

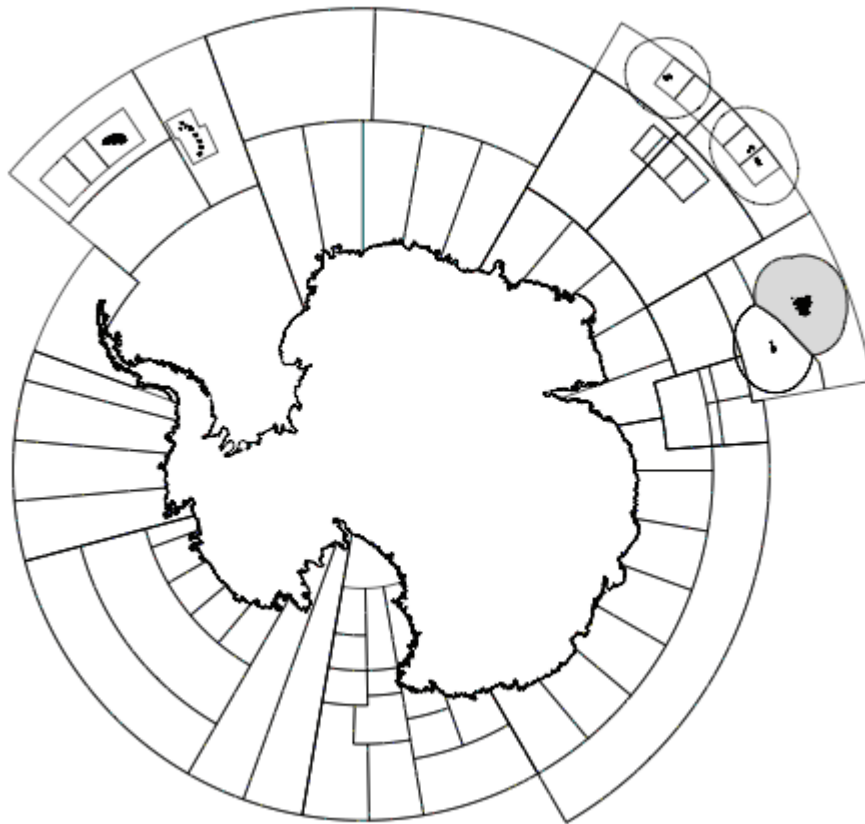


CCAMLR

Commission for the Conservation of Antarctic Marine Living Resources
Commission pour la conservation de la faune et la flore marines de l'Antarctique
Комиссия по сохранению морских живых ресурсов Антарктики
Comisión para la Conservación de los Recursos Vivos Marinos Antárticos

Fishery Report 2018: *Dissostichus eleginoides* Kerguelen Islands French EEZ (Division 58.5.1)

FISHERY REPORT



The map above shows the management areas within the CAMLR Convention Area, the specific region related to this report is shaded.

Throughout this report the CCAMLR fishing season is represented by the year in which that season ended, e.g. 2015 represents the 2014/15 CCAMLR fishing season (from 1 December 2014 to 30 November 2015).

Fishery Report 2018: *Dissostichus eleginoides* Kerguelen Islands, French EEZ (Division 58.5.1)

Introduction to the fishery

1. This report describes the licensed longline fishery for Patagonian toothfish (*Dissostichus eleginoides*) in the French exclusive economic zone (EEZ) established in 1978 around the Kerguelen Islands in Division 58.5.1.
2. The fishery, targeting *D. eleginoides*, began as a trawl fishery in 1985 but targeting other species between 1979 and 1984 caught small amounts of toothfish as by-catch. Trawling continued to 2001 and intermittently in 2006 and 2010; a longline fishery began in 1992 and continues to the present (Duhamel et al., 2011). The fishery is active throughout the year with the exception of a summer closure period (1 February to either 1 or 15 March) which has been in place since 2004.
3. Within the French EEZs, fishing seasons, catch limits for target and by-catch species, as well as vessel licensing, are allocated by France. The season extends from 1 September to 31 August. French management measures, annually established by TAAF, specific to the EEZ, have restricted the longline fishery to waters outside the 12 n mile zone and no shallower than 500 m.
4. For the 2018 season, a catch limit set by France of 5 050 tonnes was allocated among seven longline vessels.

Reported catch

5. Reported catches of *D. eleginoides* are presented in Table 1. The total catch reported up to February 2019 was 4 430 tonnes. The highest reported catch of 7 758 tonnes was recorded in 1992.
6. The average (unstandardised) catch per hook decreased from 0.37 kg/hook in 2000 to 0.18 in 2004 and remained stable at 0.23 kg/hook since 2011.
7. Fishing effort in Division 58.5.1 is widely distributed throughout the French EEZ.

Illegal, unreported and unregulated (IUU) fishing

8. Illegal, unreported and unregulated (IUU) fishing was first detected in this region in 1996 and in some years IUU catches have exceeded legal catches, resulting in total removals exceeding 10 000 tonnes in some seasons.
9. IUU fishing activity was detected in Division 58.5.1 (Kerguelen EEZ) during 2006, with one IUU-listed fishing vessel observed in the division. Two IUU-listed vessels were sighted during 2007 and three IUU-listed vessels were sighted during 2008. One IUU fishing vessel was observed at Lameyne Ridge (on the boundary of the Kerguelen EEZ) during winter 2007,

and reports from France indicate that IUU activities sometimes occurred here during each year from 2008 to 2012. One IUU-listed fishing vessel was sighted in Division 58.5.1 during 2010, two during 2012 and one during the 2013. No IUU-listed vessels were observed during 2014, 2015 and 2016, however, IUU fishing gear was recovered from the region during all three years. Following the recognition of methodological issues in its assessment, no estimates of the IUU catch of *Dissostichus* spp. have been provided since 2011 (SC-CAMLR-XXIX, paragraph 6.5).

Table 1: Catch history of *Dissostichus eleginoides* in the French EEZ at Kerguelen Island (Division 58.5.1) and estimated IUU catch in tonnes. (Source: fine-scale data.)

Season	Reported catch (tonnes)			Estimated IUU catch (tonnes)
	Longline	Trawl	Total	
1996	370	3304	3674	833
1997	628	4018	4646	6094
1998	929	3628	4557	7156
1999	840	3617	4457	1237
2000	2992	6127	9119	2600
2001	2370	4348	6718	4550
2002	4087	346	4433	6300
2003	5453	0	5453	5518
2004	5103	0	5103	536
2005	5022	0	5022	268
2006	4694	254	4948	144
2007	5350	0	5350	451
2008	4850	0	4850	720
2009	5244	0	5244	0
2010	4930	235	5165	22
2011	5224	0	5224	*
2012	4900	0	4900	*
2013	5381	0	5381	*
2014	5318	0	5318	*
2015	4401	0	4401	*
2016	5562	0	5562	*
2017	5095	0	5095	*
2018**	4430	0	4430	*

* Not estimated.

** Data reported to February 2019.

Data collection

Biological data

10. The collection of biological data is conducted as part of the CCAMLR Scheme of International Scientific Observation. In longline fisheries targeting *D. eleginoides*, biological data collection includes representative samples of length, weight, sex and maturity stage as well as collection of otoliths for age determination of the target and most frequently taken by-catch species.

Length distributions of catches

11. The length-frequency distributions of *D. eleginoides* caught in this fishery from 2008 to 2017 are presented in Figure 1 (only commercial longline considered). The majority of *D. eleginoides* caught by longline range from 50 to 100 cm in length, with a single strong mode for all seasons at approximately 70–80 cm. These length-frequency distributions are unweighted (i.e. they have not been adjusted for factors such as the size of the catches from which they were collected). The interannual variability exhibited in the figure may reflect differences in the fished population but is also likely to reflect changes in the gear used, the number of vessels in the fishery and the spatial and temporal distribution of fishing.

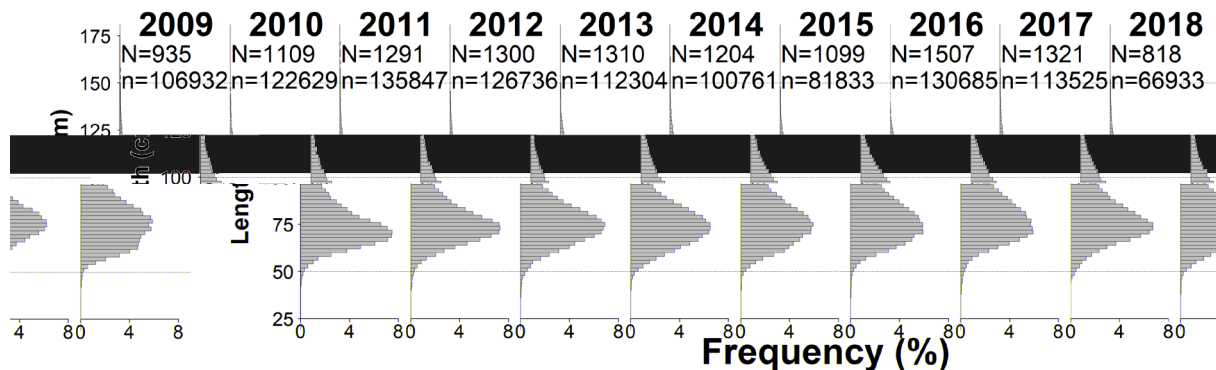


Figure 1: Annual length-frequency distributions of *Dissostichus eleginoides* caught in the French EEZ at the Kerguelen Islands in Division 58.5.1 from 2009 to 2018 (partial data). The number of hauls from which fish were measured (N) and the number of fish measured (n) in each year are provided.

Tagging

12. Within the French EEZ, vessels are required to tag and release toothfish at a rate of 1 fish per tonne of green weight caught throughout the season.

13. Tagging commenced in 2006 and to date, a total of 54 463 *D. eleginoides* have been tagged in the longline catches in the French EEZ in Division 58.5.1, of which 6 411 have been recaptured (Table 2). Only few tagged fish have been recovered outside the Kerguelen EEZ (34 in the Crozet EEZ). An additional 286 fish, which were tagged in the Australian EEZ at Heard Island (Division 58.5.2), have been recaptured in Division 58.5.1.

Table 2: The number of individuals of *Dissostichus eleginoides* tagged and recaptured in each season in the French EEZ in Division 58.5.1.

Year	Tagged	Recaptured												Total	
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018		
2007	2894	1	5	26	17	11	4	10	4	6	3	2	1	90	
2008	1629		4	10	85	58	55	37	16	12	7	9	5	393	
2009	4367			5	42	114	118	96	94	50	30	23	17	7	591
2010	4880				26	132	139	139	83	48	54	30	22	673	
2011	5378					43	227	245	155	106	99	52	36	963	
2012	4987						51	197	180	138	125	63	48	802	
2013	5445						2	85	211	176	168	123	80	845	
2014	5400								44	180	203	132	97	656	
2015	4503											185	101	541	
2016	5631											190	256	526	
2017	5021											64	230	294	
2018	4328												37	37	
Total	54463													6411	

14. The tagging program undertaken by France in its EEZ in Division 58.5.1 has achieved a similar tag-recapture rate to the tagging program undertaken by Australia in Division 58.5.2, which indicates that tagged fish move mainly short distances, but some fish make longer forays around the slope, as well as long-distance movements outside the division. Fish from the tagging program at Heard Island (Division 58.5.2) have also shown movement of sub-adult/adult fish between zones (Heard to Kerguelen and also Crozet), but the proportion of exchange between stocks is relatively small (Williams et al., 2002; WG-FSA-07/48 Rev. 1).

Life-history parameters

Data collection

15. The life history of *D. eleginoides* is characterised by slow growth, low fecundity and late maturity. *Dissostichus eleginoides* appear to have protracted spawning periods, taking place mainly in winter, but which may start as early as late autumn and extend into spring. The areas that are considered to be the most likely spawning grounds for *D. eleginoides* at Kerguelen Islands are the western deep sectors, including Skiff Bank.

16. *Dissostichus eleginoides* occur throughout the Kerguelen Islands shelf, from shallow waters (<10 m) to depths of at least 2 000 m. As fish grow, they move to deeper water and are recruited to the trawl fishery on the shelf slopes at the start of the fishery and subsequently to the longline fishery in deeper waters. On the Kerguelen Plateau (Divisions 58.5.1 and 58.5.2), a general east–west deep-sea movement of adult fish occurs and spawning is restricted to the westerly zone during the early winter (Lord et al., 2006).

Parameter estimates

17. There are no specific recent life-history parameters for *D. eleginoides* in the French EEZ. However, the metapopulation of the Indian Ocean sector has been validated by Appleyard

et al. (2004) and thus it is likely that the parameters used in the stock assessment for Heard Island, such as growth rate and natural mortality, would be valid for the stock in Division 58.5.1. Age-specific data from Kerguelen otolith sampling are available since 2015.

Stock assessment status

18. Four biomass survey cruises (named POKER 1, 2, 3 and 4) have been conducted during 2006 (Duhamel and Hauteceur, 2009), 2010 and 2013 (see WG-FSA-14/07) and 2017 respectively to estimate biomass and recruitment of *D. eleginoides* on the whole shelf and surrounding banks (100–1 000 m). Such cruises are planned to be conducted again in the future.

19. Cooperative work between France and Australia on analyses of catch, effort and other data (survey, tagging) to be used to progress understanding of fish stocks and fishery dynamics for Divisions 58.5.1 and 58.5.2 is ongoing (see WG-SAM-11/20, 15/37).

20. The results of biomass surveys have been included in a CASAL stock assessment model (WG-FSA-11/28, 12/09, 14/36 Rev. 1, 15/68 and 16/54).

21. WG-FSA-17/60 presented an updated stock assessment of *D. eleginoides* at Kerguelen Islands (Division 58.5.1 inside the French EEZ) which included a revised tag-shedding parameter and a compensation for fish migration between Divisions 58.5.1 and 58.5.2 at an annual migration rate of 0.004 as developed at WG-SAM-17 (WG-SAM-17/11).

22. No new information was available on the state of fish stocks in Division 58.5.1 outside areas of national jurisdiction and thus the prohibition of directed fishing for *D. eleginoides*, described in Conservation Measure (CM) 32-13, shall remain in force for 2018.

By-catch of fish and invertebrates

Fish by-catch

23. Catch limits for by-catch (macrourids, rajids and other species) inside the French EEZ are set by France. Primary by-catch species from the longline fishery in the French EEZ in Division 58.5.1 are the macrourid *Macrourus carinatus*, rajid skates (*Bathyraja irrasa* and *B. eatonii*) and blue antimora (*Antimora rostrata*). The latter species is fully discarded, while the others are partly or totally retained. The spatial distribution of by-catch indicates specific areas of higher catch rates that differed between species (WG-FSA-10/34).

24. The catch histories for by-catch species since 2005 are provided in Table 3.

Table 3: Catch history for by-catch species (macrourids, rajids and *Antimora rostrata*) taken in the fishery for *Dissostichus eleginoides* in the French EEZ in Division 58.5.1. (Source: fine-scale data.) (2018:data to February 2019.)

Season	Macrourids	Rajids		<i>Antimora rostrata</i>
	Reported catch (tonnes)	Reported catch (tonnes)	Number released alive	Reported catch (tonnes)
2005	779	974	-	47
2006	686	597	-	54
2007	782	546	1954	56
2008	816	376	3593	68
2009	957	415	3432	45
2010	887	456	2	58
2011	860	437	535	52
2012	690	433	15878	26
2013	728	308	12510	67
2014	750	68	32730	72
2015	610	9	33660	69
2016	694	13	53460	56
2017	641	21	44277	50
2018	616	21	40206	34

Assessments of impact on affected populations

25. No stock assessments of individual by-catch species are presently undertaken, but biomass of a part of the stocks is now available from the biomass surveys (POKER 1, 2, 3, 4) and could help in the future.

Mitigation measures

26. The Working Group on Fish Stock Assessment (WG-FSA) recommended that, where possible, areas with high by-catch rates should be avoided, particularly those shown in WG-FSA-09/43. A plan of action to avoid high-concentration areas of by-catch has been proposed to the longliners during 2010 and results will be further analysed. The requirement for rajids to be ‘cut-off’ at the surface has been in force since 2014.

Incidental mortality of seabirds and marine mammals

Incidental mortality

27. CCAMLR mitigation measures are in force in the French EEZ. A summary of the historic bird mortality by longline in the French EEZ in Division 58.5.1 since 2007 is presented in Table 4. The three most common species injured or killed in the fishery were white-chinned petrel (*Procellaria aequinoctialis*), grey petrel (*P. cinerea*) and northern giant petrel (*Macronectes halli*). Night-setting requirements have been highly effective in removing the previously high levels of albatross mortality.

Table 4: Number of birds killed and injured in the longline fishery in the French EEZ in Division 58.5.1. (Source: Observer SISO IMAF table).

Season	<i>Procellaria aequinoctialis</i>	<i>Procellaria cinerea</i>	<i>Macronectes halli</i>
2007	59	10	4
2008	313	14	5
2009	111	6	2
2010	74	15	9
2011	50	7	8
2012	43	5	2
2013	20	2	5
2014	5		
2015	9	3	1
2016	12	7	
2017	19	1	
2018	13		

28. Up to the end of July 2018 there were 13 bird mortalities observed inside the French EEZ in Division 58.5.1, all of which were white-chinned petrels (Table 4).
29. The level of risk of incidental mortality of birds in Division 58.5.1 is category 5 (high) (SC-CAMLR-XXX, Annex 8, paragraph 8.1).
30. There have been no reports of incidental mortalities of mammals since 2007.

Mitigation measures

31. The requirements of CM 25-02 ‘Minimisation of the incidental mortality of seabirds in the course of longline fishing or longline fishing research in the Convention Area’ apply to this fishery. France has applied the CCAMLR mitigation measures for the last three seasons and these will continue for the upcoming fishing season.
32. Additional measures will also be applied (WG-IMAF-11/10 Rev. 1), including:
- (i) changes to the bird exclusion device to ensure it is effective in all weather conditions
 - (ii) closure of fishing areas and quota allocation reduction to vessels that have high by-catch rates
 - (iii) education and training will be strengthened by regular meetings between TAAF and fishing masters of vessels with high by-catch
 - (iv) data will continue to be collected and submitted using CCAMLR standard methods and forms
 - (v) a demographic study on the white-chinned petrel will be undertaken at Kerguelen Islands, as well as the continued population counts of white-chinned petrels on the Kerguelen archipelago.

Ecosystem implications and effects

33. There is no formal evaluation available for this fishery, but fishery observers collect information about benthic taxa, including those considered as vulnerable marine ecosystem (VME) taxa.

Current management advice and conservation measures

34. In addition to those CCAMLR conservation measures that are applied in this fishery, various national conservation and fisheries enforcement measures are applicable, such as:

- annual fishing season closure (February and half of March)
- annual catch limit and limitation on the number of longline vessels allowed to operate in the fishery (seven)
- allocation of fishing effort permitting not more than one longliner simultaneously per 0.5° latitude \times 1° longitude rectangle
- obligatory vessel logbooks
- one French observer on board each licensed vessel
- minimum fishing depth limit of 500 m
- minimum legal size limit for *D. eleginoides* of 60 cm
- mitigation measures for the reduction of bird mortality
- a single catch landings site at Réunion Island
- unless retained for commercial processing, all skates are to be released alive
- mandatory port inspection.

35. The limits in force and the advice of WG-FSA to the Scientific Committee for the forthcoming season are:

- (i) WG-FSA-17 agreed that the catch limit set by France of 5 050 tonnes in 2018, which allows for average depredation rates (313 tonnes, based on the average of the estimated depredation from the 2004 season to the 2016 season), is consistent with the CCAMLR decision rules for the model runs presented. This advice was carried forward for 2019.
- (ii) No new information was available on the state of fish stocks in Division 58.5.1 outside areas of national jurisdiction and thus the prohibition of directed fishing for *D. eleginoides*, described in CM 32-02, shall remain in force for 2018.
- (iii) WG-FSA noted the continued progress with the development of the model and encouraged the continued expansion in the range of years with aged data in the

model. The Working Group noted that as the amount of age data in the model increases, there would be an increase in the robustness of the model fit. The Working Group requested more details on the time series of catches used in assessment (summarised in the Division 58.5.1 Fishery Report, Appendix 1) and that for future assessments the full model diagnostic summary developed by WG-SAM is presented.

References

- Appleyard, S.A., R. Williams and R.D. Ward. 2004. Population genetic structure of Patagonian toothfish in the West Indian Ocean sector of the Southern Ocean. *CCAMLR Science*, 11: 21–32.
- Duhamel, G. and M. Hautecoeur. 2009. Biomass, abundance and distribution of fish in the Kerguelen Islands EEZ (CCAMLR Statistical Division 58.5.1). *CCAMLR Science*, 16: 1–32.
- Duhamel G., P. Pruvost, M. Bertignac, N. Gasco and M. Hautecoeur. 2011. Major fisheries events in the Kerguelen Islands: *Notothenia rossii*, *Champscephalus gunnari*, *Dissostichus eleginoides*. Current distribution and status of stocks. In: Duhamel, G. and D. Welsford (Eds). *The Kerguelen Plateau: marine ecosystem and fisheries*. Société française d'ichtyologie, Paris: 275–286.
- Lord, C., G. Duhamel and P. Pruvost. 2006. The Patagonian toothfish (*Dissostichus eleginoides*) fishery in the Kerguelen Islands (Indian Ocean sector of the Southern Ocean). *CCAMLR Science*, 13: 1–25.
- Williams, R., G.N. Tuck, A.J. Constable and T. Lamb. 2002. Movement, growth and available abundance to the fishery of *Dissostichus eleginoides* Smitt, 1898 at Heard Island, derived from tagging experiments. *CCAMLR Science*, 9: 33–48.

Time series of catches in tonnes used in the 2017 assessment (WG-FSA-17/60)

Fishing seasons	Trawl shallow <500m	Trawl deep >500m	POKER Survey 100–1000m	Total trawl	Longline shallow 500–1250m	Longline deep >1250m	Total longline	IUU	Total	Estimated depredation %		Total with depredation
1980	159	-	-	159	-	-	-	-	159	-	-	159
1981	47	-	-	47	-	-	-	-	47	-	-	47
1982	136	-	-	136	-	-	-	-	136	-	-	136
1983	121	-	-	121	-	-	-	-	121	-	-	121
1984	151	-	-	151	-	-	-	-	151	-	-	151
1985	6669	2	-	6671	-	-	-	-	6671	-	-	6671
1986	460	-	-	460	-	-	-	-	460	-	-	460
1987	3553	59	-	3612	-	-	-	-	3612	-	-	3612
1988	118	6	-	124	-	-	-	-	124	-	-	124
1989	1514	53	-	1567	-	-	-	-	1567	-	-	1567
1990	1031	136	-	1167	-	-	-	-	1167	-	-	1167
1991	1827	16	-	1843	2	107	109	-	1952	-	-	1952
1992	2398	4292	-	6690	456	982	1438	-	8128	-	-	8128
1993	898	1733	-	2631	9	84	93	-	2724	-	-	2724
1994	1718	2430	-	4148	15	944	959	-	5107	-	-	5107
1995	1316	2862	-	4178	10	1432	1442	-	5620	-	-	5620
1996	602	2922	-	3524	223	1007	1230	833	5587	-	-	5587
1997	1173	2501	-	3674	125	877	1002	6094	10770	-	-	10770
1998	1530	2505	-	4035	215	908	1123	7156	12314	-	-	12314
1999	1044	1999	-	3043	770	1073	1843	1237	6123	-	-	6123
2000	1153	1207	-	2360	1856	700	2556	2600	7516	-	-	7516
2001	1038	1440	-	2478	2175	720	2895	4550	9923	-	-	9923
2002	144	756	-	900	2763	1524	4287	6300	11487	-	-	11487
2003	-	-	-	-	3252	1758	5010	5518	10528	-	-	10528
2004	-	-	-	-	2352	2322	4674	536	5210	386	7.6	5596
2005	-	-	-	-	3480	1267	4747	268	5015	115	2.4	5130
2006	-	-	-	-	3318	1467	4785	144	4929	220	4.4	5149

(continued)

Fishing seasons	Trawl shallow <500m	Trawl deep >500m	POKER Survey 100–1000m	Total trawl	Longline shallow 500–1250m	Longline deep >1250m	Total longline	IUU	Total	Estimated depredation %	Total with depredation	
2007	155	91	7	253	2171	2892	5063	451	5767	368	6.8	6135
2008	-	-	-	-	2659	2360	5019	720	5739	374	6.9	6113
2009	-	-	-	-	2487	2619	5106	-	5106	277	5.1	5383
2010	-	3	-	3	2494	2619	5113	22	5138	451	8.1	5589
2011	84	146	5	235	2305	2788	5093	-	5328	318	5.9	5646
2012	-	-	-	-	2685	2366	5051	-	5051	278	5.2	5329
2013	-	-	12	12	2490	2672	5162	-	5174	206	3.8	5380
2014	-	-	-	-	2437	2714	5151	-	5151	412	7.4	5563
2015	-	-	-	-	1843	3315	5158	-	5158	305	5.6	5463
2016	-	-	-	-	2038	3272	5310	-	5310	355	6.3	5665
2017	-	-	-	-	1851	3041	4892	-	4892	303	5.8	5195
Projection					2020	3030	5050		5050	313	5.8	5363

(2018 catch limit)