INSIDE: Novel Food Sources for Polar Bears | Polar Bear Attacks | Circumpolar Action Plan

Tundra Times

The Annual Newsmagazine of Polar Bears International FALL 2015

From Polar Bears to People

SVALBARD DENNING | INDIGENOUS LENS: POLAR BEARS AND A CHANGING ARCTIC

Seasons of the Polar Bear

The polar bear's year is an ever-shifting world of sea ice, open leads, and time on shore. It's full of fierce cold and long winter nights, of long summer days and melting ice.

Times of plenty, or just passing time waiting for the next meal. Seasons of mating on the ice, and seasons of giving birth to cubs.

For more than twenty years, these seasons of the polar bear have shaped our year and guided our projects—with a goal of sustaining a future for polar bears and the arctic ecosystem for generations to come.

In this issue of *Tundra Times*, we span continents and bring you a range of insights about the polar bear, from the indigenous viewpoint to perspectives from scientists and climate leaders.

We venture into polar bear dens in Alaska and Svalbard and discuss a circumpolar conservation plan. We explore new research on whether walking hibernation exists and delve into the science of polar bear attacks. We discuss changes to the food web in a warming world and meet change-makers working on the frontlines of climate change.

For the first time, we've included tear-out pages, too: handy educational tools including a scorecard on polar bear body condition, a primer on arctic sea ice, and a checklist of key actions to take.

Finally, we introduce you to our carbon fee petition, the quickest and surest path to reduce greenhouse gas emissions.

We hope you enjoy this journey with us—and will join us in our goal of conserving polar bears throughout life's seasons: in the voting booth; at home, work, and school; by signing and sharing our petition; and through your ongoing and valued support.

Krista Wright
Executive Director

PBI's mission is to conserve polar bears and the sea ice they depend on. Through media, science, and advocacy, we work to inspire people to care about the Arctic, the threats to its future, and the connection between this remote region and our global climate.

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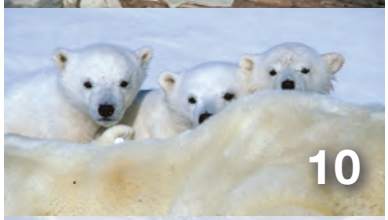
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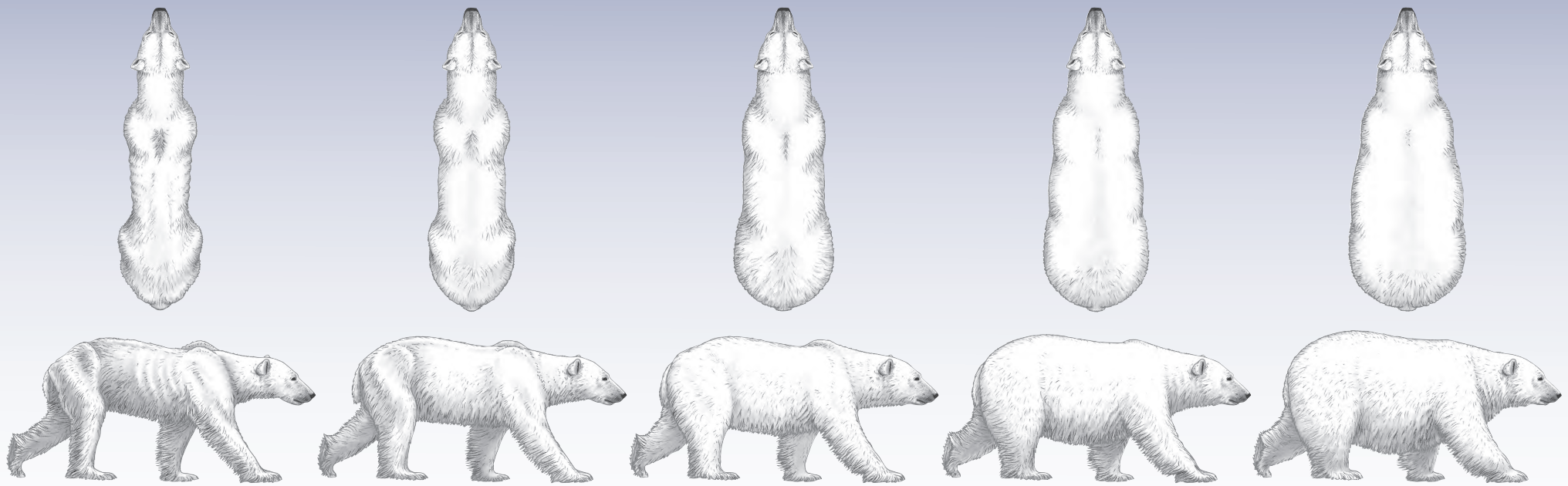
Polar Bear Scorecard: A Standardized Fatness Index

Illustrations by Emily S. Damstra



SKINNY	THIN	AVERAGE	FAT	VERY FAT
Skinny; emaciated appearance; vertebrae, ribs, and hip bones externally visible without palpation; no fat palpable between skin and muscle over the dorsal body, hips, or lower rump.	Thin; vertebrae and hip bones (but not ribs) partially visible, easily palpable under the skin; little/no fat between skin and muscle over the back; small amounts of fat detectable on lower rump.	Average; healthy appearance; vertebrae and hip bones not visible; upper 1/3 to 1/2 of the spinal column can be felt under the skin; detectable layer of fat between skin and muscle over rear half of body, thickening slightly but detectably over lower rump.	Fat; vertebrae and hip bones not visible; palpation reveals fat deposited over upper vertebrae; hip bones difficult to feel through fat; fat thick over rump; a hand rubbed above the rump will initiate ripples in the skin over the fat layer.	Obese; vertebrae and hip bones undetectable by palpation; thick layer of fat is apparent between skin and muscle 2/3 of the way up the back & over rump; a hand rubbed on lower back above rump sets off waves of rolling fat, possibly jiggling.

This is a subjective determination of a bear's body condition based on assessment of body fat. Source: I. Stirling, G.W. Thiemann, E. Richardson. 2008 Quantitative Support for a Subjective Fatness Index of Immobilized Polar Bears. Journal of Wildlife Management 72(2): 568-574.

You Are Entering Polar Bear Country

The Arctic and subarctic are home to an estimated 20-25,000 polar bears. These large predators prefer to be out on the sea ice, but can be found along coastal areas and inland on both tundra and in the boreal forest. While negative encounters are rare, they can pose significant risks to both humans and polar bears. Be *bear aware* as polar bears can be encountered anywhere in their range and at any time of year. Treat all bears as potentially dangerous animals.

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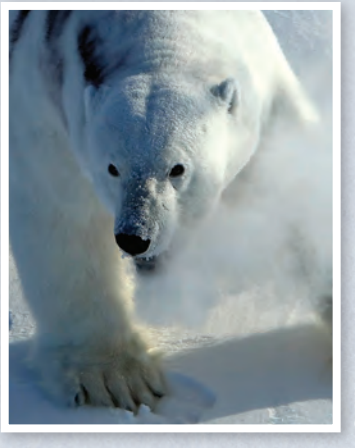
Bear Safety

- ✔ Educate yourself.
- ✔ Carry deterrents (like bear spray or signal flares). Practice using them beforehand. Know how they work.
- ✔ Check with regional wildlife management authorities for localized information on avoiding wildlife conflict. Many have excellent resources.
- ✔ Look for and obey all posted warnings and seek current, accurate information from local sources like conservation officers or rangers.
- ✔ Remain alert and look for signs of recent bear activity.
- ✔ When possible, avoid traveling alone, after dark, or in low-visibility areas.

Encounters

Situations vary, but here are some general rules of thumb if you encounter a polar bear:

- ✔ Ready your deterrent and be prepared to defend yourself.
- ✔ STAY CALM. DO NOT RUN.
- ✔ Do not play dead.
- ✔ If in a group—STAY TOGETHER.
- ✔ Keep the bear in sight until you are in a safe place or at a safe distance.
- ✔ Report the sighting and encounter to local authorities.



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If a Bear Charges:

- ✔ Use your deterrent and prepare any potential weapons.
- ✔ Stand your ground and be prepared to fight.
- ✔ Shout at the bear and yell for help.
- ✔ Stay together.
- ✔ Report all bear attacks to local authorities regardless of outcome.

Considerations

- ✔ If legal and available, consider carrying bear spray while in polar bear country. It is a very effective deterrent. Keep it accessible and warm (inside parka).
- ✔ Think about options for deterrence and defense before heading out: bear spray, more than two people in a group, flashlight, walking stick, air horn, and signal flares are examples.
- ✔ Group size matters—attacks on groups of two or more are less common. Stay together!
- ✔ Secure or remove all attractants. Food, trash, and other items with strong odors (gas, oil, coolants, etc.) are potential attractants that can lead a good bear down a bad path if not stored properly.
- ✔ If properly set up, portable electric fencing and trip wire alarm systems around camps/tents can be very effective in deterring bears and alerting you to their presence.

From Polar Bears to People

By Dr. Steven C. Amstrup

During a summer marked by heat waves, droughts, and forest fires, Pope Francis issued a moving encyclical on climate change and the environment. In it, he urged world leaders to phase out the use of fossil fuels, framing it as a moral issue. He stated that humans have caused the climate change problem—and it is up to us, as stewards of the earth, to fix it.

I couldn't agree more.

As a scientist who has devoted his career to studying polar bears, I am keenly aware of the polar bear's plight in a warming world. Polar bears are adapted for a life on the sea ice, and the loss of their frozen habitat threatens their very survival.

But, climate change is not just about polar bears—it's about all life on Earth, including people. As a scientist, father, and citizen of this planet, I am painfully aware that unless we take action to curb the use of fossil fuels, we will leave future generations with a climate markedly different, and more challenging, than the one that has allowed humans to flourish.

I am sometimes asked: *What will happen to polar bears by the end of this century if we fail to take action on climate change?* My reply is always the same: *By that point, people won't really care about polar bears, because by then we will face widespread human famine, relocation and refugee problems, and a host of other climate-change-related problems.*

But I think we *will* act, and the Pope's statements are an important sign that we are ready to overcome past inertia. Other signs include the growth of renewable energy, which has recently outpaced fossil fuels in the electricity sector, and bold greenhouse gas reduction efforts from the world's major cities. Perhaps most important is that citizens around the globe are calling that a fair price be placed on carbon emissions—and their governments are starting to listen.

The Paris climate talks in December will give world leaders the chance to come together on this issue, but our work will continue beyond that milestone, focusing on saving the Arctic, polar bears, and all of us—as custodians of this remarkable planet.

Dr. Steven C. Amstrup is the chief scientist at Polar Bears International and was the Polar Bear Project Leader at the U.S. Geological Survey in Alaska for thirty years. In 2012, he was awarded the Indianapolis Prize, considered the Nobel Prize of animal conservation.

photo © Daniel J. Cox/NaturalExposures.com

Walking Hibernation?

Scientists have long been intrigued with the long fasts that some polar bears undergo when forced ashore by melting ice. Polar bears in the Western Hudson Bay population, for example, typically swim to shore when the ice breaks up in July. They spend the next few months living off their fat reserves until the sea ice returns again in late fall.

The polar bear's ability to go months without a meal prompted some scientists to wonder if the bears have a unique ability to slow their metabolism during times without food—a state of so-called *walking hibernation*. If so, would such an adaptation give the bears an edge in a warming Arctic?

A recent intensive and logistically challenging study of polar bears in the Beaufort Sea found no evidence to support the concept.

"This study shows that polar bears have no special trick that will allow them to prolong their ability to survive long periods without food. Instead, they lose body condition just like any other food-deprived mammal," said Dr. Steven C. Amstrup, our chief scientist and part of the research team.

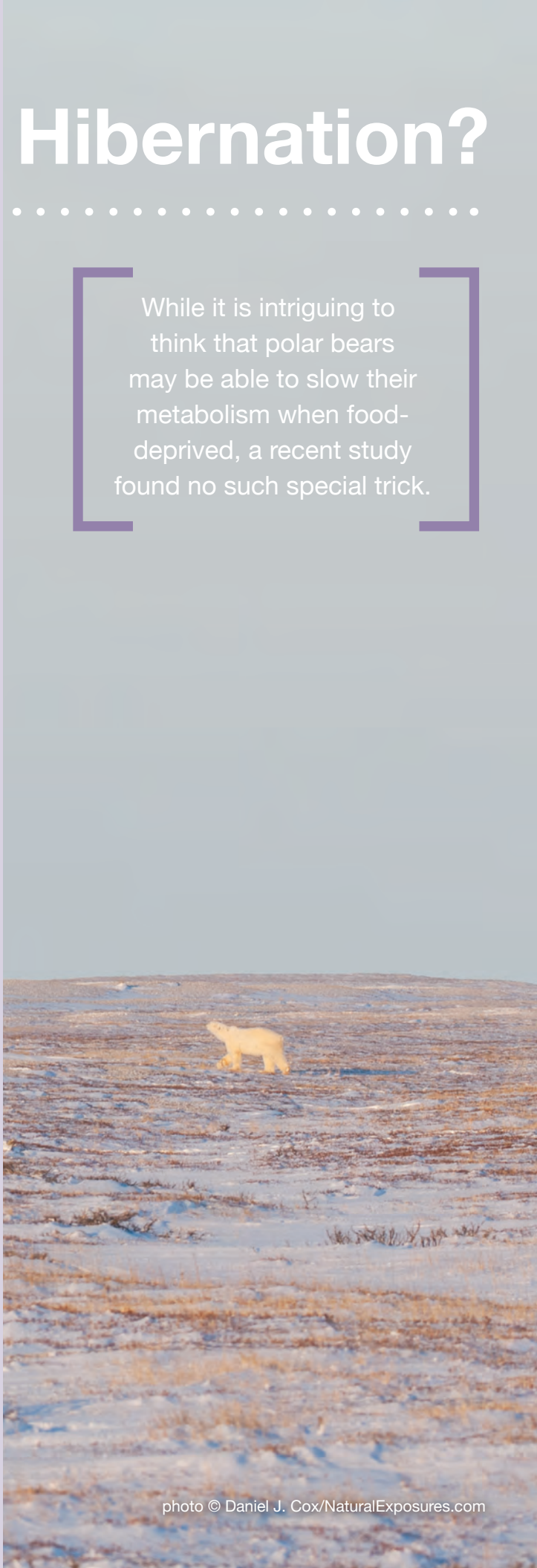
"The findings come at a time when polar bears in some parts of the Arctic are spending more time on land, away from their seal prey, due to retreating summer sea ice," he added.

Amstrup said these new understandings, which support past findings, are important. "There is a limit to how long polar bears can persist as sea ice continues to decline. They have no special metabolic ability to prolong that time frame, and if we want polar bears in our future, we need to stop sea ice decline."

Interestingly, while scientists found no evidence of walking hibernation, they did find that polar bears have a special adaptation to swimming in frigid waters—one that protects their core body temperature and helps prevent hypothermia. Polar bears do this by temporarily cooling their outermost core tissues to form an insulating shell, a phenomenon known as *regional heterothermy*.

John Whiteman, a doctoral student at the University of Wyoming, led the study, working in cooperation with scientists at UW, USGS, U.S. Fish and Wildlife Service, and Polar Bears International. The team collared two-dozen polar bears in the Beaufort Sea north of Alaska, fitted them temperature loggers, and tracked and monitored them on the sea ice, in the water, and on land from 2008-2010.

While it is intriguing to think that polar bears may be able to slow their metabolism when food-deprived, a recent study found no such special trick.



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A Fair Price for Carbon

We know we need to greatly reduce greenhouse gas emissions to solve the problem of climate change—a problem that extends beyond polar bears and the Arctic to affect all life on Earth, including our own. But how do we achieve that goal? Experts say the quickest way is to set a fair price for carbon pollution.

By including the true cost of carbon pollution in the prices we pay, we can speed up the transition to a renewable energy future. Not only will this reduce the greenhouse gas emissions that cause global warming, it will improve human health, reduce air and water pollution, and strengthen the economy at the same time.

How does this work? Currently, fossil fuel companies receive direct subsidies and are not held accountable for the environmental damage their products cause. This makes fossil fuels appear cheaper than they really are and puts other forms of energy at a competitive disadvantage.

By eliminating subsidies and adding a fee to cover the true cost of carbon pollution, we can level the playing field, allowing free market forces to lead the way to a clean energy future. At the same time, we can stimulate the economy and create jobs. The monies collected can be returned directly to citizens as a dividend to offset changes to energy costs.

"Under a well-designed policy the vast majority of households would receive back more than they will pay for increased energy costs," said Dr. Katharine Hayhoe, a climate scientist who serves on the advisory board of the Citizens' Climate Lobby, a nonprofit grassroots advocacy group. "This will inject billions into the economy, protect family budgets, and free up households to make independent choices about their energy usage. It will also spur innovation and create an upwelling of demand for low-carbon products at the consumer level."

Success stories

Almost 40 countries now have carbon-pricing programs. Denmark, a pioneer, has curbed its emissions by more than 30% since 1990 while also enjoying a strong economy. In the process, it has emerged as a global leader in the offshore wind turbine market.

The Canadian province of British Columbia is another example. Since passing its carbon tax in 2008, its emissions have dropped 16%, while its economic growth outpaced the rest of the country. And because the carbon fees are used to offset other taxes, its citizens now enjoy the lowest personal income tax rates of any province.

U.S. leadership needed

Policies set in the U.S. have an impact around the globe—which is why U.S. leadership is so important. Join us in asking President Obama to help secure a renewable energy future by setting a fair price for carbon.

Visit **www.polarbearsinternational.org/carbon-petition** *to sign and share.*

In 1973, the five countries where polar bears live came together to sign an Agreement for the Conservation of Polar Bears. Those nations—Canada, Greenland, Norway, Russia, and the United States—are collectively known as the Range States because they represent the range where polar bears roam. Back then, the largest threat to polar bears was overhunting, and so the Range States initially focused on establishing robust harvest management programs and protected areas.

Since 1973, however, the nature of the threats facing polar bears has changed. The world now faces what portends to be the greatest challenge to polar bear conservation in the agreement's history: Human activities are changing the climate at a rate that threatens the arctic ecosystem. One of the consequences of climate change is loss of the sea ice habitat on which polar bears critically depend. Other emerging or possible threats include contaminants and pollution, human-caused mortality, shipping, resource and energy exploration and development, tourism, and disease.

The Circumpolar Action Plan:
A Global Conservation Strategy for the Polar Bear

By Mary Colligan

To address these new threats, the Range States have developed a collaborative initiative: the **Circumpolar Action Plan**. The CAP is a range-wide strategy designed to guide the mitigation of those threats. Each Range State already has a management system in place, so the CAP focuses on issues best coordinated at the international level. It identifies actions to focus on over the next ten years, accompanied by a more detailed implementation plan for the first two years. Member nations will review progress biennially and update the plan accordingly.

The goal is to ensure the long-term survival of polar bears in the wild in a way that protects the genetic, behavioral, and ecological diversity of the species. This goal cannot be achieved without adequate greenhouse gas reductions by the global community.

The CAP details the common goals and initiatives that the Range States share related to the management, research, and monitoring of polar bears. The plan recognizes that polar bear conservation is crucial for ecological reasons, and that the polar bear is historically, culturally, and economically important to indigenous peoples throughout the circumpolar Arctic.

The CAP identifies and addresses **the following seven threats** that are already impacting, or are most likely to have an impact, on the polar bear and its habitat in the next ten years: (1) Climate Change; (2) Disease; (3) Human-Caused Mortality; (4) Mineral and Energy Resource Exploration and Development; (5) Contaminants and Pollution; (6) Shipping; and (7) Tourism.

To achieve the CAP's goal, the Range States developed **six key objectives** to address the threats: (1) Use adaptive management to minimize threats to polar bears and their habitat; (2) Communicate the importance of mitigating greenhouse gas emissions to polar bear conservation; (3) Ensure the preservation and protection of essential habitat for polar bears; (4) Ensure responsible harvest management systems are in place; (5) Manage human-polar bear interactions; and (6) Ensure that international legal trade of polar bears is carried out according to conservation principles.

Strategic Approaches

In developing the CAP, the Range States identified actions and activities appropriate at the circumpolar level to address the threats and help meet the objectives. They then outlined the best ways to implement these, resulting in the following four strategies:

The first strategic approach is **adaptive management**, a planned and systematic process to continuously re-evaluate management decisions and practices by learning from

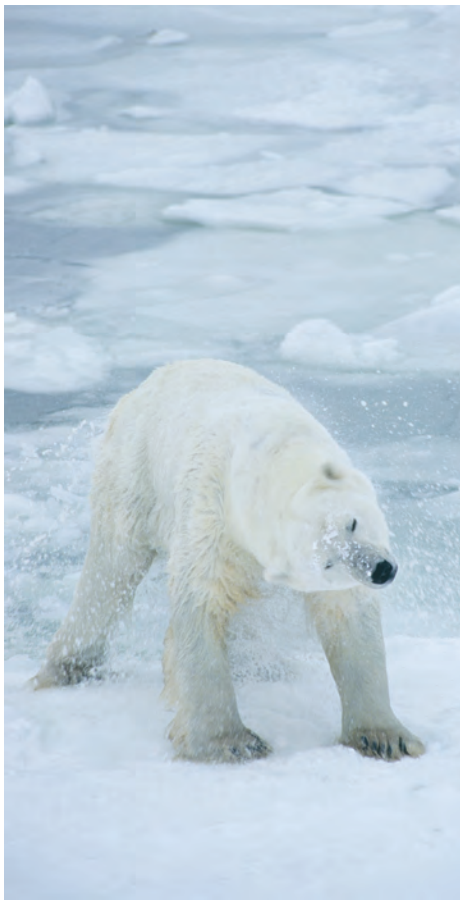
past outcomes and new knowledge. The Range States view adaptive management as essential to planning and decision-making for polar bear conservation and management throughout the circumpolar region, particularly in addressing the threats posed by climate change and its effect on habitat, prey abundance and availability, and disease.

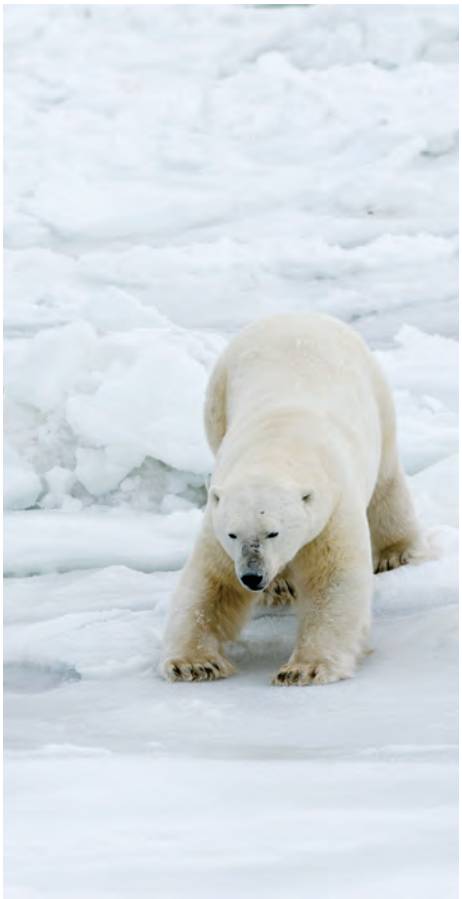
The second strategic approach involves **best management practices**, which are methods that have demonstrated effective results compared with other approaches, and are often therefore used as a standard. The Range States have identified developing, implementing, and sharing BMPs as important for addressing resource exploration and development, contaminants and pollutants, tourism, shipping and polar bear-human interactions.

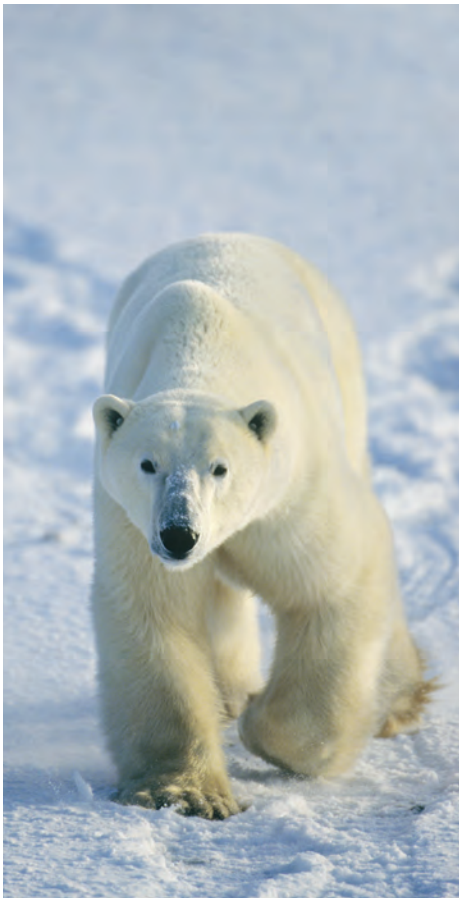
The third strategic approach is to enhance and increase coordination at the circumpolar level on **monitoring and research** programs.

Finally, the Range States have identified the need for a **communications and outreach strategy** consisting of actions to clearly explain and represent the Range States and the plan, as well as efforts to raise understanding of the link between climate change and polar bear conservation.

Biologist Mary Colligan is a supervisor with the U.S. Fish and Wildlife Service and part of the working group that drafted the CAP. She has spent over 20 years working on the management and conservation of marine species.







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Arctic residents are witnessing first-hand the effects of a changing ecosystem and a changing political climate.

In a world dominated by darkness and extreme cold temperatures, the month of December was an important time in the lives of the Arctic Eskimos. By October the oceans would be frozen and the mid-winter season offered down time where contemplation of worldviews and an individual's place in society were negotiated or solidified in the men's house (*kazgi*).

December was a time for dancing and the telling of stories of the first successful hunts for polar bears by young men determined to prove their value to society by taking the king of the arctic jungle, and by older men re-telling their stories to emphasize the many strict protocols associated with securing food in their harsh environments.

Successful hunts were followed by a weeklong dedication of reverence with food and dancing in the community. It was hoped that the most powerful and humanlike creature would become an advocate in its afterlife for future successes in hunting on behalf of the hunter and the community.

Alaska's Native people of the Arctic still live with and among polar bears; however, times are changing. During this season's spring whale hunt in Barrow, active polar bear lookouts continued to be a necessary precaution for hunters butchering whales out on the ocean ice. But in many places the ocean is no longer frozen in December. During the winter of 2015, no significant sea ice formed near the Seward Peninsula.

Jack Omelak is the executive director of the Alaska Nanuuq Commission. He was raised in both Nome and Anchorage and has backgrounds in natural science, anthropology, and rural development.

Indigenous Lens: Polar Bears and a Changing Arctic

By Jack Omelak

Arctic residents are witnessing first-hand the effects of a changing ecosystem and a changing political climate. Polar bears have now become what whales were in the 1980s, an iconic symbol for conservation, legislation, and regulation. This intense focus on polar bears and other marine resources imposes a disproportionate burden on arctic communities, which can be considered as endangered as polar bears are. What remains unchanged for the people of the Arctic is their direct reliance on the immediate environments and their resources, and the inherent conservation strategies inseparable from the cultures of arctic residents.

Often you hear that there are limited roads, supply stores, or sources of income for residents of the Arctic and that is why they have to hunt. Another way to look at the realities of life in the Arctic is to consider the question: If the ability to secure food from local resources is abridged or limited, what is the alternative? As the interests of a changing Arctic have increased, some of the arctic nations have identified and focused on the need to prepare their communities to be able to adapt and become more resilient.

In the case of the two U.S. polar bear populations, the Chukchi and Southern Beaufort seas, the effects of the unmitigated release of global carbon emissions have been identified as the primary threat. However, with limited political will among the world nations to offset, mitigate, or reduce this driver of climate change, subsistence users looking to provide for their families through the only practical means available are being pressured to reduce their takes. First it was whales, now it is polar bears, and in the near future it is inevitable that other marine resources will be targeted as conservation species as the hidden effects of a changing climate begin to become tangible.

Today's indigenous groups are the direct result of generations of many successful applications of scientific principles, observations, and conservation strategies within their natural world and environments.

This approach seems counter-productive as we are seeking to increase arctic communities' ability to become adaptive and resilient. Policy makers should also be seeking to allow our communities to maintain their cultural practices and lifeways that have allowed them to remain successfully adaptive and resilient over thousands of years in, at times, the perilous and ever-changing prehistoric environment of the Arctic.

Today's indigenous groups are the direct result of generations of many successful applications of scientific principles, observations, and conservation strategies within their natural world and environments. Post-modernism has allowed many of us to understand that management systems can benefit directly from local user inclusion into the management process. Regulations, if needed, should be flexible, promoting access by arctic users to new resources, or utilization of existing resources in new ways. Management policies founded in local initiatives and perspective can produce management strategies arising from organic and inherent responses to a changing environment.

An example is the reduction of polar bear hunting in some of the arctic

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The Mysteries of Svalbard Denning

Wild. Pristine. Remote. The islands known as Svalbard—set halfway between Norway and the North Pole—are well-known denning sites for the region's female polar bears.

Svalbard's polar bears typically dig their maternity dens in snowdrifts at the base of steep fjords, close to where the sea ice meets the shore. They give birth to their cubs and nurse them in these snowy shelters. But little is known about the behavior of families between the time when they first emerge from the den and when they eventually leave it.

This spring, PBI researchers will team up with scientists at the Norwegian Polar Institute on a pilot study of den sites in the Svalbard archipelago. The goal is to use remote cameras to gather information on denning families, answering questions like:

- When do moms and cubs typically emerge from their snow dens?
- How long do they remain around the den before heading onto the sea ice?
- How many cubs does each bear have?
- What is their condition?

"The study will provide scientists with baseline information on the behavior of polar bear families denning in Svalbard," said Geoff York, PBI's senior director of conservation. "The insights could prove invaluable because of the remoteness of the location and other factors."

photo © Kt Miller/polarbearsinternational.org

"Working with Norwegian partners, the team will be able to compare the data on Svalbard families with data on family groups from other areas. We'll also be able to track any changes in the Svalbard bears over time."

Alaskan Contrast

PBI has conducted non-intrusive polar bear den studies in Alaska for more than a decade, partnering with Brigham Young University on a project led by Dr. Tom Smith. That study takes place on Alaska's North Slope, where polar bear families den close to large-scale industrial activity at Prudhoe Bay.

The Alaska project began with observations made by scientists camping in subzero weather in tents. Today, they rely on remote, solar-powered video cameras set near the dens. These cameras record activity from the time families first emerge until they depart for the sea ice—typically about six or seven days for Alaskan bears. Scientists believe that family groups don't leave for the sea ice immediately because the mother bear wants to let her cubs adapt to the outside world before undergoing a long trek.

The North Slope study has already yielded a number of new insights into denning behavior and has added to our understanding of how to ensure denning families are not disturbed.

The Svalbard project will use the same approach as the Alaska study, with high-definition video cameras recording the behavior of mothers and cubs. Scientists will locate den sites by tracking the movements of collared females—and then hide the cameras in white, insulated coolers at a respectful distance from the dens.

"Aside from the remoteness, Svalbard differs from Alaska by the presence of winter tourism in limited areas, including dog-sledding and snow machine tours," York said. "The denning area in northern Alaska has virtually no winter tourism. This provides a unique opportunity to look at issues of tolerance, habituation, and disturbance of denning polar bears.

"Another contrast is that more dens in Svalbard are located in snowdrifts close to the shoreline, very near the sea ice," he added. "Many Alaskan polar bears also den along the coast, but some mothers choose dens that are ten, twenty, or, more rarely, over forty miles inland. This makes for some long treks when walking to the sea ice, particularly for very young cubs on wobbly legs.

"The final difference is that while there is heavy industry in the northern Alaska denning areas—primarily large-scale onshore oil and gas production and exploration—Svalbard is relatively quiet in this regard. Its industrial footprint is relatively small, with two coal mines, and the activity is largely underground."

The contrast between the two locations could provide important insights on protections needed for polar bear families during this vulnerable period in their life cycle.

photo © Dan Guravich/polarbearsinternational.org

Polar Bear ATTACKS

An interview with Jim Wilder, a co-author of the U.S. Conservation Management Plan for Polar Bears as well as the Range States Circumpolar Action Plan for polar bear conservation.

By Melynda Coble Harrison

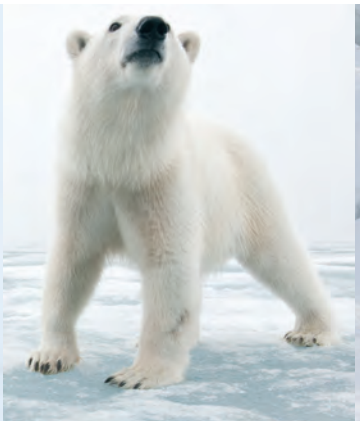
In March, a Czech tourist was dragged out of his tent as he slept on a remote arctic island in Svalbard. The polar bear clawed his back and injured his arm and head before being driven away by gunshots. Jakub Moravec told the *Associated Press* that the bear was going for his head, but he was able to protect himself with his hands.

Moravec survived, but the bear was later killed by authorities.

Unfortunately, polar bear attacks on humans may increase in the near future. Scientists suspect that sea ice loss may play a role in the increase.

James Wilder, who until recently was with the U.S. Fish and Wildlife Service in Alaska, said it's hard to tell whether there are more polar bear attacks now or just better reporting.

photo © Daniel J. Cox/NaturalExposures.com



photos © Daniel J. Cox/NaturalExposures.com

Without sea ice, polar bears are unable to hunt seals, their main food source. When stuck on land, hungry bears look for alternative food sources. Thin bears, like the ones above, pose the greatest risk to humans.

"But when we look at the number of attacks in just the last few years, it looks like we are on track to have two to three times as many attacks this decade as we did in recent decades," Wilder said. "One likely reason is that there is less sea ice, so bears are pushed ashore for longer periods of time, in poorer body condition."

Without sea ice, polar bears are unable to hunt seals, their main food source. When stuck on land, hungry bears look for alternative food sources. Humans and all their smells and sounds are very interesting to a hungry bear.

"It's not fat, happy bears that are attacking people," Wilder said. "If I saw a skinny bear coming toward me, I'd be very nervous."

Wilder studied black and brown bears in Alaska before turning his expertise to polar bears and human-polar bear conflicts. He currently works with grizzly bears with the U.S. Forest Service in Wyoming, but is still an active member of the Polar Bear Specialist Group.

In 2009, the five polar bear Range States—Canada, Greenland, Norway, Russia, and the United States—revisited the 1973 Agreement on the Conservation of Polar Bears. Members recognized the need to address the potential for increased human-polar bear conflicts. They tasked delegates from the U.S. and Norway, including Wilder, to create a database of encounters from their countries that could be used to develop mitigation strategies.

The team took a database Wilder had used for compiling and tracking human-bear conflicts in Alaska's national parks, adapted it for polar bears, and began populating it with data. The group then expanded it to include data from across the Arctic.

Wilder is a co-author of the U.S. Conservation Management Plan for Polar Bears as well as the Range States Circumpolar Action Plan for polar bear conservation. Both plans acknowledge that less sea ice is the main threat to polar bear survival, but emphasize steps that can immediately help the bears—such as better management of polar bear harvests and working to mitigate and reduce human-polar bear conflicts.

Not only do those conflicts seem to be increasing, the *time of year* when they occur is changing. Historically, polar bear attacks on humans happened during every month of the year, with about sixty-eight percent occurring between July and December.

Since 2000, eighty-seven percent of attacks happened between July and December. Wilder suggests this correlates with the dramatic sea ice retreat that became noticeable early this century.

Still, even with the hundreds of thousands of encounters humans have had with polar bears over the years, only seventy-one resulted in attacks, with just twenty-one human fatalities. "If polar bears really were the man-eating beasts they've been portrayed to be, we'd have a lot more to report," Wilder said.

As with all bears, avoiding an interaction is the best way to avoid an attack. In other words, don't surprise a polar bear and put it on the defensive.

If you encounter a bear, Wilder advises gathering in a group and deploying your deterrent. Study the

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Novel Food Sources for Polar Bears

By Geoff York

This page: Forced ashore by melting ice, a hungry polar bear scales a sheer cliff to feed on bird eggs. Recent research shows that while some individual bears may temporarily benefit from eating energy-rich foods like bird eggs, these aren't abundant enough to have an impact at the population level.

Next page: Polar bears lucky enough to find a whale carcass gather for a feast.

photo © JoAnne Simerson

"In the warmer open seas plankton may bloom—we can't be sure how richly—but it will be a different kind of plankton, blooming at different places and at different times, feeding the more southerly species that are already adapted to the seas the Arctic will come to resemble." ~ Alun Anderson, *After the Ice*

In a world warming more rapidly than humans and most other life forms have ever before experienced, full and fundamental systems are in flux. Descriptions like *unusual, unprecedented, historic, new milestone, and record-breaking*—not to mention *irreversible, extinction*, and *migration*—are becoming all too common.

Here's a recent example from the news: "Researchers observe polar bears eating dolphins, freezing leftovers." File this one in the category of *never seen before*.

While white-beaked dolphins are common summer visitors to areas inhabited by polar bears in the North Atlantic, they are an open water species. Seeing them trapped in the ice and preyed upon by polar bears—that's unusual to say the least. Researchers surmise the dolphins ventured further north than usual due to warmer-than-average ocean temperatures.

photo © Daniel J. Cox/NaturalExposures.com

As the world continues to warm, changes in the timing and availability of food may become the new normal for both arctic wildlife and southern visitors investigating recently ice-free seas. The dolphin predation is consistent with unusual observations elsewhere—from increased sightings of orcas across the North to harbor seals in Hudson Bay. It's not just charismatic mega fauna either: Scientists are noting changes in benthic and plankton communities in the Bering, Baltic, and Chukchi Seas as new species outcompete current arctic residents.

Warming is also reducing habitat availability for ice-dependent animals from plankton to polar bears. While some ice-dependent species have limited options for refuge, polar bears are gradually spending more time on shore, in more places, and in some cases, in larger numbers than seen historically.

Increased time ashore without their primary food source—fat-rich marine mammals like ringed seals—means some food-stressed bears start to look for temporary substitutes like bird eggs, berries, carrion, and the occasional fish.

While polar bears have been observed foraging opportunistically onshore since people have been documenting polar bears, we know from recent research that these sources will simply not substitute for the calorie-dense, high-fat marine mammals polar bears evolved to prey on.

While tracking these changes individually present novel opportunities and are scientifically interesting, taken together they exemplify what many are now calling *ecosystem disruption* driven by climate change.

Cascading effects across arctic food webs are occurring at differing rates and at different times, complicating our efforts to document the changes and understand where they may be heading. Will orcas ultimately replace polar bears as the Arctic's top predator? Will harbor seals displace ringed and bearded seals?

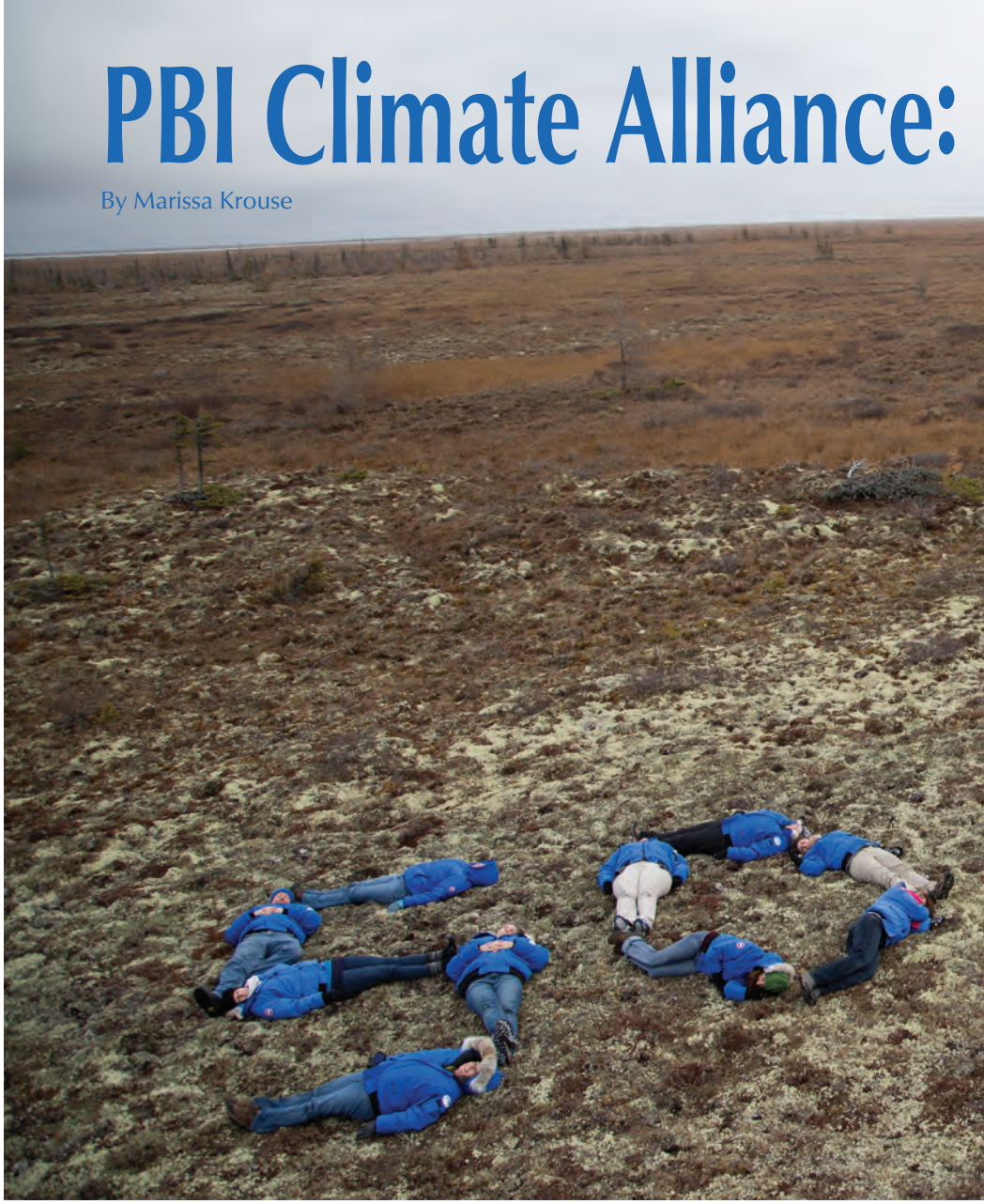
Perhaps. Although it's just as likely that we'll see fundamental changes from the *bottom* of the food web up, with the large marine mammals that currently dominate arctic systems—bowheads and narwhals, ringed and bearded seals, walruses and polar bears—replaced by jellyfish as the dominant species.

The future is truly uncertain, but we are on a path towards unprecedented change. The magnitude of that change, however, is still in our hands. The opportunities for action to reign in greenhouse gas emissions are available now—but will we seize them in time?

Geoff York is the senior director of conservation at Polar Bears International. He has worked with polar bears and arctic issues for more than twenty years.

PBI Climate Alliance:

By Marissa Krouse



CLIMATE ALLIANCE—a can-do working group focused on climate change solutions and community involvement—celebrates ten years as frontline ambassadors for polar bears and action on climate change.

Six years ago, I visited Churchill and looked my first wild polar bear in the eye as part of PBI's Zookeeper Leadership Camp—now called the PBI Climate Alliance. Sharing the experience with a team of like-minded change-makers had a profound effect on me. As one of our guides, Heather Macleod from Parks Canada, said, "Now the Arctic is in your heart."

Back home, I helped put climate change front and center as part of my work as a keeper at the North Carolina Zoo. My colleagues and I engaged with tens of thousands of visitors through keeper talks and action-oriented special events.

For example, we held moonlit walks to the polar bear exhibit, giving me the chance to tell my Churchill story, talk about the impacts of climate change, and send guests home with tools to reduce carbon in their daily lives. These included free energy-efficiency kits—with LED light bulbs, hot water heater insulators, and low flow faucet fixtures—plus home energy audits, thanks to the generosity of a local energy provider.

I found the outreach so gratifying and empowering that I joined PBI's staff last year, with the Climate Alliance program one of my main responsibilities.

A Unique Program

So, what is the Climate Alliance? It's a can-do working group focused on climate change solutions and community involvement. It begins with an online course followed by a real-life session in Churchill, the polar bear capital of the world, where participants work with and learn from polar bear biologists, naturalists, museum curators, and expert guides—all while bonding with each other and forming a strong support network.

Most of our participants come from the zoos and aquariums in PBI's Arctic Ambassador Center network. We focus on these partners because of their unique cachet with the public and ability to reach a broad cross-section of people—and because research shows that visitors view zoos and aquariums as a trusted source on climate.

So far, we've trained 248 ambassadors on climate, representing fifty organizations from the United States, Canada, Denmark, Austria, Germany, and Australia! Over time, the program's name evolved from Leadership Camp to the Climate Alliance, joining all alumni, past and present, together. This year marks our tenth anniversary.

Celebrating Ten Years

photo © Kt Miller/polarbearsinternational.org

After their tundra experience, graduates return home to effect change, working on projects from green programs at schools to city and community efforts.

We count among our past graduates leaders and innovators, networkers and collaborators, skilled communicators, and those who lead by example to motivate others:

✔ They're getting cars off the road with bike-to-work efforts.

✔ They're starting zoo-wide composting and recycling programs that become community models.

✔ They're taking their outreach to local school districts and motivating green cafeterias, LED bulbs, and anti-phantom-power campaigns.

✔ And they're engaging with the public every day as trusted messengers, expanding public understanding about climate change and changing the conversation to one about citizenship and solutions.

Expanded Reach

As the program continues to grow, we add new alumni every year and collaborate with new conservation partners to build climate literacy and help communities transition from fossil fuels.

This year, for example, we've partnered with the National Network for Ocean and Climate Change Interpretation (NNOCCI) to bring an empirically driven approach to all communications, one proven to make the science of ocean and climate change understandable to zoo and aquarium visitors and to motivate them to *act*.

While in Churchill, we task participants with researching local collective solutions that they can plug into and support through their facility—or solutions they can create and launch themselves at the community level. We also help them with their communication skills, working with each participant, for example, to create a short video filmed on the tundra.

Our Impact

The real work begins back home. There, Climate Alliance alumni put their knowledge and solutions to work, turning to each other (and to PBI) for support and encouragement.

Our graduates leave Churchill as frontline ambassadors for polar bears and action on climate change, working every day to engage their communities and expand grassroots solutions. At the same time, we continue strong partnerships around the globe, drawing attention to polar bears and the importance of their sea ice habitat—and effecting social change.

photo © Daniel J. Cox/NaturalExposures.com

communities in Alaska due to changing sea ice circulation patterns and extent equaling a loss of access to the resource: a natural response.

As it has always been, hunters still make active choices either individually or through community meetings where entire villages can and have imposed self-regulations or moratoriums on take when the populations are perceived or observed to be stressed or low. Granted, at times formal management has its place, and when it comes down to it the goals of hunting communities and conservation and management groups are working towards the same goal:

indigenous lens

continued from page 9

conservation of the species. For conservationists and managers, that the resource may be enjoyed and used by future generations. For subsistence users, that the resource may be enjoyed and used by future generations.

Instead of a top-down approach, or unproven ideals shaped by non-residents of the Arctic in a far-away place, successful and adaptive management principles should continue to inform effective co-management efforts. In both research and management, priority should be given to local participation and observation or what has been termed Traditional Ecological Knowledge, Local Ecological Knowledge, or Indigenous Knowledge into management strategies.

Following on the tradition of respect and care, Arctic Natives did their part to manage and protect whale populations and have agreed through resolutions to do their part to protect polar bears. This inclusion of local observation and understanding of real time and immediate responses within environmental systems will likely lead to a better understanding of our changing climate.

By the way, the whales are doing very well.

PBI Calendar of Events

Climate Alliance Training
October 4–10, 2015

Project Polar Bear Registration
October 1–November 22, 2015

Tundra Connections Webcasts
Late October–mid–November

Polar Bear Cam
Late October–late November

Polar Bear Week—Energy Challenge
November 1–7, 2015

International Polar Bear Day—Thermostat Challenge
February 27, 2016

Earth Day—Transportation Challenge
Project Polar Bear Winners Announced
April 22, 2016

Arctic Sea Ice Day—Green House Grocery List Challenge
July 15, 2016

Beluga Cam
Late July–August

Visit our website, **www.polarbearsinternational.org**, for details on these events and programs and how you can get involved.

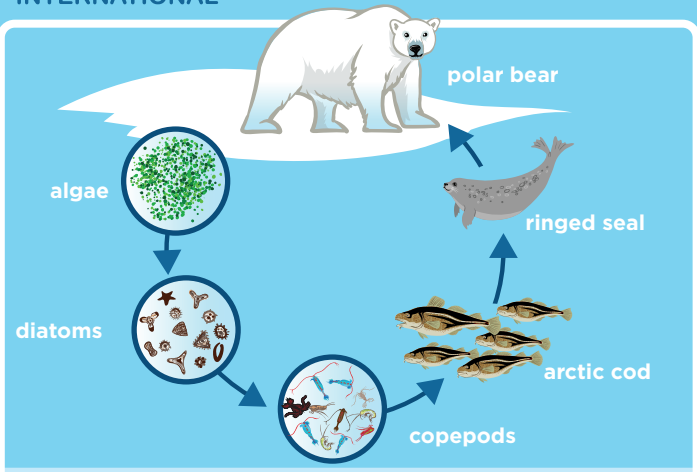
photo © Daniel J. Cox/NaturalExposures.com

POLAR BEARS INTERNATIONAL

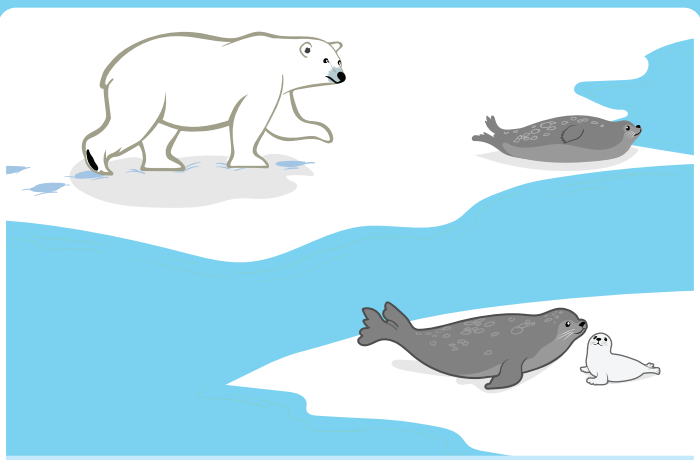
WHY SHOULD WE CARE ABOUT ARCTIC SEA ICE?

an educational handout

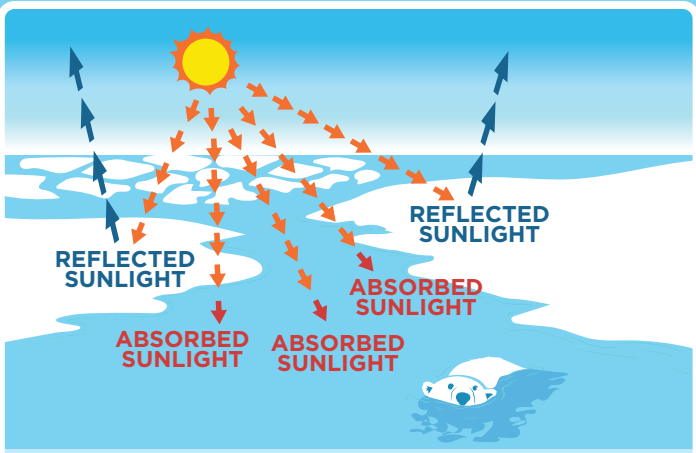
ARCTIC SEA ICE DAY
JULY 15



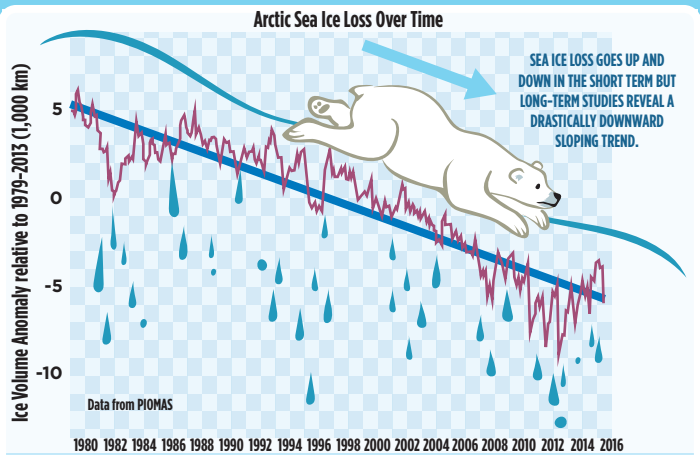
Sea ice is as important to the arctic ecosystem as soil is to a forest. The food chain begins with algae and other tiny organisms that live on and in the sea ice. Arctic cod feed on them. Seals eat arctic cod. And polar bears eat seals.



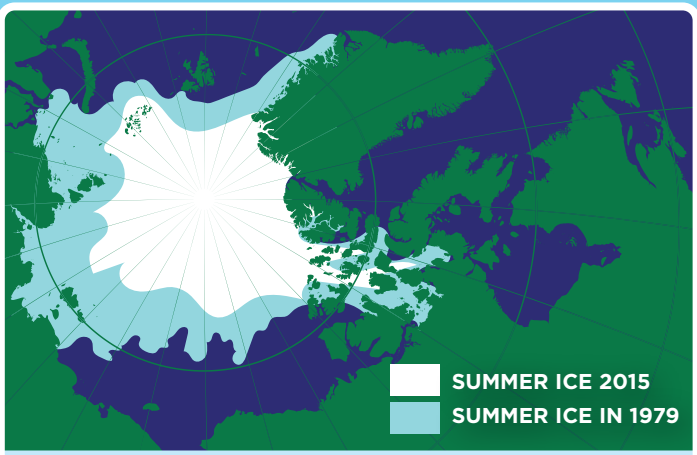
Polar bears rely on sea ice for catching their seal prey. Without sea ice, polar bears can't survive. The polar bear's main prey, ringed seals, rely on sea ice, too—for giving birth to and raising their young.



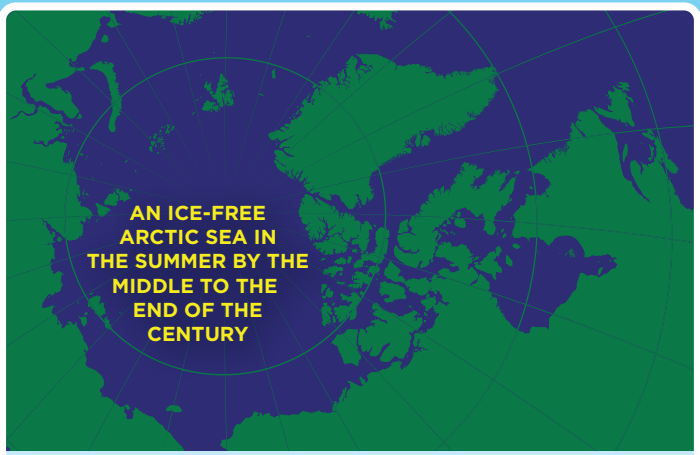
Arctic sea ice is important to our global climate. The Arctic is called the earth's air conditioner because sea ice helps cool the planet by reflecting the sun's light and heat back into space. Less sea ice means a warmer planet and more extreme weather events.



Arctic sea ice experiences natural ups and downs from one year to the next. However multi-year data sets show that, despite these short-term trends, the long-term trend of sea ice loss is steeply downward.



Since satellite tracking began in 1979, the Arctic has lost roughly 40% of its summer sea ice—a loss slightly larger than all the land east of the Mississippi in the United States.



Without action to reduce greenhouse gas emissions, the probability of ice-free summers in the Arctic increases significantly from the middle to the end of this century.

POLAR BEARS INTERNATIONAL

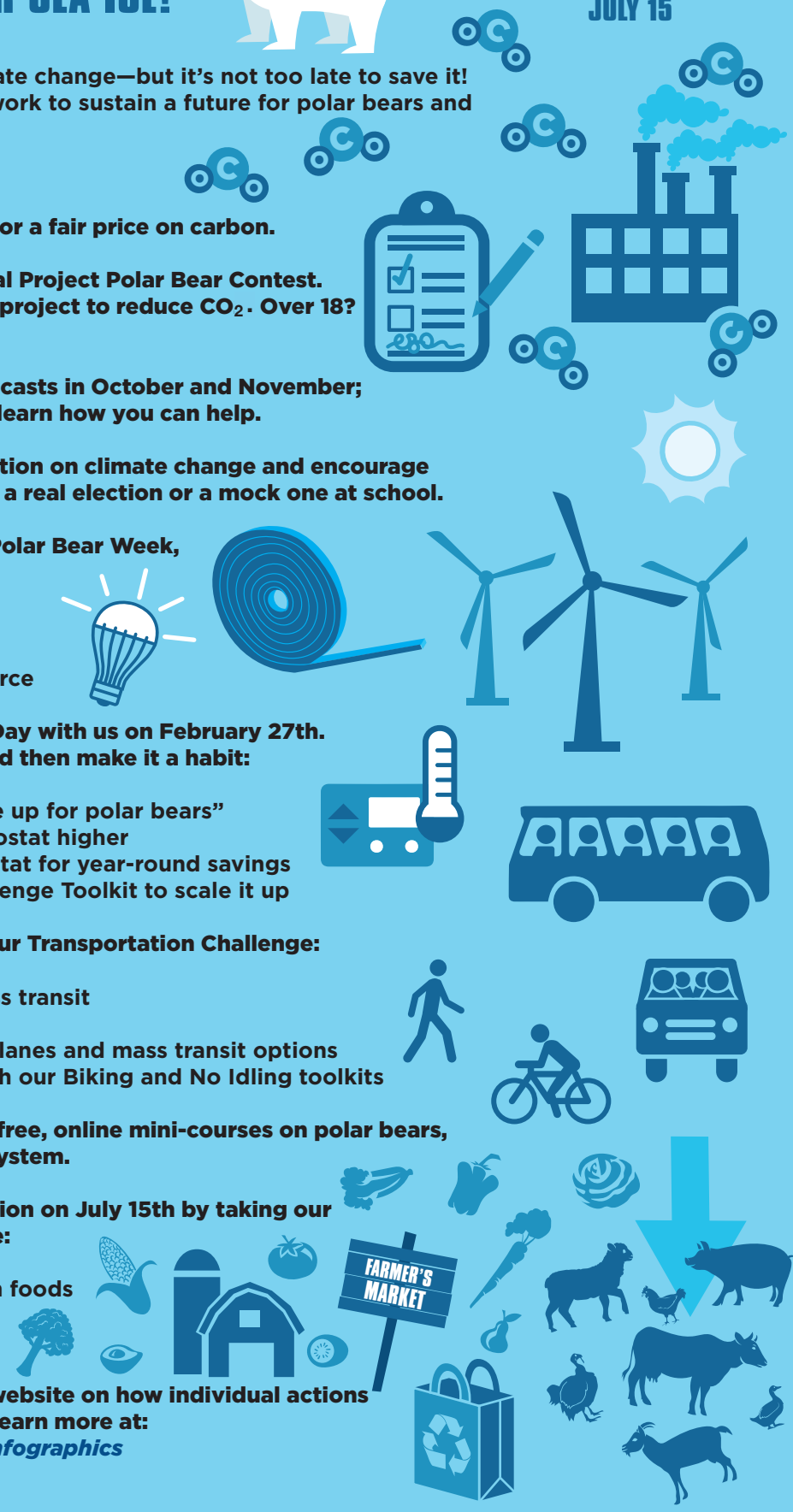
IT'S NOT TOO LATE TO SAVE OUR SEA ICE!

ARCTIC SEA ICE DAY
JULY 15

Arctic sea ice is threatened by climate change—but it's not too late to save it! Join us throughout the year as we work to sustain a future for polar bears and the sea ice they depend on.

HERE'S HOW:

- [ ] **Sign and share our petition asking for a fair price on carbon.**
- [ ] **If you're 11-18, register for our annual Project Polar Bear Contest. Team up and work on a community project to reduce CO_2. Over 18? Mentor a team!**
- [ ] **Watch our Tundra Connections webcasts in October and November; meet scientists, ask questions, and learn how you can help.**
- [ ] **Vote for candidates that support action on climate change and encourage others to do the same—whether it's a real election or a mock one at school.**
- [ ] **Take our Energy Challenge during Polar Bear Week, the first full week of November:**
  - Replace light bulbs with LEDs
  - Insulate and weather-strip
  - Choose a renewable energy source
- [ ] **Celebrate International Polar Bear Day with us on February 27th. Take our Thermostat Challenge—and then make it a habit:**
  - Turn down the heat and "bundle up for polar bears"
  - Set your air conditioning thermostat higher
  - Install a programmable thermostat for year-round savings
  - Check out our Thermostat Challenge Toolkit to scale it up
- [ ] **On Earth Day, and every day, take our Transportation Challenge:**
  - Walk, bike, carpool, or take mass transit
  - When you do drive, don't idle
  - Support local projects like bike lanes and mass transit options
  - Create community solutions with our Biking and No Idling toolkits
- [ ] **Are you a teacher? Take one of our free, online mini-courses on polar bears, climate change, and the arctic ecosystem.**
- [ ] **Join our Arctic Sea Ice Day celebration on July 15th by taking our Green House Grocery List Challenge:**
  - Choose local, sustainably grown foods
  - Shop with reusable bags
  - Reduce your meat consumption
- [ ] **Check out the infographics on our website on how individual actions scale up to make a big difference! Learn more at:** ***www.polarbearsinternational.org/infographics***



POLAR BEAR ATTACKS *continued from page 13*

photo © Daniel J. Cox/NaturalExposures.com

bear's behavior and body language. Is it being aggressive, or just wanting to be on its way? Also, look at its physical appearance; a bear with poor body condition is more dangerous than a healthy bear.

"Bear spray appears to be a very effective deterrent against polar bears," Wilder said. "We have a small data set of bear spray use (fifteen records), but it has been one hundred percent effective and no polar bears or people have been hurt during its use."

"When I worked around polar bears, I always had a can of bear spray in my parka."

Currently both Norway and Greenland prohibit bear spray, but Wilder suspects they may reconsider the ban based on a soon-to-be-released scientific paper that will examine the effectiveness of bear spray.

If Moravec had carried bear spray, and if he would have had the time to deploy it, he may have been able to deter the bear that attacked him.

As polar bears continue to lose their sea ice habitat and are forced to spend more time on land, we can expect increased human-polar bear conflict. Increased understanding of those conflicts and how to mitigate them, based on scientific data, will be an extremely valuable asset to all those who live, work, and recreate in polar bear habitat.

Melynda Coble Harrison is PBI's social media manager. She is also a freelance writer based in Montana.

Every fall, Polar Bears International, Frontiers North Adventures, explore.org, and Parks Canada work together to stream the polar bear migration live from the banks of the Hudson Bay to people around the world. Watch this season live at explore.org/polarbears.

explore.org

photo © Daniel J. Cox/NaturalExposures.com

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