



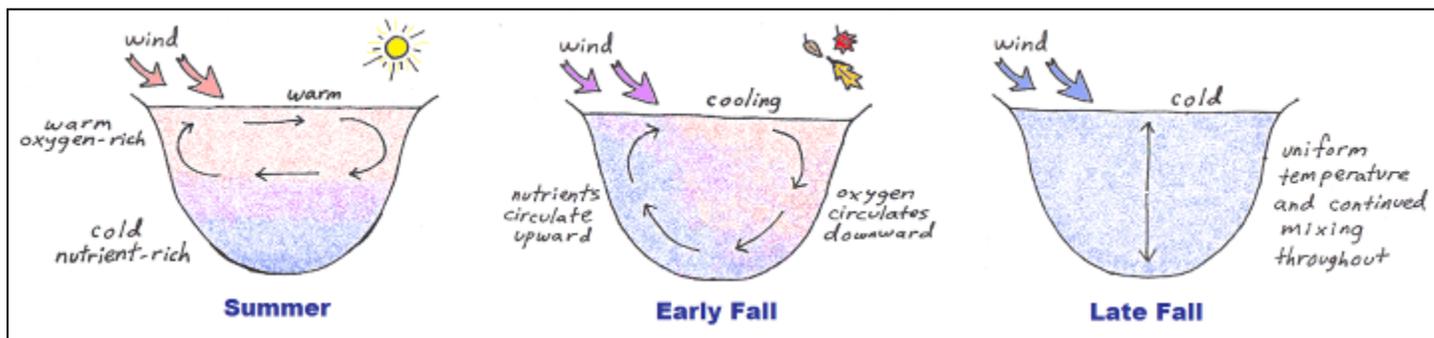
## Lakes in Autumn

We can feel the seasons change as a nip in the air at night, and we can easily see it, too, in the seasonal tapestry change in trees. Autumn is a time of change in New Hampshire, of finishing up those warm-weather projects and attempting to plan for an increasingly unpredictable, but doubtless chilly, winter. The lakes are experiencing seasonal change as well. Now, the strong summer sun and warm breezes no longer heat the rippled lake surface and this heralds a total breakdown in the unseen summer structure of the lake's water column.

During the summer, the water in most New Hampshire lakes separates into thermal layers, with the warmest, least dense and most oxygen-rich layer towards the lake's surface and the coldest, densest, and most nutrient-rich layer towards the bottom. These layers are like oil and water—the cold, dense lower layer cannot mix with the warm, buoyant upper layer. By summer's end, each of these layers, separated from sources of rejuvenation (including wind and waves at the surface, and decomposition and the release of nutrients at the lake bottom), becomes deficient in what the other has in abundance. Oxygen is scarce below, nutrients are scarce above. But autumn's cooling temperatures change the structure of the water column so that the surface waters cool, become denser, and sink. This begins a simple circulation of water, allowing the previously thermally-stratified lake water to mix, mingle, and share resources. Oxygen is mixed from the surface to the lake bottom, allowing fish to roam further into the depths out of anglers' reach, and nutrients are moved throughout the water column from the bottom to the surface, sometimes clouding the water and causing sulfurous odors for a short time.



Thus, the so-called "fall turnover" replenishes the lake just in time for winter. This is important for everything living in the lake because, when ice forms a cap over the water sometime between November and January, there will be neither replenishment nor mixing of oxygen and nutrients until spring, when another seasonal lake turnover occurs.



*Lake water circulation patterns change as the seasons change.*