

Reduced Genetic Variation in Upper Missouri River Drainage Westslope Cutthroat Trout Populations Appears to be due to Historical and Contemporary Factors

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*Abstract*—The number of westslope cutthroat trout *Oncorhynchus clarkii lewisi* local populations has decreased over the past 100 years. In Montana, this decrease has been most severe in the upper Missouri River drainage. The remaining populations in the drainage tend to be small and confined to headwater streams isolated above man made or natural barriers. Data from 14 nuclear loci indicate that mean average expected heterozygosity (Columbia = 0.155, Missouri = 0.064), mean proportion of polymorphic loci (0.321, 0.179), and mean average number of alleles per locus (2.040, 1.313) are all significantly smaller within 16 Missouri populations than within 34 upper Columbia River populations. Total heterozygosity among the Missouri populations (0.106) was only about half of that observed among 16 randomly chosen Columbia populations (0.194). The average number of alleles per locus was also lower among the Missouri (2.714) than Columbia (3.643) populations. These latter two observations suggest that the reduced genetic variation in the Missouri populations is partially the result of a significant founder effect when the fish colonized the drainage. The relative amount of genetic divergence among the Missouri populations ( $F_{ST}=39.4\%$ ) was about twice that observed among the Columbia populations (20.5%) suggesting that subsequent to colonization the former have experienced more genetic drift and isolation than the latter. Because of their reduced genetic variation, genetic rescue is more likely to be required in Missouri than Columbia populations. Furthermore, the reduced genetic variation in the Missouri populations may retard their response to other conservation actions.