

## **WEIR EFFECTS ON FISH SPAWNING IN LAKE TECUMSEH**

Residents have expressed concern over the effect the weirs would have on fish spawning in Lake Tecumseh. To answer this question we asked Chad Boyce, fish biologist with the Virginia Department of Game and Inland Fisheries. Chad confirmed that several species of fish are likely to successfully spawn in Lake Tecumseh (Lake). These include Asiatic Carp, Gizzard Shad, and possibly white and yellow Perch. Chad said it was possible, but highly unlikely due to low numbers, that Blueback Herring and Alewife spawn there too. Lake Tecumseh has unsuitable spawning grounds for others such as Striped Bass and Croaker even though they occur in the Lake and may attempt to spawn there. However, Stripers need fresh flowing highly oxygenated water like those found in rivers to carry or move their eggs for a period of several days for the eggs to successfully hatch. So despite the presence of adults and juveniles, present conditions in the Lake make it very unlikely they successfully spawn there.

The weirs are expected to make Lake Tecumseh less saline than those of Back Bay estuary which currently ranges from 0-2 parts per thousand (ppt). For reference, ocean water is 35 ppt. This will not harm fish using the Lake because they all belong to a group that tolerates brackish water or water that ranges from fresh to slightly saline. Migrating fish are motivated by flowing water. If the weirs are submerged during spring runs fish will swim over the weirs into the Lake and spawn. Otherwise they will spawn in Asheville Bridge Canal or Back Bay estuary. Fish entering the Lake might be trapped inside and unable to return to the canal after spawning if water levels recede and remain to low for them to cross over the weirs into the canal. However, adults and their young will have the ability to leave the Lake during subsequent weir inundations. Water level monitoring indicated this occurred approximately 38% of the time in 2004 and 13% in 2008. Thus, the weirs will not prevent fish from moving in and out of the lake but will limit their migration between the Lake and Asheville Bridge Canal to periods when the weirs are under water.

The weirs will benefit fish inside the Lake by stabilizing water levels, improving water quality, and providing better foraging habitat. Fish need water. In 2008, the lake was almost completely drained 21% of the year and mostly drained 47% of the year. During these episodic drainage events fish are concentrated into a restricted space of very turbid water creating stressful conditions including increased temperatures and low dissolved oxygen. Suspended particles in the water column can clog gillrakers and gill filaments, reducing the ability to absorb oxygen, and suffocating the fish (Bruton 1985, Tomasson 1983). We believe this is what led to the death of over 150 fish in the lake during a high wind and drainage event in September 2008.

We believe the positive effects of the weirs on fish and wildlife outweigh any negative effects that may occur. Negative effects include adult fish becoming trapped in the Lake after spawning and the potential for fish kills under extreme drought conditions when no rain and calm winds prevail. In addition, crabs and clams using the Lake may decrease if the lake becomes less saline. However, with water levels stabilized inside the lake, fish populations are expected to increase because of improved habitat that will support adults,

as well as juveniles, over the entire year. Spring spawning runs will continue to access to the Lake when the weirs are submerged and juveniles cresting the weir will use the lake as rearing habitat. The expected increase in emergent vegetation and phytoplankton will provide greater food and habitat support for juvenile fish in the Lake. Overall, the weirs are expected to result in a healthy freshwater fishery in Lake Tecumseh like those found in similar lakes and ponds of Virginia.

#### References

Bruton, M.D. 1985. The Effects of Suspendoids on Fish. *Hydrobiologia* 125:221-241.

Tomasson, T., & Allanson, B.R. 1983. Effects of hydraulic manipulations on fish stocks. pp. 122–131, in: Allanson, B.R., & Jackson, P.B.N. (eds) *Limnology and Fisheries Potential of Lake le Roux. South African National Scientific Programmes Report, N° 77.*