

ABSTRACT

Water pollution is a tapering global challenge, encompassing industrial, agricultural, residential, and domestic effluents, detrimental to water quality and ecosystems. Water depth plays a vital role in the distribution and concentration of pollutants. The system proposes automated monitoring with unmanned boats and sensor technology, enabling precision measurement and effective information processing. A better understanding of water quality changes by depth can support efforts to protect vulnerable aquatic ecosystems. It also supports the identification and control of pollution sources, improves monitoring efficiency and coverage, and helps develop efficient mitigation strategies.

The proposed solution includes the application of sensor technology for monitoring. This automated monitoring provides an efficient and economical alternative to limited manual monitoring. The technology supports mitigation of the impacts of climate change and human activities on aquatic ecosystems, providing the necessary information to manage changes in vulnerable ecosystems.

The results show improved water resource management effectiveness, illustrating changes in water quality and contaminant distribution by depth. This technology supports mitigation of the impacts of climate change and human activities on ecosystems, providing the information necessary to manage changes in vulnerable ecosystems. The use of unmanned boats and sensors is a positive step in the sustainable monitoring and protection of water resources. The main objective is to:

- Using sensor technology and unmanned vessels to automatically monitor water quality, more effective and cost-effective than manual monitoring.
- Supports management of changes in fragile aquatic ecosystems by providing accurate information on water quality changes by depth.
- Improve the efficiency of water resource management by monitoring and managing changes in water quality on an ongoing basis.

Keywords: *Water pollution, unmanned boats, aquatic ecosystems.*