

How to evaluate the effectiveness of a hydromorphological restoration action? Feedback after 13 years of monitoring on the Marolles river

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I.S. Rivers How to evaluate the effectiveness of a hydromorphological restoration action? Feedback after 13 years of monitoring on the Marolles river **Hypothesis** Objective **Study Area** Reference/Control Site Evaluate the spatiotemporal Remeandering ЧN evolution of macrobenthic Ecological Status Taxonomic metrics Functional metrics Adding sediment stored Site communities Control Define the best taxonomic or ommunity Recovery functional metrics to highlight after Restoration Genillé the recovery M Inter annual variability D 10 Inspired by Henry & Amoros, 1995 Time Network of "Site de Démonstration" (SDD) Vivier et al., 2018 **Methods** BACI (Before-After-Control-Impact) monitoring Traits profile calculation (Tachet et al., 2000) (Rolan-Meynard et al., 2019) I₂M₂: MultiMetric Invertebrate Index I₂M₂ field sampling protocol (NF T 90-333) calculation (Mondy et al., 2000) Composition, structure and functional metrics calculation Multivariate analysis (FCA) Results 1. of cor composition BEFORE M Bran ard / OFE st stability the faunal the control site Before After a∰0.77 Ŧ uits of the factorial correspondence analysis (FCA) on invertebrate communities. Distribution of status types (Control/Restored)/sampling dates (Before/After) (solids circles) and sampling sites (solid squares) on the first factorial plane. Status types/Sampling dates are located at the weighted average of the corresponding sampling sites. Lines link sites to their status type/sampling dates. +Im=+Imonth after restoration work, +3m=+3months, +1y=+1/years, +3y=+3years, +4y=+4years, +5y=+5years, +9y=+9years, +11y=+11years after restoration work AFTER Example of biological metrics: Example of an ecological profile of the macrobenthic I₂M₂ community: Current Velocity* S H' *In four categories the trait describes a taxon's affinity for a specific current velocity 1: fast (> 50 cm/s) 2020 at mesohabitat scale, from still waters (i.e < 5 cm/s) to fast flowing waters (> 50 cm/s) 2: medium (25-50 cm</s) 1.5 3: slow (< 25 cm/s) Results are expressed in relative 4: null 0,5 abundance at the community leve +2y +3y +4y Time after worl Restored Restored Restored Restored 2007 2011 +1m 2010 2003 EPT GOLD a new multimetric 1, M, i 50% Quality 80% 40% Class 60% index is able to identify 30% Restored Restored 40% 2007 2012 2007 2013 2007 2014 2007 2018 npaired reaches for nthropogenic pressu gories potentially lea vater quality alteration habitat degradation. 20% 20% The I₂M₂ is composed by : Shannon diversity index, Shannon diversity index, (ii) original ASPT score, (iii) the relative abundance of polyvoltine taxa, (iv) the relative abundance of ovoviviparous taxa and (v) Restored Before restoration After restoration **Control Restored** 2020 S: Number of families, H': Shannon Diversity, EPT: % of Ephemeroptera Plecoptera and Trichopt GOLD: % of Gastropoda Oligochaeta and Diptera mic richn Conclusion The further one goes from the date of the work, the more the communities of the two sites look like each other, and the more sensitive taxa are found at the restored site, which follows the expected pattern

• The most interesting metrics to study seem to be: Richness, Diversity, I₂M₂, %EPT, %GOLD, Current Velocity (Preferendum)

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