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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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Related Research Data

The effects of water-level manipulation on the benthic invertebrates of a managed reservoir
Source: Freshwater Biology
Preference for Rocky Habitat by Age-0 Yellow Perch and Alewives
Source: Journal of Great Lakes Research
An extension of the floodpulse concept (FPC) for lakes
Source: Hydrobiologia
Spawning Substrate Preferences of Yellow Perch along a Sand–Cobble Shoreline in Southwestern Lake Michigan
Source: North American Journal of Fisheries Management
Partitioning total size selectivity of gill nets for walleye (Stizostedion vitreum) into encounter, contact, and retention components
Source: Canadian Journal of Fisheries and Aquatic Sciences
Quantity, Structure, and Habitat Selection of Natural Spawning Reefs by Walleyes in a North Temperate Lake: A Multiscale Analysis

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