



HIGH-FREQUENCY VERTICAL WATER THERMAL MONITORING TO IMPROVE CLIMATE CHANGE ADAPTATION IN NET CAGES FISH FARMS IN A NEOTROPICAL RESERVOIR

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Climate change is one of the major challenges currently facing humanity and, due to its direct link to climate, will significantly affect aquaculture. Net-cage fish farming is strongly influenced by thermal variability and the effects of temperature on vertical water structure, making this activity vulnerable to climate risk. Using thermal comfort (TC) ranges for Nile tilapia (*Oreochromis niloticus*) from the literature, this study evaluated high-frequency water temperature monitoring in a neotropical reservoir as a tool to define thermal stress risk (TSR) and cultivation favorability (CF) for Nile tilapia farming, as a technological strategy to enhance aquaculture resilience to climate change. Two commercial net-cage farms (P1 and P2) in the Chavantes Reservoir (São Paulo/Paraná, Brazil) were monitored. Water temperature was recorded every 10 minutes ($n = 15,500$) at multiple depths, from the surface to approximately 15 m. Minimum and maximum temperatures at P1 were 14.6 and 31.0 °C, and at P2 were 14.6 and 32.6 °C, respectively. Based on TC classification, summer was identified as the optimal season for tilapia cultivation. CF was generally classified as High in summer and autumn, Medium in spring, and Low in winter. Although summer showed the highest CF, it also presented the greatest TSR, underscoring the need for continuous monitoring during this period. High-frequency vertical water-column monitoring proved effective in defining TSR and CF for



Nile tilapia in the Chavantes Reservoir and represents a practical climate-risk management tool for reservoir-based aquaculture.

Keywords: *climate risk; climate change; environmental monitoring and management; thermal stratification; fish farming.*