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USE OF AQUATIC INSECTS IN BIOASSESSMENT

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INTRODUCTION

Bioassessment (also called biomonitoring) is the science and practice of using resident organisms to evaluate the environmental health of a waterbody (Rosenberg and Resh 1993; USEPA 2011). Because legislation in the United States, European Union, and Canada explicitly mandates assessment and maintenance of biological or ecological integrity (e.g., U.S. Clean Water Act, Canada Waters Act, the European Union Water Framework Directive), the bioassessment process increasingly underpins management decisions and increases the value of monitoring programs in North America. Although bioassessment studies may address basic research questions, the connection to management sets them apart from other studies in the field of ecology: Bioassessment activities may take place at a range of spatial and temporal scales, from cellular assays to whole-ecosystem studies, although assemblage-level studies based on aquatic macroinvertebrates (along with fish and algae) are generally the most widely used and integrated into legislation or management programs. Bioassessment is now an essential element of the aquatic resource manager's toolkit because, unlike physical or chemical measures, biological data provide a direct indication of a waterbody's ability to support aquatic life (Karr 1981; Rosenberg and Resh 1993; Kuehne et al. 2017). It is not a surrogate for water quality or habitat quality, but rather a direct measure of condition. Although this chapter focuses on freshwater bioassessments in North America (and mostly in streams, where they are routinely applied), examples and research from other parts of the world and in other habitat types are included.

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