How Water Works

ILLUSTRATED PROCESSES, EQUIPMENT, AND TECHNOLOGY

Highlighting Surface Water Contamination Sources

Surface water is the term used to describe water on the land surface. It may be running, such as in streams and rivers, or quiescent, such as in lakes, reservoirs, and ponds. Surface water is produced by runoff of precipitation and natural groundwater seepage. For regulatory purposes, surface water is defined as all water open to the atmosphere and subject to surface runoff. Surface water is vulnerable to numerous chemical and microbiological contamination sources and, in most cases, requires filtration and disinfection before it is safe to drink. Next month, How Water Works reveals groundwater contamination sources.

1. Lakes and reservoirs are vulnerable to natural and human contamination. For example, silt washed into lakes can smother organisms on the lake floor, upsetting or destroying aquatic ecosystems. Animal and human wastes within a watershed often find their way into surface water.

2. Rivers and streams are at the mercy of all upstream users of the water and land within the drainage basin. Some streams also have occasional periods when water quality is especially poor as a result of natural causes, such as heavy spring runoff.

3. Oil pollution from commercial vessels is a common occurrence.

4. Pesticides and fertilizers used in agriculture (4a) and on golf courses and suburban lawns (4b) account for a major portion of nonpoint source pollution.

5. Runoff containing manure from livestock and poultry producers has been a major source of surface water pollution. More than 150 pathogens found in livestock manure pose risks to humans.

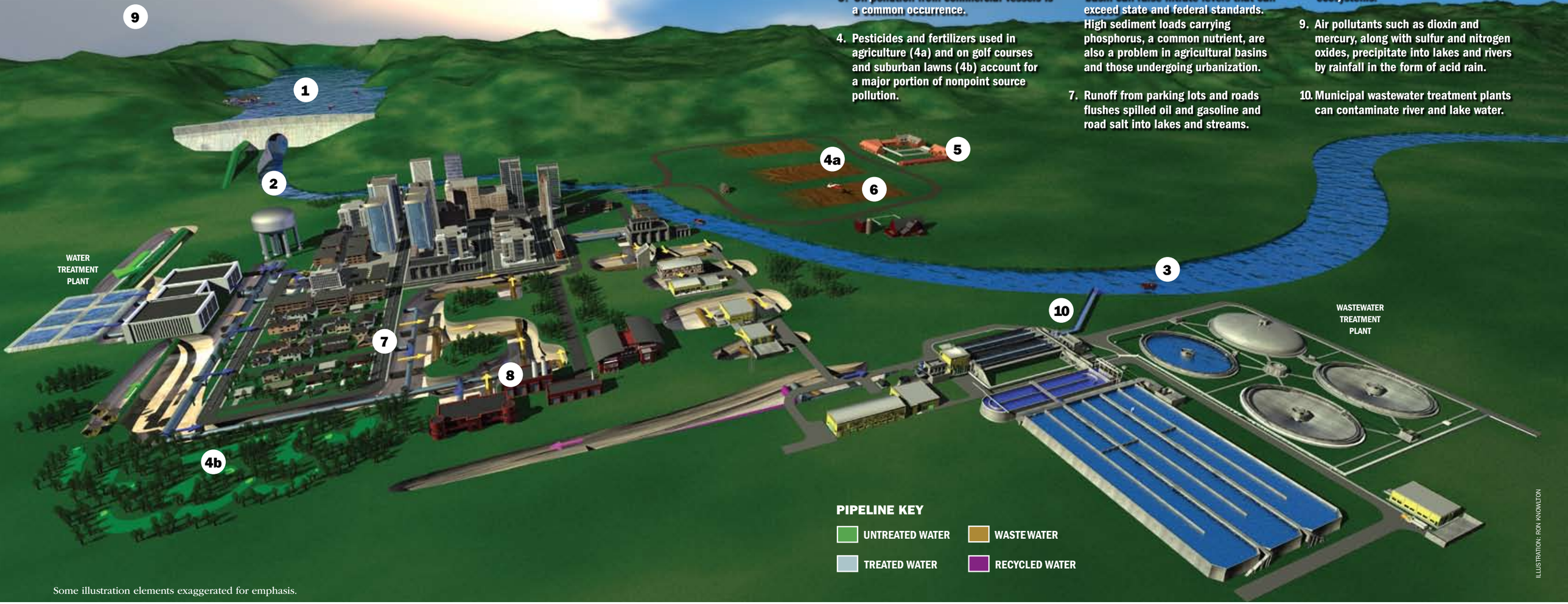
6. Runoff from farmlands in the drainage basin can raise nitrate levels that can exceed state and federal standards. High sediment loads carrying phosphorus, a common nutrient, are also a problem in agricultural basins and those undergoing urbanization.

7. Runoff from parking lots and roads flushes spilled oil and gasoline and road salt into lakes and streams.

8. Hazardous and many "nonhazardous" industrial wastes contaminate surface water. Toxic chemicals, although now regulated, can still be discharged directly into surface water. Thermal pollution, such as an influx of warm water from cooling towers, also has a detrimental effect on aquatic ecosystems.

9. Air pollutants such as dioxin and mercury, along with sulfur and nitrogen oxides, precipitate into lakes and rivers by rainfall in the form of acid rain.

10. Municipal wastewater treatment plants can contaminate river and lake water.



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Some illustration elements exaggerated for emphasis.

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