

# IBA Grants Program News

Grantee	Project Area	Species	Topic	2014 Grant	Amount transferred in 2014
Morehouse, Andrea	Canada (Alberta)	Brown Bear	Evaluating the efficacy of intercept feeding in reducing spring grizzly bear-ranching conflicts	\$6,000	\$6,000
Pagano, Anthony	U.S.A. (Alaska & zoos)	Polar Bear	The effects of declining sea ice on polar bear behaviors and energetic rates	\$5,000	\$5,000
Sharp, Thomas Satyanarayan, Kartick Seshamani, Geeta	India	Sloth Bear	Sloth Bear Attack Behavior and a Behavioral Approach to Safety	\$3,545	\$3,545
Weckworth, Byron	China (Tibetan Plateau)	Brown Bear	Brown bear ecology and human conflict on the Tibetan Plateau, China	\$10,000	\$10,000
Wong, Pamela	Canada (Nunavut)	Polar Bear	Integrating Inuit traditional knowledge and telomere quantification toward novel methods of ageing polar bears	\$10,000	\$10,000
<b>TOTALS</b>				<b>\$74,621</b>	<b>\$67,121</b>

## Conservation

### News from the GLOBE – Disentangling the Impacts of Global Climate Change on Brown Bear Populations

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# Conservation

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Logo of the GLOBE project under the Polish-Norwegian Research Programme

This year we started a research project entitled GLOBE “GLObal climate change and its impact on brown BEar populations: Predicting trends and identifying management priorities.” GLOBE aims to establish solid cooperation between Polish and Norwegian bear researchers in order to exchange knowledge and experience to better understand climate change impacts on large carnivore ecology and conservation. The partner institutions are, from the Polish side, the Institute of Nature Conservation of the Polish Academy of Sciences and the Faculty of Economic Sciences of the University of Warsaw, and from the Norwegian side, the Norwegian University of Life Sciences, Telemark University College, and the Norwegian Institute for Nature Research. Tatra National Park (Poland) is involved in GLOBE as a third party. The project GLOBE will last 3 years, until December 2016. The kick-off meeting was held in Krakow, Poland, on March 3-5, 2014. The funding for the project comes from the Polish-Norwegian Research Programme, which aims at promoting bilateral cooperation through popularization and support of scientific research. Climate change is one of the research areas prioritized by the Programme.

Our main goal is to assess the effects of climate change on 2 brown bear populations (Carpathian Mountains and Scandinavia), and how these effects are mediated by humans. We aim to contribute to a better understanding of the mechanisms for climate-change adaptation in large carnivores in boreal and alpine ecosystems. We hypothesize that climate-related factors, interacting with non-climate factors, particularly human-driven habitat changes, are affecting wintering patterns, physiological state, and foraging ecology of brown bears, and human-bear interactions. Assessing climate-induced responses by brown bears and predicting future trends in bear ecology, behavior, distribution and relations with humans may have important implications for brown bear conservation and ecosystem management.

Large carnivores inhabiting northern latitudes are considered good indicators of ongoing climate and environmental changes. The best example is the polar bear, which has become the iconic symbol of a melting Arctic. Its sister species, the brown bear, may be a model species in climate change research, particularly in Europe, where boreal and alpine regions are likely to be especially affected by climate change (IPCC 2007). The Carpathian (7,200 bears) and Scandinavian populations (2,800 bears) are among the largest in Europe and inhabit alpine and boreal ecosystems, respectively. Brown bear ecology and physiology are largely influenced by climatic factors (Bojarska and Selva 2012, Steyaert et al. 2012). Recent observations from the Carpathian population suggest behavioral modifications that may be linked to changes in winter conditions. For example, non-hibernating bears are being observed increasingly more often during winter in the eastern Polish Carpathians. Winter is a period of low food availability and hibernation is an adaptation to those conditions.

Climate-induced changes in bear wintering patterns may trigger a cascade of ecological, behavioral, and physiological responses, including an increase in baseline stress levels or in human-bear conflicts. Most injuries caused by brown bears to humans occur during the denning period, including the den entry period (Sahlén 2013). Shortening of the bear denning period or increased bear activity during winter may produce a trophic mismatch. Such mismatches in the availability of key bear foods during crucial periods may have important consequences. Given that temperature and snow conditions are the main determinants of brown bear diet (Bojarska and Selva 2012), and that the availability of some crucial bear foods (e.g.

ungulate carrion after wintering or berries during hyperphagia) may be affected by global warming, we expect a long-term change in brown bear diet. This trophic shift may be accompanied by latitudinal and altitudinal range shifts. A climate-induced increase in bear numbers, in bear winter activity, or an expansion of their range into new areas may translate into higher probability of occurrence of human-bear encounters and affect how bears are perceived and valued. We expect that individual ecological responses will be linked to physiological stress and that the overall response will have consequences for fitness.

To address these research questions, we are combining different methods, such as GPS telemetry, stable isotope and hormonal analyses, climate envelope and predictive models, spatial analysis and socio-economic surveys. One general limitation in understanding how climate change affects animal populations is the lack of long-term datasets. The Scandinavian Brown Bear Research Project (SBBRP) has been gathering data and biological samples from captured and radio-collared bears, including detailed data on individual life histories, since 1984 and therefore offers a unique opportunity for climate change research involving a large predator. A long-term dataset on bear records, including winter observations and bear-caused damage, is also available for the Polish Carpathians. The comparative analysis of these long-term datasets and the comparison of climate-induced responses in both bear populations provide an exceptional opportunity to advance our current understanding of climate change impacts on biodiversity and ecosystem functioning.

During this spring trapping season, 4 male bears (3 adult and 1 subadult) have been equipped with GPS collars in Poland in the Tatra mountains and 16 previously unmarked bears have been captured and radiomarked in Sweden. The collection of bear foods and the collation of bear hairs for stable isotope and hormonal analysis are ongoing. The socio-economic surveys in the 2 countries will start soon. For more information, visit our website ([www.globeproject.pl](http://www.globeproject.pl)).

## Literature Cited

- Bojarska, K., and N. Selva. 2012. Spatial patterns in brown bear *Ursus arctos* diet: the role of geographical and environmental factors. *Mammal Review* 42:120-143.
- IPCC (Intergovernmental Panel on Climate Change). 2007. *Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.* (Core Writing Team, R.K. Pachauri and A. Reisinger, eds.). IPCC, Geneva, Switzerland, 104 pp.
- Sahlén, V. 2013. Encounters between brown bears and humans in Scandinavia—contributing factors, bear behavior and management perspectives. PhD thesis, Norwegian University of Life Sciences, Ås.
- Steyaert, S.M.J.G., A. Endrestol, K. Hacklander, J.E. Swenson, and A. Zedrosser. 2012. The mating system of the brown bear *Ursus arctos*. *Mammal Review* 42:12-34.



Field teams involved with bear captures in Poland (left) and Sweden (right).

