

Investigation 2.C: What's in the Water? Answer Key

Answers to Analysis Questions

1. The bar graphs will usually have higher levels of sulfate, iron, nitrate, and phosphate depending on the nature of the site being tested. pH level may be higher or lower depending on the nature of the discharge into the body of water. Your graph should include a title and labels and measurement units on both axes.
2. Any differences will be due to the nature of the discharge. For example, a freshly watered and fertilized plant will have high levels of nitrate and phosphate due to the use of fertilizers, while a plant that received water only will have significantly lower levels.
3. Comparisons with Calgary tap water will again vary depending on where samples are taken. Calgary drinking water is treated to lower some of these levels. In comparison, water downstream of Calgary has high levels of nitrate and phosphate due to storm water and sewage (treated).

Answers to Conclusions Questions

4. In general, most human activities cause phosphate and nitrate levels to go up in downstream water. Other factors vary with the discharge.
5. Moderate levels of nitrate and phosphate in water increase aquatic plant and algal growth. This subsequently increases the number of invertebrate herbivores and carnivores, which provide an abundant source of food for fish. More significant increases in nitrate and phosphate levels can also result in algal blooms. The very large number of big trout downstream of the city of Calgary provides a testament to how a problem (nutrient loading) can affect a natural environment. These fish were also well known for their oily taste many years after the local oil refineries were torn down.

Answers to Extension Questions

6. The spill into Wabamun Lake was mostly Bunker C crude oil, which has a relatively high sulfur content and includes many other metals. Another component of the spill was described as pole preservative, a polycyclic aromatic hydrocarbon. The immediate effects of the spill included extensive oil coverage of the lake surface; an immediate order to stop using the water for cooking, washing, showering, drinking, and swimming; oil damage to over 1000 birds, of which less than 50% survived; contamination of wildlife habitats; the shutdown of a TransAlta power plant that used the water after unacceptably high levels of aluminium, chromium, arsenic, and copper were detected; and the shutdown of the sport fishing industry on the lake. In the spring of 2006 there was another intensive clean-up effort; during that summer high temperatures brought more of the oil sunk in the lake to surface, creating oil sheens and tar balls. A fish consumption advisory from Capital Health remained in effect throughout 2006.