

OLE MATHISMOEN AND JENNY JORDAHL

WHAT'S THE  
DEAL  
WITH CLIMATE?

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Vigmostad & Bjørke

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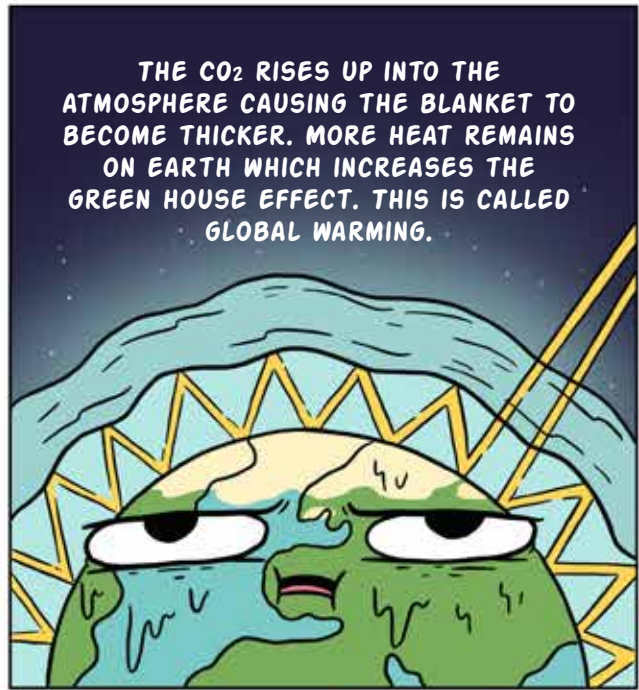
HI! MY NAME IS JENNY AND  
I LOVE TO DRAW ANIMALS.

# LITTLE YOU AND LITTLE ME

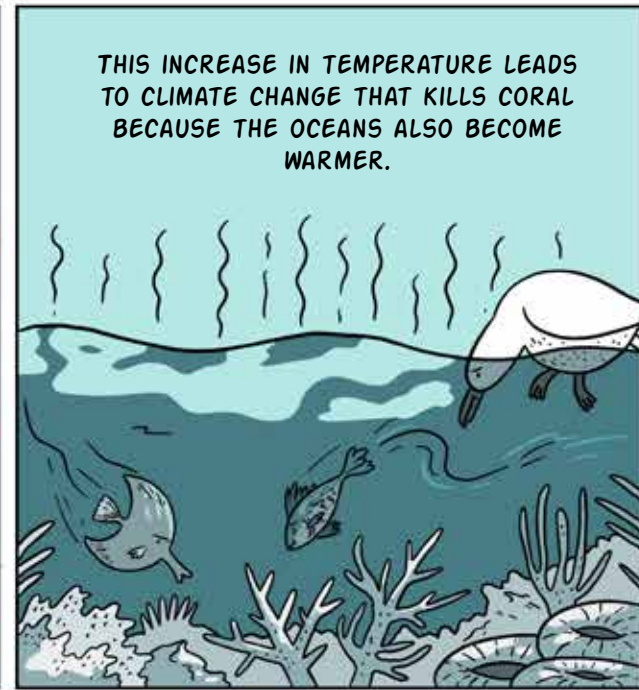


AND I'M OLE. I WRITE A LOT  
ABOUT NATURE AND THE  
CLIMATE.





THE CO<sub>2</sub> RISES UP INTO THE ATMOSPHERE CAUSING THE BLANKET TO BECOME THICKER. MORE HEAT REMAINS ON EARTH WHICH INCREASES THE GREEN HOUSE EFFECT. THIS IS CALLED GLOBAL WARMING.



THIS INCREASE IN TEMPERATURE LEADS TO CLIMATE CHANGE THAT KILLS CORAL BECAUSE THE OCEANS ALSO BECOME WARMER.



OH I SEE! IF I AM COLD AND WRAP MYSELF IN A WOOLY BLANKET, I BECOME WARM AND COZY. BUT IF I USE TWO OR THREE BLANKETS I BECOME TOO WARM.

EXACTLY! IT'S THE SAME THING WITH THE PLANET. A BLANKET THAT IS TOO THICK IS NOT A GOOD THING.



### FACTS ABOUT THE ATMOSPHERE

THE ATMOSPHERE IS THE LAYER OF AIR WHICH SURROUNDS PLANET EARTH.

IT CONSISTS OF SEVERAL LAYERS WITH DIFFERENT NAMES. THE BOTTOM LAYER, UP TO 10-20 KM IS CALLED THE TROPOSPHERE.

THE LAYER ABOVE THAT, UP TO ABOUT 50 KM IS CALLED THE STRATOSPHERE.

THE GREENHOUSE EFFECT OCCURS MOSTLY IN THE TROPOSPHERE.



# CO<sub>2</sub> GOES AROUND AND AROUND

YOU SAID THAT PLANTS USE CO<sub>2</sub> TO GROW. SO CO<sub>2</sub> IS GOOD. BUT CO<sub>2</sub> ALSO CAUSES CLIMATE CHANGE. AND THAT'S NOT SO GOOD.

THIS YOU HAVE TO EXPLAIN!



# WHAT HAPPENS TO CO<sub>2</sub> EMISSIONS?

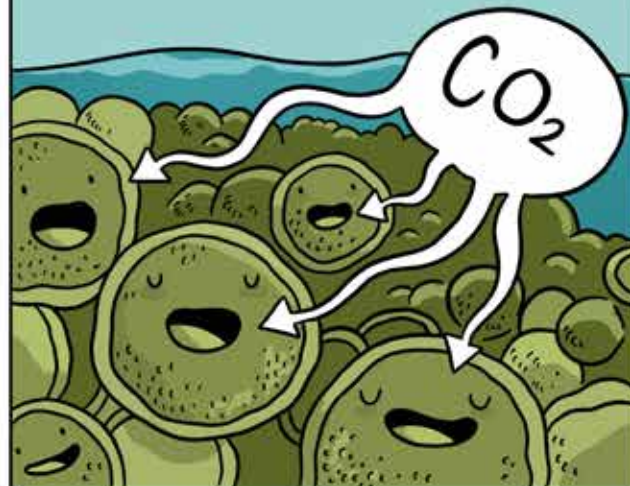


BUT WHERE DOES OUR SUPPLY OF CO<sub>2</sub> COME FROM?

MANY MILLIONS OF YEARS AGO, BEFORE AND AFTER THE GREAT DINOSAURS ROAMED THE EARTH, THERE WERE ALSO HUGE AMOUNTS OF ALGAE IN THE OCEAN.



ALGAE USED A WHOLE LOT OF CO<sub>2</sub> IN ORDER TO GROW.



AFTER MANY MILLIONS OF YEARS THEY BECAME COAL, OIL AND GAS.



WHEN THEY DIED, THEY SUNK DOWN TO THE OCEAN FLOOR AND WERE COVERED WITH SAND AND SLUDGE.

TODAY WE CALL THIS FOSSILE FUEL. OIL IS IN FACT, ALGAE FOSSILS.



WHEN WE REMOVE THE OIL AND BURN IT - EITHER AS GASOLINE IN A CAR MOTOR OR IN A FACTORY, THE ALGAE'S CO<sub>2</sub> IS RELEASED BACK INTO THE ATMOSPHERE, AFTER MILLIONS OF YEARS BELOW THE OCEAN FLOOR.



IT IS THIS CO<sub>2</sub> WHICH INCREASES THE GREENHOUSE EFFECT ON EARTH.



IS THAT WHY CLIMATE CHANGE IS SAID TO BE CAUSED BY HUMANS?

RIGHT! BECAUSE WE'RE THE ONES RESPONSIBLE FOR RELEASING CO<sub>2</sub> BACK INTO THE ATMOSPHERE.



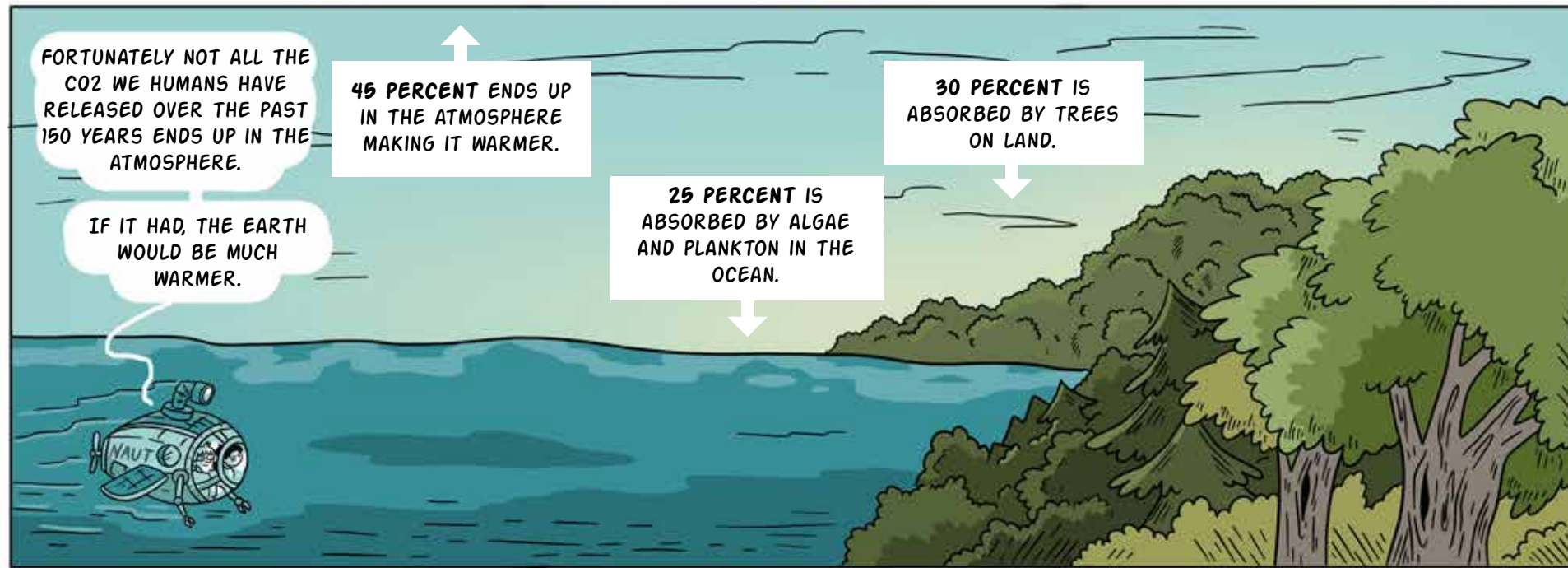
FORTUNATELY NOT ALL THE CO<sub>2</sub> WE HUMANS HAVE RELEASED OVER THE PAST 150 YEARS ENDS UP IN THE ATMOSPHERE.

IF IT HAD, THE EARTH WOULD BE MUCH WARMER.

45 PERCENT ENDS UP IN THE ATMOSPHERE MAKING IT WARMER.

30 PERCENT IS ABSORBED BY TREES ON LAND.

25 PERCENT IS ABSORBED BY ALGAE AND PLANKTON IN THE OCEAN.

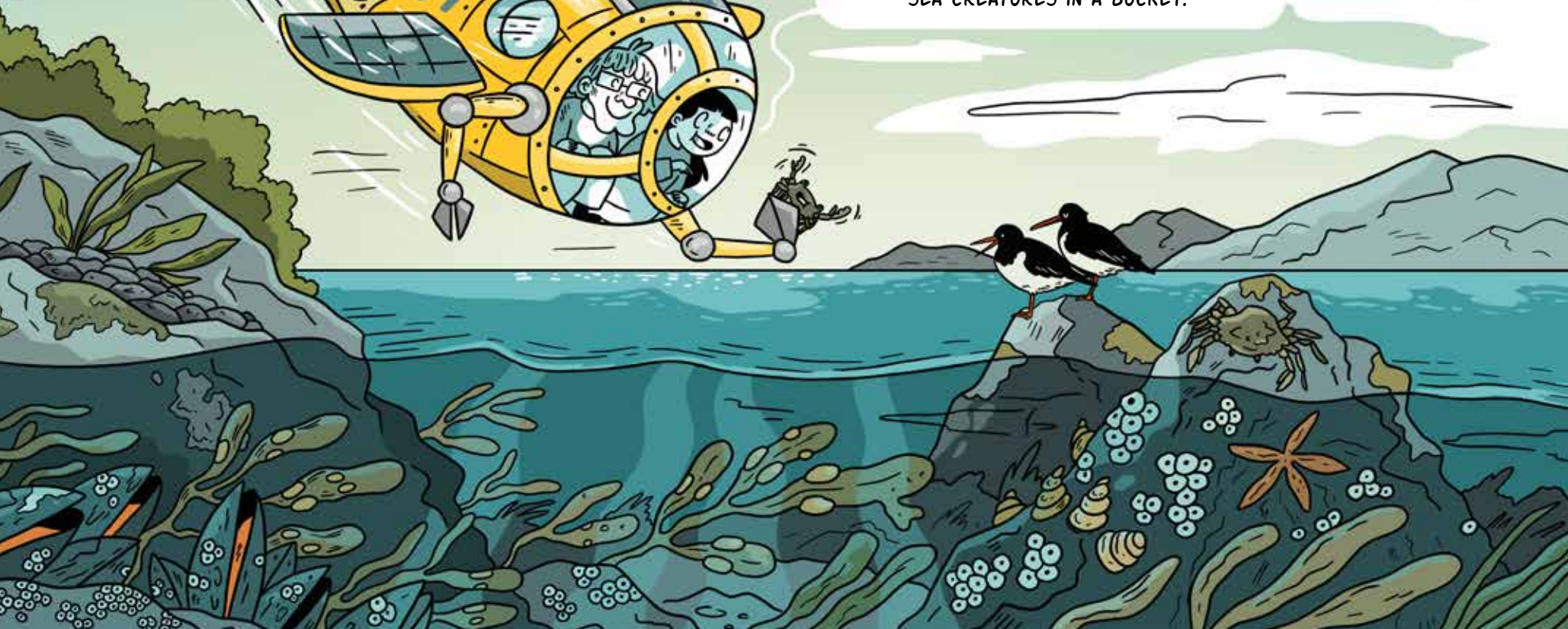




# ACIDIC OCEANS

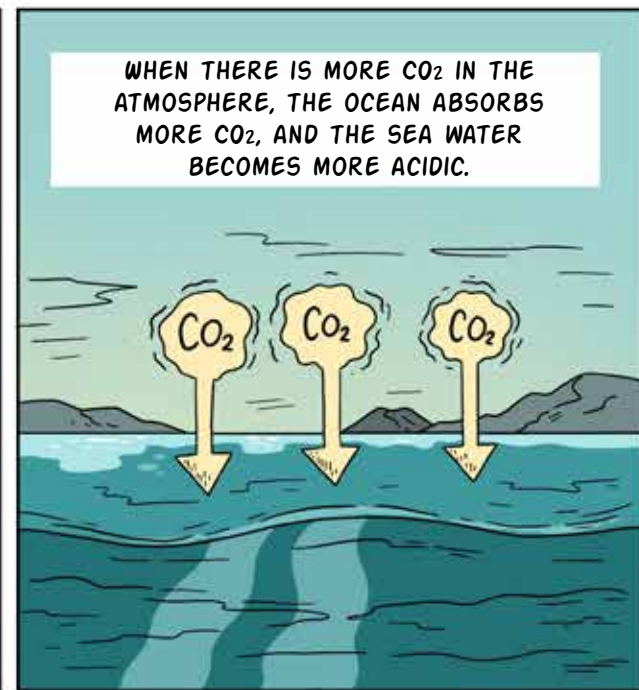


I LOVE THE SEASHORE. WHEN I WAS LITTLE I WOULD LIFT UP SEASHELLS TO SEE WHAT WAS UNDERNEATH. AND I COLLECTED TINY SEA CREATURES IN A BUCKET.



MANY OF THE CREATURES YOU COLLECTED NEED LIME. SNAILS AND MUSSELS HAVE HOUSES MADE OF LIME. SHRIMPS AND CRABS HAVE LIME IN THEIR SHELLS.

YES, THEY ARE VERY HARD!



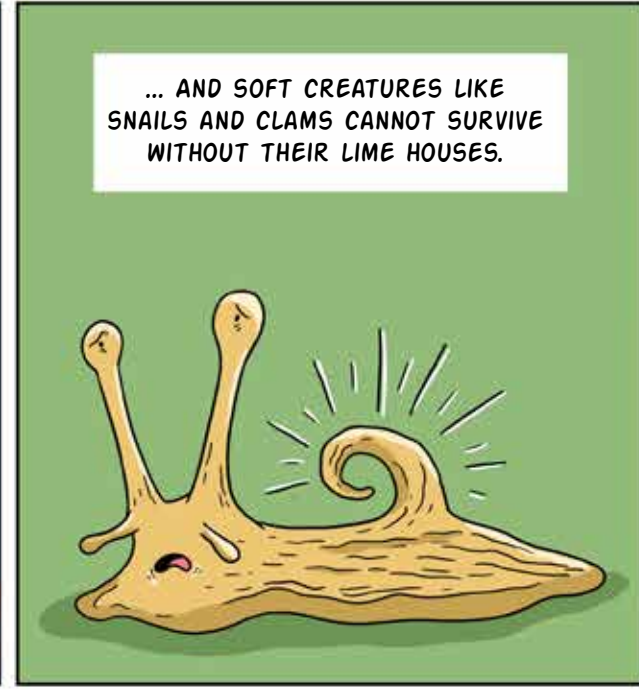
WHEN THERE IS MORE CO<sub>2</sub> IN THE ATMOSPHERE, THE OCEAN ABSORBS MORE CO<sub>2</sub>, AND THE SEA WATER BECOMES MORE ACIDIC.



WHEN THE OCEAN BECOMES ACIDIC, THERE IS LESS OF THE ELEMENT WE CALL CARBONATE.



CARBONATE IS AN IMPORTANT PART OF LIME AND AN IMPORTANT BUILDING BLOCK FOR ALL ANIMALS WHO BUILD HOUSES OF LIME.



... AND SOFT CREATURES LIKE SNAILS AND CLAMS CANNOT SURVIVE WITHOUT THEIR LIME HOUSES.



OUR CO<sub>2</sub> EMISSIONS CAUSE A LOT OF DIFFERENT PROBLEMS, FOR SURE.



# ANIMALS DON'T LIKE THE NEW CLIMATE

IN THE COURSE OF THE PAST 150 YEARS THE TEMPERATURE ON EARTH HAS INCREASED BY ONE DEGREE. THAT DOESN'T SOUND LIKE VERY MUCH.

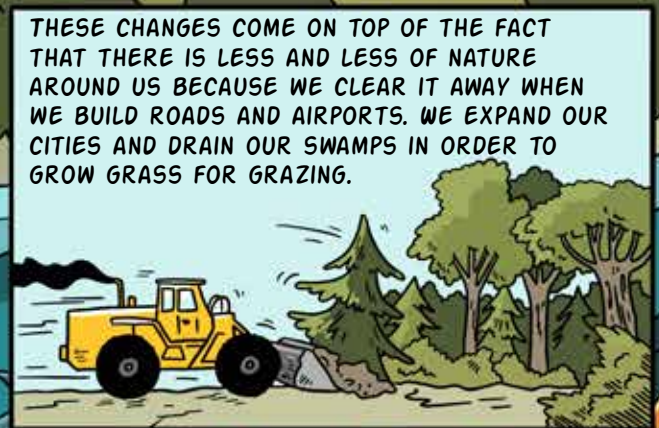
BUT IT IS ENOUGH TO CAUSE BIG PROBLEMS FOR MANY ANIMALS AND PLANTS.



THERE ARE TWO REASONS FOR THIS.



GLOBAL WARMING CAUSES CHANGES IN NATURE. PERHAPS AREAS WHERE ANIMALS LIVE BECOME DRIER OR WETTER. PERHAPS THE WINTER BECOMES SHORTER AND SPRING ARRIVES MUCH EARLIER.



THESE CHANGES COME ON TOP OF THE FACT THAT THERE IS LESS AND LESS OF NATURE AROUND US BECAUSE WE CLEAR IT AWAY WHEN WE BUILD ROADS AND AIRPORTS. WE EXPAND OUR CITIES AND DRAIN OUR SWAMPS IN ORDER TO GROW GRASS FOR GRAZING.



IN MANY PLACES NATURE HAS BECOME JUST TINY ISLANDS IN THE HUMAN WORLD. BEFORE, IT WAS THE OPPOSITE.



LET'S GO HAVE A LOOK AT WHAT'S HAPPENING AROUND THE WORLD.





**RISING TEMPERATURE IN THE ARCTIC REGIONS AROUND THE NORTH POLE IS GREATER THAN IN THE REST OF THE WORLD. THE RESULT IS THAT LESS AND LESS OF THE ARCTIC OCEAN IS COVERED WITH ICE IN THE SOMMER.**



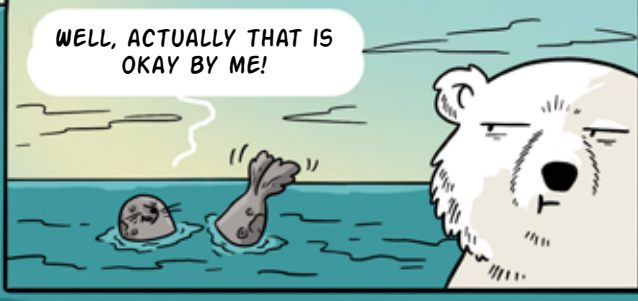
I USED TO BUILD A SNOW LAIR ON THE ICE WHERE I GAVE BIRTH TO MY PUPS.

I USED TO HUNT RINGED SEALS WHO WERE LYING IN THESE SNOW LAIRS.



BUT NOW THERE'S JUST OPEN SEA. AS AN ADULT POLAR BEAR I CAN SWIM NORTHWARD TO WHERE THERE STILL IS ICE, BUT IT'S TOO LONG A TRIP FOR POLAR BEAR CUBS. THEY WILL SURELY DROWN IF THEY TRY.

WELL, ACTUALLY THAT IS OKAY BY ME!



**A GREAT MANY SEABIRDS ARE STRUGGLING TO FIND ENOUGH FOOD. THAT'S WHY THERE ARE SO FEW OF SOME SPECIES. BEFORE THERE WERE 330,000 KITTIWAKES IN NORWAY. NOW THERE ARE JUST 90,000.**

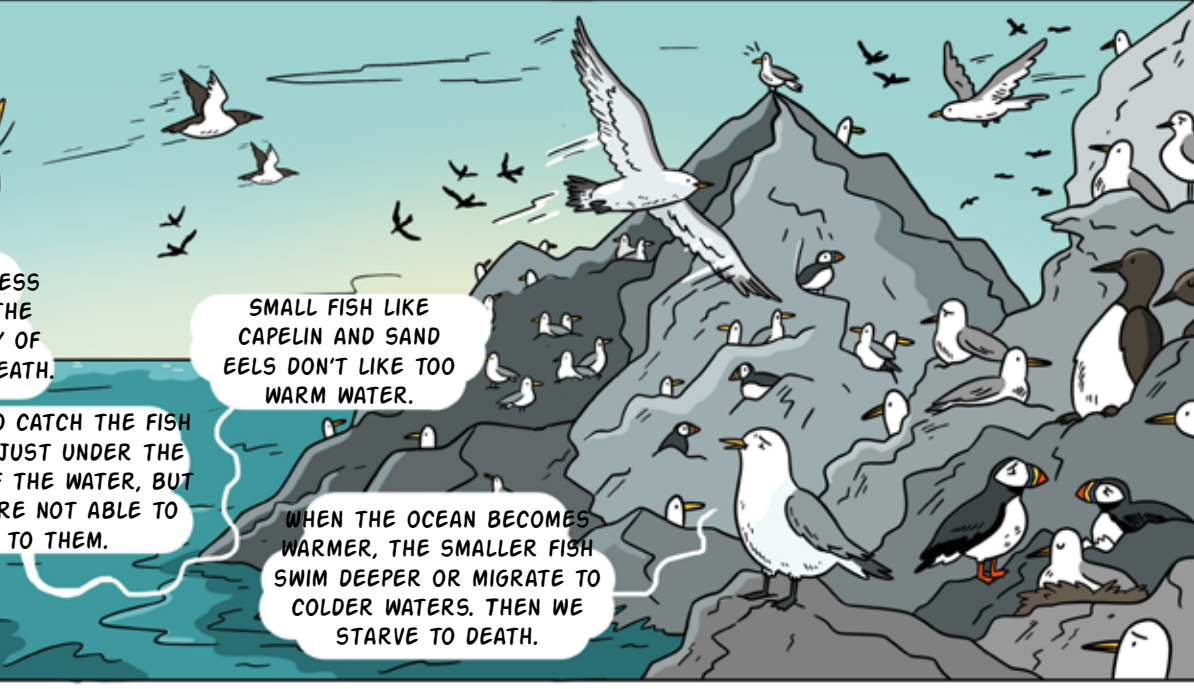


THERE IS GREAT SADNESS IN THE FAMILY. OVER THE PAST FEW YEARS MANY OF US HAVE STARVED TO DEATH.

WE USED TO CATCH THE FISH SWIMMING JUST UNDER THE SURFACE OF THE WATER, BUT NOW WE ARE NOT ABLE TO GET TO THEM.

SMALL FISH LIKE CAPELIN AND SAND EELS DON'T LIKE TOO WARM WATER.

WHEN THE OCEAN BECOMES WARMER, THE SMALLER FISH SWIM DEEPER OR MIGRATE TO COLDER WATERS. THEN WE STARVE TO DEATH.



WHEN THE OCEAN WARMS UP NEW TYPES OF FISH ARE ABLE TO THRIVE IN AREAS THAT PREVIOUSLY WERE TOO COLD. FISH THAT ARE ALREADY LIVING THERE HAVE TO MOVE TO COLDER WATERS.

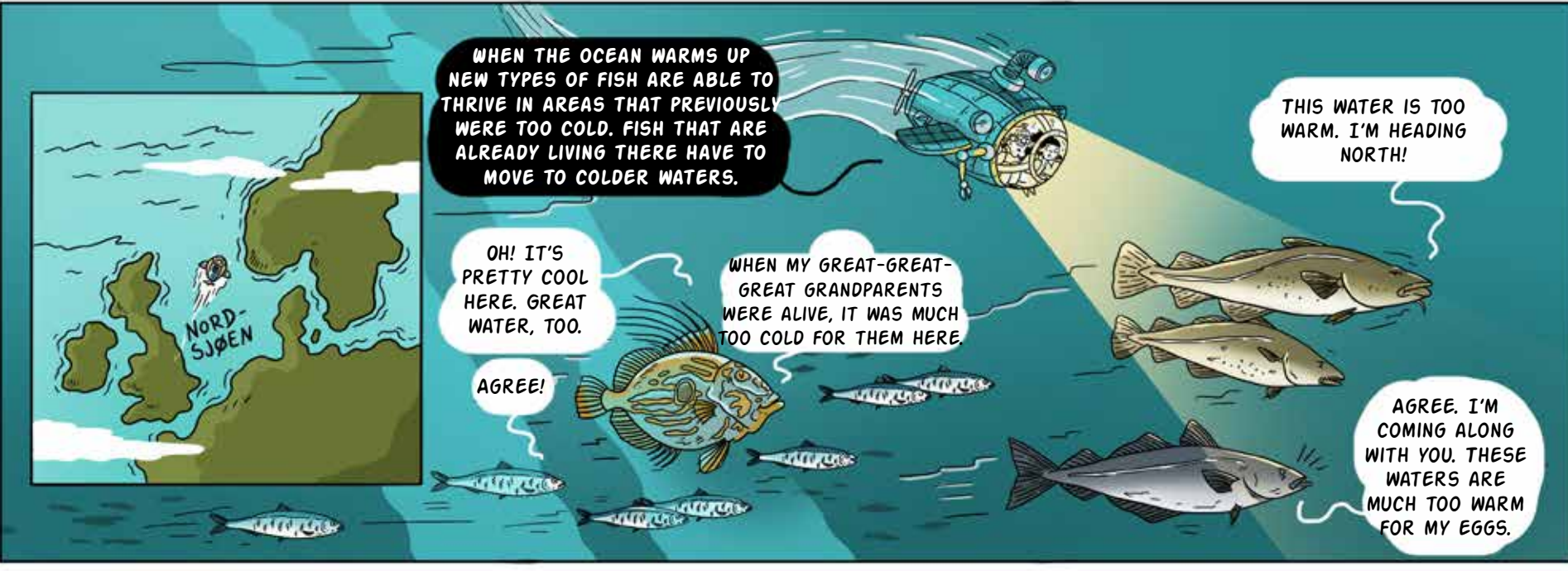
OH! IT'S PRETTY COOL HERE. GREAT WATER, TOO.

AGREE!

WHEN MY GREAT-GREAT-GREAT GRANDPARENTS WERE ALIVE, IT WAS MUCH TOO COLD FOR THEM HERE.

THIS WATER IS TOO WARM. I'M HEADING NORTH!

AGREE. I'M COMING ALONG WITH YOU. THESE WATERS ARE MUCH TOO WARM FOR MY EGGS.



CLIMATE CHANGE CAN CAUSE SPRING TO ARRIVE EARLIER UP NORTH. IT'S GOOD FOR SOME BIRDS, BUT BAD FOR OTHERS.

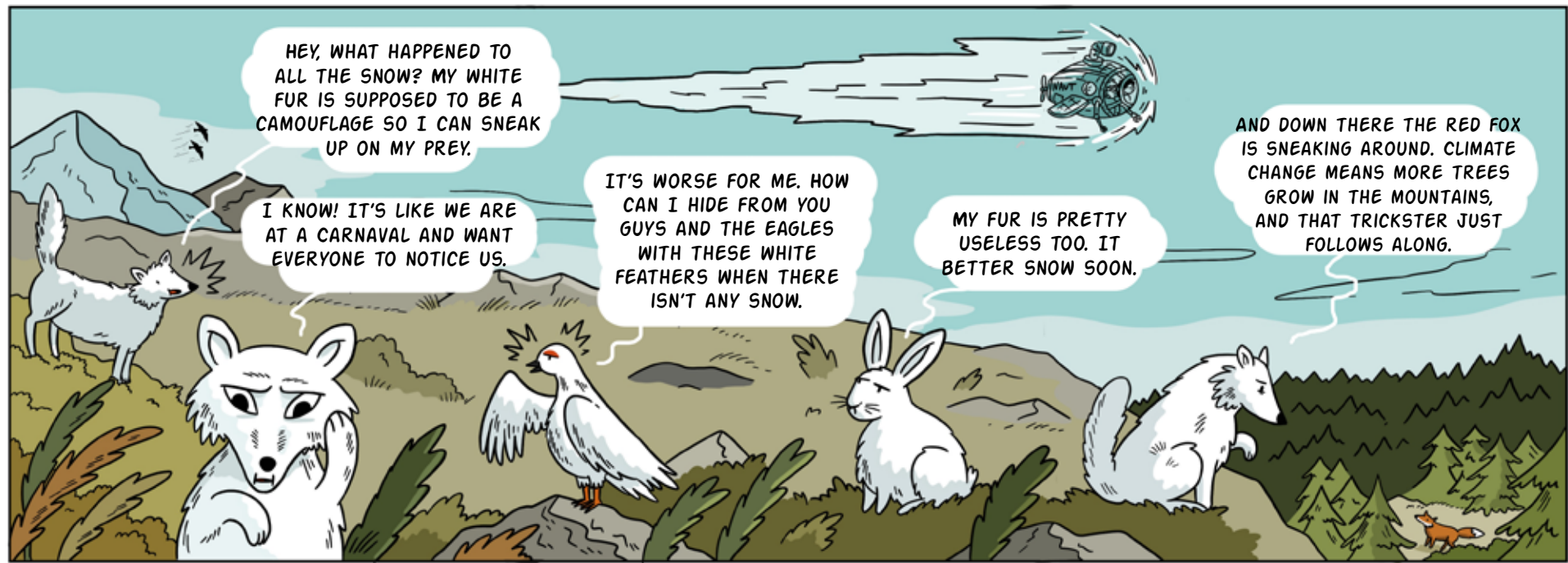
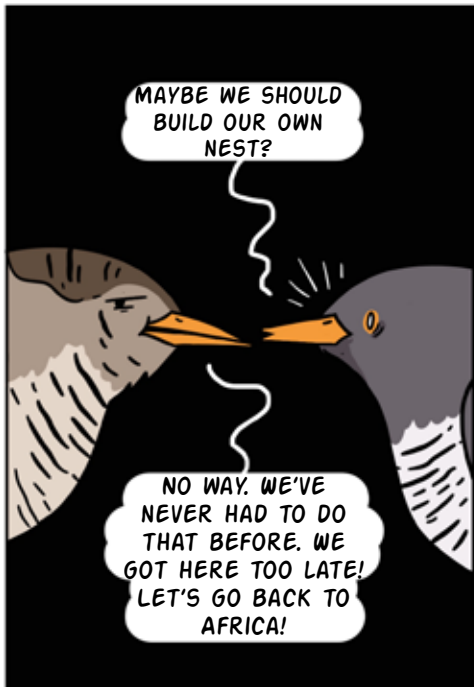
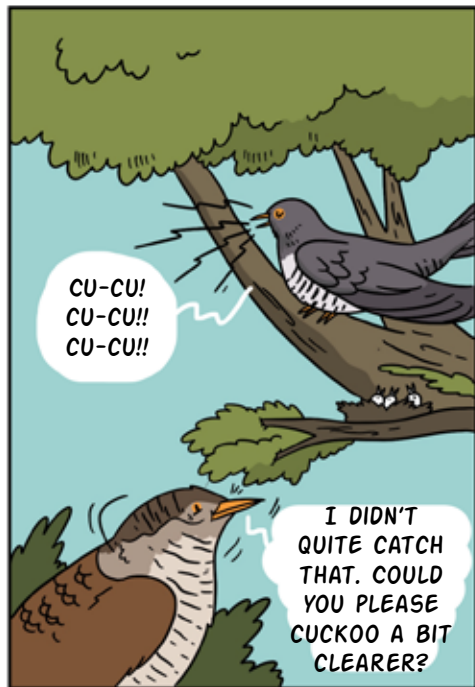
INCREASED TEMPERATURES CAUSE SOME SPECIES TO MOVE TO NEW HABITATS, AND FORCE OUT OTHERS WHO ARE LIVING THERE.





### CUCKOO

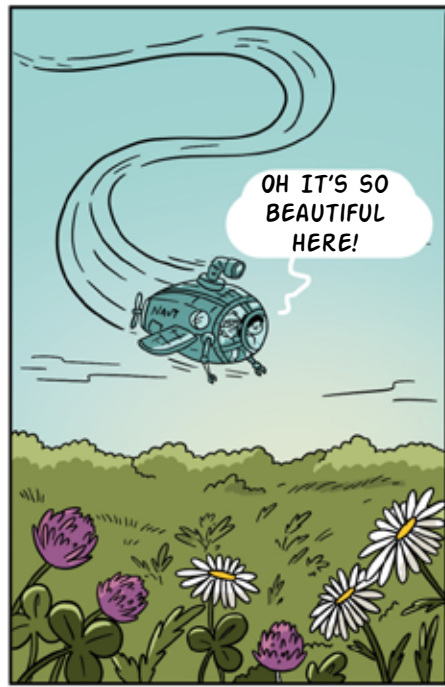
THE CUCKOO BIRD LIVES IN AFRICAN DURING THE WINTER. AT A CERTAIN TIME EVERY YEAR IT FLIES TO NORTHERN EUROPE TO LAY ITS EGGS - IN OTHER BIRDS' NESTS. DUE TO CLIMATE CHANGE THE SMALLER BIRDS ARE OFTEN FINISH WITH THE YEAR'S NESTING WHEN THE CUCKOO FINALLY ARRIVES.



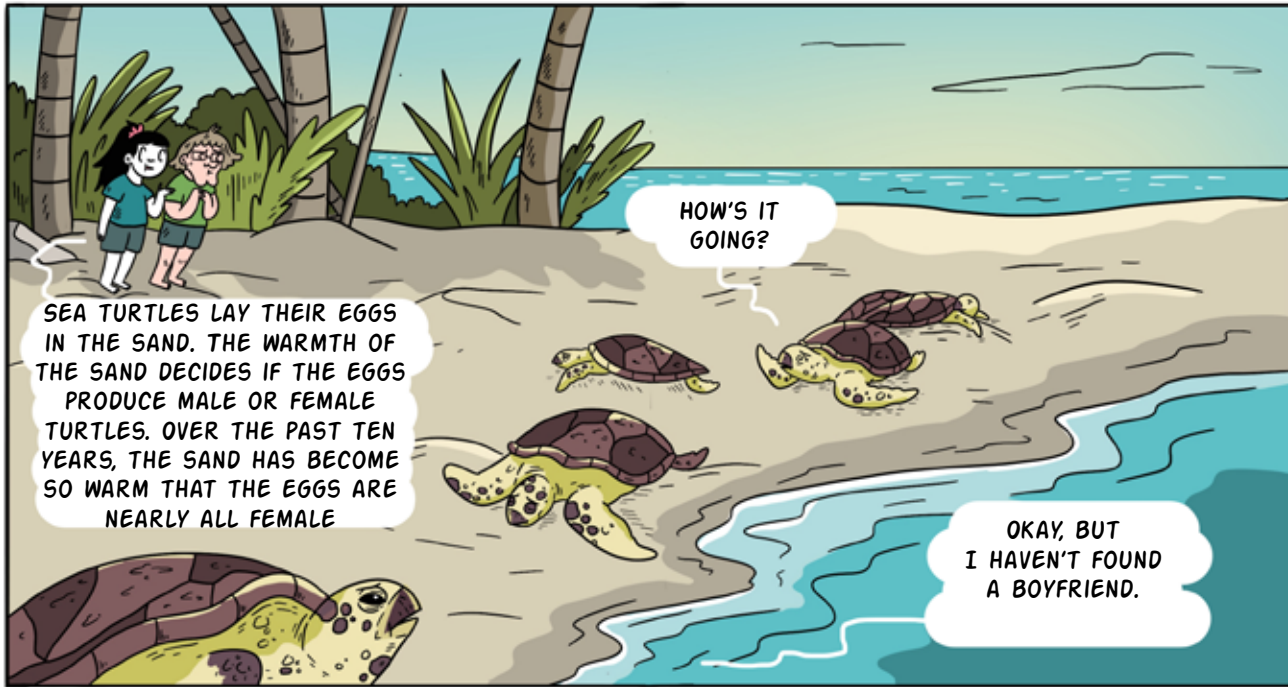
### PIED FLYCATCHER

THE LARVA WE USUALLY COLLECT FOR OUR BABIES TURNED INTO BUTTERFLIES LONG BEFORE WE GOT BACK FROM OUR WINTER VACATION IN AFRICA.

THIS IS PRETTY HOPELESS.







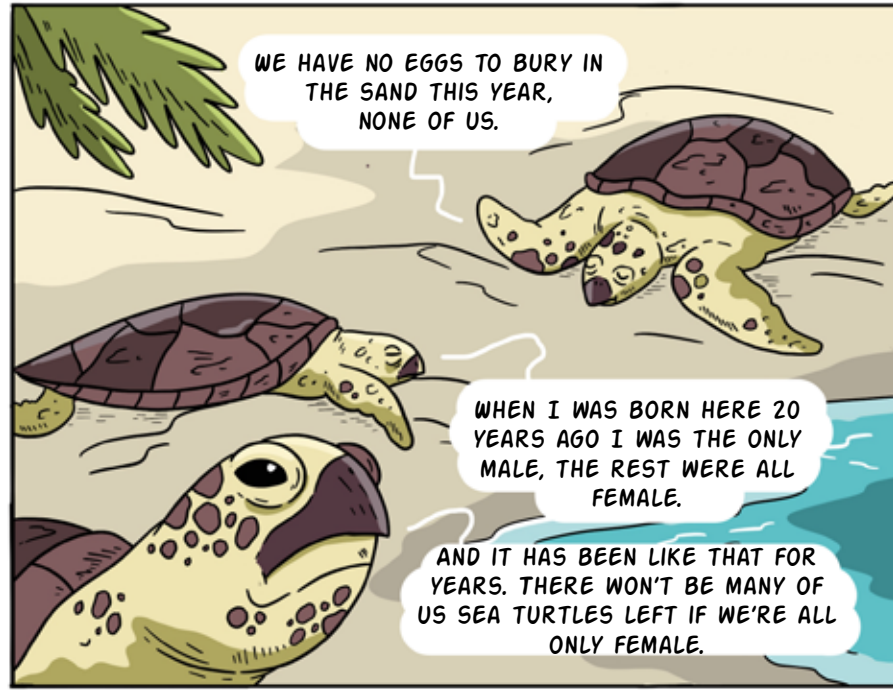
SEA TURTLES LAY THEIR EGGS IN THE SAND. THE WARMTH OF THE SAND DECIDES IF THE EGGS PRODUCE MALE OR FEMALE TURTLES. OVER THE PAST TEN YEARS, THE SAND HAS BECOME SO WARM THAT THE EGGS ARE NEARLY ALL FEMALE

HOW'S IT GOING?

OKAY, BUT I HAVEN'T FOUND A BOYFRIEND.



ME NEITHER.



WE HAVE NO EGGS TO BURY IN THE SAND THIS YEAR, NONE OF US.

WHEN I WAS BORN HERE 20 YEARS AGO I WAS THE ONLY MALE, THE REST WERE ALL FEMALE.

AND IT HAS BEEN LIKE THAT FOR YEARS. THERE WON'T BE MANY OF US SEA TURTLES LEFT IF WE'RE ALL ONLY FEMALE.

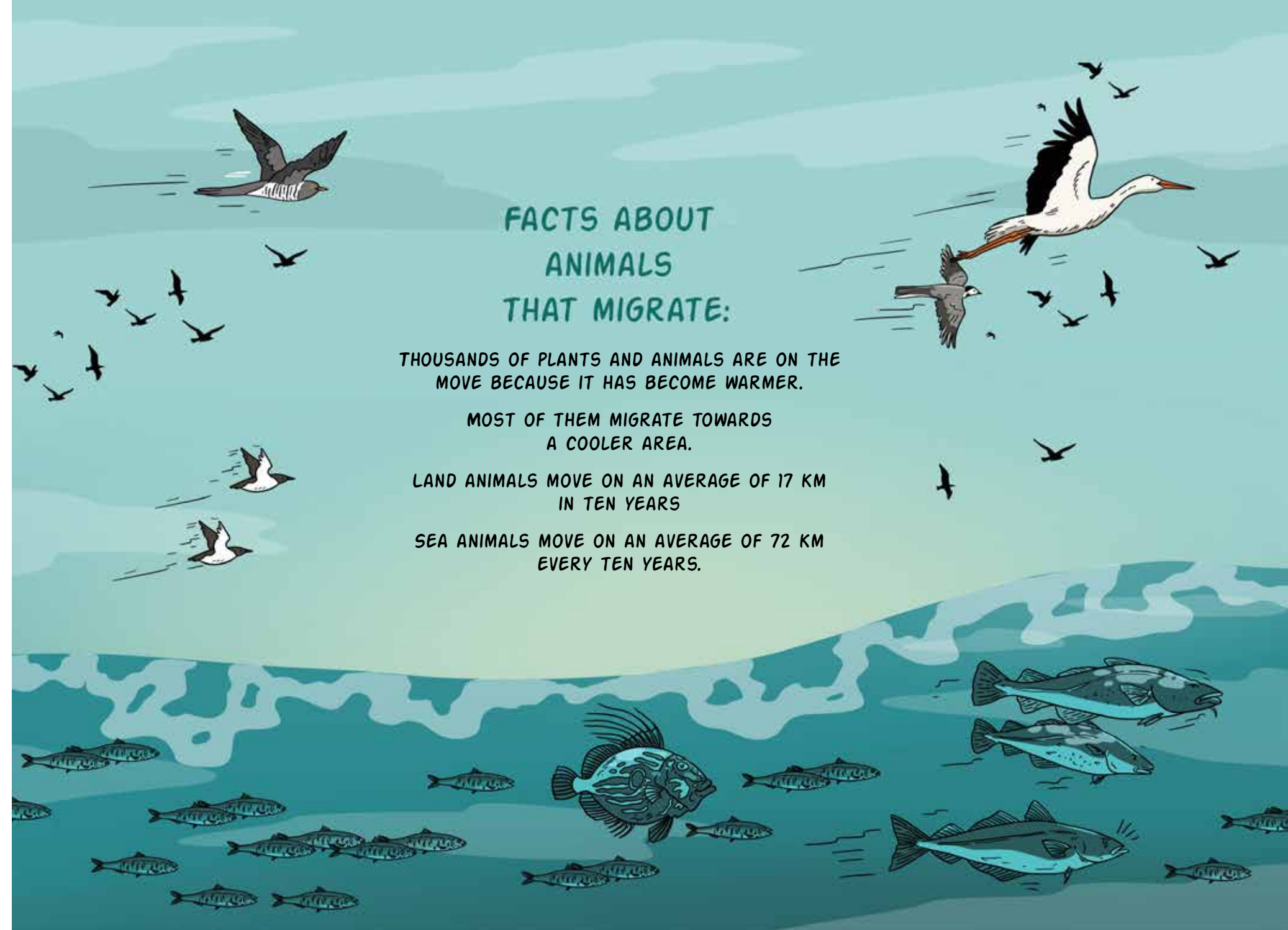


BAD NEWS FOR OUR SPECIES.

MAYBE WE CAN ADOPT?



...SAME HERE.



### FACTS ABOUT ANIMALS THAT MIGRATE:

THOUSANDS OF PLANTS AND ANIMALS ARE ON THE MOVE BECAUSE IT HAS BECOME WARMER.

MOST OF THEM MIGRATE TOWARDS A COOLER AREA.

LAND ANIMALS MOVE ON AN AVERAGE OF 17 KM IN TEN YEARS

SEA ANIMALS MOVE ON AN AVERAGE OF 72 KM EVERY TEN YEARS.



# PLANTS AND ANIMALS ARE VANISHING FOREVER

EVERYWHERE ON EARTH PLANTS AND ANIMALS ARE BECOMING EXTINCT. THEY ARE GONE FOREVER.

USUALLY IT'S BECAUSE WE HUMANS HAVE REDUCED OR DESTROYED THEIR NATURAL ENVIRONMENT.

CLIMATE CHANGE HAS BECOME A NEW THREAT. THE CLIMATE WHERE ANIMALS AND PLANTS LIVE HAS CHANGED SO MUCH THAT THEY NO LONGER CAN LIVE THERE.

THE RESEARCHERS BELIEVE THAT MANY ANIMALS AND PLANTS WILL DIE OUT IF GLOBAL WARMING IS NOT STOPPED.

IT'S REALLY DUMB THAT CLIMATE CHANGE FORCES ANIMALS TO MIGRATE.

FOR SOME, IT'S ALREADY TOO LATE.

CLIMATE CHANGE IS ESPECIALLY SCARY FOR SPECIES THAT ARE FOUND ONLY ONE PLACE ON EARTH.

IN THE MISTY RAIN FOREST ON COSTA RICA LIVED A SPECIES OF RARE, TINY FROGS THAT WERE ONLY FOUND THERE.

THE GOLDEN FROG WAS JUST 4-5 CM LONG AND LIVED UNDERGROUND. BUT NOW IT'S EXTINCT.

SOME RESEARCHERS SAY IT WAS BECAUSE OF GLOBAL WARMING. OTHER SAY IT WAS DUE TO NATURAL VARIATIONS IN CLIMATE.

BUT IT'S CERTAIN THAT THIS TINY FROG BECAME EXTINCT BECAUSE THE CLIMATE IN THE RAIN FOREST BECAME TOO DRY.

AND RESEARCHERS ARE CERTAIN THAT GLOBAL WARMING WILL RESULT IN MORE FREQUENT DROUGHTS IN THE RAIN FOREST.

THEY ARE AFRAID THAT OVER TIME, DROUGHTS IN THE RAIN FOREST WILL WIPE OUT MANY OF THE SPECIES THAT LIVE THERE.