



REPORT

ZA

2011

TOGETHER, SECURING THE
DIVERSE BENEFITS OF OUR
HEALTHY OCEANS.
PICK N PAY, PROUD PARTNER
OF THE WWF SUSTAINABLE
FISHERIES PROGRAMME.

Pick n Pay
Inspired by you

© WWF-SALTHOMAS PESCHAK

Fisheries: Facts and Trends South Africa

FOREWORD

by Morné du Plessis
Chief Executive:
WWF South Africa



This snapshot report provides an overview of the status of South Africa's fishing industry and the marine environment within which it operates. It highlights some of the significant challenges facing our marine ecosystems and the associated socio-economic and cultural systems which rely on these resources for their wellbeing.

The report provides a clear picture of the precarious state in which we find ourselves after decades of mismanaging our marine systems. It underscores WWF's drive to promote an Ecosystem Approach to Fisheries (EAF), recognising the critical role that marine ecosystems play in maintaining resilient socio-cultural systems in the face of growing threats of climate change and food security.

We have not attempted to provide a comprehensive assessment of every issue, but have rather tried to provide a broad view which highlights the areas of concern and showcases some of the best-practice solutions that we will need to implement in order to meet humanity's growing demands on our marine ecosystem. This is clearly one of the key challenges of the 21st century.

The information in this report has been collated from diverse and reliable sources and is intended to catalyse collaboration and act as a marker against which we can measure our progress in years to come.

A handwritten signature in dark ink, appearing to read 'Morné du Plessis'.

Morné du Plessis
Chief Executive: WWF South Africa

CONTENTS

The context	3
Global trends	5
Marine ecosystems of South Africa	7
South Africa's sectors	9
The status of inshore resources	10
The status of offshore resources	13
Biodiversity and ecosystems	18
Bycatch	22
The economics of fisheries	24
Seafood markets	26
Social considerations	30
Conclusion	34



THE CONTEXT

“All our natural living marine resources and our marine environment belong to all the people of South Africa.”

Marine Living Resources Act, 1998

South Africa is a nation largely defined by the characteristics of its oceans. The confluence of two great currents, the cold Benguela Current on the west coast and the warm Agulhas Current on the east coast, contributes to the high levels of marine biodiversity and species endemism found within the region. Boasting a coastline that stretches over 3000km from the cool temperate waters of the southeast Atlantic Ocean to the subtropical Indian Ocean bordering Mozambique, South Africa's oceans support diverse artisanal and commercial fisheries. The upwelling of cold, nutrient-rich waters along the west coast contributes to the productivity of this area, supporting vast commercial fisheries for many valuable fish and invertebrate species, while the warmer, less productive waters of the east coast support several smaller fisheries. The long-term sustainability of marine resources through responsible and collaborative management no doubt plays an essential role in the social and economic wellbeing of South Africa's coastal people. In the past, fisheries have been managed on the basis of a so-called single species approach to fisheries management, which only considered the species being harvested in the management with no consideration for any other effect the fishing activity had. This strategy has failed us. Holistic environmental management strategies and more sustainable fishing practices are being employed to ensure present and future generations are able to meet their needs.

“HOLISTIC ENVIRONMENTAL MANAGEMENT STRATEGIES AND MORE SUSTAINABLE FISHING PRACTICES ARE BEING EMPLOYED TO ENSURE PRESENT AND FUTURE GENERATIONS ARE ABLE TO MEET THEIR NEEDS.”

In contrast to the previous single species approach to fisheries management, the holistic approach - an Ecosystem Approach to Fisheries (EAF) - was adopted. An EAF takes into consideration that all marine organisms and processes are interconnected and that alterations in these processes are not easily recognised and difficult to restore once they are disrupted. An EAF aims to “*balance diverse societal objectives, by taking into account the knowledge and uncertainties about biotic, abiotic and human components of ecosystems and their interactions and applying an integrated approach to fisheries within ecologically meaningful boundaries*” (FAO 2003).

Tracking tool to examine progress toward implementation of an Ecosystem Approach to Fisheries (EAF) in South Africa

The Ecosystem Approach to Fisheries management utilises the following objectives as a tracking tool to evaluate fisheries:

- There is a good understanding of the **ecosystem impacts** of the fisheries and impacts are included in management advice;
- The **social wellbeing** of dependent fishing communities is accounted for in the management advice;
- The **economic** wellbeing of the fishing industry is maintained;
- The managing authority has **transparent** and **participatory** management structures;
- Management plans incorporate **EAF** considerations;
- **Compliance to regulations** reduces the ecosystem impacts of the fishery;
- Sufficient **capacity, skills, equipment and funding** exist to support EAF implementation;
- **Good scientific data** collection procedures exist to support EAF implementation;
- **External impacts** of the fishery are addressed (e.g. climate change, other industries)

Source: WWF South Africa Report Series (2010).

Earth's annual biocapacity is currently exceeded by 50%, meaning it takes 1,5 years to generate the renewable resources used in a year.

2=

THE NUMBER OF EARTHS
WE'LL NEED BY 2030



GLOBAL FACTS

- OVER US\$102 BILLION IN MARINE RESOURCES WERE TRADED IN 2008.
- 81% OF FISH PRODUCTS ARE CONSUMED BY HUMANS, THE REST ARE USED FOR NON-FOOD PURPOSES. IN 2007 MORE THAN 1.5 BILLION PEOPLE DERIVED 20% OF THEIR ANIMAL PROTEIN INTAKE FROM FISH.
- IN 2008 THE AVERAGE INDIVIDUAL CONSUMPTION OF FISH WAS 17.2KG. GLOBAL PRODUCTION FROM MARINE WILD-CAPTURE FISHERIES PEAKED AT 86.3 MILLION TONNES IN 1996. THIS DECLINED TO 79.5 MILLION TONNES IN 2008.
- SEVEN OF THE TOP 10 WILD-CAPTURE SPECIES – ACCOUNTING FOR OVER 30% OF THE GLOBAL CATCH – ARE CONSIDERED FULLY EXPLOITED WITH 1 OVEREXPLOITED AND 1 UNDEREXPLOITED (FAO 2010).
- 63% OF ASSESSED FISH STOCKS REQUIRE REBUILDING.

Sources: FAO 2010 & Worm *et al.* 2009

GLOBAL TRENDS

With a global population nearing 6.9 billion people, humankind is having an unprecedented impact on Earth's natural resources.

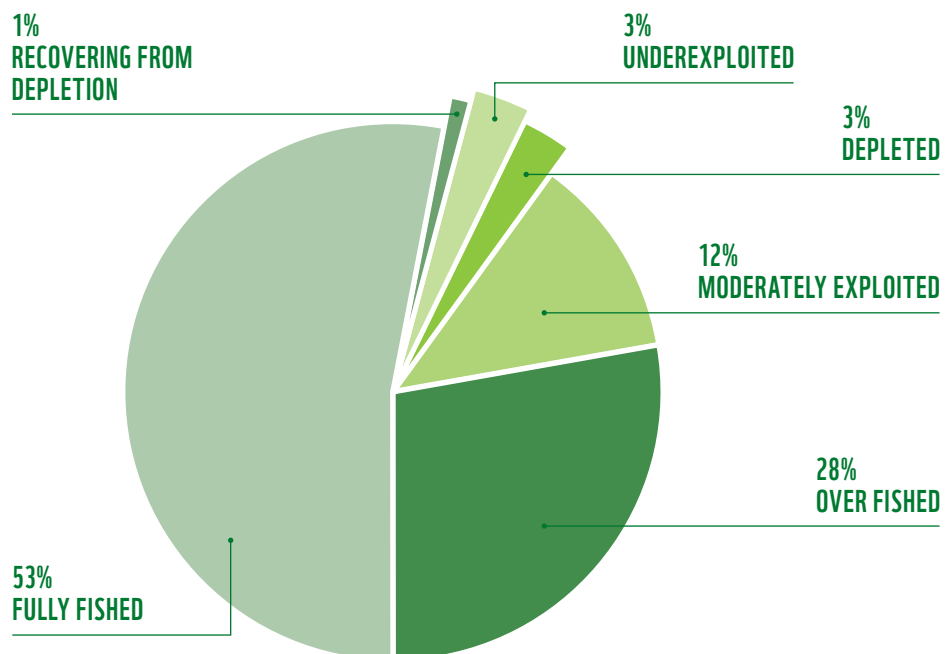
COMBINED WITH THE
IMPACT OF INCREASING
FOOD PRICES AND GLOBAL
ECONOMIC CRISIS,
HUNDREDS OF MILLIONS
OF PEOPLE WORLDWIDE
ARE NOW FACED WITH
INCREASED UNCERTAINTY
AND FOOD SHORTAGES



The consequences of continued unchecked consumption include threats to global food and water security, economic wellbeing and environmental health. Combined with the impact of increasing food prices and global economic crises, hundreds of millions of people worldwide are now faced with increased uncertainty and food shortages (FAO 2010). Fisheries and aquaculture have traditionally been regarded as part of the solution to this global dilemma with billions of consumers deriving affordable, high-quality protein from these sectors while providing a source of employment and livelihood for millions (FAO 2010).

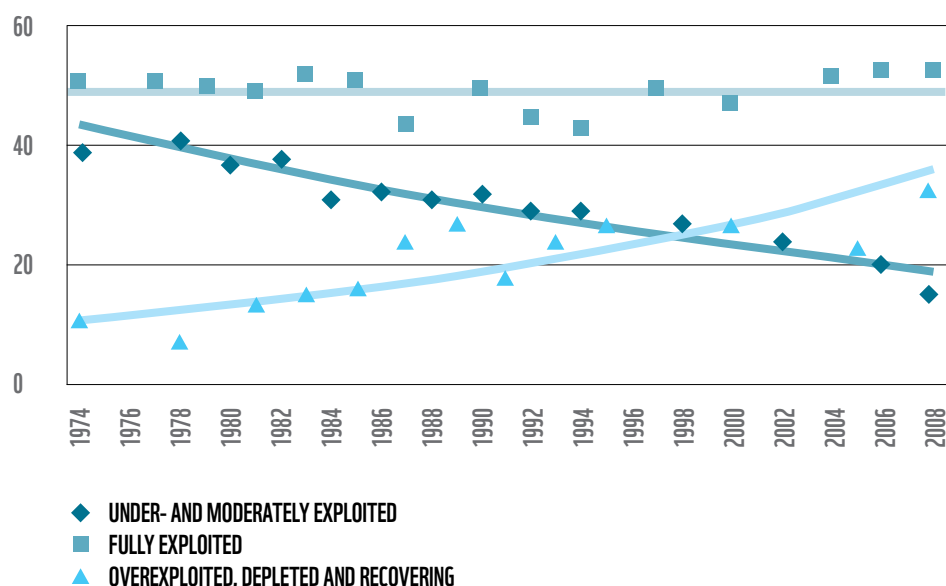
Following advances in fishing technology during the last half-century, the proportion of over-exploited, depleted or recovering stocks have steadily increased from 10% in 1974 to 32% in 2008. Although fully exploited stocks have remained relatively stable at about 50% since the 1970s, there is cause for concern regarding increasing catch trends in over-fished, depleted and recovering stocks and decreasing catch trends in moderately and under-exploited commercial fish stocks (FAO 2010). Widening gaps between sustainable production levels versus real consumption rates are now recognised as a leading environmental and socio-economic problem in the marine realm with wide-reaching impacts on the global community (Worm *et al.* 2009; FAO 2010).

Figure 1: **FACT: STATUS OF GLOBAL FISH STOCKS IN 2008**



Source: FAO World Review Fisheries and Aquaculture (2010).

Figure 2: FACT: COMMERCIALY HARVESTED GLOBAL MARINE STOCKS 1970-2008



Source: FAO World Review Fisheries and Aquaculture (2010).

The contribution of farmed products to international trade has grown significantly in recent years and is now the fastest growing animal food producing sector in the world. Worldwide, the production of aquaculture products has increased from less than 1 million tonnes in the 1950s to 52.5 million tonnes in 2008 and comprises over 360 species – 25 of which are considered important global trade commodities. Although aquaculture is set to overtake capture fisheries as a source of food fish, the finfish and crustacean aquaculture sectors are highly dependent on capture fisheries for dietary nutrients such as fish oil and fishmeal. In 2010, nearly 85% of fish oil purchased was used as shrimp and finfish aquaculture feed. The use of substitutes such as soybean, cornmeal and rice bran is being investigated as sustainable substitutes to capture fishery products (FAO 2010).

TRENDS IN PRODUCTION AND CONSUMPTION

The global fishing fleet is comprised of approximately 4.3 million vessels. This fleet targets a wide diversity of marine species primarily destined for human consumption. Over half of the global fishing fleet is comprised of oar and sail powered vessels utilised by small-scale and artisanal fishermen primarily from developing countries in Asia and Africa. Developing nations such as China, Vietnam and Thailand are often exploited by distant fleets yet are rarely evaluated due to the high costs involved in conducting stock assessments. In 2008 developing countries accounted for 80% of fish production with 50% of this production being exported to developed nations.

MARINE ECOSYSTEMS OF SOUTHERN AFRICA

The Southern African region straddles three great oceans: the Atlantic, Indian and Southern oceans.

The region has a total of eight coastal states: Angola, Democratic Republic of Congo, Mauritius, Mozambique, Namibia, Seychelles, South Africa and Tanzania. The living marine resources of the region's waters, including migrating fish stocks, are shared between two or more countries. Southern Africa is the home of a diverse fishing community comprised of small-scale and industrial-scale fisheries targeting a diverse array of species for local and international consumption. Trends for marine harvests indicate a decline in most marine stocks since 1972 for most countries in the Southern African region (Sherman 2003). Fishing pressures are driven by increasing demand due to local population increases, higher consumer rates, emergent export markets and tourism (Sherman 2003).

MANAGEMENT OF LARGE MARINE ECOSYSTEMS IN SOUTHERN AFRICA

Within the Southern African region there are several Regional Fishery Management Organisations (RFMOs) and regional fisheries bodies delegated with managing high seas fisheries and migratory fish stocks which straddle the waters of more than one state. The Large Marine Ecosystem (LME) concept characterises marine regions of the world according to ecological (rather than political or economic) criteria. The Southern African region is defined by two LMEs: the Benguela Current Large Marine Ecosystem (BCLME) and the Agulhas-Somali Current Large Marine Ecosystem (ASCLME) (NOAA 2009).

1.5
MILLION KM²
- AREA OF THE BCLME

Benguela Current Large Marine Ecosystem (BCLME)



The BCLME (in red) includes the exclusive economic zones (EEZs) of Angola, Namibia and part of the EEZ of South Africa. It encompasses an area of 1.5 million km² of which 0.59% is protected. The BCLME has a temperate climate and highly productive ecosystem. It plays an important role in global climate and ocean processes (NOAA 2009).

Agulhas-Somali Current Large Marine Ecosystem (ASCLME)



The ASCLME (in red) includes the waters of Mozambique and eastern South Africa, as well as Madagascar, the Comoros, the Seychelles, Mauritius and La Reunion. This dynamic and moderately productive ecosystem is characterised by nutrient cycling and upwelling which plays an important role in the dispersal of juvenile tropical fish species (NOAA 2009).

RECREATIONAL FISHERY FACTS

1.

IT IS ESTIMATED THAT 500 000 PEOPLE PARTICIPATE IN SOUTH AFRICA'S RECREATIONAL FISHERY.

2.

THE VALUE OF THE RECREATIONAL FISHERY WAS ESTIMATED TO BE ZAR2.3BILLION IN 2003 AND IS NOW CONSIDERED TO BE AROUND ZAR3 BILLION IN 2011.

3.

THE TOTAL FISH CAUGHT WAS ESTIMATED TO BE 5600T IN 2003 WITH THE COMMERCIAL CATCH OF LINEFISH BEING ESTIMATED AT 16 000T.

A LACK OF SCIENTIFIC DATA ON CATCH STATISTICS AND POST-RELEASE SURVIVAL RATES MAKES IT DIFFICULT TO QUANTIFY THE IMPACT OF THE FISHERY ON SOUTH AFRICA'S INSHORE RESOURCES. THE LONG-TERM IMPACT OF RESOURCE COMPETITION BETWEEN ANGLERS AND COMMERCIAL FISHERS IS UNKNOWN.

SOUTH AFRICA'S SECTORS

Two components are identified:
aquaculture and wild capture
fisheries.

IT IS ESTIMATED IN SOME
STUDIES THAT
OVER 850 000 PEOPLE
PARTICIPATE IN SOUTH
AFRICA'S SHORE-BASED
RECREATIONAL FISHERIES,
WITH A TOTAL ECONOMIC
IMPACT OF ZAR2,5 BILLION

AQUACULTURE

Aquaculture is relatively new in South Africa and is currently considered an underdeveloped sector (DAFF Sector GDP Draft 2010). Historically focused on high value species such as abalone, mussels and oysters, the South African government has identified aquaculture as an area for expansion. It is estimated that South Africa contributes about 21% to global abalone production and in 2008 South African mariculture was comprised of abalone (1 037 tonnes), oysters (227 tonnes), mussels (737 tonnes), prawn (11 tonnes), finfish (3 tonnes) and seaweeds (1 834 tonnes) (FAO 2010b).

The aquaculture industry will undoubtedly experience substantial regional growth in the coming years, thus the challenges and lessons learnt globally about sustainable and responsible aquaculture should be applied to any new aquaculture ventures in Southern Africa.

WILD CAPTURE

The wild capture fisheries include commercial, recreational and subsistence fisheries, each with their own specific research and management mandates. The commercial fishing sector can be divided into highly industrialised fisheries - which generally operate offshore - and near-shore fisheries, which are generally more traditional and require less capital investment (DAFF Sector GDP Draft 2010). The management and exploitation of this country's fisheries are governed by an overarching policy known as the Marine Living Resources Act (MLRA), first promulgated in 1998.

The commercial fisheries of South Africa

- Hake inshore trawl
- Hake offshore trawl
- Hake longline
- Hake handline
- Small pelagics
- South Coast rock lobster
- West Coast rock lobster inshore
- West Coast rock lobster offshore
- Squid
- Horse mackerel
- Patagonian toothfish
- Prawn trawl
- Tuna and swordfish longline
- Tuna pole
- Abalone
- Seaweed
- Demersal shark
- Traditional linefish
- White mussel
- Gillnet and trek net fishery

THE STATUS OF SOUTH AFRICA'S INSHORE RESOURCES

Many of South Africa's inshore marine resources are considered overexploited or collapsed with a few being fully exploited.

This is mainly due to the accessibility of the resources to a wide range of marine user groups including traditional linefishers, recreational fishers, and inshore trawl and longline fisheries. Illegal

TAC TOTAL ALLOWABLE CATCH

harvesting or poaching – which targets many of the same inshore resources – appears to be on the rise in South Africa and will have dramatic impacts on the economic wellbeing of traditional, commercial and recreational fishers, and on the environment (Traffic 2010).

Full stock assessments are lacking for the majority of South Africa's linefish species, and existing stock assessments for other species are several years old and considered outdated. Given the status of the inshore resources, there is an urgent need for updated stock assessments to inform appropriate management measures and allow for the implementation of rebuilding strategies. At the 2002 World Summit on Sustainable Development, South Africa undertook to maintain and rebuild fish stocks to levels able to produce maximum sustainable yields by no later than 2015 (McLean and Glazewski 2009).

TAE TOTAL ALLOWABLE EFFORT

Important terms

Total Allowable Catch (TAC) is the total amount in kilograms or tonnes permitted to be caught by the permit holder.

Total Allowable Effort (TAE) defines the amount of effort – vessels, fishermen or hours - applied to a fishery.

WEST COAST ROCK LOBSTER

The commercial West Coast rock lobster (WCRL) fishery dates back to 1875 when the first commercial processing plant was established (Stats SA 2010). The fishery peaked in the early 1950s with an annual catch of 18 000 tonnes. Catches declined by nearly half in the 1960s indicating that the high catches of previous years were unsustainable. There have been a number of management measures put into place during the history of the fishery including Total Allowable Catch (TAC), restricted areas, closed seasons, reduced daily bag limits, minimum size limits and restricted fishing hours during seasonal fishing days for recreational fishing licence holders. To date the WCRL commercial fishery is the most economically important rock lobster fishery in South Africa contributing approximately R260 million per annum. Although considered overexploited, the 2009 assessment showed some improvement since the last assessment in 2006. It is likely that the stock recovery of WCRL will continue as long as permit allocations remain at the current sustainable levels (DAFF 2010b).

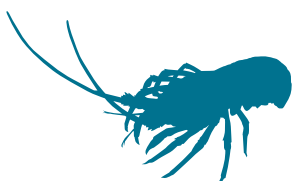
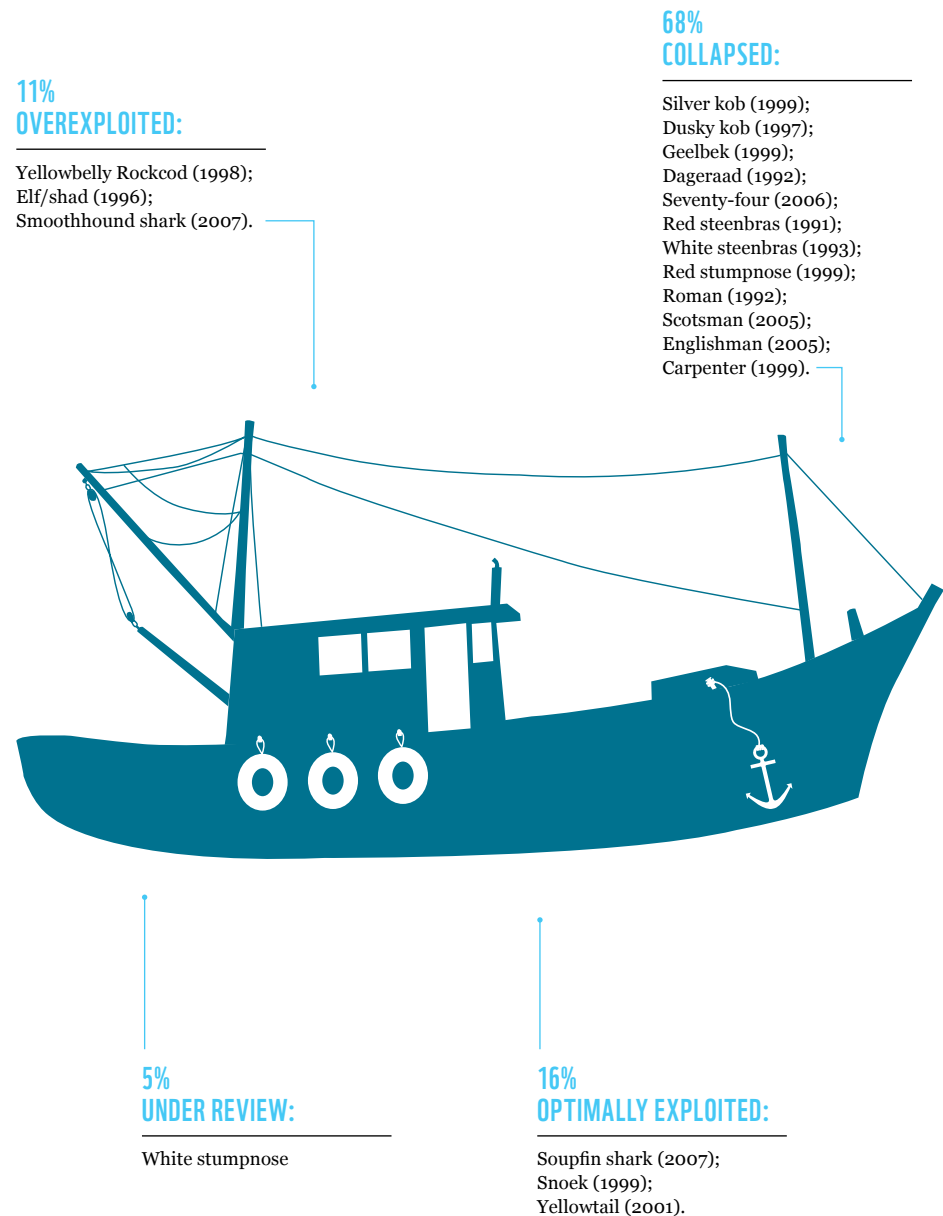


Figure 3:

FACT: THE STATUS OF COMMERCIAL LINEFISH IN SOUTH AFRICA



The above infographic illustrates the status of some commonly caught commercially important linefish species in South Africa. Linefish stocks are assessed using various methods such as examining trends in catch per unit effort, spawner biomass per recruit and virtual population analysis. The status of the above species is sourced from the date of last comprehensive stock assessment illustrated in brackets. Species highlighted in the infographic were chosen according to the availability of data from the Status of the Marine Resources Report (DAFF 2010).

The status of some commercially important inshore species



Geelbek (*Atractoscion aequidens*)

By 1997, Southern African geelbek spawning stocks were thought to have collapsed and to be depleted to approximately 3% of their unexploited populations. However, as a result of the State of Emergency declared on linefishery in 2000, there is indication of positive trends in catches per unit effort (CPUE) although the fishery remains far from recovered (DAFF 2010b).



Snoek (*Thyrsites atun*)

This nomadic shoaling species is the mainstay of the linefishery in the Western Cape. Catches are subject to seasonal and inter-annual variability dependent on environmental parameters. The stocks are considered optimally exploited and are assessed through catch per unit of effort (CPUE)(DAFF 2010b).



Yellowtail (*Seriola lalandi*)

Yellowtail stocks are currently considered to be optimally exploited. Yellowtail is nomadic and catches have increased in the last two decade from the early stages of the fishery from 1900 to 1930 (Griffiths 2000).

Chokka/squid (*Loligo reynaudii*)

South Africa's chokka/squid is classed as a medium-sized fishery and is not considered big compared to fisheries such as hake. This fishery generates high foreign revenue and supplies employment to approximately 500 people in the poverty-stricken Eastern Cape. Stocks are considered optimally exploited and the squid fishery is fairly stable (*pers comm.* Mwicigi, 2011).

Poaching of commercially important inshore species

Abalone (perlemoen) (*Haliotis midae*)

Abalone, a slow growing and late maturing species, is a highly prized seafood delicacy in the Far East. Catches of abalone have declined steadily since the mid-1960s and the prognosis for the stock of abalone in South Africa is pessimistic given the extent of illegal harvests. It is estimated that the illegal catch of abalone exceeded the legal commercial catch by more than 10 times during the past decade. The South African abalone is listed on the Convention on International Trade in Endangered Species (CITES) and despite increased management and strengthened compliance illegal fishing remains high. Continued levels of illegal fishing prompted a complete closure of the fishery in 2008. A partial reopening of the fishery occurred in 2010 (Joubert *et al* 2005; DAFF 2010b).

THE STATUS OF SOUTH AFRICA'S OFFSHORE RESOURCES

Historically fishing effort in the offshore environment has been dependent on the capabilities of the vessels and equipment used to target the resources.

During the 17th century, inshore predators such as whales, seals and seabirds were targeted by commercial fisheries in the southern ocean. These fisheries were at that time limited by several factors, including the inability of vessels to travel long distances, limiting holding space, and the lack of a means to preserve fresh products while at sea. After

World War II, improved technology gave rise to the rich commercial offshore fishery we see today. Improved engines, refrigeration and sonar allowed fishing vessels to move further offshore in search of their catch, giving rise to the need for superior regulatory systems to be put in place to govern marine resources in the open seas (Hutchings *et al* 2009).

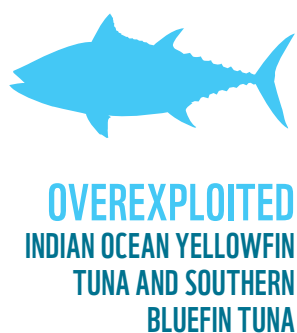
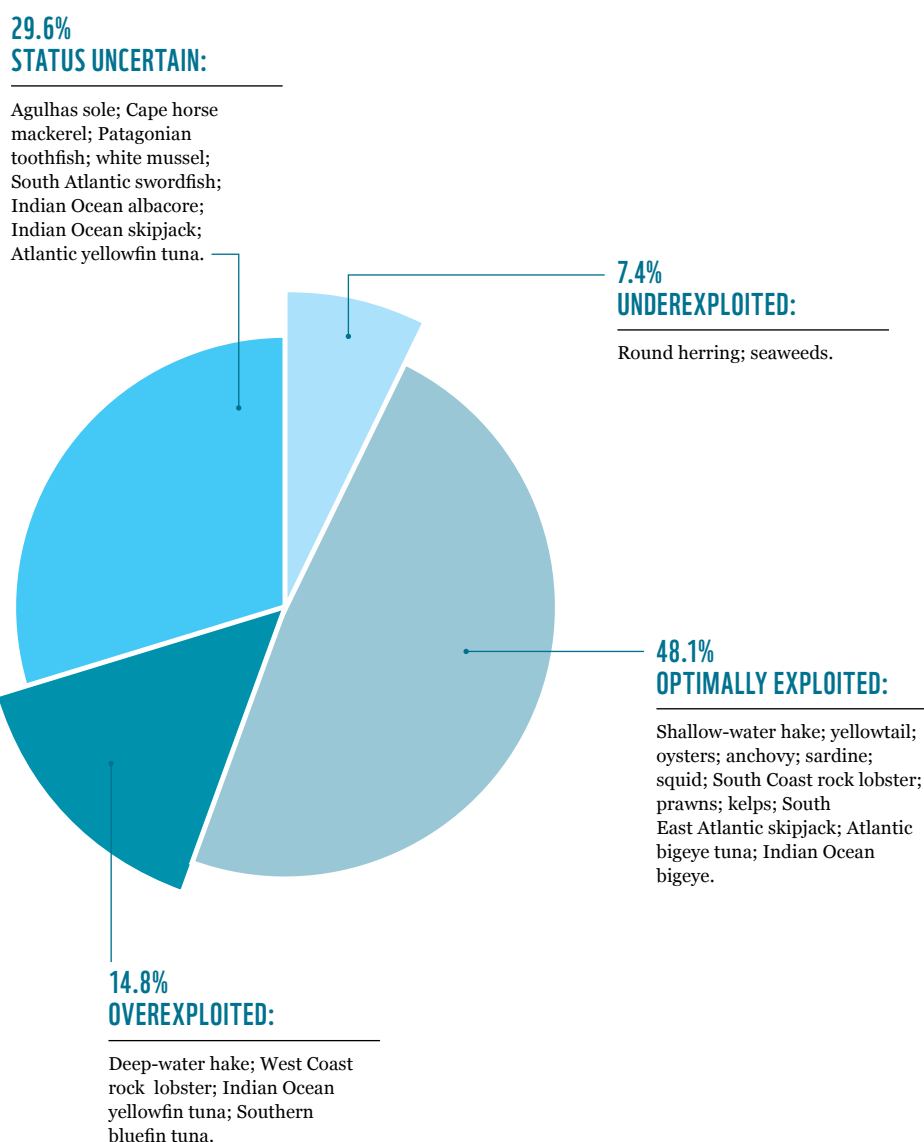
Throughout the 1960s and early '70s, intense foreign fishing activities in South African waters resulted in the overexploitation of several species. Relief from international fishing pressure was achieved through the implementation of an Exclusive Economic Zone (EEZ) in 1977.

Due to the large-scale capital investment required for many fisheries it has been difficult for much of the South African fishing community to develop the skills and technology required to participate in commercial fishing activities. This has historically led to high levels of foreign fishing activities in South African waters as developed commercial fishing nations have access to the technologies required to pursue industrial scale fishing (DAFF Sector GDP Draft 2010). However, in an attempt to reshape South Africa's fishing communities, the Department of Agriculture, Forestry and Fisheries (DAFF) has issued rights in an attempt to "South Africanise" our fisheries. The rights of foreign fishing vessels in South African EEZ (Exclusive Economic Zone) were revoked in 2002, although there are still some joint-venture tuna fisheries in operation (Kimakwa 2009). The allocation of long-term rights not only encourages community involvement in fisheries and their management, but also promotes a sense of stewardship for resources that fishers will have access to over a seven to 10 year period. Long-term rights have been issued in 22 fishing sectors, with over 2900 rights holders and 1788 vessels (DAFF Sector GDP Draft 2010).

**LONG-TERM
RIGHTS**
HAVE BEEN ISSUED IN
22 FISHING SECTORS,
WITH OVER 2900 RIGHTS
HOLDERS AND 1788
VESSELS

Figure 4:

FACT: THE STATUS OF SOUTH AFRICAN MARINE RESOURCES



Source DAFF 2010b; IOTC 2011; ICCAT 2009, CCBST 2010.

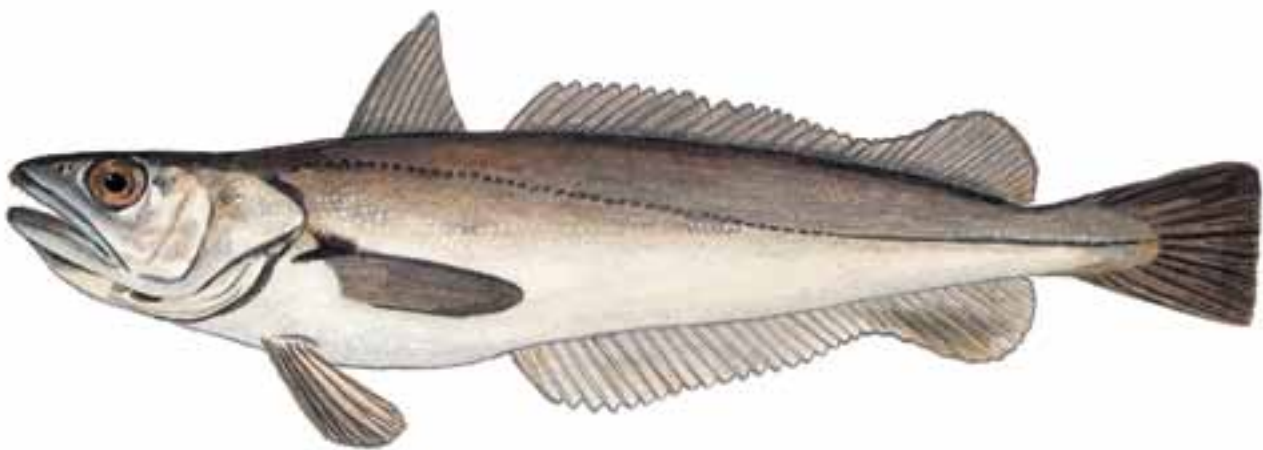
The above graph illustrates the status of some commercially important marine species exploited in South Africa. The information highlighted in this graph represents the latest available information from the Department of Agriculture, Forestry and Fisheries, but does not represent all of South Africa's exploited marine resources. The status of tuna species represented in this graph is sourced from the latest available data from the Indian Ocean Tuna Commission (IOTC), the Commission for the conservation of Southern Bluefin tuna (CCBST) and the International Commission for the Conservation of Atlantic Tuna (ICCAT). Linefish species statuses are illustrated on page 11.

CAPE HAKES

Deep-water hake (*Merluccius paradoxus*) is caught by trawl, longline and handline fisheries. Hake is primarily exported to Europe, mostly Spain, with smaller markets in Australia and the USA where it is sold under the collective name of Cape hake. Species-specific stock assessments are now conducted (DAFF 2010b). Hake grow relatively slowly (a 1-meter fish is approximately 10 years old), but they are highly fecund (can lay many eggs) so can withstand fishing pressure. Stock assessments conducted in 2010 indicated that stocks are improving. The entire hake fishing fleet is covered by vessel monitoring systems (Tingley *et al* 2008; DAFF 2010b). The offshore and inshore hake trawl fishery is the only South African fishery certified by the Marine Stewardship Council (MSC). Ecosystem concerns include seabird bycatch and impacts on bottom habitats. Ecosystem concerns include seabird bycatch and impacts on bottom habitats.

There are two species of hake in South African waters: shallow-water hake (*Merluccius capensis*) and deep-water hake (*Merluccius paradoxus*). Although these are two separate species, there is an overlap in their distribution and they are often caught, processed and sold under the collective name of Cape hakes. Until 2000 both species were assessed as a single population. The current biomass of deep-water hake is estimated to be about 15% of pristine, i.e. over-fished. The current biomass of shallow-water hake is estimated to be about 57% pristine, i.e. underutilised. However, because the two hake species cannot be managed separately and because of uncertainty about the relative status of the two hake species, the resource is regarded as fully fished. A recovery plan has been put into place for deep-water hake, and there are encouraging signs of resource recovery. Trawled deep- and shallow-water hake are the only fisheries in South Africa to be certified by the Marine Stewardship Council (MSC) (DAFF *b* 2010).

DEEP-WATER HAKE IS
CAUGHT BY TRAWL,
LONGLINE AND HANDLINE
FISHERIES. HAKE IS
PRIMARILY EXPORTED
TO EUROPE, MOSTLY
SPAIN, WITH SMALLER
MARKETS IN AUSTRALIA
AND THE USA.





Small pelagic fish form the foundation for the Benguela ecosystem food chain and are considered a critical component of the region.

THE SMALL PELAGIC FISHERY

Small pelagic fish form the foundation for the Benguela ecosystem food chain and are considered a critical component of the region. The purse-seine fishery for small pelagics is the largest commercial fishery in South Africa with an average landing of 380 000 tons per annum from 1950-2005 and over 500 000 tons from 2005 - 2009 (Hutchings 2009). The west coast small pelagic fishery – targeting sardine (*Sardinops sagax*) and horse mackerel (*Trachurus trachurus*) with purse-seine nets - peaked in the early 1960s. High catches rapidly declined, and smaller net meshes were introduced to target anchovy (*Engraulis encrasicolus*) to compensate. It is now believed that sardine and anchovy populations fluctuate out of sync due to environmental conditions and the availability of their main food source, plankton (Hutchings 2009). Due to the management strategies implemented in the South African Small Pelagic Fishery, anchovy and sardine populations stabilised, although in the past half-decade sardines have suffered poor recruitment levels. The fishery is now managed through limitations in the amount of effort, access rights and vessel licensing, as well as limits on the Total Allowable Catch (TAC). There is now a precautionary catch limit for red-eye round herring (*Etrumeus whiteheadii*) and juvenile horse mackerel and sardine which are taken as bycatch in the anchovy fishery (DAFFb 2010). Ecosystem concerns such as competition for food with seabirds such as penguins are currently being managed through the experimental closure of areas near important breeding colonies such as Dassen Island. A model of penguin population dynamics is under development and will be used in conjunction with the small pelagic operational management plan to evaluate the impact of the fishery on penguin populations. The fishery is considered optimally exploited (DAFFb 2010).

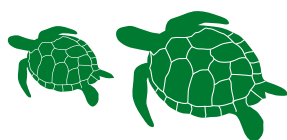


The African penguin and the Cape gannet feed primarily on sardine and anchovy, both of which are targeted by the commercial small pelagic fishery in South Africa.

FACT: COMPETITION FOR FISH BETWEEN HUMANS AND SEABIRDS

Two endemic and vulnerable seabirds, the African penguin (*Spheniscus demersus*) and the Cape gannet (*Morus capensis*) feed primarily on sardine and anchovy, both of which are targeted by the commercial small pelagic fishery in South Africa. As seabirds and fisheries overlap both in size of prey and depth of exploitation there is intense competition between fisheries and the declining penguin and gannet populations (Pichegru et al 2009).

Good practice



BYCATCH DATA IS USED TO ASSESS THE IMPACTS OF LONGLINE FISHERIES ON SEABIRDS, TURTLES AND SHARKS

Large pelagic research and monitoring through observer programmes

South Africa has had an established onboard scientific observer programme since 1998 in the large pelagic fishery. The observer programme collects fishery-dependent data to inform management strategies. Coverage is 100% for foreign vessels and 20% for domestic fishing vessels. The programme has collected swordfish length frequencies and biological measurements for age and growth studies, sexual maturity ratios and dietary preferences. Genetic studies of swordfish have shed light on the mixing aspects of populations in the boundary regions between the Atlantic and Indian Oceans. WWF and BirdLife SA use bycatch data collected to assess the impacts of longline fisheries on seabirds, turtles and sharks in Southern African waters to mitigate and manage bycatch (DAFF 2010b).



Swordfish are targeted using longline gear which has minimal environmental impact; however, high levels of bycatch of non-target species such as sharks are of concern

THE LARGE PELAGIC FISHERY

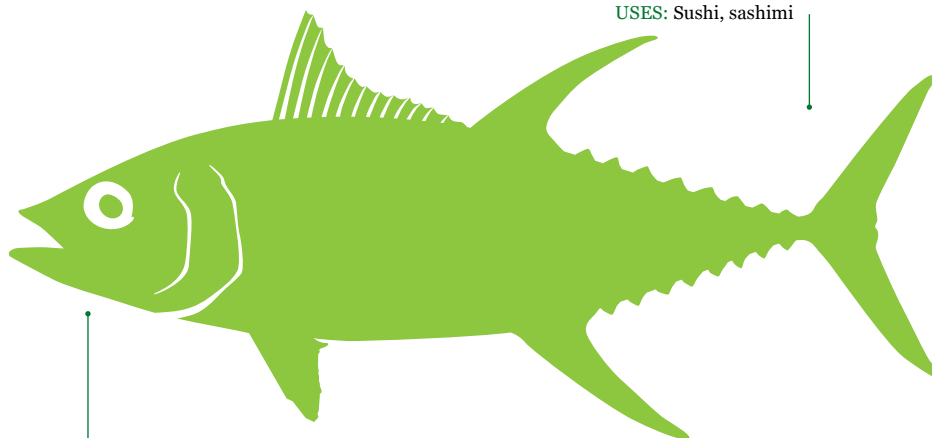
South Africa has two commercial large pelagic (open ocean) fishing sectors: the longline, and a pole and line or rod and reel fishery. As a highly sought-after and commercially important group of species, tuna and swordfish are managed by Regional Fisheries Management Organisations (RFMOs). South African fishery managers have taken a precautionary approach and limited effort to 20 swordfish and 30 tuna directed permits. The Southern African tuna industry targets bigeye tuna (*Thunnus obesus*), yellowfin tuna (*Thunnus albacares*), albacore/longfin tuna (*Thunnus alalunga*) and southern bluefin tuna (*Thunnus maccoyii*). Tuna - found in open waters of all temperate and tropical waters, and the Mediterranean Sea – have biological characteristics which vary according to species.

Swordfish were historically considered relatively resilient to fishing pressure due to their fast growth rate, moderate age at maturity and worldwide distribution. Recently, however, global swordfish stocks have been separated into three distinct populations - a Mediterranean, northern and southern stock. Swordfish are targeted using longline gear which has little environmental impacts; however, high levels of bycatch of non-target species such as sharks are of concern (DAFF 2010b).

THE REGIONAL MANAGEMENT BODY AND USES OF LARGE PELAGICS IN SOUTH AFRICA

YELLOWFIN TUNA

STOCK: Atlantic Ocean
REGIONAL MANAGEMENT BODY: International Commission for the Conservation of Atlantic Tuna
STOCK: Indian Ocean
REGIONAL MANAGEMENT BODY: Indian Ocean Tuna Commission
USES: Sushi, sashimi



SOUTHERN BLUEFIN TUNA

STOCK: All Southern Ocean
REGIONAL MANAGEMENT BODY: Commission for the Conservation of Southern Bluefin Tuna
USES: Sushi, sashimi

ALBACORE/LONGFIN TUNA

STOCK: Atlantic Ocean
REGIONAL MANAGEMENT BODY: International Commission for the Conservation of Atlantic Tuna
USES: Canning

BIODIVERSITY AND ECOSYSTEMS

The ocean varies from place to place, supporting a variety of life forms from microscopic plankton to apex predators.

A habitat - or the natural environment of an organism - is determined by the physical and chemical conditions surrounding it. The organisms occupying these habitats have evolved and adapted to live in the specific environment where they occur (Castro 2007). Marine ecosystems include everything from small organisms like algae and plankton to apex predators like sharks, whales and dolphins. Unlike terrestrial ecosystems there are few boundaries which limit organisms to specific areas in the environment. Humans form part of this ecosystem as they remove both prey and predators. Humans also have unintended impacts on marine ecosystems such as pollution and habitat destruction from fisheries such as demersal trawling which can upset the sensitive balance of marine ecosystems and food webs (Castro 2007). The richness - or variety of life - is referred to as biological diversity or biodiversity. In recent years there has been a growing focus on the state of the planet's biodiversity. Extinction – although a natural occurrence since the beginning of life on earth – has reached an unprecedented rate due to pollution, habitat destruction, overexploitation and other human impacts. In the past, marine conservation efforts were concentrated on charismatic species such as whales, dolphins and turtles. These species cannot survive in isolation, however, and it is now recognised that microscopic worms, molluscs and plankton are vital components ensuring the survival of the planet as we know it (Castro 2007).

MARINE PROTECTED AREAS

As traditional marine management systems are failing to maintain the productivity and biodiversity of marine ecosystems, Marine Protected Areas (MPAs) are being increasingly implemented to protect ecosystems and habitats which - amongst other reasons - support and maintain the diversity of commercially and ecologically important species. The term Marine Protected Area can be applied to many different marine and coastal parks and reserves which offer protection by various levels of restrictions on activities from the restriction of fishing – in the form of no-take reserves - to limited fishing reserves which allow angling but restrict commercial fishing in the area. The National Protected Area Expansion strategy includes the implementation of offshore MPAs (Department of the Environment and Heritage 2003).

MPAs
ARE IMPLEMENTED TO
PROTECT ECOSYSTEMS
AND HABITATS

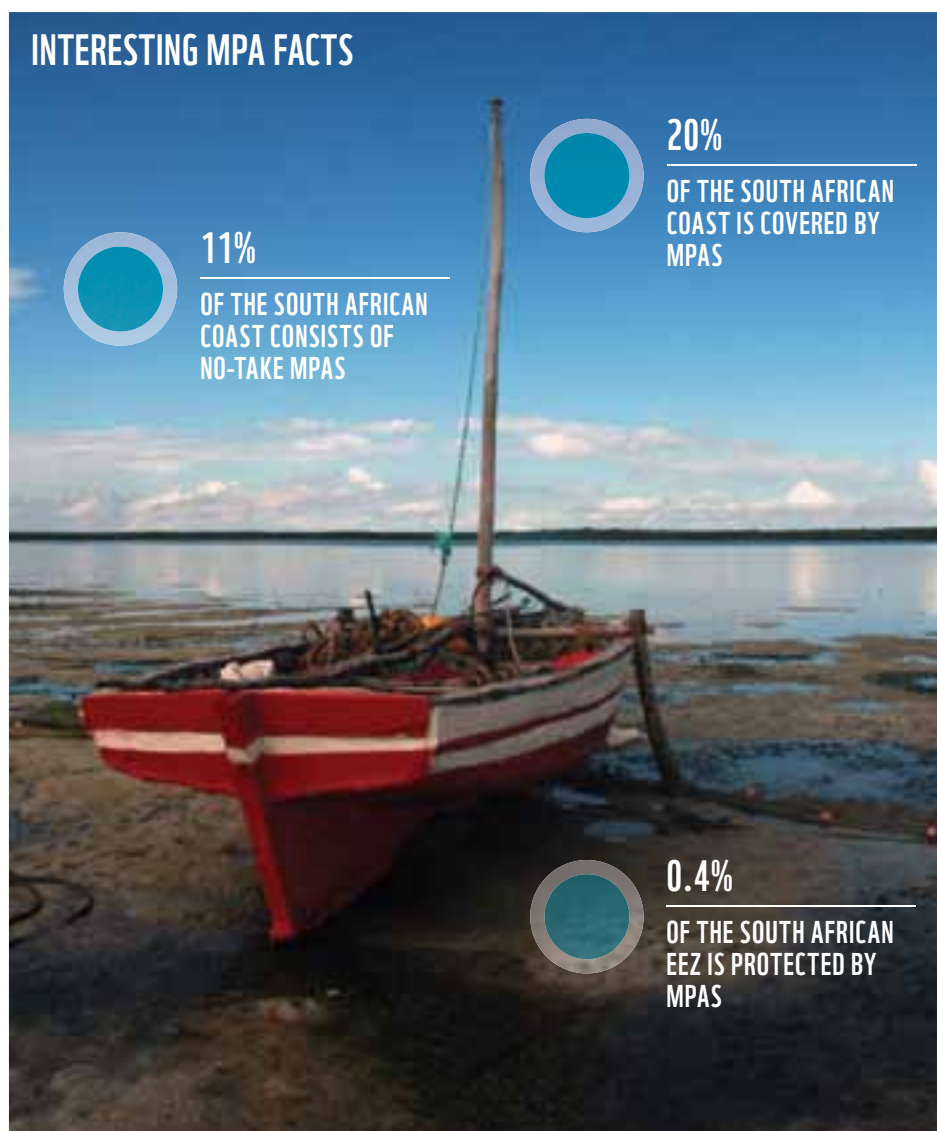
Good practice

Marine Protected Areas (MPAs) in South Africa

In the fisheries management context, a thriving MPA must provide an environment free from exploitation to protect a part of spawning fish stocks to ensure recruitment success. Fisheries yields are boosted in adjacent areas via a spill over effect of adult fish, larvae and eggs. In South Africa the benefits of well-planned MPAs have been proven successful with linefish species such as red roman. For South African MPAs to be successful they must have the following characteristics:

- Be large enough;
- Represent all habitats;
- Have adequate law enforcement to control poaching;
- Meet the community's financial income, education and recreational rights.

Adapted from Branch 1998.



REEFS ARE SENSITIVE MARINE HABITATS

Approximately 25% of commercially important species are reef associated, making them directly linked to food security and job opportunities. Overfishing, destructive fishing practices, pollution and global warming threaten these life sustaining ecosystems.

Red roman (*Chrysoblephus laticeps*) is a highly resident temperate reef fish endemic to South Africa. The Goukamma Marine Protected Area has been successful in rehabilitating the stocks of red roman in the area. The spill-over effect of this MPA has resulted in good catches for commercial fishers on the outskirts of the area (Göetz *et al.* 2009).





BYCATCH

No fishing method is entirely selective, catching only target species. This unintended catch is referred to as “bycatch”.

The incidental capture of these non-target species is estimated at 7 million tonnes globally per year. Bycatch is considered to be one of the greatest threats to the health of the marine environment, wasting valuable resources and causing dramatic declines in many marine species (FAO 2010). Bycatch is often discarded overboard, thereby impeding stock assessments and management of these species. As many bycatch species are top marine predators, the unmonitored and uncontrolled discarding of these animals can have major knock-on impacts on marine ecosystems. The wasteful practice of discarding unwanted species is contributing to the global problem of overfishing and declining marine ecosystem health, as well as endangering food security in poorer countries (FAO 2010).



85%

REDUCTION IN SEABIRD
MORTALITY IN THE PELAGIC
LONGLINE SECTOR OVER
THE LAST DECADE

SEABIRDS

Globally, approximately 300 000 seabirds are killed annually due to unsustainable fishing practices (BirdLife International). Demersal and pelagic longline fisheries are considered the most dangerous types of fisheries for seabirds, while trawl fisheries also capture seabirds. It is estimated that 27% of seabird species, including 17 albatross species, are threatened with extinction because of fishing. In South Africa's longline fisheries, fishers are required to set their lines at night since seabirds feed during the day. A “bird scaring device” or “tori line” is also employed in longline and trawl fisheries in South Africa. The weighting of fishing lines to increase line sink rates, reduced deck lighting and discarding of offal on the opposite side of the vessel from hauling also reduce seabird bycatch. A precautionary catch limit of 25 seabirds per year has been implemented in the tuna longline industry (Melvin *et al* 2008).

Good practice

Comparative estimates of annual Seabird bycatch statistics from the South African pelagic longline industry operating in the Benguela Current Large Marine Ecosystem.

Seabirds	2000 – 2005	2006 – 2010
Albatross	153	32
Petrels	44	1
Cape gannets	-	0
Shearwater		1
TOTAL	197	34

With bycatch mitigation measures in place there has been an 85% reduction in seabird mortality in the South African longline fishing sector in recent years.

(Petersen *et al* 2007; ATF Annual Report 2010).



6 OF 7
SEA TURTLE SPECIES ARE
ENDANGERED

SEA TURTLES

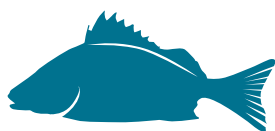
Turtles are particularly susceptible to capture due to their slow movement and their need to surface to breathe. Turtles drown when attempting to eat bait from longlines and by becoming entangled in nets in the trawl fishery. Because of their slow growth rates, late sexual maturity, low reproduction rates, and broad-scale migration patterns six of seven sea turtle species are endangered or critically endangered with the seventh species listed as data deficient (IUCN 2010). In South Africa, sea turtles constitute a portion of bycatch in the tuna and swordfish longline fishery. The possible impact on the critically endangered leatherback and the endangered loggerhead turtle populations is difficult to evaluate (Petersen *et al* 2008).



SHARK SPECIES
ARE EXTREMELY
SUSCEPTIBLE TO
OVEREXPLOITATION

SHARKS

Sharks are taken as bycatch in most marine fisheries around the world. Many shark species are slow growing, display late sexual maturity and give birth to few young at a time, making them extremely susceptible to overexploitation. Sharks now represent the greatest percentage of threatened marine species on the IUCN Red List of threatened species. In South Africa sharks are primarily taken as bycatch in the pelagic longline, inshore handline, demersal longline, trawl and trek net fisheries. As apex predators, the unmitigated and unmanaged capture and discarding of sharks can have long-term consequences on ecosystem equilibrium and health.



**THE TRAWL AND
LONGLINE INDUSTRIES
CATCH A NUMBER OF
UNTARGETED FINFISH**

FINFISH

The trawl and longline industries catch a number of untargeted finfish. In some cases these are discarded at sea. DAFF has recently implemented a number of bycatch management measures, including precautionary catch limits in the commercial hake longline and trawl industry for kingklip and monk and a seasonal closed area to protect the spawning grounds for kingklip (Tingley *et al* 2007). To mitigate finfish bycatch in these fisheries, longline permit conditions stipulate minimum hook sizes. The trawl industry regulates net mesh size to reduce bycatch. There are still a number of outstanding challenges which require addressing for example managing the inshore trawl fishery as a multispecies fishery by putting management in place for some of the species and those that cannot be managed looking into closed areas to protect them.

How you can help with bycatch

WWF's international competition to reduce bycatch in the global fishing sector, *Smart Gear*, brings together the fishing industry, research institutes, universities, and government to inspire and reward practical, innovative fishing gear designs that reduce bycatch. The competition is open to eligible entrants from any background, including fishermen, professional gear manufacturers, teachers, students, engineers, scientists and backyard inventors. WWF offers more than US\$50 000 in prize money to attract innovative ideas that may prove to be a valuable solution to some of the most pressing bycatch problems in fisheries around the globe. Visit the WWF Smart Gear Competition website (http://www.smartgear.org/about_smargear) for information on the competition.

THE ECONOMICS OF FISHERIES

ECONOMIC STATUS OF THE GLOBAL FISHERY

The economic performance of the global marine fishery is determined by the quantity of fish caught, the price of fish, harvesting costs, and the biological productivity of fisheries (The World Bank 2009). Rising demand for fish and fish products, coupled with a growing human population, has placed increasing pressure on fish

resources and the fisheries themselves (*i.e.*, meeting market demand in the face of declining economically valuable fish stocks).

Although the total value of the global marine fishery was estimated at US\$78.8 billion in 2007, the World Bank estimates the lost economic benefits of fisheries at US\$50 billion per annum. This loss represents the difference in potential versus actual net economic benefits from global marine fisheries due to poor governance, subsidies within the fishing sector and the underutilisation of lower-value “trash fish” species. Combined with fluctuating market exchange rates, increases in fuel prices and changes in food prices, the state of the global fishery economy appears to be negatively impacting the global natural capital (FAO 2007c; The World Bank 2009).

Global marine fish catches have been documented to be stagnant over the last decade, while natural fish capital (termed ‘the wealth of the oceans’) has declined. An economically healthy fishery balances the needs of marine ecosystems with human requirements, taking into account both natural and human capital. This requires reform within current fishery management paradigms including placing focus on maximising net benefits, such as social and economic yield, rather than focusing purely on biological management strategies (The World Bank 2009).

RISING DEMAND FOR FISH AND FISH PRODUCTS, COUPLED WITH A GROWING HUMAN POPULATION, HAS PLACED INCREASING PRESSURE ON FISH RESOURCES AND THE FISHERIES THEMSELVES

THE EFFECTS OF INCREASING FUEL AND FOOD PRICES ON THE FISHING SECTOR

FACT:

Increasing fuel prices:

- Reduce fishing effort as a result of higher costs
- Reduce fish supply and drive fish prices higher
- Change fishing patterns to less fuel-intensive modes
- Result in higher fuel subsidies

Increasing food prices:

- Increase fish prices to more than compensate for higher harvest costs
- Redirect forage fisheries (fish meal) catches to higher-value human food products
- Stimulate increased fishing effort

Reproduced from: The World Bank. 2009. *The sunken billions: the economic justification for fisheries reform*.

TRAGEDY OF THE COMMONS

Due to their size and diversity, most marine resources are held in public trust by nations for the use of all. However, because of this lack of individual ownership, users of the resource are incentivised to overexploit these resources in what is known as a 'race to the bottom'. Ultimately while this may benefit individual users over the short term, in the long run this comes at a cost to all and the increasing degradation of our marine ecosystems.



SEAFOOD MARKETS

30%
OF GLOBAL FISH
PRODUCTION
CURRENTLY FLOWS
INTO INTERNATIONAL
TRADE, MAKING IT ONE
OF THE MOST TRADED
AGRICULTURAL PRODUCTS

GLOBAL FISH MARKETS

Increasing globalisation has led to increased trade in fish and fish products. Over 30% of global fish production currently flows into international trade, making it one of the most traded agricultural products. In 2008, global trade in fish and fish products was valued at over US\$100 billion with developing countries contributing 80% of world fisheries production. Although the amount of fish consumed varies significantly by region and country, the average consumption per person is 17.1 kg per annum (FAO 2010).

SOUTH AFRICAN SEAFOOD: EXPORTS AND IMPORTS

Trade of fishery products is of integral importance to government revenues, income and employment generation in South Africa. Fish trade is governed by complex multilateral and bilateral trade agreements, and negotiations at the national, regional and international levels determine the amounts of fish imported and exported in the country. Following the change of government in 1994, South Africa's market opened substantially with the lifting of international sanctions. In 2009 South Africa exported US\$75,547,408 of fish and fishery products worldwide. Imports of fish and fishery products into South Africa for 2009 were valued at US\$ 69,932,024 (TRAFFIC 2010).



FISH MARKETS IN SOUTH AFRICA

Fish and seafood market trends in South Africa are largely influenced by market price, species availability, and ease of accessibility for consumers. Increasingly, market trends are influenced by consumer awareness programmes like the WWF's Southern African Sustainable Seafood Initiative (SASSI), and eco-labels like the Marine Stewardship Council (MSC).



ECO-LABELLING AND CONSUMER AWARENESS CAMPAIGNS

Traditionally used to inform consumers about the sustainability of terrestrial products, eco-labels are now utilised as a market-based conservation mechanism which seeks to reward positive conservation behaviour by setting environmental assessment and manufactured goods production standards. The world's largest and most recognised marine wild capture fishery eco-label, the Marine Stewardship Council (MSC), assesses the various fishing industries with regard to the sustainability and environmental impacts of the fishery. Alternatively, consumer awareness programmes such as the WWF Southern African Sustainable Seafood Initiative (WWF SASSI) serve to educate buyers, consumers and the general public about the sustainability of seafood products, enabling them to make educated choices when buying seafood.

FACT: THE IMPORTANCE OF DIVERSIFICATION IN THE SOUTH AFRICAN SEAFOOD INDUSTRY

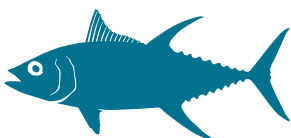
Diversification in the South African seafood industry refers to the broadening of the market and access to new markets. Eco-labels are one way to enter new markets or create niche markets which are more likely to withstand economic changes. An example which illustrates this is the difference between the MSC hake trawl fishery which withstood the recent global economic crises versus the hake long line industry which was largely tied up for the past year due to a collapse in their primary market in Spain with little alternative.

Increasing consumer and retailer awareness of environmental and sustainability issues has resulted in increased demand for environmentally friendly and sustainable seafood products. Recognising that this growing market represents a very powerful force in shaping what happens out at sea, a number of global conservation initiatives have been developed to harness the power of the market and incentivise responsible fisheries and suppliers.

By providing retailers, restaurants and consumers with information about the sustainability of their seafood choices, sustainable seafood initiatives have empowered consumers to make ocean-friendly choices. The last decade has already seen a steady increase in the development of global eco-labelling organisations such as the Marine Stewardship Council (MSC) and, more recently, the Aquaculture Stewardship Council (ASC). Unlike sustainable seafood initiatives - which provide broad information for all seafood species on the market - eco-labels provide consumers with the assurance of sustainability by certifying that the fisheries have met the organisation's standard for a sustainable seafood product. Internationally, several large chain stores have committed to selling 100% sustainable seafood in the coming years, including Walmart and Marks & Spencers.

In South Africa, consumers and retailers are increasingly making use of the information provided by WWF's Southern African Sustainable Seafood Initiative (WWF SASSI) to preferentially procure more sustainable seafood options. At the same time, there has also been an increase in eco-labelled MSC products on the South African market and more consumers are looking for the blue eco-label on their seafood products. Many of South Africa's leading retailers and suppliers are committed to working with SASSI to improve the sustainability of their seafood operations. National restaurant chains are also partners on this programme and are committed to helping consumers make ocean-friendly choices.

10 MOST
REQUESTED SEAFOOD
SPECIES ON FISHMS
KINGKLIP, HAKE,
TUNA, SOLE, DORADO,
YELLOWTAIL, SALMON,
SILVER KOB, PRAWNS, AND
KABELJOU (KOB)



Good practice

The difference between MSC and WWF SASSI

The MSC is a global programme which assesses the sustainability of wild capture fisheries. Working together with fisheries and other stakeholders, the MSC develops standards against which fisheries can be certified by an independent certification body for sustainable fishing and seafood traceability. South Africa's offshore hake trawl fishery is the only MSC-certified fishery in Africa.

SASSI is a programme initiated by WWF South Africa to inform and educate all participants in the seafood trade, from seafood lovers to seafood wholesalers and restaurateurs; it is not an eco-label. SASSI has three primary objectives:

- promoting voluntary compliance with the law through education and awareness;
- shifting consumer demand away from over-exploited species to more sustainable options; and
- creating awareness around marine conservation issues.

Consumers can make use of the SASSI *Consumer Seafood Pocket Guide*, *website*, *mobi site* or the FishMS service.

About the list

The SASSI guide lists seafood in an easily readable format according to sustainability. Green-listed species are the most sustainable, with the healthiest and most well-managed populations. Orange-listed species are species of concern, which are rare as a result of overfishing or fisheries that cause severe environmental damage. Red-listed species are either unsustainable or illegal to buy or sell in South Africa.

FishMS
ALLOWS CONSUMERS
TO MAKE ON-THE-SPOT
CHOICES ABOUT THE
SEAFOOD THEY PURCHASE
WITH JUST ONE SMS TO
079 499 8795



ONLY A
PORTION
OF THE
CATCH IN
LONG LINE
TUNA
FISHING IS
TUNA



MOST COMMERCIAL
FISHING GEAR IS
NOT COMPLETELY
SELECTIVE. AS A
RESULT MANY
ENDANGERED SEA
ANIMALS ARE ALSO
CAPTURED.

TO ENSURE THE FISH
YOU BUY IS CAUGHT
IN A WAY THAT IS
ENVIRONMENTALLY
FRIENDLY, TEXT OUR
FISHMS NUMBER
(079 499 8795) WITH
THE TYPE OF FISH
AND YOU'LL RECEIVE
AN SMS BACK AS TO
WHETHER IT'S IN THE
RED, ORANGE OR
GREEN CATEGORY.



FOR THE LOVE OF
OUR OCEANS

Join
wwf.org.za/sassi
to ensure a
sustainable
future for our
sealife.

SOCIAL CONSIDERATIONS

LINKS BETWEEN FOOD SECURITY AND FISHERIES

The concept of food security is a complex issue linked not only to food availability, but also to human health, sustainable economic development, environment and

trade. The World Food Summit of 1996 defined food security as:

“...when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life.”

According to the World Health Organisation (2011), food security is built on three pillars:

1 FOOD AVAILABILITY: SUFFICIENT QUANTITIES OF FOOD ARE AVAILABLE ON A CONSISTENT BASIS

Around the world, fisheries are vital for ensuring the food security of billions of people, with fish and fish products constituting the primary source of animal protein in the diets of individuals in developed and developing nations. Additionally, the fishing industry plays a key role in ensuring food security by providing direct and indirect employment for approximately 200 million people worldwide. However, when assessing the overall impacts of fisheries on food security, it is essential that impacts on fish workers and their communities, the general populace and the poor – who are most vulnerable to malnutrition – be taken into consideration (FAO 2003).

2 FOOD ACCESS: HAVING SUFFICIENT RESOURCES TO OBTAIN FOOD FOR A NUTRITIOUS DIET

The rich biodiversity of South Africa's marine ecosystems attracted fishers and their families to the shoreline where they developed communities whose cultural values, customary practices and social dynamics are – to this day - intricately linked to the ocean. Some fishing communities in the country are able to trace their fishing roots to 100 000 years ago when traditional fishing gear was used to harvest marine resources for basic sustenance and the maintenance of livelihoods (Sunde *et al* 2010). Currently, South Africa has around 147 fishing communities, 28 338 fisher households and about 29 233 people are considered true subsistence fishers (DAFF Sector GDP Draft 2010). Although the 1996 South African Constitution includes access to food as a basic human right, it is estimated that 53% of traditional fishing community's countrywide are still classified as *food insecure*. South Africa features as one of the top 20 countries with the highest burden of undernutrition (Altman *et al* 2009). Thus, the health of South Africa's fishing communities is inextricably linked to the health of the adjacent fisheries resources and raises the importance of the sustainable and responsible management of these resources to ensure job and food security for these communities.

3 FOOD USE: APPROPRIATE USE BASED ON KNOWLEDGE OF BASIC NUTRITION AND CARE, AS WELL AS ADEQUATE WATER AND SANITATION

Good practice

South Africa's Fisheries Management Mission Statement

According to the Department of Agriculture, Forestry and Fisheries (DAFF) the natural resources of South Africa will be managed according to the following Mission Statement:

A leading dynamic, united, prosperous and people centred sector. This vision will be achieved through developing and sustaining a sector that contributes and embraces: economic growth and development, job creation, rural development, sustainable use of natural resources, maintenance of biodiversity and ecosystems, sustainable livelihoods, food security.

Source: DAFF GDP Sector Draft. 2010.

JOB SECURITY VERSUS JOB CREATION

In 1996, it was estimated that globally 30 million people were deriving an income from fisheries, with 95% of these coming from developing countries. Ten years later (2006), this had increased to 43.5 million people employed part- or full-time in the primary production of fish in both wild capture fisheries and aquaculture (FAO 2010). In 2008 the commercial fishing industry in South Africa employed approximately 27 000 people directly, while 100 000 people were employed in fishery-related enterprises (DAFF GDP Sector Draft 2010).

The South African government currently regards the fishing industry as a sector for employment expansion within the country. Given the state of many of South Africa's fisheries resources, in particular those found inshore, it is unlikely that job creation can take place in the short-term without progressive rebuilding strategies. The immediate goal of fisheries management should be on job security with job creation being a longer-term vision. It is now widely accepted that the financial capital (or income) of a fisher – and a fishing community – cannot be achieved through increasing catches alone due to the state of the global marine fisheries. To circumvent the negative effects of over-fishing and habitat destruction, the need for livelihood options outside of the fishing sector will ensure the quality, diversity and availability of fisheries resources for present and future generations (Sunde and Raemaekers 2010). There is the opportunity to increase the value of the products from fishing through increased quality control and value adding. There are also many sustainable alternatives to fishing which are yet to be properly explored in South Africa. Marine ecotourism ventures and MPAs are increasingly considered viable livelihood alternatives for many fishing communities.

THE SOUTH
AFRICAN
GOVERNMENT
CURRENTLY REGARDS THE
FISHING INDUSTRY AS A
SECTOR FOR EMPLOYMENT
EXPANSION WITHIN THE
COUNTRY

OVERVIEW OF EMPLOYMENT AND INCOME

Role of the fishing industry to meet the national objective of poverty alleviation

Prior to 1994 the South African fishing industry was predominantly run by white-owned companies. Since the end of the apartheid era, legislation and policy have been aimed at transforming the growing commercial fishing sector to ensure previously disadvantaged communities have equitable access to fishing rights. DAFF is in the final stages of developing a Small-scale Fisheries policy to address these issues.

FACT

- ZAR4.4 billion of fish were landed in 2009. This is equivalent to 583 000 tonnes of fish.
- The annual revenue from commercial fisheries exports from South Africa was estimated at ZAR3.1 billion in 2008.
- Commercial fisheries contribute about 0.5% of South Africa's GDP.
- In the Western Cape the fishing industry contributes 0.2% to the Gross Geographic Profit (GGP).
- In the impoverished Eastern Cape region, the squid fishery generates ZAR500 million in foreign revenue per annum, making it one of the country's most valuable fisheries.
- South Africa's commercial fishing industry employs approximately 43 458 people, including seasonal and permanent employment

Source: DAFF GDP Sector Draft 2010. Feike. 2010.

0.5%
OF SOUTH AFRICA'S
GDP COMES FROM
COMMERCIAL FISHERIES

Good practice



43 458 PEOPLE
EMPLOYED BY SOUTH
AFRICA'S COMMERCIAL
FISHING INDUSTRY

Ecotourism as an alternative source of Income

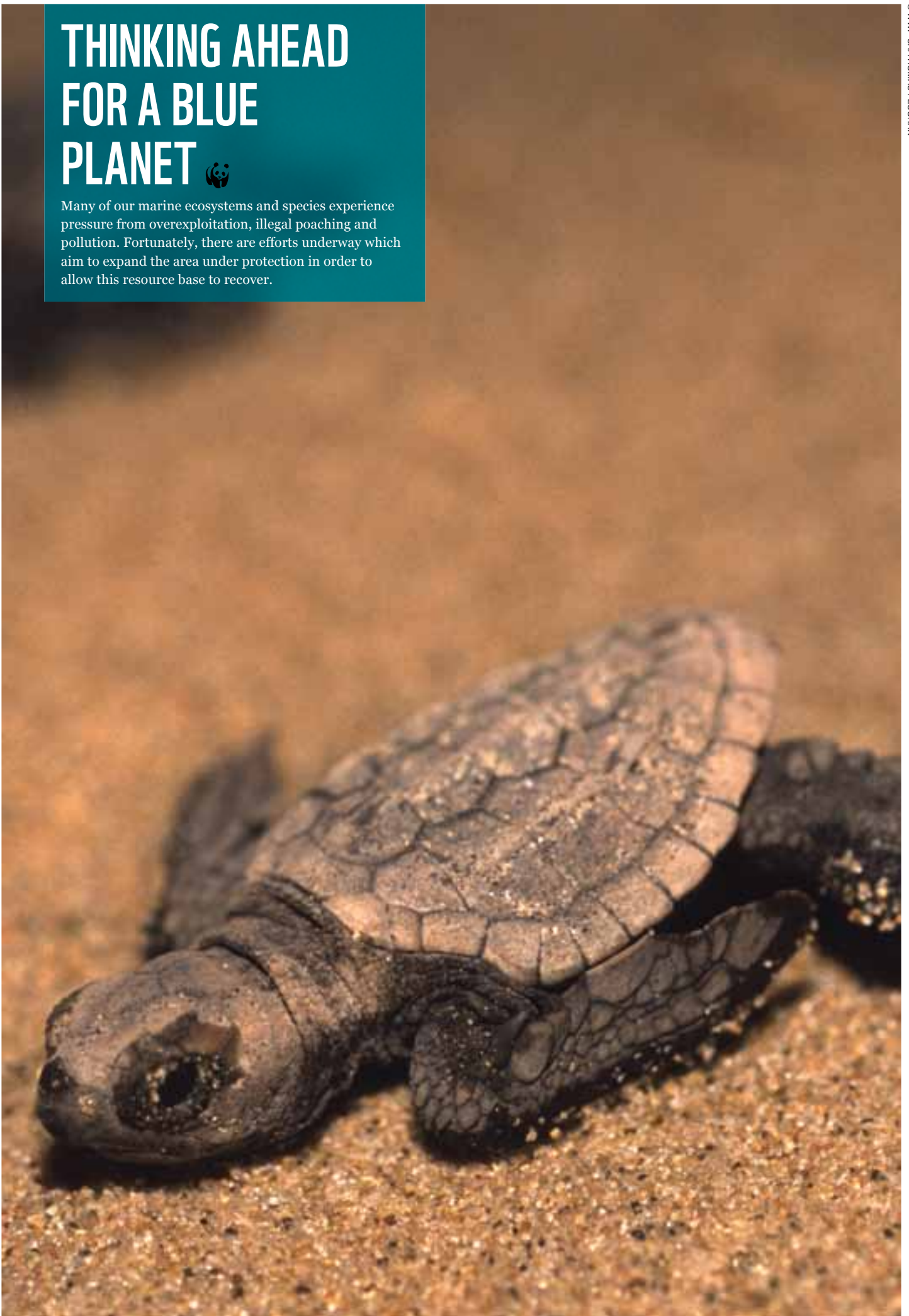
In Japan, the North Atlantic, Peru and Norway, dolphin drivers use small boats to herd thousands of dolphins, porpoises and small whales close to a shore or enclosed bay. The fishermen kill the trapped dolphins and sell their meat - often fraudulently - as minke, sei or Bryde's whale meat. In 1999 video footage taken by videographer Hardy Jones of a pod of 70 dolphins being slaughtered in Japan caused public protest worldwide. Tougher regulations were placed on fishermen and the industry became less profitable.

After 30 years of dolphin driving, Japanese fisherman Izumi Ishii had a change of heart. Ishii, a third generation dolphin fisherman, realised that dolphin driving is not only inhumane but unsustainable. Mr Ishii now operates a boat-based dolphin watching programme, business is booming and Ishii san is an outstanding example of means of utilising marine resources in a sustainable manner.

(Source: Humane Society International. 2011).

THINKING AHEAD FOR A BLUE PLANET 🐼

Many of our marine ecosystems and species experience pressure from overexploitation, illegal poaching and pollution. Fortunately, there are efforts underway which aim to expand the area under protection in order to allow this resource base to recover.



CONCLUSION

Since the earliest recorded history, humankind has been dependent on the world's oceans for the provision of food, employment and valuable trade commodities, as well as to meet recreational, cultural and spiritual needs.

Once regarded as an inexhaustible source of fish and seafood, it is now recognised that the oceans are undergoing dramatic ecological changes primarily due to human actions. Following recent trends of overexploitation, global fisheries are at risk of biological and economic collapse with largely unknown long-term consequences for the health of our planet. Around the world, however, fishers, conservationists, scientists and managers are taking action to mitigate previous unsustainable practices, ensuring the health of our oceans for generations to come. It is through a combination of approaches that the vision of rebuilding fish stocks, conservation of natural resources and sustainable use of marine resources will be realised, in turn bringing together science, management and society.

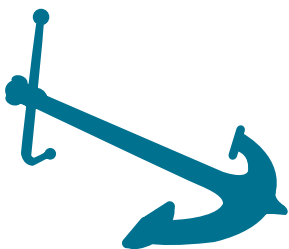
The report was researched and written by Meaghen McCord and Tamzyn Zweig from the South African Shark Conservancy.

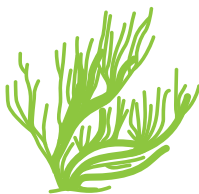
Fish images by Elaine Heemstra © SAIAB

Produced by WWF-SA

REFERENCES

- Altman, M, TGB Hart and PT Jacobs. 2009. *Household Food Security in South Africa*. Agrekon. 48(4): 459-482.
- Atkinson, L and B Clark. 2005. Background Research Paper produced for the South African Environment Outlook report on behalf of the Department of Environmental Affairs and Tourism. [online] http://soer.deat.gov.za/dm_documents/Marine_and_Coastal_-_Background_Paper_wPDBE.pdf. Date of access: 20 March 2011.
- BirdLife Global Seabird Programme (2010). Albatross Task Force Annual Report 2009. Royal Society for the Protection of Birds, The Lodge, Sandy, Bedfordshire, UK.
- Branch, M. 1998. *Explore the Seashore of South Africa*. United Kingdom: Cambridge University Press.
- Castro, P. and M.E. Huber. 2007. *Marine Biology sixth edition*. New York: McGraw-Hill press.
- CCSBT. 2010. Report of the Fifteen Meeting of the scientific meeting. Commission for the Conservation of Southern Bluefin Tuna.
- Cohen, D.M., T. Inada, T. Iwamoto and N. Scialabba. 1990. FAO Species Catalogue. Vol. 10. Gadiform fishes of the world (Order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. FAO Fish. Synop. 10 (125). 442 pp.
- Cowley, P.D., Kerwath, S.E., Childs, A-R., Thorstad, E.B., Økland, F. and T.F. Næsje. 2008. Estuarine habitat use in juvenile dusky kob *Argyrosomus japonicus* (Sciaenidae), with implications for management. *African Journal of Marine Science* 30(2): 247-253.
- DAFF. 2010a. *Agriculture, Forestry and Fisheries Integrated Growth and Development Plan (GDP)*, Department of Agriculture, Forestry and Fisheries. DAFF Sector GDP Draft. 96pp.
- DAFF. 2010b. *Status of South African Marine Fishery Resources 2010*. Fisheries Research, Fisheries Branch, Department of Agriculture, Forestry and Fisheries.
- DAVIES RWD, SJ Cripps, A Nickson and J Porter. Defining and estimating global marine fisheries bycatch. *Marine Policy* (2009), doi:10.1016/j.marpol.2009.01.003.
- Department of the Environment and Heritage. Commonwealth of Australia. 2003. *The Benefits of Marine Protected Areas*. Australia: Department of Commonwealth and Heritage.
- Department of Environmental Affairs and Tourism. 1998. *The Marine Living Resources Act (18 of 1998)* South Africa.
- Department of Environmental Affairs and Tourism. 2007. [online]<http://soer.deat.gov.za/297.html> Date of access: 17 February 2011. South Africa.
- Department of Environmental Affairs and Tourism (DEAT). 2007. *Media release by Minister of Environment and Tourism*. South Africa.
- Department of Environmental Affairs and Tourism. 2009. *Publication of the Policy for the transfer of Commercial Fishing rights*. South Africa.
- Department of International Relations and Cooperation. 2003. [online] <http://www.dfa.gov.za/foreign/Multilateral/inter/unclos.htm>. Date of access: 29 March 2011.
- Dunn, E. 2007. *The Case for a community plan of action for reducing incidental catch of seabirds in longline fisheries. A report from BirdLife's International Global Seabird Programme*. BirdLife International. Cambridge. United Kingdom.
- Ellis, F and E Allison. 2004. *Livelihood diversification and natural resource access*. Overseas Development Group, University of East Anglia, UK. Prepared for the UN FAO Livelihood Support Programme. 46pp.
- FAO (Food and Agriculture Association of the United Nations) *Fisheries Technical Paper. No. 350, Part 2*. Rome, 1996.
- FAO. 1996. *Precautionary approach to fisheries. Part 2: scientific papers*. Prepared for the Technical Consultation on the Precautionary Approach to Capture Fisheries (Including Species Interactions). Lysekil, Sweden, 6-13 June 1995 (A scientific meeting organized by the Government of Sweden in cooperation with FAO). *FAO Fish. Techn. Pap.*, No. 350, Part 2. Rome FAO, 210 pp.





- FAO. 1998. Rome Declaration on World Food Security and World Food Summit Plan of Action. [online] http://www.fao.org/wfs/index_en.htm. Date of access: 3 April 2011.
- FAO. 1999. *The state of the world's fisheries*. FAO: Rome. [online] <http://www.fao.org/FOCUS/E/fisheries/intro.htm>. Date of access: 1 February 2011.
- FAO. 2002. *The Impact of World Trade Organization Agreements on Fish Trade*. FAO Fisheries Circular No. 977. 66pp.
- FAO. 2003. Report of the Expert Consultation on International Fish Trade and Food Security. Casablanca, Morocco, 27 – 30 January 2003. *FAO Fisheries Report*. No. 708. Rome, FAO. 213pp.
- FAO. 2010. *The State of World Fisheries and Aquaculture 2010*. 218pp.
- FAO. 2010b. Fishery and Aquaculture Country Profiles. 20pp.
- Feike. 2010 Fishinc: A guide to the South African commercial fishing industry. 31pp.
- Göetz, A, S Kerwath, C Attwood and WHH Sauer. 2009. *A change in the seaward boundary of Goukamma Marine Protected Area could increase conservation and fishery benefits*. Southern African Journal of Marine Science. 105: 130-131.
- Griffiths MH (2000) Long-term trends in catch and effort of commercial linefish off South Africa's Cape Province: Snapshots of the 20th Century. *South African Journal of Marine Science* 22: 81 – 110
- Heemstra P. and Heemstra A. 2004. *Coastal Fishes of South Africa*. South Africa NICS SAAIB: Paarl Print.
- Hilborn, R. 2005. *Are Sustainable Fisheries Achievable?* In Norse and Crowder (2005). 15: 247 – 259.
- Howard, M. 2003. *When fishing grounds are closed: Developing alternative livelihoods for fishing communities*. Marine Protected Area News.SPC Women in Fisheries Bulletin. 13: 19-23.
- Humane Society International. 2011. *Former Japanese fisherman's tour could change a way of life*. [online] http://www.hsi.org/news/news/2002/japanese_fishermans_ecotour_o8o2o2.html Date of access: 16/02/2011.
- Humane Society International. 2007. [online] http://www.hsi.org/issues/shark_finning/facts/shark_species_in_peril.html Date of access: 20 March 2011.
- Hutchings L, CJ Augustyn, A Cockcroft, C Van der Lingen, RW Coetzee, RJ Leslie, R Tarr, H Oosthuizen, MR Lipinski, MR Roberts, C Wilke, R Crawford, LJ Shannon and M Mayekiso. 2009. *Marine fisheries monitoring programmes in South Africa*. *South African Journal of Science*. 105:182.
- International Whaling Commission. 2010. [online] <http://iwcoffice.org/conservation/status.htm> . Date of access: 19 February 2011.
- IOTC.2011. Report of the fifteenth Session of the Indian Ocean Tuna Commission. Indian Ocean Tuna Commission.
- Joubert A, T Stewart, L Scott, A Gilbert, R Janssen, J Matthee, L de Vries, and M van Herwijnen. 2003. *Fishing rights and small scale fishers: An evaluation of the rights allocation process and the utilisation of fishing rights in South Africa*. University of Cape Town, Vrije Universiteit Amsterdam and University of the Western Cape.
- Kent, G. 1997. *Fisheries, Food Security, and the Poor*. *Food Policy*. 22 (5): 393-404.
- Kilimani, N. 2006. *Mitigating the effects of the credit crunch: diversifying Uganda's exports markets*. Economic Policy Research Centre, Department of Trade and Regional Integration, Uganda. 24pp.
- Kimakwa, E. 2009. *Proceedings of the WWF-AU Expert Consultations of Sustainable Management of Tuna and other Highly Migratory resources in South West Indian Ocean Coastal States*. [online] www.spfif.org/.../35-report-proceedings-on-the-tuna-dialogue-workshop Date of access: 26 March 2011.
- Leibold, M and CJ van Zyl. 2008. *Report of project to scientifically determine the overall Economic Impact and Strategic Value of Sport & Recreational Angling in the Republic of South Africa*. University of Stellenbosch. 49pp.
- Maartens, L and AJ Booth. 2001. *Quantifying commercial catch and effort of monkfish Lophius vomerinus and L. vaillanti off Namibia*. *South African Journal of Marine Science*. 23(1): 291 – 306.
- McLean B and JI Glazewski. 2009. Chapter 14: Marine Systems. In: Fuggle and Rabie's Environmental Management in South Africa, Second Edition. Eds: HA Strydom and ND King. Pg455-478.
- National Oceanic and Atmospheric Administration (NOAA). 2009. *Large Marine Ecosystems of the World*. [online] <http://www.lme.noaa.gov/>. Date of access: 12 February 2011.

- NOAO. 2009. *Stock Assessment and Fisheries Evaluation Report for Atlantic Highly Migratory Species*. Department of Commerce. National Marine Fisheries Service.
- Oceans Africa. 2002. [online] <http://www.oceansafrica.com/whalinghistory.htm> Date of access: 19 February 2011.
- Read AJ, P Drinker and S Northridge. 2006. *Bycatch of Marine Mammals in the US and Global Fisheries*. Conservation Biology Vol. 20, No 1. 163 – 169. Society for Conservation Biology.
- Report of the 2009 Meeting of the Standing Committee on Research and Statistics” International Commission for the Conservation of Atlantic Tunas (ICCAT) 2009-10-11 ICCAT Report for biennial period 2008-09 PART II (2009) - Vol. 2 ICCAT.
- Petersen SL, MB Honig and DC Nel. 2007. *The impact of longline fisheries on seabirds in the Benguela Current Large Marine Ecosystem*. In Petersen S., Nel D. & Omardien A. (eds). Towards an Ecosystem Approach to Longline Fisheries in the Benguela: An assessment of impacts on seabirds, sea turtles and sharks. WWF South Africa Report Series -2007/Marine/001.
- Petersen SL, MB Honig, PG Ryan, R Nel and LG Underhill. 2009. *Turtle bycatch in the pelagic longline fishery off Southern Africa*. African Journal of Marine Science 31:1. 87 – 96.
- Pichegru L, PG Ryan, C Le Bohec, CD van der Lingen, R Navarro, SL Petersen, S Lewis, J van der Westhuizen and D Gremillet. 2009. *Overlap between vulnerable top predators and fisheries in the Benguela upwelling system: implications for marine protected areas*. Marine Ecology Progress Series Vol 391: 199 – 208.
- SANBI. 2008. National Protected Area Expansion Strategy. [online] http://www.bgis.sanbi.org/protectedareas/Nationa_Protected_Area_Expansion_Strategy.pdf. Date of access: 18 February 2011.
- Shannon LJ, PM Curry, D Nel, CD van der Lingen, RW Leslie, SL Brouwer, AC Cockcroft and L Hutchings. 2006. *How can science contribute to an ecosystem approach to pelagic, demersal and rock lobster fisheries in South Africa?* African Journal of Marine Science. 28(1): 115-157.
- Sherman R. 2003. *Briefing on national, regional and international fisheries and marine related agreements*. Environmental Monitoring Group, South Africa. March 2003. 10pp.
- Statistics South Africa. 2010. *National Accounts: Fisheries Accounts for South Africa: 1990 – 2008*. South Africa: Pretoria. [online] <http://www.statssa.gov.za/Publications/DO4050/DO40502010.pdf>. Date of access: 22 March 2011.
- Sunde, J and S Raemaekers. 2010. *Promoting poverty alleviation, food security and gender equity in small-scale fisheries*. A handbook towards sustainable small-scale fisheries in South Africa. Cape Town: Masifundise Development Trust. 100pp.
- Tingley, G, J Powers, D Japp, and A Hough (Moody Marine Ltd.). 2007. South African Hake Trawl Fishery: Surveillance Report 3 2007. 21 p. http://www.msc.org/track-a-fishery/certified/south-atlantic-indian-ocean/south-africa-hake-trawl-fishery/south-african-hake-assessmentdocuments/Surv_Report_Oct2007.pdf
- Tingley G, J Powers, D Japp, A Hough, and J Combes. 2008. *Surveillance Report South African Trawl Industry*. Moody Marine Ltd.
- Traffic. 2010. [online] <http://www.traffic.org/home/2010/6/4/removal-of-trade-controls-signals-bleak-future-for-abalone.html>. Date of access: 20 March 2011.
- Wallace, BP, RL Lewison, SL McDonald, RK McDonald, CY Kot, S Kelez, RK Bjorkland, EM Finkbeiner, S Helmbrecht, and LB Crowder. 2010. *Global patterns of marine turtle bycatch*. Conservation Letters, 3: 131–142. doi: 10.1111/j.1755-263X.2010.00105.x
- Walmsley, SA, RW Leslie and WHH Sauer. 2005. *The biology and distribution of the monkfish Lophius vomerinus off South Africa*. African Journal of Marine Science. 27(1):157-168.
- World Health Organization. 2011. *Trade, foreign Policy, diplomacy and health: food security*. [online]: <http://www.who.int/trade/glossary/story028/en/>. Date of access: 30 March 2011.
- Worm B, R Hilborn, JK Baum, TA Branch, JS Collie, C Costello, MJ Fogarty, EA Fulton, JA Hutchings, S Jennings, OP Jensen, HK Lotze, PM Mace, TR McClanahan, C Minto, SR Palumbi, AM Parma, D Richard, AA Rosenberg, R Watson, and D Zeller. 2009. *Rebuilding Global Fisheries*. Science. Vol 325: 578-585.
- WWF. 2010. *Biodiversity, biocapacity and development*. WWF Living Planet Report 2010. 120pp.
- WWF South Africa Report Series. 2010. *Tracking the implementation of an Ecosystem Approach to Fisheries in Southern Africa*. Vol 1. 18pp.

Living Seas of the Future

THE SUSTAINABLE FISHERIES
PROGRAMME FORMS PART OF
THE WWF MARINE PROGRAMME
FUNDED BY SANLAM



100%
RECYCLED



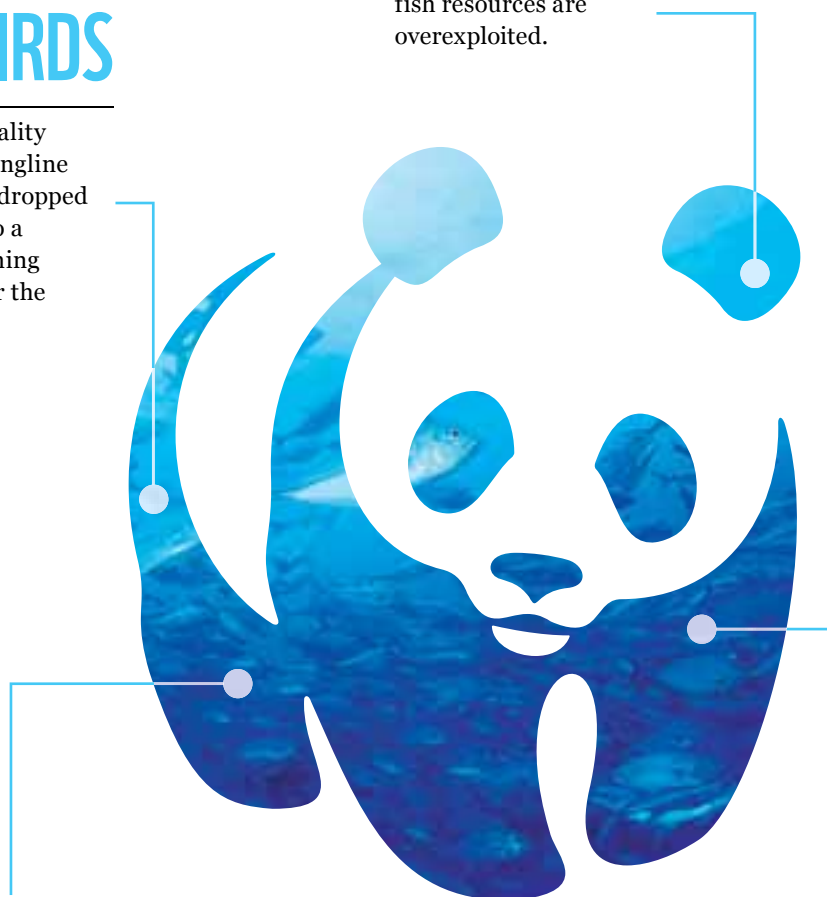
WWF · FISHERIES: FACTS AND TRENDS | SOUTH AFRICA

SEABIRDS

Seabird mortality in the local longline fisheries has dropped by 85% due to a change in fishing practices over the last decade.

23%

Of South Africa's key commercial fish resources are overexploited.



NO FISHING

11% of our coastline is protected by no-take MPAs.

JOBS

South Africa's commercial fisheries employ some 43 460 people.



Why we are here

To stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature.

www.wwf.org.za

WWF-SA is a registered Non-Profit Organisation, number 003-226 NPO. © 1986 panda symbol and © "WWF" Registered Trademark of WWF-World Wide Fund For Nature (formerly World Wildlife Fund), 1st Floor, Bridge House, Boundary Terraces, Mariendahl Lane, Newlands, Cape Town, PO Box 23273, Claremont, 7735, t: +27 21 657 6600, e: info@wwf.org.za, www.wwf.org.za

© BRENT STIRTON / GETTY IMAGES / WWF

ZA

WWF.ORG.ZA