MONITORING STREAM FISH POPULATION IN RELATION TO NEWLY CONSTRUCTED WEIRS IN CENTRAL WESTERN GHATS, INDIA

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Summary

To meet the rising need for electricity, drinking water requirements of urban towns and cities, many water diversion projects are in place. Such project involves construction of roads and hydrological barriers which may submerge a large track of intact forest and drastically alter stream habitat conditions. Hydro-ecological studies have demonstrated that river barriers change the natural flow regime, stream habitat structure, and overall biological interconnectedness of headwater streams within and across river basins.

Under Yettinhole Integrated drinking water project, eight weirs were constructed in headwater habitat of Nethravathi river basin by Visvesvaraya Jala Nigam Ltd of Government of Karnataka. This study was undertaken to understand the effects of these weirs on native fish communities and identify degraded stream sites for restoration in future.

Eight weirs were surveyed four times and a control site was sampled once during the dry season (December 2025 to March 2026) to assess fish assemblages and habitat features across upstream-downstream of weirs, and control site (reference stream reaches). We recorded a suite of hydro-ecological variables including stream habitat characteristics, physicochemical variables, stream flow and land use land cover. Fish sampling was carried out using local fishing methods per site. The catch per unit effort (cpue) was standardized per site.

The study documented 34 fish species representing 16 families and 9 orders, providing an updated assessment of freshwater fish diversity in the Nethravathi River basin. The results show that the weirs altered the local stream habitat conditions, changed water chemistry thereby negatively impacted fish communities. The highest fish richness was found in a control site - Adda hole. Upstream sites represented near natural habitat condition like control site as a result it retained more species than downstream sites. Sites at downstream had a greater number of individuals of fish. Of the four habitat types, pool had highest species diversity than run, riffle and cascades. As per the non-metric multi-dimensional scaling approach (NMDS), overall fish composition differed across sampled sites. The control sites had a tight and well separated species composition than upstream and downstream sites.

Family Cypriniformes represented the most (93%) followed by Cyprinodontiformes (2.63%), Tetraodontiformes (1.58%) etc. Similarly, Danionidae was the most dominant (47.12 %) than Cyprinidae (31.91%), Nemacheilidae (10.78 %) etc. As per the IUCN threatened status, 25

species were Least Concern, 2 Data Deficient, 1 Vulnerable, 1 Endangered and five were Not Evaluated.

Overall, this study offers baseline ecological data on responses of fish diversity to changing habitat conditions and hydrology in a Nethravathi River sub-basin. Going forward, data will be useful for effective monitoring as well as conservation planning for fragile stream habitats in the central Western Ghats, in India.