

**Biologist Report: Walleye Management in Vermont's Inland Lakes  
June 2, 2009**

**Summary of Inland Waters Walleye Management Activities**

Walleye management efforts for inland waters (waters other than Lake Champlain) are focused on efforts to establish a walleye population in Chittenden Reservoir, restore the walleye population in Island Pond, and monitor the walleye population in Lake Carmi.

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*These projects were made possible by fishing license sales and matching Dingell-Johnson/Wallop-Breaux funds, available through the Federal Aid in Sport Fish Restoration Act.*

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**Chittenden Reservoir Walleye Introduction**

Chittenden Reservoir is a 700-acre impoundment located in the town of Chittenden, Rutland County, VT. Fisheries management efforts on the reservoir focused on trout until the early 1990's when surveys indicated that water temperatures frequently exceeded those preferred by trout and that dissolved oxygen levels in the deepest, coldest parts of the lake were often less than those required for trout survival. Competition from the very abundant, slow growing, yellow perch population found in the reservoir may have also limited trout survival and growth.

Walleye were introduced into Chittenden Reservoir in 1993 because habitat conditions were more suited for walleye than trout, and the abundant, stunted, yellow perch population would serve as a forage base for walleye. It was also hoped that the newly established walleye population would eat enough perch to reduce the competition for food among the perch population, thereby allowing the perch to grow faster and larger. Walleye were stocked each year from 1993 to 1998 and have been stocked in alternate years beginning in 2001 (Table 1).



**Table 1. Numbers of walleye stocked into Chittenden Reservoir, 1993 to 2008. Fry are 3-4 days old, advanced fry are 10 days old, and fingerlings are 39-45 days old when stocked.**

<b><u>Year</u></b>	<b><u>Fry</u></b>	<b><u>Advanced Fry</u></b>	<b><u>Fingerlings</u></b>
2008	0	25,000	0
2007	0	50,000	15,000
2005	0	0	15,000
2003	1,071,400	0	15,000
2001	0	0	5,000
1998	0	0	5,260
1997	0	0	5,000
1996	0	0	15,000
1995	0	0	16,000
1994	0	0	17,095
1993	0	0	15,000



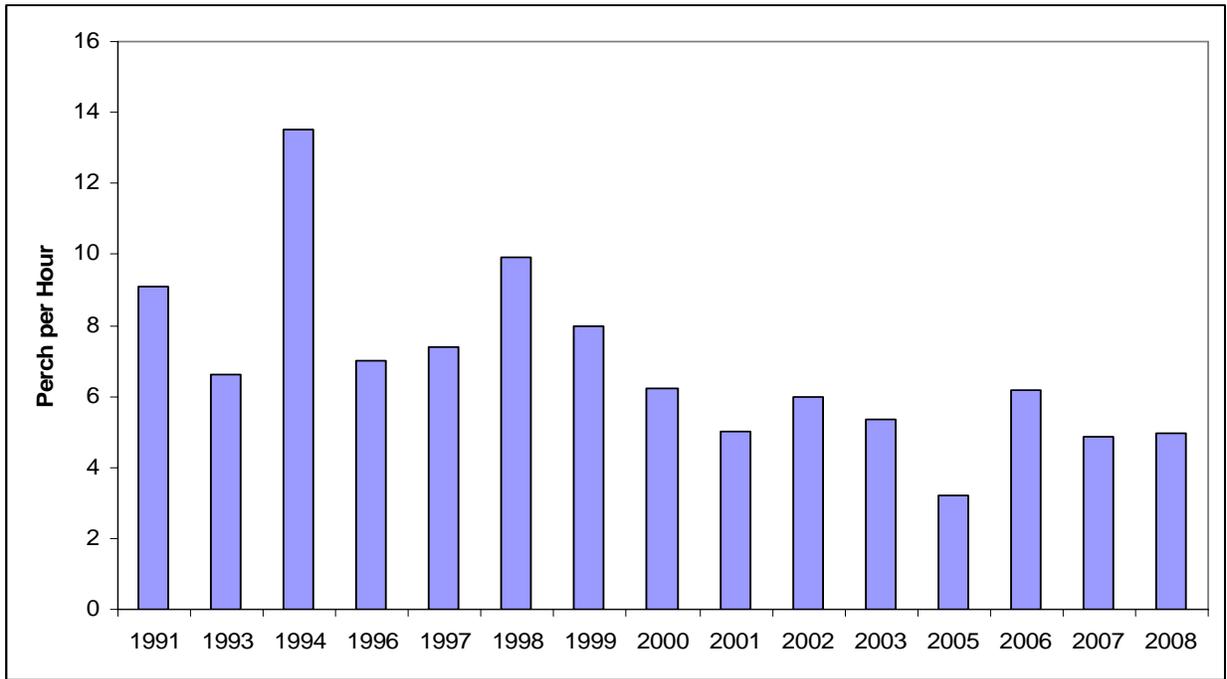
Fry are easiest to raise but tend to have poorer survival when stocked. Fingerlings are much harder to raise, but have the best survival. Advanced fry may provide a good compromise, but their survival has not been evaluated.

A popular walleye fishery has developed with increasing angler use in both the ice and open-water seasons. Walleye weighing over 10 pounds have been harvested by anglers. The large size of the walleyes is in part due to the special regulations, namely a 2-fish daily creel limit and a 22-inch minimum size limit.

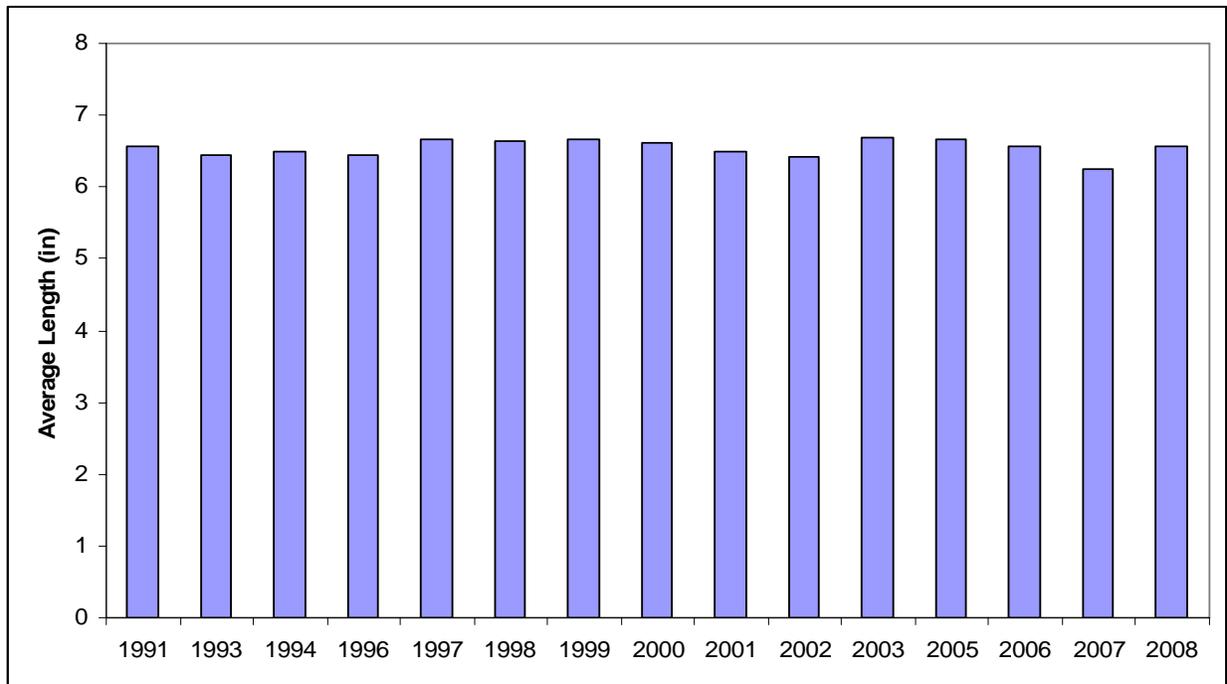
Department biologists use gill nets to monitor the yellow perch population to see if predation by walleyes will change the abundance or average size of the yellow perch population. The catch rate of yellow perch in the gillnets has gone down over the years indicating numbers of yellow perch in the reservoir may be declining (Figure 1), but the average size of perch has not changed significantly (Figure 2). At this point, it seems that the walleye population has not been able to exert enough predation to affect the average size of yellow perch.



The Vermont Fish and Wildlife Department intends to continue stocking walleyes in Chittenden Reservoir and monitor the results to maintain this popular fishery.



**Figure 1. Catch rate of yellow perch in gill nets set in Chittenden Reservoir.**



**Figure 2. Average length of yellow perch collected in gill nets set in Chittenden Reservoir.**

## Island Pond Walleye Population Restoration



Island Pond is a 608-acre lake in the town of Brighton, Essex County, VT. A walleye population was established in Island Pond by introductory stocking over a century ago. A viable fishery developed and persisted into the 1970s, after which it virtually disappeared for reasons that are a matter of speculation. Population restoration was considered in the late 1990s as a result of local popular interest. The goal of the Island Pond walleye restoration effort is to create a self-sustaining population of walleyes that provides a sport fishery.

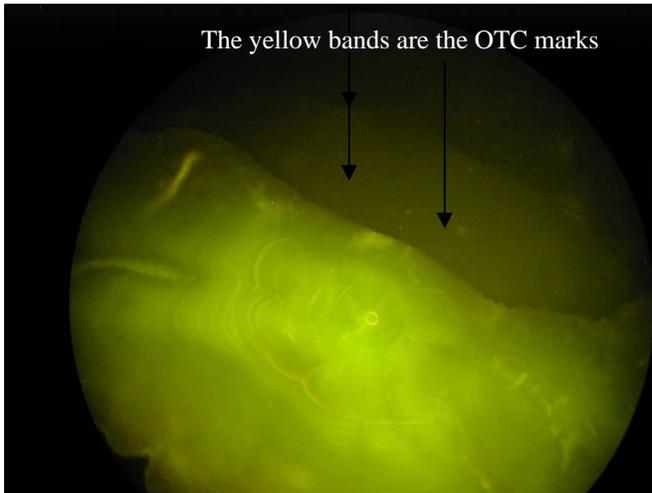
Walleyes have been stocked into Island Pond every other year since 2000 (Table 2). During the first four years of stocking, the eggs and sperm were collected from adult walleyes captured by electrofishing in the Clyde River upstream of the Salem Lakes, while in 2008, the eggs and sperm were taken from adult walleyes in Island Pond. The offspring are raised to the fry (3-4 days old), advanced fry (# days old) or fingerling (39-45 days old) stage before being stocked into Island Pond. It is much more difficult to catch large numbers or large, female walleyes in Island Pond than it is in the Clyde River above Salem Lake. Thus, only 150 fingerlings were stocked into Island Pond in 2008.

<u>Year</u>	<u>Fry</u>	<u>Advanced Fry</u>	<u>Fingerlings</u>
2008	0	0	150
2006	0	0	38,400
2004	0	24,000	45,100
2002	163,997	0	28,600
2000	0	10,900	32,100

**Table 2. Numbers of walleye stocked into Island Pond, 2000 to 2008. Fry are 3-4 days old, advanced fry are 10 days old, and fingerlings are 39-45 days old when stocked.**

Department fisheries biologists evaluate the re-establishment of walleyes in Island Pond. Before the walleyes are stocked, they are held in a bath that contains a solution of oxytetracycline (OTC), which is taken up by the fish and stored in its bones. The OTC acts as a dye, and when specific walleye bones are viewed under ultraviolet light, the dye glows, giving biologists a way to determine whether a fish came from natural reproduction or the hatchery. The best bones to use are called otoliths, or ear stones, and are located in the head of the fish. Department biologists examine otoliths from Island Pond walleyes killed by anglers and from walleyes used to produce eggs and sperm in 2008.





Some evidence suggests that there was a remnant walleye population before restoration efforts began in 2000 and that very limited natural reproduction is occurring. One walleye collected in the spring of 2005 was determined to be eight years old, placing its year of birth before the first year of stocking in 2000. One walleye collected in 2006 and six collected in 2007 were determined to have been born in 2001, which was a non-stocking year. Finally, three walleyes have been collected that did not have any OTC marks in their otoliths. While there is evidence of limited

natural reproduction, stocking efforts have clearly been effective at increasing the size of the walleye population, as over 90% of walleyes examined for OTC were marked.

The spring of 2008 was scheduled to be the last year for walleye stocking in Island Pond under the current restoration plan. Evaluation of the restoration effort will be continued for several years following the final year's stocking, during which time a long-term plan for walleye management at Island Pond may be developed. This plan may or may not include the continuation of walleye stocking at Island Pond.

### **Lake Carmi Walleye Management**

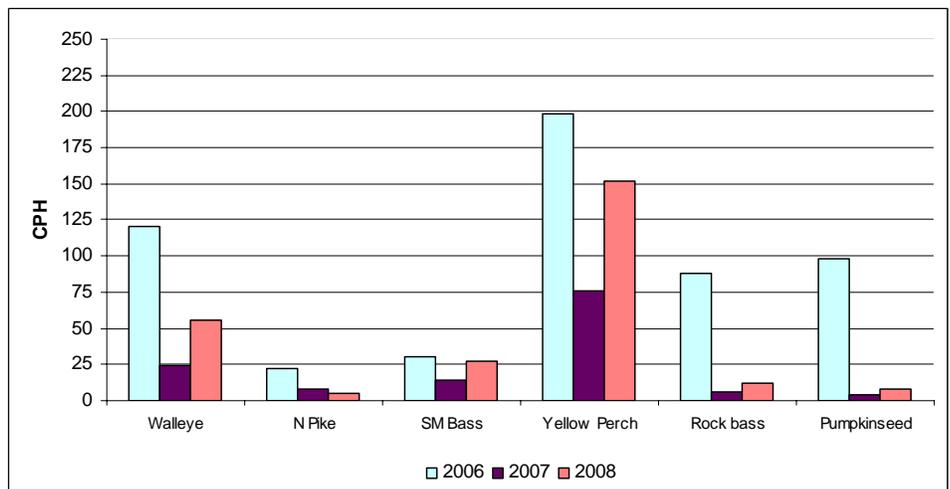
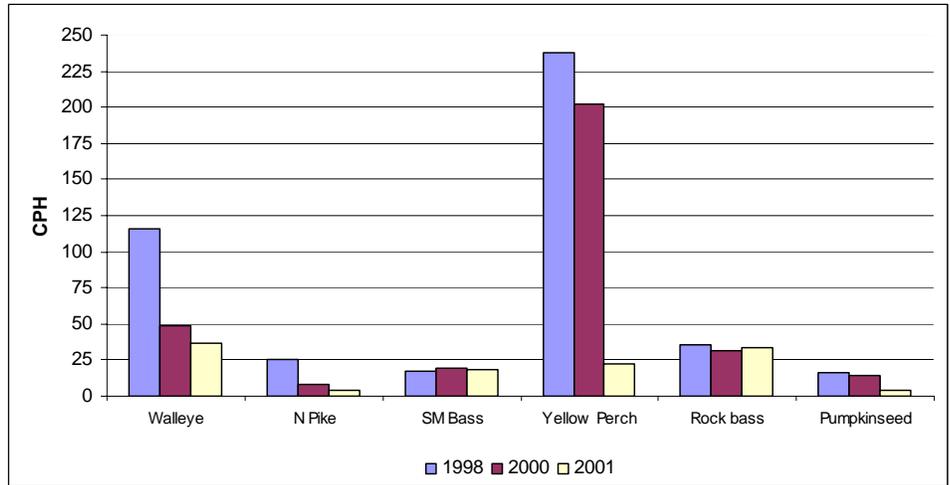
Lake Carmi, the 1,375-acre lake in the town and county of Franklin, is unique among Vermont's lakes. It's relatively shallow and productive waters and suitable spawning habitat creates conditions that are especially suited to a naturally reproducing walleye population. In addition to the unique physical and chemical characteristics of the lake, Carmi also has a unique fishing regulation, the "slot limit". Only walleyes between 15" and 17" or longer than 19" can be kept, and an angler can only keep one walleye over 19" per day. Slot limits are only appropriate for fish populations that are so productive that some of the smaller fish must be harvested in order to decrease competition and allow for growth of larger fish. For this reason, Department biologists have not recommended that the slot limit be applied to other walleye fisheries in the state.

Department biologists monitor this important fishery with nighttime electrofishing. Fish are temporarily stunned with an electric current so that they can be identified, counted, and measured. It is impossible to capture all the fish in the lake or to even catch a large proportion of them to determine how many are actually there. However, biologists use the number of fish caught per unit of time as a measure of relative abundance. The assumption is that a greater number of fish should result



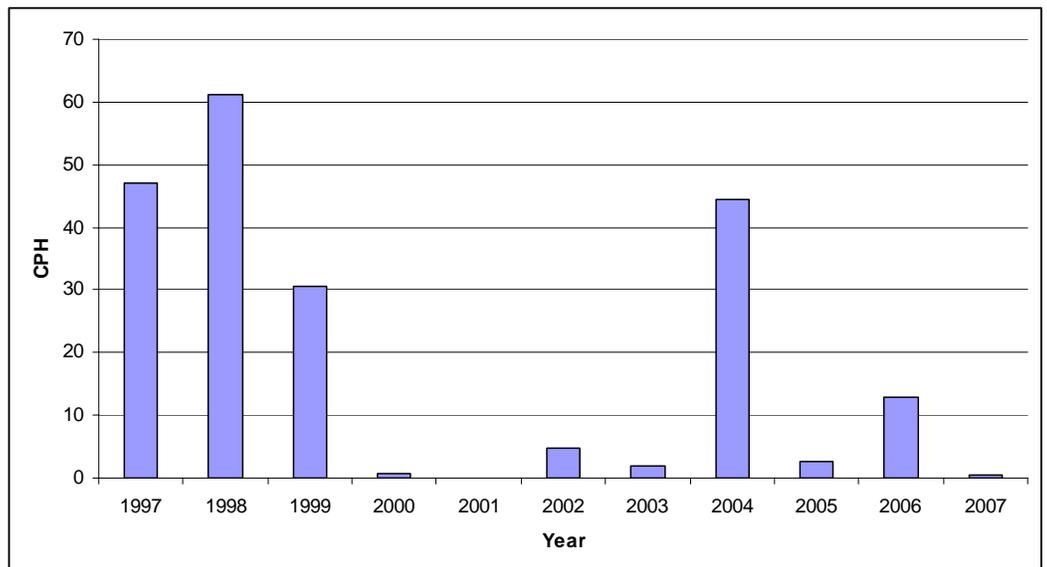
in a higher catch rate of fish. It appears that relative abundance of walleye and populations of other species in Lake Carmi can be quite variable from year to year (Figure 3). This is a common pattern among naturally reproducing fish populations. This pattern is largely driven by

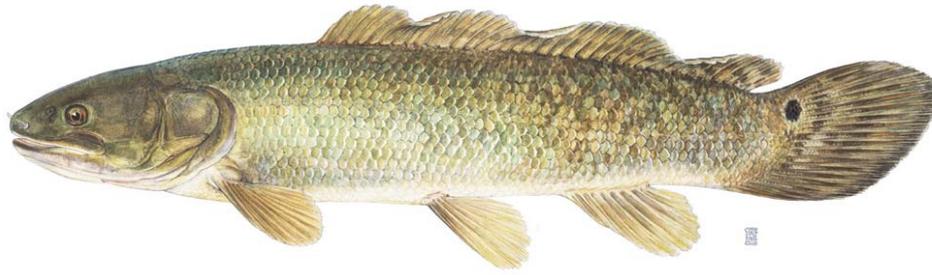
annual variations in spawning success. Walleye in particular are known to have highly variable spawning success, and Lake Carmi walleyes are no exception (Figure 4). The Vermont Fish and Wildlife Department will continue periodic electrofishing surveys to track trends in relative abundance and age structure of these species.



**Figure 3. Comparison of catch per hour (CPH) of selected species collected in fall electrofishing surveys at standardized transects in Lake Carmi.**

**Figure 4. Comparison of catch per hour (CPH) of age 1 walleyes collected in summer electrofishing surveys at standardized transects in Lake Carmi.**





Bowfin (*Amia culva*)

An important discovery in 2007 was the capture of two largemouth bass. Then in 2008, an angler caught a bowfin. These are the first official records of their presence in Lake Carmi. They were apparently introduced by anglers. Transport of live fish from one water body to another is illegal because it risks the introduction of disease, it often results in the introduction of unwanted species, and can negatively affect indigenous species. In this case, these new introduced fish species will eat juvenile walleyes and will compete with walleye for food.