Integrated Management Plan for the Itaquari Lobo Watershed and UHE Carlos Botelho (Lobo/Broa) Reservoir

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Abstract

This paper refers to the management plan for the watershed and reservoir of the UHE Carlos Botelho, also known as Lobo/Broa. The management is based on the ILBM Platform Process, that is Integrated Lake Basin Management. It includes three main basin regulations and management: *basin water quality regulations; basin infrastructure development plans; basin water quality plans.*

The management plan is based on the scientific and technical developments at the watershed and reservoir since 1971.

Keywords: watershed, reservoir, limnology, management, water resources.

Introduction

Lobo/Broa reservoir is situated in the Itaquari/Lobo watershed. The watershed and the reservoir have the following characteristics: Latitude: 22°15'S, Longitude: 47°49'W; Area of watershed: 230 km²;

Area of reservoir: 7 km²; Mean depth of reservoir: 3.0 meters; Volume of reservoir: 22.000.000 m³.

The watershed is located in a region of Savanna vegetation ("cerrado") cover and areas of reforestation with *Pinus* sp and *Eucalyptus* sp.

Climatological fluctuations shows higher precipitation during summer, very little precipitation during winter and an average of 1.500mm of rainfall during the year concentrated in the summer months (November to March/April) (TUNDISI, MATSUMURA-TUNDISI, RODRIGUES, 2003).

Wind speed is around 10m/s during the winter. Due to the shallowness of the reservoir, a permanent mixing occurs in the open water. Retention time is around 20 days. The reservoir is used for hydropower generation (2 MW/h); recreation; sport fisheries; tourism; aquatic sports.

The reservoir has an important economical input for the region receiving around 10.000 tourists in the weekends specially during the summer. Periotto, Tundisi (2013) identified 20 services of watershed and the reservoir that are useful to the human well being and to the biological communities of terrestrial and aquatic organisms.

Therefore a management plan for the watershed and reservoir is essential in order to secure permanently a good soil use, pollution control, adequate water quality that will enhance touristic activities with economic impact. The management plan was based on the IBLM Platform Process (NAKAMURA, RAST, 2011).

The management plan

Figure 1 shows the integrated management plan for the reservoir and the watershed. The main purpose of this paper is to inform and guide the process of watershed and reservoir governance

and the implementation of programs, policies and actions in an integrated and systemic view with ample participation of the basin communities, stakeholders, with high accountability and responsibility. This management plan is, to a large extent based on the research, planning and monitoring activity carried on in the watershed and reservoir since 1971, and in discussion with all municipalities, involved, stakeholders, research workers and The Public Ministry of S. Paulo State dedicated to this area (GAEMA) (TUNDISI, MATSUMURA-TUNDISI, RODRIGUES 2003; TUNDISI, MATSUMURA-TUNDISI, 2013, TUNDISI, 2017).

Discussion and Conclusion

As reported by Nakamura and Rast (2011) IBLM Platform activities develops a series of activities and steps in the following flows:

- Describe the state of lake/reservoir basin management. Develop a lake/reservoir brief.
- Prepare a database and knowledge bases of data and information from monitoring, reconnaissance, survey, inventory.
- Analyze the existing information to ensure a systemic approach and a integrated overview of ecosystems (watershed and reservoir).
- Integrate ways and means for implement future actions.
- Coordinate stakeholder consultations.
- Evaluate improvements in governance issues.

Figure 1 – The integrated management plan for the Itaquiri/Lobo basin and the Lobo/Broa reservoir. (original from TUNDISI, 2017 based on NAKAMURA, RAST, 2011).

This integrated management plan is complex due to several plans and regulations. Watershed and reservoirs are complex ecosystems with many interactions, of climatological, hydrological, hidrogeochemical, biological and geomorphological process in a dynamic, spatial and temporal succession and fluctuations. All these complexities were studied at Lobo/Broa reservoir and Itaqueri/Lobo watershed. Therefore the next step is to promote a sound management

plan structured in the basic knowledge developed after many years of research (TUNDISI, MATSUMURA-TUNDISI, 2013; TUNDISI, 2017).

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