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### First-ever autumn icebreaker expedition studying polar bears of the southern Beaufort Sea to reveal how bears are coping in a warming Arctic

(November 3, 2009): For the very first time, researchers are studying of the summering ecology of polar bears of the southern Beaufort Sea who choose to migrate north to the sea ice of the polar basin when the winter ice pack melts, rather than return to the shores of Alaska. Early reports from the icebreaker expedition, which launched September 29<sup>th</sup> from Barrow, AK and returned November 1<sup>st</sup>, show warmer than expected weather and thinner than expected ice – conditions potentially detrimental to polar bears says the president of Polar Bears International, Robert Buchanan.

“Polar bears need appropriate ice to hunt and survive. Young, thin ice can break up or disappear in a storm and older ice can actually be too thick for the bears to hunt seals, so this study is providing ground-breaking insight into the changing conditions of this part of the Arctic and the effects on polar bears,” said Buchanan. “PBI is pleased to be part of this critical study, with our photographer Daniel J. Cox working side-by-side researchers to document these polar bears in a habitat never-before seen.”

This is the first time this subpopulation of polar bears has been studied in the summer and autumn, as the distance to the bears is too far out to sea for land/helicopter-based operations. The study is addressing the relative costs and benefits of two different strategies used by the southern Beaufort Sea polar bears when the sea ice retreats into the deep-waters of the polar basin: return to the shores of Alaska, or follow the receding ice pack. The research team from the University of Wyoming, the U.S. Geological Survey, and the and the U.S. Fish and Wildlife Service, onboard the U.S. Coast Guard Cutter Polar Sea, are using physiological, behavioral (movements), and environmental metrics to determine the consequences of summer sea ice melt on these polar bears.

The study began in the summer of 2008, with a focus on bears in the southern Beaufort Sea that use land during summer. This year, the study has focused mostly on bears from the same subpopulation that use the pack ice in summer, with eleven bears originally collared in April and May, to be targeted for recapture during this autumn icebreaker work. During the summer and autumn ice minimum these bears were distributed over more than 900 miles of the Arctic Ocean: from 225 miles north of Russia’s Wrangel Island to within 100 miles of Banks Island in Canada.

The ability to study the collared bears up close on this autumn expedition has proven difficult in many cases as the bears were located on thin new ice or on small broken floes where it was not safe to attempt a capture. An intact and stable floe approximately the size of a football field is needed to safely land a helicopter, and sedate and work on a bear. The sea ice has been regionally variable, with newer ice in the northwestern Chukchi Sea and older and thicker ice in the eastern Beaufort Sea. The eastern Beaufort, where the sea ice is exported southward from the Polar basin by the Beaufort Gyre, contained many stable floes of multi-year ice that were thousands of meters to many kilometers across.

“Air temperatures and sea surface temperatures have averaged approximately  $-4^{\circ}\text{C}$  and  $0$  ( $25^{\circ}\text{F}$  and  $32^{\circ}\text{F}$ ), respectively. At these temperatures sea ice formation is slow. A high wind event early in the cruise, and another just recently, with winds between 30-40 knots, generated large ocean swells that have stymied the expansion of the autumn freeze,” said George Durner, U.S. Geological Survey.

“During the first weeks of October while we worked in the northwestern Chukchi Sea, thin new and young ice where many polar bears were observed was later turned into a vast region of slush and large broken floes that were being churned by ocean swells. It was difficult to imagine how even polar bears could negotiate this environment,” said Durner.

The radio telemetry data shows that many collared bears have responded by traveling deeper into the pack ice. Presently, the pack ice edge is still approximately 75 miles north of the Alaska coast (visually estimated from AMSRE imagery).

The icebreaker has allowed researchers a first-hand glimpse of the behavior of polar bears in their sea ice world.

“Several times during this cruise we have been fortunate to observe from afar, polar bears as they travel about in their remote summer home. Most of these bear appeared oblivious to the passing of the ship. Others take notice and sometimes approach, to the thrill of the scientists and crew aboard the Polar Sea,” said Durner.

The icebreaker team has managed to capture several of the target bears. Each recapture provides a treasure trove of data that has never before been available to scientists who study free-ranging polar bears. Linear body measurements and body weight are recorded. Measures are taken to estimate the amount of body fat in each bear. Blood samples and breath samples are collected and analyzed to provide information on blood chemistry and cellular composition. These samples provide insight on whether bears have recently fed and if their energy source is from a recent meal or if they are metabolizing their own body fat. Some bears were instrumented with a body temperature logger, an activity monitor, and a GPS radio collar. Core-body temperature data will provide information on energetics while activity monitors and GPS data give insight on how polar bears respond to their environment. This information, to be released in full at the conclusion of the study, will allow scientists to better understand the response of polar bear populations to a changing Arctic.

The icebreaker research is being conducted by a team from the University of Wyoming, U.S. Geological Survey, and U.S. Fish and Wildlife Service onboard the U.S. Coast Guard Cutter

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Polar Bears International is a nonprofit organization dedicated to the worldwide conservation of polar bears and their Arctic habitat through research and education.

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