



FISHERY ASSESSMENT REPORT

IFFO GLOBAL STANDARD FOR RESPONSIBLE SUPPLY OF FISHMEAL AND FISH OIL



FISHERY:	Anchovy (<i>Engraulis encrasicolus</i>)
LOCATION:	South Africa
DATE OF REPORT:	30/12/11
ASSESSOR:	Sam Peacock

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Issue No; 2; Issue Date; Nov 09

Report Ref: SA Anchovy

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1. Application Details and Summary of the Assessment Outcome			
Name:			
Address:			
Country: South Africa		Zip:	
Tel. No.		Fax. No.	
Email address:		Applicant Code	
Key Contact:		Title:	
Certification Body Details			
Name of Certification Body: Global Trust Certification			
Assessor Name:	Peer Reviewer:	Assessment Days:	Initial/Surveillance/Re-certification:
Sam Peacock	Mike Platt	5	Initial
Assessment Period	26-30 Dec 2011		
Scope Details			
1. Scope of Assessment:		IFFO Global Standard for Responsible Supply	
2. Fishery		Anchovy (<i>Engraulis encrasicolus</i>)	
3. Fishery Location		South Africa	
4. Fishery Method		Purse Seine	
Outcome of Assessment			
5. Overall Fishery Compliance Rating		High	
6. Sub Components of Low Compliance		None	
7. Information deficiency		Minimal – more information required on TEP species	
8. Peer Review Evaluation <p>The South African management regime from the evidence assessed is robust and provides a solid framework for the management for the pelagic species within this fishery. The scientific evaluations of this stock and associated by catch stock are on-going and are used when management decisions on the total allowable catch (TAC) are made. The evidence of compliance to the set TAC to this scientific advice were positive and in compliance to the precautionary approach adopted within these pelagic fisheries. Information on the impacts of the fishery on PET species and the enforcement of the fishery was initially insufficient, but a preliminary on-site investigation provided sufficient evidence to score all section highly compliant.</p>			
9. Recommendation		Approve	

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2. Quality of Information
Good; primarily from South African government websites and publications and a preliminary on-site visit. Also scientific journals and environmental organisation websites.

3. Compliance Level Achieved
High.
Recommendation
Provisional Approval proceed to on site assessment

4. Guidance for On-site Assessment
Based on High Compliance Findings
Based on Medium Compliance Findings
Key Stakeholders of the Fishery

5. Assessment Determination
Approve, subject to more information being provided on the treatment and avoidance of TEP species bycatch by the fishery, and the effectiveness of enforcement agencies.
HIGH COMPLIANCE
A1, A2, A3, B1, B2, C1, D1, D2, D3, E1, E2
MEDIUM COMPLIANCE

Background

South African Marine Fisheries

South Africa has a coastline that spans two ecosystems over a distance of 3 623 km, extending from the Orange River in the west on the border with Namibia, to Ponta do Ouro in the east on the Mozambique border. The western coastal shelf has highly productive commercial fisheries similar to other upwelling ecosystems around the world, while the east coast is considerably less productive but has high species diversity, including both endemic and Indo-Pacific species. Marine fisheries in South Africa are diverse, and because of the different ecosystems and irregular coastline, are diversified, both with respect to species caught and gear deployed.

Small Pelagic Fishery

The small pelagic fishery dates back to the late 1940's when a fleet of privately owned purse seine vessels began targeting sardine and horse mackerel. In 1953 an annual maximum catch limit of 270 000 tons was set but was never enforced. As a result, catches regularly exceeded this figure. By 1961, the maximum limit was repealed. In 1962, more than 410 000 tons of sardine were landed, but by 1966, the catch had dropped to 100 000 tons. The fleet then started targeting anchovy, using nets with a smaller mesh size. In 1987 anchovy catches peaked at 600 000 tons, but catches declined thereafter and in 1996 only 40 000 tons of anchovy were landed. Anchovy and sardine catches have subsequently increased, with landings of both species averaging around 250 000 tons each over the past five years.

The fishery is currently managed in terms of an Operational Management Procedure (OMP) that sets annual Total Allowable Catches (TAC) for anchovy and sardine, and also Total Allowable Bycatch (TAB) for sardine within the anchovy directed fishery. In terms of catch volumes, the small pelagic fishery remains the largest in South Africa. It is the second most important in terms of value. This fishery's management procedure is the most complex of the commercial fisheries. Two species are the main targets, namely sardine *Sardinops sagax* and anchovy *Engraulus encrasicolus*, with associated bycatch species being red-eye round herring *Etrumeus whiteheadii* and Cape horse-mackerel *Trachurus trachurus capensis*. Sardines are canned for human consumption while anchovy and most of the

bycatch species are reduced to fishmeal, fish oil and fish paste. Small pelagic targeting occurs inshore, primarily along the Western Cape's west and south coasts (anchovy and sardine) and the Eastern Cape coast (sardine). The pelagic fleet consists of just over 100 wooden, GRP and steel hulled purse-seine vessels, ranging in length from 15 metres to 30 metres. The industry employs approximately 7 800 people. Of these, 5 300 are employed on a permanent basis and 2 500 on a seasonal basis. The value of fish landed in 2005 was worth approximately R800 million per annum. Most of the catch is processed in 8 fishmeal plants, 6 canning factories and more than 40 bait packing facilities.

Anchovy

Engraulus encrasicolus (also known as *Engraulis capensis*) is a marine, pelagic, coastal species found in shallow inshore waters, but also down to about 200 m, forming large schools. Anchovy feeds chiefly on calanoid copepods when juvenile, gradually switching to phytoplankton at about 5cm standard length. Spawning occurs from early spring to late summer (October to April in southern African waters, with a peak in November/December in the south, but in February off Namibia), in coastal waters and not more than 80 km offshore.

References: R1, R2, R3, R4

SUMMARY OF LEVEL OF COMPLIANCE					
	The Management Framework and Procedures	Stock assessment procedures and management advice	Precautionary approach	Management measures	Implementation
legal and administrative basis	High Compliance	Low Compliance	Low Compliance	Low Compliance	Low Compliance
Fisheries management should be concerned with the whole stock unit	High Compliance	Low Compliance	Low Compliance	Low Compliance	Low Compliance
Management actions should be scientifically based	High Compliance	Low Compliance	Low Compliance	Low Compliance	Low Compliance
Research in support of fisheries conservation and management should exist	Low Compliance	High Compliance	Low Compliance	Low Compliance	Low Compliance
Best scientific evidence available should be taken into account when designing conservation and management measures	Low Compliance	High Compliance	Low Compliance	Low Compliance	Low Compliance
The precautionary approach is applied in the formulation of management plans	Low Compliance	Low Compliance	High Compliance	Low Compliance	Low Compliance
The level of fishing permitted should be set according to management advice given by research organisations	Low Compliance	Low Compliance	Low Compliance	High Compliance	Low Compliance
Where excess fishing capacity exist, mechanisms should be in established to reduced capacity	Low Compliance	Low Compliance	Low Compliance	High Compliance	Low Compliance
Management measures should ensure that fishing gear and fishing practices do not have a significant impact on non-target species and the physical environment	Low Compliance	Low Compliance	Low Compliance	High Compliance	Low Compliance
A management system for fisheries control and enforcement should be established	Low Compliance	Low Compliance	Low Compliance	Low Compliance	High Compliance
A framework for sanctions of violation of laws and regulations should be efficiently exists	Low Compliance	Low Compliance	Low Compliance	Low Compliance	High Compliance

KEY: Low Compliance Medium Compliance High Compliance:

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6. Rationale of the Assessment Outcome

a. The Management Framework and Procedure

LEVEL OF COMPLIANCE	a.i. The management of the fishery must include a legal and administrative basis for the implementation of measures and controls to support the conservation of the fishery.	References	Rating
LOW	<p>Determination: South Africa has in place a robust legal and administrative framework for the determination and implementation of fishery management measures and controls. This framework is applied to the anchovy fishery.</p> <p>Legal Basis</p> <p>The legal foundation for the management of South African fisheries, including fisheries for sardine, anchovy and round herring, is the Marine Living Resources Act, 1998 (Act No. 18, 1998) of South Africa, which includes the following overarching goals:</p> <ul style="list-style-type: none"> • achieve optimum utilisation and ecologically sustainable development of marine living resources • conserve marine living resources for present and future generations • apply precautionary approaches in respect of the management and development of marine living resources • utilise marine living resources to achieve economic growth, human resource development, capacity building within fisheries and mariculture branches, employment creation and a sound ecological balance consistent with the development objectives of the national government • protect the ecosystem as a whole, including species which are not targeted for exploitation; • preserve marine biodiversity 	R2, R4, R7, R11	HIGH
MEDIUM			
HIGH			

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	<ul style="list-style-type: none"> • minimise marine pollution • achieve to the extent practicable a broad and accountable participation in the decision-making processes provided for in the Act <p>Administrative Basis</p> <p>The South African fishing industry is managed and regulated by the Fisheries Management Branch (FMB) of the Department of Agriculture, Forestry and Fisheries (DAFF). The FMB is the primary implementer of the Marine Living Resources Act, and its aims include the maintenance and restoration of the productive capacity and biodiversity of the marine environment, ensuring the protection of human health, and promotion of the conservation and sustainable use of marine living resources.</p> <p>The Branch conducts research and monitoring on anchovy, amongst other stocks, including biannual research surveys, manned field stations, and creating Scientific Working Groups (SWGs) to gather state and invited outside specialist scientists to assess the status of the various pelagic stocks. The FMB uses this research to make recommendations regarding management measures, including total allowable catches (TACs) and fishery closures. The specific SWG relevant to the anchovy stock is the Small Pelagic Scientific Working Group, which provides advice and recommendations to ensure the sustainable utilisation of South Africa's small pelagic fish resources.</p>		
	a.ii. Fisheries management should be concerned with the whole stock unit over its entire area of distribution and take into account fishery removals and the biology of the species	References	Rating
LOW	<p>Determination: The information provided to the assessment team suggests that the South African anchovy fishery is considered by scientists to constitute a distinct population, largely separate from the more northern <i>E. encrasicolus</i> distribution, justifying its management as a distinct stock.</p> <p>Sardine, anchovy, horse mackerel, round herring, lanternfish, and lightfish occur in the Benguela Ecosystem, which can be loose loosely considered to cover the continental shelf between the Angola-Benguela frontal zone</p>	R1, R6, R12	HIGH
MEDIUM			
HIGH			

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	<p>off northern Namibia/southern Angola and the Agulhas retrolection area, typically between 36 °S and 37 °S. As such, it covers the west coast of South Africa, the entire Namibian coast, and part of southern Angola, depending on the position of the Angola-Benguela front, which moves seasonally typically between 14°S and 17°S. Thus although <i>E. encrasicolus</i> is phenotypically almost indistinguishable across its entire distribution from Scandinavia to South Africa, there is considered to be little or no mixing of the South African and Namibian stocks of anchovy, and the Namibian and South African stocks of the various Low Trophic Fishery species are managed entirely separately.</p> <p>The two primary target species in the small pelagic fishery, sardine and anchovy, have to be managed jointly because the two stocks interact. Sardine and anchovy shoal together as juveniles, so any catch of juvenile anchovy is unavoidably accompanied by a bycatch of juvenile sardine. A larger anchovy TAC in one year could therefore have a negative effect on the potential (directed) catch of adult sardine some years later and the industry is faced with a choice between the anchovy catch and the directed sardine catch. For this reason, the two fisheries are considered jointly to allow more effective management of this trade-off.</p> <p>Since June 2008, South Africa has been a member of the South East Atlantic Fisheries Organisation (SEAFO). The objective of the organisation is to ensure the long-term conservation and sustainable use of the fishery resources in the Convention Area through the effective implementation of the Convention. The Convention Area excludes the exclusive economic zones of the coastal states in the region, and so is largely not applicable to the anchovy fishery.</p>		
	a.iii .Management actions should be based on long-term conservation objectives	References	Rating
LOW	<p>Determination: The Operation Management Procedure sets out a probability-based, specific, and long-term objective for maintaining anchovy spawning stock biomass.</p> <p>The long-term conservation objectives of the management of the South African small pelagic fishery are set out in the Operational Management Procedure (OMP). An OPM is simply a set of clearly defined decision rules, which translate data from the fishery into a regulatory mechanism, in this case an annual Total Allowable Catch</p>	R6	HIGH
MEDIUM			
HIGH			

	<p>(TACs). These decision rules say precisely how the TACs are to be calculated and what data are to be used for this purpose. An important feature of this approach is that the risk of stock collapse is defined in easily understandable ways. All concerned parties (i.e. managers, scientists, industry) have to agree to the decision rules before they are implemented. Once in place, the management procedure is set to run for a number of years (normally 3 to 5 years).</p> <p>The current OMP, in place since 2008, is OMP-08, although it retains many of the definitions and rules present in the previous version, OMP-04. The specific long-term aim of OMP-08, which was carried over from OMP-04, is that “the probability that the adult anchovy biomass falls below 10% of the average adult anchovy biomass between November 1984 and November 1999 at least once during the projection period of 20 years should be less than 10%”.</p>	
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b. Stock Assessment Procedures and Management Advice

LEVEL OF COMPLIANCE	bi. Research in support of fisheries conservation and management should exist.	References	Rating
LOW	<p>Determination: Management of the South African small pelagic fishery is supported by ongoing fishery dependent and annual fishery independent research.</p> <p>Fishery dependent:</p> <p>Information collected from pelagic landing sites includes the catch weight, species composition, and catch location (grouped into 10 × 10 mile blocks). Anchovy catch data are used to ensure quotas are not exceeded. Additionally, anchovy catch data and the ratio of juvenile sardine to anchovy as observed in commercial catches during May are both used as input in the operational management procedure in the mid-year determination of the revised anchovy total allowable catch and sardine total allowable bycatch.</p>	R2, R3,	HIGH
MEDIUM			
HIGH			

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	<p>Catch location data are used to monitor spatial trends in fishing patterns and from those infer distribution patterns of pelagic species. For example, anchovy, round herring and sardine appear to have increased substantially in their distribution ranges between mid- to late 1980s and the 1990s and, since 1997, the average location of sardine catches has shifted further eastwards each year. Additionally, this data may be used in conjunction with other data sources to derive spatial ecosystem indicators such as an index of spatial biodiversity and the exploited fraction of the ecosystem surface for the pelagic fishery.</p> <p>Catch-at-age and weight-at-age data for both anchovy and sardine are generated from age-length keys derived from commercial catch samples, and are required for the stock assessment models. Biological data have been used to construct time series of indicators that characterise the state of the target stock and the fisheries they support.</p> <p>Observers on boats have been deployed in the pelagic fishery since 1999, to provide data relating to catch weight and locality, catch composition, and length frequencies of important species, in addition to collecting some biological data. Observer data has been used to validate catch data (primarily catch weight and species composition) recorded by fisheries inspectors at landing sites, and to compare the fishing behaviour of observed versus unobserved vessels. The most significant gap in the observer data pertains to the low coverage of the pelagic fleet, which is currently around 8% of fishing trips.</p> <p>Vessel monitoring systems are presently on board every pelagic vessel and provide data on location (with a temporal resolution of six hours), but are currently only used for compliance purposes to ensure that vessels do not fish in restricted areas.</p> <p>Fishery-independent:</p> <p>A hydroacoustic survey programme to estimate pelagic fish biomass was initiated in 1983. These surveys cover much of the continental shelf around South Africa, although the spawner biomass survey has a greater offshore coverage than does the recruitment survey. Annual biomass estimates of anchovy and sardine spawner biomass have been made every November since 1984, resulting in an uninterrupted time series that spans 22 years. The collection of ichthyoplankton samples during spawner biomass surveys permitted estimates of</p>		
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anchovy spawner biomass using the daily egg production method (DEPM), and between 1984 and 1993 concomitant acoustic and DEPM estimates were made which were combined to obtain a single, unbiased measure of population size. The DEPM estimates and acoustic survey estimates for anchovy spawner biomass showed good agreement over a period of ten years, leading to discontinuation of the DEPM due to the additional work load required to produce two essentially similar biomass estimates.

Ichthyoplankton data have also been used more broadly to study other life history characteristics of the small pelagic species, such as spawning habitat and nursery areas.

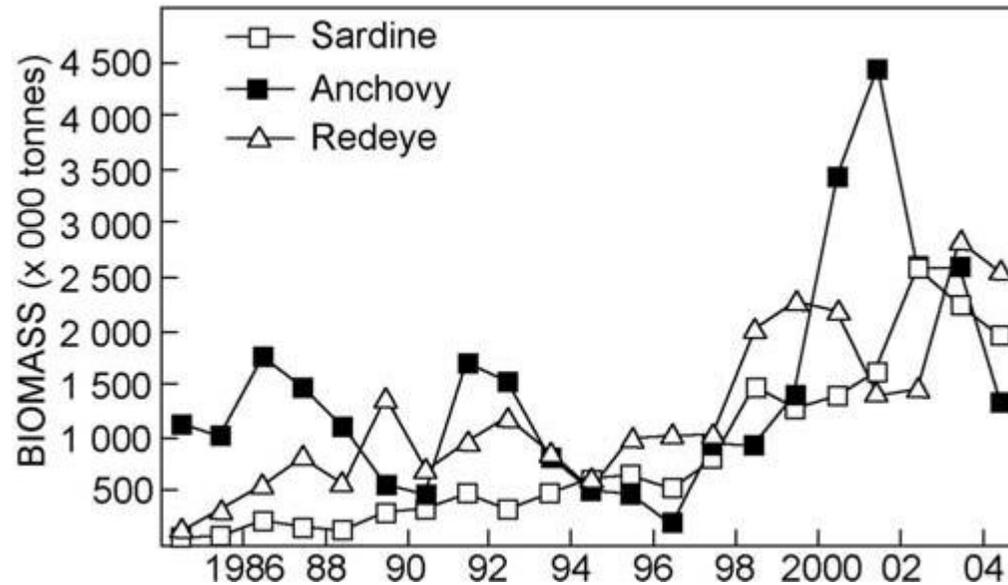


Fig. 1. Time series of fishery-independent data for annual hydroacoustic survey estimates of spawner stock size of anchovy, redeye and sardine, 1984–2005.

LEVEL OF COMPLIANCE	b.ii Best scientific evidence available should be taken into account when designing conservation and management measures	References	Rating
LOW	<p><i>Determination: Several scientific working groups are involved throughout the fishery management process, and in the opinion of the assessment team the recommendations of these groups are heavily relied upon for the development of management actions.</i></p>	R2, R6, R7, R8	HIGH
MEDIUM			
HIGH			

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c. The Precautionary Approach

LEVEL OF COMPLIANCE	c.i The precautionary approach is applied in the formulation of management plans.	References	Rating
LOW	<p>Determination: South African fisheries policy states the application of the precautionary approach as one of the primary aims. The small pelagic OMP utilises a risk-based approach to setting annual quotas, factoring in a large number of research variables (detailed below).</p>	R6, R7	HIGH
MEDIUM			
HIGH			<p>The Marine Living Resources Act, 1998 includes as one of its recognised principals “the need to apply precautionary approaches in respect of the management and development of marine living resources”.</p> <p>OMPs are aimed at quantifying risks and benefits of alternative short- and long-term management options, in terms that resource managers and decision-makers can understand and relate to. OMPs perform a risk analysis, which allows results to be expressed as the probability that a defined event will occur (e.g. the biomass falling below a specified threshold level or the fishery collapsing) within a fixed period. Commonly used risk statistics include the probability of depleting the (spawning-stock) biomass below some threshold or the median biomass expected at the end of the simulation period (compared with the biomass at the onset of this period).</p> <p>In the South African pelagic OMP for sardine and anchovy (OMP-08 being the current one), the fundamental "risk" addressed is the unintended depletion of the two resources. OMP-08 was designed specifically to achieve the desired trade-offs between mutually conflicting objectives, such as maximizing catch, minimizing interannual catch variability, and minimizing the risk of substantial depletion of the resource.</p> <p>Several novel adaptations were introduced in OMP-04 and carried through to OMP-08, allowing rapid</p>

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	<p>responses to sharp changes in resource abundances, which are typical of pelagic resources worldwide, but still keeping the risks of undue response depletion under control.</p> <p>As noted in section A3 above, the risk for anchovy is defined as: “the probability that the adult anchovy biomass falls below 10% of the average adult anchovy biomass between November 1984 and November 1999 at least once during the projection period of 20 years should be less than 10%.”</p> <p>The OMP quota calculation model factors in a large number of variables, including observed estimates of sardine and anchovy abundances from the acoustic surveys; historical catches and biomass estimates; predicted annual bycatch of small pelagic species in other fisheries; estimated ratios of juvenile sardine to juvenile anchovy; and also fixed values reflecting the relative risk levels and economic factors of the stocks. Although under normal conditions there is a minimum recommendable TAC, under exceptional circumstances (i.e. if estimated biomass falls below a pre-defined level), this minimum quota can be ignored. For example, the 1997 anchovy TAC was 0t.</p>	
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d. Management Measures

LEVEL OF COMPLIANCE	d.i The level of fishing permitted should be set according to management advice given by research organisations.	References	Rating
LOW	<p><i>Determination: Anchovy (and sardine) quotas are set according to the small pelagic OMP. As the OMP is created and revised by scientific working groups, this ensures that the level of fishing is always set according to scientific advice, albeit somewhat indirectly.</i></p> <p>The level of fishing permitted is set according to the annual management advice given by the Small Pelagic Scientific Working Group, which in turn calculates its recommendation based on the scientifically-derived formula detailed in the OMP.</p> <p>Following the 2011 pelagic recruitment survey, the revised and final 2011 TAC for anchovy and the final 2011 TAB for sardine are recommended. As per the OMP used to manage South Africa's small pelagic</p>	R5, R6, R7	HIGH
MEDIUM			
HIGH			

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	<p>resources the 2011 directed sardine TAC recommended in December 2010 remains unchanged. Using the estimates of anchovy and sardine recruitment in 2011 and refinements to these as input to OMP-08 results in the following final anchovy TACs:</p> <p>Final normal season anchovy TAC: 270,291 tonnes</p> <p>Sub-season anchovy TAC: 120,000 tonnes</p> <p>"Normal season" refers only to the anchovy directed fishery and associated juvenile sardine by-catch which runs from 1 January to 31 August. "Sub-season" refers to the anchovy directed fishery and associated juvenile sardine by-catch which runs from 1 September to 31 December (as detailed in section B2).</p>		
LEVEL OF COMPLIANCE	d.ii Where excess fishing capacity exist, mechanisms should be in established to reduced capacity to allow for the recovery of the stock to sustainable levels.	References	Rating
LOW	<p><i>Determination: South Africa has several mechanisms in place to reduce excess fishing capacity, including the setting of strict, enforced quotas, vessel registering and commercial fishing licences. There is currently not considered to be excess fishing capacity in this fishery.</i></p>	R10, R11	HIGH
MEDIUM			
HIGH			
	<p>Any commercial fishing in South Africa requires an annually-renewed license. Commercial fishers are considered to be exercising a fishing right. The right must first be applied for and granted, to exploit, harvest fish or engage in a fishing related activity for trade purposes. It also includes engagement in fishing related and non-consumptive activities. Commercial fishing permits are granted by the Minister of Department of Agriculture, Forestry and Fisheries (or the delegated authority). Full or limited commercial fishing rights are granted in selected fishing sectors based on a Total Allowable Catch or Effort (TAC/E) which is determined annually by the Minister of the Department of Agriculture, Forestry and Fisheries. It is illegal to engage in commercial fishing without a permit. In addition, any vessel which is “used for, or equipped for the management, harvesting and exploitation of living marine resources, or in support of related activities” must be registered with and approved by the DAFF and African Maritime Safety Authority (AMSA).</p>		

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	Historically, when anchovy and sardine biomass levels have been low, TACs and TABs have been adjusted accordingly to allow stock recovery, extending as far as the closure of the anchovy fishery in 1997.		
LEVEL OF COMPLIANCE	d.iii Management measures should ensure that fishing gear and fishing practices do not have a significant impact on non-target species and the physical environment.	References	Rating
LOW	<p><i>Determination: Purse-seine nets are not considered to have a major impact on the physical environment. The major bycatch species in the small pelagic fishery are subject to quotas, and in any case the fishery is considered highly targeted (within the four main species caught). A detailed and on-going assessment of the impact of fishing on penguin populations is in place. Information provided by government scientists during a preliminary on-site visit suggests that there is no PET bycatch in this fishery.</i></p> <p>Anchovy are caught using purse-seine nets in the mid-water. This method is preferred for capturing commercially important fish species which aggregate close to the water’s surface, and is not considered destructive to the benthic habitat or species within the benthic habitat. Bycatch in the small pelagic fishery is less than 10 %, due to the dense schooling behaviour of target species and the fishing methods employed. Some reef species traditionally referred to as linefish (e.g. yellowtail, white steenbras and kob) are occasionally caught. The two major bycatch species, redeye round herring and horse mackerel, are subject to annual quotas. Small pelagic fishing permits set out a detailed plan for regional fishery closures if bycatch exceeds defined minimums, and processor permits prohibit certain gear types to minimise Cape fur seal casualties.</p> <p>Government scientists (from the Small Pelagic Scientific Working Group, SPSWG) have stated that there is no TEP bycatch in the small pelagic fishery. Sealions and seals are scared out of the nets by skippers when they are seen. All landings are monitored by a government official, who completes a pelagic landing report for each vessel. Skippers also complete a report, which must match the monitor’s figures to within 10%. Samples are taken of landings every 30 minutes to check bycatch composition. Excessive bycatch of certain species leads to area closures, as described in the assessment report.</p> <p>Small pelagic fish such as anchovy are an important part of the food chain in the Benguela Current, and as such</p>	R4, R9	HIGH
MEDIUM			
HIGH			

	<p>they are important for the functioning of the ecosystem in the region.</p> <p>It is illegal in South Africa to use any explosive, fire arm, poison or other noxious substance to catch fish.</p> <p>African Penguins</p> <p>The African Penguins are severely under threat and are now considered Endangered by the World Conservation Union. Their populations have decreased by over 90% since the turn of the last century, initially as a result of egg collecting and guano scraping but more recently as a result of competition between man and penguins for a source of food – sardines and anchovies.</p> <p>The Responsible Fisheries Alliance has embarked on a project to better understand the energy requirements of African Penguins at different sites within the penguins’ distribution and at different stages of their life cycle. This new information will contribute to a growing database of information on other dependent predators such as the Cape Gannet. The additional use of logger technology will assist in assessing areas in which prey is caught and where the birds spend the majority of their time at sea. This is critical information needed for the Ecosystem Approach to Fisheries management, as it can be used for modeling different foraging efficiency, food abundance and availability scenarios. With the combined scientific expertise of the parties involved, results and conclusions of this study can be translated into practical solutions to appropriately design and formulate long-term conservation strategies (e.g. Marine Protected Areas) for the African Penguin, and to improve management of fisheries so as to avoid undue competition between man and penguins.</p> <p>As part of the implementation of an ecosystem approach to fisheries (EAF) in South Africa's fishery for small pelagic species, a model of penguin dynamics has been developed for use in conjunction with the small pelagic OMP so that the impact on penguins of predicted future pelagic fish trajectories under alternative harvest strategies could be evaluated. These studies have indicated that to the extent that recent declines in penguin numbers might be linked to lesser availability of pelagic fish for their prey, the decline is more likely a consequence of the eastward shift in the distribution of these fish over the past decade rather than any impact of fishing on their abundance. Thus even with large reductions in pelagic catches under an alternative OMP, there would be little benefit for penguins if fish remain distributed primarily off the south coast. However,</p>		
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		these were initial results and further modelling that includes new data is currently underway. Additional measures to restrict fishing in close proximity to penguin breeding colonies are also being investigated.		
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e. Implementation

LEVEL OF COMPLIANCE	e.i There should be a framework for sanctions of violation of Laws and regulations.	References	Rating
LOW	<p><i>Determination: There is a detailed legal framework for sanctions of violations of laws and regulations by South African fishers.</i></p> <p>A framework of sanctions for violations of laws and regulations is established by the Marine Living Resources Act, 1998 (Act No. 18, 1998) of South Africa, with jurisdiction throughout the South-African EEZ. There are numerous other Acts that add to the marine legislative framework that work in conjunction with the MLRA. These include the National Environmental Management: Protected Areas Act (No. 57 of 2003), the National Environmental Management: Biodiversity Act (No. 10 of 2004), the Maritime Zones Act (No. 15 of 1994), Sea Birds and Seals Protection Act (No. 46 of 1973), Sea Shore Act (No. 21 of 1935) and the Nature and Environmental Conservation Ordinance, (Ordinance 19 of 1974).</p> <p>Sanctions include the suspension or removal of fishing rights, the seizure of gear or vessels, fines of up to 5 million rand (approx. US\$500,000), or imprisonment for up to five years. A detailed list of sanctions is presented in Chapter 7 of the Marine Living Resources Act.</p>	R7, R11	HIGH
MEDIUM			
HIGH			
LEVEL OF COMPLIANCE	e.ii A management system for fisheries control and enforcement should be established.	References	Rating

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LOW	<p>Determination: A management system for fisheries control and enforcement is established. Information obtained during a preliminary on-site visit confirms that the fishery is highly compliant in this section.</p> <p>Enforcement is the responsibility of the Fisheries Management Branch of the Department of Agriculture, Forestry and Fisheries. Compliance is maintained through a comprehensive monitoring, control and surveillance strategy, 4 fishery patrol vessel warships and one chase vessel (used for all South African fisheries), officers and vessel monitoring systems. Vessel monitoring systems are presently on board every pelagic vessel and provide data on location (with a temporal resolution of six hours), and are used for compliance purposes to ensure that vessels do not fish in restricted areas. Both the skipper and holder of fishing rights of vessels detected fishing in closed or restricted areas are subject to fines. Fish must be landed in the presence of a Fishery Control Officer, who completes a pelagic landing report for each vessel. Skippers also complete a report, which must match the monitor’s figures to within 10%. Samples are taken of landings every 30 minutes to check bycatch composition. Excessive bycatch of certain species leads to area closures, as described above. Fishing permits also contain restrictions on where fish can be landed.</p> <p>Catch data (detailed in section B1 above) is recorded at landing, and observers are present on approximately 8% of fishing trips. All commercial fishing vessels are required by law to have a license and fishing permit, and all licensed vessels are required to permit observers and fishery control officers on board when requested. Full details of the powers of fishery control officers are set out in Chapter 6 of the Marine Living Resources Act, 1998.</p>	R3, R7, R11	HIGH
MEDIUM			
HIGH			

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References

- R1 – FAO species profile, Anchovy: <http://www.fao.org/fishery/species/2106/en>
- R2 – South Africa Department of Agriculture, Forestry and Fisheries: <http://www.daff.gov.za/>
- R3 – Hutchings, L. et al, 2009: *Marine fisheries monitoring programmes in South Africa*. South African Journal of Science 105
- R4 – Ecological Risk Assessment (ERA) for the South African Small Pelagic Fishery, D.C. Nel, 2005: Provided by Client
- R5 – Final Recommendation of the Scientific Working Group for the Sustainable Management of Small Pelagic Resources for the Season 2011: Provided by Client
- R6 – South Africa OMP-08: Provided by client.
- R7 – South African Marine Living Resources Act, 1998:
http://www.saflii.org/za/legis/num_act/mlra1998256.pdf
- R8 – South African Sustainable Seafood Initiative (SASSI) species page, Anchovy:
<http://www.wwfsassi.co.za/?m=5&s=5&idkey=844>
- R9 – South African Sustainable Seafood Initiative (SASSI) Sardine and Anchovy Fishery Improvement Project: <http://www.wwfsassi.co.za/?m=9&idkey=1169>
- R10 – South Africa Government services, Applying for a fishing licence:
http://www.services.gov.za/services/content/Home/OrganisationServices/permitslicencesrights/fishingpermit/ApplytoundertakeCommercialFishing/en_ZA
- R11 – FAO fisheries country profiles, South Africa:
ftp://ftp.fao.org/FI/DOCUMENT/fcp/en/FI_CP_ZA.pdf
- R12 – South East Atlantic Fisheries Organisation: <http://www.seafo.org/>