Proceedings of the 1st National Coastal Symposium
Belize

Best Western Belize Biltmore Plaza
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Acknowledgment

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As always gratitude is expressed to the entire CZMAI team who unselfishly gave of themselves to ensure the success of the event.
Executive Summary

This proceedings document contains fourteen (14) papers that were presented at the First National Coastal Symposium held on May 27, 2003 at the Best Western Belize Biltmore Plaza Hotel, Belize City.

The symposium was hosted by the Belize Coastal Zone Management Authority and Institute (CZMAI) and was held in conjunction with a Coastal Awareness Week, which was held under the theme “Healthy Coastal and Marine Resources + Healthy Communities = A Healthy Belizean Economy.”

The objective of the 1st National Coastal Symposium was to bring together government leaders, policy makers, industry stakeholders, businesses and scientists to discuss critical issues affecting the coastal and marine resources of Belize.

Session I: Coastal Marine Management Policies and their Importance

The National Integrated Coastal Zone Management Strategy for Belize

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The National Integrated Coastal Zone Management Strategy for Belize was approved by the Cabinet in February 2003. This Strategy seeks to facilitate the improved management of the coastal resources at a national level in Belize. Its three main objectives are:

(i) Knowledge and Sustainable Use of the Coastal Resources
(ii) Supporting Planned Development
(iii) Building of Alliances

Strategy implementation will largely depend on the identified regulatory agencies and on the development of an enabling environment to ensure that there is an integrated approach to management of the resources.

Belize Draft Cruise Ship Policy Document

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Tourism generates about Bz$265 million a year to the Belizean economy. Cruise tourism in particular has been rapidly growing, yielding approximately Bz$30 million in 2002 and bringing over 320,000 people to Belize’s shores. In the past, basic guidelines were used to steer the industry, however, with the expected continued growth in this sector of the industry, the need for a formal Cruise Ship Policy is evident.
The Draft Cruise Ship Policy’s main objective is to support increase in the number of cruise ship passengers in a sustainable manner to optimize the revenue generated from the cruise ship expenditure. Main focal points in the policy are:

(i) Ensure the security of tourists
(ii) Provision of manageable tours
(iii) Promote carrying capacity studies
(iv) Emergency plan
(v) Transportation
(vi) Entertainment
(vii) Cruise ship operation
(viii) Anchoring of cruise ships
(ix) Recreational activity
(x) Activities on board the vessels
(xi) Environmental monitoring

A task force has been convened to review the Draft Cruise Ship Policy and is charged with making recommendations to Minister of Tourism. So far, the task force has determined that Belize can accommodate three large cruise ships, bearing about six thousand passengers per day. This is an increase from the original limit of three thousand passengers per day. According to the Belize Tourism Board, upgrades in facilities and improvement in services has enabled proper management of this increase.

Belize Draft Cayes Development Policy Document

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The Cayes Development Policy was first drafted in 1995 and has recently undergone revision, reflecting the changes in use, investment policy and the demands of civil society. Policy revision has also allowed for the inclusion of the relevant regulatory agencies and further facilitates policy integration and broad based approval and adoption.

This policy takes into consideration the economic, ecological and scientific importance of the cayes; the recognition of the different types and characteristics of cayes which dictate the appropriate and sustainable form of use or development; and the awareness that the cayes represent one of Belize’s most valuable resources, the use and exploitation of which should benefit all Belizeans. The Policy focuses on the less developed cayes and aims to address issues relating to the following areas: land use and development; shipping, commercial development and housing; land tenure and ownership; clearance, extraction and infrastructure; recreation, tourism and cultural heritage; protected areas, fishing and wildlife exploitation; and freshwater, waste disposal and fuel storage. It outlines the guiding principles for coastal development, tourism, fishing and recreation that are necessary for sustainable use of Belize’s cayes.
1. Facilitation of improved management of our national coastal resources.
2. Acknowledgement of the economic, ecological and scientific importance of the cayes
3. Development of a culture of low impact and high spending tourism to create an upmarket destination
4. Recognition of the projected implications of climate change and subsequent sea level rise
5. Recognition of the different types of cayes and their characteristics
6. Awareness of the cayes as one of the most valuable resources of our country

It is expected that the Cayes Development Policy will be included in the Coastal Zone Management Plan and will be linked to the Coastal Zone Planning guidelines under the Plan.

Belize Draft Marine Dredging Policy
Evadne Wade – Director, Geology and Petroleum Department

The Draft Marine Dredging Policy was developed by the Geology and Petroleum Department (GPD) to address issues such as the demand for coastal lands and sources of fill and the need to balance development with sustainable use of the resources. One major goal was identified: “To create an environment conducive to the integrated management of Belize’s coastal and marine resources via transparent mechanisms, which include inter-alia inputs from all stakeholders. Six objectives were developed to achieve this goal.

1. Obtain a clear understanding of proposed activity or activities related to dredging along the coast, offshore cayes, barrier reef and atolls, and marine waters of Belize.
2. Provide for ongoing and future research and development (R & D) relevant to and as a consequent of coastal offshore marine dredging.
3. Provide for the monitoring of marine dredging by competent authority/authorities. The monitoring of all sanctioned marine dredging will be undertaken by the Inspector of Mines in connection with other authorities that are responsible for the management of marine and coastal resources.
4. Allow for protection of the Barrier Reef System and the cayes. A specified distance from the shoreline for dredging will be set based upon consultation with relevant agencies/individuals.
5. Adhere to the concept of good neighborliness and the right to know certain basic principles of law. If you want to do any development in your area that will involve dredging and you have a neighbor, you must inform your neighbor of your intentions.
6. Implement a security bond for use of the coastal resources.
The GPD is garnering input from agencies responsible for coastal and marine resource use. These inputs will compose the rest of the objectives of the proposed document. The proposed Belize Marine Dredging Policy shall not be prejudicial to the rights of the holders of a production sharing agreement awarded by the Government of Belize under the Petroleum Act.

Session II: Impact of Watershed Activities on the Coast

Draft National Policy for Aquaculture Development in Belize

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The National Policy for Aquaculture Development in Belize has been prepared with a view of guiding aquaculture development over the next 8 to 10 years (2002 – 2012). An overarching mission statement guided development of the policy - “to develop a globally competitive aquaculture industry to meet consumer demands at home and abroad for cultivated aquatic foods and products that are of a high quality, safe, affordable and wholesome, and that are produced in an environmentally responsible manner, with maximum opportunity for profit, social justice and sustainable in all aspects of the industry”.

It is presented in three documents: the Draft National Aquaculture Policy and Zoning Plan for Belize - the main report and two other schedules. Schedule 1 is the draft National Policy for Aquaculture Development in which a zoning scheme is presented and schedule 2 is the Draft National Policy for Aquaculture Development.

Issues addressed within the Draft National Aquaculture Policy and Zoning Plan for Belize include issues such as practices, production and revenue, rolling national economic range, social culture and production practices and environmental issues. Twenty policy objectives were developed branching into strategies and methodologies for achieving these objectives. The objectives include:

1. Invest in people through training and education – through short-term training programs targeting potential fish farmers, integration into the tertiary level curricula and the development of public awareness material.
2. Improve food security and eliminate poverty
3. Improve the management of aquatic animal health to reduce the risk of disease in farm and wild stocks
4. Expand society and economic benefits to impact the wider community and country
5. Maximize the efficiency of resource use and minimize waste output – such as best management practices, investigate alternative land systems for use for farms, and reducing single ownership of large tracts of land for shrimp farming.
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Review of the document by stakeholders will be carried out and a public consultation will be held to obtain comments from the general public.

Land use and Land use Influence on the Coastal Zone

**Mr. Ramon Frutos – Meterology Department**

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Land use and access to natural resources and ecosystems services are essential for livelihood, security and economic development of people all over the world, including Belize. However, land use and land use changes transform the landscape and where there are excesses may lead to environmental degradation. This can be seen in activities taking place on land which affects upstream water sources and eventually the coastal zone, therefore, poor water quality is as a result of unsustainable land use.

Exploitation of the natural resources can lead to poverty and conflict if leaders of a country or communities are not active or proactive in implementing mitigative measures. A proactive community can resolve conflict or migration by people moving from degraded areas to pristine areas. Similarly, proactive government or policy makers can improve policies leading to a more sound use of the natural resources.

Other sources of negative impact to water resources include uncontrolled pollution and over harvesting or deforestation both of which can lead to erosion and increase in sediment loads which block channels. This can lead to flooding as was experienced in Belmopan and the Beaver Dam area in June 2002.

Chetumal Bay and Belize City are two areas where activities in the watershed are affecting the coastal zone. Two projects have been developed to address such activities and to manage the watersheds in a sustainable manner. One of those projects is incorporation with Mexico and Guatemala in the Rio Hondo and the Blue Creek areas while the other project is in the greater Belize river basin.

Weather phenomenons that Belize should consider are drought and flooding; more so flooding than drought. The implementation of improved land use policies and practices, poverty alleviation strategies, disaster awareness programs, effective early flooding and drought warning systems can help to mitigate the impact of natural disaster.
Planned Watershed-Reef Interconnectivity Scientific Study (WRIScS) 2004
Mr. Frank Panton – Country Rep., WRIScS Project
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The Watershed Reef Interconnectivity Scientific Study (WRIScS) project addressed concerns in relation to irrigation in Belize’s coastal environment due to land use changes such as agriculture and forestry. In the first phase, the research area was concentrated in the Stann Creek District, studying whether the citrus and banana plantations were influencing river runoffs.

At the conclusion of the first phase of the study, it was revealed that changing land use was increasing soil erosion and the delivery of sediment and contaminants to the coastal zone. However, this appeared to have no significant effect on the barrier reef due to the existence of natural systems, the coupled river discharge and coastal sediment transport. The study recommended that long term monitoring should be implemented to monitor this situation.

A second phase of the project is currently being proposed to funding agencies. This would include new elements such as extending the project to a regional level and involving neighbouring countries in Central America. The project scope would then extend along the Caribbean coast from Chetumal to Limon. Secondly, all phases of material transported by the rivers would be addressed, including suspended sediments, floating materials, benthic sediments and dissolved material. Lastly, the primary aim will be to encourage sustainable long-term local activity for monitoring conditions in the coastal zone.

Funding will be sought later this year and the WRIScS team will present the proposed project designed to the European Union. A website has been set up for interactive discussions with stakeholders. The website can be visited at www.wriscs.org and comments or questions can be sent to email address wriscs_comments@ambios.net.

Session III: Economic Benefits of the Coast

Benefits of Coastal and Marine Tourism in Belize
Mr. Andrew Godoy – General Manager, Belize Tourism Industry Association
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Tourism is the most important industry in Belize’s services sector contributing approximately 16% to the country’s gross domestic product. Employment in the industry has grown from an estimated 4,000 in 1993 to approximately 7,000 in 2000. It is estimated that tourism provides employment for one in every five persons.
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The industry is largely concentrated in the coastal areas of Belize as an estimated 75% of the country’s hotels are found on the cayes and along the coast. Visitor expenditure and motivation surveys show that the existence of marine attractions played the greatest influence in visitors choosing Belize as their vacation destination. Of those who participated in marine activities, 62% snorkeled while 30% choose to dive.

Coastal and marine tourism is of great economic benefit to Belize therefore, the focus must be on sustaining the capacity of the resource base to continue delivering economic benefits. The proper mechanism to monitor the use of these resources in an efficient and sustainable manner must be put into place.

Cruise tourism is expected to double in growth in 2003 over 2002 figures of 319,690. Of these visitors, 8,485 went to the Blue Hole National Monument, 10,207 visited the Halfmoon Caye Natural Monument, while Hol Chan Marine Reserve registered about 46,404 visitors. A total of 65,096 visitors traveled to these three marine locations.

It is critical that studies be undertaken which will assist in determining carrying capacity of these sites and others as failure to institute such guidelines may lead to depletion of the resources upon which the tourism industry heavily depends on. In addition, national policies, regulations and institutional arrangements for marine ecosystem conservation and sustainable use must be coordinated and strengthened. As indicated in the Coastal Zone Management Strategy for Belize, measures to reduce non-sustainable patterns of resource use must be promoted, existing marine protected areas strengthened, and new protected areas along intrans-boundary locations should be identified.

Benefits of the Fisheries Industry to Belize

Mr. Robert Usher – Northern Fishermen Cooperative Association

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The majority of the fishing activity is conducted within the coastal zone, therefore this area is very important to the industry. However, pressures on the marine ecosystem can negatively affect the aquatic resources of Belize.

The face of the fishing industry is changing as there has been an increase in farming activities with fifteen active shrimp farms. These farms are a major part of the income generating revenues that are brought into this country through the fishing industry. Wild catch marine species continue to provide great economic benefits to many with over 3,000 licensed fishermen earning a living from their catch.

Over the past forty years extensive fishing pressures has resulted in the lowering of fish stock with some locations at the point of depletion. The number of fishers belonging to the Northern Fishermen Cooperative Association has grown from about 150 – 200 to now 650. Today, the fishery yielded provides less income generation than before. Other
Factors such as dredging is also attributing to the lowered fish stock as this activity may result in the destruction of nursery habitats.

**Developing Alternative Livelihood - Belize**

**Ms. Shalini Cawich – Friends of Nature**

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Friends of Nature (FoN) is a community-based conservation NGO responsible for co-managing the Gladden Split Marine Reserve and the Laughing Bird Caye National Park. The organization represents five coastal communities that are traditional users of these two MPAs and is working closely with the communities.

These communities depend heavily on the coastal and marine resources for their livelihoods, however, some of the practices employed were unsustainable. It was recognized, however, that in order to have people give up unsustainable practices and conserve natural resources, alternative livelihoods needed to be identified. Therefore FoN developed several alternative livelihood projects which entailed training community members in tour guiding, scuba diving, fly fishing and kayaking. Other possible projects that can be developed include smoked fish and lobster bisque.

**Bioprospecting Possibilities - Belize**

**Mr. James Azueta – Belize Fisheries Department**

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Bioprospecting is the search for new chemical compounds in living organisms that will have some pharmaceutical or commercial application. Belize does not currently have a national policy framework for bioprospecting in Belize. However, the Belize Fisheries Department, the agency with responsibility for overseeing marine bioprospecting, may utilize policies, guidelines and Statutory Instruments under the Ministry of Agriculture and Fisheries and the Ministry of Natural Resources, Environment and Industry.

In addition, a Bio-safety Committee is also used to screened applications which require further input and technical expertise. A transfer agreement must be signed between the Fisheries Department and the party conducting the bioprospecting. The Government of Belize currently receives 10% of the revenue derived from successful agreements or projects.

An updating of the process is underway, including the development of a national bioprospecting policy through consultancy from the CZMAI.
Climate Change Risks in the Coastal Zone  
Mr. Carlos Fuller – Chief Meteorologist, Meteorology Department  
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Global climate change can affect Belize by average surface temperature rise, change in rainfall patterns and rise in sea level. This could mean higher maximum temperature with more hot days and heat waves, leading to decrease in tourism. In addition, extreme weather events could result in more floods, avalanches, landslides/mudslides, increased soil erosion, damage to property and increased insurance costs.

Sea level rise will increase erosion, coastal flooding, inundation, salt water intrusion and could affect mangrove forest. This could have some beneficial impacts, however more adverse effects on biological and socioeconomic systems are expected - affecting tourist destinations and human settlements, water supplies, agriculture, aquaculture and fisheries. Proper management systems must be put into placed to ensure the sustainability of the coastal zone and its resources.

Coastal Vulnerability Assessment  
Mr. George Hanson – National Emergency Management Organization (NEMO)  
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Coastal vulnerability refers to the system’s ability to recover from natural disaster. In assessing vulnerability several issues must be addressed. These include verification of the geomorphology of the area/systems, relative sea level rise, and susceptibility to shoreline erosion.

Belize lies in a low-lying belt system or slope and therefore susceptible to shoreline erosion, as well as rising sea levels. While Belize exhibits high coastal vulnerability, only few vulnerability assessments have been conducted. Currently a gap analysis is being conducted to identify vulnerable areas. However, this is only in relation to the country’s vulnerability to hurricane, and in particular flooding as a result of hurricane, and not at other threats.

The National Emergency Management Organization (NEMO) is attempting to address vulnerability to oil spills, however, there are limited resources. Other hazards such as spills from chemicals such as ammonia, detergents, and other are also being addressed. However, there remains the need to address vulnerability of the coastal zone to agrochemicals, and liquid and solid wastes.
Recommendations for Mitigation Measure for Coastal Developments
Mr. Eugene Ariola – Oceanographer, Coastal Zone Management Institute (CZMI)
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Belize’s coastal areas include coastal plains, flood plains, wetlands, coastal lagoons, estuaries, beaches, barrier reef and atolls. The habitats, biological diversity, and geomorphology of Belize’s coastal zone have earned its recognition as one of the seven underwater wonders of the world as well as the barrier reef, which has been designated a World Heritage Site.

The country is naturally vulnerable to climate change including sea level rise and increase in the frequency and intensity of tropical cyclones, and the bio physical impacts that are associated with these such as coastal erosion, inundation, and sea water intrusion. A number of activities could compound this vulnerability including coastal developments - activities such as human settlement, sea walls, drainage, roads, bridges, and artificial beaches construction, geotubes, land reclamation, and marine dredging.

At this point, Belize cannot mitigate climate change. The country is considered to be a sink, and is not at fault for impacts relating to climate change as it does not produce much carbon dioxide or greenhouse gases. However, there is a need to educate the public to the impacts of climate change and host more forums and specific technical studies in relation to sea level rise. While there are no blanket solutions for coastal developments, adherence to specific development practices can help. These include maintaining the 66 feet buffer zone along water bodies where possible, discouraging building within waterways, and strengthening of the EIA process. In regards to the EIA process, there is a loophole whereby small scale developments most likely will not have to pass through the NEAC process and these could have an impact.

Poorly planned and ad hoc coastal development could worsen the coastal zone’s vulnerability. Belize can mitigate climate change impacts by using the coastal zone for environmentally sound developments.
Special Address

Hon. Ismael Cal
Minister of State, Min. of Agriculture and Fisheries

It is indeed an honor to address you on this important occasion, the First National Coastal Symposium, which is very significant to the Ministry of Agriculture & Fisheries and our country as a whole. I do not believe that I have to emphasize to this audience the benefits of Belize’s coastal resources to all its citizens, for I was made to understand that if there was ever a group of specialist, scientist and policymakers in coastal resource management, this would be it. However, I will take a risk and make an attempt at giving you the experts some basic advice if you will kindly allow me.

Today is a symbolic day for we hope that it marks the beginning of a tradition, a tradition of celebration, a celebration of our nation's endowment of our wealth of coastal resources. We have every right to celebrate because as a nation there is so much that we have done and continue to do to benefit from the resources today and well into the future. During the last years we have created vital legislations such as the Coastal Zone Management Act, which establishes the Coastal Zone Management Authority & Institute entrusted with the responsibility of overall management of coastal resources in Belize. A central approach to this management is the recognition of the high importance of collaboration and integration in research and monitoring, and decision-making. We have in place the systems. Let’s make them work to improve our beloved country Belize.

An integrated approach to management is by no means an easy way of management. Undoubtedly, it is easier to make decisions on your own, as sectoral agencies without consultations with other departments or stakeholders, but we have for sometime now recognized the many weaknesses of such an approach and as such must find common grounds. During the course of the day you will review critical policy issues, technical and perhaps even sight specific matters that you will have prioritize for consideration. My suggestion would be to bear in mind the following points when drawing your conclusions or developing resolutions at the end of the day.

First, start off by asking whether or not the technical advice on the specific issue will mean something to the average Belizean today, tomorrow or thirty years from now. For if you give advise in this session that is only of importance to you, your ministry or agency, we would be doing all Belizeans, including those to come, and injustice. So, let your policy recommendations, your resource priorities, your emphasis in general be of great value to Belizeans because they are non bias, they are national priority issues and they give due consideration to the human dimension in the short and long term.
Second, ask yourself how practical are your policy and technical recommendations. Practical in terms of ease and ability to implement, in terms of ease of political embrace and practical as it relates to financial and human resources required in implementing any of what is recommended. I say this because more than often intellectuals like yourselves spend an awful lot of time developing these abstracts that later enjoys no utility as little consideration is given to issues such as those I had just mentioned, which coincidentally the ordinary man and woman, to be politically correct, is concerned with.

Third, ask yourselves how will you sustain the initiative, what will you do between now and next year around the same time when we reconvene for the 2nd National Coastal Symposium and we are taking stock of the accomplishments. Will your contributions be astonishing? Will they be well above what anyone here today expected? I ask this for it is always easy for us to develop grandiose plans for implementation but my challenge to you therefore is that in the discussions, you should also develop clear and realistic timelines for the implementation. Take responsibility and give indications of where you and your agency can lead or where you can be supported, and above all, commit to the effort. Yes, indeed we have come a long way and have much to be proud of as a nation and for that you must applaud yourselves. You have in various ways and at various times intervened and contributed to the management of the coastal resources of Belize, and for that you should be proud. I, especially, wish to acknowledge the critical role that the Coastal Zone Management Authority & Institute plays in coordinating and facilitating the many processes. I take this opportunity to congratulate the staff for a job well done and to encourage them to continue the good work of this important Institution.

In conclusion, I trust that you will have very stimulating and fruitful decisions and I look forward to seeing the proceedings report which will no doubt be filled with much wise advise that I am certain will be well received. Best wishes for today’s activities and for those during the remainder of the week.

God Bless Belize.
Abstract
The National Integrated Coastal Zone Management Strategy, prepared by the Coastal Zone Management Authority and Institute, and approved by Cabinet in February 2003, facilitates the improved management of the coastal resources at a national level in Belize. Mechanisms employed seek to ensure the coordination of the activities and decision making of the relevant regulatory agencies, NGOs, CBOs, traditional users, industry operators, and investors so as to benefit all Belizeans. This spirit of the strategy is to build on existing legislation and initiatives to ensure sustainable economic growth and sound environmental management.

Introduction
The Coastal Zone Management Act 1998 requires the development of a Coastal Zone Management Plan for Belize to guide development and future investment, while ensuring the protection of important natural habitats and existing human uses of coastal resources. As key steps towards Plan preparation and implementation the strategy seeks to address three main objectives:

1. **Knowledge and Sustainable Use of the Coastal Resources** which seeks to promote the scientific understanding that is essential to the setting and maintenance of targets and standards for environmental and natural resources management in the coastal area of Belize;

2. **Supporting Planned Development** an essential link between realizing and harnessing the economic potential of the resources and ensuring the equitable allocation and sustainable use of the resources. Mechanisms for planning hinges
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3. **Building Alliances to Benefit Belizeans** so as to facilitate further appreciation by stakeholders and interest groups of the interdependence between all natural resources and processes, and human interventions in the coastal area in Belize. For it is only through even greater collaboration between all involved parties will we be able to effectively develop and manage this complex and vital national asset.

**Background**

Integrated Coastal Zone Management (ICZM) is the business of trying to find that balance between economic development and sustainable use of the resources. However, the method or the mechanism for achieving this hinges on a coordinated approach to try to ensure that all agencies and all beneficiaries are involved in the process of determining how best to use Belize’s resources. Simply, we want to highlight the fact that it requires inter-sectoral coordination. However, it is a bit tricky to have the right mix to ensure that decisions always happen in an integrated way. We also try to promote public participation in decision-making. We hope that this will benefit all Belizeans in the long run, especially if we are thinking about best use of the resources now and in the future.

An integrated approach to the management of our coastal and marine resources is of extreme importance, especially when considering the direct economic benefits derived from such resources in terms of fishing, recreational use, and built development tourism. These resources contribute significantly to the GDP and the economic development of this country. If we want to be able to continue benefiting from them in the long term, we need to seriously manage them. Manage them in the same manner in which you’d manage a business. You’d ensure that your accounts are in order, that there are no leaks, and no abuse of the resources in that company. It’s the exact same principle.

Historically, decision-making in Belize has not necessarily been coordinated. We have fragmented decision-making, with various agencies making decisions not necessarily through consultation with other agencies. We have really grown, though. We conduct significant consultation on development applications, for example, those coming from the Ministry of Natural Resources and its various departments. We have actually accomplished a lot in a short space of time, and through coordination and consultation, we are able to look for best use of the resources.

The Coastal Zone Management Authority and Institute (CZMA&I) developed a Coastal Zone Management Strategy that was endorsed by Cabinet in February of this year. The Strategy basically lays the foundation for the development of an Integrated Coastal Zone Management Plan (ICZM). The CZMA&I is mandated under the Coastal Zone Management Act to prepare an ICZM Plan, which we are hoping to complete by the end of this year. It is extremely ambitious but we are going to push for the end of this year nonetheless. The Plan will provide detailed guidelines with regards to development and future investments, protection of important natural habitats and the existing uses so as to
ensure that we consider traditional users, etc. and to guide all activities. It can, for instance, give recommendations for cruise ships visitors in terms of development potential, permissible fish catch in a particular region, etc. The legislation is such that it allows for any detailed guidelines regarding resource use, regardless of the sector or the specific activity. It is not intended to create new legislation but to try and strengthen those that exist to ensure there is no duplication and that there is actually a consensus on how we use the resources in the long run.

The Strategy Document
The Strategy document has three overarching goals. These are:

1.) Knowledge – this is required because decisions should not be based on myths and beliefs.

2.) Supporting planned development - some developments we can say no to but some we must say yes to, thus, we need to support planned development.

3.) Building of Alliances - at all times, we need to remember that the integrated approach needs that building of alliance and collaboration for it to benefit all Belizeans.

Knowledge Base
In relation to knowledge, the Strategy refers to scientific research and the need for greater coordination in scientific research and monitoring, the need for improvements in the whole system of protected area management, and the need for improved intervention as it relates to natural habitat and wildlife management. We recognize that we need to coordinate a bit more for the monitoring work that we do, and the Strategy calls for the creation of a monitoring coordination unit and I believe that we really need to give this serious consideration because although we have come a long way in terms of coordination, we probably need to formalize the relationships a bit more. Under the MBRS project, monitoring protocols have been developed and all of us have been involved in the process of developing those protocols. It would be a shame if we do not adapt and embrace the protocols, and ensure that they become standard guidelines for monitoring throughout Belize. According to the CZM Act, we are to implement or put into place monitoring protocols. Rather than reinvent the wheel, we intend to adapt the MBRS monitoring protocols when we present the Plan to Cabinet.

We need to strengthen the coastal marine protected areas. To achieve this, we will have to increase dialogue and public education so that traditional users recognized that there are benefits to be derived from the protection of these sites. More than often, marine protected areas (MPA) are viewed as a mechanism for marginalizing traditional users, hence, we need to ensure that the knowledge that we have in terms of the benefits is shared with them. Furthermore, we also need to support alternative livelihood and income generation projects for traditional users.
Supporting Planned Development
In terms of supporting planned development, most of you if not all are familiar with the CZMAI planning programme. Central to this though is the revision of current legislations and regulations, and standards and guidelines to ensure that we can guide development as best as possible. This in carried out in close collaboration with the Ministry of Natural Resources, primarily since they have the legal mandate. It is through such consultations that we can revise legislations and guidelines. Some of the policy documents that set the tone in terms of resource use will be discussed today. So, I won’t go into them except to say that we would really love for them to be revised before the end of the year so that when we get the ICZM Plan endorsed, we could get those policy documents endorsed as well.

Building Alliances to Benefit Belizeans
There are currently nine planning regions, and much of what we have achieved in terms of these, we achieved through consultation and dialogue; all the meetings that people complains about. The consultation and dialogue process is very time consuming but it is the only way we can integrate and have decision-making through broad consensus. It will not happen through telephone calls or letters. We need to be committed to the process, spend the time to think through and talk through the issues. It requires the kind of alliance building that can only happen through dialogue. This is also required at the decentralized level because while we dialogue at the policy and technical level, the discourse still needs to occur at the regional and community levels. The people at these levels knows what it is that they want to use the resources for, they have an excellent idea of where they want to go in terms of community development so they need to be involved in the decision-making regarding resource use.

Strategy Implementation Requirements
What do we need if we are to have successful implementation of this Strategy? At the political level, I believe that without a transformation of existing governance structures, we will always have fragmentation unless at the technical level people are committed to dialogue and reconciling of differences. These are shared resources and as such decision-making must be shared. We must try to promote an integrated approach to management of the resources, which will only occur through meetings and dialogue. At the technical level, we need to seriously commit to this process and also ensure that there is sustainability linkage attached to the methodologies that we utilize to manage the resources. It is not just for the Institute as a coordinating entity but for those actors who are on the ground as well – how do they sustain the activities that they are doing? How do they sustain their contributions to resource management? We need to look at the system as a whole because we keep on grappling with just paying bills as individual institutions and not spend any significant time brainstorming for ideas that could enable us to collectively manage the resources. We must try to think outside of the box to see how we can work together to achieve the sound management and sustainable use that we strive for.

Thank You
II. Belize Draft Cruise Ship Policy Document

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Introduction
First of all I’d like to commend the Coastal Management Authority and Institute (CZMAI) for the initiative of starting a coastal awareness week. I think from a tourism stand point, events like these are important because 60% of the people that visit Belize say that they were attracted to Belize because of a particular marine activity. For an industry that generates over $265 million a year for our economy, I think the marine resources are a vital part of what we have to offer. My job today is to focus on the draft cruise ship policy that was developed in 2000. I’ll give an overview of overall tourism worldwide then focus on a brief history of the cruise sector in Belize, and then get into the policy. I will also focus on some of the challenges that we are faced with today, what we are doing to address such challenges, and show some basic figures of where we’re going in the future.

Global Tourism Trends
Cruise tourism globally and in Belize is a big business. It generates close to $20 million worldwide. There are about 300,000 people working in the industry, and it’s expected to have double digit increases over the next few years. Between 2000 and 2005, it is expected that 50 new cruise ships will be placed on the waters generating about $15 billion. My research has revealed that these ships are going to be larger than war ships or aircraft carriers, so to speak. Such large ships would be able to carry about 5,000 passengers.
Cruise Tourism in Belize

The cruise ship industry in Belize didn’t just blow up. The industry existed in the past but it was more or less stagnant. There were minimal arrivals. A lot of cruise ships didn’t come to Belize for several reasons, including: 1.) The cruise ship head tax was $10.00 US, which has been reduced now, 2.) Infrastructure that was in place was not appropriate. In the past, before the village was built, ships docked at the Radisson Fort George pier, which is not conducive to the large number of people that we are faced with today. The arrival numbers was also low, for example, we had less than 10,000 people in 1998. We were faced with smaller cruise ships, like Premier that only brought about 800 people to an occasional Norwegian Cruise Line that bought about 12,000 individuals. For the most part of that time, we were faced with about eight hundred people coming off the cruise lines weekly, and 3.) Attractions were not developed. They are going through that transition period right now.

We started to get lobbying from the cruise sector so the government decided to reduce the head tax to $5.00 US per passenger. Every passenger that comes on board a cruise ship to Belize, whether they get off the ship or not, now has to pay $5.00 US. With this in place, we started to see an increase in interest by cruise lines to come to Belize. We reveal that we were serious about the sector growing by building a tourist village that could accommodate their guest more comfortably. However, before we allowed the major increase in arrival, we looked at what other countries were doing, and to try to learn from their mistakes. We decided to convene a cruise ship committee to look at developing a policy that would guide the growth of this industry, and we invited a host of organizations, including the private and public sectors, and NGO’s. Some of these meetings got quite heated and we had to be mediators at times for both sides of the coin, the private/cruise sector, who was pushing for growth and the environmentally conscious people, who were against it. After all the deliberations and all the meetings, we finally came up with a document that we believed would move the industry in a sustainable manner.

In 2000, the draft cruise ship policy was ratified by the Belize National Tourism Council and came into effect. The main purpose of the policy is to grow tourism overall and have the economic benefits of it improved the country, taking into consideration that the eco-cultural integrity that we had promoted thus far has been successful in maintaining the resources that we have to offer. The key objective of the policy is to increase the number of cruise ship passengers in a sustainable manner to optimize the revenue generated from the cruise ship expenditure. From my figures for last year, the cruise sector has injected about $30 million into the economy of Belize, whether it’s from the head tax or from port charges.

We also conduct a visitor and motivation survey every two to three years, and this has showed us that a cruise passenger spends at least $45.00 US in Belize. This also results in increasing the overall benefits of cruise tourism in creating inter sectoral linkages, linkages with agriculture, fisheries and all of those areas that are important for us. In relation to expanding the absorptive capacity of the country by developing new sites, we strongly believe that if we do not develop carrying capacities for certain areas and the
industry continues to grow, then they will become over used. We want to develop more sites throughout the country so that we can disperse people in a manageable fashion. We also want to explore the opportunities of opening new ports. We’ve looked at Big Creek and Placencia, and I think the government of the day has stated that they are interested in seriously looking at opening a docking facility in Punta Gorda. We also want to develop and implement appropriate promotional programmes that effectively convert cruise passengers into overnight passengers or stay over passengers, and our marketing department is actively pursuing this. We have created different programs geared towards trying to convert these people and bringing them back to Belize.

Basic guidelines for industry growth have been employed to raise the level of organization throughout the Industry. In the past, this was fragmented but the private sector has now organize it’s self and formed what we call the Belize Cruise Ship Industry Association. This Association focuses on tour operators, port agents, taxi drivers, etc. to try to raise the standards of the industry. We also want to improve the quality of visitor experience to Belize. One of the major knocks on Belize right now is that Belize City is not aesthetically pleasing for visitors coming off the cruise ships, thus, we have been dialoguing with the City Council and the Government to upgrade the infrastructure. The level of security is another issue. It is of paramount importance that we keep the safety of these people in mind at all times and we have taken a number of measures to ensure this.

In terms of maximizing foreign exchange revenues, we informed the cruise lines that when they come to Belize, they must shut down all activities on board the vessels. Thus, all their casinos, restaurants, and entertainment must be shut down. This results in more people coming off the ships and spending money in Belize. To protect and develop major sites and attractions, both private and public sectors are taking up the initiative to increase the number of destinations to visit. We try to ensure that there is equitable distribution of economic benefits. If you visit the tourist village on a cruise ship day, you would be able to see the different types of people making money. The handicraft people, taxi drivers, hair braiders, etc., all making a decent living. We try to promote the creation of manageable tours at the major attraction locations. We work with other agencies to ensure this. We have had discussions with the Belize Audubon Society, and the Fisheries and Archaeology Departments to develop carrying capacities for attraction sites and to ensure adherence to the set limitation numbers.

**Main Focal Points in the Policy**
Some of the focus areas of the policy are:

1. **Ensure the security of the tourists.**

2. **Provision of manageable tours** - from the point of departure from the ships, tours must be managed in an organized fashion.

3. **Promote carrying capacity studies for destination sites.** We often hear that you can go to Goff’s Caye in a day and you can find six hundred people. I can tell you that in the cruise policy document, the capacity of Goff’s Caye was 150 people
and so the management of these areas must take on a proactive role. The same goes for Hol Chan. If the management body at Hol Chan knows that the carrying capacity for the site is 150 individuals, why sell tickets to 300 people?

4.) **Emergency plan** - There is an emergency plan in place, where we try to work with agencies such as the Belize Port Authority, the health sector, the hospitals, BDF, etc. to ensure that all the agencies are on the same page to react quickly if an accident should occur.

5.) **Transportation** – this is a key issue and we are focusing on improving the standards here.

6.) **Entertainment** – as was mentioned before, it’s mandatory that the cruise ships shut down all their entertainment on board so that we can increase benefit from this sector.

7.) **Cruise ship operation** – this is also in reference to the shutting down of all activities on board the ship. An Environmental Compliance Plan was developed by the Department of Environment, BTB and the Fisheries Department, which each cruise line must comply with.

8.) **Anchoring of cruise ships** – cruise lines must abide by the Belize Port Authority’s identified areas.

9.) **Recreational activity** - we try to encourage the cruise lines, port agents and tour operators to give an orientation of the sites that their visitors are going to for that day. There is even a diving and snorkeling dos and don’ts when in sensitive areas.

10.) **Activities on board the vessels** – no hazardous chemicals should be used on board the ships or when cleaning the ship. This section also addresses waste disposal – no oil, contaminants, bilge or wastewaters, etc. should be disposed in Belizean waters. The Department of Environment ensures that if dry waste is offloaded, it be incinerated. In the past, cruise lines used to offload garbage because the ships did not have onboard incinerators but we have now seen a reduction in such type of ships.

11.) **Environmental monitoring** - if anything should occur, the cruise lines or the port agent will be charged with the responsibility of paying for any damage to the natural resources.

**Reasons for Rapid Growth**
The tremendous growth of the cruise industry over the last few years is owed to a number of reasons including:

1.) Construction of the Belize Tourism Village - this has been a major contributory to the growth of the industry.
2.) More tours - Belize is a diverse destination, which makes us able to offer many different types of tours. The cruise lines find this very lucrative.
3.) The September 11th event and terrorist threats – these have prompted many cruise lines to pull their voyages out of the Mediterranean and place them close to their home ports, which is either Fort Lauderdale or Miami.

4.) Upgrade of sites - through a US $14 million loan, we have been able to upgrade the major archaeological sites and cave area with better facilities, and we’ve open up new sites. Both the private and public sectors have done their part.

5.) Aggressive private sector lobby - the industry has been spurred on for the most part by the private sector lobbying, lobbying by port agents and tour operators.

In 2001, we experienced a slight decline in numbers and that’s because one of our major cruise lines at that point in time, filed for bankruptcy, and had to pull out their ships. This cruise line was coming year round. Their itinerary was set from a year or two in advance so it was difficult to get a new cruise line in that same year. In 2002, the growth was estimated to close to 320,000 people. The majority of this number came in on Wednesdays. We have heard complaints that five cruise ships visit Belize per day but this is not the norm. This only occurs on specific days or an occasional instance.

**Current challenges and how these are being addressed**

In terms of the challenges that face us today, we have realized that the growth has been too rapid. For the most part, we didn’t expect to see the current huge numbers in arrivals so quickly. We still have limited infrastructure in the country to accommodate these people - Belize City and the traffic congestion, facilities at the destination sites (e.g. if you go to Xunantunich, the ferry cannot accommodate the number of people going there), bathroom facilities at the site as well, and human resources and management as well. We are currently looking at addressing the appearance of Belize City. Safety concern is another key challenge. We have a lot more people coming with the same number of Tourism Police, so we have to depend on the regular Police to support us. There are a limited number of sites that meet standard. A lot of these sites need to be upgraded for us to promote them or for the tour operators to package tours to those areas. The cruise ships are on set itineraries, which make it difficult for them to spread out during the entire week. Currently, most of the cruise ships arrive in Belize between Monday and Thursday. We are trying to work on spreading them out throughout the entire week.

**The Way Forward**

We have convened a cruise task force to look at the draft cruise ship policy and to make recommendations to the Minister on how we should approach the cruise sector. The Committee has met and concluded that with the current infrastructure, the tenders, buses, guides, villages and attraction sites, we can only accommodate three large cruise ships per day, which is approximately six thousand passengers per day. In our original policy, the limitation was three thousand passengers per day but at that time ships were docking at the Radisson Fort George pier. The tenders were also much smaller, and there were not enough guides and buses. The Government has also invested a lot of money in upgrading all the archaeological sites and some private sector investors are opening up their own sites. We invited the BDF, the Police Department, Port Authority and other agencies to discuss how best to monitor with the limited resources that we have. We have decided on a coordinated effort, for example, instead of the Police patrolling an area where the BDF
is, the BDF can do the patrolling. We have been developing new sites, trying to work with cruise lines that are flexible in their itineraries, and right now we’re developing new carrying capacities studies. The CZMAI is currently conducting a carrying capacity project for Goff’s Caye, and we’re supporting it. We are investing approximately five thousand dollars to support this initiative. We are also increasing training through the Training Unit. We are trying to bring people up to the level of standard that we think they need to be to operate within the industry.

Finally, I want to assure everyone that the Ministry of Tourism and the Belize Tourism Board look at coastal tourism seriously and we realized that we must balance stop over tourism and the cruise sector. However, all agencies must also do their part. They must do their part in managing the resources that they are responsible for as well. With that I thank you for your attention.
Abstract
The Belize Barrier Reef, cayes and atolls are regarded as one of the country’s greatest assets. They include about 1,065 cayes which host an array of endangered and commercially important wildlife and provide critical ecosystem functions. The cayes are increasingly sought after by a range of users from investors to fisherfolks. This flurry of activity has created development pressures, which are having increasing impacts on the marine environment. The Cayes Development Policy, first drafted in 1995, was developed with the basic objective of ensuring sustainable use and long term protection of Belize’ coastal resources. The Cayes Development Policy has recently been under revision. The process of revision includes relevant permitting agencies to ensure full participation and integration of the policy for broad based approval and adoption.

The Cayes Development Policy elaborates on the provisions of the National ICZM Strategy, which identifies key actions to facilitate the improved and sound management of national coastal resources. It also takes into consideration the economic, ecological and scientific importance of the cayes; the recognition of the different types and characteristics of cayes which dictate the appropriate and sustainable form of use or development; and the awareness that the cayes represent one of Belize’s most valuable resources, the use and exploitation of which should benefit all Belizeans. The Policy focuses on the less developed cayes and aims to address issues relating to the following areas: land use and development; shipping, commercial development and housing; land tenure and ownership; clearance, extraction and infrastructure; recreation, tourism and cultural heritage; protected areas, fishing and wildlife exploitation; and freshwater, waste disposal and fuel storage. It outlines the guiding principles for coastal development, tourism, fishing and recreation that are necessary for sustainable use of Belize’s cayes.
Introduction
The Cayes Development Policy elaborates on the Integrated Coastal Zone Management Strategy and as the name suggests, it aims to guide development on the cayes in the coastal zone of Belize. The atolls, barrier reef and cayes are one of the country’s greatest assets and while development is necessary, we have seen increasing impacts from development on the cayes. In recognition of the significance of the cayes and the threats from increasing developments, the Cabinet requested a draft Cayes Development Policy, which was first created in 1995. Since then, the policy has been changed to reflect changes in use, investment policy and the demands of civil society. In our drive to get a Coastal Zone Management Plan prepared by the end of the year, we have once again begun final revisions of the policy.

The Cayes Development Policy is based on seven guiding principles. Six of these are:

1.) Facilitation of improved management of our national coastal resources.

2.) Acknowledgement of the economic, ecological and scientific importance of the cayes, which are recognized both nationally and internationally for their beauty, wildlife, and opportunities for recreation, sports and research.

3.) Development of a culture of low impact and high spending tourism to create an up market destination

4.) Recognition of the projected implications of climate change and subsequent sea level rise, which is of particular relevance for Belize since most of our coastal areas are below sea level, and we are highly susceptible to disasters such as hurricanes and floods,

5.) Recognition of the different types of cayes and their characteristics, which is key because it dictates the form of development that would be suitable and sustainable.

6.) Awareness of the cayes as one of the most valuable resources of our country, and as such, the use and expectations for them should benefit all Belizeans.

Policy Objectives
Based on the guiding principles, there are five main policy objectives:

1.) Motivate and encourage both local and foreign investments - developers should be encouraged to contribute to the cayes and the established occupants. Development should not be a source of conflict or result in the loss of customer rights or inappropriate development.

2.) Promote development without compromising national identity and customs or traditional rights, which we have in existence for over a hundred years such as the culture of Belizean to always head to the cayes during the Easter vacation for recreation.
3.) Balance development with sound conservation management; the cayes are fragile on account of their small size and their ecological characteristic. With the increase in development, there has been evidence of damage at many locations.

4.) Strengthen and focus governmental procedures for reviewing development proposals; strengthen the entire process.

5.) Ensure that the existing and traditional users of the cayes have a right to secure their interest.

### Issues Addressed Under Objectives

Under the broad objectives, there are several issues that the policy aims to address. Some of these issues include:

1.) Land use and development management, where development guidelines will be created for the coastal regions. This is already underway and will form a part of the Integrated Coastal Zone Management Plan (ICZMP).

2.) Accompanying the development of the guidelines is the establishment of coastal advisory committees, which are comprised of stakeholders from each of the coastal regions. Their role is to monitor the implementation of the guidelines.

3.) Development should be carried out, and encouraged to take place in appropriate locations according to the guidelines to ensure maximized benefits and minimal damage.

4.) Assessment of and decisions on development applications should be subjected to greater transparency and accountability to ensure that there is equitable use of the resources.

5.) Low density development principles will be applied to subdivisions, resorts construction and development projects but special provisions will be made to enable high density development in the cases of exceptional public need.

6.) Aesthetic appearance and use of practical construction material will be encouraged in all developments.

7.) Boat speed limits or no wake zones will be mandated for areas identified as having high human use, susceptible to high flooding and erosion, and which have a high presence of wildlife vulnerable to moving vessels.

8.) Policies and legislations on commercial and recreational vessels will be integrated into government licensing procedures to ensure integration of all vessel activity within the coastal zone.

9.) Opportunities for enhancing diversification and promotion of economic benefits of the cayes will be explored with an emphasis on fisher folks and residents.

10.) Issuance of trade licenses and fiscal incentives will reflect the need to support Belizean businesses, which do not detract from the value of the cayes.

11.) Housing on the cayes will be in response to increasing demands and should adapt appropriate designs and standards, and not be based on mainland models.

12.) The insurance and development funding agencies will develop more flexible policies and criteria necessary for insuring and financing development on the cayes.

13.) In terms of land tenure and ownership, only applications from Belizeans will be considered in leasing any national caye or part of a caye. Holders on less
developed cayes will be encouraged to obtain titles, and long-term occupants on national land with no leases will be encouraged to obtain leases. In addition, advice will be provided on the property market and value of the land. This is important because there are few Belizeans who are aware of the actual worth of the cayes and as such there is a growing displacement by wealthier and more informed parties.

14.) Comprehensive development plans must be submitted with any application for lease on the cayes.

15.) Assessments of applications for subdivision must take the Coastal Zone Management Plan into account, taking for granted that the Plan is ready by the end of the year.

16.) Monitoring of development activities will be carried out to ensure compliance with the Plan and other regulations.

17.) A Caye database will be created to provide information on use, ownership, value and the ecological and physical characteristics of the cayes.

18.) For clearance, extraction and related infrastructure, the minimum natural vegetation will be cleared to allow for development, and attention will be paid to maximize the retention of areas identified as critical habitat or for areas that are served for erosion control.

19.) Forested areas, which are used by fishers and others for timber extraction, will be sustainably managed.

20.) A program to rehabilitate damaged mangroves and coastal vegetation will be launched.

21.) The required sixty-six foot reserve and setback from the water will be strictly adhered to, except where it is impractical.

22.) Extended reserves will be required in mangrove habitats at possible areas of erosion.

23.) The construction of coastal structures such as groins, sea walls, piers and causes will require full investigation and approval from the relevant agencies. This is to avoid unnecessary deposition of sediments, erosion of the cayes, and general obstruction to public access.

24.) Dredging and sand mining activities will be subjected to strict assessment and licensing. Dredging will not be used to create land if there was no previous legal existence except with explicit permission. Suitable sites for dredging of fill material will be identified, and only material will be allowed to be taken from the areas once such areas have been identified.

25.) Channels and canals will be dredged only after careful assessment.

26.) Oil prospecting and drilling will be subjected to provisions of the Petroleum and EPA Acts.

27.) The Uway sizing of docking facilities and commercially used piers will be encouraged.

28.) Private vehicle usage will be discouraged on the cayes, and golf carts will be encouraged so long as there is adequate disposal of batteries and tubes.

29.) Means to facilitate recreation for less advantaged Belizeans on the cayes will be promoted. Cayes commonly used by Belizeans for recreation should be retained or acquired for public reserves.
30.) A system to determine and monitor the carrying capacity of the cayes will be developed.
31.) Maximized opportunities for Belizeans on all levels of the tourism industry will be promoted. Tour guiding on the cayes will be promoted, providing that proper training and registration is followed.
32.) All archaeological and wreck sites will be identified and consider for protection under the relevant legislation.
33.) In relation to protected areas and wildlife exploitation, areas will be identified for protection, which should include important mangrove stands, and these will be prioritized for declaration. Reef and wetland areas including cayes will be assessed for listing as either World Heritage Sites or Ramsar Sites.
34.) Protection of the cayes or parts of cayes will only be carried out after viable management has been identified for these areas, and only if maximum stakeholder involvement in the process has been achieved.
35.) Littoral forest recommended for their high value will be assessed for their protection potential.
36.) Traditional fishing rights should be respected in waters around cayes where it does not conflict with the Fisheries Act.
37.) Recreational, and sport fishing will be promoted in accordance with the necessary guidelines.
38.) Native fauna and flora unique to the cayes will be afforded full protection under the Wildlife Protection Act.
39.) Water supply systems for all developments will use environmentally acceptable alternative to ground water extraction. Rainfall catchments systems will be installed for all developments and thorough research and monitoring will be undertaken before any wells are dug. Desalination and osmosis plants will be installed only if other methods of water extraction are not adequate for supply.
40.) Treatment of solid and liquid waste will adhere strictly to methods identified by the relevant agencies.
41.) The use of fertilizers, pesticides, herbicides and vermicides will be discouraged on the cayes. In the event that pesticides must be used, only biodegradable agents will be allowed in accordance with the Pesticides Control Board Regulations.

The aforementioned was a quick overview of the Cayes Development Policy. It’s an overarching and ambitious policy but it is projected that this policy will be a key policy within the Coastal Zone Management Plan and as such will be linked to the coastal planning programmes’ guidelines under the Plan. Upon completion of the Coastal Zone Management Plan, the Coastal Zone Management Authority & Institute in conjunction with other relevant agencies will ensure overall implementation. With this policy, it is expected that there will be greatly improved development and sustainable use of the cayes. Thank You.
Introduction
I was approached by personnel from the Coastal Zone Management Authority and Institute (CZMA&I) on or around the 29th January 2003 to provide input into the development of a Marine Dredging Policy for Belize. Since then, we have tried to come up with something. What I am going to present today is an incomplete draft of it. It represents the position of the authorized agency, Geology and Petroleum Department, but there is also allowance for input by the CZMA&I, Fisheries Department, and other authorities that are legally responsible for the coast.

In 1995 the Geology and Petroleum Department recognized that we had a lot of Acts, which gave us the authority to do certain things. Out of these Acts, we had regulations that were more specific as to how certain things that were proposed under the Act or mandated in the Act, were to be carried out. However, it was realized that there were no linkage between the technocrats who had all these Acts and Regulations to monitor and the political level where there are the policies, whether ad hoc or written. We recognized that there was no policy linking the extraction of minerals, for example, what it is the Government of the day wanted to do. We could have all kinds of polices, concise and very intensive ones, but if they do not fit in with the political mandate and direction of the time, they will become just another document that sits on somebody’s table and then thrown away. It is with that background that we recognized we needed to come up with something relevant to dredging in the marine environs.

The first approach in developing this policy was to answer the question “Why a Dredging Policy?” In Belize, most of the coastal area is either at sea level or below sea level. In addition, in the 21st century, there has been a catalytic increase in demand for coastal lands for real estate. Whether it is for tourism or a fishing camp, there has been demand for surface rights. Along with this, we recognized that we needed to identify cheap sources of fill. In the past, we have had lobbying for no dredging and recently, we have heard complaints that there should be no dredging for the creation of land. However, even
these we have to look at in a different light. We should not say ‘no’ but look at the circumstances that will allow for them. We must think about balancing development with the environment.

We also had a situation where people were recommending that you go to the mainland to get your fill if you wanted to do a development on the cayes. This may be very good from an environmental point of view but we have to also balance the economic cost. We recognized that people wanted a source of fill that was cheap, the cheaper the fill, the more they can maximize the profits. It is against this scenario, background, and preamble that we decided to propose this dredging policy, and it is currently an incomplete draft.

**Policy Objectives**

In developing the current document, we identified one major goal and six objectives to achieve the goal attainment. The goal is to *create an environment conducive to the integrated management of Belize’s coastal and marine resources via transparent mechanisms, which include inter-alia inputs from all stakeholders*. Under this goal, six objectives for goal attainment were identified. These are:

1.) Obtain a clear understanding of proposed activity or activities related to dredging along the coast, offshore cayes, barrier reef and atolls, and marine waters of Belize. All applicants wishing to dredge in Belize’s marine environs, whether coastal or offshore, must lodge a project proposal along with an application form directly to the Inspector of Mines or indirectly via the Fisheries Department and/or Coastal Zone Management Institute & Authority.

2.) Provide for ongoing and future research and development (R & D) relevant to and as a consequent of coastal offshore marine dredging. For example, there will be provisions of monies to be set aside for undertaking necessary R & D for large scale dredging operations. Large scale simply means the extraction of any volume of material in excess of 16,000 cubic yards.

3.) Provide for the monitoring of marine dredging by competent authority/authorities. The monitoring of all sanctioned marine dredging will be undertaken by the Inspector of Mines in connection with other authorities that are responsible for the management of marine and coastal resources. All dredging within coastal and marine areas and on offshore cayes and atolls of Belize shall employ sedimentation curtains at all times during dredging, except where water depths are such that the use of such curtains is impractical. All contracts to be issued from the Geology Department will have this clause. Adequate containment structures such as berms and sedimentation ponds must also be erected by contract holders in order to minimize the effect of sediments in runoff and returned waters to the marine environment. The cost for monitoring will not be borne by the monitoring agent, but by the proponent. The contractor shall bear all cost associated with the monitoring of his project by authorized agencies.
4.) Allow for protection of the Barrier Reef System and the cayes. A specified distance from the shoreline for dredging will be set based upon consultation with relevant agencies/individuals.

5.) Adhere to the concept of good neighborliness and the right to know certain basic principles of law. If you want to do any development in your area that will involve dredging and you have a neighbor, you must inform your neighbor of your intentions. Also, if you can afford it, offer your neighbor or the village council as the case may be, five percent of the material and then let them decide whether they want it or not. Five percent of fill is five percent more than that person had the day before. In the past, this has worked to pacify controversies in relation to the execution of such activities. In anything that you want to do, even if it’s only going to benefit you or you believe it’s your personal thing, it’s good to let your neighbor or the communities know. They have a right to know. Thus, during the processing of an application to extract minerals or materials from within the environments, the applicant must seek the written support of relevant bodies, including Town Council, Village Council, etc. If such support is not forthcoming within 14 days, the applicant may appeal to the Minister responsible for minerals whose decision shall be final on the matter. In any policy, one must remember the applicable laws, and therefore, any and all extraction or dredging, including within the coastal and marine environs, shall comply with the Laws of Belize. In this case, the Belize Mines and Mineral Act and the Mines and Mineral Regulation, there are two of them.

6.) Implement a security bond. The proposed dredging policy that came to me had a section that dealt with security for compliance. The problem with this is that it was stated that any applicant who wishes to dredge must pay a performance bond. It’s an excellent idea in theory but the authorized agency, the Geology and Petroleum Department (GPD), is already doing this. It is a standard feature of all our permits whether it’s for dredging along the coast or emplacing shrimp ponds. The security for compliance that the dredging policy will be dealing with cannot be a performance one; it cannot be the same as the one the GPD already has in effect. This security bond, on the other hand, could be related to use of the coastal resources. However, there is a need to decide on the parameters that the developers must comply with.

**Conclusion**

The GPD is awaiting input from relevant agencies. Once such inputs are received, discussed and agreed upon, they will form the rest of the objectives of the proposed document. Finally, I would just like to state that extraction is not only for mineral. There is also oil out there. I would think everybody would like us find it. Not only for the pollution component that we have to deal with but so that we can have our own source of energy. I have linked the proposed dredging policy with the Petroleum aspect. The proposed Belize Marine Dredging Policy shall not be prejudicial to the rights of the holders of a production sharing agreement awarded by the Government of Belize under the Petroleum Act.
PANEL DISCUSSION: MATTERS ARISING FROM SESSION 1

1. Of the US $5.00 per cruise ship passenger charged by the Belize Tourism Board (BTB), US $1.00 goes to the Protected Areas Conservation Trust (PACT) and the remainder is divided between the BTB and Belize Tourism Village. The exact figure (total) received by each agency per month is contingent on the arrival numbers, which vary. An approximate $33,000 per month goes to the BTB. The money that goes to the tourism village is utilized for maintenance and improvement in investments.

2. There was a moratorium in existence since the early 1990’s on the ‘whole’ sale of small cayes. It was brought to light, however, that this moratorium was not gazetted (therefore not official) but was rather a policy that came out of Cabinet, which sets a hold or freeze on the sale of an entire caye. With change of Government came a change of policy.

3. A concern was raised in relation to the purchasing of a property from a developer who had previously received a dredging/mining permit for the area. The new property owner, instead of applying for another permit, proceeds to dredge under the previously acquired permit, which is illegal. The Director of the Geology and Petroleum Department (GPD) stated that there is a penalty for illegal dredging/mining, however, often time such incidences are reported to the Department of the Environment (DOE) rather than the GPD; the agency responsible for extraction. The DOE usually issues a stop order. The penalty for illegal dredging is $5,000 for an individual and $25,000 for a company with the possibility of confinement if it goes to court.

4. A concern was raised as to whether a socioeconomic survey was conducted to address the benefits gained by local communities or Belizeans from the cruise industry. Mr. Mahler, the BTB rep stated that the BTB through consultation with the Central Bank and Central Statistic Office conducted a visitor and expenditure motivation survey to get certain figures. The analysis of data collected from this survey is currently being carried out.

5. On the issue of benefits to stakeholders and communities from cruise tourism, it was pointed out that there needs to be a showing of what is being distributed, shared and trickling down, more detailed studies need to be carried out to highlight the way(s) it is impacting the various sectors. The figures currently being reported tend to be macro figures (e.g. Belize benefited with X million dollars in this area, etc.). A study needs to be designed as soon as possible to indicate how the different sectors are benefiting, be it taxi drivers, other service providers, local communities, etc. This is not happening as yet.

6. It was recommended that a service charge be collected for the use of the coastal resources; such a charge should be independent of that which is being paid to
obtain permits. This will ensure that users of the resources will pay for the true value of the resource. Attached to this also should be a charge to cover the cost of monitoring by relevant agencies.

7. A concern was raised as to whether a percentage of the money received from the cruise ship passengers head (that which is obtained by BTB, PACT and the tourism village) is reinvested to ensure sustainability of the ecosystem, which these people come to enjoy. It is important that this be addressed for it is bad business to not reinvest in the business.

8. A concern was raised as to whether the draft Cayes Development Policy went through a consultation process. It was made mentioned that the draft Cayes Development Policy had indeed been through a process of consultation with many stakeholders and is now at the point of discussion with inter-agency and departments. Subsequent to such discussions, it will go through another process of public consultation.

9. It was mentioned that a problem with going through the consultation process is obtaining response/feedback from stakeholders. Most often it is not forthcoming. On the contrary to this, it was also mentioned that the problem might not be response but the procedure/methods utilized in conducting the consultations. Sending out questionnaires is one method that should be used but there are other methodologies that could be utilized to get stakeholders involvement. These need to be investigated.

10. With the current unexpected large increase in the cruise ship industry and the lack of the necessary infrastructure, it was suggested that a moratorium be set in place to put a top level on the number of tourists that would be allowed to visit per year. With this in place, time could be spent to deal with other important matters such as conducting carrying capacity and socioeconomic studies, etc. The establishment of a moratorium is sometimes look at unfavorably by Government and policy makers as you are restricting growth in the short-term even if there are greater benefits in the long-term.

11. Prior to the construction of the tourism village, the limit that was set in terms of the number of cruise ship passengers disembarking in Belize City was 3,000/day. With the operation of the tourism village, this has been expanded to 6,000/day; equivalent to three large cruise ships per day. However, there is lobbying by private sector groups to allow up to five cruise ships on certain days. This will be addressed during the revision of the Policy. From a licensing standpoint, the BTB is currently only allowing three ships per day.

12. An inquiry was raised as to whether a tourism village is necessary before cruise ships will be allowed to dock at other locations within the country. It was mentioned that having a tourism village is one of the main attraction. It allows for a larger disembarkation number as well as safety. You have to deal with liability
issues. If someone should fall and get injured, the cruise lines could be sued. Small cruise lines, however, do dock at other locations.

**Conclusion**

It was realized that many other policies could have been addressed under Session 1, however, due to the short time frame allotted for the symposium, it was not possible to do so. Some of the most important ones, however, were tackled.
Abstract
The National Policy for Aquaculture Development in Belize has been prepared with a view of guiding aquaculture development over the next 8 to 10 years (2002 – 2012). The Policy has been founded on the premise of sustainable development.

The National Policy for Aquaculture Development is structured in four (4) parts, which include; a mission statement, a number of policy objectives or policy statements, a list of activities and strategies to support each policy statement, and a set of 6 principles to guide the overall process.

Introduction
The National Aquaculture Policy is something very important for Belize. The shrimp farming and in general, the aquaculture industry has developed to a point where there is now a need for guided development to ensure that optimum benefits accrue to the people and country of Belize, and to ensure that the industry is sustainable in all aspects. There have been many discussions in regards to allowing farmers to regulate themselves but you simply cannot leave the ‘rat to mind the cheese’, so to speak. The Government of Belize and all the other stakeholders have to be involved. Self-regulation of the aquaculture industry is very valuable but only in certain areas such as voluntary compliance with code of conduct for the industry. This needs to be complemented by a holistic and integrated governance of the Industry.

Methodology for Policy Formulation
The development of this policy document commenced approximately nine months ago and it has been dragged out due to constraints in funding and in trying to get interviews with stakeholders. All sorts of methodologies were tried to attain interviews but in the
end, sixty individuals were interviewed. The review committee evaluated the first draft of the policy document, and their comments have been included in this revised document. This revised document has also been re-submitted for revision. It consists of three documents, the main report, which is the Draft National Aquaculture Policy and Zoning Plan for Belize and two schedules, which are the draft National Aquaculture Zoning Plan (schedule 1) and Draft National Policy for Aquaculture Development (schedule 2). The main report addresses issues such as practices, production and revenue, rolling national economic range, social culture and production practices, environmental issues, and hopes for future development. Every possible aspect was addressed in this national policy.

In schedule one, the zoning scheme, a zoning plan was presented. This document includes physical maps and discussions on cultural possibilities, environmental quality standards, and a list of topics or areas for further study. Schedule two is a synopsis of the main report. A mission statement was also developed and this is “to develop a globally competitive aquaculture industry to meet consumer demands at home and abroad for cultivated aquatic foods and products that are of a high quality, safe, affordable and wholesome, and that are produced in an environmentally responsible manner, with maximum opportunity for profit, social justice and sustainable in all aspects of the industry”.

Policy Objectives
There are twenty policy objectives and each is further developed into strategies and methodologies for achieving the stated objectives. Five of these objectives are: 1.) Invest in people through training and education, 2.) Improve food security and elevate poverty, 3.) Improve the management of aquatic animal health to reduce the risk of disease in farm and wild stocks, 4.) Expand society and economic benefits to impact the wider community and country, and 5.) Maximize the efficiency of resource use and minimize waste output.

Under investing in people through training and education, issues such as development of short-term training programs to target potential fish farmers, integrating aquaculture into the curricula of the UB and 6th Forms, and development and dissemination of public education materials such as pamphlets, brochures, posters were discussed. Under maximizing the efficiency of resource use and minimizing waste output, issues such as adoption of judicious husbandry practice at the level of the farm such as best management practices (BMP), investigating the potentials of using other land systems apart from the primary Toledo Pulledan Plain, such as the Stann Creek plain and Corozal salient swamp, and implementing land reform schemes to reduce or eliminate lands speculation and tenureship of unnecessary large tracts of land by a few shrimp farming operations. Within the Policy document, strategies and methodologies for achieving each of the twenty objectives are discussed.

Guiding Principles
Some guiding principles were also utilized in developing this policy. We used the Precautionary and the Polluter Pay principles, and the integrated planning and management approaches such as the coastal zone management (CZM), integrated coastal
management (ICZM), Enhance Sector Management (ESM) and water shed management, cost benefit assessments, carrying capacity focus and the Best Management Principle (BMP) application. We also conducted thorough research in regards to the zoning of the coast, and the coastal and inland areas of Belize.

Conclusion
The second draft of the policy document has been submitted to the CZMA&I. It is expected that hard copies will be delivered to all stakeholders by the first week of June. A hard copy of the policy will also be available at the CZMAI’s Library, and it will be accompanied by a logbook to log your comments/input, should you wish to. We would appreciate receiving comments from the review committee and stakeholders by the 4th week of June. A workshop on the policy will be held in the first week of July, and all stakeholders will be invited. We also hope to receive some additional comments or inputs during this workshop. Inputs derived from the workshop and other comments sent in, would be incorporated into the final document, which we hope to complete by the 3rd week of July.
II. Landuse and Landuse influence on the Coastal Zone
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Abstract
Society depends on natural resources and ecosystems services for livelihood security and increased socio-economic development. Land use and land use changes brought about by driving forces such as economic activities and energy use, population increase, unregulated urbanization, and food production disrupt natural processes in the landscape. The relentless drive for economic development may be genuine, but globally the gap between the rich and the poor gets ever wider, at the expense of the environment. This paper reviews these phenomena and argues that the declining environmental quality resulting from unsustainable land use practices exacerbates the negative impacts of extreme hydrometeorological events such as floods and droughts, and impacts negatively on the coastal zone.

Introduction
The hypothesis is that land use and land use changes transform the landscape. They disrupt the hydrological cycle and impact the coastal zone. Land use and access to natural resources and ecosystems services are essential for livelihood, security and economic development of people all over the world, including Belize. Excessive land use transformation or landscape transformation, and unsustainable use of the same leads to environmental degradation and unpleasant surprises. For instance, activities in the watersheds can affect the coastal zone directly or indirectly. Water is a reflection of land use, what happens on the land is shown in the water, and water doesn’t forget anything. It has a very long memory. If you pollute the water upstream, it can result in impacting the coastal zone.
Natural Processes
In the hydrological cycle, the physical characteristics or things that happen are evaporation, condensation, and precipitation, and that water falls to the surface of the earth. When it falls to the surface of the earth, many things happen but even before the water reaches the surface of the earth things begin to happen. For example, the water may pick up pollutants in the atmosphere. Some of the precipitated water evaporates and some reaches the vegetation canopy. Some evaporates from the vegetation canopy and some eventually trickle to the surface. If there is no vegetation, the water ends up on the surface of the earth.

When water falls from the sky, it is partitioned into blue and green waters. The blue water is the water that falls on the surface of the earth and runs off or trickles down into the groundwater system. The green water is the water that the plant transpires, the water that the plants absorb through their roots and transpire to the atmosphere. There is also the concept of gray and black waters. These are the wastewaters that we, human beings, produce. If there are no efficient settling ponds or treatment plant, these are returned directly to the water sources and the pollution begins there.

Land use Influences
We have society and we have the landscape. The leaders of the society must facilitate access of food, water, and energy to the people, and protect them from natural and manmade hazards. On the landscape side, there are the natural resources – water, biogas energy and minerals. Society exploits or extracts natural resources from the landscape and this can impact the land or the water physically or chemically through waste and agricultural activity. Whenever you exploit the environment, you cause an impact, be it small or large, and the impact can lead to environmental side effects or degradation, degradation of the air, land or water systems. Society can either take a passive or an active response to the degradation. When leaders of a country or a community are not active or proactive, they take a passive move and the passive move can lead to suffering, morbidity and famine. It can also leads to poverty, disputes, wars, etc. If the community is active, it takes action such as implementing mitigation measures. It can resolve conflict or migration; people moving out of degraded areas to more pristine areas. If it’s an active response, the government or the policy makers can improve policies. Interaction with the landscapes becomes more positive when there is an environmentally sensible or sensitive government or leadership. Some environmental threats that can result from human activities on the landscape are dams, dikes and levees construction, and excessive river diversion or water abstraction.

Consumption grows or changes as the population increases and we become more affluent. People want better things and they exploit the resources of the environment even more. There are emissions of air pollutants, which could influence global climate change. Uncontrolled pollution is another important factor and very critical in relation to fresh water resources and over harvesting. Over harvesting can occur in the coastal zone or the landscape, for example, if you put a hundred cattle in a small little pasture in the dry season, they can deplete the grass; a process referred to as over grazing. Another form of over harvesting is deforestation. Deforestation alters runoff patterns, inhibits natural
recharge, increases sediment loads and accelerates soil degradation, and increases vulnerability to droughts and floods.

The forest canopy protects the land. When you have clear cutting of steep slopes, there is quick runoff. This leads to soil erosion and increased sediment loads entering drainage channels, which can result in blocking the channels. The severe flooding in Belmopan and the Beaver Dam area in June of last year was as a result of situations such as this. People are clearing the land and not looking at the repercussion of their actions. Clearing the land is good to a certain extent because we have to develop but it must be carried out in a sustainable manner. Urban development on steep slopes or the landscape also leads to quick storm runoff and flooding. Floods occur when water is channel into streams much faster than it normally does with no percolation to the ground water zone.

Conversion of land into farmland also leads to soil degradation or erosion. Furthermore, in the agricultural setting, there is the use of chemicals and nutrients on the land and these can also end up in the channel. Unsustainably land use practices in the watershed and coastal zone leads to environmental degradation and poor water quality. Poor water quality is a reflection of land use. Pollution can originate from point sources, industrial plants or non point sources, which are the agricultural lands. Land degradation is any form of deterioration of the natural potential of land, which affects ecosystem integrity whether in terms of reducing its sustainability, ecological productivity, native biological richness or resilience. Degraded land is also very prone or vulnerable to extreme weather conditions.

Pollutants enter surface water directly via deposition or indirectly through runoff. They can be transported via erosion, leaching (e.g. from waste disposal sites), absorption or decomposition. Pollutants also enter the surface water via interflow or sub surface flow, and within the unsaturated zone of the soil. They can be transported through the soil via absorption, deep sorption, oxidation and decomposition. When there is interaction between the ground water and the surface water, pollutants can also percolate into the ground water system. Pollutants also undergo a lot of transformation when in contact with water. In streams or in stream channel, pollutants pathway to the coastal zone include sedimentation, re-suspension, and transformation. Agrochemicals like nitrogen and potassium can also reach the coastal zone via the water transport medium or through the sediments.

The Chetumal Bay and Belize City are two areas where activities in the watershed are probably having an impact on the coastal zone. There are two projects that we are currently working on to address such activities and to manage the watersheds in a sustainable manner. One is incorporation with Mexico and Guatemala in the Rio Hondo and the Blue Creek areas and the other is in the greater Belize river basin, which includes the Mopan River (coming from Peten), Macal River, and the greater Belize River that runs to Belize City. The components of the Mexico and Guatemala proposal are: 1.) Conduct a rapid ecological assessment (REA) and a transborder diagnostic analysis (TDA) of the greater Rio Hondo Basin, 2.) Implement integrated water shed management practices within the greater Rio Honda and Belize/Mopan river basins for sustainable
development and to reduce impact on the coastal zone, and 3.) Develop an effective early flood warning system.

This year Belize experienced a very long dry season, with many birds and chicken from the Mennonite and other farming communities dying as a result of the extreme heat. We need to consider such mortalities because they can have an impact on our economic development and it can get worse with climate change. Drought is also something that we need to consider. Drought, however, is something that does not occur in one day. It takes a number of weeks or months to develop and it moves through different ranges, from a meteorological to agricultural to hydrological drought, which is when the society begins to feel the impact of the shortage of water; which is the most extreme case.

What should be of greater interest to Belize is flooding, though. If we do not take precautionary measures or implement sound management practices, especially for steep slope areas like in the Stann Creek District, further down south, and in the Cayo District, factors such as flash floods could occur in the event of extreme rain fall, and we have experience heavy rain fall already. In June of last year, for example, we had almost 32 inches of rainfall in less than two days, and that is extremely high. This is the trend that we will be faced with as global and local climate change kicks in, which could occur within the next fifty to seventy-five years.

In conclusion, I would like to reiterate that the implementation of improved land use policies and practices, poverty alleviation strategies, disaster awareness programs, effective early flood warning systems, and early drought warning systems can help to mitigate the impact of natural disasters. There is also a need to rehabilitate degraded landscape, improved livelihood securities in communities and diminish pollution load on the coastal zone and the marine environment.
Abstract
This presentation highlights the positive responses from the results of the WRIScS project in Belize during 1997 – 2001, which has encouraged this new WRIScS proposal. The planned project, which is still in development stages, expects to address Regional Connectivity for 2200 kilometers along the Caribbean coast incorporating Belize, Guatemala, Honduras, Nicaragua and Costa Rica.

People working with Government, Universities, NGO’s, private companies and coastal communities are encouraged to become involved in the project through initial interaction with the www.wriscs.org internet site.

Introduction
The planned project for 2004 is a third phase of the WRISc Project, which began in 1997. This proposed project, however, will be of a larger scope. It will be a regional project, associating the Caribbean Region and Central America from the Chetumal Bay to Costa Rica but particularly focusing on locations near Puerto Limon, Nicaragua. There will be two main areas of the project, the Nicaragua and Belize areas. The project is currently in its planning stage and funding is being sought.

The Watershed Reef Interconnectivity Scientific Study (WRIScS) project was active in Belize from 1997 to 2002 and it addressed concerns in relation to irrigation in Belize’s coastal environment due to land use changes such as agriculture and forestry. The initial phase of the project concentrated on the Stann Creek District and on providing scientific answers as to whether the citrus and banana plantations were influencing river runoffs. The project was very effectively staged by a working group comprised of key Belizean institutions involved in the management of land-sea interactions. The funding for the project was donated by the development directorate of the European Union and matched by funds raised by youth volunteers on Raleigh International expeditions. It was directed
by a group of UK environmental scientists but primarily implemented through a local project team, which included Belizean staff. 

**First Phase Project Findings**

The success of any project can be assessed using many criteria. Some of the most important questions that were asked in relation to the effectiveness of the WRIScS project were: 1.) Was the study able to answer concerns? 2.) What was the assessment of the local population? 3.) Was the impact of the project sustainable? 4.) Was the project cost effective? and 5.) Did the study meet the expectations of the funding agency? In relation to the ability to provide scientific answers, the project was successful for the Stann Creek District, and in relation to detecting changing sediment loads and associated contaminants. The results revealed that changing land use was increasing soil erosions and the delivery of sediment and contaminants to the coastal zone. However, due of the existence of natural systems, the coupled river discharge and coastal sediment transport did not appear to be having any significant effect on the barrier reef. Long term monitoring, however, was recommended to monitor this situation.

**Concerns Regarding Project Sustainability**

The feedback received by the project team was very positive but the true answer lies in the hearts of many members of the audience today. That is “Was the impact of the project sustainable?” The sustainability of the project is now a key issue in the world of international aid. In assessing their performance, the WRIScS team believes that they have left behind a lasting legacy in Belize but there could have been better outcomes for many aspects of the project. The team is very cognizant of the fact that after only four years of working on the project, they approached some practical appreciation of how the sustainability issue can be best approached in the future. Using financial resources effectively is another key issue. The WRIScS spending was very tightly controlled and focused on the project’s principal objectives, which were data collection and capacity development through demonstration projects. The US $1.5M that was invested in the project was spent over a 4 ½ year period. Raleigh International contributed to maintaining encampments at three remote locations on the reef through eight three-month expeditions. This allowed for approximately six thousand survey-man days of intensive field data collection.

Through the various feedback mechanisms that were employed, the European Union (EU) funding agency was able to receive excellent reports of the project, and they were very pleased with the project. The net result of this positive impact prompted the UK management team to consider a new phase of the WRIScS project. The EU has also responded very positively to this suggestion and there is an intention to make a new bid for funding.

There is wide international concern regarding the present day effects of the discharges from the land on coastal ecosystems. The Mesoamerican Barrier Reef System Project identifies this as one of the five most serious potential costs of coastal degradation. It is particularly worrisome when the compound effects of these threats are examined. To give
one example of this, while the WRISc study indicates that the effects of land use change alone may not be significantly affecting the reef, the combination of these effects with those induced by global warming may be far more threatening. This is because global warming is raising sea levels, which may decrease the shelter the reef provides from ocean waves, thus, increasing wave energy at the coast. This could mobilize presently stable sediments near the river mouths, dispersing associated contaminants and therefore increasing the likelihood of damage to the reef. Thus, there is a great need for local capacity for effective monitoring of the regional coastal environments.

Second Phase Project Objectives
The approach planned for the proposed new work programme is similar to the past project however, with significant new elements. Firstly, the project will be regional, involving neighboring countries in Central America who share the same river drainage systems and coastal water circulation. Secondly, the programme will address all phases of material transported by the rivers. Not just sediments but floating materials, benthic sediments and dissolved material. The third difference lies in the fact that the primary project aim is to encourage sustainable long-term local activity for monitoring conditions in the coastal zone.

Belize has traditionally looked at the Caribbean Island community to share environmental monitoring experiences. However, when dealing with shared rivers systems and coastal water circulations, it makes more sense for Belize to develop links with her Latin mainland neighbors. As such, the Caribbean Coast from Chetumal to Limon is proposed for inclusion in the new WRIScS project. Appreciation of the different conditions and processes active along the region’s coast can be beneficial to Belize. For example, should the Barrier Reef degrade in the future, the southern Nicaraguan coast is a model for the conditions that may develop. The project also aims to connect coastal zone managers across national boundaries. It hopes to bring the wide spectrum of people who aspire to make scientific observations along the coast of the region closer together. Apart from being a small group in Central America, these people are very motivated, and have the institutional support that is required. They would benefit from closer interconnectivity. The project’s main hydrological focus is to quantify exactly what the rivers are constantly delivering to the coastal zone. It would be a great achievement if this information could be efficiently recorded and immediately made available to the public, for example, via the Internet system. In this manner, government will recognize the impacts that national activities are having in shared coastal rivers and hopefully take responsibility for such actions. Five years ago, speaking of such an Internet facility would have been looked at as taking on a huge task with high long-term maintenance cost. Recent developments in satellite communication systems, however, means that such programmes could be taken on within existing national budgets.

Monitoring Systems
To complement the REV monitoring system, the WRIScS project intends to continue to develop a methodology to allow ocean color satellite data to be cheaply used to monitor coastal water quality even in shallow coastal areas, where seabed visibility causes a problem. The pilot study that was conducted during the final year of the second phase of
the WRIScS project provided very encouraging results. To complement these data, more efforts need to be put into taking measurements at sea to understand and monitor the natural system. Belize currently leads the region in this respect, with the CZMAI activity, but there is no room for complacency. At the other extreme, Nicaragua currently has no active monitoring of marine conditions on its Atlantic Coast. WRIScS would need to work with helping to build coastal observations stations. The WRIScS proposal to build or upgrade coastal monitoring centers to a regional standard has been named CICOCOA - Centers for Coastal Connectivity or Centros de Conectividad Costera. In improving the coastal monitoring capacity of the region, there is much scope for innovative thinking. An example of this is WRIScS’s intention to explore the use of fast sailing Catamarans to provide cheap, silent and pollution free monitoring platforms.

**Education**

All activity planned for the WIScS project will have to be sustainable. Forty teams have been identified, which should enhance sustainability of monitoring operations. One of these important cross cutting teams is the role of higher education in coastal zone management. Educational institutions can play a pivotal role in effective management of the coastal zone. Professional education is needed to improve the effectiveness of scientific observations, and public education is needed to persuade stakeholders and the wider public to conform to conservation efforts. There appears to be some public contention over the role that the region’s universities are adopting in relation to coastal zone management.

**Conclusions**

The WRIScS team wants to hear your views on the design of the project from the earliest stages. This is to ensure that the emerging project is in step with both current levels of capacity and aspirations for development within the region. A bid for funding will be made later this year but in arriving at a design for the project we intend to present to the EU, the WRIScS team wishes to make sure that all their potential partners in Central America will support the application. It is somewhat an experimental approach but we have produced a simple website where we are presenting our ideas for a project in a step-by-step fashion, and are inviting interactive discussions with all stakeholders to guide the project design process. The intention is to ensure the fullest accord between potential participants in the project and the approach to be adopted by the project. Some issues may prove to be a little controversial. Many key institutions are already aware of the website and the presentations, and discussions that are just beginning. The WRIScS team hopes it is going to be a very communicative, informative and useful process.

If you are interested in watershed/coastal zone connectivity issues, please do take the time to log on and join in the debate. Entrance to the site can be found via the [www.wriscs.org](http://www.wriscs.org) website. The WRIScS Team apologizes for not being able to make it today, and ask that any comments or questions regarding this presentation be forwarded to the following email address: wriscs_comments@ambios.net.
Panel Discussion: Matters Arising from Session 2

1. It was mentioned that resources would be made available to the University of Belize to develop an aquaculture curriculum.

2. It was mentioned that a Bill would be developed under the Fisheries Act to address aquaculture issues. This will allow for better regulation of the Aquaculture industry. The Bill will be drafted and follow the process of a regulation under the parent Fisheries Act.

3. A concern was raised as to whether there are any policies in place that address agricultural activities that influence the condition of the watersheds and coastal zone of Belize. It was mentioned that the Pro Tem Water Commission would be proposing policies to the Government of Belize on how to protect our watersheds. Other than this, there is the Wild Parent Forest regulation under the Forestry Act that states that a 66ft buffer of wild parent forest must be maintained along all river channels and active water bodies. There are many locations, however, where this is being degraded. At such locations, wide spread erosion can occur and agrochemicals can enter surface water.

4. It was realized that it is difficult to reach conclusions when there is no monitoring in place. It is, thus, crucial for permitting agencies (including the DOE) to have the capacity to sustain environmental monitoring.
5. There is a new science in ecological or environmental work known as forensic ecology. This allows you to determine the cause(s) of something even if no baseline information is available. It allows you to build a picture backwards even if there is very little information available at the site. This is something important that we should investigate.

6. There is a need for the students of the University of Belize to take ownership of environmental monitoring. We are the only country in the region where the university students do not ‘cry out’ when there is an issue. University students should try to be major players. This is important because if our future scientists, who are the university students, are not saying anything then is everything fine or are we just living in a dormant and docile society?

7. It was recommended that examples be made of individuals or companies who break environmental laws. They should be penalized via all possible means. This would serve to inform the general populace of the effects of such adverse actions.

8. Mention was made of the importance of putting complaints in writing. In submitting formal complaints to the various governmental departments or permitting agencies, it is best to send a letter rather than just calling. This provides a written record of your complaints.

**Conclusion**

It was realized that in someway, we all live within watersheds; we all live downstream and this should be of great concern to us. We should each try to play a role in protecting our watersheds.
I. **Benefits of Coastal and Marine Tourism to Belize**  
*Mr. Andrew Godoy - General Manager, Belize Tourism Industry Association*  
Email contact: gm@btia.org

**Abstract**  
Tourism is by far the most important industry in Belize’s services sector, providing jobs, financial returns and opportunities for micro-business development. A recent Visitor Expenditure and Motivation Survey showed Marine Attractions to rank the highest percentage decision-making factor, which influenced visitors to choose Belize as their vacation destination. The survey proved that marine activities remained the biggest selling point for Belize, with the most popular being snorkeling followed by diving. Yes, water-based interests were more popular among visitors, leading with the cayes, the Barrier Reef, Shark-Ray Alley and Hol Chan. Other inland coastal destinations, including the southern destinations of Hopkins and Placencia are also a must see for travelers. So then, it is safe to say that Belize depends greatly on Coastal and Marine Tourism for its economic survival.

**Introduction**  
If you were to ask any Belizean today what’s the fastest growing industry in Belize, the answer no doubt would be tourism. In Belize, tourism currently is a business accounting for almost 16% of our country’s gross domestic product. Tourism provides jobs, financial returns and opportunities for micro business development, making it by far the most important industry in Belize’s services sector. What is the driving force behind Belize’s overwhelming success in tourism growth? What is it that is calling hundreds of visitors, even thousand each year to our shores?

Tourism is primarily focused on the coastal areas of Belize. An estimated 75% of the country’s hotels are found on the cayes and along the coast. A recent visitor expenditure and motivation survey showed marine attractions to rank over 50%, the highest percentage decision-making factor, which influence visitors to choose Belize as their vacation destination. Climate and the people rated second and third respectively. Among marine activities were swimming in the warm clear waters, which are protected from rough surf conditions by the Barrier Reef, scuba diving along Belize’s Barrier Reef, which provides numerous opportunities for all levels of diving from novice through advance, and snorkeling which like diving is a very popular tourist past time. Other areas of marine interest are fishing along the rivers, reef flats or deep sea, boating, wind surfing, sea kayaking and jet skiing. The survey proved that marine activities remain the biggest selling point for Belize. Of all the marine activities, the most popular was snorkeling along our reefs with over 62% participation rate, while another 30% of visitors participated in diving. When asked to rate the value of their marine travel experience to Belize, over 46% of visitors rated marine attractions as excellent and another 22% rated it as good for an overall satisfaction rate of 68%.
How fitting is the phase, “tourism means business”, when we look at the growth of employment in the tourism sector from an estimated 4,000 in 1993 to approximately 7,000 in 2000, and the number keeps on increasing since the introduction of the Belize Tourism Training Unit just over two years ago. Today, it is estimated that tourism provides employment for one in every five person in our work force.

**Recognized Entities that Enable Sustained Benefits**

The BTIA supports destination branches in areas such as San Pedro, Caye Caulker and the southernmost coastal parts of the Stann Creek and Punta Gorda Districts, which have been working diligently to create sustainable development plans that would safeguard the use of our coastal resources and marine attractions for present and future generations. We have been instrumental in our talks with government to set in place the proper infrastructure in these areas, including upgrading of the roads to Placencia and Hopkins, and the renovation of the Caye Caulker and Placencia airstrips. If Belize is to continue experiencing increases in tourism arrivals to these coastal areas, there has to be proper infrastructure to encourage greater economic activities. Belize must also work to sustain the capacity of the resource base to deliver economic benefits while maintaining the overall economic ecosystem function.

The economic value of coastal and marine tourism to Belize is great in numbers, which is why it is important for us to have in place the proper mechanism to monitor the use of these resources in an efficient and sustainable manner. One way in which the Belize Tourism Industry Association has sought to address the issue of sustainability of the reef is through our ongoing COMPAC/GEF Small Grants Program Project, whereby we have trained over 100 individuals, men and women in five of Belize’s targeted coastal destinations; Sarteneja, Caye Caulker, Hopkins, Placencia and Punta Gorda. These individuals were trained to be efficient tour guides. The overall objective of this training was to provide fisherfolks, as well as those who traditionally use the Belize Barrier Reef extensively for economic survival, with a sustainable alternative means of providing income through guiding. This, we felt, would mitigate the level of impact these individuals have on the reef whether through fishing or just taking tourist in boats to the reef. In some of the communities targeted, many of the participants were engaged in grave over fishing as they depended entirely on fishing on the reef as their primary mean of economic survival and for providing for their families. Sixty-nine of the fisherfolk, who took the training were certified as tour guides. This means that with the increase in tourist arrival and their overwhelming interest in marine and coastal attractions, there would be more guides in these coastal areas to help sustain the already high percentage of visitors’ satisfaction.

Another area of interest, and where the work has been great is the development of guidelines for the Turneffe Islands. This was carried out through all the relevant stakeholders, including the BTIA. Other organizations such as Programme for Belize, Toledo Institute for Environment and Development, Friends of Nature and Green Reef, have all contributed enormously to the sustainable development of our coastal communities. We also cannot forget the hard work and determination of one man, Lionel “Chocolate” Heredia, whose conviction saw the recognition of the Swallow Caye
Manatee Reserve. Whatever role each of us play, whether as individuals or part of an organizations, in the sustainable development of our coastal resources, we have no doubt contributed to tourism in a positive manner.

Cruise tourism in 2003 is already turning out to be another record-breaking year. Compared to 48,116 in 2001, cruise visitors for 2002 peaks at 319,690 and is projected to even double that figure for 2003. Of these visitors, the Blue Hole National Park saw some 8,485, while the Halfmoon Caye National Monument saw some 10,207 visitors. The Hol Chan Marine Reserves registered some 46,404 visitors for 2003, giving a total altogether of 65,096 visitors for only these three locations. Thus, there is a need for us to ensure that the right studies are conducted for each of these sites, and that we adhere to the carrying capacity for these sites. Failure to do so may deplete the very resources that the industry is heavily relying on for its economic sustenance.

**Requirements for Sustainable Growth**

It is time for us to enforce guidelines that will monitor visitors’ experience at attraction sites, thereby ensuring that they remain at the high level of satisfaction they are currently boosting. National policies, regulations and institutional arrangements for marine ecosystem conservation and sustainable use must be coordinated and strengthened. As indicated in the Coast Zone Management Strategy for Belize, we must promote measures to reduce non-sustainable patterns of resource use, focusing initially on the tourism and fisheries sectors. Of equal importance also is the need for us to strengthen existing marine protected areas and establish new protected areas along intrans-boundary locations. We should not become complacent with the work that we have done so far. After all, development in coastal areas will increase the numbers of people and the extent of necessary infrastructure.

Environmental education and public awareness must be at the forefront of all plans that are developed to promote conservation and sustainable management of coastal resources. It is also important that we institute the tourism best practices that were developed, primarily relating to issues of coastal and marine resources. Our works must also be regional as in the case of the Mesoamerican Barrier Reef System Project. We must work with our neighboring countries of Mexico, Guatemala and Honduras who all share a common reef system with Belize.

The livelihood of our tourism industries is largely dependent on the reef system and our coast. Without our rich and healthy marine attractions, tourism as we know it today would not exist. Let us continue working hard at creating and sustaining that balance between increased economic coastal and marine tourism activities and a sustainable coast through tourism best practices. Thank You.
II. Benefits of the Fisheries Industry to Belize
Mr. Robert Usher – Northern Fishermen Cooperative Association
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Introduction
Belize is a coastal nation with a territorial sea running the entire length of the country. The territorial sea is the area where our coastal nation has the exclusive right to fish. Most fishing activity is done within our coastal zone, which is inside our main barrier reef but also includes the Turneffe, Glogers and Lighthouse reef atolls. The fishing co-operatives of Belize have, over four decades, evolved with the exclusive right to export coastal shellfish and finfish resources. Therefore, fishing co-operatives members does the majority of commercial fishing in the coastal zone. These marine resources have positively impacted the members, families and communities of fishing co-operatives in the city, towns and villages along our coastal zone. Coastal zones are very important for the health of the marine ecosystem and any pressures now and in the future can negatively impact the aquatic resources of Belize.

Status of the Industry
The fisheries industry has evolved considerably over the years since the first fishing cooperative was formed. If you take notice of the numbers today, the industry, in terms of both wild catch and farm-raised species, is being overwhelmed by the growth and proliferation of farming activities in this country. Currently, there are over fifteen active shrimp farms. The Tilapia farming that is in progress was one that was just established a few years ago but together these farms account for a major part of the income generating revenues that are brought into this country through the fishing industry.

Benefits
My talk is not about farm-raised fisheries. It is about wild catch marine species and the economic benefits that have been acquired by the users of marine fisheries in the coastal zone. The economic benefits are nothing less than significant as far as our harvest is concern. There are currently over 3,000 licensed fishermen actively earning a living through fishing within Belize’s waters. Their catch is such that they are able to make quite a comfortable living.

Concern
Although the catch is good, it has fallen below that which existed in the past. The extensive fishing pressure over the past forty years has result in lowering fish stock. At some locations the stock has reach the point of almost total depletion. In the past, when the industry was young, there were only about 150 to 200 fishermen. Today, there are about 650 fishermen in the society alone. The fishery is such that its income generation is lower than what it was.

Another factor that has been equated to the lowered fishery stock is dredging. Dredging activity has resulted in destroying nursery habitats at a number of locations. A good example was the situation at Caye Caulker.
III. Developing Alternative Livelihood - Belize  
*Ms. Shalini Cowich – Friends of Nature*

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**Abstract**

Programs to develop alternative livelihoods for resource users are essential for long-term conservation. Such alternatives should be sustainable, use the natural skills of the users, provide equal or greater economic benefit, and be readily marketable. Examples of successful alternative livelihood projects will be presented.

**Introduction**

Friends of Nature (FoN) is a community-based conservation NGO, whose office is located in Placencia Town. Presently, FoN co-manages the Gladden Split Marine Reserve along with the Fisheries Department, as well as the Laughing Bird Caye National Park along with the Forestry Department. As co-managers we represent the people of five coastal communities that have traditionally used these areas, Placencia and Monkey River towns, and Independence, Seine Bight and Hopkins villages. In working closely with the people of these five communities, we have found that the key to conserving natural resources lies in human resources. In fact we have a motto that reflects just that.

**Guiding Principles**

The communities depend heavily on the coastal and marine resources, and in some cases unsustainably utilize the resources, therefore, we need to help them find alternative livelihoods. Programs of alternative livelihoods are essential for conservation. Friends of Nature’s commitment to alternative livelihood is based on the principle that you cannot ask people to give up what they have unless you have something viable to replace it with. Viable alternatives have the following characteristics:

1.) They target resource users who employ unsustainable methods – we do not cut out their practices completely but rather help them to select methods that are less harmful. Exchange programs can be very useful for achieving this, for example, Friends of Nature has organized three exchange programs involving local fishermen, one to Cuba and two to Punta Allen Mexico. On all these trips, fishermen learned about new methods and better fishing practices that have proved very useful and sustainable for our neighbors.

2.) Use Natural Skill - it is crucial that these people use their natural skills. Most of them have their own motor boats, have excellent boat handling skills, and are familiar with the waters, cayes, dive sites, fishing grounds, and most are natural divers, so everything comes naturally to them.

3.) Must be sustainable - we should not change one unsustainable practice for another.

4.) Have the potential for equal or increase economic benefits or diversification of earnings. On a fulltime basis, this alternative livelihood needs to provide equal or
increase income. In many cases the alternative livelihood is par-time, for example, fly-fishing. Fly-fishing is seasonal. It is conducted approximately twenty days out of the year. Not only does this provide a significant bump to one’s income but also results in less time being spent fishing on the reef.

5.) Job opportunities must be available. For these programs to be successful, a market must exist for it. The Government needs to support these efforts by creating niches for Belizeans. We can train these people but if foreigners are allowed to come in and swamp the market or if the market does not exists, the training will be wasted.

Practical Examples
A few examples of our alternative livelihood projects are:

1.) Tour guiding - Friends of Nature recently organized a whale shark course for special certification at Gladden Split. All tours to Gladden Split must be led by one of these certified persons. Twenty-seven local community members will reap the benefits of the whale shark tourism. In the future, we plan to organize more whale shark courses in collaboration with B.T.B.

2.) Scuba diving - in collaboration with COMPAC, Friends of Nature trained thirty-six local community members in scuba diving, twenty three of which went from open water certification to dive master, and are all now certified Paddy Dive Masters. Most of them are now working in the field professionally with local dive shops and some with Friends of Nature as community researchers.

3.) Fly fishing- fly-fishing is the fastest growing tourism niche in the south. In fact, there are two new Lodges that have just been built and both were booked solid for this season. T.I.D.E. has conducted fly fishing training courses in Monkey River, Punta Negro, and Punta Gorda. That training provided the guides that the lodges utilizes for the season. This is clearly an area in which we expect further expansion.

4.) Kayaking- we have not done much with kayaking so far but we plan to because sea kayaking is an expanding market and Southern Belize is full of beautiful places for this activity. Those that are involved in this activity, small businesses such as guesthouses, restaurants, etc., have proven that it is lucrative. In many cases, these businesses utilized the natural skills of family members who are not necessarily the breadwinner. Not only do they provide added income but also the diversification of income.

Training can also be focused on small business skills, accounting, bookkeeping, etc., which is also considered as an extension of looking at alternative livelihoods or diversification of income and value added practices. For example, in Cuba and Punta Allen, fishermen have found that there is a premium paid for live Lobster. This is good not only for the fishermen but also for conservation in that you are able to measure.
lobster and return undersize ones, as well as identify and selectively remove females with eggs. Fishermen that went on the exchange programs to Cuba and Punta Allen had hands on experience with this.

Other possible alternative methods include:

1.) Smoked fish - the type of the fish used in this process is usually those that would not bring in a lot of income in the Belize market. For example Jacks. Instead of selling Jacks for two dollars a pound, fishermen can smoke Jacks and obtain up to twenty dollars a pound for this delicacy.

2.) Lobster Bisk - this entails the use of the Lobster head, which in Belize is usually thrown away. All the meat is removed from the head and is used to make a creamy rich soup; considered to be a delicacy.

Tangible Benefits to Locals

There are advantages of alternative livelihood programs. For example:

1.) The ability to target specific groups like women and youth. In a dive master training course that we sponsored, through special efforts, we trained 3 women who completed the course and are now certified dive masters. All 3 are presently involved in the market.

2.) The ability to use local trainers. In the dive master course, we used 6 local trainers from surrounding villages including a woman.

3.) Establish Exchange Programmes - these help us not to reinvent the wheel. In the programmes that Friends of Nature has carried out, we have brought back many lessons in sustainable practices.

In conclusion, Friends of Nature recognizes the fact that we cannot ask people to give up what they have even if it is unsustainable unless we have something viable to replace it with, and this is the heart of sustainable use of natural resources. This is how we can protect our natural resources by developing our human resources.
Abstract
Bioprospecting is the search for new chemical compounds in living organisms that will have some pharmaceutical or commercial application. While it is a high-risk investment area, it can have substantial returns. Of the world's 32 top-selling pharmaceuticals more than half were discovered from animals, plants or microorganisms. In 2001, these accounted for nearly $US25 billion in global sales. However, various countries in the world are tightening bioprospecting agreements with pharmaceutical and food corporations that are anxious to get genetic materials for profits. In Belize, these corporations are pressuring the agencies that have the legislative authority to regulate bioprospecting to enter into agreements so that they can operate in the country legally. Some companies may already be operating illegally. As a result, the Fisheries Department is in the process of updating its legal agreement formats to address marine bioprospecting.

Background
Bioprospecting is the search for biochemical and genetic resources from plants, animals and microorganisms. It is practiced in the biogenetic and medical fields, and the pharmaceutical and agricultural industries. The most recent background on bioprospecting dates back to 1999, and relates to the adoption of the Cottenberg Resolution by Ishnier and his colleagues at a chemical ecology workshop. This resolution states that any compounds found in plants and animals should be put for the best use of humanity. Prior to this, was the adoption of another resolution at the United Nation’s Biological Diversity Convention in Rio de Janeiro, Brazil in 1992. It stated that all countries should manage their resources in a sustainable manner. A big delegation from Belize attended this Convention. The ancient background is that plants have been used for various centuries to cure sickness.
Benefits of Bioresources
The global perspective is that since the 18th century, hunters from Europe and North America have discovered a lot of different chemicals, especially from the botanical areas and the tropics. Of the top twenty-five pharmaceutical products, fifteen have been derived through bioprospecting. The pharmaceutical industry has generated over $300 billion, the agrochemicals $60 billion, ornamentals around $20 billion and natural medicines $10 billion from bioprospecting products. In terms of some of the products, pharmaceutical companies prospect for anti cancer agents and antibiotics. Some use bioprospect products as tranquilizers, heart drugs, birth control, anesthetics, and in surgeries. In the commercial industry, there are the edibles and essential oils, and in the agricultural and food industries, there are the exotic fruits and vegetables. A hot item that is being given a lot of attention in the news worldwide is the 18MC, which can stop drug addiction and cure cold. It has been found to stop drug addiction in rats after only one dosage. Another popular product is Corasol, a synthetic version of mycrosoporine, which absorb UV radiation from the sun. This is derived from corals.

Guiding Principles
Bioprospecting can provide many benefits but when explored, it should be conducted in a sustainable manner. There should also be fair use and equitable sharing of benefits, especially for the indigenous people. This is a very problematic area because often time the indigenous people are forgotten. Prospectors should operate in contractual framework/agreements with governments or institutions that are responsible for managing bioprospecting. The collection of samples for screening should not be allowed without the proper permission or contentment of the host country. Exploratory companies often conduct biopiracy, thus, they need to be closely monitored. Leaders in the field of bioprospecting include the Intstituto de Biodiversidad (INBIO), and the Universities of Harvard and Princeton.

Legal Framework in Belize
Currently, there is no national policy framework for bioprospecting in Belize. However, the Belize Fisheries Department under the auspices of the Ministry of Agriculture and Fisheries, and the Ministry of Natural Resources, Environment and Industry have general policies, guidelines and Statutory Instruments that could be use to address bioprospecting explorations. The Forest Department, for example, uses the Forestry Act of 2000 and its revised edition to address bioprospecting, and employs Memorandum of Understandings (MOU) to address issues such as the percentage of revenue that is to stay within the country, and to set conditions on the use of chemicals and hazardous materials. Currently, only a few independent researchers are conducting bioprospecting in collaboration with the Forest Department, and they are prospecting for antibiotics from Fungi.

To conduct terrestrial bioprospecting in Belize, an application must be submitted to the Forest Department. This application is then vetted and approved by the Department. However, if the Department sees the need for additional input, the application is forwarded to the Bio-safety Committee for further input and technical expertise. The Bio-safety Committee was created to look at Genetic Modified Organisms (GMOs) but they
also assist with bioprospecting. The Statutory Instrument 13 (S.I.13) of 1999 of the Fisheries Regulation deals with marine bioprospecting. It states that a bioresearch license is required to work in the aphasic environment. It also states that all the genetic material is of national patrimony (belongs to the country), hence, it is a common goods. To conduct marine bioprospecting, a transfer agreement must be signed between the Fisheries Department and the Party doing the bioprospecting. Bioprospectors must also train Belizeans in the related field. Only environmentally friendly bioprospecting projects are allowed in Belize. Licenses are also not transferable, and an issued license has a deadline after which it is no longer valid. All material to be transported from marine bioprospecting projects must be inspected by Fisheries Department’s personnel. The Government of Belize receives 10% of any or all revenue derived from a successful agreement or project.

**Current Initiatives**

The Belize Fisheries Department is in the process of updating its application and transfer agreement formats. A consultant will be hired by CZMAI to assist in this process. Applications for this consultancy are currently being vetted and we hope to interview suitable candidates shortly. The successful applicant will work closely with the Forest and Fisheries Departments, the CZMA&I, and other relevant agencies.

A closer coordination for monitoring of specimens needs to be conducted because it has come to our attention, through unconfirmed reports, that bioprospectors are illegally taking samples and materials and transporting them out of the country. In fact, the Joint Intelligence Committee (JIC) is currently addressing this. The JIC is a committee that consists of various government departments such as Customs, Fisheries, Immigration and Quarantine. There is a need for a national bioprospecting policy to complement the legislations that are currently in place.

If properly planned and executed, bioprospecting can generate substantial revenue, which can be utilized to assist in the management of biodiversity, especially within protected areas.
Panel Discussion: Matters Arising from Session 3

1. A concern was raised relating to the fact that with the decline in fishery catch, fishermen would be increasingly pushed into poverty if something is not done to address this issue.

2. Concerns were raised in relation to bioprospecting and the Biosafety Committee; who are the individuals on the Committee and what mechanisms are in place to monitor this fast developing industry. How active is Belize in this scenario?

3. There are no bioprospecting or marine bioprospecting agreements. There are contemplations to work along with the University of Belize and the Consortium of the University of Mississippi. Apart from these, there is only BLACKSO from the United Kingdom that is interested but no license has been given as yet. We are still defining what we have and making sure we proceed along the right path.

4. There was no confirmation as to who sits on the Biosafety Committee. Reference was made only to the Ministries of Natural Resources and Agriculture and Fisheries.

5. A concern was raised concerning the allowance of open access to fishing. It was stated that a S.I. was past last year to allow for closure to the open access. Only nationalized Belizeans can now fish in Belize’s waters. Before it used to be all residents living in Belize.

6. An inquiry was made as to whether the Fishery Cooperatives and/or the fishing community were consulted about the new Fisheries Bill. It was stated that they were consulted. Mr. Usher stated that the Fishery Cooperatives are adequately represented on the Fisheries Advisory Board with four fishermen from the four
main Societies on the Board. He went to state that although they were consulted, they did not participate one hundred percent.

7. An inquiry was made as to whether, in the visitor expenditure and motivation survey carried out by the BTIA, tourists were asked if the price they pay for the destination was matched by the value; did they feel that they were paying too much, too little or the right price. It was stated that this was not inquired upon, however, they were asked whether or not they felt that their experience in Belize was worth it. The survey revealed that coming to Belize and seeing all it has to offer in terms of marine attraction was worth it. The report from this survey was published a year and a half to two years ago.

8. The Fisheries Department will be working with the Coastal Zone Management Authority and Institute to update application and agreement formats to deal with marine bioprospecting in Belize. It was suggested that in the updating of formats, it should not be only about marine bioprospecting but bioprospecting within Belize on a whole. It was also mentioned that the Forest Department be included.

9. Concerning the lost of nursery habitat at Caye Caulker, it was made mentioned that there is no way that you can equate one year’s compensation for traps with a lifetime of lost fishing activity.

10. It was mentioned that although there are 3,400 registered fishermen, only 1,800 of these fishermen are active; whether part time or fulltime. This is an official tally by the Fisheries Department. In trying to mitigate impacts from shrimp trawlers, a decision was made to reduce the number of trawlers from twelve to six. This was recently legislated.

11. The ratio of by catch to shrimp, as obtained by the current shrimp trawlers, is 7:1. It was realized that this is still high. It was also advised that the by catch could be usable. Following up on this statement, a call was made for a thorough investigation to ascertain what percentage of the by catch is usable. Such data is currently not available.

12. An inquiry was made as to whether a carrying capacity limit is set for whale shark watching at Gladden Split. It was stated that a maximum of sixty tourists are allowed in the whale shark zone per day. Including the dive masters, there are usually seventy-two individuals. This is staggered in terms of hours. A two-hour slot is allotted to each tour operator. This includes getting into the water, diving, completing the dive and leaving the zone. There can only be six boats within the zone at any given time. There are several regulations in place.

13. A request was made for the publishing of information generated from the Fisheries surplus models.
14. It was advised that it is not a good idea for the fishery industry to police itself. The industry based on representation on the Fisheries Advisory Board is policing itself. If it is exploiting the resources, will it advise the public adequately that it is doing so to the detriment of the industry? Not necessarily. There is a need for a new authority, maybe through the new Fisheries Bill, to allow for transparency and dissemination of information, and to adequately advise the industry on how it can be sustainable.

**Conclusion**

The session was found to be very interesting and interactive. Many important issues were brought to the forefront and thoroughly discussed.
I. Climate Change Risks in the Coastal Zone

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Introduction
Global climate change can affect Belize in at least three ways:

1.) Average surface temperature rise,
2.) Change in rainfall patterns, and
3.) Rise in sea level.

Although there is a yearly fluctuation in temperature, there has been a steady rise in the mean global temperature over the past 140 years. These are also the highest temperatures seen in the past 1000 years. Records also reveal that sea level has risen at various parts of the world during the past 300 years. Temperature rises have been observed both over land and over the oceans. These records also show that precipitation patterns have changed. While there is more rainfall in general, the Caribbean has shown a decline in rainfall.

Climate Change (Temperature and Rainfall Patterns)
Climate change could disrupt the thermohaline circulation. One of its major branches passes through the Caribbean. A change in this pattern could have major effects on the oceanography, climate and marine life of the Caribbean. Extreme weather events are projected to increase. There will be higher maximum temperature, more hot days and heat waves. This could lead to fewer tourists coming to the Caribbean to escape harsh winters. More intense precipitation events are also likely. This would result in more floods, avalanches, landslides, mudslides, increased soil erosion, damage to property, and increased insurance costs. Hurricane intensities could increase as well as the associated mean and extreme rainfall. This would have a significant impact on ecological and socioeconomic systems. Catastrophic weather-related losses have already increased ten-fold since the 1950s. While we have not seen an increase in the number of hurricanes, we have noted an increase in the number of intense hurricanes.

Sea Level Rise
Sea level rise will increase erosion, coastal flooding, inundation, salt water intrusion and could affect mangrove forests. These could adversely affect the coastal zones as tourist destinations; and human settlements, water supplies, agriculture, aquaculture and fisheries. While some beneficial impacts are expected, more adverse effects on biological and socioeconomic systems are expected. The number of coral bleaching episodes is expected to increase. Agricultural productivity will decline resulting in lower food security. Higher temperatures and lower humidity will also affect forestry. These could produce more forest fires and produce an increase in pests and diseases. Water security would be threatened by salt-water intrusion, lower rainfall and greater evaporation. Fisheries would be threatened by habitat loss resulting from effects on the mangroves and reefs. Species will migrate.
Implications for the Coastal Zone
The coastal zone is a very important component of the socioeconomic structure of Belize and the Caribbean. Virtually all the sectors within the coastal zone are vulnerable to the adverse effects of climate change. Where vulnerability to climate change is concerned, the impacts are worse in developing countries. We are flood and drought prone, and a large share of the economy is climate sensitive. We have a lower capacity to adapt to climate change due to a lack of financial, institutional and technological capacities, and access to knowledge. Management systems must be put in place to ensure sustainability and policies modified to include options to adapt to a changing climate.
II. Coastal Vulnerability Assessment

Mr. George Hanson – National Emergency Management Organization
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Introduction

I don’t need to reiterate the location of Belize and the problems that we face in terms of natural disaster, and as we grow in terms of technology, how some technological disaster will affect our coastal zone.

Coastal vulnerability is wide ranging and is basically the vulnerability of the system to certain events and the system’s ability to recover from such events, even in terms of temporal scale. Temporal refers to the frequency of occurrence of the events. We have recently experienced three major hurricanes within a short time frame, and these have affected the system’s ability to rebound. For example, some areas in Placencia and mangroves on many cayes are just recovering after nearly two years. If we suffer another hurricane within this year, which is not unforeseen, we might lose some of these systems.

Vulnerability

To assess vulnerability, we will need to address several things, including: 1.) Verification of the system - this is to investigate the geomorphology of the area/system. We have to look at Belize’s location. Belize lies in a low-lying belt system or slope, which makes the country highly vulnerable. Its coastal zone is also flat with some areas below sea level, and this also increases our coastal vulnerability, 2.) Relative sea level rise - due to its location, Belize is also highly vulnerable to rising sea levels, and 3.) Susceptibility to shoreline erosion – because the country is low-lying, it is also susceptible to shoreline erosion. Many of our cayes are dynamic in nature, constantly shifting. This is a problem in terms of vulnerability. In certain areas, hurricane has destroyed the entire caye, with some just rebounding after twenty-five years.

Even though Belize exhibits a high coastal vulnerability, not much energy is being placed into conducting vulnerability assessments. So far, only a few vulnerability assessments have been conducted. The most recent one was conducted approximately two years ago, which looked at coastal flooding. Presently, we are conducting some gap analysis to identifying vulnerability areas. We are also working on some mitigation policy to address vulnerability for the country. However, only vulnerability in terms hurricanes is currently being looked at, and this is basically in relation to flooding.

The National Emergency Management Organization (NEMO) is also trying to address Belize’s vulnerability in relation to oil spills. We currently have limited resources to combat oil spills, thus, if one should occur, we’ll definitely have a major problem. Plans are underway to address oil spills as well as other technological hazards such as chemicals like ammonia, detergents and the likes. Vulnerability in relation to agrochemicals, and liquid and solid wastes also needs to be addressed.
III. Recommendations for Mitigation Measures for Coastal Developments  
Mr. Eugene Ariola – Oceanographer, Coastal Zone Management Institute  
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Abstract  
The coastal areas of Belize include the coastal plains, flood plains, wetlands, coastal lagoons, estuaries, beaches, cayes, barrier reef and atolls. This geomorphologically varied coastal zone nurtures unique habitats and supports a biological diversity of global significance. The characteristically low relief of the coastal area reflects its inherent vulnerability to the biophysical impacts of climate change and climate variability. Anthropogenic activities including coastal developments could further augment the vulnerability of these areas.

There has been a notable increase in coastal development in Belize. This may be attributed to population growth coupled with migration from rural communities to coastal urban centers. Economic growth, especially within the tourism and aquaculture sectors has also contributed significantly to the increase in coastal development. This trend of increasing development for human settlement, aquaculture and amenities for the tourism sector warrants mitigation measures to protect such developments without exacerbating the vulnerability of the fragile coastal zone.

Acknowledging that there is little that could be done to abate climate change per se, the inhabitants of the coastal zone should be encouraged to prepare for its potential impacts through the implementation of pragmatic adaptation measures. Coastal developments could be protected against coastal erosion, flooding and inundation by adhering to specific development guidelines, proper flood control mechanisms and the appropriate design of shore protection structures.

Introduction  
The coastal areas of Belize include coastal plains, flood plains, wetlands, coastal lagoons, estuaries, beaches, barrier reef and atolls. This comes about because of the variety of landforms that we have and these variety of landforms lead to what we have as our resources, for example, the critical habitats. We have the northern part of Belize that is remarkably flat, some parts just below sea level, some at sea level. We have other habitats like around the cayes, areas that are very suitable for sea grass and mangroves, and the three atolls. Because of these diverse habitats, we also have a biological diversity of global significance, and it’s this biological diversity that is one of our cornerstones to tourism. It is a cornerstone also to the fisheries industry, both commercial and subsistence. We should, thus, not look at our resources and take them lightly. We need to look at them from a holistic point of view. Due of the habitat, biological diversity, and geomorphology of our coastal zone, Belize is recognized as one of the seven underwater wonders of the world, which is remarkable. Belize is also recognized for its World Heritage Sites that were declared in December of 1996.
Impact of Natural Processes
Belize is naturally vulnerable to climate change. Living in areas that are at sea level or just below sea level especially within the hurricane belt is a clear indication that we should not have development in those areas but we can’t have a blanket policy that would restrict development in these areas. So, what can we do? We need to take up the challenge that is bestowed upon us to sustainably manage and optimize the public use of the resources while implementing protection measures and optimizing the economic benefits gained from use of the coastal resources.

Vulnerabilities include direct impact from sea level rise and increase in the frequency and intensity of tropical cyclones, and the bio physical impacts that are associated with these, for example, coastal erosion, inundation, and sea water intrusion. To compound these problems, we have unsustainable use of coastal and marine resources such as deforestation, etc.

Man Induced Transformation
There are a number of activities that could compound the effect of our country’s vulnerability to climate change. Take, for instance, coastal development. Coastal development includes activities such as human settlement, sea walls, drainage, roads, bridges, and artificial beaches construction, geotubes, land reclamation, and marine dredging. In Belize, we have had several marine dredging operations. We have also experienced development in the aquaculture industry. We have moved from simple dwellings and fisherman camp, to massive large-scale coastal development.

In Belize, we have a very small but steady increase in population growth. We have an inland to coastal migration that is becoming more and more prominent and that could be attributed to the growth of the tourism sector. The growth of the aquaculture sector has also lead to some of these demographic changes. One interesting point as far as a catalyst for development is concern, is recognizing the policies or the lack thereof to propel the movement of people from one area, for example, from the inland to coastal areas. Look at tourism, there is a national policy in which we try to promote tourism. We have an increase in tourist arrival, and probably we’re tasked with a challenge of not to refuse entry or a certain number of visitors into Belize. There is a growth in the aquaculture sector and our government has recognized the need to further subsidized and provide the incentives that would create more aquaculture development in the short term, medium term and long term. These investments policies, for example, under the Ministry of Agriculture, is something that we need to address and look at more carefully if we want to look at the potential cumulative effect of what population growth and these growth in sectors will do to the resources that we depend on as other means of livelihood.

Recommendations
At this point we cannot mitigate for climate change. In Belize, we are considered a sink according to the studies that have been conducted, and we are not at fault for impacts relating to climate change. There is little we could do because we do not produce much carbon dioxide and most of the green house gases that create an effect. Also, if we try to
do something right now, we would not stop the nurture that climate change already has in motion. However, we need to educate our public as to the impacts of climate change. We need to have more forums and specific technical studies about our situation in relation to sea level rise. We already have global knowledge of what we should expect as a region. We need to determine the relative sea level rise. The Caribbean Planning for Adaptation to Climate Change (CPACC) project, for example, generated some of this information but more is required. We need to devise and implement physical plans. We have had initiatives, like the ESTAP project, which did some of this but we need to do this for the northern part of the country as well. There are some areas that are highly vulnerable to hurricanes and floods. We need to encourage voluntary retreat where possible, and the only way we could do this if we speak about this more openly. We have had several experiences in which disaster strikes, we need to take advantage of those opportunities to plan and start again. Almost 90% of the piers and sea walls on Caye Caulker and San Pedro islands, for example, were knocked down due to Hurricane Mitch and by the following year, more than 100% of the sea walls and piers were restored.

There is no blanket solution for coastal developments but within the guidelines, we could look at adhering to specific development practices. We should maintain the 66 feet buffer zone along water bodies where possible. The traditional way in which lands were issued or sold impedes this condition but where possible we should encourage people to comply and maintain better drainage. In Belize we’re noting day-by-day more construction within waterways, areas that are very dry in the dry season and flooded during the west season. We need to discourage this type of activity. We need to also strengthen the EIA process. The NEAC is comprised of a lot of technical and professional people and they must be commended for doing some positive work but the process needs to be strengthened. There are still some loop holes and this is one process that could ensure the mitigation of certain development, for example, small scale development most likely will not have to pass through the NEAC process but larger scale developments that could have an impact, need to pass through this process adequately and to ensure that the compliance agreement are followed adequately.

Poorly planned and ad hoc coastal development could only exacerbate the vulnerability of the coastal zone. If we continue business as usual, build where we want to, whatever we want to, when we want to, we could be heading for trouble. Considering the current and potential coastal developments in Belize, it is not practical to recommend a suite of mitigation measures that is applicable to all. One size does not fit all. We need to look at this in detail. Let us use the coastal zone for environmentally sound development activities. This is a point that is very crucial, especially as we consider vulnerabilities. We have seen in neighboring countries, the construction of car parks, and the construction of clinics along vulnerable coastal areas. Let us use those areas to construct things that are of maximum economic benefit that could only take place within the coastal zone, for example, we can not build a dock or a ship yard in the Cayo District, we need to build that where we have the land sea inter phase and things like that.
Panel Discussions: Matters Arising from Session 4

1. NEMO is undertaking a pilot project (SHAM project) to address two areas: a.) Development of a mitigation plan, which will include the development of mitigation policies, strategies and interventions and b.) Coming off the same plan, looking at simpler building practices, which will include training developers from masons to contractors in terms of simpler building practices.

2. A concern was raised in relation to the utilization of vulnerable areas for multi residential projects. Examples such as Mile 8 and Los Lagos were mentioned. It was mentioned that the relevant parties were warned (given technical advice) in advance about the vulnerabilities entailed in utilizing such areas for such projects.

3. An inquiry was made as to whether any work had been done by NEMO with regards to standardizing building codes with respect to vulnerability to hurricane destruction. It was mentioned that new building codes were recently developed and are in the process of getting approval from Cabinet. These, however, are only for Belize City but collaboration with the Ministry of Housing is ongoing to develop codes for the entire country. There is also the intention to train students from CETS, UB and other institution about such codes.

4. Subsequent to Hurricane Iris, the Belize Association of Professional Engineers came out with a very valuable publication on how to retrofit your house; how to build your house to be hurricane proof. Studies have indicated that you can protect your home by only a 1% increase in investment in hurricane straps. The publication is still available. It was felt that is a practical approach to adopt, especially until the building codes are completed.
5. It was made mentioned that in terms of training, the education process needs to start at the highest level and not just at the technical, the laborer, the contractor levels, etc. because sometimes decisions are made at the political level that are contrary to sound technical advice.

Conclusions
A lot of important recommendations were highlighted. It was felt that a majority of these recommendations could be incorporated into the resolutions.
RESOLUTIONS

There is a need to ensure that in our deliberations, we remember that recommendations should be relevant to Belizians. They should be practical in terms of our ability to implement them, and we should give some consideration to how we can sustain our initiatives.

1.) Coming out of the first session, the “coastal and marine management policies and their importance”, were some useful recommendations with regards to the process of consultation and dialogue when reviewing policy documents. The process, although benefited from technical advice from key government agencies, is lacking in wider consultation with civil society on a whole. The discourse should be broadened to include civil society in its entirety before policy documents are taken to Cabinet.

2.) Arising from the first session also, was the realization that there needs to be greater integration and discussion amongst decision-makers regarding increasing pressures in the tourism and fisheries sectors.

3.) With regards to general resource use, capacity issues, we heard about the cruise ship projected growth and later on in the discourse, we heard about the wild catch fishery and the minimum or the narrowing of opportunities for being involved in the decision-making processes. The circle consists of primarily those individuals within the industry, self policing has its limitations and as such the range of actors involved on these boards planning and advising on how things should proceed should be broadened. Both sectors need to give serious consideration to the call for broadening of the dialogue and discourse to involve a whole new range of people in their policy formulation processes.

4.) When looking at general issues of watershed, the interface between land and sea, and the role of CZMA&I in water shed management issues, it was recognized that the institutions scope was limited due to legal definitions under the CZM Act. Although recognized in independent evaluations, the agency has still not expanded its scope to support the coordination required in the terrestrial realm. The challenge then is to find utility the existing coordination mechanisms established by CZMAI so as to bridge terrestrial and coastal/marine issues.

5.) In terms of scientific research and monitoring, it was recognized that, although monitoring efforts are ongoing, there is a need to use new cutting edge techniques to monitor projects and activities. It was offered that forensic science techniques be explored as a new way of determining impacts. There is also a recognized need to utilize even more local level researchers and community groups in monitoring and database development nationwide.
6.) There was a call for greater involvement of the University of Belize in terms of scientific research, management and advocacy for key issues that are of importance to the society.

7.) On the issue of bioprospecting, there is a need for greater coordination, dialogue, and transparency in what is currently happening. Most nationals must be made aware of that fact that these resources are of national importance, and high value and as owners of these assets we must safeguard them. Moreover, the opportunity to address these issues under a consultancy being awarded by CZMAI to develop a National Bioprospecting Policy and Legislation is critical.

8.) With regards to climate change, there is unfortunately the realization that our opportunities for intervention are limited as we are primarily a sink and as such are not contributing to the problem as much as we are going to be impacted. As such, we need to educate our population as best as possible for adaptation. It is quite possible that we could educate the visitors from the north who are in a better position to minimize their contributions to climate change.

9.) There is a need for proper planning as only through proper planning will we be able to allocate use of our resources wisely. Without a plan, which details guidelines for all developments, we will repeatedly discuss the same issue of resource depletion and mismanagement.