

Passage Two

Beluga Whales in the St. Lawrence River

A team of marine biologists headed by Pierre Béland began a series of investigations with one dead beluga beached on the St. Lawrence. Laboratory work showed that the whale died from renal failure. Tissue samples revealed that the whale was heavily contaminated with mercury, lead, PCBs, DDT, MIREX, and other pesticides. Investigations of two other dead belugas revealed similar results.

Still curious about why the population remained low, the biologists continued their investigations. During a 15-year period the team recorded 179 deaths and examined 73 carcasses. The entire sample was highly contaminated with an array of chemicals. Results of the study included the following.

- 40% of the organisms bore tumors, 14 of which were cancerous.
- The whales had a high incidence of stomach ulcers, including three perforated ulcers.
- 45% of females produced smaller than normal amounts of milk due to infections or tumors in their mammary glands.
- Lesions of the thyroid and adrenal glands were common.
- Some whales had compromised immune systems.

In comparison, Arctic beluga in other locations did not display any of these conditions, nor did other species of whales or seals living in the St. Lawrence. Both of the latter groups contained the same toxic substances as the belugas, but in lesser amounts. Finally the scientists also found that the toxins were not confined to the fat in blubber. Small amounts were found in other tissues, which might have contributed more readily to the injury of vital organs. In answering the original questions the scientists proposed that the whales were victims of pollution.

When the scientists presented their evidence and explanation suggesting that pollution was the cause of the low numbers and lack of increase in the beluga population, other marine biologists maintained that toxins were not at fault. The skeptical scientists argued that although the diseases and lesions observed in belugas matched the known effects of toxic chemicals, the original investigations had not demonstrated a cause-and-effect relationship.

- Based on your understanding, were the original investigations adequate? Why or why not?
- Did the scientists use appropriate tools and techniques to gather, analyze, and interpret data? How do you know?
- What evidence did the scientists use to develop an explanation that the whales died because of pollutants?
- What would be the best approach to design and conduct a scientific investigation that would demonstrate a cause-and-effect relationship?