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Participatory Planning Workshop for the Restoration of Ashton Lagoon

WORKSHOP PROCEEDINGS AND FINAL REPORT

May 22 – 24, 2007
Union Island, St. Vincent and the Grenadines

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Society for the Conservation and Study of Caribbean Birds

WIWD & WETLANDS CONSERVATION PROJECT

BirdLife INTERNATIONAL CARIBBEAN PROGRAM

U.S. FISH & WILDLIFE SERVICE
DEPARTMENT OF THE INTERIOR

AVIANEYES St. Vincent and the Grenadines

September 2008

Participatory Planning Workshop for the Restoration of Ashton Lagoon

WORKSHOP PROCEEDINGS AND FINAL REPORT

A project implemented by:

The Society for the Conservation and Study of Caribbean Birds (SCSCB)

The Sustainable Grenadines Project (SGP), Clifton, Union Island, St. Vincent and the Grenadines

AvianEyes Birding Group, St. Vincent and the Grenadines

On behalf of:

The people, communities, and businesses of Union Island, St. Vincent and the Grenadines

Assisted by:

Union Island Ecotourism Movement

Union Island Association for Ecological Preservation

BirdLife International

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Cover photo: Portion of Ashton Lagoon and Frigate Island with Carriacou in the background; by Gregg Moore

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Mr. Mathew Harvey

Sincere thanks to all of the scientists and specialists that shared their expertise during the workshop and provided advice and recommendations for the restoration planning. Drs. Stephen Price and Purnima G. Price (Marine Ecologists, University of Victoria, BC) conducted an independent EIA of Ashton Lagoon prior to the failed development as well as follow-up surveys and reports after construction of the causeway documenting the many negative impacts of the construction and restoration strategies and solutions. Dr. Tom Goreau (President, Global Coral Reef Alliance) carried out assessments of the health of the lagoon's coral reefs and informed the workshop of the possibilities for coral reef restoration using Biorock® technology. Mr. Jon Kohl (Sustainable Nature Tourism Consultant, Fermata, Inc.) gave an inspiring and thought-provoking presentation on the potentials of using nature tourism as a tool for sustainability in Union Island, including use of a restoration and renewal theme as a centerpiece. Dr. Gregg Moore (Mangrove Ecologist, University of New Hampshire) gave an assessment of the health of Ashton Lagoon's mangroves and provided advice on their rehabilitation and management. Mr. Robert Bascom (Coastal engineer, CEES, Inc.) kindly jumped in to help at a moment's notice and provided a preliminary assessment of the potentials for restoring water circulation in the lagoon. I thank Mr. Amiro Pérez-Leroux (Partner Development Officer, BirdLife International Americas Programme) for his role as workshop facilitator. He guided the planning process with much insight and good humor.

Mr. Jacques Daudin

Special thanks to all of the workshop participants. Each person brought with them a unique perspective and a keen desire to work together to not only come up with a plan to restore the beauty and bounty of the lagoon, but also improve the quality of life and livelihood opportunities for the citizens of Union Island, St. Vincent and all the Grenadines islands. Thank you for sharing your experiences and knowledge.

Finally, we extend our gratitude to the US Fish and Wildlife Service, Neotropical Migratory Bird Conservation Act Fund, for providing the funding for the first phase of this project; the Participatory Planning Workshop. We also thank the US Fish and Wildlife Service, Division of International Conservation, Wildlife Without Borders Program for their continuing support to the SCSCB and bird and habitat conservation in the Caribbean. Wetlands are vitally important ecosystems for resident and migratory birds and people. We hope that the restoration of Ashton Lagoon will once again provide habitat for these birds and other biodiversity.

Ashton Lagoon, Union Island, St. Vincent and the Grenadines. Frigate Island, and failed marina infrastructure with naturally recruited mangroves and other vegetation growing are visible in the distance; mangroves and salt pond are in the foreground. Photo by Gregg Moore, May 2007, approximately 12 years post-construction.

"The best way to predict the future is to invent it."

- Alan Kay

Executive Summary

Ashton Lagoon, the largest lagoon in the Grenadines, supports a range of important habitat types (e.g., coral reefs, mangroves, mudflats, seagrass beds, and salt ponds) and associated commercially and ecologically important fish and invertebrates. The lagoon and nearby offshore Frigate Island also provide important habitats for wintering and migrating populations of seabirds, waterbirds, shorebirds, and landbirds. Despite the ecological importance of the area, and the fact that it was officially designated a conservation area, the St. Vincent government accepted a proposal by a developer for a 300-boat marina, condominiums, and golf course within the lagoon and wetland system. An environmental assessment clearly pointed out that the development would cut off water circulation through the lagoon, resulting in elevated water temperatures and siltation and causing catastrophic damage to reefs, seagrasses, mangroves, and fisheries. Nevertheless the project proceeded and the expected results were manifested. Soon after beginning construction on the marina, the developer disappeared, leaving behind a severely damaged lagoon.

Our project aims to initiate the restoration and sustainable use of the Ashton Lagoon area. The main objective of Phase 1 was a three-day participatory planning workshop on Union Island to determine the community's vision for sustainable use of Ashton Lagoon and how to reach that vision through specific objectives and activities. The plan would address the lagoon's many conservation needs, including removal of impediments to the lagoon's natural hydrologic flow, restoration of marine and coastal habitats and re-establishment of aquatic and coastal flora and fauna. Key stakeholders (local NGOs, government, fishing community, businesses, residents, etc.) were invited to attend and participate. Marine, wetland, birdlife and coral reef restoration ecologists, a marine engineer, and sustainable tourism expert provided assessments and expert advice to help guide the restoration planning. Recognizing that further developments of the site were possible, our aim was to produce a plan with objectives and activities that would emphasize nature tourism and other sustainable uses of the lagoon and Union Island's unique natural heritage and beauty.

The first part of the workshop consisted of presentations by scientists and experts. We then used the process of logical framework analysis (a.k.a. logframe) for project planning, including stakeholder analysis, problem analysis, developing overall and immediate objectives, identifying strategies and activities to achieve objectives, and summarizing the most important aspects in a logframe matrix.

The main problems identified could be grouped into three categories—the environment, governance and public awareness. The environmental problems (e.g., stagnant water, destruction of marine life) were all a consequence of the marina construction. Problems with governance and public awareness included issues such as proper administrative procedures not being followed, the community was not consulted, and lack of knowledge and awareness about the environment and the links between the environment and sustainable livelihoods. It was recognized that problems in the latter two categories are what led to the construction of the causeway in the first place, and that the problems are larger than the site level. Participants agreed that all three problem areas needed to be addressed in the project objectives in order to restore Ashton Lagoon and prevent a similar tragedy from occurring in the future. The participants expressed a desire to pursue development through a project that involves community participation and emphasizes sustainable livelihood opportunities.

Participants identified the following Overall Objective for the project:

Restore the Ashton Lagoon environment in order to improve local livelihoods and quality of life.

The Immediate Objectives/Results are:

1. The natural ecological processes in Ashton Lagoon are restored and the lagoon once again supports biodiversity and provides important ecological services
2. Awareness and appreciation of the links between the environment and sustainable livelihoods and the importance of using our natural resources wisely is increased among the general public, stakeholders, government officials and politicians
3. Sustainable local tourism and livelihood employment opportunities are developed for local people
4. Legislation is revised and local decision-making capacity is improved

Activities necessary to achieve the results were identified and are summarized in the Logframe Matrix, (Appendix 16), along with Indicators, Means of Verification and Assumptions. Opening up the causeway in strategic locations in order to restore natural circulation and tidal flow of water is the first step in the ecological restoration process. Replanting of seagrass beds, restoration of coral reefs and marine life and management and restoration planting of mangroves are recommended for supporting biodiversity and livelihoods.

A greater understanding and awareness of the environment will be achieved through a comprehensive outreach and education program that includes training workshops, production and distribution of educational materials (e.g., fact sheets, posters, newspaper articles), media training, partnerships with local NGOs and businesses, and community participation in the restoration and awareness-raising activities (e.g., celebration of bird/wetland festivals, clean-ups, planting and monitoring projects).

Sustainable tourism and livelihood employment opportunities will be developed by creating a community vision and overall strategic plan following some key principles and guidelines covered in the workshop. Training guides and small business owners, developing a marketing plan, building infrastructure and interpretive materials, developing an Ashton Watchable Wildlife Pond with a renewal theme, and creating a birding/nature trail are a few of the actions that will provide employment as well as highlight and conserve the unique beauty, natural history and culture of Union Island.

It is recommended that local decision-making capacity and governance be improved through establishment of a community oversight/co-management group and the adoption by government of a new policy framework for development entitled *Lessons learned from Ashton Lagoon – Guidelines for development in St. Vincent and the Grenadines*. The policy statement, written by the participants, stipulates that development should not occur in environmentally sensitive areas, there should be community participation and transparency in the decision-making process, EIAs should be completed and applied as required by law, and projects should be independently monitored and reviewed.

The next step in the project is review of this report by all stakeholders and government. It is recommended that the proceedings be read carefully as they capture many important and insightful comments and discussions held during the workshop. The reports prepared by the scientists and experts should also be thoroughly perused. Following consultation with stakeholders, government and conservation partners, grant proposals addressing one or more objectives in the project should be prepared and submitted to funding agencies. The successful restoration of Ashton Lagoon, in conjunction with greater public awareness of the environment, increased community participation in governance, and development of sustainable tourism and livelihoods, will not only benefit Union Islanders, but also serve as a model for other countries in the region to follow as the way forward for sustainable development.

Introduction

Working together with local NGOs and government agencies and with assistance from marine, mangrove and coral reef ecologists, marine engineer, and a nature tourism consultant, a 3-day Participatory Planning Workshop for the restoration of Ashton Lagoon was held in Union Island, St. Vincent and the Grenadines, 22 - 24 May 2007. The venue was St. Joseph's Catholic Church in Clifton. Here we report on the proceedings and main outcomes of the workshop, along with recommendations and plans for the way forward.

The workshop, sponsored by the Society for the Conservation and Study of Caribbean Birds (SCSCB), in collaboration with the Sustainable Grenadines Project, based in Union Island, and AvianEyes Birding Group of St. Vincent, was made possible through a grant from the Neotropical Migratory Bird Conservation Act Fund of the US Fish and Wildlife Service, a program aimed at reversing habitat loss and advancing conservation strategies for a broad range of neotropical birds in the United States, Latin America and the Caribbean. Caribbean wetlands provide vitally important habitats for wintering and migrating populations of seabirds, waterbirds, shorebirds and landbirds. Because these habitats are being destroyed for other uses, primarily development for tourism, USFWS provided funding for the initial phase of this project—bringing together stakeholders to design a long-term conservation-minded management plan for the lagoon. In addition, many concerned and dedicated individuals and organizations donated their time and resources to this work.

Background

Ashton Lagoon, located on the south coast of Union Island in the Grenadines, is the largest wetland on St. Vincent and the Grenadines and was unique in that it contained all the primary components of a mangrove/seagrass/coral reef ecosystem, including a long stretch of outer reefs, a shallow protected inner lagoon, abundant seagrass beds within the lagoon, a large area of mangroves, and salt ponds along the shore (Price and Price 1994a). Because of its rich biological diversity and ecological importance for the entire coast of Union Island, the lagoon was designated a marine conservation area and protected under The Fisheries Act of 1986. In 1994, a foreign developer proposed to build a large marina complex in the bay. The project called for a 300 berth marina in the central section of Ashton Lagoon, a causeway connecting Frigate Island to Union Island, a recreation center on Frigate Islands, a large condominium complex to be built on top of the outer reefs, and 50 acre golf to be laid over the mangroves. An environmental assessment pointed out that the development would cut off water circulation to the bay, causing catastrophic damage to reefs, seagrasses and fisheries (Price and Price 1994b). Despite its protected status and the EIA, the project was allowed to proceed. During the first few months of work, the lagoon was dredged, a road was built around the mangrove area, marina berths were installed, and a causeway completely bisecting the Ashton Lagoon into eastern and western sections was constructed. In mid-1995 the construction company declared bankruptcy and the project was abandoned. Impacts from the failed development were as predicted in the EIA, including stagnant eutrophic water in the lagoon, warming water temperature, reduced oxygen levels in the water, water becoming more shallow,

Aerial photo of Ashton Lagoon causeway and marina berths showing stagnant eutrophic water in the lagoon (2004)

increased turbidity, algae buildup and severe reductions in marine life such as lobster, lambi and fish (Price and Price 1998, Goreau and Sammon 2003).

Concerns about the health of the lagoon led to a call for a restoration project. It was recognized that if remedial measures and restoration techniques were implemented, the lagoon could be returned to near its former health (Price and Price 1998, Goreau 2003, Goreau and Sammons 2003). During initial stakeholder and planning meetings held in December 2006, the local community expressed a keen interest and desire to restore the lagoon and pursue sustainable development options (e.g., low impact tourism).

Our three-day participatory planning workshop was aimed at determining the Union Island and Vincentian community's vision for sustainable use of the Lagoon, assessing the feasibility of different options, and developing a plan to pursue the vision (see Appendix 1, Workshop Agenda). The plan would address the lagoon's many conservation needs, including removal of impediments to the lagoon's natural hydrologic flow, restoration of marine and coastal habitats and re-establishment of aquatic and coastal flora and fauna. We assembled an outstanding team of local, regional and international marine, wetland, birdlife and coral reef ecologists, fishers, a marine engineer, and a sustainable nature tourism expert to provide assessments and advice to help guide the planning process. A wide range of stakeholders was invited to participate in the planning process and share their views on how the proposed vision could be reached. Recognizing that further developments of the site were possible, our aim was to produce a plan with objectives and activities that would emphasize nature tourism and other sustainable uses of the lagoon and Union Island's unique natural heritage and beauty. Development that provides good jobs is of paramount importance, but we believe this can be achieved without undue harm to the environment. Our hope was that this project would not only restore the previous functions and benefits provided by the lagoon, but also ensure that additional socio-economic benefits could be obtained by surrounding communities.

The objectives of the workshop were to:

- Determine the Union Island and Vincentian community's vision for the sustainable use of Ashton Lagoon
- Develop alternative scenarios for the management of the lagoon considering land ownership
- Develop a framework for funding proposals to carry out the work

A total of 37 people attended the workshop[1]. This included representatives from a number of government and non-government agencies, institutions and organizations, schoolteachers, local businesses, fishers and community members. The workshop provided the opportunity to bring different stakeholders together to share experiences and ideas, exchange information, build friendships and partnerships, gain a common understanding of the issues, look at the problems and threats faced and investigate solutions. During the workshop participants had a chance to discuss key questions such as: What does the Union Island community want to be in 10-20 years? What will your quality of life indicators be? What makes Ashton Lagoon and Union Island unique in the marketplace of Caribbean islands? What other local products could benefit from the arrival of many new customers? How can the local community use tourism as part of an overall sustainability or restoration strategy?

Workshop Methodology

The first part of the workshop consisted of presentations by scientists and experts in marine engineering, marine, mangrove, and coral reef ecology and restoration and sustainable tourism who

[1] See Appendix 1: Attendance list

provided assessments and advice to help guide the planning process. We then used the process of logical framework analysis (logframe) for project planning. The elements of this type of participatory planning are: stakeholder analysis, SWOT analysis (Strengths, Weaknesses, Opportunities, Threats), problem analysis, identifying project objectives that will address the problems, documenting activities to achieve the objectives, and summarizing the most important aspects in a succinct and logical manner (filling in the logframe matrix).

PROCEEDINGS FROM DAY 1

The workshop began with an opening prayer by Father Andrew Roach and a welcome from Mr. Martin Barriteau, Project Manager, Sustainable Grenadines Project. The Opening Address was given by Mr. Edwin Snagg, Director, Southern Grenadine Affairs.

Summary of Mr. Snagg's Opening Remarks:

"Ashton Lagoon has a long history. Older members of the community remember it as an area rich in marine life and as one of the most beautiful spots on the island. What happened to the lagoon is a pity; it was the worst environmental disaster in St. Vincent and the Grenadines (SVG). Over time people take the environment for granted. You never know what you have until you lose it.

There are two aspects to consider: the environment and livelihoods and sustainability of livelihoods and the development of the society. Ashton Lagoon historically provided many livelihoods. It was the spawning ground for the lambi, lobster and fish which have been fished by many fishermen over the years - the best in the area. Look at it now and see what it is and we can see it is not providing that function well. Then there is the question of bird life. We have seen the birds and have taken them for granted. It was there, it was ours, it was pristine. Like I said, we don't know what we have until we lose it. This started the new phenomenon of efforts to preserve the environment, a new environmental awareness.

Mr. Edwin Snagg

I commend the work of those here that have been involved in environmental groups, especially the few key people that have kept the work going and are primarily responsible for increasing awareness. Some people say that it is difficult to get support from politicians and government. But I can assure you that there has been a shift—the politicians are involved now and are environmentally conscious.

The environmental concerns need to work closely with the Directorate and look at sustainable livelihoods. It is not good enough to just focus on eco-tourists. Tourism is such a volatile industry. There can be one negative incident such as September 11th or a hike in airfare and tourists may not come, causing great hardship. Despite what tourism offers we need to look at other alternatives. People have ideas and concepts of how things should be done but we must look at the broad scope – no one of us is always right. In terms of Ashton Lagoon, I believe there may still be discussions with investors but in those talks we ought to consider protection of the environment. We need to look at new ideas and find the correct and proper mitigation. Look for a balance. I want to be environmentally friendly all the time.

The government is very interested in environmental issues. Dr. Len Ishmael had a high level meeting to make sure the environment was high on the agenda for a sustainable Grenadines. We have fragile ecosystems on very small islands here. We realized that the interests of the Grenadines cannot be managed from the mainland. So we established the Directorate of Southern Grenadines and it has a unit here on Union Island.

We all want a good standard of living and we all want a sense of community. We need to strike a balance between restoration and development. All projects are interrelated. I am very interested in seeing what comes out of the workshop. I wish this program well. Sorry I can't stay for the whole workshop but Herman Belmar will be here for the 3 days."

Round-Robin Introductions by Workshop Participants

Following Mr. Snaggs remarks, we took a few minutes to go around the room and have everyone introduce themselves, say a little bit about their background, their interests in and hopes for Ashton Lagoon and expectations from the workshop. The following comments were made:

- I would like to see the natural flow of water through the lagoon restored and once again see marine and bird life.
- The lagoon I remember: when I was young I could go out in the afternoon and catch a big shark and have it for lunch. Now I don't even see a shark there. It is a dead sea. Also people use to bathe there all the time and the sand was white and beautiful. Now it is just mud. I am appealing to the trades people to do something. I see some of the birds that were absent for many years beginning to return. We need ideas for how to revitalize the area and at the same time protect the environment.
- I would like to see the lagoon and mangroves serving again as a breeding ground for fishes.
- I remember the days when we used to go to Frigate Island and have picnics; the water was clean and the swimming and snorkeling beautiful. Those days are gone now. I would like to see the conditions at Ashton Lagoon restored as close as possible to the old natural conditions.
- I am a fisherman and have long been concerned about Ashton Lagoon. I tried to stop the project; I distributed petitions and tried to raise awareness. My concerns are still the same. We can do many things without harming the environment. Visitors who come to see the restored lagoon would make a big contribution to our economy.
- Ashton Lagoon, the mangroves, and Frigate Island are of interest to me for its unique habitat for migratory birds and also nesting habitat for resident seabirds and waterbirds, and spawning ground for fishes. Would like to see what can be done to protect the biodiversity aspect of the lagoon; how we can sustain life and also generate revenue.
- The fish and invertebrate stocks are dropping and the mangroves are not serving their function as a breeding ground for fish. I would like to see the restoration of the mangrove.
- We need economic activities that do not have a negative impact on the environment or harm future generations.
- My hopes for the workshop are that clear objectives will be established and there is will to stand by them to see them through to completion (perseverance often lacking).
- One of the things that upsets me most is how people treat the environment. It is not children who are the problem but adults that throw garbage everywhere. We need to stop this. I've led many projects to clean the environment. I want to learn more about Ashton Lagoon. My hope for the workshop is that it is not just talk but that action comes out of it.
- There have been areas of progress, for example the Tobago Cays project. People have a long history of survival on the islands. We need to look at the restoration of the lagoon from both the environmental and the social survival angle. I hope through this workshop there will be a greater awareness of marine life and livelihood.
- I would like to see the water quality improved.
- Over the years I have observed the mangrove (salt pond) behind the airport turned into a dump and damaged. We need sustainable development on the island. What is sustainable development—that which meets the needs of the present generation without hurting the potential of future generations to meet theirs. I would like the outcome of the workshop to be

the means by which this (sustainable development) is going to be implemented in the restoration of the lagoon.

- Union Island faces many challenges from climate change. Whatever we do somehow borders on or incorporates climate change policies. Impacts from climate change need to be incorporated into the planning.
- I want to know how best to preserve, restore and sustain the lagoon.
- I remember as a child when the water flowed free. Any development should be sustainable and support livelihoods. I would like to see training and local people involved in planning and implementation of the project, and greater community education and awareness; we need to inspire local people to go on to graduate studies in the environment.
- We never knew the importance of the lagoon but it was there and we enjoyed it. In those days no one cut down trees. Now some natives cut trees. There is Bloody Bay in close proximity to old engines. And there is lots of garbage and breeding mosquitoes. We need greater awareness in the community that these places need to be preserved, and of environmental problems like dumping garbage in wetlands.
- My expectation is to plan for the restoration of flow through the lagoon, permitting the natural systems to recover.
- I would like to see a policy statement come out of this workshop that captures the minds of politicians. Most often local people only hear of a project at the implementation stage but are not consulted before. I would like to see this change. So I expect a statement at the end of the workshop that captures the attention of politicians, to change the process – get government to consult the people first before proceeding with a project.
- I would like to see Ashton Lagoon cleaned and marine life restored.
- Frigate Island became the property of the National Trust in 1971, but the land was taken for development despite protests from the NT. I would like to have a quality national environmental policy that works.
- My main concern is that tourism often benefits outsiders more than the locals. Whatever we do should be concentrated on locals. We must make tourism our slave and not our master. I would like for us to come up with robust clear objectives and follow them.
- The disaster of Ashton Lagoon was due to execution of the project without form or function. But there is an awakening not only in technocrats but also in the people. The lagoon should be restored to its natural state as much as possible but keeping in mind that sustainable livelihoods need to be made. Stakeholders must be involved in the project or it will fail.
- I expect that we will come out of this workshop with a plan; I am a great believer in participatory efforts.
- You can only bring about positive change when local people are involved. My expectation is that the community develops it own mechanisms to manage the future and the government recognizes it.
- We need to manage visitors to serve the communities. Tourism is a tool – if it is an end then it can destroy the environment and the community.
- I would like to see the lagoon restored and preserved and used for ecotourism in its natural form.

In addition to the above comments, many people expressed interest in collaborating and forming partnerships among the different organizations, institutions and agencies, and many individuals offered their help and support with the restoration plan and work. It was pointed out that that in the room there were many perspectives and much expertise and local knowledge and that this would positively affect change.

Presentations

Introduction to the Workshop, Project History and Workshop Objectives - Dr. Lisa Sorenson, Vice President, Society for the Conservation and Study of Caribbean Birds

Lisa began by presenting information about her organization, the Society for the Conservation and Study of Caribbean birds (SCSCB). It is the largest single regional organization dedicated to bird conservation. SCSCB's mission is to conserve the birds of the Caribbean and their habitats through research, education, site protection and capacity building. The overarching objective of the society is to increase the ability of Caribbean ornithologists, resource managers, conservation organizations, institutions, and local citizens to conserve the birds of the Caribbean and their habitats (www.scscb.org).

Dr. Lisa Sorenson

Lisa pointed out that the Caribbean is a "hotspot" for bird biodiversity with over 560 species of birds, more than 25% of these birds are endemic to the region and 56 species are globally threatened. One could argue that, with the melting pot of many different peoples and cultures that make up the islands, the only thing uniquely Caribbean is, in fact its birds. The Caribbean is also home to many neotropical migrants which spend the winter in or migrate through the islands and are dependent on food, water and shelter provided in forest, scrub and wetland habitats for up to nine months out of the year. Many of these birds are declining due to habitat loss and other threats. So one of the main goals of the society is to increase awareness of Caribbean birds and the importance and value of conserving their habitats. And this forms the basis for SCSCB's two main outreach and education programs.

1) The **Caribbean Endemic Bird Festival** is celebrated April 22 (Earth day) to May 22 (International Biodiversity Day) each year. The festival aims to draw attention to the region's unusually high endemism in bird species and to increase public awareness of the importance and value of wild birds and their habitats. The festival is celebrated with presentations and workshops on local birds, guided birding walks, bird arts and crafts and art exhibitions (paintings, photographs, handicrafts), ecology games, planting of native trees that provide fruit for birds, wetland and beach clean-ups, and distribution of materials on birds. Activities are organized by local committees from partner organizations in each Caribbean island/country. There is one regional coordinator. SCSCB facilitates by developing and sending educational materials to local groups. The theme this year is global warming.

2) The **West Indian Whistling-Duck and Wetlands Conservation Project** – the mission of this project is to reverse the decline of the West Indian Whistling-Duck (WIWD), a globally threatened and endemic species, and to prevent the further loss and degradation of wetlands in the West Indies. The primary threat to WIWDs is habitat loss through wetland destruction and degradation. In most West Indian countries, wetlands are regarded as "wasteland;" people are largely unaware of their importance and value to human populations as well as birds. For example, during storms and hurricanes, mangroves protect coastlines from damage, they serve as nurseries for marine fisheries, and, like sponges, wetlands soak up excess rainwater, thereby lessening flooding. Economic development for tourism is often the highest priority for governments in most Caribbean countries and wetlands are usually the

Purple Gallinule

first places to be destroyed. Growing human populations in most countries has meant that wetlands have also been lost to other development such as building of homes, roads, power stations, agriculture, fish farms, and industry. Wetlands are degraded from various types of pollution, cutting of mangroves, water mismanagement, urbanization and encroachment on wetland banks, grazing by livestock, and invasive species. In many countries the development pressures override environmental concerns; decision-makers view economic development as being more important than environmental protection. People feel powerless to make change, so part of our role is to provide, during intensive two-day trainings workshop, knowledge and skills to local citizens (educators and NGO staff) who in turn, teach children and train others ("multiplier effect"). With this strategy, we can develop a network of local people that care about birds and wetlands and become involved in their conservation. The underlying theme to our work is sustainable development. Conservation of the environment safeguards human health and provides economic benefits.

In collaboration with AvianEyes Birding Group, Lisa delivered a Wetlands Education Training Workshop here on Union Island in 2004. The participants visited Ashton Lagoon for the field trip and Lisa learned about what had happened to the lagoon. Lisa talked with workshop participants and together with Martin Barriteau and BirdLife International staff held additional stakeholder meetings in Dec. 2006. It was clear that many people were deeply saddened about what had happened to the lagoon and the loss of many of the resources that the lagoon had provided. They could see the impacts—stagnant water, marked declines in marine life, shallower water—and were keen to pursue a restoration project. Lisa was aware that the US Fish and Wildlife Service is concerned about what is happening to Caribbean wetlands and they invited her to submit a proposal for the first phase of the project (this Participatory Planning Workshop). Lisa corresponded with Tom Goreau, Stephen Price and others that had worked here and knew the history and ecology of the lagoon. So after many months of planning, here we are at the workshop.

The workshop objectives are to:

- Develop Union Island and the Vincentian community's vision for the sustainable use of the lagoon.
- Develop alternative scenarios for the management of the lagoon considering land ownership.
- Develop a framework for funding proposals to carry out the work.

The Sustainable Grenadines Project – Mr. Martin Barriteau, Project Manager

Mr. Martin Barriteau

Martin provided an overview of the Sustainable Grenadines Project. It is a trans-boundary project from Bequia to Carriacou. The main concerns are biodiversity conservation and sustainable development. The project is administered through CERMES (Centre for Resource Management and Environmental Studies) and is based in Union Island. Project administration is through a working committee and a steering committee that meets once a year. The Lighthouse Foundation in Germany provides funding.

Martin described how in the Grenadines many livelihoods are dependent on the marine resources. Thus there is a need for this project to coordinate the efforts of government, civil society and the many small NGOs. During Phase 1 (2002-2004), stakeholders were brought together in participatory planning workshops to come up with a vision, strategy and activities. During Phase 2 (2004-2008), they are working on capacity building, and promoting co-management and linkages with

other NGO partners. Their philosophy is that the social and resource use systems are complex – difficult to control from the top down. Thus it is best to use the bottom-up participatory approach. The role of the SusGren Project is to act as an agent of change. They work on capacity building for long-term management and sustainability, hold planning and training workshops and administer a mini-projects grant program to help small organizations organize and implement projects and gain experience so that they can approach larger donors in the future. Associated projects include seamoss farming, the water taxi project, and the Ashton Lagoon restoration project. They support communications and networking in the Grenadines through their listserve and website. For more information visit: http://www.cavehill.uwi.edu/cermes/Associated_Projects.html

Tourism: A Tool for Sustainability, What Could it Look Like for Ashton Lagoon?[2] – Mr. Jon Kohl, Interpretive Specialist, Park Planner, Fermata, Inc.[3]

Mr. Jon Kohl

Jon began his presentation with some examples and photographs of successful ecotourism initiatives in other countries.

Example 1 - Embera Drua Cultural Tourism, Panama: A dugout canoe will take you up river into the rainforest and onto a sandy beach. Visitors see indigenous folks performing traditional dances, serving traditional food and leading a traditional life and selling handicrafts (carvings, jewelry, baskets). One can hike and participate in various activities. Due to the revenue from ecotourism the tribe was able to restore its traditional culture and traditional livelihood. Even the young people within the tribe who had become estranged from their traditions are now returning to their traditional ways.

Example 2 - Des Cartier Trail, St Lucia: Before the trail was built, the island's tourism was entirely dominated by foreign-owned beachfront resorts. The trail was built in 1994 with a business mentality. They have a monitoring plan and charge fees and also use money to protect the forest. In its first 60 months, $1.32 million was generated for the community, and $240,000 for the Forestry Dept. from the park entrance fees; average of 400 visitors per month. There have been various spin-off professions and benefits – guides, taxi drivers, tour operators, maintenance crew, etc.

Example 3 - Community Tours Sian Ka'an, Mexico: Some local guys got together in 2004 and started an eco-tourism company. To date they have had greater than 2,600 visitors and generated $230,000 for themselves and for their community. Also provide employment locally for fisher guides etc. Local guides, restaurants, hotels and others work directly with SK conservation projects and tourism. Were finalists for the Equator Prize, an international award for environmental and community projects in the tropics. They also contribute 1% of their revenue directly to the preservation of the SK biosphere because they want to give back to the community and the environment. They realize that their livelihood depends on the preservation of these resources.

Example 4 - Elk Scenic Drive, Pennsylvania – A problem was turned into a money-making resource. There were many elk in and around the small town of Benezette, a poor community. Tourists wanting to see the elk followed them, sometimes right into people's yards and gardens, invading privacy, disrupting community life and also at times causing traffic jams. So, the community got

[2] See Appendices 2 and 3 for a summary report of Jon's talk and a process for determining Quality of Life Indicators, respectively.

[3] This presentation was originally scheduled for early afternoon but was moved up because Mr. Snagg wanted to see it before he had to depart.

together and created a large loop of elk viewing opportunities. They used wastelands like the parking lot of the nuclear missile silo as an elk viewing site, thereby converting a wasteland into a useful purpose. Strip mining sites were restored as browse habitats for elk and these were also made to be viewing stations. Signage and interpretation literature was developed. Thus, a conflict was converted into a revenue-generating enterprise. There were also spin-off revenue opportunities such as woodcraft products.

What is sustainable local tourism? It is often thought of as a business that lasts forever, but companies come and go. The average life span of Fortune 500 companies is 40 years. What should be sustained is the culture and the environment of the place. Use tourism to sustain these. Tourism may not last forever and so we need to diversify the local economy.

Elements of Effective Local Tourism:

- **Low Volume**: Not too many people and vehicles. Best for maintaining dignity and the feeling of community. One doesn't need to rebuild for tourists. This is in contrast to high volume tourism where big changes need to be made to accommodate the large number of people who come as tourists. This interferes with the way people live their lives in the local community. Cruise ships, for example, provide little benefit to the local economy because very few dollars are spent in the community although the tourists enjoy all the resource (beaches, etc.) provided by the local community. So we want eco-tourism to be low volume.
- **Low Impact**: no major alterations to the resources. The community doesn't assume lots of bills from tourists. The community/identity is not degraded, resulting in a lower quality of life. In other words, we do not want tourism to interfere with the way we live our lives.
- **High yield**: We want a good/fair return on each visitor that comes; not a huge capital investment per capita. We do not want backpackers or "cheapies." Find people who will spend a lot of money.

Challenges for the Development of Local Nature Tourism: You will have a greater chance of success by considering some challenges.

- **Know your market, know yourself**: Developing eco-tourism is not a matter of going out and building it, but seeing how to build strength. Know what people want. The saying "if you build it, they will come" is a fallacy. For example, in Pico Bonito, there was a lot of white water rafting business. The tourists were driven up to the launch site and then floated down-river. So, they built a visitor center along the road up to the launch site. However, no one came because there was no reason to stop at the visitor center and when they checked, the tour operators told them that there were time constrains and so they had to get to the launch site as soon as possible and hence did not have time to stop at the visitor center or use the trail.
- **Have patience, no short cuts**: One needs to build capacity to run a business. To be good at anything takes time. It takes time to become a good interpreter or a good guide. Example of a long capacity building program: Kapawi – Peruvian Amazon, got money from banks to build infrastructure deep in the jungle. It took over 10 years to train the Ashwar Indians to become guides and manage the eco-lodge. They are now in their eighth year and many of the staff have been replaced by Indians but the manager is still an outsider. Need to have patience to develop capacity.
- **Don't put all your eggs in one tourism basket** – Example: a marina demolished by a hurricane in Grenada. Tourists get nervous easily. Tourism drops after hurricanes, assassinations, robberies, conflicts, a spike in oil prices, etc. After September 11th the World Travel and Tourism Council said there was a 30% drop in tourism worldwide and a loss of 26.4 million jobs. So, it is very volatile industry.

- **Build small with local capital**: When outsiders own capital, the result is usually menial jobs and a loss of dignity and identity for the local people. In many parts of the world there is "enclave tourism" where all the tourism operations are owned by outsiders. Example - Okavango Delta, Botswana. They get all the services and products from abroad, so little money trickles down to the local community. This is called internal colonialism. The local people have a feeling of betrayal, a loss of dignity and identity and there is a loss of autonomy and control. The people feel that the delta has been taken from them by the government and given to foreign tour operators. As a result, citizens view the approach negatively because they perceive the domination by non-citizens as "selling out" their resources. They get a few benefits but mainly in the form of menial jobs. The lesson is: start small, use capital from local banks.
- **Lower profit margins should fit the community vision**: Sustainable tourism is usually small scale; one does not get rich quickly. The higher the quality of the product, the higher the price that can be charged and more money is generated. The community vision should not have inflated expectations.
- **Money causes conflict**: The benefits are never distributed equally in tourism; no matter what the tourism enterprise, some people within the community will make more money than others. How can this money be distributed? Need mechanisms for distribution and some way to share the profits of the industry with the community. Could be conservation contribution, like the eco-tourism operators giving money back to the preservation of the biosphere reserve in Mexico. Or the profits could be used to build schools or for community projects.

The community needs to develop a vision of what it wants to be and define the role of tourism within that vision. So, even if tourism fails the community has a vision to go back to and start planning. For example, the Jolly Harbour hotel and marina development in Antigua (this has happened in many sites in the Caribbean): Valuable mangroves and salt ponds were filled in for the development. The community gained little from the development and they bore the brunt of the loss of resources and the environmental damage. So, need to have a good vision of how the development is going to help the community gain its vision.

What is the process to develop sustainable tourism? There are many ways but Fermata, Inc. has one that is called the **Matrix of Opportunity**: Community Vision and How Tourism Contributes. Use tourism as a tool for diversifying a local economy, thereby reducing the community's dependence on tourism and increasing the number of people who benefit from tourism (albeit indirectly). Example from Ashton Lagoon; it could be a powerful interpretive story (recover pride, create local tourism on a renewal theme).

1. Develop a community vision and assess how tourism contributes to this vision. What is quality of life for this community? Develop the quality of life indicators (see Appendix 2). How do we come up with that? Figure out what is important to the community. For example, when I was growing up the trees were so large they met over the road, we knew the names of all our neighbours, most of the community was involved in common projects. Jon asked the participants what they saw as quality of life indicators. Responses: no cars, only bicycles (could play in the streets); catch a shark for lunch; sand to play in and not mud. Important point: If we don't identify them in the beginning then we will forget them – the baseline is always shifting!

2. Make an inventory of outstanding features and stories. Examples from UI and Ashton Lagoon: The cannon, basketball player Adonal Foyle (NBA player from UI), coral reefs, lagoons, mangroves. Stories need to be identified and used to develop tourism. Example of story: Degradation

and restoration of Ashton Lagoon. Tour: Points around the lagoon showing before and after the project.

3. Define visitor experiences and messages. Is it going to be one of the sun and surf experience, drinks, and not even see the country and local communities? This is true of cruise ships and big resorts. Or are we going to emphasize interaction with the community, a sense of place, renewal to preserve culture? We may want to emphasize the experiences that make the place unique. Can even make the process of damage and restoration of Ashton Lagoon part of the experience and theme – this would be unique in the Caribbean.

4. Identify products that provide experience and opportunities for community interaction. Once experiences have been identified than we can build the infrastructure. For example, develop signage that documents the chronology of the experience in the Ashton Lagoon – start at the damaged part and walk a trail to look at the restoration, finishing in a pristine area to offer hope and show renewal. In addition, could have a Visitor Center where people can see a slide show of the history of what happened and how it was reversed. Could also offer birding and tours.

5. Trace routes that move people to different places. How do people travel here? How can we take advantage of existing routes? How do they get around UI? People arrive via SVG; also yachting and sailing market. Design a scenic trail or roads (like Elk Scenic drive), so that the visitor encounters different communities and they (the communities) receive the benefits.

6. Develop a tourism marketing strategy. Emphasize differentiated experience and messaging, for example, nature-based tourists who want to see the "other side" (i.e., not just the beach) of the Caribbean

Wilson's Plovers are common residents of Ashton Lagoon's mudflat, salt pond, and mangrove areas.

7. Use trails as marketing platform for regional good and services. Use tourism as a laboratory to test different products – e.g., different foods, jewellery, handicrafts, etc. Bring people into the community to try out these services and see which ones they like. Local examples: specialized seamoss drinks, tamarind balls, UI version of pea soup, callaloo soup. Tourists are interested in trying new things and it will be a way to test these to see what else we can develop to sell.

8. Formulate a strategy to enhance and develop a broader array of destinations and events to offer the traveling public. With development of tourism use it to develop more sites and events. For example, Easterval – bring back cultural restoration, visit historical Lenkin Pond and describe how locals used the pond.

9. Formulate a strategy to enhance and develop a broader array of goods and services. What new products and services could be developed. Tourism is like R & D for local products; the idea is to move non-tourism merchandise to broader markets (e.g., Grenada nutmeg). An example for Ashton: new dive sites on renewal and marine engineering.

10. Use experiential travel as an identity (brand) builder for the region. Identity or brand: Unique identity of place based on experiences (not so hard in the Caribbean where there is so much repetition). For example, "Ashton Lagoon: A Land Coming Back."

11. Use new identity to expand products and services beyond region to broader market. For example, successful local products exported with a local brand, such as hot sauce or nutmeg oil. Showcase ship building expertise in Petit Martinique – Disney used it to build ships for Pirates of the Caribbean. Use this to develop brand. Other examples: Costa Rican coffee, Guatemalan furniture, Caribbean rum.

Conclusion: Tourism may not be for every community, but those who think through the process enjoy greater success.

Review

- Move people to places – Get people to come to UI and see Ashton Lagoon (branding, marketing, unique)
- Move masses to messages – Have them involved in Ashton's new story of recovery, experience the vibrant return to life, not big hotels, marinas, golf courses. Interact with the community.
- Move markets to merchandise – use tourism to test products that could be exported or used in other ways. This helps to diversify the economy.
- Move merchandise to markets: export local products

Final Questions for Workshop Participants:

- What does the Union Island community want to be in 10-20 years? What will their quality of life indicators be?
- What makes Ashton Lagoon and Union Island unique in the market place of Caribbean islands?
- What other local products could benefit from the arrival of new customers?
- How can the local community use tourism as part of an overall sustainability or restoration strategy?

Questions and discussion following Jon's presentation:

Lucine – Do you know of other restoration project elsewhere that have been used to promote tourism?

Jon – Not really. Cultural restoration of seed ivory carving used by (Indians) to develop tourism products.

Tom steps in – There is a village in Indonesia that is growing a reef community and this is used for tourism attraction.

Lisa - Florida Everglades – natural water flow was destroyed by the Army Corps of Engineers but now restoration is used as a theme in the park. At $6 billion it is the largest restoration project ever.

William – How do you keep up with the change?

Jon - Tight on ends, loose on means. No guarantee that a business will survive. The steps used to develop the first strategy should be used in a loop fashion for continual assessment to keep the process going. Continual research, continual adaptation. Expand and adapt. Link up with other projects in the region.

Kemraj – Short term political cycle – most projects do not have continuous monitoring and adaptation built in. The problem with this is only now being realized.

Jon – The vision should last beyond the political cycle.

Ottis – In the 3 principles you talked about. Low volume just means that you are talking about the carrying capacity. Some tourism developments have higher carrying capacity but others not.

Jon – The community vision needs to determine this level of tourism development.
Lystra – We can have branding of seamoss – Ashton Lagoon seamoss - and provide a little history on the bottle – this would be strong branding. Also, plan on linking different sites – Fort trail, etc. For example, the Cayman Island tours – bring together trails, marine and terrestrial; they have tours that take them around the two sister islands. Have a brochure describing the trails.
Jon – Yes, you need to know how to link stories with the things that increase the value of the product.
Ottis – We need more branding and need to develop local and unique products (not done now).
Question for Mr. Snagg – Could you tell us - Does the government have any plans for Ashton Lagoon?
Mr. Edwin Snagg – No policies are written in stone. Ashton Lagoon has a history and so we need to be careful. There have been number of proposals that are under review. The government has continued to try to find investors to take on the project and complete it. After meetings with the Ministry of Health and Environment – there is a proposal to dredge to permit the ferries from Carriacou to get in to the jetty without trouble. Also, there is a proposal to put of a boardwalk with shops along the west of the jetty. (*Talking to Herman, it seems that there was a meeting with the community and these were projects that the community wanted. The idea is to dredge next to the jetty and fill-in a patch to extend the jetty. The new area created would have a few picnic tables and be a place for the community to meet. Herman thinks that the dredging in this area can be done with minimum sediment flushing into the lagoon. The goal is to provide some revitalization to the Ashton community that is really dying right now).* There is some Japanese funding for small fish farming operation. Government wants to preserve the mangrove and protect it. The idea is to strike a balance between economic activity and also preservation of the lagoon. Lots of investors have proposed all kind of things. Have to be careful. Awaiting what comes from the workshop because it may complement or be the same as what comes from the government. The community also needs to clean up. Some shops on the waterfront have toilet bowls set right on the waters edge.
Fitzoy – what plans do you have for soil stabilization to prevent the problem with resiltation?
Mr. Snagg – I leave it to the technocrats. Even though the governments change the technocrats need to make plans that carry over the political cycle.
? - Made the observation that because technocrats are usually political appointments, technocrats change with the change with the politicians.

AvianEyes Birding Group – Ms. Lystra Culzac-Wilson, Secretary

Ms. Lystra Culzac-Wilson

The group, based in SVG, was formed in 1995 by a group of people working in the Forestry Department at that time in SVG. The mission is supporting nature conservation through birding. The group's objectives are to: 1) Promote conservation of birds and habitat by involving others in bird watching, 2) Promote education, research, and documentation on flora and fauna with specific emphasis on birds, 3) To acquire knowledge about local and migrant avian species, 4) Foster interest in bird watching as a viable means of promoting ecotourism in SVG, 5) Foster partnerships with local, regional and international birders and other natural resource managers and developers in promoting bird watching and conservation, and 6) Promote bird watching as a recreational activity.

Local activities of the group include: school presentations, community displays, newspaper articles, bird watching and other educational tours (e.g., Botanic Gardens, La Soufriere, Fenton Valley, Mount St. Andrew, Vermont Nature Trails, Mustique).

AvianEyes participates in regional and international activities such as the Caribbean Endemic Bird Festival, International Migratory Bird Day, and World Wetlands Day. They attend meetings and present papers at conferences (e.g., Society for the Conservation and Study of Caribbean Birds) and organized the SCSCB Wetlands Education Training Workshops held on Union Island and St. Vincent in 2004. They also conduct assessments of the birds on Mustique, Islet, La Soufriere, Brighton Wetland Reserve, Botanic Gardens, produce promotional items (e.g., birding brochures, t-shirts, pins), and maintain a website: www.avianeyes.com

History of Ashton Lagoon and Marine Restoration Potentials – Dr. Stephen Price and Dr. Purnima G. Price, Scientific Consultants, Union Island Association for Ecological Protection[4]

Stephen began his talk by reviewing the ecology of Ashton Lagoon. He described the primary components of the lagoon, which include mangroves, seagrass beds, salt marsh swamp, coral reefs (both fringing and patch), and Frigate Island. Despite the seemingly simple appearance of a salt marsh ecosystem, these areas are actually quite complex and play an invaluable role in the health and integrity of all coastal ecosystems. A major function of salt marshes (and mangroves) is that they greatly aid in the control of flooding and improve coastal water quality. Because of their buffer-like qualities, marshes add nutrients and microorganisms, greatly contributing to coastal food webs. These areas also function as a safe habitat for a wide variety of birds.

Dr. Stephen Price

Regarding water currents: coming westward from the North Atlantic gyre flows, they are deflected upwards after hitting the Brazilian coast, then enter the Caribbean Sea through the windward islands, bouncing off the north end of Carriacou and westward past Union island. The currents bring both nutrients and fresh recruits of larvae to the island's reefs. There are also prevailing trade winds that generate water movement, bringing water over the reefs of Ashton.

Mangroves: They dominate many of the world's tropical coastlines. They are ecologically critical to islands, supporting large numbers of resident crabs, mollusks, oysters, shrimp, prawns, fish and birds. Two of these in particular are economically important locally – lobsters *Panulirus argus* and lambi. Mangroves are extremely productive ecosystems: much of the organic carbon produced from primary productivity is transported into the lagoon ecosystem and the reef. Most (85%) of pelagic and reef fish spend part of their lives in a mangrove. There is a tight ecological and economic link between healthy mangroves and fish/shrimp catches.

Seagrass beds: Previously, there were huge seagrass beds in the lagoon, especially in the area where the causeway and marina fingers are located. Nutrients and detritus from the mangrove flush into the seagrass beds and form the base of the food web which recycles the nutrients. This key ecological community included seagrasses - turtle grass and seamoss, and herbivoures - sea-eggs, lambi, turtles, and manatees.

Coral and algal reefs: provide habitat and food for various food species of fish and invertebrates. Outer fringing reefs break the wave forces. Inner patch reefs provide habitat for a diversity of invertebrates, fish and zooplankton.

[4] See Appendix 4 for a summary report of Stephen's talk.

History: Arawaks and Caribs lived here in the pre-colonization period. They hunted and fished and had a small ecological footprint. European colonization occurred during 1500s to 1950, multinational colonization from the 1950s to the present. The island was wooded during pre-colonization, then cleared for cotton and sugar cane, large herbivores on reefs were decimated (groupers, turtles, manatees, and humpback whales). Smaller fish stocks were stable. During multinational colonization, foreigners bought up or leased much of the land and small Grenadine islands, there was over fishing of large reef fish, lambi and lobster, and a yachting centre was established (Clifton).

Then in 1994, came the failed marina development in Ashton Lagoon by the Valdeterro Construction Company. Construction of the causeway caused the following impacts: the natural flow of water through the lagoon was blocked, dredging and construction increased sedimentation load, mangroves were affected, seagrass, patch reefs and associated flora and fauna were lost, and the benthic community was drastically changed. This in turn has resulted in stagnant water and sedimentation. Now there is a tube worm community, only a few small corals, and overgrowth of macro-algae. The fish, lambi and lobsters disappeared.

Dr. Purnima G. Price

To restore the lagoon, we need to re-establish the natural currents, which will flush sediments and pollution (sewage and hydrocarbons), allow seasonal and daily migration of reef and pelagic organisms to and from mangroves and seagrasses, and allow carbon from the mangroves to reach the seagrass beds and outer reef.

Potential economic alternatives include green tourism (kayaking, windsurfing, SCUBA diving), mariculture (lambi (Queen conch), oysters, seamoss, shrimp and fish) although there are environmental issues with shrimp farming. The good news is that restoration of the lagoon is possible. We have good documentation of the area prior to its degradation and the technology to restore the coral reefs and seagrass beds once the flow of water is restored.

Another factor to consider is climate change or global warming: the seas are getting warmer, sea levels are rising, ocean current patterns are changing and acidification of the ocean is occurring, a major concern because of negative impacts on the formation of coral and other marine organisms. Mangroves will likely not keep pace with sea level rise and be lost. Seagrasses and the benthic community will also be threatened by increased water temperature and increased waves from hurricanes. Warming seas will cause coral bleaching[5] and increases in coral diseases. A large percentage of reefs throughout the Caribbean have already been killed from bleaching, pollution and disease. Concluding comment: removing the causeway and restoring the lagoon ecosystem is the best hope for maintaining the resilience of the system.

In response to a question about whether pH has been measured, Gregg Moore commented that he and colleagues from The Nature Conservancy recently measured pH and dissolved oxygen in the stagnant water. He could not remember the exact numbers but noted the water was so eutrophic that the numbers were off the scale of their instruments; "if you put a fish in there it would have died instantly."

[5] Coral bleaching occurs when coral eject the symbiotic algae or zooxanthellae that normally produce food for the coral. This makes corals appear bleached, and can ultimately kill the coral.

Ashton Lagoon Coral Reef Restoration – Dr. Tom Goreau, President, Global Coral Reef Alliance[6]

Dr. Tom Goreau

Tom studied coral reefs in the Lesser Antilles in the early 1970s – the best reef was in Ashton. By 1979 the reef was dead – an epidemic wiped out the elk horn coral. Since then there has been little recovery. The corals that are coming back are mainly weedy species. The reason is that there is very poor recruitment of new coral into the system due to the flow of currents (we are up current and so baby corals cannot make it). Hurricane Lenny moved backwards from Bonaire and carried new coral recruits but recruitment is dependent on these rare events. In Ashton, the outer reefs are clean but no recruitment.

Overfishing has largely caused the loss of lambi in shallow water. But the main reason for the loss of fishes in the Caribbean is habitat destruction. Most reefs are mostly dead. Another major threat to the system is climate change – two years ago high temperatures caused the worst documented bleaching event. Many corals died. It was during this time that Nick Sammons asked me to look at the Ashton reefs and explain why they were in such poor condition. Our survey showed that in deeper water most corals have disease. Another threat is the pollution from added nutrients, which causes excessive algae growth, that in turn leads to loss of oxygen, and reductions in water quality and marine life. Clifton is a nutrient source and the currents carry this to Ashton and affect the systems there. The simple answer is to recycle the nutrients on land. We cannot let our sewage go into the water.

We sampled water quality in Ashton Lagoon in 2003 (Goreau and Sammons 2003). We took 270 readings of oxygen, temperature and salinity at 50 locations in the western (where the marina is located) and eastern sides of the area.

<u>Summary of our results:</u>

- Western side was stagnant and hotter than the eastern side.
- There was no significant variation in temperature with depth.
- Western areas had higher salinity than eastern areas due to stagnation.
- There was no significant variation of salinity with depth.
- Western areas had lower oxygen than eastern areas; the high oxygen level in the eastern part was produced by the seagrass beds. Western part had little surviving seagrass and consequently much lower oxygen.
- On the eastern side there was no difference in oxygen with depth. On the western side deeper water had lower oxygen than surface waters.

We're fortunate the marina was not completed, or it would be a much worse mess due to discharge from the boats. To restore the lagoon, we need to restore the water flow as the area around the dock fingers is completely stagnant. We probably need to open up the causeway in at least three places. Once the flow is restored we can begin to restore the mangroves, seagrasses and corals. Lobsters start out in mangroves, then move to seagrass and then to coral as they get bigger. A lot of water exchange (for flushing, oxygen, and nutrients) is needed for lobsters and healthy fisheries. Right now, the mangroves have no channels and the dwarf mangroves on the inside indicate a lack of nutrients. Channels can restore oxygen exchange and increase the nutrient input (*detritus*) from the

[6] See Appendix 5 for a summary report Tom's talk.

mangroves. The growing of seamoss in the lagoon will also increase the habitat for lambi and lobster; seamoss can be full of baby lobsters.

We also need to grow corals in patch reefs and these will provide habitat for lambi, lobster and fish. We can do this through a method called **Biorock®**[7]. How does a Biorock reef work? A low current is passed through rebar and this encourages the deposition of calcium carbonate on a rebar sructure. We use low voltage electricity, 6-12 volts (a battery). The source of DC current can be solar, wind, tidal or conventional. You can build a structure of any size or shape and can grow solid limestone rock, 1-2 cm/year, with the idea of making it grow strong and hard. The corals are tied on or otherwise attached to this framework of rebar and deposited calcium carbonate. The corals on Biorock grow 3 to 5 times faster than normal and survival is 99%. Within 1.5 years you have fish habitat and can build up tremendous populations of fish and lobster (a series of photos is shown showing the rapid growth of coral on Biorock reefs at different sites in Indonesia, Maldives and St. Maarten).

Two-year old Biorock reef, Gili Trawangan, Lombok, Indonesia. Photograph by Delphine Robbe.

<u>Other advantages of Biorock corals:</u>

- There is 100 times higher recruitment of baby coral on the calcium carbonate skeletons.
- They can survive high temperatures (16-50 times more than adjacent reefs) and resist disease better.
- They heal more than 20 times faster. Reefs can be quickly restored where they cannot recover naturally.
- Fishers can grow reefs and increase fish and shellfish populations and catches, becoming farmers instead of hunters.
- We can keep reefs alive and restore them where they can't establish naturally.
- Biorock structures are the only marine construction material that get stronger with age and are self-repairing.
- The steel framework is completely protected from rusting.
- Biorock material grown properly has three times the compressive strength of ordinary concrete.
- Structures cost much less than concrete or rock of the same dimensions.
- Biorock breakwaters can be built at a fraction of the cost of concrete or stone breakwaters, with vastly greater environmental benefits.
- Biorock reefs attract incredible numbers of fish. Once fishing communities see what can be done, they want to experiment with their own designs to attract different types of marine life; e.g., different kinds of fish, lobster, oysters, and octopus each require different sizes and shapes of holes and places to hide. In the Maldives, we grew coral in front of the beach to slow the waves down and made the beach grow 50 feet in a couple of years. Biorock reefs have been awarded many international environmental and ecotourism prizes.

We tried very hard to do a project here at Big Sands but were blocked bureaucratically. The current style of fisheries management of exclusion zones will not work if suitable habitats are not created as part of the process.

[7] The Biorock® process was invented by Architect Wolf Hilbertz to grow construction materials from ocean minerals.

Questions and discussion following Tom's presentation:

Kemraj – Where do you find the corals to transplant?

Tom – We don't teach people to break corals, but to rescue pieces. In most places it is not hard to find small pieces of broken coral. You can transport them from elsewhere.

Kemraj – What about recruitment?

Tom – The structure is weakest when built and so need to get coral growing quickly and so we add the bits to the structure. This is to maximize growth.

? - When does the power turn off?

Tom - Not ever. The electricity gives advantage when the coral are stressed by disease and nutrient load. If the current is turned off the corals lose that advantage.

Caroline – Can we get coral from other places?

Tom - Yes

Caroline – Do we need big equipment?

Tom - No. Simple building techniques. In most cases we use local folks, local rebar, supplying power is an issue of course.

Vernalyn – What is the cost of building a given size?

Tom – The cost depends on the size. Short reefs can cost 5 or 10 dollars per sq meter for materials. Higher reefs get more expensive, maybe tens of dollars per sq meter. The problem is that our mindset is that corals are a free good. But if they are destroyed they don't always come back. Funding is very difficult. Government and hotels will not spend money on habitat restoration. Hotels will spend millions of dollars on ornamentals on land but nothing on corals. We can grow a reef full of fish right in front of the beach which is great for tourism.

Roseman – Was there a specific reason for not permitting the Biorock reef at Big Sands?

Tom – Not really.

Wilian – When the coral reef is growing well, what do you do with the rebar?

Tom – Leave it in place. It remains in the structure.

Ottis – The Caribbean Community Climate Change Center has about $300,000 to spend on UI and this would be a good project to invest in but we need to know costs.

Tom – Let us talk about it.

Lucine – Has there been a comprehensive study of the methodology?

Tom – There are demonstrations and information published on the web[8]. Visit: http://www.globalcoral.org/

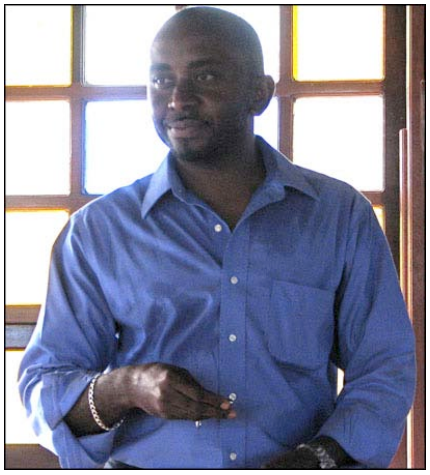
Lucine – Has the technology been assessed in peer reviewed publications?

Tom – There are no disadvantages to the system, but there has not been a comprehensive assessment. Wherever we have done a project, people want more. We need to invest in our subsistence fishers. Biorock is the best technology and most cost effective solution for coral reef, fisheries, and shellfish restoration, limestone breakwaters for shoreline protection, mariculture, protecting reefs from global warming and for ecotourism.

Preliminary Assessment of Restoration of Water Circulation in Ashton Lagoon by Opening up Sections of Marina Causeway – Mr. Robert Bascom, Coastal Engineer, Coastal and Environmental Engineering Solutions, Inc., Barbados.[9]

[8] There was an excellent interview of successful use of Biorock electric reefs in the Maldives on National Public Radio (*All Things Considered* program) on 22 October 2007. You can read the article and listen to the interview at: http://www.npr.org/templates/story/story.php?storyId=15367660. Tom's organization, the Global Coral Reef Alliance, is referenced on this page.

[9] See Appendix 6 for a summary report of Robert's talk.


Mr. Robert Bascom

Robert prefaced his presentation with the caveat that he had only one day to look at the site, so his assessment of the engineering aspects of the restoration is indeed preliminary. From observations made yesterday, the tidal range is less than a meter in Ashton Lagoon. The current is the southeast wave train moving towards the causeway. Two things will generate current inside the marina, tidal movement and ocean waves. There is a tendency to a delicate flushing balance: flushing is low because of the low tidal range. The development blocked what little flushing there was in Ashton Lagoon previously. The sheet piling makes it an even more effective barrier.

Determining how to remove the causeway will take more thought and assessment. Both the sheet metal piling and the stone fingers have been eroding over time. Within the fingers we are getting erosion by sloshing on both sides of fingers. There may be more movement during extreme weather events. The fingers are constructed of boulders and dredge material on top of that. If we do nothing they will continue eroding to the boulders, but there's not enough action to move the big boulders. The sheet piling has been rusting and eroding but it may take another 12 years before they rot to any big extent.

There are a number of proposed scenarios about where you can break the causeway, but no data to suggest that if you break here you will get what you want because the tidal range is so small. You would have to rely on high-energy events to drive the flow.

There are several ways to get rid of the sheet piling. They can be cut to below the low tide level which would help the waves erode them over time more efficiently. This may be the easiest and most cost effective thing to do. Pulling up the sheet pilings may not work as bringing in machinery to pull up the pilings would be difficult and could cause more damage. If we cut holes, waves will choose a path of least resistance and it will create rip currents. We need to clearly define the objectives of the restoration efforts before we can decide on the best course of action.

Another problem to consider is the sedimentation that will result from pulling up the sheet metal pilings. There are two problems. One is that the low tidal flow will mean that the sediment will be retained within the system for a long time and the second is that the islands are all connected in a system. Some would like to see the whole causeway removed, but this is not advisable, as you would create a huge plume of sediment that would last a while based on wave activity.

Sheet metal piling and causeway restricting the flow of water into the lagoon near Frigate Island

The water quality is poor and there are some little things we can do up front. A short-term solution to reducing the algal bloom in the fingers is to pump fresh water into the lagoon. This is a low cost, easy and immediate remedy to deal with the stagnation. You could also use a simple aeration system to create flow in the system to improve water quality. We can do this right now while other options are being worked out.

We need a hydrodynamic model to understand the circulation patterns and flows within the area and come up with a plan. We would replicate the configuration of waves and currents and other processes into a computer model and come up with cost-effective scenarios for specific

objectives. For example, what level of circulation do we want? For a marina, we need a 10-day flushing period – the people who built the Ashton Lagoon marina project did not seem to have considered this.

Robert concluded that he needs to do more surveys and study the system in more detail before making recommendations. He stressed that the objectives of the restoration need to be clearly defined.

Questions following Robert's presentation:

Rusting sheet metal piling

Roseman – If the bank owns the causeway, why are the bank members not in the meeting?

Kemraj – If the bank owns it and is trying to recoup some money from it, it may be open to proposals from a workshop like this. Even positive publicity may be sufficient for them to cede the causeway over to restoration.

Robert asked what has happened to the shoreline. Someone answered that the area has become shallower due to build-up of deposits.

Gregg mentioned that even if the marina is rebuilt they are going to have to update and upgrade the decaying system. Robert commented that he is very doubtful that an investor would take on such a project given its current conditions. It would require a huge amount of capital to fix it, and ripping it out would be very costly as well.

Mangrove Ecology and Restoration and Sustainable Use of the Ashton Mangrove – Dr. Gregg Moore, Research Scientist, Jackson Estuarine Laboratory, University of New Hampshire[10]

Dr. Gregg Moore

Gregg began his talk with a brief review of mangrove distribution, taxonomy and ecology. Mangroves have a pantropical distribution, 25° N/S. They are halophytic (salt-tolerant) trees and shrubs and the dominant wetland type of the Caribbean. They can occur on coastal wetlands, lagoons, and estuarine and brackish habitats. Four species are common/dominant in the Caribbean including red mangrove (*Rhizophora mangle*), black mangrove (*Avicennia germinans*), white mangrove (*Laguncularia racemosa*) and buttonwood (*Conocarpus erectus*).

Mangroves are specialists with many unique adaptations. They are unique among plants in that they can handle a broad range of salinity – from hypersaline (e.g., twice as salty as sea water) to almost fresh. They can also handle high anoxia, have special seed dispersal adaptations, are exceptional at holding sediments, are adapted to cope with high winds, lots of sun and evaporation and can tolerate nutrient limitation.

Their ecological significance is very clear and has been talked about – they are a nursery (provide habitat) for fish - both permanent residents and juveniles, they provide various habitats for birds – nesting, resting, foraging and roosting. Mangroves are important habitat for various species of crabs, which are critical for the breakdown of material for food chains. Mangrove oysters are increasingly

[10] See Appendix 7 for a summary report of Gregg's talk.

harvested and becoming increasingly rare. Of 46 sites surveyed in the Grenadine islands, we found only one with oysters – Tyrell Bay in Carriacou. Mangroves even benefit sea turtles. They provide nesting habitats in sand spits as the prime nesting habitats of sea turtles are getting increasingly paved over and built upon.

In addition to ecological benefits they also provide many important benefits to local communities. It's well-known that mangroves provide a safe haven for boats in storms. The root biomass of mangroves is 2 to 3 times the above ground biomass. These roots trap sediments and filter pollutants from upland runoff, thereby improving coastal water quality. Mangroves also stabilize shorelines and protect them from erosion and provide coastal protection from storms. When mangroves were removed, the cemetery in Carriacou started to erode into the sea.

The species of mangroves that are present depends on their tolerance of flooding and salinity.

There are many different types of mangrove communities. Some examples include Fringe (Ashton was a Fringe system and is now converting to basin), Basin or Overwash, Scrub, and Riverine. Mangrove benefits to the other nearshore ecosystems. It can serve as sink or source of carbon depending on the type. Ashton – was historically an exporter of carbon. Now with the conversion of Ashton to a basin type, the export of carbon is reduced.

Ecological Summary of Mangroves:

- Highly specialized group
- Highly productive
- Abundant ecosystem functions, including forming the basis of a complex marine food chain
- Community structure is controlled by tidal regime, salinity, physiological stress and soil biogeochemistry
- Low plant diversity, high animal diversity
- There are many benefits of healthy mangroves
- They are an essential component of healthy, productive, stable coastal ecosystems
- All nearshore systems integrate for the health functioning of the ecosystem

Threats to mangroves can be categorized as anthropogenic (e.g., pollution, development, climate change, reclamation, extraction/cutting of mangroves, etc.) and natural (hurricanes, storms, sediment). In most sites in the region and around the world the main threats are from development and land reclamation.

In Ashton, fortunately we still have mangroves; however, Hurricane Ivan killed or seriously damaged many mangroves in Grenada. Restoration of mangroves following storm damage is possible, but impacts from humans are often so severe that restoration is very difficult. For example, when humans bring about permanent changes to the system, such as the development of the Tyrell Bay Marina where a very large area of mangrove area has been completely built over and dumped with fill from the seagrass beds, impacts cannot be reversed due to a lack of suitable area or substrate. Off site restoration can offer some hope, but few examples have shown success on anything more than small-scale efforts when attempting to restore coastal, fringing mangroves.

There is hope for Ashton Lagoon. The most important factor affecting the mangroves is tidal restriction (from the building of roads, causeways and berms); tidal flushing needs to be restored so that it can revert the mangrove back to a fringing type. The reduced flushing is converting the mangrove to a dwarf system. The overwash from the remnant fringing system and terrestrial runoff create pooling of water behind the mangrove which creates ideal mosquito breeding habitat. The reduced tidal exchange has altered salinity, increased sulfides, decreased redox potential, decreased pH, and accumulation of phytotoxins. The changed condition means that there are no more large trees. The changed hydrological cycle means that the seed dispersal has been interrupted leading to changed species composition in the mangrove and changed sedimentation regimes. There is a loss of habitat stability,

community structure and self-regulation and decreased productivity, which has impacts to the mangroves, water quality, fish, coral and seagrass.

However, if I were to come in fresh to look at Ashton Lagoon without knowing the history, I would say the situation is manageable with respect to mangrove restoration. I am more concerned for seagrasses, corals and fisheries as these have been comparatively wiped out. The mangrove health is on a continuum and so we need to define the endpoint of our restoration efforts. Where do we want to be in this continuum of restoration.

Rehabilitation has been defined as partial or full replacement of the ecosystem's structural and functional characteristics. Restoration has been defined as the act of brining an ecosystem back to its original condition. *Restoration* is one possible end point of a successful *rehabilitation*, but there are many others.

Possibilities for habitat/ecosystem restoration: The Ashton mangrove can be rehabilitated, some of the impacts may be reversible by restoring the hydrology and restoring regular tidal flushing (e.g., installing culverts underneath the access road; see Appendix 8). We also need to maintain and increase habitat diversity and facilitate vegetation response to restored hydrology through plantings and we need continued monitoring and stewardship.

Local restoration examples from Carriacou: Petit Carenage – mangroves have been planted in area where they were damaged by hurricanes. L'islet Carriacou – Removed debris from a historic inlet to allow flooding. We harnessed the energy of local youth (2 scout groups) to do mangrove planting. We used seedling encasement methods to secure plantings in some areas of high wave energy. The groups also maintain monitoring schedule, which is done 4 times each year. They measure survivorship, growth, stem/leaf counts, salinity, pH, HS and Eh. Mangroves have also been planted at Dover/Limlair.

Planting of mangroves is only one aspect of restoration. Real restoration involves a diversity of activities all of which contribute to overall health of the mangrove. So, there is hope of successful restoration of Ashton.

Questions following Gregg's presentation:

Jon – If the hydrology is restored – would the mosquito population be decreased?

Gregg – Yes, because mosquitoes need stagnant and still water to breed, the flushing action of the tide would disrupt the breeding cycle, making the site much less suitable for successful breeding. In addition, fish and other predators would like come in and eat the larvae.

Vernalyn – where did you get the plants?

Gregg – We collected the seeds during seedset and transplanted those. It is more difficult to dig up and plant seedlings. The most successful method was to collect seeds, germinate them in buckets circulated with seawater until root development and then transplant the young seedlings.

Father Andrew Roach commented that the 1970s second biggest mosquito breeding population came from the garbage dump pond (*lots of people get into the mosquito question but the final consensus seemed to be that the mosquito problem predated the AL disaster*)

PROCEEDINGS FROM DAY 2

Participatory Project Planning – Creating a Sustainable Use Plan for Ashton Lagoon

Introduction to Project Planning – Mr. Amiro Pérez-Leroux, Partner Development Officer, BirdLife International Americas Programme, Quito, Ecuador

Amiro provided an overview of the benefits and steps to project planning. Following a planning process is important because it: 1) allows the identification of issues (problems) that will need to be addresses, allows defining solutions and activities, and 3) ensures ownership of the project. Planning also helps to: think ahead and prepare for the future, ensure the right direction, consider whether a project is possible, and make the best use of resources.

Mr. Amiro Pérez-Leroux

We will follow a **Logical Framework Approach** to project planning[11]. There are two stages to the planning. In the **Analysis Phase**, the existing situation is analysed to develop a vision of the "future desired situation" and to select strategies to achieve it. The Analysis Phase includes the following steps: 1) Stakeholder analysis, 2) Analysis of problems, 3) Analysis of objectives, and 4) Identification of Strategies. In the **Planning Phase**, the operational details (activities, etc.) are developed. The steps are: 5) Goal (or Overall Objective or Development Objective), 6) Purpose (or Immediate objective(s)) 7) Outputs, 8) Activities, 9) Indicators, and 10) Assumptions.

Amiro explains that we will be creating a **problem tree** - identifying (brainstorming) problems with Ashton Lagoon on 5 x 7 index cards, pasting them on the wall, and then ordering them hierarchically in relation to their cause and effects so that the main problem is as the top of the tree. The problem tree provides a visualization or comprehensive picture of the **existing negative situation**. Once the problem tree is constructed, then we create the solution or **objective tree**: the negative situations on the problem tree cards are converted to solutions, expressed as "**positive achievements**." These achievements are objectives. Once completed, the objective tree provides a comprehensive picture of the **future desired situation**, and includes the activities necessary to achieve it. In the final stage of the Analysis Phase, we select the **Strategies** that will be used to achieve the desired objectives. Objectives form themselves into 'clusters' of objectives of the same type – identified as particular 'strategies.' In designing our project we may decide not to address ALL the clusters/strategies – some may be not be feasible (given resource availability) or they may be better met by another organization and/or separate project. Each cluster may form a project-sized intervention on its own, or may form a component of a larger, integrated project or programme.

To help us assess the current situation in Ashton Lagoon before we began the project planning, Amiro led us in a SWOT (Strengths, Weaknesses, Opportunities and Threats) Analysis, a tool that can be used during all phases of the project cycle. The group participated in identifying the following:

Strengths. The potential of the lagoon. Things that one is proud to say about the site/activities.
Weaknesses. Those things that are not working so well. Things that could have gone better.
Opportunities. Ideas on how to overcome weaknesses and build on strengths.
Threats /Constraints. The constraints that exist which reduce the range of opportunities for change.

[11] The Logical Framework Approach is a technique to identify and analyse a given situation, and to define objectives and activities which should be undertaken to improve the situation. We followed the approach outlined in the following references: "The Conservation Project Manual." 2003. C.J. Bibby and C. Alder (eds). BP Conservation Programme, Cambridge, UK; and "Project Cycle Management Handbook," March 2002, Version 2.0. European Commission, EuropeAid Co-operation Office.

Creating a Sustainable Use Plan for Ashton Lagoon: Strengths, Weaknesses, Opportunities and Threats (SWOT) of the existing situation in Ashton Lagoon	
STRENGTHS (internal) mangroves still alive provides safe haven residents are aware and concerned problem is reversible diverse interest of stakeholders (more perspectives) healthy mangroves improve value of nearby real estate have clear idea of problems and activities needed to remedy	**Opportunities (external)** many people interested in project possible to restore nature will rejuvenate no clear plan for development tourism/livelihood in the area all weaknesses could be turned into opportunities
Weaknesses (internal) poor water quality restoration may be costly lost spawning area for fish, lobster, lambi lost beach on Frigate lost beach in lagoon (safe swimming area) loss of social use (e.g., picnics) loss of boating, racing area mosquitos breeding in stagnant water pollution from Ashton boats (western side) pollution from Clifton (eastern) stakeholders have conflicting interest existing structure - further decline in area if action not taken lack of stakeholder participation in initial development community not consulted community too passive	**Threats-Constraints (external)** development will proceed uncertainty political will conflicting interests existing structure preventing natural flow of water and will cause further decline natural disasters (hurricanes, sea level rise) developers lack respect for social and natural environment government does not carry out environmental impact assessments power of developers

The SWOT Analysis generated a lot of discussion. It was pointed out that at this point it was unknown if some factors were threats or opportunities; for example, some weaknesses or threats (e.g., development, political will) could in fact also be opportunities or strategies (e.g., developer could be persuaded to pursue environmentally friendly development). Another example: conflicting interests is not just a threat but an opportunity—as with conflicting views, a diversity of ideas will be contributed, which ultimately may strengthen the outcome.

Stakeholder Analysis – A stakeholder is an individual, community, group or organisation with an interest in project/programme outcomes, either because they are affected by it, or because they can influence it (positively or negatively). The process of identifying stakeholders was initiated at preliminary meetings in December 2006. Additional stakeholders were filled into the table by the group – see Appendix 8. A column was added for 'power and influence of the stakeholder' and a preliminary assessment of the potential impact of the project on each stakeholder was made (+, -, +/-, & ?). We

also identified the relative priority to be given to the needs and interests of different stakeholders by the project. There was much debate about assigning categories and values in the last three columns for some stakeholders and so the table was not completed in the allotted time. Missing values were filled in later by the facilitators; thus, the table needs further review and possible revisions. The findings from the Stakeholder Analysis will be linked into the final project design.

Problem Tree – The next step was to create a problem tree for Ashton Lagoon. Participants were asked to write out specific problems on 5 x 7 Post-Its (one problem per card) and these were stuck onto the wall. The cards were then grouped and ordered in hierarchical fashion with 'effects' at the higher levels and 'causes' below them. It quickly became clear that there was an "environmental" set of problems and a "social" set of problems (further sub-divided into "governance" and "public awareness" related to Ashton Lagoon so three trees were created).

Environmental Problem Tree (Appendix 9): Construction of the causeway caused a number of cascading negative effects, such as blocking of natural circulation of water in the lagoon, stagnant and polluted water, destruction of marine life, and fishing livelihoods damaged. The overarching problem identified was "disruption of the natural ecological processes in Ashton Lagoon." It was pointed out that the "causes" in the problem tree were really symptoms of underlying problems and that the causes were deeper—such as the lack of an overall strategic plan for the area. This was addressed in the social problem trees.

Creating the problem trees for Ashton Lagoon; Adrian Codogan

Social Problem Tree: Two "branches" to the social problem tree were identified—a "governance" branch (Appendix 10) and a "public awareness" branch (Appendix 11). The discussion focused on the problems in these areas that led to the construction of the causeway in the first place, but ultimately, participants agreed that these problems are larger than the site level, in other words, they are characteristic of how development projects generally proceed in the country.

In the **governance** branch (Appendix 10), a number of problems led to the construction of Ashton Lagoon and failed marina development, including undue influence of the developers on government, stakeholders were not consulted, appropriate procedures (e. g., conducting an EIA) were not followed, lack of transparency in the process, and little/no accountability of government officials. Points that were made by various participants in the discussion:

- There is legislation in the books that requires EIA of proposed developments, but it was not applied in the case of Ashton Lagoon because of the influence that the developer had with the government.
- Every development has to be published in the newspaper and the public have the opportunity to comment or protest in writing. The comments are collected by the Planning Department and passed on to cabinet.

Question – How are the issues resolved?

- Sometimes have public hearings. The Planning Department can decide to have a hearing.
- The Planning Department is seen as a department that does what the cabinet tells them to do even though they are supposed to be an advising body for the government and hence influencing the outcomes.

- There is a procedure for what happens when the Cabinet does not agree with what the Planning Department advises and the Planning Board decides. The procedure was there before but not followed.
- The Planning Department has staff to advise and analyse but the Planning Board makes the decisions. [Heated argument about whether the Planning Board makes final decision.]
- In previous times the minister could overrule the Planning Board decision – veto power. But now there has to been a new "yield" committee set up that makes a ruling between minister and the Planning Board. The ministry gets by this rule by electing those on its side to the board and a decision is made that is favourable to the government.
- The problem is that many Caribbean governments are poor and the foreign investors can play each other off to see who will make the most concessions. This is why they get such good deals and why so many rules are bent in the development of the projects. For example, the Ashton project had to have an EIA and other regulations but this was waived because of the money the developer promised to invest in the region.
- Even when the regulations are followed and agreements are signed, these are not enforced. For example, the developer on Canouan promised that the nearshore would not be dredged or trees above a certain height on a hillside cut. However, the nearshore has been dredged about 4 or 5 times now and the trees have been cleared.

Regarding **public awareness** (Appendix 11), the main problems identified included poor communication on environmental issues, little knowledge of and awareness about the environment, and passive communities. Several people pointed out (and everyone agreed) that the connections between environmental and social health and the economic benefits of conservation have not been clearly explained to the people, ultimately leading to the environment not being valued. Nor is there political vision on the part of the government to implement unpopular measures to protect the environment and demonstrate the connection. Someone described how, "The government in St Lucia wanted to set up "no fish" zones to help replenish local fish stocks, but the fishers protested strongly. The government persevered, however, and soon the fish stocks were built up. The very fishers that protested are now begging the government to set up other no-fish zones." Another participant pointed out that extreme poverty could make it too difficult to be able to implement this effectively: "If the person is going to die if he does not take the fish today, then it is difficult to get them to see the benefits of long-term environmental and social health." All agreed, however, that public awareness and communication were key issues. Additional points made during the discussion:

- People may at first not be aware of or understand environmental and sustainable development issues, but if you explain it to them, their interest and understanding quickly grows.
- The environment is not valued because people don't connect it to the economy. We need to show how protecting the environment leads to better economic development.
- There are excellent examples of how wetlands and mangroves protect coastlines from storms and hurricanes, saving millions of dollars in property damage. Government, developers and local people need to be made aware of the value of these environmental services.

Everyone agreed that the different sectors of the problem tree are/must be integrated. For example, increased public awareness about the environment and public pressure will force politicians to implement legislation and follow proper procedures and thus improve governance.

Objective Tree – Amiro explained that the next step in the process was to create an objective tree for Ashton Lagoon. Each of the negative problems in the problem trees is reformulated into positive statements or achievements (objectives). The objective tree is a "mirror" image of the problem

tree and describes the situation in the future once the problems have been remedied. Participants were asked to come up and reformulate at least one problem as the objective that must be achieved to resolve that problem.[12]

Objectives in the Environmental Objective Tree (Appendix 12) addressed reversing all the damage caused by the construction of the causeway, and included restoring the natural flow of water in the lagoon, and re-establishing seagrass beds, coral reefs, lobster, lambi, and fish populations, and habitat for wildlife.

In the Governance Objective Tree (Appendix 13), the ideal situation in the future included following proper administrative procedures (e.g., conducting an EIA and following its recommendations, unbiased project monitoring, government officials being accountable for their actions), the community being consulted and involved in the decision making process, and priority given to sustainable livelihoods.

In the Public Awareness Objective Tree (Appendix 14), the objectives related primarily to increasing communication, community participation and the public's knowledge and awareness about the environment so that the public is fully aware of the links between the environment and sustainable livelihoods and the environment is valued. Also important was exploring and pursuing opportunities for sustainable livelihoods that made full use of local tourism assets, taking into consideration environmental impacts, and using local capitol to develop (following Jon Kohl's message). Increased public awareness, including awareness of government officials and politicians, was seen as crucial in improving the decision-making process and leadership.

Analysis of Strategies - The final step in the analysis phase was to select the strategies that would be used to achieve the desired objectives—the branches of the objective tree that the participants agreed to be the most appropriate to pursue in the project. After some discussion, it became clear to the group that it was important to pursue at least some of the objectives in all three areas/branches of the tree. Ecological restoration of the lagoon was the ultimate goal of the project but it could not be achieved without first/also increasing public awareness and lobbying to gain support for and permission to do the restoration. The specific objectives chosen for the project would depend on human resources, attractiveness to donors and partners, expertise required/available, and priorities and interests of the group.

The group also felt very strongly that Ashton Lagoon was a prime example of what could go wrong when there is no EIA (the independent one was ignored), no consultation, no monitoring, etc. The Ashton Lagoon disaster should therefore be used to change the decision-making model so that this kind of problem would not repeat itself again.

Participants made the following points during discussion:

- There has been a drastic decline in fisheries (including lobster, lambi, sea eggs and fish). This can be used to our advantage to point out the impacts from the failed development. We need images of before and after and data showing the damages (declines in water quality, fisheries, etc.). These data are available in the papers by Stephen Price and Tom Goreau.
- In the initial stages of the marina development, it was seen as a good thing by people because the people did not understand the environmental and social impacts. But if you asked them if they were willing to sacrifice their resources for the development, they would have said no.

[12] Due to time constraints, the Objective Trees were not finished during the workshop. They were completed by L. Sorenson during the writing of the workshop report. In several instances, it was necessary to revise objectives or add new ones to the tree in order to establish means-ends relationships and complete the hierarchy.

- Public awareness should be a primary goal; with the history of the disaster of Ashton Lagoon and the current restoration efforts serving as an example for raising public awareness and involvement in environmental issues.
- It is important that the public is fully aware of what happened so that this kind of fiasco does not happen again. The restoration can be a demonstration project.
- The project needs to be brought to the local community in Ashton. Only through participation can you give the community a voice. We want effective locally based management; the people need to take a stand.
- There is an inquiry underway about the Ashton Lagoon Project and so the government is open to input from this workshop. This is a good time to make suggestions or to come up with a plan that the government can take into consideration.

Project Planning: The Logframe or Project Planning Matrix - The next stage in the participatory planning process was filling in the Logframe (Logical Framework) Matrix. Amiro gave an overview presentation on how the Logframe Matrix is constructed and filled in using the selected strategies and results from the Objective Trees. Using the Objective Trees we needed to identify/formulate the Project Goal or Overall Objective or Development Objective, the Project Purpose or Immediate Objectives, Results or Outputs, and Activities[13]. The *Overall Objective* describes the longer-term benefits and the wider benefits of the project to other groups. It will not be achieved by the project alone but will require the impacts of other programs as well. The *Immediate Objectives* are the specific statements detailing the desired accomplishments or outcomes of the project. Usually each immediate objective relates to one of the main strategies identified at the end of the analysis phase. *Results* or *Outputs* are products of the *Activities* undertaken. *Assumptions* and *Indicators* and *Means of Verification* also need to be identified and specified. The Overall Objective was drafted following discussion of the strategies.

Overall Objective: Restore the Ashton Lagoon environment in order to improve local livelihoods and quality of life.

The four strategies (not yet formulated as Immediate Objectives) to achieve the Overall Objective are: ecological restoration, developing local tourism and livelihoods, increasing environmental awareness, and improving local decision-making capacity.

PROCEEDINGS FROM DAY 3

Participatory Project Planning – Creating a Sustainable Use Plan for Ashton Lagoon (cont)

The morning session began with a review of the project Overall Objective and Strategies/Immediate Objectives; Amiro asked if what was written on the walls and flipchart paper accurately reflected the discussions and outcomes from the previous day's work. It was agreed that recommendations from the experts' presentations on Day 1 and reports would be incorporated into the Logframe, as appropriate, along with Results and Activities in the Objective Trees. Participants next split up into break-out groups, one for each strategy, to further brainstorm ideas and activities that could be pursued to achieve the results in the Objective Trees.

[13] Note that not all funding agencies and organizations use the same terminology; for this document we use Overall Objective, Immediate Objective and Outputs.

Reports from Break-out Groups

Increasing Environmental Awareness

Draft Objective: Improve public understanding of the linkages between the environment and our livelihoods so that the environment is appreciated and valued and considered in development projects

Break-out Group discussing environmental awareness

Main tools: education and outreach

Target audience: Must tailor strategies to each target audience.

Children:

- Provide environmental education materials to schools and incorporate into curriculum
- Encourage formation of youth environmental groups, such as bird-watching and nature exploration clubs
- Promote awareness-raising activities for children including poster campaigns, art, song, poetry, jingle, and essay writing contests, field trips, and clean-ups and participation in restoration activities within the natural environment (e.g., continue activities of UI Environmental Attackers)
- Training workshops for teachers to enhance their knowledge and skills in environmental education

Ashton/Union Island and St. Vincent communities, including business owners:

- Produce and publish a brochure about Ashton Lagoon to educate about what happened and current restoration efforts
- Radio/print media PSAs for environment with cost sponsored by businesses
- Publish an article in *Caribbean Compass* about the Ashton Lagoon restoration project
- Promote awareness through incentives, including "sponsored" advertisements, environmental partnerships, development of "green" business practice criteria
- Invite business leaders to environmental meetings so they can see how to incorporate a green philosophy into their business plans, etc.

Fishers:

- Invite to meetings, organize meeting/workshops to specifically address link between fishing and health of marine habitat, etc. Also direct conversations with fisherfolk in the places they frequent. Enlist their help and participation in restoration projects (e.g., replanting of seagrass beds, coral reef restoration)

Ecological Restoration of Ashton Lagoon

Draft Objective: The natural ecological processes in Ashton Lagoon are restored and the lagoon once again supports biodiversity and provides important ecological services.

Main tool: Remove parts of the causeway in strategic locations (determined by engineering models) to restore natural circulation and tidal flow of water in the lagoon. Refer to experts' reports in appendices for detailed recommendations on restoration of marine life, coral reefs, etc. The scientists recommended that the restoration be done slowly so that the system would have time to recover gradually and equilibrate.

- After water cools and turbidity clears, replant seagrass beds; the habitat will bring back the marine organisms
- Mangroves: dredge channels to restore water circulation to mangroves and so fish can come in
- Coral reefs: use Biorock and concrete balls to build new patch reefs
- There was discussion about whether or not it would be feasible to have a small-scale, environmentally friendly marina on the west side of Frigate. Dr. Price pointed out that yachts need 4 m; it is not deep enough for a marina and would need constant dredging. The pollution and disturbance would be problematic for maintaining marine life.
- Mangrove islands can be created out of remaining sections of causeway (after sections are removed to restore circulation). These will make excellent and safe nesting and roosting habitats for a variety of waterbirds and seabirds.

Developing Local Tourism and Livelihoods

Draft Objective: Explore and pursue viable opportunities for sustainable livelihoods via local nature and eco-tourism following the principles outlined by Jon Kohl (e.g, establishing a community vision, designing visitor experiences and messages, low volume, low impact and high yield, use local capitol, etc.). Possible activities/ideas to include:

- Seamoss cultivation and harvesting, seamoss products
- A day in the life of a fisher
- Fisheries complex (proposed by Mr. Snagg) or Museum; could include a visitor center with " a day in the life of a fisher," crafts, and facilitate tour operators[14]
- Shell fishing
- Involvement of the community in management of fisheries stock
- Crafts from legally obtained fisheries products and mangroves
- Bird watching—resident, endemic and migratory species around the island
- Ashton Watchable Wildlife Pond and Birding/Nature Trail – to interpret Ashton Lagoon and lagoon ecosystem; include salt pond, mangroves, and Frigate Island – an archeological and historic site – whaling; building of a trail, interpretive signs and observation tower
- Small aviary/sanctuary
- Water taxi operation
- Trained local guides and tour operators
- Boat building
- Outdoor recreation - Watersports (kite surfing, kayaking, canoeing, etc.), rock climbing (E and G), biking and paddling

Break-out Group discussing local tourism and livelihoods

Andrew Wilson reporting back to group

[14] Someone point out that the fisheries complex was not needed because there were no fish for it. Apparently, it was built in past and used for another purpose.

trails around Union Island with rental equipment
- Basketball facility – to showcase basketball
- Historic role of "Bumba"
- Green marina (maintenance, free collection, pump boat, water provisioning, garbage collection)
- Local food or packed lunch to picnic on Frigate Island
- Cultural festivals[15]
- Interpretation of traditions/history
- Make sure that environmental awareness and education is incorporated in tourism activities and interpretation

Other Associated Sites on Union Island for tourism
- The Spann cemetery – first French settlers
- Lenkin Pond
- Bloody Bay/Mansion
- Top Hill – Forest Trail
- Forts
- Historical Cemetery/Water cemetery, Clifton (Mulzac)
- Mulzac Square
- Old slave and cart roads

Someone pointed out that in the past, four or five groups have encouraged sustainable tourism projects but that these failed, probably because they did not have a marketing strategy and enough support.

Improving Local Decision-making Capacity

Draft Objective: Ensure co-management arrangements for the natural, social and economic affairs of the Ashton Community for the sustainable livelihoods of the Ashton community

Main tool: Establish a diverse community group to oversee the affairs of the Ashton Community, e.g., fishers, environmentalists, private sector, etc.

Role of the community group:
- Watchdog for Ashton Lagoon development
- Review and watchdog enforcement of current and future legislation specific to the area (to ensure that laws are not circumvented when an investor approaches the government with large sums of money, resulting in lands and waters being improperly seized/used for development, e.g., Frigate Island, Ashton Lagoon)
- Ensure community participation in decision-making process
- Develop decision-making capacity through education and training

Break-out Group discussing governance

To further address the governance objectives, participants decided that a policy statement or framework should be come out of the workshop and be formally adopted. **A draft policy statement was written by the group.**

[15] Local persons noted to have knowledge of local history, culture, traditions and ecology: Vernalyn, Rosamunde, Mathew, Ashwa, Jeremiah, Father Mark

Lessons learned from Ashton Lagoon - Guidelines for development in St. Vincent and the Grenadines:

Governments should not develop in *environmentally sensitive areas*, defined as areas which provide key natural resources (see footnote). Governments should apply EIAs as required by law, based on international environmental standards, including third party review, and presentation to affected communities for review and comment. The community shall be consulted and included in the decision-making process during the project-planning period, especially local knowledge.

The Ashton community declares that the National Environmental Advisory Board shall be reactivated with the oversight of all future development.

Each project should have an operational management plan, which includes independent monitoring and review.

By 2 PM we realized that we were running short on time and would not able to finish the Logframe Matrix during the final afternoon of the workshop (it has been difficult to stay on schedule because every topic has generated so much discussion and debate). The facilitators agreed that the essential information was completed and that Indicators, Means of Verification, and Assumptions could be filled into the matrix later (and the Logframe could be reviewed later by workshop participants and stakeholders)[16]. The remaining time was spent in final wrap-up discussions and Next Steps. The group also toured Ashton Lagoon in the late afternoon as not everyone at the workshop had been to the site.

Developing the community vision: Given the importance of developing the sustainable livelihood and local tourism objectives, the group felt it was important to spend a little more time talking about Quality of Life Indicators in order to begin to develop a vision statement for the Ashton community (see page 9 and Appendix 2). Jon Kohl reminded the group that Quality of Life Indicators are a tool for helping us articulate and remember what we consider most important to our spiritual and cultural fulfilment. The group discussed and brainstormed some ideas, including: sharks available to catch for morning breakfast, a number of local foodplots for subsistence per 10 houses, ability to leave doors unlocked (no crime), finding sand dollars, catching lobsters, and maroon spirit (people helping each other to build their houses). Ashwa, Jeremiah, Marlon, Martin and Rosamund were to lead efforts to come up with the community vision.

Next Steps and Final Recommendations:

- Complete the workshop proceedings and report and share with stakeholders, government, the local community in Ashton, and project partners; all provide feedback on the outcomes, particularly the Logical Framework Matrix. Prepare one or more proposals for funding. Depending on the interests and priorities of the group, project partners, and potential donors, proposals could be prepared addressing just one of the Immediate Objectives/Results in the proposal, or, two or more objectives could be included in one proposal.
- The workshop outcomes serve as a solid basis for proposal development, but Objectives can continue to be refined and revised for proposals, new objectives and activities may be added as appropriate, etc.
- The Sustainable Grenadines Project would be an excellent group to lead future work on the project. The Union Island Development Council, a newly-formed umbrella group, could also serve as an organizing body or means to communicate and work together on the project.

[16] Draft Logical Framework Matrix completed by L. Sorenson; see Appendix 16.

Fortunately, there are many other community-based organizations and local groups that can help and are most welcome to be involved in the project.

- Continue to communicate with government about the project and involve relevant departments (Forestry, Fisheries, Planning, CBOs, NEAB) in the project planning and activities as much as possible. Participants are hopeful that recommendations from the workshop for restoration of the lagoon and associated activities will be attractive to government, especially given the project's history and Robert Bascom's assessment of the suitability of the lagoon for a marina, and that he is very doubtful that an investor would take on such a project given its current conditions. (It would require a huge amount of capital to fix it, and ripping it out would be very costly as well.)
- There is the issue of land ownership; apparently the lagoon is now owned by the bank. Investigate options and partners (e.g., The Nature Conservancy) for acquiring the land, setting up a conservation easement or other arrangement, etc.
- A more detailed engineering assessment is needed to determine how best to restore natural circulation and flow of water in the lagoon and to estimate the cost. Follow up on this immediately.
- Lisa S. mentioned that she can help prepare a proposal to be submitted to the USFWS Neotropical Migratory Bird Conservation Act (NMBCA) Fund (the grant agency that funded the planning workshop), however, the objectives would need to be related to conservation of migratory birds and bird habitat (restoration of the lagoon, mangroves, Frigate Island, salt pond, creating islets for nesting/roosting birds, etc.). Capacity building, increasing environmental awareness and sustainable livelihoods (bird/nature tourism) can also be included in the proposal, as long as the activities address bird conservation in some way. (Activities under Objectives 1-3 appear most appropriate). Note that the maximum amount that can be requested from this program is $250,000 and that a 3 to 1 funding match is required (can be cash and/or in-kind). The proposal will be reviewed more favourably it is submitted by the Sustainable Grenadines Project (or other local group). The next deadline for submission of proposals is Nov. 13, 2008. NMBCA website: http://www.fws.gov/birdhabitat/Grants/NMBCA/index.shtm. We will need to move quickly to submit a proposal.
- Investigate other projects (local, national, regional) that could be linked to this one and help to provide match funding and sharing of expertise and resources (e.g., mangrove restoration efforts in Grenada or other Grenadine islands, government efforts to increase fisheries through the Caribbean Regional Fisheries Office, coral reef restoration, etc.)
- It was agreed that it would be helpful to set up a listserve discussion group on Yahoo: *Friends of Ashton Lagoon*. The SusGen e-group could also be used to share information.
- Prepare a Paradise Lost Fact Sheet or brochure to be distributed to the community to explain what happened to the lagoon and describe restoration plans and efforts[17]. Stephen to draft; others to review and comment.
- Prepare an article for Caribbean Compass – Lystra, Lisa and Stephen to draft.

[17] At the request of Lennus Wilson, Geography teacher at Union Island Secondary School. Lisa S., Gregg M., Mathew H. and Lystra C. led a morning field trip of 8 students to Ashton Lagoon on May 25. We looked at birds, the mangroves, the failed marina construction and naturally occurring recovery (e.g., erosion and vegetation growing). We noted that the students did not know what had happened to the lagoon. They were very young when the development began so would not have remembered it and their parents evidently did not tell them much about it. Hence the importance of a brochure and community involvement to educate.

Helpful Tools for our Project Planning:

Foundations of Success (FOS): Improving the Practice of Conservation. Jon K. gave a brief introduction to different kinds of conservation tools via FOS taxonomy. For more information visit: http://www.fosonline.org/Site_Page.cfm?PageID=22

St. George's Declaration Of Principles For Environmental Sustainability In The OECS: http://www.oecs.org/esdu/SGD.htm - review the 12 principles.

Fermata, Inc. FERMATA promotes the considered use of nature, culture, and history to move people to places, masses to messages, and markets to merchandise. FERMATA is working on a variety of exciting projects helping communities, agencies, and organizations study and promote experiential tourism opportunities. http://www.fermatainc.com/

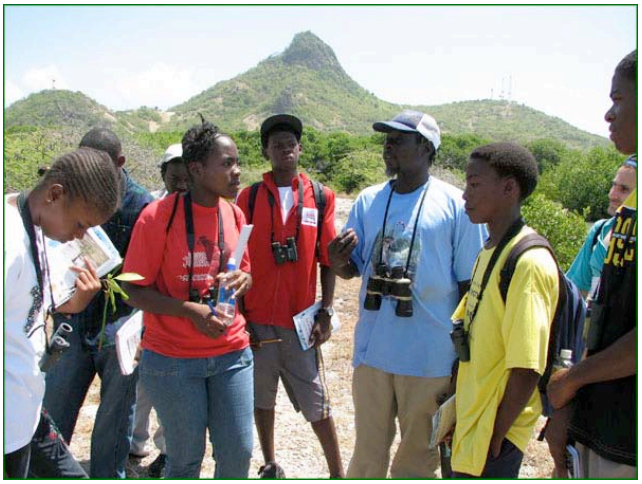
The International Ecotourism Society. The world's oldest and largest ecotourism organization, TIES is committed to promoting the principles of ecotourism and responsible travel. With the goal of uniting conservation, communities and sustainable travel, TIES serves its members in over 90 countries, as the global source of knowledge and advocacy in ecotourism.
http://www.ecotourism.org/webmodules/webarticlesnet/templates/eco_template.aspx?a=12&z=25

Field trip on Day 3: Participants enjoy birding in Ashton Lagoon

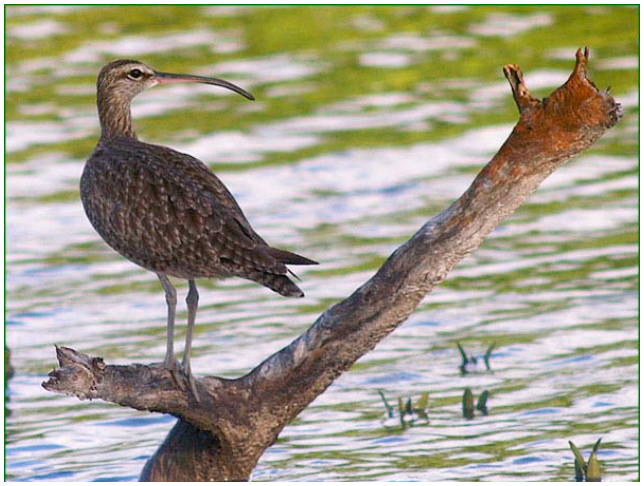
Dumping garbage in the mangroves is a problem in Ashton Lagoon

Workshop participants watching a kite surfer at dusk in the lagoon

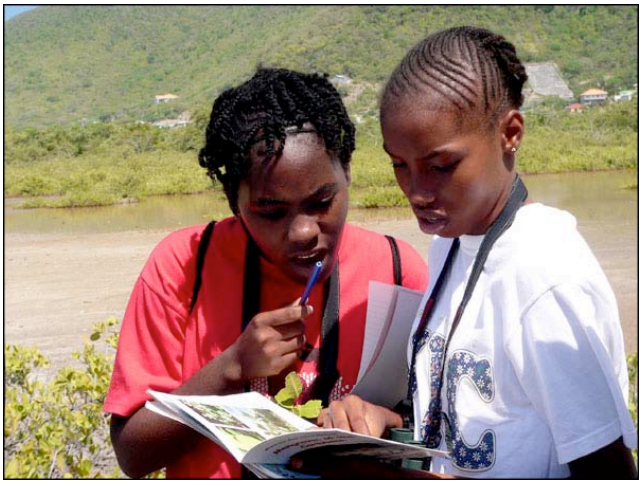
Union Island Secondary School students learn about mangroves from Gregg Moore



Mathew Harvey talks to the youth about the history of the lagoon



The Whimbrel is a uncommon winter migrant in Ashton Lagoon



Youth learning to identify mangroves at Ashton Lagoon

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Students from Union Island Secondary School take a field trip to Ashton Lagoon on May 25, 2007; Geography teacher Mr. Wilson on right

Appendices

1. Workshop Agenda and List of Facilitators and Presenters. Ashton Lagoon Restoration Project, Participatory Planning Workshop, May 22 – 24, 2007, Union Island, St. Vincent and the Grenadines
2. Workshop Attendance List
3. Tourism: Tool for Sustainability. What could Ashton Lagoon Look Like? by Mr. Jon Kohl
4. Quality of Life Indicators
5. Review of History of Ashton Lagoon, Union Island, and Assessment of Ecological Restoration Potential, by Dr. Wm Stephen Price and Dr. Purnima G. Price
6. Restoring Ashton Lagoon Ecosystems, Coral Reefs, and Fisheries by Dr. Thomas J. Goreau
7. Ashton Harbour: A Preliminary Engineering Perspective by Mr. Robert L. Bascom
8. Ashton Lagoon Mangroves, Union Island, St. Vincent and the Grenadines: Assessment and Restoration Recommendations by Dr. Gregg Moore
9. Stakeholder Analysis
10. Environmental Problem Tree
11. Governance Problem Tree
12. Public Awareness Problem Tree
13. Environmental Objective Tree
14. Governance Objective Tree
15. Public Awareness Objective Tree
16. Logical Framework Matrix

Workshop Agenda

Ashton Lagoon Restoration Project, Participatory Planning Workshop
May 22 – 24, 2007, Union Island, St. Vincent and the Grenadines

DAY 1 – Tuesday, May 22nd, 2007

09:00 - 09:05 Opening Prayer

09:05 - 09:30 Opening Ceremony – Welcome and Opening Remarks

- Martin Barriteau, Project Manager, Sustainable Grenadines Project
- Mr. Edwin Snagg, Director, Grenadines Affairs
- Mr. Lanceford Weekes, Permanent Secretary, Ministry of Health and the Environment
- Hon. Terrence Ollivierre, Parliamentary Representative-Southern Grenadines

09:30 – 10:10 Introductions and Round-robin Presentations by Workshop Participants, Expectations and Fears, Ground Rules

10:10 – 10:40 Presentations

10:10 Introduction to the Workshop, Project History and Workshop Objectives - Dr. Lisa Sorenson, Vice President, Society for the Conservation and Study of Caribbean Birds

10:25 Overview of local initiatives
Sustainable Grenadines Project – Mr. Martin Barriteau, Project Manager

10:35 AvianEyes Birding Group – Ms. Lystra Culzac-Wilson, Secretary

10:40 – 11:00 Break

11:00 – 12:20 Presentations – Ecology, Restoration and Sustainable Use of Ashton Lagoon

11:00 History of Ashton Lagoon and Marine Restoration Potentials – Dr. Stephen Price, and Dr. Purnima G. Price, Scientific Consultants, Union Island Association for Ecological Protection

11:30 Ashton Lagoon Coral Reef Restoration – Dr. Tom Goreau, President, Global Coral Reef Alliance

11:50 Restoration of Water Circulation in Ashton Lagoon by Opening up Sections of Marina Causeway - Preliminary assessment – Mr. Robert Bascom, Coastal Engineer, Trinidad

12:05 Mangrove Ecology and Restoration and Sustainable Use of the Ashton Mangrove – Dr. Gregg Moore, Research Scientist at Jackson Estuarine Laboratory, University of New Hampshire

12:20 – 13:20 Lunch

13:20 – 14:10 Presentations (cont) – Ecology, Restoration and Sustainable Use of Ashton Lagoon

13:10 Tourism: A Tool for Sustainability, What Could it Look Like for Ashton Lagoon? – Mr. Jon Kohl, Interpretive Specialist, Park Planner Fermata, Inc.

14:10 – 15:15 Participatory Project Planning - – Creating a Sustainable Use Plan for Ashton Lagoon

14:10 Introduction to Project Planning

14:25 SWOT Analysis (Strengths, Weaknesses, Opportunities, Threats)
- Introduction
- Group exercise
- Summary of Results

14:55 – 15:10 Break

15:10 – 17:30 Participatory Project Planning (cont) – Stakeholder Analysis, Problem Analysis and Problem Tree

15:45 Stakeholder Analysis
- Introduction
- Group exercise
- Summary of Results

16:15 Problem Tree
- Introduction
- Group exercise
- Building a Problem Tree (to be continued on Day 2)

17:30 Wrap up and Introduction to Day 2

DAY 2 – Wednesday, May 23rd, 2007

08:30 – 09:00 Problem Tree (cont. from Day 1)
- Review

09:00 – 10:15 Objective Tree
- Introduction
- Breakout groups (exercise)
- Objective Tree
- Review

10:15 – 10:30 Break

10:30 – 11:00 Strategy Analysis
- Introduction
- Group exercise

11:00 – 12:30 - Logical Framework Analysis (Logframe) – Goal, purpose, results and activities
- Introduction
- Filling up the matrix – Goal and purpose
- Breakout groups – Results and activities

12:30 – 13:15 Lunch

13:15 – 14:15 Logframe (cont)
- Group reports
- Group exercise - check horizontal logic

14:15 – 15:15 Logframe – Assumptions and Preconditions
- Introduction
- Breakout group exercise

15:15 – 15:30 Break

15:30 – 16:30
- Group reports
- Wrap up and introduction for Day 3

16:30 Birding 101, Visit to Ashton Lagoon, Bird Watching

DAY 3 – Thursday, May 24th, 2007

08:30 – 9:45 Logframe Analysis: Success Indicators
- Introduction
- Group exercise
- Group reports
- Collective verification: vertical & horizontal logic

09:45 – 10:30 Logframe Analysis: Means of Verification
- Introduction
- Group exercise

10:30 – 10:50 Break

10:50 – 12:15 Logframe Analysis: Means of Verifications (cont)

10:50 Group reports
11:20 Review Logframe Analysis

12:15 – 13:15 Lunch

13:15 – 14:15 Final Session: Next steps

- Roles and responsibilities
- Review "Expectations and Fears" cards

14:15 Closing Ceremony

International Presenters and Facilitators

W. Stephen Price, Ph.D. Coral reef ecologist, Lecturer in Marine Ecology and Conservation at the **University of Victoria, B.C.**, Scientific Advisor to the **Union Island Association for Ecological Protection**. Dr. Price has thirty years experience in the Lesser Antilles, specifically St. Vincent and the Grenadines, conducting research on coral feeding and fluid dynamics, disease and anthropogenic impact assessment and biodiversity monitoring. He conducted the first and only comprehensive marine surveys and impact assessments of Union Island coastal wetlands. (Email: wmsprice@shaw.ca)

Thomas J. Goreau, Ph.D. President, **Global Coral Reef Alliance**, a non-profit organization for cutting edge work on coral reef conservation and sustainable management. Dr. Goreau led efforts to protect coral reefs at negotiations for the UN Conference on Environment and Development, Framework Convention on Climate Change, UN Conference on the Development of Small Island Developing States, and World Summit on Sustainable Development. Research currently focuses on effects of global warming and pollution on coral reefs and on coral reef restoration. Dr. Goreau is based in Cambridge, MA, but travels the world assisting nations with reef restoration. He has worked on coral reefs throughout the Caribbean (including St. Vincent and the Grenadines), Indian Ocean, and Pacific. (Email: goreau@bestweb.net)

Purnima Govindarajulu, Ph.D. Research Associate, Wetland Ecology and Biological Invasions at the **University of Victoria, B.C.**, Scientific Advisor to the **Union Island Association for Ecological Protection**. In the Caribbean, Dr. Govindarajulu conducted nearshore marine surveys, impact assessments, and sea turtle conservation. She has expertise in invasive species, restoration ecology, environmental education and the development of volunteer-based stewardship initiatives. (Email: purnimap@uvic.ca)

Jonathan Kohl, M.S. Yale University School of Forestry and Environmental Studies. Interpretive Specialist, **Fermata, Inc.**, Park Planner. Mr. Kohl has expertise in project planning, park management, and sustainable tourism development. He has worked several years at the non-profit RARE (www.rareconservation.org) developing the Public Use Planning Program for World Heritage Sites, and co-authored Fermata's new interpretive and guide training manual. He is currently working with UNESCO's World Heritage Centre and CATIE international university in Costa Rica to promote an alternative approach to park planning that relies on learning and adaptive management. For more information, visit www.jonkohl.com. **Fermata, Inc.** is committed to local economic development and conservation of natural resources. Fermata provides cost-effective strategies for generating revenue in communities via sustainable nature tourism activities. Fermata's work includes conceptualization, development, field assessment, and implementation of large-scale nature tourism projects. For more information, visit www.fermatainc.com

Robert L. Bascom, Bsc., Msc., PEng. **Coastal and Environmental Engineering Solutions, Inc.**, Barbados. Mr. Bascom has over 14 years experience in the area of project development, design, execution and management of marine and sea defense work. His main areas of educational training are in coastal and civil engineering design, coastal and shoreline processes research, numerical modeling, physical oceanographic research and geographical information system development and management. (Email: rbascom@ceesinc.com) (URL: http://www.ceesinc.com/welcome.php)

Gregg E. Moore, Ph.D., is a Research Scientist at **Jackson Estuarine Laboratory, University of New Hampshire** and Lecturer in Wetland Restoration and Mitigation, Natural Resources Department. He recently contributed to the IUCN's Red Listing Workshop on mangroves and has been working on habitat assessments, conservation, and restoration of mangroves with various partners in the Caribbean, with an emphasis on the Grenadines, for over 10 years. Dr. Moore is specifically interested in the design and implementation of site-specific mangrove ecosystem restoration. (Email: gregg.moore@unh.edu)

Amiro Pérez-Leroux, Ph.D. Partner Development Officer, **BirdLife International**, Americas Programme, Quito, Ecuador. Mr. Perez will assist as the main workshop facilitator. He has many years experience in providing capacity development and institutional strengthening support to NGOs in the Americas in areas such as strategic planning, project planning, design and management using Logical Framework Approach, governance and fundraising. (Email: Amiro.Perez-Leroux@birdlife.org.ec)
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Lisa G. Sorenson, Ph.D. Vice President, **Society for the Conservation and Study of Caribbean Birds** (SCSCB), Project Coordinator of the **West Indian Whistling-Duck (WIWD) and Wetlands Conservation Project**. Twenty years experience working in the Caribbean, including field research on Caribbean waterfowl, environmental impact assessment work, and conservation education and training. Currently Dr. Sorenson is leading/coordinating a region-wide outreach and education program on the importance and value of local wetlands and their birdlife. Sorenson is the overall Project Coordinator for the Ashton Lagoon Project and will assist with workshop facilitation. (Email: LSoren@bu.edu) (URL: www.scscb.org)

Attendance List
Ashton Lagoon Workshop
22nd to 24th May 2007
Union Island

No.	Name	Role/Responsibility	Organization/Agency	Mailing Address	Phone and Email	Days Attended
1.	Edwin Snagg	Director	Grenadines Affairs Government of St. Vincent		pmosgv@caribsurf.com 431-7597	1
2.	Mr. Herman Belmar	Deputy Director	Grenadines Affairs C/o Ministry of National Security Kingstown	Revenue Office, Port Elizabeth, Bequia, St. Vincent and the Grenadines	784-458-3514 458-3510	1,2,3
3.	Hon. Mr. Terrence Ollivierre	Parliamentary Representative-Southern Grenadines	New Democratic Party Headquarters Kingstown	Clifton, Union Island	sgreps@yahoo.com	2,3
4.	Adrian Codogan	Board Member	St. Vincent and the Grenadines National Trust	Sharpe's Village, Chateaubelair, St. Vincent	Burning_up_loni@yahoo.com tanific@hotmail.com	1,2
5.	Ottis Joslyn	National Coordinator	Second National Communications Project to the United Nations Framework Convention on Climate Change (UNFCCC) c/o Environmental Services Unit Public Health Department Kingstown	P.O Box 2968, Kingstown, St. Vincent	456-1084, 485-6992, 454-7301	1,2,3
6.	Marlon Mills-Browne	Coordinator	Friends of the Tobago Cays Kingstown	P.O Box 230, St. Vincent	784-456-1616, 457-4444, 532-9696	1,2,3
7.	Lucine Edwards	Fisheries Officer-Conservation	Fisheries Division Kingstown	Kingstown, St. Vincent	Lucine.edwards@gmail.com 456-2738	1,2,3
8.	Andrew Wilson	Parks Manager	National Parks Botanic Gardens	Ministry of Tourism, Youth and Sports	tourism@caribsurf.com	1,2,3

8.	Andrew Wilson	Parks Manager	National Parks Botanic Gardens	Ministry of Tourism, Youth and Sports	tourism@caribsurf.com	1,2,3
9.	Wilan Hamilton	Education Officer	Forestry Department, Grenada	Queen's Park, St. George	473-440-2934, 406-6739 Hamib9@yahoo.co.uk	1,2,3
10.	Bentley Browne	Chief Executive Officer	Social Investment Fund Arnos Vale	P.O. Box 83, Kingstown, St. Vincent	456-6853	2
11.	Andrew Simmons	Development Consultant	JEMS	Enhams P.O Enhams, St. Vincent	Jimpy_simmo@yahoo.co.uk 532-3009, 456-9533	2
12.	Amiro Pérez-Leroux	Partner Development Officer	BirdLife International Americas Programme Quito, Ecuador		Amiro.perez-leroux@birdlife.org	1,2,3
13.	Gregg Moore, Ph.D	Research Scientist Lecturer	University of New Hampshire	85 Adams Pt. Road, Durham, NH 03824	Gregg.moore@unh.edu 603-862-5138	1,2,3
14.	Jonathan Kohl	Interpretive Specialist Park Planner	Fermata, Inc.		Jkohl-fermata@jonkohl.com	1,2,3
15.	Lisa Sorenson	Project Coordinator Vice President	West Indian Whistling-Duck and Wetlands Conservation Project Boston University Society for the Conservation and Study of Caribbean Birds (SCSCB)	Department of Biology 5 Cumnnington St. Boston MA 02215	lsoren@bu.edu	1,2,3
16.	Kemraj Parsram	PhD Research	Centre for Resource Management and Environmental Studies, Barbados	CERMES, Cave Hill, Barbados	246-417-4316	1,2,3
17.	Lystra Culzaz - Wilson	Secretary Conservation Biologist	AvianEyes Birding Group			1,2,3
18.	Fitzroy Springer	Logistics Officer	Forestry Department	Kingstown, St. Vincent	784-593-7380	1,2,3
19.	W. Stephen Price, Ph.D.,	Coral Reef Ecologist Lecturer Scientific Advisor to the Union Island Association for	University of Victoria University of Victoria, B.C., B.C.	174Q Christmas Avenue Victoria, BC V8P2X8 Canada	250-383-6262	1,2,3

20.	Purnima Govindarajulu, Ph.D.	*Ph.D.* Research Associate Scientific Advisor to the Union Island Association for Ecological Protection	University of Victoria, B.C.	174Q Christmas Avenue Victoria, BC V8P2X8 Canada	250-383-6262 purnimap@uvic.ca	1,2,3
21.	Thomas J. Goreau, Ph.D.	President	Global Coral Reef Alliance			1,2,3
22.	Ashwa Stewart	President	Union Island Museum and Ecological Society	P.O Box 2448 Kingstown, St. Vincent	593-3449 451-2650	1,2,3
23.	Jacques Daudin	Environmentalist	Union Island Association for Ecological Preservation (UIAEP)	Clifton, Union Island		2,3
24.	Mathew Harvey	President	Union Island Ecotourism Movement	Ashton, Union Island	495-4817	1,2,3
25.	Jeremiah Jones	Community Development Officer Public Relations Officer	Ministry of National Mobilisation South Grenadines Water Taxi Association	Ashton, Union Island	533-4833	1,2,3
26.	Olando Harvey	President	Young Help Striders 4-H Club	Ashton, Union Island	426-6546	1,2,3
27.	Meritha Small	Secretary	Tobago Cays Marine Park	Ashton, Union Island	485-8191, 532-2877 Meritha1@hotmail.com	1,2,3
28.	Katrina Collins	President	Union Island Environmental Attackers	Clifton, Union Island	Environmentalattackers@yahoo.com	1,2,3
29.	Kedahli Crichton	Urban Planner	Physical Planning Unit	P.O Box 85, Kingstown	457-0140	2
30.	Mark DaSilva	Environmentalist	Mayreau Environmental Development Organization	P.O Box 860 Mayreau	mayreau@caribsurf.com	2,3
31.	Andrew Roache	Chairman	Tobago Cays National Park	St. Joseph's, Union Island	593-1766	1
32.	Trovan Ferrari	Fisheries Extension Officer	Fisheries Division, St. Vincent and the Grenadines	Ashton, Union Island	532-2220	1,2,3

33.	Gracita Wilson	Social Worker Community Member	Ministry of National Mobilisation	Ashton, Union Island	485-8114	1,2,3
34.	Mr. Weston Stewart	District Officer	Union Island Revenue Office	Clifton, Union Island St. Vincent and the Grenadines	458-8231	1
35.	Martin Barriteau	Project Manager	Sustainable Grenadines Project	Clifton, Union Island	485-5779 susgrenpm@vincysurf.com	1,2,3
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38.	Vernalyn Blencowe	Coordinator	Culture – Mary Hutchingson Primary School	Ashton, Union Isand	485-8316	1,2,3
39.	Lennus Wilson	Geography Teacher	Union Island Secondary School	Ashton, Union Island		1
40.	Caroline Delancy	Community Member	Ashton, Union Island	Ashton, Union Island		1
41.	Jeannette Augustus	Employee	Union Island Tourist Information	Clifton, Union Island	458-8350	1,2,3
42.	Roseman Adams	Member	Union Island Environmental Attackers		youngbuffalo@yahoo.com 784-526-4500	1,2,3
43.	McDonald Harvey	Fisherman		Ashton , Union Island	784-458-8769	1
44.	Jacob Coy	Boat builder		Ashton, Union Island	784-433-4865	1
45.	O.J. Simmons	Community Member				3
46.	Norma Harvey	Community Member		Ashton, Union Island	784-458-8463	3

Tourism: Tool for Sustainability. What Could Ashton Lagoon Look Like?

Jon Kohl
Fermata, Inc.
www.fermatainc.com
www.jonkohl.com

Communities can use local tourism for a variety of ends such as resource protection, income generation, and most important diversification of the local economy. While the tendency and temptation for communities is simply to build touristic infrastructure, the assumption that simply building is sufficient to generate profitable tourism usually proves vain. Thus if a community like Union Island wishes to increase its chances of success, it must take a considered approach. It should consider common challenges that impede many a touristic project and should also consider steps that lead to the development of tourism in a strategic fashion.

The most common challenges include the following:

If you build it, they will come. This assumption usually implies ignoring the target market as well as having a clear understanding of a community's own features, stories, and attractions, since infrastructure is rarely an attraction itself.

Have patience. A tourism promoter or operator often needs years to develop proficiency in offering profitable tourism products that also benefit the community.

Don't put all the tourism eggs in one basket. Tourism is a vulnerable and volatile industry that for communities that depend too much on it can suffer significantly if tourism demand decreases rapidly.

Build small and with local capital. Very often when outsiders own the tourism capacity, locals feel disempowered, left out, and even betrayed. They are left out of decision making and lose control over their own resources. Thus, where possible local tourism involves local owners and small capital that implies a scale manageable for local people.

Lower profit margins should be included in the community vision. Since local tourism usually involves small amounts of capital, the profit margins tend to be small. High quality experiences however can increase those margins.

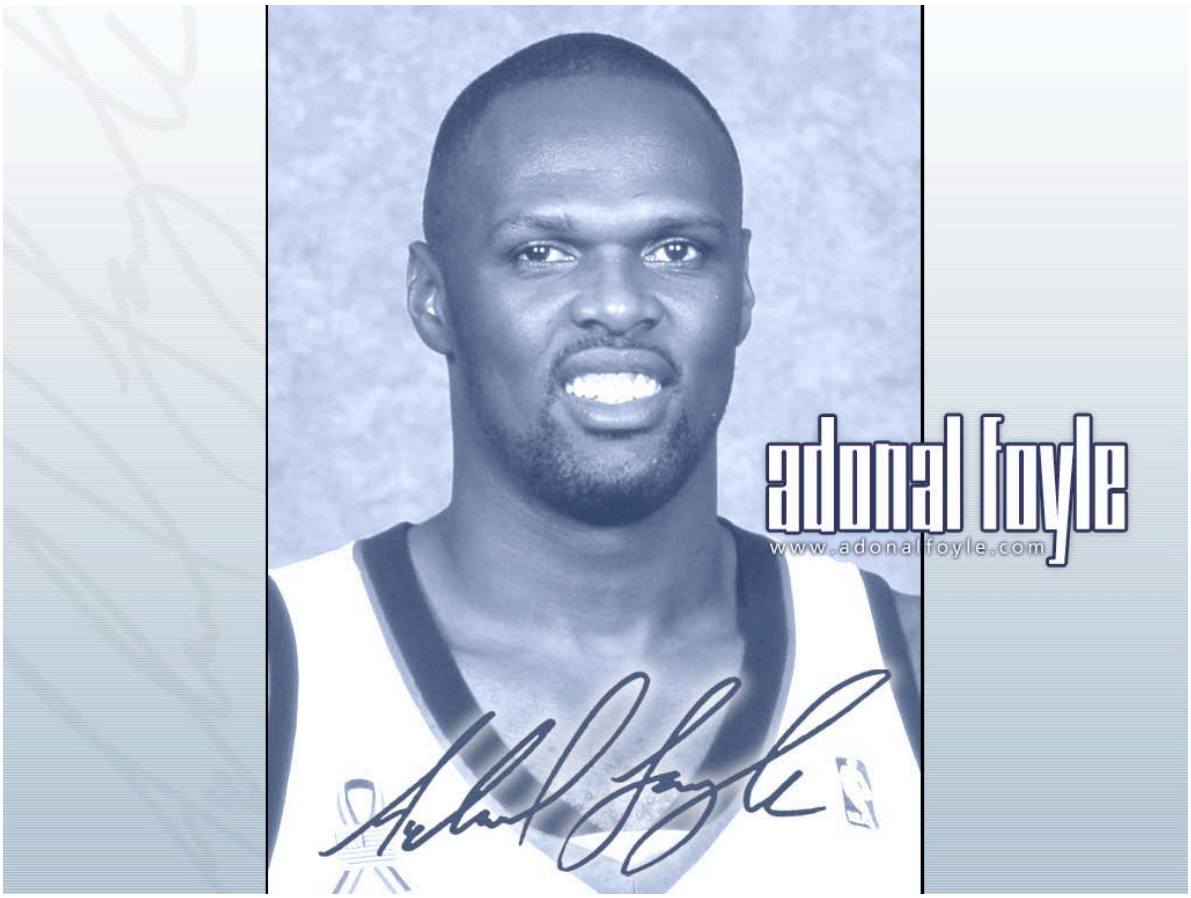
Money can cause conflicts. Because tourism benefits rarely distribute equitably, a community can use techniques that specifically aim to distribute benefits to a wide array of people in a community that just the capital owners.

With these challenges in mind, communities can use tourism as a tool for diversifying a local economy, thus reducing the community's dependence on tourism and increasing the number of people who benefit from tourism, albeit indirectly. In short, a community can bring tourists into contact with local goods and services in order to test the viability of those for possible exportation. Such goods might include specialized drinks using sea moss, spiced tamarind balls, or Union Island version of pea soup. The community can test not only existing goods and services, but those enhanced through a regional tourism brand. Those products to which tourists react positively can then be marketed to wider markets and exported. Thus tourism serves as a bridge or R&D

laboratory for diversifying the economy. The presentation reviews a series of steps created by Fermata, Inc. (www.fermatainc.com) designed specifically to use tourism in just this fashion.

Ultimately to be effective, then, sustainable tourism (that is a tourism that sustains a site's sense of place and its resources rather than long-lived tourism businesses) needs to be low volume, low impact, high yield (large return for each visitor), and intentionally integrates a wide variety of products into the tourism and marketing strategy of the community.

In the case of Union Island, islanders could use the Lagoon restoration as its central interpretive theme. A variety of sites and efforts could be tied into restoration including the restoration of the water tanks, archeological sites, local culture (especially through Easterval), and even the post-slave independence (taking advantage of the old slave road). Interpretation is key to bring this history and these potential attractions to life.



An important story on Union Island is its dominance in basketball and production of players, especially NBA caliber players.

A variety of sites and resources could be tied into Ashton Lagoon and the theme of restoration. Brand qualities that arise from this interpretive approach might include “natural”, “local,” “healthy,” “authentic.” This cannon that overlooks one of the island’s bays is a rusty reminder of the value the British placed on the island’s resources.

While sea moss harvesting might not be a novelty on the island, Unionites could develop a regional brand that makes their sea moss competitive with larger producers in places like St. Lucia. Here locals tend to a pilot sea moss cultivation project.

Quality of Life Indicators

For the people of Ashton, Union Island, SVG

By Jon Kohl, May 2007

Purpose: Quality of life indicators are a tool for helping us articulate and remember what we consider most important to our spiritual and cultural fulfillment. The indicators become a measure against which communities can compare to qualify their "progress." When created in a community consensus manner, the indicators can empower communities to confront and guide development to suit their community vision and cultural needs.

Background: When big changes happen to a community, members often allow various characteristics of their communities to change or erode without making a conscious evaluation. As the things that matter most to them change, the people often find themselves only realizing what they lost years too late. They look back and reminisce, lamenting how things used to be. As change continues, children look back to their parents' quality of life while the parents look to their parents. Over time, how life once was is forgotten. History becomes legend and legend becomes myth. Globalization, outmigration, politics, overdevelopment and commercialization, and community division as a result of historical conflicts (Union Island rebellion), etc. continue their erosive influence and soon every place seems like so many other places, the struggle for survival continues, and our spiritual happiness grows worse and worse. Purposeless, depression, and lack of meaning can weaken communities, making them susceptible to many common ills such as crime, drug use, conflicts, and apathy.

How to Use: Remind us of what is important and thus not allow tourism ruin our quality of life

Examples: Ones from participants, Ones from Jon Kohl's presentation

Format: Indicator, target, measurable

Product: List of indicators (max of 10?), vision

Suggested categories of indicators: Aesthetic, spiritual, traditional, economic, cultural

Volunteers to carry out task: Ashwa, Jeremiah, Marlon, Roseman, Martin (he was volunteered)

Examples given in Jon Kohl's presentation

- Big trees overgrowing trees like a shadowy green tunnel
- Everyone knew everyone else on the street

- Everyone was involved in a community group
- Could leave doors unlocked
- Everyone watched out for each other's back; almost no crime
- Kids could go out and play in the streets without parental supervision or fear
- Could see hundreds of stars at night
- Could enjoy silence at night

Suggested examples by community

- Shark availability for morning breakfast
- # Local foodplots for subsistence per 10 houses
- Willingness to leave doors open (crime)
- Maroon spirit (people help each other build their houses)

REVIEW OF HISTORY OF ASHTON LAGOON AND ASSESSMENT OF ECOLOGICAL RESTORATION POTENTIALS

Wm Stephen Price and Purnima G. Price

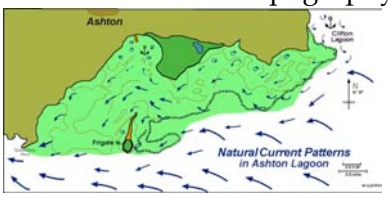
Ashton Lagoon before development

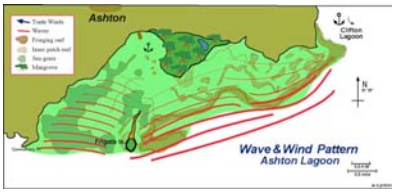
They paved paradise & put up a (marine) parking lot, with a pink hotel, a boutique, & a swinging hot spot.
Don't it always seem to go; that you don't know what you've got till it's gone?
They paved paradise and put up a parking lot.
Canadian Singer/Songwriter, Joni Mitchell

Ashton Lagoon after development

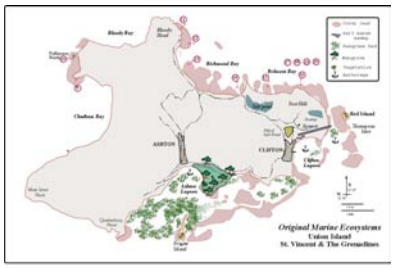
The presentation provided a brief review of the ecological processes and components of the nearshore ecosystem of Ashton Lagoon (***AL***), followed by a summary of the historical human impacts to these ecosystems with emphasis on the most recent Ashton Marina Development Project. This provided the background for the discussion of the potential restoration and utilization possibilities for the lagoon and also an assessment of the continued threat to the ***AL*** system from global climate change.

The nearshore topography and the current patterns are the primary forces driving the distribution of habitats and ecology of ***AL***. The North Atlantic gyre is the major current generator in the region, sweeping north-westward from the coast of South America over the Grenadine islands bringing fresh oxygen rich water, nutrients and larval recruits. In addition, the prevailing winds and storm surges generate current patterns within the lagoon.





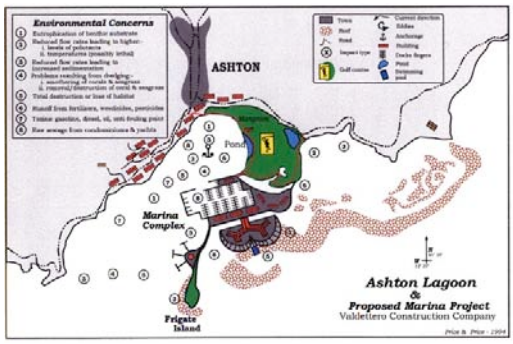
The three primary components of the ***AL*** ecosystem are the mangroves, the seagrass beds, and the reefs (both outer fringing and inner patch). The mangroves stabilize the coastline, and export 50-95% of the organic carbon to the seagrass and reef systems. They also serve as a juvenile habitat for 85% of the commercially important fish and invertebrates. The seagrass beds composed mainly of the flowering plant *Thalassia testudinum*, stabilize the seafloor and provide essential habitats for sea-eggs, lambi, lobster and many reef-fish. The coral reefs with their complex calcium carbonate skeletal architecture made from coral and encrusting coralline algae provide essential habitats for fish and invertebrates, and generate the white sand beaches so treasured by tourists. The fringing reefs absorb the force of the storm swells and protect the coastline. The three components of ***AL*** function together as an integrated system, with each contributing to the health and functioning of the other.



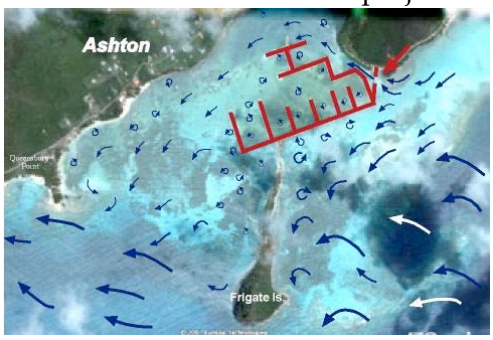
The protected waters and rich food sources of the AL have been used by humans for about 8 millennia. The first records are of the Arawak and Caribs arriving from South America. They subsisted on the rich inshore fishery and left a fairly small ecological footprint. European colonization starting in the 1500's resulted in widespread deforestation and the decimation of the large marine animals including the whales, manatees, turtles and many groupers. However, ***AL*** still functioned as an interconnected ecosystem. The 1950's brought the era of multi-national

tourism mega-developments and the leasing of entire islands to foreign interests. These projects have had profound impact on the social and ecological systems of the Grenadines.

The Valdetterro Ashton Marina Project was one such mega-project. It planned for a 300-berth marina in the center of ***AL***, a causeway connecting Frigate Island to Union Island, a recreation pavilion on Frigate Island, a large condominium complex built over the fringing reef and a golf course over the mangrove. The project did not follow the required procedures for environmental and social impact assessments. Construction of the project commenced in 1994 and for reasons that remain unclear the project was halted just after the causeway and the main fingers of the marina were completed.



The aborted ***AL*** marina project had many ecological impacts, and the expected economic benefits never materialized. Increased sedimentation during dredging and construction of the causeway smothered seagrass beds and stressed the reefs. The impacts of the causeway have been: 1) the prevention of the essential flow of oxygen rich water to the mangroves and seagrass beds; 2) disruption of the migration of animals (lambi, lobster, fish) between the mangroves, seagrass beds and reefs; 3) blockage of the flow of cool fresh water from the east section resulting in lethal temperatures (31-32° C) for many marine organisms in the west section of the lagoon; 5) occurrence of algal blooms in the marina fingers due to high temperatures and the loss of flow and 6) dramatic change in the benthic community of seagrass beds which are now replaced by algal beds and tubeworm communities. Lobsters, lambi and sea-eggs have disappeared from the west section of the lagoon.



The ecology of ***AL*** can only be restored when current speed and pattern are restored. The restoration of flow would permit the flushing of pollution and nutrients out of the lagoon, allow the seasonal and daily migration of pelagic and reef organisms, and restore the normal exchange of carbon, nutrients and sediment among the seagrass, mangrove and reef systems. Once flow is restored, the ecology of the lagoon may recover naturally. Where recovery is slow, techniques for ecological restoration such as planting of seagrass and mangrove, and the use of artificial patch reefs (e.g., *reef-balls* and *bio-rocks*) may be considered.

The ecological restoration of ***AL*** will provide many benefits through the improvement of local fisheries for lobster, lambi and other commercially important species. In addition, options for eco-tourism and mariculture of seamoss, lambi and oysters may be considered. Expertise for the mariculture of seamoss and lambi is available in the Caribbean region. Aquaculture for fish and shrimp has proved to be ecologically negative in many regions of the world. Development options within the lagoon have to be considered carefully, as all the components of the AL ecosystem will be under added stress due to climate change induced rising sea-levels, increased temperatures, and higher storm frequency and intensity.

A brief survey of current conditions in the east section of ***AL*** indicates that the potential for ecological recovery is promising. There are also some promising options for the generation of socio-economic benefits from ***AL***. However, in the face of the climate change crisis facing us we must apply the precautionary principle as enshrined in the Rio declaration on Environment and Development to any development within the ***AL***.

GLOBAL CORAL REEF ALLIANCE
A non-profit organization for protection and sustainable management of coral reefs

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RESTORING ASHTON LAGOON ECOSYSTEMS, CORAL REEFS, AND FISHERIES

Thomas J. Goreau, PhD
President, Global Coral Reef Alliance

Ashton Lagoon, site of the best coral reefs, seagrasses, mangroves, and fisheries in the Grenadines (Price and Price, 1993), was destroyed by an ill-conceived and irresponsible marina "development" project. Circulation of the bay was blocked by the causeway to Frigate Island, causing the seagrasses and reefs of the eastern half of the bay to be smothered in sand that could no longer be flushed out by the wind-driven currents, and the western half to go stagnant, killing most of the marine life, precisely as had been previously predicted by Price and Price (1994a, 1997). In addition, the extension of the airport runway blocked the natural flushing of Clifton Harbour (Price and Price, 1994b), causing erosion in Belmont Bay and sewage nutrients from Clifton to flow instead into Ashton Lagoon, triggering excessive weedy algae growth.

A water quality survey of Ashton Lagoon by Goreau and Sammons (2003) made 273 measurements of temperature, salinity, and oxygen at nearly 50 locations in all parts of Ashton Lagoon and surrounding reefs, including surface waters and at every 5 feet depth until 20 feet or reaching bottom (see map). Statistical analysis of the data showed very strongly significant patterns: 1) western areas had higher temperature than eastern areas; 2) there was no significant variation of temperature with depth; 3) western areas had higher salinity than eastern areas; 4) there was no significant variation of salinity with depth; 5) western areas had lower oxygen than eastern areas; 6) deeper western waters had lower oxygen than surface waters; 7) there was no significant variation of oxygen with depth in eastern waters; 8) very high oxygen levels were produced by the seagrasses in the eastern lagoon, but there was little surviving seagrass in the western lagoon. These results confirm that the eastern areas are well flushed but that the western lagoon has become stagnant. If there were any significant discharge of nutrients from a marina or from land based sources of pollution, the western lagoon would quickly turn into a foul-smelling dead zone.

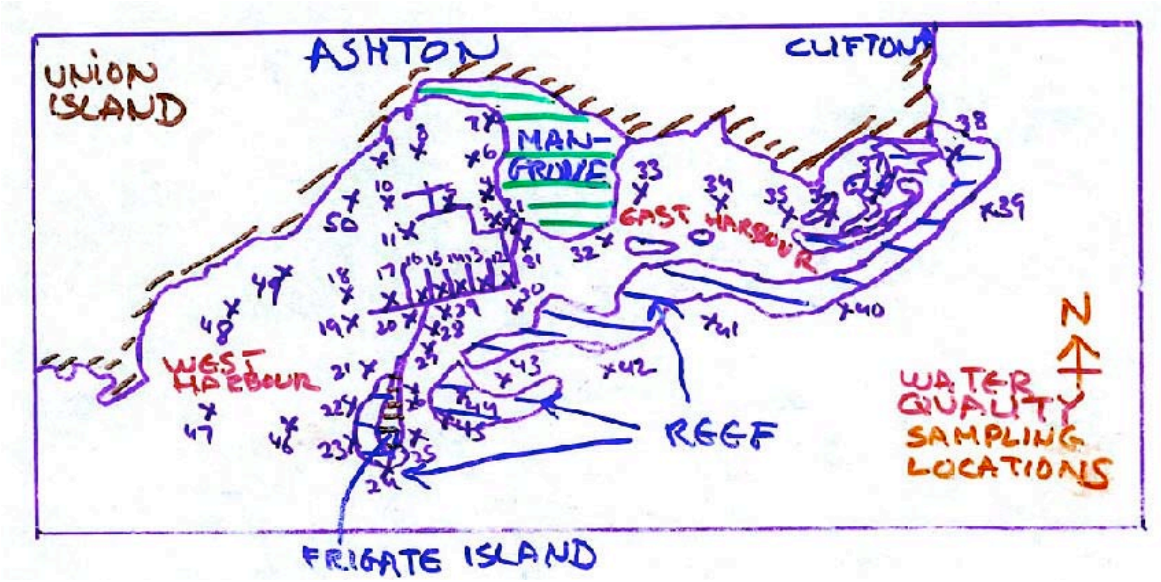


Figure 1. Location of water quality measurements marked by purple crosses.

Restoration of the coral reefs, seagrasses, and fisheries can only happen after circulation is restored and the normal flushing of water and sediments through the bay resumes. Once current flow through the bay is re-established there would be an interim period in which the sand is redistributed. This might cause temporary increased turbidity in parts of the western bay as sand now accumulating in the east is suspended by currents and re-deposited in the west. It is hard to estimate how long this would take, since most of the sand movement will occur during hurricanes, so a couple of years would likely be needed. Once the situation has stabilized, habitat restoration and mariculture projects can proceed. Re-establishing circulation does not necessarily mean removal of all of the causeway and finger docks, which are now becoming mangrove habitat that will eventually have valuable fisheries nursery functions. Circulation of water through the bay can likely be restored by opening up the causeway, at just three critical locations (See figure, but also see report by Robert Bascom, Marine Engineer, CEES, Inc).

First is near the existing bridge where the last hurricanes opened a channel now used by small boats. This can be expanded easily by hand as a community effort and would allow free passage of larger boats and avoid the long and sometimes rough circuit around Frigate Island. This passage is crucial for flushing the mangroves, promoting the value of the mangroves as habitat for juvenile fish, lobsters, and conch, and preventing build up of pollution from Ashton town.

Second is at the right angle corner of the causeway, at the eastern end of the stagnant green water area enclosed by the finger docks. The permanent algae bloom in the stagnant area is clearly visible from the air, and has blocked light to the bottom and wiped out much of the natural marine habitat in the western bay. Opening this corner would quickly flush out the stagnant water, allowing the water to clear and become fisheries habitat again, while promoting the fish nursery value of the mangroves now colonizing the

fingers. This might require some machinery, such as a back-hoe loader to remove the rocks of the causeway, and the steel bulkheads in the opening would need to be removed.

Third is the linear extension of steel bulkhead extending from the north end of Frigate Island to the rest of the causeway. The diversion of the current caused by this has caused the beach that used to exist there to wash away. Opening this passage would allow water to flush through the bay, ending the scouring that has removed the beach, and allow some of the sand now piling up in the eastern part of the bay or scoured out of the channel that has formed to the east of the island, to accumulate at the north end of the island and grow the beach back.

Figure 2. Red arrows show locations discussed in text where the causeway should be opened to restore flow. The tail end of Frigate Island is at lower left. The blue circle is the suggested location for the power supply for Biorock projects and a future office and visitor centre. This location would allow power to be supplied for Biorock projects on both sides in much of the central Lagoon. Photograph by Stephen and Purnima Price.

Removal of the steel would normally require a heavy-duty crane to pull each of the massive steel plates out of the ground, and would be extremely expensive since a crane cannot be driven to the site. Robert Bascom suggested that welding equipment could be readily used to cut through the plates just above the waterline, which would allow a small amount of water to spill over the top. This would only increase circulation to a limited degree, until the submerged steel bulkhead rusts away or becomes eroded out. I propose a novel solution to removing the submerged steel plates. The top parts of the plates would be cut off and then placed flat on the sea bottom. Because they are corrugated, they would

provide lobster shelters. These would then be wired to the cathodic terminal of a DC power source. DC current could be generated by windmills (but as the purpose is to establish a migratory bird sanctuary this might not be desirable due to the small but unavoidable risks of birds flying into the blades), by solar panels mounted on the finger dock causeway, or by a generator hooked to a transformer. The anodic terminal of the power supply would then be hooked up to the submerged vertical steel plates. The resulting electrical current, probably at a safe 12 volts, would cause limestone to grow on the flat cathodic plates, allowing corals to grow on them and creating excellent habitat for lobster and fish. In contrast the anodic vertical plates would undergo greatly increased rusting, basically dissolving them away and opening up the passage. The rust, which is non-toxic and harmless, would be quickly flushed away by the currents. This simple and elegant solution would be the first time that such in-situ deconstruction has ever been done anywhere.

The mangrove habitat, and its juvenile fish nursery, can be greatly expanded by leveling the finger causeways to be intertidal in height. Another method would be to introduce channels into the main mangroves so there is more water circulation into the mangroves and more juvenile fish and lobster habitat. At present the tallest mangroves are on the seaward edge and their height diminishes inland. It is clear that there is little supply of nutrients from groundwater on the landward side, which diminishes mangrove growth away from the sea along with salt buildup. Channels to exchange water would help remedy this. One possibility is to make a small experimental channel to see if this significantly increases juvenile fish, lobster, and conch populations.

Seagrass restoration has been widely attempted, but has often ended in failure because the locations were too turbid and polluted, or the bottom sand too mobile. Seagrass restoration should be tried only after the sand has assumed a new stable distribution after the opening of circulation. Sand would probably be removed from the east, possibly eroding some existing seagrass, and be added to the west where new seagrass habitat might become available. This area could be planted with seagrass in order to expand the conch, juvenile lobster, and sea egg populations to an area where they were lost after that part went stagnant.

Algae (seaweed or sea moss) cultivation could be introduced over shallow sandy areas especially in the east of the bay. This might serve to absorb some of the excess nutrients entering Ashton Lagoon from Clifton Harbour to the east. Algae can be grown on lines and rafts but should not be grown over sea grass or coral as they will shade them and reduce their productivity. In addition algae benefit from light reflected from white sand bottom. In algae cultivation work in Jamaica by A. H. Macfarlane and myself in Jamaica in the 1980s we found that large numbers of juvenile lobsters and conchs, as well as fish, were living in our algae lines. Therefore algae cultivation should be managed to not only produce an economically valuable product, but to enhance the lobster, conch, and fish populations by producing more habitat for the juveniles. Doing so in front of the mangroves would be especially effective.

One of the major reasons for the collapse of fish and lobster populations in Union

Island is the loss of coral habitat to shelter them from predators as well as overfishing. Restoration of the fish and lobster populations will not only need effective management to ensure that harvesting is at sustainable levels, but restoration of habitat. Even in the total absence of fishing, the populations cannot recover without suitable habitat for them at all stages of their life cycle. Once habitat is restored only effective community-based fisheries management can maintain populations at levels allowing high sustainable harvests. This requires community ownership, control, and management of the resources and effective cooperative regulation of fishing efforts. Top-down management, controlled from outside the local community, almost never works to sustain marine resources.

Coral reef restoration will be the key to enhancing lobster and fish populations in Union Island. I recommend the *Hilbertz-Goreau Biorock Method* to restore coral reefs in Ashton Lagoon (Hilbertz and Goreau, 1996; Goreau and Hilbertz, 2003; in press). The Biorock method uses completely safe low voltage direct current to grow solid limestone rock structures of any size or shape in the ocean. Power can be supplied by solar panels, windmills, ocean current turbines, chargers, or batteries. Biorock structures are the only marine construction material that get stronger with age, are self-repairing, and have turned severely eroding beaches into growing ones. Biorock coral has been shown to:

- Grow 3-5 times faster than normal
- Heal more than 20 times faster
- Survive high temperature stress 16-50 times more than adjacent reefs
- Have hundreds of times higher baby coral settlement
- Greatly increase reef and juvenile fish populations

Biorock reefs can be grown where no natural reef recovery is taking place (See photos). Fishers can grow the reefs and within a few years greatly increase fish and shellfish populations and catches, becoming farmers as well as fishers. An additional advantage of Biorock reefs is that breakwaters can be built for a fraction of the price of concrete or stone and with vastly greater environmental benefits.

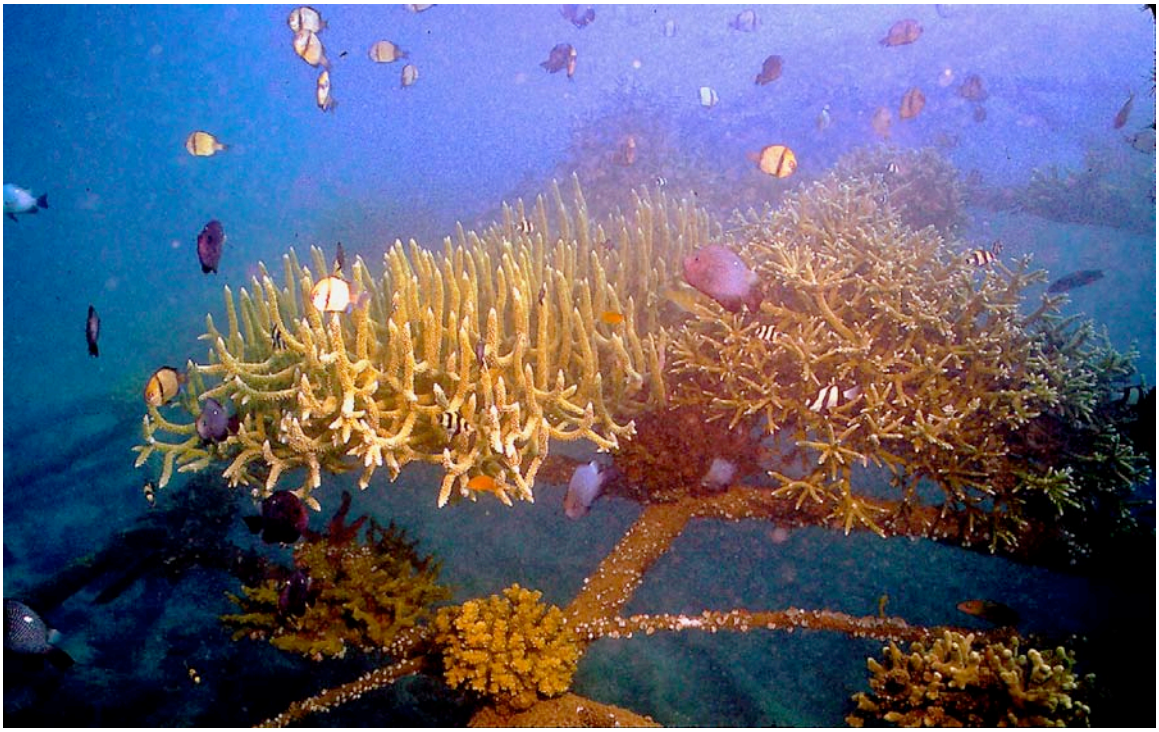


Figure 3. Three year old Biorock Reef, Bali, Indonesia.

Photograph by James Cervino

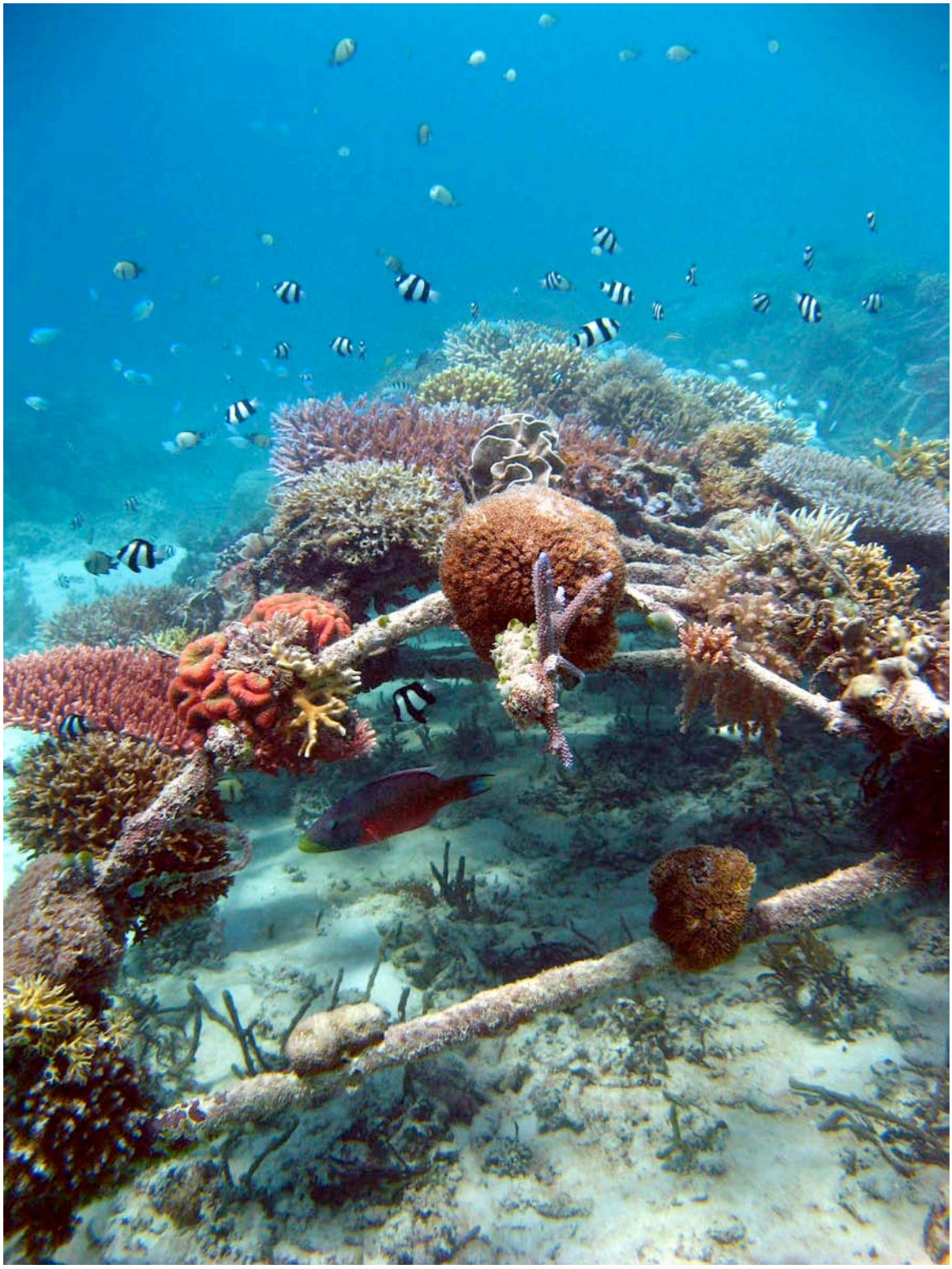


Figure 4. Two year old Biorock reef. Gili Trawangan, Lombok, Indonesia. Photograph by Delphine Robbe.

Biorock reefs have now been built in more than 20 countries and are enormous tourism attractions because of the large number of fish and corals on them. Community-based fisheries management projects in Indonesia, Philippines, Thailand, and countries in the Caribbean, Pacific, and Indian Ocean are using them to restore their fisheries. The biorock reef restoration method, invented by Architect Wolf Hilbertz to grow construction materials from ocean minerals, has won many international environmental and ecotourism prizes.

Because Biorock reefs can be built with spaces of any size or shape, in any number of levels, it is possible to grow reefs with many more hiding places than even a healthy natural reef, and these can be built in sizes that specific species prefer. For example, dead and degraded reefs have few hiding places for lobster, but Biorock reef habitat can be built in shapes that lobsters crowd into by the dozens. It is therefore recommended that once community-based fisheries management is established in Ashton Lagoon, large-scale coral reef restoration efforts be introduced to increase fish and lobster habitat and allow their sustainable exploitation, as well as to create snorkeling habitat for ecotourism.

Biorock reef and fisheries habitat restoration require a source of direct current. Batteries can be used, but would need to be constantly replaced and recharged. Because the first step would include rusting away the steel bulkhead between Frigate Island and the finger docks, it is suggested that a small building be built on the fingers at the end of the Frigate Island bulkhead (blue circle in figure 2). This would house a diesel powered generator used to produce the current for rusting the bulkhead and at the same time growing lobster, coral, and fish habitat in the channel in front of the bulkhead. This phase should be done with 24 hour power at high levels. At a later date the building could be roofed over with solar panels, wired in a direct mode, without batteries, which would provide smaller currents and only when the sun is shining. This central location would be used to power Biorock projects in nearby areas of the central lagoon, on both western and eastern sides of the fingers and within them. With the generator now removed, the building could serve as a visitor center and/or as an office for the local fisheries management cooperative, allowing supervision of mariculture activities, fishing and mariculture gear storage, etc. The cost of the Biorock projects will depend on their size and the kinds of materials used. It is proposed to recycle all of the bulkhead steel available, and to build open mesh framework Biorock reefs on top of them for fish and coral habitat, using steel reinforcing bar. Typical costs for Biorock reefs are in the range of $2-3 per square foot, depending on the distance, size, materials, and power source used.

In summary, I recommend the following actions:

1. Restore water circulation of the lagoon.
2. Allow time for sand to stabilize.
3. Initiate a community-based coral reef restoration project in Ashton Lagoon. The project should include growth of coral reef habitat in the lagoon using the Biorock method and establishment of a community-based fisheries management program.

Ashton Harbour:
A Preliminary Engineering Perspective

prepared by

Robert L. Bascom
MSc.(Eng.), BSc.(hons), MBAPE, PEng.

This document is based on a very brief site assessment conducted during May 2007. As a result it relies heavily on earlier investigations made by the author in March 1997 after the development had been halted.

The Issues

From an engineering perspective while the site presents a well sheltered area suitable as a haven for vessels, there are a number of critical concerns which appear to have been ignored by the developers in conceptualizing the site as a marina resort. These include, *inter alia:*

1. the low tidal range and hence the reduction in the natural flushing potential of the site
2. the potential for the reduction in water circulation based on the marina configuration

3. the shallow nature of the bathymetry at the site thereby causing the need for dredging in an area laden with marina biodiversity
4. the potential for negative impacts on the sediment transport regime based on the marina configuration and
5. the role of the mangroves in the preservation of the ecological balance at the site

The Project

The Ashton Lagoon located on the south coast of Union Island was proposed to be the home of the Ashton Marina Resort which reportedly began construction in 1994 (plate 1). The site in its original configuration was well protected from excessive wave activity both by a series of coral reefs lying southeast of Frigate Island, and by the island itself. It has been noted that the site was previously listed as the most extensive and diverse mangrove wetland on the island.

Plate 1: As built configuration of the started marina project

Today the area reportedly is a shadow of itself as the biodiversity which once thrived are now fighting for survival as they try to adapt to the effects of the construction.

The project scheme as reported included the following elements; a 300 berth marina with yacht club and shipyard, a causeway between Frigate Island and Union Island, a hotel and villa development and a 9 hole golf course.

Site Characteristics and Observations

As with the mainland the mean tidal range at the site is <0.5 m, with a maximum range of approximately 0.7 m. Lee Young and Partners, 1991 indicated that during the flood tide the general current flow was from west to east with a reversal during ebb tide. They also noted that the stronger currents occurred during the ebb tide.

Currently, water within many of the berthing areas within the marina is stagnant especially in the eastern end of the marina. The piles are at an advanced state of corrosion and the banks of the finger-piers are being eroded by wave action and what appears to be periodic seiching. There was one distinct area of breaching observed towards the eastern end of the marina which allows for some degree of mixing within the cell. It is however inadequate to supply the currents and water exchange necessary to provide an aerobic condition along that section of the marina.

Mangrove species have begun to reform on various segments of the forgotten development while the nearshore marine environment has been documented in several publications (WM. Stephen Price and Purima G.Price 1994[18])

The littoral sediment transport patterns have also been altered through the establishment of the physical barrier forming the causing with Frigate Island.

Conclusions

In concluding, given the combination of the degree of natural sheltering at the site, the low tidal range, the sensitive marine flora and fauna and the shallow bathymetry it was always going to be challenging to come up with the optimum design for the site which would have had minimal negative environmental consequences.

The following issues/questions will remain pertinent regarding any future proposed development and/or remediation measures:

[18] A Survey of the Nearshore Marine Environment of Union Island, St. Vincent the Grenadines

1. any new proposed works for the area will have some very difficult challenges:
    i. the high cost related to the removal of the existing sheet piling (causesway). This will make future projects at the site economically challenging based on the estimated 2000m of severely eroded causeway existing at the site.
    ii. any attempt at the sudden removal of the dredged spoil used to create the core material of the causeway and the finger piers will cause persistently high turbidity levels within the very fragile ecosystem.
    iii. a question that should be investigated is; "has some areas of the site reached a new ecological equilibrium more than a decade after work was halted and do we want to upset the fragile balance of the ecosystem that now exist in certain areas of the previous construction works?"
2. in the case of a remediation effort the following questions are relevant
    i. what are the objectives of the remediation effort?
    ii. what level of remediation is necessary to achieve those objectives?
    iii. How will it impact on the existing ecosystem

Recommendations

- They are a number of engineering approaches to returning some form of circulation within the Ashton Lagoon, it must however ***be clear*** as to the future proposed activities at the site so that the solution be in harmony with the development strategies for the area.
- It is agreed by all that some level of circulation needs to be restored at the site to alleviate the anaerobic conditions existing in the confines of the marina footprint (primarily the eastern section).
- Circulation can be introduced in 2 ways
    i. Mechanically – this involves the use of physical mixing through aerators or other such devices which will cause agitation within the water column
    ii. Naturally – this involves the uses of tidal influences, wind and/or waves to provide the forcing function
- Theoretically mechanical mixing does not require the removal of any of the physical structure represented by the marina. It merely involves the introduction of devices so specified by design, to provide the necessary forces within the areas deployed to produce the circulation required. The advantages of this approach s that it:

i. Does not require any heavy equipment
ii. Easy installation
iii. No adverse impacts on the marine environment
iv. Allows immediate results by design

The main disadvantage of the system is the electrical power requirement

- Natural mixing will require some physical removal of areas of the marina either through:
    i. Complete removal of the sheet piling creating gaps within the marina layout of through
    ii. Partial removal of sheet piles i.e. cutting the piles to a depth below the low tide level thereby allowing the existing wave activity to erode the exposed core material

Whatever option is chosen it is recommended that the area be numerically modeled from a hydrodynamics perspective to better understand the circulation patterns and flows within the area. This modeling will require the following field exercises be conducted to facilitate model setup, calibration and verification:

- A bathymetric survey of the area
- Drogues study to determine current flows
- Development of a wave climate for the site
- Marine flora a fauna mapping to determine sensitive areas.

UNIVERSITY of NEW HAMPSHIRE

June 4, 2007

Electronic Copy
(Original via Federal Express)

Lisa G. Sorenson, Ph.D.
Boston University
Department of Biology
5 Cummington Street
Boston, MA 02215

RE: Ashton Lagoon Mangroves, Union Island, St. Vincent and the Grenadines Assessment and Restoration Recommendations

Dear Dr. Sorenson:

As you are aware, I have had an opportunity to view the mangrove of Ashton Lagoon during the Sustainable Grenadines Project: Ashton Lagoon Restoration Project Participatory Planning Workshop, May 22-24th, 2007. In addition to hearing from my colleagues and the community stakeholders from Union and St. Vincent, my role in the workshop was to highlight the condition of the mangrove and to outline potential restoration and rehabilitation opportunities within the system. In the following text, I review the status and restoration potential of this threatened habitat based upon existing conditions, buffered by my knowledge of the site from prior inspections in 2002 and 2004 and available literature.

1.0 Existing Site Conditions

There is no question that the construction of the infrastructure for the failed marina in Ashton Lagoon has resulted in significant ecological impacts with immediate and long-term ramifications for the coastal habitats and associated marine and terrestrial organisms that utilize these threatened habitats. Such projects have been responsible for extensive ecological impacts throughout the region and similar marina developments are presently under way on nearby islands within the Grenadines (Moore, 2004). Impacts to water quality, circulation and tidal flushing are immediately apparent from aerial photos as well as on-site inspections (Figure 1). Further investigation demonstrates a loss of seagrasses, impacts to corals, and a lack of expected fish and shellfish species within the Lagoon and adjacent waters – a sobering fact confirmed in comparison to the pre/post-development biodiversity documented by Price and Price (1998) and later by Layman, Moore, et al. (2006).

The most significant impact from the marina infrastructure appears to be the physical impediment to water circulation and flushing of the system as the sheet piling, spoil piles, and fill material effectively 'dams' the lagoon. Related impacts may have been incurred as fill material was added within the mangrove interior to fortify a historic cart path into an access road for heavy equipment working at the site. The latter represents a direct impact for the mangrove system, resulting in increased tidal restriction within the mangrove interior (to be discussed in detail is Sections 2 and 3: *The Mangroves of Ashton Lagoon* and *Mangrove Impacts*, respectively). To my knowledge, no work has been conducted at the site to improve existing conditions, including any efforts to repair or maintain the marina infrastructure or attempts at ecological restoration. Thus, under existing conditions, the site is expected to continue to degrade causing compounded and potentially irreversible damage to the coastal habitat and the economically and ecologically important resources it once contained.

2.0 The Mangroves of Ashton Lagoon

Ashton Lagoon contains a significant mangrove ecosystem, representing one of the largest contiguous mangrove habitats in the Grenadines region, and one of the last mangroves of St. Vincent and the Grenadines. Despite the aborted marina development, the mangrove maintains many important ecosystems functions, most significantly as habitat for resident and migratory birds and as a habitat and nursery grounds for a variety of fish and shellfish. The mangrove system is dominated by a fringing stand of red mangrove (*Rhizophora mangle*) with a mixture of black mangrove (*Avicennia germinans*), white mangrove (*Laguncularia racemosa*), and buttonwood (*Conocarpus erectus*) comprising its interior. Figure 2 identifies the major habitat divisions within the mangrove system. Scattered manchineel (*Hippomane manchinella*), seagrape (*Coccoloba uvifera*), and coconut (*Cocos nucifera*) line the upland edge, along with a mix of woody and herbaceous species including petite baum (*Lantana camara*), croton (*Croton flavens*), black stage (*Cordia curassavica*), turtle weed (*Trianthema portulacastrum*), and seaside tansy (*Borrichia arborescens*) which flank the access road cut along its northeast margin.

In the 1890's, this mangrove reportedly extended 100 acres (Nichols 1891), but showed evidence of degradation in the 1950's reportedly caused by sedimentation associated with rapid erosion by steep slopes along it landward edge (Howard 1952). Today, there is evidence that erosion continues to accrete along the landward margin of the system, contributing to an extensive mudflat which ponds during the rainy season (Figure 2 and 3). The potential impact of this accumulation of eroded material was made more severe as placement of fill and roadway widening associated with the marina development now impedes tidal flushing of the mangrove. Qualitative inspection of sediment cores showed over 25cm of terrigenous sediment material over the former mangrove surface, burying characteristic mangrove peat deep beneath. Sediment which might have migrated to the sea now continues to accumulate within the mangrove, smothering new growth and hastening scrub habitat development or loss of mangroves within the interior all-together.

3.0 Impacts to Mangroves

The mangroves of Ashton Lagoon appear the most resilient of the coastal resources impacted by the marina development. Despite this resiliency, there is evidence that the mangrove interior is being impacted by a partial tidal restriction brought about in two ways. Initially, an existing pathway from the adjacent upland of Ashton was fortified to accommodate construction vehicles and equipment needed for the marina development. I am told by community members that this work involved widening of the path, cutting of some mangroves, and placement of dredge spoils and/or fill. In doing so, the roadway acts as a causeway or berm that limits tidal flow into the mangrove interior along its length. Additionally, the berm limits the outflow of stormwater runoff from the land, or outflow of storm tides which occasionally overtop the road. The tidal restriction ultimately results in a significant change to the ecology and character of the mangrove, by altering tidal flux, flushing, and stormwater discharge. Impacts may include irregular flooding/draining, accumulation of salts, accumulation of phytotoxins (*e.g.*: sulfides), nutrient limitation, and other physiological stressors to plant growth. Altered tidal regime can significantly change the species composition of tidally regulated plant communities. As the interior becomes increasing dry and or fresh, habitat for red mangrove will continue to decline, replaced by less salt tolerant, fresh water, or even upland species. As tidal restrictions impact the regularity of tidal flux to the mangrove, the interior of the Ashton mangroves may spend half the year as a shallow, brackish-fresh pond, and the other half as a hypersaline desert. In essence, the mangrove is being impacted by from accreting sediment from the land *and* a lack of tidal flushing from the sea, both contributing a variety of factors that discourage mangrove diversity and plant growth.

4.0 Mangrove Restoration, Rehabilitation and Management Potential

Given the clear threats to the mangrove at Ashton described above, there remains hope for rehabilitation of this important coastal habitat. I have separated my discussion of restoration, rehabilitation and management of the Ashton mangroves into landward edge, seaward edge, and marina categories as detailed below.

4.1 Landward Edge

Prior to the marina development, the most significant impact to the mangroves of Ashton Lagoon was the addition of terrestrial sediment due to rapid erosion from the steep, adjacent hillsides. This impact remains today, but has been overshadowed somewhat by the more obvious impacts caused by the marina. Deposition of silt and mud continues to fill the landward edge of the mangrove, encroaching upon the interior and potentially resulting in further loss of forested habitat. While land management practices may be difficult to change, placement of a sediment barrier along the landward edge of the mangrove will serve to slow sedimentation rates. Double staked hay bales and silt fence can be easily installed but these methods do not address suspended sediments in stormwater entering the system from street drains and culverts which discharge directly to the mangrove. Sediment traps are not a proposed as a solution. However, they may lessen the impact of sedimentation while providing a visual representation of the significance of erosion on the sustainability of coastal habitats.

4.2 Seaward Edge

Compounded by the deposition at the landward edge, tidal restriction along the seaward fringe of the mangrove represents a significant threat to the species composition and sustainability of the mangrove over the long-term. The access road clearly impedes tidal flow, as evidenced by severe erosion along the seaward face its length. Without upkeep and maintenance, the roadway is expected to erode further and once again allow for tidal direct influence along the northeast edge of the forest. Strategic placement of appropriately-sized culverts would allow for increased tidal exchange and fish access while discouraging further degradation of the access road. In its present condition, the path is an asset in that it provides access for community, as well as for increased access for ecotourists, birders, etc.

Despite the impacts to the interior, the remaining fringing red mangroves continue to provide habitat to fish and shellfish. Suggestions have been made to 'cut channels' into this fringe to create additional surface area and access for fish habitat. While this practice would increase tidal access deeper into the system, I would discourage such efforts as they may represent further impact to a delicate system that is presently providing suitable habitat as is. Such access could be provided under the access road (above) which is already impacted. As an alternative, I would encourage planting and/or transplanting of red mangroves in suitable coastal areas nearby to increase fringe mangrove habitat (see Section 4.3 *Marina Infrastructure*, below). Similar community-based mangrove restoration initiatives have demonstrated success in both low and moderate energy fringing habitats within the Grenadines (Moore 2005, Moore 2007).

4.3 Marina Infrastructure

While the root cause of the impacts to coastal habitats and the species they support, the construction of the marina infrastructure has yielded subtle *benefits* to the mangrove. The structures have slowed currents and wave energy that have allowed establishment of red mangroves along now protected shores and along the leeward portions of the structure itself (Figures 4, 5 and 6). According to stake holder's reports, mangrove is actually expanding in some areas along the shore as well, again likely due to the dissipation of tidal energy resulting from the sheet piling and fill.

Given the cost (both monetarily and ecologically) of removing the infrastructure entirely, an overall site restoration may be initiated by first cutting sluiceways and openings in the marina structures to promote water circulation and flushing of the lagoon as discussed in detail in the Workshop. Such actions are essential should any restoration goals be achieved. In tandem with such modification, I suggest that mangrove restoration planting be initiated along the marina structure immediately. Further establishment of mangroves along the structure will provide: 1) increase fringe mangrove habitat of great importance to fisheries and birds, 2) increase acreage of mangrove which are in decline world wide, 3) continued protection of adjacent shorelines through soft engineering of a 'mangrove reef' as the man-made structure beneath it continue to degrade, 4) potential for development of a natural protected area for local (shallow draft) boats during storms, and 5) a natural and beneficial way to promote ecotourism while discouraging

further speculation of Ashton Lagoon for a man-made marina re-development. In fact, rehabilitation of the marina into a sustainable mangrove reef or island may be the first time a mangrove was established over a marina, as apposed to the other way around. In this sense, such a planting effort represents a real opportunity and the potential as a key element in an ecotourism development plan.

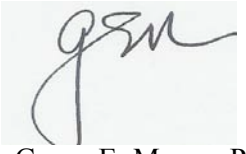
5.0 Recommendations and Summary

The significance of the failed marina development at Ashton Lagoon on the degradation of coastal habitats is well known and documented. While a number of habitats and resources have been impacted or lost, its appears that restoration of water circulation is at the heart of any sustainable or effective restoration strategy for Ashton Lagoon as a whole. Based on my observations and the available literature, mangrove habitat appears the least impacted of the coastal habitats affected by the development in that much of the original system and at least some of its functions remain. Moreover, new mangrove habitat has established at the site and may be promoted (through additional restoration plantings and transplants) to result in a measurable increase in mangrove area and associated fisheries and bird habitat at the very least. Mangrove restoration planting can be readily achieved in tandem with strategies to increase essential water circulation and tidal flushing of the system so that water quality can be restored to promote seagrasses, coral, fisheries and other coastal-marine resources simultaneously.

Despite the ecological impacts this development caused, restoration of Ashton Lagoons' natural habitats and their associated ecosystems functions *is* realistic and possible given the continued support and input of the community, government and other stakeholders *and* the approval/support of the land owner(s). It is essential that any restoration, rehabilitation or management plan be inclusive of the local community and demonstrate real social and economic benefits to that community, while promoting a sustainable, high quality habitat for the marine and terrestrial organisms Ashton Lagoon has historically supported.

Thank you for the opportunity to participate and contribute to this important community-based restoration and management effort. Should you have any questions or require further information, please do not hesitate to contact me at 603-862-5138 or via e-mail at gregg.moore@unh.edu.

Sincerely,



Gregg E. Moore, Ph.D.
Research Scientist

attachments

cc: Martin Barriteau, Sustainable Grenadines Project

6.0 Literature Cited

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Figure 1: Aerial view of Ashton Lagoon and mangrove (G.E.Moore, 5/21/2007). Note the dark green, eutrophic water within the interior of the marina infrastructure and the access road way within mangrove fringe that blocks tidal exchange to the forest interior.

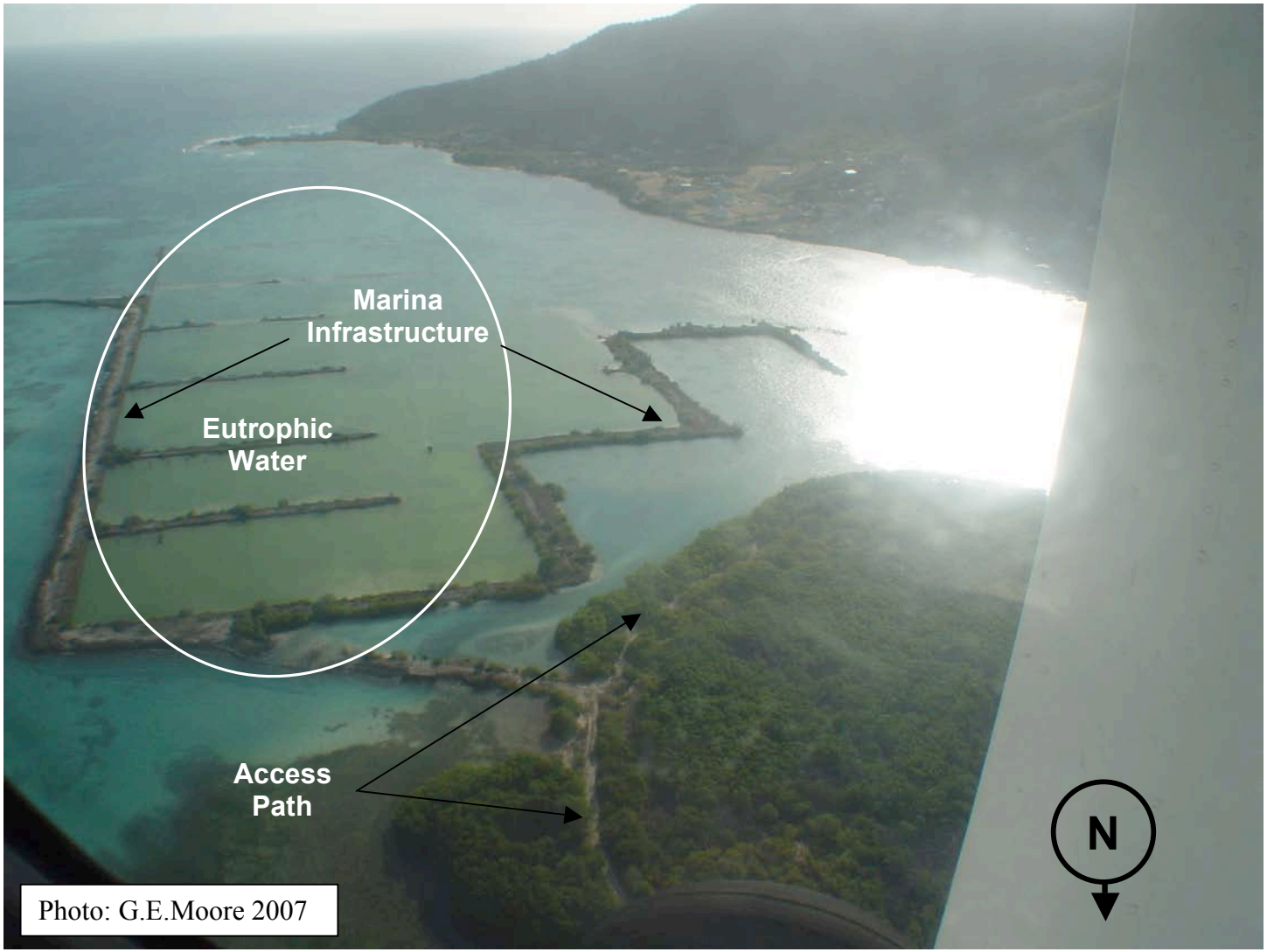


Figure 2: Mud flats within the mangrove interior experience periods of ponding and dry-down linked to rainy and dry seasons. Accumulation of silts and clays eroded from adjacent slopes is evident, and may be linked to loss of mangroves within the forest interior. While devoid of mangrove, the flats provide quality habitat for foraging birds as shown here. (G.E.Moore 5/24/2007)

Figure 3: The extensive mud flat depicted in Figure 2 as seen from the air (G.E.Moore 5/21/2007). Here the ponding of water is evident and likely derived from storm water runoff from the adjacent hillsides, carrying suspended silt, clays and fine materials.

Figure 4: Red, black, and white mangroves have begun to establish upon the manmade marina infrastructure as represented by this dense stand of red mangrove seedlings exploiting available habitat next to some degraded sheet pilings. Elsewhere the mangroves have grown to 2-3 meters in height along the aging marina spoil piles.

Figure 5: An extensive red mangrove (Rhizophora mangle) stand has naturally recruited along the failed marina infrastructure, creating a valuable coastal fringe habitat favored by many fish, shellfish and bird species. White mangrove (*Laguncularia racemosa*) and buttonwood (*Conocarpus erectus*) have established a vigorous stand upon the top of the man-made berm as well.

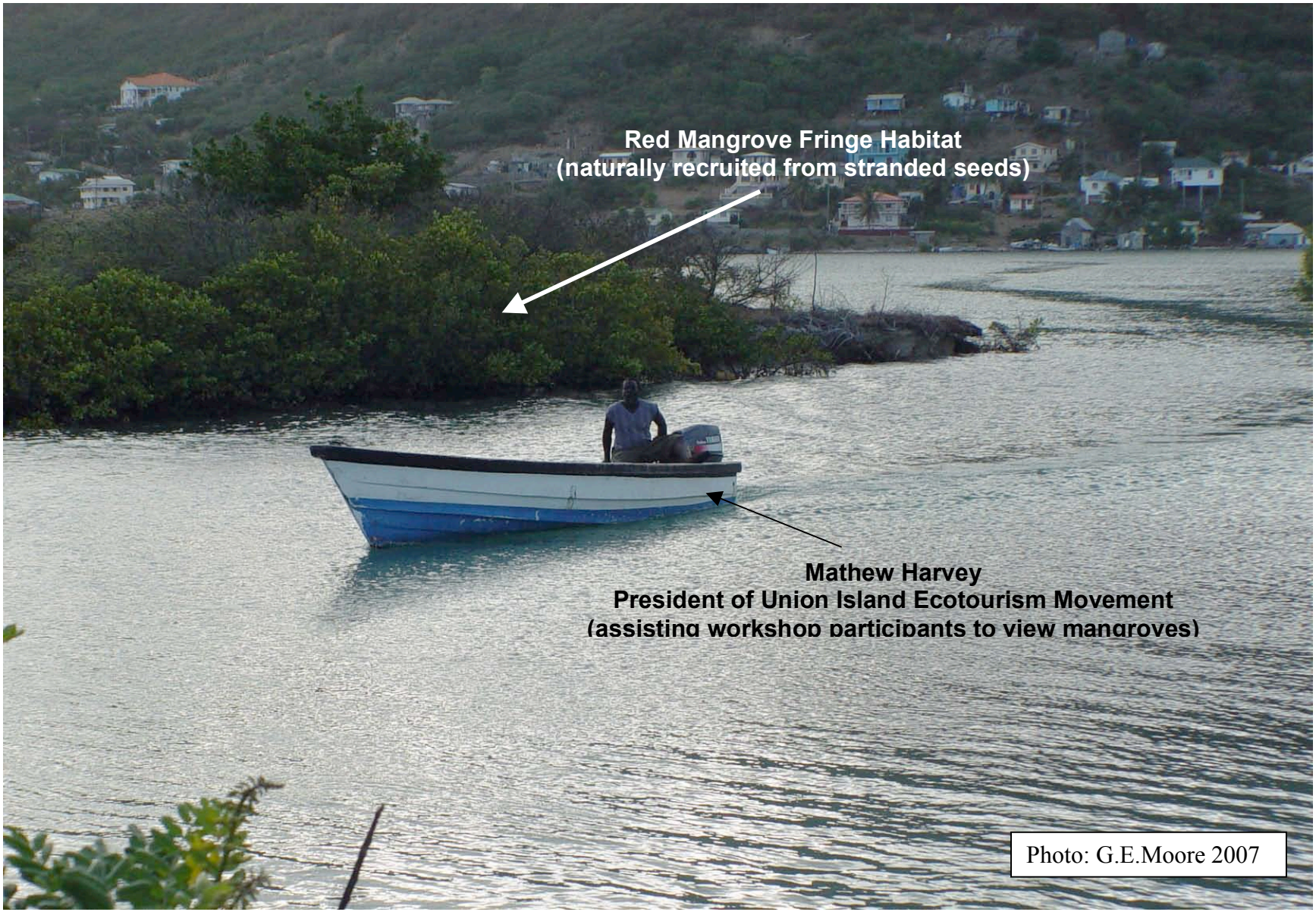
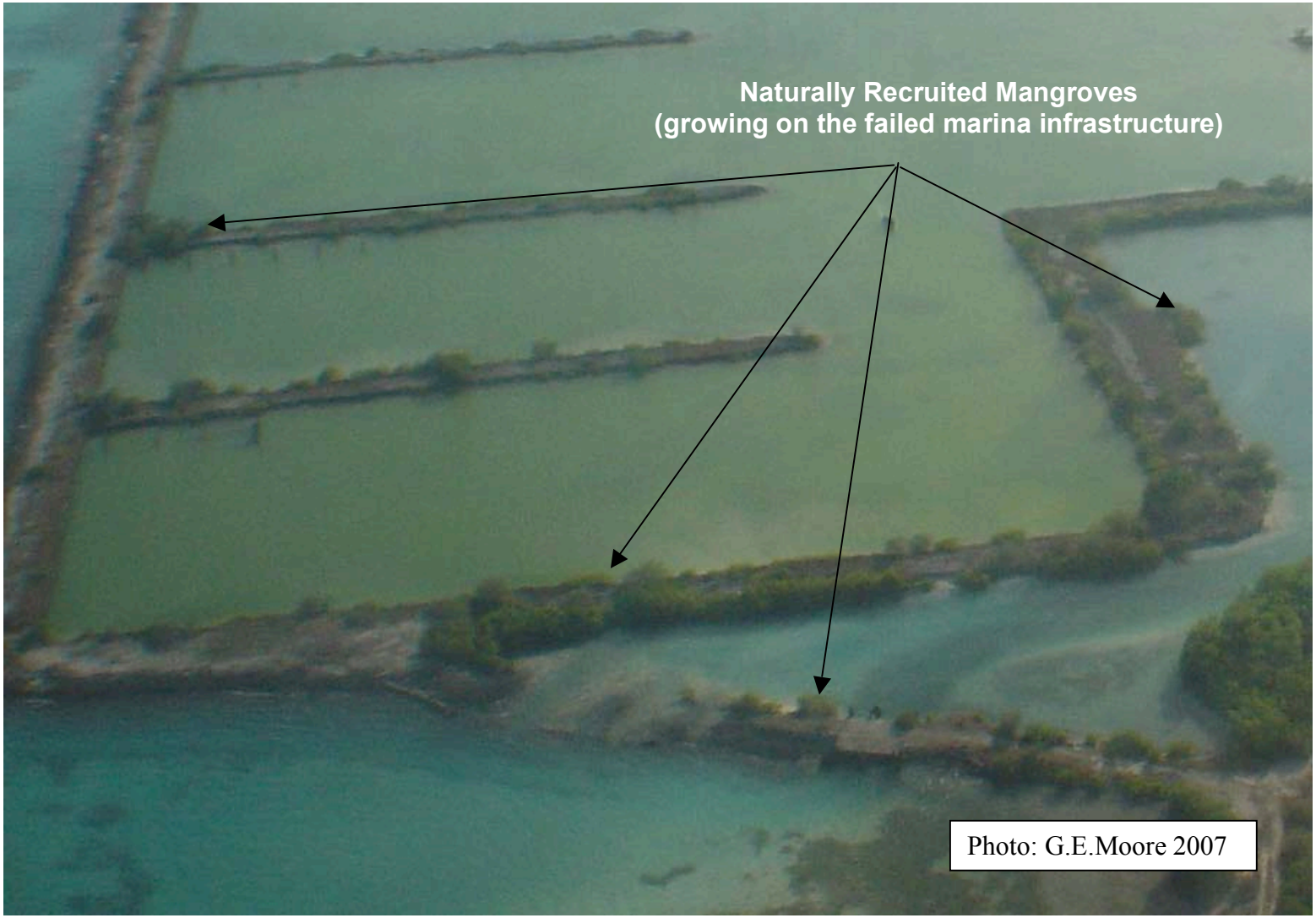


Figure 6: A Site Ripe for Restoration: Aerial view illustrating the extent of existing, natural recruitment of mangroves upon the degrading marina infrastructure. While predominately comprised of red mangrove (*Rhizophora mangle*), evidence of black (*Avicennia germinans*) and white (*Laguncularia racemosa*) mangroves and buttonwood (*Conocarpus erectus*) were also noted. These plants established naturally, as floating propagules (seeds) stranded upon the 'shores' of the manmade structures and colonized. Ironically, the failed marina infrastructure has created both suitable substrate and environmental conditions (decreased wave and tidal energy) to promote mangrove establishment and growth despite all the associated impacts it has created for other threatened coastal habitats.



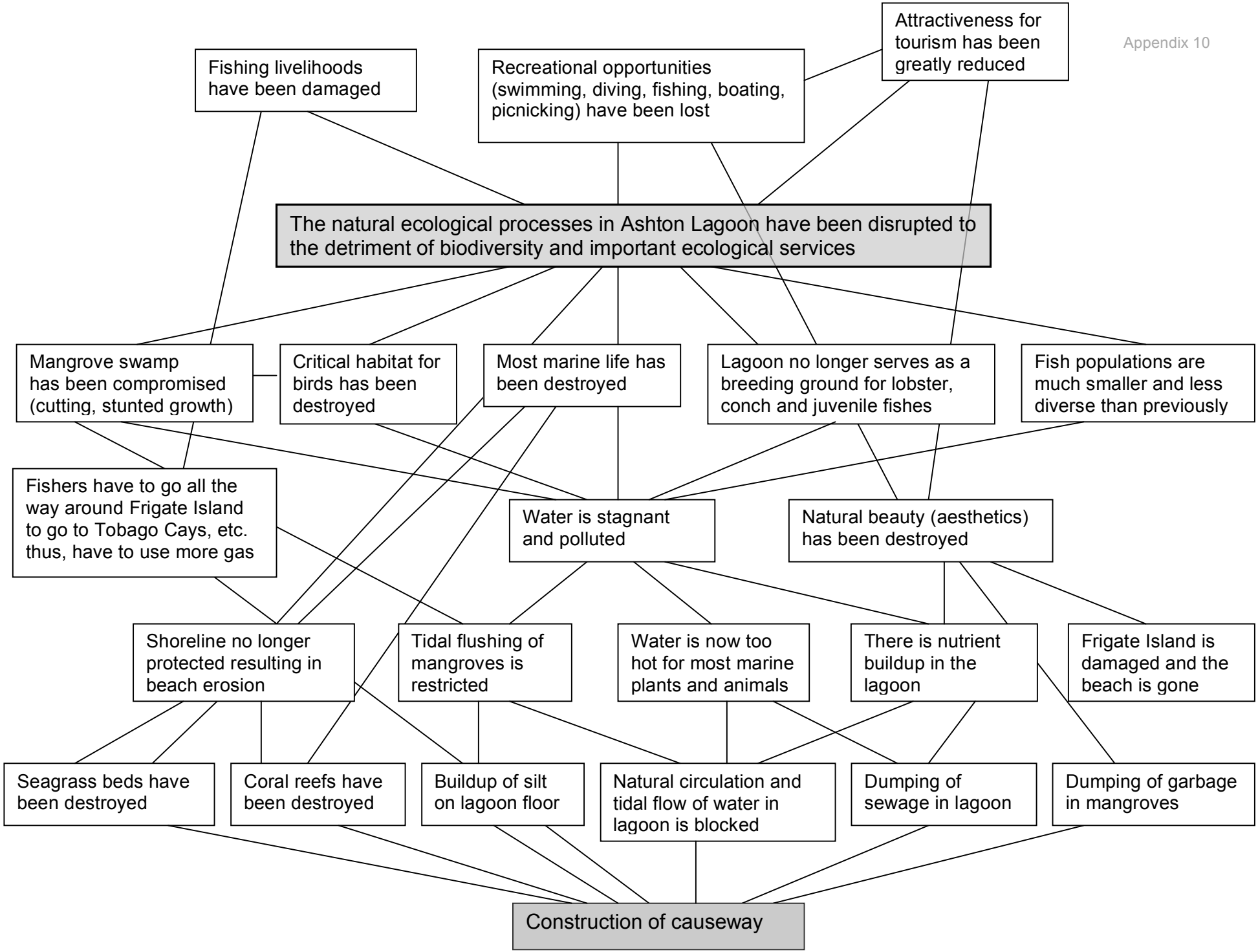
Appendix 9. Stakeholder Analysis – Creating a Sustainable Use Plan for Ashton Lagoon

Stakeholders	**Institutional level** • Global & international • National • Regional • Local on site • Local outside of the site	**Category** (arbitrary) 1. Primary 2. Secondary 3. External	Interests (publics/hidden) Examples: 1. Funding and activities control 2. Public image 3. Benefits 4. Conservation interests 5. Development interests 6. etc.	Power and influence of stake-holder From 1 to 3 1= high 2 = medium 3= low	Potential project impact on stake-holder **(arbitrary)** • **+** • **-** • **+/-** • **?**	**Relative priority of interests**[19] From 1 to 3 1= maximum 3= minimum
Government agencies						
Tobago Cays Marine Park (Hiram Joseph /Vibert Dublin)	National	Secondary	Conservation	2	+	2
Ministry of Health and Environment (Douglas Slater)	National	Primary	Development (Health), conservation, monitoring, coordination mandate	1	+	1
Directorate of Grenadines Affairs (Mr. Edwin Snagg)	National	Primary	Development (?) mandate	1	+/-	1
Director of Tourism (Minister, Mr. Glenn Beache, out of State)	National	Primary	Development (Tourism) mandate, public image, economic, niche markets	2	+	1
Town Planner, and Secretary of the Physical Planning and Development Board (Ardon Nelson)	National	Primary	Development (Planning)	2	+/-	2 (?)
Ministry of Agriculture, Fisheries and Forestry (the Director, Mr. Raymond Ryan	National	Primary	Conservation & sustainable development	1	+	1
National Parks	National	Primary	Protected areas and biodiversity conservation, education	2	+	2
Ministry of Finance	National	Primary	Funding, development	2	+/-	2
Prime Minister	National	Primary	Development, conservation , public image, finances	1	+	2
Cabinet	National	Primary	Development, conservation , public image, finances	1	+	2
Ministry of National Mobilization	National	Secondary		2	+	3
Ministry of Works	National	Secondary	Development	2	+	3
Southern Grenadines Tourism Board	National	Primary	Development (Tourism) mandate, public image, economic, niche markets	2	+	1
US Fish and Wildlife Service	International	External	Migratory bird and habitat conservation, potential donor	3	+	2

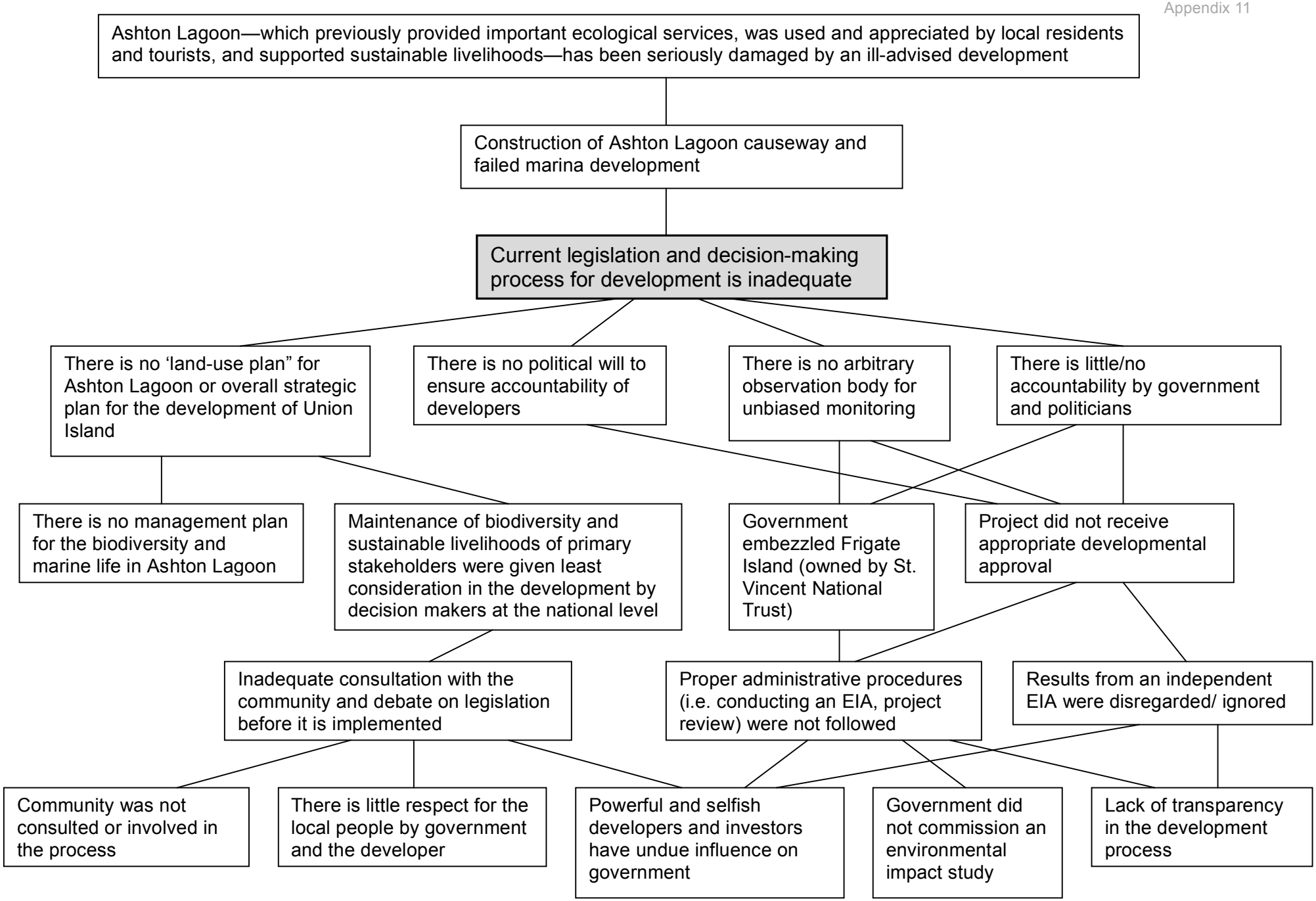
[19] This is the relative priority to be given to the needs and interests of different stakeholders by the project

Private Sector						
National Commercial Bank (Mr. Derry Williams - Deputy Chief Executive Officer)	National	Primary	Financial	1	?	1
Mr. Floyd Patterson (accountant-liquidator for development)	National	Primary (?)	Financial	1	?	1
Potential developers	National, International	Primary	Development	1	?	1
National Investment Promotion, Inc.	National	Secondary	Sustainable development	2	+	2
Other national/international financial groups	National, international	External	Development	3	?	3
Yachting sector	Regional, international	Secondary	Natural beauty, clean environment, and water, culture, services, local products and activities	2	?	2
Chamber of Commerce	National	Secondary	Financial	2	?	2
NGOs						
Union Island Association for Ecological Preservation (Jacques Daudin)	Local	Primary	Conservation, education	2	+	1
South Grenadines Water Taxi Association (Jeremiah Jones)	Local	Secondary	Development	2	+	2 (?)
Union Island Environmental Attackers (Katrina Collins)	Local	Primary	Conservation, clean environment, education	2	+	1
St. Vincent National Trust (Kathy Martin, Ottis Joslyn)	National	Primary	Conservation, protected areas, education	2	+	1
Union Island Museum and Ecological Society (Ashwa Stewart)	Local	Primary	Conservation & preservation, education	2	+	1
4-H Club(Keisha Bowen)	Local	Primary (?)	Educaction, conservation		+	1 or 2 (?)
Union Island Tourism Board	Local	Primary	Public image, conservation, development	2	+	1
AvianEyes Birding Group	National	Primary	Bird and habitat conservation, education, monitoring	2	+	1
Union Island Friends of Tourism	Local	Primary	Public image, conservation, development	2	+	1
Union Island Development Council	Local	Primary	Sustainable development	!	+	1
Friends of the Tobago Cays	Local	National	Conservation, education	2	+	2
JEMS	National	Secondary	Conservation & development	2	+	2
Universities	Regional	External	Education, research	3	+	3
Sustainable Grenadines Project and partners	National	Primary	Conservation, sustainable development, education	1	+	1
Society for the Conservation and Study of Caribbean Birds	Regional	Primary	Bird and habitat conservation, education, research, monitoring, training	2	+	1
The Nature Conservancy	Regional and international	Primary	Biodiversity conservation, research, monitoring, training	2	+	1
BirdLife International	Regional and international	Primary	Bird and habitat conservation, monitoring, training	2	+	1
Caribbean Conservation Association	Regional	Secondary	Conservation, training, education	2	+	2
Individuals and Communities						
Fishers	Local on site	Primary	Benefits, conservation, sustainable livelihoods	2	+	1
Residents of Ashton	Local on stie	Primary	Benefits, conservation, sustainable livelihoods, development, public image	2	+/-	1
General population-Union Island	Local outside of	Primary	Benefits, conservation, sustainable	2	+/-	1

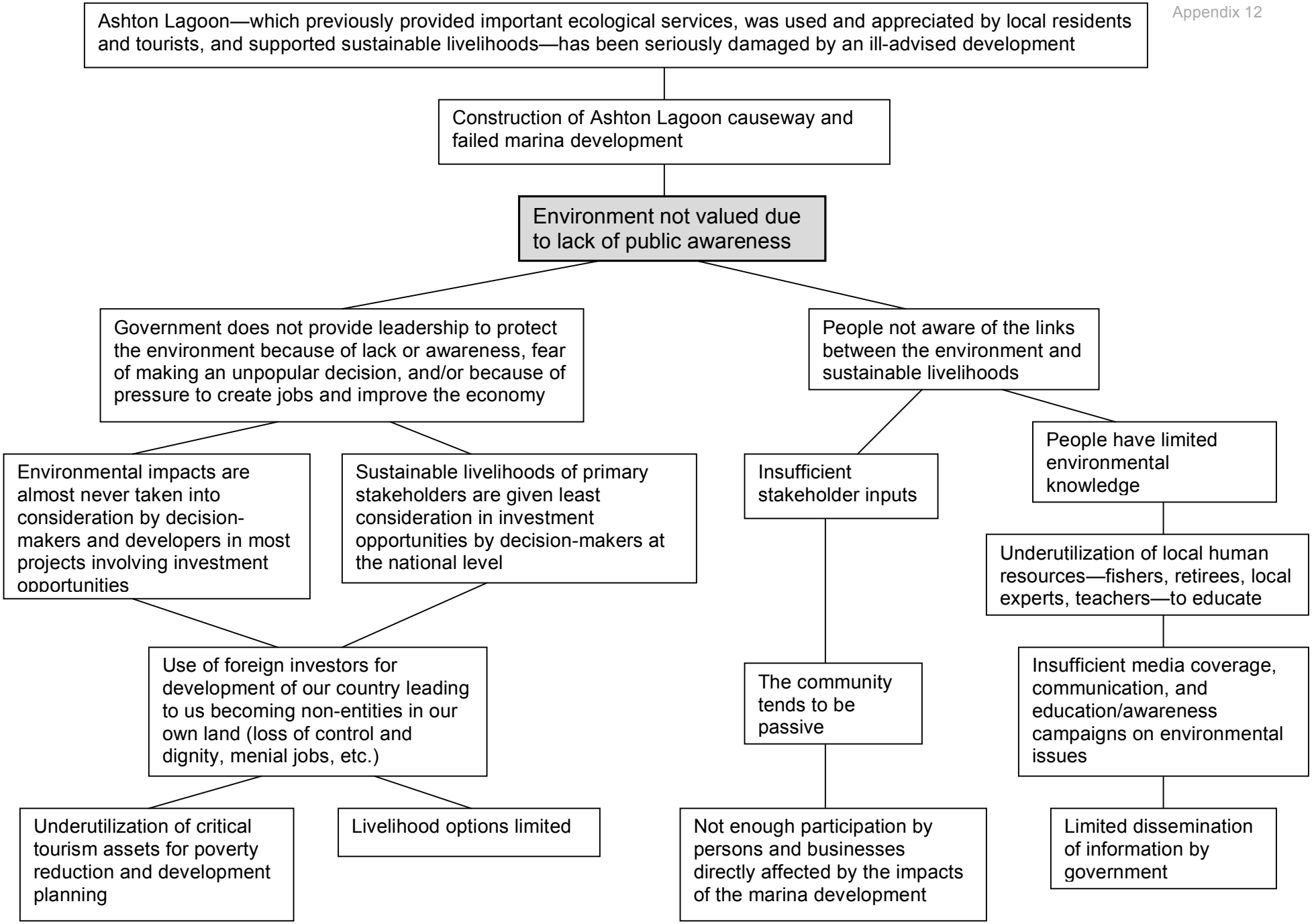
	site		livelihoods, development, public image			
General population- St. Vincent	National	Secondary	Conservation, development	3	+/-	3
Schoolchildren and future generations	Local, National	Primary	Conservation, sustainable livelihoods, education	3	+	1
Local private sector	Local	Secondary	Conservation, development, sustainable livelihoods	2	+/-	1
Tourists	Regional, international	External	Benefits, natural beauty, clean environment, culture, services, local products and activities	3	+/-	2
Dive operators	Local	Primary	Conservation, sustainable livelihoods	2	+	1
Unemployed in Union	Local	Primary	Development, benefits, sustainable livelihoods	3	+/-	2
Political parties	Local and National	Secondary	Funding and activities control, development, conservation	1	+/-	2
Politicians	Local and National	Secondary	Funding and activities control, development, conservation, public image	1	+/-	2
Educators	Local	Secondary	Benefits, conservation, education	2	+	1



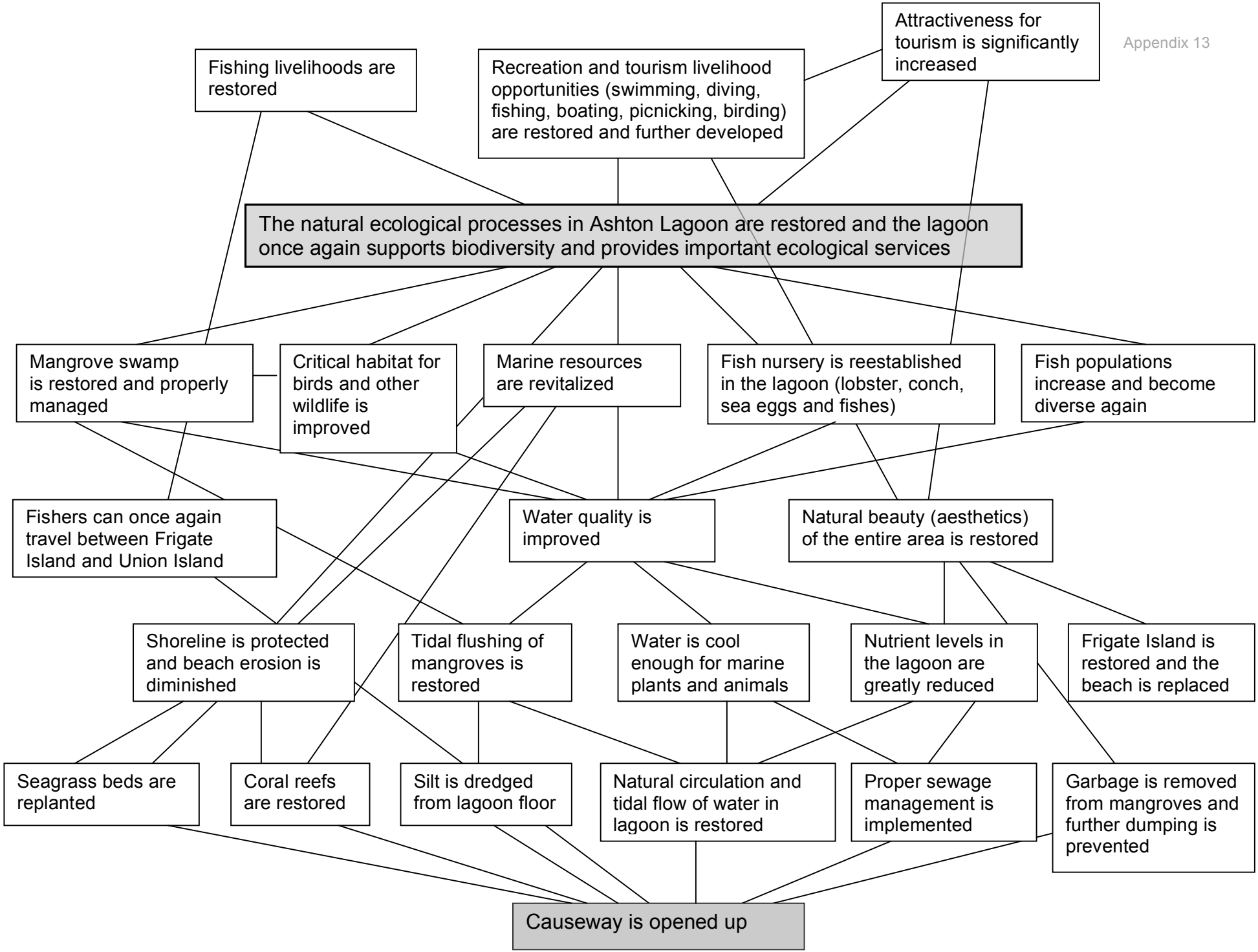
Appendix 10: Environmental Problem Tree for Ashton Lagoon, Union Island, St. Vincent and the Grenadines



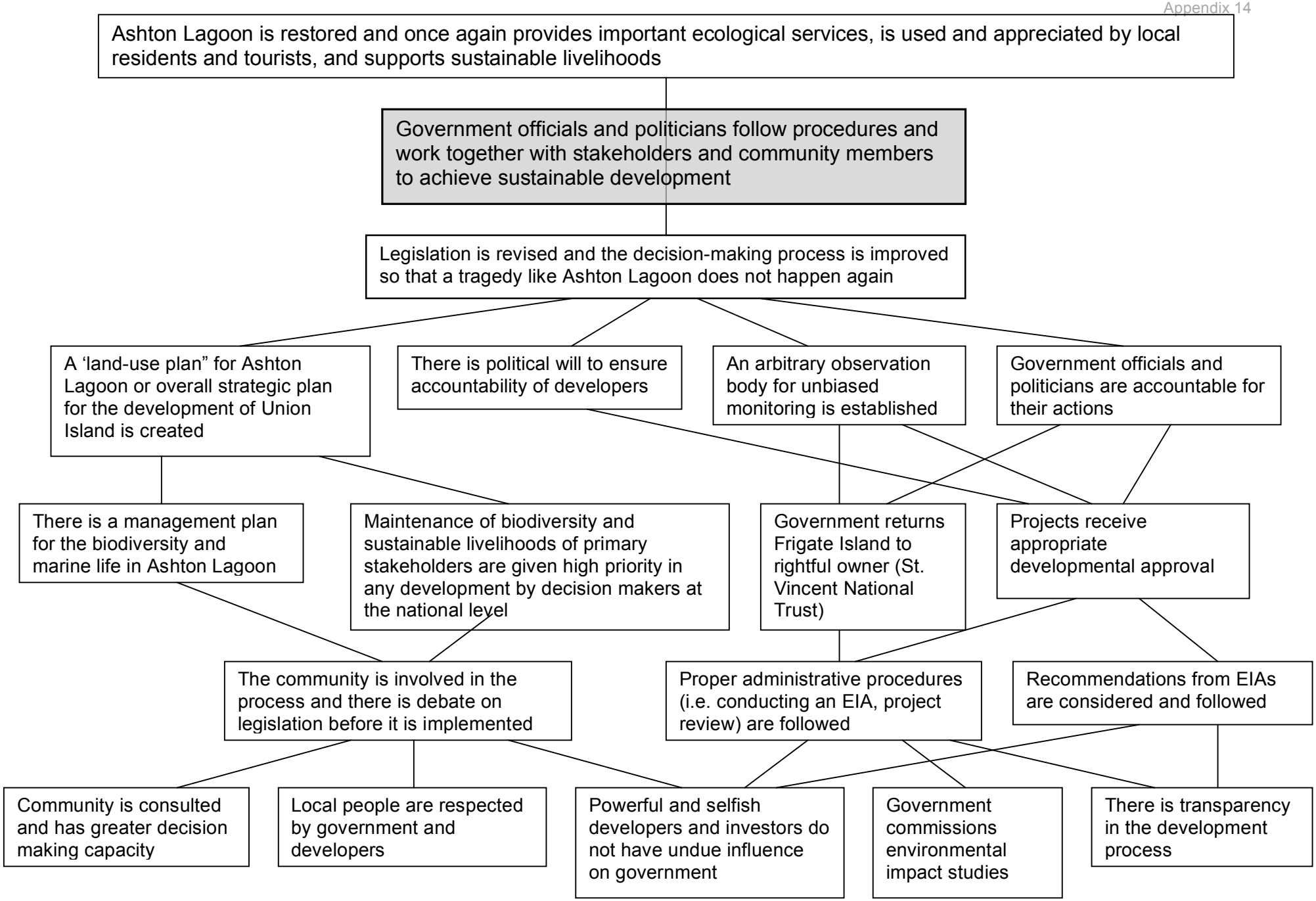
Appendix 11: Governance Problem Tree for Ashton Lagoon, Union Island, St. Vincent and the Grenadines



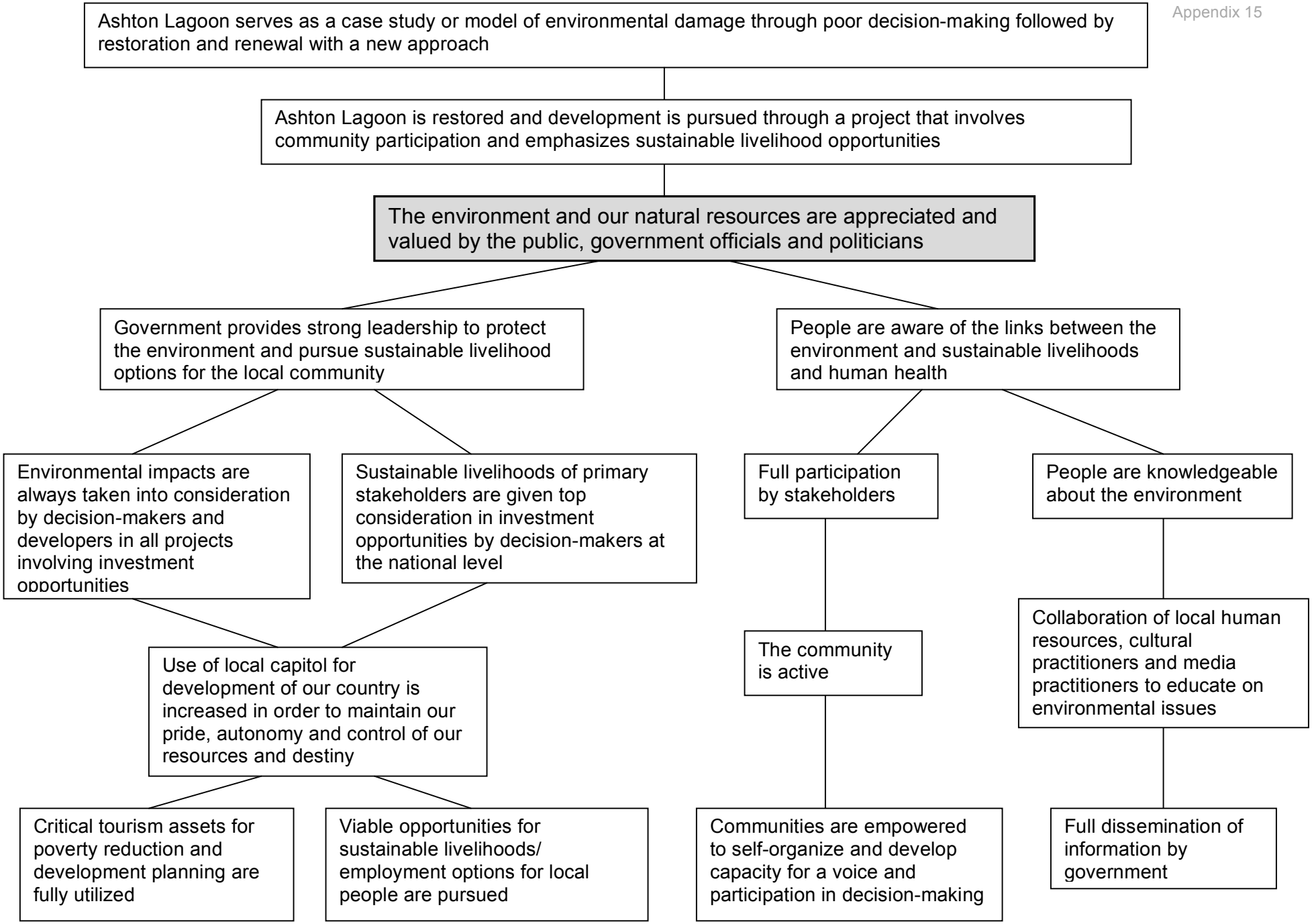
Appendix 12: Public Awareness Problem Tree for Ashton Lagoon, Union Island, St. Vincent and the Grenadines



Appendix 13: Environmental Objective Tree for Ashton Lagoon, Union Island, St. Vincent and the Grenadines



Appendix 14: Governance Objective Tree for Ashton Lagoon, Union Island, St. Vincent and the Grenadines



Appendix 15: Public Awareness Objective Tree for Ashton Lagoon, Union Island, St. Vincent and the Grenadines

Appendix 16. Logical Framework Matrix[20]

Objectives and Activities	Indicators	Means of Verification	Assumptions
OVERALL OBJECTIVE Restore the Ashton Lagoon environment in order to improve local livelihoods and quality of life	• Lagoon water is clear • Seagrass beds are growing • Coral reefs are growing • Lobster, conch and fish populations have increased • Mangroves are healthy • Bird populations are increasing • Members of the local community participate in the decision-making process • Sustainable livelihood and nature tourism jobs have increased	• Results of water quality testing • Monitoring of seagrass beds • Monitoring of coral reefs • Surveys of marine life • Mechanisms for co-management • Monitoring reports • Bird monitoring reports • Strategic plan for sustainable development of Ashton Lagoon in operation • Number of jobs created	• Government is supportive of the project and approves restoration efforts • Ashton community and local groups are supportive and involved in the project • Restoration efforts are successful
Immediate Objectives/Results 1. The natural ecological processes in Ashton Lagoon are restored and the lagoon once again supports biodiversity and provides important ecological services 2. Awareness and appreciation of the links between the environment and sustainable livelihoods and the importance of using our natural resources wisely is increased among the general public, stakeholders, government officials and politicians 3. Sustainable local tourism and livelihood employment opportunities are developed for local people 4. Legislation is revised and local decision-making capacity is improved			

[20] The Logical Framework Matrix should be reviewed by stakeholders, scientists, and project partners. The Objectives/Results, Activities, Indicators, etc. can be revised and added to as needed.Sub-activities can be added to proposals.

Activities/Outputs	Indicators	Means of Verification	Assumptions
Immediate Objective/Result 1 The natural ecological processes in Ashton Lagoon are restored and the lagoon once again supports biodiversity and provides important ecological services	• Lagoon water is clear (no longer polluted and stagnant) • Seagrass beds and coral reefs are growing • Fish nursery is reestablished; lobster, conch and fish populations have increased • Mangroves are healthy • Bird populations are increasing • Mangroves, salt pond, and lagoon protect coastline and reduce shoreline erosion	• Results of water quality testing • Monitoring reports	• Government is supportive of the project and approves restoration efforts • Ashton community and local groups are supportive and involved in the project • Restoration efforts are successful
1.1 Open up causeway in strategic locations	• Natural circulation and tidal flow of water is restored • Turbidity and nutrient levels are decreased • Water temperature is cooler • Oxygen level is increased • Algal growth is reduced • Populations of fish and other marine life increase	• Results of water flow and water quality testing • Marine life monitoring reports • Reports from fishers	• Engineering assessment is accurate
1.2 Replant seagrass beds	• Seagrass beds are flourishing and support marine life	• Monitoring reports	•
1.3 Restore coral reefs using Biorock® technology	• X number of coral reef patches established • Coral reefs are growing and serve as habitat for fish, lambi, sea eggs, and other marine life	• Monitoring reports	• The reefs and power source can be maintained over the long-term
1.4 Restore hydrology and regular tidal flushing of mangroves; rehabilitate mangroves	• Culverts installed underneath access road • Barriers blocking water flow are removed • Growth and productivity of mangroves is increased	• Mangrove and fish survey reports	•
1.5 Manage/enhance new islets, mangroves, Frigate Island, and salt pond for bird populations	• Restoration planting of mangroves and other vegetation beneficial to nesting and feeding birds along marina structure that will remain • Remove predators • Ensure nesting birds are free from disturbance • Diversity and number of birds using the area is increased • Construction debris removed from Frigate Island and vegetation planted, beach is restored	• Bird monitoring reports	•
1.6 Reintroduce lobster, lambi (conch), and other marine life	• Increase in lobster, lambi, sea eggs, etc. populations	• Monitoring reports • Reports from fishers • Increase in fishing revenues	•

Activities/Outputs	Indicators	Means of Verification	Assumptions
Immediate Objective/Result 2 Awareness and appreciation of the links between the environment and sustainable livelihoods and the importance of using our natural resources wisely is increased among the general public, stakeholders, government officials and politicians	• Environmental awareness and education materials distributed to the public and government • General public understands environmental issues and the importance of environmental stewardship, advocates for sound policies and holds elected officials accountable for their actions • Stakeholders participate in development planning and sustainable livelihood employment options • Government and politicians provide strong leadership to safeguard the environment and pursue sustainable development and livelihood options	• Newspaper, magazine articles, posters, brochures and other materials published and distributed • Teachers, natural resource agency staff, and community leaders and trained • Stakeholders and decision-makers are working together to	• Awareness is increased amongst the most influential and important people • Increased awareness has a tangible impact on conservation of natural resources and development planning
2.1 Educational materials on the functions and values of biodiversity, ecosystems and links between natural resources and sustainable livelihoods and human health produced and distributed	• *Paradise Lost* educational brochure/fact sheet produced • Article about Ashton Lagoon restoration published in *Caribbean Compass* • XX media packs developed and distributed • 10+ individuals trained in media relations and public awareness • Posters, books, fact sheets, and identification guides on wetlands, mangroves, birds, marine life, coral reefs developed and/or distributed • Radio/print media PSAs for environment with cost sponsored by businesses • Establish partnerships with local businesses to help cover costs and encourage leadership • Ashton Lagoon Restoration Project website established; with updates, materials and information • Provide environmental education materials to schools	• Published articles and educational materials and distribution list • Website available online • Published media pack and distribution list • PSAs played on air and in the news • Partnerships established with 10 businesses	• Awareness and appreciation can be raised through materials and increased communication
2.2 Training workshops conducted for teachers, natural resource agency staff, decision-makers, developers and community leaders	• Workshops held on the importance of wetlands and marine ecosystems, bird identification, and monitoring of biodiversity (marine plants and animals, mangroves, birds, etc.) • Use “training the trainer” model to increase the number of people educated • Use local knowledge/human resources (e.g., fishers) to assist with training wherever possible	• Training workshop reports and participant lists • Numbers of youth and community members educated by newly-trained local people	• Training workshops are effective in increasing knowledge and raising awareness and appreciation
2.3 Involve the local community and community based organizations in all Ashton Lagoon restoration efforts	• Train local counterparts in restoration and monitoring techniques and project management • Establish a corps of volunteers/youth groups/students to assist with monitoring	• Numbers of people trained • Numbers of volunteers recruited and involved in restoration and monitoring efforts	• Local communities are interested in participating in the project
2.4 Carry out awareness-raising activities	• Celebrate World Wetlands Day, International Coastal Clean-up Day, Caribbean Endemic Bird Festival, etc. • Organize special activities for each event (e.g., clean-ups, bird/nature walks, art, poster, song, poetry, essay competitions, handicrafts, talks, displays, tree plantings, etc.)	• Festival reports and activities	• Local communities are receptive to awareness raising

Activities/Outputs	Indicators	Means of Verification	Assumptions
Immediate Objective/Result 3 Sustainable local tourism and livelihood employment opportunities are developed for local people	• Sustainable livelihood and nature tourism jobs have increased • Ashton Watchable Wildife Pond developed	• Conceptual plans and marketing plans developed • Number of people working in sustainable tourism is increased • Infrastructure in place and people visiting the site(s) and using the recreational opportunities • Guides, small business owners trained	• Local community is interested in developing sustainable local tourism
3.1 Community vision is established and overall strategic plan—following principles of local sustainable tourism—is developed by stakeholders[21]	• Planning workshop held to decide on community vision and how tourism contributes to the vision, inventory outstanding features and stories, define visitor experiences and messages, products, marketing strategy, quality of life indicators, etc.	• Strategic plan produced and distributed	• There is leadership and enthusiasm to follow through with the plan
3.2 Recreation and eco-tourism employment opportunities are developed	• Conceptual plan for Union Island developed (with input from stakeholders) that includes recreational activities (boating, fishing, picnicking, snorkeling, kayaking, wind/kite surfing, hiking, bicycling, birding, etc.), touring of historic sites (boat building, Lenkin Pond, etc.), community cultural events (e.g., maroons, Easterval) and traditional life, and opportunities for small businesses—guide services, water taxis, "green lodging, restaurants/snack bars offering local specialties, gifts shops with local and unique products (e.g., sea moss, hot sauce) and handicrafts, etc. • Plans emphasize natural history, culture and the environment, rely on local cultural practioners • Marketing plan and tourism website developed • Training for guides and small business owners	• Conceptual plan produced and distributed • Numbers of jobs and businesses created • Local products developed • Website online • Guides and small business owners trained • Trail/site visit/small business reports	• Livelihoods are sustainable in the short and long-term
3.3 Ashton Watchable Wildlife Pond[22] and Birding/Nature Trail developed – to interpret Ashton Lagoon restoration and renewal story and lagoon ecosystem; including archaeology and history of area	• Conceptual plan for Ashton Lagoon developed (with input from stakeholders) using a renewal theme • Site Support Group established to carry out the plan • Trails built, observation decks/towers installed • Interpretive signs created and installed • Education materials available on-site and in the community • Bird/nature tour guides trained in the ecology and history of the site and Union Island	• Conceptual plan produced and distributed • Trails built and signs and infrastructure installed • Educational materials published • Guides trained • Site visit reports	• Watchable Wildlife Pond is an effective vehicle to raise awareness and support livelihoods
3.4 Fishing livelihoods are restored and new marine livelihoods are developed	• Fishers participate in restoration projects to enhance lobster, lambi and fish populations (e.g., growing reefs, seagrass) • Growing seamoss and other mariculture promoted	• Numbers of fishers and fish caught and sold • Seamoss/products sold and exported	• Fishers are interested in participating in projects

[21] See notes from Jon Kohl's presentation and summary paper; many other resources are available.

[22] *Watchable Wildlife Ponds* are wetlands equipped with interpretive sign and viewing areas where local people, school groups and tourists can observe wildlife and enjoy and learn about nature. They are developed by the West Indian Whistling-Duck and Wetlands Conservation Project of the Society for the Conservation and Study of Caribbean Birds.

Activities/Outputs	Indicators	Means of Verification	Assumptions
Immediate Objective/Result 4 Legislation is revised and local decision-making capacity is improved	• Public and stakeholders are informed and participate in the decision-making process • Government officials and politicians follow procedures and work together with stakeholders and community members to achieve sustainable development	• Community group(s) established • Stakeholders and groups attend public meetings and provide input	• Local people are interested in having a voice • Government is willing to listen to the concerns of its people
4.1 Community group established to oversee/co-manage the natural, social and economic affairs of the Ashton community for the sustainable livelihoods of the Ashton community	• Group is established, composed of diverse members of the community (e.g., fishers, private sector, environmentalists, etc.) and members of CBOs • Group provides information to the community and ensures community participation in the decision-making process • Decision-making capacity developed through education and training • Group acts as watchdog for Ashton Lagoon development • Group provides Information to the media	• Newspaper articles published • Town hall meetings held • Information flyers/brochures distributed	• Local citizens participate
4.2 Policy statement/framework for development is issued by Ashton community group as product of this workshop: *Lessons learned from Ashton Lagoon – Guidelines for development in St. Vincent and the Grenadines*	• Government formally adopts policy framework, follows procedures and works together with stakeholders and community members to achieve sustainable development • Review and watchdog enforcement of current and future legislation specific to the area	• Sound environmental policies and procedures (e.g., conducting an EIA) are followed in future developments • Local communities and stakeholders are consulted	• Government will adopt policy framework and listen to/work with the community