



Arctic

National Wildlife Refuge

A Polar Bear Year

The following stories are based on the biology and behavior of the southern Beaufort Sea subpopulation of polar bears. These bears inhabit the land and sea ice of northeastern Alaska and northwestern Canada, which includes Arctic National Wildlife Refuge.

Part 1: Winter

It is early winter, and the Arctic Ocean is blanketed by a bumpy, jagged layer of ice. Here in the far north, the temperature remains well below freezing most of the year. In winter, the sun stays below the horizon for months at a time, leaving the landscape dark and frozen. Though it is morning, moonlight reflects on the snow-covered ice, giving the scene a gentle glow.



Susanne Miller/USFWS

A polar bear walking on sea ice

Dotting this frozen landscape are several small holes in the ice. Perched next to one of them is a massive polar bear. For hours she has been sitting at this very spot, still as a sculpture as she waits. In front of her giant paws, dark water splashes against the edges of the icy hole.

Behind her, she can smell the arctic fox that has taken to following her. The polar bear pays the fluffy white creature no attention. The fox is very quick, and always careful not to get too close to her. Trying to catch it would be a waste of her precious energy stores. Besides, it is so small it would hardly be a snack for a polar bear.

Polar bears need to eat a lot of fat to stay warm and survive the tough parts of the year. Ice seals, such as ringed and bearded seals, have a thick layer of blubber that make them excellent polar bear prey. Using their sharp claws, seals carve breathing holes in the sea ice. Though seals can stay underwater for a very long time, they eventually need to come up for air. Polar bears know this, and often hunt seals by ambushing them at breathing holes. However, one seal may use as many as twelve different holes at a time as it hunts for fish and crustaceans. If a bear picks the wrong hole, it may go hungry.

The polar bear's muscles are stiff from sitting still for so many hours, but still she does not budge one inch. Even the tiniest shift of her weight on the ice would sound loud in the water below, alerting any nearby seals to her presence. She fixes her eyes on the breathing hole.

Finally, a thin stream of bubbles floats to the water's surface. A seal is near! The polar bear sits as still as the frozen world around her. These bubbles are the seal's test. A less experienced polar bear might lunge at the first sign of prey. This bear has learned the hard way that if she falls for this trick and attacks before the seal is within reach, the seal will escape. Her hours of waiting would be wasted. Long moments pass as the seal waits underwater for a reaction from above. When the seal sees no sign of danger, it swims upward, preparing to take a deep breath.



Susanne Miller/USFWS

A bearded seal at a breathing hole

Just as the seal's nose breaks the surface, the polar bear plunges forward, sharp teeth and claws reaching for the seal. Snap! Her long jaws lock around the back of the seal's neck. The bear uses her muscular hind legs to pull the seal out of the water, digging her claws into the ice. She drags the seal far from the water to prevent escape.

The polar bear eats the seal's blubber first. This fat will sustain her through the coming months. This polar bear is pregnant, and she will need a blubber layer of her own to survive the challenge of raising cubs. Pregnant polar bears build snow dens to give birth. There, they nurse their cubs through the winter, but have nothing to eat for themselves. Soon, this

mother will go months without a meal. The fat reserves she gains now will sustain her and her cubs until she can hunt again.

When the blubber is gone, the polar bear moves on to the meat, eating until her hunger is sated. When she is done, she moves away and rubs her muzzle and paws against the white snow. Polar bears need to keep their fur clean and dry in order to stay warm. As soon as she steps away from the carcass, the arctic fox bounces forward to scavenge the remains. A good meal can be hard to come by during Arctic winters. By following the polar bear, this fox has guaranteed itself first access to the bear's scraps. It lowers its head to eat, but keeps its eyes on the bear, in case she decides she's not done eating after all.



Erik F. Brandsborg

An arctic fox in its white winter coloration

But for now, her belly is full. Over the past few weeks, she has been hunting constantly, working to build up the fat reserves necessary to raise cubs. Now, she is ready. In a few hours, she will start her search for a suitable place to build a snow den. She must make sure the snow is deep enough to dig a bear-sized hole, and stable enough that it will not cave in on top of her. In the past, many polar bear mothers along the northern coast of Alaska built dens on the sea ice. Nowadays, the warming climate has made it difficult to find quality places to den on the ice, so bears have increasingly been denning on land. This bear was born on the mainland, where the wind often blows snow into deep piles that make good den sites. As sea ice continues to shrink, coastal and river bluffs, barrier islands, and other areas where snow accumulates have become increasingly valuable for polar bears in this part of eastern Alaska.

Once she has carved out her den, she will enter and wait for snow to seal the entrance and block out the cold winter wind. Soon after, she will give birth and nurse her cubs until they are ready to return to the sea ice. First, though, it is time for a nap. She flops her enormous body down, resting her heavy head on a smooth lump of ice. As the moon sets above her, the green and pink lights of the aurora borealis start to dance.

Part 2: Spring

It is early spring in the Arctic, and the sun is resting higher in the sky than it has in months. Its light reflects brightly on the smooth, snow-covered landscape of the Arctic National Wildlife Refuge coastal plain. Though the sunshine provides a gentle warmth, the temperature is still below freezing.

On the surface of the snowdrifts, all is still this morning. Yet hidden below the snow, a polar bear stirs. Five years ago, this bear had been a tiny cub herself in a den on this coastal plain. Now, two fuzzy cubs of her own rest at her side. When they were born, blind and helpless, they were barely bigger than squirrels. After three months of drinking their mother's rich milk, they are now the size of Welsh corgis.

Today, however, their mother hasn't allowed them access to her milk. The cubs yip, crawling toward her belly. She turns away, lifting her long snout to sniff the air through the small air hole in the dense snow layer over her head.

For months, this mother has rested beneath the snow. Winter denning is the norm for the bears of Arctic Refuge, with almost all black bears and brown bears sleeping through the months when food is scarce. Polar bears are different: only pregnant females seek out dens, while the rest remain active throughout winter. Their fur and blubber protect them from the cold, and the sea ice provides a solid platform from which they can hunt seals. Newborn polar bear cubs, however, lack the fur and fat needed to stay warm. So, pregnant females give birth in winter dens. There they nurse their cubs until spring, when the young are sturdy enough to venture into the world.

This icy den, only large enough for the mother to turn around in, has kept the polar bear cubs safe and warm. Even when winter temperatures drop as low as -40°F, the den's temperature remains close to 32°F due to the mother's warmth and the insulating snow. From in here, however, the mother cannot hunt. She hasn't eaten since the beginning of winter, and now her fat reserves are low from sustaining herself and her two cubs.



USFWS

Inside an abandoned polar bear den

The cubs cry louder. They haven't eaten all day. The mother stops sniffing, perhaps because her sensitive nose hasn't picked up the scent of any potential predators. She turns toward the snow-covered entrance to the den and digs. Her black paws, lined with white fur and bigger than dinner plates, cut through the packed snow. A circle of sunlight bursts down into the den, and the cubs blink in the brightness. Above, the mother slowly scans the horizon, looking in each direction. After a moment, she crawls out, stretching her legs for the first time in months. She tumbles down the bright snowy bluffs, rolling onto her side, wiggling to clean her thick fur on the jagged shards of wind-packed snow.

Back at the den, two cubs poke their heads out of the tunnel, seeing the outside world for the very first time. Against the snowy background, they are well camouflaged: only their dark eyes and noses stand out. They squint at the bright sun and sniff the cold air. Their mother is now a few yards away, at the bottom of a snow drift. She seems to be inviting them to join her, enticing them with the promise of milk as she shows them her belly. They start to yip loudly – they've never been more than inches away from their mother. Slowly, the first cub takes a step out of the den and into the sun. The cub slips and stumbles toward its mother, quieting as it struggles to stay upright while the snow slides beneath its feet.

The second cub watches from the den, calling louder and louder as its family creeps away. It takes one uneasy step, and then another. The mother watches silently from the bottom of the slope. Though the cubs struggle to take these first steps, it is vital that they learn to keep up with their mother, even on tough terrain. After a few more careful steps, the cub charges forward into a clumsy run before tumbling down, catching up to its sibling.

Finally, the ungainly cubs reach their mother, purring softly as they begin to nurse. Though her body relaxes into the snow, the mother's eyes continue to scan the tundra and her nose remains lifted, steadily sniffing the breeze, ever wary of dangers.

Having finished nursing, the cubs begin to wrestle. They gently paw at each other's faces and stumble together as they roll through the newfound space outside the den. The mother watches as they gracelessly stalk and pounce. The cubs turn to look at their mother, then scramble to her, one standing to reach her neck and the other clambering onto her back. She opens her mouth and wraps her jaws around one cub, her sharp teeth barely grazing its soft fur. Playtime is the perfect way to practice the skills her cubs will need to survive—hunting, fighting, and communicating with other bears.

When their mother stands and walks up the slope to their den, the cubs bound through the snow right behind her. Already they move more gracefully than they did when first stepping out of the den. In a week or two, when the cubs are ready, the family will leave their den for good. The mother will need to hunt soon, and the cubs will watch and learn. But for now, they return to their cozy home for a bit more rest.



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A mother polar bear and two cubs outside their den

Part 3: Summer

A mother polar bear lumbers across the snow-covered sea ice, her long snout high in the air as she sniffs this way and that. The early summer sun glows just below the icy northern horizon, even though it is nighttime. The once powdery snow is wet from melting. The bear's gigantic feet distribute her weight evenly over the ice, their black bumpy pads gripping the slippery surface with ease.

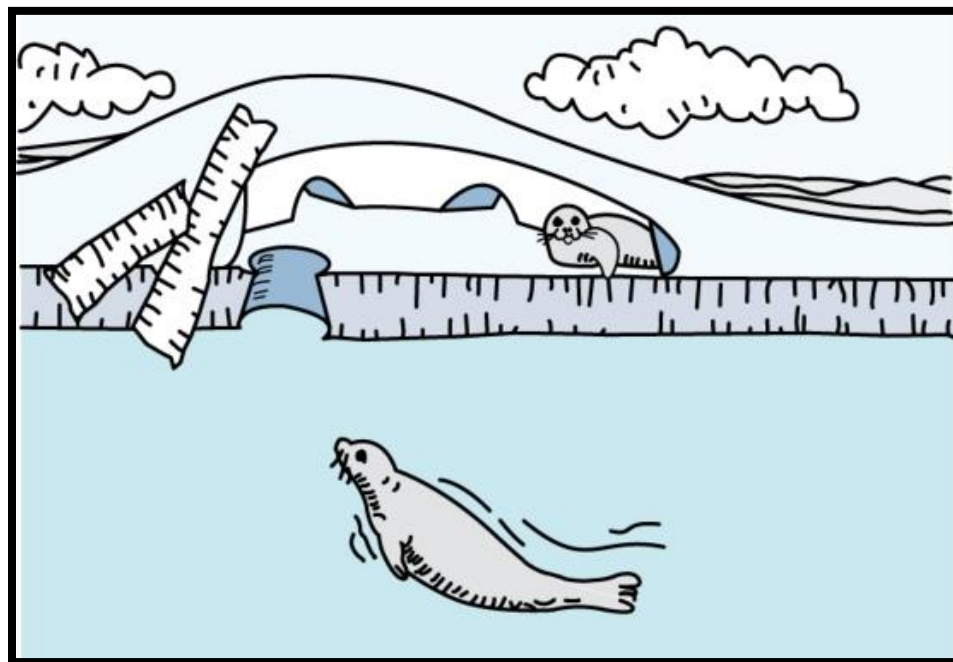
Several feet behind her are two cubs, playing as they walk. One nips the other's fuzzy throat, while the other bats at its sibling's small ears. Usually, their mother would not mind their playfulness, as playtime helps them grow strong. But today, she is hungrier than ever before. She looks back at her cubs and grumbles quietly. This gets the cubs' attention. They pause their antics and jog to catch up with her.

It has been weeks since the cubs first poked their heads out of their den. It has been months since the mother had her last meal, before entering the den. After nearly as many months of nursing two cubs, she needs to find food. Otherwise, her cubs will not survive.

Now, they are miles from land, far out on the sea ice. The mother stops suddenly, blinking in the sun as she raises her nose. Her cubs imitate her, catching scents on the breeze. She points her body toward a scent the cubs don't recognize. She starts walking, faster than before. After some time, she stops and looks back at her cubs, who are still close behind her. Now that she has finally paused, the tiny cubs slump onto the ice to rest their short legs.

The mother sniffs again, this time pointing her nose straight ahead at a round lump in the snow. To less experienced eyes, this lump would look like nothing more than a small snow drift on the ice. The mother, however, recognizes this lump to be a seal lair.

In late spring and early summer, ringed seals give birth to pups in lairs, or ice caves, on the sea ice. They use these lairs to rest and nurse their pups. After months of fasting, mother polar bears rely on seal pups as a food source to sustain themselves and their cubs. Early summer can be a time of plenty when polar bears have the chance to gain lots of fat by hunting seal pups. This fat helps polar bears survive through summer and autumn, when the lack of sea ice makes it impossible for them to hunt seals.



Robert Barnes, UNEP/GRID-Arendal, grida.no/resources/5262

A snow-covered seal birthing lair, which is entered from the water below

The mother shifts her body into a crouch as she stalks ever so slowly toward the lair. She must not let the mother seal know that she is there. If she is discovered, the seal family will escape through a hole in their lair into the frigid waters below. Even a newborn seal pup can hold its breath and swim for minutes at a time. If the polar bear mother is to earn her first meal in months, she will need to be stealthy.

Finally, the prowling polar bear is just outside the seal lair. Her two cubs, who had been sitting quietly, are now alert and watching her every move. She gradually sits back on her haunches, preparing to pounce. The cubs, perhaps sensing that she is about to attack, leap forward as if to join her. The mother's sensitive ears pick up the sound of seal bellies sliding across ice – they know that danger is near! She launches herself high into the air, landing on her front paws and breaking through the roof of the seal lair. She snaps her teeth!

But her giant jaws crunch around nothing but snow and ice. She paws through the rubble but finds nothing. The seals escaped. Her cubs' loud footsteps had alerted the mother seal to danger, so the seal family had slipped beneath the thick ice into the sea. Though polar bears are strong swimmers, seals are much faster and would be long gone by now.

The cubs approach their mother, sniffing her mouth to see if she had caught anything. Realizing that she has not, they yip and growl as they scurry to her side to nurse from her belly. She stands up and walks away, ignoring their hungry sounds. Her cubs must learn not to interrupt her hunt, or else she will run out of energy and none of them will be able to eat. Again, she raises her nose to sniff the air. After a long moment, she walks energetically in a new direction. Perhaps she has caught the scent of another seal lair.



Susanne Miller/USFWS

A polar bear mother and two cubs sniffing the air and the ground

Part 4: Fall



Amanda Zuelke/USFWS

A mother polar bear with two second-year cubs resting on a barrier island

Three polar bears sleep curled together on a small barrier island in the southern Beaufort Sea, on the northern edge of Arctic National Wildlife Refuge. The two young cubs nestle into their mother's side, blocking their faces from the autumn wind. Their coats, once bright, are spotted with brown from their time spent resting on land.

Back in early summer, the family had eaten well. They had sniffed out many ringed seal lairs hidden on the sea ice, and the cubs had learned to watch silently as their mother hunted. The mother, whose fat reserves had been dangerously low after denning all winter with her cubs, nearly doubled her weight after leaving the den. The high fat content of the seal pups was also perfect nourishment for the two growing cubs. After feasting all summer, they weigh as much as arctic wolves – though they are much stouter. Even now, late in the fall, all three bears still have a healthy layer of blubber to keep them warm.

But this year's seal pups are all grown up. They are strong swimmers, and no longer need to stay near the sea ice. Seals prefer to forage in the shallow waters close to the coast where the fish and crustaceans they eat are more plentiful. Polar bears hunt by using ice as a platform from which to ambush seals, but by autumn the sea ice is far from the shallow waters where seals are found.

When the climate was cooler just a few decades ago, sea ice was usually visible from Alaska's northeastern coast all year long. Polar bears in this region could swim between land and ice, and hunt seals throughout much of the year. Now, the summer thaw comes earlier, and the winter freeze up comes later, giving the sea ice more time to melt. The polar bear's icy habitat shrinks as the climate warms. By autumn nowadays, the sea ice is a floating island hundreds of miles from the coast, in the center of the Arctic Ocean where seals are rare.

Most polar bears spend autumn on the remaining sea ice, waiting for cooler temperatures to expand the ice back over the seal's preferred habitat. However, more bears than ever before are staying on Alaska's coast through the fall. On land, these bears have a chance at scavenging food: a whale, seal, or fish carcass washed up on shore, or the remains of an animal hunted by another predator.

This polar bear family has come to shore for the season. This particular part of the shoreline is where winter's land-fast ice reforms first. Still, it could be weeks until the ice freezes solid enough to allow the mother to hunt. And so, they spend their time relaxing on gravel islands or the tundra. The cubs sometimes roughhouse together or play with sticks and seaweed clumps. But for most of the day the family snoozes, conserving energy.

The mother rests her massive head on one cub's fuzzy back. Suddenly, her eyes pop open. She lifts her long nose, sniffing the cold breeze for a moment. The next instant she is on her feet. The cubs blink at her, watching her movements and smelling the air. The mother huffs quietly at them. It is time to get moving.

The mother treks along energetically, only pausing to check that her cubs are close. She marches into the frigid lagoon separating the Alaskan coast from the little island on which they had been resting. Polar bears are considered marine mammals because they are specially adapted to live in the ice-covered waters of the Arctic. They are excellent swimmers: their giant, slightly webbed paws work like paddles, and their nostrils close underwater. Adults have the fur, blubber, and strength to swim for miles, but cubs get cold and tired more easily. Polar bear mothers make sure not to swim too far with their cubs.

Today's swim is a quick one, and soon the cubs are walking on the tundra, shaking water from their fur. The mother continues her march and the cubs lope after her on shorter legs. The sun, always low in the sky at this time of year, is starting to set. Soon, the cubs pick up the scent their mother is following. They hurry to keep up.

They walk and sometimes swim their way west until they reach what the mother had been searching for: the remains of a bowhead whale. The carcass is almost 40 feet long from head to tail. For thousands of years, Inupiat communities have lived on the Arctic coast, hunting whales as their primary source of food. Here in the village of Kaktovik, whale remains are brought to the edge of town after the community has taken the parts they need from the whale. Now that melting sea ice has caused more polar bears to stay on land in autumn, the bears are drawn to whaling communities such as Kaktovik. If polar bears could hunt seals at this time of year, they would likely not be very interested in whale carcasses. But until the sea ice reforms, whale remains provide an energy-rich food source for hungry bears.



Susanne Miller/USFWS

A polar bear mother and two cubs scavenging a whale carcass

The mother and her cubs are not the only ones who can smell a whale carcass from miles away. She chuffs quietly to her little ones as she investigates the scene, and they come close to her sides. She spots another polar bear mother with a cub near the whale's giant ribs, and a young adult female near the head. It seems that they are among the first bears to reach the carcass. She approaches the whale slowly, her eyes locked on the other bears. They watch her carefully, but do not stop gnawing meat from the bones.

When the family reaches the enormous whale, the mother starts licking the remains, looking for chunks to pull off. The cubs copy their mother's technique, though they do not chew with their mother's intensity. The cubs have been drinking their mother's milk each day, while she hasn't eaten in weeks. Nevertheless, the mother frequently pauses to sniff the air and watch for danger.

For a long time, they work on the carcass, getting what scraps they can from the bony remains. The moon is already hanging low in the sky when the wind shifts. The mother abruptly stops feasting to sniff deeply, pointing her nose east along the coast. In the distance, a white dot glows against the dark tundra. Another polar bear is approaching.

The mother tenses. Even from a distance, she can smell that this bear is an adult male. Male polar bears have been known to attack polar bear cubs. Though it may seem gruesome, they may do this when they are very hungry. Until the ice returns and makes seal hunting possible, there is almost nothing to eat. To a hungry male, a cub could be a welcome meal.

The mother bear turns back toward the carcass and digs her teeth into a particularly large chunk, bracing her legs against the bone. With a mighty tug, she yanks the meat off the carcass. Still holding this last morsel, she growls to her cubs through clenched jaws. At this sound, the cubs cease their gnawing and follow their mother as she retreats quickly from the male.

Without slowing her pace, the mother frequently glances over her shoulder to ensure that her cubs are close – and to track the male’s movements. Finally, she sees that he has reached the whale bones. The lone female from before has moved to the opposite end of the whale but is still working on the bones as she watches the newcomer carefully. He pays her no mind as he starts exploring the carcass. The other mother and her cub are long gone. They too had decided not to wait and find out whether this male would be peaceful.

Now that the mother sees that the male is not pursuing them, she slows her pace enough that her cubs can keep up easily. However, until there are miles between her cubs and any adult males, she will not stop to rest. Darkness falls as the moon dips below the horizon. They trudge on.

The End

Arctic National Wildlife Refuge

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