

# The Impact of Hydroelectric Power Plants on Biodiversity, With an Emphasis on Fish Species

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Among the known sources of renewable energy, hydroelectric power plants (HPPs) are often promoted as low-carbon energy sources, but, in practice, their ecological impact on the biodiversity of freshwater ecosystems is considerable and well researched (e.g., Luangphon et al., 2025).

With dam construction it comes to river fragmentation, which changes the natural flow regimes of watercourses, interferes with the longitudinal connection, and impacts sediment transport—all of which are critical for preserving the ecosystem function, as well as the diversity of aquatic and riparian species (e.g. Ding et al., 2026).

These barriers interfere seriously with fishes' essential migratory pathways for feeding and spawning. By isolating individual populations, they decrease the genetic diversity of species and make them more vulnerable to predators. (Consuegra et al., 2021). There are also direct affects, like sublethal injury and mortality, that result from turbine passage (Algera et al., 2020).

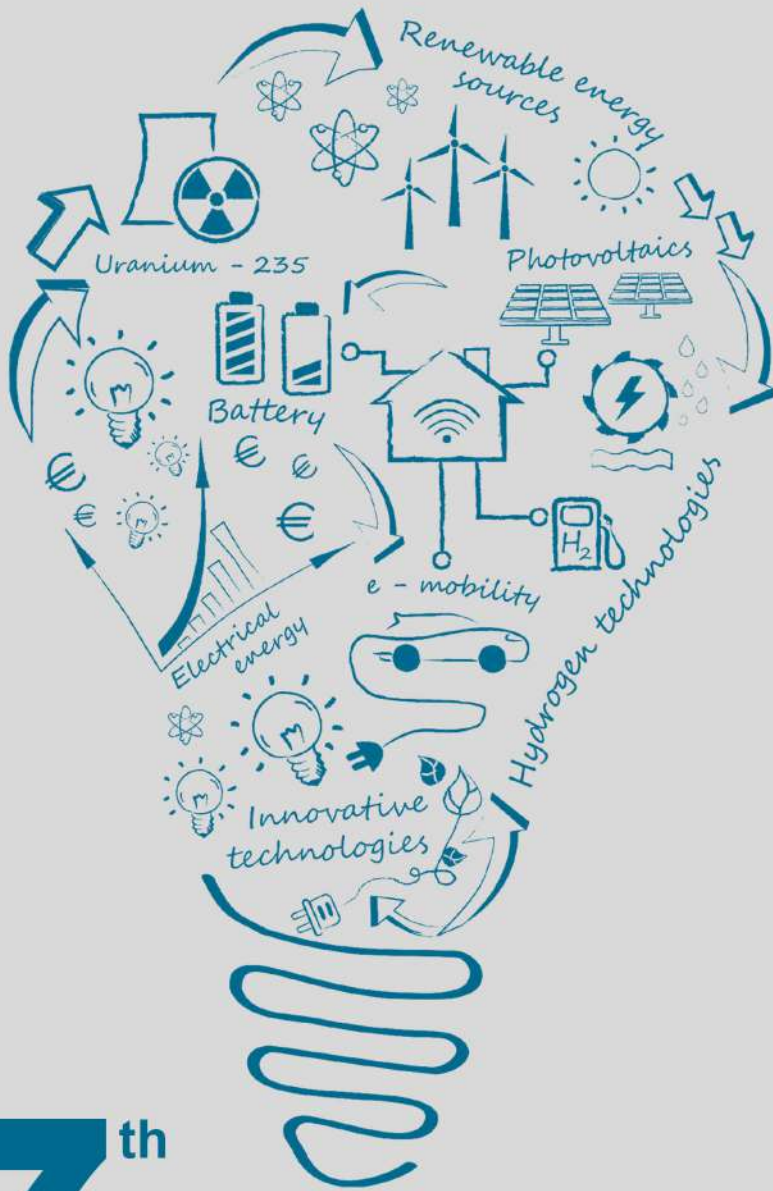
According to various studies, further dam constructions may hasten endangerment and the extinction rate of freshwater species, especially in waterflows that are considered biodiversity hotspots (ex. Amazon Basin) (Zarfl et al., 2019; Keijzer et al., 2024). Slovenia is no exception regarding the impact of HPPs on ecosystems and biodiversity.

Although hydropower plants will continue to have a huge, mostly negative impact on the environment and local biodiversity, this can be mitigated to some extent, or even turned into something positive, by following certain guidelines for ecosystem welfare during construction and operation (Nielsen and Szabo-Meszaros, 2022).

**Keywords:** hydropower, fish; biodiversity, habitat, environmental impacts

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