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ARTICLE

Do Water Level Fluctuations Influence Production of Walleye and Yellow Perch Young-of-the-Year in Large Northern Lakes?

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Abstract

Many ecological processes depend on the regular rise and fall of water levels (WLs), and artificial manipulations to WL regimes can impair important ecosystem services. Previous research has suggested that differences in WL between late summer and early spring may alter the suitability of shoals used by Walleyes Sander vitreus for spawning. Other species, such as the Yellow Perch Perca flavescens, are unlikely to be affected in the same way by WL fluctuations because their spawning requirements are quite different. We used 11–23 years of data from six northern Minnesota lakes to assess the effects of WL fluctuations on the abundances of young-of-the-year (age-0) Walleyes and Yellow Perch. In two lakes (Rainy Lake and Lake Kabetogama), a change in WL management occurred in 2000, after which these lakes saw increased age-0 Walleye abundance, while the other study lakes experienced decreases or no change. Rainy

Lake and Lake Kabetogama also had increases in age-0 Yellow Perch, but another study lake did also. We used partial least-squares regression to assess whether WL metrics were associated with variation in age-0 Walleye and Yellow Perch abundances, but WL metrics were seldom associated with age-0 abundance for either species. Our analysis suggested a potential influence of WL regulation on age-0 Walleye abundance, but we found no evidence that early spring access to spawning shoals was the mechanism by which this occurred.

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