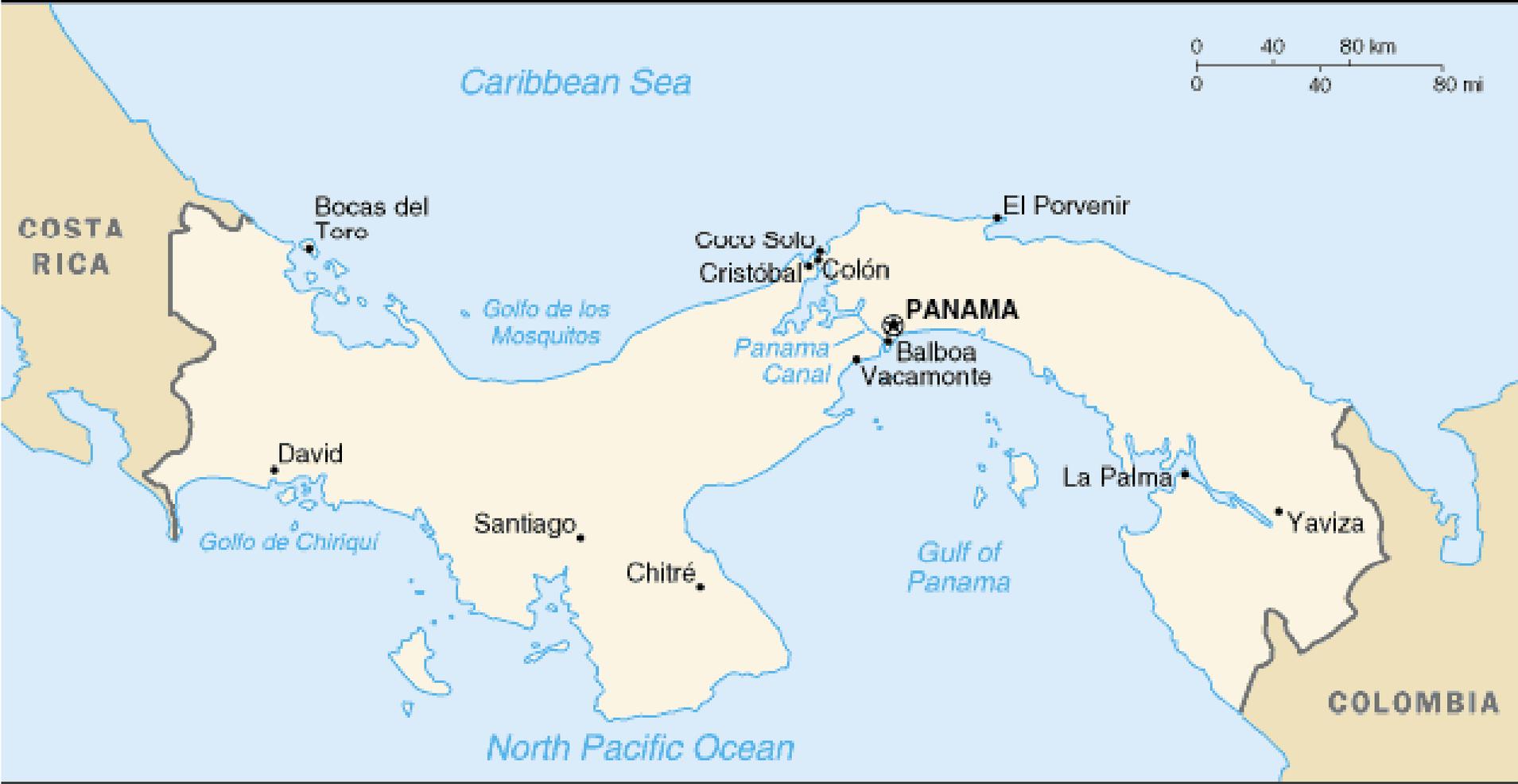


Development of an Integrated
Coastal Management Plan
for the Gulf of San Miguel,
Darién, Panama

Daniel Suman

Map of Panama



Landsat Photograph of the Gulf of San Miguel





CARRETERA PANAMERICANA
—— actual
- - - proyectada



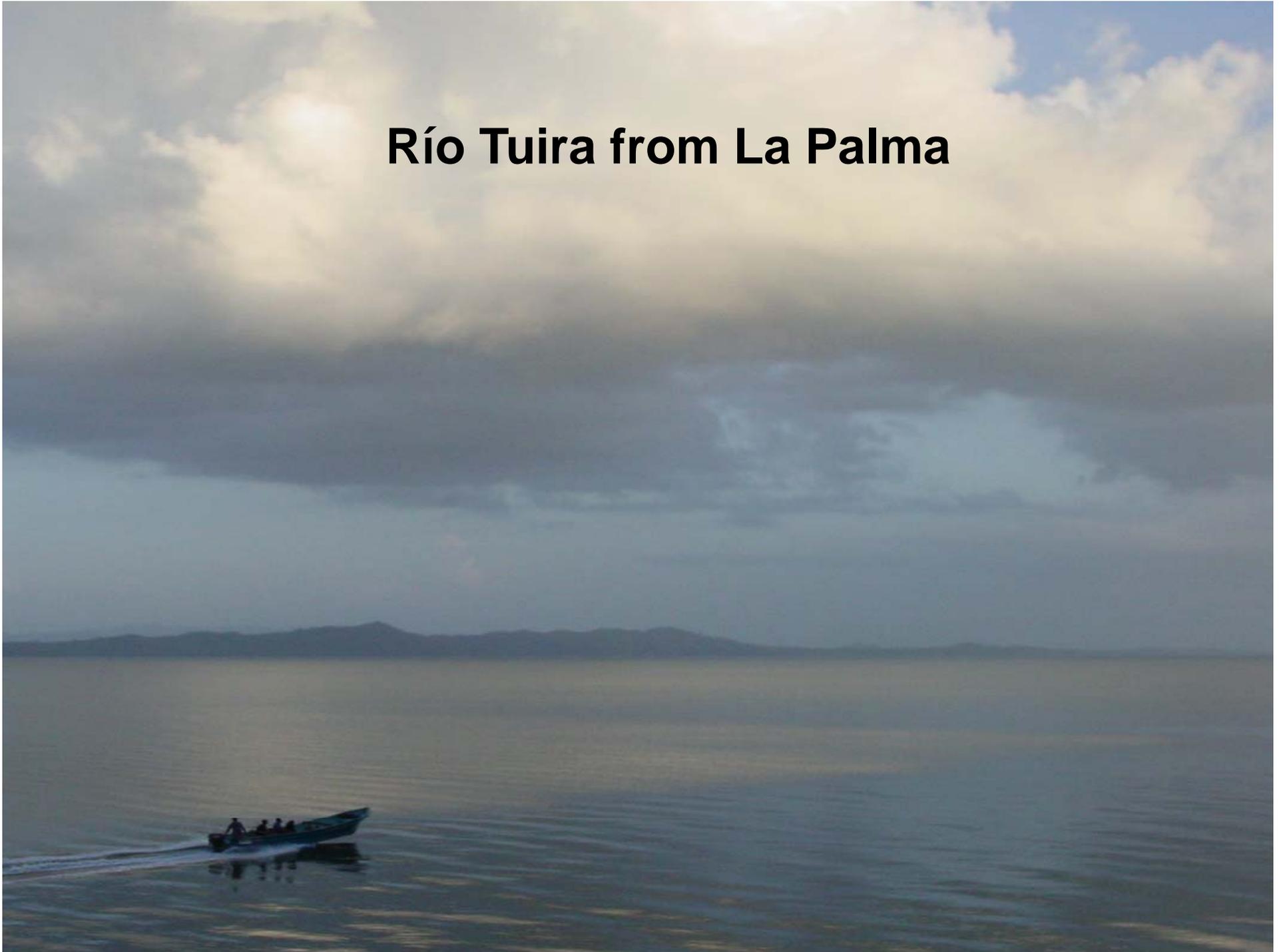
The Coastal Areas of the Gulf of San Miguel

- **Panama's largest estuary**
- **Extension of 1,760 km²**
- **Panama's largest river (Tuirá River) drains into the Gulf of San Miguel**
- **Large river systems empty into the Gulf.**
- **The annual freshwater discharge to the Gulf of San Miguel is more than 29 billion m³ (29 km³/yr).**
- **About 10,000 people live in more than 10 small communities around the Gulf. They belong to different ethnic groups (Emberá and Wounán Native Peoples, Afro-Darién peoples, and mestizo colonists from the western areas of Panama).**

Río Tuirá – Upper Estuary



Río Tuirá from La Palma



Río Cucunatí





Mapa de los Pueblos Costeros en el Darién

Map of the Coastal Towns in Darién

Coastal Ecosystems of the Gulf of San Miguel

- **Extensive mangrove forests (40,000 has). These forests cover 3 percent of Darién Province and make up 35 percent of mangrove forests in Panama.**
- **Other freshwater wetlands**
- **Extensive mudflats**
- **Sandy beaches**
- **Rocky coastlines**
- **Dry and wet Pacific Coastal Forests**

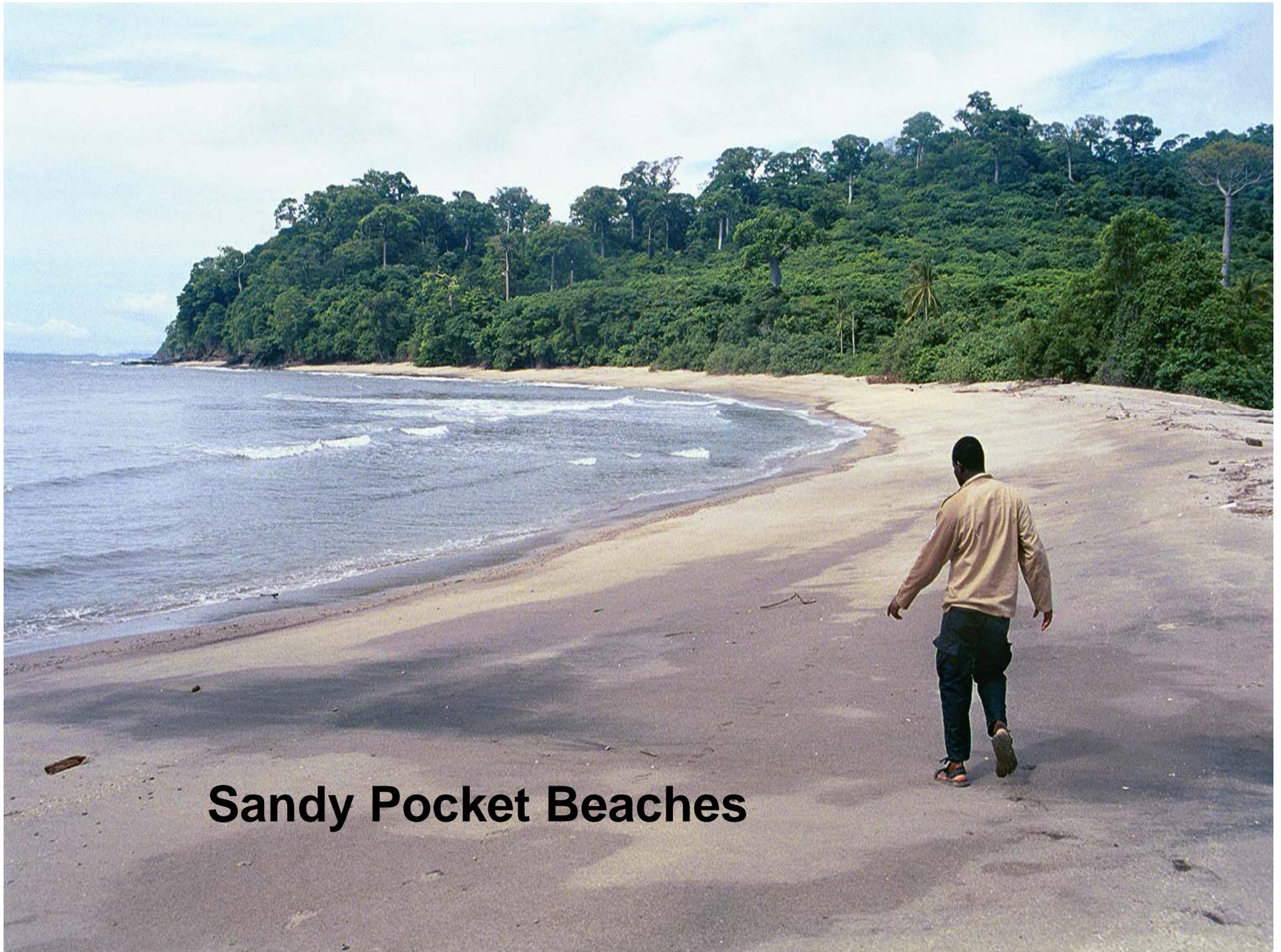
Red Mangrove Forests of Río Congo





Mudflats Exposed at Low Tide



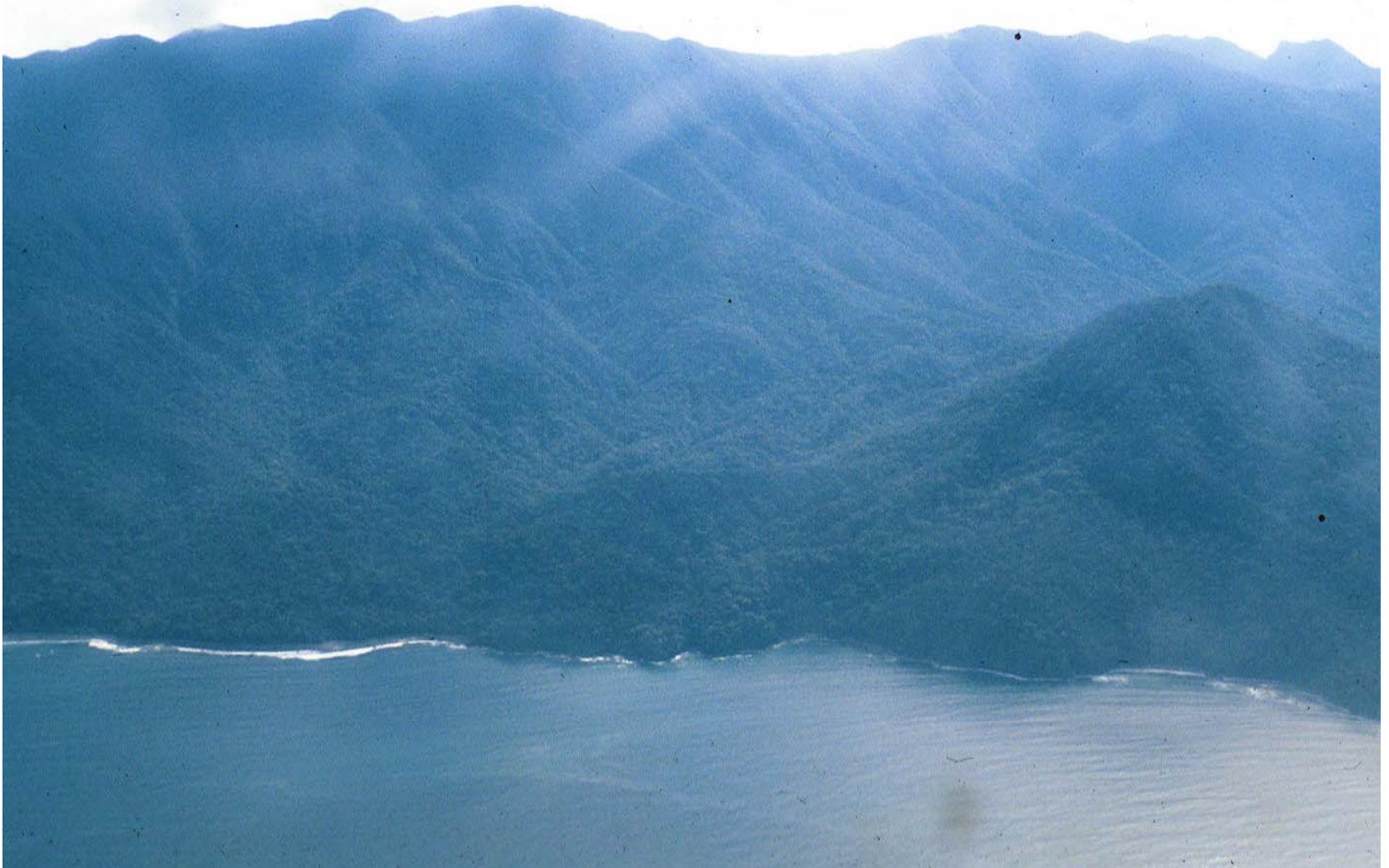


Sandy Pocket Beaches

Rocky Coastlines



Dry and Wet Pacific Coastal Forests



Uses of the Marine & Coastal Resources **of the Gulf of San Miguel**

- **Industrial Fisheries (shrimp, sardines)**
- **Artisanal Fisheries (shrimp, corvina, snapper, grouper, shellfish, lobster)**
- **Mangrove wood products**
- **Limited Agriculture and extensive Cattle-ranching**
- **Incipient urban development**
- **Disposal of human and solid wastes**
- **Eco-tourism and Cultural Tourism**
- **Maritime Transportation**
- **Ports**

Industrial Shrimp Trawler in the Gulf of San Miguel





**Incidental
Catch from
Shrimp
Trawlers**

About 1,000 Small-Scale Fishers use Wooden Boats, Outboard Motors, and Gill Nets to Catch White Shrimp and Finfish.



Artisanal Fishers use Gill Nets to Catch White Shrimp and Finfish.





**White Shrimp is
the Preferred
Catch.**



**Corvina
transported by
Truck to
Panama City**

Air Transport for High Value Shrimp



21 10:37 AM

Shellfish Harvest in Garachiné





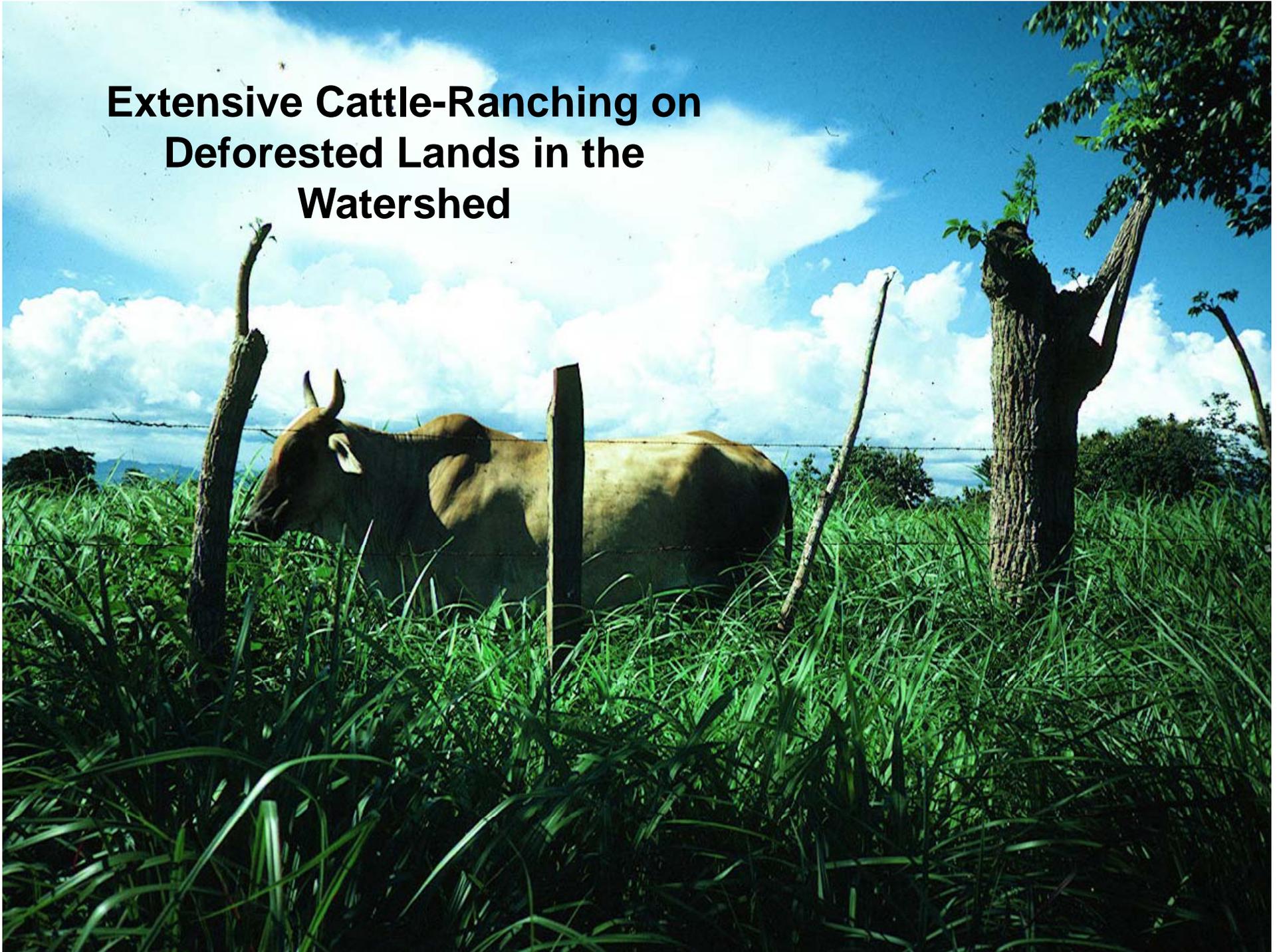
**Local Residents
Harvest Seven
Species of
Shellfish from
Mudflats.**

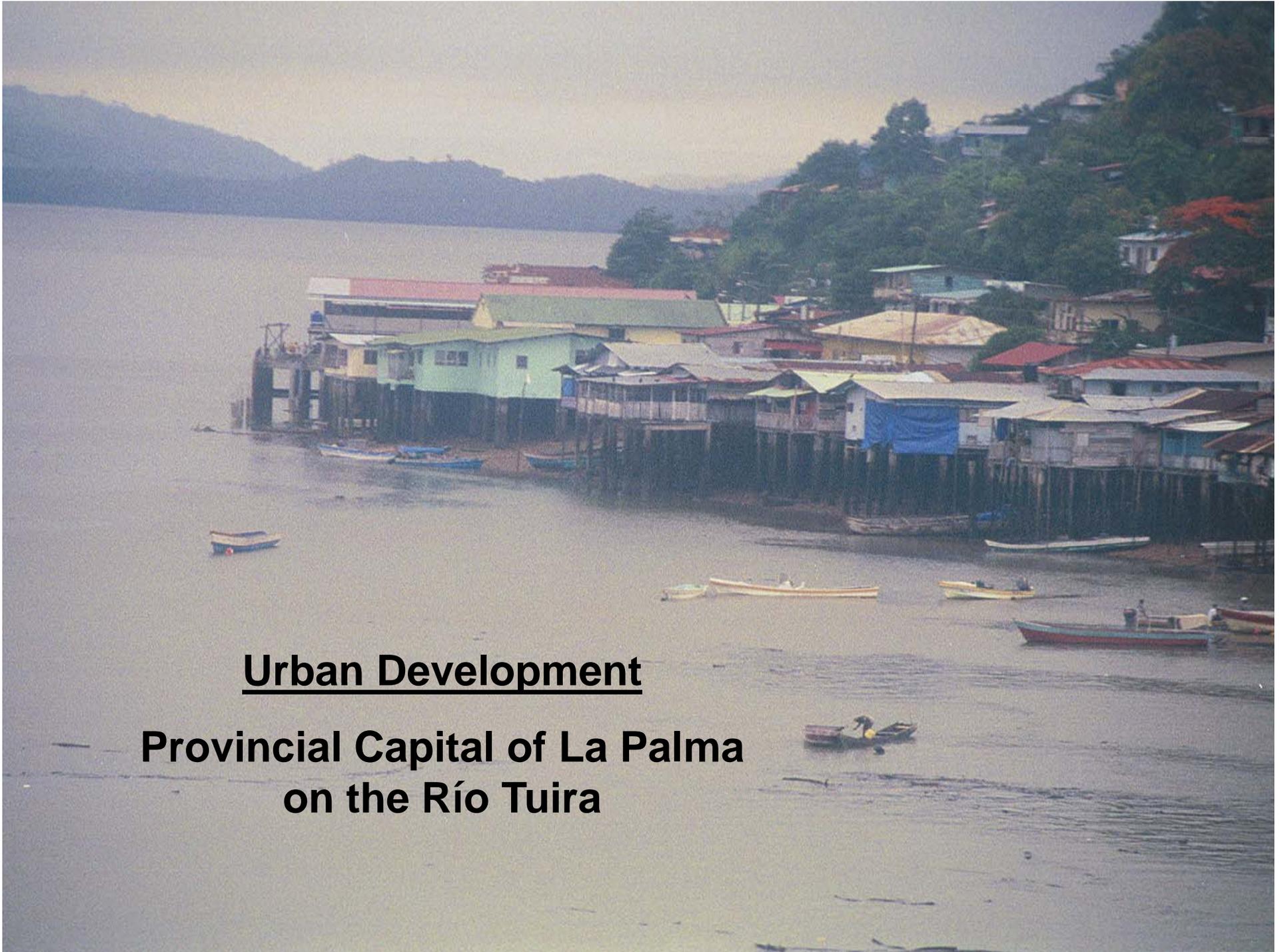




Mangrove Wood Products in Garachiné

**Extensive Cattle-Ranching on
Deforested Lands in the
Watershed**





Urban Development

**Provincial Capital of La Palma
on the Río Tuirá**

**Punta Alegre – a rapidly
growing fishing village**



Waste Disposal Problems



**Emberá Native Peoples
known Worldwide for their
Crafts**



**Cargo Vessels carry
goods between
Panama City and
Darién.**



**Puerto Quimba – The
New Road Link to the
Pan-American Highway**



Integrated Coastal Management **(ICM)**

- a dynamic process in which the public and authorities develop and implement a coordinated strategy for the allocation of environmental, socio-cultural, and institutional resources to achieve the conservation and sustainable development of the coastal zone and its resources.**

This Project – Development of an ICM Plan for the Gulf of San Miguel

Principal Goals:

- **Knowledge of:**
 - condition of coastal ecosystems
 - institutional arrangements
 - communities that use and depend on the marine & coastal resources
 - production systems related to the marine & coastal resources
- **Critical summary of the evaluations and presentations of information in an atlas of coastal resources**

- **This information will assist authorities and communities to make better decisions related to the sustainable use of the resources.**
- **Development with community representatives of a shared vision for the future of the marine & coastal resources of the Gulf of San Miguel**
- **Preparation of a Management Plan for the Marine & Coastal Resources of the Gulf of San Miguel**

Duration of the Project - 16 months beginning in November 2002

Diagnostic Phase (Phase 1)

Characterization of the Resources of the Gulf of San Miguel and the people who use them

Duration – 7 months

1. Goals:

- understand the users of the marine & coastal resources
- characterize the condition of the resources
- evaluate changes in the condition of the resources
- determine critical sites and resources that are extremely vulnerable to human action
- identify key themes

2. Methodologies:

- **fieldwork and measurements**
- **evaluation of satellite images**
- **surveys of resource uses and residents of coastal communities**
- **community observation and observation of social and political structures and productive activities**
- **collection and validation of existing information**

3. Public Participation:

- **We believe active community participation is essential in all phases of the project. Only with high quality information, can we develop a Coastal Management Plan that offers long-term benefits to the community.**
- **Surveys of resource users**
- **Interviews with resource users**
- **Determination of traditional sources of knowledge and their usefulness**
- **Focal groups**
- **Informational and training workshops**

4. Products:

- **Reports on fishery resources, mangroves, and productive systems**
- **Critical document that evaluates the condition of the resources and the changes they experience. This document will also identify priority themes.**
- **Atlas of Marine & Coastal Resources of the Gulf of San Miguel**

Marine & Coastal Resources Management Plan (Phase 2)

Product – Coastal Management Plan

Duration – 7 months

Goals –

- **Development of a shared vision for the future of the coastal zone**
- **Elaboration of strategies and management actions**
- **Consideration of alternatives**
- **Development of a formal Management Plan**

Public Participation –

- **Interactive public workshops**
- **Focal groups**



**Public
Participation
via Focal
Groups**

Priority Themes for Coastal Management in Darién, Panama

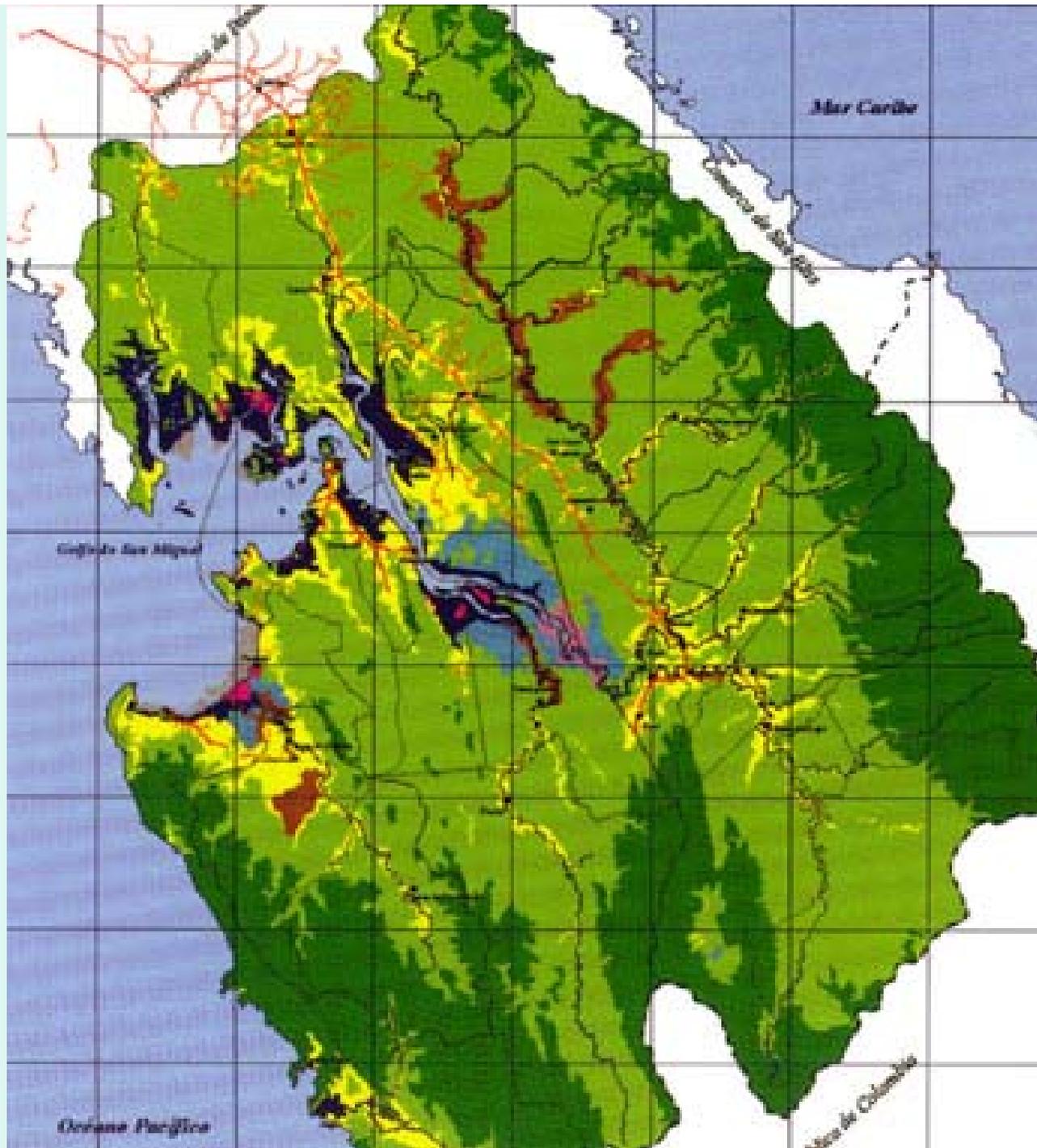
1. FISHERIES

Overfishing by both the Industrial Shrimp Trawlers and Artisanal Fishers may lead to an unsustainable situation for the shrimp and fishery resources of the region.

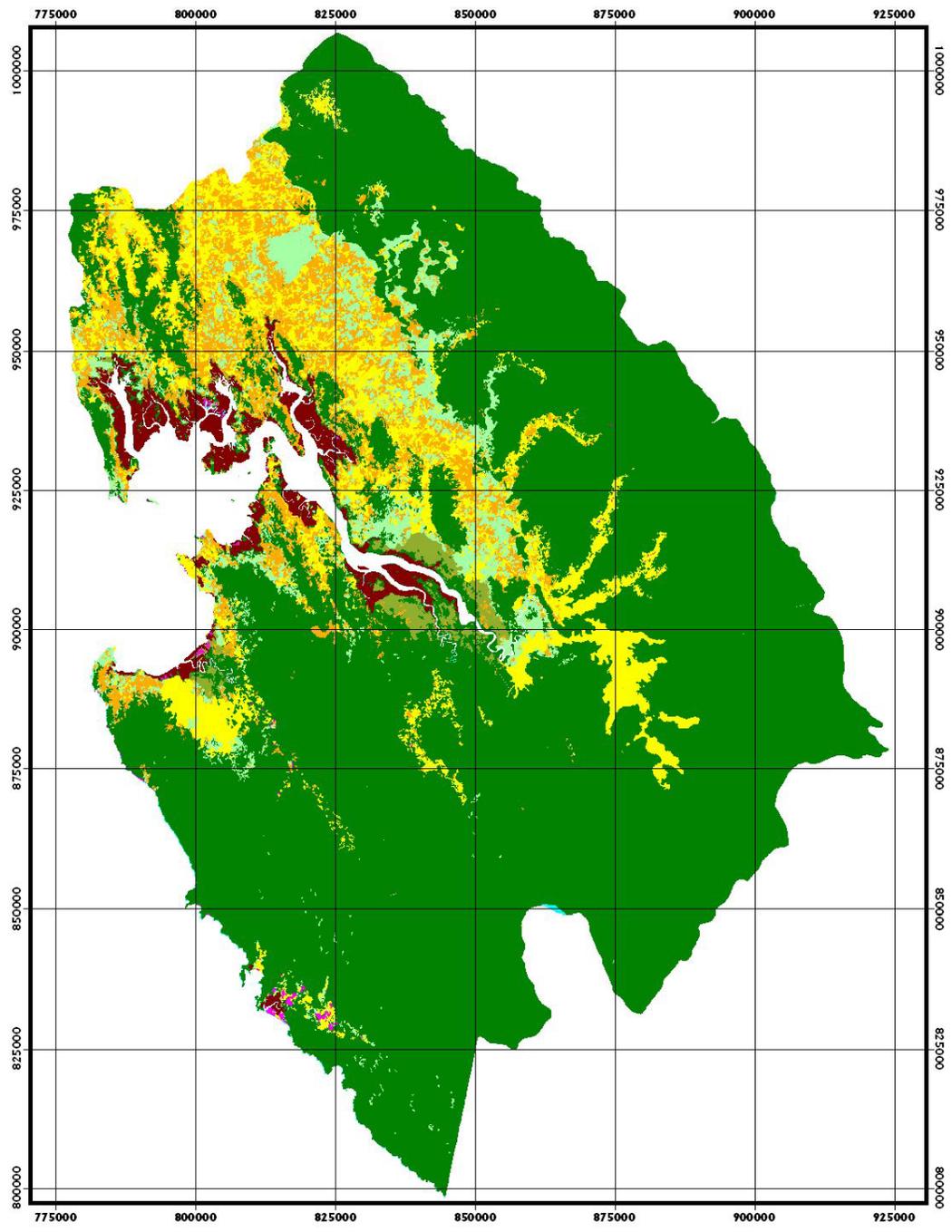
Conflicts between the Industrial Shrimp vessels and artisanal fishers over fishing in Nearshore areas are on the rise.

2. HABITAT DESTRUCTION

Mangroves around the Gulf of San Miguel appear to be fairly undisturbed. However, the agricultural frontier is rapidly approaching the Gulf of San Miguel. Without plans in place to protect critical habitats, human intervention may cause irreparable damage.



**1981
Vegetation
Cover**



2001 Vegetation Cover

TIPOS

- Agua
- Bosque Intervenido
- Bosque Maduro
- Manglar
- Otros Usos
- Rastrojos
- Uso Agropecuario
- Vegetación Baja Inundable



**Major Deforestation in the
Gulf Watershed**

3. WATER QUALITY

Lack of sewage treatment or latrines in many homes is causing localized deterioration of water quality and may lead to public health problems.

4. QUALITY OF LIFE

The social indicators (electricity, potable water, latrines, literacy, public health) for the coastal residents of Darién are below the national averages for Panama.



The Future of the Gulf is Theirs.

