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MAD-06

Main Assessment Report

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FISHERIES Certification Full Report

Project number:	5004
Client:	Hoki Fishery Management Company Ltd.
Country:	New Zealand
Fishery title:	New Zealand's Commercial Hoki Fishery
Area:	New Zealand EEZ
Authority:	Ministry of Fisheries, Wellington
Main species:	Macruronus novaezelandiae
Fishing methods:	Mid water and bottom-trawl
Recommended production limits:	1999 TACC is 250,000 tonnes
Assessment date:	30 th October – 11 th November 2000
Certificate number:	1102/5004/002
Date of issue:	?? February 2001
Duration: Contacts:	5 years Mr. Jim Mace – Executive Director
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SECTION I - PUBLIC SUMMARY REPORT

1. INTRODUCTION AND SCOPE

This report presents the results of the main assessment of the New Zealand hoki fishery in the New Zealand EEZ waters, carried out through the period of October 2000 to January 2001. The assessment took place on-site during the period of 30th October to 11th November 2000 and the itinerary of activities undertaken on-site is shown in Appendix I. The main evaluation (main assessment) of the fishery was preceded by a preliminary analysis (pre-assessment) which took place earlier in 2000.

The purpose of the main assessment was to assess the hoki fishery against the requirements of the MSC Fishery Programme using the SGS Group's MSC Fishery Programme for which SGS Product and Process Certification (The Netherlands) has been accredited by the Marine Stewardship Council. This includes all requirements of the Marine Stewardship Council's Principles and Criteria (MSC P&C).

2. HISTORY OF THE FISHERY

2.1. Introduction

Historically, the main fishery for hoki has operated from late June to late August on the West Coast South Island (WCSI) where the hoki aggregate to spawn. The spawning aggregations begin to concentrate in depths of 300-700 meters around the Hokitika Canyon from late June, and further north later in the season. Fishing in these areas continues into September in some years. In 1988 another fishery developed in Cook Strait on large spawning aggregations of hoki. The spawning season in Cook Strait also runs from late June to mid September, peaking in July and August, like WCSI fishery.

Small catches of spawning hoki are taken from other spawning grounds off the East Coast South Island (ECSI) and late in the season at Puysegur Bank. There is also anecdotal evidence of spawning hoki being caught in other locations around the South Island. Since 1991-92, substantial fisheries have developed on the Chatham Rise and to some extent in the Sub-Antarctic. These fisheries are generally outside the spawning season when hoki disperse to their feeding grounds, and operate in depths of 400-800 meters. Other out of season catches are taken from Cook Strait and the east coast of the North Island (ECNI), but these are small by comparison.

The hoki fishery was developed in the early 1970s by Soviet and Japanese vessels. Catches peaked at 100,000 tonnes in 1977, but dropped to less than 20,000 t in 1978 when the 200 nM Exclusive Economic Zone (EEZ) was declared and a quota limit of 60,000 t was introduced. Hoki remained a relatively small fishery of up to 50,000 t a year until 1986 when the TACC was increased. It expanded to an estimated catch in 1987-88 of about 255,000 t. The annual catch ranged between 175,000 and 215,000 t from 1988-89 to 1995-96. In 1996-97, catches increased to 246,000 t, higher than any previous year, except 1987-88, and in 1997-98, the

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TACC was over-caught by 19,000 t, with the 269,000 t catch the highest record. The pattern of fishing has changed markedly since 1987-88 when over 90% of the total catch was taken in the WCSI spawning fishery. Generally, the catch from the WCSI declined steadily each year after 1988-89 until 1996-97 when the catch began to increase again. In Cook Strait, catches have risen from 1988-89 to 1995-96 but have since dropped. In 1997-98 out of season catches on the Chatham Rise increased further to 74,000 t, although catches from the Sub-Antarctic were at a similar level to 1996-97.

Although a greater proportion of the total catch is still taken during the spawning season, the hoki fishery new operates throughout the year, producing high quality fillets from both spawning and non-spawning fisheries. Since 1994-95, there has been an increase in the number of vessels under 43 meter total length and fishing inside the 25-mile line on the WCSI has increased.

2.2. Biology

Hoki is an elongate fish with a long tapering body and tail, growing to an average length of 60 cm to 1 m and an average weight of 1.5 kgs. It is a largely bottom-living species feeding on other fish. Hoki is a type of 'grenadier hake' (family Macruronidae), confined to the Southern Hemisphere.

Hoki are widely distributed throughout New Zealand waters from 34° S to 54° S, from depths of 10 m to over 900 m, with greatest abundance between 200 and 600 m. Large adult fish are generally found in waters deeper than 400 m, while juveniles are more abundant in shallower water.

Hoki migrate to spawning grounds in Cook Strait, WCSI (West Coast South Island) and Puysegur areas in the winter months. Throughout the rest of the year the adults are dispersed around the edge of the Stewart and Snares shelf, over large areas of the Southern Plateau and Chatham Rise, and to a lesser extent around the North Island. Juvenile fish (2–4 years) are found on the Chatham Rise throughout the year.

Hoki spawn from late June to mid-September, releasing multiple batches of eggs. They have moderately high fecundity with an average sized female of 90 cm Total Length (TL) spawning over 1 million eggs in a season. Not all hoki within the adult size range spawn in a given year. Winter surveys of both Chatham Rise and Southern Plateau have found significant numbers of large hoki with no gonad development, at times when spawning is occurring in other areas.

The main spawning ground is centred on the Hokitika Canyon off the WCSI. The planktonic eggs and larvae are dispersed north and south with the result that 0+ and one year old fish can be found in most coastal areas of the South Island. However the major nursery ground for juvenile hoki aged 2–4 years is along the Chatham Rise, in depths of 200 to 600 m. The older fish disperse to deeper water and are widely distributed on both the Southern Plateau and Chatham Rise. There is also strong circumstantial evidence from trawl surveys that hoki recruit to the Southern Plateau from the Chatham Rise. Analyses from the trawl surveys (1992–95) suggest that most year classes disperse to other areas between 4 and 8 years old.

Growth is fairly rapid with juveniles reaching about 27–30 cm TL at the end of the first year. There is some variability in growth rates, but hoki reach about 40–45, 50–55 and 60–65 cm TL

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respectively in the following three years. Males appear to mature at 60–65 cm TL at 4–5 years, while females mature at 65–70 cm TL. From the age of maturity the growth of males and females differs. Males grow up to about 115 cm TL, while females grow to a maximum of 130 cm TL and up to 7 kg weight. Fish from the eastern stock sampled in Cook Strait are smaller on average at all ages than fish from the WCSI. Maximum age is from 20–25 years, and the instantaneous rate of natural mortality in adults is about 0.25 to 0.3 per year.

Hoki feed in midwater on small fish, crustaceans and squid, but are prey to many deep water species, particularly as juveniles.

2.2. Fishing effort

TACC (t) for HOK 1, estimated catch and reported catches (t) from QMS since the introduction of the Quota Management System (Annala et. al., 2000).

Year	TACC	Estimated catch ¹	Reported catches
1986-87	250,000	175,000	158,171
1987-88	250,000	255,000	216,206
1988-89	250,000	210,000	208,500
1989-90	251,884	210,000	210,000
1990-91	201,897	215,000	215,000
1991-92	201,897	215,000	215,000
1992-93	202,155	195,000	195,000
1993-94	202,155	190,000	191,000
1994-95	220,350	168,000	174,000
1995-96	240,000	194,000	210,000
1996-97	250,000	230,000	246,000
1997-98	250,000	269,000	269,000
1998-99	250,000	-	245,000

¹ From Trawl Catch Effort Processor returns and Catch Effort Landing returns data

2.3. By-catch

2.3.1 Fish bycatch

Hake bycatch problems have occurred in the West Coast South Island hoki fishery. Hake caught in this area (quota management area HAK7) has generally consisted of bycatch taken within the much larger hoki fishery. In the fishing years 1986-87 to 1996-97 the HAK7 landing exceeded the TACC. A number of industry initiatives were taken to address this overfishing problem. These included changes in fishing practices (e.g. use of certain gear, and length of tows), fishing strategies (e.g. fishing season). In 1992 the Ministry increased the TACC for HAK 7. Landings in the last reported two years, '96 - '97 and '97 - '98, has been a net 3% below the TACC. However it is not known if the current TACC's for all hake fish stocks are sustainable (Annala *et al*, 1999).

In HAK7 in some years—notably in 1992 and 1993—there has been a hake target fishery in September after the peak of the hoki fishery is over; about 2500 tonnes of hake were taken in

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this target fishery during September 1993. Since then, however, there has been no significant target fishery in September.

Estimates of current and reference biomass are not available for HAK7. The TACC in HAK7 has been over-caught in recent years. It is not known if recent catch trends and the current TACC are sustainable, or will allow the stock to move towards B_{MSY} . However, the Ministry of Fisheries has no immediate sustainability concerns for HAK7 because the available information gives no signals that abundance is decreasing. In particular it was observed by the Ministry of Fisheries that the bycatch rate of hake in the hoki fishery has remained relatively consistent in recent years, fishers are still having to adjust fishing patterns to avoid hake, and the broad age-structure of the commercial catch has remained constant over recent years.

The most recent assessment for ling in management area 7 (LIN7) suggests that the current biomass is just above B_{MSY} . However, the assessment is highly uncertain. It is driven by a longline catch-per-unit-effort (CPUE) series, which is the only relative abundance index available for this stock. Proportion-at-age data from the trawl fishery is available from the last three years. The next assessment of LIN7 will include proportion-at-age data from seven years, which will enable a better estimation of year class strengths and fishing selectivity, and should improve the overall assessment.

Given the above assessments the Ministry of Fisheries (MoF) has not included HAK7 or LIN7 in the current (2000/01) annual review of sustainability measures. However, MoF does regularly assess the deemed values (over-catch penalty) for both fish stocks. The deemed values for both stocks is currently set at 90% of the port price as a result of the consistent over-catch of their respective TACC's. This high deemed value level has been set to provide a disincentive for fishers to take fish without the authority of quota.

The Ministry of Fisheries also has active research programmes operating for both LIN7 and HAK7 with aim of collecting data from the commercial fishery (catch-at-age, CPUE) to improve and regularly update the assessments of both stocks. A review of the HAK7 ageing data is due for completion at the end of 2000. In addition, the use of acoustic research techniques to assess the biomass of HAK7 has recently been evaluated and will be considered for use in the next hoki acoustic assessment on the west coast South Island in 2003.

Other bycatch fish species include mainly ling and silver warehou. The most important of these is ling. Ling on the east coast South Island and in the southern areas (LIN 3,4,5 and 6) are considered to be only moderately fished and current stock sizes are estimated to be above the size that will support MSY (Annala et al, 1999). For ling stocks on the West Coast South Island and Cook Strait it is not known if recent catch levels are sustainable. In recent years the ling bycatch by hoki fleet on the west coast South Island has decreased, largely due to the move to midwater trawling. Bycatch in the Cook Strait is not considered to be an important issue.

2.3.2 Non-fish bycatch

There is an occasional, incidental bycatch of seals and seabirds in the hoki fishery. Such bycatch is not illegal provided that catches are accidental and always declared to the competent Authority. There is a formal programme to monitor, and legal means to control, such by-catch. The industry co-operates with, and complies with, such programmes and laws. There is an industry-based "Code of Practice" (and extra industry research) to minimise and mitigate such by-catch.

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The size of the seal and seabird populations are unknown, and it is thus not known if the hoki fishery poses any threat to these populations. However, there are no adverse signals from the fishery or from seal and seabird population bycatch monitoring to suggest that significant risk occurs.

The hoki fishery is not known to have any adverse effects (that are irreversible in the medium to long term), on bycatch or on associated and dependent species, although as discussed below, this is an area where there is little information.

The New Zealand Department of Conservation does not class the NZ fur seal as threatened. Three species of albatross were observed to be caught in the hoki fishery during 1997/1998. Under the revised IUCN criteria for identification of threatened taxa, these species were identified as vulnerable, but not endangered or threatened. Based on current information, the hoki fishery is not considered to pose a medium to long term threat to any threatened or endangered species.

2.4. Reporting of catches

The primary information source comes from the catching vessel's skipper who provides information on catches and related effort each time the catch is landed or on a monthly basis. The information is provided in a standardised Ministry of Fisheries form such as the Catch, Effort and Landing Returns or the Trawl Catch, Effort, and Processing Returns. These reports provide additional information about the landed weight and state of the fish, the quota against which the fish was caught, and the receiver of the fish.

Two other sources of information about catches are provided in the Quota Management Report and the Licensed Fish Receiver Report.

Fishers must sell their catch to a Licensed Fish Receiver. The Licensed Fish Receiver supplies monthly reports to the Ministry of Fisheries on the catch they receive and the quota holder the catch relates to. The Licensed Fish Receiver Return provides catch information in green weight tonnage. Standard conversion factor tables for the conversion of processed weights to green weights are provided by regulation.

The quota holder provides quota Management reports to the Ministry. These reports provide information on the catch taken against a quota holding and the vessel used to take the quota.

These requirements are specified in the Fisheries (Reporting) Regulations 1990 and amendments.

2.5. Post-harvest

Most of the product is exported as a further processed product, less than 15 percent of sales are of basic product (frozen, headed and gutted fish).

United States of America, the European Union, Japan and Australia provide 80 percent of the markets for hoki. The major customers are the food service industry (e.g. hotels and restaurants) and food preparation businesses of branded products such as the ready-to-serve meals.



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3. FISHERIES MANAGEMENT SYSTEM

3.1. Administrative context

The Ministry of Fisheries (MoF) is the Government agency responsible for the conservation and management of fisheries while the Department of Conservation is responsible for the sustainable management of the seabed within the 12 nM territorial waters. MoF is charged with consistently monitoring the fishery resource and making timely and appropriate policy advice on all aspects of fisheries management to the Government. The Ministry is also responsible for carrying out the Government's policies to manage and conserve fisheries, and to actively encourage compliance of fisheries regulations by all fishers.

The main statutes related to the management of the marine environment are as follows:

- Establishment of the 12 nautical mile (nM) territorial sea and the 200 nautical mile EEZ (Territorial Sea, Contiguous Zone and Exclusive Economic Zone Act 1977);
- Management of residual areas of the foreshore and territorial seabed so as to protect their natural and historic resources (Foreshore and Seabed Endowment Revesting Act 1991);
- Provision for mineral exploration of the continental shelf (Continental Shelf Act 1964);
- Establishment of mineral programmes for the allocation of Crown-owned minerals and petroleum beyond the 12 mile limit together with a framework for access to those minerals (Crown Minerals Act 1991);
- Management of environmental effects within the territorial sea (Resource Management Act 1991);
- Prevention of pollution from ships, marine oil spill planning and response, and granting of marine dumping permits. Most of the marine pollution provisions apply beyond the territorial sea (Marine Transport Act 1994);
- Protection of seabirds and three marine 'species' together with provisions to manage sea bird deaths caused by fishing (Wildlife Act 1953);
- Protection of all marine mammals within the EEZ, control of marine mammal watching, and provision for the establishment of marine mammal sanctuaries (Marine Mammals Protection Act 1978);
- Recognition of Maori fishing rights secured by the Treaty of Waitangi (Maori Fisheries Act 1989);
- Allocation of fisheries resources, non-commercial traditional and customary rights and interests to tangata whenua (Treaty of Waitangi (Fisheries Claims) Settlement Act 1992, Fisheries Act 1996);
- Management of unwanted organisms within the territorial sea (Biosecurity Act 1993);
- Sustainable utilisation of fisheries resources within the EEZ (Fisheries Acts 1983 and 1996);
- Management of recreational fishing (Fisheries (Amateur Fishing) Regulations 1986/221);
- Establishment and development of marine farming in New Zealand waters (Marine Farming Act 1971, the Resource Management Act 1991 and the Fisheries Act 1983);
- Conservation of marine ecosystems within the 12 mile limit for scientific purposes (Marine Reserves Act 1971);
- Protection of land or foreshore held for conservation purposes (Conservation Act 1987);
- Prohibition on the taking of any marine living resources in the area subject to the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) without

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a permit issued by New Zealand or another party to the convention (Antarctic Marine Living Resources Act 1981);

• Prohibition of mineral resource activities on Antarctica (including islands) or its continental shelf, and recognition of comprehensive protection of the Antarctic environment and recognition of areas designated as specially protected by the Consultative Parties to the Antarctic Treaty and implementation of the Protocol on Environmental Protection to the Antarctic Treaty 1991 (Antarctica (Environmental Protection) Act 1994)

There is a range of government agencies responsible for administering these Acts.

3.2. Stock assessment

A wide variety of data is used in hoki stock assessment, including fishery catch and effort data, information from hydroacoustic and bottom trawl surveys, age and length composition, maturity information and information from studies about stock structure. Current stock assessment analysis carried out by NIWA (National Institute of Water and Atmospheric Research) under contract to the Ministry of Fisheries concludes that the stock is being sustainably fished. An independent report commissioned by the Ministry of Fisheries to review the hoki stock assessment research found that; "the contracted research performed by NIWA generally meets contemporary stock assessment standards and is comparable to stock assessments performed around the world." (Quinn II and Sullivan, 1999).

The Fisheries Act 1996 provides for maximum sustainable yield (MSY) as the management target for the sustainable management of fisheries. Currently the fishery is considered to have two stocks units – Western and Eastern. The latest stock assessment report describes the current stock size of the Western stock to be much greater than the size that will support the maximum sustainable yield and can sustain the expected catch level under the Total Allowable Commercial Catch (TACC) for the next five years (Annala *et al*, 1999). The most recent assessment of the Eastern stock suggests that "the current biomass is above the size that will support the MSY. Stock risk for the next five years is low at the expected catch level under the current TACC." (Annala *et al*, 1999).

In the scientific assessment process the term "stock" means either a biological population of fish that have been grouped together for stock assessment purposes, or if the boundaries of the biological stocks are not known for that species, a group of fish that have been managed as one unit.

In the stock assessment process the fish in each biological stock (breeding population) are assessed separately. A biological stock is made up of all the fish of one species that live together in one area of the ocean. Although the fishery is managed as one stock, morphometric and ageing studies have demonstrated that there are clearly two substocks of hoki. The 'western stock' covers the west coast of the North and South Islands down to Puysegur, Snares and the Southern Plateau. The 'eastern stock' is located From North Cape down the east coast of the North and South Islands, including Cook Strait, the Mernoo Bank and Chatham Rise. No genetic differences between the two stocks have been identified. It may be that the two stocks result from environmental (rather than genetic) differences. The exchange rate between stocks may be as low as two percent. The boundaries of these are shown below. Each of these

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different stocks has different biological characteristics (growth rates, mortality rates) and can be fished at different rates so each must be modelled separately.



Figure 1 (a) Biological stocks for hoki (left); and (b) administrative fish stock boundaries for hoki (right)

Assessments are carried out using research time series of abundance from trawl and acoustic surveys, catch and effort and catch at age information from the commercial fishery, and estimates of biological parameters.

Two alternative models are used to estimate the stocks. NIWA developed a model using the MIAEL estimation method specifically for the hoki fishery. The second estimation method is a Bayesian model. Both models are used in the stock assessment.

There are a number of important differences between the two estimation procedures:

- a. The MIAEL model uses a multi-area two-stock approach. The Bayesian model assesses each stock ('eastern' and 'western') separately.
- b. The MIAEL model assumes a deterministic equilibrium structure for the unfished population. The Bayesian model's initial age structure incorporates stochastic year class strength.
- c. The MIAEL model defines virgin biomass as the mid-season spawning biomass. The Bayesian model defines the virgin biomass as the mid-season mean mature biomass. Assuming that 77 percent of the mature hoki spawn annually, the MIAEL model estimates the mid-season spawning biomass at a level around 23 percent lower than the Bayesian estimate.

The 2000 Plenary Report (Annala et al, 2000) states that the assessment for the western stock is inconclusive because of the discrepancy between the acoustic and CPUE abundance indices. However, under either data set the biomass is estimated to be above the biomass level that can support the maximum sustainable yield (B_{MSY}) and risks to the stock over the next five years of going below these levels are zero or low to moderate. The risks vary according to which data set is used in the model.

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The eastern stock is about one-third the size of the western stock but accounts for 40% of the current hoki catch. Model results indicate that this stock is also above B_{MSY} , but the risks of going below these levels over the next five years are much higher than for the western stock. The risk to the eastern stock would be decreased if a smaller proportion of the total catch was taken from this stock. Again the risks vary according to the data set used.

Hoki is New Zealand's largest fishery by volume and one of the most valuable. The Minister of Fisheries has indicated that he wants to manage it carefully, particularly when the assessment indicates a possible sustainability risk occurring in one or both of the stocks within the next five years. MoF notes that the risks to hoki in the next fishing year are low.

Recent or planned research on hoki stock abundance includes another acoustic survey of the West Coast South Island (winter 2000), and trawl surveys of the Sub-Antarctic area (December 2000) and Chatham Rise (January 2001). This research will help resolve the discrepancies that currently exist between the different data sets used in the modelling. Sampling of commercial catches in all the main fisheries will also provide catch at age data as inputs to the stock assessment.

This research will allow an improved assessment to be completed for hoki in 2001. The Ministry of Fisheries intends to undertake a full review of the management of the hoki fishery following the completion of the 2001 assessment. It is anticipated that this review will need to address redistribution of the proportion of catch between the western and eastern stocks, in addition to evaluation of appropriate catch limit. The Ministry is of the view that this review would best be undertaken in the context of a management plan for the fishery.

Maximum Sustainable Yield (MSY)

The Fisheries Act 1996 requires that harvested species be managed at, or above, a biomass level that can produce the MSY. This biomass level has a label B_{MSY} , which stands for the biomass that will support the MSY. The Minister must set catch limits for Quota Management System stocks that will maintain the stocks at or above this level. The Minister must also take the same target into consideration when setting catch limits for non-Quota Management System harvested stocks. The only two harvested species where B_{MSY} is not the policy target are southern scallops and squid, which have been made exceptions in the 1996 Act.



Figure 2: Schematic diagram of biomass changes over time

Year

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The scientific stock assessments aim to find the MSY for each of the harvested stocks. The yield is the catch taken each year by the fishery. A sustainable yield is a yield that can be taken year after year without affecting the stock size. The MSY is the greatest possible of these sustainable yields. This maximum yield does not usually occur when the stock is at its maximum size. Figure 2 and the following paragraphs explain why this is so.

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The stock assessments assume that before fishing begins on any stock, the biomass (the total weight of live fish in the stock) fluctuates around a value called the virgin biomass (also known as the carrying capacity of the environment). This is shown as point A in Figure 2. It is also assumed that if significant amounts of fishing occur, the biomass begins to decline. This biomass decline is not necessarily a threat to the stock because the stock tends to compensate for the fishing by becoming more productive. This is because when the biomass is at a virgin size (near the carrying capacity of the environment) then there is no room for growth in the population. As a result fish compete intensely with each other for limited resources and cannot grow or reproduce as fast as they would with unlimited resources. The surplus (or excess) production is small in these circumstances so it is not possible to take a large catch repeatedly without affecting the stock size. This means that when the stock size is high, the sustainable yield is small.

As the biomass declines (the point B in Figure 2), there is less competition, and individual fish grow and reproduce faster. The stock becomes more productive and can sustain a higher sustainable yield. But if the biomass decreases to very low levels, there is less overall production from the stock because the stock is so small, and the sustainable yield decreases. At some point in between, (usually around 30-45% of the virgin biomass) the sustainable yield will be at a maximum. The biomass is then at the level that will support the MSY. This is labelled point C in Figure 2.

If biomass falls to very low levels, (a level of 20 % of the virgin biomass is a common benchmark for the threshold), then there may be risks to the stock, as the number of adults in the stock may not be able to produce enough juveniles to replace themselves. This risky level is labelled point D in Figure 2.

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There is a sustainable yield at any biomass level, even for very low ones, which can be taken year after year without affecting the stock size. However, the Fisheries Act 1996 identifies the target biomass for all harvested species as the level of biomass that will support the MSY. In each successive fishing year, a TAC should be chosen to move the biomass towards a level at or above the level that will support the MSY. As noted previously, this biomass level may be written B_{MSY} . Figure 2 shows the biomass increasing from the risky level up towards the target level that it achieves at point E.

Benefits of managing a stock at or above B_{MSY}

A stock that is at or above B_{MSY} , compared to a stock that is below B_{MSY} , has the following benefits for fishers:

- Larger total biomass allowing higher catch rates;
- Larger average size fish in the stock and hence in the catches;
- More stable stocks and catches from year to year, as more year classes of fish contribute to the exploited stock and catch;
- More year classes in the population of adult fish that spawn, allowing for chances of better recruitment (recruitment means the contribution made to the stock each year as young fish grow to a takeable size);
- Reduced risk of over-fishing in the short term; and
- A greater safety margin in the sense that the higher stock levels provide longer lead times to overcome uncertainties in stock assessments and to take corrective measures if required.

Estimating MSY and B_{MSY}

In practical terms MSY cannot be measured directly but must be derived from an assessment of the fishery. The fishery assessment plenary report describes the use of biological reference points to approximate MSY. They embody the concept of MSY, apply to all conditions of stock size, account for stock fluctuations, and are calculable.

MSY corresponds to the highest or maximum point on a theoretical yield curve of the whole range of stock biomass sizes. B_{MSY} is the stock biomass that will allow this yield to be taken on a sustained basis. For reasons including uncertainty in the stock assessment, and the effect of environmental variability on stock abundance it is not possible to actually maintain a stock exactly at this optimum biomass. However, the aim of management is to use the assessment to determine stock size relative to B_{MSY} and then adjust catch limits and management controls to achieve the target biomass over time, and thereby achieve the highest sustainable yield.

The biological reference points most commonly used are Maximum Constant Yield (MCY) and Current Annual Yield (CAY) which derive from two ways of viewing MSY: a static interpretation and a dynamic interpretation.

MCY is the largest constant catch that you can take sustainably even if the number of recruits fluctuates from year to year. This value is often estimated from a long sequence of constant historical catches; and

CAY is the catch to biomass ratio that maximises the sustainable yield from a fishery over time. CAY is calculated as a constant percent of the biomass and as such, increases and decreases

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in tandem with natural changes in the stock biomass. It is possible to estimate CAY only when the current stock size is known.

Note that MCY is dependent to a certain extent on the current state of the fish stock. If a stock is fished at the MCY level from a virgin state then over the years its biomass will fluctuate over a range of levels depending on environmental conditions, abundance of predators and prey, etc. For stock sizes within this range the MCY remains unchanged (though our estimates of it may well be refined). If the current state of the stock is below this range the MCY will be lower.

Applying a constant fishing mortality each year to a stock is a strategy that maximises the average yield over time. The Maximum Average Yield (MAY) is the average catch taken when the catch each year is the CAY. A CAY strategy does not depend upon knowing, with any certainty, the relationship of the current biomass to B_{MSY} . If a CAY harvest strategy were implemented for a fishery, the biomass would, regardless of its state relative to B_{MSY} , always be exploited at the appropriate level.

The exploitation rate (catch to biomass ratio) used to calculate the CAY for a species is related to its biological characteristics. For example, for orange roughy, which is slow-growing and very long-lived, CAY corresponds to a catch to biomass ratio of 6%. For snapper, which is moderately long-lived, the ratio is between 11 and 14%, and for hoki, which is fast growing and relatively short lived, the ratio is between 25 and 30%.

MCY is generally less than MAY. This is because CAY will be larger than MCY in the majority of years. However, when fishable biomass becomes low (through overfishing, poor environmental conditions, or a combination of both), CAY will be less than MCY. This is true even if the estimates of CAY and MCY are exact. The following diagram (Figure 3) shows the relationships between CAY, MCY, and MAY.



Figure 3 Relationship between CAY, MCY and MAY.

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In this example CAY represents a constant fraction of the fishable biomass, and so (if it is estimated and applied exactly) it will track the fish population exactly. MAY is the average over time of CAY. The reason MCY is less than MAY is that MCY must be low enough so that the fraction of the population removed does not constitute an unacceptable risk to the future viability of the population. With an MCY strategy, the fraction of a population that is removed by fishing increases with decreasing stock size. With a CAY strategy, the fraction removed remains constant. A constant catch strategy at a level equal to the MAY, would involve a high risk at low stock sizes.

Another estimate of yield that is sometimes calculated is Current Surplus Production (CSP). CSP is the amount of fish production (or biomass increase due to growth or recruitment) which is surplus to what is needed simply to replace the fish that die from natural causes. Taking the CSP as catch should leave the biomass at the same level for the next year.

An important point to realize is that, whichever MSY strategy is applied (i.e. MCY or CAY), the biomass will fluctuate, possibly quite widely. The reason for these fluctuations is that the environment in which the fish live is naturally variable: the abundance of predators and prey varies from year to year, as do physical factors such as temperature. The main way in which this variation affects the stock biomass is through recruitment (the number (and size) of fish that recruit to the fishery each year).

A consequence of this variability is that B_{MSY} for these strategies can be sensibly defined only as a long-term "average" biomass. Further, for a given fish stock, this "average" biomass will be different for each MSY strategy. These biomass levels are usually referred to as B_{MCY} and B_{MAY} , that is the biomass levels that will support a MCY and CAY harvest strategy, respectively.

Thus, B_{MSY} is not uniquely defined for any given stock (it depends on which MSY harvesting strategy is used). Also, it must be interpreted not as a fixed point at which we should expect the biomass to stay, but as a level about which we should expect the biomass to fluctuate.

3.3. Management strategies

Fishing areas

The main fishing season has been from mid-July to late August but may run as late as September. The main fishing area has been the spawning grounds on the west coast of the South Island particularly the Hokitika trench and Westport. Since 1988 a fishery has developed in the Cook Strait on separate spawning aggregation to that on the West Coast. This fishery occurs in late June to mid September. Smaller spawning aggregations have been found on the east coast of the South Island and later in the season at Puysegur Bank.

Although the greater proportion of catch remains in the spawning areas, catches in nonspawning areas have increased since 1989. A substantial fishery now occurs on the Chatham Rise peaking in December/January and May/June. A lesser fishery occurs in the Sub-Antarctic peaking in October/November and April/May. Smaller fisheries occur in Cook Strait and on the east coast of the North Island.

Vessel types have also changed in the last decade. Up until 1990 surimi vessels dominated but since that time fillet and head and gutted product has increased. Since the mid 1990s vessel

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size has also changed with an increasing proportion of vessels 43 metres or smaller entering the fishery to fish inside the 25-mile line on the west coast of the South Island.

The Quota Management System

The Quota Management System (QMS) was introduced in 1986 to manage and conserve New Zealand's major commercial fisheries. It was introduced to prevent overfishing, which had reached dangerous levels in some inshore fisheries, and to improve the economic efficiency of the fishing industry.

The QMS controls the total commercial catch for all major fish stocks found within New Zealand's 200 nautical mile EEZ. Quota is allocated to fish stocks and within fish stocks to fisheries management areas. The management areas are defined within the Fisheries Act. Changes to management areas require an amendment to the Fisheries Act.

New Zealand is not the first country to bring in quotas, but it is the first to use them on such a broad scale in a multi-species fishery. Most countries manage fisheries by controlling inputs, such as the number of boats, the size of boats, mesh size of the nets and so on.

The QMS is based on an output management regime. The approach used in the QMS is to directly limit the total quantity taken by the commercial fishing industry so that there are sufficient fish available for non-commercial uses and for the conservation of the resource. These are known as output controls.

Total Allowable Catch (TAC)

For each fish stock the Minister can set a Total Allowable Catch (TAC). The TAC represents the total amount of fish that can be sustainably removed from a fish stock in any one year. It encompasses all removals by all fishers (commercial and non-commercial).

For most species the fishing year begins on 1 October and carries through until 30 September the next year. For example, the 1997–98 fishing year began on 1 October 1997 and finished on 30 September 1998. For southern blue whiting and rock lobster the fishing year begins on 1 April and finishes on the 31 March.

The TAC must be set by the Minister with reference to Maximum Sustainable Yield (MSY). This is the greatest yield that can be achieved over time while maintaining the stock's productive capacity. The Minister is required to maintain stocks at or above a level that can produce MSY. A stock can be fished down, or rebuilt, to or above a level that can produce MSY. In determining the rate at which a stock is moved towards the desired level, the Minister must consider relevant biological, environmental, social and economic and cultural factors. The concept of MSY is discussed in more detail below.

Once a TAC is set, the Minister must set allowances for recreational and Maori customary noncommercial fishing and other sources of mortality caused by fishing and then set a Total Allowable Commercial Catch (TACC). The TACC represents the total amount of fish that commercial fishers can remove from a fish stock in any one year.

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Management Fish Stocks

The fishery for each species within the Quota Management System is divided into a number of different management units (defined as fish stocks). The boundaries for the biological stocks may not necessarily line up with the Quota Management Area boundaries. For example, there are two hoki fish stocks (HOK 1 and HOK 10 shown in Figure 1(b)), but one of these Fish stock boundaries (HOK 1) is a huge area which contains both the Western and Eastern biological stocks described above. TACs are set for each Quota Management Area rather than each biological stock.

Species that are managed outside the Quota Management System are administratively managed within fish stock boundaries that line up with ten generic Fishery Management Areas (see Figure 4). Non-harvested species that are taken as a bycatch of harvested species and are not managed have no administrative boundaries.



Figure 4: Fishery Management Areas for non-Quota Management System species

Hoki Fishery Management Company's Management Strategies

The management goal of the HFMC is to improve the management and economics of the hoki fishery by collaborative actions among shareholders in research, management, organisation and advocacy. The strategies listed below are those which shareholders of the Hoki Fishery Management Company (HFMC) believe the HFMC should pursue on their behalf as it takes greater responsibility for managing the hoki fishery. There are other aspects of the fishery which shareholders will pursue on an individual or co-operative basis.

The overall management strategy to achieve fisheries goal is that the HFMC will:

- Manage the Fishery; maximise quota owner responsibility for managing the hoki fishery; •
- Determine Services Required; work with the Ministry of Fisheries to determine specifications and standards for the services required in the hoki fishery;
- Obtain Cost Effective Services; pursue cost effective provision of all services in the hoki fishery;



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- Purchase Services Directly; purchase services for the hoki fishery directly from providers to approved specifications and standards:
- Advocate Management Actions; advocate management actions which will best serve the sustainability of the stocks, the economics of the fishery and the well being of participants;
- Cooperate in Registry and Administration Services; Cooperate with other quota owner companies in registry services and related fisheries administrative services.

<u>A. Harvest Strategy</u> The HFMC will promote a stable catch limit harvest strategy that maximises the economic yield from the fishery. Catch limits will normally be increased only where the proposed increase is assessed to be sustainable for a minimum of three years and the rate of change of catch limits will normally be restricted to plus or minus ten percent, every second year.

The tactics to achieve the harvest strategy are that the HFMC will:

- Support Management by QMS; supports continued management of the fishery under the • Quota Management System with the catch limit being the primary sustainability control;
- Minimise Management Controls; Minimise management controls in the hoki fishery consistent with sustainable and equitable management. Where controls are required, they will be implemented wherever possible through voluntary mechanisms agreed between shareholders:
- <u>Recognise Economic Factors When Setting Catch Limits;</u> key factors to be taken into account when determining catch limits are those that will maximise economic yields over time, including:
 - maintenance of high catch rates: _
 - maintenance of a year round fishery;
 - optimum fish sizes for processing requirements;
 - costs of required stock assessment research; _
 - market returns for hoki;
- Manage the Fishery as a Single Quota Management Stock; advocate management of the • hoki fishery as a single quota management stock with any necessary area-specific catch limits to be co-ordinated by the HFMC;
- Manage Special Areas; implement management plans for areas of the fishery requiring additional management measures. The first of these is a management plan for the Cook Strait Hoki Fishery which proposes a maximum spawning season catch of 42,000 tonnes;
- Encourage Avoidance of Small Hoki; encourage all fishers not to fish in areas and at times where a significant portion of the catch comprises small hoki which can only be utilised for fishmeal;
- Review Hoki Fishery Regulations; review all controls relating to the hoki fishery at regular ٠ intervals. In particular:
 - provision should be made as soon as is practicable for the electronic transmission of catch and effort data;
 - provision should be made for setting of processing machine-specific conversion factors; and
 - regulations concerning handling of small and damaged fish;
- Support Retention of 43 m Exclusion Zones; support of retention of current regulations excluding trawling by vessels larger than 43 m overall length from particular areas. All fishing controls and regulations will be reviewed at regular intervals.



B. Compliance Strategy

The HFMC will:

- <u>Ensure High Levels of Compliance with Fishery Controls</u>; ensure high levels of compliance with controls in the hoki fishery to protect the value of investments in the fishery;
- <u>Take a Greater Role in Compliance</u>; maximise the extent to which the hoki industry takes responsibility for compliance in the fishery consistent with the availability of suitable self-compliance systems and the support of shareholders;
- <u>Support the Development of Alternative Compliance Regimes</u>; support the development of alternatives to the criminal law compliance regime by which Industry can take an increased role in managing compliance and ensure high levels of compliance in the fishery;
- <u>Retain Key Fishery Controls as Criminal Law;</u> retain controls which directly affect the value of the QMS fishing right under the criminal law regime until alternative compliance regimes such as contract or administrative law are suitably developed and proven;
- <u>Implement New Compliance Programmes</u>; continue to implement cost-effective compliance programmes by which Industry can take responsibility for aspects of compliance in the fishery. These include codes of practice, observer programmes and the management of area catch limits such as proposed for the Cook Strait Fishery;
- <u>Maximise Voluntary Compliance</u>; maximise voluntary compliance with fishery controls by ensuring controls are necessary, reasonable and practicable and by educating participants about the need for the controls;
- <u>Use Appropriate Commercial Mechanisms;</u> encourage shareholders to use commercial mechanisms to improve compliance in the fishery;
- <u>Obtain Cost Effective Compliance Services</u>; pursue options to obtain cost effective provision of all compliance services, where appropriate through the contestable supply of services.

C. Environmental Strategy

The HFMC will:

- <u>Proactively Address Environmental Concerns</u>; support appropriate research and management of environmental issues affecting the fishery. Current recognised issues include the by-catch of fur seals, discharging of factory vessel fish waste on fishing grounds and impacts to the seabed benthos of trawl operations;
- <u>Monitor Within-Season Incidental Non-Fish By-Catch</u>; maintain a within-season reporting system to provide accurate and timely data on levels of incidental non-fish by-catch in the fishery;
- <u>Continue Research into Non-Fish By-Catch Mitigation Measures</u>; support appropriate research into measures designed to reduce the incidental non-fish by-catch in the hoki fishery including improved codes of practice, marine mammal excluder devices and seal scaring devices;
- <u>Manage Non-Fish By-Catch Issue</u>; develop a strategy to manage issues related to non-fish by-catch in the hoki fishery including dissemination of information concerning the fishery, mitigation measures and by-catch populations;
- <u>Support Independent Assessments</u>; support efforts to obtain independent assessments of the impact of fishing related mortalities on seal populations;
- <u>Maintain Seal By-Catch Code of Practice</u>; maintain the West Coast Hoki Fishery Code of Practice designed to minimise incidental by-catch of seals;



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- <u>Investigate Impacts of Trawling on Seabed Benthos</u>; support appropriate research to identify the extent of any impacts of trawl operations on the seabed benthos, in Cupertino with other quota owner companies;
- <u>Control the Discharge of Waste on Fishing Grounds</u>; prohibit the dumping at sea of all nonbiodegradable ships waste, including plastics and other inorganic waste, and discourage the discharge of organic material including fish processing waste on the finish grounds;
- <u>Monitor Fish By-Catch</u>; implement within-season monitoring of catches of fish by-catch species, where necessary, to help ensure catches of by-catch species are not excessive.

D. Stock Assessment Research Strategy

The HFMC will:

- <u>Co-ordinate a Comprehensive Research Plan</u>; co-ordinate the process to develop and regularly review a comprehensive plan for stock assessment and other required research in consultation with MoF and stakeholders and identify annual research activities required to implement the plan;
- <u>Determine Appropriate Frequency of Abundance Assessments</u>; determine the appropriate frequency of abundance assessments of the main hoki spawning aggregations based on the current exploitation rate;
- <u>Directly Purchase Required Research</u>; identify and purchase the research required to provide confidence that hoki fishery catch limits are sustainable, predict future stock sizes and provide input to catch limit decision rules;
- <u>Improve Stock Assessment Models</u>; seek agreements on the use of a single informative stock assessment model using an independent evaluation of the current models if required;
- <u>Support Development of Abundance Assessment Methodology</u>; the HFMC will support the development of abundance assessment methods which can be undertaken in conjunction with commercial fishing operations.
- <u>Support Research on Stock Structure</u>; support research and modelling to verify hoki stock structure;
- <u>Support Regular Catch Sampling</u>; the HFMC will facilitate appropriate levels of catch sampling from commercial fisheries to provide necessary size and age information;
- <u>Identify and Assess Other Spawning Aggregations</u>; support research to identify spawning
 aggregations other than the West Coast South Island and Cook Strait aggregations and
 support abundance assessments of these aggregations where they are of significant size;
- *Facilitate Recruitment Prediction*; Facilitate recruitment strength predictions based on industry information or special surveys as required.
- <u>Determine the Maximum Economic Yield</u>; support research to define and determine the maximum economic yield from the hoki fishery.

E. Other Research Strategy

The HFMC will:

• <u>Support Relevant Research</u>; support research into improved harvesting, processing, transport and storage of hoki. Research into specific product development will be left to individual shareholders.



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- <u>Develop a Research Plan</u>; prepare and regularly update a plan prioritising research into hoki harvesting, processing, transport and storage to provide guidance on which research projects to support;
- <u>Seek Additional Sources of Research Funding</u>; support research providers in their attempts to obtain funding for appropriate hoki-related research from the Foundation for Research, Science and Technology and other sources.
- <u>Facilitate Dissemination of Research Results</u>; work with research providers to ensure effective dissemination of the results of new research and to co-ordinate input from shareholders in the provision of advice on what research should be undertaken.

3.4. Quota

Each year the Government decides what quantity of each quota species may be caught. It makes the decision based on information supplied by the Ministry and other interest groups such as the commercial fishing industry, recreational fishers, Maori and conservation groups. Scientists provide biological data, such as the size of the resource and its productivity. They use the concept of maximum sustainable yield (MSY) to work out safe fishing levels. This is the largest average annual catch that can be taken over time without reducing the stock's productive potential. MoF works out risks to the fish stocks of particular catch levels in the future.

The quantity of fish that can be taken for each fish stock by both commercial and noncommercial fishers is known as the Total Allowable Catch (TAC). An allowance is then made to provide the recreational fishing and customary Maori uses. The remainder is then made available to the commercial sector as the Total Allowance Commercial Catch (TACC). This is the total quantity of each fish stock that the commercial fishing industry can catch that year.

The TACC for each fishery comprises individual transferable quota (ITQs). These give commercial fishers the right to harvest a defined amount of the TACC in a defined area. Quota holders can fish their quota, sell it, or lease it to another fisher for a period of time.

Initially, quotas were issued in tonnage, but in 1990 the Government moved to proportional quotas. Quotas are now a percentage of the TACC for each species and not a fixed tonnage. Before 1990, if the TACC went down, the Government had to buy back quota from fishers, or conversely if the TACC increased the Government sold quota. Now fishers carry the cost of reductions because if the TACC is reduced their individual quota holdings are proportionately reduced. On the other hand, if the TACC is increased they don't have to pay for the extra quota they receive.

The Quota right

Commercial fishers with ITQs do not own the fish in the sea. ITQs give them the right to catch fish. Because their rights are secure and tradeable, fishers can make long-term plans. They can also spread their catching programme throughout the year to determine when best to catch "their" fish. They can also fine tune their quota. For example, if they find they're catching fish, they don't have quota for (by-catch), they can buy or lease quota to cover the catch. On the other hand, if they're not catching their full quota of a species, they can sell or lease some of it.

Within the commercial catch limit, ownership of quota determines access. Quota is a right to harvest a particular species in a defined area. Quota can be traded (bought, sold, or leased).



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The QMS is designed to ensure sustainable use of the fisheries resources while allowing economic efficiency in the industry. The quota system is also being used to deal with aboriginal (Maori) claims to commercial fisheries.

Maori fishing rights

The Government has a responsibility to ensure that 20% of all commercial quota is transferred Maori in recognition of the indigenous Maori rights to the commercial fishery. The quota is allocated to the Treaty of Waitangi Fisheries Commission responsible for the distribution of quota to tribes (iwi).

3.5. Monitoring, control, surveillance and enforcement

The Ministry of Fisheries is responsible for the monitoring of compliance of the fisheries management regime. The industry also has an observer programme which monitors catches and vessel behaviour at sea in the Cook Strait. In recent years this programme has been contracted out to an independent organisation "Fisheries Audit Services (NZ) Ltd".

The penalty regime for breaches of the Fisheries Act and regulations is severe, and includes:

- Severe fines
- Confiscation of catch and vessel plus related fishing gear,
- Possible forfeiture of quota and,
- Possible prohibition from the industry for repeated offences.

The Marine Reserves Act (1971) administered by the Dept of Conservation, provides for the establishment and Management of marine reserves. Commercial fishing is prohibited in these areas. There are currently no marine reserve areas that impact on hoki fishing grounds.

Since April 1994 vessels of greater than 42 metres and other vessels as specified by the Ministry of Fisheries must operate an Automatic Location Communicator (ALS) which report to the Ministry of Fisheries the position of the vessel via a satellite communication link. This requirement covers most of the hoki fleet. Additionally, ships and planes of NZ Defence Forces make occasional routine sweeps to identify and report vessels sighted within the NZ EEZ. The Ministry of Fisheries considers that there is an effective vessel monitoring system operating in the fishery.

The HFMC and its member companies are responsible for much of the day-to-day management of the New Zealand hoki resource and have developed Sustainable Management Criteria (see Appendix II). Member Companies are shareholders in the HFMC and have executed a voluntary agreement to comply in all respects with the requirements of the Sustainable Management Criteria (see Appendix III). SGS New Zealand is contracted to audit the member companies against these Sustainable Management Criteria which can be grouped into the following categories:

International Agreements

- Adherence to relevant international fisheries agreements
- Adherence to relevant international environmental agreements
- Adherence to other relevant international agreements

Sustainable Use and Management Principles

• Sustainable fisheries and environmental principles



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- Sustainable fishery management principles
- Rightsholder's principles and incentives •

Food Safety, Social Responsibility and Open Market Principles

- Sound business principles
- Food safety and quality principles
- Trade and market access principles
- Human rights principles •

Of necessity, some of the criteria apply at the national level, others apply to the fisheries management regime in general, and others are specific to the individual fishery.

Awaiting descriptions of the:

- MoF Observer Programme [from Andrew France, MoF]
- HFMC Observer Programme [from Jim Mace, HFMC]

3.6. Environmental issues

The medium to long term impacts of hoki fishing on the ecosystem or habitats are unknown at this time. A well-managed fishery will have a management system in place that is based on a broad planning framework, contains policies, plans and activities that identify the key aspects of environmental issues, and implement actions to reduce or remove threats, or to remediate any unavoidable impacts. The planning framework, and any supporting research, will integrate matters of public interest across the various responsibilities of a range of government agencies, together with those of the fishery, to ensure that important environmental issues (often known as 'cross-sectoral' issues) will be effectively addressed. The responsibilities for implementation (and funding) of corrective or preventative actions should be negotiated across the range of stakeholders.

The major areas for consideration that are of potential environmental concern are:

- the impacts of bottom trawling on the seabed;
- ecological effects of the fishery on midwater ecosystems;
- discharging of fish wastes;
- effects of incidental capture of seals and seabirds;
- the existence of a fisheries planning and management framework that is capable of • identifying, and responding to, environmental issues in an effective manner.

However, for each of these areas of concern, there are major gaps in knowledge that mean that the nature and magnitude of these issues is highly uncertain.

In terms of the planning framework, the Ministry of Fisheries responsibilities are reasonably clear. In the event that adverse impacts are identified, the Fisheries Act 1996 requires that action is taken to avoid, remedy or mitigate any adverse effects of fishing on the aquatic environment. Section 10 of the 1996 Fisheries Act requires that when undertaking any action under the Act in relation to utilisation and sustainability of fisheries, the precautionary approach should be adopted. Although the 1996 Fisheries Act encompasses an ecosystem management approach, fisheries regimes to achieve such management are in their infancy. For example, minimising the incidental and accidental bycatch of seabirds and marine mammals by commercial fishing remains a contentious issue. However, the roles of other government

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agencies, and the integration of their responsibilities into mechanisms to control the fishery are unclear. In addition, government responsibilities for control and management of ecosystems outside the 12 nM territorial waters (but within the EEZ) appear unclear.

In addition to the legal requirements, the HFMC has an environmental strategy requiring members to proactively address environmental concerns by supporting appropriate research and management of environmental issues affecting the fishery (New Zealand Hoki Fishery Strategic Development Plan December 1997). For example there is an Industry Code of Practice for the Cook Strait Hoki Fishery (a distinct fishery within the overall New Zealand hoki fishery) to reduce the incidence of excess catch, and dumping of fish, fish waste and ship's refuse (Cook Strait Hoki Fishing Observer Programme 1999).

The Ministry of Fisheries considers that the hoki fishery impact on biodiversity is not a significant issue, although there is limited evidence to support this view. The majority of the hoki is taken by midwater trawl with minimal impact on the seabed. However, bottom trawling for hoki has occurred for a number of years, with suggestions that up to 40% of trawls may use bottom trawling gear, but the impact that this has had on the biodiversity of bottom fauna is unknown.

The ITQ management of multispecies fisheries has created a number of difficulties. Bycatch issues arise because fish species living in close association with each other have different TACC levels, and species are caught at differing rates. Bycatch issues are managed by sanctioned trading of quota between specified species (bycatch trade off or payment of pre-set deemed values (payment of penalties to the Crown)).

The primary management tool used in the hoki fishery is the QMS. While the QMS manages the amount of biomass taken from the fish stock, it does not manage the potential biodiversity or ecosystem impact issues in an equivalent manner. For example, for the hoki, retention of a range of ages, sizes, genetic composition, and spatial distribution of the population are not used in the QMS to any great extent. Parameters used for both types of hoki stock assessment models are focused on production and management of hoki biomass, and do not, for example, take into account the issue of retaining a range of size/age classes across the spatial range of the Hoki populations in New Zealand waters, a key factor in maintaining the biodiversity of natural fish populations.

The fisheries management system that has been developed for the hoki is implemented by the Ministry of Fisheries and involves a range of environmental and ecosystem-based management measures, with some implemented by other government agencies(The ecosystem management measures include, for example, measures to protect endangered species that may be caught as incidental catch in the hoki fishery. Such measures typically have been designed to respond to a range of threats, or to rebuild populations of rare species, and are implemented in the hoki fishery as part of a national-scale process. Their relevance to the hoki fishery varies with the extent to which the fishery is considered to be contributing to threats, or preventing recovery. An important issue that has yet to be resolved is the way in which the mixture of fishery-specific management measures (including the QMS) interact with the broader ecosystem or icon species management measures to influence or exert control over operations in the fishery. The range of ecosystem and environmental controls that apply to the hoki fishery do not appear to be effectively integrated into a management plan for the fishery.



3.7. Other activities

The recreational fishing for hoki is negligible and the level of Maori customary fishing is believed to be negligible. Other commercial fisheries occur within the area of commercial hoki fishing. Some examples include trawl fisheries for hake, ling and silver warehou. Some non-hoki commercial fisheries do overlap in time and area with the fisheries being evaluated (see section 2.2). There appears to be little structural impact on non-hoki species by the hoki fishery. Similarly, although there is some bycatch of hoki in the large offshore trawl fisheries, the non-hoki fisheries do not appear to significantly impact the operation of the hoki fisheries.

4. STANDARDS

4.1. General MSC Fishery Programme requirements

Recognizing that market incentives have the potential to improve fisheries management and to turn chronic over-fishing into recovery, sustainability and economic stability; the Marine Stewardship Council (MSC) was established in 1997. The goal of the MSC is to harness these incentives in such a way as to provide the fishers, processors and retailers with greater security of supply and employment than has been possible to date.

The MSC is an independent, charitable, not-for-profit, and non-governmental international organisation working to achieve sustainable marine fisheries by promoting responsible, environmentally appropriate, socially beneficial and economically viable fisheries practices, while maintaining the biological diversity, productivity and ecological processes of the marine environment.

To accomplish its objectives, the MSC proposed a new approach to change the incentive structure so that benefits accrue to the fishers, fish processors, traders, retailers and consumers in adopting a more responsible and sustainable approach to fisheries exploitation. At the center of the MSC is a set of *Principles and Criteria for Sustainable Fishing* which are used in an independent assessment as a standard by which an independent assessment team evaluates a fishery. In this project these standards were used in the evaluation of New Zealand's commercial Hoki fishery.

The MSC Principles and Criteria (P&Cs) were developed by means of an extensive, international consultative process through which the views of stakeholders in many fisheries have been gathered from around the world. Further international consultations will take place through 2001 at which time the MSC will revise the P&Cs as necessary. The P&Cs reflect a recognition that a sustainable fishery should be based upon:

- The maintenance and re-establishment of healthy populations of targeted species (Principle 1);
- The maintenance of the integrity of ecosystems (Principle 2);
- The development and maintenance of effective fisheries management systems, taking into account all relevant biological, technological, economic, social, environmental and commercial aspects (Principle 3); and
- Compliance with relevant local and national local laws and standards and international understandings and agreements (Principle 3).

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The Principles and Criteria are further designed to recognise and emphasise that management efforts are most likely to be successful in accomplishing the goals of conservation and sustainable use of marine resources when there is full co-operation among the full range of fisheries stakeholders, including those who are dependent on fishing for their food and livelihood.

The scope of the MSC Principles and Criteria relates to marine fisheries activities up to but not beyond the point at which the fish are landed. The MSC Principles and Criteria apply at this stage only to marine fishes and invertebrates (including, but not limited to shellfish, crustaceans and cephalopods). Aquaculture, freshwater fisheries, and the harvest of other species are not currently included. Issues involving allocation of quotas and access to marine resources are considered to be beyond the scope of these Principles and Criteria.

For further information about the MSC Principles and Criteria or about other aspects of the Marine Stewardship Council, information can be found at the MSC website (http://www.msc.org).

PRINCIPLE 1

A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery.

Intent:

The intent of this principle is to ensure that the productive capacities of resources are maintained at high levels and are not sacrificed in favour of short term interests. Thus, exploited populations would be maintained at high levels of abundance designed to retain their productivity, provide margins of safety for error and uncertainty, and restore and retain their capacities for yields over the long term.

Criteria:

- 1. The fishery shall be conducted at catch levels that continually maintain the high productivity of the target population(s) and associated ecological community relative to its potential productivity.
- 2. Where the exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level consistent with the precautionary approach and the ability of the populations to produce long-term potential yields within a specified time frame.
- 3. Fishing is conducted in a manner that does not alter the age or genetic structure or sex composition to a degree that impairs reproductive capacity.

PRINCIPLE 2

Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends.

Intent



The intent of this principle is to encourage the management of fisheries from an ecosystem perspective under a system designed to assess and restrain the impacts of the fishery on the ecosystem.

<u>Criteria</u>

- 1. The fishery is conducted in a way that maintains natural functional relationships among species and should not lead to trophic cascades or ecosystem state changes.
- 2. The fishery is conducted in a manner that does not threaten biological diversity at the genetic, species or population levels and avoids or minimises mortality of, or injuries to endangered, threatened or protected species.
- 3. Where exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level within specified time frames, consistent with the precautionary approach and considering the ability of the population to produce long-term potential yields.

PRINCIPLE 3

The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.

Intent

The intent of this principle is to ensure that there is an institutional and operational framework for implementing Principles 1 and 2, appropriate to the size and scale of the fishery.

A. Management System Criteria

1. The fishery shall not be conducted under a controversial unilateral exemption to an international agreement.

The management system shall:

- 2. demonstrate clear long-term objectives consistent with MSC Principles and Criteria and contain a consultative process that is transparent and involves all interested and affected parties so as to consider all relevant information, including local knowledge. The impact of fishery management decisions on all those who depend on the fishery for their livelihoods, including, but not confined to subsistence, artisanal, and fishing-dependent communities shall be addressed as part of this process;
- 3. be appropriate to the cultural context, scale and intensity of the fishery reflecting specific objectives, incorporating operational criteria, containing procedures for implementation and a process for monitoring and evaluating performance and acting on findings;
- 4. observe the legal and customary rights and long term interests of people dependent on fishing for food and livelihood, in a manner consistent with ecological sustainability;
- 5. incorporates an appropriate mechanism for the resolution of disputes arising within the system;
- 6. provide economic and social incentives that contribute to sustainable fishing and shall not operate with subsidies that contribute to unsustainable fishing;
- 7. act in a timely and adaptive fashion on the basis of the best available information using a precautionary approach particularly when dealing with scientific uncertainty;



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- 8. incorporate a research plan appropriate to the scale and intensity of the fishery that addresses the information needs of management and provides for the dissemination of research results to all interested parties in a timely fashion;
- 9. require that assessments of the biological status of the resource and impacts of the fishery have been and are periodically conducted;
- 10. specify measures and strategies that demonstrably control the degree of exploitation of the resource, including, but not limited to:
 - a. setting catch levels that will maintain the target population and ecological community's high productivity relative to its potential productivity, and account for the non-target species (or size, age, sex) captured and landed in association with, or as a consequence of, fishing for target species;
 - b. identifying appropriate fishing methods that minimise adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas;
 - c. providing for the recovery and rebuilding of depleted fish populations to specified levels within specified time frames;
 - d. mechanisms in place to limit or close fisheries when designated catch limits are reached;
 - e. establishing no-take zones where appropriate;
- 11. contains appropriate procedures for effective compliance, monitoring, control, surveillance and enforcement which ensure that established limits to exploitation are not exceeded and specifies corrective actions to be taken in the event that they are.

B. Operational Criteria

Fishing operations shall:

- 12. make use of fishing gear and practices designed to avoid the capture of non-target species (and non-target size, age, and/or sex of the target species); minimise mortality of this catch where it cannot be avoided, and reduce discards of what cannot be released alive;
- 13. implement appropriate fishing methods designed to minimise adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas;
- 14. not use destructive fishing practices such as fishing with poisons or explosives;
- 15. minimise operational waste such as lost fishing gear, oil spills, on-board spoilage of catch, etc.;
- 16. be conducted in compliance with the fishery management system and all legal and administrative requirements; and
- 17. assist and co-operate with management authorities in the collection of catch, discard, and other information of importance to effective management of the resources and the fishery.

4.2. Developing the scoring guideline

The MSC Principles and Criteria are general statements describing what aspects need to be present in fisheries to indicate that they are moving toward sustainable management. The certification approach or methodology adopted by the MSC requires that any assessment of a fishery or fisheries move beyond a management verification program that provides third-party assurances that a company's stated management policies and procedures are being implemented. The MSC's approach is designed to be an evaluation of a fishery's performance to determine if the fishery is being managed consistent with emerging international standards of sustainable fisheries. In particular, the requirements of the MSC are to bring to bear evaluation

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criteria or performance indicators that are consistent with emerging international standards of environmentally responsible fisheries management and the MSC Principles and Criteria.

Using its expertise, the assessment team developed a set of performance indicators to be consistent with the intent and extent of the MSC Principles and Criteria. Specifically, each MSC Principle and its associated Criteria were translated into a specific set of indicators that could be used by the assessment team either quantitatively or qualitatively to measure performance (see http://www.msc.org and look for the Hoki fishery scoring guideline).

To the extent possible, the assessment team tried to avoid overlap in performance indicators between the criteria within the three MSC principles. This was accomplished by Recognizing that the three MSC principles for use in certification can be broadly classified in the following manner:

- <u>Principle 1</u> is concerned with maintaining the target species at productive levels and is therefore concerned with outcomes of a management system that provide documentation that the resource is being maintained at the appropriate levels.
- <u>Principle 2</u> is concerned with restraining the impact of the fishery on ecological systems (including the target species), and therefore is also concerned with documented outcomes of a management system showing that the fishery has or is moving toward an understanding of its impact on the environment.
- <u>Principle 3</u> is concerned with sound management systems, and is therefore focused on processes. The intent is to show that all the processes necessary for moving toward and attaining a sustainable fishery are in place. In addition, Principle 3 includes standards for management of fishing operations.

In determining the different performance indicator levels, the team used the following guidance on their interpretation of the 60, 80 and 100 levels:

- 60 being the minimum level for a fishery to be considered for certification,
- 80 being the level required to pass; and
- 100 being the perfect fishery.

The associated minor and major corrective actions to be taken by the fishery resulting from the achieved scores on the MSC criteria are described in section 5.4.6 and in section 8.

4.3. Summary of the Performance Indicators

Below is a summary table of the MSC Principles, Criteria and hoki Performance Indicators is given while in Appendix VII the full hoki performance indicators and scoring guideposts can be found.

MSC Principle	MSC Criterion	Hoki Performance Indicator	
	-		
Principle 1	Criterion 1.1	Indicator 1A: There is adequate	
A fishery must be	The fishery shall be	knowledge about the target stock being	
conducted in a manner	conducted at catch	fished	
that does not lead to	levels that continually	Indicator 1B: There is adequate	
over-fishing or	maintain the high	knowledge about the fishery	
depletion of the	productivity of the	Indicator 1C: There is a robust	
exploited populations	target population(s)	assessment of the stocks	



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and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery	and associated ecological community relative to its potential productivity.		Indicator 1D: There is a well-defined and effective strategy to manage the target stocks Indicator 1E: Stocks are not depleted and harvest rates are sustainable	
	Crite Why pop dep will that rebu occ leve the abill pop long yield time	erion 1.2 ere the exploited ulations are leted, the fishery be executed such recovery and uilding is allowed to ur to a specified el consistent with precautionary roach and the ity of the ulations to produce g-term potential ds within a specified e frame	Not used for hoki ass	essment
	Crit Fish a m alte stru com deg repi	erion 1.3 ning is conducted in anner that does not r the age or genetic cture or sex nposition to a ree that impairs roductive capacity.	Indicator 1F: There is knowledge about the fished Indicator 1G: There is knowledge about the Indicator 1H: There is effective strategy to m stocks.	adequate target stock being adequate fishery a well-defined and nanage the target
Principle 2 Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends.	Crit The con that fund sho trop eco cha	erion 2.1 fishery is ducted in a way maintains natural ctional relationships ong species and uld not lead to hic cascades or system state nges.	Indicator 2A: There is knowledge of the econ where the fishery ope Indicator 2B: The fish- manner that does not impacts on protected, endangered or highly Indicator 2C: An ecolo assessment has been determine the potentia fishery on the environ Indicator 2D: The imp gear or lost consumal waste on target or not not unacceptable Indicator 2E: The fish- unacceptable impacts structure or function, populations of depend	adequate system and its value rates ery is conducted in a have unacceptable threatened, valued icon species ogical risk n conducted to al impacts of the ment act of lost fishing oles or disposed n-target species is ery does not have s on the ecosystem on habitats or on the dent or otherwise



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		associated species
		Indicator 2F: Precautionary strategies are
		employed in the fisheries management
		system to address and restrain the
		impacts of the fishery on the ecosystem
	Criterion 2.2	Indicator 2G: There is adequate
	The fishery is	knowledge of the ecosystem and its value
	conducted in a manner	where the fishery operates in relation to
	that does not threaten	protected, endangered, threatened or
	biological diversity at	icon species
	the genetic, species or	Indicator 2H: An ecological risk
	population levels and	assessment has been conducted to
	avoids or minimises	determine the potential impacts of the
	mortality of, or injuries	fishery on the genetic, species and
	to endangered,	population level biodiversity of the
	threatened or protected	protected, endangered, threatened or
	species.	icon species
		Indicator 21: The impact of lost fishing
		gear or lost consumables or disposed
		waste on endangered, threatened,
		protected or icon species is not
		unacceptable
		Indicator 2J: The fishery does not have
		unacceptable impacts on the endangered,
		threatened, protected or icon species and
		the associated ecosystem
		Indicator 2K: Strategies are employed in
		the fisheries management system to
		address and restrain the impacts of the
		tisnery on the endangered, threatened,
	Oritarian 0.0	Not used for balling as a series
	Criterion 2.3	Not used for noki assessment
	deploted the fishery	
	will be executed such	
	that receivery and	
	robuilding is allowed to	
	rebuilding is allowed to	
	time frames consistent	
	with the precautionary	
	approach and	
	considering the ability	
	of the nonulation to	
	produce long-term	
	notential vields	
Principle 3	Criterion 3A	Indicator 3A: The management system
	Management System	recognises use rights
The fishery is subject	Criteria	Indicator 3B: The management system
		<u> </u>

¢SGS)	SGS Product & Pro A section of Internation	ocess Certification nale Controle Maatschapp	ij (I.C.M.) B.V.
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to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.	Crit	erion 3B	has a clearly defined a well-managed fishe <u>Indicator 3C</u> : The man has a comprehensive <u>Indicator 3D</u> : The man implemented <u>Indicator 3E</u> : The man has compliance and e procedures <u>Indicator 3F</u> : The man has an effective moni <u>Indicator 3G</u> : The man has an effective revie	scope designed for ry nagement system scope of planning nagement system is nagement system enforcement nagement system nagement system nagement system w system
	Ope	erational Criteria	and practices designed capture of non-target target size, age and/o species); minimise mo where it cannot be av discards of what cann <u>Indicator 31</u> : Implement fishing methods design adverse impacts on h critical or sensitive zo spawning and nursery <u>Indicator 3J</u> : Minimised Indicator 3J: Minimised Indicator 3J: Minimised Indicator 3L: The fish conducted in compliant administrative required <u>Indicator 3L</u> : The fish and co-operates with authorities in the colled discard and other infor importance for the eff of the resource and a ecosystem	species (and non- species (and non- or sex of the target ortality of this catch oided and reduce not be released alive. In appropriate abitat, especially in nes such as a operational waste ery operations are nce all legal and ments ery operation assists management ection of catch, ormation of ective management nd the associated

5. ASSESSMENT PROCESS

5.1. Schedule

The main assessment was carried out over the period of October 2000 to January 2001. The assessment took place on-site during the period of 30th October to 11th November 2000 and the itinerary of activities undertaken on-site is shown in Appendix I. The main evaluation (main assessment) of the fishery was preceded by a preliminary analysis (pre-assessment) which took place earlier in 2000.



5.2. Team

One of the key aspects of conducting an independent evaluation of a fishery using the requirements and methods outlined by the Marine Stewardship Council, is forming a team of experts to review information about the fishery and make final judgements regarding the fishery's ability to meet the MSC Principles and Criteria. A team approach has been adopted to limit internal bias and to ensure appropriate understanding and review of the widely varied sets of information needed to prove that fisheries meet all the MSC requirements. To select members of the assessment team, SGS used the following determinants: technical expertise in fisheries management, ecosystem management or management systems; specific knowledge of the New Zealand hoki fishery and the ability to provide an objective assessment. Ultimately, SGS formed an assessment team of four experts to evaluate the extent to which the commercial hoki fishery in New Zealand complied with the MSC Principles and Criteria as listed below (see Appendix II for CV's):

Lead Assessor and Team Leader:

 Mr. Edwin Aalders – Management System Expert MSC Fishery Programme Director SGS AgroControl The Netherlands

Assessors:

- Mr. Aldin Hilbrands Management System Expert MSC Fishery Programme Manager SGS AgroControl The Netherlands
- Mrs. Jo Akroyd Fisheries Management & Research Expert Director Akroyd Walshe Ltd. Consultants in Marine Research & Fisheries and Quality Management New Zealand
- Dr. Trevor Ward Marine Ecosystem and Fishery Impacts Expert Institute for Regional Development University of Western Australia Australia

While each team member participated in all discussions regarding the performance of the fishery, individuals also had specific roles in facilitating the team's overall understanding of the information provided. Each team member's role was based on their respective expertise.

<u>Mr. Edwin Aalders (M.Sc.)</u> filled the role of team leader, providing process control to ensure that all MSC procedures and methods were properly followed and completed. He also acted as the primary liaison with the HFMC in organising the project and with the stakeholders initiating the consultations. Mr. Aalders has about 10 years experience in environmental auditing for the purpose of certification and ecolabelling, as well as technical training and experience in these fields.

<u>Mr. Aldin Hilbrands (M.Sc.)</u> filled the role of assistant team leader and acted as the secondary liaison with the HFMC in organising the project and with the stakeholders initiating the

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consultations. Mr. Hilbrands has about 5 years experience in project development and auditing for the purpose of standard setting, certification and ecolabelling in the aquaculture and fisheries sector, as well as technical training and experience in these fields.

The two external experts hired to perform the independent evaluation provided control over the content used by the team in evaluating the fisheries. Each of the respective team members helped facilitate the collection, evaluation, and discussion of information in their respective areas of expertise.

<u>Mrs. Jo Akroyd (M.Sc.)</u> facilitated the evaluation of the fisheries management and stock assessment system utilised by the Hoki Fisheries Management Company. Mrs. Akroyd has more than 25 years experience in fisheries research and management from both a practical standpoint being the executive director of Akroyd Walshe Ltd. and from a government policy perspective as the past Director of Fisheries Policy & Research with the Ministry of Fisheries in New Zealand.

<u>Dr. Trevor Ward</u> facilitated the discussions on the ecological impacts associated with fishing based on his extensive experience with coastal and deepwater ecosystems, and assessment and management of the environmental impacts of fisheries in Australia and the Asia-Pacific region. Dr Ward has been involved as an ecosystem expert during the evaluation process of the Australian Western Rock Lobster for MSC certification. Dr. Ward spent over 20 years at CSIRO (Australia) working on ecosystem impacts and ecosystem management prior to taking his current position at the University of Western Australia.

5.3. Peer Review

A further important aspect of conducting an independent evaluation of a fishery, using the requirements and methods outlined by the Marine Stewardship Council, is having the assessment team report peer-reviewed by three independent experts. The peer review is to review the presented information and the conclusions drawn for recommending the hoki fishery for MSC certification. A team approach has been adopted to limit internal bias and to ensure appropriate understanding and review of the widely varied sets of information needed to prove that fisheries meet all the MSC requirements, ranging from good management practices to ecosystem impacts. SGS selected three peer-reviewers for the peer-review team using the following determinants: technical expertise in fisheries management, ecosystem management or management systems; scientific credibility; knowledge of the deep-water fisheries and the ability to provide an objective assessment.

5.4. On-Site Process

5.4.1. Preparation

The MSC Principles and Criteria are by their very nature general statements that are meant to apply to all fisheries. The MSC Principles and Criteria are intended to be used in conjunction with a specified methodology that requires the development of practical measures of fisheries performance that embody the intent of the MSC Principles and Criteria. Following the MSC specific process, measurable performance indicators are established for each Principle and its associated set of Criteria and provided to accredited certifiers by the MSC. Each evaluation team must then determine if the set of indicators and performance measures are appropriate

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for the specific fishery under evaluation. Where the evaluation team feels that the set of performance indicators and measures needs to be modified, the team must submit its recommendations to the MSC for approval before continuing with the evaluation process.

In the case of the New Zealand hoki Fishery, a completed set of performance measures was not available from the MSC prior to the on-site visits. Therefore, the evaluation team was given permission to develop a specific hoki Scoring Guideline using, as a guide, the MSC approved scoring guidelines used during earlier evaluations of fisheries against the MSC P&C's. Approval for this was given under the condition that the specific hoki Scoring Guideline developed would be submitted to the MSC for approval prior to scoring the fishery. The hoki Scoring Guideline approved by the MSC for use in the evaluation of the New Zealand Hoki Fishery can be found on the MSC website. In addition, the consulted stakeholders were also provided with a copy of the draft hoki Scoring Guideline to comment on.

5.4.2. Opening meeting

An opening meeting was held with the Hoki Fishery Management Company at the office of Sealord, in Nelson on 03rd November 2000. The scope of the assessment was explained and time schedules were determined (see Appendix III for attendance sheets).

5.4.3. Document review

Document review aimed to determine how closely the fishery management practice complied with documented procedures and the MSC P&C requirements. Interviews with the responsible managers of the HFMC were conducted to determine their familiarity with, and their application of, policies, procedures and practices that are relevant to their activities. A randomly-selected sample of documents were audited to evaluate whether practices met the required performance levels.

5.4.4. Field assessments

Site assessments aimed to determine how closely the fishery management complied with documented procedures and the MSC P&C requirements. Interviews with staff, operators and contractors were conducted to determine their familiarity with, and their application of, policies, procedures and practices that are relevant to their activities. A randomly-selected sample of operations were audited to evaluate whether practices met the required performance levels.

5.4.5. Scoring the fishery

The MSC methodology for fishery evaluations utilises a decision support process known as AHP (Analytic Hierarchy Process) to assist the team prioritise, weight, and score sets of performance indicators within each individual Principle. This allows the expert team of fisheries professionals to identify and prioritise performance indicators according to which ones are most important for achieving the performance required by the MSC.

Using this method, compliance with each MSC Principle was evaluated independently. It is important to note that while the criteria associated with each Principle were ranked and
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weighted based on importance, there was no such attempt made to rank and prioritise the three MSC Principles. Each Principle is considered independent of the others and, to be certified, a fishery must obtain an evaluation score consistent with meeting compliance with the MSC Principles and Criteria. If the fishery does not meet compliance on any one of the three MSC Principles, the fishery is not recommended for certification.

In determining the performance indicators, the team used the following guidance on their interpretation of the 60, 80 and 100 levels:

- 60 being the minimum level for a fishery to be considered for certification,
- 80 being the level required to pass; and
- 100 being the perfect fishery.

The scores for each performance indicator of the hoki Scoring Guideline were determined by a team process. To reduce potential bias, each team member made their own individual evaluation and score after an introductory discussion on each indicator. Discussions on the indicators in each MSC Principle were led by the team member of the most relevant expertise and experience. Individual scores were entered into the AHP software programme as well as a custom built spreadsheet, and where team member scores varied widely (inconsistancy ratio greater than 0.2 or coefficient of variation greater than 5%), the team engaged in further discussion to explore the nature of differences in scores, and where appropriate scores were revised to take account of different views about performance.

The arithmetic average of all 4 team member scores was used as the final score for each indicator. The arithmetic average of the scores for each indicator, after adjustment to reflect the numeric weightings, were used to determine the final score for each criterion. The arithmetic average of the scores for each criteria were used to calculate the score for each MSC Principle.

5.4.6. Summing up and closing meeting

At the conclusion of the main assessment, findings were presented to the HFMC management at the closing meeting on Saturday 11th November 2000. Any areas of non-conformance with the MSC Principles & Criteria were raised as one of two types of Corrective Action Request (CAR):

- **Major CARs** which must be addressed and re-assessed before certification can proceed, indicate a scoring under 80 on one of the MSC Principles or a scoring of under 60 one one of the criteria;
- **Minor CARs** which do not preclude certification, but should preferably be addressed and will be checked at the next surveillance visit, indicate a scoring between 60 and 80 on one of the MSC criteria and under 80 on indicator level.

5.5. Sampling

In order to determine how closely the fishery management of the HMFC and its member companies complied with documented procedures and the MSC P&C requirements, interviews were conducted with staff and operators of the HFMC and its member companies were conducted to determine their familiarity with, and their application of, policies, procedures and practices that are relevant to their activities. A randomly-selected sample of management and operations were sampled to be audited whether practices met the required performance levels.

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Within the HFMC, the executive director Mr. Jim Mace was extensively interviewed on the hoki fishery day-to-day management in co-operation with the HFMC member companies. The HFMC chairman, Mr. Ross Tocker was interviewed during the opening meeting only.

Of the HFMC member companies, two of the largest quota holders were interviewed and inspected on fishing operations: Sealord Ltd. and Amaltal Ltd. With these two companies, the responsible operations managers were interviewed as well as skippers of their large hoki trawlers.

Additionally, a skipper of a private, relatively small hoki trawler was also interviewed.

5.6. Stakeholder consultation

SGS New Zealand has identified the major stakeholders in the hoki fishery in the preassessment report. This list was completed in conjunction with additional stakeholder contacts suggested by WWF-NZ and Forest & Bird. The list with contacted stakeholders is included in Appendix XII.

Before interviews with stakeholder took place, SGS New Zealand sent out a stakeholder notification letter in which the MSC certification process was outlined. In this way, the assessment team informed the particular stakeholder in advance on general MSC related matters associated to the audit.

In section 6.2, the issues raised by the stakeholders are described in detail.

6. ASSESSMENT RESULTS

6.1. Findings related to the general MSC Certification Programme

6.1.1. Principle 1: Sustainable Stock Exploitation

Criterion 1.1

The fishery shall be conducted at catch levels that continually maintain the high productivity of the target population(s) and associated ecological community relative to its potential productivity.

Indicator 1A: There is adequate knowledge about the target stock being fished.

Status of knowledge

1. There is adequate knowledge of the identity of the identity of the target species, and its range and stock structure

Hoki (*Macruronus novaezelandiae*) cannot be confused with any other species within New Zealand. This species also occurs in Tasmanian and Australian waters. However the New Zealand stock is genetically distinct from the Australian stock.

Within New Zealand, there is evidence of two sub-populations that have different morphological features, different growth rates and that live as mature fish in different areas. These sub-



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populations do not appear to be genetically distinct. Stock fidelity and the extent of mixing between stocks is unknown. The latter are modelled under a range of scenarios in stock assessment. Although the TACC is set for one fish stock (HOK1) the sub-populations of hoki are assessed as 2 stocks (eastern and western).

2. There is adequate knowledge of the life history (fecundity, growth, natural mortality) and behaviour of the target species

The fecundity at size has been estimated for the western stock. Individual hoki do not spawn every year. There are two estimates of the annual proportion of female hoki developing to spawn in the western stock.

Growth rates of hoki in different areas of the EEZ have been well documented.

Natural mortality is assumed (0.25 females, 0.3 males) and is held constant across all age classes.

Existing fishery and fishery independent data have been explored extensively to derive the current view of the life cycle. However migration pathways and cues, and stock movements are not well understood.

3. There is adequate information on trends in abundance of spawning stock, larval recruitment, and fishery recruitment.

The seasonal patterns of movement and availability to the fishery are well understood.

Fishery independent abundance surveys on spawning stocks (west coast, Cook Strait), prerecruits (Chatham Rise) and mature fish during their resting phase (Chatham Rise, Sub-Antarctic) have been carried out extensively over the past 10 years using acoustic and trawl survey methods.

Minor Corrective Actions

Nil

Gaps and Observations

- 1. Natural mortality could be better estimated for male and female hoki, different stocks and areas, and estimated at age.
- 2. There is a large difference in the model estimates of catchability in trawl survey estimates of mature hoki on the Chatham Rise and in the Sub-Antarctic. The reasons for this are not clear.
- 3. The mechanism that determines stock destiny of juvenile hoki mixed together on the Chatham Rise nursery grounds as they mature is unknown.
- 4. Surveys of juvenile hoki abundance on the Chatham Rise cannot determine what proportion of each year class will belong to each mature stock.
- 5. The relationship of North Island hoki to the current stock structure is unknown.

Indicator 1B: There is adequate knowledge about the fishery

Status of knowledge

1. There is adequate monitoring of Catch and Effort



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There is an extensive catch and effort monitoring system in place for all quota species, including hoki.

2. There is adequate monitoring of landings, discards and incidental moralities

There is an independent at-sea observation programme that measures bycatch, discards, samples the hoki catch to obtain length and age data, and documents fishing practices

3. There is adequate information on fishing methods and fishing patterns

The total annual catch and effort by fishing methods are known for major spatial zones of the fishery. This has been analysed on a fine spatial and temporal scale for the spawning fisheries.

4. There is adequate information on gear selectivity and on changes in catchability over time. This information is available from the catch and effort system and from the at sea observer programme.

Minor Corrective Actions

Nil

Gaps and Observations

- 1. Historically the Sub-Antarctic and Chatham Rise have not been well sampled by the Observer programme.
- 2. Levels of observer coverage in some areas may be insufficient to accurately estimate total discard levels.
- 3. Commercial gear selectivity and catchability are not well understood.
- 4. Catchability estimated within the assessment models may not be accurate.

Indicator 1C: There is a robust assessment of the stocks

Status of Knowledge

1. The assessment models used are appropriate to the biology of the species and the nature of the fishery.

Two modelling approaches to stock assessment of hoki are used: one models the two subpopulations separately using a Bayesian estimation procedure. The other uses a model tailored specifically to take into account current knowledge of the life-cycle of hoki, its stock structure and uses all historical sources of abundance data, irrespective of inconsistencies in sampling. The later uses a MIAEL estimation technique

2. The methods used to fit the models to date are statistically rigorous.

Both the models used are statistically rigorous and take into account all known and significant impacts of the fishery on the target species.

3. The sensitivity of the assessment to major uncertainties in data and assumptions has been evaluated and is reflected in management advice

The assessment takes into account key uncertainties and predicts future consequences of different harvesting strategies on the stocks, as requested by the Ministry of Fisheries



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4. The assessment evaluated current stock status relative to prescribed reference points and future consequences of current harvest strategies.

Current stock size and harvest rates have been estimated and evaluated against appropriate reference points.

Minor Corrective Actions

Nil

Gaps and Observations

- 1. There are conflicting trends in abundance indices derived from CpUE and from acoustics surveys of the western spawning stock. The indices are therefore used in separate runs of the models. The reason for the differences is undergoing further research at present.
- 2. The proportion of hoki on the Chatham Rise that will become western or eastern stock fish at maturity has to be assumed at present.

Indicator 1D: There is a well-defined strategy to manage the target stocks

Status of Knowledge

1. Fishing effort is contained.

Total catch, and therefore fishing effort, is restrained by the TACC, although this is not spatially explicit at the level beyond the two management zones (Figure 1b).

2. Management tools are specified and appropriate.

Management measures are set on the basis of best scientific information, taking into account uncertainty.

3. The relationship between assessment advice and subsequent decisions is clear, and have been evaluated and action is timely.

There is an annual review of the TACC. All stakeholders have an opportunity to be involved in the review process. Any decisions are bought into effect and the commencement of the next fishing year

Minor Corrective Actions

Action is needed to correct the following weaknesses:

- 1. There is insufficient recognition of spatial structure of the fishery, as current strategy does not sufficiently address the requirements for spatial explicit management.
- 2. The relationship between assessment advice and subsequent management decisions and implementation is not well defined.

Gaps and Observations

1. The harvest strategy does not take stock structure into account. It is likely that the eastern stock is being harvested at a level beyond sustainability.

Indicator 1E: Stocks are not depleted and harvest rates are sustainable

Member of the SGS Group (Société Générale de Surveillance)



Status of Knowledge

1. The assessment indicates that stocks are above specified limit reference points and that harvest rates are below specified limit reference points.

The assessment indicates that the western stock is above Bmay for both acoustics and CPUE (catch per unit effort) model runs, but Bmcy is only above for the acoustic runs, not CPUE runs. The status of the eastern stock is far less certain. It is likely however that if rates of harvesting this stock continue at the current level, biomass will fall below 20% Bo in the next 5 years. The situation is being reviewed on an annual basis, but present indications are that corrective actions may be required to reduce harvest from the eastern stock.

2. The limit reference points used meet acceptable international standards.

The limit reference points used meet acceptable international standards.

Minor Corrective Actions

Action is needed to correct the following weaknesses:

- 1. There is a high probability that the Eastern hoki stock will not remain above the limit reference point (Bmcy).
- 2. Insufficient recognition of spatial structure of the fishery as current strategy does not sufficiently address the requirements for spatially explicit management.

Gaps and Observations

- 1. Certainty for the eastern stock assessment needs to be improved
- 2. A way in which effort on eastern stock hoki can be reduced to a level that maintains sustainability needs to be found

Criterion 1.3

Fishing is conducted in a manner that does not alter the age or genetic structure or sex composition to a degree that impairs reproductive capacity.

Indicator 1F: There is adequate knowledge about the target stock being fished

Status of Knowledge

1. There is adequate knowledge of the age, genetic structure and sex composition of the stock.

There is comprehensive knowledge about the age class, sex composition and genetic structure of the population

2. There is adequate knowledge about the reproductive capacity of the target species.

There are fishery independent estimates of spawning stock size for both stocks since 1987. The fecundity of hoki at age has been estimated for the western stock

Minor Corrective Actions

Nil



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Gaps and Observations

- 1. Behavioural differences between males and females are not well understood.
- 2. The fecundity and proportion of fish that spawn in the eastern stock have not been estimated.
- 3. The proportion of males that spawn has not been estimated.
- 4. Turnover rates and therefore time spent by male and female hoki on the spawning grounds are unknown. This is important for interpretation of acoustic indices of abundance. Ongoing issues regarding spawning stock abundance indices are the subject of further research underway.
- 5. Fecundity is not being monitored.
- 6. The reproductive capacity of the stocks is not being monitored.
- 7. Abundance estimates are relative, not absolute.

Indicator 1G: There is adequate knowledge about the fishery

Status of Knowledge

1. There is adequate spatial and temporal monitoring of catch, effort, age and sex composition There is considerable spatial and temporal monitoring of catch, effort, age and sex composition in the spawning fisheries. Monitoring of these variables in the non-spawning fisheries is currently being improved.

2. There is adequate spatial and temporal information on fishing patterns and fishing methods. There is considerable spatial and temporal information on fishing patterns and fishing methods used.

Minor Corrective Actions

Nil

Gaps and Observations

- 1. Commercial gear selectivity differences and catchability are not well understood.
- 2. The catch of bycatch species in non-spawning fisheries (particularly less abundant species) is difficult to estimate by area. Only the top 5 species by weight are recorded on tow by tow TCEPR forms. The remaining bycatch species are recorded by observers, but the percent observer coverage in non-spawning areas is often less than 5% of the total number of tows in a given month.

Indicator 1H: There is a well-defined and effective strategy to manage the target stocks

Status of Knowledge

1. *Age, sex and genetic structure are involved in the stock assessment.* Age, sex and stock structure are all involved in the stock assessment.

2. *Reproductive capacity and spawning stock are involved in the stock assessment.* Spawning stock size and proportion of fish that spawn are considered in the stock assessment.



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3. Management tools are specified and appropriate.

The management tool is the TACC

Minor Corrective Actions

Action is needed to correct the following weakness:

1. Management tools dealing with the Eastern stock are not clearly specified and appropriate to the management of the stocks

Gaps and Observations

- 1. The reproductive capacity of the stock is unknown and is not used in the assessment.
- 2. While the assessment gives stock status for western and eastern stocks separately, there are no management controls to enforce harvesting levels for the two stocks. This is because the TACC is set for both stocks combined. To separate them is not however a trivial task. From a biological point of view, the western and eastern stocks occur together at some stages in some areas. From an administrative point of view, quota holders hold propriety rights for quota in HOKI 1 which does not discriminate between eastern and western stocks

6.1.2. Impact of Fishing Operations on the Ecosystem

Criterion 2.1

The fishery is conducted in a way that maintains natural functional relationships among species and should not lead to trophic cascades or ecosystem state changes.

Indicator 2A: There is adequate knowledge of the ecosystem and its values where the fishery operates

Status of Knowledge

1. Information on the distribution of habitats and the major assemblage types and their distribution is available to the fishery;

There is some knowledge of the major habitats and assemblage types found in the areas where the fishery operates; however knowledge of the distribution of mid-water assemblages is limited, and knowledge of the benthic habitats is very limited. Much of the benthic system has been mapped by acoustic technology, but this has provided little biological information. The information support system for the fishery has the capacity to increase this knowledge-base, although research projects have so far been very limited in scope.

2. Information on the species diversity, populations structures and the natural functions and trophic relationships among species throughout the fishery areas is available;

There is only limited information on the natural functional relationships of hoki and its ecologically associated species. This is weakest in the deepwater benthic habitats. The information support system for the fishery has the capacity to expand this knowledge, although research projects so far have been very limited in scope.

3. The distributions of protected species are well-known, together with the nature and distributions of their critical habitats;

The identity of the protected species that interact with the fishery are known, their distributions are generally well understood, and their critical habitats defined.



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4. Knowledge of the natural variability in the ecosystem is adequate, including the natural physical forcing factors such as dominant currents, and seasonal patterns in oceanographic conditions.

There is an adequate level of knowledge of the broad-scale physical forcing factors in the ecosystem where the fishery operates, but the finer scale patterns in shallower waters, in the benthic habitats and in diurnal/seasonal vertical migrations are poorly understood.

Minor Corrective Actions

Action is needed to correct the following weakness:

Information is not sufficient on the distribution of habitats, major assemblage types and the natural functions and trophic relationships among species in the midwater and benthic ecosystems where the fishery operates.

Gaps and Observations

- 1. More information on the species that are ecologically dependent on hoki in the mid-water and deep-water habitats is needed, to make assessments of the ecosystem impacts of the fishery more reliable.
- 2. Much more information on the benthic habitats where demersal trawling is undertaken is required for impacts assessment. There is, generally in the deeper waters, a high quality acoustic map of benthic substrata, but similar information is also required in the shallow waters where the fishery operates. At present the impacts of demersal trawling are largely conjectural, and they could be a major issue for the fishery.
- 3. The vertical migration patterns (diurnal and seasonal) of hoki are only weakly understood, and should be more intensively studied to underpin assessments of the ecological impact of the fishery (potentially also improving targeting and reducing bycatch).

Indicator 2B: The fishery is conducted in a manner that does not have unacceptable impacts on protected, endangered, threatened species or highly valued icon species.

Status of Knowledge

1. Information on the direct interactions of the fishery with protected, threatened, endangered or highly valued icon species, such as through by-catch, entrainment, effects on behaviour, or physical disruption of seabird and sea mammal populations is available;

There is considerable information on the direct interactions of the fishery with protected or icon species, including seabirds and marine mammals, and activities designed to avoid or mitigate interactions. This includes codes of practice used by the fishery. The direct information covers incidental catch of a range of important species derived from the independent observer program operated by the Ministry of Fisheries.

2. Information on the extent of interruptions, removals, mortalities of protected threatened or endangered, or highly value icon species caused by the fishery is available.

Generally speaking, much of this information is available for the most important species, but for some seabirds the statistical analyses are based on highly limited samples, and the underlying

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statistical models are questionable. The reliable direct information is derived from the observer program operated by the Ministry of Fisheries.

3. Levels of incidental mortality of protected, threatened, endangered and highly valued icon species do not have unacceptable impacts on their populations.

The impact of the incidental mortality amongst the seal populations and some seabirds is not clear. For the seabirds this relates to the statistical sampling issues and models, and the lack of an effective risk assessment; for the seals the uncertainty relates to the lack of a clear understanding of the fishery cause-effect relationships and to the lack of reliable seal population estimates determined in an appropriate time and space scale.

Minor Corrective Actions

Nil

Gaps and Observations

- 1. There is a need to design and implement specifically targeted observation programs for the 'vulnerable' seabirds to ensure that low abundances reported in the observer program are not caused by sampling design or at-sea procedural limitations. In the meantime, given the potential risks to some species of seabirds, and taking a precautionary approach, the fishery should adopt a policy, and implement an active program, to move towards a 'zero catch' of albatrosses.
- 2. The estimates of seal population size are very limited and need to be more firmly established, as well as rates of increase of populations in specific areas.
- 3. The population level impacts of the incidental catch of seals in the fishery is unclear, and needs to be clarified in the context of the impacts of other fisheries that may also affect the seals, the space and time characteristics of the seal mortality, and the interaction with other sources of mortality including broad-scale changes in ocean ecosystems. In order to demonstrate a responsible and precautionary approach to the issue of seal bycatch, the fishery should adopt a policy, and actively support the development and implementation of, a national plan of management for fur seals.

Indicator 2C: An ecological risk assessment has been conducted to determine the potential impacts of the fishery on the environment.

Status of Knowledge

1. There have been studies of, or assessment of, the impacts in space and time of the fishery on the ecosystem

There is little available knowledge about the impacts of the fishery on the ecosystem, habitats and non-commercial biodiversity other than formally protected species in the areas of fishery operation.

2. Impact detection and assessment is based on appropriate ecological understanding, on assumptions, sampling designs and inferential models that are appropriate, and uses space and time scales that are ecologically important

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There have been no comprehensive attempts to evaluate the impact of the fishery on the ecosystem.

3. The cause-effect models used in experimental studies to evaluate the nature of fishery impacts are appropriate, including their ecological, toxicological and statistical basis;

There have been no comprehensive attempts to evaluate the impact of the fishery on the ecosystem.

4. The natural dynamics of the ecosystem is adequately accounted for in determining the fishery-based impacts

There have been no comprehensive attempts to evaluate the impact of the fishery on the ecosystem.

5. Factors outside the fishery management system that can have an impact on the fishery or the ecosystem are adequately considered in determining fishery-based impacts

There is some information on the interaction of the fishery with climate variability, but the interactions with other fisheries are poorly studied, including the ecological interactions.

6. There is knowledge of the potential for effects of the type of gear, or fishery operations on the ecosystem, habitats and species that occur within the fished areas

The types of impact that the gear can cause are reasonably understood, but there is no compiled information on the potential for impacts because there is no analysis of the distribution of bottom trawling that uses demersal fishing gear (as opposed to near-bottom fishing with pelagic gear).

7. There is adequate knowledge of potential for ecosystems, habitats and species that occur within the fished areas to recover after fishing (or the fishery activity) has been removed. This is unknown. However, for deepwater benthic habitats, if they are damaged by demersal trawling, recovery within a reasonable time scale is unlikely.

Minor Corrective Actions

Action is needed to correct the following weakness:

• An ecological risk assessment has not been conducted.

Gaps and Observations

- There have been no attempts to prepare a comprehensive conceptual understanding of the potential impacts of the fishery on the ecosystem or habitats where the fishery operates. This leads, potentially, to a lack of appropriate priorities for environmental issues, an imbalance between environmental (fishery impacts) research and stock research, and a failure to detect important ecological impacts that may pass unnoticed.
- 2. There has been no comprehensive assessment of the use of demersal fishing gear in the fishery or its potential impacts in specific areas.
- 3. There has been a general failure in the fishery to capture the appropriate types of environmental information that would underpin a suitable environmental risk assessment. This is a flaw in the rights-quota based fisheries management system, because environmental responsibilities that match the fishing rights are not allocated to the fishery.

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The Ministry of Fisheries has some responsibility for gathering this information but this has not been implemented in a manner that matches the government's broader responsibility for managing the marine environment.

Indicator 2D: The impact of lost fishing gear or lost consumables or disposed waste on target or non-target species is not unacceptable.

Status of Knowledge

1. Information on the extent of lost fishing gear and its effects on the populations of target and non-target species, and any physical habitat damages is available

There is limited information on the rate of loss of fishing gear; gear loss appears to be limited, and of minor ecological consequence.

2. Information on the loss of processing and consumable wastes, their effects on the populations of target and non-target species is available, and any physical habitat damage is available.

There is limited information about the losses of these wastes, although a code of practice and the fishery operations appear to operate to reduce these losses to low levels that will be of minor ecological consequence.

Minor Corrective Actions

Nil

Gaps and Observations

- 1. The fishery has adopted a commendable response to the issues of managing at-sea wastes, and embodied these in codes of practice. At-sea compliance with the fishery codes of practice needs to be better supported by independent observer data. Fishery-independent observer systems need to comply with high standards of performance, and be audited by international third party systems to guarantee independence and performance.
- 2. The fate of lost fishing gear should be studied in a research project to determine the amount lost from all types of vessels in the fishery, where the loss occurs, at what time of year, and, for the Cook Strait fishery, should be coupled to an analysis of shallow water/beach wrack residues. If there is potential for important habitat or species effects from lost gear, this should be followed by experimental research to clarify the nature of possible effects.

Indicator 2E: The fishery does not have unacceptable impacts on the ecosystem structure or function, on habitats, or on the populations of dependent or otherwise associated species.

Status of Knowledge

1. The effects of the removal of target species biomass on populations of species that depend on it as food source

The ecological interactions of hoki with other species are not well understood, and there is limited information about predator-prey relationships.



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2. The effect of the removal of target species biomass on populations of species that it consumes as food

The ecological interactions of hoki with other species are not well understood, and there is limited information about predator-prey relationships.

3. The effects of the fishery on the habitat structure, productivity and species diversity/interactions in fished areas

There is very limited information about the effects of the fishery on habitats or their composition or productivity in fished areas.

4. The effects of bycatch (including quota species) and discarded species (including the target species) on trophic structure and dynamics, species diversity, and productivity in fished areas.

The bycatch from demersal trawling is not clearly documented or the effects understood. Bycatch from midwater trawling is limited, and effects are probably minor other than possible impacts on predators and on quota species. The impacts of the fishery on hake and ling are not well understood.

Minor Corrective Actions

Action needs to be taken to correct the following weaknesses:

- The impact of the hoki fishery on non-target quota species is not well defined.
- Research programmes are mainly limited to aspects of setting the TACC for hoki.
- The information availability is not adequate to comply with the requirements for full implementation of the Fisheries Act.

Gaps and Observations

- 1. There has been little attention given to research and information relating to the demersal trawling component of the fishery. Further information is needed to clarify the ecological values of the habitats where demersal fishing is conducted, the species composition of the fish and invertebrate bycatch, and to evaluate the nature and extent of demersal fishing effort. Deepwater benthic habitats may be of high ecological value, depending on their composition and distribution, and demersal trawling impacts may be important.
- 2. Further research is needed to understand the trophic structure and ecological interactions in the midwater fish communities, including diurnal, seasonal and interannual variability in distribution; predator-prey interactions; and fish and invertebrate bycatch.
- 3. The data gathered by the Ministry of Fisheries observer program should be synthesised and analysed on an annual basis for input to periodic stakeholder review of environmental research needs and priorities. There appears to be an adequate short term process for disseminating information from the observer programme to stakeholders, but there appears to be no process in place to synthesise and evaluate medium and long-term observer data to detect environmental changes. An analysis of the historic archive of observer data would be an important research project, in particular an analysis of changes in effort and bycatch in space and time standardised across the data archive.



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Indicator 2F: Strategies are employed in the fisheries management system to address and restrain the impacts of the fishery on the ecosystem.

Status of Knowledge

1. Ecological objectives for habitats and populations have been developed and acted upon No ecological objectives or targets for habitats or ecosystems are in place in the fishery management system. The responsibility for setting and implementing such ecosystem-based objectives is not clear.

2. The levels of unacceptable impact have been identified for a range of habitats and nontarget species in fished areas

No targets have been developed and implemented for levels of unacceptable impact on nontarget species.

3. Monitoring programs designed to assess fishery impacts are operational

Monitoring programs are limited to stock issues and to issues related to formally protected species. There are no habitat or ecosystem monitoring systems in place.

4. Fishery management measures are in place to enable adjustment of fishery practices where unacceptable impacts have been identified.

Both industry and government measures are available to alter fishing practices where unacceptable impacts are identified. However, the responsibility for management of non-commercial species that are not also formally protected under legislation—the bulk of the marine biodiversity—and marine habitats is not clear.

Minor Corrective Actions

Nil

Gaps and Observations

- The lack of criteria and targets for habitats and ecosystems where the fishery operates prevents a clear understanding of the acceptability of fishing impacts. Assessment of the effects of fishing needs to be based on reliable scientific data and information, and there has been little effort devoted to such work in the matter of habitats and ecosystems. Better information is required by the management system to enable the fishery effects and their acceptability to be determined.
- 2. Monitoring programs (both at-sea observers and a fishery independent program) need to be boosted in terms of habitats and ecosystem monitoring. Better monitoring data will clarify the nature and level of fishery impacts which are currently very uncertain.
- 3. There has been a general failure in the fishery management system to capture the appropriate types of environmental information to determine if impact-restraining strategies are required. This is a flaw in the rights-quota based fisheries management system, because environmental responsibilities that match the fishing rights are not allocated to the fishery. The Ministry of Fisheries has the main responsibility for gathering this information but this has not been implemented in a manner that matches the government responsibility for managing the marine environment.



4. The government responsibilities for managing non-commercial biodiversity need to be clarified and operationalised. Whilst the fishery (or more correctly the fishery management system) is required to demonstrate its sustainability in terms of all forms of biodiversity to meet the MSC standards, much of the authority to manage marine biodiversity rests with the government, not the fishery operators with hoki quota. When combined with the matters discussed in #3 above, this has created a confused situation in terms of management responsibilities for marine biodiversity other than for formally protected species. This problem becomes particularly complex because seabed management responsibility for marine biodiversity in government is assigned, while water column responsibility is not; and the roles and responsibilities of each government agency between the 12nM territorial waters boundary and the 200nM EEZ boundary are also unclear. It appears that managing non-commercial species of marine biodiversity has 'fallen between the sectoral cracks', and this leaves the fishery management system in a highly uncertain position about the nature of its responsibility for non-commercial biodiversity. The roles and responsibilities of the hoki quota owners and the government agencies in relation to the non-commercial biodiversity within the fisheries management system must be clarified, preferably within the context of a formal plan of management for the fishery.

Criterion 2.2

The fishery is conducted in a manner that does not threaten biological diversity at the genetic, species or population levels and avoids or minimises mortality of, or injuries to endangered, threatened or protected species.

Indicator 2G: There is adequate knowledge of the ecosystem and its values where the fishery operates in relation to protected, endangered, threatened or icon species.

Status of Knowledge

1. The distribution and conservation status of protected, endangered, threatened or icon species are well-known, together with the nature and distributions of their critical habitats. There is considerable information on the status and the distribution of seabirds and seals, and their habitats, in relation to the fishery. There is little information about other potentially important species, including sharks.

2. Knowledge of the natural variability in the ecosystem is adequate, including the natural physical forcing factors such as dominant currents, seasonal patterns in oceanographic conditions

There is an adequate level of knowledge of the large scale variability in ocean conditions.

3. Information on the direct interactions of the fishery with protected, threatened, endangered or highly valued icon species, such as through by-catch, entrainment, effects on behaviour, or physical disruption of seabird and sea mammal populations is available

There is considerable information on the direct interactions of the fishery with protected or icon species, including seabirds and marine mammals, and activities designed to avoid or mitigate interactions. The direct information covers incidental catch of a range of important species derived from the independent observer program operated by the Ministry of Fisheries.



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4. Information on the extent of interruptions, removals, mortalities of protected threatened or endangered, or highly value icon species caused by the fishery is available.

Considerable information is available for seals and a number of species of seabird, but for some seabirds the data is very limited. The statistical analyses are based on very few captures/incidents, and the underlying statistical models are questionable. The most reliable direct information is derived from the observer program operated by the Ministry of Fisheries.

Minor Corrective Actions

Nil

Gaps and Observations

- 1. There is a need to design and implement specifically targeted observation programs for the 'at-risk' seabirds (as defined in the Seabird National Plan of Action) to ensure that low capture rates or incidences of interaction reported in the observer program are not caused by sampling design or at-sea procedural limitations.
- 2. The estimates of seal population size are very limited and need to be more firmly established, as well as rates of increase of populations in critical habitat areas and at the fringes of the existing range. The estimates of pupping rates and population growth need to be assessed in the context of climate variability and the natural dynamics of the seal populations.
- 3. The Working Group process used in the fishery management system to review priorities for data, information and research needs is an effective mechanism to engage relevant stakeholders. Where questions of control and influence on decisions arise, it may be beneficial to have the Working Group process organised and implemented by an independent third party, and guided to outcomes by professional facilitators from outside the fishery or conservation sectors and agreeable to major stakeholders.
- 4. The fishery has available to it a world-class science base from which it can choose specific expertise to resolve key problems as they arise. Scientists from the agencies, the tertiary institutions and the private sector are recognised world-wide for their expertise, and this capacity should be better utilised in addressing some of the environment issues discussed in this report.

Indicator 2H: An ecological risk assessment has been conducted to determine the potential impacts of the fishery on the protected, endangered, threatened or icon species.

Status of Knowledge

1. There have been studies of, or assessment of, the impacts in space and time of the fishery on the endangered, threatened, protected or icon species;

There is an adequate knowledge of the impacts of the fishery on many of the potentially affected species, although more knowledge is needed for some seabirds and for the seal population. Only cursory attention has been given to other icon species, such as sharks.

2. Impact detection and assessment is based on appropriate ecological understanding, on assumptions, sampling designs and inferential models that are appropriate, and uses spaces and time scales that are ecologically important

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The approaches used to determine the importance of the impacts of the fishery on seal and seabird populations are limited, and advanced models of population dynamics have not been used to set population-level objectives to assess the fishery impacts.

3. The cause-effect models used in experimental studies to evaluate the nature of fishery impacts are appropriate, including their ecological and statistical basis

The cause-effect models are limited in scope and derived from a limited knowledge base.

4. The natural dynamics of the endangered, threatened, protected or icon species is adequately accounted for in determining the fishery-based impacts

Natural dynamics are generally adequately accounted for in existing assessments, although in more developed assessments better information on natural dynamics will be required.

5. Factors outside the fishery management system that can have an impact on the fishery or the ecosystem are adequately considered in determining fishery-based impacts

The models used to evaluate seal and seabird populations are narrow and take only limited account of external factors, such as incidental capture by other fisheries, migratory behaviour, or climate variability.

6. There is knowledge of the potential for effects of the type of gear, or fishery operations on the habitats and endangered, threatened, protected or icon species

The potential for effects of the gear types and fishery operations on seabirds and seals are mostly understood, although the potential for effects of demersal trawling on sedentary icon species if they are impacted by the fishery (such as deepwater corals) is poorly understood.

7. There is adequate knowledge of potential for endangered, threatened, protected or icon species that occur within the fished areas to recover after fishing (or the fishery activity) has been removed (reversibility of the effects).

This is poorly understood except for some seabirds where models of population recovery have been developed.

Minor Corrective Actions

Action needs to be taken to correct the following weaknesses:

• The risks to seabirds have been assessed but the assessment of the risks to seals is insufficient.

Gaps and Observations

- Risks to some of the icon species from activities of the fishery have been assessed, but for some seabird species the data is highly limiting, and statistical models in such circumstances are questionable. Risk assessments should use data derived from highpower assessments of the interaction of the fishery with each species, and particularly those species identified as 'at risk' within the National Plan of Action.
- 2. There is considerable further information required on the seal population, and on the importance of the fishery-derived incidental mortality. Population abundances need to be determined at suitable space and time scales, and the fishery impact needs to be assessed in the context of El Nino/La Nina climate variability and ocean ecosystem conditions to ensure that the population is not severely affected by the incidental fishing mortality at times of high natural stresses. Such knowledge is most efficiently obtained by comparing fished

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with non-fished areas, and should be developed in conjunction with other measures to manage fishing effort.

3. With improved data on benthic habitats where the fishery is conducted, on the frequency and duration of demersal trawls, and on the rate of natural recovery of the deepwater coral species, a robust assessment of the risk from demersal trawling should be undertaken.

Indicator 2I: The impact of lost fishing gear or lost consumables or disposed waste on endangered, threatened, protected or icon species is not unacceptable.

Status of Knowledge

1. Information on the extent of lost fishing gear and its effects on endangered, threatened, protected or icon species, and any physical habitat damages is available

There is little available knowledge for lost gear. However, there appears to be only limited gear loss in the fishery, and effects on icon species are therefore likely to be minor.

2. Information on the loss of processing and consumable wastes, their effects on endangered, threatened, protected or icon species is available, and any physical habitat damage is available

Discards and process wastes are limited across the fishery, and effects on icon species, such as entrainment of seabirds from this source, is likely to be minor. Critical habitats for icon species are unlikely to be affected by the small amount of wastes or losses from the hoki fishery. Information on this is most limited for the shallow water components of the fishery.

Minor Corrective Actions

Nil

Gaps and Observations

- At-sea compliance with the fishery codes of practice on disposal of wastes at sea needs to be better supported by independent observer data. Fishery-independent observer systems need to comply with high standards of performance, and be audited by international third party systems to guarantee independence and performance.
- 2. The fate of lost fishing gear should be studied in a research project to determine the amount lost from all types of vessels in the fishery, where the loss occurs, at what time of year, and coupled to an analysis of shallow water/beach wrack residues. If there is potential for important impacts on icon species from lost gear, this should be followed by experimental research to clarify the nature of any possible effects.

Indicator 2J: The fishery does not have unacceptable impacts on the endangered, threatened, protected or icon species and their ecosystems.

Status of Knowledge

1. The effects of the removal of target species biomass on endangered, threatened, protected or icon species that depend on hoki as a food source

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There is limited information on the effects of the removal of hoki biomass on icon species. This may be particularly important for the seal populations where interaction with environmental variability may cause an additional stress.

2. The effects of the fishery on the structure and productivity of habitats of endangered, threatened, protected or icon species, and their diversity/interactions in fished areas

There is little information on habitat effects of the fishery, but there are unlikely to be any major direct or indirect consequences for the critical habitats of the icon species

3. The interaction of bycatch, discarded species, including the target species, with the behaviour, dynamics, and species diversity of the endangered, threatened, protected or icon species.

There is considerable evidence that seals and seabirds are entrained on the vessels in the hoki fleet, and that this results in these species being incidentally caught during fishing operations. Codes of practice adopted by the fishery limit the catch and mortality, and mitigation procedures have been used to limit the catch of such species. Additional mitigation techniques are under development for both seabirds and seals.

Minor Corrective Actions

Nil

Gaps and Observations

- 1. Further research is needed to understand the trophic structure and ecological interactions in the midwater fish communities, including diurnal, seasonal and interannual variability in distribution; predator-prey interactions; and fish and invertebrate bycatch. This should also consider the predator-prey interactions with seal populations near critical habitat sites.
- 2. The fishery-based codes of practice should be expanded to include independent third party auditing to demonstrate the level of compliance in relation to environmental issues. In particular, the incidental catch/mortality of all large species should be fully documented as part of an observer program within the codes of practice.
- 3. Mitigation techniques to reduce the capture and incidental mortality of seals in the fishery need to be trialled, and, if successful, implemented throughout the fishery and embedded into the industry codes of practice.
- 4. Entrainment of seals and seabirds on hoki vessels may be related to the multi-species nature of vessel activities. Hoki fishing vessels also fish in a range of other fisheries, often including hoki fishing in close succession with other fishing activities. These other fisheries may involve much greater level of discards, and it is therefore likely that seabirds and seals are entrained on vessels rather than a fishery-specific fishing activities. In order to reduce entrainment in the hoki fishery it is therefore necessary for bycatch and discarding policies in all fisheries where the hoki vessels participate to be integrated into a single set of at-sea practices that apply in all those fisheries. The hoki fishery can demonstrate leadership by taking the lead in promoting such co-ordination and integration.



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Indicator 2K: Strategies are employed in the fisheries management system to address and restrain the impacts of the fishery on the endangered, threatened, protected or icon species.

Status of Knowledge

1. Area-based ecological objectives for populations of endangered, threatened, protected or icon species and their habitats have been developed and acted upon

Objectives for populations of icon species are broadly established, although not in area-specific terms that could be used by the fishery to manage bycatch on a spatial basis.

2. The levels of unacceptable impact have been identified for endangered, threatened, protected or icon species and their habitats in fished areas.

The levels of unacceptable impact have been established for a number of seabird species, but not for seals, and not for any other potentially impacted icon species (deepwater corals, sharks).

3. Monitoring programs designed to assess fishery impacts on endangered, threatened, protected or icon species are operational

Both fishery-based and independent (Ministry of Fisheries) monitoring programs are in place to document the incidental capture of icon species in the fishery.

4. Fishery management measures are in place to enable adjustment of fishery practices where unacceptable impacts on endangered, threatened, protected or icon species have been identified

At the fishery level, the fishery management system has an appropriate set of strategies and measures in place to restrain the recognised impacts on icon species. At the government level, the strategies are broadly in place, although there is only limited support for impact-related research on icon species, and this results in only a limited basis for recognition and interpretation of the fishery catch of icon species.

Minor Corrective Actions

Nil

Gaps and Observations

- The main mechanism for development of the mitigation strategies is through the Aquatic Environment Working Group. The fishery should take an active role in promoting appropriate forms of environmental research in this forum to address key icon species issues. This role would be seen as further public evidence of a proactive role in environmental issues, and add further weight to the value of the rights-quota system as a comprehensive system for fisheries sustainability rather than the narrower role it currently takes as a mechanism for stock sustainability.
- 2. The industry should support and proactively address the need for a national plan of action for seals, and the subsequent incorporation of seal-related strategies into the fishery. This is best accomplished through a comprehensive plan of management for the fishery, that amongst others, sets out the agreed roles and responsibilities amongst government, the quota owners and other stakeholders on seal population issues. The plan of action for seals would need to take full account of the need to rebuild seal populations from their highly currently reduced state (population size estimated to be about 10% of pre-European settlement levels).



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3. The main mechanism for implementation of the mitigation strategies is through the fishery codes of practice. The fishery should give extra weight to this system by having each code independently audited for compliance against a set of performance standards. Alternatively, the fishery should press for an expanded Ministry of Fisheries observer program that covers a range of operational and environmental issues, including dealing with mitigation measures for icon species.

6.1.3. Fishery Management System

Criterion 3.1: Fishery Management System

Indicator 3A: The management system recognises use rights

Status of Knowledge

1. Observe the legal and customary rights and long term interest of people dependent on fishing for food and livelihood, in a manner consistent with ecological sustainability

In 1992 Maori and New Zealand government completed negotiations on a package that is a full and final settlement of Maori claims to commercial fisheries. This package included *inter alia* delivery to Maori of:

- 10% of all quotas initially allocated (this included 10%hoki)
- assistance to purchase the assets and business of a major NZ fishing company (including further quota and involvement in hoki)
- 20% of any quota created for new fisheries by their future introduction into the Quota Management System.

A recognition of treaty partnership between Maori and NZ government for the protection of customary harvest rights in fisheries.

Te Ohu Kai Moana (The Treaty of Waitangi Fisheries Commission) was created to hold temporarily in trust the hoki quota and property delivered to Maori. Te Ohu Kai Moana is a shareholder in the HFMC.

Discrimination is addressed in the Employment Contracts Act 1991 and the Human Rights Act 1993. As commented earlier in this report, these issues are included within employment contracts by Member Companies.

Employment relationships are controlled by the Employment Contract Act 1991. Member Companies are required to have either a site "collective employment contract" or "individual employment contracts" covering all employees. Member Companies are complying with these requirements.

Employees are protected by the Minimum Wage Act 1983 to ensure an adequate minimum wage, currently set at \$7.00 per hour, compared to the New Zealand average wage of \$17.64 per hour. (Ref. NZ Government Department of Statistics). Actual wage rates (generally in excess of the NZ average wage) are negotiated and agreed between employee and employer and embodied within "Employment Contracts". Member Companies are complying with these requirements.



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2. The fishery shall not be conducted under a controversial unilateral exemption to an international agreement

No controversial unilateral exemptions to international agreements in relation to the New Zealand hoki fishery are operational.

3. The fishery shall be conducted in a manner consistent with International Conventions and Agreements

New Zealand is a signatory to a range of international agreements which have been implemented in the management of New Zealand hoki fishery, and are complied with by member Companies. External audits by SGS New Zealand against the HFMC Sustainable Management Criteria have assessed this compliance. There is a thorough briefing document for skippers in part focusing on fisheries law used by the various HFMC's member companies. Requirements resulting from international conventions and agreements are reflected in this document.

Minor Corrective Actions

Nil

Gaps and Observations

Nil.

Indicator 3B: The management system has a clearly defined scope designed for a wellmanaged fishery

Status of Knowledge

1. Clear short and long-term objectives, including ecosystem objectives, consistent with a well-managed fishery

In the HFMC's 'New Zealand Hoki Fishery Strategy Development Plan' (1997) and 'Hoki Sector Foresight Strategy – Our Vision to 2010 and Beyond' (1998), strategies are described which also include some ecosystem objectives for the short and long-term consistent with a well-managed fishery.

2. A consultative process that is transparent and open to all interested and affected parties The Ministry of Fisheries has a number of forums that provide for interested parties participation in the assessment and management of the fishery. All stakeholders are actively encouraged to participate in the meetings or to provide submissions. These forums include specific working groups on hoki management and research issues. Commercial, recreational, customary and environmental fishery interests, participate in each of these processes. In addition interested groups representing environmental and wildlife interests, along with local community interests are given every opportunity to participate in these discussions or provide submissions.

Section 12 of the Fisheries Act 1996 requires the Minister to consult with interested parties before making decisions on utilisation and sustainability of fisheries. The Ministry of Fisheries has a number of forums that provide for all interested parties to participate in the assessment and management of the fishery. All stakeholders are actively encouraged to participate in the meetings or at least to provide submissions. Disclosure of information can be requested from the Ministry, under the Official Information Act. Information is released except when it is decreed by the Minister to be commercially sensitive or breaches confidentiality between the parties.



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The consultative process of the Ministry of Fisheries is transparent and open to all interested and affected parties as described above. The HFMC actively participates in this process. However, in the development of the HFMC's 'New Zealand Hoki Fishery Strategy Development Plan' (1997) and 'Hoki Sector Foresight Strategy – Our Vision to 2010 and Beyond' (1998), were developed through consultation a selective group of stakeholders.

3. An appropriate mechanism for the resolution of disputes arising within the system

There are two mechanisms in operation for dispute resolution. The first is a mechanism described in the Fisheries Act and executed by the Ministry of Fisheries by means of a court proceedings. The second one is a mechanism in place as described in the constitution of the HFMC whereby both an internal mechanism as well as court proceedings are used to resolve disputes.

4. Provide economic and social incentives that contribute to unsustainable fishing and shall not operate with subsidies that contribute to unsustainable fishing

The New Zealand government does not support any subsidy programmes which could form economic and social incentives contributing to unsustainable fishing. Part grants are in place for some support activities (e.g. training and public good research programmes generic to all fisheries).

5. Specific measures and strategies that demonstrably control the degree of exploitation of the resource in the light of the natural variation in ecosystems

The Ministry of Fisheries is responsible for the monitoring of compliance of the fisheries management regime. The industry also has an observer programme which monitors catches and vessel behaviour at sea in the Cook Strait. In recent years this programme has been contracted out to an independent organisation "Fisheries Audit Services (NZ) Ltd".

The penalty regime for breaches of the Fisheries Act and regulations is severe, and includes:

- Severe fines
- Confiscation of catch and vessel plus related fishing gear,
- Possible forfeiture of quota and,
- Possible prohibition from the industry for repeated offences.

The Marine Reserves Act (1971) administered by the Dept of Conservation, provides for the establishment and management of marine reserves. Commercial fishing is prohibited in these areas. There are currently no marine reserve areas that impact on hoki fishing grounds.

Since April 1994 vessels of greater than 42 metres and other vessels as specified by the Ministry of Fisheries must operate an Automatic Location Communicator (ALS) which report to the Ministry of Fisheries the position of the vessel via a satellite communication link. This requirement covers most of the hoki fleet. Additionally, ships and planes of NZ Defence Forces make occasional routine sweeps to identify and report vessels sighted within the NZ EEZ. The Ministry of Fisheries considers that there is an effective vessel monitoring system operating in the fishery.

The New Zealand quota management system is primarily based on "output controls" (i.e. a total allowable commercial catch from a fishery), rather than on "input controls" (i.e. there are no regulations to compel any change in fishing effort or vessel numbers). Industry members adjust

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the size of their respective hoki fishing fleets based on individual company business decisions, having regard to their individual hoki quota.

There is a clear strategy established by the HFMC to maintain the level of extraction of Hoki at 250,000 tonnes per annum in spite of assessment advice to increase the TACC.

6. The extent to which the fishery is supported by research that is adequate and appropriate for the needs of a well-managed fishery.

The fishery is well supported by research, in particular by research in support of stock assessments. Environmental research is somewhat limited, although there is increasing emphasis in this area at present. The process for reviewing and prioritising research is adequate, although for environmental research, a more independent process will provide the outcomes with greater levels of credibility with stakeholders.

Minor Corrective Actions

Nil

Gaps and Observations

- 1. The HFMC should include a transparent and open consultative process in the development of its own strategic management plan. By doing so, it can steer this process from its own interests and deal with important stakeholder issues in a more detailed and more time-effective manner thereby better anticipating short-term issues requiring immediate attention. In addition, the HFMC can show its pro-active role in dealing with stakeholder issues and build mutual trust, respect and recognition with the involved stakeholders.
- 2. Environmental research activities should be identified and prioritised using an independent process to ensure that key environmental issues are appropriately identified and prioritised for research support.

Indicator 3C: The management system has a comprehensive scope of planning

Status of Knowledge

1. Management plan is consistent with the spatial scale and intensity of the fishery Under the current HFMC organisation, there is no single coherent management plan for the fishery. Each individual member company is responsible for developing its own management plan consistent with the spatial scale and intensity of the fishery according to the overall HFMC strategies.

2. The planning is appropriate to the cultural, social and environmental context of the fishery and is of precautionary nature

The TACC is being set conservatively in the case of scientific uncertainty applying the precautionary approach for this purpose. Long-term planning to integrate environmental impacts of the fishery is inadequate due to the focus on target species extraction in an output controlled fishery as this one. However, the cultural and social context of the fishery is planned through the earlier described legally binding quota settlement with the Treaty of Waitangi Fisheries Commission representing the New Zealand Maori community.



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Minor Corrective Actions

Action is needed to correct the following weakness:

• Long-term planning is insufficient to integrate environmental impacts in relation to in/output control measures in the hoki fishery.

Gaps and Observations

- There is a lack of adequate long-term planning to incorporate environmental aspects of the hoki fishery. There have been and are research initiatives being employed by the HFMC though these are too limited and short-term in nature in the light of the importance of environmental fishery effects with the involved stakeholders and the effort put into stock assessment projects.
- 2. There is a clear need for the development of an integrated plan of management for the fishery that encompasses stock and environmental management matters.

Indicator 3D: The management system is implemented

Status of Knowledge

1. Does the fishery have a procedures manual/handbook Individual HFMC member companies do have operate procedures manual/handbooks. Skippers are provided with 'Briefing Documents' prior to each trip.

2. Are the procedures being implemented

The link between the HFMC and its members is weak in part due to the voluntary nature of membership.

3. Specific measures and strategies that demonstrably control the degree of exploitation of the resource.

The hoki fishery is managed under the Quota Management regime which provides for individual property rights to be held in perpetuity by quota holders. The quota can be traded and as such has an asset value which can be effected by the health of the fishery. The industry estimates that the asset value of the fishery is of the order of NZ\$1.5 billion. Annual earnings for the latest reported year was NZ\$300 million. If stocks are over-fished and the TACC reduced, quota holders will have their quota reduced without compensation. This provides a strong incentive for quota holders to conserve and enhance their fishery.

The HFMC's strategic development plan has adopted amongst others the following guiding principles: "Quota owners will take the responsibility for long term sustainable management of the fishery" and "Co operation between quota owners and other stakeholders will be promoted". Evidence that the participants take a conservative approach to exploitation of the fishery is also contained in the stated "Harvest strategy" which states "The HFMC will promote a stable catch limit harvest strategy that maximises the economic yield from the fishery. Catch limits will normally be increased only where the proposed increase is assessed to be sustainable for a minimum of three years and the rate of change of catch limits will normally be restricted to plus or minus ten per cent, every second year." (Strategic Development Plan, 1997). The above Harvest Strategy has been reflected in recent submissions made to the Minister when he has contemplated (and consulted over) any TACC change. There is a clear strategy and associated

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measures to maintain the level of extraction of hoki at 250.000 tonnes per annum in spite of

measures to maintain the level of extraction of hoki at 250,000 tonnes per annum in spite of favourable assessment advice that would permit an increase.

The formation of the HFMC has provided a means for Cupertino and collective action by quota holders in the hoki fishery. The strategic development plan states that its goal is "...to improve the management and economies of the hoki fishery by collaborative actions among shareholders in research, management, organisation and advocacy". The HFMC has been active in supporting hoki interests in a range of forums with the Ministry of Fisheries and the Department of Conservation.

Minor Corrective Actions

Action is needed to correct the following weakness:

• The effective implementation of a comprehensive management system is not sufficient.

Gaps and Observations

1. For an effective implementation of the HFMC's management procedures, the link between the company and its members should be strengthened.

Indicator 3E: The management system has compliance and enforcement procedures

Status of Knowledge

1. Are the procedures being adhered to

The hoki fishing operation is a heavily regulated one both by the obligatory governmental regulations as well as the voluntary Sustainable Management Criteria. Both frameworks are formulated in compliance with the fishery management system and its associated legal and administrative requirements.

There is evidence from the HFMC's observer programme that management procedures are being adhered to. In addition, the observer programme run by the Ministry of Fisheries shows compliance with the Fisheries Act requirements related to target stock sustainability.

2. Contains procedures for effective compliance and enforcement which ensure that management system controls are not violated and appropriate corrective actions are taken

The management system does contain procedures for effective monitoring, control, surveillance and compliance. However, procedures for effective enforcement are not in place since the HFMC's membership is voluntary and no binding member agreements are in place.

Minor Corrective Actions

Action is needed to correct the following weakness:

• There is insufficient evidence of enforcement procedures and practices.

Gaps and Observations

1. No evidence of effective enforcement procedures and practices were found. However, effective enforcement is of crucial importance to have the HFMC's member companies comply with its management objectives including the requirements laid down in the MSC Principles & Criteria for a well-managed fishery.



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Indicator 3F: The management system has an effective monitoring system

Status of Knowledge

1. The monitoring programme of the fishery

The HFMC has an internal effective monitoring (observer) programme in place including various Codes of Conduct. Independent from this, an effective governmental monitoring (observer) programme is implemented by the Ministry of Fisheries.

2. The monitoring procedures of the fishery

There is evidence from the HFMC's observer programme that there are effective monitoring procedures in place outlined in the various Codes of Conduct. In addition, the observer programme run by the Ministry of Fisheries also shows effective monitoring procedures in relation to Fisheries Act requirements focusing on target stock sustainability.

3. The monitoring results of the fishery

There is evidence of annual data synthesis and feedback into the management system from the Ministry of Fisheries or HFMC's observer programme. No long-term trend analysis based on these data is systematically conducted, documented and feed back into the management system.

Minor Corrective Actions

Nil

Gaps and Observations

- 1. The HFMC could make use of the wealth of information generated by the two observer programmes in a much more efficient way thereby improving on various management aspects in a more (cost)-effective way such as saving on future research needs, improving catch efficiency, improving management level, etc.
- 2. In addition, the feedback of the generated information into the management system could be improved considerably after analysis.

Indicator 3G: The management system has an effective review system

Status of Knowledge

1. Programme of internal assessment and review

There is a limited internal assessment and review programme within the HFMC itself. For example no evidence was found that data of the HFMC's observer programme are regularly reviewed against the data of the Ministry of Fisheries observer programme for each individual member of the HFMC.

2. Programme of external assessment and review

Assessments of the biological status of the hoki stocks and impacts of the fishery have been and are periodically conducted by National Institute of Water and Atmosphere (NIWA) under contract of the Ministry of Fisheries.



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The stock assessment modelling process has recently been externally assessed and reviewed. The Fisheries Act involves environmental sustainability requirements to the both the Ministry of Fisheries and the private NZ fisheries sector (and thus also to the HFMC) which was highlighted in the external assessment and review report of the Fisheries Act by the Auditor General.

3. Guidelines for acting on assessment outcomes

There is assessment and review within the HFMC's management system though no evidence was found of clear guidelines for acting on assessment outcomes.

4. Research needs and funding

The Ministry of Fisheries manages a process (Nature and Extent of Required Services) which provides for industry and other stakeholders to have input into the proposed research and monitoring programmes. The final decision on these programmes is made by the Minister of Fisheries after considering the comment and submissions from interested parties. The HFMC actively participates in this process and supports additional research on hoki and related impacts associated with hoki fishing.

There is an effective process in place by the HFMC which reviews their research needs. An example of effective review and use of research occurred when NIWA research indicated that too many small fish were being caught by trawlers in a certain part of the Cook Strait. This resulted in an industry agreed Code of Practice ('Hoki Target Trawling') to prevent the catch of more than 10% of small fish in tows conducted in a defined area of the Cook Strait.

Minor Corrective Actions

Nil

Gaps and Observations

- 1. Improvement of internal assessment procedures for their own benefit
- 2. Clear guidelines for effective and quick action on assessment and review outcome

3.2 Criterion Fishery Operations

Indicator 3H: Make use of fishing gear and practices designed to avoid the capture of nontarget species (and non-target size, age and/or sex of the target species); minimise mortality of this catch where it cannot be avoided and reduce discards of what cannot be released alive

Status of Knowledge

1. Type of fishing gear

Incorporated into the HFMC's Sustainable Management Criteria, is the implementation of appropriate fishing methods designed to minimise adverse impacts on habitat, especially in critical or sensitive zones such as spawning zones and nursery areas.

In addition, the HFMC's individual member companies have a thorough procedures manual/handbook (called 'Briefing Document') which is used by skippers. This document briefs the skipper in detail about the operational practices during fishing including the type of fishing gear to be used, incident reports and discard reports (procedures for discarding quota and nonquota species). Other elements that may be included are: the skipper's responsibility for the

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briefing of the people on-board, New Zealand fisheries laws, New Zealand fisheries waters, New Zealand fisheries management system, fishing activities, marine obstructions, vessel registration, marking and gear, reporting to the vessel manager and the Ministry of Fisheries, satellite vessel monitoring system, marine mammals, processing at sea and emergency contact procedures for shore and sea-going staff.

2. The operational practices See above.

3. Incident reports See above.

4. Discards reports See above and below.

In the New Zealand hoki fishery, the catches of major bycatch species are controlled by the Quota Management System (QMS). The status of each fish stock is reported on each year and, if there are concerns about a stock, recommendations to adjust the TACC and / or amend other fishing controls are made. Law prohibits discarding of legal size fish covered by the QMS.

Minor Corrective Actions

Nil.

Gaps and Observations

Nil.

Indicator 3I: Implement appropriate fishing methods designed to minimise adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas

Status of Knowledge

1. The impacts of the various fishing techniques used by the fishery

As the majority of hoki is caught with mid water trawls and some with bottom trawls, no destructive fishing practices (such as fishing with poisons or explosives) takes place. Since the hoki fishery is an output controlled one, there is only limited research conducted on the improvement of e.g. gear selection, catchability, etc. primarily by the individual HFMC member companies. The effect of the hoki fishing techniques (i.e. mid water and bottom trawling) and the associated impact is not known since no habitat maps are available to demonstrate effects. However, exclusion zones have been established, e.g. in some areas of the Cook Strait, where no bottom-trawling is possible due to the construction of cables on the seabed, and these may form *de facto* refuges for hoki.

2. Records on the distribution of critical or sensitive habitats in the fishery

There is some knowledge of the major habitats and assemblage types found in the areas where the fishery operates; however knowledge of the distribution of mid-water assemblages is limited, and knowledge of the benthic habitats is very limited. Much of the benthic system has been mapped by acoustic technology, but this has provided little biological information on critical and sensitive habitats in the fishery. The information support system for the fishery has



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the capacity to increase this knowledge-base, although research projects have so far been very limited in scope.

3. Controls and guidelines on fishery operations

There are several controls and guidelines on the hoki fishery's operations such as the earlier mentioned skipper's Briefing Document focusing on fishery operation practice while the HFMC and the Ministry of Fisheries' observer programmes focus on fisheries controls.

Minor Corrective Actions

Nil

Gaps and Observations

- 1. More information is needed to assess fisheries impacts on critical or sensitive habitats, and if necessary adjustment of fishing methods.
- 2. There are only limited records on the distribution of critical or sensitive habitats in the fishery

Indicator 3J: Minimise operational waste

Status of Knowledge

1. Type, quantity, location and frequency of lost fishing gear, oil spills, operational waste, sewage, plastics, etc.

As required under the Marine Pollution Rules, Member Companies have implemented procedures which comply with these rules. These rules address all aspects of pollution control and waste disposal from fishing vessels.

Concern has been raised about offal or waste discharged as a by-product of at-sea processing. Many of the at-sea hoki processing vessels now have meal plants which process the waste previously dumped. Any waste not processed in this way is controlled and disposed of in accordance with Marine Pollution Rules Part 170.

Under the Pesticides Act 1979, regulations controlling the use of antifouling materials have been gazetted. Member Companies must abide by these regulations and from this audit appear to be doing so. These regulations are further reinforced by the requirements of the Resource Management Act 1991 and its regulations. Regional Councils administer this Act. Where any activity may impact significantly on the environment, a "Resource Consent" must be obtained from the Regional Council.

The HFMC member companies have

- Code of Practice for the Handling of Non-Biodegradable Wastes at Sea
- Code of Practice for the Handling of Biodegradable Wastes at Sea
- Code of Practice for Vessel Discharge

2. Management of unwanted catch of target species

- All catch of target species must be recorded and is counted against quota.
- Briefing Document
- 3. Management of unwanted by-catch of non-target species



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- All catch must be recorded and for quota species must be held or obtained to cover any catch.
- Briefing Document

Minor Corrective Actions

Nil

Gaps and Observations

Nil

Indicator 3K: The fishery operations are conducted in compliance all legal and administrative requirements

Status of Knowledge

1. Legislation requirements of all relevant acts

The skipper's Briefing Document provides operational guidelines and practice to comply with all legislative and administrative requirements of the relevant acts for fishing. However, the environmental requirements of the Fisheries Act are not fully dealt with.

2. Codes of Practice

There are various industry agreed Codes of Practice included in the skipper's Briefings Documents such as those for the handling of (non)-biodegradable wastes at sea, bulk fisheries, fishing operations, factory vessel discharge, minimising accidental fur seal and sea lion bycatch, minimising accidental seabird bycatch, hoki target trawling and hoki catch sampling programme.

Minor Corrective Actions

Nil

Gaps and Observations

Nil

Indicator 3L: The fishery operation assists and co-operates with management authorities in the collection of catch, discard and other information of importance for the effective management of the resource and the associated ecosystem

Status of Knowledge

1. Data collection by the fishery

Most HFMC's member companies are involved in the collection of fishery data through the Ministry of Fisheries observer programme and the HFMC's own observer programme of which the results are used as data in the stock assessment process.

2. Distribution of collected data to appropriate authorities

The collected data, focused around fish and non-fish by-catch, is distributed by the HFMC's individual member companies to the appropriate authority which is the Ministry of Fisheries. However, debriefing of the Ministry of Fisheries observers occurs on a regular basis by the Department of Conservation.



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Minor Corrective Actions

Nil

Gaps and Observations

1. One observed company refused to co-operate with the HFMC's observer programme to deliver data for the Cook Strait Code of Practice to limit the catch of small fish.

6.2 Issues raised by Stakeholders

The most important issues raised during the stakeholder consultation by the contacted stakeholders are listed below.

Implementing environmental aspects of the Fisheries Act

The limited nature of the implementation of the various environmental aspects of the Fisheries Act 1996 and its subsequent amendments was pointed out. This was considered by stakeholders to be a controversial issue in relation to the environmental implications of sustainability of ecosystems and biological diversity beyond the target species, in the face of fishing pressures. Examples used to highlight the implementation problems included the limited amount of research support provided to fisheries sustainability issues that involve non-stock matters, including the effects of fishing on ecosystems. The Auditor-Generals report of 1999 on fisheries was perceived to be highly critical of the implementation of the environmental aspects of the Fisheries Act.

Confused responsibilities for managing the environmental effects of fishing

It was considered that there was no clear management system that deals with the management of the environmental impacts of fishing. In particular roles and responsibilities in government in relation to the impacts of fishing on various aspects of marine ecosystems were considered to be uncertain. Issues raised were the responsibilities for managing non-commercial species such as sharks; benthic habitats where fishing may operate; and species that may be considered at risk but not formally protected under government legislation.

Seal by-catch

It was considered that the by-catch of seals was a controversial issue and a major ecological and public perception problem for the fishery. Concerns were raised that the fishing industry was moving too slowly to design and implement effective seal excluder devices in the Hoki fishery. Furthermore, the assessment team was made aware of the preliminary results of a research project which indicated a decline in seal pup numbers on the west coast. However, this research could as yet demonstrate no relationship between the decline and the hoki fishery operations.

Seabird by-catch

It was considered that the by-catch of seabirds was a controversial issue and there was concern about the reliability of data on bycatch of seabirds by Hoki fishery trawlers, because affected birds may not be retrieved with the catch, and hence not included in observer data. Also concerns were raised about the lack of Cupertino of some parts of the fishery in relation to return of seabirds for autopsy/examination that were killed in trawling operations.

Over-fishing of the East coast stock of Hoki

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It was considered that over-fishing of the East coast hoki stock was a controversial issue and there was concern about overfishing of the east coast hoki stock. The virgin biomass of the eastern stock was estimated to have been , in 1999, 10% or 20% of the total virgin biomass.

The probability of the stock being below 20% B_0 in 2004 was estimated at 30% under the current catch levels. This stock is expected to remain above B_{MSY} over the period of projection under the current catch levels although there is a 66% probability of the stock declining in size over the next 5 years.

Eastern stock fish account for about 40% of the current hoki catch. The risk to the eastern stock could be decreased if a smaller proportion of the total catch was taken from this stock. Given the current assumptions about hoki stock structure and if the eastern stock size is at the lower end of biomass estimates, then the current distribution of catches at the present TACC may cause the eastern stock to decline to unacceptably low levels.

Lack of ecosystem, habitat and species assemblage knowledge

A basic lack of ecological knowledge of mid-water and benthic ecosystems was identified as an issue in developing a better understanding of the environmental effects of the fishery.

Lack of a management plan for the fishery

It was considered that the lack of an integrated management plan for the fishery was an issue. This was considered to be important for managing aspects of the stock, interactions with other quota species (particularly hake and ling), and the environmental interactions of the fishery with the ecosystem.

Lack of a spatial structure for quota

The lack of spatial structure in the existing system of management of Hoki was considered to be an issue.

Industry-based catch observer program

The industry-based program of observers was considered unreliable, and not enough effort was being committed to proceed to standardisation between the industry and government observer programs.

Effects of the environment on Hoki

It was considered that there was insufficient knowledge about the way in which Hoki populations responded to the influences of large-scale environmental factors. This includes the relationship of climate variability to productivity and recruitment of Hoki.

Data reliability for stock assessment

It was considered that the data used as input to the stock assessment process was unreliable. This also was considered to produce estimates of current biomass that were too unreliable.

Stakeholder participation process flawed

The process for involving stakeholders in management decisions of the fishery is considered flawed and ineffective. Examples were considered to be the strong influence of the fishing industry on the research support working group process, on the stock assessment process, and on the nature and implementation of the Fisheries Act, to the detriment of the interests of other stakeholders.



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Marine protected areas

The establishment of closed areas, marine protected areas and no-take zones for commercial fisheries and the marine ecosystem was suggested. Benefits included reportedly real time analysis of stock distribution, abundance, movement and the availability of specific areas for fishing, are all techniques that can be developed with modern integrated adaptive management tools and incorporated as key facets of the fishery management plan. The specific design key objective being: managing for the sustainability of the genetic diversity of the hoki stocks.

6.4 Scoring outcome

In determining the performance level of the fishery for a particular indicator of the hoki Scoring Guideline, the team used the following guidance on their interpretation of the 60, 80 and 100 levels:

- 60 being the minimum level for a fishery to be considered for certification,
- 80 being the level required to pass; and
- 100 being the perfect fishery.

The associated minor and major corrective actions to be taken by the fishery resulting from the achieved scores on the MSC criteria are described in section 5.4.6 and in section 8.

Using the methodology prescribed by the Marine Stewardship Council, the assessment team found that the New Zealand commercial hoki fishery met all three MSC Principles and Criteria independently. For each Principle, the assessment team scored the fishery as follows:

- Principle 1 Resource Sustainability: Pass;
- Principle 2 Minimizing Ecosystem Impacts: Pass;
- Principle 3A The Management System: Pass;
- Principle 3B Fishing Operations: Pass.

In Appendix VIII, the exact scores for each of the MSC Principles, Criteria and hoki Performance Indicators is given.

7. STRENGTHS AND WEAKNESSES

7.1. Strengths

Some of the observed strengths of the hoki fihsery as described below:

- Strong, fisheries independent government observer programme;
- Dedicated HFMC observer programme, additional but independent from the governmental observer programme;
- Stock assessment process with an exceptional hoki research capacity;
- Pro-active role of the hoki towards environmental issues;
- Strong, truly transparent and open working group process in establishment of research agenda;
- Good information availability on seabirds populations;
- Utilisation and waste system regulations on-board vessels are strong;
- Briefing document for skippers with operational practice guidelines is thorough.



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7.2. Weaknesses

Ten minor Corrective Action Requests (CARs), as described below, were raised. In the following table the requirement number refers to the indicator used in the MSC Fisheries Programme to test each criterion from the MSC P&C.

CAR No	MSC Requirement	Description
	(MSC P&C)	
001	P 1, C 1.1, I 1D	 Insufficient recognition of spatial structure of the fishery as current strategy does not sufficiently address the requirements for spatially explicit management The relationship between assessment advice and subsequent management decisions and implementation is not well-defined.
002	P 1, C 1.1, I 1E	 There is a high probability that the Eastern hoki stock will not remain above the limit reference point (B_{MSY}) Insufficient recognition of spatial structure of the fishery as current strategy does not sufficiently address the requirements for spatially explicit management
003	P 1, C 1.3, I 1H	Management tools dealing with the Eastern hoki stock are not clearly specified and appropriate to the management of the stocks.
004	P 2, C 2.1, I 2A	 Information is not sufficient on the distribution of habitats, major assemblage types and the natural functions and trophic relationships among species in the midwater and benthic ecosystems where the fishery operates.
005	P 2, C 2.1, I 2C	An ecological risk assessment has not been conducted.
006	P 2, C 2.1, I 2E	 The impact of the hoki fishery on non-target quota species is not well defined. Research programmes are mainly limited to aspects of setting the TACC for hoki. The information availability is not adequate to comply with the requirements for full implementation of the Fisheries Act.
007	P 2, C 2.2, I 2H	• The risks to seabirds have been assessed but the assessment of the risks to seals is insufficient.
008	P 3, C 3.1, I 3C	Long-term planning is insufficient to integrate

♦SGS	SGS Product & Process Certification A section of Internationale Controle Maatschappij (I.C.M.) B.V.
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CAR No	MSC Requirement	Description
	(MSC P&C)	
		environmental impacts in relation to in/output control measures in the hoki fishery.
009	P 3, C 3.1, I 3D	The effective implementation of a comprehensive management system is not sufficient.
010	P 3, C 3.1, I 3E	There is insufficient evidence of enforcement procedures and practices.

8. CERTIFICATION RECOMMENDATION

There being no Major Corrective Action Requests, the assessment team recommends certification of the New Zealand Hoki fishery management by the HFMC.

The outstanding Minor Corrective Action Requests do not preclude certification, but the HFMC is required to commence the agreed actions before 11 May 2001. These will be verified by SGS Product & Process Certification at the first surveillance to be carried out about 6 months from the date of the issuance of the certificate. If satisfactory actions have been take the CARs will be 'closed out'; otherwise Minor CARs will be raised to Major CARs.

Prepared: Aldin Hilbrands	Approved: Edwin Aalders
Date: 18 June 2008	Date: 18 June 2008


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- V. ATTENDANCE SHEETS
- VI. CORRECTIVE ACTION REQUESTS
- VII. HOKI SCORING GUIDELINE
- VIII. HOKI SCORING OUTCOME
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APPENDICES

I. ITINERARY

ITINERARY

Mon 30/10/00 Tue 31/10/00	Assessment Team Training Development of Hoki Scoring Guideline
Wed 01/11/00	Development of Hoki Scoring Guideline
Thu 02/11/00	Meetings/contacts with some of the Stakeholders in Wellington
	(Department of Conservation, Ministry of Fisheries, National Institute of Water
	and Atmosphere, Sea Fisheries Industry Council, Treaty of Waitangi Fisheries
	Commission)
Fri 03/11/00	Opening Meeting with Hoki Fisheries Management Company ()
Sat 04/11/00	Development of Hoki Scoring Guideline
Sun 05/11/00	Data Review
Mon 06/11/00	Data Review
Tue 07/11/00	Nelson – Data Review and Meetings with Member Companies (SeaLord,
Mad 09/11/00	Mollington/Noloon Data Daview and Stakeholder Meetings (Seefeed Industry
weu 08/11/00	Council, WWF NZ)
Thu 09/11/00	Wellington – Data Review and Stakeholder Meetings/Contacts (Ministry of
	Fisheries, National Institute of Water and Atmosphere Research, Skipper,
	Forest & Bird, ECO)
Fri 10/11/00	Assessment Team Scoring
Sat 11/11/00	Closing Meeting with Hoki Fisheries Management Company



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II. SUSTAINABLE MANAGEMENT CRITERIA OF THE HFMC

<u>Criteria</u>	Relevant New Zealand	Operational Implementation	
International			
Fichariaa			
risneries A sus automatic			
Agreements	Now Zeeland is a signatory to	- Implemented by Ministrics including	
Convention on the Law of the Sea	New Zealand is a signatory to UNCLOS. Implementation is through the Territorial Sea and Exclusive Economic Zone Act 1977, the Fisheries Act 1983 and the Fisheries Act 1996.	 Implemented by Ministries including Ministry of Defence and Ministry of Fisheries. Provides for the establishment of 200 NM exclusive economic zones; requires sustainable management of fish stocks. 	
United Nations Fish Stocks Agreement (Straddling Stocks and Highly Migratory Fish Stocks)	New Zealand is a signatory to the Fish Stocks Agreement. Some elements of the Agreement are already implemented in the Fisheries Act 1996. New Zealand is in the process of amending the Fisheries Act to implement outstanding Fish Stocks Agreement provisions and allow it to ratify the agreement.	 The agreement sets out how UNCLOS fisheries provisions should be applied to straddling fish stocks and highly migratory fish stocks. Provides a framework for regional arrangements to be established to manage these stocks. Requires application of the Precautionary Principle. Requires countries to control the fishing activities of its registered vessels wherever they operate in the world 	
FAO Code of Conduct for Responsible Fishing	 New Zealand is a signatory to the Code of Conduct. Ratification is not required. The provisions of the Code are implemented through the Fisheries Act 1996. 	 The Code applies to all fisheries and requires sustainable management of fish stocks. A key part of the Code is the Compliance Agreement which sets out agreed international standards for fisheries compliance. 	
International			
Environmental			
Agreements			
Convention for the Control of Trade in Endangered Species (CITES)	 New Zealand is a signatory to CITES and has implemented its provisions through the Trade in Endangered Species Act 1989. 	 Prohibits the trade in species considered endangered. Does not currently apply to any New Zealand fish. 	
Ozone Agreement	 New Zealand has implemented the provisions of this agreement through the Ozone Layer Protection Act 1990. 	 Provides for phasing out of the use of ozone depleting substances. 	
MARPOL (Marine Pollution Agreement)	 Provisions are implemented in New Zealand through the Marine Pollution Rules of the Maritime Transport Act 1994 (outside 12 NM) and through the Marine Pollution Regulations of the Resource Management Act 1991 (inside 12 NM). 	 Operation of the MTA is the responsibility of the Maritime Safety Authority. Operation of the RMA is the responsibility of Regional Councils. 	
Biodiversity Convention	 New Zealand is a signatory to the Biodiversity Convention. Biodiversity provisions are contained in s9 of the 	The Ministry for the Environment has recently developed a national biodiversity strategy.	



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<u>Criteria</u>	Relevant New Zealand	Operational Implementation	
	Fisheries Act 1996 and will also be implemented through, <i>inter alia</i> , the Resource Management Act 1991 and Wildlife Act 1953.		
Other International			
Has the country(ies) responsible for management of the fishery implemented the provisions of the: International	New Zealand has implemented the	Operation of the MTA is the	
Maritime Organisation	provisions of the IMO through the Marine Transport Act 1994.	responsibility of the Maritime Safety Authority.	
Fisheries and			
Environmental			
Principles			
Is the fish stock(s) managed in a sustainable manner?	 The purpose of the Fisheries Act 1996 is to provide for utilisation of fisheries while ensuring sustainability. 	 Operation of the FA is the responsibility of the Ministry of Fisheries. The purpose of the Act guides all activities undertaken pursuant to the Act 	
Is production from the fish stock(s) maintained at or above above an appropriate threshold level?	• S13 of the Fisheries Act 1996 requires that TACs be set at the level which maintains the stock at or above a level that can produce the maximum sustainable yield.	 TACs are set annually according to these requirements after an extensive fishery assessment programme. The results of the assessments are documented in the annual "Report from the Fishery Assessment Plenary [Year]: stock assessments and yield estimates". 	
Does the fishery management regime provide for rebuilding over a specified time frame if the fishery is depleted?	 S13 of the Fisheries Act 1996 requires that TACs for stocks below B_{MSY} be set at a level which will result in the stock being restored to B_{MSY} 	 The Act does not specify the timeframe over which the rebuild should occur. The Minister determines an appropriate timeframe on a case by case basis. Hoki is not considered to have been significantly depleted in the past. 	
Does the operation of the fishery have any significant adverse impacts (which are irreversible in the medium to long term) on:			
The ecosystem in which the fishery occurs	 In the purpose of the Fisheries Act 1996 ensuring sustainability is defined as including "avoiding, remedying, or mitigating any adverse effects of fishing on the aquatic environment". Section 13 of the Fisheries Act 1996 requires that, when setting a TAC, the Minister must have regard to the interdependence of stocks 	 This principle is taken into account in the setting of TACs and determination of other sustainability measures. This is documented in the Ministry of Fisheries' annual Final Advice Paper to the Minister on TACs and sustainability measures. 	



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<u>Criteria</u>	Relevant New Zealand	Operational Implementation
	Legislation	
The habitat in which the fishery occurs	 In the purpose of the Fisheries Act 1996 ensuring sustainability is defined as including avoiding, remedying, or mitigating any adverse effects of fishing on the aquatic environment. Section 9 of the Fisheries act 1996 requires that habitat of particular significance for fisheries management should be protected. 	 This principle is taken into account in the setting of TACs and determination of other sustainability measures. This is documented in the Ministry of Fisheries' annual Final Advice Paper to the Minister on TACs and sustainability measures.
Bycatch species	 The Fisheries Act 1996 provides for TACs to be set for other species taken as bycatch in the hoki fishery. 	 TACs for bycatch species are set so as to maintain the stock at or above B_{MSY}.
Associated and dependent species	 Section 9 of the Fisheries Act 1996 requires that the need to maintain associated and dependent species above a level that ensures their long-term viability be taken into account when actions are taken under the Fisheries Act. 	 This principle is taken into account in the setting of TACs and determination of other sustainability measures. This is documented in the Ministry of Fisheries' annual Final Advice Paper to the Minister on TACs and sustainability measures.
Threatened or endangered species	 The Wildlife Act 1953 provides protection for seabirds and turtles. The Marine Mammal Protection Act 1978 provides protection for marine mammals. 	 This principle is taken into account in the setting of TACs and determination of other sustainability measures. This is documented in the Ministry of Fisheries' annual Final Advice Paper to the Minister on TACs and sustainability measures. Under the MMA plans may be developed to limit the impacts of fishing in order to protect threatened and endangered species.
Biodiversity	 Section 9 of the Fisheries Act 1996 requires that persons undertaking actions under the Act in relation to utilisation and sustainability of fisheries shall take into account, <i>inter alia</i>, the need for the biological diversity of the aquatic environment to be maintained. 	 This principle is taken into account in the setting of TACs and determination of other sustainability measures. This is documented in the Ministry of Fisheries' annual Final Advice Paper to the Minister on TACs and sustainability measures.
management regime require the precautionary approach to be applied?	 Section 10 of the Fisheries Act 1996 requires that when undertaking any action under the Act in relation to utilisation and sustainability of fisheries all persons must apply the precautionary approach. 	This principle is taken into account in the setting of TACs and determination of other sustainability measures.
Are there provisions in place to control pollution and waste disposal at sea, to preclude environmental damage, including to the environment of fish?	The Resource Management Act 1991 and Maritime Transport Act 1994 control the discharge of waste from vessels.	 These Acts are operated by Regional Councils and the Maritime Safety Authority respectively. The Seafood Industry has developed a code of practice dealing with handling of wastes from fishing vessels.
Are there provisions in place to control pollution and waste disposal on shore, to preclude	The Resource Management Act 1991 controls use of land, water and air—including all emissions from shore-based processing operations.	 The RMA is operated by Regional Councils. A resource consent is required for any activity which may impact



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<u>Criteria</u>	Relevant New Zealand Legislation	Operational Implementation
environmental damage, including to the environment of fish?		significantly on the environment.
Are there provisions in place to regulate the use of anti-fouling materials used on vessels?	 The Pesticides Act 1979 provides for regulations controlling the use of anti-fouling materials. 	The PA is operated by the Pesticides Board. The Board is supported by the Agricultural Compounds and Veterinary Medicines Group of the Ministry of Agriculture and Forestry.
Fishery Management Principles		
Does management of the fishery encourage appropriate monitoring and research?	 The Fisheries Act 1996 allows the Minister purchase the services necessary to allow him/her to make the necessary fisheries utilisation and sustainability decisions. Consultation on proposed services is required. The Minister may take into account information provided by sources other than the Ministry of Fisheries. 	 The consultation on proposed fisheries research services helps ensure that research is necessary and appropriate. Provision for non-Ministry information to be taken into account in decision making has encouraged the industry to commission independent research which in many cases provides an effective audit of research commissioned by the Minister.
Is the fisheries compliance regime adequate to control exploitation of the fishery?	The Fisheries Act 1996 establishes a rigorous monitoring, compliance and surveillance regime.	 The Ministry of Fisheries is currently responsible for fisheries compliance services. The penalties for non-compliance with fisheries regulations include large fines and confiscation of catch, vessels and quota. The Hoki Fishery Management Company Ltd has implemented an observer programme to help ensure compliance with fisheries controls in the Cook Strait Hoki Fishery.
Has an appropriate Vessel Monitoring System been implemented in the fishery?	 The Fisheries Act 1996 provides for a Vessel Monitoring System to be required for specified types of vessels and fisheries. 	All vessels in the New Zealand hoki fishery (except very small vessels) are required to use a Vessel Monitoring System by which authorities can independently determine the vessel position.
Ficher		
Stakeholder Principles		
Does the fishery management regime encourage fishery participants to conserve and enhance the fishery?	 The Fisheries Act 1996 provides for management of fisheries by ITQs in perpetuity which has encouraged responsible management and fishing practices by quota owners. 	 Management of the New Zealand hoki fishery by individual transferable quotas (in perpetuity) has encouraged quota owners to operate in the fishery in a manner that promotes the long term value of the fishery. In a number of years quota owners have requested a lower TAC than allowed by scientific advice because



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<u>Criteria</u>	Relevant New Zealand	Operational Implementation
		of industry concerns that the scientific advice was too optimistic.
Does the fishery management regime encourage Cupertino and collective actions by fishery participants?	 The Fisheries Act 1996 provides for management of fisheries by ITQs in perpetuity which has encouraged collective actions by quota owners. The New Zealand Seafood Industry Council Ltd represents the Seafood Industry on industry-wide issues and undertakes a number of functions on behalf of the industry including: Provision of information Stock assessment research Working to improve seafood trade access Policy development The Seafood Industry Board which operates under the New Zealand Fishing Industry Board Act 1963. 	 Management by ITQs and the imposition of cost recovery has encouraged quota owners to work closely together to maximise the long term value of the fishery. This has occurred at an industry-wide level through the NZ Seafood Industry Council Ltd and at a fishery level through the Hoki Fishery Management Company Ltd.
Is their an appropriately constituted commercial rights holder organisation which represents rights holders in the fishery?	A number of fishery management companies now operate under the New Zealand Companies Act 1993.	 Owners of over 99% of hoki quota belong to the Hoki Fishery Management Company Limited which operates under the New Zealand Companies Act 1993. The Company is increasingly taking responsibility for management of the fishery. The Company requires a high level of support for key decisions—in order to safeguard the interests of minority shareholders. Company initiatives include funding of additional stock assessments, undertaking a catch sampling programme, imposing voluntary area restrictions and implementing an observer programme in the Cook Strait Hoki Fishery.
Does the fishery management regime provide for all interested parties to participate in assessment and management of the fishery?	The Fisheries Act 1996 requires the Minister of Fisheries to consult with all interested parties when making decisions related to sustainability and utilisation.	 The Ministry of Fisheries has established a number of annual consultative processes dealing with assessment of the fishery, determination of the TAC and sustainability measures, and determination of research and other services to be provided in the fishery. Commercial, recreational, customary Maori and environmental fisheries interests participate in each of these processes.
Business Principles		
Does the country(ies) responsible for	Employment relations are controlled by the Employment Contracts Act	The ECA allows employers and employees to negotiate terms of



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<u>Criteria</u>	Relevant New Zealand	Operational Implementation
management of the fishery have in place controls to ensure appropriate employment relationships?	1991.	employment appropriate for the business and the individual employee.
Does the country(ies) responsible for management of the fishery have in place controls to ensure employees are paid an adequate minimum wage.	 The Minimum Wages Act 1983 establishes the minimum wage payable to employees. 	 Operation of the MWA is the responsibility of the Labour Department.
Are decisions concerning management of the fishery taken in an open, consultative and transparent manner?	 The Official Information Act 1982 requires that, except where information is commercially sensitive or otherwise requires to be kept confidential, all information relating to the operation of government agencies is to be made available to the public at reasonable cost. The Fisheries Act 1996 requires the Minister to consult with interested parties when making fisheries utilisation and sustainability decisions. 	 Interested parties regularly participate together with Govt. advisors in open and contestable science meeting, and in Statutory consultations on management decisions Interested parties frequently request and obtain all relevant Ministry papers related to particular decisions to assist their participation in consultative processes.
Is information on the fishery readily available?	The Fisheries Act 1996 provides for the establishment of public registers of individual catching rights and yearly catch to date.	 Fisheries catch and effort information is readily available in grouped format. Vessel-specific data is available to researchers. Seafood trade statistics are freely available on a monthly basis.
Does management of the fishery provide for long term security of access to fish stocks?	The Fisheries Act 1996 provides that ITQs are in perpetuity. ITQs may be traded, divided and aggregated with few restrictions.	 ITQs are specified in terms of shares in a fish stock. Therefore, the quantity of fish which may be taken per share may vary depending on the TAC for the fishery. However, the quota owner's share of the fishery does not change unless the quota owner trades quota.
Has the authority responsible for management of the fishery addressed health and safety issues in the fishery work place	Occupational safety and health are controlled by the Health and Safety in Employment Act 1992 and, on board vessels, by the Maritime Transport Act 1994.	 Operation of these Acts are the responsibility of the Labour Department and the Maritime Safety Authority respectively. Work place safety on board vessels must be covered in the Safe Ship Management Plan.
Does the country(ies) responsible for management of the fishery have in place controls to ensure fishing vessels meet IMO standards.	IMO standards are implemented through the Maritime Transport Act 1994 which regulates most aspects of vessel operation including anti- collision regulations, safety equipment, qualifications etc.	 Operation of the MTA is the responsibility of the Maritime Safety Authority. Fishing vessels are required to have a Safe Ship Management Plan detailing how it complies with safety requirements.
Food Safety and		
Quality Principles	Poolood optoby and suplity are controlly in	
Does the country(les)	Sealood safety and quality are controlled	 Operation of these Acts are the



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<u>Criteria</u>	Relevant New Zealand	Operational Implementation
responsible for management of the fishery have in place adequate provisions to ensure high standards of seafood safety and quality?	by the: • Meat Act 1991 • Food Act 1981 • Food and Drug Act 1964 • Health Act 1956 • Animal Products Act	 responsibility of the Regulatory Authority of the Ministry of Agriculture and Forestry, and the Ministry of Health. Together they ensure very high standards of seafood safety and quality. Fish export regulations are promulgated under the Meat Act 1991.
Trade and Subsidy		
Are the fishing operations involved in the fishery subsidised in any way?		 New Zealand fisheries are probably the least subsidised in the world. Fishers receive no direct subsidies and only in the areas of training and public good research are there indirect subsidies of any kind.
Does the industry fund all the research and management necessary to support the fishery?	 The Fisheries Act 1996 provides for the Government to recover fishery management costs from the industry. 	 New Zealand quota owners pay all the costs associated with research, management and compliance in the hoki fishery.
Does the country(ies) responsible for management of the fishery impose any restrictive import licenses or tariffs on imported seafood?	Imported fish for further processing or for local consumption must meet similar criteria of integrity, health and safety as apply to domestic produce.	 New Zealand imposes no quantity restrictions or tariffs on imports of whitefish.
Is there provision for fishing fleet capacity to adjust as the available yield from the fishery changes?		• The capacity of the New Zealand hoki fishing fleet is adjusted by quota owners according to the available yield from the fishery. Restructuring assistance is not provided by the Government.
Human Rights Principles		
Has the authority responsible for management of the fishery:		
 Addressed customary rights issues in the fishery 	 Maori commercial and customary fisheries rights are protected by Article II, Treaty of Waitangi of 1840. Maori commercial fishery claims under the Treaty were settled in two stages; an interim settlement in 1989 legislated in the Maori Fisheries Act 1989, and a final settlement in 1992, legislated in the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992. Maori customary fishing rights are protected by the Fisheries (Kaimoana customary Fishing) 	 The MFA resulted in 10% of all hoki quota being transferred to Maori. The TOWFCSA saw the Crown transfer ownership of half of the country's largest seafood company to Maori, including approximately 15% of all hoki quota. In total, about 25% of quota in the commercial hoki fishery was transferred to Maori. Maori customary non-commercial fishing rights are operated under permits issued by kaitiaki (guardians) nominated by Maori for each area of New Zealand and



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<u>Criteria</u>		Relevant New Zealand		0	perational Implementation
		Legislation			
			Regulations 1998 and the Fisheries (South Island Customary Fishing) Regulations 1998.		appointed by the Minister of Fisheries.
•	Addressed human rights issues	•	The Bill of Rights Act 1990 establishes fundamental human rights	•	Operation of the BORA is the responsibility of the Justice Department.
•	Addressed discrimination issues	•	The Human Rights Act 1993 prohibits discrimination in a wide range of situations including employment. The Employment Contracts Act 1991 requires equal pay for the same work by males and females	•	Operation of the HRA is the responsibility of the Human Rights Commission.



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APPENDICES

III. COPY OF AGREEMENT AND CONTRACT BETWEEN SHAREHOLDERS

Declaration of Agreement and Contract Between Shareholders in the Hoki Fishery Management Co Ltd.

Policies and Procedures for Sustainable Utilisation and Management of, and for Production from, the NZ Hoki Fishery.

Whereas:

The Hoki Fishery Management Company Ltd in New Zealand has identified Fishery Certification Criteria that may be applied to evaluate fisheries.

Criteria have been developed in the following categories:

International Agreements:

- Adherence to relevant international fisheries agreements
- Adherence to relevant international environmental agreements
- Adherence to other relevant international agreements

Sustainable Use and Management Principles:

- Sustainable fisheries and environmental principles
- Sustainable fishery management principles
- Rightsholder's principles and incentives

Food Safety, Social Responsibility and Open Market Principles:

- Sound business principles
- Food safety and quality principles
- Trade and market access principles
- Human rights principles

Of necessity, some of the criteria apply at the national level, others apply to the fisheries management regime in general, and others are specific to the individual fishery.



Declaration:

As a quota owner in the hoki fishery and a shareholder in the Hoki Fishery Management Co Ltd.

We confirm our knowledge of the Fishery Certification Criteria, endorse their validity and effect, and agree with those criteria and their application to all of the relevant aspects of the hoki fishery and our participation therein.

Moreover, we state that:

our own activities are currently managed so as to observe and comply with the criteria, and we undertake to continue that compliance.

We also undertake:

to make a similar level of compliance a binding condition of any arrangement for lease or contract fishing of our quota in hoki, and

to enter a similar condition as a binding, enduring caveat attached to any sale of our quota in hoki so as to ensure similar compliance by any future quota owner.

By signing this document I acknowledge there is a binding agreement and contract for performance of the above with Hoki Fishery Management Co Ltd valid during the fishing year 1 October 1999 – 30 September 2000, and renewable by a further signature on 1 October in each subsequent fishing year.

Signed Date

On behalf of: Quota Owner QRN

This documents is valid when signed and lodged with the office of Hoki Co.



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APPENDICES

IV.

ASSESSMENT TEAM CV's

EDWIN AALDERS

PROGRAMME DIRECTOR SGS

MSC FISHERY PROGRAMME

Date of Birth:	1968
Qualifications:	University of Oxford, Oxford Forestry Institute (1991-1992) MSc Forestry and its relation to other land use Larenstein International Agricultural College Velp, The Netherlands (1986- 1991) Ing/BSc Tropical Forestry
Languages:	Dutch (mother tongue) English (fluent), French (average)

EXPERIENCE

Edwin Aalders has an engineering degree in Tropical Forestry from the LIAC, the Netherlands and a Masters Degree in Forestry from the University of Oxford. He has 8 years experience as an assessor in Environmental Auditing (ISO 14 000), Organic Farming and SQF 2000 systems and as a Lead Assessor in Forest Management Certification, ISO 9000 and Carbon Offset Verification (COV).

Since 1998 he is the Programme Manager of the Carbon Offset Verification Service of the SGS Group with extensive knowledge of carbon projects in Latin America, Africa and Australasia. As such Mr Aalders is frequently asked to speak or provide training on Climate Change and Forestry Certification topics.

Other expertise's include development of new services within the management of natural resources, project design, implementation, forest resource assessments, wood product tracking and providing consultancy on internal monitoring systems to the relevant industries.



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CAREER SUMMARY

- 1999 to date Programme Director MSC Fishery Programme, SGS AgroControl, The Netherlands
- 1998 to date Programme Manager Carbon Offset Verification Service, SGS AgroControl, The Netherlands
- 1998 to date Senior Project Manager Forestry, SGS AgroControl, The Netherlands
- 1998 Forestry Management Auditor, SGS Forestry, United Kingdom
- 1997 1998 Regional Manager (Islands), SGS PNG PTY Ltd, Papua-New Guinea.
- 1995 1996 Operations Manager, SGS Congo SA, Congo.
- 1992 1995 Technical Forester, SGS Forestry Ltd, United Kingdom.

DETAILS OF EXPERIENCE

1998 to date SENIOR PROJECT MANAGER SGS AgroControl, the Netherlands

Programme Manager of the SGS Climate Change Programme

Main part of the duties are developing the service to the world' leading verification services of carbon offset projects in the Land Use Change and Forestry category; advising the SGS Group on business development strategies regarding the Framework Convention on Climate Changes; coaching SGS affiliates around the world that wish to engage in carbon offset verification; project management of all carbon offset projects.

Programme Director of the SGS MSC Programme

Main part of the duties are developing the groups Fishery Certification Programme under the Marine Stewardship Council (MSC); coaching SGS affiliates around the world that wish to engage in MSC certification; project management of all Fishery projects.

Manager of the Forestry Department in the Netherlands

Main part of the duties are the development of the QUALIFOR programme (Forest Management & Chain of Custody) and ISO 14 000 Certification in the Dutch Forest industry.

Auditor: <u>Variety of Countries</u> Chain of Custody Inspections against the QUALIFOR, and SGS MSC Programme. [the Netherlands, United Kingdom].

Auditor: <u>Variety of countries</u> Pre-Assessment against the Climate Change Programme and QUALIFOR Programme criteria. [the Netherlands, Congo, Uganda, Argentina, Brazil, Chile, Colombia, Ecuador].



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Auditor: <u>Variety of countries</u> Main-Assessment against the Climate Change Programme and QUALIFOR Programme criteria. [the Netherlands, Chile, Ecuador, Uganda]

Speaker/Trainer: <u>Variety of Countries</u>: Speaker and Trainer for a variety of Conferences, Universities and Private Companies on the subjects of Environmental Auditing/Certification (Forestry, Climate Change, Fishery, Organic Farming) [the Netherlands, Belize, Brazil, El Salvador, Ecuador, Paraguay, Peru, Malaysia, Thailand]

 1998
 FORESTRY MANAGEMENT AUDITOR SGS Forestry, United Kingdom

 Auditor the Netherlands
 Pre-Assessment against QUALIFOR programme.

1997 - 1998 REGIONAL MANAGER (ISLANDS) SGS PNG, Papua New Guinea

Manager of the Export Log Monitoring Programme of SGS PNG for the islands region and act as the QUALIFOR affiliate manager/assessor. Responsibilities:

- · regional systems control of the project;
- daily recruitment and management;
- supervision of staff;
- develop a local market for QUALIFOR; and
- assist and undertake assessment under the QUALIFOR programme in the region.

Auditor <u>Solomon Islands</u> Assessment and Surveillance visit at QUALIFOR certified organisation

Auditor Papua New Guinea Assessment against QUALIFOR programme.

1995 - 1996 OPERATIONS MANAGER SGS Congo, Republic of Congo.

Implementing and managing the newly formed Forestry department of SGS Congo responsible for the Sector Export Monitoring (SEM) Bois contract and QUALIFOR's local certification programme. Responsibilities:

- liaison between the SGS Congo, SGS Cameroon and SGS Forestry on the design of the database programme design (Foxpro based) and maintenance;
- design and implement project systems and procedures
- systems control of the project;
- daily recruitment and management;
- supervision of staff;
- monthly project reporting;
- develop a local market for QUALIFOR; and
- assist and undertake assessment under the QUALIFOR programme in the region.



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Auditor <u>Gabon</u> Investigate claims of illegal hunting by the company certified under the QUALIFOR programme.

Auditor Congo Pre-assessment against QUALIFOR Programme.

1992 - 1995 TECHNICAL FORESTER SGS Forestry, United Kingdom Provide technical support in managing forest inventory and resource assessment projects, including the responsibility for Quantity, Quality and Chain of Custody inspections. Specific examples of these are:

> **Technical project co-ordinator** SGS SEM Bois <u>Cameroon</u> Responsible for:

- liaison between the SGS Cameroon and SGS Forestry on the database programme design (Foxpro based) and maintenance;
- systems control of the project;
- · daily management support of project activities.
- supervision of inspectors

Certification specialist/team leader Gabon

Managed an evaluation of the client's forest operation following the introduction of a forest certification programme.

Forest management specialist Nigeria

Managed an evaluation mission of a newly formed forest company requiring technical assistance in the introduction of environmental/socially acceptable management practises.

Inventory specialist/team leader Zaire

Team leader of a feasibility study of a 1 million hectare forest concession expected to supply a new production and processing operation. The study concentrated on a general assessment of the resource in terms of the economic and environmental feasibility of the project.

Liaison with SGS ICM Netherlands

Responsible for a joint promotion of the SGS certification service to a Forest certification group established by the Dutch government, Dutch timber trade and Dutch environmental organisations.

Project co-ordinator ODA CPATU Research Project Brazil

The project is multi-disciplinary including consideration of forest economics, ecology and autecology, harvesting, forest management, silviculture, seed technology and seed physiology.

Chain of custody inspection United Kingdom

Verified the Chain of Custody for a client purchasing certified timber.

Operations control and inventory specialist <u>Guyana</u>

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Established the internal controls for a timber company wishing to improve its management information and work performance. Emphasis was placed on the company's economic and environmental performance. In particular:

- designed and implemented operational procedures to ensure greater control of inventory and harvesting operations;
- drafted the company's manuals on harvesting systems, forestry inventory and enumeration systems;
- trained staff at both managerial and field operational levels;
- advised the company on the practical constrains of its sustainable timber production strategy; and
- advised the company on implementation of an improved log tracking system.

Control system design & forest inspector Guyana

Assessed the sustainable forest management practices of a concession; with particular emphasis on environmental and socio-economic factors. Detailed forest audit procedures were also developed.

- 1992 MSc THESIS STUDY, Oxford Forestry Institute, Oxford <u>United Kingdom</u> Revised two chapters in the book "Plantation Forestry in the British Isles" [Julian Evans & Peter Savill (1986) OUP]
- 1990 REGENERATION RESEARCHER Willems Timber & Trading Co, Ltd <u>Guyana</u>.
 Regeneration study of the Celos silvicultural logging system designed in Surinam.
 designed and implemented a regeneration study of 10 year old gaps in tropical rainforest caused by the extraction of *Ocotea rodiaei* (Greenheart).
- 1989 RESEARCH ASSISTANT, ESNACIFOR (Lancetilla Botanical Garden & Research Centre W. Popenoe) Tela <u>Honduras</u>.



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Personal Data

Family name	Hilbrands
First names	Aldin (Albert Dinand)
Date of birth	February 25th, 1972
Nationality	Dutch
Gender	Male
Position	SGS Programme Manager Aquaculture & Fisheries

Professional Education

1990-1996

AGRICULTURE & NATURAL ENVIRONMENT (MASTER OF SCIENCE) Wageningen Agricultural University, The Netherlands Study Profile: Animal Production Systems *M.Sc. Theses*: Aquaculture & Fisheries

Key Qualifications

Project development regarding certified ecological and/or fair trade production:

- Animal production systems in general
- Integrated farming systems in particular
- Aquaculture and fisheries production systems specifically
- Establishment of production and processing standards
- Conversion and business plans including product marketing
- Auditing Management Systems in the aquaculture & fisheries industries

Professional Experience

2000	Country Projects Commissioner Description	<u>UK</u> Auditing of Fishery Management & Chain-of-Custody Practice Colchester Borough Council MSC Surveillance Visit & Chain of Custody main assessment of Thames herring fishery
2000	Country Project Commissioner Description	<u>Various European</u> Auditing of Aquaculture & Fishery Management Practice PEFA.COM Development and implementation of a management system for the entire fish supply chain to be marketed via e-commerce verified by SGS in various countries

SGS

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2000	Country Project Commissioner Description	<u>The Netherlands</u> Auditing of Aquaculture Management Practice NedFish Auditing of primary producers in the African catfish industry
1999	Countries Project Commissioner Description	<u>Senegal, Côte d'Ivoire, Ghana, Seychelles, Cape Verde</u> Fair Trade Canned Tuna Fair Trade Assistance, Culemborg, The Netherlands Feasibility for export possibilities of canned tuna from Africa produced according to fair trade and ecological fisheries guidelines
1999	Country Project Commissioner Description	<u>Iran</u> Ecological Sturgeon Fisheries WWF – The Netherlands, Zeist, The Netherlands MSC Pre-Assessment of the sturgeon fisheries in the Iranian part of the Caspian Sea
1998 - 19	99 Country Project Commissioner Description	<u>Ecuador</u> Organic Shrimp Production Naturland / GTZ, Germany Development, testing and evaluation of organic shrimp aquaculture production standard with key industry stakeholders
1998 – 19	999 Country Project Commissioner Description	<u>The Netherlands</u> Ecological Waddensea Fisheries I WWF – The Netherlands, Zeist, The Netherlands MSC Pre-Assessment of the mussel, cockle and shrimp fisheries in the Waddensea
1996	Country Project Commissioner Description	<u>Thailand</u> North-East Water Management and Systems Improvement Project Euroconsult, Arnhem, The Netherlands Management, monitoring and evaluation of the catfish, carp, shrimp rice-fish culture programme
1994	Country Project Commissioner Description	Israel Status and Potential of the Israeli Aquaculture and Fisheries Industry Dutch Aquaculture Industry Assessment of future possibilities and constraints in the Israeli aquaculture and fisheries industry



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Other Relevant Experience

1995 – present Post Country Project Commissioner Description		CHIEF EDITOR / WEBMASTER <u>The Netherlands</u> AQUAcultuur Magazine / Website Dutch Aquaculture Society, Wageningen, The Netherlands Chief editor of the magazine issued jointly by the Dutch Aquaculture Society and the Dutch Fish Farmers' Association	
1996 – 199	8 Post Country Project Employer Description	PROJECT LEADER <u>The Netherlands</u> Course Development Agromisa, Wageningen, The Netherlands Development and organisation of a course on participation in local development aimed at for Dutch development workers	
1997	Post Country Projects Employer Description	CONSULTANT TROPICAL LAND-USE <u>The Netherlands</u> Various concerning tropical land-use development SBW Consultancy & Research, Wageningen, The Netherlands Project development focusing on land-use options for smallholders in the tropics	
1995	Post Country Project Commissione Description	AUTHOR <u>The Netherlands</u> Practical Handbooks 'Small-Scale Freshwater Fish Farming' and 'Integrated Fish Culture' rAgromisa Foundation, Wageningen, The Netherlands Chief editor of two practical handbooks for development workers	
1993 – 199	6 Post Country Projects Employer Description	COORDINATOR / CONSULTANT AQUACULTURE & FISHERIES <u>The Netherlands</u> Various concerning smallholder animal production Agromisa Foundation, Wageningen, The Netherlands Management of the Animal Husbandry Division and consultancy in aquaculture and fisheries for smallholders	

Publications

- 1. Hilbrands, A.D. 1999. Fair Trade Canned Tuna from Africa. Feasibility study for export of certified ecological and fair trade canned tuna from Africa. 48p.
- 2. Hilbrands, A.D. 1999. Ecological Sturgeon Fisheries. Feasibility study for MSC-certification of the Iranian sturgeon fisheries in the Caspian Sea. 35p.
- 3. Hilbrands, A.D. 1999. Certified ecological Waddensea fisheries: fiction or reality? Visserijnieuws Magazine July.



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- Hilbrands, A.D. 1999. Ecological Waddensea Fisheries. Feasibility study for MSCcertification of the Dutch mussel, cockle and shrimp fisheries in the Dutch part of the Waddensea. 51p.
- Hilbrands, A.D. 1998. Certified organic shrimp production: a guarantee for sustainability, p.45-61. In: Hillen, M.Ph. (Ed.) Exclusive Economic Zones at Sea. A Green Export Market. SMO, The Hague, The Netherlands. 107p.
- 6. Hilbrands, A.D. 1998. Certified ecological Waddensea fisheries: a sustainably guaranteed. Visserijnieuws Magazine August.
- 7. Hilbrands, A.D. and Yzerman, C. 1997. Integrated fish farming. Agrodok-series No.21. Agromisa Foundation, Wageningen, The Netherlands. 67p.
- 8. Verdegem, M.C.J., Hilbrands, A.D. and Boon, J.H. 1997. Influence of salinity and dietary composition on blood parameter values of hybrid red tilapia (*Oreochromis niloticus* (Linnaeus) *x O. mossambicus* (Peters)). Aquaculture Research 28 (6): 453-459.
- 9. Hilbrands, A.D. 1997. Worldwide fish production peaks due to aquaculture (in Dutch). AQUAcultuur Magazine 12 (2): 12-17.
- 10. Hilbrands, A.D. 1997. Rice with fish from Isaan (in Dutch). AQUAcultuur Magazine 12 (1): 28-32.
- Hilbrands, A.D. 1996. Aquaculture options in Isaan. Euroconsult, North-East Water Management and Systems Improvement Project (NEWMASIP), Khon Kaen, Thailand. NEWMASIP Technical Report No. 24. 53p.
- Hilbrands, A.D. 1996. The effect of predator stocking on growth, mortality and recruitment of Nile tilapia in tropical fish ponds. Department of Fish Culture and Fisheries, Wageningen Agricultural University, Wageningen, The Netherlands. MSc Thesis. 61p.
- 13. Eer, A. van, Schie, T. van and Hilbrands, A.D. 1996. Small-scale freshwater fish farming. Agrodok-series No.15. Agromisa Foundation, Wageningen, The Netherlands. 76p.
- 14. Hilbrands, A.D. and Van Eekeren, T. 1995. Nutrient waste in the intensive fish culture industry in The Netherlands (in Dutch). AQUAcultuur Magazine 10 (4): 37-38.
- 15. Hilbrands, A.D. 1994. The effects of salinity and dietary protein level on the haematology of hybrid red tilapia (*Oreochromis niloticus x Oreochromis mossambicus*). Department of Fish Culture and Fisheries, Wageningen Agricultural University, Wageningen, The Netherlands. MSc Thesis. 38p.



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CURRICULUM VITAE

Name	Jo-Anne Mary Akroyd
Address	16 Cornwall Pk Ave, Epsom, Auckland NZ
Phone	0064-25-782434
Email	jakroyd@attglobal.net
Date of Birth	23 October 1952
Nationality	New Zealand
Qualifications	BSc 1974: Zoology Major, Victoria University Wellington NZ
	M Phil (Commerce)1993/96 Auckland University (Current)
	Masters Papers in:International Business & Marketing Advanced Strategic
	Management and Advanced Total Quality Management
	M AppSc (current) Auckland University of Technology

Management

- Harvard University, Boston USA. Programme for Senior Managers in Government, John F Kennedy School of Government, 1990
- Total Quality Management, Advanced training development and implementation, Sydney Australia, 1991
- ISO Auditing and Certification. ETRS Stebbing Quality Management Systems assessor.
- Associate Auditor (Quality Society of Australia).

Membership of Professional Organisations

- The NZ Strategic Management Society
- The Society of Women Geographers
- Quality Society of Australasia
- New Zealand Public Administration

Awards

1990 NZ Commemoration Medal.

1993 NZ Women's Suffrage Medal

Professional Positions Held

1994- current

Director Akroyd Walshe Ltd. Consultants in marine research and fisheries and quality management

1990-1994

Director Quality and Strategic Management Ministry of Agriculture & Fisheries, Wellington

1998-1990

Assistant Director Marine Research NZ, Ministry of Agriculture & Fisheries



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1974-1990

Marine Biologist, Ministry of Agriculture & Fisheries

Recent Work History

Fisheries Research

- Ministry of Fisheries research contracts including: Snapper, estimation of juvenile mortality in the commercial fishery. Toheroa, determination of abundance and age structure on Dargaville beach. Intertidal shellfish studies on 11 beaches in the Auckland Fisheries management area.
- Consultancy for the Fishing Industry Board for the development and management of data gathering and analysis of commercial fishing catches. Development and maintenance of associated computer databases.
- Consultancy for Te Ohu Kai Moana Assessment of Individual transferable quota species from northern harbour areas.
- Ministry of Foreign Affairs and trade contract on development of sustainable fisheries in reef areas in Fiji
- Consultancy for Maori on feasibility of aquaculture in northern harbour areas

Environmental / Sustainable Management

- Consultancy for Opus NZ Itd Ecological survey Oriental Bay Breakwater construction and refurbishment proposal to prepare a marine Environment Impact Assessment for a RMA application.
- Development of fisheries management strategies for commercial and recreational fishing sectors.
- Assessment and review of the east coast NZ snapper fishery and its management.
- Environmental impact reports and assessments for marine parks, port development, fisheries and aquaculture projects.
- Preliminary assessment of the sustainable management of the NZ Hoki fishery

Quality Management

- Technical expert for audit of NZ fishing company ISO 14000 system
- Consultancy for five companies to develop ISO 9000 and TQM quality systems.
- Consultancy for a fishing company assessing fish quality at sea.
- Consultancy for MFish Policy in establishing a Quality System suitable for their organisation
- Development and implementation of Total Quality Management System appropriate for the organisation
- Training and education of staff in principles and tools of Quality Management

Policy Advice

• Ministry of Fisheries contract for the identification of performance indicators and development of an economic model for monitoring the performance of commercial fisheries policy



- Policy Advice papers to government department and select committees on management strategies for various fisheries cost recovery.
- Policy Advice to Government on Fisheries legislation.

Training

- Lecturer in Masters degree programme at Auckland University of Technology in Project Management, Managing the Research process and Fisheries Management and Environmental Issues in developing countries.
- Training in Strategic Management at UNITEC Institute of technology, Ministry of Fisheries and Queen Victoria College.
- Training programme for Women in Fisheries with University of South Pacific on conservation issues

Overseas Consultancies

- MFA Consultancy with University of South Pacific on fisheries management in Fijian villages.
- MFAT project re involvement of women in the conservation of coastal fisheries Relevant Publications:

Relevant Publications

- Akroyd, J. A., C. Batstone, B. Sharp, and K.A.R. Walshe. 1999. Monitoring Performance of Commercial Fisheries Policy. Research report to the Ministry of Fisheries on research project SEC 9802
- Akroyd J.M. 1997. Oriental Bay Breakwater Construction and beach refurbishment Proposal. A marine ecological study. Unpub report to Opus Consulting NZ Ltd.
- Akroyd, J.M., Walshe, K.A.R., and Millar, R. 1999. Distribution of Toheroa (*Paphies ventricosum*)
 Beds, and the abundance and size structure of toheroa at Ripiro Beach, Dargaville.
 Final report to the Ministry of Fisheries (unpubl).
- Akroyd, J.M. and Choi, M. 1982. Multivariate analysis of the benthic intertidal population, Ahuriri estuary, Hawkes Bay. Ministry of Agriculture and Fisheries (unpubl)
- Kilner, A.R. and Akroyd, J.M., 1982. Ohiwa Harbour Mussel Survey 1978/79. Ministry of Fisheries Technical report No 153.
- Kilner, A.R. and Akroyd, J.M., 1978. Fisheries and Invertebrate Macrofauna of Ahuriri Estuary. Fisheries technical Report No 53 79p
- Murray, T. and Akroyd, J.M. 1978. The New Zealand Paua Fishery. An update and review of biological considerations to be reconciled with management goals. Fisheries research Internal Report No.4 (unpubl)
- Walshe, K. A. R., and Akroyd, J. A., 1999. Motivations and perceptions of marine recreational fishers. Research report to the Ministry of Fisheries on research project REC 9802



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Summary CV

Trevor J. Ward PhD

Institute for Regional Development University of Western Australia Nedlands WA 6907 Australia

Personal Information

Gender: Male Marital Status: married, two children (7 and 10 years) Nationality: Australian Date of Birth: 5 October 1948 Place of Birth: Gosford, NSW, Australia

Summary of qualifications

Australian National University Canberra, Australia

Ph. D. Zoology

awarded 1976

Australian National University

Canberra, Australia B. Sc. (Hons Class 1) Zoology

awarded 1972



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Professional appointments

Institute for Regional Development,

July 1999 to present

July 1999 to present

July 1999 to present

University of Western Australia Director, Sustainable Ocean and Coastal Development Program (research, consultancies, training, post-graduate teaching)

Department of Geography,

University of Western Australia

Adjunct Research Fellow

CSIRO Division of Marine Research, Perth

Honorary Research Fellow

October 1978 - June 1999

CSIRO Division of Marine Research Senior Principal Research Scientist

Leader—Environment Program (in the former Division of Fisheries) Sub-Program Leader—Biodiversity and Conservation Management

Fields of Expertise

Marine biodiversity strategic policy and planning

Marine environmental management—design and implementation of monitoring and baseline studies, sustainability and performance indicators, and 'best practice' marine management systems for biodiversity

Design and implementation of marine parks, reserves and protected areas

Assessment and management of tropical and temperate marine biodiversity

Marine and estuarine pollution-impacts of heavy metals, nutrients and sediments

Publications

More than 60 science journal articles, policy reviews, and technical consultancy reports

Recent papers focus on monitoring and assessment of marine biodiversity, marine reserves and sustainability

Summary of Experience

Project Development and Team Leadership (** = team leader; * = team member)

Ecological studies of smelter pollution in Spencer Gulf (1978-1982; \$1M)**

Jervis Bay baseline environmental studies (1988-1992; \$5.5M)**

Port Phillip Bay environmental studies (jointly awarded CSIRO Chairman's Medal; 1991-1995; \$11M)*

Leader - CSIRO Division of Fisheries Marine Environment Program (1990-1995; 45 staff, 3 sites, \$3.5M pa budget)**



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Ecology

Studies of coastal and continental shelf ecosystems, habitats and species: tropical—Great Barrier Reef, North West Shelf, North West Slope; temperate—Spencer Gulf, Jervis Bay, Port Phillip Bay

Pollution

Biological effects of heavy metals, nutrients and suspended sediments

Biodiversity

Habitat mapping, inventory and baseline studies, surveys, rapid assessment tools and procedures

Environmental Management

Environmental impacts assessment, environmental indicators, sustainability policy and frameworks, conservation and protected area management

Strategic Assessment

Certifier of marine fisheries to Marine Stewardship Council (London) standards of sustainability; optimisation across competing sector objectives to identify representative areas for dedication as no-take (high biodiversity value) reserves in the Great Barrier Reef World Heritage Area; design and implementation of measures of success for conservation on Pacific Islands.

Professional Societies

Australian Marine Sciences Association (member)

Estuarine Research Foundation (USA) (member)

IUCN Commission on Ecosystem Management (member)

National Biodiversity Council (member)

Awards Received

1996 CSIRO Chairman's Medal jointly for Port Phillip Bay Environmental Studies (lead role in design, ecology and impacts assessment)

Recent Projects and Clients

(** = team leader; * = team member)

Identification of Representative Areas of the Great Barrier Reef World Heritage Area for high priority protection as 'no-take' sanctuaries (Great Barrier Reef Marine Park Authority) (current)**

Assessment of Sustainability of Western Rock Lobster Fishery (Western Australia Fishing Industry Council and Marine Stewardship Council) (2000)*

Indicators of Sustainability for South Pacific Conservation Areas (South Pacific Regional Environment Programme, Samoa) (current)**

Marine Reserves as Tools for Marine Fisheries Management (Bureau of Rural Resources, Canberra) (current)**



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Biodiversity Conservation in Australia's Oceans Policy (Environment Australia, Canberra) (1998)**

Maintaining Biological Diversity In Sustainable Capture Fisheries (Australian Seafood Industry Council, Canberra) (1998)**

Environmental Indicators for Australia's Estuaries and the Sea (Environment Australia, Canberra) (1998)**

Guidelines—Rapid Assessment of Marine Biological Diversity (World Bank, Washington) (1998)**Recent Publications: 1995 to present

International Science Journals

(since 1995)

Vanderklift M.A. & Ward T.J. (2000) Using biological survey data when selecting Marine Protected Areas: an operational framework and associated risks. *Pacific Conservation Biology* **6**, 152-161

Ward T. J. (2000) Indicators for assessing the sustainability of Australia's marine ecosystems. *Marine and Freshwater Research* **51**, 435-446

Ward T.J., Vanderklift M.A., Nicholls A.O. & Kenchington R.A. (1999) Selecting Marine Reserves using Habitats and Species Assemblages as Surrogates for Biological Diversity *Ecological Applications* **9**, 691-698

Vanderklift M.A., Ward T.J. & Phillips J.C. (1998) The Use of Assemblages Derived from Different Taxonomic Levels to Select Areas for Conservation of Marine Biodiversity; *Biological Conservation* **86**, 307-315

Ward T.J. & Hutchings P.A. (1996)

Effects of Trace Metals on the Species Composition of the Infauna of Polluted Intertidal and Subtidal Marine Sediments Near a Lead Smelter, Spencer Gulf, South Australia. *Marine Ecology Progress Series* **135**, 123-135.

Vanderklift M. A., Ward T. J. & Jacoby C. A. (1996) Effect of Reducing Taxonomic Resolution on Ordinations to Detect Pollution-induced Gradients in Macrobenthic Infaunal Assemblages. *Marine Ecology Progress Series* **136**, 137-145.

Ward T. J. and Jacoby C. A. (1995) Deciphering spatiotemporal dynamics: what can mesocosm experiments do to improve predictions of environmental impacts? *Australasian Journal of Ecotoxicology* **1**, 51-54

Reports to Industry and Other Publications

(since 1995)

Ward T. J., Heinemann D. & Evans N (2001) The Role of Marine Reserves as Fisheries Management Tools: A Review of Concepts,



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Evidence and International Experience. A report for Bureau of Rural Sciences; Agriculture, Fisheries and Forestry Australia.

Leadbitter D., Ward T. J. & Ridge K. (1999)

Maintaining Biodiversity in Sustainable Marine Fisheries—A Review and Scoping of Future Directions. Australian Seafood Industry Council. Environment Report Series 15, Coast and Clean Seas, Department of Environment and Heritage, Canberra. 86 pp.

Ward T. J., Kingstone F. & Siwatibau S. (1999)

Indicators of Success for the South Pacific Biodiversity Conservation Programme; Volumes 1 to 5. South Pacific Regional Environment Programme, Apia, Samoa.

Ward T. J. (1998)

Environmental Indicators for Estuaries and the Seas. In: Measuring Progress: is life getting better? Ed. Eckersley, R. CSIRO Australia, Canberra. 314-318.

Ward T. J. (1998)

Will a National Oceans Policy Help to Conserve Marine Ecosystems and Biological Diversity? Australian Marine Conservation Society Bulletin, Autumn, 1998. 20 (2), 11-14.

Ward T. J., Butler E. & Hill B. (1998)

Environmental Indicators for National State of the Environment Reporting – Estuaries and the Sea. Australia: State of the Environment (Environmental Indicator Reports), Department of the Environment, Canberra. 80 pp.

Ward T. J., Kenchington R. A., Faith D. P. & Margules C. R (1998) Marine BioRap Guidelines: Rapid Assessment of Marine Biological Diversity. CSIRO Australia, Perth. 52 pp.

Sainsbury K., Haward M., Kriwoken L., Tsamenyi M., & Ward T. (1997) Australia's Oceans Policy, Oceans Planning and Management, Issues Paper 1; **Multiple Use Management in the Australian Marine Environment: Principles, Definitions and Elements**, June 1997. Department of the Environment, Canberra, Australia. 42pp.

Ward T., Alder J., Margules C., Sainsbury K., Tarte D., & Zann L. (1997) Australia's Oceans Policy, **Biodiversity Conservation**, Issues Paper 7. November, 1997. Department of the Environment, Canberra, Australia. 54pp.

Ward T.J. and Butler A.J. (1996)

Indicators of Environmental Quality. In: **Managing Australia's Marine Environment: The Way Ahead**. Eds. Craig Johnson and David Neil, Recommendations of the Marine Environment Conference, Brisbane, February 1995. School of Marine Science, University of Queensland. pp. 27-34.

Ward T.J. (1996)

The Eutrophication of Tropical Marine and Estuarine Waters: The Issues and Priorities. In: **Proceedings of the Workshop on Eutrophication in Tropical Marine Systems — the Impacts and Management of Nutrient Pollution,** ed Ward T.J., UNEP EAS/RCU Technical Report, Publication #8. United Nations Environment Programme, Bangkok, 1-14.

Ward T.J. (ed) (1996)

Proceedings of the Workshop on Eutrophication in Tropical Marine Systems — the



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Impacts and Management of Nutrient Pollution, UNEP EAS/RCU Technical Report, Publication #8. United Nations Environment Programme, Bangkok; 137pp.

Ward T.J. (1996)

Rapid Assessment of Biodiversity in Small Island Developing States. In Proceedings: **Experts Meeting on Identifying and Monitoring Biodiversity and its Utilisation in Commonwealth Small Island Developing States,** Valletta, Malta. November 1995. Sponsored by the Commonwealth Science Council and the Malta Council for Science and Technology.

Ward T.J., Jacoby C. & Blaber S. (1996)

Proceedings: Marine Biodiversity – a CSIRO Workshop. CSIRO Division of Fisheries, Hobart. 18pp.

Ward T.J. (1996)

Biodiversity—Case Study Timor Sea. In **Workshop on Multiple Use in Marine Environments—Proceedings**, Australian Petroleum Production and Exploration Association, Canberra. pp 108-112.

Harris et al. (1996) Port Phillip Bay Environmental Study Final Report. CSIRO, Canberra, Australia. 239pp.

Ward T.J. (1995)

Invited Book Review - "Global Marine Biodiversity: A Strategy for Building Conservation into Decision Making", ed Elliot A. Norse, Island Press, Washington. USA. In: **Reviews in Fish Biology and Fisheries** 5, 382-383.

Ward T.J. (1995) Water Quality. In "Jervis Bay - A Place of Cultural, Scientific and Educational Value" Kowari 5, Australian Nature Conservation Agency, Canberra. 163-164.

Ward T. J and Jacoby C. A. (1995) Ecotrekker: an environmental mystery. Multimedia CD-ROM; coastal management computer game. CSIRO, Dataworks, Melbourne, Vic.

Unpublished Technical Reports

(since 1995)

Ward T. J. and Sainsbury K. J. (1998) Australia's Oceans Planning and Management: The Case for Integrated Regional Ecosystem-Based Management. Briefing Paper for Environment Australia. 6 pp

Lyne, V., Last P., Scott R., Dunn J., Peters D., & Ward T. (1998) Large Marine Domains of Australia's EEZ. Report to Environment Australia. 8 pp + maps

Kenchington R., Muldoon J., Ward T. & Oxley W. (1996) Coastal Resources Management Project, Marine National Park Sub-Project, Thailand. GBRMPA, AIMS, & CSIRO Report to The World Bank. 107 pp.



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Major Seminar Papers

(since 1995)

Ward T. J. (1999)

Indicators for Assessing the Sustainability of Marine Ecosystems. Invited background paper for FAO-Australia Consultation on Sustainability Indicators for Capture Fisheries, Sydney; 18-22 January, 1999.

Ward T. J. (1998)

"Achieving the Preferred Future for our Ocean Ecosystems". Invited Keynote Address to SeaViews International Conference, Wellington, New Zealand. February 11-14, 1998.

Ward T. J. (1998)

"Environmental Indicators for Australia's Estuaries and the Seas". Paper presented to the Coast-to-Coast '98 Conference, Perth, May, 1998.

Ward T. J. (1998)

"Conservation of Australia's Marine Biodiversity: Developing a National Ecosystem Management Framework" Paper presented to Society for Conservation Biology 12th Annual Meeting, Macquarie University, Sydney, July 1998.

Ward T. J. (1997)

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APPENDICES

V.

ATTENDANCE SHEETS

ATTENDANCE SHEET

MEETING: Opening & Closing Meeting	DATE:	02/11 – 11/11
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NAME:	ORGANISATION:	POSITION:	SIGNATURE:
Edwin Aalders	SGS	Lead Auditor – Management System Expert	
Aldin Hilbrands	SGS	Auditor – Management System Expert	
Murray Fairweather	SGS	Director of SGS ICS New Zealand	
Jo Akroyd	SGS	Fisheries Management Expert	
Trevor Ward	SGS	Marine Ecosystem Expert	
Jim Mace	Hoki Fishery Management Company	Executive Director	
Ross Tucker	Company Hoki Fishery Management Company	Chairman	

SGS	SGS Product & Process Certification A section of Internationale Controle Maatschappij (I.C.M.) B.V.				
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APPENDICES

CORRECTIVE ACTION REQUESTS

CORRECTIVE ACTION REQUEST

Organisation: Hoki Fishery Management Company Dept/area:						
Job No: M5004-NZ		Visit No: 1	: 1 Date: 11 Nov		mber 2000	
Lead Assessor: Edwin Aalders						
CAR No: 001	Check	list Clause No:		MAJOR	MINOR	
	P 1, C	: 1.1, I 1D				
Details of non-compliance	:					
Indicator 1D: There is a w	ell-defir	ed and effective	strateg	y to manage the	target stocks.	
The intent of this performance indicator is to evaluate the extent to which there is a well- defined and effective strategy in place that will maintain the target species at productive levels, or the recover the target species to productive levels if already below such levels.					there is a well- s at productive low such levels.	
Objective Evidence:						
 Insufficient recognition of spatial structure of the fishery as current strategy does not sufficiently address the requirements for spatially explicit management 						
 The relationship between assessment advice and subsequent management decisions and implementation is not well-defined. 						
Proposed close-out date:			Client's name: Hoki Fishery Management Company			
11 May 2001						
Assessor's Signature: Edwin Aalders			Client's signature: Jim Mace			
Acceptance of Corrective Action.						
Close-out details:						
Assessor's signature:		Date:				



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CORRECTIVE ACTION REQUEST

Organisation: Hoki Fishery Management Company Dept/area:					
Job No: M5004-NZ		Visit No: 1		Date: 11 November 2000	
Lead Assessor: Edwin Aa	lders				
CAR No: 002	Checklist Clause No:			MAJOR	MINOR
	P 1, C	: 1.1, I 1E			
Details of non-compliance	:				
Indicator 1E: Stocks are n	ot depl	eted and harvest	rates ai	re sustainable.	
The intent of this performance indicator is to evaluate whether the target species is currently overfished, and whether current harvest levels are appropriate.					
Objective Evidence:					
 There is a high probability that the Eastern hoki stock will not remain above the limit reference point (B_{MSY}) 					
 Insufficient recognition of spatial structure of the fishery as current strategy does not sufficiently address the requirements for spatially explicit management 					
Proposed close-out date: Client's					
11 May 2001 Name: Hoki Fishery Management Compa				nagement Company	
Assessor's signature: Edwin Aalders			Client's Signature: Jim Mace		
Acceptance of Corrective Action.					
Close-out details:					
Assessor's signature:			Date:		


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Organisation: Hoki Fishery Management Company				iy Dept/area:		
Job No: M5004-NZ	Visit No: 1			Date: 11 November 2000		
Lead Assessor: Edwin Aalders						
CAR No: 003	Check	Checklist Clause No: MAJOR N			MINOR	
	P 1, C	; 1.3, I 1H				
Details of non-compliance	:					
Indicator 1H: There is a w	ell-defir	ned and effective	strateg	y to manage the t	target stocks.	
The intent of this performance indicator is to evaluate the extent to which there is a well- defined and effective strategy in place to ensure the effects of the fishery on the genetic structure, age and sex composition of the fish population do not impair reproductive capacity.						
Objective Evidence:						
 Management tools de appropriate to the ma 	aling w nagem	ith the Eastern he ent of the stocks.	oki stoo	ck are not clearly	specified and	
Proposed close-out date:			Client's	3		
11 May 2001			name: Hoki Fishery Management Company			
Assessor's signature: Edwin Aalders			Client's signature: Jim Mace			
Acceptance of Correctiv	e Actic	n.				
Close-out details:						
Assessor's signature:			Date:			



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Organisation: Hoki Fishery Management Company Dept/area:						
Job No: M5004-NZ		Visit No: 1		Date: 11 November 2000		
Lead Assessor: Edwin Aalders						
CAR No: 004	Check	dist Clause No:		MAJOR MINO		
	P 2, C	2.1, I 2A				
Details of non-compliance	:					
Indicator 2A: There is ade operates.	quate k	nowledge of the	ecosyst	em and the value	e where the fishery	
The intent of this performance indicators is to enable an evaluation of the extent to which there is sufficient knowledge of the ecosystem and of the natural functional relationships between species so that the fisheries management system can determine the nature of the effects of fishing on the ecosystem. This includes the extent to which there is a sufficient and appropriate process that operates to gather such knowledge.						
Objective Evidence:						
 Information is not sufficient on the distribution of habitats, major assemblage types and the natural functions and trophic relationships among species in the midwater and benthic ecosystems where the fishery operates. 						
Proposed close-out date:			Client's			
11 May 2001			name: Hoki Fishery Management Company			
Assessor's signature: Edwin Aalders			Client's signature: Jim Mace			
Acceptance of Corrective Action.						
Close-out details:						
Assessor's signature:			Date:			



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Organisation: Hoki Fisher	y Mana	gement Compan	ıy	Dept/area:		
Job No: M5004-NZ		Visit No: 1			Date: 11 November 2000	
Lead Assessor: Edwin Aalders						
CAR No: 005	Check	klist Clause No:			MAJOR	MINOR
	P 2, C	2.1, I 2C				
Details of non-compliance	:					
Indicator 2C: An ecologica	al risk a	ssessment has b	een	con	ducted.	
The intent of this performance indicator is to evaluate the extent to which there are robust assessments or prediction of impacts of the fishery, and if they are based on reliable knowledge methods for estimating risks, inferring or detecting ecological changes.					there are robust d on reliable changes.	
Objective Evidence:						
 An ecological risk assessment has not been conducted. 						
Proposed close out date:						
11 May 2001			name: Hoki Fishery Management Company			
Assessor's signature: Edwin Aalders			Client's signature: Jim Mace			
Acceptance of Corrective Action.						
Close-out details:						
Assessor's signature:			Dat	e:		



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Organisation: Hoki Fishery Management Company Dept/area:					
Job No: M5004-NZ		Visit No: 1		Date: 11 November 2000	
Lead Assessor: Edwin Aa	lders	I		I	
CAR No: 006	Check	dist Clause No:		MAJOR	MINOR
	P 2, C	2.1, I 2E			
Details of non-compliance	:				
Indicator 2E: The fishery does not have unacceptable impacts on the ecosystem structure or function, on habitats, or on the populations of dependent or otherwise associated species.					
The intent of this criterion is to evaluate the extent to which the fishery has unacceptable impacts on important aspects of the ecosystems, habitats or associated species where it operates.					
Objective Evidence:					
• The impact of the hok	i fishery	on non-target q	uota spe	ecies is not well d	efined.
Research programme	s are m	ainly limited to a	spects c	of setting the TAC	C for hoki.
The information availa implementation of the	bility is Fisheri	not adequate to es Act.	comply	with the requirem	nents for full
Proposed close-out date:			Client's		
11 May 2001			name:	Hoki Fishery Mar	nagement Company
Assessor'sClient'ssignature: Edwin Aalderssignature: Jim Mace					
Acceptance of Corrective Action.					
Close-out details:					
Assessor's signature:			Date:		



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Organisation: Hoki Fisher	y Mana	gement Compar	ıy	y Dept/area:		
Job No: M5004-NZ		Visit No: 1			Date: 11 November 2000	
Lead Assessor: Edwin Aa	lders	I				
CAR No: 007	Check	dist Clause No:		MAJOR MINOR		MINOR
	P 2, C	2.2, I 2H				
Details of non-compliance	:					
Indicator 2H: An ecologica impacts of the fishery on	al risk a the pro	assessment has tected, endange	been red,	thre	nducted to deter eatened or icon s	mine the potential species.
The intent of this performance indicator is to evaluate the extent to which there are robust assessments or prediction of impacts of the fishery, and if they are based on reliable knowledge methods for estimating risks, inferring or detecting ecological changes.					there are robust d on reliable changes.	
Objective Evidence:						
 The risks to seabirds h insufficient. 	nave be	en assessed bu	t the a	ass	essment of the ri	sks to seals is
Proposed close-out date:			Clie	nt's		
11 May 2001	11 May 2001			name. Hoki Fishery Management Company		
Assessor's signature: Aldin Hilbrands			Client's signature: Jim Mace			
Acceptance of Corrective Action.						
Close-out details:						
Assessor's signature:			Date	e:		



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Organisation: Hoki Fishery Management Company Dept/area:						
Job No: M5004-NZ	Visit No: 1			Date: 11 November 2000		
Lead Assessor: Edwin Aalders						
CAR No: 008	Check	dist Clause No:		MAJOR	MINOR	
	P 3, C	3.1, I 3C				
Details of non-compliance	:					
Indicator 3C: The manage	ement	system has a co	mprehe	ensive scope of p	anning.	
The intent of this performance indicator is to evaluate to the extent to which the management system has been developed on the basis of a comprehensive scope of planning.						
Objective Evidence:						
 Long-term planning is insufficient to integrate environmental impacts in relation to in/output control measures in the hoki fishery. 						
Proposed close-out date:			Client'	s		
11 May 2001			Name	: Hoki Fishery Ma	nagement Company	
Assessor's signature:	Issessor's Client's signature:					
Acceptance of Corrective Action.						
Close-out details:						
Assessor's signature:			Date:			



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Organisation: Hoki Fishery Management Company Dept/area:						
Job No: M5004-NZ		Visit No: 1		Date: 11 November 2000		
Lead Assessor: Edwin Aalders						
CAR No: 009	Check	klist Clause No:	MAJOR		MINOR	
	P 3, C	3.1, I 3D				
Details of non-compliance	:					
Indicator 3D: The manage	ement	system is implen	nented			
The intent of this performance indicator is to evaluate to the extent to which the management system is being implemented by the fishery.						
Objective Evidence:						
 The effective implementation of a comprehensive management system is not sufficient. 						
Proposed close-out date:			Client's	3		
11 May 2001			name: Hoki Fishery Management Company			
Assessor's signature: Edwin Aalders			Client's signature: Jim Mace			
Acceptance of Correctiv	e Actio	on.				
Close-out details:						
Assessor's signature:			Date:			



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Organisation: Hoki Fishery Management Company Dept/area:						
Job No: M5004-NZ		Visit No: 1		Date: 11 November 2000		
Lead Assessor: Edwin Aalders						
CAR No: 010	Check	klist Clause No:		MAJOR	MINOR	
Details of non-compliance	Р3, С :	; 3.1, I 3E				
Indicator 3E: The manage	ement s	system has comp	oliance	and enforcement	t procedures.	
The intent of this performance indicator is to evaluate to the extent to which the management system has efficient and effective compliance and enforcement procedures in place.						
Objective Evidence:						
There is insufficient evidence of enforcement procedures and practices.						
Proposed close-out date: Client's						
11 May 2001	1 May 2001					
Assessor's signature: Edwin Aalders			Client's signature: Jim Mace			
Acceptance of Corrective Action.						
Close-out details:						
Assessor's signature:			Date:			



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APPENDICES

VII.

HOKI SCORING GUIDELINE

Introduction

To the extent possible, the assessment team tried to avoid overlap in performance indicators between the criteria within the three MSC principles. This was accomplished by Recognizing that the three MSC principles for use in certification can be broadly classified in the following manner:

- <u>Principle 1</u> is concerned with maintaining the target species at productive levels and is therefore concerned with outcomes of a management system that provide documentation that the resource is being maintained at the appropriate levels.
- <u>Principle 2</u> is concerned with restraining the impact of the fishery on ecological systems (including the target species), and therefore is also concerned with documented outcomes of a management system showing that the fishery has or is moving toward an understanding of its impact on the environment.
- <u>Principle 3</u> is concerned with sound management systems, and is therefore focused on processes. The intent is to show that all the processes necessary for moving toward and attaining a sustainable fishery are in place. In addition, Principle 3 includes standards for management of fishing operations.

Principle 1

Criterion 1.1

Indicator 1A: There is adequate knowledge about the exploited target stock

The intent of this performance indicator is to evaluate the extent to which there is sufficient knowledge of the life history, distribution and abundance of the target species to allow an adequate evaluation of the effects of the fishery on the target species.

Elements considered in scoring include:

- 1. There is adequate knowledge of the identity of the target species, and its range and stock structure;
- 2. There is adequate knowledge of the life history (fecundity, growth, natural mortality) and behaviour of the target species; and
- 3. There is adequate information on trends in abundance of spawning stock, larval recruitment, and fishery recruitment.

- There is comprehensive knowledge of the taxonomy of the species, its range, and of any genetic sub-structuring of fished populations based on state-of-the-art techniques.
- There is comprehensive knowledge of key life history parameters, and of the behaviour and ecology of key life history stages.
- Comprehensive, fishery independent surveys of spawning stock size and larval and fishery recruitment are available over a substantial period of the history of the fishery.



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80 Scoring Guidepost

- The target species cannot be confused with any other species. Research data are adequate to assess whether multiple stocks are being fished.
- Reliable estimates are available of fecundity at size, growth rates and natural mortality. The seasonal patterns of movement or availability to the fishery are known.
- Reliable fishery independent estimates of abundance are available (or fishery dependent estimates have been shown to be reliable).

60 Scoring Guidepost

- The target species is unlikely to be confused with any other species. Research data indicate whether multiple stocks are being fished.
- Estimates are available of fecundity at size, growth rates and natural mortality. There is limited knowledge of seasonal patterns of movement or availability to the fishery.
- Some fishery independent estimates of abundance are available (or fishery dependent estimates have been shown to be reliable).

Indicator 1B: There is adequate knowledge about the fishery

The intent of this performance indicator is to evaluate the extent to which is sufficient knowledge of the fishery, including spatial and temporal patterns in catch and efforts by all fishing methods including discards and incidental mortality of the target species, to allow an effective evaluation of the productivity of the target species.

Elements considered in scoring include:

- 1. There is adequate monitoring of catch and effort;
- 2. There is adequate monitoring of the landings, discards, incidental mortality;
- 3. There is adequate information on fishing methods and fishing patterns;
- 4. There is adequate information on gear selectivity and on changes in catchability over time.

100 Scoring Guidepost

- There are comprehensive data available at fine spatial and temporal resolution on fishing effort in all sectors and on catches, discards (by size) and incidental mortality from all fishing methods.
- There is an independent at-sea observation program to measure discarding and document fishing practices.
- Research programs have established gear selectivity and key determinants of catchability including, where relevant, environmental influences and changes in fishing technology and practices.

- Total annual catch and effort by fishing methods are known for the major spatial zones of the fishery. Reliable data are available to estimate levels of discards. Data on size composition of the catch are available on a regular basis.
- There is an independent at-sea observation program to measure discarding and document fishing practices.
- Gear selectivity of fishing methods is known.



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 Reliable estimates of catchability is considered for stock assessments and used if required.

60 Scoring Guidepost

- Total annual catch and effort by fishing methods are known for the major spatial zones of the fishery. Data are available to estimate levels of discards. Data on size composition of the catch are available on a regular basis.
- There is an at-sea observation program in-place to measure discarding and document fishing practices.
- Gear selectivity is included in the fishery stock assessments.
- Catchability is considered for stock assessments and used if required.

Indicator 1C: There is a robust assessment of the stocks.

The intent of this performance indicator is to evaluate the extent to which the methods used to assess the current and the future state of the stocks and future impacts of the fishery on the target species are robust and rigorous.

Elements considered in scoring include:

- 1. The assessment models used are appropriate to the biology of the species and the nature of the fishery;
- 2. The methods used to fit the models to date are statistically rigorous;
- The sensitivity of the assessment to major uncertainties in data and assumptions have been evaluated and a precautionary approach to decision making is reflected in management advice; and
- 4. The assessment evaluated current stock status relative to prescribed reference points, and the future consequences of current harvest strategies.

100 Scoring Guidepost

- Assessment models and methods have been developed specifically for, and are appropriate to, the species and fishery in question and take account of all known and significant impacts of the fishery on the target species.
- Agreed harvest strategies are in place that specify monitoring strategies, assessment methods and decision rules for determining management response to assessment results. These harvest strategies have been formally evaluated that take account of a wide range of uncertainties.

- Assessment models and methods are appropriate to the species and fishery, take into account major impacts of the fishery on the target species, and meet internationally accepted standards of rigor.
- There are reliable estimates of current stock size and harvest rates and these have been evaluated against appropriate limit reference points.
- The assessment takes into account of key uncertainties, and predicts future consequences, and a precautionary approach to making management decisions is used in the management advice.



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60 Scoring Guidepost

- Assessment models and methods are appropriate to the species and fishery.
- Current stock size and harvest rates have been estimated and evaluated against appropriate limit reference points.
- The assessment takes account of key uncertainties and these are reflected in the management advice.

Indicator 1D: There is a well-defined and effective strategy to manage the target stocks

The intent of this performance indicator is to evaluate the extent to which there is a well-defined and effective strategy in place that will maintain the target species at productive levels, or the recover the target species to productive levels if already below such levels.

Elements considered in scoring include:

- 1. Fishing effort is contained;
- 2. Management tools (input and/or output controls) are specified and appropriate; and
- 3. The relationship between assessment advise and subsequent decisions is clear, and has been evaluated and action is timely.

100 Scoring Guidepost

- There is an explicit and precautionary strategy in place for management of the target species.
- The strategy specifies monitoring and stock assessment methods, and agreed rules for setting management measures on the basis of assessments.
- Catch levels are appropriate to the productive potential of the resource.
- Assessment advice is implemented and action is timely.

80 Scoring Guidepost

- There is a harvest strategy in place to manage the catch and effort in the fishery.
- The strategy is adaptive, and management measures are set on the basis of best scientific information, taking account of uncertainty.
- When the quota holders reach their ITQ, there are effective measures to prevent any further fishing.

60 Scoring Guidepost

- There is a basic harvest strategy to manage the catch and effort in the fishery.
- The strategy is adaptive, and management measures are set on the basis of available information, taking into account uncertainty.
- A strategy is in place to monitor attainment of the TACC and control effort accordingly in a timely manner.

Indicator 1E: Stocks are not depleted and harvest rates are sustainable

The intent of this performance indicator is to evaluate whether the target species is currently overfished, and whether current harvest levels are appropriate.

Elements considered in scoring include:



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- 1. The assessment indicated that stocks are above specified limit reference levels;
- 2. The assessment indicates that harvest rates are below specified limit reference levels; and
- 3. The limit reference points used meet acceptable international standards.

100 Scoring Guidepost

- The limit reference point selected for the stock is at least as precautionary as B_{MSY}.
- The stock is above the limit reference point.
- The limit reference point selected for the exploitation rate is at least as precautionary as F_{MSY}.
- The current exploitation rate is below the limit reference point.

80 Scoring Guidepost

- A biomass limit reference point has been chosen that is appropriate for the species and is above levels for which major declines in recruitment have been observed or are expected.
- The stock is assessed to have a high probability of being above the limit reference point.
- A limit reference point has been chosen for the exploitation rate that is appropriate for the species.
- There is a high probability that the current exploitation rate is below the limit reference point.

60 Scoring Guidepost

- A biomass limit reference point has been chosen that is appropriate for the species.
- Historical data indicate that the stock is assessed to be usually above the limit reference point.
- A limit reference point has been chosen for the exploitation rate that is appropriate for the species.
- Historical data indicate that the current exploitation rate is below the limit reference point.

Criterion 1.2

S 13 of the Fisheries Act 1996 provides for any stock whose current level is below that which can produce the MSY to be rebuilt to that level. The Act requires the rate of rebuild will occur within a period appropriate to the stock and its biological characteristics. Currently hoki stocks are not considered to be below MSY, and therefore a rebuild strategy is not required at this time.

Criterion 1.3

Indicator 1F: There is adequate knowledge about the target stock being fished The intent of this performance indicator is to evaluate the extent to which there is sufficient knowledge about age, genetic structure, sex composition and reproductive capacity of the stock.



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Elements considered in scoring include:

- 1. There is adequate knowledge of the age, genetic structure, sex composition and reproductive capacity of the stock;
- 2. There is adequate knowledge about the reproductive capacity (fecundity, spawning aggregations, age structure) of the target species; and
- 3. There is adequate spatial and temporal information on trends in abundance of the spawning stock.

100 Scoring Guidepost

- There is comprehensive knowledge of the age class, sex composition and genetic structure of the population;
- There is comprehensive knowledge of the reproductive capacity;
- Comprehensive, fishery independent surveys of spawning stock size are available over a substantial period of time and space of the fishery.

80 Scoring Guidepost

- Reliable estimates are available of the spatial structure, age class distribution and sex composition of the population which is used to evaluate the reproductive capacity of the stock;
- Reliable fishery independent estimates of reproductive capacity are available (or fishery dependent estimates have been shown to be reliable);
- The reproductive capacity is known of the main fishing grounds.

60 Scoring Guidepost

- Estimates are available of the age class distribution and sex composition of the population which is used to evaluate the reproductive capacity of the stock;
- The fishery has a time series of catch data;
- The sex and size structure of the catch has been estimated;
- Estimates of spawning stock size have been conducted.

Indicator 1G: There is adequate knowledge about the fishery

The intent of this performance indicator is to evaluate the extent to which fishing has an impact on the reproductive capacity of the target species.

Elements considered in scoring include:

- 1. There is adequate spatial and temporal monitoring of catch, effort, age and sex composition;
- 2. There is adequate spatial and temporal information on fishing patterns;
- 3. There is adequate spatial and temporal information on fishing methods (gear selectivity, changes in catchability).

100 Scoring Guidepost

 There are comprehensive data available at fine spatial and temporal resolution on fishing effort in all sectors and on catch, effort, incidental mortality, age and sex composition from all fishing methods.



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- There is an independent at-sea observation program to measure discarding, incidental mortality and document fishing practices.
- Research programs have established gear selectivity and key determinants of catchability including, where relevant, environmental influences and changes in fishing technology and practices in relation to age and sex composition of the fish population.

80 Scoring Guidepost

- Total annual catch and effort and sex composition by fishing methods are known for the major spatial zones of the fishery. Reliable data are available to estimate the size composition of the discards.
- There is an independent at-sea observation program to measure discarding and document fishing practices.
- Gear selectivity of fishing methods is known.
- Reliable estimates of age/size composition are used in stock assessments.

60 Scoring Guidepost

- Total annual catch and effort by fishing methods are known for the major spatial zones of the fishery.
- Gear selectivity is included in the fishery stock assessments.
- Catchability (in relation to reproductive capacity) is considered for stock assessments and used if required.

Indicator 1H: There is a well-defined and effective strategy to manage the target stocks.

The intent of this performance indicator is to evaluate the extent to which there is a well-defined and effective strategy in place to ensure the effects of the fishery on the genetic structure, age and sex composition of the fish population do not impair reproductive capacity.

Elements considered in scoring include:

- 1. Age, sex and genetic structure are involved in the stock assessment;
- 2. Reproductive capacity and spawning stock are involved in the stock assessment;
- 3. Management tools (input and/or output controls) are specified and appropriate; and
- 4. The current status of the reproductive capacity of the population is known;

100 Scoring Guidepost

- There is an explicit and precautionary strategy in place for management of the target species.
- The strategy specifies monitoring and stock assessment methods, and agreed rules for setting management measures on the basis of assessments.
- Catch levels are appropriate to the reproductive capacity of the resource.
- Assessment advise is implemented and action is timely and no evidence exist that reproductive capacity is impaired.

80 Scoring Guidepost

• There is a harvest strategy in place to manage the catch and effort in relation to the fishery reproductive capacity.



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- The strategy is adaptive, and management measures are set on the basis of robust estimates of reproductive capacity.
- When the reproductive capacity of the fishery is recognised to be impaired then a precautionary and timely management response is invoked.

60 Scoring Guidepost

- There is a basic harvest strategy to manage catch and effort in relation to the fishery reproductive capacity.
- The strategy is adaptive, and management measures are set on the basis of estimates of reproductive capacity.

Principle 2

Criterion 2.1

Indicator 2A: There is adequate knowledge of the ecosystem and its value where the fishery operates

The intent of this performance indicator is to enable an evaluation of the extent to which there is sufficient knowledge of the ecosystem and of the natural functional relationships between species so that the fisheries management system can determine the nature of the effects of fishing on the ecosystem. This includes the extent to which there is a sufficient and appropriate process that operates to gather such knowledge.

Elements considered in scoring include:

- 1. Information on the distribution of habitats and major assemblage types in relation to the distribution is available to the fishery;
- 2. Information on the species diversity, populations structures and the natural functions and trophic relationships among species throughout the fishery areas is available;
- 3. The distribution of protected species are well-known, together with the nature and distributions of their critical habitats;
- Knowledge of the natural variability in the ecosystem is adequate, included the natural physical forcing factors such as dominant currents, seasonal patterns in oceanographic conditions.

- The major habitat types have been determined and mapped across the areas where the fishery operates, using a comprehensive biophysical habitat classification.
- There is comprehensive comparative data with non-fished but otherwise comparable ecosystems on species diversity, population structures and the natural trophic relationships among species.
- The dominant natural large-scale factors responsible for structuring the marine ecosystems and their composition are known the dominant ecological effects of the major ocean currents, have been defined.



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 The nature, spatial and temporal extent of natural variation in the ecosystem is understood.

80 Scoring Guidepost

- There is knowledge of the major types of habitat in the area of the fishery, and aspects of their distribution.
- Research has been or is being undertaken on the predators and prey of the target species.
- There is knowledge of the natural variability in the ecosystem, including natural physical forcing factors such as dominant currents and seasonal patterns in oceanographic conditions.

60 Scoring Guidepost

- There is knowledge of the major types of habitat in the area of the fishery.
- Research initiatives have been or are being identified on the predators and preys of the target species, trophic relationships and the natural variability in the ecosystem.

Indicator 2B: The fishery is conducted in a manner that does not have unacceptable impacts on protected, threatened, endangered or highly valued icon species

The intent of this performance indicator is to evaluate the extent to which the fishery has unacceptable impacts on protected, threatened, endangered or highly valued icon species, and particularly those identified for protection under New Zealand legislation.

Elements considered in scoring include:

- 1. Information on the direct interactions of the fishery with protected, threatened, endangered or highly valued icon species, such as through by-catch, entrainment, effects on behaviour, or physical disruption of seabird and sea mammal populations is available;
- 2. Information on the extent of interruptions, removals, moralities of protected, threatened or endangered and highly valued icon species caused by the fishery is available.
- 3. Levels of incidental mortality of protected, threatened, endangered and highly valued icon species do not have unacceptable impacts on their populations.

100 Scoring Guidepost

- The extent of potential risks from fishing gear on the ecosystems, habitats and species that occur in the fished areas have been studied in detail and quantified, including the nature of any irreversible changes.
- The extent of potential risks from fishing operations on the ecosystems, habitats and species that occur in the fished areas have been studied in detail and the risks are quantified, including the nature of any irreversible changes.
- The levels of incidental mortality of protected, threatened, endangered and highly valued icon species do not have detrimental impacts on their populations.

80 Scoring Guidepost

• There is adequate knowledge of the types of fishing gear used, and the extent and location of their use.



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- There is adequate knowledge of fishing practices, including levels and types of bycatch and discards.
- There is adequate knowledge of lost gear and disposable wastes.
- The levels of incidental mortality of protected, threatened, endangered and highly valued icon species do not have unacceptable impacts on their populations.

60 Scoring Guidepost

- There is knowledge of the types of fishing gear used, and the extent and location of their use.
- There is knowledge of fishing practices, including levels and types of bycatch and discards.
- There is knowledge of lost gear and disposable wastes.
- Issues are identified and trials are underway to reduce levels of incidental mortality on protected, threatened, endangered and highly valued icon species and related impacts on their populations.

Indicator 2C: An ecological risk assessment has been conducted to determine the potential impacts of the fishery on the environment

The intent of this performance indicator is to evaluate the extent to which there are robust assessments or prediction of impacts of the fishery, and if they are based on reliable knowledge methods for estimating risks, inferring or detecting ecological changes. This includes the use of specific gear type, the nature and extent of bycatch, fishing deployment techniques, discarded consumables, gear loss at sea, potential introduction of pest species, the impacts of discards and waste, and the disturbance to natural behaviour of species.

Elements considered in scoring include:

- 1. There have been studies of, or assessment of, the impacts in space and time of the fishery on the ecosystem;
- Impact detection and assessment is based on appropriate ecological understanding, on assumptions, sampling designs and inferential models that are appropriate, and uses spaces and time scales that are ecologically relevant;
- 3. The cause-effect models used in experimental studies to evaluate the nature of fishery impacts are appropriate, including their ecological, toxicological and statistical basis;
- 4. The natural dynamics of the ecosystem is adequately accounted for in determining the fishery-based impacts;
- 5. Factors outside the fishery management system that can have an impact on the fishery or the ecosystem are adequately considered in determining fishery-based impacts;
- 6. There is knowledge of the potential for effects of the type of gear, or fishery operations on the ecosystem, habitats and species that occur within the fished areas;
- 7. There is adequate knowledge of thresholds for acceptable levels of effect of the fishery on key ecosystem indicators, and of the potential for ecosystems, habitats and species that occur within the fished areas to recover after fishing (or the fishery activity) has been removed.



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100 Scoring Guidepost

- The effects of the fishery have been determined by detailed, peer reviewed comparative studies between fished and non-fished but otherwise comparable ecosystems, across large space and time scales, using precautionary threshold levels of effect of the fishery for a broad range of ecological attributes/indicators.
- Studies of causes and effects in the fishery are comprehensive across habitats and regions and use ecologically relevant attributes and statistically robust designs.
- The impact-detection designs include space and time across a range of scales.
- The impact-detection designs include and control for the effects of factors outside the fishery in determining fishery impacts.

80 Scoring Guidepost

- There has been a comprehensive and peer-reviewed evaluation of the risks posed by the fishery to the ecosystem (ecological risk assessment), based on existing information.
- Such an evaluation is based, where possible, on information from fished versus unfished areas.
- Key ecological risks are identified and prioritised for appropriate action within the fisheries management system.

60 Scoring Guidepost

An ecological risk assessment has been conducted.

Indicator 2D: The impact of lost fishing gear or lost consumables or disposed waste on target or non-target species is not unacceptable

The intent of this performance indicator is to evaluate the extent to which fishing gear and waste materials (such as processing waste and other consumables) that are lost at sea have an impact on the target or non-target species.

Elements considered in scoring include:

- 1. Information of the extent of lost fishing gear and its effects on the populations of target and non-target species, and any physical habitat damages is available;
- 2. Information of the loss of processing and consumable wastes, their effects on the populations of target and non-target species is available, and any physical habitat damage is available.

100 Scoring Guidepost

- The nature of gear, consumables, and operational/processed waste has been measured and assessed across the fishery, and the extent of impacts has been measured and shown to be a negligible threat to habitats, marine ecosystems or species of concern that may be susceptible (e.g. seabirds, sharks, marine mammals, deepwater corals).
- A program for waste minimisation should be operational and is effective.

80 Scoring Guidepost

 The extent of gear and consumable loss from the fishery has been estimated in at least one area, and gear or consumable loss from the fishery is not cited as a threatening, or potentially threatening, process in any formally implemented species management or recovery plans.



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• A program for waste minimisation should be operational.

60 Scoring Guidepost

• A program for waste minimisation should be operational.

Indicator 2E: The fishery does not have unacceptable impacts on the ecosystem structure or function, on habitats or on the populations of dependent or otherwise associated species

The intent of this performance indicator is to evaluate the extent to which the fishery has unacceptable impacts on important aspects of the ecosystems, habitats or associated species, where it operates.

Elements considered in scoring include:

- 1. The effects of the removal of target species biomass on populations of species that depend on it as food source;
- 2. The effect of the removal of target species biomass on populations of species that it consumes as food;
- 3. The effects of the fishery on the habitat structure, productivity and species diversity/interactions in fished areas;
- 4. The effects of by-catch (including quoted species), discarded species, including the target species, on trophic structure and dynamics, species diversity and productivity in fished areas.

100 Scoring Guidepost

- In the major fishing areas, and across a representative sample of occasionally fished areas, the impacts of fishing on the distributions or abundance of the populations of the main prey and the predators of the target species are within acceptable limits.
- In the main habitats, the impacts of fishing on structure, productivity and species diversity have been assessed and are within defined limits.
- Effective measures are put in place to prevent any further fishing by individual companies once the ITQ of non-target quoted species has been reached.

80 Scoring Guidepost

- No unacceptable impacts of the fishery on ecological systems have been demonstrated.
- Where specific impacts have been studied, the impacts are contained within acceptable limits.
- Research programs are investigating the impacts of the fishery on the main habitats and the main predators and prey of the target species.
- Research programs are attempting to identify acceptable limits to change for ecological impacts on key habitats and species.
- Disincentives are in place to prevent any further fishing by individual companies once the ITQ of non-target quoted species has been reached

- The ecological impact issues in the fishery have been identified.
- Specific mitigation programmes have been initiated to address impacts.



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Indicator 2F: Precautionary strategies are employed in the fisheries management system to address and restrain the impacts of the fishery on the ecosystem

The intent of this performance indicator is to evaluate the extent to which the fisheries management system includes an appropriate, precautionary set of strategies designed to restrain and reduce any important impacts of the fishery on the natural functional relationships between ecosystem species.

Elements considered in scoring include:

- 1. Ecological objectives for habitats and populations have been developed and acted upon.
- 2. The levels of unacceptable impact have been identified for a range of habitats and nontarget species in fished areas.
- 3. Monitoring programs designed to assess fishery impacts are operational.
- 4. Fishery management measures are in place to enable adjustment of fishery practices where unacceptable impacts have been identified.

100 Scoring Guidepost

- Management objectives and strategies designed to adequately protect ecosystems, habitats and populations from degradation are included as environmental objectives in the fisheries management plan.
- Fisheries operations use the objectives and limits for environmental change to guide operational practices.
- Variables related to ecosystems, habitats and populations of non-target species are included within the fisheries monitoring program and in the management plan, and these data are used to guide and revise fishery management practices.

80 Scoring Guidepost

- The fisheries management system includes management objectives and strategies for key aspects of the ecosystem, including habitats and species diversity where potential impacts of the fishery have been identified.
- The fisheries management system has the appropriate arrangements to adjust fishery operations if adverse ecological impacts of the fishery are detected.

60 Scoring Guidepost

- The fisheries management system includes elements to identify and address environmental issues.
- The fisheries management system has the capacity to act upon environmental issues.

Criterion 2.2

Indicator 2G: There is adequate knowledge of the ecosystem and its value where the fishery operates in relation to protected, endangered, threatened or icon species

The intent of this performance indicator is to enable an evaluation of the extent to which there is sufficient knowledge of the protected, endangered, threatened or icon species and of the natural functional relationships between species so that the fisheries management system can determine the nature of the effects of fishing on the protected, endangered, threatened or icon species. This includes the extent to which there is a sufficient and appropriate process that operates to gather such knowledge.



Elements considered in scoring include:

- 1. The distribution and conservation status of protected, endangered, threatened or icon species are well-known, together with the nature and distributions of their critical habitats;
- 2. Knowledge of the natural variability in the ecosystem is adequate, included the natural physical forcing factors such as dominant currents, seasonal patterns in oceanographic conditions.
- 3. Information on the direct interactions of the fishery on protected, threatened, endangered and highly valued icon species, such as through by-catch, entrainment, effects on behaviour, or physical disruption of seabird and sea mammal populations is available;
- 4. Information on the extent of interruptions, removals, moralities of protected, threatened, endangered and highly valued icon species caused by the fishery is available.

100 Scoring Guidepost

- The distributions of protected, threatened, endangered or icon species and the habitats upon which they depend have been identified and mapped including an assessment of temporal variability.
- There is comprehensive comparative data on endangered, threatened, protected or icon species in relation to breeding and migration patterns, natural trophic relationships among species.

80 Scoring Guidepost

- The presence and distribution of protected, threatened, endangered or icon species in the area of the fishery is known.
- There is knowledge of the major species and their habitats in the area of the fishery, and aspects of their distribution.
- Research has been or is being undertaken on the relationships between the threatened, endangered, protected or icon species of the hoki.

60 Scoring Guidepost

- The presence of protected, threatened, endangerered or icon species in the area of the fishery is known.
- Research has been or is being undertaken on the relationships between the threatened, endangered, protected or icon species of the hoki.

Indicator 2H: An ecological risk assessment has been conducted to determine the potential impacts of the fishery on the genetic, species and population level biodiversity of the protected, endangered, threatened or icon species

The intent of this performance indicator is to evaluate the extent to which there are robust assessments or prediction of impacts of the fishery on protected, endangered, threatened or icon species, and if they are based on reliable knowledge methods for estimating risks, inferring or detecting ecological changes. This includes the use of specific gear type, the nature and extent of by-catch, fishing deployment techniques, discarded consumable, gear lost at seas, potential introduction of pest species, the impacts of discards and waste and the disturbance to natural behaviour of species.



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Elements considered in scoring include:

- 1. There have been studies of, or assessment of, the impacts in space and time of the fishery on the endangered, threatened, protected or icon species;
- 2. Impact detection and assessment is based on appropriate ecological understanding, on assumptions, sampling designs and inferential models that are appropriate, and uses spaces and time scales that are ecologically relevant;
- 3. The cause-effect models used in experimental studies to evaluate the nature of fishery impacts are appropriate, including their ecological and statistical basis;
- 4. The natural dynamics of the endangered, threatened, protected or icon species is adequately accounted for in determining the fishery-based impacts;
- 5. Factors outside the fishery management system that can have an impact on the fishery or the ecosystem are adequately considered in determining fishery-based impacts;
- 6. There is knowledge of the potential for effects of the type of gear, or fishery operations on the habitats and endangered, threatened, protected or icon species;
- 7. There is adequate knowledge of potential for endangered, threatened, protected or icon species that occur within the fished areas to recover after fishing (or the fishery activity) has been removed (reversibility of the effects).

100 Scoring Guidepost

- The effects of the fishery on endangered, threatened, protected or icon species has been conducted in a risk assessment in between fished and non-fished areas with involvement of all stakeholders.
- The impact-detection designs include space and time across a range of scales.
- The impact-detection designs include and control for the effects of factors outside the fishery in determining fishery impacts.

80 Scoring Guidepost

- There has been a risk assessment of the fishery on the endangered, threatened, protected or icon species.
- Such an evaluation is based, where possible, on information from fished versus unfished areas.

60 Scoring Guidepost

• There has been a risk assessment of the fishery on the endangered, threatened, protected or icon species.

Indicator 2I: The impact of lost fishing gear or lost consumables or disposed waste on endangered, threatened, protected or icon species is not unacceptable

The intent of this performance indicator is to evaluate the extent to which fishing gear and waste materials (such as processing waste and consumables) that are lost at sea have an impact on the endangered, threatened, protected or icon species.

Elements considered in scoring include:

1. Information of the extent of lost fishing gear and its effects on endangered, threatened, protected or icon species, and any physical habitat damages is available;



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 Information of the loss of processing and consumable wastes, their effects on endangered, threatened, protected or icon species is available, and any physical habitat damage is available.

100 Scoring Guidepost

- The nature of gear, consumables, and operational/processed waste has been measured and assessed across the fishery, and the extent of impacts has been measured and shown to be a negligible threat to endangered, threatened, protected or icon species.
- An effective waste program for minimisation of effects on endangered, threatened, protected or icon species should be operational.

80 Scoring Guidepost

- The extent of gear and consumable loss from the fishery has been estimated in at least one area, and gear or consumable loss from the fishery is not cited as a threatening, or potentially threatening, process in any formally implemented species management or recovery plans.
- A waste program for minimisation of effects on endangered, threatened, protected or icon species should be operational.

60 Scoring Guidepost

- The extent of gear and consumable loss from the fishery has been estimated in at least one area, and gear or consumable loss from the fishery is not cited as a threatening, or potentially threatening, process in any formally implemented species management or recovery plans.
- A waste minimisation program should be operational.

Indicator 2J: The fishery does not have unacceptable impacts on the endangered, threatened, protected or icon species and the associated ecosystem

The intent of this performance indicator is to evaluate the extent to which the fishery has unacceptable impacts on important aspects of the ecosystems, habitats of associated endangered, threatened, protected or icon species, where the fishery operates.

Elements considered in scoring include:

- 1. The effects of the removal of target endangered, threatened, protected or icon species biomass on species that depend on it as food source;
- 2. The effects of the fishery on the habitat structure, productivity of endangered, threatened, protected or icon species diversity/interactions in fished areas;
- 3. The interaction of by-catch, discarded species, including the target species, with the behaviour, dynamics, species diversity of the endangered, threatened, protected or icon species.

100 Scoring Guidepost

 In the major fishing areas, the distributions and abundance of the endangered, threatened, protected and icon populations are within acceptable limits.



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 In the main habitats, the impacts of fishing on the endangered, threatened, protected or icon species have been identified, described and assessed and, where necessary, corrective action has been undertaken.

80 Scoring Guidepost

- No unacceptable impacts of the fishery on the endangered, threatened, protected or icon species and their habitats have been demonstrated.
- Where unacceptable impacts have been identified, adequate corrective actions are being undertaken.

60 Scoring Guidepost

- Research programs are investigating the impacts of the fishery on the main habitats and the endangered, threatened, protected or icon species.
- The ecological impact issues in the fishery on the endangered, threatened, protected or icon species have been identified.
- Specific mitigation programmes have been initiated to address impacts.

Indicator 2K: Strategies are employed in the fisheries management system to address and restrain the impacts of the fishery on the endangered, threatened, protected or icon species

The intent of this performance indicator is to evaluate the extent to which the fisheries management system includes an appropriate set of strategies designed to restrain and reduce any important impacts of the fishery on the endangered, threatened, protected or icon species and where necessary facilitate rebuilding of populations of ecologically related species including endangered, threatened, protected or icon species.

Elements considered in scoring include:

- 1. Area-based ecological objectives, for populations of endangered, threatened, protected or icon species and their habitats, have been developed and implemented.
- 2. The levels of unacceptable impact have been identified for endangered, threatened, protected or icon species and their habitats in fished areas.
- 3. Monitoring programs designed to assess fishery impacts on endangered, threatened, protected or icon species are operational.
- 4. Fishery management measures are in place to enable adjustment of fishery practices where unacceptable impacts on endangered, threatened, protected or icon species have been identified.

- Management objectives and strategies designed to adequately protect endangered, threatened, protected or icon species from degradation are included as environmental objectives in the fisheries management plan.
- Fisheries operations use the objectives and limits to change of endangered, threatened, protected or icon species to guide operational practices.
- Variables related to endangered, threatened, protected or icon species are included within the fisheries monitoring program and in the management plan, and these data are used to guide and revise fishery management practices.



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80 Scoring Guidepost

- The fisheries management system includes management objectives and strategies for key aspects of the endangered, threatened, protected or icon species and their habitats where potential impacts of the fishery have been identified.
- The fisheries management system has the appropriate arrangements to adjust fishery operations if adverse impacts of the fishery on endangered, threatened, protected or icon species are detected.

60 Scoring Guidepost

- The fisheries management system includes elements to identify and address issues related to endangered, threatened, protected or icon species.
- The fisheries management system has the capacity to act upon issues related to endangered, threatened, protected or icon species.

Criterion 2.3

Omitted as argued under Criterion 1.2.

Principle 3

Criterion 3.1: Fishery Management System

Indicator 3A: The management system recognises use rights

The intent of this performance indicator is to evaluate to the extent to which the management system recognises and reflects national and international obligations.

Elements considered in scoring include:

- 1. Observe the legal and customary rights and long term interest of people dependent on fishing for food and livelihood, in a manner consistent with ecological sustainability;
- 2. The fishery shall not be conducted under a controversial unilateral exemption to an international agreement;
- 3. The fishery shall be conducted in a manner consistent with International Conventions and Agreements.

- The management system is fully effective in the identification, acknowledgement and in addressing legal and customary rights and long term interests of stakeholders in the fishery and in the setting of the TAC and addressing environmental and cultural issues.
- The management system has to fully reflect all relevant international conventions and agreements in managing the fishery.



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80 Scoring Guidepost

- The management system identifies, acknowledges and addresses legal and customary rights and long term interests of stakeholders in the fishery and in the setting of the TAC and addressing environmental and cultural issues.
- The management system has to reflect the main elements of all relevant international conventions and agreements in managing the fishery.

60 Scoring Guidepost

- The interests of stakeholders in the fishery are taken into account in the setting of the TAC and addressing environmental and cultural issues.
- The management system has to reflect the major international conventions and agreements in managing the fishery.

Indicator 3B: The management system has a clearly defined scope designed for a well-managed fishery

The intent of this performance indicator is to evaluate to the extent to which the fishery management system has an appropriate scope, content and process for a well-managed fishery.

Elements considered in scoring include:

- 1. Clear short and long-term objectives, including ecosystem objectives, consistent with a well-managed fishery;
- 2. A consultative process that is transparent and open to all interested and affected parties;
- 3. An appropriate mechanism for the resolution of disputes arising within the system;
- 4. Provide economic and social incentives that contribute to unsustainable fishing and shall not operate with subsidies that contribute to unsustainable fishing;
- 5. Specific measures and strategies that demonstrably control the degree of exploitation of the resource in the light of the natural variation in ecosystems;
- 6. The extent to which the fishery is supported by research that is adequate and appropriate for the needs of a well-managed fishery

- Clear short and long-term objectives, including ecosystem objectives, that are consistent with a well-managed fishery;
- A consultative process that is transparent and open to all interested and affected parties;
- An appropriate mechanism for the resolution of disputes arising within the fishery management system;
- Where economic and social incentives are provided they do not lead to unsustainable fishing;
- Specific measures and strategies are in place to control the degree of exploitation of the resource;
- The fishery is supported by comprehensive research, data-capture and analysis activities in stock management, environmental dynamics and assessments of fishing on ecosystems and icon species that may be affected by the fishery.



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80 Scoring Guidepost

- Short and long-term objectives, including ecosystem objectives, are consistent with a well-managed fishery;
- A consultative process is open to all interested and affected parties;
- A mechanism for the resolution of disputes arising within the fishery management system;
- Where economic and social incentives are provided they do not lead to unsustainable fishing.
- Specific measures and strategies are in place to control the degree of exploitation of the resource'
- Specific research projects are underway to address key uncertainties in management of the target species, management of ecosystem impacts of the fishery and management of potentially negative effects on icon species.

60 Scoring Guidepost

- Short and long-term objectives are consistent with a well-managed fishery;
- A consultative process does exist for those parties affected by the fishery;
- Evidence exists of successful dispute resolution;
- Incentives have been evaluated to ensure that they do not lead to unsustainable fishing;
- Measures are in place to control the degree of exploitation of the resource;
- The fishery is supported by research projects that address key aspects of stock management.

Indicator 3C: The management system has a comprehensive scope of planning The intent of this performance indicator is to evaluate to the extent to which the management system has been developed on the basis of a comprehensive scope of planning.

Elements considered in scoring include:

- 1. Management plan is consistent with the spatial scale and intensity of the fishery;
- 2. The planning is appropriate to the cultural, social and environmental context of the fishery and is of precautionary nature.

100 Scoring Guidepost

- The management plan is fully consistent with the spatial scale and intensity of the fishery;
- The plan fully reflects cultural, social and environmental elements of the fishery and is of precautionary nature.

80 Scoring Guidepost

- The management plan/system is consistent with the spatial scale and intensity of the fishery;
- The plan/system fully reflects cultural, social and environmental elements of the fishery and is of precautionary nature.

60 Scoring Guidepost

• The fishery operates under a system of management.



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 The system of management reflects cultural, social and environmental elements of the fishery and is of precautionary nature.

Indicator 3D: The management system is implemented

The intent of this performance indicator is to evaluate to the extent to which the management system is being implemented by the fishery.

Elements considered in scoring include:

- 1. Does the fishery have a procedures manual/handbook;
- 2. Are the procedures being implemented;
- 3. Specific measures and strategies that demonstrably control the degree of exploitation of the resource.

100 Scoring Guidepost

The management system is implemented and fully effective.

80 Scoring Guidepost

The management system is implemented and effective.

60 Scoring Guidepost

• The management system is implemented.

Indicator 3E: The management system has compliance and enforcement procedures The intent of this performance indicator is to evaluate to the extent to which the management system has efficient and effective compliance and enforcement procedures in place.

Elements considered in scoring include:

- 1. Are the procedures being adhered to;
- 2. Contains procedures for effective compliance, monitoring, control, surveillance and enforcement which ensure that management system controls are not violated and appropriate corrective actions are taken.

100 Scoring Guidepost

 The management system compliance and enforcement procedures are implemented and fully effective.

80 Scoring Guidepost

 The management system compliance and enforcement procedures are implemented and effective.

60 Scoring Guidepost

• The management system compliance and enforcement procedures are implemented.



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Indicator 3F: The management system has an effective monitoring system

The intent of this performance indicator is to evaluate to the extent to which the management system has a monitoring system that evaluates the performance of the fishery against its policy and objectives.

Elements considered in scoring include:

- 1. The monitoring programme of the fishery;
- 2. The monitoring procedures of the fishery;
- 3. The monitoring results of the fishery.

100 Scoring Guidepost

 The management system includes a monitoring programme that fully evaluates the performance of the fishery against its policy and objectives in a timely manner.

80 Scoring Guidepost

 The management system includes a monitoring programme that evaluates the performance of the fishery against its policy and objectives in a timely manner.

60 Scoring Guidepost

 The management system includes a monitoring programme that evaluates the performance of the fishery against its policy and objectives.

Indicator 3G: The management system has an effective review system The intent of this performance indicator is to evaluate to the extent to which the management system has a review system that is effective and timely.

Elements considered in scoring include:

- 1. Programme of internal assessment and review;
- 2. Programme of external assessment and review;
- 3. Guidelines for acting on assessment outcomes;
- 4. Research needs and funding.

100 Scoring Guidepost

- The management system includes internal and external processes that fully review the fishery performance annually.
- The management system review outcomes are fully incorporated into the fishery management in a timely manner.
- Research needs, priority and funding are effectively reviewed on an annual basis.

- The management system includes internal and external processes that fully review the fishery performance regularly.
- The management system review outcomes are incorporated into the fishery management in a timely manner.
- Research needs, priority and funding are adequately reviewed on an annual basis.



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60 Scoring Guidepost

- The performance of the fishery is regularly reviewed.
- Research needs, priority and funding are reviewed on an annual basis.

3.2 Criterion Fishery Operations

Indicator 3H: Make use of fishing gear and practices designed to avoid the capture of non-target species (and non-target size, age and/or sex of the target species); minimise mortality of this catch where it cannot be avoided and reduce discards of what cannot be released alive.

The intent of this performance indicator is to evaluate to the extent to which the management operations use fishing gear and practices that are designed to avoid the capture of non-target species.

Elements considered in scoring include:

- 1. Type of fishing gear;
- 2. The operational practices;
- 3. Incident reports;
- 4. Discards reports.

100 Scoring Guidepost

- There is an effective code of conduct for responsible fishing that is fully supported by fishers.
- Fishing gear and operations are designed for minimum impact on non-target species and the ecosystem.
- An appropriate record system of incident and discard reports is in place.

80 Scoring Guidepost

- There is an education and awareness program for fishers concerning responsible fishing practices.
- Fishing is conducted in a way that attempts to reduce impacts on non-target species and the ecosystem.
- An appropriate record system of incident and discard reports is in place.

- There is an education and awareness program for fishers concerning responsible fishing practices.
- Development of a code of conduct is underway that attempts to reduce impacts on nontarget species and the ecosystem.



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Indicator 3I: Implement appropriate fishing methods designed to minimise adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas

The intent of this performance indicator is to evaluate to the extent to which the management operations are set up to minimise the impacts on habitats and in particular sensitive zones such as spawning and nursery areas.

Elements considered in scoring include:

- 1. The impacts of the various fishing techniques used by the fishery;
- 2. Records on the distribution of critical or sensitive habitats in the fishery;
- 3. Controls and guidelines on fishery operations.

100 Scoring Guidepost

- No intensely destructive fishing practices are used in this fishery.
- There is an effective code of conduct for responsible fishing that is fully supported by fishers.
- Fishing gear and operations are designed for minimum impact on critical or sensitive habitats.
- Controls on fishery operations in critical or sensitive habitats are highly precautionary.

80 Scoring Guidepost

- No intensely destructive fishing practices are used in this fishery.
- There is an education and awareness program for fishers concerning responsible fishing practices.
- Fishing is conducted in a way that attempts to reduce impacts on critical or sensitive habitats.
- There are defined controls on fishery operations in critical or sensitive habitats.

60 Scoring Guidepost

- No intensely destructive fishing practices are used in this fishery.
- There is an education and awareness program for fishers concerning responsible fishing practices.
- Critical or sensitive habitats have been identified and development of a code of conduct is underway that attempts to reduce impacts.

Indicator 3J: Minimise operational waste

The intent of this performance indicator is to evaluate the extent to which the management operations minimise the disposal of waste (such as lost fishing gear, oil spills, on-board spoilage of catch and operational waste) generated by the fishery.

Elements considered in scoring include:

- 1. Type, quantity, location and frequency of lost fishing gear, oil spills, operational waste, sewage, plastics, etc.;
- 2. Management of unwanted catch of target species.
- 3. Management of unwanted by-catch of non-target species.



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100 Scoring Guidepost

- Operational wastes are not disposed at sea by the fishery.
- Accidental losses of fishing gear are minimised by highly precautionary fishing practices.
- Full documented utilisation of all target fish species catch.

80 Scoring Guidepost

- Operational wastes are at defined low levels, and plans to minimise them are supported by fishers.
- Accidental losses of fishing gear are minimised by sound fishing practices.
- Disposal at sea of target fish species catch is at defined and acceptable low levels.

60 Scoring Guidepost

- A program to minimise operational waste and gear loss is in place.
- A program to minimise disposal of target fish species is in place.

Indicator 3K: The fishery operations are conducted in compliance all legal and administrative requirements

The intent of this performance indicator is to evaluate the extent to which the fishery operations operate within the legal and administrational requirements applicable to the fishery.

Elements considered in scoring include:

- 1. Legislation requirements of all relevant acts;
- 2. Codes of Practice.

100 Scoring Guidepost

• There is a very high level of compliance with all legislative requirements and agreed management arrangements and measures.

80 Scoring Guidepost

 There is an adequate level of compliance with all legislative requirements and agreed management arrangements and measures.

60 Scoring Guidepost

The fishery operation complies with all legislative requirements.

Indicator 3L: The fishery operation assists and co-operates with management authorities in the collection of catch, discard and other information of importance for the effective management of the resource and and the associated ecosystem The intent of this performance indicator is to evaluate the extent to which the fishery operation are assisting with the collecting of data for the benefit of the fishery.

Elements considered in scoring include:

- 1. Data collection by the fishery;
- 2. Distribution of collected data to appropriate authorities.



100 Scoring Guidepost

- Fishers are significantly involved in the collection of appropriate data.
- The distribution of collected data to appropriate authorities is conducted in a timely manner.
- Voluntary information provided by the fishermen is monitored and occasionally collated and analysed alongside other information sources for the fishery.

80 Scoring Guidepost

- Fishers are actively involved in the collection of appropriate data.
- The distribution of collected data to appropriate authorities is conducted.

60 Scoring Guidepost

Fishers are involved in the collection of appropriate data.



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VIII. HOKI SCORING OUTCOME

MSC Principle	MSC Criterion	Hoki Performance Indicator
Principle 1 (Score 82) A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery	Criterion 1.1 (Score 82) The fishery shall be conducted at catch levels that continually maintain the high productivity of the target population(s) and associated ecological community relative to its potential productivity.	Indicator 1A: There is adequate knowledge about the target stock being fished (Score 87,5) Indicator 1B: There is adequate knowledge about the fishery (Score 90) Indicator 1C: There is a robust assessment of the stocks (Score 86,25) Indicator 1D: There is a well-defined and effective strategy to manage the target stocks (Score 70) Indicator 1E: Stocks are not depleted and harvest rates are sustainable (Score 75)
	Criterion 1.2 Where the exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level consistent with the precautionary approach and the ability of the populations to produce long-term potential yields within a specified time frame	Not used for hoki assessment
	Criterion 1.3 (Score 82) Fishing is conducted in a manner that does not alter the age or genetic structure or sex composition to a degree that impairs reproductive capacity.	Indicator 1F: There is adequate knowledge about the target stock being fished (Score 83,75) Indicator 1G: There is adequate knowledge about the fishery (Score 85) Indicator 1H: There is a well-defined and effective strategy to manage the target stocks (Score 76,25)
Principle 2 (Score 80) Fishing operations should allow for the maintenance of the structure, productivity, function and diversity	<u>Criterion 2.1 (Score 77)</u> The fishery is conducted in a way that maintains natural functional relationships among species and	Indicator 2A: There is adequate knowledge of the ecosystem and its value where the fishery operates (Score 76,25) Indicator 2B: The fishery is conducted in a manner that does not have unacceptable impacts on protected, threatened,



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of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends.	MAD-06 Main Asset ecosystem should not lead to ling habitat and trophic cascades or ated dependent coogically d species) on the fishery ds. ds.		endangered or highly valued icon species (Score 80) <u>Indicator 2C</u> : An ecological risk assessment has been conducted to determine the potential impacts of the fishery on the environment (Score 70) <u>Indicator 2D</u> : The impact of lost fishing gear or lost consumables or disposed waste on target or non-target species is not unacceptable (Score 87,5) <u>Indicator 2E</u> : The fishery does not have unacceptable impacts on the ecosystem structure or function, on habitats or on the populations of dependent or otherwise associated species (Score 73,75) <u>Indicator 2F</u> : Precautionary strategies are employed in the fisheries management system to address and restrain the impacts of the fishery on the ecosystem (Score 80)	
	Critt The con that biol the pop avo moi to e thre spe	erion 2.2 (Score 82) fishery is ducted in a manner does not threaten ogical diversity at genetic, species or ulation levels and ids or minimises tality of, or injuries ndangered, eatened or protected cies.	impacts of the fishery on the ecosystem (Score 80) Indicator 2G: There is adequate knowledge of the ecosystem and its value where the fishery operates in relation to protected, endangered, threatened or icon species (Score 87,5) Indicator 2H: An ecological risk assessment has been conducted to determine the potential impacts of the fishery on the genetic, species and population level biodiversity of the protected, endangered, threatened or icon species (Score 72,5) Indicator 2I: The impact of lost fishing gear or lost consumables or disposed waste on endangered, threatened, protected or icon species is not unacceptable (Score 86,75) Indicator 2J: The fishery does not have unacceptable impacts on the endangered threatened, protected or icon species an the associated ecosystem (Score 81,25) Indicator 2K: Strategies are employed in the fisheries management system to address and restrain the impacts of the fishery on the endangered, threatened, protected or icon species (Score 86,75) Not used for hoki assessment	
Criterion 2.3 Where exploited populations are		I NUL USEU TOF NOKI ASS	essment	

depleted, the fishery


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Principle 3 (Score 83) The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.	will that rebu occ leve time with app con of tl proo pote <u>Crit</u> Mar Crit	be executed such t recovery and uilding is allowed to ur to a specified e frames, consistent of the precautionary proach and sidering the ability he population to duce long-term ential yields. erion 3A hagement System eria (Score 82)	Indicator 3A: The main recognises use rights Indicator 3B: The main has a clearly defined a well-managed fishe Indicator 3C: The main has a comprehensive (Score 78,25) Indicator 3D: The main has compliance and exprocedures (Score 77 Indicator 3E: The main has compliance and exprocedures (Score 77 Indicator 3E: The main has an effective monin 85) Indicator 3G: The main has an effective revies Indicator 3H: Make us and practices designed capture of non-target target size, age and/or species); minimise miniwhere it cannot be av	nagement system (Score 84,25) nagement system scope designed for ry (Score 84,25) nagement system scope of planning nagement system is 76,25) nagement system enforcement 7,25) nagement system toring system (Score nagement system toring system (Score nagement system w system (Score 85) se of fishing gear ed to avoid the species (and non- or sex of the target ortality of this catch oided and reduce
			discards of what cannot be av discards of what cannot (Score 90) <u>Indicator 31</u> : Impleme fishing methods desig adverse impacts on h critical or sensitive zo spawning and nursery <u>Indicator 3J</u> : Minimise Indicator 3K: The fish conducted in complia administrative require <u>Indicator 3L</u> : The fish and co-operates with authorities in the colle	not be released alive not be released alive and to minimise abitat, especially in nes such as y areas (Score 80) e operational waste ery operations are nce all legal and ements (86,75) ery operation assists management ection of catch,

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		discard and o importance fo of the resour ecosystem (S	discard and other information of importance for the effective managemer of the resource and and the associated ecosystem (Score 81,25)	



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X. WWF-NZ STAKEHOLDER INPUT

Murray Fairweather SGS Product and Process Certification MSC Fisheries Programme SGS New Zealand PO Box 13518 Onehunga AUCKLAND

Dear Murray

Hoki MSC Certification: WWF's submission

Please find enclosed WWF's submission on the MSC Hoki certification assessment. WWF is of the view that the Hoki Fishery does not yet meet the MSC requirements as it is currently managed. In summary, the fishery should not be certified unless the following conditions are met.

- **Maintaining the stock:** The catch level should be immediately lowered so that there is 95% confidence that the stock will not drop below the 20% biomass level. This confidence level should apply to both the eastern and western stocks.
- **Ecosystem approach:** Within 5 years the B_{MSY} must be recalculated taking into account ecological functions, such as the needs of species that prey on Hoki.
- **Genetic diversity:** Within 2 years plans must be developed and implemented to protect the genetic diversity of Hoki. Practical means could include establishing marine protected areas in certain locations.
- **Seals:** Seal exclusion devices should be fitted to nets as soon as is practicable. There should be a long term goal of zero seal by-catch and at least a 50% reduction in seal catches each year.
- **Birds:** Work should begin immediately to develop a plan to reduce seabird by-catch. The long term goal for seabird by-catch should be zero. There should be a 50% reduction in bird by-catch each year.
- **Protecting marine benthos:** Within 2 years develop and implement plans to identify and protect ecologically important areas of the seabed from trawling.
- **Comprehensive fisheries management plan:** Within 2 years a comprehensive fisheries management plan must be developed that covers all the above points and clearly identifies a long term information and management strategy for the Hoki fishery.

Additionally, subsequent to the advice of my colleague Katherine Short regarding the issues WWF has with the stakeholder process, we are concerned about the timing of the process for consultation. In particular the short timeframe that was given to stakeholders between their meetings with the assessment team and the close of submissions.



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We are most interested in the result of your deliberations for assessing this fishery.

Yours sincerely

Eric Pyle Conservation Director WWF New Zealand



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Submission on the assessment of the New Zealand Hoki (*Macruronus novaezealandiae*) Fishery against the Marine Stewardship Council's Principles and Criteria for Sustainable Fishing

About World Wide Fund For Nature

World Wide Fund For Nature is the world's largest and most experienced independent conservation organisation, with around 5 million supporters and a global network of 27 National Organizations, 5 Associates, and 21 Programme Offices.

WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by:

- conserving the world's biological diversity
- ensuring that the use of renewable natural resources is sustainable
- promoting the reduction of pollution and wasteful consumption

WWF supports the approach of certifying healthy and well-managed fisheries that meet the Marine Stewardship Council's Principles and Criteria. WWF and Unilever established the Marine Stewardship Council in 1996 to create market incentives for sustainable fishing.

- WWF does not support certification of the hoki fishery unless it is required to meet the conditions that are described in this submission and summarised in the covering letter.
- We have learnt from the Western Rock Lobster certification that to be successfully certified, a detailed and comprehensive set of requirements needs to be developed. They must address the issues raised through the assessment, from this submission, and from those identified by other stakeholders.
- Again, based on the experience with Western Rock Lobster, if successful, WWF expects that at the time of any announcement of successful certification, any requirements developed should be published on the MSC website and mentioned in any such announcement.

The ideas and recommendations described in this submission are predicated on the thorough application of the Precautionary Principle in managing human interactions with the marine environment. Giving meaning to the use of the Precautionary Principle for managing fisheries is often thought to be fraught with opinion, expense, idealism and differences in interpretation, however there are a range of pragmatic tools that can be used to start to interpret this principle.

These include:

- the protection of spawning aggregations,
- the protection of sites where key spawning and life cycle events occur,
- the use of spatial, temporal and permanent area closures (marine protected areas¹ of all types and for all purposes),

¹ Roberts and Hawkins (2000) describe Marine Protected Area's (MPA's) as: The World Conservation Union (IUCN) defines marine protected areas as "any area of intertidal or subtidal terrain, together with it's overlying water and associated flora, fauna, historical of cultural features, which has been reserved by law, or other effective means, to protect part of all of the enclosed environment". An MPA can be zoned to support multiple uses, including zones providing full protection. Some authors have argued that the possession of at least one fully-protected zone should be a minimum standard for MPA's. They mention



- understanding and protecting the genetic diversity of the target species,
- understanding and protecting the genetic diversity of key associated and dependent species,
- understanding the ecological interactions of key associated and dependent species and protecting the ecological functions that they carry out,
- development, application and use of appropriate mitigation measures to reduce nontarget bycatch, and;
- development and implementation of clear, objective based management plans.

Specifically WWF questions the appropriateness of B_{MSY} as an objective appropriate for modern fisheries management. It was internationally recognised that New Zealand led the field of fisheries management in the late eighties when the Quota Management System (QMS) was introduced. New Zealand now needs to extend this leadership through demonstrating that it has adopted an ecosystems approach to fisheries management. In November 1999 at 'Fishrights99'² New Zealand Ministry of Fisheries' officers publicly acknowledged the QMS is a system for managing quota, not a fishery management system. Those involved with fisheries management in New Zealand must develop fishery management plans that consider and take account of the whole marine environment as a functioning ecosystem from which we all want to be able to extract product, in this case fish, long into the future. WWF considers that the goal for fisheries management today should be rebuilding ecosystems where they are degraded in order to allow marine ecosystems to continue to provide the services, both utilitarian and aesthetic, that humans and other species require for generations to come. This is reinforced by the latest work of Pitcher $(2000)^3$ from the University of British Colombia's Fisheries Centre, and the MSC approach is one way of working to achieve this that WWF fully supports. It is necessary to set the fishery in the ecosystem context, which would be an advance on the current fishery management approach used in New Zealand.

fully-protected marine reserves and no-take marine reserves as additional specific management mechanisms for particular situations.

² Fishrights99, organised by Fisheries WA and the FAO - a conference on property rights for fisheries management held in Fremantle, Australia

³ Pitcher, T.J. 2000. Rebuilding ecosystems as a new goal for fisheries management: reconstructing the past to salvage the future. Fisheries Centre, University of British Colombia.



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Key Issues

As WWF's Mission is to conserve biodiversity, this submission is structured to discuss the following areas of concern:

1. <u>Target Stock Sustainability</u>

- 1.1 Stock Assessment Risks
- 1.2 Ecological Function of the Target Stock
- 1.3 Genetic Diversity
- 1.4 Marine Protected Areas as a Management Tool

2. <u>Ecological Interactions</u>

- 2.1 Trophic Interactions
- 2.2 New Zealand Fur Seal
- 2.3 Seabirds
- 2.4 Physical Interactions

3. Management

4. <u>Comments on the Stakeholder Process</u>

Appendices

- 1. Stakeholder advice letter
- 2. Comments on the Performance Criteria and Scoring Guideposts

References

1. Target Stock Sustainability

1.1 Stock Assessment Risks

We understand there are serious risks associated with the harvest of the Eastern Stock at current levels. Recent stock assessments indicate there is between 58% and 69% risk that the stock would go below 20% B₀ in the next 5 years (Annala et al.)⁴. Although it has been known for some time that the Eastern Stock is one quarter to one fifth of the size of the Western Stock, the TAC is drawn equally from the two stocks and the fishery is managed as one fishery management area.

We consider that these levels of risk are unacceptable and consider that a 95% level of certainty that the fishery will not go below 20% B_0 should be required in order to meet MSC certification. We also question the appropriateness of 20% as a trigger level for sustainability decisions. (See below).

⁴ Report from the Fishery Assessment Plenary, May 2000: stock assessments and yield estimates Compiled by J.H. Annala, K.J.Sullivan and C.J O'Brien, Science Policy, Ministry of Fisheries, New Zealand.



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While the risk is less for the Western Stock at 23% (Annala et al.) It may not be possible for the Western Stock to sustain a switch in harvest effort if the proportion of the TACC taken from the Eastern Stock were to be transferred to the Western. The risk to the Western Stock would dramatically increase. However any increase in fishing on the Western Stock is likely to add to Fur Seal deaths which in our view, are already at an unacceptable level. (See 2. Ecological Interactions)

Annala et al. also mention there are strong differences and inconsistencies in abundance trends indicated by CPUE analyses and the acoustic series between the late 1980's and 1990's. These inconsistencies must be resolved.

WWF recommends the assessment team source a thorough breakdown and description of the areas of the stock assessment process that need development and redesign. This is necessary in order to achieve a fishery that is managed taking account of these many overlaying complexities ie. modelling, size of stock, data collection methodologies, interpretation anomalies, TAC setting, levels of risk and uncertainty etc. A requirement of certification must be the redesign of the stock assessment process to incorporate the additional areas through the adaptive management plan (also required for certification) within two years.

 B_{MSY} is the management target for fisheries under the Quota Management System in New Zealand fisheries law. While the MSC requires a robust management framework and system to operate against, WWF does not consider B_{MSY} , as it is commonly used, to reflect an ecosystem approach. Too often under the single species approach of the Quota Management System only the sustainability of the target stock is considered and B_{MSY} as the management target reinforces this. Too often it is not known how much of a target species must be left in the water for the marine ecosystem to function and WWF regularly encourages fisheries managers to develop their thinking in this area and use adaptive management techniques to do so. (See 1.2 Ecological Function). At the Middle Depth Research Planning meeting in Wellington on the 25th of August this year, it was also clear that there are many research areas that could provide more certainty in the scientific advice contributing to management decisions, especially in the ecosystems area.

WWF recommends the assessment thoroughly consider the use of B_{MSY} in an ecological context. This must lead to the published revision within 5 years of the use of B_{MSY} as the target, and demonstrating that management system has satisfactorily incorporated an ecosystems approach.

1.2 Ecological Function of the Target Stock

From the perspectives of target stock sustainability, biodiversity conservation and ecological function, it is important to ground the target stock within the ecological community that it is a part of. It is likely there are ecological interdependencies that are critical to the sustainability of hoki itself, let alone the wider ecosystem, and it is essential to understand these.

The information available to assess the functional ecological role for hoki and thus manage the stocks as integral parts of the ecosystem is inadequate. This is required to fully use the

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precautionary approach. According to Quinn and Sullivan (1999)⁵ little is known about early life movements and stock mixing. Additionally length frequency data indicates the average size at catch has decreased in the Western Stock and this may suggest larger individuals have been fished down. While this may be a rational strategy for optimal productivity of the target stock, it does not take account of the longer-term ecological function requirements of a healthy, genetically diverse ecological community.

WWF considers that a plan to source the necessary information to recalculate B_{MSY} taking into account ecological interactions must be developed and significant progress made to incorporate this information in the recalculation of B_{MSY} within 2 years.

1.3 Genetic Diversity

Genetic diversity within hoki is not thought to be high according to Livingstone⁶ however a thorough assessment of the full genetic diversity of the hoki stocks and sub-stocks including the outlying individuals is necessary. Ensuring these individuals are not fished in the meantime would also be the appropriate precautionary strategy. Industry representatives⁷, at the Middle Depth Research Meeting held in Wellington in August 2000, described how the exploratory fishing activities have shown substantially larger individuals around deeper seamounts in smaller volumes. Has the genetic diversity of these individuals been considered? Has their role in the overall functioning of the stocks been evaluated? NIWA is currently undertaking further morphometric analysis and there needs to be an adaptive management framework to incorporate these lessons.

- WWF would strongly recommend that the question of genetic diversity of the stock be addressed within two years..
- Closed areas around these 'outliers' need to be designed.
- Knowledge needs to be shared with the scientific community about stock genetics.
- An appropriate research strategy to thoroughly understand the genetic makeup of the stock needs to be developed.
- These should be requirements of certification under Principle 1 and plans developed to address them within one year for subsequent implementation.

1.4 Marine Protected Areas as a Management Tool

Additionally recent evidence⁸ clearly demonstrates the benefits of closed areas, marine protected areas and no-take zones for commercial fisheries and the marine ecosystem. The precautionary approach requires management strategies that consider the sustainability of the full spatial and genetic range of the stock and Quinn and Sullivan 1999 state;

⁵ Quinn, T.J., and Sullivan, P., 1999. Review of Hoki Stock Assessment Research. NZ Ministry of Fisheries.

⁶ In Annala et al. May 2000

⁷ Richard Wells, Fishing Operations Manager for Sealord Fishing, Jim Mace, Hoki Management Company

⁸ Roberts and Hawkins (2000) and Salm, Clark and Siirila (2000)

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"robust management strategies that reduce the effects of stock assessment errors should also be sought (Natural Research Council 1998a). These measures may include time and area closures, protected areas, and gear limits....that are insensitive to estimation errors that affect TAC calculations."

Real time analysis of stock distribution, abundance, movement and the availability of areas for fishing, are all techniques that can be developed with modern integrated adaptive management tools and incorporated as key facets of the fishery management plan.

WWF recommends that a system of spatial and temporal closures be designed within three years, and implemented within 5, as part of the fishery adaptive management plan. The specific design objective being: managing for the sustainability of the genetic diversity of the hoki stocks.

2. Ecological Interactions

Too frequently ecological interactions only focus on the 'charismatic megafauna'⁹ of seabirds and marine mammals. While there are serious issues for both New Zealand Fur Seals and an array of seabird species associated with the hoki fishery, the Marine Stewardship Council's Principles and Criteria for Sustainable Fishing also require consideration and management of the less obvious species, under the water.

2.1 Trophic Interactions

The interdependencies of hoki under the water have been briefly mentioned in Section 1. It is a requirement of the NZ Fisheries Act that these relationships be considered when making management decisions. Additionally Principle 2 Criteria 1 of the Marine Stewardship Council's Principles and Criteria for Sustainable Fishing requires the fishery to be "conducted in a way that maintains natural functional relationships among species and should not lead to trophic cascades or ecosystem state changes".

Additionally, the Terms of Reference for Fishery Assessment Working Groups for 1999-2000¹⁰, Second bullet points for 3.a)b)and c) Point 2 state words to the effect:

• to identify any factors relating to the interdependence of stocks of fish that would determine whether a larger stock level is appropriate.

These objectives are designed to ground the target stock within the ecological community of which it is a part. Although it is known that hoki commonly eat midwater species such as small fish, crustaceans and squid, they are also prey to many deeper species, particularly as juveniles. The information is scant and there is little understanding and research to fulfil these particular Terms of Reference.

⁹ A colloquial term meaning big fluffy, warm fuzzy creatures. Also used negatively and sarcastically to describe species such as pandas, seals and albatross as they are often used for fundraising!

¹⁰ As described in Annala et al.

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Trawl surveys and the analyses of the content of the catch demonstrate that Ling, Silver Warehou and Hake are all caught as bycatch in the hoki fishery and there are mixed opinions about the sustainability of these particular species. Some of the tools used to monitor and analyse them are also those developed for hoki and are therefore crudely applied to these other species. There is also little evidence, given the lack of understanding about the ecological and functional requirements of these species, that consideration has been given to the sustainability of the ecological community these species contribute to, when setting the various TACs.

It is paramount that the broadest range of ecological interactions possible are described and a thorough risk analysis of the key trophic relationships completed. In essence, those making decisions about the hoki fishery need to understand the ecosystem dynamics of the fishery and how much fish can be extracted while still maintaining a functioning ecosystem. While the ecological assessment models of the past have been clumsy and no substitute for having a 'good look under the water'¹¹, the ecological modeling techniques presently being developed by researchers internationally, are a great improvement.

- WWF recommends a thorough ecological assessment of the fishery within one year, using and building on, the techniques that are currently being developed for the Western Rock Lobster fishery to fulfil a requirement of MSC certification.
- WWF recommends that the issues identified through the ecological assessment are addressed through the adaptive management plan (suggested requirement under 3. Management see below) within 5 years.
- We recommend the hoki fishery assess and incorporate the principles of the latest techniques in ecological modelling. Demonstrable progress needs to be made within one year.

2.2 New Zealand Fur Seal

The incidental capture of the New Zealand Fur Seal (*Arctocephalus forsterii*) is a persistent and serious problem within the NZ EEZ¹². They are protected throughout the Exclusive Economic Zone by the Marine Mammals Protection Act (MMPA) 1978. As shown by the many environmental non-government organisation campaigns to put an end to this problem, it is unacceptable to the New Zealand public, that deaths of fur seals continue in the normal operations of the hoki fishery and other trawl fisheries in New Zealand waters.

Although hoki is often trawled at depths far below the depths that fur seals are known to dive, the capture of fur seals is common as the nets are hauled. In some years as many as 1000 fur seals may be killed in the Hoki fishery. Killing 100 animals of a specie that is protected by law is not acceptable in WWF's view.

¹¹ Ground-truthing theoretical marine science through underwater experiments and at-sea research is costly. Often sufficient theoretical evidence has to be gathered before the expense can be justified.

¹² DOC Science for Conservation 81.

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The greatest abundance of hoki is between 200m and 600m and as there is evidence that female fur seals off the West Coast are known to be able to dive to 238m (DOC) and hoki is also a natural component of their diet, the risks are constant. The New Zealand government through the Department of Conservation has taken the approach of developing Population Management Plans for species such as Hooker's Sealion, which is listed as rare under New Zealand law, however there are no plans to do this for the NZ Fur Seal.

West Coast South Island (WCSI) annual pup estimates are conducted by the Department of Conservation at rookeries on the West Coast including Wekakura Point in North West Nelson, Cape Foulwind in North Westland, Taumaka Island and Open Bay Islands in South Westland. The data collected by DOC do not show an obvious increase in annual estimated pup numbers on the three study rookeries over the last decade. It is not clear at this stage if the overall trend in pup numbers per rookery is stable, with periodic annual fluctuations, or declining, owing to the likely affects of La Nina weather patterns. Fur seals typically feed on cool water species and during the periodic warming climatic events, these fish are likely to be less abundant to breeding cows foraging from home rookeries. These cows are likely to have difficulty obtaining sufficient food to bear and raise pups. The impact of fur seal bycatch in the hoki fishery of the WCSI is not known. (Best, pers.comm)¹³

Although the NZ Fur Seal is not listed as endangered, it is protected under the Marine Mammals Protection Act 1978 and the Department of Conservation needs to embark on a process to develop a Population Management Plan for this species. This would require definitive, up to date science on the current status of the Fur Seal throughout New Zealand waters, the numbers killed in fishery interactions, the source rookeries of the individuals caught, the ability or otherwise to exclude them and modelling of the various factors with climactic inputs also. It would require stakeholders such as the fishing industry, Maori, the conservation community and wider public to engage in an organised process. It would give those with varying views about the management of this species, such as those who desire complete protection (as is the case presently) and those who believe a certain level of harvest and/or mortality is acceptable to engage in a focussed way.

A marine mammal exclusion device (MMED) has been developed and shown to work effectively, with minimal disruption to the fishing operation and at very reasonable cost¹⁴. An efficient fishing operation works to minimise the capture of non-target species and thus the hoki fishery should require their use as a normal part of the operations of a fishery with 'best practice management.

• WWF recommends that the range and extent of the impacts on the NZ Fur Seal population of the hoki fishery be considered as part of the ecological strategic risk assessment required under Principle 2 and suggested in 2.1 above.

¹³ Hugh Best, DOC Science and Research Fur Seal Scientist pers. comm November 2000.

¹⁴ Gibson, D., Isakssen, B. 1998. Functionality of a full-sized marine mammal exclusion device. Science for Conservation. Department of Conservation, New Zealand.

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- WWF recommends that the MSC require the hoki fishery to participate in, or initiate, with the Department of Conservation and Ministry of Fisheries, a full Population Management Plan process for the New Zealand Fur Seal within three years..
- In the meantime, WWF recommends the establishment of no-go areas at relevant times, to avoid the incidental capture of NZ Fur Seals as identified by the ecological strategic risk assessment within two years. If necessary permanent closures should be developed around areas of intense feeding or areas of other intense behaviour (ecological hot spots or particular physical features.)
- Additionally, in the meantime, WWF recommends that a process is instigated to determine the origins of bycaught individuals through systematically sampling for genetic information.
- WWF strongly recommends the immediate trial and public assessment of marine mammal exclusion devices in real fishing operations and that it be clearly ascertained that NZ Fur Seals are being excluded alive and unharmed.
- Should the assessment of MMED's prove successful, WWF strongly recommends the MSC assessment immediately require vessels trawling for hoki to fit them to all trawl nets to achieve the ultimate goal of zero bycatch by 2005, or earlier, if determined by the Population Management Plan.

2.3 Seabirds

Part A: Threatened Seabirds of the Action Plan for Seabird Conservation in New Zealand¹⁵ sets out how the incidental capture of seabirds by longline and trawl fisheries will be addressed over the next five years. The current impact of trawl fisheries on seabirds is unclear and although some support the idea that trawl fisheries can support seabird populations by providing new food sources, from an ecological function and biodiversity conservation perspective WWF seeks to minimise the disruption to natural systems from industrial natural resource use.

According to unpublished observer coverage and described in Part A: Threatened Seabirds, white-capped albatross (*Thalassarche steadi* - IUCN Rank Vulnerable) and sooty shearwater are the species most frequently killed in trawls. There is also the impact on populations from deaths incurred through incidental bird-strike, when birds are killed through flying into fishing gear and the structures of the vessels themselves. Little detailed quantification and analyses of these impacts have been done and the MSC process should require that this be considered and addressed through the ecological strategic risk assessment and subsequent adaptive management decisions.

While mitigation techniques have been developed for longline fisheries, information specifically related seabird mortality from trawl fisheries is scarce. Additionally the question of competition for fish as food, rather than only alterations of behaviour could well be a serious ecological problem.

¹⁵ Department of Conservation. May 2000. Action Plan for Seabird Conservation in New Zealand. Threatened Species Publication No. 16.



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- WWF recommends that the range and extent of the impacts on seabird populations of the hoki fishery be considered as part of the ecological strategic risk assessment. This needs to include, but not be limited to, the behavioural changes that may have developed through the presence of the fishery (ie. feeding on offal and feeding on fish in the nets before they are hauled), the potential competition for food and the impact of direct bird strike.
- Where the seabird species are already listed as threatened, vulnerable or endangered, WWF recommends that immediate and substantial steps, such as developing Population Management Plans for specific species or communities of species, be taken to prevent further mortality.
- WWF recommends that the ultimate goal of zero mortality of listed seabirds should be achieved by 2005 or earlier if determined by the various Population Management Plans.
- Additionally, WWF recommends that other steps such as trials of the use and efficacy of mitigation measures such as scaring devices be conducted immediately.

2.4 Physical Interactions

Little information is available about the impact of trawling on the seabed. Although much of the fishing occurs in midwater, scientific opinion suggests that up to 50% of the EEZ of New Zealand has been, or is regularly trawled. What is the nature and extent of the area of the bottom that has been trawled? What is the degree of bottom trawling currently in the fishery? What is the degree of recovery? Although a number of seamounts were closed to bottom trawling in September this year, there are no offshore marine protected areas of in New Zealand that take the whole ecosystem of those areas into account. Have there been any retrospective surveys of areas that have been bottom trawled for monitoring of recovery etc? Has the Hoki Management Company considered a pro-active strategy for addressing such issues?

WWF recommends that the degree of impact of the hoki fishery on the seabed be evaluated as part of the ecological strategic risk assessment. Following this an appropriate mosaic of permanent area closures should be designed and implemented within three years, to protect key features, areas, ecological hot spots and if necessary, allow for ecosystem rebuilding where damage has occurred in the past.

3. Management

It is grossly inadequate that the hoki fishery does not have a published management plan containing management objectives that fulfill ALL the requirements of New Zealand fisheries legislation.

• WWF recommends the immediate development of a comprehensive adaptive management plan to achieve a healthy and well-managed fishery.



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- WWF strongly encourages the MSC to require the process for the development of this plan to take account of the New Zealand context, and recognise it is essential to include all stakeholders in the development of such a plan. These include but are not limited to, the various government departments, industry representatives, customary maori, environmental NGO's and recreational fishers.
- WWF would also like to take the opportunity of contributing to this submission, to request that any development of such a plan include our fisheries officers regionally.

4. Comments on the Stakeholder Process

Although not requested for the purposes of this submission WWF would like to reinforce the detailed comments provided to SGSNZ on the Stakeholder process conducted to assess the hoki fishery (copied to the MSC). Transparency, inclusiveness, and due consideration of the full range of opinion and facts are core tenets of the MSC approach. Although the stakeholder process is not prescribed by the MSC, WWF gave thorough advice about the potential pitfalls associated with the hoki assessment process to SGSNZ. We understand budget constraints have limited the opportunity to seek thorough professional analysis of some of the key questions associated with this assessment.

If the fishery is to be certified, WWF urges SGS to ensure the limitations of information and resources are overcome to allow for the drafting of detailed requirements, in time for any announcement about such a certification.

To reiterate:

- WWF does not support certification of the hoki fishery unless it is required to meet the conditions that are described in this submission and summarised in the covering letter.
- We have learnt from the Western Rock Lobster certification that to be successfully certified, a detailed and comprehensive set of requirements needs to be developed. They must address the issues raised through the assessment, from this submission, and from those identified by other stakeholders.
- Again, based on the experience with Western Rock Lobster, if successful, WWF expects that at the time of any announcement of successful certification, any requirements developed should be published on the MSC website and mentioned in any such announcement.

The letter that was originally sent to SGSNZ on 25th October 00 is attached as Appendix 1.

Prepared by Katherine Short, Sustainable Fisheries Officer with WWF Australia with input from Jo Anderson, Conservation Policy Officer WWFNZ and Mona Qureshi, volunteer with WWF Australia.

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Endorsed by Dr Ray Nias, Conservation Director, WWF Australia and Eric Pyle, Conservation Director, WWF New Zealand.

Should you wish to discuss any of the matters raised in this submission, please feel free to contact Katherine Short, kshort@WWF.org.au, Eric Pyle, eric.pyle@WWF.org.nz or Dr Ray Nias rnias@WWF.org.au



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Appendix 1

Murray Fairweather Manager New Zealand SGS International Certification Services SGS Product and Pocess Certification MSC Fisheries Programme C/o SGS New Zealand Ltd PO Box 13518 Onehunga, Auckland New Zealand

25th October00

Dear Murray,

Thank you for the invitation to participate in the stakeholder consultation for the Hoki Assessment. Eric Pyle and I will be developing a written submission on the Hoki certification within the one month timeframe indicated on page two of the letter.

We have developed an excellent working relationship and having read through your letter and attached documents thoroughly, I believe it important to make a number of comments on them to encourage rigour in the stakeholder process of Marine Stewardship Council assessment of the Hoki fishery. In the absence of explicitly published MSC process guidelines for stakeholder consultation (that I am aware of) and being aware of the consultation and communication needs of busy, under-resourced environmental NGO's, I offer the following for your consideration.

I appreciate that this material has already been disseminated to the stakeholders on the list included, however if you feel these comments useful, I would urge you to consider providing additional information to clarify the issues raised.

1. <u>The Cover Letter</u>

1.1 I believe this letter is premised on several assumptions which may be incorrect such as: stakeholders already know about the MSC, have adequate information at hand about the fishery, understand the MSC's processes and how an assessment works and are familiar with the Principles and Criteria. I have visited many of the stakeholders and briefly and informally introduced the MSC but I am assuming that this is not be the sole information base relied upon for informing the stakeholders about the MSC.

1.2 The mention in the first paragraph of the 'MSC Fishery Programme (accredited by the MSC)' and then 'MSC Certification Programme' is confusing. I think I understand that the former is SGS's internal MSC work programme but this may not be the case for all stakeholders, ie. there needs to be an explanation of how SGS is working with the MSC, that SGS was accredited internationally once the Thames Herring certification was awarded (note the second paragraph of section three of the Stakeholder Briefing Note mentions the Fishery Certification Programme is soon to be accredited.



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1.3 What are 'Local Standard performance criteria' mentioned in the introduction? Does this paragraph mean stakeholders are invited to assist in the creation of these? Do you mean Scoring Guidelines? If so it may be useful to direct people to the MSC website and mention the Western Rock Lobster Scoring Guidelines.

1.4 The following paragraph mentions "a new and systematic approach for gathering information from stakeholders" developed by the MSC but it is not clear what this is? Is it published? Is it the Stakeholder Briefing Note? Is it an internal SGS process?

1.5 Under <u>'Your Role'</u>, the use of "this organisation" is confusing. It is my understanding that the whole fishery and all of the management processes are assessed and in the NZ Hoki Fishery context this would include the Ministry of Fisheries and Department of Conservation processes directly involved with the management of the fishery as well as the Hoki Management Company. This assessment is not just of the Hoki Management Company is it?

1.6 There also needs to be some reference to the Principles and Criteria where the three areas 'environmentally responsible, socially beneficial and/or economically viable' are mentioned otherwise these points have no context. Also this is different from the statement in Introduction to the Principles and Criteria in the Airlie House Draft which reads "The MSC is working to promote 'responsible, environmentally appropriate, socially beneficial and economically viable fisheries practices, while maintaining the biological diversity, productivity and ecological processes of the marine environment."

1.7 The second paragraph on the second page includes a request to return the Stakeholder Report Form as soon as possible but in the penultimate paragraph it is clear that a month is available. The timing and expectations of each step need to be explicitly described.

1.8 What/who/how is it determined whether an independently facilitated stakeholder forum will be held in Wellington as mentioned in the penultimate paragraph? What expectations could I have as a stakeholder about the process from here, once I have returned my Stakeholder Report Form.

2. <u>Stakeholder Briefing Note</u>

2.1 The **Stakeholder Briefing Note** appears to have been translated from another language, as it contains several inconsistencies. There is also no reference to the MSC website should people need or wish to delve into further detail about the MSC or the process?

2.2 Some of the points in the **Stakeholder Briefing Note** specifically noted include; How stakeholder issues will be addressed? What constitutes a major issue? Under certification and surveillance: Why only a summary report? What guidelines have the MSC published to require full transparency ie. a published final report?

I understand that some commercial in confidence information may be withheld but one of the outcomes that I know the scientific community are hoping for includes more access to scientific information held by the Hoki Management Company and individual fishing companies.

2.3 Another point to raise relates to the formulation of the Assessment Team. In the Western Rock Lobster case, stakeholders were asked for their recommendations for the



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composition of this team and the best fit between the various nominations were asked to participate in the team. What has been the process for establishing the team for this assessment?

2.4 There are also several references to 'management certification' that I believe to be confusing. Whilst it could be loosely described that it is the overarching management that is certified, it is actually the whole fishery that is assessed with management and the management systems used to manage the fishery only one component of the whole.

3. Stakeholder Contact List

3.1 With regards to the Stakeholder Contact List, have you developed your own stakeholder contact list to which my suggestions were added or only worked off the one I provided? There are a number of inaccuracies in the one circulated with this material as well as a number of names I would have expected to see. The address details for Russ Babcock and Peter Davies are absent, the name of the CEO of SEAFIC is John, not Ian, Sarah Duthie, Ocean Ecology Campaigner Greenpeace NZ, Michelle Surcouf, Friends of Golden Bay and, Derek Shaw and Andy Dennis of Nelson RFBPS are missing as are other possible industry representatives such as Richard Wells, Fishing Operations Manager for Sealord.

4. Stakeholder Report Form/Stakeholder Consultation Work Instruction

4.1 Although a useful starting point the Work Instruction does not have any criteria or interpretative information for assessing the meaning of Small/Medium/Large or low medium high. Although throughout the documentation you have repeatedly invited additional comment, this sheet could be interpreted as only allowing a superficial summary of stakeholder concerns and the opportunity to provide further information stated in the introductory paragraph needs to be more explicit.

4.2 Also the timing mentioned in the Covering letter relates to the date on this form but the date box is empty. Is the timing for responses indeed one month from the 17th October?

Please again, accept that this is my advice as a WWF staff member familiar with consultative processes and also familiar with the context of the NZ situation. (ie. the occasionally subversive view of things!) My suggestions are obviously not explicit MSC requirements for the stakeholder process. Have you had any clear and explicit guidance from the MSC on what their latest thoughts are for a robust stakeholder process for MSC assessments given their experience to date (I am not implying that this has been poor)?

To clarify the timeframe, is the 17th Nov the full and final cut off date for comments? ie. If people attend a forum say on the 6th Nov, they may feel that this is their first opportunity to engage, they then have 9 days to get a response organised and into SGS. For some they will require an additional month from the meeting, in order to go through the processes of their own group and to develop a position that has the sign off of their members. Again, just pointing out some of the potential areas for criticism and that are not explicit through this letter.

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Eric Pyle and Jo Breese (CEO) at WWFNZ are happy for WWFNZ to be used as a venue for the Hoki stakeholder meeting if required. However WWF will keep a low profile in terms of the actual organising, communications and invitations etc.

I would strongly recommend that at the beginning of November a letter be sent to stakeholders inviting them to attend such a meeting and inviting them to let you know whether they would prefer any other form of engagement, ie. phone interviews and lastly I recommend that you consider a ring around to check that people feel they have had adequate opportunity to engage and at that point check whether they will come to a forum, or whether they need one to be held elsewhere ie. Nelson.

I will be overseas next week but hope this is a useful contribution.

Sincerely

Katherine Short Sustainable Fisheries Project Officer



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Appendix 2

Comments on the Performance Criteria and Scoring Guideposts

It was most useful to have access to the Performance Criteria and Scoring Guideposts in order to compile this submission and SGSNZ and the MSC are to be commended for releasing these. However there is still considerable work to be done on them and we have provided summary comments below to aid this. There are also many content corrections required both editorially and grammatically and we look forward to the next iteration of these to correct these. We have not made editorial suggestions at this stage.

Principle 1

Principle 1, Criterion 1.1, Indicator 1A 80% Scoring Guidepost - Point One Add:, through detailed genetic and morphometric analysis of the stocks.

Principle 1, Criterion 1.1, Indicator 1A 80% Scoring Guidepost - Point Two

Issues of commercial in confidence aside, it is essential that the scientific community is able to obtain access to the information held by the industry and gathered when they are exploratory fishing.

Principle 1, Criterion 1.1, Indicator 1C Intent

Should include a predictive facility in the intent "assess the current and future state"

Principle 1, Criterion 1.1, Indicator 1C Elements to be considered, 2.

These methods should be based on best international practice not only those developed to date.

Principle 1, Criterion 1.1, Indicator 1C Elements to be considered, 3.

Change to:have been evaluated and a precautionary approach to decision making is used in management advice.

Principle 1, Criterion 1.1, Indicator 1C 100% Scoring Guidepost

Add: The models used include the ability to assess different ecological risk scenarios.

Principle 1, Criterion 1.1, Indicator 1C 80% Scoring Guidepost – Point Three

Add: The models used include the ability to assess different ecological risk scenarios. Change to: The assessment takes into account key uncertainties, and predicts future consequences and a precautionary approach to making management decisions is used.

Principle 1, Criterion 1.1, Indicator 1D 100% Scoring Guidepost – Point Three

Add:..of the resource and allow for its trophic role within its ecological community.

Principle 1, Criterion 1.1, Indicator 1D 80% Scoring Guidepost – Point Three

This indicator does not make sense. It should read: when quota holders reach the TACC, there are effective measures to prevent any further fishing.

Principle 1, Criterion 1.1, Indicator 1E



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WWF seriously questions the validity and appropriateness of using B_{MSY} as a limit reference point under an MSC certified fishery.

Principle 1, Criterion 1.2 seems to be missing?

Principle 1, Criterion 1.3, Indicator 1F, Elements to be considered

Add: 4. Major life cycle stages and key behavior and ecological interactions are known.

Principle 1, Criterion 1.3, Indicator 1F, 100 Scoring Guidepost

Add: Point 4. Comprehensive, fishery independent surveys of the spawning stock size are available over a substantial portion of the spatial extent of the fishery. Add: Point 5. Key life cycle stages are known and understood within the stocks. Add: Point 6. Key life cycle stages between stocks and closely related species are known and taken account of in so far as they impact on the productive ability of the target stock.

Principle 1, Criterion 1.3, Indicator 1F, 80 Scoring Guidepost

Point 1. Genetic structure should still be included at the 80% level

Add: Point 4. Data is being gathered about the spatial extent of stocks

Principle 1, Criterion 1.3, Indicator 1G, Elements to be considered Each point should be 'There is comprehensive etc.....'

Principle 2

Principle 2, Criterion 2.1, Indicator 2A:

Change to: There is adequate knowledge of the ecosystem, it's components and functional relationships where the fishery operates.

Principle 2, Criterion 2.1, Indicator 2A: Intent

The fundamental intent of this Indicator is to ensure ecosystem state stability. Add:....can determine the nature of the effects of fishing on the ecosystem and avoid altering the fundamental ecological relationships.

Principle 2, Criterion 2.1, Indicator 2A: Elements

Add:in relation to distribution of fishing effort.... Add:....throughout the fishery area, including the target stock....

Principle 2, Criterion 2.1, Indicator 2A: 100 Scoring Guidepost, Point 3.

Add: ... species including the ecology of the target stock.

Principle 2, Criterion 2.1, Indicator 2A: 100 Scoring Guidepost,

Add: Point 4. The trophic roles of the target species are known and understood.

Principle 2, Criterion 2.1, Indicator 2A: 100 Scoring Guidepost,



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Add: Point 5. Key trigger levels for equilibrium of key ecosystem relationships are established and monitored to avoid trophic cascades, species shifts or population crashes.

Principle 2, Criterion 2.1, Indicator 2B:

....unacceptable.....To Whom?

Principle 2, Criterion 2.1, Indicator 2B: 100 Scoring Guidepost

Add: Point 3. Critical reference points for ecological thresholds for highly valued icon and/or protected species, are established and management triggers are in place to halt or restrain fishing operations if necessary.

Principle 2, Criterion 2.1, Indicator 2B: 80 Scoring Guidepost, Point 3

Doesn't this point fit more appropriately under 2D? Shouldn't it be: Gear loss and potential waste that are known to cause harm to icon or protected species is minimised?

Principle 2, Criterion 2.1, Indicator 2B: 60 Scoring Guidepost

Where are the 60% Guideposts?

Principle 2, Criterion 2.1, Indicator 2C: Intent

Change to:....impacts of the fishery on the physical environment and natural functional relationships within the ecosystem where the fishery operates and that Hoki are a part of.

Principle 2, Criterion 2.1, Indicator 2C: Elements

Add: New 1. and change numbers or perhaps change the intent to: A precautionary approach to managing the ecosystem within which the fishery operates and that Hoki is a part of is reflected in the fishery management framework and fishery management decisions that minimise irreversible disruptions to the ecosystem and natural trophic and functional relationships.

Add: 9. There is adequate fishery independent, ecologically relevant and comparably data gathered.

Principle 2, Criterion 2.1, Indicator 2C: 100 Scoring Guidepost, Point 2

Change to: ...use ecologically relevant....

Add new point: Ecological risk assessment techniques have been used to determine critical ecosystem thresholds and incorporate a precautionary approach to maintaining functioning trophic relationships and avoiding ecosystem shifts.

Principle 2, Criterion 2.1, Indicator 2C: 80 Scoring Guidepost, Point 1

Change to:fishery to the physical environment and ecosystem....

Principle 2, Criterion 2.1, Indicator 2C: 80 Scoring Guidepost

Change to:....there has been an ecological risk assessment Add: Key ecological risks identified are being avoided, remedied or mitigated.

Principle 2, Criterion 2.1, Indicator 2D:

Change to:non-target species are avoided or minimised. It is not good enough to aim for 'unacceptable', to whom, the industry? Greenpeace? The seals and albatross!?



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Principle 2, Criterion 2.1, Indicator 2D: 100 Scoring Guidepost

Add: Point 3. A program to cease disposal of processing at sea is underway.

Principle 2, Criterion 2.1, Indicator 2D and 2I can be merged?

Principle 2, Criterion 2.1, Indicator 2E:

Change the indicator and the intent of the indicator to: The fishery does not have irreversible, catastrophic or unacceptable imacts....

Principle 2, Criterion 2.1, Indicator 2E: Elements. Point 5.

Add: a precautionary management system is in place to minimise....

Principle 2, Criterion 2.1, Indicator 2E: 100 Scoring Guidepost

Point 1. Change to: In the major fishing areas and across a representative sample of occasionally fished areas, the impacts of fishing......main prey and predators of the target species are known and understood and within limits that allow for balanced ecological functioning.

Add: Point 3. A precautionary management system is in place to......

Principle 2, Criterion 2.1, Indicator 2E: 80 Scoring Guidepost. Point 1

Change to: Impacts of the fishery on ecological systems have been identified and a precautionary approach is used to minimise the long term disruption to ecosystem stability.

Principle 2, Criterion 2.2, Indicator 2G: Elements

Add: 5. A comprehensive marine protected area regime containing permanent spatial and temporal closures has been designed and implemented to allow for the protection of key ecological and physical features, iconic and protected species, as well as to protect the genetic diversity of Hoki.

Principle 2, Criterion 2.2, Indicator 2G: 100 Scoring Guidepost.

Add Point 3. A comprehensive marine protected area regime containing permanent spatial and temporal closures has been designed and implemented.

Principle 2, Criterion 2.2, Indicator 2G: 80 Scoring Guidepost.

A comprehensive marine protected area regime containing permanent spatial and temporal closures has been designed and implementation is being considered.

Principle 2, Criterion 2.2, Indicator 2G: 60 Scoring Guidepost.

A comprehensive marine protected area regime containing permanent spatial and temporal closures is being considered.

Principle 2, Criterion 2.2, Indicator 2H:

Change to:.....fishery on the physical environment and on the genetic, species and population biodiversity of the ecosystem in which it operates and on which Hoki depend.



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NOTE: This whole indicator needs to show detailed thinking in order to make provision for biodiversity conservation at all levels. Genetic, species, population and ecosystem biodiversity.

Principle 2, Criterion 2.2, Indicator 2H: 100 Scoring Guidepost.

Point 1. Remove 'with involvement of all stakeholders'. THIS SHOULD BE THE BASIS ON WHICH ANY MANAGEMENT PLAN FOR THE FISHERY IS DESIGNED AS A WHOLE AND BY WHICH KEY MANAGEMENT DECISIONS ARE MADE.

Principle 2, Criterion 2.2, Indicator 2J: 100 Scoring Guidepost. Point 2

Change to: have been identified, described and assessed......corrective action has been undertaken to avoid and minimise the impacts.

Principle 2, Criterion 2.2, Indicator 2k:

Add......icon species and where necessary facilitate rebuilding of populations of ecologically related species including endangered, threatened and protected icon species.

Principle 2, Criterion 2.2, Indicator 2k: Elements

Change Point 1.developed and implemented

Add Point 2. Risk assessments for endangered, threatened and protected icon species have been conducted with relation to the fishery.

Principle 3

Principle 3, Criterion 3.1. Indicator 3A.

What do use rights have to do with it! This should be about the management system. This criterion should be to design a management system to manage the marine environment and interactions of the fishery with the physical and ecological environments through comprehensive and precautionary management planning and implementation. The indicator can be solely based on giving credence to international and national obligations but it has nothing to do with use rights!

Proposed Indicator 3A. The management system takes account of obligations under national and international law.

Principle 3, Criterion 3.1. Indicator 3B

Change to: The scope of the management system is clearly defined and designed to manage the fishery sustainably.

Principle 3, Criterion 3.1. Indicator 3B Elements 5.

Change to: exploitation of the resource and fluctuations in the marine ecosystem.

Add Point 6: The management plan is adaptive and based on real time management of the fishery.

Principle 3, Criterion 3.1. Indicator 3B. 100 Scoring Guidepost

Add Point 6: The management of the target stock is clearly grounded in the ecological reality and there is a comprehensive research strategy in place to achieve this.

Principle 3, Criterion 3.1. Indicator 3C Elements

Add 3. The plan provides for efficient harvest of the target species whilst ensuring...



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Principle 3, Criterion 3.1. Indicator 3C 100 Scoring Guidepost

Add: The plan incorporates the requirement and facility to maintain a functioning ecosystem.

Principle 3, Criterion 3.1. Indicator 3D Elements

Add: Point 4. Reporting, feedback and real time management procedures exist and are effective.

Principle 3, Criterion 3.1. Indicator 3F

There needs to be far more detail about what happens with the monitoring ie. research and adaptive management.

Research for:

Monitoring, effectiveness, continuous improvement, implementation of MSC requirements, excellence and innovation – ie. a comprehensive research strategy.

Principle 3, Criterion 3.2. Indicator 3H 100 Scoring Guidepost

Add: Reduction targets for non-target species are in place and pursued. Add: An incentive mechanism exists for crews operating vessels with minimised non-target species interactions.

Principle 3, Criterion 3.2. Indicator 3I Elements

Add Point 4. Use of spatial and temporal closures

Principle 3, Criterion 3.2. Indicator 3I 100 Scoring Guidepost

Point 1. 'Intensely' should be removed, destructive fishing is destructive fishing! Point 1 and point 4 under the 100% Scoring Guidepost contradict each other as they are written at present. Point 1. Remove point 1 as it stands at present.

Add: the fishery operates within a comprehensively designed mosaic of appropriate and relevant spatial and temporal closures designed to protect biodiversity at all levels.

Principle 3, Criterion 3.2. Indicator 3I 80 Scoring Guidepost

Point 1 - remove intensely - as above

Principle 3, Criterion 3.2. Indicator 3I 100 Scoring Guidepost

Point 1 - remove intensely - as above

Principle 3, Criterion 3.2. Indicator 3J Elements

Add 3. Management of unwanted bycatch of non-target species

Add 4. Efforts to reduce operational waste.

Add 5. Efforts to research alternatives and avoid operational waste.

Add 6. Efforts to reduce, reuse, recycle operational waste.

Principle 3, Criterion 3.2. Indicator 3K Elements

Add: 3. Fishery Management Plan.

Principle 3, Criterion 3.2. Indicator 3L

Change to.other information of importance for the effective management of the resource, the fishery and the ecosystem.

Principle 3, Criterion 3.2. Indicator 3L 100 Scoring Guidepost

SGS	SGS Product & Process Certification A section of Internationale Controle Maatschappij (I.C.M.) B.V.	
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Add Point 3. Voluntary information provided by the fishers is monitored and occasionally collated and analysed alongside other information sources for the fishery.



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APPENDICES

XI. FOREST & BIRD STAKEHOLDER INPUT

Sent by: Barry Weeber <b.weeber@wn.forest-bird.org.nz>

Date: 11-06-2000

To: Murray Fairweather/ICS/Auckland/NZ/SGS@SGS, Edwin Aalders/CoProd/Spijkenisse/NL/SGS@SGS

cc: "Cath Wallace (E-mail)" <Cath.Wallace@vuw.ac.nz>, "Sarah Duthie (E-mail)" <Sarah.Duthie@nz.greenpeace.org>, "Clive Monds (E-mail)" <cmonds@wave.co.nz>, "ECO (E-mail)" <eco@reddfish.co.nz>, "Barbara Leonard (E-mail)" <bleonard@clear.net.nz>, "Ian West (E-mail)" <iwest@doc.govt.nz>, "Jim HEAD OFFICE Nicolson (E-mail)" <Jnicolson@doc.govt.nz>, "Joe and Marg Bell (E-mail)" <gbaybell@xtra.co.nz>, "Liz Slooten (E-mail)" <liz.slooten@stonebow.otago.ac.nz>, "Michele Surcouf (E-mail)" <seachel@voyager.co.nz>, "Mike Donoghue (E-mail)" <donoghue@pop.ihug.co.nz>, "Nicola Beynon (E-mail)" <nicola@hsi.org.au>, "Owen Cox (E-mail)" <owen.cox@mfe.govt.nz>, "Russell Babcock (E-mail)" <r.babcock@auckland.ac.nz>, "Steve Dawson (E-mail)" <steve.dawson@stonebow.otago.ac.nz>, "Eugenie Sage (E-mail)" <sage@southern.co.nz>, "Roger Grace (E-mail)" <GraceR@xtra.co.nz> Subject: RE: Stakeholders Meetings.Hoki Fishery

Murray

We consider there are a range of management and sustainability issues which mean that hoki should not get MSC certification (see below). If MSC is to have any credibility in New Zealand the following issues need to be addressed.

I've also copied this email to a range of people who are interested in the hoki fishery and associated fisheries management issues. We hope you will talk to all these people in your consultation round.

Regards

Barry Weeber

1. The eastern hoki stock, which includes the Cook Strait and the Chatham Rise, meets the criteria of an "urgent sustainability" risk. The hoki fishery has for nearly 10 year been scientifically assessed as two stocks – eastern and western.



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The latest NIWA assessment (two-stock MIAEL model) for the Ministry of Fisheries predicts that there is greater than 58 percent chance that the eastern stock will go below 20%Bo (the default danger level for any stock) in any year in the next 5 years. (When eastern CPUE is used the risk rises to 69 percent). The current biomass is estimated to be below Bmcy and above Bmay, which are proxies for Bmsy.

The current assessment states that "the current distribution of catches at the present TACC may cause the eastern stock to decline to unacceptably low levels". About 40% of current hoki catches are taken from the eastern stock. This stock is estimated to represent between 10 and 20% of the total hoki unfished biomass. From the assessment MCY is estimated at 28,000 tonnes and CAY1999 at 42,000 tonnes. These estimates of sustainable yield are less than half the current catch at around 100,000 tonnes.

Due to decisions made last year by the Ministry to curtail last year's stock assessment process, this assessment does not include all the latest indices and is principally a 1999 assessment. More recent information is not optimistic. The 1995 and 1996 hoki year classes are weak. The January 2000 Chatham Rise trawl survey (the 9th annual survey) produced the lowest biomass of the 3+ year olds (half the lowest previous value). The 1 and 2 year olds were in the middle of the range indicating that the last 2 year classes are unlikely to be strong.

We have rejected the industry Bayesian model because of its single stock modelling approach, its use of model inputs, and its overly optimistic bayesian inputs.

2. It is not a simple matter of switching 60-70,000 tonnes of catch to the larger western stock. This fishery is not without risk. CPUE based model results gives the risk of the stock going below 20% Bo in any year in the next 5 years as 23%. Switching catch would increase this risk. Length frequencies from this fishery indicates that over the last decade fishers are catching smaller fish, indicating an increasing reliance on younger fish and fewer year classes.

3. If more of the western stock catch was taken on the West Coast of the South Island additional complications arise:

a. Fur seal deaths would likely increase from their current level of around 1000/year. This level of bycatch is neither acceptable nor sustainable. Surveys of West Coast breeding rookeries by DOC indicate a significant decline in pup numbers over the last 5-8 years.

Fur seals are also drowned in the hoki fisheries elsewhere in EEZ. This can be an extra 5-600.

b. Ling, silver warehou and hake over catch would increase. These three species have all had their catch limits in QMA7 (West Coast) exceeded due to the hoki fishery. Last year the hake catch was 2,200 tonnes over TACC (20%) and the ling catch was 1100 tonnes over the TACC (50%). Silver warehou TACC has been up to 45% over the TACC.

c. Hoki trawlers kill at least 500 albatross and petrels annually. This is much more than is assessed from charter southern blue fin tuna boats.

4. Despite these sustainability and management concerns the Minister of Fisheries decided not to review the hoki fishery despite the obligations of the 1996 Fisheries Act.