Draft

Acanthurus achilles - Shaw, 1803

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - achilles

Common Names: Achilles Tang (English), Akilles' Kirurgfisk (Danish), Bir (Marshallese), Chirurgien à Tache Rouge (French), Chiurgien d'Achille (French), Cirujano (Spanish; Castilian), Cirujano Encendido (Spanish; Castilian), Indangan (Filipino; Pilipino), Kolala (Niuean), Kolama (Samoan), Meha (Tahitian), Navajón de Aguiles (Spanish; Castilian), Pāku'iku'i (Hawaiian), Red-spotted Surgeonfish (English), Redspot Surgeonfish (English), Redtail Surgeonfish (English)
Synonyms: Acanthurus Shaw, 1803; Hepatus (Shaw, 1803); Teuthis (Shaw, 1803);

Taxonomic Note:
This species is a member of the *Acanthurus achilles* species complex known for their propensity to hybridize (Randall and Frische 2000). The four species in this complex (*A. achilles* Shaw, *A. japonicus* Schmidt, *A. leucosternon* Bennett, and *A. nigricans* Linnaeus) are thought to hybridize when their distributional ranges overlap (Craig 2008).

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Choat, J.H., Russell, B., Stockwell, B., Rocha, L.A., Myers, R., Clements, K.D., McIlwain, J., Abesamis, R. & Nanola, C.

Reviewers: Davidson, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus achilles is widespread and abundant throughout its range. It is found in isolated oceanic islands and is caught only incidentally for food in parts of its distribution. It is a major component of the aquarium trade and is a popular food fish in West Hawaii. There is evidence of declines from collection and concern for the sustained abundance of this species. These localized declines are not considered to be affecting the global population. In Hawaii, where the demand for this species is high, conservation measures such as harvest management (bag limits) are being developed. Furthermore, harvest levels and and trade are closely monitored in Hawaii and this species occurs in a number of Fish Replenishment Areas in West Hawaii and a number of marine protected areas in parts of its range. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus achilles is found from the oceanic islands of Oceania to the Hawaiian and Pitcairn islands. It is also found in Wake, Marcus Island and the Marianas. It is also found in the Eastern Tropical Pacific from Mexico and other offshore islands such as Clipperton (Randall 2001). This

species is unknown in Australia (Australian Biological Resources Study accessed 28 July 2010).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 18

Depth Upper Limit (in metres below sea level): 0

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
American Samoa -> American Samoa	Extant	Native	-	Resident
Cook Islands	Extant	Native	-	Resident
Cook Islands -> Cook Is.	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
French Polynesia -> Marquesas	Extant	Native	-	Resident
French Polynesia -> Society Is.	Extant	Native	-	Resident
French Polynesia -> Tuamotu	Extant	Native	-	Resident
French Polynesia -> Tubuai Is.	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Gilbert Is.	Extant	Native	-	Resident
Kiribati -> Kiribati Line Is.	Extant	Native	-	Resident
Kiribati -> Phoenix Is.	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Mexico	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
Niue	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Philippines	Presence Uncertain	Native	-	-
Pitcairn	Extant	Native	-	Resident
Samoa	Extant	Native	-	Resident
Tokelau	Extant	Native	-	Resident

Tonga	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
United States -> Hawaiian Is.	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Howland-Baker Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Johnston I.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Midway Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> US Line Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Wake Is.	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident
81. Pacific - southwest	Extant	Native	-	Resident

Population

Acanthurus achilles is rare in the Marianas Islands. It is more common in the islands of Polynesia than Micronesia (Randall 2001). It is collected in several islands in the Pacific and based on visual surveys is abundant throughout its range (L. Rocha pers. comm. 2010).

In Kona, Hawaii, there was a 57% difference in abundance between control and collection sites (Tissot and Hallacher 2003). In Moorea Is., French Polynesia, it is a targeted marine ornamental fish, a total of 3,056 individuals/ surface area was recorded from 1990-1993 (Lecchini *et al.* 2006).
This species is one of the top 10 taxa collected for the aquarium trade in Hawaii with 337,781 individuals caught from FY 1976-2003. Catch has been in decline since FY 1990 (Walsh *et al.* 2004). Overall aquarium catch in fiscal years 2004 through 2006 reported 12,399 individuals caught/year and a value of $969,663/year (Friedlander 2006). In West Hawai'i, 42, 283 individuals were caught from FY 2005-2009 with a total value of $274,111 (Walsh *et al.* 2010).

There was a change in abundance recorded from nine monitoring stations in Fish Replenishment Areas (FRAs) in West Hawaii. FRAs were closed to aquarium collecting in 2000. Prior to establishment of FRAs density was recorded at 0.24 individuals/100 m^2 and after establishment density was 0.15 individuals/100 m^2 (Friedlander *et al.* 2006). There was a significant decrease in overall density across the nine Fish Replenishment Areas. However, the FRAs were shown to be effective in terms of increases inside the FRAs relative to long term marine protected areas. Highly variable pattern in all management areas from 1999-2005 with an overall decline from 2006-2009. Average densities of this species is very low on all transects = 0.26/100 m^2. The deeper areas where the West Hawaii Aquarium Project transects are located is not the prime habitat for adults of this species. *Acanthurus achilles* inhabits high energy shallow surge zones. Initial results from shallow water surveys and other longer term studies suggest concern for the sustained abundance of this species. Achilles Tang is a very popular food fish as well as an aquarium fish with both juveniles and adults harvested. Low levels of recruitement over the past 11 years = 0.09/100 m^2 appear insufficient to compensate current level of harvest (Walsh *et al.* 2010).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus achilles is found in shallow water, generally less than about 5m, along rocky shores or coral reefs exposed to wave action. It maintains a territory very aggressively (Randall 2001). Like *A. lineatus*, it grazes on on algal turfs mainly on thallate and filamentous red and green algae (Choat *et al.* 2002, 2004). No demographic information is available for this species (J.H. Choat pers. comm. 2010).

The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
25 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

This species, together with *Zebrasoma flavescens*, *Naso lituratus* and *Ctenochaetus strigatus*, make up 90% of Hawaii's total ornamental catch, representing 87.2% of total catch value (Kusumaatmadja *et al.* 2004). It is a popular aquarium fish and sells for $129.99 - $249.99 online (L. Rocha pers. comm. 2010). It is a popular food fish in West Hawaii (Walsh *et al.* 2010) and is caught incidentally in other parts of its range.

Threats

Acanthurus achilles is targeted heavily in Hawaii and there may be evidence of declines in some parts. In Kona, Hawaii, there were fewer individuals observed at collection than at control sites (Tissot and Hallacher 2003).

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

In Hawaii, nine Fish Replenishment Areas were established in 2000. These areas prohibit marine aquarium organism collecting within approximately 30% of the Kona coast nearshore habitat (Kusumaatmadja *et al.* 2004). In 2002, the Marine Aquarium Council initiated a three-year project designed to enhance coral reef conservation in the islands by facilitating MAC certification of qualifying aquarium industry operators and encouraging market incentives (MAC 2003).

The Hawaii Division of Aquatic Resources is currently in the process of developing comprehensive package of size and bag limits. There is a recommended bag limit 10 Achilles Tang/person/day which would apply to all harvesters including commercial fishers and aquarium collectors (Walsh *et al.* 2010).

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Draft

Acanthurus albipectoralis - Allen & Ayling, 1987

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - albipectoralis

Common Names: Whitefin Surgeonfish (English), Hvidfinnet Kirurgfisk (Danish)
Synonyms: No Synonyms

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Russell, B., Stockwell, B., Nanola, C., McIlwain, J., Choat, J.H., Clements, K.D., Rocha, L.A., Abesamis, R. & Myers, R.

Reviewers: Davidson, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus albipectoralis is widespread and common in parts of its range. It is harvested for food but is caught only incidentally. There are no major threats known and it occurs in a number of marine protected areas within its range. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus albipectoralis is found from the Great Barrier Reef, Herald Cays, Chesterfield Islands and reefs of the Coral Sea (17°00'S) to Swains Reef, Queensland (20°57'S), New Caledonia, Loyalty Islands and Tonga. It was recorded from American Samoa (Green *et al.* 1999). Phung (1998) recorded this species from the Spratly Islands, central South China Sea. This record from the Spratly Islands needs to be confirmed.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 30

Depth Upper Limit (in metres below sea level): 5

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
American Samoa -> American Samoa	Extant	Native	-	Resident
American Samoa -> Swains Is.	Extant	Native	-	Resident
Australia	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
Samoa	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident
Vanuatu	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident
81. Pacific - southwest	Extant	Native	-	Resident

Population

Acanthurus albipectoralis is uncommon in the American Samoa National Park (National Park of Samoa Checklist of Fishes accessed 21 April 2010). It is common in the Coral Sea and Elizabeth Middleton Reefs (J.H. Choat pers. comm. 2010).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus albipectoralis is found off exposed outer-reef slopes. It is usually seen in small aggregations feeding above the bottom on zooplankton (Randall 2001).

The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
33 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus albipectoralis is harvested for food but is not targeted. It is caught only incidentally.

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. Its distribution overlaps several marine protected areas in parts of its range.

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Reeson, P.H. 1983. The biology, ecology and bionomics of the surgeonfishes, Acanthuridae. In: J.L. Munro (ed.), Caribbean Coral Reef Fishery Resources, pp. 178-265. International Center for Living Aquatic Resources Management, Manila, Philippines.

Draft

Acanthurus auranticavus - Randall, 1956

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - auranticavus

Common Names: Orange-socket Surgeonfish (English), Debam (Malay), Diebdro (Undetermined), Indangan (Filipino; Pilipino), Orangebladet Kirurgfisk (Danish), Ring-tail Surgeon (English)
Synonyms: No Synonyms

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Russell, B., Nanola, C., Choat, J.H., Stockwell, B., McIlwain, J., Clements, K.D., Rocha, L.A., Abesamis, R. & Myers, R.

Reviewers: Davidson, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus auranticavus is widespread and generally uncommon. It is captured for food but is not targeted in most of its range. There are no major threats known for this species and it occurs in a number of marine protected areas in parts of its distribution. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus auranticavus is found from the Philippines, Indonesia, Great Barrier Reef, Australia, Maldives and Seychelles (Randall 2001a). It was reported from Ashmore, Scott and Rowley Shoals (J.H. Choat pers. comm. 2010), Malaysia (Mohsin *et al.* 1993), Samoa (Wass 1984), western Solomon Islands (Aswani and Lauer 2006) and Papua New Guinea (Allen *et al.* 2003). It was recently recorded from Christmas Island (J.H. Choat pers. comm. 2010). Records from Samoa and Viet Nam need to be verified (K.D. Clements pers. comm. 2010).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 8

Depth Upper Limit (in metres below sea level): 3

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Australia	Extant	Native	-	Resident
British Indian Ocean Territory	Extant	Native	-	Resident
British Indian Ocean Territory -> Chagos Archipelago	Extant	Native	-	Resident
Brunei Darussalam	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Maldives	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Samoa	Extant	Native	-	Resident
Seychelles	Extant	Native	-	Resident
Singapore	Extant	Native	-	Resident
Thailand	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident

Population

Acanthurus albipectoralis has been recorded as abundant in deep stations at the Nha Trang Bay Marine Protected Area (MPA) (Nguyen and Phan 2008). This deep water record from Viet Nam is doubtful on the basis that this species has only been observed on reef flats and reef crests in other parts of its range (i.e., Great Barrier Reef) and similar species (*A. blochii, A. grammoptilus and A. xanthopterus*) have not been observed

during the Viet Nam survey (K.D. Clements pers. comm. 2010). Visual census surveys along Aceh coast, Indonesia recorded fish densities of 4 individuals/750 m^2 at Teluk Pelabuhan (FMIPA 2007).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus auranticavus inhabits shallow reefs, both in lagoons and outer reef areas. It is generally associated with hard substrata (K.D. Clements pers. comm. 2010). It is often encountered in feeding aggregations, sometimes consisting of more than 30 individuals (Randall 2001a). It was recorded as a major resident species on shallow inner lagoon reefs, mid-depth inner lagoon reef and lagoon pool and reef channel in the Baraulu MPA, Western Solomon Islands (Aswani and Lauer 2006). *A. auranticavus* feeds on detritus and sedimentary material (Choat *et al.* 2004). Maximum age 30 years (Choat and Robertson 2002). It is classified as a grazer/detritivore (Choat and Bellwood pers. obs. in Green and Bellwood 2009).

The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

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IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity
30 Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
30 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus auranticavus is captured for food in parts of its range. It is one of the most commonly consumed species on Brooker Is., Papua New Guinea (Allen *et al.* 2003). It is harvested incidentally in the Philippines.

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. Its distribution overlaps several marine protected areas in parts of its range.

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Draft

Acanthurus bahianus - Castelnau, 1855

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - bahianus

Common Names: Ocean Surgeon (English), Barbeiro (Portuguese), Barber (English), Barbero (Spanish; Castilian), Chirurgien Marron (French), Cirujano (Spanish; Castilian), Cirujano pardo (Spanish; Castilian), Doctor (Spanish; Castilian), Doctorfish (English), Grey Doctorfish (English), Médico (Spanish; Castilian), Navajero (Spanish; Castilian), Navajón (Spanish; Castilian), Navajón Pardo (Spanish; Castilian), Ocean Surgeonfish (English), Ocean Tang (English), Peixe-cirurgião (Portuguese), Ringtail (English), Sangrador (Spanish; Castilian), Sangrador Lucio (Spanish; Castilian), Shitty Trooper (English), Vestatlantisk Kirurgfisk (Danish)
Synonyms: Acanthurus Briggs & Caldwell, 1957; Acronurus Poey, 1875;

Junior synonym junior synonym junior synonym

Taxonomic Note:
Mitochondrial DNA (mtDNA) survey reveal strong separation between the Brazilian and Carribean provinces, and no significant population structure across the oceanic gap separating Brazil and the mid-Atlantic ridge. The genetic differences between the Brazilian and Carribean populations is matched by colour differences: in the North Atlantic, individuals show a distinguishing arrow, bluish posterior margin on the caudal and dorsal fins, whereas in the South Atlantic, individuals have a bright yellow margin (Rocha *et al.* 2002). Morphological and genetic data indicate that *Acanthurus bahianus* is now split into two species: *Acanthurus tractus*, which is distributed in the northwestern Atlantic and *A. bahianus* distributed from eastern Brazil to Ascension and St. Helena Islands (Bernal and Rocha 2011).

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-01-11	Passed	-	-

Assessor(s): Choat, J.H., Abesamis, R., Clements, K.D., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Floeter, S., Edgar, G., Davidson, L. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Morphological and genetic data indicate that *Acanthurus bahianus* is now split into two species: *Acanthurus tractus*, which is distributed in the northwestern Atlantic and *A. bahianus* distributed from eastern Brazil to Ascension and St. Helena Islands (Bernal and Rocha 2011). *A. bahianus* is common and abundant in parts of its range. Although the northern portion of its range is subject to fishing pressure, there is no information at present time indicating that this species is experiencing localized declines from fishing in its range of distribution. It is found in a number of marine protected areas in parts of its range. It is therefore listed as Least Concern. Additional research is needed to determine the effects of harvesting to this species and to what extent it is being utilized in its range of distribution.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus bahianus is found in the South and Central Atlantic off the coast of Brazil, from Parcel Manuel Luiz to Santa Catarina, including Fernando de Noronha, Atol das Rocas, Trinidade, Ascension and St. Helen (Bernal and Rocha 2011).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 40

Depth Upper Limit (in metres below sea level): 2

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Brazil	Extant	Native	-	Resident
Brazil -> Fernando de Noronha	Extant	Native	-	Resident
Brazil -> Santa Catarina	Extant	Native	-	Resident
Brazil -> Trindade	Extant	Native	-	Resident
Saint Helena, Ascension and Tristan da Cunha	Extant	Native	-	Resident
Saint Helena, Ascension and Tristan da Cunha -> Ascension	Extant	Native	-	Resident
Saint Helena, Ascension and Tristan da Cunha -> Saint Helena (main island)	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
41. Atlantic - southwest	Extant	Native	-	Resident
47. Atlantic - southeast	Extant	Native	-	Resident

Population

Acanthurus bahianus was the dominant roving herbivorous/detritivore species in terms of density (0.11 ind m^{-2}) recorded from Abrolhos Bank eastern Brazil (Francino-Filho *et al.* 2009). It is common along the northern and central coasts of Brazil, at all but the smallest of the Brazilian offshore islands, and at both oceanic islands (Ascension and St. Helena) in the south-central Atlantic (Randall 2002, Rocha *et al.* 2002). It is one of the commonest small, herbivorous/detritivore reef-fishes throughout its range (Robertson *et al.* 2005b). It is one of the most abundant reef species in the outlying areas of its range (Ascension and St. Helena) (J.H. Choat pers. comm. 2010).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Morphological and genetic data indicate that *Acanthurus bahianus* is now split into two species: *Acanthurus tractus*, which is distributed in the northwestern Atlantic and *A. bahianus* distributed from eastern Brazil to Ascension and St. Helena Islands (Bernal and Rocha 2011). However, we infer that life history and biological information from the former northern portion of this species' range (now considered to be *A. tractus*), is still pertinent to this species.

Acanthurus bahianus inhabits coral reefs and inshore rocky areas, generally where mixed with sandy substrata. It grazes on many species of benthic algae, occasionally on seagrass, it also feeds on the film of algae on the surface of sand undisturbed by surge. Contents of digestive tract includes from 5 to 80% inorganic material (Randall 2002). It is often found together actively feeding with *A. coeruleus* (Lawson *et al.* 1999), this information now applies to *A. tractus* (Bernal and Rocha 2011). It is found singly (territorial to some extent) or in roaming feeding schools, and do not form territorial pairs or harems as do Indo-Pacific Acanthurids that show sexual dimorphism (Robertson 1985). Schooling occurs primarily in adults; small juveniles never participate in large, dense schools. The proportion of adults that were schooling increased from the back reef to the reef crest to the spurs and grooves zone (Lawson 1999).

The pelagic juveniles of this species settle in sheltered shallow habitats (Robertson 1988, 1992). The pelagic larval stage ranges from 42 to 68 days (Rocha *et al.* 2002), it then settles on reefs when 26.9 mm (Robertson 1992). This species is generally non-aggressive and highly mobile (Lawson *et al.* 1999).

A study by Lawson et al. (1999) showed that this species exhibits ontogenetic habitat shifts. Density of small juveniles was highest in the back reef, lower on the reef crest and lowest in the spurs and grooves zone, but schooling adults were most abundant in the spurs and grooves zones.

There are strongly contrasting patterns of habitat variation in demography at 2 sites studied by Robertson *et al.* (2005a): at Bermuda, fish settle inshore, grow to about asymptotic size and then, when 2 to 6 yr old, relocate permanently to outer reefs, where they can reach 32 yr. At Belize, fish settle and attain 10 yr on both inner and outer reefs, but grow faster and reach a ~50% greater asymptotic weight on inner reefs.

Growth

A. bahianus displays the highly characterized pattern of asymptotic growth. Terminal size was reached at around age 4, and most of the growth occurred within the first 10% of the lifespan, and approximately 85% of somatic size was attained within the first year. The mean maximum age fluctuated from 5 years in Jamaica to 26 years in Bermuda with a maximum longevity of 32 years in Bermuda (Mutz 2006).

Throughout this species' large latitudinal range growth occurs for a relatively short and fixed period (2 to 3 yr) and then effectively ceases, despite the existence of considerable variation in maximum longevity. It exhibits the fastest growth known for an Acanthurid, and the strongest spatial variation in demography known for tropical reef fish. Maximum age, adult survivorship, terminal size and absolute growth rate are inversely related to temperature (Robertson *et al.* 2005a).

A study by Choat & Robertson (2002) show the following maximum age estimates from different locations of this species' range:

St. Helena Island - 31 years
Ascension Island - 19 years
Cabo Frio, Brazil - 22 years
San Blas, Panama - 10 years
Lee Stocking Island, Bahamas - 13 years

Reproduction

A. bahianus does not exhibit sexual size dimorphism and has a 1:1 sex ratio (Reeson 1983). There are also no sexual difference in color or shape in this species (Robertson 1985). Maturity seems likely to occur within 1 year in most cases (Robertson *et al.* 2005a). First maturity is at about 11 cm

(FL), and most fish are probably mature at 15 to 16 cm (FL) (Reeson 1983). It was observed to form a resident spawning aggregation of up to 20,000 individuals each afternoon from December to March off southwestern Puerto Rico over 4 years (Colin 1985, Colin and Clavijo 1988). Fish spawned as subroups out of the larger aggregation in a manner identical to *A. nigrofuscus*. It also pair spawns, the males holding small territories adjacent to the aggregation site (Domeier and Colin 1997).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-
9.8.5. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Soft Substrate	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-
9.9. Marine Neritic -> Marine Neritic - Seagrass (Submerged)	Suitable	-
12.1. Marine Intertidal -> Marine Intertidal - Rocky Shoreline	Suitable	-
12.6. Marine Intertidal -> Marine Intertidal - Tidepools	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female	Age at Maturity: Male
(Not specified) Years	(Not specified) Years

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity
32 Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
36 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Morphological and genetic data indicate that *Acanthurus bahianus* is now split into two species: *Acanthurus tractus*, which is distributed in the northwestern Atlantic and *A. bahianus* distributed from eastern Brazil to Ascension and St. Helena Islands (Bernal and Rocha 2011). However, we infer that fisheries information from the former northern portion of this species' range (now considered to be *A. tractus*), may still apply to this species. Additional research is needed to determine the extent of the utilization of this species.

Acanthurus bahianus is a component of subsistence fisheries and is caught in traps and gill nets (as by catch) and occasionally by spearing (Randall 2002). Trapping is the primary method by which this species is fished (Robertson *et al.* 2005b). This species is not a targeted catch and the method (traps) is not widely used in San Blas (Choat and Robertson 2002a). It is also a component of the aquarium trade (Global Marine Aquarium Database).

Threats

There is no information at present time indicating that this species is experiencing localized declines from fishing in parts of its range. Additional research is needed to determine the effects of harvesting to this species and to what extent it is being utilized in its range of distribution.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. Its distribution overlaps several marine protected areas in parts of its range.

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Draft

Acanthurus bariene - Lesson, 1831

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - bariene

Common Names: Roundspot Surgeonfish (English), Bariene Surgeonfish (English), Black-spot Surgeonfish (English), Debam (Malay), Eye-spot Surgeon (English), Indangan (Filipino; Pilipino), Kanranhagi (Japanese), Øjeplettet kirurgfisk (Danish)
Synonyms: Acanthurus Bennett, 1835;

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Choat, J.H., Abesamis, R., Clements, K.D., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Davidson, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus bariene is widespread in the western Pacific. It is common and locally abundant in parts of its range. Adults are occasionally found in fish markets and juveniles are harvested for the aquarium trade. Though targeted in areas where overfishing and illegal fishing practices are known to occur, adults inhabit deeper waters in depths greater than 10m on outer reef slopes and drop offs. It occurs in a number of marine reserves in parts of its range and there is no indication of population declines through fishing. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus bariene is found from the Ryukyu Islands, Japan, southwards to the Great Barrier Reef, Australia (Ashmore Reef, Timor Sea, Western Australia (12°15'S) and Lizard Island, Queensland (14°40'S)), eastwards to the Solomon Islands and westwards to the Seychelles. It was recently recorded from Christmas Island (J.H. Choat pers. comm. 2010).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 50

Depth Upper Limit (in metres below sea level): 4

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Australia	Extant	Native	-	Resident
British Indian Ocean Territory	Extant	Native	-	Resident
Brunei Darussalam	Extant	Native	-	Resident
Cambodia	Extant	Native	-	Resident
China	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Comoros	Extant	Native	-	Resident
Disputed Territory	Extant	Native	-	Resident
Disputed Territory -> Paracel Is.	Extant	Native	-	Resident
Disputed Territory -> Spratly Is.	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
Hong Kong	Extant	Native	-	Resident
India	Extant	Native	-	Resident
India -> Andaman Is.	Extant	Native	-	Resident
India -> Nicobar Is.	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Maldives	Extant	Native	-	Resident
Mayotte	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Myanmar	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Seychelles	Extant	Native	-	Resident
Singapore	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
Taiwan, Province of China -> Taiwan, Province of China (main island)	Extant	Native	-	Resident
Thailand	Extant	Native	-	Resident

Timor-Leste	Extant	Native	-	Resident
Viet Nam	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident

Population

Acanthurus bariene was recorded as rare in terms of relative abundance in the northern Bismarck Sea and Milne Bay, Papua New Guinea (Allen 2003, 2009). It is occasionally found in Raja Ampat (Allen 2003b). It is common and locally abundant in the Philippines (C. Nanola pers. comm. 2010).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus bariene is generally found in depths greater than 10m and extending to at least 50 m on outer reef slopes and drop offs. It is usually seen as solitary individuals grazing on reefs or compact sand surfaces and is relatively easy to approach underwater (Randall 2001). It is found singly or in pairs. It feeds on algal film on bare rocks and sand. Juveniles are found in shallow protected reefs, usually between soft coral, in 0.2-3 m depth (Lieske and Myers 1994). It is classified as a grazer/detritivore (J.H. Choat and D.R. Bellwood pers. obs. in Green and Bellwood 2009). *A. bariene* was found to be confined to deeper sandstone reefs in Bar Reef Marine Sanctuary (BRMS), northwestern Sri Lanka (Ohman *et al.* 1997).

The sexes are separate among the acanthurids and there is no evidence of sexual dimorphism (Reeson 1983).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.5. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Soft Substrate	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
42 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthrus bariene is occasionally seen in fish markets. It is a targeted food fish in western Thailand (Allen 2005) and in the Philippines (R. Abesamis and C. Nanola pers. comm. 2010). It is harvested for the aquarium trade, it sells for $69.99 - $449.95 (L. Rocha pers. comm. 2010).

Threats

The range of this species overlaps the Coral Triangle where it is a targeted food fish. It is found in an area with known prevalence of illegal fishing practices and overfishing.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and

degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. Its distribution overlaps several marine protected areas in parts of its range.

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Draft

Acanthurus blochii - Valenciennes, 1835

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - blochii

Common Names: Ringtail Surgeonfish (English), Blue-banded Pualu (English), Cirurgião Cauda Anelar (Portuguese), Dark Surgeon (English), Indangan (Filipino; Pilipino), Jarrah-mahi-e-ghahvahei (Persian), Kacan Baxareed (Somali), Pualu (Hawaiian), Stertring-doktervis (Afrikaans), Tailring Surgeonfish (English), Whitetail Lancet (English)
Synonyms: No Synonyms

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Choat, J.H., Abesamis, R., Clements, K.D., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Davidson, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus blochii is widespread and common in parts of its range. It is a targeted food fish in parts of its distribution (Guam, Saipan and the Philippines) and is harvested for the aquarium trade. There are localized declines observed in the Philippines but there is no evidence of global population declines due to fishing. It occurs in a number of marine protected areas and is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus blochii is found from the coast of East Africa to the Hawaiian Islands and the islands of French Polynesia, northwards to the Ryukyu Islands, Japan, southwards to the Great Barrier Reef and Lord Howe Island, Australia (Randall 2001). It is also reported from Rowley Shoals, Scott Reef and Ashmore Reef (Allen and Russell 1986) and Christmas Island (J.H. Choat pers. comm. 2010). Records from New South Wales coast may be based on misidentification of *A. dussumieri* (J.H. Choat and B. Russell pers. comm. 2010).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 50

Depth Upper Limit (in metres below sea level): 2

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Australia	Extant	Native	-	Resident
British Indian Ocean Territory	Extant	Native	-	Resident
Brunei Darussalam	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Cocos (Keeling) Islands	Extant	Native	-	Resident
Comoros	Extant	Native	-	Resident
Cook Islands	Extant	Native	-	Resident
Disputed Territory	Extant	Native	-	Resident
Disputed Territory -> Spratly Is.	Extant	Native	-	Resident
Djibouti	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
French Southern Territories	Extant	Native	-	Resident
French Southern Territories -> Mozambique Channel Is.	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Kenya	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Gilbert Is.	Extant	Native	-	Resident
Kiribati -> Kiribati Line Is.	Extant	Native	-	Resident
Kiribati -> Phoenix Is.	Extant	Native	-	Resident
Madagascar	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Mauritius	Extant	Native	-	Resident
Mauritius -> Mauritius (main island)	Extant	Native	-	Resident
Mauritius -> Rodrigues	Extant	Native	-	Resident
Mayotte	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Mozambique	Extant	Native	-	Resident
Nauru	Extant	Native	-	Resident

New Caledonia	Extant	Native	-	Resident
Niue	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Réunion	Extant	Native	-	Resident
Samoa	Extant	Native	-	Resident
Seychelles	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Somalia	Extant	Native	-	Resident
South Africa	Extant	Native	-	Resident
Tanzania, United Republic of	Presence Uncertain	Native	-	-
Timor-Leste	Extant	Native	-	Resident
Tokelau	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
United States	Extant	Native	-	Resident
United States -> Hawaiian Is.	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Howland-Baker Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Johnston I.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Midway Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> US Line Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Wake Is.	Extant	Native	-	Resident
Vanuatu	Extant	Native	-	Resident
Viet Nam	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident
Yemen	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident
81. Pacific - southwest	Extant	Native	-	Resident

Population

Acanthurus blochii was recorded as occasional in terms of relative abundance in Calamianes Islands, Philippines and the northern Bismarck Sea, Papua New Guinea (Werner and Allen 2000, Allen 2009). It was recorded as common in Milne Bay, Papua New Guinea (Allen 2003). It is moderately common at Raja Ampat (Allen 2003b). It is common in the American Samoa National Park (National Park of Samoa Checklist of Fishes, accessed 21 April 2010). It is one of the most common fishes recorded in the Bar Reef Marine Sanctuary (BRMS), northwestern Sri Lanka.

It was found to be most abundant in shallow reef flat and structured sandstone reef habitats (Ohman *et al.* 1997).

Density and biomass did not change significantly in marine reserves censused in New Caledonia before and after protection (Wantiez *et al.* 1997).

	Before	After
Density (10¯2 fish m¯2)	1.26 (0.50)	1.36 (0.39)
Biomass (g m¯2)	1.65 (0.33)	2.21 (0.65)

A. blochii accounts for 2% and 1% of the Acanthurid fishery in Guam (Division of Aquatic and Wildlife Resources unpub. data) and Saipan (P. Houk unpub. data) respectively, but shows no signs of decline. It was not observed from the fishery in Ponpei (Rhodes *et al.* 2008). Average catch 2,900 kls/year in Hawaii (Division of Aquatic Resources unpub. data). This species is collected as an aquarium fish in West Hawaii. The total number of individuals caught from FY 2005-2009 was 134 with a total value of $182 (Walsh *et al.* 2010).

In Kenya, landings during 1978-2001 for families that are less important in commercial catches (e.g., scarinae and Acanthuridae) showed rising catches (1978-1984) followed by a general decline during the 1990s, but the landings for the scarinae showed a rising trend in recent years (Kaunda-Arara *et al.* 2003).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus blochii occurs on shallow coral reef (Randall 2001). It is occasionally observed in seagrass beds in Ryukyu Islands (Nakamura amd Tsuchiya 2009). Juveniles settle in coral rubble at Ishigaki Island, Japan (Nakamura *et al.* 2009). It feeds on detritus and sedimentary material (Choat *et al.* 2004). It is classified as a grazer/detritivore (J.H. Choat and D.R. Bellwood pers. obs. in Green and Bellwood 2009). Maximum age recorded at 35 years (Choat and Robertson 2002). The sexes are separate among the acanthurids and there is no evidence of sexual dimorphism (Reeson 1983).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-
9.8.5. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Soft Substrate	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-
9.9. Marine Neritic -> Marine Neritic - Seagrass (Submerged)	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity
35 Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
45 (SL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus blochii is one of the most important species captured in islands of the southwest lagoon of New Caledonia (Wantiez *et al.* 1997). It is also a component of the aquarium trade (juveniles) (GMAD). It sells for $29.99-$99.95 online (L. Rocha pers. comm. 2010).

In the Philippines, it is one of the most targeted Acanthurids. There have been localized declines observed in central Philippines (B. Stockwell pers. comm. 2010).

Threats

Acanthurus blochii is a targeted food fish in parts of its range. There have been localized declines due to fishing in the Philippines.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and

degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. Its distribution overlaps several marine protected areas in parts of its range.

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Bulletin of Biological Assessment 17. Conservation International, Washington, USA.

Draft

Acanthurus chirurgus - (Bloch, 1787)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - chirurgus

Common Names: Doctorfish (English), Acaraúna (Portuguese), Acaraúna-preta (Portuguese), Barbeiro (Portuguese), Barbero rayado (Spanish; Castilian), Black Doctorfish (English), Carauna (Portuguese), Caraúna (Portuguese), Chirurgien Docteur (French), Cirujano (Spanish; Castilian), Cirujano rayado (Spanish; Castilian), Cirurgião (Portuguese), Doctor (Spanish; Castilian), Doktorfisk (Danish), Gallinazo (Spanish; Castilian), Kleinfeshi blanku (Papiamento), Lanceta (Portuguese), Navajero (Spanish; Castilian), Navajón (Spanish; Castilian), Navajón cirujano (Spanish; Castilian), Navajón rayado (Spanish; Castilian), Peixe-cirurgião (Portuguese), Peixe-doutor (Portuguese), Pokolec Chirung (Polish), Sangrador común (Spanish; Castilian), Sangrador rayado (Spanish; Castilian), Yokoshimahagi (Japanese), хирург обыкновенный (Russian)
Synonyms: Acanthurus Valenciennes, 1835; Chaetodon Bloch, 1787;

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-01-11	Passed	-	-

Assessor(s): Rocha, L.A., Myers, R., Abesamis, R., Clements, K.D., Choat, J.H., McIlwain, J., Nanola, C., Russell, B. & Stockwell, B.

Reviewers: Floeter, S., Edgar, G., Davidson, L. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus chirurgus is widely distributed in the Atlantic. It is common and abundant throughout its range. It is harvested in subsistence fisheries and is a targeted food fish in parts of its distribution. There are localized declines in areas where this species is heavily fished (Jamaica), however, there is no indication of global population declines. It is found in a number of marine protected areas in parts of its range. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus chirurgus is found from South Carolina, USA (juveniles are found to Massachusetts, it is rare north of Florida), Bermuda, and the northern Gulf of Mexico to São Paulo,, Brazil. It also occurs on the tropical and subtropical coast of West Africa. Records from West Africa are probably misidentifications of *A. monroviae* (L. Rocha pers. comm. 2010).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 65

Depth Upper Limit (in metres below sea level): 2

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Anguilla	Extant	Native	-	Resident
Antigua and Barbuda	Extant	Native	-	Resident
Aruba	Extant	Native	-	Resident
Bahamas	Extant	Native	-	Resident
Barbados	Extant	Native	-	Resident
Belize	Extant	Native	-	Resident
Bermuda	Extant	Native	-	Resident
Brazil	Extant	Native	-	Resident
Cayman Islands	Extant	Native	-	Resident
Colombia	Extant	Native	-	Resident
Colombia -> Colombia (mainland)	Extant	Native	-	Resident
Colombia -> Colombian Caribbean Is.	Extant	Native	-	Resident
Costa Rica	Extant	Native	-	Resident
Cuba	Extant	Native	-	Resident
Curaçao	Extant	Native	-	Resident
Dominica	Extant	Native	-	Resident
Dominican Republic	Extant	Native	-	Resident
French Guiana	Extant	Native	-	Resident
Gambia	Presence Uncertain	Native	-	Resident
Grenada	Extant	Native	-	Resident
Guadeloupe	Extant	Native	-	Resident
Guatemala	Extant	Native	-	Resident
Guyana	Extant	Native	-	Resident
Haiti	Extant	Native	-	Resident
Honduras	Extant	Native	-	Resident
Jamaica	Extant	Native	-	Resident
Martinique	Extant	Native	-	Resident
Mexico	Extant	Native	-	Resident
Montserrat	Extant	Native	-	Resident
Netherlands Antilles	Extant	Native	-	Resident
Netherlands Antilles -> Bonaire	Extant	Native	-	Resident
Netherlands Antilles -> Netherlands Leeward Is.	Extant	Native	-	Resident

Nicaragua	Extant	Native	-	Resident
Panama	Extant	Native	-	Resident
Puerto Rico	Extant	Native	-	Resident
Saint Barthélemy	Extant	Native	-	Resident
Saint Helena, Ascension and Tristan da Cunha	Extant	Native	-	Resident
Saint Helena, Ascension and Tristan da Cunha -> Ascension	Extant	Native	-	Resident
Saint Kitts and Nevis	Extant	Native	-	Resident
Saint Lucia	Extant	Native	-	Resident
Saint Martin (French part)	Extant	Native	-	Resident
Saint Vincent and the Grenadines	Extant	Native	-	Resident
Sao Tomé and Principe	Presence Uncertain	Native	-	Resident
Sao Tomé and Principe -> Principe	Presence Uncertain	Native	-	Resident
Sao Tomé and Principe -> Sâo Tomé	Presence Uncertain	Native	Unknown	Resident
Senegal	Presence Uncertain	Native	-	Resident
Suriname	Extant	Native	-	Resident
Trinidad and Tobago	Extant	Native	-	Resident
Turks and Caicos Islands	Extant	Native	-	Resident
United States	Extant	Native	-	Resident
Venezuela, Bolivarian Republic of	Extant	Native	-	Resident
Virgin Islands, British	Extant	Native	-	Resident
Virgin Islands, U.S.	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
21. Atlantic - northwest	Extant	Native	-	Resident
31. Atlantic - western central	Extant	Native	-	Resident
34. Atlantic - eastern central	Presence Uncertain	Native	-	Resident
41. Atlantic - southwest	Extant	Native	-	Resident
47. Atlantic - southeast	Extant	Native	-	Resident

Population

Acanthurus chirurgus is the most abundant surgeonfish in the western Atlantic (L. Rocha pers. comm. 2010). Densities were recorded at (0.05 ind m^{-2}) from Abrolhos Bank, eastern Brazil. It showed higher densities within the no-take area of Timbebas (Francino-Filho *et al.* 2009). This species had greater abundances in unfished areas than fished areas in Saba Marine Park (Netherlands Antilles) and in Hol Chan Marine Reserve, Belize (Polunin and Roberts 1993). There were order of magnitude differences in biomass among six Caribbean islands studied on which fishing pressure ranged from non existent in Bonaire, increasing through Saba, Puerto Rico, St. Lucia and Dominica and reaching very high intensities in Jamaica, with biomass declining as fishing intensity increased (Hawkins and Roberts 2004).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus chirurgus inhabits coral reefs and inshore rocky areas with sand and deep sponge bottoms from 2-70 m. Juveniles use seagrass beds and mangroves as nurseries. It grazes on many species of benthic algae, occasionally on seagrass. It also feeds on the film of algae on the surface of sand undisturbed by surge. Contents of digestive tract includes from 25 to 75% inorganic material, including sand and gravel to 5 mm diameter, *Halimeda* fragments and sponge spicules. In Abrolhos Bank eastern Brazil, it was recorded to have foraged more frequently over sand bottoms (Francino-Filho *et al.* 2009).

Pelagic larval stage duration range from 45 to 71 days (M. Bergenius in Rocha *et al.* 2002), it then settles on reefs when 26.9 mm (Robertson 1992). In Bermuda, juveniles settle onto lagoonal reefs and migrate to the outer reefs as adults (Mutz 2006). The sexes are separate among the acanthurids and there is no evidence of sexual dimorphism. First maturity is at about 17 cm (FL) (Reeson, 1983).

Growth

A. chirurgus displays the highly characterized pattern of asymptotic growth. Terminal size was reached at around age four, and most of the growth occurred within the first 10% of the lifespan, and approximately 85% of somatic size was attained within the first year. The mean maximum age fluctuated from 7 years in Belize to 16 years in Bermuda with a maximum longevity of 30 years in Bermuda (Mutz 2006). Maximum age recorded from San Blas was 13 years (Choat and Robertson 2002). This species has high turnover rates (J.H. Choat pers. comm. 2010).

There are strongly contrasting patterns of habitat variation in demography at five sites studied by Robertson *et al.* (2005a): In most locations fish settle inshore, grow to about asymptotic size and then, when two to six years old, relocate permanently to outer reefs, where they can reach 30 years. At Venezuela, fish grow very rapidly and do not show asymptotic growth but have shorter life spans of 16 years.

Cleaning Behavior

At Fernando de Noronha Archipelago in southwestern Atlantic, juveniles hold cleaning stations together with the blue tang (*Acanthurus coeruleus*) and sergeant major (*Abudefduf saxatilis*) and graze algae as well as pick molted skin and parasites from green turtles (*Chelonia mydas*). This behavior is preceded by a characteristic inspection usually followed by feeding nips on the turtles' skin (head, limbs, and tail), as well as on the carapace. The most inspected and cleaned body parts are the flippers (Sazima et al. 2004).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-
9.8.5. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Soft Substrate	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-
9.9. Marine Neritic -> Marine Neritic - Seagrass (Submerged)	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female	Age at Maturity: Male
(Not specified) Years	(Not specified) Years

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity
30 Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
34.5 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus chirurgus is a component of subsistence fisheries and is caught in traps and gill nets, occasionally by spearing. It is a targeted food fish in Haiti and Jamaica. It is caught incidentally in trap fisheries elsewhere (L. Rocha pers. comm. 2010). It is also a component of the aquarium trade (Global Marine Aquarium Database accessed 21 April 2010). It sells for $29.99-$69.95 online (L. Rocha pers. comm. 2010).

Threats

Acanthurus chirurgus is heavily fished in parts of its range (Haiti and Jamaica).

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. Its distribution overlaps several marine protected areas in parts of its range.

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Draft

Acanthurus chronixis - Randall, 1960

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - chronixis

Common Names: Kapingamarangi Surgeonfish (English), Botana abu abu (Malay), Chronixis Kirurgfisk (Danish), Chronixis Surgeonfish (English), Mimic Surgeonfish (English), Namerahagi (Japanese)
Synonyms: No Synonyms

Taxonomic Note:
Acanthurus chronixis is a close relative of *Acanthurus pyroferus*, sharing the count of VIII dorsal spines and the same morphology, in particular the protruding snout (Randall 2001a). Its taxonomic status is uncertain due to limited number of specimens. There is taxonomic work underway to determine the status of this species. We accept current taxonomy that this species is valid (Eschmeyer 2011, J.E. Randall pers comm. 2011).

Red List Status
VU - Vulnerable, D2 (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Myers, R., Choat, J.H., Abesamis, R., Clements, K.D., McIlwain, J., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G., Davidson, L. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus chronixis is known from a limited number of specimens: the holotype and two possible juveniles from Kapingamarangi Atoll, Caroline Islands and an individual collected in 1980. The estimated Area of Occupancy is 31 km^2 using 25m depth layer analysis on ArcGIS, however, this species has only been collected in depths no greater than 6m, so the Area of Occupancy is much less than 31 km^2.There is taxonomic work underway to verify the taxonomic standing of this species, as it is involved in species complexes that mimic color patterns. There is very little information available on the population status or life history characteristics of this species. Kapingamarangi Atoll is a highly isolated but heavily populated island. Local waters are presumably heavily fished with spearfishing occurring widely around the island (G. Edgar pers. comm. 2011). This species is therefore listed as Vulnerable under D2. We recommend continued research on this species' taxonomic standing, distribution, life history characteristics and population status. We accept current taxonomy that this species is valid (Eschmeyer 2011, J.E. Randall pers comm.. 2011) and although taxonomic problems persist for this putative species, it is clear that even at the population level, the only location where it occurs is subject to intensive harvesting.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus chronixis is known only from Kapingamarangi Atoll, Caroline Islands. It is reported from southwestern Taiwan and southern Japan, however, reports from other areas are probably misidentifications of the juvenile stages of *Acanthurus pyroferus* (Randall 2002b, R.F. Myers

pers. comm. 2011). The estimated Area of Occupancy is 64 km^2 using coral layer analysis with the World Conservation Monitoring Centre's 1 km grid polygon.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 6

Depth Upper Limit (in metres below sea level): 0

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Micronesia, Federated States of	Extant	Native	Unknown	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
71. Pacific - western central	Extant	Native	-	Resident

Population

There is very limited population information available for this species and this is attributed to its isolated range of distribution. This species was originally only known from the type specimens, however, an individual has been collected since its description in 1960 (accessed through the Fishnet 2 Portal, www.fishnet2.org, 2012-06-11).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus chronixis was described from a single adult specimen collected over coral and sand bottom in less than 6 m (Randall 1960, 2001a). The sexes are separate among the acanthurids and there is no evidence of sexual dimorphism (Reeson 1983).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
21.1 (SL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Aquarium trade reports from the Global Marine Aquarium Database (GMAD) of this species are probably juveniles of *A. pyroferus* (R. Myers pers. comm. 2010). Local waters around Kapingamarangi Atoll are presumably heavily fished with spearfishing occurring widely around the island (G. Edgar pers. comm. 2011).

Threats

Kapingamarangi Atoll is a highly isolated but heavily populated island. Local waters are presumably heavily fished with spearfishing occurring widely around the island (G. Edgar pers. comm. 2011).

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place. Kapingamarangi Atoll is extremely isolated; the nearest atoll Nukuoro, is 164 nautical miles northward (Niering and Miller 1956).

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Draft

Acanthurus coeruleus - Bloch & Schneider, 1801

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - coeruleus

Common Names: Blue Tang (English), Acara-úna (Portuguese), Acaraúna-azul (Portuguese), Acaraúna-preta (Portuguese), Barbeiro (Portuguese), Barbeiro-azul (Portuguese), Barbero (Spanish; Castilian), Barbero azul (Spanish; Castilian), Blauer Doktorfisch (German), Blue Barber (English), Blue Doctor (English), Blue Doctorfish (English), Blue Tang Surgeonfish (English), Blå kirurgfisk (Danish), Chirurgien Bayolle (French), Chirurgien Bleu (French), Cirujano (Spanish; Castilian), Cirujano azul (Spanish; Castilian), Doctor (Spanish; Castilian), Kleinfeshi blou (Papiamento), Médico (Spanish; Castilian), Navajero (Spanish; Castilian), Navajón (Spanish; Castilian), Navajón Azul (Spanish; Castilian), Peixe-cirurgião (Portuguese), Peixe-doutor (Portuguese), Pokolec Turkusowy (Polish), Sangrador Azul (Spanish; Castilian), Yellow Barber (English), Yellow Doctorfish (English), хирург синий (Russian)
Synonyms: Acanthurus Poey, 1860; Acronurus Poey, 1875; Hepatus (Bloch & Schneider, 1801); Teuthis (Bloch & Schneider, 1801);

Taxonomic Note:
There was a significant level of genetic structure observed between North and South Atlantic populations, suggesting limited dispersal across the Amazon barrier (Rocha *et al.* 2002).

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-01-11	Passed	-	-

Assessor(s): Choat, J.H., Myers, R., Rocha, L.A., Abesamis, R., Clements, K.D., McIlwain, J., Nanola, C., Russell, B. & Stockwell, B.

Reviewers: Floeter, S., Edgar, G., Davidson, L. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus coeruleus is widely distributed in the Atlantic. It is common and abundant throughout its range. It is targeted in some areas and there have been localized declines from harvesting, however it is found in a number of marine reserves in parts of its range. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus coeruleus is found from South Carolina, USA (juveniles to New York), Bermuda, southwards to Sao Paulo, Brazil (L. Rocha pers. comm. 2010). It is also reported from Ascension and St. Helena Island.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 60

Depth Upper Limit (in metres below sea level): 1

Depth Zone: Shallow photic (0-50m), Deep Photic (51-200m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Anguilla	Extant	Native	-	Resident
Antigua and Barbuda	Extant	Native	-	Resident
Aruba	Extant	Native	-	Resident
Bahamas	Extant	Native	-	Resident
Barbados	Extant	Native	-	Resident
Belize	Extant	Native	-	Resident
Bermuda	Extant	Native	-	Resident
Brazil	Extant	Native	-	Resident
Brazil -> Trindade	Extant	Native	-	Resident
Cayman Islands	Extant	Native	-	Resident
Colombia	Extant	Native	-	Resident
Costa Rica	Extant	Native	-	Resident
Cuba	Extant	Native	-	Resident
Dominica	Extant	Native	-	Resident
Dominican Republic	Extant	Native	-	Resident
French Guiana	Extant	Native	-	Resident
Grenada	Extant	Native	-	Resident
Guadeloupe	Extant	Native	-	Resident
Guatemala	Extant	Native	-	Resident
Guyana	Extant	Native	-	Resident
Haiti	Extant	Native	-	Resident
Honduras	Extant	Native	-	Resident
Jamaica	Extant	Native	-	Resident
Martinique	Extant	Native	-	Resident
Mexico	Extant	Native	-	Resident
Montserrat	Extant	Native	-	Resident
Netherlands Antilles	Extant	Native	-	Resident
Nicaragua	Extant	Native	-	Resident
Panama	Extant	Native	-	Resident

Puerto Rico	Extant	Native	-	Resident
Saint Barthélemy	Extant	Native	-	Resident
Saint Helena, Ascension and Tristan da Cunha	Extant	Native	-	Resident
Saint Helena, Ascension and Tristan da Cunha -> Ascension	Extant	Native	-	Resident
Saint Kitts and Nevis	Extant	Native	-	Resident
Saint Lucia	Extant	Native	-	Resident
Saint Martin (French part)	Extant	Native	-	Resident
Saint Vincent and the Grenadines	Extant	Native	-	Resident
Suriname	Extant	Native	-	Resident
Trinidad and Tobago	Extant	Native	-	Resident
Turks and Caicos Islands	Extant	Native	-	Resident
United States	Extant	Native	-	Resident
Venezuela, Bolivarian Republic of	Extant	Native	-	Resident
Virgin Islands, British	Extant	Native	-	Resident
Virgin Islands, U.S.	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
21. Atlantic - northwest	Extant	Native	-	Resident
31. Atlantic - western central	Extant	Native	-	Resident
41. Atlantic - southwest	Extant	Native	-	Resident
47. Atlantic - southeast	Extant	Native	-	Resident

Population

Acanthurus coeruleus is rare in the Gulf of Mexico and is not common north of Florida. *Acanthurus coeruleus* was the most abundant species observed in traps from the U.S. Virgin Islands (Garrison *et al.* 2004). It is common and abundant throughout its range (L. Rocha pers. comm. 2010). There were order of magnitude differences in biomass among six Caribbean islands studied on which fishing pressure ranged from non existent in Bonaire, increasing through Saba, Puerto Rico, St. Lucia and Dominica and reaching very high intensities in Jamaica, with biomass declining as fishing intensity increased (Hawkins and Roberts 2004). Densities were recorded at (0.07 ind m^{-2}) from Abrolhos Bank eastern Brazil. It showed higher densities within the no-take area of Timbebas (Francino-Filho *et al.* 2009).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus coeruleus is found on coral reefs, rocky habitats and grassy areas in depths from 1 to 60 m. It grazes on a wide variety of benthic algae, occasionally on seagrass. It is sometimes seen in feeding aggregations with *Acanthurus bahianus* and/or *A. chirurgus.* In the Abrolhos

Bank, all roving herbivorous species ingest large amounts of detritus with the exception of *A. coeruleus*. It is mainly a fleshy algae consumer (Ferreira and Goncalves 2006). Digestive tract contains little sand or inorganic material (Randall 2002a). Aggregates with other surgeonfishes (*A. bahianus, tractus* and *A. chirurgus*) to raid algae patches guarded by damselfishes.

Juveniles of this species are solitary and territorial (Bell and Kramer 2000) while adults commonly form mixed-species schools (Foster 1985) to facilitate access to defended high quality algal resources in damselfish territories (Robertson *et al.* 1976, Foster 1985). Schooling occurs primarily in adults; small juveniles never participate in large, dense schools. The proportion of adults that were schooling increased from the back reef to the reef crest to the spurs and grooves zone (Lawson *et al.* 1999).

A. coeruleus adults are consistently either territorial or non-territorial, with territorial individuals found in schools and wandering. Territorial adults engage in aggressive interactions with conspecific and congeners. Fish in the territorial mode restrict activity to a small area overlapping the territories of other tangs. Non-territorial fish form schools and wander (Morgan and Kramer 2004).

Growth

A. coeruleus displays the highly characterized pattern of asymptotic growth. Terminal size was reached at around age 4, and most of the growth occurred within the first 10% of the lifespan, and approximately 85% of somatic size was attained within the first year. The mean maximum age fluctuated from 8 years in Belize to 37 years in Bermuda with a maximum longevity of 43 years in Bermuda (Mutz 2006).

A study by Choat and Robertson (2002) show the following maximum age estimates from different locations of this species' range:

Ascension Island - 37 years
San Blas, Panama - 16 years
Lee Stocking Island, Bahamas - 27 years

In upwelling areas in Isla Margarita, Venezuela it achieves 320 mm (SL), very rapid non-asymptotic growth same as *A. chirurgus* (Robertson *et al.* 2005b, Choat and Robertson 2002a).

Reproduction

The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010). It appears to normally mature at ~ 13 cm (FL) (Reeson 1983). This species was observed to form late afternoon resident spawning aggregations of 6,000-7,000 individuals, possibly year-round, during a 12-21 day period centered between the full and new moon of each month off southwestern Puerto Rico. This species also pair spawns. The pair spawning male holds a benthic territory and develops an ephemeral 'white-faced' color phase (Domeier and Colin 1997).

The pelagic larval stage duration ranges from 46 to 57 days (B. Victor in Rocha *et al.* 2002), it then settles on reefs when 26.7 mm (Robertson 1992). After settlement, juveniles have a distinct yellow coloration. Juveniles occur primarily on the reef crest, spurs, and a transition zone between the reef crest and reef flat (Bell and Kramer 2000). A study by Lawson *et al.* (1999) showed that this species exhibits ontogenetic habitat shifts. Newly settled blue tangs occur in the reef crest and spurs and grooves, but larger juveniles are more common in the back reef, while adults are evenly distributed across zones.

Cleaning behavior

At Fernando de Noronha Archipelago in southwestern Atlantic, juveniles hold cleaning stations together with the doctorfish (*Acanthurus chirurgus*) and sergeant major (*Abudefduf saxatilis*) and graze algae as well as pick molted skin and parasites from green turtles (*Chelonia mydas*). This behavior is preceded by a characteristic inspection usually followed by feeding nips on the turtles' skin (head, limbs, and tail), as well as on the carapace. The most inspected and cleaned body parts are the flippers (Sazima *et al.* 2004).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-
9.8.5. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Soft Substrate	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-
9.9. Marine Neritic -> Marine Neritic - Seagrass (Submerged)	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female	Age at Maturity: Male	Size at Maturity (in cms): Female	Size at Maturity (in cms): Male
(Not specified) Years	(Not specified) Years	15	19.5

Longevity
43 Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
39 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus coeruleus is a component of subsistence fisheries and is caught with traps and gill nets, occasionally by spearing. It is also a component of the aquarium trade (Global Marine Aquarium Database accessed 19 March 2010). Prices online range from $25.98-$89.95 (L. Rocha pers. comm. 2010).

Threats

Acanthurus coeruleus is a targeted food in fish in parts of its range. It is heavily fished in some areas (Haiti and Jamaica).

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their

life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. Its distribution overlaps several marine protected areas in parts of its range.

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Draft

Acanthurus dussumieri - Valenciennes, 1835

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - dussumieri

Common Names: Eyestripe Surgeonfish (English), Chirurgien Couronné (French), Chirurgien de Duss (French), Chirurgien de Dussumier (French), Chirurgien à Lunettes Jaunes (French), Cirurgião Coroado (Portuguese), Dussumier's Surgeonfish (English), Hawaiian Surgeonfish (English), Indangan (Filipino; Pilipino), Kangaja (Swahili), Kaxan (Somali), Navajón Coronado (Spanish; Castilian), Nise-kanranhagi (Japanese), Ornate Surgeonfish (English), Palani (Hawaiian), Penciled Surgeonfish (English), Pencilled Surgeon (English), Pencilled Surgeonfish (English), Picot Kanak (French), Potlood-doktervis (Afrikaans), Øjestribet Kirurgfisk (Danish)
Synonyms: Acanthurus Valenciennes, 1835; Hepatus (Valenciennes, 1835); Rhombotides (Valenciennes, 1835); Teuthis (Valenciennes, 1835);

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Choat, J.H., McIlwain, J., Abesamis, R., Clements, K.D., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Davidson, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus dussumieri is widespread throughout the Indo-Pacific. It is uncommon in some parts of its range. Although heavily fished in some areas (e.g., Hawaii), there is no evidence of global population declines. It has a wide habitat range and is found in inter-reefal depths down to 131 m, thus provided with refuge. Its distribution encompasses a number of marine protected areas. Given this species' wide distributional and habitat range and occurrence in marine reserves, it is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus dussumieri is found from the eastern coast of Africa to the southern Arabian Peninsula, northwards to southern Japan, southwards to New South Wales, Australia and eastwards to New Caledonia, Guam and Hawaii. This species is not recorded from eastern Micronesia and in most parts of the Central Pacific (R. Myers pers. comm. 2010).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 131

Depth Upper Limit (in metres below sea level): 4

Depth Zone: Shallow photic (0-50m), Deep Photic (51-200m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Australia	Extant	Native	-	Resident
British Indian Ocean Territory	Extant	Native	-	Resident
British Indian Ocean Territory -> Chagos Archipelago	Extant	Native	-	Resident
Brunei Darussalam	Extant	Native	-	Resident
Cambodia	Extant	Native	-	Resident
China	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Comoros	Extant	Native	-	Resident
Cook Islands	Extant	Native	-	Resident
Disputed Territory	Extant	Native	-	Resident
Disputed Territory -> Paracel Is.	Extant	Native	-	Resident
Disputed Territory -> Spratly Is.	Extant	Native	-	Resident
Djibouti	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
French Southern Territories	Extant	Native	-	Resident
French Southern Territories -> Mozambique Channel Is.	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
Hong Kong	Extant	Native	-	Resident
India	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Kenya	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Kiribati Line Is.	Extant	Native	-	Resident
Macao	Extant	Native	-	Resident
Madagascar	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Maldives	Extant	Native	-	Resident
Mauritius	Extant	Native	-	Resident
Mauritius -> Mauritius (main island)	Extant	Native	-	Resident
Mauritius -> Rodrigues	Extant	Native	-	Resident

Mayotte	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Mozambique	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
New Zealand	Extant	Native	-	Resident
Niue	Extant	Native	-	Resident
Norfolk Island	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Oman	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Réunion	Extant	Native	-	Resident
Seychelles	Extant	Native	-	Resident
Singapore	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Somalia	Extant	Native	-	Resident
South Africa	Extant	Native	-	Resident
Sri Lanka	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
Tanzania, United Republic of	Extant	Native	-	Resident
Thailand	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident
United States	Extant	Native	-	Resident
United States -> Hawaiian Is.	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
Vanuatu	Extant	Native	-	Resident
Viet Nam	Extant	Native	-	Resident
Yemen	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
47. Atlantic - southeast	Extant	Native	-	Resident
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident
81. Pacific - southwest	Extant	Native	-	Resident

Population

Acanthurus dussumieri was recorded as occasional in terms of relative abundance in Milne Bay, Papua New Guinea (Allen 2003). It is uncommon

from survey data in Guam and rare in the Guam and Saipan fishery (DAWR and P. Houk unpub. data). This species makes up 35% of acanthurid fishery in Hawaii at 11, 200 kilos in 2007. Catch has declined from 16, 000 kls. in 1997 but there is no corresponding effort data (DAR unpub. data).
This species is collected as an aquarium fish in West Hawaii. The total number of individuals caught from FY 2005-2009 was 2,363 with a total value of $3,753 (Walsh *et al.* 2010). *A. dussumieri* is uncommon to rare in the Phils. (R. Abesamis, B. Stockwell and C. Nanola pers. comm. 2010).

In Kenya, landings during 1978-1982 for families that are less important in commercial catches (e.g., scarinae and Acanthuridae) showed rising catches (1978-1984) followed by a general decline during the 1990s, but the landings for the scarinae showed a rising trend in recent years (Kaunda-Arara *et al.* 2003).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus dussumieri is generally found on seaward reefs, usually at depths greater than 10 m. Submarine observations in Hawaii to 131 m (Chave and Mundy 1994). It is usually seen as a solitary fish but may also occur in small groups. It feeds on detritus and sediment (Choat *et al.* 2004). It is classified as a grazer/detritivore (Choat and Bellwood pers. obs. in Green and Bellwood 2009).

The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010). It is reported as a pair spawner (Randall 2001b). Maximum age recorded from the Great Barrier Reef is at 28 years (Choat and Robertson 2002).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-
9.8.5. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Soft Substrate	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity
28 Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
54 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus dussumieri is caught incidentally in many localities. It is one of the most commonly consumed species on Brooker Is., Papua New Guinea (Allen *et al.* 2003). It is taken mainly by traps. This species is the most landed Acanthurid species in the Hawaii commercial fishery (DAR unpub. data). It is occasionally seen in markets. It is also a component of the aquarium trade. Online prices range from $79.99-$799.95 based on size (L. Rocha pers. comm. 2010).

Threats

Acanthurus dussumieri is a targeted food fish in parts of its range. It is the most landed Acanthurid species in the Hawaii commercial fishery. In parts of its distribution (e.g., Coral Triangle), it is harvested in areas with known occurrence of illegal fishing practices.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. Its distribution overlaps several marine protected areas in parts of its range. In Queensland, Australia, there is a recreational catch limit of five per species and a minimum size limit of 25 cm (Department of Primary Industries accessed 8 April 2010).

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Draft

Acanthurus fowleri - de Beaufort, 1951

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - fowleri

Common Names: Horseshoe Surgeonfish (English), Fowler's Surgeonfish (English), Fowlers Kirurgfisk (Danish)
Synonyms: No Synonyms

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Abesamis, R., Choat, J.H., Clements, K.D., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Davidson, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus fowleri is rare in most of its range and is found in deeper waters (up to 50 m) on steep drop-offs. It is rarely seen in fish markets and is a minor component of the aquarium trade. It is found in several marine protected areas in parts of its range and is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus fowleri is found in the Coral Triangle Region from the Philippines, Malaysia, Indonesia to the Solomon Islands, and Scott Reef off northwestern Australia (Randall 2001a).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 50

Depth Upper Limit (in metres below sea level): 2

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Australia	Extant	Native	-	Resident
Australia -> Ashmore-Cartier Is.	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
57. Indian Ocean - eastern	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident

Population

Acanthurus fowleri is rare in most of its range (J.H. Choat pers. comm. 2010). This species was recorded as occasional in terms of relative abundance in the northern Bismarck Sea, Milne Bay, Papua New Guinea and Raja Ampat, Indonesia (Allen 2003, 2003b, 2009). In the central Visayas, Philippines, *A. fowleri* has only been recorded during fish visual censuses in Balicasag Is. and Tubbataha Island. It has not been observed in fishers' catch and is not commonly found in fish markets (R. Abesamis and S. Conales, Jr. pers. comm. 2010).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus fowleri is generally found solitary on deep outer reef slopes, usually in more than 20 m. It is easily confused with other similar species. It is classified as a grazer/detritivore (Choat and Bellwood pers. obs. in Green and Bellwood 2009). The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
45 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus fowleri is a targeted food fish in New Ireland and Manus, Papua New Guinea (Hamilton *et al.* 2009) and is collected for food in parts of its range. It is also a minor component of the aquarium trade. Online prices range from $219.99-$699.95 based on size (L. Rocha pers. comm. 2010).

Threats

Acanthurus fowleri is a targeted food fish in parts of its range. It is found in areas where illegal fishing practices are known to occur.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. Its distribution overlaps several marine protected areas in parts of its range.

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Draft

Acanthurus gahhm - (Forsskål, 1775)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - gahhm

Common Names: Black Surgeonfish (English)
Synonyms: Acanthurus (Linnaeus, 1758); Chaetodon Forsskål, 1775;

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed? (Not specified)

Assessor(s): Abesamis, R., Choat, J.H., Clements, K.D., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Raynal, M. & Polidoro, B.

Contributor(s): Ram, M., Beresford, A., Collen, B., Richman, N. & Chenery, A.

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus gahhm is endemic to the Red Sea, Gulf of Aden and Socotra. It is occasionally encountered over hard reef substrata in Jeddah and Dubba, Saudi Arabia, but may be locally abundant in appropriate habitat (e.g. lagoons). This species inhabits a variety of habitats including open sand and rubble bottoms in lagoons and seaward reefs. It is a component of the marine aquarium trade and is well represented in fish markets in parts of its range, however, there are no indications at present time of detrimental effects of harvesting to the population. Although this species shows varying degrees of habitat preference and utilization of coral reefs, it inhabits areas where coral reef degradation and loss is underway. Additional research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Its distribution overlaps with some marine protected areas in parts of its range. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus gahhm is endemic to the Red Sea, Gulf of Aden and Socotra (Randall 2001a). Records from other areas (central west Pacific) are probably misidentifications of *A. nigricauda* (L. Rocha pers comm. 2010).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 50

Depth Upper Limit (in metres below sea level): 5

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: Afrotropical, Palearctic

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Djibouti	Extant	Native	-	Resident
Egypt	Extant	Native	-	Resident
Eritrea	Extant	Native	-	Resident
Israel	Extant	Native	-	Resident
Jordan	Extant	Native	-	Resident
Saudi Arabia	Extant	Native	-	Resident
Somalia	Extant	Native	-	Resident
Sudan	Extant	Native	-	Resident
Yemen	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident

Population

Underwater fish visual surveys in Jeddah and Dubba on the east coast of the Red Sea recorded *Acanthurus gahhm* as occasional with a maximum of 0.1 individuals per 300 m^2 (A. Ayling pers comm. 2010). However, the surveys conducted in Jeddah and Dubba, Saudi Arabia, were carried out on hard reef substrate, as this species inhabits sand/lagoonal areas, it is inferred that *A. gahhm* will be more abundant in lagoons. This species is well represented in the Jeddah fish market (J.H. Choat pers comm. 2010).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus gahhm, has a depth range of 5-50 m and is usually found in tropical climates over open sand and rubble bottoms in lagoons or at the base of seaward reefs (Kuiter and Debelius 2001). It is also often found in large groups in open areas near coral or rock, and in small groups which sometimes join to form large loose aggregations.

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-
9.8.5. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Soft Substrate	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
40 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: Congregatory (and dispersive)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus gahhm is a component of the marine aquarium trade, however, no prices were found online. This species is harvested for food, although is not specifically a targeted resource.

Threats

Acanthurus gahhm is associated with coral reef habitats. Urban growth, coastal land reclamation, fisheries expansions and water pollution combined with Crown of Thorns (COTS) outbreaks are placing increasing pressure on the coral reefs of the Red Sea and Gulf of Aden (Kotb *et al.* 2004). It is predicted that pressures on the reefs of the Red Sea and Gulf of Aden will increase over the next 8 years due to major development for mass tourism and industrialization, over exploitation, destructive fishing in poorly managed areas and COTS outbreaks (Kotb *et al.* 2004).

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for *Acanthurus gahhm*. However, the distribution of this species overlaps with a number of marine protected areas in its range of distribution. There has been some success in establishing MPA's in the Red Sea, but there is little or no effective regional MPA network, and most of the MPAs have ineffective management (Kotb *et al.* 2004).

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Draft

Acanthurus grammoptilus - Richardson, 1843

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - grammoptilus

Common Names: Finelined Surgeonfish (English), Ring-tailed Surgeonfish (English), Smålinjet Kirurgfisk (Danish)
Synonyms: No Synonyms

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Russell, B., Abesamis, R., Clements, K.D., Choat, J.H., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A. & Stockwell, B.

Reviewers: Davidson, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus grammoptilus is apparently confined to Northern Australia, it is common, and not heavily utilized. There are no major threats known and it is found in marine protected areas in parts of its range. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus grammoptilus occurs in Australia from Abrolhos, Western Australia to Queensland eastwards to Fiji. The record from Vanuatu is most likely *A. blochii* based on the absence of any yellow on the pectoral fin and the relatively small caudal knife (J.H. Choat and K.D. Clements pers. comm. 2010).

It was also recorded from Broome and the Dampier Archipelago. It has been recorded from Aceh, Indonesia (FMIPA 2007). This and other records from the Philippines and Indonesia are doubtful (Randall 2001a).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 91

Depth Upper Limit (in metres below sea level): 5

Depth Zone: Shallow photic (0-50m), Deep Photic (51-200m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Australia	Extant	Native	Unknown	Resident
Fiji	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
57. Indian Ocean - eastern	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident

Population

There are no population data available for this species.

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus grammoptilus inhabits silty inshore coastal reefs (Lieske and Myers 1994), but in western Australia it occurs in outer reefs in clear water environments. The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?

9.5. Marine Neritic -> Marine Neritic - Subtidal Sandy-Mud	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.5. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Soft Substrate	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
35 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus grammoptilus is harvested for food by the indigenous people in N Western Australia. It is also a minor component of the aquarium trade (Department of Primary Industry, Fisheries and Mines accessed 3 May 2010).

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. Its distribution overlaps several marine protected areas in parts of its range.

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Draft

Acanthurus guttatus - Forster, 1801

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - guttatus

Common Names: Whitespotted Surgeonfish (English), Api (Hawaiian), Botana mutiara (Malay), Chirurgien moucheté (French), Gomaniza (Japanese), Hapi (Niuean), Hvidplettet Kirurgfisk (Danish), Indangan (Filipino; Pilipino), Maogo (Samoan), Mustard Surgeonfish (English), Mustard Tang (English), Spotband Surgeonfish (English), Spotted Surgeonfish (English), Spotted Tang (English), Tabacenitoga (Fijian), Wotwot (Marshallese)
Synonyms: Harpurus (Forster, 1801); Hepatus (Forster, 1801); Rhombotides (Forster, 1801); Teuthis (Forster, 1801); Zabrasoma (Forster, 1801);

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Abesamis, R., Clements, K.D., Choat, J.H., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Davidson, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus guttatus is widely distributed throughout the Indo-Pacific. It is moderately common throughout its range. It is not specifically targeted in any fishery. There are no major threats known for this species and it occurs in marine protected areas in parts of its distribution. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus guttatus is found from the Hawaiian Islands and Pitcairn Islands, westwards to Maldive Islands, Chagos Archipelago, Mascarenes and the Seychelles, northwards to the Ryukyu Islands, Japan and southwards to the Great Barrier Reef, Australia and New Caledonia. It has been recorded from Rapa Island.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 6

Depth Upper Limit (in metres below sea level): 1

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Australia	Extant	Native	-	Resident
British Indian Ocean Territory	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Cocos (Keeling) Islands	Extant	Native	-	Resident
Cook Islands	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Gilbert Is.	Extant	Native	-	Resident
Kiribati -> Kiribati Line Is.	Extant	Native	-	Resident
Kiribati -> Phoenix Is.	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Maldives	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Mauritius	Extant	Native	-	Resident
Mauritius -> Mauritius (main island)	Extant	Native	-	Resident
Mauritius -> Rodrigues	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Nauru	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
Niue	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Pitcairn	Extant	Native	-	Resident
Réunion	Extant	Native	-	Resident
Samoa	Extant	Native	-	Resident
Seychelles	Extant	Native	-	Resident

Solomon Islands	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident
Tokelau	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
United States	Extant	Native	-	Resident
United States -> Hawaiian Is.	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Howland-Baker Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Johnston I.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Midway Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> US Line Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Wake Is.	Extant	Native	-	Resident
Vanuatu	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident
81. Pacific - southwest	Extant	Native	-	Resident

Population

Acanthurus guttatus was recorded as occasional in terms of relative abundance in the northern Bismarck Sea, Papua New Guinea (Allen 2009). It is common in the American Samoa National Park (National Park of Samoa Checklist of Fishes accessed 21 April 2010). It is also common on the exposed coast of Guam. It is a minor component of the fishery in both Guam and Saipan (J. McIlwain pers. comm. 2010).

In American Samoa, landings of acanthurids (surgeonfish) totalled 13,431 lbs. or 9% of the total catch. 27 lbs. were landed in study areas from July 1990 through June 1991. Densities are most likely underestimated as these were harvested primarily by night divers (Ponwith 1991).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus guttatus inhabits the surge zone in exposed reefs or rocky shores, usually in small schools. It is non-territorial (Craig 1998). It browses mainly on filamentous algae, but ingests some calcareous algae such as *Jania* (Randall 2001). It is classified as a grazer (Choat and Bellwood pers. obs. in Green and Bellwood 2009).

Reproduction

The sexes are separate among the acanthurids (Reeson 1983). This species was observed to spawn year round in American Samoa. Spawning occured in or adjacent to the outlet channel of the reef flat where water currents flowed in a seaward direction. It migrated to a specific area in the outer reef channel and spawned above several large coral blocks in waters 4-7 m deep. Groups of 50-500 fish began spawning near sunset (Craig 1998). It forms spawning aggregations (Sadovy *et al.* 2008).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
26 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus guttatus is harvested for food. In Atafu, this species is captured by hook and line mainly around reef channels (Ono and Addison 2009). In Nauru, it is caught by spear and cast nets (Dalzell and Debao 1994). It is also a minor component of the aquarium trade (Global Marine Aquarium Database accessed 19 March 2010). Online prices range from $128.98-$219.99 (L. Rocha pers. comm. 2010).

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. Its distribution overlaps several marine protected areas in parts of its range.

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Draft

Acanthurus japonicus - (Schmidt, 1931)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - japonicus

Common Names: Japanese Surgeonfish (English), Botana Kacamata (Malay), Japan-kirurgfisk (Danish), Labahita (Filipino; Pilipino), Powder Black Surgeon (English), White-nose Surgeonfish (English)
Synonyms: Acanthurus (Schmidt, 1931); Hepatus Schmidt, 1931;

Taxonomic Note:
This species is a member of the *Acanthurus achilles* species complex known for their propensity to hybridize (Randall and Frische 2000). The four species in this complex (*A. achilles* Shaw, *A.japonicus* Schmidt, *A.leucosternon* Bennett, and *A.nigricans*) are thought to hybridize when their distributional ranges overlap (Craig 2008).

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Abesamis, R., Clements, K.D., Choat, J.H., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Davidson, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus japonicus is common and abundant in most of its range. It is not specifically targeted in any fishery and is found in marine reserves in parts of its range. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus japonicus is found from southern Japan and southwards to Sulawesi, Indonesia. It is rarely found in Palau.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 20

Depth Upper Limit (in metres below sea level): 5

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Disputed Territory	Extant	Native	-	Resident
Disputed Territory -> Spratly Is.	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident

Population

Acanthurus japonicus was occasionally found in Calamianes Islands, Puerto Princesa, San Vicente and Taytay Philippines (Werner and Allen 2000, J. Pontillas pers. comm. 2010). It is common and abundant in the Philippines (R. Abesamis, C. Nanola and B. Stockwell pers. comm. 2010).

In the central Philippines, density and biomass of herbivorous fish in reserves had positive relationships with duration of reserve protection. Acanthuridae and Labridae (parrotfishes) were the major families that increased in biomass inside reserves with increased duration of reserve protection. Herbivore biomass inside reserves compared to fished sites was on average 1.4,4.8 and 8.1 times higher at 0.5, to 4.5 to 7 and 8 to 11 years of protection, respectively (Stockwell *et al.* 2009).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus japonicus is classified as a grazer (Choat and Bellwood pers. obs. in Green and Bellwood 2009). The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
21 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus japonicus is a component of the aquarium trade (Global Marine Aquarium Database accessed 19 March 2010). Online prices range from $49.99-$69.99 (L. Rocha pers. comm. 2010). It is also caught incidentally in artisanal fisheries.

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. Its distribution overlaps several marine protected areas in parts of its range.

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Draft

Acanthurus leucocheilus - Herre, 1927

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - leucocheilus

Common Names: Palelipped Surgeonfish (English), Bleglæbet Kirurgfisk (Danish), Indangan (Filipino; Pilipino), White-spine Surgeon (English)
Synonyms: Acanthurus Herre, 1927;

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Abesamis, R., Clements, K.D., Choat, J.H., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Davidson, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus leucocheilus is widely distributed and found occasionally in most parts of its range. It is not specifically targeted and is found within Marine Protected Areas (MPAs). It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus leucocheilus is widespread in the Indo-Pacific and is found from the Philippines and Indonesia, eastwards to Tuvalu and the Line Islands and westwards to East Africa including Maldives and Seychelles.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 30

Depth Upper Limit (in metres below sea level): 1

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Australia	Extant	Native	-	Resident
Australia -> Ashmore-Cartier Is.	Extant	Native	-	Resident
British Indian Ocean Territory	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Djibouti	Extant	Native	-	Resident
India	Extant	Native	-	Resident
India -> Andaman Is.	Extant	Native	-	Resident
India -> Nicobar Is.	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Kenya	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Kiribati Line Is.	Extant	Native	-	Resident
Maldives	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Mozambique	Extant	Native	-	Resident
Myanmar	Extant	Native	-	Resident
Niue	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Seychelles	Extant	Native	-	Resident
Somalia	Extant	Native	-	Resident
Sri Lanka	Extant	Native	-	Resident
Tanzania, United Republic of	Extant	Native	-	Resident
Thailand	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
Yemen	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality

51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident

Population

Acanthurus leucocheilus was recorded as occasional in most parts of its range (J.H. Choat pers. comm. 2010). It is moderately common at Raja Ampat, Indonesia (Allen 2003b). It is uncommon in the American Samoa National Park (National Park of Samoa Checklist of Fishes accessed 21 April 2010). Visual census surveys along Aceh coast of Indonesia recorded fish densities of 6 individuals/750 m2 at Pantai sirkui, 9 individuals/750 m2 at Teupin Layeu and 11 individuals/750 m2 at Teluk Pelabuhan (FMIPA 2007).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus leucocheilus occurs singly or in small groups, generally in outer reef areas from about 5 to at least 30 m (Randall 2001a). It grazes over sand and feeds on a combination of algae and detritus (Choat 1991, Choat *et al.*, 2002). It is classified as a grazer/detritivore (Green & Bellwood, 2009). The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)

48 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus leucocheilus is a component of the marine aquarium trade. It is sold online for $169.95 to $449.95 depending on size (bluezooaquatics.com, accessed 20 April 2010). It is a targeted food fish in western Thailand (Allen 2005). It is found in fish markets in Palawan, Philippines (Conales pers. comm. 2010).

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. Its distribution overlaps several marine protected areas in parts of its range.

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Draft

Acanthurus leucopareius - (Jenkins, 1903)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - leucopareius

Common Names: Whitebar Surgeonfish (English), Chirurgien à Joue Blanche (French), Head-band Surgeonfish (English), Hvidbåndet Kirurgfisk (Danish), Maikoiko (Hawaiian), Suji-kurohagi (Japanese)
Synonyms: Hepatus (Jenkins, 1903); Teuthis Bryan & Herre, 1903;

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Abesamis, R., Clements, K.D., Choat, J.H., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Davidson, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus leucopareius is relatively widespread and is a minor component of the fishery in Hawaii. It is not specifically targeted in any fishery. It is very common in the main Hawaiian Islands and common in the North West Hawaiian Islands (NWHI). It is found in a number of marine protected areas and is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus leucopareius is found from the Hawaiian Islands to the Minami-tori-shima (Marcus Island), Mariana Islands and southern Japan from the Ogasawara Islands to Wakayama Prefecture, Honshu. In the Southern Hemisphere it is found from Easter Island, Pitcairn Island, Austral Islands, and Rapa to New Caledonia.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 85

Depth Upper Limit (in metres below sea level): 1

Depth Zone: Shallow photic (0-50m), Deep Photic (51-200m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Chile	Extant	Native	-	Resident
Chile -> Easter Is.	Extant	Native	-	Resident
China	Extant	Native	-	Resident
Cook Islands	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
Hong Kong	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Macao	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Pitcairn	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
United States	Extant	Native	-	Resident
United States -> Hawaiian Is.	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Midway Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Wake Is.	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident
81. Pacific - southwest	Extant	Native	-	Resident
87. Pacific - southeast	Extant	Native	-	Resident

Population

Fish biomass at the Limahuli offshore site (Hawaii) was dominated by large mobile herbivores. Surgeonfishes were the most important family by weight observed at Limahuli offshore site, followed by triggerfishes, and parrotfishes. *Acanthurus leucopareius* was among the top five species by weight at this site (Coral Reef Assessment and Monitoring Program accessed 20 April 2010). This species is collected as an aquarium fish in West

Hawaii. The total number of individuals caught from FY 2005-2009 was 47 with a total value of $135 (Walsh *et al.* 2010).

It is one of the top 17 species by weight in the Northwestern Hawaiian Islands (NWHI). Biomass densities in the NWHI record 0.05 (t ha^{-1}) and 0.04 (t ha^{-1}) in the main Hawaiian Islands. This species along with *Ctenochaetus strigosus*, *Acanthurus nigrofuscus* and *Naso lituratus* accounted for 46% of the total herbivorous fish biomass and 25% of the total fish biomass in the main Hawaii Island. In the NWHI, these 4 species comprised less than 5% of total fish biomass (Friedlander and DeMartini 2002). It is a dominant fish species in Lawaii Bay, Kauai, Hawaii, biomass of 0.62 (t ha^{-1}) (Friedlander *et al.* 2007).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus leucopareius inhabits rocky and coral reefs, primarily boulder-strewn areas of surge zone. It browses on filamentous algae, often in large aggregations that overwhelm the defenses of territorial damselfishes and surgeonfishes. It may mix with *A. triostegus* when feeding. It is classified as a grazer (Green and Bellwood 2009). The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
24 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus leucopareius is harvested in Hawaii where it is a minor component of the fishery (Western Pacific Regional Fishery Management Council accessed 20 April 2010). It is also a component of the marine aquarium trade. Online prices range from $169.95-$399.95 (L. Rocha pers. comm. 2010).

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. Its distribution overlaps several marine protected areas in parts of its range.

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Draft

Acanthurus leucosternon - Bennett, 1833

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - leucosternon

Common Names: Powder Blue Surgeonfish (English), Alakan (Malayalam), Blue Surgeonfish (English), Botana Biru (Malay), Chirurgien Poudré (French), Chirurgien à Poitrine Blanche (French), Cirurgião Poeirento (Portuguese), Hvidstrubet Kirurgfisk (Danish), Imim (Marshallese), Kaxan (Somali), Nila Orandeya (Tamil), Poeierblou-doktervis (Afrikaans), Pokolec Bialobrody (Polish), Powder Blue Tang (English), Powder-blue Tang (English), Powderblue Surgeonfish (English), Vitbröstad Kirurgfisk (Swedish)
Synonyms: Acanthurus Valenciennes, 1835; Hepatus (Bennett, 1833); Rhombotides (Bennett, 1833);

Taxonomic Note:
This species is a member of the *Acanthurus achilles* species complex known for their propensity to hybridize (Randall and Frische 2000). The four species in this complex (*A. achilles* Shaw, *A.japonicus* Schmidt, *A.leucosternon* Bennett, and *A.nigricans*) are thought to hybridize when their distributional ranges overlap (Craig 2008).

Acanthurus cf. *leucosternon*, a hybrid between *A. leucosternon* and *A. nigricans* has been recognized from the Cocos Keeling and Christmas Islands (Marie *et al.* 2007).

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Abesamis, R., Clements, K.D., Choat, J.H., McIlwain, J., Nanola, C., Myers, R., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Davidson, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus leucosternon is widespread in the Indian Ocean. It is generally rare in parts of its range but achieves high abundances in some areas (i.e., Maldives, east African coast). It is a targeted species and is commonly collected for the aquarium trade. There were differences in densities observed between fished and protected areas (Mclanahan *et al.* 1999). However, this species is found in a number of marine reserves in parts of its distribution. We recommend further monitoring of the species' population status and harvesting trends. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus leucosternon is found from East Africa to Natal, eastwards to the Andaman Sea, Lesser Sunda Islands of southern Indonesia at least to Komodo, including Christmas and Cocos Keeling Islands. There was one sighting from the Gulf of Oman (Randall 1995). It is not known from

the Red Sea.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 25

Depth Upper Limit (in metres below sea level): 0

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Bangladesh	Extant	Native	-	Resident
British Indian Ocean Territory	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Cocos (Keeling) Islands	Extant	Native	-	Resident
Comoros	Extant	Native	-	Resident
French Southern Territories	Extant	Native	-	Resident
French Southern Territories -> Mozambique Channel Is.	Extant	Native	-	Resident
India	Extant	Native	-	Resident
India -> Andaman Is.	Extant	Native	-	Resident
India -> Nicobar Is.	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Iran, Islamic Republic of	Extant	Native	-	Resident
Kenya	Extant	Native	-	Resident
Madagascar	Extant	Native	-	Resident
Maldives	Extant	Native	-	Resident
Mauritius	Extant	Native	-	Resident
Mauritius -> Mauritius (main island)	Extant	Native	-	Resident
Mauritius -> Rodrigues	Extant	Native	-	Resident
Mayotte	Extant	Native	-	Resident
Mozambique	Extant	Native	-	Resident
Myanmar	Extant	Native	-	Resident
Oman	Extant	Native	-	Resident
Réunion	Extant	Native	-	Resident
Seychelles	Extant	Native	-	Resident
Somalia	Extant	Native	-	-
South Africa	Extant	Native	-	Resident

Sri Lanka	Extant	Native	-	Resident
Tanzania, United Republic of	Extant	Native	-	Resident
Thailand	Extant	Native	-	Resident
Yemen	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident

Population

Acanthurus leucosternon is rare in the Cocos Keeling and Christmas Islands relative to *Acanthurus* cf. *leucosternon* and *A. nigricans* (Marie *et al.* 2007). It is generally rare in the western Indian Ocean. In Seychelles, less than 5 individuals/1,000 m^2 were recorded. In Cocos, an average of 0.51 per 1,000 m^2 (58 transects) were recorded. It is not abundant on continental or fringing reefs. Surveys in Mauritius, Reunion and Sri Lanka did not record it as an abundant Acanthurid (J.H. Choat pers. comm. 2010).

In the Maldives, it reaches fairly high abundances (average of 35 per 1,000 m^2) and 318 per ha (Edwards and Shepherd 1992). It achieves high abundances in reef flats and were most abundant on reef slopes outside the atoll rim. Its density decreases with increasing depth (Sluka and Miller 2001). On the east African coast, 4.4 per 1,000 m^2 were recorded in marine reserves (McClanahan *et al.* 1999).

Visual census surveys along the Aceh coast, Indonesia recorded fish densities of 33 individuals/750 m^2 at Pantai sirkui, 21 individuals/750 m^2 at Teupin Layeu and 22 individuals/750 m^2 at Teluk Pelabuhan (FMIPA 2007).

In Kenya, landings during 1978-2001 for families that are less important in commercial catches (e.g., scarinae and Acanthuridae) showed rising catches (1978-1984) followed by a general decline during the 1990s, but the landings for the scarinae showed a rising trend in recent years (Kaunda-Arara *et al.* 2003).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus leucosternon inhabits inshore reefs and is known to occur in large feeding aggregations. It is generally found on reef flats and along upper seaward slopes (Kuiter and Debelius 2001). It is classified as a grazer (Green and Bellwood 2009). The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
23 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus leucosternon is commonly collected for the aquarium trade (Global Marine Aquarium Database accessed 19 March 2010). Online

prices range from $69.99 - $99.00 (L. Rocha pers. comm. 2010). In the Maldives, the estimated export for the aquarium trade in 1986 was 6, 200 individuals (Edwards and Shepherd 1992). It is a targeted food fish in western Thailand (Allen 2005) and in other parts of its range.

Threats

Acanthurus leucosternon is a targeted fish species and is generally rare in parts of its range (J.H. Choat pers. comm. 2010). On the east African coast, differences were observed in densities between fished (average of 0.56 per 500 m^2) and protected areas (average of 2.27 per 500 m^2) (McClanahan *et al.* 1999).

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. Its distribution overlaps several marine protected areas in parts of its range.

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Draft

Acanthurus lineatus - (Linnaeus, 1758)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - lineatus

Common Names: Lined Surgeonfish (English), Belai (Palauan), Blouband-doktervis (Afrikaans), Blue Banded Surgeonfish (English), Blue-lined Surgeonfish (English), Blåstribet Kirurgfisk (Danish), Botana kasur (Malay), Cajeta Moteada (Spanish; Castilian), Chirurgien Zébré (French), Chirurgien à Lignes Bleues (French), Cirurgião Zebra (Portuguese), Clown Surgeonfish (English), Combo (Konkani), Debam (Malay), Indangan (Filipino; Pilipino), Kaxan (Somali), Kingoye (Swahili), Kwi (Marshallese), Maro'a (Tahitian), Migraine Tachetée (French), Navajón Cebra (Spanish; Castilian), Nijihagi (Japanese), Pokolec Strojny (Polish), Randig Kirurgfisk (Swedish), Striped Surgeon (English), Striped Surgeonfish (English), Varipad (Malayalam), Zebra Surgeonfish (English), dridri oriori (Fijian)
Synonyms: Acanthurus Bennett, 1828; Chaetodon Linnaeus, 1758; Ctenodon (Linnaeus, 1758); Harpurus (Linnaeus, 1758); Hepatus (Linnaeus, 1758); Rhombotides (Linnaeus, 1758); Teuthis (Linnaeus, 1758);

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Choat, J.H., McIlwain, J., Abesamis, R., Clements, K.D., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Davidson, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus lineatus is widespread throughout the Indo-Pacific region, is common and locally abundant. It is fished over many parts of it range and is a targeted commercial and ornamental species. There were significant reductions in biomass between fished and unfished areas in the Philippines (Stockwell *et al.* 2009). Densities of this species are considerably lower outside of marine reserves and in areas of high exploitation. In American Samoa, where this species is the most important of the reef fishes in subsistence and artisanal fisheries, there have been no indications of significant overfishing. Moreover, fishery independent surveys with fishery-dependent data showed a decline in fishing effort resulting in constant catch landings and catch-per-unit effort (Sabater and Carroll 2009). There are no significant population reductions reported in other parts of its range. It occurs in number of marine protected areas in parts of its distribution and is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus lineatus is widespread in the Indo-Pacific from the east coast of Africa to the Society Islands, Marquesas Islands, and Tuamotu Archipelago. There were two records from the Hawaiian Islands: from the southern end of the island of Hawaii and from Oahu; these are probably waifs (Randall 2001a).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 15

Depth Upper Limit (in metres below sea level): 0

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Australia	Extant	Native	-	Resident
Bangladesh	Extant	Native	-	Resident
British Indian Ocean Territory	Extant	Native	-	Resident
Brunei Darussalam	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Cocos (Keeling) Islands	Extant	Native	-	Resident
Comoros	Extant	Native	-	Resident
Cook Islands	Extant	Native	-	Resident
Disputed Territory	Extant	Native	-	Resident
Disputed Territory -> Paracel Is.	Extant	Native	-	Resident
Disputed Territory -> Spratly Is.	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
French Southern Territories	Extant	Native	-	Resident
French Southern Territories -> Mozambique Channel Is.	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
India	Extant	Native	-	Resident
India -> Andaman Is.	Extant	Native	-	Resident
India -> Nicobar Is.	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Kenya	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Gilbert Is.	Extant	Native	-	Resident
Kiribati -> Kiribati Line Is.	Extant	Native	-	Resident
Kiribati -> Phoenix Is.	Extant	Native	-	Resident
Madagascar	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident

Maldives	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Mauritius	Extant	Native	-	Resident
Mayotte	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Mozambique	Extant	Native	-	Resident
Myanmar	Extant	Native	-	Resident
Nauru	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
Niue	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Réunion	Extant	Native	-	Resident
Samoa	Extant	Native	-	Resident
Seychelles	Extant	Native	-	Resident
Singapore	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Somalia	Extant	Native	-	Resident
South Africa	Extant	Native	-	Resident
Sri Lanka	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
Tanzania, United Republic of	Extant	Native	-	Resident
Thailand	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident
Tokelau	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Howland-Baker Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> US Line Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Wake Is.	Extant	Native	-	Resident
Vanuatu	Extant	Native	-	Resident
Viet Nam	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident
Yemen	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident

77. Pacific - eastern central	Extant	Native	-	Resident
81. Pacific - southwest	Extant	Native	-	Resident

Population

In Fagatale Bay, American Samoa, *A. lineatus* is a dominant species on the reef slope (Green *et al.* 1999). It was the eighth most dominant species in Tutuila, Aunuu, and Taema Banks, American Samoa contributing to 2.7% of total fish biomass and 1.9% of numerical abundance (Sabater and Tofaeono 2006). It is moderately common in Calamianes Islands, Puerto Princesa and San Vicente, Philippines, Milne Bay, Papua New Guinea and Raja Ampat, Indonesia where it is usually in shallow surge-affected areas (Werner and Allen 2000; Palawan Council for Sustainable Development unpub. data; Allen 2003, 2003b).

At Moorea, French Polynesia, SPOT satellite images allowed estimation of the surface area of fringing reef (1,076 ha), barrier reef (3,788 ha) and outer slop (493 ha). A total of 30, 563 individuals/total surface area were recorded in fish visual surveys conducted from 1990-1993 (Lecchini *et al.* 2006).Visual census surveys the Iboih coast, Weh Island, Indonesia recorded fish densities of 19 individuals/750 m^2 at Pantai sirkui, 13 individuals/750 m^2 at Teupin Layeu and 9 individuals/750 m^2 at Teluk Pelabuhan (Faculty of Mathematic and Natural Science 2007). It occurs in high densities on coral reefs 0.4 fish/m^2 in American Samoa (Craig 1996).

In American Samoa, 2007 commercial landings for Acanthurids totalled 10,338 lbs with an estimated value of $23, 586 USD (Department of Marine and Wildlife Resources and the Western Pacific Fishery Information Network 2009). From July 1990 through June 1991 landings of Acanthurids (surgeonfish) totalled 13,431 Ibs, or 9% of the total catch. This species and *A. xanthopterus*, comprised 82% of the total Acanthurid catch. *A. linetaus* were caught almost exclusively by divers, and 78% of the catch was landed at night. Four thousand fifty-four lbs. were landed in the study areas from July 1990 through June 1991 (Ponwith 1991). In 1994, *A. lineatus* ranked 2nd among all species harvested in small-scale fisheries in American Samoa. It accounted for 10% of the total catch of 295 tons (Department of Marine and Wildlife Resources unpub. data Pago-Pago, American Samoa). *A. lineatus* accounted for 39% by weight of artisanal catches and only 1-3% of subsistence catches (Craig *et al.* 1997).

In the outer islands of American Samoa, the annual harvest 37.5 metric tonnes (mt) (82,584 lb) of a small-scale subsistence fishery, consisted of a diverse array of coral reef fishes and invertebrates. Of the reef-associated catch of 21.4 mt, *A. lineatus* accounted for 24% of the catch (Craig 2008). In Guam it is the third most abundant surgeonfish in terms of landing. The numbers increased throughout the 1990s, which corresponded with an increase in spearfishing. Densities of this species are considerably lower outside of marine reserves and in areas of high exploitation. In Pohnpei, it is 15% of the total Acanthurid landing (Rhodes *et al.* 2008). This species makes up 5% of the total catch in Saipan for 2009 (P. Houk unpub. data).

In the central Philippines, density and biomass of herbivorous fish in reserves had positive relationships with duration of reserve protection. Acanthuridae and Labridae (parrotfishes) were the major families that increased in biomass inside reserves with duration of reserve protection. Herbivore biomass inside reserves compared to fished sites was on average 1.4,4.8 and 8.1 times higher at 0.5, to 4,5 to 7 and 8 to 11 years of protection, respectively. For *A. lineatus*, fished site mean biomass was recorded at 0.01 (kg per 500 m^2) while mean biomass recorded in 4 reserves were 0.13, 0.91 (5 to 7 years of protection), 1.67 and 19.59 (8 to 11 years of protection) (Stockwell *et al.* 2009).

In Kenya, landings during 1978-2001 for families that are less important in commercial catches (e.g., scarinae and Acanthuridae) showed rising catches (1978-1984) followed by a general decline during the 1990s, but the landings for the scarinae showed a rising trend in recent years (Kaunda-Arara *et al.* 2003).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus lineatus inhabits inshore coral reefs or rocky substrata exposed to wave action. It is strongly site-attached (Craig *et al.* 1997). It is most frequently encountered on shallow reef flats (Brown and Allen 2008). It is an aggressive territorial fish. It grazes on algal turfs mainly on thallate and filamentous red and green algae (Choat *et al.* 2002, Choat *et al.* 2004). It maintains feeding territories in shallow waters during the

daytime but spends nights in deeper-water crevices where it is harvested by fishermen (Craig *et al.* 1997). Craig (1996) found that territorial and non-territorial *A. lineatus* where different individuals, with territorial fish being significantly larger.

Growth

It shows rapid growth for the first three to four years of life. Beyond four years, growth declines sharply; resulting in extended periods of asymptotic growth. Most of the growth occurs within the first 10% of their lifespan regardless of their location (Mutz 2006). The maximum number of annuli recorded for this species was 46 (Choat and Axe 1996). Maximum age 42 years (Choat and Robertson 2002). On Great Barrier Reef, Australia (GBR), the mean maximum age is 32 years, A. Samoa is 11 yrs Marquesas is 14 yrs. The maximum age decreases moving eastwards (Mutz 2006).

Mutz (2006) investigated the pattern of demographic variation among a longitudinal scale across the South Pacific Ocean. The variation from west to east indicated locality specific variation rather than a general environmental trend among study sites. The population with the shortest lifespan was at American Samoa with a mean maximum age of 11 years, while the population at Lizard Island lived longest reaching the mean maximum age of 32 years. Populations at Moorea, French Polynesia and Lizard Island attained maximum ages of 43 and 42 years, respectively.

Reproduction

The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010). It spawns year-round but primarily during the austral summer (October-February) in American Samoa (Craig *et al*. 1997). This species has been observed in early morning group spawning in Palau and Guam (Johannes 1981, Robertson 1983, J. McIlwain pers. comm. 2010) and late afternoon group spawning at Escape Reef, Great Barrier Reef (Robertson, 1983). It is likely to form resident spawning aggregations (Domeier and Colin 1997). Pair spawning (Robertson 1983) and non-sex-specific color changes associated with spawning (Johannes 1981) have also been observed. In Palau, it was observed to spawn prior to the full moon and during the new moon from February-April. In Guam it was observed to spawn 3 days before the full moon in March-April on the outgoing tide (J. McIlwain pers. comm. 2010). In the GBR it spawns in December (Johannes 1981, Robertson 1983). Size at sexual maturity 160 mm (Choat and Robertson 2002a). Larvae are transported through pelagic waters while adults live sedentary lives associated with the reef (Robertson 1983). It has a long pelagic larval stage (Randall 2005).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female	Size at Maturity (in cms): Male
16 (SL)	16 (SL)

Longevity
43 Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
38 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus lineatus is the most important of the reef fishes in subsistence and artisanal fisheries in American Samoa. It is the third most important acanthurid in Guam. It is a targeted commercial species in Tanzania (Tyler *et al.* 2009) and a targeted marine ornamental fish in Moorea, French Polynesia. It is taken by throw nets, gill nets, spears and traps. It is also a major component in the catch by beach seine fishing and spearfishing in Nauru (Dalzell and Debao 1994). It is a component of the marine aquarium trade (Global Marine Aquarium Database accessed 19 March 2010). Online prices range from $44.99-$119.99 (L. Rocha pers. comm. 2010). *A. lineatus* is not very popular in the aquarium trade because of the size it attains and its aggressive behavior (Randall 2001a).

Threats

There were significant reductions in biomass between fished and protected areas reported in the Philippines (Stockwell *et al.* 2009). In American Samoa, indicators of fishing pressure did not point to significant overfishing over a 9-year period (Craig *et al.* 1997).

The status of reef fisheries in American Samoa has commonly been reported as over-exploited, however, comparing patterns and trends from fishery independent surveys with fishery-dependent data showed a significant decline in shoreline fishing effort and a non-significant decrease in boat-based effort, resulting in constant catch landings and catch-per-unit effort. Concurrent with the decline in fishing effort and constant catch landing was an increase in fish abundance and biomass for the targeted families. The decrease in fishing pressure occurred during a period of rapid population growth, indicating non-dependence of the general population on fishing, reflecting the change in the social and economic dynamics within the territory (Sabater and Carroll 2009).

Craig *et al.* (2008) showed that the current harvests of the subsistence fishery in outer islands of American Samoa is similar to those in historic and prehistoric periods, indicating that the fishery is harvested at a sustainable level.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. Its distribution overlaps several marine protected areas in parts of its range. In American Samoa, SCUBA fishery has been banned since 2001 by Executive Order and subsequently in 2002 by regulation (Green 2003). Night spearfishing has been banned as well (J.H. Choat pers. comm. 2010).

In Queensland, Australia, there is a recreational catch limit of 5 per species and a minimum size limit of 25 cm (Department of Primary Industries accessed 8 April 2010).

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Draft

Acanthurus maculiceps - (Ahl, 1923)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - maculiceps

Common Names: Spotted-face Surgeonfish (English), Earbar Surgeonfish (English), Fregnet Kirurgfisk (Danish), Indangan (Filipino; Pilipino), Irezuminiza (Japanese), Muk (Undetermined), Pale-lined Surgeonfish (English), White-freckled Surgeonfish (English), Yellow-freckled Surgeonfish (English)
Synonyms: Hepatus Ahl, 1923;

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Abesamis, R., Clements, K.D., McIlwain, J., Choat, J.H., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Davidson, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus maculiceps is widely distributed in the Indo-Pacific region. It is rare in most parts of its range but is reasonably common in some areas (i.e., Christmas Island). It is not specifically targeted in any fishery and is a minor component of the aquarium trade. It is found in a number of marine protected areas in parts of its distribution. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus maculiceps is found from the Maldive Islands to the Line Islands and Samoa Islands, northwards to the Ryukyu Islands, Japan and southwards to the Great Barrier Reef, Australia.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 30

Depth Upper Limit (in metres below sea level): 1

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Australia	Extant	Native	-	Resident
Australia -> Ashmore-Cartier Is.	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Cocos (Keeling) Islands	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Gilbert Is.	Extant	Native	-	Resident
Kiribati -> Phoenix Is.	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Maldives	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Nauru	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Samoa	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident
Tokelau	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Howland-Baker Is.	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident

Population

Acanthurus maculiceps was recorded as occasional in terms of relative abundance in the northern Bismarck Sea, Papua New Guinea and in Raja Ampat Indonesia (Allen 2009, 2003b). It was recorded as rare in Milne Bay, Papua New Guinea (Allen 2003). It is reasonably common in Christmas Island, Indian Ocean (J.H. Choat pers. comm. 2010). It is rare in the American Samoa National Park (National Park of Samoa Checklist of Fishes accessed 21 April 2010). It is also rare in Guam (J. McIlwain unpub. data) and in the Philippines (C. Nanola, B. Stockwell and R. Abesamis pers. comm. 2010).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus maculiceps is found in outer reef areas from 1 to at least 30 m, either as a solitary individual or in a small group. It is classified as a grazer/detritivore (Choat and Bellwood pers obs. in Green and Bellwood 2009). The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.5. Marine Neritic -> Marine Neritic - Subtidal Sandy-Mud	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
40 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus maculiceps is part of the multi-species surgeonfish fisheries throughout its range. It is rarely collected for the aquarium trade. It is sold online for $69.99-$499.95 (L. Rocha pers. comm. 2010).

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. Its distribution overlaps several marine protected areas in parts of its range.

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Draft

Acanthurus mata - (Cuvier, 1829)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - mata

Common Names: Elongate Surgeonfish (English), Aflang Kirurgfisk (Danish), Anfoos (Arabic), Bekiru (Marshallese), Bleeker's Surgeonfish (English), Blue-lined Surgeonfish (English), Buntana (Malay), Chirurgien (French), Cirurgião Comprido (Portuguese), Cirurgião de Bleeker (Portuguese), Debam (Malay), Fardh (Arabic), Faridh (Arabic), Grand Picot de Récif (French), Hiraniza (Japanese), Indangan (Filipino; Pilipino), Kangaja (Swahili), Lang doktervis (Afrikaans), Mata Surgeonfish (English), Osuji-kurohagi (Japanese), Pala (Malayalam), Pale Surgeon (English), Para'I (Tahitian), Picot Kanak (French), Poisson Docteur à Queue Blanche (French), Striped Surgeonfish (English), White-tail Lancet (English), Yellowmask Surgeonfish (English), dridri (Fijian)
Synonyms: Acanthurus Günther, 1861; Chaetodon Cuvier, 1829;

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Abesamis, R., Clements, K.D., Choat, J.H., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Davidson, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus mata is widespread in the Indo-Pacific and common in parts of its range. It is a targeted food fish in the Coral Triangle Region and is one of the more important surgeonfish harvested. Fishing is not considered a major threat globally and it occurs in a number of marine reserves in parts of its distribution. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus mata is found from the Red Sea and Gulf of Oman, south to Natal, eastwards to Society and Marquesan Islands, northwards to southern Japan, southwards to New South Wales and New Caledonia. Juveniles occur as far south as Sydney (R. Myers pers. comm. 2010). It is reported from Western Australia (Allen and Swainston 1988), south to Shark Bay. It is not known to occur from the Hawaiian Islands, Pitcairn Islands and Rapa (Randall 2001a).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 100

Depth Upper Limit (in metres below sea level): 5

Depth Zone: Shallow photic (0-50m), Deep Photic (51-200m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Australia	Extant	Native	-	Resident
Bangladesh	Extant	Native	-	Resident
British Indian Ocean Territory	Extant	Native	-	Resident
Brunei Darussalam	Extant	Native	-	Resident
Cambodia	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Cocos (Keeling) Islands	Extant	Native	-	Resident
Comoros	Extant	Native	-	Resident
Cook Islands	Extant	Native	-	Resident
Disputed Territory	Extant	Native	-	Resident
Disputed Territory -> Spratly Is.	Extant	Native	-	Resident
Djibouti	Extant	Native	-	Resident
Egypt	Extant	Native	-	Resident
Eritrea	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
French Polynesia -> Marquesas	Extant	Native	-	Resident
French Southern Territories	Extant	Native	-	Resident
French Southern Territories -> Mozambique Channel Is.	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
India	Extant	Native	-	Resident
India -> Andaman Is.	Extant	Native	-	Resident
India -> Nicobar Is.	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Iran, Islamic Republic of	Extant	Native	-	Resident
Israel	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Jordan	Extant	Native	-	Resident
Kenya	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Gilbert Is.	Extant	Native	-	Resident

Kiribati -> Kiribati Line Is.	Extant	Native	-	Resident
Kiribati -> Phoenix Is.	Extant	Native	-	Resident
Madagascar	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Maldives	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Mauritius	Extant	Native	-	Resident
Mayotte	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Mozambique	Extant	Native	-	Resident
Myanmar	Extant	Native	-	Resident
Nauru	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
Niue	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Oman	Extant	Native	-	Resident
Pakistan	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Réunion	Extant	Native	-	Resident
Samoa	Extant	Native	-	Resident
Saudi Arabia	Extant	Native	-	Resident
Seychelles	Extant	Native	-	Resident
Singapore	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Somalia	Extant	Native	-	Resident
South Africa	Extant	Native	-	Resident
Sri Lanka	Extant	Native	-	Resident
Sudan	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
Tanzania, United Republic of	Extant	Native	-	Resident
Thailand	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident
Tokelau	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
Vanuatu	Extant	Native	-	Resident
Viet Nam	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident
Yemen	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident
81. Pacific - southwest	Extant	Native	-	Resident

Population

Acanthurus mata is common in parts of its range. Visual census surveys along Aceh coast, Weh Island, Indonesia recorded fish densities of 4 individuals/750 m^2 at Pantai sirkui and 6 individuals/750 m^2 at Teupin Layeu (Faculty of Mathematics and Natural Science 2007). This species was recorded as moderately common in terms of relative abundance in the northern Bismarck Sea and Milne Bay, Papua New Guinea (Allen 2003, 2009). At Raja Ampat, Indonesia it is moderately common, usually on drop-offs in turbid water (Allen 2003b). It is occasionally found in Calamianes Islands and El Nido, Philippines, mostly juveniles and subadults were seen (Werner and Allen 2000). It is rare in the American Samoa National Park (National Park of Samoa Checklist of Fishes accessed 21 April 2010).

In Kenya, landings during 1978-2001 for families that are less important in commercial catches (e.g., scarinae and Acanthuridae) showed rising catches (1978-1984) followed by a general decline during the 1990s, but the landings for the scarinae showed a rising trend in recent years (Kaunda-Arara *et al.* 2003).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus mata generally feeds above the bottom on zooplankton, often in small schools. It is more inclined than other surgeonfishes to enter turbid water (Randall 2001a). It is found on coral reefs or over rocky substrata, generally at depths greater than 15 m. Juveniles feed on benthic algae, adults primarily on zooplankton. It was observed within and below schools of *Caranx sexfasciatus* feeding on fecal material (Randall 2001a). It is sometimes seen in aggregations (Randall 2001b). It is a very mobile pelagic species. Maximum age 23 years (Choat and Robertson 2002).

Reproduction

The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010). This species was observed to form very large spawning aggregations on the reef flat of Palau around both full and new moons of May (Johannes 1981). *A. mata* is likely to form resident spawning aggregations (Domeier and Colin 1997). It is also known to form spawning aggregations on the Great Barrier Reef (Johannes 1981).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.5. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Soft Substrate	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity
23 Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
50 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus mata is a minor component of the aquarium trade (Global Marine Aquarium Database accessed 19 March 2010). Online prices range from $29.99-$168.95 (L. Rocha pers. comm. 2010). It is a targeted food fish in western Thailand (Allen 2005) and in the Philippines. It is caught in gill nets, spears, traps in the Philippines.

Threats

Acanthurus mata is targeted in areas where illegal fishing practices are known to occur (i.e., Coral Triangle Region).

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. Its distribution overlaps several marine protected areas in parts of its range.

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Draft

Acanthurus monroviae - Steindachner, 1876

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - monroviae

Common Names: Monrovia Surgeonfish (English), Alicate (Portuguese), Asno-na-seta (Portuguese), Barbeiro (Portuguese), Canivete (Portuguese), Chirurgien Chas-chas (French), Cirujano (Spanish; Castilian), Cirurgião (Portuguese), Docteur (French), Doktooru Jën (Wolof), Finadi Yékhé (Susu), Monrovia-kirurgfisk (Danish), Navajón (Spanish; Castilian), Navajón caniveta (Spanish; Castilian), Navajón canivete (Spanish; Castilian), Peixe-barbeiro (Portuguese), Peixe-canivete (Portuguese), Peixe-unha (Portuguese), Pokolec Afrykanski (Polish), Unha (Portuguese)
Synonyms: Teuthis (Steindachner, 1876);

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Abesamis, R., Clements, K.D., Choat, J.H., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Davidson, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus monroviae is widely distributed in the Eastern Atlantic. Even though this species is a component of the aquarium trade, there is no indication of population declines caused by harvesting. It occurs in a few marine protected areas in parts of its range. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus monroviae is found from southern Morocco to Angola, including the Canary Islands, Cape Verde Islands, and Gulf of Guinea. It was also recorded from the coast of Algeria, individuals found here are believed to be part of a continuous, sparse population occurring along the coast of North Africa (Hemida *et al.* 2004). Vagrants were reported from the western Mediterranean, off the Spanish coast (Crespo *et al.* 1987), and in the eastern Mediterranean on the coast of Israel (Golani and Sonin 1996). Vagrants were also reported from the south-eastern coast of Sao Paulo, Brazil (Luiz-Junior *et al.* 2004).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 200

Depth Upper Limit (in metres below sea level): 5

Depth Zone: Shallow photic (0-50m), Deep Photic (51-200m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Algeria	Extant	Native	-	Resident
Angola	Extant	Native	-	Resident
Benin	Extant	Native	-	Resident
Brazil	Extant	Vagrant	-	-
Cameroon	Extant	Native	-	Resident
Cape Verde	Extant	Native	-	Resident
Congo	Extant	Native	-	Resident
Congo, The Democratic Republic of the	Extant	Native	-	Resident
Côte d'Ivoire	Extant	Native	-	Resident
Equatorial Guinea	Extant	Native	-	Resident
Gabon	Extant	Native	-	Resident
Gambia	Extant	Native	-	Resident
Ghana	Extant	Native	-	Resident
Guinea	Extant	Native	-	Resident
Guinea-Bissau	Extant	Native	-	Resident
Israel	Extant	Vagrant	-	-
Liberia	Extant	Native	-	Resident
Mauritania	Extant	Native	-	Resident
Morocco	Extant	Native	-	Resident
Namibia	Extant	Native	-	Resident
Nigeria	Extant	Native	-	Resident
Sao Tomé and Principe	Extant	Native	-	Resident
Sao Tomé and Principe -> Principe	Extant	Native	-	Resident
Sao Tomé and Principe -> Sâo Tomé	Extant	Native	-	Resident
Senegal	Extant	Native	-	Resident
Sierra Leone	Extant	Native	-	Resident
Spain	Extant	Vagrant	-	-
Spain -> Canary Is.	Extant	Native	-	Resident
Togo	Extant	Native	-	Resident
Western Sahara	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
34. Atlantic - eastern central	Extant	Native	-	Resident
37. Mediterranean and Black Sea	Extant	Vagrant	-	-
41. Atlantic - southwest	Extant	Vagrant	-	-
47. Atlantic - southeast	Extant	Native	-	Resident

Population

Acanthurus monroviae is common along the eastern tropical Atlantic shore (Randall 1981). Trawl surveys in the Eastern Central Atlantic during April 1990 reported that *A. monroviae* accounted for 2.2% of the total catch in Ghana (20-50 m depth) and 7.6% of the total catch in Western Sierra Leone (20-50 m depth) (Martos *et al.* 1991).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus monroviae is restricted to areas of hard bottom. It is found in rocky and coral bottoms (Schneider 1990) including lagoons and river mouths (Desoutter 1986). It is usually found between 2-20 m. The record of 200 m is unconfirmed. It feeds on zooplankton, phytoplankton and detritus (Diouf 1996). It is normally solitary, in south-east Brazil it was seen joining a school of *Acanthurus chirurgus* (Bloch) and feeding together with the members of this group (Luiz-Junior *et al.* 2004). The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.3. Marine Neritic -> Marine Neritic - Subtidal Loose Rock/pebble/gravel	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
45 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus monroviae is a component of the aquarium trade. It sells for US $199.95 to $299.95 depending on size. It is collected most commonly from Southern Morocco down to Nigeria, including Cape Verde (http://www.bluezooaquatics.com, accessed 13 April 2010). It is landed in commercial fisheries in Senegal (N'Dao 1997).

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. Its distribution overlaps a few marine protected areas in parts of its range.

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Draft

Acanthurus nigricans - (Linnaeus, 1758)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - nigricans

Common Names: GoldenRim Surgeonfish (English), Black Surgeonfish (English), Blackear Surgeonfish (English), Botana biru palsu (Malay), Chirurgien Noirâtre (French), Chirurgien à Joue Blanche (French), Chirurgien à Marques Jaunes (French), Cirujano Cariblanco (Spanish; Castilian), Cirujano Filo Amarillo (Spanish; Castilian), Cirujano de Cara Blanca (Spanish; Castilian), Filippinsk Kirurgfisk (Swedish), Gold-rim Tang (English), Gray Surgeonfish (English), Hvidhovedet Kirurgfisk (Danish), I'usina (Samoan), Indangan (Filipino; Pilipino), Kangaja (Swahili), Laulama (Samoan), Maito a'au (Tahitian), Megane-kurohagi (Japanese), Navajón Cariblanco (Spanish; Castilian), Pala (Malayalam), Pez Cirujano (Spanish; Castilian), Pez Cirujano de Filo Amarillo (Spanish; Castilian), Tiebro-ael (Marshallese), Velvet Surgeonfish (English), White-cheeked surgeonfish (English), Whiteface Surgeonfish (English), Whitetail Surgeonfish (English), Yellow Spotted Surgeonfish (English), Yellowrimmed Surgeonfish (English), dridri (Fijian)
Synonyms: Acanthurus Lesson, 1831; Chaetodon Linnaeus, 1758;

Taxonomic Note:
Acanthurus nigricans is a member of the *A. achilles* species complex known for their propensity to hybridize (Randall and Frische 2000). The four species in this complex (*A. achilles* Shaw, *A. japonicus* Schmidt, *A. leucosternon* Bennett, and *A. nigricans*) are thought to hybridize when their distributional ranges overlap (Craig 2008). Hybrids have been recorded from the Hawaiian Islands (*Acanthurus achilles* x *nigricans*), Taiwan (*Acanthurus japonicus* x *nigricans*), Indonesia, Christmas and Cocos Island (*Acanthurus leucosternon* x *nigricans*) (Randall 2001a, Marie *et al.* 2007).

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Choat, J.H., Abesamis, R., Clements, K.D., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Davidson, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus nigricans is widespread throughout the Pacific Ocean. It is common and abundant in parts of its range. It is caught incidentally as food and is a component of the marine aquarium trade. Harvest for the aquarium trade is not considered a major threat globally and it occurs in a number of marine reserves in parts of its distribution. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus nigricans is widely distributed in the Pacific Ocean. In the Pacific Ocean, it occurs from Ryukyu islands and the Great Barrier Reef to the Hawaiian islands and French Polynesia (excluding Rapa). In the eastern Indian Ocean, it is known from Cocos-Keeling Islands and Christmas

Island. It was recently recorded from Diego Garcia, Chagos Archipelago (Craig 2008).

This species occurs across the eastern Pacific barrier from the tip of Baja California to the southwest and southeast Gulf of California, southern Mexico, Costa Rica to Ecuador and all the offshore islands.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 67

Depth Upper Limit (in metres below sea level): 0

Depth Zone: Shallow photic (0-50m), Deep Photic (51-200m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Australia	Extant	Native	-	Resident
British Indian Ocean Territory	Extant	Native	-	Resident
British Indian Ocean Territory -> Chagos Archipelago	Extant	Native	-	Resident
Brunei Darussalam	Extant	Native	-	Resident
China	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Cocos (Keeling) Islands	Extant	Native	-	Resident
Colombia	Extant	Native	-	Resident
Cook Islands	Extant	Native	-	Resident
Costa Rica	Extant	Native	-	Resident
Disputed Territory	Extant	Native	-	Resident
Disputed Territory -> Paracel Is.	Extant	Native	-	Resident
Disputed Territory -> Spratly Is.	Extant	Native	-	Resident
Ecuador	Extant	Native	-	Resident
Ecuador -> Ecuador (mainland)	Extant	Native	-	Resident
Ecuador -> Galápagos	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Gilbert Is.	Extant	Native	-	Resident

Kiribati -> Kiribati Line Is.	Extant	Native	-	Resident
Kiribati -> Phoenix Is.	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Mexico	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Nauru	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
Niue	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Panama	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Samoa	Extant	Native	-	Resident
Singapore	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
Thailand	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident
Tokelau	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
United States	Extant	Native	-	Resident
United States -> Hawaiian Is.	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Howland-Baker Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Johnston I.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Midway Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> US Line Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Wake Is.	Extant	Native	-	Resident
Vanuatu	Extant	Native	-	Resident
Viet Nam	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident
87. Pacific - southeast	Extant	Native	-	Resident

Population

Acanthurus nigricans is common and widespread throughout the Pacific Ocean. On Christmas Island, it is the dominant Acanthurid on a reef dominated by Acanthurids and achieves densities of mean 83.6 SE 9.14 per 1,000m^2 (Choat unpub. data). It was at least eightfold more abundant than *Acanthurus leucosternon* and twofold more abundant than putative hybrids at Cocos (Keeling) and Christmas Island (Marie *et al.* 2007).

In Fagatale Bay, American Samoa, it is a dominant species on the reef slope (Green *et al.* 1999). *A. nigricans* was the second most dominant species recorded from Tutuila, Aunuu, and Taema Banks, American Samoa, contributing to 7.6% of total fish biomass and 11.87% of numerical abundance (Sabater and Tofaeono 2006). In Tutuila Island, American Samoa, it was the second most dominant species recorded, contributing to 8% of total fish biomass (Sabater and Tofaeono 2007).

It was the fourth most abundant Acanthurid in Guam and Saipan, but makes a minor contribution to the Acanthurid fishery, 2.5% and 0.5% respectively (J. McIlwain unpub. data). This species is collected as an aquarium fish in West Hawaii. The total number of individuals caught from FY 2005-2009 was 3,969 with a total value of $18,813 (Walsh *et al.* 2010). It is common and locally abundant in the Philippines but is not specifically targeted in the fishery (R. Abesamis and B. Stockwell pers. comm. 2010). It was recorded as generally rare, but locally common, particularly at Louisiades, Milne Bay, Papua New Guinea (Allen 2003). It was recorded as occasional at Raja Ampat, Indonesia (Allen 2003b).

In the central Philippines, density and biomass of herbivorous fish in reserves had positive relationships with duration of reserve protection. Acanthuridae and Labridae (parrotfishes) were the major families that increased in biomass inside reserves with duration of reserve protection. Herbivore biomass inside reserves compared to fished sites was on average 1.4,4.8 and 8.1 times higher at 0.5, to 4,5 to 7 and 8 to 11 years of protection, respectively. For *A. nigricans*, mean biomass recorded in 2 reserves (5 to 7 years duration of protection) were 0.59 and 0.07 (kg per 500 m2) (Stockwell *et al.* 2009).

This species is the least abundant of the Acanthurids at Gorgona, Colombia. According to Robertson and Allen (1996), this fish was frequent enough to have a resident population in Clipperton Atoll. This fish was studied in the Galapagos archipelago, with an overall mean density of 1.49 ind/500m2 (Edgar *et al.* 2004). It is locally common in southern Costa Rica, and in Cano Island and Cocos Island.

According to Aburto-Oropeza and Balart (2001), *A. nigricans* is a rare species in Los Islotes, Gulf of California, having an occurrence frequency below 10%. In Cabo Pulmo, Gulf of California, this species was considered scarce, with a relative frequency between 25-50% (Villarreal-Cavazos *et al.* 2000). Densities on the tropical eastern Pacific offshore islands are much higher than along the continental coast.

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

This reef-associated species inhabits hard substrate areas of clear lagoons and seaward reefs, from the lower surge zone to at least 67 m. Small juveniles hide among large corals (Kuiter and Tonozuka 2001). In Gulf of Chiriqui, Panama, this species can be found over exposed shallow rocky reefs and deep rocky walls (Dominici-Arosemena and Wolff 2006). According to Rubio (1986), at Gorgona Island, Colombia, this fish (cited as *A. glaucopareius*) is abundant on rocky substrata, while also frequently found on sandy and coralline substrata. It grazes on algal turf mainly on thallate and filamentous algae (Choat *et al.* 2002, Choat *et al.* 2004). Maximum age 34 years in the Great Barrier Reef (Choat and Robertson 2002). Mean maximum age for females is 30 years, males at 24 years (Jones 2008).

The sexes are separate among the acanthurids and there is no evidence of sexual dimorphism (Reeson 1983). However, there is size dimorphism with females consistently larger than males (J.H. Choat pers. comm. 2010). *Acanthurus nigricans* is monogamous (Whiteman and Côté 2004).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-

9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female	Size at Maturity (in cms): Male
16	13

Longevity
34 Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
21.3 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus nigricans is important to subsistence fisheries and is also collected for the aquarium trade (Global Marine Aquarium Database accessed 19 March 2010). Online prices range from $33.98-$99.00 (L. Rocha pers. comm. 2010).

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. Its distribution overlaps several marine protected areas in parts of its range.

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Draft

Acanthurus nigricauda - Duncker & Mohr, 1929

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - nigricauda

Common Names: Blackstreak Surgeonfish (English), Aelmeej (Undetermined), Black-barred Surgeonfish (English), Chirurgien à Queue Blanche (French), Cirurgião Graduado (Portuguese), Debam (Malay), Epaulet-doktervis (Afrikaans), Epaulet-kirurgfisk (Danish), Epaulette Surgeonfish (English), Indangan (Filipino; Pilipino), Oturi (Undetermined), Pone-i'usina (Undetermined), Shoulderbar Surgeonfish (English), White-tail Surgeonfish (English)
Synonyms: Acanthurus Duncker & Mohr, 1929;

Taxonomic Note:
A. nigricauda x *olivaceous* hybrids have been observed in the Marshall Islands (Randall 2001a).

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Clements, K.D., McIlwain, J., Choat, J.H., Abesamis, R., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Davidson, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus nigricauda is widespread in the Indo-Pacific Region and is common in parts of its range. It is harvested as food and is a component of the aquarium trade. Harvest is not considered a major threat globally and it occurs in a number of marine reserves in parts of its distribution. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus nigricauda is widespread in the Indo-Pacific and is found from East Africa to the Society Islands and Tuamotu Archipelago, northwards to Ryukyu Islands, Japan and southwards to the Great Barrier Reef, Australia and New Caledonia. It is absent from the Red Sea, Arabian Peninsula and the Hawaiian Islands.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 30

Depth Upper Limit (in metres below sea level): 1

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Australia	Extant	Native	-	Resident
British Indian Ocean Territory	Extant	Native	-	Resident
British Indian Ocean Territory -> Chagos Archipelago	Extant	Native	-	Resident
Brunei Darussalam	Extant	Native	-	Resident
Cambodia	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Cocos (Keeling) Islands	Extant	Native	-	Resident
Comoros	Extant	Native	-	Resident
Cook Islands	Extant	Native	-	Resident
Disputed Territory	Extant	Native	-	Resident
Disputed Territory -> Paracel Is.	Extant	Native	-	Resident
Disputed Territory -> Spratly Is.	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
French Southern Territories	Extant	Native	-	Resident
French Southern Territories -> Mozambique Channel Is.	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
India	Extant	Native	-	Resident
India -> Andaman Is.	Extant	Native	-	Resident
India -> Nicobar Is.	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Kenya	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Gilbert Is.	Extant	Native	-	Resident
Kiribati -> Kiribati Line Is.	Extant	Native	-	Resident
Kiribati -> Phoenix Is.	Extant	Native	-	Resident
Madagascar	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Maldives	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident

Mauritius	Extant	Native	-	Resident
Mauritius -> Mauritius (main island)	Extant	Native	-	Resident
Mauritius -> Rodrigues	Extant	Native	-	Resident
Mayotte	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Mozambique	Extant	Native	-	Resident
Myanmar	Extant	Native	-	Resident
Nauru	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
Niue	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Réunion	Extant	Native	-	Resident
Samoa	Extant	Native	-	Resident
Seychelles	Extant	Native	-	Resident
Singapore	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Somalia	Extant	Native	-	Resident
South Africa	Extant	Native	-	Resident
Sri Lanka	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
Tanzania, United Republic of	Extant	Native	-	Resident
Thailand	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident
Tokelau	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Howland-Baker Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> US Line Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Wake Is.	Extant	Native	-	Resident
Vanuatu	Extant	Native	-	Resident
Viet Nam	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident

Population

In the Philippines, *Acanthurus nigricauda* is common over sandy bottoms. Abundance estimates in Guam record 1 ind/500 m^2 (J. McIlwain pers. comm. 2010). It is targeted in Guam and makes up 2% of the acanthurid community and 5% of the acanthurid fishery. It is uncommon to rare in fished areas (J. McIlwain unpub. data).Visual census surveys along Aceh coast, Weh Island, Indonesia recorded fish densities of 8 individuals/750 m^2 at Pantai sirkui, 9 individuals/750 m^2 at Teupin Layeu and 6 individuals/750 m^2 at Teluk Pelabuhan (Faculty of Mathematics and Natural Science 2007).

This species was recorded as common in terms of relative abundance in the northern Bismarck Sea, Papua New Guinea (Allen 2009). It is moderately common in Milne Bay Province, Papua New Guinea and in Raja Ampat, Indonesia (Allen 2003, 2003b). It was occasionally found in Calamianes Islands, Philippines (Werner and Allen 2000). It is a ubiquitous species, usually seen over sand (K.D. Clements pers. comm. 2010). It is uncommon in the American Samoa National Park (National Park of Samoa Checklist of Fishes accessed 21 April 2010).

In Kenya, landings during 1978-2001 for families that are less important in commercial catches (e.g., scarinae and Acanthuridae) showed rising catches (1978-1984) followed by a general decline during the 1990s, but the landings for the scarinae showed a rising trend in recent years (Kaunda-Arara *et al.* 2003).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus nigricauda occurs in sandy areas near coral reefs or rocky bottom where it grazes on the biofilm on sandy surfaces. It has low levels of SCFAs (short chain fatty acids) (Clements and Choat 1995). Its diet is dominated by organic detritus and calcareous sediments with very small portions of identifiable algae (Choat *et al.* 2002b).

Reproduction

The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).This species was reported to form spawning aggregations on the Great Barrier Reef (Squire and Samoilys unpub.).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.4. Marine Neritic -> Marine Neritic - Subtidal Sandy	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity
(Not specified) Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
40 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus nigricauda is collected for food and is generally caught in traps, nets, or spear. It is also a minor component of the aquarium trade (Global Marine Aquarium Database accessed 19 March 2010). It is sold online for $119.99 (L. Rocha pers. comm. 2010).

Threats

Acanthurus nigricauda may be affected by targeted fishing in some parts of its range.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral

reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Draft

Acanthurus nigrofuscus - (Forsskål, 1775)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - nigrofuscus

Common Names: Brown Surgeonfish (English), Blackspot Surgeonfish (English), Bruin doktervis (Afrikaans), Brun Kirurgfisk (Danish), Chirurgien Brun (French), Cirurgião Castanho (Portuguese), Dusky Surgeonfish (English), Indangan (Filipino; Pilipino), Kangaja (Undetermined), Keen (Arabic), Koli (Undetermined), Lavender Tang (English), Ma'aua (Undetermined), Maiii (Hawaiian), Naganiza (Japanese), Neythala (Undetermined), Pala (Undetermined), Ponepone (Undetermined), Spot-cheeked Surgeonfish (English), Teeeo (Undetermined), dridri (Undetermined)
Synonyms: Acanthurus Lesson, 1831; Chaetodon Forsskål, 1775; Ctenodon (Rüppell, 1829); Hepatus (Lesson, 1831); Teuthis (Fowler, 1938);

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Choat, J.H., McIlwain, J., Abesamis, R., Clements, K.D., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Davidson, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus nigrofuscus is widespread in the Indo-Pacific Region and is one of the most abundant surgeonfishes on coral reefs (Randall 2002). It is common and dominant on reefs in most of its range. It is caught incidentally for food and is a major component of the aquarium trade in parts of its range (i.e., West Hawaii). There was no clear trend in mean biomass observed in marine protected areas and in fished areas in the Philippines (Stockwell *et al.* 2009) and no clear trend in the declines in overall density in Fish Replenishment Areas in West Hawaii (Walsh *et al.* 2010). Harvest is not considered a major threat globally and it occurs in several marine reserves in parts of its distribution. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus nigrofuscus is widespread in the Indo-Pacific Region from the Red Sea and coast of East Africa to the Pitcairn Islands and Hawaiian Islands, northwards to southern Japan and southwards to New South Wales, Australia. It was recorded from Western Australia to Rottnest Island (Allen and Swainston 1988).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 25

Depth Upper Limit (in metres below sea level): 0

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Australia	Extant	Native	-	Resident
British Indian Ocean Territory	Extant	Native	-	Resident
Brunei Darussalam	Extant	Native	-	Resident
Cambodia	Extant	Native	-	Resident
China	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Cocos (Keeling) Islands	Extant	Native	-	Resident
Comoros	Extant	Native	-	Resident
Cook Islands	Extant	Native	-	Resident
Disputed Territory	Extant	Native	-	Resident
Disputed Territory -> Paracel Is.	Extant	Native	-	Resident
Disputed Territory -> Spratly Is.	Extant	Native	-	Resident
Djibouti	Extant	Native	-	Resident
Egypt	Extant	Native	-	Resident
Eritrea	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
French Southern Territories	Extant	Native	-	Resident
French Southern Territories -> Mozambique Channel Is.	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
Hong Kong	Extant	Native	-	Resident
India	Extant	Native	-	Resident
India -> Andaman Is.	Extant	Native	-	Resident
India -> Nicobar Is.	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Israel	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Jordan	Extant	Native	-	Resident
Kenya	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident

Kiribati -> Gilbert Is.	Extant	Native	-	Resident
Kiribati -> Kiribati Line Is.	Extant	Native	-	Resident
Kiribati -> Phoenix Is.	Extant	Native	-	Resident
Macao	Extant	Native	-	Resident
Madagascar	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Maldives	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Mauritius	Extant	Native	-	Resident
Mauritius -> Mauritius (main island)	Extant	Native	-	Resident
Mauritius -> Rodrigues	Extant	Native	-	Resident
Mayotte	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Mozambique	Extant	Native	-	Resident
Myanmar	Extant	Native	-	Resident
Nauru	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
Niue	Extant	Native	-	Resident
Norfolk Island	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Pitcairn	Extant	Native	-	Resident
Réunion	Extant	Native	-	Resident
Samoa	Extant	Native	-	Resident
Saudi Arabia	Extant	Native	-	Resident
Seychelles	Extant	Native	-	Resident
Singapore	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Somalia	Extant	Native	-	Resident
South Africa	Extant	Native	-	Resident
Sri Lanka	Extant	Native	-	Resident
Sudan	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
Tanzania, United Republic of	Extant	Native	-	Resident
Thailand	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident
Tokelau	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Howland-Baker Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Johnston I.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Midway Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> US Line Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Wake Is.	Extant	Native	-	Resident
Vanuatu	Extant	Native	-	Resident

Viet Nam	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident
Yemen	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident
81. Pacific - southwest	Extant	Native	-	Resident

Population

Acanthurus nigrofuscus is one of the most abundant surgeonfishes on coral reefs (Randall 2002). In Fagatale Bay, American Samoa, it is a dominant species on the reef slope (Green *et al.* 1999). It was recorded as common in terms of relative abundance in the northern Bismarck Sea, Papua New Guinea (Allen 2009). It was recorded as occasional in Calamianes Islands, Philippines, Milne Bay Province, Papua New Guinea and in Raja Ampat, Indonesia (Werner and Allen 2000; Allen 2003, 2003b). In South Kona, Big Island, Hawaii, *A. nigrofuscus* was one of the most abundant species recorded (Friedlander *et al.* 2006). It is the most abundant acanthurid in Guam. There was no evidence of an increase in abundance inside protected areas 10 years of protection (J. McIlwain unpub. data).

In West Hawaii, it is one of the top 10 most collected aquarium fish. There was a significant decrease in overall density across the nine Fish Replenishment Areas (FRAs). As with density there was a significant decrease in the effectiveness of the FRAs for the Brown Surgeonfish. *Acanthurus nigrofuscus* is not heavily exploited averaging Zebrasoma flavescens and *Ctenochaetus strigosus* (Walsh *et al.* 2010).

In Nha Trang Bay MPA, Viet Nam, it is one of the most common species recorded and was encountered in almost all of the study sites (Nguyen and Phan 2006). In Kenya, landings during 1978-2001 for families that are less important in commercial catches (e.g., scarinae and Acanthuridae) showed rising catches (1978-1984) followed by a general decline during the 1990s, but the landings for the scarinae showed a rising trend in recent years (Kaunda-Arara *et al.* 2003).

In the Nabq Managed Resource Protected Area, South Sinai, Egyptian Red Sea, mean abundances of this species showed significant differences at various depths and between no-take zones (NTZ) and take zones (TZ). At 1m depth of the NTZ, mean abundance was recorded at 50.67 while in the TZ it was 32.80. At 3m depth of the NTZ, mean abundance was recorded at 38.67 while in the TZ it was 109.00. At 10m depth of the NTZ, mean abundance was recorded at 32.08 and 58.25 in the TZ (Ashworth and Ormond 2005).

In the central Philippines, density and biomass of herbivorous fish in reserves had positive relationships with duration of reserve protection. Acanthuridae and Labridae (parrotfishes) were the major families that increased in biomass inside reserves with duration of reserve protection. Herbivore biomass inside reserves compared to fished sites was on average 1.4, 4.8 and 8.1 times higher at 0.5, to 4.5 to 7 and 8 to 11 years of protection, respectively.

For *A. nigrofuscus*, fished site mean biomass was recorded at 0.02 (kg per 500 m^2) while mean biomass recorded in 6 reserves were 0.01 (0.5 to 4 years of protection), 0.21, 2.14, 0.06 (5 to 7 years of protection), 0.38 and 0.13 (8 to 11 years of protection) (kg per 500 m^2), respectively (Stockwell *et al.* 2009). There was no clear trend in mean biomass between protected areas and fished areas in the central Visayas (B. Stockwell pers. comm. 2010).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus nigrofuscus is one of the smallest surgeonfishes, but aggressive. It is generally abundant on shallow coral reefs or rocky bottoms (Randall 2001a) and below the surge zone (Randall 2001b). It feeds on algal turf (Choat *et al.* 2004). It feeds mainly on red algae. It sneaks up on *A. lineatus* territories (J.H. Choat pers. comm. 2010). It is classified as a grazer (Green and Bellwood 2009) and a herbivore browser (Walsh *et al.* 2010). Maximum age recorded was 16 years (Choat and Robertson 2002a). There were locality specific variation in maximum sizes (J.H. Choat pers. comm. 2010).

Spawning

The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010). Spawning aggregations were observed in the Red Sea (Myberg *et al.* 1988), Aldabra Atoll, Palau and Lizard Island, Australia (Robertson 1983). Adults made daily afternoon migrations from shallow feeding areas to specific spawning sites located at the most seaward extension of the reef (Robertson 1983, Myrberg *et al.*1988) or channels between lagoon and open ocean (Aldabra) (Robertson 1983). This species was observed to form spawning aggregations of several thousand individuals. Dense aggregations formed expanding domes that would repeatedly rise off the bottom to about 3 m height, then rapidly return to the substrate. Rapid succession of spawning rushes occurred by subgroups of 4-15 individuals, led by an individual female followed by multiple males, at the top of the dome, followed by a period of no spawning before spawning activity commences again (Domeier and Colin 1997). Robertson (1983) observed group spawning in pulses of subgroup activity. After large pulses of spawning activity, streams of fish migrated away from the spawning site (Myrberg *et al.* 1988).

In Aldabra Atoll it was observed to spawn before the new/full moon during November-December. In the Great Barrier Reef it spawns from February-April. In Palau it spawns from January to April, 5-7 days before the new/full moon (Robertson 1983).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.3. Marine Neritic -> Marine Neritic - Subtidal Loose Rock/pebble/gravel	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-
9.8.5. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Soft Substrate	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity
16 Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
21 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus nigrofuscus is incidentally captured for food. It is taken mostly in traps or by driving schools to a barrier net. It is also a minor component of the aquarium trade (Global Marine Aquarium Database accessed 19 March 2010). Online prices range from $29.95-$79.95 (L. Rocha pers. comm. 2010).

Threats

There was no clear trend in mean biomass observed between fished and marine reserves in the central Philippines (Stockwell *et al.* 2009). There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range. In Queensland, Australia, there is a recreational catch limit of 5 per species and a minimum size limit of 25 cm (Department of Primary Industries accessed 8 April 2010).

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Draft

Acanthurus nigroris - Valenciennes, 1835

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - nigroris

Common Names: Bluelined Surgeonfish (English), Blålinjet Kirurgfisk (Danish), Guagnas (Undetermined), Hugupau (Undetermined), Maiko (Hawaiian), Maito (Undetermined), Meito (Undetermined), Ponepone (Undetermined), dridri (Undetermined)
Synonyms: Acanthurus (Jordan & Evermann, 1905); Hepatus Jordan & Evermann, 1905; Teuthis Jordan & Evermann, 1903;

Taxonomic Note:
Acanthurus nigroris is an endemic species in the Hawaiian Islands and Johnston Atoll, *Acanthurus nigros* is valid for the species elsewhere in Oceania and the Great Barrier Reef. The genetic analyses, based on mtDNA cytochrome *b* sequences from a total of 544 *Acanthurus nigroris* samples, revealed a clear separation (d = 0.041) between individuals from the Hawaiian Archipelago and the rest of the Pacific indicating a cryptic species pair (Randall *et al.* submitted manuscript, DiBattista *et al.* 2011).

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Choat, J.H., McIlwain, J., Rocha, L.A., Clements, K.D., Abesamis, R., Myers, R., Nanola, C., Russell, B. & Stockwell, B.

Reviewers: Davidson, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus nigroris is widespread, common and abundant in most of its range. It is caught as food and is a minor component of the aquarium trade. There was no difference in abundance between the main Hawaiian islands and the Northwest Hawaiian Islands. 80% of its distribution is encompassed by the Papahanaumokuakea Marine National Monument. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus nigroris is an endemic species in the Hawaiian Islands and Johnston Atoll (Randall *et al.* submitted manuscript).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 90

Depth Upper Limit (in metres below sea level): 1

Depth Zone: Shallow photic (0-50m), Deep Photic (51-200m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
United States -> Hawaiian Is.	Extant	Native	Unknown	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Johnston I.	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
77. Pacific - eastern central	Extant	Native	-	Resident

Population

Randall *et al.* (1993) recorded *A. nigroris* from Midway Atoll, Northwestern Hawaiian Islands as abundant outside the lagoon at depths of less than 2 to over 20 m. It is common and abundant in Hawaii after *A. nigrofuscus* and *Z. flavescens*. Average of 1600 kilos/year harvested in the Hawaiian commercial fishery (Hawaii Division of Aquatic Resources unpub. data). This species is collected as an aquarium fish in West Hawaii. The total number of individuals caught from FY 2005-2009 was 1,099 with a total value of $1,453 (Walsh *et al.* 2010).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus nigroris is usually found in schools from a few to several hundred individuals and feeds primarily on plankton or filamentous algae (Myers 1991). This species is classified as a grazer (Green and Bellwood 2009). This habitat generalist occupies lagoons, seaward reefs, mixed coral and rubble, and sand (depth range: 1 to 90 m; Myers 1991). Long-distance dispersal in *A. nigroris* presumably occurs during the pelagic larval stage that lasts approximately 55 to 60 days, based on estimates from related surgeonfish (Doherty *et al.* 1995, Fisher *et al.* 2005).

The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.3. Marine Neritic -> Marine Neritic - Subtidal Loose Rock/pebble/gravel	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
25 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus nigroris is collected for the aquarium trade (Global Marine Aquarium Database accessed 19 March 2010). Online prices range from $69.95-$99.95 (L. Rocha pers. comm. 2010). It is occasionally by recreational fishers. It is also a component of the Hawaii commercial fishery (Hawaii Division of Aquatic Resources unpub. data).

Threats

There are no major threats known for this species. There was no difference in abundance observed between the main Hawaiian Islands and Northwest Hawaiian Islands (L. Rocha pers. comm. 2010).

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range. 80% of its distribution is within the Papahonamokuahkea National Marine Park.

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Walsh, W., Cotton, S., Carman, B., Livnat, L., Osada, K., Barnett, C., Tissot, B., Stevenson, T., Wiggins, C., Tarnas, D., Bourdon, K. and Peck, S. 2010. Report on the Findings and Recommendations of Effectiveness of the West Hawaii Regional Fishery Management Area. Department of Land and Natural Resources State of Hawaii, State of Hawaii.

Draft

Acanthurus nigros - Günther, 1861

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - nigros

Common Names: No Common Names
Synonyms: No Synonyms

Taxonomic Note:
Acanthurus nigroris is an endemic species in the Hawaiian Islands and Johnston Atoll, *Acanthurus nigros* is valid for the species elsewhere in Oceania and the Great Barrier Reef. The genetic analyses, based on mtDNA cytochrome *b* sequences from a total of 544 *Acanthurus nigroris* samples, revealed a clear separation (d = 0.041) between individuals from the Hawaiian Archipelago and the rest of the Pacific indicating a cryptic species pair (Randall *et al.* submitted manuscript, DiBattista *et al.* in press).

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Rocha, L.A., Choat, J.H., Abesamis, R., Clements, K.D., McIlwain, J., Myers, R., Nanola, C., Russell, B. & Stockwell, B.

Reviewers: Davidson, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

This species is widespread and common in some parts of its range. It is not targeted and is caught only incidentally in multi-species fisheries. There are no major threats known and it occurs in numerous marine reserves in parts of its range. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus nigros occurs from the Pitcairn Islands to Micronesia to the Great Barrier Reef. A record from Davao, Philippines needs to be verified (C. Nanola pers. comm. 2010).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): 40

Elevation Upper Limit (in metres above sea level): 0

Depth Lower Limit (in metres below sea level): (Not specified)

Depth Upper Limit (in metres below sea level): (Not specified)

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Australia	Extant	Native	-	Resident
Cook Islands	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Japan -> Marcus I.	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Gilbert Is.	Extant	Native	-	Resident
Kiribati -> Kiribati Line Is.	Extant	Native	-	Resident
Kiribati -> Phoenix Is.	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Nauru	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
Niue	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Pitcairn	Extant	Native	-	Resident
Samoa	Extant	Native	-	Resident
Tokelau	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident

United States Minor Outlying Islands -> Howland-Baker Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> US Line Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Wake Is.	Extant	Native	-	Resident
Vanuatu	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident
81. Pacific - southwest	Extant	Native	-	Resident

Population

Acanthurus nigros is relatively common in Micronesia (Myers 1999) and rare in the Great Barrier Reef (Russell 1983). When both *A. nigros* and *Acanthurus nigrofuscus* are present at a locality, the latter is usually more common (Randall *et al.* submitted manuscript). In Moorea, French Polynesia, the Acanthuridae family was dominant on the barrier reef (2.30 ind. m^{-2}) and on the outer slope, (1.61 spec. m^{-2}). On the outer slope, this species accounted for 10% of the total density (Moussa 2009). It is uncommon in the American Samoa National Park (National Park of Samoa Checklist of Fishes accessed 21 April 2010). It is rare to uncommon in Guam and Saipan (J. McIlwain unpub. data). In a series of three reefs in Tuvalu, density estimates from 73 transects recorded 2.08+-0.39 individuals per 300m^2. It is abundant with up to 10 individuals per 300 m^2 (K.D. Clements unpub. data).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus nigros is usually found in schools from a few to several hundred individuals and feeds primarily on plankton or filamentous algae (Myers 1991). This species is classified as a grazer (Green and Bellwood 2009). This habitat generalist occupies lagoons, seaward reefs, mixed coral and rubble, and sand (depth range: 1 to 90 m; Myers 1991). Long-distance dispersal in *A. nigros* presumably occurs during the pelagic larval stage that lasts approximately 55 to 60 days, based on estimates from related surgeonfish (Doherty *et al.* 1995, Fisher *et al.* 2005).

Randall (unpubl.) observed a large spawning aggregation of *Acanthurus nigros* in 40 m in Teavaraa Pass, Tahiti at 11 a.m. on 26 February 1969. The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.3. Marine Neritic -> Marine Neritic - Subtidal Loose Rock/pebble/gravel	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
22 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: (Not specified)

Use and Trade

General Use and Trade Information

Acanthurus nigros is a minor component of the aquarium trade (Global Marine Aquarium Database accessed 19 March 2010). Online prices range from $69.95-$99.95 (L. Rocha pers. comm. 2010). It is incidentally caught in multi-species fisheries.

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Draft

Acanthurus nubilus - (Fowler & Bean, 1929)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - nubilus

Common Names: Dropoff Surgeonfish (English), Bloulyn-doktervis (Afrikaans), Bluelined Surgeonfish (English), Chirurgien Rond (French), Pin-striped Surgeon (English), Storfregnet Kirurgfisk (Danish)
Synonyms: Harpurina (Fowler & Bean, 1929); Hepatus Fowler & Bean, 1929;

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Russell, B., Choat, J.H., Myers, R., Abesamis, R., Clements, K.D., McIlwain, J., Nanola, C., Rocha, L.A. & Stockwell, B.

Reviewers: Davidson, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus nubilus is widely distributed and occurs in moderately deep water (25 to at least 90 m). It is a rare species that occurs in steep, current-swept drop-offs. Utilisation is minor and there are no apparent major threats. It occurs in a number of marine reserves in parts of its range. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus nubilus is found from Indonesia, Society Islands and New Caledonia. It is also reported from the Austral Islands, Pitcairn, Philippines, and the Marianas (Lieske and Myers 1994).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 90

Depth Upper Limit (in metres below sea level): 5

Depth Zone: Shallow photic (0-50m), Deep Photic (51-200m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
French Polynesia	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Phoenix Is.	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Pitcairn	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Wake Is.	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident
81. Pacific - southwest	Extant	Native	-	Resident

Population

Acanthurus nubilus was recorded as rare in Milne Bay Province, Papua New Guinea and in Raja Ampat, Indonesia, where only 2 were seen on outer drop-offs (Allen 2003, 2003b). There were 1-2 individuals recorded in steep walls in Balicasag Island, Philippines (B. Stockwell pers. comm. 2010). There were loose aggregations observed in Wakatobi, Indonesia (R. Myers pers. comm. 2010).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus nubilus is typically found on steep drop-offs feeding on zooplankton well away from the substratum at depths of 25 to at least 90 m. It is a rare species that occurs in steep, current-swept drop-offs (Lieske and Myers 1994, Kuiter and Tonozuka 2001). It is usually seen well off the bottom (Randall 1956). It is a planktivore (Myers 1999). The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
26 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus nubilus is collected for food and is a minor component of the aquarium fishery.

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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resources, pp. 178-190.

Draft

Acanthurus olivaceus - Bloch & Schneider, 1801

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - olivaceus

Common Names: Orange band Surgeonfish (English), Ael (Marshallese), Botana coklat (Malay), Chirurgien Olive (French), Chirurgien à Epaulettes (French), Gendarme Fish (English), Havari (Tahitian), Indangan (Filipino; Pilipino), Montsukihagi (Japanese), Nae nae (Hawaiian), Olive Surgeonfish (English), Orange Epoulette Surgeon (English), Orange Spot Tang (English), Orange-blotch Surgeon (English), Orange-ear Surgeonfish (English), Orange-epaulette Surgeonfish (English), Orangeband Surgeonfish (English), Orangebar Surgeonfish (English), Orangeplettet Kirurgfisk (Danish), Orangespot Surgeonfish (English), Poisson Gendarme (French), Pone-apasama (Samoan), Tila (Fijian)
Synonyms: Acanthurus Bleeker, 1857; Ctenodon Swainson, 1839; Harpurus Forster, 1844; Hepatus (Bleeker, 1857); Rhombotides (Bloch & Schneider, 1801); Teuthis (Bloch & Schneider, 1801);

Taxonomic Note:
This species hybridizes with *Acanthurus nigricauda* in the Marshall Is. and *A. tennentii* in Bali (Randall 2001a).

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Russell, B., McIlwain, J., Choat, J.H., Abesamis, R., Clements, K.D., Myers, R., Nanola, C., Rocha, L.A. & Stockwell, B.

Reviewers: Davidson, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus olivaceus is widely distributed and is moderately common. It is a minor component of the aquarium trade and is landed in fish markets. There are no apparent major threats and its distribution overlaps with several marine protected areas. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus olivaceus is found from southern Japan to northern New South Wales, Australia, eastwards to the Hawaiian Islands and Tuamotu Archipelago. In the Indian Ocean, it is found from Christmas Island (Allen and Swainston, 1988), Cocos-Keeling Islands (Allen and Smith-Vaniz 1994), Western Australia to Ningaloo Reef (Allen and Swainston 1988).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 83

Depth Upper Limit (in metres below sea level): 3

Depth Zone: Shallow photic (0-50m), Deep Photic (51-200m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Australia	Extant	Native	-	Resident
Brunei Darussalam	Extant	Native	-	Resident
China	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Cocos (Keeling) Islands	Extant	Native	-	Resident
Cook Islands	Extant	Native	-	Resident
Disputed Territory	Extant	Native	-	Resident
Disputed Territory -> Paracel Is.	Extant	Native	-	Resident
Disputed Territory -> Spratly Is.	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
Hong Kong	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Gilbert Is.	Extant	Native	-	Resident
Kiribati -> Kiribati Line Is.	Extant	Native	-	Resident
Kiribati -> Phoenix Is.	Extant	Native	-	Resident
Macao	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Nauru	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
Niue	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident

Philippines	Extant	Native	-	Resident
Samoa	Extant	Native	-	Resident
Singapore	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident
Tokelau	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
United States	Extant	Native	-	Resident
United States -> Hawaiian Is.	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Howland-Baker Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Johnston I.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Midway Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> US Line Is.	Extant	Native	-	Resident
Vanuatu	Extant	Native	-	Resident
Viet Nam	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident
81. Pacific - southwest	Extant	Native	-	Resident

Population

Acanthurus olivaceus is common in most of its range (G. Allen pers. comm.). It was recorded as occasional in terms of relative abundance in Milne Bay Province and northern Bismarck Sea, Papua New Guinea (Allen 2003, 2009). It is moderately common on mixed sand reef at Raja Ampat, Indonesia (Allen 2003b). It is common in the American Samoa National Park (National Park of Samoa Checklist of Fishes accessed 21 April 2010). It is rare in Calamianes Islands and Puerto Princesa City, Philippines (Werner and Allen 2000, Palawan Council for Sustainable Development unpub. data). It is common and abundant in the Spratly Islands and Tubbataha, Philippines (S. Conales, Jr. pers. comm. 2010).

At Moorea, French Polynesia, SPOT satellite images allowed estimation of the surface area of fringing reef (1,076 ha), barrier reef (3,788 ha) and outer slope (493 ha). A total of 23,132 individuals/surface area was recorded in fish visual surveys conducted from 1990-1993 (Lecchini *et al.* 2006). The Acanthuridae family was dominant on the barrier reef (2.30 ind. m^{-2}) and on the outer slope, (1.61 spec. m^{-2}). On the outer slope, this species accounted for 7.5% of the total density (Moussa 2009).

It is moderately common in Guam and Saipan particularly on exposed coasts. It comprises 3% of the total Acanthurid density in both Guam and Saipan (J. McIlwain unpub. data). 3,000 kls. were landed in Hawaii each year in commercial landings (Hawaii Division of Aquatic Resources unpub. data). Guam comprises (5%) and Saipan (2%) of the Acanthurid fishery (Guam Division of Aquatic and Wildlfe Resources and P. Houk unpub. data). It is a minor component of the fishery in Pohnpei (Rhodes *et al.* 2008).

This species is one of the eight most collected aquarium fish in West Hawaii. The total number of individuals caught from FY 2005-2009 was 5,195 with a total value of $9, 654. There was a non-significant decrease in overall density across Fish Replenishment Areas (FRAs) surveyed from 1999-2009. However, the FRAs were shown to be effective in terms of increases inside the FRAs relative to long term marine protected

areas (Walsh *et al.* 2010).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus olivaceus is usually encountered grazing over sand near reefs, sometimes in small aggregations (Randall 2001a), submarine observations to 62 m (Chave and Mundy 1994). It occurs over coral and rubble bottoms (Brown and Allen 2008). It is found in depths from 9 to at least 46 m depth, juveniles inhabit protected bays and lagoons, singly or in small groups in as little as 3 m. Adults occur singly or in schools. Its diet is dominated by organic detritus and calcareous sediments with very small portions of identifiable algae (Choat *et al.* 2002).

Reproduction

The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010). This species was reported to form spawning aggregations on the Great Barrier Reef (Squire and Samoilys unpub. data). Size at sexual maturity 180 mm (Choat and Robertson 2002a).

Growth

It shows rapid growth for the first three to four years of life. Beyond four years, growth declines sharply; resulting in extended periods of asymptotic growth. The maximum number of annuli recorded for this species was 32 to 35 (Choat and Axe 1996). Maximum age recorded 33 years in the Great Barrier Reef (Choat and Robertson 2002a).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-
9.8.5. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Soft Substrate	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female	Age at Maturity: Male	Size at Maturity (in cms): Female	Size at Maturity (in cms): Male

2 Years	2 Years	18	18

Longevity
33 Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
35 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus olivaceus is occasionally seen in fish markets. Juveniles are sought after aquarium fish. Online prices range from $29.99-$69.99 (L. Rocha pers. comm. 2010).

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Draft

Acanthurus polyzona - (Bleeker, 1868)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - polyzona

Common Names: Multibar Surgeonfish (English), Black-barred Surgeonfish (English), Sortbåndet kirurgfisk (Danish)
Synonyms: Acanthurus (Bleeker, 1868); Rhombotides Bleeker, 1868;

Red List Status
DD - Data Deficient, (IUCN version 3.1)
Data Deficient reason: : none

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Russell, B., McIlwain, J., Choat, J.H., Abesamis, R., Clements, K.D., Myers, R., Rocha, L.A., Nanola, C. & Stockwell, B.

Reviewers: Davidson, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus polyzona is restricted to the islands of the western Indian Ocean. There is very little information available on this species' population status, biology, or its utilization. The threats are unknown for *A. polyzona*, although its distribution overlaps with some marine protected areas in parts of its range. It is therefore listed as Data Deficient.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus polyzona is known only from Mauritius, Réunion, Madagascar, Rodriguez, Comoro Islands and Mayotte.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 15

Depth Upper Limit (in metres below sea level): 0

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Comoros	Extant	Native	-	Resident
French Southern Territories	Extant	Native	-	Resident
French Southern Territories -> Mozambique Channel Is.	Extant	Native	-	Resident
Madagascar	Extant	Native	-	Resident
Mauritius	Extant	Native	-	Resident
Mauritius -> Mauritius (main island)	Extant	Native	-	Resident
Mauritius -> Rodrigues	Extant	Native	-	Resident
Mayotte	Extant	Native	-	Resident
Réunion	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident

Population

After a hurricane in Reunion Is. in January 1989, the mean abundance for this species was 0.3/ 200 m^2 on the reef flat. There was no change in mean abundance 18 months after the hurricane (LeTourner *et al.* 1993). It was not recorded from a biodiversity assessment in northwest Madagascar (Allen 2005).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Specimens were collected from a rocky mangrove shore and tidepool. It also occurs on reef flats and other coral reef habitats to at least 15m. It co-occurs with *A. triostegus.* The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
12.6. Marine Intertidal -> Marine Intertidal - Tidepools	Suitable	-
12.7. Marine Intertidal -> Marine Intertidal - Mangrove Submerged Roots	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
20 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

General notes regarding trade and use of this species: (Not specified)

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps with some marine protected areas within its range.

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Draft

Acanthurus pyroferus - Kittlitz, 1834

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - pyroferus

Common Names: Mimic Surgeonfish (English), Botana Model (Malay), Chirurgien Porteur de Feu (French), Chirurgien Rose (French), Chocolate Surgeonfish (English), Chokolade-kirurgfisk (Danish), Indangan (Filipino; Pilipino), Kuroguchiniza (Japanese), Maito uteute (Tahitian), Orange-gilled Surgeonfish (English), Pacific Mimic Surgeon (English), Pone-i'usama (Samoan), Yellowspot Surgeon (English), dridri (Fijian)
Synonyms: Acanthurus Valenciennes, 1834; Hepatus (Bleeker, 1852); Rhombotides (Bleeker, 1852);

Taxonomic Note:
Hybrids of this species and *A. tristis* have been observed in Bali, Indonesia (Randall 2001a).

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Choat, J.H., Abesamis, R., Clements, K.D., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: McClenachan, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus pyroferus is widespread and occurs in a wide range of habitats and is found in deeper water. It is caught incidentally for food. Juveniles are targeted for the aquarium trade. Harvest is not considered a major threat. It occurs in a number of marine protected areas in its range of distribution. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus pyroferus is widespread in the Indo-Pacific and is found from French Polynesia (except Rapa) and the Line Islands to Wakayama Prefecture, Honshu, Japan, southwards to New South Wales, Australia. In the Indian Ocean it is recorded from Scott Reef, Western Australia (Allen and Russell 1986), Christmas Island (Allen & Steene 1988) and Cocos-Keeling Islands (Allen and Smith-Vaniz 1994).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 60

Depth Upper Limit (in metres below sea level): 2

Depth Zone: Shallow photic (0-50m), Deep Photic (51-200m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Australia	Extant	Native	-	Resident
Brunei Darussalam	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Cocos (Keeling) Islands	Extant	Native	-	Resident
Cook Islands	Extant	Native	-	Resident
Disputed Territory	Extant	Native	-	Resident
Disputed Territory -> Paracel Is.	Extant	Native	-	Resident
Disputed Territory -> Spratly Is.	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Gilbert Is.	Extant	Native	-	Resident
Kiribati -> Kiribati Line Is.	Extant	Native	-	Resident
Kiribati -> Phoenix Is.	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Nauru	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
Niue	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Samoa	Extant	Native	-	Resident
Singapore	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident

Thailand	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident
Tokelau	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Howland-Baker Is.	Extant	Native	-	Resident
Vanuatu	Extant	Native	-	Resident
Viet Nam	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident
81. Pacific - southwest	Extant	Native	-	Resident

Population

Acanthurus pyroferus was recorded as common in terms of relative abundance in Milne Bay Province, northern Bismarck Sea, Papua New Guinea and Raja Ampat, Indonesia (Allen 2003, 2009, 2003b). It is occasional in Guam and Saipan (J. McIlwain unpub. data). In Bali, Indonesia it was recorded as abundant in Tulamben (L. Rocha pers. comm. 2010).

At Moorea, French Polynesia, SPOT satellite images allowed estimation of the surface area of fringing reef (1,076 ha), barrier reef (3,788 ha) and outer slope (493 ha). A total of 493 individuals/ surface area was recorded in fish visual surveys conducted from 1990-1993 (Lecchini *et al.* 2006). It is common in the American Samoa National Park (National Park of Samoa Checklist of Fishes accessed 21 April 2010). It is common in the Philippines (B. Stockwell pers. comm. 2010), occasional in the Calamianes Islands and Puerto Princesa City and more commonly found in the northeast side of Busuanga and offshore Islands, Philippines (Werner and Allen 2000, Palawan Council for Sustainable Development unpub. data).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus pyroferus is found solitary on coral reefs at depths from 2 to at least 60 m (Randall 2001a). It feeds on detritus and sediment (Choat *et al.* 2004). It is classified as a grazer/detritivore (Choat and Bellwood pers obs. in Green and Bellwood 2009). Maximum age 28 years in the Great Barrier Reef (Choat and Robertson 2002a). The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display

obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

Mimicry

Juveniles of this species mimic various species of pygmy angelfish (genus *Centropyge*) at different locations throughout the geographic range of the surgeonfish, while adopting a common species-specific coloration as adults (Eagle and Jones 2004). Juveniles exhibit a remarkable resemblance to *C. flavissima* in the Pacific Islands (Randall and Randall1960) and to *C. vrolikii* and *C. heraldi* in the Indo-Pacific region (Myers 1989, Kuiter 1996).

Eagle and Jones (2004) show that *A. pyroferus* juveniles gain a foraging advantage by mimicking *C. vrolikii*. In Moorea, French Polynesia where juveniles of *A. pyroferus* mimic *C. flavissima*, Rainey (2009) showed that this close resemblance to the pygmy angelfish does not provide this species with access to damselfish *Stegastes nigricans* territories. *A. pyroferus* appears to exemplify 'competitive mimicry' (Rainey and Grether 2007, Rainey 2009).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-
9.8.5. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Soft Substrate	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity
28 Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
29 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus pyroferus is collected for the aquarium trade. Online prices range from $34.99-$69.99 per fish (L. Rocha pers. comm. 2010). It is incidentally caught as food.

Threats

Though targeted for the marine aquarium trade, there are no indications of population declines from harvesting.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Draft

Acanthurus randalli - Briggs & Caldwell, 1957

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - randalli

Common Names: Gulf Surgeonfish (English), Golf-kirurgfisk (Danish)
Synonyms: Acanthurus Briggs & Caldwell, 1957;

Red List Assessment

Red List Status

Red List Criteria: (Not specified)

Assessment Information

Reviewed? (Not specified)

Assessor(s): (Not specified)

Reviewers: (Not specified)

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Rationale for the Red List Assessment: (Not specified)

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Geographic Range Information: (Not specified)

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): (Not specified)

Depth Upper Limit (in metres below sea level): (Not specified)

Depth Zone: (Not specified)

Map Status

Map Status: (Not specified)

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Countries of Occurrence: (Not specified)

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

FAO Marine Areas: (Not specified)

Population

Population Information: (Not specified)

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Habitat Information: (Not specified)

IUCN Habitats Classification Scheme

General Habitat Information: (Not specified)

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms): (Not specified)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Does the species lay eggs? (Not specified)

Does the species give birth to live young: (Not specified)

Does the species exhibit parthenogenesis: (Not specified)

Does the species have a free-living larval stage? (Not specified)

Does the species require water for breeding? (Not specified)

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: (Not specified)

Use and Trade

General Use and Trade Information

General notes regarding trade and use of this species: (Not specified)

Threats

Threats Information: (Not specified)

Conservation

Conservation Actions Information: (Not specified)

Bibliography

No references used in this assessment.

Draft

Acanthurus reversus - Randall & Earle, 1999

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - reversus

Common Names: Marquesan Surgeonfish (English)
Synonyms: No Synonyms

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Abesamis, R., Clements, K.D., Choat, J.H., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: McClenachan, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus reversus is restricted to the Marquesas (and possibly also the Tuamotus). It is common and abundant at inshore sites and is found in all 10 major islands in the Marquesas. The reef area is estimated to be at least 100,000 km^2. The population in Marquesas is estimated to be less than 10,000 people (http://www.polynesia.com/marquesas/population.html, accessed 4 May 2010). It is not targeted in any fishery and is caught incidentally for food. There are no major threats known and its distribution overlaps with Motu One reserve. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus reversus is endemic to the Marquesas Islands; a single additional record from Takaroa Atoll in the Tuamotos is probably a vagrant (Randall 2001a).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 25

Depth Upper Limit (in metres below sea level): 4

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
French Polynesia	Extant	Native	-	Resident
French Polynesia -> Marquesas	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
77. Pacific - eastern central	Extant	Native	-	Resident

Population

Acanthurus reversus is common and locally abundant.

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus reversus occurs on inshore reefs where it is common. It is found solitary or in small groups.

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.3. Marine Neritic -> Marine Neritic - Subtidal Loose Rock/pebble/gravel	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-

9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
34 (SL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus reversus is incidentally caught for food.

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, Motu One reserve in the northern Marquesan islands, established in 1992, encompasses the whole of the island and reef system of Motu One (Pacific Biodiversity Information Forum accessed 23 September 2010).

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Draft

Acanthurus sohal - (Forsskål, 1775)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - sohal

Common Names: Sohal Surgeonfish (English), Anfoos (Arabic), Fardh (Arabic), Faridh (Arabic), Red Sea Clown Surgeon (English), Red Sea Surgeonfish (English), Sohal-kirurgfisk (Danish)
Synonyms: Acanthurus Bloch & Schneider, 1801; Aspisurus (Forsskål, 1775); Chaetodon Forsskål, 1775; Choetodon (Forsskål, 1775); Ctenodon Swainson, 1839;

Taxonomic Note:
Acanthurus sohal is closely related to the Indo-Pacific species *Acanthurus lineatus* (Alwany *et al.* 2005).

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Choat, J.H., McIlwain, J., Abesamis, R., Clements, K.D., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: McClenachan, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus sohal inhabits the outer edge of fringing reefs where exposed to surge in depths from 0-50m. It is a targeted food fish and a component of the marine aquarium trade. FAO landings data from Saudi Arabia indicate declines from a peak of 62 tonnes in 2005 to a low of 18 tonnes in 2007, however, these declines do not reach the thresholds for a threatened category. *A. sohal* is common and is the most abundant acanthurid throughout its range. It is therefore listed as Least Concern. This species is found in a number of marine protected areas in parts of its distribution. We recommend continued monitoring of the population status and harvest levels of this species.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus sohal is found from the Red Sea, around the Arabian Peninsula to the Persian Gulf. It is not found in the Seychelles where the sister species *A. lineatus* occurs (J.H. Choat pers. comm. 2010).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 50

Depth Upper Limit (in metres below sea level): 0

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Bahrain	Extant	Native	-	Resident
Djibouti	Extant	Native	-	Resident
Egypt	Extant	Native	-	Resident
Eritrea	Extant	Native	-	Resident
Iran, Islamic Republic of	Extant	Native	-	Resident
Iraq	Extant	Native	-	Resident
Israel	Extant	Native	-	Resident
Jordan	Extant	Native	-	Resident
Kuwait	Extant	Native	-	Resident
Oman	Extant	Native	-	Resident
Qatar	Extant	Native	-	Resident
Saudi Arabia	Extant	Native	-	Resident
Somalia	Extant	Native	-	Resident
Sudan	Extant	Native	-	Resident
United Arab Emirates	Extant	Native	-	Resident
Yemen	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident

Population

FAO capture production from Saudi Arabia recorded 18 tonnes in 2000, increasing to 56 tonnes in 2003 and a peak in 2005 with 62 tonnes, it has decreased to 17 tonnes in 2006 and 18 tonnes in 2007. There are no capture production records for this species prior to 2000.

In Ras Mohammed National Park, species abundance was recorded at 9.3 to 43 fish per 300 m^2 (Alwany *et al.* 2005). It is very abundant in shallow water. Abundance estimates in the southern Arabian gulf (Musandam) recorded 18 individuals per 1, 000 m^2. In northern Oman

(Daymaniyat Islands) 46.7 individuals per 1, 000 m . In the Red Sea, abundance estimates of 267.7 individuals per 1,000 m were recorded by A. Ayling (J.H. Choat pers. comm. 2010). At two sites in Dhofar, 2 individuals/250 m^2 were recorded. It is occasional along the Oman coast of the Arabian Seaash (J. McIlwain unpub. data). It is the most abundant Acanthurid in this region (J.H. Choat pers. comm. 2010).

In the Nabq Managed Resource Protected Area, South Sinai, Egyptian Red Sea, mean abundances for *A. sohal* were generally higher in the no-take zones (NTZ) than in the take zones (TZ) across 1 and 3 m, however there was no significant difference between zones in 10 m depth (Ashworth and Ormond 2005).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus sohal inhabits the outer edge of fringing reefs where exposed to surge. It is strongly territorial and highly aggressive. It displays aggression by swimming rapidly towards the intruder, turning at the last moment or brushing alongside the other fish (Alwany *et al.* 2005). This aggressive behaviour ultimately affects not only the distribution of algae but also of sessile epibenthic invertebrates (Vine 1974, Randall 1983).

Acanthurus sohal and *Zebrasoma xanthurum* cohabit fringing reefs in Oman and feed on epilithic algal species (Mill 2007). It is herbivorous and usually swims solitary around its territory (Alwany *et al.* 2005). It feeds on benthic algae (Sommer *et al.* 1996). Schooling enables *A. sohal* to sometimes feed on the territories of other fishes (Vine 1974). A study by Alwany *et al.* (2005) show that this species spends considerable time (51.3%) swimming and patrolling the borders of its territory. Feeding occupied only 33.7%. It also spends less time sheltering (6%), usually outside the territory. Short sheltering time and feeding time indicate that the primary function of the territory is to defend food resources (Warner and Hoffman 1980, Tricas 1989a).

From a small sample in northern Oman (n=10) the maximum age for 32.3 cm (FL) specimen was recorded at 11 years. This is short live for an acanthurid this size and reflects the influence of the high productivity upwelling coastal environment. One specimen sampled in southern Oman (Al Halanyat) was 32 cm at 26 years (J.H. Choat and J. McIlwain unpub. data).

The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
40 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus sohal is a targeted food fish. It is also a component of the aquarium trade (Global Marine Aquarium Database accessed 19 March 2010). Online prices range from $112.98-$239.99 per fish (L. Rocha pers. comm. 2010).

Threats

There have been localized population declines recorded from Saudi Arabia.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Draft

Acanthurus tennentii - Günther, 1861

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - tennentii

Common Names: Doubleband Surgeonfish (English), Chirurgien Fer à Cheval (French), Cirurgião Ferradura (Portuguese), Karutha-kotti (Undetermined), Kaxan (Undetermined), Lieutenant Surgeonfish (English), Luitenant-doktervis (Afrikaans), Løjtnant-kirurgfisk (Danish), Neythala (Undetermined), Pala (Undetermined), Sangrador Herradura (Spanish; Castilian)
Synonyms: Acanthurus Smith, 1955;

Taxonomic Note:
Acanthurus tennentii hybridizes with *A. olivaceus* in Bali, Indonesia (Randall 2001a).

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Russell, B., Choat, J.H., Abesamis, R., Clements, K.D., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A. & Stockwell, B.

Reviewers: McClenachan, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus tennentii is widely distributed and although utilized for food and aquarium trade, these uses appear to be minor. Its distribution overlaps with a number of marine reserves in parts of its range. It is therefore listed as Least Concern.We recommend monitoring of the harvest levels and population trends of this species.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus tennentii is found from East Africa to the west coast of Thailand and along southern Indonesia as far east as Bali including Christmas and Cocos-Keeling. It is not known from the Red Sea (Randall 2001a).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 35

Depth Upper Limit (in metres below sea level): 1

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
British Indian Ocean Territory	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Cocos (Keeling) Islands	Extant	Native	-	Resident
Comoros	Extant	Native	-	Resident
Djibouti	Extant	Native	-	Resident
French Southern Territories	Extant	Native	-	Resident
French Southern Territories -> Mozambique Channel Is.	Extant	Native	-	Resident
India	Extant	Native	-	Resident
India -> Andaman Is.	Extant	Native	-	Resident
India -> Nicobar Is.	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Kenya	Extant	Native	-	Resident
Madagascar	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Maldives	Extant	Native	-	Resident
Mauritius	Extant	Native	-	Resident
Mayotte	Extant	Native	-	Resident
Mozambique	Extant	Native	-	Resident
Myanmar	Extant	Native	-	Resident
Oman	Extant	Native	-	Resident
Réunion	Extant	Native	-	Resident
Seychelles	Extant	Native	-	Resident
Somalia	Presence Uncertain	Native	-	-
South Africa	Extant	Native	-	Resident
Sri Lanka	Extant	Native	-	Resident
Tanzania, United Republic of	Extant	Native	-	Resident
Thailand	Extant	Native	-	Resident
Yemen	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident

Population

Acanthurus tennentii is common in the Seychelles, Maldives and Mauritius and rare in Oman, where it was observed only in the south (Randall 1995). It is common but not abundant throughout its range (L. Rocha pers. comm. 2010). It is rare on the reef flats of Reunion (Letourner *et al.* 1993).

In Kenya, landings during 1978-2001 for families that are less important in commercial catches (e.g., scarinae and Acanthuridae) showed rising catches (1978-1984) followed by a general decline during the 1990s (Kaunda-Arara *et al.* 2003).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus tennentii inhabits shallow-water coral reefs. It is classified as a grazer/detritivore (Choat and Bellwood pers. obs. in Green and Bellwood 2009). The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.3. Marine Neritic -> Marine Neritic - Subtidal Loose Rock/pebble/gravel	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
31 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus tennentii is captured for food in nets and traps. It is also a minor component of the aquarium fishery. Online prices range from $45.99-$89.99 per fish (L. Rocha pers. comm. 2010).

Threats

There are indications of localized population declines from fishing in Kenya.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Reeson, P.H. 1983. The biology, ecology and bionomics of the surgeonfishes, Acanthuridae. In: J.L. Munro (ed.), Caribbean coral reef fishery resources, pp. 178-190.

Draft

Acanthurus thompsoni - (Fowler, 1923)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - thompsoni

Common Names: Thompson's Surgeonfish (English), Chirurgien à Queue Blanche (French), Chocolate Surgeonfish (English), Cirurgião Chocolate (Portuguese), Indangan (Filipino; Pilipino), Maito (Tahitian), Night Surgeonfish (English), Ohagurohagi (Japanese), Pone-i'usina (Samoan), Sjokolade-doktervis (Afrikaans), Thompson's Tang (English), Thompsons Kirurgfisk (Danish), Whitetail Surgeonfish (English)
Synonyms: Acanthurus Herre, 1927; Hepatus (Herre, 1927); Teuthis (Fowler, 1923);

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Abesamis, R., Clements, K.D., Choat, J.H., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: McClenachan, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus thompsoni is widespread, common and abundant in most parts of its range. It is caught incidentally and occasionally found in fish markets. Its distribution overlaps with a number of marine protected areas in parts of its range. It is therefore listed as Least Concern. We recommend monitoring of the harvest levels and population status of this species.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus thompsoni is widespread in the Indo-Pacific, found from East Africa to the Hawaiian Islands and Pitcairn Islands, northwards to Kochi Prefecture, Japan, southwards to the Great Barrier Reef, Australia and New Caledonia. It was recorded from Rowley Shoals (Allen and Russell 1986).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 119

Depth Upper Limit (in metres below sea level): 4

Depth Zone: Shallow photic (0-50m), Deep Photic (51-200m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Australia	Extant	Native	-	Resident
Bangladesh	Extant	Native	-	Resident
British Indian Ocean Territory	Extant	Native	-	Resident
Brunei Darussalam	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Cocos (Keeling) Islands	Extant	Native	-	Resident
Comoros	Extant	Native	-	Resident
Cook Islands	Extant	Native	-	Resident
Disputed Territory	Extant	Native	-	Resident
Disputed Territory -> Paracel Is.	Extant	Native	-	Resident
Disputed Territory -> Spratly Is.	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
French Southern Territories	Extant	Native	-	Resident
French Southern Territories -> Mozambique Channel Is.	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
India	Extant	Native	-	Resident
India -> Andaman Is.	Extant	Native	-	Resident
India -> Nicobar Is.	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Kenya	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Gilbert Is.	Extant	Native	-	Resident
Kiribati -> Kiribati Line Is.	Extant	Native	-	Resident
Kiribati -> Phoenix Is.	Extant	Native	-	Resident
Madagascar	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Maldives	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Mauritius	Extant	Native	-	Resident
Mayotte	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Mozambique	Extant	Native	-	Resident

Myanmar	Extant	Native	-	Resident
Nauru	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
Niue	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Pitcairn	Extant	Native	-	Resident
Réunion	Extant	Native	-	Resident
Samoa	Extant	Native	-	Resident
Seychelles	Extant	Native	-	Resident
Singapore	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Somalia	Presence Uncertain	Native	-	-
South Africa	Extant	Native	-	Resident
Sri Lanka	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
Tanzania, United Republic of	Extant	Native	-	Resident
Thailand	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident
Tokelau	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
United States	Extant	Native	-	Resident
United States -> Hawaiian Is.	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Howland-Baker Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Johnston I.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Midway Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> US Line Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Wake Is.	Extant	Native	-	Resident
Vanuatu	Extant	Native	-	Resident
Viet Nam	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident
Yemen	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident

81. Pacific - southwest	Extant	Native	-	Resident

Population

Acanthurus thompsoni is common and abundant in most of its range. It was recorded as occasional in terms of relative abundance in the northern Bismarck Sea, Papua New Guinea (Allen 2009). It is moderately common in Milne Bay Province, Papua New Guinea and Raja Ampat, Indonesia. It is usually seen over steep drop-offs (Allen 2003, 2003b). It is common in the American Samoa National Park (National Park of Samoa Checklist of Fishes, accessed 21 April 2010). It is common in the Philippines (S. Conales, Jr. and C. Nanola pers. comm. 2010). This species is collected as an aquarium fish in West Hawaii. The total number of individuals caught from FY 2005-2009 was 1,143 with a total value of $2,247 (Walsh *et al.* 2010).

In Kenya, landings during 1978-2001 for families that are less important in commercial catches (e.g., scarinae and Acanthuridae) showed rising catches (1978-1984) followed by a general decline during the 1990s (Kaunda-Arara *et al.* 2003).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus thompsoni is found near steep drop-offs (Brown and Allen 2008). It feeds on zooplankton well above the bottom, or away from the wall in drop-offs. It is reported to occur as deep as 75 m (Chave and Mundy 1994), it is generally seen in less than 30 m and may occur in as little as 4 m (Randall 2001a). The sexes are separate among the acanthurids and there is no evidence of sexual dimorphism (Reeson 1983).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
27 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus thompsoni is a minor component of the aquarium trade (Global Marine Aquarium Database accessed 19 March 2010). It sells for $49.95 to $74.95 per fish depending on size (bluezooaquatics.com accessed 13 April 2010). It is a targeted food fish in western Thailand (Allen 2005). It is not targeted in the Philippines but occasionally found in fish markets.

Threats

There are indications of localized population declines from fishing in Kenya.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Draft

Acanthurus triostegus - (Linnaeus, 1758)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - triostegus

Common Names: Convict Surgeonfish (English), Bandiet-doktervis (Afrikaans), Botana lorek (Malay), Chelas (Palauan), Chirurgien Bagnard (French), Chirurgien Zèbre (French), Chirurgien à Raies Noires (French), Cirujano Convicto (Spanish; Castilian), Cirujano Rayado (Spanish; Castilian), Cirujano Reo (Spanish; Castilian), Cirurgião Convicto (Portuguese), Convict Tang (English), Cà Đuôi gai (Vietnamese), Debam (Malay), Fembåndet Kirurgfisk (Danish), Fiveband Surgeonfish (English), Indangan (Filipino; Pilipino), Kaxan (Somali), Kozhimeen (Tamil), Kurichil (Malayalam), Lancero Convicto (Spanish; Castilian), Manini (Hawaiian), Mootah (Telugu), Pokolec Pasiasty (Polish), Polonon-lago (Marshallese), Polosatyi Khirurg (Russian), Sangrador Carcelario (Spanish; Castilian), Sebrastrimmig Kirurgfisk (Swedish), Shimahagi (Japanese), Tabace (Fijian), Togoo (Swahili), Tukutea (Niuean), Varipara (Malayalam)
Synonyms: Acanthurus Bennett, 1829; Chaetodon Lacepède, 1802; Harpurus Forster, 1801; Hepatus (Streets, 1877); Rhombotides (Bleeker, 1850); Teuthis Gray, 1827;

Taxonomic Note:
There is strong geographical pattern in the genetic structure of *Acanthurus triostegus* throughout the tropical Pacific but does not warrant species recognition (Planes and Fauvelot 2002).

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): McIlwain, J., Choat, J.H., Abesamis, R., Clements, K.D., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: McClenachan, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus triostegus is widespread throughout the Indo-Pacific region, there is strong geographical pattern in genetic structure throughout the Pacific, but does not warrant species recognition. It is very abundant in some parts of its range. It is a targeted food and recreational species. There are no indications of global population declines through harvesting. It is found in a number marine protected areas in parts of its range. It is therefore listed as Least Concern. We recommend monitoring of the harvest levels and population status of this species.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus triostegus is widely distributed throughout the Indo-Pacific, including Yemen, but is not found elsewhere in the Arabian Peninsula. In the eastern Pacific it occurs from the lower Gulf of California, El Salvador to Ecuador and all the oceanic islands.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 90

Depth Upper Limit (in metres below sea level): 0

Depth Zone: Shallow photic (0-50m), Deep Photic (51-200m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Australia	Extant	Native	-	Resident
Bangladesh	Extant	Native	-	Resident
British Indian Ocean Territory	Extant	Native	-	Resident
Brunei Darussalam	Extant	Native	-	Resident
Cambodia	Extant	Native	-	Resident
Chile	Extant	Native	-	Resident
Chile -> Easter Is.	Extant	Native	-	Resident
China	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Cocos (Keeling) Islands	Extant	Native	-	Resident
Colombia	Extant	Native	-	Resident
Comoros	Extant	Native	-	Resident
Cook Islands	Extant	Native	-	Resident
Costa Rica	Extant	Native	-	Resident
Disputed Territory	Extant	Native	-	Resident
Disputed Territory -> Paracel Is.	Extant	Native	-	Resident
Disputed Territory -> Spratly Is.	Extant	Native	-	Resident
Djibouti	Extant	Native	-	Resident
Ecuador	Extant	Native	-	Resident
Ecuador -> Galápagos	Extant	Native	-	Resident
El Salvador	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
French Southern Territories	Extant	Native	-	Resident
French Southern Territories -> Mozambique Channel Is.	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident

Honduras	Extant	Native	-	Resident
Hong Kong	Extant	Native	-	Resident
India	Extant	Native	-	Resident
India -> Andaman Is.	Extant	Native	-	Resident
India -> Nicobar Is.	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Kenya	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Gilbert Is.	Extant	Native	-	Resident
Kiribati -> Kiribati Line Is.	Extant	Native	-	Resident
Kiribati -> Phoenix Is.	Extant	Native	-	Resident
Macao	Extant	Native	-	Resident
Madagascar	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Maldives	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Mauritius	Extant	Native	-	Resident
Mayotte	Extant	Native	-	Resident
Mexico	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Mozambique	Extant	Native	-	Resident
Myanmar	Extant	Native	-	Resident
Nauru	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
New Zealand	Extant	Native	-	Resident
Nicaragua	Extant	Native	-	Resident
Niue	Extant	Native	-	Resident
Norfolk Island	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Panama	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Pitcairn	Extant	Native	-	Resident
Réunion	Extant	Native	-	Resident
Samoa	Extant	Native	-	Resident
Seychelles	Extant	Native	-	Resident
Singapore	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Somalia	Extant	Native	-	Resident
South Africa	Extant	Native	-	Resident
Sri Lanka	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
Tanzania, United Republic of	Extant	Native	-	Resident
Thailand	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident
Tokelau	Extant	Native	-	Resident

Tonga	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
United States	Extant	Native	-	Resident
United States -> Hawaiian Is.	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Howland-Baker Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Johnston I.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Midway Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> US Line Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Wake Is.	Extant	Native	-	Resident
Vanuatu	Extant	Native	-	Resident
Viet Nam	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident
Yemen	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
47. Atlantic - southeast	Extant	Native	-	Resident
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident
81. Pacific - southwest	Extant	Native	-	Resident
87. Pacific - southeast	Extant	Native	-	Resident

Population

Acanthurus triostegus was recorded as the most abundant species of surgeonfish in the Hawaiian Islands (Randall 1961b). It is an abundant inshore species (Randall 2001b). Marine recreational catch surveys administered by the Hawaii Marine Recreational Fishing Survey in 2006 recorded 432, 182 individuals (Friedlander et al. 2006). It is the 3rd most commercially landed Acanthurid in Hawaii, with an average of 5,800 kls. from 1997-2005 (Hawaii Division of Aquatic Resources unpub. data).

It was recorded as occasional in Raja Ampat, Indonesia, where it is usually found in shallow, wave affected areas (Allen 2003b). It is locally abundant in the Philippines (B. Stockwell pers. comm. 2010). In Calamianes Islands, El Nido and San Vicente, Palawan, it is moderately common in shallow, wave affected areas near shore (Werner and Allen 2000, Palawan Council for Sustainable Development unpub. data). In Moorea, French Polynesia, the Acanthuridae family was dominant on the barrier reef (2.30 ind. m^{-2}) and on the outer slope, (1.61 spec. m^{-2}). On the barrier reef, this species accounted for 37% of the total density (Moussa 2009).

In Guam, *A. triostegus* accounts for 6% of acanthurid landings and less than 1% in Saipan (Guam Division of Aquatic and Wildlife Resources unpub. data). After a hurricane in Reunion Is. in January 1989, the density of *Acunthurus triostegus*, decreased six months after the hurricane, and later increased. Abundance estimates record 19 ind/200 m^2 (LeTourner *et al.* 1993).

In Kenya, landings during 1978-2001 for families that are less important in commercial catches (e.g., scarinae and Acanthuridae) showed rising catches (1978-1984) followed by a general decline during the 1990s (Kaunda-Arara *et al.* 2003).

Visual census surveys in the Iboih coast, Weh Island, Indonesia recorded fish densities of 18 individuals/750 m^2 at Pantai sirkui, 11 individuals/750 m^2 at Teupin Layeu and 12 individuals/750 m^2 at Teluk Pelabuhan (Faculty of Mathematics and Natural Science 2007). It was

recorded as occasional in terms of relative abundance in Milne Bay Province, Papua New Guinea, usually in shallow wave-affected areas (Allen 2003).

This species is very abundant on offshore islands other than Galapagos (where it is uncommon), and common in clear water environments along the tropical eastern Pacific continental coast and Gorgona Island, Colombia. According to Robertson and Allen (1996), this fish was frequent enough to have a resident population in Clipperton Atoll. In Cabo Pulmo, Gulf of California, this species was considered scarce (Villarreal-Cavazos *et al.* 2000).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

This reef-associated species occurs in lagoons and seaward reefs with hard substrate. It is usually seen in reef crests in shallow exposed reef fronts (J.H. Choat pers. comm. 2010). The young are abundant in tide pools (Randall 1986, Kuiter and Tonozuka 2001) In Gulf of Chiriqui, Panama, this species can be found over zones of madreporic branching corals, in sheltered areas (Dominici-Arosemena and Wolff 2006). In Hawaii, this species occurs in bays, harbors, and exposed reef areas. It abounds in tide pools and shallow water, yet is also known in depths of at least 100 ft (Randall 1961b). It is often observed feeding near freshwater run-offs where certain algae grow on rocks (Kuiter and Tonozuka 2001). Adults are often observed in large feeding aggregations, it may also be seen as solitary or in small groups. Large aggregations may be dense and cover areas more than 50 ft in diameter (Randall 1961b). It feeds on algal turfs (Choat *et al.* 2004). It is classified as a grazer (Green and Bellwood 2009). It rarely achieves sizes above 20 cm (TL).

Reproduction

The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010). This species spawns year-round in equatorial waters, but seasonally in Hawaii, which coincides with the colder part of the year (February-March) (Randall 1961b). It recruits year-round in Guam (J. McIlwain unpub. data).

It was observed to form spawning aggregations on the Great Barrier Reef (Randall 1961a, 1961b; Johannes 1981; Robertson 1983). In Palau it spawns from May-August after the new moon (Randall 1961b). At Aldabra Atoll it spawns from November-December (Robertson 1983). During mid-day to dusk fish migrate in dense streams to aggregation sites, reaching tens of thousands to spawn (Randall 1961a, 1961b; Robertson 1983; Randall *et al.* 1990). Males displayed a spawning color phase. Spawning takes place in pulses by sub-groups of 10-20 fish (Randall 1961a, 1961b; Robertson 1983). Pair spawning has also been observed in this species. *A. triostegus* aggregations are resident spawning aggregations (Domeier and Colin 1997). Its size during metamorphosis, from the post-larval stage to juvenile, is 3.2 cm (Krupp 1995). The eggs and larvae are pelagic. The smallest running ripe female found on Oahu was 10.1 cm (SL); the smallest male 9.7 cm (SL) (Randall 1961b).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-
12.6. Marine Intertidal -> Marine Intertidal - Tidepools	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
27 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus triostegus is utilized as a food source (Titcomb 1972), and is important in commercial fisheries in some parts of its range. It is a popular recreational fish in Hawaii. It is also collected for the aquarium trade (Global Marine Aquarium Database accessed 19 March 2010). Online prices range from $22.95-$49.99 per individual (L. Rocha pers. comm. 2010).

Threats

Localized fishing for artisanal and recreational fisheries.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their

life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Draft

Acanthurus tristis - Randall, 1993

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - tristis

Common Names: Indian Ocean Mimic Surgeonfish (English), Blackcheek Surgeonfish (English), Imitator-kirurgfisk (Danish), Yellowspot Surgeonfish (English)
Synonyms: No Synonyms

Taxonomic Note:
Hybrids of *Acanthurus trisis* with *A. pyroferus* were observed in Bali, Indonesia (Randall 2001a).

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Abesamis, R., Clements, K.D., Choat, J.H., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: McClenachan, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus tristis is found in the eastern Indian Ocean, it is rare in parts of its range and can be common but not abundant in parts of its distribution (Bali). Juveniles are a minor component of the aquarium trade in Sri Lanka and is incidentally captured for food. Harvesting is not considered to be a threat at present time and its distribution overlaps with marine protected areas in parts of its range. It is therefore listed as Least Concern. We recommend monitoring of the harvest levels and population status of this species.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus tristis is found from the Andaman Sea, southern Indonesia to the Maldive Islands and Chagos Archipelago.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 26

Depth Upper Limit (in metres below sea level): 2

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Bangladesh	Extant	Native	-	Resident
British Indian Ocean Territory	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Cocos (Keeling) Islands	Extant	Native	-	Resident
India	Extant	Native	-	Resident
India -> Andaman Is.	Extant	Native	-	Resident
India -> Nicobar Is.	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Malaysia -> Peninsular Malaysia	Extant	Native	-	Resident
Maldives	Extant	Native	-	Resident
Myanmar	Extant	Native	-	Resident
Sri Lanka	Extant	Native	-	Resident
Thailand	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident

Population

Acanthurus tristis is rare in the Seychelles, Christmas and Cocos Islands (J.H. Choat pers. comm. 2010). It is common in Bali, Indonesia but not abundant (L. Rocha pers. comm. 2010). This species is a target reef fish in western Thailand. One hundred twenty-four individuals were recorded from 14 sites off the western coast of Thailand, four months after the Sumatran tsunami disaster (Allen 2005).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Acanthurus tristis occurs on shallow lagoon and seaward reefs, in areas of mixed coral, rock or sand. Generally in deeper and more sheltered waters frequently over sand and rubble bottoms (J.H. Choat pers comm. 2010). It is classified as a detritivore (Choat and Beood pers obs. in Green and Bellwood 2009). The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010). Juveniles of this species resemble *Centropyge eibli* (Kuiter and Debelius 1994).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.4. Marine Neritic -> Marine Neritic - Subtidal Sandy	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
25 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?

No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus tristis is a component of the aquarium trade. Online prices range from from $37.99-$59.95 per individual (L. Rocha pers. comm. 2010). It is a targeted food fish in western Thailand (Allen 2005). It is caught by setnets and traps (Sri Lanka; DeBruin *et al.* 1995).

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Draft

Acanthurus xanthopterus - Valenciennes, 1835

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Acanthurus - xanthopterus

Common Names: Yellowfin Surgeonfish (English), Anfoos (Arabic), Balagi (Fijian), Chancho Aleta Amarilla (Spanish; Castilian), Chirurgien Aile Jaune (French), Chirurgien à Nageoires Jaunes (French), Cirujano Aleta Amarilla (Spanish; Castilian), Cirujano de Aleta Amarilla (Spanish; Castilian), Cirurgião Barbatana Amarela (Portuguese), Cuvier's Surgeonfish (English), Debam (Malay), Fardh (Arabic), Faridh (Arabic), Geelvin-doktervis (Afrikaans), Gulfinnet Kirurgfisk (Danish), Indangan (Filipino; Pilipino), Kaxan (Somali), Kurohagi (Japanese), Mesekuuk (Palauan), Navajón Aleta Amarilla (Spanish; Castilian), Para'I (Tahitian), Pez Cirujano (Spanish; Castilian), Pez Cirujano Púrpura (Spanish; Castilian), Poisson Docteur à Nageoires Jaunes (French), Pualu (Hawaiian), Purple Surgeonfish (English), Ring-tailed Surgeonfish (English), Ugupao (Chamorro), Yellow-mask Surgeon (English)
Synonyms: Acanthurus (Jordan & Starks, 1895); Hepatus Jordan & Seale, 1906; Teuthis Jordan & Starks, 1895;

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Abesamis, R., Clements, K.D., Choat, J.H., McIlwain, J., Myers, R., Rocha, L.A., Nanola, C., Russell, B. & Stockwell, B.

Reviewers: McClenachan, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Acanthurus xanthopterus is widespread in the Indo-Pacific and is common in parts of its range. It is a targeted food fish in parts of its distribution. There are no signs of global population declines through harvesting. Its distribution overlaps with a number of marine protected areas. It is therefore listed as Least Concern. We recommend monitoring of the harvest levels and population trends of this species.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Acanthurus xanthopterus is widespread in the tropical Indo-Pacific from eastern Africa to the Americas. In the Indo-Pacific, it occurs from eastern Africa to the Hawaiian islands and French Polynesia, northwards to southern Japan, and south to the Great Barrier Reef and New Caledonia. In the eastern Pacific, it ranges from the mouth of the Gulf of California to Ecuador, including all the oceanic islands, but excluding the Central American Gap (coastal El Salvador, Guatemala). One record from Halaniyat Islands, southern Oman is possibly a vagrant (J. McIlwain unpub. data).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 120

Depth Upper Limit (in metres below sea level): 1

Depth Zone: Shallow photic (0-50m), Deep Photic (51-200m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Australia	Extant	Native	-	Resident
British Indian Ocean Territory	Extant	Native	-	Resident
Brunei Darussalam	Extant	Native	-	Resident
Cambodia	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Cocos (Keeling) Islands	Extant	Native	-	Resident
Colombia	Extant	Native	-	Resident
Comoros	Extant	Native	-	Resident
Cook Islands	Extant	Native	-	Resident
Costa Rica	Extant	Native	-	Resident
Disputed Territory	Extant	Native	-	Resident
Disputed Territory -> Spratly Is.	Extant	Native	-	Resident
Ecuador	Extant	Native	-	Resident
Ecuador -> Galápagos	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
French Southern Territories	Extant	Native	-	Resident
French Southern Territories -> Mozambique Channel Is.	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
Honduras	Extant	Native	-	Resident
India	Extant	Native	-	Resident
India -> Andaman Is.	Extant	Native	-	Resident
India -> Nicobar Is.	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Kenya	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Gilbert Is.	Extant	Native	-	Resident
Kiribati -> Kiribati Line Is.	Extant	Native	-	Resident

Kiribati -> Phoenix Is.	Extant	Native	-	Resident
Madagascar	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Maldives	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Mauritius	Extant	Native	-	Resident
Mayotte	Extant	Native	-	Resident
Mexico	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Mozambique	Extant	Native	-	Resident
Myanmar	Extant	Native	-	Resident
Nauru	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
Nicaragua	Extant	Native	-	Resident
Niue	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Panama	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Réunion	Extant	Native	-	Resident
Samoa	Extant	Native	-	Resident
Seychelles	Extant	Native	-	Resident
Singapore	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Somalia	Extant	Native	-	Resident
South Africa	Extant	Native	-	Resident
Sri Lanka	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
Tanzania, United Republic of	Extant	Native	-	Resident
Thailand	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident
Tokelau	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
United States	Extant	Native	-	Resident
United States -> Hawaiian Is.	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Howland-Baker Is.	Extant	Native	-	Resident
Vanuatu	Extant	Native	-	Resident
Viet Nam	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident
87. Pacific - southeast	Extant	Native	-	Resident

Population

Acanthurus xanthopterus is common in outer reef slopes. It was recorded as occasional in terms of relative abundance in Milne Bay Province and northern Bismarck Sea, Papua New Guinea. It is usually on sandy slopes adjacent to reefs (Allen 2003, 2009). It is moderately common in Raja Ampat, Indonesia (Allen 2003b). It is uncommon in the American Samoa National Park (National Park of Samoa Checklist of Fishes, accessed 21 April 2010). It is rare in Palawan, Philippines, only a few sub-adults were observed (Werner and Allen 2000, Palawan Council for Sustainable Development unpub. data). It is common elsewhere in the Philippines (B. Stockwell pers. comm. 2010).

In American Samoa, landings of acanthurids totaled 13,431 Ibs. or 9% of the total catch. This species and alogo (*Acanthurus lineatus*), comprised 82% of the total acanthurid catch. *A. xanthopterus* were caught by hook and line methods and 79% by weight were caught in the Fagatogo area. Most of those were caught by hand line and rod and reel anglers fishing from small canoes. 5,996 lbs were landed in the study area from July 1990 through June 1991 (Ponwith 1991).

This species comprises 9.5% of the acanthurid fishery in Pohnpei (Rhodes *et al.* 2008), 5% of the fishery in Guam and 8% in Saipan (Guam Division of Aquatic and Wildlife Resources unpub. data, P. Houk unpub. data). This species is collected as an aquarium fish in West Hawaii. The total number of individuals caught from FY 2005-2009 was124 with a total value of $321(Walsh *et al.* 2010).

In Kenya, landings during 1978-2001 for families that are less important in commercial catches (e.g., scarinae and Acanthuridae) showed rising catches (1978-1984) followed by a general decline during the 1990s (Kaunda-Arara *et al.* 2003).

In the tropical eastern Pacific, this species can be locally common. According to Robertson and Allen (1996), this fish has a doubtful population status in Clipperton Atoll. It was studied in the Galapagos archipelago, with an overall mean density of 0.06 ind/500 m^2 (Edgar *et al.* 2004). Some surveys conducted in northern part of Costa Rica, did not observe this fish (Dominici-Arosemena *et al.* 2005, Figueroa 2001). However, it was observed three times in one coral zone north of Costa Rica (Espinoza and Salas 2005). However, it has been regularly recorded in southern Costa Rica, including Cano Island and Cocos Island.

According to Aburto-Oropeza and Balart (2001), *A. xanthopterus* is a rare species at Los Islotes, Gulf of California, having an occurrence frequency below 10%. A survey conducted at Gorgona Island, Colombia, observed this fish to have a mean recruitment of 0.01+/-0.2 settling individuals with an average size of 23.0+/-0.0 mm (Mora and Zapata 2002). It is abundant at Gorgona and El Slavador, and along much of the continental tropical eastern Pacific coast south of the Gulf of California; moderately common off the offshore tropical eastern Pacific islands and Gulf of California. Densities in the southern part of its continental range are considerably higher than observed at any site surveyed in the Indo-West Pacific.

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

This reef-associated species lives in various reef habitats, sand slopes and lagoons (Kuiter and Tonozuka 2001). It is more common in lagoons and bays than exposed outer reef areas; usually found at depths greater than 10 to 15 m; reported to 90 m (Randall 2001b). Consistently feeds on the feces of other pelagic species especially Carangids (J.H. Choat, pers comm. 2010). In Gulf of Chiriqui, Panama, this species can be found over

most kinds of substrata except for deep zones of middle size rocks and sand (Dominici-Arosemena and Wolff 2006). According to Rubio (1986), at Gorgona Island, Colombia, this fish (cited as *A. glaucopareius*) is abundant on rocky and sandy substrata, while it is also frequently found on coralline substrata.

Juveniles recruit to shallow, protected, turbid inshore waters, while adults are usually found in outer reef areas (J.H. Choat pers. comm. 2010). It is also found on outer reef areas (Myers 1991, Kuiter and Tonozuka 2001). It feeds on sediment and detritus (Choat *et al.* 2004). It is classified as a grazer/detritivore (Choat and Bellwood pers. obs. in Green and Bellwood 2009). It is more inclined than other species of *Acanthurus* to stray from the shelter of coral reefs or rocky outcrops. It may occur as solitary individuals or in small aggregations (Randall 2001b). Maximum age 34 years (Choat and Robertson 2002a).

Reproduction

The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010). This species forms spawning aggregations in Palau from January-May during the new and full moon (Johannes,1981). It was also reported to form spawning aggregations on the Great Barrier Reef (Squire and Samoilys unpub.).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.3. Marine Neritic -> Marine Neritic - Subtidal Loose Rock/pebble/gravel	Suitable	-
9.4. Marine Neritic -> Marine Neritic - Subtidal Sandy	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-
9.8.5. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Soft Substrate	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity
34 Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
70 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Acanthurus xanthopterus is of minor importance in commercial fisheries and in the aquarium trade. In Australia, fishermen are starting to target this species along with *A. dussumieri* and *A. blochii*. It is a targeted fish species in Apo Island and elsewhere in the Philippines. It is occasionally found in markets. It is caught by hook and line and spears (A. Candido pers. comm. 2010). It is a component of the aquarium trade (Global Marine Aquarium Database accessed 19 March 2010). Online prices range from $39.99-$69.99 per individual (L. Rocha pers. comm. 2010).

Threats

Acanthurus xanthopterus is of minor importance in commercial fisheries and in the aquarium trade. There may be some localized population declines from fishing.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range. In Queensland, Australia, there is a recreational catch limit of five per species and a minimum size limit of 25 cm (Department of Primary Industries accessed 8 April 2010).

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Draft

Ctenochaetus binotatus - Randall, 1955

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Ctenochaetus - binotatus

Common Names: Two-spot Bristletooth (English), Barbeiro Mancha Negra (Portuguese), Blauaugen-Borstenzahn-Doktorfisch (German), Dengkis (Malay), Kokuten-sazanamihagi (Japanese), Maito (Tahitian), Toplettet kirurgfisk (Danish), Tweekol-borseltand (Afrikaans), Twospot Surgeonfish (English), Zweifleck-Borstenzahn-Doktorfisch (German), dridri (Fijian)
Synonyms: Ctenochaetus Fourmanoir, 1966;

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Clements, K.D., Choat, J.H., Abesamis, R., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: McClenachan, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Ctenochaetus binotatus is widely distributed and is common and abundant in parts of its range. It is harvested for food and for the aquarium trade but not at high levels. There are no major threats known. It is found in a number of marine reserves in parts of its distribution. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Ctenochaetus binotatus is widespread in the Indo-Pacific from East Africa to the Tuamoto archipelago and Mangareva, northwards to southern Japan, and southwards to Elizabeth and Middleton reefs with juveniles ranging to Sydney, New South Wales. It is absent from the Line and Marquesan Islands.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 55

Depth Upper Limit (in metres below sea level): 2

Depth Zone: Shallow photic (0-50m), Deep Photic (51-200m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Australia	Extant	Native	-	Resident
British Indian Ocean Territory	Extant	Native	-	Resident
Brunei Darussalam	Extant	Native	-	Resident
Cambodia	Extant	Native	-	Resident
China	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Cocos (Keeling) Islands	Extant	Native	-	Resident
Comoros	Extant	Native	-	Resident
Cook Islands	Extant	Native	-	Resident
Disputed Territory	Extant	Native	-	Resident
Disputed Territory -> Paracel Is.	Extant	Native	-	Resident
Disputed Territory -> Spratly Is.	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
French Southern Territories	Extant	Native	-	Resident
French Southern Territories -> Mozambique Channel Is.	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
Hong Kong	Extant	Native	-	Resident
India	Extant	Native	-	Resident
India -> Andaman Is.	Extant	Native	-	Resident
India -> Nicobar Is.	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Kenya	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Gilbert Is.	Extant	Native	-	Resident
Kiribati -> Phoenix Is.	Extant	Native	-	Resident
Macao	Extant	Native	-	Resident
Madagascar	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Maldives	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Mauritius	Extant	Native	-	Resident
Mayotte	Extant	Native	-	Resident

Micronesia, Federated States of	Extant	Native	-	Resident
Mozambique	Extant	Native	-	Resident
Myanmar	Extant	Native	-	Resident
Nauru	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
Niue	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Réunion	Extant	Native	-	Resident
Samoa	Extant	Native	-	Resident
Seychelles	Extant	Native	-	Resident
Singapore	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Somalia	Presence Uncertain	Native	-	-
South Africa	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
Tanzania, United Republic of	Extant	Native	-	Resident
Thailand	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident
Tokelau	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
Vanuatu	Extant	Native	-	Resident
Viet Nam	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident
81. Pacific - southwest	Extant	Native	-	Resident

Population

Ctenochaetus binotatus is common and locally abundant in the Philippines (R. Abesamis and C. Nanola pers. comm. 2010). It was recorded as common in terms of relative abundance in Palawan, Philippines, Milne Bay Province, northern Bismarck Sea, Papua New Guinea and Raja Ampat, Indonesia (Werner and Allen 2000; Palawan Council for Sustainable Development unpub. data; Allen, 2003, 2009, 2003b). It is common in the American Samoa National Park (National Park of Samoa Checklist of Fishes accessed 21 April 2010).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

The genus *Ctenochaetus* feed on fine detrital material. They whisk the sand or rocky substratum with their teeth and utilize suction to draw in the detrital material that consists of diatoms, small fragments of algae, organic material and fine inorganic sediment (Randall and Clements 2001). On the Great Barrier Reef, this species is generally found deeper than *C. striatus*. Juveniles are associated with rubble substrata (K.D. Clements pers. comm. 2010). Species of *Ctenochaetus* share the presence of a thick-walled stomach (Randall and Clements 2001), this character is significant with respect to the nutritional ecology of this genus (Choat *et al.* 2002b).

Growth

Off Lizard Island, in the northern GBR, otolith increment counts suggests a larval period of 47 to 74 days. The growth rate of this species decreased after settlement (Lou 1993). Maximum age of 25 years was recorded from the Great Barrier Reef and 15.1 cm (TL) (J.H. Choat pers. comm. 2010).

Reproduction

The sexes are separate among the Acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010). *Ctenochaetus binotatus* recruits all year round in the central Visayas with peaks during the NE monsoon (Dec-Feb) low numbers 0.2 fish/250 m2 (R. Abesamis unpub. data).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity
25 (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
22 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Ctenochaetus binotatus is a component of the marine aquarium trade. Online prices range from $34.95-$59.99 per individual (L. Rocha pers. comm. 2010). It is a targeted food fish in western Thailand (Allen 2005). It is rare in the Guam fishery (J. McIlwain pers. comm. 2010).

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Werner, T.B. and Allen, G.R. 2000. A rapid marine biodiversity assessment of the Calamianes Islands, Palawan province, Philippines. RAP Bulletin of Biological Assessment 17. Conservation International, Washington, USA.

Draft

Ctenochaetus cyanocheilus - Randall & Clements, 2001

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Ctenochaetus - cyanocheilus

Common Names: Short-tail bristle-tooth (English), dridri (Fijian)
Synonyms: No Synonyms

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Clements, K.D., Choat, J.H., Abesamis, R., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: McClenachan, L., Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Ctenochaetus cyanocheilus is widely distributed and occasional to uncommon in most its range. It is caught incidentally in subsistence fisheries and for the aquarium trade but not at high levels. There are no major threats known. It is found in a number of marine reserves in parts of its distribution. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Ctenochaetus cyanocheilus is found from peninsular Malaysia, southern Sumatra and Vietnam to American Samoa and the Line Islands, north to Ogasawara Islands, Japan, south to the Great Barrier Reef, New Caledonia and Tonga (Randall and Clements 2001).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 40

Depth Upper Limit (in metres below sea level): 1

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Australia	Extant	Native	-	Resident
Brunei Darussalam	Extant	Native	-	Resident
Disputed Territory	Extant	Native	-	Resident
Disputed Territory -> Paracel Is.	Extant	Native	-	Resident
Disputed Territory -> Spratly Is.	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Gilbert Is.	Extant	Native	-	Resident
Kiribati -> Phoenix Is.	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Nauru	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Samoa	Extant	Native	-	Resident
Singapore	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident
Tokelau	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Howland-Baker Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> US Line Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Wake Is.	Extant	Native	-	Resident
Vanuatu	Extant	Native	-	Resident
Viet Nam	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident

Population

At Tuvalu, this species was six times more common than *Ctenochaetus striatus* (Randall and Clements 2001). It was recorded as occasional in terms of relative abundance in the northern Bismarck Sea, Papua New Guinea (Allen 2009). It is abundant in the American Samoa National Park (National Park of Samoa Checklist of Fishes, accessed 21 April 2010). It is occasional in the Philippines (R. Abesamis pers. comm. 2010). It is uncommon in the Marianas (R.F. Myers pers. comm. 2010).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

The genus *Ctenochaetus* feed on fine detrital material. They whisk the sand or rocky substratum with their teeth and utilize suction to draw in the detrital material that consists of diatoms, small fragments of algae, organic material and fine inorganic sediment (Randall and Clements 2001). Species of *Ctenochaetus* share the presence of a thick-walled stomach (Randall and Clements 2001), this character is significant with respect to the nutritional ecology of this genus (Choat *et al.* 2002b). On the Great Barrier Reef, it is found in outer reef fronts below *C. striatus* (J.H. Choat pers. comm. 2010).

The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
17.7 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Ctenochaetus cyanocheilus is a minor component of the marine aquarium trade, no price was listed online (L. Rocha pers. comm. 2010). It is caught incidentally in subsistence fisheries.

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the

persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Reeson, P.H. 1983. The biology, ecology and bionomics of the surgeonfishes, Acanthuridae. In: J.L. Munro (ed.), Caribbean coral reef fishery resources, pp. 178-190.

Draft

Ctenochaetus flavicauda - Fowler, 1938

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Ctenochaetus - flavicauda

Common Names: Whitetail Bristletooth (English)
Synonyms: No Synonyms

Taxonomic Note:
Ctenochaetus flavicauda is closely related to *C. cyanocheilus* (K.D. Clements pers. comm. 2010).

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Clements, K.D., Choat, J.H., Abesamis, R., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Ctenochaetus flavicauda is widely distributed in the central Pacific and common in parts of its distribution. It is not specifically targeted and is a minor component of the aquarium trade. There are no major threats known and it occurs in marine reserves in parts of its range. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Ctenochaetus flavicauda is found in the central Pacific from the Phoenix Islands through Cook Islands and French Polynesia to Pitcairn Island, north to Line Islands and south to Rapa.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 30

Depth Upper Limit (in metres below sea level): 10

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Cook Islands	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Kiribati Line Is.	Extant	Native	-	Resident
Kiribati -> Phoenix Is.	Extant	Native	-	Resident
Pitcairn	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> US Line Is.	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
77. Pacific - eastern central	Extant	Native	-	Resident

Population

Ctenochaetus flavicauda is common outside the fringing reef at Tubuai, Rurutu, Raivavae, Rapa, and the Cook Islands (Randall and Clements 2001). It is rare in the American Samoa National Park (National Park of Samoa Checklist of Fishes accessed 21 April 2010).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

The genus *Ctenochaetus* feed on fine detrital material. They whisk the sand or rocky substratum with their teeth and utilize suction to draw in the

detrital material that consists of diatoms, small fragments of algae, organic material and fine inorganic sediment (Randall and Clements 2001). Species of *Ctenochaetus* share the presence of a thick-walled stomach (Randall and Clements 2001), this character is significant with respect to the nutritional ecology of this genus (Choat *et al.* 2002b).

The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
11.8 (SL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Ctenochaetus flavicauda is a minor component of the marine aquarium trade. The price listed online was $69.95 (L. Rocha pers. comm. 2010).

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps with several marine protected areas within its range.

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Draft

Ctenochaetus hawaiiensis - Randall, 1955

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Ctenochaetus - hawaiiensis

Common Names: Hawaiian Bristletooth (English), Black Surgeonfish (English), Chevron Tang (English), Hawaii-Borstenzahn-Doktorfisch (German), Hawaii-kirurgfisk (Danish), Hawaiian Kole (English), Hawaiian Surgeonfish (English), Maito (Tahitian)
Synonyms: No Synonyms

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): McIlwain, J., Clements, K.D., Choat, J.H., Abesamis, R., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Ctenochaetus hawaiiensis is widespread and uncommon in parts of its range. It is a component of the aquarium trade and is the 5th most collected aquarium fish in western Hawaii. It is known to be harvested primarily from the west coast of the big island of Hawaii. There have been decreases in density in western Hawaii, however this decrease in overall density is not significant. Moreover, the Fish Replenishment Areas (FRAs) established in western Hawaii have been shown to be effective in terms of increases in the FRAs relative to long term marine protective areas. In addition, harvest levels and and trade are closely monitored in Hawaii and this species occurs in a number of marine protected areas in parts of its range. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Ctenochaetus hawaiiensis is widespread in the tropical Pacific from Ryukyu Islands, Japan and southwest Palau islands to the Pitcairn group including most of Micronesia and French Polynesia (except Rapa), and north to the main Hawaiian Islands.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 61

Depth Upper Limit (in metres below sea level): 1

Depth Zone: Shallow photic (0-50m), Deep Photic (51-200m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Cook Islands	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Gilbert Is.	Extant	Native	-	Resident
Kiribati -> Kiribati Line Is.	Extant	Native	-	Resident
Kiribati -> Phoenix Is.	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Nauru	Extant	Native	-	Resident
Niue	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Pitcairn	Extant	Native	-	Resident
Samoa	Extant	Native	-	Resident
Tokelau	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
United States	Extant	Native	-	Resident
United States -> Hawaiian Is.	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Howland-Baker Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Johnston I.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Midway Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> US Line Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Wake Is.	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident
81. Pacific - southwest	Extant	Native	-	Resident

Population

Ctenochaetus hawaiiensis is relatively common in the Hawaiian Islands. It is relatively uncommon throughout Micronesia (R.F. Myers pers. comm. 2010). It is a minor component in the commercial landings in Hawaii, 90 kls. recorded in 2007 (Hawaii Division of Aquatic Resources unpub. data). It is the fifth most collected aquarium fish in West Hawaii. There was a non-significant decrease in overall density across Fish Replenishment Areas (FRAs) surveyed from 1999-2009. However, the FRAs were shown to be effective in terms of increases inside the FRAs relative to long term marine protected areas. There was minimal recruitment into West Hawaii in the last decade = 0.05/100 m^2. The deeper areas where the West Hawaii Aquarium Project transects are located is not the prime habitat for adults of this species. *Ctenochaetus hawaiiensis* inhabits high energy shallow surge zones. For FY 2005-2009, the total number of individuals caught was 19,631 with a total value of $309,808 (Walsh *et al.* 2010). There was a change in abundance recorded from nine monitoring stations in Fish Replenishment Areas (FRAs) in West Hawaii. FRAs were closed to aquarium collecting in 2000. Prior to establishment of FRAs density was recorded at 0.23 individuals/100 m^2 and after establishment density was 0.39 individuals/100 m^2 (Friedlander *et al.* 2006).

It was observed in Tuvalu but was noted as rare (Randall and Clements 2001). It seemed to be quite uncommon in the northwest Hawaiian Islands. It was not observed at the French Frigate Shoals, Pearl and Hermes or Midway (K.D. Clements pers. comm. 2010). Overall aquarium catch in fiscal years 2004 through 2006 reported 5, 867 individuals caught/year and a value of $91, 016/ year (Friedlander *et al.* 2006). It is rare in the American Samoa National Park (National Park of Samoa Checklist of Fishes, accessed 21 April 2010).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Ctenochaetus hawaiiensis inhabits high energy shallow surge zones (Walsh *et al.* 2010). The genus *Ctenochaetus* feed on fine detrital material. They whisk the sand or rocky substratum with their teeth and utilize suction to draw in the detrital material that consists of diatoms, small fragments of algae, organic material and fine inorganic sediment (Randall and Clements 2001). Species of *Ctenochaetus* share the presence of a thick-walled stomach (Randall and Clements 2001), this character is significant with respect to the nutritional ecology of this genus (Choat *et al.* 2002b).

The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
28.1 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

The juvenile stage known as the Chevron Tang is popular in the aquarium trade. It is the fifth most collected aquarium fish in West Hawaii (Walsh *et al.* 2010). It is incidentally caught as food.

Threats

Ctenochaetus hawaiiensis is a popular aquarium species. In West Hawaii, it is the 5th most collected aquarium fish. Surveys since 1999 show that there is minimal recruitment (Walsh *et al.* 2010).

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their

life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

In Hawaii, nine Fish Replenishment Areas were established in 2000. These areas prohibit marine aquarium organism collecting within approximately 30% of the Kona coast nearshore habitat (Kusumaatmadja *et al.* 2004). Its distribution overlaps with several marine protected areas in parts of its range.

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Draft

Ctenochaetus marginatus - (Valenciennes, 1835)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Ctenochaetus - marginatus

Common Names: Blue-spotted Bristletooth (English), Blautupfen-Borstenzahn-Doktorfisch (German), Bluespotted Surgeonfish (English), Chirurgien Strié (French), Navajón Estriado (Spanish; Castilian), Stribefinnet Kirurgfisk (Danish), Striped-fin Surgeonfish (English)
Synonyms: Acanthurus Valenciennes, 1835; Ctenochaetus Randall, 1955;

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Clements, K.D., Choat, J.H., Abesamis, R., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Ctenochaetus marginatus is widespread in the eastern and central Pacific. It is common and abundant (offshore islands in the Eastern Tropical Pacific) in parts of its range. It is a minor component of the aquarium trade. There are no major threats known and it occurs in marine reserves in parts of its distribution. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Ctenochaetus marginatus is found in some scattered localities in the tropical central and eastern Pacific. It occurs in the Marshall, Caroline, Kiribati, Tuvalu, Johnston, Marquesas, Society and Line Islands (Randall 2001a). This species occurs in the tropical eastern Pacific from Costa Rica to Colombia, including all the offshore islands.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 40

Depth Upper Limit (in metres below sea level): 0

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Colombia	Extant	Native	-	Resident
Colombia -> Malpelo I.	Extant	Native	-	Resident
Costa Rica	Extant	Native	-	Resident
Costa Rica -> Cocos I.	Extant	Native	-	Resident
Costa Rica -> Costa Rica (mainland)	Extant	Native	-	Resident
Ecuador	Extant	Native	-	Resident
Ecuador -> Galápagos	Extant	Native	-	Resident
France	Extant	Native	-	Resident
France -> Clipperton I.	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Gilbert Is.	Extant	Native	-	Resident
Kiribati -> Kiribati Line Is.	Extant	Native	-	Resident
Kiribati -> Phoenix Is.	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Mexico	Extant	Native	-	Resident
Mexico -> Revillagigedo Is.	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Panama	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Howland-Baker Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Johnston I.	Extant	Native	-	Resident
United States Minor Outlying Islands -> US Line Is.	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident
87. Pacific - southeast	Extant	Native	-	Resident

Population

Ctenochaetus marginatus was common at Kosrae (R. Myers pers. comm. in Randall 2001a). It is common at Palmyra and Jarvis, Line Islands and Balcer and Howland in the northern Phoenix Islands (B.C. Mundy pers. comm. in Randall and Clements 2001). *C. marginatus* is common in Niutao, Tuvalu (Randall and Clements 2001). It is abundant at Clipperton and Cocos, uncommon throughout the rest of its tropical eastern Pacific range. According to Robertson and Allen (1996), this fish was frequent enough to have a resident population in Clipperton Atoll. Surveys conducted in the Galapagos (Edgar *et al.* 2004), Costa Rica (Dominici-Arosemana *et al.* 2005, Espinoza and Salas 2005, Figueroa 2001) and Colombia (Rubio 1986) did not observe this species, indicating that it may be quite rare in the tropical eastern Pacific region.

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Ctenochaetus marginatus inhabits shallow, seaward reefs (Lieske and Myers 1994). Small schools may also be found in relatively turbulent waters of the surge zone (Krupp 1995). It was observed in small rapidly moving schools in moderately rough water in broad shallow surge channels on the lee side of Onotoa Atoll, Kiribati (Randall and Clements 2001). In the Gulf of Chiriqui, Panama, this species could be found over sand and rubble substrate (Dominici-Arosemena and Wolff 2006). The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

Maximum age was recorded at 15 years at 25.1 cm (FL) in the Marquesas (J.H. Choat pers. comm. 2010).

The genus *Ctenochaetus* feed on fine detrital material. They whisk the sand or rocky substratum with their teeth and utilize suction to draw in the detrital material that consists of diatoms, small fragments of algae, organic material and fine inorganic sediment (Randall and Clements 2001). Species of *Ctenochaetus* share the presence of a thick-walled stomach (Randall and Clements 2001), this character is significant with respect to the nutritional ecology of this genus (Choat *et al.* 2002b).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity
15 Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)

27 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Ctenochaetus marginatus is a minor component of the aquarium trade (Global Marine Aquarium Database accessed 19 March 2010). There were no prices listed online (L. Rocha pers. comm. 2010).

Threats

There are no major threats to this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps a few marine protected areas within its range.

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Draft

Ctenochaetus striatus - (Quoy & Gaimard, 1825)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Ctenochaetus - striatus

Common Names: Striped Bristletooth (English), Barbeiro Estriado (Portuguese), Brauner Borstenzahn-Doktorfisch (German), Bristle-toothed Surgeonfish (English), Chirurgien Noir (French), Chirurgien Strié (French), Cirujano Estriado (Spanish; Castilian), Gestreepte borseltand (Afrikaans), Gestreifter Borstenzahn-Doktorfisch (German), Indangan (Filipino; Pilipino), Kangaja (Swahili), Kaxan (Somali), Lined Bristletooth (English), Maito (Tahitian), Orange-dotted Bristletooth (English), Pala'ia (Samoan), Sazanamihagi (Japanese), Striated Surgeonfish (English), Stribet Kirurgfisk (Danish), Tiebere (Marshallese), dridri (Fijian)
Synonyms: Acanthurus Quoy & Gaimard, 1825; Acronurus (Quoy & Gaimard, 1825); Ctenodon (Valenciennes, 1835);

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Choat, J.H., Clements, K.D., McIlwain, J., Abesamis, R., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Ctenochaetus striatus is widespread throughout the Indo-Pacific region. It is the most common and abundant reef fish in the Indo-Pacific. It is a targeted food fish in parts of its distribution (i.e., American Samoa and the Philippines). In American Samoa, studies have failed to detect any population declines through harvesting. There is no evidence of population declines at the global scale due to harvesting. It is found in several marine reserves in parts of its range and harvest management measures are in place in some areas of its distribution. It is therefore listed as Least Concern. We recommend continued monitoring of the species' population and harvest trends. In addition, monitoring of the fisheries and comparison between fisheries data and the life history of this species in areas where it is heavily fished.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Ctenochaetus striatus is widespread throughout the Indo-Pacific Region and is found from the Red Sea and coast of East Africa to Pitcairn Island and French Polynesia except the Marquesas, northwards to the Ryukyu and Ogasawara Islands, Japan and southwards Elizabeth/Middleton Reefs and Rapa. It was recorded from Masirah Island, central coast of Oman (J. McIlwain unpub. data).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 30

Depth Upper Limit (in metres below sea level): 1

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Australia	Extant	Native	-	Resident
British Indian Ocean Territory	Extant	Native	-	Resident
Brunei Darussalam	Extant	Native	-	Resident
Cambodia	Extant	Native	-	Resident
China	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Cocos (Keeling) Islands	Extant	Native	-	Resident
Comoros	Extant	Native	-	Resident
Cook Islands	Extant	Native	-	Resident
Disputed Territory	Extant	Native	-	Resident
Disputed Territory -> Paracel Is.	Extant	Native	-	Resident
Disputed Territory -> Spratly Is.	Extant	Native	-	Resident
Djibouti	Extant	Native	-	Resident
Egypt	Extant	Native	-	Resident
Eritrea	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
French Southern Territories	Extant	Native	-	Resident
French Southern Territories -> Mozambique Channel Is.	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
Hong Kong	Extant	Native	-	Resident
India	Extant	Native	-	Resident
India -> Andaman Is.	Extant	Native	-	Resident
India -> Nicobar Is.	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Israel	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Jordan	Extant	Native	-	Resident
Kenya	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident

Kiribati -> Gilbert Is.	Extant	Native	-	Resident
Kiribati -> Kiribati Line Is.	Extant	Native	-	Resident
Kiribati -> Phoenix Is.	Extant	Native	-	Resident
Macao	Extant	Native	-	Resident
Madagascar	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Maldives	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Mauritius	Extant	Native	-	Resident
Mayotte	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Mozambique	Extant	Native	-	Resident
Myanmar	Extant	Native	-	Resident
Nauru	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
Niue	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Oman	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Pitcairn	Extant	Native	-	Resident
Réunion	Extant	Native	-	Resident
Samoa	Extant	Native	-	Resident
Saudi Arabia	Extant	Native	-	Resident
Seychelles	Extant	Native	-	Resident
Singapore	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Somalia	Extant	Native	-	Resident
South Africa	Extant	Native	-	Resident
Sri Lanka	Extant	Native	-	Resident
Sudan	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
Tanzania, United Republic of	Extant	Native	-	Resident
Thailand	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident
Tokelau	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Howland-Baker Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> US Line Is.	Extant	Native	-	Resident
Vanuatu	Extant	Native	-	Resident
Viet Nam	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident
Yemen	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident
81. Pacific - southwest	Extant	Native	-	Resident

Population

Ctenochaetus striatus is the most common surgeonfish at most localities where it occurs. In Moorea, French Polynesia, it was the most abundant fish on the reef and was frequently encountered (Rainey 2009) and the Acanthuridae was dominant on the barrier reef (2.30 ind. m^{-2}) and on the outer slope (1.61 ind. m^{-2}). On the barrier reef, this species accounted for 34% of the total density and 29% of the total density on the outer slope (Moussa 2009).

In American Samoa, it was the single most common species found in underwater surveys (Green 1996, 2002; Green *et al.* 2005; Whaylen and Fenner 2005). In Fagatale Bay it is a dominant species on the reef slope (Green *et al.* 1999). It occurred in 100% of all transects and accounted for 22% of total biomass around Tutuila Island, American Samoa (Sabater and Tofaeono 2007). In Tutuila, Aunuu, and Taema Banks, American Samoa, it accounted for 21.9% of total biomass and was the most dominant reef species (Sabater and Tofaeono 2006).
This was confirmed as the most dominant species based on the index of relative dominance (Sabater and Tofaeono 2007).

In Guam, it is the most abundant Acanthurid species (29%) but only makes up 5% of the acanthurid fishery (Division of Aquatic and Wildlife Resources unpub. data, J. McIlwain unpub. data). In the outer islands of American Samoa, *C. striatus* accounted for 51% of the reef-associated catch (21.4 mt) (Craig 2008).

It is abundant throughout the Great Barrier Reef and reefs of tropical East Africa. It is the most common Acanthurid and most abundant moderate sized reef fish in the Society Islands (Randall and Clements 2001). In Aitutaki Lagoon, Cook Islands, it made up the bulk of the spearfishers' catch, accounting for 45% of the catch; it also dominated the visual census survey. Surgeonfishes as a family comprised 53% of the catch (Adams *et al.* 1996).

Visual census surveys along the Iboih coast, Weh Island, Indonesia recorded fish densities of 7 individuals/750 m^2 at Pantai Sirkui and 19 individuals/750 m^2 at Teluk Pelabuhan (Faculty of Mathematics and Natural Science 2007). It is common in Palawan, Philippines, Milne Bay Province, Papua New Guinea, and in Raja Ampat, Indonesia, usually seen in depths less than 10 m (Werner and Allen 2000; Palawan Council for Sustainable Development unpub. data; Allen 2003, 2003b). It was the most abundant surgeonfish recorded in the Calamianes Islands, Philippines (Werner and Allen 2000).

In Moorea, French Polynesia, SPOT satellite images allowed estimation of the surface area of fringing reef (1,076 ha), barrier reef (3,788 ha) and outer slop (493 ha). A total of 35,117,140 individuals/total surface area were recorded in fish visual surveys conducted from 1990-1993 (Lecchini *et al.* 2006). In the Nabq Managed Resource Protected Area, South Sinai, Egyptian Red Sea, mean abundances of *C. striatus* showed differences at various depths and between no-take zones (NTZ) and take zones (TZ). Abundance was greater in fished areas at 3 and 10 m depths, this can be attributed to a result of reduced predation or competition (Ashworth and Ormond 2005).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Ctenochaetus striatus is found in a variety of habitats from protected lagoons to ocean reefs (Randall 2001a). It often forms large grazing aggregations (G. Allen, pers. comm. 2010).

The genus *Ctenochaetus* feed on fine detrital material. They whisk the sand or rocky substratum with their teeth and utilize suction to draw in the detrital material that consists of diatoms, small fragments of algae, organic material and fine inorganic sediment (Randall and Clements 2001). *C. striatus* has low levels of SCFAs (short chain fatty acids) (Clements and Choat 1995). Species of *Ctenochaetus* share the presence of a thick-walled stomach (Randall and Clements 2001), this character is significant with respect to the nutritional ecology of this genus (Choat *et al.* 2002b).

A study by Trip *et al.* (2008) showed that there are several distinct trends in age structure, growth rate and size across 15 sites that spanned 158° longitude and 40° latitude of the Indian and Pacific Oceans. In both oceans, fish live longer at higher latitudes; in addition, Indian Ocean populations tended to be shorter-lived than those in the Pacific Ocean. Growth rate and adult size did not differ between the two oceans, and were not related to temperature in either the Pacific or Indian Ocean.

Growth

C. striatus is characterized by rapid growth in the first year, followed by attainment of asymptotic size by the fifth year in all populations examined to date. An analysis of 15 populations of this species sampled across 83% of its longitudinal and 66% of its latitudinal range showed that asymptotic growth was consistent across locations and geographical scales (Trip *et al.* 2008). The maximum number of annuli recorded for this species was 32 to 35 (Choat and Axe 1996).

A study by Choat and Robertson (2002) show the following maximum age estimates from different locations of this species' range:

Kimbe Bay - 28 years
exposed mid Great Barrier Reef (GBR) - 32 years
sheltered mid Great Barrier Reef (GBR) - 36 years

Reproduction

The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship color. In the GBR, both sexes have similar gonad indexes (J.H. Choat pers. comm. 2010). This species forms resident spawning aggregations. It can 'hitch-hike' on migrating streams of *A. nigrofuscus* in the Red Sea, where upon reaching the spawning site they break off from the larger *A. nigrofuscus* aggregation to form a separate aggregation of 50-100 individuals (Myrberg *et al.* 1988). In Palau (Robertson 1983) and Tahiti (Randall 1961a), late afternoon spawning aggregations numbered thousands of fish. It also pair spawns (Domeier and Colin 1997). It was also observed to form spawning aggregations on the Great Barrier Reef (Randall 1961a, Robertson 1983, Squire and Samoilys unpub.).

In the Red Sea, this species was observed to form spawning aggregations around a coral knoll on the most seaward edge in front of reefs with deep water from June-September (Myrberg *et al.* 1988). In Aldabra Atoll, it spawns on the outer reef edge of the channel from August-December, 4-7 days before the full/new moon. In Palau, it spawns on the outer reef edge from January-April, 4-7 days before the full/new moon (Randall 1983). In Society Island, it was observed to spawn in 50 ft deep passage with strong currents set to open sea and on reef edges 8-25 ft deep (Randall 1961a). Size at sexual maturity 135 mm (Choat and Robertson 2002a).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-
9.8.5. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Soft Substrate	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female	Age at Maturity: Male	Size at Maturity (in cms): Female	Size at Maturity (in cms): Male
3-4 Years	3-4 Years	13.5 (TL)	13.5 (TL)

Longevity
36 Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
26 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Ctenochaetus striatus is captured for food and is taken mainly in nets and traps. It is also a minor component of the aquarium trade (Global Marine Aquarium Database accessed 19 March 2010). Prices online range from $39.95-$69.95 (L. Rocha pers. comm. 2010). It is captured by spearfishers in Aitutaki Lagoon, Cook Islands (Adams *et al.* 1996). It is targeted in subsistence fisheries species in the Solomons, American Samoa, and the Philippines. It is occasionally found in fish markets.

Threats

Ctenochaetus striatus is heavily fished in American Samoa, an overfished, collapsed fishery. There was no relationship found between fishing pressure and longevity, growth or adult size across sampling sites, among which fishing pressure on this species varied from intense to zero (Trip

et al. 2008).
The status of reef fisheries in American Samoa has commonly been reported as over-exploited, however, comparing patterns and trends from fishery independent surveys with fishery-dependent data showed a significant decline in shoreline fishing effort and a non-significant decrease in boat-based effort, resulting in constant catch landings and catch-per-unit effort. Concurrent with the decline in fishing effort and constant catch landing was an increase in fish abundance and biomass for the targeted families. The decrease in fishing pressure occurred during a period of rapid population growth, indicating non-dependence of the general population on fishing, reflecting the change in the social and economic dynamics within the territory (Sabater and Carroll 2009).

Craig *et al.* (2008) showed that the current harvests of the subsistence fishery in outer islands of American Samoa is similar to those in historic and prehistoric periods, indicating that the fishery is harvested at a sustainable level.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range. In Samoa, SCUBA fishery has been banned since 2001 by Executive Order and subsequently in 2002 by regulation (Green 2003). Night spearfishing has been banned as well (J.H. Choat pers. comm. 2010). In Queensland, Australia, there is a recreational catch limit of 5 per species and a minimum size limit of 25 cm (Department of Primary Industries accessed 8 April 2010).

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Draft

Ctenochaetus strigosus - (Bennett, 1828)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Ctenochaetus - strigosus

Common Names: Goldring Bristletooth (English), Bristletoothed Surgeonfish (English), Goldring Surgeonfish (English), Guldringet Kirurgfisk (Danish), Kole (Hawaiian), Matta (Telugu), Orandah (Tamil), Pala (Malayalam), Slender-toothed Surgeonfish (English), Spotted Bristletooth (English), Spotted Surgeonfish (English), Yellow-eyed Surgeonfish (English)
Synonyms: Acanthurus Bennett, 1828;

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): McIlwain, J., Clements, K.D., Abesamis, R., Choat, J.H., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Ctenochaetus strigosus is restricted to the Hawaiian Islands where 80% of its distribution lies within the Papahanaumokuakea Marine National Monument, where extraction is prohibited. It is common and abundant throughout its range. Although a very popular aquarium species, harvest is not considered a major threat. There has been overall increase in density in protected areas in West Hawaii. Areas open to fishing have been relatively stable and recruitment levels relatively high enabling densities to increase in protected areas (Walsh *et al.* 2010). It is found in a number of well-policed MPAs and FRAs, in addition, harvest is closely monitored in Hawaii. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Ctenochaetus strigosus is endemic to the Hawaiian Islands and Johnston Island.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 113

Depth Upper Limit (in metres below sea level): 1

Depth Zone: Shallow photic (0-50m), Deep Photic (51-200m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
United States	Extant	Native	Unknown	Resident
United States -> Hawaiian Is.	Extant	Native	Unknown	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Johnston I.	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
61. Pacific - northwest	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident

Population

Ctenochaetus strigosus is an abundant reef fish in the Hawaiian Islands (Randall 2001a). It is a very common species at South Kona, Big Island, Hawaii (Friedlander *et al.* 2006). It is among the top ten commercial aquarium species collected in Hawaii with reported catches of 346,944 individuals from FY 1976-2003. Catch has been consistently increasing since the late 1980s and in 2003 ranked the second in collected fishes in West Hawai'i and statewide (Walsh *et al.* 2004). Overall aquarium catch in fiscal years 2004 through 2006 reported 44,202 individuals caught/year and a value of $93, 202/ year. It made up 5.9% of the total catch (Friedlander *et al.* 2006).

The Goldring Bristletooth is the second most collected aquarium species in West Hawaii. There was an increase in overall density across Fish Replenishment Areas (FRAs) surveyed from 1999-2009 (Walsh *et al.* 2010, Friedlander *et al.* 2006). The FRAs were shown to be effective in terms of increases inside the FRAs relative to long term marine protected areas. This species and *Zebrasoma flavescens* account for 91% of the total aquarium fish catch from FY 2005-2009 in West Hawaii. The total number of individuals collected over the past five years was 181,121 with a total value of $376, 253. Goldring Bristletooth exhibited a 13% increase in density since establishment of the FRAs. It is more abundant than *Z. flavescens* and much less collected than the Yellow Tang. Areas open to fishing have been relatively stable and recruitment levels relatively high (Walsh *et al.* 2010).

Marine recreational catch surveys administered by the Hawaii Marine Recreational Fishing Survey in 2006 recorded 111, 221 individuals (Friedlander *et al.* 2006). Approximately 1,500 kls./year landed in the commercial fishery of Hawaii (Division of Aquatic Resources unpub. data).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Individuals are usually solitary and occur mainly in shallow water. It has been recorded down to 113 m depth (Randall and Clements 2001).

The genus *Ctenochaetus* feed on fine detrital material. They whisk the sand or rocky substratum with their teeth and utilize suction to draw in the detrital material that consists of diatoms, small fragments of algae, organic material and fine inorganic sediment (Randall and Clements 2001). Species of *Ctenochaetus* share the presence of a thick-walled stomach (Randall and Clements 2001), this character is significant with respect to the nutritional ecology of this genus (Choat *et al.* 2002b).

The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.3. Marine Neritic -> Marine Neritic - Subtidal Loose Rock/pebble/gravel	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
19 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Ctenochaetus strigosus together with *Zebrasoma flavescens*, *Acanthurus achilles* and *Naso lituratus* make up 90% of Hawaii's total ornamental catch, representing 87.2% of total catch value (Kusumaatmadja *et al.* 2004). It is caught landed in the commercial fishery in Hawaii and is also a component of the recreational fishery.

Threats

Ctenochaetus strigosus is a very popular aquarium fish. In West Hawaii, it is the second most collected aquarium fish. There is no evidence of declines from harvesting.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

In Hawaii, nine Fish Replenishment Areas were established in 2000. These areas prohibit marine aquarium organism collecting within approximately 30% of the Kona coast nearshore habitat (Kusumaatmadja *et al.* 2004). In 2002, the Marine Aquarium Council initiated a three-year project designed to enhance coral reef conservation in the islands by facilitating MAC certification of qualifying aquarium industry operators and encouraging market incentives (MAC 2003). In addition, approximately 80% of this species range lies within the Papahanaumokuakea Marine National Monument, where any type of extraction is prohibited.

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Draft

Ctenochaetus tominiensis - Randall, 1955

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Ctenochaetus - tominiensis

Common Names: Orange-tipped Bristletooth (English), Labahita (Filipino; Pilipino), Tomini Bristletooth (English), Tomini Surgeonfish (English), Tomini-Borstenzahn-Doktorfisch (German), Tomini-kirurgfisk (Danish), Yellow-tip bristle-tooth (English), dridri (Fijian)
Synonyms: Ctenochaetus Randall, 1955;

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Clements, K.D., Choat, J.H., Nanola, C., Abesamis, R., McIlwain, J., Myers, R., Russell, B., Rocha, L.A. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Ctenochaetus tominiensis is not targeted throughout its range and is only incidentally caught. It is moderately common to rare in parts of its distribution. There are no major threats known and it occurs in marine reserves in parts of its range. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Ctenochaetus tominiensis is found from Indonesia, Philippines, Papua New Guinea, northern Great Barrier Reef, Solomon Islands, Palau, Vanuatu and Fiji.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 45

Depth Upper Limit (in metres below sea level): 3

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Australia	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
Vanuatu	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
57. Indian Ocean - eastern	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident

Population

Ctenochaetus tominiensis was recorded as moderately common in terms of relative abundance in Milne Bay Province and the northern Bismarck Sea, Papua New Guinea, especially in sheltered locations that drop steeply to deep water. (Allen 2003, 2009). It is occasionally found at Raja Ampat, Indonesia (Allen 2003b). It appears to be rare on the northern Great Barrier Reef, as this has never been observed in the area (K.D. Clements pers. comm. 2010). It is also not listed in the revised edition of the "Fishes of the Great Barrier Reef and Coral Sea" by Randall *et al.* (1997) and in the "Reef fish identification- tropical Pacific" by Allen *et al.* (2003). It is restricted to inshore areas in the Philippines with low densities 2 (C. Nanola unpub. data).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Ctenochaetus tominiensis is found in coral-rich areas, outer reef areas where not exposed to heavy surf. The genus *Ctenochaetus* feed on fine detrital material. They whisk the sand or rocky substratum with their teeth and utilize suction to draw in the detrital material that consists of diatoms, small fragments of algae, organic material and fine inorganic sediment (Randall and Clements 2001). Species of *Ctenochaetus* share the presence of a thick-walled stomach (Randall and Clements 2001), this character is significant with respect to the nutritional ecology of this genus (Choat *et al.* 2002b). The maximum age recorded was 20 years from Kimbe Bay, Papua New Guinea, at 12.7 cm (FL) (J.H. Choat pers. comm. 2010).

The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity
20 Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
17.5 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Ctenochaetus tominiensis is a minor component of the aquarium trade (Global Marine Aquarium Database accessed 19 March 2010). Online prices range from $39.99-$69.99 (L. Rocha pers. comm. 2010). It is rarely found in fish markets.

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Draft

Ctenochaetus truncatus - Randall & Clements, 2001

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Ctenochaetus - truncatus

Common Names: Squaretail Bristletooth (English), Indian gold-ring bristle-tooth (English)
Synonyms: No Synonyms

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Clements, K.D., Choat, J.H., Abesamis, R., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Ctenochaetus truncatus is widespread in the Indian Ocean and achieves high abundances in Christmas Island and common in some areas of its distribution. It is not targeted and is caught only incidentally. There are no major threats known and is found in a number of marine reserves in parts of its range. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Ctenochaetus truncatus is found from East Africa from Kenya to Natal to the Andaman Sea off Thailand, Cocos Keeling Islands and Christmas Island.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 25

Depth Upper Limit (in metres below sea level): 1

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
British Indian Ocean Territory	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Cocos (Keeling) Islands	Extant	Native	-	Resident
Comoros	Extant	Native	-	Resident
French Southern Territories	Extant	Native	-	Resident
French Southern Territories -> Mozambique Channel Is.	Extant	Native	-	Resident
India	Extant	Native	-	Resident
India -> Andaman Is.	Extant	Native	-	Resident
India -> Nicobar Is.	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Kenya	Extant	Native	-	Resident
Madagascar	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Maldives	Extant	Native	-	Resident
Mauritius	Extant	Native	-	Resident
Mayotte	Extant	Native	-	Resident
Mozambique	Extant	Native	-	Resident
Myanmar	Extant	Native	-	Resident
Oman	Extant	Native	-	Resident
Réunion	Extant	Native	-	Resident
Seychelles	Extant	Native	-	Resident
Somalia	Extant	Native	-	Resident
South Africa	Extant	Native	-	Resident
Sri Lanka	Extant	Native	-	Resident
Tanzania, United Republic of	Extant	Native	-	Resident
Thailand	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident

Population

Ctenochaetus truncatus is one of the most abundant surgeonfishes on Christmas Island (Allen and Steene 1979). It is unusual in being much more common there than *C. striatus* (Randall and Clements 2001). It is common in the Seychelles (L. Rocha pers. comm. 2010) and Sodwana Bay (K.D. Clements pers. comm. 2010).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Ctenochaetus truncatus inhabits shallow water, coral-reef and rocky reefs. The genus *Ctenochaetus* feed on fine detrital material. They whisk the sand or rocky substratum with their teeth and utilize suction to draw in the detrital material that consists of diatoms, small fragments of algae, organic material and fine inorganic sediment (Randall and Clements 2001). Species of *Ctenochaetus* share the presence of a thick-walled stomach (Randall and Clements 2001), this character is significant with respect to the nutritional ecology of this genus (Choat *et al.* 2002b).

The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
18.5 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Ctenochaetus truncatus is a minor component of the marine aquarium trade. It sells online for $79.95 to $149.95 depending on size (bluezooaquatics.com accessed 20 April 2010). It is a targeted food fish in western Thailand (Allen 2005). It is caught incidentally as food in other parts of its range.

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Draft

Naso annulatus - (Quoy & Gaimard, 1825)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Naso - annulatus

Common Names: Whitemargin Unicornfish (English), Banded Unicornfish (English), Cá một sừng sọc (Vietnamese), Hime-tenguhagi (Japanese), Hvidkantet Næsehornsfisk (Danish), Indangan (Filipino; Pilipino), Long-horn Unicornfish (English), Mengai (Palauan), Nosefish (English), Ringtailed Unicornfish (English), Rufia Anelar (Portuguese), Ume herepoti (Tahitian), Unicornfish (English), Witrand-eenhoringvis (Afrikaans), ta masimasi (Fijian)
Synonyms: Naso Smith, 1966; Priodon Quoy & Gaimard, 1825;

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Abesamis, R., Clements, K.D., Choat, J.H., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Naso annulatus is widespread in the Indo-Pacific region and is common in parts of its range. It is a targeted food fish in the Philippines and is harvested for food elsewhere in its range. There are no indications of population declines by harvesting. There are no major threats known and it is found in a number of marine protected areas in parts of its range. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Naso annulatus is widespread in the Indo-Pacific and is found from the Red Sea to Natal, eastwards to the Hawaiian Island, Tuamotu Archipelago and Marquesas, northwards to Honshu, Japan, southwards to Lord Howe Island and Norfolk Island. It is also found in the eastern Pacific from Clipperton Island (Robertson and Allen 1996).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 60

Depth Upper Limit (in metres below sea level): 1

Depth Zone: Shallow photic (0-50m), Deep Photic (51-200m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Australia	Extant	Native	-	Resident
Brunei Darussalam	Extant	Native	-	Resident
Cambodia	Extant	Native	-	Resident
China	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Comoros	Extant	Native	-	Resident
Cook Islands	Extant	Native	-	Resident
Costa Rica	Extant	Native	-	Resident
Costa Rica -> Cocos I.	Extant	Native	-	Resident
Disputed Territory	Extant	Native	-	Resident
Disputed Territory -> Paracel Is.	Extant	Native	-	Resident
Disputed Territory -> Spratly Is.	Extant	Native	-	Resident
Djibouti	Extant	Native	-	Resident
Egypt	Extant	Native	-	Resident
Eritrea	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
France	Extant	Native	-	Resident
France -> Clipperton I.	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
French Southern Territories	Extant	Native	-	Resident
French Southern Territories -> Mozambique Channel Is.	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
Hong Kong	Extant	Native	-	Resident
India	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Israel	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Jordan	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Gilbert Is.	Extant	Native	-	Resident
Macao	Extant	Native	-	Resident
Madagascar	Extant	Native	-	Resident

Malaysia	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Mayotte	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Mozambique	Extant	Native	-	Resident
Nauru	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
Niue	Extant	Native	-	Resident
Norfolk Island	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Samoa	Extant	Native	-	Resident
Saudi Arabia	Extant	Native	-	Resident
Seychelles	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Somalia	Presence Uncertain	Native	-	-
South Africa	Extant	Native	-	Resident
Sri Lanka	Extant	Native	-	Resident
Sudan	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
Tanzania, United Republic of	Extant	Native	-	Resident
Thailand	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
United States	Extant	Native	-	Resident
United States -> Hawaiian Is.	Extant	Native	-	Resident
Vanuatu	Extant	Native	-	Resident
Viet Nam	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident
Yemen	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident
81. Pacific - southwest	Extant	Native	-	Resident
87. Pacific - southeast	Extant	Native	-	Resident

Population

In the central Philippines, density and biomass of herbivorous fish in reserves had positive relationships with duration of reserve protection. Acanthuridae and Labridae (parrotfishes) were the major families that increased in biomass inside reserves with duration of reserve protection. Herbivore biomass inside reserves compared to fished sites was on average higher as years of protection increases. *Naso annulatus* mean biomass (kg per 500 m^2) recorded in 3 reserves were 0.67 (0.5 to 4 yr of protection), 0.10 (5 to 7 years of protection), 8.16 (8 to 11 years of protection), respectively (Stockwell *et al.* 2009).

This species is common in Tubbataha, Spratlys and northern Palawan (C. Nanola, S. Conales, Jr. and R. Abesamis pers. comm. 2010). It is uncommon in Guam and Saipan based on fish visual census (J. McIlwain unpub. data) and rare in the Guam and Saipan Acanthurid fishery (It was recorded as occasional in terms of relative abundance in the northern Bismarck Sea, Papua New Guinea (Allen 2009). It is moderately common, usually adjacent to steep outer slopes in Milne Bay Province, Papua New Guinea (Allen 2003). It is uncommon in the American Samoa National Park (National Park of Samoa Checklist of Fishes accessed 21 April 2010).

In Kenya, landings during 1978-2001 for families that are less important in commercial catches (e.g., scarinae and Acanthuridae) showed rising catches (1978-1984) followed by a general decline during the 1990s, but the landings for the scarinae showed a rising trend in recent years (Kaunda-Arara *et al.* 2003).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Naso annulatus is found in shallow waters, with large adults typically found on steep drop-offs in more than 25 m, usually in small aggregations (Randall 2001a). It feeds on green filamentous algae as juveniles and gelatinous zooplankton as adults (Choat 1991, Choat and Clements 1998, Choat *et al.* 2002b). Ontogenetic change in diet tends to occur by at least 20 cm (SL) (Green and Bellwood 2009). Maximum age 23 years in the Great Barrier Reef (Choat and Robertson 2002a).

The sexes are separate and there is evidence of sexual dimorphism in the caudal knives which are relatively larger in males. The males get the longer caudal filaments (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity
23 Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
100 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Naso annulatus is collected for food. It is targeted in parts of its range (i.e., Philippines). It is a minor component of the aquarium trade (Global Marine Aquarium Database accessed 19 March 2010).

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Draft

Naso brachycentron - (Valenciennes, 1835)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Naso - brachycentron

Common Names: Humpback Unicornfish (English), Boggel-eenhoringvis (Afrikaans), Dengkis (Malay), Indangan (Filipino; Pilipino), Komban-karukkan (Malayalam), Nason Bossu (French), Oni-tenguhagi (Japanese), Puju (Swahili), Pukkelrygget Næsehornsfisk (Danish), Ringtailed Unicornfish (English), Rufia Concurda (Portuguese), Ume tuapuu (Tahitian), ta masimasi (Fijian)
Synonyms: Naseus Valenciennes, 1835; Naso Smith, 1951; Prionolepis Smith, 1931;

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Abesamis, R., Clements, K.D., Choat, J.H., McIlwain, J., Myers, R., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Naso brachycentron is widespread throughout the Indo-Pacific region. It is occasionally found in most parts of its range. It is a targeted food fish but there have been no indications of population declines by fishing. There are no major threats and found in marine protected areas. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Naso brachycentron is found from East Africa to French Polynesia, northwards to Ryukyu Islands, Japan, southwards to the Great Barrier Reef, Vanuatu and New Caledonia. Records from Hong Kong (To and Situ 2005) and Cook Islands (M. Kulbicki pers. comm. 2011) need to be verified.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 50

Depth Upper Limit (in metres below sea level): 5

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Australia	Extant	Native	-	Resident
British Indian Ocean Territory	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Comoros	Extant	Native	-	Resident
Disputed Territory	Extant	Native	-	Resident
Disputed Territory -> Spratly Is.	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
French Southern Territories	Extant	Native	-	Resident
French Southern Territories -> Mozambique Channel Is.	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Kenya	Extant	Native	-	Resident
Madagascar	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Maldives	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Mauritius	Extant	Native	-	Resident
Mayotte	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Mozambique	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
Niue	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Réunion	Extant	Native	-	Resident
Seychelles	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Somalia	Presence Uncertain	Native	-	-
South Africa	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
Tanzania, United Republic of	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident

Tonga	Extant	Native	-	Resident
Vanuatu	Extant	Native	-	Resident
Yemen	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident

Population

Naso brachycentron was recorded as occasional in terms of relative abundance in Milne Bay Province, northern Bismarck Sea, Papua New Guinea and in Raja Ampat, Indonesia (Allen 2003, 2009, 2003b). It is rare in the American Samoa National Park (National Park of Samoa Checklist of Fishes, accessed 21 April 2010). In the Philippines, it is occasional in the central Visayas (R. Abesamis, C. Nanola and B. Stockwell pers. comm. 2010) and common in Tubbataha (S. Conales, Jr. pers. comm. 2010).

In Kenya, landings during 1978-2001 for families that are less important in commercial catches (e.g., scarinae and Acanthuridae) showed rising catches (1978-1984) followed by a general decline during the 1990s, but the landings for the scarinae showed a rising trend in recent years (Kaunda-Arara *et al.* 2003).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Naso brachycentron adults may be seen in shallow reef areas but are usually difficult to approach. It is occasionally encountered in small aggregations (Randall 2001a). It feeds on macroalgae (Choat *et al.* 2004). It is classified as a browser (Choat pers obs. in Green and Bellwood 2009). Maximum age recorded was 31 years (Choat and Robertson 2002a).

The sexes are separate and there is evidence of sexual dimorphism in the caudal knives which are relatively larger in males (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity
31 Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
90 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Naso brachycentron is harvested for food. It is caught in basket traps in Shoals Rodrigues (Anderson 2005).

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Draft

Naso brevirostris - (Cuvier, 1829)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Naso - brevirostris

Common Names: Palefin Unicornfish (English), Bataklaj (Undetermined), Brown Unicornfish (English), Corne (French), Einhornfisch (German), Gespikkelde eenhoringvis (Afrikaans), Indangan (Filipino; Pilipino), Kala lōlō (Hawaiian), Langsnudet Næsehornsfisk (Danish), Longnose Unicornfish (English), Nasique (French), Nason Pointillé (French), Nason à Rostre Court (French), Rufia Manchada (Portuguese), Short-nosed Unicornfish (English), Shortnose Unicornfish (English), Shortnosed Kala (English), Shortsnout Unicornfish (English), Spotted Unicornfish (English), Tarian (Undetermined), Tatihi (Undetermined), Tsumari-tenguhagi (Japanese), Ume tatihi (Undetermined), Ume-ulutao (Undetermined), ta masimasi (Undetermined)
Synonyms: Cyphomycter Smith, 1955; Naseus Cuvier, 1829; Naso (Valenciennes, 1835);

Taxonomic Note:
Naso brevirostris is widespread throughout the Indo-Pacific region, genetic studies conducted by Horne *et al.* (2008) did not find any evidence of geographic population structure even at the largest spatial scales.

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Choat, J.H., Abesamis, R., Clements, K.D., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Naso brevirostris is widespread and cosmopolitan, occupies a wide range of habitats. It is the most abundant *Naso* on the Great Barrier Reed and in the central Indian Ocean (Western Australia and Cocos-Keeling Islands (J.H. Choat pers. comm. 2010). It is not specifically targeted in multi-species fisheries. There is no evidence of declines from harvesting. It occurs in a marine protected areas in parts of its range. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Naso brevirostris is found from the Red Sea south to Durban, eastwards to Pitcairn Islands and Hawaiian Islands, northwards to southern Japan, southwards to Lord Howe Island and Ningaloo Reef off western Australia. In the eastern Pacific, it is found in the Galapagos Islands.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 122

Depth Upper Limit (in metres below sea level): 2

Depth Zone: Shallow photic (0-50m), Deep Photic (51-200m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Australia	Extant	Native	-	Resident
Bangladesh	Extant	Native	-	Resident
British Indian Ocean Territory	Extant	Native	-	Resident
Brunei Darussalam	Extant	Native	-	Resident
Cambodia	Extant	Native	-	Resident
China	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Cocos (Keeling) Islands	Extant	Native	-	Resident
Comoros	Extant	Native	-	Resident
Cook Islands	Extant	Native	-	Resident
Disputed Territory	Extant	Native	-	Resident
Disputed Territory -> Paracel Is.	Extant	Native	-	Resident
Disputed Territory -> Spratly Is.	Extant	Native	-	Resident
Djibouti	Extant	Native	-	Resident
Ecuador	Extant	Native	-	Resident
Ecuador -> Galápagos	Extant	Native	-	Resident
Egypt	Extant	Native	-	Resident
Eritrea	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
French Southern Territories	Extant	Native	-	Resident
French Southern Territories -> Mozambique Channel Is.	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
Hong Kong	Extant	Native	-	Resident
India	Extant	Native	-	Resident
India -> Andaman Is.	Extant	Native	-	Resident
India -> Nicobar Is.	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident

Israel	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Jordan	Extant	Native	-	Resident
Kenya	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Gilbert Is.	Extant	Native	-	Resident
Kiribati -> Kiribati Line Is.	Extant	Native	-	Resident
Kiribati -> Phoenix Is.	Extant	Native	-	Resident
Korea, Republic of	Extant	Native	-	Resident
Macao	Extant	Native	-	Resident
Madagascar	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Maldives	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Mauritius	Extant	Native	-	Resident
Mayotte	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Mozambique	Extant	Native	-	Resident
Myanmar	Extant	Native	-	Resident
Nauru	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
Niue	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Pitcairn	Extant	Native	-	Resident
Réunion	Extant	Native	-	Resident
Samoa	Extant	Native	-	Resident
Saudi Arabia	Extant	Native	-	Resident
Seychelles	Extant	Native	-	Resident
Singapore	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Somalia	Extant	Native	-	Resident
South Africa	Extant	Native	-	Resident
Sri Lanka	Extant	Native	-	Resident
Sudan	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
Tanzania, United Republic of	Extant	Native	-	Resident
Thailand	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident
Tokelau	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
United States	Extant	Native	-	Resident
United States -> Hawaiian Is.	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Howland-Baker Is.	Extant	Native	-	Resident

United States Minor Outlying Islands -> Johnston I.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Midway Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> US Line Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Wake Is.	Extant	Native	-	Resident
Vanuatu	Extant	Native	-	Resident
Viet Nam	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident
Yemen	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident
81. Pacific - southwest	Extant	Native	-	Resident
87. Pacific - southeast	Extant	Native	-	Resident

Population

Naso brevirostris was recorded as occasional in terms of relative abundance in the northern Bismarck Sea, Papua New Guinea and in Raja Ampat, Indonesia (Allen 2009, 2003b). It is moderately common in Milne Bay Province, Papua New Guinea (Allen 2003). It is rare in the American Samoa National Park (National Park of Samoa Checklist of Fishes, accessed 21 April 2010). It is rare in the Philippines from fish visual census surveys (R. Abesamis and C. Nanola pers. comm. 2010). It is the most abundant *Naso* in Cocos (J.H. Choat pers. comm. 2010).

At Moorea, French Polynesia, SPOT satellite images allowed estimation of the surface area of fringing reef (1,076 ha), barrier reef (3,788 ha) and outer slop (493 ha). A total of 30,843 individuals/total surface area were recorded in fish visual surveys conducted from 1990-1993 (Lecchini *et al.* 2006). It is rare in the fish landings data from Guam (<1%) of the acanthurid fishery (Division of Aquatic and Wildlife Resources unpub. data). It is not recorded from the fishery in Saipan during 2008-2009 (P. Houk unpub. data).

In Kenya, landings during 1978-2001 for families that are less important in commercial catches (e.g., scarinae and Acanthuridae) showed rising catches (1978-1984) followed by a general decline during the 1990s, but the landings for the scarinae showed a rising trend in recent years (Kaunda-Arara *et al.* 2003).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Naso brevirostris occurs on coral reefs or over rocky substrata. Juveniles and subadults graze on benthic algae; adults feed primarily on zooplankton (Randall 2001b). Food items include green filamentous algae and gelatinous zooplankton (Choat *et al.* 2002). Ontogenetic change in diet tends to occur by at least 20 cm (SL) (Green and Bellwood 2009).

The number of sagital increments in a study done by Choat and Axe (1996) suggest that members of the genus *Naso* attain the same maximum ages as the other Acanthurids, in excess of 20 years for this species. Maximum age 25 years (Choat and Robertson 2002a).

Reproduction
The sexes are separate and there is evidence of sexual dimorphism in the caudal knives which are relatively larger in males (J.H. Choat pers. comm. 2010). This species was observed to form spawning aggregations on the Great Barrier Reef (Johannes 1981, Squire and Samoilys unpub.). Size at sexual maturity 250 mm (Choat and Robertson 2002a). The large pelagic larvae persist in the pelagic environment for approximately 90 days (B.Victor pers. comm. in Horne *et al.* 2008).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female	Age at Maturity: Male	Size at Maturity (in cms): Female	Size at Maturity (in cms): Male
3 Years	3 Years	25	25

Longevity
25 Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
60 (FL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Naso brevirostris is captured for food. It is usually caught in traps or by spearing. It is a minor component of the aquarium trade (Global Marine Aquarium Database accessed 19 March 2010).

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. Its distribution overlaps with several marine protected areas within its range. In Queensland, Australia, there is a recreational catch limit of five per species and a minimum size limit of 25cm (Department of Primary Industries accessed 8 April 2010).

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Draft

Naso caeruleacauda - Randall, 1994

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Naso - caeruleacauda

Common Names: Bluetail Unicornfish (English)
Synonyms: No Synonyms

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Russell, B., Choat, J.H., Abesamis, R., Clements, K.D., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Naso caeruleacauda is widely distributed in the Coral Triangle Region. It occurs in moderately deep water. It is caught only incidentally in subsistence fisheries and there is no evidence of declines from harvesting. It is found in a number of marine reserves in the Coral Triangle. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Naso caeruleacauda is found from the Philippines, Indonesia and the northern Great Barrier Reef, Australia. It was also recorded from northwest Madagascar (Allen 2005).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 40

Depth Upper Limit (in metres below sea level): 5

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Australia	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Madagascar	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident

Population

Naso caeruleocauda was recorded as occasional in terms of relative abundance in the northern Bismarck Sea, Papua New Guinea and in Raja Ampat, Indonesia (Allen 2009, 2003b). It is occasional in the Philippines (R. Abesamis, C. Nanola and B. Stockwell pers. comm. 2010). There was only one school recorded from northwest Madagascar (Allen 2005).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Naso caeruleacauda forms aggregations off seaward slopes, generally at depths greater than 15 m where it feeds on zooplankton. It sometimes

swims in mixed schools with *Naso hexacanthus*.

Reproduction

The sexes are separate among the acanthurids. In Papua New Guinea, it is known to form spawning aggregations in open water above the reef every month of the year during the first and third quarter moon phase. It was reported to spawn early morning and late afternoon with group and pair spawning observed. *N. caeruleacauda* and *N. caesisus* are reported to aggregate bimonthly, just prior to the new and full moons. Several hundred species were observed to spawn (Hamilton *et al.* 2004).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
30 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Naso caeruleacauda is occasionally seen in fish markets. In a spawning aggregation site in Papua New Guinea, fishers interviewed state that catch rates have not changed in the years that they have targeted it. It was first exploited in 1999 (Hamilton *et al.* 2004). It is incidentally caught by gill nets in the Philippines.

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Draft

Naso caesius - Randall & Bell, 1992

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Naso - caesius

Common Names: Gray Unicornfish (English), nuqa ta (Undetermined)
Synonyms: No Synonyms

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Choat, J.H., Abesamis, R., Clements, K.D., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Naso caesius is widespread throughout the west and south central Pacific but not yet reported from the rest of the Coral Triangle Region. It is harvested in the Guam fishery and in Papua New Guinea. There is no evidence of population declines from harvesting. It occurs in marine reserves in parts of its range. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Naso caesius is known from Palau, Mariana Islands, northern Marshall Islands, Hawaiian Islands, Great Barrier Reef, Osprey Reef, and Chesterfield Islands in the Coral Sea, New Caledonia, Fiji, Tuvalu, Society Islands and Pitcairn Islands. It is also recorded from Kavieng, Papua New Guinea (Hamilton *et al.* 2004), Christmas Island (Hobbs *et al.* 2010) and Cocos Keeling.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 50

Depth Upper Limit (in metres below sea level): 3

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Australia	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Cocos (Keeling) Islands	Extant	Native	-	Resident
Cook Islands	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Gilbert Is.	Extant	Native	-	Resident
Kiribati -> Phoenix Is.	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Nauru	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
Niue	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Pitcairn	Extant	Native	-	Resident
Samoa	Extant	Native	-	Resident
Tokelau	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
United States	Extant	Native	-	Resident
United States -> Hawaiian Is.	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Howland-Baker Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Johnston I.	Extant	Native	-	Resident
Vanuatu	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident
81. Pacific - southwest	Extant	Native	-	Resident

Population

Naso caesius is uncommon in the American Samoa national park (National Park of Samoa Checklist of Fishes accessed 21 April 2010). In Christmas Island, this species is common (Hobbs *et al.* 2010) and is the dominant *Naso* sp. (J.H. Choat pers. comm. 2010). It accounts for 2% of the Acanthurid fishery in Guam (Division of Aquatic and Wildlife Resources unpub. data) but absent in the Saipan fishery in 2008 (P. Houk unpub. data).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Naso caesius is usually seen in aggregations on drop-offs, sometimes in mixed schools with *N. hexacanthus*. A few schools were observed in Christmas Island, all the *N. hexacanthus* seen were with *N. caesius* (J.H. Choat pers. comm. 2010). This species prefers oceanic conditions - clear water along steep dropoffs, offshore reefs and pinnacles (R.F. Myers pers. comm. 2010).

Reproduction

The sexes are separate among the acanthurids (Reeson 1983). Sexual dimorphism differentiated with males having larger caudal spines (J.H. Choat pers comm. 2010). Nuptial males were observed to flash different colors (R.F. Myers pers. comm. 2010).
In Papua New Guinea, it is known to form spawning aggregations in open water above the reef every month of the year during the first and third quarter moon phase. It was reported to spawn early morning and late afternoon with group and pair spawning observed. *N. caesius* is reported to aggregate bimonthly, just prior to the new and full moons. Several hundred species were observed to spawn (Hamilton *et al.* 2004).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
45.6 (SL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Naso caesius is harvested for food. In a spawning aggregation site in Papua New Guinea, fishers interviewed state that catch rates have not changed in the years that they have targeted it. It was first exploited in 1999 (Hamilton *et al.* 2004).

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Draft

Naso elegans - (Rüppell, 1829)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Naso - elegans

Common Names: Elegant Unicornfish (English), Indian orange-spine Unicorn (English), Lipstick Surgeonfish (English), Nasique à Eperons Oranges (French), Nason Bariolé (French), Orangespine Unicornfish (English), Oranje stekel-eenhoringvis (Afrikaans), Qumburo (Undetermined), Rufia Espigão Laranja (Portuguese), Smoothheaded Unicornfish (English)
Synonyms: Aspisurus Rüppell, 1829;

Taxonomic Note:

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Choat, J.H., McIlwain, J., Abesamis, R., Clements, K.D., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Naso elegans is widespread in the Red Sea and Indian Ocean as far east as Bali including all intervening island groups. It achieves high abundances in Cocos and the central Red Sea and moderately common in Madagascar. It is relatively rare elsewhere in its range. It is not specifically targeted in any fishery except in western Thailand. There is no evidence of declines from harvesting. It occurs in numerous marine protected areas in parts of its distribution. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Naso elegans is found from the Red Sea south to Durban, eastwards to Bali, Indonesia. It occurs in southern Oman but not the Gulf of Oman or Persian Gulf, and not reported from India.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 30

Depth Upper Limit (in metres below sea level): 1

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Bangladesh	Extant	Native	-	Resident
British Indian Ocean Territory	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Cocos (Keeling) Islands	Extant	Native	-	Resident
Comoros	Extant	Native	-	Resident
Djibouti	Extant	Native	-	Resident
Egypt	Extant	Native	-	Resident
Eritrea	Extant	Native	-	Resident
French Southern Territories	Extant	Native	-	Resident
French Southern Territories -> Mozambique Channel Is.	Extant	Native	-	Resident
India	Extant	Native	-	Resident
India -> Andaman Is.	Extant	Native	-	Resident
India -> Nicobar Is.	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Israel	Extant	Native	-	Resident
Jordan	Extant	Native	-	Resident
Kenya	Extant	Native	-	Resident
Madagascar	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Maldives	Extant	Native	-	Resident
Mauritius	Extant	Native	-	Resident
Mayotte	Extant	Native	-	Resident
Mozambique	Extant	Native	-	Resident
Myanmar	Extant	Native	-	Resident
Oman	Extant	Native	-	Resident
Réunion	Extant	Native	-	Resident
Saudi Arabia	Extant	Native	-	Resident
Seychelles	Extant	Native	-	Resident
Singapore	Extant	Native	-	Resident
Somalia	Extant	Native	-	Resident
South Africa	Extant	Native	-	Resident
Sri Lanka	Extant	Native	-	Resident

Sudan	Extant	Native	-	Resident
Tanzania, United Republic of	Extant	Native	-	Resident
Thailand	Extant	Native	-	Resident
Yemen	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident

Population

Naso elegans is moderately common in northwest Madagascar (Allen 2005). In Duba, Saudi Arabia, density was recorded at 7.5 ind/1,000 m^2. It is reasonably abundant in the Red Sea and appears in the Jedda markets. It is relatively rare elsewhere in the Indian Ocean, moving further east in Christmas Island, abundance drops to 2 (J. McIlwain pers. comm. 2010). In Cocos, it is the most abundant reef dwelling *Naso* with a mean abundance of 8 ind./1,000 m^2. It is less abundant in the Seychelles (J.H. Choat pers. comm. 2010).

In the Nabq Managed Resource Protected Area, South Sinai, Egyptian Red Sea, mean abundances of this species showed differences at various depths and between no-take zones (NTZ) and take zones (TZ). The greater abundance of the Acanthuridae in the fished area than in the NTZ across 1, 3 and 10m depths, can be attributed to a result of reduced predation or competition (Ashworth and Ormond 2005).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Naso elegans is classified as a browser on macroscopic algae (J.H. Choat pers. obs. in Green and Bellwood 2009). It achieves a maximum size of 360 mm (TL) in four years. The maximum age recorded is 17 years. It is much faster growing than *N. lituratus* in many locations it was found (J.H. Choat pers comm. 2010).

The sexes are separate and there is evidence of sexual dimorphism in the caudal knives which are relatively larger and longer filaments in males (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-

9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-
9.8.5. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Soft Substrate	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity
17 Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
36 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

The "blonde *Naso* tang" *Naso elegans*, is a component of the marine aquarium trade. It sells online for $59.99 to $149.99 depending on size (thatpetplace.com accessed 20 April 2010). It is a targeted food fish in western Thailand (Allen 2005). It is caught incidentally in other parts of its

range.

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Draft

Naso fageni - Morrow, 1954

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Naso - fageni

Common Names: Horseface Unicornfish (English), Indangan (Filipino; Pilipino), Moai-tenguhagi (Japanese), Perdgesig-eenhoringvis (Afrikaans), Rufia cara-de-cavalo (Portuguese), Stumpnæset Næsehornsfisk (Danish), Tarian (Undetermined)
Synonyms: Cyphomycter Smith, 1955; Rhinodactylus Smith, 1957;

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Russell, B., Choat, J.H., Abesamis, R., Clements, K.D., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Naso fageni is widely distributed but not reported from many localities in between its range. It is caught only incidentally in subsistence fisheries. There are no apparent threats and its distribution overlaps with marine protected areas in parts of its range. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Naso fageni is found from East Africa from Kenya to Mozambique, to central Japan, southwards to the Philippines and Flores, Indonesia. It is also found in Western Australia.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 40

Depth Upper Limit (in metres below sea level): 1

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Australia	Extant	Native	-	Resident
British Indian Ocean Territory	Extant	Native	-	Resident
Comoros	Extant	Native	-	Resident
Djibouti	Extant	Native	-	Resident
French Southern Territories	Extant	Native	-	Resident
French Southern Territories -> Mozambique Channel Is.	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Kenya	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Mayotte	Extant	Native	-	Resident
Mozambique	Extant	Native	-	Resident
Oman	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Somalia	Extant	Native	-	Resident
Tanzania, United Republic of	Extant	Native	-	Resident
Yemen	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident

Population

In Kenya, landings during 1978-2001 for families that are less important in commercial catches (e.g., scarinae and Acanthuridae) showed rising catches (1978-1984) followed by a general decline during the 1990s, but the landings for the scarinae showed a rising trend in recent years (Kaunda-Arara, et al., 2003). There is no other population information available for this species.

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Naso fageni occurs in deeper non-reef environments (Klanten *et al.* 2004). Juveniles recruit into the back reef slopes (J.H. Choat pers. comm. 2010). The sexes are separate and there is evidence of sexual dimorphism in the caudal knives which are relatively larger in males (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
80 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Naso fageni is occasionally seen in fish markets.

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Draft

Naso hexacanthus - (Bleeker, 1855)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Naso - hexacanthus

Common Names: Sleek Unicornfish (English), Barbero Liso (Spanish; Castilian), Black Unicornfish (English), Blacktongue Unicornfish (English), Debam (Undetermined), Dengkis (Undetermined), Gangis (Undetermined), Geenhoringvis (Undetermined), Guassa (Undetermined), Ik in ae (Undetermined), Indangan (Filipino; Pilipino), Kala Holo (Hawaiian), Kaxan (Undetermined), Nason Jaune (French), Nason Lisse (French), Nason Noir (French), Nohorn Unicorn (English), Opelu Kala (Hawaiian), Puju (Undetermined), Pulang ikog (Undetermined), Rufia Lisa (Portuguese), Salinkupau (Undetermined), Silanis (Undetermined), Sorttunget Næsehornsfisk (Danish), Surahan (Undetermined), Tenguhagi-modoki (Japanese), Thorpe's Unicornfish (English), Ume 'ere'ere (Undetermined), Ume kuripo (Undetermined), ta ni nubu (Undetermined)
Synonyms: Naseus Klunzinger, 1871; Naso Smith, 1966; Priodon Bleeker, 1855;

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Choat, J.H., McIlwain, J., Abesamis, R., Clements, K.D., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Naso hexacanthus is widespread in the Indo-Pacific region. It is common and locally abundant in parts of its range. It is a popular food fish and although common in fish markets and targeted in the Philippines, there is no evidence of population declines due to fishing. It is found in a number of well-policed marine protected areas in parts of its distribution. It has a wide depth range and is generally found in deeper waters. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Naso hexacanthus is found from the Red Sea and East Africa including the Mascarene Islands to the Hawaiian, Marquesan and Ducie islands, northwards to southern Japan and southwards to Lord Howe Island. It is reported in the eastern Pacific from Clipperton Island (Robertson and Allen 1996) and Cocos Island.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 229

Depth Upper Limit (in metres below sea level): 6

Depth Zone: Shallow photic (0-50m), Deep Photic (51-200m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Australia	Extant	Native	-	Resident
British Indian Ocean Territory	Extant	Native	-	Resident
Brunei Darussalam	Extant	Native	-	Resident
Cambodia	Extant	Native	-	Resident
China	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Cocos (Keeling) Islands	Extant	Native	-	Resident
Comoros	Extant	Native	-	Resident
Cook Islands	Extant	Native	-	Resident
Costa Rica	Extant	Native	-	Resident
Costa Rica -> Cocos I.	Extant	Native	-	Resident
Disputed Territory	Extant	Native	-	Resident
Disputed Territory -> Paracel Is.	Extant	Native	-	Resident
Disputed Territory -> Spratly Is.	Extant	Native	-	Resident
Djibouti	Extant	Native	-	Resident
Egypt	Extant	Native	-	Resident
Eritrea	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
France	Extant	Native	-	Resident
France -> Clipperton I.	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
French Southern Territories	Extant	Native	-	Resident
French Southern Territories -> Mozambique Channel Is.	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
India	Extant	Native	-	Resident
India -> Andaman Is.	Extant	Native	-	Resident
India -> Nicobar Is.	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Israel	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident

Jordan	Extant	Native	-	Resident
Kenya	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Gilbert Is.	Extant	Native	-	Resident
Kiribati -> Kiribati Line Is.	Extant	Native	-	Resident
Kiribati -> Phoenix Is.	Extant	Native	-	Resident
Madagascar	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Maldives	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Mauritius	Extant	Native	-	Resident
Mayotte	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Mozambique	Extant	Native	-	Resident
Myanmar	Extant	Native	-	Resident
Nauru	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
Niue	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Oman	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Pitcairn	Extant	Native	-	Resident
Réunion	Extant	Native	-	Resident
Samoa	Extant	Native	-	Resident
Saudi Arabia	Extant	Native	-	Resident
Seychelles	Extant	Native	-	Resident
Singapore	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Somalia	Extant	Native	-	Resident
South Africa	Extant	Native	-	Resident
Sudan	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
Tanzania, United Republic of	Extant	Native	-	Resident
Thailand	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident
Tokelau	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
United States	Extant	Native	-	Resident
United States -> Hawaiian Is.	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Howland-Baker Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Johnston I.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Midway Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> US Line Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Wake Is.	Extant	Native	-	Resident

Vanuatu	Extant	Native	-	Resident
Viet Nam	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident
Yemen	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident
81. Pacific - southwest	Extant	Native	-	Resident
87. Pacific - southeast	Extant	Native	-	Resident

Population

Naso hexacanthus is not common in depths less than about 15 m, but abundant in deeper water, particularly near escarpments (Randall 2001b). It was recorded as occasional in terms of relative abundance in the northern Bismarck Sea, Papua New Guinea (Allen 2009), occasional but locally common to abundant in Milne Bay Province, Papua New Guinea (Allen 2003). It is moderately common at Raja Ampat, Indonesia (Allen 2003b). It is uncommon in the American Samoa National Park (National Park of Samoa Checklist of Fishes accessed 21 April 2010). It is common in drop-offs in Palau (R. Myers, pers comm. 2010). It is common and locally abundant in the Philippines (R. Abesamis and B. Stockwell pers. comm. 2010).

In the Apo Island, Philippines fishery beginning March and through August - it is abundant in catch when it is the season for small jellyfish and spearfishers can catch *N. hexacanthus* using breathhold spearfishing at night during the new moon. Hook and line is used during the day. During the peak in jellyfish season (June-July) fishers can land up to 60 kls. (3 fishers). One fisher average of 10 fish (A. Candido pers. comm. 2010).

It is uncommon in Guam (J. McIlwain unpub. data). It is not recorded in the Pohnpei fishery in 2007 (Rhodes *et al.* 2008). In Hawaii. an average of 1,400 kls./year is harvested. *N. hexacanthus* is the sixth most important Acanthurid species (Division of Aquatic Resources unpub. data). It is a commercial species in the Tuamotos and French Polynesia (de Loma *et al.* 2009).

In Kenya, landings during 1978-2001 for families that are less important in commercial catches (e.g., scarinae and Acanthuridae) showed rising catches (1978-1984) followed by a general decline during the 1990s, but the landings for the scarinae showed a rising trend in recent years (Kaunda-Arara *et al.* 2003).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Naso hexacanthus is often seen in large aggregations. It feeds on the larger animals of the zooplankton such as crab larvae, arrow worms and

pelagic tunicates (Randall 2001b). The diet of this species consists almost exclusively of large gelatinous plankton. Juveniles feed on macroscopic and turf algae and strongly associated with reef substrata. It is herbivorous up to age 2 years. Juveniles are more common in mid-shelf reefs (Choat *et al.* 2002).
The number of sagital increments in a study done by Choat and Axe (1996) suggest that members of the genus *Naso* attain the same maximum ages as the other Acanthurids, in excess of 40 years for this species. Maximum age 44 years (Choat and Robertson 2002a).

Reproduction

The sexes are separate among the acanthurids (Reeson, 1983). Males have characteristic mating colors when courting in open water. Caudal knives in males are enlarged (J.H. Choat pers. comm. 2010). This species was observed to form spawning aggregations on the Great Barrier Reef (Johannes 1981). Size at sexual maturity 450 mm (Choat and Robertson 2002a).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female
45

Size at Maturity (in cms): Male: (Not specified)

Longevity
44 Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
75 (FL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?

No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Although abundant in many localities and a good food fish, the landings are relatively low due to difficulty in capturing it. It is taken mainly in traps (Randall 2001b). It is also harvested using spear and hook and line (A. Candido pers. comm. 2010). It is found in fish markets in the Coral Triangle Region (J.H. Choat pers. comm. 2010).

Threats

Naso hexacanthus is a targeted food fish in parts of its range.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Draft

Naso lituratus - (Forster, 1801)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Naso - lituratus

Common Names: Orange spine Surgeonfish (English), Anitan-surahan (Undetermined), Barbero de Aguijón Naranja (Spanish; Castilian), Barcheek Unicornfish (English), Bulok (Undetermined), Bwilok (Undetermined), Clown Tang (English), Debam (Undetermined), Dengkis (Undetermined), Erangel (Undetermined), Guassa (Undetermined), Hangun (Undetermined), Ikan hitam (Undetermined), Ila'ilia (Undetermined), Indangan (Filipino; Pilipino), Kalditan (Undetermined), Kankettiyar (Undetermined), Karukkan (Undetermined), Maito (Undetermined), Mangadlit (Undetermined), Masked Unicornfish (English), Maskeret Næsehornsfisk (Danish), Miyako-tenguhagi (Japanese), Nashornfisch (German), Naso (Undetermined), Naso trang (English), Nason à Eperons Oranges (French), Orange-spine Unicornfish (English), Pacific orange-spine Unicorn (English), Poll Unicornfish (English), Pulak (Undetermined), Redlip Surgeonfish (English), Salinkupau (Undetermined), Silanis (Undetermined), Smooth-head Unicornfish (English), Striped Unicornfish (English), Striped-faced Unicornfish (English), Surahan (Undetermined), Umaumalei (Hawaiian), Ume tarei (Undetermined), Umelei (Undetermined), Umulei (Undetermined), ta masimasi (Undetermined)

Synonyms: Acanthurus Forster, 1801; Aspisurus Quoy & Gaimard, 1825; Callicanthus (Forster, 1801); Monoceros Seale, 1901; Naso (Forster, 1801); Prionurus Lesson, 1831;

Taxonomic Note:
Naso lituratus was observed to be actively hybriding with *N. elegans* at Cocos-Keeling (J.H. Choat pers. comm. 2010, Klanten 2003).

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): McIlwain, J., Choat, J.H., Abesamis, R., Clements, K.D., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Naso lituratus is widespread throughout most of the Pacific. It is common and locally abundant in parts of its range. Although heavily targeted for the aquarium trade in parts of its range (Hawaii), it is found in well-policed marine reserves and Fish Replenishment Areas. Harvest is not considered a global threat although there may be some localized declines in areas where it is harvested. There are no significant population reductions at present time. It is therefore listed as Least Concern. However, we recommend monitoring of the harvest levels of this species

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Naso lituratus is widespread from Cocos-Keeling in the eastern Indian Ocean to French Polynesia and the Pitcairn group, northwards to Honshu, Japan, southwards to Ningaloo reef, southern Great Barrier Reef, Australia, New Caledonia and Rapa. It is reported in the eastern Pacific from Clipperton Island as a vagrant. Records from the Indian Ocean west of Cocos-Keeling refer to *N. elegans.*

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 90

Depth Upper Limit (in metres below sea level): 0

Depth Zone: Shallow photic (0-50m), Deep Photic (51-200m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Australia	Extant	Native	-	Resident
Cambodia	Extant	Native	-	Resident
China	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Cocos (Keeling) Islands	Extant	Native	-	Resident
Cook Islands	Extant	Native	-	Resident
Disputed Territory	Extant	Native	-	Resident
Disputed Territory -> Paracel Is.	Extant	Native	-	Resident
Disputed Territory -> Spratly Is.	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
France	Extant	Native	-	Resident
France -> Clipperton I.	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Gilbert Is.	Extant	Native	-	Resident
Kiribati -> Kiribati Line Is.	Extant	Native	-	Resident

Kiribati -> Phoenix Is.	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Nauru	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
Niue	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Pitcairn	Extant	Native	-	Resident
Samoa	Extant	Native	-	Resident
Singapore	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
Thailand	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident
Tokelau	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
United States	Extant	Native	-	Resident
United States -> Hawaiian Is.	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Howland-Baker Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Johnston I.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Midway Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> US Line Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Wake Is.	Extant	Native	-	Resident
Vanuatu	Extant	Native	-	Resident
Viet Nam	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident
81. Pacific - southwest	Extant	Native	-	Resident

Population

Naso lituratus is among the top 10 commercial aquarium species collected in Hawaii with reported catches of 298,884 individuals from FY 1976-2003 (Walsh *et al.* 2004). Overall aquarium catch in fiscal years 2004 through 2006 reported 13,149 individuals caught/year and a value of

$52,997/ year (Friedlander 2006). It is the fourth most collected aquarium fish in West Hawaii. There was a non-significant decrease in overall density across Fish Replenishment Areas (FRAs) surveyed from 1999-2009. However, the FRAs were shown to be effective in terms of increases inside the FRAs relative to long term marine protected areas. There was minimal recruitment into West Hawaii in the last decade = 0.05/100 m^2. For FY 2005-2009, the total number of individuals caught was 29,859 with a total value of $122,090 (Walsh *et al.* 2010).

It was recorded as more abundant in shallow stations where there was high cover of living hard corals at the Nha Trang Bay MPA (Nguyen and Phan 2008). It was recorded as common in terms of relative abundance in Milne Bay Province, northern Bismarck Sea, Papua New Guinea and Raja Ampat, Indonesia (Allen 2003, 2009, 2003b). It is moderately common in the Philippines (Werner and Allen 2000, Palawan Council for Sustainable Development unpub. data, R. Abesamis and C. Nanola pers. comm. 2010), the densities seem to be low in the central Visayas (R. Abesamis and C. Nanola pers. comm. 2010).

In the commercial coral reef fishery in Pohnpei, acanthurids contribute nearly 30% of the total catch volume and include the most heavily targeted species, *N. lituratus* and *N. unicornis* (Rhodes *et al.* 2008). It was the fourth most dominant species in Tutuila, Aunuu, and Taema Banks, American Samoa contributing to 2.7% of total fish biomass and 1.7% of numerical abundance (Sabater and Tofaeono 2006). In Moorea Is., French Polynesia, a total of 292, 994 individuals/ surface area was recorded in fish visual surveys conducted from 1990-1993 (Lecchini *et al.* 2006). It is very abundant on the outer slope of Tiahura (Moussa 2009). It is abundant in the American Samoa National Park (National Park of Samoa Checklist of Fishes accessed 21 April 2010).

On Saipan, *N.lituratus* accounted for 4.5% of the total fish landings and 16.5% of the acanthurids landings (P. Houk unpub. data). The numerical abundance of *N.lituratus* in the shallow reefs around Saipan from underwater visual census data was 7% of all acanthurids with an average density of 4 ind./450m^2 (J. McIlwain unpublished data). On Guam the average density was 9/450m^2 where it accounts for 22% of the total acanthurid fishery (J. McIlwain and Division of Aquatic and Wildlife Resources unpub.data). A mark-release-resight study on Guam revealed population size of 40, 000 individuals in a single bay (Piti Marine Preserve) covering an area of 10 578m^2(A. Marshell unpub.thesis).

Densities of 30.1 gm^2 was recorded at outer reef slopes at Yyin on the west coast of Yap. Overall biomass for both sites on Yap (Riiken and Yyin) was 5.9 gm^2 and 5.6 gm^2. At one site on Chuuk (Romanum) the biomass across all sites was 2.5gm^2. At the same location (Chuuk) *Naso lituratus* contributes up to 32% of the total catch in the lagoon, outer reef and passage (SPC unpub. report 2006).

In the central Philippines, density and biomass of herbivorous fish in reserves had positive relationships with duration of reserve protection. There was an order of magnitude difference in mean biomass between fished sites and marine protected areas (0.5-11 years of protection) (Stockwell *et al.* 2009).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Naso lituratus is usually encountered in less than 30 m, but reported as deep as 90 m in coral reefs and rocky bottoms. It is sometimes seen in large aggregations but is usually solitary (Randall 2001a,b). It feeds on macroalgae (Choat *et al.* 2004). It is classified as a browser (Choat and

Clements 1998). It has high levels of SCFAs (short chain fatty acids) and is known to harbor abundant microbiota in the posterior intestine (Clements and Choat 1995). Maximum age recorded from the Great Barrier Reef was 39 years (Choat and Robertson 2002a), Cocos-Keeling 15 years. Orange Spine Surgeonfish has a similar maximum size at both sites 37 cm (FL) and significantly smaller than *N. elegans* (J.H. Choat pers. comm. 2010). The maximum size in Guam 27 cm (FL) (A. Marshell unpub. thesis). *N. lituratus* has a highly disparate size distribution (J.H. Choat pers. comm. 2010).

Reproduction

The sexes are separate among the acanthurids (Reeson 1983). Sexual dimorphism is evident from the length of the caudal filament which is present in males but not females (J.H. Choat pers. comm. 2010). This was confirmed with histology of gonads (A. Marshell unpub.thesis). This species was reported to form spawning aggregations on the Great Barrier Reef (Squire and Samoilys unpub.).

Histology of a number of 12-14 cm individuals collected from Guam found all had mature stage oocytes although it's unlikely fish of this size are making a contribution to the overall reproductive output. Spawning year round in Guam, females with matures oocytes and mature males occured in most months of 2008-2009. Newly settled *N.lituratus* preferred high coral cover over coral rubble (J.McIlwain unpub.data).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity
39 Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
37 (FL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis

No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Naso lituratus is a targeted food fish, juveniles and sub-adults of this species are popular in the aquarium trade (Kusumaatmadja *et al.* 2004).It is taken in nets, traps, and by spears (Randall 2001b). It is common in fish markets in the Philippines (B. Stockwell pers. comm. 2010). It does not appear in the Hawaiian commercial fishery (Division of Aquatic Resources unpub data).

In Atafu, large netting drives with seines are occasionally employed as a community fishing activity involving over 100 people. This species is one of the main species captured by this netting method (Ono and Addison 2009).

Threats

There were order of magnitude differences in mean biomass between fished and protected areas in the Philippines (Stockwell *et al.* 2009). *Naso lituratus* is heavily targeted in areas where fishery management is close to non-existent and coral reef areas are impacted by anthropogenic threats.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place. However, its distribution overlaps with several marine reserves in parts of its range. In Hawaii, nine Fish Replenishment Areas were established in 2000. These areas prohibit marine aquarium organism collecting within approximately 30% of the Kona coast nearshore habitat (Kusumaatmadja *et al.* 2004). In 2002, the Marine Aquarium Council initiated a three-year project designed to enhance coral reef conservation in the islands by facilitating MAC certification of qualifying aquarium industry operators and encouraging market incentives (MAC 2003).

Despite the creation of FRAs on the Big Island of Hawaii, densities of *N. lituratus* sub-adults and juveniles has continued to decline since a peak in 2005. However this is attributed to the high inter-annual variability in recruitment such that without replenishment of YOY (young of year) to the deeper reef areas where transects are conducted. Consequently, densities of younger fish have declined because of ontogenetic movement into adult habitat and natural mortality (Walsh *et al.* 2010).

For reef slopes on Guam (4-12 m) there was no evidence of a biomass buildup within Marine Reserves when compared with adjacent fished sites (J. McIlwain unpub.data).

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Draft

Naso lopezi - Herre, 1927

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Naso - lopezi

Common Names: Slender Unicornfish (English), Aflang næsehornsfisk (Danish), Debam (Undetermined), Dengkis (Undetermined), Elongate Unicornfish (English), Indangan (Filipino; Pilipino), Lopez' Unicornfish (English), Naga-tenguhagi-modoki (Japanese), nuqa ta (Undetermined)
Synonyms: Naso Herre, 1927;

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Abesamis, R., Nanola, C., Stockwell, B., Choat, J.H., Clements, K.D., McIlwain, J., Myers, R., Rocha, L.A. & Russell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Naso lopezi is widespread in the central and western Pacific. It is a targeted food fish in the Philippines. There are some localized threats from fishing, although there is no data at the moment indicating global population declines. It is found in a number of well-policed marine protected areas. It is therefore listed as Least Concern. We recommend continued monitoring of the harvest levels of this species.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Naso lopezi is found from southern Honshu, Japan to the Great Barrier Reef and New Caledonia. It is reported from the Similan Islands in the Andaman Sea and Guam. It was recently recorded from Tonga (Randall *et al.* 2003).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 70

Depth Upper Limit (in metres below sea level): 6

Depth Zone: Shallow photic (0-50m), Deep Photic (51-200m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Australia	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
India	Extant	Native	-	Resident
India -> Andaman Is.	Extant	Native	-	Resident
India -> Nicobar Is.	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Gilbert Is.	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Marshall Islands	Presence Uncertain	Native	-	-
Micronesia, Federated States of	Extant	Native	-	Resident
Myanmar	Extant	Native	-	Resident
Nauru	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
Thailand	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
Vanuatu	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
57. Indian Ocean - eastern	Extant	Native	-	Resident

61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident

Population

Naso lopezi is rare in Calamianes Islands, Philippines and Milne Bay Province, Papua New Guinea (Werner and Allen 2000, Allen 2003). It is occasionally found in Raja Ampat, Indonesia (Allen 2003b). It is fairly common in the central Visayas (R. Abesamis, C. Nanola, A. Candido, Conales, S., Jr. and B. Stockwell pers. comm. 2010).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Naso lopezi occurs above fore reef slopes and steep escarpments usually in small groups ranging in size from a few individuals to a thousand or more. It sometimes mixes with other schooling *Naso* species (R.F. Myers pers. comm. 2010). Primary food items include ctenophores and crustaceans. Other food items include algae, diatoms, dinoflagellates and molluscs. It was observed to form feeding schools of a few hundred to a thousand individuals in the Philippines during the daytime. Early morning and late afternoon, it feeds on near the bottom and in the upper layers of the water at noon and early afternoon (Alcazar and Alcala 1977). The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
60 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

This species is captured for food using bamboo traps, hook and line and gill nets. It is specifically targeted in the Philippines.

Threats

Naso lopezi is targeted in the Philippines. Localized declines are occurring in parts of its distribution.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Draft

Naso maculatus - Randall & Struhsaker, 1981

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Naso - maculatus

Common Names: Spotted Unicornfish (English), Gangis (Undetermined), Goma-tenguhagi-modoki (Japanese), Plettet Næsehornsfisk (Danish)
Synonyms: No Synonyms

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Russell, B., Abesamis, R., Clements, K.D., Choat, J.H., McIlwain, J., Myers, R., Rocha, L.A., Nanola, C. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Naso maculatus is widely distributed, possibly antitropical and occurs in moderately deep water. It is caught only incidentally. Localized fishing poses a threat in parts of its distribution. However, it is caught only incidentally in Taiwan and occurs in a number of well-policed marine reserves in Hawaii and marine protected areas in other parts of its range. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Naso maculatus is found from Wakayama Prefecture, Japan and the Hawaiian Islands in the North Pacific, and Lord Howe Island, Chesterfield Islands and New Caledonia in the South.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 220

Depth Upper Limit (in metres below sea level): 20

Depth Zone: Shallow photic (0-50m), Deep Photic (51-200m), Bathyl (201-4,000m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Australia	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
United States	Extant	Native	-	Resident
United States -> Hawaiian Is.	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident
81. Pacific - southwest	Extant	Native	-	Resident

Population

There is no population information available for this species.

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

In Japan, this species was reported to form schools and occasionally seen in mixed schools with *N. hexacanthus (*Masuda 1975). The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
60 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Naso maculatus is occasionally seen in fish markets. Incidentally caught in Taiwan (trammel nets).

Threats

Fishing poses a threat to this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Draft

Naso mcdadei - Johnson, 2002

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Naso - mcdadei

Common Names: Squarenose Unicornfish (English)
Synonyms: No Synonyms

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-10	Passed	-	-

Assessor(s): Choat, J.H., Abesamis, R., Clements, K.D., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Naso mcdadei is widespread and found in moderately deeper waters.There are some localized threats (fishing), with no data indicating population declines. However, it is found in a number of well-policed marine protected areas. Studies have shown that in well-managed reserves acanthurids tend to recover comparatively quickly (Stockwell *et al.* 2009) and therefore increased management in protected areas and potentially fishery protection might offset the overexploitation of this species. It is therefore listed as Least Concern. We recommend continued monitoring of the harvest levels of this species.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Naso mcdadei is known from East Africa to the Great Barrier Reef, Australia, from Natal, Mauritius, Chagos, Archipelago, Maldive Islands, Dampier Archipelago (Western Australia), Indonesia, to southern Taiwan.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 65

Depth Upper Limit (in metres below sea level): 20

Depth Zone: Shallow photic (0-50m), Deep Photic (51-200m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Australia	Extant	Native	-	Resident
British Indian Ocean Territory	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Maldives	Extant	Native	-	Resident
Mauritius	Extant	Native	-	Resident
Mozambique	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Réunion	Extant	Native	-	Resident
South Africa	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident

Population

Naso mcdadei is widespread, but appears to be uncommon. It is known only from a few specimens (Johnson 2002).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Naso mcdadei is generally found on steep drop-offs of offshore coral reefs or rocky outcrops. It is characteristic of deeper non-reef environments (Klanten *et al. 2004*). The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.5. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Soft Substrate	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
75 (SL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Naso mcdadei is occasionally found in markets in the Philippines.

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Choat, J.H., Clements, K.D. and Robbins, W.D. 2002b. The trophic status of herbivorous fishes on coral reefs. 1. Dietary analyses. *Marine Biology* 140: 613-623.

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Draft

Naso minor - (Smith, 1966)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Naso - minor

Common Names: Blackspine Unicornfish (English), Indangan (Filipino; Pilipino), Little Unicorn (English), Silanis (Undetermined), Slank eenhoringvis (Afrikaans), Slender Unicorn (English)
Synonyms: Axinurus Smith, 1966;

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Abesamis, R., Choat, J.H., Clements, K.D., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Naso minor is common and can be locally abundant in some parts of its distribution. It is harvested for food but is not targeted. It has a wide depth range and can be found in moderately deeper waters. *N. minor* has high turn over rates with the maximum age recorded at 5 years. It is found in a number of marine protected areas in parts of its range. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Naso minor is found from Mozambique eastwards to the Philippines. It was recorded from the outer reef slopes of the Great Barrier Reef (Clements and Randall 1996) and photographed off Guam by Tim Allen (R.F. Myers pers. comm. in Randall 2001a).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 55

Depth Upper Limit (in metres below sea level): 3

Depth Zone: Shallow photic (0-50m), Deep Photic (51-200m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Australia	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Kenya	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Mauritius	Extant	Native	-	Resident
Mozambique	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Réunion	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
Tanzania, United Republic of	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident

Population

Naso minor is common and locally abundant in parts of its range. It is a regular component of the artisanal fisheries catch at Pamilacan and Balicasag, Bohol, Philippines (Lavides *et al.* 2010). It is rare in Calamianes Islands, Philippines (Werner and Allen 2000). It is common on the seaward side of outer shelf reefs in the northern section of the Great Barrier Reef (Clements and Randall 1996). Occasional schools were recorded at Raja Ampat, Indonesia (Allen 2003b). It is common along the reef slope in Tulamben, Bali, Indonesia, as shallow as 3m (R.F. Myers pers. comm. 2010).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Naso minor occurs in small zooplankton-feeding aggregations well above the bottom at depths of 8 to at least 40 m (Randall 2001a). The maximum age recorded was 5 years. *N. minor* has high turn-over rates (J.H. Choat pers comm. 2010). The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity
5 Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
22.5 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?

No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Naso minor is collected for food and occasionally found in markets.

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Draft

Naso reticulatus - Randall, 2001

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Naso - reticulatus

Common Names: Reticulate Unicornfish (English)
Synonyms: No Synonyms

Red List Status
DD - Data Deficient, (IUCN version 3.1)
Data Deficient reason: : taxonomic

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Russell, B., Choat, J.H., Abesamis, R., Clements, K.D., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Naso reticulatus is known only two type specimens and a specimen collected at a fish market in Dumaguete, Philippines. It is not reported elsewhere in the Coral Triangle Region and is probably confused with other species and occurs in deeper waters. There is no information on its biology and its population status. It is therefore listed as Data Deficient.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Naso reticulatus is found from Taiwan and Indonesia (Sumatra), including the Philippines.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): (Not specified)

Depth Upper Limit (in metres below sea level): 16

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Indonesia	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident

Population

There is no population information available for this species.

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

There is little known about the biology and life history characteristics of this species. It is only known from two type specimens (Randall 2001c) and a specimen collected at a fish market in Dumaguete, Philippines (Randall 2001a). The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-

9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
57 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

A specimen was obtained from a fish market in Dumaguete, Philippines (Randall 2001a).

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Draft

Naso thynnoides - (Cuvier, 1829)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Naso - thynnoides

Common Names: Singlespine Unicornfish (English), Barred Unicornfish (English), Bôzuhagi (Japanese), Dengkis (Malay), Eenmes-eenhoringvis (Undetermined), Enkeltbladet Næsehornsfisk (Danish), Indangan (Filipino; Pilipino), One-spine Unicorn (English), Oneknife Unicornfish (English), Rufia Quilhada (Portuguese), Thunny Unicornfish (English)
Synonyms: Axinurus Cuvier, 1829; Naso (Cuvier, 1829);

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Abesamis, R., Choat, J.H., Clements, K.D., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Naso thynnoides is widespread in the Indo-Pacific region. It is common and can be locally abundant. It is a targeted food fish in parts of its range and is occasionally seen in fish markets. There may be some localized declines through harvesting, however, it is not considered a major threat to the global population. It is found in several Marine Protected Areas within its range. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Naso thynnoides is widespread from East Africa to the Marshall and Solomon Islands, northwards to the Ryukyu Islands, south to the Solomon Islands and the Great Barrier Reef. It is also known from American Samoa, Johnston Atoll and Tuamoto archipelago. It is probably more widespread in the central Pacific than current records indicate (R.F. Myers pers. comm. 2010).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 50

Depth Upper Limit (in metres below sea level): 2

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Australia	Extant	Native	-	Resident
British Indian Ocean Territory	Extant	Native	-	Resident
Comoros	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
French Southern Territories	Extant	Native	-	Resident
French Southern Territories -> Mozambique Channel Is.	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
India	Extant	Native	-	Resident
India -> Andaman Is.	Extant	Native	-	Resident
India -> Nicobar Is.	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Kenya	Extant	Native	-	Resident
Madagascar	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Maldives	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Mauritius	Extant	Native	-	Resident
Mayotte	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Mozambique	Extant	Native	-	Resident
Myanmar	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Réunion	Extant	Native	-	Resident
Samoa	Extant	Native	-	Resident
Seychelles	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Somalia	Presence Uncertain	Native	-	-
Sri Lanka	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
Tanzania, United Republic of	Extant	Native	-	Resident

Thailand	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Johnston I.	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident

Population

Naso thynnoides is generally rare, but several large schools were observed in Milne Bay Province, Papua New Guinea (Allen 2003). Occasional large schools were observed at Raja Ampat, Indonesia (Allen 2003b). It is common and locally abundant in the Philippines (R. Abesamis and C. Nanola pers. comm. 2010).

The catch composition of the Apo Island fishery in the Philippines is dominated by a few fish families, Acanthuridae being one of the five families accounting for about 50-90% of the catch. Reef and reef-associated species became more dominant in the catch over the years. In particular, an increasing proportion of carangids and acanthurids was observed in the catch over time. The proportion of Acanthuridae total catch almost doubled over the study period (16% in 1980/81 to 27% in 2000/2001) (Maypa *et al.* 2002).

In Kenya, landings during 1978-2001 for families that are less important in commercial catches (e.g., scarinae and Acanthuridae) showed rising catches (1978-1984) followed by a general decline during the 1990s, but the landings for the scarinae showed a rising trend in recent years (Kaunda-Arara *et al.* 2003).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Naso thynnoides is usually seen in small roving aggregations feeding on zooplankton. It occurs both in the protected waters of lagoons and in exposed outer reef areas from the shallows to at least 40 m, but generally more than 10 m. It sleeps on reefs at night at which time it takes on a disruptive mottled color pattern. The maximum age recorded was 4-5 years. *N. thynnoides* has high turnover rate (R. Abesamis & J.H. Choat pers comm. 2010).

The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.5. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Soft Substrate	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity
4-5 Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
35 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Naso thynnoides is captured for food. In Apo Island, Philippines, it is caught by gill nets and traps (Maypa *et al.* 2002). It is occasionally seen in markets.

Threats

Fishing may cause some localized declines.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Draft

Naso tonganus - (Valenciennes, 1835)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Naso - tonganus

Common Names: Bulbnose Unicornfish (English), Hompmeus-eenhoringvis (Undetermined), Humphead Unicornfish (English), Humpnose Unicornfish (English), Kuli pasir (Undetermined), Nason Loupe (French), Petit Barbillon (French), Picot à Deux Couteaux (French), Tosakahagi (Japanese), Ume-uluto'i (Undetermined), ta masimasi (Undetermined)
Synonyms: Naseus Valenciennes, 1835;

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Choat, J.H., Abesamis, R., Clements, K.D., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Naso tonganus is widespread and common in many parts of its distribution. It is occasionally found in fish markets. It is an important food fish in parts of its range but is not specifically targeted elsewhere in its distribution. There is no evidence of declines from harvesting and it is found in a number of marine protected areas in parts of its range. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Naso tonganus is found from East Africa to Samoa Islands and throughout Micronesia, northwards to Ryukyu Islands, Japan and southwards to the Great Barrier Reef and New Caledonia. It is also recorded from Rowley Shoals and Scott Reef, Western Australia and in Cocos and Christmas Island (J.H. Choat pers. comm. 2010).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 25

Depth Upper Limit (in metres below sea level): 3

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Australia	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Cocos (Keeling) Islands	Extant	Native	-	Resident
Comoros	Extant	Native	-	Resident
Cook Islands	Extant	Native	-	Resident
Disputed Territory	Extant	Native	-	Resident
Disputed Territory -> Spratly Is.	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
French Southern Territories	Extant	Native	-	Resident
French Southern Territories -> Mozambique Channel Is.	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Kenya	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Gilbert Is.	Extant	Native	-	Resident
Kiribati -> Phoenix Is.	Extant	Native	-	Resident
Madagascar	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Maldives	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Mauritius	Extant	Native	-	Resident
Mayotte	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Mozambique	Extant	Native	-	Resident
Myanmar	Extant	Native	-	Resident
Nauru	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
Niue	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Réunion	Extant	Native	-	Resident

Samoa	Extant	Native	-	Resident
Seychelles	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Somalia	Extant	Native	-	Resident
South Africa	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
Tanzania, United Republic of	Extant	Native	-	Resident
Thailand	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident
Tokelau	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Howland-Baker Is.	Extant	Native	-	Resident
Vanuatu	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident

Population

Naso tonganus was recorded as occasional in terms of relative abundance in the northern Bismarck Sea, Papua New Guinea (Allen 2009). It is rare in the American Samoa National Park (National Park of Samoa Checklist of Fishes accessed 21 April 2010). This species is uncommon in Guam, Palau and Saipan (R.F. Myers and J. McIlwain pers. comm. 2010). It is common on the Great Barrier Reef and Christmas Island. It is rare at Cocos (J.H. Choat pers. comm. 2010). It is occasionally seen in Tubbataha, Philippines (S. Conales, Jr. pers. comm. 2010).

In Kenya, landings during 1978-2001 for families that are less important in commercial catches (e.g., scarinae and Acanthuridae) showed rising catches (1978-1984) followed by a general decline during the 1990s, but the landings for the scarinae showed a rising trend in recent years (Kaunda-Arara *et al.* 2003).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Naso tonganus inhabits coral reefs. It is found solitary or in small groups (Randall 2001a). It feeds on turfing and filamentous red and green algae (Choat *et al.* 2004). It is classified as a browser (Choat 1991, Choat *et al.* 2002b). The sexes are separate among the acanthurids (Reeson 1983). Caudal knives in males are enlarged (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity
25 Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
60 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

In Bellona Island, Solomon Islands, this species is among the finfish species that is of particular commercial, subsistence and cultural importance (Thaman *et al.* 2010). *N. tuberosus* is one of the most commonly consumed species on Brooker Is., Papua New Guinea (Allen *et al.* 2003). *N. tuberosus* is known only from the western Indian Ocean. This record may be for *Naso tonganus.* It is occasionally seen in fish markets.

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Draft

Naso tuberosus - Lacepède, 1801

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Naso - tuberosus

Common Names: Humpnose Unicornfish (English), Fullikkarukkan (Undetermined), Indangan (Filipino; Pilipino), Mudiyan (Undetermined), Rufia Narigudo (Portuguese)
Synonyms: No Synonyms

Red List Status
DD - Data Deficient, (IUCN version 3.1)
Data Deficient reason: : taxonomic

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	-	-	-	-

Assessor(s): Choat, J.H., Abesamis, R., Clements, K.D., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Naso tuberosus is known only from a few specimens. It has long been confused with *Naso tonganus*. This species is the less common species known only from the western Indian Ocean. There is limited information available on its biology, life history characteristics and population trends. It is therefore listed as Data Deficient.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Naso tuberosus is known from the western Indian Ocean from Mauritius, Seychelles, and Mozambique. It has been recorded from Rottnest and Cocos Islands (J.H. Choat pers. comm. 2010).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 25

Depth Upper Limit (in metres below sea level): (Not specified)

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Australia	Extant	Native	-	Resident
Cocos (Keeling) Islands	Extant	Native	-	Resident
Comoros	Extant	Native	-	Resident
French Southern Territories	Extant	Native	-	Resident
French Southern Territories -> Mozambique Channel Is.	Extant	Native	-	Resident
Kenya	Extant	Native	-	Resident
Madagascar	Extant	Native	-	Resident
Mauritius	Extant	Native	-	Resident
Mayotte	Extant	Native	-	Resident
Mozambique	Extant	Native	-	Resident
Réunion	Extant	Native	-	Resident
Seychelles	Extant	Native	-	Resident
Somalia	Extant	Native	-	Resident
Tanzania, United Republic of	Extant	Native	-	Resident
Yemen	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident

Population

Naso tuberosus has long been confused with *Naso tonganus*. This species is the less common species known only from the western Indian Ocean. Only a few specimens are known (Randall 2001a).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Naso tuberosus feeds on thallate and filamentous algae (Choat *et al.* 2002b). The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010). The number of sagittal increments in a study done by Choat and Axe (1996) suggest that members of the genus *Naso* attain the same maximum ages as the other acanthurids, in excess of 20 years for this species. Maximum age 25 years. Size at sexual maturity 350 mm (Choat and Robertson 2002a).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity
(Not specified) Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
60 (SL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Naso tuberosus is collected for food, however there are no capture records available.

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Draft

Naso unicornis - (Forsskål, 1775)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Naso - unicornis

Common Names: Bluespine Unicornfish (English), Barbero de Aguijón Azul (Spanish; Castilian), Batoklaj (Undetermined), Berbero de Aguijon Azul (Spanish; Castilian), Bloustekel-eenhoringvis (Undetermined), Blåpigget Næsehornsfisk (Danish), Brown Unicornfish (English), Chum (Undetermined), Corne (French), Dawa (French), Debam (Malay), Fiantandroka (Undetermined), Fiantsifa (Undetermined), Guassa (Undetermined), Hangun (Undetermined), Humphead Unicornfish (English), Humu (Undetermined), Indangan (Filipino; Pilipino), Kala (Hawaiian), Karukkan (Undetermined), Kaxan (Undetermined), Komban-karukkan (Undetermined), Licorne (French), Long-snouted Unicornfish (English), Longhorn Unicornfish (English), Longnose Unicornfish (English), Mone (Undetermined), Nason Brun (French), Nason Vert (French), Nason à Eperons Bleus (French), Noshörningsfisk (Swedish), Pacul (Undetermined), Puju (Undetermined), Rufia Espigão Azul (Portuguese), Ta (Undetermined), Tarian (Undetermined), Tenguhagi (Japanese), Um (Undetermined), Ume (Undetermined), Ume-isu (Undetermined), Unicorn Tang (English)
Synonyms: Acanthurus (Forsskål, 1775); Chaetodon Forsskål, 1775;

Taxonomic Note:
Naso unicornis is widespread throughout the Indo-Pacific region, genetic studies conducted by Horne *et al.* (2008) did not find any evidence of geographic population structure even at the largest spatial scales.

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): McIlwain, J., Choat, J.H., Abesamis, R., Clements, K.D., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Naso unicornis is widespread in the Indo-Pacific. It is common and can achieve high abundances in parts of its range. It is a targeted fish species in most of its distribution. There have been signs of catch declines, however with no corresponding effort data, population declines cannot be easily quantified. There is no clear trend of population declines. It is found in a number of well-managed protected areas and has shown positive responses to protection. It is therefore listed as Least Concern. We recommend continued monitoring of the harvest levels and population status of this species.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Naso unicornis is found from the Red Sea and East Africa to the Hawaiian Islands and Pitcairn Islands, northwards to southern Japan, southwards to New South Wales, Lore Howe Island, and Norfolk Island. It is also reported from Western Australia. It was recently recorded from

Easter Island.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 80

Depth Upper Limit (in metres below sea level): 0

Depth Zone: Shallow photic (0-50m), Deep Photic (51-200m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Australia	Extant	Native	-	Resident
British Indian Ocean Territory	Extant	Native	-	Resident
Brunei Darussalam	Extant	Native	-	Resident
Cambodia	Extant	Native	-	Resident
Chile	Extant	Native	-	Resident
Chile -> Easter Is.	Extant	Native	-	Resident
China	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Cocos (Keeling) Islands	Extant	Native	-	Resident
Comoros	Extant	Native	-	Resident
Cook Islands	Extant	Native	-	Resident
Disputed Territory	Extant	Native	-	Resident
Disputed Territory -> Paracel Is.	Extant	Native	-	Resident
Disputed Territory -> Spratly Is.	Extant	Native	-	Resident
Djibouti	Extant	Native	-	Resident
Egypt	Extant	Native	-	Resident
Eritrea	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
French Southern Territories	Extant	Native	-	Resident
French Southern Territories -> Mozambique Channel Is.	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident

India	Extant	Native	-	Resident
India -> Andaman Is.	Extant	Native	-	Resident
India -> Nicobar Is.	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Israel	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Jordan	Extant	Native	-	Resident
Kenya	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Gilbert Is.	Extant	Native	-	Resident
Kiribati -> Kiribati Line Is.	Extant	Native	-	Resident
Kiribati -> Phoenix Is.	Extant	Native	-	Resident
Madagascar	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Maldives	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Mauritius	Extant	Native	-	Resident
Mayotte	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Mozambique	Extant	Native	-	Resident
Myanmar	Extant	Native	-	Resident
Nauru	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
New Zealand	Extant	Native	-	Resident
Niue	Extant	Native	-	Resident
Norfolk Island	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Oman	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Pitcairn	Extant	Native	-	Resident
Réunion	Extant	Native	-	Resident
Samoa	Extant	Native	-	Resident
Saudi Arabia	Extant	Native	-	Resident
Seychelles	Extant	Native	-	Resident
Singapore	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Somalia	Extant	Native	-	Resident
South Africa	Extant	Native	-	Resident
Sri Lanka	Extant	Native	-	Resident
Sudan	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
Tanzania, United Republic of	Extant	Native	-	Resident
Thailand	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident
Tokelau	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident

Tuvalu	Extant	Native	-	Resident
United States	Extant	Native	-	Resident
United States -> Hawaiian Is.	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Howland-Baker Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Johnston I.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Midway Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> US Line Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Wake Is.	Extant	Native	-	Resident
Vanuatu	Extant	Native	-	Resident
Viet Nam	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident
Yemen	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident
81. Pacific - southwest	Extant	Native	-	Resident
87. Pacific - southeast	Extant	Native	-	Resident

Population

FAO cpature production for *Naso unicornis* from Saudi Arabia recorded 126 tonnes in 2000 to 191 tonnes in 2001, catch decreased from 2002-2004 with 133,145 and 113 tonnes respectively; it has increased since then with 195 tonnes recorded in 2007. There are no capture production records prior to 2000. Density of *N. unicornis* was 3-10 times greater after marine reserves around five islands in New Caledonia were protected from fishing for 4 yrs (Wantiez *et al.* 1997). In the central Philippines, there were two orders of magnitude difference in mean biomass between fished areas and marine reserves (0.5 to 11 years protection) (Stockwell *et al.* 2009).

In Saipan, this species was the most abundant fish in the surveys with landings accounting for 14% of the total fish landings, and 50% of the acanthurids landings (P. Houk unpublished data). Census data from seven sites around Saipan using timed visual surveys on SCUBA revealed *N. unicornis* was extremely rare at 0.05% of the total acanthurid abundance. A similar result was found on Guam, where this species made up 17% of the acanthurid fishery but was rarely recorded during visual surveys. In these and other locations where spearfishing is the primary fishing method, daytime visual surveys using fixed length transects might be inappropriate.

In the Federal States of Micronesia, particularly Yap, *N. unicornis* accounts for approximately 12% of the total catch landed from the sheltered coastal reefs and lagoons at two sites Yyin and Riiken (Kronen *et al.* 2006). On Pohnpei, this species is the second most abundant acanthurid in the fishery (26% of all acanthurids) (Rhodes *et al.* 2008). Analysis of longterm fishery data (1984-2007) from Guam reveal no decline in mean individual weight for this species (Division of Aquatic and Wildlife Resources unpub. data). Average of 7,700 kls/year landed in Hawaii (Division of Aquatic Resources unpub. data). This species is collected as an aquarium fish in West Hawaii. The total number of individuals caught from FY 2005-2009 was 24 with a total value of $68 (Walsh *et al.* 2010).

This species was recorded as occasional in terms of relative abundance in Palawan Province, Philippines and the northern Bismarck Sea, Papua New Guinea (Werner and Allen 2000, Palawan Council for Sustainable Develeopment, Allen 2009). It is moderately common in Milne Bay Province, Papua New Guinea and in Raja Ampat, Indonesia (Allen 2003, 2003b). In Moorea, French Polynesia, SPOT satellite images allowed estimation of the surface area of fringing reef (1,076 ha), barrier reef (3,788 ha) and outer slop (493 ha). A total of 21,346 individuals/total surface area were recorded in fish visual surveys conducted from 1990-1993 (Lecchini *et al.* 2006).

In the Nabq Managed Resource Protected Area, South Sinai, Egyptian Red Sea, mean abundances of this species was higher in the fished areas than in the no-take zones across 3 and 10m depths. This can be attributed to a result of reduced predation or competition (Ashworth and Ormond 2005). In a stock assessment conducted at the northern province of New Caledonia by Letourneur *et al.* (2000), density and biomass was higher in the north zone and on barrier reefs (17.5 $g \cdot m^{-2}$ and 129 10^{-4} × $indivuals \cdot m^{-2}$) compared to other areas surveyed and other reef types.

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Naso unicornis is found in inshore coral reefs but will enter shallow water (Randall 2001a). It feeds on macroscopic algae, mainly larger brown algae (*Turbinaria* and *Dictyota*) (Choat *et al.* 2002, 2004). It undergoes ontogenetic habitat shifts from shallow, sheltered areas of the reef to deeper, more exposed habitats (Meyer and Holland 2005), juveniles move from shallow reef flats to the reef crest at approximately 12 cm (J. McIlwain pers. obv.). It typically occurs in small groups, migrates around the outer reef edge, and spawns around both new and full moons (Johannes 1981, Arai and Sato 2007).

Home range estimates of *N. unicorns* from a study on Guam ranged from 51 m^2 to 100,045 m^2 (mean = 30,227m2) almost ten times that for the same species in Hawaii (mean = 3,172 m^2) (Meyer *et al.* 2000, Marshall unpub thesis). These differences may reflect differences in methods with the former employing a remote array deployed over five months and the latter a hand-held hydrophone used to track individual fish for a maximum of 21 days. There was a strong ontogenetic shift in both home range size and habitat preference at both locations. On Guam, large individuals 26 cm use not only the shallow reef flats but range over deeper, more exposed habitat on the reef slope

Reproduction

The sexes are separate and there is evidence of sexual dimorphism in the caudal knives which are relatively larger in males (J.H. Choat pers. comm. 2010). Size at first reproduction (L50) for females collected from the fishery in Guam (2008-2009) was 328 mm (J. McIlwain unpub.data). In Hawaii the L50 for reproductive females collected only in June was 378 mm (Eble *et al.* unpub report). The smallest females with vitellogenic or hydrated oocytes was 286 mm and 342 mm respectively. The L50 for males from Hawaii was 286 mm, and the smallest male with sperm present was 266 mm. For the Hawaiian fishery, two thirds of females enter the fishery before maturation (Eble *et al.* 2009). In Guam, mature or spent females were only recorded from August to October during 2008. This species exhibits high recruitment rates (J. McIlwain unpub, data).

In Hawaii mean age from a sample of 197 fish was 12.8 yrs (range of 1- 58 yrs). They found no evidence of sexual dimorphism in size or differences in growth among locations. Males reached age at first maturity at 4.5 yrs, 7.5 years for females at 37.8 cm (TL) (J. Eble unpub. report). In the Great Barrier Reef females reach first maturity at four years 30-35 cm (TL) (J.H. Choat pers comm. 2010).

It was observed to form spawning aggregations on the Great Barrier Reef (Johannes 1981, Squire and Samoilys unpub.). The large pelagic larvae persist in the pelagic environment for approximately 90 days (B.Victor pers comm. in Horne *et al.* 2008).

Age

The number of sagital increments in a study done by Choat and Axe (1996) suggest that members of the genus *Naso* attain the same maximum ages as the other Acanthurids, in excess of 20 years for this species. Maximum age 30 years in the Great Barrier Reef (Choat and Robertson 2002a), 58 years in Hawaii (Eble 2009).

Movement

A study by Meyer and Holland (2005) revealed the first nocturnal movements in surgeonfishes. *Naso unicornis* moved up to 170 m on nights where moonlight was completely absent. The study also showed that this species was site-attached to home ranges situated within the boundaries of the study area and their movements were aligned with topographical features.

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female	Age at Maturity: Male	Size at Maturity (in cms): Female	Size at Maturity (in cms): Male
7-8 Years	4 Years	28-38 (TL)	26-28.6

Longevity
58 Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
70 (FL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Naso unicornis is an important food fish and is targeted by fishers. In Atafu, large netting drives with seines are occasionally employed as a community fishing actvity involving over 100 people. This species is one of the main species captured by this netting method (Ono and Addison 2009). It is also an occasional component of the aquarium trade (Global Marine Aquarium Database accessed 19 March 2010).

Threats

Naso unicornis is a targeted food fish. There have been significant reductions in biomass in parts of its range.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range. In Queensland, Australia, there is a recreational catch limit of five per species and a minimum size limit of 25 cm (Department of Primary Industries accessed 8 April 2010).

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Draft

Naso vlamingii - (Valenciennes, 1835)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Naso - vlamingii

Common Names: Bignose Unicornfish (English), Aunel (Undetermined), Bagis (Undetermined), Big-nose Unicorn (English), Bignose Unicorn (English), Debam (Undetermined), Dengkis (Undetermined), Grootneus-eenhoringvis (Undetermined), Indangan (Undetermined), Isdang ilong (Undetermined), Karaua (Undetermined), Karukkan (Undetermined), Nason Zébré (French), Nason à Gros Nez (French), Rufia (Portuguese), Sazanami-tosakahagi (Japanese), Scibbled Unicornfish (English), Stornæset næsehornsfisk (Danish), Surahan (Undetermined), Tudluan (Undetermined), Ume (Undetermined), Ume-masimasi (Undetermined), Vlaming's Unicornfish (English), Zebra Unicornfish (English)
Synonyms: Naseus Valenciennes, 1835; Naso (Valenciennes, 1835);

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed? (Not specified)

Assessor(s): Dominici, A., Molina, H., Robertson, R. & Smith-Vaniz, B.

Reviewers: (Not specified)

Contributor(s): De Silva, R., Milligan, H., Lutz, M., Batchelor, A., Jopling, B., Kemp, K., Lewis, S., Lintott, P., Sears, J., Wilson, P., Smith, J. & Livingston, F.

Facilitators/Compilers: (Not specified)

Assessment Rationale

This species is widespread in the Indo-Pacific. There are no major threats known, and there is no current indication of widespread population decline. It is listed as Least Concern. However, continued monitoring and research on this species population is needed given that it is associated with coral reefs and is occasionally harvested for subsistence fisheries and the aquarium trade.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Naso vlamingii is a wide-spread Indo-pacific unicorn fish, distributed from East Africa to French Polynesia and Hawaii, north to southern Japan, and south to the southern Great Barrier Reef and New Caledonia. In the Eastern Pacific, this species is only found in the Galapagos Islands.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 50

Depth Upper Limit (in metres below sea level): 1

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: (Not specified)

Biogeographic Realms

Biogeographic Realm: Afrotropical, Australasian, Indomalayan, Neotropical, Oceanian, Palearctic

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Australia	Extant	Native	-	Resident
British Indian Ocean Territory -> Chagos Archipelago	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Cocos (Keeling) Islands	Extant	Native	-	Resident
Comoros	Extant	Native	-	Resident
Cook Islands	Extant	Native	-	Resident
Ecuador	Extant	Native	-	Resident
Ecuador -> Galápagos	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
French Polynesia -> Marquesas	Extant	Native	-	Resident
French Polynesia -> Tuamotu	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
India	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Japan -> Nansei-shoto	Extant	Native	-	Resident
Japan -> Ogasawara-shoto	Extant	Native	-	Resident
Kenya	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Madagascar	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Maldives	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Mauritius	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Mozambique	Presence Uncertain	Origin Uncertain	-	-
Myanmar	Extant	Native	-	Resident
Myanmar -> Coco Is.	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident

Réunion	Extant	Native	-	Resident
Samoa	Extant	Native	-	Resident
Seychelles	Extant	Native	-	Resident
Somalia	Presence Uncertain	Origin Uncertain	-	-
South Africa	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
Tanzania, United Republic of	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident
United States	Extant	Native	-	Resident
United States -> Hawaiian Is.	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Wake Is.	Extant	Native	-	Resident
Viet Nam	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident
87. Pacific - southeast	Extant	Native	-	-

Population

There is no population information available for *Naso vlamingii*.

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations	Qualifier	Justification
-	Suspected	-

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals?	Qualifier	Justification
-	Suspected	-

Habitats and Ecology

Naso vlamingii occurs in deep lagoons and seaward coral reefs. This species is often found forming loose schools along upper regions of deep drop-offs to depths of 50 m. It forms mid-water aggregations off steep coral slopes to feed upon zooplankton during the day.

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
60 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: Congregatory (and dispersive)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Naso vlamingii is harvested by subsistence fisheries and for the aquarium trade.

Threats

There are no major threats known to this species, however it is harvested by subsistence fisheries and for the aquarium trade. It is associated with coral reefs, a habitat that can be locally degraded by water pollution, human pollution pressures, overfishing, tourism, Crown of Thorns outbreaks and coral bleaching.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for *Naso vlamingii*. However, the distribution of this species may fall with numerous designated marine protected areas, including Apo Island Marine Reserve in the Philippines. Apo Island marine reserve is a no-take reserve and *N. vlamingii* biomass is reported to have tripled inside the reserve from 1983 to 2001. Outside the reserve, but close to the reserve boundary, *N. vlamingii* biomass has increased by a factor of 40 (Russ *et al.* 2003). Therefore habitat conservation measures, such as the establishment and management of no-take zones and marine protected areas are needed to effectively conserve populations of this species.

Monitoring of this species, its habitat status, harvest levels and threats should be undertaken, to accurately determine the impact of coral reef degradation and fisheries on the population of *N. vlamingii* in the future. Research should also be conducted on species specific conservation meaures for *N. vlamingii*, to try and reduce further negative impact on the population of this species.

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Draft

Paracanthurus hepatus - (Linnaeus, 1766)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Paracanthurus - hepatus

Common Names: Palette Surgeonfish (English), Acaraúna-preta (Portuguese), Barbeiro (Portuguese), Blue Surgeonfish (English), Blue Tang (English), Chankatayan (Undetermined), Chirurgien Bleu (French), Cirurgião (Portuguese), Dengkis (Malay), Dory (English), Flagtail Surgeonfish (English), Hepatus Tang (English), Indo-Pacific Bluetang (English), Jila (Undetermined), Leter enam (Undetermined), Leter enam kecil (Undetermined), Nanyôhagi (Japanese), Palet-doktervis (Afrikaans), Paletkirurgfisk (Danish), Palettkirurgfisk (Swedish), Regal Blue Surgeonfish (English), Wedge-tailed Tang (English), Wedgetail Blue Tang (English)
Synonyms: Acanthurus (Linnaeus, 1766); Paracanthurus (Lacepède, 1802); Teuthis Linnaeus, 1766;

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): McIlwain, J., Choat, J.H., Abesamis, R., Clements, K.D., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Paracanthurus hepatus is widespread in the Indo-Pacific and is relatively rare in most of its range. It is a targeted aquarium species. There are no indications of any population declines due to harvesting and no clear trends of catch information over time. It is found in numerous marine protected areas in parts of its distribution. It is therefore listed as Least Concern. We recommend further monitoring of the harvest levels and population trends.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Paracanthurus hepatus is found from East Africa to Micronesia, Line Islands and Samoa Islands, northwards to Kochi Prefecture, southwards to New South Wales, Australia. Two instances of vagrants found in Hawaii are probably aquarium releases.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 40

Depth Upper Limit (in metres below sea level): 2

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Australia	Extant	Native	-	Resident
British Indian Ocean Territory	Extant	Native	-	Resident
Brunei Darussalam	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Cocos (Keeling) Islands	Extant	Native	-	Resident
Comoros	Extant	Native	-	Resident
Cook Islands	Extant	Native	-	Resident
Disputed Territory	Extant	Native	-	Resident
Disputed Territory -> Paracel Is.	Extant	Native	-	Resident
Disputed Territory -> Spratly Is.	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
French Southern Territories	Extant	Native	-	Resident
French Southern Territories -> Mozambique Channel Is.	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
India	Extant	Native	-	Resident
India -> Andaman Is.	Extant	Native	-	Resident
India -> Nicobar Is.	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Kenya	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Gilbert Is.	Extant	Native	-	Resident
Kiribati -> Kiribati Line Is.	Extant	Native	-	Resident
Kiribati -> Phoenix Is.	Extant	Native	-	Resident
Madagascar	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Maldives	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Mauritius	Extant	Native	-	Resident
Mayotte	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Mozambique	Presence Uncertain	Native	-	-

Myanmar	Extant	Native	-	Resident
Nauru	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
Niue	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Réunion	Extant	Native	-	Resident
Samoa	Extant	Native	-	Resident
Seychelles	Extant	Native	-	Resident
Singapore	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Somalia	Extant	Native	-	Resident
South Africa	Extant	Native	-	Resident
Sri Lanka	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
Tanzania, United Republic of	Extant	Native	-	Resident
Thailand	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident
Tokelau	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
United States	Extant	Native	-	Resident
United States -> Hawaiian Is.	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Howland-Baker Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> US Line Is.	Extant	Native	-	Resident
Vanuatu	Extant	Native	-	Resident
Viet Nam	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident
81. Pacific - southwest	Extant	Native	-	Resident

Population

Paracanthurus hepatus is a targeted aquarium species in the Solomon Islands. Total purchases from Rarumana from 2002 to May 2004 was

recorded at 7,697 individuals. In Vonavona Lagoon, purchases of this species was recorded at 5,568 individuals (Kinch 2004). It was recorded as occasional in terms of relative abundance in the northern Bismarck Sea, Papua New Guinea and in Raja Ampat, Indonesia (Allen 2009, 2003b). It is occasional in the American Samoa National Park (National Park of Samoa Checklist of Fishes accessed 21 April 2010). It is occasional in Tubbataha (Conales, S., Jr. pers. comm. 2010) and generally rare in most of the Philippines (R. Abesamis and C. Nanola pers. comm. 2010) and in Guam (J. McIlwain pers comm. 2010). It is relatively common in Christmas Island and rare elsewhere in Australian waters.

On the reef systems of Tanzania, mean density was recorded at 0.63 per 500 m^2 (McClanahan *et al.* 1999). It is the 8th most traded species worldwide. 74,557 individuals 1997-2002 (Global Marine Aquarium Database accessed 19 March 2010).

Kinch (2004) estimated CPUE rate for aquarium fish at Rarumana, Solomon Islands at one fish caught per minute. Juvenile blue tangs are the main size group targeted, are easy to collect as they school on certain *Acropora* spp. for shelter.

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Paracanthurus hepatus is typically found in clear water on exposed outer reef areas or in channels where there is consistent moderate to strong current.

The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010). It forms spawning aggregations around outer reef slopes and is believed to spawn all year during the new/full moon (Johannes 1981). It was observed to form spawning aggregations in January, February and March at Escape Reef, northern Great Barrier Reef spawning in the late afternoons (Robertson 1983, Squire & Samoilys unpub.).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
26 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

This highly-prized species is targeted by roving collectors from Bali, Indonesia (Reksodihardjo-Lilley and Lilley, 2007) and is a targeted aquarium species in other parts of its range.

Threats

Overexploitation and destructive fishing practices in some parts of its range (Kinch 2004, Reksodihardjo-Lilley and Lilley 2007).

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Robertson, D.R. 1983. On the spawning behavior and spawning cycles of eight surgeonfishes (Acanthuridae) from the Indo-Pacific. Environmental Biology of Fishes 9(3/4): 193-223.

Draft

Prionurus biafraensis - (Blache & Rossignol, 1961)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Prionurus - biafraensis

Common Names: Biafra Sawtail (English), Biafra Doctorfish (English), Biafra-savkirurgfisk (Danish), Chirurgien Biafra (French), Navajón de Biafra (Spanish; Castilian)
Synonyms: Xesurus Blache & Rossignol, 1961;

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Myers, R., Choat, J.H., Abesamis, R., Clements, K.D., McIlwain, J., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Prionurus biafraensis is common and can be locally abundant in parts of its distribution. It is caught incidentally and is not targeted. There are no major threats known and it occurs in a few marine reserves in parts of its range. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Prionurus biafraensis is found from Sao Tome in the Gulf of Guinea to Pointe-Noire, Congo.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 25

Depth Upper Limit (in metres below sea level): 5

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Congo	Extant	Native	-	Resident
Gabon	Extant	Native	-	Resident
Sao Tomé and Principe	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
34. Atlantic - eastern central	Extant	Native	-	Resident

Population

Prionurus biafraensis is common throughout its range, can be abundant in some parts of its distribution.

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Prionurus biafraensis inhabits rocky shores from 5-25 m where it can be found in small groups and sometimes in large aggregations. The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
24 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Prionurus biafraensis is incidentally caught in subsistence fisheries in Sao Tome but not targeted.

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly

worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. Its distribution overlaps with a few marine protected areas in parts of its distribution.

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Draft

Prionurus chrysurus - Randall, 2001

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Prionurus - chrysurus

Common Names: Yellowtail Sawtail (English), Indonesian Sawtail (English)
Synonyms: No Synonyms

Red List Status
DD - Data Deficient, (IUCN version 3.1)
Data Deficient reason: : none

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Choat, J.H., Abesamis, R., Clements, K.D., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Prionurus chrysurus occurs in southern Indonesia, it is known only from a few specimens. There is no biological information other than it occurs in surge areas of upwelling. There are no known major threats. It occurs in marine reserves in parts of its distribution. It is therefore listed as Data Deficient.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Prionurus chrysurus is known from Bali to western Flores. It is also known from Lombok, Indonesia (Allen and Erdmann 2009).

The other species of *Prionurus* in the western Pacific are antitropical in distribution, *P. chrysurus* is restricted to cool seas from upwelling in tropical waters. This species may be a glacial relic that once had a broader distribution during an ice age when the seas were cooler (Randall 2001a).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 30

Depth Upper Limit (in metres below sea level): 3

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Indonesia	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
57. Indian Ocean - eastern	Extant	Native	-	Resident

Population

Prionurus chrysurus is rare.

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Prionurus chrysurus is described from two adult specimens speared off the east coast of Bali in 10-12 m in areas of upwelling (sea temperature 20-23°C). It is restricted to cool seas from upwelling. It was observed to feed on benthic algae. Most sightings were of solitary individuals, but small aggregations were also seen (Randall 2001a). It swims in groups around rocky outcrops, usually in high energy zones (Kuiter and Debelius 2001).

The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
30 (SL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

General notes regarding trade and use of this species: (Not specified)

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Draft

Prionurus laticlavius - (Valenciennes, 1846)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Prionurus - laticlavius

Common Names: Razor Surgeonfish (English), Chirugien Barbier (French), Cirujano Barbero (Spanish; Castilian), Cochinito Barbero (Spanish; Castilian), Gallinazo (Spanish; Castilian), Navajón Barbero (Spanish; Castilian)
Synonyms: Naseus Valenciennes, 1846;

Taxonomic Note:
This species is closely related to *Prionurus punctatus*, and genetic and morphological studies are required to confirm the taxonomic status of these two species.

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed? (Not specified)

Assessor(s): Abesamis, R., Choat, J.H., Clements, K.D., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Carpenter, K.E., Polidoro, B. & Livingstone, S.

Contributor(s): Allen, G., Robertson, R., Lea, B., Rivera, F., Zapata, F., Merlen, G. & Edgar, G.

Facilitators/Compilers: (Not specified)

Assessment Rationale

This species is widespread in the Eastern Pacific, and is relatively common throughout its range. There are no known major threats to this species, and no current indication of population decline. It is listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

This species is endemic to the Eastern Pacific, and is primarily found from Costa Rica to Ecuador, including the Galapagos, Cocos, and Malpelo Islands. This species can also be found at the mouth of the Gulf of California, and around the Revillagigedo Islands. However, futher genetic studies are required to identify potential taxonomic differences or similarities between spotted and unspotted individuals, as the current distribution is based on those with a lack of spots.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 40

Depth Upper Limit (in metres below sea level): 0

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: (Not specified)

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Colombia	Extant	Native	-	Resident
Costa Rica	Extant	Native	-	Resident
Ecuador	Extant	Native	-	Resident
Mexico	Extant	Native	-	Resident
Nicaragua	Extant	Native	-	Resident
Panama	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

	Presence	Origin	Formerly Bred	Seasonality
4.5.1. Coastal Biome -> Pacific Coastal Provinces -> Gulf of California	Extant	Native	-	Resident
4.5.2. Coastal Biome -> Pacific Coastal Provinces -> California Current	Extant	Native	-	Resident
4.5.8. Coastal Biome -> Pacific Coastal Provinces -> Pacific Central American Coastal	Extant	Native	-	Resident

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
77. Pacific - eastern central	Extant	Native	-	Resident
87. Pacific - southeast	Extant	Native	-	Resident

Population

This species is extremely abundant in southern part of its range, but is considered uncommon in the northern part. In the Galapagos archipelago, studies of this species reported a mean density of 118.6 individuals per 500 m^2 (Edgar *et al.* 2004). In the Gulf of Papagayo, Costa Rica, this species had a mean density of 0.03 (±0.22) individuals per m^2 (Dominici-Arosemena *et al.* 2005). In Golfo Dulce, Costa Rica, this species had a density of 0.000 (±0.0020 individuals per m^2, with a relative abundance of 0.011% (Figueroa 2001).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

This reef-associated species inhabits shallow waters, forms big schools (Krupp 1995), and generally inhabits rocky areas (Jiménez Prado and Béarez 2004). It is herbivorous and feeds in schools on algae attached to rocks or corals (Grove and Lavenberg 1997).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Marginal	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
60 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

General notes regarding trade and use of this species: (Not specified)

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no known conservation measures for this species. However, this species' distribution falls partially into a number of Marine Protected Areas in the Eastern Pacific region (WDPA 2006).

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Draft

Prionurus maculatus - Ogilby, 1887

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Prionurus - maculatus

Common Names: Yellowspotted Sawtail (English), Gulplettet savkirurgfisk (Danish)
Synonyms: No Synonyms

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Clements, K.D., Choat, J.H., Abesamis, R., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Prionurus maculatus is distributed in the western and southern Pacific in Australia and New Zealand. It achieves high abundances in parts of its range (Elizabeth and Middleton Reefs). It inhabits protected areas often in very shallow waters in the surge zone. It is occasionally caught in recreational fisheries. There are no major threats known for this species and it occurs in marine protected areas in parts of its range. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Prionurus maculatus is found from New South Wales and Lord Howe Island to Queensland (only Capricorn Group and Swains Reefs on the Great Barrier Reef). Also reported from Norfolk, Kermadec, and northern New Zealand (Francis 1993). It has been observed at Three Kings Islands and off the west coast of the North Island near Wellington (K.D. Clements pers comm. 2010). A record from Wallis Island (M. Kulbicki pers. comm. 2011) needs to be verified (R.F. Myers and J.H. Choat pers. comm. 2011).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 30

Depth Upper Limit (in metres below sea level): 2

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Australia	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
New Zealand	Extant	Native	-	Resident
Norfolk Island	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
71. Pacific - western central	Extant	Native	-	Resident
81. Pacific - southwest	Extant	Native	-	Resident

Population

Prionurus maculatus achieves high abundance in the Elizabeth and Middleton Reefs (16.5 per 1,000 m^2) (Hobbs *et al.* 2008). This species is rare in the Kermadecs (M. Francis pers comm. 2010). It is rare in the North Island, New Zealand (K.D. Clements pers comm. 2010).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Prionurus maculatus is found in protected waters, often in aggregations, but also occurs in outer-reef areas. It is generally seen in very shallow waters, in the surge zone (K.D. Clements pers comm. 2010). It achieves rapid growth during the first 3 to 5 yr of life (Choat and Axe 1996). The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors

(J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
45 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Prionurus maculatus is occasionally caught by recreational fishermen.

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range. In Queensland, Australia, there is a recreational catch limit of five per species and a minimum size limit of 25 cm (Department of Primary Industries accessed 8 April 2010).

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Draft

Prionurus microlepidotus - Lacepède, 1804

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Prionurus - microlepidotus

Common Names: Sixplate Sawtail (English), Sekstakket savkirurgfisk (Danish)
Synonyms: No Synonyms

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Clements, K.D., Choat, J.H., Abesamis, R., McIlwain, J., Nanola, C., Myers, R., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Prionurus microlepidotus is endemic to the coast of southeastern Australia from New South Wales north to Townsville, Queensland where it is common. This species occurs along rocky shores or coral reefs. It is often found in schools around coastal reefs. It is occasionally captured in recreational fisheries. *P. microlepidotus* is found in marine protected areas and there are no major threats known for this species. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Prionurus microlepidotus is known only from the coast of southeastern Australia from New South Wales north to Townsville, Queensland.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 30

Depth Upper Limit (in metres below sea level): 5

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Australia	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
71. Pacific - western central	Extant	Native	-	Resident
81. Pacific - southwest	Extant	Native	-	Resident

Population

Prionurus microlepidotus is more common in the northern half of New South Wales (New South Wales Primary Industries accessed 9 April 2010). It is very common at Julian Rocks (Byron Bay, northern New South Wales) and at the Solitary Islands (off Coff's Harbour, New South Wales) (K.D. Clements pers comm. 2010).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Prionurus microlepidotus occurs along rocky shores or coral reefs where it feeds on benthic algae. It is often found in schools around coastal reefs. Juveniles often reside in coastal bays and estuaries. Sometimes found in mixed schools with the spotted sawtail surgeonfish but is easily separated from this species by its silver/grey colour (New South Wales Primary Industries accessed 9 April 2010).

The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
70 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Prionurus microlepidotus is occasionally captured in recreational fisheries.

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range. In Queensland and New South Wales, Australia, there is a recreational catch limit of five per species and a minimum size limit of 25 cm (Department of Primary Industries accessed 8 April 2010).

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Draft

Prionurus punctatus - Gill, 1862

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Prionurus - punctatus

Common Names: Yellowtail Surgeonfish (English), Barbero (Spanish; Castilian), Cirujano Cochinito (Spanish; Castilian), Cochinito (Spanish; Castilian)
Synonyms: No Synonyms

Taxonomic Note:
This species is closely related to *Prionurus laticlavious*, and genetic and morphological studies are required to confirm the taxonomic status of these two species.

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed? (Not specified)

Assessor(s): Abesamis, R., Choat, J.H., Clements, K.D., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Carpenter, K.E., Livingstone, S. & Polidoro, B.

Contributor(s): Allen, G., Robertson, R., Lea, B., Rivera, F., Zapata, F., Barraza, E., Merlen, G. & Edgar, G.

Facilitators/Compilers: (Not specified)

Assessment Rationale

This species is widespread in the Eastern Pacific, and is common throughout its range. There are no known major threats to this species, and no current indication of population decline. It is listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

This species is endemic to the Eastern Pacific, and is found from southern Baja California and the Gulf of California to southern Mexico, including the Revillagigedo Islands, and from El Salvador to northwest Costa Rica.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 30

Depth Upper Limit (in metres below sea level): 0

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: (Not specified)

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Costa Rica	Extant	Native	-	Resident
El Salvador	Extant	Native	-	Resident
Guatemala	Extant	Native	-	Resident
Honduras	Extant	Native	-	Resident
Mexico	Extant	Native	-	Resident
Nicaragua	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

	Presence	Origin	Formerly Bred	Seasonality
4.5.1. Coastal Biome -> Pacific Coastal Provinces -> Gulf of California	Extant	Native	-	Resident
4.5.2. Coastal Biome -> Pacific Coastal Provinces -> California Current	Extant	Native	-	Resident
4.5.8. Coastal Biome -> Pacific Coastal Provinces -> Pacific Central American Coastal	Extant	Native	-	Resident

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
77. Pacific - eastern central	Extant	Native	-	Resident

Population

This species is abundant in many parts of its range.According to Aburto-Oropeza and Balart (2001), *Prionurus punctatus* is a dominant species at Los Islotes, Gulf of California, and has an occurrence frequency higher than 80%. In Cabo Pulmo, Gulf of California, this species is considered common, with a relative frequency between 75-100% (Villarreal-Cavazos *et al*. 2000).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

This reef-associated species is found on shallow reefs in schools, and feeds on algae in rocky areas (Krupp 1995).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Marginal	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
60 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

General notes regarding trade and use of this species: (Not specified)

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no known conservation measures for this species. However, this species distribution falls partially into a number of Marine Protected Areas in the Eastern Pacific region (WDPA 2006).

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Draft

Prionurus scalprum - Valenciennes, 1835

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Prionurus - scalprum

Common Names: Japanese Sawtail (English), Nizadai (Japanese), Scalpel Sawtail (English), Skalpelkirurgfisk (Danish)
Synonyms: Prionurus Valenciennes, 1835; Xesurus (Valenciennes, 1835);

Red List Status
DD - Data Deficient, (IUCN version 3.1)
Data Deficient reason: : none

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Myers, R., Choat, J.H., Abesamis, R., Clements, K.D., McIlwain, J., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Prionurus scalprum is listed as Data Deficient.There is no biological information available for this species. It is common along rocky shores in Japan, there is no other population information available. It is caught incidentally and is not targeted.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Prionurus scalprum is found from Matsushima Bay, Japan to Taiwan and Hong Kong (Sadovy and Cornish 2000). It is also reported to occur in Jeju Is., South Korea (http://www2.naris.go.kr accessed 9 April 2010).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 20

Depth Upper Limit (in metres below sea level): 2

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
China	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Korea, Republic of	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
61. Pacific - northwest	Extant	Native	-	Resident

Population

Prionurus scalprum is common in Japan along rocky shores where it browses on algae (Randall 2001a).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Prionurus scalprum inhabits rocks and seaweed-rich areas 5 to 10 meter deep (http://www2.naris.go.kr accessed 9 April 2010).

The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?

9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
50 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Prionurus scalprum is occasionally seen in markets. It is not targeted.

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps some marine protected areas within its range.

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LIST

Draft

Scarus guacamaia - Cuvier, 1829

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - LABRIDAE - Scarus - guacamaia

Common Names: Rainbow Parrotfish (English), Blue Rainbow (English), Bobó (Portuguese), Bodiano (Portuguese), Bodião (Portuguese), Bodião-rabo-de-forquilha (Portuguese), Budião (Portuguese), Budião-batata (Portuguese), Budião-rabo-de-fogo (Portuguese), Budião-rabo-de-forquilha (Portuguese), Guacamaia (Spanish; Castilian), Guacamaya (Spanish; Castilian), Loro Guacamayo (Spanish; Castilian), Papagaio (Portuguese), Perroquet arc-en-ciel (French), Rainbow (English)
Synonyms: Scarus Poey, 1861;

Taxonomic Note:
Westneat and Alfaro (2005) recognize the Scarini as a tribe within the family Labridae. The genera *Chlororus* and *Scarus* are two distinct monophyletic lineages (Smith *et al.* 2008).

Red List Status

NT, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed? (Not specified)

Assessor(s): Choat, J.H., Feitosa, C., Ferreira, C.E., Gaspar, A.L., Padovani-Ferreira, B. & Rocha, L.A.

Reviewers: Robertson, R., Craig, M.T. & McIlwain, J.

Contributor(s): Raynal, M.

Facilitators/Compilers: (Not specified)

Assessment Rationale

Scarus guacamaia is the largest parrotfish in the Atlantic, reaching a maximum size in excess of 100 cm. It is relatively widespread in the western Atlantic from Bermuda through south Florida, the Bahamas and the Caribbean to Venezuela. It is naturally rare, a characteristic that is shared by other large-bodied labrids. It achieves high densities only in areas that are protected from exploitation and habitat degradation, with highest densities recorded in areas that have long been protected from exploitation (e.g., Bermuda, Bonaire and Los Roques). There have been significant decreases in species densities recorded over a gradient of fishing pressure, human densities and presence or absence of species protection through marine reserves. Densities of large-bodied parrotfish are 10-fold lower in areas where fishing is present than in areas where fishing is restricted (Debrot *et al.* 2008). *S. guacamaia* has experienced significant historical declines. In most of its range, this species is still fished, but given its current and natural rarity it is not often caught. This species is also threatened by the continued loss of coral reef and mangrove habitat from coastal development and extraction. Based on anecdotal information from Glovers Reef in the Caribbean (D. Wesby pers comm 2009), *S. guacamaia* has undergone local extinction in the past 30 years. Schools of this parrotfish were commonly observed in the 1960s when several of the islands had well-developed mangrove habitats (Mumby et al. 2004).This species appears to be uncommon elsewhere in its range.

S.guacamaia is usually associated with shallow waters and in reefs with extensive sheltered lagoonal/backreef areas. There are a number of parallels with *Bolbometopon muricatum*, the largest parrotfish in the in the Indo-Pacific, currently listed as Vulnerable on the IUCN Red List of Threatened Species. Intrinsic life history characteristics such as large size, natural rarity and shallow foraging areas render them particularly susceptible to overfishing (particularly spearfishing). Both species recruit into very shallow water, sheltered reef and mangrove sites that are increasingly impacted by habitat modification and degradation. *S. guacamaia* is experiencing > 30% decline and destruction of coral reef habitat which makes up 7% of its range and is exposed to extensive mangrove deforestation in many parts of its distributional range. Unlike *B. muricatum*, which inhabits a wide oceanic basin and could find refuge on isolated oceanic islands in the Indo-Pacific, *S. guacamaia* inhabits a smaller oceanic habitat and may not have access to the types of refuge available for *B. muricatum*.

In summary, there are several biological features of major significance to population reductions of this species due to extrinsic threats: 1) natural rarity of *S. guacamaia*; 2) large size; 3) shallow depth range (to 30 m) and propensity to occupy, recruit and forage in shallow sites. In addition to the impacts of exploitation, this species utilizes habitats that are increasingly impacted and have experienced significant loss in the last 20-30 years. Although significant declines have been reported, the lack of adequate historical population data combined with the rarity of current

sightings and subsequent difficulty in coordinating efforts to determine its current population size has resulted in the inability to effectively quantify population declines over time. Moreover, *S. guacamaia* appears to be conservation dependent with recorded densities highest only in areas where protection is present. It is therefore listed as Near Threatened at the very minimum because cessation of conservation measures could result in this species qualifying for one of the threatened categories within a period of 5 years. We recommend further monitoring of this species' population and habitat status and a comprehensive analysis of the reproductive biology including gonadal studies to confirm estimates of size and age at first maturity, estimates of age and sex-specific growth rates, and mortality estimates. In addition, a more detailed analysis of demographic and abundance data is needed in order to predict population responses to varying rates of fishing pressure.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Scarus guacamaia is relatively widely distributed in the western Atlantic from Bermuda through south Florida, the Bahamas and the Caribbean to Venezuela.

There are dubious records from Brazil (Floeter *et al.* 2005) which are based on few specimens from museums and literature records. Although Ferreira et al. (2005) suggest that *S. guacamaia* is locally extinct, this species is confirmed as a vagrant along the Brazilian coast.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 25

Depth Upper Limit (in metres below sea level): 1

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Anguilla	Extant	Native	Unknown	Resident
Antigua and Barbuda	Extant	Native	Unknown	Resident
Aruba	Extant	Native	Unknown	Resident
Bahamas	Extant	Native	Unknown	Resident
Barbados	Extant	Native	Unknown	Resident
Belize	Extant	Native	Unknown	Resident
Bermuda	Extant	Native	Unknown	Resident
Bonaire, Sint Eustatius and Saba	Extant	Native	Unknown	Resident
Cayman Islands	Extant	Native	Unknown	Resident

Colombia	Extant	Native	Unknown	Resident
Costa Rica	Extant	Native	Unknown	Resident
Cuba	Extant	Native	Unknown	Resident
Curaçao	Extant	Native	Unknown	Resident
Dominica	Extant	Native	Unknown	Resident
Dominican Republic	Extant	Native	Unknown	Resident
Grenada	Extant	Native	Unknown	Resident
Guadeloupe	Extant	Native	Unknown	Resident
Guatemala	Extant	Native	Unknown	Resident
Haiti	Extant	Native	Unknown	Resident
Honduras	Extant	Native	Unknown	Resident
Jamaica	Extant	Native	Unknown	Resident
Martinique	Extant	Native	Unknown	Resident
Mexico	Extant	Native	Unknown	Resident
Montserrat	Extant	Native	Unknown	Resident
Netherlands Antilles	Extant	Native	Unknown	Resident
Netherlands Antilles -> Bonaire	Extant	Native	Unknown	Resident
Netherlands Antilles -> Netherlands Leeward Is.	Extant	Native	Unknown	Resident
Nicaragua	Extant	Native	Unknown	Resident
Panama	Extant	Native	Unknown	Resident
Puerto Rico	Extant	Native	Unknown	Resident
Puerto Rico -> Navassa I.	Extant	Native	Unknown	Resident
Puerto Rico -> Puerto Rico (main island)	Extant	Native	Unknown	Resident
Saint Barthélemy	Extant	Native	Unknown	Resident
Saint Kitts and Nevis	Extant	Native	Unknown	Resident
Saint Lucia	Extant	Native	Unknown	Resident
Saint Martin (French part)	Extant	Native	Unknown	Resident
Saint Vincent and the Grenadines	Extant	Native	Unknown	Resident
Sint Maarten (Dutch part)	Extant	Native	Unknown	Resident
Trinidad and Tobago	Extant	Native	Unknown	Resident
Turks and Caicos Islands	Extant	Native	Unknown	Resident
United States	Extant	Native	Unknown	Resident
Venezuela, Bolivarian Republic of	Extant	Native	Unknown	Resident
Virgin Islands, British	Extant	Native	Unknown	Resident
Virgin Islands, U.S.	Extant	Native	Unknown	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
31. Atlantic - western central	Extant	Native	Unknown	Resident

Population

Scarus guacamaia has experienced significant historical declines. In most of its range, this species is still fished, but given its current and natural rarity it is not often caught. This species is also threatened throughout its range from the continued loss of coral reef and mangrove habitat from coastal development and extraction. Based on anecdotal information from Glovers Reef in the Caribbean (D. Wesby pers comm 2009), *S.*

guacamaia has undergone local extinction in the past 30 years. Schools of this parrotfish were commonly observed in the 1960s when several of the islands had well-developed mangrove habitats (Mumby *et al.* 2004). Within this species' range, aggregated parrotfish catch landings show an increase that began in 2000 with a spike in 2003 and a 27% decline since then (FAO 2012). The pattern in catch landings are concordant to the shift in target preference to herbivorous fishes and planktivores with the removal of the piscivores (Butler *et al.* 1993, Debrot *et al.* 2008, Mumby *et al.* 2012).

S. guacamaia is naturally rare, a characteristic that is shared by other large labrids (Choat *et al.* 2006). However, it achieves relatively high densities in protected areas; for example, ~16 individuals/10,000 m^2 were observed in Bonaire, where it has been protected since 1979 (J.H. Choat pers comm. 2012) and 9.30 ± 3.79 ind/1,000 m^2 were recorded in Los Roques, where fishing is restricted (Debrot *et al.* 2008). In comparison, densities of *S. guacamaia* and other big-bodied parrotfishes at four localities in the Caribbean open to fishing were 10-fold lower than those within the Los Roques marine reserve, and were absent in Barbados where there was an extensive trap fishery for reef fishes and where parrotfishes are prized components of the reef fishery (Debrot *et al.* 2008). In Las Aves archipelago, an uninhabited area with an uncontrolled fishery targeting piscivorous reef fishes, only 0.4 individuals/10,000 m^2 were recorded for this species, while 15-16 individuals/10,000 m^2 were recorded for *Scarus coelestinus*, a large-bodied scarine (J.H. Choat pers comm. 2012). In Bermuda, where parrotfishes have been protected since 1978, this species was observed in big schools (15-30 individuals) (J.H. Choat pers. comm. 2012). Providing further support of the conservation dependency of this species, in a marine reserve in the Bahamas, the Exuma Cays Land and Sea Park, protection has resulted in an increase in total biomass inside the reserves for large-bodied parrotfishes such as *Scarus vetula*, although *S. guacamaia* was not reported in this study (Mumby 2006). This species appears to be uncommon elsewhere in its range (San Blas, Lee Stocking Island, Bahamas, Barbados, Belize, Curacao, St. Croix, St. Thomas, Jamaica and Margarita Island). and at a number of locations only small individuals were seen but none were recorded in counts (J.H. Choat pers comm. 2012).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Scarus guacamaia is the largest parrotfish in the Atlantic (Dorenbosch *et al.* 2006, Bellwood and Choat 2011) reaching a maximum size of 1.2 m (Choat *et al.* 2006) and a maximum age of 16 years (J.H. Choat pers comm. 2012). This species recruits primarily to mangroves (Mumby *et al.* 2004, Dorenbosch *et al.* 2006, Mumby and Hastings 2008, Bellwood and Choat 2011), and although it is suggested to be functionally dependent on mangroves, juveniles have been collected on rocks in Bermuda and adults have been found on isolated rocky islands 30-50 km from the nearest mangroves off the coast of Venezuela (Robertson pers comm. 2012). This species therefore appears to recruit to a variety of habitats. *S. guacamaia* is classified as a detritivore, with detritus/bacterial complexes and meiofauna as the primary food items. It also feeds on sponges (Dunlap and Pawlik 1998) and feeds more similarly to *Sparisoma* spp. particularly *Sparisoma viride*, than to other *Scarus* spp. (Burkepile and Hay 2011).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	Yes
9.7. Marine Neritic -> Marine Neritic - Macroalgal/Kelp	Suitable	Yes
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	Yes
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	Yes
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	Yes
9.9. Marine Neritic -> Marine Neritic - Seagrass (Submerged)	Suitable	Yes
12.7. Marine Intertidal -> Marine Intertidal - Mangrove Submerged Roots	Suitable	Yes

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity
16 Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
120 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: (Not specified)

Use and Trade

General Use and Trade Information

This species is harvested for food and is an important component of subsistence and commercial fisheries in many parts of the Caribbean.

Threats

Scarus guacamaia is usually associated with shallow waters and in reefs with extensive sheltered lagoonal/backreef areas (J.H. Choat pers comm. 2012). There are a number of parallels with *Bolbometopon muricatum*, the largest parrotfish in the Indo-Pacific, currently listed as Vulnerable on the IUCN Red List of Threatened Species. Intrinsic life history characteristics such as large size, natural rarity and shallow foraging areas render both species particularly susceptible to overfishing (particularly spearfishing). In addition, both species recruit into very shallow water, sheltered reef and mangrove sites that are increasingly impacted by habitat modification and degradation. Unlike *B. muricatum*, which inhabits a wide

oceanic basin and could find refuge on isolated oceanic islands in the Indo-Pacific, *S. guacamaia* inhabits a smaller oceanic habitat and may not have access to the types of refuge available for *B. muricatum*. *S. guacamaia* is experiencing > 30% decline and destruction of coral reef habitat which makes up 7% of its range (Comeros-Raynal in prep.). In addition, the Caribbean region has the second highest mangrove area loss relative to other global regions with ~24% of mangrove area lost over the past 25 years (FAO 2007, Polidoro *et al.* 2010). The greatest rate of mangrove deforestation is occurring in the Americas (2,251 km^2/year) and exceeds that of tropical rainforests (Mumby *et al.* 2004).

Parrotfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reefs, while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. Although the majority of the parrotfishes occur in mixed habitat (primarily inhabiting seagrass beds, mangroves, and rocky reefs) approximately 78% of these mixed habitat species are experiencing greater than 30% loss of coral reef area and habitat quality across their distributions. Of those species that occur exclusively in coral reef habitat, more than 80% are experiencing a greater than 30% of coral reef loss and degradation across their distributions. However, more research is needed to understand the long-term effects of habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that depend on live coral reefs for food and shelter especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats. Furthermore, coral reef loss and declining habitat conditions are particularly worrying for some corallivorous excavating parrotfishes that play major roles in reef dynamics and sedimentation (Comeros-Raynal *et al.* 2012).

Conservation

This species is found in a number of marine reserves in parts of its range. Furthermore, in Bermuda all species of parrotfishes are protected under the Fisheries (Protected Species) Order 1978. In addition, there have been recent protective measures put in place for parrotfishes in Belize, wherein the fishing of grazers, defined as any scarinae species and Acanthuridae species, is prohibited. In the Turks and Caicos, the fishing and selling of any species of parrotfish is prohibited, and the Caribbean Management Council, which comprises the Commonwealth of Puerto Rico and United States Virgin Islands, has prohibited the harvest and possession of Midnight Parrotfish (*Scarus coelestinus*), Blue Parrotfish (*Scarus coeruleus*), and *S. guacamaia* and reduced parrotfish harvest in St. Croix. In Bonaire, a recent law (instated in 2010) was passed banning the harvesting of parrotfish (Steneck *et al.* 2011).

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Draft

Zebrasoma desjardinii - (Bennett, 1836)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Zebrasoma - desjardinii

Common Names: Indian Sailfin Tang (English), Desjardin's Sailfin Tang (English), Indian Sailfin Surgeonfish (English)
Synonyms: Acanthurus Bennett, 1836; Zebrasoma (Bennett, 1836);

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Myers, R., Choat, J.H., Abesamis, R., Clements, K.D., McIlwain, J., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Zebrasoma desjardini is widespread and occasionally to locally common in most parts of its range. It is harvested for the aquarium trade, but is not a major component (300 fish/year 1992 in the Maldivian market). There are no major threats known and it occurs in a number of marine protected areas in parts of its distribution. It is therefore listed Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Zebrasoma desjardini is found from the Red Sea south to Natal, South Africa and east to India, Java, and Cocos-Keeling Islands, but not Christmas Island.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 30

Depth Upper Limit (in metres below sea level): 1

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Bangladesh	Extant	Native	-	Resident
British Indian Ocean Territory	Extant	Native	-	Resident
Christmas Island	Presence Uncertain	Native	-	-
Cocos (Keeling) Islands	Extant	Native	-	Resident
Comoros	Extant	Native	-	Resident
Djibouti	Extant	Native	-	Resident
Egypt	Extant	Native	-	Resident
Eritrea	Extant	Native	-	Resident
French Southern Territories	Extant	Native	-	Resident
French Southern Territories -> Mozambique Channel Is.	Extant	Native	-	Resident
India	Extant	Native	-	Resident
India -> Andaman Is.	Extant	Native	-	Resident
India -> Nicobar Is.	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Israel	Extant	Native	-	Resident
Jordan	Extant	Native	-	Resident
Kenya	Extant	Native	-	Resident
Madagascar	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Maldives	Extant	Native	-	Resident
Mauritius	Extant	Native	-	Resident
Mayotte	Extant	Native	-	Resident
Mozambique	Extant	Native	-	Resident
Myanmar	Extant	Native	-	Resident
Réunion	Extant	Native	-	Resident
Saudi Arabia	Extant	Native	-	Resident
Seychelles	Extant	Native	-	Resident
Singapore	Extant	Native	-	Resident
Somalia	Extant	Native	-	Resident
South Africa	Extant	Native	-	Resident
Sri Lanka	Extant	Native	-	Resident
Sudan	Extant	Native	-	Resident
Tanzania, United Republic of	Extant	Native	-	Resident
Thailand	Extant	Native	-	Resident
Yemen	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident

Population

Zebrasoma desjardini is common but not locally abundant. In the Maldives, 300 fish/year were reported in 1992 for the aquarium trade (Edwards and Shepherd 1992). In Duda, Red Sea, density estimates recorded 8.4 individuals/1,000 m^2 (A.M. Ayling pers. comm. 2010).

In the Nabq Managed Resource Protected Area, South Sinai, Egyptian Red Sea, mean abundances of this species showed differences at various depths and between no-take zones (NTZ) and take zones (TZ). At 1m depth of the NTZ, mean abundance was recorded at 3.33 while in the TZ it was 0.83. At 3m depth of the NTZ, mean abundance was recorded at 5.17 while in the TZ it was 3.38. At 10m depth of the NTZ, mean abundance was recorded at 0.75 and 1.71 in the TZ (Ashworth & Ormond, 2005).

The greater abundance of the Acanthuridae in the fished area than in the NTZ across 3 and 10m depths, can be attributed to a result of reduced predation or competition (Ashworth and Ormond 2005).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Zebrasoma desjardini is found in coral reefs and is usually solitary or in pairs. It is classified as a grazer (Choat 1991). Juveniles recruit into live, digitate coral (J.H. Choat pers comm. 2010).

The sexes are separate among the acanthurids (Reeson 1983). Acanthurids do not display obvious sexual dimorphism, males assume courtship colors (J.H. Choat pers. comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
40 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Zebrasoma desjardini is a component of the marine aquarium trade. Online prices range from $59.99-$199.99 (L. Rocha pers. comm. 2010).

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly

worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Draft

Zebrasoma flavescens - (Bennett, 1828)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Zebrasoma - flavescens

Common Names: Yellow Tang (English), Ababang amariyu (Undetermined), Gul Kirurgfisk (Danish), Kiirohagi (Japanese), Lau'ipala (Hawaiian), Lemon Sailfin (English), Palpal rangrang (Undetermined), Somber Surgeonfish (English), Yellow Sailfin Tang (English)
Synonyms: Acanthurus Bennett, 1828;

Red List Status

LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): McIlwain, J., Choat, J.H., Abesamis, R., Clements, K.D., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Zebrasoma flavescens is widespread in the west and central Pacific. It achieves high abundances in Hawaii but is rare elsewhere. It is the number one collected aquarium fish in Hawaii (Walsh *et al.* 2004) and accounts for approximately 80% of the fish caught for the aquarium trade in West Hawaii in recent years (Claisse *et al.* 2009, Williams *et al.* 2009). There have been decreases in Yellow Tang density in areas open to fishing in West Hawaii. The decrease in open areas is attributable to the life history characteristic of *Z. flavescens* as well as the increase in the number of aquarium collectors and collected animals. Several additional management actions have been proposed in response to the continuing decline of Yellow Tang in areas open to collecting, these include restricting which species can be collected and the establishment of a limited entry program for the fishery (Walsh *et al.* 2010). In addition, Yellow Tang is protected in Fish Replenishment Areas (FRAs) and in a number of marine reserves in parts of its range and the trade is closely monitored in Hawaii. It is therefore listed as Least Concern. We recommend continued monitoring of the harvest and trade of this species. Especially that it has a complicated life history with adults settling in deeper, coral rich areas then migrate into shallow water after maturity. This characteristic has only been recently recorded, the 10 yr population monitoring set up in 1999 was targeting juvenile habitats and that surveys in the shallow adult habitat has occurred only once in 2006. Studies have shown that the FRAs West Hawaii will become important in maintaining breeding population with increased fishing pressure.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Zebrasoma flavescens is found in the central and western Pacific from the Hawaiian Islands and Johnston Island to the Marshall Islands, Wake, Mariana Islands, Philippines, Ogasawara and Ryukyu Islands, Japan. It was also recorded from southern Taiwan.

Sightings of *Z. flavescens* were made at three sites in southern Florida by the REEF Fish Survey Project between 1993 and 2002. These were the result of a deliberate aquarium release. The authors report this species did not establish itself and there was no significant impact to the community composition of local fish (Semmens *et al.* 2004).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 81

Depth Upper Limit (in metres below sea level): 1

Depth Zone: Shallow photic (0-50m), Deep Photic (51-200m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Guam	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
United States	Extant	Introduced	-	Resident
United States -> Hawaiian Is.	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Johnston I.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Midway Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Wake Is.	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident

Population

Zebrasoma flavescens is abundant only in Hawaii, rare elsewhere. It is the number one collected aquarium fish in Hawaii (Walsh *et al.* 2004). It accounts for approximately 80% of the fish caught for the aquarium trade in West Hawaii in recent years (Claisse *et al.* 2009, Williams *et al.* 2009). It made up 43.5% of the catch and 57.1% of the value of the overall aquarium catch in fiscal years 2004 through 2006. Reported catch from FY 2004-2006 was 366,317 individuals caught/year with a value of $896,048/ year (Friedlander *et al.* 2006).

Williams *et al.* (2009) state recent surveys of Hawaiian Islands by Hawaii Division of Aquatic Resources reveal no populations comparable in size to that of West Hawaii. Of 60 locations surveys across the Hawaiian archipelago, *Z. flavescens* was ranked 9 by index of relative dominance = (Freq occurrence x percent biomass) (Friedlander and DeMartini 2002).

Reported Yellow Tang catch increased 30-fold between 1976 and 2007. The reported yellow tang catch has increased from ~10,000 fish per year in the 1970s to ~ 400,00 fish in 2006 (Friedlander *et al.* 2007, Williams *et al.* 2009). In 2007, reported catch declined to 291,013; although less than the catch in 2006, the catch in 2007 was still the third highest on record. The number of active collectors increased from 16 in 1999, to 37 in 2007 (Williams *et al.* 2009). Reported catches statewide of 3,386,860 individuals caught from FY 1976-2003 with a total value of $5, 567, 252.60 (Walsh *et al.* 2004).

The Yellow Tang is the most collected aquarium species in West Hawaii. There was a significant increase in overall density across Fish Replenishment Areas (FRAs) surveyed from 1999-2009. The FRAs were shown to be effective in terms of increases inside the FRAs relative to long term marine protected areas. The total number of individuals collected over the past five years was 1,621,053 with a total value of $5,035,883. There was a delayed increase in abundance in all areas surveyed following a strong recruitment in 2002. Even with low recruitment in the 6 of the past 11 years adult populations increased by 57% in the FRAs since establishments (Walsh *et al.* 2010)

In West Hawaii Hawaii, approximately 3,000 fish/km are harvested annually from areas open to fishing (Williams *et al.* 2009). A study by Tissot *et al.* (2004) conducted three years after the establishment of Fish Replenishment Areas (FRA) reported 78% higher yellow tang density in FRAs than in open areas. The monitoring stations for this study were located in mid-depth high-complexity reefs, which largely comprises of juveniles (Tissot *et al.* 2004, Williams *et al.* 2009). Adult densities in FRAs of West Hawaii are expected to increase as the total length of the fishery closure is short relative to the longevity of the fish (40 years) (Williams *et al.* 2009).

Prior to MPA establishment, densities were similar at sites open to fishing and those slated for closure ~10-15 per 100 m^2, whereas densities at Long-term protected (LTP) sites were ~20-25 per 100 m2. By 2003, and in all subsequent years, mean yellow tang densities in Fish Replenishment Areas (FRA) sites had risen to values similar to those at LTP sites and were higher than at sites which remained open to fishing. Between 1999 and 2007, mean density increased by 72% at FRA sites, remained stable at LTP sites and declined by 45% at sites which were open to fishing (Williams *et al.* 2009). Adult Yellow Tang densities were highest within protected areas and in open areas adjacent to protected areas. Densities were lowest in open areas far from protected areas.

Williams *et al.* (2009) showed within-MPA effects, including density of targeted juveniles (5-10 cm) within FRAs as five times that of fished areas. Adult yellow tang densities were 48% higher in FRAs than in non-boundary open sites in 2006. Densities of adults in open areas et al. 2009).

The establishment of the FRAs have been attributed to higher catches with 2004 (5 yrs after their establishment) recording the highest catch for the entire 38 yr history of the fishery. The CPUE is highest in West Hawaii compared to other Hawaii islands, and is showing signs of increasing (Tissot *et al.* 2009). Recent genetic evidence involving parentage analysis suggest there is self-recruitment on the Big Island which might explain the possible increases in adult biomass since the FRAs were established (M. Christie unpub. PhD thesis).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Zebrasoma flavescens is found in inshore coral reefs, protected bay and lagoons. It may be seen in less than 1 m, but occurs deeper on exposed outer-reef areas (Randall 2001a). It is classified as a grazer/detritivore (Choat 1991). Yellow Tang in the west coast of the Hawaiian Island settle primarily into mid-depth (10 to 25 m) reef habitat with a high percentage of coral cover (Walsh 1984, Ortiz and Tissot 2008, Claisse *et al.* 2009). Males and females of this species in West Hawaii each showed a clear ontogenetic pattern of habitat use. When Yellow Tang reach sexual maturity, adults leave the deeper coral reef areas for shallower reef habitat. For females this occurs at approximately 4-5 years of age and for males at age 5-7 years (Claisse *et al.* 2009).

The ontogenetic habitat shift in yellow tang coincides with the size at which there is a clear increase in reproductive output. The sexual difference in size at habitat transition, combined with sexual size dimorphism (mean asymptotic maximum length - male: 17.9 cm; female: 15.6 cm) results in differences in size distributions of both sexes in the two habitats (Claisse *et al.* 2009).

Growth

Z. flavescens is a long-lived species, the oldest individual collected was 41 yrs old (Claisse *et al.* 2009). It displays the typical Acanthurid square growth curve with high initial growth rates that rapidly decrease after the first few years (Choat and Axe 1996, Choat and Robertson 2002). Yellow Tang exhibits sexual difference in growth. Growth rates for both sexes are 300 mm per year during the first year of life to (0 to 1 yr), but males grow substantially faster than females from year 2 to 3, a trend that continues until the asymptotic size is approached. Sexual size dimorphism resulted from a higher growth rate for males through the juvenile period (Claisse *et al.* 2009)

Reproduction

Z. flavescens is gonochoristic (Bushnell 2007) and like its sister species, *Zebrasoma scopas* (Guiasu and Winterbottom 1998, Clements *et al.* 2003), is macroandric (Robertson 1985). The sexes are separate among the acanthurids (Reeson 1983). There is possibility of sexual dimorphism in *Zebrasomas* with cloacas bigger in females (Bushnell *et al.* 2010). Annual fecundity for an average adult yellow tang female is estimated at 1,055,628 (SE 120,596) eggs per year. (Bushnell *et al.* 2010). Size at maturity for females is 132 mm TL (5.1 yrs), which is the median size/age at which migrate to adult habitat (Claisse *et al.* 2009, Bushnell *et al.* 2010).

Yellow tang in West Hawaii make crepuscular migrations away from daytime shallow turf-dominated foraging habitat to spawn at sunset in the deeper coral-rich habitat, primarily along the edge of the deeper reef slope (Walsh 1984). Each evening males return repeatedly to the same temporary spawning territory (J.T. Claisse unpub. data) and court passing females in what has been described as a linear lek (Loiselle and Barlow 1978, Walsh, 1984)

In Hawaii, peaks in recruitment of *Z. flavescens* occurs during the summer months from June to August. There was considerable inter-annual variability in the recruitment of this species over a 51 month period with 80 recruits during 1977 compared with a maximum of 15 per year in the following years (Walsh 1987).

In Johnston Atoll peaks in spawning of *Z. flavescens* occur during the outgoing tide, when current velocity is greatest and occurred predominately in the reef channel (Sancho *et al.* 2000). In the same location they are group spawners, with a promiscuous mating system, releasing pelagic eggs between 16:00-18:00 hrs.

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.3. Marine Neritic -> Marine Neritic - Subtidal Loose Rock/pebble/gravel	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female	Age at Maturity: Male	Size at Maturity (in cms): Female
4-6 Years	(Not specified) Years	13.2 (TL)

Size at Maturity (in cms): Male: (Not specified)

Longevity
41 Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
20 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Zebrasoma flavescens is the primary coral reef fish species taken in Hawaii for the aquarium trade (Claisse *et al.* 2009). It accounts for over 50% of all aquarium fish collected of Kona, Hawaii (Kusumaatmadja *et al.* 2004) and is the most collected aquarium species in West Hawaii (Walsh *et al.* 2010). The yellow tang fishery largely targets young juvenile fish in the size range of 5-10 cm corresponds to two years or younger (Williams *et al.* 2009).

Threats

Zebrasoma flavescens is the primary coral reef fish species taken in Hawaii for the aquarium trade (Claisse *et al.* 2009). There have been decreases in Yellow Tang density in areas open to fishing in West Hawaii. The decrease in open areas is attributable to the life history characteristic of *Z. flavescens* as well as the increase in the number of aquarium collectors and collected animals (Walsh *et al.* 2010).

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral

reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

In Hawaii, nine Fish Replenishment Areas (FRAs) were established in 1999. These areas prohibit marine aquarium organism collecting within approximately 30% of the Kona coast nearshore habitat (Kusumaatmadja *et al.* 2004). In addition, several additional management actions have been proposed in response to the continuing decline of Yellow Tang in areas open to collecting, these include restricting which species can be collected and the establishment of a limited entry program for the fishery (Walsh *et al.* 2010). In 2002, the Marine Aquarium Council initiated a three-year project designed to enhance coral reef conservation in the islands by facilitating MAC certification of qualifying aquarium industry operators and encouraging market incentives (MAC 2003).

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Draft

Zebrasoma gemmatum - (Valenciennes, 1835)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Zebrasoma - gemmatum

Common Names: Jewelled Tang (English), Acanthure à Pierreries (French), Canivete Manchaco (Portuguese), Gem Surgeonfish (English), Gespikkelde Tang (Undetermined), Spotted Tang (English), Ædelstens-kirurgfisk (Danish)
Synonyms: Acanthurus Valenciennes, 1835;

Red List Status
DD - Data Deficient, (IUCN version 3.1)
Data Deficient reason: : none

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Myers, R., Choat, J.H., Abesamis, R., Clements, K.D., McIlwain, J., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Zebrasoma gemmatum is rare and inhabits deeper waters. It is harvested for the aquarium trade and due to its rarity fetches a very high price online. There is very little information available on its biology or the rates of harvest. It is therefore listed as Data Deficient.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Zebrasoma gemmatum is found from Mauritius to Madagascar and Natal, South Africa. It has also been recorded from Mozambique (Fischer *et al.* 1990).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 60

Depth Upper Limit (in metres below sea level): 10

Depth Zone: Shallow photic (0-50m), Deep Photic (51-200m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
French Southern Territories	Extant	Native	-	Resident
French Southern Territories -> Mozambique Channel Is.	Extant	Native	-	Resident
Madagascar	Extant	Native	-	Resident
Mauritius	Extant	Native	-	Resident
Mozambique	Extant	Native	-	Resident
Réunion	Extant	Native	-	Resident
South Africa	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident

Population

There is no population information available for this species. It is rare.

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

This is a rare species, usually encountered below 25 m and reported to 60 m. Juveniles have been reported to occur in shallower parts of its depth range and adults usually below 20 m (Lieske and Myers 1994). Jewelled Tang is seen on open reefs or over mixed sand and rubble adjacent to reefs. Territorial and nearly always solitary (Kuiter and Debelius 2001).

The sexes are separate among the acanthurids (Reeson 1983). There is a possibility of sexual dimorphism in *Zebrasomas* with cloacas bigger in females (Bushnell *et al.* 2010). This dimorphic character most likely applies to all *Zebrasomas* (J.H. Choat pers comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
23 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Zebrasoma gemmatum is a rare component of the aquarium trade. It sells for $3,499.00 each online (www.themarinecenter.com accessed 9 April 2010).

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Draft

Zebrasoma rostratum - (Günther, 1875)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Zebrasoma - rostratum

Common Names: Longnose Tang (English), Langsnudet kirurgfisk (Danish), Longnose Surgeonfish (English)
Synonyms: Acanthurus Günther, 1875;

Taxonomic Note:
Zebrasoma rostratum hybridizes with *Z. scopas*. Taxonomic status is unkown (L. Rocha pers comm. 2010).

Red List Status
DD - Data Deficient, (IUCN version 3.1)
Data Deficient reason: : none

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Myers, R., Choat, J.H., Abesamis, R., Clements, K.D., McIlwain, J., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Zebrasoma rostratum is uncommon throughout its range. It is harvested for the aquarium trade but makes up a minor component. There is no information on the harvest or population trends of this species and there is very little known about its biology. It is therefore listed as Data Deficient.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Zebrasoma rostratum is found in the central Pacific from Tuvalu to Pitcairn including all of French Polynesia, north to the Line Islands and south to Rapa. A waif was found in Oahu, Hawaii.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 35

Depth Upper Limit (in metres below sea level): 0

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Cook Islands	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Kiribati Line Is.	Extant	Native	-	Resident
Kiribati -> Phoenix Is.	Extant	Native	-	Resident
Pitcairn	Extant	Native	-	Resident
Tokelau	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
United States	Extant	Native	-	Resident
United States -> Hawaiian Is.	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Howland-Baker Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> US Line Is.	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident
81. Pacific - southwest	Extant	Native	-	Resident

Population

Zebrasoma rostratum is uncommon throughout its range.

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Zebrasoma rostratum is found on coral reefs from the shallows to depths of at least 25 m. It is classified as a grazer (Choat 1991).

The sexes are separate among the acanthurids (Reeson 1983). There is a possibility of sexual dimorphism in *Zebrasomas* with cloacas bigger in females (Bushnell *et al.* 2010). This dimorphic character most likely applies to all *Zebrasomas* (J.H. Choat pers comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity: (Not specified)

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
26.5 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Zebrasoma rostratum is a rare component of the aquarium trade (Global Marine Aquarium Database accessed 19 March 2010). Prices online range from $549.99-$1,049.95 (L. Rocha pers. comm. 2010, bluezooaquatics.com accessed 20 April 2010).

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. Its distribution overlaps with some marine reserves in parts of its range.

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Draft

Zebrasoma scopas - (Cuvier, 1829)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Zebrasoma - scopas

Common Names: Brushtail Tang (English), Blue-lined Tang (English), Bluelined Sailfin Tang (English), Brown Saiffin Tang (English), Brown Sailfin Surgeonfish (English), Brown Tang (English), Canivete Bicolor (Portuguese), Chirurgien Brun (French), Chirurgien à Balai (French), Chirurgien à Brosses (French), Chirurgien à Robe Sombre (French), Cà Đuôi gai nâu hong (Vietnamese), Cà Đuôi gai nâu hồng (Vietnamese), Dengkis (Malay), Gomahagi (Japanese), Pe'ape'a (Undetermined), Peretiti (Undetermined), Peretti (Undetermined), Pitopito (Undetermined), Røgfarvet Kirurgfisk (Danish), Tweekleur-tang (Undetermined), Two-tone Surgeonfish (English), Twotone Tang (English), Yellow sailfin tang (English), via (Undetermined)
Synonyms: Acanthurus Valenciennes, 1835; Zebrasoma (non Bennett, 1828);

Taxonomic Note:
Zebrasoma scopas hybridizes with *Z. flavescens* and *Z. rostratum* (Randall 2001a).

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Abesamis, R., Choat, J.H., McIlwain, J., Clements, K.D., Myers, R., Rocha, L.A., Nanola, C., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Zebrasoma scopas is widespread in the Indo-Pacific region. It is common in many most localities where it occurs and can be locally abundant. It is caught incidentally in subsistence fisheries and makes up a minor component of the aquarium trade. It is found in a number of marine reserves in parts of its range. There are no major threats known. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Zebrasoma scopas is found from East Africa and Gulf of Aden to French Polynesia and the Pitcairn Islands except Marquesas, northwards to Suruga Bay, Honshu, Japan and southwards to the Abrolhos Island, Western Australia, Lord Howe Island, Norfolk Island and Rapa.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 60

Depth Upper Limit (in metres below sea level): 1

Depth Zone: Shallow photic (0-50m), Deep Photic (51-200m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Australia	Extant	Native	-	Resident
Bangladesh	Extant	Native	-	Resident
British Indian Ocean Territory	Extant	Native	-	Resident
Brunei Darussalam	Extant	Native	-	Resident
Cambodia	Extant	Native	-	Resident
China	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Cocos (Keeling) Islands	Extant	Native	-	Resident
Comoros	Extant	Native	-	Resident
Cook Islands	Extant	Native	-	Resident
Disputed Territory	Extant	Native	-	Resident
Disputed Territory -> Paracel Is.	Extant	Native	-	Resident
Disputed Territory -> Spratly Is.	Extant	Native	-	Resident
Djibouti	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
French Southern Territories	Extant	Native	-	Resident
French Southern Territories -> Mozambique Channel Is.	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
India	Extant	Native	-	Resident
India -> Andaman Is.	Extant	Native	-	Resident
India -> Nicobar Is.	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Kenya	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Gilbert Is.	Extant	Native	-	Resident
Kiribati -> Kiribati Line Is.	Extant	Native	-	Resident
Kiribati -> Phoenix Is.	Extant	Native	-	Resident
Madagascar	Extant	Native	-	Resident

Malaysia	Extant	Native	-	Resident
Maldives	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Mauritius	Extant	Native	-	Resident
Mayotte	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Mozambique	Extant	Native	-	Resident
Myanmar	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
Niue	Extant	Native	-	Resident
Norfolk Island	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Pitcairn	Extant	Native	-	Resident
Réunion	Extant	Native	-	Resident
Samoa	Extant	Native	-	Resident
Seychelles	Extant	Native	-	Resident
Singapore	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Somalia	Presence Uncertain	Native	-	-
South Africa	Extant	Native	-	Resident
Sri Lanka	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
Tanzania, United Republic of	Extant	Native	-	Resident
Thailand	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident
Tokelau	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Howland-Baker Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> US Line Is.	Extant	Native	-	Resident
Vanuatu	Extant	Native	-	Resident
Viet Nam	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident
Yemen	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident

71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident
81. Pacific - southwest	Extant	Native	-	Resident

Population

Zebrasoma scopas is a common species in coral reefs at most localities where it occurs (Randall 2001a). It was recorded as more abundant in offshore stations sampled at the Nha Trang Bay MPA and was found to be associated with encrusting corals (Nguyen and Phan 2008). It was recorded as abundant in the northern Bismarck Sea, Papua New Guinea (Allen 2009). It is common in Milne Bay Province, Papua New Guinea and in Raja Ampat, Indonesia (Allen 2003, 2003b). It is common and can be locally abundant in the Philippines (R. Abesamis, C. Nanola and B. Stockwell pers. comm. 2010). In the central Philippines mean biomass of *Z. scopas* was higher in marine reserves compared to areas open to fishing (Stockwell *et al.* 2009). It was the eighteenth most dominant species in Tutuila, Aunuu, and Taema Banks, American Samoa contributing to 0.6% of total fish biomass and 1.4% of numerical abundance (Sabater and Tofaeono 2006).

Visual census surveys along the Iboih coast, Weh Island, Indonesia recorded fish densities of 10 individuals/750 m^2 at Pantai sirkui and 7 individuals/750 m^2 at Teupin Layeu (Faculty of Mathematics and Natural Science 2007). In Moorea, French Polynesia, SPOT satellite images allowed estimation of the surface area of fringing reef (1,076 ha), barrier reef (3,788 ha) and outer slop (493 ha). A total of 511,438 individuals/total surface area were recorded in fish visual surveys conducted from 1990-1993 (Lecchini *et al.* 2006).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Zebrasoma scopas inhabits coastal, lagoon, and outer reefs in coral-rich areas at depths between about 1-60 m (G. Allen pers comm.). It grazes on algal turf mainly on thallate and filamentous red and green algae (Choat *et al.* 2002, Choat *et al.* 2004). Juveniles recruit into high coral cover (Wilson *et al.* 2006).

Growth

It shows rapid growth for the first three to four years of life. Beyond four years, growth declines sharply; resulting in extended periods of asymptotic growth. The maximum number of annuli recorded for this species was 32 to 35 (Choat and Axe 1996). Maximum age 33 years in the Great Barrier Reef (Choat and Robertson 2002a).

Reproduction

The sexes are separate among the acanthurids (Reeson 1983). There is a possibility of sexual dimorphism in *Zebrasomas* with cloacas bigger in females (Bushnell *et al.* 2010). This dimorphic character most likely applies to all *Zebrasomas* (J.H. Choat pers comm. 2010). This species was observed to form spawning aggregations. A single observation was made by Randall (1961b) in the Society Is. around 10-20 ft over coral heads at the edge of a lagoon next to a barrier reef with strong currents going out to open sea. Spawning occurred near dusk in subgroups with a tendency for diagonal spawning rushes. No color changes were observed. It may form resident spawning aggregations (Domeier and Colin 1997). It was observed to pair spawn at Aldabra (Robertson *et al.* 1979). It was observed to form spawning aggregations on the Great Barrier Reef (Squire and Samoilys unpub., Randall 1961b, Russell 2001). It recruits all year round in low numbers 2 in the central Visayas (R. Abesamis unpub. data).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-

9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity
33 Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
21.5 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Zebrasoma scopas is a component of subsistence fisheries, it is not targeted. It is a minor component of the aquarium trade (Global Marine

Aquarium Database accessed 19 March 2010). Online prices range from $19.99-$44.99 (L. Rocha pers. comm. 2010).

Threats

Zebrasoma scopas is captured in subsistence fisheries, there may be some localized declines in areas where it is harvested.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Draft

Zebrasoma veliferum - (Bloch, 1795)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Zebrasoma - veliferum

Common Names: Sailfin Tang (English), 'Iriaeo (Undetermined), Canivete Veleiro (Portuguese), Chirurgien Voilier (French), Chirurgien à Voile (French), Churiyan (Undetermined), Debam (Malay), Desjardin's Sailfin Tang (English), Eastern Sailfin Tang (English), Hamoktan (Undetermined), Hirenagahagi (Japanese), Iliu (Undetermined), Indangan (Filipino; Pilipino), Iriaeo (Undetermined), Jorur (Undetermined), Kranjang Bali (Undetermined), Laid (Undetermined), Māneoneo (Hawaiian), Navajón Velero (Spanish; Castilian), Pacific Sail-fin Surgeonfish (English), Pasific Sailfin Tang (English), Purple-lined Tang (English), Qumburo (Undetermined), Ringed Tang (English), Sailfin Surgeonfish (English), Segelfenad Kirurgfisk (Swedish), Seilvin-tang (Undetermined), Via (Undetermined), Zebrasoma (Polish), Zebrastribet Kirurgfisk (Danish)
Synonyms: Acanthurus Bloch, 1795;

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Abesamis, R., Clements, K.D., Choat, J.H., McIlwain, J., Myers, R., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Zebrasoma veliferum is widespread in the Pacific region. It is occasionally to locally common in most parts of its range, however occurs in low densities. It is harvested for the aquarium trade, but is not a major component (average of 4,000 fish/year from 1992-2001). There are no major threats known and it occurs in a number of marine protected areas in parts of its distribution. It is therefore listed Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Zebrasoma veliferum is found from Christmas Island (Indian Ocean) and Viet Nam eastward to Pitcairn group, Hawaiian Islands, northward to southern Japan, southward to Rottnest Is., and New South Wales, Australia and Rapa, French Polynesia except the Marquesas.

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 30

Depth Upper Limit (in metres below sea level): 1

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
American Samoa	Extant	Native	-	Resident
Australia	Extant	Native	-	Resident
Brunei Darussalam	Extant	Native	-	Resident
Cambodia	Extant	Native	-	Resident
China	Extant	Native	-	Resident
Christmas Island	Extant	Native	-	Resident
Cook Islands	Extant	Native	-	Resident
Disputed Territory	Extant	Native	-	Resident
Disputed Territory -> Paracel Is.	Extant	Native	-	Resident
Disputed Territory -> Spratly Is.	Extant	Native	-	Resident
Fiji	Extant	Native	-	Resident
French Polynesia	Extant	Native	-	Resident
Guam	Extant	Native	-	Resident
Hong Kong	Extant	Native	-	Resident
Indonesia	Extant	Native	-	Resident
Japan	Extant	Native	-	Resident
Kiribati	Extant	Native	-	Resident
Kiribati -> Gilbert Is.	Extant	Native	-	Resident
Kiribati -> Kiribati Line Is.	Extant	Native	-	Resident
Kiribati -> Phoenix Is.	Extant	Native	-	Resident
Macao	Extant	Native	-	Resident
Malaysia	Extant	Native	-	Resident
Marshall Islands	Extant	Native	-	Resident
Micronesia, Federated States of	Extant	Native	-	Resident
Nauru	Extant	Native	-	Resident
New Caledonia	Extant	Native	-	Resident
Niue	Extant	Native	-	Resident
Northern Mariana Islands	Extant	Native	-	Resident
Palau	Extant	Native	-	Resident
Papua New Guinea	Extant	Native	-	Resident
Philippines	Extant	Native	-	Resident
Pitcairn	Extant	Native	-	Resident

Samoa	Extant	Native	-	Resident
Singapore	Extant	Native	-	Resident
Solomon Islands	Extant	Native	-	Resident
Taiwan, Province of China	Extant	Native	-	Resident
Thailand	Extant	Native	-	Resident
Timor-Leste	Extant	Native	-	Resident
Tokelau	Extant	Native	-	Resident
Tonga	Extant	Native	-	Resident
Tuvalu	Extant	Native	-	Resident
United States	Extant	Native	-	Resident
United States -> Hawaiian Is.	Extant	Native	-	Resident
United States Minor Outlying Islands	Extant	Native	-	Resident
United States Minor Outlying Islands -> Howland-Baker Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Johnston I.	Extant	Native	-	Resident
United States Minor Outlying Islands -> Midway Is.	Extant	Native	-	Resident
United States Minor Outlying Islands -> US Line Is.	Extant	Native	-	Resident
Vanuatu	Extant	Native	-	Resident
Viet Nam	Extant	Native	-	Resident
Wallis and Futuna	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
57. Indian Ocean - eastern	Extant	Native	-	Resident
61. Pacific - northwest	Extant	Native	-	Resident
71. Pacific - western central	Extant	Native	-	Resident
77. Pacific - eastern central	Extant	Native	-	Resident
81. Pacific - southwest	Extant	Native	-	Resident

Population

Zebrasoma veliferum is common in most parts of its range but not locally abundant. It was recorded as more abundant in offshore stations sampled at the Nha Trang Bay MPA and was found to be associated with branching corals (Nguyen and Phan 2008). It is common in Milne Bay Province, Papua New Guinea and in Raja Ampat, Indonesia (Allen 2003, 2003b). It is occasional in Palawan Province, Philippines (Werner and Allen 2000, Palawan Council for Sustainable Development unpub. data).

It is rare in the Guam fishery <1% of the acanthurid fishery (Division of Aquatic and Wildlife Resources unpub. data). Average of 4,000 fish/year from 1992-2001 export from a number of locations (most come from the Philippines) (Global Marine Aquarium Database accessed 19 March 2010). In 2007 in Hawaii, 57 lbs. were landed as bycatch, 93 lbs. in 2004. This species is not targeted (Division of Aquatic Resources unpub. data).

In Moorea, French Polynesia, SPOT satellite images allowed estimation of the surface area of fringing reef (1,076 ha), barrier reef (3,788 ha) and outer slop (493 ha). A total of 84, 118 individuals/total surface area were recorded in fish visual surveys conducted from 1990-1993 (Lecchini *et al.* 2006). It is uncommon in the American Samoa national park (National Park of Samoa Checklist of Fishes, accessed 21 April 2010).

In the central Philippines, density and biomass of herbivorous fish in reserves had positive relationships with duration of reserve protection. Acanthuridae and Labridae (parrotfishes) were the major families that increased in biomass inside reserves with duration of reserve protection. For *Z. veliferum*, mean biomass 0.19 (kg per 500 m^2) was recorded at one reserve (5 to 7 years of protection) (Stockwell *et al.* 2009). It is common but not abundant in the Philippines (R. Abesamis and C. Nanola pers comm. 2010). Frequency of occurence <10% in the Philippies based on Underwater Visual Census (C. Nanola pers comm. 2010).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Zebrasoma veliferum is usually encountered as solitary individuals, but occasionally in pairs, on coral reefs from shallow protected areas to outer reef habitats at least as deep as 40 m (Randall 2001a, b). It grazes on algal turf (Choat *et al.* 2004). It is classified as a grazer (Choat 1991). Maximum age 27 years (Choat and Robertson 2002a). Max age 30 years in the Great Barrier Reef, Australia (J.H. Choat pers. comm. 2010). Juveniles shelter within branching corals on shallow reef flats as well as reef slopes. It occurs most consistently in high quality, coral reef environments, in lower densities in turbid reef habitats (R.F. Myers pers comm. 2010).

Reproduction

The sexes are separate among the acanthurids (Reeson 1983). There is a possibility of sexual dimorphism in *Zebrasomas* with cloacas bigger in females (Bushnell *et al.* 2010). This dimorphic character most likely applies to all *Zebrasomas* (J.H. Choat pers comm. 2010). It was observed to form spawning aggregations on the Great Barrier Reef (Squire and Samoilys unpub.), it spawns in pairs (Randall 2001a).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.2. Marine Neritic -> Marine Neritic - Coral Reef -> Back Slope	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.4. Marine Neritic -> Marine Neritic - Coral Reef -> Lagoon	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity
30 Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
40 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Zebrasoma veliferum is harvested for food and is usually caught in traps in parts of its range and caught using spears in Guam. Because of its larger size, it is of greater value as food fish than *Zebrasoma flavescens* or *Z. scopas* (Randall 2001b). It is also a component of the aquarium trade (Global Marine Aquarium Database accessed 19 March 2010).

Threats

Zebrasoma veliferum is a component of subsistence fisheries and is found in localities where coral reef degradation is prevalent.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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Draft

Zebrasoma xanthurum - (Blyth, 1852)

ANIMALIA - CHORDATA - ACTINOPTERYGII - PERCIFORMES - ACANTHURIDAE - Zebrasoma - xanthurum

Common Names: Yellowtail Tang (English), Acanthure à Queue Jaune (French), Dusky Sailfin Tang (English), Gulstjärtad Kirurgfisk (Swedish), Kejserkirurgfisk (Danish), Purple Tang (English), Red Sea Sailfin (English), Yellow Tang (English), Yellowtail Sailfin Tang (English), Yellowtail Surgeonfish (English)
Synonyms: Acanthurus Blyth, 1852; Zebrasoma (Blyth, 1852);

Red List Status
LC - Least Concern, (IUCN version 3.1)

Red List Assessment

Assessment Information

Reviewed?	Date of Review:	Status:	Reasons for Rejection:	Improvements Needed:
true	2011-02-11	Passed	-	-

Assessor(s): Myers, R., Abesamis, R., Clements, K.D., Choat, J.H., McIlwain, J., Nanola, C., Rocha, L.A., Russell, B. & Stockwell, B.

Reviewers: Edgar, G. & Kulbicki, M.

Contributor(s): (Not specified)

Facilitators/Compilers: (Not specified)

Assessment Rationale

Zebrasoma xanthurum is found from the Red Sea around the entire Arabian Peninsula. It is common throughout its range and can be locally abundant in some parts of its distribution. It is a minor component of the aquarium trade.There are no major threats known and it occurs in a number of marine reserves in parts of its range. It is therefore listed as Least Concern.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: (Not specified)

Distribution

Geographic Range

Zebrasoma xanthurum is found from the Red Sea around the entire Arabian Peninsula, with a single siting in the Maldives (Randall and Anderson 1993). Records from Sri Lanka appear to be based on an error in the type locality (Randall 2001a). It has been recorded off Hoi Ha Wan Marine Park, Hong Kong. It was likely released a released aquarium fish (To and Situ 2005). Records from Comoros and Zanzibar need to be verified (R.F. Myers pers. comm. 2010).

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): (Not specified)

Elevation Upper Limit (in metres above sea level): (Not specified)

Depth Lower Limit (in metres below sea level): 50

Depth Upper Limit (in metres below sea level): 1

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status: Done

Biogeographic Realms

Biogeographic Realm: (Not specified)

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Bahrain	Extant	Native	-	Resident
Djibouti	Extant	Native	-	Resident
Egypt	Extant	Native	-	Resident
Eritrea	Extant	Native	-	Resident
India	Extant	Native	-	Resident
Iran, Islamic Republic of	Extant	Native	-	Resident
Iraq	Extant	Native	-	Resident
Israel	Extant	Native	-	Resident
Jordan	Extant	Native	-	Resident
Kuwait	Extant	Native	-	Resident
Maldives	Extant	Native	-	Resident
Oman	Extant	Native	-	Resident
Pakistan	Extant	Native	-	Resident
Qatar	Extant	Native	-	Resident
Saudi Arabia	Extant	Native	-	Resident
Somalia	Extant	Native	-	Resident
Sri Lanka	Extant	Native	-	Resident
Sudan	Extant	Native	-	Resident
United Arab Emirates	Extant	Native	-	Resident
Yemen	Extant	Native	-	Resident

Large Marine Ecosystems (LME) Occurrence

Large Marine Ecosystems: (Not specified)

FAO Area Occurrence

	Presence	Origin	Formerly Bred	Seasonality
51. Indian Ocean - western	Extant	Native	-	Resident
57. Indian Ocean - eastern	Extant	Native	-	Resident

Population

Zebrasoma xanthurum is more common on the outer islands of the Gulf of Oman and Arabian Sea: Halaniyat Islands, at 123 ind/450 m^2 and

Daminiyat Island 85 ind/450 m^2. On the central coast of the Gulf of Oman 64 ind/450 m^2 Bandah Kayran. It is uncommon on the reefs of southern coast of Oman (J. McIlwain unpub. data). In Duda, Red Sea density estimates 6.6/100 m^2 (A. Ayling pers. comm. 2010)

In the Nabq Managed Resource Protected Area, South Sinai, Egyptian Red Sea, mean abundances of this species showed differences at various depths and between no-take zones (NTZ) and take zones (TZ). At 1m depth of the NTZ, mean abundance was recorded at 0.00 while in the TZ it was 0.04. At 3m depth of the NTZ, mean abundance was recorded at 4.83 while in the TZ it was 4.00. At 10m depth of the NTZ, mean abundance was recorded at 0.42 and 1.13 in the TZ (Ashworth and Ormond 2005). The greater abundance of this species in the fished area than in the NTZ in 10m depths, can be attributed to a result of reduced predation or competition (Ashworth and Ormond 2005).

Population Information

Extreme fluctuations in the number of subpopulations: (Not specified)

Continuing decline in number of subpopulations: (Not specified)

All individuals in one subpopulation: (Not specified)

Size of the largest subpopulation? (in mature individuals): (Not specified)

Number of Subpopulations: (Not specified)

Continuing decline in mature individuals? (Not specified)

Habitats and Ecology

Zebrasoma xanthurum is a herbivore grazer feeding mostly on benthic algae. The diel activity of this species is divided into three distinct patters: early morning (6:00 a.m.), during the day (09:00-15:00 hr) and sunset. It feeds mostly solitary or in pairs during the day. At sunset individuals cease feeding and move to their night shelter at the reef wall. It takes cover among coral colonies as well as crevices (Fouda and Sayed 1994). The sexes are separate among the acanthurids (Reeson 1983). There is a possibility of sexual dimorphism in *Zebrasomas* with cloacas bigger in females (Bushnell *et al.* 2010). This dimorphic character most likely applies to all *Zebrasomas* (J.H. Choat pers comm. 2010).

IUCN Habitats Classification Scheme

Habitat	Suitability	Major Importance?
9.2. Marine Neritic -> Marine Neritic - Subtidal Rock and Rocky Reefs	Suitable	-
9.8. Marine Neritic -> Marine Neritic - Coral Reef	Suitable	-
9.8.1. Marine Neritic -> Marine Neritic - Coral Reef -> Outer Reef Channel	Suitable	-
9.8.3. Marine Neritic -> Marine Neritic - Coral Reef -> Foreslope (Outer Reef Slope)	Suitable	-
9.8.6. Marine Neritic -> Marine Neritic - Coral Reef -> Inter-Reef Rubble Substrate	Suitable	-

Life History

Generation Length: (Not specified)

Age at Maturity: Female: (Not specified)

Age at Maturity: Male: (Not specified)

Size at Maturity (in cms): Female: (Not specified)

Size at Maturity (in cms): Male: (Not specified)

Longevity
11 Years

Average Reproductive Age: (Not specified)

Maximum Size (in cms)
25.1 (TL)

Size at Birth (in cms): (Not specified)

Gestation Time: (Not specified)

Reproductive Periodicity: (Not specified)

Average Annual Fecundity or Litter Size: (Not specified)

Natural Mortality: (Not specified)

Breeding Strategy

Does the species lay eggs?	Does the species give birth to live young	Does the species exhibit parthenogenesis
No	No	No

Does the species have a free-living larval stage?	Does the species require water for breeding?
No	No

Movement Patterns

Movement Patterns: (Not specified)

Congregatory: (Not specified)

Systems

System: Marine

Use and Trade

General Use and Trade Information

Zebrasoma xanthurum is a minor component of the aquarium trade (Global Marine Aquarium Database accessed 19 March 2010). Online prices range from $87.98-$259.95 (L. Rocha pers. comm. 2010).

Threats

There are no major threats known for this species.

Surgeonfishes show varying degrees of habitat preference and utilization of coral reef habitats, with some species spending the majority of their life stages on coral reef while others primarily utilize seagrass beds, mangroves, algal beds, and /or rocky reefs. The majority of surgeonfishes are exclusively found on coral reef habitat, and of these, approximately 80% are experiencing a greater than 30% loss of coral reef area and degradation of coral reef habitat quality across their distributions. However, more research is needed to understand the long-term effects of coral reef habitat loss and degradation on these species populations. Widespread coral reef loss and declining habitat conditions are particularly worrying for species that recruit into areas with live coral cover especially as studies have shown that protection of pristine habitats facilitate the persistence of adult populations in species that have spatially separated adult and juvenile habitats (Comeros-Raynal *et al.* 2012).

Conservation

There are no species-specific conservation measures in place for this species. However, its distribution overlaps several marine protected areas within its range.

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