

# People and the Environment

## **Topic:**

The negative effects of climate change on marine life in North Vancouver/BC: more specifically, the heat wave from June 25th - August 1st 2021 inflicted by human caused climate change.

Short description: As temperatures rise, the ocean's waters do too. Although it might be a nicer temperature to go for a swim, the marine life in BC and surrounding waters have taken a huge hit.

## **Audience:**

(Not yet decided)  
– North Shore News  
– Vancouver aquarium  
(Maybe CBC or CTV??)

## **Questions:**

Why is this a problem?  
How can this be prevented/changed?  
What steps do we have to take in order to prevent this?  
Which species are being affected?  
How can the average person help this problem? |  
Who needs to make the change?  
How drastic has the population of \_\_\_ gone down because of climate change?  
What specific things caused \_\_\_ to happen?  
Who is your audience?  
What is the issue?  
What is the evidence?  
What should they do about it?

## **Quotes & Evidence:**

- *"They're carcinogenic, mutagenic and toxic to both humans and aquatic organisms."*
- *"The DFO Centre for Aquaculture and Environmental Research on Marine Drive was recently updated with new pilings coated in creosote, a tar-based preservative that is a known environmental hazard, according to Mary-Sue Atkinson." – north shore news: **Creosote on government dock a threat, West Vancouver activist says***
- *"Recovery work is essential as Chinnoek, Coho, and steelhead in the Salish Sea are struggling"*
- *"some populations have dropped by 90%"*
- *"Identify the species of kelp most likely to survive in the warmest temperatures" – **pacific salmon foundation***

- *"The problem surfaced in 2013, when sea star wasting disease (or SSWD) was spotted along the B.C. and Washington coasts."*
- *"The syndrome, linked to a virus, starts as white lesions on the sea stars, but quickly causes their arms to fall off and reduces the creatures to white piles of mush."*
- *"The sunflower sea star has been hit especially hard"*
- *"There's been up to a 90 percent decline in the overall population"*
- *"Research indicates rising sea temperatures linked to climate change makes the sea stars more vulnerable to a virus that previously had isolated effect on sea star populations — but is now pushing some to the edge of extinction"* - Gehman, a researcher with the University of British Columbia and the Hakai Institute
- *"Sunflower stars, in particular, are voracious eaters that can swallow sea urchins whole, keeping their populations in check. But now without this primary predator, sea urchins are mowing down kelp forests."* — **Prince George Citizen: Disease, warming oceans sea stars to edge of extinction on West Coast**
  
- *"Rising sea levels, ocean acidification, and overfishing are problems that the ocean faces right now"*
- *"Jellyfish prefer the warmer waters that are a result of global climate change"*
- *"With less competition for space and resources due to overfishing and habitat destruction, jellyfish have been able to bloom to record numbers"* — **science buzz: Jellyfish Apocalypse: Problems, Causes and Opportunities**
  
- *"The giant red sea cucumber is an attractive candidate for co-cultivation"*
- *"And what the sea cucumber spits out the other side of its digestive system has less impact on the marine environment, Montgomery said."* — **CTV news: B.C. researchers turn to sea cucumbers to address aquaculture sustainability**
  
- *" Judy Hicks had about 5,000 to 6,000 oysters growing over a half-acre of shoreline. As she made her way down to the rocky beachfront, she noticed a strange smell and assumed it was a dead animal. Then she noticed that many of the oyster shells had opened. The oysters inside were dead."*
- *"From June 25 to July 1, during B.C.'s unprecedented "heat dome" that caused hundreds of human fatalities; record-breaking temperatures are estimated to have killed more than one billion sea animals."*
- *"Seashore animals that were killed included sea stars, barnacles, sea clowns and cockles, along with a range of shellfish species farmed by commercial growers, such as clams, blue mussels and oysters."* — **theyee: BC's Shellfish Farmers Struggle After Heat Wave Decimates Oysters**
  
- *"Harley, a marine biologist at the University of British Columbia, now estimates that last week's record-breaking heat wave in B.C. may have killed more than one billion seashore animals living along the Salish Sea coastline."*
- *"As temperatures cracked 40 C in Vancouver, and several degrees higher in B.C.'s Interior, infrared cameras used by Harley's team recorded temperatures above 50 C on rocky shoreline habitats."*
- *"They discovered endless rows of mussels with dead meat attached inside the shell, along with other dead creatures, including sea stars and barnacles."*
- *"The wipeout will temporarily affect water quality, as mussels and clams help filter the sea"*
- *"Marine foundation species, such as coral reefs, kelp beds and seagrass meadows, depend on cooler temperatures to survive"* — **CBC: More than a billion seashore animals may have cooked to death in B.C. heat wave, says UBC researcher**
  
- *"The world's oceans will likely lose about one-sixth of their fish and other marine life by the end of the century if climate change continues on its current path"*
- *"While warmer water is the biggest factor, climate change also produces oceans that are more acidic and have less oxygen, which also harms sea life"*
- *"past studies have shown places where observed fish loss can be attributed to human-caused climate change"* — **CBC: In hot water? Warming oceans may reduce sea life by 17%, study says**



# Research Chart:

Species being effected:	Source:	General notes/info to include:	Main problem:	Where:	What to change:
Salmon & kelp	Pacific Salmon Foundation - <a href="#">link</a>	<ul style="list-style-type: none"> <li>- kelp is slowly dying as the ocean temp rises</li> <li>- Juvenile Fish need kelp to survive</li> <li>- Fish population has gone down</li> </ul>	<ul style="list-style-type: none"> <li>- ocean warming killing kelp</li> <li>- Chinnoek, Coho, and Steelhead populations have gone down 90%</li> </ul>	Salish sea (BC)	<ul style="list-style-type: none"> <li>- create harsh fishing regulations</li> <li>- Identifying species of kelp that survive better in warm temp and breed them</li> <li>- Conserve species of kelp that are dying</li> </ul>
Starfish	Prince George Citizen: Disease, warming oceans sea stars to edge of extinction on West Coast - <a href="#">link</a>	<ul style="list-style-type: none"> <li>- sea stars becoming extinct due to disease cause by temps rising</li> <li>- sea star wasting disease (or SSWD)</li> </ul>	<ul style="list-style-type: none"> <li>- temps rising, causing sea stars to die</li> <li>- Allowing sea urchins to thrive: they kill kelp forests that protect fish</li> </ul>	BC and surrounding waters	<ul style="list-style-type: none"> <li>- plant/breed kelp and starfish</li> <li>- Focus on making the temperatures decrease</li> </ul>
Jellyfish	Science buzz: Jellyfish Apocalypse: Problems, Causes and Opportunities - <a href="#">link</a>	<ul style="list-style-type: none"> <li>- due to the fish populations going down, jellyfish are thriving</li> <li>- Overpopulation of jellyfish all over the west coast</li> <li>- Overfishing and climate change</li> </ul>	<ul style="list-style-type: none"> <li>- jellyfish population going up bc of rising temps and not many predators</li> </ul>	BC	<ul style="list-style-type: none"> <li>- take care of the fish through creating kelp forests</li> </ul>
Sea cucumbers	CTV news: B.C. researchers turn to sea cucumbers to address aquaculture sustainability - <a href="#">link</a>	<ul style="list-style-type: none"> <li>- sea cucumbers clean the ocean</li> </ul>	<ul style="list-style-type: none"> <li>- isn't really much of a problem: other than extinction bc of the food industry - they do ok in the heat as well</li> </ul>	BC	
Clams/oysters/shellfish	Theyee: BC's Shellfish Farmers Struggle After Heat Wave Decimates Oysters - <a href="#">link</a>	<ul style="list-style-type: none"> <li>- after the heat wave, over a billion sea animals dead</li> <li>- Oysters died after being exposed to extreme heat</li> </ul>	<ul style="list-style-type: none"> <li>- oysters and shellfish dying after low tides and extreme heat caused by climate change</li> </ul>	BC	<ul style="list-style-type: none"> <li>- help with climate change</li> </ul>
General marine life	<p>CBC: More than a billion seashore animals may have cooked to death in B.C. heat wave, says UBC researcher - <a href="#">link</a></p> <p>CBC: In hot water? Warming oceans may reduce sea life by 17%, study says - <a href="#">link</a></p> <p>North shore news: Creosote on government dock a threat, West Vancouver activist says - <a href="#">link</a></p>	<ul style="list-style-type: none"> <li>- heat wave causes death across many marine animals.</li> <li>- sea lions have left North Vancouver bc of the tar on docks driving the limited fish away, they left to find food</li> </ul>	<ul style="list-style-type: none"> <li>- sea lions disappearing</li> <li>- Salmon disappearing</li> <li>- Marine life in general</li> <li>- 17% of sea animals in BC died after the heat wave</li> <li>- More than one billion animals were cooked to death during the heat wave</li> </ul>	BC/Vancouver	<ul style="list-style-type: none"> <li>- Clean tar on the docks to fish friendly</li> <li>- Increase the fish population</li> </ul>

## Overall summary (from research, to solidify knowledge, inspired by Cornell notes..):

After the heat wave in BC (June 25th - August 1st), ocean animals all across BC and BC's surrounding waters have been dying. The heat warms the waters, which allows some species to thrive, and most others to almost go completely extinct. The warm water also allows underwater diseases to spread faster across larger areas. Species like the jellyfish, specifically Lions Mane Jellyfish who thrive in warm water are now becoming overly populated all across BC, which is a danger to humans, domesticated animals, as well as marine life. Sea urchins have also been thriving, as their main predator, starfish are now dying off due to disease and the heat. Over population of sea urchins has caused valuable kelp forests to be completely devoured by them. The kelp has also been dying as the water is becoming too warm for them to grow, allowing juvenile fish and other prey animals to become more susceptible to extinction. With fish becoming extinct all across the Salish sea, predators like sea lions, otters and seals are also slowly dying off due to starvation.

## Statistics:

- **17%** of sea life will be reduced because of the ocean warming - [link](#)
- Over **1 billion** ocean animals died after heat wave in BC - [link](#)
- Humans emissions and activities have caused around **100%** of the warming observed since 1950, according to the Intergovernmental Panel on Climate Change's (IPCC) fifth assessment report. - [link](#)
- More than **90%** of the warming that has happened on Earth over the past 50 years has occurred in the ocean - [link](#)
- estimate that warming of the upper oceans accounts for about **63%** of the total increase in the amount of stored heat in the climate system from 1971 to 2010, and warming from 700 meters down to the ocean floor adds about another **30%**. - [link](#)

## Letter outline:

### [VERY ROUGH LETTER OUTLINE]

I still need to add more detail, make it more concise, and add evidence, and in general, just add more (this is only the first draft!)

(Date)

Dear, (audience)

My name is Teva Barzilay and I am a grade nine Performance Learning Program student at Seycove Secondary School in North Vancouver BC. I am writing this letter in an effort to make a change and provide my own valuable perspective on the important issue at hand.

After the heat wave in BC (June 25th - August 1st), ocean animals all across BC and BC's surrounding waters have been dying. The scorching heat warms the waters, which allows some species to thrive, and most others to almost go completely extinct. The warm water also allows underwater diseases like the "Sea Star Wasting Disease" to spread faster across larger areas in the water.

Species like the jellyfish, specifically Lions Mane Jellyfish which contain long tentacles that contain a painful sting that can cause allergic reactions to some are flourishing in the changing environment. These jellyfish thrive in warm water and are now becoming overly populated all across BC, which is a danger to humans, as well as marine life. Sea urchins have also been enjoying the heat, as their main predator, the starfish is now dying off due to disease and the warm waters. Over population of sea urchins has caused valuable kelp forests to be completely devoured by them. In addition, the kelp has also been dying as the water is becoming too warm for them to grow, allowing juvenile fish and other prey animals to become more susceptible to extinction. With fish populations becoming an all time low all across the Salish sea, predators like sea lions, otters and seals are also slowly dying off due to starvation.

This needs to change. This cycle of death is all due to climate change directly caused by humans. We need to take care of our marine life, it is our responsibility, it is our consequence

we have to face. We must protect our environment through taking steps as an individual, and taking big leaps as a society. We must take care of our fish through identifying species of kelp that survive through extreme water temperature changes, and plant them to serve as protection for young fish and prey animals. (Add more ways we can change...) Our duty as humans is to save our planet, and we must do our part in making this world a home again, and not just for us, but for every species. Our future is in our hands, and we must do something about it. I want to live and experience a world that is free of pollution, free of climate change, and free of people who are not aware of what they are doing to our planet.

I am looking forward to receiving your response

Sincerely,

(Sign)

Teva Barzilay