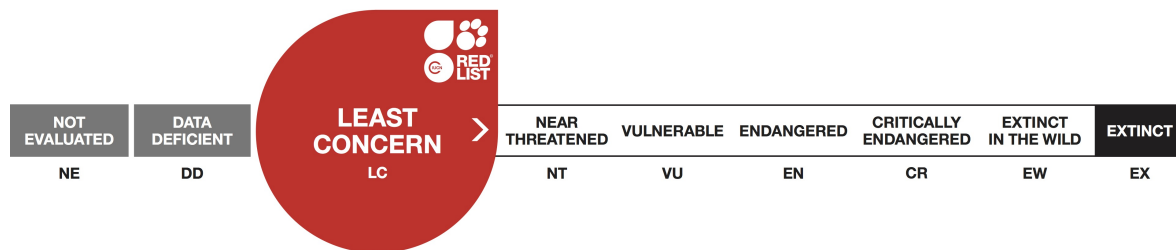


## *Epinephelus diacanthus*, Spinycheek Grouper

Assessment by: Nair, R.



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## Taxonomy

| Kingdom  | Phylum   | Class          | Order       | Family        |
|----------|----------|----------------|-------------|---------------|
| Animalia | Chordata | Actinopterygii | Perciformes | Epinephelidae |

**Taxon Name:** *Epinephelus diacanthus* (Valenciennes, 1828)

### Synonym(s):

- *Epinephelus dayi* (Bleeker, 1874)
- *Epinephelus diacanthus* (Valenciennes, 1828)
- *Serranus diacanthus* (Valenciennes, 1828)
- *Serranus sexfasciatus* (non Valenciennes)

### Common Name(s):

- English: Spinycheek Grouper
- French: Mérou Épineux
- Spanish: Mero Espinado

### Taxonomic Notes:

This species has been confused with *Epinephelus stictus* in the western Pacific and with *E. rivulatus* in South Africa (Heemstra and Randall 1993).

## Assessment Information

**Red List Category & Criteria:** Least Concern [ver 3.1](#)

**Year Published:** 2018

**Date Assessed:** November 20, 2016

### Justification:

This widely distributed species primarily inhabits soft bottoms and can be common in parts of its range. Both juveniles and adults are heavily targeted by commercial trawl fisheries through much of its range, especially in India, but also Oman. The level of exploitation in Pakistan is not known. Some level of decline has occurred in several areas, but catch data do not indicate that declines have occurred at a level that qualifies under a Near Threatened or Threatened category, and catch and effort has been increasing. Therefore, it is listed as Least Concern with a strong recommendation to reduce fishing effort (especially on juveniles), improve fishery data collection and monitoring and conduct research on its life history. If effectively enforced, recent conservation actions undertaken in India to reduce fishing impacts may help avoid overexploitation. The change in status from the previous assessment reflects an improved application of the Red List categories and criteria, as well as a better understanding of available data.

### Previously Published Red List Assessments

2008 – Near Threatened (NT)

<http://dx.doi.org/10.2305/IUCN.UK.2008.RLTS.T132777A3448896.en>

## Geographic Range

### Range Description:

This species is distributed in the Indian Ocean from the Gulf of Aden (McKoy *et al.* 2009, Mehanna *et al.* 2013) to Sri Lanka and Madras, India, including the Lakshadweep Islands and Andaman Islands (Rekha *et al.* 2011). It is not known from the Persian Gulf or the Red Sea (Heemstra and Randall 1993). Juveniles have been taken from coastal waters of Pontian Johor in Peninsular Malaysia (Oh *et al.* 2010). Records from Kenya (Agembe *et al.* 2010) require verification. Records of *Epinephelus diacanthus* from the the South China Sea, southern East China Sea and western Pacific are based on misidentifications of *E. stictus* and records from South Africa are misidentifications of *E. rivulatus* (Heemstra and Randall 1993, Chen *et al.* 1997). Its depth range is 2-180 metres, but more commonly occurs between 10-90 m (Heemstra and Randall 1993, Al-Abdelsalaam 1995, Al-Marzouqi *et al.* 2015).

### Country Occurrence:

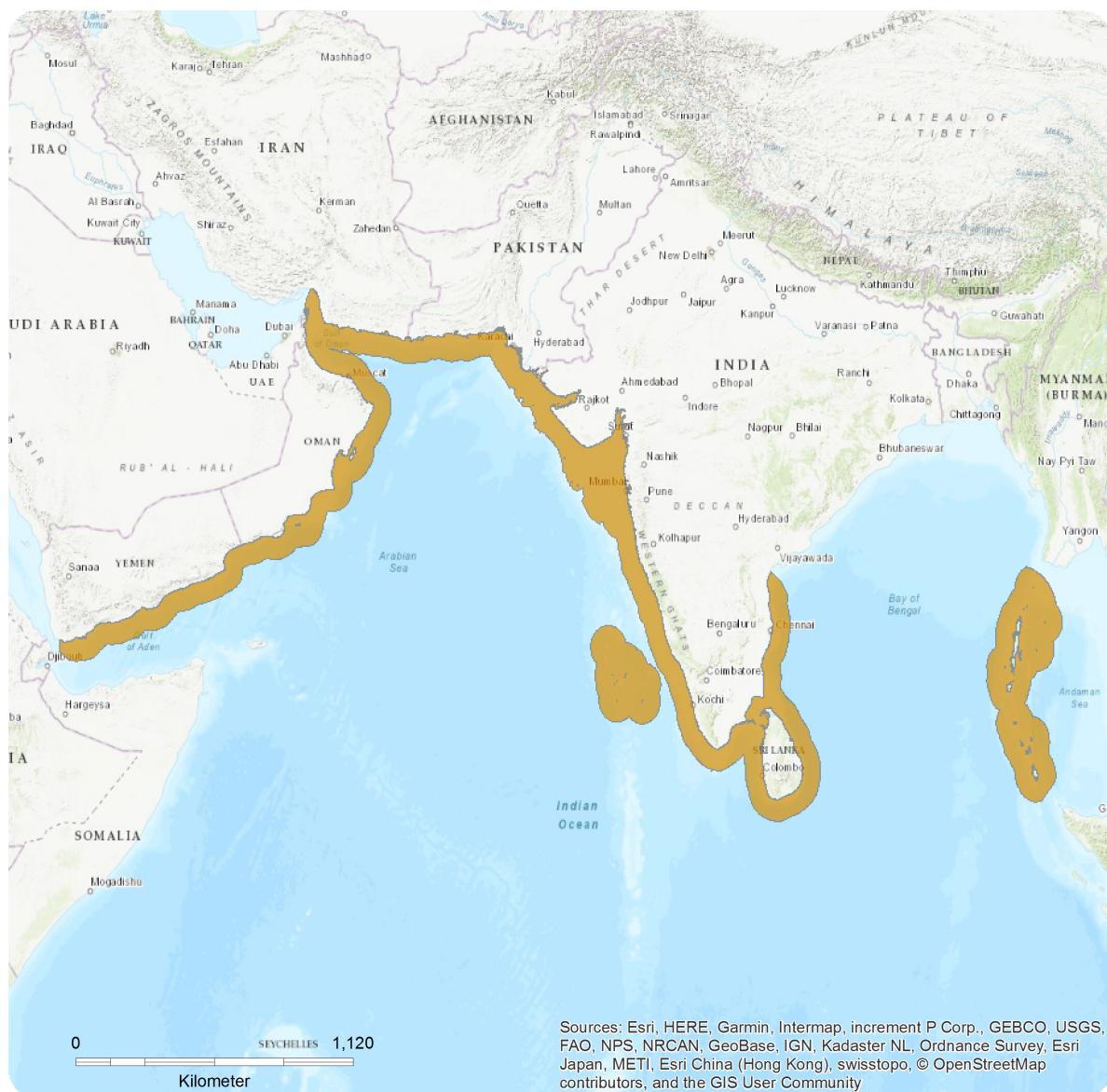
**Native:** India; Iran, Islamic Republic of; Oman; Pakistan; Sri Lanka; United Arab Emirates; Yemen

### FAO Marine Fishing Areas:

**Native:** Indian Ocean - eastern, Indian Ocean - western

# Distribution Map

*Epinephelus diacanthus*

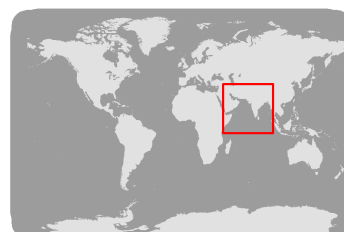


## Range

Extant (resident)

## Compiled by:

IUCN Grouper and Wrasse Specialist Group



The boundaries and names shown and the designations used on this map do not imply any official endorsement, acceptance or opinion by IUCN.



## Population

This species can be common in parts of its range, and is locally abundant on muddy trawling grounds where it forms large schools (e.g., Pakistan; De Bruin *et al.* 1995). It is relatively uncommon in Sri Lanka (De Bruin *et al.* 1995). Despite fishing pressure, populations appear to remain stable in India, but it is overexploited in the Arabian Sea. Since 2013, landings have increased tremendously (Nair *et al.* 2016).

**Oman:** Underwater surveys conducted in 1989-1990 and 2007-2008 along the Oman/Yemen border reported no significant difference in estimated biomass of this species between the two survey periods (McKoy *et al.* 2009). In Oman, this species has an estimated total fishing mortality coefficient of 0.49 year<sup>-1</sup>, which indicates this species is likely being overfished, and juveniles are known to comprise some portion of the catch there (Mehanna *et al.* 2013).

**Pakistan:** A trawl survey conducted off Pakistan in 1983-1984 reported mean catch rates of this species ranging from 6.8 kg/hour in September to 12.7 kg/hour in June and an estimated biomass of 0.01 to 0.14 tonnes per nm<sup>2</sup> and 93 to 1,302 tonnes per nm<sup>2</sup>, respectively (Iqbal 1995).

strong style=""">

**India:** Underwater surveys conducted in northwest India found this species to be moderately common (Sluka and Lazarus 2010). A trawl survey conducted on the Wadge Bank and Gulf of Mannar reported this was one of the dominant species of groupers and fish, and was most abundant between 20–50 metres depth with no catch occurring in the 200–500 metre depth zone (Sivaprakasam 1986, Joseph *et al.* 1987). Declines have been noted in India due to fishing activity and there is particular concern associated with the large amount of juveniles being taken. This is one of the most abundant species in trawl fishing conducted between 18 to 45 metres depth off India (Chakraborty 1994, James *et al.* 1996) and grouper species such as this constitute one of the most important demersal fishery resources on the Malabar Coast, Kerala. In the 1990s, the trawl fishery operating from 30 to 60 metres depth landed only immature individuals of this species in the 0-year age class (maximum total length was 23.5 cm; Zacharia *et al.* 1995a). In September 1995, this species comprised 83% of the grouper trawl catch in India (Zacharia *et al.* 1995b). The trawl fishery expanded to deeper depths (60 to 80 m) in 1994 and even further in 1996 (72 to 108 m), which increased the potential for this species to be overfished (Zacharia *et al.* 1995b). Landings of this species at Mangalore increased by 328% from 81 tonnes in 1988-1989 to 348 tonnes in 1993-1994, and catch rate also increased from 0.18 to 0.54 kg/hour, respectively (Zacharia *et al.* 1995a). From 1992 to 2002, this species comprised 4% of trawl landings and 90% of the grouper catch and the annual average catch was 2,727 tonnes with catch sharply increasing to over 5,000 tonnes in 1996 and 2002. By the early 2000s, fishing pressure was considered to be too high for this species (Manojkumar 2005). Total landings in India were relatively stable from 2007 to 2013, but increased by several orders of magnitude after 2013 until at least 2015. The increases were especially due to landings in Gujarat, Karnataka and Kerala on the west coast, with landings on the southeast coast from Tamilnadu and Andhra Pradesh also contributing (Nair *et al.* 2017). Across India, landings of grouper species have increased steadily over 27 years from 3,251 tonnes in 1985 to 44,684 tonnes in 2013, with highest landings recorded from the southwest followed by southeast and northwest. It is considered to have a higher natural abundance in the southwest as compared to other parts of India (Nair *et al.* 2017), especially off Mangalore (Dineshbabu *et al.* 2014). According to a length cohort analysis conducted with fishery data collected during 2007-2013, the spawning stock biomass was estimated at 403 tonnes and the standing stock was 599 tonnes with a yield of 272 tonnes (Nair *et al.* 2017). From 2005-2015, exports of grouper species from India, to which this species is a major

contributor, increased by USD\$10 million. The trawl fisheries in Gujarat catch a high number of juveniles of this species, which are then reduced to fishmeal. From 2007-2012, effort increased only slightly at Cochin Harbour, which is where the major landings of groupers from trawlers are landed, including this species; however, catch per unit effort has increased (Nair *et al.* 2017). In order to supply demand, the fishery has expanded operations into deeper depths and to other grounds further along the coast (Dineshbabu *et al.* 2016). Catch and catch per unit effort has increased in the trawl fishery, but effort in the Cochin hook and line fishery has declined. Catch of juveniles of this species in trawls declined from 2008-2011. In 2009-2010, individuals of this species landed in trawls ranged from 10-32 cm, and immature individuals constituted 74% of the catch and a further 26% were nearly mature (predominantly 1+ year class fish). In 2011-2012, immature individuals also dominated trawl landings (CMFRI 2011-2012). In the hook and line fishery, immature individuals of this species (10-34 cm total length) comprised 43% of the landings, sizes ranged from 24-54 cm and about 50% of females were immature, 37% were maturing and very few fully mature individuals were observed (CMFRI 2009-2012). In 2012 at Kochi, 40% of the individuals landed in the hook and line fishery were mature and mean length fluctuated from 23-36 cm. In 2013 in Kerala, individuals of this species ranged in length from 12-56 cm and juveniles were reported in bulk during August 2013 ranging from 12-13 cm (R. Nair pers. comm. 2017). Despite heavy exploitation, the most recent catch data indicates that this species still comprises 61% of the catch landed at the main landing centre in the southwest area (specifically Kerala) and overall declines in catch are not yet observed (Nair *et al.* 2017). Zacharia *et al.* (1995a) reported this species as depleted on the Dakshina Kannada coast, though there is some disagreement associated with their conclusion.

**Current Population Trend:** Decreasing

## Habitat and Ecology (see Appendix for additional information)

This species inhabits muddy and muddy sand bottoms (Heemstra and Randall 1993, Al-Abdelsalaam 1995). It has also been recorded on shallow coral reef and hard bottom during underwater surveys off west India and in the Andaman Islands (Sluka and Lazarus 2010, Nair and Dinesh 2017). Juveniles and smaller individuals form large schools on muddy bottom in midshelf waters to feed and then migrate to deeper waters for further growth and spawning (Zacharia *et al.* 1995a, De Bruin *et al.* 1995, Sivakami and Seetha 2006). It apparently can tolerate some level of lower oxygen conditions (Al-Marzouqi *et al.* 2015) and primarily consumes crustaceans and fish (Zacharia *et al.* 1995a, Sivakami and Seetha 2006). Its maximum total length is 52 cm (Boulenger 1895). This species is a protogynous hermaphrodite that spawns throughout the year typically within the 100 metre depth zone. Peak spawning is considered to occur from May–June (Premalatha 1989, McIlwain *et al.* 2006). Male individuals reach first maturity at 38 cm (R. Nair pers. comm. 2017). At 22-24 cm, the species is about one year of age (Chakraborty 1994, Manojkumar 2005, Mehanna *et al.* 2013). The estimated natural mortality in India is relatively low at 0.42 (Nair *et al.* 2017). In the northern Arabian Sea, its estimated natural mortality is 0.37 year<sup>-1</sup> (Mehanna *et al.* 2013).

**Systems:** Marine

## Use and Trade

This species is directly targeted by subsistence and commercial trawl and hook and line fisheries through most of its range. It is mostly sold for consumption in local markets, but some catch is also exported (Zacharia *et al.* 1995a). Small juveniles caught in trawl fisheries are made into fish meal for poultry feed,

especially in Mangalore.

## **Threats (see Appendix for additional information)**

Overfishing is a major threat to this species. The large numbers of juveniles/immature individuals taken in trawl catches will likely contribute to growth overfishing and fishing effort has been increasing overall (Zacharia *et al.* 1995b).

## **Conservation Actions (see Appendix for additional information)**

In southwestern India, where exploitation of this species is highest, the Government of Kerala recently set a minimum legal size of 18 cm for this species. A recent National Fisheries Policy document includes strict recommendations to also regulate the proliferation of fish meal plants with the intention of reducing fishing pressure on juveniles (GOI 2016). The Fisheries Department and Marine Enforcement of Kerala has also recently increased enforcement of regulations against landing juvenile fish (R. Nair pers. comm. 2017). It is recommended that fishing effort is reduced through adjusting fleet size, mainstreaming biodiversity conservation in production processes, implementing species-specific and area-specific management plans and creation of fish refugia through consultative processes (GOI 2016). McIlwain *et al.* (2003) suggested area closures that protect critical habitat as well as installing satellite tracking devices in individual trawlers to monitor fishing activity. Given its susceptibility to unsustainable exploitation, especially due to the trawl fishery, further research is needed on its population, life history and management practices. In particular, a monitoring programme for the grouper fishery of Oman would be beneficial.

## **Credits**

**Assessor(s):** Nair, R.

**Reviewer(s):** Linardich, C.

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# Appendix

## Habitats

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

| Habitat  | Season   | Suitability | Major Importance? |
|--|----------|-------------|-------------------|
| 9. Marine Neritic -> 9.2. Marine Neritic - Subtidal Rock and Rocky Reefs | Resident | Marginal    | -                 |
| 9. Marine Neritic -> 9.4. Marine Neritic - Subtidal Sandy                | Resident | Suitable    | Yes               |
| 9. Marine Neritic -> 9.5. Marine Neritic - Subtidal Sandy-Mud            | Resident | Suitable    | Yes               |
| 9. Marine Neritic -> 9.6. Marine Neritic - Subtidal Muddy                | Resident | Suitable    | Yes               |

## Threats

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

| Threat   | Timing    | Scope   | Severity                         | Impact Score     |
|--|-----------|---|----------------------------------|------------------|
| 5. Biological resource use -> 5.4. Fishing & harvesting aquatic resources -> 5.4.1. Intentional use: (subsistence/small scale) [harvest] | Ongoing   | Unknown                                       | Unknown                          | Unknown          |
|  | Stresses: | 2. Species Stresses -> 2.1. Species mortality |                                  |                  |
| 5. Biological resource use -> 5.4. Fishing & harvesting aquatic resources -> 5.4.2. Intentional use: (large scale) [harvest]             | Ongoing   | Majority (50-90%)                             | Causing/could cause fluctuations | Medium impact: 6 |
|  | Stresses: | 2. Species Stresses -> 2.1. Species mortality |                                  |                  |
| 5. Biological resource use -> 5.4. Fishing & harvesting aquatic resources -> 5.4.4. Unintentional effects: (large scale) [harvest]       | Ongoing   | Unknown                                       | Unknown                          | Unknown          |
|  | Stresses: | 2. Species Stresses -> 2.1. Species mortality |                                  |                  |

## Conservation Actions Needed

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

| Conservation Actions Needed   |
|---|
| 1. Land/water protection -> 1.1. Site/area protection                         |
| 3. Species management -> 3.1. Species management -> 3.1.1. Harvest management |
| 3. Species management -> 3.1. Species management -> 3.1.2. Trade management   |

## Research Needed

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

|  |
|--|
| <b>Research Needed</b>                                     |
| 1. Research -> 1.2. Population size, distribution & trends |
| 1. Research -> 1.3. Life history & ecology                 |
| 3. Monitoring -> 3.1. Population trends                    |

## Additional Data Fields

|                                    |
|------------------------------------|
| <b>Distribution</b>                |
| Lower depth limit (m): 500         |
| Upper depth limit (m): 10          |
| <b>Population</b>                  |
| Population severely fragmented: No |

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