

11 years of limnological research in the Gran Paradiso National Park (GPNP, Torino, Italy): between research and conservation

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Chronology of the limnological research and conservation activities

1921 the GPNP is one of the oldest protected areas in Europe. It has the invaluable merit of having saved from extinction the Alpine ibex (*Capra ibex*), the symbol of the GPNP as well as of the alpine wilderness.

In the last decades most of the local threats to the GPNP biodiversity derived from exploitation and mismanagement of water resources (e.g. dams and connected infrastructures construction, channelization, alien fish, water eutrophication).

2006 a long term monitoring campaign of alpine lakes began, starting an 11-years long research season on aquatic ecosystems, which turned out to influence the conservation policies of the GPNP.

In the following years the participation of the GPNP to EU projects and a series of collaborations (e.g. Uni. Pavia, ISE-CNR, ISAC-CNR, Uni. Genova, CEAB-CSIC, Uni. Swansea, Uni. Statale di Milano, Uni. di Milano Bicocca) fueled for a long time (2008-2017) the research and conservation activities.

2008 The GPNP became partner of the FP7 ACQWA project (Assessing Climate Impacts on the Quantity and Quality of Water).

2012 an important co-financing was obtained within the LIFE+ Project BIOAQUAE - Biodiversity Improvement of Alpine Aquatic Ecosystems www.bioaquae.eu

Research lines and ongoing projects

The most prominent characteristic of the limnological research carried out in the GPNP is its strong connection to **applied conservation issues**, often providing feasible indications which convinced the GPNP authorities to take the path of **active conservation**. In particular the BIOAQUAE project and its conservation actions (the successful eradication of alien fish from alpine lakes, the re-oligotrophication of aquatic habitats through the use of phyto-pedo-depuration plants and the conservation actions for the Marble trout *Salmo marmoratus*) represent a first important achievement of this new attitude of GPNP towards the conservation of aquatic environments. At the same time, the long-term limnological studies are progressively creating a database of ecological variables which will provide a reference against which to quantify the effects of the global changes, inevitably affecting the protected area.

Selected scientific production

1. Introduced fish [1-7]
2. Livestock grazing and organic pollution [8]
3. Water exploitation [9]
4. Alpine lakes hydrochemistry [8,10]
5. Zooplankton ecology and evolution [3, 11-14]
6. Ecological dynamics ISAC CNR [15]
7. Ecological restoration [16]
8. Climate change and bioindicators [17]

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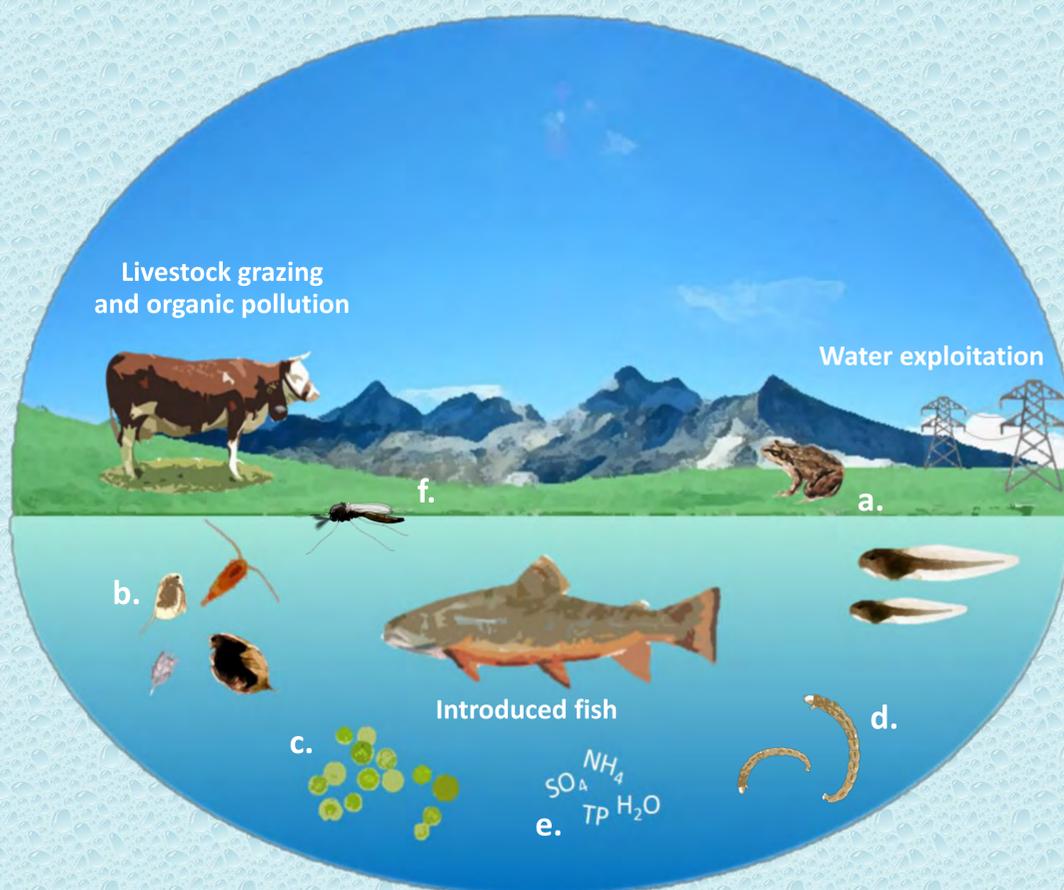


Fig. 1 Picture above: main local ecological threats and impacted ecological compartments in a typical alpine aquatic habitat. a. amphibians; b. zooplankton; c. bacterial and primary production; d. aquatic invertebrates; e. water chemistry; f. emerging insects



Fig. 2 GPNP is an example of integration between biodiversity conservation and scientific research, in a protected area which is just an hour's drive from the conference venue.

ACKNOWLEDGEMENTS.

The authors would like to thank Giuseppe Bogliani (University of Pavia), the Park wardens and many students and field assistants. Funding and logistic support for this research was provided by the GPNP within the framework of the LIFE+ project BIOAQUAE (Biodiversity Improvement of Aquatic Alpine Ecosystems).