FACT SHEET

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

Foam on Water

Office of Water Quality – Watershed Assessment and Planning Branch/Targeted Monitoring Section

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Foam on the surface of Mill Creek just above the Lower Falls at Cataract Falls State Recreation Area in Owen County.

Description:

- Foam may appear on lakes, rivers and streams. Many times, you will see it accumulate against logs, on the banks of streams, or along the shores of lakes. The presence of foam is not necessarily a sign that anything is wrong or an indicator of pollution in the water.
- Foam is often the result of natural processes, not environmental pollution. Foam can occur naturally when the physical characteristics of water are altered by the presence of organic material in the water. Foam can be white but generally turns brown over time.

What causes foam?

- Water and other liquids possess a property called *surface tension*. Water molecules are normally attracted to each other. This attraction between molecules pulls those at the surface. It is this “skin”, or surface tension, that enables some insects to glide across the surface of the water. Many substances decrease the surface tension of water. Some occur naturally and some are the result of human activities, such as use of detergents. Natural processes include autumn leaves that fall into lakes or streams and decay. The process of decay releases organic substances such as fatty acids, similar to the compounds that produce bubbles in soap and detergents.
- Foam molecules are both *hydrophilic* and *hydrophobic* – one end is attracted to water and one end is not. The foam rises to the surface of a river, lake or stream and interacts with water molecules. The attraction between the foam and the water molecule decreases the surface tension. When the surface tension is decreased, air more easily mixes with the water. Bubbles form when air mixes with the interacting water and foaming agent. These lightweight bubbles can congregate as foam.

When am I likely to see foam on the water?

- Since foam occurs through mixing of air and water, you may see foam on a windswept lake or near the bank of a fast flowing stream. You may see more foam at certain times of the year, such as in spring, after trees and flowers lose their buds, or fall, when leaves fall into the water and further decay produces foam. When temperatures rise, the process of decay occurs more rapidly, increasing the release of organic substances. Foam may also result from the release of organic compounds found in certain eroding soils, or from human activities, such as gravel washing.

Is foam harmless?

- Foam observed on the surface of water is usually harmless. It only takes a small amount of a fatty acid being released from decaying organic matter to produce a large amount of foam. The foam is usually about 1% of what you see. The remainder is air and water.
- Foam is not always harmless. In the past, it was often an indication of pollution. Detergents with high amounts of phosphorus can cause foaming. Phosphorus is an important nutrient, but it is not abundant in nature. Large amounts of phosphorus introduced into rivers and lakes cause algae populations to grow quickly. Excessive nutrients in the water may result in the formation of algae blooms, creating other problems. Indiana has limited the amount of phosphorus a detergent may contain.

How can I tell if foam is from human activities?

- Some differences in the appearance and persistence of foam may indicate whether it is a natural occurrence or caused by human activity. General guidelines include:
    - Natural foam
        - Light tan or brown in color, but may be white
        - An "earthy", "fishy", or "fresh cut grass" odor
        - Dissipates fairly quickly when not agitated
    - Foam from human activity
        - Usually white in color
        - A fragrant, perfumed or soapy odor
        - Foam persists for a longer period of time.

IDEM's Role:

- IDEM is responsible for protecting human health and the environment while providing for safe industrial, agricultural, commercial and governmental operations vital to a prosperous economy.
- IDEM's Office of Water Quality oversees water quality for the state as well as permitting of industrial activities related to water.

More Information:

- Contact IDEM's Office of Water Quality, Watershed Assessment and Planning Branch/Targeted Monitoring Section at (317) 232-8670 or (toll free) at (800) 451-6027, ext. 2-8670.
- Visit IDEM's website at www.idem.IN.gov/4677.htm.

References:

1. Ebbing, Darrell D. 1993. **General Chemistry**. Fourth ed., Houghton Mifflin Co., Boston. 1085pp.

2. Courtemanch, David. 1979. Foam – A cause for Concern. Main Department of Environmental Protection. Augusta, ME. www.main.gov/dep/water/lakes/foam.html as of July 29, 2014.

3. Manitoba environment. 2012. Manitoba's Water protection handbook, Everyone's Responsibility. Manitoba Environment, Water Quality Management Section. www.gov.mb.ca/conservation/waterstewardship/reports/water_protection_handbook.pdf. Manitoba, Canada. 68pp. July 29, 2014 (page 41 of his handbook).

4. Indiana Administrative code: 327 IAC 2-5-1-Phosphate detergents: Permits Required. www.IN.gov/legislative/iac/T03270/A00020.pdf. July 29, 2014. Page 116.