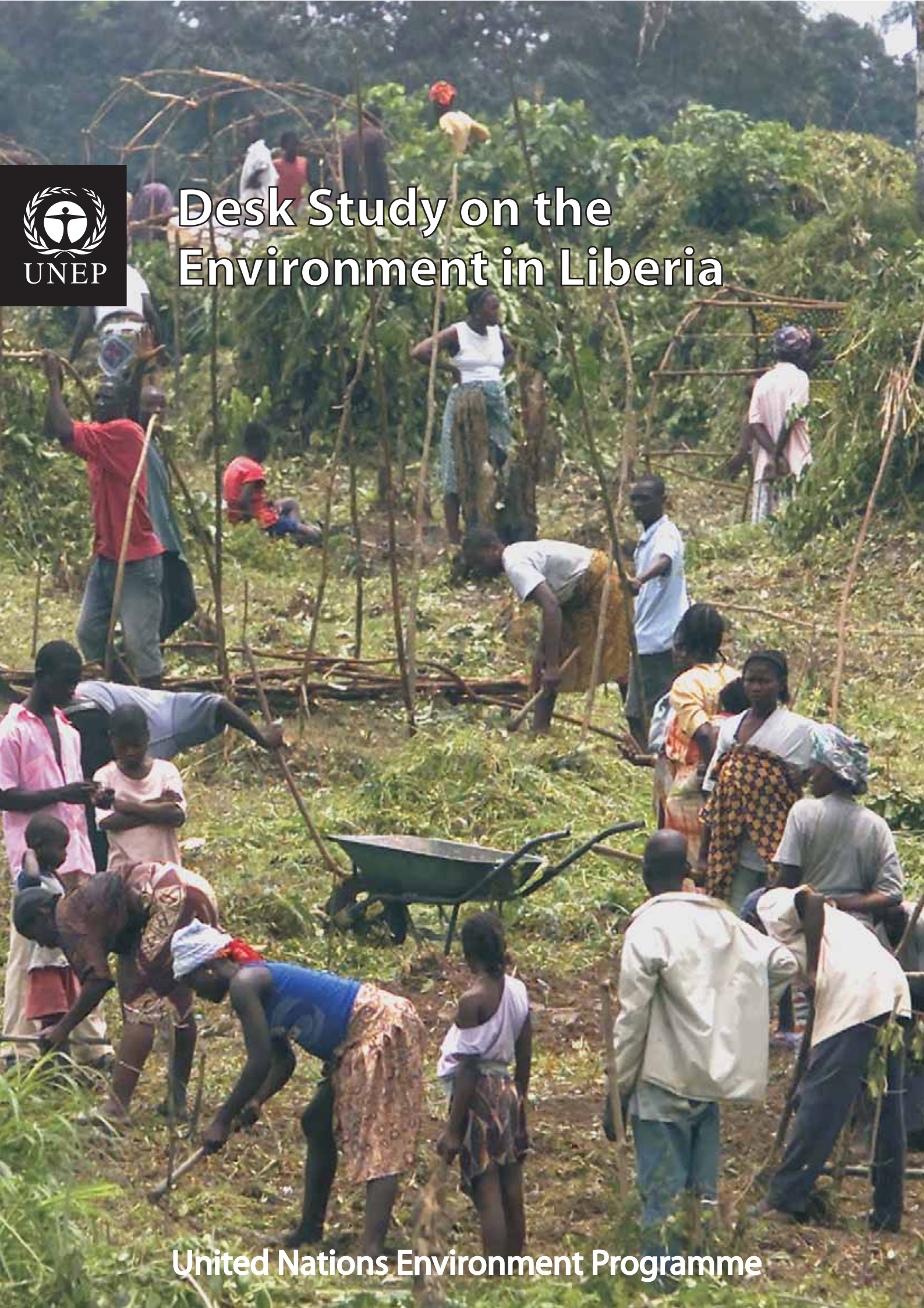




Desk Study on the Environment in Liberia



United Nations Environment Programme

First published in Switzerland in 2004 by the United Nations Environment Programme.

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ISBN 92-807-2403-7

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DISCLAIMER

This revised edition includes grammatical, spelling, and editorial corrections to a draft version of the report released in February 2004.

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Cover Design and Layout: Matija Potocnik

Maps: Ola Nordbeck - UNEP/PCAU

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Desk Study
on the Environment
in Liberia

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Foreword

A new chapter in the history of Liberia started when the peace agreement in Accra, Ghana, was signed in August 2003. The National Transitional Government of Liberia has been established, and the United Nations peacekeeping mission in Liberia (UNMIL) is helping to re-establish the security in the country.

The fighting in Liberia has not only had a devastating impact on its people but also on the country's rich natural resources and biodiversity. In Liberia, as is the case in many other African countries, resource abundance or scarcity is all too often the catalyst for war and suffering. The Liberian people have been forced to pay a high price for living in a country rich in prized timber and mineral resources.

In modern Africa, environment security and effective and fair resource governance are at the very heart of peacemaking and peacekeeping. The misuse of natural resources has not only been a source of conflict in Liberia and the wider region, but has also sustained it. Effective and strong management to promote the sustainable use of natural resources is central to preventing additional conflict in Liberia. For the long-suffering people of Liberia, many of whom have been displaced and separated from their families, this new era provides them with a chance for a better future.

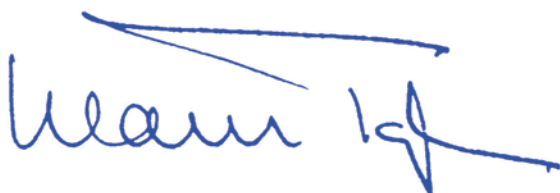
The United Nations Environment Programme (UNEP) is the United Nations agency for the environment. I have been asked many times if in the post-conflict situation – like in Liberia today – it is too early to speak about environment and sustainable development. My experience is that sustainable development cannot be achieved if one of the three key components of it – economic, social or environmental – is forgotten. In Liberia, the country's growth is dependent on the management and use of its natural resources: timber, minerals, agriculture and wildlife. Unfortunately, during the last 14 years of misery we have witnessed the woeful and unsustainable use of Liberia's natural wealth to buy arms and support conflict.

UNEP, as a part of the United Nations Development Group and its Needs Assessment process for Liberia, has managed the cross-cutting sector of environment. Working with United Nations colleagues, the government of Liberia and its agencies and with non-governmental organisations, UNEP has collated environmental background data, which is now published in this desk study. My sincere wish is that as soon as the security situation allows, the comprehensive environmental legislation already prepared by Liberia as well as recommendations of this study can be fully implemented.

UNEP has a strong track record in post-conflict work including scientific assessment reports and remediation activities in the Balkans, the Occupied Palestinian Territories, Iraq and Afghanistan. This is our first post-conflict study in Africa. With our headquarters in Africa and specialist units dealing with early warning, monitoring and assessment and African Environment Governance, UNEP can deliver real value to the Liberian reconstruction process.

This study of Liberia shows how environment and development are fully interlinked even in the poorest societies. The clean-up of the environment after the conflict period and sustainable management of natural resources are prerequisites for the safe return of refugees, sound livelihoods and successful reconstruction of the country.

I am grateful for the full support given by the National Transitional Government of Liberia and its ministries and agencies to this study. I would also like to thank the non-governmental organisations in Liberia, as well as my United Nations colleagues, who facilitated much of our work under difficult security restrictions.



Klaus Töpfer
United Nations Under-Secretary General
Executive Director of the United Nations Environment Programme

Introduction

In Liberia, direct linkages are apparent between environment and security, as well as between environment and development. Poor management and overexploitation of Liberia's natural resources has created and fuelled civil war and conflict for the past 14 years. With the Accra Peace Agreement in place and the support of the international community, there is now an opportunity for Liberians to build an accountable, transparent, representative and effective system of governance to ensure the sustainable use and development of the country's extensive natural resources.

As with all conflicts, the biggest tragedy has been the suffering and misery of the civilian population in Liberia. Tens of thousands have been injured and killed, and many left with disabilities. One in three Liberians has been uprooted and displaced. Their basic human rights and opportunity to develop has been denied. This peace accord offers hope for a new start. However, major challenges lie ahead since the 14 years of conflict have destroyed both natural resources and manmade infrastructure in Liberia. Vital infrastructure in the energy, water, sanitation, waste management and housing sectors has been partially or totally destroyed.



JEREMY HOLDEN – FAUNA & FLORA INTERNATIONAL

Natural coastal savannah near Lake Piso, Grand Cape Mount County

For displaced people and returning refugees, the most important priority is safe drinking water and sanitation. Currently, the capital of Monrovia and many other areas are totally dependant on water trucks. The temporary wells that are being drilled under houses and in gardens face the problem of cross-contamination from sewage and waste. A wide disinfection programme is underway to prevent the spread of disease caused by unsanitary conditions, such as cholera. Safe drinking water, a functioning sewage treatment and sanitation system and proper waste management are the most urgent needs in the urban areas.

With unemployment at an estimated 85 per cent, environmental protection and restoration can create much-needed new jobs through the reconstruction of water and sanitation sys-



JEREMY HOLDEN – FAUNA & FLORA INTERNATIONAL

University of Liberia students collecting botanical specimens in Sapo National Park

tems, clean-up activities after the conflict, the collection and separation of waste, environmental protection projects and integrating environment into the reconstruction process. Special attention should be paid to the role of women, particularly as the losses and casualties from war have made more families dependent exclusively on women for their livelihoods.

The destruction of the electricity production and distribution network has resulted in a massive increase in the use of charcoal. Forests – even mangrove forests in wetlands and coastal zones – are under severe pressure. Furthermore, in addition to domestic use, Liberian charcoal is being exported. The unregulated destruction of coastal forests for fuelwood, together with the mining of sand, are contributing to coastal erosion. In Monrovia, the effects of erosion can easily be seen. There is an urgent need to protect coastal, estuarine and marine ecosystems, and to implement an integrated coastal zone management plan.

As timber was cut down to finance the war, logging roads were cut deeper and deeper into virgin forest. In addition to facilitating illegal logging, these roads have also opened up greater areas to uncontrolled hunting. Not only is bushmeat consumed by the local population, but it is also being exported to neighbouring countries. Several species are already under threat. The implementation of hunting rules and regulations, and the development of alternative sources of income for the rural population are urgently needed.

The Liberian flag is well known in the world's oceans and ports, since the country has the second largest shipping fleet in the world, as a result of its status as an “open register” or “flag of convenience”. Since shipping has serious global environmental impacts and risks, it is important that, with peace prevailing, capacity is built to improve inspections and the enforcement of relevant environmental standards.

Despite the long-lasting conflict, Liberia has signed several international environmental conventions. It has also developed comprehensive environmental legislation. Protection of the environment is included in the Liberian Constitution, and there are legal requirements for all new projects to undergo environmental impact assessments. It is important that this legislation be fully implemented during the reconstruction period and beyond.



DAVID MEADOWS – UNEP / PCAU

The United Nations Mission in Liberia (UNMIL) is already implementing quick impact projects in Liberia, including projects on the environmental sector, waste management and infrastructure

The decision to establish a fully-fledged Environment Protection Agency (EPA) has also recently been taken. A Board of Directors and Policy Council will need to be designated for the new EPA, and there should be full cooperation with other ministries and government agencies. It is important that this new environmental agency, upgraded from the existing National Environmental Commission of Liberia (NECOLIB), receive the resources needed to become operational as soon as possible.

The role of the international community is crucial. The early stages of Liberia's reconstruction will depend on donor input and support. The overwhelming priority is the re-establishment of effective and good governance of Liberia's natural resources. The forest sector will be the driver for Liberia's economic development. Professional, well-equipped and effective administrations in the Forest Development Authority (FDA) and the newly established Environment Protection Agency (EPA) are essential.

This Desk Study is not intended to be a comprehensive environmental survey. It has been prepared during a period when most of Liberia was inaccessible due to the security restrictions. This study with its 60 recommendations is a rapid, strategic assessment aimed at identifying the most urgent environmental issues to be addressed as a part of Liberia's post-conflict reconstruction. The study provides an overview of the state of Liberia's environment in the context of 14 years of conflict, the United Nations sanctions and the lack of effective and good governance. I hope it will increase awareness and mobilize international assistance for priority environmental needs and projects.

The report complements the work and findings of the United Nations Development Group (UNDG) Needs Assessment Report and the efforts of the United Nations Mission in Liberia (UNMIL). During the first months of its work, UNMIL has already put in place several rapid impact projects on the environmental sector, such as the collection of metal waste resulting from the conflict and the clean-up of Monrovia's streets. In the UNDG Needs Assessment Report, environment is recognized as one of the cross-cutting topics, affecting all sectors in reconstruction.

This study has been prepared by UNEP's Post-Conflict Assessment Unit, in cooperation with the UNEP Regional Office for Africa and UNEP's Disaster Management Branch. It is based on information collected during two missions by UNEP to Monrovia, in December 2003 and in January 2004.

This Desk Study could not have been prepared without the valuable assistance of the National Transitional Government of Liberia (NTGL) and its Chairman Charles Gyude Bryant. The environmental commission NECOLIB and the Forestry Development Authority (FDA) both shared precious information with UNEP. The Ministry of Lands, Mines and Energy and the Ministry of Planning and Economic Affairs shared their views on environmental needs in Liberia. United Nations colleagues in Monrovia – including representatives of UNMIL, UNICEF, WHO, UNDP and other agencies – were fully supportive to UNEP. UNDP, with the experience of its long presence in Liberia, has been crucial in supporting the environmental sector in the country, and financing the preparation of important earlier environmental reports. Colleagues in the United Nations Development Group (UNDG) made every effort to include environment in their important work of highlighting the most urgent needs in Liberia.

During the period of conflicts, when ministries and government agencies were vandalized and burnt, while scientific institutions and the university were looted and closed, a group of people continued to collect and maintain information on the environment, and to raise environmental awareness in most difficult conditions. These were the local and international non-governmental organizations (NGOs) operating in Liberia. These people, committed to the environment and working throughout the most difficult times, deserve special acknowledgement. Among NGOs, Fauna & Flora International has been especially helpful throughout the preparation of this study. In the reconstruction period, support to civil society organizations should not be forgotten.

Liberian environmentalists, both in the administration and in many active NGOs, have shown that environmental protection and sustainable development should not be addressed only once all other problems have been solved. Instead, there should be continuous and ongoing efforts to reach these goals in order to build the wealth of the country and the region. We should all give our full support to meet these challenges.



Pekka Haavisto
Chairman
Liberia Task Force
United Nations Environment Programme

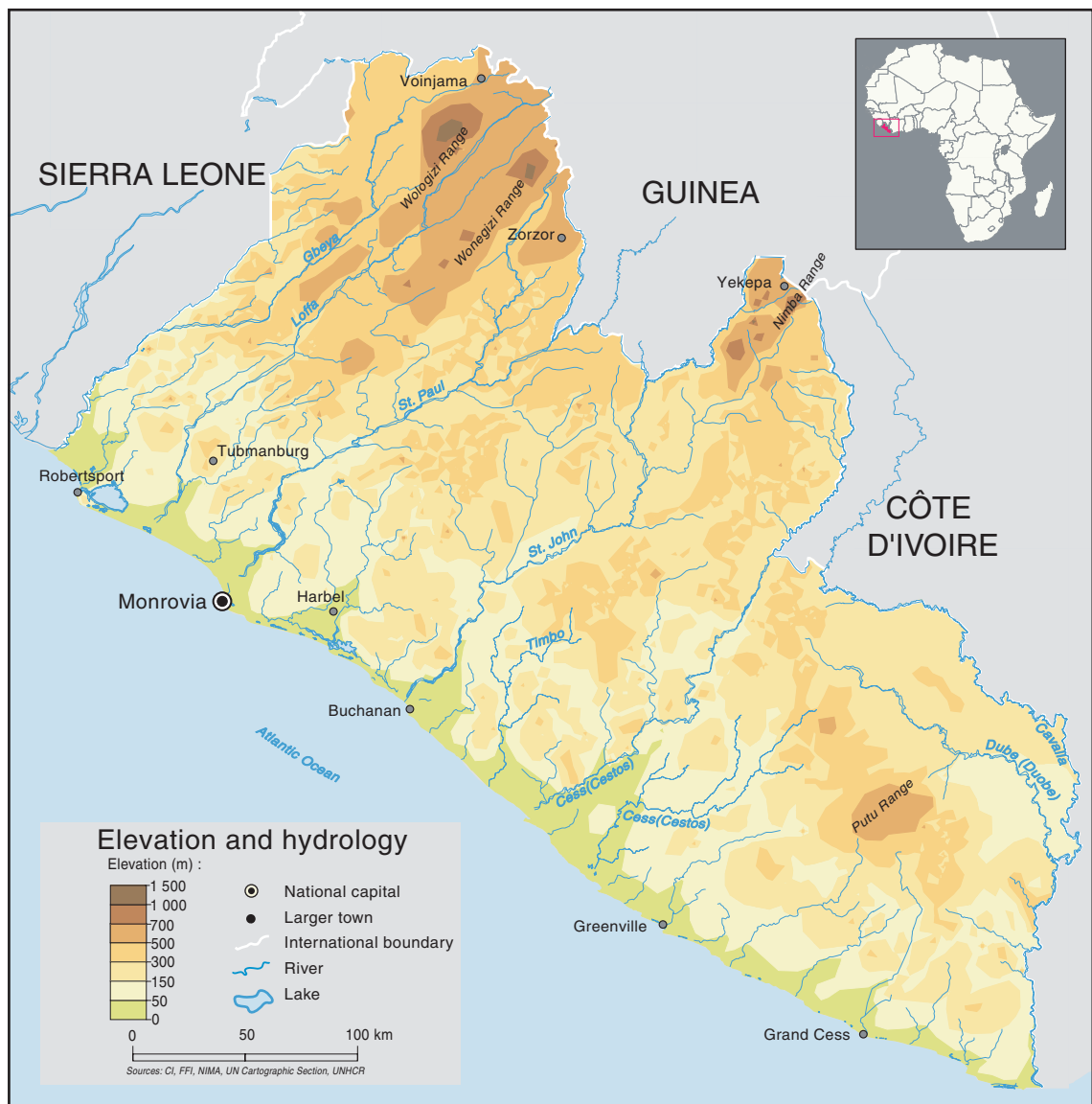
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Country context

2.1 Introduction

Liberia covers an area of 111 370 km², of which 15 050 km² is water and the remaining 96 320 km² land. It is bordered to the south by the North Atlantic Ocean, Côte d'Ivoire to the east, Sierra Leone to the northwest and Guinea to the northeast. The capital, Monrovia, is the country's largest city. Other important cities are Buchanan and Harper, situated on the coast, and the inland trade centre of Yekepa, near the border with Guinea. Administratively, Liberia is divided into 15 counties.

► Map 1. Elevation and hydrology of Liberia



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

2.2 Geographical features

Liberia can be roughly divided into four geographical zones: the coastal plain, the rolling hills, plateau and tablelands, and northern highlands¹.

► Map 2. Liberia is divided into 15 counties



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

The coastal plain of Liberia is 579 km long and is characterized by lagoons, mangrove swamps, river-deposited sandbars, riparian and coastal vegetation. This zone extends up to 65 km inland with a maximum altitude of 50 m.

The rolling hills are situated behind the coastal zone. This zone is characterized by hills, valleys and watercourses. Most of the agricultural land is situated in this zone due to the favourable climate and topography. The rolling hills have an elevation of 90 m above sea level and are covered with tropical rainforests both to the southwest and southeast.

Plateau and tablelands are up to 300 m in elevation and mountain ranges reach an altitude of 610 m. Important ranges within this zone are the Mano river mountains and the Bea, Bong, Gibi, Kpo, Putu and Tienpo ranges. The greatest width of this zone is 129 km between the Lofa and Saint Paul rivers.

The northern highlands are located in the upper Nimba and Lofa counties. The highest points of Liberia are Mount Wuteve at 1 380 m and the Liberian part of Mount Nimba, both located in the Nimba Range. The Wologizi Range in Lofa County has an altitude of 1 356 m.



JEREMY HOLDEN – FAUNA & FLORA INTERNATIONAL

Park ranger on the Sinoe River, Sapo National Park

The Upper Guinean Forest zone²

The Upper Guinean Forest zone extends across the borders of eastern Sierra Leone, south-eastern Guinea, Liberia, Côte d'Ivoire, Ghana and eastern Togo. It is considered one of the world's priority conservation areas due to its rich biodiversity and the world's highest diversity of mammals. The overall forest ecosystem covers around 420 000 km² but estimations from the Conservation Priority-Setting Workshop in 1999 suggest a forest loss of almost four-fifths of the original extent. These forests are home to many endangered animals such as pygmy hippopotamus (*Choeropsis liberiensis*), forest elephant (*Loxodonta africana*), leopard (*Panthera pardus*), numerous rare duikers like Jentink's (*Cephalophus jentinki*), zebra (*Cephalophus zebra*), Liberian mongoose (*Liberiictis kuhni*) and giant pangolin (*Manis gigantea*). The Guinean forests are also home to two subspecies of chimpanzee.

2.3 Social conditions

The Liberian population is estimated at 3,3 million of which 0,8 million live in Monrovia. However, the massive refugee fluxes caused by either fleeing or returning populations makes accurate figures on total numbers difficult. Up to one million Liberians fled to neighbouring countries in 1990 and while many returned during the calmer periods in the civil war, the renewed conflict forced people to again seek refuge in the cities of Liberia and the surrounding countries. According to a United Nations report of September 2003, there were around 500 000 internally displaced people (IDPs) in Liberia, about 300 000 were refugees in neighbouring countries and 50 000 refugees from Côte d'Ivoire and Sierra Leone remain in Liberia.³ The same report estimates the



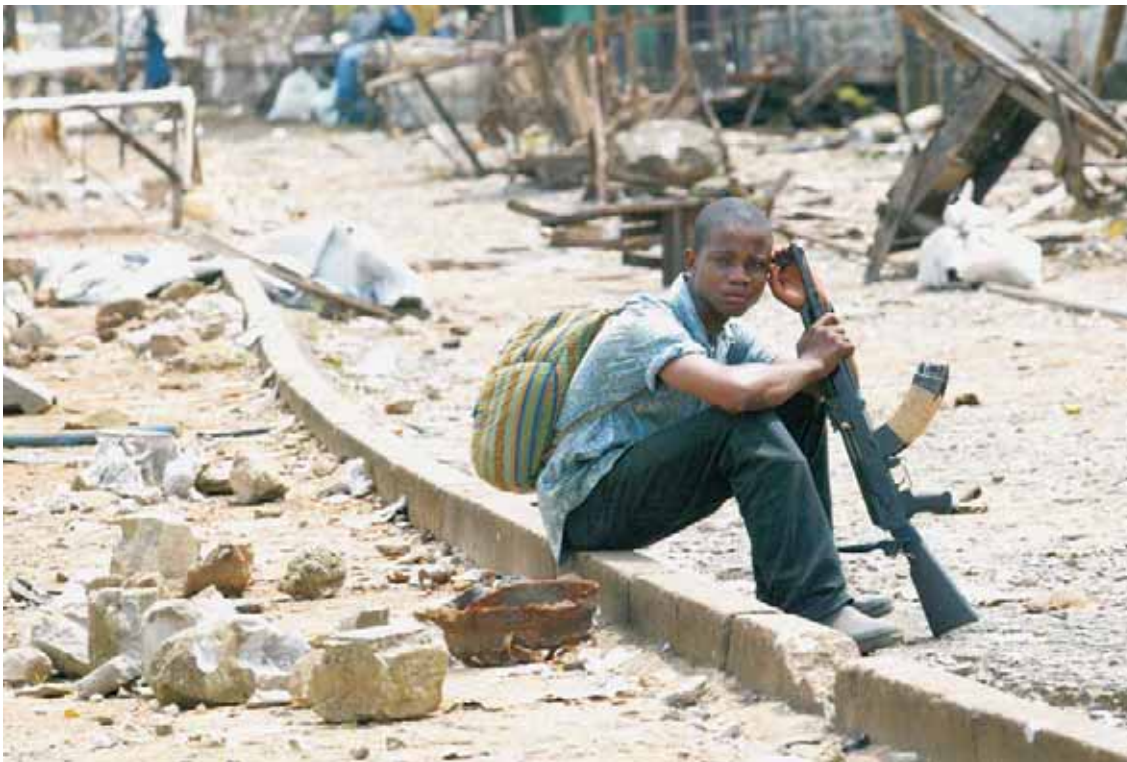
DAVID MEADOWS – UNEP / PCAU

Children in Monrovia, January 2004

number of people killed in war-related circumstances since 1989 to be 250 000, half of which were civilians.⁴

The percentage of the Liberian population living in urban areas, which prior to the conflict was already high by African standards, rose even further to reach 45 per cent in 2000.⁵ The average population growth rate in Liberia fell from 3,3 per cent in 1980–1987 to 2,5 per cent in 1990–2000 and two per cent in 2002. Infant and under-five mortality rates in Liberia were estimated in 1999 at 134 per 1 000 live births and in 2000 at 235 per 1 000 live births.⁶ Average life expectancy is 48 years.⁸ Women are expected to bear an average of 6,2 children.

Of the Liberian population, 95 per cent belongs to the 16 indigenous African tribes⁹, whereas Americo-Liberians (descendants of immigrants from the United States who had been slaves) and Congo People (descendants of immigrants from the Caribbean who had been slaves) together comprise 2,5 per cent of the population. About 40 per cent of Liberians are Christians, 40 per cent have indigenous beliefs and 20 per cent are Muslims. While English is the official language, it is only spoken by 20 per cent of the population. The remaining 80 per cent speak some 20 ethnic group languages.



JUDA NGWENYA - REUTERS

An estimated 21 000 of the 50 000 former combatants in Liberia are under the age of 18

The Liberian healthcare system has suffered severely from chronic underfunding, lack of management capacity and looting. It is estimated that less than 10 per cent of Liberians have access to health care.¹⁰ According to the World Bank, between 1997 and 2000 the total health expenditures in Liberia averaged a mere 2 USD per capita – eight times less than the figure for Côte d'Ivoire. In addition, many health care professionals have moved to the private sector and the reported number of doctors working in the public sector at the end of 2003 was as low as 25.¹¹

Communicable diseases, especially malaria, acute respiratory infections and measles along with diarrhea are major causes of illness and mortality in Liberia. The situation is exacerbated by the fact that a large portion of the population is living in temporary camps under poor sanitary conditions and only 26 per cent of the population has access to safe drinking water.¹² In 2003, there was an outbreak of a cholera epidemic in Monrovia, totaling 26 651 cases by December. HIV/AIDS prevalence in Liberia is estimated at 11–12 per cent, but in some urban areas the figure can be up to 20 per cent.¹³

The years of civil war have had a devastating effect on the educational system of Liberia, with 75 per cent of the educational infrastructure damaged or destroyed leading to a virtual collapse of educational services. Illiteracy is high, estimated nationwide at 63 per cent. However, as indicated by many other social and human development data, the situation in the countryside and among women is often worse: rural female illiteracy is reported to be 87,5 per cent.¹⁴ In early 2003, the enrolment at the primary school level was at 50 per cent for boys and 24 per cent for girls, and only 35 per cent of boys and 27 per cent of girls reached the fifth school year. The University of Liberia is situated in Monrovia and has eight faculties with about 10 000 registered students. Due to the long-term conflict and the looting that took place, the University infrastructure is largely destroyed, but the university is scheduled to re-open in spring 2004.



STEFAN MICALEFF - UNEP

Water sellers pushing their carts across the Gabriel Tucker bridge in Monrovia

The University of Liberia is situated in Monrovia and has eight faculties with about 10 000 registered students. Due to the long-term conflict and the looting that took place, the University infrastructure is largely destroyed, but the university is scheduled to re-open in spring 2004.



PEKKA HAANISTO - UNEP / PCAU

Canal filled with household waste, Monrovia



GRANT WROE-STREET - UNEP / PCAU

Unloading of a rice shipment in Free Port harbour, Monrovia

2.4 Economy

Liberians live in extreme poverty: over 85 per cent of the population live on less than 1 USD per day and even more alarming, 52 per cent subsist on less than 0,50 USD.¹⁵ Liberia was not ranked in the UNDP Human Development Indicators for 2003¹⁶, nor in the 2002 report as the accuracy of economic figures was questionable because of the civil war and lack of reliable data. The World Food Programme classifies Liberia as a least developed country (LDC) and a low-income, food-deficit country.¹⁷



GRANT WROE-STREET - UNEP / PCNU

Iron ore stockpile, Free Port harbour, Monrovia

At the beginning of 2003, the official unemployment rate in Liberia was 85 per cent with the remainder of the workforce mainly involved in the informal sector. Traditionally, around 75 per cent of the workforce has been involved in agriculture, 15 per cent in services and less than 10 per cent in mining and manufacturing.¹⁸

In the 1970s and 1980s, iron mining accounted for more than half of Liberia's export earnings¹⁹ and it was the world's fifth largest

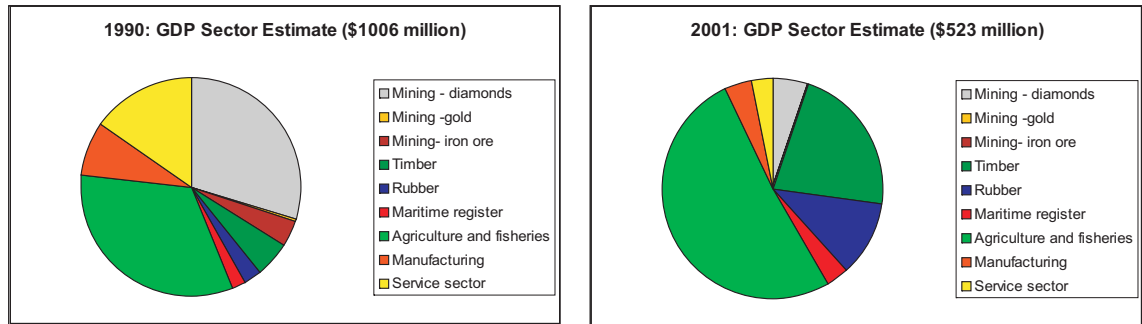
exporter of iron ore on the world market. Prior to the civil war, other major contributors to the Liberian gross domestic product (GDP) were rice and natural rubber.



STAFF - REUTERS

Liberian rubber tapper stands beside raw rubber

Figures 1 and 2 show the effect of the decade of conflict in the 1990s^{20a}



The civil war that began in 1989 had a devastating effect on the country's economy. The country's gross domestic product decreased by almost 50 per cent and the contributions of various sectors of the economy have dramatically changed as businesses were destroyed and foreign investors left the country.^{20b}

As the conflict ruined the manufacturing and iron mining sectors, timber harvesting and alluvial diamond and gold mining became important contributors to the Liberian economy. Revenues from these sources further funded and fueled the conflict.

By the end of 2000 the Liberian GDP had recovered to half of the pre-war levels, but the economic structure had changed significantly. Iron ore production had stopped completely and the rubber sector accounted for over half of export income.

From 2000 to 2002, forestry represented the country's most important economic activity, responsible for 50–60 per cent of the nation's foreign exchange and accounted for 26 per cent of GDP in 2002. In March 2003, the International Monetary Fund (IMF) stated that the near term growth prospects of the Liberian economy would rely primarily on timber products from the regions unaffected by the conflict and warned that without effective control mechanisms the viability and long-term sustainability of the forests would be endangered.²¹



JEREMY HOLDEN - FAUNA & FLORA INTERNATIONAL

Oriental Timber Company logs awaiting export in Buchanan port



GRANT WROE-STREET - UNEP / PCAU

Sunken vessels in Free Port harbour, Monrovia

Currently, the second largest source of Liberian revenue is its maritime registry. Liberia is the second largest maritime licensor in the world with more than 1 800 vessels registered under its flag, including 35 per cent of the world's tanker fleet. In 2001, Liberia's maritime revenue stood at 18 million USD.²²

Other important sources of revenue are derived from cash crops including cacao (3 000 metric tonnes), coffee (3 200 metric tonnes) and oil palm fruit (174 000 metric tonnes) from which palm oil is extracted. The fishery sector also accounts for about 15 per cent of the Liberia's GDP.²³

Despite the recent peace accord, relatively few foreign investors have returned to the country due to the depressed business climate and continuing instability.

2.5 Chronology of key events²⁴

The country's beginnings

- 1822 - Liberia founded by freed slaves from the Americas
- 1847 - Constitution drawn up, modelled on that of the USA
- 1847 - Liberia became independent
- 1917 - Liberia declared war on Germany, giving the Allies a base in West Africa
- 1926 - Firestone Tyre and Rubber Company opened rubber plantation on land granted by government; rubber production becomes backbone of economy
- 1936 - Forced-labour practices abolished
- 1943 - William Tubman elected president
- 1944 - Government declared war on the Axis powers
- 1951 - Women and indigenous property owners voted in the presidential election for the first time
- 1958 - Racial discrimination outlawed
- 1971 - William Tubman died and succeeded by William Tolbert Jr.
- 1974 - Government accepted aid from the Soviet Union for the first time
- 1975 - First Lomé Convention between Liberia and the European Economic Community (EEC) signed
- 1979 - More than 40 people killed in riots following a proposed increase in the price of rice

Years of instability

- 1980 - Master Sergeant Samuel Doe staged military coup; President Tolbert and 13 of his aides publicly executed; People's Redemption Council headed by Doe suspended constitution and assumed full powers
- 1984 - Doe's regime allowed return of political parties following pressure from the United States and other creditors
- 1985 - Doe won presidential election

Start of the civil war

- 1989 - National Patriotic Front of Liberia (NPFL) led by Charles Taylor began an uprising against the government
- 1990 - Economic Community of West African States (ECOWAS) sent peacekeeping force; Doe executed by the NPFL
- 1991 - ECOWAS and the NPFL agreed to disarm and set up an Interim Government of National Unity
- 1992 - Arms embargo established by the United Nations Security Council under resolution 788; NPFL attacked West African peacekeepers in Monrovia, the latter responded by bombing NPFL positions outside Monrovia and pushing the NPFL back into the countryside

Tentative ceasefire

- 1993** - Warring factions drew up a plan for a National Transitional Government and a ceasefire, it failed to materialize and fighting resumed
- 1993 September** - United Nations Observer Mission to Liberia (UNOMIL) established
- 1994** - Warring factions agreed on a timetable for disarmament and setting up a joint Council of State
- 1995** - Abuja Accord signed in Nigeria; and interim council of state is installed and a ceasefire is agreed upon
- 1996 April** - Factional fighting resumed and spread to Monrovia
- 1996 August** - West African peacekeepers initiated disarmament programme, cleared land mines and reopened roads allowing refugees to return
- 1997 July** - Presidential and legislative elections held; Charles Taylor won a landslide victory and his National Patriotic Party won a majority of seats in the National Assembly; international observers declared the elections free and fair
- 1997 September** - UNOMIL withdrew from the country upon the completion of the peace process
- 1997 November** - United Nations Peacebuilding Support Office in Liberia (UNOL) established with the primary task of consolidating the peace together with the Government of Liberia

Border fighting

- 1999 January** - Ghana and Nigeria accused Liberia of supporting Revolutionary United Front rebels in Sierra Leone; the United Kingdom and the United States threatened to suspend aid to Liberia
- 1999 April** - Rebel forces thought to have come from Guinea attacked the Liberian town of Voinjama; fighting displaced more than 25 000 people
- 1999 July** - Rebel group Liberians United for Reconciliation and Democracy (LURD) formed by Liberian exiles
- 1999 September** - Guinea accused Liberian forces of entering its territory and attacking border villages
- 1999 November** - ECOWAS Monitoring Group (ECOMOG) withdrew from Liberia
- 2000 September** - Liberian forces launched "massive offensive" against rebels in the north; Liberia accused Guinean troops of shelling border villages

United Nations sanctions

- 2001 May** - United Nations Security Council resolution 1343 entered into force where the Council reimposed arms embargo, the travel ban on senior members of the Liberian Government and a ban on direct and indirect diamond exports
- 2002 January** - More than 50 000 Liberians and Sierra Leonean refugees fled fighting
- 2002 February** - President Taylor declared a state of emergency
- 2002 May** - United Nations sanctions renewed by Security Council resolution 1408
- 2002 September** - President Taylor lifted an eight-month state of emergency and a ban on political rallies, citing a reduced threat from rebels
- 2002 October** - United Nations panel of experts reported a number of violations of the arms embargo and the travel ban of the senior members of the Liberian Government

Rebel offensives

2003 March - New rebel group Movement for Democracy in Liberia (MODEL) formed; rebels opened several battlefronts and advanced to within 10 km of Monrovia; tens of thousands of people displaced by fighting

2003 May - United Nations Security Council renewed its sanctions under resolution 1478 including importing of all round logs and timber products originating from Liberia, effective 7 July 2003

2003 June - Talks in Ghana aimed at ending rebel uprising overshadowed by indictment accusing President Taylor of war crimes over his alleged backing of rebels in Sierra Leone

2003 July - Fighting intensified; rebels battled for control of Monrovia and several hundred people killed; ECOWAS agreed to provide peacekeepers

Peace accord, United Nations peacekeeping mission and Needs Assessment

2003 August - Interim government, LURD and MODEL signed peace accord in Accra, Ghana; Nigerian peacekeepers arrived; United States troops arrived; Charles Taylor left Liberia after handing power to his deputy Moses Blah; Gyude Bryant chosen to head the two-year National Transitional Government of Liberia

2003 September - United Nations Mission to Liberia (UNMIL) established by the United Nations Security Council resolution 1509; UNMIL has 12-month mandate and will be the second largest United Nations peacekeeping mission after Sierra Leone with the deployment of 15 000 military personnel

2003 September/October - United States forces pulled out

2003 October - Gyude Bryant sworn in as the Chairman of the National Transitional Government

2003 November - United Nations, World Bank and International Monetary Fund Needs Assessment began

2004 January - United Nations Secretary-General Kofi Annan named five experts to conduct a follow-up mission to Liberia and its neighbours to assess the effectiveness of sanctions against the export of certain natural resources and the import of illicit arms

2004 February - International Reconstruction Conference on Liberia held in New York

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Human and urban environment

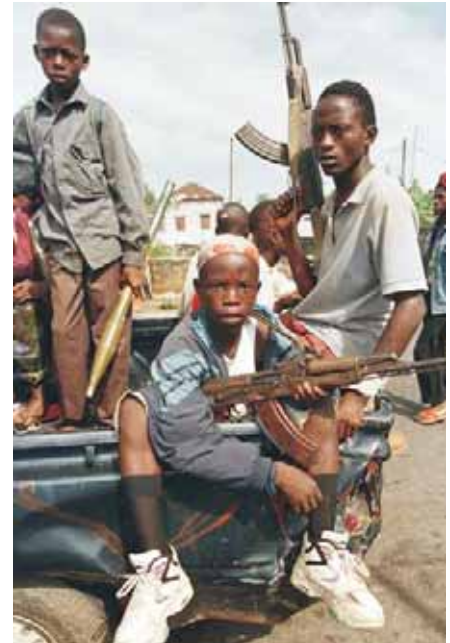
3.1 Introduction

The impact of conflict on Liberia's human and urban environments cannot be overstated. During 14 years of war, one in three Liberians has been displaced. More than half a million remain in temporary housing or camps. The remnants of war and unexploded ordnance (UXO) cause additional challenges for repatriation.

Major economic activities are limited to shipping, rubber plantations, timber production, and mining, with the export of the latter two currently prohibited by the United Nations sanctions. The Liberian economy has collapsed and unemployment is now estimated to be 80 per cent.

Infrastructure has been damaged by the war and looting, leading to a collapse in many areas. Key services such as energy production and distribution, provision of safe drinking water and waste management are barely operational.

Poor sanitation and access to safe drinking water have caused the outbreak of disease. The uncontrolled digging of wells has resulted in inadequate water quality for many. To meet energy needs, the local population has resorted to uncontrolled production of charcoal, which has caused significant deforestation in several areas, including mangrove forests.



CORINNE DUJKA - REUTERS

Child soldiers ride through the streets of Monrovia, 25 April 1996



VASILY FEDOSENKO - REUTERS

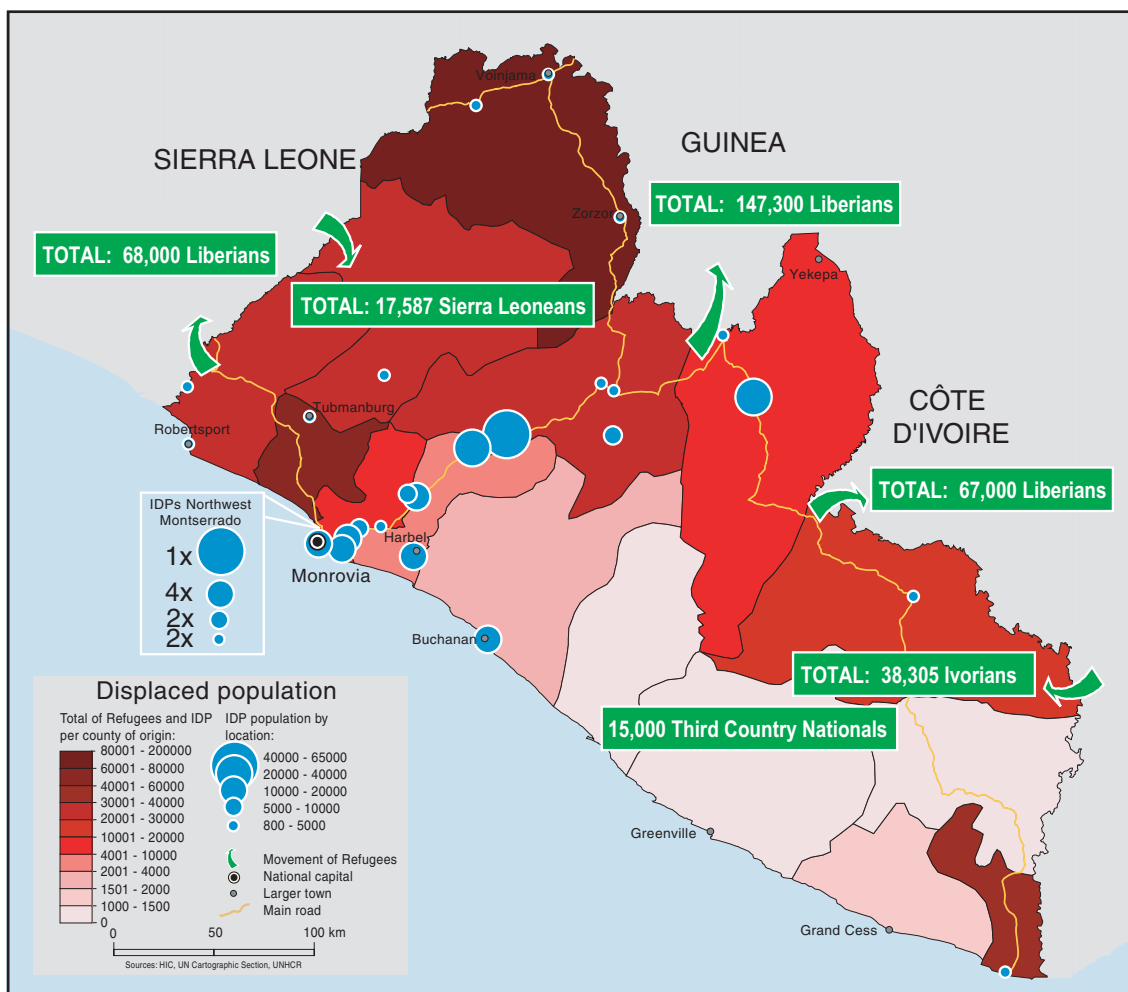
Thousands of Liberian refugees head into Cotton Tree, some 50 km from Monrovia, 23 August 2003

3.2 Population displacement

Perhaps the most immediate consequence of the conflict has been the massive movement of refugees and internally displaced people (IDP) across the country. The victims are from Liberia as well as from neighbouring countries.

It is estimated that some 500 000²⁵ Liberians are currently displaced in the country with many having been displaced up to seven times over the past 14 years of civil war. Some 275 000 IDPs reside in formal camps, irregular shelters and public facilities such as the Monrovia soccer stadium. Another 190 000 people have been hosted in different communities throughout Liberia. The international community is attempting to temporarily relocate and accommodate IDPs in camps to provide better access to services including food assistance and health care.

► Map 3. Displaced population as of December 2003 (excluding returnees)

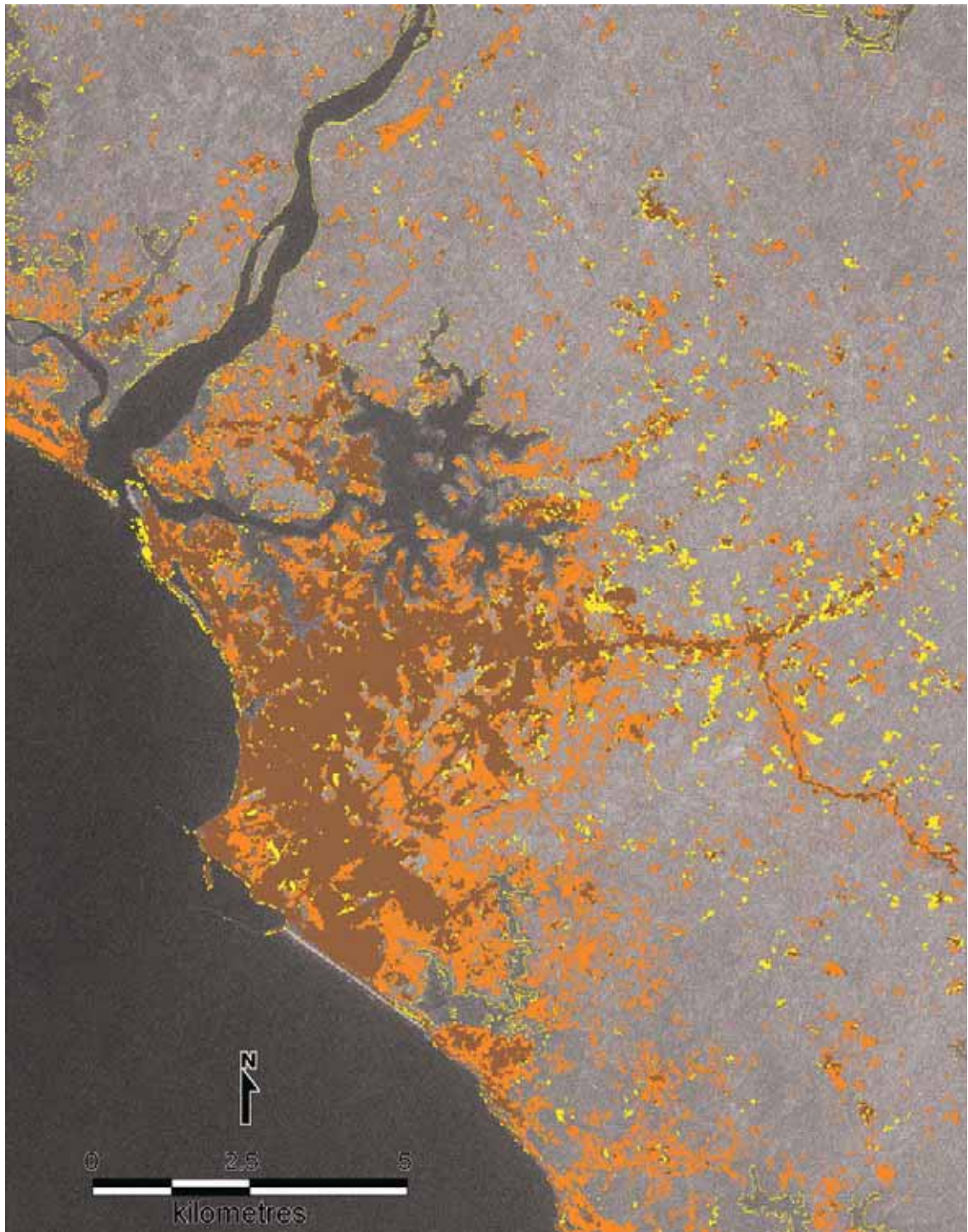


The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

In addition to IDP camps, a number of additional camps have been established in Liberia to host refugees from the region. At the height of the crisis in Sierra Leone, over 70 000²⁶ refugees made their home in Liberia. The refugees were sheltered in camps along the border and in parts of Montserrado County near Monrovia. While the majority of Sierra Leonean refugees have been repatriated, 17 587 refugees are still registered in camps in Liberia. The second major group of refugees consists of Ivoirians that fled their country in November 2002 to the eastern counties of Grand Gedeh, Maryland and Nimba. While most of these 40 500²⁷ Ivoirian refugees have returned home, a limited number continue to reside in Liberia.

3

► Buchanan urban evolution (1986 - 2001)



Multi-temporal analysis Landsat TM image
Taken on: 14 January 1986 and Landsat ETM+ 16 February 2001
Classification: Unsupervised ISOCCLASS method

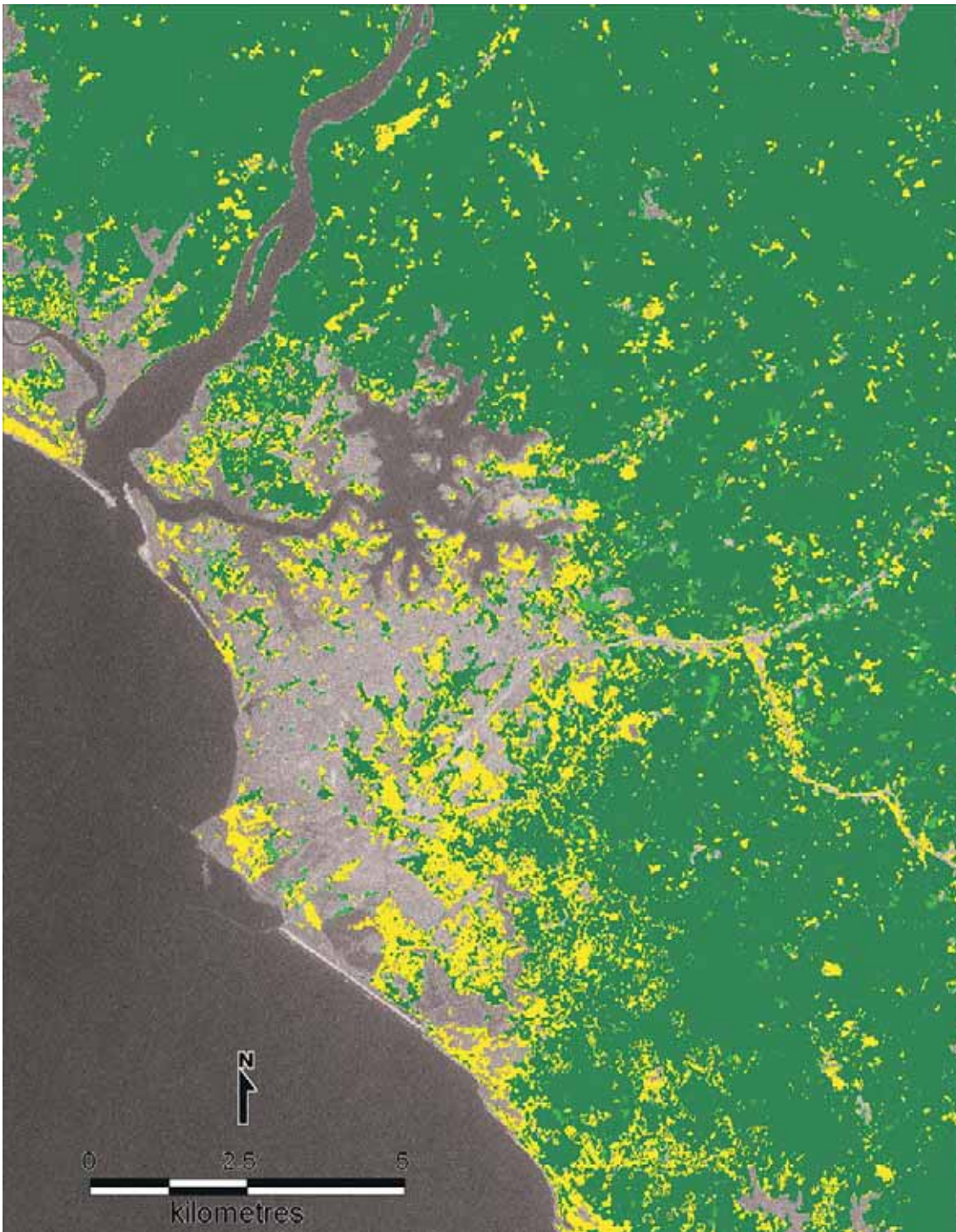
Images courtesy of University of Maryland
Image classification by UNOSAT

The darker brown areas signify the unchanged urban area between 1986 and 2001. The orange areas symbolize urban expansion and the yellow illustrates potential decrease in the urban area between the two dates.

Uncontrolled Urbanization

One consequence of conflict and the subsequent movement and resettlement of people is the uncontrolled and unplanned influx of rural people to urban areas. The negative social

► Forest cover change around Buchanan (1986 - 2001)



Multi-temporal analysis Landsat TM image
 Taken on: 14 January 1986 and Landsat ETM+ 16 February 2001
 Classification: Unsupervised ISOCCLASS method, additional manual analysis

Images courtesy of University of Maryland
 Image classification by UNOSAT

The darker green areas signify unchanged forest cover between 1986 and 2001. The yellow areas symbolize deforestation and the lighter green areas illustrate potential forest growth between the two dates.

and environmental impacts of this include the deterioration of housing facilities, the collapse of sewage and surface water drainage systems, the lack of proper waste management and sanitation services, and an insufficient supply of water. Urbanization not only increases the footprint of the urban areas but also alters the surrounding landscape.



VASILY FEDOSENKO - REUTERS

Displaced Liberian civilians build temporary shelters in a camp northeast of Monrovia

In addition to IDPs within Liberia, there are also over 350 000 Liberians in asylum in countries across West Africa including Guinea (147 300), Sierra Leone (68 000), Côte d'Ivoire (67 000), Ghana (42 500), Gambia (900), Nigeria (6 000) and other countries (20 000).

While the non-urban environmental impacts of the IDP and refugee flows have not been systematically studied in Liberia, forests around the majority of the camps have been cleared to establish the sites and to provide wood for cooking and construction. Reportedly, many IDPs and refugees have also been selling bushmeat, hardwoods and charcoal as alternative means of earning cash income for survival.

Earlier studies by the United Nations High Commissioner for Refugees (UNHCR) on the environmental impacts of refugees in Africa also identified a number of potential impacts. In many IDP and refugee camps, sites are exposed and vulnerable to various degrees of erosion and flooding. In the forests where trees have been cut, especially on hill slopes and fragile soils, serious erosion, landslides, drying of perennial streams and low agricultural productivity are



GRANT WROE-STREET - UNEP / PCAU

Roadside charcoal seller on the outskirts of Monrovia. The bags have been closed with palm fronds

possible consequences in the medium and long term. In addition, waste management and water and sanitation problems prevail in almost all camps. Local security can also be placed at risk due to conflicts between IDPs and host communities arising from increased pressure on an already degraded and scarce resource base.

UNHCR's Environmental Guidelines²⁸

In 1996 the Office of the United Nations High Commissioner for Refugees (UNHCR) published Environmental Guidelines that identify and propose best-practice solutions to address the refugee and IDP-related environmental problems during all three phases of assistance: emergency phase, the care-and-maintenance phase and the durable-solutions phase. The guidelines emphasize that the environmental problems related to refugees are not only an issue of the host country, but that attention also needs to be given to the impacts related to the re-integration of the returnees. The environmental impacts of refugees are different from case to case, but there are certain common features: the need for an integrated approach (early environmental intervention), the importance of preventive and mitigation measures (such as the environmentally sound selection and design of refugee camps), and utilising local participation with local knowledge.

The return or resettlement of IDPs and the repatriation of Liberian refugees from countries of asylum are key elements of the peace process. While some refugees may return spontaneously, it is envisaged that the majority will wait for assisted voluntary repatriation. To facilitate the return, issues relating to the security situation, social infrastructure and environmental degradation must be resolved to permit resettlement and the development of sustainable livelihoods.

3.3 Water and sanitation

Liberia has large potential water resources. The climate is of the tropical type, with heavy rainfall that ranges from 2 000 to 4 000 mm per year. Average annual rainfall is estimated at 2 372 mm for Monrovia. Water tables in Liberia are on average 7–13 m below ground level and easily accessible for shallow well development.²⁹



PEKKA HAAVISTO – UNEP / FCAU

Safe drinking water delivered by truck in Monrovia, January 2004

Before 1990, approximately 45 per cent of the urban population had access to safe drinking water – managed water systems or improved hand pump wells – compared to 23 per cent of the rural population. In 1991, the daily water production for Monrovia amounted to 61 000 m³/day. The water supply system included house connections and a limited number (150) of public taps to serve the low-income areas.

Due to conflict-related damage, a lack of maintenance and a shortage of electricity, the current treated water production rate in Monrovia is approximately 10 per cent (5 800 m³/day) of the production in 1990 and supply covers only a small area of the city.

The poor water supply has resulted in communities and families installing independent uncontrolled wells. This had led to a heavy reliance on ground water and risks to human health

resulting from poor sanitation and the total breakdown in solid waste management. In addition, the water supply systems in ten urban areas outside of Monrovia have collapsed, causing supply problems.

Due to the lack of supply, the international community provides supplementary water to hospitals, IDP centres and orphanages as well as public water distribution tanks. A number of organizations such as Action contre la Faim, the European Union, UNICEF, WHO and the United Kingdom's Department for International Development (DFID) also assist with regular well disinfections. In Monrovia there are currently at least 5 500 wells and in Buchanan at least 2 700. The regular chlorination of this number of wells is not sustainable in the long term.

In contrast to the urban environment, traditional rural communities in Liberia rely primarily on local watercourses for their water needs. Shallow wells are also used occasionally when surface supply levels are low. However, the conflict has disrupted these traditional methods, as in some areas the conflict has restricted access and in others streams have been diverted or polluted.

The only functioning sewerage system is in Monrovia. However, the sewage treatment plant has under-capacity and was only intended for a population of 130 000 people,

whereas the current population is approximately 800 000. The plant was designed to provide sedimentation and secondary (biological) treatment with trickling filters. Although the system is designed to handle sanitary wastewaters, the influent is supplemented with storm water due to illegal connections with drains and from infiltration of ground water. The plant and the pumping stations have not functioned consistently for over ten years due to disrepair and a shortage of electricity, hence raw sewage has been frequently allowed to flow directly into lagoons, rivers and the sea. It was reported that a small number of Monrovians (1,3 per cent) still use the sewer system, causing a build-up of sewage within low-points in the pipeline. Occasionally, the mains are fractured causing outflow on to the

streets or into the sea and local rivers.

The majority of the population uses either pit latrines, toilets connected to septic tanks or open defecation. In some cases faeces are put in plastic bags and disposed of in drainage channels or with domestic waste. These practices have the potential to contaminate ground and surface water and thereby pose risks to human health.



GRANT WROE-STREET - UNEP / PCAU

Donors such as the European Union have supported the water sector in Monrovia



DAVID MEADOWS - UNEP / PCAU

Burning of the wastes on the streets of Monrovia, January 2004

3.4 Waste management

Prior to the conflict, domestic and commercial solid waste in central Monrovia was collected and hauled for disposal by the Monrovia City Corporation. In order to improve efficiency, a private waste collection system was eventually introduced under the service name “Betty Garbage System”. It was reported that prior to 1990, municipal solid waste was collected from 85 per cent of the city.³⁰ However, collection was restricted to accessible areas, with slum and shanty towns remaining uncleared.

Reportedly, other municipal areas such as Buchanan, Gbanaga, Greenville, Harper, Kakata and Robertsport also had waste collection and disposal systems. In rural areas waste collection and disposal was the responsibility of the household and waste was either buried or burned.

During the conflict, waste collection services ceased to function in most cases, and collection vehicles and equipment were either looted or destroyed. Garbage transfer stations and depots were also heavily damaged.



GRANT WROE-STREET - UNEP / PCAU

Piles of rubbish in downtown Monrovia, December 2003

Following the conflict, the only functioning waste collection and disposal system is restricted to Monrovia. However, the Monrovia City Corporation presently lacks human, financial and technical resources and is operating at a reduced capacity with only three operational refuse collection vehicles and no sanitary landfills. As a result, the collection system is unable to cope with the volume of waste being generated. This has led to a build-up and open burning of wastes in Monrovia, primarily in streets and vacant plots. These urban dumpsites present risks to the environment and human health through air pollution, potential contamination of surface and ground water, as well as exposure to disease vectors and toxic substances including asbestos.

As of January 2004, limited waste separation was taking place in Monrovia where metals were recovered from the waste stream for recycling. This is one of the quick impact projects supported by UNMIL.

Potential risks from hazardous, clinical and industrial wastes are presumed to be minimal given the low level of activity in these sectors. However, some toxic wastes are likely to be produced in workshops and garages. It was reported that automotive batteries are co-disposed with domestic waste and in central Monrovia waste engine oils are collected and filtered for re-use. In addition, it can be assumed that other hazardous wastes such as solvents and building materials containing asbestos will also be generated in Monrovia. Tailings (or waste from mines) also pose potential environmental hazards from heavy metals contained in run-off and leachate, suspended solids that clog rivers. When of a sufficiently large scale, tailings can suffer from slope failure and pose the risk of landslides.

3.5 Energy

The electricity supply system in Liberia is operated by the Liberian Electricity Commission (LEC). It is based on a central Monrovia city system with radial lines extending into the country and independent isolated grids. When the conflict started in 1989, a total of 11 grids were in operation while three were under construction.³¹



PEKKA HAAVISTO – UNEP / ICAU

Charcoal has become the main energy source in Monrovia

The total combined installed capacity of the LEC power system prior to the conflict was 182 MW sourced from a combination of hydro and thermal (e.g. petrol) generating facilities. The conflict resulted in collateral damage, looting and vandalism to the power plants, substations and transmission lines.

Perhaps the single greatest loss of infrastructure caused by the conflict was the Mount Coffee hydropower plant. This station supplied 64 MW to the transmission system – approximately 35 per cent of the pre-conflict capacity. In 1990, the intake dam was breached at one end and a significant part of the dam wall was damaged. In subsequent years the internal plant was completely destroyed. Following the loss of this facility, electrical output plummeted and many people turned to other sources of energy such as charcoal.



STEFAN MICALEFF - UNEP

Fuel storage problems in Free Port harbour, Monrovia. Background photo: leaking oil storage tanks. Left: spilled oil in liquid state. Right: oil saturated soil

Other energy infrastructure that has been damaged as a result of the conflict includes the Gardnersville oil refinery and associated pipeline and the fuel storage facilities at Buchanan, Ganta and Greenville. Reportedly, fuel storage and handling is poor across the country with little or no safeguards to contain surface spillages. Fuel importation, distribution and storage in Liberia is controlled by the Liberian Petroleum Refinery Company (LPRC) through an act of Parliament.



STEFAN MICALEFF - UNEP

Leaking fuel storage tanks pose threats to ground water



GRANT WROE-STREET - UNEP / PCAU

Poor fuel management in Free Port harbour poses threats to the marine environment

At present, only portions of the new diesel-powered generator plant at Bushrod Island are operational. The current system of three generators supplies one per cent of the demand supplied prior to 1989. Electricity cannot be imported into the country as the Liberia network is based on the American frequency of 60 Hz, while all neighbouring countries use 50 Hz.

An unreliable supply of electricity has meant that Monrovia use approximately 45 000 generators. These generators are a source of air emissions (particulates, sulphur oxides, and nitrogen oxides), noise pollution and surface oil spills.³² Damage to the 16 main sub-stations and 3 500 transformers may have also caused the spillage of transformer fluid, often containing polychlorinated biphenyls (PCBs).

One of the most critical impacts from the lack of electricity has been the increase in demand for alternative sources of energy. Given the abundance of Liberia's forests, fuelwood and charcoal became the principal energy sources, and consumption skyrocketed both during and after war.

Various estimates indicate that the entire population (up to 99 per cent) is now dependent on



GRANT WROE-STREET - UNEP / PCAU

Charcoal on sale in the streets of Monrovia

charcoal and fuelwood to satisfy their basic needs for cooking and heating. The production of fuelwood and charcoal is also an important source of employment. The selling of these goods is an important source of supplemental income for many families – in some cases as much as 40 per cent of their total income.³³ Nationally, while charcoal production only contributed two per cent of the gross domestic product (GDP) in pre-war times, in 1999 it accounted for nine per cent.³⁴

Reportedly, Liberia is also beginning to assume a major regional role in charcoal production. The Food and Agriculture Organization (FAO)³⁵ reports that charcoal is being manufactured for export purposes for neighbouring countries that are suffering from a lack of fuelwood due to deforestation. As a result, Liberia's forests may face significant future threats as trees are cut to meet the increasing regional demand.

During UNEP's mission to Monrovia it was reported that some ships have been buying charcoal from producers to ship it to other countries of the region.

FAO concludes that with the continuous absence of electricity supply in the urban sectors and the lack of other alternative sources of household energy supply in most parts of the country, the demand for fuelwood is expected to increase. These conditions may create additional environmental degradation and more social problems as the population and demand increase rapidly.³⁶ In addition to the environmental impacts, the production of charcoal is also a serious threat to human health from smoke inhalation.³⁷

3.6 Rubber plantations



GRANT WROESTREET – UNEP / PCAU

Rubber tapping at the Bridgestone plantation

Rubber is one of the main exports in Liberia, with the first plantation established in 1906. Bridgestone – formerly the Firestone Plantation Company – is the major rubber producer, reportedly owning the world's largest industrial rubber plantation at Harbel. The plantation was established in 1926 and covers about 30 per cent of the total area under rubber cultivation.

According to the IMF, rubber exports have increased rapidly from 19,4 million USD in 1997 to an estimated 57,4 million USD in 2002, despite falling international rubber prices over the period. Rubber production accounted for an estimated 99 569 tonnes in 2002.³⁸ Most of the rubber produced is exported and only limited rubber processing is undertaken in Liberia. However, the sector is reportedly on the verge of collapse as many of the plantations are coming to the end of their productive life and replanting has not been conducted.

The environmental impacts associated with rubber production are related to the clearance of primary rainforest and human settlements including roads, housing, water supply, sewage treatment and waste management. In addition, the monoculture plantations reduce biological diversity, and can serve as vectors for insect and disease transmission to native trees.

3.7 Manufacturing

Fifteen years of conflict have left the manufacturing sector in a weak condition and the number of companies operating in Monrovia dropped from 850 in the mid-1980s to 350 in 1990. Current numbers are unknown.³⁹ Facilities are mostly located in and around Monrovia and are mainly restricted to textile/clothing, furniture, brewing and non-metallic mineral products. Information on textile/clothing and furniture manufacturing and associated wastes was not available for review.



Street market in Monrovia

The cement grinding plant in Monrovia re-opened in mid-August 2003 and currently has 80 employees. The plant grinds imported clinker and gypsum into a fine “pure cement” powder and secondary constituents are also added to make blended cements. The finished products are stored in large silos from where they are dispatched in bulk or in bags. Cement grinding operations generate particulate emissions and can be noisy, however, it was reported that the plant operates in accordance with local regulations.

Although the main brewery in Monrovia – Monrovia Breweries Inc. – was damaged during the summer of 2003, it is currently operational. However, the source of water and effluent treatment details are not known.

Reportedly a former automotive battery manufacturing plant located at Bushrod Island in Monrovia has impacted soils with lead and battery acid.

3.8 Agriculture

The principal food crops of Liberia are rice and cassava (manioc). Due to the insecurity caused by the conflict, many fields were left unplanted and food production plummeted. Production has not yet recovered to pre-war levels and the country must import rice to meet its needs. According to estimations by FAO from 2003, less than 10 per cent of the 4,6 million hectares of arable land is cultivated.⁴⁰ Other crops grown for local consumption include sugarcane, bananas, plantains, citrus, pineapple, sweet potatoes, corn and vegetables.^{41, 42}

In the aftermath of the war, Liberia is now one of the most food insecure countries in the world, with more than one third of its population undernourished.

Traditionally, domestic production of the country's main staple foods, rice and cassava, still relies on a traditionally low input/low output, shifting cultivation, mixed crop system. As a result, the use of chemical inputs such as fertilizers and pesticides is not widespread. Liberia has never conducted an inventory of potential chemical stocks and pesticides, and the degree of potential risk is unknown. The primary environmental impact from domestic agricultural production is therefore from shifting agriculture.

In order to expand the area under cultivation, discussions are currently underway to promote swamp cultivation. The urgent need to increase food production and self-sufficiency will have to be balanced against the potential impacts of converting areas to swamp cultivation. While it is generally accepted that swamp cultivation is more productive than dry land cultivation, the conversion of swamps into agricultural areas has environmental consequences that could include habitat loss (for example to migratory waterfowl) and a loss of flood attenuation. Areas of mangrove swamp are due to the combination of decaying plant material, mud, gravel, sand and peat apparently particularly suitable for conversion to large-scale paddy rice production. The longer-term environmental impacts of a widespread introduction of swamp-cultivation would still need to be assessed. Swamp cultivation does however have some positive effects. It reduces pressure on forest reserves thereby decreasing deforestation and the loss of wildlife habitats.

Landmines and unexploded ordnance (UXO) were used by all sides during the 1989–1997 conflict and may pose threats in agricultural areas. Recent landmine surveys have not been conducted due to security conditions, but UXO contamination is suspected wherever fighting took place. Given that Liberia's rural economy is completely dominated by subsistence agriculture, any loss of land due to fear of landmines is particularly damaging to food security.



CONSERVATION INTERNATIONAL

Shifting cultivation practices are a major cause of deforestation in Liberia

3.9 Transport

The conflict in Liberia has further reduced the capacity of the transportation sector, with no new rail or airport construction during the conflict period. Limited road construction has occurred but this seems to have been mostly funded by logging companies.



JAMISON SUTER – FAUNA & FLORA INTERNATIONAL

One of the Oriental Timber Company's logging roads through mature rainforest

The road network is in a poor condition with only 6,2 per cent out of the total network of 10 600 km being surfaced.⁴³ Most roads are impassable during the rainy season. Unpaved roads cause air pollution due to dust. The clogging of surface water ditches with waste causes flooding and associated health risks. The unplanned and dense nature of the housing in towns restricts access for large vehicles such as emergency, commercial, water, sewage and waste disposal. In addition, vehicles are poorly maintained and are fuelled either by diesel or leaded petroleum, which generates particulates, carbon monoxide and lead pollution.

The rail network was developed to transport iron ore to the ports of Monrovia and Buchanan and has not been used since mining stopped. This network has not been maintained and there is no passenger capability.

Roberts International Airport (RIA) is located 45 km to the south of Monrovia and is the only international airport in Liberia. There are also a number of gravel-surfaced runways and a paved runway at James Spriggs Payne. There is no information available on the jet fuel storage and distribution systems.

Prior to the conflict, the five main ports of Buchanan, Greenville, Harper and Monrovia



GRANT WROE-STREET – UNEP / PCAU

Roberts International Airport, December 2003

handled about 200 000 tonnes of general cargo and around 400 000 tonnes of imported petroleum products per year. In addition, Monrovia and Buchanan handled all the bulk iron ore exports, while Buchanan and Greenville were responsible for most of the timber exports. The conflict resulted in the damage and looting to warehouse and loading facilities, shipwrecks in the ports, channel siltation and spillage in petroleum storage tanks. At Free Port harbour, the UNEP mission found sunken vessels and extensive pollution around the fuel storage installations.

► Free Port harbour, Monrovia, 2001



Spot panchromatic image
Taken: 2001

Image courtesy of UNOSAT
Image compilation by UNEP / PCAU

A number of ships have sunk in the general cargo wharf in Free Port harbour in Monrovia. The fuel storage areas of the harbour is affected by oil spills

Apart from the direct damage inflicted on transportation infrastructure during the conflict, an additional concern is the potential presence of landmines and UXOs. Reportedly, landmines were used by all factions during the 1989–1997 civil war. A mine survey conducted by UNMIL in 1995 located seven mine fields with an estimated total of 18 250 antitank and antipersonnel mines. The mine fields were located in the counties of Grand Bassa, Rivercess, Lofa and Sinoe.

In September 2003, the United Nations Mine Action Service (UNMAS) took part in a technical assessment mission led by the United Nations Department of Peacekeeping Operations in preparation for the deployment of UNMIL. The assessment uncovered no new reports of mine use during the most recent period of conflict. However, UXO is a potential concern in Monrovia, where scores of munitions have been collected and destroyed since the deployment of the West African Peacekeeping Force (ECOMIL). Due to security concerns, the assessment was unable to confirm UXO contamination in areas outside Monrovia but expects that it will be a problem wherever fighting took place. UNMAS plans a follow up assessment in early 2004 to determine mine-action needs and future activities in the country.⁴⁴



STEFAN MICALEFF - UNEP

The general cargo wharf of Free Port harbour has been damaged and a number of sunken vessels will need to be cleared before the harbour can be fully operational

Landmines and unexploded ordnance (UXOs)⁴⁵

Mines and UXOs cause a number of economic, social and environmental impacts. The International Convention to Ban Landmines includes the following impacts in the environmental risks posed by landmines in Africa: habitat degradation, species loss, alteration of the natural food chain and the placing of additional pressure on biodiversity hotspots. Where landmines have been laid in national park areas, this increases management problems and apart from the threat to species, poses long-term problems to the development of the potential tourist industry.¹

► Map 4. Ship wrecks near the coast of Liberia



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

No surveys of the environmental risks posed by wrecks along the Liberian coast have been undertaken

3.10 Shipping

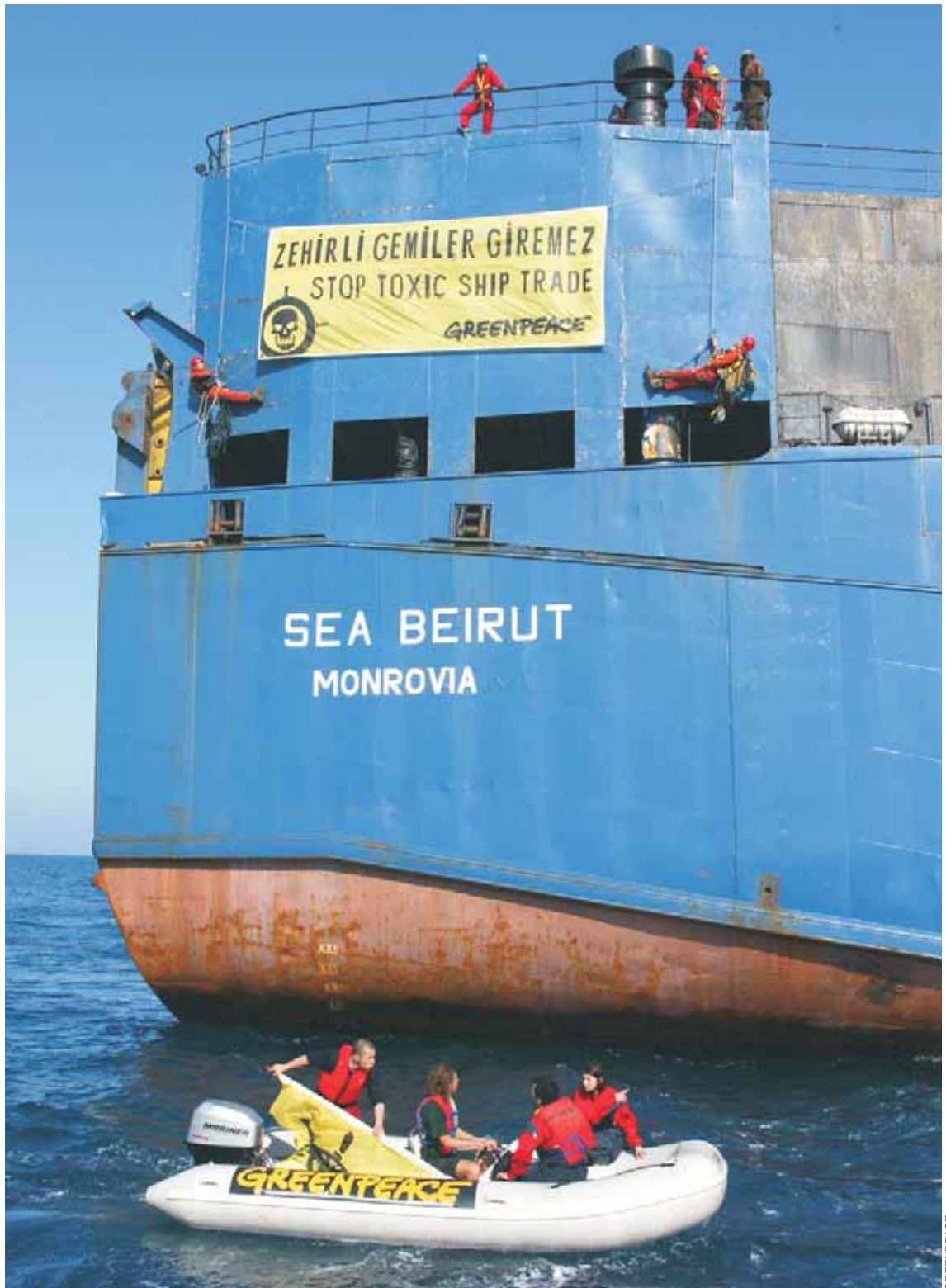
Liberia currently has the world’s second largest fleet in shipping tonnage. This is mainly a result of Liberia’s status as an “open register” (OR), also known as a “flag of convenience” (FOC). A flag of convenience is “a flag of a foreign country that is used by a ship from another country for legal or financial reasons”.⁴⁶

About 50 per cent of the world’s maritime tonnage is under a flag of convenience. In 2001, 1 566 ships with a combined gross registered tonnage of about 52 million were registered in Liberia and most were foreign-owned. Annual revenue from shipping was reported to be more than 20 million USD in 1995, representing a substantial source of foreign earnings for the country. In 2001, maritime revenue stood at 18 million USD.

Table 1. Six largest FOC fleets in 2001⁴⁷

Flag	Number	Gross tonnage	Average age
Panama	6 245	122 352 071	16
Liberia	1 566	51 784 010	12
Bahamas	1 312	33 385 713	16
Greece	1 529	28 678 240	23
Malta	1 421	27 052 579	19
Cyprus	1 407	22 761 778	16

(Source: Lloyds Register, World Fleet Statistics 2001.)



The Sea Beirut⁴⁸

In 1999, the 27-year-old cargo ship Sea Beirut, flying the Liberian flag, broke down off the coast of France and was towed into Dunkirk harbour for repairs. Asbestos was found on board. The Liberian-registered owner chose to abandon the ship rather than pay to rid the vessel of its asbestos problem. The ship was then auctioned to a Turkish ship-breaking company and towed to Istanbul to be broken up and sold for scrap. The Turkish government, not informed of the presence of asbestos on board the vessel, requested that the Sea Beirut be returned to France. So far, there is no agreement on who has responsibility for the ship, which remains at a ship-breaking centre in Turkey.

There are potential and actual negative environmental impacts from shipping activities. Air pollution includes the emissions of oxides of sulphur, nitrogen and carbon. The world's large ships contribute five per cent of the total sulphur oxides (SO_x) and 14 per cent of the nitrogen oxides (NO_x) emissions.⁴⁹

The discharge by ships of “grey-water waste” includes wastewater from sinks, showers, galleys, untreated sewage and oily bilge water. Cruise ships discharge significant amounts of grey-water. In 1999, a Liberian-registered cruise line was fined 18 million USD for pollution in United States waters.⁵⁰

Oil pollution can occur from intentional or accidental discharge. Amounts have been estimated at 0,4 – 1,5 million tonnes of oil per year from tanker accidents and operational discharges.⁵¹

The disposal of ships at the end of their life cycle also has implications for the environment. Parties to the Basel Convention on the Control of the Transboundary Movements of Hazardous Waste are discussing issues related to classification of ships as hazardous waste under the Convention.⁵² Ships can contain asbestos, oils, heavy metals and polychlorinated biphenyls (PCBs) that represent a risk to human health and the environment.⁵³ Greenpeace International reports that the majority of the ships sent to breaking yards are registered with FOCs, with many only being re-registered for the final voyage.⁵⁴

Several international treaties exist that regulate and prevent marine pollution by ships. Liberia is signatory to several of them, including the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78), the International Convention for the Safety of Life at Sea (SOLAS), the International Convention on Civil Liability for Oil Pollution Damage, and the Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (FUND). Liberia was the first major flag state to ratify MARPOL Annex VI (in 2002), which prevents air pollution from ships. (For a list of international agreements of relevance to Liberia's environment, see Appendix E.)

At its Seventh Session, in April 1999, the United Nations Commission on Sustainable Development “invited the International Maritime Organization (IMO) as a matter of urgency to develop measures, in binding form where IMO members consider it appropriate, to ensure that ships of all flag States meet international rules and standards so as to give full and complete effect to the UN Convention on the Law of the Sea ...”

The IMO's Sub-Committee on Flag State Implementation has as a primary objective the identification of measures necessary to ensure effective and consistent implementation of global instruments, including the consideration of difficulties faced by developing countries, primarily in their capacities as flag states but also as port and coastal states.

The criticism has been made that ship owners use flags of convenience in order to avoid national regulations that are required for compliance under international treaties, including those related to the environment.⁵⁵

Given the large size of Liberia's shipping fleet and the important role that this sector currently plays in the country's economy, it is essential that there be proper implementation of environmental standards related to compliance with the international agreements to which Liberia is party. The current period provides an opportunity to improve inspections and the enforcement of relevant standards, now and into the future.

4

Natural resources

4.1 Introduction

Liberia's rich natural resources have played a significant role in the conflicts of the region, but also hold the key to its future development. The control of timber and mineral wealth was linked to and sustained the armed conflict. The laying of solid foundations for the sustainable development of the country's natural resources is of central importance to Liberia's future in order to maintain peace and security.

The export of illegally logged timber has been a source of income for parties involved in the conflict. The uncontrolled construction of logging roads has led to a growing fragmentation of forests, provided easier access to hunters and has accelerated the spread of slash and burn farming practices. The FAO has estimated that forest cover in Liberia has been reduced from 38,1 per cent to 31,3 per cent between 1990 and 2000.^{56a}

While Liberia has large amounts of freshwater, there is a lack of proper management of these resources. Uncontrolled drilling of wells cannot be maintained. Coastal and marine environments are under pressure from erosion, which is caused in part by the extensive harvesting of mangroves for charcoal production.

Liberia is rich in biodiversity, with several endemic species. However, an increase in the commercial trade of bushmeat is posing a serious threat to a number of hunted species. The bushmeat market has expanded to supply an increased demand from urban areas. In part this demand is linked to the lack of alternative sources of protein as the conflict severely restricted the rearing of livestock. In addition, the expansion of logging roads has enabled organized gangs to increase the scale of commercial bushmeat hunting to supply a growing export market. Hunting controls and designated seasons to protect targeted bushmeat species were not possible to enforce during the conflict years.

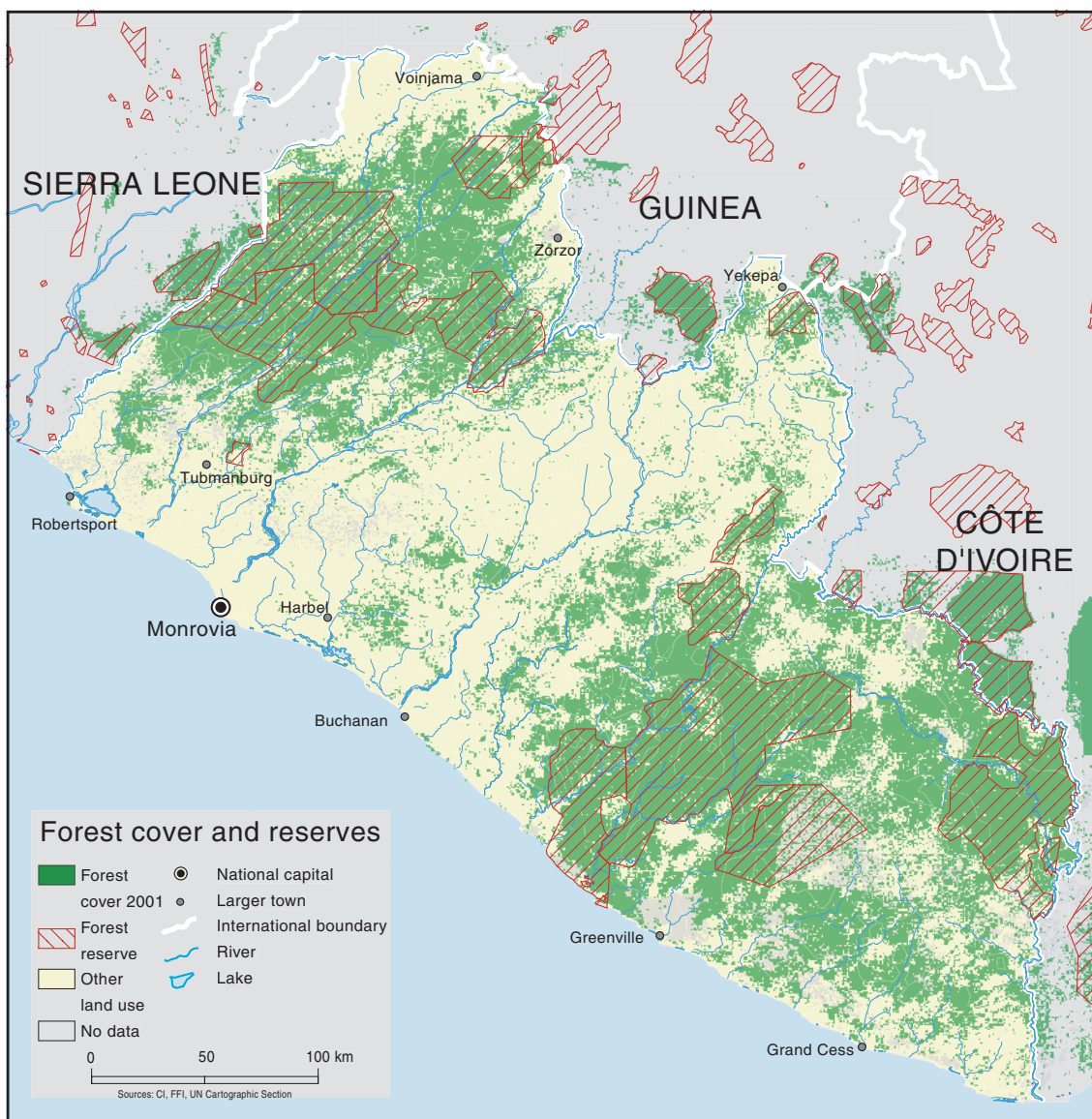


Dancer of the poro traditions of the Gola and Vai ethnic groups, Bomi County

A network of national parks has been planned, but lack of government control of the entire territory meant that implementation could not take place. There is, however, good potential for cross border cooperation through the establishment of regional transboundary protected areas.

Until Liberia's national authorities, supported by UNMIL, have full control of the territory there is a risk of continued logging and mining for illegal export in breach of the United Nations sanctions currently in place. When the United Nations sanctions on the import of timber from Liberia are lifted, it is imperative that there be full governmental control of the territory coupled with proper forest and environmental management. Support from the international community will be needed to ensure that all of these are in place.

► Map 5. Liberia forest cover 2001



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

4.2 Forests

Forests are fundamental to Liberian society. They are a source of subsistence, economic activity and cultural identity for rural Liberians and also provide medicines, construction materials, fuel, food and commodities to sell for cash. They are of great cultural importance to nearly all Liberians. The traditional 'sandé' and 'poro' (secret) societies, that are hugely important to rural Liberians, conduct their rites in certain groves and rivers within the forests.



JEREMY HOLDEN – FAUNA & FLORA INTERNATIONAL

Liberia's forests provide fuel and construction materials

It is believed that Liberia is the only country in West Africa that was once covered with rain forest. The Liberia Forest Re-assessment Project estimates that today the 4,3 million hectares of forest remaining in Liberia are being reduced by 0,3 percent every year.^{56b} There are also higher estimates, but until field assessments are conducted, it will not be possible to assess accurately the rate of deforestation. The FDA claims that the current forests consists of approximately 35 per cent “undisturbed” forest, 45 per cent “disturbed but productive” forest and 20 per cent “disturbed and unproductive” forest, but these figures date from before 1990.

The two remaining dense forest areas are now found in the northwest (semi-deciduous forest) and southeast (evergreen forest) of the country separated and isolated from each other by a corridor extending from Monrovia to Nimba County. These two forest blocks are further fragmented and dissected by the advances of shifting cultivation along existing roads and by the construction of logging roads.



CONSERVATION INTERNATIONAL

The Liberia - Côte d'Ivoire border lies along the Cavalla River, territory of the Grebo people



CONSERVATION INTERNATIONAL

Fire is used to clear areas of the forest for shifting cultivation practices

By the end of 2000 Liberia contained 42 per cent of the Upper Guinea Forest of West Africa; the largest portion possessed by a single country in the region. The remaining portions are unevenly scattered in fragments across the region in Côte d'Ivoire (28 per cent), Ghana (16 per cent), Guinea (8 per cent), Sierra Leone (5 per cent) and Togo (1 per cent).

In addition to direct logging, as well as fuelwood and charcoal production, the deforestation in Liberia has been caused by three other factors.

First, historically, subsistence agriculture – in particular of upland rice – has been the most significant human factor influencing forests, in the form of shifting cultivation, or slash and burn agriculture. Large areas are cleared to grow crops for a short period, which are then left to regenerate. Forests no longer have the time to regenerate in the face of new pressures from the movement of displaced persons and improved access from new logging roads.



CONSERVATION INTERNATIONAL

Round logs awaiting transportation to the coast

New roads fragment Liberia's forests⁵⁷

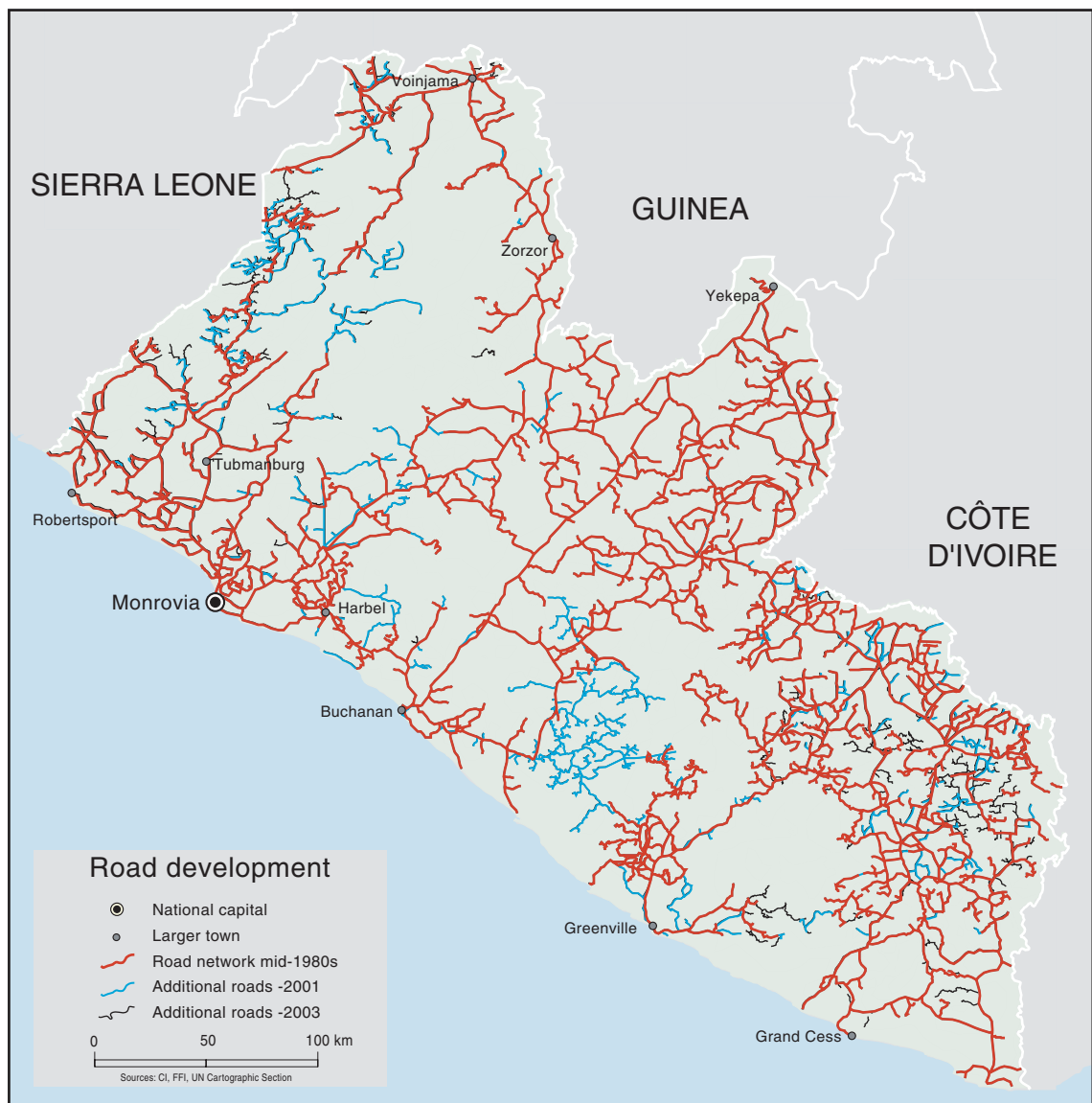
There are only 657 km of paved roads in Liberia. Satellite image analysis estimates Liberia's entire road network, including dirt and gravel roads, to be more than 13 585 km.

Much of these dirt and gravel roads have been developed for logging and the forest area with access from roads has been expanding rapidly. Satellite image analysis shows that sixty percent of Liberia's deforestation occurs within 3 km of a road.

In the Liberian part of the West Africa's upper Guinea forest, the area within 3 km of logging roads has increased since the mid-1980s to reach 81% today.

The network of new logging roads in forests fragments the habitat and threatens biodiversity.

► Map 6. Road development in Liberia: 1986, 2001 and 2003



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

The second cause of deforestation in recent decades has been the development of a logging road network, which also facilitates easier access to the forest for hunters, miners and farmers. The road development is clearly linked to forest change and fragmentation. The changes in recent years are mostly the construction of smaller roads, especially in the counties of River Cess and Sinoe. These effects can also be seen in the national forest of Krahn Bassa. The Cestos-Senkwehn rivershed, located within the Krahn Bassa national forest is designated as a protected area and is also threatened by the road development in the region.



JEREMY HOLDEN – FAUNA & FLORA INTERNATIONAL

Oriental Timber Company logging truck en route to Buchanan, Grand Bassa County

The third cause of deforestation has been mining, which has caused intense localized disturbances as well as river and riparian zone disturbance downstream of major mines. One of these is the LAMCO (Liberian-American-Swedish Minerals Company) in the Nimba area.

The Forestry Development Authority is government agency responsible for the management of Liberia's forests but has suffered tremendously since 1990, generally receiving only 20 per cent of its annual budgets. Also, the agency has admitted that fees charged on logging to support forest management and reforestation were typically redirected to other purposes. Staff that were lost to retirement or death were not replaced by equally qualified staff, and staff skills also atrophied when access to the field was impossible.

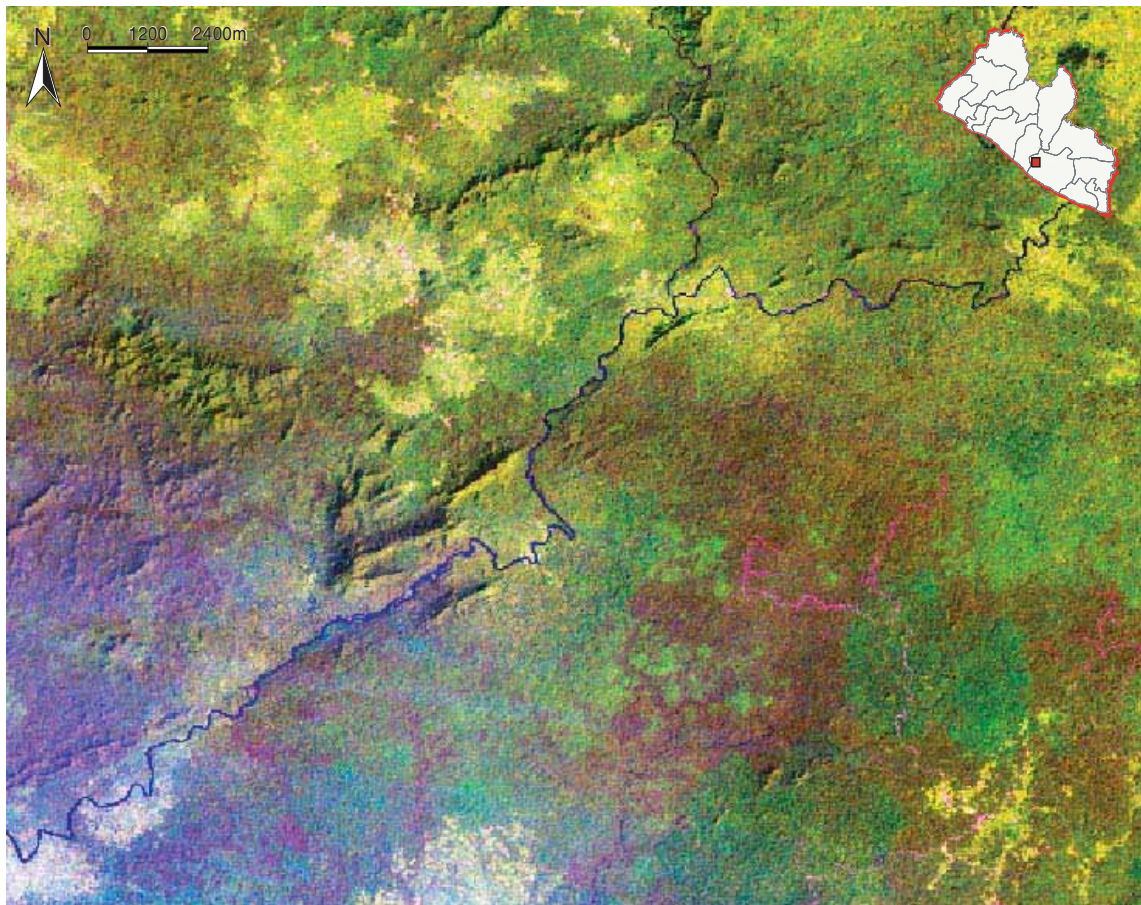
While rural Liberians complained for decades about their exclusion from decision making, the existing policies, laws and regulations regarding community control of rural resources were contradictory, incomplete and not implemented. Given the political climate, especially over the last 14 years, little has been done to support community-managed forest areas and the problems around rural land tenure remain. Neither could the Forest Development Authority enforce the rights of communities to receive the benefits promised to them in forest concession agreements. Communities benefited only to the extent that individual concessionaires acted responsibly. The situation of rural Liberians would be improved if a comprehensive national land-use plan that balanced the concerns of forest management with other sectoral concerns were formulated and implemented.

The Liberia Forest Reassessment (LFR) Project

The Liberia Forest Reassessment (LFR) Project is implemented by Fauna & Flora International (FFI) and Conservation International in partnership with three Government of Liberia agencies: the Forestry Development Authority, the National Environmental Commission of Liberia and the Department of Statistics of the Ministry of Planning and Economic Affairs. It is funded primarily by the European Commission's Tropical Forests Budget Line and the Critical Ecosystem Protection Fund. Implemented from 2001 to 2004, the LFR is the largest externally funded forest management effort in Liberia since the start of the civil conflict in 1990.

The overall objective of the project is to establish the necessary foundations in terms of information, tools and policy environment for effective and sustainable forest and biodiversity management in Liberia. A related objective is to improve overall environmental management nationally. This involves three main components: (1) analyses of satellite imagery from the mid-1980s and 2001 to reassess the extent of changes in and the quality of Liberia's forest cover, plus the establishment of a Geographical Information System (GIS) database that is continually expanded and updated with biophysical and socio-economic information; (2) a review of Liberian forest policy looking at what policies, laws and regulations exist and how Liberia's forests should be classified and managed; and (3) field surveys of significant forest blocks to obtain adequate socio-economic and biological data to classify and manage Liberia's forests and biodiversity for the benefit of all Liberian society. The project emphasizes correcting a historical imbalance that favoured commercial use of forests over protecting representative samples of Liberia's biodiversity and ensuring the economic and cultural needs of rural Liberians.

► Roads in Krahn Bassa national forest 1986



Landsat TM image: Bands 5, 4, 3
Taken: 1986

Images courtesy of Conservation International
Image compilation by UNEP / PCAU

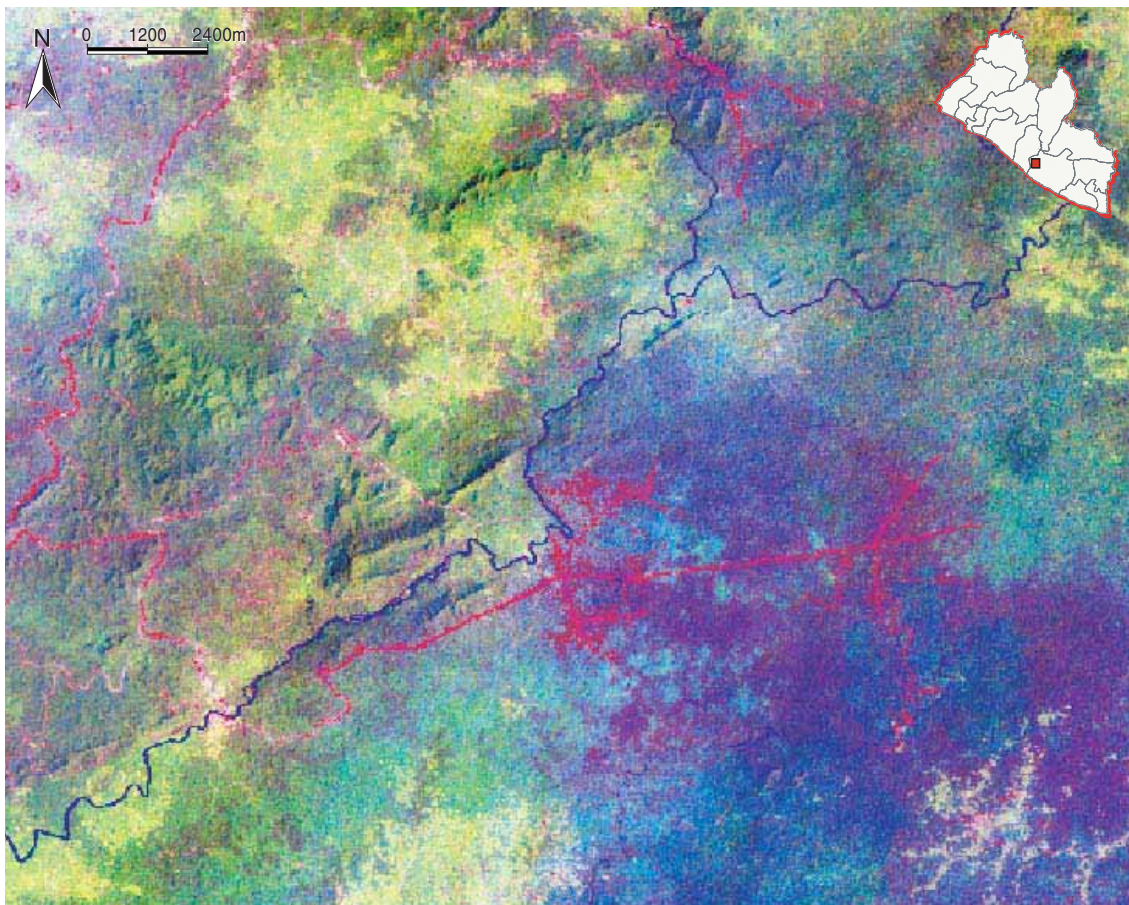
The image above illustrates the road network, shown in red, in the Krahn Bassa national forest in 1986

Until 2002, management of Liberia’s forests, like all of its natural resources, was done in the absence of a coherent legal framework. With the adoption in that year of the National Environmental Policy, the Environmental Protection Agency Act and the Environmental Protection and Management Law, this framework now exists but it remains to be implemented. Liberia’s forests continue to suffer from the effects of uncoordinated sectoral interventions – mining, agriculture, transportation, energy supply and others – without sector-specific safeguards to minimize damage to forests.

The conflict and so-called “war-lord” economy, where natural resources are used to fuel and extend conflict, has directly affected Liberia’s forest resources. The United Nations Security Council resolution 1343 of May 2001 that imposed sanctions on Liberian diamonds reduced the income available to warring factions, who then turned to other sources of revenue. Reportedly, timber extraction turned out to be almost as lucrative than the smuggled diamonds. In 2002, it was estimated that income generated by timber exports was at least 150 million USD.

In May 2003, the Security Council completed a six-month review of the situation. It found that the proliferation of arms and armed militia in the sub-region continued to constitute a threat to international peace and security in West Africa, in particular to the peace process in Liberia. It also recognized the linkage between the illegal exploitation of natural resources such as timber, and the proliferation and trafficking of illegal arms as a major source of

► Roads in Krahn Bassa national forest 2001



Landsat ETM+ image: Bands 7, 4, 2
Taken: 2001

Images courtesy of Conservation International
Image compilation by UNEP / PCAU

The road network, shown in red, in the Krahn Bassa national forest has increased considerably since 1986, as can be seen in the above image of 2001

fuelling and exacerbating regional conflicts. As a result, the Security Council passed resolution 1478 extending the existing sanctions against Liberia for an additional 10 months, and adding a ban on the import of its timber.

The timber ban went into effect on 7 July 2003, after the Liberian government failed to demonstrate that revenue from the timber industry was used for legitimate social, humanitarian and development purposes. Since the timber sanctions entered force, there has been little documented trade in Liberian timber. Although some countries, especially close neighbours, have failed to enact implementing legislation and do not appear to be enforcing the sanctions, many developed countries have rigorously enforced them. However, the potential environmental consequences of the sanctions have not yet been systematically investigated and it is not clear to what extent logging has decreased in recent months.



JEREMY HOLDEN – FAUNA & FLORA INTERNATIONAL

Logs cut illegally in an area that is now part of Sapo National Park

In December 2003, the situation was again reviewed and resolution 1521 was passed, further extending the diamond, timber and arms sanctions. The United Nations Security Council commissioned a panel of experts to report again by 30 May 2004 on compliance with the sanctions. At that time, it is likely that the sanctions will be reviewed and further action considered. Based on resolution 1521, it seems reasonable to expect that timber sanctions will be lifted only when the forest is in the control of a legitimate authority, the FDA is reformed to properly manage the forests, and revenue flows are controlled to ensure legitimate uses.

In November 2003, given the importance of the timber trade to the Liberian economy, the Chairman of the Transitional Government of Liberia also appointed a Review Committee on log and timber exports. This Committee will advise on how the full benefits of the logging and timber sector can accrue to the Liberian people and how the sector activities can be undertaken in a manner that is consistent with internationally accepted environmental standards.

A report from the Committee – “A Road Map to Lifting UNSC Sanction on Log and Timber Trade in Liberia: Basic Reforms in the Forest Industry” – proposes reform programmes for the Liberian forest sector. The report identifies the following areas that require immediate reform:

- Capacity building of the Forestry Development Authority (FDA)
- Improving sector transparency and accountability
- Concession review
- Forest inventory
- Protection and development of parks

As part of the reform of the forest industry the report proposes that the Environment Protection Agency be activated and that an independent committee be established to oversee the activities of the FDA.

There is agreement among the international community and Liberians that the forest sector must be reformed. This reform process will need to address the environmental impacts of forestry and at the same time undertake the steps necessary to have the timber and logging trade sanctions lifted. Due to the economic importance of the forestry sector these reforms should ensure that the sector can be developed in a sustainable manner. The international community will need to provide the necessary assistance to the FDA during this reform process.

The regional importance of Liberia's forest resources is increased given the extent of forest loss in its neighbouring countries. Consequently, the forests along Liberia's borders are increasingly at risk of being illegally harvested. The United Nations Expert Panel (October 2003 report) reported hearing accounts of logs being smuggled from Liberia into southwestern Côte d'Ivoire. Similar unconfirmed reports allege the Guinean military to have taken logs from Gbarpolu or Lofa Counties into southern Guinea. Both Sierra Leone and Côte d'Ivoire require timber for their reconstruction, in addition to needing it for fuel and other daily matters. Both countries have less forest reserves than Liberia. Côte d'Ivoire – with established timber processing facilities – will continue to create a strong demand for round logs to process and consume domestically or export.

4.3 Freshwater and wetlands

Liberia possesses abundant surface water and six principal watersheds: Cavalla, Cestos, Lofa, Mano, Saint John and Saint Paul. Together, these basins drain approximately 65,5 per cent of the country. The Mano and Cavalla are shared basins between Sierra Leone and Côte d'Ivoire respectively, while the Lofa, Saint John and Saint Paul drain part of Guinea. Numerous micro watersheds or sub-watersheds also exist.



JEREMY HOLDEN – FAUNA & FLORA INTERNATIONAL

Rapids forming along the middle Cestos River during the dry season

The major rivers flow in a northeast to southwest direction due to topographical conditions en route to the Atlantic Ocean.⁵⁸ Major exceptions to the patterns are the middle reaches of the Cavalla and Dugbe in eastern Liberia, which flow parallel to the coast in their lower reaches before entering the Atlantic Ocean.

Only eight large permanent wetlands have been identified in Liberia. They provide both subsistence and economic benefits to its many inhabitants. However, like wetlands all over the world, they have become stressed by human induced activities.

Liberia has acceded to the Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat 2002. Liberia presently has one site designated as a Wetland of International Importance, the Lake Piso wetlands, with a surface area of 76 091 hectares. Two additional wetlands of particular importance are the Marshall Wetlands and the Cestos-Senkwehn wetland. Both are being considered for protection status.

Table 2. Wetlands of Liberia⁵⁹

	Wetland	Type	Conservation status
1	Lake Piso	Coastal lacustrine	Proposed nature reserve
2	Marshall	Inland riverine	Proposed nature reserve
3	Mesurado	Coastal	None
4	Lake Shepherd	Coastal	None
5	Bafu Bay	Coastal	None
6	Cestos-Senkwehn	Inland riverine	Proposed nature reserve
7	Gbedin	Inland swamp	None
8	Kpatawe	Inland riverine	None

(Source: Biodiversity Strategy and Action Plan)

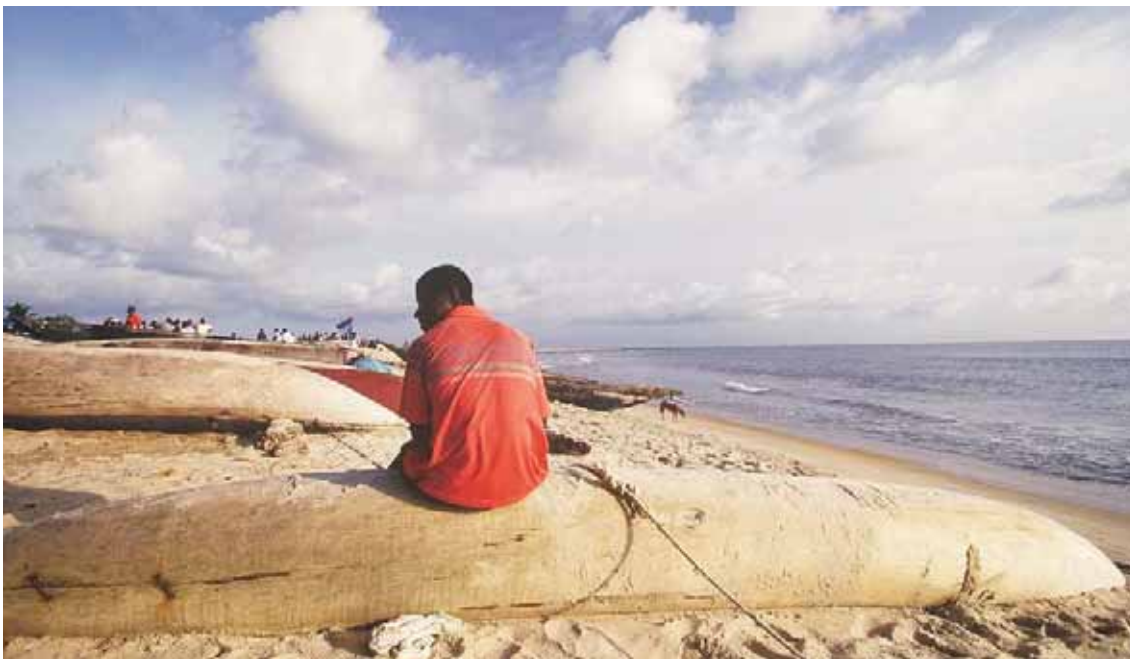


Royal terns (*Sterna maxima*) at dawn at Lake Piso

JEREMY HOLDEN – FAUNA & FLORA INTERNATIONAL

4.4 Marine and coastal environment

The coastline of Liberia is 560 km long and about 58 per cent of its population lives along this coast. With an area of continental shelf of 14 894 km² and territorial sea of up to 159 200 km², it produces annually 7 616 metric tonnes of fish and 126 metric tonnes of molluscs and crustaceans. The coastline consists of swamp related vegetation, which includes mangrove forest and savannah related vegetation that extends up to 25 km inland. The coastal and marine environments are subjected to a variety of pressures: erosion due to sand mining, oil pollution, waste dumps, human settlement and the discharge of municipal wastewater due to the lack of proper water and sanitation facilities. Fishing is not a significant pressure on fish populations, as the Liberian fleet is small due to a lack of nets, engines and fuel. There has however, not yet been any fish stock assessment undertaken for the country to inform the management decisions on utilizing this resource.



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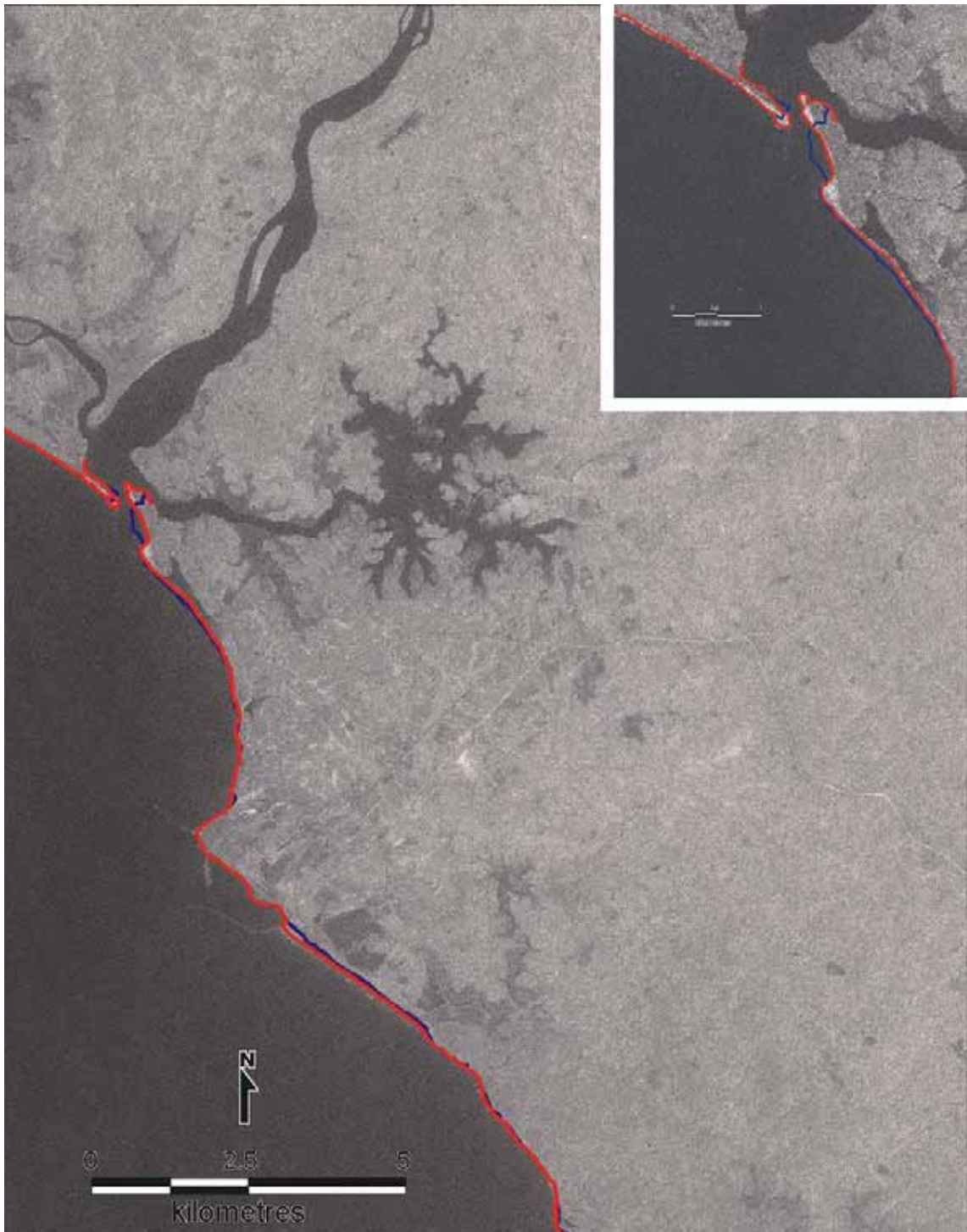
Artisinal fishermen's dugout canoes

Mangroves cover a small area along the coast – from Cape Mesurado to Cape Palmas – at the edges of lagoons, rivers banks and river estuaries and in wide-spread areas of swamps. Mangroves perform several ecological and hydrological functions, including water supply and flood control, erosion protection, habitats for fisheries and are critical for the conservation of biological diversity. Despite the importance of these functions, mangroves continue to be used for firewood and charcoal. Marine life also faces the risk of losing natural habitat. The regenerative capacity of the mangrove systems strongly declines and the ability to provide feeding grounds for fish, molluscs and crustaceans is dramatically decreasing as uncontrolled harvesting continues.

Catch of the day on the beach near Monrovia: Blacktip Shark

4

► Changes in the coast-line near Buchanan (1986 - 2001)



Multi-temporal analysis Landsat TM image
Taken on: 14 January 1986 and Landsat ETM+ 16 February 2001
Digitalization: The coastlines for 1986 and 2001 are manually extracted

Images courtesy of University of Maryland
Image compilation by UNOSAT

The shoreline outside Buchanan has changed between 1986 (in blue) and 2001 (in red). The northern shoreline is affected by changes in the water level of the Saint John river, its changing delta, as well as the coastal erosion from the sea

Except for few places in the central part of the country, primary mangrove forest has been replaced by secondary ones. Much of the mangrove destruction appears to concentrate along the edges of creeks, and is particularly more widespread around the larger towns and cities such as Buchanan, Greenville and Monrovia. The mangrove trees are also harvested as firewood for local energy requirement.

Liberia, like most coastal nations is faced with serious problems as a result of changes to its shoreline. The 2002 State of the Environment Report cited significant shoreline recession in the cities of Buchanan, Greenville, Harper, Monrovia and Robertsport. In some cases the extent of this change was an estimated to be three metres per year. The UNEP missions to Monrovia also heard reports of coastal erosion, for example in the area around the Africa Hotel in Monrovia.

4.5 Mineral resources

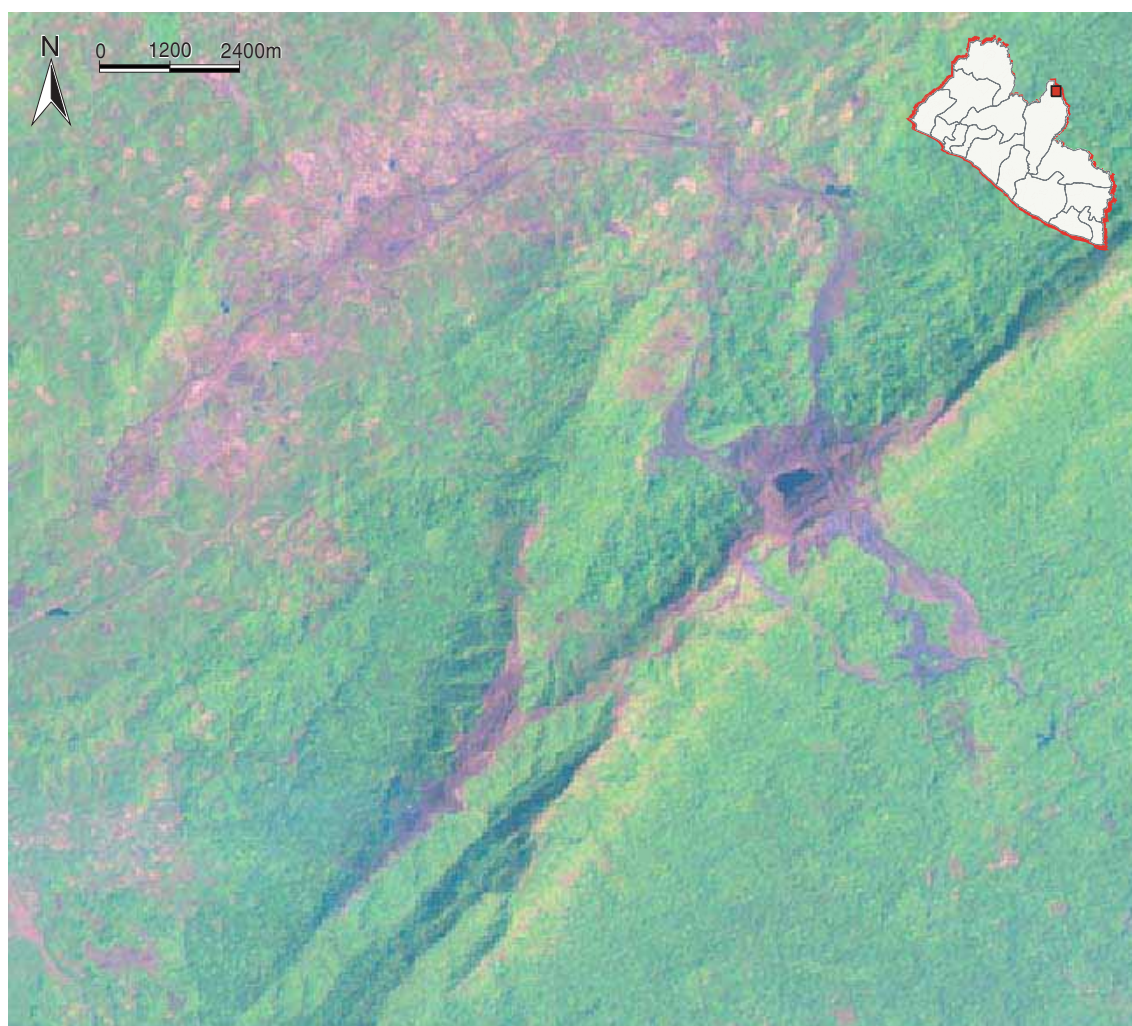
Liberia is rich in mineral resources with substantial iron ore, diamond and gold deposits. Iron ore mining was previously undertaken by American and European companies in the following areas: Bomi, Bong Mines, Mano River and Nimba. The concessions resulted in widespread clearance of the tropical rainforest for mines, open-cast pits, processing plants, housing and roads/railways and unmanaged disposal sites. Environmental impact assessments

► Map 7. Mineral deposits and extraction facilities in Liberia



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

► Iron ore tailings on Mount Nimba 2001



Landsat ETM+ image: Bands 7,4,2
Taken: 2001

Images courtesy of Conservation International
Image compilation by UNEP / PCAU

An area of around 4km square in the vicinity of the open cast iron ore mine at Mount Nimba has been heavily affected by erosion. The 300 million tonnes of tailings, or mine waste, that were dumped continue to be eroded. The resulting water acidification causes death of aquatic life and affects wildlife drinking the water. The polluted water also causes health problems for communities downstream

have not been conducted at the sites and potential chemical risks are unknown. One site of particular concern is the Nimba Mine and the 300 million tonnes of mining waste that were deposited in the surrounding forest.

Diamonds and gold in Liberia are mined in small-scale operations, although smuggling makes accurate estimation impossible. In 1999, the Ministry of Land and Mines estimated that there were 5 000 unlicensed and 1 000 licensed mining and dealing operations in the country.⁶⁰ Artisanal mining of gold and diamonds results in the clearing and excavation of large areas of forest and river beds and the uncontrolled discharge of suspended solids which can clog rivers and the discharge of metals, metalloids and cyanide.⁶¹ In addition, artisanal and small-scale gold mining uses the mercury-based amalgamation process. Mercury vapour is released into the air, which can affect human health, or is discharged to soil/surface waters. It has been estimated that two grams of mercury are released into the environment for each gram of gold recovered.⁶² In addition, sulphide gold ores are often purified by roasting and emit sulphur and arsenic oxides.⁶³

In 1988, before Liberia imploded into civil war, it exported an annual average of 8,4 million USD worth of diamonds. However, with the outbreak of war and the need for revenue, Liberia diamond exports increased dramatically. For example, in 1995, when formal economic activity in Liberia was almost non-existent, Belgium reportedly imported 500 million USD worth of diamonds that were declared as Liberian. In reality, the majority of these diamonds came from both Angola and Sierra Leone, and Liberia was simply being used as a hub for smuggled gems.



TOM ELDER – MANO RIVER RESOURCES INC.

Alluvial mining poses threats to water quality and riparian habitat

The phenomenon soon became institutionalized when international diamond dealers established offices in Liberia and fictitious mines were created as cover for the smuggling. Numerous reports cited the diamond trade as a major contributor to regional conflict and instability, as revenues were being used to purchase arms and pay militia salaries.

To address the situation, the United Nations Security Council passed resolution 1343 in May 2001. The resolution imposed comprehensive sanctions on Liberia, including an embargo on its diamond exports, a travel ban on senior Liberian officials and their families and a ban on Liberian importation of weapons.

After two annual reviews, the sanctions remained in place. Liberian diamond exports decreased considerably, and on average the country could export only small amounts of diamonds, a large proportion of them of the industrial, low-value type. The sanctions will not be lifted until Liberia has taken measures to join and comply with the Kimberley Process, including establishing a transparent and internationally verifiable system for issuing certificates of origin for all rough diamonds.

The Kimberly Process⁶⁴

The Kimberly Process is an international initiative aimed at breaking the link between legitimate trade in diamonds and conflict diamonds. Conflict diamonds are rough diamonds used by rebel movements or their allies to finance conflict aimed at undermining legitimate governments. The Kimberly Process was launched in May 2000 in the city of Kimberly, South Africa. It started out as a consultative process, later becoming a negotiating process that culminated in the adoption of the Kimberly Process Certification Scheme (KPCS) at a Ministerial Meeting in Interlaken, Switzerland, in November 2002. The KPCS sets the international benchmark for national certification schemes to be implemented by each participant country through national legislation.



TOM ELDER - MANO RIVER RESOURCES INC.

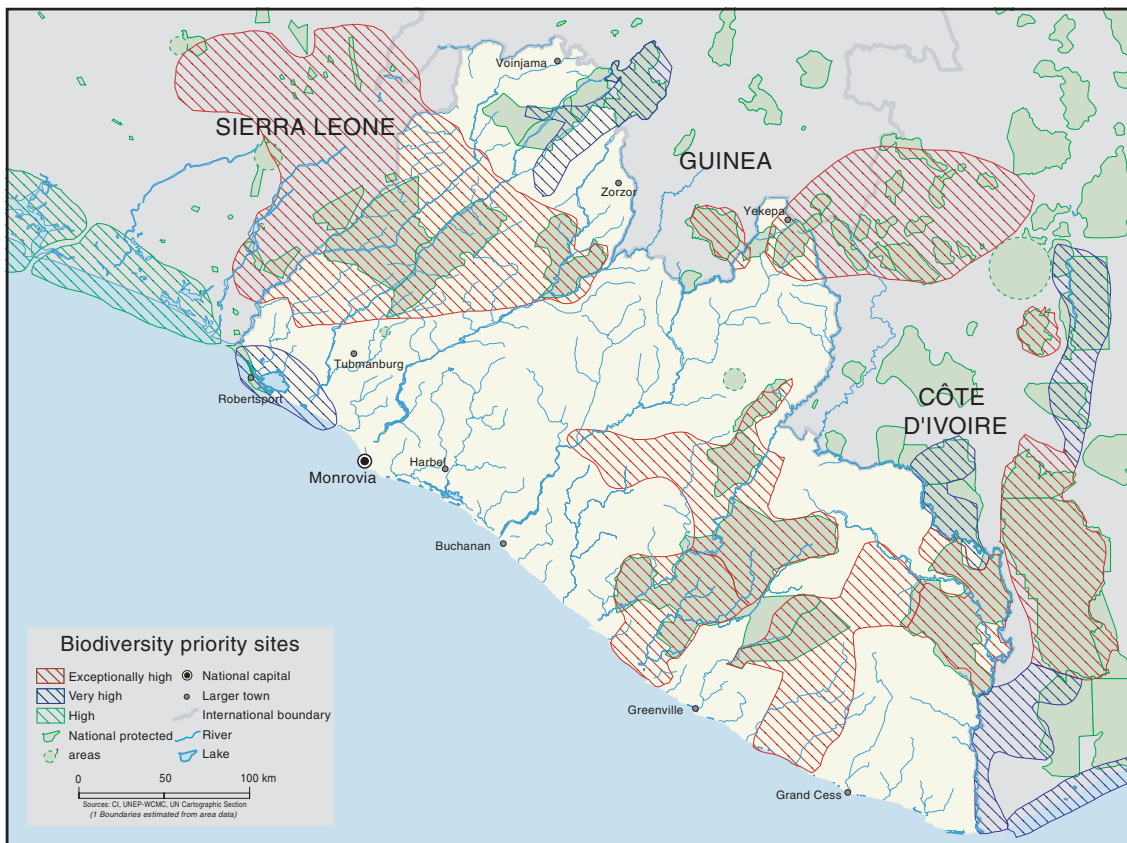
Artisanal miners, Mano River

Liberia does not contain known reserves of oil and gas. However, in 2001, an Australian consortium, Fusion Oil & Gas plc, conducted an offshore seismic survey and early results were optimistic. The Liberian Government withheld oil exploration permits until the results of the survey were finalised.⁶⁵

4.6 Biodiversity

Liberia's plant and animal life is exceptionally diverse, with extremely high rates of biodiversity and high populations of species that are nearly extinct outside the country. Liberia is home to approximately 125 mammal species, 590 bird species, 162 native fish species, 74 known reptiles and amphibians and over 1 000 described insect species.

► Map 8. Biodiversity priorities and national protected areas



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Botanical knowledge of Liberia is poorer than for any other Upper Guinean ecosystem country. Liberia is thought to contain over 2 000 flowering plants, including 240 timber species. In late 2002, botanical collections over 10 days at Sapo Park sampled 353 higher-level plant species, of which 78 were endemic to the Upper Guinean forests and six were new to science. Such a level of undiscovered species is extremely rare in continental Africa outside of the Congo Basin and leads botanical experts to theorize that this number may be far higher. Only once the security situation has improved will it be possible to launch field assessments to verify earlier predictions.

Given that no systematic inventories have ever been carried out of southeast and northwest Liberia's flora, insects, amphibians, arachnids, gastropods or other animal species often displaying a high degree of dependence on specific plant hosts, the uniqueness of Liberia's flora and fauna can only be surmised.

In December 1999 the Global Environment Facility (GEF) funded the West African Conservation Priority-Setting Exercise for the Upper Guinean Ecosystem Project, which identified Liberia as the top priority country in humid West Africa for conservation purposes since 41

per cent of its area is designated as being of exceptionally high biological importance. Then, in September 2002, the West African Chimpanzee Conservation Priority-Setting Process identified the southeast Liberian forest block as one of the top five rainforest sites for chimpanzees. Informally, many participants recognized it as the highest priority site. In 2001, Bird Life International identified nine Liberian important bird areas.



Ground orchid (*Habenaria buntingii*) at Sapo National Park

JEREMY HOLDEN – FAUNA & FLORA INTERNATIONAL

Table 3. Summary of important bird areas in Liberia⁶⁶

IBA code	Site name	Administrative region
LR001	Wologizi Mountains	Lofa
LR002	Wonegizi Mountains	Lofa
LR003	Lofa-Mano	Lofa, Grand Cape Mount
LR004	Nimba Mountains	Nimba
LR005	Cape Mount	Grand Cape Mount
LR006	Zwedru	Grand Gedeh
LR007	Cestos-Senkwen	Grand Bassa, Sinoe
LR008	Sapo	Sinoe
LR009	Cavalla River	Grand Gedeh

(Source: Biodiversity Strategy and Action Plan)



JEREMY HOLDEN – FAUNA & FLORA INTERNATIONAL

Liberian chimpanzees⁶⁷

There are an estimated 21 300 to 55 600 Western chimpanzees remaining in ten West African countries. Their original range covered 13 countries, but they have already been lost from three of these, and it is feared that they will be lost very soon from three more, bringing the number of original territories down to seven. Of the existing range states, five are named as containing viable populations by the Conservation International assessment (co-funded by the Great Apes Survival Project, GRASP), of which Liberia is one. The Liberian population of chimpanzees is estimated at only 1 000 – 5 000, but includes parts of two areas identified as “exceptionally important” and one “very important” for the survival of the subspecies. The main threats to the animals are habitat loss and commercial hunting for bushmeat, both of which affect many other key species and are exacerbated by civil disturbance. Four distinct subspecies of chimpanzee have been identified and two of these are present in Liberia: the Western subspecies (*Pan troglodytes verus*) and the East Nigeria–West Cameroon chimpanzees (*Pan troglodytes vellerosus*).

The rich biodiversity of the country is currently threatened by two major sources. First, loss and fragmentation of habitat caused by deforestation. Second, wildlife remains a critical source of protein to rural Liberians, as well as a source of cash income. Animals are killed and may be eaten locally, or sent raw or smoked to urban areas for sale. Hunting is traditionally a male activity, principally done with firearms, snares and pits, while females sell the bushmeat on the roadside or in marketplaces. Most hunting has been for consumption within Liberia, although recently with intense forest loss in Sierra Leone and Côte d'Ivoire, bushmeat markets in border areas in these countries are reportedly increasingly supplied from Liberia.

Bushmeat and wildlife surveys over the past years have indicated that most Liberians believe wildlife to be inexhaustible.⁶⁸ Many Liberian villagers feel that hunting has no impact on wildlife populations. To meet growing demands, by 2002 a large-scale commercial bushmeat industry had emerged in southeast Liberia. Traders from Liberian cities as well as neighbouring countries supply cartridges to local hunters or to external professional hunters who set up camps deep in the forest and export most if not all animals taken. In some cases, the hunting of bushmeat has reached the status of a cash crop and forest dwellers completely abandon agriculture in favour of hunting. Excessive hunting can eliminate almost all animal life in those portions of the forests that are easily accessible and result in what is known as the “empty forest” effect, which has been reportedly noted in places like the forests of the Cestos and Senkwehn Rivers. These were surveyed in early 1999 and again in early 2003, during which time the density of wildlife observed had decreased significantly.



REG HOYT - FOREST PARTNERS INTERNATIONAL

Selling of bushmeat is an important source of income for women in Liberia

No reliable estimates exist on the quantities of animals killed, nor of the value of such meat. As commercial hunting increases, previously held taboos that serve to protect selected species fall away and result in all species being hunted. Commercial hunters are particularly indiscriminate, tending to favour large animals to get the biggest return on their cartridges.

Although hunting is governed by a permit system managed by the Wildlife and National Parks Division of the Forestry Development Authority, logistical reasons and a lack of implementation capacity make the implementation and enforcement of the legislation problematic.



HO - REUTERS

Illegal killing of the sea turtles^{69, 70}

Leatherback turtles (*Dermochelys coriacea*) are critically endangered and along with the Olive ridley (*Lepidochelys olivacea*), Green turtle (*Chelonia mydas*), Loggerhead turtle (*Caretta caretta*) and Hawksbill turtle (*Eretmochelys imbricata*) are found on Liberia's beaches. While it is illegal to kill sea turtles in Liberia, they are widely hunted while nesting and occasionally are caught in artisanal fishermen's nets. No data exist to indicate with certainty how many are killed each year. However, as surveys undertaken in 2002–2003 by the environmental organization Save My Future (SAMFU) found approximately 450 shells in villages along approximately 60 per cent of Liberia's coastline in the course of one year, it is possible to estimate that at least 1 000 turtles are captured each year. Harper and Greenville have seasonal markets in sea turtle meat, eggs and blood. SAMFU's surveys showed that while most nests had tracks showing the female turtle returned safely to the ocean after laying eggs, about 95 per cent of all nests are poached of their eggs.

4.7 Protected Areas

In the late 1970s, the Forest Development Authority, with assistance from the International Union for the Conservation of Nature (IUCN) and World Wildlife Fund (WWF), carried out a nationwide biological survey of Liberia in order to recommend a network of national parks and nature reserves. The results were ready by 1980, but not published until 1983. Soon thereafter, Sapo National Park was created in Sinoe County. Political and commercial pressures during the remainder of President Doe's Administration precluded the creation of any further parks or reserves.

During the 1990–1996 civil war, no additional progress was achieved, although the Society for the Conservation of Nature of Liberia, and its international partner organization, the Society for the Renewal of Nature Conservation in Liberia, prepared an Action Plan for the Renewal of Nature Conservation Programmes in Liberia that updated the earlier recommendations.

In 1999, the Forest Development Authority prepared decrees for several protected areas including the Lake Piso Nature Reserve and the Cestos-Senkwehn National Park, but these never went beyond Forest Development Authority management. Local and international en-

Table 4. Protected areas of Liberia⁷¹

	Protected area	Type	Area (ha)
1	Cape Mount	Nature Conservation Unit	55400
2	East Nimba	National Forest	9591
3	Gibi	National Forest	60704
4	Gio	National Forest	32780
5	Gola	National Forest	202000
6	Grebo	National Forest	260326
7	Kpelle	National Forest	174828
8	Krahn Bassa	National Forest	513962
9	Lorma	National Forest	43505
10	National Forest Name Unknown (LBR) No.1	National Forest	unknown
11	National Forest Name Unknown (LBR) No.2	National Forest	unknown
12	North Gio	National Forest	13172
13	North Lorma	National Forest	71226
14	Sapo	National Park	129230
15	West Nimba	National Forest	9146
16	Yomo	National Forest	2648

(Source: UNEP-WCMC, 26 January 2004)

Environmental organizations continued to push for the revision and expansion of Liberia's protected area system, especially in light of the conclusion of the West Africa Conservation Priority-Setting Workshop organized in 1999 by Conservation International, Global Environment Facility, WWF, UNDP, ECOSYN and BirdLife International that Liberia has the greatest potential for nature conservation of any Upper Guinean Ecosystem country.

In early 2002, Conservation International negotiated and signed a memorandum of understanding (MoU) with President Taylor and his top advisors on the forest sector. Building on earlier recommendations, the MoU included the creation of six new national parks and nature reserves and the expansion of Sapo Park. This would add almost 700 000 hectares to Liberia's network of strictly protected areas. The



Entrance to Sapo National Park, November 2002



The zebra duiker (*Cephalophus zebra*) is widespread in Liberia's mature forest

government committed itself to setting aside an additional 800 000 hectares through other protected areas and corridors linking parks and reserves to cover a total of 1.5 million hectares, or 30 per cent of Liberia's forests. Progress on the MoU was limited as the agreement had no formal legal status. However in October 2003, based on work prepared by the Liberia Forest Re-assessment project, the National Legislature approved and Acting President Blah signed acts creating the East Nimba Nature Reserve (13 400 hectares) and

expanding Sapo National Park by 54 100 hectares. This expands forest cover protection from three per cent to four percent of total forest cover though it falls short of the 10 per cent Liberia committed to protect under the Convention on Biological Diversity.

The Liberia Forest Re-assessment Project has used Geographic Information Systems (GIS) and remote sensing to provisionally map many potential national parks and nature reserves. It has also surveyed areas in southeast and central Liberia to assess what would be biologically most valuable as well as socially and economically reasonable to set aside for strict protection. The project intends to continue collecting field data until it finishes in late 2004.

The Protected Forest Area Network Law was passed along with the Nimba Nature Reserve and Sapo Park Acts in October 2003 and restores the provisions of an earlier 1988 Wildlife & National Parks Law, but also incorporates elements of the Conservation International – government of Liberia MoU, committing Liberia to protect at least 30 per cent of its forests, or 1,5 million hectares within a protected forest network. The law also clarifies that eight types of protected forest shall exist legally in Liberia.

Given the critical commercial, socio-economic, biological and cultural importance of forests and natural resources in Liberia, the Liberia Forest Reassessment Project is trying to lay the foundation for balancing the different interests with legitimate claims to Liberia's forests and natural resources, i.e. balancing commercial, community and conservation interests in the forest sector (the so-called three C's of the Liberian forest management). To do this, it is preparing recommendations on a decision making framework and criteria to assist decision-makers find an appropriate balance between the commercial, communal and conservation uses of Liberia's forests and establish the capacity to implement these recommendations. The framework and criteria will furthermore provide guidance on balancing forest management concerns, taken together with other sectoral concerns that may compete with or be complemented by forest management such as mining, agriculture, road building, energy/power supply, health and fisheries.



CONSERVATION INTERNATIONAL

Sapo National Park has numerous species endemic to the Upper Guinean forests

No marine or coastal protected area exists in Liberia, although on the basis of their sea turtle surveys, SAMFU recommends four areas for immediate protection in the following order of priority:

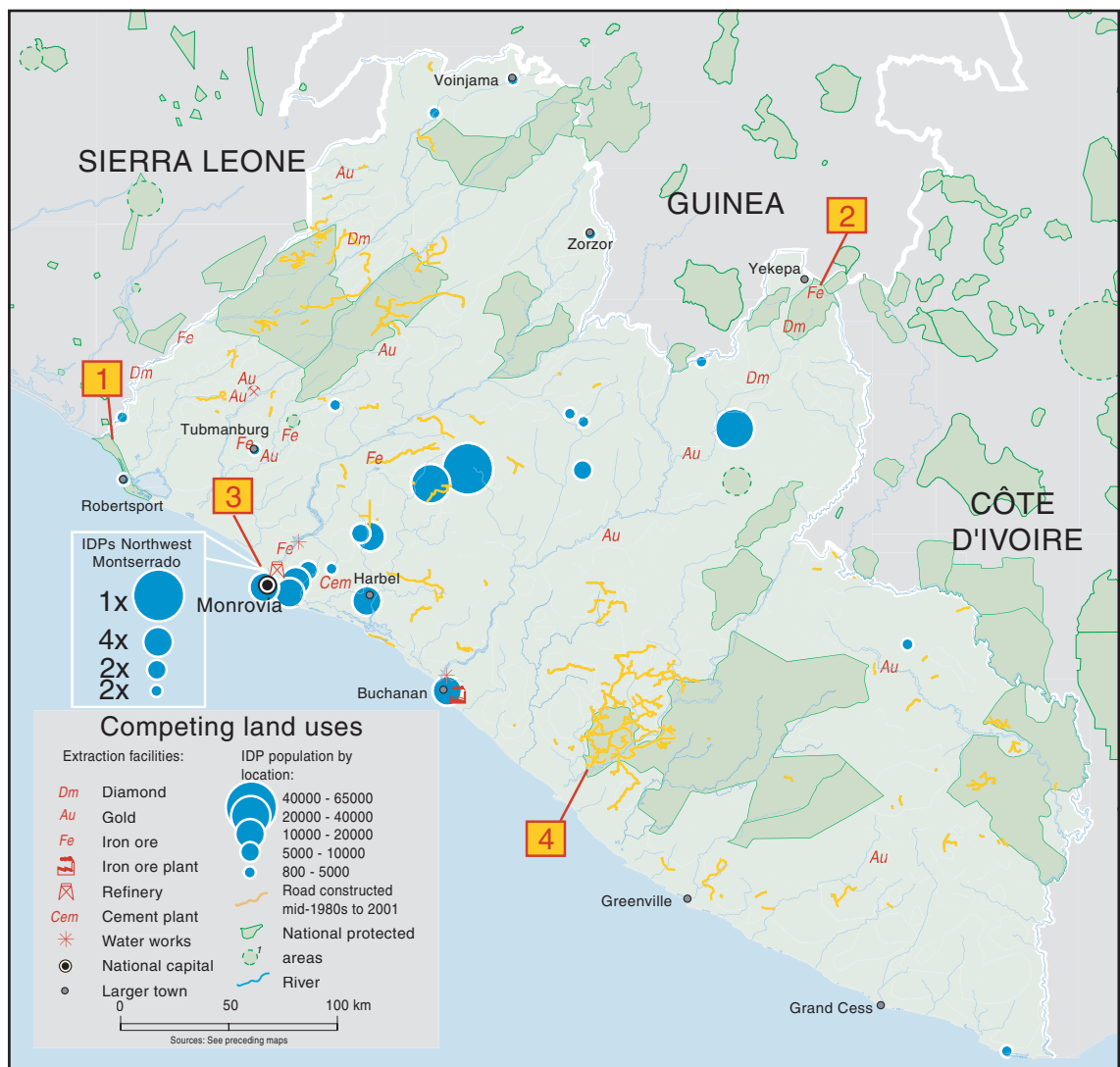
- Borgor Point (Rivercess County, around the town of Rivercess)
- Grandcess (central Grand Kru County)
- Bafu Bay (Sinoe County, 20 km northwest of Greenville)
- Karblakeihn (very near Harper)

Both the National Biodiversity Strategy and Action Plan and The Environment Protection and Management Law of Liberia correctly note that there has been inadequate land use planning in Liberia. The potential for environmental degradation increases where different sectors and interests coincide in the same geographical area.

Mano River and Mount Nimba both illustrate potential competing land uses in areas where the exploitation of mineral resources can potentially affect protected natural areas and areas of biodiversity priority. The uncontrolled exploitation of the iron ore deposits and alluvial diamonds along the Mano River pose potential threats of pollution and habitat destruction to the nature conservation unit and protected area of Cape Mount.

The uncontrolled exploitation of iron ore deposits around Mount Nimba has had an extremely high environmental impact, which continues today. During the period of operation (1963 - 1992) 300 million tonnes of mine waste were stockpiled without any precautions. The resulting acidification of rainwater draining from this stockpile and siltation of water-courses has affected large areas of the downstream watershed.

► Map 9. Competing land uses in Liberia



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Competing land uses for (1) Mano River, (2) Mount Nimba, (3) north west Montserrado and Monrovia and (4) Krahn Bassa national forest and protected area

The areas around north west Montserrado, Monrovia and its surroundings have a high concentration of population. In the absence of adequate waste and sanitation measures this poses potential threats to the water quality and mangrove areas around Monrovia.

A fourth example is the Krahn Bassa national forest and protected area, where there has been a fragmentation of the forest (and thereby an increased threat of biodiversity loss) as a result of increased road construction between the mid-1980s and 2001.

One way to address these competing demands is to ensure that the Environment Protection Agency has sufficient capacity to harmonise the policies adopted in different government sectors, and to arbitrate in the disputes of land use using sound technical criteria.

5

Environmental governance and institutions

5.1 Introduction

Practically all of Liberia's governance institutions have collapsed as a result of the civil war and armed conflict. A lack of good governance and continued bouts of fighting have been the root causes of Liberia's social and economic hardship and the slow pace of its development. With a peace accord now in place, there is an immediate need to promote good governance in order to prevent the recurrence of conflict. An effective institutional framework should rapidly be established to foster peace, security and stability and to promote sustainable development in Liberia.

Adequate environmental legislation already exists, but under the current circumstances little has been done to implement it. Several ministries have a stake in environmental governance, but the primary institutions are the Forestry Development Authority (FDA) and the Environment Protection Agency (EPA). The FDA has been operational since 1976, but requires restructuring and re-equipping to carry out its mandate. The EPA has recently been established in accordance with the Environment Protection Agency Act of 2003 and subsequent proclamation by Chairman Bryant. Action is now needed to implement this law and make the institution operational, by appointing its Board of Directors and National Environment Policy Council. As both the Liberian government and the United Nations Sanctions Committee have acknowledged, the effective governance of natural resources should be in place before sanctions are lifted.

A key priority for the EPA will be to establish policy and technical linkages with other ministries and agencies, in particular the Ministry of Lands, Mines and Energy, the Ministry of Agriculture and the FDA. Environmental non-governmental organizations have played

an active role in assembling the existing environmental knowledge and legislation. It is important to enhance their partnership with the administration.



Looted Ministry of Labour building in Monrovia, December 2003

Liberia is a member of a number of regional organizations and a party to Multilateral Environmental Agreements but its participation could be further enhanced. Re-engaging with its neighbouring countries and the international community is of paramount importance to the country's future.

5.2 Institutional framework

Historically, the most important institution dealing with environmental matters has been the Forest Development Authority (FDA), which was established in 1976 to replace the former Bureau of Forest Conservation and Wildlife. The FDA has a staff of approximately 550 employees and an operating budget of 850 000 USD. It has been reported that none of the staff salaries have been paid since February 2003 (unpaid salaries are reported to be 340 000 USD) and that due to looting and conflict related destruction an additional 2,5 million USD is also required to re-equip the organization. The FDA has the mandate to protect, manage and conserve government-owned forests and wildlife on a sustainable basis.

The development and management of protected areas and wildlife comes under the FDA's Division of Wildlife and National Parks, which was created by the 1988 Wildlife and National Parks Act. In the conflicts between timber production and conservation of wildlife, the balance has been heavily weighted in favour of commercial utilization of the Liberian forests. However, in November 2003 an Act became law mandating the creation of a Protected Forest Area Network, which should provide more protection for wildlife if the resources are available for implementation. In the FDA, the control of hunting and settlement in the National Forests is the responsibility of the Forest Management Department.



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UNEP meeting with the Environmental Commission

in Liberia. The absence of an overarching environmental policy and legal framework often resulted in poor decision making, duplication and ineffective policy implementation.^{72a}

From inception, it was planned that NECOLIB would evolve into an independent Environment Protection Agency (EPA). To fulfil this aim, its recent work plan has been focused on the formulation of a national environmental policy and the drafting of a comprehensive framework of environmental legislation.

In November 2002, the Government adopted the National Environmental Policy, the Environment Protection Agency Act and the Environment Protection and Management Law. The three documents became law in April 2003 when they were published into leaflets as required by the Constitution of Liberia. The National Transitional Government of Liberia formally proclaimed by de-

In 1999, as a commitment to environmental management, the Government of Liberia established the National Environmental Commission of Liberia (NECOLIB). NECOLIB was given the executive authority over all programmes and activities relating to environmental management in the country as well as serving as the focal point for international environmental agreements. These include the Convention on Biological Diversity, the United Nations Framework Convention on Climate Change and the Ramsar Convention on Wetlands of International Importance. Prior to the establishment of NECOLIB, several ministries and agencies shared responsibilities for the environment



PEKKA HAANVISTO – UNEP / PCAU

Old NECOLIB office in Monrovia, January 2004

create the establishment of the Environment Protection Agency (EPA) in December 2003. Once provided with sufficient capacity in terms of administration, staff and equipment, the EPA will act as the principal authority for the inter-sectoral management of the environment and will cooperate, monitor, supervise and consult with relevant stakeholders on all activities in the protection of the environment and sustainable use of natural resources.

The Environment Protection Agency Act also defines the structure of the EPA which includes, among others, an Executive Director, a Policy Council, a Board of Directors, an Environmental Protection/EIA Unit and a Programmes Unit. The Policy Council will be the policy-making body on the environment and will consist of members of government ministries and agencies, NGOs and community-based organizations. The Board of Directors will be the supervisory body of the EPA and will be composed of nine persons, including representatives from different government and private institutions. In addition, according to the EPA Act, the Executive Director of the EPA will be appointed by the president from a list of three names recommended by the Policy Council. As of January 2004, the Government had not yet taken the necessary steps to establish either the Board of Directors or the Council or appoint the Executive Director.

The proposed structure of the EPA and its responsibilities outlined in the act appear to be comprehensive and it needs implementation in the short term. Staffing and equipment needs must be met to make the EPA fully operational. Furthermore, training and technical assistance need to be provided in the areas of water and waste management, environmental impact assessment, Geographical Information System (GIS) and awareness raising. NECOLIB had already served as a focal point for international cooperation as had developed modest capacity to deal with international conventions and agreements.

Activation of the Environment Protection Agency is also of importance to facilitate the reform of the forest sector, which should take place in cooperation with the FDA. Reforming the forestry sector is not only a requirement for the lifting the sanctions on timber and logging trade, but also ensuring that this important sector of the Liberian economy is managed in a sustainable way.

UNDP – Government of Liberia Environment Project^{72b}

In April 2000, the Government of Liberia and UNDP signed an Environmental Project Document to provide technical and funding support for the evolution of NECOLIB into an Environment Protection Agency (EPA) responsible for the coordination of sustainable environmental management through the implementation of Agenda 21.

The development objectives of the project are:

- to strengthen the National Environmental Commission through capacity building;
- to promote Environmental Outreach Programmes nationally;
- to promote National Environment Management Policy;
- to facilitate international and regional cooperation and formulate strategies to meet Liberia's obligations under conventions for environmental protection; and
- to produce an environmental policy and prepare an environmental legislation.

The major accomplishments of the UNDP Environment Project to date are the production of the second draft of the first State of the Environment Report for Liberia and the final drafts of the National Environment Policy of Liberia, the Environment Protection Agency Act and the Environment Protection and Management Law and the National Biodiversity Strategy and Action Plan.

Furthermore, under the Environment Protection Agency Act, environmental units will be created in relevant sector ministries that will serve as sectoral contact units for the EPA on environmental matters.

Drafts of the environmental laws were reviewed line-by-line, with interpreters when necessary, in four regional meetings and a national workshop. As a result, they reflect the concerns and agreement of the people's representatives and reflect the beginnings of a much needed move toward greater transparency and accountability in environmental management and legislation.

In addition to the EPA and the FDA, many other ministries and institutions have direct or indirect responsibilities in the field of the environment. However, like the EPA and FDA, their operating capacities are severely restricted.

The Ministry of Agriculture deals with soil protection and conservation, regulation of the forestry and agriculture sectors, including fisheries, plantations and animal husbandry.

The Ministry of Lands, Mines and Energy, besides its pivotal role in mineral resource development, is also in charge of the national responsibility of administering and regulating public and private lands. This includes land tenure, land policy, land reform, land use, planning and all other aspects of land administration. It coordinates the activities of gold and diamond miners and is responsible for issuing mining licenses. The National Energy Committee administered the energy sector prior to the 1990 civil crisis. The National Hydrological Service is housed in the ministry and deals with water resources development and hydrometeorology.

The Ministry of Transport, beside its role in land, sea and air transport, has a department that deals with aeronautical meteorology.

The Ministry of Planning and Economic Affairs, by the statutes that established it, is a major stakeholder in general environmental and developmental matters. It is the formal link between implementing ministries and the international community, and will become one of the major holders of national environmental data.

The National Water Resources and Sanitation Board was established in 1981 to coordinate all activities in water resources development, review sectoral regulations and draft a comprehensive Water Legislation and Policy. This process was disrupted by the civil crisis in 1990. A proposal has been submitted to reconstitute the National Water Resources and Sanitation Board.

In addition to these ministries and institutions, the Ministry of Education also has a specific role through educational activities and awareness building. Furthermore, there are several other authorities with environment-related responsibilities, such as the Ministry of Public Works, Ministry of Health and Social Welfare, Ministry of Foreign Affairs, and the Liberia Water and Sewer Corporation.

The University of Liberia's College of Agriculture and Forestry is a research centre for soil science, forestry, wood science and agriculture. In addition to its traditional educational role, the University continues to play an important role in national socio-economic development, including environmental affairs.⁷³ However, the University as a whole has repeatedly been a target of looting and destruction during any civil unrest in Monrovia. It hopes to reopen in Spring 2004 and is exploring the possibility of offering environment related courses.

5.3 Legal framework

The Constitutional basis for environmental law is found in Article 7 of the 1986 Constitution of Liberia, which provides for public participation of all citizens in the protection and management of the environment and natural resources in Liberia. The clause embraces environmental protection as a fundamental rule according to which the country must be governed. It binds state organizations – in particular the legislative and executive – to adopt and activate environmental policy and to formulate national development plans that are environmentally sustainable.

Liberia does not lack environmental legislation. Some legal reform might be necessary but the real requirement is for implementation and enforcement.

Early legislation establishing forest reserves and conservation areas were included in the Conservation of the Forests of the Republic of Liberia Act of 1953. This act and a supplementary Act for the Conservation of the Forests of 1957 provided the framework for the use of forests and wildlife resources and allowed for the creation of government reserves, native authority reserves, communal forests, national parks and wildlife refuges.

In 1976, the act that created the Forest Development Authority established and defined the responsibilities of the Forest Development Authority, outlined offences and penalties in connection with the act, made provisions for an Advisory Conservation Committee and specified powers of forest officers with regard to trees in reserve areas.⁷⁴

The Natural Resources Law of 1979 includes chapters on forests, fish and wildlife, soil, water and minerals. The forest chapter gave the FDA authority to create and establish government forest reserves and national parks where logging, hunting or mining are strictly prohibited. The law also covered matters such as the control and prevention of soil erosion, reserving and improving soil fertility, adequate use of water resources and controlling pollution of public and private waters from industrial or agricultural wastes.⁷⁵



DAVID MEADOWS – UNEP / PCAU

UNEP meeting with the Forestry Development Authority

The Wildlife and National Parks Act of 1988 identified a number of protected areas and specified policies and objectives regarding wildlife conservation in the country, but its effect was reduced at the time by a total hunting ban imposed by the president, immediately prior to the act. Regulations to be declared by the FDA under the new act concerning wildlife and protected area conservation have been drafted and will cover hunting, internal and international trade, and procedures for establishing new protected areas. The FDA is re-establishing its protection programme for the national forests.⁷⁶

A new Minerals and Mining Law was approved on 3 April 2000, and a new Forestry Law on 6 April 2000. Both of these laws contain chapters that deal with the sustainable management of the environment.⁷⁷

The new Minerals and Mining Law foresees minimizing land degradation and other environmental problems arising from mineral resources development. The law and resulting



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UNEP meeting with the Minister of Lands, Mines and Energy in his looted office in Monrovia, January 2004

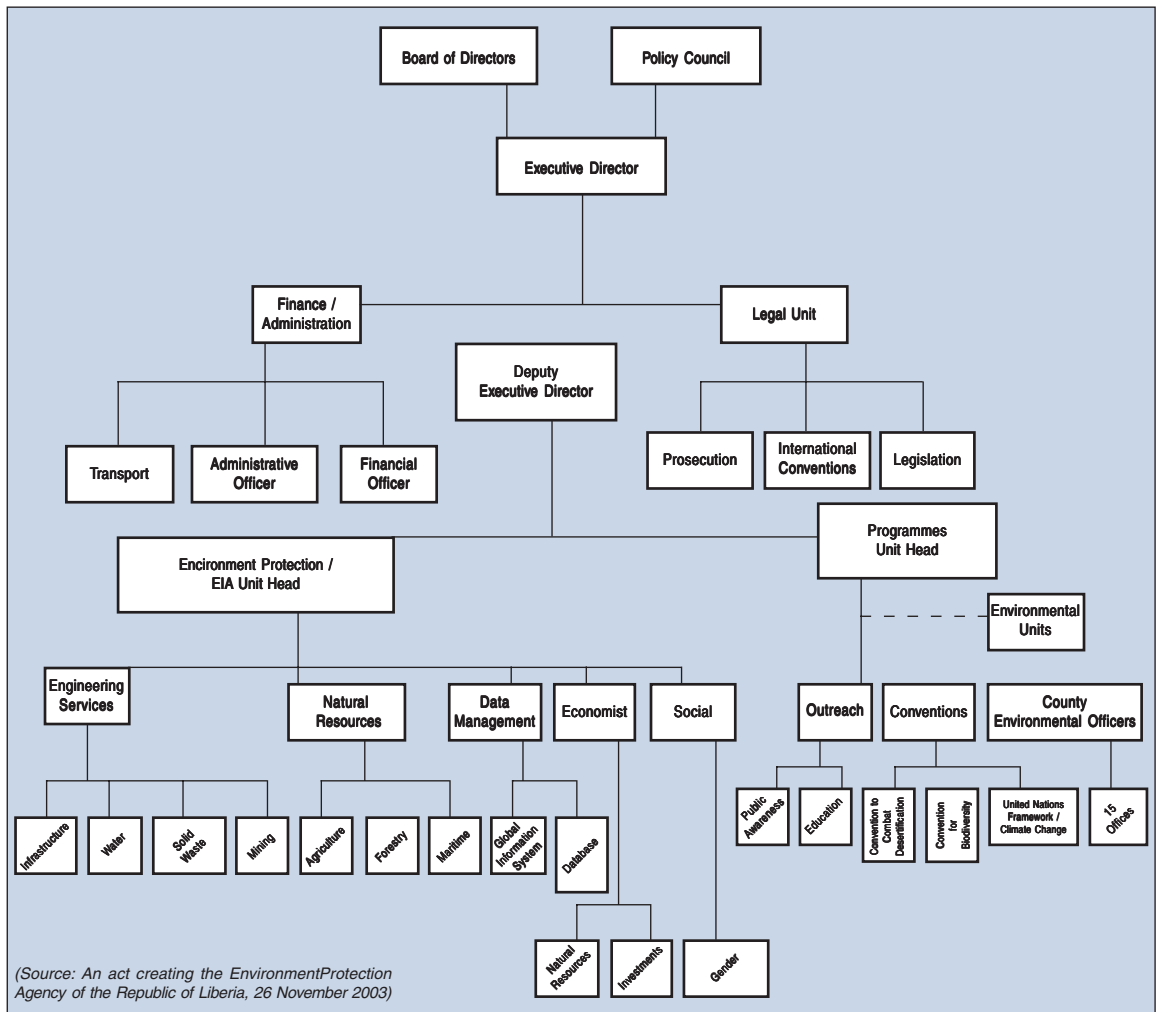
cal resources and to protect natural biological resources against damage, as well as to prevent pollution and contamination of the environment”. The law provides for the establishment of protected areas, research in the conservation of forest resources, reforestation and afforestation programmes, and the conduct of education and awareness programmes on forest resources conservation and management. A provision in the Forestry Law also prohibits the waste of forest resources.

The Public Health Act contains provisions for the protection of the sources of drinking water and the inspection of potential sources of pollution, but it has been limited in terms of its enforcement. The act does not address the total management aspect of water resources. In 1981, with the assistance of UNDP, the government of Liberia, through the Liberian Hydrological Services and the Ministry of Lands, Mines and Energy, prepared a draft water law. The law laid down a complete framework for water resources management in Liberia, but was not enacted.

The 2002 Environment Protection Agency Act established the Environment Protection Agency (EPA) and the institutional arrangements that support the Agency. The main bodies created under the Act are the Policy Council, the Agency, the Board of Directors, and County and District Environmental Committees. It also provides for the formulation and periodic update of a National Environment Action Plan, which will incorporate county and district environmental action plans. The National Environment Action Plan (NEAP) is intended to be an integral part of the national plan for sustainable economic development in Liberia. In addition, the act mandates the institution for enforcing the law and provides the tools through which the environment will be managed. It provides for an Environmental Administrative Court to hear cases from aggrieved parties. It requires that environmental impact assessments (EIAs) be carried out for all activities and projects likely to have an adverse impact on the environment. It provides for a mechanism for ordering a person responsible to restore degraded environment. The act requires the formulation of environmental protection standards, guidelines and procedures; and economic incentives to encourage environment-friendly business practices. The Court has the provision to meet in regional capitals and in Monrovia. The act also foresees the establishment of a national environment fund for revenues received by the Agency, such as fees for permits, fines, contributions and donations.⁷⁸

The Environment Protection and Management Law is a parallel bill to the Environment Protection Agency Act. The Environment Protection and Management Law enables the EPA to protect the environment through implementing the law. The EPA, when functioning, will ensure that all sectoral laws conform to the framework law.

Organogram Liberia Environment Protection Agency Proposed Structure⁷⁹



The Environment Protection and Management Law arranges the rules, regulations and procedures for environmental impact assessment, auditing and monitoring. It establishes regulations for environmental quality standards; pollution control and licensing; guidelines and standards for the management of the environment and natural resources. It also addresses the protection of biodiversity, national heritage and the ozone layer. Other areas covered include environmental restoration orders; inspections; international obligations; and information access; education and public awareness. Several subjects comprised in the Environment Protection and Management Law anticipate stand-alone, sector-specific statutes, rules and regulations that may be required to facilitate implementation of this law.⁸⁰

On 11 October 2003, outgoing acting president Moses Blah signed three laws aimed at protecting Liberia's forests from deforestation, fragmentation and degradation. These laws – the Protected Forest Area Network Law, the Sapo National Park Act and the Nimba Nature Reserve Act – will come into force when printed as leaflets. Preparation of the laws was led by Fauna & Flora International with technical input from numerous Liberian and international partners, and financial support from the European Commission, the Critical Ecosystem Partnership Fund and the Pantan Trust.⁸¹

The first law amends the New National Forestry Act of 2000. It defines a series of eight protected area types and the uses permitted and prohibitions for each, establishing for the first time order and coherency in a previously incoherent legal situation.⁸²

The second law expands Sapo National Park – created in 1983 and Liberia’s only fully protected area – from 130 845 to 180 500 hectares, an increase of 38 per cent. Biological surveys since 2001 have demonstrated that Sapo Park is among West Africa’s least disturbed lowland rainforest areas, with populations of free-ranging forest elephants, tool-using chimpanzees, pygmy hippos and other species whose West African ranges have been severely reduced outside of Liberia. Botanical collection experts who visited the Park in late 2002 found six species new to science in just ten days.

The third law creates the Nimba Nature Reserve – approximately 13 400 hectares – out of the former Nimba East National Forest. This mountainous reserve is contiguous with the Nimba Nature Reserves of Guinea and Côte d’Ivoire, which together were declared a Natural World Heritage Site by UNESCO in 1981.⁸³

5.4 Policy framework

Over the years, Liberia operated fragmented environmental policies, with each public agency governed by its own policies it had set. However, under the auspices of the National Environmental Commission of Liberia, established in 1999, a National Environmental Policy of the Republic of Liberia was prepared and submitted to the Office of the President on 1 August 2001. The document was approved on 26 November 2002.

The objectives of the National Environmental Policy of Liberia are to ensure the improvement of the physical environment, improve the quality of life of the people and ensure reconciliation and coordination between economic development and growth with sustainable management of natural resources. The policy focuses on the following areas: (1) socio-economic dimensions and cross-cutting issues; (2) sustainable management of sectoral systems; (3) working with and through people; and (4) policy implementation.

In order to promote effective implementation of sectoral environmental policies and strategies, the National Environmental Policy, among other things, calls for the strengthening of institutional mechanisms and reviewing – and where necessary – formulating environmental legislation. It also calls for establishing a national environmental council and an autonomous government agency. It seeks to develop and implement systems and guidelines for assessing environmental impacts of development economic activities and to increase environmental education and public awareness. Other goals include developing capacity for environmental management, empowering local communities in the management of natural resources through community participation, and involving the private sector and non-governmental organizations (NGOs) in all aspects of management of the natural resources and the environment.

The Environmental Policy defines policy goals, objectives and principles for sustainable development, but does not include measures and actions to address the priority problems. There is a need to prepare a National Environmental Action Plan, that describes the environment situation existing in the country and outlines environmental strategies, measures and programmes necessary for promoting the conservation, management and sustainable utilization of its natural resources.

Liberia is a party to the Convention on Biological Diversity and the Cartagena Protocol on Biosafety. The EPA is mandated to function as the focal point for the Convention, and received financial support to implement the Convention and to prepare the National Biodiversity Strategy and Action Plan. For this purpose, NECOLIB established a steering committee consisting of different stakeholders to monitor the formulation of the strategy.

The final draft of the National Biodiversity Strategy and Action Plan describes the status of the biodiversity in Liberia and defines the guiding principles, goals and objectives of biodiversity

conservation in the country. It also sets out the threats to biodiversity, which include among others shifting cultivation, soil erosion, timber exploitation, poaching and hunting, mining exploitation, inadequate law enforcement and insufficient staff in biodiversity management. The strategy contains a list of goals and objectives for biodiversity conservation, as well as actions to implement the goals and objectives. It also includes key elements needed for implementation, such as institutional structures, time frame and funds. The strategy states that upon adoption by the Government, a mechanism for implementation is needed that is geared around different elements – oversight of a stakeholders’ committee, creation of an implementation unit, fundraising, an information campaign, participatory monitoring, evaluation of impact, appropriate revision and update of strategy. The National Biodiversity Strategy and Action Plan should be published in 2004.

NECOLIB has participated in the “Development of a Collaborative Institutional Data Framework for Integrated Environmental Assessment and Reporting for West Africa” project and, with the assistance of UNDP and UNEP, prepared a State of the Environment Report in November 2002, which has unfortunately not yet been published.

Besides these environmental policy documents, other strategies and plans that address environmental protection include the National Energy Strategy (1984), the National Water Strategy (1981), the Ten-Year Forestry Sector Development Programme and Project 1998–2008 (1997) and plans and policies in the agricultural sector and the mining/mineral resources sector.

Liberia is in the initial stages of formulating a National Action Programme to combat desertification and has accordingly informed the United Nations Convention to Combat Desertification (UNCCD) secretariat of this intention. Liberia prepared its first national report on the implementation of the UNCCD in April 2002.⁸⁴

5.5 Civil society

There are numerous environment-related NGOs in Liberia, many of which have played an important role in contributing information and experience to the preparation and review of laws.

The most prominent international NGOs include Fauna & Flora International (FFI), Conservation International (CI), Birdlife International, and Forest Partners International. FFI and CI have a joint project, the Liberia Forest Reassessment Project.

Local NGOs include the Society for the Conservation of Nature in Liberia (SCNL), Pollution Control Association of Liberia (POCAL), Environmental Foundation for Africa (EFA), Farmers Associated to Conserve the Environment (FACE), Centre for Environmental Education and Protection (CEEP), Liberia Indigenous Forum for the Environment (LIFE), Environmental Relief and Development Research Organization (ERADRO), Environ-Link, Liberia LTD, Society Against Environmental Degradation (SAED), Liberian Community Development Foundation (LCDF), Association of Environmental Lawyers (Green Advocates), Concerned Environmentalists for the Enhancement of Biodiversity (CEEB), Save My Future Foundation (SAMFU), and Grand Gedeh Community Servant Association (GECOMSA).

Since the beginning of 1997 Fauna & Flora International has supported its Liberian partners in restarting conservation and forest management and is a partner of the Liberia Forest Reassessment (LFR) Project. Other key areas in which FFI has been involved include the revitalization of the management of Sapo National Park, building of capacity within Liberian government departments and NGOs, development of environmental legislation, sourcing of



DAVID MEADOWS – UNEP / PCAU

funding for environmental projects and the proposed establishment of the Nimba transnational park involving Côte d'Ivoire, Guinea and Liberia. In particular, the LFR office under FFI management has been instrumental in developing a Geographical Information Systems laboratory for government use to facilitate forest management analyses and planning.

The Geographical Information Systems laboratory of the Liberia Forest Reassessment (LFR) project

actively involved in various nature conservation projects such as the maintenance of parks, wildlife and conservation. Through SCNL, the Critical Ecosystem Partnership Fund (CEPF) is funding a regional project coordinated by Birdlife International. The project cuts across the Upper Guinea Forest Ecosystem and involves Côte d'Ivoire, Guinea, Ghana, Liberia and Sierra Leone.

The Society for the Conservation of Nature of Liberia (SCNL) is ac-

The Government of Liberia and Conservation International (CI) signed a memorandum of understanding in 2002, paving the way for setting up of CI offices in Liberia and the Government has committed to investigating the creation of a network of protected areas to cover 30 per cent of the land area. CI is also involved in the Liberia Forest Reassessment Project and has developed extensive GIS and mapping expertise in this regard.

The Liberia Indigenous Forum for the Environment (LIFE) strives to work with local communities to bring about awareness and empowerment on matters of environmental and conservation concerns. One of its major thrusts is to ensure that traditional knowledge is respected and maintained in Liberia and promoted in the conservation of biodiversity, especially promotion of medicinal plants. LIFE has been concerned about the state of timber operations, especially the fate of some timber species thought to be threatened or vulnerable.

In 1999, UNDP organized a theme group of local NGOs in Liberia to support NECOLIB in carrying out its mandate and to discuss issues, develop strategies and plans, and present stances to UNDP. In collaboration with NECOLIB, the theme group has conducted several workshops and hosted many environmental meetings.⁸⁵

In January 2004, national and international environmental NGOs, with assistance from CI, organized themselves into a body named Alliance for Conservation in Liberia (ACL). The establishment of ACL has formalized partnerships with several international NGOs including CI, WWF, FFI, Bird Life, the Philadelphia Zoo as well as local NGOs such as the Society for Conservation of Nature in Liberia. This partnership has provided a platform to coordinate conservation efforts within the country.



PEKKA HAAVISTO – UNEP / PCAU

NGO meeting in Monrovia in January 2004 to establish the Alliance for Conservation in Liberia (ACL)

5.6 Regional cooperation

Regionally, Liberia is a member of many organizations, including the Economic Community of West Africa (ECOWAS), Mano River Union (MRU), West African Rice Development Association (WARDA), and recently the African Union (AU). Liberia has also signed all Lomé Conventions between the European Union countries and African-Caribbean-Pacific (ACP) countries.

However, due to the conflict and the related disasters, Liberia has not been a dynamic partner in the activities of the African Ministerial Conference on the Environment (AMCEN), which serves as a platform for taking decisions on processes that advance the implementation of the environmental agenda in Africa.

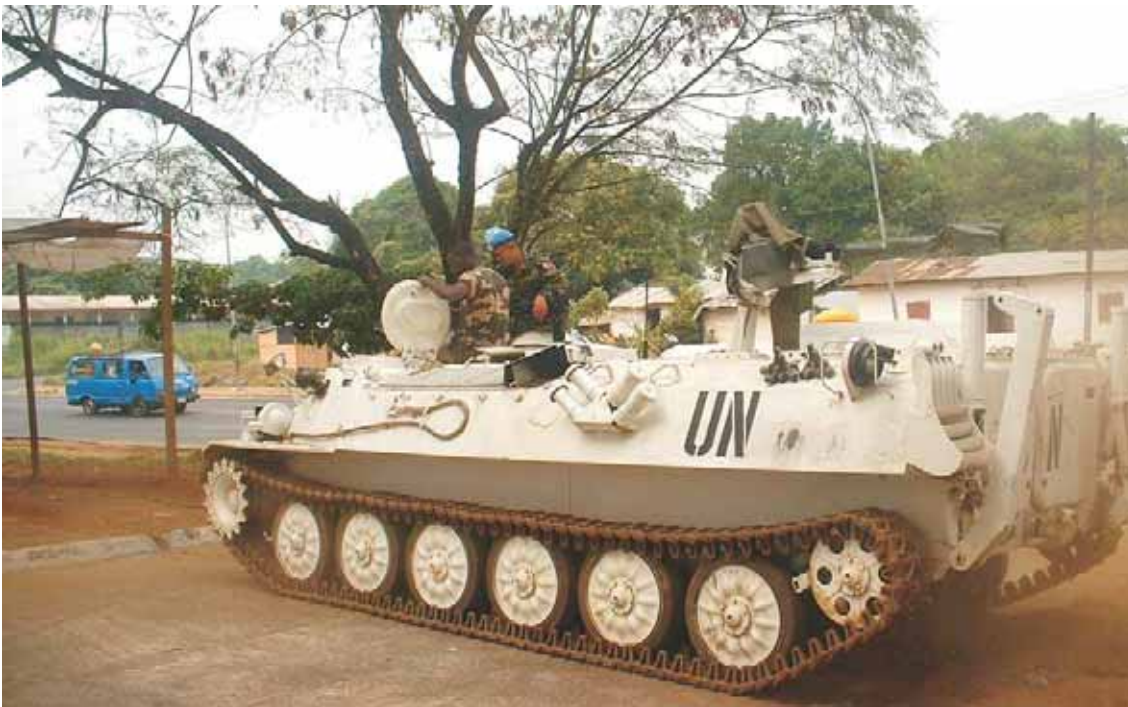
An important regional initiative is the African Forest Law Enforcement and Governance (AFLEG) process, which is the continental arm of the global body on Forest Law Enforcement and Governance. This global body is the outcome of a number of consultations, conferences and national initiatives organized by multilateral and bilateral donors that focused on combating the threat posed to forests by illegal logging and trade, corruption and poaching. It is coordinated by the World Bank and sponsored by the governments of France, the United Kingdom and the United States.

In October 2003, an AFLEG Ministerial Conference convened in Cameroon, drawing together ministers from Africa, Europe and North America to consider how partnerships between producers and consumers, donors, civil society and the private sector could potentially address illegal forest exploitation and associated trade in Africa. The Conference resulted in the endorsement of a Ministerial Declaration and Action Plan for AFLEG. Out of the 39 countries that signed the declaration outlawing illegal logging, 31 come from Africa, an indication of how seriously the problem of illegal logging is viewed around the continent. The Government of Liberia did not participate in the Ministerial Conference and therefore did not sign the Ministerial Declaration and Action Plan.

Another important regional process is the New Partnership for Africa's Development (NEPAD). NEPAD calls for the development and adoption of an environment initiative – a coherent action plan and strategies – to address the region's environmental challenges while at the same time combating poverty and promoting socio-economic development. The Action Plan of the Environment Initiative of NEPAD has been prepared through a consultative and participatory process under the leadership of the African Ministerial Conference on the Environment (AMCEN) and with the support of UNEP and GEF. The Action Plan relates to Africa's common and shared sustainable development problems and concerns. It provides an appropriate framework for the establishment of a strong partnership for the protection of the environment between Africa and its partners based on the commitments contained in the United Nations Millennium Declaration. Active participation of Liberia in the environment initiative would enable the country to rebuild their environmental capacity.

Liberia should also actively pursue re-engagement with its neighbours and participate in a number of transboundary environmental initiatives such as the proposed Sapo-Tai conservation corridor on the Liberia - Côte d'Ivoire border, the potential transboundary park around Mount Nimba on the Liberian, Côte d'Ivoirian and Guinean borders, and the management of the Lofa-Mano area on the borders of Liberia and Sierra Leone.

Liberia is not a party to the Convention for Co-operation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region (Abidjan Convention) nor its Protocol concerning cooperation in combating pollution in cases of emergency, both adopted in 1981, and entered into force in 1984.



DAVID MEADOWS – UNEP / PCAU

United Nations peacekeepers on duty in Monrovia, January 2004

5.7 International cooperation

Transforming Liberia into a prosperous, democratic and self-sustaining country cannot be achieved without the assistance of the international community. The signing of the Accra Peace Agreement, deployment of a sub-regional peacekeeping force (ECOMIL) and the subsequent establishment of a United Nations Mission in Liberia (UNMIL) have created a tremendous opportunity for the international community and their local counterparts to fully respond to Liberia's humanitarian emergency after years of isolation.

UNMIL was established by Security Council resolution 1509 on 19 September 2003 to support the implementation of the ceasefire agreement and the peace process; protect United Nations staff, facilities and civilians; support humanitarian and human rights activities; and assist in national security reform, including national police training and formation of a new, restructured military.

Under the Consolidated Appeals Process of the United Nations Office for the Coordination of Humanitarian Affairs (OCHA), 137 million USD were requested for Liberia for 2004. The amount covers the programmes of the United Nations agencies for non-food items in the following sectors: agriculture, coordination and support services, economic recovery and infrastructure, education, family, shelter and non-food items, food, health, multisector, protection/human rights/rule of law, security and water and sanitation. Liberia's food requirements are presented under the West Africa Appeal amounting to 40 millionUSD.⁸⁶

Following the signing of the Comprehensive Peace Agreement on 18 August 2003, UNMIL and the United Nations Country Team in Liberia agreed with the National Transition Government of Liberia to prepare a plan for reconstruction to be presented at the International Conference on Reconstruction in Liberia in February 2004. To this end, the United Nations and the World Bank agreed to undertake a joint Needs Assessment for Liberia, with additional participation by the International Monetary Fund (IMF). The ongoing Needs Assessment is carried out by the United Nations Country Team with the technical support of the United Nations and the World Bank under the overall coordination of the Special Representative of the Secretary General for Liberia, Jacques Klein. The Needs Assessment is or-

ganized around several sectors, as well as cross-cutting themes. Environment has been identified as a cross-cutting theme to be addressed in all sectors of the Needs Assessment, and UNEP has been tasked with coordinating the input for environment. The final Needs Assessment report was presented at the International Conference on Reconstruction in Liberia on 5–6 February 2004 in New York. The Conference will seek funding from the donor community to address priority reconstruction and rehabilitation needs.

Debt-for-Nature Swaps⁸⁷

A heavy debt burden can increase the economic and exploitive pressures on a country's natural resource base. This is especially true for developing countries, which rely heavily on natural resources for income. This vicious circle can have devastating environmental consequences. One way of addressing the problem is the Debt-for-Nature Swaps (DNSs) scheme that allows for the cancellation of external debt in exchange for a debtor's commitment to mobilize domestic resources for an agreed environmental purpose. Since 1987, over 30 countries have benefited from DNSs.

Four factors combine to indicate the potential that exists for Liberia to benefit from DNSs: at the end of 2002 Liberian debt was estimated to be 3,1 billion USD; it has proven threats to its rich biodiversity, it is a member of the Heavily Indebted Poor Countries (HIPC) initiative, and almost 50 per cent of Liberia's debt is owed to the International Monetary Fund (IMF), African Development Bank and World Bank.

Key United Nations policy reports and studies include the United Nations Common Country Assessment (1997/1998 and 2000/2001), the modified United Nations Development Assistance Framework 2003–2005, the Poverty Profile of Liberia (2001), and the Liberia Demographic and Health Survey (1999/2000).

The Common Country Assessment (CCA) of 1997/1998 identifies several environmental problems that the country is encountering due to uncontrolled exploitation of the natural resources and other human activities for the sustenance and survival of the population for the past few years. The problems identified include deforestation due to logging, shifting cultivation, firewood and charcoal production and the associated destruction of biodiversity. It also highlights the pollution of surrounding rivers and streams, destruction of vegetation, habitat and forests by uncontrolled mining operations. The assessment also draws attention to oil, water and air pollution, and problems associated with natural causes such as coastal erosion, particularly around Buchanan, Greenville and Monrovia. The CCA was updated in 2000/2001.

Preparation of a Millennium Development Goals (MDGs) report of Liberia is underway. The draft MDGs report of Liberia will capture an assessment of the current situation of Liberia relative to the global targets. It will translate the global targets into national targets, and will build national capacity in assessing, monitoring and reporting on the global targets. One of the goals of the MDG Report of Liberia is to ensure environmental sustainability. The draft MDG report identifies several environmental problems that the country is encountering and proposes different priorities for development assistance in the field of environmental sustainability.

The United Nations Agencies have mobilized their resources and efforts in support of the humanitarian needs, rehabilitation and reconstruction of social services, reintegration of refugees and returnees, food security, child protection, gender equality, environment and for building governance and economic management capacity. The main United Nations agencies involved in environmental cooperation are UNDP, UNEP, UNHCR, FAO and UNESCO.

FAO has funded a forest resources assessment project through the Liberian forest Development Authority.

Until 2001, UNHCR worked with the Environmental Foundation for Africa around refugee camps: planting trees, introducing fuel-efficient stoves, conducting awareness campaigns and advising on environmental matters.⁸⁸

Liberia joined the Global Environment Facility (GEF) in 2000 and became eligible to apply for GEF grants. The projects funded through GEF are the preparation of the National Biodiversity Strategy and Action Plan (BSAP) and activities to facilitate early action on the implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs). Liberia has also received GEF funding to prepare its national biosafety framework and its National Capacity Self-Assessment (NCSA) for Global Environmental Management.⁸⁹ The GEF projects in Liberia are mainly coordinated through the UNDP country office.

In April 2000, the government of Liberia and UNDP signed an Environmental Project Document to provide technical and funding support for the evolution of NECOLIB into an Environment Protection Agency (EPA) responsible for the coordination of sustainable environmental management through the implementation of Agenda 21. UNDP has assisted in the preparation of the National Environmental Policy of Liberia, the Environment Protection Agency Act, and the Environment Protection and Management Law. Furthermore, UNDP organized different workshops throughout the country and assisted in preparing a National Biodiversity Strategy and Action Plan and, together with UNEP, a State of the Environment Report.

UNICEF and WHO – together with many other international humanitarian organizations, donor countries and NGOs – are mainly operating in the water and sanitation sector in Liberia.

Major aid agencies operating in Liberia are the African Development Bank (ADB), World Bank (WB), IMF, USAID and DFID. Priority areas have been primary health care, food security, water and sanitation.

The European Commission (EC) has provided financial support to projects that promote the conservation and sustainable management of tropical forests and other forests in developing countries. The objective is to meet the economic, social and environmental demands placed on forests at local, national and global levels. The EC has financially supported the preparation of new forest laws and the Liberian Forest Re-assessment Project.⁹⁰

The International Contact Group on Liberia was formed in September 2002 to respond to the political, security and humanitarian crisis in Liberia. It comprises representatives of the United Nations, the European Union, the African Union, the Economic Community of West African States (ECOWAS), France, Morocco, Nigeria, Senegal, the United Kingdom and the United States. It is coordinated by the ECOWAS.⁹¹

5.8 Multilateral Environmental Agreements

International and regional conventions are increasingly becoming an important way of addressing national and transboundary environmental issues in Liberia. Liberia has ratified and is currently a party to several international environmental agreements.

Liberia has ratified the African Convention on the Conservation of Nature and Natural Resources, which established several categories of protected area. Liberia has become Party to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in 1981.

In 2002, Liberia became a Party to the Convention Concerning the Protection of the World's Cultural and Natural Heritage, the Framework Convention on Climate Change and the Kyoto Protocol, and the Stockholm Convention on Persistent Organic Pollutants (POPs).



JEREMY HOLDEN – FAUNA & FLORA INTERNATIONAL

Liberian mantid, Sapo National Park

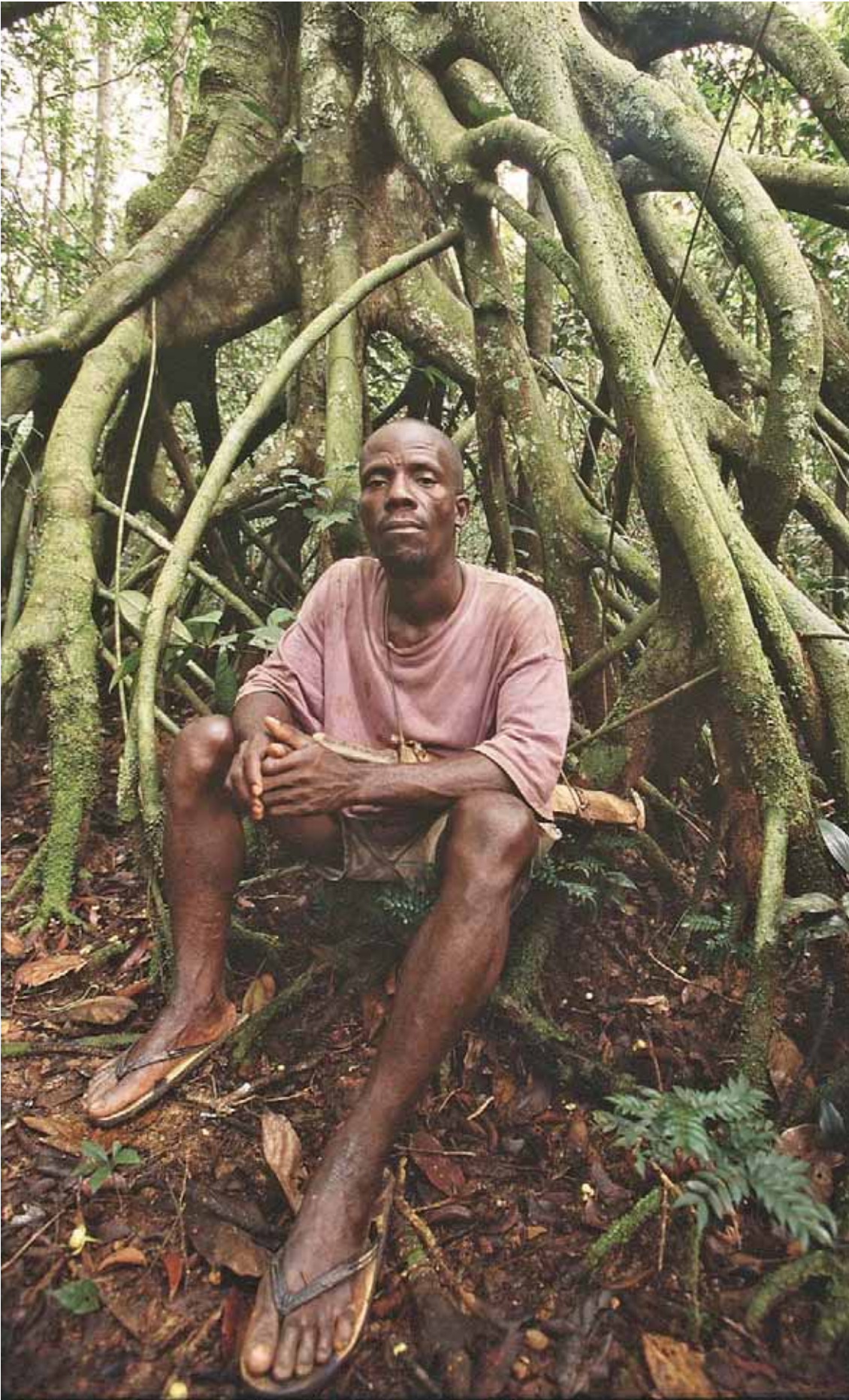
The Ramsar Convention on Wetlands of International Importance, especially as Waterfowl Habitat, came into force for Liberia on 2 November 2003. Liberia presently has one site designated as a Wetland of International Importance, the Lake Piso wetlands, with a surface area of 76 091 hectares. NECOLIB has also submitted in June 2003 the designation of a second Ramsar site, the Marshall Wetlands, which is presently undergoing review by the Ramsar Bureau's regional team before proceeding to its inclusion on the Ramsar List. The Cestos Sekwehn wetlands system is also under review for designation.

The Convention on Biological Diversity (2000) and its Biosafety Protocol (2002) were ratified by Liberia. Since then, Liberia has held many workshops to identify capacity needs for the implementation of the Convention. Currently, the National Biodiversity Strategy and Action Plan is in the process of finalization and will give the opportunity to initiate projects and actions to preserve biodiversity in Liberia.

Liberia is a party to the Convention on Desertification (1998) and submitted its first national report on desertification to the convention secretariat. Liberia's geographic location does not place it in any serious situation that warrants concern for desertification and land degradation. However, increase in commercial logging and fuel wood harvesting, coupled with the creeping northern savannah and the extending derived and coastal savannahs are giving reason for rethinking.⁹²

Furthermore, Liberia is a party to the Vienna Convention for the Protection of the Ozone Layer (1996) and the Montreal Protocol on Substances that Deplete the Ozone Layer (1996). However, Liberia is not a significant user of ozone depleting substances or a net producer of greenhouse gases.⁹³

Each convention that Liberia ratified, or will ratify, will enable it to access technical support in terms of funding, training and other capacity building activities. On the other hand, Liberia will also need to ensure it fulfils its obligations under each convention and enforcing their respective provisions at the national level.



JEREMY HOLDEN - FAUNA & FLORA INTERNATIONAL

Rural Liberian resting in dryland forest. Trees in this forest type commonly display exposed upper root systems as an adaptation to high water tables and seasonal flooding

6

Recommendations

The new post-conflict situation in Liberia offers a unique opportunity to address all environmental problems that have resulted from the 14 years of conflict. Control of the country's rich natural resources was itself an underlying cause of the conflict. Furthermore, the proceeds generated by the sale of these products were used to finance the operations of armed groups. These resources could now be harnessed for the benefit of the country's social and economic reconstruction.

The Security Council, by its Resolution 1509 of September 2003, established the United Nations Mission in Liberia (UNMIL). Among other things, UNMIL has the mandate to assist the Transitional Government in the reestablishment of national authority throughout the country, including the establishment of a functioning administrative structure at both the national and local levels. UNMIL also has the mandate to assist the transitional government in restoring proper administration of natural resources. During the first months of its existence, UNMIL has already initiated quick impact projects, for example waste collection and the recycling of metal waste, which have also created jobs.

Immediate challenges in Liberia include a successful process of disarmament and the re-establishment of the rule of law. The safe return or resettlement of the hundreds of thousands refugees and displaced people is also an urgent task. This is not only an economical and social challenge, but is also closely linked to establishing a safe and healthy environment, for example by providing access to safe drinking water and basic sanitation. The material needs for reconstruction – timber, energy and construction materials – have to be supplied in a manner that does not further damage the environment.

During the difficult years of conflict, Liberian environmentalists in the administration and in non-governmental organizations (NGOs) have been working to improve environmental legislation, policies and institutions in the country. These efforts have been successful: key environmental legislation, policies and institutions already exist in Liberia.

The most important task in the transition period will be to address the lack of capacity in government agencies, including refurbishing and re-equipping looted offices, and to ensure a fair distribution of revenues derived from the exploitation of natural resources.

The environmental challenges faced by Liberia cannot be addressed without the financial, technical and logistical support of the international community.

■ Post-conflict environmental assessments

In post-conflict Liberia, it is of the utmost importance that the Transitional Government, environmental authorities, NGOs and citizens have access to updated information on the current environmental situation. This information will help to avoid unnecessary health risks from a polluted or dangerous environment, and will also help the authorities to plan their action on the most recent data. Therefore, as soon as the security situation allows, full-scale post-conflict environmental field analysis should be carried out.

1. Carry out a comprehensive environmental assessment: The government agencies, in cooperation with the United Nations and scientific organizations, should carry out comprehensive assessments on the environmental situation. In order to formulate national environmental priorities, assessments are needed on topics such as wetlands; estuaries and coastal and marine ecosystems; coastal zone management; potential sources of pollution; and envi-

ronmental threats to human health. More detailed information is needed on manufacturing activities that could pose immediate threats to human health.

2. Carry out a full environmental assessment of forests in Liberia: An assessment of the forests in Liberia, using satellite imagery and remote sensing combined with ground-truthing, should be undertaken before major decisions are made regarding the forestry sector. This assessment should build on the work already carried out by the Forestry Development Authority (FDA) with environmental authorities, and the joint Geographical Information Systems (GIS) initiative of the organizations Fauna & Flora International and Conservation International.

3. Carry out a full environmental assessment of the Liberian mining sector: A proper environmental assessment of the Liberian mining sector should be undertaken, which should include the possible environmental impacts from earlier activities, including the risks posed by mining wastes and the use of heavy metals, such as mercury.

4. Implement environmental clean-up activities recommended in the field assessments: Field assessments may confirm suspected cases of serious environment threats. For example, there have been reports of leakages from oil depots and oil transportation facilities, badly managed temporary waste sites and uncontrolled industrial waste. If such problems are identified, the assessments should recommend clean-up activities, and steps should be taken immediately in order to avoid any risks to human health and the environment.

5. Carry out environmental assessments only if the security situation allows: Over the years of conflict and resulting poor security situation, the authorities and the international community have not had access to many parts of the country. Therefore, with regard to security, all future environmental assessments should be carried out in full cooperation with the United Nations peacekeeping operation UNMIL and the relevant authorities of the Transitional Government of Liberia. Special attention should be paid to possible landmines and other unexploded ordnance (UXO). Areas should be entered only if they have been designated as secure.

■ Environment in the reconstruction process

The signing of the Comprehensive Peace Agreement brings the promise of a new period of peace and reconstruction. Reconstruction also provides the opportunity for Liberia to make important and much needed steps forward in the protection of its environment and safeguarding of the livelihoods of current and future generations.

6. Integrate environment into the reconstruction process: As the international community and the United Nations mobilize to assist Liberia in post-conflict reconstruction, it is essential that all major reconstruction projects and programmes apply international environmental “good practice”. Examples include Environmental Impact Assessment, internalization of pollution costs and the preferential use of clean technologies.

7. Employment creation in the environmental sector: Environmental protection and restoration can create new jobs for some of the 85 per cent of unemployed Liberians. The reconstruction of water and sanitation systems, collection of metal and other war debris, the collection and separation of waste, reforestation, and conservation and management of protected areas are but a few of the activities that will generate employment and at the same time restore the country’s environment.

8. Undertake environmental impact assessments (EIAs): The Transitional Government, in cooperation with international community, should undertake environmental impact assess-

ments for all new proposed facilities and donor projects, in accordance with the Environment Protection Agency Law. This will require appropriate EIA capacity building and training, which could be included as part of the donor projects.

■ Environmental governance

Liberia already has well developed environmental legislation. However, because of the current circumstances and weak administrative structures, it has not been possible to properly implement and enforce the laws and policies. Effective environmental management will help to integrate environmental needs and considerations into the post-conflict reconstruction of the country.

9. Make the Environment Protection Agency (EPA) operational: A law and a proclamation of the Chairman of the Transitional Government have established the EPA, but steps should be taken to make it operational. These include nomination of the Board of Directors and the National Environment Policy Council, and the provision of sufficient financial and human resources. International assistance is needed for capacity building and technical training and to cover operational costs to establish a functional EPA.

10. Begin implementation of existing environmental laws: The Transitional Government and the Environment Protection Agency, together with other relevant institutions, should start implementing the existing Environment Protection Agency Act and the Environment Protection and Management Law.

11. Create a National Environmental Action Plan (NEAP): The Transitional Government and the Environment Protection Agency, in cooperation with key stakeholders, should determine their environmental policy goals and priorities and develop a comprehensive National Environmental Action Plan.

12. Develop additional environmental laws: The EPA should develop, in cooperation with relevant sector agencies and stakeholders, additional sector laws within the framework of the Environment Protection Law. Key gaps in sector legislation include water and waste management, soil and land protection, and coastal and marine protection.

13. Build the capacity of the environmental administration: United Nations agencies and other international organizations should train staff of the Environment Protection Agency (EPA) and the Forestry Development Authority (FDA) on key policy areas such as environmental management and monitoring, Geographical Information Systems (GIS), environmental impact assessment (EIA) international environmental conventions and public awareness and participation in decision making.

14. Build capacity in key sectors linked to the environment: The Transitional Government of Liberia and international organizations should provide adequate resources and training for the authorities responsible for the enforcement of government policies on shipping, forestry and mining.

15. Ensure environment remains a cross-cutting issue in the administration: The Transitional Government should maintain and enhance cooperation with the ministries, government agencies and institutions that have authority and knowledge on issues relevant to environmental policy making and enforcement.

16. Engage citizens and non-governmental organizations (NGOs): The EPA should utilize the expertise and experience that the various NGOs have gathered on Liberia's environment and should provide access to information and promote public participation.

17. Provide environmental training for lawyers and judges: United Nations agencies and the international community should provide environmental training for judges and law enforcement institutions on the aims and tools contained in environmental laws and policies. Training should also be provided on how to comply with Liberia's obligations and commitments under international environmental conventions.

■ International cooperation

International and regional conventions are becoming an increasingly important means of addressing national and transboundary environmental issues. Liberia is party to several multilateral environmental agreements, but so far little has been done to implement these agreements. There is also scope for improved cooperation on environmental issues with neighbouring countries.

18. Revitalize regional and international cooperation on environment: The Transitional Government and NGOs should exchange relevant information on Liberia's transboundary environmental problems in order to develop a joint plan of action on natural resource management and environmental protection. Existing regional environmental cooperation initiatives should be further strengthened through training, capacity building and international financial assistance.

19. Establish transboundary protected areas: The Transitional Government should support the conservation goals in the proposed Sapo-Tai conservation corridor on the Liberia Côte d'Ivoire border and the management of the Lofa-Mano area on the borders of Liberia and Sierra Leone. The park around Mount Nimba on the Liberian, Côte d'Ivoirian and Guinean borders, already designated as a UNESCO World Heritage site on the Guinean side, could also be designated as such in the other countries and be established as a transboundary park.

20. Participate fully in African environmental cooperation: Liberia should participate fully in African multilateral environmental cooperation processes, such as the Africa Forest Law Enforcement and Governance (AFLEG) and African Ministerial Conference on the Environment (AMCEN).

21. Strengthen Liberia's participation in international environmental conventions: The Transitional Government of Liberia should receive additional international assistance to comply with those environmental conventions to which it is party.

■ Environmental information and awareness

Systematically collecting and analyzing environmental information and maintaining environmental databases is a prerequisite for sound environmental decision making. Liberian environmental authorities have already carried out impressive work on collecting baseline environmental data; this work should be completed and updated. Environmental education should be included in curricula in schools and in courses at the University of Monrovia to guarantee that new generations have a good understanding of environmental issues and related challenges.

22. Include environment in school curricula: Environmental education should be introduced in school curricula nationwide, at primary and secondary levels.

23. Introduce university courses on the environment: The Transitional Government, with assistance from the international community, should introduce courses on environmental sciences at the University of Monrovia through exchange programmes with other African universities.

24. Strengthen national environmental research institutes: Resources should be provided for the institutions to carry out research on environment, such as at the School of Forestry and the Agro-Meteo Station.

25. Finalize and publish relevant environmental reports: The State of Environment Report of Liberia (2002) should be updated to include the most recent environmental information. The National Biodiversity Strategy and Action Plan is already in its final draft. These well prepared documents should be published and disseminated widely in Liberia.

26. Develop an environmental monitoring and reporting system: Environmental monitoring and reporting systems should be developed, particularly within the Environment Protection Agency (EPA) and the Forestry Development Authority (FDA).

27. Raise environmental awareness: Efforts should be made to raise public awareness and launch campaigns at the community level on environment-related topics. Topics for initial focus could include environmental issues related to bushmeat, forests, waste, water and sanitation, and energy.

■ Financing environmental protection

In post-conflict situations, the environment sometimes suffers from poor funding owing to competing needs from other urgent humanitarian or social priorities. Special economic instruments to guarantee sustainable funding for the environment should therefore be developed. During the transition period, the donor community should provide the funds to re-establish an effective environmental administration and to carry out the most urgent environmental tasks.

28. Consider “debt-for-nature” swaps for Liberia: “Debt-for-nature” swaps have been used successfully in Africa and in other continents to transform part of country’s foreign debt into environmental commitments. This tool could be used in Liberia, for example for the establishment of protected areas and national parks.

29. Use revenues from natural resources for environmental protection: Part of the revenues from Liberia’s national resources – for example from the forestry and mining sectors – should be allocated directly for environmental protection, for environmental assessments and to establish and maintain a network of protected areas.

30. Develop economic instruments to protect the environment: In many countries environmental or ecological taxes generate additional financial resources for environmental protection and promote environmentally friendly production and consuming patterns. The “polluter pays principle” should be applied fully to polluting industries and those that are high in their use of energy and natural resources.

■ Forestry

Illegal logging for the trade in timber has been one of the main sources of finance for armed groups during the conflict. Control of these timber resources was itself an underlying cause of the conflict. The long duration of the conflict and lack of access to forests throughout make it difficult to assess accurately the damage that occurred to Liberian forests. However, a rapid assessment is needed. The Forestry Development Authority (FDA) will need sufficient resources to carry out this and other tasks in its mandate. Currently, sanctions are in place on the import of timber from Liberia. Sustainable forestry management requires full government control over the forested territory and border roads and also that protected areas are established.

31. Strengthen the Forestry Development Authority (FDA): International assistance is needed to strengthen the skills of staff in administration and sustainable forestry management. The Forestry Development Authority (FDA) should also be re-equipped with adequate communication and transportation to enable it to carry out its controlling duties.

32. Implement sustainable forestry management practices: The Transitional Government, with assistance of the international community, should provide the Forestry Development Authority (FDA) with policy guidance and training on best practice in sustainable forest management and on how to balance commercial, community and conservation interests in the forestry sector. Other areas that require review in the formulation of a new forestry policy include agro-forestry, community forestry management, reforestation and the economic value of non-timber forest productions, including bushmeat.

33. Guarantee revenue for sustainable forestry management: Priorities include sustainable forestry practices, proper control by the forestry authorities and the establishment of needed protected areas in Liberian forests. When sanctions are lifted, revenues from timber trade should be allocated to sustainable forestry management and the renewal of forests. Transparency and accountability should be introduced into the management of all revenues derived from forestry.

34. Develop alternatives to slash-and-burn agricultural practices: Slash-and-burn agricultural practices have contributed to forest degradation. Recent years have witnessed pressures from huge movements of the population and new logging roads have been constructed improving access to the forests. As a result, traditional shifting agricultural practices have become unsustainable, since forests no longer have the time to regenerate. As part of the rural population is dependent on these methods for their livelihoods, there is a need to develop alternatives, such as inter-cropping, agro-forestry, tree crops, animal husbandry and appropriate use of swamp cultivation.

■ Biodiversity

Liberia is rich in biodiversity with several endemic species, but is under threat from two major sources. First, deforestation causes loss and fragmentation of habitat. Second, wildlife remains a critical source of protein and cash income to rural Liberians. The recent increase in the commercial trade of bushmeat is posing a serious threat to a number of hunted species.

35. Regulate hunting and eliminate poaching of wildlife: The Transitional Government should introduce rules and regulations on the hunting of wildlife. These should include designated hunting seasons and permitted species. In addition, efforts should be made to develop alternative means of earning livelihoods to hunters, especially those that also provide sources of protein (e.g. poultry farming or sustainable fishing). Public awareness should be raised on these hunting regulations.

36. Adopt and implement the National Biodiversity Strategy and Action Plan: The Transitional Government should adopt the National Biodiversity Strategy and Action Plan as soon as possible. Upon its adoption, projects and actions identified in the Strategy should be implemented by the Environment Protection Agency and other relevant stakeholders, with financial support from internal and external sources.

37. Implement biodiversity-related conventions: The Transitional Government should implement measures in biodiversity-related conventions such as the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES), and conform to all related international agreements to which Liberia is a party. This would include the introduction of necessary controls, for example the sale of ivory.

38. Protect endemic species: The Transitional Government should undertake special efforts to protect endemic species, as well as other highly endangered species.

■ Energy

The loss of energy infrastructure during the conflict has had negative social and environment impacts. Lack of electricity causes water treatment and sanitation services to halt. Households and offices now rely on individual generators, thus increasing air pollution and oil leakages. Reliance on fuelwood and charcoal has also increased drastically. Production of charcoal is contributing to the excessive logging of forests, and destruction of coastal mangroves. A continued lack of a reliable source of electricity will inhibit foreign investment and lead to further deterioration in human health and the environment. Major investments in the energy sector are therefore needed to reverse these trends.

39. Develop environmentally friendly sources of energy: The Ministry of Lands, Mines and Energy should undertake an assessment of hydroelectric, wind, tidal, solar and biomass potential across Liberia, taking into account the recommendations of the World Commission on Dams.

40. Develop power sharing between neighbouring states: The Ministry of Lands, Mines and Energy should assess the costs and benefits from harmonizing electricity standards to allow power sharing between neighbouring states.

41. Improve the efficiency of fuelwood and charcoal: Investments are needed for projects that improve efficiency in the burning of fuelwood and charcoal, including fuel-efficient stoves, improved charcoal manufacturing techniques and improved fish smoking techniques.

42. Create energy forests for fuelwood and charcoal: To meet existing and future demands, woodlots for fuelwood and charcoal production should be developed to relieve pressure on natural forests and to protect forest biodiversity.

43. Develop environmental standards on the transportation and storage of fuel: Environmental standards related to the transportation and storage of fuel should be further developed and implemented.

■ Mining

Prior to the conflict period, wide-scale iron ore mining was an important economic activity in Liberia. During the conflict, alluvial mining of gold and diamonds, as well as the smuggling of diamonds from neighbouring countries, became important sources of revenue. Alluvial mining of gold usually requires the use of hazardous substances such as mercury. The current legislation on mining requires proper environmental assessments to be conducted. However, under current circumstances, the Ministry of Lands, Mines and Energy has not been able to exercise full control over the mining sector.

44. Carry out environmental impact assessments (EIA) on new mining projects: The Ministry of Lands, Mines and Energy should ensure that, in accordance with the existing mining law, environmental impact assessments are conducted for all future mine development. The ministry, together with the environmental authorities, should provide instructions and guidance on how to minimize the environmental impacts from mining.

45. Clean and rehabilitate the landscape: The developer of the mining site should have the responsibility to clean the site up after the closure of the mine, as well as to restore the land to its previous state as far as possible.

46. Guarantee the revenue for administration: Part of the revenue from the mining sector should be allocated to covering the activities of the authorities responsible for implementing controls, as well as the possible environmental costs associated with these activities. The international community should provide support to the Ministry of Lands, Mines and Energy until a system is established to enable the mining sector administration to generate its own finance.

47. Join the Kimberly process: Liberia should join the Kimberly process – an international diamond certification system aimed at stopping the trade in conflict diamonds – and comply with the requirements of membership.

■ Water and sanitation

Despite a large water resource potential, a combination of damage from the conflict and lack of investment and maintenance has left Liberia's water supply system in a critical state. Families and local communities have resorted to hand-dug wells to meet their needs. The proximity of fresh water pipes and sewage pipelines, coupled with leaking sewage pipelines and electricity cuts causing drinking water to remain in pipes for long periods, have resulted in serious cases of cross-contamination of drinking water. Sewage and waste are currently contaminating the drinking water sources. This, together with a breakdown in sanitation systems, has resulted in the need for intensive disinfection programmes.

48. Develop a strategy for integrated water resources management: The Transitional Government should develop a strategy for integrated water resources management to provide a reliable supply of potable drinking water and guarantee wastewater treatment and pollution control. The strategy should include principles of environmental protection of water resources.

49. Collect hydro-geological information: It is important to obtain hydro-geological information on aquifer recharge rates, direction and rates of groundwater flow and proximity to sources of contamination. This would assist in the determination of sustainable yields, groundwater quality, accurate dosage requirements for disinfection and the possible establishment of source protection zones in areas where temporary wells have been established.

■ Solid waste

As a result of the conflict, all waste collection systems in Liberia have broken down. There are no sanitary landfills, with all waste being either burnt or dumped on vacant land

50. Establish sanitary landfills in urban areas: Environmental impact assessments (EIAs) should be undertaken to determine the appropriate size and location of sanitary landfills that would receive waste from major urban areas. Landfills should be established in locations that pose no risks for the water resources.

51. Develop guidelines for disposal of waste from villages and rural communities: Guidelines should be developed to determine the minimum acceptable standards for solid waste management in villages and rural communities.

52. Introduce safe disposal of clinical, hazardous and industrial wastes: An integrated waste management strategy should be developed that includes the collection and treatment of clinical, hazardous and industrial wastes.

53. Destroy unexploded ordnance (UXO) in an environmentally safe way: Landmines and UXOs that are collected under the disarmament and clean-up process should be dis-

posed of in an environmentally acceptable manner that minimizes the release of heavy metals. Risks of contamination of groundwater should be assessed at the detonation sites.

■ Manufacturing

Although the manufacturing sector in Liberia remains underdeveloped, activities such as breweries and cement grinding have restarted. However, the environment impact of these activities is not known and assessment is required.

54. Develop environmental standards for industries: Each industrial sector should be made responsible for carrying out environmental impact assessments (EIAs) related to its activities. Industry guidelines should be developed to encourage best environmental practice. Industries should pay for their environmental costs according to the “polluter pays principle”. Cleaner production technologies and practices should be advocated.

■ Shipping

Due to its flag of convenience status, Liberia has one of the biggest fleets in the world. Maritime administration income has been an important source of government revenue. The current transition period provides an opportunity to review maritime policy with a view to improving vessel inspection and safety, as well as the enforcement of environmental safeguards.

55. Improve the environmental safety of shipping: Capacity building to assist the Liberian maritime administration in improving its inspection regime and adopting environmental safeguards would raise confidence that Liberia is complying with national and international standards and reducing the environmental risks of related to shipping.

56. Address dangers from shipwrecks: Shipwrecks in Liberian ports and coastal zone should be surveyed to determine the danger to shipping and potential environmental risks. Appropriate salvaging and disposal techniques should also be assessed.

■ Land-use planning

The territory and natural resources of Liberia face pressures from a number of competing sources, including forestry, mining, agriculture and human settlements. In order to balance land-use pressures between the sectors, as well as between commercial, community and conservation interests, a comprehensive national land-use plan is required. One way to address these competing demands is to ensure that the Environment Protection Agency, as envisaged in the Environment Protection and Management Law of Liberia, has sufficient capacity to harmonise the policies adopted in different government sectors, and to arbitrate in the disputes of land use using sound technical criteria.

57. Include all stakeholders in land-use planning: A national land-use planning process involving all government ministries and key stakeholders should be initiated under the auspices of the Environment Protection Agency. All government ministries, environmental NGOs as well as the local level actors should be part of this participatory planning process.

58. Clarify land ownership and tenure: In addition to a land-use plan, a parallel effort should also be established for clarifying and mapping land ownership and tenure. Experience from other countries has shown that defining property rights greatly assists environmental protection.

■ Displaced people

The impact of the conflict on the people of Liberia has been immense. In addition to the casualties from war, the conflicts have resulted in huge movements of people, which itself has caused further suffering. Over the 14 years of war, almost one in three Liberians has been displaced and more than half a million remain in temporary housing or camps. While addressing immediate humanitarian needs is always the most important priority, refugees and internally displaced persons may have had long-term impacts on the environment.

59. Implement UNHCR Environmental Guidelines: The full adoption and implementation of the Environmental Guidelines issued by the United Nations High Commissioner for Refugees (UNHCR) should be encouraged at existing settlements and transit camps in Liberia.

60. Rehabilitate former camp sites: Assessments should be undertaken at previous and existing refugee camp sites to determine the extent of environmental impacts, including deforestation, degradation of farm lands, water pollution and inadequate waste management practices. Rehabilitation plans should then be drawn up to prevent further degradation and potential conflict between refugees in the camps and neighbouring villages.

A

Appendix A

List of Acronyms

ACF	Action contre la Faim
ACL	Alliance for Conservation in Liberia
AFLEG	Africa Forest Law Enforcement and Governance
AMCEN	African Ministerial Conference on the Environment
CCA	Common Country Assessment
CEEB	Concerned Environmentalists for the Enhancement of Biodiversity
CEEP	Centre for Environmental Education and Protection
CEPF	Critical Ecosystem Partnership Fund
CI	Conservation International
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CST	Crude Storage Terminal
DES	Department of Environmental and Sanitation
EC	European Commission
ECOMIL	ECOWAS Military Mission to Liberia
ECOMOG	ECOWAS Monitoring Group
ECOSYN	ECOLOGical SYNthesis
ECOWAS	Economic Community of West African States
EEC	European Economic Community
EFA	Environmental Foundation for Africa
EIA	Environmental impact assessment
EPA	Environment Protection Agency
EU	European Union
FACE	Farmers Associated to Conserve the Environment
FAO	Food and Agriculture Organization
FDA	Forestry Development Authority
FFI	Fauna & Flora International
FLEG	Forest Law Enforcement and Governance
FOC	Flag of convenience
GDP	Gross domestic product
GEF	Global Environment Facility
GIS	Geographic information systems
GoL	Government of Liberia
GRASP	Great Apes Survival Project
HIV/AIDS	Human immunodeficiency virus/acquired immune deficiency syndrome
ICBL	International Convention to Ban Landmines
IDPs	Internally Displaced People
ILC	Inland Logging Company
IMF	International Monetary Fund
IMO	International Maritime Organisation
ITF	International Transport Workers' Federation
IUCN	World Conservation Union
KPCS	Kimberley Process Certification Scheme
LAMCO	Liberian-American-Swedish Minerals Company
LDCs	Least developed countries
LEC	Liberia Electric Commission
LFR	Liberia Forest Re-Assessment Project
LIFE	Liberia Indigenous Forum for the Environment
LPRC	Liberian Petroleum Refinery Company
LURD	Liberians United for Reconciliation and Democracy
LWCS	Liberia Water and Sewer Corporation
MARPOL	International Convention for the Prevention of Marine Pollution from Ships
MCC	Monrovia City Corporation
MDGs	Millennium Development Goals
MJP	Movement for Justice and Peace
MODEL	Movement for Democracy in Liberia
MOU	Memorandum of understanding

MSW	Municipal solid waste
MWPI	Maryland Wood Processing Industries
NAP	National action programme
NBSAP	National Biodiversity Strategy and Action Plan
NCSA	National Capacity Self-Assessment
NEAP	National Environmental Action Plan
NECOLIB	National Environmental Commission of Liberia
NEPAD	New Partnership for Africa's Development
NESDA	Network for Environment and Sustainable Development in Africa
NGO	Non-governmental organisation
NO_x	Nitrogen oxides
NPFL	National Patriotic Front for Liberia
NTGL	National Transitional Government of Liberia
OAU	Organisation of African Unity
OR	Open register
OTC	Oriental Timber Company
PCAU	Post-Conflict Assessment Unit
PCBs	Polychlorinated biphenyls
POCAL	Pollution Control Association of Liberia
POPs	Persistent organic pollutants
PST	Product storage terminal
PVC	Polyvinyl chloride
RIA	Roberts International Airport
RUF	Revolutionary United Front
SAED	Society Against Environmental Degradation
SAMFU	Safe My Future Foundation
SCNL	Society for the Conservation of Nature of Liberia
SO_x	Sulphur oxides
SRNCL	Society for the Renewal of Nature Conservation in Liberia
UKDFID	United Kingdom Department for International Development
UNCCD	United Nations Convention to Combat Desertification
UNDG	United Nations Development Group
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
UNMAS	United Nations Mine Action Service
UNMIL	United Nations Mission to Liberia
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
UNOL	United Nations Peace-Building Support Office in Liberia
UNOMIL	United Nations Observer Mission to Liberia
UNOPS	United Nations Office for Project Services
UNSC	United Nations Security Council
UNSCR	United Nations Security Council Resolution
USA	United States of America
USAID	United States Agency for International Development
USD	United States dollar
UXO	Unexploded ordnance
WB	World Bank
WCMC	World Conservation Monitoring Centre
WFP	World Food Programme
WHO	World Health Organization
WPWTP	White Plains Water Treatment Plant
WWF	World Wildlife Fund

Signs and measures

Kilogram (kg)
 Kilometre (km)
 Square kilometre (km²)
 Metre (m)
 Square metre (m²)
 Cubic metre (m³)
 Millimetre (mm)
 Megawatt (MW)
 Hertz (Hz)

B

Appendix B

List of References

1. UNITED NATIONS ENVIRONMENT PROGRAMME/NETWORK FOR ENVIRONMENT AND SUSTAINABLE DEVELOPMENT IN AFRICA, 2002. *State of the Environment Report*, November 2002. Commissioned as part of the project “Development of a Collaborative Institutional Data Framework for Integrated Environmental Assessment and Reporting for West Africa”. Monrovia.
2. Conservation Priority Setting Workshop held in 1999. A joint initiative by Conservation International, Global Environment Facility, WWF, UNDP, ECOSYN and Birdlife International.
3. UNITED NATIONS SECURITY COUNCIL, 2003. *Report of the Secretary General to the Security Council on Liberia S/2003/875* [online]. New York: UNSC. Available from: <http://ods-dds-ny.un.org/doc/UNDOC/GEN/N03/491/10/PDF/N0349110.pdf?OpenElement> [Accessed 25 January 2004]
4. UNITED NATIONS SECURITY COUNCIL, 2003. *Report of the Secretary General to the Security Council on Liberia S/2003/875* [online]. New York: UNSC. Available from: <http://ods-dds-ny.un.org/doc/UNDOC/GEN/N03/491/10/PDF/N0349110.pdf?OpenElement> [Accessed 25 January 2004]
5. THE ECONOMIST INTELLIGENCE UNIT, 2003. *Liberia Country Profile*, London: EIU.
6. UNITED NATIONS/WORLD BANK/INTERNATIONAL MONETARY FUND, 2003-2004. *Liberia Joint Needs Assessment* as of February 2004 [online]. Available from: <http://www.undg.org> [Accessed 27 January 2004]
7. CENTRAL INTELLIGENCE AGENCY, (information as of 1 January 2003). *World Factbook* [online]. Available from: <http://www.cia.gov/cia/publications/factbook/geos/li.html> [Accessed 19 January 2004]
8. UNITED NATIONS/WORLD BANK/INTERNATIONAL MONETARY FUND, 2003-2004. *Liberia Joint Needs Assessment* as of February 2004 [online]. Available from: <http://www.undg.org> [Accessed 27 January 2004]
9. Kpelle (20%), Bassa (16%), Gio (8%), Kru (7%), Grebo (of which the current President Gyude Bryant is a member). Other minor indigenous ethnic groups include the Mano, Krahn, Gola, Gbandi, Loma, Kissi, Vai, Dei, Bella, Mandingo, and Mende. Americo-Liberians 2.5% (descendants of immigrants from the US who had been slaves), Congo People 2.5% (descendants of immigrants from the Caribbean who had been slaves). CENTRAL INTELLIGENCE AGENCY, *World Factbook* [online]. Available from: <http://www.cia.gov/cia/publications/factbook/geos/li.html> [Accessed 19 January 2004]
10. UNITED NATIONS/WORLD BANK/INTERNATIONAL MONETARY FUND, 2003-2004. *Liberia Joint Needs Assessment* as of February 2004 [online]. Available from: <http://www.undg.org> [Accessed 27 January 2004]
11. UNITED NATIONS/WORLD BANK/INTERNATIONAL MONETARY FUND, 2003-2004. *Liberia Joint Needs Assessment* as of February 2004 [online]. Available from: <http://www.undg.org> [Accessed 27 January 2004]
12. UNITED NATIONS SECURITY COUNCIL, 2003. *Report of the Secretary General to the Security Council on Liberia S/2003/875* [online]. New York: UNSC. Available from: <http://ods-dds-ny.un.org/doc/UNDOC/GEN/N03/491/10/PDF/N0349110.pdf?OpenElement> [Accessed 25 January 2004]
13. UNITED NATIONS/WORLD BANK/INTERNATIONAL MONETARY FUND, 2003-2004. *Liberia Joint Needs Assessment* as of February 2004 [online]. Available from: <http://www.undg.org> [Accessed 27 January 2004]
14. UNITED NATIONS/WORLD BANK/INTERNATIONAL MONETARY FUND, 2003-2004. *Liberia Joint Needs Assessment* as of February 2004 [online]. Available from: <http://www.undg.org> [Accessed 27 January 2004]

15. UNITED NATIONS DEVELOPMENT PROGRAMME (2001), *Poverty Profile of Liberia*, [online] <http://mirror.undp.org/liberia/poverty.pdf> [Accessed 19 January 2004] & CR_insert_121 UNITED NATIONS/WORLD BANK/INTERNATIONAL MONETARY FUND, 2003-2004. *Liberia Joint Needs Assessment* as of February 2004 [online]. Available from: <http://www.undg.org> [Accessed 27 January 2004]
16. UNITED NATIONS DEVELOPMENT PROGRAMME, 2003. *Human Development Report 2003*, Human Development Indicators – Liberia [online]. Available from: http://www.undp.org/hdr2003/indicator/cty_f_LBR.html [Accessed 19 January 2004]
17. WORLD FOOD PROGRAMME, World Hunger – Liberia [online]. Available from: http://www.wfp.org/country_brief/indexcountry.asp?country=430 [Accessed 19 January 2004]
18. THE ECONOMIST INTELLIGENCE UNIT, 2003. *Liberia Country Profile*, London: EIU.
19. UNITED STATES DEPARTMENT OF STATE, *Country background notes, Background Note: Liberia*. [online] Available from : <http://www.state.gov/r/pa/ei/bgn/6618.htm> [Accessed 19 January 2004]
- 20a. Economic, demographic and environmental statistics for Liberia are not well developed and these diagrams reflect data resourced from a number of authorities. They are not meant to represent an precise breakdown of economic information, but merely indicate that the decade of conflict following on from 1989 has left the country radically worse off in terms of GDP and that importance of different economic sectors has altered during this period. Sources include the WORLD DIAMOND COUNCIL ASSOCIATION *Estimated World Diamond Mining Output For 2000* [online] www.worlddiamondcouncil.com/minout.html [Accessed 31 January 2004]; YAHOO INTERNATIONAL FINANCE CENTER *Liberia country fact sheet* [online] <http://biz.yahoo.com/ifc/lr.html> [Accessed 31 January 2004]; ALLREFER.COM REFERENCE *Liberia: Economy* [online] <http://reference.allrefer.com/world/countries/liberia/economy.html> [Accessed 31 January 2004]; THE WORLD BANK GROUP: Liberia Data profile [online] <http://devdata.worldbank.org/external/CPPProfile.asp?SelectedCountry=LBR&CCODE=LBR&CNAME=Liberia&PTYPE=CP> [Accessed 31 January 2004]
- 20b. UNITED STATES DEPARTMENT OF STATE, *Country background notes, Background Note: Liberia*. [online] Available from : <http://www.state.gov/r/pa/ei/bgn/6618.htm> [Accessed 19 January 2004]
21. INTERNATIONAL MONETARY FUND, 2003. *IMF Concludes 2002 Article IV Consultation with Liberia*, Public Information Notice (PIN) No. 03/107 September 3, 2003 [online]. Available from: <http://www.imf.org/external/np/sec/pn/2003/pn03107.htm> [Accessed 25 January 2004]
22. UNITED STATES DEPARTMENT OF STATE, *Country background notes, Background Note: Liberia*. [online] Available from: <http://www.state.gov/r/pa/ei/bgn/6618.htm> [Accessed 19 January 2004]
23. UNITED NATIONS ENVIRONMENT PROGRAMME/NETWORK FOR ENVIRONMENT AND SUSTAINABLE DEVELOPMENT IN AFRICA, 2002. *State of the Environment Report*, November 2002. Commissioned as part of the project “Development of a Collaborative Institutional Data Framework for Integrated Environmental Assessment and Reporting for West Africa”. Monrovia.
24. BBC NEWS, 2003. *Country Profile for Liberia. Timeline: Liberia A chronology of key events*. 28 December 2003. [online] Available from: http://news.bbc.co.uk/1/hi/world/africa/country_profiles/1043567.stm [Accessed 25 January 2004]; THE ECONOMIST INTELLIGENCE UNIT (2003), *Liberia Country Profile*, London: EIU; OFFICE OF THE SPOKESMAN FOR THE SECRETARY-GENERAL, *Use Of Sanctions Under Chapter Vii Of The UN Charter*, (Updated January 2004), Liberia [online]. Available from: <http://www.un.org/News/ocsg/liberia.htm> [Accessed 25 January 2004]; PUBLIC BROADCASTING SERVICE, *Events 1971-2000* [online]. Available from: <http://www.pbs.org/wgbh/globalconnections/liberia/timeline/time4.html> [Accessed 25 January 2004]; BRABAZON, J. (2003), *Liberia: Liberians United for Reconciliation and Democracy (LURD), Armed Non-State Actors Project Briefing Paper No. 1 February 2003* [online]. The Royal Institute Of International Affairs. Available from: <http://www.riia.org/pdf/research/africa/Brabazon%20BP.pdf> [Accessed 25 January 2004]
25. ENVIRONMENTAL FOUNDATION FOR AFRICA, January 2004. *The Environmental Impacts Associated with IDPs and Refugees in Liberia*. Draft report prepared for the United Nations Environment Programme

26. ENVIRONMENTAL FOUNDATION FOR AFRICA, 2004. *The Environmental Impacts Associated with IDPs and Refugees in Liberia*. Draft report prepared for the United Nations Environment Programme
27. ENVIRONMENTAL FOUNDATION FOR AFRICA, 2004. *The Environmental Impacts Associated with IDPs and Refugees in Liberia*. Draft report prepared for the United Nations Environment Programme
28. UNITED NATIONS HIGH COMMISSIONER FOR REFUGEES, 1996. *UNHCR Environmental Guidelines* [online]. Available from: http://www.unhcr.ch/cgi-bin/texis/vtx/home/+uwwBmeHA_w_wwwnwwwwwwwhFqA7ZZR0gRfZNtFqrpGdBnqBAFqA7ZZR0gRfZNtFqD0DVoGdDMnD BwcDzmxwwwwww/opendoc.pdf [Accessed 25 January 2004]
29. UNITED NATIONS/WORLD BANK/INTERNATIONAL MONETARY FUND, 2003-2004. *Liberia Joint Needs Assessment* as of February 2004 [online]. Available from: <http://www.undg.org> [Accessed 27 January 2004]
30. UNITED NATIONS/WORLD BANK/INTERNATIONAL MONETARY FUND, 2003-2004. *Liberia Joint Needs Assessment* as of February 2004 [online]. Available from: <http://www.undg.org> [Accessed 27 January 2004]
31. UNITED NATIONS/WORLD BANK/INTERNATIONAL MONETARY FUND, 2003-2004. *Liberia Joint Needs Assessment* as of February 2004 [online]. Available from: <http://www.undg.org> [Accessed 27 January 2004]
32. UNITED NATIONS ENVIRONMENT PROGRAMME/NETWORK FOR ENVIRONMENT AND SUSTAINABLE DEVELOPMENT IN AFRICA, 2002. *State of the Environment Report*, November 2002. Commissioned as part of the project "Development of a Collaborative Institutional Data Framework for Integrated Environmental Assessment and Reporting for West Africa". Monrovia.
33. SAVE THE CHILDREN, 2001 *The Charcoal Livelihood System, Liberia*, Food Security and Livelihoods Programme, [online]. Available from: <http://www.savethechildren.org.uk/foodsecurity/documentation/pdfs/Charcoal%20Livelihood%20System.pdf> [Accessed 27 January 2004].
34. WORLD HEALTH ORGANISATION (29 November 2003), *Liberia: Health situation analysis final report*, Jul. 2002 – Nov 29, 2003 [online]. Available from: <http://www.reliefweb.int/library/documents/2003/who-lib-29nov.pdf> [Accessed 20 January 2004]
35. SATIA, L.N., 2000. EC-FAO Partnership Programme (1998 – 2002), *Tropical forestry budget line B7-6201/97-15/VIII/FOR, Project GCP/INT/679/EC, Woodfuel review and assessment in Liberia*.
36. SATIA, L.N., 2000. EC-FAO Partnership Programme (1998 – 2002), *Tropical forestry budget line B7-6201/97-15/VIII/FOR, Project GCP/INT/679/EC, Woodfuel review and assessment in Liberia*.
37. SAVE THE CHILDREN, 2001 *The Charcoal Livelihood System, Liberia*, Food Security and Livelihoods Programme, [online]. Available from: <http://www.savethechildren.org.uk/foodsecurity/documentation/pdfs/Charcoal%20Livelihood%20System.pdf> [Accessed 27 January 2004].
38. THE ECONOMIST INTELLIGENCE UNIT, 2003. *Liberia Country Profile*, London: EIU
39. Third UN Conference on the Least Developed Countries (15 June 2000). Action Programme for the Development of Liberia: 2001-2010.
40. UNITED NATIONS/WORLD BANK/INTERNATIONAL MONETARY FUND, 2003-2004. *Liberia Joint Needs Assessment* as of February 2004 [online]. Available from: <http://www.undg.org> [Accessed 27 January 2004]
41. UNITED STATES DEPARTMENT OF STATE, *Country background notes, Background Note: Liberia*. [online] Available from: <http://www.state.gov/r/pa/ei/bgn/6618.htm> [Accessed 19 January 2004]
42. MSN ENCARTA ONLINE ENCYCLOPEDIA, 2004. *Liberia* [online]. Available from: http://encarta.msn.com/encyclopedia_761565772_2/Liberia.html [Accessed 18 January 2004]

43. THE ECONOMIST INTELLIGENCE UNIT, 2003. *Liberia Country Profile*, London: EIU
44. MINEACTION, 2002. *Liberia Country Overview*, 30 November 2002. [online]. Available from: http://www.mineaction.org/countries/countries_overview.cfm?country_id=640 [Accessed 18 January 2004]
45. TORRES NACHÓN, C. [no date]. *Environmental Aspects of Landmines* [online]. International campaign to ban landmines. Available from: http://www.icbl.org/resources/document/lm_environment.php3 [Accessed 27 January 2004]
46. OXFORD UNIVERSITY PRESS, 2000. Oxford Advanced Learner's Dictionary
47. Lloyds Register, World Fleet Statistics.
48. PUBLIC BROADCASTING SERVICE, 2004. *Liberia: Ruling the Waves From Virginia* [online]. Available from: <http://www.pbs.org/frontlineworld/stories/spain/liberia.html> [Accessed 25 January 2004]
49. BARTELME, T. *Ships steam into pollution record books*, [online]. Cited by Contain The Port. Available from: <http://www.containtheport.com/contain/info/pollution.htm> [Accessed 20 January 2004]
50. INTERNATIONAL NETWORK FOR ENVIRONMENTAL COMPLIANCE AND ENFORCEMENT, Highlights of Programs/Actions/Cooperation [online]. Available from: <http://www.inece.org/Newsletter/Articles/Program%20Highlights.htm> [Accessed 20 January 2004]
51. GLOBAL MARINE OIL POLLUTION GATEWAY, *How does petroleum (oil products) become a pollutant in the coastal and marine environment?* [online]. Available from: <http://oils.gpa.unep.org/facts/sources.htm> [Accessed 20 January 2004]
52. BASEL CONVENTION ON THE CONTROL OF TRANSBOUNDARY MOVEMENTS OF HAZARDOUS WASTE AND THEIR DISPOSAL (15 September 2003), Open-Ended Working Group of the Legal Aspects of the Full and Partial Dismantling of Ships. UNEP/CHW/OEWG/2/5.
53. INDIANA UNIVERSITY OF PENNSYLVANIA NATIONAL ENVIRONMENTAL AND TRAINING CENTRE, *Ship Recycling News* [online]. Available from: <http://www.neetc.iup.edu/srnews/archives/2003/10/06/index.shtml> [Accessed 20 January 2004]
54. GREENPEACE, 2003. *UN International Maritime Organisation fails to heed warnings: ship breaking will continue to cause pollution and death*, 5 December 2003 [online]. Available from: <http://www.greenpeaceweb.org/shipbreak/news81.asp> [Accessed 20 January 2004]
55. GREENPEACE [no date]. Available from: <http://archive.greenpeace.org/oceans/piratefishing/dodgingrules.html> [Accessed 30 January 2004]
- 56a. FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, 2000. Global Forest Resources Assessment 2000
- 56b. MONGER H.J., 2003. *Liberian Forest Reassessment Programme Fauna & Flora International, 2003, unpublished Draft Report "Criteria for Balancing Concerns of Biological Conservation, Forestry and other Socio-Economic Development in Liberia (Framework for Decision Making and Resolving Conflicting Interests)"* [online]. Available from: http://www.fauna-flora.org/around_the_world/africa/lfr.htm [Accessed 25 January 2004]
57. CENTRAL INTELLIGENCE AGENCY, (information as of 1 January 2003). *World Factbook* [online]. Available from: <http://www.cia.gov/cia/publications/factbook/geos/li.html> [Accessed 19 January 2004]; Conservation International (2004); FAO (2003).
58. UNITED NATIONS ENVIRONMENT PROGRAMME/NETWORK FOR ENVIRONMENT AND SUSTAINABLE DEVELOPMENT IN AFRICA, 2002. *State of the Environment Report*, November 2002. Commissioned as part of the project "Development of a Collaborative Institutional Data Framework for Integrated Environmental Assessment and Reporting for West Africa". Monrovia.
59. NATIONAL ENVIRONMENTAL COMMISSION OF LIBERIA, *Liberia Biodiversity Strategy and Action Plan*, draft as of 20 January 2004.
60. THE ECONOMIST INTELLIGENCE UNIT, 2003. *Liberia Country Profile*, London: EIU

61. HÅKAN TARRAS-WAHLBERG, N., FLACHIER, A., FREDRIKSSON, G., LANE, S., LUNDBERG, B., SANGFORS, O. *Environmental Impact of Small-scale and Artisanal Gold Mining in Southern Ecuador*. *AMBIO: A Journal of the Human Environment* 2000 29: 484-491 [online]. Available from: <http://www.bioone.org/bioone/?request=get-abstract&issn=0044-7447&volume=029&issue=08&page=0484> [Accessed 27 January 2004]
62. UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION, 2001. *Artisanal Gold Mining without Mercury Pollution* 14 February 2001 [online]. Available from: <https://www.unido.org/en/doc/4571> [Accessed 20 January 2004]
63. YAHOO INTERNATIONAL FINANCE CENTRE, *Liberia Country Fact Sheet* [online]. Available from: <http://biz.yahoo.com/ifc/gh.html> [Accessed 20 January 2004]
64. KIMBERLEY PROCESS [online]. <http://www.kimberleyprocess.com/background.asp> [Accessed 27 January 2004]
65. Africa Energy Intelligence [online]. <http://www.africaintelligence.com> [Accessed 27 January 2004].
66. NATIONAL ENVIRONMENTAL COMMISSION OF LIBERIA, *Liberia Biodiversity Strategy and Action Plan*, draft as of 20 January 2004.
67. UNITED NATIONS ENVIRONMENT PROGRAMME. *Great Apes Survival Project* [online]. Available from: <http://www.unep.org/grasp> [Accessed 30 January 2004]
68. WAITKUWAIT, SAMBOLAH, ZWUEN, FARMER AND SUTER, 2003. Report on the Rapid Faunal Surveys to Assess Biological Integrity of Forest Areas of Liberia Proposed for the Establishment of Four National Parks and Nature Reserves. LFR, Monrovia, Liberia.
69. SAVE MY FUTURE, 2001. *Saving Liberia (sic.) Sea Turtles: A Report of the Liberia Sea Turtle Project Baseline Survey*. Monrovia, Liberia.
70. SAVE MY FUTURE, 2003. *Under Threat: the Over-Exploitation of Sea Turtles in South-Eastern Liberia*, Monrovia.
71. UNITED NATIONS ENVIRONMENT PROGRAMME/WORLD CONSERVATION MONITORING CENTER, 26 January 2004.
- 72a. UNITED NATIONS DEVELOPMENT PROGRAMME. Available from: <http://mirror.undp.org/liberia/environ1.htm> [Accessed 30 January 2004]
- 72b. UNITED NATIONS DEVELOPMENT PROGRAMME. Available from: <http://mirror.undp.org/liberia/environ1.htm> [Accessed 30 January 2004]
73. REPUBLIC OF LIBERIA, LIBERIAN NATIONAL COORDINATING COMMITTEE TO COMBAT DESERTIFICATION, 2002. *First National Report on the Implementation of the United Nations Convention to Combat Desertification* [online]. Monrovia. Available from: <http://www.unccd.int/cop/reports/africa/national/2002/liberia-eng.pdf> [Accessed 28 January 2004]
74. INTERNATIONAL UNION FOR THE CONSERVATION OF NATURE, 1993. *Liberia: Environmental Synopsis*. Gland: IUCN.
75. INTERNATIONAL UNION FOR THE CONSERVATION OF NATURE, 1993. *Liberia: Environmental Synopsis*. Gland: IUCN.
76. INTERNATIONAL UNION FOR THE CONSERVATION OF NATURE, 1993. *Liberia: Environmental Synopsis*. Gland: IUCN.
77. REPUBLIC OF LIBERIA, LIBERIAN NATIONAL COORDINATING COMMITTEE TO COMBAT DESERTIFICATION, 2002. *First National Report on the Implementation of the United Nations Convention to Combat Desertification* [online]. Monrovia. Available from: <http://www.unccd.int/cop/reports/africa/national/2002/liberia-eng.pdf> [Accessed 28 January 2004]
78. UNITED NATIONS DEVELOPMENT PROGRAMME. Available from: <http://mirror.undp.org/liberia/environ1.htm> [Accessed 30 January 2004]

79. MINISTRY OF FOREIGN AFFAIRS, 2003. *An Act creating the Environment Protection and Management Law of the Republic of Liberia*. Monrovia: Ministry of Foreign Affairs.
80. MINISTRY OF FOREIGN AFFAIRS, 2003. *An Act creating the Environment Protection and Management Law of the Republic of Liberia*. Monrovia: Ministry of Foreign Affairs.
81. FAUNA & FLORA, <http://www.fauna-flora.org>
82. FAUNA & FLORA, <http://www.fauna-flora.org>
83. FAUNA & FLORA, <http://www.fauna-flora.org>
84. REPUBLIC OF LIBERIA, LIBERIAN NATIONAL COORDINATING COMMITTEE TO COMBAT DESERTIFICATION, 2002. *First National Report on the Implementation of the United Nations Convention to Combat Desertification [online]*. Monrovia. Available from: <http://www.unccd.int/cop/reports/africa/national/2002/liberia-eng.pdf> [Accessed 28 January 2004]
85. GLOBAL ENVIRONMENT FACILITY, <http://www.gefweb.org>
86. UNITED NATIONS OFFICE FOR THE COORDINATION OF HUMANITARIAN AFFAIRS, http://www.reliefweb.int/ocha_ol/
87. UNITED NATIONS DEVELOPMENT PROGRAMME, 2003. *Debt-for-Environment swaps* [online]. Available from: <http://www.surf-as.org/Papers/Dept-for-environment%20swaps%20Sep03.pdf> [Accessed 30 January 2004]; INTERNATIONAL MONETARY FUND, 2003. *Liberia: Selected Issues and Statistical Appendix* [online]. Available from: <http://www.imf.org/external/pubs/ft/scr/2003/cr03275.pdf> [Accessed 30 January 2004]; UNITED NATIONS ENVIRONMENT PROGRAMME, [no date]. *Debt-for-nature swaps* [online]. Available from: <http://www.unep.org/aeo/256.htm>; WORLD BANK, [no date]. *Debt Initiative for Heavily Indebted Poor Countries* [online]. Available from: <http://www.worldbank.org/hipc/> [Accessed 30 January 2004]
88. FAUNA & FLORA, <http://www.fauna-flora.org>
89. GLOBAL ENVIRONMENT FACILITY, <http://www.gefweb.org>
90. GLOBAL ENVIRONMENT FACILITY, <http://www.gefweb.org>
91. UNITED NATIONS OFFICE FOR THE COORDINATION OF HUMANITARIAN AFFAIRS, http://www.reliefweb.int/ocha_ol/
92. UNITED NATIONS DEVELOPMENT PROGRAMME/GLOBAL ENVIRONMENT FACILITY, 2000. *Proposal for Capacity Development Initiative* [online]. Available from: http://www.gefweb.org/Site_Index/CDI/LAC_Assessment.doc [Accessed 20 January 2004]
93. UNITED NATIONS ENVIRONMENT PROGRAMME/NETWORK FOR ENVIRONMENT AND SUSTAINABLE DEVELOPMENT IN AFRICA/UNITED NATIONS DEVELOPMENT PROGRAMME, 2002. *State of the Environment Report*, November 2002. Commissioned as part of the project “Development of a Collaborative Institutional Data Framework for Integrated Environmental Assessment and Reporting for West Africa”. Monrovia.

Appendix C

Bibliography and Internet Sources

The following material was reviewed in preparing the UNEP Desk Study on the Environment in Liberia.

Published literature

BASEL CONVENTION ON THE CONTROL OF TRANSBOUNDARY MOVEMENTS OF HAZARDOUS WASTE AND THEIR DISPOSAL, 2003. Open-Ended Working Group of the Legal Aspects of the Full and Partial Dismantling of Ships (15 September 2003). UNEP/CHW/OEWG/2/5.

BISHOP, T. AND GARNETT, T., 2000. *Civil Conflict and the Environment in the Upper Guinea Forests of West Africa. Biodiversity Support Program – Africa & Madagascar, Disasters and Environment Project.*

BLONDEL, A. *Liberia: The Role of the Logging industry in the arms. Trade, Regional Conflict and National Insecurity.* Presented at a symposium entitled “Degradation of Environment and Destruction of Liberian Rainforest”, held on 28 September 2001 on Capitol Hill in the Rayburn Office Building of the US House of Representatives in Washington, DC. The Liberian Democracy Initiative (LDI) organised and sponsored this symposium.

BLUNDELL, A.G., 2003. Adapted extract of *A New Environment for Liberia: A road map for the forest sector – Outcome of US Embassy Workshop on Forest Sector reform.* 15 & 16 December 2003. Monrovia.

BONGERS, F., POORTER, L., VAN ROMPAEY, R.S.A.R. AND PARREN, M.P.E., 1999. *Distribution of twelve moist forest canopy tree species in Liberia and Côte d'Ivoire: response curves to a climatic gradient, LAVS;* Opulus Press Uppsala, Sweden

Conservation Priority-Setting Workshop held in 1999. A joint initiative by Conservation International, Global Environment Facility, WWF, UNDP, ECOSYN and Birdlife International. Washington D.C.

ENVIRONMENTAL FOUNDATION FOR AFRICA, 2004. *The Environmental Impacts Associated with IDPs and Refugees in Liberia.* Draft report prepared for the United Nations Environment Programme

FAUNA & FLORA INTERNATIONAL, *Briefing on Liberia's Forests & Biological Diversity, the Forest Sector, and Priority Interventions for the Interim Government and Beyond.*

FAUNA & FLORA INTERNATIONAL, 2002. *A Study to Clarify the Protected Forest Types Officially/Legally Recognized in Liberia.* Monrovia/Cambridge: FFI.

FORESTRY DEVELOPMENT AGENCY, 2000. *Annual Report.* Monrovia.

FORESTRY DEVELOPMENT AGENCY, 2001. *Annual Report.* Monrovia.

GARNETT, T. AND UTAS C., 2000. *The Upper Guinea Heritage, Nature Conservation in Liberia and Sierra Leone.* Amsterdam: Netherlands Committee for IUCN

GLOBAL WITNESS, 2003. *Briefing document Against the people, For the resources: the need for stronger enforcement of UN timber sanctions and prevention of plunder.* Global Witness.

GOVERNMENT OF LIBERIA, [no date]. *Post-War National Reconstruction Program 1998-2000.* Monrovia: GOL

GOVERNMENT OF LIBERIA, 2002. *Five-Year Reconstruction and Development Plan 2002-2007.* Monrovia: GOL.

GLOBAL WITNESS, 2003. *The Usual Suspects, Liberia's Weapons and Mercenaries in Côte d'Ivoire and Sierra Leone.* Global Witness.

- GREENPEACE, 2001. *Forest Destruction Fuels Regional Conflicts, Environmental and social impacts of the Liberian timber industry.*
- INTERNATIONAL UNION FOR THE CONSERVATION OF NATURE, 1993. *Liberia: Environmental Synopsis.* Gland: IUCN.
- MAGIN, C. AND FREEMAN, T., 2003. *Guidelines for protected forest area creation (and expansion) in Liberia.* Monrovia/Cambridge: LFR
- MINISTRY OF FOREIGN AFFAIRS, 2000. *An Act adopting a new minerals and mining law. Part 1, title 23, Liberian Code of Laws Revised.* Monrovia: Ministry of Foreign Affairs.
- MINISTRY OF FOREIGN AFFAIRS, 2002. *The National Environmental Policy of the Republic of Liberia* (Approved 26 November 2002). Monrovia: Ministry of Foreign Affairs.
- MINISTRY OF FOREIGN AFFAIRS, 2002. *An Act creating the Environment Protection Agency of the Republic of Liberia.* Monrovia: Ministry of Foreign Affairs.
- MINISTRY OF FOREIGN AFFAIRS, 2003. *An Act creating the Environment Protection and Management Law of the Republic of Liberia.* Monrovia: Ministry of Foreign Affairs.
- MINISTRY OF FOREIGN AFFAIRS, 2003. *An Act for the establishment of a Protected Forest Areas Network and amending chapters 1 and 9 of the New National Forestry Law, part II, title 23 of the Liberian Code of Law revised and thereto adding nine new sections.* Monrovia: Ministry of Foreign Affairs.
- MINISTRY OF FOREIGN AFFAIRS, 2003. *An Act for the Establishment of the East Nimba Nature Reserve.* Monrovia: Ministry of Foreign Affairs.
- MINISTRY OF FOREIGN AFFAIRS, 2003. *An Act for the Extension of the Sapo National Park.* Monrovia: Ministry of Foreign Affairs.
- MINISTRY OF PLANNING AND ECONOMIC AFFAIRS/UNIVERSITY OF LIBERIA/UNITED NATIONS POPULATION FUND, 2000. *Demographic and Health Survey 1999/2000. Volume I, Statistical Tables.*
- MINISTRY OF PLANNING AND ECONOMIC AFFAIRS/UNIVERSITY OF LIBERIA/UNITED NATIONS POPULATION FUND, 2000. *Demographic and Health Survey 1999/2000. Volume III, Analytical Report.*
- NATIONAL ENVIRONMENTAL COMMISSION OF LIBERIA, *Liberia Biodiversity Strategy and Action Plan*, draft as of 20 January 2004.
- NATIONAL TRANSITIONAL GOVERNMENT OF LIBERIA COMMITTEE TO REVIEW SANCTIONS ON LOG AND TIMBER TRADE, 2003. *A Road Map to Lifting UNSC Sanction on Log and Timber Trade in Liberia: Basic Reforms in the Forest Industry.* Monrovia: National Transitional Government of Liberia.
- NATIONAL TRANSITIONAL GOVERNMENT OF LIBERIA MINISTRY OF STATE FOR PRESIDENTIAL AFFAIRS, Press Release 26 November 2003. Monrovia: NTGL.
- NATIONAL TRANSITIONAL GOVERNMENT OF LIBERIA, 2004. *Liberia Reconstruction Conference.* Monrovia: NTGL.
- NETHERLANDS COMMITTEE FOR IUCN, 1996. *Mining in Tropical Regions, Ecological impact & Dutch involvement.* Amsterdam: Netherlands Committee for IUCN.
- NETHERLANDS COMMITTEE FOR IUCN, 2000. *Nature in War, Biodiversity Conservation during Conflicts.* Amsterdam: Netherlands Committee for IUCN.
- NILSSON, D., 2003. *Liberia – The Eye of the Storm, A Review of the Literature on Internally Displaced, Refugees and Returnees.* Studies on emergencies and disaster relief. Report No. 10. Nordiska Afrikainstitutet.
- ROBINSON, P. AND SUTER, J., 1999. *Survey and Preparation of a Preliminary Conservation Plan for the Cestos-Senkwehn Riversheds of South-eastern Liberia.* Society for the Renewal of Nature Conservation in Liberia and Fauna & Flora International, California.

- SATIA, L.N., 2000. EC-FAO Partnership Programme (1998 – 2002), *Tropical forestry budget line B7-6201/97-15/VIII/FOR, Project GCP/INT/679/EC, Woodfuel review and assessment in Liberia.*
- SAVE MY FUTURE, 2001. *Saving Liberia (sic.) Sea Turtles: A Report of the Liberia Sea Turtle Project Baseline Survey.* Monrovia, Liberia.
- SAVE MY FUTURE, 2002. *Plunder - The Silent Destruction from Rainforest.* Monrovia: Samfu.
- SAVE MY FUTURE, 2003. *Under Threat: the Over-Exploitation of Sea Turtles in South-Eastern Liberia,* Monrovia.
- SAYER, J., HARCOURT, C. AND COLLINS, N.M., 1992. *The Conservation Atlas of Tropical Forests: Africa.* Cambridge: World Conservation Monitoring Centre.
- SHAMBAUGH, J., OGLETHORPE, J., HAM, R. with contributions from TOGNETTI, S., 2001. *The Trampled Grass: Mitigating the impacts of armed conflict on the environment.* Washington, DC, USA: Biodiversity Support Program.
- THE ECONOMIST INTELLIGENCE UNIT (2003), *Liberia Country Profile,* London: EIU.
- THE POLL WATCH, *Timber Association Accuses FDA,* July 5-11, 2001. Monrovia, Liberia.
- Third UN Conference on the Least Developed Countries (15 June 2000). Action Programme for the Development of Liberia: 2001-2010.
- UNITED NATIONS ENVIRONMENT PROGRAMME/NETWORK FOR ENVIRONMENT AND SUSTAINABLE DEVELOPMENT IN AFRICA/UNITED NATIONS DEVELOPMENT PROGRAMME, 2002. *State of the Environment Report,* November 2002. Commissioned as part of the project “Development of a Collaborative Institutional Data Framework for Integrated Environmental Assessment and Reporting for West Africa”. Monrovia.
- UNITED NATIONS DEVELOPMENT PROGRAMME/WORLD BANK, 1984. *Liberia: Issues and options in the energy sector. Report No. 5279-LBR.*
- UNITED NATIONS DEVELOPMENT PROGRAMME/WORLD BANK, 1985. *Energy Sector Management Assistance Program, Activity Completion Report, No. 038/85.*
- UNITED NATIONS OFFICE OF THE SPECIAL ADVISER ON AFRICA, 1999. *The challenge of rehabilitation on the eve of the Third Millennium.* New York: UNOSAA.
- UNIVERSITY OF LIBERIA CENTER FOR ENVIRONMENTAL STUDIES, [no date] Environmental Science Program. Monrovia: University of Liberia.
- WAITKUWAIT, SAMBOLAH, ZWUEN, FARMER AND SUTER, 2003. *Report on the Rapid Faunal Surveys to Assess Biological Integrity of Forest Areas of Liberia Proposed for the Establishment of Four National Parks and Nature Reserves.* LFR, Monrovia, Liberia.

Internet resources

- AGENCE FRANCE-PRESSE, 2003. *Liberia's main rebel group on looting spree north of capital: report.* 13 November 2003 [online]. Monrovia. Cited by Reliefweb. Available from: <http://www.reliefweb.int/w/Rwb.nsf/0/234a23983699d0cecc1256ddd0051b0bd?OpenDocument> [Accessed 18 January 2004]
- ALLREFER. *Liberia: Economy* [online]. Available from: <http://reference.allrefer.com/world/countries/liberia/economy.html> [Accessed 20 January 2004]
- BARTELME, T. *Ships steam into pollution record books,* [online]. Cited by Contain The Port. Available from: <http://www.containtheport.com/contain/info/pollution.htm> [Accessed 20 January 2004]
- BRABAZON, J., 2003. *Liberia: Liberians United for Reconciliation and Democracy (LURD), Armed Non-State Actors Project Briefing Paper No. 1 February 2003* [online]. The Royal Institute Of International Affairs. Available from: <http://www.riia.org/pdf/research/africa/Brabazon%20BP.pdf> [Accessed 25 January 2004]

- CENTRAL INTELLIGENCE AGENCY, (information as of 1 January 2003). *World Factbook* [online]. Available from: <http://www.cia.gov/cia/publications/factbook/geos/li.html> [Accessed 19 January 2004]
- EARTH CRASH EARTH SPIRIT, 2001. *At current rate of logging, Liberia's once vast rainforests could be gone in 10 years, along with habitat for rare forest elephants and pygmy hippopotamuses* [online]. Available from: http://www.eces.org/archive/ec/np_articles/static/99033480068884.shtml [Accessed 26 January 2004]
- ENVIRONMENTAL FOUNDATION FOR AFRICA/UNITED NATIONS HIGH COMMISSIONER FOR REFUGEES, 1999-2001. *Refugee Environmental Awareness Programme in Liberia 1999-2001* [online]. Available from: <http://www.efasl.org.uk/projects/unhcr2.htm> [Accessed 26 January 2004]
- ENVIRONMENTAL LAW ALLIANCE WORLDWIDE, 2002. *Defending the Environment in Liberia, An interview with Alfred L. Brownell*. Winter 2002. Available from: <http://www.elaw.org/news/advocate/default.asp?article=1030> [Accessed 26 January 2004]
- FAUNA & FLORA INTERNATIONAL, 2003. *Outgoing Liberian Government Passes Forest Protection Laws* [online]. Available from: http://www.fauna-flora.org/donate/donate_home.htm [Accessed 20 January 2004]
- FISCHLER, F., [no date] (European Fisheries Commissioner). *Illegal Fishing - a threat to our common heritage* [online]. Available from: <http://europa.eu.int/comm/commissioners/fischler> [Accessed 20 January 2004]
- FOOD AND AGRICULTURE ORGANISATION OF THE UNITED NATIONS, Aquastat, FAO's Information System on Water and Agriculture – Liberia [online] <http://www.fao.org/ag/agl/aglw/aquastat/countries/liberia/index.stm> [Accessed 19 January 2004]
- FOOD AND AGRICULTURE ORGANISATION OF THE UNITED NATIONS, Forestry [online] Available from: http://www.fao.org/forestry/fo/country/index.jsp?geo_id=78&lang_id=1 [Accessed 19 January 2004]
- GBERIE, L. *West Africa: Rocks in a Hard Place, The Political Economy of Diamonds and Regional Destabilization* [online]. Partnership Africa Canada. Series Editor: Ian Smillie. Available from: http://www.pacweb.org/e/pdf/w_africa_e.pdf [Accessed 21 January 2004]
- GLOBAL MARINE OIL POLLUTION GATEWAY, [no date]. *How does petroleum (oil products) become a pollutant in the coastal and marine environment?* [online]. Available from: <http://oils.gpa.unep.org/facts/sources.htm> [Accessed 20 January 2004]
- GLOBAL WITNESS, 2001. *The Role of Liberia's Logging Industry on National and Regional Insecurity* [online]. London: Global Witness. Cited by Global Policy. Available from: <http://www.globalpolicy.org/security/issues/liberia/report/gwupdate.htm> [Accessed 20 January 2004]
- GLOBAL WITNESS/INTERNATIONAL TRANSPORT WORKERS FEDERATION, 2001. *Taylor-Made, The pivotal role of Liberia's forests in regional conflict* [online]. Available from: <http://www.globalwitness.org/reports/show.php/en.00021.html> [Accessed 18 January 2004]
- GLOBAL WITNESS, 2002. *Logging Off, How the Liberian Timber Industry Fuels Liberia's Humanitarian Disaster and Threatens Sierra Leone* [online]. <http://www.globalwitness.org/reports/show.php/en.00006.html> [Accessed 24 January 2004]
- GLOBAL WITNESS, 2002. *The Logs of War: The Timber Trade and Armed Conflict* [online]. Fafo Institute for Applied Social Science. Available from: <http://www.globalwitness.org/reports/download.php/00044.pdf> [Accessed 24 January 2004]
- GOVERNMENT OF LIBERIA/WORLD HEALTH ORGANIZATION, 2002. *Health and Situation Analysis, Final Report* [online]. Available from: <http://www.reliefweb.int/library/documents/2003/who-lib-29nov.pdf> [Accessed 24 January 2004]
- GREENPEACE, 2003. *Liberian timber trade fuels regional insecurity*, April 2003 [online]. Available from: <http://www.greenpeaceusa.org/media/publications/liberia-timber-trade.pdf> [Accessed 18 January 2004]

- GREENPEACE, 2003. *UN International Maritime Organisation fails to heed warnings: ship breaking will continue to cause pollution and death*, 5 December 2003 [online]. Available from: <http://www.greenpeaceweb.org/shipbreak/news81.asp> [Accessed 20 January 2004]
- GROLIER'S NEW BOOK OF KNOWLEDGE, 2003. *Liberia fights for Liberty* [online], cited by Scholastic. Available from: <http://teacher.scholastic.com/scholasticnews/indepth/liberia/background/index.asp?article=economy> [Accessed 20 January 2004]
- HÅKAN TARRAS-WAHLBERG, N., FLACHIER, A., FREDRIKSSON, G., LANE, S., LUNDBERG, B., SANGFORS, O. *Environmental Impact of Small-scale and Artisanal Gold Mining in Southern Ecuador*. AMBIO: A Journal of the Human Environment 2000 29: 484-491 [online]. Available from: <http://www.bioone.org/bioone/?request=get-abstract&issn=0044-7447&volume=029&issue=08&page=0484> [Accessed 27 January 2004]
- HOFSTATTER, B., 2001. *Liberia: Trade, Environment and Conflict*, ICE Case Number 82, LIBERIADIAMONDS May 2001 [online]. Available from: <http://www.american.edu/TED/ice/liberiadiamonds.htm> [Accessed 27 January 2004]
- HUMAN RIGHTS WATCH, 2001. *Liberia - The role of the international community in: World Report 2001* [online]. Available from: <http://www.hrw.org/wr2k1/africa/liberia3.html> [Accessed 27 January 2004]
- INTERNATIONAL TRANSPORT WORKERS FEDERATION, [no date]. *What are flags of convenience (FOCs)?* [online]. Available from: <http://www.itf.org.uk/seafarers/foc/foc.htm> [Accessed 30 January 2004]
- INDIANA UNIVERSITY OF PENNSYLVANIA NATIONAL ENVIRONMENTAL AND TRAINING CENTRE, 2003. *Ship Recycling News* [online]. Available from: <http://www.neetc.iup.edu/srnews/archives/2003/10/06/index.shtml> [Accessed 20 January 2004]
- INTERNATIONAL MARITIME ORGANISATION, *Summary of Status of Conventions as at 30 November 2003* [online]. Available from: http://www.imo.org/Conventions/mainframe.asp?topic_id=247 [Accessed 20 January 2004]
- INTERNATIONAL MONETARY FUND, 2003. *IMF Concludes 2002 Article IV Consultation with Liberia*, Public Information Notice (PIN) No. 03/107 September 3, 2003 [online]. Available from: <http://www.imf.org/external/np/sec/pn/2003/pn03107.htm> [Accessed 25 January 2004]
- INTERNATIONAL NETWORK FOR ENVIRONMENTAL COMPLIANCE AND ENFORCEMENT, *Highlights of Programs/Actions/Cooperation* [online]. Available from: <http://www.inece.org/Newsletter/Articles/Program%20Highlights.htm> [Accessed 20 January 2004]
- LANDMINE MONITOR, 2003. *Liberia* [online]. Available from: <http://www.icbl.org/lm/2003/liberia.html> [Accessed 18 January 2004]
- LIBERIA INTERNATIONAL SHIP & CORPORATE REGISTRY, 2003. *Registry growth offers key support for Liberian recovery*. Flagship Newsletter Issue n°10, December 2003.
- MARINELOG, 2002. *Liberia ratifies air pollution convention* [online], 2 September 2002. Available from: <http://www.marinelog.com/DOCS/NEWSMMIIB/MMIISep03.html> [Accessed on 20 January 2004]
- MINEACTION, 30 November 2002. *Liberia Country Overview* [online]. Available from: http://www.mineaction.org/countries/countries_overview.cfm?country_id=640 [Accessed 18 January 2004]
- MSN ENCARTA ONLINE ENCYCLOPEDIA, 2004. *Liberia* [online]. Available from: http://encarta.msn.com/encyclopedia_761565772_2/Liberia.html [Accessed 18 January 2004]
- National Conference on the Future of Liberia, Unity Conference Center, Virginia 19 August 1998 Conference Resolutions (The Virginia Declaration) [online]. Available from: <http://www.globalsecurity.org/military/library/report/1998/cnfres98.htm> [Accessed on 21 January 2004]
- OFFICE FOR THE PROMOTION OF GOOD GOVERNANCE/UNITED NATIONS DEVELOPMENT PROGRAMME/UNITED NATIONS DEPARTMENT FOR ECONOMIC AND SOCIAL AFFAIRS (consultations from 1997 onwards), *Liberia's Governance Program* [online]. Available from: <http://unpan1.un.org/intradoc/groups/public/documents/un/unpan002247.pdf> [Accessed 19 January 2004]

OFFICE OF THE SPOKESMAN FOR THE SECRETARY-GENERAL, *Use Of Sanctions Under Chapter VII Of The UN Charter*, (Updated January 2004), Liberia [online]. Available from: <http://www.un.org/News/ossg/liberia.htm> [Accessed 25 January 2004]

PAYE-LAYELEH, J., 2003. *Looted Liberia grinds to a halt* [online]. BBC News, 4 November 2003. Monrovia. Available from: <http://news.bbc.co.uk/1/hi/world/africa/3237485.stm> [Accessed 18 January 2004]

PUBLIC BROADCASTING SERVICE, [no date] *Events 1971-2000* [online]. Available from: <http://www.pbs.org/wgbh/globalconnections/liberia/timeline/time4.html> [Accessed 25 January 2004]

PUBLIC BROADCASTING SERVICE, 2004. *Liberia: Ruling the Waves From Virginia* [online]. Available from: <http://www.pbs.org/frontlineworld/stories/spain/liberia.html> [Accessed 25 January 2004]

REPUBLIC OF LIBERIA, LIBERIAN NATIONAL COORDINATING COMMITTEE TO COMBAT DESERTIFICATION, 2002. *First National Report on the Implementation of the United Nations Convention to Combat Desertification* [online]. Monrovia. Available from: <http://www.unccd.int/cop/reports/africa/national/2002/liberia-eng.pdf> [Accessed 28 January 2004]

SAVE THE CHILDREN, 2001. *The Charcoal Livelihood System, Liberia*, Food Security and Livelihoods Programme, [online]. Available from: <http://www.savethechildren.org.uk/foodsecurity/documentation/pdfs/Charcoal%20Livelihood%20System.pdf> [Accessed 25 January 2004]

SCZESNIAK, A.P., 2001. *The Mineral Industries of Côte D'Ivoire, Guinea, Liberia, and Sierra Leone* [online]. Available from: <http://minerals.usgs.gov/minerals/pubs/country/2001/ivgvlismyb01.pdf> [Accessed 12 January 2004]. Reston USA: U.S. Department of the Interior, U.S. Geological Survey

SIANKOR, S., 2001. *World Rainforest Movement, Liberia: At the centre of it all is the indigenous community* [online], in World Rainforest Movement Bulletin no. 44, March 2001. Available from: <http://forests.org/archive/general/wrm44.htm> [Accessed 20 January 2004]

SOMMERS, M., 2003. *Urbanization, War, and Africa's Youth at Towards Understanding and Addressing Future Challenges* [online]. United States Agency for International Development. Available from: http://www.dec.org/pdf_docs/PNACU196.pdf [Accessed 28 January 2004]

TORRES NACHÓN, C. [no date]. *Environmental Aspects of Landmines* [online]. International campaign to ban landmines. Available from: http://www.icbl.org/resources/document/lm_environment.php3 [Accessed 18 January 2004]

UNITED KINGDOM DEPARTMENT FOR INTERNATIONAL DEVELOPMENT, 2003. *DFID Liberia update 22 October 2003* [online]. Available from: http://www.dfid.gov.uk/News/PressReleases/files/info_note_liberia_22oct03.htm [Accessed 20 January 2004]

UNITED NATIONS, 2003. *Liberia 2004, Consolidated Appeals Process (CAP)* [online]. New York & Geneva: United Nations. Available from: [http://ochadms.unog.ch/quickplace/cap/main.nsf/h_Index/CAP_2004_Liberia/\\$FILE/CAP_2004_Liberia_SCREEN.PDF?OpenElement](http://ochadms.unog.ch/quickplace/cap/main.nsf/h_Index/CAP_2004_Liberia/$FILE/CAP_2004_Liberia_SCREEN.PDF?OpenElement). [Accessed 24 January 2004]

UNITED NATIONS/WORLD BANK/INTERNATIONAL MONETARY FUND, 2003-2004, *Liberia Joint Needs Assessment* [online]. Available from: <http://www.undg.org> [Accessed 27 January 2004]

UNITED NATIONS DEVELOPMENT PROGRAMME/GLOBAL ENVIRONMENT FACILITY, 2000. *Proposal for Capacity Development Initiative* [online]. Available from: http://www.gefweb.org/Site_Index/CDI/LAC_Assessment.doc [Accessed 20 January 2004]

UNITED NATIONS DEVELOPMENT PROGRAMME, 2001. *Poverty Profile of Liberia*, [online]. Available from: <http://mirror.undp.org/liberia/poverty.pdf> [Accessed 19 January 2004]

UNITED NATIONS DEVELOPMENT PROGRAMME, 2003. *Human Development Report (2003), Human Development Indicators – Liberia* [online]. Available from: http://www.undp.org/hdr2003/indicator/cty_f_LBR.html [Accessed 19 January 2004]

UNITED NATIONS DEVELOPMENT PROGRAMME, draft as of 14 January 2004, *Draft National Environmental Policy of Liberia* [online]. Available from:
<http://mirror.undp.org/liberia/draft.htm> [Accessed 25 January 2004]

UNITED NATIONS ENVIRONMENT PROGRAMME, 2000. *Municipal Solid Waste Management, Regional Overviews and Information Sources*, [online]. Available from:
<http://www.unep.or.jp/ietc/estdir/pub/msw/index.asp> [Accessed 20 January 2004]

UNITED NATIONS ENVIRONMENT PROGRAMME, 2000. *Environmental Impact of Refugees in Guinea, Report to the Secretary-General on the findings and recommendations on the pre-assessment on the environmental impact of refugees in Guinea* [online]. Available from:
<http://www.reliefweb.int/library/documents/reportfinal3b.pdf> [Accessed 25 January 2004]

UNITED NATIONS HIGH COMMISSIONER FOR REFUGEES, 1996. *UNHCR Environmental Guidelines* [online]. Available from: http://www.unhcr.ch/cgi-bin/texis/vtx/home/+uwwBmeHA_w_wwwwwwwwwwhFqA72ZR0gRfZNtFqrpGdBnqBAFqA72ZR0gRfZNcFqD0DVoGdDMnDBwcDzmxwwwwww/opendoc.pdf [Accessed 25 January 2004]

UNITED NATIONS HIGH COMMISSIONER FOR REFUGEES, 1998. *Refugee Operations and Environmental Management - Selected Lessons Learned* [online]. Available from: http://www.unhcr.ch/cgi-bin/texis/vtx/home/+hwwBmeXz_w_wwwwwwwwwwhFqA72ZR0gRfZNtFqrpGdBnqBAFqA72ZR0gRfZNcFqD0DVoGdDMnDBwcDzmxwwwwww/opendoc.pdf [Accessed 25 January 2004]

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION, 2001. *Artisanal Gold Mining without Mercury Pollution*, 14 February 2001 [online]. Available from:
<https://www.unido.org/en/doc/4571> [Accessed 20 January 2004]

UNITED NATIONS JOINT LOGISTICS CENTRE. *Liberia Fuel Storage* [online]. Available from:
<http://www.unjlc.org/content/index.phtml/itemId/11560> [Accessed 18 January 2004]

UNITED NATIONS NEWS CENTRE, *Liberia: Annan names experts to serve on panel for follow-up sanctions mission*, 20 January 2004 [online]. Available from:
<http://www0.un.org/apps/news/story.asp?NewsID=9500&Cr=liberia&Cr1> [Accessed 26 January 2004]

UNITED NATIONS OFFICE FOR THE COORDINATION OF HUMANITARIAN AFFAIRS/ INTEGRATED REGIONAL INFORMATION NETWORK, 2003. *Liberia: Fighting in Monrovia dies down, soldiers go looting*, 8 June 2003 [online]. Irin. Cited by Reliefweb. Available from: <http://www.reliefweb.int/w/rwb.nsf/0/88543053748f199c49256d40001ef908?OpenDocument> [Accessed 18 January 2004]

UNITED NATIONS SECURITY COUNCIL, 2003. *Report of the Secretary General to the Security Council on Liberia* S/2003/875 [online]. New York: UNSC. Available from: <http://ods-dds-ny.un.org/doc/UNDOC/GEN/N03/491/10/PDF/N0349110.pdf?OpenElement> [Accessed 25 January 2004]

UNITED NATIONS SECURITY COUNCIL, 2002. *Report of the Panel of Experts appointed pursuant to Security Council resolution 1395 (2002)*, [online]. S/2002/470. Available from:
<http://www.un.org/Docs/sc/committees/Liberia2/470e.pdf> [Accessed 19 January 2004]

UNITED NATIONS SECURITY COUNCIL, 2001. *Letter dated 26 October 2001 from the Chairman of the Security Council Committee established pursuant to resolution 1343 (2001) concerning Liberia addressed to the President of the Security Council*.
<http://ods-dds-ny.un.org/doc/UNDOC/GEN/N03/543/25/IMG/N0354325.pdf?OpenElement> [Accessed 25 January 2004]; Documents relating to the Security Council Committee concerning the situation in Liberia pursuant to resolution 1343 (2001) [online]. Available from:
<http://www.un.org/Docs/sc/committees/Liberia2/LiberiaSelEng.htm> [Accessed 25 January 2004]

UNITED NATIONS SECURITY COUNCIL, 2003. *Report of the Panel of Experts appointed pursuant to paragraph 25 of Security Council resolution 1478 (2003) concerning Liberia* [online]. Available from:
<http://www.reliefweb.int/library/documents/2003/unsc-lib-28oct.pdf> [Accessed 25 January 2004]

UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT, 2002. *FY 2002 Annual Report* [online]. Available from: http://www.dec.org/pdf_docs/PDABW143.pdf [Accessed 24 January 2004]

UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT, 2003. *FY 2003 Annual Report* [online]. Available from: http://www.dec.org/pdf_docs/PDABX837.pdf [Accessed 24 January 2004]

UNITED STATES DEPARTMENT OF STATE, *Country background notes, Background Note: Liberia*. [online] Available from: <http://www.state.gov/r/pa/ei/bgn/6618.htm> [Accessed 19 January 2004]

UNITED STATES DEPARTMENT OF STATE GEOGRAPHIC BUREAUS, 1996. *Testimony by William H. Twaddell, Acting Assistant Secretary of State for African Affairs, Hearing on Liberia before the House International Relations Committee, 26 June 1996* [online]. US Dept of State. Available from: <http://dosfan.lib.uic.edu/ERC/bureaus/afr/960626Twaddell.html> [Accessed 25 January 2004]

UNITED STATES FISH & WILDLIFE SERVICE, Pesticides and Wildlife [online]. Available from: <http://contaminants.fws.gov/Issues/Pesticides.cfm> [Accessed 20 January 2004]

WORLD BANK, 2001. *Conflict Diamonds*, Africa Region Working Paper Series No. 13 March 2001 [online]. Available from: <http://www.worldbank.org/afr/wps/wp13.pdf> [Accessed 25 January 2004]

WORLD FOOD PROGRAMME, World Hunger – Liberia [online]. Available from: http://www.wfp.org/country_brief/indexcountry.asp?country=430 [Accessed 19 January 2004]

WORLD HEALTH ORGANISATION, 2003. *Liberia: Health situation analysis final report*, Jul. 2002 – Nov 29, 2003 [online]. Available from: <http://www.reliefweb.int/library/documents/2003/who-lib-29nov.pdf> [Accessed 20 January 2004]

YAHOO INTERNATIONAL FINANCE CENTRE, *Liberia Country Fact Sheet* [online]. Available from: <http://biz.yahoo.com/ifc/gh.html> [Accessed 20 January 2004]

Map sources

Map 1. Elevation and hydrology

NATIONAL IMAGERY AND MAPPING AGENCY, 2004. GIS layers for Liberia from Digital Chart of the World [online]. Available from: http://www.nima.mil/cda/article2/0,2421,3104_12137_114494,00.html [Accessed 5 December 2003]

UNITED NATIONS DEPARTMENT OF PUBLIC INFORMATION, CARTOGRAPHIC SECTION, 2003. Liberia Map No. 3775 Rev. 5 [online]. Available from: <http://www.un.org/Depts/Cartographic/map/profile/liberia.pdf> [Accessed 5 January 2004]

UNITED NATIONS HIGH COMMISSIONER FOR REFUGEES, GEOGRAPHIC INFORMATION AND MAPPING UNIT POPULATION AND GEOGRAPHIC DATA SECTION, 2003, Liberia Atlas map [online]. Available from: <http://www.unhcr.ch/cgi-bin/taxis/vtx/home/openodoc.pdf?tbl=MEDIA&id=3dec2c947&page=publ> [Accessed 5 January 2004]

Map 2. Administrative boundaries

HUMANITARIAN INFORMATION CENTRE FOR LIBERIA, 2003. County district and clan administrative boundaries [online]. Available from: http://www.humanitarianinfo.org/liberia/mapcentre/topographic/populated_places_and_administrative_boundaries/pdf/LIB046_County_district_and_clan_boundaries_2002_0410-03_code_list_short_form_0510-03.pdf [Accessed 5 December 2003]

NATIONAL IMAGERY AND MAPPING AGENCY, 2004, GIS layers for Liberia from Digital Chart of the World [online]. Available from: http://www.nima.mil/cda/article2/0,2421,3104_12137_114494,00.html [Accessed 5 December 2003]

Map 3. Displaced population

HUMANITARIAN INFORMATION CENTRE FOR LIBERIA, 2003. Total of Refugees and IDPs per County of origin [online]. Available from: http://www.humanitarianinfo.org/liberia/mapcentre/thematic/idps/pdf/LIB058_A3_IDP_Refugee_20031204.pdf [Accessed 5 January 2004]

HUMANITARIAN INFORMATION CENTRE FOR LIBERIA, 2003, Location of known IDP concentrations [online]. Available from: http://www.humanitarianinfo.org/liberia/mapcentre/thematic/idps/pdf/LIB070_A3_Populations_of_known_IDP_locations.PDF [Accessed 5 January 2004]

UNITED NATIONS, DEPARTMENT OF PUBLIC INFORMATION, CARTOGRAPHIC SECTION, 2003, Liberia Map No. 3775 Rev. 5 [online]. Available from: <http://www.un.org/Depts/Cartographic/map/profile/liberia.pdf> [Accessed 5 January 2004]

UNITED NATIONS HIGH COMMISSIONER FOR REFUGEES, GEOGRAPHIC INFORMATION AND MAPPING UNIT POPULATION AND GEOGRAPHIC DATA SECTION, 2003. Liberia Atlas map [online]. Available from: <http://www.unhcr.ch/cgi-bin/tehis/vtx/home/opendoc.pdf?tbl=MEDIA&id=3dee2c947&page=publ> [Accessed 5 January 2004]

Map 4. Shipwrecks along the Liberian coast

CHRISTIE W. T., Conservation International, 2004. Washington D.C.
FAUNA & FLORA INTERNATIONAL, 2004. Monrovia

UNITED NATIONS DEPARTMENT OF PUBLIC INFORMATION, CARTOGRAPHIC SECTION, 2003. Liberia Map No. 3775 Rev. 5 [online]. Available from: <http://www.un.org/Depts/Cartographic/map/profile/liberia.pdf> [Accessed 5 January 2004]

Map 5. Forest cover and reserves

CHRISTIE W. T., Conservation International, 2004. Washington DC
FAUNA & FLORA INTERNATIONAL, 2004, Monrovia

UNITED NATIONS DEPARTMENT OF PUBLIC INFORMATION, CARTOGRAPHIC SECTION, 2003. Liberia Map No. 3775 Rev. 5 [online]. Available from: <http://www.un.org/Depts/Cartographic/map/profile/liberia.pdf> [Accessed 5 January 2004]

Map 6. Road development

CHRISTIE W. T., Conservation International. 2004. Washington D.C.
FAUNA & FLORA INTERNATIONAL, 2004. Monrovia

UNITED NATIONS DEPARTMENT OF PUBLIC INFORMATION, CARTOGRAPHIC SECTION, 2003. Liberia Map No. 3775 Rev. 5 [online]. Available from: <http://www.un.org/Depts/Cartographic/map/profile/liberia.pdf> [Accessed 5 January 2004]

Map 7. Extraction facilities and mineral resources

NATIONAL IMAGERY AND MAPPING AGENCY, 2004. GIS layers for Liberia from Digital Chart of the World [online]. Available from: http://www.nima.mil/cda/article2/0,2421,3104_12137_114494,00.html [Accessed 5 December 2003]

SCZESNIAK A.P., 2001. The Mineral Industries of Côte D'Ivoire, Guinea, Liberia, and Sierra Leone [online]. Available from: <http://minerals.usgs.gov/minerals/pubs/country/2001/ivgvlislyb01.pdf> [Accessed 12 January 2004]. Reston USA: U.S. Department of the Interior.

UNITED STATES DEPARTMENT OF THE INTERIOR, UNITED STATES GEOLOGICAL SURVEY. Liberia Mineral map [online]. Available from: <http://minerals.usgs.gov/minerals/pubs/country/maps/92589.gif> [Accessed 12 January 2004]. Reston USA: U.S. Department of the Interior.

Map 8. Biodiversity priority sites

CONSERVATION INTERNATIONAL, 2001. Results of the West African Priority-Setting Exercise Workshop held in Elmina, Ghana, December 1999. Washington DC

UNITED NATIONS DEPARTMENT OF PUBLIC INFORMATION, CARTOGRAPHIC SECTION, 2003. Liberia Map No. 3775 Rev. 5 [online]. Available from: <http://www.un.org/Depts/Cartographic/map/profile/liberia.pdf> [Accessed 5 January 2004]

UNITED NATIONS ENVIRONMENT PROGRAMME/WORLD CONSERVATION MONITORING CENTRE, 2004. Protected areas database as of 26th of January 2004. Cambridge, United Kingdom: UNEP/ WCMC.

Satellite imagery sources

Monrovia Free Port

UNOSAT, UNITED NATIONS OFFICE FOR PROJECT SERVICES, 2004. Spot panchromatic image over Monrovia.

UNITED NATIONS JOINT LOGISTICS CENTRE, 2003. Monrovia Port Diagram, http://www.unjlc.org/content/item.phtml?itemId=12596&nodeId=file3f7c4d6eb29f9&fn=UNJLC_LBR_011_031002_Monrovia_Port_Diagram.jpg

Krahn bassa 1986

CHRISTIE W. T., Conservation International, 2004, Landsat. Washington D.C.
FAUNA & FLORA INTERNATIONAL, 2004, Monrovia

Krahn bassa 2001

CHRISTIE W. T., Conservation International, 2004, Washington D.C.
FAUNA & FLORA INTERNATIONAL, 2004, Monrovia

Mount Nimba 2001

CHRISTIE W. T., Conservation International, 2004, Washington D.C.

Buchanan coastline change 1986-2001

UNOSAT, UNITED NATIONS OFFICE FOR PROJECT SERVICES, 2004. Landsat TM 14th Jan 1986, source and courtesy University of Maryland.
UNOSAT, UNITED NATIONS OFFICE FOR PROJECT SERVICES, 2004. Landsat ETM+ 16 Feb 2001, source and courtesy University of Maryland.

Buchanan forest cover change 1986-2001

UNOSAT, UNITED NATIONS OFFICE FOR PROJECT SERVICES, 2004. Landsat TM 14th Jan 1986, source and courtesy University of Maryland.
UNOSAT, UNITED NATIONS OFFICE FOR PROJECT SERVICES, 2004. Landsat ETM+ 16 Feb 2001, source and courtesy University of Maryland.

Buchanan urban change 1986-2001

UNOSAT, UNITED NATIONS OFFICE FOR PROJECT SERVICES, 2004, Landsat TM 14th Jan 1986, source and courtesy University of Maryland.

UNOSAT, UNITED NATIONS OFFICE FOR PROJECT SERVICES, 2004, Landsat ETM+ 16 Feb 2001, source and courtesy University of Maryland.

Internet home sites

Africa Energy Intelligence, <http://www.africaintelligence.com>

All About Liberia, <http://www.allaboutliberia.com>

AllAfrica, <http://fr.allafrica.com/westafrica/bydate/?n=10>

Association of Environmental Lawyers Inc. (Green Advocates),
<http://www.eco-web.com/cgi-local/sfc?a=index/index.html&b=register/03823.html>

Conservation International, <http://www.conservation.org/xp/CIWEB/home>

ECOLEX, <http://www.ecolex.org/>

ECOSYN, http://137.224.18.36/ecosyn/ecosyn_vad_en.html

Environmental Foundation for Africa, <http://www.efasl.org.uk/>

Fauna & Flora International (FFI), <http://www.fauna-flora.org/>

Global Security, <http://www.globalsecurity.org/>

Global Witness, <http://www.globalwitness.org/>

Greenpeace, http://www.greenpeace.org/international_en/

International Maritime Organisation (IMO), <http://www.imo.org/index.htm>

Kimberley Process, <http://www.kimberleyprocess.com/background.asp>

Liberia International Ship & Corporate Registry, <http://www.liscr.com>

Mano River Resources, Inc., <http://www.manoriver.com>

Merlin, <http://www.merlin.org.uk/>

Metal Bulletin, www.metalbulletin.com

Save My Future Foundation (SAMFU), <http://www.samfu.org/>

Space Applications Institute, E.C. Global Vegetation Monitoring Unit, Ispra, Italy,
<http://www.medalus.demon.co.uk/ispra.htm>

The Perspective, <http://www.theperspective.org>

United Nations High Commissioner for Refugees (UNHCR), <http://www.unhcr.org/>

United Nations News Centre, <http://www.un.org/News/>

United Nations Office for the Coordination of Humanitarian Affairs (OCHA),
http://www.reliefweb.int/ocha_ol/

World Bank <http://www.worldbank.org/>

World Wildlife Fund (WWF) <http://www.wwf.org/>

Appendix D

National Environment Policy

D

The objectives of the National Environment Policy of Liberia are to ensure the improvement of the physical environment, improve quality of life of the people and ensure reconciliation and coordination between economic development and growth with sustainable management of natural resources. The Policy focuses on the following areas:

1. Socio-economic dimensions and cross-cutting issues:

- Occupational health and safety
- Development of human settlements
- Establishment and management of recreational space
- National monuments and cultural heritage
- Poverty alleviation
- Population management
- Environmental impact assessment
- Environmental information
- Convention on biological diversity
- Conservation and management of water resources
- Conservation and management of wetlands
- Environmental economics

2. Sustainable management of sectoral systems:

- Land use
- Forest and wildlife
- Protected areas
- Energy production and use
- Toxic and hazardous substances
- Waste management and sanitation
- Marine and coastal management
- Mining and mineral resources
- Agricultural chemicals
- Noise and air pollution

3. Working with and through people:

- Capacity building and technology transfer
- Bio-prospecting and intellectual property
- Public awareness and training
- Gender and women's issues
- NGO community

4. Policy implementation:

- Legal arrangements
- Institutional arrangements
- International treaties and obligations
- Monitoring and evaluation

Appendix E

International Environmental Agreements of relevance to Liberia (including maritime conventions)

Title	Entry into force
Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare	1927
Convention on International Civil Aviation Annex 16 - Aircraft Noise	1947
Convention on the International Maritime Organization	1959
International Plant Protection Convention	1986
International Convention for the Prevention of Pollution of the Sea by Oil, 1954, as amended in 1962 and 1969	1962
International Convention for the Safety of Life at Sea	1965
Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and under Water	1964
Treaty on the Non-Proliferation of Nuclear Weapons	1970
African Convention on the Conservation of Nature and Natural Resources	1978
International Convention relating to Intervention on the High Seas in Cases of Oil Pollution Casualties	1975
International Convention on Civil Liability for Oil Pollution Damage	1975
Convention Relating to Civil Liability in the Field of Maritime Carriage of Nuclear Material	1981
Ramsar Convention on Wetlands	2003
Convention on the International Regulations for Preventing Collisions at Sea	1977
Convention concerning the Protection of the World Cultural and Natural Heritage	2002
International Convention for Safe Containers (CSS)	1979
Convention on International Trade in Endangered Species of Wild Fauna and Flora	1981
Protocol relating to Intervention on the High Seas in Cases of Pollution by Substances other than Oil	1983
International Convention for the Prevention of Pollution from Ships (MARPOL) - Annex V (Optional) = Garbage	1995
International Convention for the Safety of Life at Sea (SOLAS)	1980
Protocol to the International Convention on the Establishment of an International Fund of Compensation for Oil Pollution Damage	1994
Protocol to the International Convention on Civil Liability for Oil Pollution Damage	1981
Convention on Limitation of Liability for Maritime Claims	1986
International Convention for the Prevention of Pollution from Ships as modified by the Protocol of 1978	1983
Protocol relating to the International Convention for the Safety of Life at Sea (SOLAS Prot.)	1981
International Convention for the Prevention of Pollution from Ships, 1973 (MARPOL) - Annex III (Optional): Hazardous substances carried in packaged form	1996
International Plant Protection Convention (1979 Revised Text)	1991
International Tropical Timber Agreement	1985
Vienna Convention for the Protection of the Ozone Layer	1996
Montreal Protocol on Substances that Deplete the Ozone Layer	1996
Protocol relating to the International Convention for the Safety of Life at Sea (SOLAS PROT 1988)	2000
London Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer	1996
International Convention on Oil Pollution Preparedness, Response and Co-operation	1996
Treaty Establishing the African Economic Community	1994
United Nations Framework Convention on Climate Change	2003
Convention on Biological Diversity	2000
Copenhagen Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer	1996
Protocol to amend the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage	1996
Protocol to amend the International Convention on Civil Liability for Oil Pollution Damage	1996
International Tropical Timber Agreement	1997
International Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa	1998
Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction	2000
Annex VI to MARPOL 73/78 on the prevention of air pollution from ships	2003
Kyoto Protocol to the United Nations Framework Convention on Climate Change	2002
Memorandum of Understanding concerning Conservation Measures for Marine Turtles of the Atlantic Coast of Africa	1999
Cartagena Protocol on Biosafety to the Convention on Biological Diversity	2003
Stockholm Convention on Persistent Organic Pollutants	2002

(Sources: ECOLEX and the International Maritime Organization)

Appendix F

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Following the signing of the Comprehensive Peace Agreement in Accra in August 2003, Liberia is entering a new and promising period of peace and reconstruction. The National Transitional Government of Liberia, with support from international community and the UN peacekeeping operation UNMIL, has the responsibility of preparing democratic elections to be held in October 2005.

Environmental degradation is one of the unfortunate legacies of the 14-year period of conflicts in Liberia. There has been damage from the illegal logging of forests, mining activities, and erosion caused by the destruction of mangroves, while increased uncontrolled hunting threatens several species. The human and urban environment has suffered damage from the war, from looting, and from the huge numbers of refugees and internally displaced persons. Safe drinking water is lacking and sanitation is inadequate.

The United Nations Environment Programme (UNEP) participated in the post-conflict UN needs assessment mission to Liberia. The findings of this desk study draw on key environmental information obtained from the Liberian national authorities, non-governmental organisations and other sources. Recommendations are made how the environment could be fully integrated into the coming reconstruction efforts in Liberia.