Appendix S4: Comparison of metabolic rates estimated in our study with literature data

GPP and ER estimated in this study were among the highest values reported for similar sized rivers (discharge between 5 - 50 $m^3 s^{-1}$, Appendix S5); especially those of the sampling station R2. In comparison to other streams, higher GPP and ER were reported for formerly polluted streams with a channelized river course and degraded floodplain in the Basque country (Izagirre et al. 2008); accordingly, a direct comparison to the Ruhr seems inappropriate. Besides size, none of the rivers in our literature review was comparable to the Ruhr regarding the river characteristics: sediment structure, hydromorphology/river state, macrophytes, and geographic region (Appendix S5). Consequently, metabolism reference values from rivers similar to the Ruhr are not available. However, higher GPP and ER after restoration of flow patterns have been reported by Colangelo (2007), supporting our findings of higher metabolic rates following restoration. Of all the rivers for which metabolism has been reported, the channelized river Thur (Uehlinger 2006) is closest to the Ruhr regarding size, sediment, and region. Average GPP and ER reported for the Thur were similar to those of the channelized sampling station D. Thus, relatively low GPP and ER in hydromorphologically altered rivers may be common.

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