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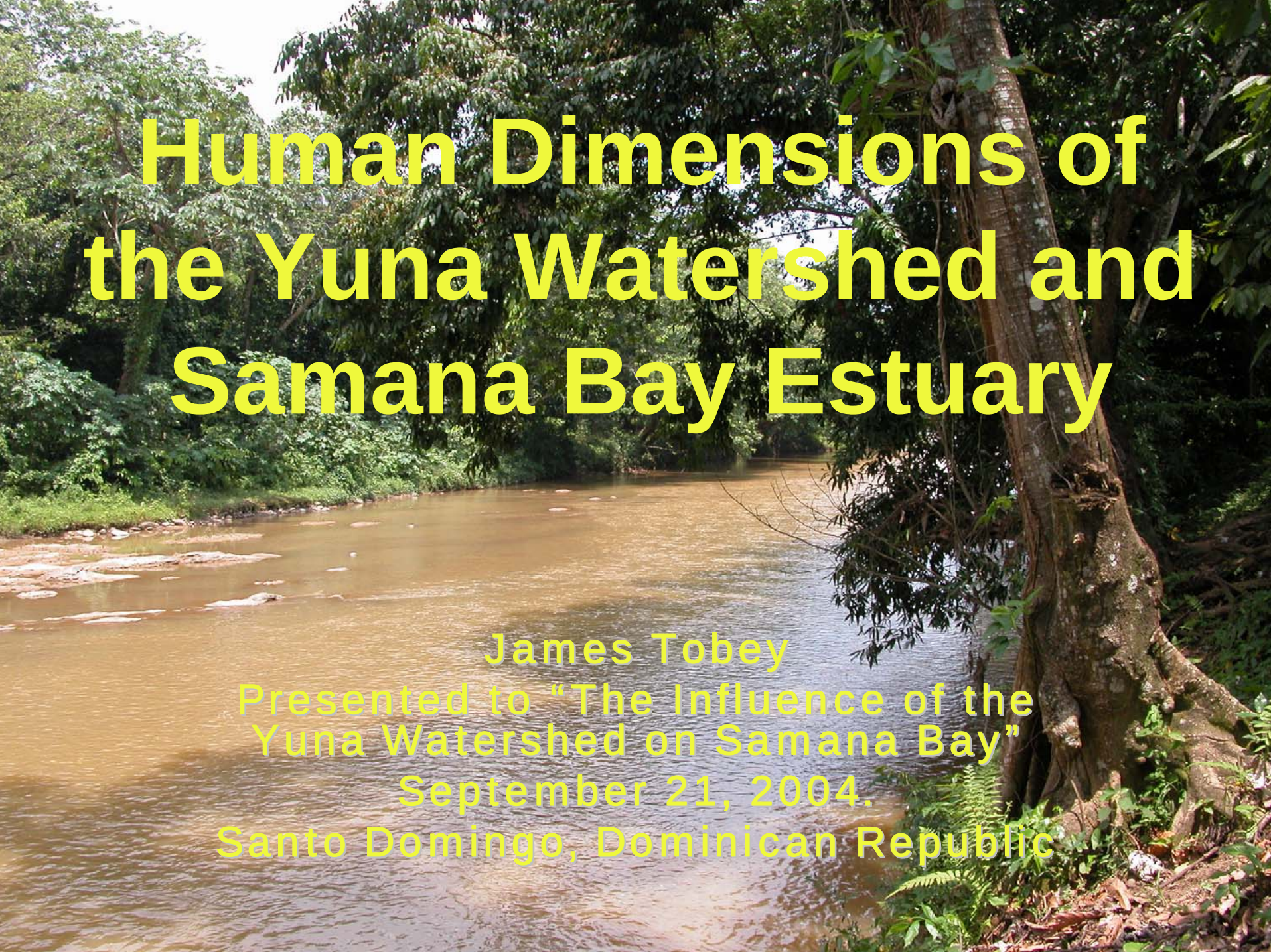
Coastal Resources Center
University of Rhode Island

MANAGING FRESHWATER INFLOWS TO ESTUARIES

Human dimensions of the Yuna Watershed and Samana Bay Estuary.

Tobey, J. (2004). Human dimensions of the Yuna Watershed and Samana Bay Estuary. Presented at: The Influence of the Yuna Watershed on the Estuary of Samana Bay (September 21), Santo Domingo, Dominican Republic. Narragansett, RI: Coastal Resources Center, University of Rhode Island.



Human Dimensions of the Yuna Watershed and Samana Bay Estuary

James Tobey

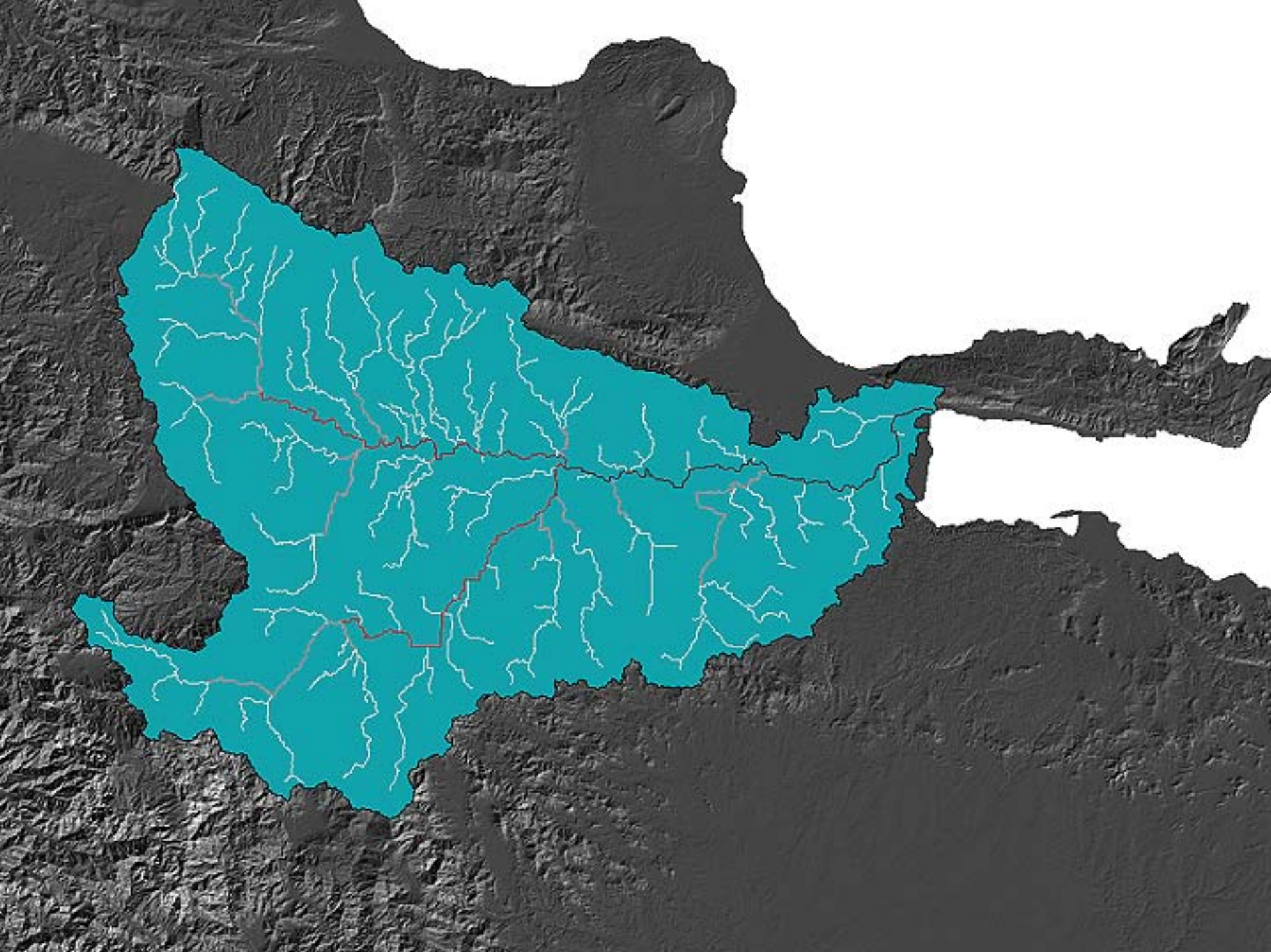
Presented to "The Influence of the Yuna Watershed on Samana Bay"
September 21, 2004.
Santo Domingo, Dominican Republic

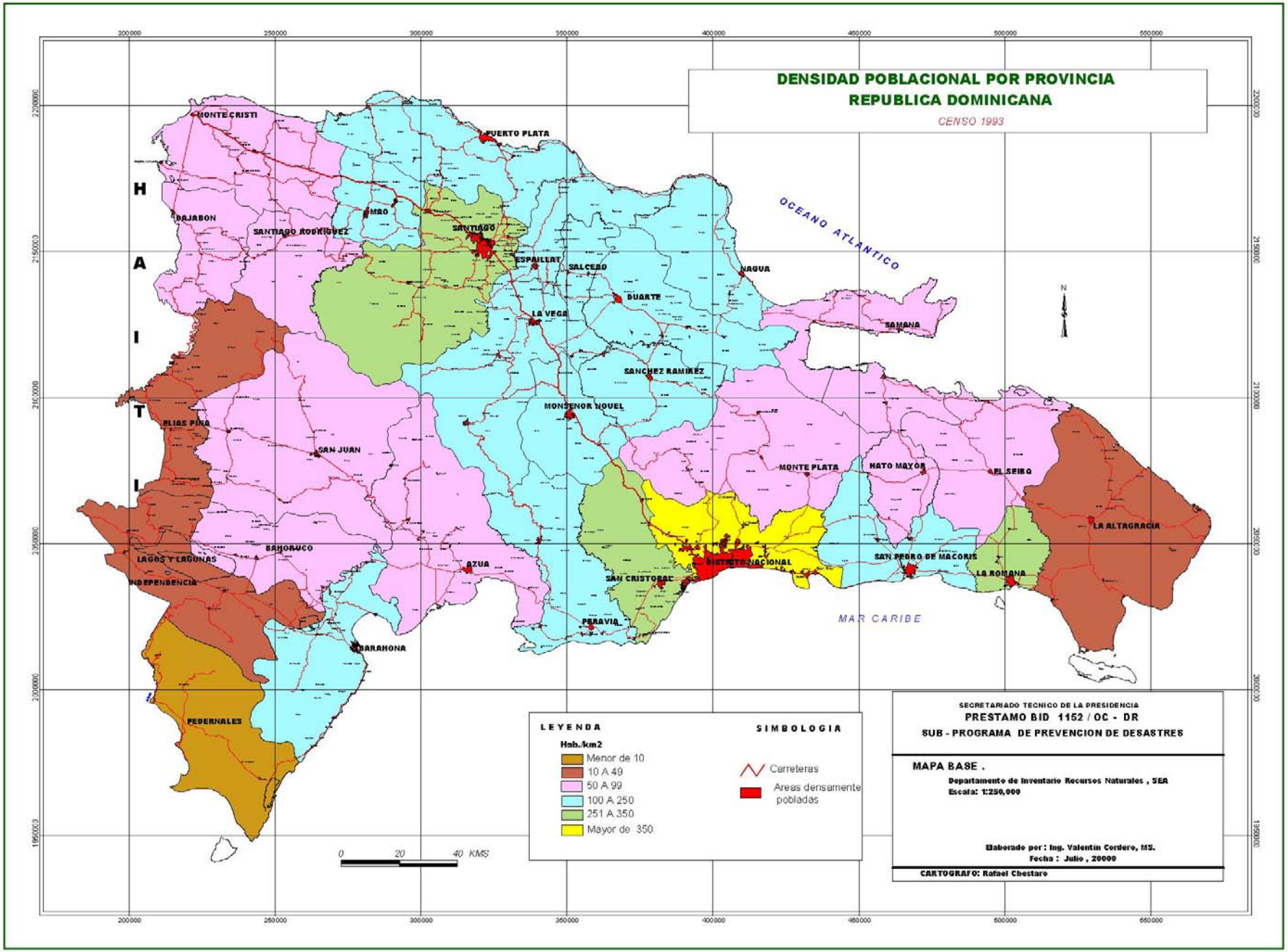
Land Use and Water Dependent Sectors

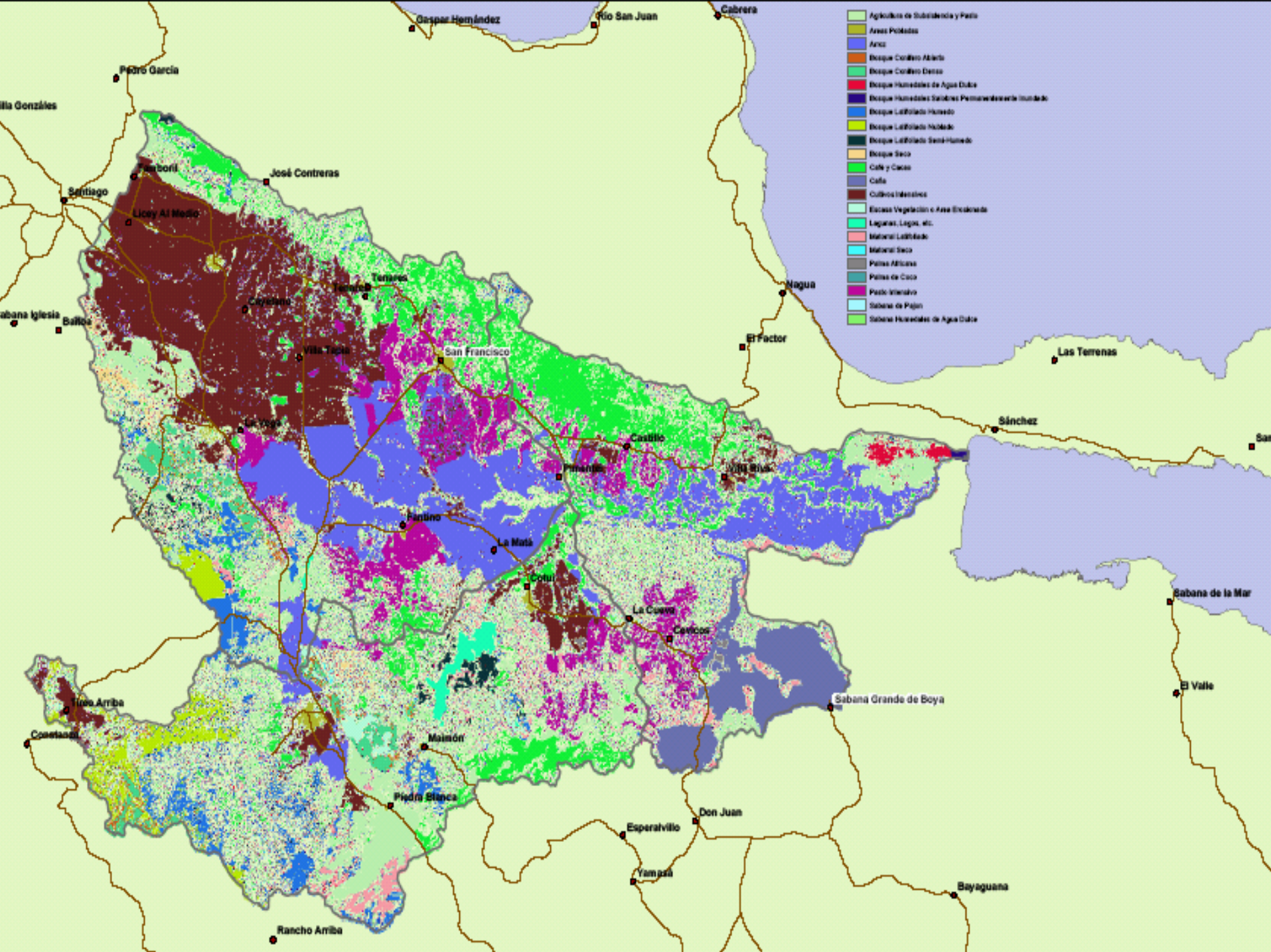
- Agriculture --
  - 2/3 of national rice production comes from within the Yuna watershed boundaries
  - Policies have promoted rice production (irrigation infrastructure, low water use fees, subsidized credit)
- Mining --
  - Falconbridge nickel-iron mine in Bonao
  - Pueblo Viejo gold mine in Cotui
  - Riverbed sand mining

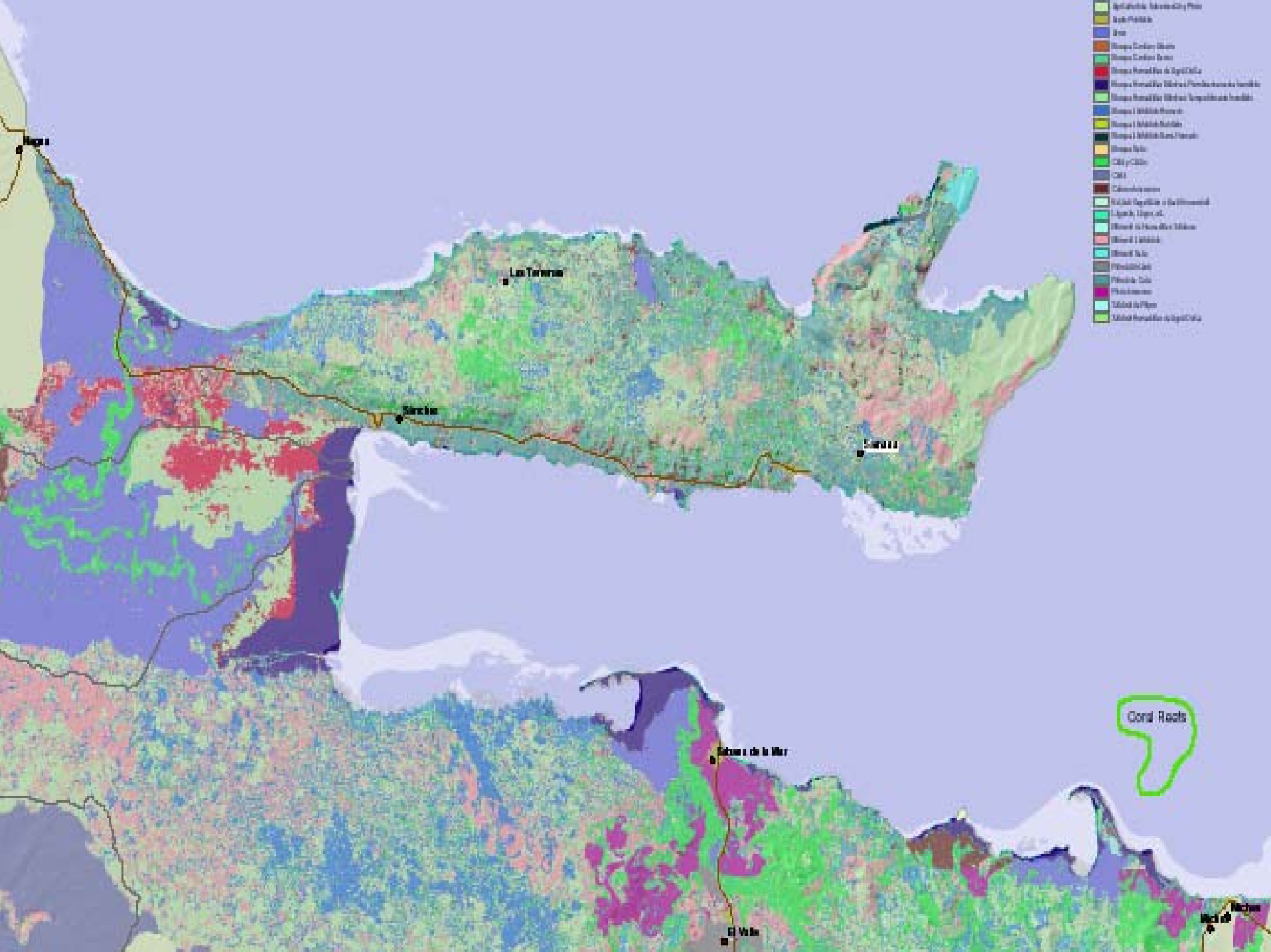
Land Use and Water Dependent Sectors

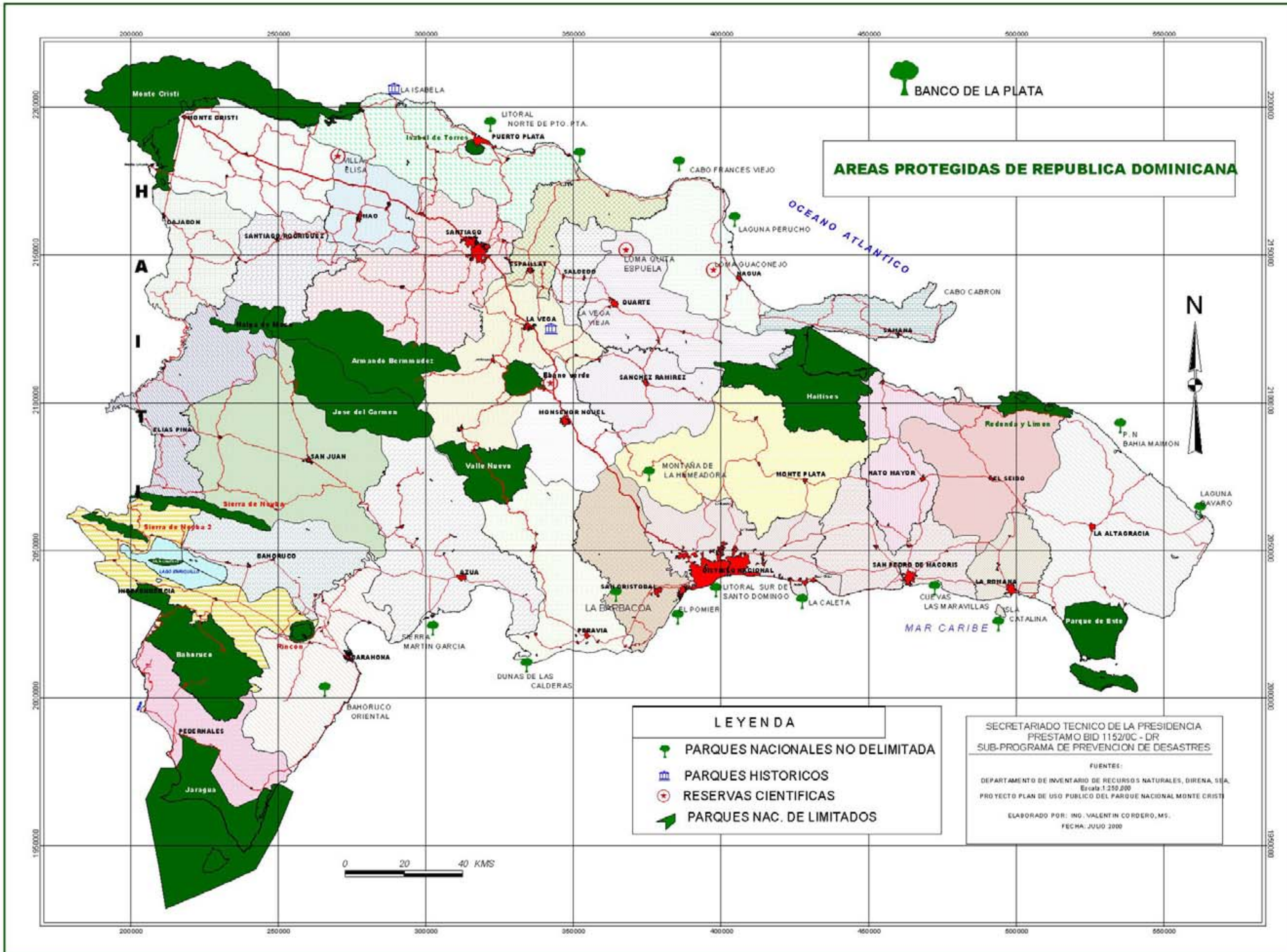
- Dams, irrigation and hydropower
- Urban water demand -- Bonao, San Fco Macoris, Cotui
- Tourism -- Samana, Los Haitises
- Fisheries -- Principal livelihood in Sanchez. About 15,000 families dependent on fisheries




DENSIDAD POBLACIONAL POR PROVINCIA
REPUBLICA DOMINICANA
CENSO 1993
HAITI
OCEANO ATLANTICO
MAR CARIBE
MONTE CRISTI
PUERTO PLATA
DAJABON
SANTIAGO RODRIGUEZ
MAO
SANTIAGO
ESPAILLAT
SALCEDO
NAGUA
DUARTE
LA VEGA
SAMANA
SANCHEZ RAMIREZ
MONSEÑOR NOUEL
ELIAS PIÑA
SAN JUAN
MONTE PLATA
HATO MAYOR
EL SEIBO
LA ALTAGRACIA
BAHORUCO
LAGOS Y LAGUNAS
INDEPENDENCIA
AZUA
DISTRITO NACIONAL
SAN CRISTOBAL
SAN PEDRO DE MACORIS
LA ROMANA
PERAVIA
BARAHONA
PEDERNALES
N
0 20 40 KMS
LEYENDA
Hab./km2
Menor de 10
10 A 49
50 A 99
100 A 250
251 A 350
Mayor de 350
SIMBOLOGIA
Carreteras
Areas densamente pobladas
SECRETARIADO TECNICO DE LA PRESIDENCIA
PRESTAMO BID 1152 / OC - DR
SUB - PROGRAMA DE PREVENCION DE DESASTRES
MAPA BASE .
Departamento de Inventario Recursos Naturales , SEA
Escala: 1:250,000
Elaborado por : Ing. Valentin Cordero, MS.
Fecha : Julio , 20000
CARTOGRAFO: Rafael Chestaro


Agricultura de Subsistencia y Pasto
Areas Pobladas
Arroz
Bosque Conífero Abierto
Bosque Conífero Denso
Bosque Humedales de Agua Dulce
Bosque Humedales Salobres Permanentemente Inundado
Bosque Latifoliado Humedo
Bosque Latifoliado Nublado
Bosque Latifoliado Semi-Humedo
Bosque Seco
Café y Cacao
Caña
Cultivos Intensivos
Escasa Vegetacion o Area Erosionada
Lagunas, Lagos, etc.
Material Latifoliado
Material Seco
Palma Africana
Palma de Coco
Pasto Intensivo
Sabana de Pajon
Sabana Humedales de Agua Dulce
Gaspar Hernández
Río San Juan
Cabrera
Pedro García
Santiago
José Contreras
Licey Al Medio
Tenares
Cayetano
Villa Tapia
San Francisco
La Vega
Nagua
El Factor
Las Terrenas
Sánchez
Castillo
Pimentel
Villa Riva
Fantino
La Matá
Cotuí
La Cuaba
Cevicos
Sabana de la Mar
El Valle
Sabana Grande de Boya
Tireo Arriba
Constanza
Maimón
Piedra Blanca
Don Juan
Esperalvillo
Yamasá
Bayaguana
Rancho Arriba


Coral Reefs


AREAS PROTEGIDAS DE REPUBLICA DOMINICANA
BANCO DE LA PLATA
OCEANO ATLANTICO
MAR CARIBE
HAITI
N
Monte Cristi
MONTE CRISTI
LA ISABELA
LITORAL NORTE DE PTO. PTA.
Isabel de Torres
PUERTO PLATA
VILLA ELISA
CABO FRANCES VIEJO
DAJABON
MAO
SANTIAGO RODRIGUEZ
SANTIAGO
ESPAILLAT
SALCEDO
LOMA QUITA ESPUELA
LOMA GUACONEJO
NAGUA
LAGUNA PERUCHO
CABO CABRON
SAMANA
DUARTE
LA VEGA
LA VEGA VIEJA
Nalga de Maco
Armando Bermudez
Jose del Carmen
Ebano verde
SANCHEZ RAMIREZ
Haitises
Redonda y Limon
P.N BAHIA MAIMON
MONSEÑOR NOUEL
ELIAS PIÑA
SAN JUAN
Valle Nuevo
MONTAÑA DE LA HUMEADORA
MONTE PLATA
HATO MAYOR
EL SEIBO
LAGUNA BAVARO
LA ALTAGRACIA
Sierra de Neyba
Sierra de Neyba 2
BAHORUCO
LAGO ENRIQUILLO
INDEPENDENCIA
AZUA
DISTRITO NACIONAL
SAN PEDRO DE MACORIS
LA ROMANA
SAN CRISTOBAL
LITORAL SUR DE SANTO DOMINGO
LA CALETA
CUEVAS LAS MARAVILLAS
ISLA CATALINA
LA BARBACOA
EL POMIER
Parque de Este
PERAVIA
SIERRA MARTIN GARCIA
Rincon
BARAHONA
Bahoruco
DUNAS DE LAS CALDERAS
BAHORUCO ORIENTAL
PEDERNALES
Jaragua
0 20 40 KMS
LEYENDA
PARQUES NACIONALES NO DELIMITADA
PARQUES HISTORICOS
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FUENTES:
DEPARTAMENTO DE INVENTARIO DE RECURSOS NATURALES, DIRENA, SEA, Escala 1:250,000
PROYECTO PLAN DE USO PUBLICO DEL PARQUE NACIONAL MONTE CRISTI
ELABORADO POR: ING. VALENTIN CORDERO, MS.
FECHA: JULIO 2000

Impacts of human activities on ecology of Samana Bay

- Pollution (toxins, nutrient loading) from agriculture, mining, cities
  - decreases in shrimp, crab and fish production and increases in health risks from seafood consumption
  - loss of endangered species (marine turtles, manatee)

- Reduced freshwater inflows during the dry season due to withdrawals for agriculture and municipal use
  - impacts on salinity distribution in the estuary and shifts in biological resources (particularly mangroves)

- Increased flooding and sedimentation due to deforestation, irrigation canals, sand mining
  - loss of seagrass beds, losses of production of shrimp, oyster and conch, changes in distribution of mangrove species
- Overfishing
  - impact on shrimp and fish populations

Key information needs for Phase 2

- Further analysis of river flow trends
- Mapping of biological resources in the estuary
- Data on salinity structure, bathymetry and historical trends in mangrove distribution
- Information on groundwater flows in Samana Bay
- Assessment of information on toxics and their movement in the food chain

Initial Findings on River Flow Patterns

- Analysis of pre- and post-dam gauging data shows greater average monthly flows in post-dam period

Priorities for Phase 2

- Analysis of precipitation trends to verify whether rainfall in the post-dam period has been significantly greater than during the pre-dam period
- Review operating plan for Hatillo Dam to evaluate its impacts on daily river flow fluctuations

…better understanding of the perceptions and concerns of key stakeholder groups

- User groups dependent on renewable ecosystem goods and services
  - Samana Bay fishing community
  - Ecotourism business
  - Rice farmers and irrigation users
- National and international institutions
  - Conservation NGOs
  - SEMARN and INDRHI
  - Secretaría de Agricultura

...better understanding of scenarios for future changes to freshwater inflows

- Construction of new dam and irrigation canals at Piedra Gorda, Bonao?
- Expanded rice production and agrochemical use?
- Mining?
- Construction of new international airport?
- Other development (tourism, aquaculture)?

Priority for Phase 2

- Review operating plans for proposed Piedra Gorda dam to evaluate possible impacts on river flows in the Yuna

Governance highlights

- Planning and decision making for the estuary and the watershed are traditionally made in isolation of one another
- There have been many projects on watershed development and conservation
  - but, there is not an integrated national water law and no watershed resources council
- There have been many efforts on integrated and community-based coastal resources management in Samana Bay area
  - but, there is little experience with EIA's, funding for MIC is weak and there is no ICM legislation or policy

Priorities for Phase 2

- **Consultations with government and other stakeholders to assess the potential for forming a watershed-wide council or commission to advance integrated watershed management**


Gracias!