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Impact of Plastic Pollution on Freshwater Fish: Pathways, Biological Effects, and Implications

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Abstract: *Plastic pollution is increasingly recognized as a significant threat to freshwater ecosystems, yet its impacts on freshwater fish remain less documented than those in marine systems. Freshwater fish play essential roles in ecosystem functioning and support food security and livelihoods for millions of people. This review synthesizes current evidence on the sources, types, and exposure pathways of plastic pollution in freshwater environments, with a focus on its physiological, behavioural, and ecological effects on freshwater fish. Available studies indicate that plastics are ingested through direct consumption and trophic transfer, leading to physical injury, oxidative stress, endocrine disruption, immune impairment, and reproductive effects. Although many impacts are sub-lethal, their cumulative influence can reduce population resilience and disrupt freshwater food webs. The paper also highlights regional evidence and discusses implications for inland fisheries and human health. Overall, the findings emphasize the need for targeted mitigation strategies and focused research to reduce plastic inputs into freshwater systems and protect freshwater biodiversity.*

Keywords: *Plastic pollution*

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