14.5.2 - Does your university as a body monitor the health of aquatic ecosystems?

Azerbaijan State Oil and Industry University (ASOIU) actively engages in the monitoring, assessment, and protection of aquatic ecosystems, particularly in the context of climate change, hydrological risks, and coastal degradation. Through its research institutes, academic departments, and interdisciplinary collaborations, ASOIU performs continuous studies on the impact of global warming, floods, mudflows, and erosion on aquatic and riparian environments across Azerbaijan, including the Caspian Sea basin and inland river systems.

This work aligns with SDG 14 (Life Below Water) and SDG 13 (Climate Action), supporting national strategies on sustainable water and ecosystem management.

Research and Monitoring Activities

ASOIU's scientists conduct long-term environmental monitoring programs focused on:

- Hydrological and sediment analysis in coastal and riverine areas to track water quality and sedimentation rates.
- Assessment of aquatic biodiversity and ecological health, including the impacts of increased runoff and pollution on marine and freshwater systems.
- Modeling of water flow and flood dynamics to predict and mitigate catastrophic hydrological events caused by climate change.
- Engineering interventions for flood and coastal erosion control that simultaneously support ecological recovery.

A key example of ASOIU's contribution to aquatic monitoring and protection is the 2024 research publication:

Gabibov, F., Huseynova, L., Ahmedova, A., & Huseynova, A. (2024). *Engineering and Ecological Methods for Protection Against Catastrophic Natural Processes Caused by Global Climate Change. Reliability: Theory and Applications.* DOI: 10.24412/1932-2321-2024-681-524-529

This paper presents quantitative monitoring of hydrological cycles and aquatic degradation processes, identifying how global climate change intensifies rainfall, runoff, and coastal flooding. It details engineering and ecological measures for stabilizing aquatic ecosystems, including:

- Protective flood-control structures using recycled materials (e.g., tires and reinforced concrete sleepers);
- Sediment and water-flow modeling to predict erosion and landslide behavior near aquatic zones;
- Assessment of cloud cover and precipitation patterns affecting aquatic ecosystems.

These findings directly inform ASOIU's data-driven monitoring frameworks for sustainable water management and aquatic ecosystem resilience.

Collaborations and Partnerships

ASOIU collaborates with national and international partners to strengthen aquatic ecosystem protection:

- Ministry of Ecology and Natural Resources of Azerbaijan – data exchange on water quality and environmental impact assessments;
- Caspian Environmental Program (CEP) – cooperation in monitoring marine pollution and ecosystem resilience in the Caspian Sea;

Student and Community Engagement

ASOIU integrates citizen science and educational activities into its aquatic monitoring framework:

- Student groups participate in “Clean Caspian” and “Water for Life” campaigns focusing on sampling and water quality awareness.
- The Green Campus Leaders and SDG Learncast initiatives include modules on aquatic ecosystem protection, wastewater reuse, and pollution prevention.

Conclusion

ASOIU demonstrates institutional monitoring of aquatic ecosystem health through research, field-based data collection, and the development of engineering–ecological protection methods. The integration of scientific monitoring, sustainable materials, and educational engagement supports long-term resilience of aquatic ecosystems in Azerbaijan.