
CLIMATE CHANGE MEDIATES THE SPATIAL PARTITIONING OF SCULPIN AND LONGNOSE DACE LEADING TO TROPHIC CASCADES IN RIVERINE ECOSYSTEMS OF WESTERN MONTANA

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Sculpin (*Cottus spp.*) and longnose dace (*Rhinichthys cataractae*), perform diverse roles in trophic interactions. Both are abundant inhabitants of the benthos, and longnose dace are present in nearly every Montana drainage. The ecological importance of both genera arises, in part, from their tendency to occur in high abundances, often dominating fish assemblages in number and biomass. Although both are numerous, small-bodied, and largely confined to the benthos, they occupy different trophic positions, express different life history tactics, and perform different ecological roles. Over the last few decades, west-central Montana rivers have warmed affecting the distribution of, among other species, longnose dace, and sculpin. Both species have undergone dramatic shifts in occupancy of habitats leading to ecotonal shifts on a broad geographical scale and this change has occurred rapidly and quietly. In general, as waters have warmed, longnose dace have replaced sculpin leading to the retreat and isolation of many sculpin metapopulations. Both species are sympatric with endangered species like the bull trout (*Salvelinus confluentus*), whose populations are targets for

protection, mitigation, and enhancement. It is unclear the effects of the replacement of sculpin by longnose dace, though they are likely large and measurable, and since they represent the basis of the food chain for higher trophic order organisms, this change could ultimately could affect the restorative potential of the systems for target species. Furthermore, warming and species replacement may lead to a further homogenization or regional distinctive ecotones and fauna.