



WHITE LAKE PRESERVATION PROJECT



ENVIRONMENT BULLETIN

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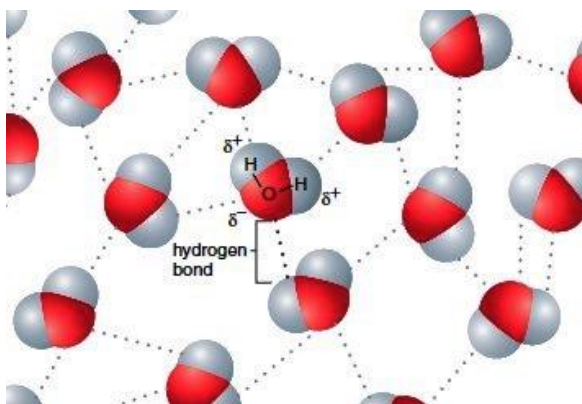
Water and Ice

WATER

As you look out onto White Lake during the winter months what do you see? Water and ice and lots of it. White Lake contains about 75 million cubic metres of water. If my calculations are correct, that translates to 3×10^{35} molecules of water give or take. Put another way, that's 300,000,000,000,000,000,000,000,000,000,000 molecules.

But strictly speaking, this is not true. In fact, there is only one molecule of water in the lake. That's because water is one of the strangest substances in the universe.

Everybody knows that water boils at plus 100 degrees Celsius. But did you know that for such a small molecule, water should boil at about minus 100 degrees Celsius. It has such a high boiling point because of the hydrogen bond. This bond, in effect, makes each water



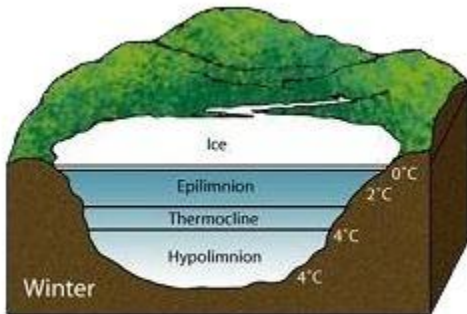
molecule stick to every other molecule, like in the diagram. And this is why there is only one water molecule in White Lake. Without the hydrogen bond, there would be no life on this planet. All of the water would have evaporated into space or be trapped in our atmosphere as vapour. Earth would be a giant sauna with no one to enjoy it!

ICE

The peculiarities of water don't end with its boiling point. The maximum density of water also occurs at a weird temperature: plus 4 degrees Celsius. Most substances, when cooled,

have their maximum density at the freezing point, but water expands at temperatures above 4 degrees, and it also expands when cooled below 4 degrees. Now that is strange!

This is why ice floats and does not sink to the bottom of the lake and it also partially explains why the lake does not freeze solid. So, if ice had its maximum density at 0 degrees, then it would sink to the bottom of the lake as it froze and eventually the entire lake would be frozen solid. There would be no fish or any other living creature in the lake.



In the winter, the temperature of the water immediately under the ice is close to freezing, but at greater depths, it's self-regulated at plus 4 degrees. Any water cooler or warmer than that temperature would rise.

So, we have the peculiar properties of water to thank for our very existence and for ice fishing as well!



McLaughlin's Island from Western Shore