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ZONING AND CARRYING CAPACITY OF PEIXE ANGICAL RESERVOIR FOR TAMBAQUI PRODUCTION

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Considering the recent changes in the regulatory aspects about the environmental laws related to aquaculture practice in federal waters, it was observed an increase in the number of net cages installed in freshwater reservoirs, contributing with the fish production status in Brazil. However, this technology may change the environment, regarding the ecossystem original limonogical characteristics maily in the surrounding areas next to the net cages. So, it is always necessary to carry out studies for zoning these aquaculture areas and determine the environment maximum carrying capacity for fish production. Nowadays, the methodology used do estimate the reservoirs carrying capacity was developed by Dillon & Rigler in 1974. Besides considered outdated, it shows conservative results, being the only method accepted by the Water National Agency for licencing purposes. In this context, the development of methods and technics for the carrying capacity calculation in water bodies are extremely relevant to guarantee the activity sustainability, avoiding environmental impacts and minimizing water use conflicts. Thus, the present study was conducted in Peixe Angical Reservoir and aimed at selecting suitable areas for aquaculture and estimate the carrying capacity for fish production in net cages. The project was developed by Embrapa Fisheries and Aquaculture and funded by Enerpeixe, the hydroeletric power organization, responsible for the reservoir administration.

The methodology employed for zoning these aquaculture areas consisted into two consecutive stages that involved the generation of thematic maps and scenarios to facilitate the process of understanding the regional peculiarities and taking the decisions to identify the most appropriate areas for the installation of aquaculture farms. The first stage aimed at excluding unsuitable areas for fish production practice as follows: depletion zone, which is defined as the minimum elevation operated by the power plant during 95% of the energy generating period; depth (areas shallower than 4 m); conservation units; effluent emission areas; water supply plants proximity, safety areas, underwater vegetation presence and tourism and traffic routes. After the data organization, the excluded areas maps were elaborated, showing the restriction sites. For the second stage, water quality parameters (pH, conductivity, dissolved oxygen, COT, BOD, total solids, ammonium, nitrite, nitrate, ortophosphate and clorophyll a) were analyzed in order to generate the suitability maps. Besides, it was conducted a tambaqui production cycle in net cages aiming at measuring the environmental impacts caused by the fish production, through the analysis of water quality parameters, feed digestibility and phosphorous excrection by fish during the one-year production cycle. As results obtained, five aquaculture zones were defined, totalizing a surface area of 283 ha. Considering the maximum fish production, the bionergetic modeling approach (based on the factorial bioenergetic model Fish-PrFEQ® adapted to tropical species) and mass balance was applied to estimate the particulated (WP), dissolved (WD) wastes, total phosphorous (P) and total nitrogen (N) discharged by tambaqui (*Colossoma macropomum*) in net-cages. Thus, it can be concluded that a maximum tambaqui production of 15 thousand tons can be practiced within these aquaculture zones in Peixe Angical Reservoir without causing major environmental impacts.