IOWA DEPARTMENT OF NATURAL RESOURCES

Sport Fish Restoration Research Findings

Recruitment and Angler Exploitation of the Walleye Fishery at Rathbun Lake

Project Duration: 1990-2008
Locations: Rathbun Lake
Study Number: 7007

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Recruitment and Angler Exploitation of the Walleye Fishery at Rathbun Lake

Rathbun Lake supports a popular Walleye fishery and is one of Iowa's main broodstock lakes. The fishery comes from decades of active Walleye management. The reservoir was first stocked in 1970, when the lake was filled. Increases in fry and fingerling stocking in the 1980s and 1990s helped managers achieve increasingly high adult Walleye densities, but maintaining those densities has been challenging due to poor recruitment. This study was started to determine the status of the Walleye population by estimating population dynamics (recruitment, growth, and death); estimate and model population abundance; determine if tributaries can provide better habitat for young fish than the main lake and serve as regular stocking locations; and model the effect of protective length regulations. Marking methods were also investigated to improve future study planning.

Population Dynamics and Abundance

- Age, growth, size structure, and weight-length statistics were collected from adult Walleye during spring broodstock collection. Fish with Visual Implant tags provided individual tracking of growth and survival over time. Survival rates differed for males and females, with females having higher survival and achieving larger sizes. Natural death for Walleye over 18 inches was 29.2% per year.
- Creel surveys showed extreme changes in Walleye harvest (from 900 fish in 1986 and 1995 to over 13,500 in 1972) that showed recruitment booms in the population. Fishing-related death for fish over 18 inches averaged 16% per year.
- Abundance of Walleye over 17 inches was estimated using the ratio of marked and recaptured fish (1984-2000) and a predictive model with sex ratio and spring catch rate (1977-2000). Estimates ranged from 3,565 in 1992 to 6,468 in 1997.

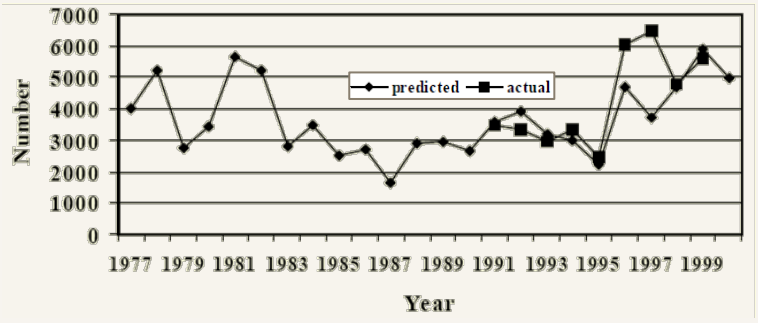

Figure. Estimated Walleye abundance based on hatchery records and mark-recapture modeling.

Tributary Stocking

- Lake-strain Walleye were marked with oxytetracycline (OTC) and stocked into Rathbun Lake's tributaries. Short-term sampling showed poor health shortly after stocking, and tributary-stocked fish did not return to the lake that fall. Reasons may include: 1) they failed to recruit, 2) they were not detected due to limited sampling power, or 3) they stayed in the tributary habitat through their first winter.
- Tributary stocking was ended as a strategy.
- OTC marks were almost always visible on Walleye otoliths (ear bones) but not on dorsal spines. Future studies should rely on otoliths.

Modeling Regulations

- Using the population dynamics from the study (recruitment, growth, and mortality), several protective regulations were modeled.
  - With no restrictions, angler harvest would be about 14,000 fish/year.
  - With a 16-inch minimum length limit, angler harvest would be about 10,600 fish/year with only a small increase in biomass yield.
  - Minimum length regulation on Rathbun Lake would provide little increase in Walleye broodstock abundance or biomass. Risk is minimal as long as fishing death rates stay below 30%. No length regulation is recommended.
- Noncompliance, such as illegally harvesting under-sized fish, negatively affected the length limit's ability to improve the fishery.