



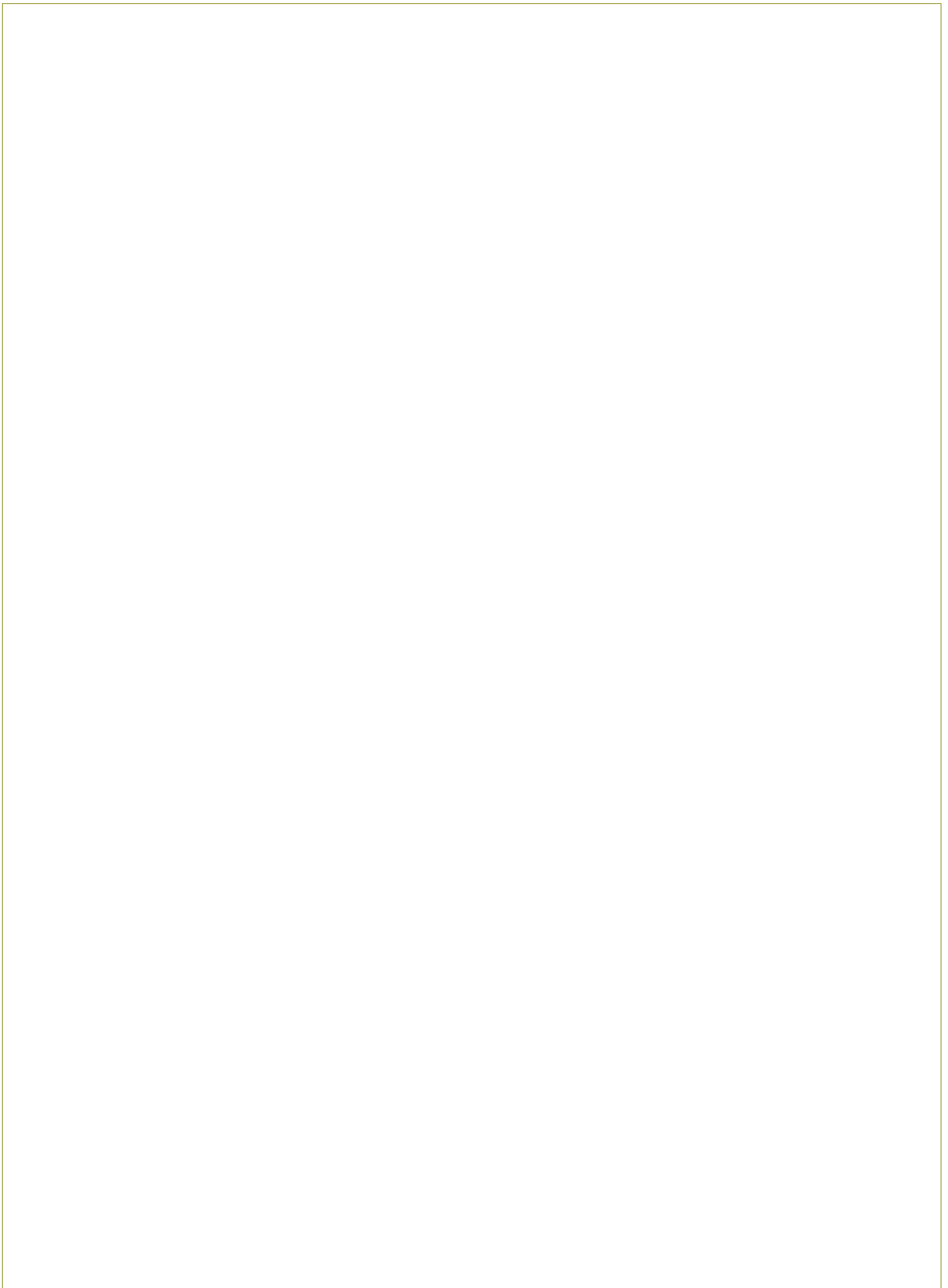
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MINISTER OF THE ENVIRONMENT AND HOUSING**

KEYNOTE ADDRESS

***How Our Conservation Efforts for
Mangroves Will Shape the
Economic & Environmental
Future of The Bahamas***

THE 2ND INTERNATIONAL SYMPOSIUM
ON MANGROVE AS FISH HABITAT

EL CID CONVENTION CENTRE,
MAZATLAN, MEXICO
10TH APRIL, 2014



Thank you for your kind introduction Mr. Tiedemann.

SALUTATIONS

- Mr. Bob Hughes – President of the American Fisheries Society;
- Pam Sponholtz – President of the Western Division of the American Fisheries Society;
- Mr. Felipe Amezcua – President of the Mexico Chapter of the American Fisheries Society;
- Other members of the planning committee;
- Fellow Invited speakers;
- Students;
- Ladies and Gentlemen.

Good Afternoon

Introduction

I hail from a country that is blessed beyond measure with environmental beauty. The Commonwealth of The Bahamas, an archipelago of many islands and cays has magnificent landscapes, beautiful marine life, blue holes, coral reefs, indigenous trees, flowering plants and mangroves. Maria Berica Rasotto, an Italian Professor, in the Biology Department of the University of Padova, recently conducted a research project in the Exuma Land and Sea Park in the Bahamas. She stated that the Bahamas can boast that it possesses “a perfect ecosystem.” These ecosystems provide drinking water, fish, fuel, grazing land, transportation and building material for our citizens.

In the Caribbean, the relationship between man and wetlands goes as far back as pre-Columbian times. As the British and Spanish colonized the islands, they were intrigued by the growth habits of mangroves. Interestingly, when Sir Walter Raleigh returned to England from a voyage to Venezuela, he documented that there were trees that grew in the sea at the mouth of the Orinoco Delta. He describes the trees as living in brackish water. The “trees” that Sir Raleigh saw were mangroves.

The Mangrove Action Project describes these “roots of the seas” as “a forest of jagged, gnarled trees protruding from the surface of the sea, roots anchored in

deep, foul smelling mud, verdant crowns arching toward a blazing sun...Here is where land and sea intertwine, where the line dividing ocean and continent blurs, in this setting the marine biologist and the forest ecologist both must work at the extreme reaches of their discipline.”

During the 16th and 17th centuries, high quality mangroves were used to produce poles and tannin and to build boats. After some environmental lobbying by Brazilian tanners, in 1760, the King of Portugal and Brazil issued the first law to protect and manage mangroves in Brazil. The law provided penalties for cutting trees that were not debarked.

According to Carrera in 1975, as mangrove depletion increased, one of the first conservation laws was established in Puerto Rico in 1839. A “Junta” was set up by a Royal Edict to bar the naval industry from using the wood of the red and black mangroves.

Analysing the history of mangroves in Brazil and Puerto Rico for a moment we appreciate that -

1. both countries had viable economic markets to utilize the mangroves that would be beneficial to their countries;
2. there was a realization that a natural resource – the mangroves were being depleted; and

3. despite economic profits, conservation laws were established.

After the establishment of these laws we can project that –

1. Puerto Rico had minimal economic contributions from mangroves since the law eliminated a major market share held by the naval industry; and
2. Brazil may have seen a decline, after the passing of the law. However, its citizens, especially the tanners no doubt, continued benefiting economically from mangroves, but in a sustainable way.

Both economics and the need to protect the mangroves played a role in the way the mangrove business was eventually conducted in Brazil and Puerto Rico. With an appreciation of the dynamics of national decisions, I am convinced that “Conservation Efforts for Mangroves Will Shape the Economics and Environmental Future of The Bahamas.”

In my opinion, the economic and environmental future of The Bahamas will be impacted, positively because conservation efforts will –

- focus attention on the importance of mangroves and why they need to be protected;
- influence policy shifts;
- demand an increase in marine and terrestrial protected areas;
- lead to further mechanisms to protect coral reefs;

- reduce statistical gaps through more economic assessments of natural resources;
- impact the tourism and fisheries industries;
- encourage The Bahamas to review its approach to mitigate climate change;
- lead to the sustainable production of goods and services from mangroves; and
- advance the Bahamas' green and blue economy.

The Bahamas spans over 100,000 square miles with over 700 islands and cays. These islands consist of landscapes including: vast Caribbean Pine forests, mangrove swamp areas, blackland coppice, sandy and rocky shores as well as tidal creeks. There are also interesting marine landscapes including caves, sinkholes and blue holes, large coral reef areas, open ocean and a huge bank system consisting mainly of the Great and Little Bahama Banks. These areas provide us with natural resources for direct use, ecosystem services and other economic benefits. Currently, there is approximately 2,700 miles of mangroves and wetlands in The Bahamas that are regularly flooded with fresh, brackish or salt water. Of the 50 different species of mangroves worldwide, The Bahamas nurtures four types – the red, black, white and buttonwood mangroves.

Focused attention on the importance of mangrove and why they need to be protected

Historically, Bahamians viewed the mangrove community as waste and useless swamp lands. Unaware of the economic significance of these habitats and the importance of the ecosystem, Bahamians often treated these areas as dumpsites. In the 1990s, the Bahamas National Trust began a wetland restoration project in Adelaide, New Providence. This was the beginning of what is now a National Creeks and Wetlands Restoration Program which is in the portfolio of my Ministry.

A primary example of the result of past behaviour is found in the history of the Bone Fish Pond National Park. The Park includes some 1280 coastal acres of wetlands. It was once surrounded by agriculture and was a site for indiscriminate dumping of construction materials and copper burning. The Bahamas National Trust employed the use of heavy equipment to remove copper, other metals and rubber casings to create an opening that would permit water to flow from the sea. Thirty (30) students from the Ministry of Education Summer Camp, the Young Marine Explorers and other volunteers worked assiduously together to plant some 600 mangrove trees along the restored channel. With these modifications,

snappers, shads, barracuda and other marine life have made Bonefish Pond National Park their home.

Access by the general public was enhanced after the BNT and the Bahamas government constructed a boardwalk with a covered pavilion. Later this year, Bonefish Pond National park is earmarked to be a kayak launching site.

Further, The Bahamas' efforts to protect the mangrove ecosystems were demonstrated in 1965, when the Inagua National Park in Great Inagua, which has an area of 185,740 acres, was established. The Inagua National Park is the where the world's largest breeding colony of West Indian flamingos can be found. Forty years ago this flamingo species made a comeback from the brink of extinction to a colony of over 50,000 birds. The park has contributed to increasing bird populations in nearby islands such as Mayaguana, Acklins, Crooked Island, Cuba, and Andros. In 1997 the park was designated a wetland of international importance under the Ramsar Convention. It is also known as a bird watchers' paradise when it was designated an Important Bird Area. The park encloses all of Lake Rosa, the largest salt water lake in the Bahamas.

As the general Bahamian populace becomes more aware of mangrove ecosystems in The Bahamas, how they function and their importance, they are beginning to appreciate the benefits that mangroves provide to our country. Mangroves serve as a nursery for a variety of fish and sharks. Since mangroves do not

usually provide shelter for large predators, their root systems provide a safe haven for juvenile fish to mature before swimming out to the coral reefs of the deeper ocean to reproduce. Studies of Muby, Edwards and Arias-Gona'lez carried out in Mexico and Belize and other areas of the Caribbean show that the biomass of blue striped grunts was 25 times bigger when found in the areas of mangroves. Further, studies showed that striped parrotfish were seen in greater densities on the corals reefs that were in close proximity to mangroves than other reefs. As this relationship was explained to fisherman they no longer see the protected marine parks as taking away their most profitable fishing spots. As Family Island communities see that marine protected areas help them maintain and expand their supplies of fish they became less objectionable to such proposals. It has always been my considered view, that without the integration and involvement of local communities and the fishing industry, marine protected areas cannot be sustainable.

Mangroves provide other benefits such as -

- habitats for birds and a variety of flora and fauna;
- food and water for humans and animals especially during periods of drought;
- water retention which reduces flooding;

- water purification by extracting excess nutrients from fertilizers or sewage and stopping pollution from the sea;
- maintenance of coral reefs by supplying nutrients, and preventing loose soil from smothering the reefs;
- reclamation of land by trapping sediment;
- energy capture;
- provides opportunities for recreational activities; and
- a source of education for community.

Appreciating these benefits, many of the mangrove areas in New Providence are outfitted with boardwalks and observatory towers. They not only provide ecotourism opportunities, but serve as ideal spots for students studying mangrove ecosystems.

Influence Policy Shifts

In The Bahamas, our ecosystems face a number of threats. High on the government's agenda is the growth of our economy for the benefit of our citizens. This sometimes calls for development of resorts, marinas, roads, businesses and houses that may occur near a mangrove community. Whilst development creates employment and additional services, it also increases potential for flood damage, and loss of habitat for fisheries and wildlife. My

government has committed to ensuring that development of our islands is carried out with the utmost respect for the environment. Non-point contamination from improperly built septic systems, fertilizers and pesticides from agricultural run-off of farms also pose a threat to this community. The most recent threat is the invasive species which have entered the country via the hulls of ships and boats and from ship ballast water. The lion fish is not a friend to the Bahamas or its Mangroves.

Achim Steiner, UN Under-Secretary and Executive Director of the United Nations Environment Programme said, "Together, the science and the economics can drive policy shifts." As postulated, this has been our experience in The Bahamas. The Bahamas Government saw the need to identify and protect mangroves and their ecosystems. On 7th June, 1997, The Bahamas signed the Ramsar Convention on Wetlands. This initiated national action to provide a framework for the sustainable use of wetlands. By August of 2004, a National Wetlands Committee was fully established and activated an eight month period of consultation via town meetings in most of the major Family Islands. From the recommendations and conclusions of these meetings, a National Wetland Policy was formulated and adopted in 2007. The policy describes wetlands and their importance both ecologically and economically. It gives The Government direction on the responsibilities of

land owners, restoration, public awareness as well as codes of conduct for all organizations with responsibilities in this area.

As my Ministry moves forward with its plans this year to forward the proposed Bill for the establishment of an Environmental Protection and Planning Agency, we foresee more stringent laws that will -

- ensure that the developer building in an area of a mangrove forest will be required to incorporate the natural environment within the design of the development;
- provide more man-power and strategies to monitor the protection of these areas during the construction of a development; and
- outline stiff penalties for renegade developers who do not respect our laws.

As mangroves are critical to sustaining the quality and volume of groundwater, protection of these ecosystems are presently addressed by the Forestry Act which was enacted by The Government of The Bahamas in 2010 and amended this year to make the Act functional. This Act provides for the conservation and control of forests and all matters related thereto. In the foreseeable future more mangroves communities will be declared protected as conservation forests. Further, according to part IV Section 10 of this Act, provisions are

made for trees to be identified on a Protected Tree List. It is expected that in the near future, mangroves will be added to this list.

Driving the need to designate more marine protected areas.

In 2008, at the 7th Conference of the Parties to the Convention on Biological Diversity, The Bahamas agreed to the Programme of Work on Protected Areas. To help The Bahamas meet its commitments under this programme, the Global Environment Facility Full Size project entitled “Building a Network of Marine Protected Areas in The Bahamas” was formulated. A component of this project is the creation of a sustainable funding mechanism for the national protected areas system.

In the same year, The Bahamas became a part of the Caribbean Challenge Initiative (CCI). This initiative is the first conservation effort adopted by governments in the region to provide sustainable financing for the effective management of protected areas. Participating countries have committed to protecting at least 20% of near-shore marine and coastal environments by 2020, and to creating a national conservation trust fund with a sustainable finance mechanism dedicated to park management.

As the project, under the United Nations Convention on Biological Diversity

(UNCBD) required the protection of 10% near-shore marine and coastal environment by 2014, and the CCI required at least 20%, The Bahamas declared that it will exceed the goals set under the UNCBD.

A White Paper entitled, "The Expansion of the Protected Areas System of the Commonwealth of The Bahamas" was developed by the Bahamas Environment Science and Technology Commission, the Bahamas National Trust, The Nature Conservancy and the Department of Marine Resources to meet the Caribbean Challenge Initiative. The paper identified recommended protected areas, rich in biodiversity, many of them with mangroves, that are significant areas for breeding and feeding grounds of many marine species. The Cabinet of the Bahamas has endorsed the proposal, subject to public consultation. My ministry has also sent for Cabinet's consideration a schedule of town meetings to discuss the creation of Marine Protected Areas with key stakeholders in the Family Islands that have been identified for Marine Protected Areas.

In the interim, the Bahamas Protected Areas Fund Bill 2013 was debated in the House of Assembly. It is expected that this Bill will be enacted in the near future. When enacted, the Bahamas Protected Areas Fund will keep an accurate register of marine protected areas and will revolutionize the way

these areas are managed in The Bahamas and provide a sustainable funding mechanism for marine protected areas.

In addition to the areas proposed in the Bahamas Protected Areas System, The Bahamas expanded the Andros West Side National Park from 185,032 acres to 1,288,167 acres to protect mud and sand flats, creeks and mangrove forests that serve as habitats for bone fish and tarpons during their life cycles. The Bahamas Government is now considering the nomination of Bonefish Pond National Park, Harrold and Wilson Ponds National Parks and the Andros West Side National Park to the Ramsar Convention to be recognized as wetlands of international importance.

Driving the need to designate more terrestrial protected areas

Presently, the Bahamas is pursuing a Small Grant Fund Agreement with the United Nations Environment Programme for a Global Environment Facility Grant to execute the project "Pine Island – Forest/Mangrove Innovation and Integration. The proposed project will be conducted on the islands of Abaco, Andros, New Providence and Grand Bahama. The main objective of the project is to integrate biodiversity consideration and ecosystem services into Forest Management and Land Use Planning.

The major components of the project are to –

1. provide institutional systemic support, capacity building, public education and community awareness;
2. expand and improve the management of pine forest and the mangrove sector; and
3. create models for sustainable forest management, livelihoods, eco-tourism, wildlife and nature based activities, including the creation of hunting reserves, agriculture, forestry and sustainable land management in coastal communities of Pine Islands and other Family Islands in the Central and Southeastern district of The Bahamas.

Some of the expected outcomes are as follows:

1. support of sustainable land management and Sustainable Forest Management with Biodiversity into land use planning;
2. increased public awareness of importance and benefits of sustainably managing forests and mangrove biodiversity.
3. an establishment of a database of forestry lands and with biodiversity overlay including mangroves.
4. identification of forest and mangrove areas that are to be prioritized for rehabilitation and protection ;
5. sustainably monitored mangrove and forest change in the long term.

6. the reestablishment and rehabilitation of Little Abaco Mangrove Ecosystem that has a potential carbon stock increase of up to 51,150 total carbon dioxide equivalent.; and
7. decreased generation of carbon by reducing deforestation of mangrove habitats.

Protection of Coral Reefs

Coral reefs are found mainly off the coast of the Bahamian islands whilst mangroves are found along the shores. This unique composition permits coral reefs to act as a first defense and mangroves to play the role of second defense to protect the country from storm surges resulting from hurricanes and possible tsunamis. This is critically important in our fight against the adverse affects of Climate Change.

Without this natural buffer system, The Bahamas would fare worse conditions during hurricanes. In connection with this, the GEF Full sized project focuses on coastal protection which mangroves provide for coastal habitats and its positive affect to mitigate climate change.

It is estimated that, worldwide, coral reefs contribute between \$29.8 - \$375 billion

per year in goods and services. Since the Bahamas accounts for some 35% of coral reefs in the Caribbean which are symbiotically attached to the activities of the mangroves, our laws prohibit persons from uprooting, destroying soft coral without written permission of the Ministry.

However, we have seen an increase in numbers of ship groundings that have seriously damaged some of our coral reefs. Among other serious implications, this new development holds heavy implications to the health of our mangroves. Therefore, the Ministry of the Environment and Housing is reviewing proposed legislation to protect this vital resource. It is expected that the legislation will include the following provisions:

- a liability and compensation regime for damage to coral reefs from commercial and recreational ship grounding, anchoring and dredging operations;
- a framework that will make it unlawful to destroy or injure coral reefs, and allow the government to recover costs and damages for coral reef injuries;
- implement measures required to research, monitor, manage and restore affected reefs;
- establish and maintain an inventory of all vessel grounding incidents involving coral reefs;

- prepare an assessment of damages and restoration plan; and
- administration of a coral reef conservation fund.

Review Approach to Climate Change

It has been proven that mangroves store carbon within their biomass similar to that of rainforests, and it releases the carbon when it is destroyed.

Interestingly, the sediment of mangroves systems trap more carbon than other trees. As a whole, mangrove ecosystems have the capacity to sequester five times more carbon than that of the tropical rainforest. Dr. Juha Siikamaki and his US colleagues of the think tank “Resources for the Future” showed that protecting mangroves reduces the amount of carbon dioxide released and can be an economically affordable way to mitigate carbon emissions. Like many other Small Island States, The Bahamas is vulnerable to Climate Change.

Therefore, it is in best interest of The Bahamas to protect these systems which allow The Bahamas to participate in more carbon reduction initiatives such as the UN-REDD+ which is the United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries.

Economic Assessment of natural resources

During the compilation of the Barbados Programme of Action for the

Sustainable Development of Small Island Developing States, many special conditions and needs of Small Island Developing States (SIDS) were identified for international attention. The Global Environment Facility appreciated the unique water related issues common among SIDS, and approved a number of international waters projects. The Integrating Watershed and Coastal Area Management (GEF-IWCAM) regional project was established to –

- strengthen the commitment and capacity of counties to manage their watershed and coastal areas in an integrated way; and
- assist countries to plan and manage their aquatic resources and ecosystems on a sustainable basis.

Andros was the island identified for a demonstration project that was focused on the development of a land and sea use plan. During the lifetime of this project a study entitled “An Economic Valuation of the Natural Resources of Andros” was written for the Nature Conservancy by Ventia Hargreaves-Allen on behalf of The Government of The Bahamas.

Andros is the largest island in The Bahamas, the sixth largest island in the Caribbean and home of the third largest barrier reef in the world. The island boasts of extensive habitats of mainly forests and wetlands. With high biodiversity counts Andros has a sizeable water catchment area, it has some of

the most extensive wetlands in the Caribbean region, and represents the largest source of freshwater in the Bahamas.

Economic value of mangrove are mostly assessed based on their quality and the coastal protection they provide to the shoreline. Assessing the situation on the island of Andros gives *only an idea* of the value of some economic impacts mangroves have on The Bahamas. From the GEF- IWCAM project completed in 2009, it was recorded that mangroves on the island of Andros had a service value of \$30,747 per square kilometer per year.

Service Provided	US\$ value/km²/year	Likely Accuracy
Coastal protection	9,100	Low
Fisheries support	8,100	High
Local uses	4,980	Medium
Non-use	3,300	Low
Biodiversity	2,270	Medium
Carbon Storage	2,054	High
Water filtration	943	High
Nutrient cycling, Raw materials, habitat refugia, water catchment groundwater recharge, topsoil formation and fertility	Unknown	Further studies required.

Table taken from Economic Valuation of Natural Resources.

It is noteworthy to mention that mangroves generate significant recreational returns. However, these have not yet been developed on the island of Andros.

Impact on Main Sectors of the Economy

1. Tourism

Tourism is the number one industry in The Bahamas. Together with tourism – driven construction and Manufacturing it accounts for approximately 60% of the country's GDP and directly or indirectly employs half of the Bahamian work force. Thousands of tourists are attracted to The Bahamas because of the stunning panorama of the beaches and our clear, blue waters. Mangroves, however, are viewed by this industry as obstructions to views of hotels on a bay or obstacles to beach access. They are seen as mosquito infested and hence would hinder tourism development.

In recent times the tourism sector has seen a diversification in tourism income through the increased number of visitors to the Family Island destinations such as Abaco, Andros, the Exumas and Harbour Island. These islands are seen as prime ecotourism destinations because of the excellent fishing grounds for bonefish, birdwatching, hunting and sailing and kayaking. Mangroves provide most of these activities. Often eco-tourism tours generate revenue from access charges to Parks, hiring boats, payment to boat drivers, guides, hunting permits, hotels, taxi operators, supermarkets, craftsmen, fish vendors and restaurants.

Mangroves are an important haven for sharks particularly the Lemon and Bull sharks in The Bahamas. Many of our visitors enjoy our beaches and marine waters for snorkelling and shark diving. The Bahamas Diving Association calculate that The Bahamas benefits from some \$78 million dollars of revenue a year from shark related activities. It is projected that over a 20 year period we can possibly see a total economic impact of some \$800 million. This impact is the result of accommodations, food, air travel, diving and local expenditure associated with a divers stay and takes into account inflation.

Interestingly, there is occupancy for over 810 tourists on the island of Andros. 258 of these rooms belong to fishing lodges. Hotel and guesthouse owners have estimated that 61% of their guests did fishing trips. From the study "An Economic Valuation of the Natural Resources of Andros" in 2009 it was reported that guests made some 27,000 trips (at the time which averaged approximately \$722.00 for accommodation and fishing) to yield some implied revenue of \$19.5 million. It was also reported that bird watching, kayaking and nature walks accounted for some \$297,400 implied revenue in that year. As expansion takes place in the Eco-Tourism sector, more tourists are canoeing, bird watching, taking nature walks and having educational experiences. It is expected that much more revenue will be generated in this area.

2. Fishing

Agriculture and Fishing together make up the third largest industry in the Bahamas. The fishing industry contributes to 1-3% of the Bahamian GDP. Mangroves and sea grass flats are very valuable since they form the primary habitat for bonefish. The island of Abaco is the number one bone fishing destination in The Bahamas. However, many of the mangroves on the northern-end of the island of Abaco, are top bone fishing destinations. Today, anglers can spend anywhere from \$2,500 - \$3,500 for a bonefish trip to The Bahamas.

Loss of this very vital habit would cripple our local and national economy. According to the Bahamas Reef Environmental Education Foundation (BREEF) 80% of our food from the sea, spends some time amongst mangroves and seagrass beds. The most popular dishes contain snappers, grouper, Queen conch, crab and the spiny lobster or crawfish. Whilst snappers and the Nassau Grouper are commonly caught for food, crawfish is regularly exported and can account for up to 95% in profits of total fishery exports.

Formation of Good and Services

It is clear from this presentation that mangroves are of significant environmental importance and have many uses.

Besides being an excellent source for food, mangroves are used for the following:

- fuel wood or charcoal for cooking;
- building homes, boats, chicken houses, fence posts, scaffold poles scantlings for house walls, and fish pot construction; and
- the tannins are used to tan leather and make floor polish.

Mangroves leaves are said to have medicinal properties. Bee hives produce high quality honey when they are placed in Black Mangrove trees. Mangroves are also used to make baskets.

The Red mangrove is an excellent source of peat since it is capable of growing on decomposed plant material.

On 5th February, 2014, the Prime Minister, The Right Honourable Perry Christie announced the release of more than \$20 million in contracts for development of the Bahamas Agriculture and Marine Science Institute in North Andros. This institution was established with the aim to revitalize the agricultural sector, promote changes in land use and trade policies, preserve

land for agricultural purposes, protect local markets, advance research in marine sciences, which can help the Government in making policy driven by science, for the conservation and management of our precious marine resources. The study and economic uses of Mangroves, will be included in the work of BAMSI.

What do we see in the future of the Bahamas

All major cities of the Caribbean, including the capital of the Bahamas, Nassau, and in fact the world were built on wetlands. We all cannot get far away from this fact. So The Bahamas will continue to work toward heightening awareness of the environmental and economic importance of mangroves in our communities. Further, my Ministry will be seeking to consolidate all proposed policies that have come out of the conservation of mangroves. Look for my Ministry to report back about the protected marine and terrestrial areas we hope to preserve. With further studies from economic assessments of the countries' mangroves, I am confident that our approach to the issue of climate change and coral reef protection, which are cross-cutting issues in the conservation of mangroves, will be altered. Further, as we explore the goods and services produced by mangroves and how they impact our touristic and fishing economies, we hope to diversify our markets for the betterment of our

people. Yes, the economic and environmental future of The Bahamas will be positively impacted because we are going to make sure that every conservation effort for the protection and preservation of our mangroves counts and is a part of the new green and blue economies we are advancing.

I thank you for your attention and this opportunity to speak with you.

May God bless you all.