

OCEAN BLUES

Humans may live on land, but we owe a lot to the sea. Oceanographer Sylvia Earle insists, "With every drop of water you drink, every breath you take, you're connected to the sea. No matter where on Earth you live."

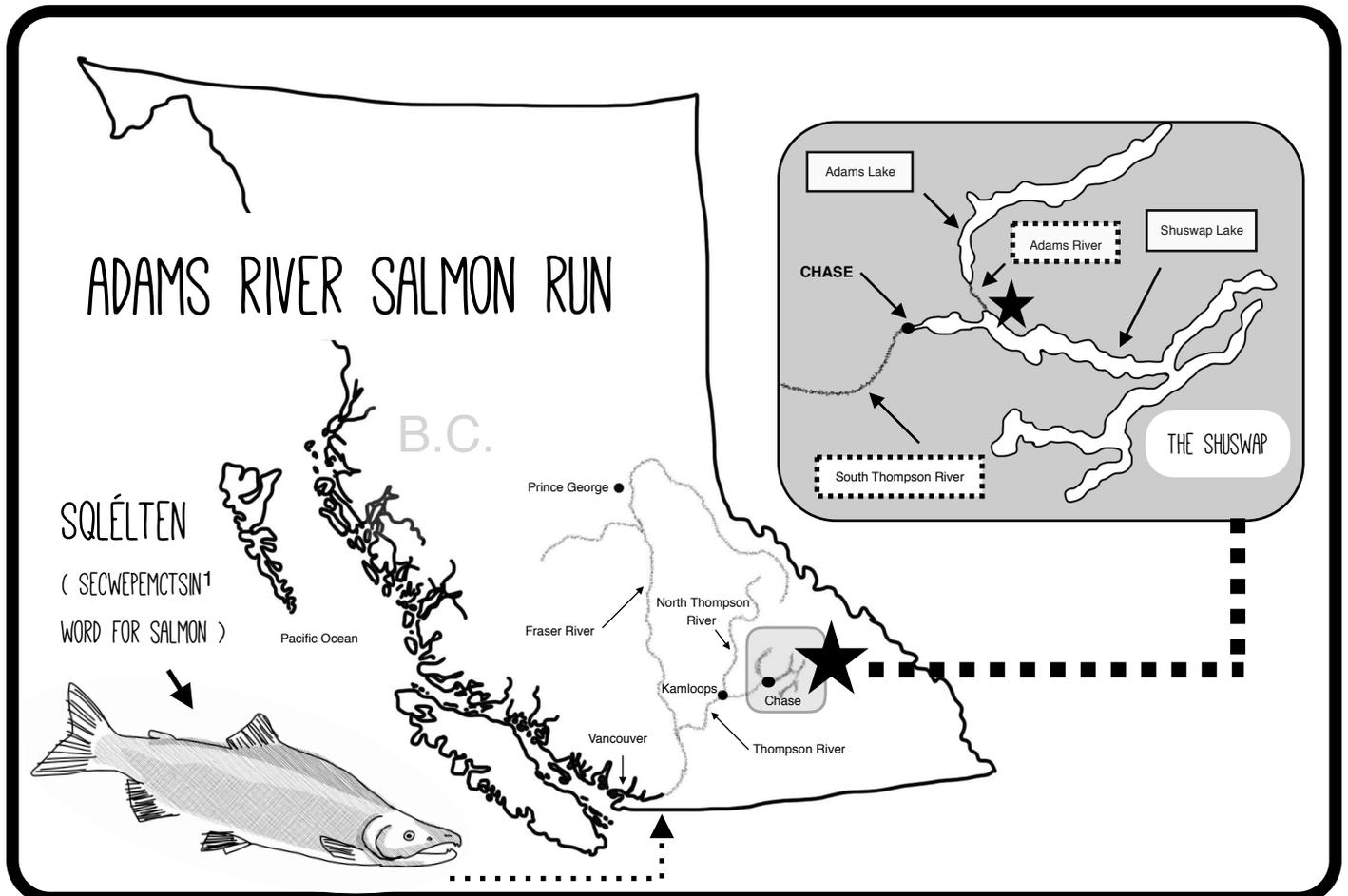
Unfortunately the oceans are in trouble, partly due to climate change. With eight of its ten provinces and all territories bordering an ocean, the changing ocean environment is impacting Canada. We need to do something about it.

Diminishing Salmon

First Nations and B.C. scientists are monitoring annual salmon runs. Many recent salmon counts show that far fewer fish are migrating from the Pacific Ocean to Interior B.C. rivers to spawn. A good example is the Adams River salmon run. This

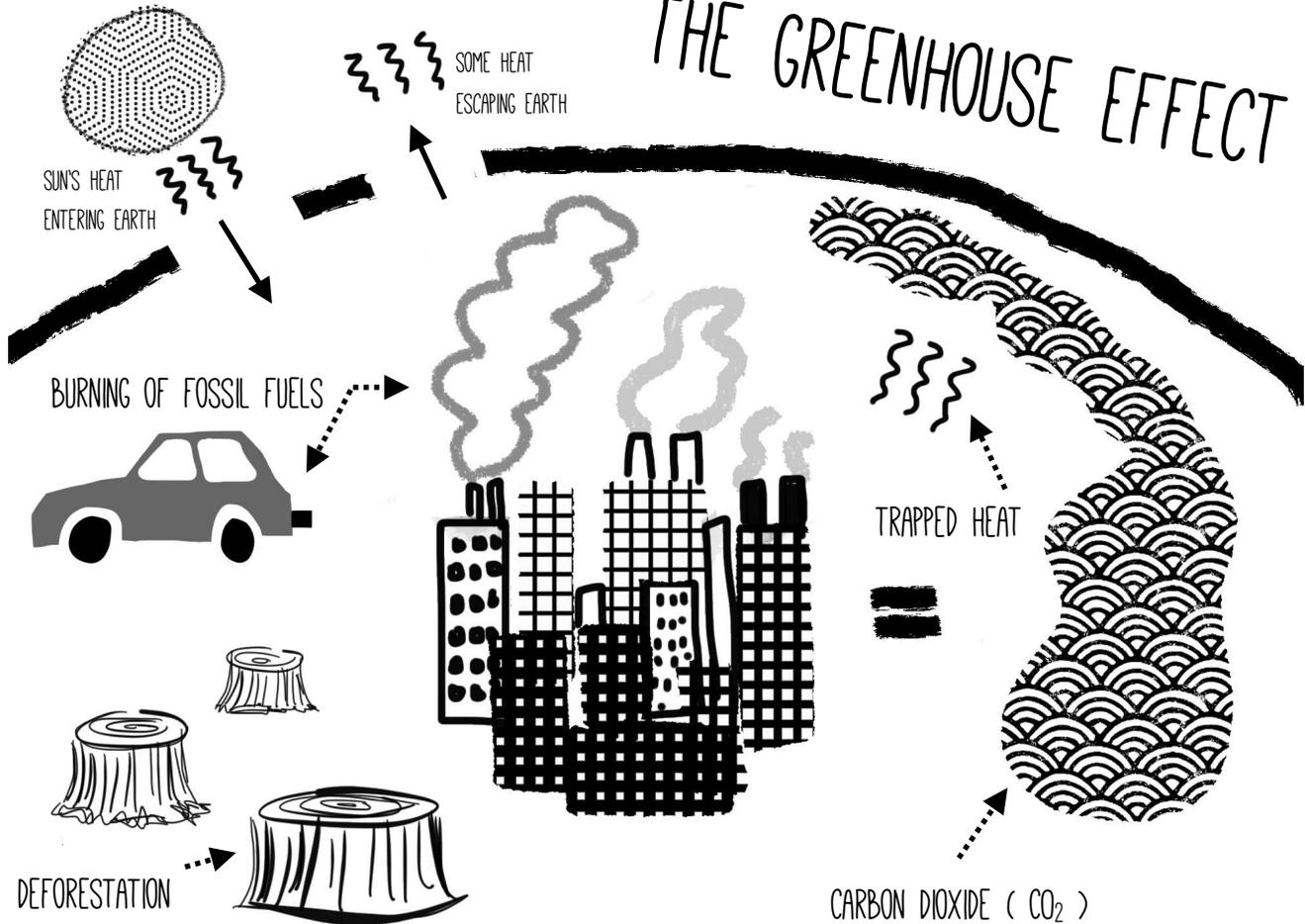
famous salmon run takes place near Chase about 75 kilometres northeast of Kamloops. In 2015, a startlingly low number of salmon returned to their freshwater birthplaces. Scientists expected 1.2 million sockeye, but only 3000 returned to the river that fall. Low salmon numbers impact nutrients in the river, reduce food for wildlife like bears and eagles, and produce fewer offspring. Could it be that the salmon life cycle is in jeopardy?

Jim Cooperman, president of the Shuswap Environmental Action Society, called the 2015 Adams River salmon return "a frightening crash." He speculated, "It could be climate change; it could be [viruses from] fish farms." The department of Fisheries and Oceans Canada said that scientists will continue to analyse the data to learn more about what is happening to salmon and their marine environments.



¹ Secwepemctsin - the language of the Secwepemc First Nations.

THE GREENHOUSE EFFECT



The greenhouse effect is a natural occurrence that happens when the atmosphere traps heat radiating from Earth toward space. Humans are increasing this effect by burning fossil fuels (oil, gas, and coal) and cutting down forests. A byproduct of all this activity is carbon, which becomes carbon dioxide (CO_2) when it mixes with oxygen in the atmosphere. Carbon dioxide prevents heat from leaving Earth. Its growing concentration is one of the main causes of global warming.

Rising Water Temperatures

The Earth has warmed about 0.8 degrees Celsius during the last 40 years, and the poles are warming even faster. In fact, the Arctic has warmed more than 2 degrees Celsius during this same time period. An increase in air temperature has made the oceans warmer.

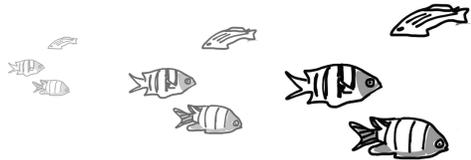
Sea ice is melting and marine life is on the move. Killer whales have even been spotted in Hudson Bay. Rising sea levels, a result of glaciers melting and warmer water, are reducing the amount of light sea plants need to grow.

Native aquatic life is being forced to adapt. For example, invasive or non-native species that prefer warmer water may intrude, consume food, and thrive. Species that are unable to compete for food may become endangered.

Another problem with warmer water is that viruses tend to flourish in milder temperatures. Fish and sea mammals that are used to colder water may not have immunity for new viruses they encounter. They are more likely to become ill or die.



DID YOU KNOW?



Coral reefs are home to 25 percent of all marine life. Now warmer water temperatures and ocean pollution are damaging corals that live in shallow water. When stressed, corals release the nourishing algae that feed and colour them, turning them white and making them susceptible to diseases. This is known as coral bleaching.

Ocean Acidity

Higher levels of carbon dioxide in the atmosphere are causing higher land and sea temperatures, but that is not the only problem with this gas. Oceans absorb about one third of human-created carbon dioxide emissions. As carbon storehouses, oceans have lessened the impact of global warming on Earth. But the more carbon dioxide oceans absorb, the more the composition of seawater changes.

For millions of years, the oceans' acidity levels have been stable. This steady environment has supported a diverse ecosystem. When extra carbon dioxide is dissolved in seawater, however, chemical reactions occur. Carbonic acid is formed, which reduces the seawater pH and makes it more acidic. This is

known as ocean acidification - sometimes called "climate change's equally evil twin."

Higher acidity is causing problems for some marine life, especially those at the lower end of the food chain. Seawater with higher acidity weakens the shells in small marine animals such as clams, oysters, and snails. Without protective shells, such creatures are at risk. Higher acidity is also linked to fewer plankton and reproductive disorders in some fish.

Humans may live on land, but we depend on oceans for our water, food, climate, and even the air we breathe. The oceans have taken care of our world for a long time. Now it is our turn to start taking care of them.

MAKE A DIFFERENCE



VANCOUVER'S SEA WALL

The *Shore Line* features stories about people responding to the threats of development, storms, and rising sea levels on coastal communities like Vancouver. To learn more about how climate change is affecting people who live by the sea, visit <http://theshorelineproject.org/>. Think about what you can do to make a difference.



NONFICTION READING ASSESSMENT GRADES 4-9

Ocean Blues

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References

A blanket around the Earth. (2016). NASA. Retrieved May 27, 2016 from <http://climate.nasa.gov/causes/>

Bennet, J. (2015). Ocean acidification. *Ocean Portal*. <http://ocean.si.edu/ocean-acidification>

Ecohard, K. (2011). NASA. What's causing the poles to warm faster than the rest of Earth? Retrieved May 27, 2016 from <http://www.nasa.gov/topics/earth/features/warmingpoles.html>

First Voices: Secwepemc. (2013). Retrieved May 27, 2016 from <http://www.firstvoices.com/en/Secwepemc/word-query-results?q=salmon&btn=Search&archive=Secwepemc&lang=en>

Fisher, G. (2016). *CBC News*. Low salmon stocks cause increased interactions between bears and humans: study. Retrieved May 27, 2016 from <http://www.cbc.ca/news/canada/british-columbia/low-salmon-stocks-more-bear-human-interactions-1.3587967>

Hume, M. (2015). *The Globe and Mail*. B.C.'s iconic Adams River salmon run off to a 'grim' start. Retrieved May 27, 2016 from <http://www.theglobeandmail.com/news/british-columbia/bcs-iconic-adams-river-salmon-run-off-to-a-grim-start/article27113272/>

Madin, K. (2010). *Oceanus Magazine*. Ocean acidification: a risky shell game. Retrieved May 27, 2016 from <http://www.whoi.edu/oceanus/feature/ocean-acidification--a-risky-shell-game>

Marine problems: climate change. (2016). *WWF*. Retrieved May 27, 2016 from http://www.panda.org/about_our_earth/blue_planet/problems/climate_change/

Ocean acidification. (2016). *National Geographic*. Retrieved May 27, 2016 from <http://ocean.nationalgeographic.com/ocean/explore/pristine-seas/critical-issues-ocean-acidification/>

The Salmon Life Cycle. (n.d.). *The National Park Service*. Retrieved May 27, 2016 from <https://www.nps.gov/olymp/learn/nature/the-salmon-life-cycle.htm>

