Lake Turnover

What is Lake Turnover? How and why do lakes do this in autumn and spring?

- The key to this question is how water density varies with water temperature. Water is most dense (heaviest) at 39º F (4º C) and as temperature increases or decreases from 39º F, it becomes increasingly less dense (lighter). In summer and winter, lakes are maintained by climate in what is called a stratified condition. Less dense water is at the surface and more dense water is near the bottom.
- During late summer and autumn, air temperatures cool the surface water causing its density to increase. The heavier water sinks, forcing the lighter, less dense water to the surface. This continues until the water temperature at all depths reaches approximately 39º F. Because there is very little difference in density at this stage, the waters are easily mixed by the wind. The sinking action and mixing of the water by the wind results in the exchange of surface and bottom waters which is called "turnover."
- During spring, the process reverses itself. This time ice melts, and surface waters warm and sink until the water temperature at all depths reaches approximately 39º F. The sinking combined with wind mixing causes spring "turnover."
- This describes the general principle; however, other factors (including climate and lake depth variations) can cause certain lakes to act differently. A more detailed description of the physical characteristics of lakes, including temporal and density interactions, can be found at the Water on the Web site, sponsored by the University of Minnesota - Duluth and funded by the National Science Foundation.

**Information found at… http://www.dnr.state.mn.us/lakes/faqs.html