IOWA DEPARTMENT OF NATURAL RESOURCES

Sport Fish Restoration Research Findings

Development of an Optimal Stocking Strategy for Walleye in Spirit, East Okoboji, and West Okoboji lakes

Project Duration: 1995-2006
Locations: Spirit, East Okoboji, and West Okoboji lakes (Dickinson County)
Study Number: 7012

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Walleye broodstock populations in Spirit Lake, East Okoboji Lake, and West Okoboji Lake are used to meet fry and fingerling walleye stocking quotas in Iowa. Broodstock walleye densities in these lakes were not consistent enough to meet these demands via traditional stocking strategies. This study evaluated survival of stocked walleye fry and various sized fingerlings in each lake and determined stocking strategies that would improve yearling densities.

Goals

- Determine and compare contribution, densities, and stocking survival of sac-fry, small, and large (intensive and extensive reared) fingerling Walleye in Spirit, East Okoboji, and West Okoboji lakes.
- Develop an efficient walleye stocking strategy for each lake that will meet yearling Walleye density management objectives.

Results

- Sufficient numbers of Walleye were not caught in West Okoboji Lake to yield valid population estimates; no fingerling or yearling survival estimates could be calculated.
- Fall Walleye fingerling population densities in Spirit Lake ranged from 0.7 to 84.5 and averaged 24.3 fish/acre. Yearling Walleye population densities ranged from 0.4 to 6.0 and averaged 2.6 fish/acre.
- Fall fingerling population densities in East Okoboji Lake ranged from 1.2 to 13.7 and averaged 7.5 fish/acre. Yearling Walleye population densities ranged from 0.5 to 2.9 and averaged 1.8 fish/acre.
- Most large (5-6 inch) fingerling Walleye perished within 2-5 weeks post-stocking and death was related to size at stocking.
- In East Okoboji Lake, survival from fall fingerling to fall yearling was greater for resident fall fingerlings (sac-fry and small fingerling) than fall stocked large fingerlings
- Cost-benefit analysis found that the most effective stocking option for these lakes is a moderate-weak annual year class.

Table 1. Survival of stocked Walleye.

Lake	Sac-fry	Small	Large Intensive	Large Extensive
	Post-Stocking Survival (%) to Fall			
Spirit	0.6	NS	25.6	NS
East Okoboji	0.1	5.0	22.9	0.3
West Okoboji	NS	NA	NA	NA
	One Year Survival (%)			
Spirit	0.07	NS	NA	NS
East Okoboji	0.03	1.2	2.3	4.2
West Okoboji	NS	NA	NA	NA
	Fall Fingerling to Fall Yearling Survival (%)			
Spirit	NA	NS	NA	NS
East Okoboji	28.0	23.2	2.7	4.6
West Okoboji	NS	NA	NA	NA

NA = sufficient sample size not availabe to conduct analysis
NS = None Stocked

Conclusions

Sac-fry were the most cost effective stocking option, but due to the inconsistency of stocked fry survival, fingerling Walleye stocking is needed to produce consistent Walleye year classes. However, survival of fingerling Walleye in this study was poor and related to size at stocking, with larger fingerling surviving better. This study provided cost-benefit stocking strategies and found that a moderate-weak annual year class option was the most feasible and cost effective. This type of recruitment pattern would produce the same number of walleyes as the current 3-year cycle, but these fish would be spread out over multiple year-classes, thus reducing intra-specific competition. Stocking fingerling Walleye that have similar first year survival rates as resident fish are a necessary component of this stocking strategy; more research is needed to determine if stocking larger fingerling walleye will result in these improvements in first year survival.