

Ascension Island Species Action Plan

YELLOWFIN TUNA



Photo: K. Downes

SUMMARY

Taxonomy: Kingdom: Animalia; Phylum: Chordata; Class: Actinopterygii; Order: Perciformes; Family: Scombridae; Species: *Thunnus albacares*

Nativeness: Native

Description: Large tuna with a slender, fusiform body that is covered with small scales. Fast growing, reaching up to 2m in length. Metallic blue-black colouration changing from yellow to silver on the body, with the first dorsal fin an intense yellow, hence common name of “yellowfin tuna”. Feed mainly on fish, crustaceans and cephalopods. Yellowfin tuna are widely distributed and important in commercial fisheries around the world.

Threats: The major threat to yellowfin is overfishing, in coastal and offshore areas; secondary threats include climate changed-induced prey alteration.

IUCN Red List status: Near Threatened

Local trend: Stable but vulnerable to over-exploitation ↔



Distribution	
Global	
<p>Occurs worldwide in tropical and subtropical seas, yet absent in the Mediterranean Sea¹. In the eastern Pacific, this species ranges from southern California to Peru, including all of the oceanic islands¹. Long-line catch data indicates that yellowfin are distributed continuously throughout the entire tropical Indian Ocean. Yellowfin tuna exhibit pan-tropical distribution in the Atlantic Ocean, where trans-Atlantic migrations occur, and are known to frequent the Mid-Atlantic Island's waters where they support active recreational and commercial fisheries².</p>	
Local	
<p>Yellowfin are widely distributed around Ascension Island, from near shore coastal waters out to the 200nm limit of the EFZ², generally year-round with slight decreases in reported catches in the near shore from December – March³, coinciding with peak spawning times in the Gulf of Guinea for the Atlantic stock^{4,5}, suggesting that yellowfin most likely move outside Ascension's waters during this time.</p> <p>Generally confined to the upper limits of the water column, above 100m, where schooling is apparent, primarily by size, either in mono-specific or multi-species groups¹</p>	
<p>Figure 1: Yellowfin tuna habitat in the Ascension Island EFZ. Grid is 1 degree latitude and longitude. White circular features indicate the position of three seamounts within Ascension waters</p>	

3. Status				
GLOBAL	Population estimate:	Unknown	IUCN status:	Near threatened
<p>Global population size of yellowfin tuna has not been formally assessed. Landings data have increased exponentially over the last 50 years by 400%, since fishing became industrialised¹. There are four stocks globally managed for this species and as of 2004, the stocks in the Atlantic, Indian Ocean and Eastern Pacific are considered fully exploited, and the Western and Central Pacific Ocean, considered fully to over-exploited¹. Recent trends in the Atlantic stock indicate that current levels of exploitation are sustainable (i.e. fishing mortality is below the Maximum Sustainable Yield (MSY) value)³</p>				
LOCAL	Population estimate:	Unknown	Local trend:	Unknown
<p>Due to the highly migratory behaviour of yellowfin tuna, assessment of local population size and trends is challenging. Although long distance migrations are known to occur, tagging studies are showing strong regional and local site fidelity, with extended periods of residency around oceanic islands^{6,7}.</p> <p>It is speculated that Ascension is home to a semi-resident population although this is not confirmed and further research into population size and retention of yellowfin at Ascension is needed.</p>				

Ecology
Habitat & diet



They are epipelagic, oceanic fish, living above and below the thermocline in thermal boundaries ranging from 18°C to 31°C, generally confined to the upper limits of the water column, above 100m. Tuna are almost unique among bony fish as they are able to maintain internal temperatures above ambient water temperature, using their vascular heat exchanger system. This thermo-regulating allows improved muscle efficiency and bursts of speed when pursuing prey into deeper and colder environments⁸.

Yellowfin tuna are agile, opportunistic predators, commonly feeding on cephalopods, crustaceans and fish⁹, in surface to mid-waters. Often feed in association with smaller predatory fish and seabirds as the yellowfin drive prey to the surface waters¹⁰.

Reproduction & life history

Growth in yellowfin is isometric and is thought to follow the typical length-weight relationship $W=aL^b$ (weight increasing 3 times that of length)¹¹. Yellowfin exhibit rapid growth during the first years of life and can reach over 200 cm fork length and 150kg weight. Sexual dimorphism occurs in yellowfin¹² and is evident at Ascension Island, with males growing much larger than females (AIG, unpublished data). Ageing has been conducted by many workers in all oceans¹²⁻¹⁶ with estimates of maximum ages around 10 years, however, ageing data collected on Ascension indicate much higher (>18 years) ages of yellowfin (AIG, unpublished data).

The primary Atlantic spawning grounds have been identified in the equatorial zone of the Gulf of Guinea from January to April, with fish maturing around 70-100cm fork length, juveniles are generally found in coastal waters off Africa⁵. Spawning occurs throughout the year in the core areas of distribution at sea surface temperatures of 24°C or higher, but peaks are observed in the northern and southern summer months respectively¹⁷. Yellowfin are batch spawners, spawning every few days over the spawning period¹.

Taxonomy & population structure

Yellowfin tuna utilising Ascension’s waters are considered a single stock in the Atlantic Ocean¹, however very limited genetic data are available and none resulting from Ascension Island to confirm this.

4. Threats*

5.4.1 Fishing & harvesting aquatic resources (Intentional use: subsistence/small scale)	Impact:	HIGH
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Yellowfin are targeted in the recreational and sport fishery on Ascension for local consumption (including sale to Obsidian hotel and US base) and personal export to US, UK and St Helena³. Yellowfin is also a target species in ‘big-game’ fishing that is popular on Ascension, with anglers and spear fisher’s landing trophy-sized specimens³. Fishing is primarily by rod-and-line or spear from sports fishing vessels along with occasional rod-and-line fishing from rocky outcrops along the coastline³. Currently there is no system in place to record annual catches and releases of yellowfin, fishing pressure is thought to be low on Island³ however approximately 5 tonnes of yellowfin has been exported annually (AIG, unpublished data), with yellowfin being the main species exported to all destinations mentioned previously. Exports are monitored through the sale of fish export permits which allow 10kg per person for personal consumption. Yellowfin is not currently managed or licenced within Ascension’s coastal waters.

5.4.4 Fishing & harvesting aquatic resources (unintentional effects, large scale)	Impact:	MEDIUM
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A pelagic longline fishery for tuna and tuna-like species currently operates in Ascension’s EFZ (50nm – 200nm), predominantly targeting big eye tuna, *Thunnus obesus*, however the fishery also takes other species including yellowfin tuna^{2,18}. The overall catches of yellowfin in the offshore fishery are a low proportion of the total catch so it is suggested that this species is being fished sustainably, although recent stock assessments are uncertain². It is important to understand distribution dynamics of yellowfin tuna in the offshore fishery, identifying any key foraging habitats and migration routes by conducting further satellite tracking and at-sea abundance surveys by fisheries observers. Research of pelagic food-web interactions, to understand dietary relationships and functional roles including any niche partitioning with key by-catch species would also help to inform management decisions. The International Commission for the Conservation of Atlantic Tuna (ICCAT), are responsible for conservation and management of Atlantic yellowfin and also issue regional catch quotas to the licensed, foreign flagged, fishing vessels operating in Ascension’s EFZ^{2,19}.



8.1.2 Invasive non-native/alien species/diseases (unspecified species)	Impact:	UNKNOWN
<p>Marine invasive species can affect biodiversity by displacing native species, by altering community structure, food webs and ecological processes²⁰. Invasive species may be introduced deliberately or unintentionally through a number of pathways including, ballast water or biofouling, shells and carapaces of other species, fishing equipment and also drifting marine debris. Any ecological changes would likely have impacts on yellowfin tuna populations although it is difficult to assess the risks at present. Ascension's marine zone currently has no documented species introductions.</p>		
11.3 Climate change & severe weather: temperature extremes	Impact:	UNKNOWN
<p>Sea surface temperature increases and changes to sea currents could have unforeseen effects on yellowfin tuna utilising Ascension's waters. Ocean thermic stability and gradients of sea surface temperature are important physical factors determining yellowfin concentration in a given area and could potentially affect spawning capability if temperatures were to rise above the upper temperature threshold, for yellowfin²¹.</p>		
<p>*Threats are classified and scored according to the IUCN-CMP Unified Classification of Direct Threats²²</p>		
5. Relevant policies and legislation		
International		
<p>This species is listed as a highly migratory species in Annex I of the 1982 Convention on the Law of the Sea.</p> <p>Routine stock assessments and the development of conservation and management measures for all tuna and tuna like species is the responsibility of Regional Fisheries Management Organisations (RFMOs)²³. In the Atlantic Ocean, the International Commission for the Conservation of Atlantic Tunas (ICCAT) is responsible for conservation, management and quota systems and yellowfin tuna is identified as one of 30 species of their concern¹⁹.</p>		
Local		
<p>Ascension Island Government Fisheries Ordinance 2016</p>		

6. Management notes
<p>Further research is urgently needed to study the migration and behaviour of tuna populations. AIG Conservation & Fisheries Department have already gathered some short-term data on vertical movements of yellowfin tuna in the near shore environment; however, this needs to be expanded to examine annual migration cycles, regional connectivity and residence times both within the inshore area and the whole Ascension EFZ. Information on foraging behaviour combined with prey distribution and prey seasonal migrations will also give insight to the potential impacts of the fisheries on food-web dynamics.</p> <p>Investigations into age, growth and reproductive biology have been improved through <i>ad hoc</i> sampling of yellowfin tuna caught in near shore waters on Ascension, although further monitoring of life history parameters is required in order to develop effective management actions. Collection of detailed catch-effort data of yellowfin caught by the local sport and recreational fishers can be used to assess fishing pressure and maintain sustainable catches in the near shore environment.</p>

SPECIES ACTION PLAN**OBJECTIVES**

1. Provide evidence towards the sustainable management of fish stocks in Ascension Island's maritime zone through robust fisheries science, legislation and enforcement, including the creation of closed areas where appropriate.

2. Promote awareness of the importance of Ascension Island's flora and fauna, both locally and internationally.

PROPOSED ACTION	OUTCOME(S)	TIMEFRAME	PROPOSED START	PRIORITY	LEAD*
Policy & Legislation					
Marine protection legislation (fisheries protection ordinance) approved and enacted.	1 ordinance enacted	1 year	September 2016	HIGH	Director of Fisheries (AIG)
Develop and implement policy document for inshore fishing licenses.	1 policy document	1 year	September 2016	HIGH	Director of Fisheries (AIG)
Management					
Implementation of compulsory inshore fishery reporting scheme through fishing licenses.	Reporting scheme implemented	1 year	December 2016	HIGH	Director of Fisheries (AIG)
Research & monitoring					
Understand distribution dynamics of yellowfin tuna (inshore/offshore) by identifying key foraging habitats and migration routes. Conduct further satellite tracking and conduct at-sea abundance surveys to identify potential aggregation areas.	Telemetry equipment deployed 1 academic paper/report produced	1 year	January 2017	HIGH	Marine & Fisheries Scientists (AIG)

PROPOSED ACTION	OUTCOME(S)	TIMEFRAME	PROPOSED START	PRIORITY	LEAD*
Collate all available catch-effort data from Ascension's commercial fishery and historic data from ICCAT.	1 report produced	6 months	December 2016	LOW	Marine & Fisheries Scientists (AIG)
Research pelagic food-web interactions through stable isotope and stomach content analysis, to understand niche overlap; to compare coastal and pelagic data to identify differences in habitats usage within and between species; and to investigate potential impact of fisheries on food-web dynamics.	300 individuals assessed 1 academic paper/thesis produced	2 years	August 2016	HIGH	Marine & Fisheries Scientists (AIG)
Monthly monitoring of length-frequency distribution and reproductive seasonality of the fished yellowfin population.	1 report produced	1 year	July 2016	MEDIUM	Marine & Fisheries Scientists (AIG)
Deploy streamer tags on yellowfin tuna in the line/sport fishery to identify possible retention in Ascension's waters.	400 tags deployed; 1 report produced	2 years	September 2016	MEDIUM	Marine & Fisheries Scientists (AIG)
Communication & Awareness Raising					
Erect visitor fishing information boards at access points and key fishing hot spots, establishing a strong sustainable fishing awareness on Ascension Island.	4 signs installed	1 year	December 2016	MEDIUM	Head of Conservation (AIG)
Produce an awareness document on fishing licences that is easily accessible and understandable. Document will be available at the post office, on the AIG website, social media outlets and conservation department	1 document produced and disseminated	1 year	September 2016	HIGH	Marine & Fisheries Scientists (AIG)
Celebrate World Ocean's Day as a focus for awareness raising activities associated with Ascension Island's marine environment.	1 event organised	1 day	June 2017	LOW	Head of Conservation (AIG)

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