

Environmental DNA (eDNA) refers to DNA that can be extracted from environmental samples (such as soil, water, feces, or air) without the prior isolation of any target organism. The analysis of environmental DNA has the potential of providing high-throughput information on taxa and functional genes in a given environment, and is easily amenable to the study of both aquatic and terrestrial ecosystems. It can provide an understanding of past or present biological communities as well as their trophic relationships, and can thus offer useful insights into ecosystem functioning. There is now a rapidly growing interest among biologists in applying analysis of environmental DNA to their own research. However, good practices and protocols dealing with environmental DNA are currently widely dispersed across numerous papers, with many of them presenting only preliminary results and using a diversity of methods. In this context, the principal objective of this practical handbook is to provide biologists (both students and researchers) with the scientific background necessary to assist with the understanding and implementation of best practices and analyses based on environmental DNA.

This advanced textbook is suitable for both graduate level students and professional researchers in the fields of ecology, evolutionary biology, and conservation biology.

The cover image illustrates an area used for environmental DNA (eDNA) studies. The scientific community recognized at an early stage that eDNA can offer new avenues for biomonitoring freshwater ecosystems such as the river in the foreground (Chapter 12). eDNA persistence in soil samples originating from the terraces of Villar d'Arène (in the background) were evaluated. Previously, potatoes, barley, and rye were cultivated on these terraces; eDNA from these three plant species can still be found in soil samples, despite the terraces no longer being cultivated (Yoccoz et al. 2012; see Section 4.1.2 and 14.1).
Photo by Pierre Taberlet

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