

2018-2020 ACTION REPORTS

CIRCUMPOLAR ACTION PLAN:

CONSERVATION STRATEGY FOR THE POLAR BEAR



**POLAR BEAR
RANGE STATES**

January 27, 2020

Contents

Progress Report, Action #1	3
Progress Report, Action #3	5
Progress Report, Action #7	8
Progress Report, Action #12	18
Progress Report, Action #17	29
Progress Report, Action #18	31
Progress Report, Actions 19 & 20.....	33
Progress Report, Action #22	36
Progress Report, Action #27	42
Progress Report, Action #29	44
Progress Report, Actions #30.....	46
Progress Report, Action #33	49
Progress Report, Action #34	51
Progress Report, Action #35	52
Progress Report, Action #42	54
Progress Report, Action #53	56
Progress Report, Action #58	58
Progress Report, Action #59.....	61
Progress Report, Action #60	65
Progress Report, Action #63	67

Progress Report, Action #1

2018-2020 Bilateral and Multilateral Actions,

Circumpolar Action Plan: Conservation Strategy for the Polar Bear

Action	Consider the cumulative effects of climate change and human activities on polar bear subpopulation and habitats when making management decisions using tools such as predictive modeling.
Point(s) of contact or Lead country	Greenland Amalie Jessen, Heidi Hansen AMALIE@nanoq.gl ; hmha@nanoq.gl ;
Partner Countries	n/a
Timeline Description as per 2018-2020 implementation table	Task proposed for 2018-2025 Proposed Timeline: October 2017: application of the Regehr et al. (2017a) modeling framework for harvest risk assessments of the Baffin Bay and Kane Basin subpopulations. 2018-2025 (ongoing, as new scientific data are obtained): application of harvest risk assessment methods that consider the combined effects of human-caused removals and habitat change to help inform management strategies for different subpopulations.
Baseline Status	Coordinated circumpolar action not yet completed some subpopulations currently using tools such as Amstrup et al. (2008)
Planned Outputs	
Modifications made to date	
Progress Report Date	September 30, 2019

Progress Report on Activity:

- Harvest risk assessment methods that consider the effects of human-caused removals and habitat change have successfully been applied to the Chukchi Sea and Southern Hudson Bay polar bear subpopulations, as documented in the following reports:
 - Regehr, E. V., L. Polasek, A. Von Duyke, J. M. Wilder, and R. R. Wilson. 2018. Harvest Risk Assessment for Polar Bears in the Chukchi Sea: Report to the Commissioners of the U.S.-Russia Polar Bear Agreement, 25 June 2018. Unpublished report, 95 pp.
 - Regehr, E., M. Dyck, G. Gilbert, S. Iverson, D. Lee, N. Lunn, J. Northrup, A. Penn, M.-C. Richer and G. Szor. 2019. Provisional Harvest Risk Assessment for the Southern Hudson Bay Polar Bear Subpopulation. Report to the Southern Hudson Bay Polar Bear Subpopulation Advisory Committee, 07 June 2019. Unpublished report. 75 pp.
- The project “Circumpolar Assessment of Sustainable Harvest for Polar Bears Under Climate Change” has been funded by the Ministry of Fishing, Hunting, and Agriculture of the Government of

Greenland. This project will be conducted by Principal Investigator Eric Regehr (University of Washington) and co-investigators Jon Aars, Todd Atwood, Markus Dyck, Kristin Laidre, Nick Lunn, Michael Runge, Dag Vongraven, and James Wilder. The project will consider the best-available data for the 19 polar bear subpopulations to achieve the following objectives:

- Evaluate relationships between subpopulation abundance, maximum intrinsic growth rate, carrying capacity, and harvest level.
 - (2) Project future trends in sustainable harvest level based on estimated relationships between sea-ice availability and the demographic parameters listed above.
- Ability to participate in this project has been confirmed by the co-investigators listed above. An analytical outline for the project has been developed and reviewed by co-investigators.
- Planned outputs include at least one manuscript submitted for publication to a peer-reviewed scientific journal.

Next Steps:

- Action complete. Allocate required funding.
- Action complete. Identify co-investigators.
- Action complete. Develop analytical outline for the project and obtain review from co-investigators.
- Winter 2019/2020. Consolidate available scientific data.
- Spring/summer 2020. Develop and apply modeling framework.
- Summer/autumn 2020. Draft manuscript with analytical results and interpretation.
- Winter 2020/2021. Submit manuscript to a peer-reviewed scientific journal.

Considerations Going Forward:

Considering your experience implementing this CAP Action to date, would you recommend that it be retained as a priority action moving forward (i.e. will it provide a positive conservation benefit for polar bears, and will multilateral collaboration on the action benefit the RS). If not, please provide a short explanation of why. If yes, then please also provide any suggested modifications going forward to make the action more meaningful in terms of goals/objectives/desired outputs. Please ensure that any modifications result in a clear expected outcome(s) (e.g. a report) and a method for sharing that report (conference, Range State website etc).

No alterations or modifications at the time being, as the analysis and main project has not been finalized yet. It is considered a highly significant action item which will benefit all Range States on both a unilateral and bilateral scale.

Progress Report, Action #3
2018-2020 Bilateral and Multilateral Actions,
Circumpolar Action Plan:
Conservation Strategy for the Polar Bear



Action	Define and Identify Essential Polar Bear Habitat and Document Change over Time
Point(s) of contact or Lead country	Greenland Amalie Jessen, Heidi Hansen hmha@nanoq.gl ; AMALIE@nanoq.gl
Partner Countries	
Timeline Description as per 2018-2020 implementation table	Carried over from 2018-2020; additional progress could be made in 2020-2022 and beyond, pending funding
Baseline status	PBSG regularly updates sea ice metric for subpopulations, but assessment does not consider other essential polar bear habitat features. Work has been conducted at national levels, but has not been coordinated internationally (between Range States jurisdictions).
Planned Outputs	Status report that would lay the groundwork for the Range States to take climate change effects into account in polar bear management.
Modifications made to date	None.
Progress Report Date	September 30, 2019

Progress Report on Activity

No progress made 2018-2020 due to lack of funding.

From 2015-2017

A peer-reviewed paper on sea-ice metrics has been published:

Stern, H.L., and K. L. Laidre. 2016. Sea-ice indicators of polar bear habitat. The Cryosphere 10, 2027-2041, doi:10.5194/tc-10-2027-2016

This metric has been used in the IUCN global conservation assessment under the Red List (Wiig et al. 2015 Red List document, Regehr et al. 2016) and as part of the PBSG Status Table. The metric has also been used in analyses related to individual subpopulations, specifically Kane Basin, Baffin Bay, and East Greenland (see SWG 2016 and Laidre et al. 2015).

Other relevant materials published to support the ongoing accomplishment of this action item are following:

Laidre, K. L., E. W. Born, P. Heagerty, Ø. Wiig, R. Dietz, H. Stern, J. Aars, M. Andersen. 2015. Shifts in habitat use by female polar bears (*Ursus maritimus*) in East Greenland. *Polar Biology* 38: 879-893. doi: 10.1007/s00300-015-1648-5

Regehr, E.V., K. L. Laidre, H. R. Akçakaya, S. Amstrup, T. Atwood, N. Lunn, M. Obbard, H. Stern, G. Thiemann, & Ø. Wiig. 2016. Conservation status of polar bears (*Ursus maritimus*) in relation to projected sea-ice declines. *Biology Letters*. 12: 20160556. <http://dx.doi.org/10.1098/rsbl.2016.0556>

SWG [Scientific Working Group to the Canada-Greenland Joint Commission on Polar Bear]. 2016. Re-Assessment of the Baffin Bay and Kane Basin Polar Bear Subpopulations: Final Report to the Canada-Greenland Joint Commission on Polar Bear. 31 July 2016: x + 636 pp.

Next Steps

Possible with funding:

- The current status table metric can be refined to a higher resolution analysis across the Arctic on a grid-cell by grid-cell basis. This would be an improvement over the current broad scale subpopulation-based analysis. This would provide a finer scale assessment of polar bear habitat change over the satellite record and can be used to address multiple other action items (e.g., #2). It can also be used to look at breakpoints.
- In addition, there could be an updated circumpolar resource selection model (RSF) (following on work similar to Durner et al. 2009, Laidre et al. 2015 and others) but using updated satellite telemetry data from multiple subpopulations.
 - (This would take about one year of a research scientist's time and requires telemetry data from several nations for collaboration).
- Detailed maps could be generated showing how critical habitat will be distributed through Arctic areas at different time steps and under different sea ice conditions.
- Essential terrestrial habitat could also be determined by looking at denning sites or use of land habitat from telemetry as part of the circumpolar RSF (e.g., identify areas of frequent land use, similar to Rode et al. 2015).

Funding needed to progress on these issues: \$120,000 USD for sea ice portion only, \$200,000 USD to do RSF.

Considerations Going Forward:

The action item should be retained as is, and will provide substantial conservation information and benefit, if funding can be secured for the specific projects described above.

Progress Report, Action #7
2018-2020 Bilateral and Multilateral Actions,
Circumpolar Action Plan:
Conservation Strategy for the Polar Bear



Action	Develop strategies for responding to the potential for large numbers of bears stranded on shore near communities and human developments and consider the consequences including those for human safety and transmission of disease between bears
Point(s) of contact or Lead Country	Conflict Working Group Martyn Obbard & Sybille Klenzendorf martynobbard@gmail.com ; Sybille.Klenzendorf@wwf.de ;
Partner Countries	
Timeline Description as per 2018-2020 implementation table	Carried over from 2015-2017; initial task expected to be completed in 2018-2020 2-yr cycle, yet should be maintained since new information becomes available on a regular basis
Baseline status	Information exists but has not been analyzed as part of international report
Planned Outputs	Each Range State will share documents they have developed (Best Management Practices [BMPs] and sponsored research) that directly pertain to action #7, including how to handle orphaned cubs. These will be posted on the Range States website.
Modifications made to date	<p>The title and description of this action were modified to better match the exact language from the Circumpolar Action Plan (CAP) document “2 YearImplementationTable_FINAL.pdf”. Further, based on discussions within the Conflict Working Group (CWG), the phrase “nutritionally-stressed” was dropped from the title and description to better reflect the need to manage large concentrations of bears on shore, regardless of their nutritional status.</p> <p>The original timeline for this action was 2015-2017; however, the CWG was not able to fully complete the task in that timeframe. Therefore, this action will be completed during the 2017-2019 timeframe. The CWG and the CAP Implementation Team (CAP IT) both agreed that this action is best handled at the individual Range State level, with BMPs being shared on what each Range State has found works best for them. As a result, the CWG will not write a strategy that would apply to all the Range States as this action is not really a collective Range States action, but rather is better</p>


	handled at the individual Range State level, though individual Range States will benefit by sharing BMPs amongst jurisdictions.
Progress Report Date	September 30, 2019


Progress Report on Activity


In 2017, the CWG and CAP IT agreed that this action is best addressed at the individual RS level and that progress should be reported by country. Each Range State should share documents they have developed (Best Management Practices [BMPs] and sponsored research) that directly pertain to action #7: Develop strategies for responding to the potential for large numbers of bears stranded on shore near communities and human developments and consider the consequences including those for human safety and transmission of disease between bears, including how to handle orphaned cubs. Links to these documents will be posted on the Range States website.

To date, several range states have posted documentation to an internal Google Docs drive. The CWG chose to create an internal Google drive because many publications are not cleared for publication as PDFs and are only available as abstracts (peer – reviewed journals). CWG is currently assembling information to be posted to the range states website. The goal is to publish them on the website in the next 6 months and add new publications as they become available.

An overview of the google drive is below:


Drive


 Search Drive


 New

☒ Priority


☒ My Drive

☐ Shared with me

☐ Recent


☐ Starred

☐ Trash



 Storage

8.6 GB of 30 GB used


[UPGRADE STORAGE](#)

My Drive > CWG Files > 


Name ↑




 Action 7: BMPs Stranded Bears on Land




 Action 19,20: Tourism




 Action 22: PBHIMS




 Action 58: Bear Safety Messages




 Admin




 CAP documents




 Community Conflict Management Plans




 Emergency Response




 Meeting Notes and Action Items




 Presentations




 Reference Papers




 Reports



 Tools to reduce HBC



 Training Materials



 Viewing/Photo/Filming Guidelines

A sample of resources obtained by jurisdiction include:

Canada:

Research publications:

1. 2016. N. W. Pilfold, D. Hedman, I. Stirling, A. E. Derocher, N. J. Lunn, and E. Richardson. Mass loss rates of fasting polar bears. *Physiol Biochem Zool.* 2016 Sep-Oct;89(5):377-88.
2. 2013. Derocher, A. E., J. Aars, S. C. Amstrup, A. Cutting, N. J. Lunn, P. K. Molnár, M. E. Obbard, I. Stirling, G. W. Thiemann, and D. Vongraven. Rapid ecosystem change and polar bear conservation. *Conservation Letters* 6:368-375.
3. 2010. Towns, L., A. E. Derocher, I. Stirling, N. J. Lunn, and D. Hedman. Spatial and temporal patterns of problem bears in Churchill, Manitoba. *Polar Biology* 32:1529-1537.

Non-peer-reviewed documentation:

1. Nunavut Polar Bear Guard Training
2. Manitoba Alert Program
3. Churchill Safety Brochure
4. Parks Canada Polar Bear Safety Brochure
5. Parks Canada Bear Safety Plan Template
6. Ontario Orphan Cub Protocol
7. NWT safety brochure
8. Nunavut Polar Bear Safety Brochure

Greenland:

Non-peer Reviewed Literature

1. Greenland Guidelines for Polar Bear Encounter

Norway:

Peer-reviewed papers:

1. Lone, K., B. Merkel, C. Lydersen, K. M. Kovacs, and J. Aars. 2018. Sea ice resource selection models for polar bears in the Barents Sea subpopulation. *Ecography* 41:567-578.

2. Lone, K., K. M. Kovacs, C. Lydersen, M. Fedak, M. Andersen, P. Lovell, and J. Aars. 2018. Aquatic behaviour of polar bears (*Ursus maritimus*) in an increasingly ice-free Arctic. *Scientific Reports* 8:9677.
3. Tartu, S., S. Bourgeon, J. Aars, M. Andersen, A. Polder, G. W. Thiemann, J. M. Welker, and H. Routti. 2017. Sea Ice-Associated Decline in Body Condition Leads to Increased Concentrations of Lipophilic Pollutants in Polar Bears (*Ursus maritimus*) from Svalbard, Norway. *Science of the Total Environment* 576:409-419.
4. Stempniewicz, L. 2017. Polar Bears Observed Climbing Steep Slopes to Graze on Scurvy Grass in Svalbard. *Polar Research* 36:1326453.
5. Hamilton, C. D., K. M. Kovacs, R. A. Ims, J. Aars, and C. Lydersen. 2017. An Arctic Predator–Prey System in Flux: Climate Change Impacts on Coastal Space Use by Polar Bears and Ringed Seals. *Journal of Animal Ecology* 86:1054-1064.
6. Aars, J., T. Marques, K. Lone, M. Andersen, Ø. Wiig, I. M. B. Fløystad, S. B. Hagen, and S. T. Buckland. 2017. The Number and Distribution of Polar Bears in the Western Barents Sea Area. *Polar Research* 36:1374125.
7. van Beest, F. M., J. Aars, H. Routti, E. Lie, M. Andersen, V. Pavlova, C. Sonne, J. Nabe-Nielsen, and R. Dietz. 2016. Spatiotemporal Variation in Home Range Size of Female Polar Bears and Correlations with Individual Contaminant Load. *Polar Biology* 39:1479-1489.
8. Lone, K., J. Aars, and R. A. Ims. 2013. Site Fidelity of Svalbard Polar Bears Revealed by Mark-Recapture Positions. *Polar Biology* 36:27-39.
9. Vongraven, D., J. Aars, S. C. Amstrup, S. N. Atkinson, S. E. Belikov, E. W. Born, T. D. Debruyn, A. E. Derocher, G. M. Durner, M. Gill, N. Lunn, M. E. Obbard, J. Omelak, N. Ovsyanikov, E. Peacock, E. Richardson, V. Sahanatien, I. Stirling, and Ø. Wiig. 2012. A Circumpolar Monitoring Framework for Polar Bears. *Ursus Monographs* 5:1-66.

Non – peer reviewed papers:

1. Norwegian Polar Institute – Guidelines for travel and wildlife in Svalbard. 2011. PDF/pamphlet. (Only Norwegian). <https://www.sysselmannen.no/globalassets/ferdsel-pa-svalbard/ferdsel-og-dyreliv-pa-svalbard.pdf>
2. Norwegian Polar Institute – Polar Bears in Svalbard. 2005. PDF/pamphlet. http://kho.unis.no/doc/Polar_bears_Svalbard.pdf
3. Sysselmannen – Safety in Svalbard. 2019. PDF/pamphlet (Norwegian/English/Russian): https://www.sysselmannen.no/contentassets/5f359e34e35d43a7a29f36064eaebc1c/foerder_sysselmannen_svalbard_a5_engelsk.pdf
4. Visit Svalbard – Polar Bears – "how to avoid confrontations with polar bears" <https://en.visitsvalbard.com/visitor-information/polar-bears>

5. Visit Svalbard – Svalbard guidelines <https://en.visitsvalbard.com/visitor-information/rules-of-svalbard-and-safety>
6. Hamilton, C. D. 2016. *Challenges for Ice-Associated Top Trophic Arctic Animals in a Changing Climate*. Ph.D.-thesis, University of Tromsø, Tromsø.
7. Andersen, M. 2013. *Polar Bears (Ursus maritimus) in the Barents Sea Area: Population Biology and Linkages to Sea Ice Change, Human Disturbance and Pollution*. Ph.D.-thesis, University of Tromsø.

Russia: no report.

United States:

Peer-reviewed papers:

1. 2018. Wilson, R. R., C. Perham, D. P. French-McCay, and R. Balouskus. Potential impacts of offshore oil spills on polar bears in the Chukchi Sea. *Environmental Pollution* 235: 652-659.
2. 2017. Wilson, R., E. Regehr, M. St. Martin, T. Atwood, E. Peacock, S. Miller, and G. Divoky. Relative Influences of Climate Change and Human Activity on the Onshore Distribution of Polar Bears. *Biological Conservation* 214: 288-294.
3. 2016. Atwood, T. C., E. Peacock, M. A. McKinney, K. Lillie, R. Wilson, D. C. Douglas, S. Miller, and P. Terletzky. Rapid environmental change drives increased land use by an Arctic marine predator. *PLoS ONE* 11:e0155932
4. 2015. Miller, S., J. Wilder, and R. R. Wilson. Polar bear–grizzly bear interactions during the autumn open-water period in Alaska. *Journal of Mammalogy* 96:1317-1325.
5. 2015. Rode, K. D., R. R. Wilson, E. V. Regehr, M. St. Martin, D. C. Douglas, and J. Olson. Increased Land Use by Chukchi Sea Polar Bears in Relation to Changing Sea Ice Conditions. *Plos One* 10:e0142213.
6. 2017. Atwood, T.C., C. Duncan, K. Patyk, P. Nol, J. Rhyhan. M. McCollum, M. McKinney, A. Ramey, O.H. Kwok, S. Hennager, and J.P. Dubey. Environmental and behavioral changes influence exposure of an Arctic apex predator to pathogens and contaminants. *Scientific Reports* 7, doi:10.1038/s41598-017-13496-9.
7. 2017. Neuman-Lee, L., P.A. Terletzky, T.C. Atwood, E.M. Gese, G.D. Smith, S. Greenfield, J. Pettit, and S.S. French. Demographic and temporal variations in immunity and

- condition of polar bears (*Ursus maritimus*) from the southern Beaufort Sea. *Journal of Experimental Zoology Part A: Ecological Genetics and Physiology* 327:333-346.
8. 2019. Watson, S.E., H.C. Hauffe, M.J. Bull, T.C. Atwood, M.A. McKinney, M. Pindo, and S.E. Perkins. Global change-mediated behavioural shift in polar bears alters faecal microbiota. *ISME*, doi:10.1038/s41396-019-0480-2.
 9. 2019. Fry, T.L., K.R. Friedrichs, T.C. Atwood, C. Duncan, K. Simac, and T. Goldberg. Reference intervals for blood-based biochemical analytes of southern Beaufort Sea polar bears. *Conservation Physiology*, 7:10.1093/conphys/coz040.
 10. 2018. Lillie, K., E. Gese, T.C. Atwood, and S.A. Sonsthagen. Development of on-shore behavior among polar bears in the southern Beaufort Sea: inherited or learned? *Ecology and Evolution*, doi:10.1002/ece3.4233.
 11. 2017. McKinney, M.A., T.C. Atwood, S. Pedro, and E. Peacock. Ecological factors drive declines in hair mercury concentrations of southern Beaufort Sea polar bears, 2004-2011. *Environmental Science and Technology*, doi:10.1021/acs.est.7b00812.
 12. 2017. McKinney, M., T.C. Atwood, S.J. Iverson, and L. Peacock. Onshore food subsidies add complexity to the response of Alaska polar bears to climate change. *Ecosphere* 8(1):e0.633.10.1002/ecs2.1633.
 13. Van Hemert, C., T.J. Spivey, B.D. Uher-Koch, T.C. Atwood, D.R. B.W. Meixell, J.W. Hupp, K. Jiang, L.G. Adams, D.G. Gustine, A.M. Ramey, X-F. Wan. 2018. Serosurvey of influenza A antibodies in wildlife from Arctic Alaska: limited evidence for exposure among mammals. *Journal of Wildlife Diseases*, doi: 10.7589/2018-05-128.
 14. The following are in press or in prep:
 - a. Lillie, K., E.M. Gese, T.C. Atwood, and M.M. Conner. Use of subsistence-harvested whale carcasses by polar bears (*Ursus maritimus*) in the southern Beaufort Sea. *Arctic*, in press.
 - b. Bourque, J., T.C. Atwood, G.J. Divoky, C. Stewart, and M.A. McKinney. Individual and combined fatty acid and stable isotope-based diet estimates suggest onshore foraging on seabirds and whale carcasses by southern Beaufort Sea polar bears. *Ecology and Evolution*, in revision.
 - c. Pagano, A.M., T.C. Atwood, G.M. Durner, and T.M. Williams. The seasonal energetic landscape of an apex marine carnivore exhibiting distinct land-sea movement strategies. *Ecology*, in revision.
 - d. Van der Walt, M., L. Nueman-Lee, P.A. Terletzky, T.C. Atwood, E.M. Gese, and S.S. French. Measuring stress and reproduction in polar bears (*Ursus maritimus*) using hair hormone concentrations.
 - e. Rode, K.D., R.R. Wilson, M. St. Martin, and E.V. Regehr. Cumulative effects of disease, contaminants and diet on polar bear body condition in the Chukchi Sea.
 - f. Wilder et al. Efficacy of Bear Spray Versus Polar Bears

Non – peer reviewed papers:

1. 2018. Miller, S. *Detection, deterrence, and attractant management: a list of tools for reducing human-bear conflicts*. Unpublished literature, prepared for Range States Human-Polar Bear Conflict Working Group, U.S. Fish and Wildlife Service, Anchorage, Alaska. 8pp.
2. 2017. USFWS. *Coping with Increasing Numbers of Polar Bears along the Coast of Alaska: Some Examples of Planning, Actions Taken, and Outreach Tools*. Unpublished literature, Marine Mammals Management, Anchorage, Alaska. 2pp.
3. 2016. USFWS. *Emergency response for polar bears: a decision matrix*. Unpublished literature, Marine Mammals Management, Anchorage, Alaska. 7pp.
4. 2015. USFWS. *Oil spill response plan for polar bears in Alaska*. Unpublished literature, Marine Mammals Management, Anchorage, Alaska. 65 pp.
5. 2012. USFWS. *Polar bear diversionary feeding workshop report*. Unpublished report, Marine Mammals Management, Anchorage, Alaska. 58pp.

Not country specific:

Peer-reviewed:

- a. Vongraven, D., A. E. Derocher, and A. M. Bohart. 2018. Polar bear research: has science helped management and conservation? *Environmental Reviews* 26:358-368.
- b. Rode, K. D., J. K. Fortin-Noreus, D. Garshelis, M. Dyck, V. Sahanatien, T. Atwood, S. Belikov, K. L. Laidre, S. Miller, M. E. Obbard, D. Vongraven, J. Ware, and J. Wilder. 2018. Survey-based assessment of the frequency and potential impacts of recreation on polar bears. *Biological Conservation* 227:121-132.
- c. Tartu, S., S. Bourgeon, J. Aars, M. Andersen, D. Ehrich, G. W. Thiemann, J. M. Welker, and H. Routti. 2016. Geographical Area and Life History Traits Influence Diet in an Arctic Marine Predator. *Plos One* 11:e0155980.
- d. Wilder, J. M., D. Vongraven, T. Atwood, B. Hansen, A. Jessen, A. Kochnev, G. York, R. Vallender, D. Hedman, and M. Gibbons. 2017. Polar bear attacks on humans: Implications of a changing climate. *Wildl. Soc. Bull.* doi:10.1002/wsb.783
- e. Atwood, T. C., K. Simac, S. W. Breck, G. York, and J. Wilder. 2017. Human–Polar Bear Interactions in a Changing Arctic: Existing and Emerging Concerns. Pages 397-418 in *Marine Mammal Welfare: Human Induced Change in the Marine Environment and its Impacts on Marine Mammal Welfare*, A. Butterworth (ed.). Springer, Cham, Switzerland.
- f. Atwood, T.C., C. Duncan, K. Patyk, and S. Sonthsagen. 2017. Monitoring the welfare of polar bear populations in a rapidly changing Arctic. Pages 503-529 in *Marine Mammal*

Welfare: Human Induced Change in the Marine Environment and its Impacts on Marine Mammal Welfare, A. Butterworth (ed.). Springer, Cham, Switzerland.

- g. Vongraven, D., J. Aars, S. C. Amstrup, S. N. Atkinson, S. E. Belikov, E. W. Born, T. D. Debruyne, A. E. Derocher, G. M. Durner, M. Gill, N. Lunn, M. E. Obbard, J. Omelak, N. Ovsyanikov, E. Peacock, E. Richardson, V. Sahanatien, I. Stirling, and Ø. Wiig. 2012. *A Circumpolar Monitoring Framework for Polar Bears*. *Ursus Monographs* 5:1-66.

Non-peer-reviewed

- a. 2018. *Range States Human-Polar Bear Conflict Working Group. Detection, Deterrence, and Attractant Management: A List of Tools for Reducing Human-Bear Conflicts. Draft overview of tools.*
- b. 2016. *Review of human-polar bear conflict reduction measures. Thesis report by Marianne Doelman.*
- c. *Camping In Bear Country. Should You Consider Using Electric Fencing? Tom S. Smith, Ph.D. Bear Research Ecologist USGS – Alaska Science Center*
- d. 2010. *TASER ELECTRONIC CONTROL DEVICE USE/SAFETY. STATE OF ALASKA DEPARTMENT OF FISH AND GAME STANDARD OPERATING PROCEDURE NO III-735*
- e. *USE OF PROJECTILES TO DETER BEARS. Dick Shideler, ADFG, Oilfield Grizzly Project, Craig Perham, USFWS, Marine Mammals Management*
- f. *EVALUATION OF BEAR REPELLENTS. Dick Shideler, Alaska Department of Fish & Game, Wildlife Conservation Division.*

Next Steps:

The CWG will continue to compile information and BMPs relevant to this action and will post them in a designated section of the Range States website for public access by those charged with managing polar bears stranded on shore.

Considerations Going Forward:

Considering your experience implementing this CAP Action to date, would you recommend that it be retained as a priority action moving forward (i.e. will it provide a positive conservation benefit for polar bears, and will multilateral collaboration on the action benefit the RS). If not, please provide a short explanation of why. If yes, then please also provide any suggested modifications going forward to make the action more meaningful in terms of goals/objectives/desired outputs. Please ensure that any modifications result in a clear

expected outcome(s) (e.g. a report) and a method for sharing that report (conference, Range State website etc).

The CWG recommends maintaining this Action Item since new information and experience on BMPs related to Action 7 become available continuously.

Progress Report, Action #12
2018-2020 Bilateral and Multilateral Actions,
Circumpolar Action Plan:
Conservation Strategy for the Polar Bear



Title	Polar Bear Range States' Trade Working Group Recommendations
Point(s) of contact or Lead Country	Trade Working Group/Canada Caroline Ladanowski, Andrea Gordon
Partner countries	All Range States
Timeline Description as per 2018-2020 implementation table	Carried over from 2015-2017; task expected to be completed in 2018-2020 2-yr cycle
Baseline status as per 10 year table (CAP Annex III)	TWG recommendations approved at 2015 meeting. Work on consistent implementation has not started yet.
Planned Outputs	<ol style="list-style-type: none"> 1. Use the agreed Terms and Units used by the Range States in their Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Annual Reports circulated to the CITES Parties for their use in their CITES annual reports.- COMPLETED 2. Use of the agreed Method to Estimate the Number of Polar Bears in International Trade for Range States when analyzing the CITES trade data. - COMPLETED 3. Use of the agreed Administrative Procedures to Verify CITES Export Permits for CITES Management Authorities. COMPLETED 4. Develop a Polar Bear Range States Wildlife Enforcement Network (WEN) for information sharing between the Range States. – ongoing

	<p>5. Implementation of agreed tagging procedures for harvested bears and bears taken in defense of life and property – partially completed</p> <p>6. Canada will post an online report of Canadian CITES Export Permits Issued for Bears Harvested in Canada annually. - ongoing</p>
Modifications made to date	None
Progress Report Date	September 30, 2019

Progress Report on Activity

Number	Planned Output Description	Output Progress	Output Status
1	Use the agreed Terms and Units used by the Range States in their CITES Annual Reports circulated to the CITES Parties for their use in their CITES annual reports.	<p>Canada Canada uses the agreed Terms and Units for polar bear in their CITES annual reports, and as described in CITES Notification 2016/032, including the Annex (https://cites.org/sites/default/files/notif/E-Notif-2016-032.pdf). While it is not possible to have a single set of terms for all polar bear imports, exports, and re-exports due to differing requirements of national legislation, the Range States recommend that CITES Parties use terms and units in their CITES annual reports for the polar bear parts in trade as they are used by each Range State.</p> <p>Norway Generally Norway adheres to the last version of the Guidelines for the preparation and submission of CITES annual reports (re-issued January 2017). This version will be used as basis for Norway's reporting on the year 2016.</p>	<p>All five polar bear Range States are current with their CITES Annual Reports submission.</p> <p>Completed in 2017.</p>

Number	Planned Output Description	Output Progress	Output Status
		<p>“See for reference – the Report from the Range States Trade Working Group Project: Completed Tasks (part Ai) with full list of appropriate terms”. On terms for scientific samples Norway uses the CITES term specimen (SPE) and always indicate in the description section what kind of sample it is (blood, milk, teeth, hair). Trade in claws is very rare, while claws attached to the rug or skin is only described as 'complete rug'. Norway notes the term bone (BON) for uncarved bones and carving (CAR) for carved bones. Trade in such specimens is rare to and from Norway.</p> <p><u>United States</u> The United States, to the best extent possible, uses the agreed terms and units for polar bear in its Annual Reports.</p> <p><u>Greenland</u> Generally Greenland adheres to the recommended terms as described by CITES concerning trade in polar bears (<i>Ursus maritimus</i>) in its annual reports. However, there is currently a voluntarily export ban on polar bears, resulting in export being limited to instances such as households and scientific specimens</p>	
2	Use of the agreed Method to Estimate the Number of Polar Bears in International Trade for Range States when analyzing the CITES trade data.	<p><u>Canada</u> Canada’s CITES Scientific Authority uses the agreed method to estimate the number of polar bears in international trade, to evaluate conservation impact. The method for analyzing the CITES trade data is described in CITES Notification 2016/032 (https://cites.org/sites/default/files/notif/E-Notif-2016-032.pdf).</p> <p><u>Norway</u> Norway concurs that the origin of parts of polar bears as in international trade is not necessarily harvested the same year as of export. For analysis of trade volume focus should be on harvest of whole bears and not on samples or parts of a bear. In its reporting Norway has focus on avoiding double reporting (e.g., skin and skull being two specimens). Such permits will,</p>	<p>Agreed upon methodology exists and all CITES Parties were informed.</p> <p>Completed in 2017.</p>

Number	Planned Output Description	Output Progress	Output Status
		<p>therefore, be adjusted to calculate the actual number individuals traded, while still mentioning what products are traded (in the description section).</p> <p><u>United States</u> CITES Parties informed of agreed methodology to estimate the number of polar bears in international trade. CITES Notification 2016/032. No recent trade analyses have been done by the United States.</p> <p><u>Greenland</u> At the present time, Greenland does not have the capacity to register exports of CITES listed II animals, therefore Greenland has not performed any trade analyses on number of polar bears in trade to and from Greenland.</p>	
3	Use of the agreed Administrative Procedures to Verify CITES Export Permits for CITES Management Authorities.	<p><u>Canada</u> Canada uses and supports other countries' use of the agreed Administrative Procedures for verification of CITES export permits, by following the agreed administrative procedures, including ensuring that Canada's contact information on the CITES website is up to date, and ensuring Management Authorities respond to requests for information within the prescribed time limits, as described in CITES Notification 2016/032 https://cites.org/sites/default/files/notif/E-Notif-2016-032.pdf).</p> <p><u>Norway</u> CITES Management Authority of Norway regularly updates contact information on 'National CITES Authorities' as found on the CITES web pages. This includes police/criminal investigation contact details related to environmental issues.</p> <p>Regarding verification of Polar Bear export permits, the Norwegian CITES MA usually will be able to respond within a week.</p> <p><u>Greenland:</u></p>	<p>Agreed upon administrative procedures for verification were developed and CITES Parties were informed in CITES Notification 2016/032.</p> <p>Completed in 2017.</p>

Number	Planned Output Description	Output Progress	Output Status
		The CITES Management Authority of Greenland generally adheres to the agreed administrative procedures as described by CITES concerning trade in polar bears (<i>Ursus maritimus</i>). Greenland will work towards updating the contact and species information on the Greenlandic CITES website: https://naalakkersuisut.gl/da/Naalakkersuisut/Departementen/Natur-Miljoe/Natur-og-Klimaafdelingen/CITES .	
4	Develop a Polar Bear Range States WEN for information sharing between the Range States.	<p><u>Canada</u></p> <ul style="list-style-type: none"> • In February 2018, the Polar Bear Range States endorsed the idea of creating a « Northern Wildlife Enforcement Network (WEN) » following a discussion after a presentation from Environment and Climate Change Canada (ECCC) at the Range States Meeting of the Parties in Fairbanks, Alaska, USA. • Since February 2018, Canada has taken action to create a Working Group to advance towards a comprehensive WEN for information sharing. To date, Working Group members from Canada, the United States, Greenland and Norway have been identified. Through the work of this group, Canada has shared information about the recently-developed “3-pronged approach” for improved tracking bears in trade. • In July 2018, Canada provided to the United States a presentation at the Annual Meeting of the U.S.-Russia Polar Bear Commission (Egvekinot, Chukotka, Russia, July 24, 2018). The presentation gave an overview of what a “Northern Wildlife Enforcement Network” would be including the type of information that members could share, the identification of challenges, opportunities and next steps. • On October 4 2018, Canada organized a “Northern Countries Enforcement Meeting” which took place during the CITES Standing Committee 70 in Sochi, Russia. The following were present: Russia foreign Ministry, Enforcement authorities of Canada (ECCC), Russia (NCB Moscow), United States (US Fish and Wildlife Service) as well 	Progress made, but implementation on-going .

Number	Planned Output Description	Output Progress	Output Status
		<p>as the following CITES Management Authorities: Denmark, Norway and Sweden. Participating countries discussed about priorities, experiences, intelligence, operation thunderstorm results as well as current challenges each countries are facing. Canada underlined to participants that while it was an informal meeting, it hoped that it would lead to a more structured opportunity to share information in the future as there is no other existing forum for discussions on compliance / enforcement issues for northern latitude countries.</p> <ul style="list-style-type: none"> • In October 9-13, 2018, during the INTERPOL Wildlife Crime Working Group meetings in Singapore, further conversations occurred highlighting the many similar issues and challenges experienced by the Arctic countries. Through discussions it became clear that many of the “Northern” issues in common go beyond “Arctic” species: glass eels, reptile smuggling, wild American ginseng, illegal harvesting of timber, fishery products, marine mammal ivory, bird egg poaching, etc. The many common repercussions identified included the increase in tourism and incursion of cruise ships into the Arctic, disturbing sensitive habitats and wildlife, as well as the increasing issues with import and introduction of invasive species into the domestic flora. • Further to discussions with members of the network, it was suggested that a collaborative approach with “Northern WEN” members would create Artic Documents outlining best practices could be shared to inspire each country. This could be accomplished through the development and agreement of terms of reference, outlining and identify areas of work. • Progress has been made, but implementation of recommendation is still on-going to create a more structured opportunity to share information in the future. There is a need to continue discussions, 	

Number	Planned Output Description	Output Progress	Output Status
		<p>among law enforcement authorities to share experiences, intelligence and collaborate on transnational investigations.</p> <ul style="list-style-type: none"> • Collaboration and sharing of information would encourage and enhance the transmission of law enforcement information between parties, providing opportunities to improve traceability of Northern species in trade and increase sharing of best practices and lead to increased prosecution of offenders. <p><u>Norway</u> Norway reported that the national wildlife authorities (NEA) act as their national WEN contact.</p> <p><u>United States</u> The U.S. presented this WEN initiative to Russia at the 2018 U.S.-Russia Bilateral Polar Bear Commission meeting in July 2018.</p> <p>On behalf of USFWS law enforcement, the U.S. invited the Russians to participate in the Wildlife Crime Working Group Meeting in London, October 8-12, 2018, and expressed that the organizers extended their welcome and invitation to have a representative from Russia attend the meeting, and participate in sessions about forming an Arctic WEN. The U.S. also expressed the organizers request for a Russian LE point of contact to whom they could extend a formal invitation to. Further, the U.S. provided Russia with their U.S. LE point of contact: bryan_landry@fws.gov Senior Special Agent, US Fish & Wildlife Service, Office of Law Enforcement, International Operations Unit.</p> <p><u>Greenland</u> The Ministry of Fisheries, Hunting and Agriculture (APNN) has been actively participating in telephone meetings as well as e-mail correspondence in the</p>	

Number	Planned Output Description	Output Progress	Output Status
		WEN Working Group. APNN has notified and invited the Ministry of Nature and Environment, which is the CITES management authority in Greenland, to participate in the WEN working group.	
5	Implementation of agreed tagging procedures for harvested bears and bears taken in defense of life and property.	<p><u>Canada</u> Canada and other Range States have shared information on their tagging procedures with each other, and this action item is complete. The tagging system in Canada allows for reliable tracing of the exported specimens back to individual harvested bears, and ensures that export of every bear is based on legal and non-detrimental harvest. A detailed description of the tagging procedures used by Canada was provided to other range states in the TWG Final Report.</p> <p><u>Norway</u> The Norwegian CITES permitting authority generally wants to see a correlation between specimens and permits, e.g., via tagging or other marking and through better description of specimens on the permits. Tagging will be mainly for products such as whole skins. Norway supports the notion of tag remaining on the specimens from harvest and to the final destination if possible.</p> <p>A new national CITES regulation is now proposed (autumn 2017) and awaits final Government endorsement. This new regulation makes it mandatory for skins of polar bears to be tagged upon import or to be tagged soon after. The tagging requirement is also applicable to polar bear skins inside the country. Locking tags are deemed to be the cheapest method and can be more easily checked. Copies of CITES permits stating tag number (including permits issued by other Parties) or a new NEA issued certificate will also be mandatory. Records of tagged specimens will be kept by NEA.</p> <p><u>United States</u> A detailed description of the United States tagging procedures was provided in the TWG Final Report. United States domestic law only allows coastal</p>	<p>Action appears to be completed by Canada and the United States. For Norway, new regulations are pending.</p> <p>Partially completed.</p>

Number	Planned Output Description	Output Progress	Output Status
		<p>dwelling Alaska Natives to harvest polar bears for subsistence or handicraft purposes. Once harvested Alaska Natives must report and register the hide and skull of the bear with the U.S. Fish and Wildlife Service (Service) or its representative within 30 days, at which time a uniquely numbered tamper-resistant tag is placed on both the hide and skull and that tag must remain with the hide through the tanning process. At time of tagging the Service collects a pre-molar from the harvested animal but no hair is currently collected. Additionally, the Service does not allow the commercial sale or export of raw or tanned hides or mounts of polar bears. Any polar bear taken in defense of human life or illegally harvested must either be transferred to the Service or in the case of an illegal harvest is seized by the Service. Such specimens are tagged by the Service and remain the property of the Service. United States domestic law does not allow a polar bear to be taken (killed) in defense of property.</p> <p><u>Greenland</u></p> <p>Greenland has at the present time no tagging procedure for harvested bears, or bears taken in defense of life and property, as there is currently a voluntarily polar bear export ban in place. When all the sub-populations of polar bears in Greenland have been estimated, the Ministry of Fisheries, Hunting and Agriculture and the Ministry of Nature and Environment will start a collaborative project to investigate the possibilities of applying a tagging system for all harvested polar bears, in the case of a possible future lift of the voluntarily export ban. Greenland is though exploring the used methods in other polar bear countries where methods are in place.</p>	
6	Canada will post an online report of Canadian CITES Export Permits Issued for Bears Harvested in Canada annually.	<p><u>Canada</u></p> <p>Canada annually publishes a summary of wildlife trade as part of the WAPPRIITA (Canada's Wildlife Trade Act) annual report. The most recent WAPPRIITA annual report, published in February 2020, can be found here: https://www.canada.ca/en/environment-climate-change/services/convention-international-trade-endangered-species/publications/wild-animal-plant-protection-2018-report. The</p>	<p>Action still in progress by Canada and under consideration.</p> <p>In progress.</p>

Number	Planned Output Description	Output Progress	Output Status
		<p>WAPPRIITA annual reports contain a summary of information on polar bear exports. Canada continues to work to make data available in an accurate timely and transparent way that respects legal and privacy concerns, in order to facilitate cooperation and ensure transparency and use of polar bear trade data in an efficient way.</p> <p>Canada also provides an annual trade data report to the CITES Secretariat. The latest published (2015) CITES polar bear trade data can be found here: http://trade.cites.org/. The recommended methods for analyzing these data are outlined in Recommendation #2 of the Circumpolar Action Plan (CAP) Implementation Plan and can also be found in CITES Notification 2016/032 (https://cites.org/sites/default/files/notif/E-Notif-2016-032.pdf).</p> <p><u>Norway</u></p> <p>Norway reported to monitor trade the focus should be on whole skins and exempt scientific samples or smaller items. There is no regular harvest of polar bear in Norway and a database containing requested information has therefore not been established. The off-take of polar bear in Norway averages one a year and are animals causing danger. These specimens are usually traded on the domestic market.</p>	

Next Steps

Please describe all future activities that will contribute toward the planned outputs, or ongoing activities related to the action, if any. If the action is complete, simply write "Action complete".

Considerations Going Forward -

Considering your experience implementing this CAP Action to date, would you recommend that it be retained as a priority action moving forward (i.e. will it provide a positive conservation benefit for polar bears, and will multilateral collaboration on the action benefit the RS). If not, please provide a short explanation of why. If yes, then please also provide any suggested modifications going

forward to make the action more meaningful in terms of goals/objectives/desired outputs. Please ensure that any modifications result in a clear expected outcome(s) (e.g. a report) and a method for sharing that report (conference, Range State website etc).

Progress Report, Action #17
2018-2020 Bilateral and Multilateral Actions,
Circumpolar Action Plan:
Conservation Strategy for the Polar Bear



Title	Develop Operations, Protocols, and Procedures of the Range States
Timeline	2015-2019
Description of Activity from 2017 Implementation Table	Explore and develop options for making the operations of the Range States more standardized and/or formal. A working group will be created to develop options for consideration by the Range States in 2017. Options should include a full range from formally adopting rules of procedure and protocols to consideration of a Secretariat, and associated costs and funding options to implement the Circumpolar Action Plan (CAP)
Baseline status	Recommendations not developed
Planned Outputs	Establish an Operations, Protocols and Procedures Working Group (OPP WG) and present recommendations at the 2018 Range States Biennial Meeting of the Parties (MoP)
Modifications	None

Progress Report on Activity

An Operations, Protocols and Procedures Working Group (OPP WG) was created with representation from each of the Range States.

Since the 2018 Meeting of the Parties, the OPP WG has accomplished the following:

1. Finalized “1973 Agreement on the Conservation of Polar Bears Rules of Procedure for Contracting Parties”- Adopted in Fairbanks, Alaska, USA, February 4, 2018. Revised March 12, 2019.
2. Finalized “1973 Agreement on the Conservation of Polar Bears Terms of Reference Role of the IUCN/SSC Polar Bear Specialist Group as Scientific Advisors to the Polar Bear Range States”- Adopted in Fairbanks, Alaska, USA, February 4, 2018. Revised March 12, 2019.
3. Developed “Memorandum of Understanding between the parties to the Polar Bear Agreement (PBA) and the Conservation of Arctic Flora and Fauna Working Group (CAFF)” for Administrative support for a Polar Bear Agreement Project Officer. This document awaits resolution of how to deal with an expected shortage of funding for Russia’s share of contribution before it can be finalized.

Next Steps

The work of the OPP WG to address HoD requests is largely complete. Next steps for completing the MoU with CAFF are:

Action 1 - Norway and CAFF to share a version of the MoU ready for signature. This will include a revised budget.

Action 2 – Range States to proceed with signing the MoU.

Action 3 – Range States to work bilaterally with CAFF to determine a funding arrangement.

Action 4 – Russia to proceed with seeking funds once MoU has been signed.

Progress Report, Action #18
2018-2020 Bilateral and Multilateral Actions,
Circumpolar Action Plan:
Conservation Strategy for the Polar Bear



Action	IUCN/SSC PBSG to consider all the science-related actions in the CAP and to prioritize them into two and ten year actions with a report back to the Range States for their consideration. The report will include possible funding sources and applications will have been made, where appropriate
Point(s) of contact or Lead country	Norway Andreas Benjamin Schei and Karen Lone andreas.benjamin.schei@miljodir.no ; Karen.Lone@miljodir.no
Partner Countries	
Timeline Description as per 2018-2020 implementation table	Carried over from 2015-2017; task will be carried into 2018-2020 2-year cycle and through 2025
Baseline status 2015	CAP approved in MoP, meeting identified a need for further exploration of options for implementation of science-related actions and tasked PBSG with this.
Status 2018	PBSG in 2017 submitted a document with input on options for further specification of research activities related to these actions and funding requirements
Planned Outputs	Suggestions for concrete research projects tied to specific CAP actions to be presented to the parties as suggestions for follow-up in next 2-year implementation plan
Modifications made to date	Action redefined and further developed from a request to the PBSG to a Range State-led discussion and assessment process
Progress Report Date	September 30, 2019

Progress Report on Activity

This is a carry-over activity from 2015-2017. In the previous two-year period PBSG provided comments on CAP actions to the CAP Implementation Team (CAP IT) in 2016. In the current period, this work has been addressed from a new angle – by bringing together researchers from all range states for a workshop to make progress on the science-related actions.

As a follow-up of this, Norway in February 2019 hosted a researcher workshop with circumpolar participation with the goal of fostering discussion on ways in which management and research goals in the CAP could benefit by enhancement and coordination among ongoing monitoring and research programs currently in place. As it was not deemed feasible or productive to address all areas of research prioritized in the CAP, the primary objective of the workshop was

to focus on the collection and analysis of scientific data to estimate demographic parameters for polar bear subpopulations. Recommendations from the researchers for prioritization and funding of research activities that will contribute to completion of CAP actions will follow as part of the workshop outcome document, which is currently under review. Similar activities focusing on other areas of research could be held in the coming years.

The workshop was very productive in terms of useful discussions of priorities and possibilities, and for establishing or advancing specific collaborative projects. A core output was the identification of a list of projects/studies that should be prioritized to fulfill actions under CAP.

Next Steps

The list of the prioritized actions and studies should be discussed by the Range States in order to identify opportunities for backing these projects with the required support, funding and international cooperation opportunities. While there is agreement among the researchers that these projects will be productive ways of making progress both within their own research and in the implementation of the CAP, these projects have not necessarily secured funding, and Range States coordination/cooperation on this should be a major discussion item moving forward. The list of projects identified will be made available to all Range States, and the Range States should consider ways to secure national or international funding.

Considerations Going Forward:

A unison recommendation coming out from the workshop was that it was a very productive workshop – that facilitated collaboration and helped make progress on the science actions. The participants strongly recommend that this type of workshop is arranged every 2-years under CAP.

Progress Report, Actions 19 & 20
2018-2020 Bilateral and Multilateral Actions,
Circumpolar Action Plan:
Conservation Strategy for the Polar Bear



Actions	19: Establish working relationships with tourism organizations 20: Collect occurrence data, and develop BMPs, with the goal of minimizing the impact of tourism-related activities and their impact on polar bears
Point(s) of contact or Lead country	Norway, Canada & the Conflict Working Group Andreas Schei, Karen Lone, Caroline Ladanowski, Andrea Gordon, Martyn Obbard & Sybille Klenzendorf andreas.benjamin.schei@miljodir.no ; Karen.Lone@miljodir.no , caroline.ladanowski@canada.ca , andrea.gordon@canada.ca , martynobbard@gmail.com ; Sybille.Klenzendorf@wwf.de ;
Partner Countries	All Polar Bear Range States
Timeline Description as per 2018-2020 implementation table	#19 carried over from 2015-2017; will be combined with #20 and tasks expected to be completed in 2018-2020 2-year cycle Proposed timeline: February 2018 – September 2018: Part 1 September 2018 – February 2019: Part 2 Spring 2019: Part 3
Baseline Status	Action 19 – existing information about the quickly developing tourism sector has not been analyzed Action 20- data has not been compiled into a database. BMPs have not yet been developed.
Planned Outputs	1. A compendium of Best Management Practices and related information to tourism operators in polar bear habitat posted on the Range States website 2. A summary of occurrence data related to interactions between tourism operators/tourists and polar bears from each of the Range States collated and posted on the Range States Website
Modifications made to date	In 2018 these actions were combined given the overlapping scope. In 2019 these actions were re-scoped given existing information, limited capacity and other priority actions. Key modifications – Action 19 – relevant jurisdictions within the Range States should be encouraged to engage with Tourism Operators at the working level to share BMPs and ensure compliance with any regulations or conservation efforts in their area of operation as it relates to polar bear.

	Action 20 - many of the relevant Tourism Operators and Jurisdictions within the Range States already have existing BMPs relevant to the regions in which they work. To avoid duplication of efforts the Range States determined that the best approach would be to collate this information into a publically accessible compendium of information which will be updated biennially and made available on the Range States website. Range State parties should share the compendium with all relevant jurisdictions and operators to ensure existing regulations and/or guidelines keep bears and people safe.
Progress Report Date	September 30, 2019

Progress Report on Activity:

A summary of occurrence data related to human-bear interactions in tourism-related settings during 2000-2019 is being collected but not complete at time of reporting.

The current status by range state:

US: data submitted

Greenland: data submitted

Canada: data submitted

Norway: no data reported

Russia: no data reported

Once complete the data will be made available on the Range States website.

A compendium of Best Practices and research related to minimizing the impact of tourism-related activities on polar bears has been developed and will be posted on the Range States website. This will be updated biennially and posted on the Range States website in advance of the biennial Meetings of the Parties.

Next Steps:

Ongoing activities – Action 19 – should be flagged for individual Range States to do with the relevant jurisdictions and removed from the work plan.

Action 20 – ongoing activities will be updating the compendium of best practices and the overview of tourism-related incidences by range state in advance of each biennial meeting of the parties and posting it on the Range States website.

Considerations Going Forward:

The compendium of best practices and related material, as well as an overview of tourism-related incidences by range state should be updated in advance of each biennial meeting of the parties and the revised version of the document should be made available on the Range States website.

It would be helpful to modify the Action to reflect this.

Suggested text for Action 20: during each 2-year work plan, provide of tourism-related incidences by range state update Compendium related to Best Management Practices and related research for minimizing the impact of tourism related activities on polar bears and their habitat. The revised version of the document should be made available on the Range States website in advance of each biennial meeting of the parties.

Progress Report, Action #22
2018-2020 Bilateral and Multilateral Actions,
Circumpolar Action Plan:
Conservation Strategy for the Polar Bear



Action	<p>Reduce the risk of injury and mortality to humans and bears as a result of their interactions by:</p> <ul style="list-style-type: none"> a. continuing to support the work of the Range State Conflict Working Group (CWG); b. implementing and making available to all Range States the Polar Bear-Human Information Management System (PBHIMS); c. developing and implementing appropriate data-sharing agreements among the Range States and making the data available to Range State management authorities; d. entering all available data on human-bear interactions into the PBHIMS database on an ongoing basis; and, e. developing Best Management Practices (BMPs) on tools and techniques for use in preventing and mitigating human–bear conflicts
Point(s) of contact or Lead country	<p>Conflict Working Group Martyn Obbard & Sybille Klenzendorf martynobbard@gmail.com; Sybille.Klenzendorf@wwf.de;</p>
Partner Countries	
Timeline Description as per 2018-2020 implementation table	<p>Carried over from 2015-2017; task expected to be completed in 2018- 2020 2-yr cycle</p>
Baseline status	<p>Terms of Reference (ToR), data sharing agreement and requirements document not completed. PBHIMS not fully populated.</p>
Planned Outputs	<p>To have completed ToR, data-sharing agreement and a requirements document. Continued population of the PBHIMS and publication of peer-reviewed papers.</p>
Modifications made to date	<p>The title and description of this action were modified to better match the exact language from the CAP document “2 YearImplementationTable_FINAL.pdf”.</p>
Progress Report Date	<p>September 30, 2019</p>

Progress Report on Activity***a. continuing to support the work of the Range States CWG.***

Description: *Providing the human and financial resources necessary for the CWG to complete assigned tasks. Ideally, a financial mechanism will be established to support working group activities including priority research, pilot projects, face-to-face meetings, and data management.*

No financial mechanism has been established, although the Range States Operations, Policies, and Procedures (OPP) Working Group (WG) is working with the Range States Heads of Delegation (HoD) to address this point. A decision is expected prior to the 2018 Range States Biennial Meeting of the Parties (MoP).

Support was provided by the Range States for a face-to-face meeting of the CWG in March 2015 in Copenhagen.

In 2017 the U.S. Fish and Wildlife Service determined that it could no longer provide the sole financial support for providing technical support for the PBHIMS database. The CWG has discussed other options to pursue, but no solutions have been developed. The SMART database used by World Wildlife Fund (WWF) for other species may provide a proven solution that could be modified to accommodate polar bears.

No financial mechanism has been established to support the work of the CWG (Conflict Working Group). The current activities are supported by staff time of range states employees and outside members such as WWF, the University of Utah, University of Washington, etc. There is no dedicated financial support for pilot projects or meetings. WWF has supported the pilot development of PBHIMS-SMART as the succession for PBHIMS by paying for staff time to tailor the software to PBHIMS, training of range state staff, and technical support. The government of Norway paid for an initial training week for SMART in Tromso in October 2018.

Currently, CWG is planning a face-to-face meeting of the CWG before the next range states meeting, but attendance of several members (such as the chair) is in question due to lack of travel funds to attend.

b. implementing and making available to all Range States the PBHIMS database;

The CWG has created a PBHIMS ACCESS database, which is currently available to all Range States for use. A ToR and requirements document were completed.

The CWG identified the following requirements for the database to be rolled out more effectively in the range states in 2017:

- Development of an access – restricted database
- Automated, standardized reporting
- Easier record submission (e.g. web, smartphones, etc.)
- Enhancement of spatial data processing functionality
- Multi-language capabilities, specifically a Russian version
- Expansion of PBHIMS user groups

The Range States agreed at their meeting MoP in January 2018 to move forward with an alternative database platform called SMART (Spatial Monitoring And Reporting Tool) from the original ACCESS database to meet the above requirements. SMART, which was developed initially to aide conservation managers in understanding wildlife population trends and threats including poaching and human -wildlife conflict (<http://smartconservationtools.org/>), is currently being implemented in ~600 sites across the globe for effective conservation management. The USFWS International Program is one of the financial supporters of SMART and co-finances implementation mainly in Africa and Asia.

c. developing and implementing appropriate data-sharing agreements among the Range States and making the data available to Range State management authorities;

Description: Determine goal of agreement, approval by CWG, Approval by HoD, National consultations

Finished, with caveat: The CWG has developed a draft data-sharing agreement. However, the CWG does not think a true data sharing agreement is practical at the International level. Rather, data sharing agreements will be developed between interested parties on a project and analysis specific basis. The draft data-sharing agreement developed by the CWG can provide a template for that along with data sharing within jurisdictions.

In 2018, the CWG agreed on a minimum number of variables that are needed for an incident report and BMP practices analysis. These data are critical to deliver on a conflict status report to the CAP annually.

d. entering all available data on human-bear interactions into the PBHIMS database on an ongoing basis; and

Description: Historic conflict records are entered, and a plan is in place to update PBHIMS annually with data from each Range State

Unfortunately, implementation of SMART-PBHIMS has been slower than anticipated due to limited amount of staff time, staffing changes, and delayed software upgrade. The software upgrade was finished in June 2019.

SMART database design and adaptation to individual range state requirements is finished for Norway (Conbear), Greenland, and Nunavut. In addition, we have designed a database for Wrangell Island (Russia) and Chukotka (via WWF).

Status of PBHIMS data entry per country:

US: The USFWS has continued data entry of PBHIMS data in the ACCESS database. USFWS has not been able to commit to SMART implementation because IT staff still need to test compatibility with the USFWS server and security requirements.

Greenland: Data entry is complete in ACCESS. Data transfer to SMART not complete but planned in the next 3 months.

Norway: PBHIMS data is entered through 2010 in the ACCESS database, 11 additional incidences are not entered for data until Aug 2016. No additional information is available from August 2016. PBHIMS data transfer is complete up to 2013 data into the SMART database, but SMART mobile data collection is not yet implemented in the field yet.

Russia: No data for PBHIMS provided.

Canada: Canada's efforts have focused on the implementation of process to obtain human-bear conflict data from sub-national jurisdictions in accordance with minimum variables recommendations that were agreed upon by the CWG in 2018. Canada has committed to reporting summarized information to fulfill its requirements under the CAP, but has not been able to commit to SMART implementation on a national level.

PBHIMS data has been entered in Manitoba into the ACCESS database for data up to 2013. Staffing limitations have prevented full entry to date.

Nunavut has finished draft design of the SMART mobile data collection tool to test in field.

e. developing BMPs on tools and techniques for use in preventing and mitigating human–bear conflicts

Description: Produce a best practices detection, deterrence, and conflict prevention manual using material from around the Arctic such as the Parks Canada/Government of Nunavut and U.S. deterrence manuals that were already produced. Include recommended suite of data to be collected whenever bears are killed in conflict (e.g. age, sex, body condition, and probable cause of the attack). Continue to update as new material becomes available.

Rather than produce a manual, the Range States will share BMPs, manuals and other materials on the Range States website to inform management of conflicts Arctic-wide. Still need to review materials from the 2014 Wildlife-Human Attack Response Training (WHART) workshop held in Whitehorse to help identify data to collect when bears are killed during conflicts.

Ongoing. See response to action #7 for a list of publications.

In April 2019, a WHART workshop was held in Anchorage and has updated information for broader use. The Alaska Department of Fish & Game is finalizing a grizzly and black bear attack response manual that will also inform responses to polar bear attacks.

Next Steps

A. SMART Implementation Plan (needs financial support):

Objective 1: By 2020, SMART is tested with at least 3 model applications (population survey, polar bear patrol, citizen science observations) and designated SMART trainers can conduct SMART workshops for stakeholders and provide basic technical advice.

Activity 1.1: Training of range staff in SMART application and IT officer in each range state.

Activity 1.2: SMART Connect Site Setup and SMART mobile collection interface design for field testing.

Activity 1.3.: Field testing of data collection

Activity 1.4: Refinement of SMART data collection interfaces after field testing (Winter 2020)

Activity 1.6: PBHIMS data transfer into SMART (SPRING 2020)

Activity 1.7: Continued field data collection and quarterly data analysis

Objective 2: By 2021, interested stakeholders can use and administer SMART effectively to meet their conservation/management needs, including data collection, citizen engagement in polar bear conservation, data management, querying data, and developing standardized reports.

Activity 2.1: Regional workshop to familiarize interested stakeholders (e.g. industry, communities) with SMART

- a two-day regional SMART orientation workshop to familiarize interested stakeholders on SMART. The workshop will include the following topics:

- SMART as a possible wildlife – conflict, harvest, and scientific monitoring tool;
- How to use and adapt SMART software for effective conservation management and adapt it to the needs of the stakeholders.
- Possible Uses of SMART mobile data collection

B. BMP – related activities (needs financial support)

Title: Develop and initiate an applied research program

Description: Reconstruct and modernize the Churchill deterrents research program (Stenhouse et al.). In partnership with Manitoba Conservation and other interested parties, create and fund a research program to quantitatively examine current and potential tools in polar bear deterrence and conflict mitigation. Examples of tools that could benefit from additional applied research include: air horns, 'cone of sound' (LRAD), "advance warning detection systems", bear spray effectiveness under different conditions, paintball guns, and the use of Tasers. Other examples include testing synthesized bear "growls" such as those used in the original Churchill test in the 1980s. These could be broadcast from a vehicle such as from a patrol vehicle with a PA system. A pepperball gun has been used by oilfield security officers on polar bears in Alaska, but needs further testing. Polar bear-resistant food storage should also be a further topic to explore.

CWG will provide regular review and recommendation of additional human-bear research that is needed.

Countries: All Range States

Lead: Tbd

Timeline: 2020-2022

Outputs: Scientific/management papers on deterrent efficacy that will directly inform BMP's.

Considerations Going Forward:

This Action stands at the core of the CWG to provide measurable impact to conservation by evaluating BMPs supported by field data. It should be kept as is and supported with a budget.

Progress Report, Action #27
2018-2020 Bilateral and Multilateral Actions,
Circumpolar Action Plan:
Conservation Strategy for the Polar Bear



Action	Inter-jurisdictional Collaboration in Support of Consistent Research Methods and Data Sets for Polar Bears
Point(s) of contact or Lead country	Polar Bear Specialist Group & Norway Nick Lunn, Dag Vongraven, Andreas Schei and Karen Lone Nick.lunn@canada.ca ; dag.vongraven@npolar.no ; andreas.benjamin.schei@miljodir.no ; Karen.Lone@miljodir.no
Partner Countries	
Timeline Description as per 2018-2020 implementation table	Carried over from 2015-2017; task will be carried into 2018-2020 2-year cycle and through 2025
Baseline status	No systematic approach to sharing research plans exists between jurisdictions.
Planned Outputs	Technical/scientific publications and procedural manuals.
Modifications made to date	
Progress Report Date	September 30, 2019

Progress Report on Activity

The PBSG currently collaborates inter-jurisdictionally to the best extent possible. The PBSG website includes descriptions of several methods extensively in polar bear research, that have been written by PBSG members with specialist knowledge. Three of the methods pages (mark-recapture, line transect surveys and fatty acid analyses) were updated in 2019.

Terms of reference for PBSGs involvement under CAP have been developed.

Additional activities during this 2-year period that supported inter-jurisdictional research collaboration included an international workshop in Tromsø in February 2019 that brought together researchers from all RS. At the workshop several research projects looking into concrete research questions raised under the CAP were identified, and collaborations were initiated or further developed.

Next Steps

This action is ongoing, will be carried into next 2-year cycle.

Considerations Going Forward:

There seems to be agreement that this action can continue to be adequately pursued in parallel by PBSG in their day-to-day workings, as well as by undertaking international workshops similar to the one held in Tromsø – during each 2-year period.

Progress Report, Action #29
2018-2020 Bilateral and Multilateral Actions,
Circumpolar Action Plan:
Conservation Strategy for the Polar Bear



Action	Determination of population size estimates as per the Inventory Schedule
Point(s) of contact or Lead country	Norway lead Andreas Schei and Karen Lone andreas.benjamin.schei@miljodir.no; Karen.Lone@miljodir.no
Partner Countries	All Range States
Timeline Description as per 2018-2020 implementation table	Carried over from 2015-2017; task will be carried into 2018-2020 2-year cycle and through 2025
Baseline status	Inventory schedule begins 2015; population estimates reflect ongoing national efforts.
Planned Outputs	Population assessments.
Modifications	None.
Progress Report Date	September 30, 2019

Progress Report on Activity

Each Range State conducts population estimates as part of their national conservation plan or bilateral agreements and, subject to priorities, each Range State will conduct these assessments as per the Inventory Schedule in Appendix V of the CAP. To ensure these population estimates are completed, the International Union for the Conservation of Nature/Species Survival Commission (IUCN/SSC) Polar Bear Specialist Group (PBSG) has suggested that the Range States adequately fund the implementation of their individual national plans.

At the end of the year, a request will go out to HoD to provide national information on inventory activities during 2018 and 2019, so that an updated Subpopulation Inventory Planning Schedule can be made available ahead of the next Meeting of the Parties.

Next Steps

This action is on-going and will remain an on-going and recurring for the full 10-year action plan period (i.e., until 2025).

Considerations Going Forward:

The work of surveying the polar bear subpopulations and publishing subpopulation assessments is carried out at the national or bilateral level. Norway recommends that the Range States

follow-up of this action under CAP in the coming 2-year period be specifically defined to consist of compiling and updating the Subpopulation inventory planning schedule annually.

Progress Report, Actions #30
2018-2020 Bilateral and Multilateral Actions,
Circumpolar Action Plan:
Conservation Strategy for the Polar Bear



Action	Obtain information, where possible, on vital rates for all 19 subpopulations of polar bears. Improve methods to evaluate ecological indicators (e.g., reproduction) as proxies for robust estimates of vital rates
Point(s) of contact or Lead country	Canada Caroline Ladanowski & Samuel Iverson Caroline.ladanowski@canada.ca ; Samuel.iverson@canada.ca ;
Partner Countries	All Polar Bear Range States
Timeline Description as per 2018-2020 implementation table	Task proposed for 2018-2020 Proposed Timeline: January 2018: Canada develops information templates; February-April 2018: request to Range State members to solicit existing vital rates information from national experts; May-October 2018: information compiled and expert opinion sought to determine priority information needs and sampling recommendations; November-December 2018: draft report prepared by Canada; January-April 2019: report reviewed by Range State national experts; May-July 2019: final report complete.
Baseline Status	No circumpolar meta-analysis of estimated vital rates, as ecological indices has occurred.
Planned Outputs	A status report. The report will be made publically available by the Range State parties through the website. Intended audience includes researchers and wildlife managers, as well as other parties with an interest in polar bear conservation.
Modifications made to date	None
Progress Report Date	September 30, 2019

Progress Report on Activity:

A detailed outline was developed by Canada in consultation with Range States partners. The planned output is a status report comprised of the following subsections:

- (1) A compendium of existing information on polar bear subpopulation vital rates and the methods used to estimate them.
- (2) An evaluation of critical information needs obtained from outreach to polar bear experts relating to (a) priority subpopulations for new or ongoing study; (b) the type of information best suited to estimate and monitor changes in vital rates; and (c) best

practices for obtaining consistent, comparable information across regional subpopulations.

- (3) A discussion of challenges and considerations in the collection of vital rate information, including prioritization of limited financial resources and issues related to Indigenous/stakeholder perspectives on the use of techniques that involve physically handling bears.

In developing the project proposal, it was noted that the Polar Bear Specialist Group (PBSG) has an interest in conducting vital rates work and has made proposals to fund such work. This sub-action is complementary to that request and seeks to work with PBSG to identify priority information needs. Much of the information required for Part 2 of this sub-action will be obtained from the products developed under CAP Action #63 (Improved design of polar bear population studies) which is ongoing and led by the U.S.

Canada is coordinating this action with input from all Range States through the PBSG.

The timeline has been delayed from that which was initially proposed. Canada determined the project would best be advanced by engaging and with contracting an expert outside consultant, Dr. Stephen Atkinson, to lead the work. Additional time was required to hire Dr. Atkinson and for him to begin his work.

From January 2018 to November 2018, information templates were developed and the proposal was refined. In December 2019, Dr. Atkinson began compiling and reviewing vital rates studies for an annotated bibliography. In May 2019, formal outreach was made to Range State colleagues and PBSG members describing the initiative and seeking additional information for inclusion in the annotated bibliography. Dr. Atkinson is currently undertaking efforts to collect expert opinion through bilateral conversations to support parts 2 and 3.

Next Steps:

- October 1 – November 15, 2019: outreach to polar bear management and research experts to be completed and the draft status report developed.
- December 15, 2019: draft status report completed and shared with Range States and PBGS colleagues for review and input.
- January 30, 2020: status report completed.

Considerations Going Forward:

Recommendations included in the status report with regard priority subpopulations for new or ongoing vital rates study should be cross-referenced against the Subpopulation Inventory Schedule (<https://polarbearagreement.org/resources/agreement/circumpolar-action->

[plan/appendix-v](#)) to ensure proposed actions are in alignment with identified priorities with regard to abundance estimation and the collection of vital rates data.

Progress Report, Action #33
2018-2020 Bilateral and Multilateral Actions,
Circumpolar Action Plan:
Conservation Strategy for the Polar Bear



Action	Annual population Assessments for each of the Polar Bear Subpopulations
Point(s) of contact or Lead country	Polar Bear Specialist Group & Norway Nick Lunn, Dag Vongraven, Andreas Schei and Karen Lone Nick.lunn@canada.ca ; dag.vongraven@npolar.no ; andreas.benjamin.schei@miljodir.no ; Karen.Lone@miljodir.no
Partner Countries	
Timeline Description as per 2018-2020 implementation table	Carried over from 2015-2017; task will be carried into 2018-2020 2-year cycle and through 2025
Baseline status	Population status table updated by International Union for the Conservation of Nature/Species Survival Commission (IUCN/SSC) Polar Bear Specialist Group (PBSG).
Planned Outputs	Annual reports.
Modifications made to date	None.
Progress Report Date	September 30, 2019

Progress Report on Activity

Range States conduct population estimates as part of their national conservation plan or bilateral agreements. The PBSG assesses these efforts and, in conjunction with other research efforts, produce status assessments for polar bear populations. The PBSG updates the status table when new information is made available. In practice, this has been less frequently than annually.

During this two-year period, the PBSG has made a thorough revision of their assessment methods.

The PBSG updated their “Summary of polar bear population status” table in September 2019. It is available on their website at: <http://pbsg.npolar.no/en/status/status-table.html>.

Next Steps

This action is on-going and will remain on-going and recurring for the full 10-year action plan period (i.e., until 2025).

Considerations Going Forward:

We recommend keeping this action as is.

Progress Report, Action #34
2018-2020 Bilateral and Multilateral Actions,
Circumpolar Action Plan:
Conservation Strategy for the Polar Bear



Action	Obtaining Traditional Ecological Knowledge (TEK) for each Subpopulation
Point(s) of contact or Lead country	TEK Working Group Heidi Hansen & Andrea Gordon hmha@nanoq.gl ; andrea.gordon@canada.ca
Partner Countries	All Range States
Timeline Description as per 2018-2020 implementation table	Carried over from 2015-2017; task will be carried into 2018-2020 2-year cycle and through 2025
Baseline status	Inventory schedule begins 2015; TEK studies reflect ongoing national efforts
Planned Outputs	Acquisition table will be posted online in advance of the 2020 Range States Biennial Meeting of the Parties.
Modifications made to date	None.
Progress Report Date	September 30, 2019

Progress Report on Activity

An updated Acquisition Schedule (CAP Appendix VI) will be posted on the Range States website in advance of the 2020 Biennial MoP.

Next Steps

The TEK WG will identify planned TEK studies for the 2020-2022 reporting period, and continue to update the CAP Acquisition Schedule as new TEK studies are planned and completed.

Considerations Going Forward:

The TEK WG recommends that this action is retained and that Range States be encouraged to undertake work related to the collection of Indigenous knowledge as it relates to polar bear. This action fits nicely into the goals of the CAP as it puts all TEK studies together in one place for easy reference. Updating the Acquisition Schedule is both informative and achievable in the 2 year work plan periods. We recommend that this action not be modified.

Progress Report, Action #35
2018-2020 Bilateral and Multilateral Actions,
Circumpolar Action Plan:
Conservation Strategy for the Polar Bear



Action	Establishment of a Range State definition of Traditional Ecological Knowledge (TEK) and guidelines for the use of TEK in management decisions
Point(s) of contact or Lead country	TEK Working Group Heidi Hansen & Andrea Gordon hmha@nanoq.gl ; andrea.gordon@canada.ca
Partner Countries	All Range States
Timeline Description as per 2018-2020 implementation table	Carried over from 2015-2017; task may be carried into 2018-2020 2-year cycle and through 2025 Update – This action, as it relates to the updating of the TEK Compendium, will be ongoing through 2025.
Baseline status	Information exists but has not been standardized or compiled by the Range States
Planned Outputs	Development of an agreed upon definition of TEK to be used by the Range States and a list of recommendations for standards for collecting and reporting on TEK which will be used in management decisions
Modifications made to date	After discussions, the TEK WG decided that it would be very hard to develop a list of recommendations of standards for collecting and reporting on TEK for management decisions. Therefore the group, with approval from the Heads of Delegation (HoD), modified the action to ‘compiling a compendium of existing guidelines for the use of TEK in decision making’ which can be used as reference material. The audience for the compendium is the Range States and anyone who is interested. This compendium will evolve as more TEK information becomes available and will aim to have a section dedicated to the use of TEK in Wildlife Management specifically, as more information becomes available.
Progress Report Date	September 30, 2019

Progress Report on Activity

The definition of TEK was approved by the HoD in 2016.

The compendium of existing guidelines for the use of TEK in decision making was first shared at the 2018 Range States Meeting of the Parties. Since this time the document has undergone some re-organizing for readability and has been updated to include additional research.

Next Steps

The compendium will be updated in advance of each biennial meeting of the parties and made available on the Range States website.

Considerations Going Forward:

The TEK WG agrees that the compendium is a very helpful document and that making it available on the range states website helps bring attention to the breadth and variety of Indigenous Knowledge related research that has been undertaken and is ongoing. Given the definition was developed in 2017 the TEK WG suggests that the ongoing action be modified to: Update the compendium of guidelines for the use of TEK in decision making on a biennial basis.

Progress Report, Action #42
2018-2020 Bilateral and Multilateral Actions,
Circumpolar Action Plan:
Conservation Strategy for the Polar Bear



Action	Compile the state of knowledge on (both global and local source) contaminants affecting polar bears and prey
Point(s) of contact or Lead country	Norway Andreas Schei, Karen Lone andreas.benjamin.schei@miljodir.no ; karen.lone@miljodir.no
Partner countries	n/a
Timeline Description as per 2018-2020 implementation table	Task proposed for 2018 – 2020 Proposed Timeline: February 2018 – June 2018: Range states will compile existing information and describe current research and monitoring efforts on contaminants, pollution and marine debris affecting polar bears or their prey. June 2018 – December 2018: The Norwegian Polar Institute will compile and analyze received information and create a draft report with input and communication with relevant scientific partners in other RS. Spring 2019: After review of draft report, final report will be completed and posted to RS Website.
Baseline status	Compilation not yet started, but national literature exists.
Planned Outputs	
Modifications	
Progress Report Date	September 30, 2019

Progress Report on Activity:

The Norwegian Polar Institute (NPI) has taken the lead compiling the state of knowledge on contaminants affecting polar bears throughout their circumpolar range, resulting in a comprehensive review article.

- Routti H, Atwood T, Bechshoft T, Boltunov A, Ciesielski TM, Desforjes JP, Dietz R, Gabrielsen GW, Jenssen BM, Letcher RJ, McKinney M. "State of knowledge on current exposure, fate and potential health effects of contaminants in polar bears from the circumpolar Arctic." *Science of the Total Environment* (2019). <https://doi.org/10.1016/j.scitotenv.2019.02.030>

Based on this updated state of knowledge, the NPI has produced a short report with input from specialists from all RS. The report identifies knowledge gaps and what types of studies are needed to fulfill the actions related to knowledge on contaminants under CAP (actions #43-46). A summary of the state of knowledge based on the review article is included in this report, which will be made available on the RS website.

Next Steps:

Nov 2019 - The short report outlining research needs and priorities will be posted on the RS website after it has been published as part of NPIs short report series.

Considerations Going Forward:

With the publishing of the report to the RS website, this action will be complete. The report should be used to inform the discussions on specific projects to implement of actions #43-46 going forward.

Progress Report, Action #53
2018-2020 Bilateral and Multilateral Actions,
Circumpolar Action Plan:
Conservation Strategy for the Polar Bear



Action	Maintenance of Website Established for 2015 Range State Meeting and Maintenance of a permanent Range States website
Point(s) of contact or Lead country	Norway/Communications Working Group Andreas Schei, Lauren Schmuck, Bridget Crokus andreas.benjamin.schei@miljodir.no ; lauren.schmuck@canada.ca ; bridget_crokus@fws.gov
Partner countries	n/a
Timeline Description as per 2018-2020 implementation table	Carried over from 2015-2017; task may be carried into 2018-2020 2-year cycle and through 2025
Baseline status	Not developed.
2018 Status	Permanent Range States website established December 1, 2017
Planned Outputs	Range States website.
Modifications	
Progress Report Date	September 30, 2019

Progress Report on Activity

Under an existing agreement between the U.S. Fish and Wildlife Service and the Conservation of Arctic Flora and Fauna (CAFF), the U.S. provided funding (\$5,000 USD) to the CAFF for the development of a Range States website, www.polarbearagreement.org. The Range States website was launched and made available to the public on December 1, 2017. For the 2-year period from 2018 to 2020, Norway provided \$5,500 (\$2,750 per year) to CAFF to host and maintain the website.

The website design is a basic structure that can be built upon as necessary. The current primary functions of the website are to serve as the “digital platform” for the Circumpolar Action Plan (CAP) and to provide access to key documents. The list below shows the current menu items and key elements of the website:

- About—Provides details about and key documents regarding:
 - The history of the Range States, including the 1973 Agreement on the Conservation of Polar Bears and the 2013 Ministerial Declaration
 - The role of the IUCN PBSG as the Scientific Advisory Body to the Range States
 - Past and upcoming Meetings of Parties

- Contact information for each Range State
- Polar Bear Management--Information about national and bilateral actions/agreements for polar bear management, as presented in the CAP
- Circumpolar Action Plan – Information about the CAP and 2-year CAP Implementation Plans
- Polar Bear Biology – General information on polar bear biology, as presented in the CAP
- Working Groups – Brief descriptions of the working groups, key documents associated with each working group, and contact information for the chairs of the working group
- Resources
 - Public-facing page with links to all key documents on the website

Password-protected page available for working group members to share documents.

Next Steps

The Communications Working Group (Comms WG) will continue to develop and populate the Range States website as an ongoing action during the next two-year work period. Changes to the website will be facilitated through a Range States Website Editorial Board, which was approved on November 14, 2017, by the Heads of Delegation and consists of members from each Range State as well as individuals from the Comms WG.

Website hosting and maintenance is expected to cost approximately \$3,000 USD per year. These costs were included in the Memorandum of Understanding (MoU) *between the Polar Bear Agreement and the Conservation of Arctic Flora and Fauna, Administrative support arrangement for a Polar Bear Agreement Project Officer* presented to the Arctic Council in June 2019. In the event the MoU is not implemented, future funding of the website will be the responsibility of the Range States host country for each 2-year cycle. Canada will assume the role of host country in March 2020 after the biennial MoP in Norway; however, the funding agreement between the current host country (Norway) and CAFF is valid through December 31, 2019.

Considerations Going Forward:

Yes, this action should be retained as a priority action. Due to the limited capacity (in both staff time and web expertise) among the Range States, it is difficult to fully exploit the potential communications power of the website. Because website maintenance and support are included in the MoU, the Comms WG strongly recommends the HoD and CAFF consider web experience when selecting the position of project officer, as the project officer is more likely to be able to dedicate time to the maintenance of the Range States website than members of the Comms WG are able to.

Progress Report, Action #58
2018-2020 Bilateral and Multilateral Actions,
Circumpolar Action Plan:
Conservation Strategy for the Polar Bear



Action	Use the PBHIMS database to produce safety education materials for use throughout the Arctic in order to minimize and mitigate human-bear interactions
Point(s) of contact or Lead country	Conflict Working Group/United States Marty Obbard, Sybille Klenzendorf, Jim Wilder, Mary Colligan martynobbard@gmail.com , Sybille.Klenzendorf@WWFUS.ORG , james_wilder@fws.gov , mary_colligan@fws.gov
Partner Countries	n/a
Timeline Description as per 2018-2020 implementation table	Task proposed for 2018-2020 Proposed Timeline: January-June 2018: CWG Range states will compile existing information on polar bear safety messages currently in use, as well as examples from the black and brown bear world. Summer 2018: CWG meets face to face to: (1) identify priority polar bear safety messages; (2) the relative merits of different data sources, with priority given to published literature and (3) best practices for proactively minimizing human-polar bear conflicts. September 2018-June 2019: Produce a suite of vetted polar bear safety messages, along the lines of Alaska's 2017 "A Framework for Bear Safety Messages in Alaska" produced by the Alaska Interagency Bear Safety Education Working Group September 2019: final report complete and posted to RS website.
Baseline status	Not developed.
Planned Outputs	
Modifications	
Progress Report Date	September 30, 2019

Progress Report on Activity:

Dr. Tom Smith and a student assistant completed an evaluation of messaging from a variety of sources within the Range States that gave advice on safety in polar bear country. Messages were grouped into 4 categories:

1. Get informed (Beware)
2. Carry/know/use deterrents (Prepare)
3. Camp/Hike/Trip Management (Take Care)
4. If all else fails – escalating encounters (Deter Bear)

On March 26, 2019, a subgroup of the CWG met in Anchorage discuss the effort by the CWG to review existing polar bear safety messaging being disseminated within the Range States, and to revise those messages as needed. While the summary compiled by Dr. Smith is thorough in listing messages by agency, by frequency and by category, it does not address which of these messages are correct (in terms of safety advice) or their priority (that is, if limited to the most critical of messages, which would you include and in what order?).

Next Steps:

Prior to the 2020 Meeting of the Parties, the CWG proposes to:

1. Review Alaska's 2017 "A Framework for Bear Safety Messages in Alaska" and use this as the foundation for our polar bear safety messages. The rationale for this is that the information contained in that document will pertain to a large extent to polar bears, and it has already been extensively vetted by the multi-agency members of the Alaska Interagency Bear Safety Education Working Group. Obviously, some sections of the document are not relevant to polar bears, and some of the messaging will need to be modified, but this is a solid bedrock foundation for us to work from.
2. Review Dr. Smith's spreadsheet of agency polar bear safety messages for anything that this expert group feels is legitimate to include in our recommended bear safety messages.
3. Review "2017 Wilder et al. Polar Bear Attacks findings.doc" and update as necessary (e.g., can no longer say that no female with cubs has attacked and killed people).
4. Incorporate all of the above into "A Framework for Polar Bear Safety Messages". As a side note, it will be important to include a specific section which identifies differences between polar bears and black/brown bears, and safety advice that is different between the 3 species. For example, some polar bears are not deterred by large groups of people, particularly when they are desperate and in poor condition.
5. Use PBHIMS to evaluate outstanding questions (e.g., what is best advice for responding to an incident involving a female with cubs?).
6. **End product:** a basic, consistent, science-based set of bear safety messages that are vetted through the expert CWG and can be placed on the RS website for use by entities throughout the Arctic, including agencies, tour guide operators, recreationists, scientists, hunters, industry etc. These vetted safety messages could then be used according to each country's needs (e.g., incorporated into brochures, websites, etc.). The key to this initiative is that everyone throughout the RS consistently use the same basic polar bear safety messages. This end product is intended to be THE reference when developing polar bear safety publications and presentations for the public. This document is not intended to be used in its entirety or verbatim for the public, but is instead meant to be a framework for consistent messaging.

Considerations Going Forward:

Yes, recommend that this action be retained without modification.

Progress Report, Action #59
2018-2020 Bilateral and Multilateral Actions,
Circumpolar Action Plan:
Conservation Strategy for the Polar Bear



Action	The Communications Working Group will create a report which strategically identifies appropriate messages regarding climate change threats to polar bear bears and the means to communicate these messages to the global audience.
Point(s) of contact or Lead country	Communications Working Group/Norway Lauren Schmuck, Bridget Crokus, Andreas Benjamin Schei, Karen Lone lauren.schmuck@canada.ca , bridget_crokus@fws.gov , andreas.benjamin.schei@miljodir.no , karen.lone@miljodir.no
Partner countries	n/a
Timeline Description as per 2018-2020 implementation table	Task partially completed under the 2015-2017 plan; task for current 2-year cycle is expected to continue beyond the Meeting of the Parties in March 2020. Further implementation of the Action will be carried into next 2-year cycle and through 2025.
Baseline Status	No Range States communications plan exists.
2018 Status	An internal communications strategy was completed in 2017 with climate change components specified for a suite of actions; no external communications plan exists.
Planned Outputs	The <i>Proposal: Climate Change Communication Activities Implementation Plan</i> was presented to the Heads of Delegation (HoD) during the HoD call on September 10, 2019. The Circumpolar Action Plan Implementation Team (CAP IT) will consider the Proposal during their midterm review.
Modifications	Action 59 was partially combined with action 55 in an effort to have a single communications plan which outlined, in one place, how the Range States would communicate about climate change and what steps would be taken for targeted outreach (i.e., the <i>Range States—Internal CAP Communication Strategy</i> adopted in 2017). Under this plan, the Communication Product “RS document describing guidelines for and potential contents of communications actions in order to address climate change threats to polar bears” is identified for the Communications Activity “Communications guidelines for communications on polar bears and climate change.”
Progress Report Date	September 30, 2019

Progress Report on Activity

The component of Action 59 that has been rolled into the communications plan is completed and was approved with the communications plan by the HoD in late March 2017. To achieve the remaining tasks under Action 59, the Communications Working Group presented the *Proposal: Climate Change Communication Activities Implementation Plan* to the HoD in September 2019. Under this proposal, a Climate Change Communications Working Group (CCCWG) will be formed consisting of representatives from each of the government agencies which are signatory to the CAP, representatives from the Polar Bear Specialist Group of the International Union for the Conservation of Nature, and representatives from outside entities, such as zoos, academia, and Indigenous organizations. The CCCWG will work to develop messages about the impact of greenhouse gas (GHG) emissions on polar bears and their habitats, and will ensure that northern and Indigenous perspectives regarding climate change are represented (i.e., they will work to produce the Communication Product identified for the Communications Activity “Communications guidelines for communications on polar bears and climate change” in the *Range States—Internal CAP Communication Strategy*).

The HoD requested the CAP IT consider this Proposal during their midterm review of CAP actions.

Next Steps

During their midterm review, the CAP IT will consider the following recommendations presented by the Comms WG in the *Proposal: Climate Change Communications Activities Implementation Plan*:

To carry out the Communications Activity “Communications guidelines for communications on polar bears and climate change,” the Comms WG recommends the HoD, under Section 11 of the Polar Bear Range States Rules of Procedure, establish an ad hoc Climate Change Communications Working Group (CCCWG) with the Terms of Reference contained in Annex II of the proposal. The Comms WG also requests that the HoD make a formal request to the PBSG to provide scientific support by having a member of the PBSG join the CCCWG, as their knowledge and expertise would be invaluable to this initiative.

The Comms WG recommends the membership of the CCCWG should consist of, at a minimum, one member per RS from the following existing working groups: Comms WG, Circumpolar Action Plan Implementation Team (CAP IT), Conflict Working Group (CWG), Traditional Ecological Working Group (TEK WG); and the scientific advisory body to the RS, the International Union for Conservation of Nature/Species Survival Commission (IUCN/SSC) Polar Bear Specialist Group (PBSG). It is highly recommended that members

from outside the RS (e.g., Indigenous rights holders [or their representatives], academia, NGOs, zoos, or similar) also be considered for inclusion on the CCCWG, as they will also bring important perspectives to the table. This Working Group will be tasked with the development of messages about the impact of GHG on polar bears and their habitats, and will ensure that northern and Indigenous perspectives regarding climate change are represented (i.e., the Communication Product identified for this Communications Activity).

This Communication Product will be shared with policy makers and climate change communication partners (NGOs, zoos, etc.) and will contain messages, illustrations, figures, or other material easily understood and intended for policy-makers, climate change communicators, and the public. To produce this document, it is recommended the CCCWG hold six monthly teleconferences and finalize the draft document during a two-day face-to-face meeting. This Communication Product will be a “living” document and specific intervals for update will be determined by the CCCWG. The completed document will be made publically available on the RS website.

The recommended timeline for the CCCWG to complete their work on the Communication Product is presented in the following table:

Task	Deadline
First teleconference of CCCWG	Date to be determined by HoD and CAP IT
Remaining five teleconferences of CCCWG	Will occur monthly following initial meeting
Face-to-face meeting to finalize products	Will occur following the conclusion of the six monthly meetings
CCCWG presents draft work products to the HoD	Within the 30 days following the CCCWG face-to-face meeting
Public release of final CCCWG work product	Within 30 days of the presentation of draft work products to the HoD

The Comms WG recommends the following Communications Activities also be carried out by the CCCWG during the course of their work to produce the Communications product:

- Produce educational materials related to bear biology and status,
- Website content creation and maintenance,
- Compile and identify key publications,
- Compile maps, and
- Raise awareness at meetings, e.g., UNFCCC meetings

After the Communications Activities are addressed by the CCCWG, the Comms WG recommends that they (the Comms WG) continue the work on the Activities.

If the CAP IT accepts these recommendations, the Comms WG will continue to use and update the products created by the CCCWG throughout the 2020 - 2022 period, as well as the entire timespan of the CAP.

Considerations Going Forward:

It is recommended that action item 59 should be retained as a priority action. The hope is that by making information pertaining to the impacts of climate change on polar bears and their habitats available to federal policy makers, changes to federal policies regarding GHG emission (and other causes of climate change) will be made and will benefit polar bears and their habitat. In addition, communication of Indigenous and northern perspectives on the impact(s) of climate change on polar bears is vital, though this information is often not relayed to members of the public.

Going forward, rather than a global target audience, the Communications Working Group recommends that federal policymakers in each of the Range States should be the target audience of this climate change messaging. The Range States are uniquely positioned to be able to communicate both scientific and Indigenous knowledge-based climate change messages directly to their respective federal governments and policymakers. The most effective use of scientific and Indigenous knowledge-based climate change messages is to provide them to policymakers to help them arrive at informed decisions related to managing greenhouse gas emissions. These informed decisions will result in beneficial outcomes for the sea ice habitat upon which polar bears depend.

Progress Report, Action #60
2018-2020 Bilateral and Multilateral Actions,
Circumpolar Action Plan:
Conservation Strategy for the Polar Bear



Action	The CAP Implementation Team (IT) will develop a biennial report which will include national updates as well as a progress report on actions related to the Plan. The reports will be posted on the website shortly before each Range States Biennial Meeting of the Parties MoP. In depth 4 year review completed by 2020.
Point(s) of contact or Lead country	Circumpolar Action Plan Implementation Team/Norway Andreas Schei, Karen Lone andreas.benjamin.schei@miljodir.no , karen.lone@miljodir.no
Partner countries	Canada, Greenland, Russia and the United States
Timeline description as per 2018-2020 implementation table	Task for current 2-year cycle expected to be completed prior to Feb 2018; will be carried into next 2-year cycle and through 2025
Baseline status	Reporting begins 2018.
Planned Outputs	Biennial report on all 2-year actions.
Modifications	Assessment of CAP progress will be an important part of each Biennial MoP; therefore; the biennial reports will be made available on the Range States website prior to each Biennial MoP, not after.
Progress Report Date	September 30, 2019

Progress Report on Activity

The CAP IT distributed reporting templates to 2-year action item points-of-contact, with a reporting deadline on September 30, 2019, in a process led by Canada.

Next Steps

Final 2-year action item reports and action item progress will be available on the Range States website well before the upcoming Meeting of the Parties.

A CAP IT 2-year progress report 2018-2020 will be compiled and presented by Norway with CAP IT input for the MoP.

The CAP IT will draft a 2-year action plan for 2020-2021 for approval by the Heads of Delegation at the 2020 Biennial MoP.

Considerations Going Forward:

Action to be kept as is.

Progress Report, Action #63
2018-2020 Bilateral and Multilateral Actions,
Circumpolar Action Plan:
Conservation Strategy for the Polar Bear



Action	Explore methods for improving the design of polar bear population studies
Point(s) of contact or Lead country	Eric Regehr (eric_regehr@fws.gov), Jim Wilder (james_wilder@fws.gov)
Partner countries	n/a
Timeline description as per 2018-2020 implementation table	2015-2019
Baseline status	Methods not developed
Planned Outputs	Progress report to the Range States at the 2017 Meeting of the Parties. Peer-reviewed publications in 2019 and 2020.
Modifications	Work has progressed slower than the Range States initially estimated; therefore, the timeline has been modified above.
Progress Report Date	September 30, 2019

Progress Report on Activity

Funding for this work has been provided by the US Geological Survey (Science Support Program) and the North Pacific Research Board, with Sarah Converse, US Geological Survey, Washington Cooperative Fish and Wildlife Research Unit, University of Washington, as lead PI and Eric Regehr, University of Washington, as co-PI. Nathan Hostetter, a University of Washington post-doctoral scientist, has been day-to-day lead on the work. One focal area has been developing a spatial capture-recapture framework for polar bear population studies, to allow for spatially explicit sampling effort and population distribution/dynamics. One paper describing this framework is in preparation and will be submitted for publication in 2019. Another area of focus is the development of analytical techniques to better use the variety of data that are collected in monitoring programs to improve inference about population abundance/dynamics. A paper on the use of age data to improve estimates from open population models is in preparation and will be submitted for publication in 2019. An additional paper that combines these two focal areas, with an open spatial capture-recapture model for the Western Hudson Bay population, will be submitted for publication in 2020.

PRESENTATIONS AND SEMINARS

- Hostetter NJ, Lunn, ES Richardson, EV Regehr, and SJ Converse. 2019. Integrating age data to improve estimation of polar bear abundance, survival, and recruitment in open-

population Jolly-Seber models. The Wildlife Society Annual Conference, Reno, Nevada. 27 September – 4 October.

- Converse SJ. 2019. In search of the polar bear: building better methods for monitoring a threatened carnivore. Bevan Series Symposium, University of Washington, School of Aquatic and Fishery Sciences, Seattle Washington, 16 – 18 April.
- Hostetter NJ. 2019. Integrated modeling approaches to inform polar bear conservation and management. University of Washington, School of Aquatic and Fishery Sciences Seminar Series, Seattle Washington, 14 March.
- Hostetter NJ, SJ Converse, EV Regehr, RR Wilson, and JA Royle. 2019. Integrating spatial capture-recapture and telemetry data to jointly estimate polar bear abundance and movement. International Conference on Polar Bear Science and Monitoring. Hosted by the Polar Bear Specialist Group and Norwegian Polar Institute. Lyngen, Norway. 12 – 14 February.
- Hostetter NJ, SJ Converse, EV Regehr, and JA Royle. 2018. Integrating spatial capture-recapture and telemetry data to jointly estimate density and movement. The Wildlife Society Annual Conference, Cleveland, Ohio. 7 – 11 October.

WORKSHOPS

- Eric V Regehr, Sarah J Converse, and Nathan J Hostetter were invited participants and presenters at the 2019 International Conference on Polar Bear Science and Monitoring hosted by the Polar Bear Specialist Group of the IUCN Species Survival Commission and Norwegian Polar Institute (Presentation Title: Integrating spatial capture-recapture and telemetry data to jointly estimate polar bear abundance and movement).
- Sarah J Converse, and Nathan J Hostetter were invited participants and presenters at a workshop focused on integrating abundance and movement modeling (July-August 2019). This workshop brought together experts in the fields of mark-recapture and movement modeling from the University of Washington and the NOAA Marine Mammal Laboratory.

PUBLICATIONS

- Hostetter NJ, NJ Lunn, ES Richardson, EV Regehr, and SJ Converse. *In-prep*. Age-structured Jolly-Seber model improves estimation of abundance, survival, and recruitment from capture-recapture data. *Methods in Ecology and Evolution* (Anticipated)

- Hostetter NJ, SJ Converse, EV Regehr, RR Wilson, and JA Royle. *In-prep*. Integrating spatial capture-recapture and telemetry data to jointly estimate polar bear abundance and movement. *Methods in Ecology and Evolution* (Invited paper for a special issue on the integration of movement and abundance modelling)
- Regehr EV, NJ Hostetter, RR Wilson, KD Rode, M St. Martin, and SJ Converse. 2018. Integrated population modeling provides the first empirical estimates of vital rates and abundance for polar bears in the Chukchi Sea. *Scientific Reports*. 8:16780.

Next Steps

- Submission of the two *in-preparation* manuscripts (see previous section) for peer review in 2019/2020.
- We are developing a spatially explicit open-population model combining the concepts from our capture-recapture and telemetry model (see above) and age-structured Jolly-Seber model (see above) to estimate multi-year abundance, movement, and demographic parameters (survival and recruitment). Anticipated peer-review publication in 2019-2020. Demonstration of these methods are applied to a multi-year polar bear data set in collaboration with USGS, Washington Cooperative Fish and Wildlife Research Unit, University of Washington, and Environment and Climate Change Canada.
- Consideration of developing an additional funding proposal focusing on optimal allocation of sampling effort between physical captures and recently developed biopsy sampling methods.

Considerations Going Forward:

The focus of polar bear studies is shifting towards broader spatial extents and the effects of rapidly changing environments on population dynamics. As such, it is increasingly beneficial to integrate multiple data sources to better characterize populations across their entire geographic range while simultaneously addressing multiple management and conservation objectives (e.g., population-specific harvest management, trends in abundance, assessing viability; Regehr et al. 2018). As part of this CAP Action, we demonstrated how collaborative efforts among managers, biologists, and quantitative ecologists improved population-level and study-specific monitoring programs. The ability of study designs to provide robust inferences, however, should be tailored to population-specific sampling constraints (e.g., spring vs fall sampling, ability to capture bears) and objectives (e.g., harvest management vs demographic analyses). For example, in the Chukchi Sea, integration of telemetry, mark-recapture, and count data proved vital to reducing biases in abundance and demographic rates by explicitly accounting for seasonal movements. In western Hudson Bay, integration of readily available

age data and mark-recapture data allowed simultaneous estimation of demographic rates (e.g., survival, recruitment, and age-structure) and dramatically improved our ability detect changes in abundance relative to methods that simply used capture-recapture data. While these approaches utilized different survey methods, they demonstrate a broadly applicable framework: integrating multiple data sources to improve estimation of polar bear abundance and population dynamics.

We highly recommend extending this CAP Action with a focus on population-specific approaches for data integration involving collaboration among managers, biologists, and quantitative ecologists. To efficiently disseminate these concepts, we also recommend supporting a polar bear data integration workshop. This workshop would bring together polar bear researchers and quantitative ecologists from each of the representative Range States to develop consistent survey and analytical approaches to improve within- and across-population monitoring programs. Results of this workshop will benefit population monitoring across the Arctic and can be directly integrated into on-going and future research activities.