
Effect of Chain Pickerel on Lake Fish Communities – A Cautionary Tale for the St. Mary's by Sean Mitchell, PhD

The chain pickerel (*Esox niger*), an introduced fish species to Nova Scotia, was initially planted in three lakes in 1945 as an alternative recreational fishery. Since the early 1800s people have been moving pike and pickerel throughout watersheds in the US and other parts of Canada to provide local commercial resources, control populations of non-sport fish, and enhance recreational fisheries. Since 1945, however, the distribution of the pickerel in Nova Scotia has spread to 95 known locations in the province. Most of these introductions into new lakes are likely through illegal movement of live fish by humans among watersheds. The problem with introducing the pickerel is that it is a significant predator – indeed, it is the classic “ambush predator”, lying patiently in wait until a food item passes close by then seizing it in an explosive and lightning fast action. There is evidence from other areas that introduction of shallow water predators, such as chain pickerel, can change the fish assemblage structure of lakes and displace native brook trout populations. The majority of the known pickerel lakes are in the southern extent of the province, with few known locations in the northern half of Nova Scotia (i.e., 4 in Pictou County, 1 in Cape Breton). The East River, Pictou system, in Pictou County is the northern-most extent of pickerel distribution on the mainland, and closest to St. Mary's River, with the introductions there being recent (i.e., since 1998). Some of the lakes in this system containing pickerel (West Branch, Long, Speicht's lakes) are within 10 km of headwater lakes of the St. Mary's (e.g., Moose and Perch Lakes).

In 2010 I conducted a study looking at the effect of chain pickerel on fish communities in the East River Pictou, and these results are relevant to the St. Mary's due to the proximity of the pickerel lakes in that system to the headwater lakes of the St. Mary's. Lessons learned from the East River Pictou show the consequences of introduction of pickerel to St. Mary's River lakes.

Once introduced to a lake, the pickerel consume all other fish in the waterbody. Fish communities were reduced from multiple species and large abundance (typically 5-7 species and more than 100 minnows and perch caught in a single gill net set not unusual) to two species – the pickerel and those white sucker which were too large to be consumed. All small fish were gone – the perch, minnows, trout, small suckers. The pickerel remaining once this food source is exhausted are feeding on aquatic insects and most likely cannibalistic on smaller pickerel. Not only is the fish community greatly simplified, but the abundance of fish in the lake is greatly decreased. This is due not only to loss of prey species but the little food does not support a large number of pickerel. And so, the lake has been effectively changed from a diverse ecosystem with a large variety of species, including abundant species such as yellow perch and brook trout for the recreational fishery, to one of low abundance pickerel and sucker. This has clear ramifications for recreational fisheries as the value and return of the lake fishery has been greatly diminished.

From an ecological point of view, the change wrought by the pickerel is profound and likely far-reaching. Such a fundamental change in the fish community likely has significant effects on in-lake ecosystem functioning such as nutrient cycling, phytoplankton/zooplankton production, etc. as well as significant ramifications on avian and mammalian fish predators such as mergansers, cormorants, kingfishers, eagles, mink and otter who have lost their prey base. These changes are likely to be permanent as long as the pickerel are present. Effectively, the pickerel have changed the ecological “state” of the lake from one with a complex food web to a very simplistic one.

A practical question then becomes, “what can be done if pickerel are found in a lake”. Unfortunately, control measures for introduced fish species are difficult, being either financially

expensive, socially not supported (e.g., piscicides), requiring extensive maintenance (e.g., barriers), or ineffective. The only true solution is to prevent the introduction in the first place. On the positive side of the equation, based on the East River study, the pickerel do not appear to be particularly prone to moving from one lake to another after introduction but rather largely remain within the lake of introduction.

The only way in which chain pickerel could find their way into the St. Mary's is by some misguided person intentionally introducing them. There have been several past and ongoing education programs by Federal and Provincial governments as well as Non-Government organizations regarding effects of introduced species. As well, angling organizations are well aware of the issue and are actively working with anglers to prevent this. This approach of education and changing behaviour of those few individuals who introduce species is likely to be much more successful than expensive and largely ineffective removal programs.

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