

Assessment of Walleye Spawning Runs in Tributaries to the Upper Great Lakes and Factors Potentially Influencing the Magnitude of Spawning Runs

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Abstract

Walleye (*Sander vitreus*) are a highly-prized and important top predator in the Great Lakes region, including Green Bay, Lake Michigan. Walleye populations in northern Green Bay have been assessed for decades but relatively little information is available to characterize the river-spawning component of the larger Green Bay population. In addition, the ability to rehabilitate and manage Walleye populations in Great Lakes tributaries is hampered by a lack of understanding of relationships between factors thought to influence Walleye reproductive success and the size of spawning stocks. To help address these knowledge gaps, I characterized Walleye spawning runs on eight rivers in the Upper Peninsula by conducting electrofishing surveys using multi-pass mark-recapture open population estimate methods. Over 25,600 Walleyes were handled during population estimate surveys, excluding recaptured fish. Estimates of spawning run size ranged from 56,710 Walleyes in the Whitefish River to 422 fish in the Manistique River. Multiple age classes were represented in each river, indicating natural reproduction during years when stocking did not occur. To identify aspects of habitat potentially associated with Walleye spawning run magnitude I examined correlations between estimates of Walleye spawning run size for eleven Michigan rivers (including the eight surveyed in this project) and 27 GIS-based parameters describing spawning and nursery habitats associated with downstream river reaches. None of the parameters describing river and estuary habitats were significantly correlated with size of Walleye spawning runs, though larger spawning runs appeared to be associated with larger rivers having intermediate channel gradients. This study provided an opportunity to adapt existing field techniques to learn more about Walleye spawning populations in individual rivers and their contribution to the larger population of northern Green Bay. The estimates and analyses here will contribute to future efforts to better understand factors influencing Walleye stocks in Green Bay, the Great Lakes region, and beyond.