

**Abstract:**

Changes in environmental conditions are expected to affect stream temperature and ultimately the presence of native Brook Trout *Salvelinus fontinalis* in Wisconsin streams. While change in climate may be an ultimate cause of Brook Trout loss, proximate causes may involve factors other than intolerance to high temperatures. Here I present data to support the hypothesis that species interactions among Brook Trout, naturalized Brown Trout *Salmo trutta*, and ectoparasitic copepods *Salmincola edwardsii* in the context of changing environmental conditions can lead to declines in Brook Trout recruitment and abundance. While *S. edwardsii* are endemic to Wisconsin streams and infect Brook Trout, they do not infect Brown Trout. *Salmincola edwardsii* were first documented in Ash Creek, Wisconsin, in 2010 and became epizootic in 2012. Conditions in 2012 conducive to an epizootic included anomalously warm stream temperatures, relative drought conditions, and an increasing sympatric population of Brown Trout. Infection prevalence increased from 42% in April 2012 to 95% in October. Average intensity of infection in 2012 was 5.5 copepods per age-0 Brook Trout and 16.1 per Brook Trout age 1 and older. Variation in Brook Trout recruitment appeared to be related to stock size and environmental factors, including flood events, Brown Trout abundance, and *S. edwardsii* epizootics. In 2012, flow conditions were conducive to salmonid recruitment, but Brook Trout recruitment fell precipitously relative to that of Brown Trout. Recruitment of age-0 Brook Trout during *S. edwardsii* epizootics in 2012–2014 decreased about 77% and 89% compared with recruitment in 2007–2011 and 2005–2006, respectively. Following three consecutive years of *S. edwardsii* epizootics and poor recruitment, Brook Trout were nearing extirpation from Ash Creek. The data support the hypothesis that species interactions among fish and an ectoparasitic copepod under stressful environmental and ultimately climatic conditions can be a proximate cause of native Brook Trout loss.

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