**Glaucostegus typus**, Giant Guitarfish

Assessment by: Kyne, P.M., Rigby, C.L., Dharmadi, Gutteridge, A.N. & Jabado, R.W.

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**Taxonomy**

<table>
<thead>
<tr>
<th>Kingdom</th>
<th>Phylum</th>
<th>Class</th>
<th>Order</th>
<th>Family</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animalia</td>
<td>Chordata</td>
<td>Chondrichthyes</td>
<td>Rhinopristiformes</td>
<td>Glaucostegidae</td>
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</tbody>
</table>

**Taxon Name:** *Glaucostegus typus* (Anonymous [Bennett], 1830)

**Synonym(s):**
- *Glaucostegus microphthalmus* (Teng, 1959)
- *Rhinobatos typus* Anonymous [Bennett], 1830

**Common Name(s):**
- English: Giant Guitarfish, Giant Shovelnose Ray

**Taxonomic Source(s):**

**Taxonomic Notes:**
Recent changes to the systematics of *Rhinobatos* have elevated the subgenus *Glaucostegus* to full generic status and placed this genus into a family of its own: Glaucostegidae (Compagno 2005, Last et al. 2016a).

*Glaucostegus microphthalmus* is currently considered a synonym of *G. typus* (W.T. White and D.A. Ebert pers. comm. 2016).

**Assessment Information**

**Red List Category & Criteria:** Critically Endangered A2bd [ver 3.1](http://dx.doi.org/10.2305/IUCN.UK.2019-2.RLTS.T104061138A68623995.en)

**Year Published:** 2019

**Date Assessed:** December 3, 2018

**Justification:**
The Giant Guitarfish (*Glaucostegus typus*) is a medium-sized (to at least 270 cm total length) shark-like ray which is widespread in the Indo-West Pacific from India to Australia and north to Taiwan. It occurs in coastal and continental shelf waters from close inshore (including the inter-tidal zone and estuarine reaches of rivers) to depths of at least 100 m. Giant guitarfishes have limited biological productivity with small litter sizes; life history of the Giant Guitarfish is poorly known, but generation length is estimated as 15 years. The ‘white’ fins of shark-like rays (including sawfishes, wedgefishes, and giant guitarfishes) are considered the best quality fins for human consumption and are among the highest valued in the international shark fin trade. The meat is of high quality and generally consumed locally. There is a high level of fisheries resource use and increasing fishing pressure across the range of the Giant Guitarfish, and as a result, targeted and incidental fishing effort is placing significant pressure on all giant
guitarfishes in the Indo-West Pacific. Where wedgefishes and giant guitarfishes have been targeted or exploited as incidental catch, severe declines, population depletions, and localized disappearances have occurred. Severe population reduction in the Giant Guitarfish is inferred from actual levels of exploitation, as well as several historical accounts and contemporary datasets from Iran, Pakistan, India, Thailand, and Indonesia (and while some of these datasets are outside the range of the Giant Guitarfish, they can be considered representative of population reduction throughout the Indo-West Pacific). While parts of Australasia provide refuge from intense fishing effort, this proportion of the species’ range is not considered to be large enough relative to the global range to lower the assessment. It is inferred that the Giant Guitarfish has undergone a >80% population reduction over the last three generations (45 years) and it is assessed as Critically Endangered A2bd.

**Geographic Range**

**Range Description:**
The Giant Guitarfish is widespread in the Eastern Indian and Western Pacific Oceans, where it occurs from India to Australia (where it is widespread across the north of the continent), Papua New Guinea, and the Solomon Islands, and north to Taiwan (Last *et al.* 2016b).

**Country Occurrence:**
Native: Australia (New South Wales, Northern Territory, Queensland, Western Australia); Bangladesh; Brunei Darussalam; Cambodia; China; India; Indonesia; Malaysia; Myanmar; Papua New Guinea; Singapore; Solomon Islands; Sri Lanka; Taiwan, Province of China; Thailand; Timor-Leste; Viet Nam

**FAO Marine Fishing Areas:**
Native: Indian Ocean - eastern, Indian Ocean - western, Pacific - southwest, Pacific - western central, Pacific - northwest
Population

Where rhinopristoid rays (sawfishes [Pristidae], wedgefishes [Rhinidae], giant guitarfishes [Glaucostegidae], and guitarfishes [Rhinobatidae]) have been targeted or exploited as incidental catch, severe declines, population depletions, and localized disappearances have occurred (e.g., Tous et al. 1998, Dulvy et al. 2016, Moore 2017, Jabado 2018). However, there are no species-specific time-series data available for giant guitarfish species that can be used to calculate population reduction. This is due to a lack of species-specific reporting as well as taxonomic and identification issues.

Despite the lack of species-specific data, there are a number of relevant historical accounts and contemporary datasets for landings and catch rates, and although landings data are not a direct measure of abundance, these can be used to infer population reduction where landings have decreased while fishing effort has remained stable or increased. In nearly all cases presented below, there is no reason to suspect that overall effort has decreased (although directed fishing effort may have shifted in response to resource collapse/depletion e.g. the Aru Islands gillnet fishery). In fact, as the human coastal population continues to grow and as fishing technology and market access improves, fishing effort and power is continuing to increase globally, with some of the highest increases in the Asian region (Anticamara et al. 2011, Watson et al. 2013). To infer population reduction for Indo-West Pacific giant guitarfishes, four relevant historical accounts are presented below, followed by five more contemporary datasets on landings and catch rates (i.e., datasets including some period of the 2000s) (see the Supplementary Information for details). For the five contemporary datasets, there is no information to suggest that overall effort would have decreased such that declining catches represent changes in the fishery. Rather, they likely indicate reductions in abundance. Three of the five contemporary datasets are outside the known range of the Giant Guitarfish, but are informative for understanding population reduction in giant guitarfishes more broadly.

With regards to historic perspectives, firstly, research trawl survey data from the Gulf of Thailand showed a 93% decline in catch rates of 'Rhinobathidae' (a name that is likely to include wedgefishes and guitarfishes broadly) from peak catches in 1968 to a low in 1972 (Ritragsa 1976, Pauly 1979). Similarly, catch rates of 'rays' declined by 92% from 1963 to 1972. Secondly, the Indonesian Aru Islands wedgefish gillnet fishery rapidly expanded from its beginnings in the mid-1970s to reach its peak in 1987 with more than 500 boats operating before catches then declined very rapidly with only 100 boats left fishing in this area in 1996 (Chen 1996) (it is suspected that this fishery caught giant guitarfishes as well as wedgefishes). Thirdly, investors in Indonesia withdrew from a wedgefish fishery in the Malaku and Arafura Seas because the resource had been overfished by 1992 resulting in limited returns for their investment (Suzuki 2002). Lastly, research trawl surveys in the Java Sea showed the decline of 'rays' between 1976 and 1997 by 'at least an order of magnitude' (i.e., a decline of at least 90%) (Blaber et al. 2009).

Five contemporary datasets are available for landings data or catch rates at varying levels of taxonomic resolution (e.g., 'guitarfishes' etc.) from Iran, Pakistan, western and eastern India, and Indonesia. These datasets likely include various species of giant guitarfishes and in each case probable species are listed. One dataset (Raje and Zacharia 2009) does not include giant guitarfishes but rather presents landings data for myliobatoid rays (stingrays, eagle rays, butterfly rays, and devil rays). However, this can be used to infer declines in giant guitarfishes given overlapping distributions, habitat, and susceptibility to capture in the same fishing gear. Data used to calculate proportional declines, annual proportional...
change, and population reduction over three generation lengths are provided in the Supplementary Information.

Firstly, landings data for the 'giant guitarfish' category are available from Iran for 1997-2016 (20 years; Table 2 in the Supplementary Information) (FAO 2018). This grouping likely includes all rhinids and glaucostegids occurring locally, including Sharpnose Guitarfish (Glaucostegus granulatus) and Halavi Guitarfish (G. halavi). Landings declined by 66% over this period, which is the equivalent of a 91% population reduction over the last three generations of larger glaucostegid species (45 years).

Secondly, landings data for the 'rhinobatid' category are available from Pakistan for 1993-2011 (19 years; Tables 3 and 4 in the Supplementary Information) covering the country’s two coastal provinces (M. Gore unpubl. data). This grouping likely includes all rhinids, glaucostegids, and rhinobatids occurring locally, including Sharpnose Guitarfish, Halavi Guitarfish, and Widenose Guitarfish (G. obtusus). Data from Sindh province (Table 3) showed a 72% decrease from peak landings in 1999 to a low in 2011, and data from Balochistan province (Table 4) showed an 81% decrease from landings in 1994 to a low in 2011. These decreases are the equivalent of 98–99% population reduction over the last three generations of larger glaucostegid species (45 years).

Thirdly, catch data for myliobatoid rays (this includes a variety of demersal rays, but does not include rhinopristoids) are available from Maharashtra, western India for 1990-2004 (15 years; Table 5 in the Supplementary Information) (Raje and Zacharia 2009). The catch rate declined by 63% over this period, while fishing effort doubled, which is the equivalent of a 95% population reduction over the last three generations of larger glaucostegid species (45 years).

Fourthly, landings data for 'guitarfishes' are available from Tamil Nadu, eastern India for 2002-2006 (5 years; Table 6 in the Supplementary Information) (Mohanraj et al. 2009). This grouping was reported in the paper to include Sharpnose Guitarfish and Widenose Guitarfish but was also likely to include Giant Guitarfish and Clubnose Guitarfish (G. thouin). Landings declined by 86% over this period. This time-period is too short to derive equivalent population reduction over three generations.

Lastly, landings data for 'whitespotted wedgefishes' are available from Indonesia for 2005-2015 (11 years; Table 7 in the Supplementary Information) (DGCF 2015, 2017). This grouping may include giant guitarfishes, but in any case, the trends can be considered representative of glaucostegids as well as rhinids. Landings declined by 88% over this period, which is the equivalent of a >99% population reduction over the last three generations of the Giant Guitarfish (45 years). An additional data point available for 2016 is excluded from this analysis. This datum suggests a massive increase in reported landings which is an artefact of the inclusion of a wider range of batoids in the reported figure (DGCF 2017).

The one region in which the Giant Guitarfish may be in a better state than most of their range is Australia, where fishing effort is relatively low, Turtle Exclusion Devices reduce catches of large rays by 94% (Brewer et al. 2006), and there are controls on their catch and retention. Estimates of fishing mortality rates in the Northern Prawn Fishery (the main fishery to interact with this species) for this, and similar species, are well below those that would lead to significant population declines (Zhou and Griffiths 2008). The Giant Guitarfish remains a common inshore and coastal batoid of northern Australia (e.g., Vaudo and Heithaus 2009).
Fishing pressure (‘actual levels of exploitation’) is high across the range of this species (see Threats section), and while some of these datasets are outside the range of the Giant Guitarfish, they can be considered representative of population reduction throughout the Indo-West Pacific (with the exception of some parts of Australasia). Australia, Papua New Guinea, and the Solomon Islands provide some refuge for the species, however, this proportion of the species’ range is not considered to be large enough relative to the global range to lower the assessment. Overall, it is inferred that the Giant Guitarfish has undergone a >80% population reduction over the last three generations (45 years) and it is assessed as Critically Endangered A2bd.

For further information about this species, see Supplementary Material.

**Current Population Trend:** Decreasing

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

The Giant Guitarfish occurs from close inshore (including the inter-tidal zone and estuarine reaches of rivers) to depths of at least 100 m on the continental shelf (Last et al. 2016b). Although juveniles and adults are known to co-occur within inshore coastal habitats, embayments and coral reef atolls, neonates and juveniles are more common within shallow areas, including the inter-tidal zone. Upon reaching sexual maturity, the species undergoes an apparent change in habitat use as they become less frequent within inshore waters and only return to these areas on a seasonal basis, exhibiting philopatry presumably for reproductive behaviours (Gutteridge 2012, White et al. 2014b). Maximum size is at least 270 cm total length (TL); males and females mature at 150–180 cm TL (Last et al. 2016b). Reproduction is lecithotrophic viviparous; litter size is unknown but giant guitarfishes have small litters; size at birth is 38–40 cm TL (Last et al. 2016b). Age at maturity is estimated at 6–8 years for males and females; maximum age is 19 years (250 cm TL female) (White 2014, White et al. 2014a), but is likely higher since the species reaches at least 270 cm TL. Generation length is estimated as 15 years (see the Supplementary Information).

For further information about this species, see Supplementary Material.

**Systems:** Marine

### Use and Trade

Giant guitarfishes are heavily utilized across their range for the meat and fins. The exception for this species is Australia where the Giant Guitarfish is generally not utilized or traded. While little species-specific information is available, the following provides a generalized account of use and trade globally. The meat is of good quality and a food source for many coastal communities in tropical countries where it is generally consumed locally, although it also enters the international trade in dried and salted form (e.g. Moore 2017, Jabado 2018). The ‘white’ fins of shark-like rays (including wedgefishes and giant guitarfishes) are considered the best quality fins for human consumption and are among the highest valued in the international shark fin trade (Suzuki 2002, Dent and Clarke 2015, Moore 2017). Fin prices in the literature include US$396/kg for wedgefish fins (Chen 1996) and an average price of US$276/kg and US$185/kg for Qun chi (fins from shark-like rays) in Guangzhou (mainland China) and Hong Kong, respectively (Hau et al. 2018). The skin may be dried and traded internationally as a luxury leather
product (Haque et al. 2018). The eggs of shark-like rays are sometimes dried and consumed locally while the heads may also be dried and used as either fish meal or fertilizer (Haque et al. 2018, R.W. Jabado unpubl. data), and the snout of giant guitarfishes are considered a delicacy in Singapore where they are steamed and the gelatinous filling consumed.

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

Globally, giant guitarfishes are subject to intense fishing pressure on their coastal and shelf habitats that is unregulated across the majority of their distributions. Giant guitarfishes are captured in industrial, artisanal, and subsistence fisheries with multiple fishing gears, including gillnet, trawl, hook and line, trap, and seine net and are generally retained for their meat and fins (Bonfil and Abdallah 2004, White and Sommerville 2010, Moore 2017, Jabado 2018). There is a high level of fisheries resource use and increasing fishing pressure across the range of the Giant Guitarfish, and demersal coastal fisheries resources have been severely depleted in significant areas of the Indo-West Pacific, including India and Southeast Asia (Stobutzki et al. 2006, Mohamed and Veena 2016). Fishing pressure is however considerably lower across northern Australia.

In general, fishing effort and the number of fishers has increased in recent decades across the range of this species, with demand for shark and ray product increasing over the same period due to the shark fin trade (Chen 1996, Jabado et al. 2017). In the Indian state of Gujarat for example (just outside the range of the Giant Guitarfish), the number of trawlers increased from about 6,600 in the early 2000s to 11,582 in 2010 (Zynudheen et al. 2004, CMFRI 2010, Jabado et al. 2017). All Indian states have high numbers of trawlers (e.g. as reported in 2010: Maharashtra, 5,613 trawlers; Kerala, 3,678 trawlers, Tamil Nadu, 5,767 trawlers; total trawlers in India: 35,228) and a high number of gillnetters (total of 20,257 as reported in 2010), and most countries have significant fishing fleets operating in coastal waters e.g., Sri Lanka (24,600 gillnet vessels operating in 2004) and Indonesia (~600,000 fishing vessels in marine waters) (Dissanayake 2005, CMFRI 2010, KKP 2016, Jabado et al. 2017).

Sharks and rays, including giant guitarfishes, are often targeted and now heavily exploited across the region by net and trawl fisheries and increasing fishing effort has put significant pressure on all giant guitarfish species in the Indo-West Pacific. Furthermore, the high value of fins is driving retention and trade of giant guitarfishes globally (Moore 2017, Jabado 2018). The Giant Guitarfish is landed throughout its range (e.g., White and Dharmadi 2007, Last et al. 2010) and several countries within the distribution of this species rank among the top 20 shark fishing nations globally, specifically Indonesia, India, Taiwan, Malaysia, Thailand, and Sri Lanka (Lack and Sant 2011).

Fishing pressure is considerably lower across northern Australia and in Papua New Guinea, which provides some refuge for this species. The degree of connectivity with Indonesia and elsewhere is however unknown, and if animals regularly move into Indonesian waters they would face significantly higher levels of fishing pressure there. There are no target fisheries for this species in Australia, but it is taken as bycatch in numerous non-target fisheries (e.g., Stobutzki et al. 2002, White et al. 2013). The introduction of Turtle Exclusion Devices in northern and eastern Australian prawn trawl fisheries is likely to have significantly reduced this species' mortality in trawl fishing gear (Brewer et al. 2006).

The shallow, inshore soft-bottom habitat preferred by the species is threatened by habitat loss and environmental degradation (Stobutzki et al. 2006, White and Sommerville 2010, Moore 2017). Southeast Asia for example has seen an estimated 30% reduction in mangrove area since 1980 (FAO...
2007, Polidoro et al. 2010).

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

There are limited species-specific conservation or management measures in place for giant guitarfishes. A finning ban, general fisheries management, and marine protected areas likely benefit this species in Australia.

In Australia, finning (i.e., removing fins and discarding the body at sea) is prohibited. This may have reduced the retention of animals solely for their fins, but fins are still traded when whole animals are landed. Queensland has a recreational possession limit of one shark or ray, and the Northern Territory a possession limit of three. In the major prawn trawl fisheries of northern and eastern Australia, the bycatch of large elasmobranchs has been significantly reduced since 2000 with the use of Turtle Exclusion Devices in trawl nets (e.g., Brewer et al. 2006). In the Northern Territory and Western Australia there are prohibitions on retention of any shark product in several non-target shark fisheries.

To conserve the population and to permit recovery, a suite of measures will be required which may include species protection, spatial management, bycatch mitigation, and harvest and trade management measures (including international trade measures). Effective enforcement of measures will require ongoing training and capacity-building (including in the area of species identification). Catch monitoring, including in artisanal fisheries, is needed to help understand population trends and inform management. Finally, taxonomy needs to be further resolved to improve certainty of species identification.

**Credits**

**Assessor(s):** Kyne, P.M., Rigby, C.L., Dharmadi, Gutteridge, A.N. & Jabado, R.W.

**Reviewer(s):** Dulvy, N.K. & Simpfendorfer, C.

**Contributor(s):** Gore, M.A.

**Facilitators(s) and Compiler(s):** Kyne, P.M. & Rigby, C.L.
Bibliography


United Nations, Rome.


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**Citation**


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**External Resources**

For [Supplementary Material](http://dx.doi.org/10.2305/IUCN.UK.2019-2.RLTS.T104061138A68623995.en), and for [Images and External Links to Additional Information](http://dx.doi.org/10.2305/IUCN.UK.2019-2.RLTS.T104061138A68623995.en), please see the Red List website.
Appendix

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

<table>
<thead>
<tr>
<th>Habitat</th>
<th>Season</th>
<th>Suitability</th>
<th>Major Importance?</th>
</tr>
</thead>
</table>

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

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<tr>
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<th>Timing</th>
<th>Scope</th>
<th>Severity</th>
<th>Impact Score</th>
</tr>
</thead>
<tbody>
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<td>Ongoing</td>
<td>Majority (50-90%)</td>
<td>Rapid declines</td>
<td>Medium impact: 7</td>
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<td>Stresses: 2. Species Stresses -&gt; 2.1. Species mortality</td>
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Conservation Actions in Place
(http://www.iucnredlist.org/technical-documents/classification-schemes)

<table>
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<tr>
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</tr>
</thead>
<tbody>
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<td>In-Place Research, Monitoring and Planning</td>
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http://dx.doi.org/10.2305/IUCN.UK.2019-2.RLTS.T104061138A68623995.en
### Conservation Actions in Place

- **Action Recovery plan**: No
- **Systematic monitoring scheme**: No

### In-Place Land/Water Protection and Management

- **Occur in at least one PA**: Yes
- **Area based regional management plan**: No
- **Invasive species control or prevention**: Not Applicable

### In-Place Species Management

- **Harvest management plan**: No
- **Successfully reintroduced or introduced beningly**: No
- **Subject to ex-situ conservation**: No

### In-Place Education

- **Subject to recent education and awareness programmes**: No
- **Included in international legislation**: No
- **Subject to any international management/trade controls**: No

### Conservation Actions Needed

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

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### Research Needed

(http://www.iucnredlist.org/technical-documents/classification-schemes)
### Research Needed

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