



# Laguna Lake Ecosystem Accounts

Photo Credit: Mark Anthony F. Salvador

As one of the eight country partners in the World Bank's WAVES (Wealth Accounting and the Valuation of Ecosystem Services) global partnership, the Philippines is constructing ecosystem accounts for Laguna de Bay.

With support from international and national experts, the Laguna Lake Development Authority (LLDA) undertook the development and analysis of these accounts that will aid in the better resource management and development planning of the Laguna de Bay.

These highlights from ecosystem accounts on land cover, flood mitigation, water quality and fisheries from 2003 to 2010 help understand the factors affecting the lake such as land conversion, soil erosion, water pollution and its impact on ecosystem services such as flood mitigation, water supply and fisheries.

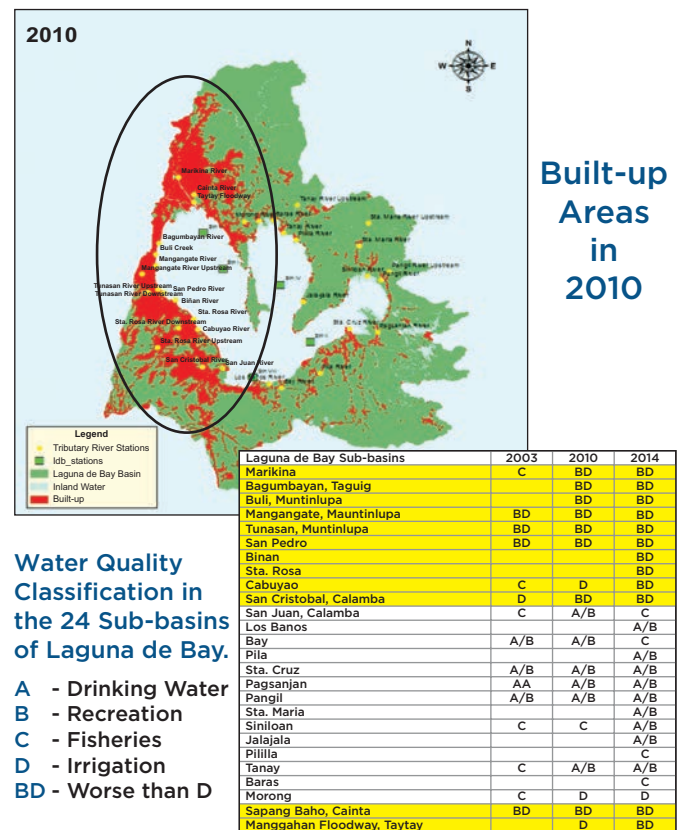
## Land conversion

Land conversion due to urban sprawl and rapid industrial development is causing a decline in forests and impacting agriculture production.

Major land cover change in the Laguna de Bay Basin occurred from 2003-2010. Closed forests decreased by 35% while built-up areas increased by 116%. Rapid urbanization and industrialization are most evident in the northwest, west and southern portions of the lake.

In addition, unplanned urban sprawl has led to the conversion of agricultural lands to residential uses, with new settlements being constructed in zones that are vulnerable to flooding.

Figure 1. Chart shows deteriorating water quality particularly in parts of the lake with expanding built-up areas.



## Water Quality Classification in the 24 Sub-basins of Laguna de Bay.

- A - Drinking Water
- B - Recreation
- C - Fisheries
- D - Irrigation
- BD - Worse than D

## Flood mitigation

Increase in soil erosion from the watershed has made the Laguna Lake more shallow making neighboring areas prone to flooding.

Flood risks in the lake zone have substantially increased because of an increasing population in the lake shore. Climate change factors such as an increase in extreme weather events and sea level rise will adversely affect the flood mitigation of the lake.



# “81%

## of pollution that flows into the lake is from domestic waste”

### Water quality

Pollution coming from domestic, industrial and agricultural/forest waste that is drained into the lake contribute to the degradation of the water quality. Domestic waste accounts for 81% of pollution that flows into the lake.

### Fish production

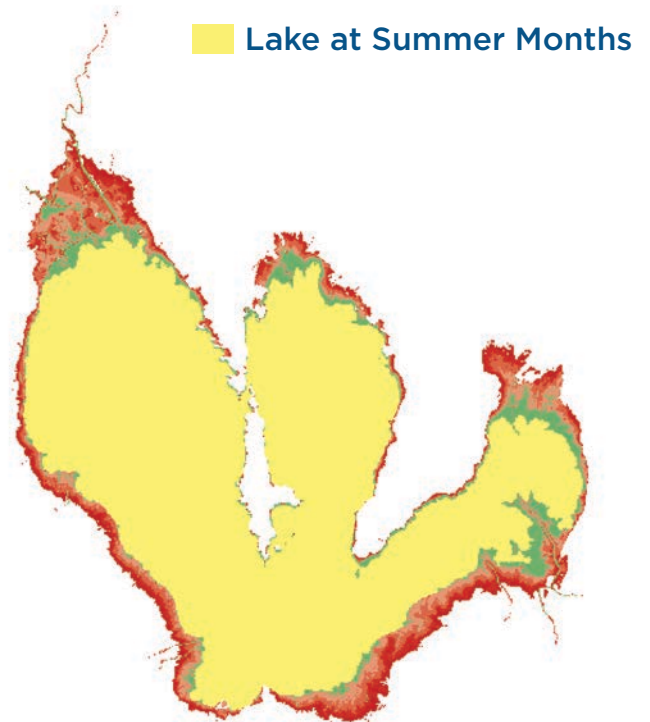
While the Laguna de Bay is a multi-use resource, the dominant use of the lake is fisheries. The Laguna Lake produces about 80,000-90,000 metric tons of fish in a year; an estimated 13,000 fishermen depend on the lake for their livelihood.

The lake can still sustain fisheries but is threatened by contamination from pollution. Invasive species threaten biodiversity and indigenous species, impacting the economic operations of fisheries.

### The future of the Laguna de Bay

- How can we align and enforce development planning laws and policies to aid in orderly development and judicious land use?
- How can we strengthen water resource management to improve water quality of Laguna de Bay?
- Can improving water-retention capacity of Laguna de Bay reduce vulnerability of shore land populations to flooding and extreme weather events?
- How can the fish production be protected from threats of contamination due to pollution?
- How can we manage the needs of a growing economy while maintaining an ecological balance in the use of Laguna de Bay's resources?

Figure 2. Flooded areas of Laguna Lake at different water levels.



Flood plain, Laguna de Bay Region  
Elevation level (LLDA Datum, m)

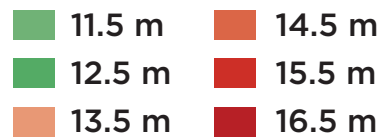
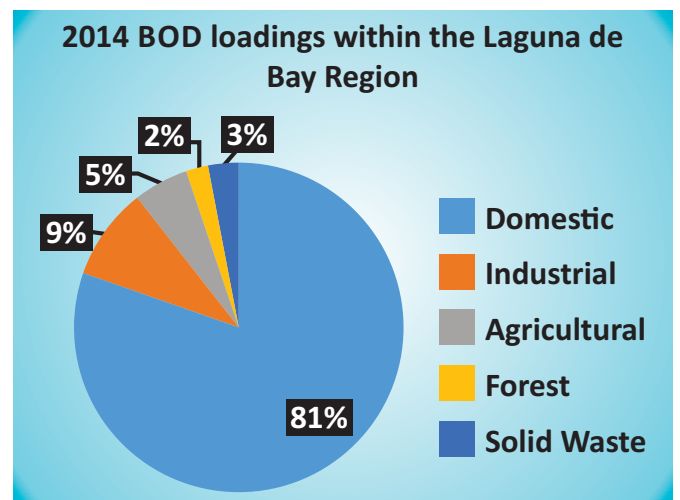


Figure 3. The highest volume of pollution flowing into the lake comes from domestic waste.



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Facilitated by the World Bank, **Wealth Accounting and the Valuation of Ecosystem Services** is a global partnership that aims to promote sustainable development by ensuring that the national accounts used to measure and plan for economic growth include the value of natural resources.