BIOGEOGRAPHY AND CONSERVATION OF FRESHWATER MUSSELS (BIVALVIA: UNIONIDAE) IN TEXAS

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БИОГЕОГРАФИЯ И ОХРАНА ПРЕСНОВОДНЫХ МОЛЛЮСКОВ (BIVALVIA: UNIONIDAE) В ТЕХАСЕ

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The knowledge of geographic patterns of species distribution and the factors contributing to species endangerment is necessary for the development of integrative conservation strategies. Freshwater mussels Unionidae have among the highest levels of imperilment recorded in North America. We studied the large-scale environmental and anthropogenic factors affecting the diversity of Unionidae in Texas, USA. Unionid assemblages were surveyed in all major Texas river basins in 2003–2009. Multivariate statistics was used to test for differences among environmental parameters and unionid communities in different bioprovinces, and to determine to what extent the multivariate pattern of species distribution was affected by environmental factors. To estimate human impact, we examined the relationship between human population density and the proportion of rare species, as well with the proportion of historically present species that persist in the watershed.

We found a positive correlation among biotic and environmental similarity matrices, which indicated concordance of the differences among unionid communities and environmental factors that could cause these differences. Lake surface evaporation rate and percentage of forest cover on the watershed were among the most important parameters explaining the differences in unionid communities. Human population density was negatively correlated with the proportion of rare species. The proportion of species found live relative to the total number of live and relic species found in our surveys and to the number of historically known species decreased with the increase in human population density on the watershed. Therefore, increased human population density was associated with the loss of rare species over several decades, but this loss was not recognized because of a lack of assessing the conservation status of unionids.