

Abstract:

Stock reproductive potential informs population dynamics and response to harvest. Indices of body condition, like relative weight (W_r), may indicate individual energetic state and provide a mechanistic link between spawning stock traits and recruitment. We tested for relationships between W_r of three female size classes (381 – 457, 457 – 559, and >559 mm total length), reproductive traits, and age-0 recruitment using data from 92 walleye (*Sander vitreus*) populations in the Ceded Territory of Wisconsin during 1989 - 2015 and a lake-specific time series from Escanaba Lake, WI, during 1958 - 2014. In Escanaba Lake, W_r was positively related to maturation in small females, and fecundity and gonadosomatic index in intermediate fish. Among and within populations, W_r demonstrated compensatory density dependence and positive relationships with growing degree days. Recruitment was positively related to large female W_r variation across lakes and negatively related to small female W_r variation in Escanaba Lake. Improving the condition of large female walleye may promote recruitment, and W_r may serve as an accessible metric of reproductive potential in walleye stock-recruit analyses.

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