

This Amazing Planet

POLAR

DECEMBER 2019

Illustrated
written
and researched
by Sarah Nelson





ANTARCTICA

Did you know that Antarctica is technically a DESERT? It precipitates (rains/snows) less there than it does in the Sahara Desert in Africa! The blizzards on Antarctica are like sandstorms in a desert, where heavy winds pick up fallen snow and carry them across the land. The coldest temperature ever recorded on the planet was documented in Antarctica at -128.6 F (-89 C)! That is VERY COLD!

Unlike the Arctic, Antarctica is a continent, but there are no native people and it does not belong to another country! It is governed by the Antarctica treaty, signed by 18 other countries, and is fully focused on peace and science!

Only scientists inhabit Antarctica all year round. They study all sorts of things, including space! Antarctica is one of the best places on the planet to observe the universe.

Antarctica holds 90% of our world's freshwater in its frozen layers of ice. Because Antarctica is made of so much ice, it shrinks and grows up to two times its size during the seasons' change. (That is a BIG change!)

The only plant life that can survive these conditions are lichen, moss and algae, but research shows that a VERY VERY long time ago the continent was covered in evergreen forests!

Antarctica is a harsh place to live. The wildlife that can survive there typically migrates during the winter. The Emperor Penguin is one of the few (if not the only) warm blooded animals that survives the WHOLE winter on the continent!





ELEPHANT SEAL



PETREL



ALBATROSS



KRILL



LEOPARD SEAL

SKOUA



WEDDELL SEAL

ELEPHANT SEAL: The male can be 10 times the size of the female! The males are very aggressive and fight each other for feminine attention. They are not afraid of humans!
(Recovering from near extinction- less Endangered)

WEDDELL SEAL: They live in the ocean and on the edge of the ice all year! They create and maintain breathing holes to get in and out of the water quickly. They carve these holes with their teeth! (NOT ENDANGERED)

LEOPARD SEAL: They weigh as much as a bear and are very strong! They are incredibly curious creatures and sneaky. They are ambush hunters, which means you may not know they are around until it is too late! Their favorite meal is penguin! (NOT ENDANGERED)

SNOW PETREL: These birds love Krill, but they are a favorite food for the Skuas! They love to nest in Antarctic rock crevasses! (NOT ENDANGERED)

SKUA: These birds are very territorial and will defend their claimed area. They can seem mean, but most scientists think they are just misunderstood. They like to eat Penguin eggs, and have the ability to fly across the planet from South to North and back again! (NOT ENDANGERED)

ALBATROSS: The Albatross has the widest wingspan of any bird! They can fly incredibly far and for long hours! They have been known to be gone on 'fishing trips' for up to 20 days! Albatross mate for life and only breed every 2 years.
(ENDANGERED)

PENGUINS

There are 18 different types of penguins on this planet! Only 8 of the 18 technically live in Antarctica! Did you know that penguins don't always live in cold places? Some, like the Galapagos penguin, live in warm climates like the Galapagos islands!

Penguins dive for their food up to 200 times a day! They only eat meat, including crabs, crustaceans, fish, and krill! Unlike most birds, penguins have dense bones which makes them excellent swimmers and divers... but not fliers.

Penguins mate for life and when caring for their chicks they will dive and regurgitate the food to feed their young! Both penguin parents share this responsibility. Penguins often gather in giant groups. They use unique calls to help them find their way back to their chicks after feeding.

Penguins are endangered! 12 of the 18 types are listed as endangered. Their greatest threats are habitat loss, disease (from tourists), commercial fishing, and climate change, which is melting sea ice that they so greatly depend on!





CRESTED



GENTOO



HUMBOLT



ROCKHOPPER



KING



ADÉLIE



CHINSTRAP



EMPEROR



SNARES



YELLOW EYED



FIORDLAND



LITTLE BLUE

GALAPAGOS



ROYAL



MACARONI



MAGELLANIC



AFRICAN



UNDER THE ICE

Scientists are just beginning their exploration beneath the ice of our polar regions, but have already discovered so much!

If you dive deep down below the ice, you will find a rich and pristine sea floor! Closer to the surface there are kelp forests, sea stars, sea spiders, octopus and crustaceans, that are all able to grow much larger than those living in warmer waters! Little can disrupt them in these deep and cold waters, which has given them the ability to thrive unlike other species closer to the surface or in more accessible waters.

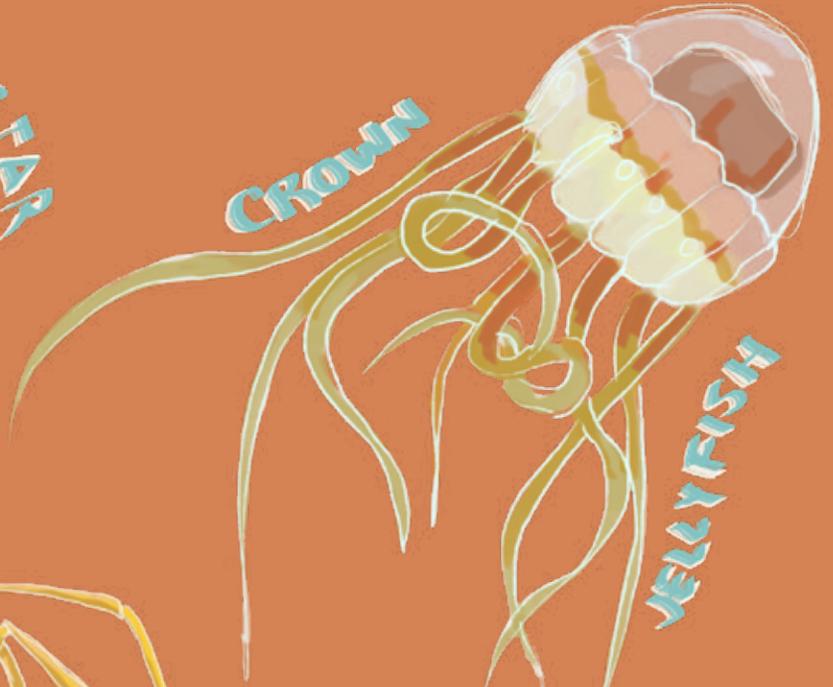
Recently, an iceberg the size of London, broke off and is now free in the ocean! The ice is believed to be as old as 120,000 years!

Scientists have begun a research expedition to study the marine life underneath the ice! This can help us learn more about how ecosystems under the ice respond to change. This habitat has never experienced sunlight, but as the iceberg melts it will begin to experience the rays of the sun and warmer ocean waters!

The smallest marine life can be found under these ice shelves and all other marine life depends on their existence! Knowing how they respond to climate change will help us know what to expect as more ice begins to break off and melt.



SEA STAR



CROWN

JELLYFISH



SEA SPIDER



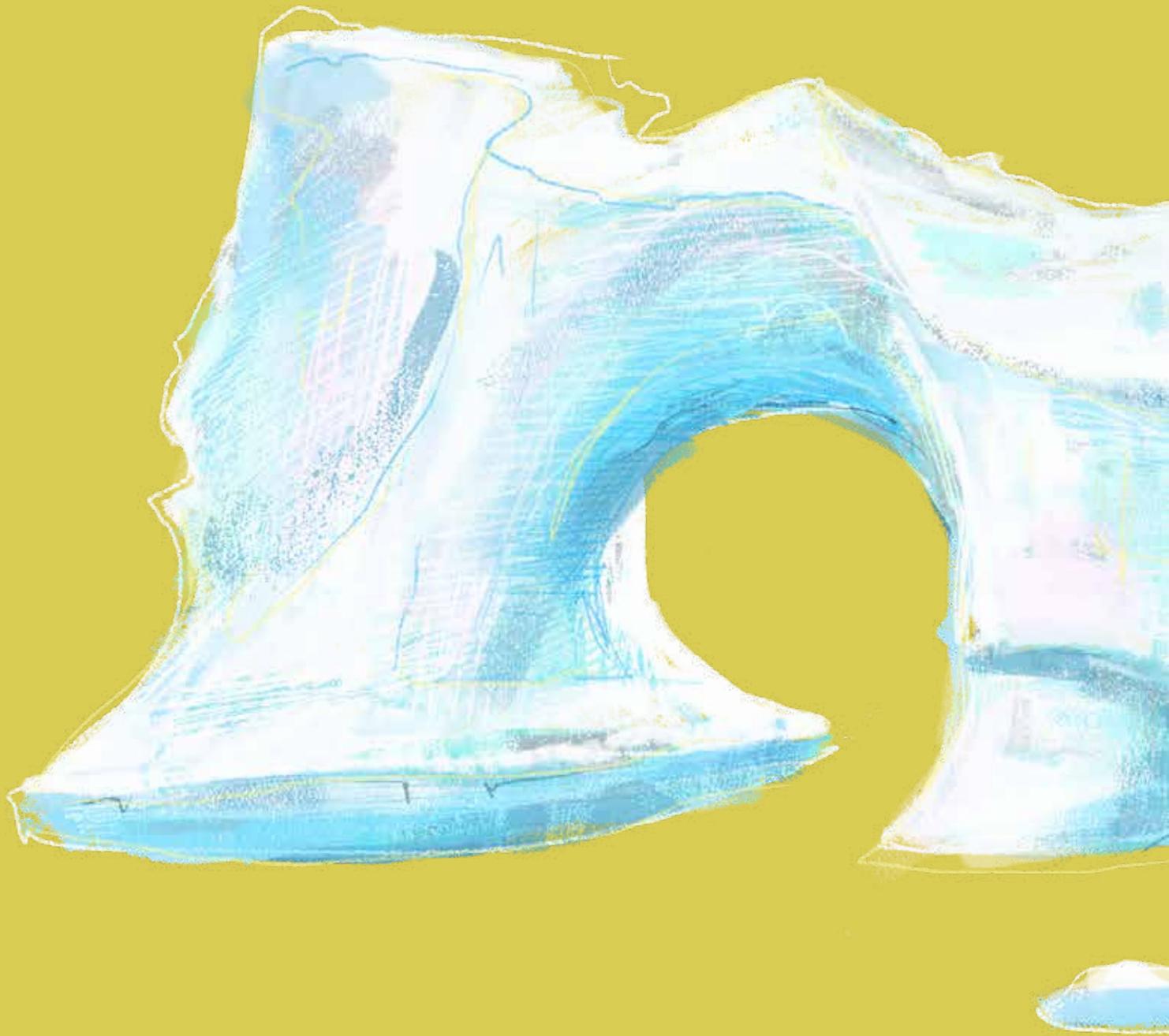
SEA SQUIRT

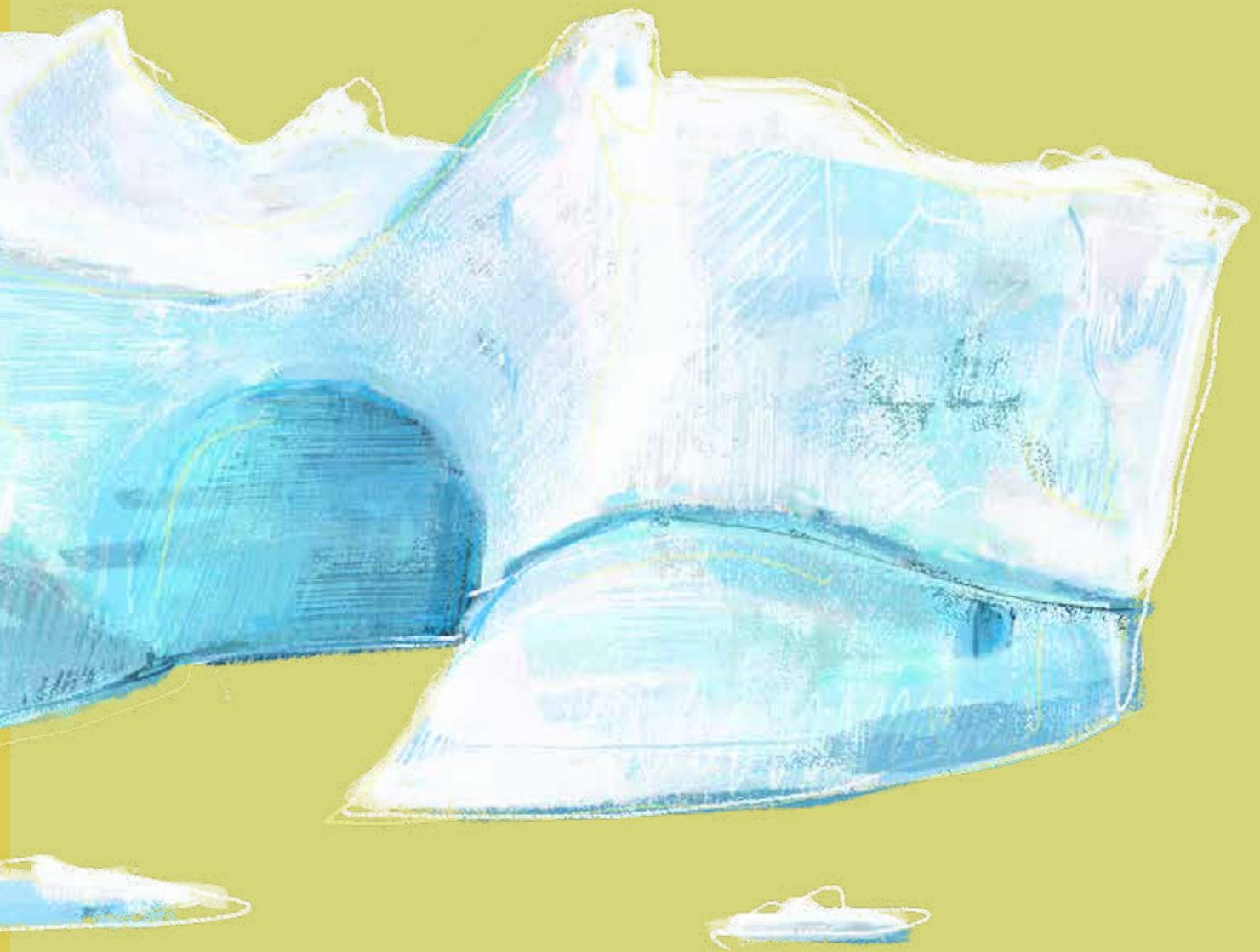


OCTOPUS



ICE FISH





Freshwater Ice and Sea Ice are two very different things, but both are desperately needed to keep our planet stable.

Ice reflects the sun's radiation, keeping our planet's temperatures stabilized. Many animals across the globe depend on the sea ice for shelter, feeding, and breed- ing. Microscopic creatures depend on it for food and habitat. Without these microscopic be- ings, the larger species cannot exist.



Ice is a lot like soil. It tells ancient stories about our environment and pre- serves history! It also has the ability to pre- serve elements of life for incredible amounts of time. Ice discoveries include ancient humans (Otzie 'the ice man'), Woolly Mam- moths, ancient forests, and arctic mummies wrapped in copper. We have even discovered islands off the coast of Greenland!

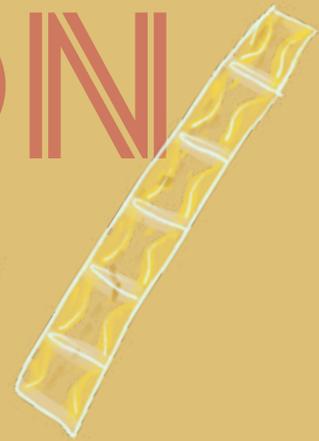


While these discoveries are exciting, there are also big risks to uncontrolled ice melt. When we explore ice we can monitor what is in it and control what it releases into the world. How- ever, when ice melts as rapidly as it has been, the release of other things like unknown trapped diseases and harmful chemicals can occur.

Ice is also being used in Norway to store and protect a seed reserve, where every seed we know of on the planet, is stored and protected from extinction in what is known as the SEED VAULT. Even the vault, stored in the Arctic, is experiencing flooding as the permafrost (frozen ground) and ice melts. Did you know that no one is allowed to be buried in these north- ern regions because their body will not decompose? They have to be moved to warmer regions for burial.

Ice is amazing! We have so much to learn from it and many reasons to protect it.

PLANKTON



There are two main types of plankton: Phytoplankton (plant) and Zooplankton (animal). They are microscopic creatures and are in many ways the heroes in the marine world! Small and large animals all depend on these creatures for nutrition. Even we depend on them!



Phytoplankton generate a large portion of the air we breathe. Like land plants they take sunshine and create energy that the species that eat them benefit from. Like plants, they take Carbon Dioxide and turn it into oxygen!

Zooplankton eat phytoplankton, and are the main food source for marine species including fish, corals, and whales! Without them, most animals in the ocean could not survive. Some Zooplankton are only plankton for the beginning stages of their life. Crabs, and other animals grow out of this stage. We owe much to these microscopic beings.

They are a good reminder that you don't have to be big to make a big difference in the world. So much of the earth revolves around tiny beings, sometimes even creatures so small that they are invisible to our eyes.



THE ARCTIC



Unlike Antarctica, which is a continent surrounded by an ocean, the Arctic is an ocean surrounded by land! Greenland, Scandinavia, Russia, Canada, and the US (Alaska), all make up the Arctic Circle. This means that the Arctic also has a lot of different types of landscapes! It has mountain ranges and forests in North America and Russia, and grasslands, moss, ice shelves, and glaciers throughout Greenland and Scandinavia! This makes the region ideal for many different types of birds and whales who migrate around the world to feed and breed!

The Arctic holds in it's ice 20% of the earth's freshwater! Because the Arctic is mostly ocean, it plays a big role in keeping the earth's temperatures stable. The Sea Ice and snow that blanket the majority of the Arctic reflect 80% of sunlight back into space. The ocean on the other hand, absorbs 90% of that radiation. Sea ice keeps our planet from overheating!

In the winter, the arctic has 24 hours of darkness. The sun never comes up. Then, during the summer, it has no night! When the sun doesn't set, some of the ice melts, and the whole world heats up!

The Arctic Ocean is the shallowest of all the oceans, and it is FULL of life! It is extremely nutrient rich, and full of microscopic organisms including an abundance of plankton. These rich waters benefit all species across the entire food chain!

Unlike Antarctica, Arctic regions have indigenous peoples with a rich history of survival and care for the planet! The Inuit in Alaska and the Sami in Norway are a few examples. Today they fight to protect the lands they call home from all that threatens them! The Arctic has a history of exploration, exploitation, innovation, and majestic, abundant life. Because part of the Arctic touches so many countries in the world, it is extremely vulnerable and necessary to protect!





PUFFIN



SPOTTED SEAL



ARCTIC FOX



ARCTIC HARE



POLAR BEAR



LEMMING



ZOO PLANKTON



ARCTIC TERN



WALRUS



CARIBOU

PUFFIN: Puffins love to breed on the cliffs in Iceland. Their favorite food are herrings and eels. Most of their life is spent at sea! Both parents care for the egg and the baby puffin once it has hatched. **(ENDANGERED)**

ARCTIC FOX: They can survive extremely harsh conditions! Their coat will change from white to gray/brown during the summer months to help them stay camouflaged. They are carnivores, but also love vegetables when they can find them! **(NOT ENDANGERED)**

SPOTTED SEAL: They depend on ice! They give birth, rest, and bring up their young on sea ice! They are found near the Yellow Sea and Sea of Japan. **(ENDANGERED)**

ARCTIC HARE: The Arctic Hare's fur coat changes with the seasons to help them camouflage and insulate them in the extreme cold. They are VERY fast and can run up to 40mph! **(NOT ENDANGERED)**

POLAR BEAR: Polar Bear's coats are waterproof which helps them stay warm in the winter! They are technically marine animals because they spend most of their life on ice. **(ENDANGERED)**

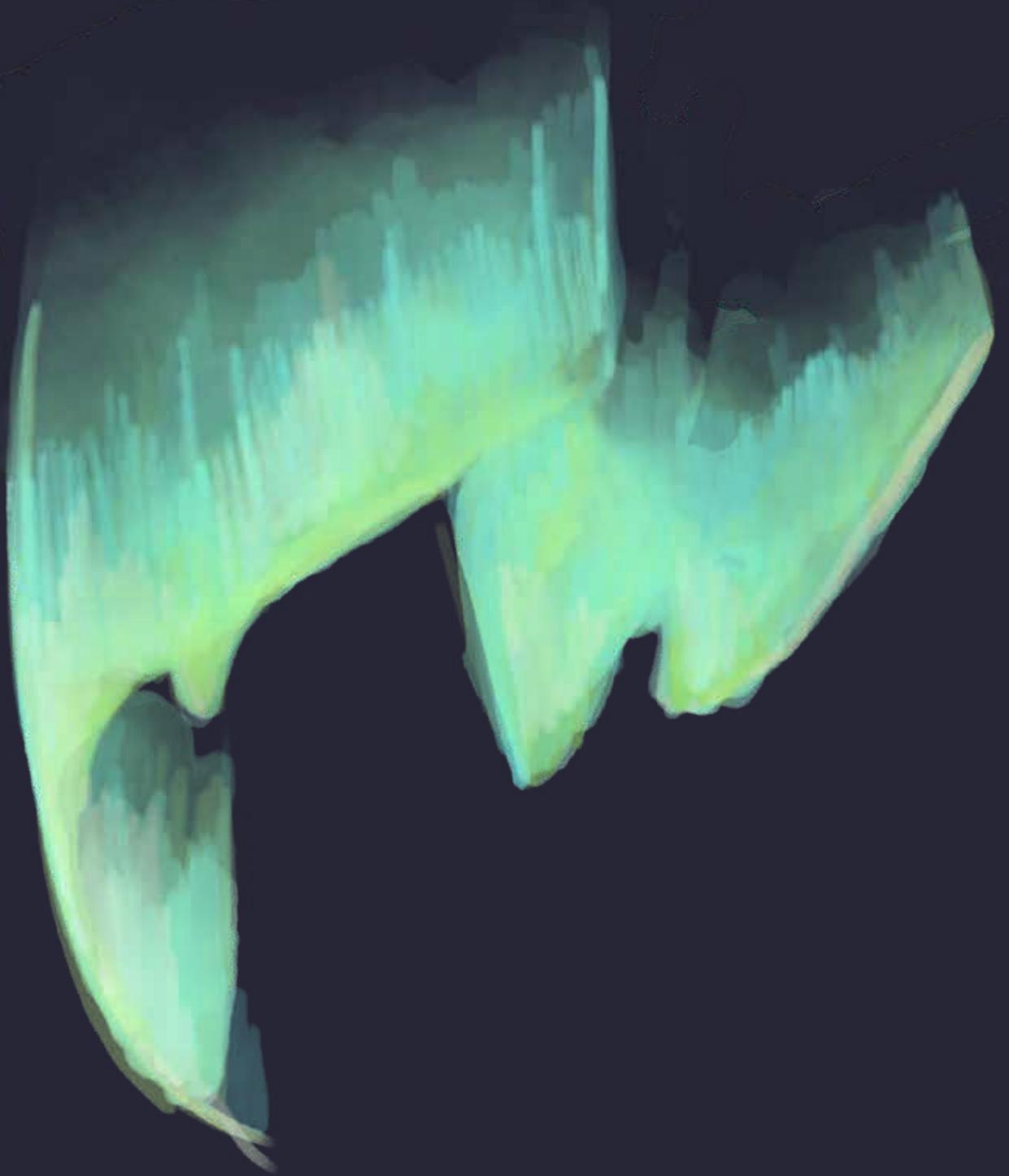
LEMMING: They are excellent swimmers and burrowers. Their population can grow to outrageous numbers when conditions are right, and when they do, they begin to migrate! **(NOT ENDANGERED)**

ARCTIC TERN: These birds migrate from pole to pole every year! Their main predators are polar bears and arctic foxes. **(NOT ENDANGERED)**

ZOOPLANKTON: These are microscopic animals! There are many different types. They drift with currents and tides around the world and are a major food source for most marine life! **(NOT ENDANGERED)**

WALRUS: They are very social creatures and like to live life huddled together on land. When getting out of the ocean they sometimes use their tusks to walk! It is called 'tooth walking'! They also have very sensitive whiskers that help them detect food at the bottom of the ocean! **(ENDANGERED)**

CARIBOU: Caribou are North American Reindeer! They are one of the largest migrating animals on the planet! They depend on lichen during the winters, which can take up to 80 years to grow. **(ENDANGERED)**



AUROLA BOREALIS

The Aurora Borealis is famous for its beautiful and colorful lights in the night sky. They are known to be northern but they exist in the southern part of the planet too and are called the Aurora Australis! They usually happen close to a magnetic pole (Arctic or Antarctic regions).

'Northern Lights' have been shrouded in mystery for centuries. Tribes native to Northern regions of the world and ancient cultures all have their own explanations for these 'dancing lights'. The Romans believed it was their goddess of dawn, Aurora. In medieval times it was thought to be a sign of war or famine. The Inuit tribes in North America have always celebrated them as the spirits of the animals they hunted, and the Menominee tribe from Wisconsin believed them to be the spirits of great hunters and fishermen. Even the Maori in New Zealand had their beliefs! They saw these lights and thought they were the reflections of campfires and torches in the distance.

What is the science behind these beautiful displays? Scientists have discovered that they are electronically charged particles from the sun that become trapped in the Earth's atmosphere! They can be many colors, in fact, you can tell what type of particle is trapped by the colors you see!

Green/Blue (the most common): is oxygen 60 miles from the surface.

Red: is oxygen caught 200 miles above the surface

Blue/Purple: is nitrogen

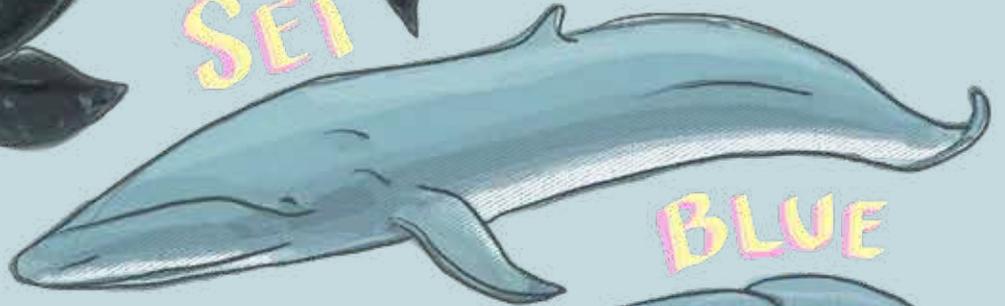
The best place to see the Aurora Borealis (northern lights) is close to midnight in the Northern regions of the world during the darkest times of year on a clear night.

Witnessing these lights is an unforgettable experience.

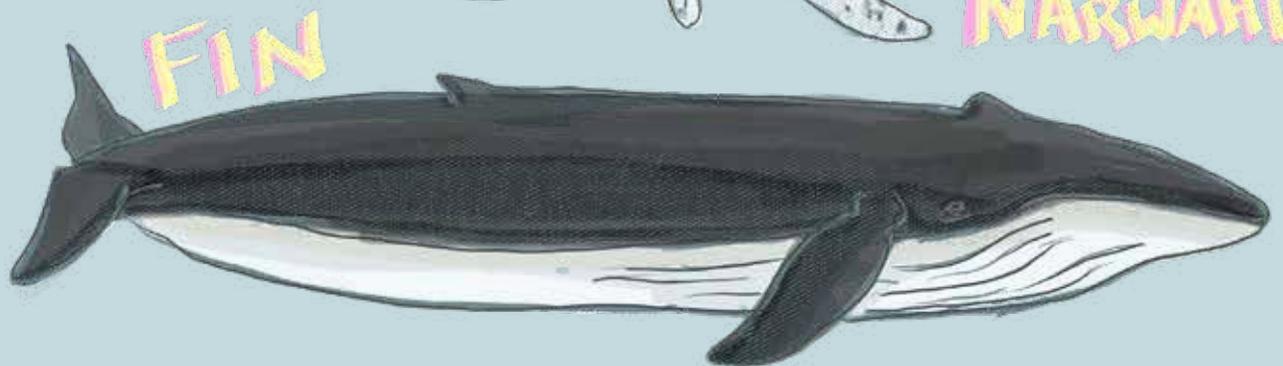
AURORA AUSTRALIS



SEI



MINKE



Whales are truly remarkable creatures! Some whale species are the largest animals that have ever existed on the planet. Despite their size, there is much we do not know about whales. We don't know where Blue Whales go to breed, and we don't know where Minke Whales go for over half the year! We don't understand their songs, but they leave us mesmerized.

Whales are a part of the Cetacean family, which includes ocean and river dolphins, whales, and porpoises. There two primary types of cetaceans: Baleen (bristle teeth that sift out water) and toothed whales! The biggest whales are all Baleen.

WHALES

Did you know that whales sing? Humpbacks are known for their 30 minute complex compositions, while Bowhead sing with variety and improvisation. Blue whales are known for extremely deep sounds and for how loudly they can sing. Though their songs are still mostly a great mystery to human beings, they are still enchanting.

All whales have been hunted to near extinction, but due to many conservation efforts, some are beginning to make a comeback! There are still many threats to whales, and some, like the Bowhead, only have as many as 300 left in the world.

PRIMARY THREATS:

- Industry (oil and gas) not only pollutes and destroys habitats, it also is so noisy that it is causing hearing loss in whales. This makes it impossible for them to migrate, breed, and feed.
- Fishing - they are subject to what we call the 'bycatch' They are caught in fisherman's nets who are trying to fish for other sea creatures.
- Commercial Whaling, though internationally banned, still occurs.
- Climate Change: sea ice, food sources, pollution, ocean temperatures, habitats are all being altered by the changing oceans, making it very difficult for whales and many other marine species to survive.



ENDANGERED ENDANGERED ENDANGERED ENDANGERED ENDANGERED ENDANGERED ENDANGERED ENDANGERED ENDANGERED ENDANGERED

BOWHEAD: May be the longest living animal on the planet. Currently we estimate up to 200 years old! Mostly live under the ice in the Arctic.

HUMPBACK: Humpback males sing complicated songs during mating seasons. They make some of the longest migrations and can be found in nearly every ocean.

MINKE: They have two blowholes at the top of their heads. They prefer pods of 2-3 whales or being on their own. We still have not discovered where they go in the summer months!

BLUE: They are bigger than any animal to have EVER existed (yes bigger than dinosaurs!) They love to eat krill! Though they are giant, there is still so much we don't know about them!

BELUGA: They travel by gender! They love to eat fish, salmon, and squid. Even though they have teeth, they prefer to swallow their food whole!

GRAY: They are bottom feeders and turn to their sides, often to their right, but like left and right handed people, there are left turn and right turning whales.

FIN: They are the second largest whale and have been known to breed with blue whales!

ORCA: Orca's are extremely clever and hunt in pods! They eat sharks, squid, penguins, seals, krill, even other whales, but not humans.

SEI: These whales rarely come to land and travel mostly on their own. There are few left, and little that we know about them. They prefer the deep ocean.

NARWHAL: Their tusk is really a tooth, and mostly males grow them. They are very sensitive and help them find food. They live at the Arctic Circle!

SPERM: Only the males travel to Antarctica! Their favorite food is Giant Squid.

MATCHING

Match each animal with the pole you think they belong to!
Draw a line from the animal to the Pole. If you think it is both, draw two lines, one connecting the animal to each pole!



The answers will be posted
on @worksby sarahnelson
Instagram in December

THE SITUATION

SOME OF THE THREATS:

Whaling
Commercial Fishing
Gas and Oil Industry
Plastics
Pollution
Ocean Acidification
Warming Oceans
Sea Ice Dissapearing

The number of challenges these regions and Polar species face is daunting!

BUT THERE IS HOPE!

Many people are working to try to protect species and regions form further damage. This is heroic work!

We need more voices to join the cause! One way you can help is by: **SUPPORTING AN ORGANIZATION:** There are LOTS of people and organizations doing amazing work to try and save the Arctic and Antarctic regions! You can support them by donating, volunteering, or spreading the word! Some organizations that are worth looking into:

WWF
Arctic Wildlife Refuge
Whale and Dolphin Conservation
Ocean Conservancy
Greenpeace
Indigenous People Secretariat
Alaska Wilderness League

WHAT YOU CAN DO

It is hard to learn about amazing places and species, only to find out that they are in critical danger.

THE GOOD NEWS is that **YOU** can make a difference!

Change happens when we **ALL** work together!

Have you ever seen how ants work together? They each take on what they can carry, and together they build amazing and complex structures. We can do that too! We each have a role to play and together we can make a difference!

PLASTIC: a LOT of our plastic ends up in the ocean. This is a big problem because plastic does not break down, and animals like whales and sea birds, seals, and fish are all eating it and aren't able to digest it and are dying. These plastics are even showing up in **OUR** food as a result! Even if you don't live near an ocean, it is flowing from our rivers into the ocean. We are finding large amounts of plastic on the poles, and by reducing (not using or buying when possible) plastics we can ensure that less plastic gets to the ocean and to our poles!

REDUCE & REUSE: Reducing in general begins a chain reaction throughout all systems that are impacting the greater environments of our planet! Using what we already have, and becoming creative in the way that we problem solve, repair, and purchase, can have an enormous impact on the way we live, and on the amount of trash we personally contribute to landfills and the oceans.

SPREAD THE WORD: It is hard for things to change when people don't know about the problem! Spreading the word is a powerful tool in helping more voices join in and make a difference! People can't help what they don't know is hurting.

KEEP LEARNING: Making a difference is always a journey! Sometimes we think we are helping, but what we are doing isn't addressing the full issue! When we keep learning, we continue to find new and better ways to solve problems, and gain a deeper love and understanding for our planet at the same time!

YOU ARE NEVER TOO SMALL, TOO BIG, TOO YOUNG, OR TOO OLD TO MAKE A DIFFERENCE!



MY EXPEDITION

JUNE 2020

In late March of 2019 I received a life changing e-mail from the Arctic Circle Residency Program based in New York. I had been accepted into their June 2020 expedition to Svalbard, Norway at the Arctic Circle!

In June, I will board a barquentine vessel and sail the Arctic Circle for 3 weeks. During our voyage there will be excursions to glaciers and many other ecosystems throughout the Arctic.

The program brings professionals together from all around the world. Scientists, researchers, and artists of all kinds will board the ship, and work to tell the story of the Arctic's fragile and magnificent ecosystem.

The founder of the residency created this opportunity with the belief that bringing people from around the world, who all work in different artistic and scientific disciplines, could have the power to create real and lasting change in the fight against climate change.

I am extremely honored to bear witness and learn first hand from the Arctic landscape. I will create art in response to this trip during the voyage and after I return. I also hope to be highly collaborative with my shipmates to collectively share our findings and our experiences with people around the world. I have also teamed up with a National Geographic Society Plankton researcher, who will look at Arctic Ocean Samples, share her research and images from the samples and I will create art in response to her findings.

I am sure this will also mean a special edition of THIS AMAZING PLANET when I return.

I am incredibly honored to participate in this work. My hope is that translating important research into illustration will make this information accessible to broader communities, and allow for more people to celebrate the incredible world we live in and to care for it better.

That passion and desire is what formed This Amazing Planet and continues to fuel my work as a whole. I believe that knowing our planet is better for us, and that a healthy planet makes us healthier too.

I know working alongside others who are also passionate about caring for our planet will be transformative, and I cannot wait to share about the trip with each of you!

Though the trip is an awarded artist residency, the experience is not free!

THE COSTS

Program expenses \$6,600

Flights to Longyearbyen and back \$2000

Taxes insurance and fees \$300

The Gear we are specifically recommended by the program to bring:

Arctic Boots \$135

Long Underwear (2 pair) \$80

Snow Pants \$170

Specific Arctic Exploration coat \$175

Paper for sketching and drawing while on boat \$70

Vials for water samples \$20

If you have a desire to be a part of this expedition by making it more possible, or if your business wants to sponsor this venture through goods or financial contribution, please reach out to me at

sarahannelsonart@gmail.com or visit

MY GOFUNDME:

<https://www.gofundme.com/f/arctic-circle-artist-residency>

THE POLES

The polar regions of our planet, though remote, play a big role in the health of all of our ecosystems and continents. In spite of their harsh climates, they give life to many beings, and provide oxygen we depend on. They are also a fresh water reserve, and by keeping much of the earth's water frozen, they keep sea levels from dramatically rising.

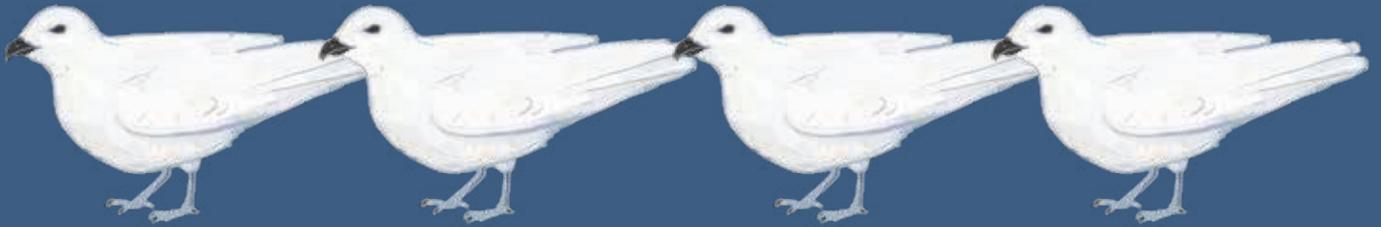
The poles remind us that we are ALL interconnected, not just as human beings but as species inhabiting the same planet. We need the phytoplankton, and we need the things that eat the phytoplankton and keep them from becoming toxic blooms. We need sea ice to remain frozen so that our climate can stabilize and coastal regions can remain above sea level.

Even though these regions are so important, we still struggle to value and protect them, because of their rich resources and our lack of knowledge about them! There are many reasons that we are seeing the effects of climate change and our industry most dramatically at our poles, and they should not be ignored.

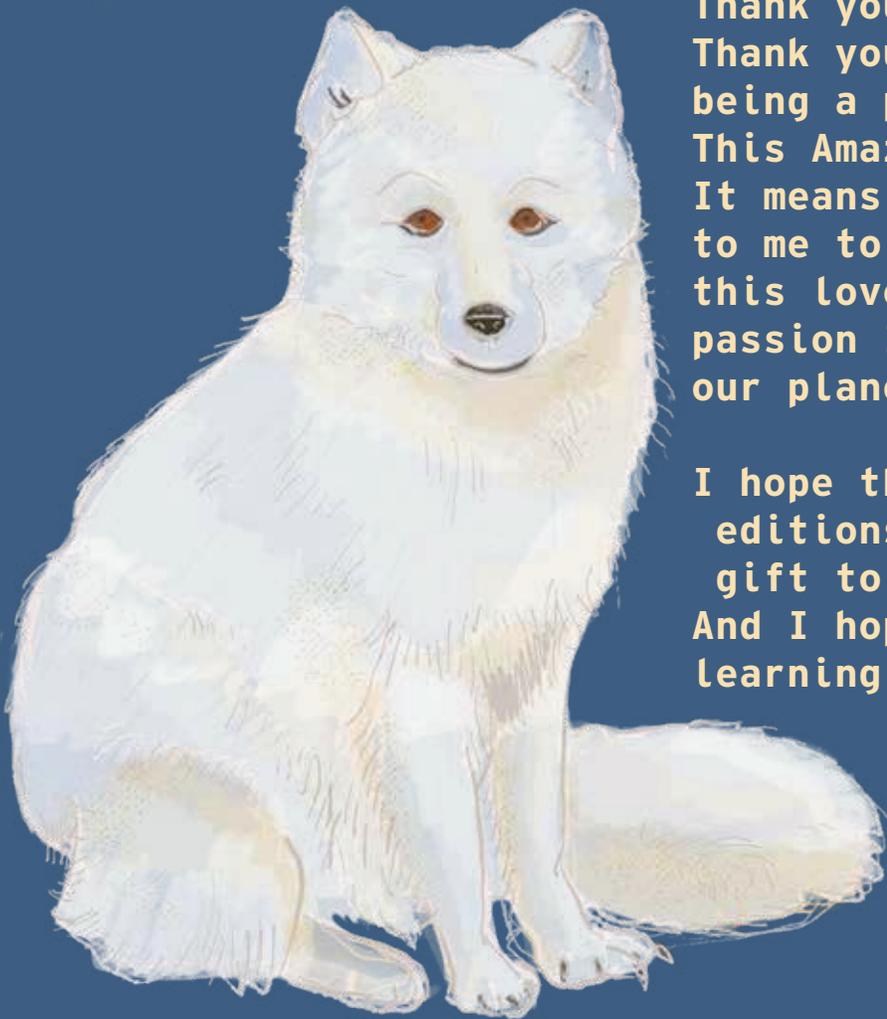
Let's make a difference and spread the word about how vital these regions are to our lives and the lives of every living thing on the planet!

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THANK YOU



Thank you for reading!
Thank you for sharing!
Thank you for
being a part of the
This Amazing Planet community!
It means the world
to me to share
this love and
passion I have for
our planet with others.

I hope these
editions can be a
gift to you and others.
And I hope you enjoyed
learning about the Poles!

- Sarah Nelson

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