

**WHITE LAKE**

PROPERTY OWNERS ASSOCIATION  
ENVIRONMENT VOLUNTEERS

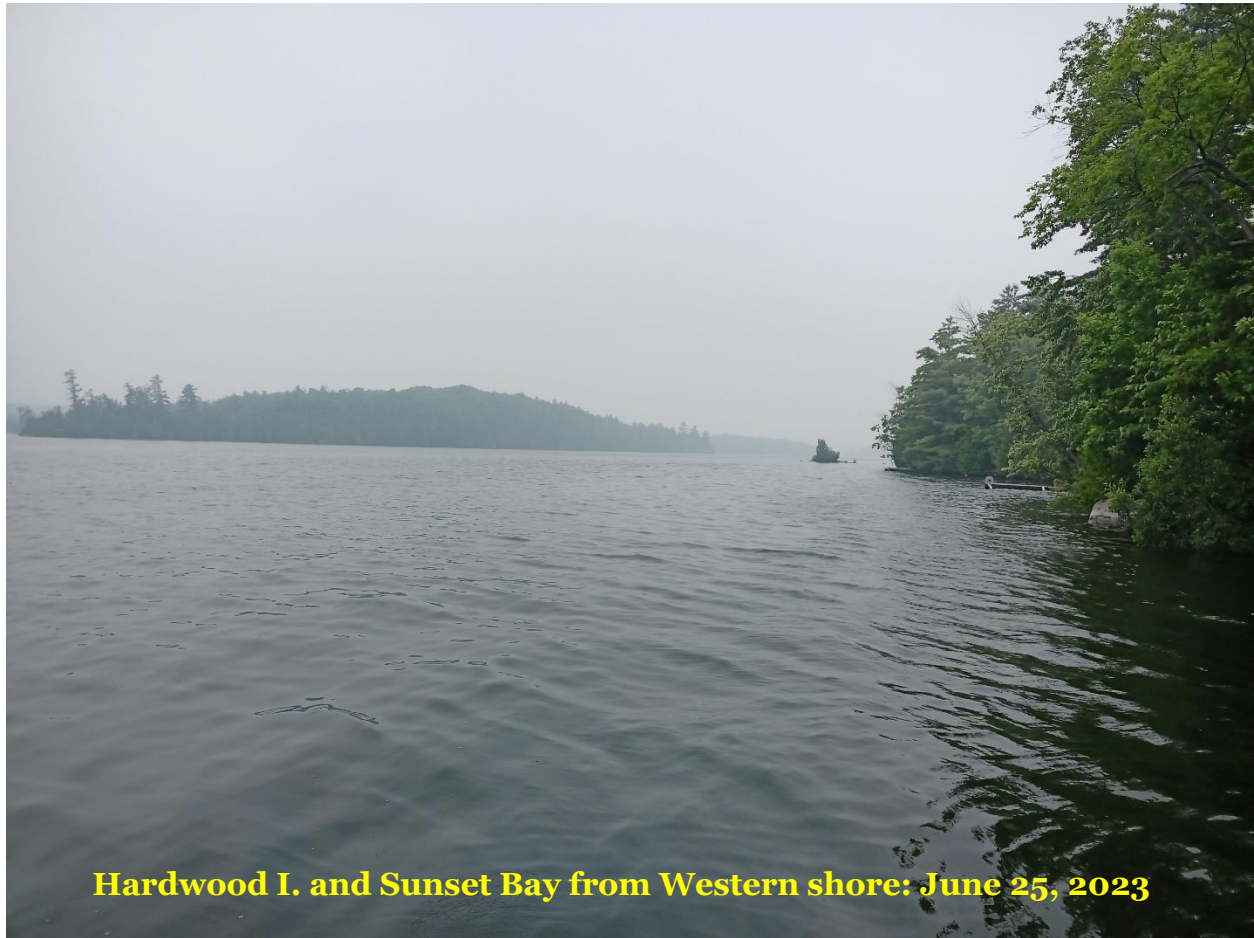


**ENVIRONMENT BULLETIN**

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# Smoke!



**Hardwood I. and Sunset Bay from Western shore: June 25, 2023**

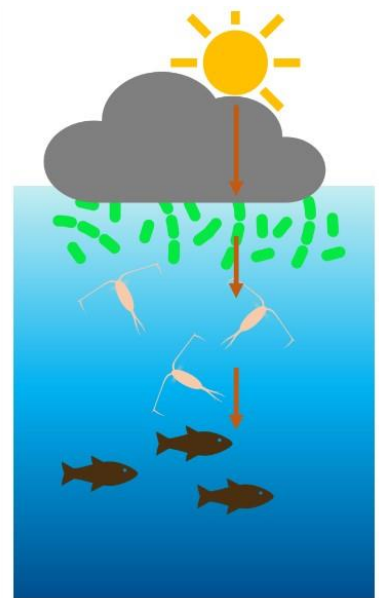
Wildfires are a phenomenon which can burn large swaths of forest. They can be started by lightning strikes or human activity. With climate change and global warming taking effect, these fires are becoming more frequent, occurring earlier in the season and burning with greater intensity. Very large fires in remote areas may be impossible to control and can only be extinguished when they run out of fuel or are contained by changing weather conditions, such as rain or wind direction.

A recent forest fire on nearby Centennial Lake highlighted the dangers of these fires in our area, and large persistent fires in Northern Québec have brought high levels of smoke to our region. A reasonable question is how forest fire smoke affects the ecology of a lake such as White Lake.

Wildfire smoke is made of a combination of particles, gaseous pollutants such as carbon monoxide and other irritant compounds both organic and inorganic. If the fire is very close to a lake, then remnants of burned plants and soil can flow into the lake when it rains. Materials swept into the lake in this way can act as ‘fertilizer’ promoting the growth of aquatic plants including algae.

When only smoke is present, as it is this year at White Lake, effects can be more subtle and dependent on the density and duration of smoke cover. There are few studies published on this topic but they generally agree that the most significant effect is the reduced sunlight reaching the lake.

All food comes from the sun which is first used by tiny phytoplankton which are fed upon by zooplankton which are then consumed by increasingly larger insects and fish. The diagram to the right is a simplified depiction of this food chain. The diagram also shows a grey cloud blocking out sunlight.

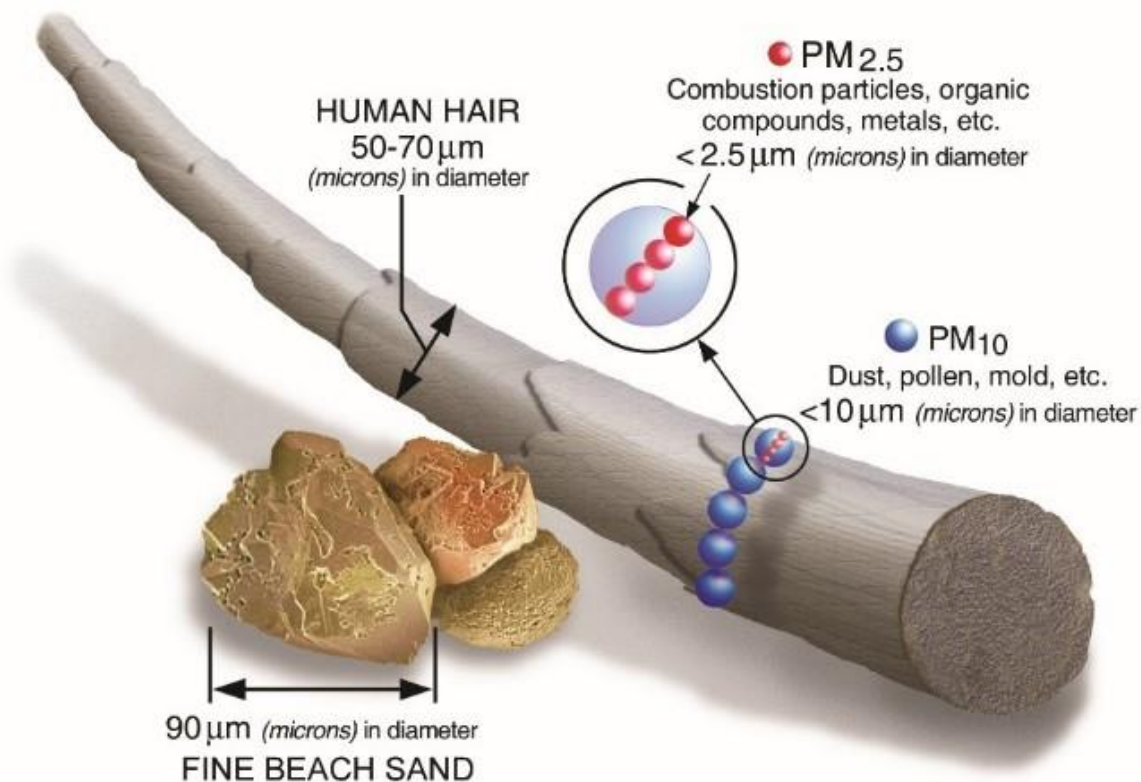


The main effect of a smoke cloud cover over a lake is to increase the production of phytoplankton in shallow water because of the presence of fertilizing smoke particles. However, phytoplankton production in deeper water is reduced because of floating particles blocking sunlight making photosynthesis more difficult while at the same time reducing the temperature of the lake.

For White Lake this year, the presence of smoke has likely not lasted long enough to result in significant changes in lake ecology. If rain falls through a smoke cloud, however, the suspended particles in the atmosphere will be washed into the lake which may then result in some measurable changes in lake chemistry.

**What about us?** A smoky atmosphere can be dangerous to wildlife and human health. 90% of fine particles in forest fire smoke is composed of particles less than 2.5 micrometres (millionths of a metre) in size. These particles are also known as PM<sub>2.5</sub>. This group of particles also include ultrafine particles with diameters of less than 0.1 micrometres.

The diagram below compares the size of these particles to more familiar items such as human hair, pollen and fine beach sand.



The danger from the very small particles is that they are so small that once they enter the lungs, they may remain lodged there permanently and may even enter the bloodstream.

External symptoms include a scratchy throat, cough, irritated sinuses, headaches, runny nose and stinging eyes. For those suffering from lung diseases such as asthma or chronic bronchitis as well for older individuals with reduced lung function, exposure may result in a worsening of symptoms and difficulty breathing.

When forest fire smoke is present, stay indoors as much as possible and wear a filter mask when outdoors.