

Importance of Hybridization Between Indigenous and Nonindigenous Freshwater Species: An Overlooked Threat to North American Biodiversity

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Abstract.—Biodiversity of North American freshwaters is among the greatest in the world. However, due to extensive habitat degradation, pollution, and introductions of nonindigenous species, this biodiversity is also among the most endangered. Unlike habitat degradation and pollution, nonindigenous species represent a permanent loss of biodiversity because their removal or control is often impossible. Most species introduced into nonnative North American ranges, however, are not from Eurasia but have been introduced from geographically isolated regions within North America. Although the ecological effects of introduced species have been widely documented, the effects of hybridization, especially between closely related species, represents an equally serious mechanism of extinction but is much less studied. Identification of which species are likely to hybridize after contact is of critical importance to prevent the further loss of native species. Molecular phylogenetics serves as a powerful tool to identify freshwater species at risk of introgression, if we can assume that genetic distance is a good predictor of the potential for hybridization. Although not a thorough review of all cases of hybridization, this article documents the extent and effects of hybridization in fishes, crayfishes, mussels, and other invertebrates in light of the currently accepted phylogenetic relationships. We suggest this approach may be the first step in addressing the potential threat of hybridization between many of the closely related species in North American fresh waters. [Aquatic biodiversity; invasion; hybridization; systematics.]