Figure 3.1.5 What issue related to wetland conservation does this cartoon highlight?

Agricultural drainage and urbanization have had a major detrimental effect on wetlands. Scientists estimate that half the world's wetlands have been lost since 1900. Loss of wetlands—when they are drained or paved over for housing, or when wells are drilled to meet human demands—can threaten groundwater supplies.

With one-quarter of the world's wetlands, covering 14 percent of its lands, Canada contains the largest concentration of wetlands in the world. Because wetlands bridge the aquatic and terrestrial spheres, their preservation and maintenance are complex, as they contain many different habitats (including woodlands, valleys, and streams) for wildlife and fish. The Canadian government has adopted a policy of wetland conservation with the goal of "promot[ing] the conservation of Canada's wetlands to sustain their ecological and socio-economic functions, now and in the future" (Canada Environmental Assessment Agency, Benchmark 52/6).

Canada also participates internationally in the Ramsar *Convention on Wetlands of International Importance* (1971), which seeks to conserve the world's wetlands. Each member country designates its internationally significant wetlands and commits to maintain the ecological character of these sites, including their ecologically sound use. As of 2009, Canada had identified 37 sites, some protected by provincial law and others that are managed by federal agencies.

REVIEW AND REFLECT

1. Create a diagram that shows the distribution and use of fresh water in your local area. Label any streams, rivers, ponds, lakes, and wetlands, and include annotations indicating their importance to your area's freshwater supply.
2. What challenges do you think the federal government faces in trying to fulfill its mandate to "promote the conservation of Canada's wetlands to sustain their ecological and socio-economic functions, now and in the future"?

Running Water

Of all Earth's processes, running water may have the greatest impact on the landscape and on people. Running water has shaped much of the world's physical environment. We depend upon rivers and streams for energy, irrigation, and transportation. Fertile flood plains have supported agriculture and human settlements for millennia.

Once the ground is saturated by rain, snow melt, or other sources, water begins to flow along the surface rather than sink into the ground. This surface run-off initially flows in broad, thin sheets, called *sheet flow*. After flowing this way for only a short distance, water begins to develop tiny rills (channels). Several rills join to form deeper depressions called gullies, which in turn empty into a stream or river.

A stream is a flow of any size that follows a definite course, from the smallest trickle to the largest river. Although the terms "stream" and "river" are often used interchangeably, a river usually refers only to larger streams, fed by several **tributaries**.

Figure 3.1.6 shows the parts of a stream or river system. The headwaters, or source, of a river—where it first appears as a surface stream—are at its highest point. The river flows downslope to its mouth—the point where it ends, either by entering a large body of water such as a lake or ocean, or by joining another river.

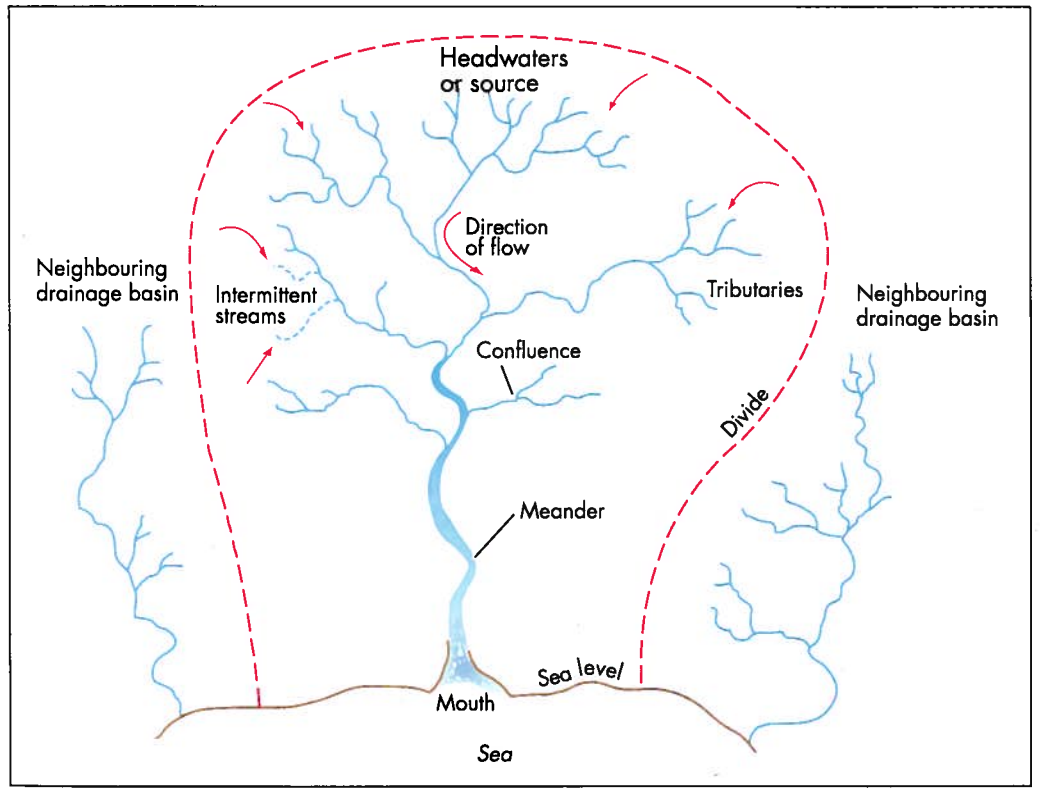

Figure 3.1.6 Parts of a river system

Floods can occur naturally when a stream reaches flood stage, the level at which it overflows its banks and its crest (highest point) reaches maximum. Because run-off takes time to collect in streams, the water rises gradually, cresting perhaps days after the rain or snow ends. The resulting flood may occur upstream over small, localized areas or over a larger area. Sudden rainstorms that drop large amounts of rain over a short period can cause upstream floods.