DEVELOPING A CONSERVATION PLAN FOR GRIZZLY BEARS (URSUS ARCTOS) IN YUKON:

SUPPORTING INFORMATION

YUKON FISH AND WILDLIFE MANAGEMENT BOARD

Yukon

DISCLAIMER

The information presented in this volume is intended as supporting information for A Conservation Plan for Grizzly Bears (Ursus arctos) in Yukon, and reflects perspectives and knowledge shared during the development of the plan. Inclusion here does not represent endorsement by the Government of Yukon, nor a commitment to address any issues raised, or adopt any recommendations within the Plan itself. The information presented herein shall not create any commitments or obligations that are legally binding on the planning participants. Without limiting the generality of the foregoing, this report shall not create, affect, define, interpret, or apply any roles, responsibilities, or interests under Indigenous Final or Self Government Agreements, or Indigenous rights affirmed under the *Constitution Act 1982* (Section 35).

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ACKNOWLEDGEMENTS

A Conservation Plan for Grizzly Bears (Ursus arctos) in Yukon is the fruit of a 2.5-year endeavour by the Yukon Grizzly Bear Conservation and Management Plan Working Group ("the Working Group"), including extensive information gathering throughout the territory.

Completion of this plan would not have been possible without the interest and engagement of Indigenous people in Yukon and transboundary communities, as well as Renewable Resources Councils, Wildlife Management Advisory Council (North Slope), Parks Canada, relevant associations, members of the public, and those individuals and agencies actively engaged in aspects of grizzly bear conservation that made presentations to the YGBCMP Working Group. Thank you.

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The information compiled in this document was used, in part, to help the Working Group members formulate the plan visions, principles, goals and recommended actions. Authors of this volume were Tyler Kuhn, Nicole McCutchen, Jodie Pongracz, Julie Thomas, Tecla van Bussel, Frank Thomas, Graham Van Tighem, Jim King, Russel Oborne, Ron Chambers, Darcy Doran-Myers, and Thomas Jung.

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INTRODUCTION

In October 2015, the Yukon Grizzly Bear Management and Conservation Plan Working Group—a collaborative initiative of the Government of Yukon and the Yukon Fish and Wildlife Management Board—began working on a compressive, long-term conservation plan for grizzly bears in the territory.

The process for plan development proceeded in phases that included:

a. Establishment of the working group through a terms of reference and agreement on operating procedures. This phase also included identifying the scope of the plan and the process for plan development that included timelines and a strategy for engagement with Yukon people.

b. Information gathering regarding grizzly bear population status and management in Yukon and neighbouring jurisdictions (e.g., Alaska, Alberta, British Columbia, and Northwest Territories). This phase was aimed at providing current knowledge about grizzly bear biology, management, and conservation to the working group to ensure that they had the requisite information to make informed decisions on issues to be addressed in the plan. Technical reports or presentations were provided to the working group by a number of people working on the varied issues in Yukon or adjacent jurisdictions.

c. Engagement with Yukon and transboundary First Nations, Inuvialuit, Renewable Resource Councils, Wildlife Management Advisory Council (North Slope), the federal government, relevant non-governmental organizations, and the public. Workshops were held in the communities as well as in Whitehorse. This phase additionally included a public survey on Yukoners' views about grizzly bears and some of the issues surrounding their management. Reviews of "what we heard" from our engagement were produced by independent social scientists with appropriate training and experience, and shared with workshop participants and the working group.

d. Drafting of the conservation plan by the working group. Various drafts were produced and subsequently revised by the working group after receiving initial reviews by the Yukon Department of Environment, Yukon Fish and Wildlife Management Board, First Nations, and the Inuvialuit.

e. Public review of the draft conservation plan by all Yukon people, and consideration for Ministerial recommendation by the Yukon Fish and Wildlife Management Board.

Realizing that much of the information provided in the "information gathering" or "engagement" stages was not readily available to the public, the working group decided that providing summaries of the material presented would increase the transparency of the planning process, and that it may be inherently of interest to some. In particular, this document may be of value to those interested or charged with implementing aspects of the conservation plan. As such, the intent of this document is to share the information provided to the working group that is not otherwise publically available, so that it may serve as a reference to support greater understanding of the plan content or as a starting point on how to implement aspects of the plan.

Included in this report are key documents from the working group establishment phase, summary reports or presentations provided to the working group on key topics about grizzly bear population status and management during the information gathering phase, as well as summaries of what we heard in workshops held across the territory during the engagement phase. The material is provided in a variety of formats, as it was presented to the working group. Additionally, we provide a list of current best management practices regarding grizzly bear conservation and point the reader to where those are located.

Given that this document is focused on providing supporting information that would not otherwise be available to most readers, we do not include documents that are already in the public domain. These would include various government technical reports or scientific papers in peer-reviewed journals, for example. The working group relied heavily on the following publically reports: Alberta's recovery plan for grizzly bears, the COSEWIC status report for the grizzly bears, the working group's report on the Yukon public survey, doctoral dissertations regarding grizzly bear management in Yukon, or several pertinent papers in scientific journals. This document also does not include review comments provided by First Nations or Inuvialuit during government-to-government consultations with Government of Yukon, or comments received by the Yukon Fish and Wildlife Management Board during their public review of the draft conservation plan, as these were beyond the purview of the working group.

In summary, this document is simply supporting information to the grizzly bear conservation plan for those interested in the material used by the working group that is not otherwise publically available. Providing this supporting information in conjunction with the conservation plan will allow readers to access much of the same information as the working group. Moreover, the hope is that this supporting information will enable interested people or organizations to contribute to the implementation of the conservation—after all, effective grizzly bear conservation in Yukon will depend on all of us.

GUIDING DOCUMENTS FOR PLAN DEVELOPMENT

Terms of Reference

Grizzly Bear Conservation and Management Plan Working Group
Terms of Reference

1. **Composition of the Working Group**
   a) The working group shall be comprised of equal numbers of delegates (3 each) of Government of Yukon staff and Yukon Fish and Wildlife Management Board (the Board) members.
   b) Working group delegates will seek input as required to represent the views of their party mandate.
   c) The working group shall select two co-chairs, one representing Government of Yukon and one representing the Board.
   d) The composition of the working group respects the Final Agreements and the roles and authorities for public management of a non-subsistence species of territorial interest under Section 16.7.12.2 of the Umbrella Final Agreement.

2. **Mandate of the Working Group**
   a) The working group shall jointly develop the Yukon Grizzly Bear Conservation and Management Plan in manner that is objective, transparent, and cooperative.
   b) The working group will act in the public interest in taking into consideration all relevant factors related to grizzly bear management.
   c) The management plan shall consider the following topics, and others as agreed to by the parties:
      a. International, national, and territorial status and "compliance" with federal species at risk legislation (i.e., plans)
      b. Protecting international trade
      c. Appreciating the range of values towards grizzly bears, including the intrinsic value
      d. Human-grizzly bear conflict management
      e. Population size and trends
      f. Habitat and land use
      g. Hunting and harvest management
      h. Wildlife viewing and tourism
      i. Education and outreach
      j. Monitoring and compliance
   d) The working group shall seek input from mandated boards and councils, Yukon First Nations, and the Inuvialuit.
   e) The working group may seek input from other individuals and organizations.
   f) In carrying out its work, the working group shall provide for public input, which may include public meetings, and opportunities for written comment.

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g) The working group will consider available scientific, traditional, and local information.
h) The working group shall recommend to Government of Yukon and the Board a draft Grizzly Bear Conservation and Management Plan.

3. **Funding**
   a) Government of Yukon and the Board shall provide funding within approved annual budgets to support the operations of the working group and the plan review.
   b) Government of Yukon and the Board shall cover expenses of their respective delegates, as applicable.
   c) Support for the working group will be provided by the YG Fish and Wildlife Planner and YFWMB Executive Director.

4. **Term of the Working Group**
   a) The working group is formally established with the signing of the terms of reference by Government of Yukon and the YFWMB.
   b) The mandate of the Working Group shall expire March 31, 2017 unless otherwise agreed to by Government of Yukon and the YFWMB.

Approvals:

Joe MacGillivray
Deputy Minister
Department of Environment, Yukon

Oct 22/15
Date

Bob Dickson
Chair
Yukon Fish & Wildlife Management Board

Oct 22, 2015
Date

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Operating Procedures

November 9, 2015

The Grizzly Bear Conservation and Management Plan working group was established in October 2015. The composition of the working group is described in the terms of reference (effective October 22, 2015).

The following operating procedures provide direction on how the working group will function to accomplish their mandate and guides the conduct of the co-chairs, members, facilitator, support staff, and meetings.

1. Meeting Procedures

a. Both parties must be present for meetings to proceed. If less than two members from either party will be attending a meeting the co-chairs will decide if the meeting will proceed.

b. Members may participate in person or by teleconference.

c. Meetings and other events will be scheduled as far as possible in advance.

d. Meeting agendas will be developed and circulated in advance of meetings. The agenda may be amended by the committee at the start of the meeting.

e. Meeting summaries of key decisions and points of discussion will be completed for each working group meeting and distributed prior to the subsequent meeting.

f. Meeting summaries will be approved by the working group and will be made available upon request.

g. All members will endeavour to participate in all workshops, community meetings, and other events to support the development of the management plan.

h. Working group members will promote a positive environment where individual contributions by working group members and others providing input into the process are encouraged and valued.

i. All working group members and others participating in the development of the recommended management plan will be treated with respect at all times.

j. Working group members will minimize distractions and disruptions during meeting (e.g. use of cell phones, etc.).

2. Decision Making

a. The working group will strive to reach decisions by consensus. Where consensus is not achieved, members will seek further direction from their party.

b. Two members from each party must be present to achieve quorum.

c. Quorum is required for decisions on items such as finalizing recommendations, changes to the work plan, etc.

3. Co-Chairs

The working group will appoint one member from each party to act as co-chairs for the working group. The tasks of the co-chairs are to:

a. Facilitate regular working group meetings, other workshops, and public meetings

b. Review draft agendas prior to working group meetings.

c. Approve and sign transmittal documents and other correspondence.

d. Communicate and act as a spokespeople on behalf of the working group as required.

e. Monitor discussions to ensure they are within the scope of the working group.

f. Ensure the working group operates in a manner consistent with its terms of reference and operating procedures.

g. Provide briefings to the parties as required.

h. Meet with the other co-chair and support staff as required.

i. Communicate with members of the working group as required to facilitate their participation.

j. Help ensure working group members are given an opportunity to express their views and that all members are involved in the work.

k. Seek to keep the working group members focused on the issue under discussion until the outcome is achieved.

l. Work with the support staff on information synthesis and to oversee the writing of the recommended plan.

4. Committee Members

The responsibility of an individual working member is to work with other members to contribute to the fulfillment of the working group mandate. To accomplish this working group members will:

a. Effectively represent the interests of their party.

b. Keep informed about the wildlife matters of relevance to the work of the working group and the views of their respective party on these matters.

c. Participate fully in working group meetings.

d. Review all relevant meeting materials prior to meetings.

e. Review meeting summaries and other documents for accuracy.

f. Facilitate effective communication between the working group and their party.

g. Coordinate absences from meetings with the co-chairs and support staff in order to ensure that meetings function efficiently in their absence.

h. Committee members will contribute information (traditional ecological knowledge, local knowledge, expert opinion, and western scientific knowledge) from their party that will assist the working group in achieving the objectives of its mandate.

5. Secretariat Support

Support for the working group will be provided by the Government of Yukon Fish and Wildlife Planner and YFWMB Executive Director. Responsibilities, carried out under the direction of the working group, will include:

a. Scheduling and arranging working group meetings.

b. Schedule and arrange other events such as workshops, community meetings, etc.

c. Preparing materials to assist the working group to carry out their work.

d. Draft meeting agendas with input from co-chairs.

e. Overseeing the production of meeting summaries, including the appropriate distribution, and required follow-up of action items as required.

f. Responding to information requests, and developing and managing public communications (e.g. website, etc.) for review and approval by the committee.

g. Under the direction of the working group, draft documents, manage contracts, develop work plans and support the completion of the recommended management plan.

h. Maintain records on behalf of the working group.

i. Draft, track, and manage correspondence on behalf of the committee.

j. Track and report on budget expenditures.

6. Non-member Participation

a. Members may request persons with specialized information about the planning process to attend meetings in an advisory capacity.

b. Attendance or presentations by such specialists will be approved in advance by the working group.

c. The working group may engage a facilitator as required to accomplish their mandate.

d. The working group may form sub-groups to work on particular topics and issues. These sub-groups may include non-members.

e. The secretariat will ensure that non-members will be aware of the operations and procedures of the working group prior to the meeting.

7. Work plan

a. The working group will develop a six month work plan (until March 31, 2016) identifying tasks, time-lines, and responsibilities.

b. The work plan will include a look ahead to additional longer term tasks and will be revised as required.

c. Working group members and support staff will use email and phone communication between meetings. Important information will be sent to the working group by email on a weekly basis.

8. Media/ Public Information

a. A communications strategy will be developed and reflected in the annual work plan.

INFORMATION GATHERING

Grizzly bear status

Review of Yukon grizzly bear monitoring and mortality management

Presented by: Thomas Jung, Fish and Wildlife Branch, Government of Yukon

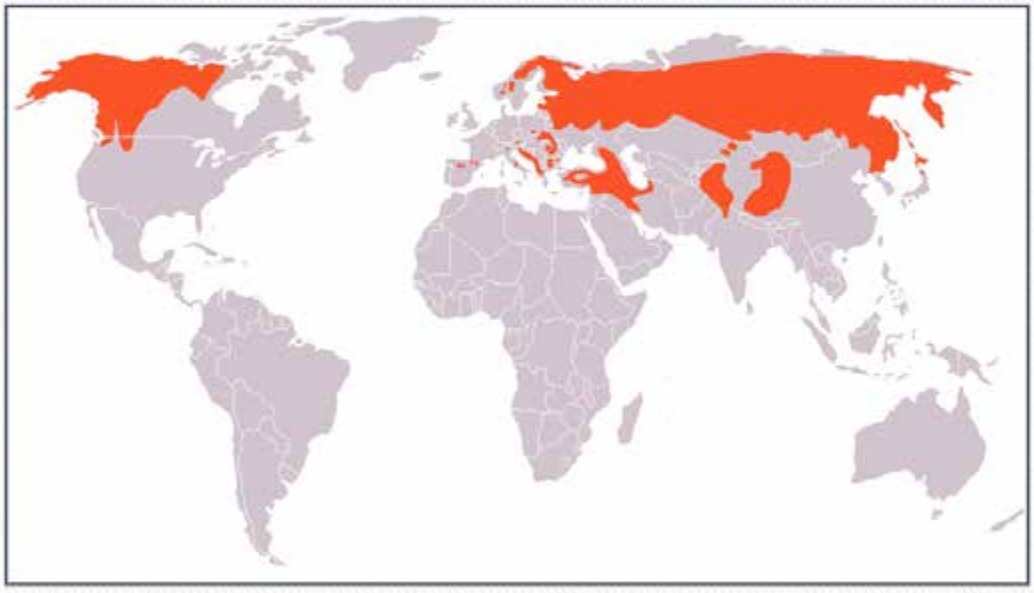
Date: October 2015

This presentation was prepared by Government of Yukon for the Grizzly Bear Conservation and Management Plan Working Group. The presentation focused on updating the working group on the current international and national status of grizzly bears (also known as brown bears), and the larger context for grizzly bear conservation in the territory. This information was compiled and presented in fall 2015. Since that time there have been some changes to the status of grizzly bears, specifically, the formal listing of grizzly bear as a species of Special Concern under the federal *Species At Risk Act* in May 2018.

Intent of Presentation

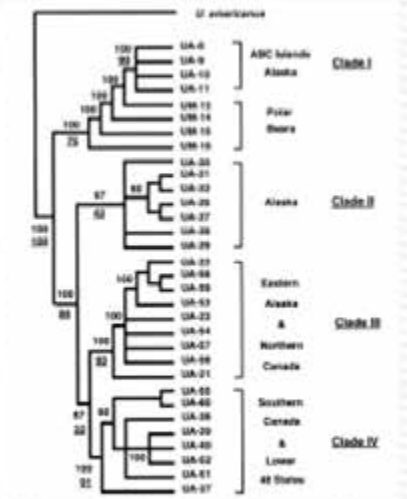
- To provide an overview of some of the national and international factors influencing the brown bear management in Canada, including:
  - Distribution and status;
  - Legislative framework; and
  - Trade issues.

Current Global Distribution



Current Global Diversity

- Subspecies of brown bear have been highly debated, with dozens originally named in North America alone. For instance, as recently as 1981 Hall – an eminent zoologist - named 86 subspecies.
- Currently, its believed that there are 8-9 living subspecies (or ecotypes) in Eurasia, and 3-4 living subspecies (or ecotypes) in North America.



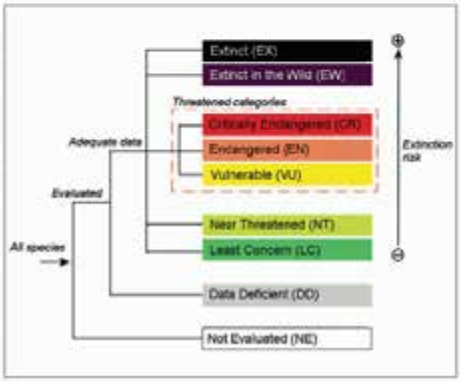
From: Waits et al. 1998

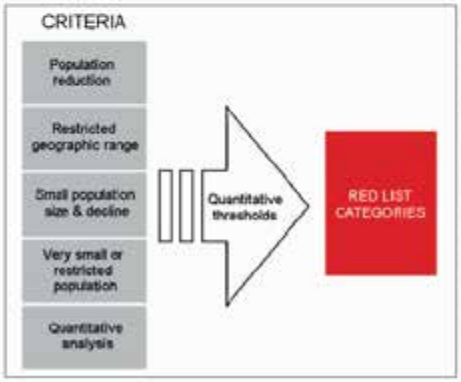
Current Global Status

- Globally, brown bears have been extirpated from ~50% of their historic range.
- In North America, brown bears have been extirpated from 16 of 26 states provinces and territories where they occurred in recent times.
- In many jurisdictions where they still occur reduced populations occupy a small part of their former range.
- They are critically endangered in many Eurasian countries where they occur.

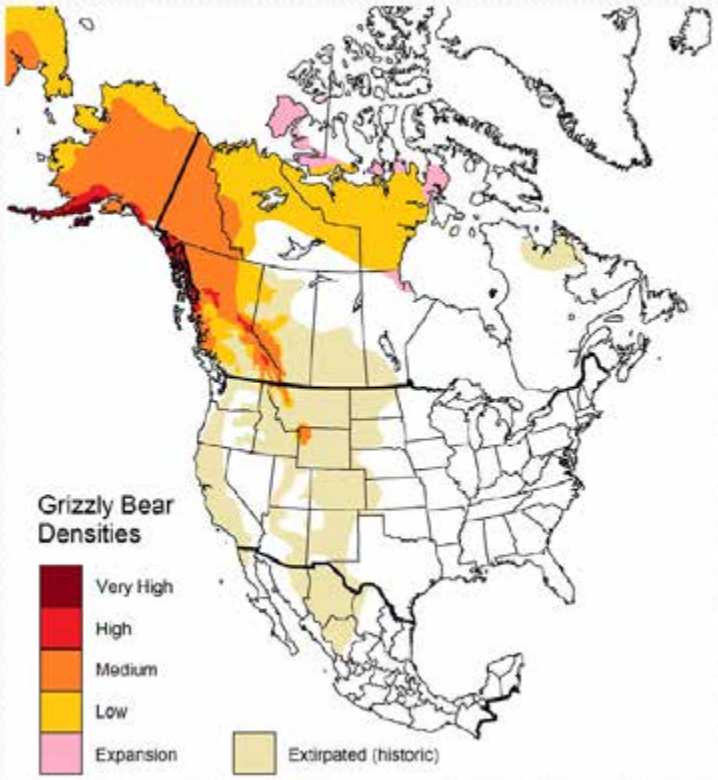
Current Global Status

- Despite being extirpated across much of their historical distribution, and with small, fragmented populations, brown bears are categorized as Least Concern globally by the IUCN.
- This is because they fail to meet criteria for a threatened category – they occupy a vast global range, the global decline has largely stabilized, and they are mostly well-managed.





North American Distribution



Brown Bear Diversity in NA

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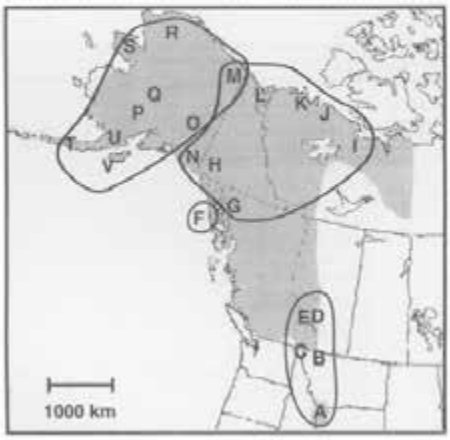
- Several named subspecies lost.
- Earlier genetic work outlined 4 living clades of brown bears in NA. With only 1 clade in Yukon.
- 3-4 living subspecies in NA, with 2 likely occuring in Yukon:
  - *Ursus arctos horriblis*
  - *Ursus arctos alascensis*
- There are likely 2-3 ecotypes of brown bears in Yukon:
  - Interior grizzly bear
  - Coastal brown bear
  - Arctic grizzly bear



How Many Bears in Canada?

Estimated grizzly bear population in Canada, 1991 and 2001/2002. Data from sources cited in text, except where noted (source COSEWIC status assessment 2002)

Jurisdiction	1991[1]	2001/2002 Range	Comments
Alberta	575	841 to 865	Estimated 46% increase since 1988 (3.9% annually)
BC	13,000	14,000+	Province-wide, trend considered to be stable.
Yukon	6,300	6,000 to 7,000	Territory-wide trend considered stable. Official estimate is 6,000-7,000.
NWT	5,050	5,100	Does not imply population change. Land area and bear population of Nunavut excised in 1999, and estimation methodology revised to incorporate new data.
Nunavut	n/a[3]	800 to 2,000	No official estimate available. Provided is a crude, unofficial estimate, determined from an estimated density of 4 bears/1,000 km^2
AB National Parks[4]	215	175 to 185	Revised estimation methodology. No perceived change since 1991
TOTAL	25,140	26,916+ to 29,150+	Changes in estimates between 1991 and 2001/2002 are largely due to revised methodology and new data. Overall, the Canada-wide trend between 1991 and 2001/2002 is perceived to have been stable.

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Grizzly Bears and COSEWIC

- Grizzly bears were assessed nationally as a species of *Special Concern* by the Committee on the Status of Endangered Wildlife in Canada in 1991. This assessment was reconfirmed in 2002.
- The species will next be assessed by COSEWIC by 2012.
- However, they have yet to be listed as such under the federal *Species at Risk Act* (SARA)

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COSEWIC's Reason for Designation

- The grizzly bear's habitat is at risk from expanding industrial, residential and recreational developments. Habitat and population fragmentation are underway in the southern part of the bear's distribution.
- The life history characteristics of this bear make it particularly sensitive to human-caused mortality (including hunting, poaching, accidents and nuisance kills). Its behavior frequently brings it into conflict with people, leading to increased mortality where human activities expand.
- It has disappeared from a substantial part of its historic range, but there are still over 26,000 grizzly bears in Canada. The grizzly bear's area of occupancy has not decreased substantially over the past 20 years.
- The future of several populations that are either completely or mostly isolated is highly uncertain and dependent on conservation.

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Grizzly Bears and SARA

- Unlike *Threatened* or *Endangered* Species, there are no legal prohibitions on killing species of *Special Concern* or destroying their critical habitat or residence (den). As well, a recovery strategy is not legally required (but see Alberta).
- The main legal requirement under SARA for species of Special Concern is to develop a management plan for the species that ensures that the species is being monitored and that potential threats and limiting factors are being addressed.
- The management plan is legally required within 3 years of being added to the species on SARA.
- Consultation with Aboriginal Peoples and Wildlife Management Boards is also a key requirement of SARA.

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Grizzly Bears and CITES

- CITES (Convention on International Trade in Endangered Species) is an international agreement between 172 governments, adopted in 1973.
- Its aim is to ensure that international trade in wild animals and plants does not threaten their survival.
- international trade for listed species must meet conditions that ensure conservation.
- Import and export of species covered by the Convention needs to be authorized through permits.

CITES Appendices

- **Appendix I**
  They are threatened with extinction
  - international trade among signatory countries is prohibited.
- **Appendix II** (current listing for Grizzly Bears)
  - Lists species that are not currently threatened with extinction.
  - Species could become threatened if trade is not managed.
  - Trade may be authorized by permit.
- **Appendix III**
  - Lists species at the request of a Party that already regulates trade in the species.
  - International trade for species listed is permitted with appropriate permits or certificates.

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Non-Detriment Findings (NDF)

- A tool used under CITES to grant an export permit.
- Permits granted when an exporting Scientific Authority advises export will not be detrimental to the survival of that species (an NDF letter)
- Scientific Authorities form each of the exporting and importing countries monitor the export
- The NDF should be based on best available scientific information, and include information on population status; distribution; population trend; harvest; other biological and ecological factors; and trade information.
- Generally, in Canada, NDF's are provided by the province or territory where the specimen harvested.
- Yukon has received a number of NDF requests related to grizzly bear export to European countries

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CITES Engagement

» US & EU are fully enagaged in CITES; they see it as a key tool to manage species on a sustainable basis.

» Canada has often thought that it applied more to other countries. We have escaped scrutiny because of our reputation; this is changing (e.g. polar bears).

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Grizzly Bears and EU

» The EU, as well as many other countries including Canada , has stronger provisions around CITES listed spp than the international protocol demands.

» In other words, EU has decided that they will make imports subject to their own NDFs.

» They will base their findings on information published and on the web – their system does not require any interaction with the country of origin until the ban of imports is in place.

» EU scientific authorities are over-ruling state scientific non-detriment findings, e.g. Slovenia's brown bear management, B.C.'s Grizzly

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Mean annual recorded man-caused mortalities in Canada during 1990-1999

	Hunter kills[1]				Non-hunting man-caused			
Jurisdiction	Males	Females	Unknown Sex	Total	Illegal	DLP	Other	Total
Alberta	9.1	4.7	0.0	13.8	3.7	4.2	3.1	24.8
British Columbia	187.3	101.6	0.0	288.9	5.9	40.2	n/a	335.0
Yukon	51.0	27.5	0.0	78.5	n/a	13.2	1.5	93.2
NWT and Nunavut	8.1	1.7	1.0	10.8	n/a	9.4	n/a	20.2
ISR and GSA	21.1	5.2	4.1	30.4	Included in hunter kills			30.4
Total	276.6	140.7	5.1	422.4	9.6	67.0	4.6	503.6

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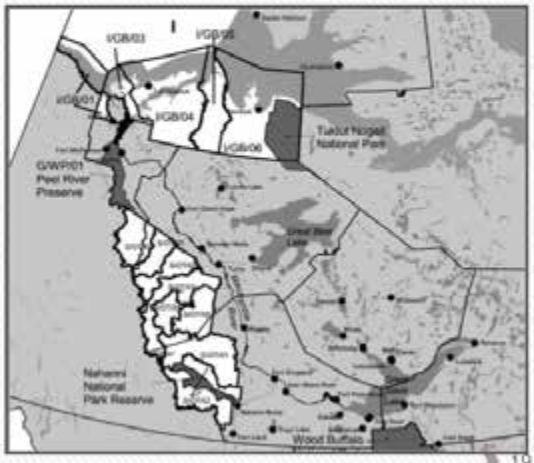
The NWT Situation

- Resident harvest occur in only a small portion of the NWT
- Much of the region where there is resident harvest will be or has been re-classified as National Park
- Commercial harvest currently only occurs in the Inuvialuit Settlement Region. These hunts must be guided by Inuvialuit.
- No hunting of grizzly bears in any other region of NWT (population density considered too low for harvest)



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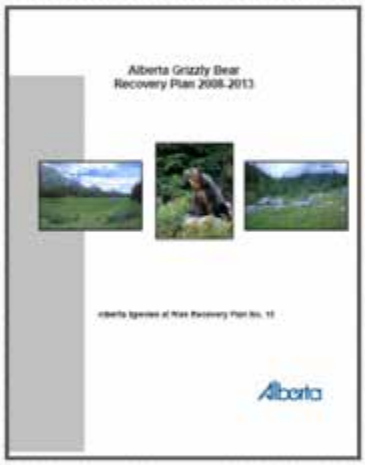
The Alberta Situation



- Grizzly bears identified as "may be at risk" in 2000 and 2005
- Government of Alberta initiated independent Grizzly population study in 2004
- hunt suspended in 2006 due to widespread concerns over decline of the species
- The study revealed the population size was lower than anticipated
- Hunt suspension continued while recovery plan is being implemented (2008-2013)

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The British Columbia Situation

- In 1996, Western Canada Wilderness committee gathered 90,000 signatures on a petition to place a proposal for a ban on grizzly hunting on the provincial ballot.
- 1998, The Environmental Investigation Agency, of London, UK, brought international attention to the issue with a call for a moratorium on B.C. grizzly hunting.
  - Polls indicated that 76% of the electorate supported the ban.
- In 1999 the provincial government placed a ban on harvesting grizzly bears and was lifted in 2001
- The EU suspended issuing import permits for B.C. grizzly bear trophies in November 2001.
- In 2002, Safari Club International assessment determined that the hunt was managed unsustainably, needing more controls in the absence of information on the population status
- 2002-2003 scientific panel review of grizzly bear management in BC
  - The EU would lift the import ban if all panel recommendations were met.
  - This has become the standard assessing management approach
- The commercial harvest in BC has seen a 25% loss in revenue from the ban.

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» Provincially, limited entry hunt used to manage for bears, First Nations harvest is regulated by the provincial government

» Key recommendations that BC is acting upon:
- > Eliminate subjectivity in the population estimates
- > Do not allow more than 30% female harvest at the population unit level
- > Set aside No-Hunt Grizzly Bear Game Management Areas in each eco-province, National Parks do not contribute
- > Must develop a system for trend monitoring, especially of cubs
- > Use Bear Smart Community programs

Grizzly Bear Conservation Strategy

Bear Management in British Columbia

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Jurisdictional reviews

Review of Yukon grizzly bear monitoring and mortality management

Presented by: Nicole McCutchen and Rob Florkiewicz, Fish and Wildlife Branch, Government of Yukon

Date: March 2017

This presentation was prepared for the Grizzly Bear Conservation and Management Plan Working Group and focuses on Yukon's current monitoring and mortality management regime (updated with information to 2016). It was based on a Government of Yukon file report "Review of grizzly bear monitoring and mortality management in Yukon". The review includes an overview of the current population status for Yukon's grizzly bears; how the population estimates for individual bear management units were derived; trends in mortality for bears in both the Inuvialuit Settlement Region and the rest of Yukon; a more detailed depiction of trends in licensed harvest (e.g., sex and age of harvest; how harvest trends have changed with time); and a list of some of the challenges and opportunities for Yukon's current mortality and management system.

The presentation slides were updated in 2018 for inclusion in this report. No substantive changes were made to the core content or message.

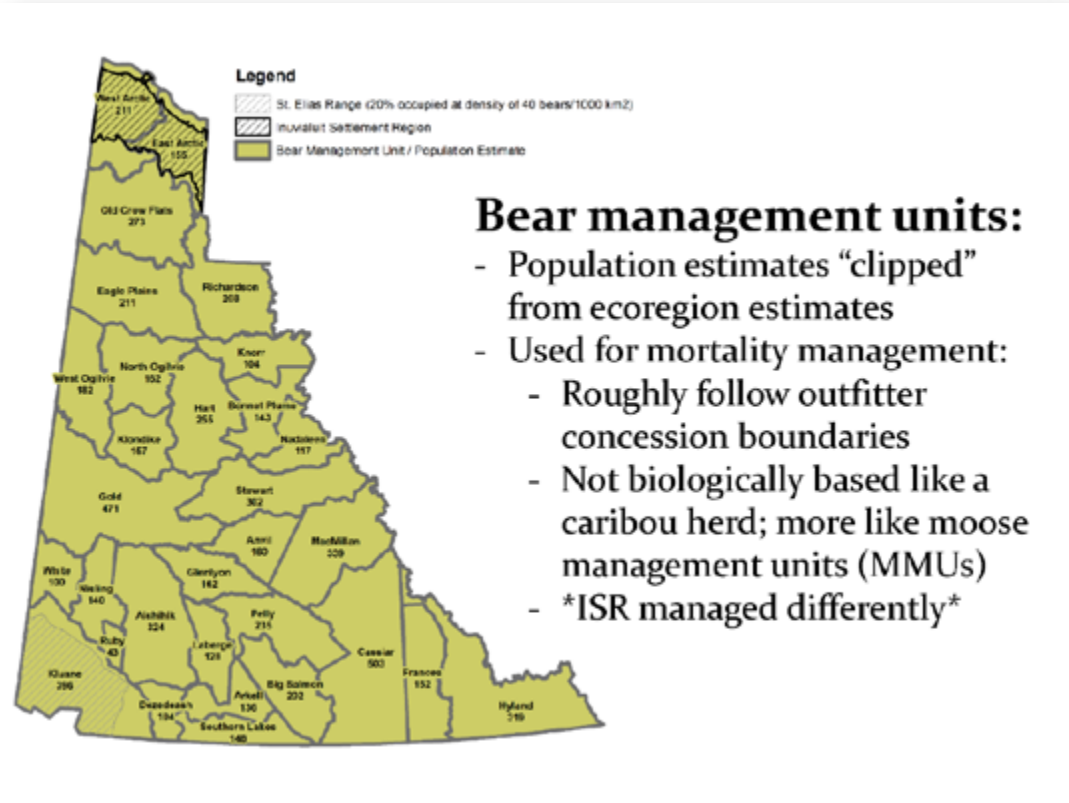
Outline

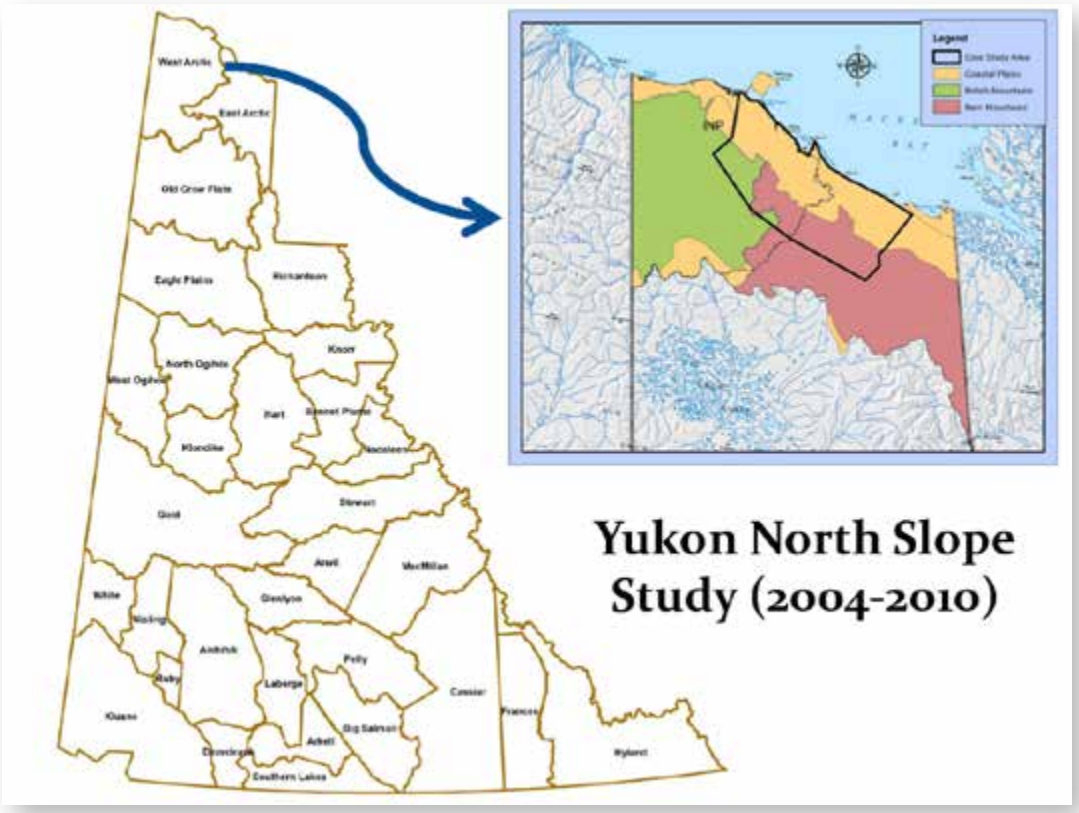
- Population status
- Mortality management
  - Inuvialuit Settlement Region
  - The rest of Yukon
  - Mortality rates for males, females and total bears
- Other trends in licensed harvest and other sources of mortality
- Considerations for future monitoring/mortality management work

Population status

- 6,000-7,000 bears ("working estimate")
- Big Game under the *Yukon Wildlife Act*
- Species that requires more management consideration:
  - COSEWIC: Species of special concern - expected listing under federal SARA
  - General Status conservation rank: Sensitive
  - NatureServe conservation rank: S3-Vulnerable


Yukon Coastal Plain (24)
Old Crow Flats (66)
British-Richardson Mountains (381)
Old Crow Basin (169)
Fort MacPherson Plain (25)
Eagle Plains (184)
Peel River Plateau (151)
North Ogilvie Mountains (435)
Mackenzie Mountains (598)
Klondike Plateau (426)
Yukon Plateau-North (835)
Selwyn Mountains (509)
Yukon Plateau-Central (394)
Ruby Ranges (415)
Saint Elias Mountains (244)
Mount Logan (46)
Yukon Southern Lakes (480)
Pelly Mountains (508)
Liard Basin (200)
Hyland Highland (161)
Yukon-Stikine Highlands (155)
Boreal Mountains and Plateaus (14)
What we know/don't know
- Found across Yukon
- Population size estimated for ecoregions in 1980s
  - Expert opinion
  - Better habitat = more bears
- Other information is limited – bear work is hard/expensive*


Legend
St. Elias Range (20% occupied at density of 40 bears/1000 km2)
Inuvialuit Settlement Region
Bear Management Unit / Population Estimate
Old Crow Flats 273
Eagle Plains 211
Richardson 209
Keele 104
North Ogilvie 152
West Ogilvie 182
Hart 255
Bonnet Plains 143
Klondike 167
Nahanni 167
Gold 471
Stewart 362
Mayo 180
MacMillan 209
White 130
Glenlyon 162
Wolf 140
Pelly 211
Ruby 43
Liard 128
Cassiar 503
Frances 152
Kluane 296
Big Salmon 202
Hyland 249
Southern Lakes 148
Bear management units:
- Population estimates "clipped" from ecoregion estimates
- Used for mortality management:
  - Roughly follow outfitter concession boundaries
  - Not biologically based like a caribou herd; more like moose management units (MMUs)
  - *ISR managed differently*

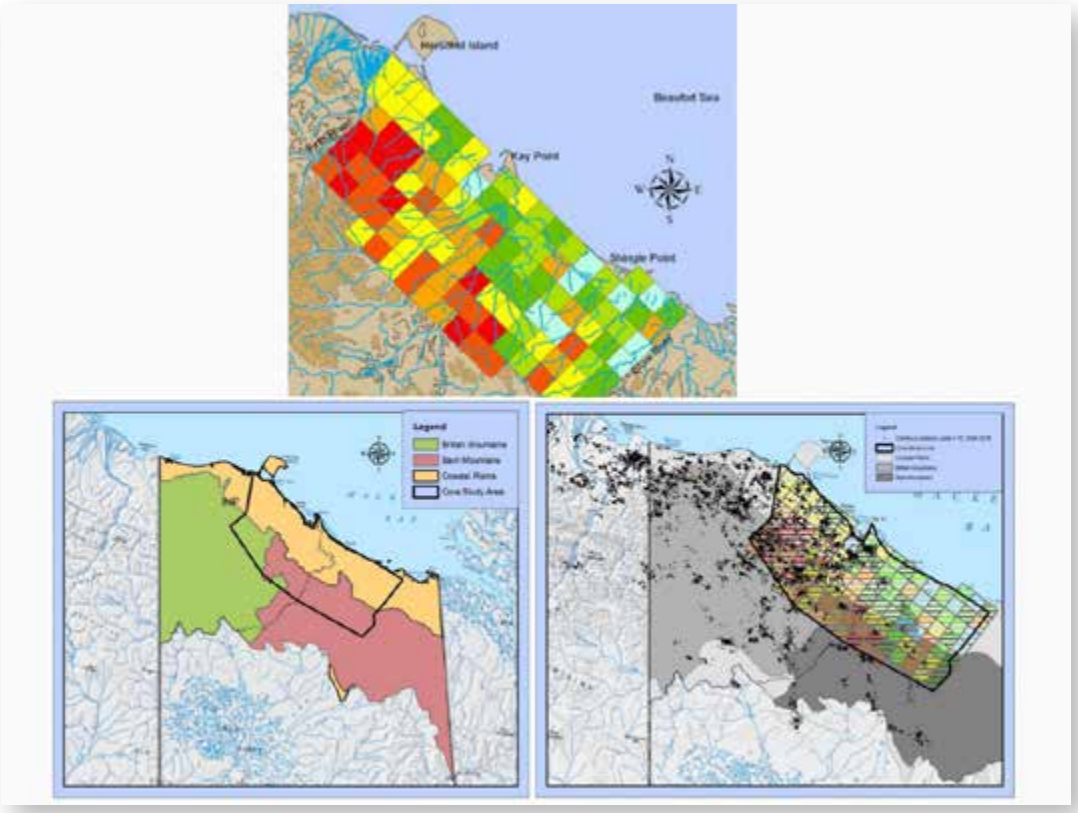


Study rationale and objectives

- Previous estimate outdated
- New information needed for management
- Collaborative study initiated by Aklavik HTC, WMAC (NS), Government of Yukon, Government of the Northwest Territories, and Parks Canada


Population size (2006-7)


Herschel Island
Beaufort Sea
Kay Point
Shingle Point
N
W
E
S



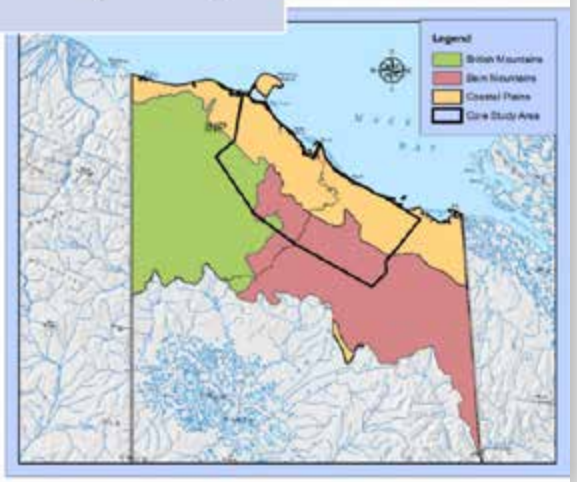
Area	Low estimate (95% confidence interval)	High estimate (95% confidence interval)
Core study area*	87 (72–106)	104 (85–128)
Ivvavik National Park (INP)	211 (173–258)	298 (224–395)
Entire Yukon North Slope	290 (235-358)	431 (349-532)

*best estimate

Last empirical population estimate: 316 bears (based on work in early 1970s)

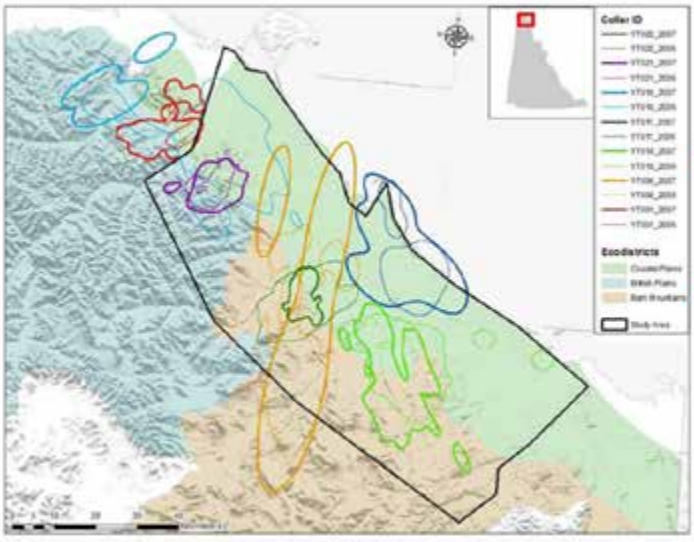
Co-mgmt plan: 305 bears (150 INP; 155 Eastern North Slope)

Ecoregion based estimates (West and East Arctic BMUs): ~306 bears



Population trend

- Determined by tracking collared bears from 2004-2010



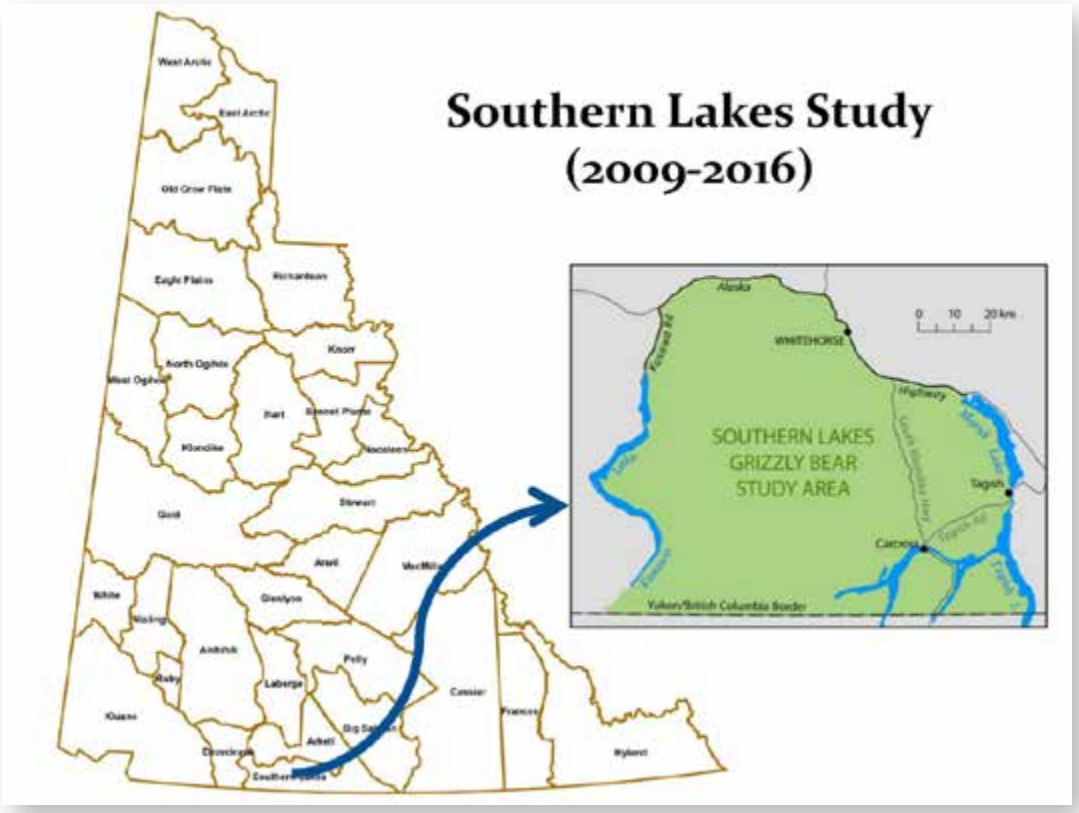
- Results suggest population stable during study period
- TK study (WMAC-(NS) 2008): stable over the last 20 years

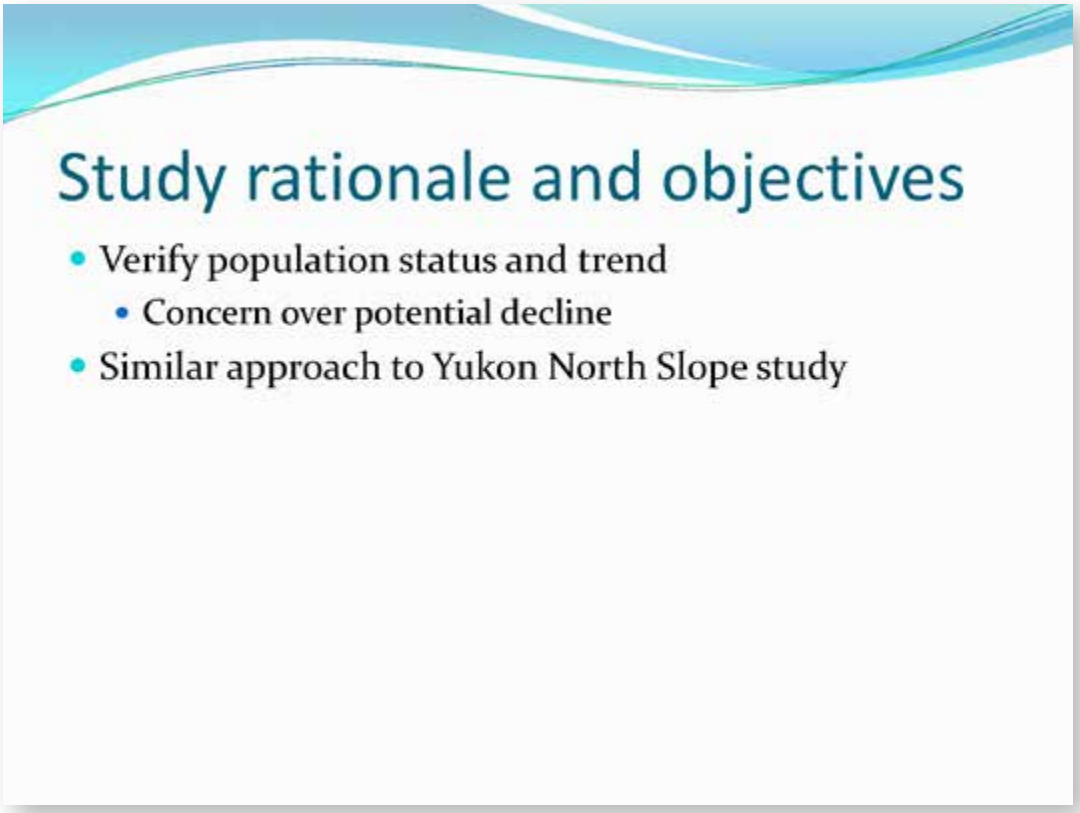
GRRB/Gwich'in Social and Culture Institute study (2014)

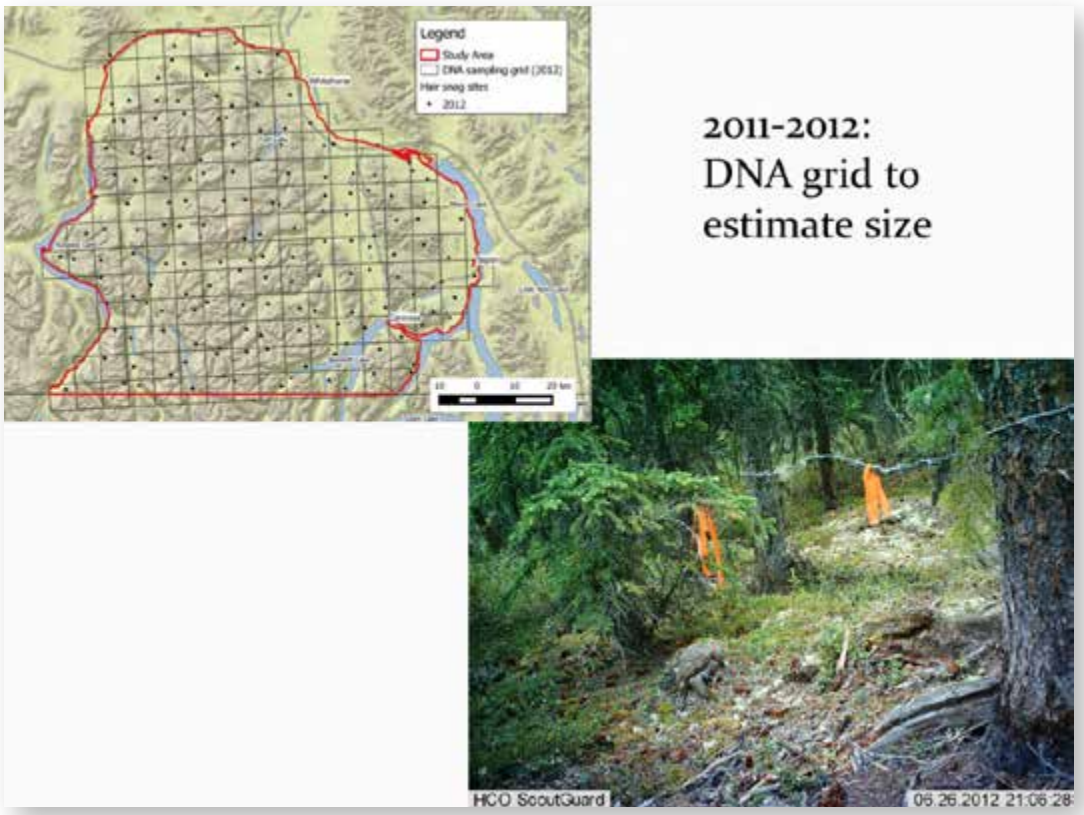
- Fewer bears noticed throughout past (1940s – early 2000s). Related to:
  - Northward movement to ISR
  - Fewer moose/caribou
  - Increased skidoo use
  - Increased hunting pressure/opening of Dempster Highway

GRRB/Gwich'in Social and Culture Institute study (2014)

- Current (2012): may be stable/increasing/high
  - linked to Porcupine caribou moving into community
- Hard to determine long term trends as people travel differently than in the past

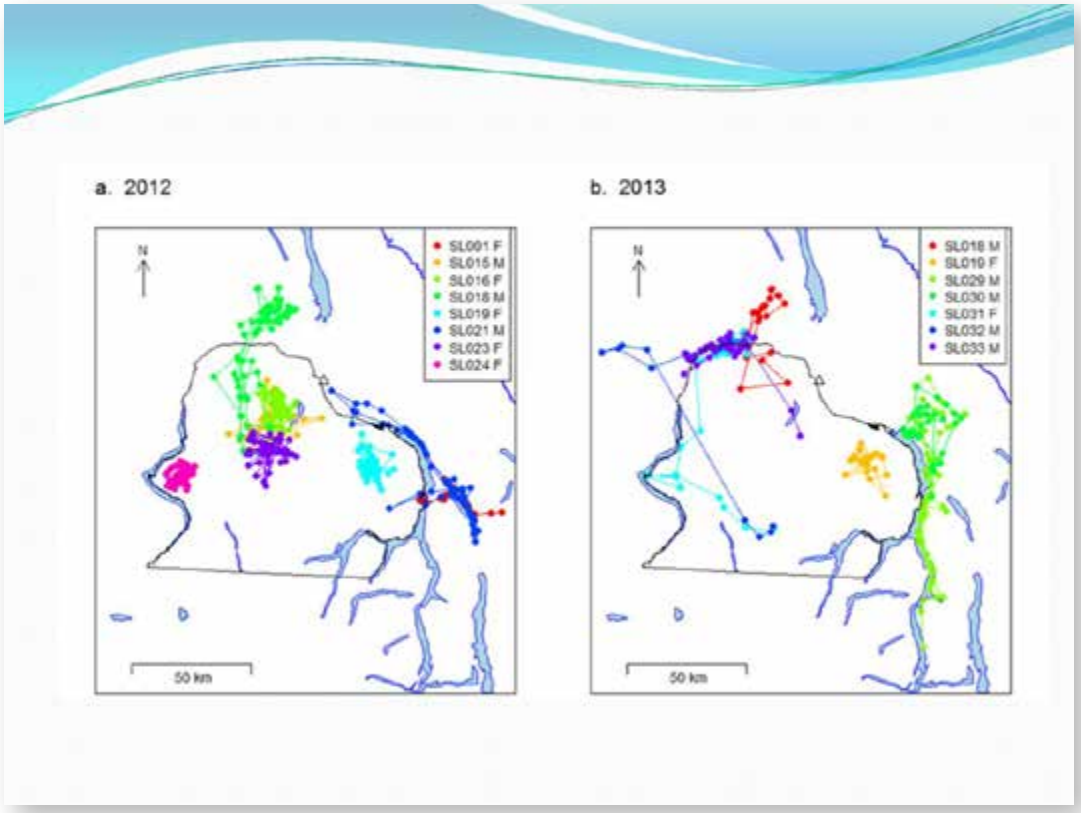

Southern Lakes Study
(2009-2016)
SOUTHERN LAKES
GRIZZLY BEAR
STUDY AREA
Alaska
WHITEHORSE
Tagish
Carcross
Yukon/British Columbia Border
0 10 20 km


Study rationale and objectives
Verify population status and trend
Concern over potential decline
Similar approach to Yukon North Slope study


Legend
Study Area
DNA sampling grid (2012)
Hair snag sites
2012
2011-2012:
DNA grid to
estimate size
HCO ScoutGuard
06.26.2012 21:06:28

2009-2016:
tracked collared
bears to estimate
trend

Results
forthcoming

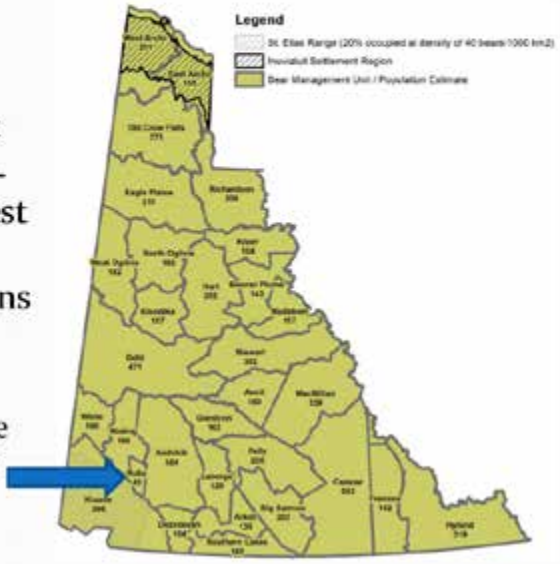


Mortality management: Goals

- Maintain grizzly bear populations and ensure mortality is sustainable
  - Cubs and females with cubs protected from harvest (legislated)
  - Minimize female mortality
- Management approach designed to ensure sustainable mortality, not just sustainable harvest
  - Account for defense of life and property kills, vehicle kills, research kills, etc.

Mortality management: Challenges

- Biological
  - Hard for hunters to tell males and females apart
  - Low reproductive rates – recovery from overharvest takes a long time
  - BMUs are not populations
  - Some BMUs have few bears
    - Sustainable mortality rate can easily be exceeded, if only a few bears lost



Mortality management: Challenges

- Information
  - Most population estimates for BMUs are based on expert opinion and are outdated
  - Outside of the ISR, not all harvest is reported
  - Some harvest may be defense of life and property kills
    - Can make it difficult to understand where issues lie

Co-management plan for Grizzly Bears in the ISR, Yukon Territory and Northwest Territories

Quota system:

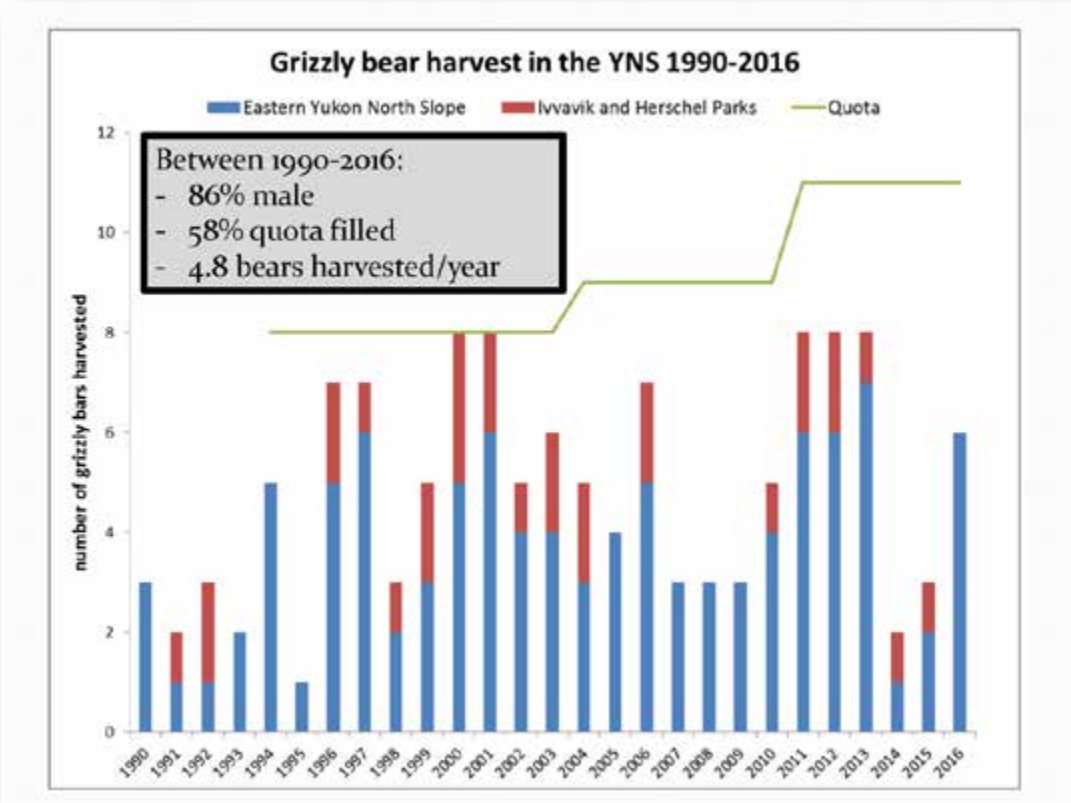
- Sustainable harvest
- If overharvest occurs, recover population by reducing quotas or closing areas for hunting

Sustainable mortality*

- Sustainable harvest rate: 3% of bears age 2 years+
- Maximum 1/3 of harvest is female
- Total allowable harvest quota accounts: for
  - kills in defense of life and property
  - other human caused mortality (e.g., research kills)

Other differences from the rest of Yukon:

- Harvest managed for entire YNS, not individual BMUs
- Inuvialuit beneficiaries have preferential right to harvest in Eastern YNS; exclusive right to harvest in INP and Herschel Island Territorial Park
- Subsistence usage of grizzly bears: under the IFA, a subsistence quota allows for harvest and sale of a hide and does not include meat.


Grizzly bear harvest in the YNS 1990-2016
Eastern Yukon North Slope
Ivvavik and Herschel Parks
Quota
Between 1990-2016:
- 86% male
- 58% quota filled
- 4.8 bears harvested/year
number of grizzly bars harvested
0
2
4
6
8
10
12
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
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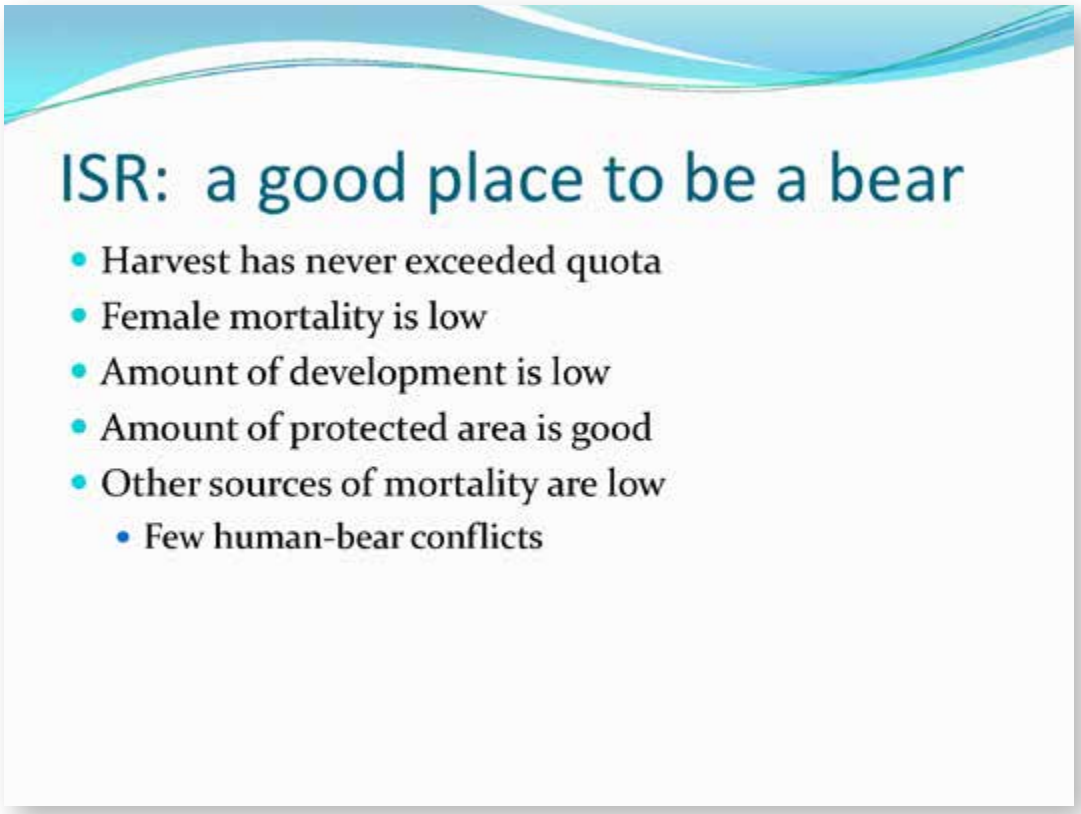
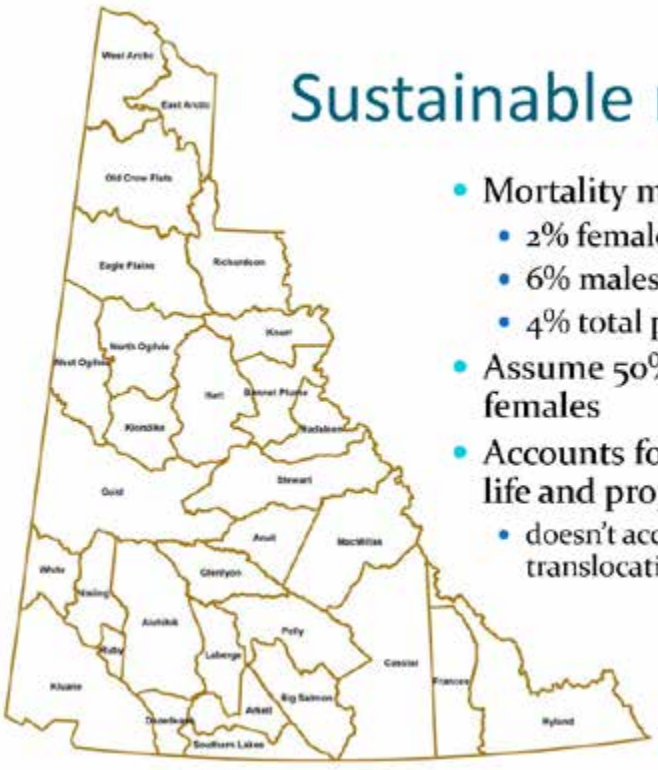
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016

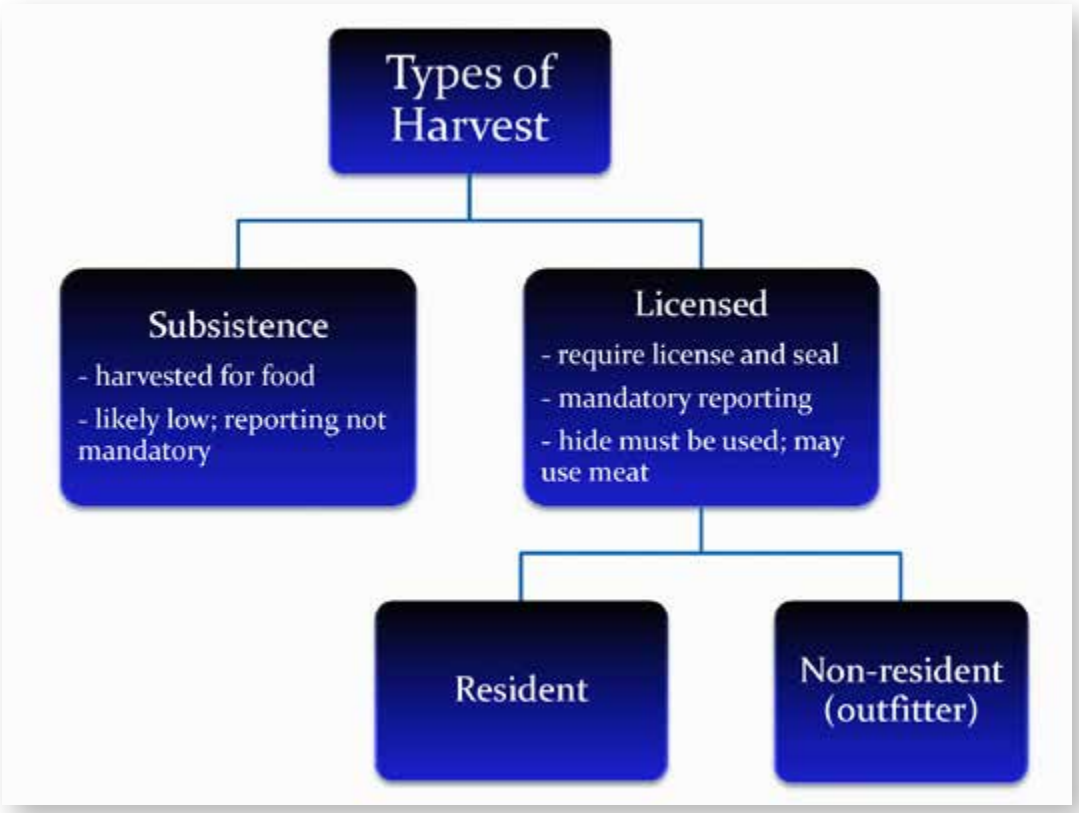

ISR: a good place to be a bear
Harvest has never exceeded quota
Female mortality is low
Amount of development is low
Amount of protected area is good
Other sources of mortality are low
Few human-bear conflicts

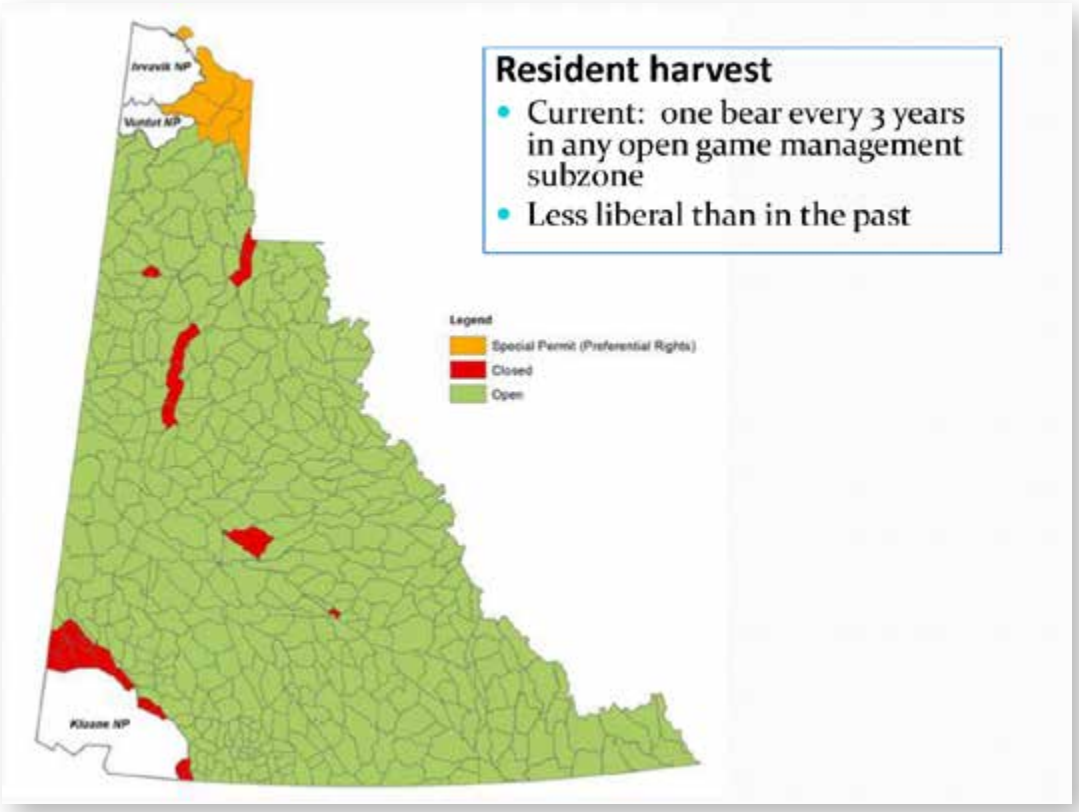
The rest of Yukon

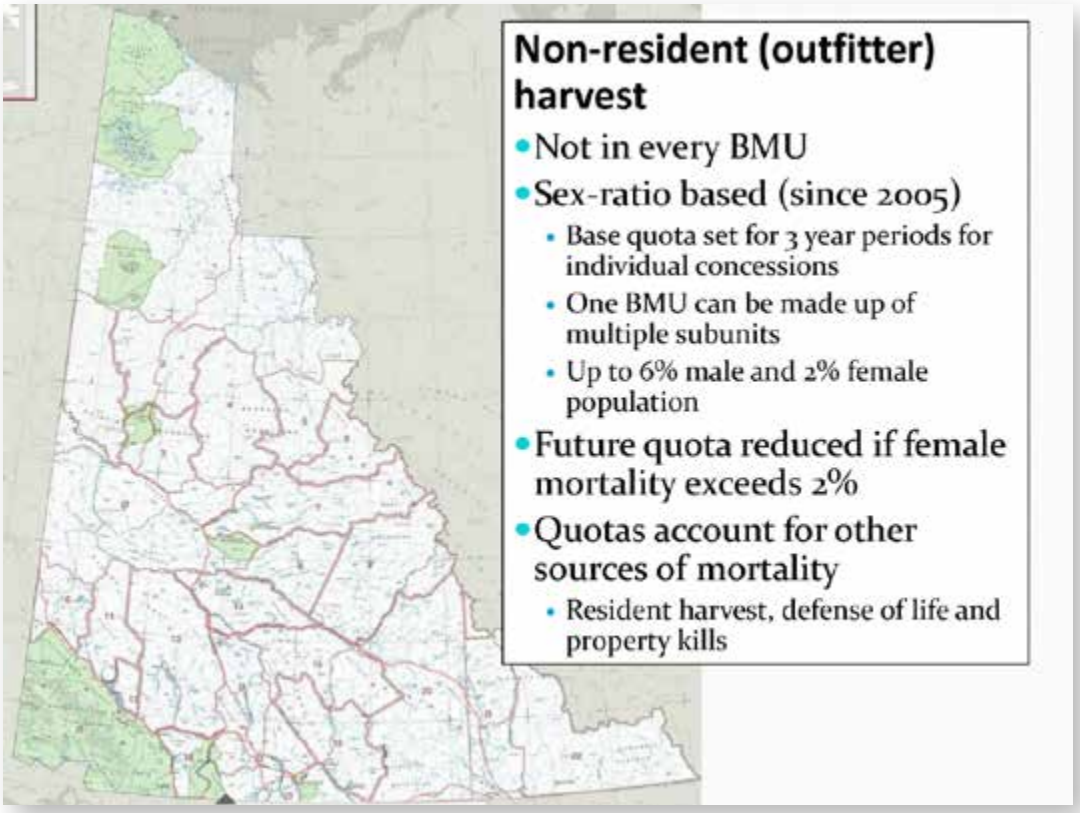


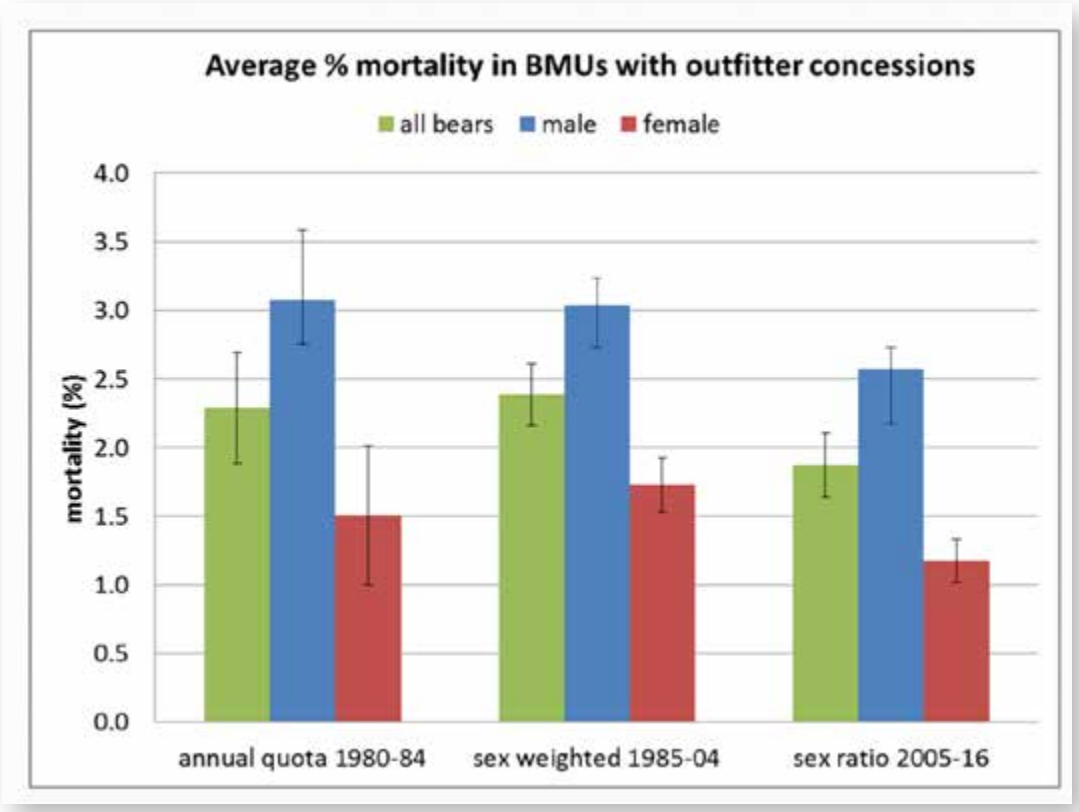
Sustainable mortality

- Mortality managed by BMUs:
  - 2% females
  - 6% males
  - 4% total population
- Assume 50% males and 50% females
- Accounts for harvest, defense of life and property kills
  - doesn't account for wounding loss, translocations


Types of Harvest
Subsistence
- harvested for food
- likely low; reporting not mandatory
Licensed
- require license and seal
- mandatory reporting
- hide must be used; may use meat
Resident
Non-resident (outfitter)


Resident harvest
Current: one bear every 3 years in any open game management subzone
Less liberal than in the past
Legend
Special Permit (Preferential Rights)
Closed
Open
Ivvavik NP
Vuntut NP
Kluane NP


Non-resident (outfitter) harvest
Not in every BMU
Sex-ratio based (since 2005)
Base quota set for 3 year periods for individual concessions
One BMU can be made up of multiple subunits
Up to 6% male and 2% female population
Future quota reduced if female mortality exceeds 2%
Quotas account for other sources of mortality
Resident harvest, defense of life and property kills

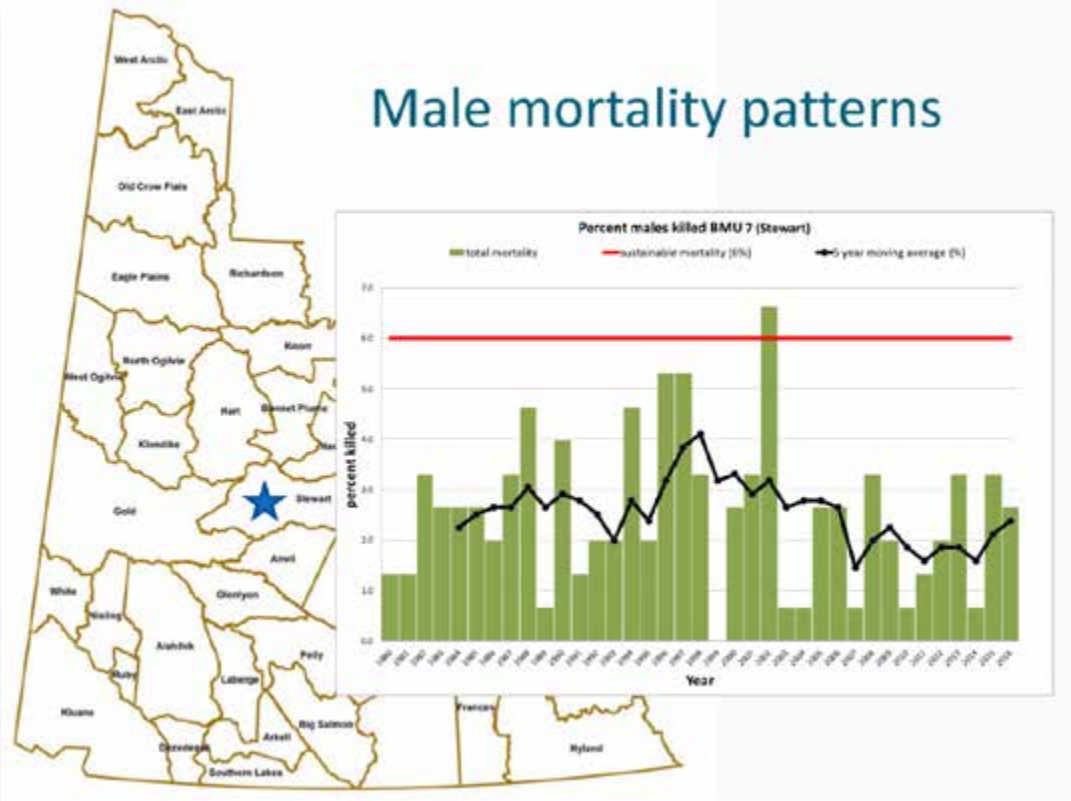

Average % mortality in BMUs with outfitter concessions
all bears
male
female
mortality (%)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
annual quota 1980-84
sex weighted 1985-04
sex ratio 2005-16

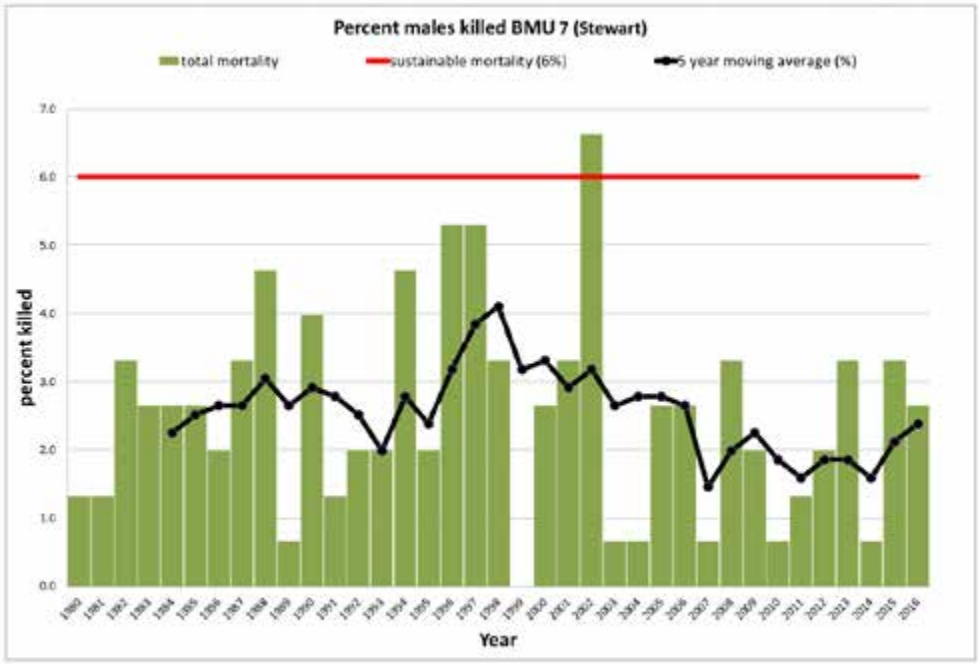
Current management regime

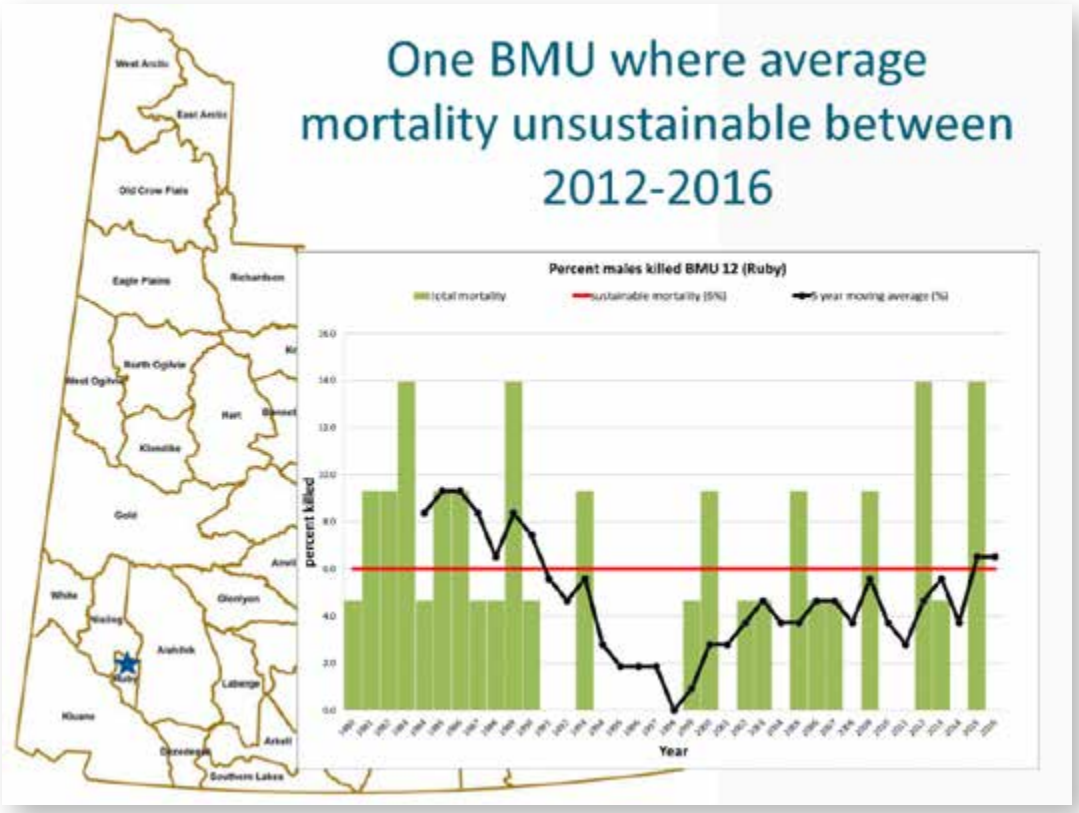
- Weight of evidence suggests for most BMUs, mortality is within sustainable limits
- New population information consistent with existing knowledge of bears
- Less likely to exceed sustainable mortality rates than in the past
  - Harvest regulations for licensed harvest are more conservative

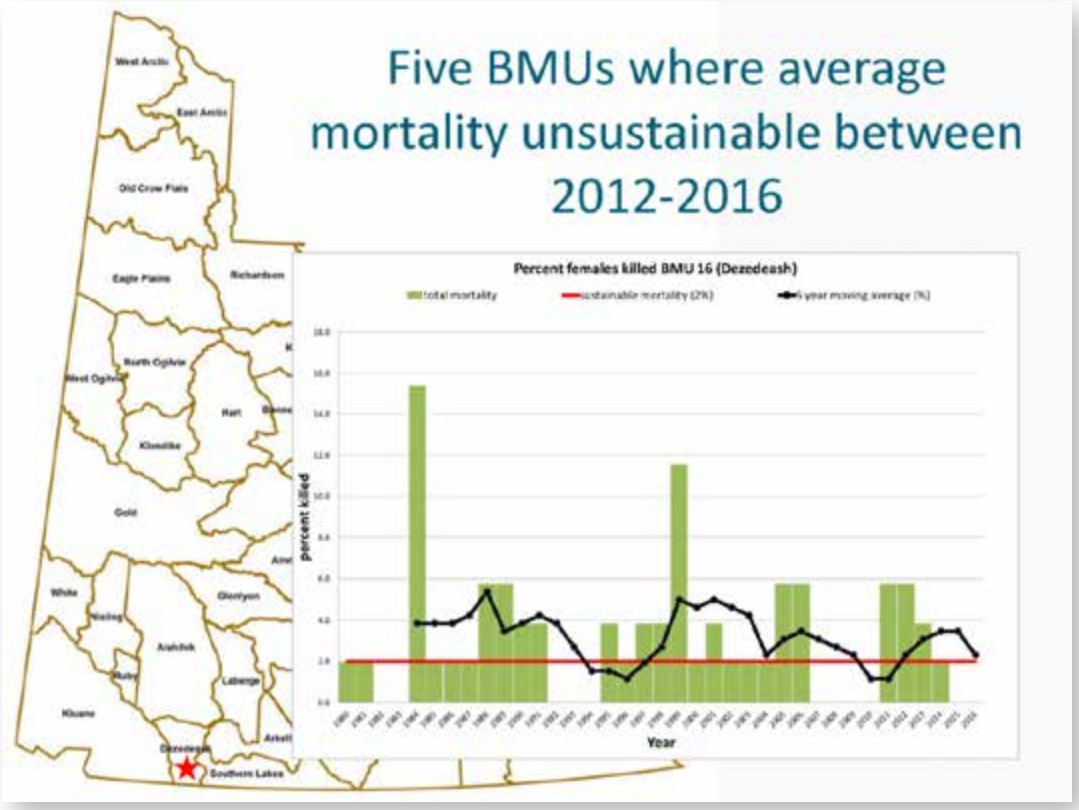
If mortality is unsustainable:

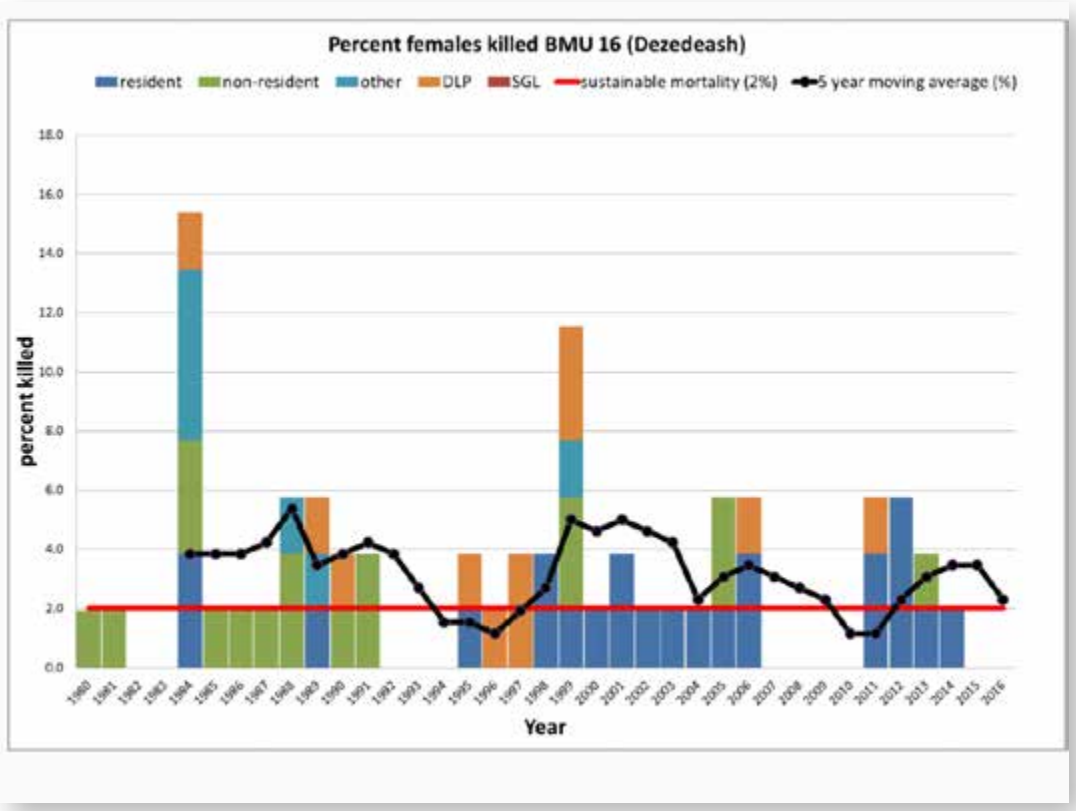
- Determine cause (overharvest, DLPs, etc.)
- Respond:
  - Adjust outfitter quotas
  - Work to reduce defense of life and property kills
  - Seek change to resident harvest via regulation change process under the *Wildlife Act*

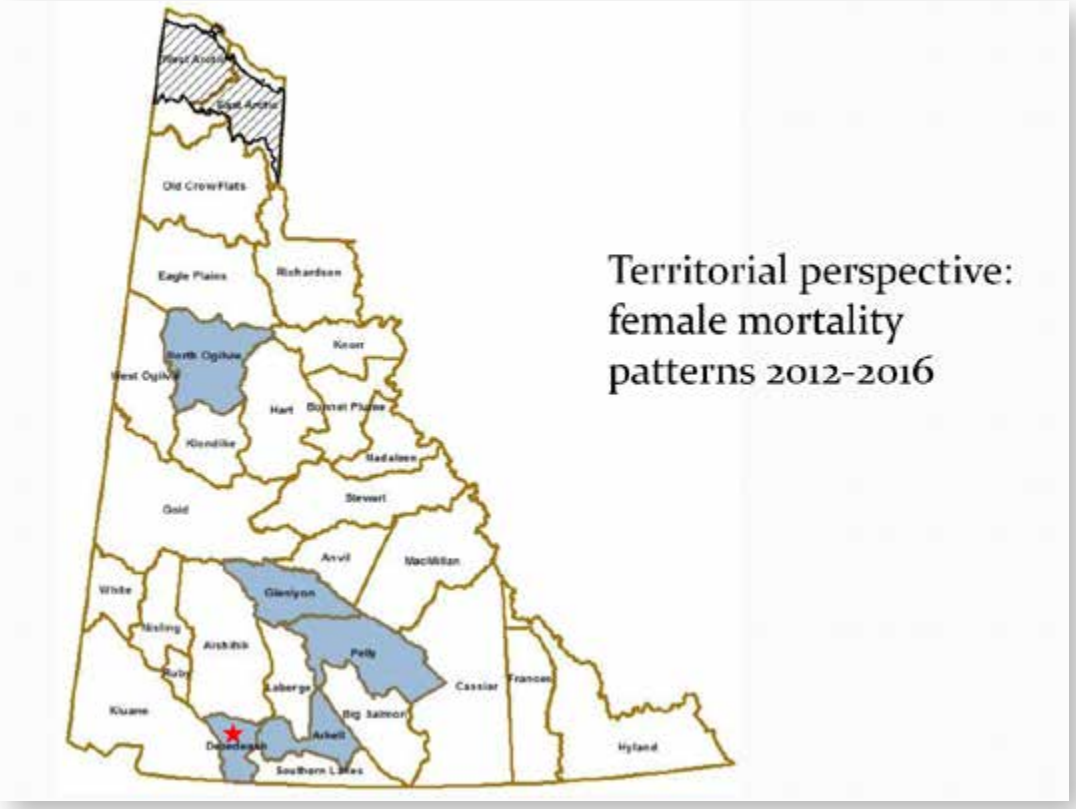

Male mortality patterns
West Arctic
East Arctic
Old Crow Flats
Eagle Plains
Richardson
Kluane
North Ogilvie
West Ogilvie
Hart
Klondike
Stewart
Gold
Mayo
White
Glenlyon
Aishihik
Pelly
Ruby
Laberge
Kluane
Big Salmon
Carmacks
Southern Lakes
Francois
Hyland
Percent males killed BMU 7 (Stewart)
total mortality
sustainable mortality (6%)
5 year moving average (%)
percent killed
Year


Percent males killed BMU 7 (Stewart)
total mortality
sustainable mortality (6%)
5 year moving average (%)
percent killed
Year


One BMU where average mortality unsustainable between 2012-2016
Percent males killed BMU 12 (Ruby)
total mortality
sustainable mortality (5%)
5 year moving average (%)
percent killed
Year
West Arctic
East Arctic
Old Crow Flats
Eagle Plains
Richardson
North Ogilvie
West Ogilvie
Klondike
Gold
White
Glenlyon
Ashihik
Ruby
Labarge
Kluane
Southern Lakes

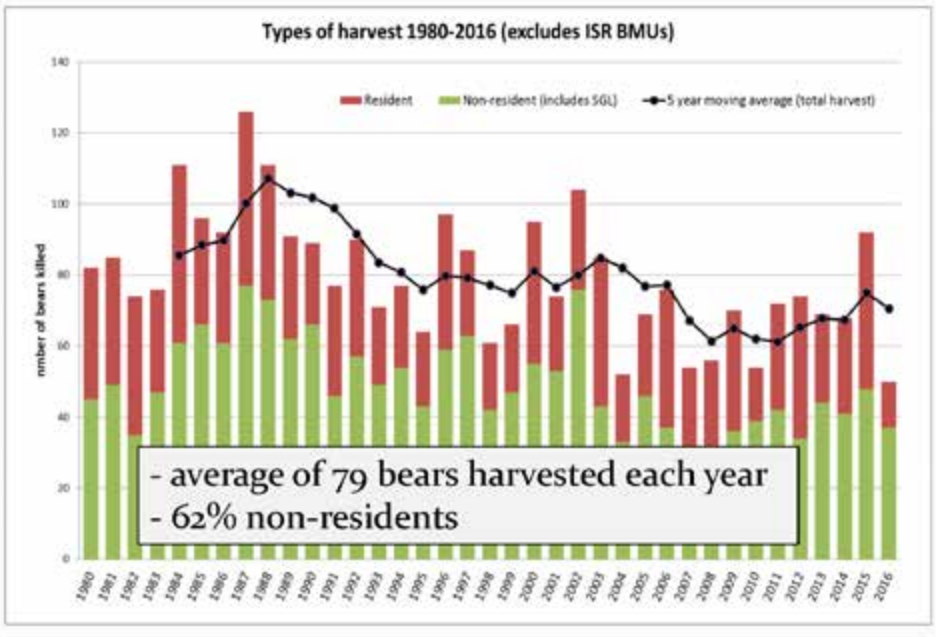

Five BMUs where average mortality unsustainable between 2012-2016
Percent females killed BMU 16 (Dezedeash)
total mortality
sustainable mortality (2%)
5 year moving average (%)
percent killed
Year
West Arctic
East Arctic
Old Crow Flats
Eagle Plains
Richardson
North Ogilvie
West Ogilvie
Klondike
Gold
White
Glenlyon
Ashihik
Ruby
Labarge
Kluane
Southern Lakes

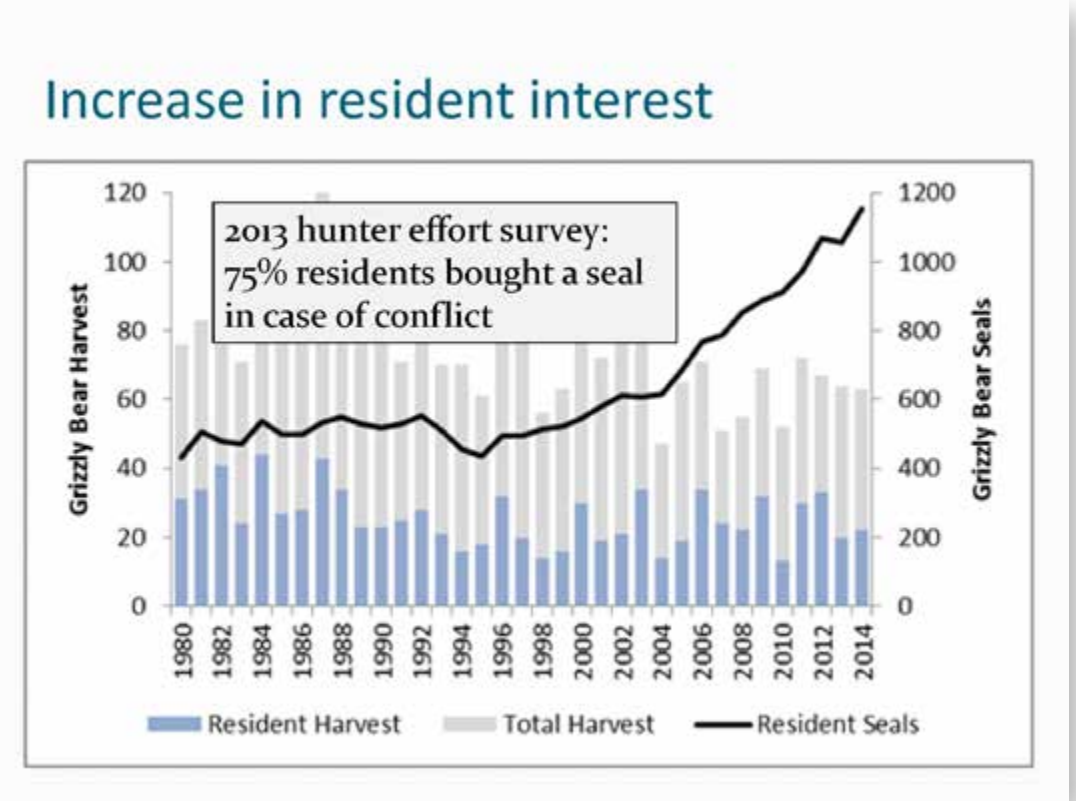

Percent females killed BMU 16 (Dezedeash)
resident
non-resident
other
DLP
SGL
sustainable mortality (2%)
5 year moving average (%)
percent killed
Year

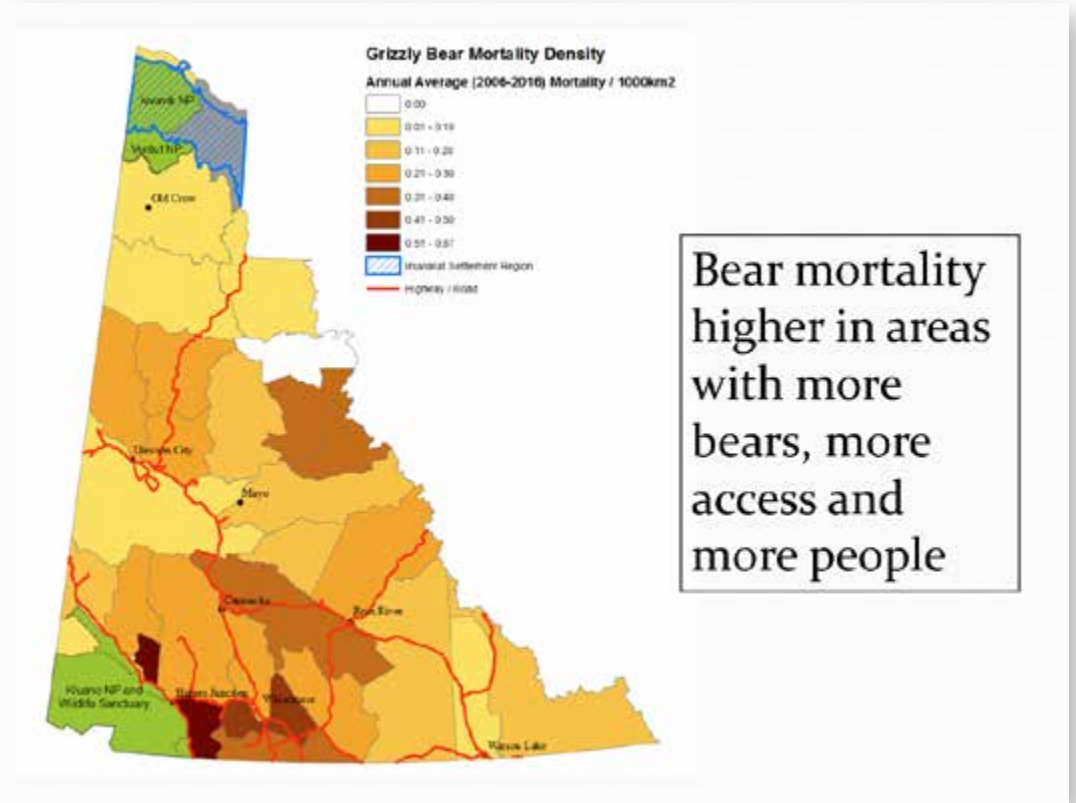

Territorial perspective:
female mortality
patterns 2012-2016
Old Crow Flats
Eagle Plains
Richardson
Keele
North Ogilvie
West Ogilvie
Hart
Klondike
Stewart
Gold
Anvil
MacMillan
White
Glenlyon
Nisling
Aishihik
Pelly
Ruby
Laberge
Cassiar
Frances
Kluane
Big Salmon
Ashell
Dezedeash
Southern Lakes
Hyland

Other trends in licensed harvest (All non-ISR BMUs 1980-2016)

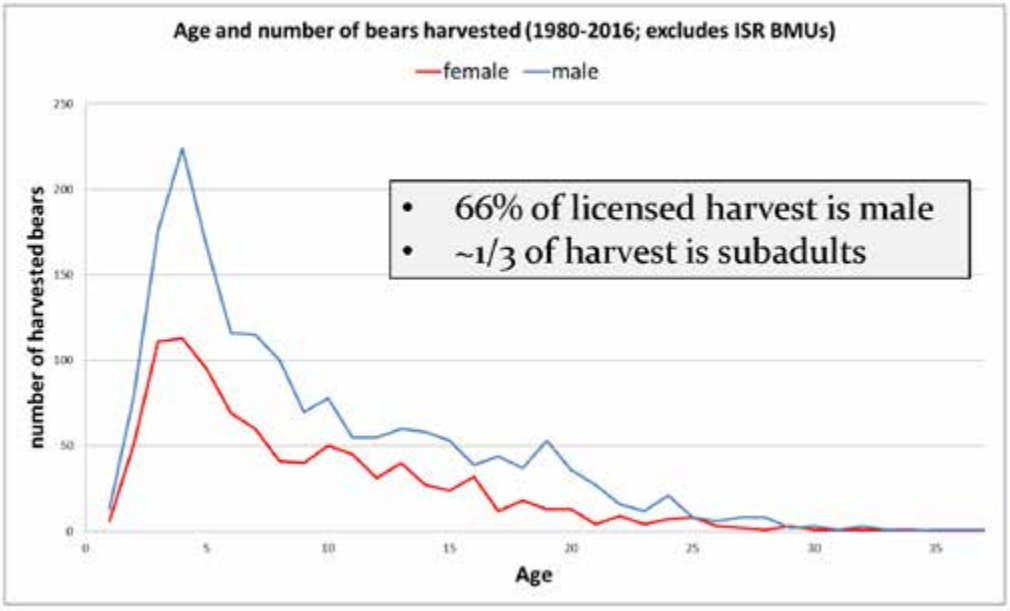
Harvest over time



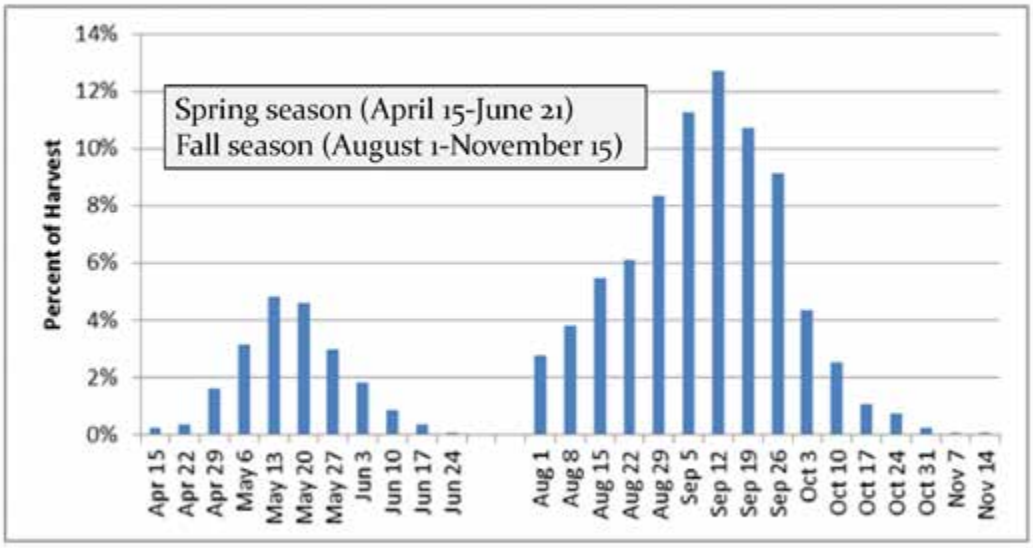

Increase in resident interest
2013 hunter effort survey:
75% residents bought a seal
in case of conflict
Grizzly Bear Harvest
Grizzly Bear Seals
120
100
80
60
40
20
0
1200
1000
800
600
400
200
0
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
Resident Harvest
Total Harvest
Resident Seals

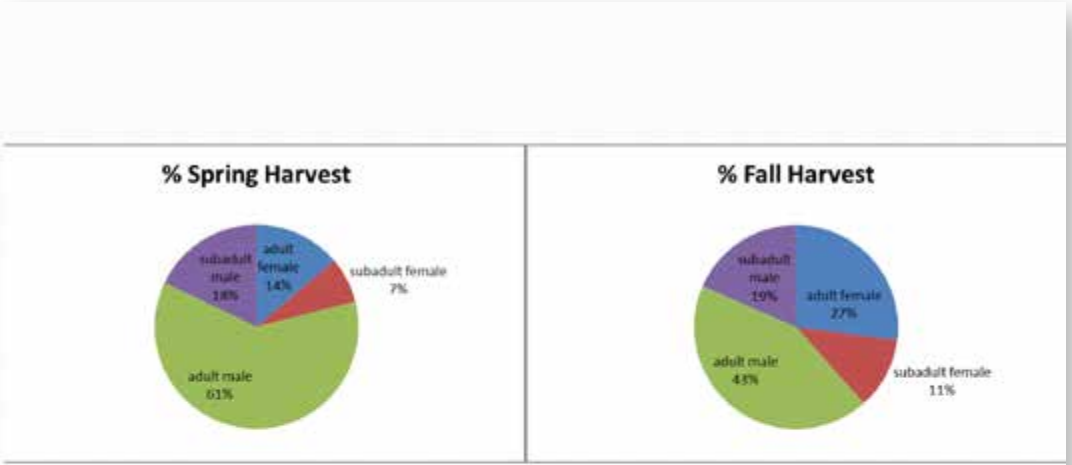

Grizzly Bear Mortality Density
Annual Average (2006-2016) Mortality / 1000km2
Old Crow
Mayo
Bear mortality
higher in areas
with more
bears, more
access and
more people

Age and sex composition of harvest



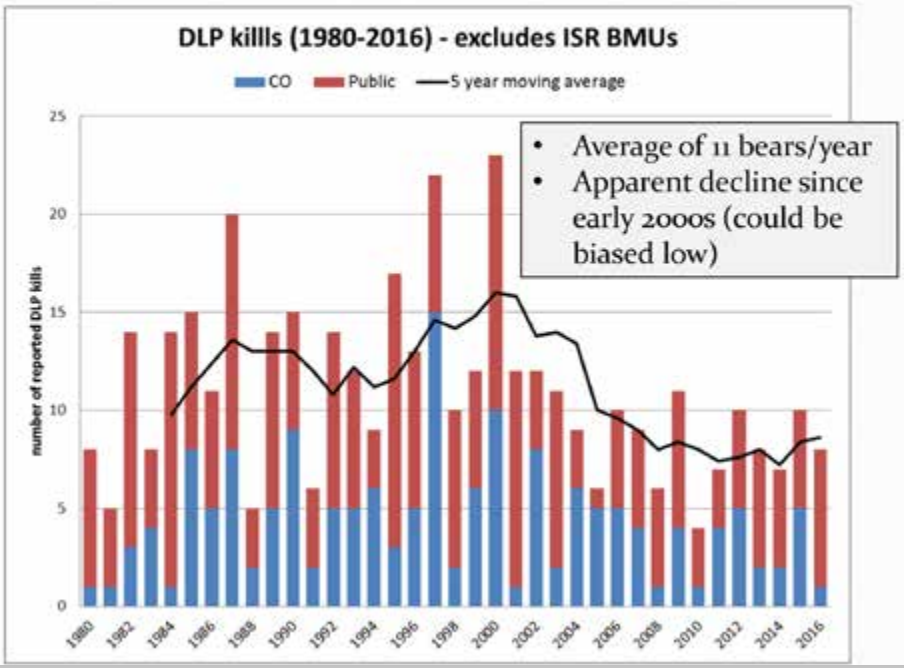
Most harvest occurs in fall

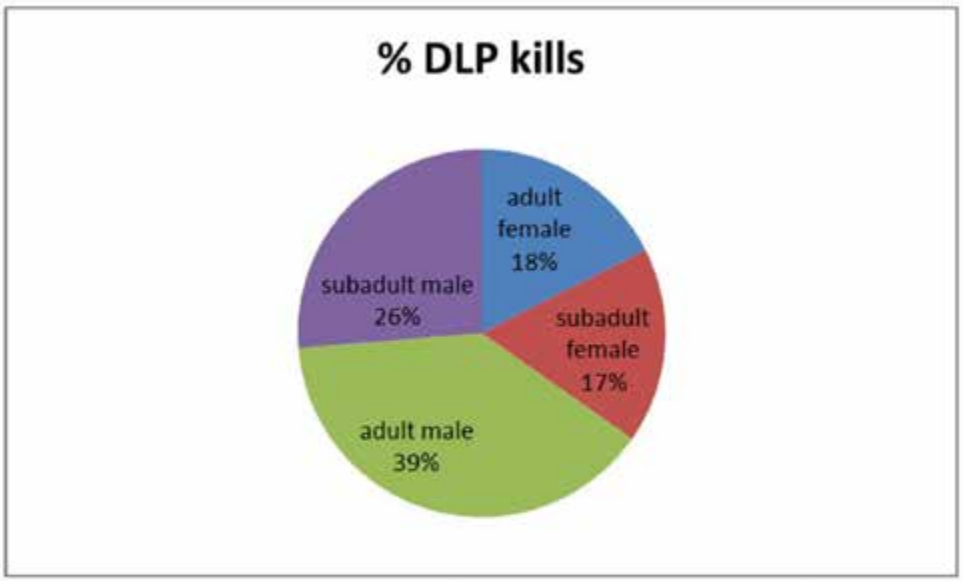




- More adult males harvested in spring (exit dens earlier; females have cubs)
- More adult female harvest in fall (no cubs)

Defense of life and property kills (DLP)





- Most DLPs are male

Most DLPS occur where human density and access is higher (GMZ 5 and 7)

Where to next?

- Monitoring considerations
  - Revisit the "BMU"
  - Revisit monitoring options
  - Verify population information, particularly in areas of conservation concern

Where to next?

- Mortality management considerations
  - Revisit mortality models and explore different scenarios depending on population status, quota system, etc.
  - Explore trends in harvest age information
  - Explore approaches used by other jurisdictions
- Management and monitoring approaches incorporate local, traditional, and scientific knowledge

Photo: Government of Yukon

Review of grizzly bear management in North America

Prepared by: Jodie Pongracz, Fish and Wildlife Branch, Government of Yukon

Grizzly Bear Status in North America

The global range and abundance of grizzly bears *(Ursus arctos)* has declined by an estimated 50% since the mid-1800s (Servheen 1990). Their historic range covered much of western North America, from Alaska and Yukon, across to Hudson's Bay, and south as far as northern Mexico. Today, they occur in Alberta, British Columbia, Northwest Territories, Nunavut, Yukon, Alaska and in isolated portions of the lower 48 states (Montana, Wyoming and Idaho). While occasional sightings are reported in northern Saskatchewan and Manitoba, they have been extirpated from the prairies, as well as parts of southern British Columbia, and much of their historic range in mainland United Sates. In Canada, grizzly bears were assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as Special Concern (COSEWIC 2012), and were listed as Special Concern under the *Species at Risk Act* on May 29, 2018. See Table 1 for a status overview by jurisdiction.

	Species Legal Status *(Assessed, not necessarily listed)*	Estimated Population Size	Type of Harvest Allowed
Canada	Special Concern[1]	27,275 – 29,775	See details for each province or territory below
Yukon	No legal status	6,000 – 7,000[2]	First Nations (subsistence harvest only for food; otherwise license required), Inuvialuit, resident,non-resident
British Columbia	No legal status	15,075[3]	First Nations (harvest for food, social, and ceremonial uses)
Northwest Territories	Assessed as Special Concern[4] No legal status (not list) as Species at Risk in the Northwest Territories[5]	4,000 – 5,000[5]	First Nations, Inuvialuit, resident, non-resident
Nunavut	No legal status	1,500 – 2,000[6]	Inuit, Resident[7], non-resident
Alberta	Threatened[8]	691[8]	Aboriginal (only for food)
Alaska	No legal status	30,000[9]	Subsistence[10], resident, non-resident
Lower 48 states	Threatened[11,12]	1,200 – 1,400[13]	None currently, but quota sharing arrangements in place if delisted[14]

Table 1. *Status and population estimates for North American grizzly bear populations.*

1 Order Amending Schedule 1 to the *Species At Risk Act* (Canada); SOR/2018-112 (May 30, 2018) *Species At Risk Act*, P.C. 2018-606

2 Smith & Osmond-Jones. 1990. *Grizzly bear abundance in Yukon ecoregions.* Fish and Wildlife branch report.

3 British Columbia Ministry of Forests, Lands, and Natural Resource Operations 2012

4 Species at Risk Committee 2017

5 Conference of Management Authorities 2018

6 Nunavut Department of Environment 2017

7 Resident harvest possible under specified circumstances, see Nunavut Department of Environment Hunting Regulations for more information; https://gov.nu.ca/sites/default/files/2018-2019_nunavut_hunting_guide.pdf

8 Alberta Sustainable Resource Development and Alberta Conservation Association 2010

9 Alaska Department of Fish and Game 2018

10 Subsistence in Alaska is defined as the non-commercial customary and traditional uses of fish and wildlife, and applies to both Alaska Natives and non-Natives (except for marine mammals)

11 Federal Register Vol. 83, Number 83 (Monday, April 30, 2018)

12 Crow Indian Tribe *et al.* vs. United States of America *et al.* and State of Wyoming *et al.*, United States District Court for the District of Montana Missoula Division, September 24, 2018

13 The Interagency Grizzly Bear Committee 2018

14 Wyoming Game and Fish Department regulations suggest 75% of tags will go to residents prior to any non-resident tag allocation (Wyoming Game and Fish Department 2018)

Grizzly bears are sensitive to human disturbance and subject to high mortality risk in developed areas where human-grizzly bear conflicts are common and roads create access. Grizzly bear populations are susceptible to, and slow to recover from, population declines. Because grizzly bears are listed under the federal *Species at Risk Act*, there is a requirement for jurisdictions to work together to develop a National Grizzly Bear Management Plan.

There are grizzly bear management, conservation or recovery plans in the following jurisdictions: Alberta (Alberta Sustainable Resource Development, Fish and Wildlife Division 2008; Alberta Environment and Parks 2016), British Columbia (British Columbia Ministry of Environment, Lands and Parks 1995; North Cascades Grizzly Bear Recovery Team 2004), the Inuvialuit Settlement Region in Yukon and Northwest Territories (Wildlife Management Advisory Council (North Slope) and Wildlife Management Advisory Council (Northwest Territories) 1998); the Gwich'in Settlement Area in Northwest Territories (Gwich'in Renewable Resource Board, Ehdiitat Renewable Resource Council, Gwichya Renewable Resource Council, Nihtat Gwich'in Renewable Resource Council, Tetlit Gwich'in Renewable Resource Council 2000), and Nunavut (Nunavut Department of Environment 2017). Management of grizzly bears in the lower 48 states is guided by the grizzly bear recovery plan (United States Fish and Wildlife Service 1993) which includes supplements specific to individual populations. There are numerous conservation and management documents relating to recovery of grizzly bears in the lower 48 states, including the 2016 Conservation Strategy for the Grizzly Bear in the Greater Yellowstone Ecosystem (Yellowstone Ecosystem Subcommittee of the Interagency Grizzly Bear Committee 2016), which includes state management plans (see Appendices H through J in the 2016 Conservation Strategy). There are also Final Rule decisions that speak to specific actions related to individual populations. In Alaska, bears are managed on a unit level, which breaks the state into smaller regions. Conservation or management plans exist within three of these Units: Kenai (Alaska Department of Fish and Game 2000a), Kodiak (Alaska Department of Fish and Game 2002), and Southeast Alaska Unit 4 (Alaska Department of Fish and Game 2000b).

Monitoring and Management Toolboxes

In Canada, the provinces, territories, and mandated cooperative management authorities are responsible for grizzly bear management. In Alaska, the Alaska Department of Fish and Game manage grizzly bears. In the lower 48 states, the federal government manages grizzly bear populations listed under the *Endangered Species Act*; state governments will manage grizzly bear populations once they are delisted.

Population Estimation and Monitoring Methods

A number of tools have been developed to improve our understanding of grizzly bear populations. Grizzly bears are a challenging species to monitor—individuals have large home ranges, exist at relatively low densities in remote environments, and spend a portion of each year in hibernation. Furthermore, they depend on forage that can fluctuate between years and over time, influencing the carrying capacity of the land. These challenges can lead to uncertainty about population size, status and delineation, which can influence the ability to ensure conservation.

Grizzly bear monitoring occurs with two primary purposes: 1) to estimate grizzly bear abundance (population size or density), and 2) to understand population trend (the population growth rate and change in this growth rate). Methods to estimate

grizzly bear abundance or density include expert opinion surveys, regression modelling, DNA-based mark-recapture surveys (hair and scat), and mark-capture-resight (radiotelemetry aerial resight and collar/ear tag mark and camera trap resight). There are two primary scientific-based methods to obtain information on population trend: 1) examination of change in abundance estimates in inventories over time, and 2) through monitoring demographic rates (survival and reproduction). Hunter effort surveys have also been used to understand trend in some populations (Kindberg *et al.* 2009). Traditional and local knowledge provides valuable insight in the context of both short and long term grizzly bear monitoring. In the Northwest Territories and Yukon, local and traditional knowledge have been used to make quota adjustments for grizzly bear populations on the Yukon North Slope in the Inuvialuit Settlement Region. Northwest Territories has included traditional knowledge in its grizzly bear status report needed for Species at Risk assessment under the NWT *Species at Risk Act* (Species at Risk 2017). Traditional knowledge of grizzly bear undoubtedly appears in many wildlife traditional knowledge studies; there have been a few focused studies specifically on this species (see Wildlife Management Advisory Council (North Slope) and the Aklavik Hunters and Trappers Committee 2008; Gwich'in Social and Cultural Institute and Gwich'in Renewable Resources Board 2014; Stoney Consultation Team and Stoney Tribal Administration 2015).

Expert Opinion surveys

Expert opinion has been used to estimate population sizes, particularly in the absence of field-based estimates. Regional bear experts (biologists, knowledgeable residents, hunters, outfitters, etc.) are surveyed to gain insight into their assessment of habitat quality and their perception of how many bears the landscape could support. Using their experience on the land and knowledge of the land, experts provide estimates of grizzly bear density as well as carrying capacity (the expected number of bears that the land could sustain—but not necessarily how many currently exist in the area). Expert opinion can be informed by understanding of field-based estimates estimated in ecologically similar regions.

Expert opinion has also been used to validate or enhance other science-based methods to monitoring grizzly bear populations. For example, in British Columbia, population estimates are derived from both predictive population density modelling and expert knowledge (British Columbia Ministry of Forests, Lands, and Natural Resource Operations 2012).

Predictive population density model

The high cost of field-based surveys in vast remote landscapes results in relatively few populations having been surveyed using field methods. Predictive abundance modelling offers an alternate method of assessment that has been used to estimate the density of bears across the landscape. Models are based on factors that influence bear density at the population level. This approach is explained in detail in Mowat *et al.* (2013) and involves the development of models based on understanding of the functional processes affecting density. Models consider food supply, competition, predation, and disturbance influences on grizzly bear density, and utilize information from existing population estimates to understand how these factors may affect grizzly bear density.

DNA (hair snag)-based mark-recapture surveys

DNA-based mark-recapture is currently the primary inventory tool used to estimate population density and abundance. Hair snag-based approaches can be used with spatially explicit modelling (see Stenhouse *et al.* 2015). This method permits sampling stratification and is non-invasive. The approach involves mark-recapture analysis on hair samples. In summary, a grid is imposed over the study area and hair snag stations are identified within specified cells. Lures are placed at the centre of each station and when a bear visits the site, their hair is snagged on barbs which provides a sample for genetic analysis. DNA is extracted from the hair and used to identify individuals and determine their sex. The initial hair sample acts as the 'mark' and the subsequent hair samples of the same individual are considered 'recaptures'. Mathematical modelling, including spatially explicit capture recapture methods, can then be used to estimate the density of grizzly bears. There are typically multiple capture sessions a season and a population estimate provides a snapshot of the bear density/abundance during the time sampling occurred.

There have been advancements in the ability to identify age class of bears based on concentrations of steroid hormones in hair (see Cattet *et al.* 2018); however, present techniques are not refined enough to allow for the inclusion of age class in DNA mark-recapture analysis so estimates are limited to number and sex of bears.

Citizen-based: DNA (scat) mark-recapture and index of effort-corrected observations of bear by moose hunters

There has been substantial development in citizen-based monitoring methods that utilize samples and information collected from citizens (ungulate hunters, volunteers) and agency personnel. Two methods in particular have been demonstrated to be successful in Sweden: 1) mark-recapture analysis using DNA extracted from scat, and 2) results from surveying moose hunters (effort corrected observation of bears by moose hunters). These two methods are highly correlated (Kindberg *et al.* 2011) and are used in Sweden for population estimation and trend monitoring, respectively. Success of these techniques in Sweden may be attributed in part to their widespread collection, which covered almost all areas where bears were expected. Moose hunter surveys even extended into areas without current bear populations.

Radiotelemetry

Radiotelemetry can be used to monitor population trends; it can also be used in methods that estimate abundance or density.

A population estimate can be determined using a mark-capture-resight approach. This involves individuals being captured and collared, and then resighted (traditionally by aircraft) (White and Shenk 2001). The number of bears is estimated from observation rates of collared individuals in the population.

A density estimate can also be obtained through an emerging mark-capture-resight technique approach in which bears originally marked with collars and/or ear tags are resighted using camera trapping (Whittington *et al.* 2018). This approach uses generalized spatial mark-resight models to estimate the density of bears across the landscape using observations of marked and unmarked individuals from camera traps.

Bears collared and tracked during DNA mark-recapture sampling sessions can furthermore be used to help correct for biases of the estimates of density provided by mark-recapture techniques (White and Shenk 2001).

Radiotelemetry alone cannot provide an initial population estimate. However, long-term telemetry studies can estimate reproduction and survival so population trend can be inferred (for example, see Mace *et al.* 2012). Tracking collared individuals can also provide insight into how vital rates change over time and vary with other factors (see McLellan 2015). Radiotelemetry has furthermore been used to identify causes of mortality (McLellan *et al.* 1999).

In some populations, only adult female grizzly bears are tracked and resighted in an attempt to understand survival and reproductive rates and how these rates change over time. The intent is that monitoring this demographic can serve as a proxy for vital rates (and change thereof) at the population level (Mace *et al.* 2012).

Counts of unique females with cubs of the year

A population estimate can also be calculated as a function of the number of unique females with cubs of the year seen during a 3-year period. The method utilizes reports of females with cubs of the year from ground based observations, trapping, and fixed-wing observations (Keating *et al.* 2002). Trend can also be evaluated through monitoring females with cubs of the year (see Knight *et al.* 1995, and for recent improvements to this method see Interagency Grizzly Bear Study Team 2012).

Harvest Monitoring

Harvest monitoring is widely used for ongoing grizzly bear population monitoring. Through mandatory harvest reporting, information on the location, sex, and age of harvested animals is collected. Harvest information is combined with other mortality information (e.g., defence of life or property, and road kills) to understand the total number of grizzly bear mortalities and the proportion of female grizzly bear mortalities. Harvest monitoring allows for observation of sex and age metrics and how they change over time. Key metrics monitored include average age of bears killed, proportion of the kill that is male, and change in sex ratio of the kill with age. For further explanation, please see Gilbert *et al. 1*979, and Harris and Metzgar 1987, and McClellan 2015.

Grizzly bear population estimation and ongoing monitoring

Some jurisdictions have small, threatened populations of grizzly bears (Alberta, British Columbia and lower 48 states), and other jurisdictions have larger, more secure populations (e.g., Yukon, British Columbia, Alaska, and Northwest Territories). Several factors can influence grizzly bear monitoring and management including status of the populations, presence of a management agreement, human density, perceived pressure on the population, remoteness, and ease and cost of monitoring. All regions with grizzly bear harvest rely on harvest monitoring for ongoing population monitoring.

Table 2. Population estimation (E,e) and ongoing population monitoring (M,m) methods used to assess grizzly bear populations in North America. Upper case letters, in bold, indicate the current or most widely applied method. Lower case letters, in grey, indicate methods that have been used in the past, or are used less frequently.

	Population Estimation								Ongoing Population Monitoring							
	Yukon	British Columbia	Northwest Territories	Nunavut	Alberta	Alaska	Lower 48	Sweden	Yukon	British Columbia	Northwest Territories	Nunavut	Alberta	Alaska	Lower 48	Sweden
Expert Opinion surveys	**E**	e	e	e	e	**E**										
Predictive population density model		**E**														
DNA (Hair) Mark-Recapture	e[1]	**E**	**E**	**E**	**E**	**E**	**E**			**m**			**M**	m	**M**	
Harvest Monitoring									**M**	M[2]	**M**	**M**	m[2]	**M**	m	**M**
Citizen-based DNA (scat)					**e**			**E**								**m**
Radiotelemetry Mark-Resight		e	e		**E**	**E**										
Radiotelemetry demographics	e[1]	e	e	e[3]	**E**	**E**	**E**									
Monitoring adult females							**E**								**M**	
Hunter Survey								**E**								**M**
Traditional and local knowledge									**m**	**m**	**m**	**m**	**m**			**m**

Table 2. *Population estimation (E,e) and ongoing population monitoring (M,m)*

1 Yukon has just completed work on two large scale population studies (Yukon North Slope and Southern Lakes region), which involve both collaring and demographic information gathering, and DNA-based mark-recapture surveys.

2 Grizzly bear harvest is currently closed in Alberta and British Columbia

3 Note occurred in the Kugluktuk region of Nunavut prior to the creation of Nunavut

Management Responses

Management Units

In each jurisdiction, the area occupied by grizzly bears is divided into smaller management units that form the scale at which management occurs. These management units may or may not be representative of biological subpopulations or populations. In some areas, boundaries of management units are delineated based on jurisdictional boundaries, outfitter areas, land claim area boundaries, multispecies management zones etc. In other areas, management units have been delineated based on biology/ecology (e.g., genetics, landscape features), and are thus more representative of biological grizzly bear population or subpopulations.

Management Strategies

A variety of management strategies are implemented across the range of grizzly bears. Most are based on tracking all human-caused mortality and managing mortality (e.g., harvest) based on knowledge of grizzly bear density and population growth.

Sustainable mortality rates are based on knowledge of population density/abundance, population growth, and mortality rates and causes. Information on population growth is often obtained using vital rates from radiotelemetry studies in which bears are tracked over time to gain insight into age-specific survival and reproductive rates. Demographic information was used to estimate sustainable mortality rates through modelling (see Harris 1984, and Harris 1986), and this has served as a base for how jurisdictions set sustainable mortality levels. Sustainable total annual human-caused mortality rates are generally between 3 and 8 percent of the total population size, depending on the quality of the habitat and with the assumption that mortality is predominately comprised of males (Miller 1990, Sidorowicz and Gilbert 1981, and Harris 1986). Sidorowicz and Gilbert (1981) suggested that adult total mortality should be limited to 5% and further limited to 2 to 3% if hunting of adult female grizzly bears is not restricted. The current mortality management system in Yukon is based on a sustainable mortality of 4% of the population (2% of the female population, and 6% of the male population); see Smith (1987) and Taylor *et al.* (1978) for population modelling that lead to these rates. Specific allowable mortality and harvest rates by jurisdiction are shown in Table 3.

Female mortality has a disproportionately higher impact on the grizzly bear population than male mortality. In all regions with legal harvest, female grizzly bears with cubs, and young grizzly bears (under two years of age or under a specified length) are protected (with the exception of isolated predatory control areas in Alaska; see below for further information). In addition, jurisdictions have regulations and management goals related to limiting female harvest to generally one third of the total allowable harvest.

Harvest management varies from region to region. Licensed hunting is not currently permitted in Alberta, BC, or within populations in the lower 48. The Greater Yellowstone Ecosystem subpopulation was delisted in 2017, then listed again in 2018. As a result, hunting of this population was anticipated to commence in 2018, managed by states, and in accordance with a Memorandum of Understanding specifying guidelines for harvest and harvest distribution between jurisdictions, but did not resume as a result of the relisting. Harvest has historically occurred in Alberta; however, a provincial grizzly bear hunting moratorium came into effect in 2006. Appendix 1 of the Alberta Grizzly Bear Recovery

Strategy outlines criteria that must be met before harvest can resume (Alberta Sustainable Resource Development, Fish and Wildlife Division 2008).

The BC government terminated grizzly bear trophy hunting in late November 2017 (British Columbia Forests, Lands, Natural Resource Operations and Rural Development 2017a), and closed all resident and non-resident hunting in mid-December 2017 (British Columbia Forests, Lands, Natural Resource Operations and Rural Development 2017b). Prior to the closure, mortality rates ranged between 4 and 6 % (McLellan *et al.* 2016) and were set for each bear management unit. Limited Entry Hunts occurred in bear management units with stable grizzly bear populations larger than 100 bears, where permits were issued based on the target harvest rate and the average success rate in the area. Even prior to the licensed hunting closure, several management units within BC had conservation concerns and were closed to licensed hunting.

In Nunavut, there is a licensed quota of 20 bears (see Sheutiapik, Elisapee: 2018 letter from Minister of Environment to Acting Chairperson, Nunavut Wildlife Management Board). Average annual harvest (inclusive of subsistence harvest, sport harvest, and problem bear kills) has been below 2% and is considered sustainable (Nunavut Department of Environment 2017).

In Northwest Territories, hunting is restricted to the Inuvialuit Settlement Region, Gwich'in Settlement Area (GSA), and Mackenzie Mountains. Harvest within the Northwest Territories portion of the Inuvialuit Settlement Region is under quota, with Inuvialuit holding exclusive rights to harvest grizzly bears. Harvest in the GSA occurs by Gwich'in and is administered by an effective tag system. Quotas and tag systems for both areas account for harvest and other sources of mortality (e.g., defence of life or property kills). Northwest Territories residents are only permitted to harvest in the Makenzie Mountains, and there is a harvest limit of one grizzly bear in a lifetime. Non-resident hunting is limited to the Inuvialuit Settlement Region where the Inuvialuit harvest right can be transferred.

In Yukon, resident hunters are limited to one grizzly bear every three years, and the harvest by non-residents is managed using a quota system that accounts for other sources of mortality (e.g., resident harvest, vehicle kills, defence of life or property kills). In the Yukon portion of the Inuvialuit Settlement Region (Yukon North Slope), harvest occurs under a quota system whereby the Aklavik Hunter and Trapper Committee can impose local restrictions. The quota system accounts for other sources of mortality. Inuvialuit beneficiaries have a preferential right to harvest grizzly bears in the Eastern portion of the Yukon North Slope and an exclusive right to harvest bears within Ivvavik National Park and Herschel Island-Qikiqtaruk Territorial Park.

In Alaska, management regulations are set for each individual game management unit. In 1994, the Intensive Management Law came into effect, which required the Alaska Board of Game (comprised of citizens appointed by the governor) to identify and ensure the adequate and sustained harvest of ungulate

populations that are an important food source for Alaskans (see http://www.adfg.alaska.gov/index.cfm?adfg=intensivemanagement.main). As a result, there is some form of liberalized grizzly bear hunting in most management units; see Harper and McCarthy (2015). Liberalization of grizzly bear hunting takes various forms including: increased bag limits; lengthened season of harvest; allowing harvest at black bear bait stations; and waiving tag fees. In extreme cases of predator control, liberalization allows for harvest of females and dependent young as long as they are not young of the year; harvest using snares; and harvest at a bait station on the same day it was flown over as long as it was at least 300 m from the aircraft (Peltier 2015; also see Miller *et al.* 2017).

In most jurisdictions, total mortality is managed over a 3 to 5 year period (with some jurisdictions additionally reviewing harvest annually), where overmortality results in adjustments to permits/tags/quotas in subsequent years.

Jurisdictions differ in how mortality rates for management are defined. Not all rates below are inclusive of all types of human caused mortality (i.e., harvest, defence of life or property kills, motor vehicle accident kills, illegal harvests, wounding loss, etc.). See footnoted references for more detail.

Photo: Government of Yukon

	Jurisdictional mortality rates for management (% of population, unless specified)	
	Total	**Female**
Yukon	4%	2% of female population
British Columbia	Currently 0%; prior to closure: 6% maximum allowable mortality rate[1] (unless written rationale is available and supports the use of a higher or lower maximum allowable mortality rate)	2018: 0% 2017 and prior: 30% of the allowable mortality rate[1]
Northwest Territories*	Differs by region: For ISR[2] and GSA3[3]: 3% of grizzly bears 2 years of age and older For Mackenzie Mountains: no identified mortality rate, however, there is a lifetime harvest limit of one grizzly bear for resident hunters[4]	33% of quota female (in ISR[2] and GSA[3])
Nunavut	Assumes a sustainable harvest rate is 2%[5]	No identified rate; male grizzly bears represent 80% of harvest[5]
Alberta	0%	
Alaska	2 to 8%[6]; however harvest often managed based on target average age of harvest and female to male harvest ratios[7]	
Lower 48	0%; however, harvest in 2018 is possible because the Greater Yellowstone Ecosystem subpopulation is no longer listed. Identified mortality rates are inclusive of natural and human caused mortality[8], and differ by estimated size of the population[9]; Mortality limits for independent female, independent male, and dependent young at < 7.6%, < 15%, and < 7.5% respectively for grizzly bears ≥ 2 years[10]	< 7.6% (mortality rate)[9]

Table 3. *Jurisdictional mortality rates used for grizzly bear management. .*

1 British Columbia Ministry of Environment 2007.

2 Wildlife Management Advisory Council (North Slope) and Wildlife Management Advisory Council (Northwest Territories). 1998.

3 Gwich'in Renewable Resource Board, Ehdiitat Renewable Resource Council, Gwichya Renewable Resource Council, Nihtat Gwich'in Renewable Resource Council, Tetlit Gwich'in Renewable Resource Council. 2000.

4 Government of Northwest Territories 2017.

5 Nunavut Department of Environment 2017.

6 Harper and McCarthy 2015.

7 Note that in Alaska there are various management targets, however, most do not involve a percentage of the population. Many specify a minimum average age of harvest or minimum average skull size, which would correspond to age, a specified percentage of the harvest to be males, etc. There are various areas within various management units in which hunting is liberalized.

8 Total mortality rates include mortality that is human caused, natural and undetermined causes (reported), and calculated unknown and unreported.

9 Mortality rates presented are for a population size < 674

10 Memorandum Of Agreement regarding the management and allocation of discretionary mortality of grizzly bears in the Greater Yellowstone Ecosystem among Wyoming Game and Fish Commission, Wyoming Game and Fish Department, Montana Fish and Wildlife Commission, Montana Fish, Wildlife and Parks, Idaho Fish and Game Commission, and Idaho Department of Fish and Game, signed August 8, 2016.

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Review of how grizzly bears are considered in environmental assessment

Presented by: Jalene Goorts and Nicole McCutchen, Fish and Wildlife Branch, Government of Yukon

Date: June 2017

A review of how Yukon and neighbouring jurisdictions (Northwest Territories, Alberta, British Columbia, and Alaska) consider grizzly bears in environmental assessments and other land use applications was prepared for the Grizzly Bear Conservation and Management Plan Working Group for the purpose of discussion and planning.

Part of the review was literature-based and part of it was based on jurisdictional interviews, where the following questions were asked:

1. What tools are available to consider grizzly bear impacts when reviewing proposed projects in an environmental assessment?
   - Legislation
   - Policy
   - Guidelines
   - Land use plans
   - Other
2. Are grizzly bears considered a valued component?
3. What type and/or scale of activities trigger comments for grizzly bears (e.g. size of project footprint, overlap with known important grizzly habitat, and status of the grizzly bear population, others)?
4. At what scale are grizzly bears approached in EAs?
   - Regional
   - Population
   - Home range
   - Watershed
   - Only in project footprint
5. Are cumulative impacts on grizzly bears or their habitat taken into account when making recommendations on specific projects that may affect grizzly bears?
6. Are there standard procedures for what/how baseline monitoring is conducted? Follow-up monitoring once development occurs?
7. Are there 'Best Management Practices' specific to mitigating impacts to grizzly bears and reduce the potential for human-grizzly bear conflicts. What are they?
8. DO BMPs become part of the permit conditions? If so, what aspects/portions of the BMPs are permit conditions?
9. Compliance and Enforcement: Are permit conditions being followed? Are they monitored? Are the enforced?
10. What are the realities of the process? What works well? What could be changed?

The document produced was not intended for distribution outside of the working group so remains an internal document.

Review of human-grizzly bear conflict

Presented by: Heather Milligan, Fish and Wildlife Branch, Government of Yukon

Date: January 2016

A review of the policies and procedures that Yukon and neighbouring jurisdictions (Alberta, British Columbia, Northwest Territories, and Alaska) use to guide responses to human-grizzly bear conflicts was prepared for the Grizzly Bear Conservation Plan working group.

Part of the review was literature based and part of it was based on jurisdictional interviews, where the following types of questions were asked:

1. What policies/directives are in place to manage response to human-grizzly bear wildlife conflicts?
2. Does the policy apply province/state-wide or vary by region?
3. Who responds to the conflicts and makes the decisions regarding the response?
4. What types of human-wildlife conflict apply?
5. What process guides how to respond to the conflict?
6. What are the range of options used to respond to the conflict?
7. When are relocation and lethal removal used as responses to the conflict?

The document produced was not intended for distribution outside of the working group so remains an internal document.

PREVIOUS RESEARCH UPDATES

The Government of Yukon, with assistance from its management partners, completed two recent grizzly bear population studies—one in the Yukon North Slope (far north of Yukon), and a second in the Southern Lakes region (southwest Yukon). Summaries of the findings from both of these reports are included here, however full reports are also available on the Government of Yukon website.

Yukon North Slope Grizzly Bear Project 2004 – 2010: Summary

Prepared by: Nicole McCutchen, Fish and Wildlife Branch, Government of Yukon

Why did we do the project?

In 2002, members of the Aklavik Hunter and Trappers Committees (HTC), the Wildlife Management Advisory Council (North Slope), Government of Yukon and Parks Canada met to discuss needs for managing grizzly bear populations in the Yukon portion of the Inuvialuit Settlement Region. Members of the Aklavik HTC felt that there was a need to update population estimates for the Yukon North Slope. The *Yukon North Slope Research and Monitoring Plan* and the ***C****o-management Plan for Grizzly Bears in the Inuvialuit Settlement Region, Yukon and Northwest Territories* also indicated a need to update population estimates for grizzly bears, and to review harvest rates using population-specific information.

We went about this in two ways. A field study to estimate the population size and trend was initiated in 2004 and completed in 2010. A local and traditional knowledge study was completed in 2008 that described many aspects of grizzly bear biology and hunting on the Yukon North Slope (YNS). The results of these research projects were meant to provide the Inuvialuit with the information needed to make the best use of grizzly bears, help develop appropriate management strategies that allow sustainable quotas, and ensure long-term survival of grizzly bears on the YNS.

How did we study the grizzly bear population?

Where did we look?

Our core study area centered on the Babbage River Drainage of the YNS and included a large portion of the area where Inuvialuit hunt grizzly bears (Figure 1). The study area also encompassed portions of Ivvavik National Park. This helped us understand the movements of grizzly bears across the Park boundary, and enabled us to evaluate the harvest quotas inside and outside of the Park. The core study area was ~5,000 $km^{2.}$

Are there differences in the population across the Yukon North Slope?

Previous work in the 1970s identified grizzly bear densities that differed across the Yukon North Slope depending on the area. Previous work showed the British Mountains had more grizzly bears than the Barn Mountains. Fewer grizzly bears were found along the Coastal Plains. We used this information when we set up the study to ensure we included each of these

three areas in our study area (Figures 1 and 2).

Another factor which affects the distribution of grizzly bears is Porcupine caribou, which calve on parts of the YNS in June. We considered this in our study as well (Figure 3).

How did we count the grizzly bears?

We divided the core study area into 107 squares (Figure 4). We put one barbed wire hair collection station in each cell (Figure 5). At each station we put some sticky, smelly liquid lure in the middle. We used a liquid lure because they are easy and fast to install and grizzly bears cannot eat them (they can only smell the bait). Once we put some lure at each station we left them for ten days. Grizzly bears would come to the station to investigate the lure and they would leave hair on the barbed wire as they passed in and out of the station. We did this three times in a row, or 3 'sessions', between the beginning of June and end of July in each of 2006 and 2007.

There is DNA in each hair sample a grizzly bear leaves at a station. DNA is like a fingerprint for the grizzly bear. We can use it to identify individual grizzly bears, and learn how many grizzly bears visited the station and when. We determine how many new grizzly bears we got in each 'session' and compared that number to the number of grizzly bears we caught in previous sessions. This way of counting grizzly bears is known as a mark-recapture analysis.

How do we know if the population is changing?

Counting tells us how many grizzly bears there are but it does not tell us if the population is going up, going down or staying the same. To look at whether the population was changing, we captured and collared 60 grizzly bears in the study area (41 females and 19 males) and followed 10 to 35 grizzly bears per year between 2004 and 2010. We followed these grizzly bears to see if they lived, how many cubs they had, and if the cubs lived or died. We looked at all of this information to determine if the population was changing or if it was staying the same.

What did we find?

What did local and traditional knowledge tell us about grizzly bear populations on the Yukon North Slope?

Interviews in the mid-2000's found that different opinions existed on the current number of grizzly bears on the YNS. Most people interviewed felt that numbers were stable over the previous 20 years. Nobody interviewed felt numbers were too low or the population was in any danger. Some thought that numbers may have increased. There were some concerns about over-harvest and removal of all the large male grizzly bears in some areas such as the Richardson Mountains. Silvertip grizzly bears were seen regularly around Qikiqtaruk.

How many grizzly bears were in the study area?

We collected many hair samples over the two years we did the hair collection study. From these samples, we identified 177 individual grizzly bears. Between 87 and 104 of those grizzly bears spent most of their time in our core study area. Of those grizzly bears, slightly more than half were female. Population estimates vary because of the different factors that affect grizzly bear distribution and abundance from year to year. For example, grizzly bear numbers were always higher in some parts of the study area (the British Mountains within Ivvavik National Park) and were correlated with caribou numbers (more caribou meant more grizzly bears). These factors affect estimates of the number of grizzly bears in the study area.

The density of grizzly bears was highest in the British Mountains (~43 to 54 grizzly bears/1000 km^2), followed by the Barn Mountains (~10

to 18 grizzly bears/1000 km2) and Coastal Plains (~10 to 12 grizzly bears/1000 km^2). Estimates are given as a range because they differed between the 2 years of the study.

How did you go from the number of grizzly bears in your study area to the number of grizzly bears for the entire YNS and Ivvavik National Park?

Our work showed there was a difference between the number of grizzly bears in the British Mountains, Barn Mountains, and Coastal Plains (Figure 2). We also found the presence of the Porcupine caribou influenced the density of grizzly bears (Figure 3). By pulling this information together, we were able to predict the total number of grizzly bears for the entire Yukon North Slope and Ivvavik National Park.

How many grizzly bears are found in the YNS and in Ivvavik National Park?

The low estimate for the number of grizzly bears living in the YNS is 290; the high estimate is 431. However, grizzly bears were not found evenly over the North Slope; our study indicates 69% or more of the population was located in Ivvavik National Park (low estimate: 211 grizzly bears; high estimate: 298 grizzly bears). Most of these grizzly bears are in the mountains).

Is the population going up, down, or staying the same?

Local and traditional knowledge and initial analysis of population information stemming from collared animals suggests the population was stable at the time of the study (or was fluctuating around the same size).

We weren't surprised by the number of grizzly bears we found; it was expected based on the food sources available. We expect the population will go up or down over short periods depending on short term changes in food supply (e.g., how many caribou are around or changes in weather that affect plant growth).

We found that adult females had a very high rate of survival during the study. However, cubs had very poor survival. Because so few cubs are surviving in the population, it is important that adult females continue to live a long life. This helps to ensure enough young grizzly bears are entering the population to keep it stable.

What does this mean for the grizzly bears on the North Slope?

Can we compare this work to previous work on grizzly bears in this area?

It is difficult to compare the estimate from this study with the work from the 1970s, partly because the study approach was much different and partly because of the amount of time between studies (decades).

What does it mean for harvest?

Setting a sustainable harvest includes consideration of other things that can affect the survival of grizzly bears. There is little to no human development in YNS and much of the grizzly bear habitat in the YNS is protected by Ivvavik National Park, Herschel Territorial Park, or the withdrawal order. There are also few human-grizzly bear conflicts (and few defence of life or property kills) and very few female grizzly bears are harvested. As a result, there are currently low human impacts on grizzly bears. We believe this means that the population can sustain a harvest.

However, harvest must be closely managed. Although the population is likely stable, the population size estimate for YNS is uncertain; we've tried emphasizing this by reporting it as a low (290) and high (431) estimate.

The two population size estimates, low numbers of young entering the population, and the general sensitivity of grizzly bear populations to harvest means we have to be careful about not letting harvest or other human activities lead to a decline. It also means we need to remain vigilant for other factors that may affect grizzly bear numbers, such as changes in food sources, or climate related impacts.

How is harvest managed within other parts of the Yukon?

Sustainable harvest rate recommendations in other jurisdictions vary, depending on grizzly bear population status and management objectives. Based on early work on the YNS and results from elsewhere in North America, the Government of Yukon recommends a harvest rate of up to 4% of the total population size, 2% of the female population, and 6% of the male population.

How many grizzly bears do Inuvialuit usually harvest on the Yukon North Slope?

Inuvialuit harvest on average 5 grizzly bears on the Yukon North Slope each year, although harvest has ranged between 1 and 8 grizzly bears since 1990 (Figure 6). Traditional knowledge interviews completed in the 2000s indicated that spring conditions affects the number of grizzly bears harvested in a given year which likely explains some of the changes in harvest from year to year.

How many grizzly bears can be harvested on the Yukon North Slope?

This is a difficult question and really is about how much risk we want to take when managing this population. Due to factors described above, it must be remembered that there are two estimates of population size and that the population may be slow to recover from any overharvest and other mortality sources. Using the conservative (low) estimate will help ensure the grizzly population does not decline outside of its natural range, given the available habitats, while still providing Inuvialuit with opportunities to harvest. Table 1 describes the number of grizzly bears that may be taken within the entire Yukon North Slope, depending on population size, and describes different levels of risk while assuming female harvest remains low. In this case, risk is from uncertainty in the size of the population and is linked to how much harvest is desired.

What new things did we learn?

The main thing we learned from this work is that the grizzly bear population on the Yukon North Slope is healthy and apparently stable—this is a good place to be a grizzly bear.

We also learned that grizzly bears are not evenly dispersed in the Yukon North Slope—more grizzly bears are in Ivvavik National Park than the coastal area and the eastern area.

Adult survival is good in this population, but young grizzly bear survival is lower, likely due to the amount of grizzly bears out there—this is as it should be. It indicates that we have about the right number of grizzly bears for the available habitat.

Although the population is healthy, we still need to exercise caution in our approach, so that our actions don't cause a change in this situation. Female harvest, for example, must continue to be low.

We estimated population size for the YNS and INP, which are larger than the smaller area that was studied. We landed on a low and high population estimate, which can be used by managers to consider risk to the population when making management decisions.

Table 1. Yukon North Slope population estimates and harvest rates ranging from 2 to 4% for both population estimates. The current quota for the Yukon North Slope is 11 grizzly bears. In the ISR, the sustainable harvest rate for grizzly bears is up to 3% of grizzly bears age 2 years or older, where maximum 1/3 of the harvest is female. The quota accounts for other sources of mortality (e.g., defence of life or property kills). In the rest of Yukon, up to 4% harvest of the total population size is generally considered sustainable for Yukon grizzly bear populations.

Population Size for Yukon North Slope		Percent of grizzly bears potentially harvested, given current quota	Approximate number of grizzly bears potentially harvested, given different harvest rates		
Estimate	Number of grizzly bears (confidence intervals)	% of grizzly bears	2%	3%	4%
Low	290 (235-358)	3.8%	6	9	12
High	431 (349-532)	2.6%	9	13	17

Table 1. *Yukon North Slope population estimates and harvest rates*

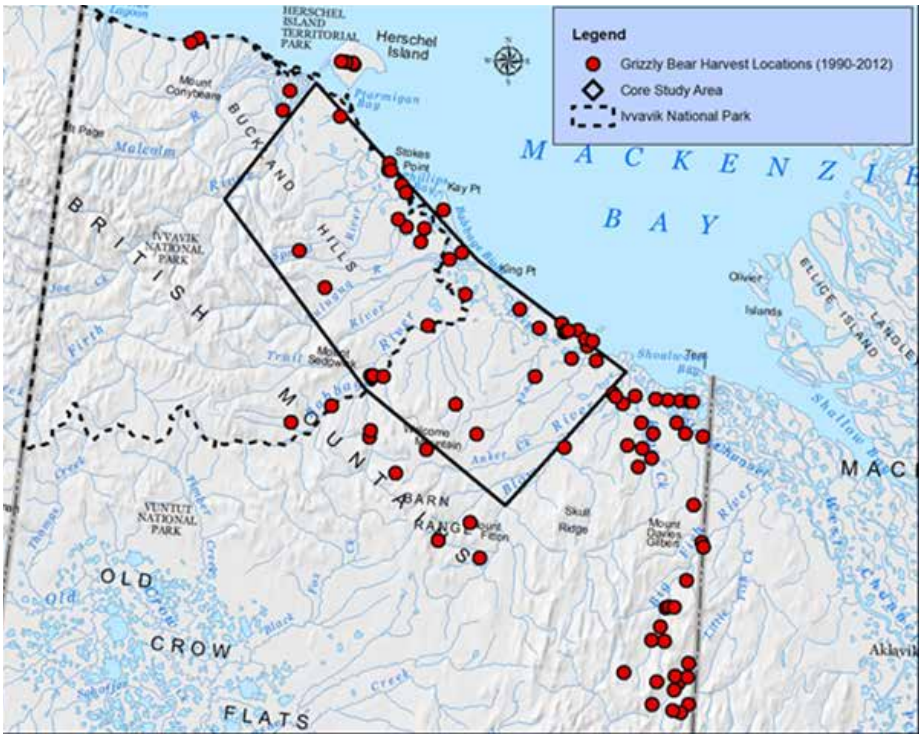


Figure 1. *The core study area relative to the distribution of grizzly bear harvest over the Yukon North Slope (1990 to 2012) and Ivvavik National Park.*

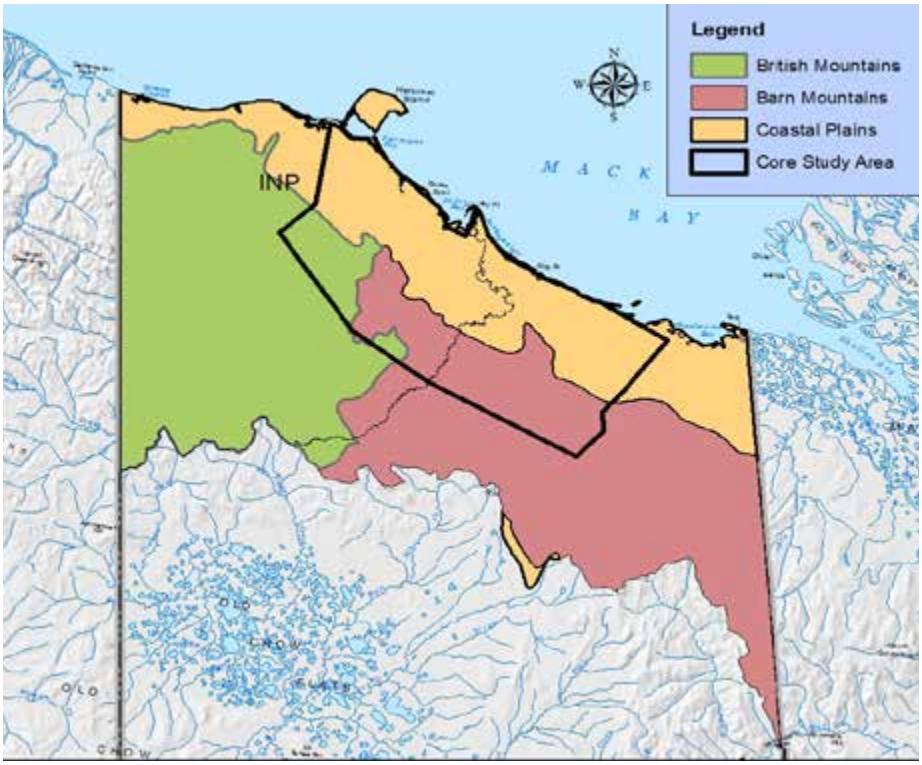


Figure 2. *The study area included 3 different groupings of habitats or ecodistricts: British Mountains; Barn Mountains; and the Coastal Plain. Density estimates varied for each ecodistrict.*

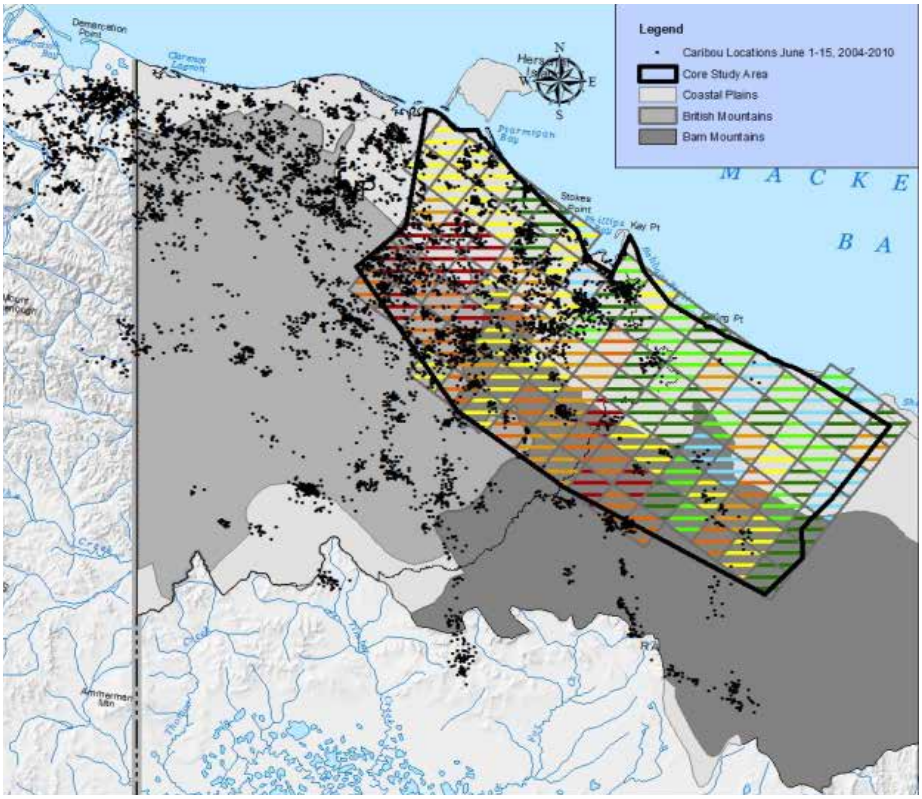


Figure 3. *Distribution of collared caribou during peak calving (1 June to 15 June) for the study years 2004 to 2010, in relation to intensity of hair snag events over the two sampling years (2006 and 2007). The redder the square means more grizzly bears visited that site.*

Figure 4. *The study area was centered on the Babbage River and extended from the Firth to the Blow Rivers. A grid was placed over the study area and divided up into cells. The red dots represent the locations of hair collection stations within each cell. Stations remained in the same location for the entire sampling season. Hair collection stations were moved to different locations in 2007 although they remained within the same cell.*

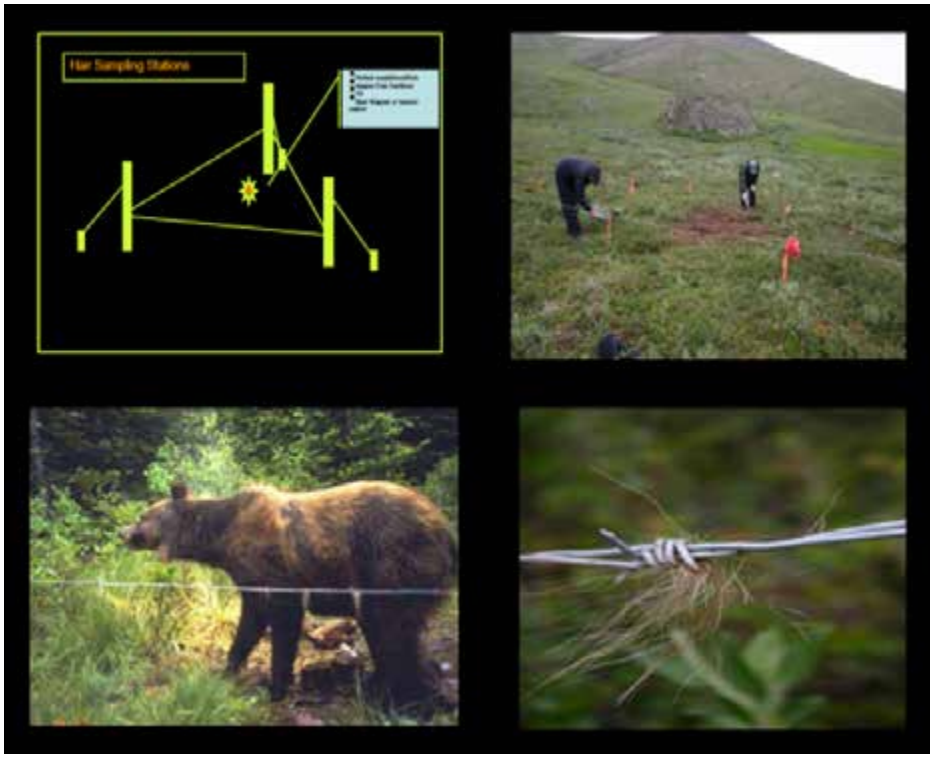


Figure 5. *To collect information on the individual grizzly bears in the region, we set up bait stations surrounded by barbed wire. Visiting grizzly bears leave hair on the barbs. From this hair, we identified which grizzly bear visited the site, which allowed us to understand how many grizzly bears were in an area.*

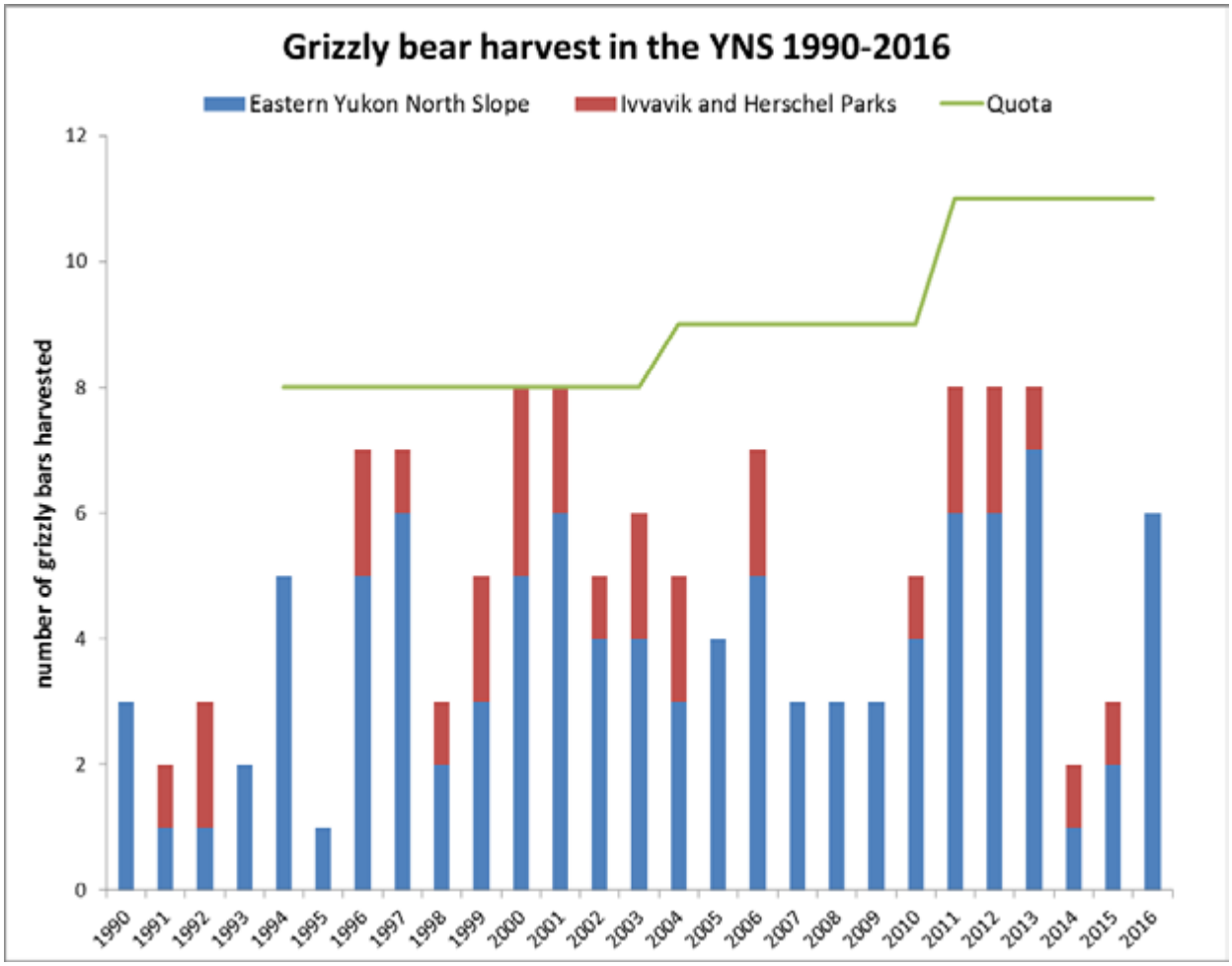
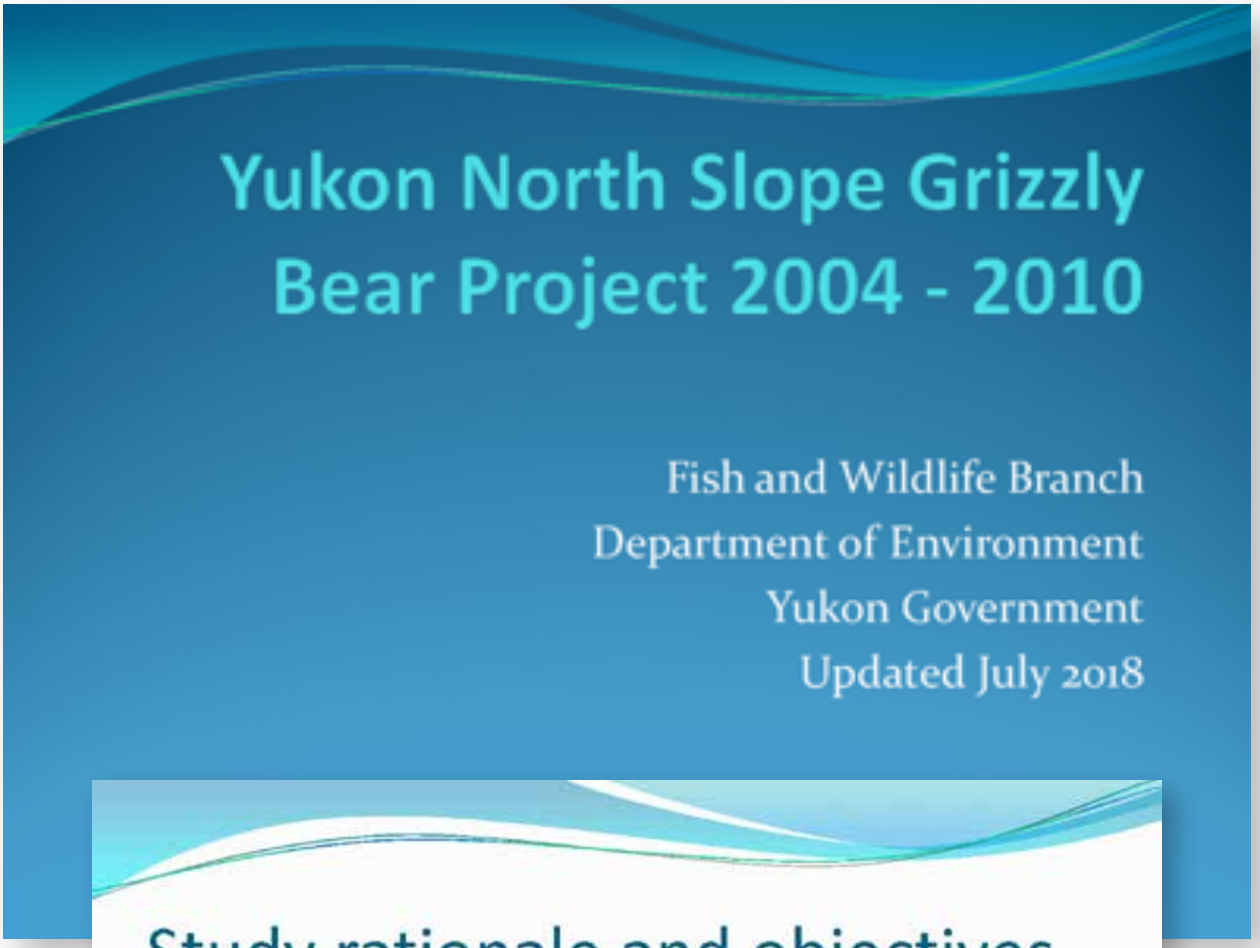
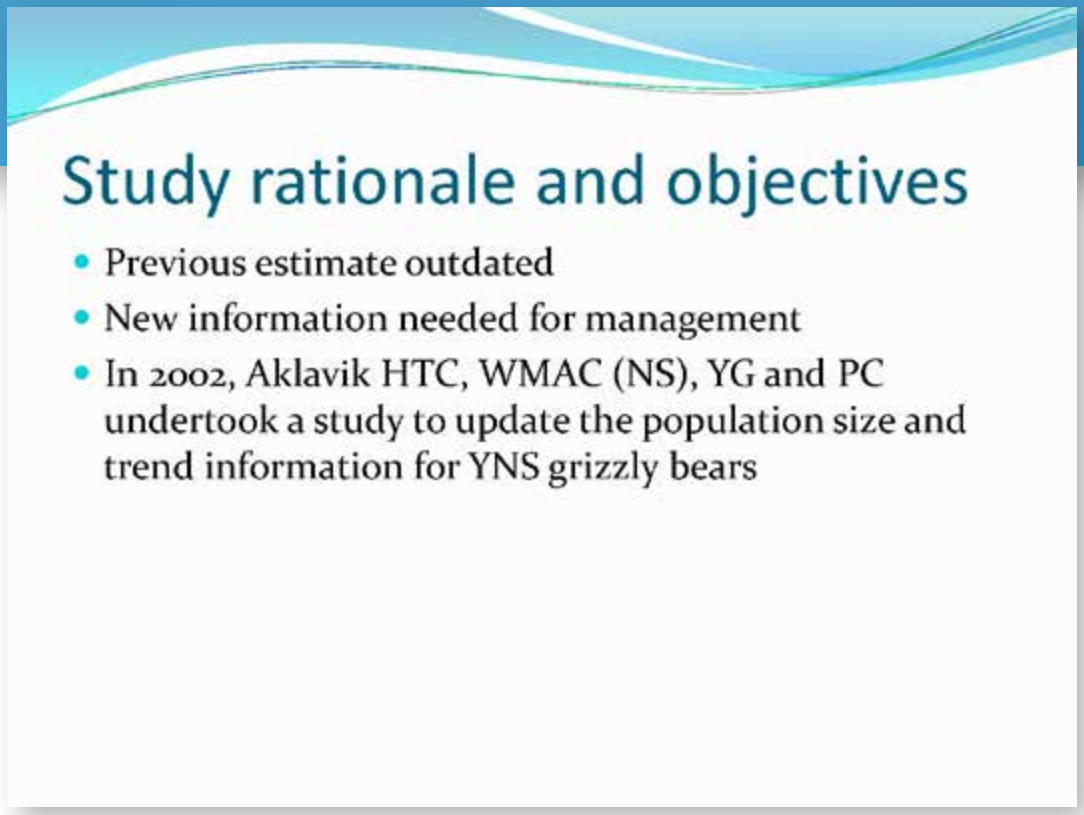


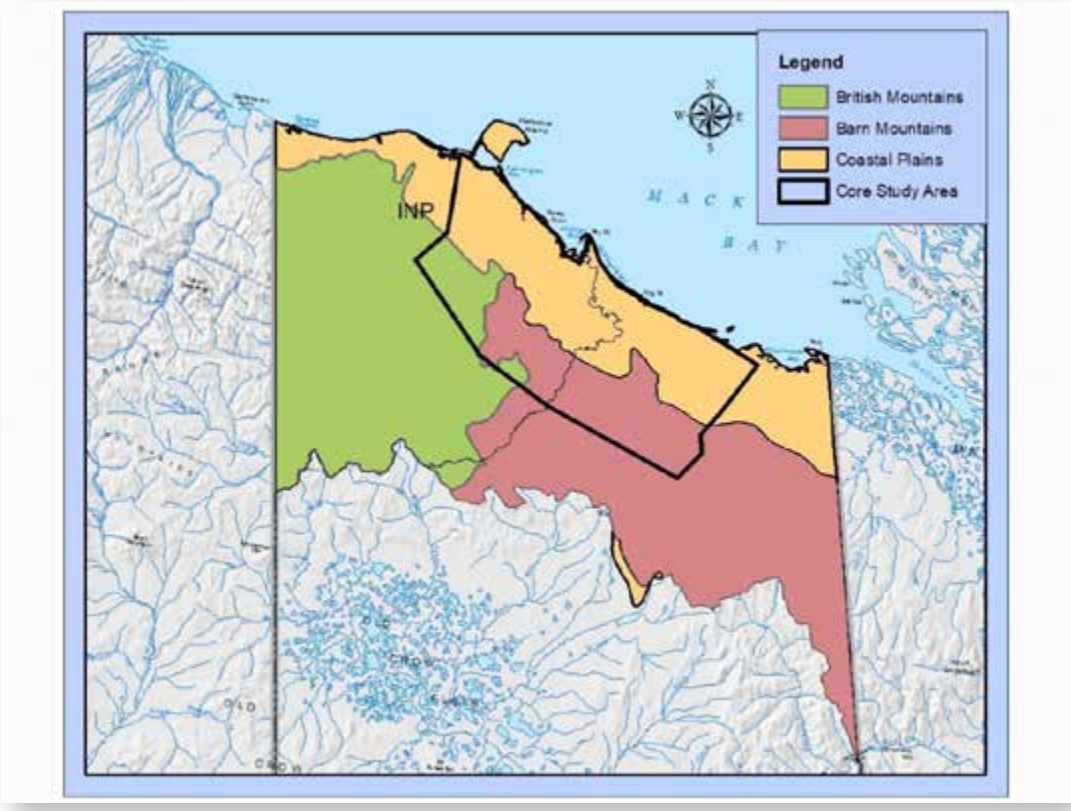
Figure 6. *Total number of grizzly bears harvested annually between 1990 to 2016 relative to the quota on the Yukon North Slope by harvest area (i.e., Eastern Yukon North Slope which is east of the Babbage, and in Ivvavik National Park and Herschel/Qikiqtaruk Territorial Park).*

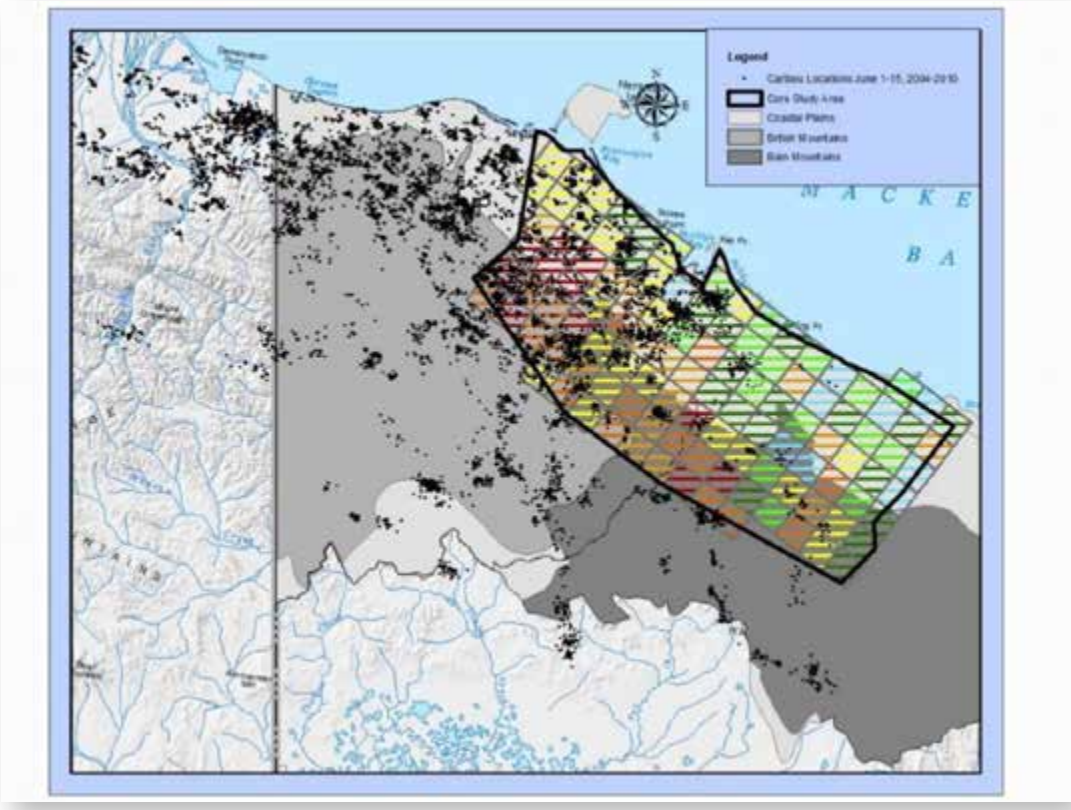
Yukon North Slope Grizzly Bear Project 2004 – 2010: Presentation

Prepared by: Nicole McCutchen, Fish and Wildlife Branch, Government of Yukon





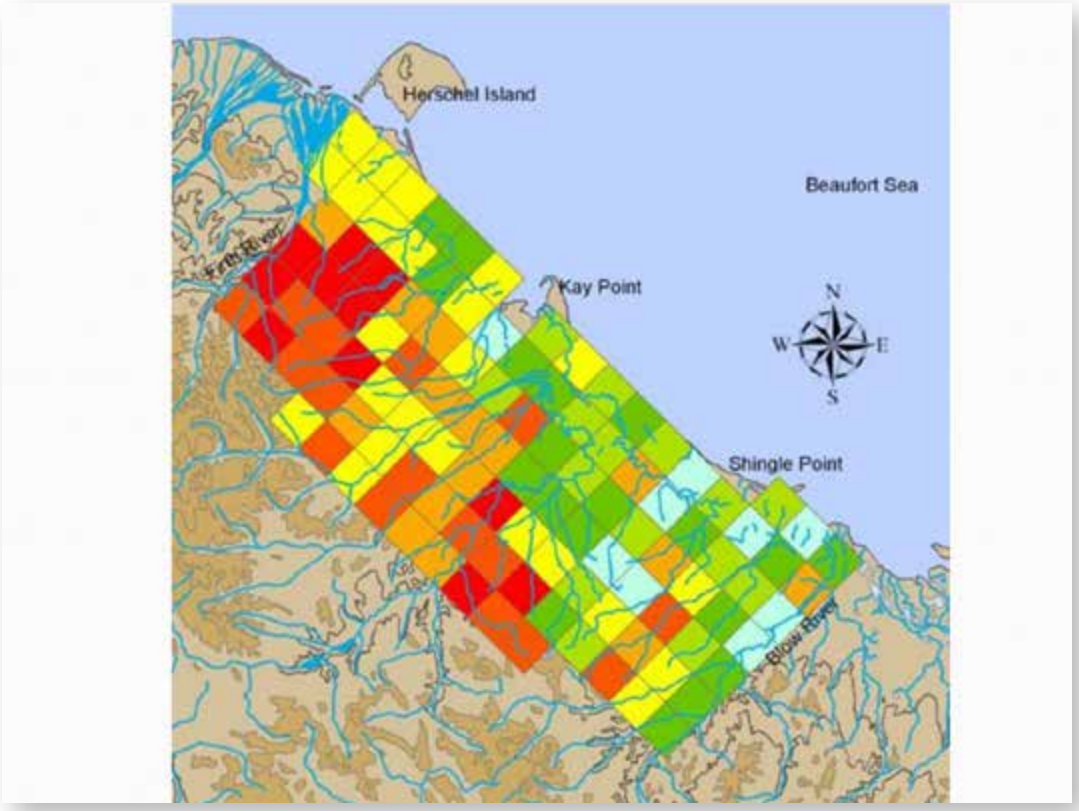

Legend
British Mountains
Barn Mountains
Coastal Plains
Core Study Area
INP
MACK
BAY


Legend
Core Study Area
Coastal Plains
British Mountains
Barn Mountains
MACKE
BA


Herschel Island
Beaufort Sea
Kay Point
Shingle Point
N
W
E
S


Population size (2006-7)


Trend info (2004-10)


Herschel Island
Beaufort Sea
Kay Point
Shingle Point
N
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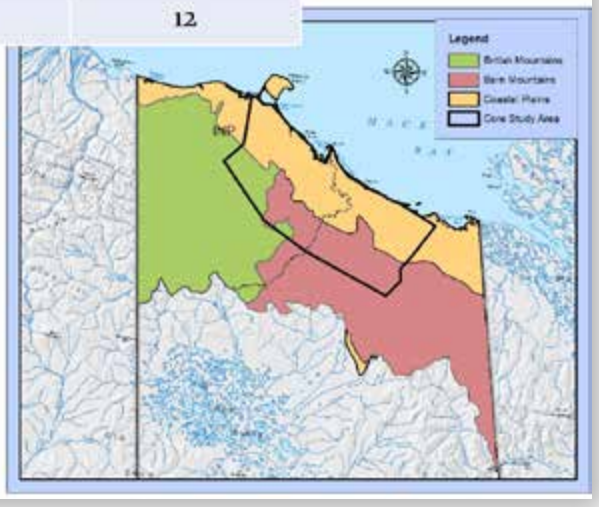
Density estimates varied

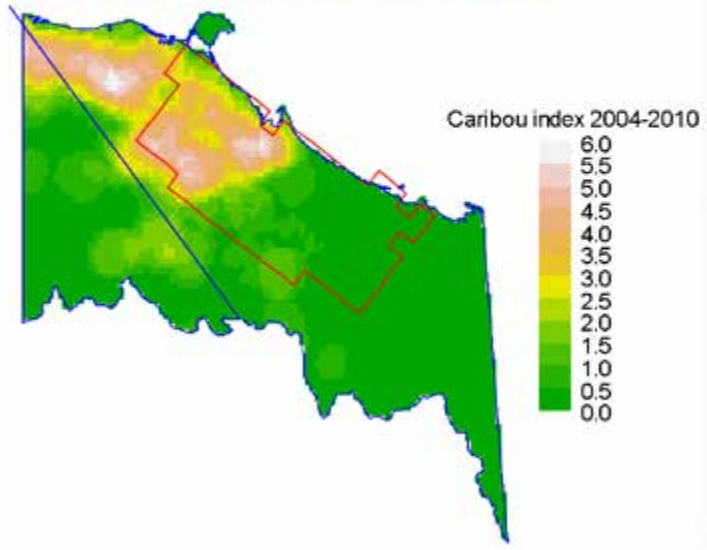
- Ecodistrict best explained bear density patterns in 2006

Ecodistrict	Density estimates in core study area (bears per 1000 km²)	
	Low estimate	High estimate
British Mountains	43	54
Barn Mountains	10	18
Coastal Plains	11	12

Ecodistrict	Density estimates in core study area (bears per 1000 km²)	
	Low estimate	High estimate
British Mountains	43	54
Barn Mountains	10	18
Coastal Plains	11	12



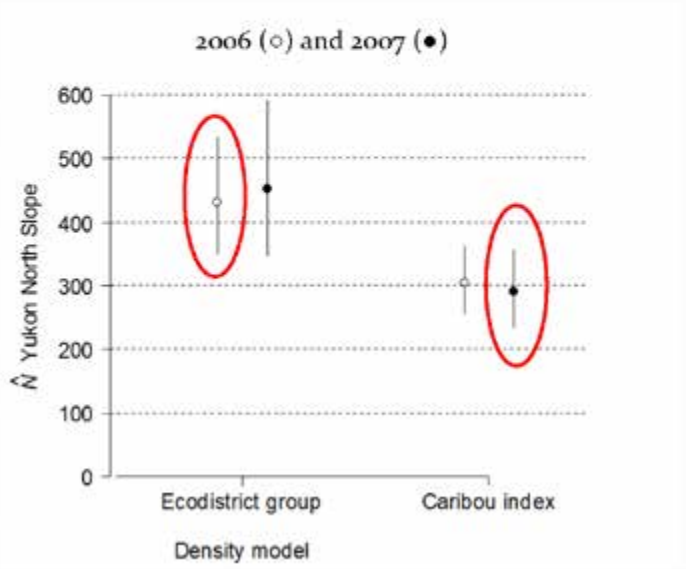
In 2007, it was caribou



Population size estimates

Area	Low estimate (95% confidence interval)	High estimate (95% confidence interval)
Core study area*	87 (72–106)	104 (85–128)
Ivvavik National Park (INP)	211 (173–258)	298 (224–395)
Entire Yukon North Slope	290 (235-358)	431 (349-532)

Area	Population size estimates
Yukon North Slope	Low: 290 High: 431



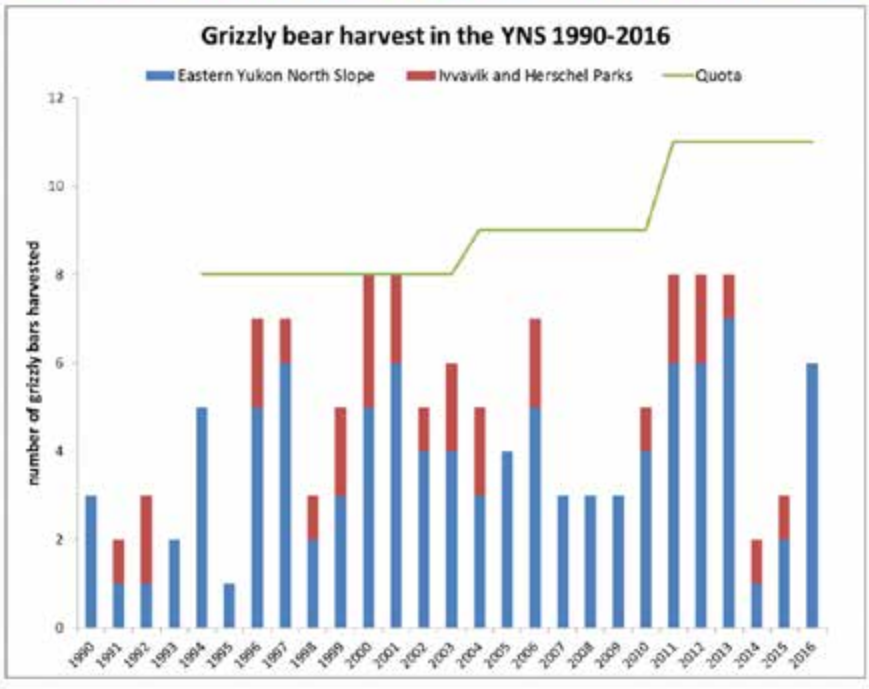
Trend

- Population appears stable - consistent with survival and reproductive rates
  - High female adult survival
  - Low cub and yearling survival rates

Next steps

- Revisit trend information to confirm preliminary analysis
- Finalize report

Harvest – below or at quota and mostly males



Harvest recommendations: things to consider

- Population information is limited but generally YNS is a good place to be a bear
- Bear populations are sensitive
- Amount of development (low)
- Amount of protected area (good)
- Other sources of mortality (low)
- Regularly monitoring bears is hard

Harvest scenarios (example)

Population size estimate for Yukon North Slope		Percent of bears potentially harvested, given current quota	Approximate number of bears potentially harvested, given different harvest rates		
Estimate	# of bears	% of bears	2%	3%	4%
Low	290	3.8%*	6	9	12
High	431	2.6%	9	13	17

*sustainable harvest rate in ISR is up to 3% of bears age 2 years or older, where maximum 1/3 of the harvest is female. The quota accounts for other sources of mortality (e.g., defense of life and property kills).

Grizzly bear population assessment in the Southern Lakes Region 2009 to 2016: Summary

Prepared by: Nicole McCutchen, Fish and Wildlife Branch, Government of Yukon

Why did we do this study?

This study was initiated following concerns about the status of the grizzly bears in the Southern Lakes Region and a formal recommendation from the Southern Lakes Coordinating Committee to inventory grizzly bears in the Southern Lakes Region[1]. Based on reported kills and estimated population size in the Bear Management Units (BMUs) where the study was located, male and female mortality was known to exceed sustainable rates in certain years (Figures 1 and 2). What was less clear were the long term implications of these occurrences on local grizzly bear populations, in part because there wasn't more recent information on population size and trend.

The Southern Lakes Region can be a challenging place for grizzly bears to live, as the region supports a large portion of Yukon's human population and has more disturbance, access, and development than other areas in Yukon. Grizzly bears are sensitive to human disturbance; they are also more likely to be killed in developed and populated areas as human-grizzly bear conflicts are more common and there is more harvester access into grizzly bear range.

What were the expected outcomes of this study?

- To verify the number of the grizzly bears within the study area using a DNA based approach.
- To verify if grizzly bears in the study area were stable, increasing, or decreasing, based on tracking of collared grizzly bears.

This information is important for determining if the current approach to grizzly bear management in the Southern Lakes Region is effective and sustainable.

What area did the study cover?

The study area covered 7,859km^2 in the Southern Lakes Region of Yukon and was bounded between Kusawa, Marsh and Tagish Lakes along the west and east (respectively), the Alaska Highway in the north, and the Yukon-British Columbia border in the south (Figure 3). The study area was also bordered by the communities of Carcross and Tagish, and Yukon's major population center, Whitehorse. This area overlaps with the Carcross/Tagish, Kwanlin Dun, Ta'an Kwäch'än, and Champagne and Aishihik First Nation Traditional Territories as well as the asserted Traditional Territory of the Taku River Tlingit First Nation.

1 Southern Lakes Wildlife Coordinating Committee. 2012. Regional Assessment of Wildlife in the Yukon Southern Lakes Region: Volume 1: Context and Recommendations. Environment Yukon, Whitehorse, Yukon 76 pp.

How did we count the grizzly bears?

We divided the study area into grid of 169 (7km x 7km) cells (Figure 3). Within each cell, we placed a hair-snag station consisting of a triangle of barbwire about 10m on each side, wrapped around trees or rebar, and suspended about 0.6m above the ground. We placed a 'smelly' liquid lure inside the triangle to attract grizzly bears to the station (Figure 4). The barbwire was used to snag hair from grizzly bears that visited the station (crossing over or under the wire). There is DNA in the hair samples a grizzly bear leaves at a station. We used it to identify individual grizzly bears, and learn how many grizzly bears visited the station and when.

We visited every station about 4 times each summer starting from mid-June to early August. During each visit we collected grizzly bear hairs from the barbwire and burned away the remainder to create a 'clean slate'. We also added more lure.

How many grizzly bears were in the study area?

From the hair samples collected from the DNA grid, we identified 75 individual grizzly bears in 2012 and 65 in 2013 (Table 1). Based on collaring information, we know that not **all** grizzly bears in the study area were detected on the DNA grid, so these numbers represent the minimum number of grizzly bears in the study area.

We used a method called DNA mark-recapture to estimate the number and density of grizzly bears within our study area. This method compares the number of new grizzly bears we detected in each session to the number of grizzly bears we caught in previous sessions. Based on our analysis, our conservative estimate of the number of grizzly bears in the study area is 82 (95% confidence interval of 69 to 97), or a density of about 11 grizzly bears per 1000km^2 (95% confidence interval of 9 to 13 grizzly bears per 1000km^2).

61% of grizzly bears in the study area were females. Unless there is information indicating otherwise, we assume a grizzly bear population is made up of 50% males and 50% females. Age cannot be determined from the hair samples so we don't know what proportion of the population is made up of cubs or subadults.

How does the new estimate compare to previous estimates?

Grizzly bear population sizes were estimated for individual ecoregions (areas of specific habitat types) in Yukon in the 1980s[1]. Estimates were based on expert opinion, interviews with outfitters/guides, and density estimates from other studies (mostly conducted outside of the Yukon). Loosely, this approach assumes more grizzly bears will be found in good quality habitats than moderate or poor quality habitats.

1 In 1985, work was completed to estimate grizzly bear abundance in a 6,310 km2 area in southwest Yukon (Coast Mountain Range). These preliminary results suggest 82 to 139 grizzly bears were in the area (average of 100), with a density estimate of 13 to 22 grizzly bears/1000 km2 (average of 16/1000 km2). Results were considered preliminary because of concerns over potential biases in the study.

The study area was predominantly located in two ecoregions: Yukon Southern Lakes (61% of study area) and Yukon-Stikine Highlands (38% of study area) (Figure 5). Using the ecoregion based approach, we previously estimated there were 144 grizzly bears in the study area (~19 grizzly bears/1000km^2); this is higher than the current DNA based estimate of 82 grizzly bears (~11 grizzly bears/1000km^2). This difference should not be interpreted as a decline as estimates were obtained using different approaches and are decades apart (meaning it is hard to infer trend). In addition, ecoregion based estimates represent how many grizzly bears an ecoregion is believed to support (the area's carrying capacity) and don't correct for factors that may reduce the actual number of grizzly bears in the ecoregion like land disturbance and human-caused grizzly bear mortality. That said, the results of this study suggest that ecoregion based estimates may need to be corrected in more developed and populated places like the Southern Lakes Region.[1]

How were grizzly bears distributed in the study area?

More grizzly bears were found at higher elevations (~19 grizzly bears/1000km^2 above 1250 m compared to ~6 grizzly bears/1000km2 below 1250 m). There are many possible reasons for this. For example, it could be a result of higher human disturbance at lower elevations and/or it could reflect higher food availability at higher elevations. There were no substantive differences in grizzly bear density between ecoregions or study years. These findings are specific to the study area so might not apply in other areas.

What is the population trend? Is the population stable, increasing, or decreasing?

In addition to the DNA mark-recapture study, we captured 39 grizzly bears (both males and females) in the Southern Lakes Region and fitted them with GPS collars. These collars tracked the locations of grizzly bears and let us know how, when and where they move throughout the landscape (Figure 6). We also tracked these grizzly bears to determine if they had lived or died, the cause of mortalities, how many cubs they had, and if the cubs survived.

We are still analyzing the collar and cub information, which will help us understand how the population is doing (that is, is it stable, increasing, or declining). One challenge we face is that a number of collared grizzly bears were involved in human-grizzly bear conflict and/or removed as defence of life or property (DLP) kills. We need to understand how this may affect our trend estimates before we can report on results as it is possible the collared grizzly bears don't accurately represent how the larger population is doing.

1 In the Yukon North Slope, which has little development and few people, ecoregion based estimates and DNA based estimates of grizzly bears were more similar (from Environment Yukon. 2016. Yukon North Slope grizzly bear population estimation and demographic analysis. Draft report. 74 pp.).

Mortality patterns

The study area primarily encompasses portions of the Southern Lakes and Arkell Bear Management Units (BMUs) (Figure 7). Outside of the Inuvialuit Settlement Region (ISR), grizzly bear mortality is managed within BMUs so population size is estimated for each BMU (calculated as the sum of grizzly bears estimated to be in each ecoregion within the BMU; Figure 7). For the most part, BMUs follow outfitter concessions boundaries. BMUs are administrative and aren't expected to represent biological populations.

Examining mortality patterns in different BMUS can help us understand how grizzly bears in a given area are doing. For example, Figures 1 and 2 tell us if mortality stemming from harvest, DLP kills, and other types of mortality like vehicle kills is sustainable (that is, mortality is 2% or less of the female population, 6% or less of the male population or 4% or less for the overall population). Minimizing female mortality is one of the main approaches for grizzly bear management in Yukon. Understanding what causes unsustainable mortality can inform management actions. An increase in DLP kills, for example, may mean more education is needed on waste management to reduce human-grizzly bear conflicts.

Over the last decade, average female mortality in the Southern Lakes and Arkell BMUs has predominantly been sustainable (Figures 1 and 2). Annual harvest sometimes exceeds sustainable limits in the Southern Lakes BMU but it isn't clear if some of the resident kills are actually DLP kills (a potential bias in our data, which makes decisions on appropriate management actions harder). DLP kills have increased in the Arkell BMU in the last few years. Mortality patterns in both BMUs will continue to be tracked; if sustainable mortality is regularly exceeded or exceeded to a substantive degree, management actions to reduce harvest and/or DLP kills will be needed.

What do we take away from this study?

Relative to the ecoregion-based estimate (144 grizzly bears), there are fewer grizzly bears in the study area (82), but it's difficult to tell if that means a decline in the number of grizzly bears given the different ways the estimates were obtained and the decades between estimates. The results of this study do suggest that ecoregion-based estimates need to be adjusted for the more populated and developed areas in Yukon.

What are the next steps for this study?

What we have now is a new estimate for the number of grizzly bears in the study area. We are currently undertaking some additional work to see if the collar and cub information can help us better understand how grizzly bears in the study area are doing (decreasing, increasing or stable).

We are also doing more work to understand if we are comfortable applying these results to areas outside the study area, include the entire Southern Lakes and Arkell BMUs. It is suspected that conditions for grizzly bears inside the study area (many people, lots of development/access, and lots of opportunities for conflict) may be different than outside the study area (fewer people, less development/access, and fewer opportunities for conflict) so study results may not be directly transferable. Our management partners' perspectives and knowledge will be important in helping us understand how to apply this new information.

Once this work is completed, current grizzly bear management approaches in the Southern Lakes will be revisited to see if they need to be modified. This could include things like adjustments to harvest and additional support for attractants management and public education so human-grizzly bear conflicts are minimized.

Acknowledgements

This study was done in collaboration with the Carcross/Tagish First Nations, Kwanlin Dun First Nation, and Ta'an Kwäch'än First Nation. The Southern Lakes Wildlife Coordinating Committee also provided direction for the study. Government of Yukon project leads were Ramona Maraj and Shelley Marshall.

A number of Fish and Wildlife staff and contractors assisted with field logistics and data collection for this project, including Julia Ahlgren, Ken Alderson, David Bakica, Dawn Barker, Al Baer, Matt Clarke, Rob Florkiewicz, Carol Foster, Lloyd Freese, Bruce Hanbridge, Jane Harms, Aaron Koss-Young, Ken Knutson, Lars Jessup, Peter Knamiller, Mike Martin, Tess McLeod, Angela Milani, John Postma, Ken Reeder, Raphael Roy-Jauvin, Kyle Russell, G. Sander, Kelsey Tousignant, and Delmar Washington (apologies to anyone we've missed).

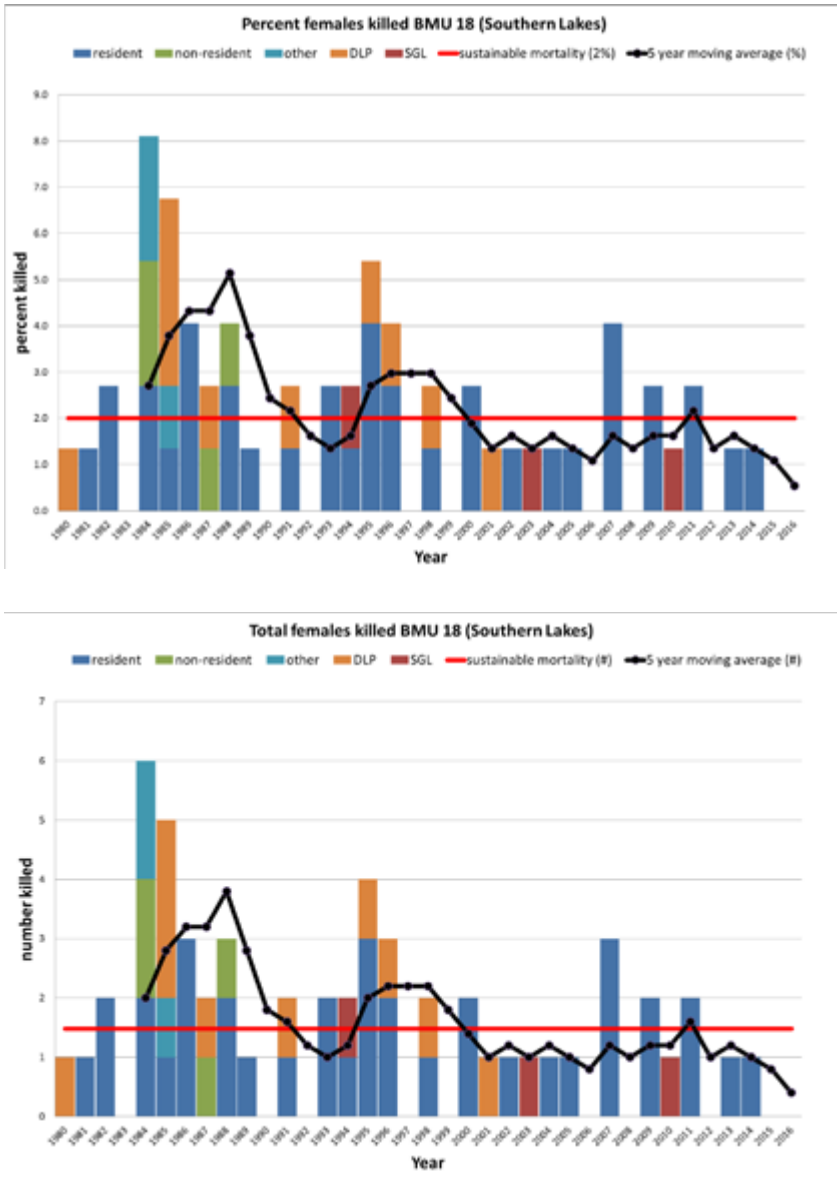


Figure 1. *Percent of female and male grizzly bears killed in the Southern Lakes BMU. Annual mortality rates are based on ecoregion-based estimates of population size and do not include updated information from the 2012/13 DNA population study. The red line is the sustainable mortality rate for female grizzly bears (2%) or male grizzly bears (6%); the black line represents mortality averaged over successive 5 year periods. The different coloured bars represent different types of mortality.*

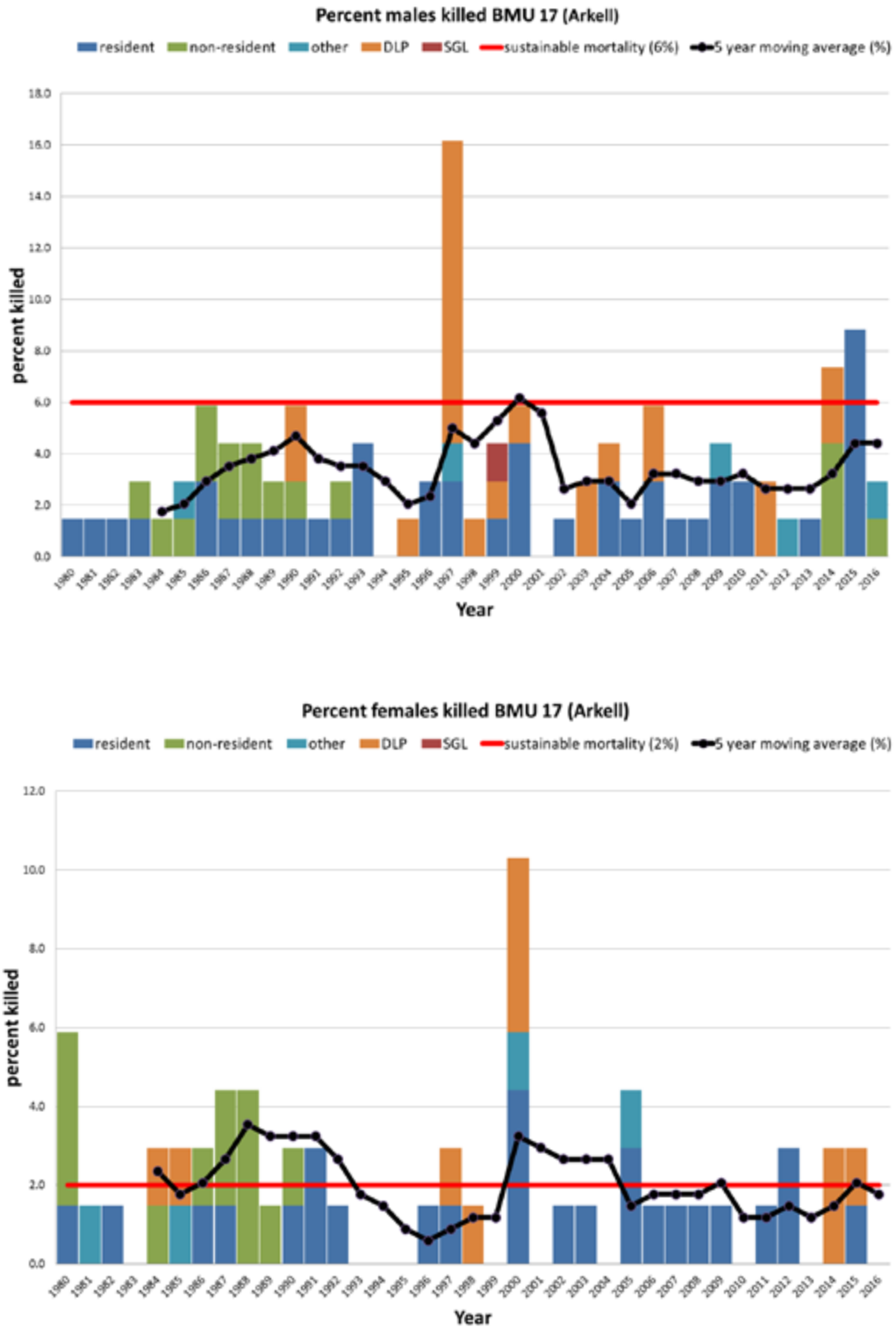


Figure 2. *Percent of female and male grizzly bears killed in the Arkell BMU. Annual mortality rates are based on ecoregion-based estimates of population size and do not include updated information from the 2012/13 DNA population study. The red line is the sustainable mortality rate for female grizzly bears (2%) or male grizzly bears (6%); the black line represents mortality averaged over successive 5 year periods. The different coloured bars represent different types of mortality.*

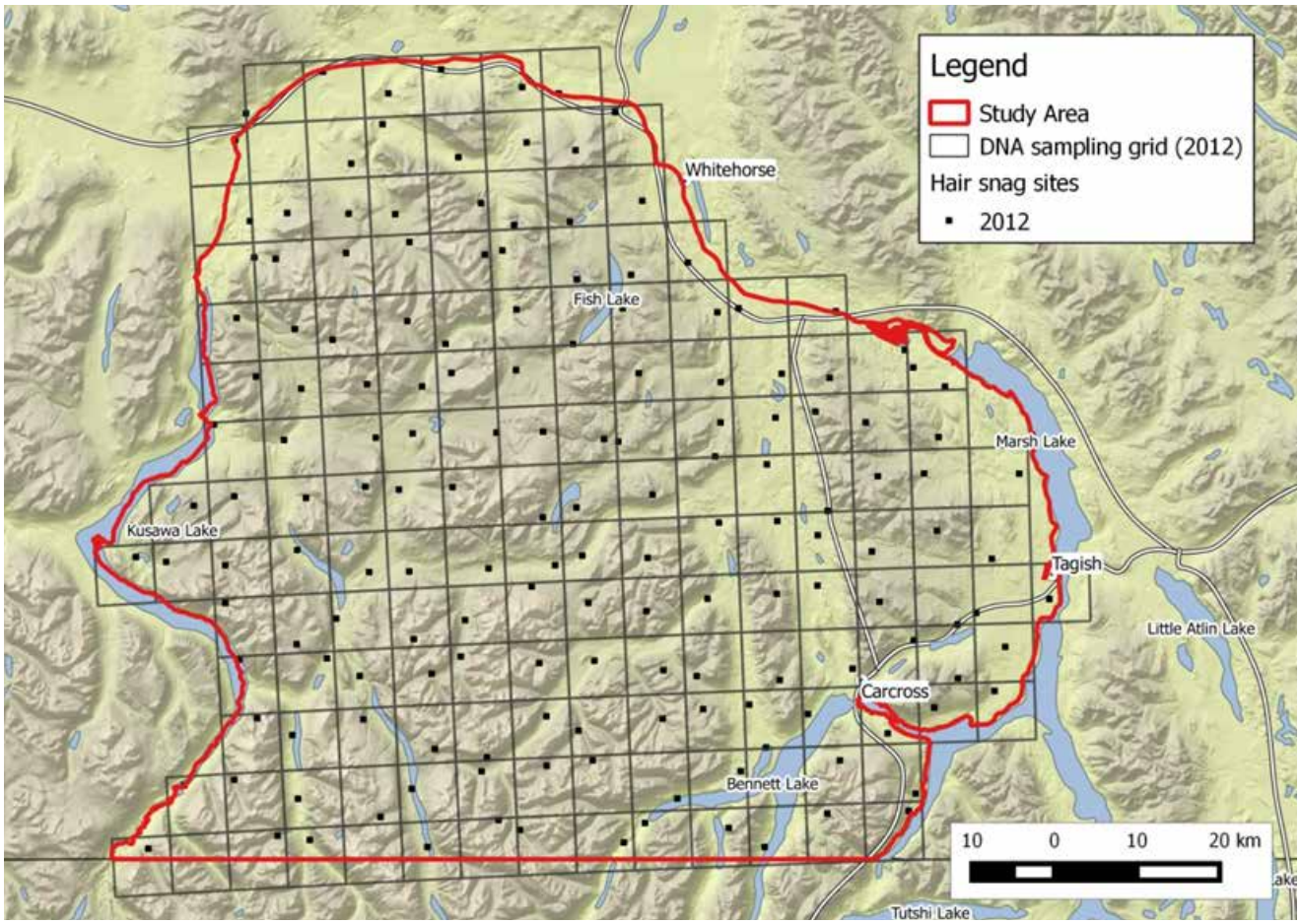


Figure 3. *The Southern Lakes grizzly bear study area 2012/13 (solid red line) and sampling grid. Hair snare stations are shown for 2012 (n = 169). The southern boundary is the Yukon-British Columbia border.*

Figure 4. *Grizzly bears visiting hair-snag station (top), leaving samples of hair snagged on the barbwire (bottom).*

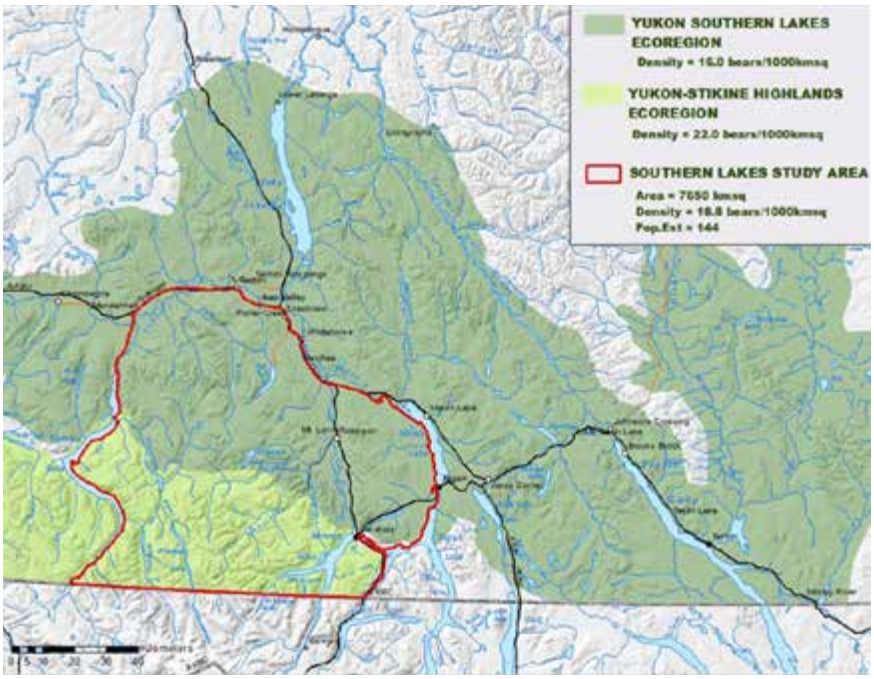
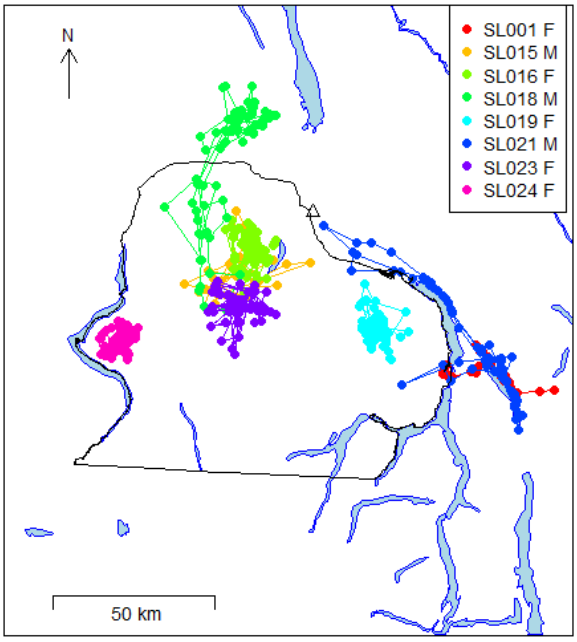


Figure 5. *Ecoregion-based grizzly bear density estimates (approximate) for the Yukon Southern Lakes ecoregion and the Yukon-Stikine Highlands ecoregion. Density and population estimates for the Southern Lakes study area were calculated from the area of overlapping ecoregions and the ecoregion densities. They do not include updated information from the 2012/13 DNA population study.*

a. 2012



b. 2013

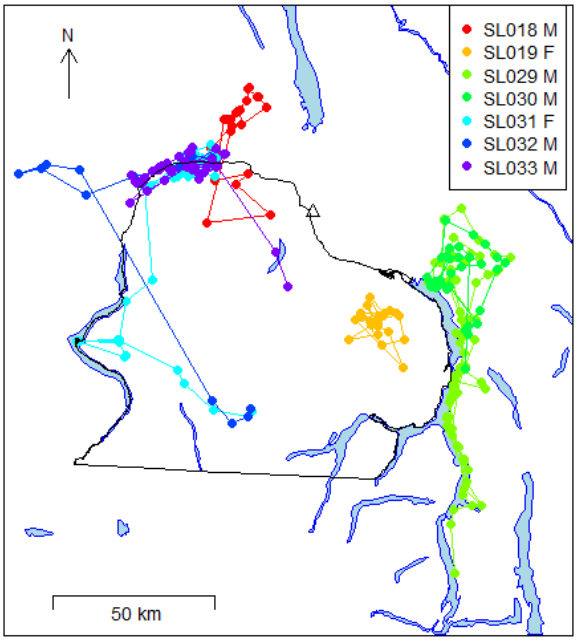


Figure 6. *Examples of movements of individual grizzly bears collared during the study period (maximum 1 fix per day). Locations are from June to August. SL031, SL032 were relocated and returned to their initial location. Δ indicates Whitehorse.*

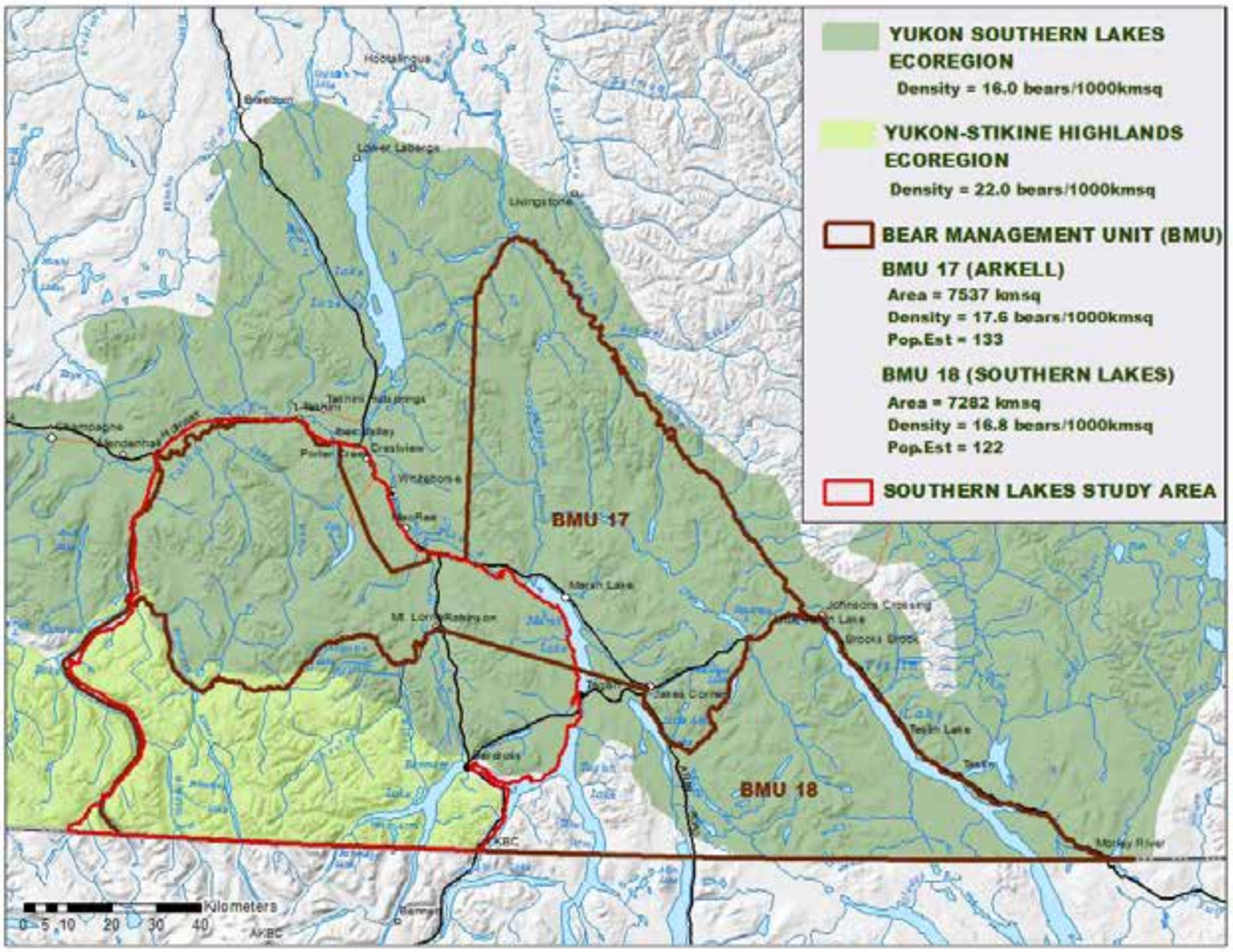


Figure 7. *Grizzly bear density and population estimates for Bear Management Units (Arkell BMU 17 and Southern Lakes BMU 18) overlapping the Southern Lakes 2012/13 study area. Density and population estimates for the BMUs were calculated from the area of overlapping ecoregions and the ecoregion densities. They do not include updated information from the 2012/13 DNA population study.*

Number of grizzly bears detected	2012	2013
Female	40	38
Male	35	27
Total	**75**	**65**

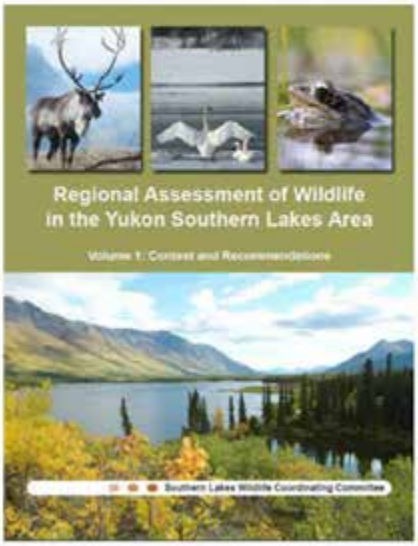
Table 1: *Summary of the number of individual grizzly bears detected at hair snares in the study area.*

Grizzly bear population assessment in the Southern Lakes Region 2009 to 2016: Presentation

Presented by: Nicole McCutchen, Fish and Wildlife Branch, Government of Yukon

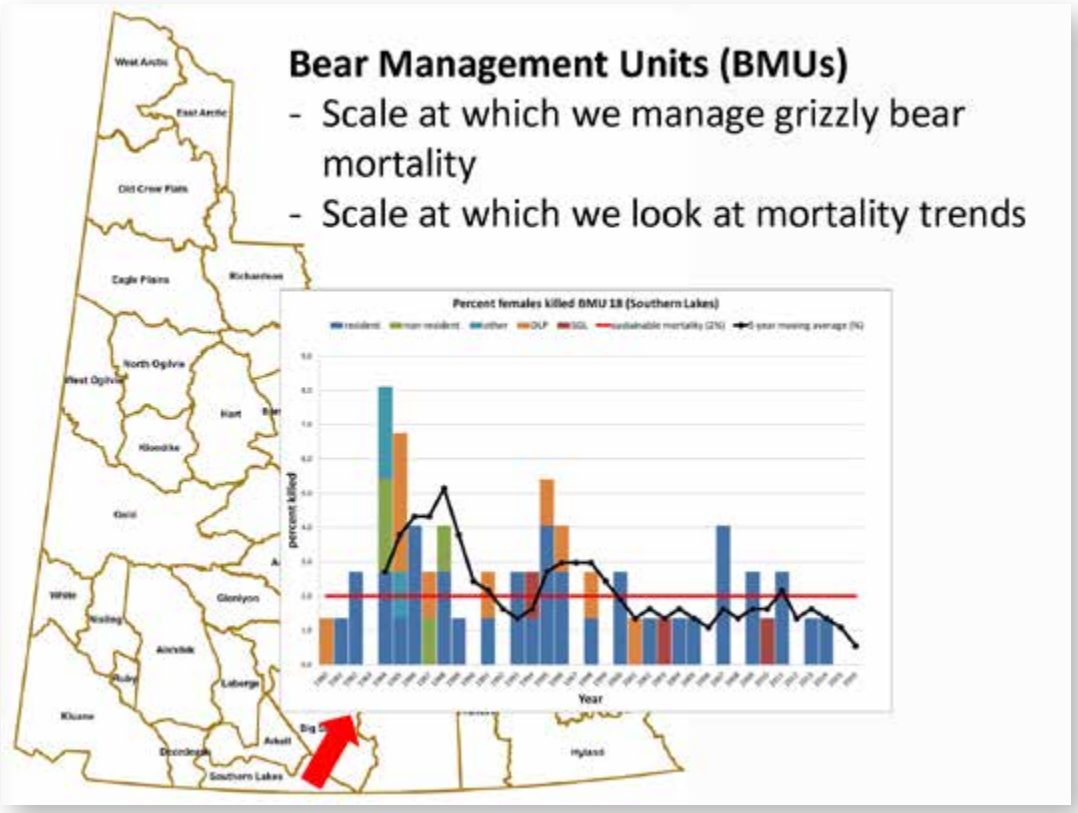
Study rationale

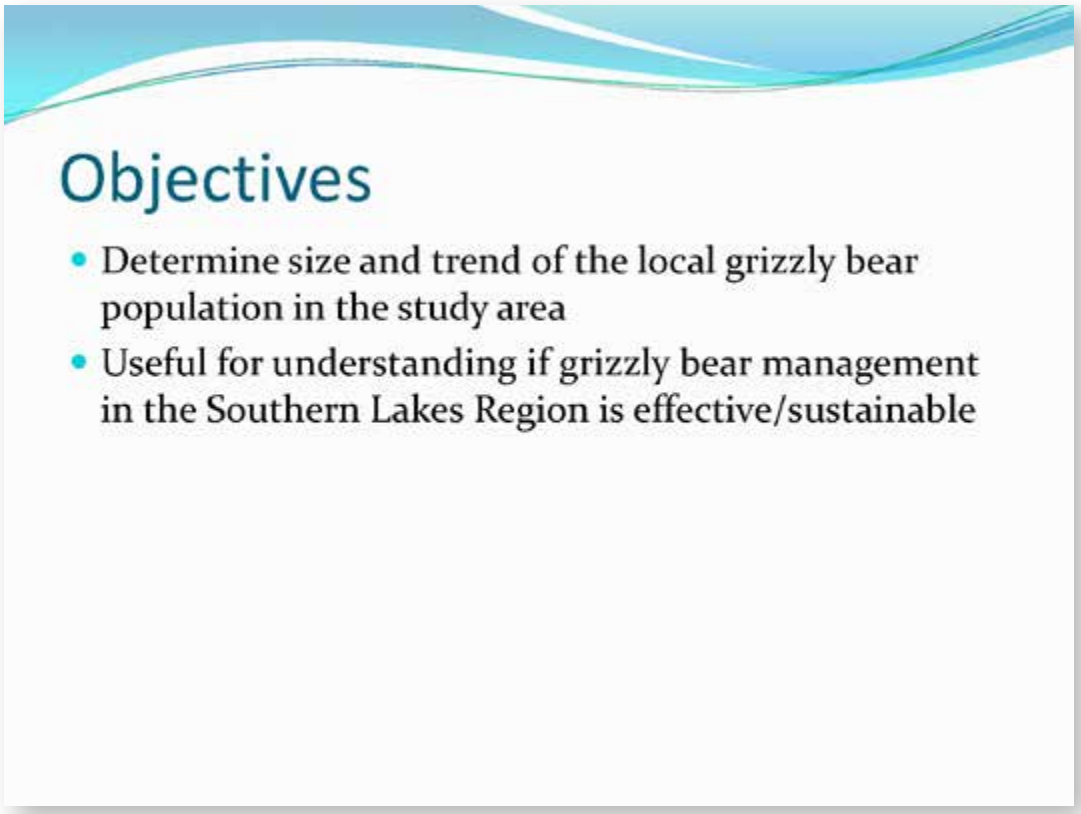
- Concern over status of grizzly bears in the Southern Lakes region
  - Formal recommendation from the Southern Lakes Wildlife Coordinating Committee to inventory grizzly bears in the Southern Lakes Region

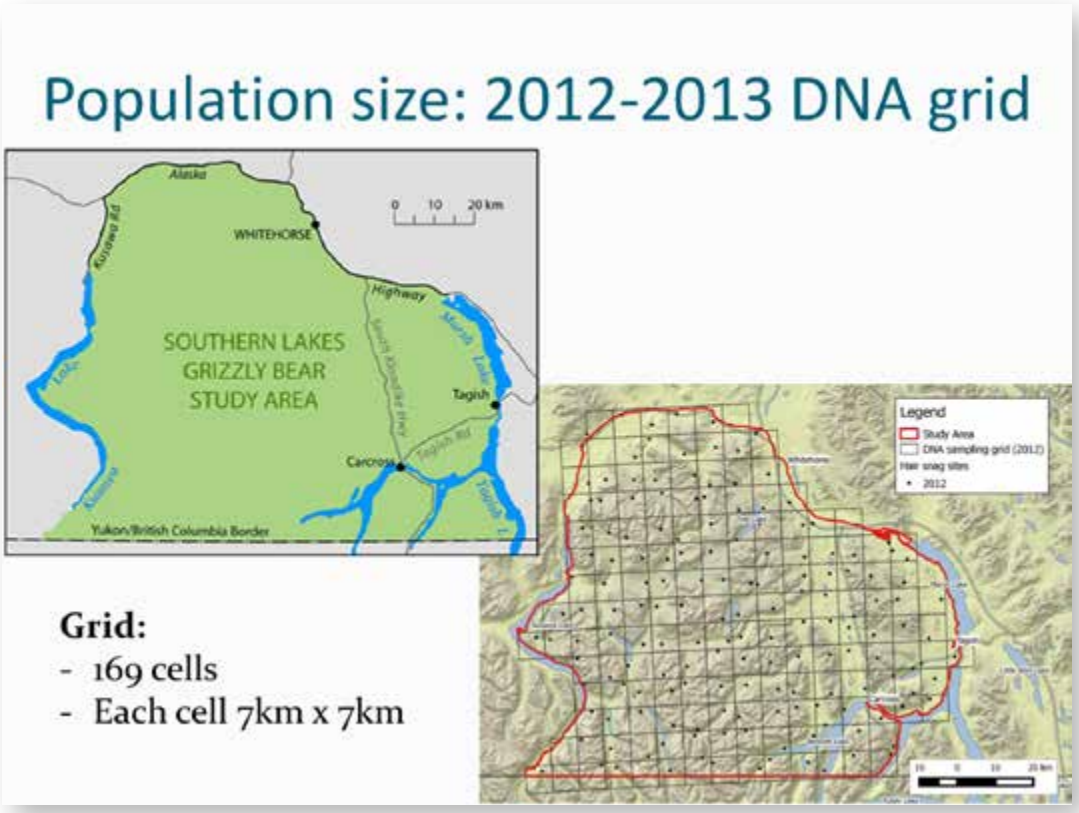


Southern Lakes: a challenging place for a bear to live

- Dense human population
- Lots of disturbance, access, development
- Increased potential for death because of human-bear conflicts and harvester access


Bear Management Units (BMUs)
- Scale at which we manage grizzly bear mortality
- Scale at which we look at mortality trends
Percent females killed BMU 18 (Southern Lakes)
percent killed
Year
West Arctic
East Arctic
Old Crow Flats
Eagle Plains
Richardson
North Ogilvie
West Ogilvie
Hart
Klondike
Dawson
White
Nisling
Glenlyon
Aishihik
Ruby
Laberge
Kluane
Arkell
Southern Lakes
Hyland

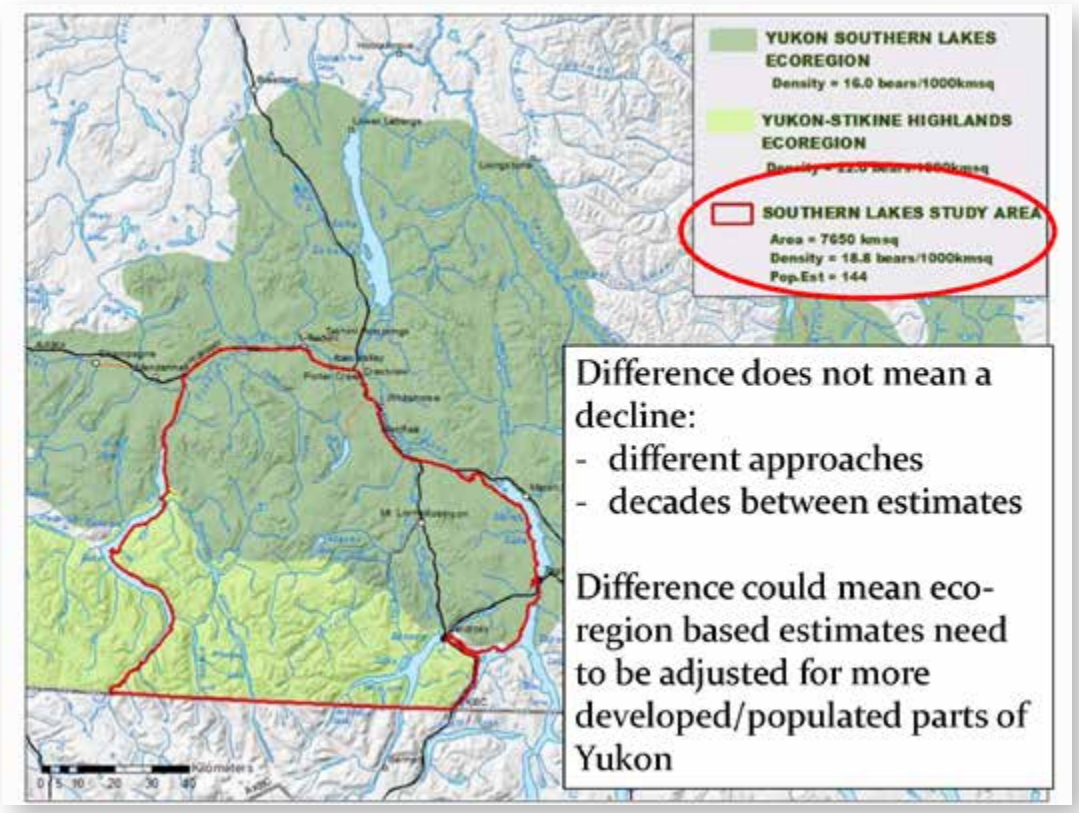

Objectives
• Determine size and trend of the local grizzly bear population in the study area
• Useful for understanding if grizzly bear management in the Southern Lakes Region is effective/sustainable


Population size: 2012-2013 DNA grid
Alaska
WHITEHORSE
0 10 20 km
Highway
SOUTHERN LAKES
GRIZZLY BEAR
STUDY AREA
Tagish
Carcross
Yukon/British Columbia Border
Legend
Study Area
DNA sampling grid (2012)
Hair snag sites
2012
Grid:
- 169 cells
- Each cell 7km x 7km

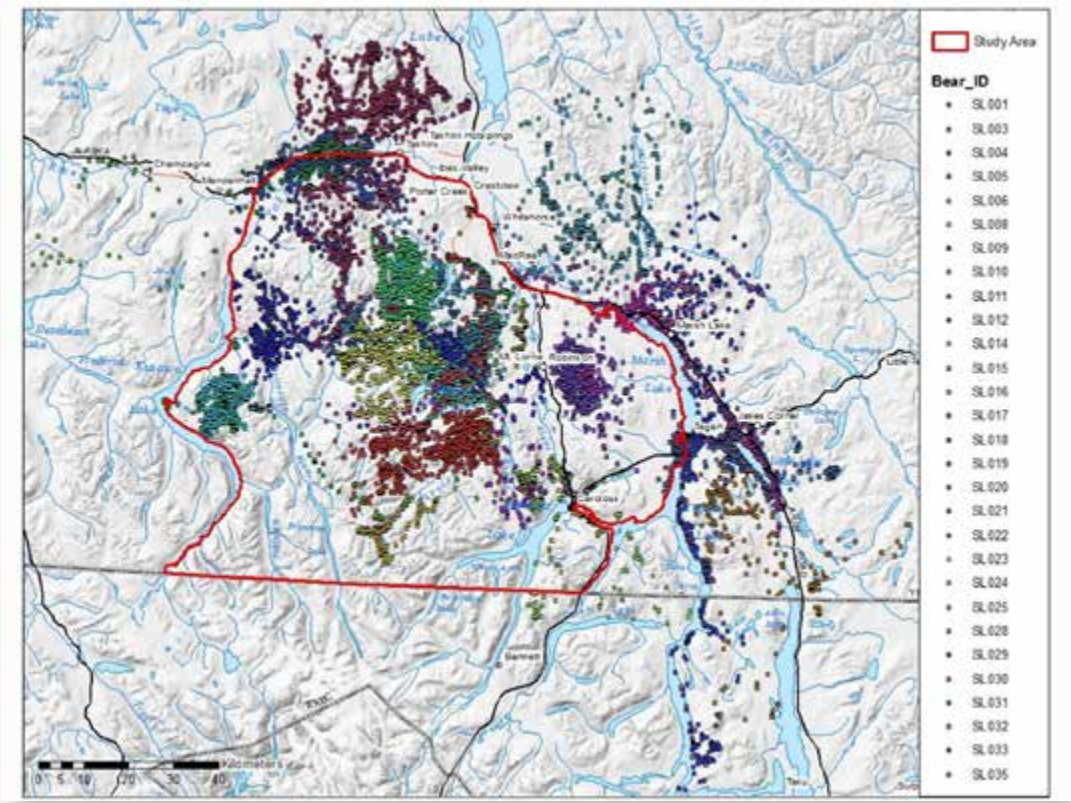
DNA from hair used to identify individual bears: informs bear count

Results

- 82 bears (95% confidence estimate: 69-97)
  - ~11 bears/1000 km²
  - 61% females
- Approach doesn't provide information on number of cubs or subadults


YUKON SOUTHERN LAKES ECOREGION
Density = 16.0 bears/1000kmsq
YUKON-STIKINE HIGHLANDS ECOREGION
SOUTHERN LAKES STUDY AREA
Area = 7650 kmsq
Density = 18.8 bears/1000kmsq
Pop.Est = 144
Difference does not mean a decline:
- different approaches
- decades between estimates
Difference could mean eco-region based estimates need to be adjusted for more developed/populated parts of Yukon


2009-2016: tracked collared bears to estimate trend based on adult survival and cub production
Information still undergoing analysis: need to understand impact of conflict bears on trends


Study Area
Bear_ID
SL001
SL003
SL004
SL005
SL006
SL008
SL009
SL010
SL011
SL012
SL014
SL015
SL016
SL017
SL018
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SL032
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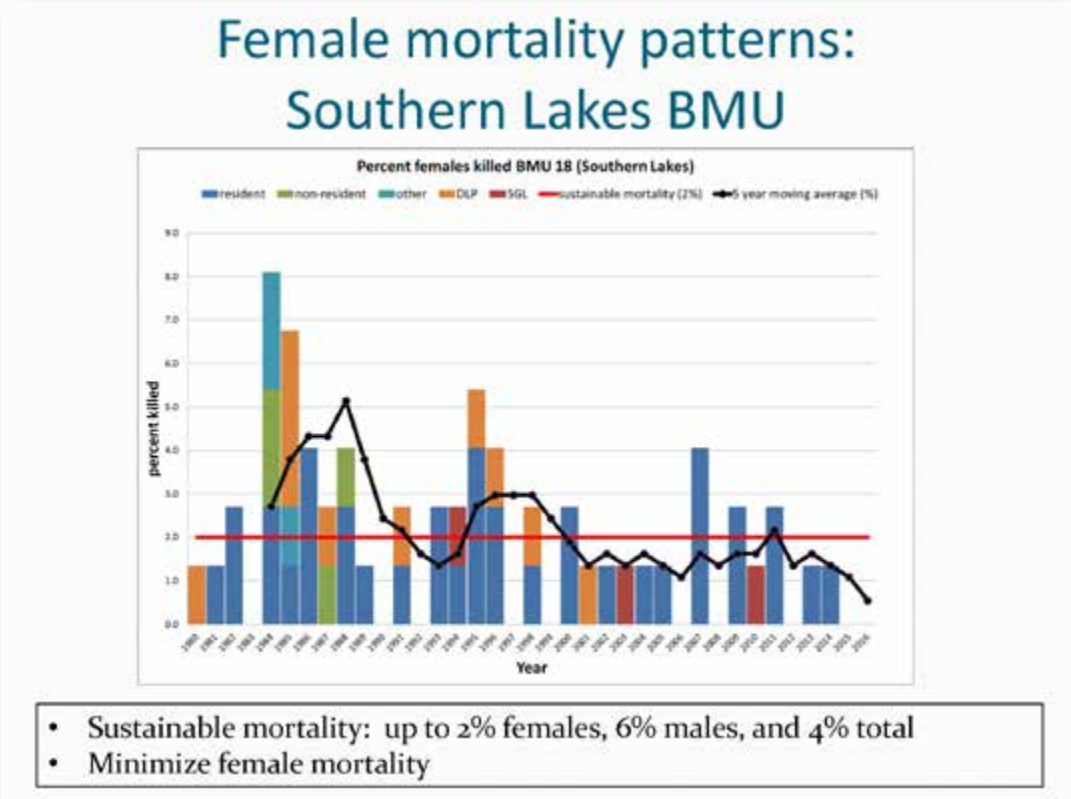
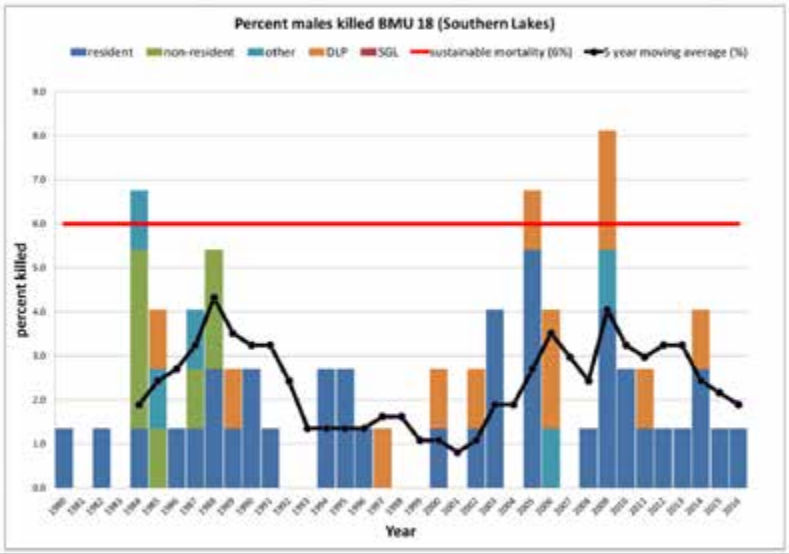
SL035

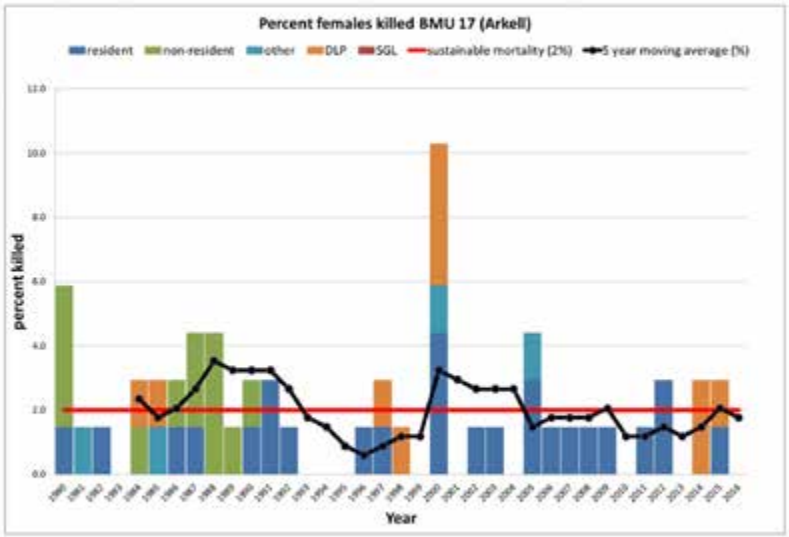

Female mortality patterns:
Southern Lakes BMU
Percent females killed BMU 18 (Southern Lakes)
resident
non-resident
other
DLP
SGL
sustainable mortality (2%)
5 year moving average (%)
percent killed
Year
• Sustainable mortality: up to 2% females, 6% males, and 4% total
• Minimize female mortality

Male mortality patterns: Southern Lakes BMU



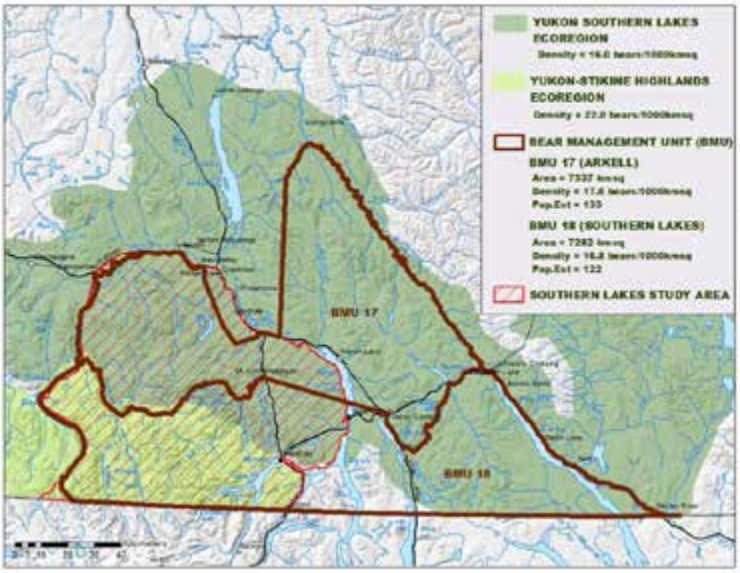
- Sustainable mortality: up to 2% females, 6% males, and 4% total
- Minimize female mortality

Female mortality patterns: Arkell BMU



- Sustainable mortality: up to 2% females, 6% males, and 4% total
- Minimize female mortality

Next steps

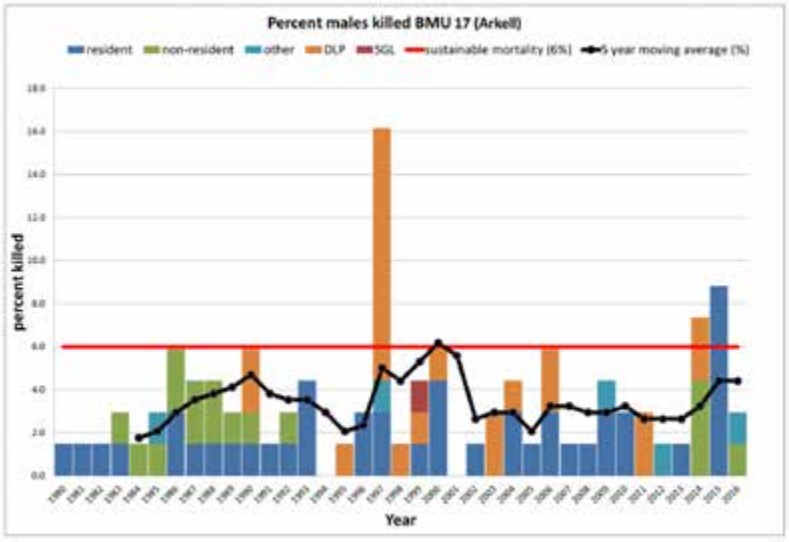


- Trend analysis
- Determine how to apply results to areas outside the study area
  - perspectives from management partners

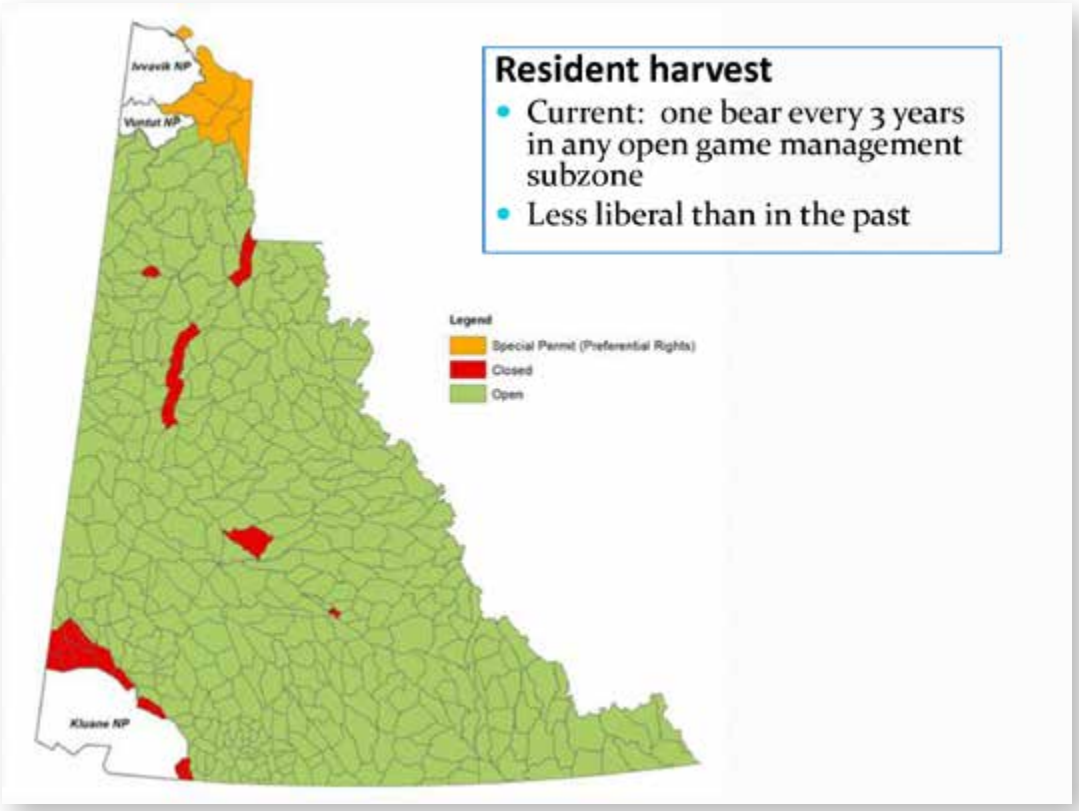
If mortality is unsustainable:

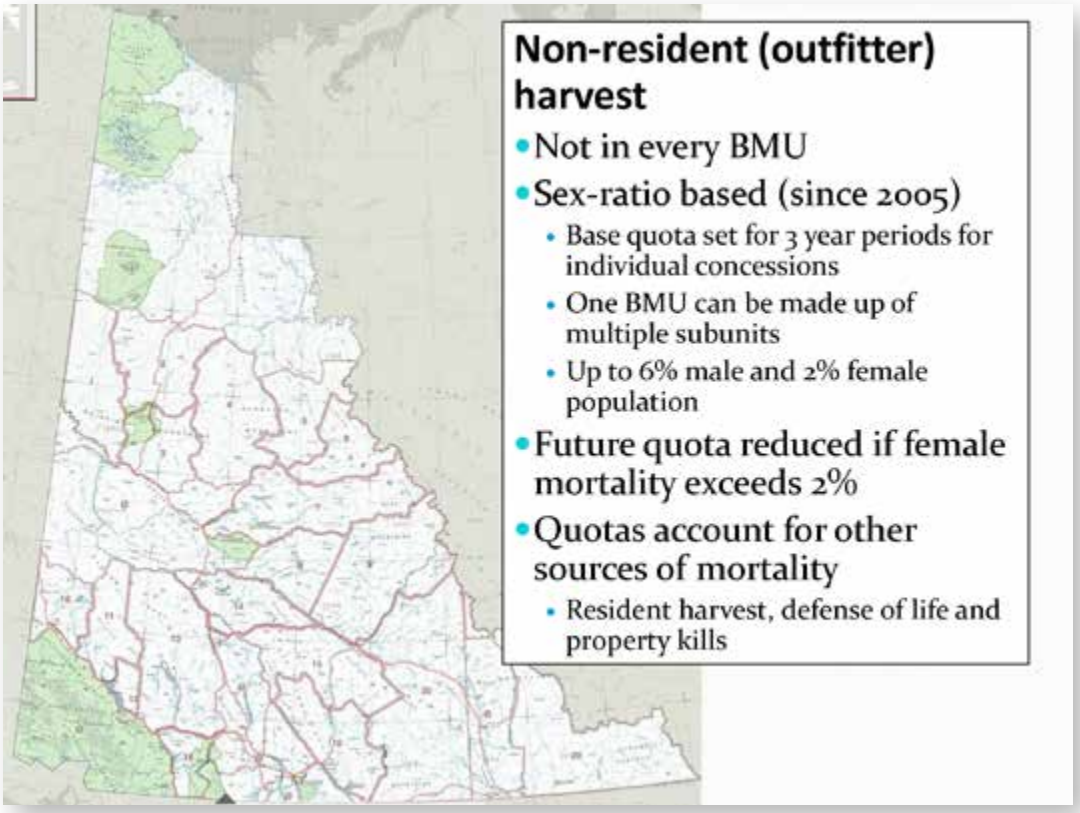
- Determine cause (overharvest, DLPs, etc.)
- Respond:
  - Work to reduce DLP kills
  - Modify licensed harvest rates
    - Seek change to resident harvest via regulation change process under the Wildlife Act
    - Adjust outfitter quotas
  - Other measures as appropriate (e.g., reduce vehicle collisions)

Male mortality patterns: Arkell BMU

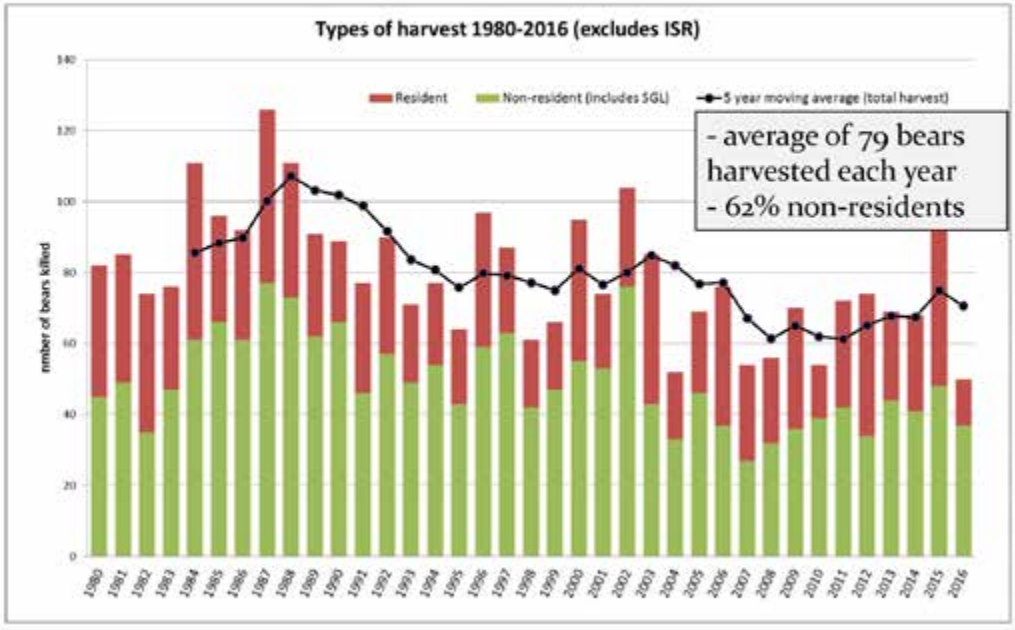


- Sustainable mortality: up to 2% females, 6% males, and 4% total
- Minimize female mortality

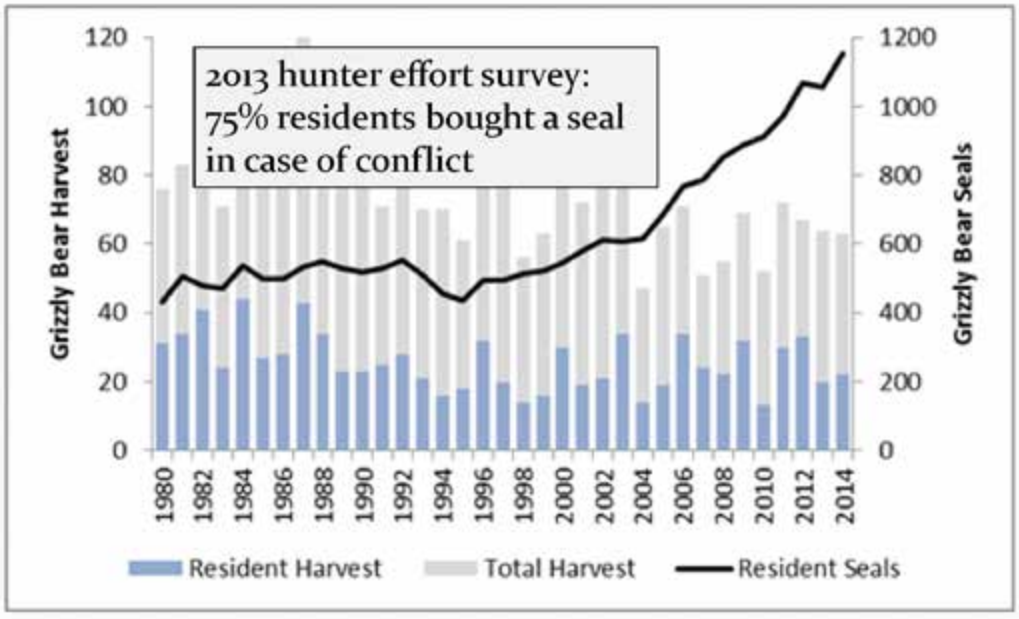

Ivvavik NP
Vuntut NP
Kluane NP
Legend
Special Permit (Preferential Rights)
Closed
Open
Resident harvest
• Current: one bear every 3 years in any open game management subzone
• Less liberal than in the past


Non-resident (outfitter) harvest
• Not in every BMU
• Sex-ratio based (since 2005)
  • Base quota set for 3 year periods for individual concessions
  • One BMU can be made up of multiple subunits
  • Up to 6% male and 2% female population
• Future quota reduced if female mortality exceeds 2%
• Quotas account for other sources of mortality
  • Resident harvest, defense of life and property kills

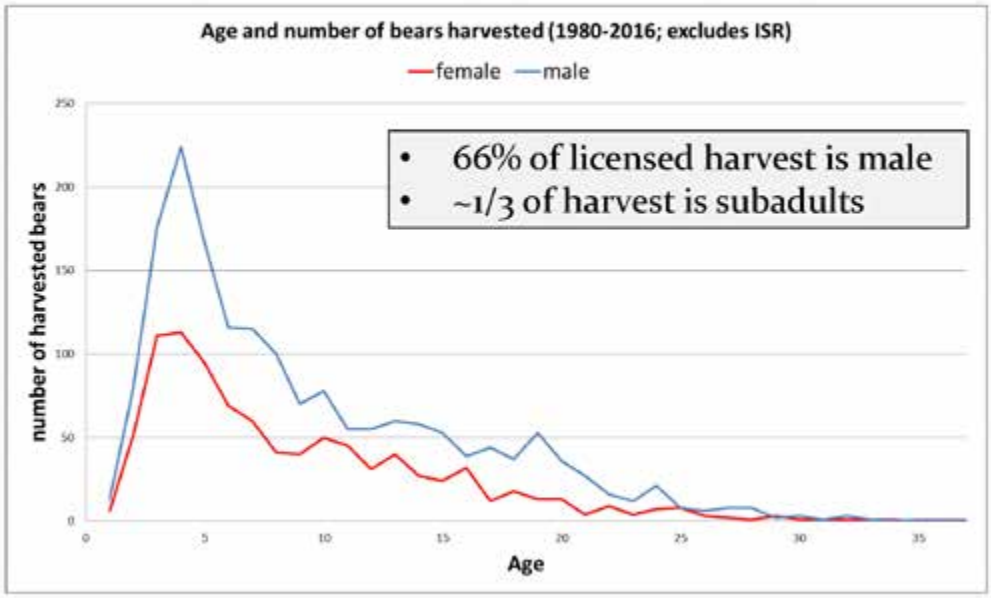
Harvest over time

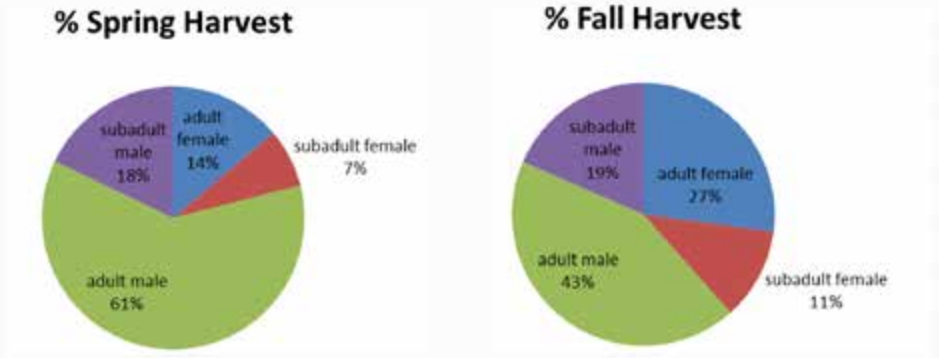


Increase in resident interest



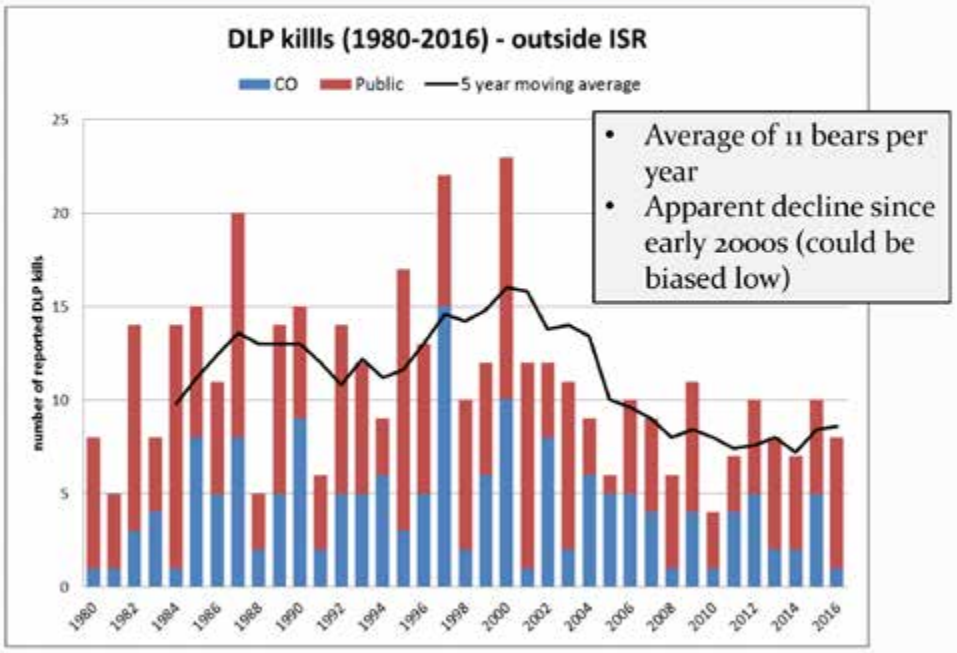
Age and sex composition of harvest





- More adult males harvested in spring (exit dens earlier; females have cubs)
- More adult female harvest in fall (no cubs)

Defense of life and property kills (DLP)



PUBLIC SURVEY

In April 2017, a public survey questionnaire was made available for residents of Yukon and transboundary communities (e.g., Atlin and Aklavik) in order to solicit information on their opinions about grizzly bears (Ursus arctos) and their management. The survey questionnaire was designed to provide information to the Yukon Grizzly Bear Conservation and Management Plan Working Group in support of their development of the first-ever conservation plan for grizzly bears in Yukon. The survey questionnaire focused on understanding respondents' beliefs and perceptions about grizzly bears as well as their level of support for a range of possible management actions related to grizzly bears.

Close to 1,400 people from Yukon and transboundary communities completed the survey and the data were analysed to compare the responses between different groups of respondents (e.g., Whitehorse residents vs. those from other communities, big game hunters vs. non big game hunters, and others). We made 13 such comparisons using the survey data. These analyses allow us to examine how different groups feel about the questions posed. It also allows us to determine which questions provoke strongly divided responses among groups of respondents, and which have a high level of agreement.

Several key conclusions can be drawn from the survey results: Most notably, there was widespread agreement among respondents that grizzly bears are important to Yukon people and ecosystems, and that they value grizzly bears and the opportunity to see grizzly bears in the wild. This sentiment was reflected by all respondent groups in their overall support for management actions that positively affected grizzly bear conservation, such as reducing human-grizzly bear conflicts, and securing important habitats and food sources for grizzly bears. While some important differences were observed between groups of respondents (particularly grizzly bear hunters vs. non-grizzly bear hunters), overall there was a lot of agreement among groups in response to questions posed in the survey. As such, the survey provides important initial information from which to base a vision and subsequent decisions regarding grizzly bear conservation in Yukon.

The aim of this report is to outline how the survey was designed and delivered, note caveats with the data, describe the analytical framework used, present the results, and illustrate how the results may be used to inform the conservation planning process.

Full survey results can be found on the Department of Environment's publications page **(https://yukon.ca/en/grizzly-bear-public-survey-report)**.

PLANNING PROCESS OUTPUTS

Regional workshop summaries

To support the development of a conservation and management plan for Grizzly bears in Yukon, the planning team hosted a series of regional workshops for First Nations, boards and councils, and relevant or impacted associations. These workshops formed the basis for gathering information about local and regional opinions on grizzly bears. The planning team used a series of 9 questions—some workshops did not go through all questions—to guide discussion.

Below is a brief draft summary of what the planning team has heard for each of the questions. This information has been compiled to support the validation of what we heard, in particular through the 11 and 12 July, 2017 "What We heard" workshop.

This document does not represent a finalized report. It is intended to be used as a reference for participants from the regional workshops to review and ensure their comments are accurately captured. These summaries are intended to complement the "What We Heard" regional posters.

Q1: What are the range of issues regarding grizzly bears in your traditional territory?

Conflicts between people and grizzly bears was an issue that was frequently identified by workshop participants (see Haines Junction, Tagish, Pelly, Fort McPherson, and Tahltan workshops). Haines Junction participants noted an increase in conflicts that they attributed to several factors:

1. increased habituation due to the highway;
2. changes in salmon spawning affecting the distribution of grizzly bears;
3. the harvest of older grizzly bears leading to more young animals coming into conflicts.

Tagish workshop participants focused mainly on ways to mitigate conflicts. Some measures suggested included managing attractants, education on how to avoid conflicts, education focused on changing people's behaviour, tagging or tracking of animals that have been involved in conflicts, and the need for enforcement. Dawson participants noted that there is a greater chance of conflict with grizzly bears in the Tombstone Territorial Park and identified the need to ensure that trails were not developed in migratory corridors. Pelly participants noted that conflicts are often the result of development in grizzly bear habitat (and grizzly bears returning to their home ranges) and that relocation of grizzly bears needs to done carefully. Fort McPherson participants pointed out that most conflicts occur on the Dempster Highway corridor due to grizzly bears associating humans with caribou gut-piles. They also noted the need for more education to prevent grizzly bear jams on the Dempster Highway and keep people from approaching grizzly bears. Participants at the Tahltan meeting noted that there were some problems with grizzly bears in British Columbia because landfills were not well managed but that overall there were few conflicts despite a large grizzly bear population. Finally Yukon Outfitter Association participants spoke about a large number of habituated grizzly bears in hunting camps, increased defence of life or property kills (DLPs)

after dumps closures and cabins being destroyed by grizzly bears. Participants at this meeting also noted that it was important to grizzly bears that have been involved in conflicts so that other animals would not learn bad behaviours.

All workshop participants discussed consumptive and non-consumptive use of grizzly bears and associated issues (see Haines Junction, Dawson, Tagish, Pelly, Fort McPherson, Tahltan, Yukon Outfitter Association, and Acho Dene Koe First Nation workshops). Many workshop participants commented on the reduced interest in hunting grizzly bears and noted that non-resident hunters do most of the grizzly bear hunting (see Dawson, Tagish, Fort McPherson, Tahltan, and Yukon Outfitter Association workshops). Haines Junction participants expressed concern over bow hunting, and Fort McPherson participants noted that the biggest threat for grizzly bears was poaching for fur. Pelly workshop participants expressed concern over the lack information on outfitter harvest. Tagish participants noted that many people buy tags for DLPs rather than out of interest in hunting grizzly bears, and questioned whether it is legitimate to harvest an animal and not eat it. Acho Dene Koe First Nation meeting participants noted that grizzly bears were only killed if they were involved in conflicts and that most bear harvest in their traditional territory is directed towards black bears. Yukon Outfitter Association meeting participants pointed out that if grizzly bear hunting becomes more restricted in British Columbia, it may increase pressure and price of grizzly bear hunts in Yukon. Yukon Outfitter Association participants also expressed concerns that harvest information is portrayed in way that negatively affects perceptions of hunters. Haines Junction workshop participants spoke about grizzly bear viewing noting that habitation and feeding of grizzly bears were associated with roadside viewing. Similarly, Dawson participants expressed their support for grizzly bear viewing provided it was properly planned. Acho Dene Koe First Nation workshop participants noted that there is a lot of respect for grizzly bears and that First Nations are supposed to protect grizzly bears.

Participants at the Dawson, Tagish, and Pelly workshops spoke about their expectations for the grizzly bear management plan. Dawson and Tagish participants noted the need for the plan to include traditional knowledge and to involve First Nation and renewable resource councils both in the planning and implementation stages. Dawson and Fort McPherson participants identified the need for the plan to reflect the value of grizzly bears and to acknowledge how humans are impacting grizzly bears. The need to allocate funds to support the plan was also identified (see Dawson, Pelly, and Tagish workshops). Dawson participants suggested that the issue of roadside hunting could be addressed through amendments to the *Wildlife Act.* Pelly workshop participants pointed out the need for the plan to come with enforcement. They also suggested that the plan be reviewed within 3 to 5 years and amended if it was not working. Tagish participants noted the need for regional land use plans to facilitate the conservation of grizzly bears. Dawson participants suggested that the management plan consider cumulative effects on grizzly bears and treat grizzly bears as an indicator or umbrella species.

The need to protect grizzly bear habitat and to minimize the effects of human land use and climate changes on grizzly bears was identified (see Dawson, Tagish, Pelly, and Yukon Outfitter Associations workshops). Concerns over negative impacts of human activities (such as tourism) and development (for example, mines, rural and municipal development, agriculture) on grizzly bear habitat were identified. For example, Dawson and Pelly participants were both concerned about the impacts of resource extraction on

habitat and connectivity. The role of climate change on food sources and habitat was also identified as a potential threat (see Dawson and Tagish workshops). Tagish, Dawson, and Pelly participants noted that changes in habitat and human encroachment was forcing grizzly bears into contact with humans and leading to more conflicts. Yukon Outfitter Association workshop participants noted the need to do land use planning to reduce the detrimental impacts human presence might have on grizzly bears. Finally, Haines Junction and Tahltan workshop participants both noted increases in grizzly bear populations and concerns over grizzly bears reducing ungulate populations.

Q2: Has there been any change in the apparent abundance of grizzly bears in your region?

Workshops participants noted **changes in grizzly bear behaviour, distribution, and abundance**. Participants reported increases in human-grizzly bear conflicts and more grizzly bears in closer proximity to people—especially more grizzly bears along highways and closer to towns (see Tagish, Dawson, and Haines Junction workshops). Some workshops (see Haines Junction and Fort McPherson workshops) noted that grizzly bears are becoming more aggressive and less afraid of humans. Many workshop participants attributed changes in grizzly bear distribution to changes in their food supply. For example, participants at the Dawson workshop noted that grizzly bears are moving to other areas due to a lack of salmon at Fishing Branch River. Changes in salmon habitat and spawning; fewer moose and caribou, and changes in vegetation resulting in less berries were cited as potential reasons for changes in grizzly bear distribution. Participants also pointed out the effects of the availability of newer food sources (caribou gut piles along the Dempster Highway) on grizzly bear distribution (see Old Crow, Dawson, and MacPherson workshops). Many workshop participants attributed changes in food supply to the effects of climate change; others noted that human activity and land-use might be displacing grizzly bears by disrupting important grizzly bear habitat. Changes in the feeding behaviour of grizzly bears were also noted in many workshops—specifically that grizzly bears had learned to hunt bison or were no longer hunting sheep.

Overall, workshop participants expressed differing opinions on the population status of grizzly bears populations around the territory. For example, some communities felt that there are more grizzly bears (see Dawson, Haines Junction, and Fort McPherson workshops) or that the population had remained stable. However, at most workshops participants noted the variability of grizzly bear populations with some areas appearing to have more grizzly bears and other areas appearing to have having fewer grizzly bears (Tagish and Old Crow workshop). For example, participants in the Tagish workshop commented on the difficultly in assessing population status based on sightings since seeing one grizzly bear frequently can give a sense that there are many grizzly bears.

Workshop participants noted that the grizzly bear management plan should not focus only on grizzly bears. The plan also needs to consider other species since, for example, changing salmon or caribou populations will affect grizzly bear populations. In addition, the grizzly bear management plan needs to be aware of, and work with existing management plans for grizzly bears. Workshop participants also pointed out the need for more and better information on grizzly bear population status in Yukon to inform the management plan and to guide implementation. Participants noted that there is a need to identify key research gaps and to establish baseline data on grizzly populations. Participants at several workshops also noted

the need to gather more up-to-date data from a variety of sources (scientific as well as traditional and local knowledge) and to include First Nations and communities in data collection efforts. For example, participants at the Tagish workshop noted that data collection and monitoring efforts should be non-invasive (i.e. genetic sampling vs. telemetry collar programs). The need to have funding to carry out data collection efforts and concern over potential financial barriers to implementation of the plan were also expressed.

Q3: Has there been any change in the apparent number of conflicts between grizzly bears and people in specific regions of the Yukon?

Participants at most workshops noted that grizzly bear behaviour had changed: specifically that grizzly bears have become more habituated towards people and that there are more conflicts with grizzly bears (see Haines Junction, Pelly, Tagish, and Fort McPherson workshops). Tagish workshop participants differed in their perspectives on habituation noting that habituated grizzly bears are safer because they are used to people, yet also were more likely to become food-conditioned. Participants in other workshop expressed the opposite: that habituation made grizzly bears less safe. Fort McPherson participants noted that grizzly bears had shifted their feeding behaviour from berries to caribou and that multiple grizzly bears feed on one caribou carcass—something that was not seen in the past.

Workshop participants often attributed increased human-grizzly bear conflicts to environmental changes (see Dawson, Tagish, Old Crow, Pelly, and Fort McPherson workshops). Increased conflicts were linked to declines in food sources (for example, fewer salmon), or seasonal shifts (leading earlier caribou migrations), as well as, to grizzly bears staying out of their dens longer due to warming weather in the Southern Lakes region. Participants in Old Crow also noted a change in the size of grizzly bears, pointing out that smaller grizzly bears were much more common now.

All workshop participants attributed increased human-grizzly bear conflicts to availability of garbage and attractants. Participants noted that hunting and fishing camps were hotspots for conflicts (due to hanging meat and unclean campsites) and that gut-piles left behind by hunters often lead to conflicts (see Haines Junction, Dawson, Tagish, Old Crow, Pelly, and Fort McPherson workshops). The presence of berries near areas of human use was also noted as a source of conflict. Human waste was another commonly-mentioned attractant. Workshop participants described the closure of dumps, improperly fenced dumps, and composting as drivers of conflicts with grizzly bears. Participants at the Tagish workshop noted that the practice of dumping garbage along roadsides to avoid tipping fees at landfills had led to conflicts with grizzly bears in the past. Finally, other human caused attractants related to agriculture (such as chicken coops) were identified as potential causes for conflict.

Participants at all workshops discussed strategies for the prevention and mitigation of human-grizzly bear conflicts. They identified the need for more education on three topics: grizzly bear behaviour, how to avoid interactions, and how to respond to grizzly bears during conflicts. Participants suggested that education should be regionally-specific and target a variety of audiences including industry, tourists, and community members. The need for more education on reducing and managing attractants was also identified. Haines Junction workshop participants noted the effectiveness of the Kluane First Nation initiative to lend out electric fences for meat storage. At the Tagish workshop participants

suggested that people who did not manage their attractants properly should be fined. In addition, participants pointed out the need to make deterrents more readily available (for example, loaning out bear spray) and to teach people to use them effectively. The role of land use planning in reducing human-grizzly bear conflicts was also discussed in several workshops (see Tagish, Dawson, and Yukon Outfitters Association workshops). For example, Dawson participants noted a range of issues in Tombstone Territorial Park including that the Grizzly backcountry campsite is located in a wildlife corridor. Participants at the Old Crow workshop spoke about the need to develop a community program for responding to grizzly bears that are involved in conflicts. This included identifying a designated person to deal with grizzly bears (such as a First Nation expert working collaboratively with the RCMP) and to provide training, equipment, etc. to support this position. Similarly, participants at the Haines Junction workshop also noted the need for local people to do the deterrence work. Finally, participants at the associations workshop noted that human-grizzly bear conflicts can be taxing on conservation officers and on resources, and also noted the lack of funding for educational efforts.

Q4: Can you comment on the harvest of grizzly bears?

Most workshop participants spoke about traditional harvest practices and methods when asked about grizzly bear harvest in Yukon. For example, Haines Junction workshop participants described the traditional practice of hunting female grizzly bears and cubs from dens and snaring grizzly bears that came into the village. Participants at this workshop noted that there were strict protocols of respect: children were not allowed to touch grizzly bears; only elders would eat cubs; people were not allowed to speak badly about a grizzly bear. Participants at some workshops talked about the practice of hunting grizzly bears for medicine (for their gall bladder) but noted that this happens only rarely (see Fort McPherson and Dawson workshops). Old Crow workshop participants noted that grizzly bears were not hunted in their traditional territory. Similarly, Dawson participants noted that bears were only hunted in hard times (and even then the preference was for black bears). Finally, Fort McPherson participants noted that grizzly bears were traditionally hunted for their fat and fur. Currently, people in Fort McPherson do not eat grizzly bear and only harvest the animals to sell the hide.

Workshops participants also spoke about harvesting grizzly bears that were involved in conflicts with people. The practice of residents buying grizzly bear tags and using them in case of a DLP (defence of life or property) kill was described in many of the workshops (see Haines Junction, Dawson, Old Crow, and associations workshops). As participants in the associations workshop noted, having a tag reduced the amount of attention and paperwork associated with shooting a grizzly bears during a human-grizzly bear conflict. Haines Junction workshop participants pointed out that some people in the community are concerned about dealing with the Government of Yukon in these situations and that the practice skews harvest statistics. Most workshop participants noted that hunters are sometimes harassed by grizzly bears and this sometimes lead to DLP kills (see Haines Junction, Dawson and Fort McPherson workshops). Finally, participants noted that resident tags were much more likely to be sold as a precaution (in case of a DLP), than because residents actually wanted to go out and harvest a grizzly bear.

Workshop participants listed a number of pros and cons of harvesting grizzly bears. For example, Haines Junction workshop participants noted that the harvest of big grizzly bears can lead

to conflicts with younger grizzly bears. Other workshop participants noted the negative perceptions of grizzly bear hunting, pointing that people did not understand why grizzly bears are being harvested if they are not being eaten (see associations and Old Crow workshops). Tagish workshop participants spoke about the ethics of hunting grizzly bears, noting that meat from harvest animals should be used or that no trophy hunting should be allowed at all. Finally, participants at the associations workshop noted that local people are more supportive of grizzly bear hunting if outfitters employ local guides. Participants at this workshop also noted that anti-hunting sentiments from British Columbia were starting to influence Yukon. Participants at this workshop also pointed out that roadside hunting is a controversial issue due to the lack of "fair chase" and because many tourists come to see grizzly bears from the roadside in Yukon.

Q5: What about the role of local and traditional knowledge as it relates to grizzly bears?

Many workshop participants noted the value of this type of data in providing long-range observations and complimenting/supplementing scientific data (see Haines Junction, Tagish, and Dawson workshops). The need to identify and document local and traditional knowledge from various user groups (including trappers, outfitters, recreational users, and roadside viewers) was noted (see Dawson, Tagish, and Fort McPherson workshops). Haines Junction workshop participants expressed concerns about a general lack of understanding of First Nation practices that may result in cultural misunderstandings and the misappropriation of First Nation stories. Dawson workshop participants noted the need to identify gaps in local and traditional knowledge data and to secure funding to address these gaps. Tagish workshop participants pointed out the role of the game guardian program in developing a ground-based monitoring program and make front-line observations about change. They noted that a standardized approach would be needed to effectively inform regional trends. Fort McPherson participants suggested using data from existing harvest monitoring programs to get more information about grizzly bears. Similarly, Old Crow participants noted that the Vuntut Gwitchin First Nation heritage department has a traditional knowledge achieves that could inform the grizzly bear management plan. Participants in this workshop also noted the need for input from elders and communities members. Association workshop participants cautioned that local and traditional knowledge data should to be considered in context and needs to be properly documented.

Workshop participated noted that the grizzly bear management plan should be flexible enough to allow for each community to develop separate regulations. Local knowledge should weigh into the plan—all voices and cultures need to be a part of the plan (acknowledge different First Nation values, practices, issues and approaches) (see Pelly, Old Crow, Haines Junction, and Tagish workshops). Participants had different perspectives on how traditional knowledge should be included in the plan with some suggesting it should span the plan and others suggesting it should be included as a separate section (see Tagish workshop). Participants at many of the workshops also provided feedback about the process noting that development of the plan should be collaborative, and that First Nation involvement should be meaningful (see Haines Junction, Tagish, and Old Crow workshops). Tagish workshop participant noted that incorporating First Nation culture (by including stories from Elders) and traditional grizzly bear management practices into the plan was important. Finally, Tagish participants also

pointed out that the Government of Yukon should assist First Nation governments with developing and implementing grizzly bear programs.

Finally, many workshop participants also described traditional knowledge and practices toward grizzly bears that were specific to their cultures. A common theme was the need to be respectful of grizzly bears during interactions and in the treatment of harvested animals (see Haines Junction, Dawson, Tagish, Old Crow, Pelly workshops). The practices of leaving grizzly bears alone and not talking about grizzly bears were noted (see Haines Junction, Old Crow, and Pelly workshops). Tagish participants noted the utility of traditional knowledge in teaching people to respect grizzly bears and noted that rules for viewing grizzly bears should incorporate First Nation code of ethics towards grizzly bears. In addition, workshop participants noted that traditional knowledge includes valuable information on how to act in the bush and safe conduct around grizzly bears (see Haines Junction, Tagish, Pelly, and Associations workshops). Dawson and Tagish workshop participants also noted First Nation values about land as sacred and something that needs to be protected for both humans and animals. Finally, participants in many workshops shared other cultural information about grizzly bears including traditional names for grizzly bears and stories about them.

Q6: What about the role of grizzly bear viewing, education and tourism in Yukon?

Participants at several workshops pointed out that it is important to have locally established rules and parameters to regulate wildlife viewing (see Tagish, Dawson, and Pelly workshops). Tagish workshop participants were very supportive of wildlife viewing, noting prime viewing locations should be identified and promoted. Tagish participants also felt that the management plan should recognize wildlife viewing as a valuable land use option supported by the First Nations. In addition, Tagish participants pointed out that grizzly bear hunting closures within First Nation traditional territories should be an option for First Nation governments. Generally, workshop participants seemed supportive of increasing grizzly bear viewing opportunities—with the exception of participants at the Haines Junction workshop. Haines Junction participants felt grizzly bear viewing should not be promoted because it had too many negative effects on the grizzly bears. When discussing grizzly bear viewing, workshop participants also noted a number of negative effects on grizzly bears, specifically that viewing habituates grizzly bears and makes them more likely to be in conflicts with people, and that this in turn has increased the risk to grizzly bears. Participants at the associations workshop noted that grizzly bear viewing could be an industry that grows very quickly and long-term management is needed to mitigate impacts on grizzly bears. Finally, associations workshop participants also noted the need to develop new grizzly bear viewing products and to establish best practice and ethics.

Participants in many workshops identified the need for more education on grizzly bear safety (see Haines Junction, Dawson, Tagish, Fort McPherson, and Associations workshops). Participants at the Haines Junction workshop noted that both education and enforcement were necessary. Participants at the Haines Junction and Dawson workshops noted that the Government of Yukon should be responsible for grizzly bear safety education. Many workshop participants also pointed out the need for diverse educational activities (for example, signage, school training, pamphlets, etc.) that targets broad audiences (residents, tourists, school children, etc.). The need for

more education on attractants was noted as well as the need for increased access to infrastructure to help tourists manage attractants (such as canisters, caches, etc.).

Tagish workshop participants noted that people should be educated on the ethics of viewing grizzly bears, as well as, on the spiritual and cultural value of seeing grizzly bears. Participants also noted that grizzly bear viewing operations (such Fishing Branch River) provide opportunities to educate people on about grizzly bears (see Old Crow and associations workshops).

All workshop participants spoke about safety issues associated with wildlife viewing. Roadside viewing was considered particularly problematic, with participants from many workshops noting that grizzly bear jams create hazards for both people and for grizzly bears (see Haines Junction, Tagish, Pelly, Fort McPherson, and Associations workshops). A commonly cited problem was that grizzly bears were becoming habituated to the presence of people, and this made them more likely to approach communities and come into conflict with people (See Haines Junction, Tagish, Pelly, and Fort McPherson workshops). In addition, participants at many workshops noted that tourist were not respectful and did not take precautions around grizzly bears. The feeding of grizzly bears, risk-taking by photographers, and other inappropriate behaviours where described by many participants (see Haines Junction, Tagish, Pelly, Fort McPherson, and Associations workshops). Dawson workshop participants noted that wildlife/bear monitors were needed to deal with grizzly bears that have come into conflicts. Old Crow workshop participants noted that it was up to people to be used to having grizzly bears around, and take action to minimize conflicts.

Q7: How well does grizzly bear conservation and management fit (or not) into land use planning processes and environmental assessment reviews?

Workshop participants described a number of planning processes that currently take into consideration grizzly bears, but also identified others that did not. For example, Haines Junction participants noted that land-use planning in Kluane First Nation's traditional territory and dump planning take grizzly bears into account. However, they also noted that grizzly bears should be considered in other processes such as highway re-vegetation, trapper applications, campground locations, and agricultural applications. Similarly, Dawson participants noted that grizzly bear habitat factored into most First Nation environmental assessments, but expressed concerns that the quartz and placer mining acts allow many activities that the First Nation is concerned about. Both Pelly and Tagish workshop participants noted that grizzly bears and grizzly bear habitat did not get enough attention in land use planning processes and environmental assessments. Participants in the association workshop noted that while grizzly bears are considered if development is proposed in an area with a large grizzly bear population, they should be more widely considered in other planning processes as well. For example, grizzly bears are currently not factored into most agricultural applications. Finally, participants at the association workshop were sceptical of land use planning processes, noting plans in the Yukon are constantly being revised based on changes in the government.

The need for more land use planning to protect grizzly bear habitat was identified in several workshops (see Haines Junction, Tagish, Pelly, Old Crow, and association workshops). Many participants pointed out the need to consider key grizzly bear habitat and corridors in land

use planning (see Haines Junction, Tagish, and associations workshops). Haines Junction participants noted that grizzly bears should be respected and interim measures to protect grizzly bear habitat should be taken. They also noted that forestry, access roads, and climate change all pose a threat to grizzly bear habitat. Tagish participants wondered if there were any regulatory tools to mitigate the loss of grizzly bear habitat. Pelly workshop participants pointed out the need to reclaim habitat that had been damaged and expressed concern over the effects of large-scale mining operations. Participants also noted that First Nation values tended to differ from those of industry and that this should be considered in planning processes. Finally, association workshop participants noted that protected areas provide strong options for grizzly bear conservation but the Yukon currently lacks protected areas large enough to support grizzly bear populations. In addition, the need for small-scale zoning to avoid conflicts (such as around riparian zones in spring, and salmon runs in fall) was identified. Workshop participants also pointed out the need to consider the yearly feeding and movement cycles when planning for grizzly bear habitat protection.

Participants also noted the lack of information and data on grizzly bears populations and their habitat. The need for more data on grizzly bear habitat, migratory corridors, grizzly bear distribution, the location of grizzly bear denning sites, and grizzly bear population status was identified in many workshops (see Haines Junction, Dawson, Tagish, Fort McPherson, Old Crow, and association workshops). Haines Junction participants noted that although grizzly bear habitat and corridors have been identified in some areas, overall more is known about ungulate habitat than grizzly bear habitat. Participants also noted that some historic spots that are important to grizzly bears (such as Klukshu and Dalton Post) are changing and therefore required more research. Dawson workshop participants noted that it is difficult to do land use planning if there are gaps in data and that the lack of scientific data on grizzly bears made land use plans difficult to defend. Participants at several workshops also made suggestions about how to fill gaps in data on grizzly bears (for example, collaring grizzly bears, and using traditional and local knowledge: see Pelly, Dawson, and association workshops).

Finally, many workshop participants noted the need for greater linkage between management plans, more coordination between management agencies, and greater connectivity across jurisdictions (see Haines Junction, Dawson, Tagish, Fort McPherson, and associations workshops). For example, Tagish workshop participants pointed out the need for a process to guide how recommendations from various management agencies (such as the Department of Environment, Yukon Environmental and Socio-economic Assessment Board, and Renewable Resource Councils) fit together. The need to look at how other management plans would overlap with the grizzly bear management plan was also identified (see Dawson and Fort McPherson workshops). Tagish workshop participants pointed out that planning should be holistic and consider all members of the ecosystem. The notion of not managing grizzly bears in isolation was reiterated in several workshops (see Tagish, Haines Junction, and associations workshops). Association workshop participants also noted that multiple considerations should go into a planning process, including the need to balance competing priorities and values.

Q8: What is the range of values related to grizzly bears you would like the working group to consider?

Participants at many of the workshops spoke about value of grizzly bears to the ecosystem (see Dawson, Tagish, Pelly, and association workshops). Grizzly bears were described as "ecosystem engineers," "stewards of the land," and "umbrella species." Participants felt that grizzly bears play a vital role in maintaining ecosystem health and function—for example, noting the grizzly bears spread seeds and nutrients from salmon and keep channels open for fish to spawn. At several workshops, participants pointed out that removing grizzly bears from the landscape would have far reaching adverse effects: ***By protecting brown bears we are protecting many other species (***Associations workshop***).*** At the Haines Junction workshop, participants cautioned that a "balanced population" was necessary because too many grizzly bears would have adverse effects on ungulate populations. At the Dawson workshop, participants stated that the ecosystem value of grizzly bears matters more than their economic value.

Participants at all the workshops talked about the cultural and spiritual value of grizzly bears. Many participants noted that grizzly bears are symbols of wilderness (see Haines Junction, Tagish, and association workshops). Participates also noted that many people like to see grizzly bears and grizzly bears are often a topic of conversation. The need to be respectful toward grizzly bears was highlighted (see Haines Junction and Old Crow workshops). For example, participants at the Old Crow workshop noted that it is important to talk to grizzly bears during interactions, and not to bother them. Tagish workshop participants pointed out the similarities between humans and grizzly bears and pointed that big predators like grizzly bears keep people humble. Pelly workshop participants described grizzly bears as teachers. Participants at the associations workshop pointed out the importance of considering how people outside the Yukon value grizzly bears and the potential impacts of those values (for example, the potential effects that banning the grizzly hunt in British Columbia would have on grizzly bear management in the Yukon). Finally, it was also noted that grizzly bears have value as individuals, not just as populations.

Many workshop participants also discussed the economic value of grizzly bears. Participants noted the value of grizzly bears to tourism—specifically that grizzly bears bring people to the territory (see Tagish, Pelly, Dawson, Haines Junction, and association workshops). Participants at the association workshops noted the economic benefits of grizzly bear hunting to Yukoners—noting that if grizzly bear hunting is closed in British Columbia Yukon might see an increase of grizzly bear hunters.

Finally, in addition to the values identified, many workshop participants also pointed out some of the challenges of living with grizzly bears. The most commonly cited issues were risks to human safety, damage to personal property, and that fear of grizzly bears can prevent people from spending time on the land.

Q9: What is your vision of where we will be with grizzly bear conservation and management in Yukon 25 years from now?

Participants from several workshops pointed out the goal of maintaining a viable, thriving, or healthy grizzly bear population at a level similar to the one that currently exists in Yukon (see Pelly, Old Crow, Tagish, and associations workshops). Participants noted that they wanted to continue living with grizzly bears and that they wanted their grandchild to have the same opportunity. Participants at the Fort

McPherson workshop noted that this required learning to co-exist with grizzly bears and enhancing spiritual connections with them. At the Haines Junction workshop, participants indicated that managing grizzly bears sustainably involves keeping grizzly bear populations at a level that did not adversely impact the moose population. Haines Junction participants also discussed the need for an adaptive or flexible management plan that could adjust to change.

Another prominent goal shared by many workshop participants was collaboration between different groups and across jurisdictions (see Dawson, Tagish, Pelly, Fort McPherson, and association workshops). For example, participants at the associations workshop noted that they would like to see all groups involved in grizzly bear management have a better understanding of each other and work together to manage grizzly bears. The need to harmonize across jurisdictions and collaborate cross borders, as well as, across different levels of government was noted (see Tagish, Fort McPherson, and Dawson workshops). In addition, the need for the grizzly bear management plan to function in conjunction with other management plans was brought up.

The need for the management plan to allow for issues to be addressed at local levels was also noted (see Tagish, Dawson, and Haines Junction). The need for communities to tailor the plan according to their needs was highlighted. For example, Dawson workshop participants noted that communities should be able to make recommendations to amend the plan based on what they see on the land. Similarly, participants at the Tagish workshop noted that the plan should allow for First Nations to develop grizzly bear viewing opportunities and to close hunting in certain areas.

The need for more information to inform grizzly bear management was raised in all the workshops. This included the need for better population estimates, increased monitoring, more baseline information (on grizzly bear genetics), and a better understanding of grizzly bear habitat and behaviour. Participants also pointed out the need for better record keeping, as well as, for more information sharing across borders to resolve trans-boundary issues. Finally, the need for the Government of Yukon to work with RRCs and First Nations to collect information and conduct research was highlighted (see Dawson workshop).

A number of challenges to managing grizzly bear populations were identified by workshop participants. For example, the impacts of climate change on grizzly bear habitat and food sources was a commonly noted concern (see Tagish, Haines Junction, Pelly, and Associations workshops). Haines Junction workshop participants noted that grizzly bear habitat will shrink and become fragmented due to climate change and increased human use of the landscape (through mining/farming/residential development). Participants pointed out the need to protect key corridors and habitat and to mitigate damage that has already occurred.

Finally, many workshop participants noted that human-grizzly bear conflicts and human attitudes towards grizzly bears would be challenge to grizzly bear management in the future. For example, Tagish workshop participants noted that people's attitudes will change with the management plan. They also noted that there is a lack of understanding with regard to what attitudes there are now and what they will be in 25 years. Fort McPherson workshop participants stated that human-grizzly bear conflicts along the highway pose a challenge to grizzly bear management, and noted that poaching was going to become a problem. Association workshop participants noted the need to address changes in tolerance of grizzly bears and to manage for an influx of tourism. Overall the need for more ways to mitigate human-grizzly bear conflicts, as well as, the need for increased education and more respect for grizzly bears was a common theme. For example, participants in the Pelly workshop noted the need to teach younger generations to protect and understand grizzly bears (traditional practices towards grizzly bears). Finally, Haines Junction workshop participants pointed out the need to talk more about how grizzly bears fit into moose recovery programs.

Photo: Government of Yukon

What we heard workshop (July 2017)

Summary and key outcomes

The following represents a brief summary of key outcomes from the July 2017 "What we heard" grizzly bear conservation and management planning workshop. The workshop was facilitated by Dr. Douglas Clark and Dr. Aimee Schmidt from the University of Saskatchewan, under contracts to the YFWMB.

Attendees

In addition to the Grizzly Bear Conservation and Management Plan working group, representatives from the following organizations attended: Alsek Renewable Resource Council, Carcross Tagish Renewable Resource Council, Carmacks Renewable Resource Council, Champagne and Aishihik First Nations, Dan Keyi Renewable Resource Council, Fort McPherson (Teetl'it Zheh) Renewable Resource Council (NWT), Gwich'in Tribal Council (NWT), Kaska Dena Council, Kluane First Nation, Lake Laberge Renewable Resource Council, Selkirk Renewable Resource Council, Taku River Tlingit First Nation, Teslin Tlingit Council, Vuntut Gwich'in First Nation, and the Wildlife Management Advisory Committee (North Slope).

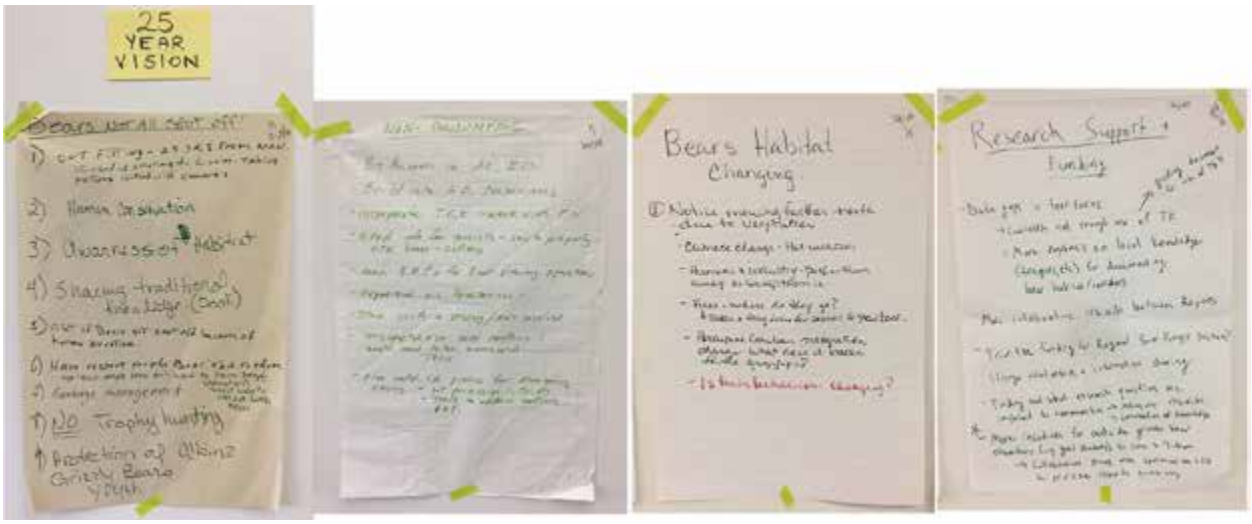
Visioning

On day one of the workshop, we asked participants as a whole group the following question: *"What is your vision of where we will be with grizzly bear conservation and management in Yukon 25 years from now?"*

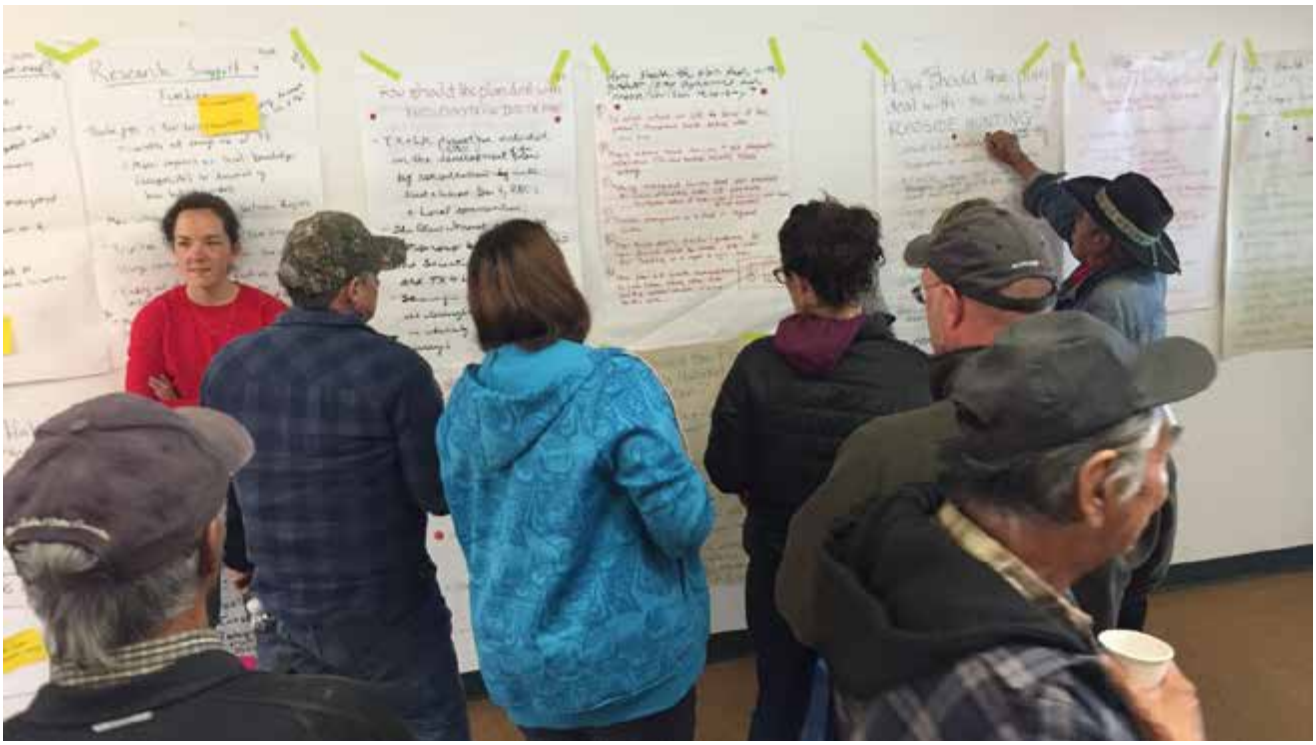
Participants suggested six components that such a vision should contain:

- Bears not all shot off
- Coping with more bears
- Protecting habitat and managing people
- Research support and funding
- Non-consumptive use of bears
- Dealing with habitat changes

We then asked participants to self-select into six small groups, each of which discussed and elaborated on what one of these components of the vision would look like. Those details were written onto flipchart sheets by participants selected by each small group.



Above: *Examples of flip charts from these discussions.*



Crafting a Vision Statement

On day two we asked participants to work in groups, and based on previously identified components of a grizzly bear conservation and management vision for the plan, craft a one-sentence vision statement.

The vision statements produced by the groups are as follows:

"All Yukoners value grizzly bears and their connection with them. They belong as an important part of the ecosystem and have a right to exist. Management needs to reflect balance and co-existence."

"Healthy and viable population in an intact ecosystem with ongoing management based on traditional, local, and scientific knowledge including education and informed land use decision making and management that benefit grizzly bears and promote conservation for future generations"

"As humans continue to encroach on grizzly bear habitat, the plan will encourage, educate and manage people to respect grizzly bears, their habitat, and the history of grizzly bears through emphasizing regional and local beliefs, respecting existing Final Agreements, and the spirit and intent of the Umbrella Final Agreement"

"Respecting that the roots of grizzly bear management is developed from traditional knowledge/local knowledge throughout the management plan; introducing why we manage the way we do."

"The Yukon values a healthy grizzly bear population and their habitat—the success of this relies on effective management through collaborative planning processes, education, communication, and gaining a better understanding and respect informed by local knowledge, traditional knowledge, and science."

Hot Issues: identifying and providing guidance

First, we asked the entire group of participants to list the important issues around grizzly bear management that the plan must address. The group proposed fifteen issues. Second, we combined related issues to yield a list of ten to be able to have enough time for sufficient small group discussion of each (see table below). We then asked each of the five table groups to answer the following questions related to a specific issue: *"Is this something the plan can solve? Or can the plan recommend things to address those issues in the future? What would those things look like?"* We then gave each of the five groups a second question to consider in the same way, and finally suggested people self-select if there was a specific issue they wished to discuss; several participants had already done so.

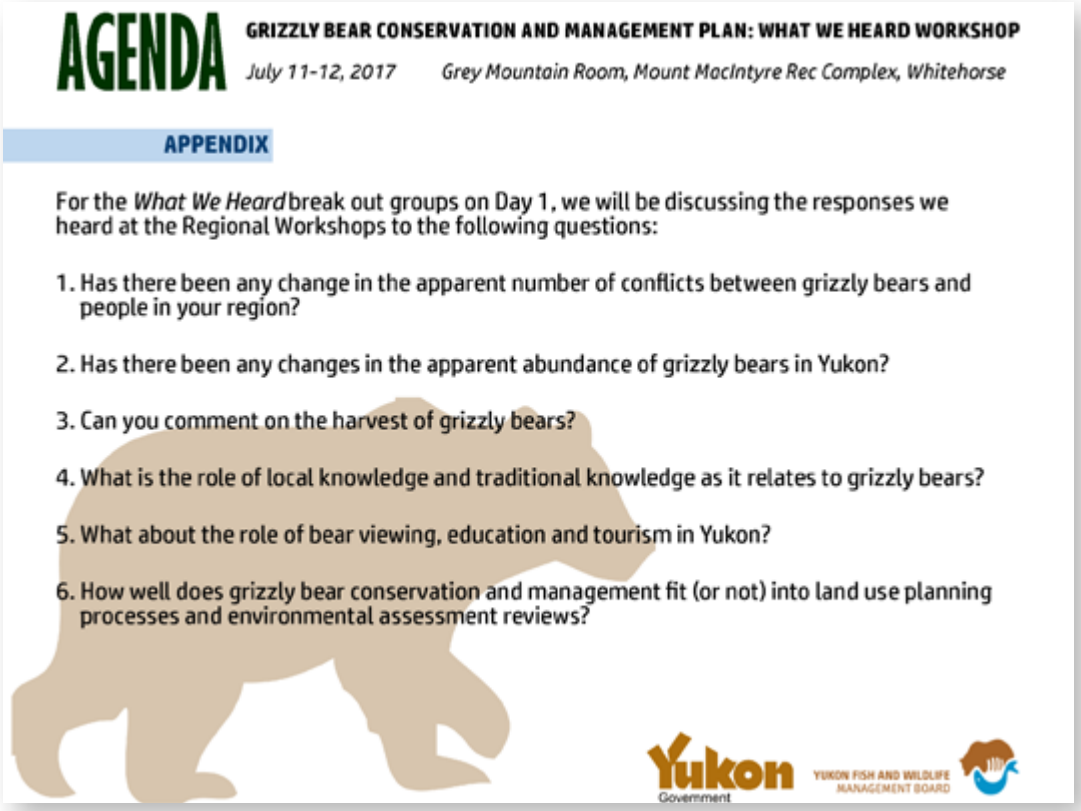
Discussions were rich and participants were highly engaged. Many concrete suggestions for grizzly bear conservation and management actions addressing those ten issues were recorded, and the working group should review these in detail for specific suggestions and tactics as the plan is developed. No participants self-selected to work on "roadside viewing".

Prioritizing Issues

We asked the entire group of participants to develop a list of issues around grizzly bear management the plan must address. Based on this list, we asked participants to prioritize the issues through a "dot vote". In this exercise, flipchart signs for each issue were placed on a wall next to each other and participants were each given three coloured dot stickers to allocate to their highest priority issues as they saw fit. These raw vote scores and rankings are shown below.

Issue	**Number of votes**	**Priority** (highest to lowest)
Including traditional knowledge and local knowledge into the plan	15	1st
Roadside hunting	14	2nd
Trophy hunting	13	3rd
Predator/prey dynamics and moose/caribou recovery	12	4th
Habitat protection	9	5th
Working with neighbours: coordinating among Agreements and other plans	5	6th
Managing peoples' behaviour towards grizzly bears	5	6th
Human negligence in managing attractants	5	6th
Climate change effects on grizzly bears	2	7th
Roadside viewing	0	8th

Workshop agenda



AGENDA — **GRIZZLY BEAR CONSERVATION AND MANAGEMENT PLAN: WHAT WE HEARD WORKSHOP**

July 11-12, 2017 *Grey Mountain Room, Mount MacIntyre Rec Complex, Whitehorse*

APPENDIX

For the *What We Heard* break out groups on Day 1, we will be discussing the responses we heard at the Regional Workshops to the following questions:

1. Has there been any change in the apparent number of conflicts between grizzly bears and people in your region?
2. Has there been any changes in the apparent abundance of grizzly bears in Yukon?
3. Can you comment on the harvest of grizzly bears?
4. What is the role of local knowledge and traditional knowledge as it relates to grizzly bears?
5. What about the role of bear viewing, education and tourism in Yukon?
6. How well does grizzly bear conservation and management fit (or not) into land use planning processes and environmental assessment reviews?

Yukon Government — Yukon Fish and Wildlife Management Board

AGENDA — **GRIZZLY BEAR CONSERVATION AND MANAGEMENT PLAN: WHAT WE HEARD WORKSHOP**

July 11-12, 2017 *Grey Mountain Room, Mount MacIntyre Rec Complex, Whitehorse*

The aim of the workshop is to:

- Update workshop participants on the grizzly bear species planning process
- Validate *What We Heard* at the regional grizzly bear workshops
- Share information among participants about grizzly bear management
- Develop a vision and goals for a Yukon Grizzly Bear Conservation and Management Plan

JULY 11, 2017 – WHAT WE HEARD INFORMATION VALIDATION

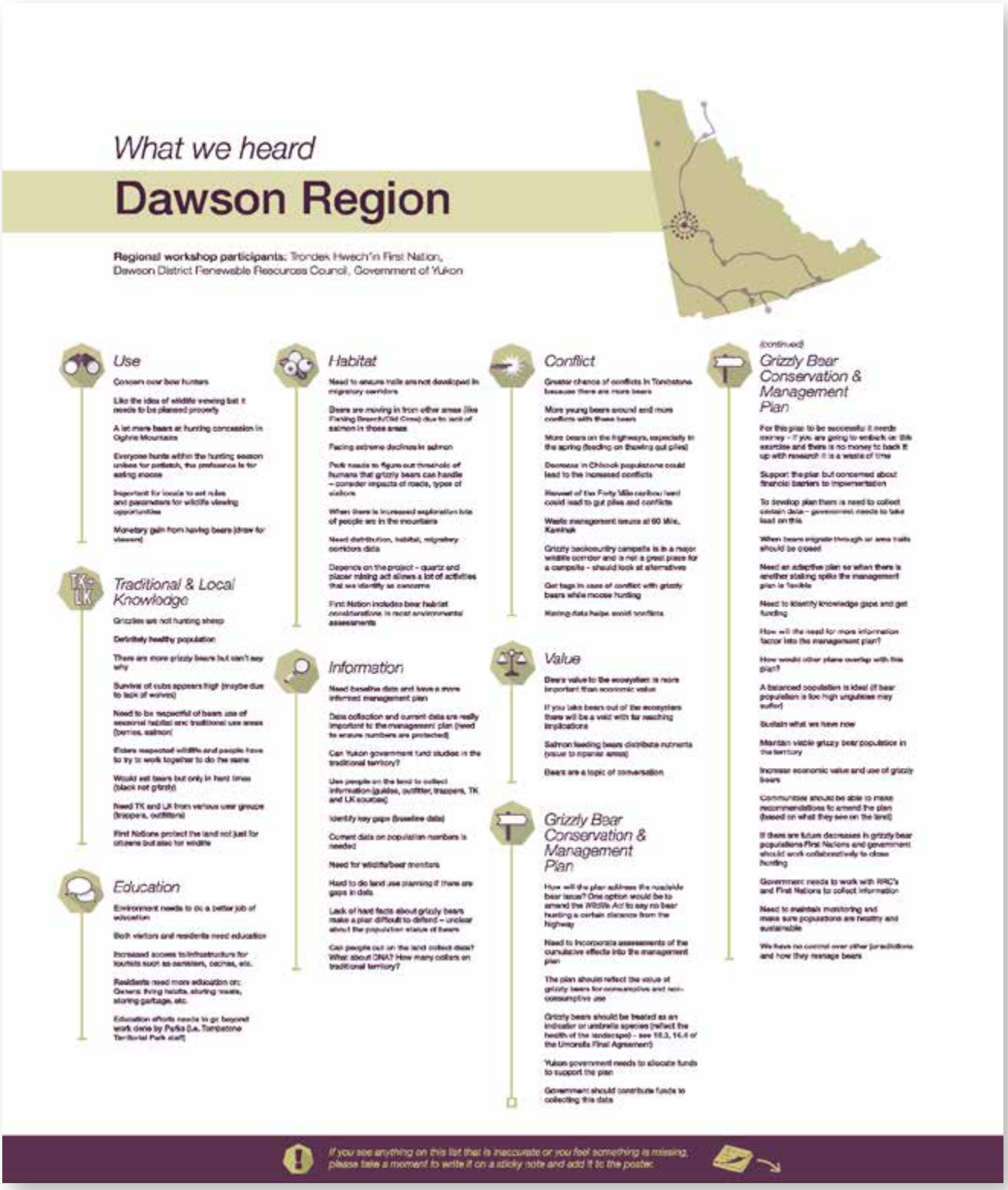
9:30	**Welcome, Opening Prayer & Introductions**
10:00	Goals of the Workshop
10:10	Why a Grizzly Bear plan?
10:20	Update on Planning Process
10:30	Mechanics of the Workshop
10:45	Break
11:00	25 Year Vision Exercise: Grizzly Bear conservation & management in Yukon
12:00	**Lunch – provided at Mount Mac**
1:00	*What We Heard* — Responses from Regional Workshops
	Break out session 1: Small group discussions on different *What We Heard* responses (see attached questions).
2:30	Break
	Break out session 2: Small group discussions on different *What We Heard* responses (see attached questions).
4:00	**End of Day: What to expect from Day 2 of the workshop**

JULY 12, 2017 – DEVELOPING A DRAFT PLAN

9:00	**Recap – Day 1 results & reflection**
9:15	Recap – Goals of the Workshop
9:30	Overview of online public survey results
10:00	Exercise: Understanding possible scenarios for the future of Yukon grizzly bears
10:45	Break
	Possible future scenarios exercise (continued)
12:00	**Lunch – provided at Mount Mac**
1:00	Defining goals and principles for grizzly bear management in Yukon
3:00	**End of Day: Next Steps & Workshop Evaluation**

Yukon Government — Yukon Fish and Wildlife Management Board

What we heard summary posters



What we heard

Fort McPherson Region

Regional workshop participants: Tetlit Gwich'in Council / Tetlit Gwich'in Renewable Resources Council, Gwich'in Renewable Resources Board, Government of Northwest Territories

Use

People are realizing they don't need to hunt bears (there have been voluntary closures in the past)

People just harvest for hide and fat which they use to tan moose hide

No one eats grizzly bear

Because of hides are exported in the Inuvialuit Settlement Region (incentive)

Most keep hide and do not sell the hide

There may be more interest in outfitting / tourism

Traditional & Local Knowledge

There are more bears – seeing more along the highway

Value

Enhance spiritual connection with bears – bears need to be respected

Education

Need to educate people not to stop on the road (traffic jams put people at risk)

Gwich'in Renewable Resources Board project to decrease interactions using education posters to educate highway travelers)

Need to educate people to avoid leaving behind pit piles that attract bears

People need to be made "bear smart"

People need to understand they are in bear territory

Educate people not to approach bears

People need to be taught to respect that they are in bears' territory and taught to take precautions

Habitat

Grizzly bears get a bad rap (humans are encroaching on bear habitat)

Diet has shifted from berries and grasses to caribou

Multiple bears feeding on individual caribou

Caribou migrations seem earlier, seasonal shifts could be having an effect on where bears are getting food

There was a big drop in Dolly Varden between the 1990s and 2008/01 – might correlate with more bears along the highway

Climate change may be affecting food availability and causing change in behaviours

Information

Could use existing harvest monitoring program (survey twice a year) to get information about grizzly bears

Request access to grizzly bear traditional knowledge report from the Gwich'in Social and Cultural Institute and coordinate on information collection

Designated Gwich'in Office is working on monitoring bears on Dempster

More information is needed on predators

To have better understanding of grizzly bear population status and know more about bears

Needs to be continuous education on best practices and what to do when you encounter bears

Need a clear understanding of situation on both sides of border (resolve trans boundary issues)

Need more plain language documents and communication across jurisdictions

Proposed risk assessment on the Dempster

Conflict

Conflicts occur mainly on the highway corridor

People get too close to bears

Harvested caribou and sheep can be bear attractants

Biggest threat is poaching for furs

Behaviour has changed in the last 10 years (conflicts on Dempster are recent)

Bears used to be more afraid, now associate people with caribou gut piles

If bears see people they come closer looking for food

There is more harvesting (of caribou) by communities and it's easy for bears to get meat

Highway is easy access to harvest caribou and hunters now leaves parts of the animal behind (depends on the hunter)

Sheep and moose outfitters have conflicts with bears at hunting sites

At Rock River and Caribou Creek there are conflicts with berry pickers

Conflicts with bears due to unclean camps

People are approaching bears for photographs and bears are getting habituated – changes in bears' behaviours

There are behavioural changes – bears getting less afraid of people

Biggest issue is conflict on the highway (need to minimize that by reducing attractants)

Poaching is going to become a problem

Grizzly Bear Conservation & Management Plan

Something needs to be done about bears approaching hunters and dead caribou (closer bait response)

Humans are affecting bears and they are reacting – this needs to be included in the plan

Humans encroach on bear habitat – we are affecting bears and they are reacting – this needs to be recognized in the plan

How does the plan hope to inform research and population status?

There are existing draft grizzly bear management plans (exec awareness of what other plans already exist)

Most plans have a section on predation – bears would fall under this category

We have plans for moose, Dall sheep, Dolly Varden, caribou – these plans have sections for predators

Need to look at associated plans and see what needs are identified

Learn to co-exist with bears rather than to manage them

Need to harmonize across borders / jurisdictions

Need to share knowledge about bears and integrate traditional knowledge and education

If you see anything on this list that is inaccurate or you feel something is missing, please take a moment to write it on a sticky note and add it to the poster.

What we heard

Haines Junction Region

Regional workshop participants: Champagne and Aishihik First Nations, Kluane First Nation, Alsek Renewable Resources Council, Dän Keyi Renewable Resources Council, Government of Yukon

Use

A lot of photographers come to Kluane and are harassing bears

Viewing changes bear behaviour (makes bears more dangerous)

Negative cumulative effects of viewing on the bears

Tourists drawn to see wild grizzly bears (big business)

Habitat

Changes in salmon spawning affecting bear distribution and is leading to increased conflicts

Bears starting to come out earlier (bear tracks in February), may be due to changing climate

Subdivisions did not take into account bear feeding areas

Key bear areas and corridors have been identified in Kluane First Nation wildlife maps (tend to be no development and green spaces)

Need to consider that habitat types may change (move to higher elevations)

Key habitat and corridors are not well known in Kluane First Nation traditional territory

Champagne and Aishihik First Nations have a good sense of bear habitat and corridors

Bear habitat is less well known than ungulate habitat

Need to consider climate change effects in land use planning and take interim measures to protect bears

Bear habitat will shrink and get fragmented due to climate change and human use of the landscape (mining/farming/residential)

Value

There is a difference between how people from Whitehorse and people from communities view bears

Bear clan - bears are culturally important

Bears provide a sense of wilderness

Bears may not be the most valued animal (moose may be more valued)

Need to consider how we value one species over the other (bears over moose, wolves over bears)

Traditional & Local Knowledge

Changes in behaviour at Aishihik – more resilient bears now, in the past they just moved through

Bears have learned to hunt bison calves

Gopher die off means bears eating moose calves

Traditionally people would scare bears if they came into the village to get rid of them (shared at Dalton Post and Kluane)

It is bad luck to talk badly about bears

TK and LK provide longer range observations and complements scientific data

Concern over misappropriation of First Nation stories about bears - need to bridge this gap

Certain rules prevent cultural practices (bear claws were used as dance symbols)

Bears are teachers and we learn from them

Leave big older bears to control younger bears

Local knowledge of bear safety and TK for how to act in the bush

Need to respect bears and avoid disturbing them

Alsek Renewable Resources Council made recommendations to Yukon government Forest Management Branch for Spades at Rex – forestry may impact bears

Strong spiritual aspect to bears

Bears need to be treated with respect (not moved or trapped)

Education

Door-to-door campaigns to reduce attractants

Kluane First Nation initiative to lend out electric fence for meat storage

People need to be educated for safety reasons

Education and enforcement must both occur

Yukon government is responsible for educating people

Education is needed for different groups (tourist, school kids, etc.) and in different ways (signage, school training, campsites, etc.)

Educate people to respect bears

Conflict

Bear populations have increased and there are concerns that moose populations have declined

Bears less afraid of people/ more aggressive

Issues created by fire smoking, fish cleaning at campgrounds, hanging meat in town, dumps

Closure of troublesome dumps means people need to take out garbage themselves

Hunters being harassed by grizzly bears is common - bears are attracted to gunshots and gut piles

People buy resident tags in case of DLP (defence of life and property) kill, not because of a desire to harvest bears

Trophy hunting is a problem because it removes larger, big bears (leading to more conflicts with young bears)

Bear jams cause road safety issues

Increases in habituated bears, causes problems for locals

Tourists not careful/respectful of bears

Forestry access roads leads to more harvest and conflicts

Habituated bears present take in bush

Personal money and efforts spent deterring conflict bears

Information

Need better census information how many bears are there?

Lack of baseline scientific data and TK/LK data

Knowledge is dependant on the time of year

Need better understanding of bear numbers and habitat to inform management

Champagne and Aishihik First Nations have identified key areas but need better numbers and data – some historic spots like Kluane and Dalton Post have changed

How do Department of Environment, YESAB, and RNC fit together?

Need better population estimates and genetics studies

Grizzly Bear Conservation & Management Plan

Provide direction in the plan about community and personal responsibility to bears

Communities need to develop local plans

Local people should do deterrence work

Plan should allow for local flexibility to develop separate regulations in each community

Local knowledge should hold weight in the plan

Special interests exist but all voices and cultures need to be part of the plan

Roads should be considered in highway re-vegetation, trapper applications, campground locations, livestock, etc.

Champagne and Aishihik First Nations – grizzly bear corridors should be considered in land use planning (balance between economic development and conservation)

Need to have more interim measures to protect bear habitat

Need a process for how recommendations from various management agencies and parties fit together

Need to adaptively manage bears (changes to hunting seasons, etc.)

Should be managed sustainably; wildlife should be kept in proper proportions (not too many bears or too many moose)

Protect key corridors and habitat

Improve deterrents

We should talk more about how bears fit into moose recovery programs (bears prey on moose so may need to consider reducing bear populations)

If you see anything on this list that is inaccurate or you feel something is missing, please take a moment to write it on a sticky note and add it to the poster.

What we heard

Old Crow Region

Regional workshop participants: Vuntut Gwitchin Government, North Yukon Renewable Resources Council, Government of Yukon

Use

Bears not hunted in the traditional territory

People do not understand why bears are harvested if they are not consumed

Some interest in wildlife viewing/ eco-tourism in the community

May be difficult to do bear viewing in this location since bears are scattered

Traditional & Local Knowledge

Seeing more bears at the Porcupine River in early fall (may be due to low berries, staying along the river eating roots)

More bears on the Rampart gut piles

A lot of bears in Vuntut Gwitch'in First Nation traditional territory

Less bears at Fishing Branch – since 2002 salmon low

More bears around

A long time ago there were no bear problems

Used to get big animals, now you get small bears

Never bothered grizzly bears in the past

Only ate bears in times of starvation – do not think anyone eats bears here now

Talk to them and do not bother them or they will retaliate

Culturally people never hunted bears unless they were starving

Do not talk about bears because they can hear you

Habitat

Changes in salmon habitat and spawning habitat is affecting bear distribution

Low salmon at Fishing Branch so more bears around the community

When humans go into the bush they invade bear's territory

Fill has a number of assets along the Yukon River and back country but bears are not considered

Seeing more bears on the river makes people wonder what is happening on the land

Education

Deliver bear awareness training at schools

Need to educate people about attractants (cleanliness of campsites is the biggest problem) and on how to interact with bears (bears get immune to people screaming)

Fishing Branch River provides opportunity of education on bears

Value

Lots of respect for bears

Conflict

More conflicts with bears because of changes in salmon abundance and distribution

Bears are attracted to meat and fish hanging to dry

Attracted to gut piles and berry patches in the fall

Need to have a designated person dealing with bear-human conflicts (working collaborative with RCMP)

People get bear tags in case they have conflicts

People used to having bears around, and take action to minimize conflicts

Bears can destroy cabins

Some people are terrified of bears

Information

Vuntut Gwitchin First Nation heritage department has TK archives – could include this information in the plan

Need to get current observations on changes

Need TK from Elders and input from community

There is a knowledge gap about bear dens (do not know where bears den)

Need to know where bear dens are

We need a better understanding of what bears do and of how we can be better stewards for them

Grizzly Bear Conservation & Management Plan

Need to address climate change effects on grizzly bears and create a plan to deal with changing bear behaviours

When talking about bears also need to talk about salmon – can't manage bear in isolation

Need to define roles and responsibilities about who gets to deal with problem bears (RCMP or First Nation experts)

Need to develop a community protocol for dealing with problem bears (for example, provide training, equipment, facility, etc.)

Develop communication and education plan to support protocol for dealing with problem bears

Plan needs traditional knowledge and input from the community

Want bears living with us and want to learn more about them

Want a thriving population similar to what we have now

Need to be able to plan for interactions with bears

If you see anything on this list that is inaccurate or you feel something is missing, please take a moment to write it on a sticky note and add it to the poster

What we heard

Pelly Region

Regional workshop participants: Selkirk First Nation, Selkirk Renewable Resources Council, Carmacks Renewable Resources Council, Mayo District Renewable Resources Council, Government of Yukon

Traditional & Local Knowledge

Fewer bears fishing at Hot Mix Lake

Used to see more bears in the Mayo area when we were young

Berries have not been good in 5-7 years

More grizzly bears and black bears

Seeing more bears last 5-7 years, more in Pelly than in Mayo area

Dyke where people in Mayo like to walk has berries and there are always bears near by – need to identify key habitat and avoid it

Shre-Cho (Northern Tutchone) name for grizzly bear

Rock Island Lake – this area belongs to bears, leave it alone

Story about grandmother learning about roots and berries from bears – bears are teachers

Elders say do not talk about bears because they will know and come to your camp – keep your camps clean

Historically bears used for clothing/inside of items (fat, claws, skin)

Bears can teach people to find food (berries/bear nuts)

Information

Need more information on harvested bears

People can use photos to help share on-the-land information

Need to deal with outfitting – want more information on harvest

Need better Yukon wide data

Ask Selkirk First Nation about Dodi laws related to bears

Baseline data needs to come from locals and biologists

Need studies of local knowledge about how fire affects bears

Need to document wildlife information from trappers (offer incentives)

Need to evaluate what deterrent besides guns are effective

Need more knowledge and study of bears; need better baseline genetics data

Need to collect genetics information and develop a genetic pool (Yukon zoo?)

Habitat

Effects of climate changes on habitat (there is a reason bears are moving away from this area)

How are we going to ensure habitat protection when the entire traditional territory is staked?

Miners do not have to follow rules on habitat protection

Leave bear habitat alone (bears dens)

Each grizzly bear has its own land

Climate change may be changing access to food

May not be enough food for bears as they are coming into town

Global warming is having a big affect on bears – weather is getting warmer and changing their habitat and affecting their food sources

Sweet clover is drowning out strawberries so there is less food for bears

More fires, more morel mushrooms; bears hang around fires and eat burned animals

Don't have access to natural foods and it's easier to dig in the garbage

Weather is getting warmer, longer seasons

Dens are flooding

Victoria Gold building over bear dens

Need to figure out how much habitat mines are taking away – this should be done by locals and biologists and not the mining people

Climate change (elders have visions about bears being the last animal we see)

Protect the Peel (not much territory left)

Value

First Nation values are not the same (not just interested in development) and should be included in plans

There are elements of the land

People like to see bears

Bears have tourism value

Conflict

Bears that have been involved in conflicts should be relocated carefully

Animals come back to where they are born – conflicts are the result of development in bear habitat

Every year they seem to get bolder

Bears have learned to pull out the garbage bins

Bears come when they hear a shot or a moose call

Seeing bears in the snow and staying out longer (longer season means more conflicts)

Bears attracted to meat and fish hanging

Attracted to cut piles and berm patches

Hunting moose causes conflicts

Dyke where people walk in Mayo has berries and lots of bears – many conflicts

After we started hauling garbage to Whitehorse there have been more bears in town

Harvest of problem animals and in self defence

People only harvest bears that are creating conflicts

Bear jams are bad for people and bears (habituation)

People take risks to get photos of bears on the roadside

Not all bears respond the same way – people don't have a sense of how to read the body language

Use

In the Mayo area outfitters are the biggest harvesters of bears

First Nation people might harvest bears for medicine (gall bladder) but this only happens every 5-10 years

Spread berry seeds, keep channel open for whitefish run

Grizzly Bear Conservation & Management Plan

There needs to be money for management

First Nations and Renewable Resources Councils should be working with Yukon government to develop the plan

The plan must come with enforcement

Game guardians need to implement the plan

Plan needs to use scientific and traditional knowledge

3-5 year review to show the plan is working and amend it

Plan has to use common sense

Plan should be able to withstand changes in government

Have to take into consideration traditional way people managed bears

There are issues with giving land away without any information on bears (most agricultural land is bear habitat)

Working group should come back in May for more input and information from Ursula/ Aurelea retreat

Need to have regulations around viewing (for tourists and for locals)

YESAB- RRCs can only make recommendations, even in areas that are important to bears

Land use plan needed before any development can happen

Need to protect them

Self-government means First Nations getting involved in research and can contribute to answering questions about bears

Education

Need to educate people on how to avoid encountering bear dens

Need to teach younger generations how to respect and understand bears (teach traditional ways)

If you see anything on this list that is inaccurate or you feel something is missing, please take a moment to write it on a sticky note and add it to the poster.

What we heard

Tagish Region

Regional workshop participants: Taku River Tlingit, Carcross/Tagish First Nation, Carcross/Tagish Renewable Resources Council, Teslin Tlingit Council, Teslin Renewable Resources Council, Ta'an Kwäch'än Council, Laberge Renewable Resources Council, Government of Yukon

Use

Harvest for traditional purposes. First Nation values of grizzly bear.

Trophy hunt should not be allowed

Bears can be viewed as an indicator of a healthy ecosystem

Hunting bears creates jobs and supports local economy

Non-consumptive use will be more valuable than trophy hunting in 25 years

Traditional & Local Knowledge

More bears along the highway, same number on the land (observations must be taken in context)

One bear can cause a lot of sightings

Use TK and LK to supplement scientific knowledge of grizzly bears

Traditional practices of respectful treatment of certain parts of harvested bears

Rules around viewing animals respectfully linked to incorporating First Nation terms of whites

Need for locally set rules and prescribers to control viewing

Education

Mandatory bear awareness would be helpful

Need to educate people (on bear behaviour, how bears move in the landscape, how to avoid interaction and conflicts)

Education should be regionally specific

Providing bear spray is helpful – working with conservation officers is helpful to provide training to people

Educate people on spiritual and cultural value of seeing bears

More signage and pamphlets necessary

More education on bear safe camp sites

Need bear education at campgrounds and on highways

Habitat

Habitat needs protection from tourists along the river

Beavers are also cause of changing bear dynamics (more beavers, less salmon)

Land use affects abundance by restricting access to prime habitat (humans displacing bears)

Climate change affecting bear populations

Warming weather can cause bears to come out more often

Grizzly bears are not always denning up at winter – more bears out in the winter

Grizzly bear denning areas should be recorded and protected

Avoid development in known corridors

Need to mitigate damage to habitat (plan should be part of larger land use planning)

Long term vision needs to be holistic and consider climate change

Information

Need to know how many bears in the Southern Lakes area (what does it mean to be "viable" population)

How many bears are in the Yukon?

Need better understanding of range and critical habitat

Need current data from science, traditional, and local knowledge

Should be more monitoring/ more non-intrusive studies (Genetics vs radio-collaring)

Need better understanding of biological needs for sustainable population

Get hunters and trappers, recreational users involved in collecting grizzly bear hair samples/bear scat

Need a standardized approach to information collected to inform regional needs

Need better understanding of bear ranges

Need better information on bear populations

Conflict

Many Yukoners buy bags for safety, not for harvest

Have traditionally avoided conflicts with bears but Whitehorse population has affected bear populations

Leaving moose and caribou remains near the road causes conflicts

Landfills are expensive and people dump garbage to avoid paying tipping fees and this causes problems

Composting in Whitehorse attracts bears

Presence of bears on the Atlin Road depends on berries – high use areas are related to conflict

Fishing and hunting camps are hotspots for conflict

If people are diligent and keep things clean there will be no bear problems

Relocation of bears is a problem – problem bears are dropped in our area

Need to charge people who are not managing attractants properly

Proper land use planning reduces conflicts

Exploration and mining camps are linked to conflicts – mining camps need to be held accountable and need site regulations

Poachers are an issue in the area

Habituation of bears increases bears' comfort with approaching human settlements

Hunting can be dangerous too – walking on to a kill

Feeding of bears from roadside creates safety issues

Value

We live in bear country. Not acceptable to say how many bears there should be.

Bears symbolize wilderness

Bears have spiritual value

Bears bring people to the territory and this has economic impact

Grizzly Bear Conservation & Management Plan

First Nation governments need involvement in the plan development

Need a regional land use plan to coordinate the conservation of bears

Renewable resources councils need to be fully involved in grizzly bear management and studies

The plan should include traditional knowledge

Population management needs to be proactive

Stories from Elders should be part of the plan

Plan should acknowledge different First Nation perspectives, values, issues and approaches

Different perspectives on how TK should be included in the plan: 1) TK knowledge should span the plan, 2) TK should have separate section of the plan

Incorporating First Nation culture and traditional bear management practices is an important place of the plan

Process should include First Nation at the planning table – currently only one decision maker at the table – Wanted someone from the RRC on the working group

Help First Nation technicians to develop and implement bear programs

Wildlife viewing should be supported in the management plan

Planning should be holistic and consider all members of the ecosystem

Plan needs to address issues at a local level

Management plan should be a living document that can change with time

Plan should work with other plans (forest management, etc.) – cult working in isolation

Plan should allow for local First Nation to develop bear viewing and close hunting in certain area

Need to mitigate the damage we have already done (no corridors) – should be part of regional land use planning

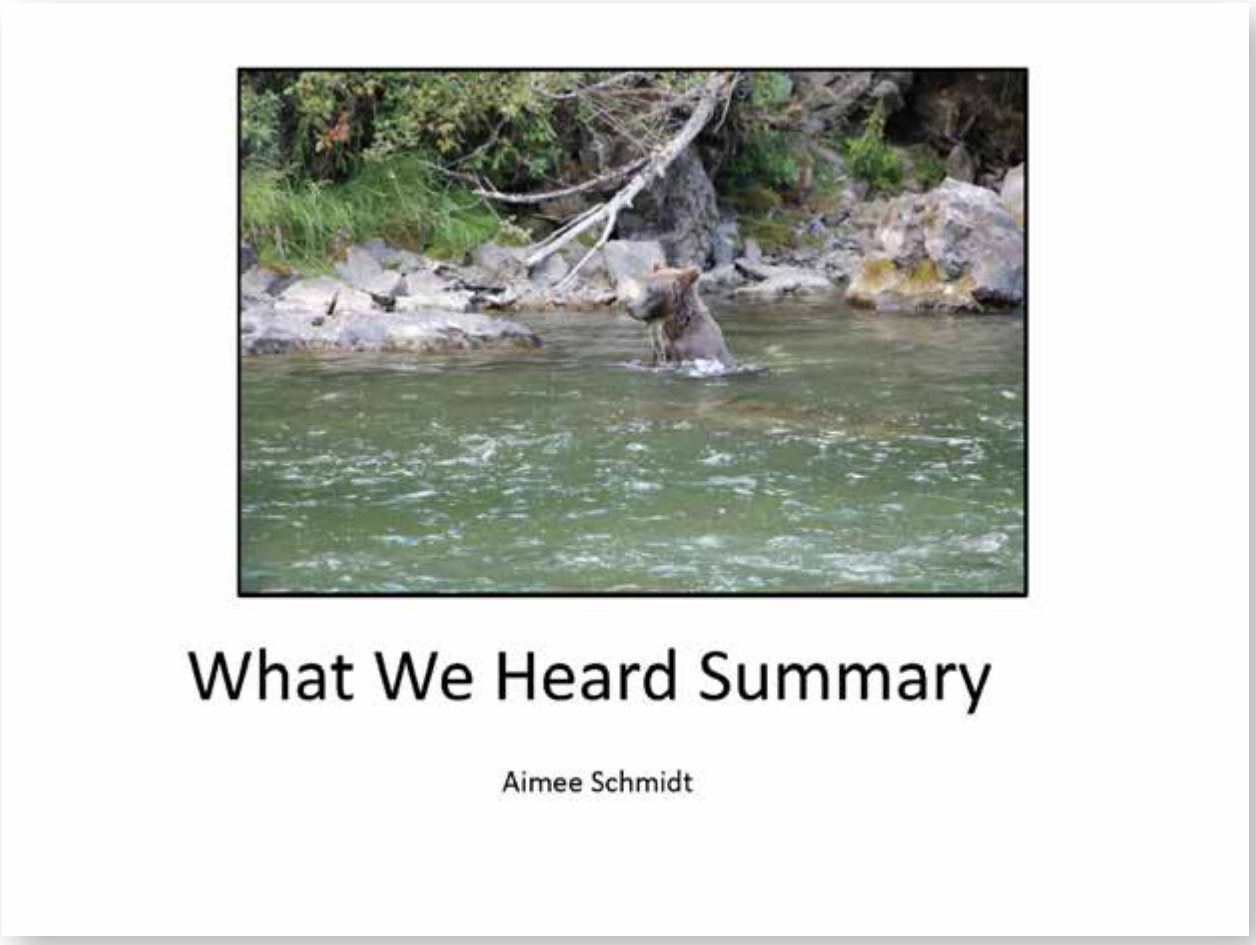
The ethics of a trophy hunt and not using the meat is an issue for First Nation

If you see anything on this list that is inaccurate or you feel something is missing, please take a moment to write it on a sticky note and add it to the poster.

What we heard presentation: thematic summary

Presented by: Aimee Schmidt, University of Saskatchewan

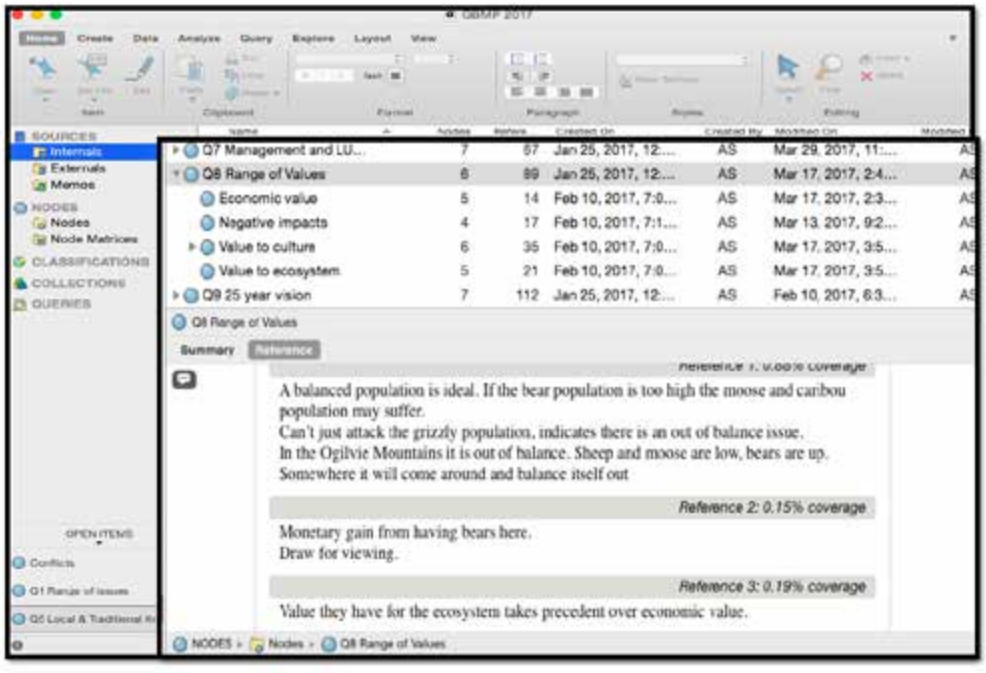
Date: July 2017



Background

1. Has there been any change in the apparent number of conflicts between grizzly bears and people in your region?
2. Has there been any changes in the apparent abundance of grizzly bears in Yukon?
3. Can you comment on the harvest of grizzly bears?
4. What is the role of local knowledge and traditional knowledge as it relates to grizzly bears?
5. What about the role of bear viewing, education and tourism in Yukon?
6. How well does grizzly bear conservation and management fit (or not) into land use planning processes and environmental assessment reviews?

What we did



Use (consumptive/non-consumptive)

Bear viewing

- Need to have locally set rules and parameters to regulate wildlife viewing (Tagish, Dawson, & Pelly regions).
- Tagish region participants were supportive of grizzly bear viewing - the plan should recognize wildlife viewing as a valuable land use option.
- Haines Junction region participants felt bear viewing should not be promoted due to negative effects on bears.
- Roadside viewing was generally viewed as problematic - creates hazards for both people & grizzly bears (Haines Junction, Pelly, Fort McPherson regions).

Use (consumptive/non-consumptive)

Traditional Harvest

- Most workshop participants spoke about traditional harvest practices and methods (Fort McPherson, Dawson, Old Crow, & Haines Junction region).
- Most workshops noted that First Nations rarely harvest grizzly bears (with the exception of Fort McPherson).
- Haines Junction region participants noted that the harvest of older bears leads to conflicts with younger bears.
- Tagish region participants noted that meat from harvested animals should be salvaged / that no trophy hunting should be allowed.
- Haines Junction participants noted that hunting can be a management tool.

Use (consumptive/non-consumptive)

Harvest continued

- Pelly region participants noted that in the Mayo area outfitters are the biggest harvesters of grizzly bears.
- Several participants felt that non-residents should not be allowed to shoot grizzly bears (Pelly & Tagish region).
- Fort McPherson region participants noted that poaching was the biggest threat to bears in this area.
- Participants from many workshops pointed out that many people by bear tags for defense of life & property kills (DLP's).

Education

Bear Safety Education

- All workshop participants noted the need for increased bear safety education.
- Education is needed for different groups (tourist, school kids, residents, etc.) and needs to take different forms (signage, school training, pamphlets, etc.).
- Participants noted the need to increase access to infrastructure such as canisters, caches, and bear deterrents.
- Dawson participants pointed out that education is needed for residents just as much as for tourists.
- Old Crow participants noted the need for increased training for locals on how to respond to bear-human conflicts.

Education

Education on respect

- The need for more education on the spiritual & cultural value of bears was also noted in many workshops.
- Tagish region participants noted the need to educate people on the ethics of bear viewing.
- Participants from all regions noted the need for people to be educated how to behave respectfully towards bears (Fort McPherson, Tagish, Haines Junction, Old Crow, & Dawson regions).
- People need to understand that we are invading the grizzly bear's territory (Tagish, Pelly, Old Crow, Fort McPherson regions).

Habitat

Human Land Use

- Human use of the landscape (through mining/agriculture/residential development, etc.) is increasing and may jeopardize bear habitat in Yukon (Tagish, Dawson, Pelly, Haines Junction regions).
- Many participants pointed out the need to consider wildlife corridors and key habitats in land use planning (Pelly, Dawson, Haines Junction regions).
- Dawson participants expressed concerns about the impacts of roads on grizzly bears (e.g. increased access for hunters, increased human presence in bear habitat, etc.).

Habitat

Climate change

- All workshop participants pointed out that there is a need to understand climate change impacts on habitat & grizzly bear food sources.
- Haines Junction workshop participants noted that grizzly bear habitat will shrink and become fragmented due to climate change.
- Habitat protection efforts should consider the impacts of climate change (Tagish, Haines Junction, Pelly regions).

Traditional & Local Knowledge

Value of TK & LK

- TK & LK provide long-range observations that complement scientific data.
- Need to identify gaps in local and traditional knowledge data and to secure funding to address these gaps.
- Haines Junction workshop participants expressed concerns about a general lack of understanding of FN practices that may result in cultural misunderstandings and the misappropriation of FN stories.
- Tagish workshop participants pointed out the role of the game guardian program in developing a ground based monitoring program.

Information

Lack of scientific data

- All workshop participants pointed out the need for more baseline data on grizzly bears.
- There is a need for more current and accurate estimates of grizzly bear populations in the Yukon.
- Participants from all workshops noted that there are big gaps in data on bear behavior.
- The lack of funding for research on grizzly bears was identified as a barrier by many workshop participants.

Information

Lack of traditional/local knowledge on grizzly bears

- All workshop participated noted the need to document traditional & local knowledge from elders and community members.
- Tagish participants noted the lack of information on people's attitudes toward grizzly bears and how these attitudes will effect management.
- Many participants suggested using people who spend time out on the land to collect information about grizzly bear populations, habitats, and behaviours.

Value

Value to ecosystem

- Participants felt that grizzly bears play a vital role in maintaining ecosystem health and function.
- Grizzly bears were described as "stewards of the land" by Dawson workshop participants.
- Participants pointed out that removing bears from the landscape would have far reaching adverse effects (Dawson, Tagish, Pelly regions).
- However, participants in the Haines Junction region noted that a "balanced population" is necessary since too many bears would have adverse effects on ungulate populations.

Value

Spiritual & Cultural Value

- Some workshop participants described bears as symbols of wilderness (Tagish & Haines Junction regions).
- Tagish workshop participants pointed out that grizzly bears have value as individual animals as well as a population.
- Many workshop participants noted the strong spiritual value of grizzly bears (Tagish, Haines Junction, & Old Crow regions).
- Pelly workshop participants described grizzly bears as teachers.
- Tagish workshop participants pointed out the big predators keep us humble.

Value

Economic value

- Many workshop participants spoke about the value of grizzly bears to tourism (Tagish, Pelly, Dawson & Haines Junction regions).
- Haines Junction participants pointed out that tourists are drawn to see wild grizzlies and that bears are big business.
- Some participants also noted that trophy hunting creates jobs and supports local economy (Tagish & Haines Junction region).

Conflicts

Increased conflicts

- All workshops noted an increase in conflicts with grizzly bears and described bears as more likely to be habituated or food-conditioned.
- Tagish participants noted that habituated bears can actually be safer than non-habituated bears.
- All workshop participants attributed the presence of garbage & attractants to increased conflicts.
- Dawson & Fort McPherson region participants identified the Dempster highway as a hot spot for conflicts.

Conflicts

Environmental causes

- Many workshop participants noted that there are now more bears in close proximity to people.
- Grizzly bear habitat has changed and lead to declines in food sources for bears.
- Respect is seen as the key to coexistence – training & local capacity building to deal with conflicts is necessary.
- Land use planning should be used to reduce conflicts between grizzly bears & people (e.g. no campgrounds in migratory corridors. etc.).

The Plan

Role of TK & LK in the plan

- Traditional knowledge & local knowledge should be included in the plan.
- Plan needs to acknowledge different First Nation values, practices, issues and approaches (Pelly region, Tagish region, Old Crow region, Haines Junction region).
- Haines Junction workshop participants expressed concerns that a general lack of understanding of First Nation practices may cause cultural misunderstandings and lead to the misappropriation of stories.
- Workshop participants had different ideas about how TK & LK should be incorporated into the plan.

The Plan

Desired outcomes of the plan

- To maintain a viable, thriving, or healthy grizzly bear population at a level similar to the one that currently exists in the Yukon (Pelly, Old Crow, Tagish, Dawson, Haines Junction, Fort McPherson regions).
- The plan needs to be adaptive & flexible – should be allow for each community to develop separate regulations.
- The plan requires collaboration between different groups and across jurisdictions (Dawson, Tagish, Pelly, Fort McPherson regions).
- Fort McPherson participants noted the need to learn to co-exist with grizzly bears and to enhance spiritual connections with them.

The Plan

Local relevance

- Many participants noted that communities need to be able tailor the plan according to their needs.
- Haines Junction participants noted the need for each community to develop local plans for responding to bear-human conflicts.
- Tagish & Pelly region participants suggested that the game guardians could help to implement the plan.

EXISTING BEST PRACTICES RELATED TO GRIZZLY BEARS

Humans and grizzly bears coexist throughout Yukon, but problems can arise when people and grizzly bears are in close contact, resulting in risk to human safety, harm to grizzly bears, or property damage. A major source of human-grizzly bear conflict is attractants such as household or industrial waste, chicken coops, and livestock, which will attract grizzly bears if not properly secured. Negative interactions between people and grizzly bears can occur during recreational activities in the backcountry (e.g., hiking, hunting, fishing, or mountain biking) or roadside grizzly bear-viewing, particularly if grizzly bears are surprised or approached. Many conflicts can be prevented or minimized by modifying human behaviour.

In Yukon and other jurisdictions, best practices have been developed that provide recommendations for reducing human-grizzly bear conflicts in residential areas, industrial camps, and in the backcountry. While best practices are not as prescriptive as regulations or standard operating procedures, they do provide valuable guidelines, advice, and information based on the best available research and local knowledge about human-grizzly bear interactions. These often simple proactive measures can promote human safety and prevent the unnecessary mortality of grizzly bears, which is essential if grizzly bears are to continue to exist in Yukon.

Links have been provided for a series of best practices from Yukon, British Columbia, Alberta, Alaska, and other US states. This list is not exhaustive, but is intended to provide examples of best practices and instructional pamphlets for a range of topics including backyard attractant management, chicken coops, agriculture, grizzly bear viewing, industrial activities, backcountry recreation, and hunting and fishing.

With respect to attractant management, educational resources have been developed by Government of Yukon about reducing backyard attractants and installing electric fences to keep grizzly bears away from livestock pens, chicken coops, bee yards, gardens, cabins, or camps (step-by-step instructions for installing electric fences are provided). “Bear Smart” protocols developed in Alberta and British Columbia are an excellent complimentary resource; they provide detailed attractant management practices including specific advice for beekeepers, farmers, and ranchers, and best practices for municipal waste management. The Alaska Department of Fish and Game has a web page with additional suggestions for backyard attractant management and demonstration videos for electric fence installation. Links have also been provided (from Government of Yukon and others) to guidelines for individual and commercial grizzly bear viewing, and staying safe in bear country when camping or recreating. Lastly, Yukon has best practices for industrial activity in bear country, including protocols for minimizing disturbance to bear habitat and managing attractants at industrial camps.

The listed resources cover the current state of information available to individuals and industry in Yukon and neighbouring jurisdictions. In the future, as the Conservation Plan for Grizzly Bears in Yukon ("the Plan") is implemented, there may be a need to update existing best practices or develop new guidelines. The Plan points to several gaps in the existing best practices for Yukon; for example, there is a need to develop additional resources for community-based attractant management and safe grizzly bear viewing at the individual and commercial scale. Guidelines for land use development and associated grizzly bear monitoring programs are also lacking. The development of new best practices will require information gathering and broad consultation to incorporate local, regional, and traditional knowledge, in addition to careful review by grizzly bear experts, stakeholders, and boards and councils. The issues surrounding human-grizzly bear conflicts, and the appropriate solutions, may vary by region. Region-specific best practices may be required in some cases, while some best practices may be standardized across the Yukon.

Existing Best Practices

Backyard Attractants

Yukon

- Government of Yukon. 2018. *Wild and Alive Bear Attraction Audit.* **https://yukon.ca/en/keep-bears-wild-and-alive-bear-attractant-audit**

  Educational flier including a checklist for recognizing and reducing backyard attractants in Yukon.

- Government of Yukon. 2018. *Reducing Wildlife Conflict with Electric Fencing: A Beginner's Guide.* **https://yukon.ca/en/reducing-wildlife-conflict-electric-fencing-beginners-guide**

  Guidelines from Environment Yukon on electric fence set-up and use for a variety of purposes and wildlife, including specific fence designs for bears.

Other – Canada

- BearSmart (based in Whistler, BC). *Managing Attractants.* **http://www.bearsmart.com/live/managing-attractants/**

  Web page with guidelines compiled regarding garbage disposal, bird feeders, fruit trees and berry bushes, barbeques, gardens, pet food, petroleum products, compost, yards and green spaces, and salt and mineral blocks.

- Government of Alberta. 2018. *Bears and Residents.* **https://www.alberta.ca/bears-and-residents.aspx**

  Web page with bear safety information for homeowners, beekeepers, farmers and ranchers, including Alberta Bear Smart Brochures about "Be BearSmart at Home" and "Bears and Residents".

- Government of British Columbia. *taying Safe Around Wildlife: Bears.* **https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/wildlife/human-wildlife-conflict/staying-safe-around-wildlife/bears**

  Web page with information for managing bear conflicts, including agriculture, barbeques, beehives, bird feeders, compost, crop damage, fruit trees, garbage, livestock, pet food, etc. Also includes information on electric fencing.

Other – International

- Alaska Department of Fish and Game. *Coexisting with Bears: Managing Bear Attractants.* **http://www.adfg.alaska.gov/index.cfm?adfg=livingwithbears.bearharmony**

  Suggestions from ADFG regarding what you can do around homes and cabins to manage bear attractants.

- Alaska Department of Fish and Game. *Electric Fences as Bear Deterrents* **http://www.adfg.alaska.gov/index.cfm?adfg=livingwithbears.bearfences**

  Demonstration on how to set up an electric fence, suggested for deterring bears around animal feed, beehives, butchered game, compost piles, domestic animals, fish cleaning sites, freezers, garbage containers, remote cabins and lodges, etc. Includes a list of vendors in Alaska.

Chicken Coops

Yukon

- Government of Yukon. 2018. *Reducing Wildlife Conflict with Electric Fencing: A Beginner's Guide.* **https://yukon.ca/en/reducing-wildlife-conflict-electric-fencing-beginners-guide**

  Guidelines from Environment Yukon on electric fence set-up and use for a variety of purposes and wildlife, including specific fence designs for bears.

Other – Canada

- Government of Alberta. 2011. *Alberta BearSmart Program Manual.* ISBN No.978-0-7785-7043-1. **https://open.alberta.ca/publications/9780778570431**

  A manual from the Government of Alberta. Section on Agriculture (p. 48-54), including livestock husbandry, bee yards, crops, grain storage and handling, yards and buildings, children, electric fencing to protect livestock, electric fencing for bee yards.

- BearSmart (based in Whistler, BC). *Managing Attractants*. **http://www.bearsmart.com/live/managing-attractants/**

  Web page with guidelines compiled regarding backyard attractants, including a section on chickens.

- Government of Alberta. 2017. *BearSmart Chickens and Bears.* **https://open.alberta.ca/publications/9781460133088**

  Brochure with recommendations on protecting chickens from bears and other animals.

Other – International

- Alaska Department of Fish and Game. *Electric Fences as Bear Deterrents* **http://www.adfg.alaska.gov/index.cfm?adfg=livingwithbears.bearfences**

  Demonstration on how to set up an electric fence, suggested for deterring bears around animal feed, beehives, butchered game, compost piles, domestic animals, fish cleaning sites, freezers, garbage containers, remote cabins and lodges, etc. Includes a list of vendors in Alaska.

Agriculture

Yukon

- Government of Yukon. 2018. *Reducing Wildlife Conflict with Electric Fencing: A Beginner's Guide.* **https://yukon.ca/en/reducing-wildlife-conflict-electric-fencing-beginners-guide**
  Guidelines from Environment Yukon on electric fence set-up and use for a variety of purposes and wildlife, including specific fence designs for bears.

Other – Canada

- Government of Alberta. 2011. *Alberta BearSmart Program Manual.* ISBN No.978-0-7785-7043-1. **https://open.alberta.ca/publications/9780778570431**

  A manual from the Government of Alberta. Section on Agriculture (p. 48-54), including livestock husbandry, bee yards, crops, grain storage and handling, yards and buildings, children, electric fencing to protect livestock, electric fencing for bee yards.

- Government of Alberta. 2018. *Bears and Agricultural Producers*. **http://aep.alberta.ca/recreation-public-use/alberta-bear-smart/bears-agricultural-producers.aspx**

  Web page with bear safety information for beekeepers, farmers and ranchers, including Alberta BearSmart Brochures and Fact Sheets. Includes a Be BearSmart Agriculture Checklist.

- BearSmart (based in Whistler, BC). *Farmers and Ranchers.* **http://www.bearsmart.com/work/farmers-and-ranchers/**

  Web page with guidelines for farmers and ranchers—including securing attractants, electric fencing, guard animals, husbandry practices, etc.

- BearSmart (based in Whistler, BC). *Beekeepers.* **http://www.bearsmart.com/work/beekeepers/**

  Web page with guidelines for keeping bears out of your bees—electric fencing suggested.

- Government of British Columbia. *Staying Safe Around Wildlife: Bears.* **https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/wildlife/human-wildlife-conflict/staying-safe-around-wildlife/bears**

  Web page with information for managing bear conflicts, including agriculture, barbeques, beehives, bird feeders, compost, crop damage, fruit trees, garbage, livestock, pet food, etc. Also includes information on electric fencing.

Other – International

- Alaska Department of Fish and Game. *Coexisting with Bears: Managing Bear Attractants.* **http://www.adfg.alaska.gov/index.cfm?adfg=livingwithbears.bearharmony**

  Suggestions from ADFG regarding what you can do around homes and cabins to manage bear attractants, including for agricultural attractants.

- Alaska Department of Fish and Game. *Electric Fences as Bear Deterrents* **http://www.adfg.alaska.gov/index.cfm?adfg=livingwithbears.bearfences**

  Demonstration on how to set up an electric fence, suggested for deterring bears around animal feed, beehives, butchered game, compost piles, domestic animals, fish cleaning sites, freezers, garbage containers, remote cabins and lodges, etc. Includes a list of vendors in Alaska.

Grizzly Bear Viewing

Yukon

- Government of Yukon. 2004. *Safe roadside bear viewing.* **https://yukon.ca/en/outdoor-recreation-and-wildlife/wilderness-safety/stay-safe-bear-country#safe-roadside-bear-viewing**

  Website with information about safe bear viewing practices from Yukon roadsides.

- Government of Yukon. 2016. *Into the Yukon Wilderness.* **https://yukon.ca/en/yukon-wilderness**

  Booklet on travelling safely in the Yukon wilderness, including a section on backcountry bear safety.

- Government of Yukon. 2016. *Yukon Wildlife viewing guide—along major highways.* **https://yukon.ca/en/yukon-wildlife-viewing-guide**

  Booklet describing where and how to view wildlife safely in the Yukon, with some helpful tips for not disturbing wildlife.

Other – Canada

- Commercial Bear Viewing Association of British Columbia. 2012. *Commercial Bear Viewing Association Best Practices Guidelines. Guidelines.* **http://www.bearviewing.ca/sites/default/files/CBVA_2012_Best_Practices_guidelines.pdf**

  Detailed best practices for commercial bear viewing organizations (e.g., wilderness tour operators). Includes recommendations for guide training, guest education, safe and respectful viewing (by land or boat), and how to interpret bear behaviour.

Other – International

- Bear Viewing Association. *Best Practices and Ethics.* **http://www.bear-viewing-in-alaska.info/BestP_BVA0.html**

  Webpage by the Bear Viewing Association of Alaska with "ten golden rules" for bear viewing.

- Oberbillig, DR. Colorado Division of Wildlife, and Watchable Wildlife Inc. 2001. *Providing Positive Wildlife Viewing Experiences.* **http://www.watchablewildlife.org/docs/ethicsbo.pdf**

  Handbook on wildlife viewing ethics for individuals and ecotourism operators.

- U.S National Park Service. Tips for watching roadside bears. Website. **https://www.nps.gov/yell/planyourvisit/roadside-bears.htm**

  Web page with recommendations for bear viewing in Yellowstone National Park, with a video on preventing roadside "bear jams".

Municipal Waste Management:

Other - Canada

- Get Bear Smart Society. *Waste Management.* **http://www.bearsmart.com/managing-communities/waste-management/**

  Website with advice for developing bear-proof waste management systems in communities.

- Government of Alberta. 2011. *Best Management Practices: Managing Waste Management Facilities for Bears and Wildlife.* **https://open.alberta.ca/publications/best-management-practices-managing-waste-management-facilities-for-bears-and-wildlife**

  Best practices from Alberta Fish and Wildlife to prevent wildlife conflicts at waste management facilities (e.g., landfills).

Industrial Activities

Yukon

- Environment Yukon, Mining and Petroleum Environmental Research Group. 2008. *Guidelines for Industrial Activity in Bear Country* (MPREG Report No. 2008-2).
  https://yukon.ca/en/guidelines-industrial-activity-bear-country

  Guidelines for industries that operate in the backcountry (e.g., mineral exploration), with best practices for managing attractants at industrial camps.

- Government of Yukon. 2012. *PROPONENT'S GUIDE: Assessing and Mitigating the Risk of Human-Bear Encounters.*
  https://yukon.ca/en/proponents-guide-assessing-and-mitigating-risk-human-bear-encounters

  Guidelines for assessing risk for human-bear encounters at a proposed work site, and measures for reducing conflict potential.

- Government of Yukon. *Staying Safe in Bear Country: Bear safety for industrial activity in the backcountry.*
  https://yukon.ca/en/outdoor-recreation-and-wildlife/wilderness-safety/stay-safe-bear-country

  Website with information about safety and attractant management at industrial or wilderness camps.

Other - Canada

- Bear Smart. *Get Bear Smart for Workers*.
  http://www.bearsmart.com/docs/WorkingBearCountryGuideNA.pdf

  Pamphlet with advice for preventing negative encounters while working in bear country, and avoiding attracting bears to work sites.

- Government of Alberta. *Alberta Bear Smart: Bears and industrial workers*.
  https://open.alberta.ca/publications/9780778590170

  Educational booklet for avoiding bear encounters and conflicts in bear country.

- Government of Alberta. *Alberta Bear Smart: Bear-human conflict management plan for camps.*
  https://open.alberta.ca/publications/9780778590170

  Best practices for establishing or operating industrial camps during spring, summer, and fall in bear country.

Recreating in the backcountry

Yukon

- Environment Yukon. 2016. *Into the Yukon Wilderness*
  https://yukon.ca/sites/yukon.ca/files/env/env-into-yukon-wilderness.pdf

  Booklet on travelling safely in the Yukon wilderness, including a section on backcountry bear safety.

- Government of Yukon. 2018. *Guide to Camping in Yukon.*
  https://yukon.ca/en/yukon-wilderness

  Booklet with information about safe camping practices and attractant management at campsites.

- Government of Yukon. 2018. *How You Can Stay Safe in Bear Country*
  https://yukon.ca/en/how-you-can-stay-safe-bear-country

  A guide to understanding bear behaviour and avoiding or staying safe during bear encounters.

- Government of Yukon. *Bear Safety in the Yukon Outdoors.*
  https://yukon.ca/en/outdoor-recreation-and-wildlife/wilderness-safety/stay-safe-bear-country#bear-safety-in-the-yukon-outdoors

  Website with advice for preventing and handling bear encounters when hiking, biking, camping, hunting, and fishing.

Other – Canada

- Government of Alberta. 2011. *Alberta BearSmart Program Manual.* ISBN No.978-0-7785-7043-1.
  https://open.alberta.ca/publications/9780778570431

A manual from the Government of Alberta, with a section on outdoor recreation.

- University of Alberta. 2014. *Bear Safety Information: Awareness and Avoidance*
  http://safety.eas.ualberta.ca/?p=20

  Website with advice for practicing bear awareness and avoidance to prevent problem encounters while in remote areas.

- Get Bear Smart Society. *Overview: Bear Smart in the Backcountry.*
  http://www.bearsmart.com/play/overview/

  Website with tips for keeping bear encounters positive and conflict-free.

Examples from National Parks in or adjacent to Yukon:

- Parks Canada: You are in bear country
  https://www.pc.gc.ca/en/docs/v-g/oursnoir-blackbear/
- Nahanni National Park Reserve
  https://www.pc.gc.ca/en/pn-np/nt/nahanni/visit/visit8
- Kluane National Park and Reserve
  https://www.pc.gc.ca/en/pn-np/yt/kluane/securite-safety/ours-bears
- Ivvavik National Park
  https://www.pc.gc.ca/en/pn-np/yt/ivvavik/safety

Other – International

- U.S. National Park Service, Yellowstone. 2017. *Bear Safety.*
  https://www.nps.gov/yell/planyourvisit/bearsafety.htm

  Includes a video on wildlife safety in Yellowstone National Park.

- Interagency Grizzly Bear Committee. 2017. *Board of Review Recommendations.*
  http://igbconline.org/wp-content/uploads/2016/03/160629_BOR_Recomm_Treat_NCDE.pdf

  Recommendations related to mountain bike safety in bear habitat based on the fatality of Mr. Brad Treat on June 29, 2016.

Harvest and fishing

Yukon

- Porcupine Caribou Management Board. 2010. *Safe Camping for Caribou Hunters.*
  http://www.pcmb.ca/PDF/hunters/Hunter-Education/Camping%20for%20Caribou%20Hunters.pdf

  Pamphlet with information about setting up hunting camps, managing meat attractants, and responding to bears in camp.

- Government of Yukon. *Stay Safe in Bear Country.*
  https://yukon.ca/en/outdoor-recreation-and-wildlife/wilderness-safety/stay-safe-bear-country#bear-safety-in-the-yukon-outdoors

  Fishing and hunting specific section of website on staying safe in bear country.

Other – Canada

- Get Bear Smart Society. *Hunters and Anglers.*
  http://www.bearsmart.com/play/hunters-and-anglers/

  Website with advice for preventing bear conflicts while hunting and fishing.

- Government of Alberta. 2011. *Alberta BearSmart Program Manual.* ISBN No.978-0-7785-7043-1.
  https://open.alberta.ca/publications/9780778570431

  A manual from the Government of Alberta, with a section on hunting and fishing.

Other – International

- Alaska Department of Fish and Game. *Fishing in Bear Country and Staying Safe.*
  http://www.adfg.alaska.gov/index.cfm?adfg=wildlifenews.view_article&articles_id=310

  Website with advice for managing bear encounters while fishing.