LAGUNA LAKE DEVELOPMENT AUTHORITY

"Ibalik ang Diwa ng Lawa"

Data Availability and Quality for the Laguna Lake Basin

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Outline of the Presentation:

I. Data Sources

II. Data Availability and Sources

a. Socio-Economic Data

a. Watershed/Land Resources Data

b. Water Resources Data

c. Other Data

II. Data Availability and Quality Issues

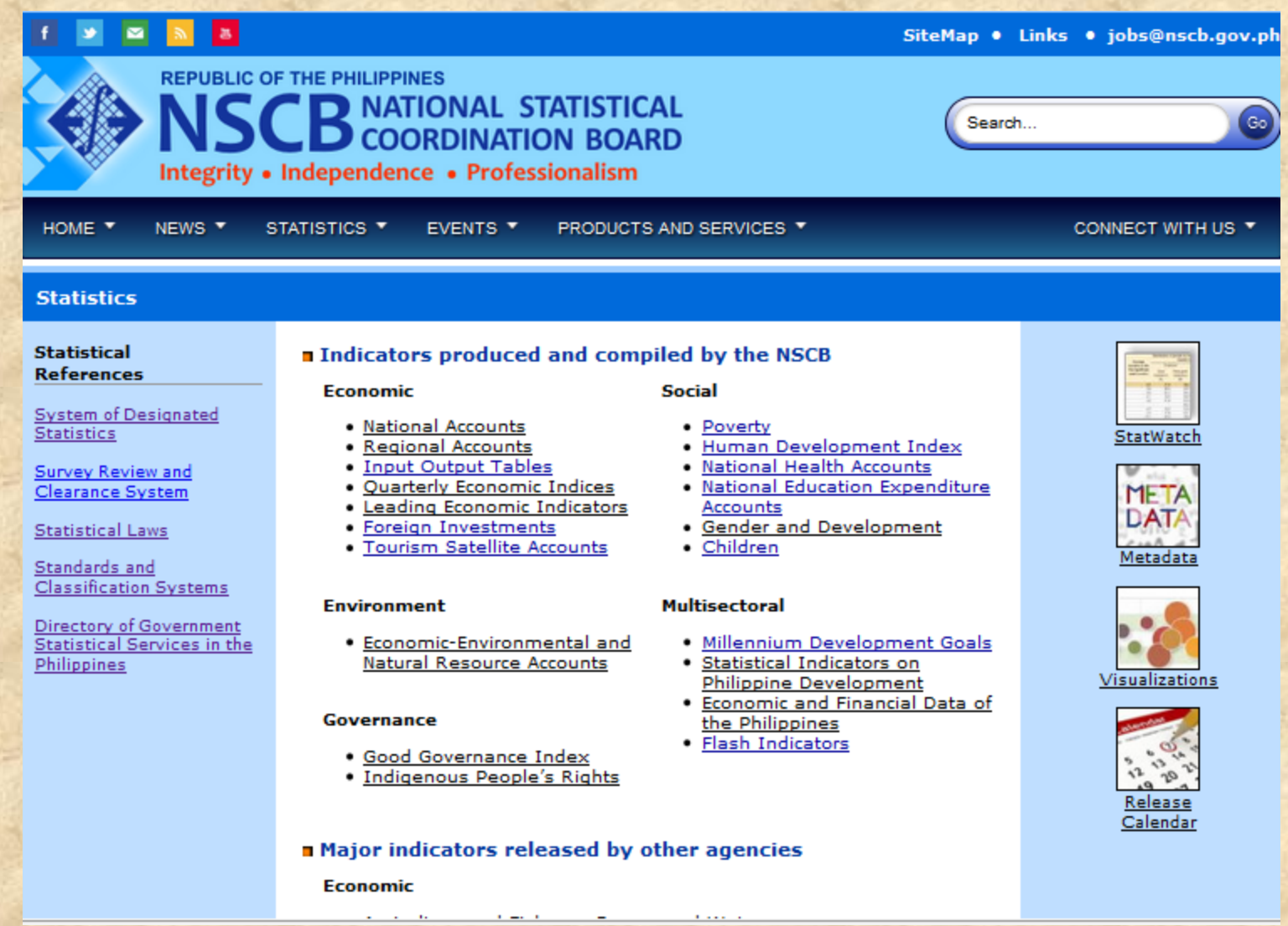
Data Sources

Data Sources

- Topographic and other basic spatial boundaries
- National accounts
- Protected area data and protected species list
- Forest statistics
- Fisheries statistics
- Land cover
- Soil data
- Socio-economic data
- Water statistics

Data Availability

Website: http://www.nscb.gov.ph/stattables/



Website:
http://www.nscb.gov.ph/grdp/2012/dataCharts/default.asp

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Gross Regional Domestic Product - Data and Charts

- Regional Accounts Main Page
- GRDP Main Page
- Press Release
- Highlights
- Past and Future Releases
- **Data and Charts**
- Publication
- Metadata
  - Technical Notes
- Contact Information

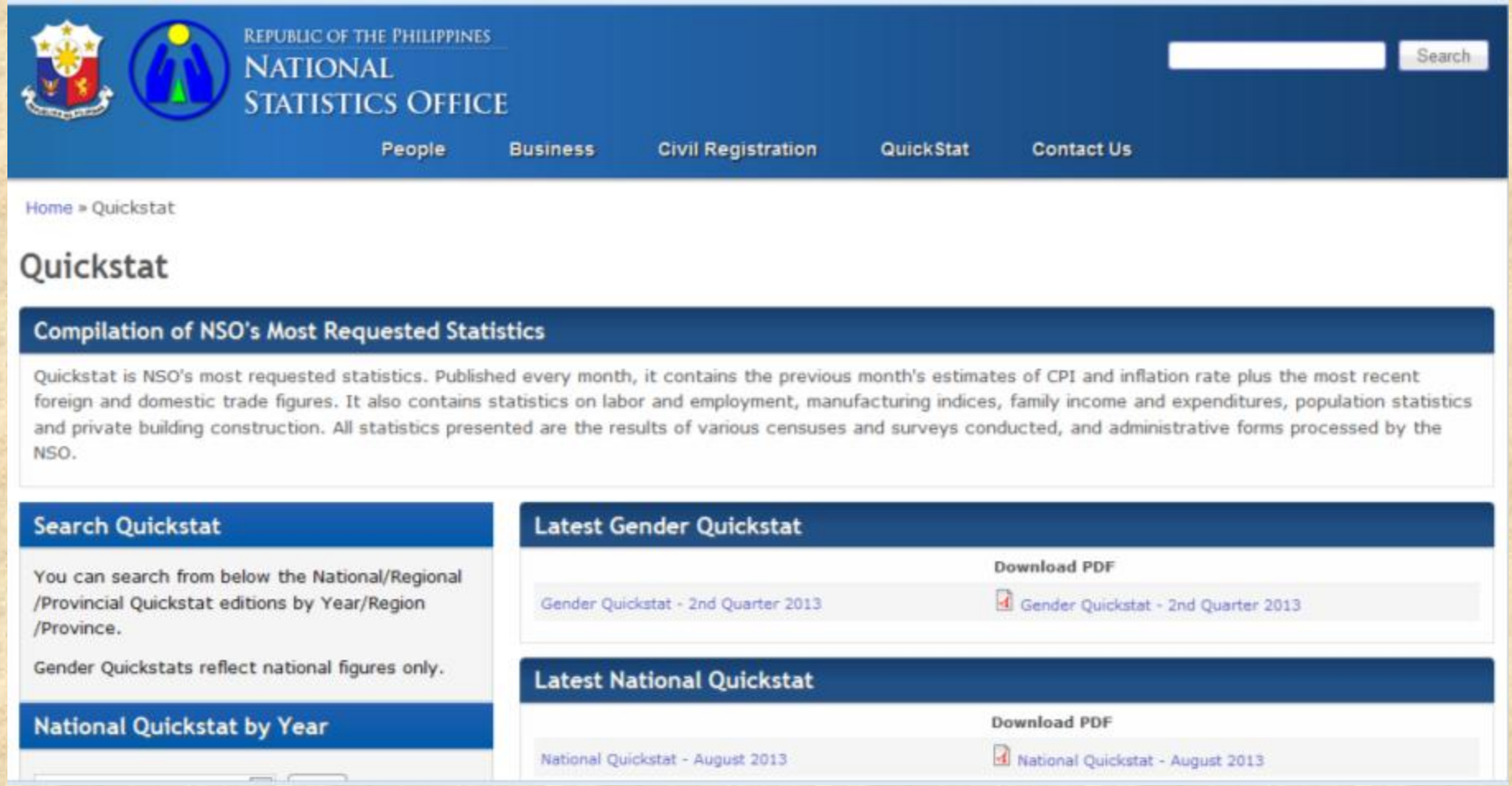
Time Series Data

Title	File
2012 (as of July 2013)	
GRDP by Region (2010-2012, at constant 2000 and current prices)	[2.00MB]
GRDP by Industrial Origin (2010-2012,, at constant 2000 and current prices)	[1.66MB]
2011 (as of July 2012)	
GRDP by Region (2009-2011, at constant 2000 and current prices)	[1.55MB]
GRDP by Industrial Origin (2009-2011, at constant 2000 and current prices)	[1.26MB]

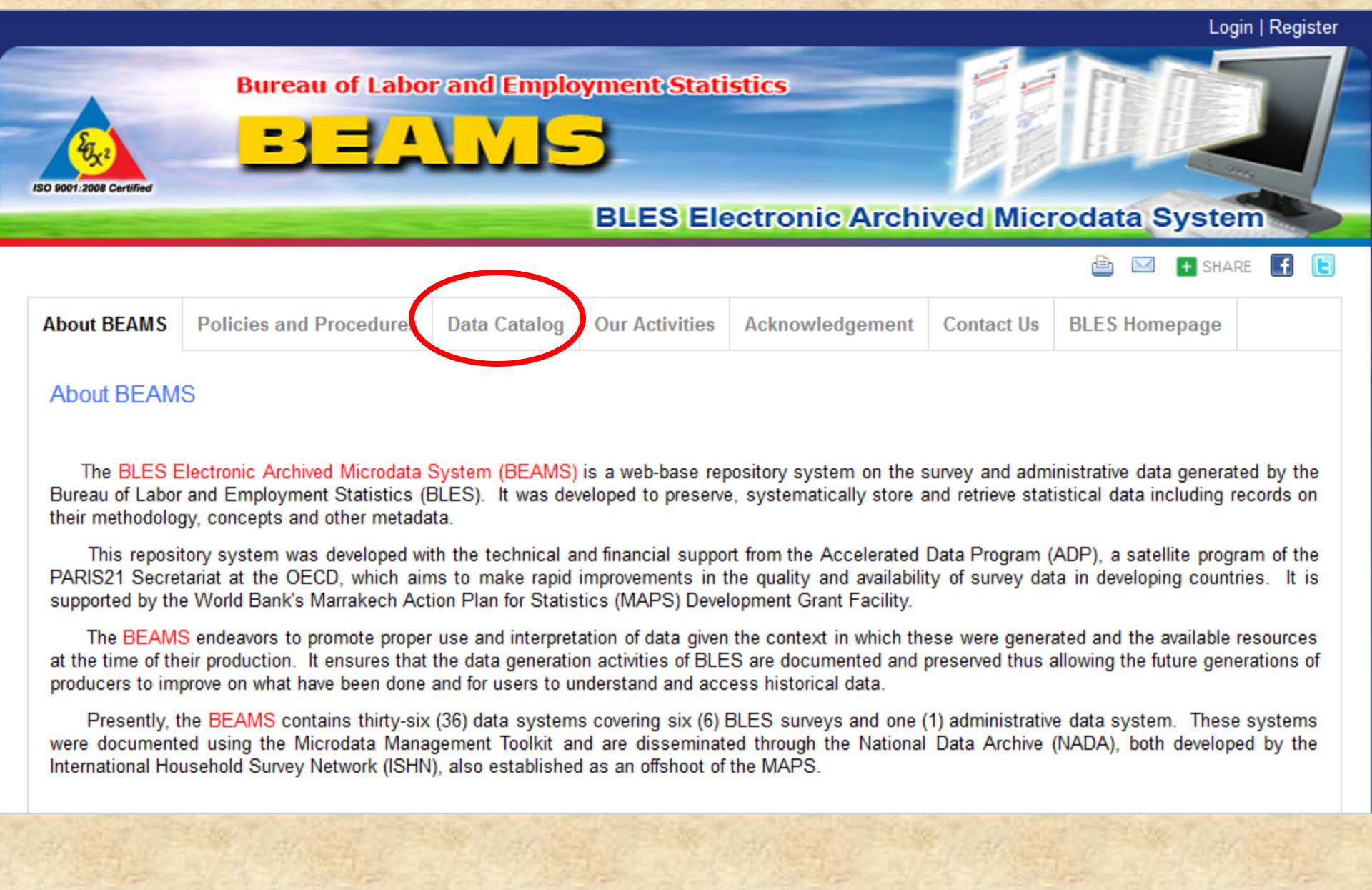
Maps

- Gross Regional Domestic Product by Industrial Origin
  In Percent (at constant 2000 prices)
- Growth Rates
  In Percent (at constant 2000 prices)
- GRDP Per Capita

Website: http://www.census.gov.ph/statistics/quickstat



Website: http://www.bles.dole.gov.ph/beams/index.php/about-beams



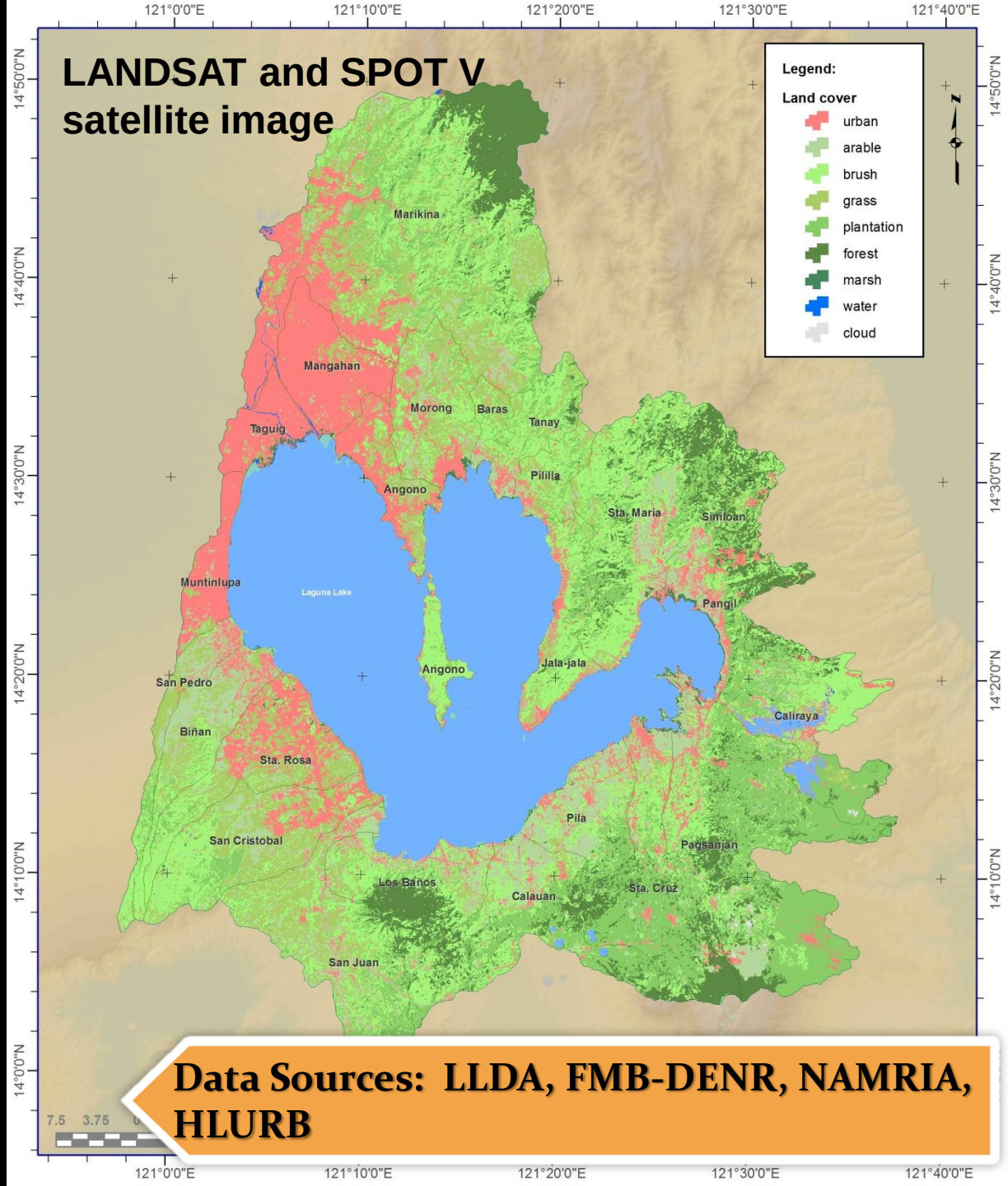
Website: http://countrystat.bas.gov.ph/

Watershed and Land Resources Data

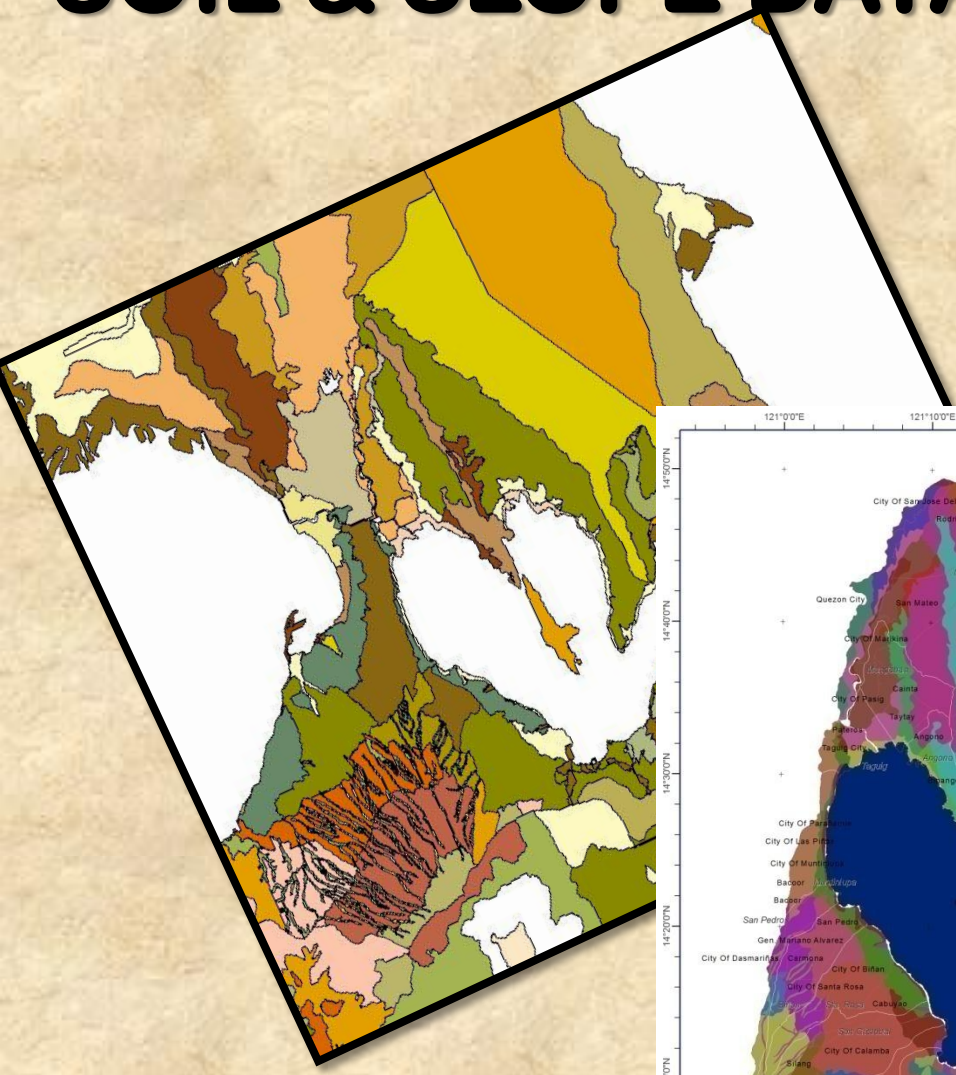
LAND COVER

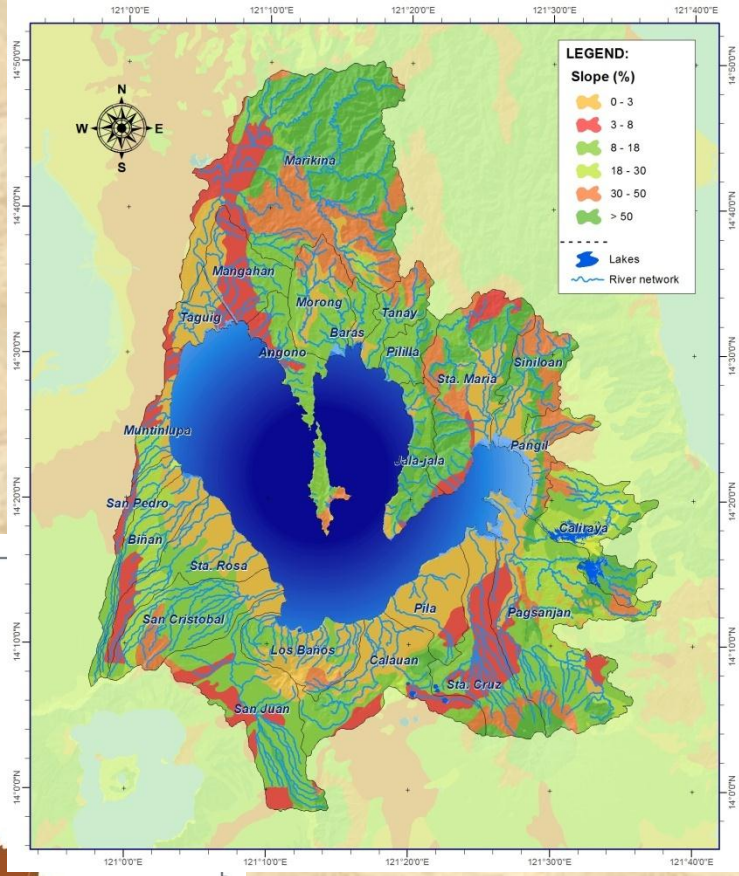
1993 vs 2003 Land Cover
Water bodies ↑
Agri ↑
Forest ↓
Built-up ↑
Open areas↓

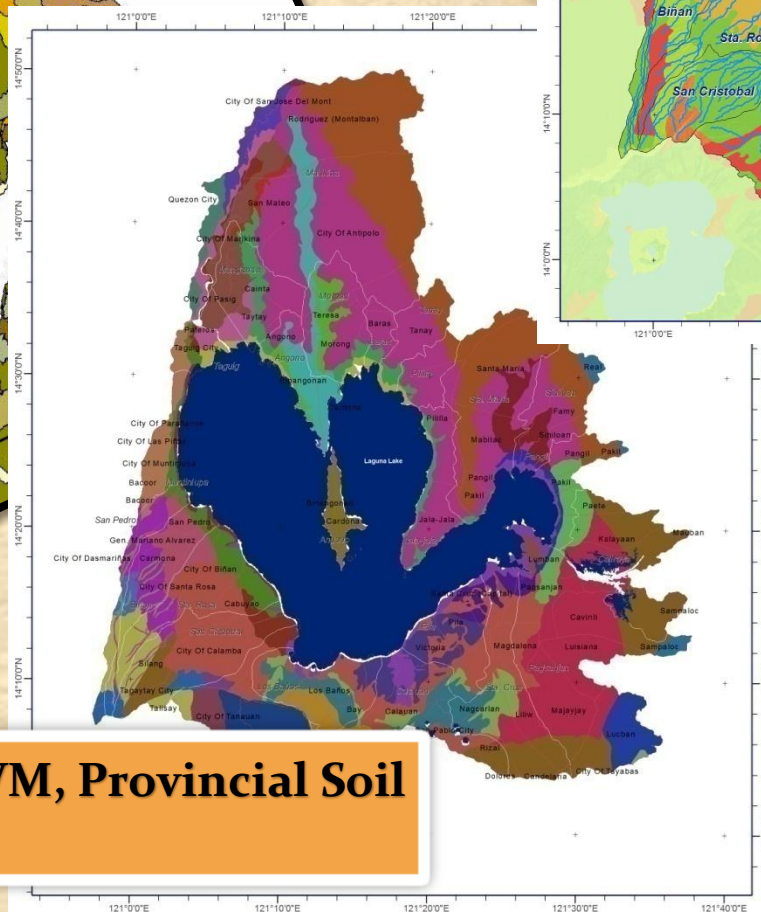
- water bodies increased by 1% in the span of 10 years
- agriculture expanded by 4% in 10 years
- the forest area reduced by 7% or 29,562 hectares over the period of 10 years
- the built up area increased by 6% or 21,630 hectares
- the open area reduced by 3% or 10,454 hectares, either used as built up or agri. purposes
- 0.7% deforestation rate per annum



SOIL & SLOPE DATA

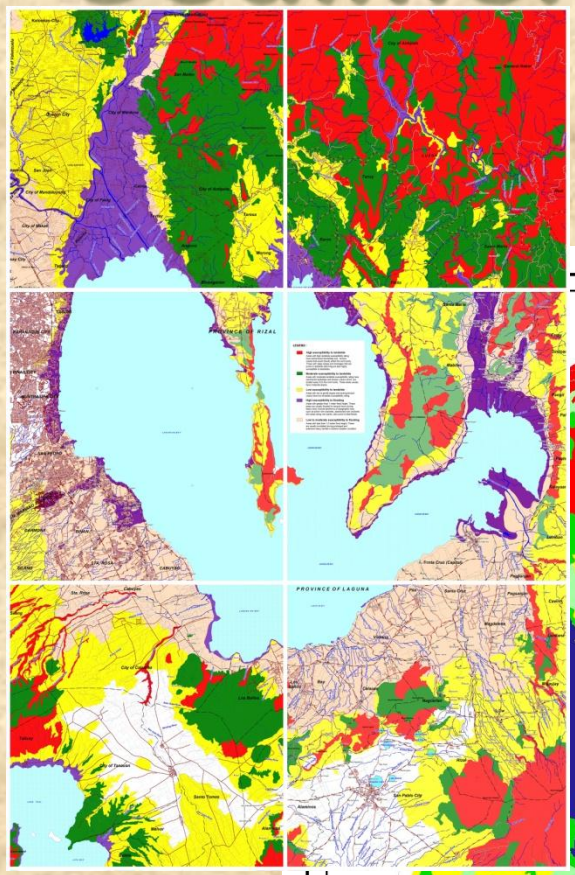


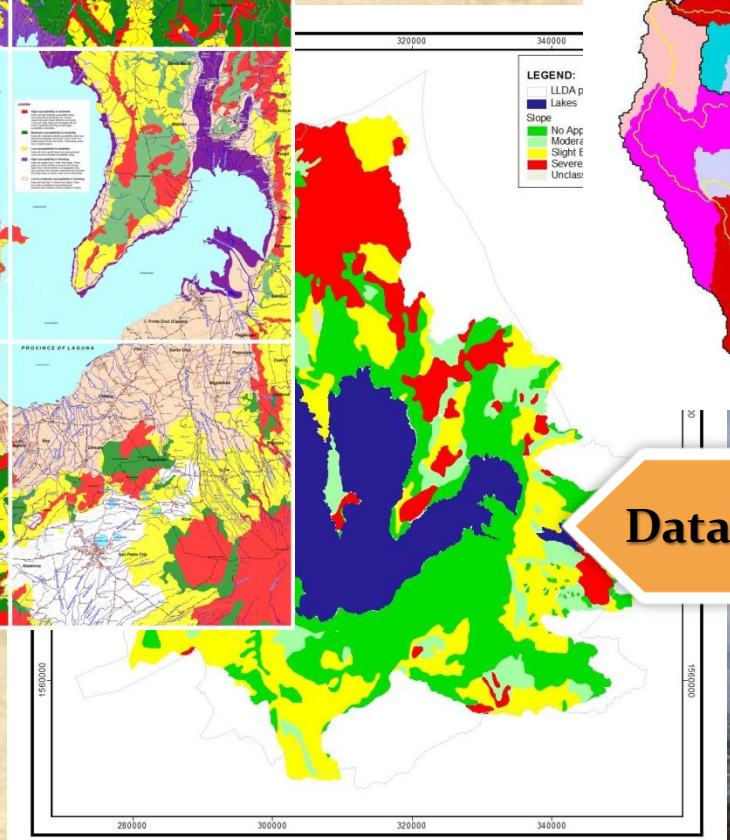


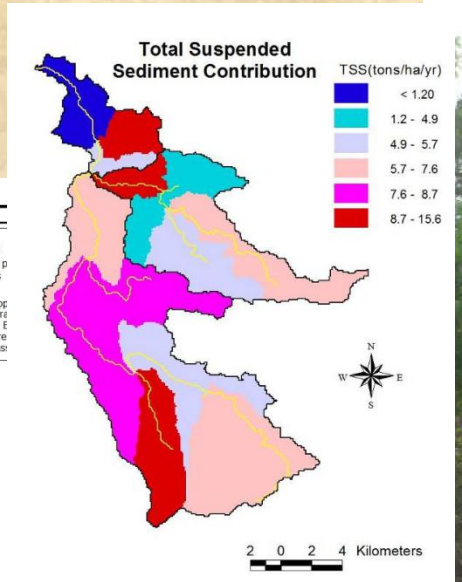


Data Sources: LLDA, BSWM, Provincial Soil data, FMB

Sedimentation and Erosion

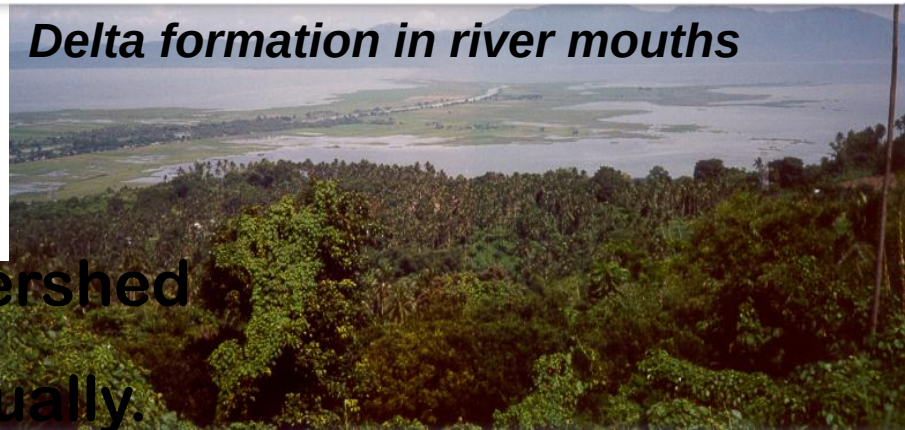






Data Sources: LLDA, MGB-DENR, NAMRIA

Delta formation in river mouths

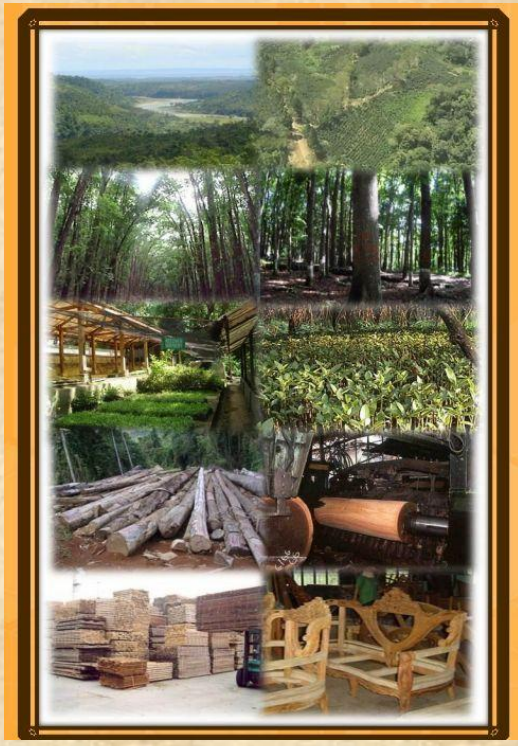


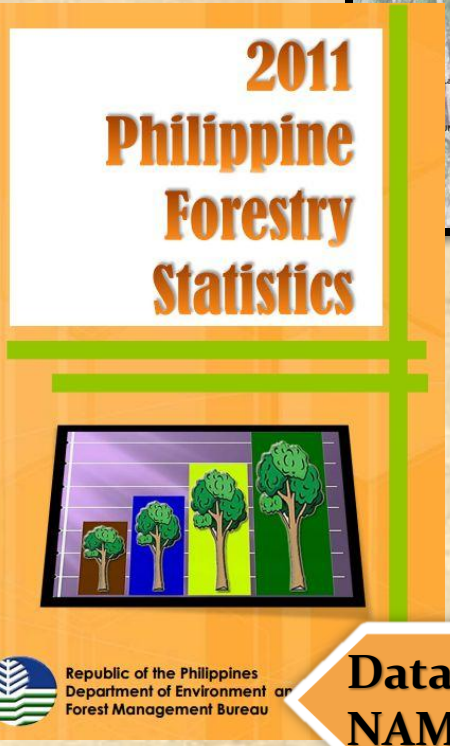
Sediments coming from the watershed

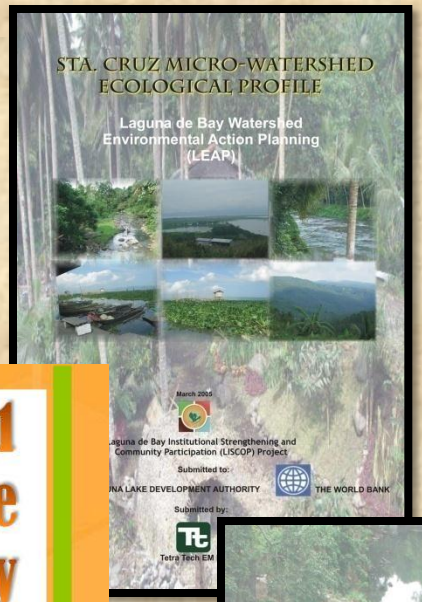
- about 4 million metric tons annually.

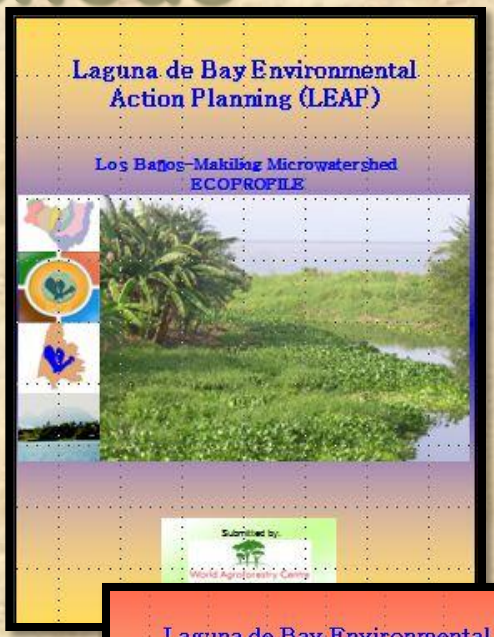
Forest and Major Sub-watersheds Ecological Profiling

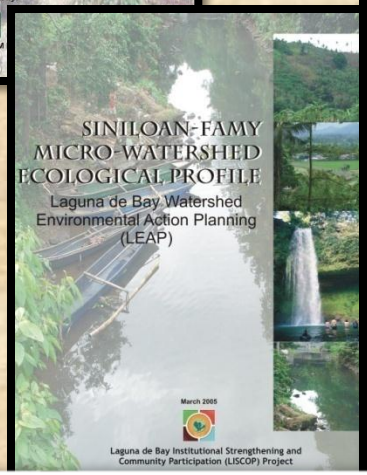
- Bio-physical characteristics
- Socio-economics
- Maps (topog, landcover, soil, among others)
- Forestry statistics
- Issues and concerns

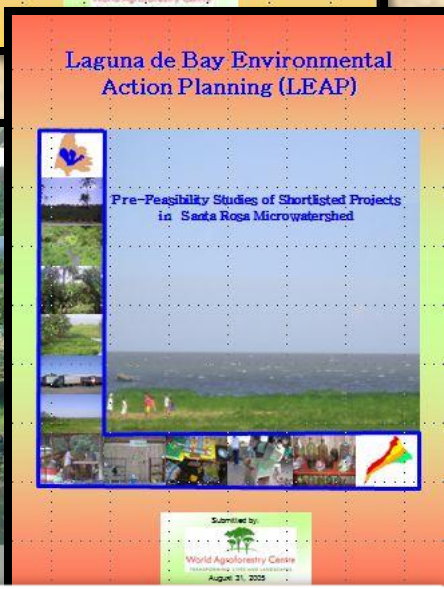










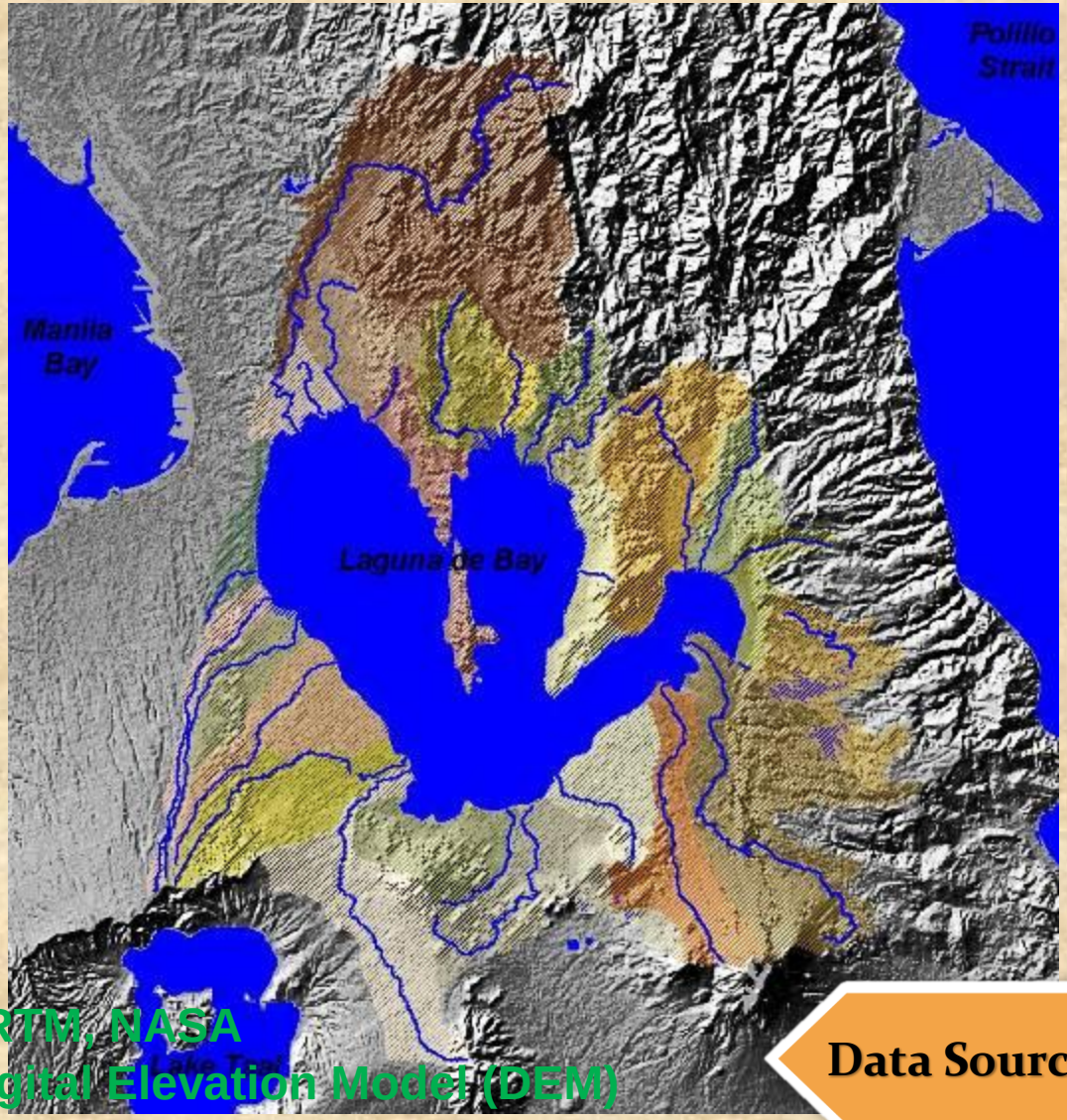


Republic of the Philippines
Department of Environment ar
Forest Management Bureau

Data Sources: LLDA, FMB,PAWB-DENR, NAMRIA, WWF, LGU data

Water Resources Data

Topographic Data



- Pasig River is the only outlet of the lake
- Some 100 streams drain into the lake
- divided into twenty-four (24) hydrological sub-basins
- watershed area = approx. 2,920 km^2

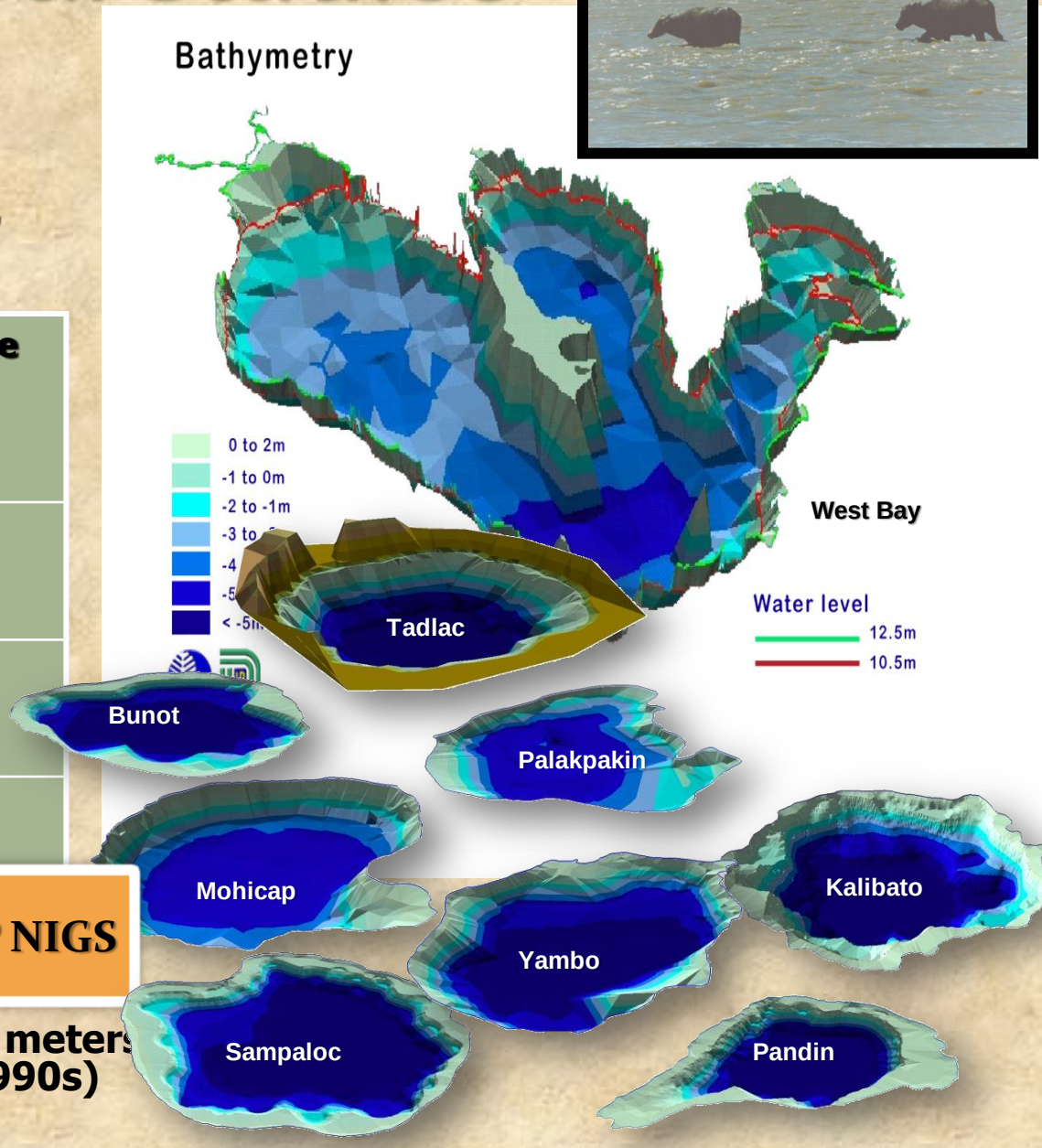
SRTM, NASA
Digital Elevation Model (DEM)
February 2000

Data Sources: LLDA, NAMRIA

Bathymetrical studies

Bathymetry Studies 1963, 1973, 1983, 1997

Year of acquisition of bathymetry data	Shallowing Rate (mm/year)
1963 vs. 1983	3.23
1983 vs. 1997	9.68
1963 vs. 1997	8.36



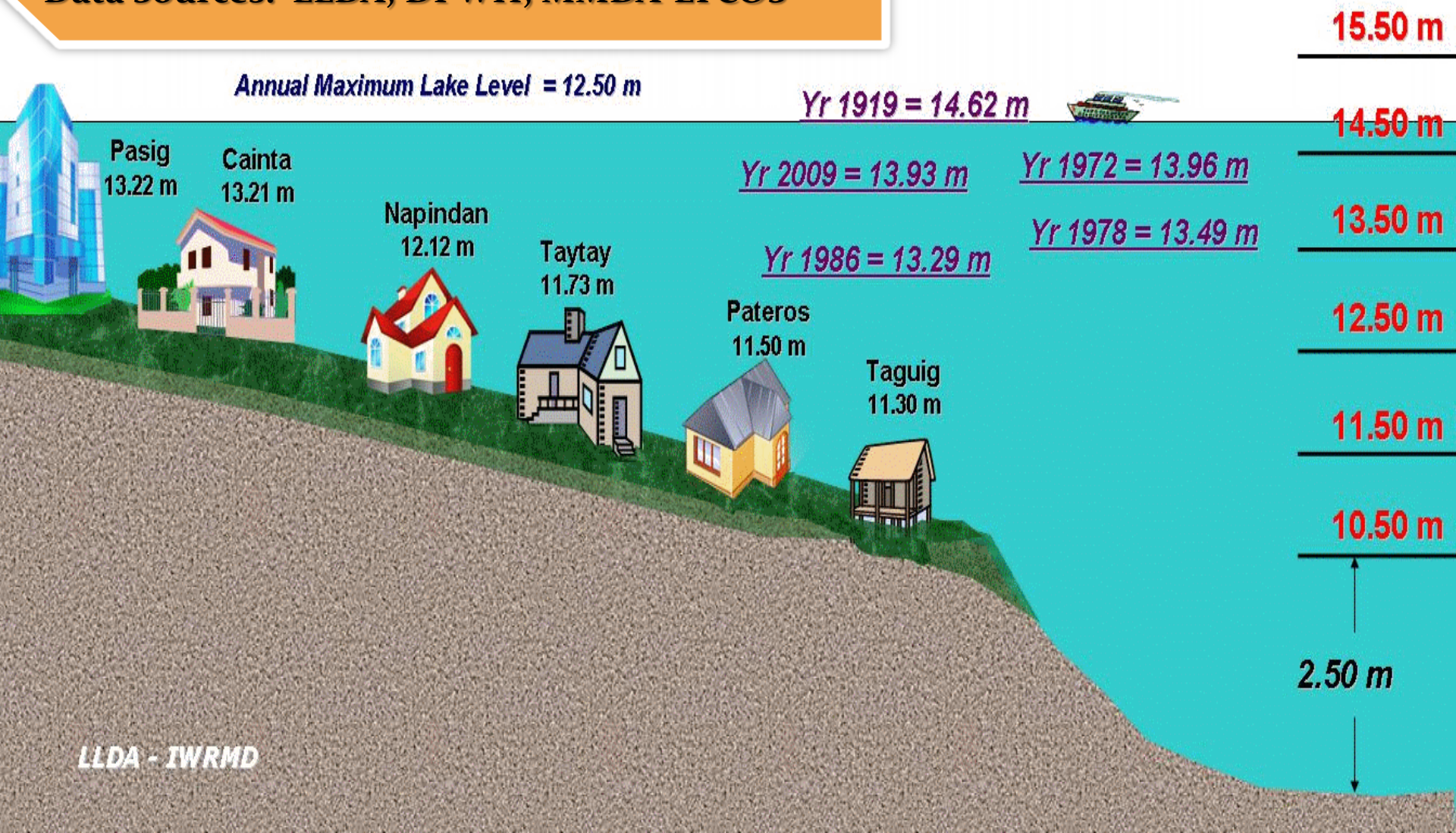
Data Sources: LLDA, DPWH, UP NIGS

The lake became shallower by 0.30 meters or about one foot (from 1960s to 1990s)

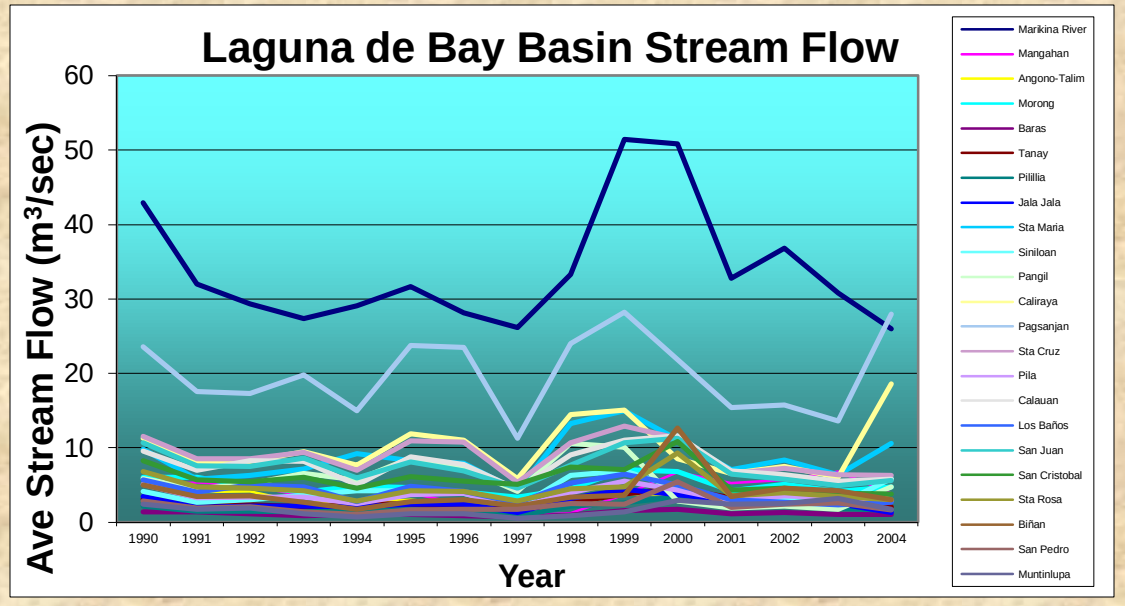
AdGIF UNREGISTERED - www.gif-animator.com

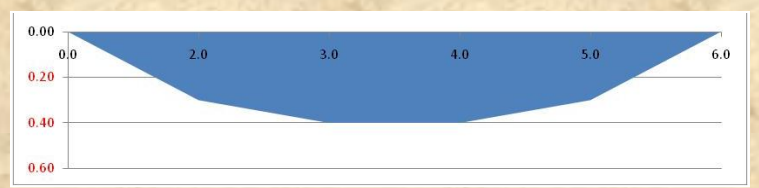
Lake Level Under Extreme Weather Conditions

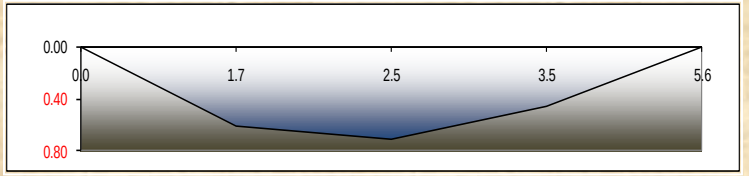
Data Sources: LLDA, DPWH, MMDA-EFCOS

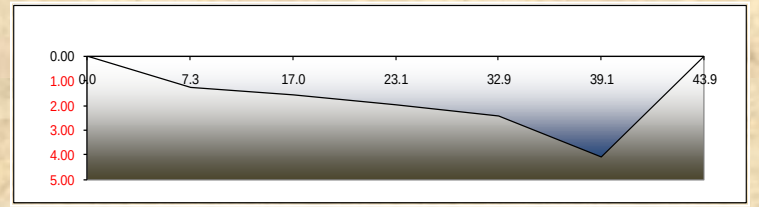


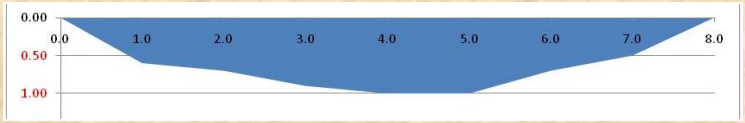
Streamflow Measurement







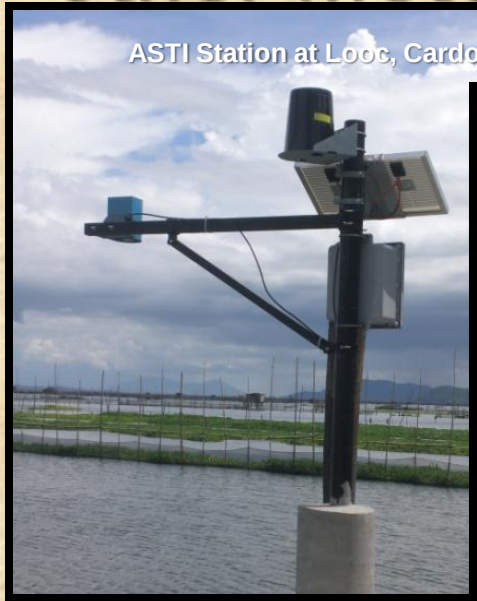


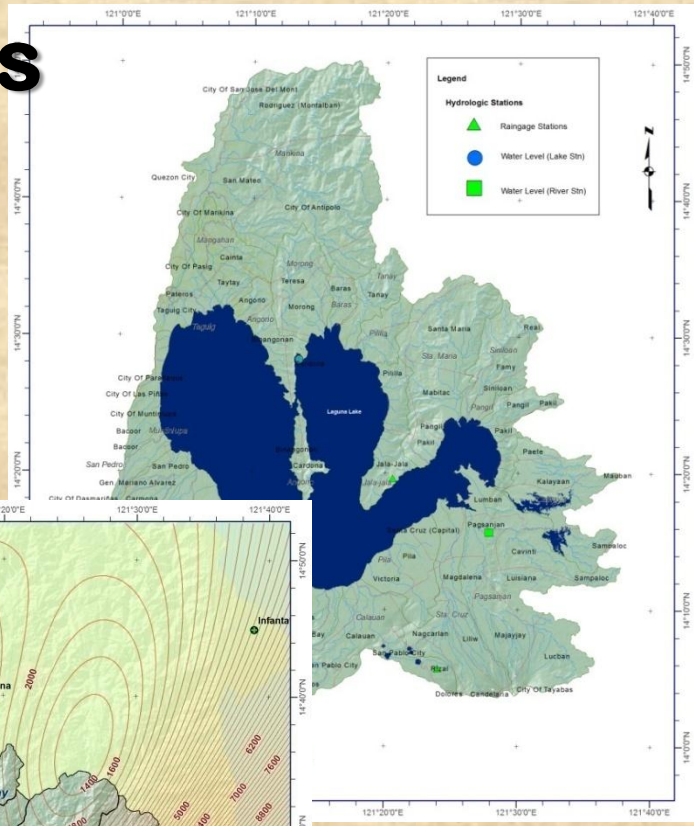


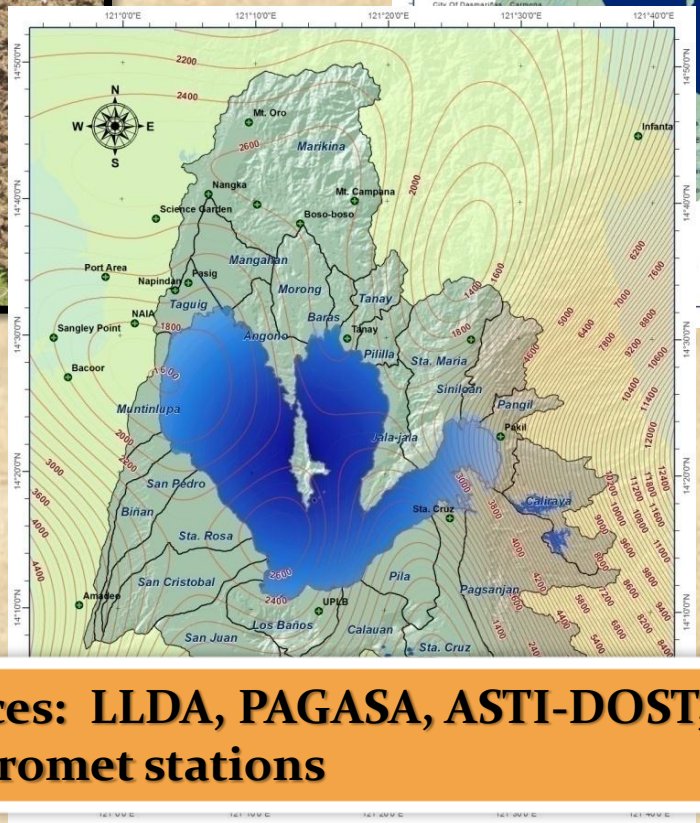
Data Sources: LLDA, DPWH, DENR

- **Inputs to the DSS Hydrological module**
- **Inputs to the TMDL study for Laguna de Bay**
  Basis for the issuance of surface water permit

Rainfall, Water Level stations and other meteorological stations

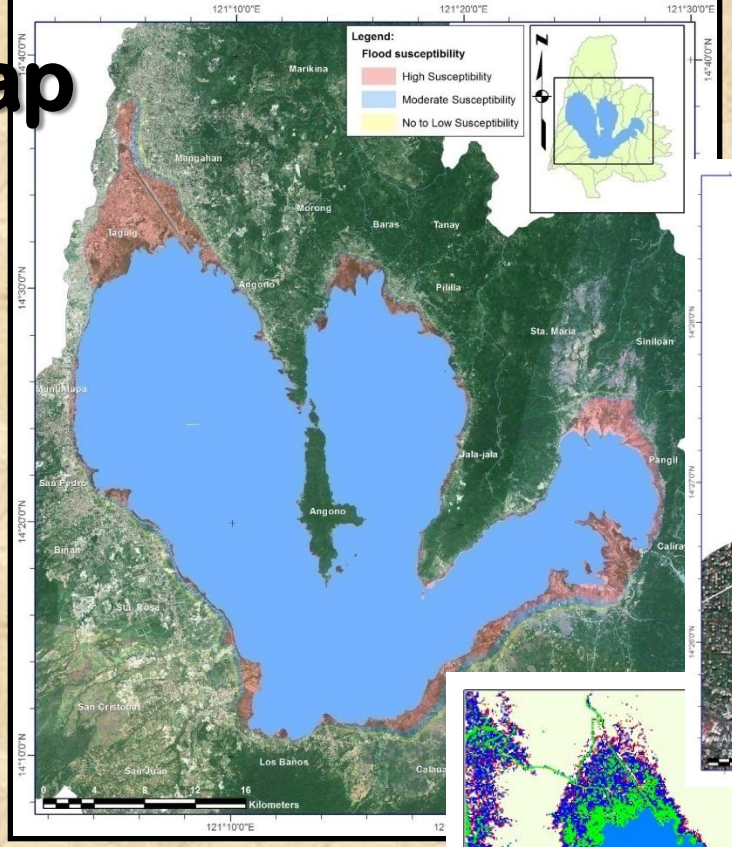


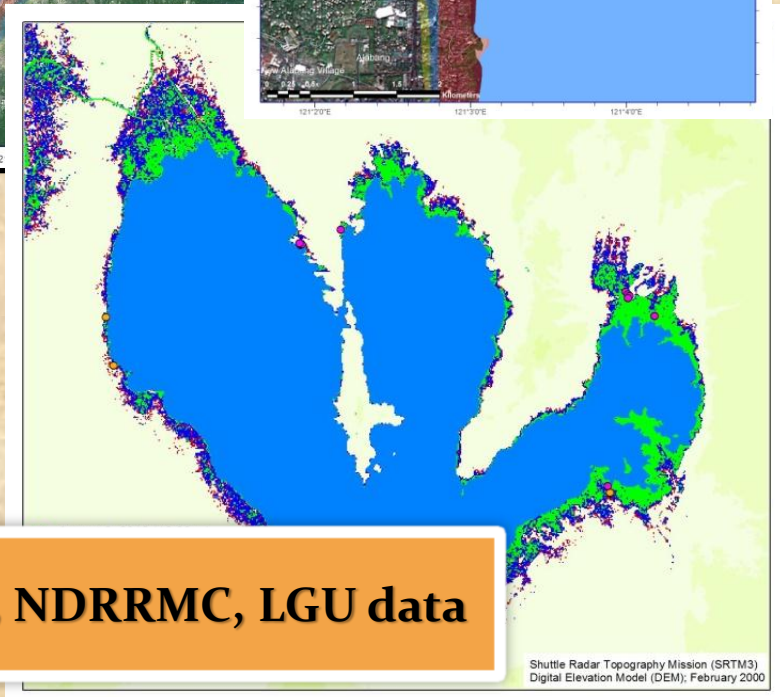




Data Sources: LLDA, PAGASA, ASTI-DOST, UPLB-Hydromet stations

Flood Hazard Map

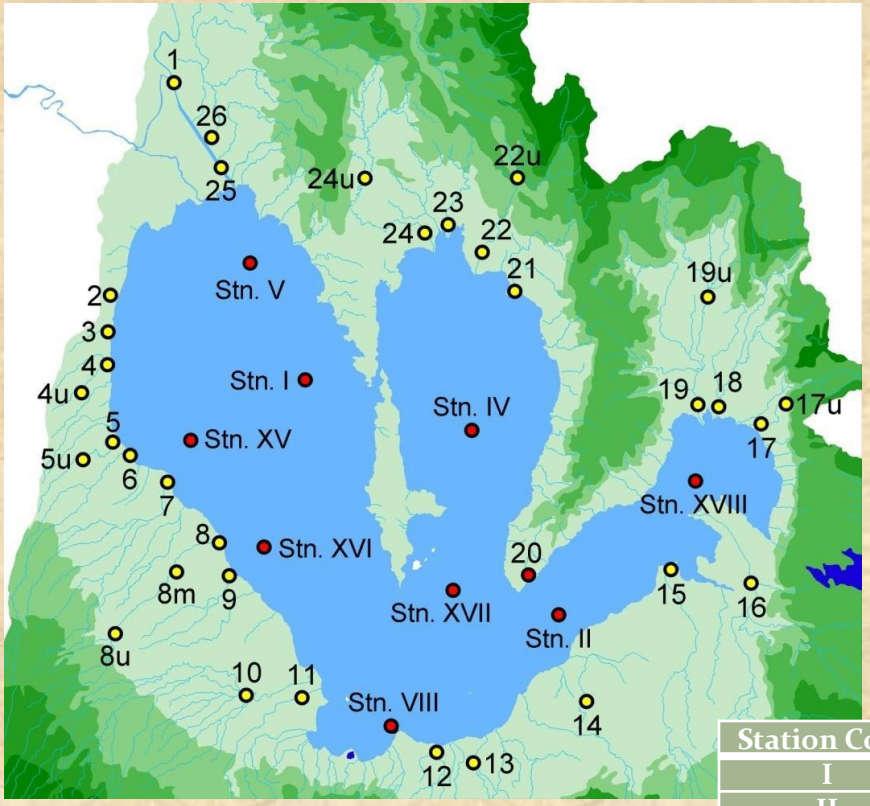




Data Sources: LLDA, MGB-DENR, NDRRMC, LGU data

FLOOD ASSESSMENT IN THE LdB REGION (After Typhoon Gener and Habagat)

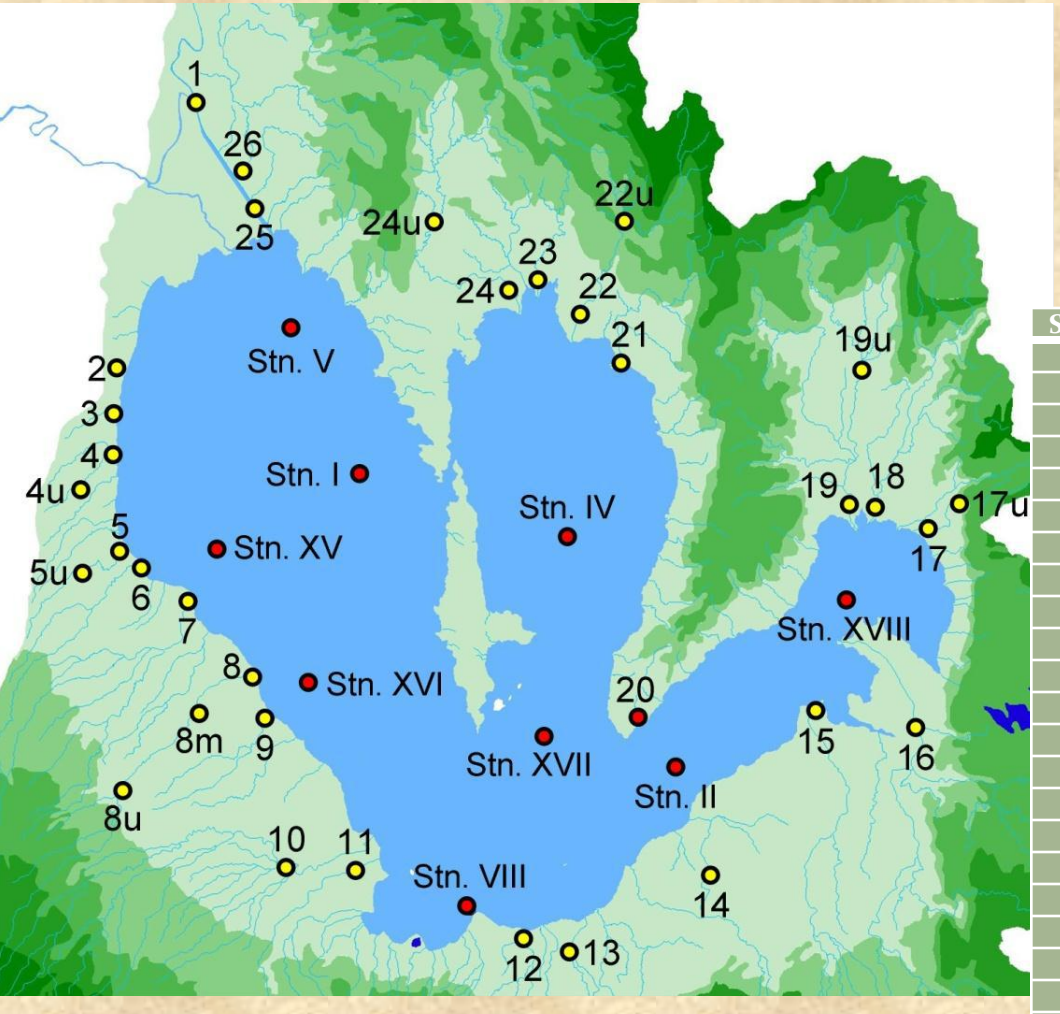
WATER QUALITY MONITORING



Laguna de Bay Stations

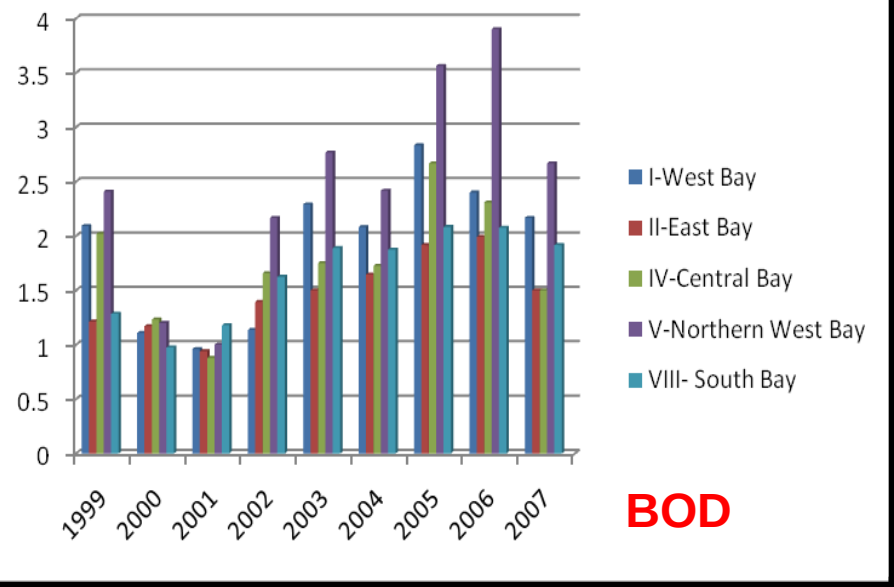
Station Code	Station Name
I	Central West Bay
II	East bay
IV	Central Bay
V	Northern West Bay
VIII	South Bay
XV	WB-San Pedro
XVI	WB-Santa Rosa
XVII	SB – Sanctuary
XVIII	EB-Pagsanjan

Tributary Rivers

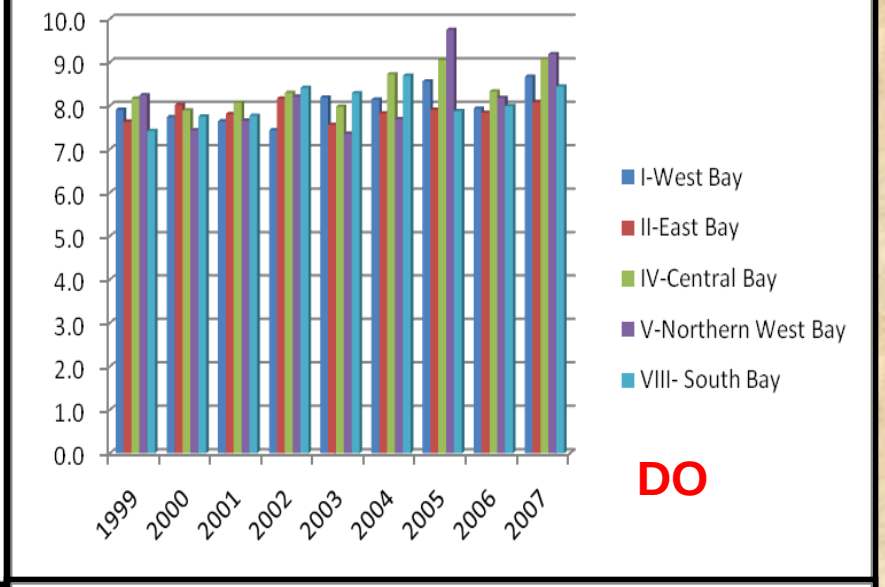


Station Code	Station Name
1	Marikina
2	Bagumbayan
3	Buli
4	Mangangate – downstream and upstream
5	Tunasan – downstream and upstream
6	San Pedro
7	Binan
8	Sta. Rosa – down, mid, and upstream
9	Cabuyao
10	San Cristobal
11	San Juan
12	Los Banos
13	Bay
14	Pila
15	Sta. Cruz
16	Pagsanjan
17	Pangil – downstream and upstream
18	Sta.Maria – downstream and upstream
19	Siniloan
20	Jala-jala
21	Pililla
22	Tanay – downstream and upstream
23	Baras
24	Morong – downstream and upstream
25	Sapang Baho
26	Manggahan Floodway

Water Quality Monitoring



BOD



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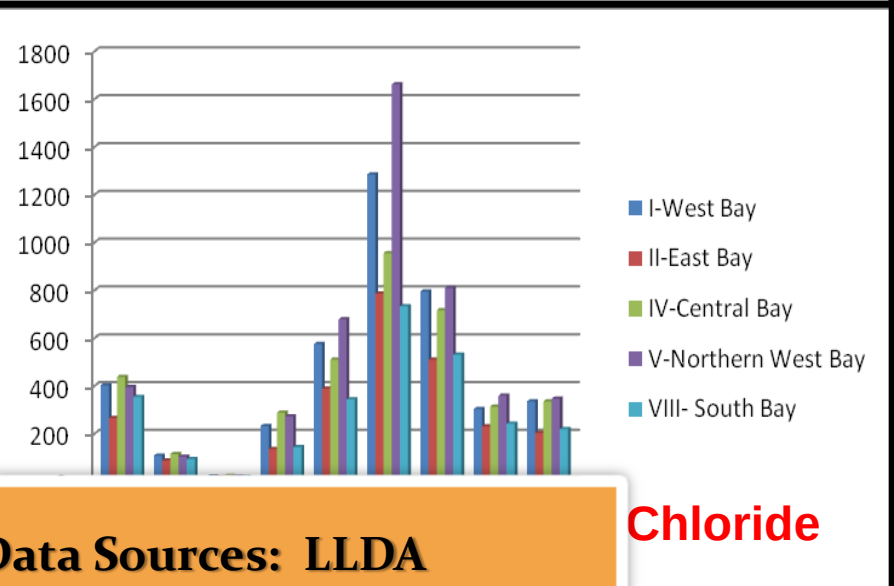
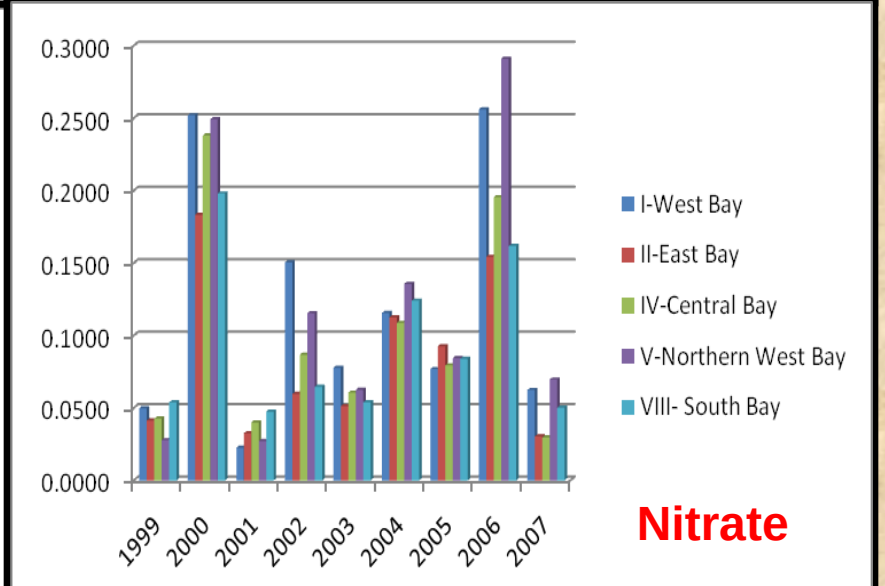


Chloride



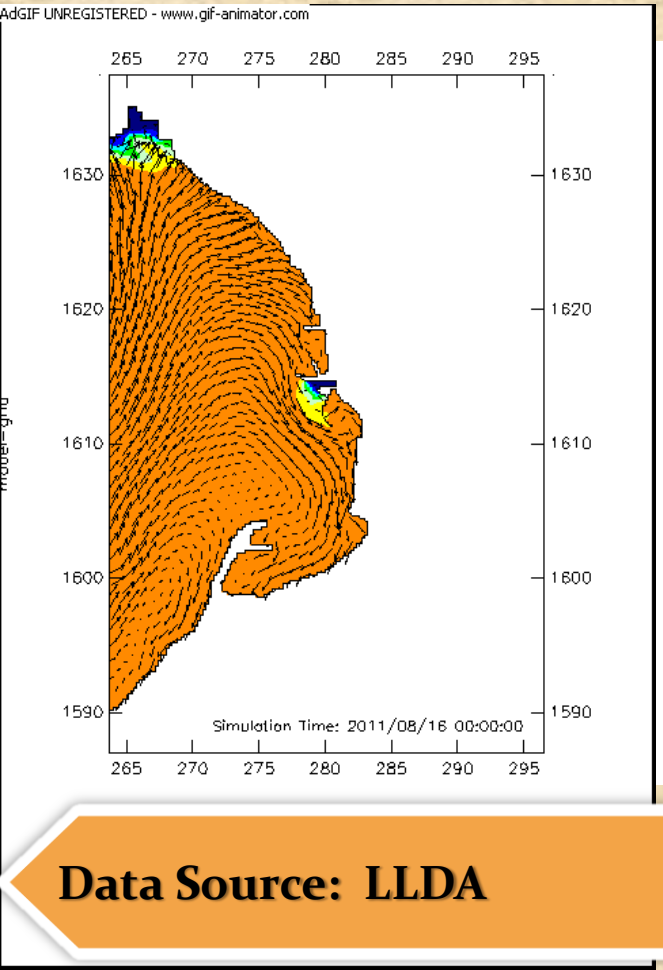
Nitrate

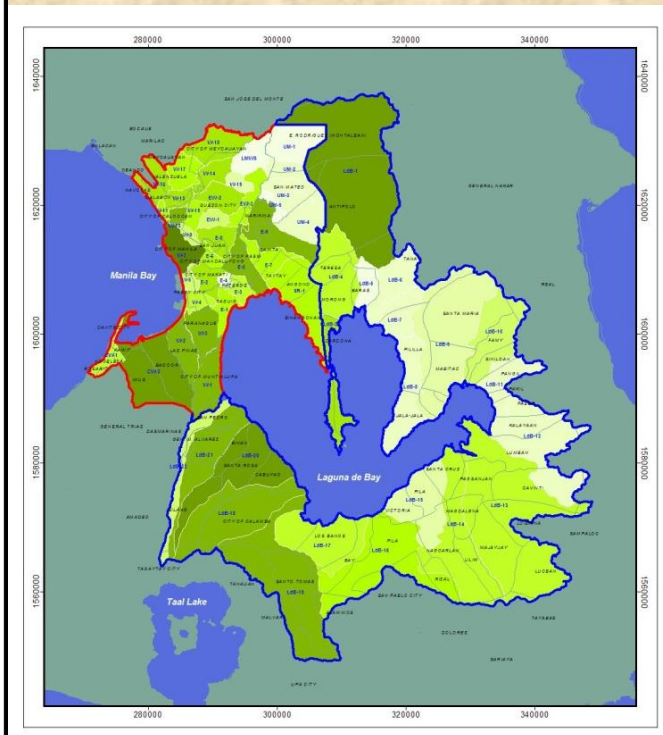
Data Sources: LLDA

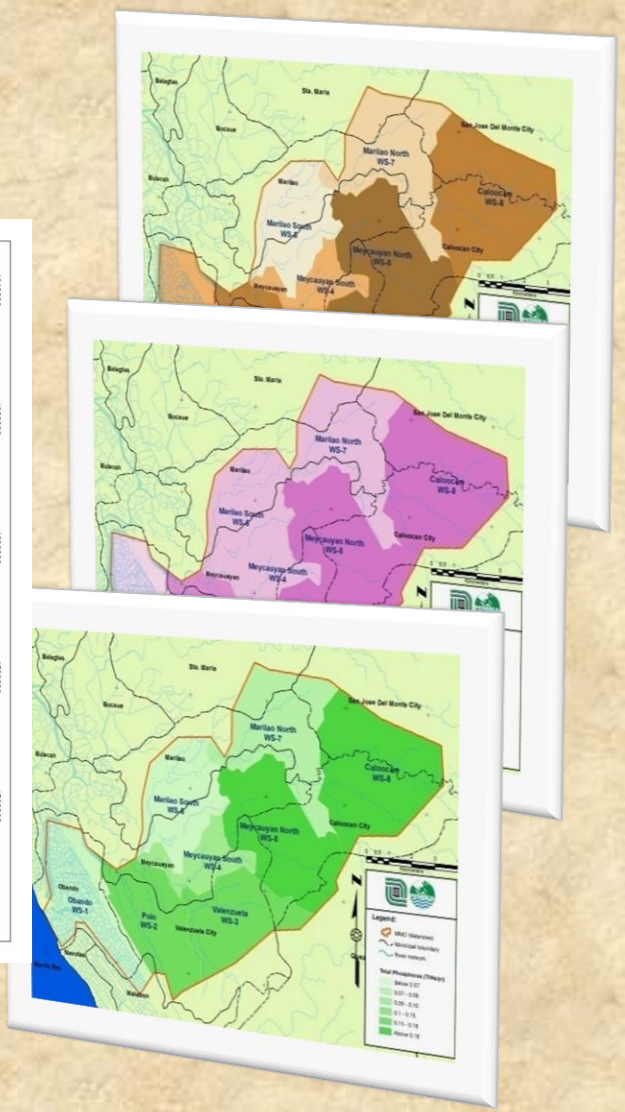
ESTIMATION OF TOTAL POLLUTION LOADING

- MANILA BAY – PASIG RIVER – LAGUNA DE BAY WATERSHED

- Estimated BOD, Nitrogen and Phosphorous loading in four years 2008, 2010, 2015 and 2020

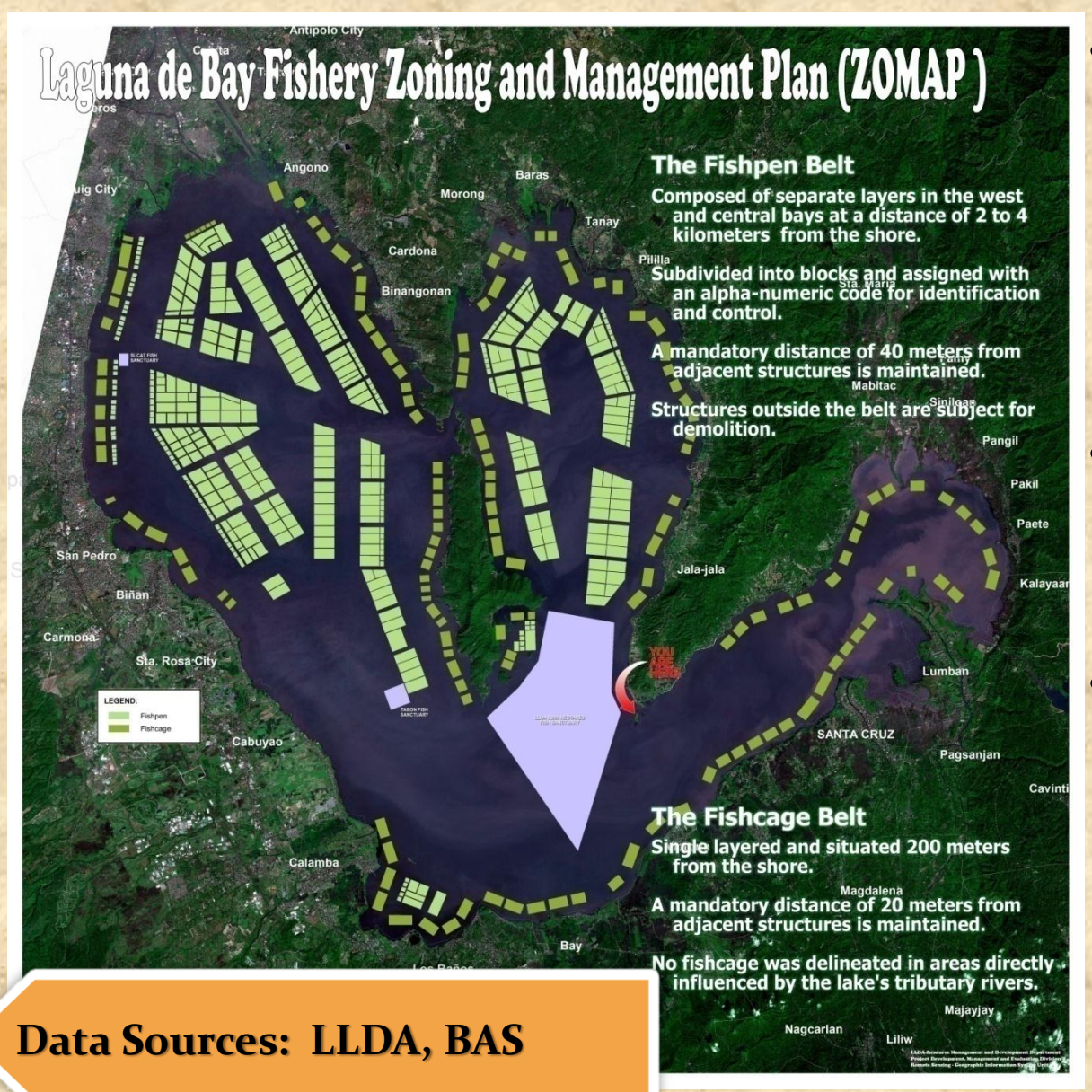






Data Source: LLDA

ZOMAP and Fisheries Data



- Fisheries Production: 140,426 metric tons (17% of National Production and 58% of Region IV Aquaculture and municipal fisheries production)
- Aquaculture: 57,805 metric tons (10% National & 37% Region IV)
- Municipal Fisheries: 82,621 metric tons (44% National & 95% of Region IV for inland water municipal fisheries (BFAR 2010)

Data Sources: LLDA, BAS

WATER PERMITTING SYSTEM

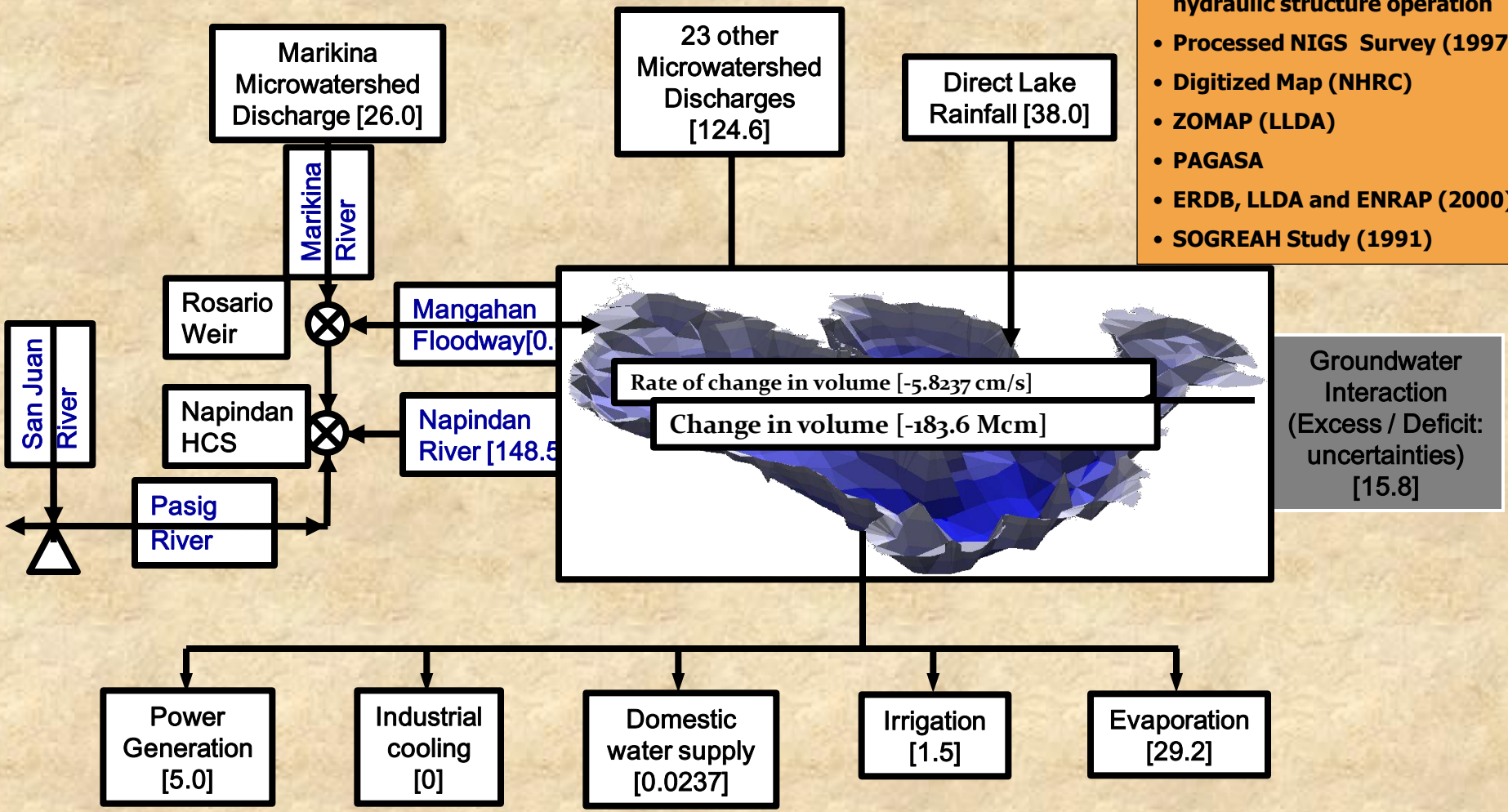
- Monitored existing Water Permitees
- Surveyed registered and unregistered Water Permitees

Data Sources: LLDA, NWRB,

Schematized Laguna Lake Water Balance [2004 results]

Data sources:

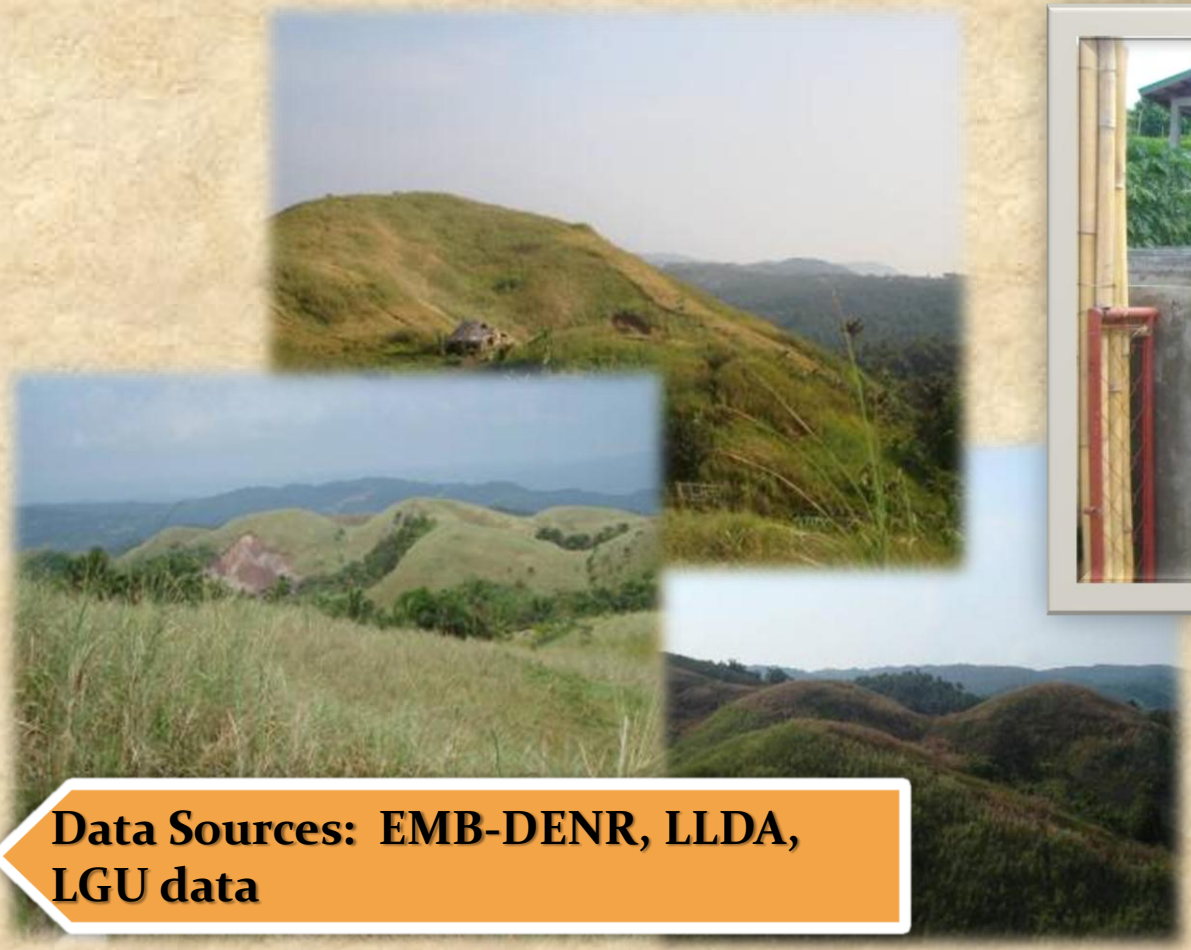
- **Sacramento Hydrologic Modelling (SDLDBE, 2000) using processed hydro-meteo data as input**
- **Hydro-meteo data processing using HYMOS**
- **DPWH-EFCOS / JICA data on hydraulic structure operation**
- **Processed NIGS Survey (1997)**
- **Digitized Map (NHRC)**
- **ZOMAP (LLDA)**
- **PAGASA**
- **ERDB, LLDA and ENRAP (2000)**
- **SOGREAH Study (1991)**



Other Data

Community Carbon Finance Project

- Afforestation/Reforestation Project (carbon sequestration)
- Composting Project, biogas (methane captured and methane avoidance projects)

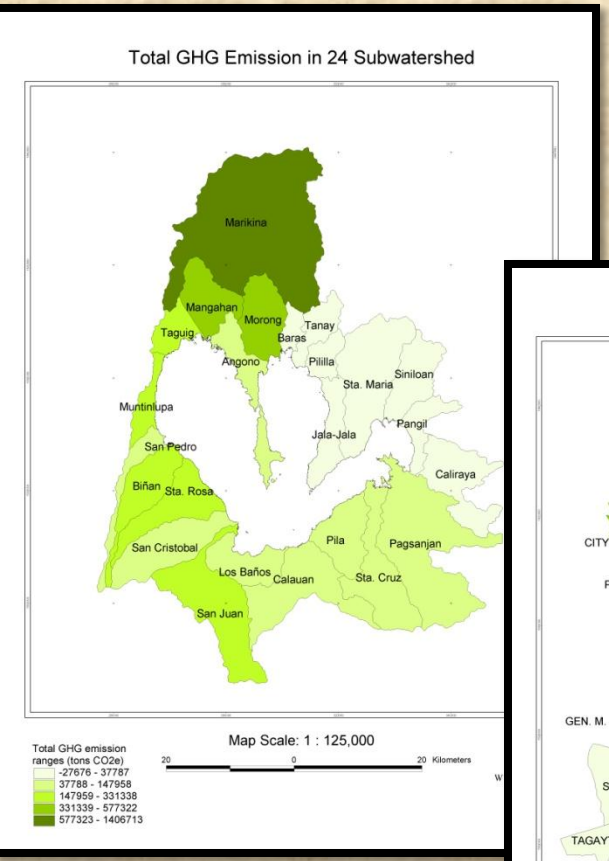


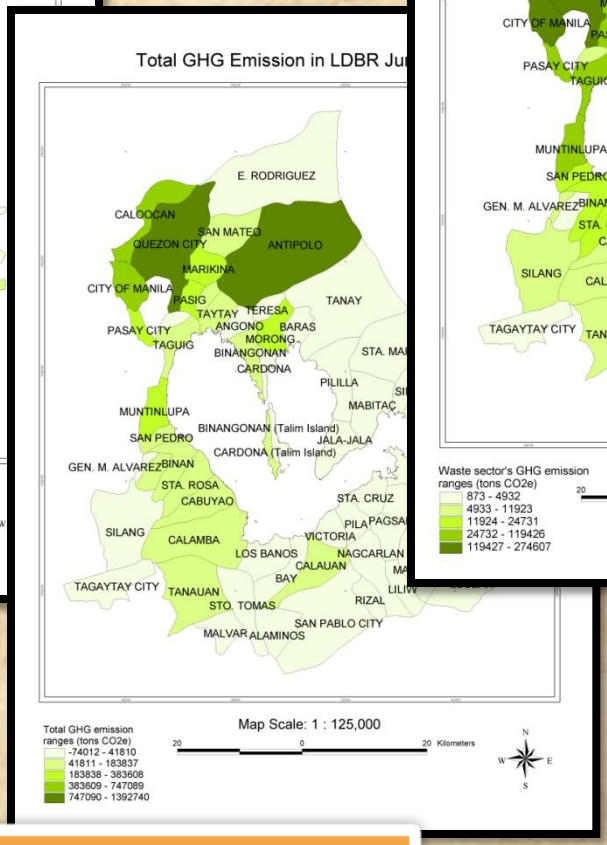
Data Sources: EMB-DENR, LLDA, LGU data

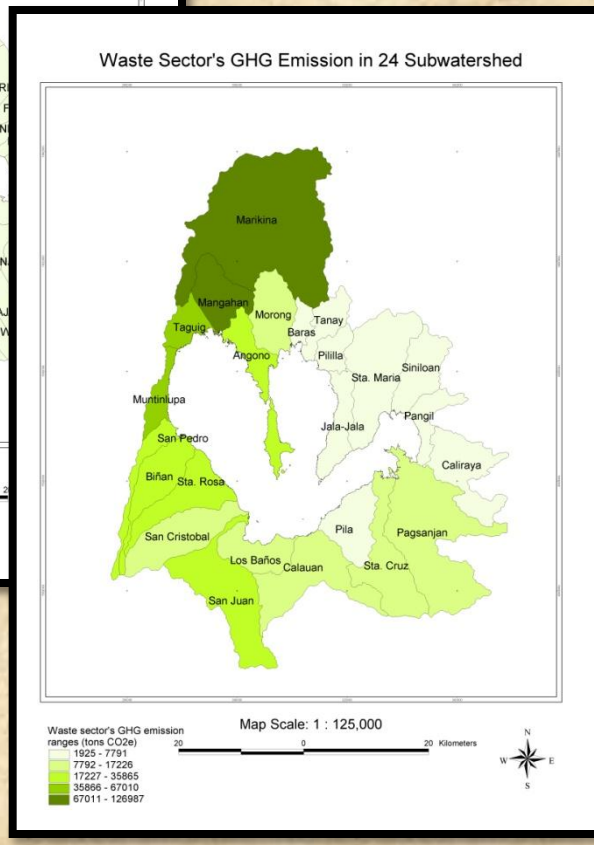
Reforestation sites in Siniloan and Caliraya, Laguna

Composting areas

Carbon Finance Projects

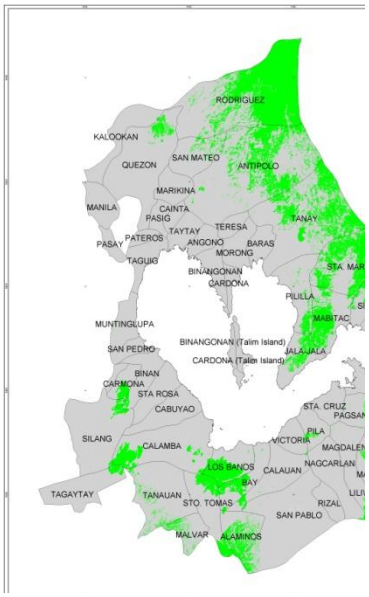




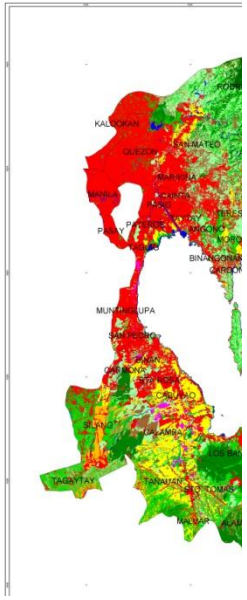


Data Sources: EMB-DENR, LLDA, DOE, LGU data

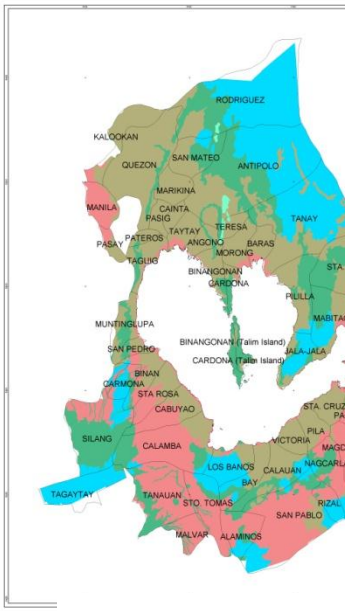
2002-2003 Forest to Non-forest in LDE



2002-2003 LCM

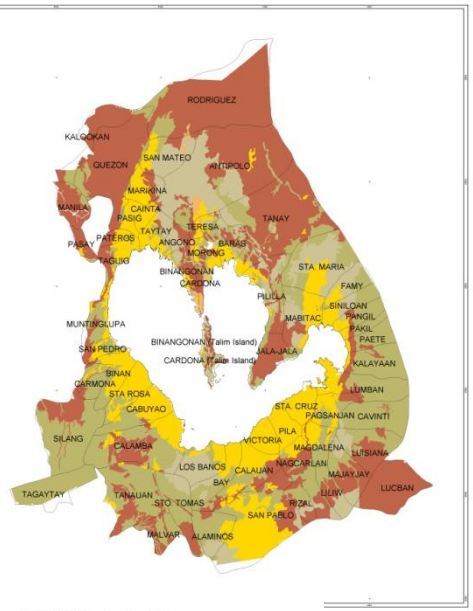


Geomorphological Map of LDBR

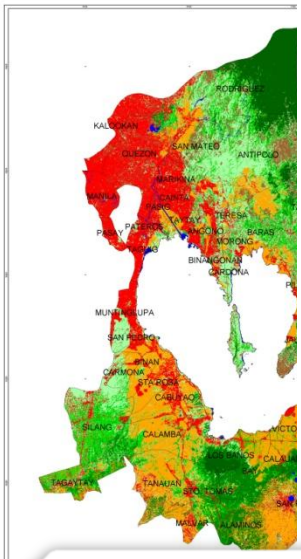


Slides in LDBR Jurisd

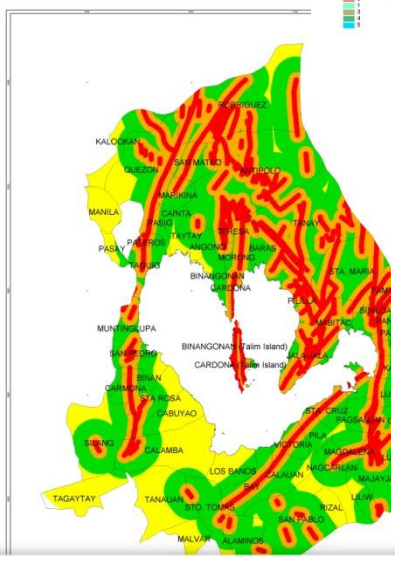
Soil Map of LDBR Jurisdiction



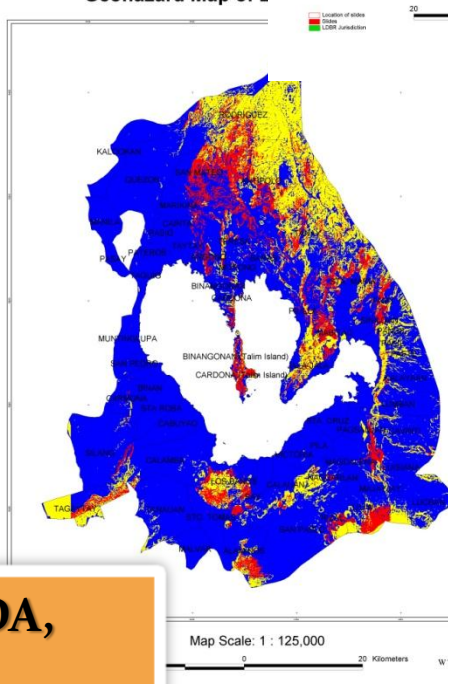
1987-1993 LCM of LDE



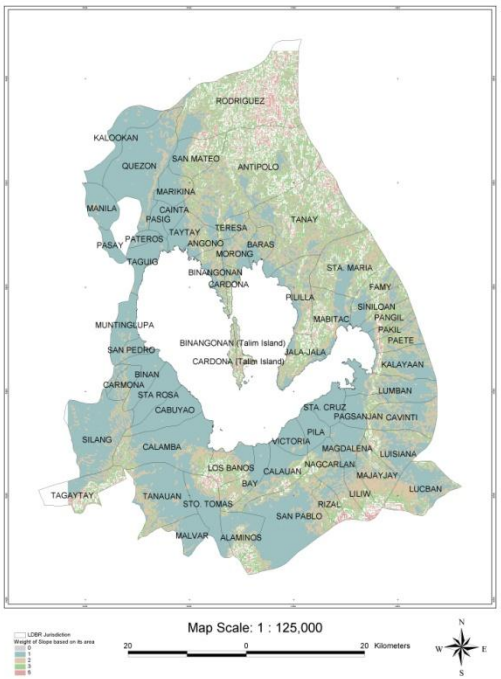
Faultlines of LDBR Ju



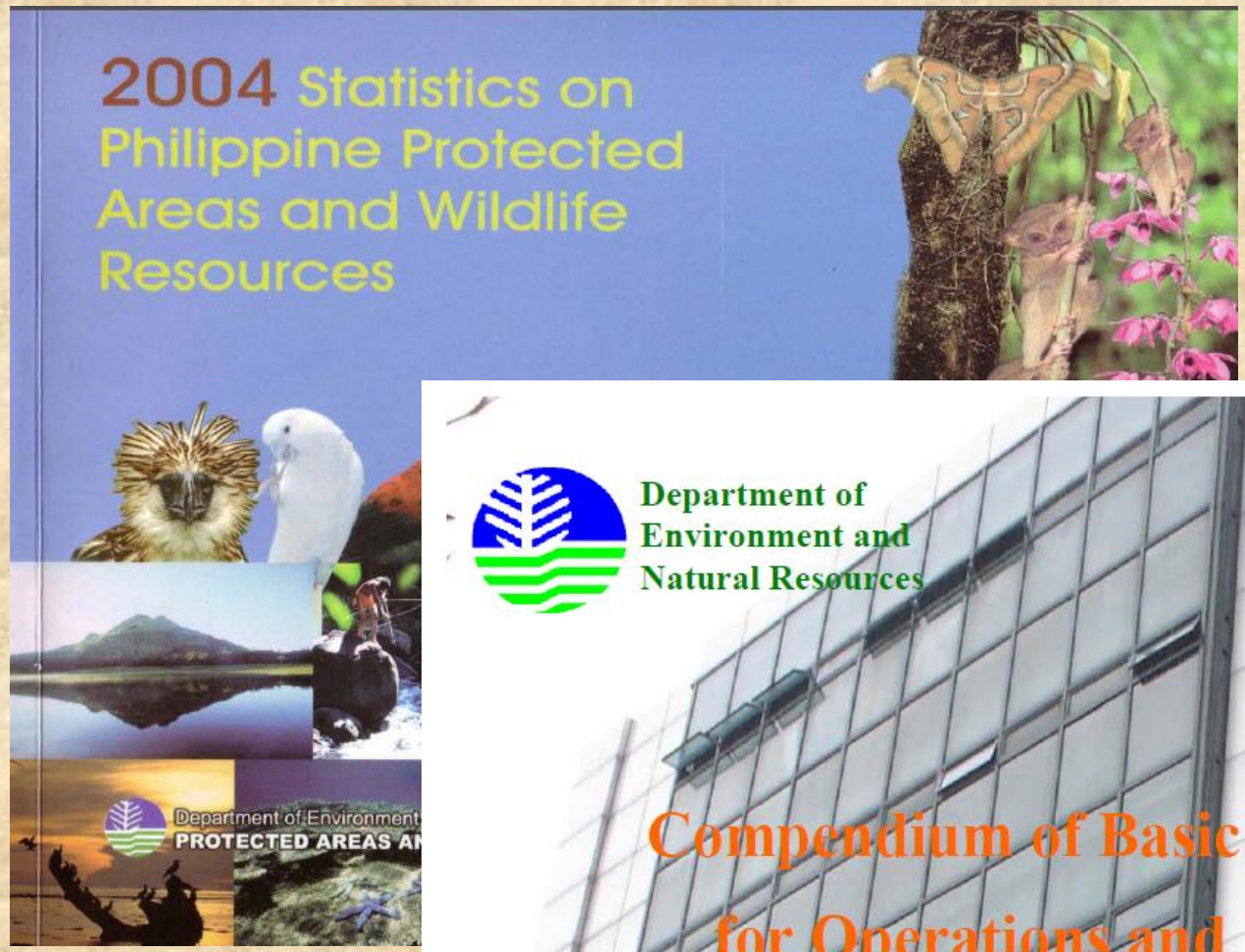
Geohazard Map of L

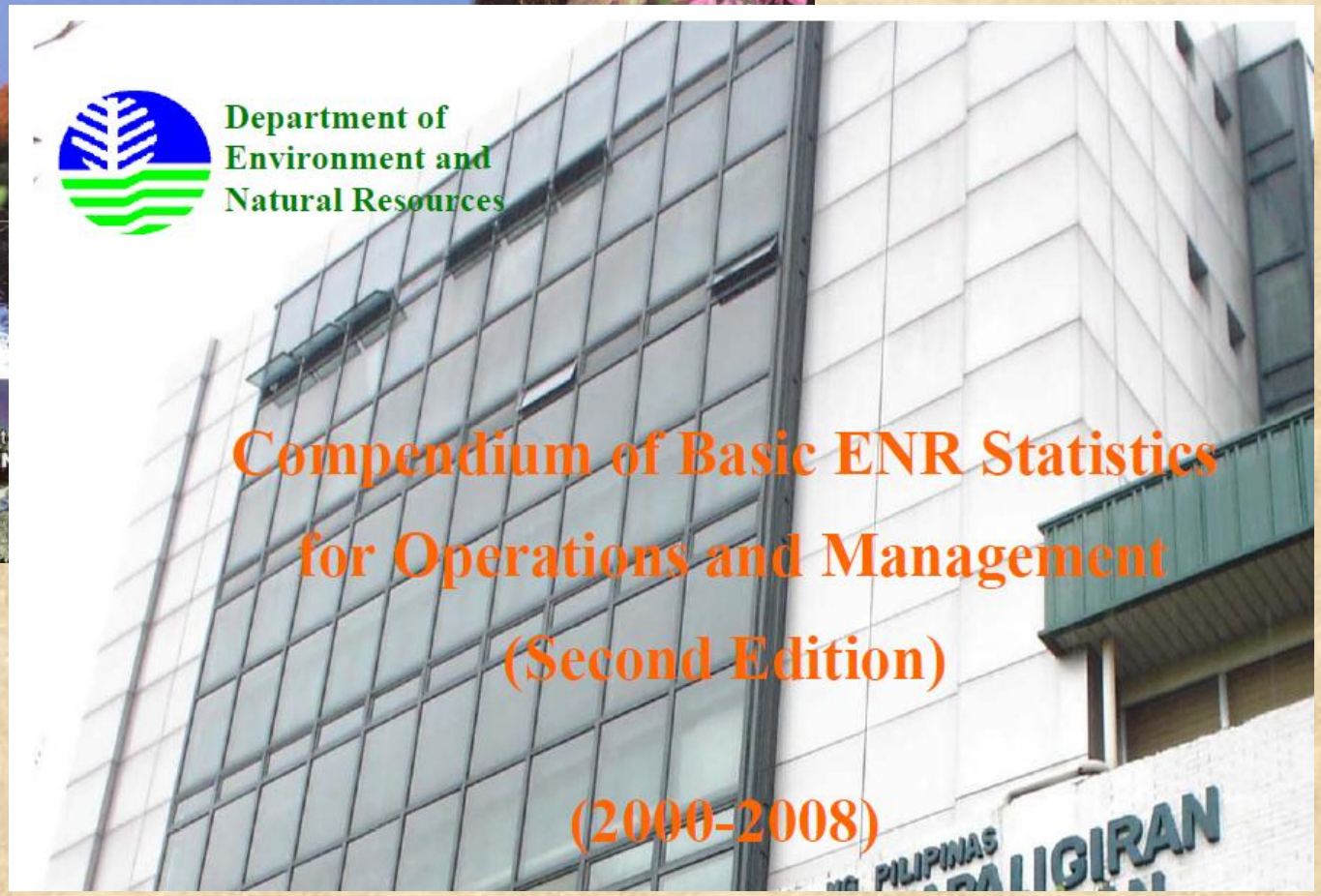


Slope Map of LDBR Jurisdiction

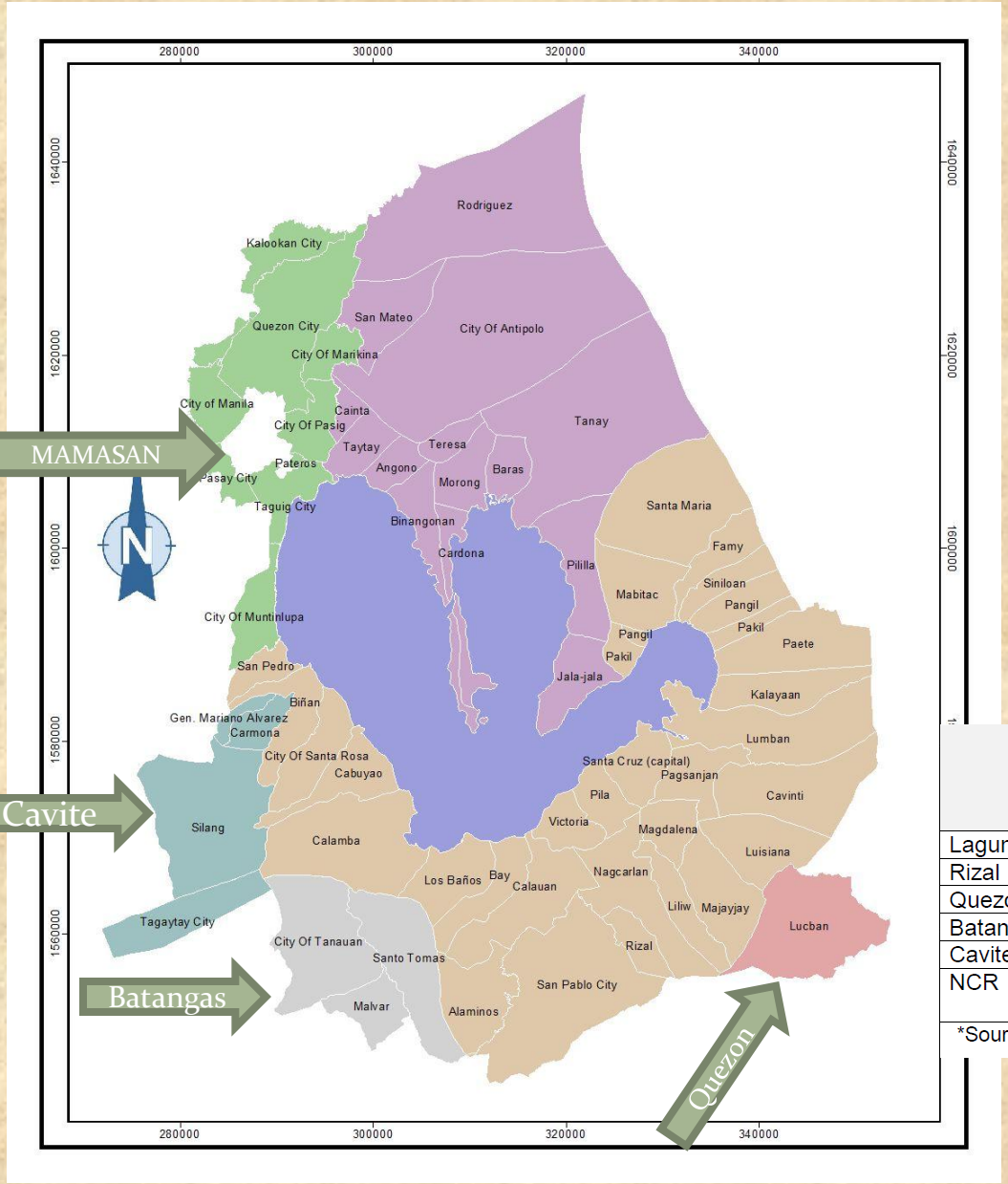


Data Sources: EMB-DENR, LLDA, NAMRIA


2004 Statistics on
Philippine Protected
Areas and Wildlife
Resources
Department of Environment
PROTECTED AREAS AN


Department of
Environment and
Natural Resources
Compendium of Basic ENR Statistics
for Operations and Management
(Second Edition)
(2000-2008)
PILIPINAS

Data Availability and Quality Issues



- disaggregation of data at the Laguna Lake Basin (Region) level

	Population, NSO 2007	Real Per Capita Income 2006 (adjusted to 2000 prices)*	*Poverty Incidence of Population 2004**	*Human Development Index 2000**
Laguna	2,490,403	30,838	8.0	0.709
Rizal	2,301,064	30,525	9.5	0.733
Quezon	45,616 (1 town)	17,773	32.5	0.635
Batangas	557,940 (4 towns)	19,750	18.8	0.683
Cavite	432,521 (4 towns)	30,539	6.4	0.735
NCR	8,578,948 (10 LGUs)	44,357	5.8	0.900

*Source: National Statistical Coordination Board

access & sharing
Gaps in historical data
Outdated data/maps
Not proactively disseminated
High resource requirements
Delayed release/reporting
Availability & quality issues
Different methodologies and standard in processing datasets

LAGUNA LAKE DEVELOPMENT AUTHORITY

"Ibalik ang Diwa ng Lawa"

Thank you!!!

Visit our website: www.llda.gov.ph