Contributions of stocked and wild walleyes to Little Bay de Noc and Big Bay de Noc, Lake Michigan

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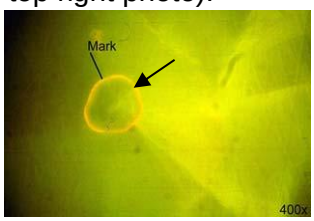
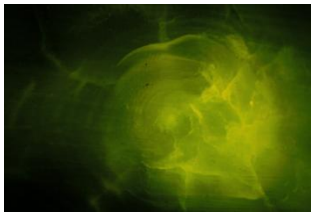
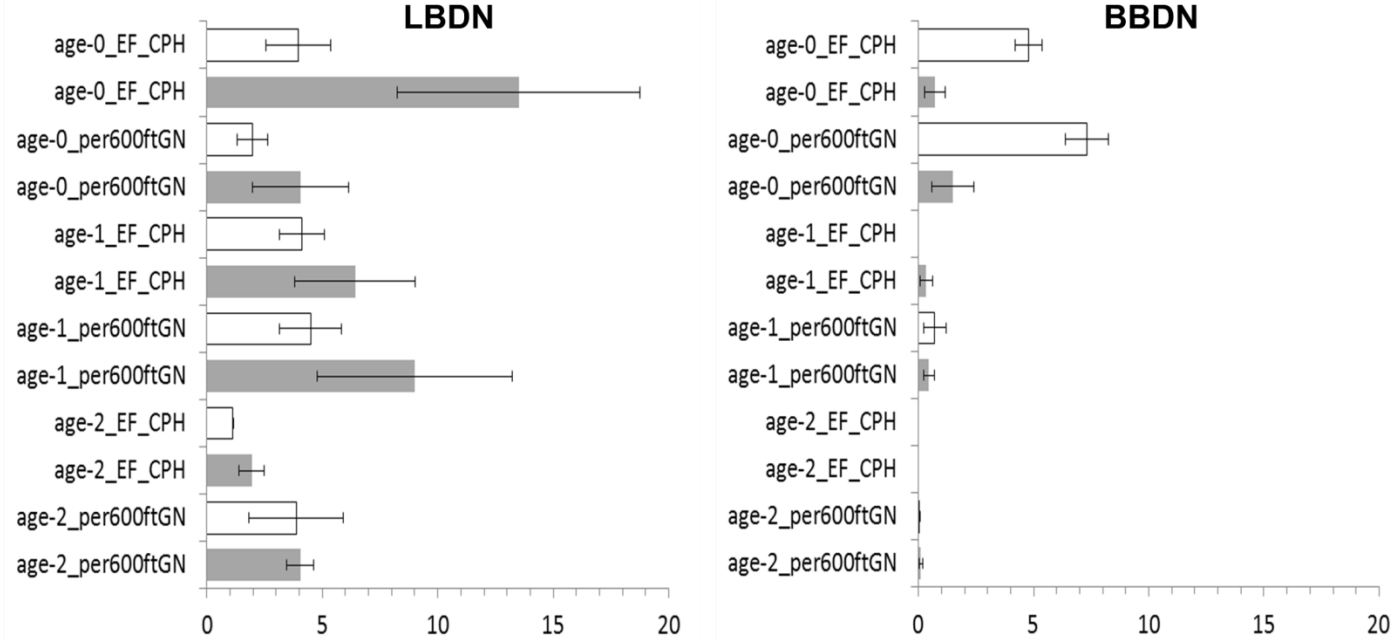
Background: Since walleye populations collapsed in Little Bay de Noc (LBDN) and Big Bay de Noc (BBDN) in the late-1960's and early-1970's, MDNR Fisheries Division and partners have stocked over 11 million fingerling walleyes into these waters to help restore populations. This resulted in a resurgence in their walleye fisheries, and indications of some natural reproduction in LBDN. Data were needed to determine the contribution of stocked walleyes to existing populations and to support future decisions on the use of stocked fish in these waters. Our study objective was to determine extent of natural reproduction and contribution of hatchery-reared fish to the walleye populations of LBDN and BBDN. We accomplished this by marking hatchery walleyes with oxytetracycline (OTC) and stocking them into the bays during 2004-2009. We then captured juvenile walleyes using electrofishing boats and gill nets, and examined each walleye's otoliths (earbones) using fluorescence microscopy to determine if they had an OTC mark indicating hatchery origin (OTC mark is shown in top right photo).





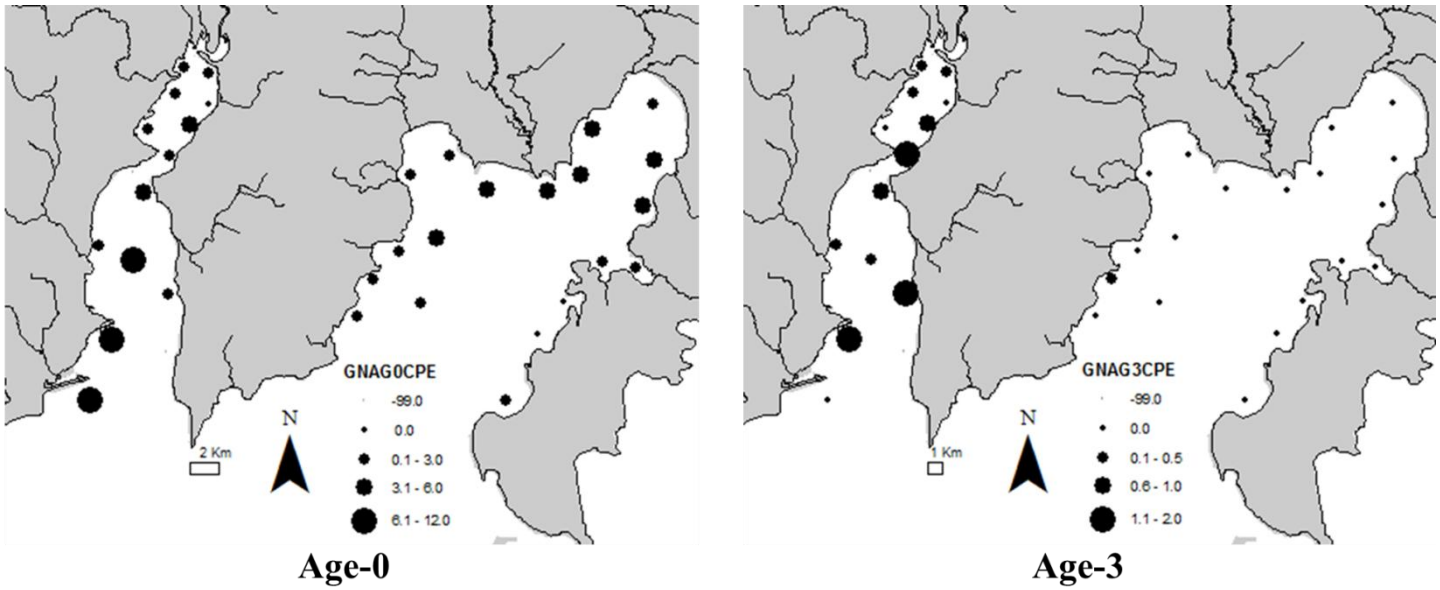
Results: During 2004-9, approximately 823,000 walleye fingerlings were stocked into LBDN and 1,017,000 fingerlings were stocked into BBDN. We captured and examined walleye that were produced during these years and found that 76% of 2,194 walleye examined from LBDN were naturally reproduced and 62% of 763 walleyes from BBDN were naturally reproduced.

Catch rates of stocked vs. unstocked year classes of walleyes from electrofishing (EF) gear or gill nets (GN)

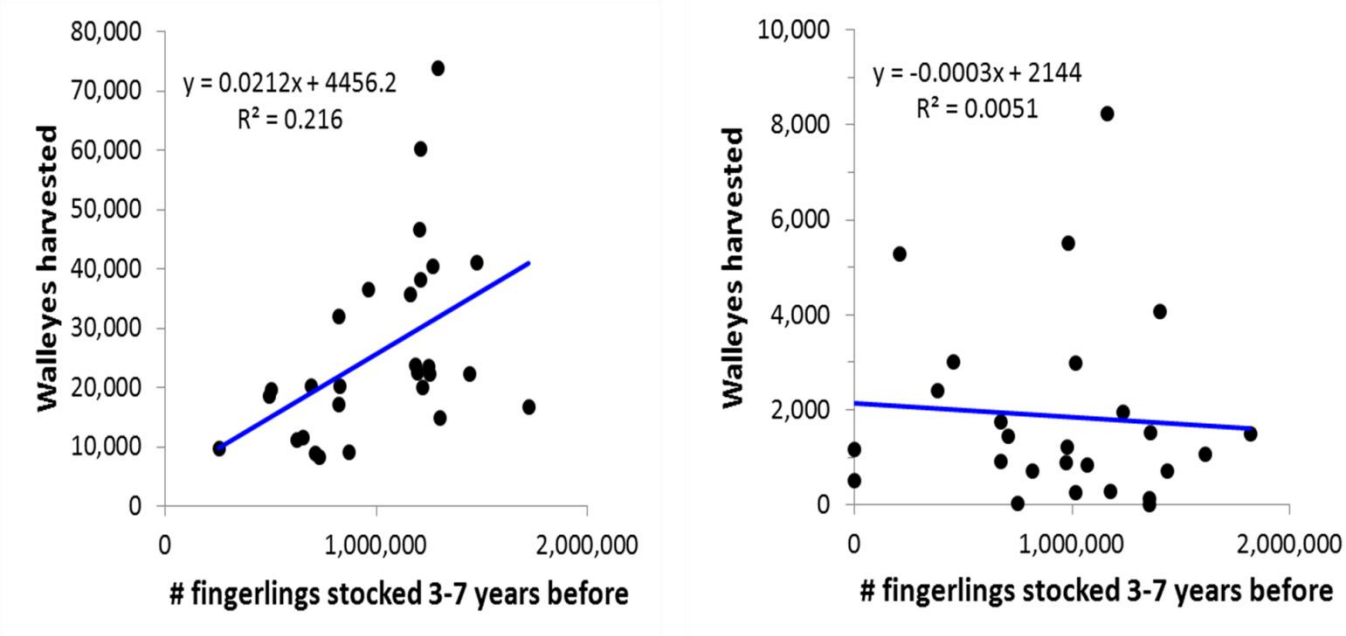


Above: Except for age-0 walleyes in BBDN, we saw no significant difference in abundance of walleyes from **stocked (white bars)** and **unstocked (gray bars)** year classes at age-0, age-1, or age-2, based on electrofishing catch rates (fish caught per hour or CPH in figure) or gill net catch rates (fish caught per 600 feet of net) of walleyes. We saw significantly higher catch rates of age-1 and age-2 walleyes in LBDN compared to BBDN using either type of sampling gear. We found no difference in growth between wild and hatchery walleyes, but walleyes in BBDN grew faster than those in LBDN.

Differences between LBDN and BBDN



Above: The maps show average gill net catch of age-0 and age-3 walleyes for each sampling location in LBDN and BBDN; larger dots indicate higher catch rates. The patterns indicate that age-0 walleyes were broadly distributed in each bay. In LBDN they persisted to age-3, but in BBDN they declined after age-0 and were not caught at age-3. Lack of persistence at sample sites in BBDN may be due to poor survival, offshore migration, or both.



Above: To get another assessment of the degree to which stocked walleyes may be contributing to the fishery in each bay, we looked at relationships between angler harvest and the numbers of walleyes stocked 3-7 years earlier (it takes a few years for walleyes to reach the minimum size limit for harvest). We found a positive relationship in LBDN, which suggests stocking contributes to walleye harvests, *but this relationship was not significant when angler effort was included in the model*. We found no relationship between harvests and prior stocking in BBDN, which suggests little if any effect of stocking on walleye harvests.

Conclusions: Our findings demonstrated that stocked walleyes were detectable in both bays at age-0, and in LBDN, they likely persisted to contribute to the sport fishery. The fate of walleyes stocked into BBDN was less clear, and their contribution to the BBDN walleye fishery was uncertain. The management potential of BBDN for walleyes differs from that of LBDN. Since BBDN lacks high-quality spawning rivers, future efforts to rehabilitate walleyes in BBDN should consider the use of reef-spawning strains rather than current (likely river-spawning) strain.