approaches to bycatch management are voluntary, multilateral efforts, for which efficacy is challenging to measure (Juan-Jordá et al., 2018, Elliott et al., 2023). Such examples include the Permanent Commission for the South Pacific’s (CPPS) Plan of Action for the Conservation of Marine Mammals in the Southeast Pacific; several resolutions under the Agreement on the

Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS) (e.g. “Resolution 4.9 on fisheries interactions with cetaceans”), the Inter-American Convention for the Protection and Conservation of Sea Turtles (IAC), and others (Elliott et al., 2023). Within the IOTC, there are a suite of CMMs relevant to bycatch that are negotiated and adopted by IOTC Members, but their efficacy in reducing cetacean bycatch to-date is unknown. National regulations are documented in Compliance and National Reports by IOTC Members.

In addition to these efforts, one approach to bycatch management is the “unilateral” approach. Currently, there are two known unilateral attempts at addressing bycatch specifically on a global scale, both promulgated via the United States: Section 609 (sea turtles and Turtle Excluder Devices) and the Dolphin Consumer Protection Information Act (dolphins and bycatch in tuna purse seines). While these can be useful from a conservation angle at generating policy or public pressure about a topic or reducing bycatch domestically (Hall 1996, Lent & Squires, 2017), unilateral approaches often result in litigation at the World Trade Organization, resulting in delayed or eroded implementation. Unilateral approaches operate much like command-and-control bycatch measures, which impose homogenous regulations on heterogeneous vessels (or other actors), leading to economic inefficiencies without incentives (Lent & Squires, 2017). While unilateral approaches, when paired with incentives, can be effective depending on the context, multilateral approaches offer a fairer (Barrett, 2016) and often preferred approach (Hall 1996; Lent & Squires, 2017; Mukherjee, 2015).

Recognizing challenges of unilateral management, this paper highlights another recent unilateral action that may have coupled effects at addressing bycatch in the IOTC: the U.S. Marine Mammal Protection Act Import Provisions Rule (“the MMPA Import Rule”). After a seven-year implementation period, this Rule will take full effect come January 1, 2024, and require that over 100 nations – including some IOTC Members – have national regulations for addressing marine mammal bycatch that are comparable to U.S. standards in order to continue exporting certain fish and fish products to the U.S. Here, we introduce the Rule, review its relevance to IOTC fisheries, and discuss the potential of the Rule to improve cetacean bycatch management within IOTC fisheries. We focus on gillnet fisheries given their risk factor to cetacean bycatch (e.g. Read et al., 2006; Roberson et al., 2021; Northridge et al. 2017).

Background: MMPA Import Provisions Rule

The U.S. MMPA of 1972 (MMPA) (16 U.S.C. §1361 et seq.) is one of a few national statutes in the world that specifically focus on the conservation and management of marine mammals. U.S. Congress passed the MMPA fifty years ago in response to growing public concern over three main issues: overexploitation of baleen whales, dolphin mortality in Eastern Tropical Pacific purse seine fisheries, and harvest of harp seal pups (National Academies of Sciences, Engineering, and Medicine, 2017). The MMPA itself has included a provision since its enactment in 1972 concerning bycatch in foreign fisheries, but it has only recently been fully implemented because of domestic litigation (81 FR 54389). Specifically, the statute states: “*The Secretary of the Treasury shall ban the importation of commercial fish or fish products that have been caught with commercial fishing technology which results in the **incidental kill or incidental serious injury** of marine mammals in excess of United States standards*” (16 U.S.C. § 1371(a)(2)) and “[*The Secretary*] shall insist on **reasonable proof from the government of any**

nation from which fish or fish products will be exported to the United States of the effects on ocean mammals of the commercial fishing technology in use for such fish or fish products exported from such nation to the United States;” (16 U.S.C. § 1371(a)(2)(A)) (emphasis added). Furthermore, MMPA § 1371(c)(3) makes the import of these fish or fish products illegal: *“It is unlawful to import into the United States . . . any fish, whether fresh, frozen, or otherwise prepared, if such fish was caught in a manner which the Secretary has proscribed for persons subject to the jurisdiction of the United States, whether or not any marine mammals were in fact taken incident to the catching of the fish.”*

In response to litigation, the U.S. government (via the National Marine Fisheries Service (NMFS)) issued the MMPA Import Rule in 2016 (81 FR 54389), with the overall goal to reduce marine mammal bycatch in foreign fisheries exported to the U.S. The Import Rule requires that over 100 nations exporting fish and fish products to the United States demonstrate that they have implemented certain standards in their fisheries to reduce marine mammal bycatch or else risk losing access to the U.S. market (Bering et al., 2022; Johnson et al., 2017; Williams et al., 2016). These standards include bycatch limits, population monitoring/research programs, and a suite of other pillars, depending on the type of fishery and where it operates. While the Final Rule was published in 2016, a five-year exemption period (later extended by six years) means the Import Rule has not yet taken full effect but is expected to come January 1, 2024 – at which point nations need to have received a “Comparability Finding” for each identified fishery to continue exporting fish and fish products to the U.S. (87 FR 63955).

In brief, the Rule requires nations exporting fish and fish products to U.S. with fisheries listed under the Import Rule’s List of Foreign Fisheries (LOFF, see below) have a regulatory program “comparable in effectiveness”¹ to the U.S. regulatory program for managing marine mammal bycatch in fisheries. Nations demonstrate this comparability by applying for and receiving a “**Comparability Finding**,” for which there two major requirements: 1) harvesting nations must either prohibit the intentional killing of marine mammals or certify that their fishery products are not the “product of intentional killing” of marine mammals (50C.F.R. § 216.24(h)(iii)(A)); and 2): harvesting nations must provide population abundance and mortality data for marine mammals, including levels of fisheries bycatch (85 FR 63527). Detailed requirements of a Comparability Finding are shown in Figure 1.

At this point, it is anticipated that all exporting nations have already applied for Comparability Findings due to a 2022 deadline, and NMFS will issue decisions on the findings by November 2023 (87 FR 63955). This will dictate which nations can continue exporting fish and fish products to the U.S. by 2024. The Rule is cyclical and requires exporting nations to apply every four years hereafter for a Comparability Finding.

Figure 1: Summary of requirements for a Comparability Finding (NMFS 2017)

¹ The term “comparable in effectiveness” is likely derived from the U.S. Government’s revisions to Section 609 following WTO challenges, which found USG’s original language of “essentially the same” as too restrictive (Bering et al., 2022).

Conditions	Within EEZ	In Another State	On the High Seas
Fishery Registration	★		
Marine Mammal Stock and Bycatch Estimate	★	★	
Reporting and Monitoring Requirements	★		
Calculation of a Bycatch Limit	★	★	
Regulatory program to reduce bycatch below bycatch limit	★	★	
Take reduction plan (TRP) requirements	★	★	★
Regional Fisheries Management Org. (RFMO) or Intergovernmental Agreement Requirements		★	★
Or Alternative Measures Comparable in Effectiveness	★	★	★

There are several key components to the Import Rule, two of which are germane to this paper here: 1) the **List of Foreign Fisheries (LOFF)**, and 2) the classification of fisheries under the LOFF as “**export**” or “**exempt**” fisheries. The **LOFF**, produced by NMFS, refers to the nations and their fisheries that must receive a Comparability Finding; inclusion on this list is based on known interactions or the likelihood of interactions with marine mammals and refinement between NMFS and consultations with a harvesting nation. The LOFF lists products by country, classification (i.e. export/exempt – see below), gear type, and information on vessels, area of operation, marine mammal information, and RFMO jurisdiction for a specific fishery. NMFS published the latest publicly available version of the LOFF in 2020, and it includes 131 nations spanning over 2,000 fisheries¹ (85 FR 63527). The LOFF, only available to the public in PDF form with many data gaps, has been criticized for its lack of transparency, uncertainties and lack of transparency as to whether information reported is derived from NMFS or a harvesting nation, and other limitations (Bering et al., 2022).

NMFS classifies fisheries into two categories based on bycatch risk under the LOFF (i.e. essentially informally defined here as based on the frequency of interactions with marine mammals and fisheries): “**export**” or “**exempt**.” Export fisheries are those where there is “more than a remote likelihood of incidental mortality and serious injury of marine mammals in the course of its commercial fishing operation,” whereas “exempt” fisheries have less than a remote likelihood or no known mortality or serious injury (Figure 2). “Exempt” fisheries are something of a misnomer; all “exempt” fisheries must still apply for a Comparability Finding, but the difference is that these fisheries do not need a regulatory program comparable to the U.S. program to continue exporting, as “export” fisheries do (see Figure 15).

Figure 2: Key differences between exempt and export fisheries under the MMPA Import Rule

Exempt	Export
<ul style="list-style-type: none"> • 10% or less of marine mammal stock's bycatch limit ("remote likelihood" of marine mammal bycatch) • Typically handline, hook & line, dip net, cast net, diving • <u>No regulatory requirement</u> 	<ul style="list-style-type: none"> • > 10% of bycatch limit ("more than a remote likelihood" of marine mammal bycatch) • Gillnets, longline, trawl, purse seine • If insufficient info => export classification • <u>Develop a regulatory program comparable to U.S. program</u>

International Perception of the Import Rule

Lauded for its conservation potential but criticized for its socioeconomic impact on numerous nations, the Import Rule has significant international trade, fisheries, diplomacy, and conservation implications (Bering et al., 2022; Johnson et al., 2017; Williams et al., 2016). Many nations do not have the monitoring and enforcement capacity, legal structure, and, importantly, the financial capacity to comply. Noncompliance or possible import bans in light of a failure to comply may impose significant economic consequences for countries with less capacity and that rely heavily on seafood exports to the U.S. for their overall GDP (Williams et al., 2016). It could, theoretically, lead to exports going to other markets with no such standards ("conservation leakage") (Helvey et al., 2017). In recent years, NMFS has offered funding via an annual grants cycle to certain nations and researchers to assist them in building marine mammal management programs to help with compliance, as well as offering "technical consultations" which each nation to provide them more information about the Rule (e.g. Johnson et al., 2017, NOAA, 2019).

The body of literature on the Import Rule remains minimal; at the time of this writing, there are four published papers that explicitly focus on the Rule: Bering et al., 2022, Félix et al., 2021, Johnson et al., 2017; and Williams et al., 2016. There are other papers, created under a Pew Lenfest MMPA Working Group, that comment on and analyze technical aspects of marine mammal monitoring and analysis that are tangentially related to the Rule (e.g., Hammond et al., 2021; Wade et al., 2021). Several papers express some degree of concern with the Rule, ranging from potential economic losses, the amount of data that needs to be collected in five years to meet these standards, and the general burden this imposes on nations. Williams et al., (2016) notes: "This regulation could thus have significant conservation benefits, potentially spilling over to other areas of marine governance, if it is accompanied by substantial investments to boost scientific and compliance capacity in developing countries. Otherwise, it risks having little effect besides inflicting economic hardship on already poor communities."

The literature demonstrates disparity in foreign government perception and uptake in the Rule's requirements based on a limited body of public-facing information; some southeast Asian nations will likely find it challenging to comply (Kaewnuratchadasorn 2022), whereas Canada and some South American nations may be better poised to comply (Bering et al., 2022; Félix et al., 2021; Johnson et al., 2017). News articles have hinted to some degree of progress towards compliance. Canada, for example, applied for Comparability Findings for all of its fisheries, and adjusted its licensing for aquaculture and seal interactions to meet U.S. standards (Withers,

2021). India launched a marine mammal population assessment cruise in 2021 as it works towards compliance (n.a., 2021). Canada and India are amongst the top 30 exporters in terms of export volume, however, so they have much to lose without a comparability finding (Bering et al., 2022).

Bering et al. (2022) found that out of 23 countries, less than a third of them have the regulatory structure needed to comply. The authors highlighted that economic capacity may hinder some countries' ability to comply, noting that the U.S. government spends millions of dollars on marine mammal research, regulations, and management, comprising about 4 percent of NMFS's 2019 budget. They also highlight potential cultural differences in marine mammal valuation and note that the U.S. is not only imposing their standards but cultural perceptions of marine mammals, too (Bering et al., 2022).

Another recent study found that for three Southeast Pacific countries – Peru, Chile, and Ecuador – seafood exports valuing at USD 2.2 million were at risk; for Chile and Ecuador, the U.S. market represented about one-third of their seafood export market. Chile is currently the only country of these three where marine mammal bycatch reduction is included in fishing laws (Félix et al., 2021). Population assessments, bycatch rate estimates, and determining potential biological removal (PBR) will be the most challenging aspects to comply with (Félix et al., 2021). Despite these challenges, the authors of this study found the Import Provisions to be beneficial for marine mammal conservation in these nations, noting that even if countries cannot meet the high bar promulgated under the Import Rule, nations have begun to taken measures in their fisheries to address bycatch because of the Rule (Félix et al., 2021).

The Import Rule and the IOTC

Most IOTC Members are included under the Import Rule's 2020 List of Foreign Fisheries (LOFF) (see Table 1), with varying fisheries (including some managed by the IOTC) under the LOFF. Of these, China, Indonesia, India, and other Members are some of the top 30 seafood exporters to the U.S. by value (Bering et al., 2022). Some of these nations have limited capacity for monitoring or assessment programs nor existing legislation to manage marine mammal bycatch, but bycatch is expected to be high in some fisheries (e.g. Anderson et al., 2020; Kiszka et al., 2021).

It is likely that many barriers previously identified for lack of bycatch management in the Indian Ocean will be barriers for these nations' compliance. The following are challenges identified in a 2019 International Whaling Commission workshop on bycatch in the Indian Ocean: “under-reporting of bycatch by fishers; lack of standardised monitoring programmes which are suitable and financially viable for small-medium-scale vessels; lack of capacity to carry out bycatch monitoring and reduction programmes; lack of reporting through RFMOs; lack of sustainable funding to carry out bycatch reduction programmes; lack of awareness and political will to tackle the issue; lack of capacity and clarity at national level on the steps, tools and approaches to tackle bycatch; lack of baseline information on cetacean distribution and abundance; and lack of technical solutions proven to work on the fisheries in the region” (IWC 2019).

Table 1: IOTC Members currently subject to requirements under the U.S. MMPA Import Provisions Rule for one or more fisheries, as reported on NOAA’s most recent and publicly available List of Foreign Fisheries (NOAA, 2020)

IOTC Members	Fisheries under MMPA LOFF
Australia	Yes
Bangladesh	Yes
China	Yes
Comoros	No
Eritrea	No
European Union	*EU Members are on LOFF
France (Overseas Territories)	Yes
India	Yes
Indonesia	Yes
Iran	*Yes (On LOFF but engagement highly limited)
Japan	Yes
Kenya	Yes
Korea	Yes
Madagascar	Yes
Malaysia	Yes
Maldives	Yes
Mauritius	Yes
Mozambique	Yes
Oman, Sultanate of	Yes
Pakistan	Yes
Philippines	Yes
Seychelles	Yes
Somalia	Yes
Sri Lanka	Yes
South Africa	Yes
Sudan	No
Tanzania	Yes
Thailand	Yes
United Kingdom of Great Britain and Northern Ireland	Yes
Yemen	No

Relevance

The MMPA Import Rule has the largest global footprint of any unilateral action ever undertaken for marine mammal bycatch, posing both potential conservation benefits and socioeconomic risks to fishing nations. Except for India and Indonesia, Indian Ocean nations have arguably received little attention in the literature compared to other nations. This may be justified on the basis of lower exports to the U.S. market from these nations, but recent information suggests bycatch in their fisheries is some of the highest in the world and many fisheries are included on the LOFF (e.g. Anderson et al., 2020). Capturing baseline information on bycatch levels and management schemes before implementation of the Rule will allow for providing a baseline of nation’s marine mammal management framework before, and several years after the Rule, as well as highlight continued management and capacity needs for future implementation of the Rule. This research comes at a critical time of implementation for the MMPA Import Rule, as NMFS is expected to issue Comparability Findings by January 1, 2024.

The IOTC area is an interesting area of implementation under the Rule, given it is the only major tuna RFMO to which the U.S. is not a member. Arguably, this may warrant *more* engagement to account for this lack of engagement at the RFMO level. Therefore, here we: 1) summarize trade and LOFF trends for IOTC Members; 2) analyze the potential of the Rule for IOTC’s major gillnet fishing nations (in terms of landed total catch); and 3) discuss the potential of the Rule for improving bycatch management in the Indian Ocean.

II. Methods

This research will ultimately address three overarching questions with respect to the IOTC and the Import Rule: 1) Which IOTC Members and fisheries are affected by the Import Rule, particularly for the top gillnet catch Members? 2) Do the fisheries and nations included under the Import Rule mirror what is known about fisheries and bycatch in the Indian Ocean for gillnet fishing nations? 3) On the basis of existing regulations, how prepared are these gillnet Members to meet U.S. standards? At this stage, this paper focuses exclusively on question one.

Trade data

We accessed NOAA’s Foreign Fishery Trade Data (downloaded June 2023) to review seafood exports to the U.S. We downloaded all export products for IOTC Members from 2015 to 2020: <https://www.fisheries.noaa.gov/foss/f?p=215:2:4019502441555> (NOAA, 2023). We summarized the total seafood trade for 2015 to 2020 by total weight and value, regardless of product/species.

Selection of IOTC case study Members

Given we were most interested in focusing on the overlap of the Import Rule with IOTC gillnet fisheries, we first selected case study nations. We accessed the IOTC nominal database (IOTC 2023) and calculated total gillnet catch for 2015 to 2020 by Member (total catch in tons). We filtered for artisanal and industrial fisheries combined, as well as “gillnet” and “offshore gillnet” fisheries. We intended to select five nations for closer review based on highest annual catch, but ultimately extended this to the top six gillnet fishing nations, given Iran is one of the

top five but existing diplomatic complications indicate that the U.S. may not implement the Rule for Iran.

List of Foreign Fisheries data

We accessed NMFS' most recently publicly available LOFF (85 FR 63527) and first transcribed the PDF into an Excel document for the IOTC case study Members. We recorded all existing information for export fisheries only, given the bycatch risk of an export fishery and the differences in reporting requirements: "target species or product," "gear type," "number of vessels/licenses/participants/aquaculture facilities," "area of operation," "marine mammal interactions or co-occurrence by group, species, or stock," "Marine mammal species/stock and annual average mortality estimate," and "RFMO." With these data, we answered the following questions:

- How many export fisheries are there by country? (defined here by product)
- How many gillnet, purse seine, and longline fisheries are listed by country?
- How many participants are there in total by country?
- Which countries report marine mammal mortality?
- Which countries have fisheries on the LOFF under the IOTC?

We conducted the analysis using Microsoft Excel and RStudio, version 2023.03.1+446.

Results

All IOTC Members but five (Table 2) are listed with fisheries under the U.S. LOFF of the MMPA Import Rule. Across the IOTC Members with fisheries included on the LOFF, the only IOTC-managed species not mentioned on the LOFF for IOTC Members are Indo-Pacific king mackerel (*Scomberomorus guttatus*) and blue marlin (*Makaira nigricans*).

A. Trade and gillnet catch

IOTC Members with the highest total seafood export value to the U.S. from 2015 to 2020 are China, Japan, South Korea, the United Kingdom, and Thailand, respectively (Figure 3, Table 2). This figure is for all seafood products, however, and not just IOTC managed species. Of these nations with the highest export value, only two (India and Indonesia) are also in the top 10 IOTC Members with highest reported total gillnet catch (tons) from 2015 to 2020. The top gillnet fishing nations in terms of total catch (value) from 2015 to 2020 are Iran, Indonesia, India, Pakistan, Sri Lanka, and Oman.

Therefore, we selected these six nations as the "case study" nations, given the risk gillnet fisheries pose to cetaceans and given the uniqueness of the prevalence of gillnet fisheries in the Indian Ocean (Aranda 2017). Of these six nations, the ones with the highest export value to the U.S. are India, Indonesia, Sri Lanka, Pakistan, Iran, and Oman, respectively.

Figure 3. Top seafood exporters (by USD) (left) and top IOTC gillnet fishing nations (by total catch in tons) (right) from 2015 to 2020.

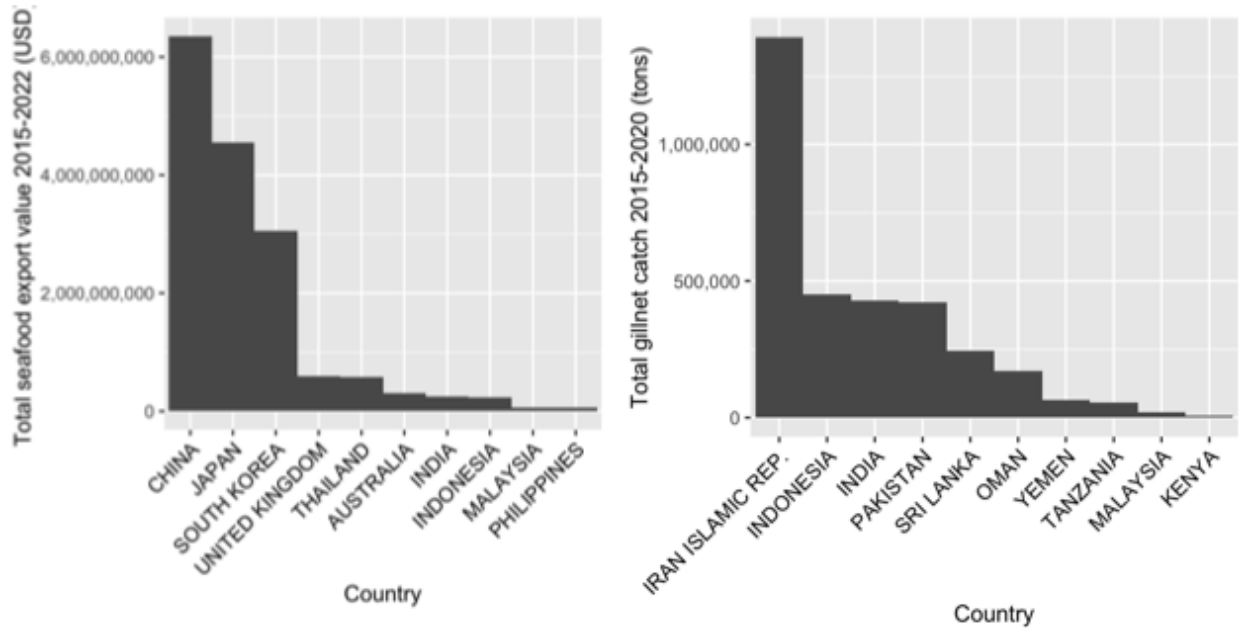


Table 2. IOTC CPCs, their inclusion on the 2020 LOFF, total export value via NOAA Fisheries Trade data, and average reported gillnet catch.

IOTC CPC	On 2020 LOFF	Total export value (USD) to U.S. 2015-2020	Total reported gillnet catch 2015-2020 (tons)
Australia	Yes	301550204	6.78
Bangladesh	Yes	15231575	4525.4
China	Yes	6347846900	0
Comoros	No	709685	5442
Eritrea	No	0	2464.24
EU	NA	NA	0
France OT	Yes	0	0
India	Yes	249341925	427753.9
Indonesia	Yes	237048742	452062.3
Iran	Yes	1284065	1394057
Japan	Yes	4547596121	0
Kenya	Yes	855946	5793.2
Korea	Yes	3057699619	0
Madagascar	Yes	217806	0
Malaysia	Yes	67783736	18597.1
Maldives	Yes	0	0
Mauritius	Yes	714257	0
Mozambique	Yes	0	5427.57

Oman	Yes	385075	169924.5
Pakistan	Yes	2168783	422146
Philippines	Yes	64651000	0
Seychelles	Yes	1282726	0
Somalia	Yes	5351	0
South Africa	Yes	46388851	0
Sri Lanka	Yes	6328663	246531.5
Sudan	No	0	516.99
Tanzania	Yes	48999	55023.99
Thailand	Yes	575450579	363
UK	Yes	600263656	0
Yemen	No	0	63420.59

B. Overarching LOFF trends for the case study nations

a. Export fisheries

Pakistan had the greatest number of export fisheries listed under the 2020 LOFF (n=39), followed by India, Sri Lanka, Indonesia and Oman, and Iran (Table 3). However, this again only looks at export fisheries, and it is possible that some of these nations may have different configurations of the number of exempt fisheries, which are still subject to receiving a Comparability Finding under the Import Rule.

Table 3. Number of export fisheries (all species)

IOTC CPC	Number of export fisheries
India	37
Indonesia	24
Iran	12
Oman	24
Pakistan	39
Sri Lanka	34

b. Gear type

While this review selected the case study nations on the basis of gillnet catch reported to the IOTC, we still filtered the LOFF to review all of which major gear types were most common for these Members. Collectively, gillnets were the highest (n=60 fisheries using gillnets), but were listed separately under the LOFF as either “driftnets,” “drift gillnets,” “driftnets,” “gillnets

and entangling nets,” and “set gillnets.” When separated, longlines were the most common gear type, with purse seines being the least common (Figure 4).

Oman had the most gear types listed overall (e.g. including most diversity in gear types), with Sri Lanka having the fewest (only gillnets: 9 instances of gillnets listed and 2 drift nets). Pakistan only had gillnets listed under the LOFF (“gillnets and entangling nets”) and (“set gillnets”). Only India, Oman, and Sri Lanka reported drift gillnets.

Figure 4. Proportion of gear use under the LOFF for case study export fisheries.



c. Participants

For the gear types listed in Figure 4, we tallied the number of vessels, licenses, and participants listed under the LOFF (Table 4). Out of existing data, Pakistan had the highest number of participants, followed by Oman and then Sri Lanka. Oman had the highest number of licenses, followed by Pakistan, Indonesia, and Sri. Oman also had the greatest number of vessels listed, followed by India, Pakistan, and Sri Lanka, respectively. There were no data reported here for Iran.

Table 4. List of vessels, licenses, and participants for all gear types under the LOFF (driftnets, gillnet and entangling nets, longlines, purse seines, and set gillnets)

Country	vessels	licenses	participants
India	111743	0	0
Indonesia	0	28319	0
Iran	0	0	0
Oman	278366	315479	551980
Pakistan	46500	46500	617500

Sri Lanka	11972	4060	30
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d. Marine mammal mortality

We also reviewed the LOFF to initially try to determine the level of reported marine mortality, but realized this was too challenging with the format of the LOFF and/or missing information. Additionally, when it was reported, the mortality often was the same across gear types and fisheries, which undermined our confidence in these being reliable data and being double counted. Instead, we note that of the case study nations, only two reported mortality for species. They are:

- **Sri Lanka:** blue whale and Indo-pacific humpback dolphin
- **India:** saddleback dolphin, finless porpoise, Indo-Pacific bottlenose dolphin, Indo-Pacific humpback dolphin, Irrawaddy dolphin, pantropical spotted dolphin, Risso’s dolphin, spinner dolphin, common dolphin, pantropical spotted dolphin

This should not, however, be interpreted as these two nations being the only ones with mortality; it is likely that information is missing and outdated, given the last publicly-available version of the LOFF is from 2020. It is also unclear whether this reflects information from harvesting nations or NMFS (Bering et al., 2022).

e. Regional Fisheries Management Organization (RFMO) coverage

We also looked at the LOFF to see which of the case study nations have fisheries listed specifically for the IOTC. The Import Rule states that compliance with RFMO regulations for which the U.S. is a Member can be used as additional criteria when issuing Comparability Findings (85 FR 63527). Therefore, this question is less relevant here given the U.S. is not a Member, but we still report on this here as potential information on which fisheries have crossover under the Import Rule and the IOTC. India and Iran did not have any IOTC-listed export fisheries; Indonesia had the most (Purse seine (pelagic), longline (pelagic), gillnets and entangling nets (demersal and pelagic)); followed by Sri Lanka (a longline fishery and drift gillnet fishery); and then by Pakistan (one gillnet and entangling net fishery). Oman had one “exempt” fishery listed for the IOTC (handlines), but we do not review exempt fisheries here.

Discussion

The U.S. Import Provisions Rule offers another policy tool to address cetacean bycatch on a global scale (Bering et al., 2022), and its implementation is timely with Comparability Findings expected to be published by the end of 2023. It offers an opportunity for managers globally to reconsider bycatch management, mitigation, and monitoring, coupled by momentum of other existing policy developments like the publication of the 2021 FAO Technical Guidelines (FAO 2021). The Rule has also spurred dialogues and resources related to bycatch management, such as the Pew Lenfest Group’s suite of papers and webinars on best practices in bycatch management (Pew 2018).

If fully implemented as written in the Final Rule, the rule does put in question socioeconomic, political, and scientific capacity to comply amongst nations and undoubtedly poses a burden on some. The United States spends millions of dollars implementing its regulatory-based marine mammal programs, a figure that is unlikely for many nations under the LOFF to mirror (Bering et al., 2022). Previous research also found that nations with more developed regulations reported more mortality, largely due to capacity capabilities (Bering et al., 2022). It is unlikely that robust forms of implementation and monitoring are possible for many IOTC Members and capacity remains a challenge (Kaewnuratchadasorn 2022).

Nonetheless, the IOTC offers an interesting case study on the application of the Rule, given 1) the lack of U.S. Membership to the IOTC; and 2) the prevalence of gillnet fishing under the IOTC, uniquely juxtaposed to other RFMOs where longlines and purse seines dominate. The direct link between IOTC fisheries and the U.S. market is unclear, and more research is needed here – specifically for gillnet fisheries. This analysis was preliminary, and an analysis of 1) data on IOTC Member exports and trade flow, 2) the LOFF for just IOTC-managed fisheries, and 3) export value by other tRFMOs is necessary to understand the full potential reach of the Rule and IOTC members.

A. LOFF trends

This review for India, Indonesia, Iran, Oman, Pakistan, and Sri Lanka showed that from an overall export value perspective (USD for total exports), India and then Indonesia are the top exports in USD. However, Pakistan, followed by India, had the most export fisheries under the 2020 LOFF – which is significant, as a Comparability Finding needs to be obtained for each fishery.

Sufficient information on the LOFF with regards to marine mammal mortality is lacking. This could be a combination of several factors: 1) a lack of data on cetacean bycatch across the Indian Ocean (Anderson et al., 2021; IOTC 2022); 2) lack of data provided by Members; and 3) lack of data compilation by NMFS. A remaining challenge with implementation of the Import Rule is the publicly-available LOFF itself. It is unclear as to where the data included in the LOFF comes from (e.g. provided by a harvesting nation or included by NMFS) (85 FR 13626), and it is likely that the 2020 LOFF now reflects some outdated information as NMFS has continued to engage with nations on the Import Rule since 2020. Additionally, the format of the LOFF limits analysis, with over 200 pages in PDF format for over 2,000 fisheries (Bering et al, 2022).

B. Synergizing implementation of the Import Rule and IOTC CMMs

Other literature has pointed to the fact that nations for which the U.S. is a key market may be more incentivized to comply (Felix et al., 2022); it is also likely that these nations have more resources themselves to comply (e.g. Bering et al., 2022). There is a general mismatch between the highest export nations in the IOTC (in terms of GDP) and the top gillnet nations specifically in the context of the Rule – with the exception of India and Indonesia. Therefore, the potential of the Rule itself to influence bycatch mitigation and monitoring is tenuous and depends on the degree to which harvesting nations address their own domestic regulations. In recent years, there are examples of certain gillnet fishing nations undertaking additional research

and pilot studies on improving marine mammal bycatch mitigation and monitoring, such as in Pakistan (Kiszka et al., 2021) and India (CMFRI 2023).

Felix et al. (2022) noted the potential of regional cooperation organization in helping members work towards U.S. standards, such as through the Permanent Commission of the South Pacific. Recent regional developments between the IOTC, such as through the IWC-IOTC joint meeting (IOTC-IWC 2021), the 2021 Joint IOTC Bycatch Mitigation workshop, or other organizations like ASEAN could be leveraged for regional trainings. Given IOTC Resolution 23/06 (On the Conservation of Cetaceans) was recently amended to include gillnets in May 2023, the Import Rule and this measure offer increased compliance opportunities for both.

C. Further research

This white paper shares the early stages of examining the LOFF to better understand how the Import Rule may offer opportunities to improve monitoring and management of IOTC fisheries, particularly gillnet fisheries. Refining the analysis to examine the following trends will be useful: filtering the LOFF and trade data for just IOTC-managed species; leveraging [FAO trade data](#) to better understand the overall proportion of seafood exports per CPC as a proportion of seafood exports globally to understand the significance of the U.S. market; and reviewing the state of existing regulations towards marine mammal bycatch in IOTC CPCs (e.g. such as by using Table 5 to guide the analysis). Ultimately, this will help provide a baseline of the state of existing information and regulations on marine mammal bycatch at the time of implementation of the Import Rule to compare with in the future as the Rule moves into its four-year cyclical implementation period.

Table 5: Example format of record of information for legal/bycatch review

	Nation 1	Nation 2	Nation 3 etc.
Tier 1: all fisheries and locations			
Regulatory program governing bycatch			
Prohibition on M&SI			
Tier 2: fisheries within the EEZ or territorial waters of the harvesting nation			
Marine mammal stock assessments			
Registry of vessels			
Regulatory requirements to report interactions			
Regulatory measures to reduce bycatch (e.g. safe-handling and release guidelines), time-area closures, etc.)			
Calculation of bycatch limits			
Tier 3: fisheries operation on the high seas			
Implementation of relevant measures “under any applicable agreement or RFMO to which the US is a party”			

Bycatch reduction for any other stocks on the high seas that the U.S. requires of its fisheries with respect to that stock			
Tier 4: Bycatch evidence			
Does a bycatch estimate exist for all or parts of the fishery?			
Tier 5: Voluntary Initiatives			
Do voluntary bycatch-reduction programs exist, such as through university or NGO partnerships or local community voluntary actions?			
Tier 6: Comparison to U.S. fishery			
For fisheries similar to those in the U.S., do they have similar requirements to those in the U.S.?			

D. The unilateral approach and regional cooperation

Each of the U.S.-imposed bycatch-related unilateral measures have been challenged at the WTO. Under the “shrimp-turtle” case, Section 609 required gear modifications on international shrimp trawl fisheries exporting shrimp to the U.S. or face embargoes (DeSombre & Barkin, 2002). India, Malaysia, Pakistan, and Thailand challenged this requirement at the WTO, and the WTO ruled against the U.S. in 1998 on three major points: the law was applied to a global scope beyond the Caribbean/Western Atlantic region for which it was created; the law was too restrictive in requiring nations to confirm their fisheries laws to the U.S.; and that the U.S. had not undertaken a good-faith effort to address the situation multilaterally. The WTO found Section 609 compliant with WTO articles in 2001 after the U.S. made two key changes: a good-faith effort to negotiate a multilateral agreement to address cetacean bycatch (the IAC), and revisions to Section 609 language from requiring nations to have standards that are “essentially the same” as those in the U.S. to “comparable in effectiveness,” thus affording exporters more flexibility (DeSombre & Barkin, 2002; WTO, 2021).

In the infamous “tuna-dolphin” case, Mexico challenged the U.S. at the WTO over the DCPIA, claiming, in brief that the U.S. discriminated against Mexico. This brought on 30 years of proceedings at the WTO, ultimately rectified due in part to development on the Agreement of the International Dolphin Conservation Program (Ballance et al., 2021; Bering et al., 2022; World Trade Organization, 2018).

The issue of unilateral and multilateral approaches to bycatch provide valuable lessons in contemplating policy changes to advance bycatch mitigation in the Indian Ocean. There currently is no known regional cooperative mechanism for cetacean bycatch in the Indian Ocean, but lessons can be drawn from how regional cooperation (e.g. the IAC and the AIDCP) maximized the implementation of the intent of these unilateral cases and could increase implementation here.

Conclusion

Implementation of the Import Rule in this region poses interesting questions given the prevalence of gillnets, data gaps, and juxtaposed lack of U.S. Membership to the IOTC, offering another lens for which to consider improvements to bycatch data collection and monitoring in the Indian Ocean. However, due to the limitations of the LOFF and lack of public-facing information on implementation of the Rule, it is challenging to decipher the full potential of the Rule in improving bycatch management of gillnet fisheries in the IOTC. Nevertheless, inclusion of gillnet fisheries and multiple IOTC Members indicates that this may be another policy tool towards improving bycatch management.

Disclaimer: The views presented in this paper are independent of U.S. government implementation of the Rule and not representative of the U.S. government.

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