



## **Sixth Meeting of the Seabird Bycatch Working Group**

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### **An example of bycatch data dissemination**

***N. Walker, M. Cryer, F. Thompson, E. Abraham***

#### **SUMMARY**

In New Zealand a novel approach has been taken to making bycatch data available to a wider audience. Summaries of fishing effort, observer coverage, bycatch events and estimated total bycatch are displayed on website maintained by a research provider. The website is interactive, so users can examine species, fisheries, areas and years of interest.

This has allowed interested parties from diverse backgrounds to examine trends in bycatch for areas, species and fisheries of interest. This helps raise the issue of seabird bycatch and highlights where further research, observer coverage and management may be appropriate.

#### **Ejemplo de divulgación de datos sobre captura secundaria**

En Nueva Zelanda, se ha adoptado un novedoso enfoque para poner a disposición de una audiencia más amplia datos sobre la captura secundaria. En un sitio web administrado por una empresa de investigación, se proporcionan resúmenes sobre el esfuerzo pesquero, la presencia de observadores, episodios de captura secundaria y la totalidad calculada de capturas. El sitio web es interactivo, de modo tal que los usuarios pueden investigar especies, pesquerías, áreas y años de interés.

Ello ha permitido que las partes interesadas de diversa índole y formación puedan indagar tendencias en la captura secundaria según áreas, especies y pesquerías de interés. Esta tarea ayuda a concientizar sobre el problema de la captura secundaria de aves marinas y resalta las áreas donde puede ser conveniente contar con más investigaciones, una mayor presencia de observadores y una mejor ordenación.

#### **Un exemple de diffusion des données liées à la capture accessoire**

Une nouvelle approche a été adoptée en Nouvelle-Zélande pour rendre les données liées à la capture accessoire accessible à un plus large public. Des résumés sur les efforts de pêche, sur la présence d'observateurs, sur les cas de capture accessoire et sur les estimations totales de captures accessoires sont disponibles sur le site internet d'un service de recherche. Le site internet est interactif, de sorte que les utilisateurs peuvent y consulter

les informations relatives aux espèces, aux pêcheries, aux zones et aux années qui les intéressent.

Cela a permis à des parties intéressées d'horizons différents d'examiner les tendances de capture accessoire par zones, espèces et pêcheries d'intérêt. Cela permet de soulever la question de la capture accessoire des oiseaux de mer et de mettre en lumière les zones nécessitant des recherches approfondies, une plus grande présence d'observateurs ou une gestion élargie.

## **1. SEABIRD BYCATCH DATA DISSEMINATION**

### **1.1. Introduction to the protected species capture website**

This analysis was carried out through a New Zealand Ministry for Primary Industries project PRO2010/01: Estimating the nature and extent of incidental captures of seabirds, marine mammals and turtles in New Zealand commercial fisheries. The overall objective of the project is to estimate the nature and extent of captures of seabirds, mammals and turtles, and the warp strikes of seabirds in New Zealand fisheries (deepwater, highly migratory and inshore) for the fishing years 2009–10, 2010–11, and 2011–12.

As part of this project, a website was developed to display summaries of fishing effort, observer coverage, bycatch events and estimated total bycatch. The website is interactive, so users can examine species, fisheries, areas and years of interest. This website is available at <https://data.dragonfly.co.nz/psc/>, it is currently maintained by Dragonfly Science who conducted the underlying analyses and designed the website.

This has allowed interested parties from diverse backgrounds to examine trends in bycatch for areas, species and fisheries of interest. This helps raise the issue of seabird bycatch and highlights where further research, observer coverage and management may be appropriate.

See Annex 2 for example screen shots from the New Zealand protected species capture website.

### **1.2. The underlying seabird capture data**

In New Zealand commercial fisheries, captures of protected marine species are monitored at sea by Government observers. Observers are deployed on a portion of vessels by the Ministry for Primary Industries and the Department of Conservation. Observers collect information on protected species captures, which is then used to estimate total captures across all (observed and unobserved) commercial fishing, using statistical modelling. For a detailed description of data preparation and statistical methods, see Abraham and Thompson (2011a, 2011b).

Estimates of total seabird captures have been made at the species level for sooty shearwater (*Puffinus griseus*), white-chinned petrel (*Procellaria aequinoctialis*), and white-capped albatross (*Thalassarche steadi*). These are the three seabird species that are most frequently reported caught in trawl and longline fisheries. Estimates of total captures are also generated for captures of 'other albatrosses' (Diomedidae, excluding white-capped albatrosses) and 'other birds' (all other seabirds excluding Diomedidae, sooty shearwaters and white-chinned petrels).

### *1.2.1. Observed captures*

Estimates of seabird bycatch are based on observed captures. These are animals reported by fisheries observers as captured and then either released alive or landed dead. A capture is defined as when an animal became fixed, entangled, or trapped so that it is prevented from moving freely or freeing itself.

Observed captures do not include cryptic mortality (e.g., birds killed by warp strikes, but not brought on board the vessel). Captures also do not include seabird deck strikes (such as birds whose deaths were unrelated to the deployment of fishing gear per se) or animals captured in a decomposing state (as these were assumed to have died of causes unrelated to the observed fishing effort).

A status of 'Dead' or 'Alive' reflects the animal's state on capture or release (if alive). The status 'Alive' does not indicate a prognosis for survival after release.

### *1.2.2. Species identification*

When birds are captured they are identified by the observer, to the extent that the observer is able. Dead animals may subsequently be returned to the Department of Conservation for necropsy. This allows an accurate identification to be made. Since 2010, observers have routinely taken suitably diagnostic photographs of captured animals, and these allow expert identification to be made.

As expert identifications often differ from the observer identification, an imputation process has been used to correct observer identifications (based on comparing observer and expert identifications of the same animals) when no necropsy identification is available. This is particularly important for seabirds, as observers are often not able to identify them to the species level.

Where an expert identification from the necropsy is available, it is used. Where no such identification is used, an imputed identification is used if it differs from the observer reported species. Imputed identifications are noted as such.

The scientific and common names follow the recommendations of the Ornithological Society of New Zealand checklist committee (2010).

### *1.2.3. Estimated captures*

These are the estimated total captures across both observed and unobserved fishing effort. Estimates were made with a Generalized Linear Model, fitted using Bayesian methods (Abraham and Thompson 2011a). The estimated captures are summarised by the mean of and 95% confidence intervals of the estimates posterior distributions.

### *1.2.4. Summary areas*

A set of areas were developed for summarising the fishing effort and the protected species captures. These areas were chosen for the purpose of grouping related fishing effort together, and are not the Fishery Management Areas. A map showing the areas is given in Figure 4 Annex 2..

### *1.2.5. Fishing year*

In general, Ministry for Primary Industries fishing years run from 1 October to 30 September, and at this stage all captures are reported by fishing year. In places such as plots, where

only a single year is given, this refers to the second year in the period. For example, 2010 refers to the 2009/10 fishing year, covering the period from 1 October 2009 to 30 September 2010. For some fisheries, such as Southern Blue Whiting a different fishing year is usually used. However, because of the need to compare and aggregate data across different fisheries, we only use the standard fishing year.

#### 1.2.6. Fishing effort

Fishing effort may either be presented as events (individual tows for trawl fisheries, and sets for longline fisheries), or as tows (trawl fisheries), and hooks (longline fisheries).

#### 1.2.7. Target species and fishery

Fisheries are defined by the fishing method and the target species (the fish that the fishing was intending to catch). When defining the target fishery, the target species reported by the fisher from each fishing event s used. In some cases the target species was missing, or else an unusual target species was reported. In these cases the fishery was assigned based on fishing by the same vessel with a defined fishery.

The following fisheries were used for summarising the data. The codes in brackets are three letter codes used by the Ministry of Fisheries.

Trawl fisheries:

1. Squid (SQU)
2. Hoki (HOK)
3. Hake (HAK)
4. Ling (LIN)
5. Scampi (SCI)
6. Southern blue whiting (SBW)
7. Mackerel - Jack mackerel (JMA), Blue mackerel (EMA)
8. Deepwater - Orange roughy (ORH), Oreos (OEO, SSO, BOE), Black cardinal fish (CDL), Patagonian toothfish (PTO)
9. Middle depths - Barracouta (BAR), Warehou (WAR, WWA, SWA), Alfonsino (BYX), Gemfish (SKI), Bluenose (BNS), Sea perch (SPE), Ghost shark (GSH), Spiny dogfish (SPD), Rubyfish (RBY), Frostfish (FRO)
10. Flatfish (FLA)
11. Inshore - Tarakihi (TAR), Snapper (SNA), Gurnard (GUR), Red cod (RCO), Trevally (TRE), John dory (JDO), Giant stargazer (STA), Elephant fish (ELE), Queen scallop (QSC), Leatherjacket (LEA), School shark (SCH), Blue moki (MOK), Blue cod (BCO), Rig (SPO), Hapuku (HPB)

Bottom longline:

1. Ling (LIN)
2. Snapper (SNA)
3. Bluenose Bluenose (BNS)

4. Other - Hapuku & bass (HPB, HAP, BAS), School shark (SCH), Gurnard (GUR), Blue cod (BCO), Ribaldo (RIB), Patagonian toothfish (PTO, ATO), Tarakihi (TAR), Trumpeter (TRU), Silver warehou (SWA), Red snapper (RSN), Gemfish (SKI)
5. Surface longline
6. Bigeye tuna (BIG)
7. Southern bluefin tuna (STN)
8. Albacore tuna (ALB)
9. Swordfish (SWO)
10. Other - Yellowfin tuna (YFN), Pacific bluefin tuna (TOR), Snapper (SNA), Northern bluefin tuna (NTU)

#### *1.2.8. Observer coverage*

Observers are placed on selected vessels by the Ministry for Primary Industries. Observers are not present on all vessels. Fishing effort is therefore categorised as observed or unobserved in the figures and tables. The observed fishing may be reported either as an amount of fishing effort, or as observer coverage (the proportion of fishing effort that was observed).

#### *1.2.9. Data availability*

Data are made available for reuse by the Ministry for Primary Industries and the Department of Conservation, under a creative commons attribution licence, following the recommendations of NZGOAL. Figures are available under the same licence, but copyright Dragonfly Science. This licence allows the figures and data to be used for any other purpose and republished, provided only that attribution is given to the source. At the bottom of each page, a citation is given with a preferred format for referencing the data.

Each release of the data has a version number. The data are subject to change if any errors are found, or when further analysis is carried out in subsequent years. Any changes to the data will be accompanied by the release of a new version. Including the version number in citations will allow for reference to the data as they were when the version was published.

Creative commons images have been sourced to illustrate each species. These may also be reused, subject to the conditions of the original licence.

## **ANNEX 1: REFERENCES**

Abraham, E. R., & Thompson, F. N. (2011a). Estimated capture of seabirds in New Zealand trawl and longline fisheries, 2002–03 to 2008–09. New Zealand Aquatic Environment and Biodiversity Report No. 79. 74 pages. Download from Ministry for Primary Industries.

Abraham, E. R., & Thompson, F. N. (2011b). Summary of the capture of seabirds, marine mammals, and turtles in New Zealand commercial fisheries, 1998–99 to 2008–09. New Zealand Aquatic Environment and Biodiversity Report No. 80. 170 pages. Download from Ministry for Primary Industries.

Abraham, E.R., Thompson, F.N., & Berkenbusch, K. (2013). Estimated capture of seabirds in New Zealand trawl and longline fisheries, 2002–03 to 2010–11. Final Research Report for Ministry for Primary Industries project PRO2010-01 (Unpublished report held by Ministry for Primary Industries, Wellington).

Ornithological Society of New Zealand checklist committee (2010). Checklist of the birds of New Zealand, Norfolk and Macquarie Islands, and the Ross Dependency, Antarctica. Ornithological Society of New Zealand and Te Papa Press, Wellington, New Zealand. 500 p.

Richard, Y., & Abraham, E.R. (2013a). Application of Potential Biological Removal methods to seabird populations. New Zealand Aquatic Environment and Biodiversity Report No. 108. 30 pages.

Richard, Y., & Abraham, E.R. (2013b). Risk of commercial fisheries to New Zealand seabird populations. New Zealand Aquatic Environment and Biodiversity Report No. 109. 58 pages.

## ANNEX 2: EXAMPLES FROM THE PSC WEBSITE

Figure 1: Screenshot from the New Zealand Protected Species Bycatch website, showing the captures of all seabird from all trawl fisheries throughout New Zealand.

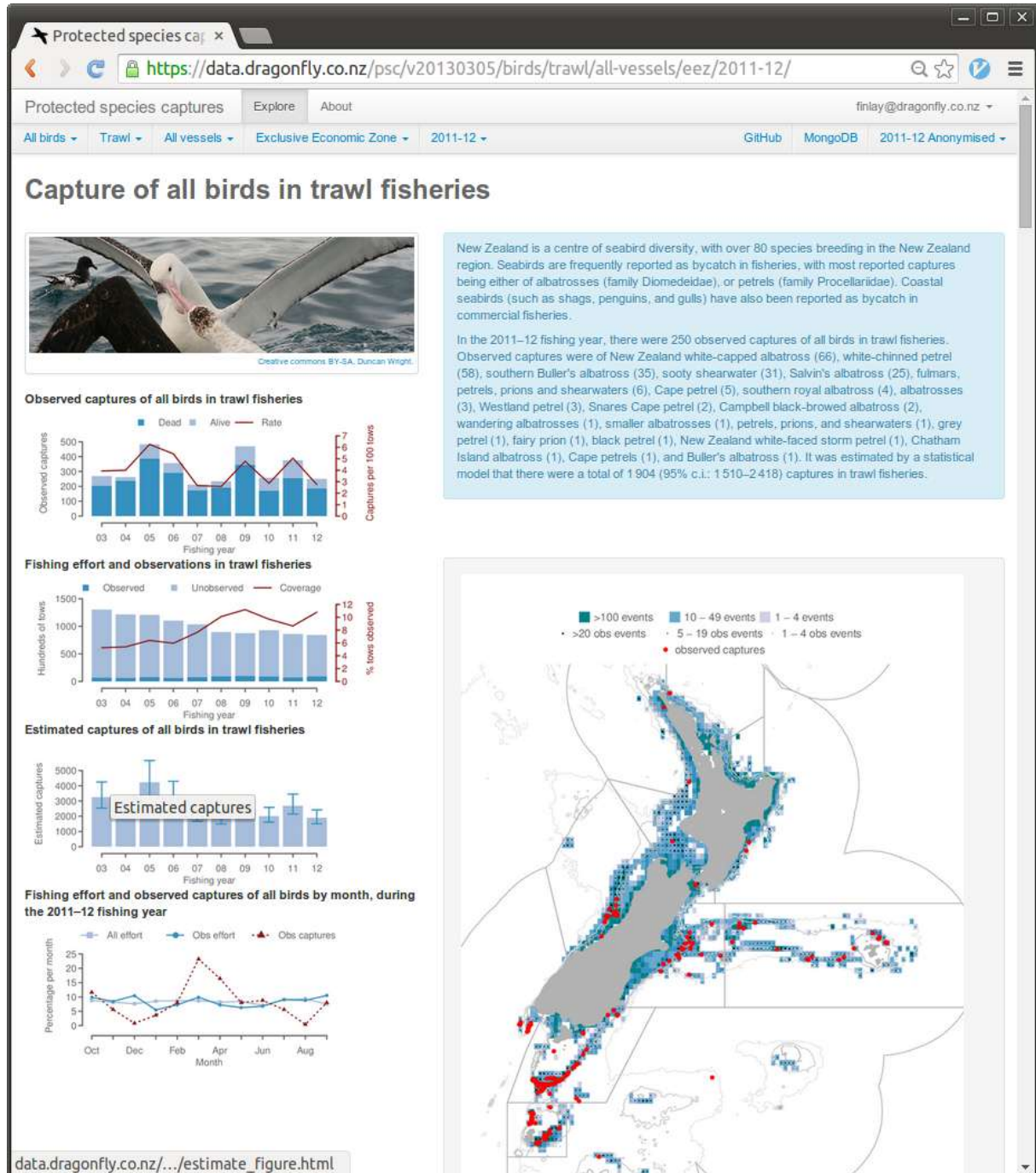


Figure 2: Screenshot from the New Zealand Protected Species Bycatch website, showing the captures of Southern Buller's albatross from surface longline fishing targeting southern bluefin tuna throughout New Zealand.

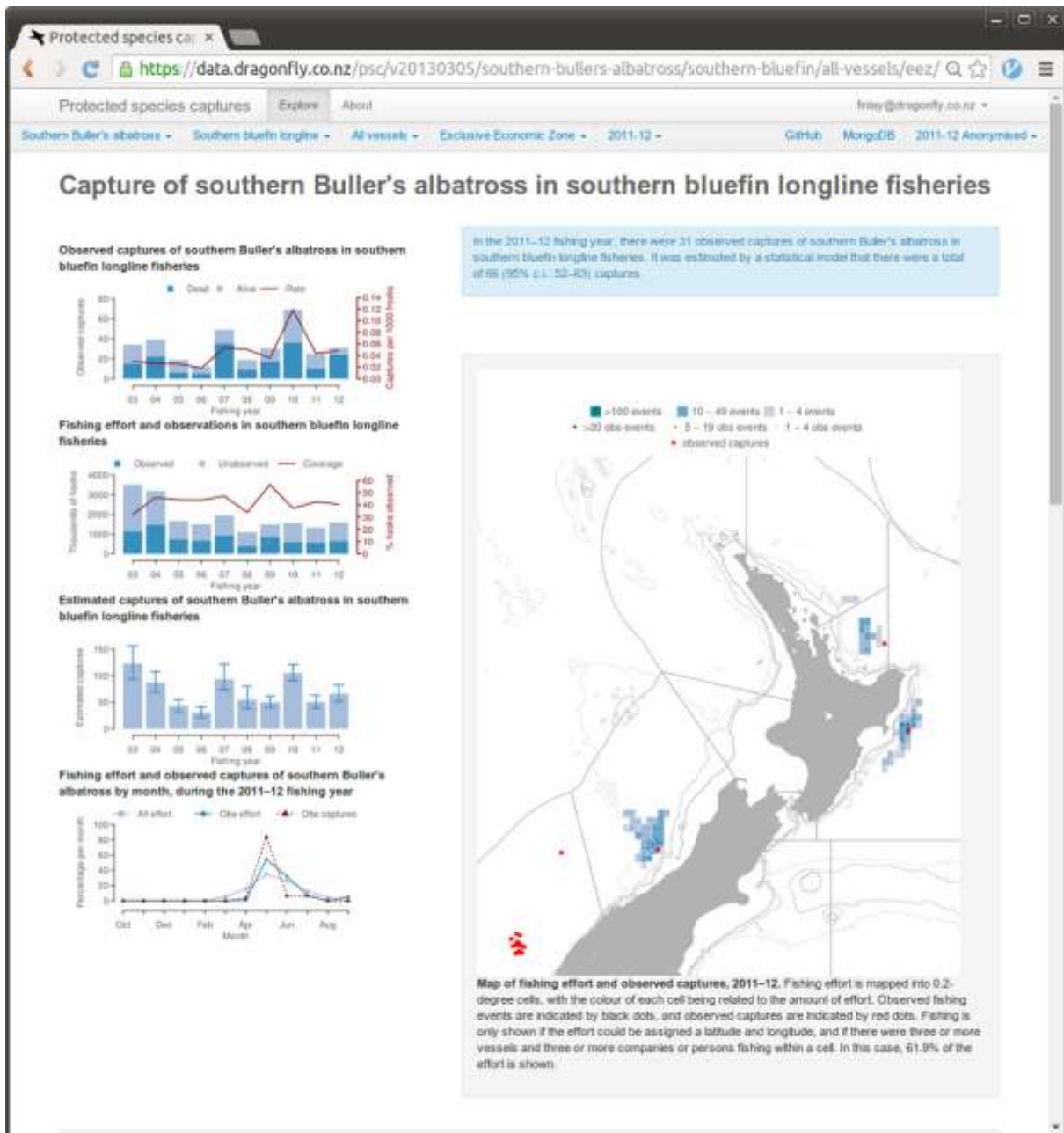




Figure 3: Screenshot from the New Zealand Protected Species Bycatch website, showing the captures of all seabird from all trawl fisheries throughout New Zealand.

Protected species captures | Explore | About | finlay@dragonfly.co.nz

Southern Buller's albatross | Southern bluefin longline | All vessels | Exclusive Economic Zone | 2011-12 | GitHub | MongoDB | 2011-12 Anonymised

**Table of effort, captures, and estimated captures by fishing year.** For each fishing year, the table gives the total number of hooks; the number of observed hooks; observer coverage (the percentage of hooks that were observed); the number of observed captures (both dead and alive); the capture rate (captures per thousand hooks); the estimation method used; the mean number of estimated total captures (with 95% confidence interval), and the percentage of hooks included in the estimate. Due to Ministry for Primary Industries anonymity requirements, fishing effort is only shown if there were three or more vessels and three or more companies or persons fishing in that year. For more information on the methods used to prepare the data, see [Abraham and Thompson \(2011b\)](#).

	Fishing effort			Observed captures		Estimated captures		% hooks included
	All hooks	Observed hooks	% observed	Number	Rate	Mean	95% c.i.	
2002-03	3 510 061	1 133 740	32.3	34	0.030	123	94-156	100.0
2003-04	3 193 871	1 471 964	46.1	39	0.026	87	69-108	100.0
2004-05	1 661 979	734 026	44.2	19	0.026	43	32-55	100.0
2005-06	1 493 418	655 445	43.9	12	0.018	30	21-41	100.0
2006-07	1 938 111	916 660	47.3	49	0.053	93	74-122	100.0
2007-08	1 104 825	375 975	34.0	19	0.051	55	38-80	100.0
2008-09	1 484 438	840 048	56.6	30	0.036	50	40-62	100.0
2009-10	1 559 858	580 395	37.2	69	0.119	105	90-121	100.0
2010-11	1 330 265	567 204	42.6	25	0.044	50	39-63	100.0
2011-12	1 588 854	645 530	40.6	31	0.048	66	52-83	100.0

[Download CSV](#)

**Table of observed captures, during the 2011-12 fishing year.** The table lists the protected species captures that were recorded by observers. For each capture, the table gives the date and time; the best identification made of the animal; the status of the animal (Alive, Dead, Killed, or Decomposed); the identification method (Necropsy, Photograph, Imputation, Observer); the capture method; the species targeted by the fishing; and the area where the capture occurred.

Date	Species or species group	Status	Identification	Capture method	Target species	Area
30 April 2012 08:55	Southern Buller's albatross	Alive	Photograph	Hook	Southern bluefin tuna	Fiordland
04 May 2012 08:24	Southern Buller's albatross	Dead	Photograph	Hook	Southern bluefin tuna	Fiordland
04 May 2012 08:30	Southern Buller's albatross	Dead	Necropsy	Hook	Southern bluefin tuna	Fiordland
04 May 2012 08:30	Southern Buller's albatross	Dead	Necropsy	Hook	Southern bluefin tuna	Fiordland
05 May 2012 08:30	Southern Buller's albatross	Alive	Photograph	Hook	Southern bluefin tuna	Fiordland
05 May 2012 08:30	Southern Buller's albatross	Alive	Photograph	Hook	Southern bluefin tuna	Fiordland
05 May 2012 08:30	Southern Buller's albatross	Alive	Photograph	Hook	Southern bluefin tuna	Fiordland
05 May 2012 08:30	Southern Buller's albatross	Dead	Necropsy	Hook	Southern bluefin tuna	Fiordland
05 May 2012 08:30	Southern Buller's albatross	Dead	Necropsy	Hook	Southern bluefin tuna	Fiordland
05 May 2012 08:30	Southern Buller's albatross	Dead	Necropsy	Hook	Southern bluefin tuna	Fiordland
05 May 2012 08:30	Southern Buller's albatross	Dead	Necropsy	Hook	Southern bluefin tuna	Fiordland
05 May 2012 08:30	Southern Buller's albatross	Dead	Necropsy	Hook	Southern bluefin tuna	Fiordland
05 May 2012 08:30	Southern Buller's albatross	Dead	Necropsy	Hook	Southern bluefin tuna	Fiordland
05 May 2012 08:32	Southern Buller's albatross	Dead	Photograph	Hook	Southern bluefin tuna	Fiordland
05 May 2012 08:35	Southern Buller's albatross	Dead	Necropsy	Hook	Southern bluefin tuna	Fiordland
05 May 2012 08:35	Southern Buller's albatross	Dead	Necropsy	Hook	Southern bluefin tuna	Fiordland
05 May 2012 08:35	Southern Buller's albatross	Dead	Necropsy	Hook	Southern bluefin tuna	Fiordland
05 May 2012 08:35	Southern Buller's albatross	Dead	Necropsy	Hook	Southern bluefin tuna	Fiordland

Figure 4: Summary areas used for producing the estimates of total bycatch

