# SC/69A/GDR/03

**Sub-committees/working group name: GDR**

**Generating multi-year summaries of National Progress Reports**

**Virginia Andrews-Goff, Jess Hopf, Michael C. Double**

# Generating multi-year summaries of National Progress Reports

Virginia Andrews-Goff[1], Jess Hopf[2], Michael C. Double[1]

[1] *Australian Antarctic Division, Department of Climate Change, Energy, the Environment and Water, 203 Channel Highway, Kingston, Tasmania, Australia*

[2] *Knowlegible Designs, Sunshine Coast, Queensland, Australia*

## Abstract

Contracting governments to the International Convention for the Regulation of Whaling are required to provide an annual National Progress Report summarising cetacean related activities annually. National Progress Reports are intended to provide a concise summary of the cetacean research undertaken in member countries as well as a summary of information on direct and incidental anthropogenic mortality. National Progress Report data is currently submitted into an online submission system by various researchers, stakeholders and government representatives. Following submission, all data is made available for statistical query during Scientific Committee meetings however there is no associated report output that summarises data at the country or continental level. In order to increase the accessibility and visibility of National Progress Report data and encourage increased reporting from member nations, we developed an script in R that generates nation reports that summarise multiple years of submitted data by way of graphical representation and data summary tables. We present two examples of National Progress Report member nation summaries here. Additionally, we make recommendations regarding the online submission system to facilitate data accessibility, transparency and analysis.

## Background

### National Progress Reports

Contracting governments to the International Convention for the Regulation of Whaling are encouraged to report scientific information related to whales annually to the International Whaling Commission (Article VIII, Paragraph 3 of the Convention). The Rules of Procedure of the Scientific Committee indicate that this information should be reported as a brief progress report following the format agreed by the Committee (Rule E.1). National Progress Reports are considered a vital contribution to the work of the Scientific Committee and the Commission and provide a valuable opportunity for countries to share an overview of their national cetacean research and data and stimulate important cross-country collaboration in science and conservation actions. However, only a very limited number of International Whaling Commission member countries have submitted National Progress Reports in recent years.

### National Progress Report data submission process

National Progress Report data is currently submitted into an online submission system by various researchers, stakeholders and government representatives. A verification process exists whereby individual users submit data records to their relevant organisational administrator for approval. These data records are then made available to the country level administrator responsible for approving and submitting all data records. Following submission, all data is made available for statistical query and consideration by relevant sub-committees during Scientific Committee meetings however there is no associated report output providing an overview a country or continental level overview. All National Progress Report data is made publicly available for download as a spreadsheet.

### Increasing the accessibility and visibility of National Progress Report data

In order to increase the accessibility and visibility of National Progress Report data and encourage increased reporting from member nations, we developed a script using R (R Core Team 2022) that can generate nation reports that summarise submitted data by way of graphics and data summary tables. By producing such high-level, multi-year, national reports, we can make available to data providers an authored output which can potentially act as an incentive for data holders to provide and submit their data. Additionally, these data summaries increase the visibility of National Progress Report data and can inform a country level or even continental view on cetacean trend, enabling detection of anomalies or emerging issues.

The utility of National Progress Report member nation summaries is likely to be broader than the Scientific Committee. National Progress Report member nation summaries could inform processes within the Conservation Committee in particular, for example, the Bycatch Mitigation Initiative or could accompany Voluntary Conservation Reports.

## Examples of National Progress Report member nation summaries

In Appendix 1, we present the National Progress Report member nation summary for Australia. Appendix 2 contains the National Progress Report member nation summary for the United States of America, with permission granted for inclusion by the Head of Delegation of the United States of America at the International Whaling Commission Scientific Committee.

## Recommendations for increased utility of National Progress Report data

In order to facilitate the production of National Progress Report member nation summaries, we have a number of recommendations primarily related to optimising data entry forms for data analysis and visualisation. These include:

- The adoption of clear and consistent data entry standards across all data entry forms, including, but not limited to:
    - Consistent and tidy field names;
    - Data validation to ensure the correct data type (e.g., integer, text) or values (e.g., from a pre-defined list) are entered.
- It is critical that data entry facilitates the ability to determine if a zero/'0' is equal to no data (i.e., no incidents happened) or no record submitted (i.e., there were cetacean incidents, but the data is missing).
- We recommend that only one incident per record be entered into a data entry form - pooling data creates issues for data analysis and transparent reporting.
    - If data pooling remains, remove the ability to enter multiple fishing gear types per data form.

A detailed breakdown of data recommendations can be found in Table 1.

## References

R Core Team (2022). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/.

**Table 1.** Data cleaning challenges specific to generation of member nation summaries of National Progress Reports and associated recommendations for the National Progress Report online reporting system.

| Data Issue | Details | Recommendations |
|---|---|---|
| Unfriendly field names | Field names contained characters that do not follow best practices for data wrangling in R (and other programs). This includes, critically, non-standard punctuation, such as " ( ) / : ? and, less critically, whitespaces (spaces between words).<br><br>Examples included: *(relevant dataset)*<br>Total Females: Dead *(Bycatch Large)*<br>Individuals - "Fate" *(Bycatch Small)*<br>Local Area (Long/Lat) *(All)* | **Revise field names** to ensure that they are easily compatible with programming languages. |
| Inconsistent field names | Bycatch dataset only: Inconsistencies between field names in the large whales and small cetaceans datasets.<br><br>For example, the field "Total Unknown: Unknown" in the Large Whales dataset is "Individuals - \ "Fate\" Unknown: Unknown" in the small cetaceans dataset. | Revise all datasets to **ensure consistent global naming**. |
| Small and large cetaceans in both datasets | Bycatch and Strike datasets only: The separation of small and large cetaceans for data entry appears redundant as both datasets contained species that are classed as large and small. | **No longer separate large and small** cetacean datasets and automatically assign 'large' or 'small' based on species.<br><br>Alternatively, restrict the species entered. |
| Non-integer values | Fields that should ideally contain only integers (e.g., counts of individuals) have non-integer values. This greatly impedes easy analysis and visualisation of the data.<br><br>For example, 'Females' in the Strandings dataset contained entries such as "11 (Tursiops sp.), 6 (unidentified dolphins)". | For relevant fields, **force only integer values** to be entered through data validation. |
| Zeros or no data | For some records, zeros or no data (NA, N/A, blank, etc.) exist for all count data. That is, the record has been entered, but the number of males, females, unknown, etc., has been left blank. | Implement **form entry checks** (data validation) that prevent submission unless count data has been entered in at least one of the boxes. |

| | | |
|---|---|---|
| Inconsistent ‘Species’ field | The ‘Species’ field can contain common and scientific names. | **Force species entries** to be either scientific or common names**.** |
| Multiple incidents and individuals per record. | Each record can contain multiple incidents (of the same type), each of which can affect multiple individuals. This obscures 1) the true number of reported incidents and 2) the number of individuals per reported incident. | If knowing the number of incidents and the number of individuals per incident is important, **allow only one incident per report** to be entered. Alternatively, include a check box that asks whether the report relates to multiple incidents (of the same type). |
| Multiple fishing gear types | Bycatch dataset only: multiple fishing gear types can be entered at once. This raises major issues for reporting the types fishing gear impacting cetaceans. | **Remove the ability to input multiple fishing gear types** in a single form. |
| Complicated contact data | The ‘Contacts’ field had useful information combined.<br>For example, name, email, and department were combined into a long character string. Some of this information is useful (e.g., email to inform jurisdiction/organisation) and requires extra steps to extract. | **Separate contact information** in exported data. |

**Appendix 1: Australia's Scientific Progress Report summary**

# IWC Data Report 2022: Australia (2012-2021)

Department of Climate Change, Energy, the Environment and Water, Australian Antarctic Division.* Prepared by Knowlegible Designs.†

September 2022

## Contents



*Virginia.Andrews-Goff@aad.gov.au
†jess@knowlegible.design

## Introduction

This report is for **IWC** data downloaded for Australia (2012-2021).

**IWC** National Scientific Progress Reports are intended to provide a concise summary of the cetacean research undertaken in member countries as well as a summary of information on direct and incidental anthropogenic mortality. These National Scientific Progress Reports make a vital contribution to the work of the IWC SC and the Commission. They also provide a valuable opportunity for countries to share an overview of their national cetacean research and data to the IWC community, and as such stimulate important cross-country collaboration in science and conservation actions.

## Definitions and notes

- The data underlying the report was downloaded from the International **W**haling Commission's (**IWC**) Data Portal.
- An **incident** is defined as an event involving a cetacean. Incident types include *bycatch*, *strandings*, and *(ship)strikes*, as defined by the **IWC**.
- For simplicity, **bycatch** is used consistently throughout this report to refer to the accidental capture of a cetacean in fishing gear (mainly small cetaceans), as well as the entanglement of a cetacean in fishing gear (mainly large cetaceans), as defined by the **IWC**.
- A **record** refers to a single entry that has been entered into the IWC Portal. Due to varied reporting practices, individual records may contain multiple incidents, each of which can involve multiple individual cetaceans.

## Data Cleaning and Errors

Raw data downloaded from the IWC Portal needed to be cleaned and analysed to generate this report. This section summarizes the data that was problematic and how it was dealt with.

- Data sets that were not downloaded or not available for download from the IWC portal:
  - None

- The number of records with missing data (e.g., NA and NaN values) recorded for the dependent variables (total male, total female, etc.), for both large and small cetaceans combined. For these records, it has been assumed that one individual was impacted:
  - Bycatches: 21
  - Strandings: 9
  - Strikes: 19

- The number of records removed from the analysis due to incorrect data (e.g., non-integer values) recorded for the dependent variables (total male, total female, etc.), for both large and small cetaceans combined:
  - Bycatches: 0
  - Strandings: 3
  - Strikes: 1

- The number of records removed from the analysis due to missing data on species name (NA, NaN, etc.), for both large and small cetaceans:
  - Bycatches: 0
  - Strandings: 0
  - Strikes: 0

- Species not classified as small or large whales, and the number of records with those species in parenthesis. These records have been removed from the analysis, **please contact report author** if any species are listed below:
  - Bycatches: (0)
  - Strandings: (0)
  - Strikes: (0)

## Cetacean Incidents Overview

This section provides an overview of the **number of cetaceans** (of all species, by size) recorded to be impacted by an incident (bycatches, strikes, and strandings) between 2012 and 2021 for Australia.

### Small cetaceans overview

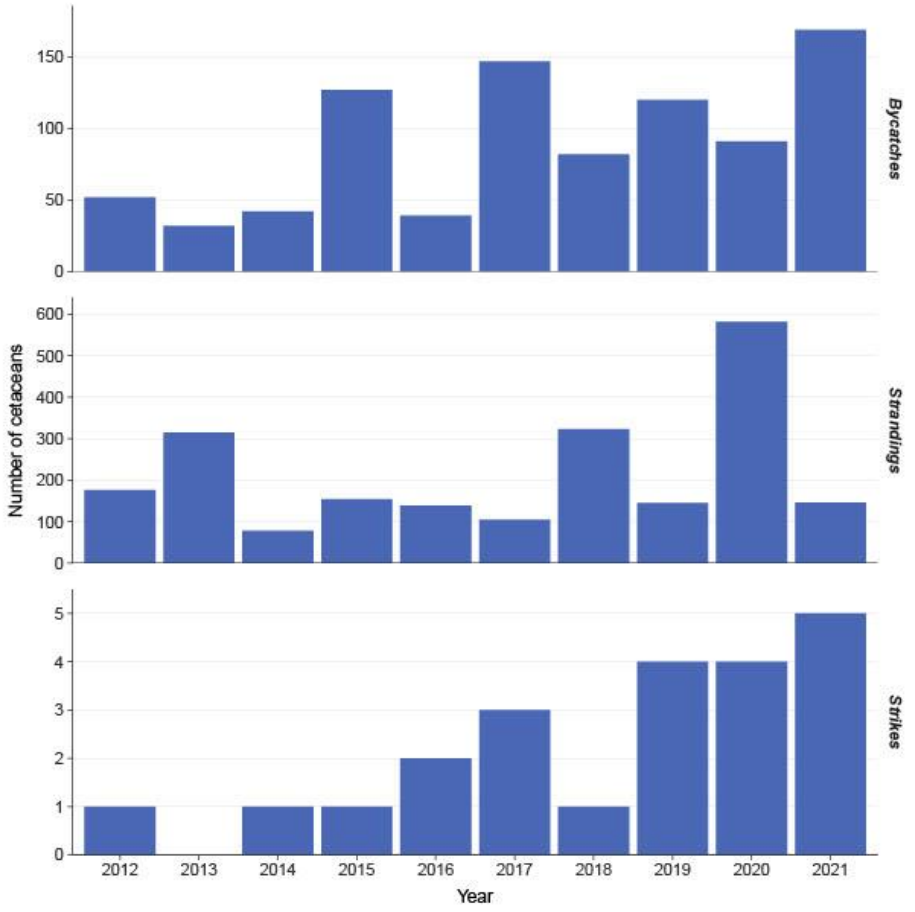


Figure 1: Total number of small cetaceans recorded to be in an incident over time, by incident type (rows). Note the different y-scales. See Table 1 (below) for cetacean groupings.

**Large cetaceans overview**

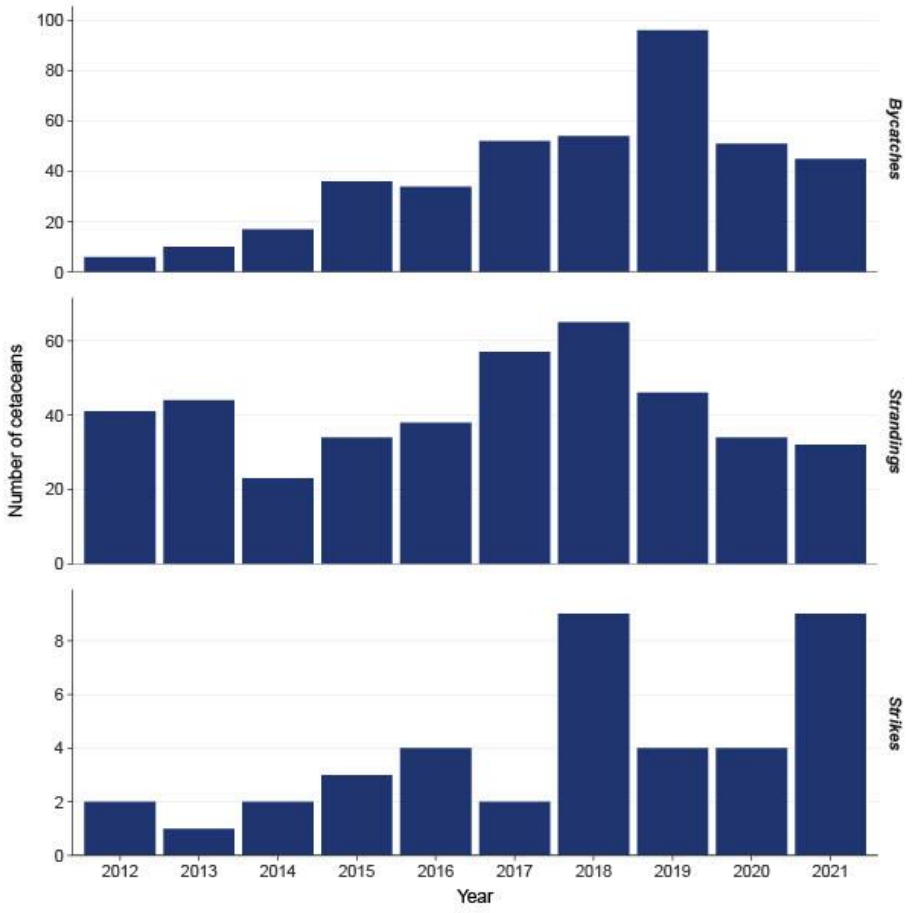


Figure 2: Total number of large cetaceans recorded to be in an incident over time, by incident type (rows). Note the different y-scales. See Table 1 (below) for cetacean groupings.

**Species overview**

Table 1: Total number of recorded cetaceans impacted and total number of records sumbitted (in parentheses) between 2012-2021 for Australia, by species groups and incident type. Note that individual records may contain multiple incidents, each of which can affect multiple individuals.

| Group | Bycatch | Strandings | Strikes | Total |
|---|---|---|---|---|
| *Small Cetaceans* | | | | |
| Pilot whale | 89 (28) | 676 (40) | NA (NA) | 765 (68) |
| Common dolphin | 373 (156) | 297 (97) | 4 (4) | 674 (257) |
| Indo-pacific bottlenose dolphin | 69 (35) | 311 (101) | 6 (6) | 386 (142) |
| Unidentified dolphin | 227 (125) | 104 (51) | 1 (1) | 332 (177) |
| Common bottlenose dolphin | 72 (39) | 187 (104) | 5 (5) | 264 (148) |
| Pantropical spotted dolphin | 2 (1) | 165 (13) | NA (NA) | 167 (14) |
| Beaked whale | 11 (2) | 76 (65) | 1 (1) | 88 (68) |
| Pygmy sperm whale | NA (NA) | 70 (44) | 2 (2) | 72 (46) |
| Indo-pacific humpback dolphin | 13 (7) | 38 (15) | 1 (1) | 52 (23) |
| False killer whale | 10 (4) | 36 (19) | NA (NA) | 46 (23) |
| Risso's dolphin | NA (NA) | 35 (18) | 1 (1) | 36 (19) |
| Melon-headed whale | 13 (6) | 18 (11) | NA (NA) | 31 (17) |
| Unidentified small cetacean | 5 (1) | 23 (11) | NA (NA) | 28 (12) |
| Striped dolphin | NA (NA) | 23 (18) | NA (NA) | 23 (18) |
| Australian snubfin dolphin | 5 (3) | 13 (10) | NA (NA) | 18 (13) |
| Killer whale | 4 (3) | 14 (7) | NA (NA) | 18 (10) |
| Spinner dolphin | 2 (2) | 14 (6) | NA (NA) | 16 (8) |
| Dwarf sperm whale | NA (NA) | 15 (12) | NA (NA) | 15 (12) |
| Unidentified small whale | 5 (2) | 7 (6) | 1 (1) | 13 (9) |
| Unidentified beaked whale | NA (NA) | 13 (10) | NA (NA) | 13 (10) |
| Pygmy killer whale | 1 (1) | 4 (4) | NA (NA) | 5 (5) |
| Fraser's dolphin | NA (NA) | 5 (5) | NA (NA) | 5 (5) |
| Rough-toothed dolphin | NA (NA) | 5 (5) | NA (NA) | 5 (5) |
| Southern bottlenose whale | NA (NA) | 4 (3) | NA (NA) | 4 (3) |
| Unidentified bottlenose dolphin | NA (NA) | 4 (1) | NA (NA) | 4 (1) |
| Southern right whale dolphin | NA (NA) | 3 (3) | NA (NA) | 3 (3) |
| Unknown | NA (NA) | 2 (2) | NA (NA) | 2 (2) |
| Unidentified humpback dolphin | NA (NA) | 1 (1) | NA (NA) | 1 (1) |
| *Large Cetaceans* | | | | |
| Humpback whale | 356 (268) | 255 (117) | 24 (22) | 635 (407) |
| Sperm whale | 2 (2) | 51 (34) | 1 (1) | 54 (37) |
| Unidentified large whale | 16 (10) | 19 (12) | 6 (6) | 41 (28) |
| Southern right whale | 14 (13) | 15 (13) | 4 (4) | 33 (30) |
| Minke whale | 4 (4) | 24 (20) | 2 (2) | 30 (26) |
| Pygmy right whale | NA (NA) | 29 (25) | 1 (1) | 30 (26) |
| Unidentified large baleen whale | 8 (2) | 7 (7) | 1 (1) | 16 (10) |
| Bryde's whale | NA (NA) | 6 (6) | NA (NA) | 6 (6) |
| Sei whale | 1 (1) | 1 (1) | 1 (1) | 3 (3) |
| Blue whale | NA (NA) | 3 (3) | NA (NA) | 3 (3) |
| Fin whale | NA (NA) | 3 (3) | NA (NA) | 3 (3) |
| Omura's whale | NA (NA) | 1 (1) | NA (NA) | 1 (1) |

## Cetacean Incidents Detailed

This section explores in more detail the number of cetaceans recorded to be impacted by an incident (by-catches, strikes, and strandings), for Australia between 2012 and 2021.

A maximum of 9 species are displayed per page, with the remaining species combined together as 'other'. The species displayed are the top 9 species for a given incident type (e.g., the next page displays the top 9 small cetacean species caught as bycatch between 2012 and 2021). If less than 9 species are displayed, no other species were reported for that incident type.

**Small Cetaceans: Bycatches**

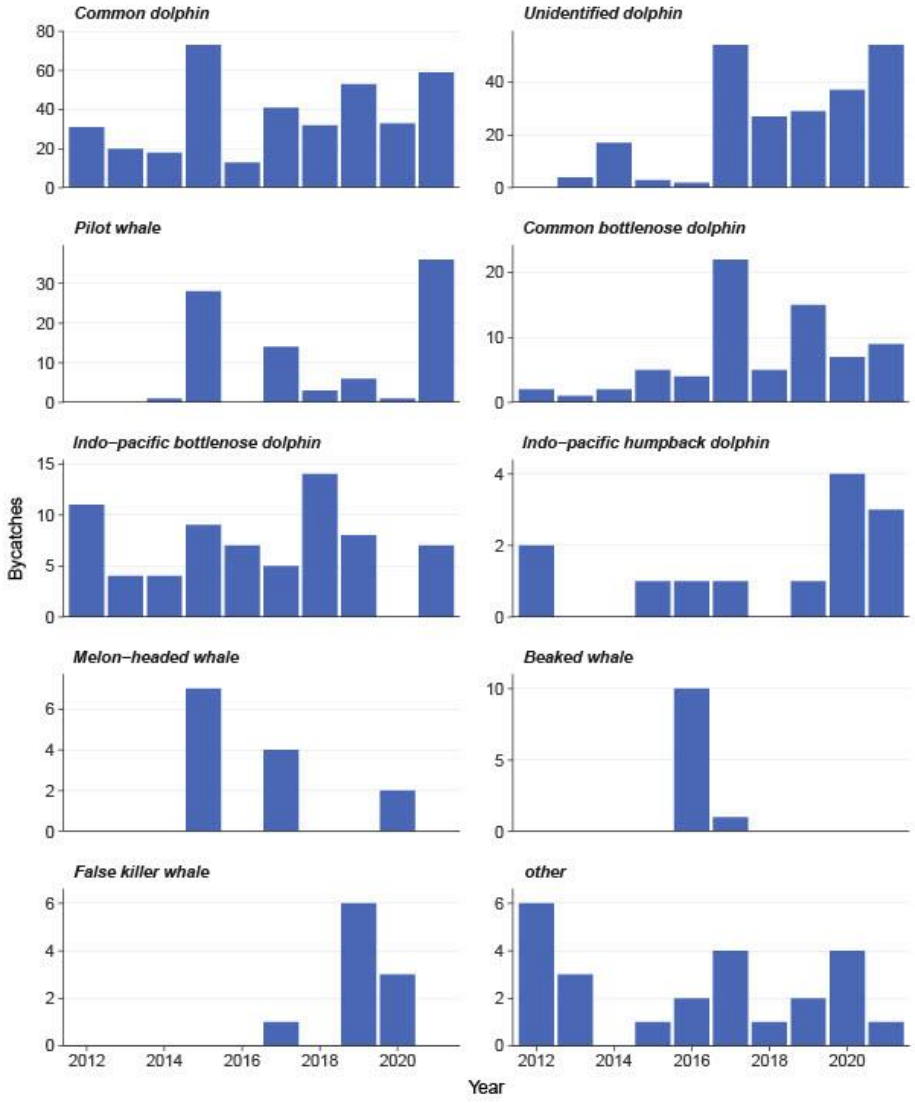


Figure 3: Total number of small cetaceans recorded to be in a bycatch incident, by species grouping. Note the different y-scales.

**Small Cetaceans: Strandings**

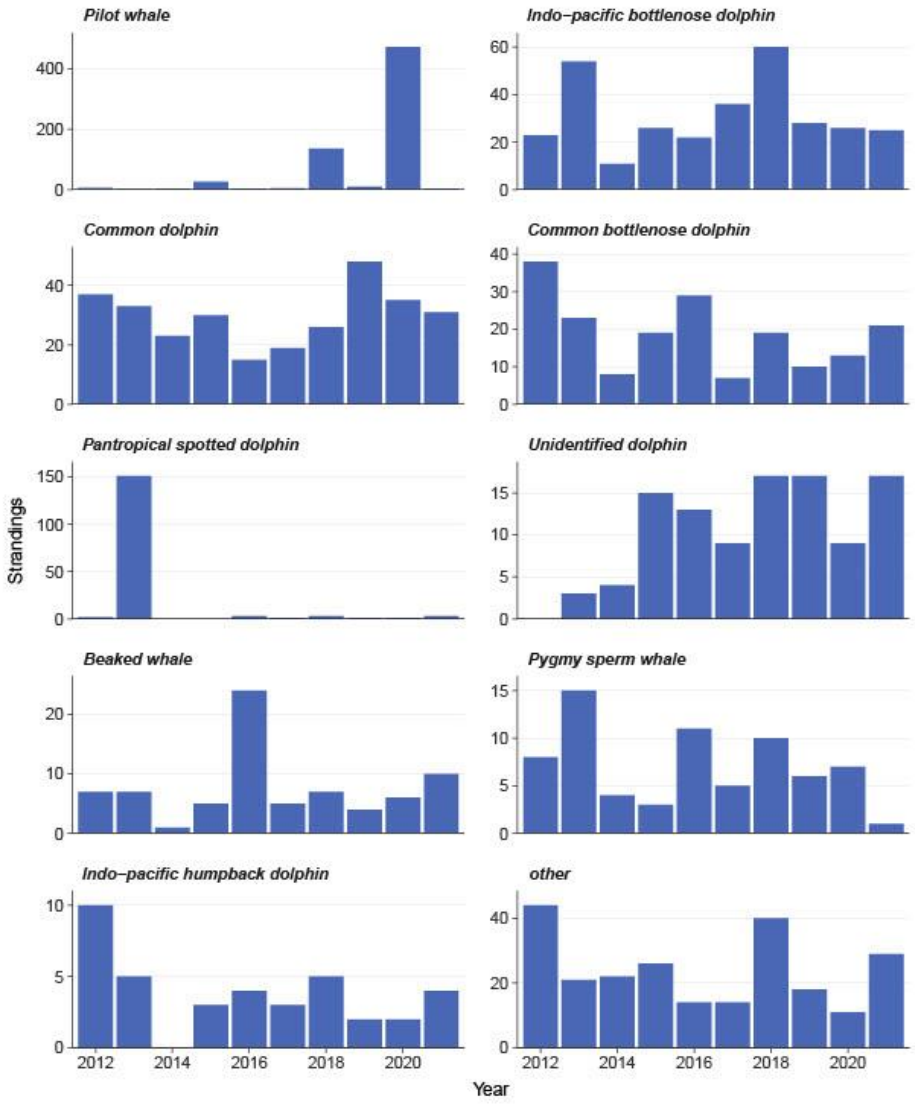


Figure 4: Total number of small cetaceans recorded to be in a stranding incident, by species grouping. Note the different y-scales.

**Small Cetaceans: Strikes**

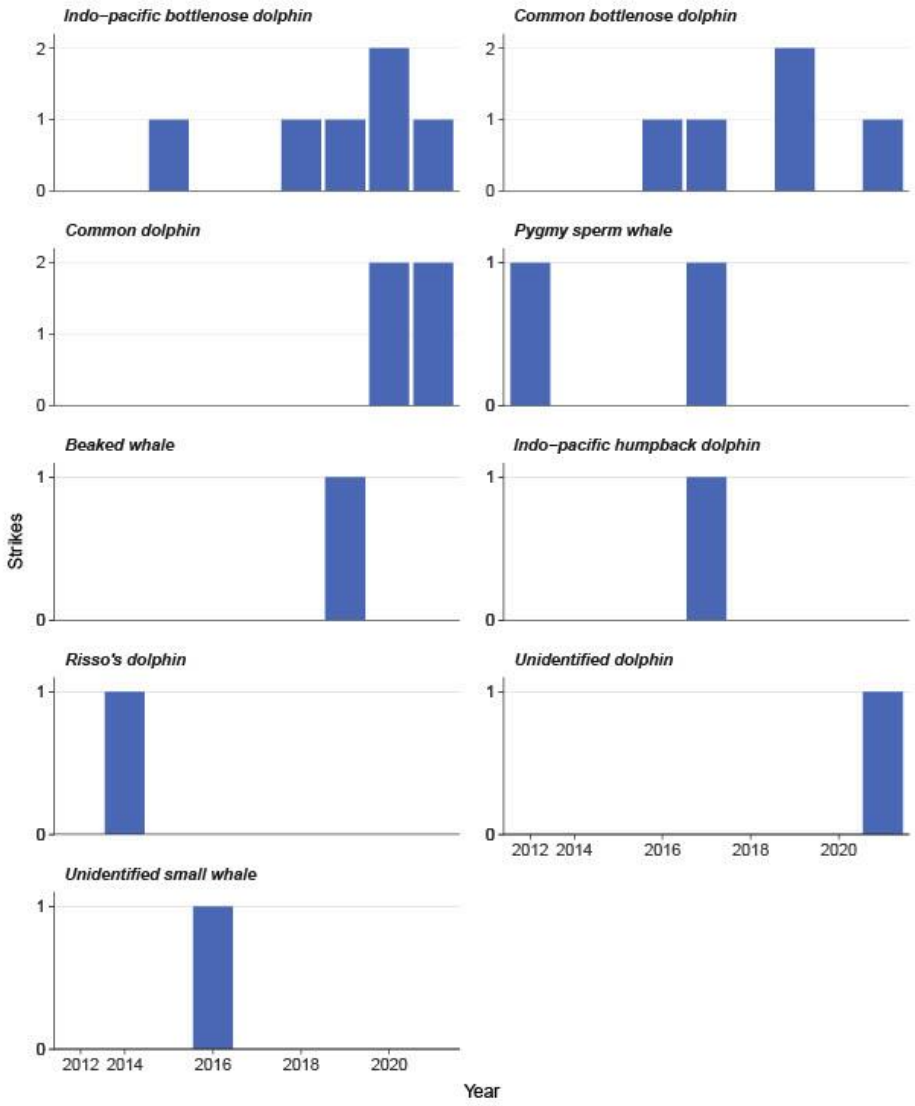


Figure 5: Total number of small cetaceans recorded to be in a vessel strike incident, by species grouping. Note the different y-scales.

**Large Cetaceans: Bycatches**

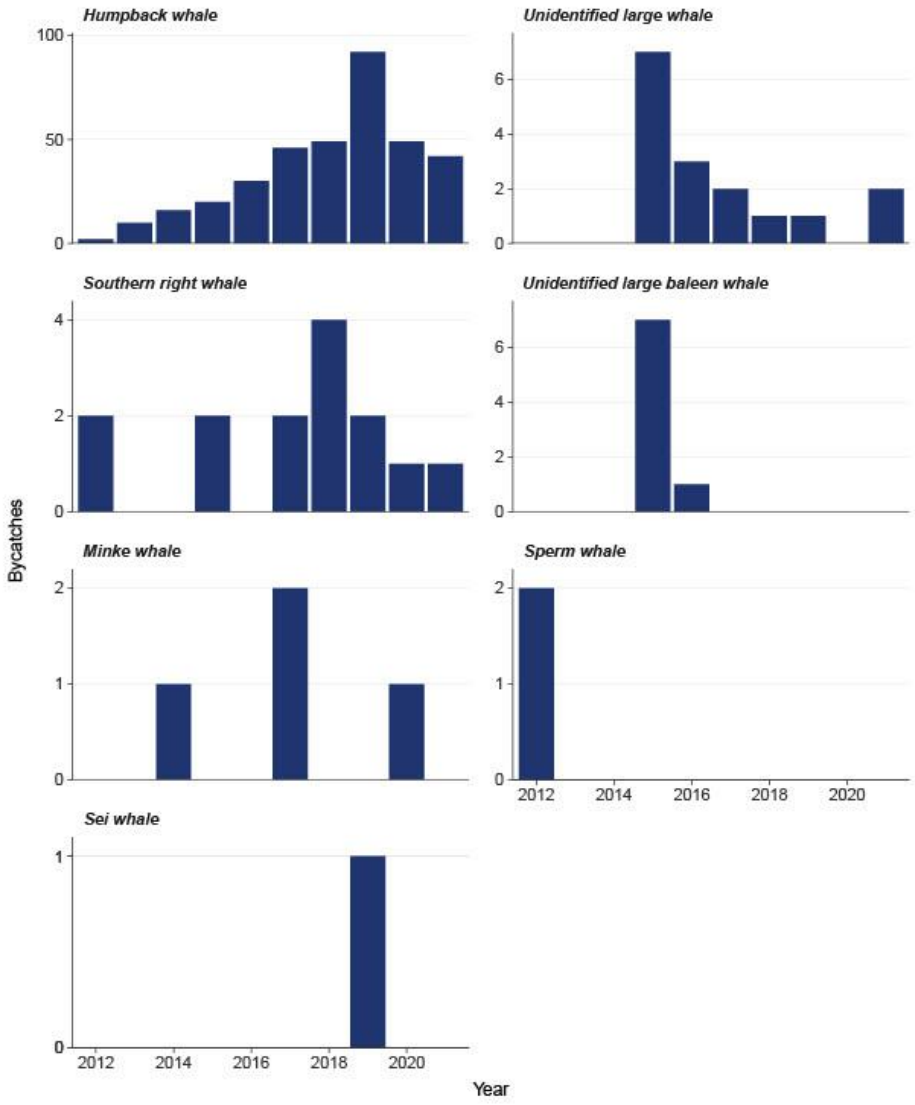


Figure 6: Total number of large cetaceans recorded to be in a bycatch incident, by species grouping. Note the different y-scales.

**Large Cetaceans: Strandings**

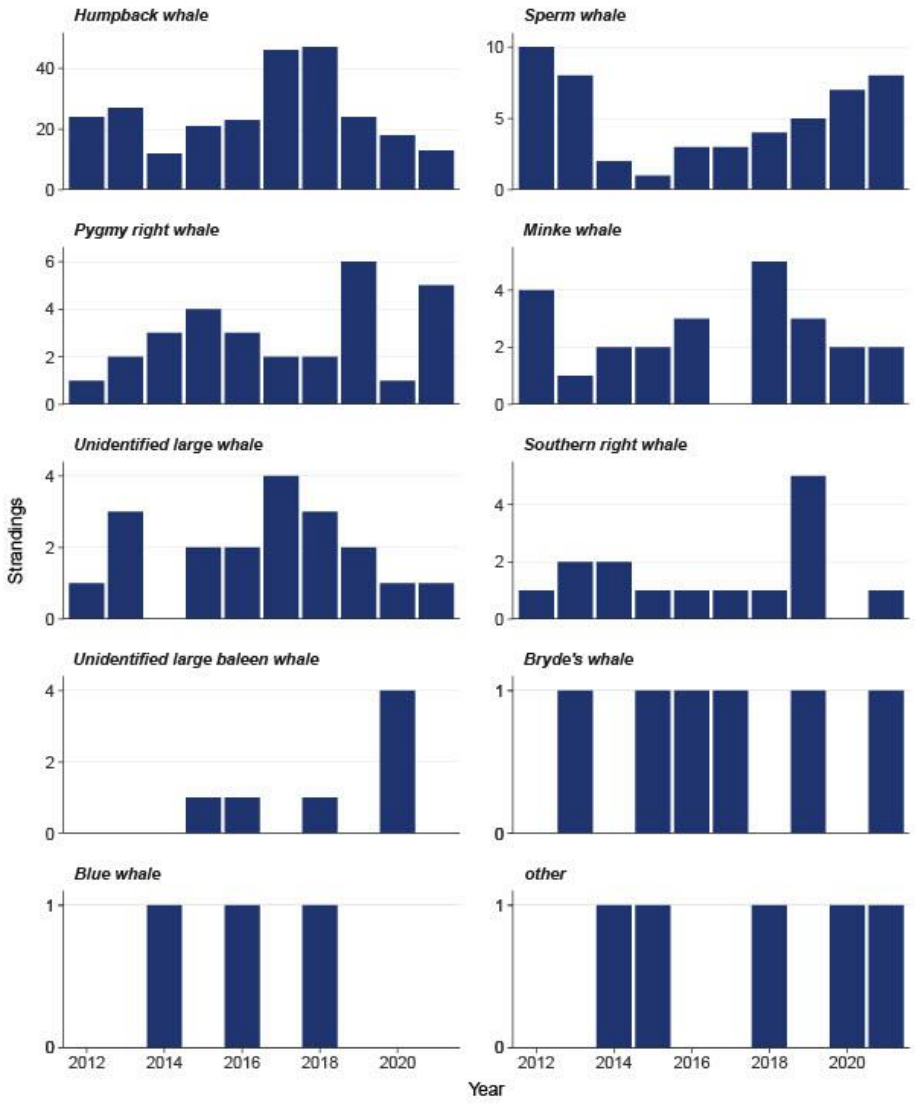


Figure 7: Total number of large cetaceans recorded to be in a stranding incident, by species grouping. Note the different y-scales.

**Large Cetaceans: Strikes**

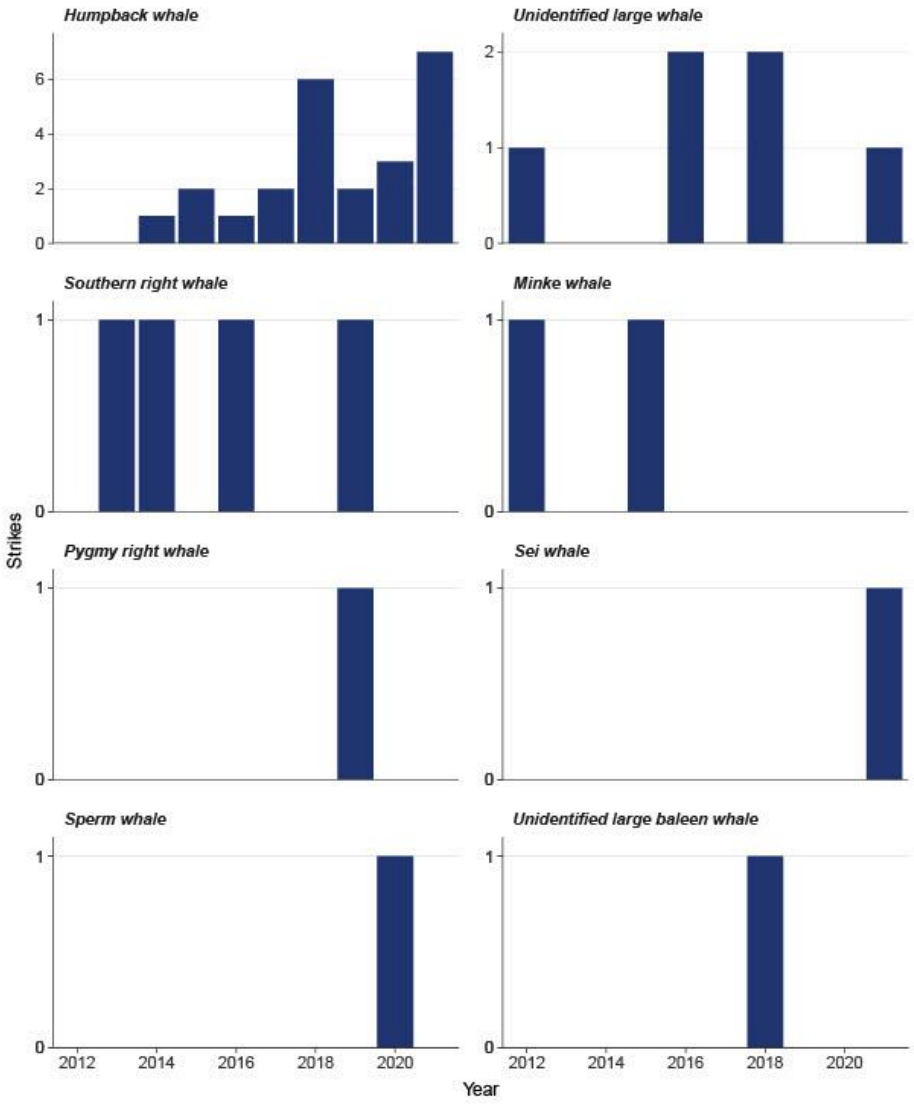


Figure 8: Total number of large cetaceans recorded to be in a vessel strike incident, by species grouping. Note the different y-scales.

## Fishing Gear

This section provides an overview of the major types of fishing gear that cetaceans have been caught as bycatch/entangled in in Australia between 2012 and 2021.

If multiple gear types were identified in a single record, the record was categorised as 'Multiple types recorded'. If the gear was listed as miscellaneous, unknown or unspecified, it was categorised as 'unknown'.

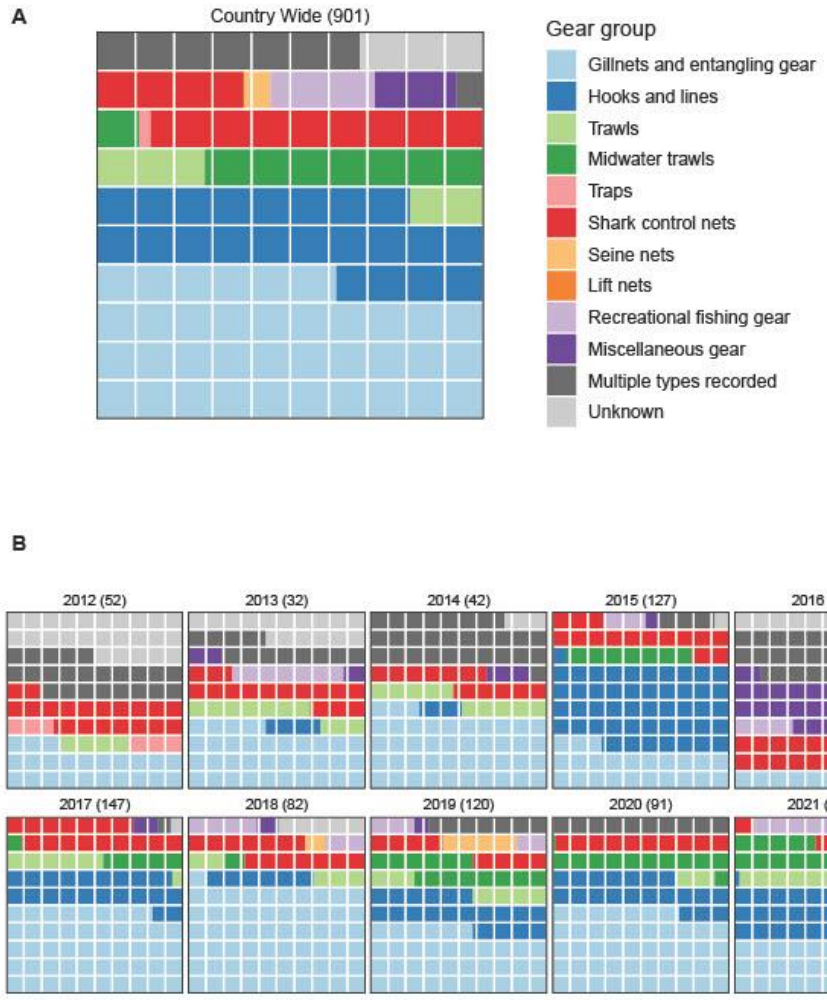


Figure 9: Proportion of the recorded total number of small cetaceans recorded as bycatch for each major fishing gear type between 2012-2021 for Australia aggregated (A) and by year (B). Note, individual squares represent 1% of total indvivduals bycaught, and numbers in parenthesis indicate total number of individuals for that year.

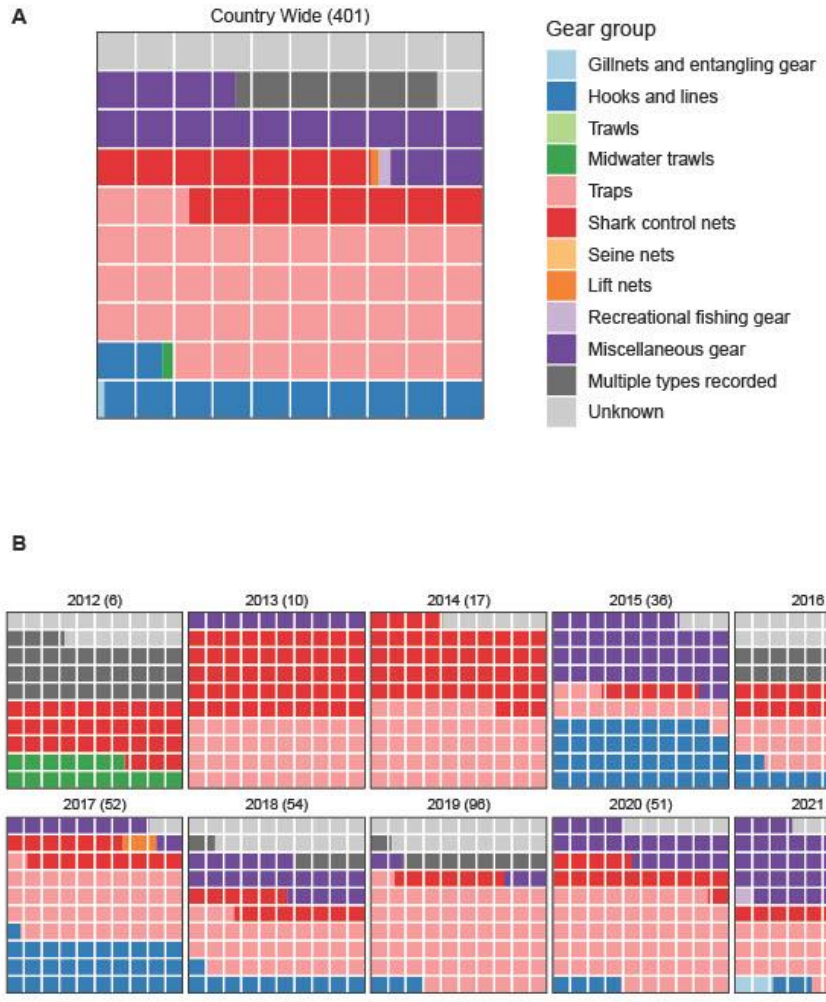


Figure 10: Proportion of the recorded total number of large cetaceans recorded as bycatch for each major fishing gear type between 2012-2021 for Australia aggregated (A) and by year (B). Note, individual squares represent 1% of total indvivduals bycaught, and numbers in parenthesis indicate total number of individuals for that year.

**Fishing gear by top species**

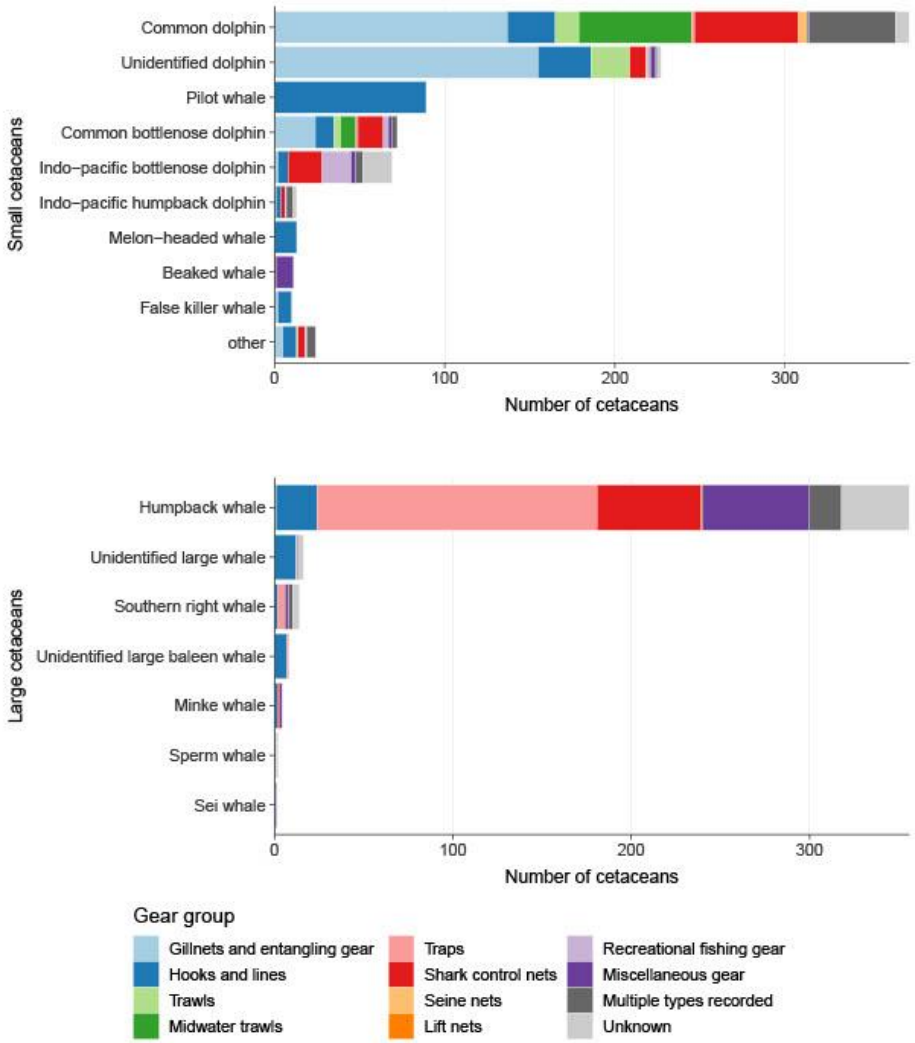


Figure 11: Number of indviduals recorded as bycatch for the top affected large and small cetacean species groups between 2012-2021 for Australia, by major fishing gear type.

## Recorded Data

This section provides an overview of the number of viable records submitted to the IWC portal, for Australia between 2012 and 2021. This excludes records removed from the analysis due to missing or incomplete data (see Data Cleaning and Errors section).

It is important to note:

1. An NA can reflect a) no data to report (i.e., no incidents happened) or b) no record submitted (i.e., there were cetacean incidents, but the data is missing). NAs for both small and large cetaceans in the same year (red NAs in Table 2) may suggest years where data has not been reported.
2. The number of records is not strictly equivalent to the number of incidents; individual records may contain multiple incidents, each of which can affect multiple individuals. The number of records, therefore, should be taken as an underestimate of the number of incidents.

### Number of records for small and large cetaceans

Table 2: Total number of large cetacean incident records submitted to the IWC portal between 2012-2021 for Australia. Red NA's indicated where data is missing for both large and small cetaceans.

| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|
| ***Small cetaceans*** | | | | | | | | | | |
| Bycatches | 13 | 26 | 29 | 56 | 17 | 119 | 26 | 29 | 19 | 81 |
| Strandings | 56 | 42 | 29 | 62 | 80 | 60 | 117 | 62 | 76 | 98 |
| Strikes | 1 | NA | 1 | 1 | 2 | 3 | 1 | 4 | 4 | 5 |
| ***Large cetaceans*** | | | | | | | | | | |
| Bycatches | 4 | 4 | 10 | 24 | 14 | 40 | 45 | 71 | 46 | 42 |
| Strandings | 18 | 15 | 16 | 25 | 20 | 26 | 43 | 29 | 27 | 23 |
| Strikes | 2 | 1 | 2 | 3 | 4 | 2 | 9 | 3 | 3 | 9 |

**Individuals per record: Small cetaceans**

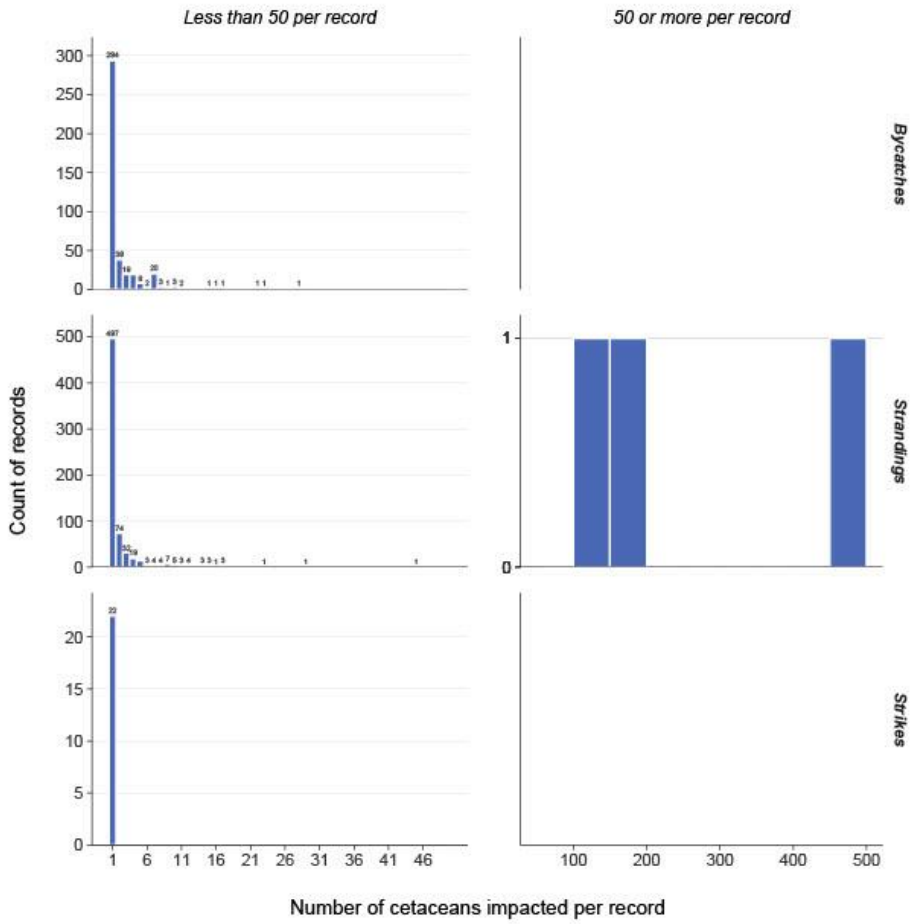


Figure 12: Distribution of the number of small cetaceans impacted per record between 2012-2021, for Australia. Note the different y-axis.

**Individuals per record: Large cetaceans**

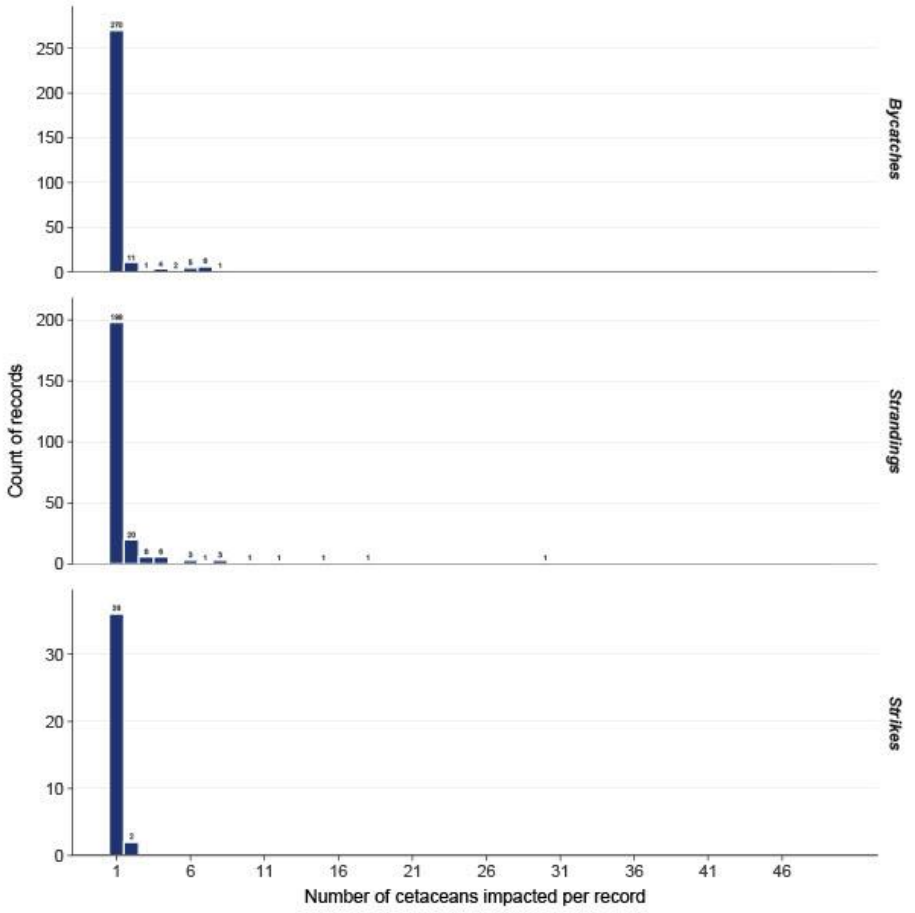


Figure 13: Distribution of the number of large cetaceans impacted per record between 2012-2021, for Australia. Note the different y-axis.

**Appendix 2: United States Scientific Progress Report summary**

# IWC Data Report 2022: USA (2009-2021)

Department of Climate Change, Energy, the Environment and Water, Australian Antarctic Division*
Prepared by Knowlegible Designs†
September 2022

## Contents



*Virginia.Andrews-Goff@aad.gov.au
†jess@knowlegible.design

## Introduction

This report is for IWC data downloaded for USA (2009-2021).

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## Definitions and notes

- The data underlying the report was downloaded from the International Whaling Commission's (IWC) Data Portal.
- An **incident** is defined as an event involving a cetacean. Incident types include *bycatch*, *strandings*, and *(ship)strikes*, as defined by the IWC.
- For simplicity, **bycatch** is used consistently throughout this report to refer to the accidental capture of a cetacean in fishing gear (mainly small cetaceans), as well as the entanglement of a cetacean in fishing gear (mainly large cetaceans), as defined by the IWC.
- A **record** refers to a single entry that has been entered into the IWC Portal. Due to varied reporting practices, individual records may contain multiple incidents, each of which can involve multiple individual cetaceans.

## Data Cleaning and Errors

Raw data downloaded from the IWC Portal needed to be cleaned and analysed to generate this report. This section summarizes the data that was problematic and how it was dealt with.

- Data sets that were not downloaded or not available for download from the IWC portal:
  - None

- The number of records with missing data (e.g., NA and NaN values) recorded for the dependent variables (total male, total female, etc.), for both large and small cetaceans combined. For these records, it has been assumed that one individual was impacted:
  - Bycatches: 2
  - Strandings: 1
  - Strikes: 73

- The number of records removed from the analysis due to incorrect data (e.g., non-integer values) recorded for the dependent variables (total male, total female, etc.), for both large and small cetaceans combined:
  - Bycatches: 0
  - Strandings: 0
  - Strikes: 0

- The number of records removed from the analysis due to missing data on species name (NA, NaN, etc.), for both large and small cetaceans:
  - Bycatches: 0
  - Strandings: 0
  - Strikes: 0

- Species not classified as small or large whales, and the number of records with those species in parenthesis. These records have been removed from the analysis, **please contact report author** if any species are listed below:
  - Bycatches: (0)
  - Strandings: (0)
  - Strikes: (0)

## Cetacean Incidents Overview

This section provides an overview of the **number of cetaceans** (of all species, by size) recorded to be impacted by an incident (bycatches, strikes, and strandings) between 2009 and 2021 for USA.

### Small cetaceans overview

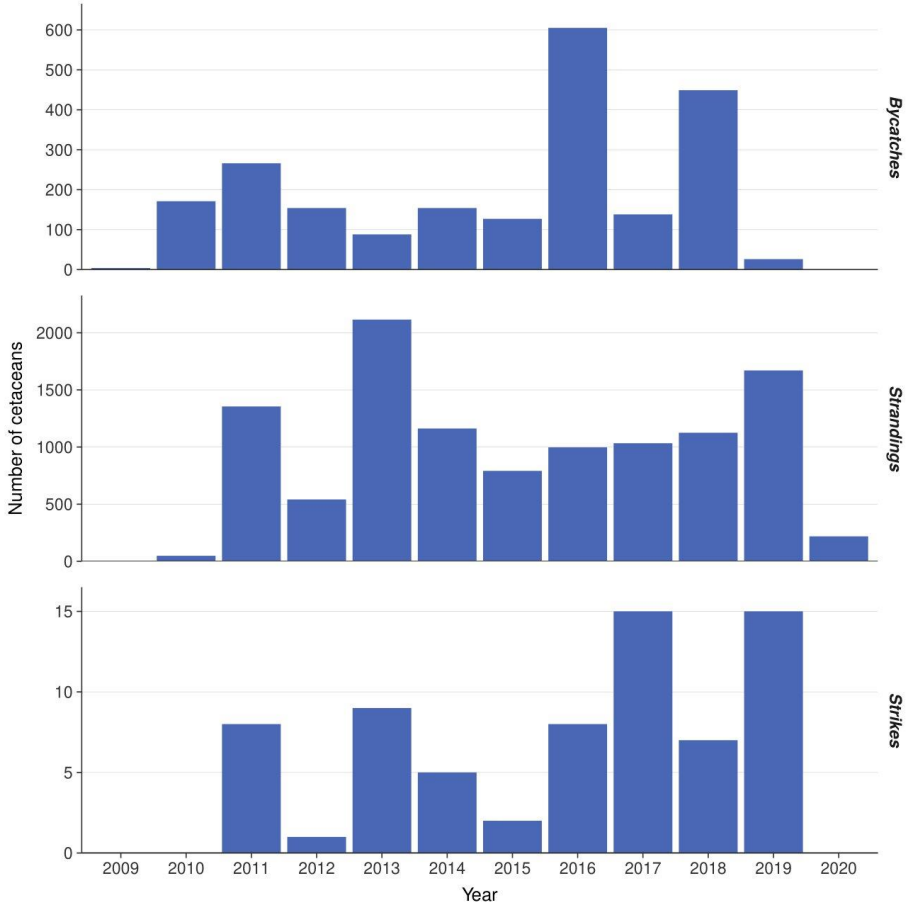


Figure 1: Total number of small cetaceans recorded to be in an incident over time, by incident type (rows). Note the different y-scales. See Table 1 (below) for cetacean groupings.

**Large cetaceans overview**

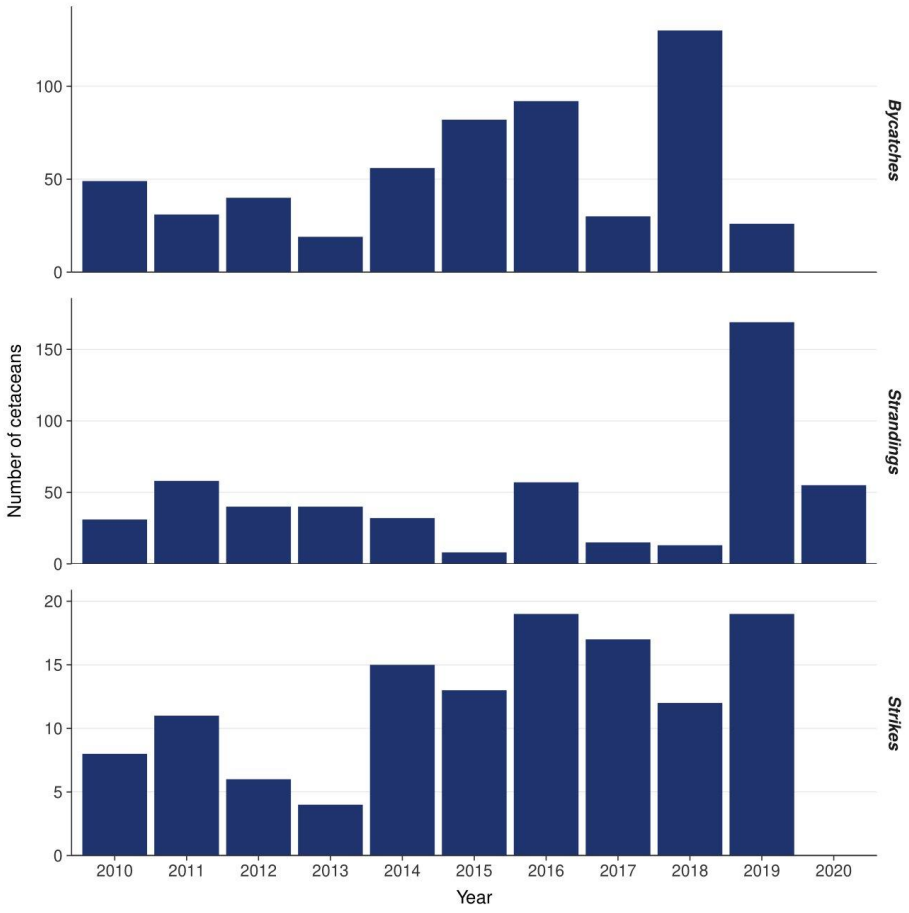


Figure 2: Total number of large cetaceans recorded to be in an incident over time, by incident type (rows). Note the different y-scales. See Table 1 (below) for cetacean groupings.

**Species overview**

Table 1: Total number of recorded cetaceans impacted and total number of records sumbitted (in parentheses) between 2009-2021 for USA, by species groups and incident type. Note that individual records may contain multiple incidents, each of which can affect multiple individuals.

| Group | Bycatch | Strandings | Strikes | Total |
|---|---|---|---|---|
| *Small Cetaceans* | | | | |
| Common bottlenose dolphin | 67 (13) | 7227 (42) | 46 (12) | 7340 (67) |
| Common dolphin | 1035 (43) | 1234 (43) | 7 (7) | 2276 (93) |
| Harbour porpoise | 549 (31) | 878 (144) | 6 (6) | 1433 (181) |
| Pilot whale | 219 (26) | 257 (20) | NA (NA) | 476 (46) |
| Atlantic white-sided dolphin | 93 (9) | 239 (10) | NA (NA) | 332 (19) |
| Pygmy sperm whale | 8 (2) | 228 (27) | NA (NA) | 236 (29) |
| Long-beaked common dolphin | 38 (20) | 189 (67) | 2 (2) | 229 (89) |
| Risso's dolphin | 108 (22) | 72 (24) | 1 (1) | 181 (47) |
| False killer whale | NA (NA) | 102 (3) | NA (NA) | 102 (3) |
| Dwarf sperm whale | NA (NA) | 88 (16) | NA (NA) | 88 (16) |
| Unidentified dolphin | 6 (5) | 81 (9) | NA (NA) | 87 (14) |
| Striped dolphin | 5 (3) | 77 (39) | 2 (2) | 84 (44) |
| Atlantic spotted dolphin | 1 (1) | 71 (12) | NA (NA) | 72 (13) |
| Unidentified small cetacean | 3 (2) | 65 (26) | NA (NA) | 68 (28) |
| Pacific white-sided dolphin | 25 (7) | 13 (12) | 5 (5) | 43 (24) |
| Beaked whale | 1 (1) | 38 (30) | 1 (1) | 40 (32) |
| Gervais' beaked whale | NA (NA) | 32 (9) | NA (NA) | 32 (9) |
| Melon-headed whale | NA (NA) | 29 (10) | NA (NA) | 29 (10) |
| Clymene dolphin | NA (NA) | 24 (7) | NA (NA) | 24 (7) |
| Spinner dolphin | NA (NA) | 23 (7) | NA (NA) | 23 (7) |
| Pantropical spotted dolphin | 2 (2) | 18 (9) | NA (NA) | 20 (11) |
| Northern right whale dolphin | 8 (6) | 8 (7) | NA (NA) | 16 (13) |
| Rough-toothed dolphin | 2 (1) | 13 (6) | NA (NA) | 15 (7) |
| Pygmy killer whale | NA (NA) | 14 (7) | NA (NA) | 14 (7) |
| Fraser's dolphin | NA (NA) | 11 (3) | NA (NA) | 11 (3) |
| Dall's porpoise | 4 (4) | 5 (3) | NA (NA) | 9 (7) |
| Unidentified beaked whale | 2 (2) | 7 (4) | NA (NA) | 9 (6) |
| White-beaked dolphin | NA (NA) | 7 (4) | NA (NA) | 7 (4) |
| Killer whale | 5 (4) | 1 (1) | NA (NA) | 6 (5) |
| White whale | 1 (1) | 1 (1) | NA (NA) | 2 (2) |
| Unidentified small whale | NA (NA) | 2 (1) | NA (NA) | 2 (1) |
| Longman's beaked whale | NA (NA) | 1 (1) | NA (NA) | 1 (1) |
| *Large Cetaceans* | | | | |
| Humpback whale | 301 (86) | 158 (40) | 57 (21) | 516 (147) |
| Gray whale | 67 (56) | 128 (64) | 21 (17) | 216 (137) |
| Minke whale | 75 (13) | 97 (18) | 9 (8) | 181 (39) |
| North atlantic right whale | 55 (8) | 17 (11) | 10 (6) | 82 (25) |
| Fin whale | 19 (10) | 20 (10) | 17 (17) | 56 (37) |
| Sperm whale | 3 (2) | 43 (14) | NA (NA) | 46 (16) |
| Unidentified large whale | 27 (12) | 11 (6) | 1 (1) | 39 (19) |
| Sei whale | 2 (2) | 11 (9) | 5 (5) | 18 (16) |
| Unidentified large baleen whale | NA (NA) | 15 (10) | NA (NA) | 15 (10) |
| Blue whale | 6 (3) | 4 (4) | 4 (4) | 14 (11) |
| Bowhead whale | NA (NA) | 11 (1) | NA (NA) | 11 (1) |
| Bryde's whale | NA (NA) | 3 (3) | NA (NA) | 3 (3) |

## Cetacean Incidents Detailed

This section explores in more detail the number of cetaceans recorded to be impacted by an incident (by-catches, strikes, and strandings), for USA between 2009 and 2021.

A maximum of 9 species are displayed per page, with the remaining species combined together as 'other'. The species displayed are the top 9 species for a given incident type (e.g., the next page displays the top 9 small cetacean species caught as bycatch between 2009 and 2021). If less than 9 species are displayed, no other species were reported for that incident type.

**Small Cetaceans: Bycatches**

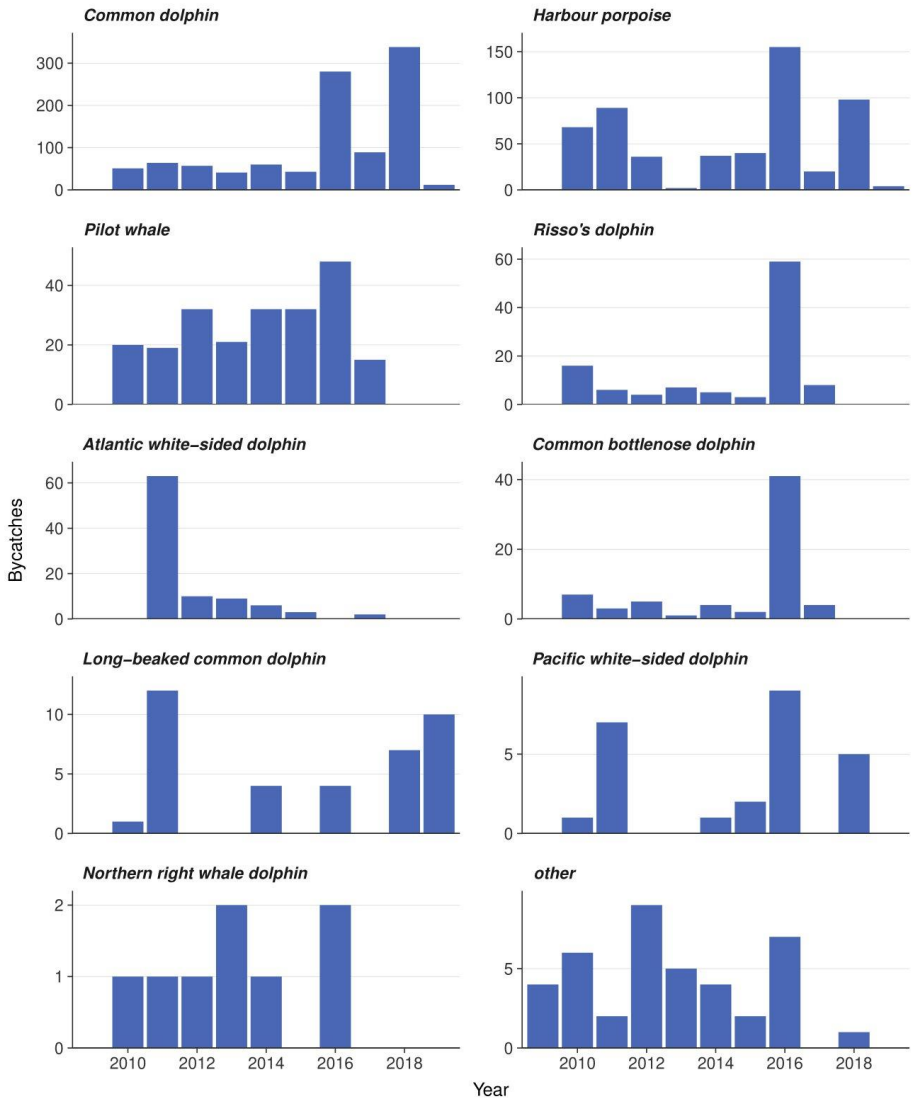


Figure 3: Total number of small cetaceans recorded to be in a bycatch incident, by species grouping. Note the different y-scales.

**Small Cetaceans: Strandings**

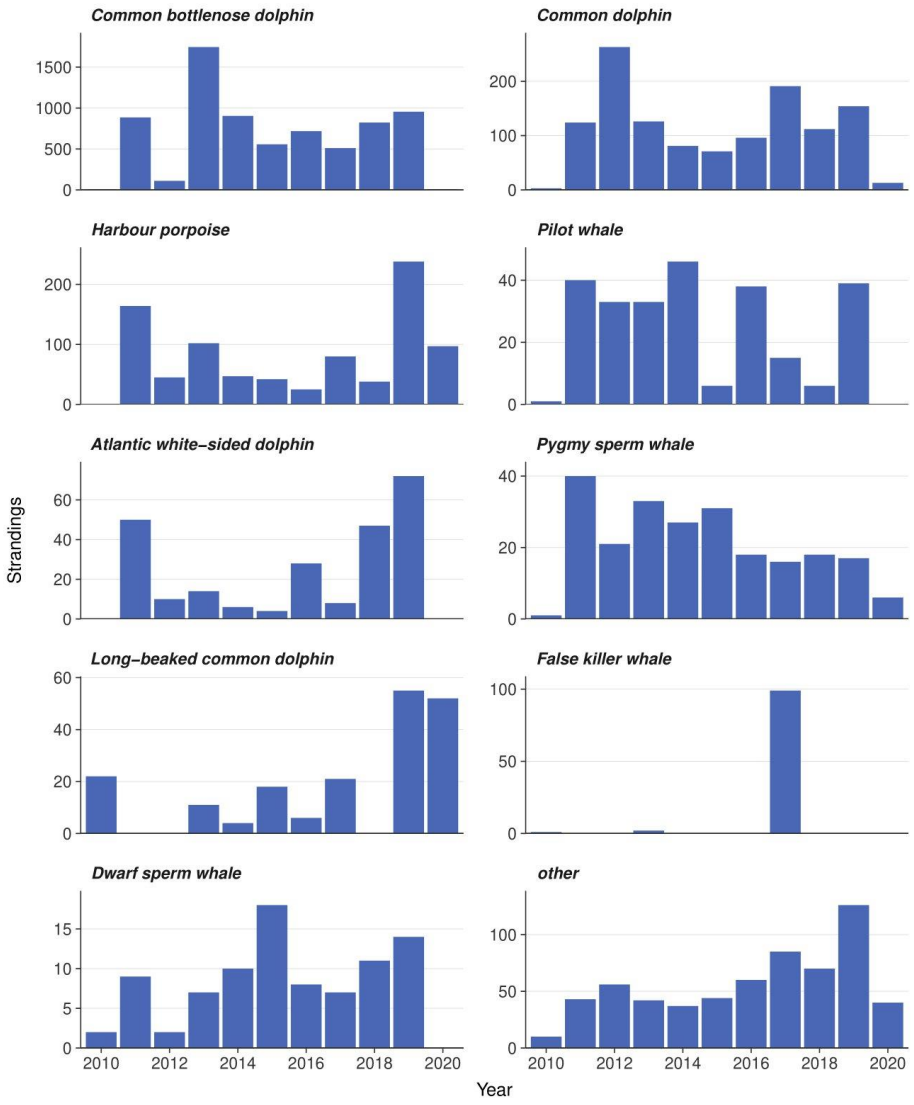


Figure 4: Total number of small cetaceans recorded to be in a stranding incident, by species grouping. Note the different y-scales.

**Small Cetaceans: Strikes**

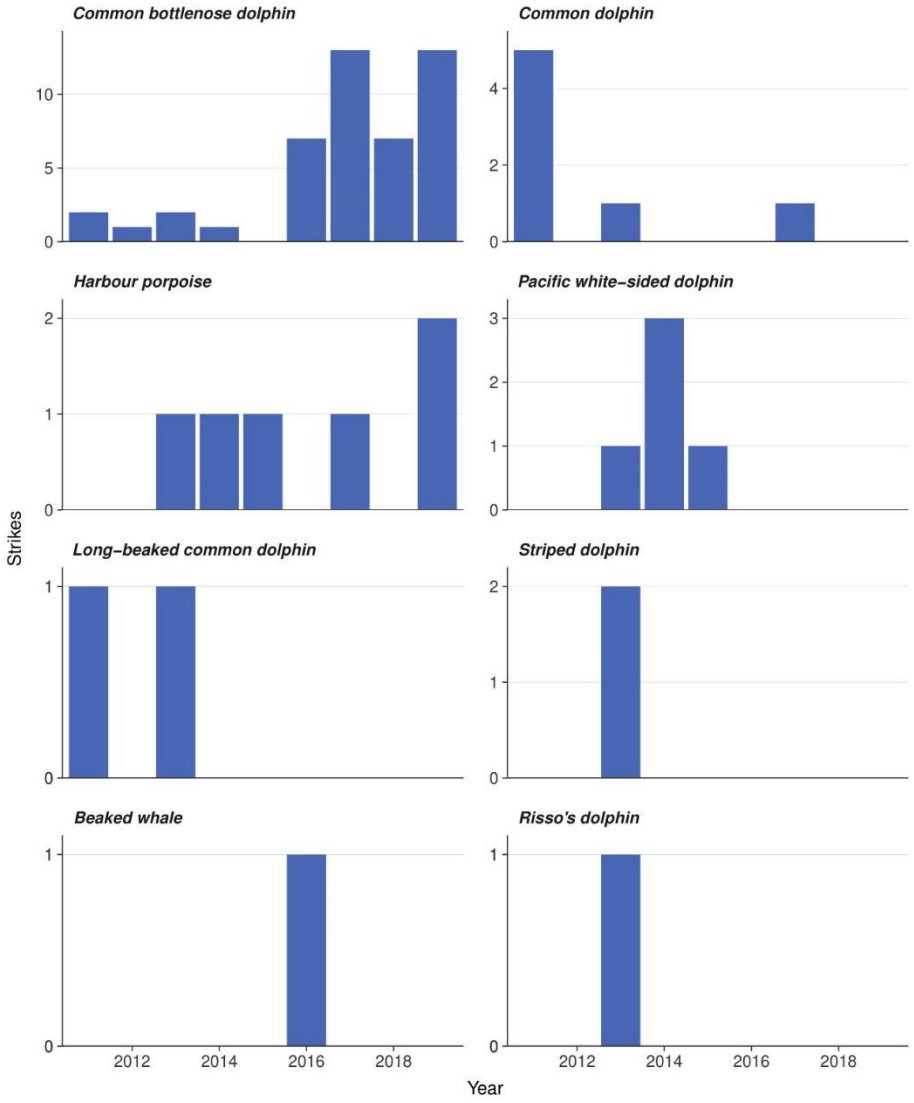


Figure 5: Total number of small cetaceans recorded to be in a vessel strike incident, by species grouping. Note the different y-scales.

**Large Cetaceans: Bycatches**

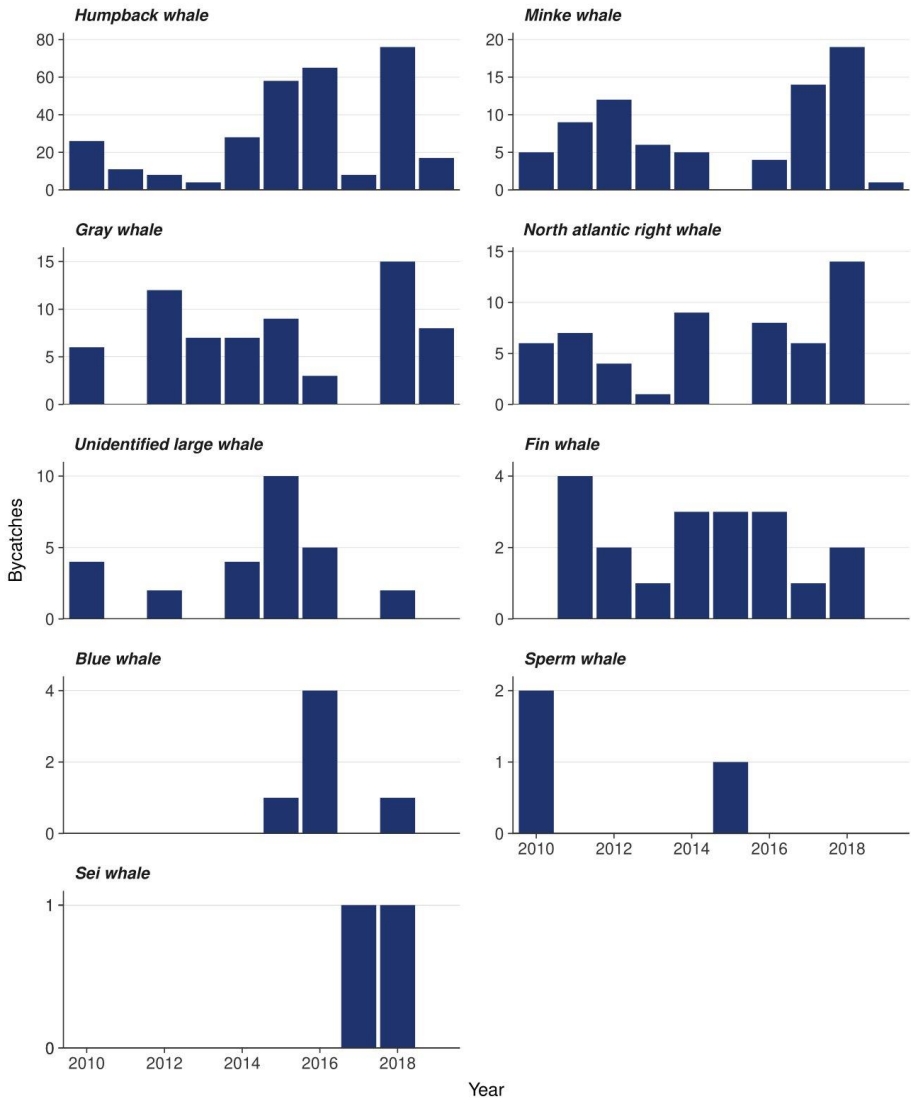


Figure 6: Total number of large cetaceans recorded to be in a bycatch incident, by species grouping. Note the different y-scales.

**Large Cetaceans: Strandings**

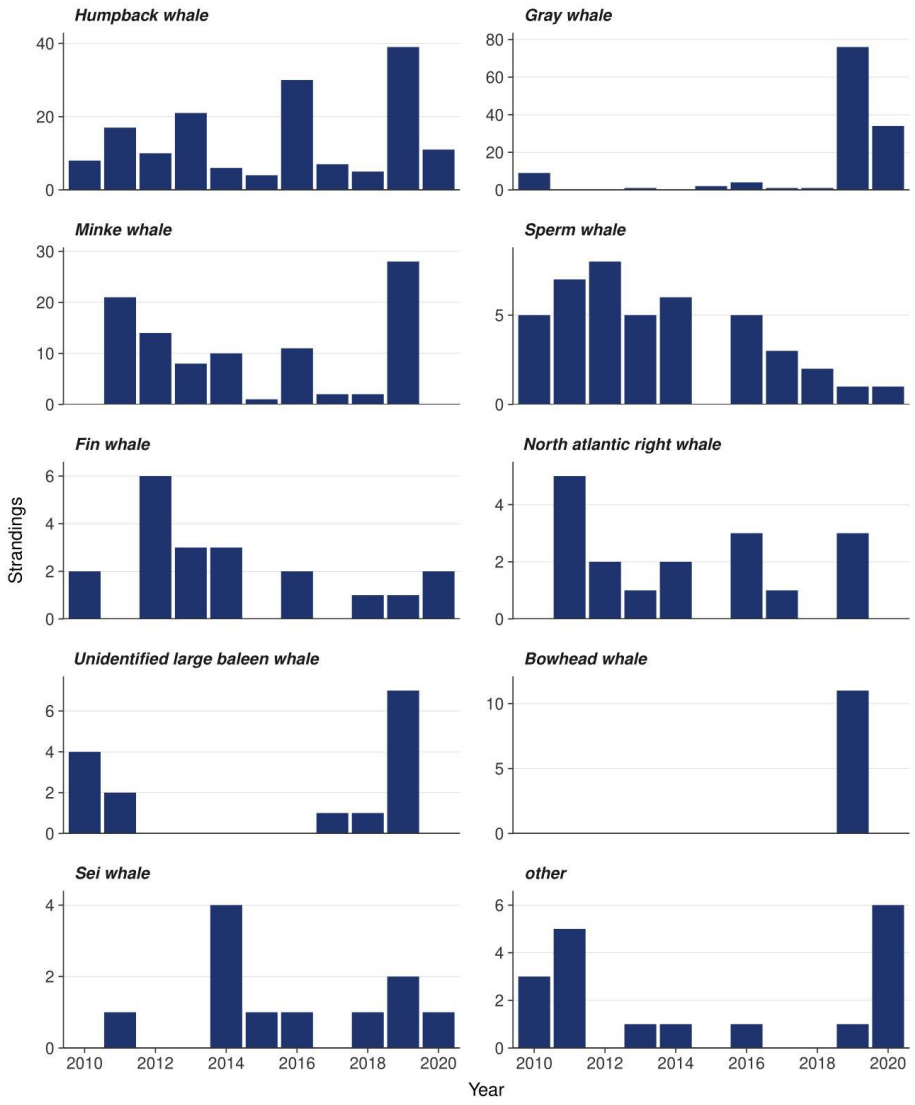


Figure 7: Total number of large cetaceans recorded to be in a stranding incident, by species grouping. Note the different y-scales.

**Large Cetaceans: Strikes**

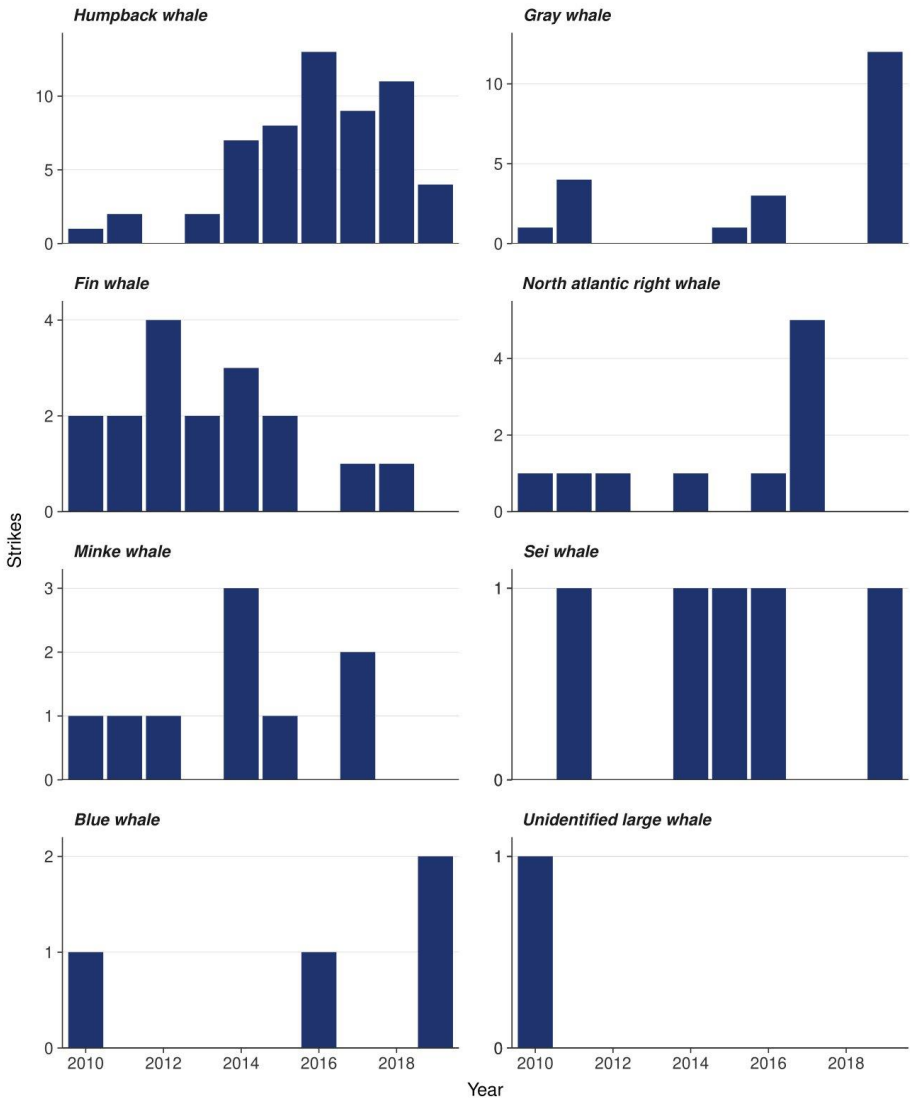


Figure 8: Total number of large cetaceans recorded to be in a vessel strike incident, by species grouping. Note the different y-scales.

## Fishing Gear

This section provides an overview of the major types of fishing gear that cetaceans have been caught as bycatch/entangled in in USA between 2009 and 2021.

If multiple gear types were identified in a single record, the record was categorised as 'Multiple types recorded'. If the gear was listed as miscellaneous, unknown or unspecified, it was categorised as 'unknown'.

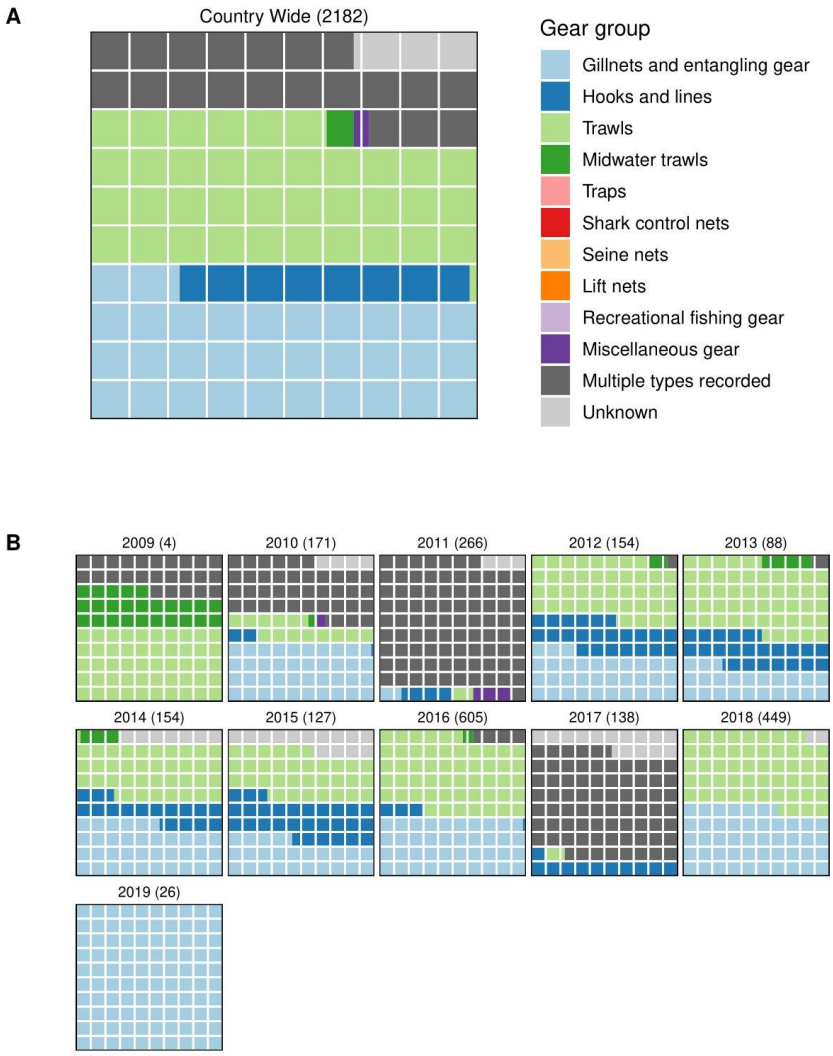


Figure 9: Proportion of the recorded total number of small cetaceans recorded as bycatch for each major fishing gear type between 2009-2021 for USA aggregated (A) and by year (B). Note, individual squares represent 1% of total indvivduals bycaught, and numbers in parenthesis indicate total number of individuals for that year.


Figure 10: Proportion of the recorded total number of large cetaceans recorded as bycatch for each major fishing gear type between 2009-2021 for USA aggregated (A) and by year (B). Note, individual squares represent 1% of total indvivduals bycaught, and numbers in parenthesis indicate total number of individuals for that year.

**Fishing gear by top species**

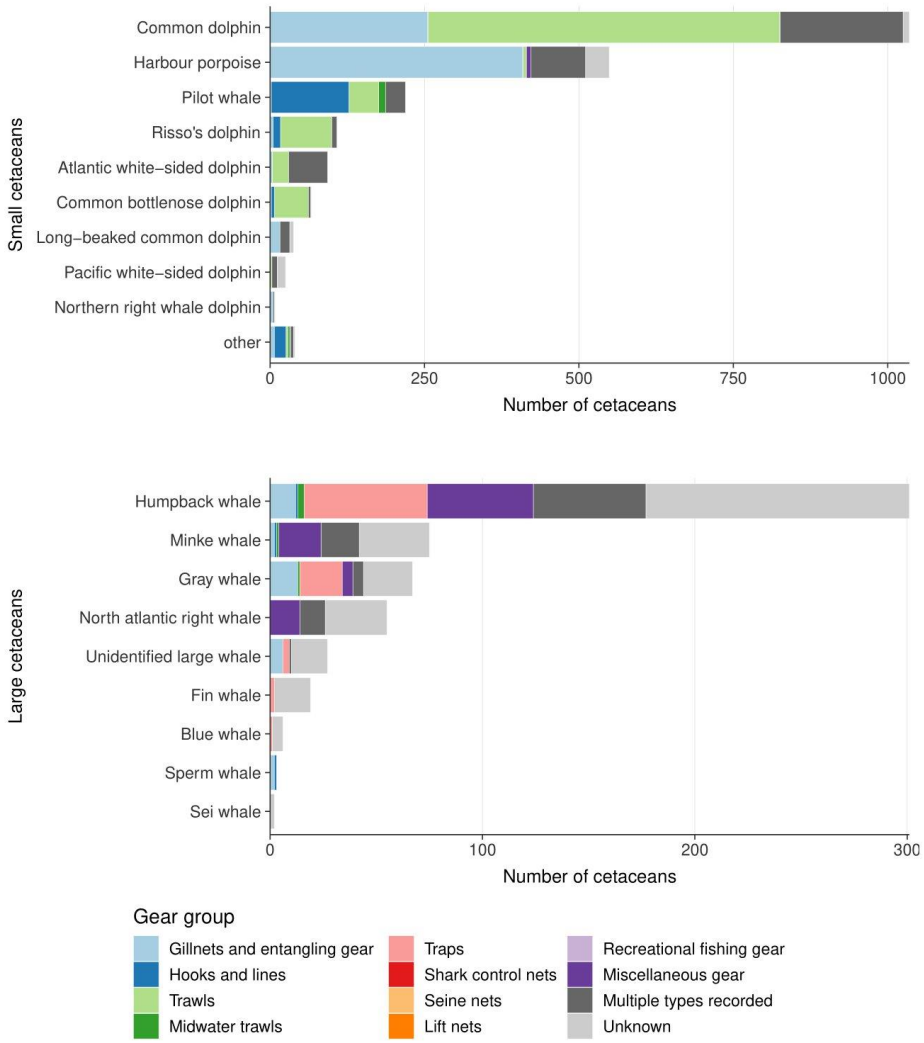


Figure 11: Number of indviduals recorded as bycatch for the top affected large and small cetacean species groups between 2009-2021 for USA, by major fishing gear type.

## Recorded Data

This section provides an overview of the number of viable records submitted to the IWC portal, for USA between 2009 and 2021. This excludes records removed from the analysis due to missing or incomplete data (see Data Cleaning and Errors section).

It is important to note:

1. An NA can reflect a) no data to report (i.e., no incidents happened) or b) no record submitted (i.e., there were cetacean incidents, but the data is missing). NAs for both small and large cetaceans in the same year (red NAs in Table 2) may suggest years where data has not been reported.
2. The number of records is not strictly equivalent to the number of incidents; individual records may contain multiple incidents, each of which can affect multiple individuals. The number of records, therefore, should be taken as an underestimate of the number of incidents.

### Number of records for small and large cetaceans

Table 2: Total number of large cetacean incident records submitted to the IWC portal between 2009-2021 for USA. Red NA's indicated where data is missing for both large and small cetaceans.

| | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Small cetaceans*** | | | | | | | | | | | | |
| Bycatches | 3 | 16 | 20 | 22 | 21 | 39 | 15 | 20 | 7 | 16 | 26 | NA |
| Strandings | NA | 15 | 34 | 26 | 29 | 33 | 32 | 35 | 30 | 30 | 122 | 218 |
| Strikes | NA | NA | 8 | 1 | 9 | 5 | 2 | 2 | 5 | 1 | 3 | NA |
| ***Large cetaceans*** | | | | | | | | | | | | |
| Bycatches | NA | 12 | 5 | 21 | 13 | 33 | 13 | 10 | 5 | 54 | 26 | NA |
| Strandings | NA | 9 | 12 | 9 | 10 | 13 | 5 | 14 | 6 | 7 | 50 | 55 |
| Strikes | NA | 8 | 11 | 6 | 4 | 15 | 7 | 6 | 4 | 2 | 16 | NA |

**Individuals per record: Small cetaceans**

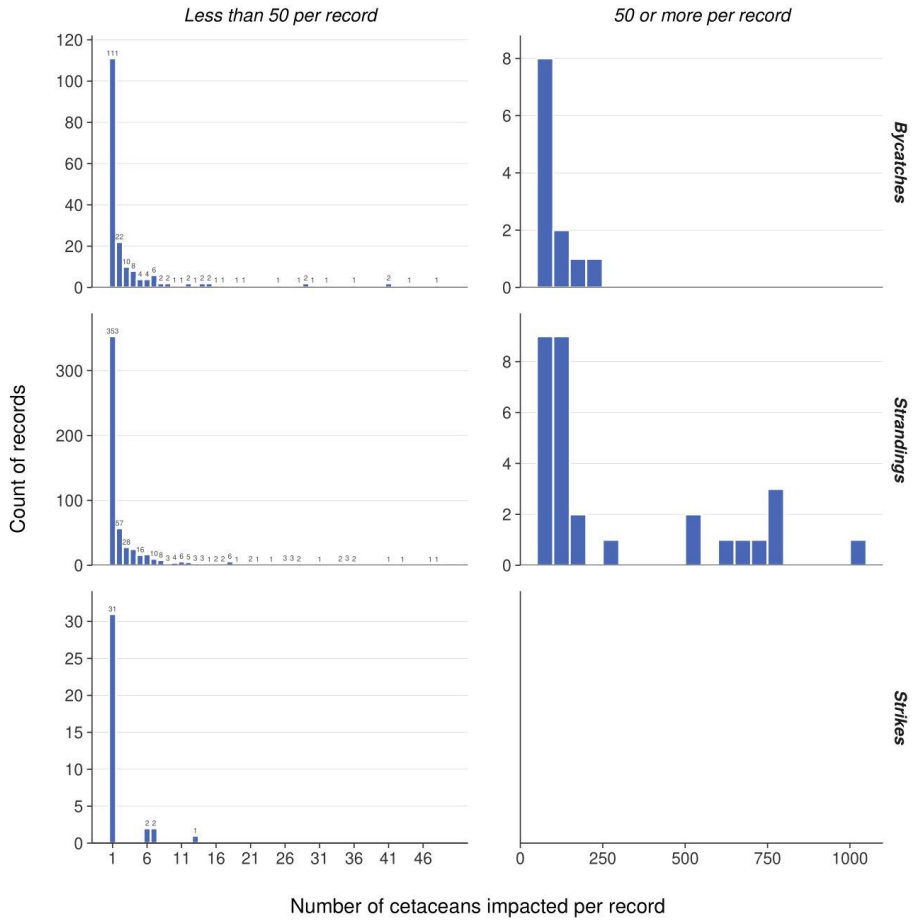


Figure 12: Distribution of the number of small cetaceans impacted per record between 2009-2021, for USA. Note the different y-axis.

**Individuals per record: Large cetaceans**

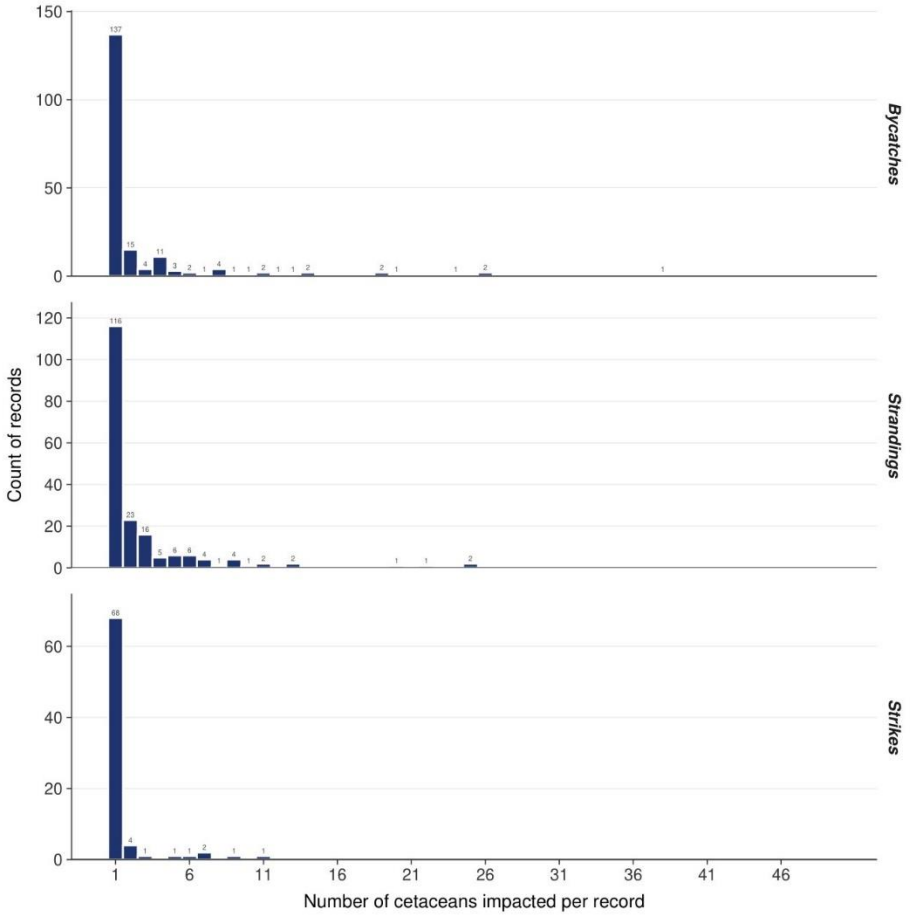


Figure 13: Distribution of the number of large cetaceans impacted per record between 2009-2021, for USA. Note the different y-axis.