

Abiotic Factors and Species Interactions that Influence Recruitment of Walleyes in Kansas Reservoirs

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ABSTRACT

Walleyes *Stizostedion vitreum* are an important secondary consumer and sport fish throughout the Great Plains; however, little is known about the factors influencing their recruitment in Kansas reservoirs. Therefore, the objective of the first study was to examine factors influencing variability in walleye recruitment over 20 years in seven Kansas reservoirs. Recruitment of walleyes was highly variable within and among reservoirs. A reduction in recruitment through time was not apparent for most reservoirs, but peaks in recruitment were generally highest in the 1980s. Strong walleye year classes were produced during years with warm spring temperatures, low water levels, and high storage ratios. Juvenile white crappie *Pomoxis annularis* abundance was negatively associated with walleye recruitment in all reservoirs. Mesocosm experiments suggested that predation may affect walleye recruitment when white crappie densities are high.

Many of the factors identified as important for walleye recruitment across Kansas reservoirs likely influence the early life history of walleyes. Therefore, the objective of the second study was to investigate the influence of temperature and prey availability on growth and survival of larval walleyes in Glen Elder Reservoir during 1999-2001. Despite similarities in zooplankton abundance among years, recruitment of walleyes in 1999 was the lowest in nearly 20 years, while moderate year classes were produced in 2000 and 2001. During 1999, low spring temperatures resulted in poor growth of walleyes. Larval gizzard shad *Dorosoma cepedianum* were extremely abundant in 1999 and likely competed with larval walleyes for zooplankton resources. In addition, slow growth of walleyes in 1999 probably prevented walleyes from feeding on larval gizzard shad. Walleyes grew faster in 2000 and 2001 and were able to consume larval gizzard shad resulting in moderate recruitment.

Reservoirs are unique habitats for fishes. Not only are abiotic conditions different from natural lakes and rivers, but fish communities are comprised of species with little or no history of co-occurrence. The results of this study suggest that recruitment of walleyes is highly variable within and among reservoirs and further illustrates the importance of interactions between abiotic and biotic conditions.