JAMAICA

STATE OF THE ENVIRONMENT

THE 1997 REPORT

Natural Resources Conservation Authority

Acknowledgments

Natural Resources Conservation Authority staff from:

- Administration & Finance
- Policy, Corporate Planning & Projects
- Enforcement & Compliance
- Legal Services
- Coastal Zone Management
- Watershed Protection & Management
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STATE OF THE ENVIRONMENT

THE 1997 REPORT

Natural Resources Conservation Authority
Ministry of Environment & Housing

53 ½ Molynes Road Kingston 10, Jamaica W.I.

May 1998

Preface
by the Minister of Environment & Housing

Agenda 21, the blueprint document for sustainable development, mentions the importance of ensuring that decisions are based on sound information. One of the programmes outlined concerns "the development of indicators of sustainable development to provide solid bases for decision-making at all levels and to contribute to a self-regulating sustainability of integrated environment and development systems".

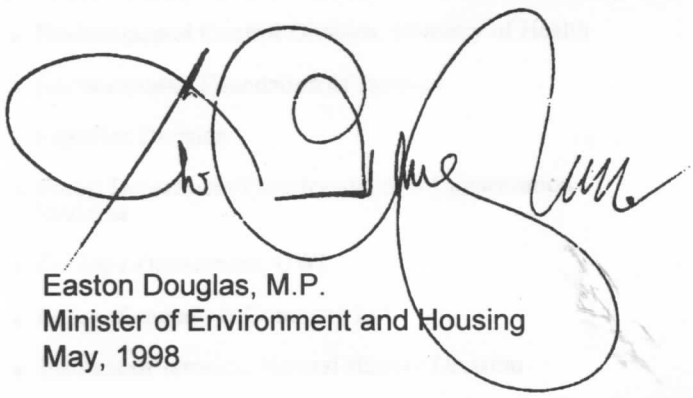
The first State of Environment Report was produced by the Natural Resources Conservation Authority in 1995/1996.

The State of Environment Report provides important information to be used by decision-makers in Planning for good environmentally sound management. Once base-line data have been established, it will be possible to see how effective our actions have been. Making this information accessible to the public reflects the Government's commitment to transparency and its resolve to work together with all members of the Jamaican society to ensure the best possible use of the nation's resources.

For us to develop an accurate, timely and useful State of the Environment Report, the commitment of the various agencies to providing information and data is vital.

The 1997 State of the Environment Report includes much more data then the first, and I must thank all those who contributed to the preparation of the document. There is still much more that needs to be done and the future SOE Reports will reflect the use of modern information and technology and Geographical Information Systems. Such systems are being put in place in the Natural Resources Conservation Authority, the Survey Department and in several other Government agencies dealing with natural resources and land-related issues.

Some of the information in the Report is sobering. The Jamaica National Environmental Action Plan will reflect the actions to be taken to deal with the issues arising from the State of the Environment Report.



Easton Douglas, M.P.
Minister of Environment and Housing
May, 1998

Introduction

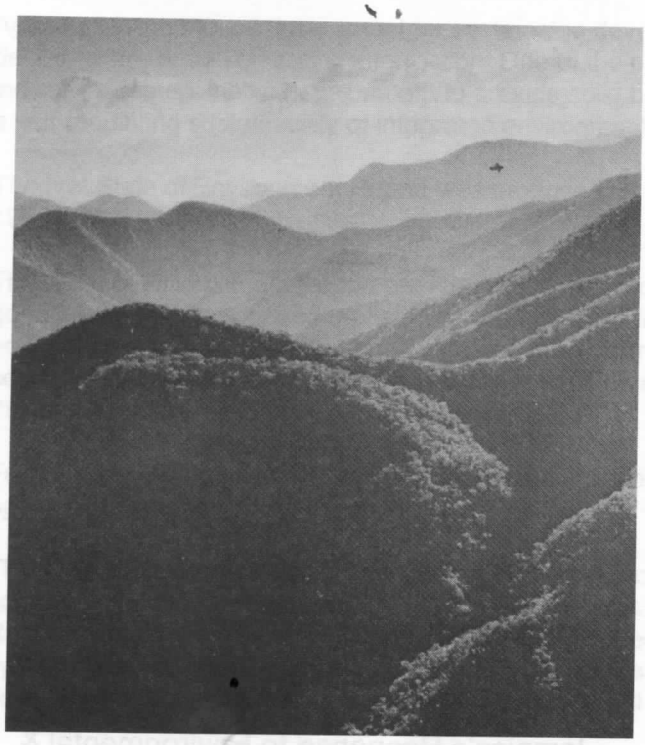
The objective of the State of the Environment (SOE) Report is to provide readily available information on an annual basis about Jamaica's environment and natural resource use. Together with the Jamaica National Environmental Action Plan (JANEAP), the SOE provides a basis for the public participation in development planning and environmental protection. JANEAP present the nation's environmental agenda and identifies activities that will lead the country on a path of sustainable development; The State of the Environment Report records changes and identifies trend of indicators measuring the impact of all human activities and natural events on our natural resources.

This 1997 Report is the Second State of the Environment Report prepared by the Natural Resources Conservation Authority. It represents the most up to date available at end of 1997. Although the report is meant to be a snapshot of the state of the environment at the end of the calendar year 1997, it also gives historical data to highlight the overall trends. The report covers the present state of the economy relative to the country's natural resources. It summarizes institutional roles and programmes and indicates the priorities and strategies of the principal environmental management institutions. In this report we tried to include as much quantitative data as possible and tried to put the information in its geographic context. It has to be emphasized that this could not done without the help of all the other regulatory and resource management agencies or the assistance of several academic and non-governmental organizations.

Contents

Part 1

Jamaica's Response to Environmental and Development Issues



Establishment of an Environmental Management Framework

Before independence the responsibility for protecting and managing Jamaica's natural resources was vested in various government agencies, statutory organizations and ministries. The passing of the Harbours Act in 1874, prohibiting pollution of selected marine waters, demonstrated an early concern for the environment. From then up to the 1960's a variety of laws related to natural resources were passed, including the Forest Act (1937), Mining Act (1944), Wildlife Protection Act (1945), and the Beach Control Act (1956). These were chiefly geared towards regulating the exploitation of natural resources. Specialized institutions were established to administer these laws.

By the early 1960's there was growing concern at environmental degradation. Passage of the Town and Country Planning Act (I958), Clean Air Act (1961), and Watershed Protection Act (1963) symbolized government's response to the need to shift from exploitation to stronger development controls and proactive management of natural resources. New committees, authorities, and commissions emerged, which, along with those that already existed, shared responsibilities for the variety of environmental laws in effect. This institutional network suffered from shortages of technical staff, overlapping responsibilities, and lack of coordination. The result was a fragmented and often ineffective approach to environmental management.

The 1970's brought needed change. The Ministry of Mining and Natural Resources was created in 1972. Its responsibilities included many environmental laws and regulations and oversight of the various authorities and commissions mandated to administer them (the Beach Control Authority, the Watershed Protection Commission, and National Parks and Wildlife Committee, etc.). This marked the beginning of a more coordinated approach to environmental management.

The momentum generated by the Stockholm Conference on the Environment in 1972 culminated in 1975 in the formation of the Natural Resources Conservation Department (NRCD) within the Ministry of Mining and Natural Resources. The NRCD become the umbrella environmental management agency with a broad mandate to protect environmental quality. At the same time the Environmental Control Division (ECD) was formed within the Ministry of Health and Environmental Control to focus on pollution control and occupational health. Both the NRCD and ECD were included on the Town and Country Planning Authority in an effort to include environmental considerations in the development control process.

The 1988 Country Environmental Profile (CEP) made the case for a more comprehensive framework for environmental management, as well as a stronger NRCD. The NRCA Act established the Natural Resources Conservation Authority in June of 1991. Its function is to effectively manage the physical environment of Jamaica so as to ensure the conservation, protection, and proper use of its natural resources.

Sustainable Development

The 1990's saw Jamaica joining the rest of the world in embracing the concept of, sustainable development. That is meeting human needs and providing for social development and economic growth while not compromising the earth's ability to continue to meet the needs of future generations. Jamaica's aspirations towards environmentally sustainable development are demonstrated in the passing of the NRCA Act and the policy, institutional arrangements, programmes, and projects which followed.

The 1992 United Nations Conference on the Environment and Development (UNCED) in Brazil, like the Stockholm Conference twenty years earlier, was a milestone. Out of it came Agenda 21, a comprehensive blueprint for the global and local actions required for the transition to sustainable development. Agenda 21 helped set the framework for the Jamaica National Environmental Action Plan (JANEAP) of 1995. JANEAP and the complementary annual SOE Report measures progress, set priorities and identifies actions to guide, national policies, programme planning, investment decisions and budget preparation.

There are many constraints on the path to sustainable development. These include inadequate legislation, uncoordinated planning, inadequate levels of public awareness, illiteracy, and poverty. The erosion of traditional values and attitudes that uphold nature and the introduction of new high consumption lifestyles also are major obstacles.

Five Years After the "Earth Summit"

Jamaica has made steady progress in the five years since the Rio conference. The NRCA, after six years of existence, has emerged as a credible and effective national lead agency on the environment. This is evidenced by:

- The establishment of the public's "right to know" through full disclosure of Environmental Impact Assessments facilitating civil society's capacity for addressing environmental issues.
- Published policies, standards, and guidelines, including standards for sewage and trade effluent, vehicle and stacks emissions, and beach access and use policy.
- An emerging National Protected Areas System, with a Policy Framework completed, two National Parks established and 7 other protected areas under study. The system, based on stakeholder participation and co-management, is expected to ensure that 25% of the national land area is protected by the end of the century.
- An environmental Permitting and Licensing System to monitor and minimize the negative impacts of development on the environment through an effective process based on Environmental Audits and Impact Assessments.
- The participation in several international and regional treaties and conventions such as Convention on International Trade in Endangered Species of Wild Flora & Fauna (CITES), the Montreal Protocol on Substances that Deplete the Ozone Layer, Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region etc.
- An increasingly proactive and team-based approach that brings together a variety of technical skills and partners to bear on policy formation and geographically focused conservation and development planning.
- Growth in NRCA staff capacity and effectiveness, with functioning units dealing with Coastal Zone Management, Watersheds, Wildlife and Biodiversity Conservation, Protected Areas, Pollution Control and Waste Management, and Enforcement. They are supported by Legal Services, Public Education, a Documentation Centre, Laboratory Services, and a Data Management System enhanced with Geographic Information System capabilities

As Agenda 21 clearly states, the path to sustainability requires partnerships and the sharing of responsibilities. Support for the national environmental management and sustainable development objectives has come from agencies and institutions throughout the public sector and civil society. Examples include:

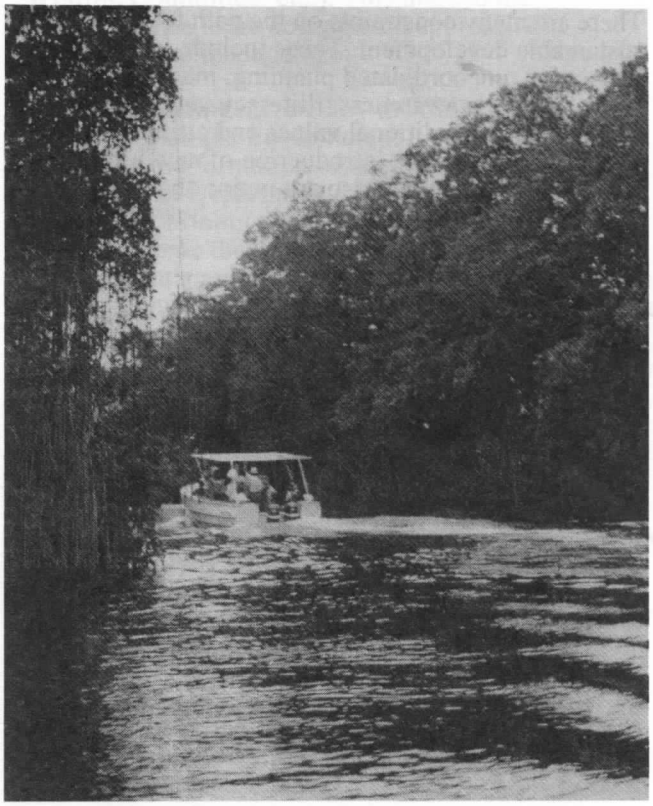
- Preparation of the first Jamaica National Environmental Action Plan (JANEAP) in 1995, which involved broad participation by public and private sectors as well as civil society groups
- New legislation and policies related to water resources, pesticide regulation, forestry, fisheries, energy, watershed management, industrial development, and landuse.
- Accession to international environmental conventions including those on climate change and biodiversity, wetland protection, trade in endangered species, ozone depletion, and membership on related bodies.
- Active implementation of programmes to phase out environmentally damaging substances such as lead in gasoline (by 2001), ozone depleting substances (by 2005) and certain pesticides. These phase-outs have been marked by strategic partnerships involving the NRCA, other regulatory agencies, and the private sector.

A strengthened civil society, the growing environmental NGO movement, and the activities of the business community complement and support the work of government. This is evident through:

- The emergence of the Environmental Foundation of Jamaica as a key player in financing local environmental programmes and projects, distributing $J36.9million for 81 projects in 1997.
- The formation of at least 8 new environmental NGOs since Rio, and the continued activities of the environmental umbrella organization NEST and the more than 40 non-government organizations with the environment as a central part of their mission.
- Recent NRCA-NGO co-management delegations of the Montego Bay Marine Park, and the Blue John Crow Mountains National Park, and active involvement of NGOs in areas under study for addition to the system (Negril, Portland Bight, St.Ann Coast and Port Antonio).
- Growing corporate sector participation, with nearly 180 companies voluntarily submitting quarterly reports on the environmental impacts of their operations.

Finally, individuals across the country have joined in the effort. Teachers are guiding students in understanding the importance of local wetlands. Children are cleaning up beaches and becoming junior rangers. New parents are reviving deep traditions by planting a tree with the birth of a child. Farmers are minimizing their use of chemicals. More citizens are becoming volunteer NRCA Game Wardens. More land developers are avoiding cutting down trees to minimize erosion. More consumers are avoiding products with excessive packaging. The list goes on, as Jamaicans realize that individually and collectively they need to take action and make environmentally sound choices. This is the path to environmentally sustainable development.

This annual **State of the Environment Report** is another example of steps being taken to increase public awareness and make relevant information available to all Jamaicans so they can participate in the process of protection and sustainable development of their environment.



Black River Lower Morass

Part 2
Status of Our Natural Resources

Natural resources have always played an important role in economic development. Though attention has been paid to the role of non-renewable resources (minerals and fossil fuels), Jamaicans are now recognizing the wider contribution of the natural environment. This includes the role of non-renewable resources, such as minerals; the use of renewable resources, including forests, soils, rivers and the sea; and the use of lands and waters for waste treatment and disposal. Also included are the essential life support functions of ecosystems, a wide range of valuable biological resources, and recreational opportunities for both Jamaicans and visitors. Therefore, development planning must involve comprehensive knowledge of our natural resource base, the functioning of the natural systems, and the social, cultural, and economic factors, which influence the use of these resources. The sectors/resource are selected because of their importance to Jamaica's development.

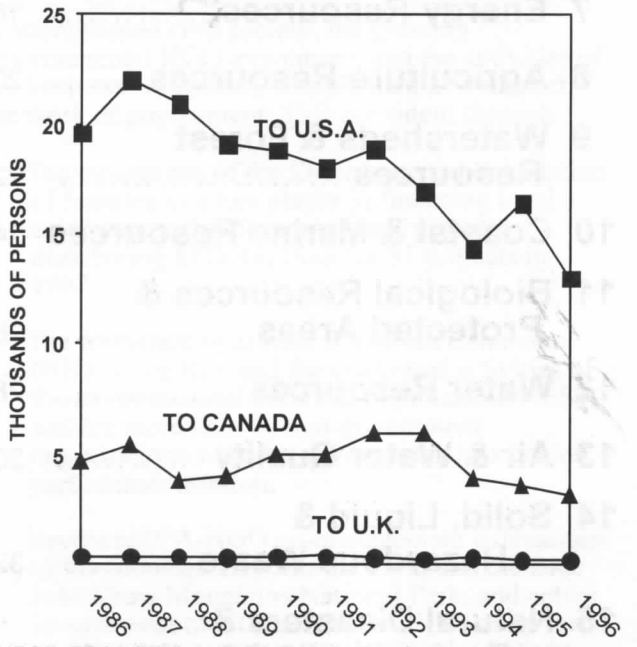
1 Population

There is a clear relationship between population and the environment. As jobs become scarcer, more people turn to the natural resource base for their livelihood. The more people there are, the less land there is to support their needs. This places severe stresses on the country's land, water, and energy resources. As a result, the environment is less able to support life and restore itself.

Issues

- Population growth without providing for housing, water, waste management, roads, schools and other services, often results in environmental degradation.
- A growing population with limited access to land and other resources often leads to squatting and farming on unsuitable areas (gullies, steep slopes, wetlands) and unsustainable use of nearby natural resources (trees, fish, water, etc.)
- Migrations from the country into the city often lead to poverty in the urban areas. This is evident in overcrowded tenements and the mushrooming of squatter settlements. Severe stress is placed on water supply, sewerage systems, and garbage disposal, as well as on such factors as quiet, open space, trees, and natural beauty, which are so important to human health and quality of life.

EMIGRATION TRENDS 1986-96



SOURCE: ECONOMIC AND SOCIAL SURVEY JAMAICA, 1996, PIOJ

Trends and Indicators

1.1 Jamaica's population at the end of 1996 numbered 2,527,600. This represents a 1.0 per cent increase over 1995's end of year figure of 2,503,300. Over one million people (43%) live in the Kingston and St. Andrew (691,600) and St. Catherine (402,500) (STATIN).

1.2 In order to ensure that the population does not exceed the number of persons that can be supported by the nation at satisfactory standards of living, the population should not grow more than 0.8 per cent per annum over the next three decades. On this basis the population should not exceed 2.7 million by the year 2000, or 3.0 million by the year 2020 (PIOJ).

1.3 The average population density of Jamaica is 230 persons per Km^2, approximately the same as in 1995. This density is unevenly distributed.

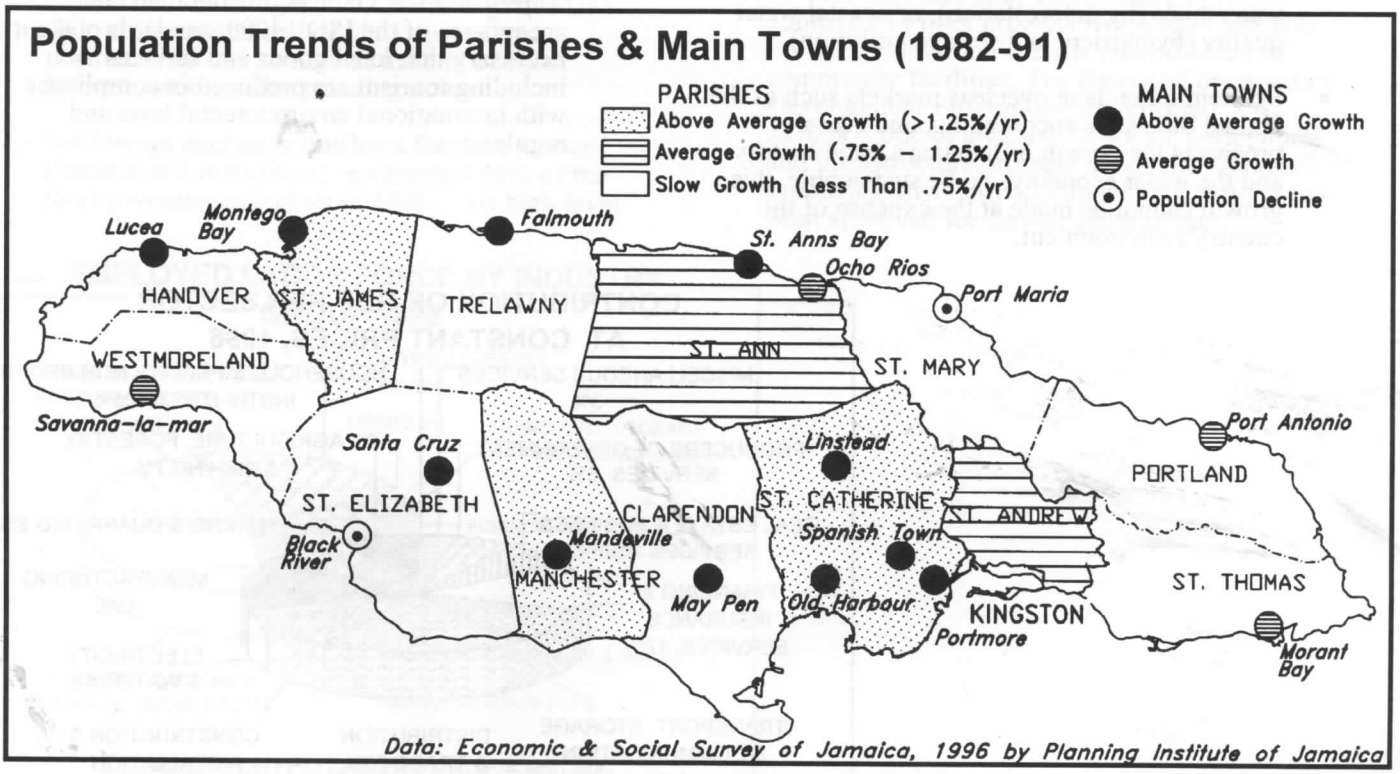
Trelawny has the lowest density, with only 83 persons per square kilometre, whereas Kingston and St. Andrew has 1528 persons per square kilometer.

1.4 The average household size in Jamaica in 1994/95 was 3.8. Since 1990 there has been no marked change in average family size. Approximately 44 percent of households were headed by women.

1.5 The crude birth rate declined to 22.8 per thousand in 1996 (the lowest since 1989). The crude death rate declined from 6.3 per thousand in 1990 to 5.9 per thousand in 1996.

1.6 At the end of 1996, approximately 50 percent of the Jamaican population resided in urban areas. Approximately 65 % of the total population lived within 5 km of the coast.

1.7 Net migration off the island was estimated at 18,100 during 1996. This represents an increase of 2.4% over the 1995 estimate of 17,669. This net external movement of about 18,000 people per year helps keep the population growth rate at 1.1%. At this rate the population is expected to remain below 3 million up to the year 2020.



2 Economy

The transformation of the Jamaican economy from its dependence on sugar and bananas began in the 1950s, with the establishment and growth of the bauxite/alumina sector, manufacturing, and the emergence of tourism. These three sectors still earn the most foreign exchange for the country. Tourism is the principal earner of foreign exchange, with Eco-tourism a growing marketing approach. Clearly Jamaica's economy depends on its environment and natural resources.

Issues

- The National Industrial Policy provides the framework for action in the productive sectors. This policy will be complemented by guidelines for environmental protection in all sectors. The new NRCA Permit and Licensing system is consistent with the "polluter pays" policy, and should bring industrial and commercial activities into compliance with national standards for air and water emissions and make them at the same time more competitive on the international market.

- There is growing global interest in having the National Accounts recast to reflect the contribution of natural resources. Presently there is no way to indicate the economic losses due to resource degradation related to soil (by erosion), watersheds (by deforestation), or coastal water quality (by nutrient and sewage pollution).

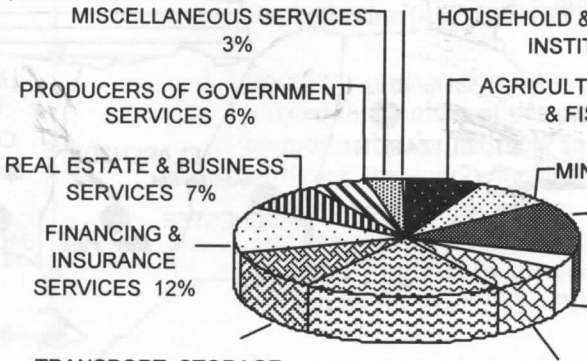
- Economic trends in overseas markets such as the United States are encouraging, and signal prospects for growth in Jamaica's trade sectors and the wider economy. To be sustainable, this growth cannot be made at the expense of the country's environment.

- Despite the fall in the inflation rate, the regulatory authorities failed to keep up with the growth in financial service operations. At the start of the financial year 1996, the government had set aside US $500 million to close or take over three financial groups and to 'bailout' 4 insurance companies. The government estimates the necessity to borrow and additional US $300 million for this venture.

- The country has been borrowing significant sums since 1980, and there has been a steady decline in production since the start of the 1990's. This has led to the erosion of the real income of the population.

- Recent external developments such as the North American Free Trade Agreement, and the acceptance of the ISO 14000 standards make it necessary that local goods and services including tourism are produced in compliance with international environmental laws and regulations.

CONTRIBUTION OF GDP PER SECTOR AT CONSTANT PRICES, 1996



SOURCE: STATIN , 1996 YEARBOOK

Trends and Indicators

2.1 In 1996, the Gross Domestic Product (GDP) for Jamaica, which is the sum of all goods and services produced, was J$202.1 billion compared J$ 162.6 billion in 1995. At constant 1986 prices, the GDP annual growth rate for 1996 was a negative 1.7%, compare with a positive 0.5% growth rate for 1995.

2.2 High interest rates and increasing competition from imports impeded growth. Agriculture has maintained a positive growth rate since 1992. Mining was the fastest growing goods producing sector. The fastest growing sector however was Transport, Storage & Communication.

2.3 Positive economic indicators are the steady decline of the inflation rate and the relative stability of the Jamaican Dollar. The inflation rate fell from 30.1% in 1993 to 9.2% in 1997. The average annual exchange rate for the US$ rising from J$25.68 in 1993 to J$33.35 in 1994, reached J$35.58 in 1997.

2.4 There was a positive improvement in Jamaica's balance of payment position. The Net International Reserves, which was negative US$ 443 million at the end of 1991 moved to a positive US$ 693 million at the end of 1996. Interest rates are also trending down.

2.5 Net foreign exchange outflows for debt service (interest and maturities) represented 46% of the total government budget in 1996. This high level of debt servicing continues to be a major constraint to economic growth.

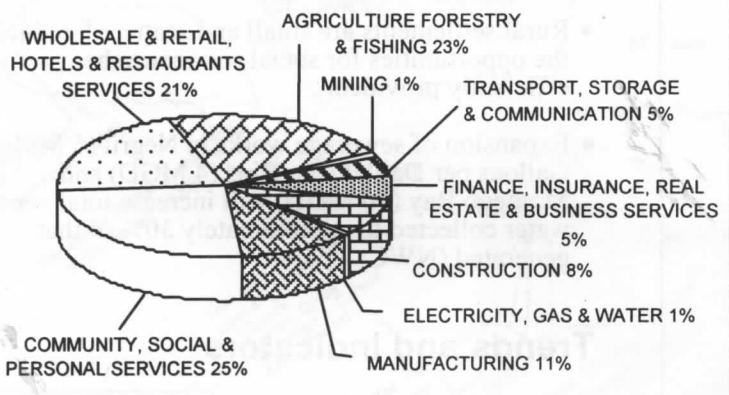
2.6 Total external debt increased from US$1,866.8 million in 1980 to US$3,277.6 million in 1997. The dept peaked in 1990 reaching US$ 4,152.4 but has decreased steadily since to US$3,231.9 in 1996. The debt increase in 1997 is partly caused by bond issues.

2.7 The labour force in 1995-96 was 1,149,400 of this approximately 83% or 967,100 were employed. At October 1996 the unemployment rate was 16.3%, a rise from 15.4% in 1994 (STATIN).

2.8 Approximately 26.1 percent of the population (1996) live below the poverty line of J$2450 per week for a family of 5, down from 30.5% in 1989 (PIOJ). Approximately 7.5% of children under three years of age that attended child health clinics during 1996 were undernourished.

2.9 There has been significant investment in community development by the government in the 1995-96 fiscal year as part of the Poverty Alleviation Programme. The Jamaica Social Investment Fund had, up to April 1997, approved 14 pilot projects worth J$89,508,000 for the construction and the rehabilitation of community facilities. The Bauxite Communities Development Programme has injected J$30,000,000 in a variety of social, agricultural and infrastructure projects in bauxite/alumina producing areas. An additional J$50 million has been approved for similar programmes.

EMPLOYED LABOR FORCE BY INDUSTRY GROUP 1995



TOTAL EMPLOYED LABOR FORCE = 956,400

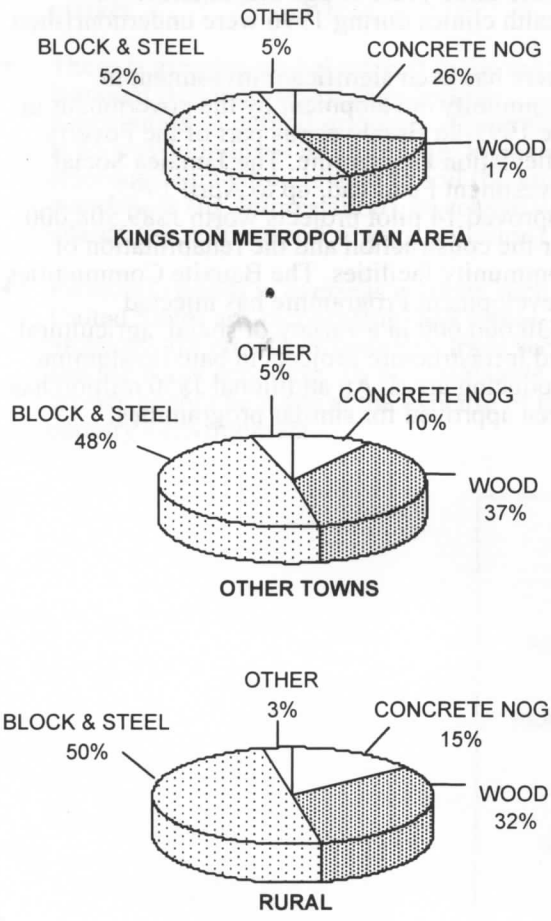
SOURCE: STATIN, 1996 YEARBOOK

3 Shelter

The gap between housing demand and supply is great. According to the 1987 National Shelter Strategy Report, to satisfy housing needs Jamaica needed to build 15,500 new units and upgrade 9,700 units each year until 1990 to eliminate over crowding, and build an average of 4,009 new units and upgrade 2,580 units annually to the year 2006.

A number of actions have been taken to address this problem. The Government has developed a Land Policy, a draft Settlement Policy, and a Programme for Re-settlement and Integrated Development Enterprise (Operation PRIDE).

BUILDING MATERIALS IN OUTER WALL OF HOUSING



SOURCE: SURVEY OF LIVING CONDITIONS, 1995

Issues

- According to the 1996 National Land Policy document, 50 to 75% of all development takes place outside the formal regulatory or economic sector.
- Land and housing have become less affordable for most people because of the high interest rates affecting both construction financing and mortgage rates and because their income has not kept up with the increases in land prices, building materials and the construction costs in general.
- More people are squatting on marginal lands such as wetlands, steep slopes, gully banks and even gullies themselves. All these areas are unsuitable for housing or cultivation.
- Some of the best agricultural lands are also preferred for housing developments because they typically are flat and cheaper to build on. Such lands are especially vulnerable to development when they are near cities and towns.
- The high incidence of rural to urban drift both reflects and results in a lower level of investments, facilities, and amenities in rural areas.
- Rural settlements are small and scattered, reducing the opportunities for social services to be efficiently provided.
- Expansion of sewerage works in Negril (5 Million Gallons per Day), Ocho Rios (4 MGD) and Montego Bay (10 MGD) will increase total waste water collected to approximately 30% of that generated (NWC).

Trends and Indicators

3.1 In 1995, 8,022 public sector housing units were officially completed, an increase of 180% over

1994. The number of housing unit completed by the private sector decreased from 5094 units in 1994 to 1313 units in 1995 (STATIN).

3.2 In 1996, approximately 60.3 percent of households own the dwelling they live in, compared to 60.6 percent in 1991; 27.4 percent rent or lease, while 11.6 per cent occupy units rent free. (PIOJ).

3.3 In 1996, 76 percent of Jamaicans lived in single family detached houses, compared with 85 percent in 1992. The rest lived in parts of houses, semi-detached houses, apartment/townhouses, or commercial buildings.

3.4 Operation PRIDE started in 1995 has spent $300 million (1997), on planning and site improvements for low-income housing. The aim of the programme is to make land more easily accessible and affordable to persons who presently do not own land. Among these persons are squatters. By the end of 1997, 178 sites were distributed and 20 sales agreements were made. Beneficiaries are asked to contribute at least 20 per cent of the value of the lot to qualify.

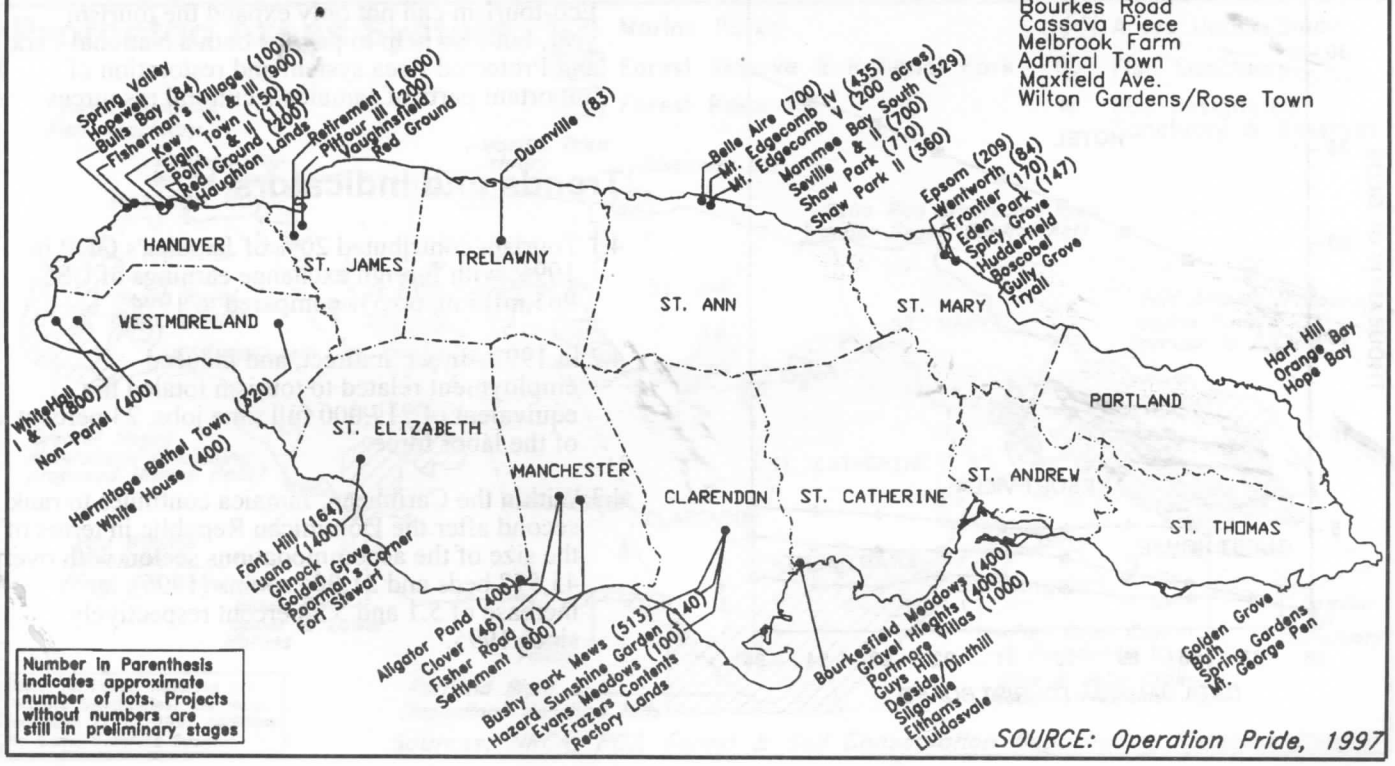
3.5 Permits are now required by the NRCA for housing development projects (subdivision of 10 lots or more, housing projects of 10 house or more).

3.6 There has been little change in the proportion of households having access to toilet facilities since 1990. The percentage sharing toilets in inner city communities is extremely high. In areas such as Denham Town 86.1%, East Down Town 75 %, and Allman Town 72.8 %. Sharing of toilet facilities provides a good indication for poor sanitary conditions and increased health risks.

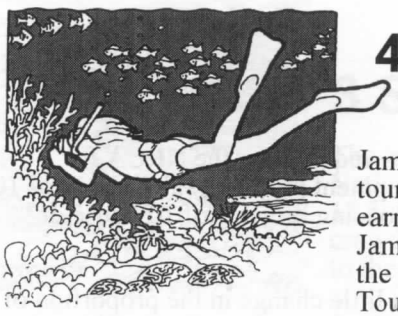
Kingston & St. Andrew

Riverton Meadows (2300)
Callaloo Mews (200)
Mandella Terrace (135)
Monaltrie (32)
Ambrook Lane (70)
Premix Lands
New Haven (150)
Karachi I (270)
Karachi II (110)
Beverly Hills (178)
Havendale (40)
Mona Estate (1000)
Norbrook (88)
Temple Hall (108)
Langston Road/Deanery (36 apts.)
Hope Valley Garden (310)
Bedward Gardens (150)
Bottom River (104)
Harbour Hgts. (Bayshore) (1000)
St. Benedict Hgts. (200)
Rock Spring Rennock Lodge (300)
Rennock Lodge (300)
Hampstead Park (117)
Swallowfield (80)
Oak Glades (184)
Woodford Park (14)
McGregor Gardens (80)
Jacques Road (50)
Gold Smith Villa
Bower Bank
Stadium Gardens
56 Arnold Road
Bourkes Road
Cassava Piece
Melbrook Farm
Admiral Town
Maxfield Ave.
Wilton Gardens/Rose Town

Operation Pride Housing Projects (Mid 1997)



SOURCE: Operation Pride, 1997



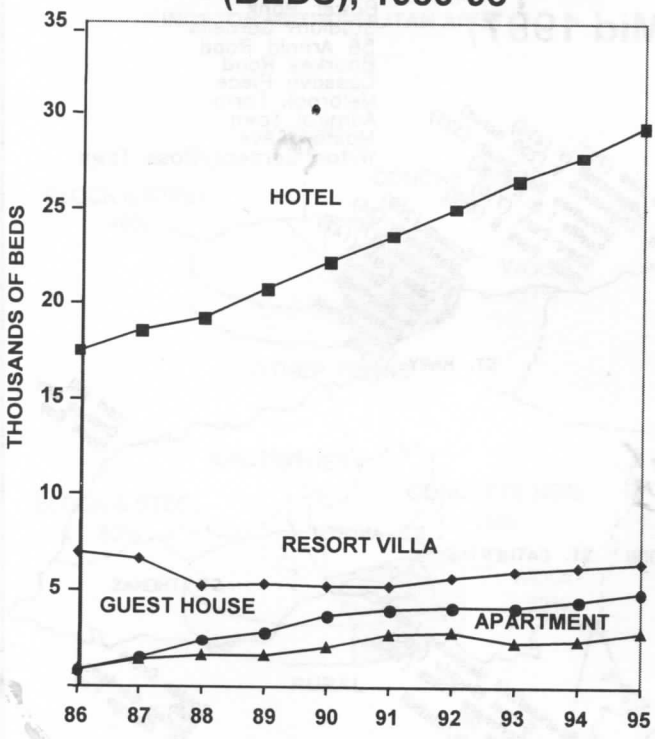
4 Tourism & Recreational Resources

Jamaica's economy has become increasingly dependent on tourism. As an industry, tourism represents great growth potential since it increases foreign exchange earnings and expands employment opportunities. While tourism brings visitors to Jamaica in search of natural beauty and cultural attractions, the dramatic growth of the industry poses special problems to the nation's environment and culture. Tourism underscores the need to harmonize environmental, social and economic planning.

Issues

- Recreational facilities, attractions, accommodations and services are frequently developed for foreign visitors at the expense of access and affordability by local residents. Safe and clean public parks, playfields, beaches, and areas of natural beauty are necessary in every community.
- Many persons migrate to tourist areas in search of jobs. The tourism industry, while providing top quality accommodation for visitors, tends to make little or no provision for its own workers. The result is expanding squatter communities close to major tourist areas.

VISITOR ACCOMODATION (BEDS), 1986-95



DATA: JAMAICA TOURIST BOARD

The tourist industry makes many demands on the environment, such as pressure on beaches, the use of resources for craft items, use of wetlands for facilities and waste disposal, removal of sea grass beds at swimming beaches and blocking of visual and public access to the coast.

- There is the growing danger of Jamaica becoming overly dependent on one sector, which is subject to seasonal fluctuations and uncertainties. The peak season starts in December and ends in March. In recent years the tourism industry has been promoting a year round calendar of activities/events to obtain a more balanced spread of tourist arrivals to the island and to ensure long term sustainability of the industry.
- Current policy directions in the National Industrial Policy address the need to diversify the tourism product to other areas such as nature, cultural, heritage and health tourism. Heritage tourism and Eco-tourism can not only expand the tourism year, but also help to pay for both a National Park and Protected Area system and restoration of important parts of Jamaica's cultural resources

Trends and Indicators

4.1 Tourism contributed 20% of Jamaica's GDP in 1996, with foreign exchange earnings of US$ 965 million, up 5% compared to 1994.

4.2 In 1992, direct, indirect, and induced employment related to tourism totaled the equivalent of 217,000 full time jobs, 23 percent of the labor force.

4.3 Within the Caribbean, Jamaica continues to rank second after the Dominican Republic in terms of the size of the accommodations sector, with over 45,577 beds and 21,984 rooms (1996), an increase of 5.1 and 5.2 percent respectively since 1995.

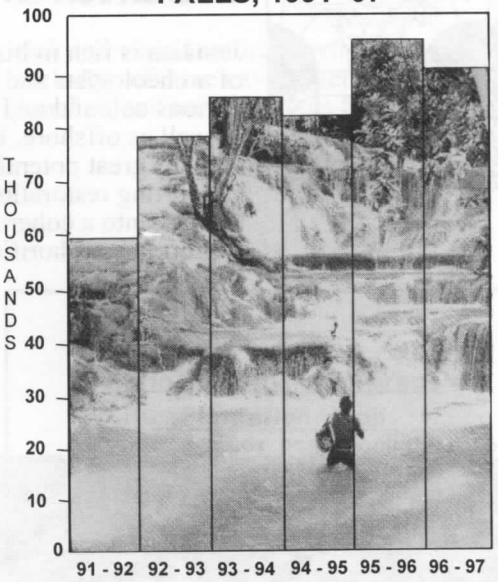
4.4 Presently there are 185 hotels, 293 guesthouses, 985 resort villas and 485 apartments in Jamaica (1996 JTB).

4.5 Recreational facilities include 101 attractions registered with the Tourist Board, 13 of which are government-owned, and 85 public bathing beaches.

4.6 Jamaica has one marine park (Montego Bay established 1992) and one terrestrial park (Blue & John Crow Mountain established 1993). Seven areas are currently under study for possible addition to the National Protected Areas system. Some progress continues to be made on development of parts of a National Heritage Trail system proposed in 1991(see map page 15)

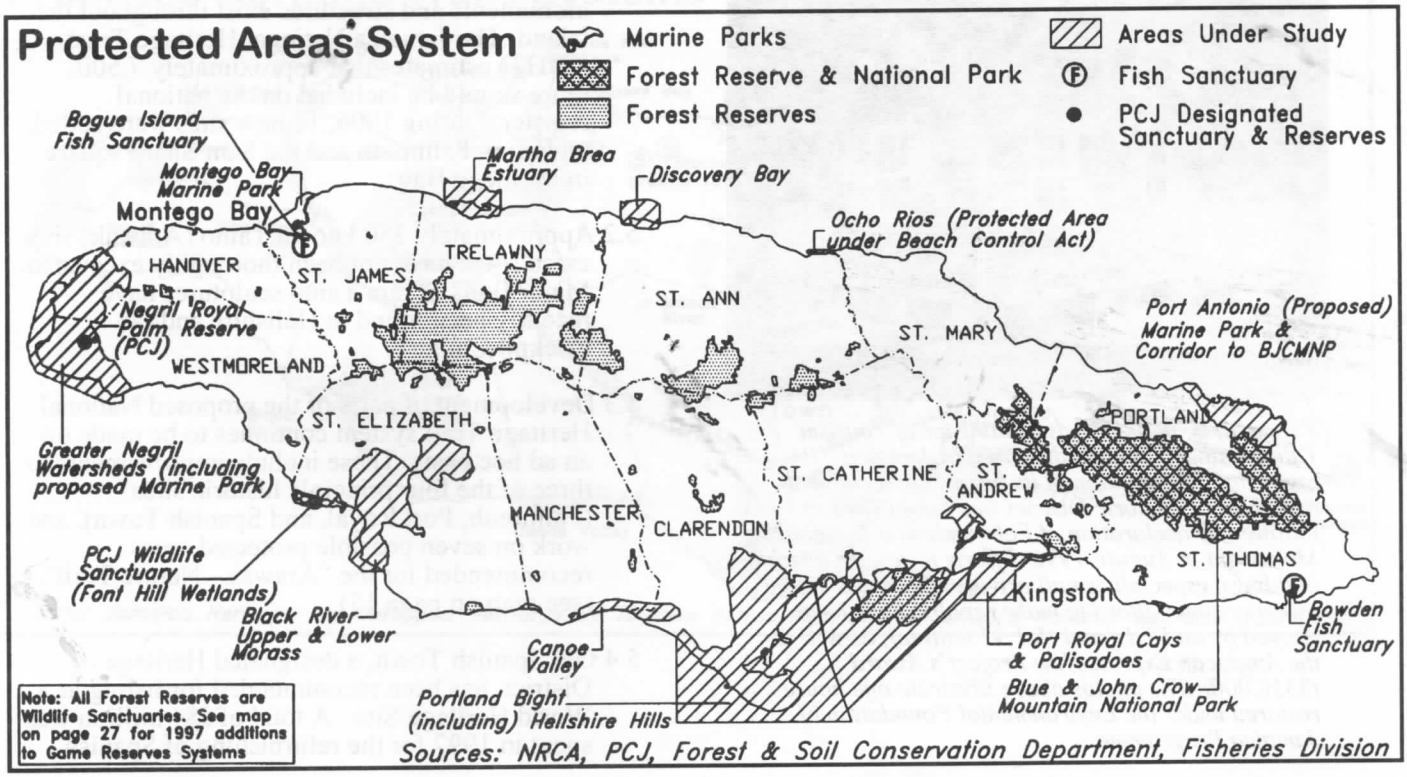
4.7 In 1996 several hotels received environmental Awards. Dragon Bay Hotel received a certificate of appreciation from the environmental NGO PEPA for its contribution to the protection of the reefs in Port Antonio by recycling its treated waste water to irrigate the hotel property. Half Moon Golf, Tennis and Beach Club received the British Airways Holidays Special Hotel Awards for its environmental projects which included public awareness, recycling, waste management, environmental friendly clearing and composting.

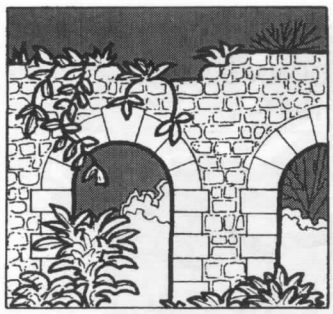
VISITORS TO DUNN'S RIVER FALLS, 1991- 97



DATA: ST. ANN DEVELOPMENT COMPANY 1997

4.7 Eco-tourism is one of the fastest growing sectors of the tourism industry globally. In Jamaica there pockets of activity reflecting this alternative tourism development (e.g. Port Antonio and South Coast). However, its contribution to Jamaica's tourism product is difficult to assess.



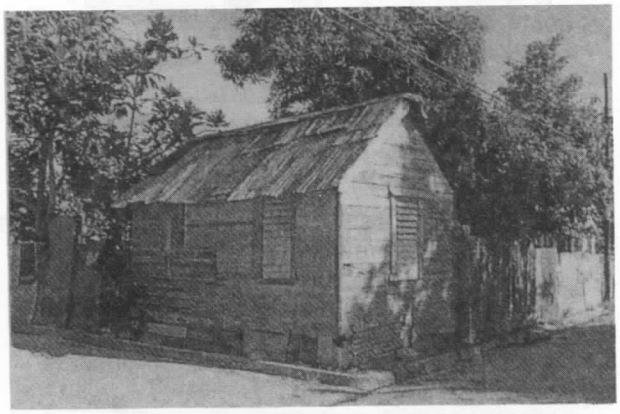


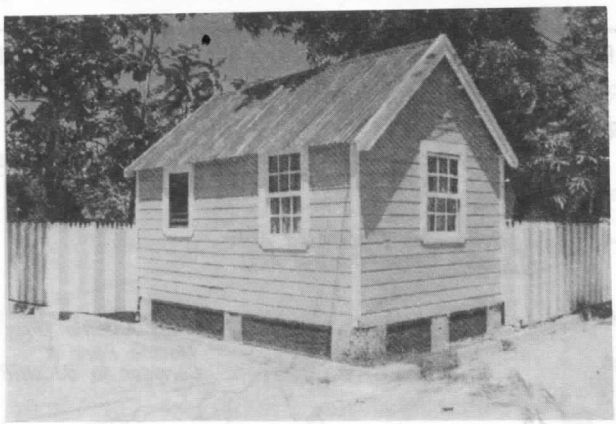
5 Cultural & Historic Resources

Jamaica is rich in historic sites, buildings and monuments, and attracts the attention of archeologists and historians from all over the world. These sites reflect the various colonial and native interactions of our history, and are found in all parishes as well as offshore. Heritage tourism is a relatively new area of interest to Jamaica, and has great potential for diversifying the tourism product, for revenues, and for supporting restoration of historic sites. The integration of cultural and nature tourism into a coherent ecotourism programme requires further attention of the appropriate authorities and the private sector

Issues

- Most buildings declared as national monuments are occupied by private owners, who often find it difficult and costly to maintain them.
- Significant threats to our national cultural heritage and assets include neglect, lack of funds and development prior to full surveys or rescue excavations.
- The high costs of maintaining national heritage sites could be met by earnings from the tourism sector.





Falmouth is, in the words of Minister of Tourism Tulloch, ahead of any other area in Jamaica regarding preservation of its historic and cultural resources. A Historic District was established in 1995, followed by declaration of Falmouth as a National Monument in August, 1996. Efforts to restore historic buildings, especially small private residences where owners cannot afford to make repairs, have been buoyed by an EFJ grant ($ 1.97 million), as well as the American Express New Project's Award ($350,000). The photos above illustrate one house restored under the Environmental Foundation of Jamaica Programme.

Trends and Indicators

5.1 An estimated 300 registered sites, districts, monuments and structures exist throughout the Island. The Jamaica National Heritage Trust (JNHT) estimates that approximately 7,500 more should be included on the national register. During 1996, 11 new sites were added, including Falmouth and the Sam Sharp square in Montego Bay.

5.2 Approximately 350 known Taino (Arawak) sites exist. Most have not been thoroughly excavated. Major finds of rare Taino sculptures have recently been found in Hellshire and the Cockpit Country.

5.3 Development of parts of the proposed National Heritage Trail system continues to be made on an ad hoc basis. These include improvements to three of the four principle historic sites (Falmouth, Port Royal, and Spanish Town), and work on seven possible protected areas recommended for the "Arawak - Nature Trail" (see map on page 15)

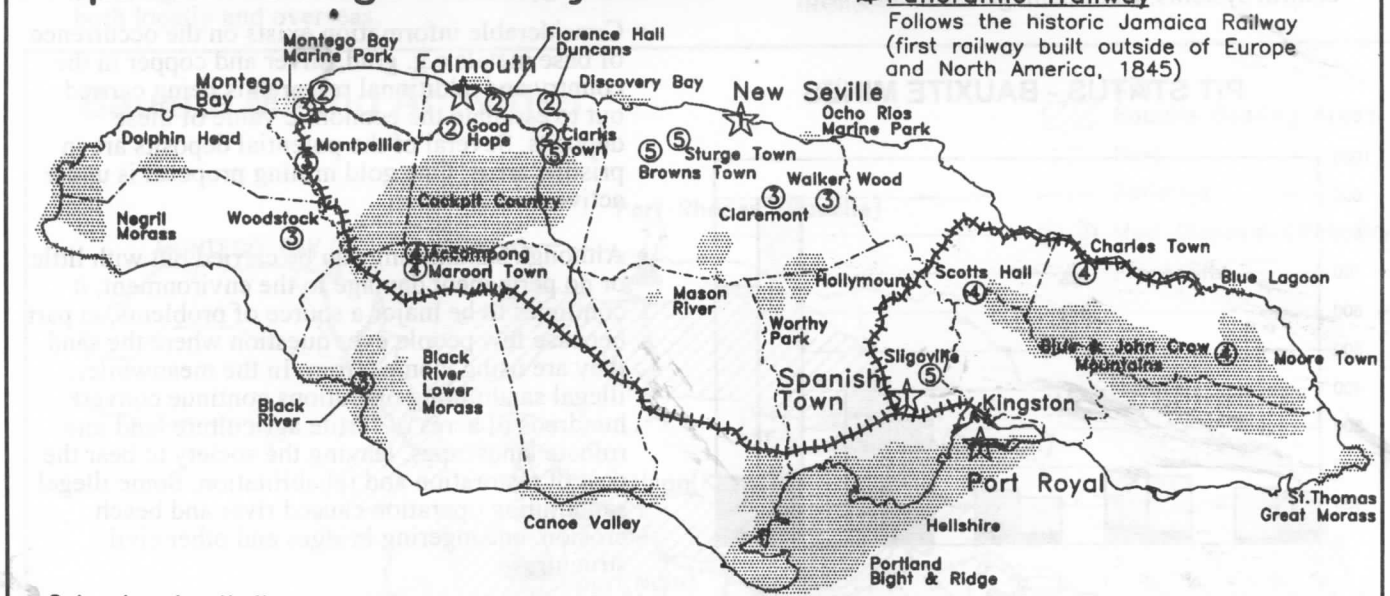
5.4 Old Spanish Town, a designated Heritage District, has been recommended for listing as a World Heritage Site. A total of J$4 million was spent in 1997 for the refurbishing of Spanish

Town square. Renovations were done to the Old Legislative Building (which now houses the St. Catherine Parish Council) and the Rodney Memorial among others. This was completed by Emancipation Day activities on August 1, celebrating the fact that the Proclamation of Emancipation was read in the Spanish Town square on August 1, 1834

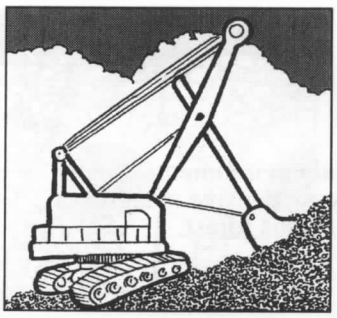
5.5 Falmouth, Trelawny has an extraordinary concentration of Georgian architecture and has been designated the first site on the National Heritage Trail. A "World Slavery Museum" is being proposed for Falmouth.

5.6 Efforts to revive the old glory of Port Royal, the bustling capital of Jamaica during the 17th century continue. Plans call for cruise ship facilities capable of handling 5000 visitors per day, as well as theatres, museums, and living history presentations with people dressed in period costumes. At the same time, the NRCA is working with area residents, stakeholders, and NGOs to establish a Protected Area for the rich and varied natural environment, which includes offshore cays, extensive mangroves, beaches, and unique cactus forest.

Proposed Heritage Trails Systems



Data: Jamaica Heritage: An Untapped Resource by Tourism Action Plan Ltd. & Jamaica National Heritage Trust (1991)



6 Mineral Resources

Jamaica's mineral resources include metallic ores such as bauxite, copper and nickel; industrial minerals such as limestone, gypsum, silica sand, marble, sand and gravel deposits; some precious metals such as gold, silver, and platinum. Traditionally, bauxite/alumina has been Jamaica's most important export mineral, though it has been subject to major cyclical fluctuations. Gold and silver occur in association with copper, but exploitation will depend on the potential deposits and world market prices. Mineral resources have the potential for greater contribution to economic development, but require careful environmental assessments

Issues

- Jamaica has long relied on bauxite as the mainstay of its mineral sector. The National Industrial Policy proposes the development of other minerals for export, providing adequate environmental standards are followed. The environmental cleanups in the USA for example have created a significant demand for limestone which Jamaica has the potential to fulfill.

- While bauxite has contributed significantly to the country's economy, mining and processing of the ore as well as port operations and the actual mining have not been without environmental challenges. These challenges include dust and noise pollution, the relocation of communities, loss of biodiversity and the reduction of forest cover. Red mud production and management has required a significant investement in pollution control systems. Roof damage associated with sulfur-dioxide emissions have let to complex compensation arrangements with several communities in the bauxite areas.

- Four of the five Bauxite processing plants produce alumina, each ton of which gives rise to approximately one ton of caustic red mud residues. Red mud disposal in unlined pits resulted in seepage of the caustic solution into the groundwater. This has not been practiced since 1976. A number of environmentally friendlier dry mud disposal techniques are being used. They produced a waste with a much lower amount of liquid and dispose of this material in sealed beds where the effluent released is treated or recirculated into the processing system.

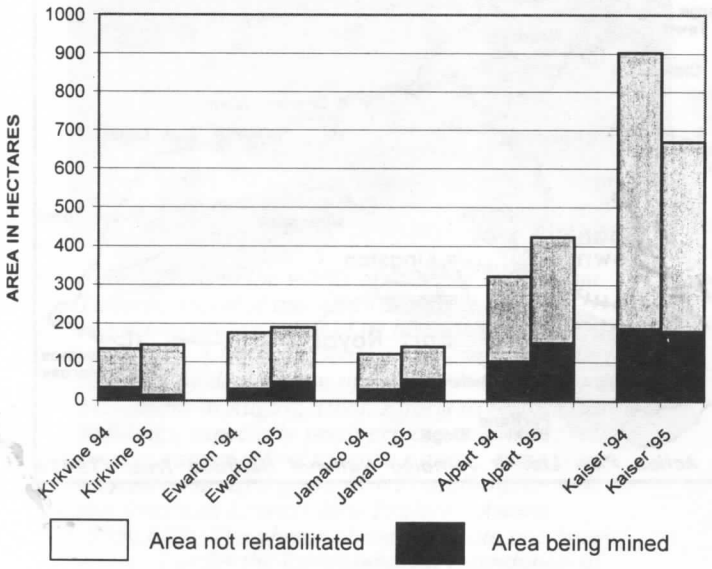
- Major bauxite reserves are located in the Cockpit Country, one of the most pristine ecosystems of the country and a refuge of several of our most endangered species.

- Considerable information exists on the occurrence of base metals e.g. gold, silver and copper in the country and additional research is being carried out to estimate the economic value of these deposits. Several of the potential deposits are in pristine areas. One gold mining proposal is under active consideration

- Although sandmining can be carried out with little or no permanent damage to the environment, it continues to be major a source of problems, in part because few people ever question where the sand they are using, comes from. In the meanwhile, illegal sandmining operations continue convert hundreds of acres of fertile agriculture land into ruinate landscapes, leaving the society to bear the cost of restoration and rehabilitation. Some illegal sandmining operation caused river and beach erosion, endangering bridges and other civil structures.

- As glass bottles are increasingly replaced by plastic bottles, the demand for silica sand which is used in the manufacturing of glass is expected to continue to decline. Silica sand is only mined in

PIT STATUS - BAUXITE MINES



the Black River area, one of the more important ecosystems in the country.

Trends and Indicators

6.1 In 1996, there was an upturn in the bauxite / alumina industry, with production of total bauxite increasing by 2.3 % over 1995 to 11,828,634 tonnes. A total of 3,917,478 tons of crude bauxite was exported in 1996. This compares to 3,253,072 tons of alumina exported in the same year. These production figures places Jamaica the third largest producer of bauxite behind Australia and Guinea, and the third largest producer of alumina behind Australia and the USA.

6.2 Gypsum production in 1997 was 263,662 metric tons, a 22 percent decrease over the 1996 output of 338,375 metric tons. In 1993 the gypsum production was 203,700 metric tonnes.

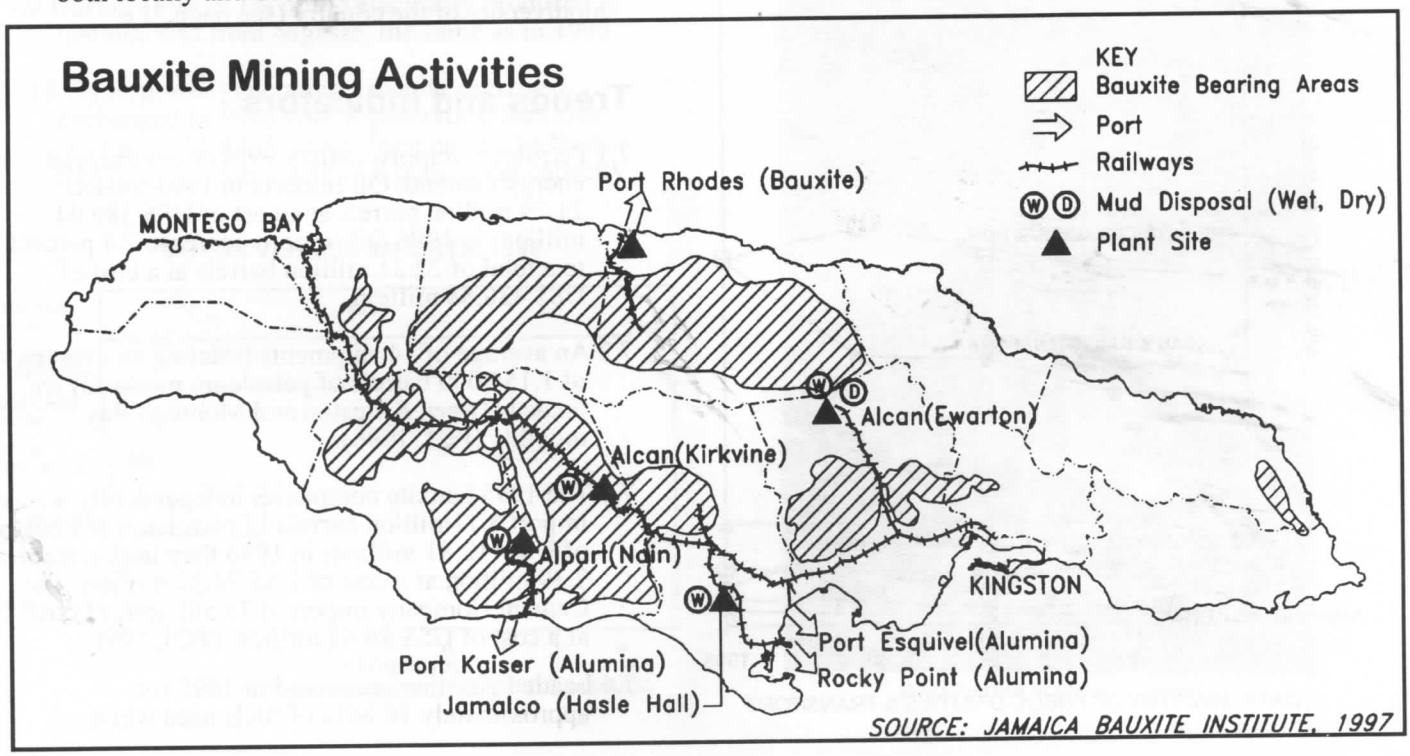
6.3 Crushed limestone production has been fairly level for the last 3 years, with an output of 3,351,000 metric tons in 1997; 3,351,000 in 1996; 3,382,500 in 1995. Industrial lime produced by the bauxite companies amounted to 190,919 metric tons, a decrease of 28.5% over 1996. This reduction is due to the companies sourcing this material from external supplies both locally and overseas.

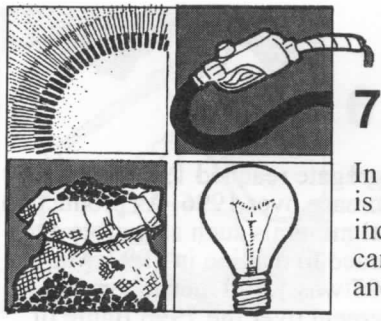
6.4 Production of aggregate reached 1,928,000 tons in 1997, a 5% increase over 1996. As production of some industrial minerals such as marble and silica sand continued to decline in 1997. Marble production in 1997 was 1,500 metric tons a decrease of 25 percent over the 1996 figure of 2,000 metric tons. In 1995 the marble production was 2,000 metric tons. Silica sand declined from 6,700 metric tons in 1995 to 15,790 metric tons in 1996 primarily as a result in an increased importation and use of plastic bottles in the beverage industry.

6.5 The number of licenses issued in 1996 and early 1997 for sand and gravel mining was 35, limestone and marl 27 as well as 3 mining leases and one temporary permit to mine gold in Clarendon (using the cyanide-vat leaching technique).

6.6 The bauxite/alumina industry is currently rehabilitating about 100 ha. of land annually. Often these lands are made viable again with high yield dairy and beef cattle farming.

6.7 Mining and mineral processing, metal processing, are prescribed categories requiring a permit (and possible Environmental Impact Assessment,) by the NRCA. Air and water effluent discharges are also subject to NRCA licences.





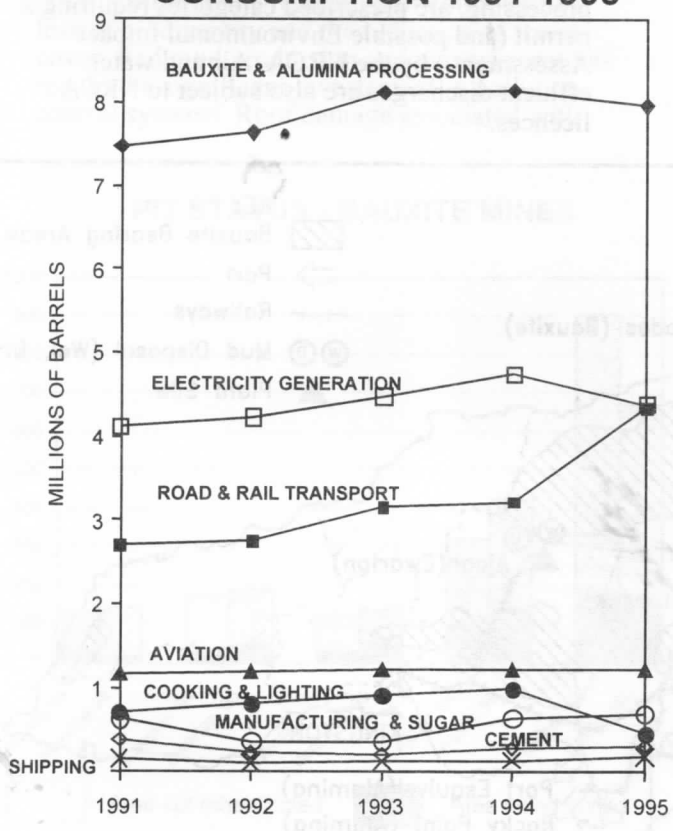
7 Energy Resources

In recent years, Jamaica's energy consumption has increased significantly. Energy is needed for essential services such as power for manufacturing and other industrial activity, and fuel for transportation and cooking. The use of oil and coal carries with it a number of environmental problems, such as water and air pollution and contamination of soils.

Issues

- While Jamaica is poor with respect to fossil fuels energy sources (oil, natural gas, coal), it is potentially rich in sunlight, and could meet greater portions of its energy demands using fuelwood plantations, hydropower, wind-power, photo-voltaics, use of agricultural and other wastes, greater efficiency and conservation, The Government is encouraging small hydro projects as the main focus of alternative energy development.
- Solar waters heaters, efficient light bulbs and other products, which save both money and energy in the long run, have considerably higher initial costs. To encouraging their wider use, they need to be the subject of an incentive scheme.
- In the last decade the demand for charcoal for domestic and commercial (Jerk food) use has increased. Indiscriminate cutting of trees and bush for the production of charcoal, has an obvious negative impact on the forest resources and biodiversity of the country (see page 22).

TRENDS IN PETROLEUM CONSUMPTION 1991-1995



DATA: MINISTRY OF PUBLIC UTILITIES & TRANSPORT

Trends and Indicators

7.1 Petroleum imports satisfy 99% of commercial energy demand. Oil Imports in 1995 totaled 21.79 million barrels at a cost of US$ 389.04 million; in 1996 Oil Imports increase 2.4 percent to a total of 22.31 million barrels at a cost of US$ 430.88 million.

7.2 An average of 14 shipments (totaling an average of 1,154,000 barrels of petroleum products) are made between Kingston and Montego Bay monthly (PCJ, 1996).

7.3 The 1995 bauxite companies independently import 8.11million barrels of petroleum at a cost of US$112.81 million; in 1996 they imported 7.39 million at a cost of US$ 74.37 million. The Cement Company imported 73,505 tons of coal at a cost of US$ 46.44 million. (PCJ, 1996)

7.4 Leaded gasoline accounted in 1995 for approximately 10.86% of fuels used while

unleaded gas, first introduced in 1990, had 5.89% of the market share. Given the trend towards imported vehicles with catalytic converters requiring unleaded fuels, the proposed phase out date of 2001 for leaded gas appears achievable.

7.5 During 1996, the Jamaica Public Service Company (JPSCo.) supplied 2,147 million-kilowatt hours (kWh) of electricity to 486,540 customers legally connected to its grid.

7.6 For household lighting, 82.9% had access to electricity and 11.1% used kerosene in the Kingston Metropolitan Area. In the rural areas, 60.2% had access to electricity and 38 % used kerosene (1994/95 PIOJ).

7.7 Approximately 41% of household energy needs for cooking were met by fuel wood and charcoal in 1996, and increasingly by charcoal. When compared with other sources of fuel sources of fuel (LPG cooking gas, wood, kerosene and electricity), charcoal is third behind LPG and wood.

7.8 Use of solar technology remains low. The number of solar water heaters installed remained unchanged from the 1995 level (3000 units).

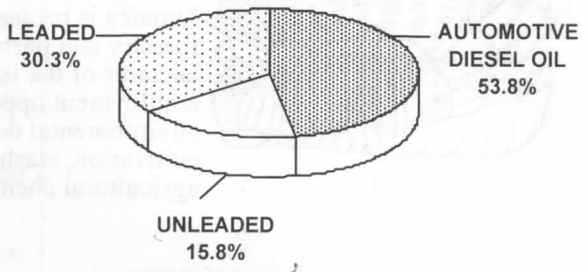
7.9 During 1996, 5.7% of the electricity produced in Jamaica was from bagasse, the same as in 1995.

7.10 Hydropower generating capacity remained unchanged in 1996 with 8 generating facilities producing 23.8 MW. Development of the Back Rio Grande, with a potential generating capacity of 50 MW remains the primary area being looked at for a new dam.

7.11 Power generation plants, and electric transmission/ sub-stations above 69KV are prescribed categories requiring an NRCA permit and Environmental Impact Assessment.

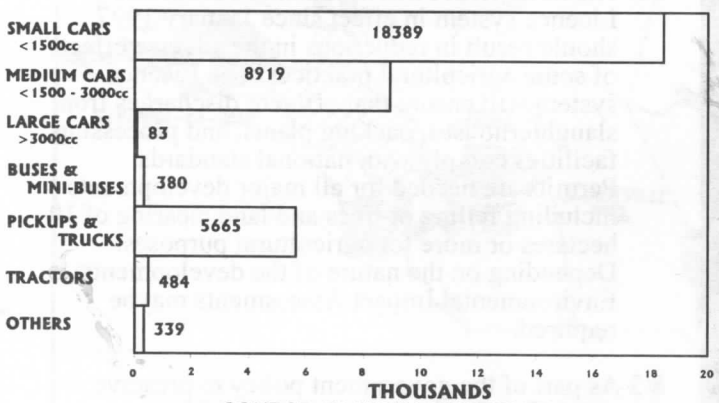
7.12 Jamaica's first wind turbine (at Munro College, St. Elizabeth) operated successfully during its first year (1996). It can generate up to two million-kilowatt hours of energy per year. A 10 to 20 MW wind farm could be built by 1998, the most likely site being on the Manchester plateau. It is believed that there are sufficient suitable sites to provide more than 10% of Jamaica's energy needs using wind power.

AUTOMOTIVE FUEL USE 1995

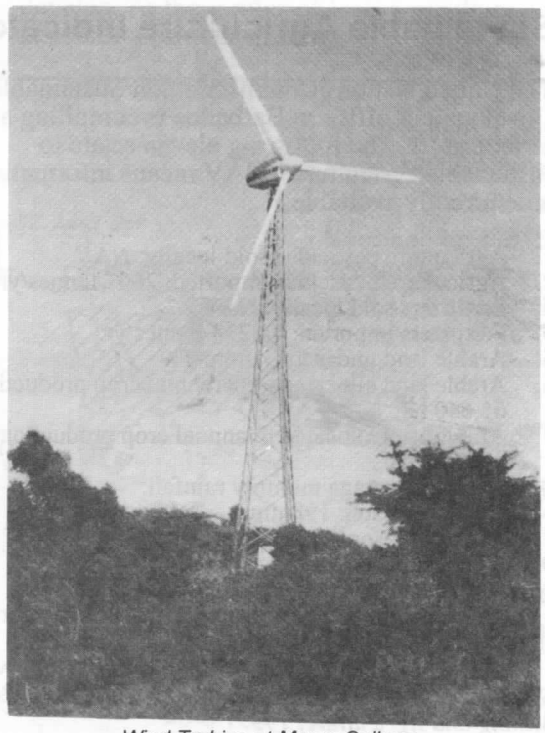


SOURCE: PETROLEUM CORPORATION OF JAMAICA, 1997

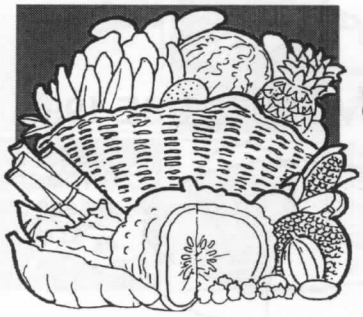
MOTOR VEHICLE IMPORTS, 1996



SOURCE: PLANNING INSTITUTE OF JAMAICA



Wind Turbine at Munro College



8 Agricultural Resources

Jamaica is primarily an agricultural country. The sector (including fisheries, forestry and pasture) occupies over half of the country's land area (602,674 hectares of the island's 1,100,784 hectares) and provides nearly 2/5 of the employment opportunities. Agriculture presently contributes greatly to environmental degradation. This result from the clearing of unstable slopes for cultivation, slash and burn methods often causing forest fires, and runoff of agricultural chemicals into groundwater, rivers, and the sea.

Issues

- Many large areas of arable land are under-utilized and negative social attitudes towards working in agriculture persist.
- Inadequate technology, marketing, and transportation hinder growth in this sector.
- Praedial larceny, insecurity of tenure, and lack of credit make it difficult for small farmers to make an adequate living from agriculture.
- Given the topography and population distribution in Jamaica, use of steep hillside lands for agriculture is a common phenomenon. This often results in serious soil erosion especially when no proper soil conservation techniques are used.
- Misuses of agricultural chemicals (pesticides, herbicides, and fertilizers) are contributing to water pollution.

Trends and Indicators

8.1 Agriculture continues to play a major roll in the Jamaican economy employing 36 percent of the population.

8.2 The new NRCA Environmental Permit and Licence system in effect since January 1997 should result in reductions in the adverse effects of some agricultural practices. The Licence system will ensure that effluent discharges from slaughterhouses, packing plants, and processing facilities comply with national standards. Permits are needed for all major developments including felling of trees and land clearing of 10 hectares or more for agricultural purposes. Depending on the nature of the developments Environmental Impact Assessments maybe required.

8.3 As part of the government policy to preserve prime farmlands, the conversion of 5 acres or more of farmland requires the approval of the

Sustainable Agriculture Indicators

The United Nations Commission on Sustainable Development office in Barbados is compiling a list of indicators. The following eleven relate to sustainable agriculture. (NAV means information not currently available.)

1. Agriculture pesticides sold locally: NAV
2. Agriculture pesticides imported: 2607 tonnes/yr.
3. Fertilizers sold locally: NAV
4. Fertilizers imported: 44,234 tonnes/yr.
5. Arable land under irrigation: 7%
6. Arable land allocated to perennial crop production: 65,640 ha.
7. Arable land allocated to annual crop production: 200,000 ha.
8. National average monthly rainfall:
   wet season: 198mm
   dry season: 112mm
9. Arable land affected by waterlogging: NAV
10. Arable land affected by erosion: NAV
11. Annual number of workshop & short course for farmers: NAV

Source: Data Bank and Evaluation Division, Ministry of Mining and Agriculture, 1997

Minister of Agriculture. No statistics are available regarding how much farmland was converted to other uses during 1996.

8.4 The agricultural sector reported positive growth in production for the seventh consecutive year. PIOJ's "Agricultural Production Index increased by 5.5% compared with 4.5% in 1995 (PIOJ).

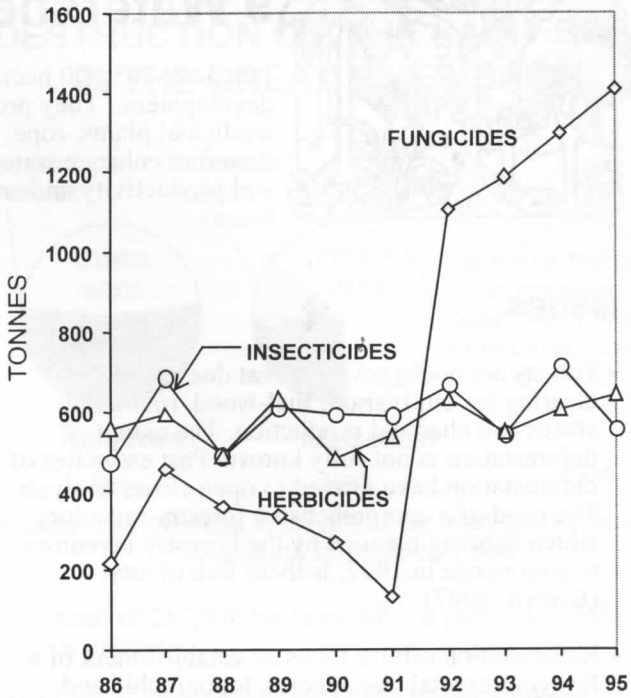
8.5 Export earnings from agriculture for 1996 was US$ 225 million, compared with food imports of US$ 154.7 million, a US$ 70.3 million surplus.

8.6 Meat production in 1995 increased by 4.8 percent over 1994. Some 27,084,472 animals were slaughtered producing 68,705,930 kg. of meat. Poultry production accounted for the highest percentage of meat produced 71% and pork 8.1 %.

8.7 Agriculture continues to be the primary user of water, representing 75% of demand. Seven percent of farming uses irrigation, primarily for sugar production. Water use is particularly heavy in the Rio Cobre and the Rio Minho basins. Projected demand by the year 2015 indicate shortages in both basins as well in the Kingston & St. Andrew basin (see page 29)

8.8 Use of chemicals for agriculture continues to rise as indicated by import increases of 95 percent for 1996 over 1995 levels.

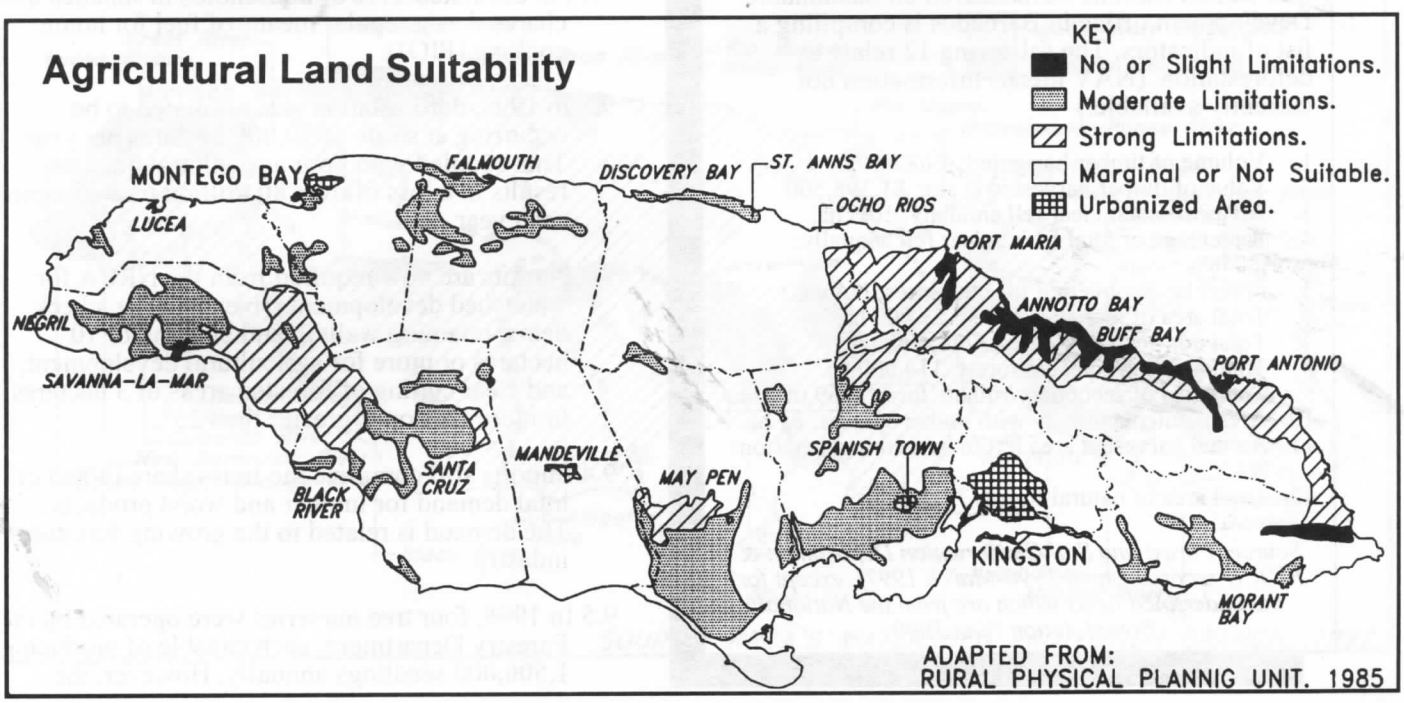
AGRICULTURAL IMPORTS (1986-95)

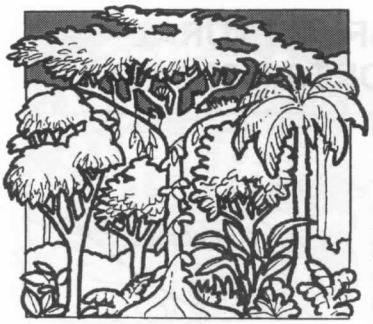


DATA: DATABANK & EVALUATION DIVISION, MINISTRY OF AGRICULTURE & MINING

8.9 Topsoil from farms and forests around the country is lost a rate of 80 million tons per year. An inch of topsoil can take hundreds of years to develop. At these rates of loss, agriculture becomes a form or mining.

Agricultural Land Suitability





9 Watersheds & Forest Resources

Jamaica's 265,000 hectares of forests play a critical role in the country's development. They provide lumber, posts, yam sticks, fuel-wood, charcoal, fruits, medicinal plants, rope, drinks, and other consumable. They protect watersheds and therefore enhance water supply, provide habitats for many wildlife species, maintain soil productivity and environmental integrity. They are critical to Jamaica's scenic beauty.

Issues

- Forests are under severe threat due to land clearing for cultivation, fuel-wood, round log stakes and charcoal production. The extent of deforestation is not fully known. Past estimates of deforestation have proved to open closer analysis. The need of a comprehensive forestry inventory which is being planned by the Forestry inventory to commence in 1997, is there fore pivotal (Evelyn, 1997)

- Reforestation efforts focus on establishment of a few commercial tree species, topographic and climatic conditions, but are poor substitutes for the biologically rich natural forest, which have many different species within a single stand. All of the same age, typically Caribbean pine, mahoe, and cedar. These are a poor substitute for the.

Deforestation Indicators

The United Nations Commission on Sustainable Development office in Barbados is compiling a list of indicators. The following 12 relate to deforestation. (NAV means information not currently available.)

1. Volume of timber harvested: 1,682m^3/yr.
2. Value of timber harvested at site: $1,398,500
3. Areas of forest clear fell annually: 10.5 ha.
4. Percentage of total forest clear fell annually: .0038%
5. Forest land converted for other uses: NAV
6. Total area of managed forest: 21,000 ha.
7. Total non-managed forest: 246,000 ha.
8. Total area of protected forest: 114,000 ha.
9. Total area of secondary/ruinate forest: 169,000 ha.
10. Area planted annually with timber species: 85 ha.
11. Annual harvested area left to natural regeneration: NAV
12. Total area of natural forest: 77,000 ha.

Source: Forest and Soil Conservation Department & FIDCO records (April 1996-March 1997), except for the underlined items which are from the National Forest Action Plan 1990.

biologically rich natural forests, which have many different species in a single hectare

- Charcoal is not just used by individuals and households, but by restaurants and hotels, therefore the usage rate in Jamaica is therefore much higher than estimated.

- To revert the continuing decline of the forest industry, is will be necessary to invest in reforestation and to follow sustainable levels of harvesting.

- In Jamaica, natural and plantation forests are usually located within the upper reaches of watersheds. The removal of these trees can therefore have severe impacts on low-lying areas, e.g. increased flooding, sedimentation, altering river courses, and reduction in aquifer recharge and available water supplies.

Trends and Indicators

9.1 An estimated 41% of households in Jamaica use charcoal as a regular means of fuel for home cooking (PIOJ).

9.2 In 1995, deforestation was estimated to be occurring at a rate of 10,000 hectares per year. This coupled with poor agricultural practice results in a loss of over 80 million tons of topsoil each year.

9.3 Permits are now required from the NRCA for watershed development (river training, check dams, retaining walls), land clearing of 10 hectares or more for agricultural development, and clear cutting of forested areas of 3 hectares or more on slopes greater than 25°.

9.4 Imports still comprise the lion's share (80%) of total demand for lumber and wood products. The demand is related to the growing furniture industry.

9.5 In 1996, four tree nurseries were operated by the Forestry Department, each capable of producing 1,500,000 seedlings annually. However, the

demand for seedlings and planting capacity is much lower. The 1997 target is to plant 400 hectares of Government Forest Land. Government tree planting in 1996 improved only 300 hectares. More tree nurseries are being established by PSOJ, PCJ, and a number of environmental NGOs for both fuelwood and reforestation purposes. Most of these are just being started.

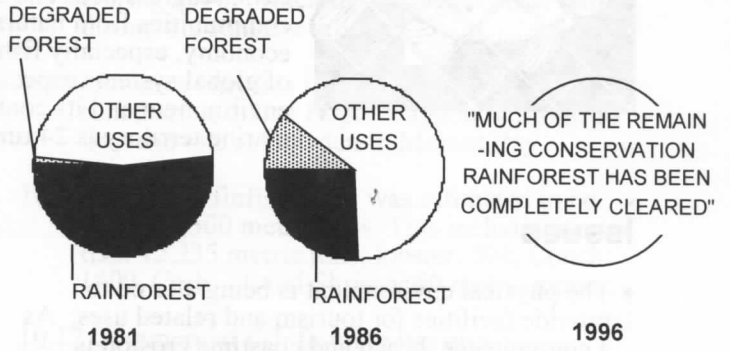
9.6 Statements about the drying up of Jamaican rivers are common. While there may not be agreement on how many rivers no longer flow, there has been a trend towards both reductions in the flows of many rivers as well as an increase in the intensity of flooding. Both are attributed to loss of forest cover in watersheds.

9.7 Each of Jamaica's 26 watershed management units have portions that are considered to be degraded.

9.8 Less than 6% (77,000 ha.) of Jamaica's forest is relatively undisturbed. The remainder is listed as badly disturbed (ruinate) secondary forest (169,000 ha.) and plantations (21,000 ha.). Of a total of 267,000 hectares 44% is public and 56% is private.

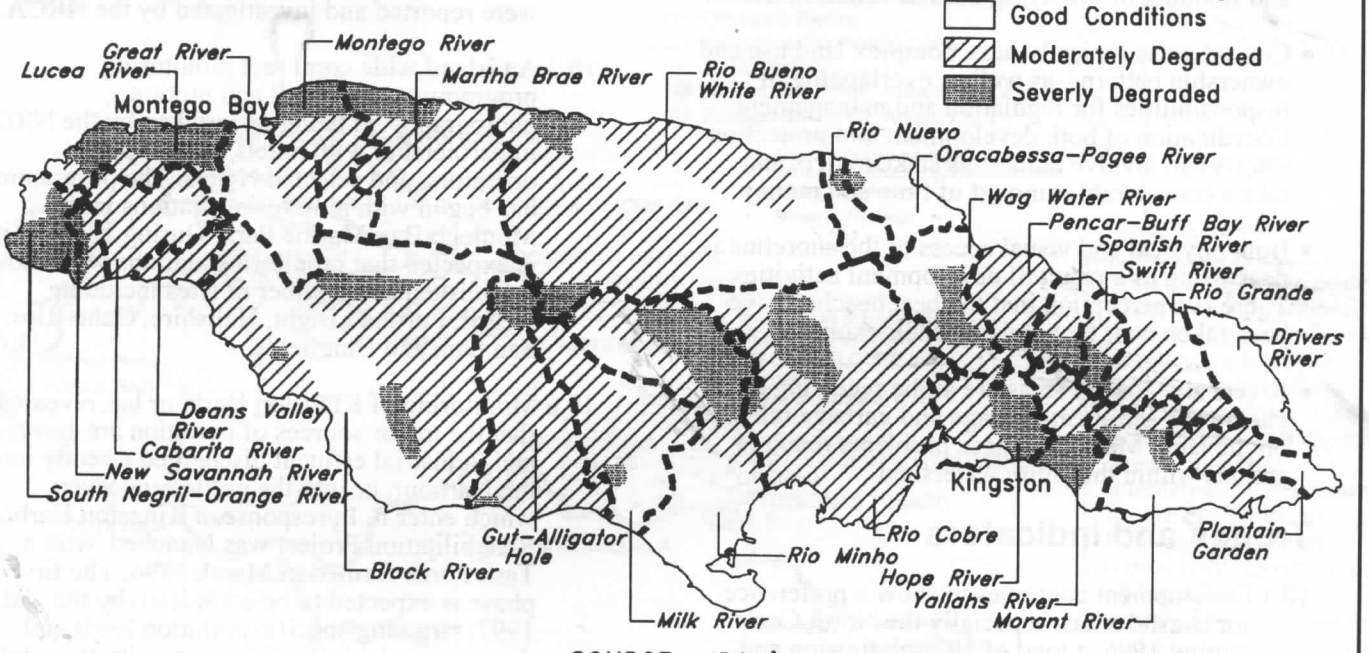
9.9 Improved management of the Island's forests and better watershed management are expected to result from the passage of the Forest Act in 1996 and the Water Resources Act in 1995

DESTRUCTION OF THE RAIN FOREST IN THE GREAT RIVER BASIN

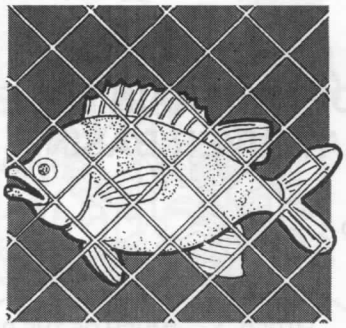


SOURCE: THE TROPICAL RAINFOREST OF JAMAICA BY L. ALAN EYRE IN JAMAICA JOURNAL 26:1, 1996

Watershed Conditions



SOURCE: NRCA'S WATERSHED PROTECTION BRANCH. 1997



10 Coastal & Marine Resources

Jamaica's coastline is 795 kilometers (494 miles) long and is highly irregular, with diverse ecosystems, including bays, beaches, rocky shores, estuaries, wetlands, cays, seagrass beds and coral reefs. Coastal ecosystems protect land-based communities from natural disasters. They are a significant base for the island's economy, especially fisheries and tourism. Marine ecosystems also act as stabilizers of global systems especially our climate. We continue to undervalue the marine environment and its contribution to national development, although Jamaica's marine territory is 24 times its land area.

Issues

- The physical environment is being altered to provide facilities for tourism and related uses. As a consequence, beach and coastline erosion is accelerating, aggravated by mining of sea sand.
- Fish catches are being reduced by increasing numbers of fishermen, poor fishing techniques such as use of fine mesh nets to trap immature fish, as well as illegal dynamiting and poisoning.
- Coastal mangroves, wetland areas and seagrass beds which provide breeding, feeding and nursery grounds for fish and shrimp are being destroyed.
- A warmer global climate is expected to result in a rise of sea level, as well as changes in weather patterns. The frequency of hurricanes and tropical storms could change, loss of protective coral reefs, and flooding of low-lying coastal communities.
- Coastal areas typically have complex land use and ownership patterns, as well as overlapping of responsibilities for regulation and management. Coordination of both development and protection efforts can involve numerous stakeholders and take a considerable amount of time and money.
- Both physical and visual access to the shoreline is decreasing as a result of development activities. There is a perception that the best beaches have been taken over by hotels for their exclusive use.
- Rivers and coastal areas are at the receiving end of chemicals, sediment, sewage and garbage released on the land. Managing these problems requires actions within the entire watershed.

Trends and Indicators

10.1 Development continues to show a preference for coastal areas, especially the North Coast. During 1996, a total of 102 subdivision and building applications were submitted to the NRCA through the Town Planning Department, of which 22 (25%) were located within the "coastal zone", defined as within 3 km. from the coast. During 1994 and '95 a total of 267 subdivision applications were approved, with 47 along the shoreline.

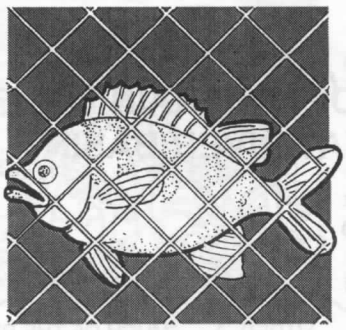
10.2 During 1996, four Licenses were issued to undertake beach modification/improvement works along the coast. This compares to three Licenses each for the previous two years.

10.3 An inventory of marine and coastal resources and conditions has been underway since 1995, expected to provide baseline information for coastal zone management and development decisions. A Coastal Zone Resource Atlas as well as a working computerized Geographic Information System (GIS) database were completed by December 1997.

10.4 During 1996, two marine oil spill incidents were reported and investigated by the NRCA.

10.5 An island wide coral reef monitoring programme, using still and motion photography, is being undertaken by the NRCA in partnership with hotels, water sports operators, and selected NGOs. The programme has begun with monitoring stations in the Montego Bay Marine Park. During 1996-97 it is expected that monitoring stations will also be established at a number of sites including Negril, Portland Bight, Hellshire, Ocho Rios, San San, and Bluefields.

10.6 Monitoring of Kingston Harbour has revealed that the major sources of pollution are sewage and industrial effluent discharged directly into the Harbour, or into the gullies and rivers which enter it. In response, a Kingston Harbour Rehabilitation Project was launched, with a Task Force formed in March 1996. The first phase is expected to be completed by the end of 1997, targeting specific pollution loads and developing the institutional capacity to sustain a recovery effort.



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10.7 There has been a trend towards degradation of Jamaica's 85 public bathing beaches since the mid-1980s when responsibility for maintenance shifted from the Parish Councils to TPDCO. In response, a new Beach Policy and a 4-year strategy for beach rehabilitation were developed. During 1997-98, five beaches will be upgraded (Orange Bay in Portland, Silver Sand in Trelawny, Guts River in Manchester, and Fort Charles in St. Elizabeth, and Marine terminal in St. Catherine). Maintenance responsibilities will rest with local authorities, NGOs and community groups.

10.8 During 1995-96 the NRCA has prepared guidelines for dredging, marinas and small craft harbours, benthic structures, coastal protection and enhancement structures, and underwater pipelines and cables. These, in combination with the new NRCA Permit and Licence system should help to reduce the negative impacts of coastal development.

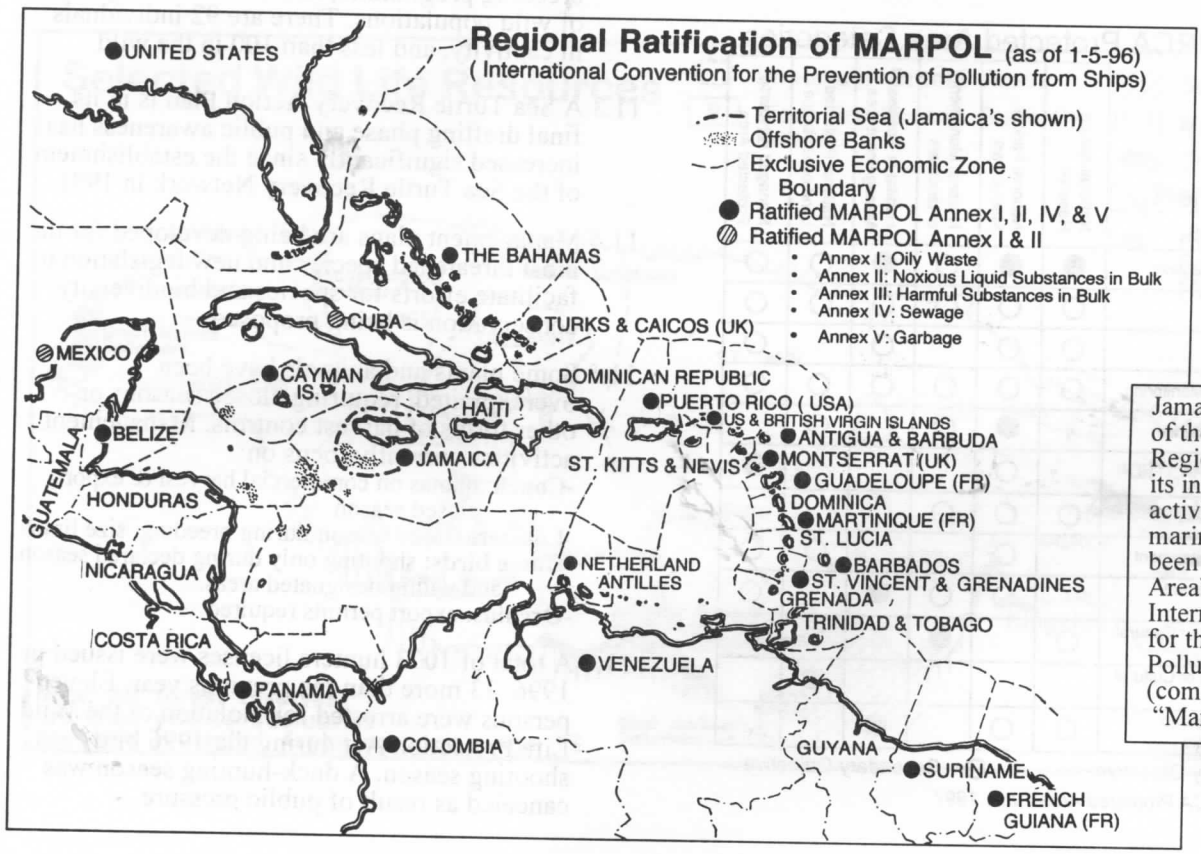
10.9 Coral reefs are being seen as sensitive indicators of global climate change. When average water temperatures rise above, corals may expel the algae living in their tissues, resulting in loss of color or bleaching. In Jamaican waters, bleaching episodes were observed during three of the last ten years. During 1996, bleaching was again observed during the summer months.

10.10 Jamaica only has two designated fish sanctuaries, one at Bogue Lagoon in Montego Bay and one at Bowden in Morant Bay.

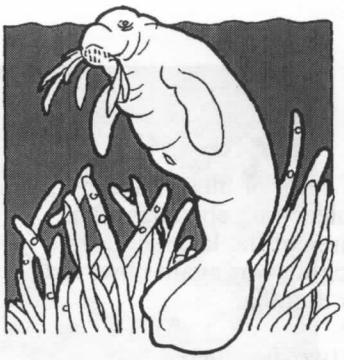
10.11 The 1996 finfish catch was estimated to be about 14,500 metric tons. This includes Marine fish: 12,235 metric tons, lobster: 394, Conch: 1800, Crab: 11 and Shrimp: 60 metric tonnes.

10.12 Commercial fish farming has grown significantly since it began in 1976. By 1996, total land area devoted to aquaculture was over 810 hectares producing approximately 37,500 metric tonnes of fish.

10.13 Conch harvesting has been regulated since 1993. The 1996 catch was slightly below the 1.8 million kg. quota set. Quotas will be reduced annually until the estimated sustainable yield of 1.5 million kg. is reached. Most harvesting takes place on the Pedro Banks.



Jamaica is near the center of the "Wider Caribbean Region". This region, with its intensive maritime activities and sensitive marine environment, has been designated a "Special Area" under the International Convention for the Prevention of Pollution from Ships (commonly referred to as "Marpol".



11 Biological Resources & Protected Areas

Jamaica boasts a rich natural heritage created by the country's varied topography, geology, and drainage. This richness, or "biodiversity" as it is often referred to, is reflected both in the variety of natural areas as well as the many different kinds of plants and animals found in Jamaica. Jamaica ranks 5th amongst the islands of the world with respect to "endemic" species, those found only here and nowhere else. This rich natural heritage creates the scenic beauty which both visitors and locals seek out and enjoy. Protected Areas provide a means to conserve and sustainably use the nation's biological resources. They range from National Parks and Marine Parks, to Fish Sanctuaries, Forest Reserves, Water Quality Control areas, beaches and open spaces. Protected areas are central to conservation efforts in the four large centers of terrestrial biodiversity in Jamaica: the Blue and John Crow Mountains, Cockpit Country, the Black River Morass, and Portland Ridge to Hellshire.

Issues

- Reliable baseline needed for effective management of our biological resources is often not available. Estimates of the rate and extent of destruction of habitats, and loss of species are generally sketchy and incomplete.
- Degradation of biological resources continues because of an overall lack of public awareness, economic pressures to use resources at unsustainable levels, and inadequate enforcement of laws and regulations.
- Policies and guidelines related to collection, export and ownership rights of genetic materials have yet to be formulated.

NRCA Protected Area Categories

Management Objectives	National Nature Reserve	National Park or Marine Park	National Monument or landmark	Habitat or Species Management area	National Protected Land or seascape	Managed Resource Protected Area
Ecosystem Protection	●	●	○	●	○	○
Education	○	○	○	○	○	○
Research	○	○		○		○
Environmental Monitoring	○	○	○	○	○	○
Recreation & Tourism		●	○		○	
Sustainable Resource Use		○				●
Controlled Access	○	○	○	○		
Economic Development		○			○	○
Active Management Interventions		○	○	●		○
Protect Natural or Cultural Feature	○		●			
Protect Natural or Cultural Area					●	
Protect Endangered Plants & Animals	○	○		●		

● Primary Objective ○ Secondary Objective

Source: NRCA Protected Areas unit, 1997

Trends and Indicators

11.1 The population of manatees has not been surveyed since 1993, but it is generally believed that there are less than 100 of these rare aquatic mammals remaining in Jamaica.

11.2 Populations of the Jamaican Iguana continue to grow as a result of Hope Zoo's captive breeding programme, and careful management of wild populations. There are 92 individuals in captivity, and less than 100 in the wild.

11.3 A Sea Turtle Recovery Action Plan is in its final drafting phase and public awareness has increased significantly since the establishment of the Sea Turtle Recovery Network in 1991.

11.4 Management plans are being developed for the most threatened species and new legislation to facilitate efforts for species and biodiversity conservation is being proposed.

11.5 Some plants and animals have been overexploited, requiring closed seasons or other forms of harvest controls. Management activities currently focus on:

-**Conch**: quotas on commercial harvest & export, closed season
-**Lobster**: closed season during breeding, size limits
-**Game birds:** shooting only during declared season and within designated areas.
-**Orchids**: export permits required

11.6 A total of 1073 hunters licenses were issued in 1996, 33 more than the previous year. Eleven persons were arrested for violation of the Wild Life Protection Act during the 1996 bird-shooting season. A duck-hunting season was canceled as result of public pressure.

11.7 Jamaica has about 822 endemic flowering plant species, over a quarter of the total flora.

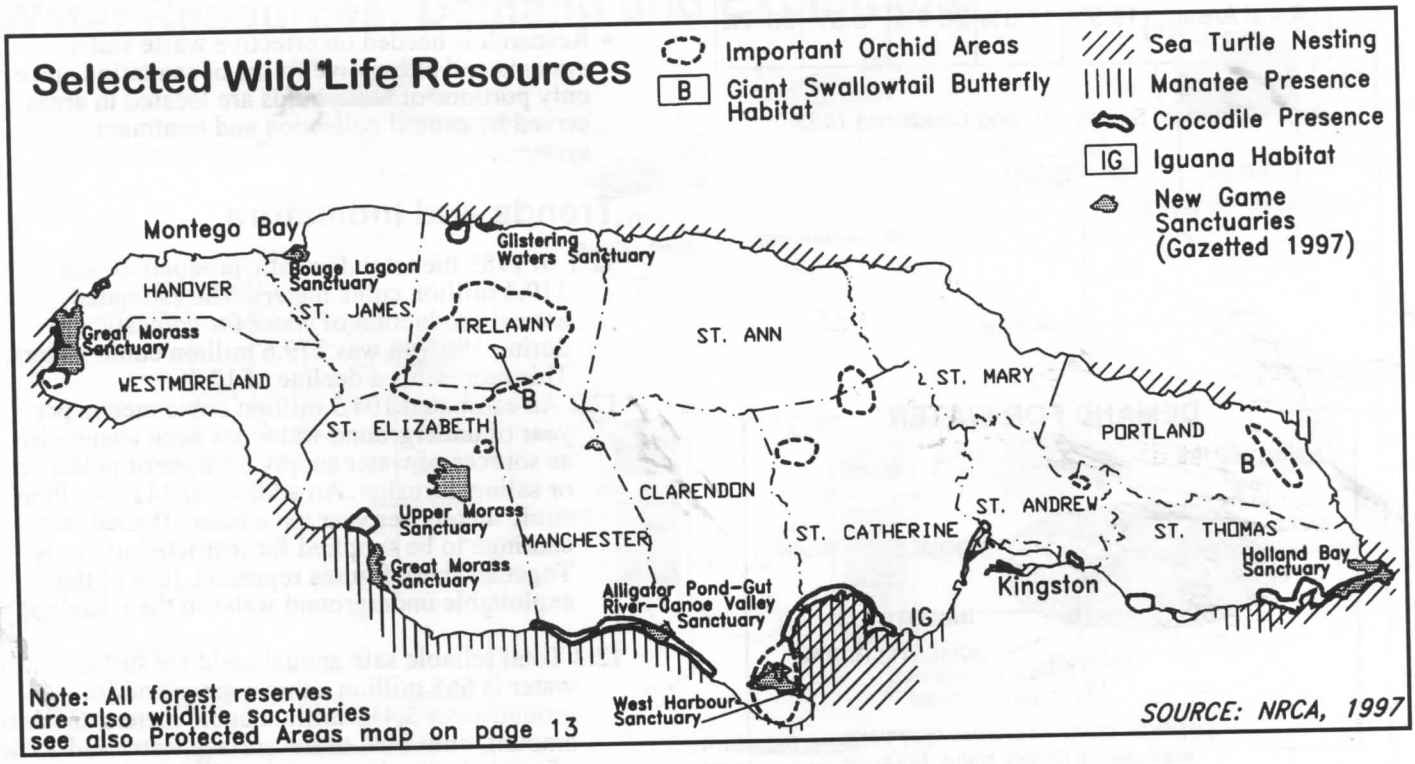
11.8 Jamaican wildlife now extinct includes the: Caribbean Monk Seal, Jamaican Rice Rat (since 1900), Jamaican Macaw, Black-capped Petrel, and the Jamaican Parauque (birds). Species which are currently protected by Law are:
BIRDS: Plain (Blue) Pigeon, Golden Swallow, West Indian Whistling Duck, Ring-Tailed Pigeon, Jamaican Blackbird (Wild Pine Sargent), Black and Yellow-Bill Parrots, Sooty Tern, Brown Noddy, Masked Duck
MAMMALS: West Indian Manatee, Jamaican Hutia (Coney)
AMPHIBIANS & REPTILES: all sea turtles, Jamaican Boa, Jamaican Iguana, American Crocodile
INVERTEBRATES: Giant Swallowtail Butterfly, Black Coral, White Coral

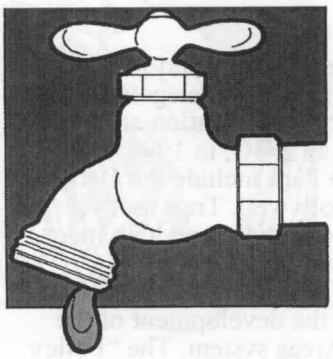
11.9 The National Park Trust Fund was established in 1991 to finance the national protected area system with an initial capitalization of J$12.3 million. At the end of 1997 the fund stood at J $ 38 million. It is currently being used to meet costs associated with Jamaica's two National Parks. To support new national parks and to off-set inflation the Trust will have to be increased with not less than J$ 50 million by the year 2001.

11.10 Authority to manage the Blue and John Crow Mountains National Park was delegated by the NRCA to the Jamaica Conservation and Development Trust, an NGO, in 1996. Improvements to the Park include the Oatley Mountain Trail in Hollywell. Trail user fees will be used to employ guides and help meet Park operational costs.

11.11 Work continues on the development of the National Protected Areas system. The "Policy for the National System of Protected Areas" was approved by Parliament in November 1997. Planning studies were launched to develop Protected Areas Systems in Black River and in Port Royal / Palisadoes areas. NGOs worked together with the NRCA towards establishment of protected areas in Negril, Port Antonio, Portland Bight, Ridge and Hellshire. The Negril and Green Island watersheds were declared Environmental Protection area in November 1997. (See map on page 13)

11.12 Jamaica has acceded and ratified a number of international treaties and conventions related to conservation of biological resources, including the Convention on Biological Diversity and the Convention on International Trade in Endangered Species of Wild Flora and Fauna.





12 Water Resources

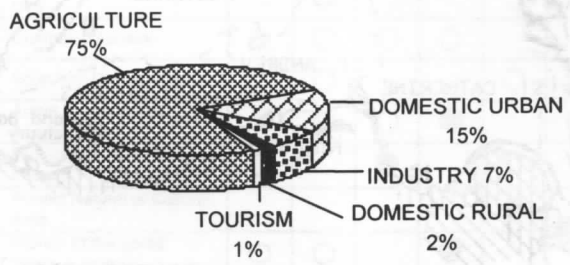
The National Water Commission reminds us that "Water is Life"; we cannot live without it. The land captures, stores and cleans our water, not only for us, but for all living creatures. Jamaica's freshwater resources come from surface sources (rivers and streams), underground sources (wells and springs), and rainwater harvesting. Reliable safe yields are estimated at 4,084 million cubic metres per year, with ground water accounting for 81%. Approximately 96% of all available groundwater is associated with limestone aquifers, and the remaining 4% with alluvium aquifers.

Access to Water

	Indoor Tap or Pipe	Outdoor Private Tap	Public Stand-Pipe	River, Lake or Spring	Rainwater Tank
Kingston Metropolitan Area	66.3%	26.8%	5.1%	0%	0.1%
Other Towns	42.5%	28.1%	18.5%	1.0%	8.7%
Rural Areas	19.5%	17.8%	28.9%	5.5%	23.3%

Source: Survey of Living Conditions 1993

DEMAND FOR WATER



SOURCE: Water Resources of Jamaica:- Availability & Quality status 1993

Issues

- Deforestation, poor land use and inappropriate construction practices in the watersheds have reduced the flows of rivers, accelerated soil erosion, and caused siltation of reservoirs and damage to water treatment works. For example it is estimated that the capacities of Mona and Hermitage reservoirs has been reduced by 2.2% and 19% respectively.
- Collecting, treating and distributing water on a sustained and reliable basis to the widely dispersed population results in high water costs.
- Sewage effluent and industrial waste are contaminating aquifers and surface waters at an increasing rate. If this is allowed to continue, the island's position of having surplus water could be reversed.
- Research is needed on effective waste water systems and alternative forms of sanitation since only portions of households are located in areas served by central collection and treatment systems.

Trends and Indicators

12.1 In 1985 the total domestic production was 319.4 million cubic meters. The estimated annual production of water for domestic use during 1995/96 was 279.6 million cubic meters. This represents a decline of 12 %.

12.2 An estimated 104.3 million cubic meters per year of underground water has been abandoned as sources of water supply because of pollution or saline intrusion. An additional 241.2 million cubic meters per year have been affected, but continue to be supplied for restricted use only. Together these figures represent 10% of the exploitable underground water in the island.

12.3 Total reliable safe annual yield for surface water is 665 million cubic meters, and for groundwater 3,418 million cubic meters. Of this amount, only 11% of the surface water and 25% of groundwater is presently utilized.

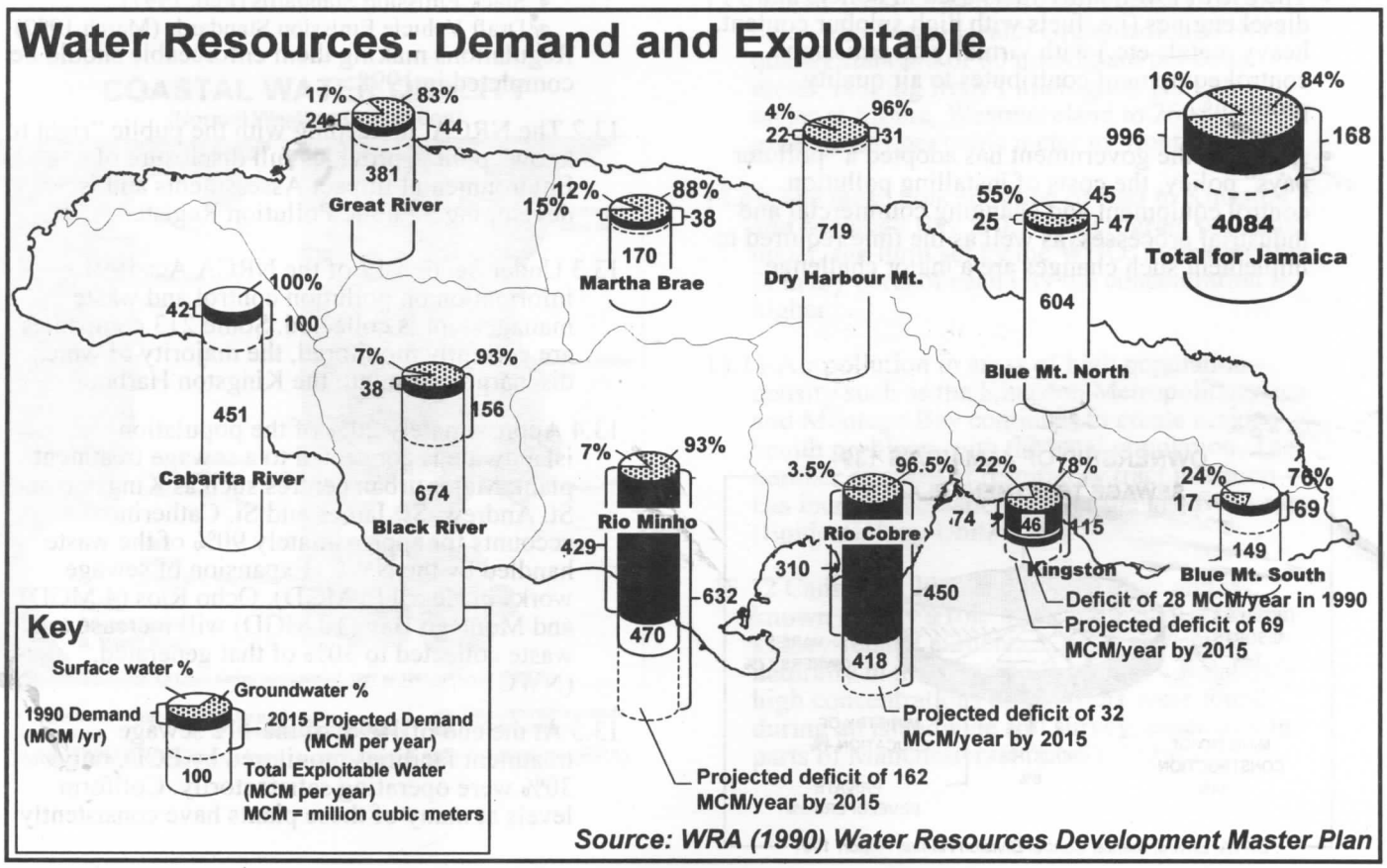
12.4 Generally the chemical quality of water sources is good, meeting World Health Organization and Jamaica Interim Standards. Groundwater quality varies depending on the geology and landuse. Groundwater in the limestone areas is more prone to bacteriological contamination then in the alluvial deposits. But in some alluvial areas such as the Liguanea Plains groundwater shows elevated nitrate levels exceeding 10 parts pro mile, contaminated by sewage seepage from soakaway pits. The bacteriological quality of surface water is generally poor where people live and keep animals in the vicinity of water sources.

12.5 In 1996 85% of the population received treated water. The quality of piped water is not always acceptable. 20.4% of the 16,626 samples tested for residual chlorine by the Environmental Control Division in 1996, came out negative and 24.5% of the 6,675 samples tested for faecal coliform were positive. The quality of the piped water is especially a problem in the rural communities. The worst affected is Portland where 47% of the samples tested negative for residual chlorine and 53% of the samples tested positive for faecal coliform. Other poor performers are St.Mary, Trelawny and Rural St.Andrew.

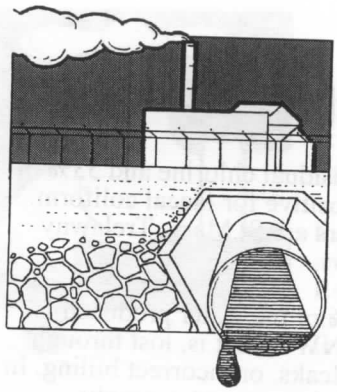
12.6 Approximately 60% of the water produced is unaccounted for by NWC, that is, lost through illegal connections, leaks, or incorrect billing. In 1985 leakage from domestic water supply systems has been estimated to be between 30 and 40%. Further it has been estimated that about 85% of the existing capacity of non-agricultural waterworks is in need of rehabilitation.

12.7 Saline intrusion has affected 257.4 million cubic meters per year of underground water supplies in Clarendon and St. Catherine.

12.8 The national average for sewage generation is estimated at 455 million liters/day. Of this, only about 25% is collected and treated in conventional treatment systems and the remainder is disposed of using pit latrines, soak-aways, and septic tanks. About 51% of the Jamaican population still uses pit latrines.



Source: WRA (1990) Water Resources Development Master Plan

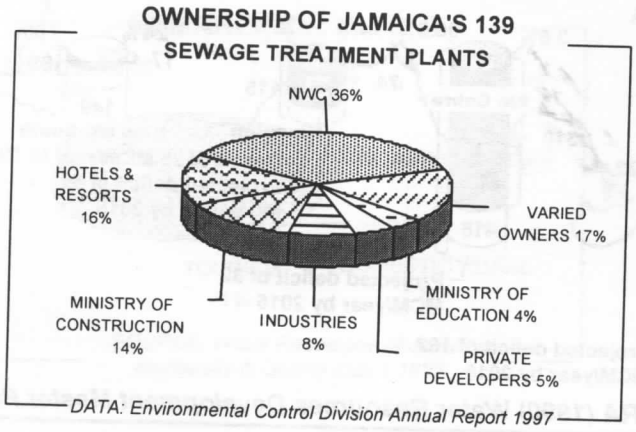


13 Air & Water Quality

Air quality has been affected by increased emissions from industrial sources, vehicular traffic, and open burning of household and commercial wastes. The major industries contributing to air emissions include oil refining, bauxite-alumina processing, mining and quarrying cement manufacturing, sugar processing and power plants. Ground water becomes polluted by infiltration from sewage, saline intrusion and the leakage of caustic residues from the older red mud disposal sites. In Kingston and St. Andrew, aquifers have been extensively contaminated by sewage, while saline intrusion on the south coast results primarily from over-pumping of ground water. Pollution of surface waters is much more significant, with many more pollutants contributing to the problem.

Issues

- Jamaica lacks routine air quality and hazardous material monitoring programmes.
- The question of regulations for the burning of garbage is one which must be addressed, especially in urban areas as it is an important contributor to poor air quality.
- There is inadequate regulation and control of pollution from motor vehicles and other non-point sources.
- The use of low quality fuels used in boilers and diesel engines (i.e. fuels with high sulphur content, heavy metals etc.) with virtually no emission control equipment contributes to air quality problems.
- Although the government has adopted a "polluter pays" policy, the costs of installing pollution control equipment and changing commercial and industrial processes, as well as the time required to implement such changes are a major challenge.



Trends and Indicators

13.1 The NRCA Environmental Permit and Licensing system, which came into effect in January 1997, will improve monitoring of air and water emissions and ensure that both existing and new facilities come into compliance with standards. The Interagency Technical Standards Committee is establishing air and water emission standards. To date (end 1997) the following have been developed

- Trade Effluent Standards (Sept. 1995)
- Sewage Effluent Standards (Dec .1996)
- Ambient Air Quality Standards (Aug.1996)
- Stack Emission Standards (Feb. 1997)
- Draft Vehicle Emission Standards (March 1997)

Regulations making them enforceable should be completed in 1998.

13.2 The NRCA, in keeping with the public "right to know" policy, provides full disclosure of Environmental Impact Assessments and is developing a Public Pollution Register.

13.3 Under Section 17 of the NRCA Act 1991, information on pollution control and waste management is collected. Some 213 companies are currently monitored, the majority of which discharge waste into the Kingston Harbour

13.4 Approximately 20% of the population islandwide is connected to a sewage treatment plant. Major urban centres such as Kingston and St. Andrew, St. James and St. Catherine accounts for approximately 90% of the waste handled by the NWC. Expansion of sewage works in Negril (5 MGD), Ocho Rios (4 MGD), and Montego Bay (10 MGD) will increase total waste collected to 30% of that generated. (NWC)

13.5 At the end of 1996, of the 112 sewage treatment facilities monitored by ECD, only 30% were operating satisfactorily. Coliform levels at many of these plants have consistently

exceeded the NRCA's sewage effluent standards. (ECD)

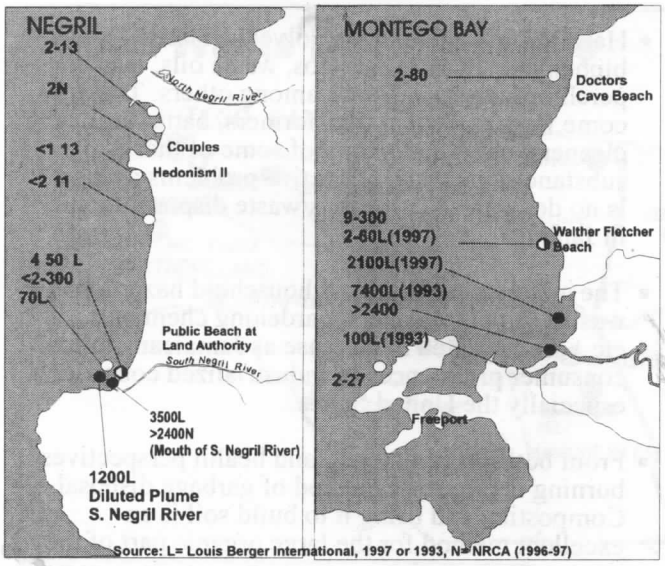
13.6 Although the sugar and rum industry has made a commitment to rid the country of dunder by early in the 21st century, until then it remains a major source of water pollution and resident complaints in rum producing watersheds. Other industries, which have made commitments to anti-pollution investments include the cement company, coffee industry, and the power sector.

13.7 Although closed in 1860, the Hope lead-zinc mine continues to pose environmental problems. A recent study of children in the Kintyre Basic School revealed high blood lead concentrations. Area residents, the Ministry of Health, UWI's ICEN, and Lions Club (Mona) joined together to take corrective action, such as paving of the school grounds.

13.8 An estimated 34,262 additional vehicles entered the Island in 1996, contributing to traffic congestion and deteriorating air quality, especially in the Kingston Metropolitan area and Montego Bay.

COASTAL WATER QUALITY

(Normal Weather Conditions)

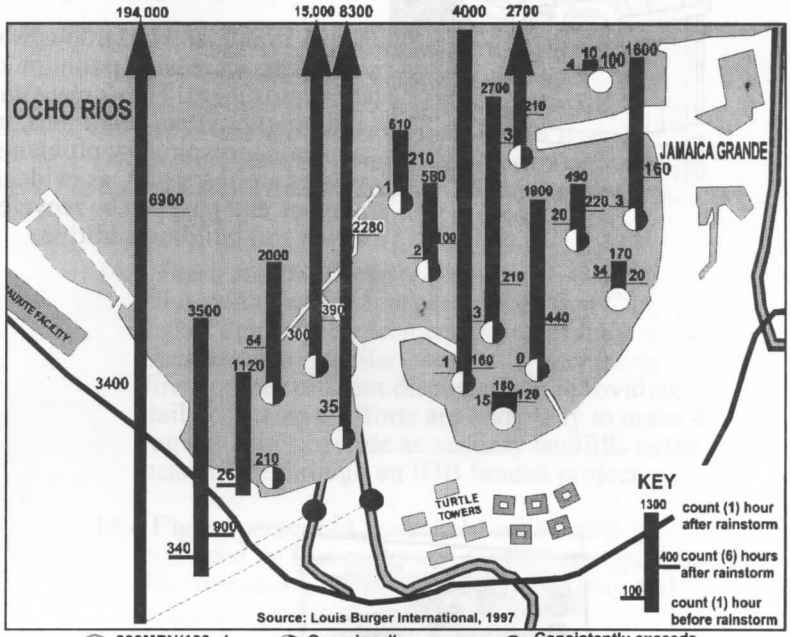


200MPN/100ml or less — Occasionally Exceed 200MPN/100ml — Consistently exceeds 200MPN/100ml

Note: 200MNP/100ml or less is considered safe for bathing (EPA)

COASTAL WATER QUALITY

Before, During And After Rainstorm October 2, 1997



200MPN/100ml or less — Occasionally Exceed 200MPN/100ml — Consistently exceeds 200MPN/100ml

Note: 200MNP/100ml or less is considered safe for bathing (EPA)

13.9 Mean Total Suspended Particulate (TSP) are below the World Health Organization WHO air quality standard of 60 microgram per cubic meter, ranging from 1 microgram per cubic meter at Frome, Westmoreland to 260 micrograms per cubic meter in Montego Bay.

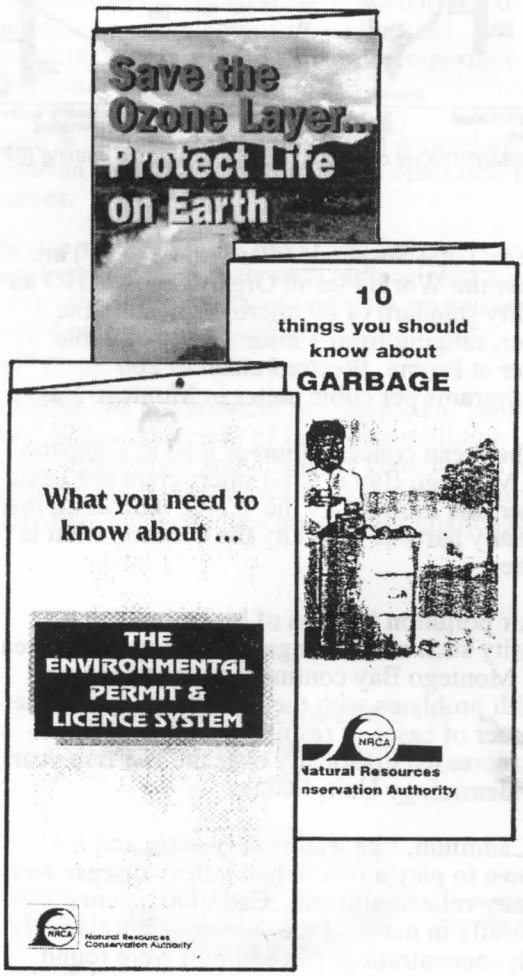
13.10 The mean concentration of lead in Kingston and Montego Bay is 0.5-1 microgram per cubic meter, the limit set by the WHO; indicating that in many parts of each city the concentration is higher.

13.11 Air pollution in areas of high population density such as the Kingston Metropolitan Area and Montego Bay continues to create major health problems with the local population. The number of cases of respiratory tract infection has increased drastically over the last five years (Epidemiology Unit, ECD).

13.12 Cadmium, like lead is very toxic and is known to play a role in respiratory disease and kidney-related ailments. Cadmium occurs naturally in many of the "red soils". Relatively high concentrations of cadmium were found during an islandwide soil survey, especially in parts of Manchester. (ICENS)

14 Solid, Liquid & Hazardous Waste

Solid, liquid, and hazardous wastes pose serious environmental problems and risks, including increasing pollution of groundwater, rivers, the marine environment, and the atmosphere. They create unsightly areas, and contribute to breeding of pests, and other noxious conditions, human health may be threatened directly through poisoning, respiratory problems, and even birth defects. At the same time, many wastes are resources, as evidenced by the use of bagasse to generate electricity, plastics and paper to be recycled into new products, and food wastes composted into a rich soil building additive.



Issues

- There is a need for regulations and national standards to control the methods by which medical waste is separated, stored, transported, treated and disposed of.
- Individuals and waste disposal collection companies are not accustomed to paying for disposal of garbage. This attitude will make it difficult to meet operating costs associated with sanitary landfills, and continues to contribute to illegal dumping in gullies, vacant land, and the sea.
- Many existing and former dumpsites were sited in inappropriate locations, posing long-term environmental problems. Future landfill sites will be required to have a permit from the NRCA and will have to go through an EIA review process, which includes public participation.
- Hazardous waste include polychlorinated biphenyl's (PCB's) asbestos, waste oils, lead and perchloroethylene (Perc), among others. These come from electrical transformers, batteries, dry cleaners, etc. The toxicity of some of these substances presents distinctive problems as there is no designated hazardous waste disposal facility in Jamaica.
- The amounts and kinds of household hazardous wastes (paints, cleaners, gardening chemicals, etc.) are expected to increase as Jamaicans follow consumer preferences of industrialized countries, especially the United States.
- From both environmental and health perspectives, burning is the worst method of garbage disposal. Composting and using it to build soil is an excellent method for the large organic part of the waste stream.

Trends and Indicators

14.1 Efforts at recycling and reuse continue to grow. Over 3 million plastic PET bottles were recycled recently by WISYNCO, one of the three companies recycling plastic. Other items being recycled and reused include cardboard, glass bottles, newspaper and some metals. The trend is towards increased use of plastic beverage containers rather than reusable glass bottles.

14.2 Desnoes and Geddes are an example of turning industrial wastes into resources. 100% of spent barley grain and 85% of excess yeast is sold as animal feed. Eighty percent of CO2 generated is reused to carbonate beverages. Glass bottles are reused, and eventually recycled into new bottles. Plastic crates, fiberboard cartons caustic soda and lubricating oils are recycled or reused. (D&G)

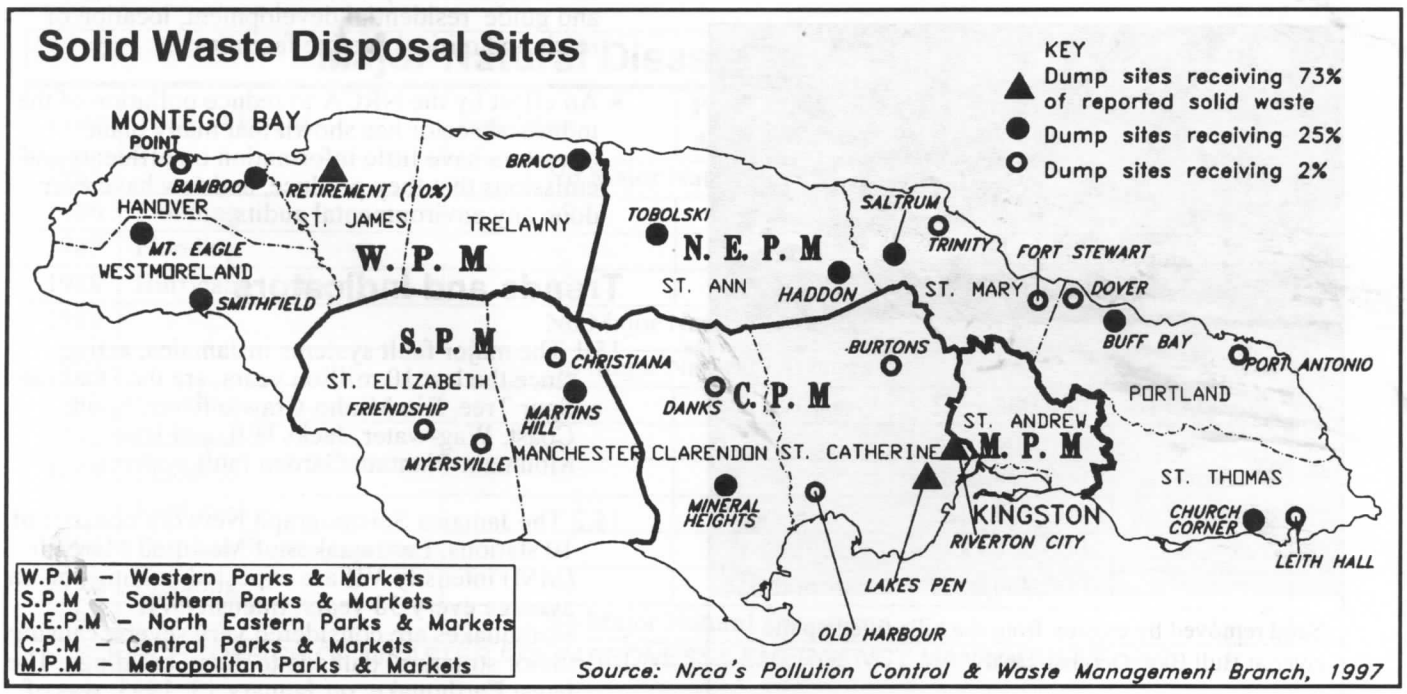
14.3 An estimated 10,000 tonnes of hazardous waste is generated each year in Jamaica, with 80% being waste oils. There are at present no adequate facilities for disposing of such wastes. Some of the waste oils are recycled in the production processes of the Caribbean Cement Company.

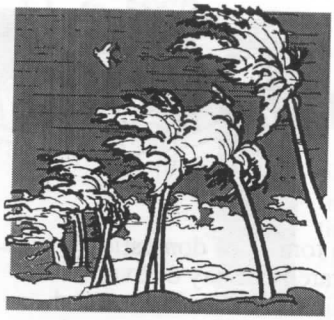
14.4 An estimated 2726 tonnes of domestic solid waste is generated per day or over 2 pounds for every Jamaican. Businesses and industry generate another 562 tonnes per day. (1995)

14.5 There are 15 officially recognized disposal sites, with the three largest at Riverton City, Lakes Pen, and Retirement. None of these sites operates as a "sanitary landfill" (preventing fires, proper effluent discharge, and providing daily covering). Efforts are underway to make 4 regional sites operate as sanitary landfills in the near future through an IDB funded project.

14.6 Eighty percent of household solid waste is collected by five parks and markets companies. The remaining 20% is collected privately and often dumped in open areas.

14.7 There is about 5040 Kg. per day of garbage generated from cruise ships. This waste is usually improperly disposed of because the ports in Jamaica do not have port reception facilities to treat and dispose of ship generated waste.



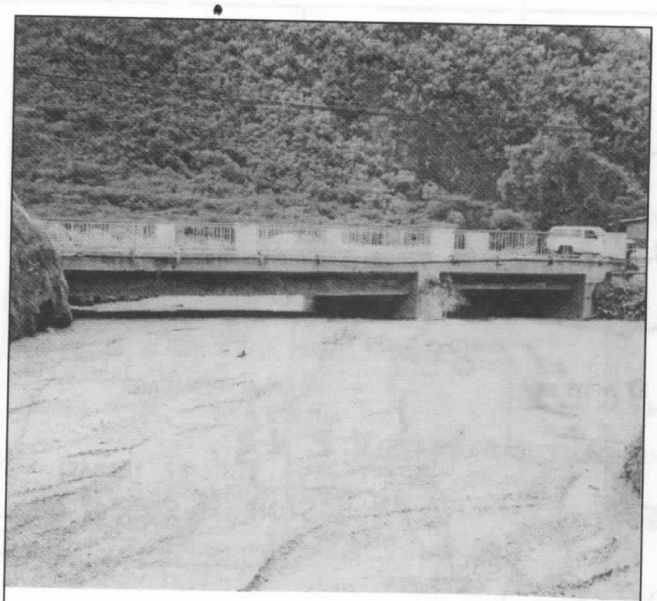


15 Natural Disasters & Environmental Accidents

Jamaica is susceptible to natural hazards, due to its physiography, geological history, and geographical location. These include earthquakes, hurricanes, tropical storms, flooding, and landslides, which usually result in loss and damage to human life, crops, ecosystems, and property. Some hazards are caused by man; including oil and chemical spills, and fires. While natural disasters cannot be controlled, man's use of the environment can reduce or increase the level of impact experienced. As such, land-use planning must incorporate accurate information on areas of high risk, and activities and management practices in these areas have to be carefully designed and implemented.

Issues

- Expanding urbanization of reclaimed land in the narrow coastal fringe and on steep slopes increases risks from natural disasters and requires large-scale hazard mapping and improved site selection.
- Excessive soil erosion raises the levels of stream beds, contributing to flooding. In extreme rain storms, sediments can fill up the stream channel causing sudden shifts in the course of the streams.
- Natural and man-made disasters have indirect damages and costs, though they are not usually quantified.
- The respective agencies are now working to put together a Flood Plain Management System based on flood zone maps, This system would regulate and guide residential development, location of roads and critical lifeline facilities
- An effort by the NRCA to reduce pollution of the industrial sector has shown that many plant operators have little information on effluents and emissions that they produce, and few have ever done any environmental audits.



Sand removed by erosion from the hills filled up the river at Bull Bay, October 1996

Trends and Indicators

15.1 The major fault systems in Jamaica, active since the last 10 million years, are the Duanvale, Spur Tree, Rio Minho-Crawle River, South Coast, Wag-water, Jacks Hill, and Blue Mountain-Plantain Garden fault systems.

15.2 The Jamaica Seismograph Network consists of 10 stations. Earthquakes of Modified Mercalli (MM) intensity VII are expected in Kingston on average every 38 years. Intensity VII earthquakes are considered very severe, causing major structural damage to many buildings. The latest Earthquake, on January 13, 1993, was of

usual intensity on the Richter scale, and resulted in extensive but mostly non-structural damage.

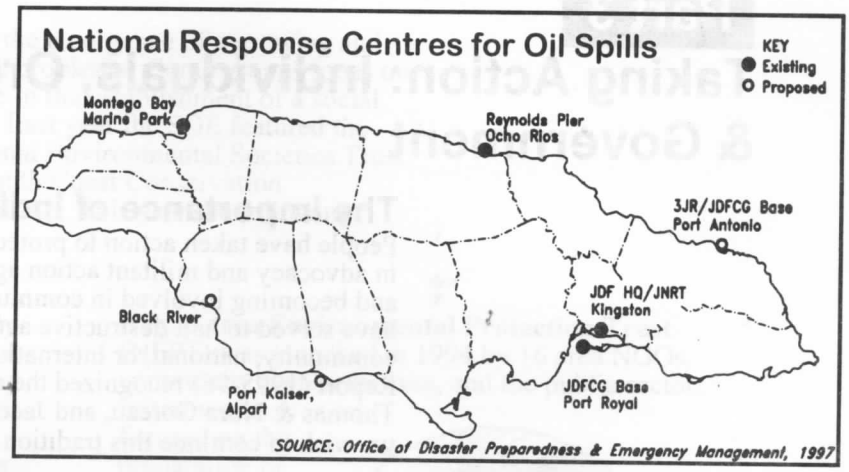
15.3 The earthquake risk is not the same for the whole Island. The rate of damaging earthquakes ranges from more than 20 per century in Kingston & St. Andrew to less than 5 per century in the West.

15.4 There is a 27% probability of a hurricane affecting Jamaica in any given year. Hurricane frequency is not uniformly distributed. Jamaica was impacted by nine hurricanes during each of the decades 1910-1919 and 1930-1939.

15.5 Direct damage from Jamaica's last major hurricane, Gilbert in 1987, stood at US $956 million. Roughly 50% of beaches were seriously eroded, 60% of mangrove trees were lost, 50% of the oyster resources were unsalvageable, marine water quality deteriorated, and landslides were widespread.

15.6 Flooding in 1995 affected 416 families with an estimated loss of J$250 million.

15.7 Environmental accidents in Jamaica to date are relatively localized and infrequent. The following are notable incidents over the past 4 years.



Chlorine gas release, NWC facility at Mona reservoir (1996)
Chlorine gas release, Water treatment facility, Falmouth (1991)

15.8 Investments in equipment and training continue related to environmental accident preparedness and quick response capability, especially with respect to oil spills. Four National Response Centres have been set up, with another three proposed. Inventory of stores for oil spill equipment 1995/96 by ODPEM totaled J$1,242,000. (ODPEM)

Major Natural Disasters 1985-1996

Year	Type of Event	Fatalities	Population Affected	Economic Losses (JA$)	Relief (JA$)
1985	No Major Natural Disasters				
1986	Flooding	49	-	$382,500,000	-
1987	Flooding	-	-	$100,000	-
1988	Hurricane (Gilbert)	45	1,000,000	$4,500,000,000	$2,100,000
1989	No Major Natural Disasters				
1990	No Major Natural Disasters				
1991	Flooding	-	2700	$317,400,000	$14,490,000
1992	Earthquake	-	-	-	-
1993	Flooding	-		$82,000,000	$11,500,000
	Earthquake	-	-	$15,810,000	$13,350,000
1994	Tropical Storm (Gordon)	-	4 families	$3,800,000	-
1995	Flooding	-	416 families	$250,000,000	-
1996	No Major Natural Disasters				

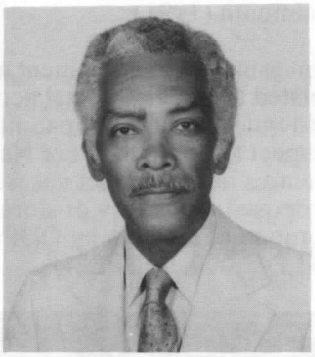
SOURCE : OFFICE OF DISASTER PREPAREDNESS& EMERGENCY MANAGEMENT 1997

Part 3
Taking Action: Individuals, Organizations & Government

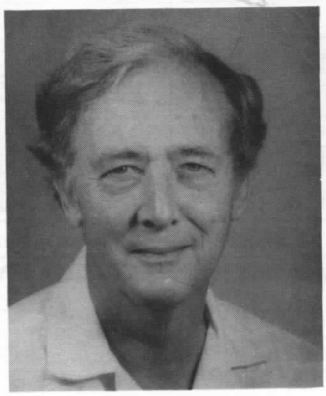
The Importance of Individual Initiative

People have taken action to protect the environment in a number of ways; engaging in advocacy and militant action against pollution, carrying out research and training, and becoming involved in community development planning efforts. Such initiatives have served to halt destructive action either directly, or through the invocation of community, national, or international action. The first State of the Environment Report (1995-96) recognized the contributions of Harold Cahusac, Lisa Salmon, Thomas & Nora Goreau, and Jacob Taylor to the Jamaican environment. This year we wish to continue this tradition with the following notable individuals.

Ambassador Don Mills has had a distinguished career in the Jamaican public and diplomatic service. He was a Vice-Chairman of the (Rio) UNCED Conference and played a significant role in ensuring the participation of NGO's. He has served on the Beach Control Authority, the Watershed Protection Commission, the Natural Resources Conservation Departments Advisory Board and was the first Chairman of the NRCA (1991-93).

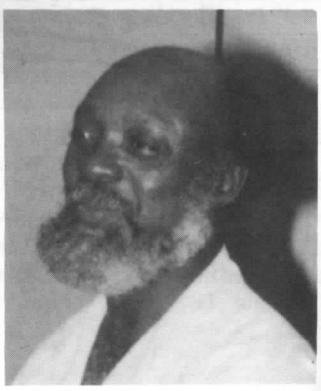


Dr. Ivan Goodbody, Professor Emeritus of the University of the West Indies (Mona), is a zoologist living and working in Jamaica since 1955. He has given distinguished service to the former Beach Control Authority, the Watershed Protection Commission and the NRCA Board and was the first Chairman of the Scientific Authority of the Convention on International Trade in Endangered Species of Fauna and Flora (CITES). Minister Douglas cited Dr. Goodbody as "foremost in bringing to the attention to us Jamaicans, and internationally, the level of biodiversity that we have, and the link between our watersheds, our gullies, our streams, our Harbour, and the Caribbean Sea."



Dr. Joyce Glasgow has been a pioneer in Environmental Education in Jamaica, the Caribbean, and internationally. Her efforts to infuse environmental literacy into the school curriculum have led many to an appreciation of the "web of life." She is author/ co-author of four in the series of UNESCO-UNEP, teacher training guides in use around the world.

Dr. Ted Aldridge was the first head of the Environmental Control Division of the Ministry of Health and Environment. His career covered both technical work in sanitary engineering and public health, as well as environmental policy at the national and international levels. He was a board member of the NRCD in the 1970's and later was a Government appointee to the newly created Board of the NRCA with the enactment of the NRCA in 1991. Dr. Aldridge was a leader in Jamaica's preparation for the 1992 UNCED "Earth Summit" in Rio, and was a moving force behind the compilation of Jamaica's Country Report to that Conference. At the time of his untimely death, in 1994, Dr. Aldridge had his own environmental consultancy.



Group and Community Action

Jamaica, like countries all over the world has seen the emergence of a growing and strong community NGO movement to resolve local problems. Some groups focus on the environment, others on development. All share in the establishment of a social partnership in support of sustainable development. Last year the SOE featured the Bluefields People's Community Association, National Environmental Societies Trust, Portland Environmental Protection Association, South Coast Conservation Foundation, and the Kiwanis Club of North St. Andrew. This year the following organizations are highlighted.

Natural History Society of Jamaica is probably Jamaica's oldest environmental NGO. It was started in 1940 by the Institute of Jamaica's Natural History Division staff and interested teachers. Its focus has been on both conserving the natural habitat and learning about it. Currently the Society operates out of the Department of Zoology at UWI, reflecting an increasing role of scientists and educators. Initially, the Society networked with its members through its "Natural History Notes" and produced popular radio broadcasts. Today it is visible through its colorful Jamaican Naturalist magazine and publications such as the Blue Mountain Guide.

The Jamaica Conservation and Development Trust (JCDT) celebrates its 10th anniversary this year. It has three programme areas aimed at promoting sustainable development in Jamaica. The Environmental Management Programme participated in the establishment of Jamaica's first two National Parks, the Montego Bay Marine Park and Blue Mountain John Crow Mountains National Park. The JCDT was recently delegated authority by the NRCA to manage this latter park. JCDT is also responsible for managing the National Parks Trust Fund. Its Environmental Education Programme includes radio programmes, school visits, a quarterly newsletter *Tody News*, and the environmental page in the *Children's Own* newspaper. JCDT organized the country's first Green Expo in June of 1996, where over 12,000 people attended. Its third programme area is Environmental Advocacy.

Negril area Environmental Protection Trust (NEPT) was launched in 1994 by 16 area NGOs, community representatives, and the public sector. Initial work focused on the preparation of an Environmental Protection Plan which sets the "Action Agenda" currently being implemented. This includes declaring the Negril and Green Island watershed areas as Jamaica's first Environmental Protection Area, and establishing protected areas within it, including a Negril Marine Park. Other ongoing work relates to promoting water saving sanitation alternatives, developing an environmental "Code of Conduct" for hotels, and setting up local tree nurseries. NEPT recently launched a fundraising campaign to help finance Negril's environmental agenda. Its goal is to raise U.S. 2 million by 2000.

Wildlife & Environment Conservation Action Now (WECAN) is a youth club with offices at the Hope Zoo. It works towards the appreciation, study, and conservation of wildlife and the environment - "youth educating youth." Projects and activities include recycling of paper and plastics, and production of the WECAN newsletter, maintaining a demonstration organic garden, nature hikes and school presentations. The group recently completed a 5 year "strategic" plan.

Non Government and Community Based Organizations Active in the Environment

Note: Date refers to year established. Asterisk indicates current (1997) membership in the ***National Environmental Societies Trust****, the national umbrella organization for environmental NGOs. Productions of informational newsletters are noted in Italics.*

Organizations with an Island-wide Focus

Association of Development Agencies, 1985
(For Your Information, bi-monthly)

* Association of Science Teachers of Jamaica (ASTJ), 1950
(science textbook contributions)

* Blue Cross Health & Environment Foundation, 1992
(Papers on environmental and health issues)

* Construction Resource & Development Centre (CRDC), 1983 *(Caribbean Housing newsletter)*

* Geological Society of Jamaica,1965
(Journal of the Geological Society of Jamaica)

* Gosse Bird Club, pre-1950 *(GosseBird Club Broadsheet)*

* Jamaica Alternate Tourism, Camping & Hiking Association, (JATCHA) 1982

* Jamaica Conservation & Development Trust (JCDT), 1987
(*Tody News,* quarterly)

* Jamaica Environment Trust (JET), 1991
(Earth Notes newsletter)

* Jamaica Environment Youth Network (JEYN), 1991

Jamaican Geographical Society, 1956
(The Jamaican Geographical Society newsletter)

Jamaica Horticultural Society (JHS), 1825

* Jamaica Orchid Society,1956

* Jamaica Organic Growers Association, Ltd. (JOGA), 1990

* Jamaica Society for the Prevention of Cruelty to Animals (JSPCA), 1920 *(brochures)*

* Jamaica Sub-Aqua Club (JSAC), 1957

* National Arboretum Foundation, 1991

* National Environmental Societies Trust (NEST), 1989
(*Chirpings, quarterly)*

* National Wildlife Foundation, 1991

* Natural History Society of Jamaica, 1941
(Jamaica Naturalist) & (Blue Mountain Lounge Magazine)

Private Sector Organization of Jamaica (PSOJ), 1976
(The Enterprize, quarterly)&(The Jamaica Economy)

Social Development Commission (SDC), 1937

* Town & Country Planning Association of Jamaica 1972

* Wildlife & Environment Conservation Action Now (WECAN), 1991 (*W.E.C.A.N. Magazine)*

Organizations with a Local Focus

Kingston & St. Andrew

Community Environmental Resource Centre (CERC)

Friends of Jamaica Environment Committee

Friends of Hope Zoo, 1981 *(Inactive but expected to be revived soon)*

Future Vision Foundation

Guiding Light Foundation, 1992

Hollywell Conservation Foundation, 1992

* Hope Zoo Trust (1984)

ICWI Group Foundation, 1988
(Science Learning Centre newsletter)

* Jacks Hill Community Council, 1978

Jamaica Environment Youth Watch

* Kingston Restoration Company Ltd. (KRC), 1983.

* New Haven Riverside Gardens Community Association, 1972

Partners of the Americas/Natural Resources Management Committee (POTA/MRMC) 1993

Projects for the People, 1979

Rockfort/Warieka-East Kingston Environment Trust, *1995 (Ten Thousand Trees for the Environment, school manual)*

St. Catherine

Joint Portmore Environmental Council, 1996
(Joint Portmore Environmental Newsletter)

Portmore Environmental Protection Trust, (PEPT), 1983

* Portmore Joint Citizen's Association 1992 *(PCJA News, and the former Portmore Echo)*

* South Coast Conservation Foundation (SCCF) 1992

Clarendon

Aneon Town Local Disaster Preparedness Committee, 1985

Enviroment Protection Development Corps,1995

South East Clarendon Development Foundation

Manchester

Central & South Tourism Organization (CESTO), 1985

* Jamaica Junior Naturalists, 1982 *(Crocodile News, last issue 1995)*

St. Elizabeth

Malvern Science Resource Centre, 1992

* St. Elizabeth Environmental Protection Association (SEEPA, formerly BREPA), 1990

Westmoreland & Hanover

* Bluefields Peoples Community Association, (BPCA) 1989

* Negril area Environmental Protection Trust (NEPT), 1994

* Negril Chamber of Commerce, 1983

* Negril Coral Reef Preservation Society (NCRPS), 1990 (*Reef Rap quarterly)*

St. James

* Environment Watch Organization, 1993

* Montego Bay Marine Park Trust, 1992 *(Montego Bay Marine Park Quarterly, News Quarterly update)*

St. James (cont'd)

South St. James Social & Economic Development Trust

St. James Environmental Protection Trust (STEPT) inactive.

Trelawny

* South Trelawny Environmental Protection Association/ South Trelawny Development Agency, 1995

* Trelawny Environmental Protection Association (TEPA), 1992

St. Ann

* Fishries Improvement Project 1988

* Friends of the Sea (FOTS),1991 *(Sea Views newsletter)*

St. Ann Organic Growers Association (STOGA)

* St. Ann Environmental Protection Association, 1989

St. Mary

* International School of Jamaica, 1986

St. Mary Association for Recovering Tomorrow

St. Mary Environmental Protection Committee

Portland

* Portland Environmental Protection Association (PEPA), 1988

St. Thomas

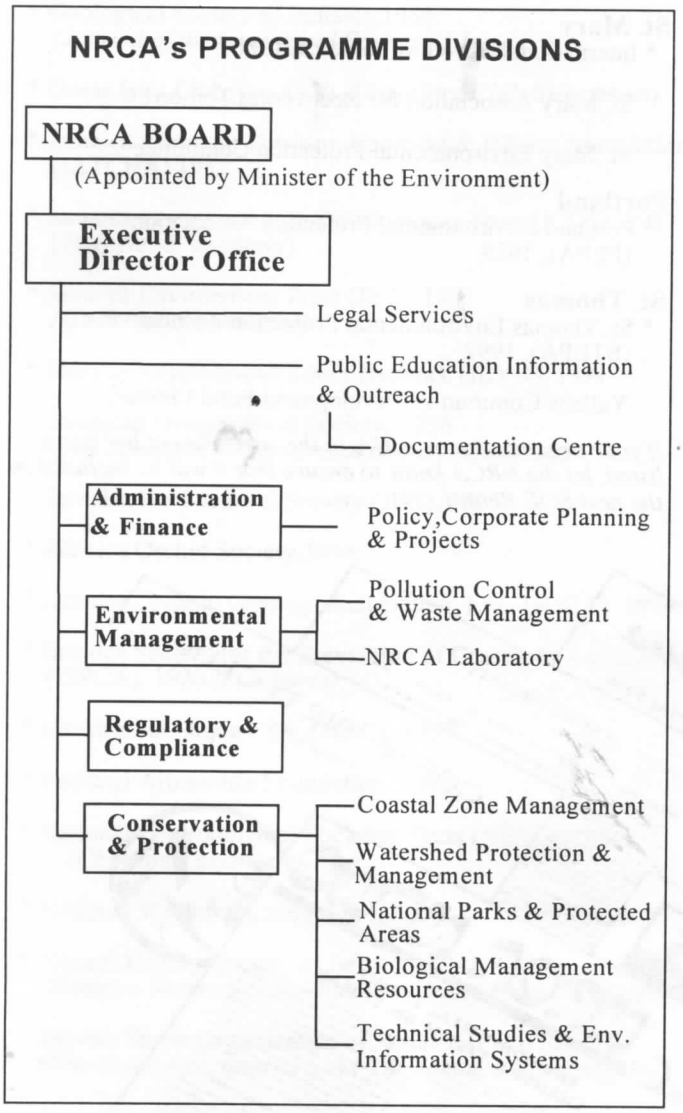
* St. Thomas Environmental Protection Association (STEPA), 1992

Yallahs Community Development Fund Limited

If your organization is active in the environment but is not listed, let the NRCA know to ensure that it will be included in the next SOE Report.

The NRCA: Its History, Mission, Achievements and Targets

The Natural Resources Conservation Department (NRCD) was established in 1975 when Jamaica, on returning from the first United Nations Conference on the Environment (Stockholm 1972), attempted to address the need for an umbrella environmental management agency. The NRCD was formed by merging a number of existing Commissions; the Watershed Protection Commission, the Wildlife Protection Committee, the Beach Control Authority, the Natural Resources Planning Unit, the Marine Advisory Committee, and the Kingston Harbour Quality Monitoring Committee. In addition to the responsibilities contained within the three related Acts, the NRCD was mandated by Parliament to protect general environmental quality, and as such was organized and given additional technical capability in the areas of aquatic resources management (water quality, wetlands, and oceanography) and wildlife management.



The NRCD, while attempting to manage Jamaica's environment effectively, was limited by the absence of certain fundamental powers, thereby making it essentially an advisory body. This need for more legislative authority, as well as a more comprehensive environmental management framework, led to the NRCD being transformed into the NRCA in 1991. The expanded authority of the NRCA includes the power to request environmental impact assessments for projects, license discharges of trade effluent to the environment, require performance evaluation of pollution control facilities, and declare and manage national parks and other protected areas. Additionally, that NRCA Act supersedes all other legislation in matters concerning management of natural resources and general environ-mental quality, and is binding to the Crown. The NRCA exists to provide the management framework for the conservation, protection and sustainable use of Jamaica's natural resources in collaboration with its partners in the public and private sectors. The NRCA's functions can best be understood by the work of the programme divisions within it.

Legal Services

Mission: to assist the Authority to fulfil its legal obligations, and understand its legal rights and duties to carry out the mandate given to it by statute.
1997-98 Budget: Operates from NRCA's recurrent budget, with staff of 2 lawyers and one secretary.
Achievements 1996-97:include passage of the NRCA (Permits and Licenses) Regulations 1996: assistance to the NRCA Board Legal Committee on amendments to the NRCA, Beach Control, Wild Life Protection, and Watershed Protection Acts; revision of Beach Licensing procedures; delegation instruments for local management of the Blue John Crow Mountains National Parks, and Montego Bay Marine Park; regulations for use of section 33 of the NRCA act to declare the first Environmental Protection Area in Negril; development of national legislation for accession to CITIES (Convention on International Trade in Endangered Species); revision of the section 17 notice procedures to obtain information on effluent discharges; develop procedures for service of enforcement notices and an administrative interpretation of serious threats to natural resources and public health

Targets for 1997-98
Development of Regulatory Agenda; Regulations for all Protected Areas under the NRCA Act; Beach Control Safety regulation; Regulations under the Watershed Protection Act; Workshop on environmental law for police and members of the Judiciary; Seminar on Environmental Laws and Sustainable Development; implementation of CITIES legislation; Court actions for illegal beach encroachments & failure to respond to section 17 Notices; Preparation of delegation instrument for Negril Marine Park & Environmental Protection Area, South Coast, Port Antonio.
Assistance: provided by the Canadian ENACT programme, USAID DEMO Project.

Public Education, Information and Outreach

Mission: to educate Jamaicans about the value of the environment and how to conserve, protect and use our natural resources in a sustainable way; increase knowledge about environmental laws and regulations and encourage compliance; functions as a national focal point for environmental information; and build and maintain the NRCA's corporate image.
1997-98 Budget: J$2.5 million an increase of 240% over the 1996-97 period. It has a staff of 8.
Achievements 1996-97: include the introduction of Caribbean based resource materials in schools; leading observations of National Awareness Week; extensive public information campaigns related to the Environmental Permit & Licence System and Parks and Protected Areas System; support to the National Environmental Education Committee.
Targets for 1997-98: include development and implement of a National Environmental Education Action Plan for sustainable development; expanded observance of National Environmental Awareness Week and other events on the environmental calendar, continued integration of environmental education in schools and at the community level; integration of environmental education and public awareness considerations in the work programme of each branch of the Authority.
Assistance: provided by the Canadian ENACT programme, USAID DEMO Project.

NRCA Documentation Centre

Mission: to acquire, organize retrieve and disseminate information relevant to all subject areas covered by NRCA's mandate. The Centre is the InfoTerra focal point for Jamaica. It cooperates on a regular basis with over 36 agencies both locally and internationally. The Centre is open to the public.
1997-98 Budget: It has a staff of 3 and operates from the Public Education, Information and Outreach budget.
Achievements 1996-97: satisfied over 433 request for information from the public (local and overseas). Over 700 items of information were send to individuals and agencies in the public and private sector. The Centre was commended by INFOTERRA PAC, Nairobi Kenya for its level of activity in 1996.
Targets for 1997-98: increase of the professional staff complement, provide public access to computerized databases, increase the number of items registered in the database; repackaging of information to satisfy various levels of users

Administration & Finance

The mission of this Division is to provide the required human resource management system and appropriate administrative and financial resources to the NRCA. Its Human Resource Development Office, Management & Support Services, Budget and Property & Transport Units have a staff of twenty-six and administered a recurrent budget of J$74 million in 1997-98. The major programme unit within this division is Policy, Corporate Planning & Projects (described below).

Policy, Corporate Planning and Projects

Mission: is to improve the institutional capacity of the NRCA through strengthening the leadership of the organization, maximizing the effectiveness of donor funding, facilitating information flows, and ensuring the progress of projects.
Routine activities include preparing proposals, selecting projects and securing funding; networking with the GOJ resource management agencies and ENGO's to develop joint projects with the NRCA; establishing contacts among donor agencies; maintaining a project information system; collaboration with the National Environmental Societies Trust to conduct short joint training workshops; undertaking special projects and monitoring all donor funded projects, and preparing the Corporate Plan for the NRCA.
1997-98 Budget: operates from NRCA's recurrent budget with a staff of five.
Achievements 1996-97: include revising the mission statement of the NRCA; establishing Quality Teams; implementing workshops on project design methodology; and preparing the Jamaica National Environmental Action Plan monitoring report.
Targets for 1997-98: include identification of legislation and regulation gaps; Review of all Permits and Licenses issued by the Authority and conditions made enforceable; implementation of CITIES legislation.

Environmental Management

Pollution Control and Waste Management

Mission: maintain an effective pollution control and waste management programme to protect human health and the environment. This often requires collaboration with a number of government and private sector organizations.

1997-98 Budget: J$2.0 million, a 50% decrease over the 1996-97 period; Staff of 10 persons.

Achievements 1996-97: include spearheading the development and implementation of NRCA's Environmental Permit & Licence system including the development of supporting documentation such as Guidelines for Conducting EIA; gazetting of regulations related to ambient air quality standards; finalizing of trade and sewage effluent standards; preparing of stack emission and vehicular emission standards; development of programmes for the phasing out of ozone depleting substances and, in collaboration with PCJ, for the phasing out of lead in gasoline. In addition, the branch aimed to maintain an effective national programme to control pollution, manage waste and encourage compliance

Targets for 1997-98: include establishing standards for potable water; drafting regulations for trade effluent, sewage effluent, stack emissions and vehicular emissions; getting the Section 17 database fully operational and implementing the Montreal Protocol Technical Programme.

Laboratory Services

Mission: support the programmes of Pollution Control and Waste Management and other NRCA branches, and the routine water quality monitoring of some of the Island's rivers and beaches.

1997-98 Budget: J$460,000 approximately 30% less than the 1996-97 period. It has a staff of 5.

Achievements 1996-97: include approval of a laboratory staff structure, improvement of physical facilities and acquisition of some new equipment; upgrading of water quality monitoring programme and development of a water quality monitoring network; participation in the development of water quality standards; training of technical staff in air quality monitoring, acquisition of a vehicle; upgrading the inventory of equipment and reagents;; and conducting training workshops on water quality monitoring among other government agencies and NGO's.

Targets for 1997-98: include regularizing a system for the dissemination of information; training field personnel in water sampling and preservation techniques and a completing a Procedures Manual to improve laboratory operations.

Assistance: comes from USAID/DEMO

Regulatory and Compliance

Mission: encourage voluntary compliance with the NRCA Act and associated environmental regulations and investigate suspected violations and follow up with prosecution as necessary. Responsibilities include conducting investigative site visits, serving enforcement notices, liaising with other divisions of the NRCA to undertake environmental monitoring; establish regulatory and compliance procedures, appoint wardens and rangers; and train staff, the police and members of the judiciary.

1997-98 Budget: J$15.5 million an increase of 80% over 1996-97. Staff of 20 includes 13 Environmental Wardens working in the field.

Achievements 1996-97: include recruitment and training of wardens; 137 site visits completed with four warning letters; nine post-permit monitoring exercises with no significant breaches observed since the introduction of the Permit and Licensing System in January of 1997.

Targets for 1997-98: include obtaining field office space for Environmental Wardens; ratification of a Motor Vehicle Policy to ensure that all environmental wardens have access to motor vehicles; and working closely with NRCA's Legal Department to follow-up on outstanding matters to be dealt with such as enforcement notices.

Conservation & Protection Division

This division integrates the NRCA's natural resource planning and management functions. It comprises the following 5 branches.

Coastal Zone Management

Mission: To develop and implement an integrated programme for the conservation and sustainable use of the coastal zone by encouraging stakeholders to adopt environmentally sound practices and to comply with laws and regulations

1997-98 Budget: is approximately J$2.0 million, a 17% decrease from the 1996. It operates with a staff of 7.

Achievements 1996-97: include progress towards a Coastal Zone Management Plan for Jamaica including inventories and resource mapping; seven policy and guideline documents; and updating Beach Control licenses.

Targets for 1997-98: period include restoration of 5 public bathing beaches, completion of Coastal Zone Atlas; implementing a coastal zone monitoring programme; and developing policies, guidelines, and regulations related to use of wetlands and beaches, protection of coral reefs and mangroves,

waste disposal at sea and cost recovery for resource use.

Assistance: continues to be provided under the Jamaican/Sweden Cooperation- Comprehensive Coastal Planning agreement.

Watershed Protection and Management

Mission: to develop an integrated policy framework, public education and participatory management system to enable stakeholders to manage and use watershed resources in a sustainable manner.

1997-98 Budget: is approximately $2 million, a decrease of 8.9%. It operates with a staff of nine, including 5 working primarily in field offices.

Achievements 1996-97: commenced with draft watershed policy and regulations; formed partnerships with NGOs and other government agencies such as RADA in farmer training and environmental awareness; exhibited at Agri-Expo shows and related events; and collaborated on watershed monitoring and protection projects (Yallahs/ Morant, North East Jamaica Agro-Forestry Project, Black River).

Targets for 1997-98: period include drafting watershed regulations and developing 3 pilot groups for participatory management in priority areas (Rio Cobre, Rio Grande, Great River).

Assistance: continues to be provided through the UNDP and USAID DEMO project.

Biological Management Resource

Mission: to achieve a balanced co-existence between man and his natural environment by ensuring the survival of Jamaica's flora and fauna and the sustainability of the country's biological resources.

1997-98 Budget: of J$758,000. Staff of 9 persons. This branch and the National Parks & Protected Areas was formed out of the NPPAW branch with a 1996-97 budget of J$534,000.

Achievements 1996-97: include accession to CITES; submission of the Bill for Trade of Endangered Species to Parliamentary Council; the protected animals in captivity policy. Ongoing activities included the development and implementation of management plans for endangered species (Giant Swallowtail Butterfly), monitoring of the bird shooting season; preparation of an orchid policy as well as a policy for wild and protected animals held in captivity; and developing strategies for Hellshire Hills and Canoe Valley protected areas.

Targets for 1997-98: include implementing amendments of the wildlife protection Act, regarding trade in endangered species; implementation of management and recovery plans (iguana, manatee, crocodile, sea birds etc).and preparation of additional plans (the Giant Swallowtail Butterfly and Orchid Policy).

National Parks & Protected Areas

Mission: to create and maintain in collaboration with private and public sector groups a system of protected areas which is managed for the social and economic benefit of the public.

1997-98 Budget: is 1.7 million. The staff includes 4 persons. The unit was formed out of National Parks, Protected Areas and Wildlife (NPPAW).

Achievements 1996-97: include islandwide presentation and subsequent approval of the "Policy for the National System of Protected areas" by Parliament; the declaration of Negril & Green Island watersheds as Environmental Protection Area; the delegation of management authority for the Blue John Crow Mountains National Park and Montego Bay Marine Park to NGOs; and technical assistance to NGO's in the preparation of protected area management plans.

Targets for 1997-98 include declaration and local management of at least 7 additional protected areas; finalization of a financing strategy for the Protected Areas system; and promotion of increased public awareness for the system of National Parks and Protected Areas.

Assistance: continues to be provided through the USAID PARC 2 and DEMO projects.

Technical Studies & Environmental Information Systems

Mission: to support the other branches of the NRCA in developing systems to gather, manage, analyse, share and publish Environmental Information

1997-98 Budget: operates from NRCA's recurrent budget, Staff of 4 persons.

Achievements 1996-97: provided 50% of staff with fulltime computer access; Introduction of GIS (Geographical Information System); production of environmental issues maps for Negril, St. Elizabeth & the Palisadoes; Introduced the technology to produce computer generated posters & displays; Development of Webpage (www.nrca.com); Design and planning of a Local Area (LAN) and Wide Area Network (WAN).

Targets for 1997-98: include the implementation of a LAN/WAN; development of the Webpage to include all policy documents & recently published reports, Implementation of Web GIS& Intranet technololgy. The development of georeferenced databases for Environmental monitoring and management, including the Beach Licence and the Environmental Permit & Licences Systems; Implementation of an institutional GIS;

Assistance: continues to be provided by the USAID PARC II and DEMO projects

Activities Of Other Government Agencies

Almost every developmental activity in one way or another affects the natural environment. Thus, Jamaica, like many other countries, has a number of institutions, which are responsible for managing various aspects of the environment. All these agencies need to work together in a coordinated effort. The Inter-agency Technical Advisory Committee on the. Environment has over 40 representatives, illustrating the challenges of collaboration and coordination. The following are some of the key government agencies with which the NRCA collaborates in the protection and sustainable use of the Jamaican environment

Environmental Control Division (ECD) within the Ministry of Health is responsible for the control of air and water pollution, abatement of environmental health hazards, and provision for health and safety in the workplace. The ECD enforces regulations under the Public Health Act, 1974. As a development review body, the ECD approves all engineering plans and specifications for water and wastewater treatment and disposal facilities for subdivisions and development projects.

Some of the ECD's achievements during 1996 included water quality sampling (nearly 7000 samples analyzed), regular inspections of 112 sewage treatment plants, and monitoring of conditions at beaches (drinking water, fish contamination, etc.).

The Town Planning Department (TPD) is the implementing arm of the Town and Country Planning Authority. It is responsible for preparing national, regional, urban, and local development plans and Development Orders. In addition to plan preparation, the TPD advises the local authorities on applications for subdivisions, change of use, and building activities. The TPD also provides advice to the public, developers, and other government agencies on matters relating to the use of land.

During 1996 the agriculture, forestry and mining components of the new National Physical Plan were completed.

The Fisheries Division within the Ministry of Agriculture and Mining, with a staff of 44, regulates and monitors harvests of fish resources, promotes fish farming, and manages two Fish Sanctuaries.

Recent activities include education and data collection programmes on six north coast fishing beaches; a needs assessment of the Port Royal Beach with training on environmentally sustainable fishing methods; enforcement of the closed lobster season; the promotion of a mesh size increase for fishtraps (to 1.5" or larger); and assistance with alternatives to harvesting reef fish (Irish moss mariculture, cage culture of Tilapia). A new Fisheries act has been drafted and is currently under review by Government agencies

Other Agencies and Institutions Involved in the Environment

- Bureau of Standards
- Coffee Industry Board
- Consumer Affairs Commission
- Jamaica Bauxite Institute
- Jamaica Coast Guard
- Jamaica National Heritage Trust
- Jamaica Tourist Board
- Lands Department
- Land Development & Utilization Commission
- Kingston & St. Andrew Corporation
- Marine Police
- Mines and Geology Division
- National Irrigation Commission
- National Water Commission
- Office of Disaster Preparedness and Emergency Management
- Parks and Markets Companies
- Pesticide Control Authority
- Petroleum Corporation of Jamaica
- Port Authority of Jamaica
- Public Health Department, Ministry of Health
- Rural Agricultural Development Authority,
- Rural Physical Planning Unit
- Scientific Research Council
- Sugar Industry Authority
- Sugar Industry Research Institute
- Urban Development Corporation

Forest and Soil Conservation Department within the Ministry of Agriculture and Mining has responsibility for the management of the nations forest estate of over 107,190 ha. (9.7% of Jamaica's land area). The current staff of 120 was recently strengthened by the new Forest Act (1996). This legislation allows for the establishment of "Forest Management Areas" to be used for generation of forest products, soil and water conservation, provision of parks and other recreation amenities, and protection of native plants and animals.

The Blue and John Crow Mountain National Park was established on Forest Reserve lands, and is being managed cooperatively by the Forestry Department, NRCA and the recently delegated NGO, the Jamaica Conservation and Development Trust.

The Water Resources Authority (WRA) was authorized by the Water Resources Act (1995) and replaced the Underground Water Authority. Its mandate is to regulate, allocate, conserve, and manage Jamaica's water resources. The WRA collects data on streamflow, groundwater, water quality, and other hydrologic/hydrogeologic features. It advises developers, investors, private and other government agencies on matters related to water availability and protection. The Authority has the primary responsibility for ground water quality assessment and can declare and manage "Water Quality Control Zones" for the protection of water quality. The authority also plays a key role in flood hazard assessment and manages the only real time flood warning system in the island.

Current efforts focus on alleviating seasonal water supply problems by working with the NWC to augment the annual supply of water to population pressure points such as Portmore; the rehabilitation and upgrading of the national hydrometric (monitor) network; the conservation of water as a part of an ongoing public education/awareness program.

Tourism Product Development Company Ltd. (TPDCo.)(formerly Tourism Action Plan Limited or "TAP") mission is to develop and improve the tourism product in order to position Jamaica as a preferred destination and to ensure that tourism is sustained as a major contributor to the economy. TPDCo plans and implements projects in resort areas, and develops and monitors standards and guidelines for the tourism industry. In collaboration with government ministries and agencies, TPDCo manages the Sustainable Environment Tourism (SET) programme, a Government of Jamaica programme aimed at improving resort towns. During 1996, SET completed 31 projects at a cost of $47 million. Some examples of these projects are the upgrading of sidewalks, the upgrading of the Montego Bay Fishmarket, the directional signs & information boots, the beach zoning and beautification projects in Negril.

The Planning Institute of Jamaica (PIOJ) was set up to strengthen the planning capability of the Government of Jamaica. It initiates and coordinates planning for the economic, financial, social, cultural, and physical development of the country. With respect to the environment, the PIOJ focuses on the integration of Environmental and Economic Issues

Many of its documents, including the annual Economic and Social Survey of Jamaica, provide useful information on resources use as well as the socio-economic and cultural links to them.

The International Centre for Environmental and Nuclear Sciences (ICENS), at the University of the West Indies focuses on applied research concerned with environmental geo-chemistry and its relationship with human, animal, and plant health. Recent work includes studies on lead contamination in the Hope Mine/Kintyre area of St. Andrew; high soil arsenic concentrations in St. Elizabeth; and publication of the Geochemical Atlas of Jamaica. Training of staff and postgraduate students is an important aspect of the Centre's work.

Local Government/Local Authorities
Local government's involvement in environmental management takes place primarily through the operations of the Parish Councils. Parish Councils have two broad areas that carry with them environmental responsibilities. They function as the local health boards and as the local planning authorities. The Ministry of Local Government acts mainly to set policy, provide funding, and monitor activities. It becomes involved in implementation only where policy changes are required. Environmentally related programmes of the Parish Councils include public cleansing and management of dump sites, land use planning and development control, maintaining public bathing beaches and monitoring bathing water quality, protection of watershed areas around local water supply sources, and assisting central government agencies in general environmental monitoring.

Funding Assistance for Environmental Action

Resources to support environmental action take the form of people, community groups, businesses, and funding institutions. At one end of the spectrum people give of their time and use there personal equipment to support particular activities. Financial support is given as cash, equipment and materials, and discounts on purchases of goods and services. At the other end of the spectrum there are local and international institutions which fund projects on a regular basis.

Environmental Funds

The Environmental Foundation of Jamaica (EFJ) was created in 1991 under the Enterprise for America's initiative Debt Reduction Agreement States of America. The mandate of the EFJ is the support activities designed to conserve and manage the natural resources and environment of Jamaica. The EFJ achieves this mission primarily through providing funds to NGO and community based organizations for projects and programmes.

Acronyms of International Donor Agencies

CARICOM, Caribbean Community
CIDA, Canadian International Development Agency
EU, European Union
FAO, Food and Agricultural Organization of the United Nations
GEF, Global Environmental Facility
IDB, Inter-American Development Bank
OAS, Organization of American States
OECD, Organization of Economic Cooperation and Development *
UNEP, United Nations Environmental Programme
UNDP, United Nations Development Programme
USAID, United States Agency for International Development

* As of January 1, 1997, the following 29 countries were members of OECD: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.

EFJ Funding Trends

Period	Funds Approved (Millions $Ja)	Funds Disbursed (Millions $Ja)	Number of Projects Supported
93 - 94	17.90	10.30	30
94 - 95	77.51	27.50	95
95 - 96	57.70	49.35	94
96 - 97	44.68	36.90	81

The Global Environment Facility (GEF) is a financial mechanism that provides grant and concessional funds for projects that aim to protect the global environment, especially in relation to climate change, biological diversity, international waters, and depletion of the ozone layer.
The GEF programme is implemented jointly by the United Nations Development Programme (UNDP), the United Nations Environmental Programme (UNEP) and the World Bank. UNDP is responsible for the technical assistance activities, capacity building, and the Small Grants Programme. UNEP is charged with catalyzing the development of scientific and technical analysis, advancing environmental management in GEF-financed activities, and managing the Scientific and Technical Advisory Panel. The World Bank, the repository of the Trust Fund, is responsible for investment projects, and mobilizing resources from the private sector.

GEF projects in Jamaica are:
- JPS Demand Side Management Demonstration
- Caribbean Planning for Adaptation to Climate Change.
- Regional Project for Planning and Management of Heavily Contaminated Bays and Coastal Areas in the Wider Caribbean.

Enabling activity projects were prepared for: National Biodiversity Strategy and Action Plan and First National Report to the Conference of the Parties to Convention on Biological Diversity.

First National Communication to the Conference of Parties to the UN Framework Convention on Climate Change.

A project proposal regarding the Cockpit Country is being developed by the National Environmental Societies Trust.

The Green Fund is a four-year programme launched in 1993 by the Canadian International Development Agency (CIDA). The focus has been support to community-based initiatives in the management of Jamaica's natural resources. The Fund total was Can. $ 2 million (J $ 48 million). As of the end of March 1979, a total of J $ 36 million (Can. $ 1.5 million) had been approved for 95 projects. The greatest proportions of funds (33%) were spent on public education.

The Dutch Environmental Fund, started in January 1997 is expected to continue indefinitely. It is adminstered by the Netherlands Embassy, and will finance small-scale environmental projects up to $US 250,000.

Assistance to the NRCA during the 1996/97 year

CIDA
Environmental Action Programme (ENACT)
Phase I, 1994-1996; Phase II, 1996-2004
Funding level: J$ 375 million (Can $15 million)

SIDA
Jamaica/Sweden Cooperation
Comprehensive Coastal Zone Planning Project.
Sept. 1994- Dec. 1997
Funding level: U.S. $ .5 million

UNDP
Environmental Management of Watersheds & Development of Institutional Capability
Nov. 1996 - Nov. 1997
Funding level: UNDP, U.S. $119,000;GOJ J$10,922,539 (in kind)

UNDP/UNEP
Kingston Harbour Rehabilitation
Jan. 1996 - Dec. 1997
Funding level: U.S.$ .5 million (by UNDP

UNDP
National Programme for Recovery & Recycling of Refrigerants
April 1997-October, 1998
Funding level: U.S.$172,465

World Bank
National Action Plan for Preparation of the Phase out of Lead in Gasoline
March 1997-June 1997
Funding level: U.S.$11,000

USAID
Development of Environmental Management Organizations (DEMO)
Oct. 1992-Sept 1997 (with extension to May, 1998)
Funding level: U.S. $10.4 million (Note, the second phase of the Protected Areas Resource Conservation Project, PARC II has been incorporated as a part of DEMO.

Other Donor Assistance

During 1996, the institutions listed above, along with other donor organizations, assisted a wide range of government and non-government organizations with the development and implementation of environmental projects. Areas of focus included the following:

Institutional Strengthening. (USAID, CIDA-UNDP, IDB, UNEP)

Sewerage/Solid Waste Management (USAID, IDB, OECD, EU)

Watershed/Forestry/Agro-forestry (Hillside Agriculture/Fisheries USAID, CIDA, UNDP, FAO, OECD, CARICOM Secretariat, Netherlands Government, EU)

Development Planning (UNDP, IDB)

Community Development/Community Resource Management (OAS, CIDA)

Environmental Monitoring/ Research/ Information Systems (CIDA, FAO, IDB)

Storm Water Drainage/Flood Control (UNDP, OECD)

Typhoid Control and Prevention (USAID)

Environmental Policy/Regulations USAID)

Protected Areas (USAID, EU)

Shelter/Urban Infrastructure (USAID, UNDP, OECD)

Public Education/Awareness (All Institutions)

Other international organizations outside the main donor community have assisted Jamaica in its environmental work. These have included regional and international non-governmental organizations and private institutions.

Annex I
Information Sources

In addition to NRCA documents and staff experience, the following were sources of information used in the preparation of this State of the Environment Report.

Population

1. PIOJ, Economic & Social Survey- Jamaica 1996, pp.17.1 , 17.2, 17.3, 17.4 &17.5b
2. Statistical Yearbook of Jamaica, STATIN, 1996 pp.69 & 75
3. A Statement of National Population Policy- Jamaica PIOJ,1995
4. The Daily Gleaner, "Population Measured at 2.5 mil in 1996" Jampress Release, April 16, 1997 p.3

Economy

1. PIOJ, People Magazine, Vol. 6 No. 1, May 1996
2. Sunday Herald," Jamaica's External Debt", May 11, 1997, p.1B
3. Ministry of Health, estimates 1996
4. JAMPRO, Jamaica A Premier Investment Location, pp.3 &4
5. JPSCO, Background on Jamaica: 1997
6. The Sunday Gleaner, "Investing for Community Development, JSIF", April 27, 1997

Shelter

1. PIOJ, Survey of Living Conditions 1993, pp.46
2. Operation Pride, Brochure (1996)
3. Ministry of Environment and Housing, estimates 1996-97
4. The Daily Gleaner, "The Montego Bay Sewerage Improvement Project", March 15, 1997, p. B16

Tourism & Recreational Resources

1. PIOJ, Economic and Social Survey-Jamaica 1996
2. STATIN, estimates 1996 p. 316
3. Jamaica Tourist Board, Planning, Research & Statistics Department information
4. St. Ann Development Company, 1997, statistics
5. Jamaica's Heritage: An Untapped Resource by Tourism Action Plan Ltd. and Jamaica National Heritage Trust (1991)
6. The Daily Gleaner, "Tourism Needs Attention", April 3, 1997 p. A12
7. Also information from Petroleum Corporation of Jamaica, Soil Conservation and Fisheries Division

Cultural and Historic Resources

1. Jamaica National Heritage Trust (JNHT), information
2. JNHT, Journal of Jamaica, "Trails of Jamaica", Vol.26. No. 1, June 1996
3. Jamaica National Heritage Trails information

Mineral Resources

1. Mines & Geology, estimates 1997
2. The Jamaica Bauxite Institute, information

Energy Resources

1. Petroleum Corporation of Jamaica Reports, 1997
2. PIOJ, Jamaica Survey of Living Conditions 1993, P.48
3. Jamaica's Energy: Old Prospects, New Resources, Raymond Wright, PCJ 1996
4. PIOJ estimates, Motor Vehicles Imports, 1996
5. Focus on Science & Technology by Scientific Research Council Vol II No.1 Jan-March 1996

Agriculture

1. Ministry of Agriculture and Mining, Statistics 1997
2. Jamaica Agricultural Society, estimates, 1997

Watersheds & Forest Resources

1. PIOJ, Economic and Social Survey of Jamaica, 1996, pp. 15.2
2. Petroleum Corporation of Jamaica estimates, 1997, pp. 15.2

3. Forestry Department, estimates, 1997
4. NRCA internal reports, 1997
5. Deforestation in Jamaica. Analysis of the Data by Owen B Elvelyn, Feb. 1997
6. "The Tropical rainforest of Jamaica". by L. Allan Eyre, Jamaica Journal, volume 26:1, 1996

Coastal and Marine Resources

1. Fisheries Division, estimates 1997
2. NRCA internal reports, 1997

Biological Resources & Protected Areas

1. JCDT information
2. NRCA internal reports

Water Resources

1. National Water Commission, estimates 1997
2. Environmental Control Division, Ministry of Health, Annual Report 1997
3. PIOJ, Jamaica Survey of Living Conditions 1993
4. Water Resources Authority, 1997, information and Statistics
5. Underground Water Authority, Water Resources Development Master Plan, 1990
6. Water Resources of Jamaica Availability and Quality 1993 Status by Basil Fernandez, p. 17

Air and Water Quality

1. NRCA internal reports, 1997
2. Centre for Nuclear Sciences, UWI, estimates, and 1997
3. NRCA, National Action Plan for the Phase Out of Leaded Gasoline in Jamaica (Draft), 1997
4. NRCA (prepared by Dr. Claude Davis), Motor Vehicles Emission Standards for Jamaica (Draft), 1997
5. Control Division, Ministry of Health, Report 1997 Louis Buger and Associates
6. Jamaica Survey of Living Conditions, 1993 , pp.47-48

Solid Waste

1. Environmental Control Division Report, 1997
2. NRCA internal reports, 1997
3. WISYNCO Trading Ltd., information 1997
4. Grace Kennedy & Co. (recycling) information 1997
5. Desnoes & Geddes Co. (recycling), information 1997

Natural Disaster and Environmental Accidents

1. Office of Disaster Preparedness and Environmental Management, estimates 1997
2. Geology Department, UWI information 1996

Additional Sources

1. Jamaica Profile, winter 1996-97 Tourism Product Development Company Publication.
2. National Environmental Societies Trust Newsletter, Chirpings, March 1997

ANNEX II
Recent Publications on the Environment

*Note: * Indicates available on NRCA's WEB page, located at site http:\\www.nrca.org*

NRCA Documents:

Mangrove and Coastal Wetlands Protection: Draft Policy and Regulation (Sept 1992)

Jamaica Coastal Resources: A Reconnaissance Report (January 1995)

Findings Of A Beach Use Survey Conducted Islandwide (February 1995)

Municipal Solid Waste Management Course Documentation (April 1995)

Report On Negril Public Beach Access Signage Programme (June 1995)

NRCA guidelines related to Preparation of an Operations & Financing Proposal for Delegation of Authority to Manage a National Park or Protected Area (November 1995)

Towards Permitting And Licensing System For National Parks & Protected Areas In Jamaica (January 1996)

NRCA Guidelines Pertaining to Marinas and Small Craft Harbours (July 1996)

National Policy for The Conservation Of Seagrasses (July 1996)

Final Report: Negril Mooring & Zoning Buoy Installation And Maintenance Training Programs (August 1996)

NRCA's Project Planning And Proposal Writing Manual For Environmental Projects (December 1996)

Guidelines for the Planning and Execution of Coastal and Estuarine Dredging Works and Disposal of Dredged Materials (January 1996)

NRCA Guidelines for the Planning, Construction, and Maintenance of Facilities for Enhancement and Protection of Shorelines (January 1996)

Guidelines for Construction, Maintenance, and Monitoring of Underwater Pipelines, and Cables in the Coastal Zone (January 1996)

Guidelines for the Deployment of Benthic Structures (April 1996)

Beach Policy: A Policy for the Use of the Foreshore and the Floor of the Sea (September 1996, Draft).

* State Of The 1995-1996 Environment

Guidelines for Conducting Environmental Impact Assessments (January, 1997)

Caring for the St. Elizabeth Area; Lands, Waters & Resources, A Community Information & Discussion Booklet, (March, 1997)

Palisadoes – Port Royal Protecting Our Natural and Cultural heritage A Community Discussion Booklet (April 1997)

Negril Environment Protection Area Water Quality Monitoring Programme Draft Proposal (June 1997)

Study Tour of U.S. And Caribbean Parks And Protected Areas (July 1997)

Report On The Environmental Awareness Survey Of Black River Area (July 1997)

Manual for Integrated Coastal Planning and Management in Jamaica: Draft. (August 1997)

Coral Reef Protection and Preservation Policy and Regulations Draft. (October 1997)

Coastal Atlas (December 1997)

NRCA Mariculture National Policy (September 1997)

Mangrove And Coastal Wetlands Protection Draft Policy And Regulation (October 1997)

Negril Environmental Protection Plan (November 1997)

Sustainable Interventions for Negril Fisher Families (December 1997)

Participatory Rural Appraisal For Natural Resources Management (A Manual Of Techniques)(February 1998)

Demo Project Newsletter (Institutional Capacity Building) (March 1998)

Report On The NRCA/Demo Training Programme (Human Resource Development For Environmental Management) (March 1998)

Negril Area Environmental Protection Trust Working For " Ridge To Reef Conservation" (Brochure)

Environmental impact Assessments presented to the NRCA are on file at Documentation Centre.

Environmental Policy and Legislation

* Towards a National System of Parks and Protected Areas (1995 White Paper) (WEB)

Water Resources Act (1995)

National Industrial Policy, Growth and Prosperity; The Way Forward (1996 White paper)

The Natural Resources Conservation (Permits and Licenses) Regulations, 1996, Jamaica Gazette Supplement, Vol. CXIX, Friday Dec. 20, 1996, No. 113 & No.114 (for sale at NRCA)

Forest Act (1996)

Other

A Geochemical Atlas of Jamaica, Centre for Nuclear Science, UWI (1995)

Economic and Social Survey for Jamaica, 1996 by planning Institute of Jamaica (published annually in April)

Jamaica Journal, Vol. 26, and No.1: June 1996 (special issue focusing on the environment)

Jamaica Energy: Old Prospects New Resources by Raymond W. Wright. PCJ, 1996

Environmental Code Of Conduct For Hotels - Nept/JHTA (Brochure)

Note: *Acts and Gazetted documents are sold by Jamaica Printing Services*

ANNEX III
International Environmental Treaties & Conventions

The International and Regional Environmental Treaties & Conventions to which Jamaica is presently a party, are:

International Plant Protection Convention, Rome, 1951. **Accession**: 24 November 1969.

Convention on the Territorial Sea and the Contiguous Zone, Geneva, 1958. **Accession**: 8 October, 1965.

Convention on the Continental Shelf, Geneva, 1958. Accession: 8 October 1965. **Entry into Force:** 7 November, 1965.

Convention on the High Seas, Geneva, 1958. Succession: October, 1965. **Entry into Force:** 30 September, 1962.

Convention on Fishing and Conservation of the Living Resources of the High Seas, Geneva, 1958 Succession: 16 April, 1964. **Entry into Force:** 20 March, 1966.

Treaty banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Underwater, Moscow, 1963. **Ratification:** 22 November, 1991.

Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space including the Moon and other Celestial Bodies, London, Moscow, Washington, 1967. **Ratification:** 10 August, 1970

Treaty on the Prohibition of the Emplacement of Nuclear Weapons and other weapons of Mass Destruction on the Sea Bed and the Ocean Floor and the Subsoil thereof, Washington, 1971. **Ratification:** 30 July, 1986

Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction, London, Moscow, Washington, 1972. **Accession:** 13 August, 1975

Convention concerning the Protection of the World Cultural and Natural Heritage, Paris, 1972. **Acceptance:** 14 June, 1983

Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (as amended), London, Mexico City, Moscow, [Washington], 1972. **Ratification:** 22 March, 1991

Definitions of Terms

Treaty: is an international agreement entered into by 2 or more states governed by International Law.

Acceptance: is where a state expresses its intention to consent to a treaty subject to ratification. It is a step towards signature and ratification.

Signature: is where states signs and exchange treaty instruments.

Ratification: is the formal confirmation and approval of the treaty instrument.

Accession: is where a state did not participate in the negotiating process of a treaty but wishes to enter and be bounded by its provisions. Accession has the same effect as signature & ratification.

Entry Into Force: where the treaty provision begin to apply as agreed by all negotiating states or where consent to be bound has been established by all negotiating states.

International Convention on the Prevention of Pollution from Ships, London, 1973. **Ratification:** 13 June, 1991

Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, London, 1973. **Ratification:** 13 June, 1991

United Nations Convention on the Law of the Sea, Montego Bay, 1982. **Ratification:** 21 March, 1983

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region, Cartagena de Indias, 1983. **Ratification:** 1 May, 1987.

Protocol Concerning Cooperation in Combating Oil Spills in the Wider Caribbean Region. **Entry into Force:** 1 May, 1987

Vienna Convention for the Protection of the Ozone Layer, Vienna, 1985. Accession: 31 March, 1993. **Entry into Force:** 29 June, 1993

Montreal Protocol on Substances that Deplete the Ozone Layer, Montreal, 1987. Accession: 31 March, 1993. **Entry into Force**: 29 June, 1993.

London amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, London, 1990. **Ratification:** 31 March, 1993.

United Nations Framework Convention on Climate Change, New York, 1992 Instrument of **Accession** deposited: 6 January, 1995; **Effective:** 5 April, 1995

Convention on Biological Diversity, Rio de Janeiro, 1992. Instrument of **Accession** deposited: 6 January, 1995; Effective: 5 April, 1995

Convention on International Trade in Endangered Species of Wild Flora & Fauna (CITES) Instrument of **Accession** deposited, signed on 24 March, 1997. **Effective:** 22 June, 1997.

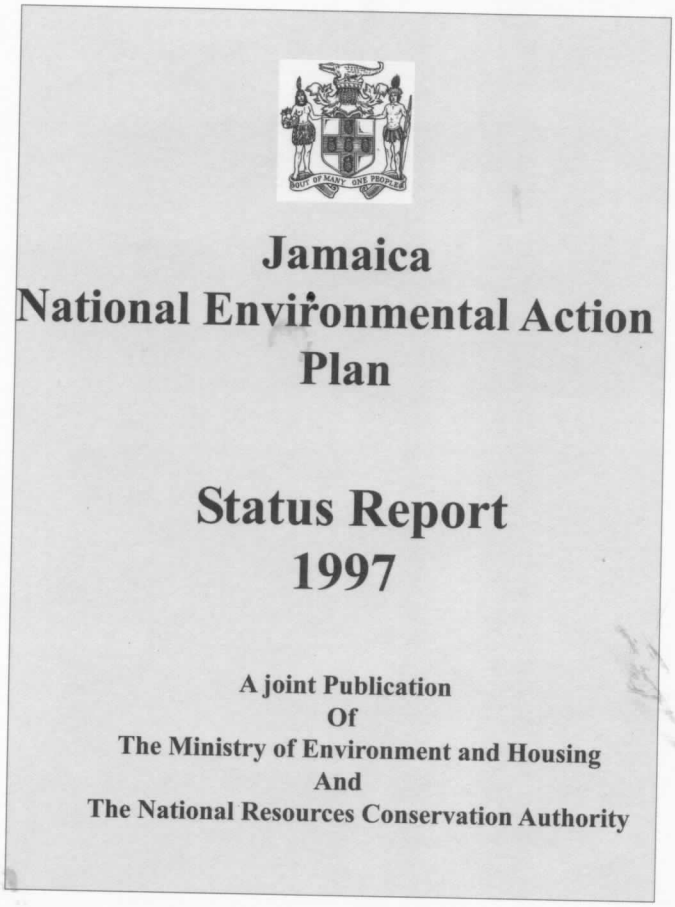
Convention of Wetlands of International Importance especially as Waterfowl Habitats (Ramsar Convention) Instrument of **Accession** deposited 13 June 1997. **Effective:** 7 February 1998.

The Copenhagen Amendment to the Montreal Protocol on Ozone Depleting Substances. Instrument of **Accession** deposited 6 November 1997. **Effective:** 4 February 1998.

UN Convention to Combat Desertification. Instrument of **Accession** deposited 12 November 1997. **Effective:** 10 March 1998.

The Jamaica National Environmental Action Plan

The clearest statement of Government Policy and Programmes related to the environment is documented in the Jamaica National Environmental Action Plan (JANEAP). Action Plans are prepared every three years (1995, '98, '01, etc.) with annual Status Reports. Over 35 public and private sector agencies, institutions, and organizations participated in preparing the 1997 Status Report updates. It describes progress made towards implementing plan actions, as well as noting "new sectors for national action". The following are some highlights.



- Progress towards a National Land Information System, including computerized ownership and valuation databases, a state-of-the-art Geographic Information System (GIS) lab at the Management Institute for National Development (MIND) and a training programme for its use.
- Progress, under the Town Planning Department, with revision of the National Physical Plan, including a National Settlement Strategy.
- Steps towards greater efficiency and more coordinated land management decision-making by the NRCA, Town Planning Department, Land Development and Utilization Commission, and Rural Physical Planning Unit.
- Progress on coral reef protection through preparation of a draft National Coral Reef policy, establishment of an island-wide Coral Reef Monitoring network, a reef baseline study for Portland Bight, and continued work on Marine Protected Areas in Negril, Port Antonio and Port Royal-Palisadoes.
- Progress towards better dealing with oil and chemical spills through the hosting by PCJ of national and regional workshops and training activities, including mock oil spill exercises.
- Progress towards strengthening local government's capacity to effectively deal with environmental issues through Parish wide consultations on sustainable development.
- Launching Jamaica's Sustainable Development Council in mid 1996 to monitor the country's progress towards agreements made at the Rio conference and Agenda 21 by the PIOJ and Ministry of the Environment and Housing.
- Progress towards adoption of the international environmental standards "ISO 14,000", under the leadership of the Bureau of Standards and PSOJ.

Copies of the JANEAP 1997 Status Report are available from the NRCA .