SUPPLEMENTARY MATERIAL S9

ENVIRONMENTAL VARIABLES PRE- AND POST-HPP

We measured physicochemical characteristics at each sampling site. Nine parameters, dissolved oxygen (mg1-1), water temperature (°C), pH, conductivity (µS.m-1), turbidity (UNT), water transparency (cm), depth (m), width (m), and water speed (m.s-1), were used to evaluate the possible differences in physicochemical characteristics between pre-and post-damming phases. Principal Component Analysis (PCA) summarized all variables to visualize them in the multivariate space. PC1 and PC2 summarize 72% data variability representing changes in the environmental variables between phases. For statistics test differences and other details, please, see Cella-Ribeiro *et al.* (2017) where authors tested for differences and showed an increase in dissolved oxygen and temperature after damming. Changes in the composition of fish species have been correlated to such variations.

We applied a Principal Component Analysis (PCA) to identify sources of variation in multivariate environmental data showing limnological differences after damming in the Madeira River. The central idea of PCA is to reduce the dimensionality of a data set consisting of many interrelated variables, while retaining as much as possible of the variation present in the data set. This is achieved by transforming it into a new set of variables, the PCs, which are uncorrelated and ordered so that the first few retain most of the variation present in all the original variables (Mirshojaeian Hosseini, Kaneko, 2011). We utilized rda function from vegan package (Oksanen *et al.*, 2017) in R programming environment (R Development Core Team, 2020). The first axis of the PCA indicated variations in pH, turbidity, conductivity, and transparence in the pos-HPP.

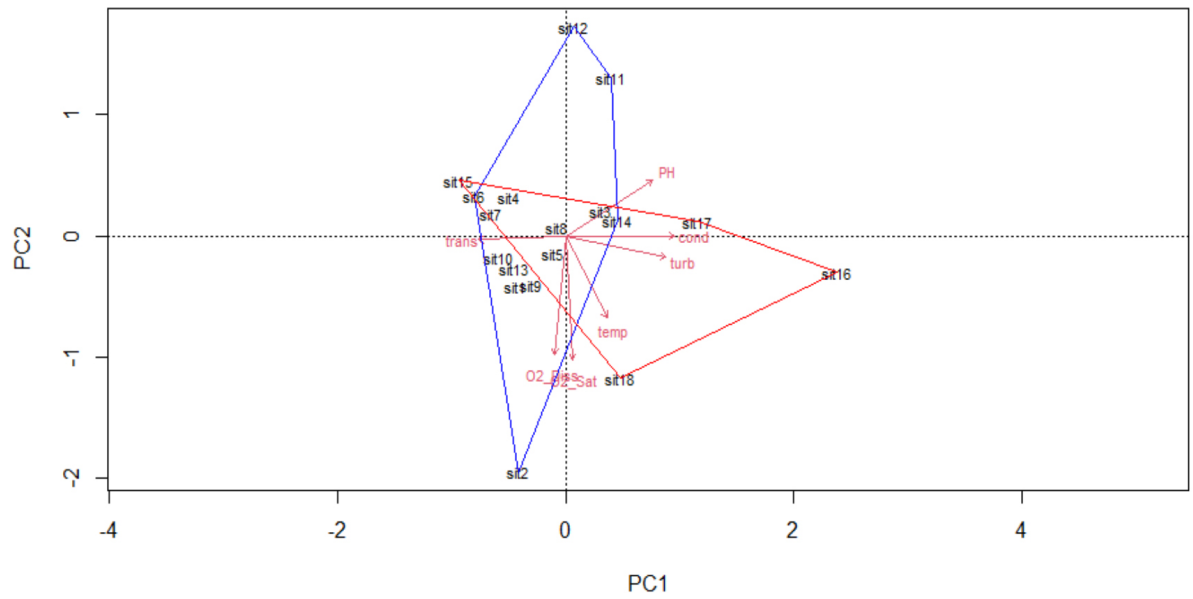

FIGURE S9 | Principal Component Analysis (PCA) was applied to the environmental data matrix collected before and after Santo Antonio dam construction in Madeira River. Blue lines indicate the pre-HPP and red lines the post-HPP.

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