

## ENHANCING UNDERWATER WIRELESS SENSOR NETWORKS FOR EFFICIENT MONITORING AND ROUTING

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### **ABSTRACT**

*Underwater Wireless Sensor Networks (UWSNs) offer promising oceanic exploration capabilities but are limited by communication challenges and energy constraints. This study presents an Empirical Exploration System employing a Multi-population Synchronization Assessment Scheme and Dynamic Routing Technique to enhance energy efficiency and extend the lifetime of Underwater Acoustic Sensor Networks (UASNs). The proposed scheme dynamically activates or sleeps sensor subsets for target coverage. Simulation results in an NS-2-based underwater simulator showcase improved metrics in packet delivery, delay, energy consumption, and network longevity compared to existing protocols. This approach addresses dynamic challenges and adapts to changing sensor locations, showcasing its effectiveness in UWSN energy and communication management.*

**KEYWORDS:** *Underwater Wireless Sensor Networks, Energy Efficiency, Dynamic Routing, Sensor Activation, Oceanic Exploration*