A Strategy for the Sustainable Use of Bermuda's Living Marine Resources

GOVERNMENT OF BERMUDA
Ministry of the Environment and Sports
Department of Environmental Protection

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Executive Summary

The goal of this Strategy is to provide a blueprint for managing Bermuda's marine resources over the next 15 years so as to encourage a sustainable and economically viable fishing industry, promote healthy marine ecosystems, and ensure that the interests of all those who have a stake in the marine environment are represented.

Worldwide, fish stocks are being subjected to increasing fishing pressure as demand for fisheries products grows and the technology used to catch fish improves. In 2007, the Food and Agriculture Organization of the United Nations (FAO) estimated that over half of the world's fish stocks were fully exploited and about 28 % were overfished. The complex multi-species fisheries associated with coral reef environments are considered to be particularly vulnerable.

Both commercial and recreational fishing are an important part of Bermuda's culture, as well as contributing to our food security. There is significant pressure on the fishery resources of the Bermuda Platform as well as increasing pressure on the oceanic species that migrate through our 200-mile Exclusive Economic Zone. There is also growing interest in other uses of the marine environment, including marine tourism activities, boating, and underwater sports such as diving, snorkelling and underwater photography. The increasing, and sometimes conflicting, demands of different user groups and stakeholders require a coherent strategy to direct the long-term management of Bermuda's marine resources.

In this document, the Marine Resources Section of the Department of Environmental Protection proposes a strategy to address the sustainable use of Bermuda's living marine resources. This strategy develops the principles outlined in the 2005 policy document known as the White Paper[1], addressing gaps, taking account of new developments and including international and regional fisheries management trends.

The strategy follows four lines of approach:

1. Co-ordinated management approaches, supported by research, will address all aspects of resource extraction and are presented in such a way as to build up from the management of individual species through the management of different fishery sectors. Spatial planning principles will help ensure the sustainable management of the wider marine ecosystem. (Themes 1 – 4)
2. Diversification of the local seafood market and improved food security will be pursued through the investigation of new harvest opportunities and the promotion of aquaculture activities. (Themes 5 - 6)
3. More efficient post-harvest handling of seafood products will be conducted through a new Shoreside Facility. Adding to the value of harvested products will be promoted as a way of improving the profitability of commercial fishing without increasing harvest levels. (Theme 7)
4. Enhancing legislation, policy, enforcement capacity and outreach activities will support management measures. (Themes 8 - 10)

[1] 2005. White Paper on the Marine Environment and Fishing Industry in Bermuda. 31 pp.

The strategy themes, along with their key actions, are detailed below:

1. Management of Fish Stocks
    - Conducting research on fish age/growth/reproduction, spawning aggregation dynamics, movement patterns and habitat distributions to support management plans
    - Preparing management plans for key fishery target species
2. Management of the Commercial Fishery
    - Collecting more detailed catch and effort data via the Shoreside Facility
    - Examining sustainable effort
    - Reviewing the licensing process for specialised fisheries
    - Promoting better relations among fishermen, and between fishermen and management
3. Management of the Non-commercial Sectors
    - Conducting a detailed survey of recreational fishing and other collecting activities
    - Revising the fisheries regulations based on the results of the survey
    - Establishing a program for ongoing monitoring of the non-commercial fishery
4. Spatial Management
    - Developing a scaled zoning plan for the entire Bermuda platform, the Banks and EEZ waters
5. Investigating New Harvest Opportunities
    - Completing research into the feasibility of offshore fishing for small local vessels
    - Investigating a new fishery for the invasive Pacific lionfish
6. Increasing Local Seafood Production Through Aquaculture
    - Working with other relevant Government Departments to create a regulatory framework for commercial aquaculture activities in Bermuda
    - Conducting research into aquaculture opportunities to enhance local production, on a commercial basis and also to assist conservation initiatives
7. Post-harvest Handling of Seafood Products
    - Establishing a Shoreside Facility to support local fishermen and make more efficient use of harvested products
    - Promoting value-adding to increase the profitability of commercial fishing
8. Legislation and Policy
    - Developing policy documents
    - Creating a new Fisheries Act (or Living Marine Resources Act)
9. Enforcement
    - Implementing a ticketing system
    - Working with the judiciary to promote support for the Fisheries legislation
    - Increasing enforcement capabilities
10. Outreach
    - Producing reports, articles, presentations and infomercials to make the public aware of the work of the Marine Resources Section and engender stewardship of the marine environment
    - Holding information sessions on fisheries regulations and basic fish biology and ecology for new commercial fishery participants
    - Posting signs detailing relevant fishing regulations in popular shoreside fishing areas
    - Continuing to work with other relevant authorities to inform the public of appropriate actions in case of an anomalous marine event (e.g. fish kill)

Bermuda's marine resources are a valuable, yet vulnerable, asset, and the sustainable management of the marine environment is critical to our way of life. It is anticipated that this strategy will guide marine resources management in Bermuda for the next 15 years. However, Bermuda's marine resources are the common property of us all, and their management is our joint responsibility. Failing in this responsibility is not an option, as it would endanger our food security, our way of life and even the physical existence of the Island. Therefore, the Department of Environmental Protection invites all members of the community to examine this strategy document, provide feedback on its content, and commit to participation in the initiatives that seek to involve the numerous and varied stakeholders in our marine environment. Comments may be mailed in to the Department of Environmental Protection, or e-mailed to fisheries@gov.bm until June 30th, 2010.

Theme 1 – Management of Fish Stocks

The goals for Management of Fish Stocks are:

- To conduct basic biological and ecological research on species targeted by the commercial and recreational fishing sectors in order to support the formulation of species management plans.
- To have a management plan in place for each of the main fishery target species, and to ensure that these plans are based on sufficient biological and ecological data that they will effectively sustain the populations of these species.

Background

Worldwide, fish stocks are being subjected to increasing fishing pressure as demand for fisheries products grows and the technology used to catch fish improves. The Food and Agriculture Organization of the United Nations (FAO) estimated that in 2007 just over half of the world's fish stocks were fully exploited (meaning that there was no room for expansion) and about 28 percent were overfished, depleted or recovering from depletion. Many coral reef fisheries are in a poor state, largely because the paucity of information on coral reef fish stocks and their response to fishing pressure has led to ineffective management measures.

Scientific information about the life history and distribution of each species is important in understanding how fish stocks react to their environment and to fishing pressure. This information should guide fisheries management measures, and be used to monitor their effectiveness. Unfortunately, life history details vary greatly between different locations, so it is unwise to base local management measures on data gathered in other countries as fishery parameter values may differ significantly.

Until recently, there was little information available on fish stocks in Bermuda to guide fisheries management decisions, and assessments of stock status were based largely on fisheries landings. A research program on key fishery species was initiated in the 1950s and this, along with a study on the red hind in the 1970s, provided some insights into the biology of a number of important reef fish species. However, a significant decline in landings of several reef species, particularly grouper species and parrotfish species, was observed in the 1970s and 1980s, and in 1990 a decision was made to ban the use of fish traps. This measure most likely saved the reef fishery from total collapse but had negative socio-economic effects on the commercial fishing industry and strained the relationship between the industry and fisheries managers. A substantial recovery of many parrotfish species has been observed. However, most of the grouper species have still not made a recovery with the notable exception of the black grouper.

After the fish pot ban, a greater emphasis was placed on studying aspects of the life history of important fisheries species in order to bring about better management of local marine resources. Research on the biology of several reef species (i.e. black grouper, red hind, lane snapper and spiny lobster) was expanded. Results from these programs have been used to create regulations such as minimum legal sizes, area closures and bag limits for the better protection of our reef fish stocks. Research was also conducted on highly migratory pelagic species such as wahoo, yellowfin tuna, and blue marlin.

Pelagic species have come to dominate commercial fishery landings and they are the most common species found in the local marketplace, however, little was known of their fishery biology in local waters.

The White Paper gave a commitment that Bermuda's marine resources would be managed in a conservative manner and that management decisions would be supported by sound research and the best available scientific information. Such information, collected from biological sampling programs, will provide a better picture of the status of key fishery target species. This will allow more effective monitoring of any changes in fish populations, particularly in the face of uncertainties with regard to the level of fishing effort. This is important, as the measure of fishing effort currently collected from the fishing industry is not adequate. Furthermore, little information is collected from recreational fishermen and the impact on the resource from this sector is largely unknown (see Theme 3).

While management at the species level is rarely adequate on its own (see Theme 4), it is important to have a management plan in place for each of the main species targeted by the commercial and recreational fishing sectors to help achieve their sustainable harvest. These plans must be based on sufficient biological and ecological data in order to effectively sustain the populations of the species concerned.

Actions:

- *Conducting research activities to provide the data required to support species management plans.*

The following research areas are those determined as being the most important for supporting the species management plans.

1. Age, growth and reproduction studies of important target species.
   Information on the age structure of local fish stocks and the relationship between fish length and age will be used to determine the mortality rates of those stocks and detect any changes in population structure brought about by the effects of fishing.
   Information on the reproductive biology of a species, particularly the age and size at which that species first reproduces, will be used to set minimum legal sizes. This protective measure is designed to permit individuals to reproduce at least once before potential capture. As an example, in Bermuda, male lane snapper are mature at 23.5 cm and female lane snapper at 24.5 cm. The minimum legal size was therefore set at 25 cm.

2. Studies on the spawning aggregation dynamics of important target species.
   Some reef fish species, notably grouper species, come together at specific times and places every year to reproduce, referred to as spawning aggregations. These species are very vulnerable to fishing pressure during these events. Information on the spatial extent and duration of aggregations is crucial in identifying areas in need of protection and in determining whether current seasonally protected areas are adequate to protect aggregating species. Spawning aggregations currently being studied include the black grouper aggregation in the NE protected area and the blue-striped grunt aggregation off Fort St. Catherine. Previous research on red hind spawning aggregations provided much important information for management and helped confirm the regulations regarding seasonal area closures. Preliminary results

from the acoustic tagging of black grouper have already provided valuable insights into the spawning season length and residence time at the aggregation site for this species.

3. Studies on movement patterns and home ranges.

Information gathered from various tagging studies, both conventional and acoustic, will be used to evaluate spatial protection measures for reef fish species. Tagging results, both locally and regionally, have provided much valuable data on highly migratory species such as tunas and blue and white marlin. These data can be used to contribute to regional and international management plans for highly migratory species.

4. Studies which examine fish recruitment, juvenile and adult fish habitats and population connectivity.

Information gathered from studies which follow fish recruits as they move from juvenile habitats to adult habitats will be used to evaluate protection measures for reef fish species and determine the management strategies for these populations.

Results of these research programs will be shared with stakeholders on a regular basis.

- *Preparing management plans for each key fishery target species, including the following information:*

1. A summary of the knowledge of the life history of the species, including information on age, growth, reproduction and mortality of the species, as well as distribution and habitat.
2. A description of the fishing methods used to capture the species and any concerns with regard to environmental impacts and other conflicts.
3. Current regulations that pertain to the species.
4. Catch history - including recent and historical landings.
5. Status of the stock - including results of any stock assessment conducted and any current or future threats to the fishery.
6. Management goals and objectives will outline the expected results of implementing the management plan and set forth any specific biological reference points.
7. A list of the management options available, along with the pros and cons of each option. The preferred management option will be highlighted along with any specific management actions recommended.

Management plans will be developed and updated as information becomes available, and will be reviewed every three to five years unless circumstances require an earlier review. Plans will be publicised for stakeholder consultation.

Theme 2 - Management of the Commercial Fishery

The goals for Management of the Commercial Fishery are:

- To collect more detailed catch and effort statistics from the commercial fishing industry in order to improve the interpretation of the landings data that will inform management decisions, and to help evaluate the appropriate level of fishing effort for the industry.
- To examine sustainable effort with a view to establishing limits on the commercial fishery in order to prevent overcapitalisation of the industry and overexploitation of the fish stocks.
- To improve the allocation system for specialised fisheries.
- To promote cohesiveness within the fishing industry and improve co-operation between the industry and management.

Background:

The commercial fishing industry is an important sector of Bermudian society, having traditional and cultural significance as well as economic importance. Commercial fishermen have been licensed since the implementation of the Fisheries Act 1972 and associated Regulations. The industry provides employment for over 300 individuals in the community and supplies the public with a healthy source of protein. As much of the food consumed on the Island is imported, it is important to guarantee that sources of local food production, such as fishing, are protected. It is therefore imperative that the Island's fisheries are effectively managed to ensure the viability of the fishing industry.

The White Paper outlined a number of important changes for the better management and regulation of the commercial fishing industry. A key change was the establishment of a Commercial Fisheries Council to evaluate the status of commercial fishermen (i.e. full-time or part-time status) and to issue commercial fishing licences.

The Commercial Fisheries Council (CFC) was established in 2007 and in the last three years has implemented a number of important policies based on White Paper recommendations. These policies are as follows:

- The industry is separated into two categories: full-time and part-time fishermen. Hours spent at sea are used to determine full-time status, with 800 hours per year at sea considered to be an appropriate minimum time. However, fishermen's commitment to the industry is also taken into consideration.
- Only full-time fishermen are entitled to benefits such as duty-free importation of fishing vessels, essential gear and supplies, fuel rebates, truck permits and participation in specialised fisheries (e.g. spiny lobster fishery)
- Fishing vessel licences are no longer transferable and will be issued to eligible applicants as they become available. However, a one-time transfer of a fishing vessel licence will be permitted for those fishermen who are a minimum of 55 years of age and who have been in the fishing industry for at least 20 years

It was anticipated that the elimination of vessel licence transfers, the cessation of duty-free privileges for part-time fishermen and an increase in licensing fees would help

prevent the retention of licences purely for speculation and create a pool of licences that could be re-issued to persons interested in entering the fishery. However, care must be taken to avoid overcapitalisation of the fishery. A form of limited entry fishery has existed since 1984 and it is now proposed that a maximum number of commercial fishing vessels and a maximum vessel size be established for the industry.

Fisheries landings can fluctuate for many reasons and a decline in landings does not necessarily mean a decline in the abundance of fish. Therefore, a measure of the effort expended in catching those fish is useful for estimating the relative abundance of the fish (i.e. catch-per-unit-effort). Catch and effort data from the fishery are essential for informed decisions regarding the effective control of fishing effort. Licensed commercial fishermen have been required to submit statistics since the implementation of the Fisheries Act 1972 and associated Regulations. Data currently collected includes:

- landings of fish by weight, number and gear type
- fishing effort expended by individual fishermen
- times and areas of catch.

However, one of the deficiencies in the data presently obtained is that effort is measured in hours at sea. Breaking up effort data into hours in transit and hours spent fishing for different types of fish (groupers, tuna etc.) would allow fisheries managers to be able to distinguish between effort spent on catching reef species versus that spent on pelagic species. This is important as different management regimes are in place for different types of fish. Another weakness of the current data is that fishermen only report whether fish are caught on the Platform or the Banks. A more detailed breakdown of fishing areas would better assist management decisions with respect to seasonally and permanently closed areas. In addition, data submitted via the existing self-reporting system is difficult to validate. Establishing designated landing facilities for regulated species (those species with minimum legal sizes or bag limits) could be the key to obtaining more accurate data on these fish stocks, and ensuring that vulnerable stocks are not overfished.

Specialised fisheries such as the spiny lobster fishery, guinea chick fishery, offshore fishery and deep-water fishery will continue to be limited entry and subject to specific terms and conditions. Licence allocation for these specialised fisheries needs to be reviewed, as fishermen have expressed dissatisfaction with the use of a lottery system because of the uncertainty involved when planning their fishing business.

Fishermen have also called for greater input into other management decisions. There is, however, a need for cohesiveness in the industry so that such input reflects the opinion of the majority of the fishermen. This could be achieved by the establishment of a fishermen's association which would act as a bridge between the industry and Government, and provide the industry with a united front.

While the emphasis going forward will be on the effective management of the fishery resource to maintain sustainable fish stocks, there are a couple of avenues for fisheries development that could inject new life into the industry. Opportunities for increasing local production, through the investigation of new fishery target species as well as through aquaculture, are discussed under Themes 5 and 6. More efficient post-harvest handling of seafood products and opportunities for value-adding are discussed under Theme 7. These approaches could increase fisheries production and provide additional employment for local fishermen.

Actions:

- *Collecting more detailed catch and effort statistics from the commercial fishing industry in order to improve the interpretation of the landings data that inform management decisions, and to help determine an appropriate level of fishing effort for the industry.*

Changes to the reporting requirements will be accomplished by the following process:

1. Consultation will be held on the matter with the MRB (Marine Resources Board), the CFC and the fishermen
2. The statistics form will be amended to reflect agreed new reporting requirements
3. The statistical database will be amended to incorporate the changes in the statistics form

The proposed Shoreside Facility (see Theme 7) would serve as a designated landing site for regulated species. However, as this facility will be located in the eastern end of the Island, a designated landing facility will be sought at the west end to accommodate fishermen who generally land their fish at that end of the Island. These fish would then be transported to the Shoreside Facility for processing.

- *Examining sustainable effort with a view to establishing a maximum number of fishing vessels and a maximum vessel size permitted in the commercial fishing industry.*

Limiting vessel size and numbers will help prevent overcapitalisation of the industry and overexploitation of fish stocks. The status and future of the commercial fishing fleet will be evaluated as follows:

1. An analysis of fishing effort in relation to historical harvest levels will be conducted by the Marine Resources Section. From this analysis, a maximum number of fishing vessels for the industry and vessel size limits appropriate to the various types of fishing will be recommended.
2. Consultation regarding these recommendations will take place with the MRB and the CFC.
3. This process will be repeated approximately every five years and adjustments made in effort controls according to the status of the fish stocks.

- *Reviewing the allocation system for specialised fisheries*.

In order to find an allocation system acceptable to both managers and fishermen, the Department will conduct “think tank” meetings with ad hoc committees of fishermen, the CFC and Department staff. A new allocation system will be developed based on these discussions.

- *Establishing a Fishermen’s Association that will represent their collective interest during interactions with management and promote cohesiveness within the industry.*

The Marine Resources Section will work with the industry to create an association that will promote discussion and cohesiveness amongst fishermen and be the point of contact for interactions with management so as to enhance industry input into management decisions.

Theme 3 - Management of the Non-commercial Sectors

The goals for the Management of the Non-commercial Sectors are:

- To acquire baseline data on recreational fishing and other non-commercial collecting in Bermuda through a detailed survey to facilitate better management of these activities.
- To revise the fisheries regulations as necessary based on the data acquired from the survey in order to conserve local fish stocks and reduce conflict between the commercial and non-commercial sectors.
- To establish a program for the ongoing reporting of harvest from the non-commercial sectors to enable adaptive management and improve Bermuda's capacity to fulfill international reporting obligations.

Background:

Globally, recreational fishing is a major contributor to fishing effort, particularly for certain species. In the U.S., recreational fishing has increased 20% in the past 20 years. Estimates of recreational catch vary from 5% of total landings to 33% of food fish landings. In some areas, and for some species, recreational catch can equal or exceed commercial landings – and often these species are those which are most at risk. Statistics from Australia show that 34% of those resident near the coast fish recreationally. The extent of recreational fishing in the Caribbean is poorly documented, with only one third of countries even collecting data, and the definition of recreational fishing often only includes recognized game fish species. The only reliable data of interest suggest that 60% of non-commercial fishing in the U.S. Caribbean (Puerto Rico and U.S. Virgin Islands) is done from the shoreline.

A common feature of recreational fisheries is the skewed distribution of fishing effort and catch between fishers. At one end of the catch and effort scale, large numbers of fishers do relatively little fishing and catch few fish. At the other end, a high proportion of the fishing effort and catch is attributed to relatively few fishers. As an example, in the state of New South Wales in Australia, a survey showed that the amount of fishing activity per person averaged 7 days fishing per year, but varied from 1 to 169 days fishing per year. 50% of those surveyed fished for 1-5 days per year and were responsible for a relatively small amount of the fishing effort (less than 20% of the total), while at the top of the fishing activity scale, 10% of fishers were responsible for nearly 30% of the fishing effort. It is thus clear that, while recreational fishing for most people involves dropping a line overboard occasionally, and hopefully taking home a few fish, a small percentage of recreational fishers can have a significant impact.

There is little information on recreational fishing practices in Bermuda today, although it seems likely that these practices are quite different from those of 20 years ago when most of the current regulations were put in place. Changes in the lifestyles of Bermudians affect how they fish for both fun and food. In addition, the composition of the local population has changed dramatically over the past 15 years along with the demand for a greater variety of skill-sets in the workforce. Guest workers from other cultures frequently have differing attitudes towards the use of natural resources, yet there is no

provision for this in the current regulations or in the existing outreach programs. Acquiring information from this sector is important to achieving fisheries management goals, yet currently the only recreational catch that is reported is that from the lobster divers and there is poor compliance with this based on the low percentage of respondents.

Preliminary information from a survey of 400 households, conducted as part of an economic valuation of Bermuda's reef platform in 2008, indicates that 30% of households have at least one person that fishes. By extrapolation, this translates to approximately 16,000 recreational fishers on the island. The data from this survey indicate that 70% of these people fish from shore, and that they fish primarily for personal and social reasons, with food a less important motivator. These data correspond well with the statistics from other countries, suggesting that this survey should provide a good basis for future work.

A detailed and complete evaluation of all non-commercial fishing activities is required in order to facilitate proper management of these activities and the way that they interact with the commercial fishery. In addition, Bermuda's responsibilities under the International Commission for the Conservation of Atlantic Tunas (ICCAT) require the reporting of all harvest of Highly Migratory Species (HMS) such as tunas and wahoo. At present, the contribution of the recreational fishing sector to this harvest is estimated but, with increasing fishing pressure on these stocks, there is a requirement for more accurate reporting. For this reason, it is imperative that a system is put in place to gather these data.

The White Paper contained a commitment from Government to establish a licensing system for recreational fishermen, and this would be an ideal way in which to gather data on this sector of the fishery; however, this program has not yet been implemented. It is likely that any recreational fishing licensing scheme would be initiated with the offshore recreational fishery, as this is the sector from which data are most urgently required in order to facilitate more accurate reporting to ICCAT. In contrast, it seems unlikely that it will be practical, or acceptable, to license the high percentage of fishers who fish from shore. This sector as a whole is capable of having a significant impact yet, based on the statistics from other countries, that impact is probably not evenly distributed. Other strategies for collecting data on shore fishing must therefore be developed.

In the interim, it is proposed that a detailed recreational fishing survey be conducted in order to get a better understanding of this sector and to begin to collect the data necessary for management. In addition to information on the extent of recreational fishing in Bermuda, the survey will be used to gather sociological information (e.g. reasons for fishing) and gauge willingness to accept new regulations and a licensing scheme or alternative data gathering program. Although the recreational lobster divers are the only non-commercial fishers that currently report on their harvesting activities, the reporting of this sector could be improved, and it is intended to include this sector in the recreational fishing survey.

It may be necessary to revise certain aspects of the Fisheries Regulations if this survey reveals that there are species which are not currently regulated but are being heavily exploited. Certainly there is an existing need to introduce new regulations for the

recreational sector in areas such as the pelagic fishery where there are some known conflicts with the commercial fishery.

Actions:

- *Conducting a comprehensive survey of all non-commercial fishing and collecting activities.*

The survey will be conducted via a combination of mail surveys, telephone surveys, voluntary logbooks, and roving creel surveys on shore and on the water. There is also the possibility to include an exit survey for the crews of visiting ships and yachts. The results of this survey will facilitate better management and enable an integrated management approach for the commercial and non-commercial fisheries.

- *Revising the Fisheries Regulations based on the results of the survey*

The results of the survey of non-commercial fishing are expected to highlight discrepancies between the existing Fisheries Regulations and current fishing practices, and the Regulations will be revised accordingly. Appropriate minimum size limits based on reproductive age will be established for frequently targeted species that are not currently regulated (see Theme 1). Bag limits may be established for species that are fished particularly heavily, especially where there is a potential conflict with the commercial fishery. This should reduce the likelihood of the illegal sale of recreationally-caught fish.

- *Establishing a program for the ongoing reporting of catch from the non-commercial sectors via licences and / or a voluntary logbook scheme and / or periodic surveys*

The form of ongoing reporting from the recreational sector will depend on the result of the survey, but is likely to include a combination of licensing, voluntary logbooks and repeat surveys at regular intervals in the future.

1. A public education campaign would be carried out in conjunction with, or immediately following, the initial survey and feedback would be sought on how a licensing system would work – ease of purchase, multiple categories, cost etc.
2. A licensing system would be developed in co-operation with the other relevant government departments (e.g. Accountant General's office, Dept. of Marine and Ports Services.)
3. A voluntary logbook scheme could be put in place to facilitate reporting from certain sectors in the absence of comprehensive licensing. Such a scheme would target the most prolific recreational fishers as well as a random selection of other less frequent fishers. Further surveys at intervals of approximately four years might also be an alternative approach for acquiring data on the non-commercial fishery.

Theme 4 - Spatial Management

The goal of Spatial Management is to develop a scaled Marine Spatial Management Plan for the Bermuda platform, the Banks and EEZ waters that will optimize ecosystem benefits while minimally impacting on existing patterns of human activity and creating a framework under which future activities can be developed.

Background:

Fisheries management in Bermuda to date has concentrated on traditional single-species management measures, such as minimum legal sizes, bag limits and time/area closures, combined with effort and gear restrictions. These methods appear to be achieving some measure of success, as seen through an increase in the abundance of parrotfish following the Fish Pot Ban, increased average size of red hinds since seasonal area closures began, and an increase in the abundance of black grouper in recent years. However there are numerous examples from around the world where fisheries have collapsed despite such measures being in place. This is particularly true of the complex multi-species fisheries found in coral reef environments.

With a greater appreciation of the complexity of coral reef systems, many scientists are now looking toward an ecosystem approach to management. Ecosystem-based management aims to manage not only the fish stocks but also the wider ecosystem of which they are a part, focusing on reducing damaging practices and closing some areas to harvesting. By working to restore functional integrity to the ecosystem, this approach provides fish with an optimal habitat while making the ecosystem as a whole more resilient and better able to withstand stresses such as diseases, storms and climate change.

While Bermuda has already designated a number of Marine Protected Areas (MPAs) where fishing is not permitted, these have been created largely in isolation rather than as part of a broader integrated management plan. A key principle of ecosystem-based management (EBM) is that of protecting representative areas of each habitat type in order to ensure the conservation of the widest range of species, as well as all the different stages of the life cycle. This provides the best chance for adequate conservation without requiring prohibitive amounts of background information. The Representative Areas Program (RAP) for the Great Barrier Reef protects 33% of each habitat type, although this percentage is increased for habitats that are particularly rare or spatially limited.

The best EBM models also incorporate the needs of the human users of the resource, and experiences globally have shown that there is greater acceptance of, and compliance with, marine management measures when this more holistic approach is taken and stakeholders are involved in the process of developing the management plan.

Marine Spatial Planning is the latest approach to ecosystem-based management, and aims to use the principles of land management in the marine environment, using zones and overlays in a similar manner and also including the concept of forward planning. The basic tenets are those of sustainable multiple use with minimal conflict, achieved via

stakeholder involvement, and adaptive management. It takes account of present and future needs, aiming to avoid conflict that could arise from the designation of a conservation area in a location that could be impacted by an essential industrial activity in the future.

This approach starts with a series of maps (physical features; biological features; existing patterns of recreational usage; the distribution of harvest activities; the needs of shipping and other industries). Then zones are created based on the compatibility of various activities with each other and with conservation goals. Zones may provide for various levels of harvesting, and typically the less restrictive harvesting zones are the ones that allow for other activities such as dredging, unless there is an issue of incompatibility. Zone descriptions are designed for adaptability, so that new activities can be readily incorporated into a suitable zone. Zones are then applied so as to protect the most important biological resources within more restrictive categories while allowing a broad range of uses within less restrictive zones. The goal is to try to allow human activities to continue in a manner that is as close as possible to their existing patterns. Zones may also be overlaid by other overriding subcategories that apply to certain areas within each zone type. An example of this would be areas where no anchoring is permitted, which might be required in a restrictive zone to protect seagrasses but will also be required in areas of less restrictive zones where there are underwater cables.

In order to bring Bermuda's marine resource management in line with advances in the field of spatially based management, a scaled zoning plan for the Bermuda platform, the Banks and EEZ waters will be developed. Similar management strategies have been successfully implemented in Australia (Great Barrier Reef), California (Channel Islands) and the Irish Sea, and their protocols are available to be used as models.

Actions:

- *Developing a zoning plan for the Bermuda platform, the Banks and EEZ waters.*

This is the most significant undertaking proposed in this strategy, and could take up to 15 years to implement.

A system of Marine Spatial Planning for Bermuda could feature:

- a Representative Areas Program with full protection for a proportion of each distinct habitat type
- inclusion of essential fish habitat (EFH) such as spawning sites and nursery areas within fully protected areas
- no fishing areas and areas that are only open to certain categories of fishing
- areas where there is no access except for research.
- areas set aside for recreational activities such as jetskiing and waterskiing, remote controlled craft etc.
- areas dedicated to swimming and non-motorised activities
- areas where shipping activities take priority
- corridors for submarine cables
- areas zoned for commercial activities such as ocean power projects and aquaculture operations
- no anchoring areas as an overlay to the primary zoning system

The first step in such a far-reaching project will be to work with other government departments to determine the roles that each department will play according to their mandate and areas of jurisdiction. Then, following preparation of materials and a public education campaign, the initial period of public consultation would begin. This will be the most important part of the process, in which the public, interest groups and existing and prospective commercial operations will submit their current and projected activity patterns, and indicate areas that they feel are important for conservation, recreation or commercial purposes. A series of surveys will also be conducted.

Information from all surveys and submissions will be compiled and mapped. Statistical and modeling software will then be used to generate a series of draft zoning plans, with an analysis of the costs and benefits of each option. A second round of public consultation will gather feedback to determine the optimal zoning scenario. An overall zoning map and explanatory document will then be developed, and presented to the public in a series of information sessions. Areas that are designated for full protection will be monitored over time to evaluate their effectiveness.

Theme 5 – Investigating New Harvest Opportunities

The goal of Investigating New Harvest Opportunities is to expand the options available to the local commercial fishery and diversify the seafood products available to the market by:

- Completing the study into the feasibility of small-scale local longline fishing, and determining the level of quotas needed to sustain such a fishery.
- Developing a new fishery targeting the invasive Pacific lionfish.

Background:

The fish stocks of the Bermuda platform are essentially fully exploited, and in some instances over-exploited. However, there are still some new harvest opportunities that exist. These opportunities are based on some currently underexploited areas of the offshore fishery, and on the recent appearance of the invasive Pacific lionfish in Bermuda waters.

In 2005, the White Paper made a commitment to study the feasibility of offshore longline fishing in Bermuda waters. While there has been some local longline fishing activity through the years, there has been reluctance on the part of fishermen to invest in a fishery that has not been proven. Government therefore proposed that a comprehensive evaluation of the offshore (pelagic) fishery resource be conducted using established longline operations. It was anticipated that such an arrangement would also provide opportunities for training local fishermen in longline fishing.

The longline feasibility study is being conducted in two phases. The objective of the first phase, conducted in 2007, was to assess the offshore fishery resource base and provide training for local fishermen. A 90 ft U.S. longline vessel was contracted to explore the resources of Bermuda's full 200 mile Exclusive Economic Zone (EEZ), as most local vessels are too small to safely venture this far offshore. Results from this phase indicated that swordfish would likely dominate catches in a local longline fishery. However, reasonable catches of albacore tuna could also be expected. The objective of the second phase of the study is to examine the economic feasibility of small-scale longline fishing that would be more in keeping with the Bermudian fishing tradition. This phase is currently underway and a final report will be released to the public in due course.

Individual fishermen will be able to use the information provided by this study to determine whether it is feasible for them to pursue offshore fishing. However, pelagic species in the Atlantic Ocean are managed by an international management organization, ICCAT (International Commission for the Conservation of Atlantic Tuna), through a quota system. Therefore, the number of vessels permitted in this fishery would be determined, in part, by the quotas that Bermuda is granted from ICCAT. In 2009, swordfish quotas were reduced as ICCAT attempts to sustain the recent growth in the North Atlantic swordfish population. However, as the swordfish population increases in coming years, quotas could also be increased.

In contrast, rather than being unexplored or underexploited, the lionfish is a new potential harvest species altogether. A popular aquarium species native to the Pacific ocean, lionfish have been gradually invading the tropical and subtropical waters of the Caribbean and the east coast of the U.S. following their accidental release into Florida waters during a series of severe hurricanes that damaged home and commercial aquarium facilities. They were first observed in Bermuda waters in 2000, and are believed to have come from the east coast of the U.S. as larvae, or as juveniles associated with floating Sargassum weed. Lionfish feed on juvenile fishes using a unique hunting technique that is unfamiliar to Atlantic Ocean species. Their long spines are also venomous, which means that this species has no natural predators in the Atlantic. These two features combine to make the lionfish a serious problem for native fish stocks in the locations it has invaded.

A community-based effort to reduce and control the local population of this invasive species is being run through the Bermuda Aquarium, Museum and Zoo, with local spearfishing enthusiasts being given Special Permits that enable them to cull lionfish whenever and wherever they are found. The number of lionfish culled through this program is relatively small, but consumption of some of the captured specimens has demonstrated that lionfish are, in fact, good to eat. Indeed, it seems that there would even be a market for them in the restaurant industry, with several chefs having expressed an interest in placing them on the menu.

In recent years, adult lionfish have been caught regularly in lobster traps, particularly those set in deeper waters. More than 300 lionfish were reported as bycatch during the 2009-2010 lobster season. However, in order to protect local finfish stocks, current regulations prevent the sale of bycatch from the lobster trap fishery, and any lionfish caught are simply destroyed. The current capture rates and the existence of a potential market, along with the likelihood that the lionfish population in Bermuda will continue to grow and impact populations of native species, suggest that initiating a commercial fishery for this species would be a positive development.

Actions:

- *Completing the study into the feasibility of local longline fishing.*

The aim of Phase II of the longline feasibility study is to provide fishermen interested in longline fishing with a plan outlining the costs involved in engaging in the fishery. Rather than calculate a specific value, an economic model has been produced. Preliminary data suggest that the current ICCAT quotas are not sufficient to support more than two longline vessels. Terms and conditions will be attached to longline permits that will require best practices aimed at minimizing by-catch. In order to address public concern with regard to the by-catch issue, the Department will:

1. Following the release of the longline report, invite written feedback from stakeholders.
2. Engage key stakeholders in a round table discussion on the issue in an attempt to resolve concerns about by-catch.

- *Determining the level of quotas needed to support up to four small longline vessels, and participating in ICCAT accordingly.*

- *Investigating the development of a new fishery targeting the invasive Pacific lionfish..*

Examine the policy and legislative changes that would be required, along with the concomitant ramifications for enforcement, in order to allow the lionfish bycatch from the lobster trap fishery to be sold on the open market.
Investigate other methods for harvesting lionfish to determine whether a year-round fishery is feasible.

- *Developing protocols and holding workshops for commercial fishermen and food service employees to facilitate the safe handling and preparation of harvested lionfish.*

Safe handling techniques must be developed so that all those who would be involved in the capture and preparation of this species can effectively protect themselves from the spines of the lionfish, and their associated venom. Some progress has already been made in developing such techniques, but further testing is required. The final protocols must then be effectively communicated to all fishermen and food service employees. It will be recommended that any lionfish sold for consumption at home be prepared appropriately by the vendor.

- *Promoting the harvest and consumption of lionfish locally.*

Theme 6 – Increasing Local Seafood Production Through Aquaculture

The goals of Increasing Local Seafood Production Through Aquaculture are to improve local food security, and potentially enter the export market, while reducing pressure on wild stocks and assisting conservation initiatives by:

- Creating a regulatory framework for commercial aquaculture in Bermuda.
- Investigating and helping to develop the culture of marine organisms as a way of maximizing the benefits from Bermuda's marine resources.

Background:

The production capacity of Bermuda's waters is finite and, even with the additional contribution of the new fisheries discussed in Theme 5, it is unlikely that the landings of the capture fishery will increase significantly. Local fishing effort cannot supply the local demand, and large quantities of seafood are imported into Bermuda for consumption both at home and in hotels and restaurants. In fact, approximately 75% of the seafood consumed in Bermuda is imported. However, an area that has not been fully explored in Bermuda is that of aquaculture. A number of studies have investigated the potential for culturing species of bivalves (scallops, mussels), spiny lobster and dolphinfish locally. Of these, the pilot projects for bivalve culture were the most successful, yet there has never been a full-scale commercial aquaculture operation in Bermuda. Bearing in mind these previous local successes and the improvements in aquaculture technology since they were conducted, further investigation into opportunities for aquaculture seems warranted.

Any local aquaculture operation must have benefits that outweigh its costs, both financially and environmentally. For an aquaculture operation to be commercially viable in Bermuda, it must be producing a product with high value on the local market. In addition, negative consequences for the marine environment or local stocks of marine species are not considered acceptable. Potential aquaculture species should be native to Bermuda to avoid the risk of introducing potentially invasive species to local waters, and broodstock should ideally be locally sourced in order to avoid the possibility of altering the local gene pool should any cultured organisms be released or escape into the wild. Another important consideration when evaluating a species for aquaculture is the potential for conflict with the wild-caught fishery, and whether a year-round supply of market-size organisms will cause problems with closed seasons, size limits and so on.

In addition to these considerations, an ideal aquaculture species should:

- be fast growing, reaching market size in 3-4 years under local natural conditions
- have high fecundity
- have a short larval phase
- be able to tolerate high stocking densities

It is also important to be able to readily supply preferred dietary items in a cost-effective way, either by purchasing them or through an associated culture operation. In this regard, organisms from lower down the food chain are good aquaculture candidates.

A preliminary list of organisms that warrant further investigation has been drawn up based on known biological characteristics, the status of local populations and the local market. Obviously, it is not possible to know the aquaculture potential of any given species without a good understanding of its biology and ecology. In this regard, the hatchery facility at Coney Island can play an important role in the investigation of potential aquaculture species.

Actions:

- *Working with other relevant Government Departments to create a regulatory framework for commercial aquaculture activities in Bermuda.*

- *Investigating the life cycle and culture potential of species whose local populations stand to benefit most from the knowledge gained, the potential for restocking or the diversion of harvesting activities, above and beyond their market potential.*

Species and groups of interest are:

- Conch, because they are a high value food item and need not reach maturity to be marketed, there is a successful culture operation in Turks and Caicos to use as a model, and because some captive breeding to enhance the wild stock is required as part of the Protected Species Management Plan of this locally depleted species; shells are a secondary market item, but sales would need to account for CITES restrictions.
- Squid, for use as bait, as feed in the culture of larger organisms and for human consumption.
- Slipper lobster, because they have traits that make them suitable for culture, there are culture operations for similar species in Australia to use as models, and because this would diversify the local shellfish market without conflicting with the established commercial spiny lobster and guinea chick fisheries.
- Baitfish (fry), because they are a poorly understood sector of the local fishery and diversion of harvest could benefit wild populations, they have many traits that would make them suitable for culture, they could be used as feed in the culture of larger organisms, and there is a small consumption market for these fish as whitebait.
- Yellowtail snapper, hogfish and mullet, since they appear to have suitable life history traits and relatively high market value.

Significant work on the aquaculture of bivalves such as mussels, scallops and clams has been done already, so these species are not in need of preliminary investigation. However the evidence from the pilot project, together with the prospect of enhancing the depleted wild stocks, means that encouraging the development of a commercial operation for these species would be given top priority.

Other groups that might warrant investigation include:

- Seaweeds, which can have high value in a variety of applications and are low impact and require low investment.
- Species popular with the marine aquarium trade, such as damselfishes, ascidians and bryozoans as components of “live rock’, cleaning gastropods and shrimps, and corallimorpharians.

Theme 7 – Post-harvest Handling of Seafood Products

The goals of the Post-harvest Handling Theme are:

- To establish a Shoreside Facility to support local fishermen, providing supplies and processing capability that will enhance the product supplied to the market.
- To improve the profitability of commercial fishing by encouraging value-adding activities.
- To improve the marketing of seafood products.

Background:

In the 2005 White Paper, Government committed to provide assistance to the fishing industry by establishing a facility that would supply fishermen with ice and other essential supplies, and provide processing capabilities that would enhance the supply of fishery products to the market. Pelagic species such as wahoo and yellowfin tuna are currently the most important species in the local commercial fishery. As a result of their highly migratory nature, these species are more plentiful at certain times, resulting in a glut on the market during these periods and a virtual absence during the rest of the year. It is anticipated that excess fish will be stored at the Shoreside Facility until needed, allowing for a more consistent supply of locally-caught fish to the market.

This may also provide an avenue to gather data on the fish market in Bermuda and to place embargos on imports of certain pelagic species much like those placed on some agricultural produce. This is not possible without an accurate assessment of fish abundance and seasonal availability. In addition, the Marine Resources Section intends to utilise the facility to better manage all species that are regulated by minimum legal sizes or bag limits.

The location identified for this facility is Marginal Wharf, St. David's. It is anticipated that the facility will be operated via a public/private partnership. While the facility will cater to the already established fishery, it will be vital to the success of a longline fishery given the greater post-harvest processing requirements of large pelagic species such as swordfish. However, as a large proportion of fishing is conducted off the western end of the Island, it will also be necessary to have a landing facility at that end from which fish can be transported to St. David's.

In addition to enhancing processing capabilities, the Shoreside Facility and Government will work together to create opportunities for adding to the value of harvested products, with a view to improving the profitability of commercial fishing without increasing harvest levels.

Lastly, several initiatives in this strategy are aimed at introducing new seafood products to the local market. There will therefore be a need to work with both the fishing industry and the hospitality and retail sectors to achieve better marketing of local seafood products.

Actions:

- *Establishing a Shoreside Facility to support local fishermen, providing supplies and processing capability that will add value to the product supplied to the market.*

It is anticipated that the corporate structure of the facility will follow a public-private partnership model. A consultant has been hired to develop a business plan for decision-making purposes for parties interested in investing in the facility. Floor plans for the facility have been approved by the Department of Planning. The following steps will be taken before construction of the facility:

1. Present the business plan to the fishermen and/or other interested parties and obtain an investment commitment.
2. Work with the Department of Works and Engineering to develop engineering plans for the facility.
3. Following approval of engineering plans by the Department of Planning, engage in a tendering process for supply and construction of the building.
4. Identify a vendor(s) to provide equipment for the facility.

In addition, potential locations for a landing facility at the western end of the Island will be identified, and the equipment needed to store landed fish prior to transport to St. David's will be purchased.

- *Creating opportunities for both fishermen and local entrepreneurs to add value to local fishery products*

It is anticipated that the Shoreside Facility could serve as a base for value-adding activities that would help increase the profits gained from harvested resources. The business plan currently being developed will include some suggestions for potential processes and products. These could include smoking fish and other seafood and creating soups or chowders to ensure maximum utilization of the product. Further, the Department of Environmental Protection will work with any local entrepreneurs who wish to start up a value-adding business associated with the fishing industry to help them to secure appropriate assistance and concessions.

- *Working with the fishing industry, hotels, restaurants and supermarkets to achieve better marketing of local seafood products*

In order to assist the commercial fishing industry and better serve the consumer, Government will work to improve the marketing of local seafood products, particularly those products that are new to the market.

Theme 8 - Legislation and Policy

The goals for Legislation and Policy are:

- To make policy more accessible to the public at all levels.
- To identify policies which need to become formalized in law either under the Act or in the Regulations.
- To consolidate and clarify the marine resources legislation.

Background:

The last major amendments to the Fisheries Act, 1972 were in 2006 and 2007. These amendments were made as a result of recommendations contained in the White Paper. Revisions to the Fisheries Regulations are expected to be completed during 2010. However, the Act has been amended numerous times and should ultimately be replaced by a new Marine Resources Act. The new Act would include the following elements that are not in the current Act or that need expanding:

- recreational fishing activities, including the establishment of various classes of recreational fishing licences,
- marine protected areas and zoning,
- collecting for research activities, aquaculture and by hobbyists
- marine tours including whale watching
- importation of marine products

In addition, elements such as the use and disposal of anti-fouling paint should be removed from the Fisheries Act and included in other, more relevant legislation.

In light of various projects currently being investigated, a policy on seabed appropriation for commercial projects such as aquaculture, ocean energy and mining is required. This would be developed in conjunction with the Departments of Marine and Ports Services and Works and Engineering, although it is likely that jurisdiction will remain with Works and Engineering. Water quality issues associated with aquaculture could come under the Water Resources Act or other relevant legislation.

Actions:

- *Developing written policies for all areas of marine resources management which are not covered specifically and directly by the Act and Regulations, and where an element of judgement is placed upon marine resources staff and / or the associated boards and councils.*

- *Identifying areas that need to be formalized in legislation.*

- *Developing a new Marine Resources Act.*

- *Working to move marine contamination and similar issues to other legislation.*

Theme 9 - Enforcement

The goal is to improve Enforcement of the marine resources legislation by:

- Simplifying the processing of offences.
- Enhancing support for the legislation amongst the judiciary.
- Increasing the capacity of the fisheries wardens.

Background:

More effective enforcement is needed to better protect marine resources. The Ministry of the Environment has purchased two new patrol vessels for the fisheries wardens in the past few years. These vessels allow them to more safely and adequately patrol the Platform and the offshore Banks. However, there are still issues with manpower and morale that need to be addressed in order to improve enforcement. There are currently five fisheries wardens (a manager and four patrol wardens) to police the entire area fished by the local population. This number of staff is insufficient to provide coverage during the day and evening/night time. In addition, there is a pressing need to review the role and responsibilities of the fisheries wardens. Over time the workload and responsibilities of fisheries wardens have increased considerably without a concomitant increase in salary or manpower. Implementation of an appropriate ticketing scheme has been under discussion for some time, and could help reduce the administrative workload by simplifying the penalization of offences and reducing the amount of time devoted to court proceedings.

Another factor which is severely impacting enforcement of the fisheries legislation is an apparent lack of support amongst the judiciary, such that fisheries offences are rarely prosecuted or penalized to the fullest extent of the law, despite there being sufficient evidence. The lack of convictions in court for fisheries offences has led to some individuals taking a brazen attitude about the contravention of fisheries regulations.

Actions:

- *Implementing a ticketing scheme to cover certain offences in order to reduce the administrative workload for fisheries wardens*

- *Developing workshops and education packages for the judiciary to enhance their understanding of the rationale behind the fisheries legislation and solicit their support for enforcement activities.*

- *Reviewing and regrading the fisheries wardens' positions.*

- *Providing additional staff for the fisheries wardens' section.*

Theme 10 - Outreach

The goals of Outreach are:

- To help engender a sense of stewardship for Bermuda's marine resources.
- To develop closer links with the public and create sector-specific education and information campaigns to keep the public informed of marine resources issues.
- To encourage greater compliance with fisheries regulations by raising awareness of the rationale behind them.
- To facilitate public input when dealing with anomalous marine events.

Background:

While it is obviously important to establish legislation to govern marine resource use, and to enforce that legislation, it is also important that people understand the rationale behind the legislation and the importance of protecting our marine resources. There is a need for management to develop a better relationship with the public, to improve communications and to engender a greater sense of responsibility for the marine environment.

Actions:

- *Conducting outreach programs targeting different sectors of the public.*

General Public and Schools

1. Produce an annual report to inform the public of fisheries programs
2. Contribute articles to Envirotalk and other magazines
3. Post information on the Department's website
4. Give lectures on marine resource protection issues, fishing practices, current research programs and other topics of interest
5. Develop information packages on fisheries regulations for work permit holders
6. Create five minute infomercials on fisheries programs for airing on television

Commercial Fishery

1. Conduct information sessions and provide written material to new industry participants on fisheries regulations and the basic biology and ecology of targeted fish species
2. Conduct workshops and provide written material on "winding" fish to promote the safe release of any protected species or undersized individuals that might be caught, and to encourage participation in tag and release programs.
3. Create a written policy document that describes Commercial Fisheries Council policies on licence allocation and the consequences of violations

Recreational Fishery

1. Conduct town hall-style meetings to educate fishers on the need for the collection of data and the goals of a recreational licensing system, and to garner feedback on management strategies. These meetings would be held with the angler's clubs first and then with the general public.

2. Conduct workshops and provide written material on “winding” fish to promote the safe release of any protected species or undersized individuals that are caught.
3. Post signs detailing relevant fishing regulations in popular shoreside fishing areas.

- *Continuing to work with other relevant authorities to facilitate public input when dealing with anomalous marine events.*

In conjunction with the Department of Conservation Services, the Bermuda Aquarium, Museum and Zoo and the Bermuda Institute of Ocean Sciences (BIOS):

1. Improve public awareness of what is normal in the marine environment, and what kind of observations or events should be reported to relevant authorities.
2. Inform the public of the appropriate actions to be taken in a marine animal incident (e.g. turtle injury, whale stranding) or other anomalous marine event (e.g. “fish kill”).
3. Develop sampling packs and protocols for the dive industry and other marine tourism operators to facilitate timely collection of samples during anomalous marine events.
4. Develop protocols to facilitate effective feedback from members of the public during anomalous marine events.

Conclusion

Strategy Rationale:

Bermuda's marine environment is one of our most valuable resources, being critical not only to the tourism industry but also the overall quality of life on the island. It provides a living for some, and recreation and relaxation for all. Examples of environmental degradation around the world emphasize the need to manage our resources sustainably in order to ensure that they are available to benefit future generations. This strategy provides details of how the Marine Resources Section plans to manage Bermuda's marine resources over the next 15 years. It also seeks support for these plans from the local community, and aims to encourage a change of mindset with respect to the importance and stewardship of our marine environment.

The Next Steps:

The Cabinet has already been informed of this strategy, and it has been presented to other Government departments to seek their support for, and input into, cross-cutting initiatives. Following the public release of this document, there will be a period of consultation during which members of the public may submit comments pertaining to the themes it addresses and note any areas they feel have not been addressed. Comments may be e-mailed to fisheries@gov.bm until June 30th, 2010. Finally, concrete support at the Cabinet level will be sought via a memorandum for decision.

Resources Required:

Many activities described in this strategy are currently being pursued by the staff of the Marine Resources Section, at least in some form, and are therefore covered by the core operating budget of the department. Several projects will involve collaborations with graduate students and other academic partners in order to leverage the resources available. One major initiative, developing a Marine Spatial Management plan for Bermuda's waters, will take up to 15 years to complete using existing resources. Applications are being made for external funding, and budget requests may be made in the future, to fast-track some aspects of this project. The Shoreside Facility described in Theme 7 is a major capital project. Budget appropriations for this have already begun, and there will be some additional requests in the coming years. Most importantly, the department is seeking a public-private partnership to help develop this facility.

Conclusion:

The ultimate goal of this strategy is to bring about the sustainable management of Bermuda's fisheries and wider marine environment for the benefit of all stakeholders, now and in the future. However, Bermuda's marine resources are the common property of us all, and their management is our joint responsibility. Failing in this responsibility is not an option, as it would endanger our food security, our way of life and even the physical existence of the Island. It is for this reason that the Department of Environmental Protection invites all members of the community to examine this strategy document, provide feedback on its content, and commit to participation in the initiatives that seek to involve the numerous and varied stakeholders in our marine environment.