Foraging Mechanisms of Walleye

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Introduction

The Walleye *Sander vitreus is* one of the most sought after fish in the Midwest United States and Canada. Walleye is a highly successful species inhabiting a wide range of latitudes and habitat including rivers, lakes, lake-river networks, and reservoirs (Scott and Crossman 1973). Walleye are members of the Percidae family, which includes the darters, and freshwater perches (Sloss 2004). Walleye are piscivorous, or fish-eaters, preying heavily on a variety of small fishes including yellow perch (*Perca flavescens*). Bozek et. al (2011) asserts that in a geographic sense, walleye is the most successful freshwater top predator in North America; its native distribution spans a latitudinal range that exceeds that of other top predators (e.g. lake trout, northern pike, small & largemouth bass).

The walleye's excellent low-light vision and visual sensitivity to light play a large role in its behavior. Numerous diet and observational field studies indicate that walleye are active during low light conditions (Bozek et al. 2011). Walleye remain more active throughout the day if turbidity, wave chop, or clouds reduce brightness. Walleye generally remain in deeper layers of a lake or in heavy cover during bright hours of the day, but migrate shallower waters at night (Scott and Crossman 1973). The sensitivity of walleye to bright light is attributed to a reflective layer in the retina called the tapetum licidum that increases vision at low light intensities (Moore 1944). Walleye activity is also inversely proportional to ambient surface illumination (Ryder 1977) with crepuscular, or nocturnal feeding (Swenson & Smith 1973; Ali et al. 1977). However, research into how certain wavelengths and intensities of light of light effect foraging success is not well documented.

The purpose of this study was to further elucidate the relationship of light intensity at specific wavelengths to the foraging success of walleye. Currently, there is little information available on the reaction distance of walleye to typical fish prey at various light intensities. This information is critical to developing accurate foraging models for walleye that can be used for food web and predator-prey interaction projections for whole lake communities. By understanding the predator-prey interaction under varying light conditions, a more complete model can be created to define the foraging mechanisms of walleye in its natural setting.