

**Advice to the Minister for the Environment, Heritage and the Arts  
from the Threatened Species Scientific Committee (the Committee)  
on Amendment to the list of Threatened Species  
under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)**

**1. Name**

*Dissostichus eleginoides*

This species is commonly known as Patagonian Toothfish. It is also known as Chilean Seabass (North America), Mero (Japan), Butterfish (Mauritius), Merluza Negra (Argentina) and Bacalao de Profundidad (Chile).

**2. Reason for Conservation Assessment by the Committee**

This advice follows assessment of information provided by a public nomination to list Patagonian Toothfish. The nominator suggested listing the species in the conservation dependent category. The Committee provides the following assessment of the species' eligibility for inclusion in the EPBC Act list of threatened species.

This is the Committee's first consideration of the species for listing under the EPBC Act.

**3. Summary of Conclusion**

The Committee judges that Patagonian Toothfish is **not eligible** for listing under the EPBC Act at this time.

**4. Taxonomy**

This species is conventionally accepted as *Dissostichus eleginoides* (Patagonian Toothfish) (Smitt, 1898).

**5. Description**

Patagonian Toothfish are large, slender fish with a broad head. They are found in the cold temperate waters of the southern Atlantic, Pacific and Indian Oceans as well as the Southern Ocean.

Patagonian Toothfish (*Dissostichus eleginoides*) are very similar in appearance and body size to Antarctic Toothfish (*D. mawsoni*) (Ghigliotti et al., 2007). These two species can be distinguished by morphological differences such as Patagonian Toothfish having interorbital (between the eyes) scaleless patches that are absent in Antarctic Toothfish.

Patagonian Toothfish also have a longer visible lateral line than Antarctic Toothfish (Fischer and Hureau, 1985).

**6. National Context**

Internationally, Patagonian Toothfish are known to occur around sub-Antarctic islands and submarine plateaus of the Southern Ocean (Gon and Heemstra, 1990; Phillips and Larcombe, 2008). The species has been found in waters offshore of the coast of Chile in the Pacific Ocean, to Cape Horn, along the coast of Argentina, in particular, South Georgia, the Falkland/Malvinas Islands, Shag Rocks and the islands of the Scotia Arc, to shelves and

seamounts of the Indian Ocean sector, Kerguelen Island and Heard Island and McDonald Islands area, Bouvet Island and Macquarie Island (Garcia de la Rosa et al., 1997), and is believed to be confined to waters north of 55°S.

Within waters controlled by Australian jurisdiction, Patagonian Toothfish are known to occur in waters surrounding the Heard Island and McDonald Islands, and Macquarie Island (Appleyard et al., 2002).

The extent of the species' occurrence in waters that include the Australian Antarctic Territory Exclusive Economic Zone (EEZ) is uncertain. Exploratory fishing within the Australian Antarctic Territory EEZ has recorded catches of Patagonian Toothfish alongside the more plentiful Antarctic Toothfish (CCAMLR, 2007a & CCAMLR, 2007b). However, given the location of the catches and the size of fish, these catches were most likely incorrectly identified Antarctic Toothfish (CCAMLR, 2007a).

Patagonian Toothfish are not listed under any Australian or State/Territory Government legislation.

### ***National fisheries context***

The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) was established in 1982, and is part of the Antarctic Treaty System. CCAMLR was established to manage living marine resources contained within the "CCAMLR Convention Area" which is roughly defined as all waters bounding the continent of Antarctica, north to the Antarctic Convergence.

Commercial fishing for Patagonian Toothfish in Australian waters occurs in two separate fisheries managed by the Australian Fisheries Management Authority (AFMA). These fisheries are managed according to the conservation principles of CCAMLR. The largest fishery is the Heard Island and McDonald Islands (HIMI) Fishery; and the smaller is the Macquarie Island Toothfish Fishery (MITF), which lies outside the CCAMLR Area.

Stock assessments for both fisheries are undertaken annually by the Australian Antarctic Division (AAD) for the HIMI fishery and by CSIRO for the MITF. These assessments are reviewed by the Sub-Antarctic Resource Assessment Group (SARAG), who advises AFMA on the status of Patagonian Toothfish.

Internationally, the species is commercially fished in the Southern Ocean in the coastal EEZ's of Chile and Argentina. Additionally, the species is also targeted in the vicinity of sub-Antarctic islands under the sovereignty of Australia, France, and South Africa (Lack and Sant, 2001), and most of the areas where Patagonian Toothfish are commercially fished for fall within CCAMLR Convention Area.

### **Heard Island and McDonald Islands (HIMI) Fishery**

Targeted fishing for Patagonian Toothfish began in the HIMI fishery in 1996. Since this time, the primary method of fishing for Patagonian Toothfish has been deepwater trawling. In the 2002–03 fishing season, longline trials were conducted and became an approved fishing method in November 2005 (AFMA, 2007; Phillips and Larcombe, 2008). Studies have shown that longline equipment is more effective for catching older, larger fish than trawl equipment (CCAMLR, 2007c). In recent years, longline captures have accounted for approximately one quarter of the total catch (Phillips and Larcombe, 2008).

Management of the HIMI fishery is undertaken in accordance with the Heard Island and McDonald Islands Fishery Harvest Strategy (or simply the HIMI Fishery Harvest Strategy). This harvest strategy is implemented by AFMA and is consistent with the principles and conservation measures outlined by CCAMLR and the Commonwealth Fisheries Harvest Strategy Policy (Phillips and Larcombe, 2008).

Under the HIMI Fishery Harvest Strategy, the target reference point for Patagonian Toothfish stocks is to maintain spawning biomass at or above 50% of pre-exploitation levels. The limit reference point (i.e. the point at which targeted fishing must cease) has been established as a spawning biomass of 20% of pre-exploitation levels.

Recent assessments have recognised that while the spawning biomass of Patagonian Toothfish in the HIMI fishery has declined since 1996, this decline has been managed appropriately within the context of commercial fishing operations. Under current management arrangements, the spawning biomass of Patagonian Toothfish is likely to remain above the 50% target reference point over a 35 year projection period (Phillips and Larcombe, 2008).

#### Macquarie Island Toothfish Fishery (MITF)

In the MITF, the primary method of fishing for Patagonian Toothfish is deepwater trawling. Exploratory fishing activities began in the region in the 1994–95 season, with the developmental fishery beginning in the 1996–97 season. The fishery consists of two major fishing grounds, the Aurora Trough and the Macquarie Ridge. Longline trials began in 2007, primarily on the Macquarie Ridge grounds. (Richardson and Larcombe, 2008).

Even though the region is not a part of the CCAMLR Convention Area, the management of the MITF is consistent with the principles and conservation measures of CCAMLR for toothfish (DEH, 2005; Phillips and Larcombe, 2008). As in the HIMI fishery, the management methods for the MITF are consistent with the Commonwealth Fisheries Harvest Strategy Policy (Richardson and Larcombe, 2008).

Two separate management arrangements exist for each of the fishing grounds, the Aurora Trough region (a very small area of the Macquarie Ridge) and the Macquarie Ridge outside the Aurora trough (simply referred to as the Macquarie Ridge region) (Richardson and Larcombe, 2008). Commercial fishing for Patagonian Toothfish is primarily focussed in the Aurora Trough region (Richardson and Larcombe, 2008; Tuck and Lamb, 2008)

- For the Macquarie Ridge region, annual catch quotas are set at 10% of the estimated available current biomass. The total allowable catch for the Macquarie Ridge Region in 2007–08 was 75 t (Tuck and Lamb, 2008).
- For the Aurora Trough region, commercial catch quotas are only offered when the estimated available biomass is greater than 66.5% of the pre-exploitation level. Prohibiting fishing if stocks fall below 66.5% is intended to ensure that spawning biomass is maintained above 50%, in accordance with CCAMLR management principles. The catch quota is then set at 10% of current estimate of biomass. If the biomass is below 66.5% then a research quota of 60 t is set in order to maintain a tagging program. The total allowable catch for the Aurora Trough region in 2007–08 was 312 t (Tuck and Lamb, 2008).

#### Conclusion

The HIMI fishery and MITF are currently meeting the management requirements recommended by CCAMLR and the Commonwealth Fisheries Harvest Strategy Policy.

Patagonian Toothfish stocks in both fisheries have been judged to be not overfished and not subject to overfishing by the Bureau of Rural Sciences in 2008 (Phillips and Larcombe, 2008; Richardson and Larcombe, 2008) and by the then Department of Environment and Heritage in 2005 (DEH, 2005), and the then Department of Environment and Water Resources in 2007 (DEWR, 2007).

## **7. Relevant Biology/Ecology**

Patagonian Toothfish have been recorded to grow to 223 cm and can weigh up to 95 kg (Cassia, 1998; Xavier et al., 2002). Juvenile fish are known to be pelagic, and develop a more demersal association as the fish matures and becomes an adult (Xavier et al., 2002). The diet of the species varies considerably from area to area and includes mid-water and bottom-associated species. The diet consists primarily of fish, and secondarily of crustaceans and cephalopods (such as squid) (Cassia, 1998; Xavier et al., 2002). The species is an opportunistic feeder and takes advantage of any locally abundant species (Cassia, 1998).

Patagonian Toothfish are a slow growing and late maturing species that attains maturity between the lengths of 70–100 cm, which corresponds to ages of approximately 7 to 12 years old. Individual fish are believed to have lifespans of greater than 30 years (Laptikhovsky et al., 2006). Minimum generation length for the species is therefore estimated to be between nine to twelve years, although may be longer.

Patagonian Toothfish are not a highly migratory species (Appleyard et al., 2002). Available data from extensive tagging programs conducted within the two Australian Patagonian Toothfish fisheries, HIMI and MITF, have shown that recaptures nearly always occur at the fishing ground of release, with fish swimming less than 25 kilometres from the point of release. There has been a very small number of fish released at Heard Island that were caught two to five years later at the Crozet Islands over 1300 nautical miles away (Welsford et al., 2007; Williams et al., 2002), however, adult Patagonian Toothfish are generally considered sedentary (Appleyard et al., 2002).

This sedentary nature is reflected in the fact that, globally, Patagonian Toothfish are believed to be separated into a number of genetically distinct stocks. However, little is known about the stock structure and the degree of stock separation. A genetic study of Patagonian Toothfish at three distinct regions in the Southern Ocean (Heard Island and McDonald Islands, Macquarie Island, and South Georgia) showed that populations occurring in each area were genetically distinct from each other, inferring a restricted level of genetic connectivity at large scale distances across the Southern Ocean (Appleyard et al., 2002). However, another study comparing the genetics of Patagonian Toothfish from Heard Island and McDonald Islands, Kerguelen Islands, Crozet Islands, and the Prince Edward and Marion Islands showed that populations at these areas were not genetically different (Appleyard et al., 2004). These studies suggest that a metapopulation of Patagonian Toothfish may occur across multiple national EEZ boundaries in the West Indian Ocean sector of the Southern Ocean, while regional populations are isolated at the scale of ocean basins.

## **8. Description of Threats**

Illegal, unreported and unregulated (IUU) fishing has been considered as the greatest threat to long-term sustainability of Patagonian Toothfish in the Heard Island and McDonald Islands area (DEWR, 2007). Estimated levels of IUU fishing in the HIMI area reached over 7000 tonnes in the 1996–97 season, but since then, the levels of IUU fishing have decreased, and no IUU activity in the HIMI has been observed since the 2005–06 season (CCAMLR, 2007c; Phillips and Larcombe, 2008).

In 2004, a full-time armed patrol program was established in the Southern Ocean to eliminate IUU operators in the HIMI area (DEWR, 2007; Phillips and Larcombe, 2008). A number of additional initiatives have been adopted to combat IUU fishing in the HIMI area, including a Vessel Monitoring System (VMS) administered by CCAMLR, training officials in key port States to validate catches of toothfish unloaded in accordance with the CCAMLR catch documentation scheme, and seizure and prosecution of IUU vessel owners and operators (DEWR, 2007; Phillips and Larcombe, 2008).

The Macquarie Island area has not been subject to the same IUU fishing pressure as experienced in the HIMI area (DEH, 2005; Richardson and Larcombe, 2008). There has only been one reported incursion by a foreign fishing vessel in the Macquarie Island area and the proximity of the fishing grounds to that island may act as a deterrent to IUU fishing operators (DEH, 2005).

As discussed above under ‘National Fisheries Context’, managed commercial fishing for Patagonian Toothfish is operating within its management targets. The Australian Government Bureau of Resource Sciences has assessed Australia’s Patagonian Toothfish fisheries and determined that stocks of this species are neither overfished nor subject to overfishing (Phillips and Larcombe, 2008; Richardson and Larcombe, 2008). Therefore, the species is not considered to be under threat from regulated commercial fishing activities under current management regimes.

The current monitoring and management of fishing activities within Australian waters by CCAMLR and AFMA are considered sufficient to mitigate the threats of IUU and overfishing to populations of Patagonian Toothfish within Australian waters.

The genetic information (under section 7) suggests that the population of Patagonian Toothfish inhabiting waters of the Heard Island and McDonald Islands area may be linked to populations occurring at other West Indian Ocean sector islands. As fisheries located around these islands are managed in accordance with CCAMLR conservation measures, the likelihood of these populations becoming extinct is low (CCAMLR, 2007d). Furthermore, as the populations at Macquarie Island and in the Indian Ocean Sector are genetically isolated from the populations found in other ocean basins (i.e. the Atlantic sector and the Patagonian shelf), fisheries in these areas do not pose a significant threat to toothfish in Australian waters (Appleyard et al., 2002; Appleyard et al., 2004; Shaw et al., 2004; Rogers et al., 2006).

## **9. Public Consultation**

The nomination was made available for public exhibition and comment for 30 business days. No comments were received.

## **10. How judged by the Committee in relation to the criteria of the EPBC Act and Regulations**

The Committee judges that the species is **not eligible** for listing in any category under the EPBC Act at this time. The assessment against the criteria is as follows:

### **Criterion 1: It has undergone, is suspected to have undergone or is likely to undergo in the immediate future a very severe, severe or substantial reduction in numbers**

Populations of Patagonian Toothfish have declined since the commencement of commercial fishing for the species in 1996. The Committee notes that these declines have been managed within the context of commercial fishing operations. The current level of biomass indicates

that decline of stocks inhabiting the waters of the Heard Island and McDonald Islands and Macquarie Island regions is less than 50%.

The current estimate of spawning biomass of Patagonian Toothfish at HIMI is 72% of pre-exploitation levels, with a sensitivities range of 50 to 80% (Candy and Constable, 2008).

Assessments indicate that Patagonian Toothfish biomass declined in the Aurora Trough region in the MITF in the late 1990s as a result of commercial fishing. This region was then effectively closed to commercial fishing between 1999 and 2003 (Richardson and Larcombe, 2008). Biomass levels increased during the period while commercial fishing was excluded in the area (Richardson and Larcombe, 2008). A recent estimate of spawning biomass for the MITF was approximately 54% of the level prior to the start of fishing (Tuck, 2007).

The Committee accepts that the spawning biomass of Australian-managed Patagonian Toothfish stocks is currently within the target biomass levels that have been established for the HIMI and the MITF fisheries. The current levels of managed fishing do not constitute a threat to the survival of the species in the wild.

The Committee judges that Patagonian Toothfish has undergone a population decline as predicted under managed fishing practices, but this decline is not judged to be substantial for the purpose of Criterion 1. Therefore, the species has not been demonstrated to have met the required elements of Criterion 1, and therefore it is **not eligible** for listing in any category under this criterion.

**Criterion 2: Its geographic distribution is precarious for the survival of the species and is very restricted, restricted or limited**

In Australian waters, Patagonian Toothfish are known to occur in the proximity of two external territories, the Heard Island and McDonald Islands area and the Macquarie Island area (Appleyard et al., 2002). It is not known whether the species occurs more widely in the Australian Antarctic EEZ, however the range and habitat available to Patagonian Toothfish in Australian waters is not considered to be precarious, nor is it limited. The Committee notes that the population that exists at the Heard Island and McDonald Islands area may belong to the same genetic stock that inhabits the waters surrounding Kerguelen Islands, Crozet Islands, and the Prince Edward and Marion Islands.

The Committee judges that geographic distribution of Patagonian Toothfish is not precarious for the survival of the species, nor is it limited. Therefore, the species does not meet the requirements of Criterion 2, and it is **not eligible** for listing in any category under this criterion.

**Criterion 3: The estimated total number of mature individuals is limited to a particular degree; and either**  
**(a) evidence suggests that the number will continue to decline at a particular rate; or**  
**(b) the number is likely to continue to decline and its geographic distribution is precarious for its survival**

Stock assessments for Patagonian Toothfish do not provide estimates of total numbers of mature individuals in Australian waters. However, the most conservative estimate from the 2007 stock assessment for the HIMI fishery calculated that a minimum of 37 000 t of Patagonian Toothfish was present in the fishery at that time (Candy and Constable, 2008). The maximum weight for Patagonian Toothfish is 100 kg, therefore the most conservative estimate of total numbers of adult Patagonian Toothfish was at least 370 000 in 2007 at the HIMI fishery alone.

The Committee accepts that the stock assessments provide a reliable indicator that the spawning biomass is above 50% of estimated unexploited levels and that this biomass is sufficient for population viability. The Committee accepts that stocks have declined in accordance with managed fisheries practises, although further notes that should spawning biomass decline below 50% of unexploited levels, catch of Patagonian Toothfish would need to be significantly reduced in order to rebuild the stock back to acceptable levels.

Therefore, the Committee judges that the total numbers of mature individuals of Patagonian Toothfish are not very low, low or limited, and that decline in numbers is not expected to continue below prescribed biomass levels. Therefore, as the species has not been demonstrated to have met the required elements of Criterion 3, it is **not eligible** for listing in any category under this criterion.

**Criterion 4: The estimated total number of mature individuals is extremely low, very low or low**

As mentioned under Criterion 3, stock assessments for Patagonian Toothfish do not provide estimates of total numbers of mature individuals in Australian waters. However, the Committee accepts that the stock assessments provide a reliable indicator that the spawning biomass is above 50% of estimated unexploited levels, which is considered sufficient for population viability. Numbers of mature individuals within Australian waters are likely to be higher than 370 000, therefore the Committee judges that the total numbers of mature individuals of Patagonian Toothfish are not very low, low or limited. Therefore, as the species has not been demonstrated to have met this required element of Criterion 4, it is **not eligible** for listing in any category under this criterion.

**Criterion 5: Probability of extinction in the wild that is at least:**

- a) **50% in the immediate future; or**
- b) **20% in the near future; or**
- c) **10% in the medium-term future.**

Stock assessments for Patagonian Toothfish explicitly assess the long-term (over a 35 year period) viability of the stocks under managed fishing pressure. The Patagonian Toothfish stock assessments predict that the current fisheries management regime will maintain the spawning biomass of stocks above 50% of estimated unexploited levels. With the biomass maintained about this reference level for long-term population viability, the probability of extinction in the wild is negligible over the next three generations (35 years). Therefore, as the species has not been demonstrated to have met the required elements of Criterion 5, it is **not eligible** for listing in any category under this criterion.

## **11. CONCLUSION**

### **Conservation Status**

*Dissostichus eleginoides* (Patagonian Toothfish) was nominated for inclusion in the list of threatened species referred to in section 178 of the EPBC Act. The nominator suggested listing in the conservation dependent category of the list.

The Committee considers that Patagonian Toothfish in Australian waters are unlikely to have experienced a substantial decline in numbers, has not been shown to have a limited geographic distribution, and the total numbers of individuals are not considered to be low. The current levels of fishing do not appear to constitute a threat to the survival of the species.

Patagonian Toothfish have not been demonstrated to have met any of the criteria. Therefore, the Committee has determined that the species is **not eligible** for listing in any category under the EPBC Act at this time.

### **Recovery Plan**

As the species has been not recommended for listing a recovery plan decision is not necessary.

### **12. Recommendations**

- (i) The Committee recommends that *Dissostichus eleginoides* is **not eligible** for inclusion in the list referred to in section 178 of the EPBC Act.

Associate Professor Robert J.S. Beeton *AM FEIANZ*

Chair

Threatened Species Scientific Committee

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