

Abstract:

Understanding ecological relationships among fishes and their environments are important for informing management policies. We conducted a statewide assessment of cisco *Coregonus artedii* in inland lakes of Wisconsin to better understand the status of this pelagic, coldwater forage fish. We then used long-term (2005–2014), standardized walleye *Sander vitreus* survey data from the Ceded Territory of Wisconsin (CTWI) to test for the influence of cisco (present, extirpated, or never present) and several abiotic factors on walleye growth trajectories described using sex-specific asymptotic lengths (L_{∞}), Brody growth coefficients (K), and time in years required to attain common length limits used to manage harvest of walleye in the recreational fishery (381 and 457 mm). Despite being top predators in many north-temperate waters, walleye growth is highly variable among lakes, suggesting that forage base and abiotic factors may be important drivers. Growth characteristics of 160 CTWI walleye populations revealed that females reached greatest L_{∞} in lakes with cisco compared to those where cisco were never present or those lakes where cisco have been extirpated; however, differences were not statistically significant. Male walleye L_{∞} did not differ based on cisco presence. Brody growth coefficients (K) for female walleye were positively correlated with growing degree days and Secchi depth; K for males was positively correlated with Secchi depth. Average time to attain 381 and 457 mm were lowest in lakes where cisco have been extirpated. Our results suggest that cooler water temperatures and lower water clarity may be more important drivers of walleye maximum growth potential in northern Wisconsin lakes than the presence of cisco.