

Alternative Ways to Measure Impacts of Dam Closure to the Structure of Fish Communities of a Neotropical River

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Abstract : Neotropical freshwaters host some of the most biodiverse ecosystems in the world and are among the most threatened by habitat alterations. The high number of species and lack of basic ecological knowledge provides a major obstacle to understanding the effects of environmental change. We assessed the impact of dam closure on the fish communities of a neotropical river by applying simple descriptions of community organizations: Species Abundance Distribution (SAD) and Abundance Biomass Comparison (ABC) curves. Fish data were collected during three distinct time periods (one year before, one year after and five years after closure), at eight sites located downstream of the dam, in the reservoir and reservoir transition zone and upstream of the regulated flow. Dam closure was associated with changes in the structural and functional organization of fish communities at all sites. Species richness tended to increase immediately after dam closure while evenness decreased. Changes in taxonomic structure were accompanied by a change in the distribution of biomass with the proportionate contribution by smaller individuals significantly increased relative to larger individuals. Five years on, richness had fallen to below pre-closure levels at all sites, while the comparative stability of the transformed habitats was reflected by biomass-abundance distribution patterns that approximated pre-disturbance ratios. Despite initial generality, respective sites demonstrated distinct ecological responses that were related to the environmental characteristics of their transformed habitats. This simplistic analysis provides a sensitive and informative assessment of ecological conditions that highlights the impact to ecosystem process and ecological networks and has particular value in regions where detailed ecological knowledge precludes the application of traditional bioassessment methods.

Keywords : ABC curves, SADs, biodiversity, damming, tropical fish

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