
THE IMPORTANCE OF LANDSCAPE AND POPULATION DIVERSITY FOR ECOSYSTEM SERVICES ASSOCIATED WITH FISHES

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One of the most pervasive themes in ecology is that biological diversity stabilizes ecosystem processes and the services they provide to society; a concept that has become a common argument for biodiversity conservation. In particular, species-rich communities are thought to produce more temporally stable ecosystem services because of the complementary or independent dynamics among species that perform similar ecosystem functions. These arguments have focused on the effects of species diversity on ecosystem stability but have generally not considered the importance of biologically relevant diversity within individual species. Current rates of population extirpation are probably at least three orders of magnitude higher than species extinction rates so there is pressing need to clarify how population and life history diversity affect the performance of individual species in providing important ecosystem services. Furthermore, heterogeneity in habitat conditions buffers the effects of regional scale climate change on aquatic organisms because of complementary filtering of climate by different habitat types. Taken together, habitat heterogeneity and the associated diversity of populations that inhabit aquatic landscapes, enhance resilience in ecosystems and the human economies that rely on these ecosystems.