Fishery Summary: orange roughy (*Hoplostethus atlanticus*)

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Prepared by the SIOFA Secretariat

Définition du style : Titre 1

a mis en forme : Centré

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1. Species Summary

Common name	orange roughy
Other common names	slimehead, atlantischer sagebauch, burfiskur, deep sea perch, degenfisch, granatbarsch, huichidai, kaiserbarsch, olho-de-vidro, orenzi rufi, red roughy, reloj, soldakfisk, l'Empereur
Scientific name	Hoplostethus atlanticus Collet 1889
Scientific synonyms	Hoplostethus gilchristi, Hoplostethus islandicus
FAO species code	ORY
Year of this report	2023
Assessment Areas/Management Units	8 assessment areas in two ~~grouos~~groups in ~~defined within~~ FAO area 51, ~~grouped into two~~
Assessment method	Integrated stock assessment (using CASAL)
Most recent assessment	2022
Year of next assessment	2025
Harvest strategy	Not yet defined
Summary of current stock status	For the Long Walter's Shoal Ridge, ~~T~~there is a ~~high~~ 76% probability ~~(76%)~~ that the stock was not overfished and no overfishing was taking place in 2020~~.~~

This report describes the orange roughy fishery in the SIOFA ~~area~~ Area and ~~some~~ available ~~key~~ biological parameters for orange roughy~~the species~~. Management advice for this species is given in the Report of the Scientific Committee of SIOFA (2022) and management decisions are summarised in the Report of the Meeting of Parties of SIOFA (2022).

Fisheries for orange roughy in the SIOFA ~~Agreement a~~Area are managed ~~through~~ under~~?~~ CMM 2020/01 (Interim Management of Bottom Fishing) and CMM2021/15 (Management of Demersal Stocks). A harvest strategy for the orange roughy stocks ~~is currently being~~has not yet been developed (~~Ref~~ Butterworth 2022).

Orange roughy is assessed through an integrated stock assessment, using the CASAL software package ~~tool~~ (~~Bull et al. 2012~~). The current stock status of orange roughy ~~is~~ provided ~~with~~in the SC7 report ~~i~~was~~,~~ based on ~~the~~ SC7-07-35 (~~paper by~~ Roa Ureta *et al.* 2022).

2. Biological Summary

~~2.~~

Orange roughy is globally widespread in deeper waters~~, distributed all over the world~~. In the south-central Indian Ocean~~,~~ it ~~occurs~~ has been found in association with ~~along~~ bottom features ~~ridges and hills~~ to a depth of 180~~–~~1800 m~~eters~~. For orange roughy, t~~T~~here is evidence for~~of~~ ontogeny changes ~~in~~ with increasing depth ~~from shallow to deep water bodies~~ (Dunn et al. 2009; Dunn & Forman 2011).

a mis en forme le tableau

Commenté [MS2R1]: Not against it, perhaps good to get the workshop to confirm whether this disambiguation is needed or not

Commenté [RS1]: I know these exist but I think this could be deleted

a mis en forme : Police :Non Italique

Commenté [RS3]: This is the first time I see Long Water Shoal – Extended Walters Shoal?. Usually does not have the genitive apostrophe but check

Commenté [MS4R3]: I've taken this pretty much verbatim from the Roa-Ureta et al 2022 report and under advice of one of the CCPs, so the nomenclature of the area should be straightforward

Commenté [RS5]: Should be shown as a cumulative probability density – is this available? This statement is fraught!

Commenté [MS6R5]: I don't think this is available, but I could stand corrected by the workshop. Perhaps worth raising it there.

Commenté [MS7]: The exploitation in Walter's Shoal Ridge and the larger Long Walter's Shoal Ridge was found to be well within sustainability limits while the exploitation in the Southwest Indian Ridge is too close to limit harvest rates (MSY) and should be considered for a biomass rebuilding program.

Commenté [AD8]: Add reference to document

Commenté [AD9]: Add reference to document

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Commenté [AD10]: Add reference to document

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Orange roughy are ~~is~~ benthic pelagic ~~lanktonic~~ and ~~is~~ are usually found near the bottom, but sometimes ~~rises~~up to 50–200 m above the seabed to forage, or ~~, especially as~~in spawning plumes ~~or spawn~~ in areas of high water mass movement and mixing (Lorance *et al.*, 2002). ~~According to interpretations of p~~Parasite and trace element analyses ~~(Edmonds et al. 1991)~~ indicate~~,~~ orange roughy is ~~considered~~ a relatively sedentary species with little movement between fishery management areas (Edmonds et al. 1991).

Aggregations of o~~O~~range roughy ~~aggregate~~ form in cold waters (3–9 ˚C) at depths between 7~~8~~00 and 1~~,~~600 m~~. Aggregations form~~ on steep continental slopes, ~~and~~ over canyons, ridges~~,~~ and other underwater topographical features such as seamounts, especially ~~for~~ to spawn~~ing~~ and feed~~ing~~ (Clark *et al.* 2000, Uiblein et al. 2003, Clark et al. 2016), with ~~. Some~~ individuals ~~may~~ migrate~~ing~~ up to 100 km to reach a spawning ground (Coburn & Doonan 1994, Francis & Clark 1998). Spawning occurs in ~~a few~~ specific areas, generally at depths of 700–1000 m near ~~in and associationed with specific bottom features such as~~ pinnacles and canyons~~, . , and it is believed that s~~~~Some individuals may migrate up to 100 km to reach a spawning ground (Coburn & Doonan 1994, Francis & Clark 1998).~~ ~~Time of spawning in the southern hemisphere extends~~ from May to August (in the ~~southern austral winter~~southern hemisphere), with differences in the onset of spawning between areas which seems to be consistent from year to year (Pankhurst 1988, Bell et al. 1992, Young et al. 2004). Not all mature fish spawn every year ~~Although spawning occurs annually,~~(see e.g., ~~Bell et al. (1992), Branch (2001), Doonan (2013)~~) ~~report~~, and the range of age-at-spawning is ~~32–41~~ years ~~apparently not all mature fish spawn every year (Bell et al. 1992, Branch 2001, Doonan 2013, (Cordue (2014)), with the records aage at which 50% of fish spawn estimated to be between 32-41 years (Cordue 2014)~~. Fecundity is variable, between about 16 000 and 115 000 eggs per kg in the Pacific ~~In the Southwest Pacific, fecundity is relatively low, ranges~~ing from 20,000–70,000 eggs per kg of body weight (Pankhurst 1988, Clark *et al.* 1994, Koslow *et al.* 1995, Young *et al.* 2004), with differences between large regions.

~~while fecundity in the Southeast Pacific it has been estimated to be slightly greater, ranging from 16 056–115 944 eggs per kg body weight (Young *et al.* 2004).~~

Orange roughy are ~~thought to be~~ opportunistic predators ~~on taking advantage of prey often available around underwater features—usually~~ feeding on prawns, squid, and small fishes (Rosecchi et al. 1988, Labbé & Arana 2001, Koslow & Bulman 2002), but also ~~. Other prey items include~~ amphipods, mysids~~,~~ and decapod crustaceans (Rosecchi et al. 1988, Bulman & Koslow 1992).

~~Sexual dimorphism in length is evident; , with f~~Females are generally ~~reaching a~~ larger ~~size~~ than males. ~~Sexes often co-occur in c~~Catches include both sexes ~~(e.g., Anderson 2011)~~, but ~~samples from~~ individual trawl tows can be dominated by either sex, ~~show catch sex compostion can be strongly biasedskewed, likely~~ indicating ~~possible~~potential ~~sexually distinct~~ sex substructure in aggregations, particularly during spawning (Anderson 2011).

The m~~M~~aximum age in ~~Age and growth estimates of~~ orange roughy ~~indicate that this species can live more than~~can exceed ~~two centuries~~200 years (Tracey & Horn 1999, Gili et al. 2002, Horn et al. 2016, Horn & Maolagáin 2019). Orange roughy have low productivity due to a combination of the late onset of maturity, and low annual growth rate in relation to size (Cordue 2014). ~~Specific age and growth e~~Estimates of productivity parameters for orange roughy ~~from~~ for the SIOFA ~~area~~ Area ~~were~~ are given ~~detailed~~ in ~~paper~~ SC-07-25.

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