

**Figure S6.** Plot showing the distribution of ASVs based on their topological roles. Each symbol represents an ASV from microbial communities in river or lake habitat. The topological role of each ASV was determined according to the scatter plot of within-module connectivity  $(z_i)$  and among-module connectivity  $(P_i)$ . According to the  $z_i$  and  $P_i$  values, the nodes in a network could be divided into the following four subcategories: (1) peripheral nodes  $(z_i < 2.5, P_i < 0.62)$ , (2) connectors  $(z_i < 2.5, P_i \ge 0.62)$ , (3) module hubs  $(z_i \ge 2.5, P_i < 0.62)$ , and (4) network hubs  $(z_i \ge 2.5, P_i \ge 0.62)$ .