

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
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.			33.3	
1.1 (MSC Criterion 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.			29.4	
1.1.1	There should be sufficient information on the target species and stock separation to allow the effects of the fishery on the stock to be evaluated.			20.0	
Weighting Commentary	<p>MSC Principles (1st level): no weighting is applied, each of the three principles is weighted equally at 33.3</p> <p>MSC Criteria (2nd level): Criteria 1 and 3 are weighted equally, Criterion 2 is weighted higher as this deals with rebuilding of a depleted stock and so is particularly applicable to west coast hake.</p> <p>Scoring Indicator Groups (3rd level): These are considered of equal importance for this fishery and are weighted equally.</p> <p>Scoring Indicators, Group 1.1.1 (4th level): These are considered of equal importance for this fishery and are weighted equally.</p>				
1.1.1.1		Are the species readily identified?			
60	Misidentification is possible and increases recording errors of catches, but this does not compromise monitoring to unacceptable levels.	The two commercial hake species are readily discriminated from other species by fishers, regulators and observers.	R47, R67	20.0	80
80	The target species are unlikely to be confused with any other species; or, if target species are grouped, then life history or stock identification information exists to justify this grouping.	The two species may be discriminated based on gill morphology, otolith morphology and fin ray and vertebrae counts and this has been used for stock identification. The two species are also broadly identified by depth distribution. Genetic studies (electrophoresis) have also been carried out on the two species and the two stocks confirmed.			
100	The species is readily identified by fishers and regulators and is recorded appropriately	Historically, however, the two species have been treated for assessment purposes as a unit stock as the commercial samples do not make differentiation easy (commercial landings of the two species are not currently separated on the demersal database). More recently the assessments have begun to evaluate the two species separately based on known depth distributions and will in future include observer data allowing the catch to be more accurately apportioned. Commercial fishers target the two species separately as “White” (shallow – <i>capensis</i>) and “Black” (deep – <i>paradoxus</i>). White hake commands higher price on international markets			

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1.1.1.2		Is the life history of the species understood?			
60	There are gaps in information but the basis of the life history is understood. Information is adequate to support a general population model.	The life history of hakes is relatively well known and is documented. All the basic population parameters are known and reported on including age and growth, mortality, fecundity, early development and larval distributions. Hake behaviour is relatively well understood and ecological interactions of hake have been modelled	R68, R66	20.0	95
80	The life history of the species is clearly documented and understood. Information is adequate to support an appropriate population model				
100	The life history of the species is clearly documented and understood including behaviour and ecological interactions.				
1.1.1.3		Is the geographical range of the target stocks known?			
60	An estimate of the geographical range of the target stock is available. A management unit approximating the stock is used with some biological justification.	The geographical range of both hake species are well known and documented. This includes spatial and temporal distributions. Stock identification is supported by studies of genetics and morphology distribution and directed demersal surveys underway since the early 1980's. These surveys are conducted annually – initially four surveys per year, now three per year. The opinion of fishers and scientists is that some migration along the West Coast by both species does occur and that movement into and out of Namibian waters is likely. Furthermore, it has also been suggested that shallow-water hake may migrate from the Agulhas Bank to the West Coast. Benefit and BCLME projects are presently addressing these questions through tagging programmes. However, South African and Namibian stocks (the neighbouring stock) are known to respond separately to natural and management measures (there is a natural separation between the stocks in the area of the Orange River, the border between the two countries) and are considered in survey and modelling as separate stocks. Seasonal patterns of movement and availability, known and used in standardisation of CPUE exercise but are not a major factor in the fishery, and so are not well documented. There are scientific proposals (through the BENEFIT programme) to tag hake to test for seasonal and area movements.	I2, I3	20.0	90
80	A reliable estimate of the geographic range of the target stock is available including seasonal patterns of movement/availability. Scientific research is used to support the stock identification				
100	The complete geographic range of the stock, including seasonal patterns of movement/availability, is estimated and documented each year. Extensive scientific research is used to justify stock identification.				

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1.1.1.4	Is there information on fecundity/recruitment and factors causing natural mortality?				
60	There is information available on the fecundity, growth and factors causing natural mortality.	<p>Fecundity. Although general information on fecundity is available, fecundity in the assessments assume that per capita fecundity at age is proportional to weight at age after the age of maturity. This is a standard assumption in assessments and is usually a good starting point. Accordingly, the basis of estimates of per capita reproductive capacity is the growth rate.</p> <p>Growth rate. Rates have been estimated and are re-evaluated from time to time. Important uncertainties still exist in terms of temporal changes and sex-specific growth, but the impacts of these uncertainties on the assessments are relatively well known.</p> <p>Natural mortality. The sources of natural mortality (including cannibalism) are known in a general way. As in virtually all fisheries, direct estimates of natural mortality rate are lacking, but indirect estimates of natural mortality rates are computed from the assessment, which provides insight into biological and ecological hypotheses. However, estimates for older fish are higher than one might expect (but estimates of mortality (M) derived from assessments may be coloured by interactions between other parameters like growth rates and selectivity in non-obvious ways). Nevertheless, the assessments are a mechanism to re-evaluate M relationships periodically. Suitable estimates of these parameters are therefore available.</p> <p>Information on fecundity and recruitment is considered to be slightly below the 80 guidepost, but information on growth rates and natural mortality is above, resulting in the aggregate score of 80.</p>	I2, I3, R67	20.0	80
80	Estimates are available of fecundity at size, growth rates and natural mortality.				
100	There is comprehensive and reliable information on the fecundity/recruitment, growth rates and factors causing natural mortality and these are monitored over time to detect trends and shifts.				

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1.1.1.5		Is information collected on the abundance/density of the stock?			
60	Either fishery dependent or fishery independent indices are available on the abundance of the stock biomass. Qualitative information exists on the appropriateness of the indices as proportional indicators of stock size.	Both fishery-dependent and fishery-independent indices of abundance are available. The fishery-dependent index is generated from CPUE data that undergoes extensive standardisation encompassing area, season, vessel power factors, bycatch factors and the incidence and prevalence of trawl “liners” used to avoid mesh size restrictions in the late 1970’s to early 1980’s. The mechanism’s by which these are incorporated into the standardisation are well debated with industry. While these factors have a great deal of significance in terms of the rate of west coast hake recovery, they are less significant in terms of the decline in abundance prior to the 1970’s.	I3, I2, I3,R8, R60, R67	20.0	90
80	Fishery dependent and/or fishery independent indices are available on the abundance of the stock. Uncertainties have been analysed (through for example catch-per-unit-effort standardisation) and those uncertainties have been reduced so as to allow trends to be determined from indices.	The fishery-independent surveys are over a much shorter time series and are more irregular in frequency (a hiatus in surveys when the research vessel was not available was filled to a large extent by use of the RV Fridtjof Nansen). Therefore, the variability in the estimates are relatively large. Although the surveys are conducted as “swept area” , they are used in the assessments as an index of abundance. This allows one to compute the relative efficiency (q) of the surveys. If the survey truly determined abundance, then q would be around one. However, estimates vary considerable, including values greater than one. This suggests areas for improvement, such as to take into account bottom topography.			
100	Fishery dependent and fishery independent indices are available on the abundance and density of the stock. Indices are consistent and there is clear evidence that they are proportional to the stock size.	The fishery-independent and fishery-dependent indices are not inconsistent. However, the inherent variability does limit discrimination. Nevertheless, the indices are proportionally related to abundance within these broad variability constraints.			

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1.1.2	There should be sufficient information on the fishery to allow its effects on the target stock to be evaluated			20	
Weighting Commentary		Scoring Indicators, Group 1.1.2 (4 th level): Weightings reflect the importance for this fishery of recording mortality and effort (for CPUE). Fishing methods and gear are well established and so this is given the lowest weighting.			
1.1.2.1		Are all major sources of fishery related mortality recorded/estimated (including landings, discards and incidental mortality)?			
60	Sufficient information is available to allow accurate estimates to be made of landings broken down as required by the population model. Estimates of discards and incidental mortality are available.	Because the hake are managed under individual quotas, the number of quota holders is relatively small and the majority of the quota is concentrated into even fewer quota holders, the monitoring of landed catch at size is considered good. The recording of landings in the line fisheries is equivalent to trawl log book system, although amounts landed are relatively small (around 500t). The implementation of an observer program, which will allow direct sampling and monitoring of the fishery will allow further discrimination of a number of stratification issues, which may be limiting. In particular:	R67	39.8	100
80	Landings are accurately recorded. Discards and incidental mortality are well estimated	<ol style="list-style-type: none"> 1) the dis-aggregation of the two species in the landings data 2) sex-specific catches has previously relied on research vessel data 3) discards of hake and other species (at present, knowledge of the background levels are available, such that their impact can be examined through sensitivity analyses of the assessments). 			
100	Landings, discards and incidental mortality are accurately recorded and monitored.				

1.1.2.2		Is fishing effort recorded/ estimated?			
60	Nominal effort data are available which can be used to estimate effective fishing effort.	Effort is recorded from most sectors comprehensively at trip intervals and within trip intervals (per haul) and at the spatial grid used. Also, the spatial-temporal scale that some industry components use for their own purposes are available for biological and population analysis. Data from observers will be correlated with vessel information.	R5, R6, R45, R60, R67	26.5	95
80	Accurate estimates of fishing effort can be made. The relationship between the fishing effort measure and fishing mortality has been established.	Establishing the relationship between effort and fishing mortality is congruent to establishing the relationship between standardised fishery-dependent indices and abundance (see 1.1.1.5). This relationship has been established within the confines of the standardisation factors incorporated.			
100	Comprehensive records are kept of fishing effort, recorded at sub-annual intervals at an appropriate degree of spatial resolution.	There is a lag in the processing of this data (of up to 6 months), but this is being addressed, via SADSTIA, by employing additional data entry typists. This is, however, a factor which can be improved.			

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1.1.2.3		Are fishing methods and gear types known throughout the fishery?			
60	Main fishing methods and gear types are known for the fishery.	Fishing methods are well known, basic bottom trawl gear has been used, mostly German otter trawls. Recent effort has seen some known modifications to net design and trawl doors, although basic configuration remains unchanged. Mesh sizes used in the deep sea and inshore sectors are documented and subject to strict permit control (110 mm deep sea and 75 mm inshore)	I3, I4, I5, I6, I7	7.8	100
80	Main fishing methods and gear types are known and information is available on the geographical areas of use.	Under the recently established observer programme, observers carry out <i>in situ</i> reports on gear type deployed.			
100	All fishing methods and gear types employed in the fishery are known. In-situ observations are made of fishing practices				
1.1.2.4		Is selectivity known for the fishery?			
60	Information is available on selectivity and qualitative changes in selectivity.	Selectivity-at-size by gear is estimated from the catch-at-size data (discussed above). The catch-at-size is converted to catch-at-age which is a component of the Likelihood-fitting procedure of the assessment models. For the west coast, the selectivity of the commercial sector is estimated from a logistic function for two different time periods. The result is that there are estimates of selectivity by age and gear over time. However, the accuracy of selectivity over time is constrained by the limitations of the basic input size and age data. For the south coast the selectivities are estimated from the ratio of survey to commercial selectivities from the west coast; and then evaluated through sensitivity analysis.	I2, R67	13.4	85
80	Selectivities of gear types are well estimated by size, sex and maturity				
100	Full selectivities have been accurately estimated for all gears, locations and times of fishing over time.	Accuracy of the estimates is, however, compromised by limitations of catch at age estimates and the proportion of the two species present, these are estimated for gear and location.			

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1.1.2.5		Is the target species taken in other fisheries in the area that are not subject to this certification and are such catches recorded or estimated?			
60	There is some information relating to other fisheries in the area that are not subject to certification, although these are not fully identified. These fisheries are accounted for in the stock assessments.	Other fisheries in the area are identified and monitored. These include the hake-directed handline and longline fisheries which collectively account for 10% of the TAC. A sole-directed fishery operates with a joint quota system in the inshore sector. Other fisheries possibly impacting hake include the mid-water trawl fishery in which hake bycatch is severely limited (<2% bycatch allowed) and all boats carry permanent observers.	I3, R60, R67	12.5	90
80	The main fisheries not subject to certification are identified. They are included in the stock assessments.	All hake, taken by targeted fisheries or in bycatch are set against the TAC. No other significant sources of human-induced mortality are identified.			
100	All fisheries (and other sources of human-induced mortality) in the area that are not subject to certification are identified and monitored.				

1.1.3	Appropriate reference levels have been developed for the stock			20.0	
Weighting Commentary		Scoring Indicators, Group 1.1.3 (4 th level): The two indicators are considered of equal importance.			
1.1.3.1	Are there appropriate limit and precautionary reference points?				
60	Limit and precautionary reference points have been chosen and are justified based on standard international practice.	Harvest policy has been established through Operational Management Procedures (OMPs) in which basic fishing mortality rate policies are established, to meet both biological (recovery) and economic objectives. The OMP uses extensive simulation testing in which TAC's are derived from relatively simple formulae based upon the population models and the ensuing catches. For the west coast, the goals of the OMP are to have a high probability of recovery of the Spawning Stock Biomass (SSB) to SSB _{msy} in 10 years; to have a low probability of any SSB decline and a low probability of a TAC reduction in the first 10 years. The basic target fishing mortality rate reference point is F _{0.2} , i.e. the fishing mortality rate which is less than F _{msy} and results in a yield which is 80% of Maximum Sustainable Yield (MSY). After adjustments for economic goals the implemented target is F _{0.075} .	I2, R9, R67	50.0	95
80	Limit and precautionary reference points are justified based on stock biology (e.g. a stock-recruitment relationship) and are measurable given data and assessment limitations.				
100	Limit and precautionary reference points are justified based on stock biology, uncertainty, variability, data limitations and statistical simulations of these factors.	For the south coast, the resource is in better condition. The OMP goal is not to have a decline in CPUE. The reference points are based on standard practice and have been evaluated extensively by simulation for their robustness due to uncertainties of biology, variability, data limitations			

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1.1.3.2		Do reference points meet acceptable international standards?			
60	Reference points recognise appropriate international standards and are being developed to meet these.	The target reference points used are less than the limit reference point (Fmsy) discussed in the Straddling Stocks Agreement and so they exceed international standards.	R9, R67	50.0	100
80	Reference points recognise, and are in line with, acceptable international standards				
100	Reference points meet or exceed international standards				

1.1.4	There is a well-defined and effective harvest strategy to manage the target stock.			20.0	
Weighting Commentary		Scoring Indicators, Group 1.1.4 (4 th level): The three indicators are considered of equal importance.			
1.1.4.1		Is there a mechanism in place to contain harvest as required?			
60	Mechanisms exist to monitor and (if necessary) reduce harvest, but do not fully contain harvest, or have not been tested.	The OMP and assessment evaluation procedures are clear (documented) measures by which harvest limits are determined, evaluated and re-evaluated as new data becomes available. The OMP determines the need to reduce harvest, if needed, as the feedback of new survey data, CPUE and catch are obtained, this operates as a constant feedback mechanism. The procedures adjust for contingencies, keeping in mind the overall objectives specified above. The systems function well but there is a delay in the processing of data and response times. Systems have been tested and their effectiveness demonstrated.	I3, R9, R67, R34-43	33.3	90
80	Mechanisms are in place to reduce harvest as and when required to maintain, or allow the target stock to return to, productive levels.				
100	Mechanisms are in place to reduce harvest as and when required to maintain (or allow the target stock to return to) productive levels. Measures to demonstrate effectiveness are in place.				

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1.1.4.2	Are clear, tested decision rules set out?				
60	It can be demonstrated that decision making, though not documented, is logical and appropriate. Rules have not been tested.	Decision rules within the OMP's are clearly documented procedures which have been tested (by simulation) for contingencies and fully reconciled with reference points based upon the assessments and have been (and will be) periodically evaluated.	I2, R9, R67, R34-43	33.3	90
80	Clear decision making rules exist, are fully documented, but have not been fully tested Decision rules are reconciled with reference points and with data and assessment limitations.				
100	Clear, documented and tested decision rules are fully implemented and have been fully reconciled with reference points, and the data and assessment limitations, and have been periodically evaluated.				

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1.1.4.3		Are appropriate management tools specified to implement decisions in terms of input and/or output controls?			
60	Management tools exist to implement decisions of input and/or output controls although these are not developed for the specific fishery, or management tools are not fully developed, but are specifically related to the fishery. Some evidence exists to show that tools can be effective	<p>The management tools chosen and implemented are output controls through a TAC that is partitioned into individual rights (quota) through an allocated rights issue. The intent is that rights holders will maintain a constant share (proportion) of the TAC with the magnitude of that share in landings going up or down based upon changes in the TAC from one year to the next.</p> <p>Individual rights have been used for some years and have been successful in terms of maintaining catches close to the TAC. Individual landings are closely monitored both within and between seasons and over-catches have important consequences in terms of future participation in the fishery.</p>	I2, I3	33.3	95
80	Management tools have been specified to implement decisions of input and/or output controls. These are generic although some attempt has been made to relate them to the specific fishery OR tools are lacking in some details but are specifically related to the fishery. Evidence exists to show clearly that tools are effective.	These output controls are considered to be appropriate to the fishery, relevant and timely.			
100	Management tools, appropriate to the species and fishery, have been specified to implement decisions of input and/or output controls. Tools are responsive, relevant and timely. Performance of the tools has been evaluated and evidence exists to show clearly that tools achieve their objectives.				

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1.1.5		There is a robust assessment of stocks.			20.0	
Weighing Commentary		Scoring Indicators, Group 1.1.5 (4 th level): The five indicators are considered of equal importance.				
1.1.5.1		Are assessment models used?				
60	Robust assessment models are used. These are generic and do not account for specific characteristics of either the biology of the species or the nature of the fishery.	Assessments are conducted with age-structured production models (although alternative models have been constructed and compared). The basic input data are catch at age, survey indices (and selectivities), and a commercial CPUE index (standardized). These are combine in a statistical maximum likelihood fitting procedure in which observed indices are compared to population model generated indices and observed catch at age is compared to population and selectivity model generated catch at age under the likelihood framework. The models are periodically re-evaluated according to the management questions being addressed. Bayesian approaches to further evaluate uncertainty have been carried out to some degree and are a priority for the future. The models are limited in several (probably related) areas: species separation of the catch, growth data, lack of recruitment variability and the stock-recruitment steepness (stock productivity) . These factors are, however, identified as research priorities.	I2, R9, R67, R34-43	20.0	80	
80	Assessment models are used. Major criteria are related to the species and/or the fishery, but there are some areas of the assessment that are generic.					
100	Assessment models are used and capture all major features appropriate to the biology of the species, the nature of the fishery and the nature of the management questions being asked.					

1.1.5.2		Does the assessment take into account uncertainties in data and have assumptions been evaluated?			
60	Major uncertainties are identified. Some attempt has been made to evaluate these in the assessment.	The assessment has been evaluated for significant uncertainties and functional relationships by examining likelihood, sensitivity analyses (relative to output management quantities), assumptions of basic model structure and the significance of timing of fishery events. While some of these uncertainties still exist, in many cases the direction of the bias, the range of the variance and the significance to management are reasonably well-known.	I2, R9, R67, R34-43	20.0	85
80	The assessment takes into account major uncertainties in the data and functional relationships. The most important assumptions have been evaluated and the consequences are known.				
100	The assessment addresses all significant uncertainties in the data and functional relationships and evaluates the assumptions in terms of scope, direction and bias relative to management-related quantities.				

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1.1.5.3	Are uncertainties and assumptions reflected in management advice?				
60	Major uncertainties are recognised and are reported in management advice, as well as possible implications of those uncertainties on the management advice	The modelling approaches (likelihood fits, sensitivity analyses, Bayesian approaches, multiple population models and OMP development through simulation) are all mechanisms to estimate and evaluate uncertainty. Uncertainties are reflected in management advice and are documented. The hake assessment process clearly documents the steps taken in these evaluations which are part of the formal record leading to the management advice to the governmental and CAF (non-management advisory body) decision-makers.	I2, R9, R67, R34-43	20.0	100
80	Major uncertainties and assumptions are addressed in the management advice and through the appropriate decision rules to address those limitations.				
100	All significant uncertainties and assumptions are addressed and reflected in the management advice, including appropriate decision rules.				

1.1.5.4	Does the assessment evaluate current stock status relative to reference points?				
60	Some attempt is made to estimate the stock status relative to reference points	The status is expressed with associated CV's (measures of precision) relative to reference points. While debate continues about the best way to estimate the probability distributions within the profession, the methods employed for hake are well-known and are considered to be reliable. More structural uncertainties do not lend themselves easily to the construction of probability distributions and were evaluated through sensitivity analyses and (more recently) through Bayesian approaches.	I2, I3, R9, R67, R34-43	20.0	90
80	The assessment makes an approximated evaluation of the stock status relative to the reference points.				
100	The assessment makes a reliable probabilistic evaluation of the stock status relative to the reference points.				

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1.1.5.5		Does the assessment include the consequences of current harvest strategies?			
60	The assessment makes an initial approximation of the consequences of current harvest strategies.	As discussed under Indicator 1.1.4.1, OMP's are re-evaluated as new data becomes available. The OMP determines the need to reduce harvest, if needed, as the feedback of new survey data, CPUE and catch are obtained, this operates as a constant feedback mechanism. The procedures adjust for contingencies, keeping in mind the overall specified objectives. The process of developing OMP's includes inherent evaluation of current and alternate harvest strategies and the split between the two species caught.	I2, R9, R67, R34-43	20.0	95
80	The assessment includes a robust approximation of the consequences of current harvest strategies.				
100	The assessment includes the consequences of current harvest strategies, forecasts future consequences of these and evaluates stock trajectories under decision rules.				

1.1.6	The stock(s) is/are at appropriate reference level(s).			N/A	
1.1.6.1	Is the stock(s) at or above reference levels? [YES - Criteria 1 is complete. NO – Answer Criteria 2]				
60	The stock is close to the limit reference levels.	For the West coast sector of the fishery the stock has been overfished (current spawning biomass is below SSB _{msy}); however, a recovery plan has already been initiated to complete recovery within 10 years and to maintain fishing mortality rate below limit standards (not undergoing overfishing, recovery plan implemented). The South coast sector is not overfished, is not undergoing overfishing and fishing mortality rate targets are below F _{msy} .	R9, R67	N/A	NA
80	The stock is above the precautionary reference levels				
100	The stock is significantly and consistently above appropriate reference levels.				

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1.2 (MSC Criterion 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.		41..2	
1.2.1		If the stock is below the precautionary reference point, are measures to rebuild the stock specified?		
60	<p>Appropriate rebuilding measures through reduction in exploitation exist and are being implemented.</p> <p>Measures have not been tested.</p>	<p>For the West coast the spawning biomass is below SSB msy, but rebuilding measures have been implemented in which harvest rates were reduced to achieve recovery within a specified time period (10 years). Recovery, as measured by the standardized CPUE and by the assessment, indicate progress toward the recovery goal. The measures have been tested by simulation and are monitored for their empirical effectiveness. However, the aggregation of the two species remains an area of uncertainty</p>	I2, I3, R9, R67, R34-43	100 95
80	<p>Appropriate rebuilding measures are being implemented to promote recovery within reasonable time frames.</p> <p>Measures have been tested and can be shown to be rebuilding the stock.</p>	<p>Measures to prevent future problems are the maintenance of the CPUE and a current move to separate species assessments.</p> <p>The 10 year recovery plan timescale is considered practicable and appropriate.</p>		
100	<p>Appropriate rebuilding measures are being implemented to promote recovery as quickly as is possible.</p> <p>Additional measures are being implemented to prevent problems in the future.</p>			

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1.3 (MSC Criterion 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.		29.4		
1.3.1	Fishing activity maintains the age, genetic structure or sex composition of the stock to a degree that does not impair reproductive capacity.		100		
Weighting Commentary		Scoring Indicators, Group 1.3.1 (4 th level): Weightings reflect the importance of knowing sufficient on these factors to allow evaluation in the assessment, and the results of the assessment.			
1.3.1.1		Is there adequate information on fecundity/recruitment and the dynamics of sub-populations/sex structure?			
60	There is information available on fecundity, growth and natural mortality.	Information is available on fecundity, size, age and sex structure for each species. Genetic structure has been determined for the two species and shows little variability (i.e. no sub-populations have been identified). However, the sex structure requires further elucidation. The size structure is well sampled but is not related well to age structure due to generic problems of ageing hake. Age : length keys and estimates of natural mortality are constructed, however, from commercial sampling.	R9, R67, R60, R47, R66, I3	44.3	75
80	Estimates are available of the size/age/sex structure and fecundity at size, growth rates and natural mortality.				
100	There is comprehensive and reliable information on the size/age/sex structure, fecundity/recruitment, growth rates and factors causing natural mortality as well as evaluations of the implications of shifts in the structure on productivity and management quantities.				

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1.3.1.2	Is the age and sex/genetic structure of the stock monitored?				
60	Population structure is based on some sampling and verification such as hard-part rings verified for this species.	The age structure has not been well monitored through systematic otolith sampling of the fishery. <i>Ad hoc</i> sampling from research surveys have provided baseline data for assessments, but this should be improved. The implementation of the observer program has provided some optimism for the future, but there will still need to be some increases in the ability to process sample shore-side to gain these improvements.	I2, I3, R9, R67, R47	16.9	75
80	Population structure is based on adequate sampling and verification based on hard-part rings verified for this stock. Ageing errors are estimated and included in the stock assessment.	Similarly, the basic stock distributions are relatively well known, but what might be useful is mechanisms to carry out constituent analyses so that catch might be correctly proportioned to the appropriate species/stock			
100	Population structure is well estimated with only insignificant errors.				

1.3.1.3	Does information from stock assessment indicate any changes in structure that would alter reproductive capacity?				
60	Changes in stock structure have been detected but there is no evidence of negative effect on recruitment of the stock.	It is noted that there are several productivity related parameters whose uncertainty are reflected in the assessments: the steepness of the stock-recruitment relationship, the lack of estimated variability on recruitment, the relatively high values of the estimated natural mortality rate. These all could be affected by the species-aggregation used in the models.	R9, R67	38.7	75
80	There are no fishery-related changes in stock structure that would affect recruitment.	No changes in stock structure that would affect recruitment are apparent. However, while the species/stock structure is reasonably well understood, the data do not allow that to be effectively translated through the models to the status evaluation. While the uncertainty in this is known and evaluated in producing the management advice, resolving the species aggregation of the data is an important priority in reducing uncertainty in the future.			
100	Data and assessments indicate that recruitment and spawning stocks are at robust levels for all genetically discrete stocks.				

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
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			33.3	
2.1 (MSC Criterion 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.			33.3	
2.1.1	There is adequate determination of ecosystem factors relevant to the geographical scale and life history strategy of the target species.			18.9	
Weighting Commentary		<p>MSC Principles (1st level): no weighting is applied, each of the three Principles is weighted equally at 33.3 MSC Criteria (2nd level): no weighting is applied, each of the three Criteria is weighted equally at 33.3 Scoring Indicator Groups (3rd level): A higher weighting is applied to 2.1.4 - the availability of strategies to address any impacts. The other groups in this level of the hierarchy are weighted equally. Scoring Indicators, Group 2.1.1 (4th level): Each indicator is weighted similarly. Due to the biomass of hake removed, however, slightly greater weightings are given to knowledge of trophic effects and the potential for ecosystem recovery.</p>			
2.1.1.1		Are the nature and distribution of habitats relevant to the fishing operations known?			
60	Some information exists but may not be comprehensive or up to date. The distribution of fishing operations is mapped.	<p>There is a good scientific record of hake distribution and substrate types based on sufficiently recent scientific surveys. Surveys are further corroborated with fishery-derived data on areas fished and catches (spatial and temporal data). Surveys have been comprehensive since the 1980's although recently these have been reduced due to vessel availability.</p> <p>However, trawlers generally remain on soft or muddy substrate. Recent development of a longline fishery has increased knowledge of hake distribution as these vessels target hard ground areas which are generally not trawled.</p> <p>The entire range of hake is not precisely known as the species feeds higher in the water column, is omnivorous and is found over most of the continental shelf from 30 m to > 600 m water depth.</p>	I3	21.7	100
80	Nature and distribution of all main habitats are known in moderate detail. Information is recent. The distribution of fishing operations is monitored.				
100	The nature and the distribution of all habitats relevant to the fishing operations are known in detail. Information is recent.				
2.1.1.2		Is information available on non-target species affected by the fishery?			
60	The main non-target species have been identified.	<p>All the main non-target species affected by the fishery are identified on south and west coasts, including corroboration between commercial and scientific surveys. The ecology of the main commercially exploited and non-commercial species is also well described.</p> <p>Stock assessments carried out on main commercial by-catch species and estimates of discarding have been made.</p>	R31, R32, R33, I2, I3	21.7	85
80	Information is available on non-target species affected by the fishery including their distribution and/or ecology.				
100	Information is available on all non-target species affected by the fishery including the distribution and ecology.				

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
2.1.1.3		Is information available on the position and importance of the target species within the food web?			
60	Key prey, predators and competitors are known.	<p>The whole Benguela system has been the subject to two long running research programmes, the 'Benguela Ecology Programme' and also 'Benguela Trophic Functioning'. This research is ongoing through the BENEFIT programme.</p> <p>From this research, ecosystem models have been produced quantifying trophic flows in the Benguela system, including key species at different life stages. Hake is included as a key species.</p> <p>Studies have included relations of hake with predators such as seabirds and seals.</p> <p>Juvenile hake have been considered in these models (e.g. in gannet diets), but the trophic relationships of juveniles have not been as well studied. Also, it is difficult in the models to differentiate the two species. There is also little information on trophic relationships within nursery areas.</p>	R68, R69, I3	28.3	90
80	Information is available on the position and general importance of target species in the environment at key life stages.				
100	Quantitative information is available on the position and importance of the target species within the food web at key life stages.				
2.1.1.4		Is there information on the potential for the ecosystem to recover from fishery related impacts?			
60	Key elements of the functioning of the ecosystem, relevant to the fishery, are identified.	<p>Food web relations are well documented for both adult and juvenile fish but understanding of interactions with the fishery are less clear. Also, not all of the main elements of ecosystem functioning relevant to the fishery are not fully understood, principally juvenile relations and the effects of the removal of large numbers of adults (the main predator in this environment).</p> <p>Hake is currently in a management regime aimed at stock recovery. The basis for this has been effort reduction and the removal of foreign effort with the 200 nm EEZ declaration. Hake stocks have shown good recovery but are still in a rebuilding phase. However, the emphasis has been on stock assessment and effort control but without significant spatial or temporal management (except for divisions between West and East coasts and Inshore and Deepsea fisheries with different mesh limits).</p>	I3, R55	28.3	75
80	The main elements of the functioning of the ecosystem, relevant to the fishery, have been documented and are understood				
100	Detailed information is available on the potential for affected elements of the ecosystem to recover from fishery related impacts.				

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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2.1.2		General risk factors are adequately determined.		18.9		
Weighting Commentary		Scoring Indicators, Group 2.1.2 (4 th level): Unobserved mortality is considered less important than potential discard and by-catch. Discard is considered of potentially greatest significance for a fishery catching large quantities of target species.				
2.1.2.1		Is information available on the nature and extent of by-catch (capture of non-target species)?				
60	Qualitative information is available on significant by-catch species.	Historically relatively little emphasis has been placed on bycatch species and the RSA fishery has essentially been “whitefish” (hake) directed. Recent years have seen more commercial emphasis on bycatch. Monk is a case in point and the subject of ongoing assessment. Logbooks record retained species quantitatively and by location and CPUE data are available. This information on by-catch is captured on the demersal data base. Good quantitative information is therefore available on commercial (quota) species (horse mackerel, sole, kingklip, squid and panga with monk currently under development). This work has concentrated on species where multi-fisheries are involved eg. snoek (trawl and line), kingklip (trawl and longline), panga (trawl and foreign trawl) and horse mackerel (trawl and midwater trawl). Biological parameters of by-catch species are determined by research surveys Seal interactions are not recorded in log books but the relationship between the fishery and seals has been established through scientific studies. Benthic species interactions, e.g. corals, are recorded and mapped through research surveys.		I2, I3, I4-I7	32.0	90
80	Quantitative information is available on significant by-catch.					
100	Accurate records are kept on the nature and extent of all by-catch species including species size and sex composition.					

2.1.2.2		Is information available on the extent of discard (the proportion of the catch not landed)?				
60	Information is available of the extent of discarding, including a species list.	As for by-catch, information is available on the extent of discard and this has recently been the subject of a number of studies. Estimates of discard practices (discard being that proportion of the target species caught which is not landed) in the trawl fisheries suggest that discard levels are similar to other demersal trawl fisheries world-wide. Due to the implementation of the rights issue, this has not been a main priority recently. However, South Africa has recently introduced a comprehensive Scientific Observer Programme. Observers are deployed throughout the deep sea and inshore trawl fleets and hake trawler coverage approximates 15-20% of all trips. Information collected relates to fishing practice, gear types, biological measurements of target and non-target species as well as estimates of discard proportions.		R31, R32, R33, I3, I4-I7	55.8	80
80	Information is available to allow estimates of discard to be calculated and interpreted.					
100	Accurate information is available on the extent of all discards, and consequences of these. or the entire catch is landed.					

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
2.1.2.3		Is there information on any unobserved fishing mortality (i.e. sources of mortality other than those above)?			
60	Areas of potential unobserved fishing mortality are identified but no further information is available.	Observations have been made on unobserved discards (e.g. fish falling from overfull nets) and attempts have been made to observe net dynamics underwater, but these have not been quantified.	I3	12.2	80
80	Information from existing work has allowed qualitative estimates of unobserved fishing mortality to be made.	Otherwise, fish can pass through nets and sustain damage (although evidence from other fisheries suggests low levels of mortality) and cod ends can split or be lost during fishing operations. Unobserved fishery-related mortality on fish could also relate to increased predation by birds and seals. Seal interactions have been studied and unobserved fish mortality could result.			
100	Research has been carried out on unobserved fishing mortality allowing quantitative estimates to be made (or it is known that significant unobserved mortality does not occur).	Qualitative judgements can therefore be made but mortality not quantified.			

2.1.3		There is adequate knowledge of the effects of gear-use on the receiving ecosystem and extent and type of gear losses.			18.9	
Weighting Commentary		Scoring Indicators, Group 2.1.3 (4 th level): Gear impacts on habitat are weighted much higher than potential impacts of loss of trawl gear.				
2.1.3.1		Is there adequate knowledge of the physical impacts on the habitat due to use of gear?				
60	Main impacts of gear use on the habitat are identified including extent and location of use. Effects of habitat perturbations estimated and appear stable.	The extent and location of gear use are accurately recorded, both historically and now via VMS. Distribution of habitats has also been accurately recorded. Trawlers target known / safe fishing grounds with typically flat muddy bottoms (and so with limited impact on reef structures etc). The only reported destructive trawling practices were up to 1996 when foreign fleets were permitted on South Coast targeting reef areas – known as the ‘Foreign Triangle’. No doubt damage then was extensive to corals and substrate. However, there is now evidence that the species targeted by these vessels (panga) is recovering and this could be an indicator of substrate recovery.	I3, I6	90.0	60	
80	Impacts of gear use on the habitat are identified including extent and location of use. Habitat perturbations appear sustainable.	The long history of the fishery and general concentration on known areas is suggestive of stability, however, evidence of impacts relies on general literature on the effects of trawling on substrate world-wide.				
100	The physical impacts on the habitat due to use of gear have been studied and quantified, including details of any irreversible changes.					

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score	
2.1.3.2		Is any gear lost during fishing operations?			
60	Some recording of gear losses takes place.	Trawl gear is lost periodically when fouling underwater obstructions. However, trawl lanes are well known and gear is expensive. Obstructions are therefore carefully plotted by skippers and so gear loss is avoided and is not common (certainly not sufficiently common to merit recording).	I3, I4-I7	10.0	80
80	There is knowledge of the type, quantity and location of gear lost during fishing operations. Estimates made show that losses do not cause unacceptable effects on the ecosystem.	Trawl gear used, if lost, does not “ghost fish”. Acceptable estimates are that no ghost-fishing or other significant ecosystem impacts would arise from the loss of this gear type.			
100	There is detailed knowledge of the type, quantity and location of gear types lost during fishing operations. The impact of gear loss on target and non-target species has been measured and shown to have negligible effects on habitats, ecosystems or species of concern.				

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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2.1.4		Strategies have been developed within the fisheries management system to address and restrain any significant impacts of the fishery on the ecosystem.	24.5		
Weighting Commentary		Scoring Indicators, Group 2.1.4 (4 th level): Indicators at this level are considered of equal importance.			
2.1.4.1		Are levels of acceptable impact determined and reviewed?			
60	There is sufficient information to determine acceptable impacts for main target and non-target species and habitats.	Impacts on hake stocks are well estimated and reviewed. Species which occur in the bycatch of the hake fishery are primarily kingklip, squid, horse mackerel, sole and monkfish. Kingklip is perhaps the highest profile bycatch species in the trawl fishery (after the stock collapse due to longlining pressure). The monk assessment is problematic due to the nature of data (particularly the difficulty of extracting clear targeting of this species from other fisheries). Separate assessments have been carried out for kingklip, squid and horse mackerel, and CPUE's, survey indices and TAC's are monitored for the other species. The interplay between fisheries are noted in the management advice and in some cases a bycatch set-aside has been included in the TAC. By catch is therefore estimated, the effects of different fishing practices have been established and are periodically reviewed. Also, trophic relations (of by-catch species and hake) are included within ecosystem models, but appropriate levels of impact are not determined as a result. Acceptable levels of impact on benthic habitat are not established.	R64, I2, I3	50.0	75
80	Levels of acceptable impacts (e.g. biological reference points) for key aspects of the ecosystem within main fishing areas have been estimated and are regularly reviewed.				
100	Levels of acceptable impact for key populations (such as of indicator species) and habitats have been estimated and are subject to frequent review.				
2.1.4.2		Are management objectives set in terms of impact identification and avoidance/reduction?			
60	Limited management systems exist in terms of impact identification and avoidance/reduction.	Management objectives and control are exercised for main impacts. Objectives are set for by-catch and target species, management measures include TAC's for certain by-catch species for which the directed fisheries are relatively small. Horse mackerel is also subject to TAC control with the TAC split between mid-water directed and demersal directed. The latter basically allows for bycatch of horse mackerel in the hake-directed fishery. Trawlers are also instructed to avoid kingklip grounds. Bay areas have been closed to trawling to protect nursery areas and prevent damage to substrate. Further benthic damage is restricted through prevention of use of heavy bobbins and an inshore depth limitation of 110 m depth for offshore boats.	I2	50.0	80
80	Management objectives are set to detect and reduce impacts, although these have not been fully tested. These are designed to adequately protect key aspects of the ecosystem within main fishing areas.				
100	Tested management objectives are set to detect and reduce impacts These are designed to adequately protect ecosystems, habitats and populations of target and non-target species.				

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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2.1.5		Assessments of impacts associated with the fishery including the significance and risk of each impact, show no unacceptable impacts on the ecosystem structure and/or function, on habitats or on the populations of associated species.		18.9	
Weighting Commentary		Scoring Indicators, Group 2.1.5 (4 th level): As above, greatest importance if given to the effects of biomass removal on ecosystem functioning and productivity. Other indicators are of approximately equal weighting but reflect the importance of impact identification and by-catch issues.			
2.1.5.1		Have all the significant effects of the fishery on the ecosystem been identified?			
60	Main impacts of the fishery on the ecosystem are known from existing information.	The effects of the fishery on the ecosystem have all been subject to a degree of evaluation. In particular, the effects of the removal of hake biomass has been evaluated and managed and effort has been made to understand the effects of fishing on target and by-catch species. Impacts on seabirds are not considered likely to be significant but equally, have not been the subject of any specific, quantified, studies.	R66, I3	16.6	75
80	There is a comprehensive evaluation of the effects of the fishery on the ecosystem based on existing information.				
100	The effects of the fishery on the ecosystem have been identified by appropriate comparative and/or experimental studies.				
		Also, ecosystem effects have been modelled, although emphasis has been placed on the pelagic components, with hake considered as a top predator. In this context, hake cannibalism present a unique set of dynamics, both intra and inter-specific. Attempts have been made to model the effects of cannibalism and also the effect of this on mortality estimates.			
		Benthic habitats are known and measures have been taken to limit impacts on these, but no specific studies have been undertaken.			

2.1.5.2		Does the removal of target stocks have unacceptable impacts on ecosystem structure and function?			
60	The removal of target stocks may lead to impacts on ecological systems (applying the precautionary approach where necessary). A program is in development to identify impacts and reduce these to acceptable, defined limits where appropriate.	For west coast hake, the stock is in a rebuilding phase and the assessment indicates that biomass is about 60-100% of biomass at MSY. If it is 60% rather than 100% , then the likelihood of ecosystem effects (shifts in equilibrium population levels, and productivity) are higher. If it is 100%, then it is unlikely that there will be profound ecosystem effects due to the reduction in abundance. Ongoing rebuilding measures will continue to reduce any such effects. For south coast hake the abundance is higher than Bmsy, thus it is unlikely that there will be shifts in equilibrium due to current levels of removal.	R9, R67, I2	30.5	85
80	Some information is available on consequences of current levels of removal of target species. These suggest no unacceptable impacts of the fishery on ecological systems within major fishing areas.				
100	The ecological consequences of current levels of removal of target stocks has been quantified and documented to be within acceptable, pre-determined, limits.				
		The consequences of harvesting are also evaluated in ecosystem models which allows quantification of impacts of removal on other fish species.			

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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2.1.5.3	Does the removal of non-target stocks have unacceptable impacts on ecosystem structure and function?				
60	The removal of non-target stocks may lead to impacts on ecological systems (applying the precautionary approach where necessary). A program is in development to identify impacts and reduce these to acceptable, defined limits where appropriate.	The removal of the main non-target species (horse mackerel, squid, kingklip, sole, monk) are estimated and these species are monitored and, in some cases, directly managed. Of these, the long-lived species monk and kingklip are more vulnerable and this is noted in the management process. As for hake, the consequences of harvesting are also evaluated in ecosystem models which allows quantification of impacts of removal on other fish species. Assessment for non-target species is not as comprehensive as for hake, however.	R31, R32, R33, I2, I3	16.4	80
80	Some information is available on consequences of current levels of removal of non-target species. These suggest no unacceptable impacts of the fishery on ecological systems within major fishing areas.	No unacceptable impacts on ecosystem structure or function have been determined.			
100	The ecological consequences of current levels of removal of non-target stocks has been quantified and documented to be within acceptable, pre-determined, limits.				

2.1.5.4	Does the fishery have unacceptable impacts on habitat structure?				
60	There is no evidence that the fishery is having unacceptable impacts, although the issue has not been directly studied.	The current hake targeting with trawls suggests no major impact on habitat structure given existing grounds fished, although no specific studies have been carried out.	I3	11.5	60
80	No unacceptable impacts of the fishery on habitat structure within major fishing areas have been demonstrated.	Management measures are in place to minimise impacts, such as steel bobbins not being permitted in the trawl fishery and only small plastic bobbins are allowed on foot ropes The issue of trawling moving into deeper water may, however, be a cause for concern in this regard.			
100	Effects on habitat structure are documented and are within acceptable tested/justified limits				

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
2.1.5.5.		Are associated biological diversity and productivity affected to unacceptable levels?			
60	There is no evidence that the fishery is having unacceptable impacts, although the issue has not been directly studied.	Impacts on productivity have been evaluated, to an extent, through the development of ecosystem models and there is no evidence of unacceptable impacts.	I3, R55	25.0	70
80	The effects of the fishery on biological diversity and productivity have been considered and no unacceptable impacts have been found.	There are also no indications of impacts on biological diversity, although the effects of the hake fishery on benthic diversity or on seabird populations have not been directly studied. The establishment of existing and future Marine Protected Areas (MPA's) will safeguard, to some extent, benthic habitat and species diversity.			
100	The effects of the fishery on biological diversity and productivity have been quantified and are within acceptable tested/justified limits				

2.2 (MSC Criterion 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.			33.3	
2.2.1	Fishing is conducted in a manner, which does not have unacceptable impacts on recognised protected, endangered or threatened species.			43.5	
Weighting Commentary		Scoring Indicator Groups (3 rd level): the moderate difference in weighting reflects the importance of having strategies to address impacts. Scoring Indicators, Group 2.2.1 (4 th level): the indicators at this level are considered of equal importance.			
2.2.1.1		Is there information on the presence and populations of protected species?			
60	There is a program in place to identify protected, threatened and endangered species directly related to the fishery.	Protected species present include large cetaceans, seals and some teleosts.	I3, I8	33.3	100
80	Key protected, threatened and endangered species directly related to the fishery have been identified.	Protected species (mammals and fish) which could be affected by the fishery are identified and their temporal presence (migration) and population trends are established. Critical habitats (breeding grounds for birds and seals, bird/whale feeding areas) are also known. Protected teleosts are line fish species which are reef species, and so these do not interact with trawl fishery to any great extent. Information is also available on bird species (which are protected), but trawling-related impacts are considered unlikely.			
100	There is knowledge of all populations of protected species directly or indirectly related to the fishery including an assessment of temporal variability. The type and distribution of critical habitats have been identified.				

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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2.2.1.2		Are interactions of the fishery with such species adequately determined?			
60	The main interactions directly related to the fishery are known.	Interactions between seals and fishers, including trawler operations, have been researched and reported on in several scientific papers and seal mortality associated with hake trawl operations is reported to be low and insignificant at the population level. There are no obvious effects of the fishery on large whale populations, which are showing recovery from previous low population levels. Cob (a protected 'line fish') may be taken as incidental catch in the inshore trawl fishery. This is an 'A' listed spp, but all such interactions are determined.	I3, I8, R10, R27	33.3	90
80	Quantitative estimates are made of the effects of interactions directly related to the fishery.				
100	Reliable quantitative estimates are made of the interactions of all populations directly related to the fishery, and qualitative information is available on indirect impacts.				

2.2.1.3		Do interactions pose an unacceptable risk to such species?			
60	Known effects are within acceptable limits of national and international legislative requirements and are believed to create no biological threats to the species concerned.	As detailed above, interactions are well estimated and no risks are identified to the above species.	I3	33.3	85
80	Critical interactions are well estimated and do not threaten protected species.				
100	It is known that the direct and indirect effects of fishing on threatened and endangered species are within acceptable limits.				

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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2.2.2	Strategies have been developed within the fisheries management system to address and restrain any significant impacts of the fishery on protected, endangered or threatened species.		56.5	
2.2.2.1	Are management objectives set in terms of impact identification and avoidance/reduction?			
60	Limited management systems exist in terms of impact identification and avoidance/reduction.	Protected species, including mammals and seabirds, are specified in the Marine Living Resources Act. The act also requires setting of objectives as required. This is supplemented by regulations and permit conditions relating to protected species.	I3	100
80	Management objectives are set to detect and reduce impacts. These are designed to adequately protect key aspects of the ecosystem within main fishing areas.	Threatened linefish species are protected by the exclusion of trawlers to bays and the establishment of MPA's. Further evaluation of the impact of the inshore fishery on threatened linefish is recommended but otherwise, no direct management regime required.		80
100	Tested management objectives are set to detect and reduce impacts These are designed to adequately protect ecosystems, habitats and populations of target and non-target species.			

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score	
2.3 (MSC Criterion 3)	Where exploited populations (of non-target species) 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.	33.3			
2.3.1	There are management measures in place that allow for the rebuilding of affected populations.	100			
Weighting Commentary	Scoring Indicators, Group 2.3.1 (4 th level): Weightings reflect the importance of having appropriate measures and, particularly, for these to be sufficient to allow rebuilding to occur.				
2.3.1.1.	Is there sufficient information to allow determination of necessary changes in fishery management to allow recovery of depleted populations?				
60	There is some information on functional relationships, sufficient to allow alterations to be made to fishing to recover and rebuild depleted species.	Compared to hake, the assessment information for the non-target species is relatively weak. Therefore, precautionary management has been implemented in some instances (such as kingklip on the west coast). The non-targeted catches are monitored and CPUE's and survey data are available for this. Assessments indicate that kingklip stocks are depleted and that while the west coast stock is recovering, the south coast stock is more problematic. Further management is planned to address this. Overall, the information available is sufficient to detect problems and allow for alterations to fishing, but not to fine-tune the management regime.	R64, I3, I1	26.2	85
80	There is adequate information, combined with a precautionary approach wherever necessary, to allow alterations to be made to fishing to recover and rebuild depleted species.				
100	There is a clear understanding of functional relationships between the impacted population and the fishery. Intervention measures based on this understanding have been tested.				

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
2.3.1.2		Are management measures in place to modify fishery practices in light of the identification of unacceptable impacts?			
60	A mechanism exists for the modification of fishing practices in light of the identification of unacceptable impacts.	The management authority is able to implement and enforce compliance measures and to bring in codes of conduct. Appropriate monitoring procedures are in place which are now further supplemented by the observer programme.	I3	32.8	90
80	Effective management measures are in place to modify fishery practices in light of the identification of unacceptable impacts.	One mechanism that can be used (and has been used with larger companies) is to define “hot-spots” if an area is being fished excessively, e.g. for a non-target species aggregation. Operationally vessels would then avoid those areas to reduce pressure on these non-target (but commercial) species. Use of VMS and observers allows monitoring of this.			
100	Monitoring programs are in place within the management system to allow modification of fishery practices in light of the identification of unacceptable impacts. Objectives and limits for environmental change are used to guide operational practices. It is demonstrated that these are effective.				

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
2.3.1.3		Do management measures allow for recovery of affected populations?		
60	Rebuilding measures exist and are implemented. Measures have not been tested.	Kingklip populations have been depleted through line fishing. Targeted line fishing for kingklip has now been stopped and overall rebuilding procedures for kingklip have been implemented in terms of TAC's as management measures. Also, all targeting practices for kingklip were stopped voluntarily by the trawling industry after the collapse of the stock. More detailed by-catch management procedures for the trawl fishery are needed and are currently in preparation	I2, I3	41.0
80	Appropriate rebuilding measures are being implemented. Measures have been tested and can be shown to be rebuilding the affected populations.			
100	Appropriate rebuilding measures are being implemented to promote recovery as quickly as is possible. Additional measures are being implemented to prevent problems in the future.			
				60

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
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		33.3	
3.A		Management System Criteria		56.5	
Weighting Commentary		MSC Principles (1 st level): no weighting is applied, each of the three principles is weighted equally at 33.3 MSC Criteria (2 nd level): Management system criteria (3A) are considered of slightly greater importance than the operational criteria (3B) Scoring Indicator Groups (3 rd level): Within the management system criteria, the legal basis of the fishery and rights issues are considered to be of greatest importance (3A.2), followed by compliance, monitoring and control of the fishery (3A.8). At the next level of weighting are setting and meeting objectives (3A.3), an appropriate management framework (3A.1) and addressing impacts on the stock (3A.6). Other groups are of approximately equal, but lower, weighting.			
3A.1 (MSC Principle 3 Intent and Criterion 3)		A management system containing an institutional and operational framework exists with clear lines of responsibility.		11.4	
Weighting Commentary		Scoring Indicators, Group 3A.1 (4 th level): Greatest weighting is given to the organisation of the management authority(s) and system, followed by this system being appropriate to the scale of the fishery. Internal and external review are considered of equal, but lower, importance.			
3A.1.1		Are organisations with management responsibility clearly defined including areas of responsibility and interactions?			
60	Organisations with management responsibility are known. Responsibilities and interactions are to be determined.	Organisations with management responsibility are clearly defined. MCM is the only relevant body, and responsibilities and interactions are clearly defined within MCM. There are overlaps in some areas, e.g. Monitoring Control and Surveillance are supplemented by police/navy and provincial authorities, but co-ordinated by MCM. Such overlaps are currently being addressed. The recent nature of some of the legislation and decision making processes, notably dealing with rights issues, mean that there are outstanding challenges to decisions that may lead to challenges to current responsibilities. Specifically, within the trawling sector, areas of responsibility are clearly defined. MCM have a "Demersal Section" which is responsible for management of the hake resource and a clearly defined structure exists e.g. for ageing, biology, assessment and management. However, recent movements of professional and technical staff have reduced the management capacity somewhat. Industry is an interested and active party and interacts to support management, mostly through INSEF's (Industry Associations), SADSTIA is also very prominent.	I3, I1	49.5	90
80	Organisations with management responsibility have been defined including key areas of responsibility and interaction				
100	Organisations with management responsibility are clearly defined including all areas of responsibility and interaction.				

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
3A.1.2		Is the system consistent with the cultural context, scale and intensity of the fishery?			
60	Inconsistencies arise in some key areas but a programme is in place to address these.	The system is consistent with the context, scale and intensity of the fishery. However, the demersal hake trawl fishery has recently undergone a significant change in make up, with small operators entering the system. Systems that dealt with the large operators only in the past are now being asked to work with a greater number of enterprises and also enterprises that may be less experienced and less able, due to resource limitations, to respond to the demands of the systems. Compounding this change are capacity limitations within MCM (due to loss of key staff, allocation of key staff to deal with rights issues, increasing demands for by-catch issues and other scientific issues). This may compromise future meeting of the demands of the fishery, particularly given changes in fishery (surveillance and compliance) requirements. It is noted that, while new staff have been brought in who may have had little previous MCS experience, a good MCS management structure is now in place, better than in previous years, and significant training programmes are now underway of observers and inspectors.	I3 Macfadyen, peer review report	23.2	80
80	The system is consistent with key elements of the cultural context, scale and intensity of the fishery				
100	The system is entirely consistent with the cultural context, scale and intensity of the fishery				
3A.1.3		Is the management system subject to internal review?			
60	There are mechanisms in place to allow for internal review.	Periodic review of the management systems (e.g. OMPs) occurs internally, including the involvement of both consultants (e.g. Prof Butterworth) and in consultation with industry and other stakeholders. In addition, the Demersal Working Group meets several times per annum with a varying agenda which includes hake at least annually. Specific task groups may also be convened.	I2, I3, I1	13.6	100
80	The management system is subject to regular internal review.				
100	The management system is subject to regular and frequent internal review.				
3A.1.4		Is the management system subject to external review?			
60	There are mechanisms in place to allow for external review.	Mechanisms for external review exist, but are weak. External review appears to be currently restricted to liaison with Namibia, on issues of science and OMP's, through such organisations as BENEFIT/NRF (in the form of an annual assessment review workshop). It is, however, unclear as to how rigorous or wide-ranging this reviewing is or whether it is sufficiently frequent to address the needs of a changing industry and variable natural resource. CAF's previously carried out a review function and are to be reconstituted in future. The CAF is to meet as required and will make recommendations to the Deputy Director General of MCM.	I3, I1	13.6	75
80	The management system is subject to regular external review.				
100	The management system is subject to regular and frequent external review.				

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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3 A.2 (MSC Criteria 1, 2, 4)		The management system has a clear legal basis.	29.7	
Weighting Commentary		Scoring Indicators, Group 3A.2 (4 th level): consistency with national legislation, and rights issues, are of equal importance. Consistency with international conventions is considered of lesser importance for a fishery operated entirely within an EEZ.		
3A.2.1		Is the fishery consistent with International Conventions and Agreements?		
60	An evaluation is being undertaken to show compliance with relevant international agreements. There is no evidence that the fishery is not consistent with agreements.	The principal RSA Act, the MLRA is committed to international law (UNCLOS) and a precautionary approach is prescribed when uncertainty prevails. Also, RSA is now an UNCLOS signatory and has also a signatory to SEAFO and member of ICCAT. MARPOL is also supported by regulations and industry action. The Management Authority is well aware of relevant conventions and there are no specific conventions relevant to the hake fishery. Several new regional initiatives are also underway, mostly with the southern African coastal states and the SADC community, including research programmes (BENEFIT and BCLME).	I3	5.3
80	An evaluation has been undertaken and fishing appears to comply with international agreements.			
100	An evaluation has been undertaken which clearly shows that the management system is compliant with all relevant international agreements			

3A.2.2		Is the fishery consistent with national legislation?		
60	An evaluation is being undertaken to show compliance with relevant national agreements. There is no evidence that the fishery is not consistent with national legislation	The fishery is subject to, and compliant with, the MLRA and appropriate regulations and permit conditions. The emphasis in National legislation is on long-term sustainability.	I3	47.4
80	An evaluation has been undertaken and fishing appears to comply with national legislation.			
100	An evaluation has been undertaken which clearly shows that the management system is compliant with all relevant national legislation.			

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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3A.2.3		Does the system observe the legal and customary rights of people dependent upon fishing?			
60	The customary and legal rights of the people dependent upon fishing are known and no major conflicts have been recorded.	The recent Rights issues have led to a period of inspection and legal review of the issue. This issue seems to have been settled now in the court of appeal. In particular, transformation in the fishing sector with claims to historical fishing rights have been, and are being, addressed. This has, and is, taking place within the legal and political framework and is viewed as a positive a part of the rights process.	I3	47.4	90
80	The system observes the legal and customary rights of people dependent upon fishing but does not necessarily have a formal codified system.				
100	The system observes all legal and customary rights of people dependent upon fishing under a formal codified system.				

3A.3 (MSC Criteria 2, 5, 7)	The management system includes strategies to meet objectives including consultative procedures and dispute resolutions.		11.5		
Weighting Commentary		Scoring Indicators, Group 3A.3 (4 th level): Greatest weight is given to the existence of clear objectives, followed by the existence of procedures to meet objectives. A consultative process and dispute resolution mechanism are considered of equal, but lower, importance but are important if objectives are to be met. Other indicators (procedures for measuring performance and adoption of a precautionary approach) are both of equal importance, but lower weighting.			
3A.3.1		Does the management system contain clear short and long-term objectives?			
60	Short and long-term resource and environment objectives are implicit within the management system.	Objectives for the resource include the issue of medium-term rights (4 years) with a subsequent issue of longer-term rights due in 2005. The hake trawl assessment aims at long-term sustainability and stock recovery to above Bmsy. Appropriate Operational Management Procedures are being introduced aimed at responding to measures of stock changes, but have not yet been finalised. There is, however a response delay in the assessment regime of about one to two years, associated with data acquisition. Short-term and Long-term environmental objectives are contained in the MLRA. Performance indicators for the resource exist (CPUE etc), but no directly relevant performance indicators are established for environmental objectives.	I2, I3	33.0	85
80	The management system contains short and long-term resource and environment objectives.				
100	The management system contains clear short and long-term resource and environment objectives that can be measured by performance indicators.				

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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3A.3.2	Do operational procedures exist for meeting objectives?				
60	Operational procedures exist which are applied to the meeting of objectives	Appropriate Operational Management Procedures are being introduced aimed at responding to measures of stock changes, but have not yet been finalised. Previous bodies such as the CAF, that added to the transparency of the process, have been suspended during the recent transition period, but are to be reintroduced in a similar or slightly changed form. Within MCM, working groups look at indicators for stock in a process which is transparent and includes objectives, milestones, feedback and relates management advice to management standards. For other objectives, such as MPA's, procedures exist and are transparent, but processes are less clear for non-stock related objectives.	I2, I3	18.1	85
80	Transparent operational procedures are applied to the meeting of objectives. These procedures can be shown to support the objectives.				
100	Operational procedures are transparent and clearly applied. There is a feedback mechanism testing effective application.				

3A.3.3	Are there procedures for measuring performance relative to the objectives?				
60	Operational procedures exist which can be used to measure performance relative to the objectives.	Procedures for measuring performance against objectives exist. These include, for example, catch management control, TAC setting, compliance etc. These are well tested and include for regular measurement of performance	R9, R67, R34-43, I3	8.1	100
80	There are procedures used for measuring performance relative to the objectives.				
100	Tested procedures are used for regular measurement of performance relative to the objectives.				

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
3A.3.4		Do objectives and operational procedures follow the precautionary approach?			
60	Some objectives and procedures implement a precautionary approach	The recent history of the hake fishery (and, for example, the horse mackerel fishery) and its management reflect the approach to rebuild the fishery from its historic depleted state. This is clear evidence of the application of a precautionary approach (pa) to the management of the fishery. The development, and continued interest in the development of key marine protected areas (MPAs) is a further indication of a sustainable approach to managing the ecosystem. Other aspects of the fisheries management show a less precautionary approach, including assessment and management of the two species of hakes as a single stock; one could be depleted and provided that the other became more abundant (or available to the fishery) the decline may be masked. Single species assessment is currently being explored, however. Other issues, including by-catch management, also show questionable precautionary approaches. However, a precautionary approach is applied when an objective is identified as being key.	R9, R67	8.1	85
80	Key objectives and procedures explicitly implement a precautionary approach.				
100	All objectives and procedures explicitly implement a precautionary approach.				
3A.3.5		Does the system include a consultative process including affected parties?			
60	The system includes a consultative process including key stakeholders within the fishery.	A consultative process is well established, all stakeholders are allowed access to working group meetings (NGO's etc). Interested and affected parties will also be allowed access to CAF meetings when this body is re-constituted. MCM present assessment results at INSEF (Industry – sea fisheries) meetings. MCM working groups also now permit industry and consultants to observe and comment. Historically only SADSTIA members were consulted as industry representatives. Now, with new dispensation and many more rights holders, the consultation process is fully representative of rights holders within this fishery. Issues affecting the fishery are not, however, subject to direct consultation with non-fishery stakeholders.	I3	16.3	90
80	The system includes a consultative process including all main stakeholders.				
100	The system includes a consultative process including all affected stakeholders.				
3A.3.6		Is there an appropriate mechanism for the resolution of disputes within the system?			
60	A program is being developed to allow for resolution of disputes within the system, but has not been tested.	Disputes within the system are first discussed directly with MCM management (to an appeals unit within MCM), but can proceed to ministerial level. Beyond ministerial level, disputes may be resolved within the legal system. The opportunity to mount a legal challenge to the system seen as a positive aspect of dispute resolution, e.g. the rights allocation legal dispute This process is well developed and fully tested.	I3	16.3	100
80	There is an appropriate mechanism for the resolution of disputes within the system.				
100	There is an appropriate and tested mechanism for the resolution of disputes within the system.				

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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3A.4 (MSC Criterion 6)		The management system operates in a manner that contributes to sustainable fishing	8.4		
Weighting Commentary		Scoring Indicators, Group 3A.4 (4 th level): The SA system has not included subsidies, but the success of incentives (through rights issues) is of importance in maintaining the sustainability of the fishery. A higher weighting is therefore applied to indicator 3A.4.2.			
3A.4.1		Does the system include subsidies that contribute to unsustainable fishing?			
60	Subsidies exist that may contribute indirectly to unsustainable fishing. These are short-term and are in the process of being removed within acceptable timescales.	No subsidies exist in the system that would contribute directly or indirectly to unsustainable fishing (e.g. through creating overcapacity in the trawl fleet).	I3, I4-I7	12.5	100
80	The system includes no subsidies that contribute to unsustainable fishing				
100	The system is not subsidised to any extent.				

3A.4.2		Does the system include economic/social incentives that contribute to sustainable fishing?			
60	A program is being developed to promote sustainable fishing practices	Effective incentives exist to promote sustainable fishing through long-term individual rights allocations.	I3, I4-I7	87.5	100
80	The system has some economic and social incentives that contribute to sustainable fishing.				
100	The system has established economic and social incentives that contribute to sustainable fishing. No subsidies are offered for purchase of vessels or vessels targeting fully exploited or depleted resources (by FAO definitions)				

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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3A.5 (MSC Criterion 8)		A research plan exists in line with the management system to address information needs.		3.7	
Weighting Commentary		Scoring Indicators, Group 3A.5 (4 th level): Research directed by the management system is considered of greatest importance for this fishery and so other research (3A.5.3) is weighted lower. Other indicators are considered to be of equal importance.			
3A.5.1		Have key research areas requiring further information been identified?			
60	Major areas requiring further research have been identified.	The key information and data needs regarding the priority for improved stock assessment has been defined by those delivering the stock assessment. Other prioritised research plans concerned with this and other fisheries also exist within MCM. However, a review process may need to be considered to review the overall priorities for this fishery in the light of limited personnel resources and demands of management over research priorities.	I2, I3, I1	44.4	90
80	Key areas requiring further research have been identified.				
100	Key areas requiring further research have been identified.				

3A.5.2		Is research planned/undertaken to meet the specific requirements of the management plan?				
60	Research is planned for highest priority information needs.	Research directed towards the hake fishery has historically been well structured.		I2, I3, I1	44.4	85
80	Research is planned and undertaken to provide necessary scientific support to the plan. There are demonstrable resources to allow implementation of the programme.	Principal areas of interest are covered by well planned research, such as R/V based trawl surveys to provide tuning data (CPUE) for the assessment process. Even when the R/V Africana was unexpectedly out of action for a considerable period of time recently, research was planned for an alternative vessel to conduct the surveys.				
100	There is an ongoing, funded, comprehensive and balanced research programme, linking research to the management plan.	Recent management demands have, however, overridden the research demands to some extent (particularly the demands of the rights allocation programme) and availability of scientifically experienced personnel within MCM is a concern. However, increasing amounts of scientific work has recently been outsourced, including stock assessment to UCT, discard and by-catch studies to Rhodes University and the scientific observer programme. The research programme is ongoing but is not considered to be completely balanced. The scientific observer programme also supports the research programme through collection of required data.				

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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3A.5.3		Is relevant research carried out by other organisations and is this taken into consideration?			
60	The management system is aware of research carried out by other organisations and elements of this is taken into consideration.	Industry, (as companies and their industry body) commission and conduct their own research, including into such complex areas as technical stock assessment. Such information is usually fully considered.	I2, I3, I1	11.1	95
80	Appropriate research carried out by other organisations is taken into consideration, although there is not necessarily any proactive co-ordination between organisations	BENEFIT and SANCOR research (and training) is taken implicitly into account within the management system , but also has wider regional priorities. Joint workshops and integrating meetings take place between SA and Namibian researchers.			
100	Relevant research carried out by other organisations is taken into account for management considerations. This research is often co-ordinated with existing research plans of the management system.	Scientists within the management system are well aware of research taking place elsewhere in Universities within SA, the region and the rest of the world. Such information is usually fully considered.			

3A.6 (MSC Criteria 7, 9, 10)	The management system includes measures to pursue objectives for the stock.		12.1		
Weighting Commentary		Scoring Indicators, Group 3A.6 (4 th level): Greatest weighting is applied to the existence of appropriate strategies (3A.6.3), followed by the existence of appropriate information (3A.6.1).			
3A.6.1		Are the resource and effects of the fishery monitored?			
60	A monitoring programme is in place which addresses some aspects of resource and effects and which can be extended.	The commercial component of the resource is monitored, but currently only as combined species not as two separate species in so far as the stock assessment is concerned. Snapshots of species mix by depth exist to try to further understand the separation of the two stocks and the effect of the fishery on them. There is also good monitoring through research surveys and the observer programme. The reporting of catch levels are well reported geographically (including VMS data) and over appropriate intervals for the system under consideration. Records are collected by the research/management body (MCM) and made available to research and assessment personnel and industry. The issue of timing of reconciliation of data related to capacity issues does, however, remain a concern.	I3, I4-I7	32.0	85
80	A monitoring programme is in place which addresses all key aspects of resource and effects at appropriate intervals and results are recorded.				
100	The resource and effects of the fishery are closely monitored over appropriate geographical areas and time periods. Full records are kept of monitoring results and these are made available to relevant research and management bodies.	Catch reporting (the effect of fishing activity on the stock) is less than adequately reported in other parts of the hake fishery (the handline fishery) and this has may undermine the current approach to stock management in the future.			

SCORING INDICATORS		Comments	Audit Trace Ref.	Weight	Score
3A.6.2		Are results evaluated against precautionary target and limit reference points?			
60	Target, precautionary and limit reference points exist and some level of evaluation is possible.	Landings are quantitatively assessed on an appropriate (annual) basis relative to TAC's. TAC's are based on precautionary target reference points.	I3	12.2	95
80	Results of monitoring are regularly interpreted in relation to precautionary, target and limit reference points				
100	Results of monitoring are quantitatively evaluated against precautionary, target and limit reference points on a regular basis.				
3A.6.3		Do procedures exist for reductions in harvest in light of monitoring results?			
60	Practical procedures exist to reduce harvest. Programmes to link these with monitoring results are underway.	Procedures to adjust the hake TAC on an annual basis (OMP, working group/consultative process, ministerial approval) exist and appear to have operated well. There remains an issue of shifting allocation of rights to newer and smaller operators and how this may affect the process of TAC management. This encompasses such issues as a possibly less coherent industry view and increased level of challenge to unpopular changes in TAC. Current continued approach to stock rebuilding suggest that the management approach is sound and is largely supported by the industry.	I2, I3	55.8	95
80	Practical procedures exist to reduce harvest in the light of monitoring results and provide for stock recovery to specified levels.				
100	Practical procedures exist to reduce harvest in light of monitoring results and provide for stock recovery to specified levels within specified time frames				

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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3A.7(MSC Criterion 10)		The management system includes measures to pursue objectives for the affected ecosystem.	5.2	
Weighting Commentary		Scoring Indicators, Group 3A.7 (4 th level): Greatest weighting is applied to the existence of appropriate measures (3A.7.1), followed by the existence of appropriate information (3A.7.2). No take zones are not considered of relatively great importance for a fishery/species of this type.		
3A.7.1		Are measures in place to address (avoid or minimise) significant environmental impacts?		
60	Significant environmental impacts are known and measures are being applied to reduce key impacts.	Studies have been carried out, at various levels, on each area of environmental impact associated with the fishery.	I3	80
80	Environmental impacts are known. Measures are being applied to minimise all significant ones and there is evidence that the measures are working.	The area of least knowledge is considered to be impacts on benthic habitats. All demersal (bottom) trawling has some impact on the sea bed environment, arising from trawl door, foot rope/bobbins and the net dragging on the sea bed. Whether this is beneficial or deleterious is still a matter of debate but certain environments (e.g. cold water corals) will inevitably be subject to some form of change as a result of high density bottom trawling. No direct studies to examine this are in place or planned, but there are a number of mitigating factors including the relatively small size of the fleet compared to the available area of sea bed, the fact that significant effort is deployed in small areas, increasing the level of impact in those areas but sparing much larger areas from any impact, a number of inshore MPA's and trawl exclusion areas in bays (particularly on south coast) exist and offshore MPA's are being considered.		
100	Measures are in place to avoid all significant environmental impacts and are subject to monitoring and periodic review.	Other potentially adverse environmental effects have been identified and studies conducted to ascertain whether the fisheries are having an impact or not. This includes possible impacts on non-target organisms such as seals where, for example, there are regular abundance estimates conducted by aerial survey. Further approaches to address fish by-catch are under development and are being actively pursued in an open and transparent way with the industry. In addition, much of industry currently uses larger mesh size than the minimum (trawling industry is voluntarily increasing mesh size >110 mm) in a quest for better quality that also results in reduced catches of small hake and other small non-target organisms (including fish). Industry have tested square-mesh nets and there are ongoing experiments in the sole / hake sector with exclusion panels.		

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score	
3A.7.2		Do fishing operations use appropriate fishing methods designed to minimise adverse impacts on habitat, especially in critical or sensitive zones such as spawning or nursery areas?			
60	Fishing operations use measures that significantly reduce major impacts on habitat, especially in critical or sensitive zones such as spawning or nursery areas.	A number of measures have been implemented to minimise impacts on benthic habitats. These include:	I3, I4-I7	33.3	75
80	There is evidence that fishing operations are effective in avoiding significant adverse effects on the environment, especially in critical or sensitive zones such as spawning or nursery areas.	<ul style="list-style-type: none"> • Deep-sea trawlers are not permitted to operate in water shallower than 110 m • The non-use of heavy gear and recent developments in gear technology allowing fishing in a semi-pelagic manner (including small plastic bobbins, foot ropes, trawl doors). These are applied to avoid loss of gear and incidentally reduces impacts • Spatial distribution of fishing effort (and so area impacted) is restricted by the use of appropriate navigation technology • Exclusion of trawlers from bay areas and implementation of inshore MPA's. Use of VMS allows tracking and warning of vessels in the vicinity of exclusion areas. 			
100	There is direct evidence that fishing operations implement appropriate methods to avoid significant adverse impacts on all habitats.	<p>No specific nursery areas are defined, but the west coast fishery operates in waters deeper than 200 m and commercial targeting of juveniles is avoided.</p> <p>However, there is no evidence available of the effectiveness of these measures in terms of impacts on habitat outside exclusion areas and in recent years, commercial trawling effort has moved into deeper water targeting larger fish.</p>			
3A.7.3		Are no take zones appropriate and, if so, are these established?			
60	Suitability of no take zones has been reviewed against objective biological criteria. Plans are in place to implement some or all of these if appropriate.	No-take zones are appropriate for inshore waters (bays and inshore MPA's) where nursery areas would be present (although no specific nursery areas are defined) and these are well established. The effectiveness of these is not, however, directly monitored.	I3	14.0	85
80	Suitability of no take zones has been reviewed and these have been or are currently being implemented if and where appropriate.	<p>Also, deep-sea vessels are not allowed to operate in waters shallower than 110 m and the west coast fishery operates in waters over 200 m depth.</p> <p>There have been preliminary discussions over the establishment of offshore MPA's, but the likelihood of these being introduced in the near future not high.</p>			
100	No take zones are established if and where appropriate and, if implemented, the consequences are being monitored.				

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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3 A.8 (MSC Criterion 11)		There are control measures in place to ensure the management system is effectively implemented.	18.1		
Weighting Commentary		Scoring Indicators, Group 3A.8 (4 th level): The indicators at this level are considered of approximately equal importance, but a slightly higher weighting is applied to the existence of appropriate corrective actions.			
3A.8.1		Are information, instruction and/or training provided to fishery operatives in the aims and methods of the management system?			
60	Mechanisms exist for the dissemination of information, instruction and training of fishery operatives. These mechanisms may not be universally implemented.	Information system are considered to be generally good, with brochures etc being provided, setting out the requirements of the management system. Fishers then sign a code of conduct formally accepting these requirements. Training education systems also exist to provide certified courses including legislation, fishing methods and gear use with instruction provided in indigenous languages as appropriate and to an adequate degree. Systems exist to involve industry in decision-making (working groups, consultative meetings etc) and within the industry, larger companies carry out considerable training, including environmental training and encouragement schemes. Overall, the amount of information provided is considered sufficient to allow effective management, but there is seen to be a lack of clear dissemination of information by the management authority. This is, however, being strengthened through the education of operatives by scientific observers.	I3, I4-I7	31.3	80
80	Information, instruction and training are provided to fishery operatives in the aims and methods of the management system allowing effective management of the system.				
100	Information, instruction and training are provided to fishery operatives in the aims and methods of the management system allowing effective management of the fishery and operatives demonstrate comprehensive knowledge of this information.				

3A.8.2		Is surveillance and monitoring in place to ensure that requirements of the management system are complied with?			
60	An enforcement system has been implemented; however, its effectiveness and/or compliance pose a risk of failing to achieve conservation objectives.	Monitoring Control and Surveillance (MCS) system is fairly sophisticated when considered in terms of the nature of the hake trawl fleet (Observers, VMS, landing control, aerial surveillance, ship-based surveillance etc). Control of landings is good but some aspects of performance could be improved, including the speed of catch reporting. Concerns about inadequate monitoring of catches by other fisheries that target the same stock of hake exist, however, particularly over the growing hake hand-line fishery. Also, sophisticated cross-checking is being implemented between the bureau of standards, tax system and fishery management system, supplemented by regional co-operation. This has shown effectiveness in MCS of other fisheries The degree of control and compliance is therefore considered to be appropriate.	I3, I4-I7	31.3	85
80	An effective enforcement system has been implemented and there is an appropriate degree of control and compliance.				
100	An effective enforcement system has been implemented and there is a high degree of control and compliance.				

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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3A.8.3		Can corrective actions be applied in the event of non-compliance?			
60	Mechanisms exist or are being developed which can be implemented or applied to deal with non-compliance.	Demonstrative corrective actions have been taken against some illegal activities. However, not only do the mechanisms need to exist and be operable but the impact of such actions (e.g. fine levels, administrative penalties) also need to be appropriate. Measures now agreed and tested include prejudice against future rights allocations and includes a confidential informant system.	I3	37.5	95
80	There are set measures that can be applied in the event of non-compliance although these may not be included in a formal or codified system.				
100	Agreed and tested corrective actions can be applied in the event of non-compliance.				

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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3 B		Operational Criteria			43.5			
Weighting Commentary		Scoring Indicator Groups (3 rd level): Within Operational Criteria, compliance with the management system (3B.5) is considered of greatest significance, followed by the provision of data from the fishery (3B.6) and the effects of use of gear (3B.1 and 3B.2). Operational waste (3B.4) and destructive practices (dynamite, poisons etc; 3B.3) are considered of relatively low significance.						
3B.1 (<i>MSC Criterion 12</i>)		There are management measures that include practices to reduce impacts on non-target species and inadvertent impacts upon target species .			23.0			
3B.1.1		Do operational measures, principally through the use of gear and other fishing practices, include avoidance of impacts on non-target species and inadvertent impacts upon target species? These would include by-catch and discard.						
60	Measures have been implemented that are intended to reduce the major impacts on non-target species and inadvertent impacts on target species but their effectiveness is not known.	A number of measures have been introduced, notably: <ul style="list-style-type: none"> • Mesh sizes greater than the specified minimum are frequently used • Most, if not all, net monitors are remote telemetered systems and are therefore wireless, creating reduced problems of seabird collision • Close inshore trawling is not permitted and enforced by VMS 				I3, I4-I7	100	85
80	Measures have been implemented to reduce the major impacts on non-target species and inadvertent impacts on target species and there is some evidence that they are having the desired effect.	<ul style="list-style-type: none"> • Large industry discard practically nothing, fish waste is either processed through fishmeal plants on board or is returned for shore based processing (for maximum value extraction). This reduces the attraction of, and impacts upon, seabirds • Avoidance of areas of high horse-mackerel abundance to avoid damage to hake. 						
100	Measures have been implemented to reduce the major impacts on non-target species and inadvertent impacts on target species, and their effectiveness is clearly demonstrated.	These are reasonably expected to be effective, but this has not been demonstrated.						

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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3B.2 (MSC Criterion 13)		There are management systems in place that encourage fishing methods that minimise adverse impacts on habitat.		11.3	
3B.2.1		Do fishing operations implement appropriate fishing methods designed to minimise adverse impacts on habitat, especially in critical or sensitive zones such as spawning or nursery areas?			
60	Fishing operations use measures that significantly reduce major impacts on habitat, especially in critical or sensitive zones such as spawning or nursery areas.	As described above, measures within the fishery to minimise impacts on benthic habitats include many operational measures. These include:		I3, I4-I7	100
80	There is evidence that fishing operations are effective in avoiding significant adverse effects on the environment, especially in critical or sensitive zones such as spawning or nursery areas.	<ul style="list-style-type: none"> • Deep-sea trawlers are not permitted to operate in water shallower than 110 m • The non-use of heavy gear and recent developments in gear technology allowing fishing in a semi-pelagic manner (including small plastic bobbins, foot ropes, trawl doors). These are applied to avoid loss of gear and incidentally reduces impacts • Spatial distribution of fishing effort (and so area impacted) is restricted by the use of appropriate navigation technology • Exclusion of trawlers from bay areas and implementation of inshore MPA's. Use of VMS allows tracking and warning of vessels in the vicinity of exclusion areas. 			
100	There is direct evidence that fishing operations implement appropriate methods to avoid significant adverse impacts on all habitats.	No specific nursery or spawning areas are defined, but the west coast fishery operates in waters deeper than 200 m and commercial targeting of juveniles is avoided. However, the effectiveness of these measures has not been demonstrated.			

3B.3 (MSC Criterion 14)		The management system incorporates measures that discourage destructive practices.		2.0	
3B.3.1		Does the fishery employ destructive fishing practices?			
60	The fishery does not allow any destructive fishing practices but there is concern that enforcement is inadequate to deter such practices effectively.	The Management System does not permit destructive fishing practices and the fishery does not employ such practices. Enforcement is considered sufficient to prevent such practices and is reinforced by a code of conduct for responsible fishing that is fully supported by fishers.		I3, I4-I7	100
80	The fishery does not employ any destructive fishing practices and enforcement is considered sufficient to prevent their use.				
100	The fishery does not employ any destructive fishing practices. There is a code of conduct for responsible fishing that is fully supported by fishers.				

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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3B.4 (MSC Criterion 15)		The management system incorporate measures that reduce operational waste.		5.3	
3B.4.1		Do measures exist to reduce operational waste?			
60	Measures/facilities are in place to reduce sources of operational waste that are known to have detrimental environmental consequences, but further reductions may be possible.	Measures to reduce operational waste are required as part of the rights application issue. Much use is made of fishmeal plants at sea and some facilities on shore, including a new plant at Mossel Bay, to reduce waste. These plants, although established by the larger companies, are also available to other local companies.	I3, I4-I7, R18	100	90
80	Measures/facilities are in place to reduce all sources of operational waste that are known to have detrimental environmental consequences, and there is evidence they are effective.	Retrieval of lost gear is carried out for economic reasons and some companies return all ship borne waste to shore for disposal. Enforcement is supported by the inclusion in the observer programme of reporting of waste disposal (plastics, fuels etc) in contravention of MARPOL. Significant sources of operational waste arising from the fishery have therefore been addressed, and measures are supported by fishing companies (voluntarily or through the rights application process).			
100	Measures/facilities are in place to reduce all sources of operational waste that are known to have detrimental environmental consequences, and there is evidence they are effective and these measures are supported by the fishers.				

3B.5 (MSC Criterion 16)		Fishing operations are conducted in compliance with the management system and legal and administrative requirements.		33.4	
Weighting Commentary		Scoring Indicators, Group 3B.5 (4 th level): Information on legal and management system requirements is generally available within SA fisheries and so compliance is weighted more highly than awareness of requirements.			
3B.5.1		Are fishers aware of management system, legal and administrative requirements?			
60	Fishers are aware of key management and legal requirements.	All fishers are aware of management requirements, the MLRA, regulations and permit conditions and all rights holders sign under oath, responsible code of conduct statements.	I3, I4-I7, R18	33.3	80
80	Fishers are aware of management requirements upon them and are kept up to date with new developments.	New developments are advertised and published in government gazettes and formal media notices but better dissemination of information to fishers is desirable.			
100	All fishers are aware of management requirements through a clearly documented code of conduct.				

SCORING INDICATORS	Comments	Audit Trace Ref.	Weight	Score
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3B.5.2		Do fishers comply with management system, legal and administrative requirements?			
60	Fishers comply with some, but not all, requirements.	Compliance is considered generally good and there have been very few prosecutions in the hake trawling sector. However, even with the MCS procedures outlined in 3A.8.2 above, compliance offshore is, by its very nature, difficult to monitor and some transgressions are reported, such that it cannot be said that fishers are <u>fully</u> compliant.	I3, I1	66.7	75
80	Fishers are fully compliant with relevant management requirements.				
100	Fishers are fully compliant with, and fully supportive of, a code of conduct which incorporates legal, and administrative requirements				

3B.6 (MSC Criterion 17)	The management system involves fishers in data collection.			25.0	
3B.6.1		Do fishers assist in the collection of catch, discard and other relevant data?			
60	Fishery operatives are occasionally involved in the collection of catch, discard and other information.	Trawl logbooks require declarations of such information as target species, bycatch and discarding estimates and there is a system for land and sea-based collection of catch and effort data. Information is made available by fishing companies to the management authority and co-operation between industry and the management authority is good. In addition the observer programme has begun verifying information declared by skippers.	I3, I4-I7	100	95
80	Fishery operatives are regularly involved in the collection and recording of catch, discard and other information.				
100	Fishery operatives assist significantly in the collection and recording of catch, discard and other information				