LIBERIA ENVIRONMENTAL THREATS AND OPPORTUNITIES ASSESSMENT (ETOA)

FINAL REPORT

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Cover Photo: +/- 100ha section of forest cleared for cassava production at the proposed Lake Piso National Park site.

The authors’ views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.
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<td>ACL</td>
<td>Alliance for Conservation in Liberia</td>
</tr>
<tr>
<td>AED</td>
<td>Academy for Educational Development</td>
</tr>
<tr>
<td>AIS</td>
<td>Alien Invasive Species</td>
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<tr>
<td>AFORNET</td>
<td>African Forestry Research Network</td>
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<td>ANAFE</td>
<td>African Network for Agroforestry Education</td>
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<tr>
<td>ARD</td>
<td>Associates in Rural Development</td>
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<td>BI</td>
<td>Birdlife International</td>
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<td>Bureau of National Fisheries</td>
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<td>BRE</td>
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<td>CARI</td>
<td>Central Agricultural Research Institute</td>
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<td>CBD</td>
<td>Convention on Biological Diversity</td>
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<tr>
<td>CBNRM</td>
<td>Community-based Natural Resource Management</td>
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<td>CCC</td>
<td>Civilian Conservation Corps</td>
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<tr>
<td>CCRF</td>
<td>(FAO) Code of Conduct for Responsible Fisheries</td>
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<tr>
<td>CEEB</td>
<td>Concerned Environmentalists for the Enhancement of Biodiversity</td>
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<td>CEEB</td>
<td>Center for Environmental Education Protection</td>
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<tr>
<td>CI</td>
<td>Conservation International</td>
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<td>CIFOR</td>
<td>Center for International Forestry Research</td>
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<td>CITES</td>
<td>Convention on International Trade in Endangered Species (of Wild Fauna and Flora)</td>
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<td>CM</td>
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<td>COP</td>
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<td>Subregional Fisheries Commission</td>
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<td>(Liberia) Conservation Trust Fund</td>
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<td>DFID</td>
<td>Department for International Development</td>
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<td>DGIS</td>
<td>Dutch Ministry of Foreign Affairs</td>
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EC European Commission
EEP Emergency Power Program
EEZ Exclusive Economic Zone
EFA Environmental Foundation for Africa
EIA Environmental Impact Assessment
EIPSC Emergency Infrastructure Supplemental Component
EMP Environmental Management Plan
ENCAP Environmentally Sound Design and Management Capacity-Building for Partners and Programs in Africa
EPA Environmental Protection Agency
EPA Act Environmental Protection Agency Act
EPML Environmental Protection and Management Law
ERADRO Environmental Relief and Development Research Organization
ESDM Environmentally Sound Design and Management
ETOA Environmental Threats and Opportunities Assessment
FAA U.S. Foreign Assistance Act
FAO Food and Agriculture Organization
FAPS Food and Agriculture Policy and Strategy
FC (FAO) Financial Controllers
FCP Forest Conservation Program
FDA Forestry Development Authority
FERN Forests and the European Union Resource Network
FFI Fauna and Flora International
FIBA International Foundation for the Bank d’Arguin
FORNESSA Forestry Research Network for sub-Saharan Africa
GDA Global Development Alliance
GDP Gross Domestic Product
GEF Global Environment Fund
GEMAP Governance and Economic Management Assistance Program
GIS Geographic Information System
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<td>GNP</td>
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<td>GPS</td>
<td>Global Positioning System</td>
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<td>Governance Reform Commission</td>
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<td>Gross Registered Tonnage</td>
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<td>Interchurch Organization for Development Co-operation</td>
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<td>ICRAF</td>
<td>The World Agroforestry Center</td>
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<td>Information, Education and Communication</td>
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<td>Japan International Cooperation Agency</td>
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<tr>
<td>KPCS</td>
<td>Kimberly Process Certification System</td>
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<td>LAC</td>
<td>Liberian Agriculture Company</td>
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<td>LACE</td>
<td>Liberia Agency for Community Empowerment</td>
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<tr>
<td>LCIP II</td>
<td>Liberia Community Infrastructure Program II</td>
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<td>LEAP</td>
<td>Liberia Energy Assistance Program</td>
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<td>LEW</td>
<td>Liberia Environmental Watch</td>
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<td>LFI</td>
<td>Liberia Forestry Initiative</td>
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<td>LIAP</td>
<td>Liberia Integrated Assistance Program</td>
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<tr>
<td>LIFE</td>
<td>Livelihood Improvement for Farming Enterprises</td>
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<tr>
<td>LISGIS</td>
<td>Liberia Institute for Statistics and Geo-Information Services</td>
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<tr>
<td>Acronym</td>
<td>Description</td>
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<tr>
<td>LLS</td>
<td>Livelihoods and Landscapes Strategy</td>
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<tr>
<td>LME</td>
<td>Lands, Mines and Energy</td>
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<tr>
<td>LRCFP</td>
<td>Land Rights and Community Forestry Program (LRCFP)</td>
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<tr>
<td>MCC</td>
<td>Monrovia City Corporation</td>
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<tr>
<td>MCS</td>
<td>Monitoring, Control and Surveillance</td>
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<tr>
<td>MCIMS</td>
<td>Mining Cadastre Informing Management System</td>
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<td>MD</td>
<td>(FAO) Managing Directors</td>
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<td>MDG</td>
<td>Millennium Development Goal</td>
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<td>MDA</td>
<td>Model Mineral Development Agreement</td>
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<td>MLME</td>
<td>Ministry of Lands, Mines and Energy</td>
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<td>MOA</td>
<td>Ministry of Agriculture</td>
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<td>MOU</td>
<td>Memorandum of Understanding</td>
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<td>NBSAP</td>
<td>National Biodiversity Strategic Action Plan</td>
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<tr>
<td>NEAP</td>
<td>National Environmental Action Planning</td>
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<td>NECOLIB</td>
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<td>National Environmental Policy</td>
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<td>NGO</td>
<td>Non-Governmental Organization</td>
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<td>National Information Management Center</td>
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<td>NMML</td>
<td>New Minerals and Mining Law</td>
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<td>National Renewable Energy Laboratory</td>
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<td>NSDS</td>
<td>National Strategy for the Development Statistics</td>
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<td>NTFP</td>
<td>Non Timber Forest Product</td>
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<td>NTGL</td>
<td>National Transitional Government of Liberia</td>
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<td>NTLA</td>
<td>National Transitional Legislative Assembly</td>
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<td>PA</td>
<td>Protected Area</td>
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<td>PCDMB</td>
<td>Post Conflict and Disaster Management Branch</td>
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<td>PD</td>
<td>Professional Development</td>
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<td>PEI</td>
<td>Poverty and Environment Initiative</td>
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<td>PEPFAR</td>
<td>President’s Plan for AIDS Relief</td>
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PERSUAP  Pesticide Evaluation Report and Safer Use Action Plan
PPA           Participatory Poverty Assessment
PPCA          Public Procurement and Concession Act
PRA           Participatory Rural Appraisal
PRCM          Programme Régional de Conservation de la Zone Cotière et Marine en Afrique de l’Ouest (Regional Program for the Conservation of the Coastal Zone and Marine in West Africa)
PRS           Poverty Reduction Strategy
REDD          Reduced Emissions from Degradation and Deforestation
SAMFU         Save My Future Foundation
SADS          Skills and Agricultural Development Services
SCNL          Society for the Conservation of Nature in Liberia
SDI           Sustainable Development Institute
SEA           (World Bank) Strategic Environmental Assessment
SGS           Société Générale de Surveillance (S.A.)
SO            Strategic Objectives
SOCFIN        (Parent company of LAC)
STCP          Sustainable Tree Crops Program
TAMOA         Technical Assistance to the Ministry of Agriculture
TFCA          Tropical Forest Conservation Act
TFLIB         World Bank Trust Fund for Liberia
TRG           Training Resources Group
UNDP          United Nations Development Program
UNEP          United Nations Environment Program
UNFCC         United Nations Framework Convention on Climate Change
UNHCR         United Nations High Commission for Refugees
UNMIL         United Nations Military in Liberia
UNSC          United Nations Security Council
USAID         United States Agency for International Development
USDA          United States Department of Agriculture
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Name</th>
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<tr>
<td>USG</td>
<td>United States Government</td>
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<td>USFS</td>
<td>United States Forest Service</td>
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<td>USFWS</td>
<td>United States Fish and Wildlife Service</td>
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<tr>
<td>WAMER</td>
<td>West African Marine Ecoregion</td>
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<tr>
<td>WCS</td>
<td>Wildlife Conservation Society</td>
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<td>WWF</td>
<td>Worldwide Fund for Nature</td>
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EXECUTIVE SUMMARY

USAID/Liberia is currently transitioning from emergency relief to development. The Mission’s Office of Economic Growth, which encompasses natural resource management and biodiversity activities, is crafting a new strategy to reflect the changing times. Pressures on Liberia’s forests, biodiversity, natural resources and ecosystems are increasing. At the same time there are growing opportunities for USAID to collaborate with other donors, non-governmental organizations (NGOs), government agencies that are acquiring new mandates and competencies, and the private sector. These factors led the Mission to decide that an Environmental Threats and Opportunities Assessment (ETOA) was warranted. An ETOA goes beyond, yet incorporates, a 118-119 analysis. An ETOA describes the range of environmental impacts from human activities across the spectrum of sectors: green (forests, agricultural systems), brown (urban, industrial systems) and blue (marine and freshwater systems).

The ETOA report is divided into three sections; a State of the Environment Report, Actions Necessary and Planned to Conserve Tropical Forests and Biodiversity (Tropical Forests and Biodiversity Report - Foreign Assistance Act Sections 118/119), and an Environmental Data Collection, Monitoring and Adaptive Management Plan.

The State of the Environment (SOE) Report identifies threats to terrestrial, coastal/marine and freshwater ecosystems and examines the potential effects of climate change on these ecosystems. It also assesses environmental and natural resource hazards and degradation in urban and rural areas. The SOE includes an analysis of policy and institutional issues impacting the environment, natural resources and ecosystems. Drawing on these assessments, the SOE identifies the underlying causes of environmental degradation and analyses approaches and interventions used by all institutions (e.g., NGOs, government, private sector) to address these causes and the results obtained, with particular emphasis on enabling conditions including the legal and regulatory environment. The SOE concludes with an analysis of opportunities and constraints associated with all environmental elements, recommendations for indicators of environmental damage/health and potential monitoring systems, and a brief analysis of key links between economic growth, health and governance activities and environmental threats and opportunities.

The Actions Necessary and Planned to Conserve Tropical Forests and Biodiversity Report was prepared to provide information and analysis required by the U.S. Congress, and stipulated in the U.S. Foreign Assistance Act (FAA) of 1961. Sections 118 and 119 of the FAA require USAID Missions to examine issues of tropical forests and biodiversity conservation when preparing strategies for development assistance.

The Environmental Data Collection, Monitoring and Adaptive Management Plan Report identifies environmental spatial data gaps, assesses the capacity of Liberian institutions to collect and manage data, analyses monitoring and adaptive management use of data and information by Government of Liberia, USAID and key partners, and provides recommendations for strengthening data collection and management.
PART 1: STATE OF THE ENVIRONMENT REPORT

THREATS TO FOREST ECOSYSTEMS

Liberia is situated in the fragmented band of forest known as the ‘Upper Guinean Forest’. It is one of the two most significant forest blocks in Africa, the other being the ‘Congolese Forest’. The Upper Guinean Forest extends from Guinea at the North-Western extreme, down through Sierra Leone, Liberia, and the Ivory Coast and reaching Cameroon at its most Easterly extent. Liberia accounts for more than half of West Africa’s remaining Upper Guinean tropical forest, and in December 1999, The West African Conservation Priority-Setting Exercise for the Upper Guinean Ecosystem identified Liberia as the “heart of the hotspot”—critical to successful conservation in the region, and in need of immediate conservation action. Liberia accounts for more than half of West Africa’s remaining Upper Guinean tropical forest.

The total Liberian land area is 9.59 million hectares, of which forests cover about 4.39 million hectares equivalent to 45 percent of the land area, including 2.42 million has classified as closed dense forest, 1.02 million ha classified as open dense forest, and .95 million ha classified as agriculture degraded forest. Liberia’s forests provide a wide range of benefits to the Liberian people and the international community. Forest areas provide habitat for globally important biodiversity and maintain ecological services (such as oxygen production and soil stabilization), enable harvesting of non-timber forest products that many local people depend upon for daily subsistence, and provide a significant input to the national budget through commercial forestry development.

Threats to forest ecosystems include:

- **Degradation from Illegal and Quasi-Legal Logging.** Currently, illegal commercial logging no longer poses a threat to Liberia’s forests. However the Government of Liberia’s (GOL) domestic timber supply policy appears to be a contributor to forest degradation though poorly regulated chain sawing practices (known locally as “pitsawing”) via a permit system which leads to over cutting, lost revenues and potential corruption, including the illegal export of planks.

- **Shifting Cultivation.** The threat of deforestation posed by shifting cultivation is difficult to measure. Attention tends to focus on the clearing of forest lands (whether secondary or primary), and this is especially noticeable for upland rice cultivation, where fields tend to be large and cleared by multiple families or commercial interests, often with some capital investment. In this context, there seems to be a trend towards more “mechanized” slash and burn using chainsaws which may impact regeneration in the future as the larger trees which provide a seed source for regeneration are now being cut. Increases in world rice prices may drive also drive upland rice expansion in Liberia. In general, however, Liberia’s low population density combined with the fact that only 6% of Liberia’s land is devoted to agriculture, means that shifting cultivation does not represent a current threat to forests if the lands are subsequently fallowed. Rather, the threat is the overall degradation of forest over time, best measured from successive satellite images.

- **The Bushmeat Trade.** Liberia is unusual in the high importance of bush meat, and in the lack of alternative animal protein. Its economic value is enormous, rivaling pre-war timber revenues, and the industry is effectively unregulated at present. Because of the adverse impacts of hunting on protected species and because the harvest is generally assumed to be unsustainable at current levels, Liberia has a bush meat crisis, and could lose an important source of animal protein, rural and urban livelihoods, and some of its protected species if the industry continues to be poorly-regulated.
• **Mining.** The GOL expects industrial and artisanal mining activities to grow rapidly during the Poverty Reduction Strategy period, from near zero production in 2005/06 to 12 percent of GDP by 2010. Indeed the GOL is counting on such growth as a means of contributing significantly to employment, income generation and infrastructure development. There is a high degree of geographic overlap between mineral deposits and exploration permits and the protected area/forest reserve network. If exploitation occurs within these areas as expected, the potential to significantly affect biodiversity and forest cover should be considered very high. Forest destruction will be locally extensive and permanent. Other potential environmental impacts include: siltation of dams and rivers, ground and surface water pollution, and habitat fragmentation among others. The impact of over 100,000 artisanal miners operating in Liberia, including 6000 operating in Sapo National Park alone, may have individually insignificant effects on biodiversity and tropical forests but cumulatively significant effects.

• **Agro Industrial Crops.** Although the current threat to forests from agro-industrial plantation expansion is currently low, in the past, the conversion of huge areas of Liberia’s forests into monocultures of rubber and oil palm accounted for the vast majority of forest loss. As tree crops are an important component of the Liberian economy, accounting for 22 percent of the GDP in 2005, with rubber alone employing 18,500 workers and accounting for 90 percent of total exports, there may be economic pressure to expand the area under tree crops, particularly given Government’s interest in biofuel (oil palm) production.

• **Alien invasive Species.** Alien invasive species such as *Acacia spp.* and *Chromoleana odorata* are out competing natural forest regeneration in some areas.

**THREATS TO COASTAL ECOSYSTEMS**

Liberia has a coastline 565 km long and claims an economic zone of 13 nautical miles and a territorial zone of two hundred (200) nautical miles. About 90% of the coastline consists of a narrow sand beach 20-25 meters wide, reaching 60-80 meters in some parts of south eastern Liberia, interspersed with lagoons, estuaries, bays and brackish wetlands. The coastal area consists of swamp-related vegetation, including mangroves forests and reeds that extend up to 25 miles inland.

Nearly 58% of Liberia’s population lives within 40 miles of the coast which puts extensive pressure on this ecosystem for food, land mineral and other resources. Threats include:

• **Over-Exploitation of Demersal Fish Species.** Although there have been no recent surveys to take stock of existing biomass, the Bureau of National Fisheries (BNF) believes that the demersal species are under threat from rampant pirate fishing that lacks any monitoring, control and surveillance systems. BNF conservatively estimates that there may be upwards of 250 “pirate” boats operating in Liberian waters, the majority of which are using illegal fishing techniques and operating within the three mile limit reserved for artisanal fisheries, and competing for the same demersal species. BNF reports that there may be an additional 8000 unlicensed foreign artisanal boats operating in Liberian waters, some of which are using undersize nets and more recently dynamite. BNF estimates that Liberia loses approximately $10-12 million through illegal fishing each year.

• **Over-Exploitation of Other Species.** There are no research facilities to study the dynamics of the ecological factor affecting the fisheries environment- the productivity of ecosystem, pollution levels and nutrient load, species diversity of the various fish communities and harvesting pattern of commercial species. With regard to sea turtles, there are reports that they are hunted secretly for food.
throughout Liberia. Their eggs are also collected by humans and destroyed by dogs and pigs on the
beaches.

- **Beach Sand Mining Beach Erosion.** Unregulated beach sand mining is one of the most serious threats
to the coastline and marine environment in the country. Sand mining changes in the balance of littoral
sand transport, blocking the natural sand drift. The sand pits cause a slight embayment of the shoreline
due to localized recession. The embayment serves as a void, which must be filled before the sand
moves along the coast. Sand is trapped by the recessions, reducing its westward flow. Sand
“downstream” from the flow is not replaced thus exacerbating shoreline erosion. In some areas,
beaches are being lost at an estimated rate of 3 meters/year with concurrent property destruction.

- **Mangrove Loss.** The biggest threat to Liberia’s mangroves is urban expansion and accompanying
landfills, particularly in Monrovia. This expansion began during the civil conflict when many displaced
people – having very limited land space to carry out business activities – established landfills in
Mesurado and Marshall Mangrove wetlands, causing large areas of mangroves to be destroyed (and to
be used as dumps or for sewage disposal). The process continues today; Liberia’s burgeoning post
conflict economy and increased population have overwhelmed the original planned land area for
Monrovia and other beach cities; originally made to accommodate 350,000 persons, Monrovia’s now
has a population of over 1 million.

### THREATS TO FRESHWATER ECOSYSTEMS

There are six major rivers in Liberia. These flow from mountains in the north and empty into the Atlantic
Ocean. Most of the rivers are navigable up to 20 miles from the coast, except for Cavalla, which is
navigable up to 50 miles. Together, these basins drain approximately 65% 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.

- **Potential Threats to Inland Fisheries—Over Fishing.** The value and production of inland fisheries is
not known but it is an important seasonal subsistence activity. BNF estimates that that there are an
estimated 8000 boats on Liberia’s inland river system with only about 200 registered. According to
BNF, there is little control over net mesh size and there is wide use of organic and chemical pesticides,
and dynamite. BNF has little capacity to monitor inland fisheries.

- **Wetlands.** There are approximately 600,000 ha of freshwater swampland in Liberia with only about
3% (20,000) ha under cultivation. Although there appears to be very few threats to Liberia’s freshwater
wetlands, very little is known about the value of freshwater wetlands, from their role in providing
medicinal plants and other products, to their role in providing ecosystems services such as water quality
enhancement, flood control, and provision of habitat.

- **Water Hyacinth.** Water hyacinth occurs in several waterways but there is no data on its extent and/or
its impact on the ecosystem.

### IMPACT OF CLIMATE CHANGE

While there is a substantial lack of data concerning climate change and its implications for Liberia’s
ecosystems, current models suggest that agriculture crops grown in the tropics, exhibit immediate yield
decline with even the slightest warming, and that there will more than likely be a subsequent increase in
crop pests and diseases. In terms of forest ecosystems, all climate change models project that even in
extreme scenarios, direct deforestation will impact tropical forests before climate-driven dieback.
Although there has been little research on the possible impact of climate change on biodiversity, most specialists agree that as with tropical forests, loss of habitat through anthropogenic factors will impact biodiversity long before any possible impact from climate change. The exception to this would be for migratory animals. Rising sea levels linked to global warming would more than likely pose the biggest threat. A one meter rise could result in the loss of about 95 km$^2$ of land in the coastal zone to inundation, the destruction of the majority of mangroves and have a significant effect on fisheries through changes in hydrology and aquatic ecology.

**URBAN AND RURAL ENVIRONMENTAL HAZARDS**

During the years of conflict, Liberia’s infrastructure was nearly completely destroyed and public services ceased to operate, including piped water, drainage, wastewater and solid waste management systems. As a result, residents in urban areas are exposed to contaminated drinking water and untreated wastes. During the rainy season, the lack of adequate drainage also results in ponds of stagnant water in urban areas. These conditions contribute to two of the primary causes of mortality and morbidity in Liberia, malaria and diarrhea.

**ENVIRONMENTAL POLICIES AND LEGAL FRAMEWORK**

Liberia has a number of existing or draft policies and several international commitments which impact environment, natural resources and ecosystems management and conservation. In general terms these policies and legislation—with the exception of land tenure—are more than sufficient to provide the enabling environment for the management of Liberia’s environment and natural resources. In specific terms, particularly with regard to implementation, the ETOA Team finds that the policy and legislative framework for managing and conserving natural resources in Liberia is overly comprehensive, complicated and detailed to facilitate implementation. In addition for the need to simplify policies and legislation, other policy issues include:

- **Land Tenure.** As land tenure conflicts are escalating, Government needs to speed up the establishment of the National Land Commission to resolve land tenure issues.

- **Bushmeat Policy and Legislation.** The modalities of wildlife protection in the various categories of reserved and unreserved production forest are not addressed in the 2006 Forestry Act, and fall under the pending wildlife conservation and protection law. Similarly, the protection and exploitation of wildlife by communities and hunters groups is not addressed, and falls under the pending community forestry law.

- **Compensation for Communities Living Around Protected Areas.** The Forest Act provides a system for community compensation in timber concession areas. Communities that live around strictly protected areas, however, receive no compensation for the loss of rights to forest products but are expected to make up the difference through GOL and donor supported alternative livelihood programs. Current alternative livelihood programs fall short in deterring illegal activities and the law does not provide for compensating these communities at least as highly as timber concession communities.

- **Outstanding Commercial Forestry Issues,** such as permitting processes for potentially competing land uses and discrepancies in undertaking commercial forestry operations on private or deeded land need to be addressed.

- **Carbon Financing.** The Government has not adopted a formal policy on the role that Liberia’s forests could or should play in accessing potential funding under various carbon financing mechanisms.
The 2003 Environment Protection and Management Law (EPML). While this law contains many significant provisions that could be used to protect the environment, its lack of implementing regulations means that these provisions remain largely inoperative. Particular areas to address include procedures for conducting Environmental Impact Assessments, the establishment of protected areas (including non-forest ecosystems), and implementation of the provisions governing public participation and access to information.

INSTITUTIONAL ISSUES AFFECTING ENVIRONMENTAL STATUS

Liberia has a number of independent agencies, ministries and related organizations as well as domestic and international NGOs whose mandates touch on environmental concerns. The most important of these are Environmental Protection Agency (EPA), the Forestry Development Authority (FDA), the Bureau of National Fisheries, the Liberia Institute of Statistics and Geo-Information Services (LISGIS), and the University of Liberia’s College of Agriculture and Forestry.

The activities of Liberia’s government institutions are constrained by a number of factors, ranging from inadequately trained personnel and lack of basic infrastructure to lack of coordination and cohesion. Particular issues with respect to the capacity of Liberia’s government institutions to manage and protect the environment include:

- **Dependence on Foreign Expertise and Resources.** Issues include: i) risk that dependence on foreign expertise and resources, absent substantial investment in local capacity, may breed resentment; ii) limited capacity of some government institutions restricts them from being able to act outside the areas of interest to their international partners; and (iii) new concepts are often outside of agency strategic plans and when taken together they place extraordinary demands on agency technical staff.

- **Infrastructure and Administration.** Liberia’s long running civil war decimated much of the country’s infrastructure, including government facilities, and severely disrupted many government functions. In the aftermath of the conflict, the country’s ministries face severe shortages with respect to office space, equipment, and supplies. The lack of reliable electricity means that for at least part of the working day the staff in government institutions cannot use any electronic equipment.

- **Human Resources.** Lack of qualified staff is a problem in all of the institutions involved in environmental management in Liberia. Of the staff that is in the institutions, many lack training and qualifications necessary for doing their jobs. Moreover, there has been no recent strategic assessment of capacity gaps within the lead environmental agencies to specifically identify what type of capacity building needs to take place and where it should be done.

- **Information and Data Collection.** Liberian government institutions are also facing shortages of scientific information pertaining to environmental management. Availability of tabular and spatial environmental data has been compromised as a result of the civil war. Data that does exist is typically in an analog or paper format which limits external investigator access.

- **Law Enforcement.** Although the EPA Act and the EPM Law authorize the creation of many regulations, rules, standards and guidelines, and provide for penalties for violation, EPA has not officially promulgated any of these regulations, rules, standards and guidelines, so enforcement is not possible. The absence of a law enforcement division within the FDA also appears to hamper enforcement efforts.

- **Overlapping Mandates.** Although there are many examples of overlapping institutional mandates, the situation between EPA and FDA is perhaps the most relevant. The Environment Protection and
Management Law contain some provisions which appear to be in conflict with the Forestry Law, which gives FDA primary authority for management of forests and protected areas.

- **Coordination across Government Institutions.** Competing land uses being considered by different government agencies for land proposed as protected areas, and the absence of a common land use policy between the Forestry Development Authority, the Ministry of Lands Mines and Energy and the Ministry of Agriculture is posing serious problems in promoting improved environmental management.

- **Coordination between NGOs and Government.** Several agencies noted that although the Ministry of Planning issues certificates of accreditation to qualifying NGOs, these NGOs fail to cooperate with the line agencies after they receive their accreditation, including restricted access to these groups’ reports or recommendations.

- **Donor Coordination.** Improved donor coordination in the environment/natural resource sector is becoming increasingly important in Liberia in light of the increased volume of aid, proliferation of projects, and the administrative weaknesses of the GOL noted above. The absence of an environment/natural resource project database hinders collaboration.

- **FDA Internal Collaboration.** Whether a result of the policy or a result of management, the three C’s at FDA—commercial, conservation and community - have essentially been compartmentalized, with little collaboration between departments. In the field, however, the lines between the responsibilities of these departments become rather blurred.

- **Financial Support.** Government institutions currently receive their core funding from a range of sources, including the Government of Liberia itself, bilateral and multi lateral donors – mainly “projectized,” and certification fees from local NGOs. Revenue for some forest management activities is also generated through the imposition of stumpage, land rental, and Forest Product fees (Section 14.2(b)), a portion of which is allocated for operational costs of the Protected Forest Areas Network. Although GOL contributions should increase as logging, mining and other concessions are granted, it is unclear whether FDA and EPA core budgets will increase proportionally relative to their mandates, and there are currently no alternative finance mechanisms that would help fill Government budgetary shortfalls in the environment sector.

**UNDERLYING CAUSES OF ENVIRONMENTAL DEGRADATION**

Drawing on the threats, policy and institutional analyses, nine key underlying causes to environmental degradation were identified including:

- **Lack of Alternative Financing.** The lack of direct financial support is a major cause of most of the institutional limitations identified, and a major underlying cause of threats to the environment. Although GOL contributions are expected to increase as logging and other concessions come on line, the absence of alternative funding sources—particularly for the implementation of field activities—will curtail the ability of Liberian government agencies to implement their mandates with respect to environmental and natural resource protection and management over the longer term.

- **Lack of Capacity.** Practically everyone interviewed by the ETOA Team—expatriate and Liberian alike—cited lack of capacity as the major underlying cause of environmental degradation. Yet there are very few donor activities that incorporate a formal capacity building component; most provide only some combination of on the job training and study visits.
• **Weak Law Enforcement.** One of the key challenges facing environmental protection and management is the lack of enforcement of the existing laws. There are several reasons for this. First, Liberia’s civil conflict, and the resulting shortages in staffing, supplies, and equipment have limited the ability of most GOL agencies to actively implement law enforcement operations. Second, given the post conflict situation and new mandates, there seems to be a certain hesitancy among environmental agencies to enforce laws given current socio-political and economic interests and concerns. In addition to these issues, there are three major contributing factors to the weak law enforcement problem: i) policies and Legislation are far removed from the realities that they are trying to influence; ii) low community awareness of policies and legislation; and iii) the absence of a law enforcement division within the FDA.

• **Lack of a Holistic Approach to Environment/Natural Resource Management.** There is little appreciation of the economic value of non-timber forest products (NTFP) (including bushmeat)—either by the communities or by the FDA. In most instances, FDA focuses on curtailing negative practices with regard to hunting and the bush meat trade rather than on positive economic ventures that could be properly regulated. In general, forest communities view commercial logging as the sole indicator of economic value or activity in the forest sector and feel that to derive economic benefit from the sector they need to be involved in commercial logging.

• **Barriers to Alternative Livelihoods.** Although there are few alternative livelihood programs in Liberia, the ones that do exist have had very limited success; the livelihood options presented to communities by these program cannot compete with incomes gained from illegal logging, the bushmeat trade or diamond and gold mining in the parks and forest reserves. A major part of the reason for this is that the livelihoods offered are not based on any value chain analysis.

• **Insecure Land and Resource Tenure.** Poverty, land, and the environment are inextricably linked. Unequal access to and ownership of land and other resources have contributed significantly to economic and political inequities and environmental degradation throughout Liberia’s history, and have exacerbated tensions and conflict. The existing systems of land acquisition favor the wealthy and the elite. Women in particular have had limited land and resource rights.

• **Absence of a Strategy to Address the Compromises between Environment and Economic Development.** Although Liberia’s Poverty Reduction Strategy (PRS), addresses environmental concerns the “exploitation of Liberia’s abundant natural resources” is the major driver of poverty alleviation. Without a strategy that specifically addresses tradeoffs between the environment and economic development, there is concern that economic development—in the form of mining and agro-industrial concessions will continue to take precedence over the environment as they have done in the past.

• **Absence of Any Land Use Planning.** In Liberia, urban land-use planning and zoning regulations at the national or county level are virtually non-existent, and the PRS only makes passing reference to both urban and rural planning. As a result, landfills for human habitat have destroyed hundreds of hectares of mangroves, while increased beach erosion due to unregulated and unplanned beach mining is destroying both animal and human habitat. At the rural level, there are numerous conflicting land use issues—agro-industrial plantations, mining concessions, absence of information on deeded lands, tribal lands, and any other preexisting land encumbrances, locations of mineral deposits and occurrences, and relevance of boundaries for parks, national forests and concessions. Without any national level land use
plan to guide resolution of these conflicts, sustainable economic development in Liberia could be hampered.

**APPROACHES AND INTERVENTIONS**

Given that Liberia’s civil conflict ended in 2003, the country does not have a long track record of approaches and interventions in environment and natural resource management. As many of these programs are now transitioning from post conflict to development, there are certain interventions that are worth noting, particularly in the context of future programming.

- **Donor-government coalitions—the Liberia Forest Initiative.** LFI has been instrumental in developing Liberia’s forestry sector and has had many notable accomplishments, the most important of which was the work leading to the lifting of U.N. Security Council timber sanctions on June 20, 2006. This model could be replicated to address the bushmeat trade.

- **Small Grants Funds for Biodiversity.** Conservation International’s Liberia Conservation Action Fund (LCAF) enabled Liberian NGOs to apply for grants, the implementation of which not only helped build their capacity to address the most pressing threats to the country’s biodiversity, but laid the groundwork for more development oriented conservation programs in the future.

- **Farmer Field Schools.** Farmer Field Schools (FFS), when operating in the buffer zones of protected areas and focusing on the value chains of high value agricultural commodities have the potential for providing significant alternative incomes to communities living in these buffer zones.

- **Save My Future Foundation’s (SAMFU) Marine Sea Turtle Program.** SAMFU claims to have stopped the hunting of sea turtles in two communities near the mouth of the Cess River. Apparently, they made a deal with the communities, so that SAMFU/USFWS would provide fishing nets and outboard motors to the fishermen, in exchange for beach protection. If true, this would be a big breakthrough for beach conservation in Liberia, since sea turtles are in serious trouble throughout their breeding ranges. This would be an important approach to replicate at Lake Piso and other coastal sites.

- **Mediation in Protected Area Boundary Demarcation.** The Land Rights and Community Forestry’s Program’s (LRCFP) participatory approach of serving as a mediator between FDA and communities in boundary demarcation could prove to be a successful model that could be applied to other protected areas.

**ENVIRONMENTAL INDICATORS AND MONITORING**

A series of environmental indicators—based on pressure, state (or condition) and response - are proposed for land, biodiversity, water and air. The design and setting up of a national environmental monitoring system for these indicators will demand considerable time, effort, and resource investment given the absence of baselines, laboratories and field facilities. In the short term, the assessment team suggests that EPA consider: i) establishing the data storage and management system into which it can input the data it should start receiving from projects and activities (and eventually data from an ambient monitoring program); ii) Establishing its own laboratory and the certification program for private laboratories; and iii) working with FDA to use GIS and periodically updated satellite imagery to monitor core land use indicators.
KEY LINKS BETWEEN ECONOMIC GROWTH, HEALTH AND GOVERNANCE ACTIVITIES AND THE ENVIRONMENT

This section examines how economic growth, health and governance activities and environmental threats and opportunities can work synergistically to provide for sustainable economic growth and a healthy environment. Programs such as alternative protein, shade grown coffee and cocoa, democracy and governance and non-timber forest products can reduce threats, provide viable alternative incomes, increase household well being as well as provide for the active participation of women.

PART 2: ACTIONS NECESSARY AND PLANNED TO CONSERVE TROPICAL FORESTS AND BIODIVERSITY

Section 2 of the ETOA report provides information and analysis required by the U.S. Congress, and stipulated in the U.S. Foreign Assistance Act (FAA) of 1961. Sections 118 and 119 of the FAA require USAID Missions to examine issues of tropical forests and biodiversity conservation when preparing strategies for development assistance.

An overview of tropical forest and biodiversity conservation status in Liberia is provided including a description of Liberia’s protected area network (national parks, nature reserves, national forests and Ramsar sites), and a review of biodiversity status and protection at the species level, both inside and outside the protected area system.

THREATS

Drawing on the SOE analysis, major threats to Liberia’s tropical forests include Illegal and quasi-legal logging, shifting cultivation, industrial and artisanal mining, potential threats from agro-industrial plantation expansion and loss of mangrove forests due to over exploitation and landfills. Threats to biodiversity include the unregulated bushmeat trade, over exploitation of demersal fish species, over exploitation of other marine species, over exploitation of inland fish species and competition from Alien Invasive Species (AIS).

POLICY AND INSTITUTIONAL FRAMEWORK

Drawing on the SOE analysis, the capacity of Government of Liberia institutions to address threats was reviewed. From a policy perspective, the ETOA team finds that the policy and legislative framework for managing and protecting forests and biodiversity is overly comprehensive, complicated and detailed to facilitate implementation. Additionally, there are several outstanding policy issues which need to be addressed including land tenure, bushmeat policy and legislation, compensation for communities living around protected areas, outstanding commercial forestry issues—particularly permitting processes for competing land uses, and carbon financing. Additionally, the lack of implementing regulations for the 2003 Environment Protection and Management Law has rendered this law largely inoperative.

The activities of Liberia’s government institutions to manage and conserve forests and biodiversity are constrained by a number of factors including dependence on foreign expertise and resources, a decimated infrastructure and weak administration, lack of qualified staff, shortage of information for decision making, overlapping mandates, weak law enforcement and poor coordination between government organizations, donors and nongovernmental organizations, and lack of direct financial support.

STRATEGIC OPTIONS FOR ADDRESSING THREATS

Drawing on the threats, policy and institutional analyses, strategic options for the Government of Liberia and donors to address the underlying threats to biodiversity, forests and ecosystems include:
• Developing alternative financing mechanisms including the EPA’s National Environmental Fund, providing support to Conservation International’s efforts to establish a protected areas trust fund, exploring the use of biodiversity offsets and developing a monetized PL 480 program to support conservation activities both inside and outside the protected area network;

• Focusing short term, capacity building assistance on law enforcement, including the establishing and building the capacity of both the Environmental Administrative Court and the Environmental Court of Appeals, and assistance in creating a separate law enforcement division within FDA;

• Increasing community awareness of the new integrated forest policy and legislation through high level environmental education and awareness campaigns combined with a better integration of environmental issues into democracy and governance programs;

• Adopting an adaptive approach to policy development that considers policies and legislation as 'social experiments' that take into account the underlying uncertainty and the necessity of trial and error in order to learn;

• Managing Liberia’s forests based on their holistic value, including the value of non-timber forest products and ecosystem services;

• Promoting the concept of equal compensation for equal loss for communities living around strictly protected areas;

• Moving quickly to resolve land and resource tenure insecurity;

• Developing a strategy to address the compromises between environment and economic development by supporting UNDP-UNEP’s Poverty and Environment Initiative; and

• Laying the groundwork for improved urban and rural land use planning by completing the second phase of the U.S. Forest Service’s land use assessment under the Liberian Forestry Initiative.

CAPACITY OF USAID TO ADDRESS THREATS WITHIN ITS EXISTING PORTFOLIO
The assessment team reviewed a cross section of current USAID activities mainly under Economic Growth (Agriculture, Energy, and Infrastructure) and assessed their impact on and existing and potential capacity to address threats to tropical forests and biodiversity. Although USAID’s existing portfolio is adequately addressing threats, there are several areas where there are opportunities for further conservation activities. These include:

Liberia Forest Initiative (LFI)
LFI is the Mission’s flagship program in terms of tropical forest conservation. As USAID begins reformulating LFI’s role for the future, the following represent opportunities for LFI to further contribute to tropical forest and biodiversity conservation and management:

• Work with FDA to promote better integration of the 3Cs—commercial, community and conservation;

• Provide short-term technical assistance (STTA) to help create a separate FDA law enforcement division;

• Provide STTA to conduct a strategic assessment of capacity gaps within the lead environmental agencies to specifically identify what type of capacity building needs to take place and where it should be done;
• Provide STTA to assist the FDA to meet CITES requirements by strengthening its species trade legislation in a number of areas, including exports, imports, and other permitting authorities;

• Complete the second phase of the U.S Department of Agriculture Forest Service’s (USDA FS) Geographic Information Systems (GIS) assessment; and

• Reinvigorate its donor coordination role for environment, forest and biodiversity programs, and specifically, work with EPA to develop an environment/natural resource project database.

Land Rights and Community Forestry Program (LRCFP)
USAID should consider exercising LRCFP’s third year option as soon as possible. Additionally, the Mission could consider modifying LRCFP to include the following:

• A country-wide biodiversity grants program;

• A study on the value of NTFPs in Liberia’s economy;

• Provide for additional study visits to successful community forestry programs where collaborative (community) forest management has become the preferred method of managing forest and biodiversity resources.

Sustainable Tree Crops Program (STCP)
Although STCP operates in areas close to protected areas, the links between STCP and reducing threats—particularly in terms of providing alternative incomes—is not readily apparent. USAID should consider strengthening STCP to increase their conservation links though more public awareness and an eventual assessment of the relationship between increased household income from cocoa and threat reduction.

Environmental Threats and Opportunities Assessment (ETOA)
USAID could consider expanding support to the ETOA program to provide short term technical assistance to the EPA to:

• Establish a data storage and management system;

• Develop clear EIA guidelines for specific sectors, particularly mining, forestry logging; concessions and road construction; and

• Facilitate a priority setting exercise for implementation of the EPML.

Liberia Community Infrastructure Program (LCIP)
LCIP could explore the possibilities of Global Development Alliance partnerships with the South African backers of the luxury tented camp in Robertsport and the developer of the ecolodge at Marshall Wetlands to support ecotourism development and sustainable use of natural resources in these areas. LCIP could also strengthen the conservation links between its coffee, cocoa and aquaculture programs and protected areas through awareness campaigns.

Community Land Use Planning
Programs such as LCIP and the Liberia Integrated Agriculture Program (LIAP) could accord more attention to land use planning at the community level to conserve forest areas and promote sustainable management. By examining how their activities fit within the overall community “landscape,” and the relationship between project activities and other community activities, LIAP and LCIP could begin to lay the groundwork for improved land use planning at the community level.

xxx LIBERIA ENVIRONMENTAL THREATS AND OPPORTUNITIES ASSESSMENT (ETOA)
Integration of Environment into USAID/Liberia Activities

In order to better integrate environmental issues into the Mission’s activities, the assessment team suggests that the Mission adopt a more systematic approach to Reg. 216 requirements. As the Economic Growth Office’s new strategy takes shape, USAID could develop an overall “economic growth” Initial Environmental Exanimation (IEE), including a Pesticide Evaluation Report and Safer Use Action Plan (PERSUAP). Instead of using IEEs at the project level, implementing partners could adapt USAID’s “Supplemental Environmental Review Forms” for agriculture, forestry and other activities to develop an internal environmental screening form for all project activities to ensure that potentially negative impacts are foreseen and plans are developed for their mitigation. Based on the screening form, partners would be required to produce an Environmental Review Report for each activity.

USAID should also take advantage of the Environmentally Sound Design and Management Capacity-Building for Partners and Programs in Africa (ENCAP) training programs for Mission Staff, implementing partners and GOL counterpart staff.

Opportunities for Partnerships

There appears to be potential for conservation partnerships in Liberia from the agro industrial crops sector (rubber and oil palm), the mining sector (BHP Billiton and ArcelorMittal), ecotourism (Lake Piso and Marshall Wetlands) and coffee and cocoa buyers. BHP Billiton (now including Rio Tinto) represents a good opportunity as they have previous experience in such partnerships with USAID in Guinea Conakry.

Potential for Carbon and Climate Projects

Liberia, like many countries is jumping on the Reduced Emissions from Degradation and Deforestation (REDD) bandwagon. There are no less than three REDD initiatives currently being developed (IUCN, FFI and CI), and USAID/Liberia has recently engaged the CIFOR/ICRAF Forests and Climate Project to help the Mission address issues of climate change within the forest sector. Based on an analysis of existing experience with regulatory, fund and market-based forest management in Liberia, the assessment team’s findings indicate that significant investments will have to be made in Liberia for REDD to work, and that USAID and Government efforts should instead focus on developing a formal carbon financing policy which would lay the groundwork for future REDD activities.

Opportunities for Program Development and Recommendations

The assessment team has formulated a set of “opportunities” for future program actions that the GOL and donors may wish to consider for improving their contribution to environmental management in Liberia. The recommendations are short to medium term in nature and could help lay the foundation for a more cohesive approach to environmental management and future long term investments.

Policy and Planning Opportunities

- **Consider Policy and Legislation As Social Experiments.** Given the complicated and complex nature of current and draft environment-related polices and legislation combined with the fact predicting the future is difficult in terms of policy implementation, the assessment team suggests that a more helpful way for the GOL to view environmental policy development is to approach policies and legislation as ‘social experiments’ that take into account the underlying uncertainty and the necessity of trial and error in order to learn.

- **Manage Liberia’s Forests Based on Their Holistic Value.** Government and donors should accord more attention to the total economic value of the forest—including NTFPs and ecosystems services, rather than just the forests’ timber value. Such a holistic approach would also help integrate FDA’s 3Cs.
• *Develop Bushmeat Policy And Legislation.* There is a need to address possible discrepancies between the 2006 Forestry Reform Law, and the January 2008 Liberia Protected Areas Network Strategic Plan, including development of a framework for wildlife management in protected and non-protected production forests.

• *Provide Support for Development of A Policy On Carbon Financing Mechanisms.* Based on an analysis of existing experience with regulatory, fund and market-based forest management in Liberia, the assessment team’s findings indicate that significant investments will have to be made in Liberia for carbon financing mechanisms to work. The first step would be the development of a formal policy on the role that Liberia’s forests could or should play in accessing potential funding under various carbon financing mechanisms. Formulation of such a policy should be the first priority before trying to access REDD and other mechanisms.

• *Create and Support A Separate Law Enforcement Division within FDA.* A separate law enforcement division complete with separate field enforcement personnel reporting directly to the division director would bring the FDA in line with the majority of other African conservation/forestry organizations while eliminating the confusing dual role of a conservation ranger who is responsible for both enforcement and community/conservation activities.

• *Develop a Strategy to Address the Compromises Between Environment and Economic Development.* As noted above, Liberia’s Poverty Reduction Strategy (PRS), does not specifically address tradeoffs between the environment and economic development. Without such a strategy, economic development could take precedence over the environment and jeopardize economic growth in the long term. In this context, active GOL and donor support for UNDP-UNEP’s Poverty and Environment Initiative is critical.

• *Integrate Environment/Natural Resources Awareness Into Local Democracy and Governance Initiatives.* Democracy and governance activities can be used as a forum for increasing awareness of both environment/natural resource issues and policy. Such efforts would enhance the level of active and positive community participation required to build effective environment/natural resource programs.

• *Develop a Policy On Equal Compensation for Equal Loss.* Government should ensure that communities that live around strictly protected areas receive the same level of compensation as communities living around timber concessions.

• *Develop a National Land Use Plan.* The use and development of land affects Liberia’s economy, environment, and quality of life in increasingly complex ways involving public and private interests. A National Land Use Plans (NLUP) – developed in collaboration with all stakeholders, would help the GOL set out a physical planning framework with a perspective to the future.

• *Develop An Urban Land Use Policy And Zoning Regulations.* The GOL (the Monrovia City Council - MCC and EPA) should consider seeking assistance from the World Bank’s Emergency Infrastructure Supplemental Component and/or the Japan International Cooperation Agency (JICA) to develop an urban land use policy. JICA assistance may be particularly relevant as JICA is currently working with MCC to develop a Monrovia master plan for water provision and waste disposal. JICA support could be expanded to include a broader urban policy and planning mandate.
Livelihoods and Economic Growth

- **Develop alternative protein programs.** Food security in Liberia, besides being an end in itself, also has considerable implications for the bush meat trade, because of the great importance of bush meat in the national diet. The growing demand for protein will need to be met through other sources. The production of goats, sheep and pigs can be greatly increased in rural areas, while poultry and egg production and aquaculture programs can be increased in villages and around towns. Game farming of cane-rats, giant snails and semi domestication of Maxwell’s’ duiker should also also be investigated.

- **Develop an NTFP Support Program.** Evidence for the local importance of NTFPs and for the existence of a national trade is abundant. Government and donors should consider developing a separate NTFP support program which would include: i) a study on the value of NTFPs in Liberia’s economy; and ii) strengthening the value chains of those NTFPs with significant local, regional and international market potential. Such a program would have to be based on a stock assessment of select NTFPs to ensure that sustainable harvesting and management programs are developed for selected NTFP “commodities”.

- **Promote Environmentally-Friendly Tree Crops Such As Cocoa and Coffee.** In addition to being good alternative livelihood activities, shade grown coffee and cocoa are generally environmentally friendly. Grown under mainly secondary, older growth natural forests, they are recognized as bird friendly and provide a habitat for certain species such as Maxwell’s duiker.

- **Expand the Community Forestry Program.** Collaborative (community) management of forests and protected areas has been proven to significantly reduce threats to biodiversity and tropical forests. As the LRCFP and other community forestry programs begins to gain traction and experience, the GOL should review lessons learned from these programs, modify the community forest strategy as required and support the roll out of community forestry to the majority of Liberia’s other counties.

Improving Collaboration

- **Support an Abbreviated National Environmental Action Planning (NEAP) Process.** Coordination across government institutions in Liberia is a major obstacle to improved environmental management. Government should consider supporting a National Environmental Action Planning (NEAP) process in Liberia as a mechanism to better define, clarify and coordinate institutional mandates and promote policy and legislative harmonization.

- **FDA-Partner Quarterly Meetings.** FDA should consider holding quarterly partners meetings. These meetings would bring together all of the FDA’s conservation partners – particularly international and local NGOs and could serve as a mechanism to share information, successes, problems, lessons learned, etc., as well confront and address potential issues before they become real problems.

- **Donor Coordination.** EPA, with LFI support should take the donor coordination role for environment, forest and biodiversity programs. This would include the development of an environment/natural resource project database.

Alternative Financing

- **Develop Alternative Financing Mechanisms.** Government and donors should consider: i) operationalizing EPA’s National Environmental Fund; ii) developing a Conservation Trust Fund; and iii) obliging mining companies—via concession agreements—to provide for biodiversity offsets.
USAID/Liberia should consider developing a monetized PL 480 program to support community forestry and conservation initiatives

**Capacity Building**

- *Develop a Training Plan to Support Capacity Building across Liberia’s Lead Environmental Agencies.* The GOL and donors should consider contracting with a reputable training organization to conduct a capacity gap assessment and develop a training plan which would identify key areas for capacity building as well as the most appropriate institutions for conducting such training.

- *Provide Long Term Support to the University of Liberia’s College of Agriculture and Forestry.* Building capacity in the environment and natural resources sector in Liberia depends a great deal on the University of Liberia’s College of Agriculture and Forestry. Bringing the college up to a recognized standard of education will require longer term donor and GOL commitment, not only for infrastructure but for elements such as revising curricula, enhancing the quality of teaching, developing staff exchange programs, etc.

- *Support for the Environmental Protection Agency.* The EPA is the principal authority in Liberia for the management of the environment in Liberia but has received very little support from the donor community. EPA needs GOL and donor support in setting priorities for implementation of the EPML, as well as assistance in developing programs for the top priority issues. Assistance that will provide physical resources and strengthen the capacity of EPA personnel will be essential for EPA to successfully develop and implement programs for the top priority issues.

**Conservation Opportunities**

- *Support to the Worldwide Fund for Nature (WWF) to facilitate Liberia’s (BNF) participation in the Programme Régional de Conservation de la zone Côtière et Marine en Afrique de l’Ouest (PRCM), and eventually WWF’s West African Marine Ecoregion (WAMER) program. PRCM now represents a coalition of nearly 50 partner institutions with the aim of coordinating conservation action directed at the coastal zone of the subregion’s seaboard countries – Mauritania, Senegal, the Gambia, Guinea Bissau, Guinea, Sierra Leone and Cape Verde. BNF’s participation in this program would begin to help address some of the major issues the marine fisheries sector is currently facing while helping to reduce threats to Liberia’s marine resources.*

- *Provide Support to the Jane Goodall Institute.* The GOL and donors should consider supporting a proposal for JGI to work in Gola National Forest. JGI has a strong track record in primary school environmental education, working with communities on chimp conservation, developing sustainable chimp ecotourism activities that benefit both government agencies and local communities. Additionally, JGI has an excellent track record in helping government agencies in protected area development, and would JGI’s presence would both complement and support FDA and COPAN initiatives.

- *Support Transboundary Initiatives.* Although the World Bank-support COPAN project will promote cross border collaboration between Sierra Leone, Guinea and Liberia, most of this effort will focus on developing memoranda of understanding between the three countries and identification of priorities. As COPAN funds are extremely limited, donors may wish to consider collaborating with the World Bank on this initiative and/or funding priorities for the Gola/Lofa/Mano Complex. Additionally, as WWF has been active in the support of Taï National Park, the GOL and donors may want to explore with WWF the possibility of developing a cross border initiative between Liberia and the Ivory Coast.
• Develop a joint USAID-Peace Corps conservation program. USAID should consider supporting Peace Corps for a small program to assist FDA with the community forestry program. Such a program could perhaps be done in collaboration with LRCFP who could provide financial support to the program.

PART 3: ENVIRONMENTAL DATA COLLECTION, MONITORING AND ADAPTIVE MANAGEMENT PLAN

After years of civil conflict during which human capital was seriously compromised Liberia’s increasing capacity in geo-spatial sciences represents an important opportunity for environmental activity planning and monitoring programs. Key government agencies house small but active groups of geo-spatial technicians representing core talent that can conduct increasingly complex environmental analysis and monitoring in a sustainable fashion.

Leveraging Liberia’s human capital requires spatial and tabular data resources. Currently Liberia’s environmental analysis and monitoring is hindered by the lack of reliable datasets, particularly digital maps and associated information. Digital map datasets (spatial data) required for monitoring, analysis and planning are outdated and not properly documented. There are significant spatial data gaps in recent spatial land resources inventories and land ownership reports. Gaps in Liberia’s community land records constrain the Government’s ability to support a decentralized approach to sustainable community-based asset planning including shared natural resources such as woodlots, water resources, grazing lands and other environmental opportunities. Participants in a workshop organized by ETOA in June 2008 identified the lack of land ownership records as an underlying risk to natural resources. The adage “if I own it then I will protect it” is relevant to protecting Liberia’s rich natural resource base. Participatory perimeter mapping surveys were identified as a necessary approach for discerning customary or historical community boundaries. A coordinated community-based planning effort with local land management officials can fosters user rights to land resources and ultimately informing new Liberian land ownership legislation.

There are several ongoing initiatives that support Liberia’s monitoring and adaptive management use of data and information. The ETOA Team inventoried these initiatives and relevant datasets and traveled to important ecological sites to make observations relating to environmental opportunities and threats. Observations were linked to geo-referenced photographs that provide a historical record of the site condition and could be used to compare maps and existing imagery with reality on the ground. This type of “ground truthing” can support the development of land cover datasets that describe and quantify important protected areas.

Various Liberian agencies have trained personnel that can use spatial datasets for environmental analysis, and some have the appropriate infrastructure to manage large spatial datasets. The increasing need for digital maps to support planning and analysis coupled with a lack of coordination between agencies has led to replication of datasets and confusion over data quality and administrative units. Key Liberian geo-spatial technical specialists view the lack of a coordinated approach to spatial data management as a significant impediment for planning and monitoring development initiatives.

Based on discussion with the Liberian geospatial community representatives, the ETOA Team has identified the need for a national spatial data infrastructure (LSDI). A proposed LSDI would comprise of policies, standards and resources and will provide a platform for inter and intra-agency collaboration. Cross-sector decisions rely on spatial and tabular data those that are vetted and validated by a Liberian
geospatial institution assuring that all agencies are using consistent information. A LSDI envisioned by the expert Liberian geospatial community can provide the underpinnings of a critical Liberian environmental risk and opportunities decision support system. Inherent transparency associated with accurate map graphics fosters the emerging Liberian democratic institutions through informing all segments of society.
BACKGROUND

USAID Operating Units are responsible for ensuring that country-level analyses are current. This includes the mandated tropical forestry and biodiversity (FAA118-119) reports. As USAID/Liberia’s strategy transitions from emergency relief to development, many new activities are being added to its portfolio. USAID/Liberia’s Office of Economic Growth, which encompasses natural resource management and biodiversity activities, is crafting a new strategy to reflect the changing times. Other donors are ramping up efforts and there is a growth in private investment. Pressures on Liberia’s forests, biodiversity, natural resources and ecosystems are increasing. At the same time there are growing opportunities for USAID to collaborate with other donors, non-governmental organizations (NGOs), government agencies that are acquiring new mandates and competencies, and the private sector. These factors led the Mission to decide that an Environmental Threats and Opportunities Assessment (ETOA) was warranted.

An ETOA goes beyond, yet incorporates, a 118-119 analysis. An ETOA describes the range of environmental impacts from human activities across the spectrum of sectors: green (forests, agricultural systems), brown (urban, industrial systems) and blue (marine and freshwater systems). Ecosystems such as coastal zones and wetlands intersect with more than one sector. Rural processing and other transformation of agricultural products can involve both green and brown sectors, as well as the blue sector if water is involved in processing. Liberia’s ETOA focuses mainly on green and blue sectors as there is not yet much urban or rural industry. However, getting a better understanding of the potential for pollution and degradation from increased processing, manufacturing, infrastructure, mining, forestry and other industries factors into this ETOA.

Finally, an ETOA also facilitates donor collaboration as it helps USAID understand its comparative advantage vis-à-vis other donors and partners. It also points to priorities for environmental impact analyses of both existing and planned USAID-funded programs. Finally and most critically, the ETOA is a vehicle for cooperation with and capacity building of Liberian institutions, mainly the Environmental Protection Agency (EPA) and the Forest Development Authority (FDA) but also significantly involves other ministries and NGOs working in the country.

In this context, the report which follows is divided into three sections; a State of the Environment Report, Actions Necessary and Planned to Conserve Tropical Forests and Biodiversity (Tropical Forests and Biodiversity Report - Foreign Assistance Act Sections 118/119), and an Environmental Data Collection, Monitoring and Adaptive management plan.

The State of the Environment (SOE) Report identifies threats to terrestrial, coastal/marine and freshwater ecosystems and examines the potential effects of climate change on these ecosystems. It also assesses environmental and natural resource hazards and degradation in urban and rural areas. The SOE includes an analysis of policy and institutional issues impacting the environment, natural resources and ecosystems. Drawing on these assessments, the SOE identifies the underlying causes of environmental degradation and analyses approaches and interventions used by all institutions (e.g., NGOs, government, private sector) to address these causes, and the results obtained with particular emphasis on enabling conditions including the legal and regulatory environment. The SOE concludes with an analysis of opportunities and constraints associated with all environmental elements, recommendations for indicators
of environmental damage/health and potential monitoring systems, and a brief analysis of key links between economic growth, health and governance activities and environmental threats and opportunities.

The Actions Necessary and Planned to Conserve Tropical Forests and Biodiversity Report was prepared to provide information and analysis required by the U.S. Congress, and stipulated in the U.S. Foreign Assistance Act (FAA) of 1961. Sections 118 and 119 of the FAA require USAID Missions to examine issues of tropical forests and biodiversity conservation when preparing strategies for development assistance. Specifically, this assessment is designed to take into consideration the FAA provisions related to:

- FAA Sec 118 (e), “Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of the actions necessary in that country to achieve conservation and sustainable management of tropical forests, and the extent to which the actions proposed for support by the Agency meet the needs thus identified;” and
- FAA Sec 119 (d), “Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of the actions necessary in that country to conserve biological diversity, and the extent to which the actions proposed for support by the Agency meet the needs thus identified.”

USAID/Liberia’s most recent 118/119 analysis (Russell and Sieber 2005) was written at a time when it was not possible for the team to venture into the Liberian countryside and the Mission’s activities were focused largely on humanitarian assistance. This report along with other literature addressing forestry, biodiversity and other environmental concerns, has been used as a basis for updating this 118/119 assessment. The updated report seeks to provide a more comprehensive assessment to inform the USAID/Liberia’s strategic planning, program development, and implementation.

The 118/119 report includes an overview of the status of biodiversity and tropical forest conservation, an analysis of major threats to biodiversity conservation and tropical forests, and an analysis of the capacity of Government of Liberia (GOL) institutions to address threats, including an overview of the policy and legislative framework. The report also examines the capacity of USAID to address threats within its existing portfolio, reviews the current donor community framework and provides recommendations and strategic options for addressing underlying threats to biodiversity, forests and ecosystems. These recommendations could also be presented for consideration by other donors, depending on the funding levels and capacity of USAID/Liberia over the coming years. These recommendations are aimed at supporting environmental sustainability and conservation objectives in a manner consistent with the overall strategy of USAID and in ways that help to address the needs identified in this assessment.

The Environmental Data Collection, Monitoring and Adaptive Management Plan Report geo-references key threats to biodiversity and forestry in Liberia as well as environmentally sensitive areas, areas of environmental degradation and areas of significant biodiversity. The report also identifies environmental spatial data gaps, assesses the capacity of Liberian institutions to collect and manage data, analyses monitoring and adaptive management use of data and information by Government of Liberia, USAID and key partners, and provides recommendations for strengthening data collection and management.

Findings, conclusions and recommendations for all three reports are based on a series of interviews with key stakeholders, specialists, and program representatives in Liberia and in Washington, D.C., and four weeks of field work in Liberia including site visits to Sapo National Park, Lake Piso, East Nimba Nature
Reserve, Wologizi and Wonegizi National Forests, several agro industrial plantation sites and USAID implementing partner sites throughout the country. Preliminary ETOA findings, conclusions and recommendations were presented to stakeholders at a one day national workshop held in Monrovia on June 24, 2008. Suggestions from this workshop were incorporated into report drafts which were then circulated to key stakeholders for review and comment. A second, smaller workshop with key FDA and EPA stakeholders was held on August 12, 2008 to review and finalize these drafts.

Annex A provides a complete scope of work for the ETOA, Annex B presents the schedule of site visits undertaken, Annex C provides a list of contacts, Annex D provides a list of documents reviewed and referenced, Annex E provides an information matrix for each primary environmental element, Annex F provides a complete list of World Conservation Union (IUCN) red list species for Liberia, and Annex G provides an inventory of spatial data available in Liberia.

Given their file sizes, two additional annexes are provided as separate documents. These include:

- A GIS map based on a visualization tool showing location of key environmental threats and hazards and environmentally sensitive areas in relation to USAID/Liberia activities; and
- A series of high resolution high quality photographs of areas of environmental importance, environmental degradation, sensitive areas and other areas and subjects of interest to USAID and partners.

This report was prepared from June to August 2008 by a seven-person team combining experience in tropical forestry, biodiversity conservation, natural resource management, environmental policy and management, and Geographic Information Systems (GIS) and landscape analysis. Dr. Jim Seyler acted as ETOA team leader and is a forestry/natural resource specialist with over 25 years of experience providing technical and management expertise on forestry and natural resources activities and assessments in Africa, Asia and Eastern Europe. Dr. Duncan Thomas, the ETOA’s biodiversity specialist, has 30 years of experience in tropical biodiversity program management including recent environmental assessment expertise in the Democratic Republic of Congo, Gabon, Chad, and Cameroon. The team’s Environmental Management Specialist, Lane Krahl, has served as team leader on numerous USAID-funded environmental assessments and has extensive experience analyzing the legal and regulatory aspects of environmental management. Robert Bouvier, the team’s Mapping and GIS Specialist, is a geographical information system (GIS) expert and has participated on dozens of field-based spatial mapping assignments, including community mapping and training activities in South Africa, Malawi, Mozambique, and Uganda. Erin Goodnough, the team’s GIS/Geographic Positioning System (GPS) analyst is specialized in data base development and management. Finally, Varney Conneh, Head of the Environmental Impact Assessment Unit at Liberia’s Environmental Protection Agency (EPA), and James Kpadehyea, Liberia’s Forestry Development Authority’s Environmental Impact Assessment Specialist, provided both technical input and guidance on a wide variety of issues, and served as a critical local “reality check” for many of the ETOA’s recommendations.
PART 1: STATE OF THE ENVIRONMENT
SECTION 1: THREATS TO ECOSYSTEMS, INCLUDING TERRESTRIAL, COASTAL, WETLANDS AND MARINE AREAS

1.0 FOREST ECOSYSTEMS

Liberia is situated in the fragmented band of forest known as the ‘Upper Guinean Forest’. It is one of the two most significant forest blocks in Africa, the other being the ‘Congolese Forest’. The Upper Guinean Forest extends from Guinea at the North-Western extreme, down through Sierra Leone, Liberia, and the Ivory Coast and reaching Cameroon at its most Easterly extent. Liberia accounts for more than half of West Africa’s remaining Upper Guinean tropical forest, and in December 1999, The West African Conservation Priority-Setting Exercise for the Upper Guinean Ecosystem identified Liberia as the “heart of the hotspot”—critical to successful conservation in the region, and in need of immediate conservation action.

The total Liberian land area is 9.59 million hectares, of which forests cover about 4.39 million hectares equivalent to 45 percent of the land area, including 2.42 million hectares classified as closed dense forest, 1.02 million ha classified as open dense forest, and .95 million ha classified as agriculture degraded forest.

The climax vegetation over most of Liberia is forest, and forests cover about 45% (4.39M ha) of Liberia’s total land area and include 2.42M ha classified as closed dense forest, 1.02M ha classified as open dense forest, and .95 M ha classified as agriculture degraded forest. Other vegetation types result from human degradation of forest and from local soil or hydrological conditions that prevent forest growth. There are three general types of forest, the evergreen or mixed evergreen/semi deciduous moist forests of western Liberia where there is a distinct dry season (under 100mm rain/month), and the wet evergreen forests of eastern Liberia where the dry season is very short or absent. The highest hills in Liberia support the third forest type, submontane (or montane) forest above about 800-1000m, though this zone is of limited extent and poorly-differentiated from the contiguous lowland forests. There are however, some notable endemic species, making this zone important for conservation. An extensive zone of degraded forest occurs near the coast and extends inland in central Liberia, separating the moist and wet forest blocks. The degraded forest is mostly managed for shifting cultivation, and typically shows a mosaic of fields with scrubby and forested fallows. More intensively farmed areas in this zone have plantations with little natural vegetation at all. Finally, there is a coastal zone, often heavily impacted by settlements and agriculture, with a mosaic of sandy and rocky shores, mangroves and fresh-water swamps, grass/shrub savannas on sand, and coastal forests. Figure 1 depicts Liberia’s forest and land cover based on 2003 satellite imagery.
FIGURE 1: DEPICTS LIBERIA’S FOREST AND LAND COVER BASED ON 2003 SATELLITE IMAGERY
During Liberia’s period of civil conflict forest resources were mismanaged and revenue generated from the sector was misappropriated. As a result, the United Nations Security Council imposed sanctions on Liberia’s timber exports in 2003. Liberia then instituted sweeping reforms of the sector during the National Transitional Government of Liberia and the current administration of President Ellen Johnson-Sirleaf. The current government consolidated these reforms by adopting a new National Forest Policy and passing the National Forest Reform Law in 2006. These reform efforts eventually led to the lifting of sanctions in 2006 and created the enabling conditions for the Forestry Development Authority (FDA) to improve forest management. Nevertheless, owing to the civil conflict combined with uncontrolled logging, expansion of land used for agriculture, mining and other threats, Liberia’s forest area has decreased in recent years. The annual rate of deforestation is currently estimated to be approximately 12,000 hectares (0.3 percent), while the recorded planting of new forests since 1971 to date has amounted to approximately 11,000 hectares.

Liberia’s forests provide a wide range of benefits to the Liberian people and the international community. Forest areas provide habitat for globally important biodiversity and maintain ecological services (such as oxygen production and soil stabilization), enable harvesting of non-timber forest products that many local people depend upon for daily subsistence, and provide a significant input to the national budget through commercial forestry development. Natural products from plant and animal species (other than commercial timber) are an important part of Liberia’s domestic and subsistence economy, and are especially important to rural people. Fish and bush meat have the highest values, but in addition to these, many species, especially plants, provide food, medicine, construction materials and have cultural importance. The sustainable management of forests and wetlands and the development of sustainable harvesting methods are crucial to ensuring that these natural products continue to play an important role in future.

1.1 THREATS TO FOREST ECOSYSTEMS
Liberia’s forests are under threat from several different fronts.

1.1.1 ILLEGAL AND QUASI-LEGAL LOGGING
Currently, illegal commercial logging no longer poses a threat to Liberia’s forests. However the Government of Liberia’s (GOL) domestic timber supply policy appears to be a contributor to forest degradation. The GOL through FDA has decided that domestic timber production is necessary for the nation’s reconstruction effort, and that timber production should be quasi-legal in the interim period, pending the implementation of the 2006 Revised Forestry Law and the allocation of new timber concessions. The current timber production is artisanal and based on a production technique incorrectly termed pit-sawing. In fact, the timber is produced by chainsaw operators, not by hand saws operated in pits dug beneath the logs. Groups of timber harvesters with chainsaws operate in forests with easy road access, move the sawn planks to the roadside, where they are collected by trucks owned or rented by timber merchants. In one logging operation, some employees were former rebels, unable to obtain other employment. The team observed numerous trucks filled with sawn planks (in containers) along the Monrovia-Buchanan-Greenville road and observed numerous piles of...
lumber awaiting collection. There are also unconfirmed reports that containers headed for Monrovia and other destinations by boat from Greenville and Buchanan are off loaded to other ships and then illegally exported. Although the intention of this policy is that timber production should operate under permits and therefore have some Government oversight, there are numerous problems with the current system, including the following.

**Degradation of Forests**
The actual production of timber is unregulated at present, and is taking place in all National Forests usually close to roads where the loggers are able to operate. A joint FDA-UNMIL forest patrol program in September 2007 around National Forests in Bong, Nimba and Grand Bassa Counties found that a total of 39 chainsaws and 114 operators producing an average of about 400 planks per week. Such intense activity is undoubtedly contributing to forest degradation/habitat loss. It also decreases the value of future concessions.

**Loss of Revenue**
Although FDA has created a system where permits for timber production can be obtained, the system is very clumsy, results in lost revenue and possibly facilitates corruption. FDA is unable to accept payment for permits; this can only be done at the Ministry of Finance in Monrovia. Consequently, the trees are felled and pitsawn and transported roadside. During this operation, permits are obtained by the timber buyer in Monrovia, and the actual production along the roads remains illicit until the buyer returns with the permit. There are also unconfirmed reports that much of the timber moves without permits on arrangement between the buyer and regional FDA staff. The inability of FDA to receive fees remains a root cause of poor forest management and will lead to future problems. One obvious example is the local harvest of trees for timber, since rural communities will continue to rely on planks produced locally by chainsaw for their construction needs.

**Loss of Volume**
Chainsaws are less efficient at converting logs into planks, producing less wood and more sawdust. This is an inevitable consequence of meeting the short term need for timber from local sources, and will hopefully be resolved in future as sawmills come into operation. Several artisanal timber production operations were observed, and the operators were very skilled in chainsaw use, minimizing waste.

### 1.1.2 SHIFTING CULTIVATION

The natural climax vegetation over most of Liberia is forest, and more than half of this forest is now degraded through human activities, including urban and rural development. Much of the degraded forest, especially in central Liberia and near the coast, is managed by rural communities for shifting cultivation.

Shifting cultivation is poorly understood despite its widespread use in the lowland tropics. It is basically a rotation agroforestry system, where one to several years of cultivation is followed by fallow, during which scrub or secondary forests develop. In a traditional shifting cultivation system, only a small percentage of a village’s agriculture lands are in cultivation in any given year, sometimes less than 10%. The non-cultivated lands support scrub and forest, and supply a diversity...
of forest products, including bush meat, fuel wood, wild food plants, medicinal plants, and plants producing natural fibers and construction materials such as building poles, thatch, rattan and raffia. Passive cultivation of woody plants is also a feature of Liberian shifting cultivation. Oil palm is the most obvious example, but other tree and liana species are also protected by farmers when land is cleared for cultivation, because of their high economic value. Besides forest products, fallows provide two important services: they restore soil fertility and they eliminate weeds from crop lands.

Shifting cultivation has few inbuilt protections against intensifying land use, since in its traditional form shifting agriculture is regulated by economics alone, it is simply not practical to bring too much land into cultivation. Soil infertility and weed problems will increase, increasing the labor required to produce crops. Urban demand for food and increased crop values through easier market access tip the scale in favor of more intensive cultivation, with the reduction or elimination of fallows, and this process is occurring all across west/central Africa. It is therefore surprising that degradation of the traditional cultivation system is not very advanced in Liberia. This could result from the long conflict reducing the pressure of cultivation on forest lands. It could also result from upland rice, the preferred crop in Liberia, since upland rice requires high soil fertility and, if the fallow period is eliminated, rice cultivation requires the application of (unavailable) fertilizers. Other crops, especially cassava, are more tolerant of poor soil conditions and can produce reduced yields with little fallow.

The threat of deforestation posed by shifting cultivation is difficult to measure. Although some FDA personnel informed the team that there was some agricultural encroachment occurring in primary forests, the extent and location of such expansion was not confirmed. Attention tends to focus on the clearing of forest lands (whether secondary or primary), and this is especially noticeable for upland rice cultivation, where fields tend to be large and cleared by multiple families or commercial interests, often with some capital investment. In this context, there seems to be a trend towards more “mechanized” slash and burn using chainsaws which may impact regeneration in the future as the larger trees which provide a seed source for regeneration are now being cut. Increases in world rice prices may also drive upland rice expansion in Liberia. In general, however, Liberia’s low population density combined with the fact that only 6% of Liberia’s land is devoted to agriculture, means that shifting cultivation does not represent a current threat to forests if the lands are subsequently fallowed. Rather, the threat is the overall degradation of forest over time, best measured from successive satellite images.

The future of the shifting cultivation system depends on decisions made by hundreds of thousands of peasant farmers and their communities. Decisions based on western ideas of land ownership and on the marketing of cultivated crops will result in the ongoing deforestation of over half of Liberia’s forest zone, and the loss of forest products. The important question is how can the scale be tipped in favor of forest products, soil fertility and weed control to slow deforestation? It will be useful for forest conservation if some donor activity can focus on projects to provide farmers with opportunities to realize greater economic benefit from their forest lands. Areas where advances can be made include the ownership of forest resources, the management of hunting and the bush meat trade, improved marketing of forest products, the development of cottage industries based on forest products, and an appreciation of the role played by fallows in increased crop yields. In future, communities that decide to maintain forest cover through monitored management plans might also benefit from carbon trading. Projects to improve the value of community forest lands should be attractive to donors, since the scale is small and the potential for replication is very high.
1.1.3 THE BUSHMEAT TRADE

Liberia is unusual in the high importance of bush meat, and in the lack of alternative animal protein. Although fish is the main protein source, bush meat comes second, comprising about 75% of animal protein consumed. Its economic value is enormous, rivaling pre-war timber revenues, and the industry is effectively unregulated at present. Rough estimates for the cash value of Liberia’s annual bush meat harvest are $US 66 million (1991) and $78 million (2002), and it may comprise 4% or more of GNP. The task of regulating the bush meat trade is enormous, and although FDA has the mandate and legislative framework to do this, implementation is lacking.

Regulating the bush meat trade presents greater challenges than regulating the timber harvest, because of the very large numbers of people involved and the complex marketing chain. Compared to timber, bush meat has greater cross-societal employment, low entry costs, less gender bias, and good value retention for the hunters, and is very important for incomes and food security in Liberia’s poorest regions (Hoyt, 2008). Unfortunately, although bush meat appears to be as important economically as timber, it is the poor relation in terms of legislation and administration. The Commercial Department at FDA deals almost exclusively with timber, while the Wildlife Department is focused mostly on protected areas. Solving the bush meat crisis will depend in part in raising wildlife to the same importance as timber, both at FDA and in the national consciousness. The root causes of the bush meat crisis are the large national and probably international demand for Liberia’s bush meat, and the near-total lack of regulation of the industry by FDA, including poor protection of wildlife in protected areas.

Because of the adverse impacts of hunting on protected species and because the harvest is generally assumed to be unsustainable at current levels, Liberia has a bush meat crisis, and could lose an important source of animal protein, rural and urban livelihoods, and some of its protected species if the industry continues to be poorly-regulated. The bush meat trade is less affected by the problems that impact other industries, such as road conditions, fuel prices and the state of the economy, although road construction and rehabilitation has certainly facilitated shifting cultivation, illegal logging and access to animals. Commercial hunters reduce wildlife populations locally then move on to other areas including protected areas\(^1\). Local hunters then continue the decline by over-hunting and trapping, until

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\(^1\) FDA staff at East Nimba Nature Reserve report that this is the case for the Reserve. Commercial hunters supplied with shotgun shells from Monrovia merchants have decimated the Reserve’s animal population and then moved on to the southeast (Sennkwehn and Sapo).
only the commonest species remain. Major challenges in regulating the industry include the following:

- Elimination of illegal commercial hunting operations, especially in protected areas, wildlife law enforcement in protected areas;
- Creation and implementation of wildlife management plans for all categories of protected area;
- Governance issues at the village level, establishing ownership and management of wildlife;
- Regulation of the hunting and selling of bush meat through the FDA permit process, controlling the trade along roads, in markets and at borders;
- Reducing the demand for bush meat in cities and villages by creating alternative sources of animal protein;
- Create alternative incomes, especially in agriculture, to offset the loss of hunting income; and
- Education at all levels on the importance of Liberia’s protected species.

Cross-Border Issues
In a small country like Liberia, it is inevitable that some bush meat trade will take place across remote, porous borders. However, there is a question of whether or not Liberia is a major hub in the export of domestically harvested bush meat. The bush meat trade is secretive at these levels, and information is difficult to gather and interpret. However, the Concerned Environmentalists for the Enhancement of Biodiversity (CEEB) report concluded that a large amount of bush meat entering Monrovia was not consumed locally and was probably transshipped to other, probably international destinations. This finding should be independently confirmed. A large bush meat trade between southeast Liberia and Ivory Coast has also been reported, with a tendency towards domestic consumption now that internal road transportation is feasible. There are also reports of a trade in primate bush meat from Sierra Leone - where most people do not eat primates - to Liberia where primate bush meat is high-value. The need for bush meat protein within Liberia and the unsustainable harvesting make the export of the remaining stocks highly undesirable. The resolutions to the cross-border issues lie with increased regulation of the domestic bush meat trade by FDA along roads and in markets, and an enforced ban on the import and export of bush meat at the existing border control posts. Collaboration with conservation programs in neighboring countries can also be important in making the borders less porous. Elimination of the international bush meat trade needs to be a high priority for FDA and in theory should be fairly straightforward. However, the high value of the trade

The Monrovia Bushmeat Market
A 2004 report by the Concerned Environmentalists for the Enhancement of Biodiversity (CEEB) provides a window into bush meat marketing, and is worth describing here. CEEB reports a 10-month study of Monrovia’s bush meat markets, conducted between October 2003 and July 2004. Bushmeat ranks second to fish among protein food products in Monrovia. Bushmeat quantities and prices were recorded at 17 markets, for a total value of over $US 8 million. The annual total is likely to be close to $10 million. Gorbachev market was the largest, with 75 bush meat sellers, with Duala and Ralley Time next in size. Huge supplies of bush meat arrive in the capital daily from all over Liberia, and some of this is apparently transshipped to other destinations. The meat is brought in vehicles by middle men who buy from hunters. Of the restaurant owners interviewed, nearly 80% claimed to serve bush meat, citing flavor and customer preference rather than cost as the reason. Similarly, about 80% of Monrovia households interviewed claimed to use bush meat. Although the bush meat is composed mostly of Maxwell’s duiker and other common species, rare species are also present, confirming that the bush meat trade in Monrovia has an adverse impact on protected wildlife species. Control of the bush meat trade in markets is clearly desirable, maybe using a process akin to chain of custody for timber, to certify that the meat comes from a legal source and is not a protected species.
and the likely importance of the merchants operating it will render enforcement efforts ineffective unless they are well-focused, well-planned, and have sufficient resources and follow-up.

Community Control of the Bush Meat Trade
The importance of local communities in the management of forests is widely recognized. A community forestry law is being drafted and FDA has a Community Forestry Division to implement community forestry. Communities benefit in many ways from the exploitation of forest resources, and are often the only forest managers over large areas of unreserved forest where FDA has no effective presence.

Communities play a key role in wildlife management since many households are active in the bush meat trade, hunting, smoking meat and selling to traders. Communities may also allow non-resident commercial hunters to hunt in their forests. Bushmeat provides villagers with an important protein source, with income generation, and is also important in crop pest control. Bushmeat is also the villagers’ economic safety net, since it can be relied on to provide income during times of hardship. The 2006 Liberia Food Security Report lists 45% of households in Grand Gedeh county as involved in hunting/trapping, while in most communities around the Sapo National park, a quarter to half of the income comes from bush meat.

Hunting and trapping are effectively unregulated at present and it is important for both food security and for biodiversity protection that the harvest moves to sustainability. This objective is stated in the 2006 forestry law, and needs to be implemented. Sustainable hunting involves both governance and science, and a key requirement is that FDA officers and hunters work together in mutual trust to manage wildlife. FDA has little experience at this type of collaboration, and hunters have little experience at working as a group to control hunting. We heard that hunters groups exist in some communities, but we were not able to find and interview any. Creating model projects in community natural resources management will require foreign donors and implementing organizations, either through forest conservation or rural development.

1.1.4 MINING
Liberia is one the least explored and most highly prospective countries for minerals in the world. Liberia has economic concentrations of iron ore, diamonds, gold, and barite, and is highly prospective for platinum, palladium, nickel, manganese, and uranium. A recent offshore seismic study indicated the possibility of significant oil reserves.

The GOL expects mining activities to grow rapidly during the Poverty Reduction Strategy (PRS) period from near zero production in 2005/06 to 12 percent of GDP by 2010. Indeed the GOL is counting on such growth as a means of contributing significantly to employment, income generation and infrastructure development. The major contributor to this growth will be the resumption of the mining and exporting of iron ore. Iron ore was the mainstay of the Liberian economy between 1960 and 1980, contributing more than 60 percent of export earnings and about 25 percent of GDP.

The ArcelorMittal mining operations—located on the northern tip of West Nimba National Forest, are expected to initiate the revival of iron ore production when it makes its first projected shipment of 2-4 million tons in 2010. Production at other mines currently out for bid, such as the Western Cluster and Bong Mines, is expected to commence production in four to five years.

The current status of mining concessions is presented in Table 1 below.
TABLE 1: CURRENT STATUS OF IRON ORE MINING CONCESSIONS IN LIBERIA

<table>
<thead>
<tr>
<th>DEPOSIT</th>
<th>LOCATION</th>
<th>COMPANY</th>
<th>RESERVE (Million Tons)</th>
<th>ORE GRADE % Fe</th>
<th>TYPE OF ORE</th>
<th>CURRENT STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt. Nimba</td>
<td>32Km ENE of Monovia</td>
<td>LAMCO LIMINCO (1989-PRESENT)</td>
<td>417</td>
<td>63-69, 59.1, 52.2</td>
<td>Nimba - Hematite, Western Area - Magnetite</td>
<td>MD to METAL STEEL</td>
</tr>
<tr>
<td>Bomi Hills</td>
<td>80Km NW of Monovia</td>
<td>Liberian Mining Co. (LMC)</td>
<td>45</td>
<td>68</td>
<td>Magnetite</td>
<td>Exploration Permit to EHP</td>
</tr>
<tr>
<td>Mano River</td>
<td>Mano River Hills, Near Sierra Leone Border</td>
<td>National Iron Ore Co. (NICO)</td>
<td>136</td>
<td>51.4</td>
<td>Limonite</td>
<td>OPEN TO NEGOTIATION</td>
</tr>
<tr>
<td>Bong Mine</td>
<td>80Km NE of Monovia</td>
<td>DELUMCO Bong Mining Co (BMC)</td>
<td>290</td>
<td>35-45</td>
<td>Magnetite</td>
<td>OPEN TO NEGOTIATION</td>
</tr>
<tr>
<td>Putu Range</td>
<td>Grand Godah County, ENE of Monovia</td>
<td>BMC</td>
<td>455</td>
<td>45</td>
<td>Ilmenite</td>
<td>Exploration Permit to MAIRO</td>
</tr>
<tr>
<td>Bea Mt</td>
<td>Grand Cape Mount County</td>
<td>LMC</td>
<td>382</td>
<td>35-45</td>
<td>Magnetite, Hematite, Goethite</td>
<td>OPEN TO NEGOTIATION</td>
</tr>
<tr>
<td>Wologizi Range</td>
<td>Loma County</td>
<td>LIBCO</td>
<td>1000</td>
<td>35-40</td>
<td>Hematite</td>
<td>Exploration Permit to EHP</td>
</tr>
<tr>
<td>Goe Fantro</td>
<td>60Km NE Of Monovia</td>
<td>LAMCO (LIMINCO)</td>
<td>NA</td>
<td>35-40</td>
<td>Hematite</td>
<td>Exploration permit to EHP</td>
</tr>
</tbody>
</table>

Source: MLME data

Gold and diamond mining in Liberia consists largely of alluvial and small-scale operations. However, plans are also underway for development of a discovery of approximately 1.5 million ounces of gold by Mano River Resources in Grand Cape Mount County. This mine, which will be Liberia’s first mechanized gold mine, is expected to be established within two years.

Currently, there are 26 exploration companies holding 53 licenses, and the MLME expects to issue about 44 new licenses over the next two years.

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2 It should be noted that in November 2002, about 50 countries that produce, trade, and process diamonds became signatories to the Kimberley Process Certification System (KPCS) aimed at establishing a system of certificates of origin to control the global trade in diamonds. The treaty resulted from international concern over the growing evidence of illegally mined and exported diamond revenues being used to support civil conflicts in Angola, Sierra Leone, Liberia and elsewhere. The NTGL was encouraged by the UNSC to establish a Certificate of Country of Origin regime that is transparent, effective, and internationally verifiable for the trade in rough diamonds, with a view to joining the Kimberley Process Certification Scheme. The NTGL requested that a Kimberley Process Review Team visit Liberia in February 2005 to assess the NTGL’s ability to comply with the requirements of the KPCS. To help enforce UN sanctions on diamond exports, the Ministry of Lands, Mines and Energy banned all diamond mining as of January 2005, although exploration was still permitted. Liberia met the standards of the Kimberley process and the U.N. lifted the ban on diamonds in April 2007.
Potential Impact

All mineral resource extraction will have direct adverse impacts to the surrounding environment, including its biodiversity. In almost all cases, the impacts can only be mitigated and never eliminated.

Industrial Mining

As Figure 5 indicates, there is a high degree of geographic overlap between mineral deposits and the protected area/forest reserve network. If exploitation occurs within these areas as expected, the potential to significantly affect biodiversity and forest cover should be considered very high. Forest destruction will be locally extensive and permanent. Other potential environmental impacts include:

- Siltation of dams and rivers;
- Indiscriminate deforestation;
- Additional degraded lands from settlement patterns of miners;
- Ground and surface water pollution, including acidic mine drainage and heavy metal pollution from copper, lead, arsenic, mercury, or cyanide, if the excavation is in highly mineralized zones;
- Dust pollution;
- Water table depression as a result of pumping water through shafts, and in some cases through boreholes;
- Oil pollution from leaks from vehicles and machinery; and
- Habitat fragmentation, decreased habitat effectiveness, and increased mortality of wildlife, through increased bush meat consumption.

Indirect impacts from industrial mineral extraction include both positive and negative changes to the local communities’ economic base and increased pressures to social structure. Industrial mining operations for diamonds, gold and iron ore can include the clearance, excavation, and flooding of farmlands. Surrounding communities are generally either displaced or relocated, which can disrupt their livelihoods and impact their cultural heritage. Changes in livelihoods can also have indirect effects on biodiversity, when new areas must be cleared for agriculture.

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3 Although the GOL states in the PRS that it intends to harmonize the New Minerals and Mining Law (NMML) Act of 2000 and the Forestry Law with respect to mining concession rights and protected zones, little progress has been made to date.
FIGURE 7: OVERLAP BETWEEN MINERAL RESERVES AND LIBERIA’S FORESTS AND PROTECTED AREA NETWORK

Source: FDA
Artisanal Mining

Small-scale artisanal operations typically involve the digging of pits within alluvial river channels and excavating for black sands that are associated with diamond-bearing gravels. Up to 100 individuals work on a one-acre site. The diggers use shovels to extract the target gravel, which is most often carried off in pans or sacks to an area where the gravels are washed using a sieve.

MLME estimates that there are over 100,000 artisanal miners operating in Liberia. FDA estimates that in Sapo National Park alone, there are over 6000 illegal artisanal miners; FDA also reports that illegal artisanal mining is taking place in nearly all of Liberia’s protected areas.

The majority of the artisanal activity, which accounts for most of the diamond mining activity in Liberia, may have individually insignificant effects on biodiversity and tropical forests but cumulatively significant effects. In combination with the lack of any effective reclamation programs for mined areas, artisanal mining has led to significant areas with decreased habitat capability and increased erosion, although the extent of this area is not known. Biodiversity is impacted by the change in habitat, water quality, and land use after extraction.

Other potential environmental impacts from artisanal mining are similar to those of industrial mining and include:

- Siltation of rivers;
- Indiscriminate deforestation;
- Additional degraded lands from settlement patterns of miners (e.g., the mining camps established by the 6000 miners in Sapo);
- Ground and surface water pollution, including acidic mine drainage and heavy metal pollution from copper, lead, arsenic, mercury, or cyanide, if the excavation is in highly mineralized zones;
- Habitat fragmentation, decreased habitat effectiveness, and increased mortality of wildlife, through increased bush meat consumption; and
- Current artisanal mining practices will likely lead to continued environmental impacts, unless improved methods and management activities are introduced.

Legal mineral resource extraction, whether large-scale companies or a single operation (artisanal miner), requires the payment a license fee. The fee collected has allocations for mine site reclamation. In all cases, the amount is far below the actual cost of reclamation and the fees are not being applied to

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4 Although the statement of intent for mining policy under the PRS appears to incorporate environmental concerns, items such as biodiversity offsets and rehabilitation are not mentioned.
reclamation on the ground. Because much of the artisanal mining activities are not recorded or legally licensed, raising funds for sustainable reclamation practices is not currently achievable.

1.1.5 AGRO-INDUSTRIAL CROPS

Although the threat to forests from agro-industrial plantation expansion is currently low, in the past, the conversion of huge areas of Liberia’s forests into monocultures of rubber and oil palm accounted for the vast majority of forest loss. As tree crops\(^5\) are an important component of the Liberian economy, accounting for 22 percent of the GDP in 2005, with rubber alone employing 18,500 workers and accounting for 90 percent of total exports,\(^6\) there may be economic pressure to expand the area under tree crops.

Prior to the civil conflict there were seven large-scale rubber plantations in Liberia:

- Firestone Plantations Company in Harbel, Margibi County;
- Liberian Agriculture Company (LAC) in Grand Bassa County;
- Cavalla Rubber Corporation in Maryland County;
- Cocopa Rubber Plantation in Nimba County;
- Sinoe Rubber Corporation in Sinoe County;
- B.F. Goodrich (now Guthrie Rubber Plantation) in Bomi County; and
- Salala Rubber Corporation (Bong County).

Currently only the Firestone and LAC plantations are functional. In addition, SOCFIN, the parent company for LAC, operates the Weala Rubber Company which has a rubber mill in Bong County and buys rubber from smallholders operating on 14,000 hectares, much of which may have been part of the previous Salala Rubber plantation.

The Firestone rubber plantation has a concession of one million acres (approximately 416,670 hectares). It is the largest rubber plantation in Liberia, and the world’s largest contiguous industrial rubber plantation. LAC has a concession for 125,000 hectares. But the area of the concession in both cases does not represent the area planted to rubber; indeed, the planted area is much smaller than the concession area. For instance, LAC has rubber on only 14,060 hectares of its concession area. It estimates that it needs to have 16,000 hectares of rubber to optimally supply its rubber mill, but has had trouble expanding the area planted to rubber due to tenure concerns within the larger concession area.\(^7\)

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\(^5\) Tree crops include rubber, oil palm, coffee and cocoa, but coffee and cocoa, as well as smallholder palm oil are usually grown with food crops interspersed among the trees or under secondary forests.

\(^6\) MoA 2007

\(^7\) The LAC plantation manager was shot and killed in 2007 while surveying a potential area for expansion within the concession boundary.
Interspersed in the areas planted to rubber in the LAC concession are corridors of native vegetation. In the past year, LAC has made a corporate commitment to maintain these corridors as small nature reserves.

Liberia’s National Biodiversity Strategy and Action Plan\(^8\) states that the area planted to rubber on plantations is 57,000 hectares. This is much less than the nearly one million hectares covered by current and previous concessions. The years of civil conflict greatly reduced the management of rubber plantations, so that many of the trees are beyond their productive age. Currently the plantations are engaged in removing old trees and replanting areas, rather than opening up new areas.

Smallholders are also faced with rejuvenating old stands of rubber. Buchanan Renewable Energy (BRE) has established a program in the Buchanan area whereby it clears old rubber trees and replants with improved rubber varieties. BRE chips the rubber wood that is removed and plans to sell the chips as biomass fuel. It enters into long-term agreements with property owners, whereby BRE assumes responsibility for the removal and replanting of the area, as well as for management of the seedlings until they reach a productive age (between 6 to 8 years). The terms and conditions of these agreements were still being developed during the preparation of this ETOA, and it is not clear whether planting will be only limited to existing sites.

There are estimated to be about 27,000 hectares of industrial palm plantations owned by parastatals and the private sector.\(^9\) All of the factories on the palm oil plantations were destroyed during the civil conflict. At the time of writing, none of the palm oil plantations were functional. In some cases, small operators are managing groups of trees in the plantations for oil production. However, the MOA is currently negotiating new leases for these plantations and the potential impact on forests from these new concessions is not clear\(^10\).

Government’s increased interest in the potential introduction of oil palm biofuel plantations may see this threat increase significantly in the future. For example, Equatorial Biofuels has expressed interest in securing a 500,000 ha tract of land in River Gee County for biofuel plantations, an area that falls within the proposed protected area in Grebo National Forest. The Ministry of Agriculture is also discussing a number of other biofuel proposals with private companies. At this point, it is unclear how Liberia’s forest policy and management would deal with these proposals particularly if they were to involve the clearing of existing forest lands for plantation purposes.

In considering a biofuels program, Government needs to keep in mind that oil palm is perhaps one of the biggest threats to tropical forests in the world. For example, between 1990 and 2005 palm plantations rocketed by 1.87 million hectares in Malaysia and by more than 3 million hectares in Indonesia. More

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\(^8\) GoL 2003

\(^9\) MoA 2007

\(^10\) For example, the old West Africa Agricultural Company palm oil concession comprises a total of 300,000 ha of which only 19,000 are under palm with the remainder in wetlands (about 1000 ha), secondary forests and village, towns and traditional agriculture. The current MOA concession caretaker expressed concern about the land tenure situation in the proposed new concession as well the impact on forests within the concession.
than half the palm plantations came at the expense of forests - largely pristine, intact forest in Indonesia and previously logged forest in Malaysia. And the situation in Brazil is similar to the point where USAID has stated that USAID funds “cannot be made available for the cultivation or processing of African oil palm, if doing so would contribute to significant loss of native species, disrupt or contaminate natural water sources, reduce local food security, or cause the forced displacement of local people."\(^\text{11}\)

### 1.1.6 ALIEN INVASIVE SPECIES

Alien species are those that have crossed natural barriers and entered ecosystems where they have not existed previously in recorded history. They can include plants, animals, fungi, bacteria, algae or viruses. Impacts on the environment from AIS can include:

- Displacement of native species through competition for food and other resources, through predation, alteration of habitat and food webs;
- Dilution and potential loss of locally adapted gene pools caused by the introduction of non-locally adapted strains of the same species, or closely related species that are able to hybridize; and
- Infection of native animal and plant species by a variety of parasitical organism, such as bacteria, viruses, and fungi.

There are many floral and faunal species that have invaded Liberia over the decades. Although no inventory has as yet been done on AIS in Liberia, nor have the impacts of AIS been quantified, Liberia’s State of the Environment Report (2006) lists four introduced plant species that are thought to have an impact on forest ecosystems:

- **Leucaena leucocephala.** The ecological impact of *Leucaena* is not deemed serious as yet because it is still limited to the localities where it was originally introduced, but it colonizes very rapidly;
- **Acacia Spp.** The Acacia species introduced by the FDA in Zarwea, Grand Cape Mount County are apparently rapidly overtaking the original forest; and
- **Chromoleana odorata** is an herb, and a typical pioneer species of secondary forest succession with a strong heliophilic character and vigorous vegetative development. Initially it spreads through seed dispersion, but after establishment it may also reproduce vegetatively from lateral branches. Regrowth occurs after slash and burn cultivation. It was introduced to West Africa around 1937 through contaminated seed lots of *Gmelina arborea*, and probably spread to Liberia in the late 1940s. Due to abundant vegetative development, *C. odorata* out-competes young trees leading to poor natural regeneration. It also provides a habitat and breeding spaces for harmful insects such as the variegated grasshopper, *Zonocerus variegates*, which attacks cassava fields causing substantial yield losses. During the dry season, it constitutes a fire hazard.

### 1.2 COASTAL AND MARINE ECOSYSTEMS

Liberia has a coastline 565 km long and claims an economic zone of 13 nautical miles and a territorial zone of two hundred (200) nautical miles. About 90% of the coastline consists of a narrow sand beach 20-25 meters wide, reaching 60-80 meters in some parts of south eastern Liberia, interspersed with lagoons,

\(^{11}\) USAID FY 2008 Assistance Checklist—Andean Counter Drug Program.
estuaries, bays and brackish wetlands. The coastal area consists of swamp-related vegetation, including mangroves forests and reeds that extend up to 25 miles inland.

The Liberian coast is critical habitat for endangered species of marine turtle which feed in the waters, and three of them reportedly nest on the beaches and in the estuaries. The four species are the Atlantic Green turtle (*Chelonian mydas*), the Leather-back (*Dermochelys coriacea*), the Hawksbill (*Eretmochelys imbricate*) and the Olive Ridley (*Lepidochelys olvacea*). Green turtles are classified by IUCN as endangered and Hawksbill turtles are classified as critically endangered. Estuaries are also important habitat for threatened West African manatees (*Tichechus senegalese*), while the mangroves are reported to harbor certain species of crocodile.

Nearly 58% of Liberia’s population lives within 40 miles of the coast, which puts extensive pressure on this ecosystem for food, land mineral and other resources. Specific threats are discussed below.

### 1.2.1 OVER EXPLOITATION OF DEMERSAL FISH SPECIES

Liberia has an Atlantic coastline of 580km and fishing grounds within its Exclusive Economic Zone (EEZ) covering over 186,000 km². Fishing provides 65% of the animal protein needs of the country and contributes around 3.2% to Liberia's GDP. The marine fisheries sector accounts for about fifteen percent (15%) of the GDP of the country. In 1986, about 11,693 metric tons were exported compared to 1990 (out beak of the civil war) when only 7,290 metric tons were exported. Annual production for 1998 and 1999 amounted to 10,830 and 15,473 metric tons respectively. In 1984—the last period for which any data is available - an acoustic survey of the country’s marine resources indicated a total biomass (total fish resources) of about 800,000 metric tons consisting of pelagic and demersal species. Although there have been no recent surveys to take stock of existing biomass, Liberia’s Bureau of National Fisheries (BNF) believes that the demersal species are under threat from over exploitation from both commercial and artisanal fisheries.

**Commercial Fisheries**

Currently there are 14 fishing companies operating legally in Liberia; 6 companies are solely engaged in the importation of frozen fish from the high seas, and 8 companies are engaged in industrial fishing activities operating 30-40 licensed fishing vessels—including eight Chinese paired trawlers—with a combined Gross Registered Tonnage (GRT) of about 5000 tons.

Industrial fishing vessels land their catches at the fishing pier in the Free Port of Monrovia. Currently, fish landed locally by all licensed trawlers is estimated at 2000-3000 tons. However, BNF believes that these figures are grossly

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12 The “pelagic zone” refers to the open waters of the ocean. Fish that live in pelagic zones are typically mobile and migratory species that are not closely associated with permanent structures such as coral reefs. Some of the largest and most commercially important species are pelagic fishes, including billfish, tunas, dorado, and many sharks.

13 This terminology encompasses crustaceans (shrimps, langoustine, lobster and crabs), cephalopods (octopus, squid, calamar) as well as miscellaneous fish belonging to the benthic or benthico-pelagic species and living in shallow waters or on the seabed.
misreported, and has a strong suspicion that a number of licensed industrial fishing vessels are engaged in illegal transshipments in the high seas and are repacking catches in Liberian waters and declaring these catches as imports. BNF estimates that Liberia loses approximately $10-12 million through illegal fishing each year.

BNF further estimates that the annual catch within the EEZ of Liberia is much higher as poaching (pirate fishing) is rampant due to the lack of any monitoring, control and surveillance (MCS) system. BNF conservatively estimates that there may be upwards of 250 “pirate” boats operating in Liberian waters, the majority of which are using illegal fishing techniques such as long lines and gear (nets with mesh sizes below the required size of 25mm for shrimp and 70mm for fish). Often these boats operate within the three mile limit reserved for artisanal fisheries and compete for the same demersal species.

Liberia is attempting to come to grips with illegal fishing. A sixty day Marine Control and Surveillance Project, jointly launched by the Ministry of Agriculture and the Bureau of National Fisheries in February 2008 resulted in the arrest of several pirate ships. Liberia is also planning to join the International Maritime Organization’s security division illegal fishing program, aimed at 25 countries in West and Central Africa. This program links local coastguards with Interpol, the FAO, UNHCR, insurers and other partners, and will include action against illegal fishing.

**Artisanal Fisheries**

Approximately 60% of the total domestic catch is landed by artisanal fisher folk, using various types of canoes and fishing gear, including 200-800m long beach seines. About 13,000 fisherfolk and 18,000 fish processors (mongers) and their families live in 139 communities in coastal counties. Together they operate about 3500 canoes of which 8% are motorized and the largest numbers of canoes are operating in Montserrado and Grand Bassa County.

The artisanal fisheries are dominated by the Fanti and Popoe fishers and they own and use the larger motorized fishing canoes. They employ more sophisticated fishing nets and fishing techniques and, as a result, catch more fish per trip than the indigenous Kru fishermen who fish with 1-3-person crew small dug-out canoes of about 7 m, powered by paddles or sail.

BNF reports that there may be an additional 8000 unlicensed foreign artisanal boats operating in Liberian waters.

As with the commercial sector, there are reports of artisanal fisherman using undersize nets and more recently dynamite.

**1.2.2 OVER EXPLOITATION OF OTHER SPECIES**

Liberia’s continental shelf provides habitat for a variety of marine species including mollusks, crustaceans, demersal and pelagic species. However, Information on distributions and abundance of these
species is nonexistent and nothing is known about specific centers of endemism. Moreover, there have been no stock assessment surveys conducted in more than twenty years to determine the level of exploitation of the fisheries resources. There are no research facilities to study the dynamics of the ecological factor affecting the fisheries environment- the productivity of ecosystem, pollution levels and nutrient load, species diversity of the various fish communities and harvesting pattern of commercial species.

With regard to sea turtles, there are reports that they are hunted secretly for food throughout Liberia. Their eggs are also collected by humans and destroyed by dogs and pigs on the beaches. SAMFU, supported by the U.S. Fish and Wildlife Service (USFWS), is promoting the long-term survival of sea turtles, including the sustained recovery of depleted stocks, taking into consideration the integrated well-being of residents of coastal communities with which they interact. Although the ETOA team was not able to verify, SAMFU claims to have stopped the hunting of sea turtles in two communities near the mouth of the Cess River. Apparently, they made a deal with the communities, so that SAMFU/USFWS would provide fishing nets and outboard motors to the fishermen, in exchange for beach protection, so that the communities would not attack the turtles and nests when they came ashore, and they would monitor the nesting.

1.2.3 BEACH SAND MINING AND BEACH EROSION

Beach sand mining is “one of the most serious threats to the coastline and marine environment” in the country (UNDP 2008). Nearly every coastal community has a sand pit but there are no estimates of the actual amount of sand being taken from the pits. At the beach mining site visited by the team, the site manager reported that the site was open (and busy) 24 hours per day.

Sand mining changes in the balance of littoral sand transport, blocking the natural sand drift. The sand pits cause a slight embayment of the shoreline due to localized recession. The embayment serves as a void, which must be filled before the sand moves along the coast. In short, sand is trapped by the recessions, reducing its westward flow. Sand “downstream” from the flow is not replaced thus exacerbating shoreline erosion.

Erosion is causing shoreline recession in some cities like Buchanan, Greenville, Harper and Robertsport. Incidents of beach erosion along some portions of the Monrovia coastline have resulted in the loss of land and shorefront properties. Beach mining is thought to be the main culprit in the storm surge that destroyed 100 homes in Buchanan in August 2007. Sand mining and dam construction at the Free Port of Monrovia breakwater is causing the beach of the OAU village to recede at an estimated rate of 3m/yr (Gatter 1988).
1.2.4 MANGROVE LOSS

Mangroves characterize the coastal wetlands of Liberia and cover a small area along the coast, from Cape Mesurado to Cape Palmas, at the edges of lagoons, riverbanks, and river estuaries and in widespread areas of coastal swamps. Mangroves are estimated to cover 0.5 per cent of the land surface of Liberia, which is equivalent to a 50 km-wide belt extending along the total length of the coastline (Gatter 1988).

Mangroves pay an important role in Liberia’s coastal ecosystem, in that they:

- Serve as spawning grounds for many fish species, crabs, shrimps, mollusks and other forms of sea life;
- Serve as habitats for many endangered species of manatees, crocodiles, turtles, migratory birds;
- Help with flood regulation and serve as buffer against violent storms surges;
- Protect shorelines from erosion; and
- Help with water recharge and maintenance of water quality.

As noted above, mangroves in Liberia occur at the mouths of the rivers and in some of the lagoons. Lake Piso, a very large open lagoon near the border with Sierra Leone, supports a series of mangrove swamps. The lagoon mangrove communities around Cape Palmas in southeastern Liberia can attain a height of 3 m and are dominated by *Conocarpus erectus* with only rare specimens of *Avicennia germinans* and *Rhizophora racemosa*. Thickets of *Acrostichum aureum* are also common. On the central Liberian coast estuarine mangroves occur, consisting of stunted *Rhizophora harrisonii*, *Avicennia germinans* and *Conocarpus erectus*. The trees of *Rhizophora* spp. and *Avicennia germinans* rarely grow taller than 6 meters, probably because of poor soil conditions; they are always higher when closer to river channels than in other inundated areas (usual growth 2 to 2.5 m height). Except for a few places in the central part of the country, primary mangrove forest has been replaced by secondary ones.

Mangroves are being degraded due to over cutting for fuelwood, charcoal and construction poles. However, mangroves can usually recover from these activities as they propagate vegetatively, although FAO (2006) reports that *Rhizophora racemosa* seems to have been eliminated in some places by extensive felling. There is no information about the impact of these activities—and secondary mangrove forest—on biodiversity.

The biggest threat to Liberia’s mangroves is urban expansion and accompanying landfills, particularly in Monrovia. This expansion began during the civil conflict when many displaced people—having very limited land space to carry out business activities—established landfills in Mesurado and Marshall Mangrove wetlands, causing large areas of mangroves to be destroyed (and to be used as dumps or for sewage disposal). The process continues today; Liberia’s burgeoning post conflict economy and increased population have...
overwhelmed the original planned land area for Monrovia and other coastal cities; originally made to accommodate 350,000 persons, Monrovia’s now has a population of over 1 million.

1.2.5 THREATS TO COASTAL (BRACKISH) WETLANDS
Liberia has a number of brackish wetlands, the largest of which have been declared Ramsar sites, and one of these—Lake Piso—has also been designated as a National Park. A brief description of these sites along with threats follows:

- **Lake Piso** (76,091 ha) is an open coastal lagoon near Robertsport to the west of Monrovia, the largest such inlet on the Liberian coast, surrounded by forested hillsides (including one of the rarest tropical rainforests in the region) and fed by a number of creeks and rivers; these latter drain a series of swamps above the lagoon, the lower ones of which are tidal and support mangroves. Other mangrove swamps occur behind the dune ridge on the west side of the lake mouth and at other creek mouths. A series of small lakes with swampy margins occurs on the sandy forested spit that separates the lake from the sea. The site is important both as a nursery and spawning ground for fish and sea turtles and as feeding and roosting places for large numbers of shore and sea birds. Mammals such as antelopes, duikers, monkeys, bushbucks, and a few crocodiles are also found in the area. The main threats are deforestation of mangroves, unregulated fishing, dredging for minerals, hunting, farming and settlements on hills, high population due to the presence of a town and the vicinity of Monrovia, port development, erosion of dunes (sand mining) and offshore mining for oil.

- **Marshall Wetlands** (12,168 ha), in Margibi county, comprises three small rivers; the area has sandy and rocky shores, and further inland is a population of secondary forests and savannah woodland. The wetland is chiefly a mangrove type with mature trees reaching up to 30m. In addition to the Red Colobus monkey, a number of bird species listed by the Convention on Migratory Species appear in the area, such as the Glossy Ibis, Lesser Kestrel and Common Pratincole. The site provides control against flooding and underground water recharge and is a sediment trap. The very large stands of mangroves, fish population and wildlife are valuable resources for inhabitants in the area. The three rivers are navigable and are used for transport from one village to another. The uncontrolled harvesting of the mangrove forest and overfishing by both local and regional fishermen are serious threats to the ecological character of the site. Pollution from the Firestone rubber factory used to be a problem until EPA forced Firestone to install a waste water treatment facility.

- **Mesurado Wetlands** (6,760 ha), is located in the capital city Monrovia and Montserrado County (the largest administrative region of the country with 1 million people), and the site is particularly important for the protection of three mangrove species (*Rhizophora harrisonii*, *R. mangle* and *Avicennia africana*). It provides a favorable habitat and feeding ground for several species of birds including the African spoonbill (*Platalea alba*), Common Pratincole (*Glareola nuchalis*) and Curlew (*Numenius arquata*). It also hosts the vulnerable African dwarf crocodile, the Nile crocodile and the African sharp-nosed crocodile and plays an important role in shoreline stabilization and sediment trapping. The site is currently used for fuel wood collection, charcoal burning, as a dumping site, for car washing, and fishing, and is subject to landfills from Monrovia expansion. Additional threats come from unregulated fishing, as well as from pollution from the industries around the site, including an oil refinery and paint factories, and medical waste discharge from the Monrovian Hospital.

Although designated as Ramsar sites and under the management responsibility of the Environmental Protection Agency (EPA), very little has been done to date in terms of protection and sustainable
management of these areas due to EPA financial and human resource constraints. To EPA’s credit, however, EPA successfully blocked a proposal to dredge Lake Piso for gold and diamonds.

### 1.3 FRESHWATER ECOSYSTEMS

#### 1.3.1 RIVERS AND STREAMS

There are six major rivers in Liberia (Table 2). These flow from mountains in the north and empty into the Atlantic Ocean. Most of the rivers are navigable up to 20 miles from the coast, except for Cavalla, which is navigable up to 50 miles.

<table>
<thead>
<tr>
<th>Basin</th>
<th>Basin Area (km²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mano</td>
<td>6,604</td>
</tr>
<tr>
<td>St. Paul</td>
<td>12,820</td>
</tr>
<tr>
<td>St. John</td>
<td>14,762</td>
</tr>
<tr>
<td>Cavalla</td>
<td>13,726</td>
</tr>
<tr>
<td>Cestos</td>
<td>10,000</td>
</tr>
<tr>
<td>Lofa</td>
<td>9,194</td>
</tr>
</tbody>
</table>

Source: UNDP 2006

Together, these basins drain approximately 65% 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.

Data on water resources in Liberia is limited. Prior to the civil war, the Liberian Hydrological Service (LHS) of the Ministry of Lands, Mines and Energy (MLME), collected basic hydrological and meteorological data from a network of 28 hydrological and 13 hydro meteorological stations covering eleven river basins around the country. During the crisis, these stations were abandoned, and maintenance has not been reestablished. Currently, the only data available for the flow of major watersheds is that acquired prior to 1990.

The freshwater resources in Liberia support 166 species of freshwater fish, including one endemic species, *Barbus trispiloides* and one introduced species, *Oreochromis macrochir*.

### Potential Threats to Inland Fisheries—Over Fishing

The value and production of inland fisheries is not known but it is an important seasonal subsistence activity. The Bureau of National Fisheries (BNF) estimates that there are an estimated 8000 boats on Liberia’s inland river system with only about 200 registered. Of the total number of boats there is a high percentage of migrant fisherfolk using bigger boats and motors and more advanced technologies and generally out competing resident fisherfolk. According to BNF, there is little control over net mesh size and there is wide use of organic and chemical pesticides, and dynamite. BNF has little capacity to monitor inland fisheries as their only one BNF agent in the field (on the St. Paul River), and he has no means of transport to either control boats on the water or at landing sites.

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15 UNDP 2006.
16 GoL 2003.
Finally, BNF is concerned over fishing may be occurring on Liberia’s inland waterways but that fisheries catch data collected by the BNF does not have national coverage and the data is often inaccurate and cannot be analyzed and interpreted into useful assessment or management tools.

**Water Hyacinth**
One of the most globally well-known water weeds is the Water Hyacinth (*Eichornia crassipes*) which occurs in the coastal areas of Liberia. The Water hyacinth is an exotic, free-floating aquatic plant which can form small colonies, “floating islands” or extensive mats that can cover thousands of hectares of previously open water. When invasive, water hyacinth forms a complete covering of the water surface that excludes most light and air for submerged organisms thus depriving them of essentials for survival. A significant reduction of general aquatic biodiversity and a change of fisheries results from invasion. The mats can also have serious mechanical impacts on water supply systems, drainage canals, inflows to hydropower generators, and movement of shipping and river flows. The hyacinth increases evapotranspiration leading to significant water loss from reservoirs and other water bodies. The crowding of plants at the edges of water bodies prevents access to the water for collecting water or fishing.

### 1.3.2 FRESHWATER WETLANDS
There are approximately 600,000 ha of freshwater swampland in Liberia with only about 3% (20,000) ha under cultivation. According to the State of the Environment Report (2006), freshwater wetlands (or swamps) serve two main purposes in rural Liberia. They are a source of herbs, and are used to augment agricultural production. They are cultivated but not to the same extent as the uplands. Swamps are important in certain societies. For instance, for the Gio and Mano tribes, swamps serve the primary purpose of augmenting upland rice production. In most cases the uplands are cultivated. According to the culture, withstanding the thorns, flies and ants is a demonstration of male masculinity. When a family has cultivated only swamp rice during a farming season, the explanation is that it was pressed for time and by other matters. A cultivated swamp is referred to as a woman’s farm. As a result many swamps remain uncultivated thereby conserving their fauna and flora.

Two freshwater wetlands have been designated as Ramsar sites:

- **Gbedin Wetlands** (25 ha) is situated in Nimba county in the north of Liberia - the area is largely a swamp but also includes a man-made wetland with an irrigation system that includes channels, ditches, dams and drainages. The paddy fields provide a good feeding ground for many bird species including Palaearctic and Nearctic migrants as well as resident breeders such as the Plover (*Charadrius dubius*), Bar-Godwit (*Limosula lapponica*) and the Forbes’ Plover (*C. forbesi*). The endemic otter shrew (*Micropotamogale lamottei*) also occurs in the area. The suitability of the swamp for rice cultivation prompted the government in 1960 to solicit technical assistance to introduce modern agricultural methods to local rice farmers in order to discourage shifting cultivation. The project, the Gbedin Swamp Rice Project, has employed a large number of local people, especially up to the onset of the civil war in 1990. The site is currently used for subsistence farming (rice), hunting and fishing, while the surroundings are used for logging and mining, as well as multiple crop farming. The use of fertilizers and pesticides are potential threats.

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17 The information in this section is taken from: the Ramsar website: http://www.ramsar.org/wn/w.n.liberia_four_new.htm
• **Kpatawee Wetlands** (835 ha) is in Bong county— the Kpatawee waterfall falls within the rainforest zone of Liberia, as a branch of the St. John River, one of the six major rivers in the country. While the river erodes the valley in its upper sections, it accumulates sand and gravel downstream, leaving patches of bare land along its course, which provide wintering grounds for large numbers of common Sandpipers and Palaearctic migrant species such as Little Ringed Plover and Greenshanks. The endangered Three-cusped Pangolin and Water Chevrotain occur at the site, too. The villagers value this area as a picnic ground, for hosting meetings, workshops and retreats, but the area and its resources are also used for palm wine production, hunting, fishing, basket making, bathing and other domestic uses. Within the site, the governments of Liberia and China undertook the Kpatawee Rice Project with the objective of introducing new rice farming methods to farmers, to discourage shifting cultivation. Threats to the site include the potential development of a hydropower scheme. The site is an ideal nature reserve and tourist attraction but has not officially been recognized for this purpose.

Although there appears to be very few threats to Liberia’s freshwater wetlands, two issues do require attention:

• Very little is known about the value of freshwater wetlands, from their role in providing medicinal plants and other products, to their role in providing ecosystems services such as water quality enhancement, flood control, and provision of habitat for valued species. A freshwater wetlands study seems appropriate particularly given the GOL’s interest in developing swamp rice.

• EPA’s declaration of Gbedin as a Ramsar site has resulted in considerable conflict between the Gbedin community and EPA. The ETOA team was informed by the community that that learned that the site had been declared a Ramsar site over the radio. Moreover, they were informed via the radio that they were to cease rice cultivation on the site—something they had been doing since 1963. Additionally, no one knows where the exact boundary for the Ramsar site (only 25 ha) but the community was led to believe that they were to stop production on the entire site (some 1000 ha). After protest to the MOA, the community was allowed to continue rice cultivation on about 400ha. The irony of the situation— even as recognized by the community—is that they only reason the site had migratory birds was because of the rice.
SECTION 2: POTENTIAL EFFECTS OF CLIMATE

Global climate changes caused by increased greenhouse gas emissions to the atmosphere from anthropogenic activities have direct influence on natural and agro ecosystem functioning. If emissions of greenhouse gases continue at present rates, the average global temperature is expected to increase about 1°C above the present value by 2025 and 3°C before the end of the next century. The greatest rates of temperature increase will occur at high altitudes. A mean increase in precipitation in the tropics is expected to occur in association with this warming, although both precipitation increases and decreases are predicted. Generally, models predict that in the tropics, wetter areas will become wetter and drier areas drier, with moderate rainfall areas suffering the biggest impact.

Because the climate models used to assess the magnitude, rate and geographic distribution of future climate change are gross in scale, only very general predictions of the impacts of global climate change for Liberia are possible given the absence of data. Nevertheless, most models predict that the anticipated impacts of climate change, such as rising sea levels, increased temperatures and more severe droughts, will strain developing countries’ ability to maintain food security while preserving ecosystem services. Most models also predict that the ability of the West and Central Africa region to withstand the impacts of future climate change will be compromised if the forests continue to be degraded and destroyed.

2.1 TERRESTRIAL ECOSYSTEMS

2.1.1 TROPICAL AGRICULTURE ECOSYSTEMS

Modifications in hydrologic regimes and atmosphere temperature due to anthropogenic greenhouse effect provoke variations in plant productivity and therefore, affect food production. Crop simulation models, driven by future climate scenarios from global circulation models, suggest that the reduction in agricultural production would be more severe in tropical regions, where there is still a shortage of food production. Although there is no clear picture on the consequences of climate change for agricultural production, uncertainties are beginning to narrow on some general research findings:

- Crops grown in the tropics, exhibit immediate yield decline with even the slightest warming because they are currently grown under conditions close to maximum temperature tolerances—even a little warming sends them over the edge.

- Climate change as a driver will have different effects on the various types of pests, but current research suggests that in terms of major crops pests: i) warming may favor most weeds in comparison to crops; ii) rising CO₂ also is likely to enhance weed growth relative to crops; iii) being highly adaptable, many

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18 For example, Wiley (2005) attempted to assess the potential impact of climate change on the fisheries sector in Liberia using a weight of evidence approach but found there were no estimates of fish stock biomass, no data on fish species, water temperature data were available only for the period from 1950—1980, and there was no data on salinity levels. The ETOA team expects that the absence of data cuts across all sectors.

weed species can be expected to rapidly and more effectively adapt to increasing stresses such as rising atmospheric ozone and soil salinization; iv) warming trends most likely will also increase abundance, growth rate, and geographic range of many key crop-attacking insect pests; v) warming may, depending on the shifting of precipitation patterns, stimulate microbial pathogens; vi) crop tissue chemistry, including nitrogen and water content as well as inducible defense mechanisms, is likely to evolve as environmental change occurs; vii) on the plus side, rising CO\textsubscript{2} may stimulate rhizobia and mycorrhizae and benefit both crop plants and soil dwelling symbionts; and viii) warming (soil) may be beneficial in some regions, but harmful in those regions where optimal soil temperatures already exist.

2.1.2 TROPICAL FOREST ECOSYSTEMS

The impact of the current level of climate change on tropical forests is a matter of considerable controversy, with estimates ranging from massive uptakes to massive emissions of carbon by standing tropical forest. The amount of monitoring data - although much greater than what was available only a few years ago - is still inadequate to resolve some of the controversies. Other parts are a matter of interpretation of the data at hand. Of course, not all interpretations, and not all data sets, are equal in terms of their consistency.

Generally speaking, in recent decades, carbon losses from tropical deforestation have been partly or largely offset by a tropical sink. Forest sinks are, however, unlikely to continue indefinitely, and continued warming will likely diminish and potentially even override any fertilization effects of increasing CO\textsubscript{2}. Climate change might also adversely impact tropical forests by reducing precipitation and evapotranspiration, making them drier, more susceptible to fires, and more prone to replacement by shrublands, grasslands, or savanna ecosystems, which store much less carbon. Continued deforestation may disrupt forest water cycling, amplifying the negative impacts of climate change.

A new generation of coupled climate/carbon models is being used to explore the prospects for the persistence of tropical forests in a changing climate. Early studies projected that business-as-usual increases in CO\textsubscript{2} and temperature could lead to dramatic dieback and carbon release from tropical forests, raising concerns that high sensitivity of tropical forests to climate change might compromise the long-term value of reduced deforestation, with dieback releasing much of the carbon originally conserved. However, more recent climate-carbon cycle models project that tropical forests will continue to act as carbon sinks, albeit declining sinks, throughout the century. The moderate sensitivity indicated by the new results suggests that reducing deforestation can result in long term carbon storage, even with substantial climate change. More importantly, all models project that even in extreme scenarios, direct deforestation will impact tropical forests before climate-driven dieback.

2.2 COASTAL ECOSYSTEMS

INUNDATION

Liberia has a coastline of 565 km (350 miles) long. Wiley (2005) estimates that about 95 km\textsuperscript{2} of land in the coastal zone of Liberia will be inundated as a result of one meter sea level rise. About 50\% (48 km\textsuperscript{2}) of the total land loss due to inundation will be the sheltered coast; parts of the capital city of Monrovia and its environs, West Point New Kru Town, River Cess, Buchanan and Robertsport will be lost due to the fact that the greater parts of these areas are below one meter. About $250 million worth of land and infrastructure such as Hotel Africa will also be lost. Inundation will be followed by shoreline retreat which would vary along the coast from 10 meters in the higher cliff zone between Mamba Point and Sinkor to about 20 meters in the lowlands on Bushrod Island.
MANGROVES
Rising sea levels linked to global warming could threaten economically, ecologically and culturally important mangrove forests in Liberia. Mangroves grow along most of Liberia’s coast line and estuaries occupying the boundary between land and sea and are semi-submerged during high tides. Many species of commercially important fish breed and raise their young among mangrove roots, and studies have shown that when mangroves are cut down local fish catches decline.

Mangroves also provide a range of ecological goods and services' for Liberia’s coastal communities. They are sources of timber, fuelwood and medicines, and they protect shorelines from storms and tidal surges. The annual economic value of products and services that mangroves provide has been estimated by UNEP to be between US$200,000 and US$900,000 per hectare.

Liberia’s mangroves could be at risk because as sea levels rise, the forests' natural response—to retreat further inland—is blocked by natural features and man-made obstructions, such as settlements and agriculture.

FISHERIES
Climate change will impact on fisheries through a diversity of direct and indirect pathways whose importance will vary depending on the type of ecosystem and fishery. Inland fisheries, particularly important for small-scale fishers in Liberia and an integral part of Liberian rural livelihood systems could be severely impacted by changing water levels and flooding events, while coastal marine fisheries could be impacted by rising water temperature that affects ecosystem functions. Generally, climate change models for fisheries suggest that:

- Sea temperature increases will have an impact on aquatic ecology, resulting in a shifting range of fish species, changes in ocean currents affecting upwelling zone fisheries, coral bleaching affecting reef fisheries, and disruption to fish reproductive patterns and migratory routes;

- Precipitation and evapotranspiration changes will affect the hydrology of inland waters, including changes in river flows and flood timing and extent change, which will in turn affect fish reproduction, growth and mortality, as well as other elements of wetland-based livelihoods;

- There will be an increased frequency of extreme events, including more frequent loss of fishing days due to bad weather, increased loss of nets, traps and longlines, increased damage to boats and shore facilities, and increased loss of life among fishermen.

2.3 BIODIVERSITY
Although there has been little research on the possible impact of climate change on biodiversity, most specialists agree that as with tropical forests, loss of habitat through anthropogenic factors will impact biodiversity long before any possible impact from climate change. The exception to this would be for migratory animals. The unique way of life of migratory animals, be it birds, marine or terrestrial mammals, fish, marine turtles, or insects, illustrates like no other phenomenon the connectivity of ecosystems across the globe. While climate change has and will have very different faces in different regions, migratory animals will need to adjust their migration patterns accordingly if they are to survive. Migratory species are especially at risk due to climate change because they require separate breeding, wintering, and migration habitats of high quality and in suitable locations. Often, one or more of these habitats could be at risk because of changing temperature ranges and hydrological patterns.
SECTION 3: ENVIRONMENTAL AND NATURAL RESOURCE HAZARDS AND DEGRADATION (URBAN AND RURAL)

During the years of conflict, Liberia’s infrastructure was nearly completely destroyed and public services ceased to operate, including piped water, drainage, wastewater and solid waste management systems. As a result, residents in urban areas are exposed to contaminated drinking water and untreated wastes. During the rainy season, the lack of adequate drainage also results in ponds of stagnant water in urban areas. These conditions certainly contribute to two of the primary causes of mortality and morbidity in Liberia, malaria and diarrhea.

The conflict years also had some positive impacts on environmental hazards, in that it reduced the number of vehicles operating in the country and closed nearly all manufacturing operations. This has resulted in reduced incidence of air pollution and reduced sources of hazardous waste.

3.1 WATER AND WASTEWATER

Prior to the onset of civil conflict, 11 cities had piped water supplies (Table 3). In addition to the public systems, some communities near large mines or rubber plantations were served by systems constructed and operated by the rubber and mining companies (e.g., the Harbel system which was owned and operated by Firestone). Most of the systems, including the largest system, in Monrovia, were based on surface water collection and treatment. Only four systems were supplied by groundwater sources.

<table>
<thead>
<tr>
<th>Town</th>
<th>County</th>
<th>Capacity (1,000 gal/day)</th>
<th>Year of Initial Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater Monrovia</td>
<td>Montserrado</td>
<td>16,000</td>
<td>1885</td>
</tr>
<tr>
<td>Gbarnga</td>
<td>Bong</td>
<td>160</td>
<td>1978</td>
</tr>
<tr>
<td>Sanniquellie</td>
<td>Nimba</td>
<td>94</td>
<td>1979</td>
</tr>
<tr>
<td>Voinjama</td>
<td>Lofa</td>
<td>125</td>
<td>1980</td>
</tr>
<tr>
<td>Zwedru</td>
<td>Grand Gedeh</td>
<td>100</td>
<td>1980</td>
</tr>
<tr>
<td>Buchanan</td>
<td>Grand Bassa</td>
<td>200</td>
<td>1984</td>
</tr>
<tr>
<td>Kakata</td>
<td>Margibi</td>
<td>580</td>
<td>1985</td>
</tr>
<tr>
<td>Robertsport</td>
<td>Grand Cap Mount</td>
<td>90</td>
<td>1971</td>
</tr>
<tr>
<td>Greenville</td>
<td>Sinoe</td>
<td>85</td>
<td>1970</td>
</tr>
<tr>
<td>Tubmanburg</td>
<td>Bomi</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Harper</td>
<td>Maryland</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

Source: Liberia Water and Sewer Corporation, as reported in UNDP 2006
During the civil conflict, all of the systems except the Harbel system became inoperable. The destruction of these systems means that today over 90 per cent of the population has to rely on groundwater for water supply, and much of that is coming from shallow, unregulated wells.\textsuperscript{20}

Prior to the conflict, Monrovia had the most sophisticated system with a reservoir, water treatment plant, and distribution system. In the 1980’s it was expanded to a capacity of 16 million gallons per day, doubling its previous capacity. Most of the system provided in-house connections, but it also included 150 public taps serving lower income areas. During the civil conflict, the reservoir and treatment plant were destroyed and maintenance of the distribution system was abandoned. By 1992, the system had ceased to function.

Today, Monrovia is officially dependent upon water from two primary bore holes and 250 shallow wells. In many areas of town the distribution system is not functional, so water has to be hauled by tanker trucks. In addition there are up to 5,500 unregulated shallow wells in the greater metropolitan area providing drinking water.\textsuperscript{21} It is estimated that the system is now providing only 1.8 million gallons to serve a population of over 1 million.\textsuperscript{22} This is compared to the pre-conflict system that provided 16 million gallons per day, serving a population of only 450,000.

The Liberian Water and Sewer Corporation is responsible for providing water to urban residents. With assistance from the European Community, it has begun the rehabilitation of pipes and water pumping equipment in Monrovia. Some communities are now receiving pipe borne water, but substantial investment and sound management is needed to ensure an adequate water supply.

In other communities, the residents are primarily reliant upon shallow wells for their drinking water. In rural area, some communities draw water from surface water sources as well as from shallow wells.

With regards to wastewater management, Monrovia was the only urban center that had a sewer system and wastewater treatment system prior to the civil conflict. Other communities relied upon septic systems and pit latrines. People living in rural areas relied upon pit latrines or open defecation.

The wastewater collection system in Monrovia relied upon four pumping stations to deliver sewage from lower areas in the city to the treatment facility. During the conflict, the treatment facility and the pumping stations were damaged. They have not operated for more than 15 years. Nonetheless, some people continue to use the sewers, resulting in untreated sewage being discharged directly into lagoons, rivers and the ocean. In other areas, sewers have become blocked or waste pools in low areas previously served by pumping stations, resulting in raw

\textsuperscript{20} UNDP 2006.
\textsuperscript{21} UN/WB 2004.
\textsuperscript{22} UNDP 2006.
sewage surfacing out of manhole covers and flowing down the streets, eventually discharging into drainages or onto beaches.

Today, urban and rural residents alike are primarily reliant upon pit latrines or open defecation. Only 11 percent of households have access to flush toilets (most of which are in Monrovia) and only an additional 25 percent have access to pit latrines, leaving 64 percent of the population with no option but open defecation. In some urban areas, waste may also be deposited in plastic bags that are then disposed of in rubbish heaps or into open areas. Residents living near rivers in both, urban and rural areas commonly use the river banks for both solid and human waste disposal.

The quality and proper location of pit latrines is not currently known but it is reasonable to assume that many of the pit latrines are either improperly constructed or located. In the less populated areas, open defecation at a reasonable distance from homes or water sources may be regarded as the appropriate solution to excreta disposal, particularly if a shallow hole is first made and then covered up after defecation. But as population density increases, this becomes a less viable source of waste management.

The combination of inadequate wastewater disposal and reliance upon nearby surface or shallow well waters for drinking water creates the potential for serious health consequences. Diarrhea is one of the main causes of mortality and morbidity in Liberia, and it is often directly related to ingestion of human waste through water or food. In 2003, Monrovia experienced an outbreak of cholera, with a cumulative number of 26,651 cases. Cholera is often associated with ingestion of human waste.

### 3.2 SOLID WASTE MANAGEMENT

Prior to the conflict, solid waste management systems existed in Monrovia and in some other urban areas such as Buchanan, Gbarnga, Greenville, Harper, Kakata and Robertsport. Today, none of these systems are fully functional, and only Monrovia has begun is attempting to reinstall a collection and disposal system. As a result, solid waste and its associated vectors (rodents and flies) collect in public areas, abandoned buildings, drainages, and on beaches, where it may be burned or sporadically hauled away by municipalities. These methods of disposal present risks to the environment and human health, through air pollution, potential contamination of surface and ground water, as well as direct exposure to disease vectors and toxic substances.

Prior to the war, domestic and commercial solid waste in central Monrovia was collected and hauled for disposal by the Monrovia City Corporation in cooperation with a private service provider named “Betty Garbage System”. It was reported that prior to 1990, municipal solid waste was collected from 85 per cent of the city.

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23 UNDP 2006.
In Monrovia, a partial waste management system has begun to operate. With assistance from the World Bank, the Monrovia City Corporation (MCC) has begun to provide waste bins, collect waste, and dispose of it in a dump. The officially designated waste dump is on the edge of a swamp located at Fiamah, a residential area, about 4 km from the city center. It is not an ideal site, in that it is an open dump, not an engineered landfill, and it is located on the edge of a wetland (although drainage structures have been built to direct off-site runoff around the dump site).

During June 2008, the Fiamah dump was closed and the MCC began to use a landfill as the disposal site, located in an agricultural area in Weintown, several kilometers away from municipal Monrovia. This is the first landfill to be constructed in Liberia.\textsuperscript{26} It is still only an interim solution, as it is not a fully engineered landfill (lacking a leachate collection and treatment system), but it is a move in the right direction. A fully engineered landfill is proposed, and should be developed during the next two to three years.\textsuperscript{27}

The MCC is operating the system with its own equipment as well as a subcontract with two private contractors.\textsuperscript{28} To date MCC is still incapable of collecting all of the garbage generated in Monrovia (estimated at 221,000 kilograms/day\textsuperscript{29}), but it is working towards that goal. The MCC, with World Bank financial assistance, has also made a concerted effort to remove waste accumulations in the city.

The disposal of hospital waste represents another potential source of environmental degradation as well as a risk to human health. There is no inventory of medical facilities and their waste disposal practices. It is known that some facilities in Monrovia are making an effort to effectively treat and dispose of hospital waste. For instance, the St. Joseph’s Catholic Hospital has a modern incinerator to deal with medical waste and the Redemption Hospital, operated by Médecins sans Frontières of Belgium, has a functioning incinerator for burning the combustible waste fraction and two separate aboveground filter-bed tanks used for placenta and bottles disposal, respectively.\textsuperscript{30} At the John F. Kennedy Hospital, however, the medical waste incinerator has not worked for many years, so medical and domestic wastes are disposed of in the compound and burnt periodically in the open-air.

Potential risks from construction/demolition, hazardous, and industrial solid wastes are presumed to be minimal given the low level of activity in these sectors.\textsuperscript{31} The number of companies operating in Monrovia dropped from 850 in the mid-1980s to 350 in 1990. Current numbers are unknown. Facilities are mostly located in and around Monrovia and are mainly restricted to textile/clothing, furniture, brewing, and non-metallic mineral products. However, some toxic wastes are likely to be produced in workshops and garages and co-disposed with domestic waste.

### 3.3 OTHER ENVIRONMENTAL HAZARDS

Air pollution does not appear to be a major environmental hazard in Liberia. The number of cars in Monrovia is much less than one might expect in a city of 1 million inhabitants, so the source of mobile

\textsuperscript{26} To the ETOA Team’s knowledge, however, no Environmental Impact Assessment was done for this site.

\textsuperscript{27} WB 2006.

\textsuperscript{28} UNDP 2007.

\textsuperscript{29} This estimate is based on an assumption that each person generates 0.6 kg/day estimate (0.5 personal + 0.1 commercial) and using the population estimate from the 2008 census of 1,010,970.

\textsuperscript{30} UNDP 2006.

\textsuperscript{31} UNEP 2004.
emissions is not high. Being located on the coast with daily sea breezes and no physical barrier to air
movement also creates conditions conducive to the dispersal of air contaminants. The unreliable supply of
electricity in Monrovia has led to the use of approximately 45,000 generators, which are a source of air
emissions (particulates, sulphur oxides, and nitrogen oxides) as well as noise pollution. Lack of energy
sources has also increased the use of charcoal and firewood for cooking in the city, but there is no
indication that the emissions from generators or charcoal/wood stoves are causing serious air pollution
problems in the city.

There are localized “hot spots” where hazardous emissions may be an issue. For instance, the energy
infrastructure has been damaged as a result of the conflict including 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.
Damage to the 16 main electrical sub-stations and 3,500 electrical transformers may have also caused the
spillage of transformer fluid, often containing polychlorinated biphenyls (PCBs).

Due to the low income of Liberia’s farmers, few pesticides and fertilizers are used in crop production.
Pesticides (primarily herbicides and fungicides) are used on rubber plantations, but generally under strict
company policies, and are probably not causing environmental degradation.

32 UNEP 2004.
33 UNEP 2004.
34 MoA 2007.
SECTION 4: ENVIRONMENTAL AND OTHER POLICIES IMPACTING NATURAL RESOURCES AND ECOSYSTEMS

Liberia has five existing or draft policies and several international commitments which impact environment, natural resources and ecosystems management and conservation.

4.1 ENVIRONMENTAL POLICY

Prior to Liberia’s participation in the United Nations Conference on Environment and Development in June of 1992, “there was hardly any mention of environment in Liberia, except for considerations about the need to conserve the natural resources, primarily forest and wildlife.” No unified policy or institution for environmental protection existed, and all management and protection of the environment was done (or not done) at the sectoral level through line ministries and autonomous agencies.

Although awareness of the need for comprehensive environmental reform was created in 1992, due to the prolonged civil strife, governmental action on this concern was postponed until 1999 when the Government of Liberia established the National Environmental Commission of Liberia (NECOLIB). One of NECOLIB’s immediate mandates was to formulate a national environmental policy and draft a national environmental law. With assistance from UNDP, NECOLIB prepared and submitted to the legislature three legislative instruments:

- The National Environmental Policy of Liberia,
- The Environmental Protection Agency Act, and
- The Environment Protection and Management Law.

All three were approved by the Liberian National Assembly on November 26, 2002 and went into effect when they were officially published on April 30, 2003.

The National Environmental Policy (NEP) provides the policy objectives for environmental protection in Liberia. The other two pieces of legislation are tiered off of the NEP, with the Environmental Protection Agency Act (EPA Act) providing the institutional framework and the Environment Protection and Management Law (EPML) providing the legal framework to implement the policy objectives.

4.1.1 NATIONAL ENVIRONMENTAL POLICY

The National Environmental Policy (NEP) sets the policy framework for environmental management in Liberia. The policy goal of NEP is “to ensure long-term economic prosperity of Liberia through sustainable social and economic development, which enhances environmental quality and resource productivity on a long-term basis that meets the requirements of the present generation without endangering the potential of future generations to meet their own needs.” Specifically, the NEP states that the Government of Liberia will:

- Commit itself to the sound scientific and sustainable use of natural resources;
- Create environment awareness among all sections of the community;
• Develop procedures for the utilization of land resources so as to ensure the maximum degree of economic value;

• Require prior environmental impact assessments for all investments that may impact the environment;

• Institute appropriate measures to control pollution and the importation and use of potentially toxic chemicals;

• Take appropriate measures to protect critical ecosystems against harmful effects, or destructive practices;

• Develop and maintain a professional agency to supervise, coordinate, implement and enforce procedures and legislation essential for safeguarding the environment;

• Oblige all concerned to provide the relevant information needed for environmental protection and for the enforcement of environmental regulations and legislation;

• Promote and support environmental research programs; and

• Establish an adequate legislative and institutional framework for monitoring, coordinating and enforcing environmental programs and issues.

The NEP states that these commitments will be accomplished by the harmonization and enforcement of Environmental Protection and Management Law. It also directs all ministries and agencies of the Government to “review their statutory authority, administrative regulations and current policies and procedures” and correct any deficiencies or inconsistencies with the policy.

The policy specifically calls for the creation of the Environmental Protection Agency (EPA) as an independent authority for the management of the environment. It also calls for the adoption of the Environmental Protection and Management Law as a tool for implementation of the NEP, and states that the law should provide for:

• Improved access to information on the environment:

• Harmonization of the appropriate legal instruments;

• Monitoring and evaluating the impact of policy decisions on the environment;

• Improvement of the scientific base of environmental decisions through appropriate research programs;

• Assessment of potential impacts of public and private projects on the environment, and environmental mainstreaming into the national planning process; and

• Establishment and implementation of appropriate standards and guidelines so as to ensure an acceptable level of public health and environmental protection.

The bulk of the NEP (Sections 3.0 through 6.1 encompassing 24 pages of the 38 page document) contains recommendations for incorporating environmental concerns into various facets of development ranging from development of human settlements to the involvement of youth and women in environmental protection:

• Occupational Health and Safety
• Development of Human Settlements
• Recreational Space
• National Monuments and Cultural Heritage
• Alleviating Poverty
• Managing Population
• Environmental Impact Assessment
• Environmental Information
• Conservation of Biological Diversity
• Conservation and Management of Water Resources
• Conservation and Management of Wetlands
• Environmental Economics
• Land Use
• Forest and Wildlife
• Protected Areas
• Energy Production and Use
• Toxic and Hazardous Substances
• Agricultural/Forestry Chemicals
• Waste Management and Sanitation
• Marine and Coastal Management
• Mining and Mineral Resources
• Noise and Air Pollution
• Capacity Building and Technology Transfer
• Bio-Prospecting and Intellectual Property
• Public Education and Awareness
• Public Participation
• Gender and Women’s Issues
• NGO’S, CBO’S PVO’S, Youth Clubs and the Private Sector

This section of the NEP, however, contains only recommendations for actions in each of these areas. As such, it is not binding on any institution or activity.
4.1.2 LEGAL FRAMEWORK

The Environmental Protection Agency Act of 2003 (EPA Act)
The Environmental Protection Agency Act of (EPA Act) authorized the establishment of an overall institutional framework for sustainable management of the environment in Liberia, including creation of:

- National Environmental Policy Council
- Environmental Protection Agency
- Board of Directors
- Executive Director
- Environmental Units in Line Ministries
- Decentralized Environmental Committees
- County Environment Committees
- District Environment Committees
- Environmental Courts
- Environmental Inspectors
- Environmental Administrative Court
- Environmental Court of Appeals
- Environmental Funds
- National Environmental Fund
- Trust Fund

National Environmental Policy Council
The National Environmental Policy Council is responsible for formulating national environmental policy; setting environmental protection priorities, goals and objectives; and promoting inter-sectoral, private-public cooperation in the achievement of environmental policy. The 33-member council is inter-sectoral, is chaired by a Minister and composed of members from governmental institutions and private sector organizations appointed by the President.

Environmental Protection Agency
The EPA Act establishes EPA as “the principal authority in Liberia for the management of the environment.” The EPA is an autonomous body under the Executive Branch of Government overseen by a nine-member Board of Directors appointed by the President from specific government agencies and the private sector.

To assist it in its oversight responsibilities and advise the EPA, the Board of Directors is authorized to establish Technical Committees. The EPA Act specifically directs the Board to establish seven “standing” committees, one each on:

- Lands and Mines;
• Pollution;
• Health and Sanitation;
• Environmental Impact Assessment;
• Biotechnology;
• Forestry/Agriculture/Wildlife; and
• Marine and Coastal Ecosystems.

Each Technical Committees is to advise the EPA in its area of expertise. The Executive Director is required to assign an EPA staff person as Secretary to each Committee.

The day-to-day operations of the EPA are overseen by the Executive Director, also appointed by the President, from a “short list” prepared by the National Environmental Policy Council. The Executive Director is also responsible for the organization of the EPA. The EPA Act calls for the appointment of a Deputy Executive Director and Department Heads by the Board of Directors, but it leaves the determination of the organization, including the determination of what Departments are necessary, in the hands of the Executive Director.

The EPA is empowered to:

• Work with Line Ministries to implement environmental policy, including recommending necessary changes in sectoral laws and regulations; establish sectoral specific criteria, guidelines, specifications and standards for environmental management; and build their capacity for environmental management;
• Establish and implement an environmental impact assessment program;
• Collect and analyze data and undertake research necessary to develop indicators for environmental changes and prepare and disseminate state of the environment reports and national environmental action plans;
• Promote public awareness of environmental issues and public participation in decision making;
• Investigate reports of pollution and other related matters;
• Initiate and co-ordinate actions required in a state of environmental emergency or any other situation which may pose serious threat to the environment and public health; and
• Function as the national clearinghouse for all activities relating to regional and international environmental conventions, treaties and agreements, and donor-sponsored environmental projects.

**Line Ministry Environmental Units**

To facilitate the coordination between the EPA and Line Ministries, the EPA Act requires each Line Ministry to establish an environmental unit. The units are charged with ensuring compliance with the requirements of the act, making comments on environmental impact assessments, and liaising with the EPA on environmental management.

At the time of preparation of the ETOA, only the FDA had established an environmental unit.
Decentralized Environmental Committees
To decentralize environmental management, the EPA Act authorizes the establishment of County and District Environmental Committees and directs the National Environmental Policy Council to provide guidelines for their establishment. The County Committees are responsible for collaborating with and facilitating the work of national institutions for sustainable management of the environment in the County and ensuring that County-level environmental concerns are identified and integrated into County plans and projects. The Committee is also charged with preparing a County Environmental Action Plan every five years. Each committee is composed of county and district officials, traditional leaders, private citizens, and two local representatives to the national legislature as ex-officio members. The Committee is staffed by a County Environment Officer, hired by the EPA, but responsible to the County Committee.

The District Environment Committees are to be established by and report to the relevant County Environment Committee. They are charged with promoting environmental awareness, mobilizing the public to manage and monitor activities within the district to ensure that they do not have any significant impact on the environment. The District Committees are composed of district officials, mayors, chiefs, and private citizens and are staffed by a District Environment Officer hired by the EPA.

In addition to assisting the County and District Committees in the fulfillment of their responsibilities, the County and District Environment Officers are responsible for compiling reports to the EPA, promoting environmental awareness, and conducting public hearings on environmental impact assessment in the County and the District.

At the time of preparation of the ETOA, no County or District Environmental Committees had been established.

Environmental Courts
To provide for enforcement of environmental requirements and standards, the EPA Act provides for the appointment of Environmental Inspectors and the establishment of an Environmental Court system.

The EPA Act authorizes the EPA to “designate its officers and duly qualified public officers/civil servants … to be environmental inspectors within such Counties and District limits.” As such, Environmental Inspectors do not have to be EPA employees, but can also be designated officers or civil servants in other branches of the government. Environmental Inspectors are authorized to enter premises, inspect activities, take samples, and review records to ensure compliance with environmental rules and regulations.

The exact nature of the inspector’s enforcement authority is not spelled out in the EPA Act. Rather, the Act directs the EPA to “establish the conditions, rules and regulations governing the qualifications, performance, powers and duties of the Environmental Inspectors.” It appears, however, that the EPA Act anticipates Environmental Inspectors will be able to make on-site orders or requirements regarding correcting an activity deemed to be noncompliant with environmental rules and regulations and issue decisions regarding environmental compliance. These responsibilities are confirmed in the Environmental Protection and Management Law.

To hear and rule on compliance with environmental rules and regulations, the EPA Act set up a two tiered court system. The first tier is the Environmental Administrative Court. This court is to hear and rule on complaints relating to the environment. The complaints may be regarding the actions or decisions of the EPA or an Environmental Inspector, or may be brought by any person who wishes to “prevent, stop or discontinue” an action (or inaction) that damages the environment or accelerates unsustainable depletion of natural resources.
The Administrative Court is composed of five members—three lawyers, two of which must have environmental law qualifications; and two individuals with environmental science or management qualifications. All of the members are appointed by the President.

Decisions of the Environmental Administrative Court can be appealed to the Environmental Appeals Court, established at the Judicial Circuit level. The Appeals Court is comprised of five experienced judges with knowledge of national and international environmental law, appointed by the President.

At the time of preparation of the ETOA, the Environmental Court system had not been established.

**Environmental Funds**
The EPA Act authorizes two environmental funds: the National Environmental Fund and a Trust Fund. The National Environmental Fund is to be established to receive and disperse funds for environmental protection. Those funds come from:

- State budget allocations;
- All fees and other remuneration charged by EPA;
- Environmental fines and compensations ordered by court rulings;
- Contributions and/or donations from national and foreign bodies; and
- Income from research and experimental projects undertaken by EPA.

The Board of Directors of EPA is responsible for administration of the National Environmental Fund. The Fund is to be used for the protection, enhancement and management of the environment and natural resources in Liberia. To that end, the funds can be used for the operation of EPA, the operation of County and District Environmental Committees, or may be disbursed to Line Ministries for specific activities to protect the environment, with the approval of the Board of Directors of the EPA.

Section 50 of the EPA Act authorizes the creation of a Trust Fund. Apparently part of the language of Section 50 in the published version of the Act is missing, in that paragraph 1) of Section 50 states:

“The agency shall establish a Trust Fund for the sources of the Trust Fund shall consist of payments of:”

It appears that between the phrases “establish a Trust Fund for” and “the sources of the Trust Fund shall” is missing language that described what the Trust Fund is for.

As the published Act stands, it only describes what funds must go into the Trust Fund:

- Refundable performance bonds deposit for reclamation, rehabilitation and restoration of the environment;
- Such proportion of fees or fines as may be determined by EPA;
- Such proportion of fees and levies from industry and other projects; and
- Any contributions for the purposes of restoration of the environment.

At the time of preparation of the ETOA, neither of the funds had been established.
Environmental Impact Assessment and Restoration Orders

The EPA Act is primarily an act establishing the institutions required for implementation of the National Environmental Policy and the Environmental Protection and Management Law. However, it also contains two programmatic elements—Environmental Impact Assessment and Restoration Orders—for which it contains minimum requirements and penalties for noncompliance.

Section 37 of the Act requires EPA to established procedures for Environmental Impact Assessment (EIA) and requires private citizens and governmental agencies to comply with those procedures. Similarly, Section 40 of the Act authorizes EPA and Environmental Inspectors to issue restoration orders to any person, for the purposes of:

- Restoring degraded environment and natural resources;
- Preventing further damage to the environment;
- Preventing pollution;
- Compensation for damage to the environment; and
- Cleanup of waste or refuse.

The penalties for noncompliance with EIA regulations or restoration orders are up to $25,000 and/or 10 years in prison.

Environmental Protection and Management Law

The Environmental Protection and Management Law (EPML) forms the legal framework for the sustainable development, management and protection of the environment by the Environmental Protection Agency in partnership with relevant ministries, autonomous agencies and organizations. The Law stresses intersectoral coordination and authorizes EPA, in consultation with the relevant Line Ministries, agencies and/or authorities, to promulgate several procedures, measures, guidelines, plans, registries, criteria, licenses/permits, standards and regulations to protect the environment.

Part I of the Law presents the title and short title of the Law as well at the definitions of terms used in the Law. Part II contains the general principles and objectives under which the EPML is to be administered. These include:

- The principle of sustainable development;
- The pre-cautionary principle;
- The polluter-pays principle;
- The principle of inter-generational equity;
- The principle of public participation; and
- The principle of international cooperation in the management of environmental resources shared by two or more states.

In addition to these basic principles, the EPML directs that the Law be implemented so as to:

- Facilitate the restoration, protection, and conservation of biological diversity;
- Ensure respect, preservation, promotion and management of historic, cultural and spiritual resources;
• Comply with international environmental treaties that Liberia has ratified; and
• Enable and encourage environmental education and awareness.

Part II also contains Section 5 which grants the right to a clean and healthy environment to the people of Liberia and establishes legal procedures for securing those rights.

Part III contains detailed procedures for the implementation of an Environmental Impact Assessment (EIA) program for Liberia. This Part, along with Annex I that pertains to Part III, takes up a full one quarter of the text of the Law and provides enough detail and specific legislative language for EPA to implementation of an EIA program with minimal subsequent development of procedures (see Box X). Indeed, the only procedures that EPA is required to develop before implementing the EIA program are to:

• Prescribe the form and content of various documents used in the process (application for EIA permit, Environmental Brief, Scoping Document, Environmental Review, etc.);
• Develop regulations establishing the procedures for evaluating the impact of the proposed project;
• Establish the Agency Registry, into which relevant documents can be deposited for public review;
• Establish guidelines for reviewing the qualifications of professionals authorized to prepare EIA documents and a Registry of the names and qualifications of approved professional; and
• Establish a fee system for EIA applications.

EPA has already taken action on most of these requirements.

Part IV of the EPML (Sections 31 through 50) concerns the establishment of environmental quality standards. The Law requires EPA, in consultation with relevant Line Ministries, to establish a national environmental quality monitoring system. It also requires that the EPA work with relevant Line Ministries to establish environmental quality standards and/or guidelines for:

• Water Quality
  – Ambient Standards
  – Use Standards
  – Effluent Standards

• Air Quality
  – Ambient Standards
  – Occupational Standards
  – Emissions Standards

• Hazardous Wastes and Materials
  – Classification System
  – Guidelines for Handling, Storage, Transport, and Disposal

• Solid Waste Management Guidelines
• Soil Quality
  – Standards
  – Management Guidelines
• Noise and Vibration Standards and Guidelines
• Ionization and other Radiation Standards
• Noxious Odors Standards
• Other Environmental Standards for:
  – Labor and Work Places
  – Industrial Products
  – Materials Used in Industry, Agriculture and for Domestic Uses;
  – Consumer Products
• Guidelines for Environmental Disasters

In addition to requiring the promulgation of standards and guidelines, many of these sections also include provisions for implementing a management or regulatory program for implementing those standards or guidelines.

Part V of the EPML (Sections 51 through 73) covers pollution control and licensing. This part, in conjunction with many of the requirements in Part IV, provides for the development of programs to manage: Pesticides, Toxic and Hazardous Materials, Leaded Gasoline and Paint, Hazardous Waste, Wastewater Effluents, Solid Waste Management, and Air Pollution.

Parts VI and VII of the EPML authorize programs to manage natural resources and biodiversity. These parts include requirements for the establishment of programs to protect and sustainably manage rivers, lakes, wetlands, coastal zones, marine environments, forests, natural heritage sites wildlife, and genetic resources. Also included in these parts are programs for land use planning, energy management, and protection of the ozone layer. All of the programs identified in these parts require consultation with the relevant Line Ministry. However, the wording is always that the “Agency shall promulgate,” leaving some confusion as to who should take the lead for some activities such as management of forests and protected areas and pesticide management where other government agencies (the FDA and the Ministry of Agriculture respectively) have been given responsibility by their authorizing laws.

Parts VIII, IX and XII deal with enforcement of the requirements of the EPML, including Restoration Orders, the roles and responsibilities of Environmental Inspectors and offences of the requirements of the EPML. Part IX also includes requirements for the designation of analytical and reference laboratories to conduct the analyses necessary for enforcement of the Law.

The remaining parts of the EPML deal with international and regional environmental treaties, conventions, and agreements (Part X), environmental education and awareness (Part XI), and miscellaneous provisions (Part XII). One of the miscellaneous provisions charges EPA to recommend to the legislature regulations that are “required or permitted” by the EPML. This provision is somewhat confusing, in that Law repeatedly states that EPA shall promulgate regulations, guidelines, procedures,
measures, standards and licenses. Generally, in Liberia, regulations are initiated by a technical Line Ministry or agency and Ministers or Heads of agencies can sign regulations into law. UNEP’s 2007 review of Liberia’s environmental policies, acts and laws concluded that:

“It is not clear whether these references to the Legislature in the context of subordinate legislation are erroneous, although it appears they may be. If they are, legislative amendment will be required. However, the view of UNEP-PCDMB that references to the Legislature as subordinate law-maker do not preclude the EPA from having subordinate law-making powers under the EPA Act and EPM Law is supported. The view is bolstered by precedent and accepted practice in Liberia, and by the evidence of the drafters’ intention in specific and mandatory regulation-making obligations imposed on the EPA in relation to certain sectoral areas under the EPM Law.”

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**Environmental Impact Assessment in Liberia (EPA Act Section 37 and EPML Sections 6-33)**

The EPA Act and the EPML requires that all public or private projects that may have a significant impact on the environment secure an environment impact assessment (EIA) permit prior to commencement of the project.

The process begins with submittal of an application for a permit along with a Project Brief. The Project Brief includes a brief description of the project and its potential environmental impacts. The EPA, in consultation with the relevant government entity (Line Ministry or other government agency or authority), reviews the Project Brief and determines into which category the project falls:

- It is unlikely to have significant impacts on the environment, and so can be awarded a EIA permit and EPA.
- It may have significant impacts on the environment, so the developer must prepare an Environmental Review.
- It will have significant impacts on the environment, so the developer must prepare an Environmental Impact Study (EIS).

Prior to preparing an Environmental Review or an EIS, the developer must conduct a public consultation, called Scoping, through which the views of stakeholders and affected parties are solicited regarding the issues and alternatives to be included in the Review or EIS. The Scoping process results in the preparation of a Scoping Report documenting the results of the public consultation and made available for public review.

An Environmental Review is a more elaborate Project Brief, providing sufficient information to enable EPA to determine the significance of the potential environmental impacts. The Review must address the alternatives and issues identified during Scoping and often will include mitigation measures. The EPA, in consultation with the relevant government entity, reviews the Environmental Review and determines if the environmental concerns have been adequately addressed, and therefore an EIA permit can be awarded, or if the developer needs to produce a full EIS for the project.

An EIS is detailed project evaluation including an assessment of the environmental impacts of the proposed project and reasonable alternatives to the proposed activities. It must also include mitigation measures and a monitoring plan. The EIS is reviewed by EPA, the relevant government entity, and the public, via public distribution of the document as well as a public hearing. After the review, the EPA must issue a decision:

- Approve the project unconditionally if it is satisfied that it will not result in significant damage to the environment.
- Approve the project conditionally by requiring the developer to modify the project based on suggestions or comments made during the reviews.
- Refer the EIS back to the applicant for further study.
- Reject the application due the significance of the impact.

EPA is required to publish its decision and the reasons for the decision and make the publication available to the developer and the public.

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4.2 FOREST POLICY

Liberia’s prolonged civil conflict has led to great loss of life, economic collapse, mass migration and internal displacement, as well as destruction of much of the country’s infrastructure. The forestry sector has suffered from these problems and, in the past was characterized by weakened forest governance, including the use of forest revenues to fund armed conflict which resulted in the United Nations Security Council placing sanctions on all exports of timber and timber products from Liberia in July 2003.

Liberia’s new forest policy aims to rehabilitate and reorient the forestry sector under Liberia’s new climate of openness and increased public participation. The policy focuses on maximizing the benefits of the forestry sector to Liberian society, but with a special emphasis on the contribution of the sector to poverty alleviation. The policy intends to do this by balancing and integrating the commercial, community and conservation uses of Liberia’s forests, so that they can continue to produce vital environmental goods and services as well as support the economic development of the nation.

Table 4 presents a summary of some of the relevant policy developments in Liberia over the last 50 years.

<table>
<thead>
<tr>
<th>Year</th>
<th>Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>1953</td>
<td>Creation of Bureau of Forests and Wildlife Conservation</td>
</tr>
<tr>
<td>1956</td>
<td>Liberia Code of Law, Subset 2, permits the creation of government reserves, native authority reserves, communal forests and national parks</td>
</tr>
<tr>
<td>1976</td>
<td>Creation of Forestry Development Authority</td>
</tr>
<tr>
<td>1983</td>
<td>Creation of Sapo National Park</td>
</tr>
<tr>
<td>1988</td>
<td>Wildlife and National Parks Act</td>
</tr>
<tr>
<td>2000</td>
<td>The New National Forestry Law</td>
</tr>
<tr>
<td>2002</td>
<td>Production of the National Environmental Strategy and the Environmental Protection and Management Law</td>
</tr>
<tr>
<td>2003</td>
<td>Proclamation of the East Nimba Nature Reserve</td>
</tr>
<tr>
<td>2003</td>
<td>United Nations Security Councils places sanctions on the export of timber and timber products originating from Liberia</td>
</tr>
<tr>
<td>2003</td>
<td>Establishment of the Environmental Protection Agency</td>
</tr>
<tr>
<td>2003</td>
<td>Establishment of a protected areas network</td>
</tr>
<tr>
<td>2003</td>
<td>Extension of Sapo National Park</td>
</tr>
<tr>
<td>2006</td>
<td>National Forestry Reform Law is passed and timber sanctions are lifted</td>
</tr>
</tbody>
</table>

Source: FDA (2006)

4.2.1 NATIONAL FOREST POLICY

Aim
The aim of the forestry policy of Liberia is to conserve and sustainably manage all forest areas, so that they will continue to produce a complete range of goods and services for the benefit of all Liberians and contribute to poverty alleviation in the nation, while maintaining environmental stability and fulfilling Liberia’s commitments under international agreements and conventions.
Objectives

- To ensure that commercial forestry, community forestry and forest conservation activities are integrated and balanced to optimize the economic, social and environmental benefits from the forest resource;

- To conserve a representative sample of forest ecosystems so that important environmental functions are maintained;

- To contribute to the national development goals of poverty alleviation and increased food security by increasing the opportunities for forest-based income generating activities;

- To grant more equitable access to forest resources so that the potential for future conflict is reduced and the benefits from forestry development are shared throughout Liberian society;

- To ensure that all stakeholders participate in the formulation of forestry policies and in the conservation and management of the forest resource;

- To maximize the contribution of the sector to income, employment and trade through the development of appropriate processing activities;

- To ensure that forestry development contributes to national development goals and international commitments (including regional cooperation and trans-boundary issues) and is coordinated with other relevant branches of government; and

- To ensure that activities in the forestry sector (including forest management, plantation development, harvesting, conservation and industrial development) are based on sound scientific and technical principles.

Implementation Strategy

The objectives above are all of roughly equal priority. However, achieving some of these objectives will require relatively more effort than others. All future public plans, programs and projects in the sector will be directed towards meeting these objectives. They will be implemented within the framework set-out below, which include activities that will benefit the conservation, community and commercial uses of forests, as well as a number of cross-cutting activities.

Strategy for Commercial forestry

The strategy for commercial forestry focuses on improving forest concession management, reforestation and forest plantation development and modernization of the wood processing industry.

Forest concession Management

Historically, forest concession management in Liberia has suffered from a lack of basic information about appropriate forest management and harvesting practices and the rules and regulations governing forest concessions have been poorly designed and weakly enforced. The policy provides for the following activities aimed at establishing a transparent and efficient forest concession system that will result in sustainable forest management in forest concessions:

- Develop and implement a set of rules and procedures for forest management in concessions, including a logging code and a new forest concession contract that sets out requirements for the following: forest management plans; environmental impact assessment; legal and financial qualifications; and local participation in the sector;
• Demarcate forest concession boundaries and implement a transparent and competitive concession allocation system;

• Develop and implement an effective production monitoring system;

• Develop and implement a mechanism to share the benefits from forest concession activities between the government, private sector and local communities; and

• Develop and implement procedures for awarding concessions or licenses to local communities and local, small-scale enterprises.

Reforestation and Forest Plantation Development
Over the last 30 years, the Forestry Development Authority has been responsible for forest plantation establishment and management and has created around 11,000 hectares of forest plantations. In addition, they have encouraged local people to plant trees in agroforestry schemes to promote income generation and food security. The success of public sector tree planting has been limited by poor site-species selection and inadequate management, resulting in poor yields and low economic returns. In addition, local people have been hired as labor to plant and care for trees rather than being taken on as partners in forest plantation development and sharing the benefits from such developments.

The policy provides for the following activities aimed at reducing the pressure on natural forests and providing new opportunities for income generation by expanding the area of forest plantations and agroforestry schemes to create new, financially viable sources of forest products for processing and local use:

• Develop and implement a national reforestation program, based on sound scientific and technical principles (best practices) and including realistic annual targets for new planting, enrichment planting and agroforestry;

• Develop appropriate mechanisms and incentives to encourage involvement of the private sector and local communities in reforestation; and

• Encourage tree planting for environmental improvement and income generation in green belts within and around urban areas.

Modernization of the Wood Processing Industry
The wood processing industry can be a source of investment and employment in the Liberian economy and should contribute to value added in the sector. However, historically log production has been export-orientated and focused upon a few very high-valued species. This dependence on a limited range of species (and harvesting above the sustainable yield in recent years) has probably affected the sustainability of forest management. Even in the period prior to the recent civil conflict there were few large-scale processing plants and not all forest concessionaires installed sawmills. Sawmills produced lumber primarily for export with residual production for domestic markets. Only three plywood/veneer plants were constructed and these operated for a short period before being destroyed or looted along with much of the rest of the installed wood processing capacity.

The policy provides for the following activities aimed at promoting value added in the wood industry, increasing the utilization of lesser-used and lesser-known timber species and ensuring improvements in efficiency in the industry:
Create an adequate legal and regulatory framework for the wood industry;

Ensure access to export markets;

Provide market intelligence and other information to the wood industry;

Promote training programs in the wood industry;

Ensure that the export of round logs is discouraged to encourage more local processing;

Encourage the production of diversified wood products, such as treated and kiln-dried sawnwood, wood based panels, pulp and paper; and

Encourage the development of the cottage industry, such as rattan processing.

**Strategy for Community Forestry**

In addition to the need for greater involvement of local people in all aspects of the forestry sector, the National Forest Policy gives special attention to the potential for forests to contribute more to local people and communities. The policy strategy for community forestry focuses on the production of bushmeat, wood energy and other non-wood forest products, as well as the management of forests by local communities to meet a variety of differing objectives.

**Community Forest Management**

For the large number of people who live in rural areas, forests and trees have always been an integral part of their livelihoods. With appropriate management, they can be used both as a sustainable source of forest products and as areas that are protected for important social and cultural uses. The Liberia Code of Law (1956) permitted the creation of government reserves, native authority reserves, communal forests and national parks, but few native authority reserves and communal forests materialized. Consequently, the government managed the entire forest estate and the issues of community forest management were never properly addressed. Community forest management presents a number of challenges in Liberia, because the government and other institutions have very little understanding or experience with the management of common property resources. To overcome these challenges, it will be essential to assess the needs and perceptions of local communities and individuals.

In this context, the policy provides for the following activities aimed at encouraging local communities to sustainably manage their forests by creating rights, transferring control and building capacity for forest management within local communities:

- Establish a framework for community forest management that allows communities to maximize benefits from all potential uses of forests and to grant user and management rights and responsibilities to them;

- Empower local communities to identify opportunities, set objectives and local management rules and liaise with government and other interested stakeholders;

- Provide extension and technical assistance in community forest management; and

- Locate and practice community forestry on communal land.
**Bushmeat and Hunting**

Liberians have always been very dependent on bushmeat as a source of protein and, in recent years, commercial hunting for bushmeat has accelerated rapidly. This increase can be attributed to greater demand from urban areas and neighboring countries and the high level of income that can be quickly achieved from hunting. In addition, the civil unrest has weakened the government’s ability to control these activities. For example, it is now estimated that prohibited or fully protected wildlife species account for about 35 percent of bushmeat sales and partially protected species account for a further 40-50 percent.

The policy provides for the following activities aimed at re-establishing control over bushmeat hunting, to bring the level of hunting down a sustainable level and stop the hunting of protected species:

- Enforce the ban on hunting of all protected wildlife species in Liberia;
- Design and implement programs to support income generating activities in rural communities as an alternative to commercial hunting; and
- Design and launch a national awareness campaign about bushmeat and hunting issues.

**Wood Energy and Non-Wood Forest Products**

Liberia has never been more dependent on wood energy as a source of national and household energy supplies than at present. The continued absence of a functioning national electricity grid or cost-effective alternatives for the majority of both urban and rural people means that the dependence upon fuelwood and charcoal is unlikely to be lessened in the short term. Likewise, non-wood forest products often fulfill vital safety net functions in rural livelihoods and could further contribute to poverty alleviation as additional sources of household income and small business development. However, the lack of an adequate regulatory framework and clear access and utilization rights has prevented the rational exploitation of these resources by forest and rural communities, as well as the private sector. In particular the commercialization of charcoal and non-wood forest products has largely been restricted by petty (and often unenforceable) regulations.

The policy provides for the following activities intended to improve household wood energy access and utilization and enhance the contribution of non-wood forest products to livelihoods and the economy:

- Ensure adequate legal and regulatory frameworks for the production and commercialization of fuelwood, charcoal and non-wood forest products;
- Conduct periodic market surveys and provide market information on wood energy and non-wood forest products; and
- Encourage rural extension services to promote the use of wood energy and non-wood forest products as an alternative livelihood for rural communities and the adoption of improved technology in the production and utilization of wood energy.

**Strategy for Forest Conservation**

Forest conservation includes the management of specific sites of high conservation value and the integration of conservation objectives into all aspects of forest management. The strategy for forest conservation focuses on wildlife and protected area management, management of wetlands and mangroves and the development of ecotourism and nature tourism.
Wildlife and Protected Area Management

Liberia contains two of West Africa’s three largest remaining rainforest blocks. These blocks contain many plants and animal species that are endemic and whose survival is severely threatened outside Liberia. They have also been identified by international agencies as a “biodiversity hot spot” and, therefore, a priority for global conservation efforts. There are currently two strictly protected areas in Liberia: Sapo National Park (established in 1983); and East Nimba Nature Reserve (established in 2003). In addition to these, six other protected areas have been proposed and the government has committed to establishing a biologically representative network of protected areas covering at least 30 percent of the existing forest area (Protected Forest Act, 2003).

The policy provides for the following activities intended to address the main threats to Liberia’s protected areas - agricultural encroachment and uncontrolled hunting, fishing, logging and mining:

- Collect and analyze biological and socio-economic information to determine the status of existing and proposed protected areas and finalize the establishment of an appropriate protected areas network;
- Increase community participation in wildlife management in all forest areas and, in particular, through collaborative management of protected areas;
- Increase public awareness of forest conservation issues;
- Strengthen and improve alternative livelihood opportunities to reduce rural dependence on forests and wildlife; and
- Improve co-operation with neighboring countries to address trans-boundary conservation issues.

Management of Wetlands and Mangroves

The coastline of Liberia includes a few areas of wetlands and mangroves, which provide subsistence and economic benefits to the local population and are of some importance for environmental management and biodiversity conservation. In addition, Liberia has acceded to the RAMSAR convention on Wetlands. Liberia’s wetlands and mangroves provide a habitat for several protected species as well as commercially useful species of plants and animals. They also protect the coastline from erosion and are used to provide other goods and services such as fuelwood.

The policy provides for the following activities intended to reverse the degradation of Liberia’s wetlands and mangroves:

- Assess the current status of wetlands and mangroves, to determine the extent of the resource and its ecological integrity;
- Develop and implement a national wetland and mangrove management plan;
- Increase public awareness of the importance and value of wetlands and mangroves; and
- Provide technical and financial support to local communities for the management of wetlands and mangroves, including training and the development and implementation of community-based management programs.

Development of Ecotourism and Nature Tourism

Much of ecotourism and nature tourism is focused on forests and their related wildlife. The development of such activities presents emerging challenges and opportunities for forest management. For example,
the development of ecotourism and nature tourism can generate much-needed income and employment for rural communities without the harvesting of forest and wildlife resources.

The policy provides for the following activities intended to strengthen the opportunities for the development of ecotourism and nature tourism so that income and employment in the sector will increase:

- Establish park entrance user fees and use the revenue collected to invest in tourism-related infrastructure in parks;
- Develop and implement a marketing strategy to promote ecotourism and nature tourism in Liberia;
- Encourage private sector investment in community-based ecotourism and nature tourism; and
- Integrate ecotourism and nature tourism into rural development and forest management plans.

**Cross-Cutting Activities**

In support of the above strategies, the policy provides for a number of cross-cutting activities intended to strengthen the overall framework for the development of the forestry sector. These include land tenure, ownership and land use planning; public administration (including financial management); research, information, education and training; and legislation and law enforcement.

**Land Tenure, Ownership and Land Use Planning**

Forests are the most important natural assets for many rural people and access to forest resources is recognized as a crucial element in enabling them to achieve their goals of cultural survival and social and economic development. Insecure land tenure discourages investment in forest management, encourages over-exploitation and can lead to conflicts over access. Successive governments in Liberia have gradually increased government control over land and natural resources, which has led to many of the problems described above.

Land-use planning is the systematic assessment of the economic, social and environmental benefits of alternative land uses, to identify and select suitable land uses on any particular site. It also includes the development of processes to assess and manage the conversion of land from one use to another. Competing uses for land include: forestry; agriculture; mining; and urban and infrastructure development. It is generally accepted that there has been inadequate land use planning in Liberia, leading to environmental degradation and conflicts over land use.

The policy provides for the following activities aimed at clarifying land tenure and ownership and improving land use, and to support sustainable forest management and reduce conflicts over land:

- In collaboration with other government agencies, establish a system for classifying and defining forest land use and produce maps showing the total forest estate and the allocation of forest areas according to this classification;
- Review the existing laws on forest land tenure and ownership and, within the forest estate, identify, classify and map forest areas by ownership and define the ownership and management rights and responsibilities of different forest users;
- Develop a process and procedures for managing land use change, so that the suitability of proposals to convert forest to other uses can be assessed and agreed; and
• Maintain collaboration between government agencies with responsibilities for land use and land use planning.

Public Administration
Public administration of the forestry sector includes the design, implementation, monitoring and evaluation of policy. This may include an enforcement function and it can include direct activities in the sector (such as the management of forest resources, provision of technical advice and collection and dissemination of information). Nowadays, it also usually includes facilitating dialogue with and amongst different stakeholders in the sector. The goal of a forestry administration is to steer future developments in a direction that meets the many and diverse demands of society. To do this in a way that is efficient and fair, it is important that the forestry administration is open, transparent and accountable and encourages public participation in the policy process. This is often referred to as “good governance”. The main branch of government responsible for the forestry sector in Liberia is the Forestry Development Authority. Historically, it played a major role in the development of the sector by performing a wide range of regulatory and management functions. However, as a result of the political and civil conflict, the capacity of the Forestry Development Authority has been eroded by the theft and destruction of infrastructure and equipment and the attrition of skills and staff motivation. Corruption and poor governance has also weakened its ability to carry out the functions described above.

The policy provides for the following activities aimed at strengthening the forestry administration:

• Introduce sound financial management, including independent oversight of expenditure and revenue collection, regular revision of forest charges and adequate funding to implement forestry policy;

• Improve transparency and accountability, by strengthening the monitoring, evaluation and reporting of all activities;

• Raise the level of performance of Forestry Development Authority staff to ensure independence, accountability and professional management;

• Improve public participation in the sector through consultation with all relevant stakeholders about the future design and implementation of policy; and

• Increase efficiency by decentralizing decision making and delegating authority (where this is feasible and appropriate) and minimizing the costs of complying with forest laws and regulations.

Research, Information, Education and Training
Scientific and technical knowledge is the foundation for sustainable forest management. It is essential that this knowledge should be accumulated and disseminated to all stakeholders in the sector. Currently, there is very little information about forest management and silviculture in Liberia and much of the documentation of earlier research programs (undertaken in the 1970s and 1980s) has been lost. In addition, the country suffers from a lack of specialized knowledge and trained manpower in all aspects of forest management and wood processing.

The policy provides for the following activities intended to support sustainable forest management by improving the collection and dissemination of information and increasing the skills of all stakeholders in the Liberian forestry sector:

• Update and restore the infrastructure (buildings, equipment and facilities) for research, education and training;
- Create an up-to-date forest information database to monitor sustainable forest management (including: forest resources; production; consumption; and other information) and establish a program to collect, update and disseminate this information often;

- Update the skills of all stakeholders to raise forest management to an international standard, through professional and on-the-job training; and

- Assess the needs for research to support forest management, harvesting and processing and commission research in high priority areas.

**Legislation and Law Enforcement**

Implementation of the above policy will require a review of existing legislation and, most likely, the amendment of some legislation. In addition to this, there will also be a need to strengthen the procedures for law enforcement.

The policy provides for the following activities intended to support the policy implementation and contribute to all policy objectives:

- Review and, where necessary, update all existing forest legislation (including laws, regulations, administrative rules and procedures) so that they support the aim and objectives of this policy;

- Strengthen forest law enforcement, through training and adequate funding of forest law enforcement activities and stricter penalties for illegal activities;

- Improve co-operation with neighboring countries to strengthen forest law enforcement with respect to illegal and unreported trade in forest and wildlife products; and

- Develop and introduce a process for public consultation, adjudication of disputes (ombudsman) and public reporting of forest law compliance.

**4.2.2 LEGAL FRAMEWORK**

The legal framework for the National Forestry Policy is grounded in the following:

- **Bureau of Forests and Wildlife Conservation (1953):** The first Liberian forestry administration - the Bureau of Forests and Wildlife Conservation - was created in the Ministry of Agriculture in February 1953 as part of “An Act for conservation of the Forests of the Republic of Liberia”. The Bureau concentrated mostly on forest inventories and concession allocation, but it was gradually realized that the Bureau did not have the financial freedom and flexibility necessary to supervise the sector.

- **The Forestry Development Authority (1976):** The Forestry Development Authority was created by a Special Act in December 1976. This Act repealed all previous forestry and wildlife laws and granted the Forestry Development Authority the power to issue, amend and rescind forestry and wildlife regulations. The Act defined the objectives for the sector, which were grouped into three broad themes: establishing a permanent forest estate made up of National Forests and National Parks; optimizing the contribution of forestry to the national economy; and increasing public involvement in forest conservation and management through the creation of communal forests and agroforestry programs.

  Under this Act, the Forestry Development Authority’s functions covered the following: formulating forestry policy; forest resource management; control and management of concessions; collection of revenue from forest activities; research (including market intelligence); and training. From 1976 until 2000, the Forestry Development Authority issued 27 regulations that dealt mostly with the
administration and management of forestry and wildlife activities (including forest charges, fines and penalties), but there was little assessment of the impact of these developments or any reformulation of policy. Consequently, the Forestry Development Authority remained highly centralized institution, with a predominant focus on industrial production.

- **Revised National Constitution (1986):** The Constitution gave the government the power to manage the national economy and natural resources of Liberia and required the legislature to ratify agreements (including forest concessions).

- **The New National Forestry Law (2000):** In 2000, “The New National Forestry Law”, amended or repealed certain provisions of the existing forest laws. The final version of the law was controversial, as it transferred powers over the sector from the legislature to the executive.

- **National Forestry Reform Law (2006):** In 2006, “An act adopting the national forestry reform law of 2006” was passed, which amended the National Forestry Law of 2000 and the Act Creating the Forestry Development Authority. This law recognizes the problems of the past and stresses the integration of community, conservation and commercial forest management for the benefit of all Liberians.

Additionally, Section 9.11.c (Wildlife Conservation) and Section 10.1.c (Community Empowerment) under the 2006 Forestry Reform state respectively that:

- “The Authority shall, within one year of the effective date of this Law, present to the Legislature for consideration and passage a comprehensive framework law for Wildlife Conservation and protection”; and

- “The Authority shall, within one year of the effective date of this Law, present to the Legislature for consideration and passage a comprehensive law governing community rights with respect to Forest Lands.”

Although behind schedule, the new WB GEF initiative, Consolidation of Liberia Protected Area Network (COPAN) project will finance a review of existing wildlife legislation, elaborate and print a draft law on wildlife utilization and management and its validation through a national workshop before being submitted to Parliament.

The development of the law governing community rights with respect to forest lands is more advanced. FDA, with technical assistance provided by the Land Rights and Community Forestry Program (LRCFP) has produced and vetted several drafts, and a final draft is expected within the next 2-3 months.

### 4.3 DRAFT FISHERIES POLICY

There has been no fisheries policy in Liberia for over a decade as a result of the conflict. With FAO assistance, The Ministry of Agriculture is now formulating a national fisheries and aquaculture policy intended to strengthen Liberia’s maritime and fisheries laws, regulations and capacity to ensure sustainable management and development.
Key elements of the draft policy include:

**Guiding Principles**

- *Conservation and Sustainable Resource Use.* The Government will endeavour to maintain ecosystems health and functioning, environmental protection, conservation and enhancement of mangroves and wetlands, maintenance of biological diversity, and pollution free marine and freshwaters;

- *Global Responsibility.* The Government will work cooperatively with Governmental and Non-Governmental agencies, institutions and organizations that are involved in environment and natural resources management to strengthen environmental conservation strategies, and will actively pursue collaboration and cooperation with countries in sustainable fisheries conservation, protection and management;

- *Responsible Fisheries Management.* The Government shall ensure that the national fisheries and aquaculture policy is consistent with the FAO Code of Conduct for Responsible Fisheries (CCRF). Provisions of the CCRF that are relevant to the sustainable development of fisheries and aquaculture in Liberia will be incorporated in the national fisheries legislation and accompanying regulations;

- *Collective Decision-Making.* The Government shall seek the participation of grassroots fisheries community organizations, farming communities engaged in aquaculture, the private sector fishing industries, national and international Non-Governmental Organizations involved in fisheries and aquaculture, and the country’s development partners, in sustainable fisheries management; and

- *Transparency and Accountability.* There shall be openness in access to information, in the elaboration of plans, and in decision-making. Also, the decision makers should be accountable and be available to answer to the stakeholders who may be affected by their decisions.

**Policy areas**

The draft fisheries policy provides for a number of policy areas concerning the environment. These areas are highlighted below.

- *Monitoring, control and surveillance (MCS).* The objective is to establish a national surveillance system capable of assuring national security and protecting the Liberian territorial waters and the EEZ (Exclusive Economic Zone). With particular reference to fisheries, the primary objectives are to control and monitor fishing activities and prevent poaching and other forms of IUU fishing;

- *Fisheries scientific research.* Fisheries research is an essential component of fisheries development and management. The policy will develop a comprehensive fisheries research program to provide Government the scientific information and knowledge it needs to make informed decisions on fisheries management and development;

- *Conservation and enhancement of the aquatic environments and ecosystems.* The overall objective of this policy area is to maintain ecosystems health and functioning through environmental protection, conservation and enhancement of mangroves and wetlands, maintenance of biological diversity, and maintaining pollution free marine and freshwaters. Measures for the protection of these natural resources and habitats and the maintenance of biological diversity will be pursued in close collaboration with the line Ministries and Departments of the natural resources sectors, the Environment Protection Agency, the Municipalities and communities and the few NGO’s working in these sectors;
Interagency collaboration and cooperation in sustainable fisheries management and development. In order to improve fisheries management and ensure sustainable implementation of development programs and projects, the MOA through the BNF will establish meaningful working relationships with other Government agencies and institutions whose mandates touch on fisheries and aquaculture, environment and natural resources conservation and management;

Promote sub-regional, regional and international cooperation in fisheries management. The policy objective is to foster external collaboration and cooperation in fisheries management. Liberia will work to strengthen sub-regional, regional and international cooperation in fisheries management. The country will accede to international fisheries agreements, conventions and protocols as an essential foundation for partnership and sub-regional and regional cooperation in sustainable fisheries management; and

Continue collaboration, cooperation and strengthening of the Fishery Committee for the West Central Gulf of Guinea for Liberia, Cote D’Ivoire, Ghana, Togo, Benin and Nigeria to promote sustainable fisheries management, to better manage shared and transboundary fish stocks through joint research programs, joint management of coastal zones and ecosystems, collaboration on pollution control, harmonization of national legislation and policies, and in the joint monitoring, control and surveillance activities. Integrating Youths and Ex-combatants into fisheries and aquaculture development.

4.3.1 LEGAL FRAMEWORK
The Natural Resources Laws of 1956 (revised in 1961 and 1973) are still en-force in Liberia. In 1972, FAO assisted the Government of Liberia to revise the Natural Resources Laws of 1956 but Presidential approval was not obtained up to the time of the military coup d’état in 1980. In March 1999, draft fisheries legislation was prepared but never finalized and approved by Government.

Currently, FAO is helping the GOL to elaborate new fisheries legislation to replace the Natural Resources Laws of 1956. The new fisheries legislation will have an international character and dimension incorporating relevant provisions of the Code of Conduct for Responsible Fisheries and other international agreements, conventions and protocols addressing fisheries, natural resources and environmental issues. The new fisheries legislation will strengthen the maritime and fisheries laws and regulations and at the same time strengthen national capacity for Monitoring, Control and Surveillance (MCS) to control and regulate fishing and effectively curb and eventually eliminate poaching and other forms of IUU fishing within the Exclusive Economic Zone (EEZ) of Liberia.

The draft legislation—“An Act Adopting the National Fisheries Law Of 2008” contains several provisions which could have a positive impact on marine and aquatic ecosystems. These include:

Section 1.5.2 (Purpose and objectives). Fisheries conservation and management measures undertaken pursuant to this Law shall seek to achieve the following objectives:

- The conservation of fisheries resources at levels which meet the needs of present and future generations;
- The preservation of the quality and biological diversity of fisheries resources and ecologies;
- The use of appropriate fisheries technology; and
- The protection of water quality, fish habitats and spawning grounds; and the avoidance of the creation of excess fishing capacity and the risk of over-fishing.
In fulfilling the objectives set out in subsection 2), fisheries conservation and management measures shall be based on the best scientific evidence available and on the precautionary principle in that the absence of full scientific information shall not be used as a reason for postponing or failing to take effective action where there are risks of serious or irreversible harm to fish stocks and/or habitats.

- **Section 7.7 (Conservation measures).** The Minister may prescribe fisheries conservation measures for the conservation of fisheries as well as measures for the protection of the marine environment, including measures that:
  - Specify the place and time in which fishing may be undertaken;
  - Specify the species, size and other characteristics and quantity of fish that may be targeted or caught;
  - Specify fishing methods and gear that may be used;
  - Limit fishing capacity;
  - Prohibit at all times, or during a specified period, the taking, from any specified area of the fishing waters of Liberia of fish or fish included in a specified class of fish and in the case of a specified class of crustaceans, females having eggs or spawn attached to them, and the processing of such fish on a vessel in the specified area;
  - Prohibit the taking, from any fisheries waters, of fish included in a specified class of fish that are less or greater than a specified size, or have dimension less or greater than a specified dimension, or have a part with dimension less or greater than a specified dimension in relation to that part;
  - Prohibit the taking, from any fisheries waters, of fish, or of fish included in a specified class of fish by a specified method or gear, or by persons other than a specified class of persons, or by vessels other than a specified class of vessels;
  - Prohibit the buying, selling, landing, sale, receiving, possession or export of fish or of fish included in a specified class of fish;
  - Prohibit a person from having in his possession or in his charge in a vessel, in any area of the fishing waters of Liberia, gear of a specified kind for catching fish unless the gear is stowed and secured;
  - prohibit a person from using, or having in his possession or in his charge in a vessel, in any fisheries waters, a quantity of equipment of a specified kind for taking fish that is in excess of a quantity specified in, or ascertainable as provided in, the notice;
  - Prohibit the discharge of wastes or effluent from a fishing vessel;
  - Prohibit a person from using or having in his possession or in his charge a vessel or a class of vessels, in any fisheries waters to which a notice under Paragraph (f) applies, equipment of a kind to which the notice applies, unless there is a license in respect of the equipment;
  - Prohibit the conduct of a specified type of related activity by persons other than a specified class of persons or in a specified manner;
  - Prohibit the taking of protected or endangered species of fish; and
  - Prohibit such other activities as may be prescribed from time to time.
Section 7.9 (Marine Reserves). After consulting the minister responsible for defense, the minister responsible for transport, the Environmental Protection Agency, the Minister may declare any part of the maritime fishing waters of Liberia to be a Marine Reserve for the purpose of:

- Protecting or regenerating of fisheries resources and marine ecosystems including breeding grounds and flora or fauna under threat of extinction;
- Promoting scientific study and research; and
- Preserving and enhancing the natural beauty of such area.

Within a Marine Reserve, no person may:

- Engage in fishing or related activities;
- Take or destroy any other fauna or any marine plants;
- Dredge or extract sand, gravel or stone;
- Discharge or deposit any waste or other polluting matter;
- Construct or erect any building or structure;
- Undertake any activity which may adversely impact the ecosystems of that area; and
- On the approval of the Government, the Minister may alter the boundaries of a Marine Reserve.

Sections 10.3, 10.4 and 10.5 deal with international conservation and management agreements, including the authority to enter into such agreements, their implementation and “giving effect” to such agreements.

4.4 NATIONAL INTEGRATED WATER RESOURCES MANAGEMENT POLICY (DRAFT 2007)

Although MLME has the overall responsibility for water resources management, actual responsibilities are currently fragmented across several government agencies, including the Ministry of Rural Development, Ministry of Health and Social Welfare, the Ministry of Agriculture, Ministry of Transport, FDA, EPA, and several boards and committees including the National Water Resources and Sanitation Board (NWRSB), the National Public Health Committee, the Water and Sanitation Coordinating Committee (WATSAN) and the Liberia Water and Sewage Corporation.

Given this above, The Ministry of Lands, Mines and Energy (MLME) has elaborated a National Integrated Water Resources Management Policy which provides a framework for water resources management in Liberia. The draft policy adopts an integrated approach and encourages the participation and support of all stakeholders in the water sector. The Policy is also intended to assist decision-makers and resource users in determining their roles in water resources management, "who does what" and "how", and in making priorities at the national level as well as at the private sector, local community and individual levels. A key guiding principle for the Policy is that freshwater is a finite and vulnerable resource, essential to sustain life, development and the environment.

The Policy focuses on two broad areas:
• Water resources management—covering the management framework for the monitoring, assessment, allocation and protection of the resources and management framework; and

• Water resources use—which takes into account the development and use of water for people (domestic water supply), water for food security (agriculture), water for industry and other water uses such as hydropower, recreation and water for maintenance of productive ecosystems.

The goals of the policy are to:

• Ensure full socio-economic benefits for present and future generations;
• Ensure access to safe and adequate water for people (domestic supply);
• Ensure the availability of adequate quantity and quality of water for the environment and ecology;
• Ensure the availability of sufficient quantity and quality water for food security; and
• Ensure availability of water for other uses (hydro power, industry, etc.).

Objectives include:

• To foster Liberia’s vision of efficiently integrating and managing the country’s water resources for sustainable development;
• To increase access to safe water supply and sanitation to meet the MDGs by 2015;
• To create a governing body to eliminate cross cutting mandates and ensuring a coordinated strategic planning, implementation and monitoring mechanisms;
• To create Local Water Coordination Units (WACU);
• To establish a National Water and Ecological Information Centre; and
• To ensure training and capacity building at all levels.

4.4.1 LEGAL FRAMEWORK

Presently, there is no concrete comprehensive legal framework governing water resources in Liberia. Neither has there been an effective national water policy guiding water resources development, use, protection and conservation. Nevertheless, the Public Health Law of the code of 1956 revised into 1975 into Title 33, the Act Establishing the New Public Health Law of Liberia Chapter 24 contained Liberia’s first water pollution control laws. The key objective of Chapter 24 was to protect the water resources of Liberia. The Environment Protection and Management Law (2002) provides additional legislation on water resources management, but is not comprehensive. MLME is currently drafting a Water Law to include water resources regulation, a water supply regulation and a sewerage and wastewater discharge regulation.
4.5 FOOD AND AGRICULTURE POLICY AND STRATEGY (DRAFT 2008)

Goal

The overriding Goal of the Food and Agriculture Policy and Strategy (FAPS) is:

‗A revitalized modernized agriculture that is contributing to shared, inclusive and sustainable economic development and growth of Liberia‘

Sector Objectives

The FAPS will focus on three broad sector objectives:

- Enhanced inclusive and pro-poor growth in agricultural production, productivity, competitiveness, value addition and diversification;

- Safe and nutritious foods are available in sufficient quantity and quality at all times to satisfy the nutrition needs for optimal health of all Liberians throughout their life cycles;

- Strong and efficient human and institutional capacities of the public sector, private sector, civil society organizations, especially grassroots, capable and carrying out effective planning, delivery of services, investment and monitoring activities in the sector; sustaining natural resources, mitigating risks to producers and mainstreaming gender considerations in planning and implementing activities in the sector; and

- The FAPS has a number of policy objectives that address environmental issues. These include:

  **Non-Traditional Crops and Non Timber Products**

  - Much greater awareness and promotion of the potential of the sub sector for employment and income generation with high levels of involvement of the private sector in activities in the sub sector;

  - Continuous increasing volumes of the quality non-traditional export commodities from measurable expanded access to markets at national, regional and global levels; and

  - Increased foreign exchange and incomes widened revenue base from the sub sector.

  **Fisheries**

  - Sustainable increase in artisanal fish production with immediate impact of available fish supplies from the sub sector contributing largely to the demands of the largest number of Liberians, and more particularly enhancing the income generating opportunities of women who dominate fish processing and marketing, and young men who are taking over the activity as a profession;

  - Sustainable increase in fish landings in the country by industrial fisheries operators providing additional increased fish supplies to the population, income, revenue, employment, trade in high value markets and product development, through the establishment of infrastructure and enforcement of legislation; and

  - A well revitalized and developed aquaculture industry with high productivity; sustainable supplies and affordable quality fish to local and export markets.

  **Forestry**

  - A well regulated exploitation and management of the forest resources of the country;
• Measurable increased performance of the value chains (production, exports, value added) of selected forest commodities (wood and non-wood and wildlife) within the National Forest Policy and National Forest Management Strategy;

• Measurable increased contribution of forestry to food and nutrition security at household levels from increased safe, and quality bush meat, wood based energy, employment and income from eco-tourism and cottage industries;

• A holistic development of agriculture, forestry and fisheries with special focus on conservation of forest resources, protection of the environment and sustainable utilization and management of forest resources;

• An effective institutional environment ensuring efficient, implementation, monitoring and evaluation of the National Forestry Reform Law as well as the National Forest Policy and National Forest Management Strategy; and

• Achieving the MDG target of reversing deforestation by at least maintaining the current forest cover levels, and reducing hunger by half through increased production of safe and quality bush meat; available supplies of materials for wood based energy; employment and income from forest products, ecotourism and cottage industries.

Land and Water Management
• Support to the establishment of a land tenure system in the country that is acceptable to all stakeholders; ensures access, security, sustainable use of land; promotes sustainable environmental protection, and facilitates private sector led development of the agricultural sector.

Water Resources Development
• An established operational legal and institutional framework ensuring efficient development, utilization, management, monitoring and conservation of the water resources of the country for agriculture.

Agriculture and Environment
• Country wide awareness in, and mainstreaming environmental considerations in all agricultural activities including production, processing, manufacturing and value addition; and

• Appropriate policy instruments are in place and being applied, complied with and enforced, in order to ensure environmental protection from agricultural and related land use activities including forestry, wild life, mining, fisheries and others.

Sustainable Natural Resource Management
• Provide support to the transition from shifting cultivation to sedentary farming in a manner that will ensure sustainable natural resource utilization and a realization of the benefits and economic returns from it.

Reduce Risks Due to Climate Change and Improve Coping Mechanisms
• Mechanisms are in place with contributions from the agriculture sector, monitoring climate change situation in respect to Liberia; ensuring agricultural activities in Liberia do not contribute to such changes; that such changes will not seriously undermine efforts directed at poverty alleviation, food security, and environmental protection.
4.6 MINING POLICY

Although MLME is currently preparing a draft mines policy, it was not available for the ETOA teams’ review. However, excerpts from the PRS on mining are presented below.

The major policy challenge in the mining sector is to develop a national mining sector framework and MDAs that promote growth that is not just rapid, but also inclusive and sustainable, while at the same time minimizing the negative social and environmental impacts of mining activities. In particular, the Government is aiming to develop mining concession contracts that differ from those of the past by better balancing competitive investor returns with the need for robust revenues, and ensuring that local communities share in the benefits through direct and indirect employment, access to new infrastructure, and programs targeted at diversification of activities and local economic development beyond the life of the mine.

The Government’s central goal for the mining sector is to rapidly expand mining as an engine of economic growth and social development, with mining expected to grow to nearly 12 percent of GDP in 2011, and to ensure that the benefits from mining activities are widely shared. The Government will aim to diversify the mining sector into new and downstream activities, and to improve its support to local miners.

To achieve this goal, the Government will review and adjust the existing enabling environment for mining sector development. In particular, it will:

- Eliminate the overlaps and conflicts between different pieces of legislation, including the conflict between the Public Procurement and Concession Act (PPCA) and the New Minerals and Mining Law (NMML) Act of 2000 regarding the granting of exploration licenses and mining leases;

- Harmonize the NMML and the Forestry Law with respect to mining concession rights and protected zones;

- Adopt and implement a national mining sector framework with input from communities and stakeholders’ groups that will include:
  - A National Mineral Policy that will provide a guiding framework for decision makers in the management of Liberia’s mineral resources;
  - A Model Mineral Development Agreement (MDA) that will define clear terms and provisions for mining operations, including fiscal, legal, infrastructure, and social and environmental issues; and
  - A Mining Cadastre Information Management System (MCIMS) that will improve management of the mining licensing system by clearly defining property boundaries.

Although the statement of intent appears to incorporate environmental concerns, items such as biodiversity offsets and rehabilitation are not mentioned.

4.7 LAND RIGHTS AND LAND TENURE POLICY

Land and property policies and rights laws in Liberia are unclear or outdated. Customarily, forests are an integral part of community property and this itself is surprisingly well defined in discrete land areas held by each village (town) or by clusters of towns referred to as clans or chiefdoms. However, the status of forest ownership under national law is unclear and is contradictory with customary law, and people and the state are at odds as to who owns the forests and how the use of forests should be regulated. There are
not yet any established mechanisms for linking these two structures in one legal system that protects the rights of all property holders. This limits investment in rural areas held under customary systems and, more critically, makes local communities potential targets for land or resource grabbing.

There is little consensus at the national level on what Liberia’s property rights system should be (e.g., private, state-held leaseholds, a mix of the two, or something else), how dual legal structures (customary and statutory) should function in one legal framework, or if the state should be engaged in land redistribution, which would imply that the state would take land from one group to give to another. While some laws (e.g., the recent 2006 Forestry Law) defining property rights exist, many laws are outdated. Once a land policy is defined, laws and regulations are required to define a number of property rights and procedures, including for tenure types, jurisdiction, land administration, eminent domain, valuation, registration and other concerns. While there is a community forestry policy in place, this policy is just now being fleshed out. As noted above, the creation of a law governing community rights with respect to forest lands (mandated pursuant to the Forestry Law of 2006 for passage in 2007) is currently being drafted by FDA with assistance from LRCFP and considered a benchmark activity.

The GOL recognizes the importance of land tenure and on March 15, 2007, the GRC produced a document, “The Way Forward: Land & Property Rights Issues in the Republic of Liberia” that lays out a proposal to create a program to address land tenure and property rights issues. It proposes a number of forward-thinking actions for initiating the program including a process of open and transparent consultation at the regional and national level, a focus on extensive research to inform decision making, proper sequencing of proposed reforms, and the establishment of a national Land Commission to investigate the issues in depth and make policy recommendations to the government on possible approaches to improve the situation with regard to property rights and land tenure in Liberia.

To this end a Land Committee was created under the auspices of the GRC to move the process forward until the creation of a national Land Commission. In its Terms of Reference the Land Committee established seven thematic working groups, including one dedicated to natural resources property rights, to prepare preliminary issue papers by mid-June 2007. There is broad-based participation in these groups from the line ministries, civil society organizations and donor institutions. The Land Committee also funded a number of targeted issues papers stemming from the efforts of the Working Groups and held regional consultations in the country to share these results and get public feedback on their validity and value in recommending possible solutions. On May 7, 2008, the Land Committee held a national conference to discuss and present the results of the issues papers as well as the comments and suggestions stemming from the regional consultations. Based on these findings, it is hope that the GOL will be able to make substantive recommendations and comments on future steps in addressing land tenure and property rights and propose that a national Land Commission be established to further investigate the issues surrounding land tenure and property rights in the country and make substantive policy recommendations.

4.8 INTERNATIONAL POLICY COMMITMENTS
Liberia is signatory to a number of international conventions and treaties. These are presented in Table 5 below.
### TABLE 5: LIBERIA’S PARTICIPATION IN INTERNATIONAL TREATIES AND CONVENTIONS

<table>
<thead>
<tr>
<th>Convention/Treaty</th>
<th>Adoption Date</th>
<th>Ratification Date</th>
<th>Objectives</th>
<th>Implementation Projects/Programs</th>
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</thead>
</table>
2. Sustainable use of its components  
<p>| 2. The Cartagena Protocol on Biosafety to the Convention on Biological Diversity  | Accession, February 16, 2002 |                  | 1. To contribute to ensuring an adequate protection in the field of living modified organisms resulting from modern biotechnology                                                                 |                                                                                                |
| 3. United Nations Convention to Combat Desertification                             | June 17, 1994       | March 3, 1998     | 1. To combat desertification and mitigates the effect of drought in countries experiencing serious droughts and/or desertification                                                                          |                                                                                                |
| 4. The United Nations Framework Convention on Climate Change                       | May 9, 1992         | November 5, 2002  | 1. To achieve stabilization of green house gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climatic system                                      | National Adaptation Programme of Action produced in 2006                                          |
| 5. Kyoto Protocol                                                                 | December 11, 1997   | November 5, 2002  | 1. To strengthen the commitment of developed country parties with a view to reduce their overall emissions                                                                                              |                                                                                                |
| 6. The Vienna Convention on Protection of Ozone Layer and Montreal Protocol on     | January 15, 1996    |                   | 1. Protect human health and the environment against adverse effects resulting from modifications of the ozone layer from anthropogenic emissions of substances proved scientifically to have high ozone depleting potential |                                                                                                |
| Substances that Deplete the Ozone Layer                                            |                      |                   |                                                                                                                                                                                                          |                                                                                                |</p>
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<tr>
<th>Convention/ Treaty</th>
<th>Adoption Date</th>
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<th>Implementation Projects Programs</th>
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</table>
2. To treat hazardous wastes and other wastes  
3. To minimize the generation of hazardous wastes |                                  |
| 8. Protocol on liability and compensation on damages resulting from transboundary movements of hazardous waste and their disposal | September 22, 2004            |                         | 1. To provide for a comprehensive regime for liability and for adequate and prompt compensation for damages resulting from the trans-boundary movements of hazardous wastes and their disposal including illegal traffic of those wastes |                                  |
| 9. Bamako Convention on the ban of the import into Africa and the control of trans-boundary movements of hazardous wastes within Africa (Bamako convention) | January 30, 1991              | September 16, 2005      | 1. To protect by strict control the human health of African population against adverse effects which may result from hazardous waste by reducing their generation to a minimum in terms of quantity and or hazard potential  
2. To adopt precautionary measures ensure proper disposal of hazardous waste and to prevent dumping of hazardous wastes in Africa. |                                  |
| 10. Stockholm Convention on Persistent Organic Pollutants (POPs)                 | Acceded January 16, 2002      |                         | 1. To strengthen National Capacity and to enhance knowledge and understanding Amongst decision makers, managers, industry and the public at large on POPs  
2. To develop a National implementation Plan (NIP) to manage the elimination of POPs. |                                  |
<p>| 11. Abidjan Convention And Protocol on Management And Protection Of Coastal and Marine Environment In The Sub-Region | Entered into force 1994       | 2005                    | For the cooperation in the protection and development of the marine and coastal environment of the West African region |                                  |</p>
<table>
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<tr>
<th>Convention/Treaty</th>
<th>Adoption Date</th>
<th>Ratification Date</th>
<th>Objectives</th>
<th>Implementation Projects/Programs</th>
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</table>
| 12. Ramsar Convention On Wetlands | 1971          | February 11, 2003 | 1. To manage wetland systems so that the human uses of these areas are undertaken in such a way as to retain their natural capital for future generations.  
2. To encourage and support countries to develop and implement national policy and legislative frameworks, education and awareness raising programs, as well as inventory, research and training projects. | Five areas designated as Ramsar sites: Lake Piso, Marshall, Mesurado Kpatawee and Gbedin |

### 4.9 POLICY AND REGULATORY ISSUES

In general terms the above policies and legislation—with the exception of land tenure—are more than sufficient to provide the enabling environment for the management of Liberia’s environment and natural resources.

In specific terms, particularly with regard to implementation, the ETOA team finds that the policy and legislative framework for managing and conserving natural resources in Liberia is overly comprehensive, complicated and detailed to facilitate implementation.

For example, together, the NEP, EPA Act and EPML set out a comprehensive and detailed mandate for the EPA to protect Liberia’s environment. The EPML alone contains 100 subsequent requirements that have to be instituted by EPA to implement the law. EPA has extremely limited capacity, and it would be completely paralyzed if it tried to fulfill the full mandate in these legislative acts. The situation is similar for the FDA; many of the strategy elements have not been or have only been partially addressed (e.g., bushmeat and hunting, management of wetlands and mangroves, development of ecotourism and nature tourism). And even a casual look at the draft fisheries legislation suggests that BNF’s legal mandate will far exceed its capacity to enforce it at least in the short to medium term. Therefore, it is imperative for EPA and other institutions to prioritize the implementation of its mandate, focusing on a few areas in which they could maximize the protection of the environment.

In terms of the level of complication, as one long term advisor to the FDA put it, in drafting the National Forestry Reform Law (2006), “the authors took state of the art legislation from the EU and the US and then added some to it.” The draft community rights legislation is a case in point. Although the most recent draft contains nine pages of articles (down from 60 at the last version), it’s still far too cumbersome for a community to understand let alone obey. Complicated legislation results in poor understanding and contributes to difficulties in enforcement.

Other critical policy and legislative issues include:

**Land Tenure**

Government needs to speed up the establishment of the National Land Commission to resolve land tenure issues. Indeed land tenure conflicts are escalating. In early May 2008, land dispute has led to the death of
two in Maryland County. In Bassa County relationships between locals and a rubber company were severely tested about the same issue after the manager of the company was shot by unknown people after the company tried to expand into tribal lands. For many years, formally cordial ties between the various ethnic groups in Nimba and Lofa have turned sour once refugees and displaced people started to return home and found their land occupied by others. The Ministry of Defense was sued in Supreme Court by the people of South Margibi who claim that their ancestral land was taken away by President Tubman to build the Shiefflin military barracks. Courts are filled with cases of lands sold to multiple buyers and the list of grievance goes on and is expected to grow without a comprehensive land tenure policy and sound, implementable and socially acceptable legislation. The final outcome of the work undertaken by an eventual Land Commission will have major implications for the relationship between the FDA and the forest communities and the way that forests are managed.

**Bushmeat Policy and Legislation**

Under the Forestry Reform Law of 2006, FDA has a clear mandate to manage wildlife and to control hunting and the trade in bush meat, and is also mandated to prepare a comprehensive framework for wildlife conservation and protection (pending). Under the 2006 law, FDA will also review the status of wildlife species and update the lists of completely and partially protected species (urgently needed). Hunting and trading wildlife within Liberia can only be legally conducted under permits issued by FDA. Export of bush meat is less clear, since the law only address the export of wild animals and does not specifically mention bush meat.

The 2006 law mandates the creation of a protected area network of about 1.5 million hectares, covering 30% of Liberia’s forests. However, the 1.5 million hectares includes all categories of reserved forest, including multiple-use National Forests. It is unclear at present how much of this area will offer strict protection for wildlife, currently limited to Sapo National Park and East Nimba Nature Reserve. The modalities of wildlife protection in the various categories of reserved and unreserved production forest are not addressed in the 2006 law, and fall under the pending wildlife conservation and protection law. Similarly, the protection and exploitation of wildlife by communities and hunters groups is not addressed, and falls under the pending community forestry law.

**Compensation for Communities Living Around Protected Areas**

The Forest Act provides a scale for community compensation in timber concession areas. Communities that live around strictly protected areas, however, receive no compensation for the loss of rights to forest products but are expected to make up the difference through GOL and donor supported alternative livelihood programs. Unfortunately, the few alternative livelihood programs that exist in Liberia, have had very limited success. In principle, a community losing forest use in a strictly protected area should be compensated at least as highly as timber concession communities, but as yet, there is no policy or legal provision to provide for this.

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**Trade in Species - CITES**

The CITES National Legislation Project, which examines countries’ compliance with CITES provisions, has placed Liberia in Category 3, indicating that Liberia’s legislation is not adequate under CITES standards. CITES has actually issued a notification to the Parties to suspend all trade in CITES-listed species from Liberia because of the country’s lack of progress on national legislation.
Outstanding Commercial Forestry Issues

- The law is unclear how different permitting processes for potentially competing land uses fit together and which permit process should take priority - i.e., which takes precedence in a particular area—agriculture, mining or forestry;
- Discrepancies in undertaking commercial forestry operations on private or deeded land. Currently, no bidding process is necessary for privately deeded land merely the consent of the land owner is needed for a valid logging contract, assuming that the logging company is prequalified. However, deeded lands with concessions must follow all rules and regulations in and under the forest law. There is considerable confusion about allocation of concessions on private or deeded land as a result of conflicting interpretations.
- There are no limitations on sitting funds for Boards managing community revenues from land rent. This could reduce the amount of money available to communities significantly.

Carbon Financing

Despite not receiving much attention in formal forestry policy documents to date, there is an increasing awareness of addressing climate change concerns in the management of Liberia’s forests and a number of initiatives have started. For example, there was a delegation of Liberian government members to the COP in Bali where a side event for Liberia was held; a proposal for REDD has been prepared by CI and the GOL and proposals from FFI and IUCN are in the works. USAID is also interested in carbon financing. At present, there is little actual information available on the possible impacts that climate change could have on Liberia’s forests. Additionally, the Government has not adopted a formal policy on the role that Liberia’s forests could or should play in accessing potential funding under various carbon financing mechanisms.

The 2003 Environment Protection and Management Law

While this law contains many significant provisions that could be used to protect the environment, its lack of implementing regulations means that these provisions remain largely inoperative. Developing such regulations would go a long way towards increasing the Law’s effectiveness. Particular areas to address include procedures for conducting Environmental Impact Assessment, the establishment of protected areas (including non-forest ecosystems), and implementation of the provisions governing public participation and access to information.

The development of EIA guidelines is of particular importance. While Liberia’s EIA procedures are fairly comprehensive, regulations are needed to flesh out the various requirements and provide more detailed definitions of their terms. This is particularly true for mining, road construction and forest logging concession activities. It remains to be seen how the EIA process will actually be implemented on the ground. Unless and until such implementation occurs, there are a large number of projects that may be free to move forward without any assessment (or mitigation) of their impacts on the environment.

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36 From the draft SEA stakeholder interviews.
Environmental management and protection depends not only on strong environmental laws and regulations, supported by robust scientific information, but also on their effective implementation and enforcement on the ground. In the wake of Liberia’s 14-year civil conflict, the challenges confronting its government institutions are vast—including infrastructural, administrative, and staffing needs. Despite such obstacles, these institutions are pressing ahead with their mandated activities. Their efforts are complemented by a number of domestic and international NGOs and international financial organizations working in-country.

This section provides a snapshot of Liberia’s institutional capacity with respect to environmental management. It introduces the primary government ministries and related organizations whose mandates address or touch on environmental concerns, as well as the relevant domestic and international NGOs. More detailed profiles are provided of five key agencies:

- Environmental Protection Agency;
- Forestry Development Authority;
- Bureau of National Fisheries;
- Liberia Institute of Statistics and Geo-Information Services; and
- University of Liberia’s College of Agriculture and Forestry.

The section concludes with an examination of capacity constraints in key GOL institutions that are affecting Liberia’s overall environmental status.

### 5.1 GOVERNMENT OF LIBERIA INSTITUTIONS

Liberia has a number of government agencies, ministries, and bureaus, along with municipal and state industry entities, whose mandates encompass environmental issues in some fashion. These entities’ environment-related mandates and activities overlap in certain respects and in some cases appear to conflict with one another. The key institutions are briefly described below.

#### 5.1.1 INDEPENDENT AGENCIES

**Forestry Development Authority**

Created in 1976, the Forestry Development Authority (FDA) is responsible for sustainable management of Liberia’s forests and related resources. The agency provides forestry planning, develops forestry policy, administers and enforces the forestry laws, administers concession agreements, calculates forestry fees, carries out reforestation and forest research and training, monitors the activities of timber companies, and sets up and administers national parks. It is also charged with implementing the 2006...
Forestry Law and associated regulations. A detailed profile of FDA and its capacity needs are presented in later sections of this chapter.

**Environmental Protection Agency**
The Environmental Protection Agency (EPA) was authorized by law in 2003, but did not become functional until late in 2006. It is charged with implementing the Environment Protection and Management Law, a framework environmental law that envisions the development and harmonization of sector-specific laws. EPA serves as the principal authority for managing environmental quality, and it is directed to coordinate all activities relating to environmental protection and the sustainable use of natural resources. It also promotes environmental awareness and oversees the implementation of international conventions related to the environment. A detailed profile of EPA and its capacity needs are presented in later sections of this chapter.

**Liberia Institute of Statistics and Geo-Information Services**
The Liberia Institute of Statistics and Geo-Information Services (LISGIS) is responsible for compilation, analysis, publication and dissemination of all data from individuals, establishments and Geo-spatial Information in the country. A detailed profile of LISGIS and its capacity needs are presented in later sections of this chapter.

### 5.1.2 MINISTRIES

**Ministry of Agriculture**
The Ministry of Agriculture—established in 1910—plans, administers, and supervises agricultural programs and provides extension services. It also trains local farmers in improved agricultural practices and provides farm inputs to increase food security. The Ministry conducts inspections and enforces rules and regulations governing the agriculture sector. The Ministry also implements agricultural programs, protects farmers’ interests, encourages investment in the agricultural sector, and monitors overall activities including the movement of agricultural commodities into and out of the country. It focuses on transboundary commodity movements that are intended for the consuming public, or use on farms, large plantations and the agribusiness sector in Liberia in collaboration with neighboring countries such as Sierra Leone, Guinea, Ivory Coast and other countries in the region. The Ministry also regulates the harvesting of botanical species by herbalists and other farmers as a part of shifting cultivation practices.

**Department of Technical Services**
The Department of Technical Services was formed in 1948. The Department works in food security, crops and animal production, and agrochemical sectors, as well as international trade in these commodities. Its mandate is to protect or prevent the introduction of insect pests and animal diseases and monitor activities with an ecological impact, including in the areas of agriculture, land use and human settlement, site selection, domestic energy use, use of fuel wood, deforestation, and sustainable ecological livelihoods. The National Quarantine and Environmental Services bureau within the Department is responsible for regulating the importation and use of agricultural chemicals, including fertilizers and pesticides. It issues permits for the importation of agricultural chemicals and implements international conventions governing pesticides and chemicals. Unfortunately, it has no scientific testing facility and limited capacity to conduct field monitoring of agricultural chemical use.
National Bureau of Fisheries
The National Bureau of Fisheries is charged with conserving all fish resources and aquatic environments in Liberia. A detailed profile of the National Bureau of Fisheries and its capacity needs are presented in later sections of this chapter.

Ministry of Lands, Mines, and Energy
The Ministry of Lands, Mines, and Energy—established in 1972—is responsible for developing Liberia’s mineral, water, and energy resources. It coordinates and regulates all mining activities, including iron, gold and diamonds and is responsible for issuing mining licenses. The Ministry is responsible for 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. Prior to the civil crisis, the National Energy Committee, housed in the Ministry, administered the energy sector.

Liberian Hydrological Services
Formerly housed at the Ministry of Public Works, the Liberian Hydrological Services is now in the Ministry of Lands, Mines, and Energy, under the direction of the Assistant Minister for Mineral Exploration and Environmental Research. Its mandate is to serve as a research organization in water management, environmental management and air quality. The Division is charged with conducting hydrometric measurements and publishing hydrological data for Liberia (i.e., the flow and concentration of water within a given area and how it affects species within that area). It provides technical support to other agencies, giving advice on the design and location of water works and the availability of water for hydropower development. It served as the focal point for the development of the National Integrated Water Resources Management Policy, which has been sent to the Cabinet for its approval.

Ministry of Planning and Economic Affairs
The Ministry of Planning and Economic Affairs was formerly part of the Ministry of Agriculture’s Department of Statistics. It became a Ministry in 1961. It serves as a direct link among Liberian government institutions, private and non-profit organizations, and international organizations. It is responsible for providing guidance to government institutions in preparing development programs and projects; reviewing proposals for new development programs and projects; and reviewing progress made on development programs and projects. It also certifies all qualifying NGOs.

The Division of Environmental Planning’s mandate is to assist all institutions involved with the protection of the environment by helping to ensure that all national policies and guidelines concerning environment, natural resources and biodiversity remain within national boundaries. It also helps collect and analyze biodiversity data, especially those collected by EPA.

Ministry of Internal Affairs
The Ministry of Internal Affairs administers the affairs of all government functionaries in Liberia, oversees the activities of all local bodies, such as chiefdoms and clans, and supervises all County Superintendents.

Ministry of Health and Social Welfare
The Ministry of Health and Social Welfare coordinates and administers all general health services in Liberia, including preventive services; collects health statistics; ensures drug availability; and monitors events and conditions affecting public health. It also maintains statistics from birth and death registrations. Through its Division of Environmental and Occupational Health, the Ministry has the mandate to assess “the environmental health of the population” and to regulate and monitor
environmental impacts resulting from pollution of air, water, food/feed, soil, all categories of wastes, sewage, occupational health and chemical safety. The Division had a water quality laboratory prior to the war, but it does not exist anymore.

**Ministry of Public Works**
The Ministry of Public Works is responsible for the installation of infrastructure required for waste management delivery services, including solid waste collection and disposal and storm sewers.

### 5.1.3 CORPORATIONS, COMPANIES AND BOARDS

**Liberia Water and Sewer Corporation**
The Liberia Water and Sewer Corporation oversees the generation and distribution of water to the public and maintaining a supply of safe drinking water. It is also responsible for providing for wastewater collection and disposal and as such constructed and maintained sewers and wastewater treatment facilities prior to the civil disturbance. At the time of this report, however, no sewers or wastewater treatment facilities were functional in Liberia.

**Monrovia City Corporation**
The Monrovia City Corporation was first created as Commonwealth District in 1833. A legislative Act of 1973 abolished the Commonwealth District and created the Monrovia City Corporation, giving it all municipal rights including the management of municipal waste, and the provision of environmental health and sanitation.

**Municipalities**
The Public Health Law of 1975 granted municipalities the responsibility of ensuring clean and sanitary environmental conditions on the territory under their respective jurisdictions. They are thus responsible for sanitation activities including wastewater collection and disposal and the cleaning, collection and disposal of generated solid waste.

**Liberia Electricity Corporation**
The Liberia Electricity Corporation was created in 1973 to generate, transmit, distribute, and sell electricity throughout the country at reasonable rates. In July 2006, electricity was restored to parts of Monrovia for the first time in fifteen years.

**Liberia Petroleum Refining Corporation**
The Liberia Petroleum Refining Corporation oversees the processing of crude oil into finished petroleum products for the Liberian market.

### 5.1.4 DETAILED PROFILES OF KEY GOL INSTITUTIONS

More detailed profiles of the Environmental Protection Authority, Forestry Development Authority and National Bureau of Fisheries are provided as they are the core institutions for environment and natural resource management in Liberia. Profiles for the Liberia Institute of Statistics and Geo-Information Services and the University of Liberia are also provided as LISGIS is responsible for the Liberia’s geospatial information on the environment and the University is the sole environmental/natural resource capacity building institution in the country.
The Environmental Protection Agency Act of 2003 authorized the establishment of an overall institutional framework for sustainable management of the environment in Liberia. This framework includes:

- **National Environmental Policy Council**—charged with formulating national environmental policy; setting environmental protection priorities, goals and objectives; and promoting inter-sectoral, private-public cooperation in the achievement of environmental policy. The council is inter-sectoral, composed of members from governmental institutions and private sector organizations appointed by the President.

- **Environmental Protection Agency**—identified in the EPA Act as “the principal authority in Liberia for the management of the environment.” The Environmental Protection Agency (EPA) is overseen by a nine-member Board of Directors appointed by the President from specific government agencies and the private sector, and is managed by an Executive Director, also appointed by the President.

- **Environmental Units in Line Ministries**—are required to be established in each Line Unit. Each Environmental Unit is responsible for ensuring compliance by its Ministry with the requirements of the EPA Act and other environmental laws, making comments on environmental impact assessments, liaise with EPA on matters of environmental management, and to report to EPA and the relevant Line Ministry any time it suspects or detects contravention of an environmental law beyond its sphere of responsibility.

- **County Environment Committees**—charged with collaborating with and facilitating the work of national institutions for sustainable management of the environment in the County and ensuring that County-level environmental concerns are identified and integrated into County plans and projects. The Committee is also charged with preparing a County Environmental Action Plan every five years. Each committee is composed of county and district officials, traditional leaders, private citizens, and two local representatives to the national legislature as ex-officio members. The Committee is staffed by a County Environment Officer, hired by the EPA.

- **District Environment Committees**—charged with promoting environmental awareness, mobilizing the public to manage the environment, and monitor activities within the district to ensure that they do not have any significant impact on the environment. The District Environment Committees are to be established by and report to the relevant County Environment Committee. They are composed of district officials, mayors, chiefs, and private citizens and are staffed by a District Environment Officer hired by the EPA.

- **Environmental Administrative Court**—before which complaints relating to the environment may initiate and appeals on Agency decisions may be heard. The Administrative Court is composed of three lawyers, two of which must have environmental law qualifications, and two individuals with environmental science or management qualifications. All of the members are appointed by the President. Any person who is aggrieved by decisions made by EPA or by regulations made under the EPA Act may appeal to the Environmental Administrative Court for redress.

- **Environmental Court of Appeals**—established at the Judicial Circuit level with jurisdiction over all appeals from the Environmental Administrative Court. The Appeals Court is comprised of five experienced judges with knowledge of national and international environmental law, appointed by the President.
Of these seven institutions, only the National Environmental Policy Council, the EPA and in some cases (for example in FDA), the Line Ministry Environmental Units have been established. The following sections present

**National Environmental Policy Council**

EPA Act mandates the creation of the National Environmental Policy Council as the “ultimate policy-making body on the environment” with the responsibility to provide environmental policy formulation and direction to all sectors of the government. Recognizing that environmental management cuts across sectors, the Act provides for 33 members appointed by the President including:

- A Minister, appointed as the Council Chair;
- Two Senators;
- Two members of the House of Representatives;
- One representatives from the Council of Chiefs;
- Representatives from 12 ministries;
- Representatives from 5 government agencies;
- Representatives from 8 NGOs and professional organizations;
- One representative from the University of Liberia; and
- One eminent female known in Liberia for her work and dedication to environmental protection.

The Chair of the Board of Directors of EPA and the Executive Director of EPA are ex-officio members of the Policy Council.

In addition to formulating environmental policies, the Council is charged with:

- Setting priorities, goals and objectives for environmental protection;
- Promoting cooperation in the protection of the environment among governmental, non-governmental and private sector entities as well as the general public;
- Providing periodic policy direction to EPA’s Board of Directors;
- Approving the Accounts and Annual Report of the EPA;
- Providing guidelines the establishment of County Environment Committees;
- Approving National Environmental Action Plans;
- Providing recommendations to President for appointing members of the Board of Directors of EPA, the EPA Executive Director, and judges on the Environmental Court of Appeals;
- Recommending to Minister of Finance economic instruments to ensure an appropriate pricing of environmental resources and that the costs of pollution are paid by the polluter;
- Approving fees charged by EPA.
The Chair of the Council, in collaboration with the Chair of the EPA Board of Directors, is also mandated to provide the President with at least two nominees per position for appointment as judges on the Environmental Administrative Courts.

Although the EPA Act authorizing establishment of the Policy Council became law in April 2003, the first National Environmental Policy Council was not appointed until 2006. The current chairman of the Council is the Minister of Lands, Mines and Energy.

**Environmental Protection Agency**

The EPA Act established the EPA as an autonomous body under the Executive Branch of Government with the principal authority in Liberia for management of the environment. The National Transitional Government of Liberia formally proclaimed by decree the establishment of the EPA in December 2003. However, the establishment of an operational EPA was delayed until September of 2006. This was due to the fact that the National Environmental Policy Council had to be established first, so that it could recommend to the Presidents candidates for the Board of Directors of EPA and its Executive Director. In the interim, some of the functions of the EPA as well as planning for its establishment were undertaken by a transitional, intersectoral team, as provided for in Section 55 of the EPA Act.

Due to the cross-cutting nature of environmental management, the EPA Act defines the powers of EPA as coordinating, monitoring, supervising and consulting with relevant stakeholders on all activities in the protection of the environment and sustainable use of natural resources. Specifically, the EPA was empowered to work with line Ministries to:

- Coordinate, integrate, harmonize and monitor the implementation of environmental policy by the Line Ministries;
- Build their capacity for environment and national resource management;
- Promote the use of economic and regulatory instruments to encourage the use environmentally sound technologies and discourage pollution;
- Establish criteria, guidelines, specifications and standards for environmental protection and sustainable use of natural resources;
- Review sectoral environmental laws and regulations and recommend changes to bring them into accordance with the EPA Act or other environmental legislation;
- Ensure the preservation of important historic, cultural and spiritual values of natural resources and, in consultation with indigenous authorities, enhance indigenous methods for effective natural resource management;
- Establish and implement an environmental impact assessment program;
- Collect and analyze data and undertake research necessary to develop indicators for environmental changes and prepare and disseminate state of the environment reports and national environmental action plans;
- Promote public awareness of environmental issues and public participation in decision making.
- Investigate reports of pollution and other related matters;
• Initiate and co-ordinate actions required in a state of environmental emergency or any other situation which may pose serious threat to the environment and public health; and

• Function as the national clearinghouse for all activities relating to regional and international environmental conventions, treaties and agreements, and donor-sponsored environmental projects.

The EPA is governed by a nine-member Board of Directors appointed by the President. The board consists of:

• The Governor of the Central Bank;
• A member of the Liberia National Bar Association;
• An Industrialist;
• The Minister of Commerce and Industry;
• The Minister of Planning and Economic Affairs;
• One representative of a university in Liberia;
• One prominent woman;
• The Executive Director of EPA, as an ex-officio member; and
• Two other members chosen for their technical expertise

The Board is solely responsible for overseeing the operation of the EPA and for providing guidance to EPA’s Executive Director and staff. It also appoints the Deputy Executive Director and the Heads of Departments in the EPA. It is mandated, however, to comply with policy directions given to it by the National Environmental Policy Council.

The Executive Director of EPA, although appointed by the President from candidates recommended by the National Environmental Policy Council, is responsible to the Board of Directors. He is directed by the EPA Act to keep both “the Board and the Policy Council informed on the progress and activities of the agency.” The Executive Director is responsible for the day-to-day operation of EPA and, in collaboration with the Board, for its organization.

The current organization of EPA is shown in Figure XX. In 2006, EPA prepared terms of reference for the agency that included a realistic assessment of necessary staffing. EPA updated this document in 2008, given the current budget limitations of the government.37 The terms of reference identifies 32 professional positions in the four substantive departments based in headquarters, including the managers. At the time of the preparation of the ETOA, however, EPA had only filled 16 of those positions (see Table 6 below.)

37 EPA 2008.
<table>
<thead>
<tr>
<th>Department</th>
<th>Professional Positions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
</tr>
<tr>
<td>Inter-Sectoral Coordination</td>
<td>8</td>
</tr>
<tr>
<td>Planning, Policy and Legal</td>
<td>8</td>
</tr>
<tr>
<td>Outstation and Inspectorate</td>
<td>3</td>
</tr>
<tr>
<td>Monitoring, Assessment and Conservation</td>
<td>13</td>
</tr>
</tbody>
</table>

Source: EPA records

Clearly, with only 16 professional staff in headquarters, EPA is incapable of achieving its mandate. This is particularly a problem for the Monitoring, Assessment and Conservation Department, which only has 4 professional staff, but is responsible for all of the mandated activities dealing with standards, pollution control program development, natural resource management, and environmental impact assessment—a total of 79 of the 100 mandated activities.

Although none of the County Environment Committees have been established, EPA has established outstation offices in eight counties (Table 7). The offices are staffed by Environmental Inspectors. As the County Environment Committees are established, some of the Inspectors may be reassigned as County Environment Officers.

<table>
<thead>
<tr>
<th>County</th>
<th>Environmental Inspectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Montserrado</td>
<td>4</td>
</tr>
<tr>
<td>Margibi</td>
<td>3</td>
</tr>
<tr>
<td>Bomi</td>
<td>3</td>
</tr>
<tr>
<td>Grand Bassa</td>
<td>3</td>
</tr>
<tr>
<td>Bong</td>
<td>3</td>
</tr>
</tbody>
</table>

Source: EPA records

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38 Does not include Environmental Inspectors or Environmental Officers based in the Counties and Districts.
FIGURE 19: ENVIRONMENTAL PROTECTION AGENCY ORGANIZATIONAL CHART

Policy Council

Board of Directors

Executive Director

Deputy Exec. Dir.

Internal Auditor

Comm. and Media Liaison Officer

Admin. Assistant

Administration and Finance Department
- Administrative Unit
  - Finance Unit
- Inter-Sectoral Coordination Department
  - Environmental Coordination Unit
  - Public Awareness & Education Unit
- Planning, Policy and Legal Department
  - Policy and Legal Unit
  - Planning Unit
  - Bilateral and Multilateral Agreement Unit
- Outstation and Inspectorate Department
  - Inspectorate Unit
  - Administrative Unit
    - County Environmental Officers
    - District Environmental Officers
- Monitoring, Assessment and Conservation Department
  - Environmental Quality and Standards Unit
  - Laboratory
  - Environmental Impact Assessment Unit
  - Conservation Unit
**Forestry Development Authority**

The FDA was established in 1976 to develop a forestry program that includes scientific and conservation research, productive use of publicly-owned forest lands, sustainable harvesting of forest products, and forestry training and technical assistance, while simultaneously conserving recreational and wildlife activities.

The primary objectives of the FDA are to:

- Establish a permanent forest estate made up of reserved areas upon which scientific forestry will be practiced;
- Devote all publicly owned forest lands to their most productive use for the permanent good of the whole people considering both direct and indirect values;
- Stop needless waste and destruction of the forest and associated natural resources and bring about the profitable harvesting of all forest products while assuring that supplies of these products are perpetuated;
- Correlate forestry to all other land use and adjust the forest economy to the overall national economy;
- Conduct essential research in conservation of forest and pattern action programs upon the results of such research;
- Give training in the practice of forestry; offer technical assistance to all those engaged in forestry activities; and spread knowledge of forestry and the acceptance of conservation of natural resources throughout; and
- Conserve recreational and wildlife resources of the country concurrently with the development of forestry program.

Structurally, the Forestry Development Authority consists of a Board of Directors, six Departments including four specialized units. The FDA is governed by a Nine-Member Board of Directors; a Managing Director who runs the authority on a daily basis assisted by Assistant Managing Director for Administration and Finance. A summary of FDA organizational roles and responsibilities is presented below and the current organization of FDA is shown in Figure 19.

**Board of Directors**

The FDA has a nine-member Board of Directors which provides policy direction and guidance and the decision making forum of the Authority. The Board is composed of:

- The Minister of Agriculture as Chairman, the Minister of Finance, the Minister of Internal Affairs, the Minister of Planning and Economic Affairs, the Minister of Commerce Industry and Transportation, and the President of the Liberian Bank of Development and Investment;
- The Managing Director of the Authority (appointed by the President); and
- Two Liberian nationals, one with experience in the field of law, and the other with experience in the field of business (appointed by the President).
Managing Director
The Managing Director is responsible for the day–to–day operations of FDA, ensuring the successful implementation of all of its programs and the effective functioning of all operating departments, sections, units and out stations as well as the Financial Accounting Management Systems. The Office of the Managing Director has about 17 staff, and includes Auditing, Strategic Planning, and Law Enforcement coordination.

Assistant Managing Director for Administration and Finance
The Assistant Managing Director for Administration and Finance is responsible for assisting the Managing Director with the day-to-day operation of FDA, ensuring the successful implementation of all its programs and the effective functioning of all operating departments, sections, units, sub-units and outstations. He is assisted by an Administrative Assistant, Financial Manager, Human Resource Manager, General Services Manager, Information Technology Manager, Public Relation Manager and other Technicians. The Office of the Assistant Managing Director has about 40 staff, and manages most administrative and logistical activities.

Departments
The FDA has five primary departments, each supported by several divisions. Three departments—Community Forestry, Commercial Forestry and Conservation Forestry reflect the “three pillars” strategy in the National Forest Policy. The departments are:

Commercial Forestry Department: The main objective of the Commercial Forestry Department is to commence, supervise and regulate commercial forestry operations in accordance with the National Forestry Reform Law of 2006. This department is structured into three divisions—Contracts Administration, Chain of Custody and Environmental Impact Assessment. The Department’s major tasks are to:

- Sensitize the relevant government agencies and non-governmental partners and the general public about the National Forestry Reform Law of 2006;
- Plan and allocate Timber Sale and Forest Management contracts;
- Negotiate and award third party chain of custody contract and administer according to the term and condition of the contracts;
- Collaborate with relevant Government ministries and agencies to develop mechanism of benefit sharing;
- Implement and enforce a set of rules and procedures for forest management contracts; and
- Develop procedure to provide incentives to modernize the wood processing industry including facilitating market access through research and training programs.

Department of Wildlife Conservation: This department is responsible for conserving the biodiversity of Liberia’s forest ecosystems, and ensuring their ability to provide a wide range of goods and services for the Liberian people in a sustainable manner. The Department is headed by a Technical Manager, and has three divisions - Wildlife Management, Protected Areas Management and Awareness and Ecotourism. The Department’s major tasks are to:
• Manage existing protected areas (East Nimba Nature Reserve and Sapo National Park) in accordance with the National Forest Reform Law of 2006;

• Conduct social and biological surveys of proposed protected areas;

• Develop and implement income generation activities in rural communities around protected areas;

• Develop a new Wildlife Management Law and raise awareness throughout Liberia on extraction of all protected wildlife species in Liberia;

• Ensure conservation at the landscape scale of biodiversity and maintain ecological services as consistent with the 3 C philosophy;

• Develop collaborative agreements with neighboring countries to establish trans-boundary conservation areas; and

• Augment protected area management plan framework for trans-boundary areas including goals, roles and responsibilities cooperation.

The Department of Community Forestry: This department is charged with the responsibility of encouraging greater involvement and participation of rural and urban communities in sustainable management of designated forest areas or landscapes by the community so that it will continue to produce a wide range of goods and services for the benefit of the Liberian people. The Department is headed by a Technical Manager who is assisted by two (2) divisional Line Managers and one (1) sectional head. Divisions include Community Forestry Extension Services and Mobilization, Community Empowerment and Community Forestry Resource Planning. The Department’s major tasks include:

• Identifying, profiling and gazetting of community-based forest resources;

• Allocating community forest areas on the basis of land-use planning;

• Preparing management plans for the community forests;

• Designing and delivering extension services to community forest users groups;

• Monitoring and evaluating the performance of community-based forest resource management projects;

• Designing appropriate public awareness programs for community-based forest management programs; and

• Providing assistance to communities for poverty reduction through alternative livelihood activities.

Department of Research and Development: The main objective of this department is to conduct forestry research both in the natural and artificial forest. The department is headed by a Technical Manager and has five department including Geographic Information System and Remote Sensing, National Reforestation, Statistics and Database Management, Social Economic and Forest Research. The Department is responsible for:

• Carrying out feasibility study in proposed protected areas, forest concession areas and in rural communities living around the fringes of the forest;

• Formulating project proposals to develop the sector, and review ongoing projects to determine their status and recommend to management for corrective actions;
• Conducting socioeconomic surveys for all Timber Sale Contract and Forest Management Contract and identify needs of communities in that area;

• Establishing and maintaining a database for timber and non-timber forest products;

• Assessing all afforestation and reforestation plantations in the country including the Identification of degraded sites for afforestation and reforestation activities; and

• Providing geographic and remote sensing information through the production of maps using satellite and spot imageries.

Financial Department: The Financial Department is responsible for managing the financial accounting, reporting and control of the Authority in accordance with the budgetary appropriation by the Republic of Liberia based on international generally accepted accounting principles. This department is headed by the Financial Manager under the supervision of the GEMAP Comptroller whose main role is to build the capacity of the department for transparency and efficiency. The department is also being assisted by the Chief Accountant and senior accounting staff. The main functions of the Department are to test and establish internal control systems and conduct internal audits.

FDA’s current estimated workforce levels by department are presented in Table 8 below.

<table>
<thead>
<tr>
<th>Department</th>
<th>Workforce</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration</td>
<td>74</td>
</tr>
<tr>
<td>Finance</td>
<td>7</td>
</tr>
<tr>
<td>Community Forestry</td>
<td>21</td>
</tr>
<tr>
<td>Commercial Forestry</td>
<td>86</td>
</tr>
<tr>
<td>Conservation</td>
<td>82</td>
</tr>
<tr>
<td>Research and Development</td>
<td>31</td>
</tr>
<tr>
<td>TOTAL</td>
<td>301</td>
</tr>
</tbody>
</table>

Source: FDA data

Field Operations
Of FDA’s 301 staff, about 132 are based in the field. FDA divides Liberia into four administrative zones. Zone 1 is the Monrovia area, with the field headquarters at Kakata. Zone 2 is the west, including Lake Piso, Gola and Wonegizi, with headquarters at Tubmanburg. Zone 3, with headquarters at Buchanan, covers central part of Liberia, including the Nimba area and River Cess. Zone 4, including the Sapo National Park, covers the eastern part of Liberia with headquarters at Zwedru. In addition to the headquarters, each zone has sub-offices in other towns (especially county seats) and at protected areas. Commercial, Conservation and Community Departments are all represented at the zone headquarters.
TABLE 9: FDA FIELD STAFFING BY ZONE

<table>
<thead>
<tr>
<th>Department</th>
<th>Zone 1</th>
<th>Zone 2</th>
<th>Zone 3</th>
<th>Zone 4</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conservation</td>
<td>5</td>
<td>6</td>
<td>25</td>
<td>36</td>
<td>72</td>
</tr>
<tr>
<td>Commercial</td>
<td>8</td>
<td>13</td>
<td>9</td>
<td>18</td>
<td>48</td>
</tr>
<tr>
<td>Community</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Totals</td>
<td>13</td>
<td>22</td>
<td>37</td>
<td>60</td>
<td>132</td>
</tr>
</tbody>
</table>

Source: FDA data

Bureau of National Fisheries (BNF)

The institutional framework for the management of fisheries and aquaculture is within the purview of the Ministry of Agriculture (MOA) through the Bureau of National Fisheries (BNF). The BNF was created by an Act of the National Legislature under the Natural Resources Laws of 1956 and charged with the responsibility of managing and developing fisheries and aquaculture in Liberia. The BNF is divided into 4 Units: Administration, Marine Fisheries, Aquaculture and Inland Fisheries, and Statistics and Research. A Coordinator assisted by a Deputy Coordinator heads the Bureau. The role of the BNF is to implement fisheries policy; formulate guidelines, rules and regulations to govern national fisheries and aquaculture for its planning, development and management. Presently, the BNF has a total of 64 staff members with only eight that have advanced degrees including: two (2) M.Sc. degree holders in Fisheries and Agronomy respectively; three B.Sc. degree holders in Management; two Associate degree holders in Agriculture; and one Diploma holder in Maritime Safety. BNF’s current staffing pattern is presented in Table 10 below. Figure 21 presents BNF’s current organizational structure.

TABLE 10: STAFFING TABLE BUREAU OF NATIONAL FISHERIES

<table>
<thead>
<tr>
<th>Division</th>
<th>Admin. Staff</th>
<th>Technical Staff</th>
<th>Contractor Staff</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marine &amp; Artisanal Fisheries Division</td>
<td>2</td>
<td>6</td>
<td>46</td>
<td>54</td>
</tr>
<tr>
<td>Aquaculture &amp; inland Fisheries Division</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Research and Statistics Division Section</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Administration</td>
<td>6</td>
<td>1</td>
<td>0</td>
<td>64</td>
</tr>
</tbody>
</table>

Source: BNF data

Clearly, with such a limited staff, BNF will never be able to accomplish the mandate proposed under the draft fisheries policy and legislation.

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39 Conservation staff as expected is numerous in Zone 3 (Nimba) and Zone 4 (Sapo).
40 Commercial staff is expected to increase in number this year in zones where timber concessions are restarted.
FIGURE 20: FDA ORGANIZATIONAL STRUCTURE
Liberia Institute for Statistics and Geo-Information Services (LISGiS)

LISGiS was established by Law by the National Transitional Legislative Assembly (NTLA) on July 22, 2004. LISGiS is headed by a Director-General, and supervised and monitored by a twenty-one (21) member Board of Directors. Both the Director-General and the Board of Directors have been initially appointed by the President but thereafter, the Director-General and the Board will subsequently be appointed by the Board to minimize the involvement of Government and secure the support of all stakeholders, particularly development partners.

The main duties of LISGiS are to:

- Advise on all initiatives to collect data at all levels (locality/village/town, clan, districts, county, regional and national) in the context of an integrated National Statistical and Geo-Information System;
- Review instruments for data collection developed for such initiatives including GIS data and maps, census and survey designs, questionnaires and concepts, definitions and nomenclatures to be used in conducting the said censuses and surveys, as well as the costs of such operations;
- Establish and manage, in collaboration with respective ministries, a National Master Sample Frame consisting of population census, enumeration areas, listing of households and a register of enterprises, as a key instrument for coordination of the National Statistical and Geo-Information System;
• Ensure that all surveys of enterprises and households and/or individuals will draw their respective sample from the National Master Sample Frame;

• Compile, update and publish a rolling National Integrated Program of Sample Surveys of Households and a National Integrated Program of Sample Surveys of Enterprises to be conducted by various components of the National Statistical and Geo-Information System;

• Conduct censuses and surveys;

• Collect routine administrative statistics;

• Collect, analyze and disseminate social, economic, environmental and national accounts statistics of internationally acceptable standard as and when required;

• Create, establish and manage the integrated National Statistical and Geo- Database;

• Organize, maintain and ensure free access to a central depository of data, statistical reports, spatial information products such as maps and geo-referenced list, publications and documents from both within and outside the country;

• Publish as its regular output a Monthly Statistical Bulletin, a Quarterly Statistical Digest, an Annual Statistical Abstract, an Annual Economic Survey and an Annual Statement of National Accounts as sources of official statistics on Liberia;

• Submit the Annual Economic Surveys to the Legislature at least a fortnight before presentation of the annual Budget of Government to provide background to the Budget for informed decision- making;

• Undertake research on and develop techniques and methods for production of statistics and Geo-Information Services;

• Establish a unified statistical service within the Government by facilitating and ensuring the creation of a statistical capacity in sector ministries, geographic administrations and other components of the National Statistical and Geo-Information System;

• Promote the use of appropriate information and communication technology (ITC) in statistical data and Geo-Information Services production process, dissemination and utilization;

• Promote the understanding and use of official statistics and Geo-Data through information, education and communication (IEC) strategies (such as workshops, seminars, symposia, print and electronic media, etc,) to ensure popular participation and national ownership;

• Promote and encourage the use of common and new concepts, methodologies, definitions, procedures, nomenclatures and standards, including geographic considerations and gender and development, in the collection, analysis and dissemination of statistical information, in order to ensure integration of the National Statistical System as well as an integrated National Statistical Database;

• Accredit all professional statisticians desirous of undertaking any statistical research in the country;

• Support sectoral capacity to acquire, access, use and contribute to the National Statistical System and the integrated National Statistical Database;

• Develop for approval by the Board a public access to information policy;
• Notwithstanding legislation and regulations on national security, protect private citizens’ right to privacy;

• Assure that data produced by LISGIS are provided free of charge to the Government of Liberia and its development partners. Provisions for cost of data products will be established to ensure cost-recovery; and

• Perform such other functions as may be prescribed by the Board.

Current LISGIS capacity for the required collection, analysis, and standardization of data is limited. Strengthening LISGIS will enable the organization to fulfill its critical mandate of data collection, analysis and dissemination, and ensure that a strong statistical system will be in place as Liberia’s development partners begin to phase out their role. To address the capacity challenges of LISGIS, the UNDP National Information Management Center (NIMAC) project is presently implementing an exit strategy in which it will transition functions, staff, resources and assets into LISGIS. In addition, a UNHCR protection monitoring team, which has provided data collection support to the recently completed population census, will be available as a resource during the PRS period. Finally, a National Strategy for the Development of Statistics (NSDS) is being finalized to provide a comprehensive framework for the collection, processing and standardization of statistical data for the Liberia National Statistical System.

The University of Liberia
The University of Liberia was established in 1862 as Liberia College and became a university through a charter granted by the legislature in 1951. It is the oldest degree-granting institution in West Africa and is the leading educational establishment in Liberia for producing graduates in the areas of Forestry and Environment. The College of Agriculture and Forestry offers a four-year course leading to a Bachelor’s degree in General Forestry, but with no environment specialization option. There is also a degree offered in Wood Science and Technology. Enrollment in General Forestry is increasing. In 2007 only nine students graduated, but the number is expected to be higher in 2008. There are currently about 18 full and part-time faculty teaching forestry.

The curriculum, currently focused on silviculture and timber management, is being revised to include the new national priorities in forestry, especially wildlife management and community forestry. Capacity to teach environment and biodiversity issues and conduct research is low at present. The herbarium, an essential tool for plant taxonomy and inventory, was destroyed during the war and has not been rebuilt. Resources for teaching other environment-related studies are similarly lacking. The University currently lacks a GIS laboratory, and GIS is not currently listed as a course option. In addition to The College of Agriculture and Forestry, course relevant to natural resources management are taught in the College of Science and Technology Biology Department, courses in geology, soils, botany and zoology. Most of the graduates of these courses are destined for medicine and mining, however.
5.2 NATIONAL AND INTERNATIONAL NONGOVERNMENTAL ORGANIZATIONS

A number of nongovernmental environmental organizations (NGO), both domestic and international, are active in Liberia. These groups include the following.

5.2.1 DOMESTIC NGOS

Alliance for Conservation in Liberia

Association of Environmental Lawyers (Green Advocates)
Founded in 2001, Green Advocates is Liberia’s first and only public interest environmental law organization. It is dedicated to protecting the environment, advancing human rights protection and advocacy through sound environmental policies, and giving voice to rural, indigenous, and tribal peoples who have been denied the benefits of natural resource extraction from their tribal and ancestral lands. Green Advocates works to build strong environmental laws, enforce existing laws, and empower citizens to participate in environmental decision-making.

Center for Environmental Education and Protection
The Center for Environmental Education and Protection (CEEP) promotes environmental education, public awareness, and sustainable development through environmental workshops and seminars in schools and communities. It also conducts youth-oriented programs in health education, as well as environmental consultation.

Enviro-Link, Liberia LTD
Enviro-link connects individuals and communities to the environment through advocacy, awareness, education, training, and research. It also participates in environmental impact assessment in cooperation with EPA and other government institutions.

Environmental Relief and Development Research Organization
The Environmental Relief and Development Research Organization (ERADRO) promotes rural extension services to address health problems linked to environmental factors. Its activities include environmental research, community organization, public education on health and hygiene, and waste disposal programs in schools and communities.

Grand Gedeh Community Servant Association
Based in southeastern Liberia, the Grand Gedeh Community Servant Association (GECOMSA) focuses on community-based sustainable wildlife management initiatives, including environmental education and public awareness campaigns about bushmeat consumption.

Save My Future Foundation
The Save My Future (SAMFU) Foundation was founded in 1987 with the mission of facilitating and promoting sustainable community-based natural and human resources management and development.
SAMFU launched an independent forest monitoring campaign in the timber industry in 2000 in collaboration with its international partners for the purpose of investigating and reporting the high wave of unsustainable logging activities that was carried on by the Oriental Timber Company and other multinational corporations, the industry's contribution to the exacerbation of the civil crisis and its associated human rights abuses in rural communities. This investigation led to the publication entitled “Plunder: The Silent Destruction of Liberia's Rainforest” in 2002 which pointed an international spotlight and sparked a major debate about the contribution of the timber industry to the prolongation of the Liberia crisis at the time. Currently, SAMFU runs three core programs: the Liberian Forest and Human Rights Campaign, the Peace Building and Community Development Program, and the Marine Sea Turtle Program. This latter is supported by the U.S. Fish and Wildlife Service (USFWS) with the objective of promoting the long-term survival of sea turtles, including the sustained recovery of depleted stocks, taking into consideration the integrated well-being of residents of coastal communities with which they interact. Funding for a 3-year community development project in Wonegizi is pending.

**Society for Environmental Conservation**

The Society for Environmental Conservation’s (SEC) objective is to increase community awareness of Liberia’s rich biological sites from both a conservation and sustainable planning perspective. SEC works in the areas of alternative energy, biodiversity, climate change, development, ecotourism, environmental education, environmental justice, forests, global warming, sustainable agriculture/farming, watersheds, wetlands and wildlife protection, using a variety of methods from lobbying and advocacy to formal education methods and organizing grassroots actions.

**Society for the Conservation of Nature in Liberia**

Founded in 1986, the Society for the Conservation of Nature in Liberia (SCNL) is the oldest environmental NGO in Liberia. Its conservation projects include the creation and maintenance of protected areas, wildlife conservation, biomonitoring, and the use of socioeconomic surveys. With support from Forest Partners International and the Philadelphia Zoo, SCNL carried out a project on bushmeat and species conservation from 2002-2004 that included a planning workshop, a media campaign, and a post-campaign survey of public opinion. They are the local partner for Birdlife International (BI), and have conducted bird inventories in several forest areas, and produced a list of priority bird sites for Liberia that is available online on the BI website. Currently, with funding from Birdlife Netherlands and a private foundation, SCNL is looking at bird flyways and alternative sources of income in the Lake Piso area.

**Sustainable Development Institute**

Established in 2002, the Sustainable Development Institute (SDI) focuses on the forestry sector with the aim to stimulate public debate, influence policy development, and enhance local and international understanding of the issues surrounding forest management in Liberia. It was heavily involved in the drafting of the new Forestry Law and remains active in the development of rules and regulations governing forest management. It produced the document “So Who Owns the Forest—an Investigation into Forest Ownership and Customary Land Rights in Liberia”. Most of their current activities are focused on community involvement and land tenure issues. SDI will be monitoring the implementation of the community involvement requirements for timber concessions and providing communities technical support as they go through the pre- and post-concession processes provided for in the Forestry Law. SDI also plans to continue its role as an independent monitor of FDA’s forest management activities and of the implementation of concession requirements. SDI is also the key local partner in the World Bank funded-IUCN implemented Strategic Environmental Assessment of Liberia’s Forestry sector. SDI’s
activities have been and are funded by IUCN-Netherlands, EC, DFID, FERN, ICCO (the Dutch-based Interchurch Organization for Development Co-operation), and several private foundations.

The Skills and Agricultural Development Services
The Skills and Agricultural Development Services, (SADS) is a not-for-profit and non-governmental organization that was established in March 1998 in Montserrado County through the needs of restoring Liberia to its pre-war status by group of University students. Since then, SADS has collaborated with local authorities, national NGO’s, International NGO’S, Government and Diplomatic Mission in Liberia. SADS has work both in rural and urban communities in Liberia. SADS implements a wide range of education and developmental programs designed to improve social services, in areas such as sustainable ecosystem management, water and sanitation, Human Rights, general agriculture, biological research and survey, gender equity, HIV/AIDS awareness education, food security and livelihoods incomes generation alternative skills.

5.2.2 INTERNATIONAL NGOS

ActionAid
ActionAid works to reduce poverty through assistance to farmers and rural communities. ActionAid’s started working in Liberia in 1996 and through 2002, concentrated its efforts around urban and suburban areas as rural areas were no longer safe. After 2002, ActionAid began working on food security to restore people’s livelihoods after the war. Programs included distribution of seed and tools, development of farm families, and helping women to find ways of making an income. Currently ActionAid works in gender, HIV, governance at all levels, youth and education, and emergencies. ActionAid is partnered with Conservation International around Sapo National Park with the Civilian Conservation Corps (CCC) program, improving incomes from agriculture as an alternative to hunting in the Sapo N.P.

Conservation International
Conservation International (CI) applies innovations in science, economics, policy, and community participation to protect plant and animal diversity around the world. CI established its office in Liberia in 2002 and is working with the Government of Liberia to set up a network of protected areas. Through its Center for Applied Biodiversity Science, CI has worked with FFI to complement the Liberia Forest Reassessment Project. CI, through its Critical Ecosystem Partnership Fund, has established a small grant fund for domestic NGOs (the Liberia Conservation Action Fund), and is currently working on establishing a Liberia Protected Area Trust Fund through debt for nature swaps and use of logging tax revenues to provide funding for protected areas and the communities around them. Sapo National Park is an important focus for CI, including rebuilding the park headquarters and infrastructure, equipping rangers and establishing the CCC program to fund community development around Sapo. CI is currently building country capacity to deal with forest-carbon partnerships.

Environmental Foundation for Africa
In response to the improving political situation and transition from humanitarian interventions to development, the Environmental Foundation for Africa (EFA) is working with the United Nations Environment Program (UNEP) and High Commission for Refugees (UNHCR) to incorporate environmental management into their operations. Other major EFA activities in Liberia include environmental education, livelihood training in tree nursery management, agroforestry, and domestic energy conservation with an emphasis on war-affected populations. EFA is also a member of the Alliance
for Conservation in Liberia which aims to protect the key species and ecosystems in Liberia by harmonizing activities among international and Liberian NGOs.

**Environmental Law Institute**
The Environmental Law Institute (ELI) is an independent, non-profit research and educational organization based in Washington, DC. The Institute serves the environmental profession in business, government, the private bar, public interest organizations, academia, and the press and works to strengthen environmental protection by improving law and governance worldwide. Since 2004, ELI has provided legal analysis and drafting guidance to Liberians as a core member of the Liberia Forest Initiative. As part of the LFI group, ELI has worked closely with in-country partners and international donors to help Liberians craft a forestry law that provides for the sustainable and beneficial use of Liberia’s forest resources.

**Fauna and Flora International**
An active international NGO in Liberia, Fauna and Flora International (FFI) seeks to conserve threatened species and ecosystems worldwide, choosing solutions that are sustainable, based on sound science and that take account of human needs. Since 1997, Fauna & Flora International has made Liberia the central pillar of its West African program. In 2001 FFI was the first international environmental group to establish an office in the country. FFI has played a significant role in supporting the National Transitional Government of Liberia and was responsible for preparing three landmark environmental laws—the expansion of Sapo National Park, creation of the Nimba Nature Reserve, and reform of Liberia’s National Forestry Law. FFI has served as a partner in the Liberia Forest Reassessment (“LFR”) Project, and assisted the LFR in developing a Geographic Information Systems laboratory (GIS) for improved forest management analysis and planning. Currently, FFI intervenes at two levels in Liberia: i) establishment of an improved management structure at Sapo National Park and empowering rural Liberians by establishing communal forests; and (ii) reviewing and adapting national forestry sector legislation to incorporate and balance community, conservation and commercial interests.

**Liberia Environmental Watch**
Liberia Environmental Watch (LEW) is a nonprofit, non-governmental organization located in Maryland serving as an advocate for Liberia's environmental management towards national sustainability. LEW is devoted to achieving maximum environmental soundness through educational awareness, ensuring the protection of the environment [water, air, forest, land, and wildlife] and preserving as well as conserving natural resources now on the brink of extinction. LEW provides educational and public awareness for the benefit of Liberian residents and will collaborate with the nation's higher institutions of learning and community-based organizations, the business community, local and national governmental, including International Agencies and other NGOs for such national endeavors.

**The World Conservation Union**
The World Conservation Union’s (IUCN) work in Liberia centers in River Cess and Sinoe counties (Liberia) and focuses on: i) reviewing land tenure arrangements to help ensure that reforms in the forest and land use sectors are responsive to the legal and actual tenure arrangements in forest lands; ii) building the capacity of local NGOs and community organizations to more effectively engage in the delivery of national priorities, with particular reference to the ongoing process of forest sector reform; and iii) in coordination with the Liberia Forest Initiative and the Liberian Sustainable Development Institute (SDI), produce materials and organize capacity building activities to lay a basic foundation of knowledge on forest governance issues, particularly as they pertain to community rights and poverty reduction. IUCN is
also the lead organization undertaking the World Bank-funded Strategic Environmental Assessment for the forestry sector, and with Dutch support, will be implementing the Livelihoods and Landscapes Strategy (LLS which focuses on poverty reduction, markets and incentives, law enforcement and governance, rights and tenure, forest landscapes restoration.

**NGOs in Fisheries and Aquaculture**
The assessment report of the fisheries sub-sector identified 14 NGOs that are active in the development of artisanal fisheries and aquaculture. 10 NGOs are involved in small-scale aquaculture development in the following counties: Maryland, Bong, Lofa, Montserrado, Bomi, Grand Gedeh, and Nimba. 4 NGOs are involved in artisanal fisheries development in Bassa, Bong, Montserrado, and Nimba Counties. 1 NGO is involved in inland fisheries research. International NGOs include Conservation International, Samaritan’s Purse, Lutheran World Service, German Agro-Action, CARITAS, Catholic Relief Services, Solidarite and Asur-Liberia. The FAO is also implementing aquaculture projects in Bong, Nimba and Lofa Counties.

### 5.3 INSTITUTIONAL ISSUES AFFECTING ENVIRONMENTAL STATUS

The activities of Liberia’s government institutions are constrained by a number of factors, ranging from inadequately trained personnel and lack of basic infrastructure to lack of coordination and cohesion.

As a result, many unmet needs exist in the areas of infrastructure and administration, human resources, information and data collection, finances, and enforcement. Although addressing these needs will require considerable additional resources, these resources will be essential to enable Liberia’s government institutions to fully carry out their functions with respect to environmental management.

Particular issues with respect to the capacity of Liberia’s government institutions to manage and protect the environment are presented below.

#### 5.3.1 DEPENDENCE ON FOREIGN EXPERTISE AND RESOURCES

Currently, there are a number of international organizations operating in Liberia, several of which play significant roles in the country’s development. These groups often belong to major international networks that afford them access to resources and expertise far greater than those available to Liberia’s government institutions. While the assistance provided by these organizations has been invaluable, there is some risk that dependence on foreign expertise and resources, absent substantial investment in local capacity, may breed some resentment. For instance, local scientists and conservation professionals could become frustrated in the face of a lack of facilities, a lack of recognition at home and abroad, and a lack of opportunity. As a result, some of the most experienced and qualified Liberian professionals end up working for the better funded international organizations than for Liberian institutions.

There is also some evidence which suggests that the limited capacity of some government institutions restricts them from being able to act outside the areas of interest to their international partners. Indeed, the search for scarce resources has forced some institutions to neglect core programs and mandates in favor of developing proposals and activities which respond to donors’ agendas and “flavor of the month” programs.

Finally, the pace of reform among Liberia’s environmental institutions has been high and multiple new concepts have been introduced by the NGO and donor community. Although concepts such as chain of custody, carbon financing, trust funds, community/collaborative management etc., are valid, they are often outside of agency strategic plans and when taken together they place extraordinary demands on agency technical staff in terms of incorporating these concepts into their daily work plans.
5.3.2 INFRASTRUCTURE AND ADMINISTRATION

Liberia’s long running civil war decimated much of the country’s infrastructure, including government facilities, and severely disrupted many government functions. In the aftermath of the conflict, the country’s ministries face severe shortages with respect to office space, equipment, and supplies. The lack of reliable electricity means that for at least part of the working day the staff in government institutions cannot use any electronic equipment.

**Environmental Protection Agency**

EPA does not have a central computer on which it can collect and store data and information. Several of its key staff is working with old computers or with their own personal computers. Although EPA has assigned Environmental Inspectors to eight counties, it only has office space for these employees in three of the counties. Only five of the county “offices” have vehicles (motorcycles) and even then, there are not enough motorcycles for all of the inspectors in those counties. None of the county “offices” have computers or printers or communications equipment, nor are the inspectors provided with air time for their personal mobile phones. EPA has established a laboratory, but it is only capable of doing basic water quality analyses.

**Bureau of National Fisheries**

The BNF Director reports that decimated by the war, presently, the BNF is not able to fulfill its mandate. The BNF is ill equipped and lacks the capacity to monitor both inland and marine fisheries resources; there is only one BNF agent stationed up country to control artisanal fisheries activities on the St. Paul river (and he has no means of transportation), and there are no boats to monitor and control marine activities. The role of the BNF has now been limited to licensing control and fisheries statistical data collection. The BNF does not have budgetary allocation to support its activities around the country, including training of its personnel, data collection and analysis, providing extension services to fish farmers and artisanal fishing communities, research in fisheries and aquaculture, monitoring of the fishing grounds and regulation of fishing activities.

5.3.3 HUMAN RESOURCES

Another area requiring attention at the institutional level is staff availability and development. Lack of qualified staff is a problem in all of the institutions involved in environmental management and protection of biodiversity in Liberia. Of the staff that is in the institutions, many lack training and qualifications necessary for doing their jobs. Liberia currently possesses little institutionalized expert capacity in environmental and biodiversity management and the fundamental science to support it, including taxonomy, environmental engineering, environmental science, land-use planning, and GIS.

Although Liberia can provide vocational and higher-education training in agriculture and forest management, more extensive training in conservation biology, conservation, taxonomy, environmental science, environmental engineering, and land-use planning are not available.

With the exception of FDA, none of the line agencies have established and staffed the environmental units required by EPA Act. Some institutions, like the Ministry of Lands, Mines and Energy, have included Environment in the portfolio of a manager (e.g., the Assistant Minister for Mineral Exploration and the Environment in the Ministry of Land, Mines and Energy) but they have not actually created and staffed an environmental unit.

Finally, to the ETOA team’s knowledge, there has been no recent strategic assessment of capacity gaps within the lead environmental agencies to specifically identify what type of capacity building needs to
take place and where it should be done. Pending such an assessment, some brief ETOA team recommendations are presented below.

**Environmental Protection Agency**
The EPA has produced a “Terms of Reference” that reflects its minimum estimate of what staff is needed in the Agency. Of the 31 positions for environmental professionals in the headquarters office, only 16 (less than 50 percent) are filled. Many of the environmental professionals have minimal experience in their assigned field. EPA does not have even one environmental engineer on its staff. Only 8 of the 15 counties have Environmental Inspectors, and many of them do not have the minimum educational requirements for the position, as stated in the Terms of Reference.

EPA’s staff is just beginning to receive Project Briefs, Environmental Impact Assessments, and Environmental Management Plans. The number of these documents arriving at the Agency will only increase in the coming months and years. Yet the staff of EPA has only had minimal training in environmental impact assessment and review.

**Forest Development Authority**
In terms of both donor and GOL resources, among FDA’s “3Cs”, the commercial forestry sector has received by far the most attention and understandably so. Currently, the conservation aspect has been receiving an increasing amount of attention but lags far behind the commercial sector. Community forest management, however, is by far the least developed in terms of available resources, conceptual frameworks and practical implementation.41

As FDA begins to shift its focus from commercial forestry to conservation and community forestry, there is a critical need for capacity building in both conservation and in community-based natural resource management (CBNRM) and collaborative management (CM). In terms of conservation, FAO’s Wildlife Conservation Issues Paper makes several recommendations for developing wildlife training and skills for FDA staff in particular. These include establishing a partnership with the University of Liberia’s College of Agriculture and Forestry, to assist university graduates in obtaining PhDs in wildlife management abroad so that they can help set up a Department of Wildlife Management at the university upon their return, as well as the sending of trainees to wildlife schools in Tanzania (College of African Wildlife Management) or Cameroon (Wildlife School) to teach them more about wildlife management in preparation for working in Liberian protected areas. Another option is to bring instructors from these schools to Liberia to teach classes in law enforcement, wildlife legislation, and anti-poaching.

In terms of CBNRM, key areas for strengthening include:

- Participatory learning and planning processes such as participatory rural appraisal (PRA), community mapping and adaptive collaborative management and participatory action research;
- Facilitation skills to enable free and open participation of the communities and to identify different levels of participatory decision making;
- Participatory land use planning;
- Partnership development and management (linkages with communities, local authorities, tribal elders, other line agencies, NGOs etc.)

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- Organizational and development skills for community organization (electing committees, developing constitutions, leadership, preparing technical and financial reports); and

- Documentation and analysis of lessons learned to share experiences and feedback into policy and legislation.

Formal and informal training in the above areas could be supplemented with study visits to the Gambia and Guinea Conakry where joint forestry department-community management of the forest estate has become the preferred method of managing forest and biodiversity resources.

**Bureau of National Fisheries**

Human resources and law/regulation enforcement capacity at the BNF are almost non-existent. There is an acute shortage of trained personnel in key disciplines including statistics, resource management, fisheries economics, fishing technology, aquaculture and extension.

**5.3.4 INFORMATION AND DATA COLLECTION**

Liberian government institutions are also facing shortages of scientific information pertaining to environment and natural resource management.

Availability of tabular and spatial environmental data has been compromised as a result of the civil war. For example, hydro-meteorological monitoring was disrupted as a result of the conflict. Many of the sensors and related technologies use to harvest data on a regular time step were destroyed or looted. Human capital required to record these data and integrate them with central databases was seriously compromised. The physical infrastructure that housed these systems along with their operators was severely damaged in many locations. Hence, there are significant gaps with respects to these and other environmental data. Data that does exist is typically in an analog or paper format which limits external investigator access. Relevant environmental data that resides in antiquated filing systems unaffected by the conflict remain largely inaccessible to the outside world. Digital data cataloging systems that can be inventoried by external clients can greatly foster information exchange.

Land cover baselines are being re-established by the FDA allowing for on-going change detection and related environmental monitoring. The 2008 census was just released by LISGIS when plotted on a map these data can be related to possible pressures levied on environmental resources. Other Liberian partner agencies such as Conservation International (CI) are conducting spatial assessments of key land resources and associated changes. The ETOA data collection process involved travelling to important protected areas and documenting key findings specific to environmental threats and opportunities. Coordinate data were taken using a Global Positioning System (GPS) together with high resolution photos. These coordinate data along with their related attribute information that describe the environmental threat/opportunity and photo images can be integrated with other environmental data such as those produced by the FDA or CI to provide a degree of validation regarding certain events identified through direct observation. This process is valuable to explaining why certain change related to environmental is occurring.

**Bureau of National Fisheries**

The BNF Director reports that fisheries catch data collected by the BNF does not have national coverage and the data is often inaccurate and cannot be analyzed and interpreted into useful management tools.
5.3.5 ENFORCEMENT
The existence of comprehensive policy and legal framework in Liberia means little without a corresponding ability and willingness to implement and enforce it. Some examples are provided below.

Environmental Protection Agency
Although the EPA Act and the EPM Law authorize the creation of many regulations, rules, standards and guidelines, and provide for penalties for violation, EPA has not officially promulgated any of these regulations, rules, standards and guidelines, so enforcement is not possible. For three areas, the EPA Act and the EPM Law themselves provide sufficient language for enforcement:

- Environmental impact assessment;
- Environmental restoration orders; and
- The prohibition on dumping of solid waste.

However, even these three areas the ability to enforce is questionable, in that neither the Environmental Administrative Court nor the Environmental Court of Appeals has been established. Although the 2003 EPA Act provides for the establishment of an Environmental Administrative Court and Environmental Court of Appeals (Sections 33-34), these courts have not yet been created. At least some infractions are currently handled through existing courts, though it is unclear how effectively they are resolved. Establishment of the environmental courts envisioned in the 2003 EPA Act may greatly enhance the ability of government agencies to enforce environmental laws and regulations, by providing for a specialized venue with substantive expertise.

Forestry Development Authority
Currently, law enforcement responsibilities are located in the MD’s office but actual enforcement in the field (at least in Nimba and Sapo) is done by conservation rangers under the direction of the Conservation Department, and in collaboration with local courts.

Interviews with FDA representatives indicate that enforcement in Sapo National Park is severely hampered mainly because of political and economic interests in the area’s gold, animal and timber resources. Although a joint FDA UNMIL operation evicted them in 2006, FDA estimates that there are currently over 6000 artisanal gold miners in the park\(^\text{42}\) who have reestablished the “Iraq” and “Afghanistan” enclaves complete with additional video entertainment halls, restaurants and other “services.” Although the FDA intends to mount another operation to evict the miners and accompanying loggers and commercial bush meat hunters, more effort needs to be placed on addressing the political issues around Sapo, and garnishing political support at all levels for better for better protection of the area.

\(^{42}\) Mainly in Zones 2 and 3. Zone 1 around park headquarters has been relatively problem free.
5.3.6 OVERLAPPING MANDATES

Although there are many examples of overlapping institutional mandate, the situation between EPA and FDA is perhaps the most relevant. The Environment Protection and Management Law contains some provisions which appear to be in conflict with the Forestry Law, which gives FDA primary authority for management of forests and protected areas. All of these provisions include the phrases, “the Agency [EPA] shall, in consultation with the relevant Line Ministry”. The first phrase seems to give the EPA the authority to act, with second phrase requiring only that the EPA consult with the Line Ministry before acting. Examples of these incidents are as follows:

- Section 75, subparagraph 3 of the EPML gives EPA authority to declare rivers, lakes, or wetlands as protected areas and impose restrictions on the management of those areas;

- Section 77 subparagraph 1 of the EPML gives EPA authority to “issue guidelines and prescribe measures for the sustainable use and protection and management of all forests in Liberia”;

- Section 77 subparagraph 3 of the EPML gives EPA authority to “define and designate communal forests and establish guidelines for [their] management and use”;

- Subparagraph 7 of Section 77 authorizes EPA to declare “specially protected forest areas” in which human activity is prohibited;

- Section 79 subparagraph 1 gives EPA authority to declare “any area of land, river, lake, wetland, or coastal zone as a protected natural environment for the purposes of promoting and preserving specific ecological processes, natural environmental systems, natural beauty or places of indigenous wildlife or the preservation of biological diversity in general.” Subparagraph 2 gives EPA authority to promulgate guidelines for the management of these protected areas;

- Section 80 provides for the declaration, upon completion of an Environmental Impact Study by EPA, of “wildlife protected areas” (consisting of national parks, wildlife reserves, nature reserves, or any other areas) and “wildlife management areas” (consisting of wildlife sanctuaries, community wildlife areas, or any other areas), and charges EPA with prescribing measures necessary for wildlife management in these areas;

- Under Section 84, EPA must promulgate guidelines for the conservation of biological resources in-situ, including the “selection and management of protected areas” and “selection and management of buffer zones near protected areas”.

It might be useful for agencies to establish an ongoing consultation process for the development and enactment of regulations governing areas of overlapping mandates. This would ensure that agencies do not unintentionally usurp one another’s roles, even when their activities target the same sectors.

5.3.7 INSTITUTIONAL COLLABORATION

Another important aspect of institutional capacity involves collaboration on environmental issues among government institutions, NGOs, and industries, and quasi-government bodies (e.g., the World Bank). Such collaboration helps to resolve problems resulting from sectoral conflicts and overlapping jurisdiction. It may be particularly important for Liberian government agencies to coordinate their actions with respect to activities such as mining, farming, and logging, all of which pose threats to the environment, forests and biodiversity. The EPA Act, EPM Law, and the National Forestry Reform Law
all call for inter-agency and stakeholder collaboration in environmental protection and natural resource management.

Currently, a number of government institutions collaborate on a formal and informal basis with other groups. The Ministry of Agriculture monitors the movement of flora and fauna, as well as the use of chemicals, in partnership with a wide range of ministries and the Monrovia City Corporation. FDA receives assistance for park patrols from Flora and Fauna International (FFI) and Conservation International (CI), and has collected data in protected areas in collaboration with CI and the Society for the Conservation of Nature in Liberia (SCNL). The Ministry of Lands, Mines and Energy serves as Chair of EPA’s Board of Directors and collaborates with UNDP, UNEP, and some local NGOs, while the Ministry of Lands, Mines, and Energy also works in partnership with international organizations.

Despite progress, some complications exist with respect to cooperation among government institutions and between government and NGOs.

**Coordination across Government Institutions**

In terms of coordination across government institutions, nearly all SEA stakeholders cited the need to increase coordination between FDA, EPA and the Ministries of Agriculture and Lands, Mines and Energy. Examples that illustrate the need for improved collaboration include:

- Logging and mining on the same tract of land and the separation of mining claim holders from that of forest concession holders;
- Competing land uses being considered by different government agencies for land proposed as protected areas, and the absence of a common land use policy between FDA, MOA and LME (e.g., Wologizi mountain range has been designated for protection by FDA while LME has granted licenses for BHP Billiton; similar problems exist for Lake Piso and the Putu mountains in Sinoe;
- Granting agricultural concessions without or with limited reference to FDA (e.g., Equatorial Biofuels request for 500,000 ha of in the River Gee area for rubber plantations which happen to fall within the proposed Grebo National Forest).

What is less clear at this point is what the most appropriate mechanism or mechanisms might be to foster improved coordination. Options range from forming an interministerial coordinating committee or seeking donor support for a National Environmental Action Planning (NEAP) process. The SEA team will be exploring these and other options with stakeholders during the balance of the SEA.

**Coordination between NGOs and Government**

There are several examples that illustrate the need for improved coordination between NGOs and the GOL:

- Although the Ministry of Planning issues certificates of accreditation to qualifying NGOs, some officials noted that NGOs fail to cooperate with the Ministry after they receive their accreditation;
- According to some FDA officials, despite the fact that FDA works with environment and development NGOs, the agency is often not given access to these groups’ reports or recommendations. Additionally,

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43 Supported by the World Bank and USAID during the late 1980s and early 1990s NEAPs have been instrumental in many African countries as a mechanism to better define, clarify and coordinate institutional mandates and promote policy and legislative harmonization. Unfortunately, as a result of the civil conflict, Liberia was never able to undertake a NEAP.
in the case of Nimba Nature Reserve, boundary demarcation was led by one conservation NGO without the participation of FDA and the local communities, resulting in a myriad of problems which have not been resolved to date.

- The BNF Director notes that international NGOs are implementing fisheries (aquaculture) projects without the knowledge and involvement of the Ministry of Agriculture and the BNF. The NGOs are registered with the Ministry of Planning but not with the Ministry of Agriculture. Neither the Ministry of Agriculture nor the NBF is in the know as to the activities and scope of operations of the NGOs.

In light of such problems, it may be helpful to convene agencies and NGOs at a conference to discuss how to better coordinate their activities.

**Donor Coordination**

Improved donor coordination in the environment/natural resource sector is becoming increasingly important in Liberia in light of the increased volume of aid, proliferation of projects, and the administrative weaknesses of the GOL noted above. The proliferation of projects was made evident to the ETOA team shortly after its arrival in country; nearly one in four people interviewed mentioned projects that were in various stages of preparation, approval or implementation, but little documentation was available for any of these proposals. Moreover, there is no central location in Liberia where project information can be found. This issue has been recognized by the key donor coordinating body within the forest sector—the Liberia Forest Initiative—and discussions are now underway within LFI to reformulate its role after the lifting of U.N sanctions and to define new mechanisms of cooperation and coordination. In this context, at least in the short term, LFI should consider expanding its membership to include EPA and take on the donor coordination role for environment, forest and biodiversity programs. This would include the development of an environment/natural resource project database.

**FDA Internal Collaboration**

Whether a result of the policy or a result of management, the three C’s at FDA have essentially been compartmentalized, with little collaboration between departments. Commercial forestry focuses on logging concessions, community forestry focuses on community forests, and the conservation department focuses on national parks. In the field, however, the lines between the responsibilities of these departments become rather blurred. Wildlife occurs in all forests, not just national parks. And as the FDA is beginning to find out, the lines between Timber Management Contract Areas and community forests are not that clear, and a major source of conflict between the communities and FDA.

**5.3.8 FINANCIAL SUPPORT**

Government institutions currently receive their core funding from a range of sources, including the Government of Liberia itself, bilateral and multi lateral donors—mainly “projectized,” and certification fees from local NGOs. Revenue for some forest management activities is also generated through the imposition of stumpage, land rental, and Forest Product fees (Section 14.2(b)), a portion of which is allocated for operational costs of the Protected Forest Areas Network. Revenues from tourism and ecotourism are likely to remain negligible for the foreseeable future, since Liberia has very poor tourist

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44 Most donors are hesitant to provide direct funding because of transparency issues. However, such funding would no doubt strengthen the capacity of Liberian government agencies to implement their mandates with respect to environmental and natural resource protection and management.
infrastructure, few tourists and is competing with the numerous other rain forest national parks being created across Africa and worldwide.

In FDA, funding for alternative incomes and community compensation is problematic, since the amounts involved are likely to be large for programs to be effective. In forests managed for extractive uses, the management and community compensation can be funded through concession rents and taxes on forest products, as outlined in the 2006 forestry law. No such funding mechanism exists for strictly protected areas, and neither FDA nor conservation organizations have directly addressed this problem. Funds are needed for the large salaried staff and the infrastructure to manage the protected area, liaise with communities and work with visitors. Funding is also needed for alternative livelihoods and community compensation for loss of forest use.

EPA is the principal authority in Liberia for the management of the environment. This designation may need to be clarified for some areas of environmental management for which other governmental agencies have also been given principal authority, such as forest and protected area management and pesticide controls. But for many types of environmental management, EPA is clearly the lead agency. These include environmental impact assessment, hazardous and non-hazardous waste management, water quality control, air pollution control, noise pollution, emissions of noxious odors, and management of ionization and other forms of radiation. Yet, EPA has received very little support from the donor community.

Alternative funding sources such as trusts funds and biodiversity offsets would enable FDA and EPA to maintain core activities using GOL budget contributions and use trust or offset funds to support field activities. CI and the World Bank are currently exploring the possibility of a protected areas trust fund and the EPA Act provides for the creation of a National Environmental Fund. Neither of these funds has been operationalized.
SECTION 6: UNDERLYING CAUSES OF ENVIRONMENTAL DEGRADATION

### 6.1 LACK OF ALTERNATIVE FINANCING

The lack of direct financial support is a major cause of most of the institutional limitations identified in Section 5 above, and a major underlying cause of threats to the environment. Liberia’s civil conflict and the resulting shortages in staffing, supplies, and equipment have limited the ability of most GOL agencies to implement their mandates. Although GOL budget contributions should increase as logging, mining and other concessions are granted, it is unclear whether FDA and EPA core budgets will increase proportionally relative to their mandates. In sum, the absence of alternative funding sources—particularly for the implementation of field activities - will curtail Liberian government agencies ability to implement their mandates with respect to environmental and natural resource protection and management over the longer term.

### 6.2 LACK OF CAPACITY

Practically everyone interviewed by the ETOA team—expatriate and Liberian alike - cited lack of capacity as the major underlying cause of environmental degradation. And the institutional profiles for FDA, EPA, LISGIS and BNF confirm this assertion—staff limitations both in terms of numbers and qualifications hamper the ability of these agencies to implement their mandates. Yet ironically, there are very few donor activities that incorporate a formal capacity building component; most provide only some combination of on the job training and study visits. Options for providing long term training are expensive; advanced degree programs in the U.S. cost about $50,000/year per participant. Rehabilitating and reinvigorating the University of Liberia will also be an expensive proposition but one that will be critical to the future of Liberia.

### 6.3 WEAK LAW ENFORCEMENT

One of the key challenges facing environmental protection and management is the lack of enforcement of the existing laws. There are several reasons for this. First, Liberia’s civil conflict, and the resulting shortages in staffing, supplies, and equipment have limited the ability of most GOL agencies to actively implement law enforcement operations. Second, given the post conflict situation and new mandates, there seems to be a certain hesitancy among environmental agencies to enforce laws given current socio political and economic interests and concerns. Finally, new agencies such as the EPA are only getting their feet on the round in terms of enforcement and older agencies such as the FDA “do not have a strong history of enforcing its laws and legislation” In addition to these issues, there are three major contributing factors to the weak law enforcement problem:

- **Policies and Legislation are far removed from the realities that they are trying to influence.** Drafted by Monrovia-based lawyers and technicians, Liberia’s environment/natural resource policies are based on the assumptions that reality is manageable and that the future is predictable. This view has resulted in ‘technical’ solutions to environment/natural resource development ‘problems’, including overly comprehensive and “unimplementable” policy and legislative

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45 From the results of the draft Strategic Environmental Assessment ranking questionnaire of consolidated issues.
mandates. Complicated policies and legislation result in poor understanding and contribute to difficulties in enforcement. The net result of this technical approach is that the majority of policies and associated acts are far removed from the reality they are trying to influence.

- **Low community awareness of policies and legislation.** The problem of weak law enforcement is also exacerbated by the fact that many communities/resource users are unaware of environmental policy and legislation as well as the new integrated forest policy and legislation. For example, although FDA maintains that they have made every effort to consult with communities on the new legislation, the SEA team, during the course of their stakeholder consultations, found that there is relatively little awareness on the details of the new forest legislation and policy and overall lack of understanding of the 3C approach to forest management. The SEA team also found that there is a general lack of conceptual clarity on community and conservation forestry and an overall lack of understanding of the rules and procedures regarding community decisions on issues such as allowing land for logging and no clarity on what actual decision-making powers they have at the local level regarding forest management decisions.

Although the ETOA team believes that FDA did make sufficient effort to increase community awareness, we suspect that the complex nature of Liberia’s environment-related legislation makes communicating by the GOL and understanding by the communities all the more difficult. In short, if someone doesn’t know or understand the rules, you cannot expect them to obey them.

- Finally, the absence of a law enforcement division within the FDA also appears to hamper enforcement efforts. The relationship between law enforcement at FDA HQ and day to day enforcement activities in the field is not clear. A separate law enforcement division complete with separate field enforcement personnel reporting directly to the division director would bring FDA in line with the majority of other African conservation/forestry organizations while eliminating the (confusing to communities) dual role of a conservation ranger as responsible for both enforcement and community/conservation activities.

### 6.4 LACK OF A HOLISTIC APPROACH TO ENVIRONMENT/NATURAL RESOURCE MANAGEMENT

In general, both FDA and forest communities tend to view commercial logging as the sole indicator of economic value or activity in the forest sector. There is little appreciation of the economic value of NTFPs (including bushmeat) —either by the communities or by the FDA - in terms of the restrictions posed by the protected areas, community access to NTFPs in logging concessions or an acknowledgement that NTFPs are also a source of economic benefits from forests and wetlands. In most instances, FDA focuses on curtailing negative practices with regard to hunting and the bush meat trade rather than on positive economic ventures that could be properly regulated. Moreover, at the institutional and policy level there has been relatively little work done on NTFPs and there are no estimates of the importance of NTFPs to the national economy or whether there is a regional trade in NTFPs. There has also been relatively little development of national and international markets for NTFPs, and data about their biological status (stock assessment) is nonexistent.

The situation is similar for ecosystem services; no attempt has been made yet to value the role of Liberia’s forests in watershed protection, carbon storage, etc. The lack of a holistic approach to environment/natural resource management: i) increases threats to biodiversity; ii) contributes to the compartmentalization of the 3 Cs; and iii) results in lost revenues both for FDA and the communities.
6.5 BARRIERS TO ALTERNATIVE LIVELIHOODS

Although there are few alternative livelihood programs in Liberia, the ones that do exist have had very limited success; the livelihood options presented to communities by these programs cannot compete with incomes gained from illegal logging, the bushmeat trade or diamond and gold mining in the parks and forest reserves. A major part of the reason for this is that the livelihoods offered are based on an assessment of what communities “want to do” rather than any kind of value chain analysis of several subsectors to identify products and services that show the greatest potential for increasing household income, and what elements along the value chain—from access to technical information and capital to market access—act as barriers to alternative livelihood development.

The problem of alternative livelihoods is particularly apparent around Liberia’s National Parks. The Forest Act provides a scale for community compensation in timber concession areas. Timber concessionaires will pay a land rent to the government and although the official value has not been published, unofficial sources suggest that it will be about $US 2.50 per ha per year. Communities will receive 30% of this, with a similar amount going to the counties. Using these figures, a community with 5000 ha in a timber concession could receive about $US 3750 annually for community development and still maintain any hunting and NTFP rights they have in that forest.

Communities that live around strictly protected areas, however, receive no compensation for the loss of rights to forest products but are expected to make up the difference through GOL and donor supported alternative livelihood programs. As these programs fail to generate income, communities continue to illegally log, hunt bushmeat and dig for diamonds and gold.

6.6 INSECURE LAND AND RESOURCE TENURE

Poverty, land, and the environment are inextricably linked. The rural poor of Liberia depend almost entirely upon land and other natural resources for their livelihoods, including their food, fuel, shelter, water and medicines. Unequal access to and ownership of land and other resources have contributed significantly to economic and political inequities and environmental degradation throughout Liberia’s history, and have exacerbated tensions and conflict. The existing systems of land acquisition favor the wealthy and the elite. Women in particular have had limited land and resource rights.

The need for and importance of rapidly developing a land tenure policy is becoming increasingly critical, not only for forestry issues but for the country as a whole. The final outcome of the work undertaken by an eventual Land Commission will have major implications for the relationship between the GOL and communities and between the GOL and agro industrial and forestry concessions operators. Indeed for this latter, this relationship already appears to be turning sour. A July 31, 2008 NGO coalition press release states that:

“The Coalition is also concerned that the Government’s decision to allocate three contracts for forest in Bokomu and Gou Nwolaila Districts violates the rights of the communities in those districts. In a resolution[4][4] presented to county officials, in the presence of the FDA Managing Director and other senior official, a representative of the UN Mission in Liberia, as well as representatives of several logging companies, these communities made it clear that they would resist any attempt to log in their area without their consent. By refusing to address the communities concerns, the FDA is creating a situation that will pitch the communities against the companies that have been granted contracts in the area. This is a dangerous precedent and could backfire with serious consequences, including conflicts between the loggers and those communities.”
6.7 ABSENCE OF A STRATEGY TO ADDRESS THE COMPROMISES BETWEEN ENVIRONMENT AND ECONOMIC DEVELOPMENT

Sustainable development is based on the notion that growth strategy should take into account environmental and social concerns, as well as the efficient management of resources to achieve long-term prosperity. This concept has been endorsed by the international development declarations and their initiatives, starting with the Rio Summit in 1992 and the World Summit on Sustainable Development in Johannesburg in 2002, and finishing with the recent launch of the Millennium Development Goals (MDGs).

Although Liberia’s Poverty Reduction Strategy (PRS), addresses environmental concerns such as harmonizing the New Minerals and Mining Law (NMML) with the Forestry Law with respect to mining concession rights and protected zones, environmental issues are relegated to an annex and with “exploitation of Liberia’s abundant natural resources” as the “major driver of poverty alleviation in the PRS implementation period and beyond.” Moreover, none of the three basic drivers of Liberia’s growth strategy - rebuilding roads and other critical infrastructure; reviving the traditional engines of growth in mining, minerals, forestry, and agriculture; and establishing a competitive business environment to help diversify the economy over time - address sustainability issues. Finally, none of the PRS’s five pillars - Consolidating Peace and Security, Revitalizing the Economy, Strengthening Governance and the Rule of Law, and Rehabilitating Infrastructure and Delivering Basic Services make reference to the environment or sustainability.

Without a strategy that specifically addresses tradeoffs between the environment and economic development, the ETOA team is concerned that economic development—in the form of mining and agro industrial concessions - will continue to take precedence over the environment as they have done in the past.

6.8 ABSENCE OF ANY LAND USE PLANNING

In Liberia, urban land-use planning and zoning regulations at the national or county level are virtually non-existent, and the PRS only makes passing reference to both urban and rural planning. Yet the absence of urban land use planning in combination with Liberia’s burgeoning post conflict economy and increased population have overwhelmed the originally planned area for many urban centers. As a result, landfills for human habitat have destroyed hundreds of hectares of mangroves, while increased beach erosion due to unregulated and unplanned beach mining is destroying both animal and human habitat. Clearly, the GOL (MCC and EPA) needs to develop an urban land use policy and zoning regulations and should seek donor support for this initiative via the World Bank’s Emergency Infrastructure Supplemental Component and Japan International Cooperation Agency’s (JICA).

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46 The “Land and Environmental Policy” section under this pillar deals primarily with land tenure issues and not sustainability.
47 Originally made to accommodate 350,000 persons, Monrovia’s now has more than 1 million persons.
The situation at the rural level is similar. There are numerous potentially conflicting land use issues—agro industrial plantations, mining concessions, commercial timber contract areas, protected areas, proposed carbon concessions, community forests—that proliferate in an absence of information on deeded lands, tribal lands, and any other preexisting land encumbrances, locations of mineral deposits and occurrences, and relevance of boundaries for parks, national forests and concessions. Without any national level land use plan to guide resolution of these conflicts, sustainable economic development in Liberia could be hampered.
SECTION 7: APPROACHES AND INTERVENTIONS USED BY ALL INSTITUTIONS (E.G., NGOS, GOVERNMENT, PRIVATE SECTOR) AND RESULTS OBTAINED UNDER EXISTING ENABLING CONDITIONS INCLUDING THE LEGAL AND REGULATORY ENVIRONMENT

Given that Liberia’s civil conflict ended in 2003, the country does not have a long track record of approaches and interventions in environment and natural resource management; for the most part, post conflict activities are focused on restoration of infrastructure and services, increasing employment, reintegration of displaced persons, and other programs designed to help Liberia get back on its feet. As many of these programs are now transitioning from post conflict to development, there are, however, certain interventions that are worth noting, particularly in the context of future programming.

7.1 DONOR-GOVERNMENT COALITIONS—THE LIBERIA FOREST INITIATIVE

The Liberia Forest Initiative (LFI) is a coalition of GOL agencies, donors, nongovernmental organizations and civil society participants committed to the long-term sustainable management of Liberia’s forest estate through a shared multi-donor program sponsored by parallel financing mechanisms.

Members of the LFI, in addition to the World Bank, include organizations such as the US State Department, the European Commission, the USDA Forest Service, the International Monetary Fund, the Food and Agriculture Organization, IUCN, the Environmental Law Institute, Conservation International, CIFOR, ICRAF, IATA, CGIAR, and Fauna and Flora International, as well as Liberian government agencies and civil society organizations.

The LFI’s primary objective is to ensure Liberia’s forests contribute to the long-term well-being of Liberia’s people, while maintaining and enhancing its rich biological diversity. LFI support to Liberian forestry sector reform is organized around three main themes; commercial forestry, community forestry and conservation. In addition, the LFI works on cross-cutting issues, such as: governance and the rule of law; transparency and information management; policy development; legislation; capacity building; and security.

LFI has been instrumental in developing Liberia’s forestry sector and has had many notable accomplishments, the most important of which was the work leading to the lifting of U.N. Security Council timber sanctions on June 20, 2006.
7.2 SMALL GRANTS FUNDS FOR BIODIVERSITY IN A POST CONFLICT SITUATION

Conservation International developed the Liberia Conservation Action Fund (LCAF) - a small grants fund with initial financial support from CI’s Critical Ecosystem Partnership Fund (CEPF). Administration of LCAF was a joint effort of Conservation International-Liberia (CI), the Forestry Development Authority (FDA), Environmental Foundation for Africa (EFA), Fauna & Flora International (FFI) and CEPF with the objective of achieving conservation outcomes while building capacity of Liberian civil society organizations.

Financial support for targeted conservation outcomes were directly channeled by LCAF to Liberian nongovernmental organizations (NGOs) to stimulate civil society organizations, build partnerships and strengthen coordination between international organizations, governmental agencies and Liberian NGOs. LCAF funding targeted following three strategic objectives:

- **The Establishment and Management of Liberia’s Protected Areas.** Under this objective project activities focused on assistance to establish or manage existing protected areas and work to build the capacity for protected area management.

- **Reduced Threats to Wildlife and Improving Wildlife Management.** Under this project activities focused on reducing hunting pressure, enforcing hunting regulations, and improving management capacity. The activities also focused on key biodiversity areas throughout the country such as Sapo National Park and the East Nimba Nature Reserve.

- **Improved Understanding of Liberia’s Biodiversity through Scientific Research.** Project activities focused on public information dissemination to improve public awareness. Field research sites focused on key biodiversity areas in and around proposed or existing protected areas.

Liberian NGOs were able to apply for grants from the program, the implementation of which not only helped build their capacity to address the most pressing threats to the country’s biodiversity, but laid the groundwork for more development oriented conservation programs in the future.

7.3 FARMERS FIELD SCHOOLS

Farmers Field Schools (FFS) - when operating in the buffer zones of protected areas and focusing on the value chains of high value agricultural commodities - have the potential for providing significant alternative incomes to communities living in these buffer zones.

The FFS approach:

- Motivates and teaches farmers to experiment with crop production practices in such a way that they can adapt and adopt technologies and even develop new ones on their own;

- Utilizes rapid, recognizable success to motivate farmers and avoid the use of artificial incentives;

- Uses appropriate technologies—those that are inexpensive, simple, and based on locally available resources;

- Initiates the process with a very limited number of technologies: one or two, if that is enough to achieve recognizable success;
• Trains some villager farmers to become trainers leading to “farmer-to-farmer extension;” and most importantly, incorporates environmental issues at all stages of the FFS process.

Although the Sustainable Tree Crops Program (STCP)—the main implementer of FFS in Liberia is only in its second year of implementation, team discussions with members of two cocoa FFS in Nimba county suggest that increased incomes from cocoa are compensating for incomes gained through bushmeat and illegal logging. As STCP progresses, STCP should undertake a more formal survey to determine the exact relationship between increased cocoa incomes and reduced illegal activities.

7.4 SAVE MY FUTURE FOUNDATION’S (SAMFU) MARINE SEA TURTLE PROGRAM

This program is supported by the U.S. Fish and Wildlife Service (USFWS) with the objective of promoting the long-term survival of sea turtles, including the sustained recovery of depleted stocks, while taking into consideration the integrated well-being of residents of coastal communities with which they interact. Although the ETOA team was not able to verify, SAMFU claims to have stopped the hunting of sea turtles in two communities near the mouth of the Cess River. Apparently, they made a deal with the communities, so that SAMFU/USFWS would provide fishing nets and outboard motors to the fishermen, in exchange for beach protection, so that the communities would not attack the turtles and nests when they came ashore, and they would monitor the nesting.

If true, this would be a big breakthrough for beach conservation in Liberia, since sea turtles are in serious trouble throughout their breeding ranges. This would be an important approach to replicate at Lake Piso and other coastal sites. Apparently, four species of sea turtle occur in the Greenville area (a very high number), of which three nest on the beaches (Green, Leatherback, Olive Ridley), and one, the Hawksbill, in the estuaries.

7.5 MEDIATION IN PROTECTED AREA BOUNDARY DEMARCATION

Protected area boundary demarcation in Liberia is fraught with problems, not the least of which is the escalation of community-FDA conflict. Although in its initial stages of implementation, the efforts of the Land Rights and Community Forestry Program (LRCFP) in solving boundary demarcation problems in East Nimba Nature Reserve may be applicable for boundary demarcation around other protected areas. Prior to LRCFP’s arrival, conflict between FDA and the boundary communities was so severe, that FDA staff was threatened with violence if they attempted to enter the park.

LRCFP’s approach of serving as a mediator between FDA and communities seems to have met with some success as determined by one community who informed the ETOA team that all they wanted was input into the boundary demarcation process and LRCFP afforded them that opportunity. LRCFP’s mediation approach focuses on helping communities develop a vision for natural resource management, sharing information in an open and transparent manner, and a willingness to listen more than talk. Such a participatory approach to boundary demarcation could be applied under the COPAN project.
SECTION 8: OPPORTUNITIES AND CONSTRAINTS ASSOCIATED WITH ALL ENVIRONMENTAL ELEMENTS (E.G., COASTAL MANAGEMENT, FORESTRY RESOURCES)

The ETOA Team has formulated a set of “opportunities” for future program actions that the GOL and donors may wish to consider for improving their contribution to environmental management in Liberia. Most of the recommendations focus on opportunities for policy development, livelihood and economic growth activities that have the potential to contribute to better management of the environment and natural resources. Other recommendations address some of the underlying causes of environmental degradation that if not resolved, could jeopardize future economic growth. The recommendations also cut across all environmental elements from forests to coastal and marine ecosystems to the urban milieu.

It should be noted that the recommendations are short to medium term in nature (3-5 years) and do not address all the actions needed to protect and manage Liberia’s environment. However, the ETOA team believes that the opportunities offered would lay the foundation for a more comprehensive and cohesive approach to environmental management and future long term investments while sustaining the natural resource base on which Liberia’s economic growth is based.

8.1 OPPORTUNITIES FOR POLICY DEVELOPMENT, LIVELIHOOD AND ECONOMIC GROWTH

8.1.1 POLICY AND PLANNING

Consider Policy and Legislation as Social Experiments
Given the complicated and complex nature of current and draft environment-related policies and legislation combined with the fact that predicting the future is difficult in terms of policy implementation, the ETOA team suggests that a more helpful way for the GOL to view environmental policy development is to approach policies and legislation as 'social experiments' that take into account the underlying uncertainty and the necessity of trial and error in order to learn. Experiments also take into account that the unexpected may happen, and that both problems and solutions may have to be redefined along the way. Policy-making then becomes less a matter of prediction and implementation, and more a matter of questions and discoveries. This approach links to wider FDA concerns about the importance of continuous learning, flexibility, and opportunities for local ownership of the policy process.

Manage Liberia’s Forests Based on Their Holistic Value
Liberia’s forests are a diverse collection of highly valuable resources. Among other things they provide:

- The opportunity to capture and store atmospheric carbon dioxide;
- Numerous products, from timber and minerals to protein, medicinal plants and tourism;
• Clean water;
• Recreational and aesthetic amenities; and
• The plant and wildlife habitat needed to maintain healthy ecosystems.

Holistic management, which accepts that humans are part of nature and that it is possible - through sound decision-making and monitoring—to improve the health, biodiversity and productivity of the forest, would enable FDA to better: i) understand these resources and their value; ii) develop products and services that allows society to capitalize on their financial attributes; and iii) manage them sustainably to generate long-term financial and conservation value.

Develop Bushmeat Policy and Legislation

There is a need to address possible discrepancies between the 2006 Forestry Reform Law, and the January 2008 Liberia Protected Areas Network Strategic Plan. From the point of view of wildlife protection, the proposed protected areas network includes two distinct categories of reserve, strictly protected such as National Parks, and multiple use such as National Forests. Law enforcement in the first category is relatively straightforward since anyone hunting is committing an illegal act. In the second category, where logging and hunting are allowed, wildlife protection and the observance of sustainable harvest limits is much more problematic, and has often proved near impossible to enforce over west/central Africa. Consequently, there is considerable doubt in conservation organizations about the contribution that Forest Reserves and other production forests can make to wildlife protection, and case studies are needed. From the literature and from discussions with experts it appears that foreign organizations and conservation NGOs are expecting a large increase in the number of strictly protected sites, including the conversion of existing National Forests into National Parks, while the Government of Liberia is reluctant to lose economic benefits through increased protection. A more focused discussion of wildlife protection should take place between Government and donors/conservation NGO’s, addressing both conservation and economic needs.

Following directly from this, there is an urgent need to develop a framework for wildlife management in protected and non-protected production forests, since these forests will play an important role in the protection of wildlife and in the production of bush meat. There are many questions that cannot be answered at the present time, and answers will depend upon the results of well-designed and monitored pilot projects. Some of these questions are: How effectively can communities control bush meat harvest and protect rare species within their hunting areas? What role will logging, agribusiness and mining companies play in the protection of wildlife within concessions? The pending legislation on wildlife protection and community forestry needs to provide a broad outline, while allowing the development of adaptive management in wildlife protection and the bush meat trade. Hoyt (2008) has developed the following wildlife policy recommendations:

• Manage wildlife as a national resource, use a pragmatic approach;
• Manage vulnerable species and locales, limiting interventions to those with a high probability of success;
• Control transport and markets, generating revenue stream to support management;
• Focus enforcement on commercial hunters rather than farmer/hunters; and
• Recognize community use rights (example: timber concessions do not include rights to wildlife).
**Provide Support for Development of a Policy on Carbon Financing Mechanisms**

Based on an analysis of existing experience with regulatory, fund and market-based forest management in Liberia, the ETOA team’s preliminary findings indicate that significant investments will have to be made in Liberia for REDD to work. First and foremost, the Government has not adopted a formal policy on the role that Liberia’s forests could or should play in accessing potential funding under various carbon financing mechanisms. Formulation of such a policy should be the first priority before trying to access REDD and other mechanisms.

**Create and Support a Separate Law Enforcement Division within FDA**

A separate law enforcement division complete with separate field enforcement personnel reporting directly to the division director would bring FDA in line with the majority of other African conservation/forestry organizations while eliminating the confusing dual role of a conservation ranger as responsible for both enforcement and community/conservation activities.

**Develop a Strategy to Address the Compromises between Environment and Economic Development**

As noted above, Liberia’s Poverty Reduction Strategy (PRS), does not specifically address tradeoffs between the environment and economic development. Without such a strategy, economic development could take precedence over the environment and jeopardize economic growth in the long term. In this context, active GOL and donor support for UNDP-UNEP’s Poverty and Environment Initiative is critical.

**Integrate Environment/Natural Resources Awareness into Local Democracy and Governance Initiatives**

Liberia has a number of democracy and governance activities which could be used as a forum for increasing awareness of both environment/natural resource issues and policy. Strengthening the capacity of local government councils, providing effective advocacy skills, informing citizens of their rights and responsibilities, and helping to build a better informed society through strengthening of professional media would assist in spreading the need for appropriate conservation measures. Training and mentoring programs for community activists, newly elected local leaders, and some paramount chiefs and members of parliament can encourage informed dialogue, transparency, accountability, responsibility, and leadership. Such efforts would enhance the level of active and positive community participation required to build effective environment/natural resource programs.

**Develop a Policy on Equal Compensation for Equal Loss**

The ETOA team believes that a community losing forest use in a strictly protected area should be compensated at least as highly as timber concession communities. To this end, the ETOA team recommends that:

- All alternative income activities around strictly protected areas be based on a value chain analysis prior to implementation; and
- Pending development of viable alternative livelihood programs, FDA consider establishing a compensation plan for communities around strictly protected areas using existing resources or those of any eventual conservation trust fund.

**Develop a National Land Use Plan**

The use and development of land affects Liberia’s economy, environment, and quality of life in increasingly complex ways involving public and private interests. A National Land Use Plan (NLUP), developed in collaboration with all stakeholders, would help the GOL set out a physical planning framework with a perspective to the future. NLUPS support the development of balanced land use by
integrating and coordinating the ongoing activities of land use development and plans in the form of an integrated land use plan and permanent planning and coordination capacity for land use development. They provide a spatial framework for public as well as private sector investment programs and serve as a basis for the environmental protection. NLUPs emphasize efficient spatial resource allocation across all sectors of the economy, regulating land use activities, and conservation of terrestrial and marine resources. These in turn form the basis upon which all the sectoral land use policies and strategies can be developed. To allow flexibility and to overcome rigidity, NLUPs are not blue prints or a conventional Master Plan but rather in a model, which readily permits changes, additions or deletions to take into consideration socio-economic and physical realities of a particular time and place.

**Develop an Urban Land Use Policy and Zoning Regulations**

The GOL (the Monrovia City Council -MCC and EPA) should consider seeking assistance from the World Bank’s Emergency Infrastructure Supplemental Component and/or Japan International Cooperation Agency’s (JICA) to develop an urban land use policy. JIKA assistance may be particularly relevant as JIKA is currently working with MCC to develop a Monrovia master plan for water provision and waste disposal. JIKA support could be expanded to include a broader urban policy and planning mandate.

### 8.1.2 LIVELIHOODS AND ECONOMIC GROWTH

**Develop Alternative Protein Programs**

Food security in Liberia, besides being an end in itself, also has considerable implications for the bush meat trade, because of the great importance of bush meat in the national diet. As the population increases in size and affluence, the demand for protein, including animal protein will increase. It is FDA’s policy to both protect and manage wildlife, with an important role for ensuring the sustainable harvest of bush meat in the future. At the moment, there is no information on the size of Liberia’s sustainable bush meat harvest, and it is likely to be a long time before an assessment can be made using monitoring data from well-managed forests. The safest assumption is that the introduction of sustainable bush meat harvesting and the protection of existing and new National Parks will lead to a drop in bush meat production, at least in the short term.

This shortfall and the growing demand will need to be met through other sources. Since fish are also over-harvested, alternatives are limited to increased production of vegetable protein, fish farming, and animal husbandry, including game farming. All of these are feasible, and, with the exception of game farming, are being actively pursued in rural development programs. While Liberia is largely unsuitable for cattle (i.e. beef), production of goats, sheep and pigs can be greatly increased in rural areas, while poultry and egg production can be increased in villages and around towns, especially if poultry feed is available. For game farming, neighboring countries have had success primarily with cane rats and giant snails, and these techniques should be tested and refined in Liberia. In addition, the Maxwell’s duiker is abundant in forests and scrub and reproduces quickly, so domestication or semi-domestication of this important bush meat species should be investigated.

**Develop an NTFP Support Program**

Evidence for the local importance of NTFPs and for the existence of a national trade is abundant. For example, during the ETOA field visit to Sapo, the team observed the collection of thatch from a forest palm, *Sclerosperma mannii*, previously unreported from Liberia. All stages in the trade, including leaf harvest, selling, transportation, and roof building were observed. At the prices quoted (up to $L
the cash value of the roofs in southeastern Liberia is several millions of SUS, though much of this value is actually subsistence and outside the cash economy. The team also observed the use of construction materials and palm wine from raffia palm, furniture and baskets from rattan, and forest foods and medicines. Clearly, NTFP use in Liberia is large enough to warrant a thorough study of the products and their marketing chains, and to include NTFPs in sustainable forest management and in rural development.

Based on the proposed LCRFP NTFP value study, the GOL should consider developing a separate NTFP support program which would include: i) a study on the value of NTFPs in Liberia’s economy; and ii) strengthening the value chains of those NTFPs with significant local, regional and international market potential. Such a program would have to be based on a stock assessment of select NTFPs to ensure that sustainable harvesting and management programs are developed for selected NTFP “commodities”.

**Promote Environmentally-Friendly Tree Crops such as Cocoa and Coffee**

In addition to being good alternative livelihood activities, shade grown coffee and cocoa are generally environmentally friendly. Grown under mainly secondary, older growth natural forests, they are recognized as bird friendly and provide a habitat for certain species such as Maxwell’s duiker. Providing that value chain issues such as markets are adequately addressed and supported, shade grown, bird friendly coffee and cocoa can also demand a higher price in international markets.

**Expand the Community Forestry Program**

Collaborative (community) management of forests and protected areas has been proven to significantly reduce threats to biodiversity and tropical forests. Forestry departments in Guinea, Senegal and the Gambia have turned over significant portions of their forest estates over to communities to manage. However, they have been able to accomplish this through long term donor financial support and technical assistance (USAID for Guinea and Senegal, and GTZ for the Gambia). As the LRCFP and other community forestry programs begins to gain traction and experience, the GOL should review lessons learned from these programs, modify the community forest strategy as required and support the roll out of community forestry to the majority of Liberia’s other counties.

### 8.2 OPPORTUNITIES FOR IMPROVING COLLABORATION

**Support an abbreviated National Environmental Action Planning (NEAP) process**

Coordination across government institutions in Liberia is a major obstacle to improved environment and natural resource management. Overlapping mandates, policies and legislation are the rule rather than the exception. The GOL should consider supporting a National Environmental Action Planning (NEAP) process in Liberia.Supported by the World Bank and USAID during the late 1980s and early 1990s NEAPs have been instrumental in many African countries as a mechanism to better define, clarify and coordinate institutional mandates and promote policy an legislative harmonization. Unfortunately, as a result of the civil conflict, Liberia was never able to undertake a NEAP. UNDP has also expressed interest in co-financing this activity.

A NEAP would also help FDA, EPA and other institutions to prioritize the implementation of their mandates, focusing on a few areas in which they could maximize the protection of the environment.
FDA Partner Quarterly Meetings
FDA should consider holding quarterly partners meetings. These meetings would bring together all of FDA conservation partners—particularly international and local NGOs and serve as a mechanism to share information, successes, problems, lessons learned, etc., as well confront and address potential issues before they become real problems.

Donor Coordination
EPA, with LFI support should take the donor coordination role for environment, forest and biodiversity programs. This would include the development of an environment/natural resource project database.

8.3 OPPORTUNITIES FOR ALTERNATIVE FINANCING

Develop Alternative Financing Mechanisms
The lack of direct financial support is a major cause of most of the institutional limitations identified in Section XX, and a major underlying cause of threats to Liberia’s ecosystems. Liberia’s civil conflict and the resulting shortages in staffing, supplies, and equipment have limited the ability of most GOL agencies to implement their mandates. Government institutions currently receive their funding from a range of sources, including the GOL itself, bilateral and multi lateral donors—mainly “projectized,” and certification fees from local NGOs. Revenue for some forest management activities is also generated through the imposition of stumpage, land rental, and Forest Product fees (Section 14.2(b)), a portion of which is allocated for operational costs of the Protected Forest Areas Network. Although GOL contributions are expected to increase as logging concessions come on line, the development of alternative funding sources will ensure that Liberian government agencies will be able to implement their mandates with respect to environmental and natural resource protection and management over the longer term. Strategic options include:

- **Operationalize EPA’s National Environmental Fund.** The EPA Act provides for the creation of a National Environmental Fund. The National Environmental Fund is to be used to fund activities undertaken by EPA, line ministries, and County and District Environment Committees to meet the objectives of the EPA Act. It is to be funded by the national budget, fees and fines collected by EPA, and donor support.

- **Operationalize a Conservation Trust Fund.** CI is currently working on establishing a Liberia Protected Area Trust Fund through debt for nature swaps and use of logging tax revenues to provide funding for protected areas and the communities around them. Donors should consider providing sufficient resources to this fund in order to ensure its effective capitalization and long term sustainability.

- **Oblige Mining Companies –Via Concession Agreements - to Provide For Biodiversity Offsets.** Biodiversity offsets - conservation activities that intend to compensate for the residual and unavoidable harm to biodiversity caused by economic development activities such as mining - are widely seen as a useful tool for managing the adverse impacts of such activities. Biodiversity offsets can:
  - Offer a means to undertake projects that might not otherwise be possible;
  - Promote better relationships with local communities, government regulators, environmental groups and other important stakeholders;
  - Provide a practical tool for managing social and environmental risks and liabilities;
– Offer the possibility of influencing emerging environmental regulation and policy;
– Reduce the costs of compliance with environmental regulations;
– Provide a mechanism to encourage companies to make increased contributions to biodiversity conservation, without necessarily requiring elaborate new rules.

Offsets could be used to support both the National Environmental Fund and any eventual trust fund.

*Monetized PL 480 funds.* For USAID, monetized PL 480 funds (Title XII) represent an opportunity to provide direct support to GOL institutions. In countries such as Uganda and Rwanda, monetized PL 480 funds have been used very successfully to support a wide variety of conservation activities both in park and out of park, from infrastructure development to road and trail maintenance and boundary marking. Such funds are jointly managed by Government and USAID (usually a contractor through a grants management unit) and misuse of funds is uncommon.

### 8.4 OPPORTUNITIES FOR CAPACITY BUILDING

#### Develop a Training Plan to Support Capacity Building across Liberia’s Lead Environmental Agencies

Other than the Land Rights and Community Forestry Programs assessment of capacity building needs in community forestry, there has been no recent strategic assessment of capacity gaps within the lead environmental agencies to specifically identify what type of capacity building needs to take place and where it should be done. The GOL and donors should consider contracting with a reputable training organization to conduct a capacity gap assessment and develop a training plan which would identify key areas for capacity building as well as the most appropriate institutions for conducting such training. The training plan would serve as a road map for the GOL and donors in integrating capacity building programs into existing activities or developing new ones.

#### Long Term Support to the University of Liberia’s College of Agriculture and Forestry

Building capacity in the environment and natural resources sector in Liberia depends a great deal on the University of Liberia’s College of Agriculture and Forestry. Although poorly equipped and poorly staffed, the College is making efforts to revise the curricula to include new national priorities in wildlife management and community forestry. However, bringing the college up to any recognized standard of education will require longer term donor and GOL commitment, not only for infrastructure but for elements such as:

- Assessing the extent of the environment/forestry job markets and manpower requirements;
- Preparing national level human resources development plans for the larger environmental sector to ensure a match between the job market and graduates;
- Revising curricula to be continuous, institutionalized and research based—and producing professionals who are able to take up emerging issues from environmental planning such as GIS, landscape management, impacts of globalization, climate change and biotechnology, participatory methodologies and interactive learning skills management, collaborative management; ensure curriculum responsiveness to changes - scope, content and delivery processes;
- Developing capacities to apply knowledge in the larger field of natural resource management
- Including courses on environmental management ethics;
• Implementing institutional reforms needed to develop environmental educational programs and make them more responsive to land production and rural development needs;

• Enhancing the quality of teaching;

• Working within regional education networks such as the African Network for Agroforestry Education (ANAFE), the African Forestry Research Network (AFORNET) and the Forestry Research Network for sub-Saharan Africa (FORNESSA).

• Developing staff exchange programs; and

• Strengthening linkages between research, education and development.

Support for the Environmental Protection Agency
As noted above, EPA is the principal authority in Liberia for the management of the environment in Liberia but has received very little support from the donor community. The mandate for EPA, established in the National Environmental Policy, Environmental Protection Agency Act (EPA Act), and the Environmental Protection and Management Law (EPML) is comprehensive and detailed. The EPML alone contains 100 directives for EPA to produce programs, regulations, standards, procedures, guidelines, permits, fee structures, etc. (see Annex XX). The 16 professional staff in EPA headquarters would be completely overwhelmed if they attempted to implement all of the 100 directives.

Clearly EPA needs GOL and donor support in setting priorities for implementation of the EPML. One approach might be the application of environmental risk assessment to identify the environmental issues posing the greatest threat to the environment and human health. There are other valid approaches for setting priorities that EPA may also wish to use. The specific technique used for setting priorities may not be as important as the transparency in setting priorities.

Once EPA has set priorities, it will need assistance in developing programs for the top priority issues. EPA has limited physical resources (computers, communications, vehicles, etc.) as well as limited human resources. Assistance that will provide physical resources and strengthen the capacity of EPA personnel will be essential for EPA to successfully develop and implement programs for the top priority issues.

Even without a priority setting process, there are certain activities for which EPA will need support if it is to ever be effective. These include:

• Implementation of Environmental Impact Assessment (EIA) requirements;

• Establishment of the EPA laboratory and laboratory certification; and

• Development of environmental public awareness/involvement activities.

In the absence of other environmental regulations, and EIA program can be an effective tool for preventing the deterioration of the environment. This is particularly true in the case of Liberia, where the EIA program includes requirements for existing industries and activities to prepare Environmental Management Plans (EMPs). The mitigation measures in EIAs and environmental management commitments in EMPs are enforceable and can be used to protect the environment.

The EIA process is almost completely codified in the EPA Act and the EPML. EPA, however, is responsible for promulgating some additional components to make the program truly operational. These include:
Prescribe the form and content of various documents used in the process (application for EIA permit, Environmental Brief, Scoping Document, Environmental Review, etc.);

Develop regulations establishing the procedures for evaluating the impact of the proposed project;

Establish the Agency Registry, into which relevant documents can be deposited for public review;

Establish guidelines for reviewing the qualifications of professionals authorized to prepare EIA documents and a Registry of the names and qualifications of approved professionals; and

Establish a fee system for EIA applications.

In addition, EPA in consultation with the relevant government agencies, needs to promulgate EIA guidelines for specific sectors. Some critical sectors include mining, forestry, and road construction.

EPA will need high quality support to produce the necessary regulatory tools it needs to implement the EIA program. EPA, and the key governmental agencies in these sectors, will need significant support if they are to generate high quality guidelines for the development of EIAs and EMPs and to be able to effectively review, monitor, and enforce the EIAs and EMPs.

Management of the environment and implementation of the requirements in EIAs, EMPs, and other environmental quality programs is largely dependent upon being able to produce and analyze environmental quality data. Establishing a “benchmark” laboratory in EPA and a program to certify private laboratories is necessary if valid environmental quality data is to be generated. EPA has begun the process of establishing an environmental laboratory, but it is far from having a high-quality, benchmark laboratory that will allow it to certify private laboratories for analysis of various environmental media (e.g., water, air, waste, and soil). EPA will need physical support as well as support in the development of the capabilities of its personnel to develop a high-quality, benchmark laboratory.

Public involvement and awareness are critical components of an effective environmental protection program. Acknowledging this fact, the National Environmental Policy, EPA Act and the EPML all include public awareness and participation in Liberia’s environmental management program. EPA will need support to make these components functional. It will need to develop awareness techniques that are applicable in the Liberian context and public participation procedures that will truly involve the public in environmental decision making. It should be able to draw upon the experiences of other countries in developing effective public awareness and involvement programs.

Finally, assistance in establishing and training the judiciary for the Environmental Administrative Court and the Environmental Court of Appeals would greatly enhance the ability of government agencies to enforce environmental laws and regulations.

8.5 CONSERVATION OPPORTUNITIES

Support to the Worldwide Fund for Nature (WWF) to Facilitate Liberia's (BNF) Participation in the Programme Régional de Conservation de la Zone Côtière et Marine en Afrique de l'Ouest (PRCM), and eventually WWF’s West African Marine Ecoregion (WAMER) Program

PRCM is a coalition of agencies for the Regional Conservation Programme for the Coastal and Marine Zone of West Africa. It was set up on the initiative of the World Conservation Union (IUCN), the WWF, Wetlands International and the International Foundation for the Banc d’Arguin (FIBA), in partnership with the Subregional Fisheries Commission (CSRP). PRCM now represents a coalition of nearly 50...
partner institutions with the aim of coordinating conservation action directed at the coastal zone of the subregion’s seaboard countries—Mauritania, Senegal, the Gambia, Guinea Bissau, Guinea, Sierra Leone and Cape Verde. The purpose of this coordination is to improve the overall relevance and coherence of conservation actions, to pool available resources, make full use of regional expertise, foster exchanges about the experiences, and develop research, training, communications and advocacy actions with a view to promoting sustainable coastal zone development which societies will derive benefit from.

WWF’s West African Marine Ecoregion (WAMER) program started in 2000 and is managed from Dakar, Senegal. It is designed to address critical marine biodiversity and fisheries issues in the ecoregion. The project consists of 4 modules and a strong communications element. These modules are:

- Supporting and Creating Marine Protected Areas;
- Sustainable Artisanal Fisheries;
- Fisheries Access Agreements; and
- Threatened Species

Both programs would significantly help reduce threats to Liberia’s marine resources. BNF’s participation in this program would begin to help address some of the major issues the marine fisheries sector is currently facing.

**Provide Support to the Jane Goodall Institute**

The ETOA team understands that USAID/Liberia has received an unsolicited proposal from the Jane Goodall Institute (JGI) to work in Gola National Forest - soon to become a National Park with assistance from the World Bank-supported COPAN project. The team believes that USAID or another donor should seriously consider supporting this proposal for a number of reasons. First, JGI has a strong track record in primary school environmental education, working with communities on chimp conservation, developing sustainable chimp ecotourism activities that benefit both government agencies and local communities. Additionally, JGI has an excellent track record in helping government agencies in protected area development, and would JGI’s presence would both complement and support FDA and COPAN initiatives.

**Support Transboundary Initiatives**

Conservation International has identified two critical cross border areas or clusters for conservation. These include:

- The Gola/Lofa/Mano Complex which represents a mix of lowland forests on the Sierra Leone and Liberia border. This area represents the westernmost extent of many plant and animal communities within the Upper Guinea forest ecosystem. Though poorly studied and largely inaccessible by researchers and conservationists in recent years, the area still contains large tracts of contiguous forest for the potential establishment of core-protected areas and cross border collaboration. These include the Gola Forest Reserves in Sierra Leone and the Gola and Foya National Forests in Liberia. The contiguous nature of these cross-border forests also presents opportunities for transfrontier initiatives between the two countries.

- The Krahn-Bassa/Sapo/Grebo/Taï complex contains the largest tract of contiguous forest left in the entire Upper Guinea ecosystem and represents the greatest opportunity to establish and maintain protected areas containing large intact stands of forest. This area includes Sapo National Park,
and Grebo and Krahn-Bassa National Forests on the Liberia side and Tai National Park on the Ivory Coast side, the single largest existing forest protected by a national park in the region and offers a potentially good opportunity for transfrontier conservation along the Liberian border.


Although the World Bank-support COPAN project will promote cross border collaboration between Sierra Leone, Guinea and Liberia, most of this effort will focus on developing memoranda of understanding between the three countries and identification of priorities. As COPAN funds are extremely limited, donors may wish to consider collaborating with the World Bank on this initiative and/or funding priorities as determined by the three countries.

Additionally, as WWF has been active in the support of Tai National Park, the GOL and donors may want to explore with WWF the possibility of developing a cross border initiative between Liberia and the Ivory Coast.
SECTION 9: INDICATORS OF ENVIRONMENTAL DAMAGE/HEALTH AND POTENTIAL MONITORING SYSTEMS

9.1 BACKGROUND
Environment is constituted of air, water, land and biodiversity, which are life support systems for human beings. Human activities in the pursuit of economic development have put immense pressure on Liberia’s environment. Reversal of environmental degradation is essential in order to safeguard the well being of present as well as future generation. The use of indicators provides a means of measuring progress of desired actions and the resulting impacts on the environment.

An indicator can be defined as a statistics or measures or parameters that can be used to track changes in the environmental and socio-economic conditions. Indicators are developed by synthesizing and transforming scientific and technical data into fruitful information. They can provide a sound base for decision-makers to make policy decisions based on present as well as potential issues surrounding local, national, regional and global environmental concerns, and can be used to assess, monitor and forecast parameters of concerns towards achieving environmentally sound development.

Environmental indicators should reduce the volume of information required to obtain a clear picture of a situation. A decision on appropriate number of indicators is determined by the user’s need. Environmental indicators should be simple and tailored to the needs of users at different levels. Some of the characteristics of environmental indicators that should be taken in account while deciding on the indicators include: the value of an indicator should be measurable or at least observable; data should be readily available/obtained through special projects, surveys or monitoring activities; the methodology for gathering and processing data for constructing indicator should be clear, transparent and standardized; the resources necessary for building and monitoring indicators should be in place; and the political acceptability of the indicators, whether at the local, national or international level is crucial.

The section which follows suggests a framework and set of indicators for environmental damage/health in Liberia as well as a monitoring system for tracking indicators.

9.2 THE ENVIRONMENTAL FRAMEWORK
An environmental framework provides basis for assigning priorities to various environmental issues. The adoption of a framework helps to identify the issues of greatest importance for a country and is helpful in reaching decisions on a number of organizational matters including:

- Agreement on all the overall process of data collection, estimation, and interpretation;
- Determination of logical ways to organize the data around key issues and topics;
- Identification of important issues for which data if lacking; and
- Assigning of responsibilities for collection and reporting on specific topics, and other institutional arrangements.
Although there are a number of environmental frameworks that can be used, the framework developed by the Organization for Economic Cooperation and Development (OECD 1993), although dated, provides a simple framework for tracking environmental indicators and one that is most easily adapted to Liberia’s current limited institutional capacity. Environmental indicators developed by OECD can be broadly divided into three main elements, namely pressure, state (or condition) and response indicators. State indicators measure the quality, quantity and distribution of natural assets and the environment, in physical terms. Pressure indicators describe pressures that are placed on the environment. These pressures can be designated positive or negative, and caused by human activities. Response indicators measure actions that are undertaken in response to environmental problems. Figure 23 shows the framework followed by the OECD for environmental indicators.

**FIGURE 23: ENVIRONMENTAL FRAMEWORK**

![Environmental Framework Diagram]

Source: Adapted from OECD (1993)

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48 These include environmental performance monitoring indicators developed by The World Bank, environmental indices developed by African Development Bank (ADB), the framework used for UNEP’s Green Land, Blue Sky and Clean Water program, and the Environmental Sustainability Index (ESI) of Yale University.
9.3 SUGGESTED INDICATORS

9.3.1 LAND INDICATORS
Land is a finite resource. However, the natural resources it supports can vary over time, and according to management conditions and uses. The combined effects of deforestation and unsustainable agriculture, together with inadequate soil conservation, cultivation of steep slopes, and rapid urban growth, have greatly affected Liberia’s land resources. Suggested core indicators to monitor the status of land resources and the effectiveness of land management are given in Table 11.

<table>
<thead>
<tr>
<th>Framework</th>
<th>Indicators</th>
</tr>
</thead>
</table>
| Pressure  | ● Land use changes (%/year, ha/year)  
            ● Deforestation (%/year, ha/year) |
| State     | ● Forest cover (ha/type)  
            ● Arable land per capita (ha/capita)  
            ● Area affected by soil erosion (ha)  
            ● Urban area |
| Response  | ● Managed forest area ratio  
            ● Protected area as a percent of total forest area (%)  
            ● Potential agricultural yields (t/ha) |

Reversal of land degradation and the proper utilization of land resources are the challenging tasks that Liberia needs to address in order to support social and economic development, pursue environmental conservation and ensure food security for present as well as future generations. Additional indicators useful to assess the management of land resources as well as to monitor the progress towards achieving the targets are provided in Table 12.

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of land area covered by forests</td>
<td>National Forest Strategy/Biodiversity Action Plan to set the minimum target for forests land</td>
</tr>
<tr>
<td>Arable land per capita (ha/capita)</td>
<td>National Agriculture Policy—food security targets</td>
</tr>
<tr>
<td>Area affected by soil erosion (ha/year)</td>
<td>Reversal the trend of land degradation</td>
</tr>
<tr>
<td>Potential agricultural yields (t/ha)</td>
<td>National Agriculture Policy—food security targets</td>
</tr>
</tbody>
</table>

9.3.2 BIODIVERSITY INDICATORS
Biodiversity is defined as ‘the variability among living organisms from all sources, including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems. Conservation and sustainable use of biodiversity is fundamental to ecologically sustainable development. An environment rich in biological diversity offers enormous support to human well being as well as economic progress. Despite recent efforts to reverse the trend, the loss of the Liberia’s biological diversity, mainly from habitat destruction and over harvesting, have continued. Suggested core indicators to monitor Liberia’s conservation status and sustainable use of biodiversity are provided in Table 13.
Liberia has an expressed need to generate baseline information on biological and genetic resources, including terrestrial, aquatic, coastal and marine ecosystems. National efforts need to be strengthened with respect to surveys, data collection, sampling, and evaluation and maintenance of gene banks. The participation and support of local communities are essential prerequisites to the success of such approach. Assuming that baseline could be made available, additional indicators and possible targets for the assessment of biodiversity are given in Table 14.

**TABLE 13: SUGGESTED CORE INDICATORS FOR BIODIVERSITY**

<table>
<thead>
<tr>
<th>Framework</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure</td>
<td>• Land use changes (%/year, ha/year)</td>
</tr>
<tr>
<td></td>
<td>• Deforestation (%/year, ha/year)</td>
</tr>
<tr>
<td></td>
<td>• Wood harvesting intensity</td>
</tr>
<tr>
<td>State</td>
<td>• Forest area change (ha/type)</td>
</tr>
<tr>
<td></td>
<td>• Threatened species as a percent of total native species (Mammals, Birds, Plants, Reptiles)</td>
</tr>
<tr>
<td>Response</td>
<td>• Managed forest area ratio</td>
</tr>
<tr>
<td></td>
<td>• Protected area as a percent of total land area (%)</td>
</tr>
</tbody>
</table>

**TABLE 14: ADDITIONAL INDICATORS PROPOSED FOR BIODIVERSITY**

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of land area covered by forests</td>
<td>National Forests/Biodiversity Action Plan to set the minimum target for forests land</td>
</tr>
<tr>
<td>Ratio of area protected to maintain biological diversity to surface area</td>
<td>10% protected area for each major ecosystem type by 2000</td>
</tr>
<tr>
<td>Threatened species as a percent of total native species (Mammals, Birds, Plants, Reptiles)</td>
<td>Reversal the current rate of loss of biological diversity; Convention on biological diversity</td>
</tr>
<tr>
<td>Changes in knowledge, attitudes and practices among key stakeholders regarding the enabling environment for biodiversity conservation</td>
<td>TBD</td>
</tr>
<tr>
<td>Threat levels to forest and aquatic ecosystem resources reduced in selected critical areas</td>
<td>TBD</td>
</tr>
<tr>
<td>Change in the number of formally reported forest, woodland and aquatic ecosystem-related conflicts</td>
<td>TBD</td>
</tr>
<tr>
<td>Change in indicator taxa in threatened (selected) forest and aquatic ecosystems within normal range of population</td>
<td>TBD</td>
</tr>
</tbody>
</table>
9.3.3 WATER INDICATORS

Life in Liberia depends a great deal on water. Overexploitation and degradation of surface and ground water have caused a number of problems and the challenge for the GOL in ensuring the supply of good quality water to the population while preserving ecosystem hydrological, biological and chemical functions. Another challenge for Liberia is to carry out economic activities within the carrying capacity of water resources.

Core indicators to assess the conditions of water resources as well as to monitor human utilization are given in Table 15. It should be noted that information generation on water budgets, such as water supply, demand and availability is a challenging task for Liberia in planning for water resource management. An extensive network needs to be set up throughout the country for generation of information on surface and ground water quality following the standard guidelines recommended by the Global Environmental Monitoring System (GEMS). The monitoring network should be supported by proper institutional mechanism equipped with sound laboratory facilities and trained manpower.

**TABLE 15: SUGGESTED CORE INDICATORS DEVELOPED FOR WATER RESOURCES**

<table>
<thead>
<tr>
<th>Framework</th>
<th>Indicators</th>
</tr>
</thead>
</table>
| Pressure  | • Annual withdrawals of ground and surface water (cu.m./sector)  
           | • Domestic consumption of water per capita (cu.m.) |
| State     | • Ground water reserves  
           | • Water availability per capita (cu.m.)  
           | • Concentration of faecal coliform in freshwater  
           | • Biochemical oxygen demand in water bodies |
| Response  | • Waste-water treatment coverage  
           | • Access to safe drinking water (percentage of population served) |

Liberia is currently formulating a national water policy to address issues related to water uses, water security and management of water ecosystem. This policy promotes integrated water resource management through strategic planning and management, effective demand management, better public participation, and an improved institutional, legal and policy framework. Suggested indicators and targets useful for assessing the status of water resources under Liberia’s proposed water policy are provided in Table 16.

**TABLE 16: SUGGESTED INDICATORS FOR WATER RESOURCES MANAGEMENT**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of population with sustainable access</td>
<td>Universal access by 2025 (Rio 92, Copenhagen 95, Beijing 95), halve by 2015 (MDG, WSSD)</td>
</tr>
<tr>
<td>to an improved water sources</td>
<td></td>
</tr>
<tr>
<td>Annual withdrawals of ground water (total,</td>
<td>Trends to be reversed, through efficient management, introduction of cleaner technology and pricing.</td>
</tr>
<tr>
<td>domestic, industrial and agriculture)</td>
<td></td>
</tr>
<tr>
<td>Annual withdrawals of surface water (total,</td>
<td>Trends to be reversed, through efficient management, introduction of cleaner technology and pricing.</td>
</tr>
<tr>
<td>domestic, industrial and agriculture)</td>
<td></td>
</tr>
<tr>
<td>National water quality standards based on WHO</td>
<td>To be prescribed</td>
</tr>
<tr>
<td>guidelines for drinking water quality</td>
<td></td>
</tr>
</tbody>
</table>
9.3.4 AIR INDICATORS

Pollution from industrialization, urbanization, vehicular growth and burning (clearing for agriculture, bushfires and woodfuel) has certainly deteriorated Liberia’s air environment, although the level of this deterioration is not known. The process of air pollution begins with economic activities, where emissions generated from the sources are dispersed due to wind and other meteorological conditions. Responses are required in the form of technological intervention, economic incentives, laws and regulations or monitoring mechanisms in order to build in air pollution mitigation measures at the sources as well as receiving ends. Although Liberia currently does not have a nationwide network for generating air quality data for ambient conditions or for sources of emissions, should this network be developed, suggested core indicators to monitor the progress of the measures as well as to assess the state of the air environment are given in Table 17.

<table>
<thead>
<tr>
<th>Framework</th>
<th>Indicators</th>
</tr>
</thead>
</table>
| Pressure  | - Emission of green house gases per sector (co2, ch4)  
- Emission of sulphur oxides (t/year)  
- Emission of nitrogen oxides (t/year)  
- Consumption of ozone depleting substance |
| State     | - Ambient concentration of pollutants in urban areas (SPM, PM10, SO2, NO2, CO, O3)  
- Greenhouse gas emission per capita |
| Response  | - Expenditure on air pollution abatement ($/year, $/GNP)  
- Participation in treaties and conventions  
- Development of national ambient air quality standards and emission standards for stationary as well as mobile sources |

Additional indicators useful for monitoring the condition and trend of the air environment along with suggested targets are provided in Table 18.

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon dioxide emission per capita</td>
<td>Reduce overall developed country emission of co2 equivalents by 5% of 1990 levels by 2008-2012 (Kyoto 97) stabilize GHG concentration in the atmosphere at a level that prevents dangerous anthropogenic interference with the climate system (UNFCCC)</td>
</tr>
<tr>
<td>Consumption of ozone depleting CFCs (ODP Tons)</td>
<td>ODS consumption elimination</td>
</tr>
<tr>
<td>National air quality standards based on WHO air quality guidelines</td>
<td>To be prescribed</td>
</tr>
<tr>
<td>Ambient concentration level of pollutants in urban areas (SPM, PM10, SO2, NO2, CO, O3)</td>
<td>Data generation on daily basis following GEMS guidelines and annual reporting</td>
</tr>
<tr>
<td>Daily air quality in urban areas</td>
<td>Air Quality Index: achieve moderate/good, to be published on daily basis</td>
</tr>
</tbody>
</table>
Finally, it should be noted that Liberia’s forests act as a carbon sink for the rest of the world. In this context and to support any eventual Reduced Emissions from Degradation and Deforestation (REDD) initiatives (see Section XX), two additional air-environment indicators are suggested:

- Change in forest cover which includes change in forest area and reduction in forest cover; and
- Change in carbon stocks and emissions of non-CO₂ gases.

### 9.4 POTENTIAL ENVIRONMENTAL MONITORING SYSTEMS

The design and setting up of a national environmental monitoring system will require considerable time, effort, and resource investment. For a country without an existing monitoring system such as Liberia, it may take many years to establish one with the capacity to effectively provide good quality information that can be used for decision-making and planning. Absence of baselines for most of the above indicators, the absence of monitoring stations or field equipment, a poorly equipped and staffed laboratory, combined with the lack of effective collaboration mechanisms between monitoring jurisdictions makes the development of an environmental monitoring system extremely challenging.

That said, EPA is required by law (EPML section 34) to set up an environmental monitoring system and also to designate reference laboratories for environmental analyses (EPML section 96). It also is supposed to receive data from projects and activities that have EIAs. In this context, EPA should consider:

- Creating the data storage and management system into which it can input the data that it should start receiving from projects and activities (and eventually data from an ambient monitoring program);
- Establishing its own laboratory and the certification program for private laboratories; and
- Working with FDA to use GIS and periodically updated satellite imagery to monitor core land use indicators (land use changes, deforestation, managed forest ratio, etc.).
As Liberia begins the transition from a post conflict/relief program to a more development oriented one, the time is ripe for the GOL and donors to look beyond simple tradeoffs between economic growth, health and governance activities and environmental threats and opportunities and focus instead on how these can work synergistically to provide for sustainable economic growth and a healthy environment for people to live in. Several examples are provided below:

- **Alternative protein programs** focusing on aquaculture, the production of goats, sheep and pigs, and game farming can alleviate food security problems, increase local protein supply (leading to better health), and increase household income all while reducing threats from the bushmeat trade. Game farming and small ruminant production also represents a particular target of opportunity for women; in most West African countries, women are responsible for the household’s small ruminants and take the lead in “farming” cane rats and snails;

- **Shade grown coffee and cocoa programs** can be environmentally friendly, and can significantly increase household income. When these programs are directly linked to the reduction of threats to critical habitats, they can provide a significant alternative income and reduce illegal activities in these habitats. Grown under mainly secondary, older growth natural forests, they are recognized as bird friendly and provide a habitat for certain species such as Maxwell’s duiker. Providing that value chain issues such as markets are adequately addressed and supported, shade grown, bird friendly or eco labeled coffee and cocoa can also demand a higher price in international markets;

- **Democracy and governance.** Recent research has found that a mixture of factors related to good government (accurate data, transparent administration, lack of corruption, and checks and balances), all show a clear statistical relationship with environmental performance\(^49\). The GOL though the LFI has already proven this point. By making Liberia’s commercial forestry sector transparent and accountable, timber sanctions have been lifted, concessions are being awarded and Liberia’s forests can now contribute to the country’s economic development in a sustainable manner. A similar approach could be used for Liberia’s bushmeat trade.

- Additionally, Liberia has a number of democracy and governance activities which could be used as a forum for both increasing awareness of environment/natural resource issues and policy and improved accountability and transparency. For example, strengthening the capacity of local government councils, providing effective advocacy skills, informing citizens of their rights and responsibilities, and helping

to build a better informed society through strengthening of professional media would assist in spreading the need for appropriate conservation measures. Training and mentoring programs for community activists, newly elected local leaders, and some paramount chiefs and members of parliament can encourage informed dialogue, transparency, accountability, responsibility, and leadership. Such efforts would enhance the level of active and positive community participation required to build effective environment/natural resource programs. Targeting and training women as environmental policy advocates would help them transition from post conflict grass-roots mobilizing activities to advocacy and development work.

- **Non-timber forest products.** NTFPs represent a particular target of opportunity to blend economic growth, health and environmental opportunities. Construction materials and palm wine from raffia palm, furniture and baskets from rattan, and forest foods and medicines are all traded locally and regionally, with some medicinal plants traded internationally. NTFP use in Liberia is large enough to warrant a thorough study of the products—particularly medicinals and their marketing chains, and to include NTFPs in sustainable forest management and in rural development programs. If managed sustainably, NTFPs can provide significant alternative incomes and improved health care through better knowledge and distribution of traditional medicines. Moreover, as many NTFPs are a woman’s responsibility, they represent a viable way of increasing women’s empowerment.
PART 2: ACTIONS NECESSARY AND PLANNED TO CONSERVE TROPICAL FORESTS AND BIODIVERSITY
1.0 INTRODUCTION

USAID/Liberia’s Office of Economic Growth, which encompasses natural resource management and biodiversity activities, is crafting a new strategy to reflect the Mission’s transition from emergency relief to development. The Actions Necessary and Planned to Conserve Tropical Forests and Biodiversity report has been prepared to provide information and analysis as requested by USAID/Liberia, required by the U.S. Congress, and stipulated in the U.S. Foreign Assistance Act (FAA) of 1961. Sections 118 and 119 of the FAA require USAID Missions to examine issues of tropical forests and biodiversity conservation when preparing strategies for development assistance.
2.0 OVERVIEW OF TROPICAL FOREST AND BIODIVERSITY CONSERVATION STATUS IN LIBERIA

Liberia is situated in the fragmented band of forest known as the ‘Upper Guinean Forest’. It is one of the two most significant forest blocks in Africa, the other being the ‘Congolese Forest’ of Central Africa. The Upper Guinean Forest extends from Guinea at the North-Western extreme, down through Sierra Leone, Liberia, and the Ivory Coast and reaching Cameroon at its most Easterly extent. Liberia accounts for more than half of West Africa’s remaining Upper Guinean tropical forest, and in December 1999, The West African Conservation Priority-Setting Exercise for the Upper Guinean Ecosystem identified Liberia as the “heart of the hotspot”—critical to successful conservation in the region, and in need of immediate conservation action.

The total Liberian land area is 9.59 million hectares, of which forests cover about 4.39 million hectares equivalent to 45 percent of the land area, including 2.42 million has classified as closed dense forest, 1.02 million ha classified as open dense forest, and .95 million ha classified as agriculture degraded forest.

The climax vegetation over most of Liberia is forest, and forests cover about 45% (4.39M ha) of Liberia’s total land area and include 2.42M ha classified as closed dense forest, 1.02M ha classified as open dense forest, and .95 M ha classified as agriculture degraded forest. Other vegetation types result from human degradation of forest and from local soil or hydrological conditions that prevent forest growth. There are three general types of forest, the evergreen or mixed evergreen/semi deciduous moist forests of western Liberia where there is a distinct dry season (under 100mm rain/month), and the wet evergreen forests of eastern Liberia where the dry season is very short or absent. The highest hills in Liberia support the third forest type, submontane (or montane) forest above about 800-1000m, though this zone is of limited extent and poorly-differentiated from the contiguous lowland forests. There are however, some notable endemic species, making this zone important for conservation. An extensive zone of degraded forest occurs near the coast and extends inland in central Liberia, separating the moist and wet forest blocks. The degraded forest is mostly managed for shifting cultivation, and typically shows a mosaic of fields with scrubby and forested fallows. More intensively farmed areas in this zone have plantations with little natural vegetation at all. Finally, there is a coastal zone, often heavily impacted by settlements and agriculture, with a mosaic of sandy and rocky shores, mangroves and fresh-water swamps, grass/shrub savannas on sand, and coastal forests. Figure 24 depicts Liberia’s forest and land cover based on 2003 satellite imagery.
During Liberia’s period of civil conflict forest resources were mismanaged and revenue generated from the sector was misappropriated. As a result, the United Nations Security Council imposed sanctions on Liberia’s timber exports in 2003. Liberia then instituted sweeping reforms of the sector during the National Transitional Government of Liberia and the current administration of President Ellen Johnson-Sirleaf. The current government consolidated these reforms by adopting a new National Forest Policy and passing the National Forest Reform Law in 2006. These reform efforts eventually led to the lifting of sanctions in 2006 and created the enabling conditions for the Forestry Development Authority (FDA) to improve forest management. Nevertheless, owing to the civil conflict combined with uncontrolled logging, expansion of land used for agriculture, mining and other threats, Liberia’s forest area has decreased in recent years. The annual rate of deforestation is currently estimated to be approximately 12,000 hectares (0.3 percent), while the recorded planting of new forests since 1971 to date has amounted to approximately 11,000 hectares.

Liberia’s forests provide a wide range of benefits to the Liberian people and the international community. Forest areas provide habitat for globally important biodiversity and maintain ecological services (such as oxygen production and soil stabilization), enable harvesting of non-timber forest products that many local people depend upon for daily subsistence, and provide a significant input to the national budget through commercial forestry development. Natural products from plant and animal species (other than commercial timber) are an important part of Liberia’s domestic and subsistence economy, and are especially important to rural people. Fish and bush meat have the highest values, but in addition to these, many species, especially plants, provide food, medicine, construction materials and have cultural importance. The sustainable management of forests and wetlands and the development of sustainable harvesting methods are crucial to ensuring that these natural products continue to play an important role in future.

### 2.1 LIBERIA’S PROTECTED AREA NETWORK

Conservation efforts to protect the forests of Upper Guinea have focused on the establishment of protected areas at priority conservation sites. Liberia is committed to including 30% of its forest (about 1.5 million hectares) in a protected areas network, including both strictly protected areas and production forests. In addition to the existing Sapo National Park and East Nimba Nature Reserve, three new areas have been selected to form the second tranche of strictly protected areas, and there is an unofficial list of nine or ten additional sites of high biodiversity importance in the Liberia Protected Area Network Strategic Plan. Together, these sites cover a full range of Liberia’s ecosystems, including the drier forests of the west, the wetter forests of the east, mountains and coastal sites.

A brief description of Liberia’s protected area network is presented below.

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2.1.1 NATIONAL PARKS\textsuperscript{51} AND NATURE RESERVES\textsuperscript{52}

Currently, only 4% of Liberia’s forests are contained in two strictly protected areas: Sapo National Park (180,000 ha) and East Nimba Nature Reserve (13,500 ha).

- **Sapo National Park.** Created in 1983, Sapo is Liberia’s first national park. The approval of the Sapo National Park Act (An Act for the extension of the Sapo National Park) on October 10, 2003 expanded the size of the park to 180,363 ha constituting an increase of more than 37%. The act recognized the park as being "at the core of an immense forest block of the Upper Guinea Forest Ecosystem that is important to the conservation of the biodiversity of Liberia and of West Africa as a whole". The park is located in the south-central portion of Liberia, and includes lowland rainforest, wetlands, and riparian forests, and represents one of - if not the most - intact forest ecosystem in Liberia. Notable fauna within the park include forest elephant (*Loxodonta africana cyclotis*), Jentink’s (*Cephalophus jentinki*) and Zebra Duikers (*C. zebra*) and large primate populations, including the Diana monkey (*Cercopithecus diana*), red colobus (*Procolobus badius*), black and white Colobus (*Colobus polycomus*) and the western chimpanzee (*Pan troglodytes verus*). Also found within the park are several populations of the endangered pygmy hippopotamus (*Hexaprotodon liberiensis*).

- **East Nimba Nature Reserve.** Created in October 2003, the East Nimba Nature Reserve is dominated by a semi-montane and deciduous forest, and is one of the 14 centers of plant endemism within the Upper Guinea Hotspot. The Mount Nimba Massif is located within the Sanokole quadrangle and is found on the northeastern border of Liberia. Hill and mountain vegetation are the favorite migration and wintering sites of Palearctic migrants such as European pied flycatcher (*Ficedula hypoleuca*), spotted flycatcher (*Muscicapa striata*) and Garden warbler with rock thrushes found in rocky areas. The Nimba slopes between 500 and 700 meters contain a large number of plant species, representing not fewer than 82 genera of trees and brushes. *Piptadeniastrum spp.*, *Heritiera spp.*, and *Lophira spp.* are common. Between 700 and 900 meters *Parinari spp.* becomes increasingly common, as well as *Parkia spp.* and associated species. East Nimba is an important bird area and a designated world heritage site.

Under the World Bank/GEF’s Consolidation of Liberia Protected Area Network Program (COPAN), to begin in late 2008, three additional national parks will be added to the protected area network for an additional 176,462 ha. These include:

- **Lake Piso (48,593 ha).** Biodiversity richness includes migratory bird species, sea turtles, hippos, manatees, primates, fish species and medicinal plants, plus a wide variety of habitats and ecosystems such as coastal, marine, forest, mangrove, brackish water, island, and freshwater habitats. The main opportunities for conservation here are based on: i) the very unique marine biodiversity here and the presence of mangroves that provide a breeding ground for important marine species; ii) the existence of enough baseline data for establishing a PA and iii) a potential for funding from tourism, research and fishery sectors as well as high interest for investment in the area including some private US funds. Lake Piso has also been designated as a Ramsar site. The main threats are deforestation of mangroves,

\textsuperscript{51} Defined as an area of sufficient size to form a complete ecological unit, set aside pursuant to Chapter 9 of the National Forestry Reform Law (2006), for the preservation and enjoyment of features that have outstanding natural beauty, or cultural or biological significance.

\textsuperscript{52} Defined as an area that does not represent a complete ecological unit, set aside pursuant to Chapter 9 of the National Forestry Reform Law (2006), for the preservation and enjoyment of features that have outstanding natural beauty, or cultural or biological significance, and which may require some management intervention.
unregulated fishing, hunting, farming and settlements on hills, high population due to the presence of a town and the vicinity of Monrovia, port development, erosion of dunes (sand mining) and offshore mining for oil.

- **Gola Forest (97,975 ha).** Gola Forest is endowed with significant biodiversity richness (endemic amphibians, elephants, hippos, birds, plants, etc) and a number of unique habitats such as forests, gallery forest, swamp forest and fram (*Terminalia superba*) bushes. Opportunities include: i) good funding potential based on charismatic fauna (elephants, hippos), transboundary conservation potential, security of border area and eco-tourism potential; ii) lessons learned from Gola in Sierra Leone in terms of management experience, biological data, community exchanges and fund raising experience; and iii) potential effectiveness of transboundary/peace park management leading to coordinated response to threats. The main threats include: i) the possibility for forest concessions to be reinstated; ii) diverse land uses such as hunting, mining, logging, farming, and transboundary migration of people from Sierra Leone and elsewhere in the region; iii) possibility of opposition from locals and others whose livelihoods might be threatened by PA’s establishment (boundaries issues); and iv) lack of FDA capacity in the area.

- **Wonegizi Forest (29,894 ha).** Biodiversity richness includes chimps and other primates, elephants and pygmy hippo. Wonegizi is a unique habitat for rock fowl (*Picathartes spp.*). Conservation opportunities include: i) opportunity for additional funding support from IUCN, Birdlife, and Great Apes programs; ii) research attention; iii) ecotourism potential (species, culture, scenery); iv) corridor (Wologizi) into Guinea and transboundary nature (peace park); and v) scattered farming communities offer opportunity for integrating community land use practices into protected area management. The most important threats include: i) mining for iron ore with the possibility of the extension of the Wologizi deposit entailing possible erosion and contamination of water bodies; ii) returning refugees that could increase population density and result in land use change (farming expansion) especially in the next 5 years; iii) legal and illegal logging; and iv) commercial hunting.

### 2.1.2 NATIONAL FORESTS

There are eleven national forests currently under partial protection. These forests are set aside as production forests. Conservation activities such as wildlife management are permitted, but farming, hunting and human settlements (except logging camps and similar activities) are not permitted. The National Forest network contains over 1,380,000 hectares of forest and includes the eleven National Forests: East Nimba, Gibi, Gio, Gola, Grebo, Kpelle, Krahn Bassa, South Lorma, North Lorma, West Nimba and Yoma.

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53 Defined as an area, set aside pursuant to Chapter 9 of the National Forestry Reform Law (200^\textcircled{A}), for sustainable regulated commercial Forest Product extraction, Hunting, and the preservation of essential environmental functions performed by the forest.
2.1.3 WETLANDS

In addition to Lake Piso, Liberia has four additional Wetlands of International Importance, or Ramsar sites:

- **Gbedin Wetlands** (25 ha) is situated in Nimba county in the north of Liberia - the area is largely a swamp but also includes a man-made wetland with an irrigation system that includes channels, ditches, dams and drainages. The paddy fields provide a good feeding ground for many bird species including Palaearctic and Nearctic migrants as well as resident breeders such as the Plover (*Charadrius dubius*), Bar-Godwit (*Limosa lapponica*) and the Forbes' Plover (*C. forbesi*). The endemic otter shrew (*Micropotamogale lamottei*) also occurs in the area. The suitability of the swamp for rice cultivation prompted the government in 1960 to solicit technical assistance to introduce modern agricultural methods to local rice farmers in order to discourage shifting cultivation. The project, the Gbedin Swamp Rice Project, has employed a large number of local people, especially up to the onset of the civil war in 1990. The site is currently used for subsistence farming (rice), hunting and fishing, while the surroundings are used for logging and mining, as well as multiple crop farming. The use of fertilizers and pesticides are potential threats.

- **Kpatawee Wetlands** (835 hectares) is in Bong County. The Kpatawee waterfall is located within the rainforest zone of Liberia, on a branch of the St. John River, one of the six major rivers in the country. While the river erodes the valley in its upper sections, it accumulates sand and gravel downstream, leaving patches of bare land along its course, which provide wintering grounds for large numbers of common Sandpipers and Palaearctic migrant species such as Little Ringed Plover and Greenshanks. The endangered Three-cusped Pangolin and Water Chevrotain also occur at the site. The villagers value this area as a picnic ground, for hosting meetings, workshops and retreats, but the area and its resources are also used for palm wine production, hunting, fishing, basket making, bathing and other domestic uses. Within the site, the governments of Liberia and China undertook the Kpatawee Rice Project with the objective of introducing swamp rice farming methods to farmers, to discourage shifting cultivation. Threats to the site include the potential development of a hydropower scheme. The site is an ideal nature reserve and tourist attraction but has not officially been recognized for this purpose.

- **Marshall Wetlands** (12,168 ha), in Margibi county, comprises three small rivers and their surrounding mangroves and forests. The area has sandy and rocky shores along the coast and the inflowing streams are surrounded by mangrove forests while the vegetation found further inland is characterized by secondary forests and savannah woodland. The wetland is chiefly a mangrove type with mature trees reaching up to 30m. In addition to the Red Colobus monkey, a number of bird species listed by the Convention on Migratory Species appear in the area, such as the Glossy Ibis, Lesser Kestrel and Common Pratincole. The site provides control against flooding and underground water recharge and is a sediment trap. The very large stands of mangroves, fish population and wildlife are valuable resources for inhabitants in the area. The three rivers are navigable and are used for transport from one village to another. The uncontrolled harvesting of the mangrove forest and overfishing by both local
and regional fishermen are serious threats to the ecological character of the site. Pollution from the Firestone rubber factory used to be a problem until EPA forced Firestone to install a waste water treatment facility. In addition, the presence of Chromolaena odorata, an invasive alien species which provides host to harmful agricultural insects such as the variegated grasshopper Zonocerus variegatus, is a serious problem for farmers. Research on chimpanzees for human vaccines against Hepatitis B and C has also been carried out at the nearby New York Blood Center’s Vilab II laboratory and the animals were released on islets in the mangroves after the closure of the research facility in 2006. The New York Blood Center currently provides for the feeding and maintenance of the chimpanzees and has obtained partial funding for an endowment to provide care for the animals indefinitely.

- **Mesurado Wetlands** (6,760 ha), is located in the capital city Monrovia and Montserrado County (the largest administrative region of the country with 1 million people), and the site is particularly important for the protection of three mangrove species (*Rhizophora harrisonii, R. mangle* and *Avicennia africana*). It provides a favorable habitat and feeding ground for several species of birds including the African spoonbill (*Platalea alba*), Common Pratincole (*Glareola nuchalis*) and Curlew (*Numenius arquata*). It also hosts the vulnerable African dwarf crocodile, the Nile crocodile and the African sharp-nosed crocodile and plays an important role in shoreline stabilization and sediment trapping. The site is currently used for fuel wood collection, charcoal burning, as a dumping site, for car washing, and fishing, and is subject to landfills from Monrovia expansion. Additional threats come from unregulated fishing, as well as from pollution from the industries around the site, including an oil refinery and paint factories, and medical waste discharge from the Monrovia Hospital.

A summary of Liberia’s protected area network is presented in Table 19 below. Figure 4 provides a map of Liberia’s protected area network excluding Ramsar sites.

<table>
<thead>
<tr>
<th>Name</th>
<th>Designation</th>
<th>Ecosystem</th>
<th>Area (ha)</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sapo</td>
<td>National Park</td>
<td>Wet Evergreen</td>
<td>150482</td>
<td>FDA</td>
</tr>
<tr>
<td>Wonegizi</td>
<td>Proposed National Park Partially In North Lorma National Forest And Partially Not Protected</td>
<td>Mixed Evergreen/Semi Deciduous, Plus (Sub) Montane</td>
<td>29894</td>
<td>FDA</td>
</tr>
<tr>
<td>Gola</td>
<td>Proposed National Park Located Largely In Gola National Forest</td>
<td>Mixed Evergreen/Semi Deciduous</td>
<td>97975</td>
<td>FDA</td>
</tr>
<tr>
<td>Lake Piso</td>
<td>Proposed National Park/Ramsar Site And Not Part Of An Existing National Forest</td>
<td>Coastal Marine And Wet Evergreen And</td>
<td>33914</td>
<td>FDA/EPA</td>
</tr>
<tr>
<td>East Nimba</td>
<td>Nature Reserve</td>
<td>Mixed evergreen/semi deciduous, plus (sub) montane</td>
<td>13569</td>
<td>FDA</td>
</tr>
<tr>
<td>Kpo Mountains</td>
<td>Located partially within Kpelle National Forest</td>
<td>Mixed evergreen/semi deciduous, plus sub montane</td>
<td>83709</td>
<td>FDA</td>
</tr>
<tr>
<td>Wologizi</td>
<td>Largely within North Lorma National Forest</td>
<td>Mixed evergreen/semi deciduous, plus (sub) montane</td>
<td>107533</td>
<td>FDA</td>
</tr>
<tr>
<td>Name</td>
<td>Designation</td>
<td>Ecosystem</td>
<td>Area (ha)</td>
<td>Management</td>
</tr>
<tr>
<td>------------------</td>
<td>--------------------------------------------</td>
<td>----------------------------------------------</td>
<td>-----------</td>
<td>------------</td>
</tr>
<tr>
<td>Grebo</td>
<td>Largely part of Grebo National Forest</td>
<td>Wet evergreen</td>
<td>97136</td>
<td>FDA</td>
</tr>
<tr>
<td>Gbi</td>
<td>Largely part of Krahn Bassa National Forest</td>
<td>Mixed evergreen/semi deciduous</td>
<td>88409</td>
<td>FDA</td>
</tr>
<tr>
<td>Nimba West</td>
<td>Largely part of West Nimba National Forest</td>
<td>Mixed evergreen/semi deciduous, plus montane</td>
<td>10482</td>
<td>FDA</td>
</tr>
<tr>
<td>Gbedin Wetlands</td>
<td>Ramsar site</td>
<td>Freshwater</td>
<td>25</td>
<td>EPA</td>
</tr>
<tr>
<td>Kpatawee Wetlands</td>
<td>Ramsar site</td>
<td>Freshwater</td>
<td>835</td>
<td>EPA</td>
</tr>
<tr>
<td>Marshall Wetlands</td>
<td>Ramsar site</td>
<td>Coastal/marine</td>
<td>12168</td>
<td>EPA</td>
</tr>
<tr>
<td>Mesurado Wetlands</td>
<td>Ramsar site</td>
<td>Coastal/marine</td>
<td>6760</td>
<td>EPA</td>
</tr>
</tbody>
</table>

Source: Compiled from FDA and EPA data.

Other important forests outside the current Protected Areas Network but being considered as additions are presented in Table 20 below.

**TABLE 20: OTHER IMPORTANT FOREST AREAS**

<table>
<thead>
<tr>
<th>Name</th>
<th>Designation</th>
<th>Ecosystem</th>
<th>Area (ha)</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foya</td>
<td>Not Part Of An Existing National Forest</td>
<td>Mixed Evergreen/Semi Deciduous</td>
<td>164628</td>
<td>FDA</td>
</tr>
<tr>
<td>Bong Mountain</td>
<td>Not Part Of An Existing National Forest</td>
<td>Mixed Evergreen/Semi Deciduous, Plus Sub Montane</td>
<td>24822</td>
<td>FDA</td>
</tr>
<tr>
<td>Margibi Mangrove</td>
<td>Not Part Of An Existing National Forest</td>
<td>Coastal/Marine</td>
<td>23813</td>
<td>FDA</td>
</tr>
<tr>
<td>Senkwehn</td>
<td>Not Part Of An Existing National Forest</td>
<td>Wet Evergreen</td>
<td>80348</td>
<td>FDA</td>
</tr>
<tr>
<td>Grand Kru-River</td>
<td>Not part of an existing national forest</td>
<td>Wet evergreen</td>
<td>135100</td>
<td>FDA</td>
</tr>
<tr>
<td>Zwedru</td>
<td>Not part of an existing national forest</td>
<td>Wet evergreen</td>
<td>63715</td>
<td>FDA</td>
</tr>
</tbody>
</table>

Source: Compiled from FDA data.
FIGURE 27: LIBERIA’S PROTECTED AREA NETWORK

Source: FDA
2.2 BIODIVERSITY STATUS AND PROTECTION AT THE SPECIES LEVEL

Biologically, Liberia’s forest and coastal marine ecosystems are exceptionally diverse, with high rates of endemism and many species that are nearly extinct outside the country. Liberia is home to approximately 2000 flowering plants including 240 timber species, 125 mammal species, 590 bird species, 162 native fish species, 74 known reptiles and amphibians and over 1000 described insect species. An assessment of biodiversity status and protection at the species level is presented below.

LARGER MAMMALS AND REPTILES

This group is relatively well known in terms of their distribution within Liberia. Along with birds, their protection forms the core of the Liberian conservation strategy. There is already some capacity within FDA to identify these animals. They do not need special resources beyond field guide books and they are well known to local hunters, so increasing capacity is relatively easy. NGO’s such as CI and FFI have been assisting FDA with inventory and monitoring. Of particular interest for forest conservation are the endangered species listed by IUCN and protected by FDA within Liberia. These are the pygmy hippopotamus, Liberian mongoose, Nimba otter shrew, Diana monkey, red colobus monkey, and chimpanzee. Threatened species such as the forest elephant and the Jentink’s and zebra duikers (both Upper Guinea endemics), are also important in the conservation strategy.

BIRDS

Birds, like larger mammals, are the flagship of Liberian conservation. There are a number of rare, endemic bird species in Liberia’s forests including the Gola malimbe, the Liberian greenbul and the rufous fishing owl, all listed as endangered, plus a number of threatened species such as the white-breasted guineafowl, the Nimba flycatcher and the white-necked rockfowl. In addition, the coastal wetlands are important overwintering habitat for migratory water birds. Birdlife International and their local partner SCNL have been active in developing a list of priority sites for bird conservation and incorporating these into the national conservation strategy.

VASCULAR PLANTS

The forests of Liberia are of high importance for the protection of the Upper Guinea flora and endemic plant species. Although the flora of West Africa is fairly well-known, the Liberian flora has been less well studied than that of neighboring countries, and local capacity for botanical inventory and monitoring is low. Recently, a botanical inventory of proposed conservation areas has been conducted through CI’s RAP program, but the local benefits of this technical assistance are diminished by the lack of a herbarium for the reference collection. Current conservation strategy emphasizes habitat quality, and assumes that the best areas for protecting mammals and birds also conserve Liberia’s flora. This is unlikely to be the case, but in the absence of plant distribution data, it is not possible to conduct the gap analyses needed to pinpoint additional conservation needs. To highlight the lack of information, the 2007 RAP surveys discovered three plant species new to science, and another three possibly new species were discovered during the ETOA field visits. Also, the palm species used widely as thatch in eastern Liberia does not appear to have been reported for the country.

COASTAL AND MARINE SPECIES

The Liberian coast is critical habitat for four endangered species of sea turtle of which three nest on the beaches (Green, Leatherback and Olive Ridley), and one in estuaries (Hawksbill). The USFWS with SAMFU have been active in marine turtle protection, which involves long-term collaboration with
fishermen and coastal communities. Estuaries are also important habitat for threatened manatees. Protection for these species along the coastline and in Liberian territorial waters presents complex problems for law enforcement.

Mangroves characterize the coastal wetlands of Liberia and cover a small area along the coast, from Cape Mesurado to Cape Palmas, at the edges of lagoons, riverbanks, and river estuaries and in widespread areas of coastal swamps. Mangroves are estimated to cover 0.5 per cent of the land surface of Liberia, which is equivalent to a 500 km-wide belt extending along the total length of the coastline (Gatter 1988). The lagoon mangrove communities around Cape Palmas in southeastern Liberia can attain a height of 3 m and are dominated by *Conocarpus erectus* with only rare specimens of *Avicennia germinans* and *Rhizophora racemosa*. Thickets of *Acrostichum aureum* are also common. On the central Liberian coast estuarine mangroves occur, consisting of stunted *Rhizophora harrisonii, Avicennia germinans* and *Conocarpus erectus*. Except for a few places in the central part of the country, primary mangrove forest has been replaced by secondary ones. Mangroves are being degraded due to over cutting for fuelwood, charcoal and construction poles and landfills. FAO (2006) reports that *Rhizophora racemosa* seems to have been eliminated in some places by extensive felling. Although the Margibi forest reserve and the Marshall and Mesurado Ramsar sites contain extensive areas of mangrove, there is no active program for mangrove management and conservation.

Liberia’s continental shelf provides habitat for a variety of marine species including mollusks, crustaceans, demersal and pelagic species. However, information on distributions and abundance of these species is nonexistent and nothing is known about specific centers of endemism. Moreover, there have been no stock assessment surveys conducted in more than twenty years to determine the level of exploitation of the fisheries resources. There are no research facilities to study the dynamics of the ecological factor affecting the fisheries environment—the productivity of ecosystem, pollution levels and nutrient load, species diversity of the various fish communities and harvesting pattern of commercial species.

**OTHER SPECIES**

Other groups of species such as freshwater fish, small mammals and herps, insects, fungi, non-vascular plants can all be described as poorly-known and lacking in local taxonomic expertise. For the most part, these species are not included in the national conservation strategy and cannot be included in gap analysis for PA’s because of a lack of inventory and distribution data. Given that no systematic inventories have ever been carried out of southeast and northwest Liberia’s flora, or its insects, amphibians, arachnids, gastropods or other animal species displaying a high degree of dependence on specific plant hosts, the uniqueness of Liberia’s flora and fauna can only be surmised.

Table 21 lists Liberia’s threatened or endangered animals, while the complete IUCN red list is presented in Annex F.
### TABLE 21: LIBERIA’S THREATENED OR ENDANGERED ANIMALS

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>English Name</th>
<th>Habitat</th>
<th>IUCN</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MAMMALS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cephalophus jentinki</td>
<td>Jentink’s duiker</td>
<td>forest</td>
<td>VU</td>
</tr>
<tr>
<td>Cephalophus zebra</td>
<td>Zebra duiker</td>
<td>forest</td>
<td>VU</td>
</tr>
<tr>
<td>Cercopithecus diana</td>
<td>Diana monkey</td>
<td>forest</td>
<td>EN</td>
</tr>
<tr>
<td>Hexaprotodon liberiensis</td>
<td>Pygmy hippopotamus</td>
<td>forest</td>
<td>EN</td>
</tr>
<tr>
<td>Hippopotamus amphibius</td>
<td>Hippopotamus</td>
<td>rivers</td>
<td>VU</td>
</tr>
<tr>
<td>Liberictis kuhni</td>
<td>Liberian mongoose</td>
<td>forest</td>
<td>EN</td>
</tr>
<tr>
<td>Loxodonta africana cyclotis</td>
<td>Forest elephant</td>
<td>forest</td>
<td>VU</td>
</tr>
<tr>
<td>Micropotamogale lamottei</td>
<td>Nimba otter shrew</td>
<td>rivers</td>
<td>EN</td>
</tr>
<tr>
<td>Pan troglodytes verus</td>
<td>Chimpanzee</td>
<td>forest</td>
<td>EN</td>
</tr>
<tr>
<td>Piliocolobus badius</td>
<td>Red colobus</td>
<td>forest</td>
<td>EN</td>
</tr>
<tr>
<td>Trichechus senegalensis</td>
<td>Manatee</td>
<td>rivers</td>
<td>VU</td>
</tr>
<tr>
<td><strong>HERPS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amnirana occidentalis</td>
<td>(frog – Ranidae family)</td>
<td>forest</td>
<td>EN</td>
</tr>
<tr>
<td>Caretta caretta</td>
<td>Loggerhead turtle</td>
<td>coastal</td>
<td>EN</td>
</tr>
<tr>
<td>Chelonia mydas</td>
<td>Green sea turtle</td>
<td>coastal</td>
<td>EN</td>
</tr>
<tr>
<td>Conraua alleni</td>
<td>(frog – Ranidae family)</td>
<td>forest</td>
<td>VU</td>
</tr>
<tr>
<td>Eremochelys imbricata</td>
<td>Hawksbill turtle</td>
<td>coastal</td>
<td>CR</td>
</tr>
<tr>
<td>Kinixys homeana</td>
<td>Home’s hingeback turtle</td>
<td>forest</td>
<td>VU</td>
</tr>
<tr>
<td>Lepidochelys olivaceus</td>
<td>Olive Ridley turtle</td>
<td>coastal</td>
<td>EN</td>
</tr>
<tr>
<td>Phrynobatrachus annulatus</td>
<td>(frog - Petropedetidae family)</td>
<td>forest</td>
<td>EN</td>
</tr>
<tr>
<td>Phrynobatrachus villiersi</td>
<td>(frog - Petropedetidae family)</td>
<td>forest</td>
<td>VU</td>
</tr>
<tr>
<td><strong>BIRDS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agelastes meleagrides</td>
<td>White-breasted guineafowl</td>
<td>forest</td>
<td>VU</td>
</tr>
<tr>
<td>Bleda eximius</td>
<td>Green-tailed bristlebill</td>
<td>forest</td>
<td>VU</td>
</tr>
<tr>
<td>Campephaga lobata</td>
<td>Western wattled cuckoo-shrike</td>
<td>forest</td>
<td>VU</td>
</tr>
<tr>
<td>Criniger olivaceus</td>
<td>Yellow-throated olive greenbul</td>
<td>forest</td>
<td>VU</td>
</tr>
<tr>
<td>Malimbus ballmannii</td>
<td>Gola malimbe</td>
<td>forest</td>
<td>EN</td>
</tr>
<tr>
<td>Melaeornis annamarulae</td>
<td>Nimba flycatcher</td>
<td>forest</td>
<td>VU</td>
</tr>
<tr>
<td>Phyllastrephus leucopelis</td>
<td>Liberian greenbul</td>
<td>forest</td>
<td>CR</td>
</tr>
<tr>
<td>Picathartes gymnocephalus</td>
<td>White-necked rockfowl</td>
<td>forest</td>
<td>VU</td>
</tr>
<tr>
<td>Scotopelia ussheri</td>
<td>Rufous fishing-owl</td>
<td>forest</td>
<td>EN</td>
</tr>
</tbody>
</table>

(CR= critically endangered, EN= endangered, VU= vulnerable/threatened)  
Source: IUCN (2007)

### 2.3 CONSERVATION OUTSIDE OF PROTECTED AREAS

Until recently, conservation efforts outside of the protected area system have been very limited. Prior to the civil conflict, communities have historically managed forests in Liberia, but were excluded from decision-making processes and lacked the legal or practical control over the natural resources they depend on for survival. During the conflict and current post conflict period, except for timber, forest resources have been freely accessible to users in Liberia. At any time, anyone can clear any size of forest anywhere
by slashing and burning it to make farms. Similarly, an estimated U.S. $60 million are traded in bush meat each year and any quantity of other non-wood products can be harvested from Liberia’s forests at will and free of charge.

Compounding resource use issues is the lack of private land ownership or land rights at the community level. While some of the population continues to relocate to urban areas, a growing number of Liberians are returning to their villages as peace has been achieved up-country. However, many of these lands have not been officially gazetted to the impacted communities and thus responsibility for the lands is not always clear. While conflict may result, a secondary issue is the lack of coordinated land use management, which can lead to negative impacts on the surrounding forests and biodiversity.

The GOL, with USAID assistance, is drafting a law governing community rights with respect to forest lands and its accompanying policies and regulations.

### 2.4 PROTECTED AREA MANAGEMENT

The FDA is responsible for managing all national parks, nature reserves and national forests, while the EPA is responsible for managing the Ramsar sites. A discussion of management issues with regard to Liberia’s protected area network is found in Section 5.2.2.
3.0 THREATS TO TROPICAL FORESTS

3.1 ILLEGAL AND QUASI-LEGAL LOGGING

Currently, illegal commercial logging no longer poses a threat to Liberia’s forests. However the Government of Liberia’s (GOL) domestic timber supply policy appears to be a contributor to forest degradation. The GOL through FDA has decided that domestic timber production is necessary for the nation’s reconstruction effort, and that timber production should be quasi-legal in the interim period, pending the implementation of the 2006 Revised Forestry Law and the allocation of new timber concessions. The current timber production is artisanal and based on a production technique incorrectly termed pit-sawing. In fact, the timber is produced by chainsaw operators, not by hand saws operated in pits dug beneath the logs. Groups of timber harvesters with chainsaws operate in forests with easy road access, move the sawn planks to the roadside, where they are collected by trucks owned or rented by timber merchants. In one logging operation, some employees were former rebels, unable to obtain other employment. The team observed numerous trucks filled with sawn planks (in containers) along the Monrovia-Buchanan-Greenville road and observed numerous piles of lumber awaiting collection. There are also unconfirmed reports that containers headed for Monrovia and other destinations by boat from Greenville and Buchanan are off loaded to other ships and then illegally exported. Although the intention of this policy is that timber production should operate under permits and therefore have some Government oversight, there are numerous problems with the current system, including the following issues.

DEGRADATION OF FORESTS

The actual production of timber is unregulated at present, and is taking place in all National Forests usually close to roads where the loggers are able to operate. A joint FDA-UNMIL forest patrol program in September 2007 around National Forests in Bong, Nimba and Grand Bassa Counties found that are a total of 39 chainsaws and 114 operators producing an average of about 400 planks per week. Such intense activity is undoubtedly contributing to forest degradation/habitat loss. It also decreases the value of future concessions.

LOSS OF REVENUE

Although FDA has created a system where permits for timber production can be obtained, the system is very clumsy, results in lost revenue and possibly facilitates corruption. FDA is unable to accept payment for permits; this can only be done at the Ministry of Finance in Monrovia. Consequently, the trees are felled and pitsawn and transported roadside. During this operation, permits are obtained by the timber buyer in Monrovia, and the actual production along the roads remains illicit until the buyer returns with the permit. There are also unconfirmed reports that much of the timber moves without permits on arrangement between the buyer and regional FDA staff. The inability of FDA to receive fees remains a root cause of poor forest management and will lead to future problems. One obvious example is the local...
harvest of trees for timber, since rural communities will continue to rely on planks produced locally by chainsaw for their construction needs.

**LOSS OF VOLUME**

Chainsaws are less efficient at converting logs into planks, producing less wood and more sawdust. This is an inevitable consequence of meeting the short term need for timber from local sources, and will hopefully be resolved in future as sawmills come into operation. Several artisanal timber production operations were observed, and the operators were very skilled in chainsaw use, minimizing waste.

### 3.2 SHIFTING CULTIVATION

The natural climax vegetation over most of Liberia is forest, and more than half of this forest is now degraded through human activities, including urban and rural development. Much of the degraded forest, especially in central Liberia and near the coast, is managed by rural communities for shifting cultivation.

Shifting cultivation is poorly understood despite its widespread use in the lowland tropics. It is basically a rotational agroforestry system, where one to several years of cultivation is followed by fallow, during which scrub or secondary forests develop. In a traditional shifting cultivation system, only a small percentage of a village’s agriculture lands are in cultivation in any given year, sometimes less than 10%. The non-cultivated lands support scrub and forest, and supply a diversity of forest products, including bush meat, fuel wood, wild food plants, medicinal plants, and plants producing natural fibers and construction materials such as building poles, thatch, rattan and raffia. Passive cultivation of woody plants is also a feature of Liberian shifting cultivation. Oil palm is the most obvious example, but other tree and liana species are also protected by farmers when land is cleared for cultivation, because of their high economic value. Besides forest products, fallows provide two important services: they restore soil fertility and they eliminate weeds from crop lands.

Shifting cultivation has few inbuilt protections against intensifying land use, since in its traditional form shifting agriculture is regulated by economics alone, it is simply not practical to bring too much land into cultivation. Soil infertility and weed problems will increase, increasing the labor required to produce crops. Urban demand for food and increased crop values through easier market access tip the scale in favor of more intensive cultivation, with the reduction or elimination of fallows, and this process is occurring all across west central Africa. It is therefore surprising that degradation of the traditional cultivation system is not very advanced in Liberia. This could result from the long conflict reducing the pressure of cultivation on forest lands. It could also result from upland rice, the preferred crop in Liberia, since upland rice requires high soil fertility and, if the fallow period is eliminated, rice cultivation requires the application of (unavailable) fertilizers. Other crops, especially cassava, are more tolerant of poor soil conditions and can produce reduced yields with little fallow.

The threat of deforestation posed by shifting cultivation is difficult to measure. Although some FDA personnel informed the team that there was some agricultural encroachment occurring in primary forests,
the extent and location of such expansion was not confirmed. Attention tends to focus on the clearing of forest lands (whether secondary or primary), and this is especially noticeable for upland rice cultivation, where fields tend to be large and cleared by multiple families or commercial interests, often with some capital investment. In this context, there seems to be a trend towards more “mechanized” slash and burn using chainsaws which may impact regeneration in the future as the larger trees which provide a seed source for regeneration are now being cut. Increases in world rice prices may also drive upland rice expansion in Liberia. In general, however, Liberia’s low population density combined with the fact that only 6% of Liberia’s land is devoted to agriculture, means that shifting cultivation does not represent a current threat to forests if the lands are subsequently fallowed. Rather, the threat is the overall degradation of forest over time, best measured from successive satellite images.

The future of the shifting cultivation system depends on decisions made by hundreds of thousands of peasant farmers and their communities. Decisions based on western ideas of land ownership and on the marketing of cultivated crops will result in the ongoing deforestation of over half of Liberia’s forest zone, and the loss of forest products. The important question is how can the scale be tipped in favor of forest products, soil fertility and weed control to slow deforestation? It will be useful for forest conservation if some donor activity can focus on projects to provide farmers with opportunities to realize greater economic benefit from their forest lands. Areas where advances can be made include the ownership of forest resources, the management of hunting and the bush meat trade, improved marketing of forest products, the development of cottage industries based on forest products, and an appreciation of the role played by fallows in increased crop yields. In future, communities that decide to maintain forest cover through monitored management plans might also benefit from carbon trading. Projects to improve the value of community forest lands should be attractive to donors, since the scale is small and the potential for replication is very high.

### 3.3 MINING

Liberia is one the least explored and most highly prospective countries for minerals in the world. Liberia has economic concentrations of iron ore, diamonds, gold, and barite, and is highly prospective for platinum, palladium, nickel, manganese, and uranium. A recent offshore seismic study indicated the possibility of significant oil reserves.

The GOL expects mining activities to grow rapidly during the Poverty Reduction Strategy (PRS) period from near zero production in 2005/06 to 12 percent of GDP by 2010. Indeed the GOL is counting on such growth as a means of contributing significantly to employment, income generation and infrastructure development. The major contributor to this growth will be the resumption of the mining and exporting of iron ore. Iron ore was the mainstay of the Liberian economy between 1960 and 1980, contributing more than 60 percent of export earnings and about 25 percent of GDP.

The ArcelorMittal mining operations – located on the northern tip of West Nimba National Forest, are expected to initiate the revival of iron ore production when the company makes its first projected shipment of 2-4 million tons in 2010. Production at other mines currently out for bid, such as the Western Cluster and Bong Mines, is expected to commence production in four to five years.

The current status of mining concessions is presented in Table 22 below.
TABLE 22: CURRENT STATUS OF IRON ORE MINING CONCESSIONS IN LIBERIA

<table>
<thead>
<tr>
<th>DEPOSIT</th>
<th>LOCATION</th>
<th>COMPANY</th>
<th>RESERVE (Million)Tons</th>
<th>ORE GRADE %Fe</th>
<th>TYPE OF ORE</th>
<th>CURRENT STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt. Nimba</td>
<td>342Km ENE of Monrovia</td>
<td>LAMCO LIMINCO (1989-PRESENT)</td>
<td>417</td>
<td>65-69</td>
<td>Nimba - Hematite</td>
<td>MDA to MITTAL STEEL</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>59.1</td>
<td>Western Area - Magnetite</td>
<td></td>
</tr>
<tr>
<td>Bom Hills</td>
<td>80Km NW of Monrovia</td>
<td>Liberian Mining CO. (LMC)</td>
<td>45</td>
<td>68</td>
<td>Magnetite</td>
<td>Exploration Permit to BHP</td>
</tr>
<tr>
<td>Mano River</td>
<td>Mano River Hills, near Sierra Leone Border</td>
<td>National Iron Ore Co. (NICO)</td>
<td>136</td>
<td>51.4</td>
<td>Limonite</td>
<td>OPEN TO NEGOTIATION</td>
</tr>
<tr>
<td>Bong Mine</td>
<td>80Km NE of Monrovia</td>
<td>DELINCO Bong Mining Co (BM)</td>
<td>290</td>
<td>35-45</td>
<td>Magnetite</td>
<td>OPEN TO NEGOTIATION</td>
</tr>
<tr>
<td>Putu Range</td>
<td>Grand Gedeh County, ESE of Monrovia</td>
<td>BMC</td>
<td>455</td>
<td>45</td>
<td>Itahnite</td>
<td>Exploration Permit to MARIO</td>
</tr>
<tr>
<td>Bea Mt</td>
<td>Grand Cape Mount County</td>
<td>LMC</td>
<td>382</td>
<td>35-45</td>
<td>Magnetite, Hematite, Goethite</td>
<td>OPEN TO NEGOTIATION</td>
</tr>
<tr>
<td>Wologizzi Range</td>
<td>Lofa County</td>
<td>LISCO</td>
<td>1000</td>
<td>35-40</td>
<td>Hematite</td>
<td>Exploration Permit to BHP</td>
</tr>
<tr>
<td>Goe Fantro</td>
<td>60Km NE Of Monrovia</td>
<td>LAMCO (LIMINCO)</td>
<td>NA</td>
<td>35-40</td>
<td>Hematite</td>
<td>Exploration permit to BHP</td>
</tr>
</tbody>
</table>

Source: MLME data.

Gold and diamond mining in Liberia consists largely of alluvial and small-scale operations. However, plans are also underway for development of a discovery of approximately 1.5 million ounces of gold by Mano River Resources in Grand Cape Mount County. This mine, which will be Liberia’s first mechanized gold mine, is expected to be established within two years.

Currently, there are 26 exploration companies holding 53 licenses, and the MLME expects to issue about 44 new licenses over the next two years.

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54 It should be noted that in November 2002, about 50 countries that produce, trade, and process diamonds became signatories to the Kimberley Process Certification System (KPCS) aimed at establishing a system of certificates of origin to control the global trade in diamonds. The treaty resulted from international concern over the growing evidence of illegally mined and exported diamond revenues being used to support civil conflicts in Angola, Sierra Leone, Liberia and elsewhere. The NTGL was encouraged by the UNSC to establish a Certificate of Country of Origin regime that is transparent, effective, and internationally verifiable for the trade in rough diamonds, with a view to joining the Kimberley Process Certification Scheme. The NTGL requested that a Kimberley Process Review Team visit Liberia in February 2005 to assess the NTGL’s ability to comply with the requirements of the KPCS. To help enforce UN sanctions on diamond exports, the Ministry of Lands, Mines and Energy banned all diamond mining as of January 2005, although exploration was still permitted. Liberia met the standards of the Kimberly process and the U.N. lifted the ban on diamonds in April 2007.
POTENTIAL IMPACT
All mineral resource extraction will have direct adverse impacts to the surrounding environment, including its biodiversity. In almost all cases, the impacts can only be mitigated and never eliminated.

Industrial Mining
As Figure 8 indicates, there is a high degree of geographic overlap between mineral reserves and the protected area/forest reserve network. If exploitation occurs within these areas as expected, the potential to significantly affect biodiversity and forest cover should be considered very high. Forest destruction will be locally extensive and permanent. Other potential environmental impacts include:

- Siltation of dams and rivers;
- Indiscriminate deforestation.

Additional degraded lands from settlement patterns of miners

- Ground and surface water pollution, including acidic mine drainage and heavy metal pollution from copper, lead, arsenic, mercury, or cyanide, if the excavation is in highly mineralized zones;
- Dust pollution;
- Water table depression as a result of pumping water through shafts, and in some cases through boreholes;
- Oil pollution from leaks from vehicles and machinery; and
- Habitat fragmentation, decreased habitat effectiveness, and increased mortality of wildlife, through increased bush meat consumption

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Although the GOL states in the PRS that it intends to harmonize the New Minerals and Mining Law (NMML) Act of 2000 and the Forestry Law with respect to mining concession rights and protected zones, little progress has been made to date.
FIGURE 31: OVERLAP BETWEEN MINERAL RESERVES AND LIBERIA’S FORESTS AND PROTECTED AREA NETWORK

Source: FDA
Indirect impacts from industrial mineral extraction include both positive and negative changes to the local communities’ economic base and increased pressures to social structure. Industrial mining operations for diamonds, gold and iron ore can include the clearance, excavation, and flooding of farmlands. Surrounding communities are generally either displaced or relocated, which can disrupt their livelihoods and impact their cultural heritage. Changes in livelihoods can also have indirect effects on biodiversity, when new areas must be cleared for agriculture.

**Artisanal Mining**

Small-scale artisanal operations typically involve the digging of pits within alluvial river channels and excavating for black sands that are associated with diamond-bearing gravels. Up to 100 individuals work on a one-acre site. The diggers use shovels to extract the target gravel, which is most often carried off in pans or sacks to an area where the gravels are washed using a sieve.

MLME estimates that there are over 100,000 artisanal miners operating in Liberia. FDA estimates that in Sapo National Park alone, there are over 6000 illegal artisanal miners; FDA also reports that illegal artisanal mining is taking place in nearly all of Liberia’s protected areas.

The majority of the artisanal activity, which accounts for most of the diamond mining activity in Liberia, may have individually insignificant effects on biodiversity and tropical forests but cumulatively significant effects. In combination with the lack of any effective reclamation programs for mined areas, artisanal mining has led to significant areas with decreased habitat capability and increased erosion, although the extent of this area is not known. Biodiversity is impacted by the change in habitat, water quality, and land use after extraction.

Other potential environmental impacts from artisanal mining are similar to those of industrial mining and include:

- Siltation of rivers;
- Indiscriminate deforestation;
- Additional degraded lands from settlement patterns of miners (e.g., the mining camps established by the 6000 miners in Sapo);
- Ground and surface water pollution, including acidic mine drainage and heavy metal pollution from copper, lead, arsenic, mercury, or cyanide, if the excavation is in highly mineralized zones;
- Habitat fragmentation, decreased habitat effectiveness, and increased mortality of wildlife, through increased bush meat consumption; and

56 Although the statement of intent for mining policy under the PRS appears to incorporate environmental concerns, items such as biodiversity offsets and rehabilitation are not mentioned.
Current artisanal mining practices will likely lead to continued environmental impacts, unless improved methods and management activities are introduced.

Legal mineral resource extraction, whether large-scale companies or a single operation (artisanal miner), requires the payment a license fee. The fee collected has allocations for mine site reclamation. In all cases, the amount is far below the actual cost of reclamation and the fees are not being applied to reclamation on the ground. Because much of the artisanal mining activities are not recorded or legally licensed, raising funds for sustainable reclamation practices is not currently achievable.

3.5 AGRO INDUSTRIAL CROPS

Although the current threat to forests from agro-industrial plantation expansion is currently low, in the past, the conversion of huge areas of Liberia’s forests into monocultures of rubber and oil palm accounted for the vast majority of forest loss. As tree crops\(^{57}\) are an important component of the Liberian economy, accounting for 22 percent of the GDP in 2005, with rubber alone employing 18,500 workers and accounting for 90 percent of total exports,\(^{58}\) there may be economic pressure to expand the area under tree crops.

Prior to the civil conflict there were seven large-scale rubber plantations in Liberia:

- Firestone Plantations Company in Harbel, Margibi County;
- Liberian Agriculture Company (LAC) in Grand Bassa County;
- Cavalla Rubber Corporation in Maryland County;
- Cocopa Rubber Plantation in Nimba County;
- Sinoe Rubber Corporation in Sinoe County;
- B.F. Goodrich (now Guthrie Rubber Plantation) in Bomi County; and
- Salala Rubber Corporation (Bong County).

Currently only the Firestone and LAC plantations are functional. In addition, SOCFIN, the parent company for LAC, operates the Weala Rubber Company which has a rubber mill in Bong County and buys rubber from smallholders operating on 14,000 hectares, much of which may have been part of the previous Salala Rubber plantation.

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\(^{57}\) Tree crops include rubber, oil palm, coffee and cocoa, but coffee and cocoa, as well as smallholder palm oil are usually grown with food crops interspersed among the trees or under secondary forests.

\(^{58}\) MoA 2007.
The Firestone rubber plantation has a concession of one million acres (approximately 416,670 hectares). It is the largest rubber plantation in Liberia, and the world’s largest contiguous industrial rubber plantation. LAC has a concession for 125,000 hectares. But the area of the concession in both cases does not represent the area planted to rubber; indeed, the planted area is much smaller than the concession area. For instance, LAC has rubber on only 14,060 hectares of its concession area. It estimates that it needs to have 16,000 hectares of rubber to optimally supply its rubber mill, but has had trouble expanding the area planted to rubber due to tenure concerns within the larger concession area.\textsuperscript{59} Interspersed in the areas planted to rubber in the LAC concession are corridors of native vegetation. In the past year, LAC has made a corporate commitment to maintain these corridors as small nature reserves.

Liberia’s National Biodiversity Strategy and Action Plan\textsuperscript{60} states that the area planted to rubber on plantations is 57,000 hectares. This is much less than the nearly one million hectares covered by current and previous concessions. The years of civil conflict greatly reduced the management of rubber plantations, so that many of the trees are beyond their productive age. Currently the plantations are engaged in removing old trees and replanting areas, rather than opening up new areas.

Smallholders are also faced with rejuvenating old stands of rubber. Buchanan Renewable Energy (BRE) has established a program in the Buchanan area whereby it clears old rubber trees and replants with improved rubber varieties. BRE chips the rubber wood that is removed and plans to sell the chips as biomass fuel. It enters into long-term agreements with property owners, whereby BRE assumes responsibility for the removal and replanting of the area, as well as for management of the seedlings until they reach a productive age (between 6 to 8 years). The terms and conditions of these agreements were still being developed during the preparation of this ETOA, and it is not clear whether planting will be only limited to existing sites.

There are estimated to be about 27,000 hectares of industrial palm plantations owned by parastatals and the private sector.\textsuperscript{61} All of the factories on the palm oil plantations were destroyed during the civil conflict. At the time of writing, none of the palm oil plantations were functional. In some cases, small operators are managing groups of trees in the plantations for oil production. However, the MOA is

\textsuperscript{59} The LAC plantation manager was shot and killed in 2007 while surveying a potential area for expansion within the concession boundary.

\textsuperscript{60} GoL 2003.

\textsuperscript{61} MoA 2007.
currently negotiating new leases for these plantations and the potential impact on forests from these new concessions is not clear.\textsuperscript{62}

Government’s increased interest in the potential introduction of oil palm biofuel plantations may see this threat increase significantly in the future. For example, Equatorial Biofuels has expressed interest in securing a 500,000 ha tract of land in River Gee for biofuel plantations, an area that falls within the proposed Grebo National Forest. The Ministry of Agriculture is also discussing a number of other biofuel proposals with private companies. At this point, it is unclear how Liberia’s forest policy and management would deal with these proposals particularly if they were to involve the clearing of existing forest lands for plantation purposes.

In considering a biofuels program, Government needs to keep in mind that oil palm is perhaps one of the biggest threats to tropical forests in the world. For example, between 1990 and 2005 the area covered by oil palm plantations rocketed by 1.87 million hectares in Malaysia and by more than 3 million hectares in Indonesia. More than half the oil palm plantations came at the expense of forests - largely pristine, intact forests in Indonesia and previously logged forest in Malaysia. And the situation in Brazil evolved in a similar manner such that USAID has now determined that USAID funds “cannot be made available for the cultivation or processing of African oil palm, if doing so would contribute to significant loss of native species, disrupt or contaminate natural water sources, reduce local food security, or cause the forced displacement of local people.\textsuperscript{63}”

\textsuperscript{62} For example, the old West Africa Agricultural Company oil palm concession comprises a total of 300,000 ha of which only 19,000 are under palm with the remainder in wetlands (about 1000 ha), secondary forests and village, towns and traditional agriculture. The current MOA concession caretaker expressed concern about the land tenure situation in the proposed new concession as well the impact on forests within the concession.

\textsuperscript{63} USAID FY 2008 Assistance Checklist – Andean Counter Drug Program.
3.6 MANGROVE LOSS

Mangroves characterize the coastal wetlands of Liberia and cover a small area along the coast, from Cape Mesurado to Cape Palmas, at the edges of lagoons, riverbanks, and river estuaries and in widespread areas of coastal swamps. Mangroves are estimated to cover 0.5 per cent of the land surface of Liberia, which is equivalent to a 50 km-wide belt extending along the total length of the coastline (Gatter 1988).

Mangroves pay an important role in Liberia’s coastal ecosystem, in that they:

- Serve as spawning grounds for many fish species, crabs, shrimps, mollusks and other forms of sea life;
- Serve as habitats for many endangered species of manatees, crocodiles, turtles, migratory birds;
- Help with flood regulation and serve as buffer against violent storms surges;
- Protect shorelines from erosion; and
- Help with water recharge and maintenance of water quality.

A noted above, mangroves in Liberia occur at the mouths of the rivers and in some of the lagoons. Lake Piso, a very large open lagoon near the border with Sierra Leone, supports a series of mangrove swamps. The lagoon mangrove communities around Cape Palmas in southeastern Liberia can attain a height of 3 m and are dominated by Conocarpus erectus with only rare specimens of Avicennia germinans and Rhizophora racemosa. Thickets of Acrostichum aureum are also common. On the central Liberian coast estuarine mangroves occur, consisting of stunted Rhizophora harrisonii, Avicennia germinans and Conocarpus erectus. The trees of Rhizophora spp. and Avicennia germinans rarely grow taller than 6 meters, probably because of poor soil conditions; they are always taller when growing closer to river channels than in other inundated areas (usual growth 2 to 2.5 m height). Except for a few places in the central part of the country, primary mangrove forest has been replaced by secondary ones.

Mangroves are being degraded due to over cutting for fuelwood, charcoal and construction poles. However, mangroves can usually recover from these activities as they propagate vegetatively, although FAO (2006) reports that Rhizophora racemosa seems to have been eliminated in some places by extensive felling. There is no information about the impact of these activities—and secondary mangrove forest—on biodiversity.

The biggest threat to Liberia’s mangroves is urban expansion and accompanying landfills, particularly in Monrovia. This expansion began during the civil conflict when many displaced people – having very
limited land space to carry out business activities—created landfills in the Mesurado and Marshall Mangrove wetlands, causing large areas of mangroves to be destroyed (and to be used as dumps or for sewage disposal). The process continues today; Liberia’s burgeoning post conflict economy and increased population have overwhelmed the original planned land area for Monrovia and other coastal cities; originally made to accommodate 350,000 persons, Monrovia’s now has a population of over 1 million.
4.0 THREATS TO BIODIVERSITY

4.1 THE BUSHMEAT TRADE

Liberia is unusual in the high importance of bush meat in the local diet, and in the lack of alternative animal protein. Although fish is the main protein source, bush meat comes second, comprising about 75% of animal protein consumed. Its economic value is enormous, rivaling pre-war timber revenues, and the industry is effectively unregulated at present. Rough estimates for the cash value of Liberia’s annual bush meat harvest are $US 66 million (1991) and $78 million (2002), and it may comprise 4% or more of GNP. The task of regulating the bush meat trade is enormous, and although FDA has the mandate and legislative framework to do this, implementation is lacking.

Regulating the bush meat trade presents greater challenges than regulating the timber harvest, because of the very large numbers of people involved and the complex marketing chain associated with it. Compared to timber, bushmeat offers greater cross-societal employment, lower entry costs, less gender bias, provides good value retention for the hunters, and is very important for incomes and food security in Liberia’s poorest regions (Hoyt, 2008). Unfortunately, although bush meat appears to be as important economically as timber, it is the poor relation in terms of legislation and administration. The Commercial Department at FDA deals almost exclusively with timber, while the Wildlife Department is focused mostly on protected areas. Solving the bush meat crisis will depend in part in raising wildlife to the same importance as timber, both at FDA and in the national consciousness. The root causes of the bush meat crisis are the large national and probably international demand for Liberia’s bush meat, and the near-total lack of regulation of the industry by FDA, including poor protection of wildlife in protected areas.

Because of the adverse impacts of hunting on protected species and because the harvest is generally assumed to be unsustainable at current levels, Liberia has a bush meat crisis, and could lose an important source of animal protein, rural and urban livelihoods, and some of its protected species if the industry continues to be poorly-regulated. The bush meat trade is less affected by the problems that impact other industries, such as road conditions, fuel prices and the state of the economy, although road construction and rehabilitation has certainly facilitated shifting cultivation, illegal logging and access to animals. Commercial hunters
reduce wildlife populations locally then move on to other areas including protected areas. Local hunters then continue the decline in overall numbers by over-hunting and trapping, until only the commonest species remain. Major challenges in regulating the industry include the following:

- Elimination of illegal commercial hunting operations, especially in protected areas, wildlife law enforcement in protected areas;
- Creation and implementation of wildlife management plans for all categories of protected area;
- Governance issues at the village level, establishing ownership and management of wildlife;
- Regulation of the hunting and selling of bush meat through the FDA permit process, controlling the trade along roads, in markets and at borders;
- Reducing the demand for bush meat in cities and villages by creating alternative sources of animal protein;
- Create alternative incomes, especially in agriculture, to offset the loss of hunting income;
- Education at all levels on the importance of Liberia’s protected species.

The Monrovia bush meat market

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<tr>
<th>The Monrovia Bush Meat Market</th>
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<td>A 2004 report by the Concerned Environmentalists for the Enhancement of Biodiversity (CEEB) provides a window into bush meat marketing, and is worth describing here. CEEB reports a 10-month study of Monrovia’s bush meat markets, conducted between October 2003 and July 2004. Bushmeat ranks second to fish among protein food products in Monrovia. Bushmeat quantities and prices were recorded at 17 markets, for a total value of over $US 8 million. The annual total is likely to be close to $10 million. Gorbachev market was the largest, with 75 bush meat sellers, with Duala and Ralley Time next in size. Huge supplies of bush meat arrive in the capital daily from all over Liberia, and some of this is apparently transshipped to other destinations. The meat is brought in vehicles by middle men who buy from hunters. Of the restaurant owners interviewed, nearly 80% claimed to serve bush meat, citing flavor and customer preference rather than cost as the reason. Similarly, about 80% of Monrovia households interviewed claimed to use bush meat. Although the bush meat is composed mostly of Maxwell’s duiker and other common species, rare species are also present, confirming that the bush meat trade in Monrovia has an adverse impact on protected wildlife species. Control of the bush meat trade in markets is clearly desirable, maybe using a process akin to chain of custody for timber, to certify that the meat comes from a legal source and is not a protected species.</td>
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CROSS-BORDER ISSUES

In a small country like Liberia, it is inevitable that some bush meat trade will take place across remote, porous borders. However, there is a question of whether or not Liberia is a major hub in the export of domestically harvested bush meat. The bush meat trade is secretive at these levels, and information is difficult to gather and interpret. However, the Concerned Environmentalists for the Enhancement of Biodiversity (CEEB) report concluded that a large amount of bush meat entering Monrovia was not

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64 FDA staff at East Nimba Nature Reserve report that this is the case for the Reserve. Commercial hunters supplied with shotgun shells from Monrovia merchants have decimated the Reserve’s animal population and then moved on to the southeast (Senkwehn and Sapo).
consumed locally and was probably transshipped to other, probably international destinations. This finding should be independently confirmed. A large bush meat trade between southeast Liberia and Ivory Coast has also been reported, with a tendency towards domestic consumption now that internal road transportation is feasible. There are also reports of a trade in primate bush meat from Sierra Leone, where most people do not eat primates, to Liberia where primate bush meat is high-value. The need for bush meat protein within Liberia and the unsustainable harvesting make the export of the remaining stocks highly undesirable. The resolutions to the cross-border issues lie with increased regulation of the domestic bush meat trade by FDA along roads and in markets, and an enforced ban on the import and export of bush meat at the existing border control posts. Collaboration with conservation programs in neighboring countries can also be important in making the borders less porous. Elimination of the international bush meat trade needs to be a high priority for FDA and in theory should be fairly straightforward. However, the high value of the trade and the likely importance of the merchants operating it will render enforcement efforts ineffective unless they are well-focused, well-planned, and have sufficient resources and follow-up.

COMMUNITY CONTROL OF THE BUSH MEAT TRADE

The importance of local communities in the management of forests is widely recognized. A community forestry law is being drafted and FDA has a Community Forestry Division to implement community forestry activities. Communities benefit in many ways from the exploitation of forest resources, and are often the only forest managers over large areas of unreserved forest where FDA has no effective presence.

Communities play a key role in wildlife management since many households are active in the bush meat trade, hunting, smoking meat and selling to traders. Communities may also allow non-resident commercial hunters to hunt in their forests. Bushmeat provides villagers with an important protein source, with income generation, and is also important in crop pest control. Bushmeat is also the villagers’ economic safety net, since it can be relied on to provide income during times of hardship. The 2006 Liberia Food Security Report lists 45% of households in Grand Gedeh county as involved in hunting/trapping, while in most communities around the Sapo National Park, a quarter to half of the income comes from bush meat.

Hunting and trapping are effectively unregulated at present and it is important for both food security and for biodiversity protection that the harvest moves to sustainability. This objective is stated in the 2006 forestry law, and needs to be implemented. Sustainable hunting involves both governance and science, and a key requirement is that FDA officers and hunters work together in mutual trust to manage wildlife. FDA has little experience at this type of collaboration, and hunters have little experience at working as a group to control hunting. We heard that hunters groups exist in some communities, but we were not able to find and interview any. Creating model projects in community natural resources management will require foreign donors and implementing organizations, either through forest conservation or rural development.
4.2 Over Exploitation of Demersal Fish Species

Liberia has an Atlantic coastline of 580km and fishing grounds within its Exclusive Economic Zone (EEZ) covering over 186,000 km². Fishing provides 65% of the animal protein needs of the country and contributes around 3.2% to Liberia's GDP. The marine fisheries sector accounts for about fifteen percent (15%) of the GDP of the country. In 1986, about 11,693 metric tons were exported compared to 1990 (out beak of the civil war) when only 7,290 metric tons were exported. Annual production for 1998 and 1999 amounted to 10,830 and 15,473 metric tons respectively. In 1984—the last period for which any data is available—an acoustic survey of the country’s marine resources indicated a total biomass (total fish resources) of about 800,000 metric tons consisting of pelagic\(^65\) and demersal\(^66\) species. Although there have been no recent surveys to take stock of existing biomass, Liberia’s Bureau of National Fisheries (BNF) believes that the demersal species are under threat from over exploitation from both commercial and artisanal fisheries.

**COMMERCIAL FISHERIES**

Currently there are 14 fishing companies operating legally in Liberia; 6 companies are solely engaged in the importation of frozen fish from the high seas, and 8 companies are engaged in industrial fishing activities operating 30-40 licensed fishing vessels – including eight Chinese paired trawlers - with a combined GrossRegistered Tonnage (GRT) of about 5000 tons.

Industrial fishing vessels land their catches at the fishing pier in the Free Port of Monrovia. Currently, fish landed locally by all licensed trawlers is estimated at 2000-3000 tons. However, BNF believes that these figures are grossly misreported, and has a strong suspicion that a number of licensed industrial fishing vessels are engaged in illegal transhipments on the high seas and are repacking catches in Liberian waters and declaring these catches as imports. BNF estimates that Liberia loses approximately $10-12 million through illegal fishing each year.

BNF further estimates that the annual catch within the EEZ of Liberia is much higher given that poaching (pirate fishing) is rampant due to the lack of any monitoring, control and surveillance (MCS) system. BNF conservatively estimates that there may be upwards of 250 “pirate” boats operating in Liberian waters, the majority of which are using illegal fishing techniques such as long lines and gear (nets with mesh sizes below the required size of 25mm for shrimp and 70mm for fish). Often these boats operate within the three mile limit reserved for artisanal fisheries and compete for the same demersal species.

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\(^65\) The “pelagic zone” refers to the open waters of the ocean. Fish that live in pelagic zones are typically mobile and migratory species that are not closely associated with permanent structures such as coral reefs. Some of the largest and most commercially important species are pelagic fishes, including billfish, tunas, dorado, and many sharks.

\(^66\) This terminology encompasses crustaceans (shrimps, langoustine, lobster and crabs), cephalopods (octopus, squid, calamar) as well as miscellaneous fish belonging to the benthic or bentho-pelagic species and living in shallow waters or on the seabed.
Liberia is attempting to come to grips with illegal fishing. A sixty day Marine Control and Surveillance Project, jointly launched by the Ministry of Agriculture and the Bureau of National Fisheries in February 2008 resulted in the arrest of several pirate ships. Liberia is also planning to join the International Maritime Organization’s security division illegal fishing program, aimed at 25 countries in West and Central Africa. This program links local coastguards with Interpol, the FAO, UNHCR, insurers and other partners, and will include action against illegal fishing.

**ARTISANAL FISHERIES**

Approximately 60% of the total domestic catch is landed by artisanal fisher folk, using various types of canoes and fishing gear, including 200-800m long beach seines. About 13,000 fisherfolk and 18,000 fish processors (mongers) and their families live in 139 communities in coastal counties. Together they operate about 3500 canoes of which 8% are motorized and the largest numbers of canoes are operating in Montserrado and Grand Bassa Counties.

The artisanal fisheries are dominated by the Fanti and Popoe fishers and they own and use the larger motorized fishing canoes. They employ more sophisticated fishing nets and fishing techniques and, as a result, catch more fish per trip than the indigenous Kru fishermen who fish with 1-3-person crew small dug-out canoes of about 7 m, powered by paddles or sail.

BNF reports that there may be an additional 8000 unlicensed foreign artisanal boats operating in Liberian waters.

As with the commercial sector, there are reports of artisanal fisherman using undersize nets and more recently dynamite.

**4.2.1 OVER EXPLOITATION OF OTHER MARINE SPECIES**

Liberia’s continental shelf provides habitat for a variety of marine species including mollusks, crustaceans, demersal and pelagic species. However, Information on distributions and abundance of these species is nonexistent and nothing is known about specific centers of endemism. Moreover, there have been no stock assessment surveys conducted in more than twenty years to determine the level of exploitation of the fisheries resources. There are no research facilities to study the dynamics of the ecological factor affecting the fisheries environment- the productivity of ecosystem, pollution levels and nutrient load, species diversity of the various fish communities and harvesting pattern of commercial species.

With regard to sea turtles, there are reports that they are hunted secretly or food throughout Liberia. Their eggs are also collected by humans and destroyed by dogs and pigs on the beaches. SAMFU, supported by the U.S. Fish and Wildlife Service (USFWS) is promoting the long-term survival of sea turtles, including the sustained recovery of depleted stocks, taking into consideration the integrated well-being of residents of coastal communities with which they interact. Although the ETOA team was not able to verify, SAMFU claims to have stopped the hunting of sea turtles in two communities near the mouth of the Cess River. Apparently, they made a deal with the communities, so that SAMFU/USFWS would provide
fishing nets and outboard motors to the fishermen, in exchange for beach protection, so that the communities would not attack the turtles and nests when they came ashore, and they would monitor the nesting.

4.3 OVER EXPLOITATION OF INLAND FISH SPECIES

There are six major rivers in Liberia (Table 23). These flow from mountains in the north and empty into the Atlantic Ocean. Most of the rivers are navigable up to 20 miles from the coast, except for Cavalla, which is navigable up to 50 miles.

<table>
<thead>
<tr>
<th>TABLE 23: MAJOR RIVER BASINS IN LIBERIA</th>
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<td>Basin</td>
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<td>-------------</td>
</tr>
<tr>
<td>Mano</td>
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<tr>
<td>St. Paul</td>
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<td>St. John</td>
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<tr>
<td>Cavalla</td>
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<td>Cestos</td>
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<td>Lofa</td>
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Source: UNDP 2006

Together, these basins drain approximately 65% 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.

The freshwater resources in Liberia support 166 species of freshwater fish, including one endemic species, *Barbus trispiloides*. The value and production of inland fisheries is not known but it is an important seasonal subsistence activity. BNF estimates that that there are an estimated 8000 boats on Liberia’s inland river system with only about 200 registered. Of the total number of boats there is a high percentage of migrant fisherfolk using bigger boats and motors and more advanced technologies and generally out competing resident fisherfolk. According to BNF, there is little control over net mesh size and there is wide use of organic and chemical pesticides, and dynamite. BNF has little capacity to monitor inland fisheries as their only one BNF agent in the field (on the St. Paul River), and he has no means of transport to either control boats on the water or at landing sites.

BNF is concerned that over fishing may be occurring on Liberia’s inland waterways but fisheries catch data collected by the BNF does not have national coverage and the data is often inaccurate and cannot be analyzed and interpreted into useful assessment or management tools.

4.4 COMPETITION FROM ALIEN INVASIVE SPECIES (AIS)

Alien species are those that have crossed natural barriers and entered ecosystems where they have not existed previously in recorded history. They can include plants, animals, fungi, bacteria, algae or viruses. Impacts on biodiversity from AIS can include:

- Displacement of native species through competition for food and other resources, through predation, alteration of habitat and food webs;
• Dilution and potential loss of locally adapted gene pools caused by the introduction of non-locally adapted strains of the same species, or closely related species that are able to hybridize; and

• Infection of native animal and plant species by a variety of parasitical organism, such as bacteria, viruses, and fungi.

There are many floral and faunal species that have invaded Liberia over the decades. Although no inventory has as yet been done on AIS in Liberia, nor have the impacts of AID been quantified, Liberia’s State of the Environment Report (2006) lists four introduced plant species that are thought to have an impact on biodiversity:

• *Leucaena leucocephala*. The ecological impact of *Leucaena* is not deemed serious as yet because it is still limited to the localities where it was originally introduced, but it colonizes very rapidly.

• *Acacia spp.* The Acacia species introduced by the FDA in Zarwea, Grand Cape Mount County are apparently rapidly overtaking the original forest;

• *Chromoleana odorata* is an herb, and a typical pioneer species of secondary forest succession with a strong heliophilic character and vigorous vegetative development. Initially it spreads through seed dispersion, but after establishment it may also reproduce vegetatively from lateral branches. Regrowth occurs after slash and burn cultivation. It was introduced to West Africa around 1937 through contaminated seed lots of *Gmelina arborea*, and probably spread to Liberia in the late 1940s. Due to abundant vegetative development, *C. odorata* out-competes young trees leading to poor natural regeneration. It also provides a habitat and breeding spaces for harmful insects such as the variegated grasshopper, *Zonocerus variegates*, which attacks cassava fields causing substantial yield losses. During the dry season, it constitutes a fire hazard.

• *Water hyacinth*. One of the most globally well-known water weeds is the Water Hyacinth (*Eichornia crassipes*) which occurs in the coastal areas of Liberia. The Water hyacinth is an exotic, free-floating aquatic plant which can form small colonies, “floating islands” or extensive mats that can cover thousands of hectares of previously open water. When invasive, water hyacinth forms a complete covering of the water surface that excludes most light and air for submerged organisms thus depriving them of essentials for survival. A significant reduction of general aquatic biodiversity and a change of fisheries results from invasion. The mats can also have serious mechanical impacts on water supply systems, drainage canals, inflows to hydropower generators, and movement of shipping and river flows. The hyacinth increases evapotranspiration leading to significant water loss from reservoirs and other water bodies. The crowding of plants at the edges of water bodies prevents access to the water for collecting water or fishing.
5.0 CAPACITY OF GOVERNMENT OF LIBERIA INSTITUTIONS TO ADDRESS THREATS

5.1 POLICIES
Libera has four key policies and several international commitments which have the potential to address threats to tropical forests and biodiversity.

5.1.1 THE NATIONAL ENVIRONMENTAL POLICY
The National Environmental Policy (NEP) sets the policy framework for environmental management in Liberia. The policy goal of NEP is “to ensure long-term economic prosperity of Liberia through sustainable social and economic development, which enhances environmental quality and resource productivity on a long-term basis that meets the requirements of the present generation without endangering the potential of future generations to meet their own needs.” Specifically, the NEP states that the Government of Liberia will:

- Commit itself to the sound scientific and sustainable use of natural resources;
- Create environment awareness among all sections of the community;
- Develop procedures for the utilization of land resources so as to ensure the maximum degree of economic value;
- Require prior environmental impact assessments for all investments that may impact the environment;
- Institute appropriate measures to control pollution and the importation and use of potentially toxic chemicals;
- Take appropriate measures to protect critical ecosystems against harmful effects, or destructive practices;
- Develop and maintain a professional agency to supervise, coordinate, implement and enforce procedures and legislation essential for safeguarding the environment;
- Oblige all concerned to provide the relevant information needed for environmental protection and for the enforcement of environmental regulations and legislation;
- Promote and support environmental research programs; and
- Establish an adequate legislative and institutional framework for monitoring, coordinating and enforcing environmental programs and issues.

The policy specifically calls for the creation of the Environmental Protection Agency (EPA) as an independent authority for the management of the environment. It also calls for the adoption of the Environmental Protection and Management Law as a tool for implementation of the NEP, and states that the law should provide for:
• Improved access to information on the environment;
• Harmonization of the appropriate legal instruments;
• Monitoring and evaluation of the impact of policy decisions on the environment;
• Improvement of the scientific base of environmental decisions through appropriate research programs;
• Assessment of potential impacts of public and private projects on the environment, and environmental mainstreaming into the national planning process; and
• Establishment and implementation of appropriate standards and guidelines so as to ensure an acceptable level of public health and environmental protection.

Legal Framework
The Environmental Protection Agency Act of (EPA Act) authorized the establishment of an overall institutional framework for sustainable management of the environment in Liberia, while the Environmental Protection and Management Law (EPML) forms the legal framework for the sustainable development, management and protection of the environment by the Environmental Protection Agency in partnership with relevant ministries, autonomous agencies and organizations. The Law stresses intersectoral coordination and authorizes EPA, in consultation with the relevant Line Ministries, agencies and/or authorities, to promulgate several procedures, measures, guidelines, plans, registries, criteria, licenses/permits, standards and regulations to protect the environment.

5.1.2 THE NATIONAL FORESTRY POLICY
The aim of the forestry policy of Liberia is to conserve and sustainably manage all forest areas, so that they will continue to produce a complete range of goods and services for the benefit of all Liberians and contribute to poverty alleviation in the nation, while maintaining environmental stability and fulfilling Liberia’s commitments under international agreements and conventions. In order to achieve this aim, the following specific objectives will be pursued:

• To ensure that commercial forestry, community forestry and forest conservation activities are integrated and balanced to optimize the economic, social and environmental benefits from the forest resource;
• To conserve a representative sample of forest ecosystems so that important environmental functions are maintained;
• To contribute to the national development goals of poverty alleviation and increased food security by increasing the opportunities for forest-based income generating activities;
• To grant more equitable access to forest resources so that the potential for future conflict is reduced and the benefits from forestry development are shared throughout Liberian society.
• To ensure that all stakeholders participate in the formulation of forestry policies and in the conservation and management of the forest resource;
• To maximize the contribution of the sector to income, employment and trade through the development of appropriate processing activities;
To ensure that forestry development contributes to national development goals and international commitments (including regional cooperation and trans-boundary issues) and is coordinated with other relevant branches of government; and

To ensure that activities in the forestry sector (including forest management, plantation development, harvesting, conservation and industrial development) are based on sound scientific and technical principles.

The strategy for policy implementation is based on commercial forestry, community forestry and conservation forestry, otherwise known as the three “Cs”.

The strategy for commercial forestry focuses on improving forest concession management, reforestation and forest plantation development and modernization of the wood processing industry;

The strategy for community forestry, in addition to providing for greater involvement of local people in all aspects of the forestry sector, gives special attention to the potential for forests to contribute more to local people and communities. The policy strategy for community forestry focuses on the production of bush meat, wood energy and other non-wood forest products, as well as the management of forests by local communities to meet a variety of differing objectives; and

The strategy for forest conservation includes the management of specific sites of high conservation value and the integration of conservation objectives into all aspects of forest management. The strategy for forest conservation focuses on wildlife and protected area management, management of wetlands and mangroves and the development of ecotourism and nature tourism.

In support of the above strategies, the policy also provides for a number of cross-cutting activities intended to strengthen the overall framework for the development of the forestry sector. These include land tenure, ownership and land use planning; public administration (including financial management); research, information, education and training; and legislation and law enforcement.

Legal Framework
The legal framework for the National Forestry Policy is grounded in the following:

- **Bureau of Forests and Wildlife Conservation (1953):** The first Liberian forestry administration - the Bureau of Forests and Wildlife Conservation - was created in the Ministry of Agriculture in February 1953 as part of “An Act for conservation of the Forests of the Republic of Liberia”. The Bureau concentrated mostly on forest inventories and concession allocation, but it was gradually realized that the Bureau did not have the financial freedom and flexibility necessary to supervise the sector.

- **The Forestry Development Authority (1976):** The Forestry Development Authority was created by a Special Act in December 1976. This Act repealed all previous forestry and wildlife laws and granted the Forestry Development Authority the power to issue, amend and rescind forestry and wildlife regulations. The Act defined the objectives for the sector, which were grouped into three broad themes: establishing a permanent forest estate made up of National Forests and National Parks; optimizing the contribution of forestry to the national economy; and increasing public involvement in forest conservation and management through the creation of communal forests and agroforestry programs.

Under this Act, the Forestry Development Authority’s functions covered the following: formulating forestry policy; forest resource management; control and management of concessions; collection of revenue from forest activities; research (including market intelligence); and training. From 1976 until
2000, the Forestry Development Authority issued 27 regulations that dealt mostly with the administration and management of forestry and wildlife activities (including forest charges, fines and penalties), but there was little assessment of the impact of these developments or any reformulation of policy. Consequently, the Forestry Development Authority remained a highly centralized institution, with a predominant focus on industrial production.

- **Revised National Constitution (1986):** The Constitution gave the government the power to manage the national economy and natural resources of Liberia and required the legislature to ratify agreements (including forest concessions).

- **The New National Forestry Law (2000):** In 2000, “The New National Forestry Law”, amended or repealed certain provisions of the existing forest laws. The final version of the law was controversial, as it transferred powers over the sector from the legislature to the executive.

- **National Forestry Reform Law (2006):** In 2006, “An act adopting the national forestry reform law of 2006” was passed, which amended the National Forestry Law of 2000 and the Act Creating the Forestry Development Authority. This law recognizes the problems of the past and stresses the integration of community, conservation and commercial forest management for the benefit of all Liberians.

Additionally, Section 9.11.c (Wildlife Conservation) and Section 10.1.c (Community Empowerment) under the 2006 Forestry Reform state respectively that:

- “The Authority shall, within one year of the effective date of this Law, present to the Legislature for consideration and passage a comprehensive framework law for Wildlife Conservation and protection”;

- “The Authority shall, within one year of the effective date of this Law, present to the Legislature for consideration and passage a comprehensive law governing community rights with respect to Forest Lands.”

Although behind schedule, the new World Bank Global Environment Fund (GEF) initiative, Consolidation of Liberia Protected Area Network (COPAN) project will finance a review of existing wildlife legislation, elaborate and print a draft law on wildlife utilization and management and its validation through a national workshop before being submitted to Parliament.

The development of the law governing community rights with respect to forest lands is more advanced. FDA, with technical assistance provided by the Land Rights and Community Forestry Program (LRCFP) and other partners has produced and vetted several drafts, and a final draft is expected within the next 2-3 months.

### 5.1.3 DRAFT FISHERIES POLICY

There has been no fisheries policy in Liberia for over a decade as a result of the conflict. With FAO assistance, The Ministry of Agriculture is now formulating a national fisheries and aquaculture policy intended to strengthen Liberia’s maritime and fisheries laws, regulations and capacity to ensure sustainable management and development.

Key elements of the draft policy include:
Guiding Principles

- **Conservation and Sustainable Resource Use.** The Government will endeavour to maintain ecosystems health and functioning, environmental protection, conservation and enhancement of mangroves and wetlands, maintenance of biological diversity, and pollution free marine and freshwaters;

- **Global Responsibility.** The Government will work cooperatively with Governmental and Non-Governmental agencies, institutions and organizations that are involved in environment and natural resources management to strengthen environmental conservation strategies, and will actively pursue collaboration and cooperation with countries in sustainable fisheries conservation, protection and management;

- **Responsible Fisheries Management.** The Government shall ensure that the national fisheries and aquaculture policy is consistent with the FAO Code of Conduct for Responsible Fisheries (CCRF). Provisions of the CCRF that are relevant to the sustainable development of fisheries and aquaculture in Liberia will be incorporated in the national fisheries legislation and accompanying regulations;

- **Collective Decision-Making.** The Government shall seek the participation of grassroots fisheries community organizations, farming communities engaged in aquaculture, the private sector fishing industries, national and international Non-Governmental Organizations involved in fisheries and aquaculture, and the country’s development partners, in sustainable fisheries management; and

- **Transparency and Accountability.** There shall be openness in access to information, in the elaboration of plans, and in decision-making. Also, the decision makers should be accountable and be available to answer to the stakeholders who may be affected by their decisions.

Policy areas

The draft fisheries policy provides for a number of policy areas concerning the environment and conservation of biodiversity. These areas are highlighted below.

- **Monitoring, control and surveillance (MCS).** The objective is to establish a national surveillance system capable of assuring national security and protecting the Liberian territorial waters and the EEZ (Exclusive Economic Zone). With particular reference to fisheries, the primary objectives are to control and monitor fishing activities and prevent poaching and other forms of IUU fishing;

- **Fisheries scientific research.** Fisheries research is an essential component of fisheries development and management. The policy will develop a comprehensive fisheries research program to provide Government the scientific information and knowledge it needs to make informed decisions on fisheries management and development;

- **Conservation and enhancement of the aquatic environments and ecosystems.** The overall objective of this policy area is to maintain ecosystems health and functioning through environmental protection, conservation and enhancement of mangroves and wetlands, maintenance of biological diversity, and maintaining pollution free marine and freshwaters. Measures for the protection of these natural resources and habitats and the maintenance of biological diversity will be pursued in close collaboration with the line Ministries and Departments of the natural resources sectors, the Environment Protection Agency, the Municipalities and communities and the few NGO’s working in these sectors;
• **Interagency collaboration and cooperation in sustainable fisheries management and development.** In order to improve fisheries management and ensure sustainable implementation of development programs and projects, the MOA through the BNF will establish meaningful working relationships with other Government agencies and institutions whose mandates touch on fisheries and aquaculture, environment and natural resources conservation and management;

• **Promote sub-regional, regional and international cooperation in fisheries management.** The policy objective is to foster external collaboration and cooperation in fisheries management. Liberia will work to strengthen sub-regional, regional and international cooperation in fisheries management. The country will accede to international fisheries agreements, conventions and protocols as an essential foundation for partnership and sub-regional and regional cooperation in sustainable fisheries management; and

• **Continue collaboration, cooperation and strengthening of the Fishery Committee for the West Central Gulf of Guinea for Liberia, Cote D’Ivoire, Ghana, Togo, Benin and Nigeria to promote sustainable fisheries management, to better manage shared and transboundary fish stocks through joint research programs, joint management of coastal zones and ecosystems, collaboration on pollution control, harmonization of national legislation and policies, and in the joint monitoring, control and surveillance activities. Integrating Youths and Ex-combatants into fisheries and aquaculture development.**

**Legal Framework**

The Natural Resources Laws of 1956 (revised in 1961 and 1973) are still in force in Liberia. In 1972, FAO assisted the Government of Liberia to revise the Natural Resources Laws of 1956 but Presidential approval was not obtained up to the time of the military coup d’état in 1980. In March 1999, draft fisheries legislation was prepared but never finalized and approved by Government.

Currently, FAO is helping the GOL to elaborate new fisheries legislation to replace the Natural Resources Laws of 1956. The draft legislation – “An Act Adopting the National Fisheries Law Of 2008” contains several provisions which could have a positive impact on marine and aquatic ecosystems. These include:

• **Section 1.5.2 (Purpose and objectives)**
  – The conservation of fisheries resources at levels which meet the needs of present and future generations;
  – The preservation of the quality and biological diversity of fisheries resources and ecologies;
  – The protection of water quality, fish habitats and spawning grounds; and
  – The avoidance of the creation of excess fishing capacity and the risk of over-fishing.

• **Section 7.7 (Conservation measures).** The Minister may prescribe fisheries conservation measures for the conservation of fisheries as well as measures for the protection of the marine environment.

• **Section 7.9 (Marine Reserves).** After consulting the minister responsible for defense, the minister responsible for transport, the Environmental Protection Agency, the Minister may declare any part of the maritime fishing waters of Liberia to be a Marine Reserve

• **Sections 10.3, 10.4 and 10.5** deal with international conservation and management agreements, including the authority to enter into such agreements, their implementation and “giving effect” to such agreements.
5.1.4 FOOD AND AGRICULTURE POLICY AND STRATEGY (DRAFT 2008)

The goal of the Food and Agriculture Policy and Strategy (FAPS) is:

‘A revitalized modernized agriculture that is contributing to shared, inclusive and sustainable economic development and growth of Liberia’

The FAPS focuses on three broad sector objectives:

- Enhanced inclusive and pro-poor growth in agricultural production, productivity, competitiveness, value addition and diversification;
- Safe and nutritious foods are available in sufficient quantity and quality at all times to satisfy the nutrition needs for optimal health of all Liberians throughout their life cycles; and
- Strong and efficient human and institutional capacities of the public sector, private sector, civil society organizations, especially grassroots, capable and carrying out effective planning, delivery of services, investment and monitoring activities in the sector; sustaining natural resources, mitigating risks to producers and mainstreaming gender considerations in planning and implementing activities in the sector.

The FAPS has a number of policy objectives that address environmental and biodiversity issues. These include:

**Non-Traditional Crops and Non Timber Products**

- Much greater awareness and promotion of the potential of the sub sector for employment and income generation with high levels of involvement of the private sector in activities in the sub sector;
- Continuous increasing volumes of the quality non-traditional export commodities from measurable expanded access to markets at national, regional and global levels; and
- Increased foreign exchange and incomes widened revenue base from the sub sector.

**Fisheries**

- Sustainable increase in fish landings in the country by industrial fisheries operators providing additional increased fish supplies to the population, income, revenue, employment, trade in high value markets and product development, through the establishment of infrastructure and enforcement of legislation.

**Forestry**

- A well regulated exploitation and management of the forest resources of the country;
- Measurable increased performance of the value chains (production, exports, value added) of selected forest commodities (wood and non-wood and wildlife) within the National Forest Policy and National Forest Management Strategy;
- Measurable increased contribution of forestry to food and nutrition security at household levels from increased safe, and quality bush meat, wood based energy, employment and income from eco-tourism and cottage industries;
• A holistic development of agriculture, forestry and fisheries with special focus on conservation of forest resources, protection of the environment and sustainable utilization and management of forest resources;

• An effective institutional environment ensuring efficient, implementation, monitoring and evaluation of the National Forestry Reform Law as well as the National Forest Policy and National Forest Management Strategy; and

• Achieving the MDG target of reversing deforestation by at least maintaining the current forest cover levels, and reducing hunger by half through increased production of safe and quality bush meat; available supplies of materials for wood based energy; and employment and income from forest products, ecotourism and cottage industries.

**Land and Water Management**

• Support to the establishment of a land tenure system in the country that is acceptable to all stakeholders; ensures access, security, sustainable use of land; promotes sustainable environmental protection, and facilitates private sector led development of the agricultural sector.

**Agriculture and Environment**

• Country wide awareness in, and mainstreaming environmental considerations in all agricultural activities including production, processing, manufacturing and value addition; and

• Appropriate policy instruments are in place and being applied, complied with and enforced, in order to ensure environmental protection from agricultural and related land use activities including forestry, wild life, mining, fisheries and others.

**Sustainable Natural Resource Management**

• Provide support to the transition from shifting cultivation to sedentary farming in a manner that will ensure sustainable natural resource utilization and a realization of the benefits and economic returns from it.

**Reduce Risks Due To Climate Change and Improve Coping Mechanisms**

• Monitor the climate change situation to ensure that: i) agricultural activities do not contribute to such changes; and ii) such changes will not seriously undermine efforts directed at poverty alleviation, food security and environmental protection.

### 5.1.5 MINING POLICY

Although the Ministry of Lands, Mining and Energy is current preparing a draft mines policy and legislation, it was not available for the ETOA teams’ review. However, excerpts from the PRS on mining are presented below.

The major policy challenge in the mining sector is to develop a national mining sector framework and MDAs that promote growth that is not just rapid, but also inclusive and sustainable, while at the same time minimizing the negative social and environmental impacts of mining activities. In particular, the Government is aiming to develop mining concession contracts that differ from those of the past by better balancing competitive investor returns with the need for robust revenues, and ensuring that local communities share in the benefits through direct and indirect employment, access to new infrastructure,
and programs targeted at diversification of activities and local economic development beyond the life of the mine.

The Government’s central goal for the mining sector is to rapidly expand mining as an engine of economic growth and social development, with mining expected to grow to nearly 12 percent of GDP in 2011, and to ensure that the benefits from mining activities are widely shared. The Government will aim to diversify the mining sector into new and downstream activities and to improve its support to local miners.

To achieve this goal, the Government will review and adjust the existing enabling environment for mining sector development. In particular, it will:

- Eliminate the overlaps and conflicts between different pieces of legislation, including the conflict between the Public Procurement and Concession Act (PPCA) and the New Minerals and Mining Law (NMML) Act of 2000 regarding the granting of exploration licenses and mining leases;
- Harmonize the NMML and the Forestry Law with respect to mining concession rights and protected zones; and
- Adopt and implement a national mining sector framework with input from communities and stakeholders’ groups that will include:
  - A National Mineral Policy that will provide a guiding framework for decision makers in the management of Liberia’s mineral resources;
  - A Model Mineral Development Agreement (MDA) that will define clear terms and provisions for mining operations, including fiscal, legal, infrastructure, and social and environmental issues; and
  - A Mining Cadastre Information Management System (MCIMS) that will improve management of the mining licensing system by clearly defining property boundaries.

Although the statement of intent appears to incorporate environmental concerns, items such as biodiversity offsets and rehabilitation are not mentioned.

5.1.6 LAND RIGHTS AND LAND TENURE POLICY

Land and property policies and rights laws in Liberia are unclear or outdated and there is little consensus at the national or local level as to what Liberia’s property rights system should be (e.g., private, state-held leaseholds, a mix of the two, or something else), how dual legal structures (customary and statutory) should function in one legal framework, or if the state should be engaged in land redistribution, which would imply that the state would take land from one group to give to another. Once a land policy is defined, laws and regulations are required to define a number of property rights and procedures, including

67 The exception to this is the creation of a law governing community rights with respect to forest lands (mandated pursuant to the Forestry Law of 2006 for passage in 2007) which is currently being drafted by FDA with assistance from USIAD’s Land Rights and Community Forestry Program.
for tenure types, jurisdiction, land administration, eminent domain, valuation, registration and other concerns.

The GOL recognizes the importance of land tenure and on March 15, 2007, the GRC produced a document, “The Way Forward: Land & Property Rights Issues in the Republic of Liberia” that lays out a proposal to create a program to address land tenure and property rights issues. It proposes a number of forward-thinking actions for initiating the program including a process of open and transparent consultation at the regional and national level; a focus on extensive research to inform decision making; proper sequencing of proposed reforms; and the establishment of a National Land Commission to investigate the issues in depth and make policy recommendations to the government on possible approaches to improve the situation with regard to property rights and land tenure in Liberia.

To this end a Land Steering Committee was created under the auspices of the GRC to move the process forward until the creation of a National Land Commission In its Terms of Reference the Land Steering Committee established seven thematic working groups, including one dedicated to natural resources property rights, which prepared preliminary issue papers in mid-June 2007. There is broad-based participation in these groups from the line ministries, civil society organizations and donor institutions. The Land Steering Committee also funded a number of targeted issues papers stemming from the efforts of the Working Groups and held regional consultations in the country to share these results and get public feedback on their validity and value in recommending possible solutions. On May 7, 2008, the Land Committee held a national conference to discuss and present the results of the issues papers as well as the comments and suggestions stemming from the regional consultations. Based on these findings, it is hoped that the GOL will be able to make substantive recommendations and comments on future steps in addressing land tenure and property rights and propose that a National Land Commission be established to further investigate the issues surrounding land tenure and property rights in the country and make substantive policy recommendations.

5.1.7 INTERNATIONAL POLICY COMMITMENTS

Liberia is signatory to a number of international conventions and treaties relevant to tropical forests and biodiversity. These are presented in Table 24 below.

<table>
<thead>
<tr>
<th>Convention/Treaty</th>
<th>Adoption Date</th>
<th>Ratification Date</th>
<th>Objectives</th>
<th>Projects and Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Sustainable Use Of Its Components</td>
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<td></td>
<td></td>
<td>3. Fair And Equitable Sharing Arising Out Of The Utilization Of Genetic Resources</td>
<td></td>
</tr>
<tr>
<td>2. The Cartagena Protocol on Biosafety to the Convention on Biological Diversity</td>
<td>Accession, February 16, 2002</td>
<td></td>
<td>1. To Contribute To Ensuring An Adequate Protection In The Field Of Living Modified Organisms Resulting From Modern Biotechnology</td>
<td></td>
</tr>
<tr>
<td>3. United Nations Convention to</td>
<td>June 17, 1994</td>
<td>March 3, 1998</td>
<td>1. To combat desertification and mitigates the effect of</td>
<td></td>
</tr>
<tr>
<td>Convention/Treaty</td>
<td>Adoption Date</td>
<td>Ratification Date</td>
<td>Objectives</td>
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<tr>
<td>4. The United Nations Framework Convention on Climate Change</td>
<td>May 9, 1992</td>
<td>November 5, 2002</td>
<td>1. To achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climatic system</td>
<td>National Adaptation Programme of Action produced in 2006</td>
</tr>
<tr>
<td>5. Kyoto Protocol</td>
<td>December 11, 1997</td>
<td>November 5, 2002</td>
<td>1. To strengthen the commitment of developed country parties with a view to reduce their overall emissions</td>
<td></td>
</tr>
<tr>
<td>6. Abidjan Convention And Protocol on Management And Protection Of Coastal and Marine Environment In The Sub-Region</td>
<td>Entered into force 1994</td>
<td>2005</td>
<td>For the cooperation in the protection and development of the marine and coastal environment of the West African region</td>
<td></td>
</tr>
<tr>
<td>7. Ramsar Convention On Wetlands</td>
<td>1971</td>
<td>February 11, 2003</td>
<td>1. To manage wetland systems so that the human uses of these areas are undertaken in such a way as to retain their natural capital for future generations. 2. To encourage and support countries to develop and implement national policy and legislative frameworks, education and awareness raising programs, as well as inventory, research and training projects.</td>
<td>Five areas designated as Ramsar sites: Lake Piso, Marshall, Mesurado Kpatawee and Gbedin</td>
</tr>
</tbody>
</table>

Source: EPA data

5.1.8 POLICY AND REGULATORY ISSUES
In general terms the above policies and legislation—with the exception of land tenure—are more than sufficient to provide the enabling environment for the conservation and management of Liberia’s environment and natural resources.

In specific terms, particularly with regard to implementation, the ETOA Team finds that the policy and legislative framework for managing and conserving natural resources in Liberia is overly comprehensive, complicated and too detailed to effectively facilitate implementation.
For example, together, the NEP, EPA Act and EPML set out a comprehensive and detailed mandate for the EPA to protect Liberia’s environment. The EPML alone contains 100 subsequent requirements that have to be instituted by EPA to implement the law. EPA has extremely limited capacity, and it would be completely paralyzed if it tried to fulfill the full mandate in these legislative acts. The situation is similar for the FDA and even a casual look at the draft fisheries legislation suggests that BNF’s legal mandate will far exceed its capacity to enforce it at least in the short to medium term. Therefore, it is imperative for EPA and other institutions to prioritize the implementation of their mandates, focusing on a few areas in which they could maximize the protection of the environment.

In terms of the level of complication, as one long term advisor to the FDA put it, in drafting the National Forestry Reform Law (2006), “the authors took state of the art legislation from the EU and the US and then added some to it.” The draft community rights legislation is a case in point. Although the most recent draft contains nine pages of articles (down from 60 at the last version), it’s still far too cumbersome for a community to understand let alone obey. Complicated legislation results in poor understanding and contributes to difficulties in enforcement.

Other critical policy and legislative issues include:

**Land Tenure**
Government needs to speed up the establishment of the National Land Commission to resolve land tenure issues. Indeed land tenure conflicts are escalating. In early May 2008, land dispute has led to the death of two in Maryland County. In Bassa County relationships between locals and a rubber company were severely tested about the same issue after the company tried to expand into tribal lands. For many years, former cordial ties between the various ethnic groups in Nimba and Lofa Counties have turned sour once refugees and displaced people started to return home and found their land occupied by others. The Ministry of Defense was sued in Supreme Court by the people of South Margibi who claim that their ancestral land was taken away by President Tubman to build the Shiefflin military barracks. Courts are filled with cases of lands sold to multiple buyers and the list of grievances goes on and is expected to grow without a comprehensive land tenure policy and sound, implementable and socially acceptable legislation. The final outcome of the work undertaken by an eventual Land Commission will have major implications for the relationship between the FDA and the forest communities and the way that forests are managed.

**Bushmeat policy and legislation**
Under the Forestry Reform Law of 2006, FDA has a clear mandate to manage wildlife and to control hunting and the trade in bush meat, and is also mandated to prepare a comprehensive framework for wildlife conservation and protection (pending). Under the 2006 law, FDA will also review the status of wildlife species and update the lists of completely and partially protected species (urgently needed). Hunting and trading wildlife within Liberia can only be legally conducted under permits issued by FDA. Export of bush meat is less clear, since the law only addresses the export of wild animals and does not specifically mention bush meat.

The 2006 law mandates the creation of a protected area network of about 1.5 million hectares, covering 30% of Liberia’s forests. However, the 1.5 million hectares includes all categories of reserved forest, including multiple-use National Forests. It is unclear at present how much of this area will offer strict protection for wildlife, currently limited to Sapo National Park and East Nimba Nature Reserve. The modalities of wildlife protection in the various categories of reserved and unreserved production forests are not addressed in the 2006 law, and fall under the pending wildlife conservation and protection law.
Similarly, the protection and exploitation of wildlife by communities and hunters groups is not addressed, and falls under the pending community forestry law.

There is also a need to address possible discrepancies between the 2006 Forestry Reform Law, and the January 2008 Liberia Protected Areas Network Strategic Plan. From the point of view of wildlife protection, the proposed protected area network includes two distinct categories of reserve, strictly protected such as National Parks, and multiple use areas such as National Forests. Law enforcement in the first category is relatively straightforward since anyone hunting is committing an illegal act. In the second category, where logging and hunting are allowed, wildlife protection and the observance of sustainable harvest limits is much more problematic, and has often proved near impossible to enforce throughout west/central Africa. Consequently, there is considerable doubt in conservation organizations about the contribution that Forest Reserves and other production forests can make to wildlife protection, and case studies are needed. From the literature and from discussions with experts it appears that foreign organizations and conservation NGOs are expecting a large increase in the number of strictly protected sites, including the conversion of parts of existing National Forests into National Parks, while the Government of Liberia is reluctant to lose economic benefits through increased protection. A more focused discussion of wildlife protection should take place between the GOL and donors/conservation NGO’s, that addresses both conservation and economic needs.

Following directly from this, there is an urgent need to develop a framework for wildlife management in protected and non-protected production forests, since these forests will play an important role in the protection of wildlife and in the production of bush meat. There are many questions that cannot be answered at the present time, and answers will depend upon the results of well-designed and monitored pilot projects. Some of these questions are: How effectively can communities control bush meat harvesting and protect rare species within their hunting areas? What role will logging and mining companies play in the protection of wildlife within concessions? The pending legislation on wildlife protection and community forestry needs to provide a broad outline, while allowing the development of adaptive management in wildlife protection and the bush meat trade. Hoyt (2008) has developed the following wildlife policy recommendations:

- Manage wildlife as a national resource, use a pragmatic approach;
- Manage vulnerable species and locales, limiting interventions to those with a high probability of success;
- Control transport and markets, generating revenue stream to support management;
- Focus enforcement on commercial hunters rather than farmer/hunters; and
- Recognize community use rights (example: timber concessions do not include rights to wildlife).

**Compensation for Communities Living Around Protected Areas**

The Forest Act provides a scale for community compensation in timber concession areas. Communities that live around strictly protected areas, however, receive no compensation for the loss of rights to forest
products but are expected to make up the difference through GOL and donor supported alternative livelihood programs. Unfortunately, the few alternative livelihood programs that exist in Liberia, have had very limited success. In principle, a community losing forest use in a strictly protected area should be compensated at least as highly as timber concession communities, but as yet, there is no policy or legal provision to provide for this.

**Outstanding Commercial Forestry Issues**

- The law is unclear how different permitting processes for potentially competing land uses fit together and which permit process should take priority—i.e., which takes precedence in a particular area—agriculture, mining or forestry;

- Discrepancies in undertaking commercial forestry operations on private or deeded land. Currently, no bidding process is necessary for privately deeded land merely the consent of the land owner is needed for a valid logging contract, assuming that the logging company is prequalified. However, deeded lands with concessions must follow all rules and regulations in and under the forest law. There is considerable confusion about allocation of concessions on private or deeded land as a result of conflicting interpretations; and

- There are no limitations on sitting funds for Boards managing community revenues from land rent. This could reduce the amount of money available to communities significantly.

**Carbon Financing**

Despite not receiving much attention in formal forestry policy documents to date, there is an increasing awareness of addressing climate change concerns in the management of Liberia’s forests and a number of initiatives have started. For example, there was a delegation of Liberian government members to the Conference of Parties (COP) in Bali where a side event for Liberia was held. A Reduced Emissions from Degradation and Deforestation (REDD) proposal has been prepared by Conservation International (CI) and the GOL and proposals from Fauna and Flora International (FFI) and the World Conservation Union (IUCN) are in the works. USAID is also interested in carbon financing. At present, there is little actual information available on the possible impacts that climate change could have on Liberia’s forests. Additionally, the Government has not adopted a formal policy on the role that Liberia’s forests could or should play in accessing potential funding under various carbon financing mechanisms.

**The 2003 Environment Protection and Management Law**

While this law contains many significant provisions that could be used to protect biodiversity and tropical forests, its lack of implementing regulations means that these provisions remain largely inoperative. Developing such regulations would go a long way towards increasing the Law’s effectiveness. Particular areas to address include procedures for conducting Environmental Impact Assessments; the establishment of protected areas (including non-forest ecosystems); and implementation of the provisions governing public participation and access to information.

The development of EIA guidelines is of particular importance. While Liberia’s EIA procedures are fairly comprehensive, regulations are needed to flesh out the various requirements and provide more detailed definitions of their terms. This is particularly true for mining, road construction and forest logging concession activities. It remains to be seen how the EIA process will actually be implemented on the

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68 From the draft Strategic Environmental Assessment (SEA) stakeholder interviews report.
5.2 INSTITUTIONS
Addressing threats to tropical forests and biodiversity depends not only on strong policies, laws and regulations, supported by robust scientific information, but also on their effective implementation and enforcement on the ground. In the wake of Liberia’s 14-year civil conflict, the challenges confronting its government institutions are vast—including infrastructural, administrative, and staffing needs. Despite such obstacles, these institutions are pressing ahead with their mandated activities. Their efforts are complemented by a number of domestic and international NGOs and international financial organizations working in-country.

This section provides a snapshot of Liberia’s institutional capacity with respect to tropical forests and biodiversity. It introduces the primary government ministries and related organizations whose mandates address or touch on forest and biodiversity concerns, as well as the role of relevant domestic and international NGOs. The section concludes with an examination of capacity constraints affecting the GOL’s ability to address threats to tropical forests and biodiversity.

5.2.1 GOVERNMENT OF LIBERIA INSTITUTIONS
Liberia has a number of government agencies, ministries, and bureaus, along with municipal and state industry entities, whose mandates encompass biodiversity and tropical forests in some fashion. These entities mandates and activities overlap in certain respects and in some cases appear to conflict with one another. The key institutions are briefly described below.

5.2.1.1 INDEPENDENT AGENCIES

FORESTRY DEVELOPMENT AUTHORITY
Created in 1976, the Forestry Development Authority (FDA) is responsible for sustainable management of Liberia’s forests and related resources. The agency provides forestry planning; develops forestry policy; administers and enforces the forestry laws; administers concession agreements; calculates forestry fees; carries out reforestation and forest research and training; monitors the activities of timber companies; and sets up and administers national parks. It is also charged with implementing the 2006 Forestry Law and associated regulations.

The primary objectives of the FDA are to:

- Establish a permanent forest estate made up of reserved areas upon which scientific forestry will be practiced;
- Devote all publicly owned forest lands to their most productive use for the permanent good of the whole people considering both direct and indirect values;
- Stop needless waste and destruction of the forest and associated natural resources and bring about the profitable harvesting of all forest products while assuring that supplies of these products are perpetuated;
- Correlate forestry to all other land uses and adjust the forest economy to the overall national economy;
- Conduct essential research in conservation of forests and pattern action programs upon the results of such research;
• Give training in the practice of forestry; offer technical assistance to all those engaged in forestry activities; and spread knowledge of forestry and the acceptance of conservation of natural resources; and

• Conserve recreational and wildlife resources of the country concurrently with the development of forestry program.

Structurally, the Forestry Development Authority consists of a Board of Directors, six Departments including four specialized units. The FDA is governed by a Nine-Member Board of Directors; a Managing Director who runs the authority on a daily basis assisted by Assistant Managing Director for Administration and Finance. A summary of FDA organizational roles and responsibilities is presented below.

**Board of Directors**

FDA’s Board provides policy direction and guidance and the decision making forum of the Authority. The Board is composed of:

• The Minister of Agriculture as chairman, the Minister of Finance, the Minister of Internal Affairs, the Minister of Planning and Economic Affairs, the Minister of Commerce Industry and Transportation, and the President of the Liberian Bank of Development and Investment;

• The Managing Director of the Authority (appointed by the President); and

• Two Liberian nationals, one with experience in the field of law, and the other with experience in the field of business (appointed by the president).

**Managing Director**

The Managing Director is responsible for the day-to-day operations of the FDA, ensuring the successful implementation of all of its programs and the effective functioning of all operating departments, sections, units and out stations as well as the Financial Accounting Management Systems. The Office of the Managing Director has about 17 staff, and includes Auditing, Strategic Planning, and Law Enforcement coordination.

**Assistant Managing Director for Administration and Finance**

The Assistant Managing Director for Administration and Finance is responsible for assisting the Managing Director with the day-to-day operation of FDA, ensuring the successful implementation of all its programs and the effective functioning of all operating departments, sections, units, sub-units and outstations. He is assisted by an Administrative Assistant, Financial Manager, Human Resource Manager, General Services Manager, Information Technology Manager, Public Relation Manager and other Technicians. The Office of the Assistant Managing Director has about 40 staff, and manages most administrative and logistical activities.

**Departments**

The FDA has five primary departments, each supported by several divisions. Three departments—Community Forestry, Commercial Forestry and Conservation Forestry reflect the “three pillars” strategy in the National Forest Policy. The departments are:

• **Commercial Forestry Department:** The main objective of the Commercial Forestry Department is to commence, supervise and regulate commercial forestry operations in accordance with the National
Forestry Reform Law of 2006. This department is structured into three divisions – Contracts Administration, Chain of Custody and Environmental Impact Assessment.

- **Department of Wildlife Conservation**: This department is responsible for conserving the biodiversity of Liberia’s forest ecosystems, and ensuring their ability to provide a wide range of goods and services for the Liberian people in a sustainable manner. The Department is headed by a Technical Manager, and has three divisions - Wildlife Management, Protected Areas Management and Awareness and Ecotourism.

- **The Department of Community Forestry**: This department is charged with the responsibility of encouraging greater involvement and participation of rural and urban communities in sustainable management of designated forest areas or landscapes by the community so that it will continue to produce a wide range of goods and services for the benefit of the Liberian people. The Department is headed by a Technical Manager who is assisted by two divisional Line Managers and one sectional head. Divisions include Community Forestry Extension Services and Mobilization, Community Empowerment and Community Forestry Resource Planning.

- **Department of Research and Development**: The main objective of this department is to conduct forestry research both in natural and artificial forest. The department is headed by a Technical Manager and has five department including Geographic Information System and Remote Sensing, National Reforestation, Statistics and Database Management, Social Economic and Forest Research.

- **Financial Department**: The Financial Department is responsible for managing the financial accounting, reporting and control of the Authority in accordance with the budgetary appropriation by the Republic of Liberia based on international generally accepted accounting principles. This department is headed by the Financial Manager under the supervision of the GEMAP Comptroller whose main role is to build the capacity of the department for transparency and efficiency. The department is also being assisted by the Chief Accountant and senior accounting staff. The main functions of the Department are to test and establish internal control systems and conduct internal audits.

FDA’s current estimated workforce levels by department are presented in Table 25 below.

<table>
<thead>
<tr>
<th>Department</th>
<th>Workforce</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration</td>
<td>74</td>
</tr>
<tr>
<td>Finance</td>
<td>7</td>
</tr>
<tr>
<td>Community Forestry</td>
<td>21</td>
</tr>
<tr>
<td>Commercial Forestry</td>
<td>86</td>
</tr>
<tr>
<td>Conservation</td>
<td>82</td>
</tr>
<tr>
<td>Research and Development</td>
<td>31</td>
</tr>
<tr>
<td>TOTAL</td>
<td>301</td>
</tr>
</tbody>
</table>

Source: FDA data
Field Operations

Of FDA’s 301 staff, about 132 are based in the field. FDA divides Liberia into four administrative zones. Zone 1 is the Monrovia area, with the field headquarters at Kakata. Zone 2 is the west, including Lake Piso, Gola and Wonegizi, with headquarters at Tubmanburg. Zone 3, with headquarters at Buchanan, covers central part of Liberia, including the Nimba area and River Cess. Zone 4, including Sapo National Park, covers the eastern part of Liberia with headquarters at Zwedru. In addition to the headquarters, each zone has sub-offices in other towns (especially county seats) and at protected areas. Commercial, Conservation and Community Departments are all represented at the zone headquarters.

<table>
<thead>
<tr>
<th>TABLE 26: FDA FIELD STAFFING BY ZONE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Department</strong></td>
</tr>
<tr>
<td>Conservation</td>
</tr>
<tr>
<td>Commercial</td>
</tr>
<tr>
<td>Community</td>
</tr>
<tr>
<td>Totals</td>
</tr>
</tbody>
</table>

Source: FDA data

ENVIRONMENTAL PROTECTION AGENCY

The Environmental Protection Agency Act of (EPA) of 2003 authorized the establishment of an overall institutional framework for sustainable management of the environment in Liberia. This framework includes:

- **National Environmental Policy Council**—charged with formulating national environmental policy; setting environmental protection priorities, goals and objectives; and promoting intersectoral, private-public cooperation in the achievement of environmental policy. The council is intersectoral, composed of members from governmental institutions and private sector organizations appointed by the President.

- **Environmental Protection Agency**—identified in the EPA Act as “the principal authority in Liberia for the management of the environment.” The Environmental Protection Agency (EPA) is overseen by a nine-member Board of Directors appointed by the President from specific government agencies and the private sector, and is managed by an Executive Director, also appointed by the President.

- **Environmental Units in Line Ministries**—are required to be established in each Line Unit. Each Environmental Unit is responsible for ensuring compliance by its Ministry with the requirements of the EPA Act and other environmental laws, making comments on environmental impact assessments, liaise with EPA on matters of environmental management, and to report to EPA and the relevant Line Ministry any time it suspects or detects contravention of an environmental law beyond its sphere of responsibility.

- **County Environment Committees**—charged with collaborating with and facilitating the work of national institutions for sustainable management of the environment in the County and ensuring that County-level environmental concerns are identified and integrated into County plans and

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69 Conservation staff as expected is numerous in Zone 3 (Nimba) and Zone 4 (Sapo).

70 Commercial staff is expected to increase in number this year in zones where timber concessions are restarted.
projects. The Committee is also charged with preparing a County Environmental Action Plan every five years. Each committee is composed of county and district officials, traditional leaders, private citizens, and two local representatives to the national legislature as ex-officio members. The Committee is staffed by a County Environment Officer, hired by the EPA.

- **District Environment Committees**—charged with promoting environmental awareness, mobilizing the public to manage the environment, and monitor activities within the district to ensure that they do not have any significant impact on the environment. The District Environment Committees are to be established by and report to the relevant County Environment Committee. They are composed of district officials, mayors, chiefs, and private citizens and are staffed by a District Environment Officer hired by the EPA.

- **Environmental Administrative Court**—before which complaints relating to the environment may initiate and appeals on Agency decisions may be heard. The Administrative Court is composed of three lawyers, two of which must have environmental law qualifications, and two individuals with environmental science or management qualifications. All of the members are appointed by the President. Any person who is aggrieved by decisions made by EPA or by regulations made under the EPA Act may appeal to the Environmental Administrative Court for redress.

- **Environmental Court of Appeals**—established at the Judicial Circuit level with jurisdiction over all appeals from the Environmental Administrative Court. The Appeals Court is comprised of five experienced judges with knowledge of national and international environmental law, appointed by the President.

Of these seven institutions, only the National Environmental Policy Council, the EPA and in some cases (for example in FDA), the Line Ministry Environmental Units have been established.

**National Environmental Policy Council**

EPA Act mandates the creation of the National Environmental Policy Council as the “ultimate policy-making body on the environment” with the responsibility to provide environmental policy formulation and direction to all sectors of the government. Recognizing that environmental management cuts across sectors, the Act provides for 33 members appointed by the President including:

- A Minister, appointed as the Council Chair;
- Two Senators;
- Two members of the House of Representatives;
- One representatives from the Council of Chiefs;
- Representatives from 12 ministries;
- Representatives from 5 government agencies;
- Representatives from 8 NGOs and professional organizations;
- One representative from the University of Liberia; and
- One eminent female known in Liberia for her work and dedication to environmental protection.

The Chair of the Board of Directors of EPA and the Executive Director of EPA are ex-officio members of the Policy Council.
In addition to formulating environmental policies, the Council is charged with:

- Setting priorities, goals and objectives for environmental protection.
- Promoting cooperation in the protection of the environment among governmental, non-governmental and private sector entities as well as the general public.
- Providing periodic policy direction to EPA’s Board of Directors.
- Approving the Accounts and Annual Report of the EPA.
- Providing guidelines the establishment of County Environment Committees.
- Providing recommendations to President for appointing members of the Board of Directors of EPA, the EPA Executive Director, and judges on the Environmental Court of Appeals.
- Recommending to Minister of Finance economic instruments to ensure an appropriate pricing of environmental resources and that the costs of pollution are paid by the polluter.
- Approving fees charged by EPA.

The Chair of the Council, in collaboration with the Chair of the EPA Board of Directors, is also mandated to provide the President with at least two nominees per position for appointment as judges on the Environmental Administrative Courts.

Although the EPA Act authorizing establishment of the Policy Council became law in April 2003, the first National Environmental Policy Council was not appointed until 2006. The current chairman of the Council is the Minister of Lands, Mines and Energy.

**Environmental Protection Agency**

The EPA Act of 2003 established the EPA as an autonomous body under the Executive Branch of Government with the principal authority in Liberia for management of the environment, although it did not become functional until late in 2006. It is charged with implementing the Environment Protection and Management Law, a framework environmental law that envisions the development and harmonization of sector-specific laws. EPA serves as the principal authority for managing environmental quality, and it is directed to coordinate all activities relating to environmental protection and the sustainable use of natural resources. It also promotes environmental awareness and oversees the implementation of international conventions related to the environment.

Due to the cross-cutting nature of environmental management, the EPA Act defines the powers of EPA as coordinating, monitoring, supervising and consulting with relevant stakeholders on all activities in the protection of the environment and sustainable use of natural resources. Specifically, the EPA is empowered to:

- Work with Line Ministries to:
  - Coordinate, integrate, harmonize and monitor the implementation of environmental policy by the Line Ministries;
  - Build capacity for environment and national resource management in the relevant ministries;
- Promote the use of economic and regulatory instruments to encourage the use environmentally sound technologies and discourage pollution;
- Establish criteria, guidelines, specifications and standards for environmental protection and sustainable use of natural resources;
- Review sectoral environmental laws and regulations and recommend changes to bring them into accordance with the EPA Act or other environmental legislation;
- Ensure the preservation of important historic, cultural and spiritual values of natural resources and, in consultation with indigenous authorities, enhance indigenous methods for effective natural resource management.

- Establish and implement an environmental impact assessment program;
- Collect and analyze data and undertake research necessary to develop indicators for environmental changes and prepare and disseminate state of the environment reports and national environmental action plans;
- Promote public awareness of environmental issues and public participation in decision making;
- Investigate reports of pollution and other related matters;
- Initiate and co-ordinate actions required in a state of environmental emergency or any other situation which may pose serious threat to the environment and public health;
- Function as the national clearinghouse for all activities relating to regional and international environmental conventions, treaties and agreements, and donor-sponsored environmental projects;
- Coordinate, integrate, harmonize and monitor the implementation of environmental policy by the Line Ministries;
- Build their capacity for environment and national resource management;
- Promote the use of economic and regulatory instruments to encourage the use environmentally sound technologies and discourage pollution;
- Establish criteria, guidelines, specifications and standards for environmental protection and sustainable use of natural resources;
- Review sectoral environmental laws and regulations and recommend changes to bring them into accordance with the EPA Act or other environmental legislation;
- Ensure the preservation of important historic, cultural and spiritual values of natural resources and, in consultation with indigenous authorities, enhance indigenous methods for effective natural resource management;
- Establish and implement an environmental impact assessment program;
- Collect and analyze data and undertake research necessary to develop indicators for environmental changes and prepare and disseminate state of the environment reports and national environmental action plans;
- Promote public awareness of environmental issues and public participation in decision making;
• Investigate reports of pollution and other related matters;

• Initiate and co-ordinate actions required in a state of environmental emergency or any other situation which may pose serious threat to the environment and public health; and

• Function as the national clearinghouse for all activities relating to regional and international environmental conventions, treaties and agreements, and donor-sponsored environmental projects.

Chaired by the Minister of Lands, Mines and Energy, The EPA is governed by a nine-member Board of Directors appointed by the President. The board consists of:

• The Governor of the Central Bank;

• A member of the Liberia National Bar Association;

• An Industrialist;

• The Minister of Commerce and Industry;

• The Minister of Planning and Economic Affairs;

• One representative of a university in Liberia;

• One prominent woman;

• The Executive Director of EPA, as an ex-officio member; and

• Two other members chosen for their technical expertise.

The Board is solely responsible for overseeing the operation of the EPA and for providing guidance to EPA’s Executive Director and staff. It also appoints the Deputy Executive Director and the Heads of Departments in the EPA. It is mandated, however, to comply with policy directions given to it by the National Environmental Policy Council.

The Executive Director of EPA, although appointed by the President from candidates recommended by the National Environmental Policy Council, is responsible to the Board of Directors. He is directed by the EPA Act to keep both “the Board and the Policy Council informed on the progress and activities of the agency.” The Executive Director is responsible for the day-to-day operation of EPA and, in collaboration with the Board, for its organization.

To accomplish the 100 mandates given to EPA by EPML, EPA has organized itself into five departments. The Administration and Finance Department is purely an administrative unit, with no responsibilities for accomplishing the mandates. The other four departments are therefore responsible for accomplishing all of EPA’s mandates as follows:

*Inter-Sectoral Coordination Department*

• Promote public awareness and public participation in decision-making;

• Support formal and non-formal environmental education;

• Manage the national network of environmental information;

• Coordinate activities of environment units in government agencies;
• Supervise production, distribution and marketing of the EPA’s publications;
• Organize and implement special environmental events; and
• Organize and coordinate training programs.

Planning, Policy and Legal Department

• Coordinate, integrate, harmonize and monitor the implementation by government agencies of policies and decisions of the Policy Council;
• Create and promote fiscal and economic instruments for environmental protection;
• Initiate and coordinate actions required in an environmental emergency;
• Review sectoral environmental laws and regulations and recommend changes for the protection of the environment; and
• Function as the national clearinghouse for all activities relating to regional and international environment-related conventions, treaties and agreements.

Outstation and Inspectorate Department

• Investigate areas of environmental degradation, pollution, and disruption;
• Determine compliance with environmental standards;
• Oversee environmental activities at county and district levels; and
• Determine and report cases of environmental emergency.

Monitoring, Assessment and Conservation Department

• Collect, analyze and document scientific environmental data;
• Oversee the development of standards, criteria and guidelines for environmental management;
• Manage and supervise the EIA/EMP processes; and
• Provide guidance for conservation and sustainable natural resource management.

In 2006, EPA prepared terms of reference for the agency that included a realistic assessment of necessary staffing. EPA updated this document in 2008, given the current budget limitations of the government.\textsuperscript{71} The terms of reference identifies 32 professional positions in the four substantive departments based in headquarters, including the managers. At the time of the preparation of the ETOA, however, EPA had only filled 16 of those positions (see Table 27 below.)

\textsuperscript{71} EPA 2008.
TABLE 27: STATUS OF PROFESSIONAL POSITIONS AT EPA HEADQUARTERS

<table>
<thead>
<tr>
<th>Department</th>
<th>Headquarters Professional Positions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Filled</td>
</tr>
<tr>
<td>Inter-Sectoral Coordination</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Planning, Policy and Legal</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Outstation and Inspectorate&lt;sup&gt;72&lt;/sup&gt;</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Monitoring, Assessment and Conservation</td>
<td>13</td>
<td>4</td>
</tr>
</tbody>
</table>

Source: EPA data

Clearly, with only 16 professional staff in headquarters, EPA is incapable of achieving its mandate. This is particularly a problem for the Monitoring, Assessment and Conservation Department, which only has 4 professional staff, but is responsible for all of the mandated activities dealing with standards, pollution control program development, natural resource management, and environmental impact assessment – a total of 79 of the 100 mandated activities.

Although none of the County Environment Committees have been established, EPA has established outstation offices in eight counties (Table 28). The offices are staffed by Environmental Inspectors. As the County Environment Committees are established, some of the Inspectors may be reassigned as County Environment Officers.

TABLE 28: EPA COUNTY OFFICES

<table>
<thead>
<tr>
<th>County</th>
<th>Environmental Inspectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Montserrado</td>
<td>4</td>
</tr>
<tr>
<td>Margibi</td>
<td>3</td>
</tr>
<tr>
<td>Bomi</td>
<td>3</td>
</tr>
<tr>
<td>Grand Bassa</td>
<td>3</td>
</tr>
<tr>
<td>Bong</td>
<td>3</td>
</tr>
<tr>
<td>Grand Gedeh</td>
<td>2 + 1 volunteer</td>
</tr>
<tr>
<td>Maryland</td>
<td>1 + 1 volunteer</td>
</tr>
<tr>
<td>Nimba</td>
<td>1 volunteer</td>
</tr>
</tbody>
</table>

Source: EPA data

LIBERIA INSTITUTE FOR STATISTICS AND GEO-INFORMATION SERVICES (LISGIS)

LISGIS was established by Law by the National Transitional Legislative Assembly (NTLA) on July 22, 2004. LISGIS is headed by a Director-General, and supervised and monitored by a twenty-one (21) member Board of Directors. Both the Director-General and the Board of Directors have been initially appointed by the President but thereafter, the Director-General and the Board will subsequently be appointed by the Board to minimize the involvement of Government and secure the support of all stakeholders, particularly development partners.

<sup>72</sup> Does not include Environmental Inspectors or Environmental Officers based in the Counties and Districts.
As with FDA and EPA, LISGIS mandate is also extensive. Its main duties are to:

- Advise on all initiatives to collect data at all levels (locality/village/town, clan, district, county, regional and national) in the context of an integrated National Statistical and Geo-Information System;
- Review instruments for data collection developed for such initiatives including GIS data and maps, census and survey designs, questionnaires and concepts, definitions and nomenclatures to be used in conducting the said censuses and surveys, as well as the costs of such operations;
- Establish and manage, in collaboration with respective ministries, a National Master Sample Frame consisting of population census, enumeration areas, listing of households and a register of enterprises, as a key instrument for coordination of the National Statistical and Geo-Information System;
- Ensure that all surveys of enterprises and households and/or individuals will draw their respective sample from the National Master Sample Frame;
- Compile, update and publish a rolling National Integrated Program of Sample Surveys of Households and a National Integrated Program of Sample Surveys of Enterprises to be conducted by various components of the National Statistical and Geo-Information System;
- Conduct censuses and surveys;
- Collect routine administrative statistics;
- Collect, analyze and disseminate social, economic, environmental and national accounts statistics of internationally acceptable standard as and when required;
- Create, establish and manage the integrated National Statistical and Geo-Database;
- Organize, maintain and ensure free access to a central depository of data, statistical reports, spatial information products such as maps and geo-referenced list, publications and documents from both within and outside the country;
- Publish as its regular output a Monthly Statistical Bulletin, a Quarterly Statistical Digest, an Annual Statistical Abstract, an Annual Economic Survey and an Annual Statement of National Accounts as sources of official statistics on Liberia;
- Submit the Annual Economic Surveys to the Legislature at least a fortnight before presentation of the annual Budget of Government to provide background to the Budget for informed decision-making;
- Undertake research on and develop techniques and methods for production of statistics and Geo-Information Services;
- Establish a unified statistical service within the Government by facilitating and ensuring the creation of a statistical capacity in sector ministries, geographic administrations and other components of the National Statistical and Geo-Information System;
- Promote the use of appropriate information and communication technology (ITC) in statistical data and Geo-Information Services production process, dissemination and utilization;
- Promote the understanding and use of official statistics and Geo-Data through information, education and communication (IEC) strategies (such as workshops, seminars, symposia, print and electronic media, etc.) to ensure popular participation and national ownership;
- Promote and encourage the use of common and new concepts, methodologies, definitions, procedures, nomenclatures and standards, including geographic considerations and gender and development, in the collection, analysis and dissemination of statistical information, in order to
ensure integration of the National Statistical System as well as an integrated National Statistical Database;

- Accredit all professional statisticians desirous of undertaking any statistical research in the country;
- Support sectoral capacity to acquire, access, use and contribute to the National Statistical System and the integrated National Statistical Database;
- Develop for approval by the Board a public access to information policy;
- Notwithstanding legislation and regulations on national security, protect private citizens' right to privacy;
- Data produced by LISGIS should be provided free of charge to the Government of Liberia and its development partners. Provisions for cost of data products will be established to ensure cost-recovery; and
- Perform such other functions as may be prescribed by the Board.

Current LISGIS capacity for the required collection, analysis, and standardization of data is limited. Strengthening LISGIS will enable the organization to fulfill its critical mandate of data collection, analysis and dissemination, and ensure that a strong statistical system will be in place as Liberia’s development partners begin to phase out their role. To address the capacity challenges of LISGIS, the UNDP National Information Management Center (NIMAC) project is presently implementing an exit strategy in which it will transition functions, staff, resources and assets into LISGIS. In addition, a UNHCR protection monitoring team, which has provided data collection support to the recently completed population census, will be available as a resource during the PRS period. Finally, a National Strategy for the Development of Statistics (NSDS) is being finalized to provide a comprehensive framework for the collection, processing and standardization of statistical data for the Liberia National Statistical System.

5.2.1.2 Ministries

Ministry of Agriculture

The Ministry of Agriculture—established in 1910—plans, administers, and supervises agricultural programs and provides extension services. It also trains local farmers in improved agricultural practices and provides farm inputs to increase food security. The Ministry conducts inspections and enforces rules and regulations governing the agriculture sector. The Ministry also implements agricultural programs, protects farmers’ interests, encourages investment in the agricultural sector, and monitors overall activities including the movement of agricultural commodities into and out of the country. It focuses on transboundary commodity movements that are intended for the consuming public, or use on farms, large plantations and the agribusiness sector in Liberia in collaboration with neighboring countries such as Sierra Leone, Guinea, Ivory Coast and other countries in the region. The Ministry also regulates the harvesting of botanical species by herbalists and other farmers as a part of shifting cultivation practices.

Department of Technical Services

The Department of Technical Services was formed in 1948. The Department works in food security, crops and animal production, and agrochemical sectors, as well as international trade in these commodities. Its mandate is to protect or prevent the introduction of insect pests and animal diseases and monitor activities with an ecological impact, including in the areas of agriculture, land use and human settlement, site selection, domestic energy use, use of fuel wood, deforestation, and sustainable ecological livelihoods. The National Quarantine and Environmental Services bureau within the Department is
responsible for regulating the importation and use of agricultural chemicals, including fertilizers and pesticides. It issues permits for the importation of agricultural chemicals and implements international conventions governing pesticides and chemicals. Unfortunately, it has no scientific testing facility and limited capacity to conduct field monitoring of agricultural chemical use.

**Bureau of National Fisheries**

The institutional framework for the management of fisheries and aquaculture is within the purview of the Ministry of Agriculture (MOA) through the Bureau of National Fisheries (BNF). The BNF was created by an Act of the National Legislature under the Natural Resources Laws of 1956 and charged with the responsibility of managing and developing fisheries and aquaculture in Liberia. The BNF is divided into 4 Units: Administration, Marine Fisheries, Aquaculture and Inland Fisheries, and Statistics and Research. A Coordinator assisted by a Deputy Coordinator heads the Bureau. The role of the BNF is to implement fisheries policy; formulate guidelines, rules and regulations to govern national fisheries and aquaculture for its planning, development and management. Presently, the BNF has a total of 64 staff members with only eight that have advanced degrees including: two (2) M.Sc. degree holders in Fisheries and Agronomy respectively; three B.Sc. degree holders in Management; two Associate degree holders in Agriculture; and one Diploma holder in Maritime Safety. BNF’s current staffing pattern is presented in Table 29 below.

<table>
<thead>
<tr>
<th>TABLE 29: STAFFING TABLE BUREAU OF NATIONAL FISHERIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Division</td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td>Marine &amp; Artisanal Fisheries Division</td>
</tr>
<tr>
<td>Aquaculture &amp; Inland Fisheries Division</td>
</tr>
<tr>
<td>Research and Statistics Division Section</td>
</tr>
<tr>
<td>Administration</td>
</tr>
<tr>
<td>Source: BNF data</td>
</tr>
</tbody>
</table>

Clearly, with such a limited staff, BNF will never be able to accomplish the mandate proposed under the draft fisheries policy and legislation.

**Ministry of Lands, Mines and Energy**

The Ministry of Lands, Mines, and Energy – established in 1972 – is responsible for developing Liberia’s mineral, water, and energy resources. It coordinates and regulates all mining activities, including iron, gold and diamonds and is responsible for issuing mining licenses. The Ministry is responsible for 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. Prior to the civil crisis, the National Energy Committee, housed in the Ministry, administered the energy sector. Currently, the energy sector is administered by the Department of Energy which consists of the Bureau of Hydrocarbons and the Bureau of Energy Technology and Policy Development.
Liberian Hydrological Services

Formerly housed at the Ministry of Public Works, the Liberian Hydrological Services is now in the Ministry of Lands, Mines, and Energy, under the direction of the Assistant Minister for Mineral Exploration and Environmental Research. Its mandate is to serve as a research organization in water management, environmental management and air quality. The Division is charged with conducting hydrometric measurements and publishing hydrological data for Liberia (i.e., the flow and concentration of water within a given area and how it affects species within that area). It provides technical support to other agencies, giving advice on the design and location of water works and the availability of water for hydropower development. It served as the focal point for the development of the National Integrated Water Resources Management Policy, which has been sent to the Cabinet for its approval.

Ministry of Planning and Economic Affairs

The Ministry of Planning and Economic Affairs was formerly part of the Ministry of Agriculture’s Department of Statistics. It became a Ministry in 1961. It serves as a direct link among Liberian government institutions, private and non-profit organizations, and international organizations. It is responsible for providing guidance to government institutions in preparing development programs and projects; reviewing proposals for new development programs and projects; and reviewing progress made on development programs and projects. It also certifies all qualifying NGOs.

The Division of Environmental Planning’s mandate is to assist all institutions involved with the protection of the environment by helping to ensure that all national policies and guidelines concerning environment, natural resources and biodiversity remain within national boundaries. It also helps collect and analyze biodiversity data, especially those collected by EPA.

Ministry of Internal Affairs

The Ministry of Internal Affairs administers the affairs of all government functionaries in Liberia, oversees the activities of all local bodies, such as chiefdoms and clans, and supervises all County Superintendents.

Ministry of Health and Social Welfare

The Ministry of Health and Social Welfare coordinates and administers all general health services in Liberia, including preventive services; collects health statistics; ensures drug availability; and monitors events and conditions affecting public health. It also maintains statistics from birth and death registrations. Through its Division of Environmental and Occupational Health, the Ministry has the mandate to assess “the environmental health of the population” and to regulate and monitor environmental impacts resulting from pollution of air, water, food/feed, and soil, all categories of wastes, sewage, occupational health and chemical safety. The Division had a water quality laboratory prior to the war, but it does not exist anymore.

Ministry of Public Works

The Ministry of Public Works is responsible for the installation of infrastructure required for waste management delivery services, including solid waste collection and disposal and storm sewers.

5.2.1.3 CORPORATIONS, COMPANIES AND BOARDS

Liberia Water and Sewer Corporation

The Liberia Water and Sewer Corporation oversees the generation and distribution of water to the public and maintaining a supply of safe drinking water. It is also responsible for providing for wastewater
collection and disposal and as such constructed and maintained sewers and wastewater treatment facilities prior to the civil disturbance. At the time of this report, however, no sewers or wastewater treatment facilities were functional in Liberia.

**Monrovia City Corporation**
The Monrovia City Corporation was first created as Commonwealth District in 1833. A legislative Act of 1973 abolished the Commonwealth District and created the Monrovia City Corporation, giving it all municipal rights including the management of municipal waste, and the provision of environmental health and sanitation.

**Municipalities**
The Public Health Law of 1975 granted municipalities the responsibility of ensuring clean and sanitary environmental conditions on the territory under their respective jurisdictions. They are thus responsible for sanitation activities including wastewater collection and disposal and the cleaning, collection and disposal of generated solid waste.

**Liberia Electricity Corporation**
The Liberia Electricity Corporation was created in 1973 to generate, transmit, distribute, and sell electricity throughout the country at reasonable rates. In July 2006, electricity was restored to parts of Monrovia for the first time in fifteen years.

**Liberia Petroleum Refining Corporation**
The Liberia Petroleum Refining Corporation oversees the processing of crude oil into finished petroleum products for the Liberian market.

**5.2.1.4 THE UNIVERSITY OF LIBERIA**
The University of Liberia was established in 1862 as Liberia College and became a university through a charter granted by the legislature in 1951. It is the oldest degree-granting institution in West Africa and is the leading educational establishment in Liberia for producing graduates in the areas of Forestry and Environment. The College of Agriculture and Forestry offers a four-year course leading to a Bachelor’s degree in General Forestry, but with no environment specialization option. There is also a degree offered in Wood Science and Technology. Enrollment in General Forestry is increasing. In 2007 only nine students graduated, but the number is expected to be higher in 2008. There are currently about 18 full and part-time faculty teaching forestry.

The curriculum, currently focused on silviculture and timber management, is being revised to include the new national priorities in forestry, especially wildlife management and community forestry. Capacity to teach biodiversity and conduct research is low at present. The herbarium, an essential tool for plant taxonomy and inventory, was destroyed during the war and has not been rebuilt. Resources for teaching other biodiversity studies are similarly lacking. The University currently lacks a GIS laboratory, and GIS is not currently listed as a course option. In addition to The College of Agriculture and Forestry, course relevant to natural resources management are taught in the College of Science and Technology Biology Department, courses in geology, soils, botany and zoology. However, most of the graduates of these courses are destined for medicine and mining.
5.2.2 NATIONAL AND INTERNATIONAL NONGOVERNMENTAL ORGANIZATIONS

A number of nongovernmental environmental organizations (NGO), both domestic and international, are active in Liberia. A brief description of these organizations along with their key activities is presented in Tables 30 and 31 below.

**TABLE 30: DOMESTIC ORGANIZATIONS**

<table>
<thead>
<tr>
<th>Organization</th>
<th>Activity Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Association of Environmental Lawyers (Green Advocates)</td>
<td>Founded in 2001, Green Advocates is Liberia’s first and only public interest environmental law organization. It is dedicated to protecting the environment, advancing human rights protection and advocacy through sound environmental policies, and giving voice to rural, indigenous, and tribal peoples who have been denied the benefits of natural resource extraction from their tribal and ancestral lands. Green Advocates works to build strong environmental laws, enforce existing laws, and empower citizens to participate in environmental decision-making.</td>
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<tr>
<td>Center for Environmental Education and Protection (CEEP)</td>
<td>CEEP promotes environmental education, public awareness, and sustainable development through environmental workshops and seminars in schools and communities. It also conducts youth-oriented programs in health education, as well as environmental consultation.</td>
</tr>
<tr>
<td>Enviro-Link, Liberia LTD</td>
<td>Enviro-link connects individuals and communities to the environment through advocacy, awareness, education, training, and research. It also participates in environmental impact assessment in cooperation with EPA and other government institutions.</td>
</tr>
<tr>
<td>Environmental Relief and Development Research Organization (ERADRO)</td>
<td>ERADRO promotes rural extension services to address health problems linked to environmental factors. Its activities include environmental research, community organization, public education on health and hygiene, and waste disposal programs in schools and communities.</td>
</tr>
<tr>
<td>Grand Gedeh Community Servant Association (CECOMSA)</td>
<td>Based in southeastern Liberia, the Grand Gedeh Community Servant Association (GECOMSA) focuses on community-based sustainable wildlife management initiatives, including environmental education and public awareness campaigns about bush meat consumption.</td>
</tr>
<tr>
<td>Save My Future Foundation (SAMFU)</td>
<td>The Save My Future (SAMFU) Foundation was founded in 1987 with the mission of facilitating and promoting sustainable community-based natural and human resources management and development. SAMFU launched an independent forest monitoring campaign in the timber industry in 2000 in collaboration with its international partners for the purpose of investigating and reporting the high wave of unsustainable logging activities that was carried on by the Oriental Timber Company and other multinational corporations, the industry’s contribution to the exacerbation of the civil crisis and its associated human rights abuses in rural communities. This investigation led to the publication entitled “Plunder: The Silent Destruction of Liberia's Rainforest” in 2002 which pointed an international spotlight and sparked a major debate about the contribution of the timber industry to the prolongation of the Liberia crisis at the time. Currently, SAMFU runs three core programs: the Liberian Forest and Human Rights Campaign, the Peace Building and Community Development Program, and the Marine Sea Turtle Program. This latter is supported by the U.S. Fish and Wildlife Service (USFWS) with the objective of promoting the long-term survival of sea turtles, including the sustained recovery of depleted stocks, taking into consideration the integrated well-being of residents of coastal communities with which they interact.</td>
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<tr>
<td>Organization</td>
<td>Activity Areas</td>
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<tr>
<td>Society for Environmental Conservation (SEC)</td>
<td>The Society for Environmental Conservation’s (SEC) objective is to increase community awareness of Liberia’s rich biological sites from both a conservation and sustainable planning perspective. SEC works in the areas of alternative energy, biodiversity, climate change, development, ecotourism, environmental education, environmental justice, forests, global warming, sustainable agriculture/farming, watersheds, wetlands and wildlife protection, using a variety of methods from lobbying and advocacy to formal education methods and organizing grassroots actions.</td>
</tr>
<tr>
<td>Society for the Conservation of Nature in Liberia (SCNL)</td>
<td>Founded in 1986, SCNL is the oldest environmental NGO in Liberia. Its conservation projects include the creation and maintenance of protected areas, wildlife conservation, biomonitoring, and the use of socioeconomic surveys. With support from Forest Partners International and the Philadelphia Zoo, SCNL carried out a project on bush meat and species conservation from 2002-2004 that included a planning workshop, a media campaign, and a post-campaign survey of public opinion. They are the local partner for Birdlife International (BI), and have conducted bird inventories in several forest areas, and produced a list of priority bird sites for Liberia that is available online on the BI website. Currently, with funding from Birdlife Netherlands and a private foundation, SCNL is looking at bird flyways and alternative sources of income in the Lake Piso area.</td>
</tr>
<tr>
<td>Sustainable Development Institute (SDI).</td>
<td>Established in 2002, SDI focuses on the forestry sector with the aim of stimulating public debate, influencing policy development, and enhancing local and international understanding of the issues surrounding forest management in Liberia. It was heavily involved in the drafting of the new Forestry Law and remains active in the development of rules and regulations governing forest management. It produced the document “So Who Owns the Forest – An investigation into forest ownership and customary land rights in Liberia”. Most of their current activities are focused on community involvement and land tenure issues. SDI will be monitoring the implementation of the community involvement requirements for timber concessions and providing communities technical support as they go through the pre- and post-concession processes provided for in the Forestry Law. SDI also plans to continue its role as an independent monitor of FDA’s forest management activities and of the implementation of concession requirements. SDI's activities have been and are funded by IUCN-Netherlands, EC, DFID, FERN, ICCO (the Dutch-based Interchurch Organization for Development Co-operation), and several private foundations.</td>
</tr>
<tr>
<td>The Skills and Agricultural Development Services, (SADS)</td>
<td>SADS is a not-for-profit and non-governmental organization that was established in March 1998 in Montserrado County through the needs of restoring Liberia to its pre-war status by group of University students. Since then, SADS has collaborated with local authorities, national NGO’s, International NGO’S, Government and Diplomatic Mission in Liberia. SADS has work both in rural and urban communities in Liberia. SADS implements a wide range of education and developmental programs designed to improve social services, in areas such as sustainable ecosystem management, water and sanitation, Human Rights, general agriculture, biological research and survey, gender equity, HIV/AIDS awareness education, food security and livelihoods incomes generation alternative skills.</td>
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<tr>
<td>Organization</td>
<td>Activity Areas</td>
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<tr>
<td>ActionAid</td>
<td>ActionAid works to reduce poverty through assistance to farmers and rural communities. ActionAid’s started working in Liberia in 1996 and through 2002, concentrated its efforts around urban and suburban areas as rural areas were no longer safe. After 2002, ActionAid began working on food security to restore people’s livelihoods after the war. Programs included distribution of seed and tools, development of farm families, and helping women to find ways of making an income. Currently ActionAid works in gender, HIV, governance at all levels, youth and education, and emergencies. ActionAid is partnered with Conservation International around Sapo National Park with the Civilian Conservation Corps (CCC) program, improving incomes from agriculture as an alternative to hunting in the Sapo N.P.</td>
</tr>
<tr>
<td>Conservation International (CI)</td>
<td>Conservation International (CI) applies innovations in science, economics, policy, and community participation to protect plant and animal diversity around the world. CI established its office in Liberia in 2002 and is working with the Government of Liberia to set up a network of protected areas. Through its Center for Applied Biodiversity Science, CI has worked with FFI to complement the Liberia Forest Reassessment Project. CI, through its Critical Ecosystem Partnership Fund, has established a small grant fund for domestic NGOs (the Liberia Conservation Action Fund), and is currently working on establishing a Liberia Protected Area Trust Fund through debt for nature swaps and use of logging tax revenues to provide funding for protected areas and the communities around them. Sapo National Park is an important focus for CI, including rebuilding the park headquarters and infrastructure, equipping rangers and establishing the CCC program to fund community development around Sapo. CI is currently building country capacity to deal with forest-carbon partnerships.</td>
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<tr>
<td>Environmental Foundation for Africa (EFA)</td>
<td>In response to the improving political situation and transition from humanitarian interventions to development, the Environmental Foundation for Africa (EFA) is working with the United Nations Environment Program (UNEP) and High Commission for Refugees (UNHCR) to incorporate environmental management into their operations. Other major EFA activities in Liberia include environmental education, livelihood training in tree nursery management, agroforestry, and domestic energy conservation with an emphasis on war-affected populations. EFA is also a member of the Alliance for Conservation in Liberia which aims to protect the key species and ecosystems in Liberia by harmonizing activities among international and Liberian NGOs.</td>
</tr>
<tr>
<td>Environmental Law Institute (ELI)</td>
<td>The Environmental Law Institute (ELI) is an independent, non-profit research and educational organization based in Washington, DC. The Institute serves the environmental profession in business, government, the private bar, public interest organizations, academia, and the press and works to strengthen environmental protection by improving law and governance worldwide. Since 2004, ELI has provided legal analysis and drafting guidance to Liberians as a core member of the Liberia Forest Initiative. As part of the LFI group, ELI has worked closely with in-country partners and international donors to help Liberians craft a forestry law that provides for the sustainable and beneficial use of Liberia’s forest resources.</td>
</tr>
<tr>
<td>Fauna and Flora International (FFI)</td>
<td>An active international NGO in Liberia, Fauna and Flora International (FFI) seeks to conserve threatened species and ecosystems worldwide, choosing solutions that are sustainable, based on sound science and that take account of human needs. Since 1997, Fauna &amp; Flora International has made Liberia the central pillar of its West African program. In 2001 FFI was the first international environmental group to establish an office in the country. FFI has played a significant role in supporting the National Transitional Government of Liberia and was responsible for preparing three landmark environmental laws – the expansion of Sapo National Park, creation of the Nimba Nature Reserve, and reform of Liberia’s National Forestry Law. FFI has served as a partner in the Liberia Forest Reassessment (“LFR”) Project, and assisted the LFR in developing a Geographic Information Systems laboratory (GIS) for improved forest management analysis and planning. Currently, FFI intervenes at two levels in Liberia: (i) establishment of an improved management structure at Sapo National Park and empowering rural Liberians by establishing communal forests; and (ii) reviewing and adapting national forestry sector legislation to incorporate and balance community, conservation and commercial interests.</td>
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<tr>
<th>Organization</th>
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<tbody>
<tr>
<td>Liberia Environmental Watch (LEW)</td>
<td>Liberia Environmental Watch (LEW) is a nonprofit, non-governmental organization located in Maryland serving as an advocate for Liberia’s environmental management towards national sustainability. LEW is devoted to achieving maximum environmental soundness through educational awareness, ensuring the protection of the environment [water, air, forest, land, and wildlife] and preserving as well as conserving natural resources now on the brink of extinction. LEW provides educational and public awareness for the benefit of Liberian residents and will collaborate with the nation’s higher institutions of learning and community-based organizations, the business community, local and national governmental, including International Agencies and other NGOs for such national endeavors.</td>
</tr>
<tr>
<td>The World Conservation Union (IUCN)</td>
<td>IUCN’s work in Liberia centers in River Cess and Sinoe counties (Liberia) and focuses on: i) reviewing land tenure arrangements to help ensure that reforms in the forest and land use sectors are responsive to the legal and actual tenure arrangements in forest lands; ii) building the capacity of local NGOs and community organizations to more effectively engage in the delivery of national priorities, with particular reference to the ongoing process of forest sector reform; and iii) in co-ordination with the Liberia Forest Initiative and the Liberian Sustainable Development Institute (SDI), produce materials and organize capacity building activities to lay a basic foundation of knowledge on forest governance issues, particularly as they pertain to community rights and poverty reduction. IUCN is also the lead organization undertaking the World Bank funded Strategic Environment Assessment (SEA) of Liberia’s forestry sector.</td>
</tr>
<tr>
<td>NGOs in Fisheries and Aquaculture</td>
<td>The assessment report of the fisheries sub-sector identified 14 NGOs that are active in the development of artisanal fisheries and aquaculture. 10 NGOs are involved in small-scale aquaculture development in the following counties: Maryland, Bong, Lofa, Montserrado, Bomi, Grand Gedeh, and Nimba. 4 NGOs are involved in artisanal fisheries development in Bassa, Bong, Montserrado, and Nimba Counties. 1 NGO is involved in inland fisheries research. International NGOs include Conservation International, Samaritan’s Purse, Lutheran World Service, German Agro-Action, CARITAS, Catholic Relief Services, Solidarite and Asur-Liberia Inc. The FAO is also implementing aquaculture projects in Bong, Nimba and Lofa Counties.</td>
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5.2.3 INSTITUTIONAL ISSUES AFFECTING THE GOL’S CAPACITY TO ADDRESS THREATS TO TROPICAL FORESTS AND BIODIVERSITY

The activities of Liberia’s government institutions are constrained by a number of factors, ranging from too few and inadequately trained personnel and lack of basic infrastructure to lack of coordination and cohesion. As a result, many unmet needs exist in the areas of infrastructure and administration, human resources, information and data collection, finances, and enforcement. Although addressing these needs will require considerable additional resources, these resources will be essential to enable Liberia’s government institutions to fully carry out their mandates with respect to environmental and natural resource management.

Particular issues with respect to the capacity of Liberia’s government institutions to protect biodiversity are presented below.

5.2.3.1 Dependence on Foreign Expertise and Resources

Currently, there are a number of international organizations operating in Liberia, several of which play significant roles in the country’s development. These groups often belong to major international networks that afford them access to resources and expertise far greater than those available to Liberia’s government institutions. While the assistance provided by these organizations has been invaluable, there is some risk that dependence on foreign expertise and resources – combined with a lack of investment in local capacity - may breed some resentment. For instance, local scientists and conservation professionals could become frustrated in the face of a lack of facilities, a lack of recognition at home and abroad, and a lack of
opportunity. As a result, some of the most experienced and qualified Liberian professionals end up working for the better funded international organizations than for Liberian institutions.

There is also some evidence which suggests that the limited capacity of some government institutions restricts them from being able to act outside the areas of interest of their international partners. Indeed, the search for scarce resources has forced some institutions to neglect core programs and mandates in favor of developing proposals and activities which respond to donor agendas and “flavor of the month” programs.

Finally, the pace of reform among Liberia’s environmental institutions has been high and multiple new concepts have been introduced by the NGO and donor community. Although concepts such as chain of custody, carbon financing, trust funds, community/collaborative management etc., are valid, they are often outside of agency strategic plans and when taken together they place extraordinary demands on agency technical staff in terms of incorporating these concepts into their daily work plans.

5.2.3.2 Infrastructure and Administration
Liberia’s long running civil war decimated much of the country’s infrastructure, including government facilities, and severely disrupted many government functions. In the aftermath of the conflict, the country’s ministries face severe shortages with respect to office space, equipment, and supplies. The lack of reliable electricity means that for at least part of the working day the staff in government institutions cannot use any electronic equipment.

**Environmental Protection Agency**
EPA does not have a central computer on which it can collect and store data and information. Several of its key staff is working with old computers or with their own personal computers. Although EPA has assigned Environmental Inspectors to eight counties, it only has office space for these employees in three of the counties. Only five of the county “offices” have vehicles (motorcycles) and even then, there are not enough motorcycles for all of the inspectors in those counties. None of the county “offices” have computers or printers or communications equipment, nor are the inspectors provided with air time for their personal mobile phones. EPA has established a laboratory, but it is only capable of doing basic water quality analyses.

**Bureau of National Fisheries**
The BNF Director reports that decimated by the war, presently, the BNF is not able to fulfill its mandate. The BNF is ill equipped and lacks the capacity to monitor both inland and marine fisheries resources; there is only one BNF agent stationed up country to control artisanal fisheries activities on the St. Paul river (and he has no means of transportation), and there are no boats to monitor and control marine activities. The role of the BNF has now been limited to licensing control and fisheries statistical data collection. The BNF does not have budgetary allocation to support its activities around the country, including training of its personnel, data collection and analysis, providing extension services to fish farmers and artisanal fishing communities, research in fisheries and aquaculture, monitoring of the fishing grounds and regulation of fishing activities.

5.2.3.3 Human Resources
Another area requiring attention at the institutional level is staff availability and development. Lack of qualified staff is a problem in all of the institutions involved in environmental management and protection of biodiversity in Liberia. Of the staff that is working in these institutions, many lack training and qualifications necessary for doing their jobs. Liberia currently possesses little institutionalized expert capacity in environmental and biodiversity management and the fundamental science to support it,
including taxonomy, environmental engineering, environmental science, land-use planning, and Geographic Information Services (GIS).

Although Liberia can provide vocational and higher-education training in agriculture and forest management, more extensive training in conservation biology, conservation, taxonomy, environmental science, environmental engineering, and land-use planning is not available.

With the exception of FDA, none of the line agencies have established and staffed the environmental units required by EPA Act. Some institutions, like the Ministry of Lands, Mines and Energy, have included environment in the portfolio of a manager (e.g., the Assistant Minister for Mineral Exploration and the Environment in the Ministry of Land, Mines and Energy) but they have not actually created and staffed an environmental unit.

Finally, to the ETOA Team’s knowledge, there has been no recent strategic assessment of capacity gaps within the lead environmental agencies to specifically identify what type of capacity building needs to take place and where it should be done. Pending such an assessment, some brief ETOA Team recommendations are presented below.

**Environmental Protection Agency**

The EPA has produced a “Terms of Reference” that reflects its minimum estimate of what staff is needed in the Agency. Of the 31 positions for environmental professionals in the headquarters office, only 16 (less than 50 percent) are filled. Many of the environmental professionals have minimal experience in their assigned field. EPA does not have even one environmental engineer on its staff. Only 8 of the 15 counties have Environmental Inspectors, and many of them do not have the minimum educational requirements for the position, as stated in the Terms of Reference.

EPA’s staff is just beginning to receive Project Briefs, Environmental Impact Assessments, and Environmental Management Plans. The number of these documents arriving at the Agency will only increase in the coming months and years. Yet the staff of EPA has only had minimal training in environmental impact assessment and review. Short term training in this area should be a priority for both the GOL and donors.

**Forest Development Authority**

In terms of both donor and GOL resources, among FDA’s “3Cs”, the commercial forestry sector has received by far the most attention and understandably so. Currently, the conservation aspect has been receiving an increasing amount of attention but lags far behind the commercial sector. Community forest management, however, is by far the least developed in terms of available resources, conceptual frameworks and practical implementation.

As FDA begins to shift its focus from commercial forestry to conservation and community forestry, there is a critical need for capacity building in both conservation and in community-based natural resource management (CBNRM) and collaborative management (CM). In terms of conservation, FAO’s Wildlife Conservation Issues Paper makes several recommendations for developing wildlife training and skills for FDA staff in particular. These include establishing a partnership with the University of Liberia’s College of Agriculture and Forestry, to assist university graduates in obtaining PhDs in wildlife management abroad so that they can help set up a Department of Wildlife Management at the university upon their

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return, as well as the sending of trainees to wildlife schools in Tanzania (College of African Wildlife Management) or Cameroon (Wildlife School) to teach them more about wildlife management in preparation for working in Liberian protected areas. Another option is to bring instructors from these schools to Liberia to teach classes in law enforcement, wildlife legislation, and anti-poaching.

In terms of community forestry and community-based natural resource management, key areas for strengthening include:

- Participatory learning and planning processes such as participatory rural appraisal (PRA), community mapping and adaptive collaborative management and participatory action research;
- Facilitation skills to enable free and open participation of the communities and to identify different levels of participatory decision making;
- Participatory land use planning;
- Partnership development and management (linkages with communities, local authorities, tribal elders, other line agencies, NGOs etc.);
- Organizational and development skills for community organization (electing committees, developing constitutions, leadership, preparing technical and financial reports); and
- Documentation and analysis of lessons learned to share experiences and feedback into policy and legislation.

Formal and informal training in the above areas could be supplemented with study visits to the Gambia and Guinea Conakry where joint forestry department-community management of the forest estate has become the preferred method of managing forest and biodiversity resources.

*Bureau of National Fisheries*

Human resources and law/regulation enforcement capacity at the BNF are almost non-existent. There is an acute shortage of trained personnel in key disciplines including statistics, resource management, fisheries economics, fishing technology, aquaculture and extension.

**5.2.3.4 Information and Data Collection**

Liberian government institutions are also facing shortages of scientific information pertaining to biodiversity and environmental management.

Availability of tabular and spatial environmental data has been compromised as a result of the civil war. For example, hydro-meteorological monitoring was disrupted as a result of the conflict. Many of the sensors and related technologies used to harvest data on a regular time step were destroyed or looted. Human capital required to record these data and integrate them with central databases was seriously compromised. The physical infrastructure that housed these systems along with their operators was severely damaged in many locations. Hence, there are significant gaps with respects to these and other environmental data. Data that does exist is typically in an analog or paper format which limits external investigator access. Relevant environmental data that resides in antiquated filing systems unaffected by the conflict remain largely inaccessible to the outside world. Digital data cataloging systems that can be inventoried by external clients can greatly foster information exchange.

Land cover baselines are being re-established by the FDA allowing for on-going change detection and related environmental monitoring. The 2008 census was just released by LISGIS when plotted on a map
these data can be related to possible pressures levied on environmental resources. Other Liberian partner agencies such as Conservation International (CI) are conducting spatial assessments of key land resources and associated changes. The ETOA data collection process involved travelling to important protected areas and documenting key findings specific to environmental threats and opportunities. Coordinate data were taken using a Global Positioning System (GPS) together with high resolution photos. These coordinate data along with their related attribute information that describe the environmental threat/opportunity and photo images can be integrated with other environmental data such as those produced by the FDA or CI to provide a degree of validation regarding certain events identified through direct observation. This process is valuable to explaining why certain change related to environmental is occurring.

Bureau of National Fisheries
The BNF Director reports that fisheries catch data collected by the BNF does not have national coverage and the data is often inaccurate and cannot be analyzed and interpreted into useful management tools.

5.2.3.5 Enforcement
The policies and regulations discussed in Section 5.1 above generally provide a sound policy and regulatory environment for environment and natural resource management in Liberia. However, the existence of comprehensive policy and legal provisions means little without a corresponding willingness and ability to implement and enforce these provisions. One of the key challenges facing biodiversity and environmental protection and management in Liberia is the lack of enforcement of the existing laws. There are several reasons for this. First, Liberia’s civil conflict, and the resulting shortages in staffing, supplies, and equipment described above have limited the ability of most GOL agencies to actively implement law enforcement operations. Second, given the post conflict situation and new mandates, there seems to be a certain hesitancy among environmental agencies to enforce laws given current socio political and economic interests and concerns. Finally, new agencies such as the EPA are only getting their feet on the round in terms of enforcement and older agencies such as the FDA “do not have a strong history of enforcing its laws and legislation”.

Environmental Protection Agency
Although the EPA Act and the EPM Law authorize the creation of many regulations, rules, standards and guidelines, and provide for penalties for violation, EPA has not officially promulgated any of these, so enforcement is not possible. For three areas, the EPA Act and the EPM Law themselves provide sufficient language for enforcement:

- Environmental impact assessment;
- Environmental restoration orders; and
- The prohibition on dumping of solid waste.

However, even in these three areas the ability to enforce is questionable, in that neither the Environmental Administrative Court nor the Environmental Court of Appeals has been established. Although the 2003 EPA Act provides for the establishment of an Environmental Administrative Court and Environmental Court of Appeals (Sections 33- 34), these courts have not yet been created. At least some infractions are currently handled through existing courts, though it is unclear how effectively they are resolved.

74 From the results of the draft Strategic Environmental Assessment ranking questionnaire of consolidated issues.
Establishment of the environmental courts envisioned in the 2003 EPA Act may greatly enhance the ability of government agencies to enforce biodiversity laws and regulations, by providing for a specialized venue with substantive expertise.

**Forestry Development Authority**

Interviews with FDA representatives indicate that enforcement in Sapo National Park is severely hampered mainly because of political and economic interests in the area’s gold, animal and timber resources. Although a joint FDA UNMIL operation evicted them in 2006, FDA estimates that there are currently over 6000 artisanal gold miners in the Park\(^7\) who have reestablished the “Iraq” and "Afghanistan” enclaves complete with additional video entertainment halls, restaurants and other “services.” Although the FDA intends to mount another operation to evict the miners and accompanying loggers and commercial bush meat hunters, more effort needs to be placed on addressing the political issues around Sapo, and garnishing political support at all levels for better protection of the area.

The absence of a law enforcement division within the FDA also appears to hamper enforcement efforts. Currently, law enforcement responsibilities are located in the Managing Director’s office but actual enforcement in the field (at least in Nimba and Sapo) is done by conservation rangers under the direction of the Conservation Department, and in collaboration with local courts. The relationship between law enforcement at FDA headquarters and day to day enforcement activities in the field is not clear.

**5.2.3.6 Overlapping Mandates**

Although there are many examples of overlapping institutional mandates, the situation between EPA and FDA is perhaps the most relevant. The Environment Protection and Management Law contains some provisions which appear to be in conflict with the Forestry Law, which gives FDA primary authority for management of forests and protected areas. All of these provisions include the phrases, “the Agency [EPA] shall, in consultation with the relevant Line Ministry”. The first phrase seems to give the EPA the authority to act, with second phrase requiring only that the EPA consult with the Line Ministry before acting. Examples of these incidents are as follows:

- Section 75, subparagraph 3 of the EPML gives EPA authority to declare rivers, lakes, or wetlands as protected areas and impose restrictions on the management of those areas;
- Section 77 subparagraph 1 of the EPML gives EPA authority to “issue guidelines and prescribe measures for the sustainable use and protection and management of all forests in Liberia”;
- Section 77 subparagraph 3 of the EPML gives EPA authority to “define and designate communal forests and establish guidelines for [their] management and use”;

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\(^7\) Mainly in Zones 2 and 3. Zone 1 around park headquarters has been relatively problem free.
• Subparagraph 7 of Section 77 authorizes EPA to declare “specially protected forest areas” in which human activity is prohibited;

• Section 79 subparagraph 1 gives EPA authority to declare “any area of land, river, lake, wetland, or coastal zone as a protected natural environment for the purposes of promoting and preserving specific ecological processes, natural environmental systems, natural beauty or places of indigenous wildlife or the preservation of biological diversity in general.” Subparagraph 2 gives EPA authority to promulgate guidelines for the management of these protected areas;

• Section 80 provides for the declaration, upon completion of an Environmental Impact Study by EPA, of “wildlife protected areas” (consisting of national parks, wildlife reserves, nature reserves, or any other areas) and “wildlife management areas” (consisting of wildlife sanctuaries, community wildlife areas, or any other areas), and charges EPA with prescribing measures necessary for wildlife management in these areas; and

• Under Section 84, EPA must promulgate guidelines for the conservation of biological resources in-situ, including the “selection and management of protected areas” and “selection and management of buffer zones near protected areas”.

It might be useful for agencies to establish an ongoing consultation process for the development and enactment of regulations governing areas of overlapping mandates. This would ensure that agencies do not unintentionally usurp one another’s roles, even when their activities target the same sectors.

5.2.3.7 Institutional Collaboration

Another important aspect of institutional capacity involves collaboration on environment and natural resource issues among government institutions, NGOs, and industries, and donors. Such collaboration helps to resolve problems resulting from sectoral conflicts and overlapping jurisdiction. It is particularly important for Liberian government agencies to coordinate their actions with respect to activities such as mining, agro industrial plantations and logging, all of which pose threats to the environment, forests and biodiversity. The EPA Act, EPM Law, and the National Forestry Reform Law all call for inter-agency and stakeholder collaboration in environmental protection and natural resource management.

Currently, a number of government institutions collaborate on a formal and informal basis with other groups. The Ministry of Agriculture monitors the movement of flora and fauna, as well as the use of chemicals, in partnership with a wide range of ministries and the Monrovia City Corporation. FDA receives assistance for park patrols from Flora and Fauna International (FFI) and Conservation International (CI), and has collected data in protected areas in collaboration with CI and the Society for the Conservation of Nature in Liberia (SCNL). The Ministry of Lands, Mines, and Energy serves as Chair of EPA’s Board of Directors, while the Ministry of Planning and Economic Affairs collaborates with UNDP, UNEP, and some local NGOs, and most international organizations.

Despite progress, some complications exist with respect to cooperation among government institutions and between government and NGOs.

Coordination Across Government Institutions

In terms of coordination across government institutions, nearly all SEA stakeholders cited the need to increase coordination between FDA, EPA and the Ministries of Agriculture and Lands, Mines and Energy. Examples that illustrate the need for improved collaboration include:
• Logging and mining on the same tract of land and the separation of mining claim holders from that of forest concession holders;

• Competing land uses being considered by different government agencies for land proposed as protected areas, and the absence of a common land use policy between FDA, MOA and LME (e.g., Wolofizzi mountain range has been designated for protection by FDA while MLME has granted exploration licenses for BHP Billiton; similar problems exist for Lake Piso and the Putu mountains in Sinoe; and

• Granting agricultural concessions without or with limited reference to FDA (e.g., Equatorial Biofuels request for 500,000 ha of in River Gee County for rubber plantations which happen to fall within the proposed Grebo protected area.

What is less clear at this point is what the most appropriate mechanism or mechanisms might be to foster improved coordination. Options range from forming an interministerial coordinating committee or seeking donor support for a National Environmental Action Planning (NEAP) process.  

**Coordination Between NGOs and Government**

There are several examples that illustrate the need for improved coordination between NGOs and the GOL:

• Although the Ministry of Planning issues certificates of accreditation to qualifying NGOs, some officials noted that NGOs fail to cooperate with the Ministry after they receive their accreditation;

• According to some FDA officials, despite the fact that FDA works with environment and development NGOs, the agency is often not given access to these groups’ reports or recommendations. Additionally, in the case of East Nimba Nature Reserve, boundary demarcation was led by one conservation NGO without the participation of FDA and the local communities, resulting in a myriad of problems which have not been resolved to date; and

• The BNF Director notes that international NGOs are implementing fisheries (aquaculture) projects without the knowledge and involvement of the Ministry of Agriculture and the BNF. The NGOs are registered with the Ministry of Planning but not with the Ministry of Agriculture. Neither the Ministry of Agriculture nor the NBF is in the know as to the activities and scope of operations of the NGOs.

In light of such problems, it may be helpful to convene agencies and NGOs at a conference to discuss how to better coordinate their activities.

**Donor Coordination**

Improved donor coordination in the environment/natural resource sector is becoming increasingly important in Liberia in light of the increased volume of aid, proliferation of projects, and the administrative weaknesses of the GOL noted above. The proliferation of projects was made evident to the ETOA Team shortly after its arrival in country; nearly one in four people interviewed mentioned projects that were in various stages of preparation, approval or implementation, but little documentation was available for any of these proposals. Moreover, there is no central location in Liberia where project information can be found. This issue has been recognized by the key donor coordinating body within the forest sector—the Liberia Forest Initiative—and discussions are now underway within LFI to reformulate a NEAP.

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76 Supported by the World Bank and USAID during the late 1980s and early 1990s NEAPs have been instrumental in many African countries as a mechanism to better define, clarify and coordinate institutional mandates and promote policy an legislative harmonization. Unfortunately, as a result of the civil conflict, Liberia was never able to undertake a NEAP.
its role after the lifting of U.N. sanctions and to define new mechanisms of cooperation and coordination. In this context, at least in the short term, LFI should consider expanding its membership to include EPA and take on the donor coordination role for environment, forest and biodiversity programs. This would include the development of an environment/natural resource project database.

**FDA Internal Collaboration**

Whether a result of the policy or a result of management, the three C’s at FDA have essentially been compartmentalized, with little collaboration between departments. Commercial forestry focuses on logging concessions, community forestry focuses on community forests, and the conservation department focuses on national parks. In the field, however, the line between the responsibilities of these departments becomes rather blurred. Wildlife occurs in all forests, not just national parks. And as the FDA is beginning discover, the line between Timber Management Contract Areas and community forest are not that clear, and potentially could become a major source of conflict between the communities and FDA.

**5.2.3.8 Financial Support**

The lack of direct financial support is the root cause of most of the institutional limitations already identified. Government institutions currently receive their funding from a range of sources, including the Government of Liberia itself, bilateral and multi lateral donors—mainly “projectized,” and certification fees from local NGOs. Revenue for some forest management activities is also generated through the imposition of stumpage, land rental, and Forest Product fees (Section 14.2(b)), a portion of which is allocated for operational costs of the Protected Forest Areas Network.

Funding for alternative incomes and community compensation is particularly problematic, since the amounts involved are likely to be large for programs to be effective. The 2008 Forest Act provides for communities around logging concessions to receive 30% of the land rent from these concessions. Communities around protected areas are supposed to receive support through alternative incomes, yet the incomes generated from activities such as the Civilian Conservation Corps project (CCC) fall short of the income generated from illegal activities such as illegal timber harvesting and gold and diamond mining.

Another crucial issue to tropical forest and biodiversity protection is the funding of strictly protected areas. In forests managed for extractive uses, the management and community compensation can be funded through concession rents and taxes on forest products, as outlined in the 2006 forestry law. No such funding mechanism exists for strictly protected areas, and neither FDA nor conservation organizations have directly addressed this problem. Funds are needed for the large number of salaried staff and the infrastructure to manage protected areas, liaise with communities and work with visitors.

Funding is also needed for alternative livelihoods and community compensation for loss of forest use. It is clear that the Government is committed to supporting the protected area network, and FDA currently has 28 salaried staff in Sapo National Park alone. However, this staffing is supplemented by an equal number of local “volunteer staff”, paid by FFI. This staffing model is common in West Africa, with conservation NGOs supporting national parks with additional staff and infrastructure. It seems likely that a partnership of FDA and foreign donors/NGOs will continue to be needed in future to support existing strictly protected areas and future expansion of the network. Revenues from ecotourism are likely to remain negligible for the foreseeable future, since Liberia has very poor tourist infrastructure, few tourists and is competing with the numerous other rain forest national parks being created across Africa and worldwide.
Although most donors are hesitant to provide direct funding because of transparency issues\textsuperscript{77}, such funding would no doubt strengthen the capacity of Liberian government agencies to implement their mandates with respect to environmental and natural resource protection and management.

\textsuperscript{77} The Liberia Governance and Economic Management Assistance Program (GEMAP) is expected to address this issue. GEMAP is a partnership between the Government of Liberia (GOL) and the international community that seeks to build a system of economic governance to promote accountability, responsibility and transparency in fiscal management so that Liberia’s resources will be used in the interests of its citizens.
6.0 STRATEGIC OPTIONS FOR ADDRESSING UNDERLYING THREATS TO BIODIVERSITY, FORESTS AND ECOSYSTEMS

Drawing on the threats, policy and institutional analyses from the preceding sections, this section examines underlying threats to biodiversity, forests and ecosystems and proposes strategic options for addressing these threats.

6.1 DEVELOP ALTERNATIVE FINANCING MECHANISMS

The lack of direct financial support is a major cause of most of the institutional limitations identified in Section 5.2.2 above, and a major underlying cause of threats to the environment. Liberia’s civil conflict and the resulting shortages in staffing, supplies, and equipment have limited the ability of most GOL agencies to implement their mandates. Although GOL budget contributions should increase as logging, mining and other concessions are granted, it is unclear whether FDA and EPA core budgets will increase proportionally relative to their mandates. In sum, the absence of alternative funding sources—particularly for the implementation of field activities - will curtail Liberian government agencies ability to implement their mandates with respect to environmental and natural resource protection and management over the longer term. Thus, the development of alternative funding sources will ensure that Liberian government agencies will be able to implement their mandates with respect to environmental and natural resource protection and management over the longer term. Strategic options include:

- **Operationalize EPA’s National Environmental Fund.** The EPA Act provides for the creation of a National Environmental Fund. The National Environmental Fund is to be used to fund activities undertaken by EPA, line ministries, and County and District Environment Committees to meet the objectives of the EPA Act. It is to be funded by the national budget, fees and fines collected by EPA, and donor support.

- **Operationalize a Conservation Trust Fund.** CI is currently working on establishing a Liberia Protected Area Trust Fund through debt for nature swaps and use of logging tax revenues to provide funding for protected areas and the communities around them. Donors should consider providing sufficient resources to this fund in order to ensure its effective capitalization and long term sustainability. However, the ETOA Team would recommend that any eventual trust fund not be restricted to strictly protected areas but to national and community forests as well.

- **Oblige mining companies –via concession agreements - to provide for biodiversity offsets.** Biodiversity offsets - conservation activities that intend to compensate for the residual and unavoidable harm to biodiversity caused by economic development activities such as mining - are widely seen as a useful tool for managing the adverse impacts of such activities. The potential benefits of biodiversity offsets include:

  - Undertaking projects that might not otherwise be possible;
Promoting better relationships with local communities, government regulators, environmental groups and other important stakeholders;

- Providing a practical tool for managing social and environmental risks and liabilities;

- Creating an opportunity to influence emerging environmental regulation and policy;

- Reducing the costs of compliance with environmental regulations; and

- Providing a mechanism to encourage companies to make increased contributions to biodiversity conservation, without necessarily requiring elaborate new rules.

Offsets could be used to support both the National Environmental Fund and the Liberia Protected Area Trust Fund.

Monetized PL 480 funds. For USAID, monetized PL 480 funds (Title XII) represent an opportunity to provide direct support to GOL institutions. In countries such as Uganda and Rwanda, monetized PL 480 funds have been used very successfully to support a wide variety of conservation activities both in park and out of park, from infrastructure development to road and trail maintenance and boundary marking. Such funds are jointly managed by Government and USAID (usually a contractor through a grants management unit) and misuse of funds is uncommon.

6.2 BUILD CAPACITY

Practically everyone interviewed by the ETOA Team—expatriate and Liberian alike—cited lack of capacity as the major underlying cause of environmental degradation. Yet ironically, there are very few donor activities that incorporate a formal capacity building component; most provide only some combination of on the job training and study visits. Options for providing long term training are expensive; advanced degree programs in the U.S. cost about $50,000/year per participant. Rehabilitating and reinvigorating the University of Liberia will also be an expensive proposition but one that will be critical to the future of Liberia. Pending resolution of these issues, the ETOA Team suggests that the GOL mandate any donor activity over a certain level of funding to include a formal, longer term capacity building component.

In the short term, capacity building in the environment/natural resource sector needs to focus on law enforcement. To this end, two actions are required:

- Establish and build the capacity of both the Environmental Administrative Court and the Environmental Court of Appeals. Although the 2003 EPA Act provides for the establishment of an Environmental Administrative Court and Environmental Court of Appeals (Sections 33-34), these courts have not yet been created. At least some infractions are currently handled through existing courts, though it is unclear how effectively they are resolved. Establishment of the environmental courts staffed by a trained judiciary will greatly enhance the ability of government agencies to enforce biodiversity laws and regulations, by providing for a specialized venue with substantive expertise; and

- Establish and Build the Capacity of a Law Enforcement Division within the FDA. The absence of a separate law enforcement division in the FDA appears to hamper enforcement efforts. A separate law enforcement division or department complete with separate field enforcement personnel reporting directly to the division director would bring FDA in line with the majority of other African conservation/forestry organizations while eliminating the confusing dual role of a conservation ranger being responsible for both enforcement and community/conservation activities.
6.3 INCREASE COMMUNITY AWARENESS OF THE NEW INTEGRATED FOREST POLICY AND LEGISLATION

The problem of weak capacity for law enforcement is exacerbated by the fact that many communities/resource users were unaware of the new integrated forest policy and legislation. Although FDA maintains that they have made every effort to consult with communities on the new legislation, the SEA team, during the course of their stakeholder consultations, found that there is relatively little awareness on the details of the new forest legislation and policy and overall lack of understanding of the 3C approach to forest management. The SEA team also found that there is a general lack of conceptual clarity on community and conservation forestry and an overall lack of understanding of the rules and procedures regarding community decisions on issues such as allowing land for logging and no clarity on what actual decision-making powers have at the local level regarding forest management decisions.

Although the ETOA Team believes that FDA did make sufficient effort to increase community awareness, we suspect that the complex nature of the legislation made both communicating by the FDA and understanding by the communities all the more difficult. This is particularly true for the draft community rights legislation. In short, if someone doesn’t know or understand the rules, you cannot expect them to obey them.

In this context, there is a clear need for a high level environmental education and awareness campaigns on the new forest act combined with a concerted effort to train and mentor community activists, elected local leaders, and some paramount chiefs and members of parliament on principles of the act to encourage informed dialogue, transparency, accountability, responsibility, and leadership in the management of Liberia’s natural resources, and enhance the level of active community participation required to build effective conservation programs.

6.4 ADOPT AN ADAPTIVE APPROACH TO POLICY DEVELOPMENT

This strategic option is related to the above. Liberia’s environment/natural resource policies are based on the assumptions that reality is manageable and that the future is predictable. This view has resulted in ‘technical’ solutions to environment/natural resource 'problems', including overly comprehensive and "unimplementable" legislative mandates. Complicated policies and legislation result in poor understanding and contribute to difficulties in enforcement. The net result of this technical approach is that the majority of policies and associated acts are far removed from the reality they are trying to influence.

The ETOA Team would suggest that a more helpful way of viewing policy development is to approach policies and legislation as 'social experiments' that take into account the underlying uncertainty and the necessity of trial and error in order to learn. Experiments also take into account that the unexpected may occur, and that both problems and solutions may have to be redefined along the way. Policy-making then becomes less a matter of prediction and implementation, and more a matter of questions and discoveries. This approach links to wider FDA concerns about the importance of continuous learning, flexibility, and opportunities for local ownership of the policy process.

6.5 MANAGE LIBERIA’S FORESTS BASED ON THEIR HOLISTIC VALUE

There is little appreciation of the economic value of NTFPs (including bushmeat) – either by the communities or by the FDA - in terms of the restrictions posed by the protected areas, community access
to NTFPs in logging concessions or an acknowledgement that NTFPs are also a source of economic benefits from forests and wetlands. In most instances, FDA focuses on curtailing negative practices with regard to hunting and the bush meat trade rather than on positive economic ventures that could be properly regulated. In general, forest communities view commercial logging as the sole indicator of economic value or activity in the forest sector and feel that to derive economic benefit from the sector they need to be involved in commercial logging.

Moreover, at the institutional and policy level there has been relatively little work done on NTFPs and there are no estimates of the importance of NTFPs to the national economy or whether there is a regional trade in NTFPs. There has also been relatively little development of national and international markets for NTFPs.

The situation is similar for ecosystem services; no attempt has been made to value the role of Liberia’s forests in watershed protection, carbon storage, etc.

In sum, the ETOA team would argue that FDA needs to take a more holistic approach and consider the total economic value of the forests when implementing the 3Cs. Holistic management, which accepts that humans are part of nature and that it is possible—through sound decision-making and monitoring—to improve the health, biodiversity and productivity of the forest, would enable FDA to better: i) understand forest resources and their value; ii) develop products and services that allow society to capitalize on their financial attributes; and iii) manage them sustainably to generate long-term financial and conservation value.

6.6 PROMOTE EQUAL COMPENSATION FOR EQUAL LOSS

The Forest Act provides a scale for community compensation in timber concession areas. Timber concessionaires will pay a land rent to the government and although the official value has not been published, unofficial sources suggest that it will be about $US 2.50 per ha per year. Communities will receive 30% of this, with a similar amount going to the counties. Using these figures, a community with 5000 ha in a timber concession could receive about $US 3750 annually for community development and still maintain any hunting and NTFP rights they have in that forest.

Communities that live around strictly protected areas, however, receive no compensation for the loss of rights to forest products but are expected to make up the difference through GOL and donor supported alternative livelihood programs. Unfortunately, the few alternative livelihood programs that exist in Liberia, have had very limited success; the livelihood options presented to communities by these programs cannot compete with incomes gained from illegal logging, the bush meat trade or diamond and gold mining. A major part of the reason for this is that the livelihoods offered are based on an assessment of what communities “want to do” rather than any kind of value chain analysis of several subsectors to identify products and services that show the greatest potential for increasing household income, and what elements along the value chain—from access to technical information and capital to market access - act as barriers to alternative livelihood development.

The ETOA Team believes that a community losing rights of forest use in a strictly protected area should be compensated at least as highly as timber concession communities. To this end, the ETOA Team recommends that:

- All alternative income activities around strictly protected areas be based on a value chain analysis prior to implementation; and
• Pending development of viable alternative livelihood programs, FDA consider establishing a compensation plan for communities around strictly protected areas using existing resources or those of any eventual conservation trust fund.

6.7 MOVE QUICKLY TO RESOLVE LAND AND RESOURCE TENURE INSECURITY

Poverty, land, and the environment are inextricably linked. The rural poor of Liberia depend almost entirely upon land and other natural resources for their livelihoods, including their food, fuel, shelter, water and medicines. Unequal access to and ownership of land and other resources have contributed significantly to economic and political inequities and environmental degradation throughout Liberia’s history, and have exacerbated tensions and conflict. The existing systems of land acquisition favor the wealthy and the elite. Women in particular have had limited land and resource rights.

Customarily, forests are an integral part of community property and this itself is surprisingly well defined in discrete land areas held by each village (town) or by clusters of towns referred to as clans or chiefdoms. However, the status of forest ownership under national law is unclear and is contradictory with customary law, and people and the state are at odds as to who owns the forests and how the use of forests should be regulated. There are not yet any established mechanisms for linking these two structures in one legal system that protects the rights of all property holders. This limits investment in rural areas held under customary systems, makes local communities potential targets for land or resource grabbing, and provides a major disincentive to for communities and individuals to protect and sustainably manage the natural resource base.

The need for and importance of rapidly developing a land tenure policy is becoming increasingly critical, not only for forestry issues but for the country as a whole. The final outcome of the work undertaken by an eventual Land Commission will have major implications for the relationship between the FDA and the forest communities and the way that forests are managed. Indeed, this relationship already appears to be turning sour. A July 31, 2008 NGO coalition press release states that:

“The Coalition is also concerned that the Government’s decision to allocate three contracts for forest in Bokomu and Gou Nwolaïla Districts violates the rights of the communities in those districts. In a resolution[4][4] presented to county officials, in the presence of the FDA Managing Director and other senior official, a representative of the UN Mission in Liberia, as well as representatives of several logging companies, these communities made it clear that they would resist any attempt to log in their area without their consent. By refusing to address the communities concerns, the FDA is creating a situation that will pitch the communities against the companies that have been granted contracts in the area. This is a dangerous precedent and could backfire with serious consequences, including conflicts between the loggers and those communities.”

6.8 DEVELOP A STRATEGY TO ADDRESS THE COMPROMISES BETWEEN ENVIRONMENT AND ECONOMIC DEVELOPMENT

Sustainable development is based on the notion that growth strategy should take into account environmental and social concerns, as well as the efficient management of resources to achieve long-term prosperity. This concept has been endorsed by the international development declarations and their
initiatives, starting with the Rio Summit in 1992 and the World Summit on Sustainable Development in Johannesburg in 2002, and finishing with the recent launch of the Millennium Development Goals (MDGs).

Although Liberia’s Poverty Reduction Strategy (PRS), addresses environmental concerns such as harmonizing the New Minerals and Mining Law (NMML) with the Forestry Law with respect to mining concession rights and protected zones, environmental issues are relegated to an annex and with “exploitation of Liberia’s abundant natural resources” as the “major driver of poverty alleviation in the PRS implementation period and beyond.” Moreover, none of the three basic prongs to Liberia’s growth strategy - rebuilding roads and other critical infrastructure; reviving the traditional engines of growth in mining, minerals, forestry, and agriculture; and establishing a competitive business environment to help diversify the economy over time—address sustainability issues. Finally, none of the PRS’s five pillars—Consolidating Peace and Security, Revitalizing the Economy, Strengthening Governance and the Rule of Law, and Rehabilitating Infrastructure and Delivering Basic Services make reference to the environment or sustainability.

Without a strategy that specifically addresses tradeoffs between the environment and economic development, the ETOA Team is concerned that economic development—in the form of mining, forestry and agro industrial concessions will continue to take precedence over the environment as they have done in the past. To this end, GOL and donor support for UNDP-UNEP’s Poverty and Environment Initiative is critical.

### 6.9 LAY THE GROUNDWORK FOR IMPROVED URBAN AND RURAL LAND USE PLANNING

In Liberia, urban land-use planning and zoning regulations at the national or county level are virtually non-existent, and the PRS only makes passing reference to both urban and rural planning. Yet the absence of urban land use planning in combination with Liberia’s burgeoning post conflict economy and increased population have overwhelmed the originally planned area for many urban centers. As a result, landfills for human habitat have destroyed hundreds of hectares of mangroves, while increased beach erosion due to unregulated and unplanned beach mining is destroying both animal and human habitat. Clearly, the GOL (the Monrovia City Council-MCC and EPA) needs to develop an urban land use policy and zoning regulations and should seek donor support for this initiative via the World Bank’s Emergency Infrastructure Supplemental Component and/or Japan International Cooperation Agency’s (JICA) work in assisting MCC to develop a Monrovia Master Plan for water provision and waste disposal.

Although the fragmentation of Liberia's forests is relatively low, most of Liberia’s remaining forests are readily accessible. This ease of accessibility suggests that the present low habitat fragmentation rate could increase if land use/conservation planning is not effectively implemented to maintain internal and transboundary wildlife corridors. Using GIS, the USDA Forest Service under LFI has developed suitability models and maps for commercial forestry, conservation/preservation, and community forestry including the design and delineation of commercial forests, community forests, and protected areas.

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78 The “Land and Environmental Policy” section under this pillar deals primarily with land tenure issues, and not sustainability.
The second phase of this assessment has not as yet been implemented and should be considered as a priority for the GOL/LFI. The second phase would lay the groundwork for an eventual national land use plan by:

- Compiling available information on deeded lands, tribal lands, and any other preexisting land encumbrances and mineral deposits and occurrences;
- Acquiring GIS data on mineral deposits and occurrences;
- Creating detailed maps of all land use areas;
- Delineating new national forest boundaries;
- Evaluating commercial forestry areas for appropriate designation, e.g., “concession”, “timber sale contract”, etc.;
- Evaluating protected areas for appropriate designation, e.g. “National Park”, “Strict Nature Reserve”, etc.;
- Identifying protected “corridors” to interconnect protected areas; and
- Demarcating/surveying land use area boundaries.
7.0 CAPACITY OF USAID TO ADDRESS
THREATS WITHIN EXISTING PORTFOLIO

7.1 CURRENT USAID STRATEGY AND ELEMENTS
In 2005 USAID/Liberia developed a new post conflict strategy statement covering the period 2006-2009 to better align its strategy with the Africa Bureau’s strategic framework, Liberia’s transitional priorities and what other donors are doing. This strategy oriented programming to establish the conditions necessary for transformational development to take place through two goals: 1) avert and resolve conflict and 2) manage crises and promote stability, recovery, and democratic reform. USAID’s FY 2006 Operational Plan has four strategic objectives (SO) for FY 2007:

- **SO: 669-007 Reinforce African Conflict-Mitigation Capacity**
  - Mitigate Conflict and Support Peace
  - Support Populations at Risk

- **SO: 669-008 Increase Access to Essential Services**
  - Achieve Equitable Access to Quality Basic Education
  - Improve Child Survival, Health & Nutrition
  - Reduce Transmission & Impact Of HIV/AIDS
  - Support Family Planning

- **SO: 669-009 Advance Inclusive Governance**
  - Strengthen Civil Society
  - Strengthen Public Sector Executive Function
  - Strengthen the Justice Sector
  - Strengthen the Legislative Function/Legal Framework

- **SO: 669-010 Restore and Maintain Basic Economic Activity and Livelihoods**
  - Expand & Improve Access To Economic & Social Infrastructure
  - Improve Sustainable Management Of Natural Resources & Biodiversity
  - Protect and Increase the Assets and Livelihoods of the Poor

Under these SOs, USAID/Liberia continued to support and reinforce community conflict mitigation capacity and establish the necessary social and economic conditions to facilitate reintegration and the rehabilitation of infrastructure; increase access to improved education and health services; advance inclusive governance through improved public sector transparency and accountability, re-inculcate the rule of law, and increase the effectiveness of civil society to monitor the government, advocate reforms
and resolve conflicts; and restore and improve basic economic activity and livelihoods with attention to improved agriculture and better management of natural resources.

In 2007, with the advent of transformational diplomacy and operational plans, USAID consolidated its activities into four major programs:

**Community Revitalization and Reintegration**
This program aids in the transition from relief to development by helping communities create economic opportunities to reintegrate internally displaced people, ex-combatants, and the general population affected by the war.

**Governing Justly and Democratically**
This program is helping to build a more representative and competitive multi-party system by supporting political party development, electoral systems, and preparations for local and municipal by-elections. Civil society organizations receive support to increase their public advocacy activities related to elections, corruption, conflict mitigation, and human rights. Through the Governance and Economic Management Assistance Program (GEMAP), USAID helps create the necessary policy conditions for the economy to grow.

**Economic Growth: Agriculture, Energy, and Infrastructure to Reintegrate Communities**
This program focuses on conservation of protected areas; the rehabilitation of smallholder tree crop farms of rubber, cocoa, and oil palm; livestock provision; and training in business and marketing skills including micro-credit and small enterprise initiatives. PL480 Title II Food for Peace funds provide a non-emergency food aid program for vulnerable groups and school children at risk of dropping out of school. In cooperation with the USDA Forest Service, USAID is providing support to improve policies on natural resource management and increasing the transparent and legitimate use, ownership, and commercialization of timber, mineral, fisheries resources and the protection of Liberia's unique biodiversity. USAID supports an Emergency Power Program to extend electricity to sections of the capital city and longer term power generation throughout the country.

**Investing In People: Education**
Major investments in education under this program are aimed at increasing school enrollments and improving the quality of education through teacher training and the provision of needed equipment, material and infrastructure rehabilitation. The program also provides support for vocational training to promote workforce development in potential growth areas. The program also works with universities to help them become more effective higher learning institutions.

**Investing In People: Health**
USAID supports public and nongovernmental providers to deliver a basic package of essential health services to under-served areas of the country. Other USAID health sector support contributes to national health planning, training of health professionals, and refurbishing facilities. Due to the high incidence of malaria, Liberia is a focus country for the U.S. President's Malaria Initiative. Under the President's Plan for AIDS Relief (PEPFAR), Liberia will receive significant support for bilateral HIV/AIDS programs in FY 2008, with programmatic emphasis on a range of interventions related to care, treatment, and prevention.

Currently, the Mission is transitioning from the above post conflict/emergency relief strategy and programs to a more development-oriented one. And the Economic Growth team, which encompasses
natural resource management and biodiversity activities, is crafting a new strategy to reflect the changing times\textsuperscript{79}. The section which follows reviews a cross section of current USAID activities mainly under Economic Growth (Agriculture, Energy, and Infrastructure) and assesses their impact on and existing and potential capacity to address threats to tropical forests and biodiversity.

\section*{7.2 CURRENT PORTFOLIO}

\subsection*{7.2.1 FORESTRY AND BIODIVERSITY}

\textbf{The Liberia Forest Initiative (LFI)}

The Liberia Forest Initiative (LFI) originated in early-2004 as an initiative led by the US State Department to provide coordinated support to the Liberian forestry sector. It engaged a number of U.S. government agencies, including the USDA Forest Service, US Agency for International Development and the US Treasury Department, as well as non-governmental organizations such as Conservation International and the Environmental Law Institute. Later in 2004 and 2005, several multilateral organizations, including the World Bank, the European Commission (EC), the Food and Agriculture Organization (FAO), the International Monetary Fund (IMF) and the World Conservation Union (IUCN) joined the initiative, giving the LFI partnership a strong multilateral and multinational character.

The purpose of the Liberia Forest Initiative (LFI) is to promote and assist reforms in the Liberian forestry sector that will allow for transparent management of forest resources and to ensure that these resources are used for the benefit of the Liberian people. LFI’s objectives are to reform the institutional and financial management of the Forest Development Authority (FDA); establish transparent forest management contract allocation, administration and fee payment mechanisms; develop an appropriate legal framework for contract management; and increase democratization in forest management.

The USDA Forest Service spearheads the LFI by providing day-to-day program support, training and technical assistance to the FDA.

LFI has been instrumental in developing Liberia’s commercial forestry sector and has made many notable accomplishments, the most important of which was the work leading to the lifting of U.N. Security Council timber sanctions on June 20, 2006.

\textit{Discussion}

There are no direct or indirect negative environmental impacts from this activity, and LFI’s work in commercial forestry has undoubtedly contributed to reducing illegal logging, at least in terms of forestry concessions/management contracts. LFI’s impact on biodiversity has probably been neutral, as to date, LFI has (understandably) accorded little attention to the other 2 Cs – conservation and community forestry - either within the timber management contract areas, or other elements of Liberia’s protected area network. LFI is now in the process of reformulating its role and is expected to place greater emphasis on conservation and community forestry.

\textbf{Civilian Conservation Corps (CCC)}

Conservation International, with ActionAid, is currently implementing the Civilian Conservation Corps project, a 16 month pilot program aimed at providing development benefits that are connected to the

\textsuperscript{79} This new strategy is only in its preliminary stages and was not made available to the ETOA Team.
protection of Sapo National Park. A total of six communities around Sapo have been mobilized and organized and have collectively determined their own conservation and development objectives. Through the CCC, these communities receive development projects, skills training and service provision in exchange for participating in conservation activities and upholding the rule of law around the park. The CCC also creates employment opportunities and jump-starts productive economic activities such as agriculture, livestock rearing and agroforestry. CI and ActionAid use an incentive based approach based on signing community agreements that benefit biodiversity and local people and where the provision of benefits (in this case development projects) is conditional on conservation performance. These agreements are monitored throughout the life of the project and project implementation modified accordingly.

Successes for the CCC program include: establishing Community Development Committees; initiating dialogue between FDA and communities including some environmental education; helping communities to create a list of development priorities; developing model contracts for communities to refrain from hunting in the park in exchange for development assistance; creating a few small business through the fast track projects of the first year; and creating a process for small development grants in six villages around the park, including small ruminant (goats and pigs) programs.

Discussion
There are no direct or indirect negative environmental impacts from this activity, although it can be argued that the introduction of goats around a national park could have a detrimental impact on forest regeneration. The ETOA Team believes that the biggest issue with CCC is the fact that the incentives/alternative income programs offered to the communities cannot compare or compete with income earned from illegal activities (mining and commercial bushmeat). The fact that many of these initiatives are based on community desires and not market-based, value chain led alternatives appears to contribute to the problem. Although there are no data (CCC or otherwise) to support this conclusion, the ETOA Team believes that this program has had only a very modest impact in reducing threats to Sapo National Park.

Land Rights and Community Forestry Program (LRCFP)
Implemented by ARD Inc, LRCFP’s goal is to advance the policy and practice of land and forest management in forest-dependent Liberian communities through the introduction of adaptive management and learning-based approaches in rural areas of both Nimba and Sinoe counties. The LRCFP also supports capacity building for national and county level institutional partners.

Specifically, the LRCFP works to improve the legal and policy environment for land tenure and property rights through:

- Support to the FDA and its partners in the development of a law governing community access rights to forests and the regulatory framework required to implement it; and

- The provision of technical assistance to the new national Land Commission to assist it in the development of key policies, regulations and processes to establish more transparent, equitable and technically sound land tenure and property rights systems in Liberia particularly as these affect community management of forests.

The program is also working to build the capacity of communities and their governmental and non-governmental partners to develop, manage and support community forestry programs and land tenure and property rights reforms through:
Improved access to justice and adjudication mechanisms to resolve conflicts related to land and property rights;

Improved public understanding of property rights and responsibilities and increased knowledge; and

Use of mechanisms to access natural and financial resources by the target beneficiaries.

The LRCFP is seeking to develop community forestry as an environmentally sustainable and economically profitable activity through:

- Improved local capacity to implement and manage community forestry programs;
- Increased opportunities for marketing of wood and non-wood forest products through targeted market studies and value chain analyses; and
- Establishment of greater economic linkages between smallholders, communities, markets and private sector investors.

Additionally, USAID and ARD are currently negotiating a small grants program add on to the LRCFP targeting conservation and economic development activities in Nimba and Sinoe counties.

**Discussion**

There are no direct or indirect negative environmental impacts from this activity. Although only in its initial stages of implementation, through its assistance to FDA in serving as a mediator in boundary demarcation of East Nimba Nature Reserve, is already showing evidence of helping reduce threats by reducing FDA-community conflict. The LRCFP’s mediation approach focuses on helping communities develop a vision for natural resource management, sharing information in an open and transparent manner, and a willingness to listen more than talk.

The LRCFP’s targeted market studies and value chain analyses of commodities including swamp rice, cassava, livestock (pigs), tree crops (coffee and cocoa), vegetables, timber forest products (furniture making), and non timber forest products should lay the groundwork for future alternative income activities that can compete with illegal ones.

The LRCFP is also conducting a capacity needs assessment for FDA’s community forestry division and results from this assessment should provide much needed guidance in moving the community forestry agenda forward.

Finally, the small grants program represents an opportunity for USAID to give the LRCFP a focus on the conservation side of community forestry with programs that directly meet Biodiversity Earmark requirements.

**Liberia Governance and Economic Management Assistance Program (GEMAP)**

The Liberia Governance and Economic Management Assistance Program (GEMAP) is a partnership between the Government of Liberia (GOL) and the international community that seeks to build a system of economic governance to promote accountability, responsibility and transparency in fiscal management so that Liberia's resources will be used in the interests of its citizens. Through the GEMAP framework, Liberian institutions and international partners are putting systems in place to ensure that the funds from Liberia’s institutions and natural resources flow into the government, that the government manages those funds well and transparently, and spends it effectively on rebuilding the country.
GEMAP provides financial controller to FDA whose task is to work directly with the FDA Financial Controllers (FC) and the FDA Managing Directors (MD), and exercise binding co-signatory authority on all financial commitments (including contracts, concessions and timber sales) entered into on behalf of the FDA. Specifically, the GEMAP financial controller:

- Ensures that all procurement, payments, commitments, transfers and obligations made on behalf of the FDA to both domestic (Government and commercial) and external customers/suppliers/other partners/employees etc., are processed in a fully accountable and transparent manner and are undertaken in accordance with internationally recognised accounting practices;

- Ensures that all revenues generated or earned by the FDA in respect of goods and services provided to domestic (Government and commercial) and external customers/suppliers/other partners etc are fully booked in the records of the FDA and are banked into the FDA escrow accounts which are to be held at the Central Bank of Liberia;

- Has co-signatory authority and approves all financial transactions undertaken on behalf of the FDA; and

- Assists the FDA to improve transparency of their accounting systems, with special emphasis on revenue collection and management as well as expenditures.

Discussion

There are no direct or indirect negative environmental impacts from this activity. On the contrary, increased transparency and accountability at FDA have indirectly contributed to the conservation of tropical forests through better logging concession management.

Liberfor

Implemented by the Société Générale de Surveillance S.A. (SGS) in association with Helveta Ltd., LIBERFOR has a five year contract with the Forest Development Authority (FDA) of Liberia for the management of a nationwide system to monitor and verify forest logging and timber chain-of-custody across the territory of Liberia. SGS, as the prime contractor to the FDA, provides overall project management leadership, turnkey operations support, and capacity building to the institution for the project. Helveta, through its CI World™ supply chain management solution, provides database technology, software applications, and hardware components to operate the end-to-end traceability system. CI World will be used as the engine of the Chain of Custody Information System (COCIS), which will afford the FDA stump-to-market traceability for all timber products as well as data validation and integration with the government regulatory reporting framework. In this way, CI World will enable comprehensive timber supply chain control and revenue collection from the Liberian timber sector.

Discussion

There are no direct or indirect negative environmental impacts from this activity. On the contrary, by providing stump-to-market traceability, LIBERFOR and FDA should be able to better control the majority of illegal timber coming into the market once logging concessions are awarded and become operational.
7.2.2 AGRICULTURE

Sustainable Tree Crops Program (STCP)
Cocoa has traditionally been a key commercial and poverty reduction crop in Liberia. An estimated 28,000 hectares were planted with cocoa by 1987; however recent production levels average around 2,000-3,000 metric tons per year. Nevertheless, cocoa presents an opportunity to improve the livelihoods of farmers and providing a solid platform for rural development.

Implemented by the International Institute for Tropical Agriculture, STCP aims to reinvigorate Liberia’s cocoa sub sector through tree rehabilitation and improved management, replanting with appropriate planting material, improve marketing system, while increasing productivity on existing farms and discouraging expansion into forests. Program objectives include:

- Implementing technical packages to raise productivity and product quality;
- Strengthening community groups to interface with markets, enhance democracy and ensure sustainability;
- Developing efficient marketing options associated with relevant information systems; and
- Engaging public and private stakeholders to address policy and institutional constraints.

STCP uses a Farmer Field School approach in implementing the program, where farmers receive training on integrated crop and pest management, quality improvement, HIV/AIDS awareness, farm safety and the environment. STCP also trains farmer organization agents to provide support to cocoa cooperatives including the provision of support for the cooperatives’ organizational development plans. STCP has hosted several roundtables on extension options to support the Ministry of Agriculture as it develops extension policy and strategy. Roundtables and workshops were also held on topics related to the reestablishment of the Cooperative Development Agency, and actionable ways to develop the cocoa sector and promote it as an engine for poverty alleviation.

Discussion
There are no direct or indirect negative environmental impacts from this activity. Cocoa is shade grown on existing farms, usually under fairly older growth secondary forest. STCP does not intend to expand the program onto “new” land. Shade grown cocoa is generally recognized as being bird friendly and provides a favorable habitat for certain species of duiker (e.g., Maxwell’s duiker).

Although promoted as an alternative income activity and located around East Nimba Nature Reserve, there are no clear links between STCP and threat reduction in the Reserve, and there has been no monitoring program established to determine if such a relationship exists.

Technical Assistance and Support to the Ministry of Agriculture (TASMOA)
Implemented by ARD Inc., the TASMOA program’s goal is to help the Ministry of Agriculture lay the foundation for private sector-led agriculture and economic growth in Liberia and develop host country expertise to achieve agricultural sector reform. The TASMOA program provides direct technical support
to the Ministry of Agriculture to help the ministry to undertake an institutional analysis of the agricultural sector’s roles and responsibilities in Liberia as well as make recommendations on determining the roles and responsibilities of the Ministry and other government institutions, civil society groups, commercial entities, farmers, organizations and other stakeholders in this sector. Specific objectives include:

- Development of a sector-wide institutional management system framework;
- Development of clear qualitative mapping and categorization of the Ministry’s functions;
- Development of an investment strategy for the sector that includes capacity building of the Ministry and its related institutions;
- Quantitative analyses of recurrent costs and physical inputs associated with the current and projected functions of the Ministry and related institutions;
- Development of an organogram for the Ministry and sector institutions with defined cooperative processes and mechanisms with partners and other actors in the agriculture sector as well as functional descriptions of Ministry departments and divisions with basic job descriptions for new or modified job categories; and
- Preparation of documents for legislation, as they concern the adoption a national policy that will affect the future mandate and responsibilities of sector stakeholders, including the Ministry and related institutions.

Discussion: As TASMOA has no field operations, there are no direct or indirect negative environmental impacts from this activity. However, TASMOA is actively working with the MOA to promote swamp rice which may in the future have an indirect impact on shifting cultivation by reducing the area under upland rice.

Emergency Multiplication of Cassava Varieties

Implemented by International Institute for Tropical Agriculture (IITA) and in collaboration with the Ministry of Agriculture and the United Nations Food and Agriculture Organization this program purchases improved cassava varieties from the International Institute for Tropical Agriculture and multiplies germplasm at the Central Agricultural Research Institute (CARI) for broad distribution to farmers throughout Liberia.

Discussion

There are no direct or indirect negative environmental impacts from this activity.

Livelihood Improvement for Farming Enterprises (LIFE)

Funded by the United States Department of Agriculture (USDA) and implemented by ACDI/VOCA, LIFE’s objective is to improve the livelihoods of 5,600 cocoa farmers. ACDI/VOCA and its partner the International Institute of Tropical Agriculture’s Sustainable Tree Crops Program (STCP) are addressing the constraints in the cocoa value chain and mitigating smallholders’ livelihood risk by encouraging the diversification of their revenue sources. LIFE targets Bong, Nimba and Lofa counties. ACDI/VOCA and STCP are using the proceeds from the monetization, or sale, of 9,300 MT of parboiled rice and wheat flour to implement program activities including farmer training, nursery tree rehabilitation, market access and access to credit.
Discussion
As with the STCP, no direct or indirect negative environmental impacts from this activity are anticipated. However, it should be noted that USDA does not require an IEE for this activity although ACDI/VOCA was required to address environmental issues during the course of proposal development.

Liberia Oil Palm Value Chain Assessment and Project Design
 Implemented by Winrock International, the objectives of this program are to assess current oil palm production and processing capacity, identify the strengths, weaknesses, opportunities, and threats relative to the sector, technically and institutionally. Specifically the program will:

- Identify, discuss and recommend lessons learned and best practices from within Liberia and elsewhere in the region;
- Identify those interventions that will most effectively increase the capacity of the oil palm sector to benefit significant numbers of smallholders, input suppliers (e.g., seedling and processing equipment producers) and processors;
- Identify and assess the feasibility of oil palm processing options, including cost-benefit analysis against volumes;
- Identify local private and public partners as well as consultants to carry out the interventions identified; and
- Develop a project monitoring and impact assessment plan (showing how the project is affecting increasing numbers of smallholders, manufacturers, and input suppliers to increase income) to facilitate decision making and determine whether project targets are being met.

Discussion:
This is a new activity and the ETOA Team was not able to meet with Winrock to assess potential environmental effects of this activity, particularly with regard to expansion of the oil palm industry into forested areas.

7.2.3 ENERGY

Liberia Energy Assistance Program (LEAP)
Implemented by the International Resources groups (IRG), LEAP’s goals are twofold: to increase access to affordable and reliable energy supplies in order to foster economic, political and social development in Liberia; and to support transparent policy reform processes and energy sector regulatory regimes. LEAP was launched in October 2006 and is a follow on and complimentary program to the Emergency Power Program (EPP) launched in July 2006 to restore public electricity supply. Whereas EPP is focused on short-term delivery of electricity power in Monrovia, LEAP is focused on long term sustainable delivery of energy services to the whole country. LEAP activities are organized around four major tasks:

- Energy Sector Reform: This is the anchor LEAP task whose principal objective is to build local capacity for developing and implementing policies and laws that will ensure the sustainable development and delivery of reliable energy services that are accessible by all citizens in urban and rural areas.
- Build upon the Emergency Power Program (EPP): The principal objectives are to coordinate EPP and LEAP activities to avoid wasteful duplication of effort and resources and to use the EPP extension as a
special LEAP pilot project for building local capacity for coordinated planning and development of major power generation, transmission and distribution facilities.

- **Urban Community Development Pilot:** The principal objective is to build the capacity for sustainable delivery of energy services to the urban population. The pilot projects support the policy reform task by providing lessons required to build the capacity for sustainable delivery of energy services to the urban population. The principal issues to be addressed include appropriate technology, metering, billing, revenue collection, electricity theft control and the general issue of affordability by the urban poor.

- **Improved Rural Energy Services:** The principal objective is to build the capacity for the sustainable delivery of energy services to the rural population. The rural pilot projects support policy reform by providing lessons required to build the capacity for the sustainable delivery of energy services to the rural population. In addition to the same issues identified for the urban areas, the principal issues to be addressed for rural energy services include appropriate technologies to deal with remoteness and environmental protection and the need for prioritizing energy interventions that support income generating activities.

IRG is also subcontracting the National Renewable Energy Laboratory (NREL) to conduct a biomass resource assessment for Liberia. The purpose of this activity is to identify key biomass resources available in the country that can be used to provide sustainable energy resources. The study will estimate the quantity and illustrate their geographic distribution. The following feedstock categories will be included: cereals, starchy and sugary crops, oilseeds, cellulosic material (crop and forest residues), municipal solid waste, and animal manure. Specifically, the study will:

- Assess the biomass resources currently available in the country, and estimate the quantity that could be collected in a sustainable manner to support power generation and/or biofuels production;

- Assess the potential to develop biomass resources based on environmental and socio-economic conditions; and

- Discuss environmental issues such as deforestation and loss of biodiversity that can be associated with increased use of biomass resources and/or land use change.

**Discussion:**
There are no direct or indirect negative environmental impacts from this activity. However, the biomass study and accompanying analysis of environmental issues such as deforestation and loss of biodiversity should provide the Mission and the GOL with the information required to make rational decisions about supporting/expanding biofuel initiatives in Liberia.

### 7.2.4 INFRASTRUCTURE AND WORKFORCE DEVELOPMENT

**Liberia Community Infrastructure Program II (LCIP II)**
The Liberia Community Infrastructure Project (LCIP) is an ongoing, four year project, funded under two sequential task orders, both awarded to DAI. LCIP II is currently funded through October 2008. DAI is one of the holders of the Managing African Conflicts IQC.

USAID/Liberia’s reintegration program played a key role in the success of infrastructure activities related to the President’s 150-day deliverables project. Under LCIP I, the program provided psycho-social counseling and reconciliation activities in over 792 communities in 8 counties; employment opportunities provided to 24,615 ex-combatants and war-affected persons; and rehabilitation of five administrative
buildings, nine schools, and four health centers. Fifteen schools also benefited from a deep well borehole program. Additionally, DAI/LCIP rehabilitated 10 roads, 4 bridges and constructed 24 latrines. Project results include employment creation; strengthening of national government’s capacity and governance; and capacity building of local construction firms.

LCIP II builds on the experiences and successes of the first phase of LCIP, which was essentially a post-conflict relief effort focused on demobilizing and disarming ex-combatants, providing urgent relief to war-affected populations, rehabilitating small-scale community infrastructure, and preventing new outbreaks of conflict. By contrast, LCIP II is a transitional program to move from post-conflict relief to longer-term development. Among the overall goals of LCIP II are to support ongoing efforts to establish and consolidate a durable peace and create conditions conducive to long-term economic growth and development. LCIP II continues to focus on supporting vulnerable groups, including youth and women, and war-affected populations returning to or reintegration into communities of origin. Conflict mitigation and conflict prevention remain important objectives of the LCIP II program and are embedded in all activities supported under the program.

LCIP II currently has activities in 11 out of 15 counties in Liberia. LCIP II activities include Rural Apprenticeship Programs (955 apprentices in 3 counties), Private Sector Internship Programs (over 190 interns), Agriculture Production and Marketing Services (coffee, cocoa, snails, honey, rice, and vegetables), and Rubber Smallholder and Rubber Nursery Rehabilitation. LCIP II also continues to provide support for rehabilitating smaller scale community infrastructure and improving availability of essential services, but also provides substantial support for larger scale Government of Liberia national infrastructure, including major roads and government institutions, such as multi-million dollar projects such as the Kakata and Zorzor Rural Teacher Training Institutes, 5 county administration buildings, cross drainage structures and spot improvements on the Buchanan to Cestos to Greenville Highway (150 miles), Todee Road Development Corridor (28 miles), Ministry of Public Works Complex Rehabilitation. Through activities under LCIP II, to date, over 7,000 jobs have been created.

Discussion

Although no data are available, anecdotal evidence suggest that LCIP’s work to “open” the Buchanan – Greenville Road has increased the rate of illegal and quasi legal logging in and around the Senkwehn Forest. More than likely, improved access to forest resources has also been accompanied by a corresponding increase in the commercial bushmeat trade. LCIP staff report and the ETOA Team observed numerous large trucks with containers of sawn wood headed to the port of Buchanan and loaded onto ships. The Team was unable to ascertain where the ships were headed although there is some
suspicion among FDA staff that some of this wood is off loaded to larger ships and illegally exported. It should be noted that LCIP’s IEE foresaw this possibility, and internally, LCIP staff did not support the use of USAID funds for this road, but acquiesced as a result of intense GOL (and USAID) pressure.

Additionally, the absence of concrete on the market at a certain time combined with pressure to complete the Buchanan-Greenville road required that LCIP cut and pitsaw certain tree species to use for cross drainage structures. This activity fits within FDA’s quasi legal local timber supply logging policy, and LCIP’s use of timber for this purpose was formally approved by FDA. LCIP has also instituted a no bushmeat transport policy for project vehicles.

Through its Economic and Social Reintegration Program, LCIP is also supporting alternative livelihood activities via shade grown coffee and cocoa production around Wologizi and Wonegizi proposed protected areas, and aquaculture near the proposed Zwedru protected area. However, as with STCP, there are no clear linkages between these activities and reduction in threats to forests or biodiversity.

Other LCIP agriculture activities - including oil palm, rubber, swamp rice and aquaculture - are limited to existing sites with no expansion into new sites, per the LCIP’s IEE.

### 7.2.5 HUMANITARIAN ASSISTANCE

**Liberia Integrated Assistance Program (LIAP)**

Non-emergency assistance to vulnerable populations is provided through the Liberia Integrated Assistance Program (LIAP). Implemented by a consortium composed of Catholic Relief Services, Samaritan’s Purse and Africare, the goal of this three-year program is to reduce food insecurity in rural households in six counties (Maryland, Grand Kru, Gbarpolu, Nimba, Lofa and Bong) in Liberia by September 2009. The program builds on the consortium’s emergency Title II projects which began in 2003 and has three specific objectives:

- Protection and enhancement of agricultural production and livelihoods of targeted households through improved access to crop inputs, increased access to livestock, increased access to fish farming inputs, increased technical knowledge of farmers, identification of market opportunities, enterprise design and the provision of increased access to business development;

- Increased human capacity through training in health and nutrition education, training of caregivers in better child feeding practices addressing malnutrition and outreach with children and youth on social issues and skills related to the reduction of HIV & AIDS; and

- Increased resilience of target communities through the rehabilitation and reconstruction of community infrastructures, the formation of village-based emergency preparedness and mitigation committees, training on the identification of risks and use of local resources for preparedness and response, and development of early warning systems.
Discussion
There are no direct or indirect negative environmental impacts from this activity. LIAP’s agriculture production program focuses solely on the rehabilitation of existing sites including previously drained wetlands for swamp rice production and aquaculture.

Food Assistance for Relief and Recovery in Post-Conflict Liberia Program
USAID has been providing emergency assistance through the World Food Program’s Food Assistance for Relief and Recovery in Post-Conflict Liberia Program. Specific activities have included 1) general food distribution to internally-displaced persons and refugees; 2) emergency school feeding; 3) food-for-work programs; 4) nutrition activities; and 5) repatriation and resettlement efforts. The new phase of the program from July 2007-July 2009 will provide $50.6 million in support and is focused on school feeding, food-for-work programs, improved nutrition and food distribution for refugees.

Discussion
There are no direct or indirect negative environmental impacts from this activity.

7.3 GENERAL OBSERVATIONS
During the course of discussions with implementing partners (IP) along with field visits to many IP sites, the ETOA Team identified several “development” issues that cut across USAID’s portfolio, and which the Mission might want to take into consideration in formulating its new strategy. These include:

- **Transitioning from Relief to Development:** Programs such as LIAP and LCIP were designed to provide post conflict support to create conditions conducive to long-term economic growth and development. Both programs focus on supporting vulnerable groups, including youth and women, as well as war-affected populations returning to or reintegrating into communities of origin. LCIP’s objective is to increase employment opportunities. It does this in part through its Economic and Social Reintegration Program whereby farmers are paid cash to initiate/rehabilitate agriculture production activities. LIAP uses food for work to accomplish similar objectives. Although food for work and direct cash transfers for on farm activities can provide emergency relief and stimulate the local economy in the short term, their prolonged use is counterproductive to agriculture development and long term economic growth. Indeed, some development projects are currently experiencing problems in launching on farm improved agriculture production programs in areas where LIAP and LCIP are working because farmers are refusing to participate in the new programs without being compensated. The MOA has also recognized this as a problem and has recently instituted a “no more hand outs” policy for the MOA and its partners. Both LIAP and LCIP also recognize this as an important issue, but current program agreements with USAID limit the possibility of modifying this approach at least in the short term.

- **Communal Activities:** A number of IP activities use a communal approach – where groups of farmers are brought together to work on a specific activity such as jointly owned and managed fish ponds, swamp rice fields, etc. However, shared work for shared benefits is an elusive concept in Africa. Starting with the 1970’s community woodlot programs in the Sahel, the continent is full of examples of failed communal initiatives. IP’s need to abandon this model in favor of producer organization-type

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80 Food for work and cash transfers are also viable alternatives for social works projects such road rehabilitation, school and health center constructions, etc.
approaches whereby farmers may join together for special purposes such as helping each other with land clearing, but where actual benefits accrue directly to the individual farmer.

- **Value Chains:** Almost across the board, IPs have focused on improving agriculture production through short term inputs and technical assistance, but have neglected other potential bottlenecks on the value chain from micro credit to markets. Identifying and working to eliminate at least some of these bottlenecks would help lay the groundwork for transitioning from relief to development while helping to ensure a certain degree of sustainability once the programs have ended.

- **Community land use planning.** Given the relief nature of many of IP activities, not much attention is accorded to land use planning at the community level to conserve forest areas and promote sustainable management. Most IP activities focus on a specific activity and do not look at how this activity fits within the overall community “landscape,” or its relationship to other community activities. For example, many IPs are promoting the production of swamp rice. Swamp rice has the potential to reduce forest loss due to shifting cultivation for upland rice, yet this relationship is usually neglected. Although some IPs such as Africare are beginning to take a more integrated landscape approach in their programs, as other IP programs transition from relief to development, more focus could be place on integrated land use planning.

### 7.4 RECOMMENDATIONS FOR THE CURRENT PORTFOLIO

This section describes specific actions that could be pursued by USAID under its existing portfolio to improve its contribution to tropical forest and biodiversity conservation and management in Liberia.

**LIBERIA FOREST INITIATIVE (LFI)**

LFI is the Mission’s flagship program in terms of tropical forest conservation. As USAID begins reformulating LFI’s role for the future, the following represent opportunities for LFI to further contribute to tropical forest and biodiversity conservation and management:

- **Work with FDA to promote better integration of the 3Cs.** As noted in Section 5.2.2 above, within FDA, there has been a tendency to compartmentalize the 3Cs. LFI could help FDA develop a more holistic strategy to better integrate the 3Cs across Liberia’s forest estate;

- **Provide STTA to help create a separate FDA law enforcement division.** A separate law enforcement division complete with separate field enforcement personnel reporting directly to the division director would bring FDA in line with the majority of other African conservation/forestry organizations while eliminating the confusing dual role of a conservation ranger as responsible for both enforcement and community/conservation activities;

- **Provide STTA to conduct a strategic assessment of capacity gaps within the lead environmental agencies** to specifically identify what type of capacity building needs to take place and where it should be done;

- **Provide STTA to assist the FDA to meet CITES requirements** by strengthening its species trade legislation in a number of areas, including exports, imports, and other permitting authorities;

- Complete the second phase of the USFS GIS assessment; and

- **Reinvigorate its donor coordination role for environment, forest and biodiversity programs,** and specifically, work with EPA to develop an environment/natural resource project database.
LAND RIGHTS AND COMMUNITY FORESTRY PROGRAM (LRCFP)

Building the capacity of communities and their governmental and non-governmental partners to develop, manage and support community forestry programs is a long term process. USAID should consider exercising the LRCFP’s third year option as soon as possible in order to permit the program to better plan for future activities. Additionally, the Mission could consider the following:

- **Include a country-wide biodiversity grants program.** The ETOA Team understands that USAID will be allowing the LRCFP to use existing funding on a small grants program. The Team also understands that the program will be limited to only Nimba and Sinoe counties. The ETOA Team believes that such a program represents an opportunity to both strengthen local NGO capacity while supporting existing and developing new approaches to conservation, and suggests that the program be expanded to include all of Liberia. The grants program should focus on biodiversity and all grant activities should meet biodiversity earmark requirements.

- **Include a study on the value of NTFPs in Liberia’s economy.** As noted in Section 6.5 above, there is little appreciation of the economic value of NTFPs in terms of the restrictions posed by the protected areas, community access to NTFPs in logging concessions or an acknowledgement that NTFPs are also a source of economic benefits from forests and wetlands. This study would lay the groundwork for helping FDA take a more holistic approach to forest management.

- **Provide for additional study visits to successful community forestry programs** where collaborative (community) forest management has become the preferred method of managing forest and biodiversity resources. For example, with GTZ support in the Gambia and USAID support in Guinea Conakry, the forestry departments of these two countries have devolved a significant portion of the forest estate to communities to manage. Although there are a number of lessons learned from these activities, the most important was that field activities should drive the legislative process, and that policy implementation through regulations was more important than developing actual laws. Although LRCFP has some funds for study visits, these should be increased to include more participants.

SUSTAINABLE TREE CROPS PROGRAM (STCP)

Although STCP operates in areas close to protected areas (East Nimba Nature Reserve), the links between STCP and reducing threats – particularly in terms of providing alternative incomes – is not readily apparent. USAID should consider strengthening STCP to increase its conservation links though more public awareness and an eventual assessment of the relationship between increased household income from cocoa and threat reduction.

ENVIRONMENTAL THREATS AND OPPORTUNITIES ASSESSMENT (ETOA)

USAID could consider expanding support to the ETOA program to provide short term technical assistance to the EPA to:

- Establish a data storage and management system into which it can input the data it should start receiving from projects and activities. EPA is required by law (EPML section 34) to set up an environmental monitoring system and currently does not have the capacity to undertake such an

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81 See “USAID’s Enduring Legacy in Natural Forests: Livelihoods, Landscapes, and Governance at [http://www.usaid.gov/our_work/environment/forestry/forest_pubs.html](http://www.usaid.gov/our_work/environment/forestry/forest_pubs.html) for many lessons learned in community forestry/collaborative management, many of which are applicable to Liberia.
endeavor. Development of such a systems would also lay the groundwork for an eventual ambient monitoring program;

- Develop clear EIA guidelines for specific sectors, particularly those having a potential impact on biodiversity and tropical forests such as mining and forestry logging concessions and road construction; and

- Facilitate a priority setting exercise for implementation of the EPML

**LIBERIA COMMUNITY INFRASTRUCTURE PROGRAM (LCIP)**

Under its Economic and Social Reintegration Program, LCIP has been exploring the possibility of providing support to an ecolodge in East Nimba Nature Reserve. However, the ETOA Team believes that East Nimba does not have enough attractions (e.g., animals) to warrant such an investment, and is too far away from Monrovia to draw the UN and donor “get out of Monrovia for a weekend” market. As alternatives, the ETAO team suggests that LCIP explore the possibilities of Global Development Alliance partnerships with the South African backers of the luxury tented camp in Robertsport and the developer of the ecolodge at Marshall Wetlands.

LCIP could also strengthen the conservation links between its coffee, cocoa and aquaculture programs and protected areas through awareness campaigns.

**LIBERIA COMMUNITY INFRASTRUCTURE PROGRAM (LCIP), AND LIBERIA INTEGRATED AGRICULTURE PROGRAM (LIAP)**

The Mission should consider modifying these programs in order for them to more easily make the transition from relief to development during their remaining lives of project. Modifications could include changing reporting indicators, eliminating food for work and direct cash payments for on farm activities, and activity consolidation with more emphasis on integrated activities, including local land use planning and value chain analysis and development. Such modifications would lay the ground work and provide lessons learned for a more sustainable program development in the future.
8.0 INTEGRATION OF ENVIRONMENT INTO USAID/LIBERIA ACTIVITIES

USAID’s Environmental Procedures (known as 22 CFR 216 or Reg. 216) provide the basis for the application of pertinent US environmental legislation and policy. Reg. 216 is designed to guide the evaluation and conduct of specific development interventions within the project development and management cycle. Specifically, it was formulated to: 1) ensure that environmental consequences of USAID-funded activities are identified and considered in the design and implementation of activities prior to final decisions to proceed; 2) assist countries in strengthening their environmental evaluation capabilities; 3) define limiting environmental factors that constrain development; and 4) identify activities that can assist in sustaining or restoring the natural resource base.

Reg. 216 requires USAID missions and cooperating sponsors to find out whether their programs and activities will affect the natural or physical environment. To help meet this important legal requirement, USAID Missions, conduct environmental reviews (or "assessments") of USAID activities, the most common review type being an Initial Environmental Examination (IEE). An IEE makes a threshold decision as to whether the proposed program or program activity will have a significant impact on the environment. Threshold decisions include:

- **Categorical exclusion**;

- **Negative Determination.** A Negative Determination indicates that the proposed action will not have a significant effect on the environment

- **Negative Determination with Conditions.** A Negative Determination with Conditions indicates that the proposed action will not have a significant adverse impact on the environment, provided that the conditions stated in the IEE are met.

- **Deferral.** Deferral indicates that insufficient information was available during the preparation of the IEE on specific project activities in this area to conduct an environmental review.

IEEs usually take place early in the activity-planning process. This allows time to conduct more detailed investigations if necessary, and to build actions into program design that avoid or mitigate any negative environmental effects.

To date, the Mission’s approach to Reg. 216 has been a bit ad hoc, relying on implementing partners to conduct their own IEEs after contract award. Although the ETOA Team was not able to review all the project IEEs, past experience suggests that the quality of such IEEs varies considerably, and that many implementing partners see IEEs as a bureaucratic necessity with little attention accorded to monitoring and mitigation once the IEE is prepared. Moreover, the use of separate IEEs for each activity makes the development of an overall environmental strategy for the Mission extremely difficult.

In order to better integrate environmental issues into the Missions activities, the ETOA Team suggests that the Mission adopt a more systematic approach to Reg. 216 requirements. For example, as the Economic Growth Office’s new strategy takes shape and as program and activity elements under the strategy begin to be defined, we would suggest that the Mission use the services of the Regional Environmental Officer to develop an overall “economic growth” IEE. This IEE would also include a
Pesticide Evaluation Report and Safer Use Action Plan (PERSUAP) should any proposed or current activity in the strategy use pesticides. A PERSUAP determines the types of approved pesticides to be used by a program, practical actions by which to reduce the risks of using these pesticides taking into consideration the context in which the products will be used, the particular elements of the program, and the different capacities of the partners involved; Instead of using IEEs at the project level, we suggest that implementing partners adapt USAID’s “Supplemental Environmental Review Forms” for agriculture, forestry and other activities to develop an internal environmental screening form for all project activities to ensure that potentially negative impacts are foreseen and plans are developed for their mitigation. Based on the screening form, partners would be required to produce an Environmental Review Report for each activity. The purpose of the Environmental Review Report is to allow each IP and USAID to evaluate the likely environmental impacts of an activity and to develop design modifications and mitigation measures as required.

Finally, while the ETOA Team was not able to review all IEEs, the ones reviewed were adequate, although actual implementation of recommendations and mitigation measures specified in the IEEs was perhaps a bit more problematic. In this context, the Mission should also take advantage of the Environmentally Sound Design and Management Capacity-Building for Partners and Programs in Africa (ENCAP) training programs for Mission Staff, implementing partners and GOL counterpart staff. Relevant ENCAP courses include:

- Africa Regional Course in Environmental Assessment and Environmentally Sound Design and Management for Small-scale Activities (ESDM Training);
- USAID Environmental Procedures and Mainstreaming Environmental Considerations in Development Programs: Regional USAID Staff Training; and
- Professional Development (PD) Fellowship program for Africans in environmental impact assessment

This latter would be particularly relevant for EIA staff at FDA and EPA.
9.0 OPPORTUNITIES FOR PARTNERSHIPS

Emerging from more than a decade of civil war, Liberia is in a critical position to quickly reform key aspects of its economy in order to jumpstart economic growth particularly at the local level. Liberia is also in an advantageous position in the sense that it can capitalize on the peace dividend by enacting changes in policies, laws and regulations in a transparent manner. Engaging the private sector in the reform process is critical, as is the eventual development of public-private partnerships in order to maximize GOL and donor reach and effectiveness in solving problems, including conservation and natural resource management issues.

Although there appears to be potential for conservation partnerships in Liberia from the agro industrial crops sector (rubber and oil palm), the mining sector (BHP Billiton and ArcelorMittal), ecotourism and coffee and cocoa buyers, the ETOA team was not very successful in identifying concrete opportunities. For example, we had expected that LCIP’s work in coffee, Africare’s work in aquaculture and STCP’s cocoa program would be based on some kind of value chain analysis which identified private sector players in the game—notably buyers—who might be open to Global Development Alliance (GDA) types of partnerships. This was not the case and we did not have time to find this kind of information ourselves.

In spite of considerable effort – including phone calls and official letters, we were unable to meet with Firestone (rubber) and ArcelorMittal (mining). Our conclusion here is that either we did not have enough clout to meet with these companies or that they were apprehensive about discussing environmental issues. In terms of oil palm, the MOA is only now in the process of awarding existing concessions, with some companies such as Equatorial Biofuels, expressing interest in securing new tracts of land for oil palm including 500,000 ha in River Gee, an area that falls within the proposed Grebo protected area.

The team did have a fairly productive meeting with BHP Billiton (now including Rio Tinto). BHP has a very good conservation ethic and under Rio Tinto, they have signed a Memorandum of Understanding to establish a Global Development Alliance (GDA) among USAID/Guinea, Conservation International (CI), and Rio Tinto to promote economic development while ensuring protection of one of The Simandou Range in Forest Guinea, one of the top priority conservation areas within the Upper Guinea Forest. The problem is that the Managing Director of BHP Billiton in Liberia was preoccupied with the Rio Tinto takeover and not familiar with GDA types of partnerships and referred us to BHP’s environmental officer and Rio Tinto’s conservation person in Guinea, neither of whom was in country during the ETOA. The bottom line is that there is some cautious interest in developing a partnership with BHP Billiton, but the work needed to do this was far beyond the capacity and time frame of the ETOA team.

Finally, Lake Piso and Marshall Wetlands also appear to represent good opportunities for partnerships in ecotourism, but we could not track down the South African backers of the “luxury tented camp” in Robertsport, nor find out who is considering/proposing to rebuild the hotel there. We also understand that a private investor is building a small lodge at Marshall Wetlands but again, we were unable to meet with this individual due to time constraints.

In spite of the above difficulties, the ETOA team believes that all of the above represent opportunities for partnerships although the development of concrete proposals would require a consider amount of time and effort on USAID/Liberia’s part.
10.0 POTENTIAL FOR CARBON AND CLIMATE PROJECTS

10.1 BACKGROUND

The UN Framework Convention on Climate Change (UNFCC) which has been ratified by over 160 nations, including key countries like Brazil, China, the EU members, India, Indonesia, Japan, and the USA, calls on all nations to protect and enhance the reservoirs of carbon, such as forests. The Marrakech Accords made afforestation (planting new forests) and reforestation (recreating severely degraded forests) projects in developing countries eligible for carbon credits under the Clean Development Mechanism (CDM). This Kyoto Protocol arrangement allows industrialized countries to support approved emission reduction projects in developing countries as an alternative to meeting their industrial emissions reduction targets at home.

Marrakech, however, excluded projects designed to stop deforestation and protect existing forests from degradation during the first Kyoto Protocol commitment period. There were a number of technical reasons for this, including uncertainty about whether forests will act mainly as stores of carbon or as sources of emissions in the future (permanence), and the need for more safeguards to ensure that protecting a forest in one place did not simply result in the shifting of logging or other land clearance activities to another place (leakage) and an absence of ground rules for defining how much deforestation would have occurred without the project (additionality). UNFCCC parties agreed that work to include avoided deforestation and forest degradation in the scope of a post-Kyoto regime, after the UNFCC scientific body reported on how to achieve ‘Reduced Emissions from Deforestation’ at the 13th Conference of the Parties in Bali in December 2007.

Bali negotiations in turn led to the Bali “Decision” on deforestation. The Decision acknowledges that deforestation and forest degradation contribute to GHG emissions, but that the problem is complex, with differing national circumstances and multiple causes. It notes that, while actions to reduce deforestation and forest degradation are occurring, there is an “urgent need” to further reduce GHG emissions from these sources, and that such efforts could complement “the aims and objectives of other relevant international conventions and agreements.” The Decision encourages various efforts, including demonstration projects, to reduce GHG emissions from deforestation and forest degradation, and encourages financial and technical support for those efforts from the Parties to the Convention and from others. It also seeks to improve the measurement and reporting of GHG reductions that result from such efforts. In short, the Bali decision gave Reduced Emissions from Degradation and Deforestation (REDD) projects the legitimacy and the “green light” needed to proceed.

10.2 REDUCED EMISSIONS FROM DEGRADATION AND DEFORESTATION (REDD)

Liberia, like many countries is jumping on the REDD bandwagon. There are no less than three REDD initiatives currently being developed (IUCN, FFI and CI), and USAID/Liberia has recently engaged the CIFOR/ICRAF Forests and Climate Project to help the Mission work with existing programs and develop concepts for new programs to address issues of climate change within the forest sector. These include the identification of opportunities/options for future USAID programming for adaptation and mitigation including carbon markets and REDD. Moreover, all of this carbon activity has raised expectations in both
communities and government institutions about benefit flows, with little recognition to the fact that it will take several years before any REDD project reaches fruition.

The ETOA Team feels that the focus on REDD may be a bit premature. The key elements of a REDD system are:

- A baseline against which to benchmark reductions in deforestation and degradation. A baseline is a projection of emissions from deforestation and degradation and allows reductions in emissions to be measured. It is a function of projected area change combined with the corresponding change in carbon stocks. Both parameters must be estimated with an acceptable level of certainty. To the ETOA Team’s knowledge, the requisite skills to conduct such a baseline do not exist in Liberia and foreign technical assistance would be needed to develop the baseline.

- A legislative and policy framework that works to support the enabling conditions necessary to guarantee the permanence of emissions reductions. With the exception of land tenure, Liberia has a viable forest policy and legal framework but enforcement and judicial processes have been and continue to be problematic. Yet, without basic legal enforcement, Liberia’s forests may continue to be lost in an unplanned or uncontrolled manner, and their vulnerability may be exacerbated as illegal degradation often precedes further loss through fires or land conversion.

Any REDD project will most certainly be compromised by Liberia’s uncertain tenure and use rights over both forest land and the ecosystem. Indeed Liberia is already experiencing judicial and even physical conflicts relating to contested ownership of and exploitation rights to large areas of forest.

- An effective means of monitoring and verifying emissions reductions, and preventing leakage. Under a REDD mechanism, Liberia will need to show credible reductions in emissions from deforestation and degradation measured against the baseline at specific intervals in time. Monitoring will need to show the success of REDD policies and interventions measured as reduced emissions against the baseline. This includes success in preventing displacement of deforestation and degradation from one area to another (leakage). Performance against the baseline will translate into tradable carbon credits. The two parameters to be monitored are:
  - Change in forest cover which includes change in forest area and reduction in forest cover; and
  - Change in carbon stocks and emissions of non-CO2 gases.

Forest cover change can be monitored using remote sensing techniques (satellite and aerial photography), and carbon stocks by a combination of field measurements and modeling. Liberia has very limited capacity to undertake such a monitoring program, especially for carbon stocks.

- Mechanisms to manage and distribute payments to those bearing the costs of avoided deforestation and degradation. The objective of a REDD payment distribution mechanism is to support policies and measures that reduce deforestation and degradation through transfer of revenues from international REDD funds or carbon markets to (or within) national levels. REDD will only work if an appropriate balance is found between efficiency and equity, embedded within a system that is accountable and transparent, focuses on long term sustainability goals and improves the ability of stakeholders to engage with the system.

Based on an (albeit cursory) analysis of existing experience with regulatory, fund and market-based forest management in Liberia, the ETOA Team’s preliminary findings indicate that significant investments will
have to be made in Liberia for REDD to work. First and foremost, the Government of Liberia has not adopted a formal policy on the role that Liberia’s forests could or should play in accessing potential funding under various carbon financing mechanisms. Formulation of such a policy should be the first priority before trying to access REDD and other mechanisms.

Second, existing institutions will need strengthening and new institutions may be needed where existing arrangements cannot accommodate REDD. These would include: fund managers for receiving and redistributing funds; registries for tracking emissions reductions credits; legal institutions for adjusting existing laws, enforcing REDD laws and resolving disputes; monitoring and verification entities for ensuring that emissions reductions are real and achieved in environmentally and socially acceptable ways; and implementing and administrative institutions for handling contracts and logistics.
11.0 OTHER DONOR AND PARTNER ACTIVITIES

Given the absence of any environment/natural resource project database in Liberia, the following is the ETOA Team’s best approximation of other donor and partner activities in the environment/natural resource sector currently operating in Liberia.

WORLD BANK

FORESTRY SECTOR MANAGEMENT PROJECT - SEPTEMBER 2006 TO SEPTEMBER 2009, $2 MILLION

Funded under the World Bank Trust Fund for Liberia (TFLIB) and implemented by UNDP under a grant, the objective of project is to assist Liberia to harness the potential of forests to reduce poverty in a sustainable manner, integrate forests effectively into sustainable economic development, protect the vital local and global environmental services and values of forests, based on an integrated package of key reforms in the sector, that will improve the performance of national institutions to make the forest sector vibrant and sustainable. The project has six components:

- Institution-building in the public sector: consolidation of a number of important institutional reforms in the public sector;
- Sustainable management of community forests and promotion of the conservation and sustainable use of natural forests;
- Sustainable agroforestry systems, management of natural forests and management of plantations and agroforestry systems;
- Sustainable small and medium private sector development through the creation of a modern and competitive private sector that will contribute to sustainable development of the forest sector in Liberia as one of the driving forces of growth of the economy;
- Competitive Forest Development Facility; financing on a cost-sharing basis, of a program of grants to private sector, non-governmental organizations, and communities for the creation of micro-enterprises for reforestation and sustainable forestry management sub-projects; and
- Public Communication Program for Forestry Sector; development and implementation of a Public Communication Program on the forestry reform, aimed at building public support to transparent and equitable management of forestry resources, fostering broad based debate on forest management, and support community oversight and bottom-up pressure for change.

The project is implemented in close coordination with LFI and essentially supports FDA’s three Cs. The different pieces of the puzzle that constitute the World Bank financial contribution to the 3Cs approach are:

- Commercial Forestry: World Bank Licus funding ($570,000 closing in June 2007), World Bank Forestry Project (Total $ 2 M - closing in Dec. 2008- Component 1 Institutional Strengthening $ 0.5 M and Component 6: Public Communication $ 0.3 M);
• Community Forestry: World Bank Strategic Environmental Assessment (SEA) for Community Forestry ($260,000) - World Bank Forestry Project (Total $2 M- Component 2 $0.3 M, Component 3 Agroforestry around Protected Areas $0.3 M, Component 4: Sustainable Livelihood around Protected Areas $0.3 M); and

• Conservation Forestry: Sapo GEF funding implemented by FFI ($1,000,000 closing date December 2010), Protected Areas Network GEF ($0.750 M – COPAN – see below), Economic Governance and Institutional Strengthening Project (Total $6 M- Component 2: $0.5 for Protected Areas Department in FDA-under preparation).

CONSOLIDATION OF LIBERIA PROTECTED AREA NETWORK (COPAN) - $750,000 WB GEF, $6,630,000 GOL CO-FINANCING

COPAN’s goal is to contribute to the conservation of the globally significant biodiversity of Liberia through the establishment of three additional protected areas, functioning and connected with each other using a PA network approach. The project has five components:

• Component 1. Strengthening of Forest Development Authority (FDA) Conservation Department and EPA Environmental Monitoring Department. Outcome. Funds will provide training and equipment to FDA Conservation department; capacity will be built for effective management of PAs, sustainable utilization of bush meat and human-wildlife conflict. EPA capacity to review Environmental assessment studies will be strengthened.

• Component 2. Consolidation of Protected Area Management Instruments. The project is will finance a review of existing wildlife legislation, elaborate and print a draft law on wildlife utilization and management and its validation through a national workshop before being submitted to the Legislature. Additionally, this component will:
  – Support transboundary collaboration (Gola with Sierra Leone and Wonegizi with Guinea) by financing an international workshop and development of MOUs between the three countries conservation institutions for joint management of the proposed protected areas;
  – Support the design and implementation of a transfer mechanism from Ministry of Finance to the FDA for stumpage and forest product fees;
  – Help establish a Liberia Conservation Trust Fund (CTF) to provide an effective mechanism to channel national and donor funding and guide investments to support the protected area network.

• Component 3. Creation of New Protected Areas. Outcome: Three new protected areas created and demarcated and with management plans, infrastructure, and equipment in place. The project will fund protected area (PA) infrastructure, demarcation and equipment as well as the operation costs of the proposed PAs on a declining basis. Socio-economic as well as biological surveys will be funded in the three PAs as a basis for the elaboration of a management plans.

• Component 4. Development of conservation livelihood systems. Outcome: reduce dependencies of communities living on the fringes of the selected PA systems on natural resource exploitation. Communities living inside and around PAs will be provided with alternative sources of income and livelihood support systems. This would be done through community forestry, community driven development and promotion of income generating activities.
Component 5. Project Management. Outcome: Project funds efficiently and transparently disbursed for project activities. A project coordinator will be recruited. Office equipment will be provided.

NB: This will be the first project entirely executed by FDA. A procurement and financial management assessment was conducted by the World Bank in Sept 2007 and the capacity is now increased in FDA, and the recommendation of the specialist was that FDA can manage the project. Still it will be the first time, so FDA will be reinforced through capacity building on procurement and financial management.

OTHER WORLD BANK ACTIVITIES
The World Bank is currently supporting a land tenure study which will be an importance piece for examining land tenure issues related to forests and is supporting agroforestry activities close to Wonegizi Park. The Bank also supports community development/sustainable development activities around protected areas under the Liberia Agency for Community Empowerment (LACE) program.

In October 2006, the World Bank approved a grant (within the Emergency Infrastructure Supplemental Component—EIPSC project) for US$16.5 million to address the most urgent infrastructure rehabilitation needs, including solid waste management. The solid waste component of the project has three facets:

- Cleanup of solid waste accumulations;
- Design and implementation of a basic solid waste collection system; and
- Upgrade and management of the existing disposal site at Fiamah.

All of these activities are being executed by UNDP, and an independent engineering firm, Poyry, is providing on-the-ground construction and delivery of services supervision. The Monrovia City Corporation (MCC) is the agency in charge of solid waste activities.

The World Bank project has recently been expanded, so that now it is funding the development of an interim landfill to replace the Fiamah dump.

UNITED NATIONS DEVELOPMENT PROGRAM (UNDP)
In April 2000, the government of Liberia and UNDP signed an Environmental Project Document whose purpose was to provide technical and funding support for the evolution of National Environmental Commission of Liberia (NECOLIB) into an Environmental Protection Agency responsible for the coordination of sustainable environmental management through the implementation of Agenda 21. This project resulted in 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. The project concluded in 2002.

UNEP’s Post Conflict and Disaster Management Branch (UNEP-PCDMB) delivered ad hoc capacity and technical support to the EPA from 2003 through 2007. This included some training in environmental impact assessment.

Currently, UNDP, UNEP and the GOL are developing a Poverty and Environment Initiative (PEI) for Liberia. The PEI will support the GOL to:

- Integrate Environmental Sustainability into National Development Processes (e.g., the Poverty Reduction Strategy and Millennium Development Goals); and
• Build national capacity to identify links between poverty and the environment and integrate environmental sustainability into national development processes.

INTERNATIONAL LABOR ORGANIZATION (ILO)
The ILO, in partnership with the Ministry of Labor and MCC, is implementing a two-component project that comprises:

• The Liberian Emergency Employment Programme, which is an 18-month program aimed at maximizing local employment for the short-term cleanup of markets within Monrovia; and

• The Liberian Employment Action Plan that will focus on empowering community based organizations in order to enhance the sustainability of the previously mentioned cleanup activities. This project will run for approximately a further 2.5 years. Activities will include moving waste from the households to the collection points and discouraging the dumping of waste into drainage channels and rivers.

FOOD AND AGRICULTURE ORGANIZATION (FAO)
FAO is assisting the MOA’s National Fisheries Bureau to conduct a fisheries sector assessment. It is expected that this assessment will address biodiversity issues related to both marine and inland fisheries. Although not directly related to biodiversity, FAO also supports;

• The rehabilitation of artisanal fisheries sector in Cape Mount and Grand Bassa counties, with 1975 target beneficiaries. The project provides inputs and training to fishers and processors, including construction of 20 smoke kilns to reduce post-harvest losses and improve the livelihood of fisherfolk; and

• The “Integrated inland valley swamp rehabilitation and development project” in Bong and Nimba counties, with support of USAID/LCIP. The objective of the project is to provide employment for ex-combatants as the main labor force in rehabilitating and developing fish ponds and rice paddies.

DEPARTMENT FOR INTERNATIONAL DEVELOPMENT (DFID) OF THE UNITED KINGDOM
Various international donors have initiated programs related to solid waste management in Liberia. The first significant contribution after the conflict dates back to 2003-2004 when UNICEF, with a DFID contribution, undertook a comprehensive review of the waste management sector and produced an improvement strategy and recommendations for a “Waste Management Plan for Monrovia”. This study also covered a technical review of ten possible sites for selecting a new landfill facility site for Monrovia, and recommended the upgrading of Fiamah disposal site, seen as a temporary solution, until the engineering and construction of a new proper landfill site could be finalized.

SUPPORT FROM INTERNATIONAL CONVENTIONS
EPA has received some support from the secretariats of international treaties and conventions for related activities. This has included support in the development of:

• The Biodiversity Strategy and Action Plan;

• The National Adaptation Programme of Action for Responding to Climate Change;

• the National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants; and
• National Biosafety Framework for Liberia.

**EUROPEAN COMMISSION (EC)**
The EC has provided a grant (Strengthening Forest Management in Post-Conflict Liberia) to FFI establish a protected forest network balancing communal, commercial and conservation objectives. The EC also supported the Liberia Forestry Reassessment.

**JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)**
JICA has just begun a program to assist the MCC prepare a city plan, including planning for the rehabilitation of the water and wastewater systems.

**DARWIN INITIATIVE OF THE UK DEPARTMENT FOR ENVIRONMENT, FOOD AND RURAL AFFAIRS**
The Darwin initiative provided grants to FFI from 2000–2007 for two activities:

- Establishing community-based forest biodiversity management around Sapo Park, Liberia (2004-2007);

**CONSERVATION INTERNATIONAL (CI)**
CI’s Critical Ecosystem Partnership Fund (CEPF) focuses on the Upper Guinean Forest Ecosystem, which extends from Guinea into eastern Sierra Leone and eastward through Liberia, Côte d’Ivoire, and Ghana into western Togo. A primary focus for CEPF is to support connectivity among forest fragments and among agencies, groups, and policies to harmonize approaches to conservation. In Liberia, EPF funds are used for:

- Strengthening institutional capacity of local civil society groups for conservation;
- Hotspot biodiversity monitoring system;
- Promotion of the concept of biodiversity conservation corridors;
- Collaborative public awareness, education, and community outreach programs; and
- Small grants (Biodiversity Action Fund).

**DUTCH MINISTRY OF FOREIGN AFFAIRS (DGIS)**
IUCN’s Forest Conservation Program (FCP) has just received funding from the Dutch Ministry of Foreign Affairs (DGIS) to implement the Livelihoods and Landscapes Strategy (LLS). The LLS will be implemented initially across 11 geographic components and 5 cross-cutting thematic areas, which are poverty reduction, markets and incentives, law enforcement and governance, rights and tenure, forest landscapes restoration and which are supported by a facilitating component focused on practical tools to achieve measurable outcomes. It is through the LLS that IUCN will work with FDA and other stakeholders to more fully engage in efforts to promote sustainable and equitable community forest management.
U.S. FISH AND WILDLIFE SERVICE (USFWS)
USFWS provides support to SAMFU for a project to promote the long-term survival of sea turtles, including the sustained recovery of depleted stocks, taking into consideration the integrated well-being of residents of coastal communities with which they interact.

BIRDLIFE INTERNATIONAL
With their local partner SCNL, Birdlife International (BI), has conducted bird inventories in several forest areas, and produced a list of priority bird sites for Liberia that is available online on the BI website. Currently, with funding from Birdlife Netherlands and a private foundation, SCNL is looking at bird flyways and alternative sources of income in the Lake Piso area.

NEW YORK BLOOD CENTER
The New York Blood Center currently provides for the feeding and maintenance of the chimpanzees used for research for human vaccines against Hepatitis B and C that were released on islets in the Marshall Wetland after the closure of the research facility in 2006. The Center has also obtained partial funding for an endowment to provide care for the animals indefinitely.
12.0 RECOMMENDATIONS FOR FUTURE PROGRAMMING

12.1 USAID’S COMPARATIVE ADVANTAGE

USAID/Liberia plays a major role in biodiversity conservation and the protection and management of tropical forests in Liberia. Under the LFI, the Mission is a key partner with the GOL in support of conservation of Liberia’s forests, and this role should be continued and expanded.

The Mission and USG are capable of facilitating the involvement of large, international NGOs with an interest in biodiversity conservation and sustainable development, and support to organizations such as Conservation International has had an impact on conservation in Liberia. Based on its experience in forming, leading and participation in multi-partner collaborations, USAID is positioned to effectively collaborate with and support the work of a number of other international conservation NGOs and organizations such as the World Wildlife Fund, the World Conservation Union (IUCN), the Wildlife Conservation Society (WCS) and the Jane Goodall Institute (JGI). As these organizations are capable of bringing significant amounts of public and private sector funding as well as networks of capable professionals, scientists, and dedicated field researchers in support of environmental programs and biodiversity conservation, the Mission should consider expanding support to include these organizations.

Through the Land Rights and Community Forestry Program (LRCFP), the Mission is on the cutting edge of community forestry and collaborative management in Liberia. Lessons learned from this activity should form the basis for a much needed future expansion of community forestry activities in the country. This would complement support already provided to commercial forestry under LFI, and in combination with an increased international conservation NGO presence, would help concretize FDA’s three “Cs” agenda.

USAID and the USG also have a distinct comparative advantage in terms of alternate conservation financing mechanisms. Through the Tropical Forest Conservation Act (TFCA), USAID has extensive experience in developing and supporting conservation trust funds. USAID’s monetized PL 480 initiatives to support conservation and other environment and natural resources activities have provided the sort of long-term, flexible funding that is absolutely critical to innovation—and results. USAID/Liberia and the USG can also use their positions in Liberia to help the GOL forge conservation partnerships with corporations such as Firestone, ArcelorMittal and BHP Billiton. Such partnerships could provide much needed alternative conservation financing through biodiversity offsets, collaborative transboundary programs and other mechanisms.

Through its Governing Justly and Democratically program, USAID/Liberia has the opportunity to encourage more accountability for conservation activities. With the active support and encouragement of a stronger and broader array of civil society organizations and local NGOs, the USG in concert with other development assistance and international organizations could provide a voice for development activities that consider the conservation and equitable distribution of Liberia’s natural resources.

Finally, USAID and the USG have provided both long and short-term training opportunities to hundreds of thousands of individuals in developing and transition countries each year. USAID/Liberia’s “Investing in People: Education” program has been at the forefront in providing accelerated learning opportunities.
for ex-combatant and non-combatant youth and young adults. USAID’s flexible approach to education and training would enable it to respond to the variety of learning challenges that are being faced by Liberia’s environmental management institutions.

12.2 RECOMMENDATIONS FOR FUTURE PROGRAM AREAS

The ETOA team has formulated a set of recommendations for future program actions that USAID may wish to consider for improving its contribution to natural resources management and biodiversity conservation in Liberia. Most of the recommendations focus on opportunities for policy development, livelihood and economic growth activities that have the potential to contribute to better management of natural resources. Other recommendations address some of the underlying causes of environmental degradation that if not resolved, could jeopardize future economic growth.

It should be noted that the recommendations are short to medium term in nature (3-5 years) and do not address all the actions needed to conserve and manage Liberia’s tropical forests and biodiversity. However, the ETOA Team believes that those recommendations offered would lay the foundation for a more comprehensive and cohesive approach to natural resource management in Liberia and future longer term investments.

Programs that have the potential of meeting Congressional Biodiversity Earmark requirements are noted. There are no potential activities which would meet the Water Earmark.

Finally, recognizing that USAID has limited resources, the recommendations should be distributed to as wide an audience as possible within the donor community, so in the case that USAID is unable to pursue these activities, other organizations may be able to contribute.

12.2.1 OPPORTUNITIES FOR POLICY DEVELOPMENT, LIVELIHOOD AND ECONOMIC GROWTH

Develop Alternative Protein Programs

Food security in Liberia, besides being an end in itself, also has considerable implications for the bush meat trade, because of the great importance of bush meat in the national diet. As the population increases in size and affluence, the demand for protein, including animal protein will increase. It is FDA policy to both protect and manage wildlife, with an important role for sustainably harvested bush meat in the future. At the moment, there is no information on what sustainable bush meat harvests would be in Liberia, and it is likely to be a long time before an assessment can be made using monitoring data from well-managed forests. The safest assumption is that the introduction of sustainable bush meat harvesting

82 USAID’s “Biodiversity Code” guides the Agency in determining what programs are included in the accounting toward the biodiversity earmark. Within the code are four key criteria, all of which must be met to be considered a biodiversity program: 1) the program must have an explicit biodiversity objective, it isn’t enough to have biodiversity conservation result as a positive externality from another program; 2) activities must be identified based on an analysis of threats to biodiversity; 3) the program must monitor associated indicators for biodiversity conservation; and 4) site-based programs must have the intent to positively impact biodiversity in biologically significant areas.

83 The purpose of this earmark is to increase sustainable access to safe drinking water and sanitation and improve hygiene. Eligible activities must have a stated intent to address these goals as a primary or secondary objective, and demonstrate that intent through objectively verifiable indicators linked to these goals. In general, all water earmark activities have to be directly linked to households. Although USAID/Washington is try to determine how to double count water and biodiversity earmarks, as yet, no one has come up with a viable example.
and the protection of existing and new national parks will lead to a drop in bush meat production, at least in the short term.

This shortfall and the growing demand will need to be met through other sources. Since fish are also over-harvested, alternatives are limited to increased production of vegetable protein, fish farming, and animal husbandry, including game farming. All of these are feasible, and, with the exception of game farming, are being actively pursued in rural development programs. While Liberia is largely unsuitable for cattle (i.e. beef), production of goats, sheep and pigs can be greatly increased in rural areas, while poultry and egg production can be increased in villages and around towns, especially if poultry feed is available. For game farming, neighboring countries have success primarily with cane-rats and giant snails, and these should be tested in Liberia. In addition, the Maxwell’s duiker is abundant in forests and scrub and reproduces quickly, so domestication or semi-domestication of this important bush meat species should be investigated.

Alternative livelihood programs such as aquaculture and small ruminants would have to be directly linked to threat reduction in critical habitats to count against the biodiversity earmark. Duiker, cane rat and other game farming activities would automatically count against the earmark.

**Develop a New NTFP Support Program**

Evidence for the local importance of NTFPs and for the existence of a national trade is abundant. For example, during the ETOA field visit to Sapo, we observed the collection of thatch from a forest palm, *Sclerosperma mannii*, previously unreported from Liberia. We observed all stages in the trade, including leaf harvest, selling, transportation, and roof building. At the prices quoted (up to $L 50/bundle) the cash value of the roofs in southeastern Liberia is several millions of $US, though much of this value is actually subsistence and outside the cash economy. We also observed the use of construction materials and palm wine from raffia palm, furniture and baskets from rattan, and forest foods and medicines. Clearly, NTFP use in Liberia is large enough to warrant a thorough study of the products and their marketing chains, and to include NTFPs in sustainable forest management and in rural development.

Based on the proposed LCRFP NTFP value study, the Mission should consider developing a separate NTFP support program which would focus on strengthening the value chains of those NTFPs with significant local, regional and international market potential. Such a program would have to be based on a stock assessment of select NTFPs, and could be counted against the biodiversity earmark if sustainable harvesting and management programs were developed for selected “commodities”.

**Provide Support for Development of a Policy on Carbon Financing Mechanisms**

Based on an analysis of existing experience with regulatory, fund and market-based forest management in Liberia, the ETOA Team’s preliminary findings indicate that significant investments will have to be made in Liberia for REDD to work. First and foremost, the Government has not adopted a formal policy on the role that Liberia’s forests could or should play in accessing potential funding under various carbon financing mechanisms. Formulation of such a policy should be the first priority before trying to access REDD and other mechanisms. USAID/Liberia should explore using the CIFOR/ICRAF Forests and Climate Project as a mechanism to develop such a policy.

**Support Shade Grown Coffee and Cocoa Programs**

In addition to being good alternative livelihood activities, shade grown coffee and cocoa are generally environmentally friendly. Grown under mainly secondary, older growth natural forests, they are recognized as bird friendly and provide a habitat for certain species such as Maxwell’s duiker. To count
against the biodiversity earmark, coffee and cocoa programs would have to be directly linked to reducing threats (e.g., poaching) in critical habitats. Providing that value chain issues such as markets are adequately addressed and supported, shade grown, bird friendly coffee and cocoa can also demand a higher price in international markets.

**Expand the Community Forestry Program**

Collaborative (community) management of forests and protected areas has been proven to significantly reduce threats to biodiversity and tropical forests. Forestry departments in Guinea, Senegal and the Gambia have turned over significant portions of their forest estates over to communities to manage. However, they have been able to accomplish this through long term donor financial support and technical assistance (USAID for Guinea and Senegal, and GTZ for the Gambia). As the LRCFP and other community forestry programs begins to gain traction and experience, the GOL should review lessons learned from these programs, modify the community forest strategy as required and support the roll out of community forestry to the majority of Liberia’s other counties.

**Integrate Environment/Natural Resources Awareness into Local Democracy and Governance Initiatives**

Through its Governing Justly and Democratically program, USAID/Liberia has the opportunity to encourage more accountability for conservation activities, while at the same helping FDA to better communicate with and “manage” its conservation partners. Through this program, USAID could strengthen the capacity of local government councils, provide effective advocacy skills, inform citizens of their rights and responsibilities, and help to build a better informed society through strengthening of professional media would assist in spreading the need for appropriate conservation measures. Training and mentoring programs for community activists, newly elected local leaders, and some paramount chiefs and members of parliament could encourage informed dialogue, transparency, accountability, responsibility, and leadership. Such efforts would enhance the level of active and positive community participation required to build effective environment/natural resource programs.

**12.2.2 OPPORTUNITIES FOR IMPROVING COLLABORATION**

**Support an Abbreviated National Environmental Action Planning (NEAP) Process**

Coordination across government institutions in Liberia is a major obstacle to improved biodiversity and tropical forest protection and management. Overlapping mandates, policies and legislation are the rule rather than the exception. USAID should consider supporting a National Environmental Action Planning (NEAP) process in Liberia. Supported by the World Bank and USAID during the late 1980s and early 1990s NEAPs have been instrumental in many African countries as a mechanism to better define, clarify and coordinate institutional mandates and promote policy an legislative harmonization. Unfortunately, as a result of the civil conflict, Liberia was never able to undertake a NEAP. UNDP has also expressed interest in co financing this activity.

**12.2.3 OPPORTUNITIES FOR ALTERNATIVE FINANCING**

**Consider Developing a Monetized PL 480 Program to Support Conservation**

For USAID, monetized PL 480 funds (Title II) represent an opportunity to provide direct support to GOL institutions. In countries such as Uganda and Rwanda, monetized PL 480 funds have been used very successfully to support a wide variety of conservation activities both in park and out of park, from infrastructure development to road and trail maintenance and boundary marking. Generally, monetization
programs from the local sale of PL 480 commodities\textsuperscript{84} provide funds for investment via two mechanisms, the creation of a trust, or the establishment of a Grants Management Unit. For trusts, proceeds from commodity sales can be invested in local treasury bills and private-issue bonds, and invested funds are withdrawn periodically for use in development programs in-country. Where local investment is not an option, a Grants Management Unit can be created under an existing project to administer the funds and issue grants on a competitive basis. In both cases, funds are jointly managed by Government and USAID (usually a contractor, a grantee or a combination of both\textsuperscript{85}) and misuse of funds is uncommon. Both options provide the sort of long-term, flexible funding that is absolutely critical to innovation--and results.

12.2.4 OPPORTUNITIES FOR CAPACITY BUILDING

Develop a Training Plan to Support Capacity Building across Liberia’s Lead Environmental Agencies

Other than the LRCFP’s current work in community forestry, there has been no recent strategic assessment of capacity gaps within the lead environmental agencies to specifically identify what type of capacity building needs to take place and where it should be done. USAID should consider contracting with AED, TRG or other training organizations to conduct a capacity gap assessment and develop a training plan which would identify key areas for capacity building as well as the most appropriate institutions for conducting such training. The training plan would serve as a road map for USAID and other donors in integrating capacity building programs into existing activities or developing new ones.

Support to the University of Liberia’s College of Agriculture and Forestry

Building capacity in the environment and natural resources sector in Liberia depends a great deal on the University of Liberia’s College of Agriculture and Forestry. Although poorly equipped and poorly staffed and with no formal environmental education program, the College is making efforts to revise the forestry curricula to include new national priorities in wildlife management and community forestry. However, bringing the college up to any recognized standard of environmental education will require longer term donor and GOL commitment, not only for infrastructure but for elements such as:

- Assessing the extent of the environment/forestry job markets and manpower requirements;
- Preparing national level human resources development plans for the larger environmental sector to ensure a match between the job market and graduates;
- Revising curricula to be continuous, institutionalized and research-based – and responsive to emerging issues related to environmental planning (such as GIS and landscape management); impacts of globalization; climate change and biotechnology; participatory methodologies and interactive learning skills management; and collaborative management;
- Ensuring curriculum responsiveness to changes - scope, content and delivery processes;
- Developing capacities to apply knowledge in the larger field of natural resource management;
- Including courses on environmental management ethics;

\textsuperscript{84} The selection of commodities for monetization will require a more detailed market analysis, but ETOA Team discussions with the World Food Program confirmed that rice should not be one of the commodities, as this would discourage local production.

\textsuperscript{85} For example, in Uganda, ACDI/VOCA ran the monetization program (including commodity selection), and through USAID, monetized funds were transferred to a contractor for the establishment and operation of a Grants Management Unit under an existing contract.
• Institutional reforms needed to develop environmental educational programs and make them more responsive to land production and rural development needs;

• Enhancing the quality of teaching;

• Working within regional education networks such as the African Network for Agroforestry Education (ANAFE), the African Forestry Research Network (AFORNET) and the Forestry Research Network for sub-Saharan Africa (FORNESSA);

• Developing staff exchange programs and continuing education opportunities; and

• Strengthening linkages between research, education and development.

Although USAID does not have the resources to take on all of the above elements, the Mission does have experience in strengthening the University through the Liberia Teacher Training Program, and the American Bar Association’s support to the University’s School of Law. Lessons learned from the programs could be applied to the development of a small support program to the College of Agriculture and Forestry.

12.2.5 CONSERVATION OPPORTUNITIES (ALL EARMARK)

Provide Support to the Worldwide Fund For Nature (WWF) to Facilitate Liberia’s (BNF) Participation in the Programme Régional de Conservation de la Zone Côtière et Marine en Afrique de l’Ouest (PRCM), and Eventually WWF’s West African Marine Ecoregion (WAMER) Program

PRCM is a coalition of agencies for the Regional Conservation Programme for the Coastal and Marine Zone of West Africa. It was set up on the initiative of the World Conservation Union - IUCN, the WWF, Wetlands International and the International Foundation for the Banc d’Arguin (FIBA), in partnership with the Subregional Fisheries Commission (CSRP.) PRCM now represents a coalition of nearly 50 partner institutions with the aim of coordinating conservation action directed at the coastal zone of the subregion’s seaboard countries—Mauritania, Senegal, the Gambia, Guinea Bissau, Guinea, Sierra Leone and Cape Verde.

The purpose of this coordination is to: i) improve the overall relevance and coherence of conservation actions; ii) pool available resources; iii) make full use of regional expertise; iv) foster exchanges about the experiences; and v) develop research, training, communications and advocacy actions with a view to promoting sustainable coastal zone development from which societies will derive benefit.

WWF’s West African Marine Ecoregion (WAMER) program started in 2000 and is based in Dakar, Senegal. It is designed to address critical marine biodiversity and fisheries issues in the ecoregion. The project consists of 4 modules and a strong communications element. These modules are:

• Supporting and Creating Marine Protected Areas;

• Sustainable Artisanal Fisheries;

• Fisheries Access Agreements; and

• Threatened Species.

Both programs would significantly help reduce threats to Liberia’s marine resources. BNF’s participation is this program would begin to help address some of the major issues the marine fisheries sector is currently facing.
Provide Support to the Jane Goodall Institute
The ETOA team understands that the Mission has received an unsolicited proposal from the Jane Goodall Institute (JGI) to work in Gola National Forest - soon to become a national park with assistance from the World Bank-supported COPAN project. The team believes the Mission should seriously consider supporting this proposal for a number of reasons. First, JGI has a strong track record in primary school environmental education, working with communities on chimp conservation, and developing sustainable chimp ecotourism activities that benefit both government agencies and local communities. Additionally, JGI has an excellent track record in helping government agencies in protected area development, and JGI’s presence would both complement and support FDA and COPAN initiatives.

Support Transboundary Initiatives
Conservation International has identified two critical cross border areas or clusters for conservation. These include:

- The Gola/Lofa/Mano Complex which represents a mix of lowland forests on the Sierra Leone and Liberia border. This area represents the westernmost extent of many plant and animal communities within the Upper Guinea forest ecosystem. Though poorly studied and largely inaccessible by researchers and conservationists in recent years, the area still contains large tracts of contiguous forest for the potential establishment of core-protected areas and cross border collaboration. These include the Gola Forest Reserves in Sierra Leone as well as the Gola and Kpelle National Forests and the proposed Foya, Gola and Kpo Mountains protected areas in Liberia. The contiguous nature of these cross-border forests also presents opportunities for transfrontier initiatives between the two countries; and

- The Krahn-Bassa/Sapo/Grebo/Taï complex contains the largest tract of contiguous forest left in the entire Upper Guinea ecosystem and represents the greatest opportunity to establish and maintain protected areas containing large intact stands of forest. This area includes Sapo National Park, Grebo and Krahn-Bassa National Forests, and the proposed Gbi and Grebo protected areas on the Liberia side and Tai National Park on the Ivory Coast side, the single largest existing forest protected by a national park in the region and offers a potentially good opportunity for transfrontier conservation along the Liberian border.


Although the World Bank-support COPAN project will promote cross border collaboration between Sierra Leone, Guinea and Liberia, most of this effort will focus on developing memoranda of understanding between the three countries and identification of priorities. As COPAN funds are extremely limited, USAID may wish to consider collaborating with the World Bank on this initiative and/or funding priorities as determined by the three countries.

Additionally, as WWF has been active in the support of Taï National Park, the Mission may want to explore with WWF the possibility of developing a cross border initiative between Liberia and the Ivory Coast.
Develop a Joint USAID-Peace Corps Conservation Program

Peace Corps Volunteers have been very effective in many countries in assisting governments with conservation and alternative livelihood activities, ranging from habituating chimps and ecotourism development to working with communities and government agencies on collaborative management of national parks and forest reserves. More often than not, these programs were supported with USAID assistance. As Peace Corps re-establishes its presence in Liberia, USAID should consider supporting Peace Corps for a small program to assist FDA with the community forestry program. Such a program could perhaps be done in collaboration with the LRCFP who could provide financial support to the program.
13.0 CONCLUSION

Liberia has been lauded for its extensive and unique biodiversity, including the largest remaining tract of Upper Guinean Forest in West Africa and a stunningly diverse range of wildlife and plant species. In 1999, the West African Conservation Priority-Setting Exercise for the Upper Guinean Ecosystem identified Liberia as the top priority country for conservation efforts in humid West Africa. However, the nation’s forests and biodiversity face serious threats from a wide range of activities, including logging, subsistence agriculture, hunting, mining, and agro-industrial plantations. These threats are compounded by the subsistence struggles of a population that ranks as one of the most impoverished in the world, in part resulting from more than a decade of civil conflict. In short, Liberia poses unique challenges for the conservation of forests and biodiversity, not the least of which is rebuilding the physical, institutional and human infrastructure required for the conservation and sustainable management of the nation’s forest and biodiversity resources.

Although USAID/Liberia has a relatively short history of involvement in conservation efforts and sustainable natural resource management in Liberia, the Mission has several notable achievements including the Liberia Forestry Initiative’s work in commercial forestry, which culminated in the lifting of U.N. timber sanctions in 2006. Moreover, USAID’s comparative advantage in facilitating the involvement of international conservation NGOs, community forestry, conservation financing, forging public-private partnerships, democracy and governance, and education and training position the Mission for future investment.

In this context, this report has examined the status of biodiversity and forests in Liberia, detailed the threats (Sections 3 and 4), policy and institutional constraints (Section 5) and strategic options for addressing the underlying causes of the threats to biodiversity, forests and ecosystems (Section 6), and compared these with the current USAID programs in Liberia (Section 7). While the results showed that USAID is indeed supporting numerous actions that benefit conservation, we have pointed out several areas where there are opportunities for further co-conservation activities under the Mission’s current portfolio. Given the USAID/Liberia’s comparative advantage, we have also identified new programming areas for the Mission’s consideration and/or consideration by other donor organizations (Section 12).

Examining the recommendations for current and proposed USAID activities in Liberia, three themes ran through the report and bear repeating:

- **Support for alternative livelihoods.** Liberia desperately needs viable, value chain driven alternative livelihood programs that can compete with illegal activities. USAID should consider: i) strengthening the linkages between current implementing partners work in coffee, cocoa and aquaculture, and reducing threats in critical habitats; and ii) developing new alternative livelihood programs in non-timber forest products and alternative protein sources.

- **Support for capacity building.** As the GOL’s lack of capacity to manage and conserve national resources is a major deficiency that prevents many needed conservation actions, USAID should, under the LFI, work to build the FDA’s and EPA’s institutional capacity to plan, implement, monitor and integrate conservation activities in Liberia. In the longer term, building capacity in the environment and natural resources sector in Liberia will depend a great deal on the University of Liberia’s College of Agriculture and Forestry; USAID should consider rehabilitation of the College as a future programming activity.
• **Support for alternative financing.** The lack of financial support is a major cause of most of the institutional limitations in conserving and managing Liberia’s tropical forests and biodiversity resources. Under its current portfolio, USAID should consider developing a monetized PL 480 program to support conservation initiatives. As a future programming activity, USAID should explore the possibility of supporting CI’s protected area trust fund initiative.

Finally, USAID could strengthen its conservation activities and better respond to the Congressional biodiversity earmark by expanding the Land Rights and Community Forestry Program (LRCFP) proposed small grants program to include targets of opportunity across all of Liberia and not just Nimba and Sinoe counties. In terms of future programming, USAID should consider supporting the Jane Goodall Institute’s unsolicited proposal to work in Gola National Forest, and explore, with the Worldwide Fund for Nature, the possibility of extending WWF’s West African Marine Ecoregion Program to Liberia.
PART 3: ENVIRONMENTAL DATA COLLECTION, MONITORING AND ADAPTIVE MANAGEMENT
3.1 INTRODUCTION

Equitable social and economic development coupled with sound environmental protection is supported through strategic sustainable utilization of Liberia’s rich natural resources. Liberia is transitioning from years of civil unrest and conflict to a state where democratic reforms are beginning to take hold. Combating environmental degradation, gender inequality, infectious diseases, famine, and unemployment requires sufficient levels of transparency among the Liberian government institutions tasked with growing Liberia’s civil society and protecting its environment. Transparent processes enable and foster a truly democratic society including participatory processes, accountability, consensus, and the rule of law. Engendering constituent confidence in government institutions through adopting transparent practices is a prerequisite for a stable society.

Liberia’s geospatial information systems must be designed to allow for the adoption of new data for spatial analysis. Data management flexibility is important as new knowledge regarding the bio-physical and socio-economic infrastructures continue to evolve. An important example of this needed flexibility is illustrated in the upcoming change in the standard populated place dataset. Liberia will be ending its use of Pcodes that were developed hastily during the conflict period by the HIC, and in its place, using data that was methodically collected during the 2008 census. Project management decision support requires current and reliable information that is consistently used by all government sectors, and as such, systems must stay flexible to accept this new data.

Current human capital in geospatial sciences and capacity to develop this important asset represents an important opportunity for Liberia’s environmental activity planning and monitoring programs. Liberia has a small but growing cadre of GIS developers and users who possess strong human capacity to effectively utilize Geospatial technology. Their expertise in geospatial sciences can contribute greatly to supporting Liberia’s emerging democratic institutions in several key ways:

COMMUNICATION
Maps communicate simple to complex data relationships allowing for a broad range of stakeholders to be involved in decision making processes. EPA, FDA and LISGIS use maps at various levels to inform discussion regarding various policy decisions, prioritizing investments and illustrating impact. Participatory mapping processes discussed with the Liberian GIS working group can give a voice to all. Representing key community assets using map points, lines and polygons with associated color schemas better ensures that all stakeholders have access to and understanding of the same information. Village level representatives without the benefit of formal education can participate in the investment planning and on-going impact monitoring. Transparency is essential for creating confidence in emerging democratic processes, maps support an open communication process that can and are currently being readily distributed through visual media outlets. However, the use of spatial information for communication purposes is constrained at the EPA through limited physical infrastructure for data management and map production. EPA currently employs a member of the GIS working committee, but this employee does not have the hardware or software infrastructure to support GIS analysis or digital cartography.

COORDINATION
Spatial data sets recognized by Liberian government institutions can be used to support intra- and inter-agency activity planning and coordination. Maps succinctly show the distribution of activities across the landscape and can inform program management where there are funding needs, gaps and priorities. Knowing where development investments are located can inform possible synergies/partnerships with
other government institutions, private companies and donors and can reduce the potential for redundant programming. Consistent and reliable information is required to foster coordinated work flow across institutions. A major constraint to transparent communication between the government of Liberia and its people, Liberian institutions and its development partners, and internally among the institutions themselves is a recent “lock-down” of maps and data available to the public by the FDA. Several activist environmental groups obtained data from the FDA to publicize their discontent with concession area allocations. As a result, the FDA has instituted a lengthy approval process that goes beyond the Director of FDA and instead requires consent from FDA’s board members. In order to effectively coordinate and bring this important counterpart into the ETOA project life-cycle, the FDA must be assured their data is safe and they will continue to have control over dissemination approvals until they are ready to make FDA data available for public dialogue again.

MONITORING AND EVALUATION

Spatial data and maps can clearly communicate to the public where investments are being made and where activities are located. Ongoing updates provided by Liberian institutions and partner agencies are readily reflected using mapping technologies where large volumes of information can be readily summarized and evaluated for impact. While several evaluations have been made with regard to land cover or donor project coverage, the lack of metadata/cataloguing standards gives rise to many obstacles for data management at the LISGIS and FDA. Monitoring changes in baseline data is difficult without the proper metadata depicting methodology, dates of analysis, and individuals involved. For example, areas of concern related to environmental threats and opportunities could be identified through performing time-series analysis of Liberia’s land cover, which has been done at least twice in the last six years. However, without understanding how each analysis was done, FDA and other agencies are unable to determine if the comparison is actually “apples to apples”. Without cataloguing the methodology for analysis and the sources of raw data, it is difficult for FDA, EPA, or LISGIS to establish a reputable baseline for comparison over time. This program can use satellite imagery and other information in the public domain to do a baseline assessment, which will be detailed further under the monitoring and adaptive management section of this report. Other key USAID partners have already begun this process and leveraging this initial good work is important.

3.2 ENVIRONMENTAL SPATIAL DATA GAPS

Availability of tabular and spatial environmental data has been compromised as a result of the civil war. For example, hydro-meteorological monitoring was disrupted as a result of the conflict. Many of the sensors and related technologies used to harvest data on a regular time step were destroyed or looted. Human capital required to record these data and integrate them with central databases was seriously compromised. The physical infrastructure that housed these systems along with their operators was severely damaged in many locations. Hence, there are significant gaps with respects to these and other environmental data. Data that does exist is typically in an analog or paper format which limits external investigator access. Relevant environmental data that resides in antiquated filing systems unaffected by the conflict remain largely inaccessible to the outside world. Digital data cataloging systems that can be inventoried by external clients can greatly foster information exchange.

Land cover baselines are being re-established by the FDA allowing for on-going change detection and related environmental monitoring. The 2008 census was just released by LISGIS and when plotted on a map these data can be related to possible pressures put on environmental resources. Other Liberian partner agencies such as Conservation International (CI) are conducting spatial assessments of key land
resources and associated changes. The ETOA data collection process involved traveling to important protected areas and documenting key findings specific to environmental threats and opportunities. Coordinate data were taken using a Global Positioning System (GPS) together with high resolution photos. These coordinate data along with their related attribute information that describe the environmental threat/opportunity and photo images can and should be integrated with other environmental data such as those produced by the FDA or CI to provide a degree of validation regarding certain events identified through direct observation. This process is valuable to explaining why certain change related to environmental conditions is occurring.

One especially critical data gap is the lack of land tenure maps. Per discussion with the key Liberian geospatial developer and user group, there are few official records that identify communal land resources or individual land holdings. Gaps associated with Liberian communal land resources constrain management ability to develop sustainable community-based planning of shared resources such as woodlots, water resources, grazing lands and other environmental opportunities. This theme was reiterated during the June 17\textsuperscript{th} 2008 ETOA workshop, where attendees identified the underlying source of environmental threats as a lack of land ownership records. Where land ownership is in question associated natural resources can be at risk. The adage “if I own it then I will protect it” is relevant to protecting Liberia’s rich natural resource base. A challenge to the Liberian Government will be to ratify national level land tenure legislation. Land resources management is important to achieving a successful and smooth decentralization process. Discerning customary or historical community boundaries can foster user rights to land resources, which in turn can help to mitigate conflict.

3.3 CAPACITY OF LIBERIAN INSTITUTIONS COLLECTING AND MANAGING DATA

As stated earlier the Liberian civil conflict contributed to a disruption in the collection process and in some instances the total destruction of key environmental data needed to conduct time-series assessments of discernable trends. For example, upon discussion with key geospatial data developers and users historical hard copy land cover maps are not available, but 50k topographic maps (from the 1960s) are. Historical and current land cover maps are used to show the location and extent of key land resources such as forest reserves. Comparing hard copy maps from one time period to the next contributes to the assessment of where forest change is occurring. GIS analytical methods allow for historical maps to be digitized and included in analysis of change detection. Rates of change relating to forest conversion, urban development, and surface water availability cannot be readily assessed without the historical record. These data gaps have an impact on identifying where environmental opportunities and threats exist.

There is sufficient local human capacity to begin addressing land ownership issues through a simple participatory mapping process. Participatory perimeter mapping methods using inexpensive geospatial data technologies such as global positioning systems (GPS) can help to loosely define community land resources. Using consumer GPS technology has an inherent error (+- 10-20 meters) and must be taken into account when defining a community perimeter. Disputes relating to boundaries must be resolved through high precision land survey methods, which are skill sets not found locally, and government land management mediation. However, using inexpensive consumer GPS technology can help to identify to define general land resources for planning purposes and more importantly, where additional high precision work is necessary. Land resource perimeter maps - defined by both community stakeholders and government officials in a joint perimeter mapping exercise -foster agreement regarding the shape and
extent of land resource holdings. Perimeter maps can also be ‘clipped’ with recent land cover maps derived from satellite images to discern the type of land resources contained within the community perimeter, the quantity of these land resources and their distribution. Effective management of land resources is dependent upon this type of information.

Although there is an extensive inventory of Liberian spatial data (see Annex G for a comprehensive list), there are important gaps with respects to Liberian environmental and land ownership spatial data. Certain data collection methods were disrupted by the war or were never planned. As the Liberian democratic processes take hold land use and related land ownership issues will become an increasingly important factor related to a peaceful transition. Developing an inventory of Liberian land resources associated with communities that interact with protected areas could help to mitigate conflict and inform the prioritization of key investments.

Spatial planning and analysis can support the development of a Liberia strategic environmental action plan; this requires current and relevant data. Various Liberian institutions have GIS technical specialists who know how to manage and use spatial data as an input to project action planning, monitoring and/or reporting process. While in the EPA case, there are some hardware constraints to fully developing GIS analysis capacity, both LISGIS and FDA have the structural capacity for robust analysis, as well as large map production.

Each of the agencies visited through this STTA where either actively using the spatial data available for planning and monitoring or were making plans to do so. Spatial data that does exist are not typically coordinated or managed across Liberian Government institutions. This can and has lent to replication of core data sets, confusion regarding administrative boundaries and other spatial features, and confusion or inaccurate activity planning based on incongruent or dated information. Key Liberian geospatial technical specialists view the lack of a coordinated approach to spatial data management as a significant impediment for planning and monitoring development initiatives. The workshops to be held in August will focus on management of existing spatial data resources and training trainers in the use of open source GIS solutions to ensure that Liberian development agencies can incorporate officially recognized spatial data at all levels of project planning and monitoring (see below).

Not only is there confusion as to what data is the more up-to-date and pertinent, but there is also an issue with multiple datum usage, as well as projected and unprojected data. The Liberia1964 datum, while not in current data development plans, has been used for several datasets. While typically not problematic, as most GIS software can perform the needed datum transformation on the fly, this is an issue for datasets that come with no metadata and missing spatial reference information. Most agencies use the UTM 29N projection when performing analyses or printing maps for dissemination, and care should be taken to identify the coordinate system of any tabular data such as population centers, etc. The HIC, when developing the populated places dataset, used WGS84, and as such, a new workflow may be needed when mapping event themes. It is imperative that close coordination between Liberian agencies takes place, as well as a stakeholder-defined spatial data standard is created.

### 3.4 Monitoring and Adaptive Management Use of Data and Information by Government of Liberia, USAID and Key Partners

Without a transparent catalogue of currently developed analyses, it is difficult to say with absolute certainty what has been accomplished in terms of using GIS as an adaptive management tool by GOL,
USAID, and key partners. One major goal of this program is to help GOL plan a catalogue standard for all assessments and data developed. Below is a summary of key monitoring and adaptive management exercises:

The Liberia Forest Reassessment (LFR) project is an initiative designed to help fill gaps with respects to forest cover spatial data gaps. The LFR is operated by Fauna & Flora International and Conservation International in partnership with the Liberia’s Environmental Protection Agency (EPA), Forestry Development Authority (FDA), and the Ministry of Planning and Economic Affairs (MPEA). The LFR represents one of the largest forest management efforts in Liberia since 1990, when the civil conflict began. The effort is co-financed by the European Commission and the Critical Ecosystem Protection Fund.


The CI forest assessment offers critical information relating to where forest is changing and the rate by which it is changing. However, change detection analysis specific to other important land cover classes, such as urban areas, grasslands, wetlands, surface water (lakes and rivers) etc. are required to determine relative rates of change and potential ‘hot spots’. There is a need to broaden the land cover change detection assessment to include all significant land cover classes to help provide comprehensive insight into priority areas. Sustaining this assessment can be fostered through further strengthening local institutional and human capacity of the FDA, EPA and LISGIS in change detection analysis.

Satellite imagery such as those acquired through the Landsat Earth-observing satellite missions and that is co-managed by NASA and the U.S. Geological Survey (http://edcsns17.cr.usgs.gov/EarthExplorer/) can be inventoried for good quality images that can be used to fill gaps in land cover change analysis. Satellite image based land cover change detection provides for a scientific analysis of land cover information methods that can be replicated. This imagery contributes critical information regarding where important change is occurring and a measurement of the rate of change. Such analysis can help managers to target environmental protection project resources where the need is most evident. The LFR described above represents an important forest cover assessment. Additional land cover classes can be assessed using these remotely sensed images to inform analysis relating to land cover conversion from one class to another.

Ground validation of land cover time-series maps and rates of change must be validated. This process typically involves traveling to the field to determine if the most recent land cover map is consistent with what is observed on the ground. Remotely sensed information and related analysis illustrates location and rate of change, but it cannot explain why change is occurring. Understanding the drivers of change is necessary when identifying key Liberian environmental opportunities and threats. Focused surveys and interviews with stakeholders who interact with land resources of interest, such as forest reserves can help to explain why change is occurring and allowing for targeted interventions that highlight opportunities and help to mitigate threats, such as community-based natural resources management planning. To this end, the ARD-implemented forestry program is a critical first step in building capacity for analysis and CBNRM activity planning.

Monitoring changes to large forest reserves and protected areas can be accomplished through use of satellite imagery in the public domain (such as AVHRR or MODIS data). The temporal resolution of this imagery allows for a daily snapshot of the surface of the earth and comprises an important data resource for global environmental monitoring (http://glcfapp.umiacs.umd.edu:8080/esdi/index.jsp). Subsets of the
global data set can be “windowed” with the boundaries of Liberia allowing for country specific vegetation change detection analysis. Typically, change detection assessments are completed with data from the same time to ensure seasons are consistent. Comparing the “leaf-on” with a “leaf off” seasonal period could lend to confusion regarding perennial land cover. MODIS also provides a firemapper resource (http://rapidfire.sci.gsfc.nasa.gov/firemaps/), where surface reflectance is measured and given a probability ranking of being a fire. This provides the FDA and other Liberian governmental institutions and partner agencies with on-going up to date information for monitoring large scale environmental change. Where there are discernable changes observed together with fire events may necessitate further investigation with higher resolution satellite imagery and field work. Making assessments of environmental threats and opportunities requires extensive field work. Stakeholders that interact with protected areas are reliant upon limited resources for sustaining livelihoods. Inventorying Liberia’s resource base is required to establish a baseline by which change can be measured. The Forest Development Authority (FDA) has completed various inventories of Liberian forest reserves – a valuable resource that can establish a baseline for selected protected area monitoring. Spatial data collected from ecologically significant sites can be used for investigative analysis and to inform decisions specific to threats and opportunities. Analytical methods such as spatial multiple criteria evaluation (SMCE) help stakeholders to use their knowledge of the biophysical and socioeconomic landscapes to prioritize investments based on probability for success. Emerging geospatial technologies allow spatial data developers to post dynamic information on the internet using innovative and compelling methods.

The ETOA field team traveled to important ecological sites to make observations relating to environmental opportunities and threats. Photographs and geospatial coordinates were collected using GPS units to document the both the route taken and location of the site visit. This information can be plotted on a mapping application (see graphic) to document the condition of the site at that location. The geo-referenced photograph provides a historical record of the site condition for the time it was taken. Future site visits can arranged around the ‘mapped’ sites to observe any changes and interview local stakeholders regarding the drivers behind observed change. Additionally, the geo-referenced photographs can be used by remote sensing analysts to compare what is observed in satellite imagery with reality on the ground. This type of ground “truthing” can support the development of a larger land cover classification that describes and quantifies important protected areas.

### 3.5 WORKPLAN

#### INITIAL FINDINGS FROM NEEDS ASSESSMENT AND RECOMMENDATIONS

Spatial data resource integrity is an important issue defined by the Liberian Geospatial Working Committee (LGWC). Creating a Liberian National Spatial Data Infrastructure (LSDI) is a priority and a process that will require a national level planning committee. Establishing a LSDI requires a national level policy that establishes a legal precedent for recognizing such an infrastructure and the committee tasked with management. Successful LSDI implementation is reliant on a campaign that raises awareness of the importance of spatial data for program planning, monitoring and reporting. Insuring that spatial data serve as a cross-cutting agency data resource requires effective inter and intra-agency coordination.

A financing mechanism to support human resources required for a LSDI committee and capital investments must be selected leveraging resources that already exist at the LISGIS will foster. Once in place the LSDI committee defines spatial data standards including reference ellipsoid, projection and data types.
The LSDI must establish a standard format for spatial data documentation (metadata) and cataloging. Metadata provides a description of the data, such as the author, date of publication, purpose, methods etc. this is essential to maintaining a relevant LSDI. Enabling a web-based metadata service allows ready access to the national level spatial data; however the internet infrastructure in Liberia is currently limited and is characterized by a low band width making large data file download a tedious process. Extending the LSDI to Liberian government institutions requires capacity strengthening in use of spatial data for decision support and the use of a metadata catalogue.

Metadata cataloging typically involves the following:

- Acquisition and/or development of spatial data must be coordinated among Liberian Government institutions to avoid unnecessary duplication and confusion regarding versioning; and

- Spatial data standards defined for data interoperability and integration of spatial data between Liberian Government agencies one agencies data set with another.

National level coordination and policies specific to developing and managing spatial data ensures that every government institution and related partners have access to data that is consistent, reliable and ensures that coordinated government decisions are made using the same spatial data set.

A proposed LSDI would comprise of a suite of technologies, related policies, standards and human capital that acquire, process, manage, analyze, distribute and improve the overall adoption of geospatial data in project decision support systems.

A National LSDI would be responsible for (list not inclusive):

- Defining legal and administrative policies that establish, maintain and apply standards to basic national spatial data sets such as administrative boundaries, populated places, transportation infrastructure, rivers, land cover, etc.;

- Establishing a geodetic framework and coordinate reference system;

- Managing topographic and cadastre databases; and

- Maintaining a web-based technological facility that provides for on-going public user access to the metadata and retrieval of those spatial data deemed in the public domain.

Typical Geospatial Data maintained in a NSDI (National Spatial Data Infrastructure):

- Administrative boundaries and territorial borders;

- Populated places;

- Elevation/relief;
• Transportation infrastructure;
• Remotely sensed imagery;
• Geodetic network;
• Cadastral information;
• Hydrographic; and
• Land cover

A plan to periodically review these core data sets and recommend up-dates aimed at keeping these data relevant for environmental protection and related project planning purposes is important. Establishing user confidence in these data is important as this will establish credibility with a LSDI.

3.6 ACTIVITIES

3.6.1 METADATA CATALOGING WORKSHOP
Organize a workshop with the key Liberian GIS developers and users to evaluate current methods for spatial metadata management. Draft a proposal specific to the establishment of a LNDI. Setting a LNDI in motion will allow the current users of geospatial data to do an inventory to determine what information is available for use in geospatial decision support and related planning/monitoring initiatives.

3.6.2 OPEN SOURCE GIS WORKSHOP
Using spatial data requires a GIS application to interact with the spatial data. Traditionally, GIS applications have been limited to institutions that can afford the licenses which limits the use of spatial planning in many development agencies that require it most. Increasingly mature open source GIS applications have become available. These applications are license free and provide a solution for those agencies that do not have a budget to purchase commercial licenses. Training trainers in basic Open Source GIS functionality can support the rationale for a LSDI through promoting a new cadre of spatial data users tasked with using these resources to support environmental protection and other development initiatives.

3.6.3 LANDCOVER ASSESSMENT FOR NON-FOREST ASSETS
Leveraging the recent forest cover analysis performed by CI, we will perform a times series analysis to show areas where mangroves and other ecological assets have changed over time. We will leverage this analysis as an educational topic for advanced GIS analysts.
ANNEX A: SCOPE OF WORK

TASK NUMBER 1: STATE OF THE ENVIRONMENT REPORT

The contractor will make use of the Report Outline in Attachment J.1 as a basis for the development of the report using the three pronged approach indicated below. This approach emphasizes the description of underlying root cause issues over extensive descriptions of specific environmental problems.

1) Identify the underlying causes of environmental degradation and suggest strategic options to address them.

2) Identify and describe approaches and interventions by all institutions (e.g., Government of Liberia, NGOs, private sector) and results (if any) under given enabling conditions including the effectiveness of the existing legal and regulatory environment to enable effective environmental management.

3) Analyze opportunities and constraints associated with all environmental elements (e.g., coastal management, forestry resources).

The contractor will provide information on each of the environmental elements listed in Attachment J.1 using this approach as a means to focus their collection of data. As an attachment to the written report, the contractor will develop an information matrix for each primary environmental element listed in Attachment J.1 (e.g., urban and rural environmental degradation, tropical forests and biodiversity, watershed management, water resources management). This matrix will be geo-referenced on a GIS map using a visualization tool.

For example, under tropical forests the matrix will contain information on forestry sector constraints, underlying causes of constraints, the identification of field interventions by USAID and other institutions (past and present as appropriate), the enabling conditions necessary to achieve success, lessons learned from any successes or failures, and suggestions for accelerating success.

The contractor will conduct a comprehensive literature review on each of the topics listed in Attachment J.1 and a list of references will be included in the report. It is especially important to document and analyze any other environmental assessments (World Bank Strategic Environment Assessment for Liberia) or large sector assessments (World Bank-sponsored Comprehensive Assessment of the Agriculture Sector in Liberia) that could provide insights on potential impacts on the environment. The contractor will meet with representatives from selected institutions in Liberia to gather information for the report and vet the overall framework of the report in a consultation workshop with key stakeholders. The contractor will also conduct targeted field visits to successful sites in order to collect the necessary information for the report and information matrix (See Box 2 for suggestions).

Box 2: Potential site visits
- Lake Piso-Robertsport (road and coastal areas)
- Nimba Highlands (STCP and conservation activities, mining area)
- Gbarpolu County (Belleh Yella proposed road construction)
- Buchanan Road area → Greenville (Greenville port)
- Sapo National Park, community forestry area
- Proposed logging concession area
- Large plantation area (rubber and/or oil palm)
- Humanitarian assistance/resettlement area
- LCIP assistance area (infrastructure)
The contractor will identify opportunities to integrate environment opportunities within the Mission’s current and planned program. For example, the contractor will examine planned activities under the Sustainable Tree Crops Program (STCP), Land Rights and Community Forestry Program (LRCFP), infrastructure, economic growth, energy, humanitarian/food security, health and education programs. The contractor will also identify opportunities for the Mission to address environment in the course of developing new activities and strategies. Finally, the contractor will provide recommendations about how the Mission can best integrate special political targets of opportunity (e.g., biodiversity, global climate change and water earmarks) into its strategy.

The contractor must approach the gathering of information on tropical forests and biodiversity in the same way as the other environmental topics in the report. Treating tropical forests and biodiversity like the other environmental topics will encourage the team members to identify opportunities to integrate tropical forests and biodiversity into the Mission’s rural development activities. However, there are special legal requirements (Foreign Assistance Act, Sections 118/119) for USAID to obtain specific information on tropical forests and biodiversity as part of the development of a strategic plan. Task 2 is included below for this reason. The challenge for the contractor is to gather information for the development of the Part I (State of the Environment Report) that can also be used in Part II (Actions Necessary and Planned to Conserve Tropical Forests and Biodiversity).

**TASK NUMBER 2: TROPICAL FORESTS AND BIODIVERSITY REPORT (FAA SECTIONS 118/119)**

As required under the Foreign Assistance Act (Section 118 and 119), the assessment must include:

- A concise evaluation of the country-wide status of biodiversity and tropical forest resources, focusing on management issues and required actions for conservation; and

- Identification of the extent to which these required actions for conservation are satisfied by the current or proposed Mission programs.

Specifically the following FAA Sec 118 (e) country analysis requirements must be met:

- “Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of the actions necessary in that country to achieve conservation and sustainable management of tropical forests, and the extent to which the actions proposed for support by the Agency meet the needs thus identified.”

And additionally the following FAA Sec 119 (d) country analysis requirements must be met:

- “Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of the actions necessary in that country to conserve biological diversity, and the extent to which the actions proposed for support by the Agency meet the needs thus identified.”

The contractor will conduct the activities identified below in order to comply with the requirements stipulated above. The contractor will make use of the Report Outline in Attachment J.1 as a basis for the development of the report.

As required in the development of Task Number 1 above, the contractor will make use of the three-pronged approach. This approach emphasizes the identification and description of root causes of threats to
biodiversity and tropical forest conservation rather than extensive descriptions of specific threats to specific species or ecosystems.

As described in Task I above, the contractor will develop an information matrix for each of the elements listed under the Tropical Forests and Biodiversity section in Attachment J.1 (e.g., Protected Areas, Species Diversity). In the course of completing the Tropical Forests and Biodiversity section, the consultant report will provide additional information on the topics indicated below.

- For each sector in which USAID/Liberia is working, describe what actions are being taken/proposed that have an effect on the conservation of biodiversity and Tropical Forests and propose, where appropriate, actions that could improve conservation of biodiversity and/or tropical forests.

- Identify USAID’s comparative advantage to address biodiversity and tropical forestry issues vis-à-vis other donors and partners.

- Identify and analyze key threats to biodiversity (e.g., pollution, policy environment, bushmeat consumption and markets, unsustainable timber extraction, plantation incursion into natural forests). The focus should be on root cause threats rather than location specific threats.

- Document tropical forest and biodiversity trends in Liberia associated with its management, biophysical condition, productivity and diversity.

- Describe the major ecosystem types and protected areas in Liberia.

- Provide information regarding threatened and endangered plant and wildlife species in Liberia and activities underway and planned to protect these species.

- Identify and describe recent, current and planned conservation efforts in Liberia.

- Describe the scope and effectiveness of existing and past conservation efforts. This information will be summarized in a matrix format.

- Describe the relationship between biodiversity and agriculture both as an opportunity to conserve biodiversity (e.g., sustainable tree crops) and as cause of biodiversity loss (e.g., agricultural expansion).

- Describe the relationship between biodiversity and other rural development activities underway or planned (e.g., agriculture, forestry, mining, energy, coastal development, infrastructure development, policy reform). Identify opportunities to integrate biodiversity conservation into activities that the Mission is planning.

- Provide information regarding the effectiveness of government management authorities that are responsible for tropical forests and biodiversity in Liberia.

- Describe the legal and regulatory environment in Liberia and its implications for sound environmental management.

Also per the description in Task 1 above, the contractor will develop an information matrix for tropical forests and biodiversity (and the other environmental elements). The matrix will contain information on biodiversity and forestry sector constraints, underlying causes of constraints, identification of field interventions (past and present as appropriate), the enabling conditions necessary to achieve success, lessons learned, and suggestions for improvement. The matrix will also include a description of other international donor and NGO tropical forestry and biodiversity activities.
TASK NUMBER 3: ENVIRONMENTAL DATA COLLECTION, MONITORING AND ADAPTIVE MANAGEMENT

For the mapping, the team will work with a GIS expert based in the US and a Liberian institution to geo-reference key threats to biodiversity and forestry in Liberia as well as environmentally sensitive areas (e.g., wetlands, mangrove areas and steep slopes), areas of environmental degradation and areas of significant biodiversity. The team will use GPS to record points of sites visited. Large exploitation areas such as plantations, potential mining sites and forest concessions must be mapped to the extent possible as information and satellite imagery is available. In addition, the team must take high resolution digital photos of key sites and activities related to environmental conservation and degradation (see Annex 1). These can be linked to the GIS points. To the extent possible the team will quantify threats and choose appropriate indicators for monitoring for use by USAID, the Government of Liberia and other stakeholders (NGOs, project implementers, and communities). The team will also make recommendations for benchmarks toward threat reduction and improvement of environmental degradations.

As a follow on activity, the data management and GIS expert will continue to backstop the Liberian institution in data collection, monitoring and use of environmental data for planning. This will require two additional trips to Liberia to assist the Liberian institution with data collection (to update the ETOA and benchmarks), synthesizing and presentation of data in spatial format. The GIS expert will train individuals from the Liberian institution and build the capacity of the Liberian institution to undertake environmental monitoring, as well as raise awareness of the importance of monitoring and adaptive management within the Government of Liberia, USAID and other key stakeholders.

ATTACHMENT J.1 ETOA REPORT OUTLINE

Table of Contents

List of Acronyms

Executive Summary

Background

Findings

PART 1: State of the Environment

- Threats to ecosystems, including terrestrial, coastal, wetlands and marine areas
- Potential effects of climate change on Liberian ecosystems
- Environmental and natural resource hazards and degradation (urban and rural)
- Environmental and other policies impacting natural resources and ecosystems
- Institutions in the environment sector and affecting environmental status
- Underlying causes of environmental degradation
- Approaches and interventions used by all institutions (e.g., NGOs, government, private sector) and results obtained under what enabling conditions including the legal and regulatory environment
- Opportunities and constraints associated with all environmental elements (e.g., coastal management, forestry resources)
• Indicators of environmental damage/health and potential monitoring systems
• Key links between economic growth, health and governance activities and environmental threats and opportunities

PART 2: Actions Necessary and Planned to Conserve Tropical Forests and Biodiversity
• Threats to tropical forests
• Threats to biodiversity
• Capacity of Government of Liberia institutions to address threats
• Capacity of USAID to address threats within existing portfolio
• Other donor and partner activities
• Recommendations
• Strategic options for addressing underlying threats to biodiversity, forests and ecosystems
• Integration of environment into USAID/Liberia activities
• Opportunities for partnerships
• Potential for carbon and climate projects (e.g., REDD)
• Opportunities for policy development, livelihood and economic growth activities that have the potential to contribute to better management of natural resources
• Conclusion
• List of contacts
• References

PART 3: Environmental data collection, monitoring and adaptive management
State of the data available in Liberia on forests, biodiversity and environmental issues (land degradation, pollution, etc.). This includes quality, type and location of data. Status of data on environmental impacts of USAID programs in Liberia.
• Major gaps in data
• Capacity of Liberian institutions collecting and managing data
• Monitoring and adaptive management use of data and information by Government of Liberia, USAID and key partners
• Recommended indicators and benchmarks related to reduction of threats to biodiversity, improvement in environmental status, policies and capacity to monitor and manage biodiversity, forests and other natural resources
• Work plan for building capacity of Liberian institution(s) to collect and manage environmental data and to assist the Government of Liberia, USAID and key partners in monitoring and using data for planning and adaptive management.
REPORT ANNEXES:
GIS map based on a visualization tool showing location of key environmental threats and hazards and environmentally sensitive areas in relation to USAID/Liberia activities (base map can be obtained from USAID’s GDA office).

At least 50 high resolution high quality photographs of areas of environmental importance, environmental degradation, sensitive areas and other areas and subjects of interest to USAID and partners.
## ANNEX B: SCHEDULE OF SITE VISITS

<table>
<thead>
<tr>
<th>Date(s)</th>
<th>Site(s)</th>
<th>Team</th>
<th>Issues/Opportunities</th>
</tr>
</thead>
</table>
| May 30, 2008  | Marshall wetland/Margibi Mangrove (proposed area) | Seyler and Kpadehyea         | **Issues:** Marshall wetland pollution (Ramsar site). Mangrove dieback, pollution, charcoal, cheap land sales and land fills  
**Opportunities:** Coastal zone management, ecotourism, fisheries. Public-private partnerships, environmental management plans |
| May 31, 2008  | Monrovia waste management and landfill sites      | Krahl, Goodnough and Conneh  | **Issues:** Urban pollution  
**Opportunities:** Environmental impact assessments (EIAs) |
|               | Mesurado wetland                                 | Krahl, Goodnough and Conneh  | **Issues:** Urban pollution, pharmaceutical waste, charcoal, over-fishing  
**Opportunities:** Management plan, public-private partnerships |
| June 2–3, 2008| Lake Piso (proposed protected area)               | Seyler, Thomas, Krahl, Goodnough, Kpadehyea (FDA) and Conneh (EPA) | **Issues:** Dredging (gold and diamonds) proposals, proposed road rehabilitation (LCIP), charcoal, multiple-use issues  
**Opportunities:** Ramsar site and proposed protected area, coastal zone management and stabilization, old growth mangroves, ecotourism, landscape management (ridge to reef), improved fisheries |
|               | Guthrie rubber plantation                        | Seyler and Goodnough         | **Issues:** Expansion into critical habitats, biofuel issues, problems  
**Opportunities:** Public-private partnerships for conservation |
|               | West Africa Agricultural Company (Palm oil)       | Seyler and Goodnough         | **Issues:** Expansion into critical habitats, biofuel issues, tenure problems  
**Opportunities:** Public-private partnerships for conservation |
| June 4–5, 2008| Buchanan                                          | Krahl and Conneh             | Buchanan Renewable Energies – chipping, conversion and export of rubber chips  
Equatorial Biofuels – palm oil to biodiesel (expansion, etc)  
Liberia Agriculture Company – rubber (land tenure issues)  
LCIP – Buchanan Greenville Road  
Oil palm issues (plantation expansion, Liberia Agriculture Corporation, social issues with regard to oil palm—land expropriation); |
| June 9–13, 2008| East Nimba Nature Reserve and West Nimba National Forest | Seyler, Goodnough and Conneh | **Issues:** Iron ore mining concession (ArcelorMittal Steel), agriculture encroachment, bushmeat trade  
**Opportunities:** Environmental management plans, IUCN FDA capacity-building initiatives, multiple use |
|               | Reserve Buffer Zone areas                        | Seyler, Goodnough and Conneh | **Issues:** Encroachment, mining, lack of alternative incomes  
**Opportunities:** Sustainable Tree Crops Program including cocoa production/cocoa as alternative income; shade grown cocoa and biodiversity; farmers field schools and farmer-
<table>
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<tr>
<th>Date(s)</th>
<th>Site(s)</th>
<th>Team</th>
<th>Issues/Opportunities</th>
</tr>
</thead>
</table>
| June 9–13, 2008 | Wologizi and Wonegizi (proposed protected areas) | Thomas, Krahl and Kpadehyea | **Issues:** Iron ore mining concession (BHP Billeton), bushmeat trade, forest management and timber sale concessions  
**Opportunities:** Public-private partnerships, elephant corridors, transboundary initiatives with Ziama Reserve in Guinea, multiple use, other non-timber forest products |
|                 | Buffer zones—LCIP sites around Wologizi and Wonegizi | Thomas, Krahl and Kpadehyea | **Issues:** Encroachment, mining, lack of alternative income  
**Opportunities:** Shade-grown coffee and cocoa and *Arabica liberica* niche market; alternative incomes |
| June 16–20, 2008| Greenville area                               | Krahl, Thomas and Kpadehyea | **Issues:** LCIP (Buchanan to Greenville Road—environmental impact);  
**Opportunities:** county collaboration for wider landscape issues |
|                 | Senkwehn proposed protected area              | Krahl, Thomas and Kpadehyea | **Issues:** Illegal logging, bushmeat trade, incursion, mining  
**Opportunities:** Senkwehn proposed protected area, ridge to reef management |
|                 | Sapo National Park (CI/ActionAid Civilian Conservation Corps activities in Jallay and Chiebioh Towns, and in Keh and Putu Jawaordee) | Thomas and Kpadehyea | **Issues:** Artisanal gold mining, heavy commercial bushmeat trade,  
**Opportunities:** Lessons learned/replicability, alternative incomes (cassava) |
| June 21, 2008   | Todee Road (LCIP)                             | Bouvier                    | **Issues:** Environmental impact  
**Opportunities:** Integrated road building and development program |
## ANNEX C: LIST OF CONTACTS

<table>
<thead>
<tr>
<th>NAME</th>
<th>TITLE</th>
<th>INSTITUTION</th>
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<tbody>
<tr>
<td>Argba, Forkpayea</td>
<td>Clan Head</td>
<td>Zeama Clan, Ziggida Town, Lofa</td>
</tr>
<tr>
<td>Bafaie, Boima</td>
<td>GIS/Monitoring and Evaluation specialist</td>
<td>Liberia Community Infrastructure Program (USAID-DAI)</td>
</tr>
<tr>
<td>Bestman, Wisseh W.</td>
<td>Plantation Manager</td>
<td>LABNIC</td>
</tr>
<tr>
<td>Bode, Scott</td>
<td>Natural Resources Adviser</td>
<td>USAID/EGAT/Office of Environment and Science Policy</td>
</tr>
<tr>
<td>Boiwu, Joseph</td>
<td>Assistant FAO Representative</td>
<td>Food and Agriculture Organization</td>
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<tr>
<td>Bwanali, Webby</td>
<td>Head, Environment/Natural Resources Department.</td>
<td>United Nations Mission in Liberia</td>
</tr>
<tr>
<td>Cancio-Newton, Steven</td>
<td>Project Leader</td>
<td>BHP Billiton</td>
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<tr>
<td>Cole, Leo</td>
<td>Social Organization</td>
<td>Forestry Development Authority</td>
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<tr>
<td>Coleman, James</td>
<td>Environment and Natural Resources. Officer</td>
<td>United Nations Mission in Liberia</td>
</tr>
<tr>
<td>Conneh, Varney L.</td>
<td>EIA Coordinator</td>
<td>Environmental Protection Agency</td>
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<tr>
<td>Dagbe, Bledee V.</td>
<td>Socio-Economic</td>
<td>Forestry Development Authority</td>
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<tr>
<td>Darlow, Dave</td>
<td>Field Assistant</td>
<td>Buchanan Renewable Energy</td>
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<tr>
<td>Datuama, J.S.</td>
<td>Media Officer</td>
<td>Forestry Development Authority</td>
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<tr>
<td>Davies, Jonathan</td>
<td>Manager, Inspectorate</td>
<td>Environmental Protection Agency</td>
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<tr>
<td>Davis, Thomas L.</td>
<td>Director GIS/Cartography</td>
<td>Liberia Institute For Statistics And Geo-Information Services</td>
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<tr>
<td>de Vernou, Geoffrey</td>
<td>Plantation Manager</td>
<td>Liberia Agriculture Corporation</td>
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<tr>
<td>Deshmukh, Ian</td>
<td>Chief of Party,</td>
<td>Land Rights and Community Forestry Program (USAID-ARD)</td>
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<tr>
<td>Dinh, Quan</td>
<td>Chief of Party</td>
<td>Technical Assistance to the Ministry of Agriculture (USAID-ARD)</td>
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<tr>
<td>Doe, Michael S.</td>
<td>Program Coordinator, Conflict and Management</td>
<td>ActionAID</td>
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<tr>
<td>Donnie, Ben T.</td>
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<td>Donnie, McAlbert</td>
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<td>Donovan, Jessica</td>
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<td>Downing, Tom</td>
<td>FDA GEMAP Advisor</td>
<td>Governance and Economic Management Assistance Program</td>
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<td>Fahnbulleh, Augustus</td>
<td>Director/Coordinator, Quarantine and Environmental Services</td>
<td>Ministry of Agriculture</td>
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<tr>
<td>Farnga, Issac V.</td>
<td>District Councilor</td>
<td>Liberia Community Infrastructure Program (USAID-DAI)</td>
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<td>Freeman, Bako</td>
<td>Consultant, Investment Climate Team for Africa</td>
<td>International Finance Corporation</td>
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<td>Freeman, Theo</td>
<td>Manager, Conservation</td>
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<td>Forestry Development Authority</td>
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<td>Acting Executive Director</td>
<td>Society for the Conservation of Nature in Liberia</td>
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<td>Garpou, Debbie F.</td>
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<td>Gaye, S. Lorser</td>
<td>Former Honorable Representative, Zorgowe Town</td>
<td>Zorgowe Town</td>
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<td>Gbadyu, Joe-Hoover</td>
<td>Food for Peace Officer</td>
<td>USAID/Liberia</td>
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<td>Gorpudolo, Moses</td>
<td>Manager, Chain of Custody</td>
<td>Forestry Development Authority</td>
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<td>Gould, Roosevelt</td>
<td>Vice President</td>
<td>Buchanan Renewable Energy</td>
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<td>Gray, M. Kadalla</td>
<td>Coordinator</td>
<td>Sustainable Trees Crops Program (USAID-IITA)</td>
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ANNEX D: DOCUMENTS REVIEWED AND REFERENCED


ANNEX E: INFORMATION MATRIX FOR EACH PRIMARY ENVIRONMENTAL ELEMENT

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<th>ELEMENT</th>
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<th>FIELD INTERVENTIONS</th>
<th>ENABLING CONDITIONS</th>
<th>LESSONS LEARNED</th>
<th>SUGGESTIONS FOR ACCELERATING SUCCESS</th>
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</table>
| FOREST ECOSYSTEMS  | Commercial logging | • Mismanagement during conflict   | • The National Forestry Reform Law was developed by FDA with assistance from the Liberia Forest Initiative (LFI) and approved by the Legislature in 2006. It sets the framework for transparent management of concessions and community forests.  
• LFI continues to support FDA with the implementation of the National Forestry Law.  
• GEMAP working with FDA to improve transparency and accountability in concessions management  
• World Bank’s Forestry Sector Management Project (under LFI) supports institutions building sustainable forest management  
• LIBERFOR and FDA’s nationwide system to | • Practical, well-defined rules and procedures for forest management in concessions  
• Transparent procedures for concession awards  
• Transparent demarcation of concession boundaries  
• Resolution of land tenure disputes  
• Environmental Impact Assessments for concessions and other large-scale management activities  
• Up-to-date forest information database  
• Effective production monitoring system with adequate equipment and personnel  
• Shared revenues with local governments and communities | • LFI is a good model for donor-government collaboration | • Develop EIA guidelines for timber concessions |
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| Illegal and Quasi-Legal Logging| • Complete ban on logging leaving no source to meet local needs  
• No current regulation of cut  
• Weak law enforcement  
• Inability of FDA to receive fees | • FDA instituted a permit program for artisanal sawing to meet the demand for local timber | • Opportunities for local or community based enterprises  
• Realistic national reforestation plan including appropriate incentives for local participation  
• Adequate legal and regulatory framework for the local wood industry | • Artisanal permits need to be managed by and paid for at local FDA offices | • Create separate enforcement division within FDA.  
• Build capacity of the division. |
| Lack of Community forestry    | • No commitment to community forestry until passage of the National Forestry Reform Law in 2006  
• Land tenure uncertainties | • FDA, with technical assistance provided by the USAID-funded Land Rights and Community Forestry Program (LRCFP), has produced and vetted several drafts of the Community Forest Law  
• IUCN’s Forest Conservation Program (FCP) has funding from the Dutch Ministry of Foreign Affairs to work with FDA and other stakeholders to promote sustainable and equitable community forest management.  
• World Bank is | • Framework for community forest management that ensures benefits flow to communities  
• Secure tenure for community forests | • All financial transactions for forest use must be transparent  
• Boundary definitions and tenure resolution must involve local communities  
• Unequal access to and ownership of land and other resources contributes significantly to economic and political inequities and environmental degradation and | • Expand the LRCFP grants program to cover the majority of Liberia.  
• Through LRCFP:  
• Support a study of the economic viability of non-timber forest products (NTFPs), including value chain analysis, and promote the development of viable NTFPs.  
• Provide for additional study visits to successful community forestry programs in other African countries.  
• Support Peace |
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| Encroachment on Protected Areas | • Lack of viable alternative livelihoods  
• Lack of funding for Protected Area management | • The LRCFP is also working with FDA and local residents to demarcate Protected Areas.  
• Through its Critical Ecosystem Partnership Fund CI has provided small grants for biodiversity projects and supported:  
  − Strengthening capacity of local civil society groups for conservation  
  − Hotspot biodiversity monitoring system | currently supporting a land tenure study which will be an importance piece for examining land tenure issues related to forests. | exacerbated tensions and conflict. | Corps activities in community forestry.  
• Develop and implement public awareness/education programs focused on the requirements of the Forestry Law and targeted at villages in forested areas.  
• Build capacity of local leaders to help implement the Forestry Law.  
• Work with FDA to promote better integration of the 3Cs. |

• Identification of economically viable alternative livelihoods, based on value chain analysis  
• Sustainable funding source for Protected Area management  
• Alternative income activities must be able to compete with illegal activities  
• Establish (or explore possibilities of) a conservation trust fund under the Tropical Forest Conservation Act (TFCA)  
• Base all alternative income activities on value chain analysis, to ensure market viability. |
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<td></td>
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<td>- Promotion of biodiversity conservation corridors</td>
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<td>- Collaborative public awareness and community outreach programs</td>
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<td>- The Sustainable Tree Crops Program, funded by USAID, works with farmers near protected areas in Nimba county to improve income from cocoa as an alternative to the bushmeat trade and illegal logging.</td>
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<td>- ActionAid in partnership with Conservation International implements the USAID-funded Civilian Conservation Corps around Sapo National Park. This project is designed to improve incomes from agriculture as an alternative to hunting in the National Park.</td>
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<td>- Consolidation of Liberia Protected Area Network (COBAN) project, funded by World Bank GEF and implemented by FDA,</td>
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| Shifting Cultivation   | • Village food production. Current impact is limited by several factors:  
- Conflict reduced pressure on land  
- Fertilizers unavailable  
- Return of war refugees and introduction of chainsaw clearing will increase impact  
- Emphasis on upland rice production | • World Bank is currently supporting agroforestry activities close to Wonegizi Park.  
• TAMOA, LCIP and LIAP promoting swamp rice production | • Clear economic benefits from:  
- Retaining trees in clearings  
- Hunting and tree crops in fallow areas  
- Clear understanding by farmers of role of fallow in maintaining fertility and weed control  
- Realistic community forest management plans that create economic opportunities | • Properly managed shifting cultivation can result in improving biodiversity in secondary forests | • Develop and implement public awareness/education programs focused on values of secondary forests and targeted at farming villages.  
• Promote environmentally-friendly tree crops such as cocoa and coffee  
• Promote swamp rice production  
• Promote local land use planning/landscape analysis at the community level |
| Mining (commercial and artisanal) | • Mismanagement during conflict  
• Little environmental regulation  
• High value of minerals  
• Need to remove vegetation and soil to access | • The USAID-funded Governance and Economic Management Assistance Program is working with the Ministry of Land, Mines and Energy to improve the mining concessions contract. | • Environmental Impact Assessments for mining concessions  
• Rehabilitation requirements | • Unconstrained mining development will lead to on-site and off-site environmental degradation | • Develop clear EIA guidelines for mining concessions.  
• Oblige mining companies – via concession agreements – to provide for biodiversity |
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| **Bushmeat Trade**                   |                                                                             | **minerals**  
• Demand by miners for protein (potentially met with bushmeat)  
• Limited inter ministerial collaboration                                                                                                   | Part of that improvement is the inclusion of contractual language requiring the assessment of environmental impacts and the design and implementation of mitigation measures.  
• Atkins Limited subcontracted by ArcelorMittal to do the Environmental Impact Assessment for mining operations in Nimba. |                     |                   |                  | offsets.  
• Develop a Strategy to address the compromises between environment and economic development |
|                                      |                                                                             | **Bushmeat Trade**  
• High demand:  
  - For protein with few current alternatives  
  - Culturally, for special occasions  
  - Well defined commercial market  
• Low entry cost and high value retention for hunters  
• Lack of regulation  
• Weak law enforcement                                                                                                                | **COBAN, a World Bank GEF initiative, will:**  
  - Finance a review of existing wildlife legislation  
  - Elaborate and print a draft law on wildlife utilization and management  
  - Validate the draft law through a national workshop  
  - Submit the validated draft law to Parliament.  
• The Sustainable Tree Crops Program, funded by USAID, works with farmers near protected areas | **Wildlife law that provides for regulated hunting**  
**Wildlife management plans for all categories of protected area**  
**Village level ownership and management of wildlife**  
**FDA permit process to regulate hunting and selling of bush meat**  
**Control of the trade along roads, in markets and at borders**  
**Cooperation with other regional governments to stop cross-border trade**  
**Availability of alternative sources of animal protein**  
**Alternative income activities must be able to compete with illegal activities**  
**To secure community support, conservation and law enforcement must be conducted by separate, independent departments** |                     |                   |                  | Address discrepancies between the 2006 Forestry Reform Law and the January 2008 Liberia Protected Areas Network Strategic Plan, identifying how wildlife management can be part of wildlife/biodiversity protection. Develop a national consensus on this issue.  
• Create separate enforcement division within FDA. |
<table>
<thead>
<tr>
<th>ELEMENT</th>
<th>CONSTRAINT</th>
<th>UNDERLYING CAUSES OF CONSTRAINTS</th>
<th>FIELD INTERVENTIONS</th>
<th>ENABLING CONDITIONS</th>
<th>LESSONS LEARNED</th>
<th>SUGGESTIONS FOR ACCELERATING SUCCESS</th>
</tr>
</thead>
</table>
|         |            | in Nimba county to improve income from cocoa as an alternative to the bushmeat trade and illegal logging. | • Feasible alternative incomes, especially in agriculture, to offset the loss of hunting income  
• Understanding at all levels on the importance of Liberia’s protected species.  
• Alternative income activities must be able to compete with illegal activities | – Build capacity of the division.  
• Develop and implement public awareness/education programs focused on wildlife management and targeted at villages in forested areas.  
• Build capacity of local leaders to help implement improved wildlife management.  
• Conduct a study on the size of Liberia’s sustainable bush meat harvest.  
• Base all alternative income activities on value chain analysis, to ensure market viability.  
• Develop alternative protein programs | |
|         |            | • World Bank is currently supporting community development/sustainable development activities around protected areas under the Liberia Agency for Community Empowerment (LACE) program  
• FFI has received funding from the EC and the Darwin Initiative to help establish a protected forest network and support activities in and around SAPO National Park | | | |
| Potential expansion of Agro Industrial Crops | • Clearing of forests to plant rubber or palm. Current impact is limited as most of the pre-conflict plantations have not been rehabilitated,  
• LEAD’s biomass study and accompanying analysis of environmental issues such as deforestation and loss of biodiversity should provide the Mission and the GOL with the  
• Environmental Impact Assessments for expansion of rubber or palm oil plantations into forested land | • Palm oil is perhaps one of the biggest threats to tropical forests in the world | | – Develop EIA guidelines for agro-industrial expansion into forested land  
• Develop a Strategy to address the compromises | |
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<th>ELEMENT</th>
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<th>SUGGESTIONS FOR ACCELERATING SUCCESS</th>
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<tbody>
<tr>
<td>COASTAL AND MARINE ECOSYSTEMS</td>
<td>Over Exploitation of Demersal Species</td>
<td>• Lack of any monitoring, control and surveillance system</td>
<td>• Ministry of Agriculture, with FAO assistance, is formulating a national fisheries</td>
<td>• National Fisheries Law incorporating relevant provisions of the FAO Code of Conduct</td>
<td>• Support to the Worldwide Fund for Nature (WWF) TO facilitate Liberia’s participation</td>
<td>• Between environment and economic development</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Many unlicensed boats operating in Liberian waters</td>
<td>and aquaculture policy intended to strengthen Liberia’s maritime and fisheries laws,</td>
<td>for Responsible Fisheries and addressing fisheries, natural resources and</td>
<td>in the Programme Régional de Conservation de la zone Côtière et Marine en Afrique de l'Ouest (PRCM), and eventually WWF’s West African Marine Ecoregion (WAMER) program</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>- Use of illegal equipment including small net mesh size and explosives</td>
<td>regulations and capacity to ensure sustainable management and development</td>
<td>environmental issues</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• No stock assessments for 20 years, so level of problem is not clearly defined</td>
<td>• 60-day Marine Control and Surveillance Project in 2008</td>
<td>Adequate resource assessments</td>
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<tr>
<td></td>
<td></td>
<td>• No in-country research capability</td>
<td>(Ministry of Agriculture and the Bureau of National Fisheries)</td>
<td>Monitoring, control and Surveillance system with adequate equipment and personnel</td>
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<td></td>
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<td></td>
<td>• West and Central Africa illegal fishing program (International Maritime Organization)</td>
<td>Collaboration and cooperation with neighboring countries in sustainable fisheries</td>
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<td></td>
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<td></td>
<td>conservation, protection and management</td>
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<td></td>
<td>Active participation in decision making by grassroots fisheries organizations, farming</td>
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<td></td>
<td></td>
<td>communities engaged in aquaculture, private</td>
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| Over Exploitation of other coastal/marine species (sea turtles) | • Demand for food by both humans and animals  
• Lack of alternative livelihoods | • The Liberia Sea Turtle Project operated by Save My Future Foundation with support from the U.S. Fish and Wildlife Service promotes long-term survival of sea turtles by supporting improved alternative livelihoods in coastal communities in exchange for turtle protection agreements. | • Understanding at all levels on the importance of Liberia’s protected species.  
• Alternative income activities must be able to compete with illegal activities | sector fishing industries, and fisheries NGOs | • Replication of Sea Turtle Project to other coastal communities, particularly Lake Piso |
| Mangrove Loss | • Demand for fuelwood, charcoal and poles, however, mangrove can usually recover from these uses.  
• Demand for land in urban areas, leading to mangrove filling, particularly in Monrovia  
• Sea level rise, as there are natural and manmade | • Three mainly mangrove wetlands declared as Ramsar sites (Lake Piso, Marshall and Mesurado)  
• JICA-funded city planning project for Monrovia may be able to address mangrove protection in the city | • Adequate legal and regulatory frameworks for the production and commercialization of fuelwood and charcoal | | • Develop an urban land use planning policy and implement zoning.  
• Develop and implement public awareness/education programs focused on values and management of mangroves and targeted at villages in mangrove areas.  
• Develop pilot improved |
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<th>LESSONS LEARNED</th>
<th>SUGGESTIONS FOR ACCELERATING SUCCESS</th>
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</thead>
</table>
| FRESH-WATER ECOSYSTEMS | Over Exploitation of Inland Fish Species | Lack of any monitoring, control and surveillance system  
- Many unlicensed boats operating on rivers  
- Use of illegal equipment including small net mesh size, chemicals and explosives  
- Capacity and financial constraints | FAO also supports the rehabilitation of artisanal fisheries sector in Cape Mount and Grand Bassa Counties, with 1,975 target beneficiaries | National Fisheries Law incorporating relevant provisions of the FAO Code of Conduct for Responsible Fisheries and addressing fisheries, natural resources and environmental issues  
- Adequate resource assessments  
- Monitoring, control and Surveillance system with adequate equipment and personnel  
- Active participation in decision making by grassroots fisheries community organizations, farming communities engaged in aquaculture, private | | Promote aquaculture programs |
| | Beach Sand Mining and Beach Erosion | Construction demand for sand  
- Little or no regulation | MLME has attempted to control by rotating mining sites | Clear regulations on beach sand mining  
- Clear understanding of the relationship between beach sand mining and beach erosion | | Conduct a study on the relationship between beach sand mining and beach erosion  
- JICA-funded city planning project for Monrovia may be able to address beach mining in the city |
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<th>LESSONS LEARNED</th>
<th>SUGGESTIONS FOR ACCELERATING SUCCESS</th>
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<tbody>
<tr>
<td>Freshwater wetlands</td>
<td>• Potential expansion of swamp rice</td>
<td>• Two freshwater wetlands designated as Ramsar sites (Gbedin and Kpatawee)</td>
<td>• Clear understanding of the value of freshwater wetlands, from their role in providing medicinal plants and other products, to their role in providing ecosystems services.</td>
<td>• Ramsar designation requires full community participation to avoid conflict</td>
<td>• Conduct freshwater wetlands study</td>
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<tr>
<td>URBAN ENVIRONMENTS</td>
<td>Inadequate Potable Water Supply</td>
<td>• Infrastructure destroyed during conflict</td>
<td>• Rural water projects providing community wells and/or appropriate technology treatment are being sponsored by many organizations and supported by many donors. For example: - BioSand water filter program operated by Samaritan’s Purse - Construction of wells and boreholes by Concern Worldwide • JICA is funding the development of a City Plan for Monrovia, which will include the drinking water standards • Guidelines for well placement • Environmental Impact Assessment of proposed pipelines and facilities</td>
<td>• Sustainable local management and revenue source for operation and maintenance • Drinking water standards • Guidelines for well placement • Environmental Impact Assessment of proposed pipelines and facilities</td>
<td>• Develop EIA guidelines for water supply projects • Support infrastructure development</td>
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sector fishing industries, and fisheries NGOs
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<th>ELEMENT</th>
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<th>FIELD INTERVENTIONS</th>
<th>ENABLING CONDITIONS</th>
<th>LESSONS LEARNED</th>
<th>SUGGESTIONS FOR ACCELERATING SUCCESS</th>
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</thead>
</table>
| Inadequate Wastewater Management       | • Infrastructure destroyed during conflict       | • Latrine projects are being sponsored by many organizations and supported by many donors.  
  • JICA is funding the development of a City Plan for Monrovia, which will include the provision of sewers  
  and wastewater treatment.                                                                 | • Sustainable local management and revenue source for operation and maintenance  
  • Guidelines for latrine placement  
  • Environmental Impact Assessment of proposed sewers and treatment facilities  
  • Effluent discharge standards                                                     | • Develop EIA guidelines for wastewater projects  
  • Support infrastructure development                                                |                                                                                                                                            |
|                                        | • Particularly serious in Monrovia due to high population |                                                                                                                                               |                                                                                      |                                                                                                              |                                                                                                                                            |
| Inadequate Solid Waste Management      | • Infrastructure destroyed during conflict       | • World Bank funds UNDP and a private, international engineering firm to support the Monrovia City Corporation (MCC) to improve collection and disposal of solid waste including:  
  ◦ Cleanup of solid waste accumulations  
  ◦ Procurement of central collection bins and collection trucks  
  ◦ Emergency rehabilitation and ultimate closure of Fiamah dump  
  ◦ Design and construction of an effluent treatment facility                                                                            | • Sustainable local management and revenue source for operation and maintenance  
  • Guidelines and standards for solid waste handling and disposal  
  • Guidelines and standards for handling and disposal of special wastes  
  • Environmental Impact Assessment of proposed management and facilities            | • Develop EIA guidelines for solid waste projects  
  • Support private sector involvement in service delivery                            |                                                                                                                                            |
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<th>SUGGESTIONS FOR ACCELERATING SUCCESS</th>
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<tr>
<td></td>
<td>engineered landfill</td>
<td>• The ILO, in partnership with the Ministry of Labor and MCC, operates programs for short-term cleanup of markets in Monrovia and works with community based organizations to enhance the sustainability of these cleanup efforts.</td>
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# ANNEX F: IUCN RED LIST SPECIES FOR LIBERIA

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<thead>
<tr>
<th>#</th>
<th>[Scientific Name]</th>
<th>Common Name(s)</th>
<th>Red List[^66]</th>
<th>Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aciagrion africanum</td>
<td></td>
<td>LC</td>
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</tr>
<tr>
<td>2</td>
<td>Acisoma panorpoides</td>
<td>GRIZZLED PINTAIL (Eng)</td>
<td>LC</td>
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</tr>
<tr>
<td>3</td>
<td>Acisoma trifidum</td>
<td></td>
<td>LC</td>
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<tr>
<td>4</td>
<td>Aethriamanta rezia</td>
<td>PYGMY BASKER (Eng)</td>
<td>LC</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Aetobatus narinari</td>
<td>BONNETRAY (Eng)</td>
<td>NT ▼</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>MAYLAN (Eng)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>SPOTTED EAGLE RAY (Eng)</td>
<td></td>
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<tr>
<td>6</td>
<td>Agriocnemis exilis</td>
<td>LITTLE WHISP (Eng)</td>
<td>LC</td>
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</tr>
<tr>
<td>7</td>
<td>Agriocnemis macla</td>
<td></td>
<td>LC</td>
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<tr>
<td>8</td>
<td>Agriocnemis victoria</td>
<td></td>
<td>LC</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Agriocnemis zerafica</td>
<td></td>
<td>LC</td>
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<tr>
<td>10</td>
<td>Anax imperator</td>
<td>BLUE EMPEROR (Eng)</td>
<td>LC</td>
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<tr>
<td>11</td>
<td>Anax tristis</td>
<td>MAGNIFICENT EMPEROR (Eng)</td>
<td>LC</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Balearica pavonina</td>
<td>BLACK CROWNED-CRANE (Eng)</td>
<td>NT ▼</td>
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</tr>
<tr>
<td>13</td>
<td>Brachythemis lacustris</td>
<td>RED GROUNDLING (Eng)</td>
<td>LC</td>
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<tr>
<td>14</td>
<td>Bradinopyga strachani</td>
<td></td>
<td>LC</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Carcharhinus longimanus</td>
<td>OCEANIC WHITETIP SHARK (Eng)</td>
<td>VU ▼</td>
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<tr>
<td></td>
<td></td>
<td>WHITE-TIPPED SHARK (Eng)</td>
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<td></td>
<td></td>
<td>WHITETIP OCEANIC SHARK (Eng)</td>
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<td></td>
<td>WHITETIP SHARK (Eng)</td>
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<tr>
<td></td>
<td></td>
<td>REQUIN OCÉANIQUE (Fre)</td>
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<td>TIBURÓN OCEANICO (Spa)</td>
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<tr>
<td>16</td>
<td>Carcharhinus signatus</td>
<td>NIGHT SHARK (Eng)</td>
<td>VU ▼</td>
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<tr>
<td>17</td>
<td>Centrophorus granulosus</td>
<td>GULPER SHARK (Eng)</td>
<td>VU ▼</td>
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<tr>
<td></td>
<td></td>
<td>SQUALE-CHAGRIN COMMUN (Fre)</td>
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<td>QUELVACHO (Spa)</td>
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<tr>
<td>18</td>
<td>Ceriagrion bakeri</td>
<td></td>
<td>LC</td>
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<tr>
<td>19</td>
<td>Ceriagrion corallinum</td>
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<tr>
<td>20</td>
<td>Ceriagrion glabrum</td>
<td>COMMON POND-DAMSEL (Eng)</td>
<td>LC</td>
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<td>21</td>
<td>Ceriagrion suave</td>
<td>SWEET POND-DAMSEL (Eng)</td>
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<td>Ceriagrion whellani</td>
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<td>23</td>
<td>Chalcostephia flavifrons</td>
<td>INSPECTOR (Eng)</td>
<td>LC</td>
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<td>YELLOWFACE (Eng)</td>
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<td>Chlorocypha curta</td>
<td>BLUE-TAILED RED-JEWEL (Eng)</td>
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<tr>
<td>25</td>
<td>Circaetus galicus</td>
<td>SHORT-TOED SNAKE-EAGLE (Eng)</td>
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</table>

[^66]: Red list categories include Extinct (EX), Extinct in the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT), Least Concern (LC), Data Deficient (DD), Not Evaluated (NE)
<table>
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<tr>
<th>#</th>
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<th>Common Name(s)</th>
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<td>Circus macrourus</td>
<td>PALLID HARRIER (Eng)</td>
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<td></td>
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<td>BUSARD PALE (Fre)</td>
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<td>AGUILUCHO PAPIALBO (Spa)</td>
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<td>27</td>
<td>Crocothemis divisa</td>
<td>SLENDER SCARLET-DARTER (Eng)</td>
<td>LC</td>
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<td>Crocothemis erythraea</td>
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<td>Crocothemis sanguinolenta</td>
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<td>Dasyatis centroura</td>
<td>ROUGHTAIL STINGRAY (Eng)</td>
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<td>Dendrohyrax dorsalis</td>
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<td>Diplacodes lefebvri</td>
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<td>Eleuthemis buettikoferi</td>
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<td>Epinephelus itajara</td>
<td>GOLIATH GROUPER (Eng)</td>
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<td>GUATO (Spa)</td>
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<td>Etmopterus bigelowi</td>
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# ANNEX G: INVENTORY OF SPATIAL DATA AVAILABLE IN LIBERIA

## NATIONAL INFORMATION MANAGEMENT CENTER (NIMAC) GIS LAYERS

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## Liberia Environment Threats and Opportunities Assessment (ETOA)

### Liberia Forest Reassessment (LFR) Data Layers

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Cd'I

| pa           |       |          |              |            |                      |                    |        |         |                           |                                                                           |

<p>| cavalymtsainte_nf | poly | shapefile | UTM          | WGS84      | 2003/12/14 | Cavaly Mt. Sainte forest reserve boundary | Circa 2003 | BNET     | Administrative boundaries | Cavaly Mt. Sainte forest reserve boundary                               |
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AVAILABLE DATA IN THE LIBERIA FORESTRY INITIATIVE (LFI)/FORESTRY DEVELOPMENT AUTHORITY (FDA) GIS LABORATORY

- Towns and Cities of the World, West Africa and Liberia
- Rivers in West Africa and Liberia
- 2002 & 2004 towns of Liberia
- Elevations of Liberia
- Airfield & airstrips of Liberia
- Sea ports of Liberia
- 1979 forest cover of Liberia
- 2002 forest cover of Liberia
- 2004 Landsat forest cover of Liberia
- 2007 Landsat image of Liberia
- 250,000k topographic map of Liberia
- 50,000k topographic map of Liberia
- Iron ore mining sites in Liberia
- 1980 deforestation sites in Liberia
- Major and secondary rivers in Liberia
- Conversation corridor linking Sapo & Grebo to Tai in Ivory Coast
- Railroads
- Urban areas
- 2002 Biological Survey sites
- 2007-08 Socio-economic survey data of all Towns and Villages within the Timber Sale Contract and Forest Management Contract areas
- 2007-08 Forest Inventory data of all Towns and Villages with the Timber Sale
- Contract and Forest Management Contract areas
- 2002 Social & Economic Survey sites
- National forests, Proposed Protected and Protected forests
- 2007 data on Proposed Protected Area Network
• 2008 data on Recommended Forest Management Contracts and Timber Sale Contract
• SRTM data for Liberia
• Forest plantation data on Liberia
• Plot data on forest carbon biomass in River Cess County-Liberia
• Counties, Districts and Clans of Liberia
• Montserrado County (specifics): water masses, swamps, settlements, pipeline, new roads, & contour
• Data on land use suitability analysis (3 C’s)