Patterns of Faunal Diversity and Environmental Variation in the Garbardi (Suki Dam) Reservoir Landscape

Kamini B. Patil[1], Dr. K. K. Chaudhary[2], Dr. S. G. Chinchore[3]

Research Scholar, Jayoti Vidyapeeth Women's University, Jaipur[1]

Professor, Jayoti Vidyapeeth Women's University, Jaipur[2]

Associate Professor, Shri V S Naik Arts ,Commerce and Science College, Raver[3]

Abstract: *Reservoir ecosystems are a mosaic of aquatic, semi-aquatic and terrestrial habitats and their associated fauna modified by man. The Garbardi (Suki Dam) Reservoir landscape is an important ecological setting, where seasonal hydrology, water availability, vegetation, habitat structure and anthropogenic activities are important. The purpose of the present study is to evaluate faunal diversity and environmental differences among representative reservoir and surrounding habitats. Major faunal groups will be documented (fishes, aquatic macro invertebrates, amphibians, reptiles, birds and terrestrial mammals) as well as environmental parameters (water quality, vegetation, shoreline characteristics, land use and human disturbance). Sampling will include inlet/riverine, transitional, open water, littoral and surrounding terrestrial zones. Species richness, relative abundance, Shannon–Wiener diversity, Simpson's diversity and evenness will be used to evaluate biodiversity patterns. The study will be expected to identify spatial and seasonal variations in faunal communities, and their relationship to environmental gradients. Results will be used to establish an ecological reference for biodiversity protection, habitat management and sustainable monitoring of the Garbardi Reservoir landscape.*

Keywords: *Garbardi Reservoir, Suki Dam, faunal diversity, biodiversity, environmental variation, aquatic ecosystem, habitat heterogeneity, seasonal variation, conservation*

I. INTRODUCTION

Reservoirs play an important role in freshwater landscapes as they offer habitat for a variety of organisms and provide water for agricultural, domestic, and fisheries uses as well as for other human needs, including irrigation. Reservoirs differ from natural lakes in that there is a high degree of spatial and temporal variation associated with their man-made control of water levels, inflow and outflow flows, modification of shorelines and alteration of surrounding land use. These characteristics result in a mosaic of ecological conditions that can affect species composition, abundance and distribution.

Faunal communities are valuable indicators of the condition of an ecosystem since various animal groups react to changes in water quality, vegetation structure, habitat availability, food sources and disturbance. Water depth, dissolved oxygen, temperature, aquatic vegetation and food availability are important factors that impact fish communities. The organisms are aquatics (macrophytic invertebrates) sensitive to physicochemical conditions and substrate and are thus suitable for ecological assessment. Aquatic and marginal habitats are associated with amphibians and reptiles, while water availability and abundance of vegetation and prey are often important for birds. Reservoir margins and surrounding vegetation might provide feeding, breeding or movement habitat for terrestrial mammals and other wildlife.

The landscape of the Garbardi (Suki Dam) Reservoir is a potentially significant aquatic landscape, in which aquatic and terrestrial habitats are juxtaposed. The reservoir, inlet zones, transition habitats, littoral margins, and the vegetation surrounding them offer various ecological niches. These habitats can also be altered by changes in rainfall, water level and vegetation during the different seasons of the year, which will affect faunal communities.

Biodiversity assessment often is based on only a single taxonomic group, but reservoir landscapes are important ecologically. The integrated approach is then useful for understanding the impact environmental variation has on biodiversity at the various habitat zones.

The present study aims to explore the diversity of fauna and variation in the environment of Garbardi (Suki Dam) Reservoir landscape. It highlights the link between habitat heterogeneity, environmental conditions and faunal distribution and offers a tool for biodiversity monitoring and ecological management.

II. OBJECTIVES OF THE STUDY

The major objectives of the proposed study are:

- To record the faunal diversity related to the Garbardi (Suki Dam) Reservoir and its habitats.
- To compare the fauna of different habitat zones.
- To determine the faunal abundance and diversity throughout the seasons and across the study area.
- To describe some important environmental conditions for the reservoir ecosystem.
- To investigate the relationship between the pattern of faunal diversity and environmental factors.
- To locate habitats with relative high ecological value.
- To make suggestions for the conservation and sustainable use of the biodiversity of the reservoir landscape.

III. LITERATURE REVIEW

Reid et al. (2024) noted integrated and long-term management of freshwater biodiversity, especially when faced with multiple environmental pressures. Their efforts proved that biodiversity responses were not always uniform and that multiple monitoring efforts offered a better foundation for detecting ecological change than single monitoring efforts. This is directly applicable to the proposed Garbardi Reservoir study where multiple habitat zones are planned as well as pre-monsoon, monsoon and post-monsoon observations. An ecological baseline for conservation and management in the future can be achieved through the integration of biodiversity indices, habitat assessment and environmental measurements[1].

Dudgeon (2023) highlighted the ongoing relevance of freshwater biodiversity for conservation, in the face of habitat modification, pollution, altered flow regimes, biological invasions, and environmental changes brought about by climate conditions. The study has revealed that there are strong interactions between physical habitat conditions, water quality and human pressures that affect freshwater organisms. This view aligns with the use of anthropogenic disturbance indicators such as fishing, livestock access, agriculture, waste disposal and vegetation removal in the assessment of biodiversity in reservoirs. This type of integrated monitoring may be useful for the detection of environmental pressures related to changes in faunal communities[2].

Liu et al. (2022) noted that littoral and shoreline habitats are crucial to ensure the biodiversity of regulated freshwater ecosystems. They found that multiple taxonomic groups will find feeding, breeding and refuge opportunities in shallow water regions, in aquatic vegetation and in structurally complex margins. The results indicate that such assessments as only open-water habitats are underestimated when biodiversity is measured. Therefore, consideration of the vegetated

---

[1] Reid, A. J., Carlson, A. K., Creed, I. F., Eliason, E. J., Gell, P. A., Johnson, P. T. J., Kidd, K. A., MacCormack, T. J., Olden, J. D., Ormerod, S. J., Smol, J. P., Taylor, W. W., Tockner, K., Vermaire, J. C., Dudgeon, D., & Cooke, S. J. (2019). Emerging threats and persistent conservation challenges for freshwater biodiversity. *Biological Reviews, 94*(3), 849–873. https://doi.org/10.1111/brv.12480

[2] Dudgeon, D. (2023). Freshwater biodiversity conservation: Recent challenges and emerging priorities. *Biological Reviews*.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 1, February 2026
Impact Factor: 8.2

and littoral shoreline habitats and surrounding terrestrial habitats is important in the present study to gain a landscape-scale understanding of faunal diversity at Garbardi Reservoir[3].

In aquatic ecosystems, the effects of water quality, habitat complexity and hydrological conditions on species richness and community structure were studied by **Zhang et al., 2021**, who examined the relationship of environmental gradients to aquatic biodiversity in reservoir ecosystems. The authors highlighted the need to include physicochemical measurements in addition to biological surveys to gain insight into patterns of biodiversity. Their results give methodological support to the evaluation of such parameters as temperature, pH, dissolved oxygen, turbidity, conductivity and water depth together with the faunal observations in the Garbardi Reservoir landscape[4].

Wang et al. (2020) discussed how reservoir development affects the ecology and noted that artificial reservoirs can have a significant ecological impact on aquatic habitat, hydrology, and species composition. They stressed that water-level fluctuations and changes in sediment transport and habitat connectivity have potential to affect species composition and ecological processes. The study further validates the need to consider reservoirs as landscapes that have more than one ecological niche, and not just as single aquatic systems. This view is especially important for the Garbardi (Suki Dam) Reservoir, since the environmental characteristics of inlet, transitional, open-water and shoreline habitats should vary, impacting the fauna of each habitat differently[5].

IV. STUDY AREA

In this study, the Garbardi (Suki Dam) Reservoir is treated as a landscape, which includes the reservoir water body, inflow areas, shoreline habitats and adjacent terrestrial habitats. The study does not assume that the reservoir is a single aquatic entity but rather a complex landscape.

In order to assess systematically, the study area can be divided into representative habitat categories:

4.1 Inlet/Riverine Zone

The inlet zone is the part of the reservoir that is affected by water from the inlet. It can include shallow water, increased sedimentation, fluctuations in current and relatively high concentrations of marginal vegetation. These can also serve as fish and macro invertebrates feeding and breeding grounds, as well as feeding and breeding ground for amphibians and birds.

4.2 Transitional Zone

The transitional zone is the second part of the system in between riverine influence and the main reservoir body. Climatic situations in this zone can change significantly as the water level of the reservoir or inflow of water changes seasonally[6].

4.3 Open-Water Zone

The open-water area provides relatively deep, less complex water and habitat. Faunal elements such as fish and water associated birds, may be significant in this zone.

---

[3] Liu, Y., Wang, X., Chen, J., et al. (2022). Spatially varying trophic effects of reservoir-derived plankton on stream macroinvertebrates among heterogeneous habitats within reaches. *Hydrobiologia, 849*, 2503–2520. https://doi.org/10.1007/s10750-022-04866-0

[4] Zhang, H., Li, X., Wang, Y., et al. (2021). Environmental gradients and aquatic biodiversity patterns in reservoir ecosystems: Implications for ecological assessment and management. *Environmental Monitoring and Assessment*.

[5] Wang, J., Li, Y., Zhang, H., & colleagues. (2020). Characteristics, main impacts, and stewardship of natural and artificial freshwater environments: Consequences for biodiversity conservation. *Water, 12*(1), 260. https://doi.org/10.3390/w12010260

[6] Zhou, Y., Wang, J., Li, X., et al. (2024). Environmental DNA reveals the effects of cascade dam development on the distribution patterns of aquatic biodiversity in mountain rivers. *Frontiers in Marine Science, 11*. https://doi.org/10.3389/fmars.2024.1444097

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 1, February 2026 Impact Factor: 8.2

4.4 Littoral and Shoreline Zone

The littoral zone is composed of shallow margins, emergent vegetation, exposed substrates and areas affected by changing water levels. These habitat types can be of special value to amphibians, reptiles, insects and birds[7].

4.5 Surrounding Terrestrial Habitat

The terrestrial component consists of the vegetation, the agricultural fields and areas of scrub and other habitats around the reservoir. These areas can provide habitat for birds, mammals, reptiles, insects and other terrestrial wildlife and can serve as movement corridors to link aquatic and terrestrial habitats.

V. MATERIALS AND METHODS

5.1 Sampling Design

The Garbardi (Suki Dam) Reservoir landscape is proposed to be sampled using a stratified sampling design to measure the spatial variation in faunal diversity and environment. The study area will be subdivided into large ecological habitat categories according to the differences found in hydrology, vegetation, shoreline features, and land use and habitat structure. Sample sites will be placed in an equitable manner throughout aquatic, marginal and terrestrial habitats instead of clustering them in one area. This will provide sufficient coverage of the inlet/riverine, transitional, open-water, littoral/shoreline and surrounding terrestrial areas. The uniformity of sampling effort per habitat type will aid in the comparison of species richness, abundance and diversity. The design will also help to define faunal distribution patterns and environmental factors associated with habitat[8].

5.2 Faunal Sampling

The methods used for faunal observation should be standardized for each faunal group.

Fish: Fish diversity can be determined by direct observation, fishery records, non-destructive sampling if this is permitted and discussion with local fishers. Use of suitable regional taxonomic keys to identify species should be carried out.

Aquatic macroinvertebrates: Sampling is recommended to be done in representative microhabitats using a standardised hand net or appropriate aquatic sampling equipment. Identifying organisms to the lowest practical taxonomic level.

Amphibians and reptiles: Visual encounter surveys can be conducted around shoreline, vegetation, shallow water or terrestrial habitats. Daytime observations may be complemented by nocturnal surveys, as and when appropriate and ethically permitted[9].

Birds: Fixed-point counts, line transects and opportunistic observations can be used to document resident, migratory and seasonal water-associated birds.

Mammals: Terrestrial mammals can be documented through direct observation, indirect evidence (tracks and signs) and camera-based monitoring (when available).

5.3 Environmental Assessment

An important part of the faunal diversity evaluations and ecological condition of the Garbardi (Suki Dam) Reservoir landscape is conducting environmental assessment. Environmental data should be collected along with faunal data at

---

[7] Zhang, Y., Wang, L., Chen, X., & colleagues. (2024). Environmental DNA metabarcoding revealing the distinct responses of phytoplankton and zooplankton to cascade dams along a river-way. *Agricultural Water Management*.

[8] Xie, H., Ma, Y., Jin, X., et al. (2024). Land use and river-lake connectivity: Biodiversity determinants of lake ecosystems. *Environmental Sciences Europe, 36*, 100434. https://doi.org/10.1016/j.ese.2024.100434

[9] Shen, Y., et al. (2024). eDNA reveals spatial homogenization of fish diversity in a mountain river affected by a reservoir cascade. *Journal of Environmental Management, 361*, 121248. https://doi.org/10.1016/j.jenvman.2024.121248

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 1, February 2026
Impact Factor: 8.2

the same sampling station to identify habitat- faunal relationships. The following key physicochemical parameters of water are to be collected in the field using appropriate field instruments and using standard procedures: water temperature, pH, dissolved oxygen, electrical conductivity, turbidity and total dissolved solids. Water depth also should be documented since the water level changes can affect the distribution and availability of aquatic habitat.

In addition to water quality, habitat characteristics such as aquatic vegetation, shoreline vegetation, substrate type and overall habitat complexity should be assessed. Land use around the area of interest, such as agriculture, human settlements, grazing land and natural vegetation should also be recorded. The level of anthropogenic disturbance can be estimated from fishing activity, livestock access, vegetation removal, waste disposal and other human activities. Environmental measurements should be taken preferably in pre-monsoon, monsoon and post-monsoon seasons to reflect the seasonal variation. This comparative evaluation will contribute to the delineation of important environmental conditions that affect faunal diversity and habitat suitability in the reservoir ecosystem.

5.4 Habitat and Disturbance Assessment

Understanding the landscape conditions that affect faunal diversity in the Garbardi (Suki Dam) Reservoir due to human activities and habitat assessments is important. A common habitat assessment score could be calculated for each sampling site based on: vegetation cover; substrate diversity; water permanence; shoreline condition; habitat complexity; habitat connectivity with adjacent habitats; and availability of shelter and refugia. A score may be given to each indicator that is suitable for comparison to other sampling sites and habitat types.

It is also important to systematically assess anthropogenic disturbance as human activities can have impacts on the abundance and distribution of fauna, and can change the habitat quality. Intensity of disturbance can be measured as low, moderate or high by observing various indicators such as fishing intensity, livestock access, agriculture activities, waste disposal, vegetation removal, vehicular movement and recreation pressure. Locations that are less disturbed due to human activity and have relatively unscavenged habitat may be considered low-disturbance habitats and locations where humans are regularly present and habitat is being modified may be classified as high-disturbance habitats. Comparing habitat and disturbance scores to faunal diversity indices may be used as a way to speculate on the relationship between habitat quality, human pressure and faunal patterns[10].

Result:

Table 1: Proposed Distribution of Sampling Stations Across Major Habitat Categories in the Garbardi (Suki Dam) Reservoir Landscape

Habitat category	Sampling habitat	Proposed stations
Aquatic	Inlet/Riverine Zone	3
Aquatic	Transitional Zone	3
Aquatic	Open-Water Zone	3
Aquatic/Marginal	Littoral/Shoreline Zone	3
Terrestrial	Vegetated Shoreline	3
Terrestrial	Agricultural/Grassland Habitat	3
Terrestrial	Scrub/Peripheral Habitat	3
Total	**Representative sampling stations**	**21**

Interpretation

The proposed sampling design features 21 representative stations located throughout the Garbardi Reservoir (Suki Dam) landscape, and across seven (7) major habitat types. The aquatic portion includes the Inlet/Riverine, Transitional and Open-Water zones, and three stations were selected in each of these zones to represent the hydrological and

[10] Li, Z., Xie, H., Peng, Z., et al. (2024). Hydrology and water quality drive multiple biological indicators in a dam-modified large river. *Water Research X, 25*, 100251. https://doi.org/10.1016/j.wroa.2024.100251

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 1, February 2026
Impact Factor: 8.2

ecological differences. The Littoral/Shoreline zone is an important transitional area between aquatic and terrestrial systems, and has 3 additional stations. The terrestrial habitats include Vegetated Shoreline, Agricultural/Grassland and Scrub/Peripheral, each of which has three stations. This even distribution allows for similar sampling effort at each habitat type and evaluation of spatial differences in faunal composition and diversity. The design also allows the comparison of aquatic and terrestrial communities, and can be used to assist in the identification of relatively rich habitat. The 21-station system can thus be used for ecological monitoring and systematic inventories of biodiversity throughout the reservoir landscape[11].

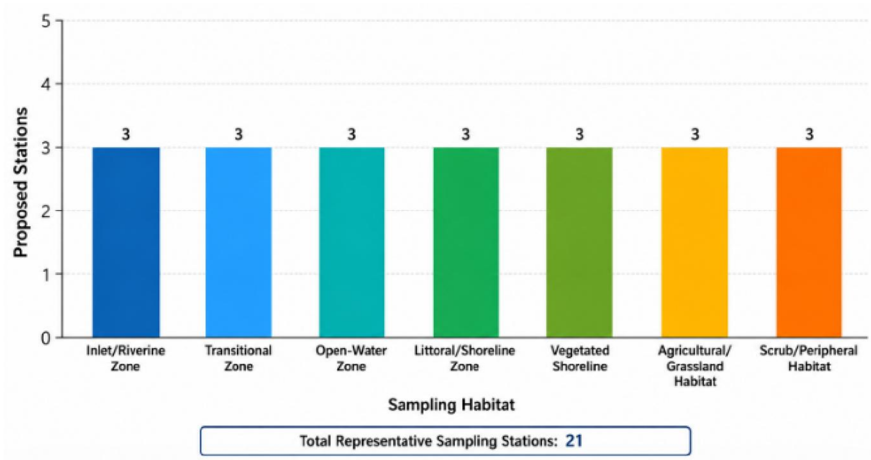

Figure 1: Proposed Distribution of Sampling Stations Across Major Habitat Categories in the Garbardi (Suki Dam) Reservoir Landscape

VI. EXPECTED PATTERNS OF FAUNAL DIVERSITY

The reservoir landscape is likely to show significant spatial variation in the diversity of their fauna. The level of habitat heterogeneity will probably be one of the most important factors affecting species distribution.

Aquatic and emergent plants in littoral habitats may contribute to relatively high diversity because they shelters, serve as breeding sites, feeding resources and substrate for a variety of organisms. Likewise the inlet area can be rich in nutrients and organic matter to support aquatic invertebrates and fishes[12].

There may be fewer habitat types in the open-water area than there are along the shoreline and the faunal composition may differ. It can be significant for pelagic or open water fish and birds associated with water.

Terrestrial habitats can make a significant contribution to landscape-level diversity, but are not necessarily a major component of their own habitat category. Vegetated areas can provide nesting, roosting, feeding and refuge opportunities for birds, insects, mammals and reptiles. Some species are able to adapt to agricultural landscapes, but may also be subject to higher levels of disturbance and seasonal habitat changes.

VII. ENVIRONMENTAL VARIATION AND FAUNAL DISTRIBUTION

Environmental conditions are likely to be different in sampling zones and seasons. Rainfall and reservoir operation can cause significant changes in water depth and temperature. Such variations can influence dissolved oxygen, nutrient distribution, aquatic vegetation and fish habitat.

---

[11] Dudgeon, D. (2024). Prospects for conserving freshwater fish biodiversity in the Anthropocene: A view from Southern China. *Integrative Conservation*. https://doi.org/10.1002/inc3.79

[12] Dudgeon, D. (2025). Bending the curve of global freshwater biodiversity loss: What are the prospects? *Biological Reviews*. https://doi.org/10.1111/brv.13137

Dissolved oxygen is important for aquatic fauna, as it affects the physiological stress and the species composition in the ecosystem. Turbidity can have an effect on feeding efficiency, primary productivity and habitat suitability for visually oriented organisms. The measurement of pH and conductivity can also give information about the chemistry of the aquatic environment.

Another environmental determinant is vegetation. Structurally complex areas may be expected to offer more ecological niches than simplified areas. Onshore vegetation can have refuge value for amphibians and reptiles, nesting and feeding value for birds and habitat value for aquatic and arthropod terrestrial invertebrates[13].

Environmental gradients can be created by anthropogenic activities as well. Habitat quality can be changed by fishing, livestock grazing, agriculture run-off, vegetation clearance, waste disposal and recreational activities. As such, one might expect that the abundance of disturbance-sensitive species would be lower in areas with the highest disturbance, and the abundance of generalist species would be higher.

VIII. SEASONAL VARIATION

Faunal patterns in the Garbardi Reservoir landscape are likely to be strongly influenced by seasonality.

Monsoon rains can also lead to increased inflow and more water, potentially expanding aquatic habitats, bringing more nutrient and sediment load, and altering shoreline conditions. These changes may influence fish movement, aquatic invertebrate productivity and amphibian activity.

With more than usual water availability and better vegetation conditions, several taxonomic groups might benefit from favorable habitat conditions during the post-monsoon season. Water associated birds are also likely to be more numerous based on the region's movement patterns.

Water level declines during the pre-monsoon or dry season can lead to the loss of aquatic habitat and focus aquatic resources in areas where water persists. Meanwhile, exposed mudflats and shallow margins can provide feeding opportunities for some shorebirds.

Thus, one-season survey may underestimate the overall biodiversity of the reservoir landscape. Monitoring over more than one season is better for a more representative assessment.

IX. DISCUSSION

The ecological value of the Garbardi Reservoir landscape may not be due to the water in the reservoir but to the combination of aquatic and terrestrial habitats. Environmental gradients in habitats provide for the occupation of different faunal groups of different ecological niches.

A landscape-level approach also understands that the ecological services provided by the water's edge of the reservoir do not just occur within the water itself. Shallow water and adjacent terrestrial habitats, and vegetated shorelines, are important resources to organisms that traverse aquatic and terrestrial habitats[14].

The hypothesized relationship between environmental conditions and diversity of fauna further emphasizes the need for simultaneous biological and environmental monitoring. Environmental information absent from biodiversity data can make species lists but not much more. On the other hand, environmental assessment, but without biological assessment, does not adequately reflect ecological consequences.

The proposed approach could thus be an effective element in establishing the Garbardi Reservoir ecological baseline. Changes in species composition, habitat quality and intensity of disturbance over time might be identified via repeated surveys.

---

[13] Das, S. K., Panda, K., & colleagues. (2023). Effect of environmental drivers of fish assemblage and diversity patterns in temporal scale in Mongra Reservoir: A case study from one of the tributaries of Mahanadi Basin, Central India. *Ecohydrology*. https://doi.org/10.1002/eco.2599

[14] Beck, M. W., Claassen, A. H., & Hundt, P. J. (2020). Environmental impacts of dams and reservoirs: A review of ecological consequences and management challenges. *Water, 12*(1), 260. https://doi.org/10.3390/w12010260

X. CONCLUSION

The Garbardi (Suki Dam) Reservoir is considered a 'mixed landscape' and not a single 'lake'. It is anticipated that different, but interrelated faunal communities would develop in its inlet, transitional, open-water, littoral and surrounding terrestrial habitats. Water quality, depth, vegetation, substrate, seasonal hydrology and human activity are important environmental factors that are likely to play a large role in observed species richness and abundance.

A combination of faunal surveys and environmental monitoring for an integrated assessment yields a better understanding of biodiversity patterns and ecological drivers. The proposed study framework is especially valuable for determining high-value habitats, disturbance sensitive areas and potential conservation priorities. Seasonal, long-term monitoring would enhance knowledge of ecological change in the reservoir in the long-term.

The study concludes with a focus on the importance of managing for the conservation of biodiversity beyond the open water habitat. The ecological integrity of the Garbardi Reservoir landscape depends on protection of shoreline vegetation, maintaining habitat complexity, and water-quality monitoring and sustainable use of biological resources.

REFERENCES

1. Beck, M. W., Claassen, A. H., & Hundt, P. J. (2020). Environmental impacts of dams and reservoirs: A review of ecological consequences and management challenges. *Water, 12*(1), 260. https://doi.org/10.3390/w12010260
2. Das, S. K., Panda, K., & colleagues. (2023). Effect of environmental drivers of fish assemblage and diversity patterns in temporal scale in Mongra Reservoir: A case study from one of the tributaries of Mahanadi Basin, Central India. *Ecohydrology*. https://doi.org/10.1002/eco.2599
3. Dudgeon, D. (2023). Freshwater biodiversity conservation: Recent challenges and emerging priorities. *Biological Reviews*.
4. Dudgeon, D. (2024). Prospects for conserving freshwater fish biodiversity in the Anthropocene: A view from Southern China. *Integrative Conservation*. https://doi.org/10.1002/inc3.79
5. Dudgeon, D. (2025). Bending the curve of global freshwater biodiversity loss: What are the prospects? *Biological Reviews*. https://doi.org/10.1111/brv.13137
6. Li, Z., Xie, H., Peng, Z., et al. (2024). Hydrology and water quality drive multiple biological indicators in a dam-modified large river. *Water Research X, 25*, 100251. https://doi.org/10.1016/j.wroa.2024.100251
7. Liu, Y., Wang, X., Chen, J., et al. (2022). Spatially varying trophic effects of reservoir-derived plankton on stream macroinvertebrates among heterogeneous habitats within reaches. *Hydrobiologia, 849*, 2503–2520. https://doi.org/10.1007/s10750-022-04866-0
8. Reid, A. J., Carlson, A. K., Creed, I. F., Eliason, E. J., Gell, P. A., Johnson, P. T. J., Kidd, K. A., MacCormack, T. J., Olden, J. D., Ormerod, S. J., Smol, J. P., Taylor, W. W., Tockner, K., Vermaire, J. C., Dudgeon, D., & Cooke, S. J. (2019). Emerging threats and persistent conservation challenges for freshwater biodiversity. *Biological Reviews, 94*(3), 849–873. https://doi.org/10.1111/brv.12480
9. Shen, Y., et al. (2024). eDNA reveals spatial homogenization of fish diversity in a mountain river affected by a reservoir cascade. *Journal of Environmental Management, 361*, 121248. https://doi.org/10.1016/j.jenvman.2024.121248
10. Xie, H., Ma, Y., Jin, X., et al. (2024). Land use and river-lake connectivity: Biodiversity determinants of lake ecosystems. *Environmental Sciences Europe, 36*, 100434. https://doi.org/10.1016/j.ese.2024.100434
11. Zhang, Y., Wang, L., Chen, X., & colleagues. (2024). Environmental DNA metabarcoding revealing the distinct responses of phytoplankton and zooplankton to cascade dams along a river-way. *Agricultural Water Management*.
12. Zhou, Y., Wang, J., Li, X., et al. (2024). Environmental DNA reveals the effects of cascade dam development on the distribution patterns of aquatic biodiversity in mountain rivers. *Frontiers in Marine Science, 11*. https://doi.org/10.3389/fmars.2024.1444097

IJARSCT

International Journal of Advanced Research in Science, Communication and Technology

International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal

ISSN: 2581-9429

Volume 6, Issue 1, February 2026

Impact Factor: 8.2

13. Wang, J., Li, Y., Zhang, H., & colleagues. (2020). Characteristics, main impacts, and stewardship of natural and artificial freshwater environments: Consequences for biodiversity conservation. *Water, 12*(1), 260. https://doi.org/10.3390/w12010260
14. Zhang, H., Li, X., Wang, Y., et al. (2021). Environmental gradients and aquatic biodiversity patterns in reservoir ecosystems: Implications for ecological assessment and management. *Environmental Monitoring and Assessment*.