Abstract

Despite the fact that little is known about the consequences of hydropower production in tropical areas, many large dams (>15m high) are currently under construction or consideration in the tropics. We researched the effects of large hydroelectric dams on aquatic macroinvertebrate assemblages in two Costa Rican rivers. We measured physicochemical characteristics and sampled aquatic macroinvertebrates from March 2003 to March 2004 in two dammed rivers, Peñas Blancas and San Lorenzo, as well as in the undammed Chachagua River. Sites above and below the dam had differences in their physicochemical variables, with wide variation and extreme values in variables measured below the dam in the San Lorenzo River. Sites below the dams had reduced water discharges, velocities, and depths when compared with sites above the dams, as well as higher temperatures and conductivity. Sites above dams were dominated by collector-gatherer-scrapers and habitat groups dominated by swimmer-clingers, while sites below dams had a more even representation of groups. In contrast, a comparison between two sites at different elevation in the undammed river maintained a similar assemblage composition. Tributaries might facilitate macroinvertebrate recovery above the turbine house, but the assemblage below the turbine house resembled the one below the dam. A massive sediment release event from the dam decreased the abundance per sample and macroinvertebrate taxa below the dam in the Peñas Blancas River. Our study illustrates the effects of hydropower production on neotropical rivers, highlighting the importance of using multiple measures of macroinvertebrate assemblage structure for assessing this type of environmental impact.

Keywords

Functional feeding groups, habitat groups, hydropower, tropical river ecology, turbine house.