

Editorial

Launching *Aquatic Ecosystems Health*

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1. Introduction

Aquatic ecosystems are among the most indispensable components of our planet's biosphere. They regulate the climate and biodiversity, as well as provide essential ecosystem services to sustain human livelihoods and well-being. Lakes, rivers, wetlands, estuaries and oceans form a vital network underpinning the ecological stability of our world. However, these aquatic ecosystems are facing unprecedented challenges threatening their health, resilience, and functionality.

The environment is at a pivotal stage in determining the future of aquatic ecosystems. With the ongoing degradation of these systems due to anthropogenic activities, the need for robust scientific research and actionable solutions has never been greater. It is within this context that *Aquatic Ecosystems Health (AquaEH)* is being launched. The journal seeks to advance scientific understanding and provide a platform for collaboration and practical solutions to safeguard the aquatic ecosystems. This editorial outlines the global challenges to aquatic ecosystems, the scope and purpose of the journal, the need for its establishment, and the future research directions that it aims to promote.

2. Global Environmental Challenges and Their Impacts on Aquatic Ecosystem Health

Aquatic ecosystems are increasingly threatened by complex global environmental challenges intensifying in both scale and severity. These challenges are interlinked with broader issues such as climate change (including heat wave and other extreme weather), population growth, industrialization, and unsustainable resource utilization. The combined effects of these pressures are leading to cascading impacts on aquatic biodiversity, ecosystem function and service, and the human communities.

One most pervasive threat to aquatic ecosystems is pollution. Industrial discharges, agricultural runoff, and

untreated wastewaters introduce a variety of chemical contaminants into aquatic environments. These include metals, pesticides, pharmaceutical residues, microplastics, or other emerging new pollutants, all of which have profound and often irreversible effects on aquatic organisms and ecosystems. Climate change further compounds these challenges by modifying physical and chemical environments of aquatic systems. Rising temperatures are causing thermal stress in aquatic species, disrupting migration patterns, breeding cycles, and food web dynamics. Additionally, sea-level rise and changes in precipitation patterns are altering hydrological cycles, leading to habitat loss in critical areas such as wetlands and estuaries. These impacts are not confined to marine systems but extend to freshwater ecosystems, where altered flow regimes, increased snowmelt, and droughts create new pressures.

The growing human population exacerbates these issues by increasing demand for water, food, and energy. Overfishing and destruction of aquatic habitats for agriculture and infrastructure development result in significant biodiversity loss. The fragmentation of rivers by dams and the draining of wetlands for agriculture have resulted in the decline of many freshwater species, with some on the brink of extinction.

Beyond biodiversity loss, the degradation of aquatic ecosystems has profound implications for human societies. Coastal communities, which are home to nearly 40% of the global population, are sensitive to sea level rising, storm, and coastal erosion. Losses of mangroves, coral reefs, and other natural barriers further exacerbate these risks, increasing the exposure of millions to climate-related disasters. Furthermore, the contamination of water supplies with pollutants and pathogens poses significant public health risks, particularly in developing countries where access to clean water and sanitation remains limited.



3. Need for Aquatic Ecosystems Health

As the pressures on aquatic ecosystems continue to escalate, the need for a dedicated platform to address these challenges has become increasingly apparent. *Aquatic Ecosystems Health (AquaEH)* has been established to fill this critical gap in the scientific landscape. While many existing journals focus on specific aspects of aquatic science, *AquaEH* aims to provide an interdisciplinary approach to understanding and addressing the complex challenges facing aquatic ecosystems.

The journal's mission is to advance both scientific understanding and practical solutions to safeguard aquatic ecosystems. This dual focus is essential because the challenges are not only scientific but also social and economic. *AquaEH* seeks to bridge these dimensions by fostering collaboration between researchers from diverse fields, including ecology, toxicology, climatology, hydrology, and environmental policy. By integrating these perspectives, the journal aims to provide holistic insights that can inform effective management and policy decisions.

A key feature of *AquaEH* is its emphasis on solutions-oriented research. While understanding the mechanisms of ecosystem degradation is crucial, there is an equally urgent need to develop innovative approach to monitoring, mitigating, and managing these impacts. *AquaEH* welcomes submission that offer practical applications, whether through the development of new technologies, the implementation of nature-based solutions, or the formulation of evidence-based policy recommendations.

The journal also seeks to address emerging challenges. For example, the impacts of microplastics on aquatic food webs, the role of aquatic systems in carbon sequestration, and the implications of genetic engineering in aquaculture are areas requiring further investigation. By providing a platform for cutting-edge research, *AquaEH* aims to stay at the forefront of these rapidly evolving fields.

4. Scope of Aquatic Ecosystems Health

The scope of *Aquatic Ecosystems Health* is intentionally broad, reflecting the complexity and interconnectedness of aquatic systems. The journal welcomes research that spans a wide range of topics, from the effects of specific stressors on biodiversity to broader studies on ecosystem resilience and sustainability. This interdisciplinary approach ensures that the journal remains relevant to both fundamental science and applied research.

Specifically, the journal welcomes high-quality, peer-reviewed research that addresses the following areas:

- **Stressors and Ecosystem Health:** Studies on the effects of chemical, physical, and biological stressors on aquatic biodiversity, ecosystem functions, and resilience.
- **Cumulative Effects and Interactions:** Studies that explore the interactions between multiple stressors and their combined effects on ecosystem health.

- **Climate Change Impacts:** Research on the implications of warming, sea-level rise, altered precipitation, and other climate-related factors on marine and freshwater systems.
- **Human and Ecosystem Safety:** Investigations into the safety of aquatic organisms and human communities reliant on aquatic resources, particularly in the face of pollution and environmental degradation.
- **Innovative Monitoring and Mitigation:** Development of novel methodologies and technologies for monitoring, mitigating, and managing the impacts of stressors on aquatic ecosystems.
- **Policy and Management Solutions:** Contributions that propose policy frameworks, management strategies, and technological innovations to enhance sustainability and resilience.

This comprehensive scope ensures that the journal addresses both fundamental scientific questions and applied challenges. While many studies have examined the impacts of individual stressors, there is a growing recognition that these stressors often interact in complex ways. Understanding the interactions of multiple stressors is essential for predicting ecosystem responses and developing effective management strategies.

Another important focus is the role of aquatic ecosystems in supporting human well-being. Research on the ecosystem services provided by aquatic systems, such as water filtration, carbon storage, and food production, can help to highlight their value and inform conservation efforts. This is particularly important in the context of sustainable development, where balancing environmental protection with economic and social needs is a central challenge.

The journal also seeks to promote research on the governance and management of aquatic ecosystems. Effective policies and management practices are essential for addressing the challenges facing these systems, yet they are often hindered by a lack of coordination between stakeholders, inadequate enforcement, and insufficient funding. *AquaEH* encourages studies that explore innovative governance frameworks, participatory approaches, and mechanisms for scaling up successful initiatives.

5. A Call to Action: Building a Collaborative Future

The launch of *Aquatic Ecosystems Health* marks a significant step forward in addressing the global challenges facing aquatic systems. However, the success of this endeavor depends on the active participation of the global scientific community. We invite researchers, practitioners, and policymakers to contribute their work, share their insights, and engage with the journal's content. By working together, we can build a vibrant and inclusive platform that drives progress in aquatic ecosystem science and sustainability.

The challenges ahead are daunting, but they also present an opportunity to rethink our relationship with aquatic

systems and chart a more sustainable path. As we embark on this journey, we are reminded of the interconnectedness of all life on Earth. The health of aquatic ecosystems is not just an environmental issue. Let us work together to protect these vital systems for future generations.

6. Conclusions

The world's aquatic ecosystems are at a crossroads. Their degradation poses a profound threat to biodiversity, human well-being, and health. Yet, with concerted effort and innovation, it is possible to reverse these trends and ensure a sustainable future. *Aquatic Ecosystems Health* aims to be a catalyst for this transformation, providing a platform for interdisciplinary research, innovative solutions, and collaborative action. We look forward to embarking on this journey with you, our readers and contributors, and to

making a meaningful impact on the health and sustainability of aquatic ecosystems.

Thank you for joining us in this endeavor. Together, we can make a difference.

Conflicts of Interest

The author declares no conflict of interest.

Use of AI and AI-Assisted Technologies

During the preparation of this work, the author used ChatGPT to go through the English. After using this tool/service, the author reviewed and edited the content as needed and take full responsibility for the content of the published article.