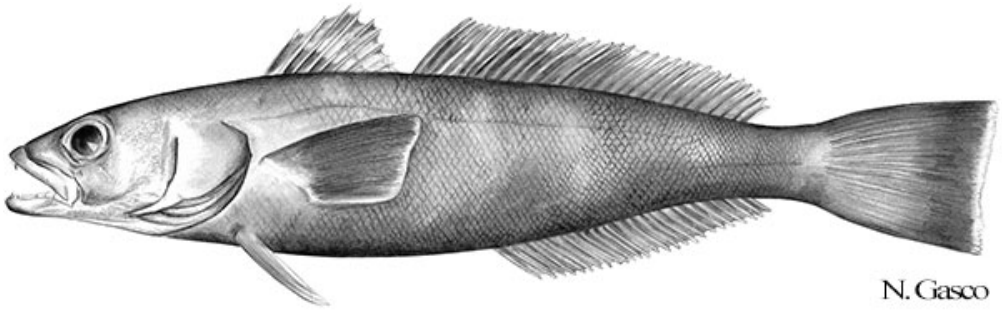
Species Description 2024: *Dissostichus eleginoides*

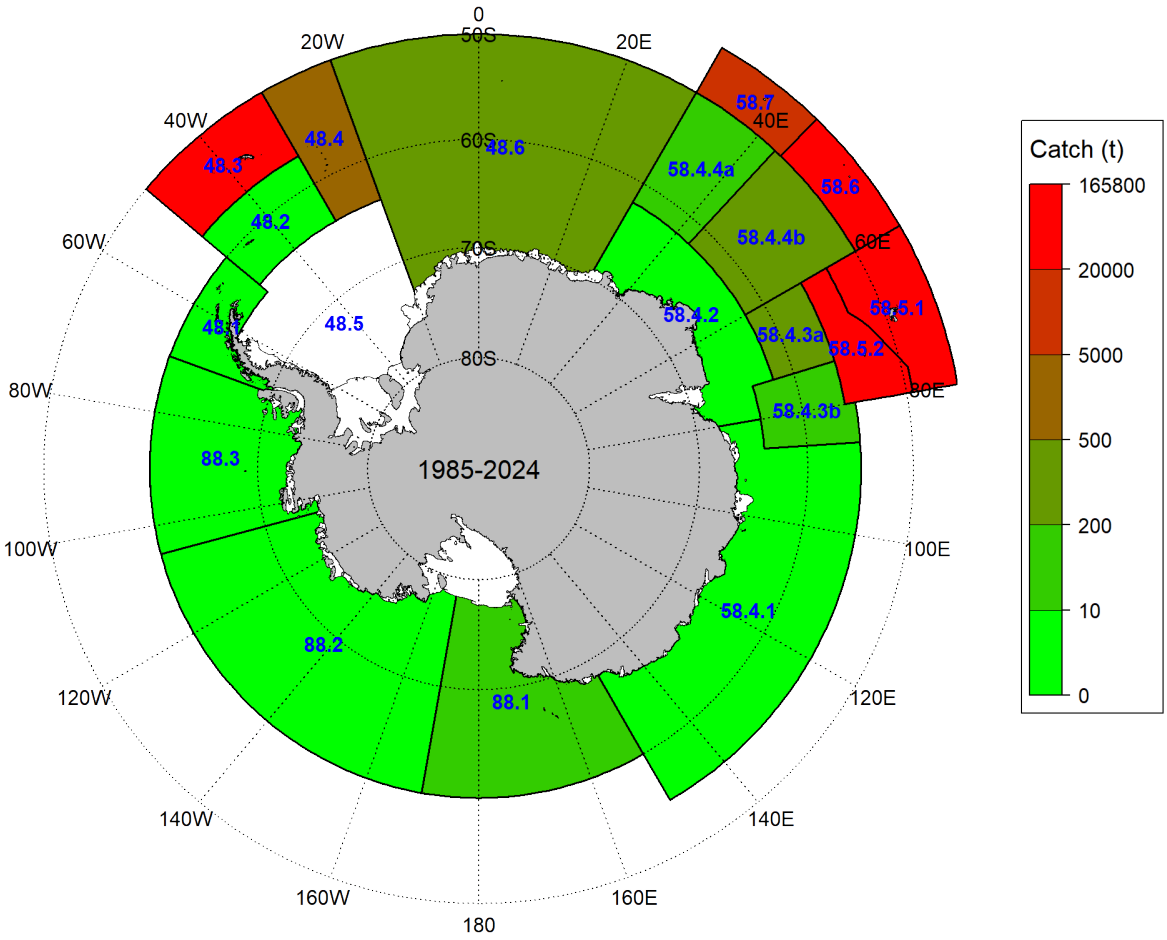
CCAMLR Secretariat

14 April 2025



Patagonian toothfish *Dissostichus eleginoides* Smitt, 1898.

Distribution of reported catch



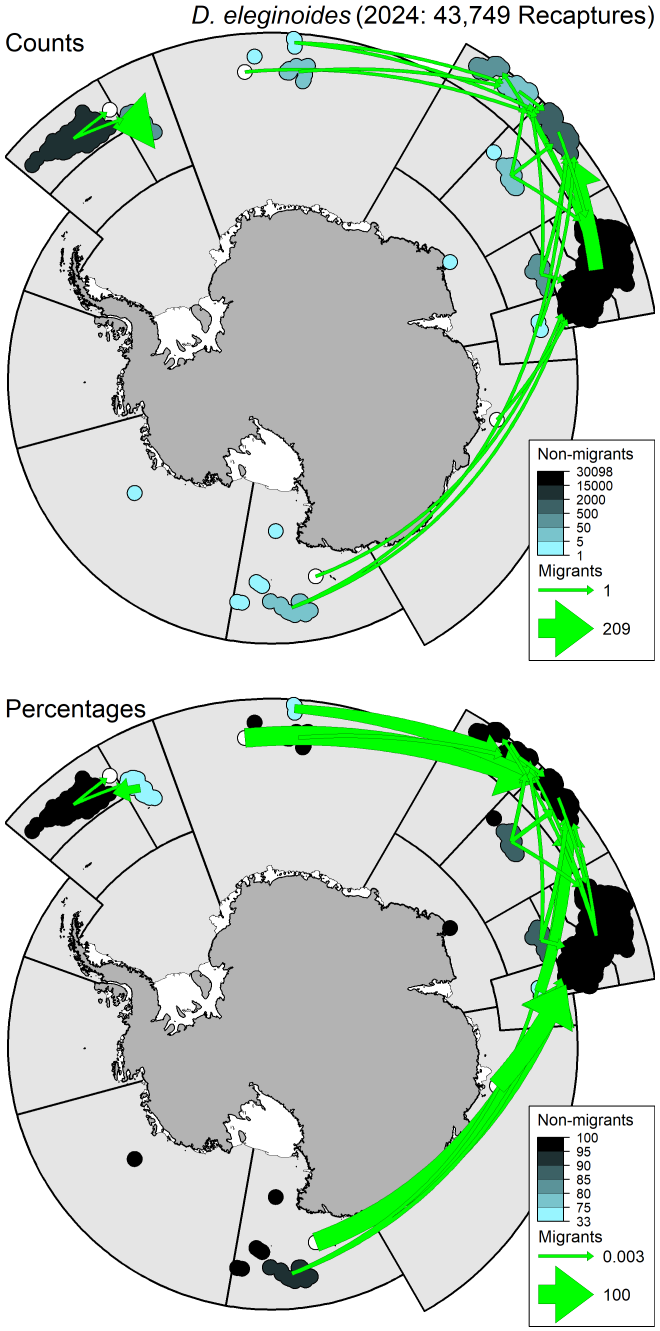
Distribution of cumulative reported catch of *Dissostichus eleginoides* at the ASD scale. (Source: C1 and C2 data). Coastlines and ice shelves: UK Polar Data Centre/BAS and Natural Earth. Projection: EPSG 6932.

Life-history

Dissostichus eleginoides (Patagonian toothfish) is a large long-lived species belonging to the family Nototheniidae, or Antarctic cods, characterised by slow growth, low fecundity and late maturity (Collins *et al.*, 2010). *Dissostichus eleginoides* appears to have protracted spawning periods, taking place mainly in winter, but which may start as early as late autumn and extend into spring. *Dissostichus eleginoides* are thought to spawn in deep water around sub-Antarctic islands, around the islands in Subarea 48.3, Bouvet Island (Subarea 48.6), Prince Edward Islands (Subarea 58.7) and on the Kerguelen Plateau (Divisions 58.5.1 and 58.5.2), but data in Crozet Islands (Subarea 58.6) are still not available. Patagonian toothfish show distinct depth preferences with age, with juveniles (<50 cm) living on the continental shelf and moving into deeper water (>500 m) as they reach maturity (~90 cm). They are associated with cold water and are found around the sub-Antarctic and South America, as far north as Equador in the cold Humboldt current. They are important predators, feeding primarily on fish, cephalopods and crustaceans; they also scavenge.

Movements inferred from tagging data

While the vast majority of tagged individuals is recaptured in the area they were released in, some have been recaptured in a different area, as shown below.



Dissostichus eleginoides movements between areas (tagging release and recapture locations were buffered by 50 nautical miles and merged). Areas are coloured based on the number (top) or percentage (bottom) of individuals that were recaptured in their area of release (non-migrants). Arrows indicate the direction of movements and their sizes depend on the number (top) or percentage (bottom) of releases that moved. Coastlines and ice shelves: UK Polar Data Centre/BAS and Natural Earth. Projection: EPSG 6932.

Biological parameters estimates

In Subarea 48.3

The biological parameters (Table 1) used in the Subarea 48.3 stock assessment are taken from the scientific literature, where available. These values are derived from analyses of the biological data collected by scientific observers on board fishing vessels. Where derived values are not available (*e.g.*, natural mortality and the steepness of the stock and recruit relationship), values have been assumed that are consistent with those used in other toothfish assessments conducted by CCAMLR.

Table 1: Biological parameters assumed for *Dissostichus eleginoides* in Subarea 48.3.

Component	Parameter	Value	Unit
Natural mortality	M	0.13	/y
VBGF	K	0.0653	/y
VBGF	t0	-1.4869	y
VBGF	L_inf	154.1977	cm
Length to mass	A	6.76 x 10-9	t/cm
	B	3.085	
Maturity range		1 to 41	
Tag-related growth retardation		0.75	
CASAL tag-loss rate		0.0061 over 4 years	
Immediate tagging survivorship		Applied as a vector to length-based tag-release data	
Tag probability of detection		1	
Stock-recruit relationship steepness	h	0.75	
Lognormal recruitment SD		Estimated	

In Subarea 48.4

The biological parameters (Table 2) used in the Subarea 48.4 stock assessment are taken from the scientific literature, where available. These values are derived from analyses of the biological data collected by scientific observers on board fishing vessels. Where derived values are not available (*e.g.*, natural mortality and the steepness of the stock and recruit relationship), values have been assumed that are consistent with those used in other toothfish assessments conducted by CCAMLR.

Table 2: Biological parameters assumed for *Dissostichus eleginoides* in Subarea 48.4.

Component	Parameter	Value	Unit
Natural mortality	M	0.13	/y
VBGF	K	0.052	/y
	t0	0	y
	L_inf	206	cm
Length to mass	a	3.44 x 10-9	t/cm
	b	3.237	
Maturity range		7 to 41	
Tag-related growth retardation		0.75	
CASAL tag-loss rate		0.0061	
Initial tag mortality		0.1	
Tag probability of detection		1	
Stock-recruit relationship steepness	h	0.75	
Lognormal recruitment SD		estimated	

In Division 58.5.1

The biological parameters used in the Division 58.5.1 stock assessment are shown in Table 3.

Table 3: Biological parameters assumed for *Dissostichus eleginoides* in Division 58.5.1.

Component	Parameter	Value	Unit
Natural mortality	M	0.155	/y
VGBF	K	0.0662	/y
	t0	-1.12	y
	L_inf	170	cm
Length to mass	A	9.61 x 10-9	
	B	3.02	
Maturity	A50	9.25	
	Ato95	8.07	
Stock recruit steepness (Beverton-Holt)	h	0.75	
Recruitment variability	sigmaR	0.89	
Tag detection		0.999	
Tag-release M		0.1	/y
Tag related growth retardation		0.5	y
Tag shedding		0.004	

In Division 58.5.2

The biological parameters used in the Division 58.5.2 stock assessment are shown in Table 4.

Table 4: Biological parameters assumed for *Dissostichus eleginoides* in Division 58.5.2.

Component	Parameter	Value	Unit
Natural mortality	M	0.155	/y
VBGF	K	0.0658	/y
	t0	-3.002	y
	L_inf	1412.94	mm
Length to mass	A	3.61 x 10-12	t/mm
	B	3.1518	
Maturity (logistic)	a50	13.7	
	ato95	10.6	
Stock recruit steepness (Beverton-Holt)	h	0.75	
Tag detection		1	
Tag-release mortality		0.1	
No-growth period		0.5 y	
Tag shedding		0.006	

In Subarea 58.6

The biological parameters used in the Subarea 58.6 stock assessment are shown in Table 5.

Table 5: Biological parameters assumed for *Dissostichus eleginoides* in Subarea 58.6.

Component	Parameter	Value	Unit
Natural mortality	M	0.155	/y
VGBF	K	0.039	/y
	t0	-2.3	y
	L_inf	197	cm
Length to mass	A	6.699 x 10-9	
	B	3.095	
Maturity	A50	9.25	
	Ato95	8.07	
Stock recruit steepness (Beverton-Holt)	h	0.75	
Recruitment variability	sigmaR	0.89	
Tag detection		0.999	
Tag-release M		0.1	/y
Tag related growth retardation		0.5	y
Tag shedding		0.004	

In Subarea 58.7

There are no specific life-history parameters for *D. eleginoides* in the South African EEZ. However, for the purposes of stock assessment, the parameters estimated by Agnew et al. (WG-FSA-06/53) for this species in Subarea 48.3 have been adopted.

Relevant Conservation Measures

In addition to Conservation Measures that apply to all Areas and all Species, the following Conservation Measures apply:

Description	Species	Area	Conservation Measure
Limits on the exploratory fishery for *Dissostichus eleginoides* on Elan Bank (Statistical Division 58.4.3a) outside areas of national jurisdiction in the 2023/24 season	*Dissostichus eleginoides*	Division 58.4.3a	CM 41-06
Limits on the fishery for *Dissostichus eleginoides* in Statistical Division 58.5.2 in the 2023/24 season	*Dissostichus eleginoides*	Division 58.5.2	CM 41-08
Mesh size	*Dissostichus eleginoides*, *Gobionotothen gibberifrons*, *Lepidonotothen squamifrons*, *Notothenia rossii*	All Areas	CM 22-02
Catch Documentation Scheme for *Dissostichus* spp.	*Dissostichus* spp.	All Areas	CM 10-05
Prohibition on fishing for *Dissostichus* spp. in depths shallower than 550 m in exploratory fisheries	*Dissostichus* spp.	All Areas	CM 22-08
Prohibition of directed fishing for *Dissostichus* spp. except in accordance with specific conservation measures in the 2023/24 season	*Dissostichus* spp.	Subarea 48.5	CM 32-09
General measures for exploratory fisheries for *Dissostichus* spp. in the Convention Area in the 2023/24 season	*Dissostichus* spp.	All Areas	CM 41-01
Limits on the fishery for *Dissostichus* spp. in Statistical Subarea 48.4 in the 2023/24 season	*Dissostichus* spp.	Subarea 48.4	CM 41-03

Additional Resources

- Fishery Summary for Subarea 48.2: pdf, html
- Fishery Summary for Subarea 48.3: pdf, html
- Fishery Summary for Subarea 48.4: pdf, html
- Fishery Summary for Division 58.4.3a: pdf, html
- Fishery Summary for Division 58.4.3b: pdf, html
- Fishery Summary for Division 58.4.4: pdf, html
- Fishery Summary for Division 58.5.1: pdf, html
- Fishery Summary for Division 58.5.2: pdf, html
- Fishery Summary for Subarea 58.6: pdf, html
- Fishery Summary for Subarea 58.7: pdf, html
- Fisheries Documents Browser

References

Collins M.A., Brickle P., Brown J. & Belchier M., 2010. The Patagonian toothfish: Biology, ecology and fishery. *Advances in Marine Biology* 58, 227-300.