



Abstract

# Management and Conservation of Fish Populations in Mountain Streams: An Holistic Approach in the Framework of LIFE DIVAQUA Project <sup>†</sup>

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**Abstract:** The recovery of threatened and endangered fish species is among the highest priorities for biodiversity conservation in national parks and fisheries management in nearby areas. Threats to fish populations are numerous and include habitat fragmentation and degradation, proliferation of invasive and pathogen species, and climate change. Moreover, mountain areas often share the most critical threats. However, there does not exist a common strategy that integrates conservation and management plans for fish populations in mountain areas. In this regard, LIFE DIVAQUA designed a conservation strategy that integrates new knowledge gained from scientific research and long-term monitoring data, and considers the main threats to fish populations in mountain areas: (1) A long term monitoring program has been already implemented for 10 years, revealing temporal trends of fish populations in mountain streams. (2) Modeling of fish population by the use of environmental DNA allowed analyzing fish distributions in areas with scarce data and evaluating habitat suitability maps. (3) Fishways construction and removal of river barriers substantially increased the distribution area of endangered species. (4) The analysis of climate change effects in water temperature and hydrology led to the implementation of environmental flows under a climate change scenario; (5) Monitoring fish diseases, their occurrence, and temporal changes (e.g., *Aeromonas* spp.) can be used as an early warning signal of ecosystem unbalance. A pilot study for the implementation of this conservation and management plan in the LIFE DIVAQUA project is showing promising results. However, the success of conservation and management strategies requires a broader approach. This includes the participation of a wide range of partners and stakeholders and utilizes independent scientific oversight, assessment, and project adjustments to ensure conservation goals are met.

**Keywords:** fish conservation; fish management; national parks; environmental DNA; long term monitoring



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