

A NEW MARINE PARK FOR THE CAPE PENINSULA

**DRAFT PROPOSAL
FOR COMMENT**

**Prepared by: Dr B.M. Clark
Marine Co-ordinator, Cape Peninsula National Park**

February 2001

Please submit comments to: David Abrahams at Common Ground Consulting,
PO Box 1828, Cape Town 8000, Tel: (021) 424 5052 Fax: (021) 424 2495
Email: dabrahams@commonground.co.za



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INTRODUCTION

The Cape Peninsula is an area of exceptional marine and coastal biodiversity. It lies at the junction of two major oceanic systems and supports a highly diverse fauna and flora comprising numerous endemic species. Ever increasing pressure is being placed on these resources by commercial, recreational and industrial activities and they are being heavily impacted in the process. The Cape Peninsula National Park (CPNP) and The Directorate: Marine and Coastal Management of the Department of Environmental Affairs (MCM) are thus investigating options for improving marine conservation on the Cape Peninsula.

Marine Protected Areas (MPAs) are now widely accepted as the principal means by which marine biodiversity and exploited species can be conserved and managed on a sustainable basis. A network of discreet marine reserves already exists on the Cape Peninsula, but it is generally accepted that the reserves do not adequately conserve the highly diverse communities found in this area nor are they able to withstand the high levels of fishing pressure that take place here. The need to revise and improve management of this MPA network such that it will provide adequate protection for biodiversity and exploited species is thus of paramount importance.

The Government of South Africa also has a commitment to the citizens of this country in terms of the White Papers on Coastal Development, Conservation and Sustainable Utilisation of Biological Diversity and Fisheries, to maintain the diversity, health and productivity of coastal processes and ecosystems; to promote the conservation of biological diversity and the sustainable use of biological resources; and to manage living marine resources in such a way as to ensure optimal social and economic benefits for its citizens. South Africa also has an international obligation and commitment towards the integrated management and sustainable development of coastal areas and the marine environment under its jurisdiction, in terms of its commitment to the 1992 Rio Declaration and Agenda 21, of the United Nations Commission on Environment and Development (UNCED).

This document is a draft proposal that outlines a mechanism by which the marine protected area network on the Peninsula can be upgraded and consolidated into a single MPA, a portion of which will be included into the Cape Peninsula National Park. Potential borders for the marine park are to be determined through a process



of consultation between the Cape Peninsula National Park, Marine and Coastal Management and all other interested and affected parties. The proposal outlines and attempts to address the major issues surrounding the establishment of a new Marine Park on the Cape Peninsula identified in the Issues Document. This proposal is broken up into four sections:

- The Social and Legal Environment
- Marine Resource Harvesting and Management on the Cape Peninsula
- Marine Resource Management on the Cape Peninsula
- A new MPA structure on the Cape Peninsula and a Marine Component for the Cape Peninsula National Park

Each section is structured in a 'question and answer' format where all issues relating to the proclamation of a new Marine Park are addressed in turn.

We believe that this proposal represents the optimum mechanism by which the highly diverse marine communities surrounding the Peninsula can be protected and conserved for future generations. It has the potential to significantly improve the conservation of marine biodiversity, as well as fisheries management and tourism on the Cape Peninsula.



THE SOCIAL AND LEGAL ENVIRONMENT

Who are the main stakeholders that will be affected by the proclamation of a marine park on the Cape Peninsula and how will they be engaged in this process?

The Cape Peninsula National Park (CPNP) is situated within a metropolitan area and as such is likely to face many more challenges in liaison with stakeholders than if it were situated in a rural area. Numbers of people and organizations using the marine environment surrounding the Park are far greater they would otherwise be in a rural context. The challenge facing the park is to establish a good working relationship with all of these stakeholders such that their concerns and requirements can be built into and addressed during the design process.

Stakeholders that are likely to be affected by the proclamation of a new marine park include a diverse set of groups, organizations and individuals most of which reside in the Cape Metropolitan Area (CMA). These can be broadly divided into two groups, organized and non-organized or general publics. Organized public includes groups such as community-based organizations, business, labour and government stakeholders. Non-organized categories include people such as park users, visitors such as fishers, bathers, surfers and many others. Community-based organizations are in the main made up of civic organizations, rate-payer and residents organizations as well as a range of social interest groups acting at the community level. They represent a wide range of interests most of which centre around a common concern relating to local conditions within their communities. A wide range of non-governmental organizations (NGOs) operate in the CMA including various environmental and developmental bodies as well as social welfare, educational, religious and recreational groups that have varying degrees of interest in the modification of the existing MPA network. Business is also an important category of stakeholders that includes both organized and non-organized groups whose interest is likely to be primarily related to effects on their livelihood. Fishers, including commercial, artisanal, subsistence, and recreational operators are likely to be one of the most vocal groups of stakeholders participating in this process. They are likely to be represented by both organized and non-organized components whose needs will have to be addressed. Tourism is a sector of importance as well, as stakeholders in this sector stand to benefit quite considerably from this initiative. Government bodies

at the national, provincial and local level are also of direct relevance here. The Cape Metropolitan Council in conjunction with the Cape Town and South Peninsula Municipalities as well as certain national bodies such as Marine and Coastal Management are currently responsible for managing land and resources within the marine areas that may ultimately be incorporated into the Cape Peninsula Marine Park.

What national, provincial and local policies and legislation are likely to affect the proclamation of a new marine park and the incorporation of parts of this park into the CPNP?

Several policies and legislation have been formulated at national, provincial and local levels that are relevant to the proclamation of a new marine park and incorporation of parts of this into the CPNP. A résumé of these policies is given below.

Government Policies

The White Paper for Sustainable Coastal Development in South Africa, approved by Cabinet and published in April 2000, sets out a vision for the South African coast, with principals, goals and objectives for coastal management. Regarding natural resource management, a stated goal of the policy is “to establish and effectively manage a system of coastal protected areas”. In terms of this goal the stated objectives are:

- An adequate and representative system of protected areas shall be established and managed to restore and maintain the diversity, health and productivity of coastal ecosystems, habitats and species
- Coastal protected areas shall be integrated across both the land and sea, where practicable
- The intensity of human use in coastal protected areas shall vary according to the appropriate level of protection required to meet ecological objectives, local needs and cultures and the compatibility of activities

The White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity, published in July 1997, set out the following aims:

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1. To conserve the diversity of landscapes, ecosystems, habitats, communities, populations, species and genes in South Africa through:
 - Establishing and managing a representative and effective system of protected areas, and
 - Promoting environmentally sound and sustainable development in areas adjacent to or within protected areas, with a view to furthering protection of these areas

 2. To use biological resources sustainably and minimize adverse impacts on biological diversity, through
 - the conservation and sustainable use of biological resources in terrestrial, aquatic and marine and coastal areas and avoid or minimise adverse impacts on the biodiversity of such areas

It is explicitly stated in this document that “the government recognises that South Africa's protected area system is an asset of unsurpassed value, which in addition to conserving biodiversity generates substantial economic benefits through tourism. Of concern is the fact that neither terrestrial nor marine protected areas in South Africa form part of a planned network. Furthermore, the management of such areas is poorly co-ordinated between the range of responsible authorities, resulting in variable and often conflicting policies being applied. The need to strengthen and rationalise this system, and so establish an effective, efficient, and representative protected area system is considered by Government to be an issue of primary importance.”

A Draft Spatial Coastal Zone Policy for the Western Cape Province has been prepared in accordance with the prescriptions of the Western Cape Planning and Development Act, 1999 (Act 7 of 1999). Stated goals of this policy relevant to the CPNP include:

1. To ensure that a diversity of coastal ecosystems and landscapes and sea-scapes are maintained through the:
 - Conservation of worthy areas on the coastal plain and along the seashore, which are representative of the aesthetic, biological or cultural diversity of the coast in a natural state
 - Conservation of worthy areas linking or surrounding representative coastal ecosystems and natural/ cultural features to maintain the integrity of the region



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2. To promote the maintenance of biodiversity through the:
- Conservation of natural habitats which contain rare and endangered species
 - The rebuilding and nurturing of healthy stocks of marine species

A Draft Integrated Metropolitan Environmental Policy has been prepared by the Cape Metropolitan Council's Environmental Department. This document lays down principals and goals for sustainable environmental management in the Cape Metropolitan Area. These include a commitment to the conservation of biodiversity in the Cape Metropolitan Area by recognizing and protecting the unique coastal and marine environment of the CMA.

Relevant legislation

The Constitution of the Republic of South Africa Act, 1996 (Act 108 of 1996) sets out the right to the environment as a fundamental right. This act states that everyone has the right to have the environment protected, for the benefit of present and future generations, through reasonable legislative measures that prevent pollution and ecological degradation and promotes conservation.

The Marine Living Resources Act, 1998 (Act 18 of 1998) governs the conservation of marine ecosystems, the long-term sustainable utilization of marine living resources and the orderly access to exploitation, utilization and protection of certain marine living resources. It provides for the declaration of marine protected areas for the protection of fauna, flora and the physical features on which they depend; for fisheries management by protecting spawning stock, allowing stock recovery, enhancing stock abundance in adjacent areas and providing pristine communities for research. Save a few exceptions, the act bans any person from carrying out an activity that may impact on ecosystems or the fauna and flora within a marine protected area including banning on fishing, discharge or deposit of waste and the erection of any buildings or structures below the high water mark.

The Sea Shore Act, 1935 (Act 21 of 1935) declares the land between the low-water and high-water marks to be state owned and regulates the use and control of this area including the discharge of waste upon the seashore or into the sea. This act provides for public access to and over this land in all areas other than a national park.

The National Parks Act, 1976 (Act 57 of 1976) provides for the declaration of any land (including the sea and sea-shore) to be a National Park or part of a park. The object of the constitution of a park is 'the establishment, preservation and study of wild animals, marine and plant life and objects of geological, archeological, historical, ethnological, oceanographic, educational and other scientific interest'. Any such features in a park are protected in terms of the Act. The Act also provides for the establishment of a board, known as the South African National Parks, which has the power (with approval from the Minister) to control the entry of people, vehicles and vessels into a park, their movement through a park and the taking of photographs in a park. It is the stated policy that the CPNP shall maintain the current open access system to the Park and solicit public support for increased control of access, should this be required. Currently there are only four pay-entry points in the Park. The Heads of Agreement between the SANP and the local authorities specifies the maintenance of the *status quo* unless otherwise supported by the public of Cape Town

The Environmental Conservation Act, 1989 (Act 73 of 1989) provides for the declaration of any area as a 'protected natural environment' if it is considered that this will promote 'the preservation of specific ecological processes, natural systems, natural beauty or species of indigenous wildlife or the preservation of biotic diversity in general'. Such declaration can only be done after consultation with the owners and rights holders in the affected area. A management committee must be established to advise on the control and management of the area once it has been established.

MARINE RESOURCE HARVESTING ON THE CAPE PENINSULA

Who are the main people targeting marine resources on the Cape Peninsula?

Subsistence fishers have exploited the marine resources off the South African coastline for at least the past 100 000 years. The intensity and distribution of these activities have varied markedly over time. In many areas exploitation at a subsistence level has now largely fallen away, to be replaced by other forms of fishing. Commercial and recreational fishing activities have increased in importance over the last 100 years and now account for the greatest proportion of the off-take of marine resources countrywide.

In terms of the Marine Living Resources Act (Act 18 of 1998) all fishers targeting marine resources in South Africa are now required to have a license or permit. These permits fall into three basic categories: commercial, recreational and subsistence.

Commercial fishers include those people that fish strictly for profit through the sale of the fish (or other resources) that they catch. They may operate as individuals, in groups or companies and range from those who are reliant on the resources for a basic livelihood to large-scale industrial operations. Recreational fishers include those people that fish strictly for leisure or sport and in terms of the law are forbidden from selling their catch. Subsistence fishers, otherwise known as artisanal fishers, are generally poor people who harvest marine resources as a source of food to meet their basic nutritional needs. In terms of the law they are allowed to sell a portion of their catch to obtain other essentials but may not engage in the sale of fish on a substantial scale.

Recreational and commercial fishers make up the greatest proportion of fishers on the Cape Peninsula with subsistence and artisanal fishers making up a smaller component.

What are the main species targeted by fishers on the Cape Peninsula?

Fishers resident on the Cape Peninsula and visitors to the area target a large number of different marine species. The total number of different species harvested is well over 100 and ranges from fish to shellfish to seaweed. The principal species targeted on the Peninsula are listed in Table 1. Most of these species are harvested in small quantities only, but some are taken in large numbers owing to the high prices they fetch or their popularity as food or bait.

What is the status of the stocks of the most commonly targeted species on the Peninsula?

Commercial, subsistence and recreational harvesters all have an impact on the species they target as well as other components of the marine environment. Reports of depletions in stock size are widespread as are reductions in mean size and reproductive output. Impacts are not only confined to the target species, and effects of exploitation can ripple through whole communities and disrupt entire ecosystems.

Most of the popular or more commonly targeted species on the Cape Peninsula are considered to be overexploited. A brief discourse on the stock status of the principal species is included below.

Linefish

Linefish is a term used to describe any fish that is caught on a line. It includes a huge number of different species of which about 50 are common around the Cape Peninsula. Linefish are targeted by commercial, recreational and subsistence fishers including shore and boat anglers, handline fishermen, spearfishermen, beach seiners, gill netters and inshore trawlers. Historically, controlling the exploitation of linefish and maintaining catches within sustainable limits has challenged management authorities to the utmost. This is because management restrictions on catches of linefish are not perceived by any one sector to be in their best interests, since many target species are also exploited by so many other sectors.

Table 1. List of some common fish, shellfish and seaweed species harvested by fishers on the Cape Peninsula.

Fish	Red roman	Coral worm
Albacore	Red steenbras	Cowries
Bank steenbras	Red stumpnose	Cuttelfish
Barbel	Sand steenbras	Giant limpet
Bronze whaler	Silver kob	Granite limpet
Butterfly ray	Skipjack tuna	Granular limpet
Buttersnoek	Slender baardman	Kelp limpet
Cape knifejaw	Smooth houndshark	Keyhole limpet
Cape stumpnose	Snoek	Long-spined limpet
Carpenter/silverfish	Soupin shark	Mud prawn
Cow shark	Spotted gullyshark	Mussel worm
Dassie/blacktail	St Joseph shark	Octopus
Dolphinfish/dorado	Steentjie	Olive shells
Dusky kob	Strepie	Pencil bait
Eagleray	Striped mullet	Plough shell
Elf	Twotone fingerfin	Pink-lipped toshell
Flathead mullet	White steenbras	Red bait
Fransmadam	White stumpnose	Ribbed mussel
Galjoen	Yellowfin tuna	Rock lobster
Geelbek	Yellowtail	Sand prawn
Gurnard	Zebra/wildeperd	Sand shrimp
Hake		Sea cucumber
Hammerhead shark	Invertebrates	Sea urchins
Harder	Abalone	Shore crab
Hottentot	Alikreukel	Siffie
John Brown	Argenville's limpet	Smooth turban shell
John Dory	Bamboo worm	Threespot crab
Jutjaw	Bearded limpet	Triton
Kingklip	Black mussel	Variiegated topshell
Leervis/garrick	Black topshell	White mussel
Guitarfish/sandshark	Blood worm	Wonder worm
Maasbanker	Cape rock crab	
Mackerel	Giant chiton	Seaweed
Panga	Chokka squid	Kelp
	Cone shells	

Evidence for the decline in stocks of important linefish species has been available for many years. The catch rates of most species have declined markedly over the last 50 years and the species composition of linefish catches has also changed considerably. It is only recently however that scientists have realized how badly overexploited our linefish species are. A recent report produced by scientists at Marine and Coastal Management shows that out of 36 linefish species investigated half are classified as “collapsed” – meaning endangered. A species is classified as collapsed when the capacity of the fish in the populations to produce offspring is less than 25% of historic levels. Many species once popular with anglers and handline fishermen off the Cape Peninsula – kob, galjoen, geelbek, red roman, red stumpnose, red steenbras, white steenbras – fall into this category. Stocks of many of these species are now at such a low level (most of them are less than 10% of historic levels) that their chances of recovery are very low unless drastic measures are taken to protect the remaining individuals. Once the stock size has been reduced to these levels, it becomes extremely difficult for the fish to breed successfully and they are in danger of being wiped out completely by even the smallest environmental changes.

Rock Lobster

West Coast rock lobster, better known in some areas as kreef or crayfish, occurs only in southern Africa, from Walvis Bay in Namibia to East London in the Eastern Cape. They have been targeted for centuries by subsistence fishers (Khoi-San) and more recently by commercial and recreational fishers. Commercial fishing operations are concentrated only on the west coast as far south as Cape Point as stocks to the east of this were, until very recently, too low to sustain commercial activities. Rock lobsters are fished throughout their range by recreational fishers, but maximum effort is concentrated around the major metropolitan areas such as Cape Town. Total annual harvest by commercial fishers has been declining annually since the early 1990's and is now in the region of 1600 tons. Recreational fishers and subsistence fishers take about one-quarter of this (ca. 400 tons per annum). Poaching is a real problem, and accounts for an additional 500-2000 tons per annum.

Overall, the rock lobster resource is considered to be severely depleted (less than 10% of historical levels) and recruitment (i.e. the rate at which new individuals enter the population) is down to 35% of pristine levels. Unsustainable commercial catches in the 1960's) are principally responsible for the current state of the fishery, but low oxygen and “black-tide” events as well as a recent coast-wide reduction in lobster



growth rates has taken a major toll in recent years. West coast rock lobsters are extremely slow growing for their size and take a long time to reach sexual maturity. Minimum larval duration is approximately 14-18 months and sexual maturity is reached only 5 years later. Females grow slower than males, taking approximately 20 years to reach the old minimum legal size of 89 mm carapace length, while males take 7-11 years to reach the same size.

Abalone

Abalone, better known to some as perlemoen, is a marine snail that inhabits shallow rocky reefs close to the shore. It is endemic to South Africa, found only from St Helena Bay on the west coast to the northern Transkei on the east coast. Abalone is heavily targeted by commercial, recreational and subsistence fishers because of its succulent tasty flesh and high prices that it fetches both locally and internationally. Commercial and recreational abalone fisheries started about 50 years ago. Informal fishers (poachers) have also recently entered the arena and are now taking out a substantial portion of the total annual catch. Levels of poaching in the period 1999 - 2000 are estimated to have been approximately equal to the total commercial catch (ca. 500 t) but are expected to exceed this in the 2000-2001 period (TAC = 372 t).

Abalone are particularly long lived and grow incredibly slowly, which makes them extremely vulnerable to over exploitation. They grow at a rate of less than 1 cm per year and take between 8-10 years to reach sexual maturity. It is hardly surprising then that signs that the South African abalone stock was already being over exploited were detected by the late 1960s. The situation has deteriorated considerably since this time despite the numerous restrictions that have been placed on harvesting (see below), and stocks are now in a state of imminent collapse. Poaching is completely out of control and large sections of coastline have been completely denuded of abalone. Recently this has necessitated the closure of all sectors of the area between Hawston and Hermanus (once a very productive area).

Although the Cape Peninsula lies close to the center of the main distribution range for abalone, commercial fishing activities on the Peninsula itself are limited only to Robben Island. Stocks of abalone on the Peninsula are nevertheless still under threat from recreational, subsistence and poaching activities.

Recent ecological changes that have taken place in the marine environment further threaten remaining abalone stocks. Juvenile abalone shelter exclusively beneath the



spines of sea urchins to escape predation. Mass movement of rock lobsters has taken place around Cape Point into southern False Bay but more concerningly onto the main abalone fishing grounds east of Cape Hangklip. Urchins form a major component of the diet of rock lobsters, and what were once healthy populations of urchins in these areas have now been decimated, resulting in a precipitous decline in the abundance of juvenile abalone. Once the urchins have been removed, any juvenile abalone not eaten by the lobsters themselves are quickly pounced upon by other predators. Fortunately, adult abalone are safe from the lobsters, but if nothing is done to protect these large animals from poachers, abalone will not survive the first decade of the 21st century.

Alikreukel

The alikreukel *Turbo sarmaticus* is endemic to South Africa and occurs only between the Cape Peninsula and the former Transkei. These large marine snails are generally found on rocky reef areas below the tide level but also occur in crevices and under boulders in the intertidal zone. Despite high population densities and their ease of capture, alikreukel have to date only really been exploited by subsistence and recreational fishers. They are considered to be a delicacy by seafood lovers because of their tasty flesh and are also popular as bait with recreational fishers. These animals are slow growing and do not reach maturity until an age of 3-4 years which means that they are likely to be vulnerable to overfishing. Surveys of alikreukel populations on the Cape Peninsula and elsewhere in the country (Betty's Bay, Mossel Bay, Port Elizabeth) have shown that this is indeed the case. Researchers have found that there are generally fewer than one quarter the numbers of adult alikreukel in exploited areas compared with those in reserve areas (where numbers are likely to be similar to historic levels along the entire coast).

Bait organisms

Fishers make use of a wide variety of marine bait organisms in order to catch other more desirable species. Marine bait organisms harvested by fishers on the Cape Peninsula include a large number of different species some of which are used exclusively as bait while others, only the excess or individuals that are too small to be consumed are used as bait. The most common bait organisms include red bait, sardine, white mussel, harders, sand prawns, mud prawns, blood worm, wonder worm, mussel worm, coral worm, squid, octopus, crabs and black mussel. Because the amount of bait required to catch a fish (or other sought after animal) is generally small relative to the target organism, stocks of bait organisms are generally healthy in

comparison to the target organisms. However, fishers generally begrudge time spent collecting bait as this detracts from potential fishing time. A result of this is that they tend to collect their bait in the most economical and fastest way possible, which is more often than not wasteful and frequently impacts on other organisms.

For example, although stocks of wonder worms on the Cape Peninsula are not thought to be threatened by overexploitation, the boulderfields that they inhabit are. Anglers dig over extensive areas of boulder shore every year in order to extract worms from the underlying sediments. Large boulders, normally well seated in the substratum are lifted and rolled to access the gravel below. Other organisms clinging to the sides and tops of the boulders are crushed when the boulder is first lifted and again when the tide comes in and the waves begin to roll the now loosened boulders around on the shore. Areas disturbed by diggers remain in evidence for many years. A recent survey indicated that between 34 and 82% of the shore on the few available boulderfields on the Peninsula showed recent evidence of being disturbed by diggers. Similarly, the practice of pumping sand and mud prawns from their burrows using a prawn pump is an extremely destructive practice. Pumping up sediment with a prawn pump and walking around on the surface, results in the disturbance and potential death of approximately 1000-1500 other organisms for every 50 prawns that are collected. Although it is highly illegal, anglers frequently use commercially available bleach or pool acid to extract mussel worms from the mussel beds they inhabit. The highly toxic bleach or acid causes the worms to come to the surface very rapidly where they are collected by the fisher, while the mussels and other organisms are simply left to die.

MARINE RESOURCE MANAGEMENT ON THE CAPE PENINSULA

What management measures are available to limit exploitation of marine organisms in South Africa and how effective are these?

The marine resources of South Africa are considered to be common property – i.e. they do not belong to any single user group and should be managed and developed for the benefit of the country as a whole. To this end, the state has promulgated various regulations over the years to ensure that these resources are utilized in the most appropriate manner. The goal of these regulations is to ensure that marine resources are utilized on a sustainable basis over the long-term so as to maximize social and economic benefits for all people. Regulations that are currently in force include those that control the amount of fishing effort that may be expended (e.g. total allowable catch and effort, daily bag limits, restricted access and gear restrictions) and those that are designed to maintain reproductive output (e.g. closed seasons, minimum size limits). Subsequent to their introduction, many of these regulations have been shown to be largely ineffective due to a host of different problems. The specifics of each of these are laid out below:

Size limits

Size limits may involve minimum sizes, maximum sizes or both (slot sizes). Minimum size limits are the only ones of this kind in force in South Africa. The rationale for having minimum size limits is to allow at least a proportion of the population an opportunity to breed before being captured. The main benefit of this is that fishers can continue to catch the largest individuals of the species, which are generally the most sought after. In order for minimum size limits to be effective, however, compliance must be good and post-release mortality must be low (i.e. fish returned to the water must have a good chance of survival). Unfortunately these conditions are rarely met. Because our coastline is so vast and accessible, anglers are rarely checked by fisheries inspectors, resulting in a very low level of compliance. A recent survey in the greater Western Cape area revealed that the average shore angler has his/her catch inspected only once every 28 years!

Fishers also harm fish and other marine organisms, often unwittingly when fishing. Some fish undergo barotrauma (rupturing of internal organs as a result of the

expansion of gas) when brought to the surface from a great depth, and may not recover. Some shellfish are haemophiliacs and bleed to death even if slightly wounded. Others die from wounds sustained during rough handling. Other areas in which minimum size limits fall short includes aspects of breeding biology and genetic diversity. They do not take into account that older and larger fish produce a disproportionate number of eggs and sperm relative to younger and smaller fish. For example, it has been estimated that a typical reef fish (8-10 years old) produces the same number of eggs per year as 212 small (3-4 year old fish). By taking out the larger individuals from a population reproductive potential can be severely reduced. Some reef fish have a complex life history and change sex after attaining a certain size. For the red roman this takes place at a size of about 30 cm where it changes from a female to a male. With the minimum size limit also set at 30 cm, males receive little if any protection from this measure. In heavily exploited areas there are generally too few males to fertilize the available females, which prevents these populations from reproducing successfully. When a farmer or animal breeder wishes to increase the individual size of the animals in his care he (or she) will selectively mate only the largest males and females together and sell off or cull the smaller ones. By catching only the largest individuals of each species when fishing, we are inadvertently selecting for smaller and slower growing individuals. One of the clearest signs of overfishing is a reduction in the average size of fish captured, which usually follows shortly after a decline in the number of fish caught.

Catch quotas

Catch quotas usually involve bag limits for recreational and subsistence fisheries and total weight limits (often referred to as total allowable catch or TAC) for commercial fisheries. Setting a TAC is often the best and easiest way of limiting catch for a commercial fishery provided the number of entrants into the fishery is low and catches are landed at a few discreet points. The total amount of fish landed is then easy to monitor and control, and transgressors can be easily identified. In the process of filling quotas however, large bycatches of undersized or unwanted species are taken, which are often dumped at sea and not reported. In most cases, unintentional catches cannot be returned alive. It is estimated that 26% of all fish caught at sea are discarded, but this may reach as high as 80% for certain kinds of fishing gear.

In the case of recreational and subsistence fisheries, access is often unlimited or at least involves larger numbers of individual entrants. A TAC is then impossible to

enforce and must be allocated in the form of a series of individual quotas or daily bag limits. This requires accurate predictions of the total effort applied (i.e. numbers of participant fishers and frequency with which they go fishing) and average catch per outing. This information is generally not available with the result that bag limits are frequently set at inappropriate levels. Bag limits are often set far in excess of the number of fish that a fisherman can expect to catch in a single day with a result that they do not limit catches at all. Fishermen often continue to fish after reaching their bag limit of a particular species in the hope of catching other species or simply in an effort to catch larger or more desirable fish. Dead fish in excess of the bag limit are simply discarded. Even where fish are returned to the water alive many die due to the injuries sustained during capture and handling. Effective enforcement of bag limits is also very difficult when dealing with a large number of entrants.

Gear restrictions

Gear restrictions are generally used to limit the use of destructive fishing gear (e.g. bans on the use of dynamite and gill nets), to limit bycatch and catches of undersized fish (e.g. minimum mesh sizes on nets and traps) or simply to limit the efficiency of fishers (used in the case of recreational fisheries only – e.g. ban on SCUBA for recreational rock lobster and abalone divers). Gear restrictions can increase fishing costs and are thus only used where necessary when dealing with commercial fisheries. For recreational fishers, cost is less important as the primary objective is not necessarily to catch and land fish as efficiently as possible. Gear restrictions can be difficult to enforce when dealing with a large number of participants, however.

Closed periods

Seasonal and temporary area closures can be beneficial in protecting stocks when they are particularly vulnerable to fishing effort such as during spawning periods. They are also useful in limiting the total applied effort and for reducing conflict between different sectors – e.g. limiting recreational fishers to weekends only and commercials to week days only, limits the total applied effort, reduces potential for conflict and also makes enforcement easier. Seasonal closure can be extremely disruptive for commercial fisheries in that fishers may be out of work for large parts of the year and can be very unpopular with recreationalists if they coincide with important holiday periods (e.g. end of year holidays). Fishers often compensate for newly established closed seasons by fishing more intensively during the open season.

Artificial reefs and supplementary stocking

Although popular, the effectiveness of building artificial reefs and the use of supplementary stocking by mariculture or hatcheries have yet to be properly demonstrated. The practical benefits of artificial reefs are generally limited to very specific conditions and are unlikely to significantly increase production in heavily fished areas. Supplementary stocking is expensive and suffers from many theoretical and practical problems. Especially troublesome are the potential effects of altering the genetic composition of wild stocks, uncertain survival of hatchery-reared juveniles in the wild and the potential for spreading hatchery diseases into wild stocks.

Marine Protected Areas

The use of marine protected areas for fisheries management and conservation is not new. For centuries communities have restricted access to marine areas through tradition or law to protect their resources and livelihoods. It is only recently, however, that scientists have begun to realise what an important role marine protected areas can play in the conservation of marine species. Marine protected areas (MPAs) are now at the leading edge of marine conservation and fisheries management around the world. MPAs can vary considerably in their form and function but four basic types can be recognised:

- Marine sanctuaries – sites or areas in which no extractive exploitation of any marine resources is allowed
- Marine reserves – areas in which some consumptive utilisation is allowed, but protection is afforded to most species (e.g. all except rock-and-surf angling)
- Fishery reserves – areas set aside for the protection of individual, exploited species (e.g. rock lobster reserves)
- Marine Parks – protected areas that include any combination of sanctuaries, marine reserves or fishery reserves (i.e. an area zoned for multiple use)

MPAs that are closed to fishing and other harmful activities provide a range of benefits to coastal communities, the public and fishers alike. These benefits may be classed under three main headings: protection of marine habitats and species, fisheries management, and education and research.

Habitat protection – True marine wilderness is disappearing at a great rate as human population numbers increase and affluence and technology allow greater and greater

access to previously unexplored and unexploited areas. MPAs play a vital role by controlling human activities in sensitive habitats and by preserving representative areas from development. Even the most robust marine habitats and species are susceptible to disturbance and damage caused by pollution, destructive fishing gear and coastal zone development. The Marine Living Resources Act (Act 18 of 1998) provides for the protection of species and habitats within MPAs in South Africa by banning all potentially destructive activities (including pollution) within the bounds of such an area.

Fishery management – Sustained fishing pressure gradually erodes the natural resilience of fish populations by reducing genetic diversity, destroying habitat and altering community structure, in addition to simply reducing fish numbers. Many South African fish stocks have collapsed (e.g. abalone, kob, steenbras) and some are even locally extinct (e.g. red steenbras). Traditional management measures have failed dismally in their efforts to limit the effects of exploitation and appear powerless to halt further declines. MPAs, however, offer some hope of being able to halt this trend and even help rebuild some depleted stocks. Adults of exploited species within MPAs are able to reach full size and hence full reproductive potential. Production of offspring is thus greatly enhanced within an MPA and is often sufficient to restock nearby fishing grounds. Substantial numbers of fish are known to move out of MPAs into adjacent exploited areas, where fishers can catch them. The spawn of protected fish and shellfish also drift out of MPAs and seed exploited areas where adults are scarce. MPAs also make enforcement easier. It is far easier to spot a transgressor fishing in an MPA than it is to enforce regulations such as size and bag limits across an entire fishing ground. There are no problems associated with the discarding of unwanted or illegal bycatch or the survival of fish that must be returned to the water. Complete information about complex ecosystem interactions is not necessary for MPA management as it is with bag limits or size limits – the assumption being that recruitment, growth and survival is maximised under natural conditions. All fisheries management has some degree of uncertainty and risk; it can fail because of inadequate scientific models, errors in the data, inadequate compliance, or ineffective management actions. MPAs also provide insurance against stock collapse – if other management measures fail, at least some populations are protected in reserves. MPAs also allow for the maintenance of genetic diversity of exploited stocks. They allow natural (non-fishery induced) selection forces to apply, so preventing a stock from losing productivity or increasing its susceptibility to fishing. This is in direct contrast with measures such as minimum

size limits, which actively select for smaller individuals and slower growth. Marine protected areas are also fair and equitable in that they prevent exploitation by all fishery sectors. No group is favoured at the expense of others, as is often the case with traditional management measures.

Education, research and tourism – One of the most important functions of marine protected areas, as is the case with terrestrial reserves, is to educate people about marine resources. Reserves are also especially important for monitoring long-term environmental changes. Reserves act as reference areas that enable resource managers to monitor the impacts of fishing, and especially to distinguish between natural and anthropogenic (human caused) changes. MPAs act as a physical reminder of the benefits of protecting our natural resources. Protected areas are considered to be instrumental in attracting visitors to an area or country. By having undisturbed natural areas in the sea, divers and photographers are more likely to encounter abundant, tame and large fish. In many cases these ancillary benefits exceed the direct value of the fishery especially where tourist support infrastructure is well developed. In many instances secondary economic benefits provided by MPAs such as tourism, diving, photography, educational group visits, etc. may compensate the local economy for any fishery loss.

Which authority is currently responsible for the enforcement of regulations controlling the exploitation of marine resources and the management of MPAs in South Africa?

Marine and Coastal Management (MCM) are the sole agency responsible for enforcing fishery regulations in South Africa and for the management of all MPAs on the Cape Peninsula. This authority has been delegated to other agencies in the other Provinces (e.g. Kwazulu-Natal Nature Conservation Service in Kwazulu-Natal, Eastern Cape Nature Conservation Service in the Eastern Cape). Several MCM fishery inspectors are stationed on the Cape Peninsula for the purpose of enforcing these regulations. They are responsible for monitoring the landings of all commercial fisheries as well as enforcing regulations relating to recreational and subsistence fishing activities. The number of inspectors available is simply too small to make more than a token gesture towards policing the large number of fishers that operate on the Cape Peninsula. The Marine Living Resources Act provides for the appointment of any state employee as a fishery control officer as well as members of the public as honorary marine conservation officers. For most of these people, the

enforcement of fishery regulations is not their primary job, and as such they have limited time available for this purpose. The result of this is that levels of poaching on the Peninsula are very high; and transgressions of the law are frequent. This is an additional reason why stocks of the principally targeted species are in such a poor state.

What special features exist on the Cape Peninsula that makes it potentially suitable as a locality for an MPA network?

The Cape Peninsula lies at the southwestern tip of Africa, in an area where the Indian and Atlantic Oceans meet. It forms the boundary between the cool temperate west and warm temperate east coast marine biogeographic provinces. These two provinces share less than 20% of their species and as such the Cape Peninsula emerges as a region with a highly diverse array and unique mix of species, across a broad size range from microorganisms to large mammals. The change in faunal composition between the western and eastern sides of the Peninsula is one of the most abrupt anywhere in the world. A recent study of the distribution patterns of coastal marine species, the Cape Action Plan for the Environment, revealed some enlightening statistics regarding the diversity (i.e. number of species) of marine fauna and flora found on the Cape Peninsula and the proportion of these endemic to the region (i.e. do not occur outside of southern Africa):

- Of all marine species recorded from South Africa, approximately 43% occur on the Cape Peninsula
- The Cape Peninsula is the most diverse section of coastline anywhere in the country in terms of the total number of marine species recorded here
- The Cape Peninsula harbours the greatest number of endemic algal species for an area of its size anywhere in the country
- Invertebrate diversity is higher on the Cape Peninsula than any comparably sized area between Port Elizabeth and the Namibian border
- The number of endemic invertebrate species on the Cape Peninsula is higher than any comparably sized area between Port Elizabeth and the Namibian border
- The proportion of invertebrate species on the Cape Peninsula that are endemic to southern Africa, calculated to be about 70%, is amongst the highest in the country

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- The number of fish species on the Cape Peninsula is the higher than anywhere else on the South African west coast (being nearly double that of the next highest area)
 - Of the 259 continental shelf fish species which occur around the Peninsula, almost 90% are endemic to southern Africa
 - The number of coastal bird species reported from the Cape Peninsula is amongst the highest in the country with the total number of individual birds per count being the second highest in the country

What is South Africa's policy regarding the establishment and use of Marine Protected Areas?

The use of marine protected areas is now considered to be the primary mechanism through which harvesting of marine resources can be kept within sustainable limits and marine biodiversity in South Africa can be conserved for future generations. Studies that have been conducted around the world suggest that approximately 20% of all marine habitats in the world should be incorporated into marine protected areas to ensure the sustainable use of marine resources. With respect to the specific use of marine protected areas as a management tool, the South African authorities and the public have been very proactive. Of all the countries in the world, South Africa is probably the country closest to achieving this 20% target, with a total of 4.7% of the coastline zoned into MPAs. Proposals have been received from the public for many additional areas to be proclaimed as MPAs, which will bring us even closer to the 20% target.

What Marine Protected Areas currently exist on the Cape Peninsula?

Several marine protected areas have been established on the Cape Peninsula (Fig. 1). These MPAs include full marine reserves (marine sanctuaries), partial marine reserves (marine reserves) and fishery management areas (fishery reserves). In the marine sanctuary category there are currently three areas – the Cape of Good Hope Marine Reserve, the Castle Rocks Marine Reserve and the portion of the Kalk Bay Marine Reserve from Kalk Bay railway station to St James railway station. The Cape of Good Hope Marine Reserve extends to a distance of 500 m out to sea in the area between Schuster's Bay (Scarborough) and Hoek van Bobbejaan but includes only the intertidal area (from the high water mark to the low water mark, plus 10 m out to sea). The Kalk Bay Marine Reserve extends 500 m out to sea along its entire length

while the Castle Rock Marine Reserve extends out 1 nautical mile (1.8 km). Excluding the intertidal portion of the Cape of Good Hope Marine Reserve, these sanctuaries together cover about 18.5 km coastline.

In the marine reserve category there are currently two areas – the Glencairn Marine Reserve and the portion of the Kalk Bay Marine Reserve that extends from St James station to Muizenberg station. Shore angling is permitted in both of these areas. Both extend 500 m out to sea and together they cover about 3 km of coastline.

A further two areas are classified as fishery reserves – the Table Bay Rock Lobster Sanctuary and the Kommetjie Rock Lobster Sanctuary. Both areas extend to 12 nautical miles (22 km) offshore and serve to protect rock lobster only (the latter for commercial fishers only).

Is there any way in which the performance of a particular MPA or set of MPAs can be evaluated?

There have been several initiatives internationally to develop criteria that could help in selecting suitable sites for MPAs and for the evaluation of existing MPAs. Most of these fell short of developing a practical methodology that could be used under any circumstances. However, recently a comprehensive and practical methodology known as COMPARE (Criteria and Objectives for Marine Protected Area Evaluation) has been developed by South African marine scientists using internationally accepted principles, for the purpose of evaluating MPAs in South Africa. This methodology (reported in South African Journal of Marine Science Vol. 18, p 369-383) incorporates a set of 14 objectives, which any MPA should strive to achieve. These objectives are matched up against a series of 22 criteria, which are used to determine whether an MPA is achieving these objectives. The objectives are grouped under the three overarching MPA objectives of conservation, fisheries management and human utilization and are listed below:

Conservation

Objective 1: To ensure protection of representative sections of the marine environment in all major biogeographic regions. Marine protected areas should be established both in the core and boundary regions of each of the four major biogeographic provinces (the marine equivalent of a vegetation biome) in South Africa to ensure that all the country's marine biodiversity is conserved.

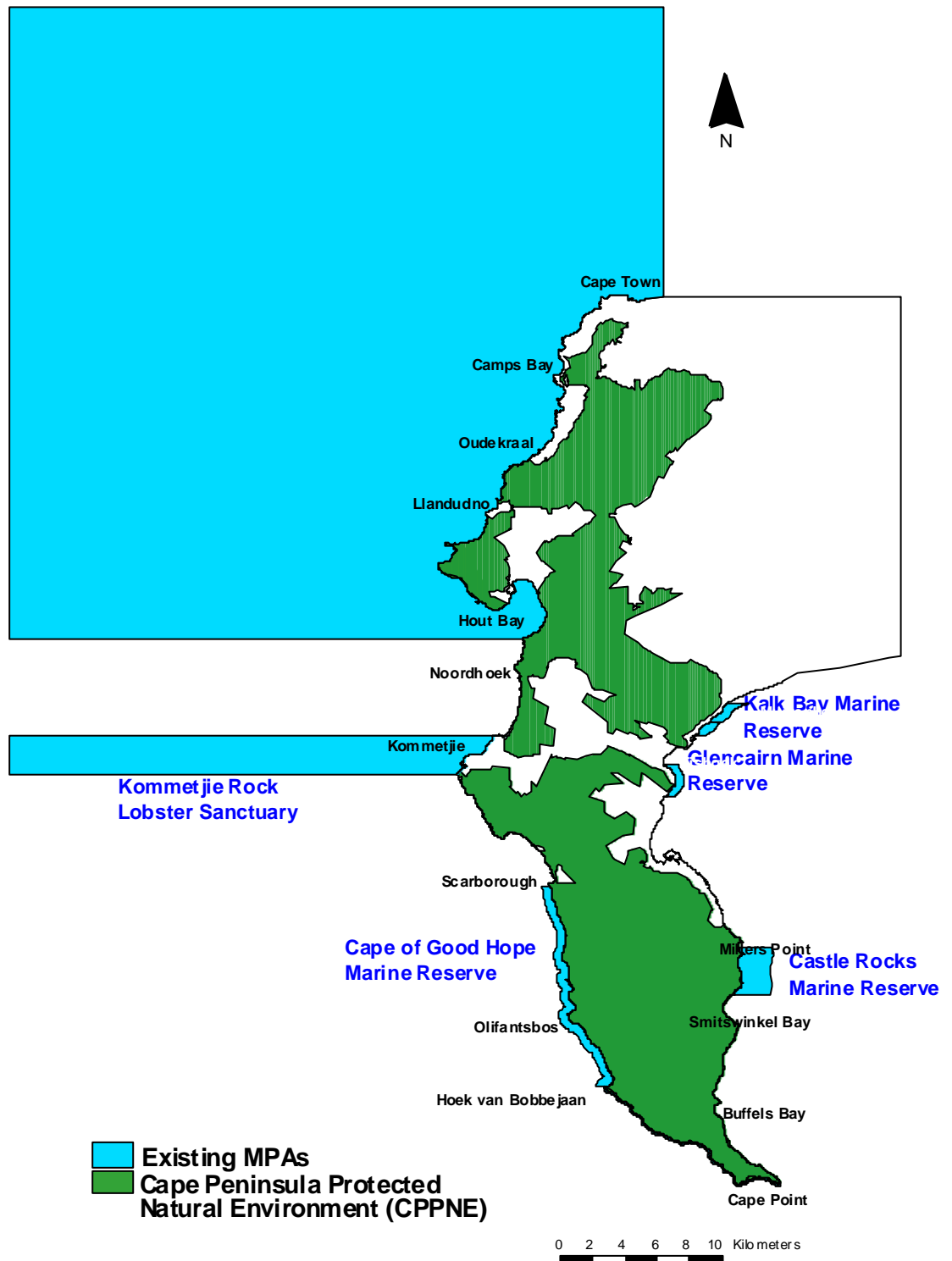


Fig. 1. Existing Marine Protected Areas on the Cape Peninsula.

Objective 2: To maximize habitat diversity (and thereby species and community diversity) within protected areas. An area that contains a wide spectrum of different habitat types (e.g. estuaries, dunes, sandy beaches and rocky shores) is likely to support a large number of different species, which can all be protected within a single reserve system.

Objective 3: To ensure protection of rare, localized or endemic species by ensuring protection of their habitats. A high proportion of the marine species in South Africa do not occur outside of the borders of the country and thus require special protection.

Objective 4: To protect areas essential for the completion of vulnerable life history stages of coastal species. Some species aggregate when breeding, when migrating or at nursery sites. These aggregations are often predictable in space and time, which makes them particularly vulnerable to exploitation, disturbance and habitat alteration. These areas obviously warrant special protection.

Fisheries management

Objective 5: To prevent overexploitation by providing refuge areas for exploited sedentary species. MPAs can reduce overall fishing effort and can guard against the loss of genetic diversity in heavily exploited species and against the possible failure of other management measures.

Objective 6: To protect exploited species at sites where they become vulnerable. Protection must be provided for exploited species that become concentrated at life-history stages where they become easy targets for fishers.

Objective 7: To improve or sustain yields in adjacent areas. Export of adults from protected areas where populations are allowed to achieve full potential helps to sustain catches of exploited species in adjacent areas.

Objective 8: To maintain spawner biomass. Appropriately sited marine protected areas should maintain breeding stocks of exploited species at sufficiently high levels to supply recruits to adjacent areas.

Utilization

Objective 9: To provide undisturbed localities, populations and communities for research. Vital information required for the management of exploited species can

often only be obtained from the study of populations in undisturbed situations. MPAs are also invaluable in demonstrating the effects of human activities by providing controls against which impacts elsewhere can be measured.

Objective 10: To provide sites in which monitoring can be conducted. Studies in MPAs allow natural variation to be quantified and thus make it possible to separate out the effects of large-scale changes such as global warming.

Objective 11. To promote and facilitate the development of tourism in South Africa. Tourism is the most rapidly growing sector of South Africa's economy and one of the fastest growing industries in the world. MPAs draw large numbers of tourists as they often represent the only completely natural undisturbed areas of this sort.

Objective 12. To provide sites for low impact, non-consumptive recreation. South Africa's coastline is coming under increasing pressure from recreation, some of which is not compatible with environmental conservation (e.g. off-road vehicle use). These need to be balanced against a demand for low-impact recreation such as hiking and diving that require protected, natural havens.

Objective 13. To provide sites where field-based education can be undertaken. Environmental education is becoming increasingly important in the face of a rapidly growing population and is best achieved in undisturbed environments with a high diversity of habitats.

Objective 14. To allow exploitation of selected taxa at a sustainable level. At least within marine reserves, it is possible to harvest particular species, provided this is strictly monitored and controlled at a sustainable level and does not impact on other species.

Criteria included in the COMPARE system against which performance towards achieving the stated objectives are as follows:

1. Is the site regionally representative?
2. Is the biogeographic region currently inadequately conserved?
3. Is habitat diversity high?
4. Does the area include vulnerable/fragile habitats?
5. Are the vulnerable species well represented?

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6. Will the areas protect vulnerable life-history stages?
 7. Is the area near-pristine or restorable to an acceptable natural condition?
 8. Does it have natural features of international interest of importance?
 9. Does the area support exploited species?
 10. Will the area supply stocks to adjacent areas?
 11. Is the area large enough to fulfil its designated objectives?
 12. Does the area lie adjacent to a terrestrial conserved area?
 13. Can the area be effectively and adequately policed?
 14. Is the area aesthetically appealing?
 15. Is the area accessible to people?
 16. Will the area satisfy needs for education, recreation, research and/or tourism?
 17. Will the area preserve historical, archeological, or geological features or cultural activities?

A careful study of the listed criteria reveals that not all criteria are relevant to all objectives. Thus in the evaluation process, performance towards each of the objectives is rated for relevant criteria only, while the remainder are simply blacked out as is shown in Table 2 below. Scores are allocated on scale of 0-2. A score of 0 implies that the reserve is ineffective in terms of achieving a particular objective, a score of 1 indicates that it is moderately effective and 2 that it is highly effective. Total scores for each criterion are calculated by adding scores in each row, while total scores for each objective are calculated by adding scores in each column. Totals for each column and row are then expressed as percentages such that different reserves can be evaluated relative to one another. The degree to which the three overarching objectives of conservation, fisheries management and utilization are being met by any particular reserve is obtained by calculating totals and percentages for each group of objectives. An overall score for each reserve can also be calculated by summing all scores for all objectives and expressing this as a percentage score out of 100.

Table 2. Evaluation table for use with the COMPARE (Criteria and Objectives for Marine Protected Area Evaluation) system.

CRITERION	OBJECTIVE														Totals for criteria	Percentages
	1. Biogeography	2. Habitat diversity	3. Rare/endemic species	4. Vulnerable stages (all spp.)	5. Reduced fishing mortality	6. Vulnerable stages (exploited spp.)	7. Adjacent yield	8. Spawner biomass	9. Research	10. Monitoring	11. Ecotourism	12. Low impact recreation	13. Education	14. Exploitation		
1. Regionally representative																
2. Not conserved elsewhere																
3. Habitat diversity high																
4. Includes fragile habitats																
5. Houses rare or endemic species																
6. Protects vulnerable stages																
7. Pristine or restorable																
8. Special natural features																
9. Supports exploited species																
10. Supplies adjacent areas																
11. Large enough																
12. Adjacent terrestrial reserve																
13. Effective management																
14. Aesthetically appealing																
15. Accessible to people																
16. Satisfies social needs																
17. Preserves historical sites																
Total for Objectives																
Percentages																
OVERALL TOTALS																
OVERALL PERCENTAGES																

How effective are the existing Marine Protected Areas on the Cape Peninsula?

The breakdown of scores for each MPA on the Cape Peninsula calculated using the COMPARE system are listed in Tables A1-8 in Appendix 1. Results, which are summarized in the form of percentages below, indicate how well each MPA on the Peninsula is performing with respect to the three overarching objectives of protection, fisheries management and human utilization as well as overall utility. The Cape of Good Hope and Kalk Bay Marine Reserves were split into their component parts for this analysis, as regulations governing the exploitation of marine resources in each were not the same.

Scores allocated to the various MPAs ranged between 5% and 68%. The average score for all the MPAs together was 42%. From this analysis it is clear that although marine protected areas cover a significant portion of the Peninsula coastline, many do not really contribute significantly to the conservation of biodiversity, fisheries management or human utilization needs. Three factors that had the greatest influence over how well (or how poorly) the MPAs scored were the type of MPA (sanctuary, marine reserve or fishery management area), the length of coastline included, and how effectively each area was being managed. The marine sanctuaries (which afford total protection to all species): Cape of Good Hope Marine Reserve (Schuster Bay – Hoek van Bobbejaan), Castle Rocks Marine Reserve and Kalk Bay Marine Reserve (Kalk Bay – St. James), generally received the highest scores (68, 64 and 45 respectively); the marine reserves (which protect the majority of species but allow harvesting of a few species): Cape of Good Hope Marine Reserve (Hoek van Bobbejaan – Cape Point), Glencairn Marine Reserve and Kalk Bay Marine Reserve (St. James – Muizenberg), generally received intermediate scores (56, 27 and 40 respectively); while the fishery reserves (which protect only one or a few species of commercial value): Table Bay Rock Lobster Sanctuary and Kommetjie Rock Lobster Sanctuary, received the lowest scores. Fishery reserves clearly meet very few of the objectives simply because they target so few species. MPAs that lie adjacent to terrestrial conservation areas, especially those into which access is controlled, also tend to be easier and therefore more effectively managed. The two sections of the Cape of Good Hope Marine Reserve scored far higher in terms of management criteria than did any of the other MPAs. These two MPAs scored 89 and 93% respectively in this category, while none of the others scored more than 50%, with most coming in at less than 25% (Tables A1-8, Appendix 1).

Table 3. Scores assigned to each of the MPAs on the Cape Peninsula emerging from the COMPARE evaluation procedure. Details on the type of MPA (MS = marine sanctuary, MR = marine reserve, and FR = fishery reserve) and length of coastline covered are also included.

MPA	Conservation	Fishery Management	Human Utilization	Overall Percentages	Type of MPA	Length of coastline (km)
1. Table Bay Rock Lobster Sanctuary	0	10	24	34	FR	26.9
2. Kommetjie Rock Lobster Sanctuary	0	11	5	5	FR	4.3
3. Cape of Good Hope Marine Reserve (Schuster Bay – Hoek van Bobbejaan)	61	55	74	68	MS	14.2
4. Cape of Good Hope Marine Reserve (Hoek van Bobbejaan – Cape Point)	55	50	58	56	MS	13.0
5. Castle Rocks Marine Reserve	55	55	71	64	MS	3.7
6. Glencairn Marine Reserve	7	13	40	27	MR	2.5
7. Kalk Bay Marine Reserve (Kalk Bay – St. James)	30	39	53	45	MS	1.3
8. Kalk Bay Marine Reserve (St. James – Muizenberg)	23	34	48	40	MR	1.6

Clearly many of the existing MPAs on the Peninsula and the MPA network as a whole do not measure up to the basic requirements set out for MPAs worldwide. If money and manpower are to be invested in managing a marine protected area network on the Cape Peninsula it must be both efficient and effective to be worthwhile. Consideration must therefore be given to modifying the existing network to make it more effective.

A NEW MPA STRUCTURE FOR THE CAPE PENINSULA

What principals were applied when evaluating the existing MPA network and how did we go about selecting new areas for conservation?

Any modifications proposed for the existing MPAs on the Cape Peninsula must seek to maximize the benefits of the existing network while at the same time ensuring that the cost and manpower required to ensure compliance is kept to a minimum. It is proposed therefore, that any existing MPAs on the Peninsula that are ineffective, inefficient or uneconomical to manage be replaced by those that are more effective, efficient and easier to manage.

With this in mind, a detailed study was undertaken with the purpose of selecting possible alternative areas for the following existing MPAs: the Table Bay Rock Lobster Sanctuary, the Kommetjie Rock Lobster Sanctuary, the Glencairn Marine Reserve and the northern section of the Kalk Bay Marine Reserve. The remaining MPAs on the Peninsula (Cape of Good Hope Marine Reserve, Castle Rocks Marine Reserve and the southern part of the Kalk Bay Marine Reserve) were considered to be of sufficient value to be maintained largely as they are. Some small modifications to these MPAs are proposed, however, where it was considered that significant benefits would be accrued.

The process by which areas potentially suitable for the siting of replacement MPAs were identified was undertaken in three phases. The first phase of the process was a broad area selection exercise in which all conservation worthy marine areas on the Peninsula were identified. In this phase, all sections of the coastline were rated as being of high, medium or low significance based on the following criteria:

- presence of significant stocks of adults of heavily exploited species (i.e. important breeding populations)
- degree of “naturalness” or “pristiness” of the area (presence of undisturbed ecosystems, low levels of exploitation)
- presence of breeding, nursery or feeding sites for significant species (e.g. rare, endangered, range restricted or heavily exploited species)
- rarity of habitat on the Peninsula and degree of representation in existing MPAs
- presence of range restricted, rare or endangered/ vulnerable species and,

-
- presence of invasive fauna or flora

Sections of coastline that were rated as being of high significance were then prioritized for reserve status while those of medium or low significance were accordingly attributed lower status. The resulting coverage developed during this phase is presented in Figure 2. Experience with MPAs worldwide and indeed on the Cape Peninsula, has also shown that it is highly advantageous if marine protected areas can be sited adjacent to terrestrially conserved areas. This has the effect of reducing management costs, makes enforcement easier and facilitates the development of tourism at these sites as they can often piggy-back on existing initiatives and infrastructure. The current extent of the Cape Peninsula Protected Natural Environment, most of which is likely to, or has already been incorporated into the Cape Peninsula National Park, was therefore also included in all of these layouts.

The second phase in the MPA selection process entailed identifying all existing and possible future threats to the proclamation of new MPAs at any particular position on the Peninsula. Future safety is considered to be very important in MPA selection as it has the power to render the proclamation of an MPA futile if it is not considered. For example, the proclamation of an MPA on a site that has already been gazetted for heavy industry is unlikely to be as effective as selecting an equivalent site where such impacts are not foreseen. Similarly, placing a new MPA in an area that is already heavily fished has the potential to create a great deal of conflict and ill feeling and would, in all likelihood, render the proclamation futile. Similarly, placing a new MPA in an area that is intensively used for recreation or one that is currently subject to, or may in the future be subject to heavy pollution, is likely to yield a similar result. Sensitive organisms are also easily disturbed by certain forms of recreation and can be prevented from nesting, mating, feeding or breeding as a result of human activities. Incorporating intensively used areas into an MPA would therefore also render proclamation futile.

The most significant potential threats to the safety of any newly proclaimed MPA on the Peninsula were identified as the following:

- major sources of pollution (domestic and industrial effluent outfalls, harbours etc.)
- major sources of disturbance (high intensity recreation areas, areas surrounding important access points such as slipways) and,
- conflict with existing users (e.g. fishermen and private landowners)

All major sources of pollution on the Peninsula were demarcated on detailed maps of the Peninsula as were the main fishing areas. Data regarding the major sources of pollution on the Peninsula was obtained from the relevant municipal authorities. Data on the location of all major fishing grounds (commercial, subsistence and recreational) was obtained from representatives of all the major fishing sectors as well as fisheries scientists and managers (rock lobster, abalone, shore angling, boat based linefishing, spearfishing, intertidal and kelp harvesting). The accuracy of this data was verified at a series of public meetings during the first phase of the public participation and consultation process, in which participants were given the opportunity to correct any inaccuracy or inconsistencies in the data. Layouts resulting from this exercise are presented in Figures 3, 4a & 4b.

The next phase of the selection process entailed overlaying the environmental significance, recreational use intensity, major sources of pollution and principal fishing grounds' layouts on top of one another. This enabled the identification of areas that were rated highly in terms of the environmental significance that did not coincide directly with the principal fishing grounds or that were likely to be subject to high levels of disturbance. These areas were considered to offer the greatest potential for marine conservation initiatives and were thus earmarked as potential new MPA sites. At the same time, all possible options for adjusting the boundaries of the existing MPAs were investigated so as to increase their efficiency without compromising the other objectives. In all situations, attempts were made to place any new boundaries or adjust existing boundaries such that they coincided with lines of longitude and latitude. Historically, the seaward boundaries of MPAs have typically been defined as being a certain distance offshore (measured from the high water mark). This has given rise to serious problems in the past, as such lines are often ambiguous and thus legally very difficult to define or enforce. It was considered a priority to avoid any such pitfalls in this exercise.

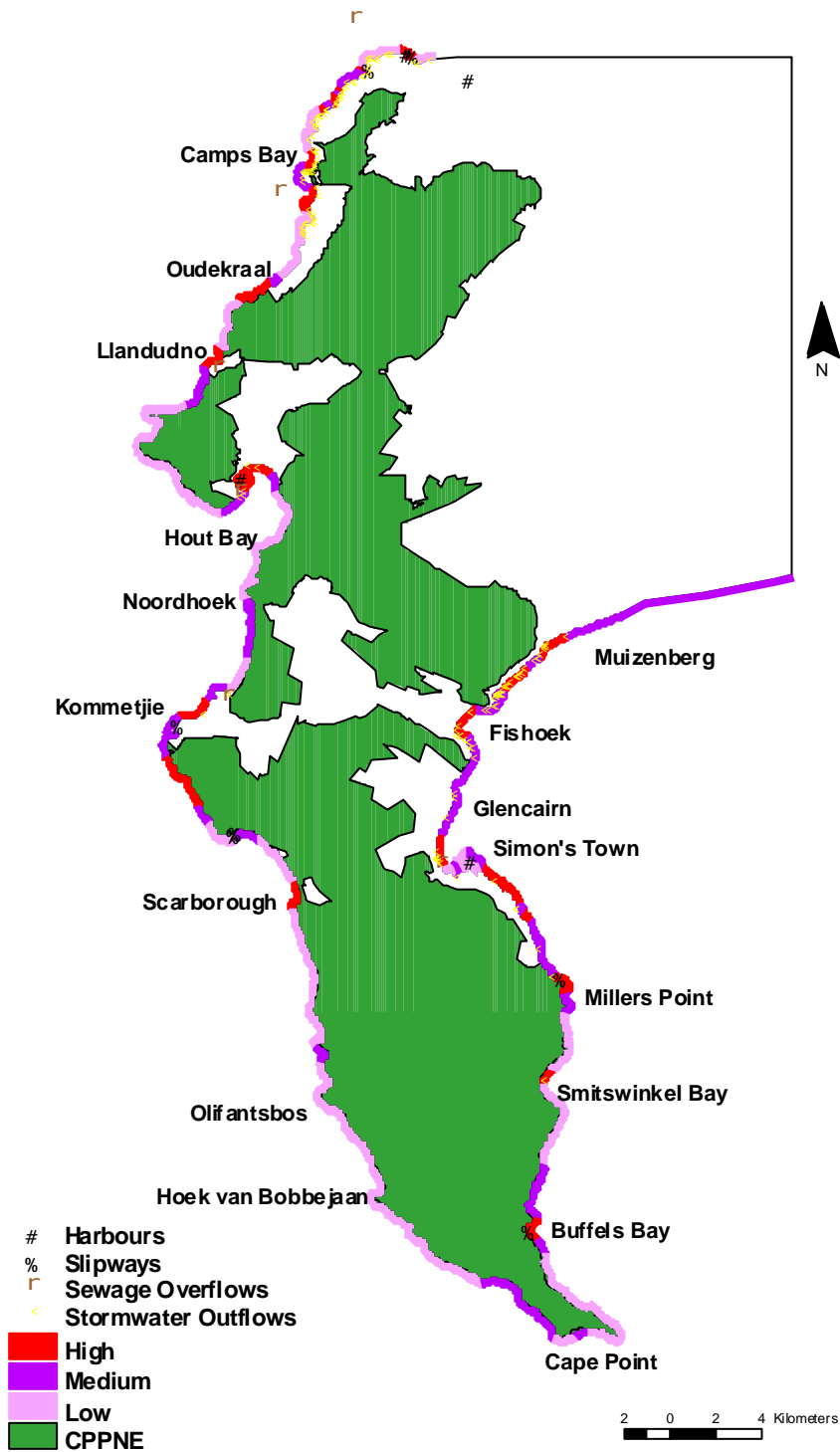


Fig. 3. Major sources of pollution and disturbance (harbours, slipways, sewage and stormwater outflows) and recreational use intensity (High/Medium/Low) on the Cape Peninsula.

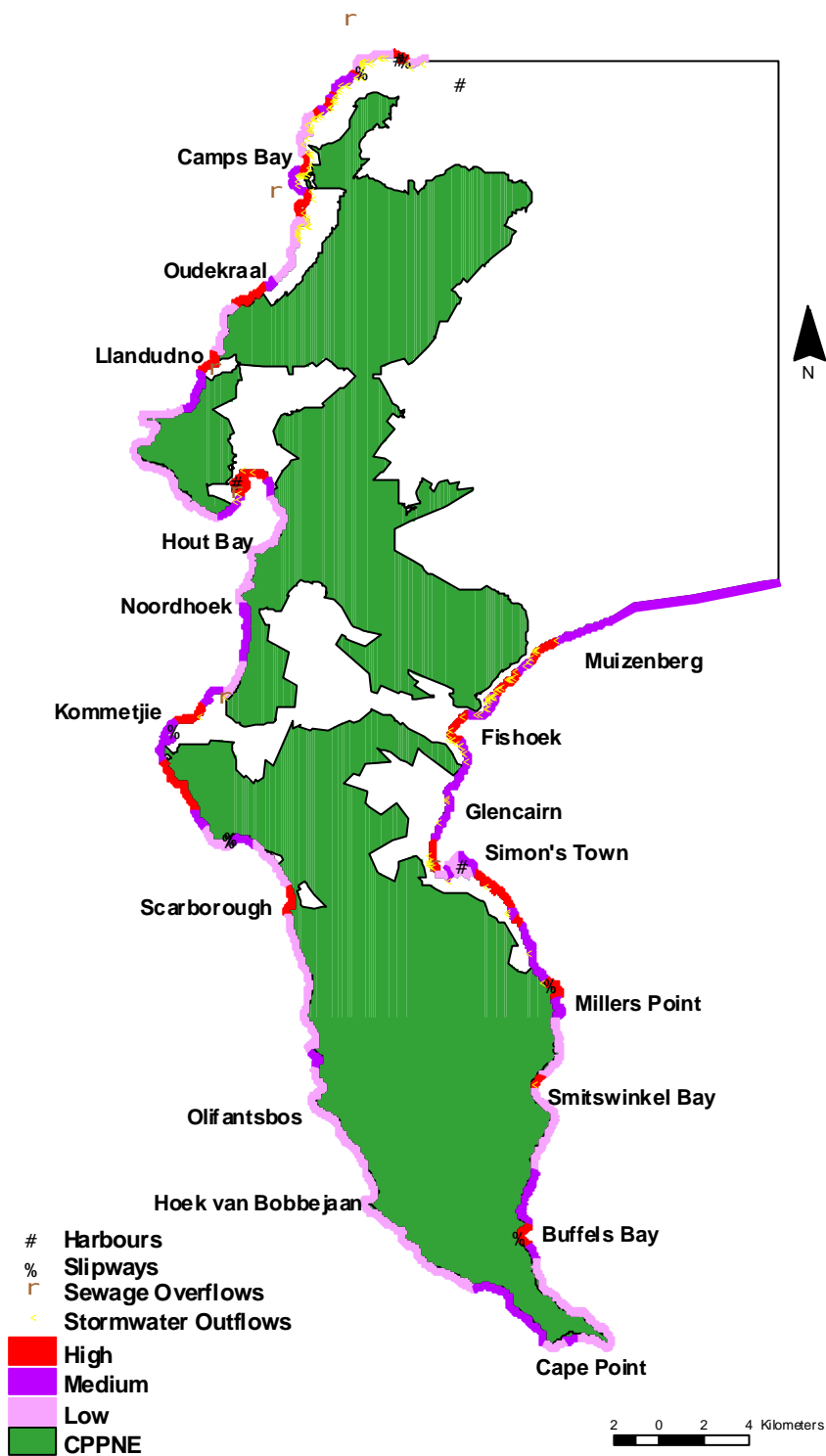


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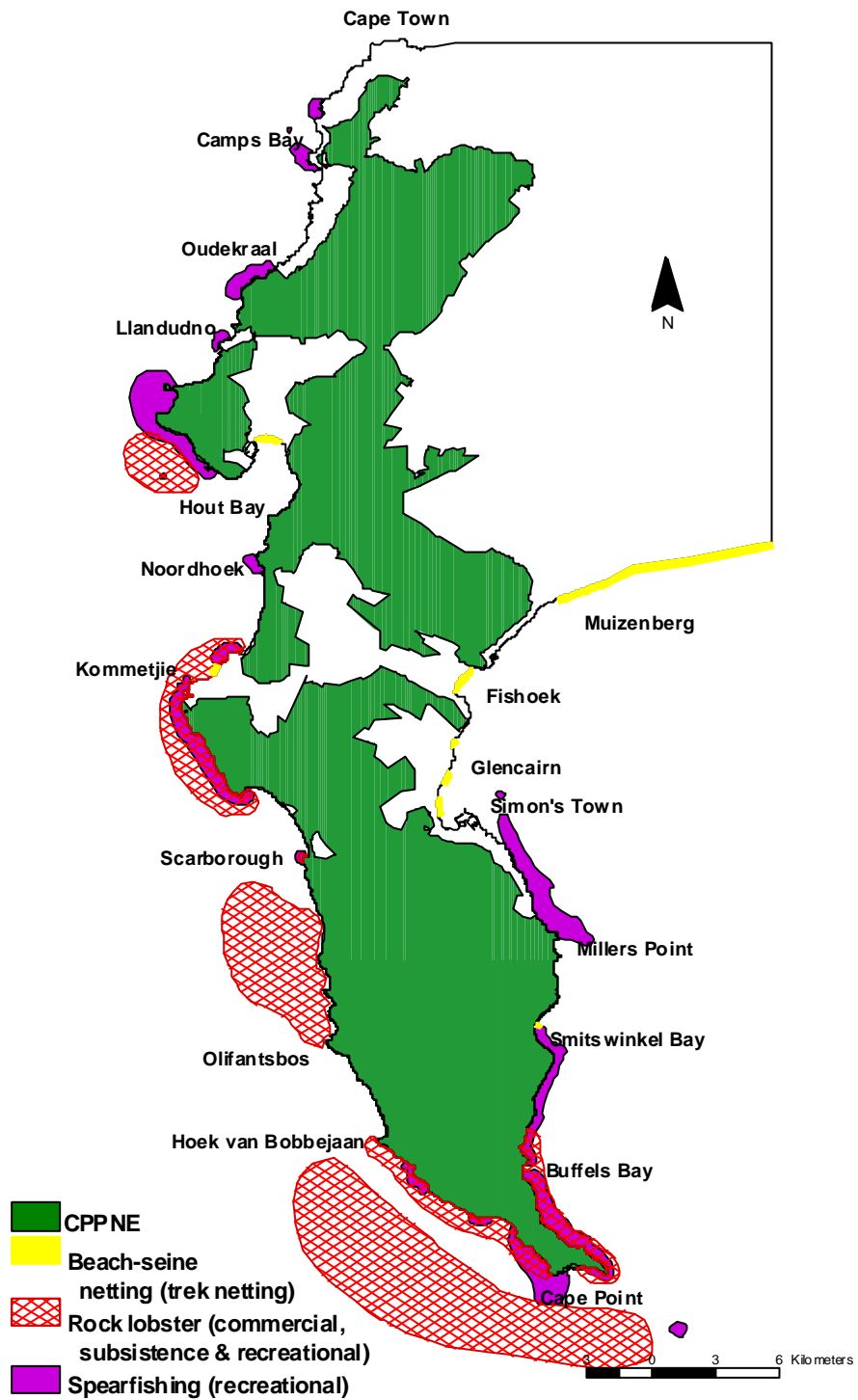


Fig. 4a. Principle marine fishing areas on and around the Cape Peninsula: Beach seine netting (trek netting), Rock lobster and Spearfishing.

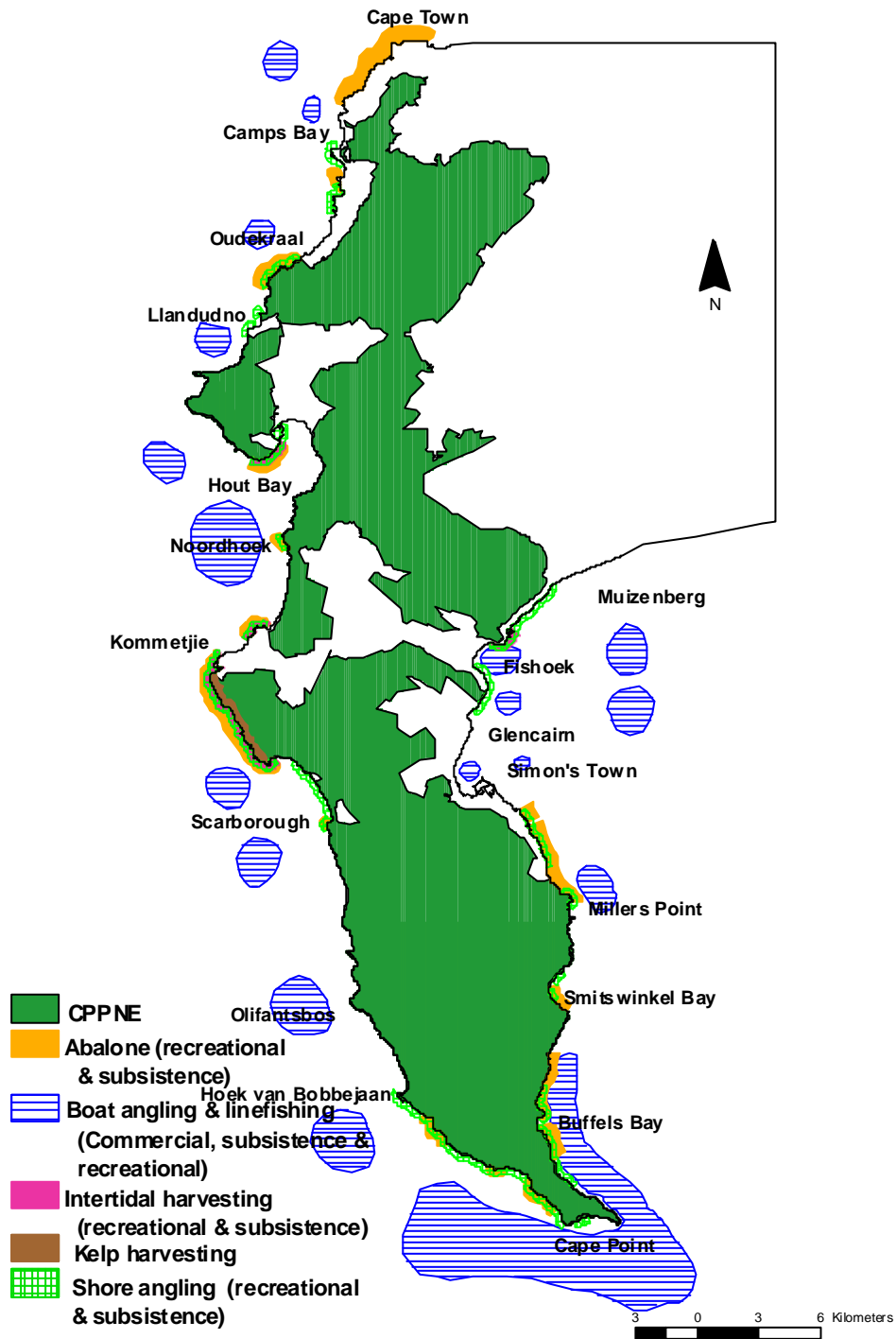


Fig. 4b. Principle marine fishing areas on and around the Cape Peninsula: Abalone, Boat angling and Linefishing, Intertidal harvesting, Kelp harvesting and Shore angling.

What changes are proposed for the MPA network on the Peninsula?

The selection process described above was designed to identify areas on the Cape Peninsula coastline that are most suitable as no-take MPAs. However, it must be remembered that the whole Peninsula represents a hotspot of biological diversity and that relative to the rest of the coastline, the entire area is significant from an environmental point of view. What is proposed here must be viewed in this light.

It is proposed that all existing MPAs on the Peninsula should be deproclaimed and that a single large marine park (marine protected area) be proclaimed that incorporates the whole of the Peninsula from Mouille Point to Muizenberg (Zandvlei estuary mouth). It is proposed that fishing be permitted in most parts of this park, but that certain areas be zoned as no-take areas, where no fishing will be allowed. Some of the no-take zones will correspond with existing marine protected areas while others will be positioned in new localities, as identified in the prioritization exercise described above. The no-take areas will also be incorporated as part of the Cape Peninsula National Park so as to ensure as high a level of protection and management as possible for these areas. The proposed boundaries of the new Cape Peninsula Marine Park and no-take zones are shown in Figure 5.

Two no-take zones will be established on the Atlantic coast:

- Karbonkelberg Marine Reserve - from Oudekraal to the southern tip of the Sentinel (Hout Bay), seawards to longitude 18°17'30"E
- Cape of Good Hope Marine Reserve, from Scarborough to Hoek van Bobbejaan, seawards to longitude 18°22'E

Four no-take zones will be established on the False Bay coast:

- Paulsberg Marine Reserve, from Black Rocks (Bordjiesrif) to Good Hope boundary at Smitswinkle Bay, seawards to longitude 18°29'30"E
- Castle Rocks Marine Reserve, from Whale Rock (Smitswinkle Bay) to Boat Rock (Millers Point), seawards to longitude 18°29'30"E
- Boulders Marine Reserve, from the A-frame (Murdock Valley) to Seaforth (Simonstown), seawards to longitude 18°28'E; and
- Kalk Bay Marine Reserve, from Kalk Bay station to St. James station, seawards to 18°28'E

Fisheries regulations (such as bag limits and minimum size limits) will be strictly enforced throughout the entire Park, as will regulations controlling the disturbance of

marine life, pollution, shipping etc. No harvesting of any sort will be permitted in the no-take zones. This will be enforced by fishery control officers from the Cape Peninsula National Park and the Directorate: Marine and Coastal Management. Areas chosen as no-take zones were carefully selected and designed to include as many special features as possible. For example, the proposed Karbonkelberg no-take zone includes the following features:

- Significant stocks of exploited species (rock lobster, hottentot, abalone) - densities of these species in this area are amongst the highest on the whole of the western side of the Peninsula
- Levels of fishing effort in this area have historically been very low (apart from a recent increase in illegal fishing effort) - the potential for conflict is thus low
- It incorporates an important seal colony on Duikerklip island
- It incorporates several historic wrecks: Mauri, Oakburn, Antipolis and Romelia
- It incorporates several of the most popular recreational dive sites on the Atlantic coast of the Peninsula: Oudekraal, Coral Gardens as well as the wrecks of the Antipolis, Mauri and Oakburn
- It is contiguous along its entire length with the terrestrial parts of the Cape Peninsula National Park
- High intensity recreation is confined to a very small section of this area – Llunduno Beach

The newly proposed no-take zones also offer several benefits over and above that which the existing MPAs offer. For example, the Cape of Good Hope no-take zone includes the following features:

- The extent of the subtidal habitat in this MPA will be increased by 300% from 5.9 km² to 17.8 km²
- It will eliminate any confusion regarding the precise location of the boundaries of this MPA and thus significantly reduce effort necessary for management and enforcement
- The new no-take MPA will include a significant portion of deepwater habitat (>30m) none of which exists in the current reserve. This will help to compensate for the loss of rock lobster habitat from the Table Bay and Kommetjie Rock Lobster Sanctuaries when they are deproclaimed
- The exemption currently granted to subsistence fishers to fish for rock lobster in the Cape of Good Hope Marine Reserve (a potentially significant source of

disturbance in this MPA) will become superfluous, as sufficient shallow water habitat will be available for them outside of the boundaries of this reserve

Having a single marine park surrounding the whole of the Peninsula also offers many new benefits:

- It will serve to bring what will otherwise be a set of discreet MPAs into a single marine park
- It will create a large buffer zone around the whole of the Peninsula in which marine communities will be protected from disturbance caused by pollution, shipping, development etc.
- The marine park could act as an important draw card for tourism similar to other internationally famous marine parks such as the Great Barrier Reef Marine Park and the Florida Keys Marine Sanctuary



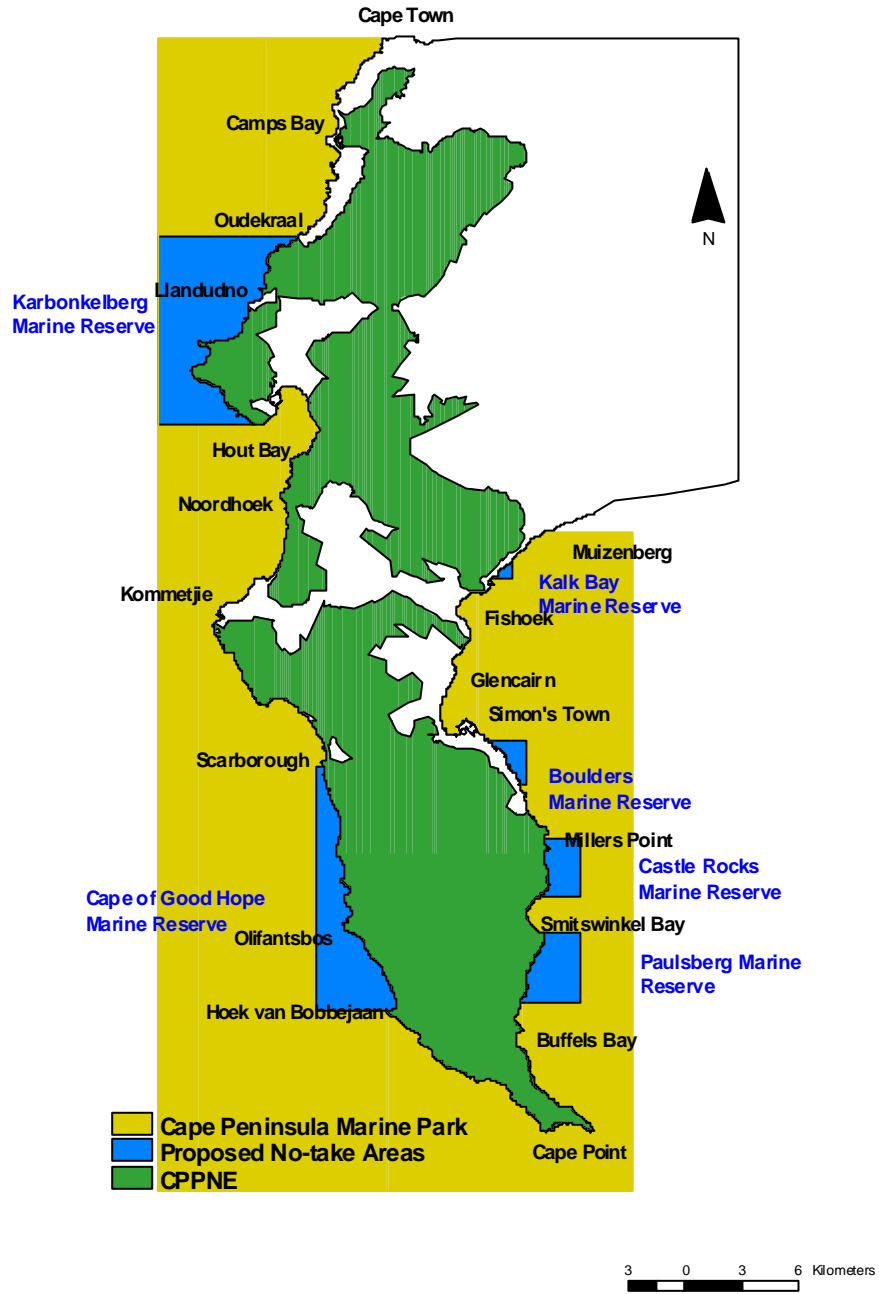


Fig. 5. Proposed Cape Peninsula Marine Park with new no-take areas.

How well is the new Cape Peninsula Marine Park with its no-take zones likely to perform in terms of biodiversity conservation, fisheries management and human utilization?

The COMPARE system was used to evaluate the proposed no-take areas in the Cape Peninsula Marine Park as though each was an individual MPA. Scores allocated to the new no-take zones were all greater than 70%, except for the Kalk Bay Marine Reserve (see Table 4 below). The average score for the no-take zones was 74%, which far exceeds that for the existing set of MPAs (42%). The new no-take zones incorporate virtually all the environmentally significant sections of coastline on the Peninsula (Fig. 6), hardly any significantly disturbed areas (Fig. 7) and few of the major fishing areas (Fig. 8). The Cape Peninsula Marine Park as proposed is also very much simpler than the existing combination of sanctuaries, partial marine reserves and fishery reserves that has been found to be very confusing in the past. Results of this analysis are presented in Tables A9-12 in the Appendix and summarized in Table 4.

It should be noted that certain assumptions had to be made when rating the new MPAs due to the absence of information on certain aspects such as management efficacy and performance towards satisfying social needs such as tourism and education. To get around this, scores for these criteria assigned to the MPAs that are currently managed largely by the Cape Peninsula National Park (e.g. Cape of Good Hope Marine Reserve) were used as an approximation for all the new MPAs. This is considered to be a realistic assumption as it is likely that management of these MPAs, once they have been formally incorporated into the Park, will be at least as good as it is currently.

Table 4. Scores assigned to each of the new proposed or modified MPAs on the Cape Peninsula emerging from the COMPARE evaluation procedure. Details on the length of coastline covered are also included for each.

MPA	Conservation (%)	Fishery Management (%)	Human Utilization (%)	Overall Percentages (%)	Length of Coastline (km)
1. Karbonkelberg Marine Reserve	61	61	84	74	16.1
2. Cape of Good Hope Marine Reserve	64	58	79	72	14.2
3. Paulsberg Marine Reserve	61	68	82	75	3.8
4. Castle Rocks Marine Reserve	61	68	82	75	3.7
5. Boulders Marine Reserve	68	73	78	74	16.9
6. Kalk Bay Marine Reserve	30	39	53	45	1.3

How will the Cape Peninsula Marine Park be managed?

The Cape Peninsula Marine Park will be managed with conservation being the key focus, as a partnership between Marine and Coastal Management and South African National Parks. The entire area will be managed in accordance with the Marine Living Resources Act as a full marine sanctuary. However, exemption will be granted for the purposes of fishing in all areas other than the no-take zones described above. The no-take areas will also be incorporated within the Cape Peninsula National Park and will receive additional protection from the National Parks Act. No fishing of any sort will be permitted in the no-take areas. The new marine components of the Cape Peninsula National Park will be managed together with the existing terrestrial parts in accordance with the Integrated Environmental Management System that has recently been developed for the Park. In accordance with this policy, the CPNP shall

maintain the current open access system to the Park and solicit public support for increased control of access, should this be required. Fishing will be permitted in areas outside of the no-take zones with no additional restrictions, other than those that apply to the rest of the South African coastline.

Where will the necessary funds be obtained for management of the Cape Peninsula Marine Park?

Marine and Coastal Management and the Cape Peninsula National Park both acknowledge the need for and are committed to enhancing and expanding existing capacity such that the management of the Cape Peninsula Marine Park will be in line with international standards. MCM acknowledges that in some regions they do not have the capacity required to manage effectively and are considering outsourcing some of their enforcement responsibilities as is currently done in the other coastal provinces. The CPNP are financing this study including the costs of developing the proposal, negotiations with existing management structures and authorities, and the public participation and consultation process. The CPNP already have 27 fishery control officers active on the Peninsula and responsible for enforcing the provisions of the Marine Living Resources Act over a large area. Additional funds will however, have to be sought to increase this capacity. Several possible avenues are available for funding, and it is likely that all of these will have to be exploited for this purpose.

The Marine Living Resources Act (Act 18 of 1998) provided for the establishment of a fund, known as the Marine Living Resources Fund, for the administration of the Act and any activity aimed at reaching the objectives of the Act. Objectives (a), (b), (e) and (f) of the Act are directly applicable to MPAs in general and certainly to the proposed Cape Peninsula Marine Park:

- (a) The need to achieve optimum utilization and ecologically sustainable development of marine resources
- (b) The need to conserve marine resources for both present and future generations;
- (e) The need to protect the ecosystem as a whole, including species that are not targeted for exploitation
- (f) The need to preserve marine biodiversity

The CPNP will be submit an application to the Marine Living Resources Fund for funds to assist in developing the required capacity, as well as for the ongoing management and monitoring of the marine park.

The CPNP will also investigate means by which revenue can be obtained from concessionaires (commercial operators) operating within the no-take zones that are to be incorporated within the Park. CPNP will explore various options here, but the most likely one is that a small levy will charged to all concessionaires operating from or within the borders of the Park.

Where can one get more information about this proposal?

Further details can be obtained from David Abrahams at Common Ground Consulting: PO Box 1828, Cape Town 8000, Telephone (021) 424 5052, Fax (021) 424 2495 or Email: dabrahams@commonground.co.za

What opportunities do the public and other interested and affected parties have to comment on the proposal?

Written or verbal comments can be directed to David Abrahams at Common Ground Consulting (CGC) at the above address and/or contact numbers. Alternatively, a series of public meetings will be held at the Hout Bay Senior Secondary School, the Mowbray Town Hall and the Fish Hoek Civic Centre on the 9th, 10th and 11th of April 2001 respectively, from 18:00-21:00, during which all interested and affected parties will have an opportunity to comment. Comments should be submitted to Common Ground Consulting before 4th May 2001.



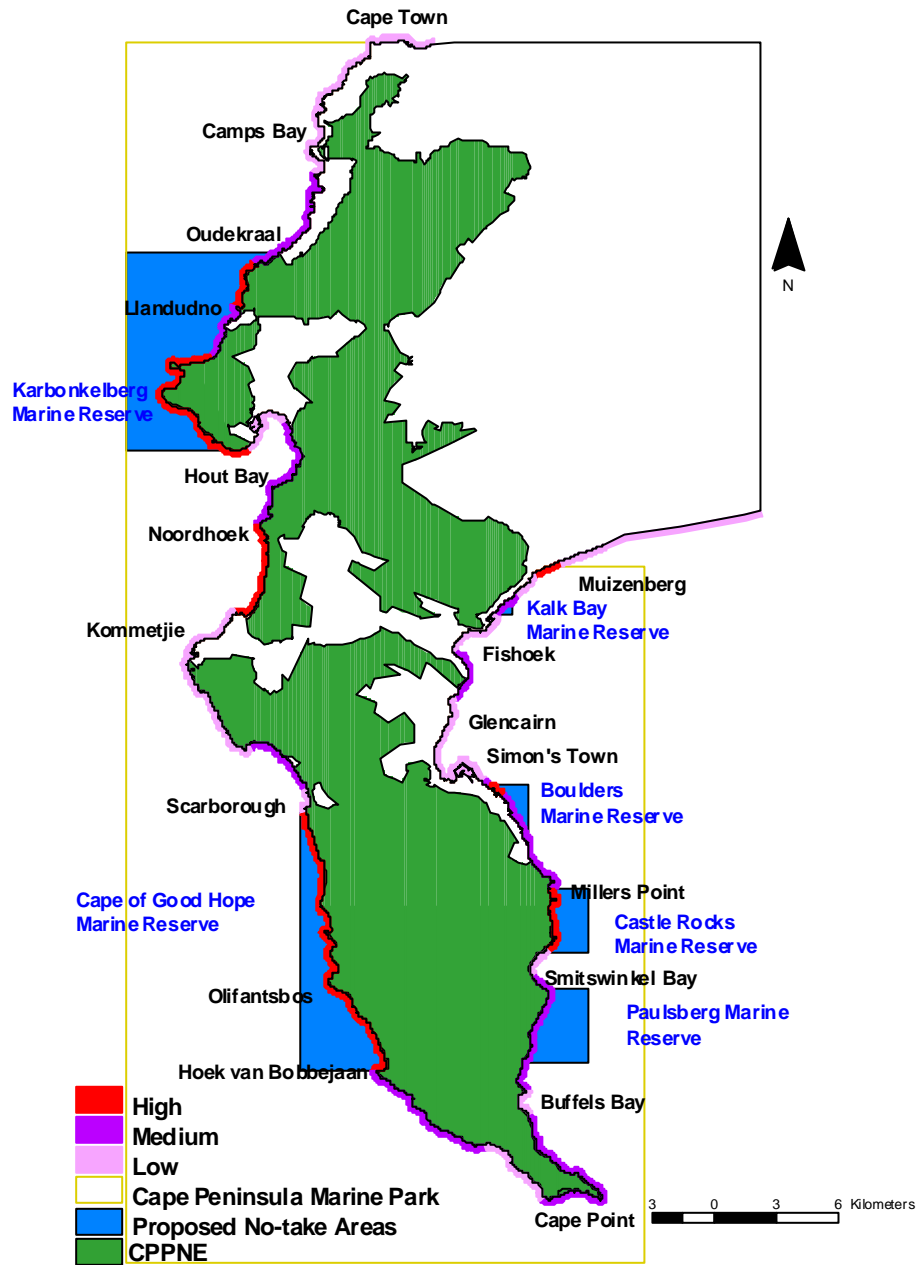


Fig. 6. Proposed Cape Peninsula Marine Park with new no-take areas shown in relation to environmental significance of the coastline.

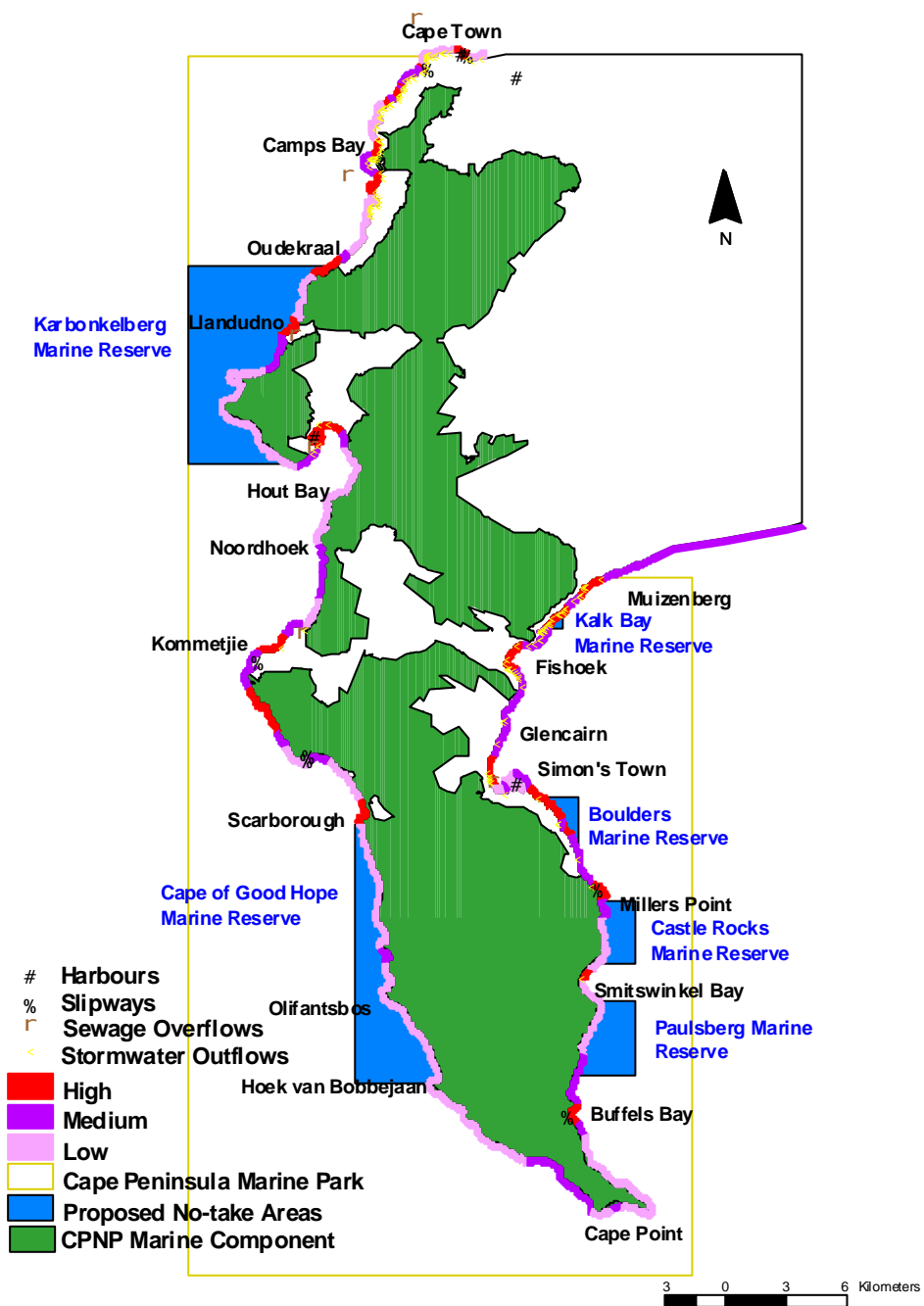


Fig. 7. Proposed Cape Peninsula Marine Park with new no-take areas shown in relation to major sources of pollution and disturbance, and recreational use intensity on the coastline.

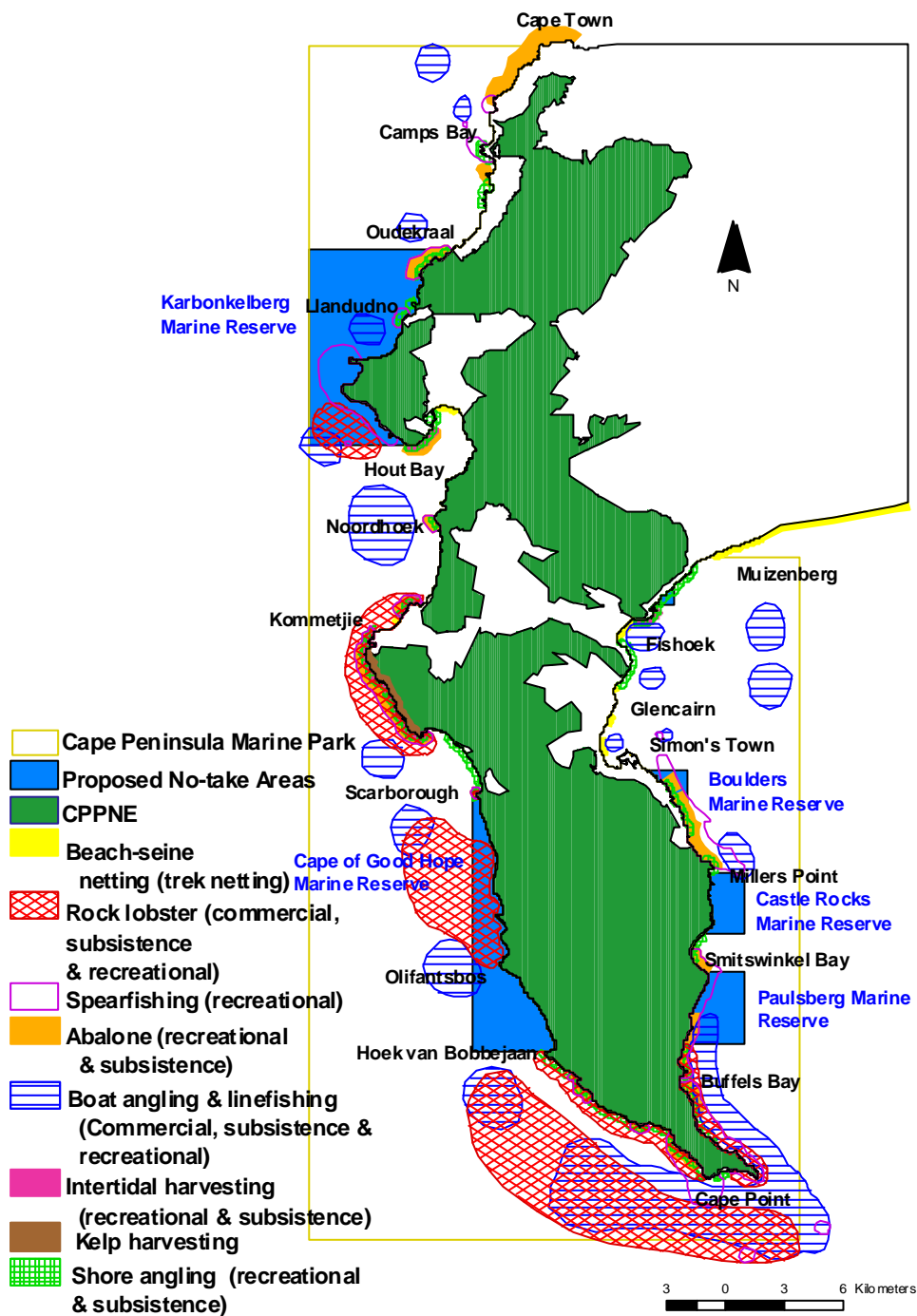


Fig. 8. Proposed Cape Peninsula Marine Park with new no-take areas shown in relation to principal fishing areas.

Appendix 1:

**COMPARE Evaluation tables for the existing
(Tables A1-8) and newly proposed no-take
zones (Tables A9-12) on the Cape Peninsula**



Table 1. COMPARE results for the existing "Table Bay Rock Lobster Sanctuary"

CRITERION \ OBJECTIVE	PROTECTION				FISHERIES MANAGEMENT				UTILIZATION				Totals for criteria	Percentages		
	1. Biogeography	2. Habitat diversity	3. Rare/endemic species	4. Vulnerable stages (all spp.)	5. Reduced fishing mortality	6. Vulnerable stages (exploited spp.)	7. Adjacent yield	8. Spawner biomass	9. Research	10. Monitoring	11. Ecotourism	12. Low impact recreation			13. Education	14. Exploitation
1. Regionally representative	0								1	1	0		1		3	30
2. Not conserved elsewhere	0		0			0		0							0	0
3. Habitat diversity high		0							1	0	0		0		1	10
4. Includes fragile habitats		0							0	0			0		0	0
5. Houses rare or endemic species									0	0	0		0		0	0
6. Protects vulnerable stages			0	0		1			0						1	13
7. Pristine or restorable		0							0	0	0				0	0
8. Special natural features	0								1		0		0		1	13
9. Supports exploited species					1	1	0	1	1	1			0	1	6	38
10. Supplies adjacent areas						0	0								0	0
11. Large enough?	0	0	0	0	1	1	1	1	1	1	0	0	0	1	7	25
12. Adjacent terrestrial reserve?		0	0	0	0	0			0	0	0		0		0	0
13. Effective management?	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2	7
14. Aesthetically appealing		0									0	0	0		0	0
15. Accessible to people?									2	2	2	2	2	2	12	100
16. Satisfies social needs?											0	1	0		1	17
17. Preserves historical sites?									0		0		0		0	0
Total for Objectives	0	0	0	0	3	4	1	2	7	5	2	3	3	4		
Percentages	0	0	0	0	38	29	13	25	27	25	8.3	30	11	50		
OVERALL TOTALS	0				10				24				34			
OVERALL PERCENTAGES	0				26				21				17			

Table 2. COMPARE results for the existing "Kommetjie Rock Lobster Sanctuary"

CRITERION \ OBJECTIVE	PROTECTION				FISHERIES MANAGEMENT				UTILIZATION						Totals for criteria	Percentages
	1. Biogeography	2. Habitat diversity	3. Rare/endemic species	4. Vulnerable stages (all spp.)	5. Reduced fishing mortality	6. Vulnerable stages (exploited spp.)	7. Adjacent yield	8. Spawner biomass	9. Research	10. Monitoring	11. Ecotourism	12. Low impact recreation	13. Education	14. Exploitation		
1. Regionally representative	0								0	0	0		0		0	0
2. Not conserved elsewhere	0		0			0		0							0	0
3. Habitat diversity high		0							0	0	0		0		0	0
4. Includes fragile habitats		0							0	0			0		0	0
5. Houses rare or endemic species			0						0	0	0		0		0	0
6. Protects vulnerable stages			0	0		1			0						1	13
7. Pristine or restorable		0							0	0	0		0		0	0
8. Special natural features	0								0		0		0		0	0
9. Supports exploited species					1	0	0	0	0	0			0	0	1	6
10. Supplies adjacent areas						0	0								0	0
11. Large enough?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12. Adjacent terrestrial reserve?		0	0	0	0	0			0	0	0		0		0	0
13. Effective management?	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2	7
14. Aesthetically appealing		0									0	0	0		0	0
15. Accessible to people?									1	1	1	1	1	1	6	50
16. Satisfies social needs?											0	0	0		0	0
17. Preserves historical sites?									0		0		0		0	0
Total for Objectives	0	0	0	0	2	2	0	0	1	1	1	1	1	1		
Percentages	0	0	0	0	25	14	0	0	4	5	4	10	4	13		
OVERALL TOTALS	0				4				6						10	
OVERALL PERCENTAGES	0				11				5						5	

Table 3. COMPARE results for the existing "Cape Of Good Hope Marine Reserve" (Schuster Bay - Hoek van Bobejaan section only)

CRITERION \ OBJECTIVE	PROTECTION				FISHERIES MANAGEMENT				UTILIZATION				Totals for criteria	Percentages		
	1. Biogeography	2. Habitat diversity	3. Rare/endemic species	4. Vulnerable stages (all spp.)	5. Reduced fishing mortality	6. Vulnerable stages (exploited spp.)	7. Adjacent yield	8. Spawner biomass	9. Research	10. Monitoring	11. Ecotourism	12. Low impact recreation			13. Education	14. Exploitation
1. Regionally representative	1								2	1	1		2		7	70
2. Not conserved elsewhere	1		0			0		0							1	13
3. Habitat diversity high		1							1	1	1		1		5	50
4. Includes fragile habitats		2							1	1			1		5	63
5. Houses rare or endemic spp.			1						1	1	1		1		5	50
6. Protects vulnerable stages			1	1		1			1						4	50
7. Pristine or restorable		2							2	2	2		2		10	100
8. Special natural features	0								0		0		1		1	13
9. Supports exploited species					1	1	1	1	2	2			2	2	12	75
10. Supplies adjacent areas						1	1								2	50
11. Large enough?	1	1	1	1	0	1	1	1	2	2	1	2	2	1	17	61
12. Adjacent terrestrial reserve?		2	1	1	2	2			2	2	1		2		15	83
13. Effective management?	2	2	2	2	1	2	2	2	2	2	1	2	2	2	26	93
14. Aesthetically appealing		2									2	2	2		8	100
15. Accessible to people?									2	2	2	2	2	2	12	100
16. Satisfies social needs?											1	2	1		4	67
17. Preserves historical sites?									0		0		1		1	17
Total for Objectives	5	12	6	5	4	8	5	4	18	16	13	10	22	7		
Percentages	50	86	50	63	50	57	63	50	69	80	54	100	79	88		
OVERALL TOTALS	28				21				86				135			
OVERALL PERCENTAGES	64				55				74				68			

Table 4. COMPARE results for the existing "Cape Of Good Hope Marine Reserve" (Hoek van Bobbejaan to Cape Point section only)

CRITERION \ OBJECTIVE	PROTECTION				FISHERIES MANAGEMENT				UTILIZATION						Totals for criteria	Percentages
	1. Biogeography	2. Habitat diversity	3. Rare/endemic species	4. Vulnerable stages (all spp.)	5. Reduced fishing mortality	6. Vulnerable stages (exploited spp.)	7. Adjacent yield	8. Spawner biomass	9. Research	10. Monitoring	11. Ecotourism	12. Low impact recreation	13. Education	14. Exploitation		
1. Regionally representative	1								1	1	1		1		5	50
2. Not conserved elsewhere	0		0			0		0							0	0
3. Habitat diversity high		0							0	0	0		0		0	0
4. Includes fragile habitats		0							0	0			0		0	0
5. Houses rare or endemic spp.			1						1	1	1		1		5	50
6. Protects vulnerable stages			1	1		0			1						3	38
7. Pristine or restorable		2							2	2	2		2		10	100
8. Special natural features	0								0		0		0		0	0
9. Supports exploited species					1	0	1	1	1	1			1	1	7	44
10. Supplies adjacent areas						1	1								2	50
11. Large enough?	1	1	1	1	0	1	1	1	1	1	1	1	1	1	13	46
12. Adjacent terrestrial reserve?		2	1	1	2	2			2	2	1		2		15	83
13. Effective management?	2	2	2	2	1	2	2	2	2	2	1	2	2	1	25	89
14. Aesthetically appealing		2									2	2	2		8	100
15. Accessible to people?									2	2	2	2	2	2	12	100
16. Satisfies social needs?											1	2	1		4	67
17. Preserves historical sites?									0		0		1		1	17
Total for Objectives	4	9	6	5	4	6	5	4	13	12	12	9	16	5		
Percentages	40	64	50	63	50	43	63	50	50	60	50	90	57	63		
OVERALL TOTALS	24				19				67						110	
OVERALL PERCENTAGES	55				50				58						56	

Table 5. COMPARE results for the existing "Castle Rocks Marine Reserve"

CRITERION \ OBJECTIVE	PROTECTION				FISHERIES MANAGEMENT				UTILIZATION						Totals for criteria	Percentages
	1. Biogeography	2. Habitat diversity	3. Rare/endemic species	4. Vulnerable stages (all spp.)	5. Reduced fishing mortality	6. Vulnerable stages (exploited spp.)	7. Adjacent yield	8. Spawner biomass	9. Research	10. Monitoring	11. Ecotourism	12. Low impact recreation	13. Education	14. Exploitation		
1. Regionally representative	1								2	2	2		2		9	90
2. Not conserved elsewhere	1		0			1		1							3	38
3. Habitat diversity high		1							1	1	1		1		5	50
4. Includes fragile habitats		0							0	0			0		0	0
5. Houses rare or endemic species			1						2	2	1		1		7	70
6. Protects vulnerable stages			2	1		1			1						5	63
7. Pristine or restorable		2							2	2	2		2		10	100
8. Special natural features	1								2		2		2		7	88
9. Supports exploited species					2	2	1	1	2	2			2	1	13	81
10. Supplies adjacent areas						1	1								2	50
11. Large enough?	1	1	1	1	1	1	1	1	2	2	2	2	2	1	19	68
12. Adjacent terrestrial reserve?		1	1	1	1	1			1	1	1		1		9	50
13. Effective management?	1	1	1	1	1	1	1	1	1	1	1	1	0	1	13	46
14. Aesthetically appealing		2									2	2	2		8	100
15. Accessible to people?									2	2	2	2	2	2	12	100
16. Satisfies social needs?											2	2	1		5	83
17. Preserves historical sites?									0		0		0		0	0
Total for Objectives	5	8	6	4	5	8	4	4	18	15	18	9	18	5		
Percentages	50	57	50	50	63	57	50	50	69	75	75	90	64	63		
OVERALL TOTALS	23				21				83						127	
OVERALL PERCENTAGES	52				55				72						64	

Table 6. COMPARE results for the existing "Glencairn Marine Reserve"

CRITERION \ OBJECTIVE	PROTECTION				FISHERIES MANAGEMENT				UTILIZATION						Totals for criteria	Percentages
	1. Biogeography	2. Habitat diversity	3. Rare/endemic species	4. Vulnerable stages (all spp.)	5. Reduced fishing mortality	6. Vulnerable stages (exploited spp.)	7. Adjacent yield	8. Spawner biomass	9. Research	10. Monitoring	11. Ecotourism	12. Low impact recreation	13. Education	14. Exploitation		
1. Regionally representative	1								1	1	1		1		5	50
2. Not conserved elsewhere	0		0			0		0							0	0
3. Habitat diversity high		0							1	1	1		1		4	40
4. Includes fragile habitats		0							0	0			0		0	0
5. Houses rare or endemic species			0						0	0	0		0		0	0
6. Protects vulnerable stages			0	0		1			0						1	13
7. Pristine or restorable		1							1	1	1		1		5	50
8. Special natural features	0								1		1		1		3	38
9. Supports exploited species					1	1	1	1	0	0			1	1	6	38
10. Supplies adjacent areas						0	0								0	0
11. Large enough?	0	0	0	0	0	0	0	0	1	1	2	2	2	0	8	29
12. Adjacent terrestrial reserve?		0	0	0	0	0			0	0	0		0		0	0
13. Effective management?	0	0	0	0	0	0	0	0	1	0	0	2	0	0	3	11
14. Aesthetically appealing		1									1	1	1		4	50
15. Accessible to people?									2	2	2	2	2	2	12	100
16. Satisfies social needs?											1	2	0		3	50
17. Preserves historical sites?									0		0		0		0	0
Total for Objectives	1	2	0	0	1	2	1	1	8	6	10	9	10	3		
Percentages	10	14	0	0	13	14	13	13	31	30	42	90	36	38		
OVERALL TOTALS	3				5				46						54	
OVERALL PERCENTAGES	7				13				40						27	

Table 7. COMPARE results for the existing "Kalk Bay Marine Reserve" (Kalk Bay - St. James section only)

CRITERION \ OBJECTIVE	PROTECTION				FISHERIES MANAGEMENT				UTILIZATION						Totals for criteria	Percentages
	1. Biogeography	2. Habitat diversity	3. Rare/endemic species	4. Vulnerable stages (all spp.)	5. Reduced fishing mortality	6. Vulnerable stages (exploited spp.)	7. Adjacent yield	8. Spawner biomass	9. Research	10. Monitoring	11. Ecotourism	12. Low impact recreation	13. Education	14. Exploitation		
1. Regionally representative	2								2	2	1		2		9	90
2. Not conserved elsewhere	1		0			0		0							1	13
3. Habitat diversity high		1							1	1	0		1		4	40
4. Includes fragile habitats		0							0	0			0		0	0
5. Houses rare or endemic species			0						0	1	0		1		2	20
6. Protects vulnerable stages			0	0		0			1						1	13
7. Pristine or restorable		1							1	1	1		2		6	60
8. Special natural features	1								1		1		1		4	50
9. Supports exploited species					2	2	2	1	1	2			2	0	12	75
10. Supplies adjacent areas						1	1								2	50
11. Large enough?	1	1	0	0	1	0	0	1	1	2	1	2	2	0	12	43
12. Adjacent terrestrial reserve?		0	0	1	0	0			0	0	0		0		1	5.6
13. Effective management?	1	1	0	0	1	1	1	1	1	1	2	2	2	0	14	50
14. Aesthetically appealing		2									1	1	1		5	63
15. Accessible to people?									2	2	2	2	2	0	10	83
16. Satisfies social needs?											1	2	2		5	83
17. Preserves historical sites?									0		1		0		1	17
Total for Objectives	6	6	0	1	4	4	4	3	11	12	11	9	18	0		
Percentages	60	43	0	13	50	29	50	38	42	60	46	90	64	0		
OVERALL TOTALS	13				15				61						89	
OVERALL PERCENTAGES	30				39				53						45	

Table 8. COMPARE results for the existing "Kalk Bay Marine Reserve" (St. James - Muizenberg section only)

CRITERION \ OBJECTIVE	PROTECTION				FISHERIES MANAGEMENT				UTILIZATION				Totals for criteria	Percentages		
	1. Biogeography	2. Habitat diversity	3. Rare/endemic species	4. Vulnerable stages (all spp.)	5. Reduced fishing mortality	6. Vulnerable stages (exploited spp.)	7. Adjacent yield	8. Spawner biomass	9. Research	10. Monitoring	11. Ecotourism	12. Low impact recreation			13. Education	14. Exploitation
1. Regionally representative	2								2	2	0		2		8	80
2. Not conserved elsewhere	1		0			1		0							2	25
3. Habitat diversity high		1							1	1	0		1		4	40
4. Includes fragile habitats		0							0	0			0		0	0
5. Houses rare or endemic species			0						0	0	0		1		1	10
6. Protects vulnerable stages			0	1		1			1						3	38
7. Pristine or restorable		1							1	1	1		2		6	60
8. Special natural features	1								1		1		1		4	50
9. Supports exploited species					2	2	2	1	1	2			2	1	13	81
10. Supplies adjacent areas						1	1								2	50
11. Large enough?	1	0	0	0	1	0	0	1	0	1	1	2	2	0	9	32
12. Adjacent terrestrial reserve?		0	0	0	0	0			0	0	0		0		0	0
13. Effective management?	0	0	0	0	0	0	0	0	0	0	2	2	2	0	6	21
14. Aesthetically appealing		2									1	1	1		5	63
15. Accessible to people?									2	2	2	2	2	2	12	100
16. Satisfies social needs?											1	2	1		4	67
17. Preserves historical sites?									0		0		0		0	0
Total for Objectives	5	4	0	1	3	5	3	2	9	9	9	9	17	3		
Percentages	50	29	0	13	38	36	38	25	35	45	38	90	61	38		
OVERALL TOTALS	10				13				56				79			
OVERALL PERCENTAGES	23				34				48				40			

Table 9. COMPARE results for the newly proposed "Karbonkelberg Marine Reserve"

CRITERION \ OBJECTIVE	PROTECTION				FISHERIES MANAGEMENT				UTILIZATION						Totals for criteria	Percentages
	1. Biogeography	2. Habitat diversity	3. Rare/endemic species	4. Vulnerable stages (all spp.)	5. Reduced fishing mortality	6. Vulnerable stages (exploited spp.)	7. Adjacent yield	8. Spawner biomass	9. Research	10. Monitoring	11. Ecotourism	12. Low impact recreation	13. Education	14. Exploitation		
1. Regionally representative	1								2	1	2		2		8	80
2. Not conserved elsewhere	1		0			0		1							2	25
3. Habitat diversity high		1							1	1	1		1		5	50
4. Includes fragile habitats		1							1	1			1		4	50
5. Houses rare or endemic spp.			1						1	1	1		1		5	50
6. Protects vulnerable stages			1	1		1			1						4	50
7. Pristine or restorable		2							2	2	2		2		10	100
8. Special natural features	1								1		2		1		5	63
9. Supports exploited species					1	1	1	1	2	2			2	2	12	75
10. Supplies adjacent areas						1	1								2	50
11. Large enough?	1	1	1	1	1	1	1	1	2	2	2	2	2	1	19	68
12. Adjacent terrestrial reserve?		1	1	1	2	2			2	2	2		2		15	83
13. Effective management?	2	2	2	2	1	2	2	2	2	2	2	2	2	2	27	96
14. Aesthetically appealing		2									2	2	2		8	100
15. Accessible to people?									2	2	2	2	2	2	12	100
16. Satisfies social needs?											2	2	2		6	100
17. Preserves historical sites?									1		1		1		3	50
Total for Objectives	6	10	6	5	5	8	5	5	20	16	21	10	23	7		
Percentages	60	71	50	63	63	57	63	63	77	80	88	100	82	88		
OVERALL TOTALS	27				23				97						147	
OVERALL PERCENTAGES	61				61				84						74	

Table 10. COMPARE results for the modified "Cape Of Good Hope Marine Reserve"

CRITERION \ OBJECTIVE	PROTECTION				FISHERIES MANAGEMENT				UTILIZATION						Totals for criteria	Percentages
	1. Biogeography	2. Habitat diversity	3. Rare/endemic species	4. Vulnerable stages (all spp.)	5. Reduced fishing mortality	6. Vulnerable stages (exploited spp.)	7. Adjacent yield	8. Spawner biomass	9. Research	10. Monitoring	11. Ecotourism	12. Low impact recreation	13. Education	14. Exploitation		
1. Regionally representative	1								2	1	1		2		7	70
2. Not conserved elsewhere	1		0			0		0							1	13
3. Habitat diversity high		1							2	2	1		1		7	70
4. Includes fragile habitats		2							1	1			1		5	63
5. Houses rare or endemic spp.			1						1	1	1		1		5	50
6. Protects vulnerable stages			1	1		1			1						4	50
7. Pristine or restorable		2							2	2	2		2		10	100
8. Special natural features	0								0		0		1		1	13
9. Supports exploited species					1	1	1	1	2	2			2	2	12	75
10. Supplies adjacent areas						1	1								2	50
11. Large enough?	1	1	1	1	1	1	1	1	2	2	1	2	2	1	18	64
12. Adjacent terrestrial reserve?		2	1	1	2	2			2	2	2		2		16	89
13. Effective management?	2	2	2	2	1	2	2	2	2	2	2	2	2	2	27	96
14. Aesthetically appealing		2									2	2	2		8	100
15. Accessible to people?									2	2	2	2	2	2	12	100
16. Satisfies social needs?											2	2	2		6	100
17. Preserves historical sites?									0		0		1		1	17
Total for Objectives	5	12	6	5	5	8	5	4	19	17	16	10	23	7		
Percentages	50	86	50	63	63	57	63	50	73	85	67	100	82	88		
OVERALL TOTALS	28				22				92						142	
OVERALL PERCENTAGES	64				58				79						72	

Table 11. COMPARE results for the newly proposed "Paulsberg Marine Reserve"

CRITERION \ OBJECTIVE	PROTECTION				FISHERIES MANAGEMENT				UTILIZATION				Totals for criteria	Percentages	
	1. Biogeography	2. Habitat diversity	3. Rare/endemic species	4. Vulnerable stages (all spp.)	5. Reduced fishing mortality	6. Vulnerable stages (exploited spp.)	7. Adjacent yield	8. Spawner biomass	9. Research	10. Monitoring	11. Ecotourism	12. Low impact recreation			13. Education
1. Regionally representative	1								2	2	2		2	9	90
2. Not conserved elsewhere	1		0			1		1						3	38
3. Habitat diversity high		1							1	1	1		1	5	50
4. Includes fragile habitats		0							0	0			0	0	0
5. Houses rare or endemic species			1						2	2	1		1	7	70
6. Protects vulnerable stages			2	1		1			1					5	63
7. Pristine or restorable		2							2	2	2		2	10	100
8. Special natural features	1								2		2		2	7	88
9. Supports exploited species					2	2	1	1	2	2			2	13	81
10. Supplies adjacent areas						1	1							2	50
11. Large enough?	1	1	1	1	1	1	1	1	2	2	2	2	2	19	68
12. Adjacent terrestrial reserve?		1	1	1	2	2			2	2	2		2	15	83
13. Effective management?	2	2	2	2	1	2	2	2	2	2	2	2	2	27	96
14. Aesthetically appealing		2									2	2	2	8	100
15. Accessible to people?									2	2	2	2	2	12	100
16. Satisfies social needs?											2	2	2	6	100
17. Preserves historical sites?									0		0		0	0	0
Total for Objectives	6	9	7	5	6	10	5	5	20	17	20	10	22	6	
Percentages	60	64	58	63	75	71	63	63	77	85	83	100	79	75	
OVERALL TOTALS	27				26				95				148		
OVERALL PERCENTAGES	61				68				82				75		

Table 12. COMPARE results for the modified "Castle Rocks Marine Reserve"

CRITERION \ OBJECTIVE	PROTECTION				FISHERIES MANAGEMENT				UTILIZATION				Totals for criteria	Percentages	
	1. Biogeography	2. Habitat diversity	3. Rare/endemic species	4. Vulnerable stages (all spp.)	5. Reduced fishing mortality	6. Vulnerable stages (exploited spp.)	7. Adjacent yield	8. Spawner biomass	9. Research	10. Monitoring	11. Ecotourism	12. Low impact recreation			13. Education
1. Regionally representative	1								2	2	2		2	9	90
2. Not conserved elsewhere	1		0			1		1						3	38
3. Habitat diversity high		1							1	1	1		1	5	50
4. Includes fragile habitats		0							0	0			0	0	0
5. Houses rare or endemic species			1						2	2	1		1	7	70
6. Protects vulnerable stages			2	1		1			1					5	63
7. Pristine or restorable		2							2	2	2		2	10	100
8. Special natural features	1								2		2		2	7	88
9. Supports exploited species					2	2	1	1	2	2			2	13	81
10. Supplies adjacent areas						1	1							2	50
11. Large enough?	1	1	1	1	1	1	1	1	2	2	2	2	2	19	68
12. Adjacent terrestrial reserve?		1	1	1	2	2			2	2	2		2	15	83
13. Effective management?	2	2	2	2	1	2	2	2	2	2	2	2	2	27	96
14. Aesthetically appealing		2									2	2	2	8	100
15. Accessible to people?									2	2	2	2	2	12	100
16. Satisfies social needs?											2	2	2	6	100
17. Preserves historical sites?									0		0		0	0	0
Total for Objectives	6	9	7	5	6	10	5	5	20	17	20	10	22	6	
Percentages	60	64	58	63	75	71	63	63	77	85	83	100	79	75	
OVERALL TOTALS	27				26				95				148		
OVERALL PERCENTAGES	61				68				82				75		

Table 13. COMPARE results for the newly proposed "Boulders Rocks Marine Reserve"

CRITERION \ OBJECTIVE	PROTECTION				FISHERIES MANAGEMENT				UTILIZATION						Totals for criteria	Percentages
	1. Biogeography	2. Habitat diversity	3. Rare/endemic species	4. Vulnerable stages (all spp.)	5. Reduced fishing mortality	6. Vulnerable stages (exploited spp.)	7. Adjacent yield	8. Spawner biomass	9. Research	10. Monitoring	11. Ecotourism	12. Low impact recreation	13. Education	14. Exploitation		
1. Regionally representative	1								1	1	2		2		7	70
2. Not conserved elsewhere	1		1			1		1							4	50
3. Habitat diversity high		1							1	1	1		1		5	50
4. Includes fragile habitats		0							0	0			0		0	0
5. Houses rare or endemic species			2						2	2	2		2		10	100
6. Protects vulnerable stages			2	1		1			1						5	63
7. Pristine or restorable		2							2	2	2		2		10	100
8. Special natural features	1								1		2		2		6	75
9. Supports exploited species					1	1	1	1	1	1			1	1	8	50
10. Supplies adjacent areas						1	1								2	50
11. Large enough?	1	1	2	1	1	1	1	1	2	2	2	2	2	1	20	71
12. Adjacent terrestrial reserve?		1	2	1	2	2			2	2	2		2		16	89
13. Effective management?	2	2	2	2	1	2	2	2	2	2	2	2	2	2	27	96
14. Aesthetically appealing		2									2	2	2		8	100
15. Accessible to people?									2	2	2	2	2	2	12	100
16. Satisfies social needs?											2	2	2		6	100
17. Preserves historical sites?									0		0		0		0	0
Total for Objectives	6	9	11	5	5	9	5	5	17	15	21	10	22	6		
Percentages	60	64	92	63	63	64	63	63	65	75	88	100	79	75		
OVERALL TOTALS	31				24				91						146	
OVERALL PERCENTAGES	70				63				78						74	