
Challenges and opportunities for research and management in Mediterranean climate rivers

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Résumé

Freshwater ecosystems account for 0.3% of the planet's freshwater but they are the habitat for 9% of all described species and 35% of vertebrate species. The levels of freshwater biodiversity loss are alarming, doubling those found in terrestrial or marine ecosystems. Mediterranean climate regions are considered global hotspots of biodiversity, also for freshwater organisms. Rivers in these regions (med-rivers) are unique ecosystems because of their predictable winter flooding and summer drought regimes. They support many species adapted to both floods and droughts, and their high levels of freshwater biodiversity are explained by past historical events and current environmental heterogeneity. At the same time, Med-rivers have been affected for centuries, in some cases millennia, by multiple human activities that increasingly threaten their biodiversity. These threats include changes in land use, nutrient loads, heavy metal concentrations, salinity, water withdrawals, invasive species and, more recently, xenobiotics or emerging organic pollutants. In addition, future climate change scenarios predict increases in drought conditions and in the occurrence of extreme events, such as floods, heat waves, and wildfires. The diversity of freshwater organisms is declining more rapidly in med-rivers than in rivers anywhere else in the world and, for some taxonomic groups, Mediterranean regions have more introduced than native species. Freshwater biodiversity conservation in med-rivers requires innovative approaches to account for both natural and human disturbances. Current protection figures, including the Natura2000 network, do not appear to be very efficient in protecting freshwater biodiversity, and current methods to assess the ecological status fail when applied to characteristic med-rivers. To ensure the protection of freshwater biodiversity and ecosystems in Mediterranean climate regions, the adaptation and development of specific management protocols and actions to the characteristics of med-rivers is needed, specially under future climate scenarios.

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