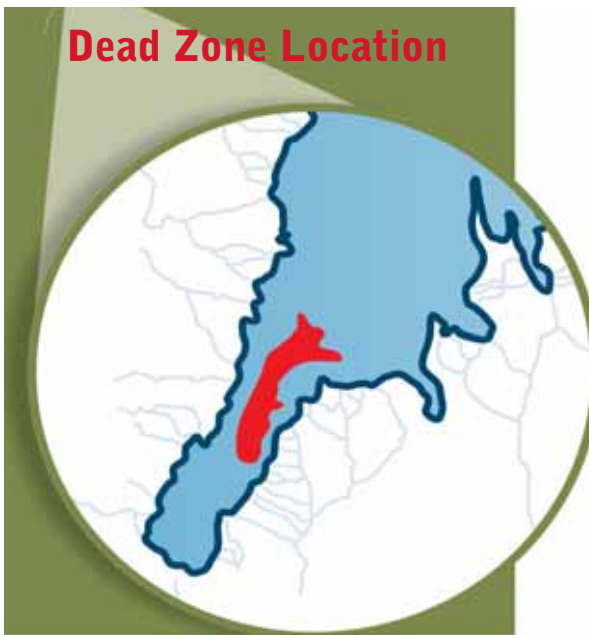


A DEAD ZONE FORMS IN THE SOUTH BASIN OF LAKE GEORGE EACH SUMMER

# DEAD ZONE

A dead zone forms by late July each year in the deep water area below Tea Island at the south end of Lake George. A dead zone occurs in a lake when oxygen levels get so low that fish cannot survive there. A dead zone is a common occurrence in severely stressed lakes and ponds and is generally associated with lakes with poor water quality. It is not an event or characteristic that is desirable for most lakes. The annual formation of a dead zone in Lake George is a warning – a canary in the coal mine – of future water quality trends. The dead zone was first found in Lake George in the mid-1980s.

The scientific term for a dead zone is "hypolimnetic oxygen depletion area." A dead zone forms in the "hypolimnion" waters, which are the deep waters of the lake. The top waters, which are warmer, are the "epilimnion" waters. Each summer the waters of Lake George, like other lakes, thermally stratify and separate



A dead zone forms in the south basin of Lake George each summer. This is an ominous trend for the lake's water quality.

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# Dead Zone

## LAKE GEORGE FACT SHEET

into a top layer of warmer waters and a deep layer of colder waters. The dividing line is referred to as the "thermocline." (Lake George stratifies similarly during the winter months as well.) The lake "turns over" and waters mix as deep and surface waters reach a similar temperature in the spring and fall. Fish generally restrict movement to one zone or the other, with bass, pickerel and perch, among others, seeking habitat in shallower or surface warmer waters, and lake trout, salmon, and smelt, among others, seeking habitat in the deeper, colder waters. As the temperature differential becomes greater between the warm and cool waters, oxygen ceases to pass between these two zones as the thermocline forms a barrier.

Oxygen in the water is referred to as "dissolved oxygen" and amounts can be measured scientifically. Once the lake is stratified, new supplies of oxygen cannot reach the lower depths. Oxygen depletion at these lower depths is accelerated by decomposition of a range of organic materials, which occurs in the sediments on the lake bottom. Oxygen is required to support fish life as well as the microbial activity that drives decomposition. As more organic matter drops to the lake bottom, in the form of

decomposing phytoplankton (microscopic plants), decomposition activity increases as does the consumption of oxygen. Areas that experience a substantial decline in dissolved oxygen rates generally see a corresponding rise in algal growth (phytoplankton). This is the case in the south basin of Lake George.

Algal growth is stimulated by nutrient loading to Lake George. Nutrients are naturally loaded to Lake George from the surrounding watershed, but loading is significantly increased by nutrients in lawn fertilizers, pesticides and herbicides, from poorly managed septic systems, by stormwater runoff from roads, parking lots, lawns and buildings, among many other sources. The massive array of nutrients loaded into the south basin of Lake George, which is a steep, heavily developed terrain that wraps the lake like a horseshoe, contributes to a chain of events resulting in the annual creation of a dead zone each summer.

The decrease in dissolved oxygen in the deeper waters can limit the viable habitat for the cold water fishery where the dead zone sees a reduction of fish due to oxygen deficiencies. These fish, such as lake trout and salmon, require high levels of dissolved oxygen to maintain their metabolic processes. If the dead zone - area of hypolimnetic oxygen depletion - continues to grow and rise in the water column in the lake, the overall fishery will be significantly diminished.

Research has recorded rates of dissolved oxygen of around 35-40% in the south basin of Lake George compared with rates of 65% - 80% in other basins of Lake George at mid-lake and in the lake's northern portions. A dead zone generally forms in a lake when dissolved oxygen rates drop to 40 - 45%.

A dead zone could be controlled and even eliminated through improved property management by landowners around the south basin that reduces green lawns, prohibits use of fertilizers, improves maintenance of septic systems, and utilizes robust shoreline and stream buffers by landowners. Stricter and better enforced stormwater and septic system regulations by local municipalities are also vitally important.

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