

Selkirk and Cabinet-Yaak Grizzly Bear Monitoring

Wayne Kasworm, Thomas Radandt, Justin Teisberg, USFWS

Michael Proctor, Birchdale Ecological Consulting

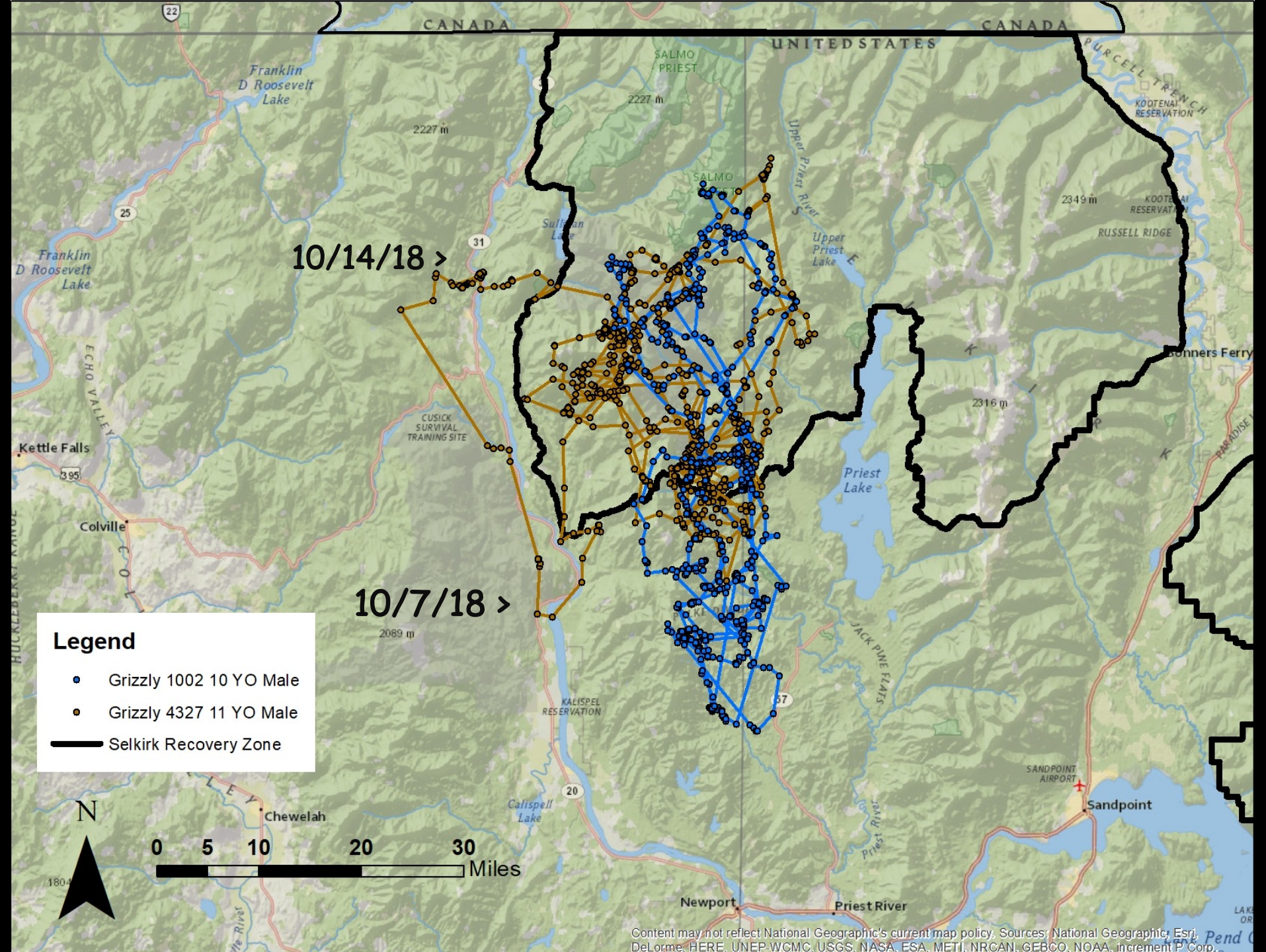
- 2018 Research Captures
- Cabinet Mountains Augmentation
- Recovery Plan Targets
- Population Trend
- Habitat and Food monitoring



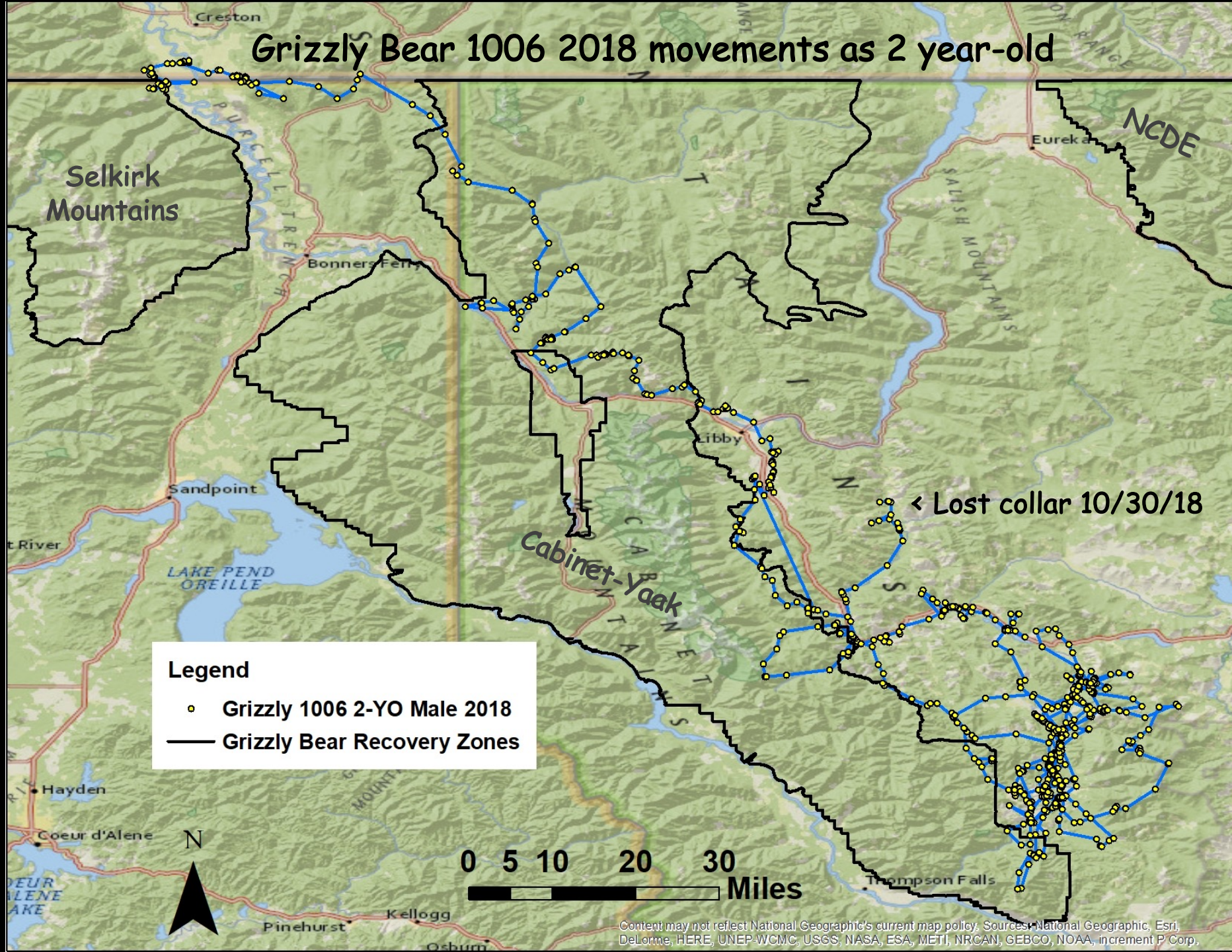
Research Captures

- Selkirks -2 Adult males both recaptures 1002 (6/21/18 - 10 year-old, WF LeClerc Cr) 4327 (6/26/18 - 11 year-old, WF LeClerc Cr)
- Cabinet-Yaak adult male 722 (9/23/18 - 19 year-old, Hellroaring Cr)





Grizzly Bear 1006 2018 movements as 2 year-old



Cabinet Mountains Grizzly Bear Augmentation

- 20 bears added since 1990
- 13 females and 7 males
- 5 bears left the target area, but one returned
- 6 bears are known dead
- 2 bears are known to have reproduced



Cabinet Mountains Grizzly Bear Augmentation 1990-2018

This map illustrates the recovery area and movement tracks of grizzly bears in the Cabinet Mountains region of Idaho, USA, from 1990 to 2018. The recovery area is outlined in black, covering the Cabinet Mountains and Northern Continental Divide. The map shows various geographical features, including the Kootenai National Forest, Flathead National Forest, and the Coeur d'Alene National Forest. Key locations such as Sandpoint, Bonner, and Kalispell are marked. The map also shows the border with Canada to the north and the state of Montana to the east. A legend on the right side of the map provides details on the movement tracks, including the year and sex of the bear. A scale bar at the bottom indicates distances in miles (0 to 50).

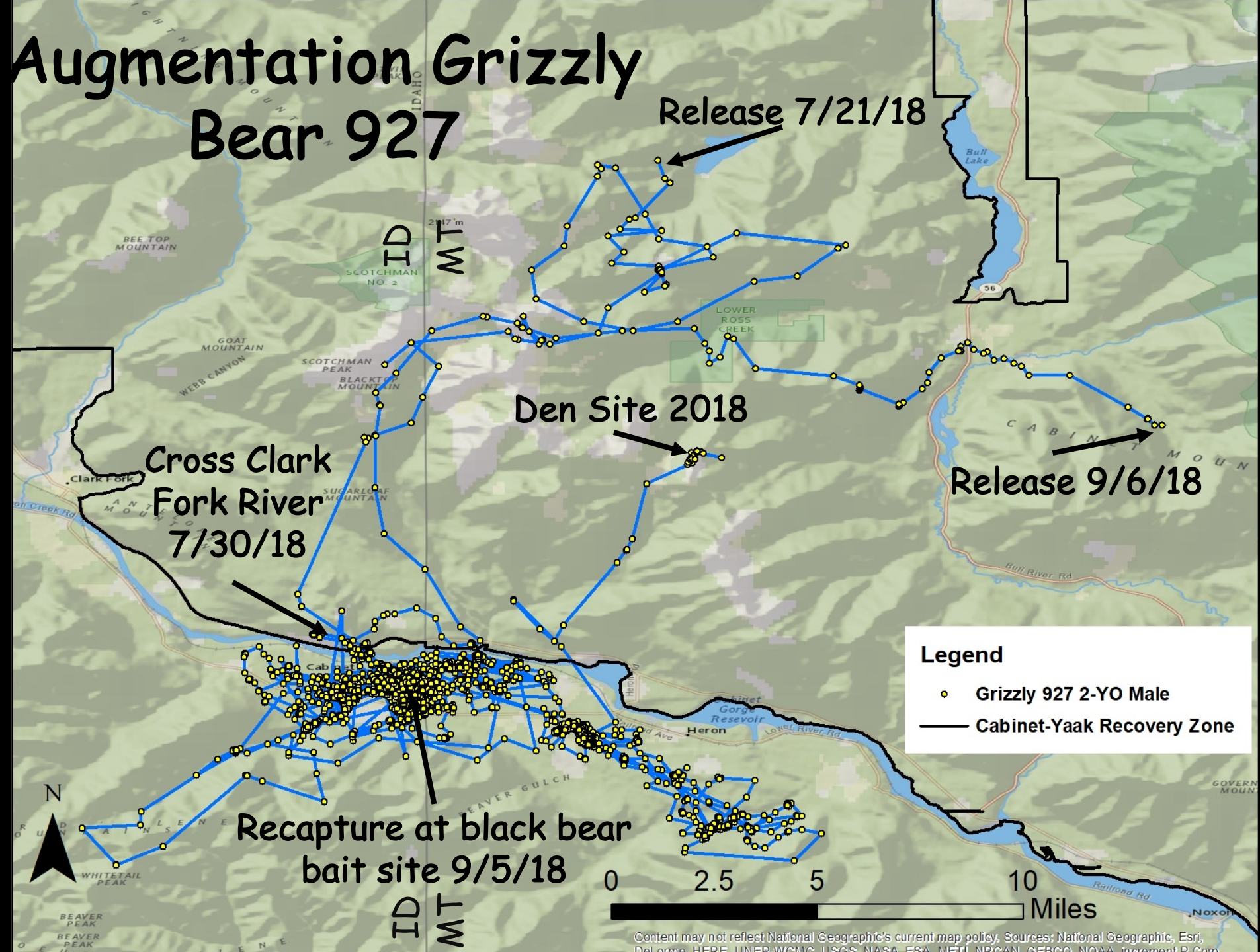
Legend

- Recovery Area
- M 927 2yo 2018
- M 926 3yo 2016
- M 924 2yo 2015
- F 920 3yo 2014
- F 921 3yo 2014
- M 919 4yo 2013
- M 918 2yo 2012
- F 725 2yo 2011
- M 723 2yo 2011
- F 714 4yo 2010
- M 713 5yo 2010
- F 715 15yo 2009
- F 790 3yo 2008
- F 635 4yo 2008
- F 782 2yo 2006
- F A1 8yo 2005
- F 311 3yo 1994
- F 286 2yo 1993
- F 258 6yo 1991
- F 218 5yo 1990

Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

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Augmentation Grizzly Bear 927



Augmentation Grizzly Bear DNA Family Tree for the Cabinet Mountains

DNA relationships for grizzly bears in the Cabinet Mountains from 1990 through 2016
 (* Bear 286 was the augmentation bear placed in the Cabinet Mountains in 1993 and Bear 782 was released in 2006)

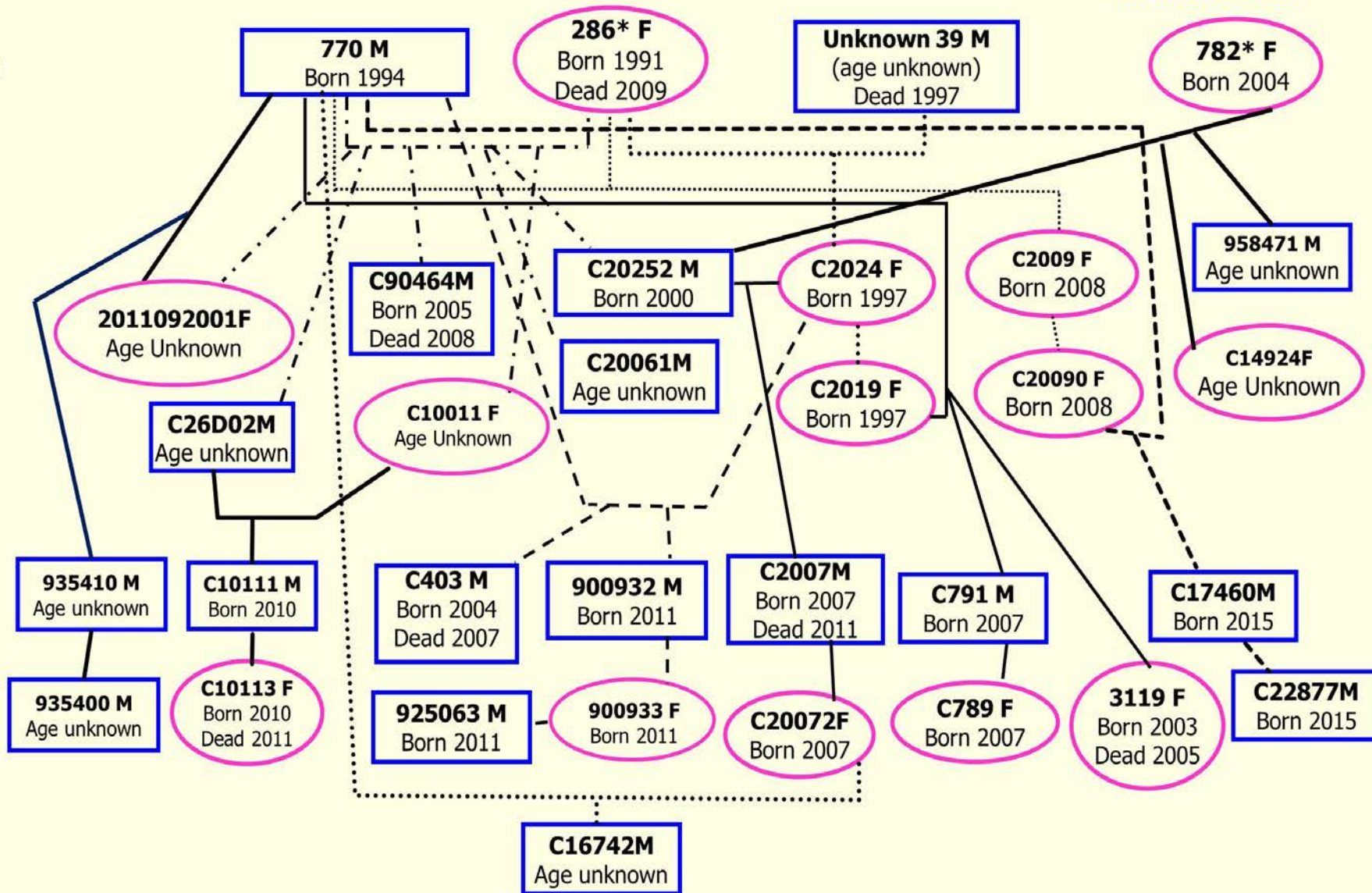
Pink Circles = Females
 Blue Boxes = Males

F0

F1

F2

F3



GRIZZLY
B E A R

RECOVERY

P L A N



NCDP subunits =

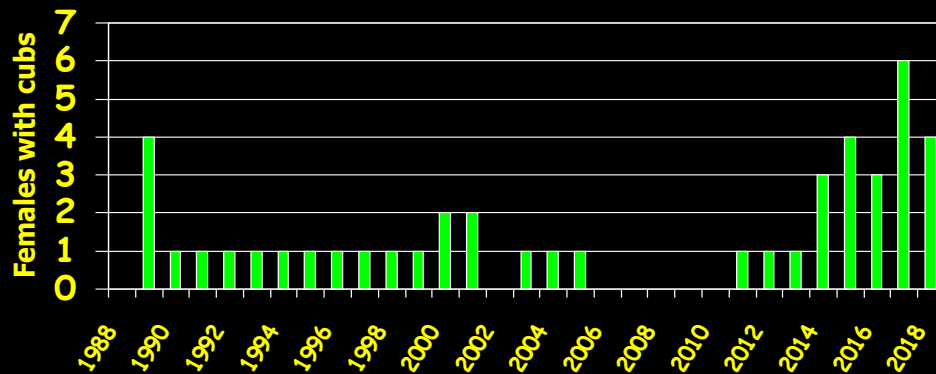
Cabinet-Yaak and Selkirk Recovery Targets

Population of about 90 -100 bears, judged by the Number and Distribution of Females with cubs, Human-caused Mortality limits. Populations need to be linked to other populations.



1. Females with cubs over a running 6 year average.
2. Number of BMUs occupied by females with young over 6 years.
3. Known human-caused mortality not to exceed 4% of calculated population (from females with cubs last 3 years).
4. Female mortality should not exceed 30% of total mortality.



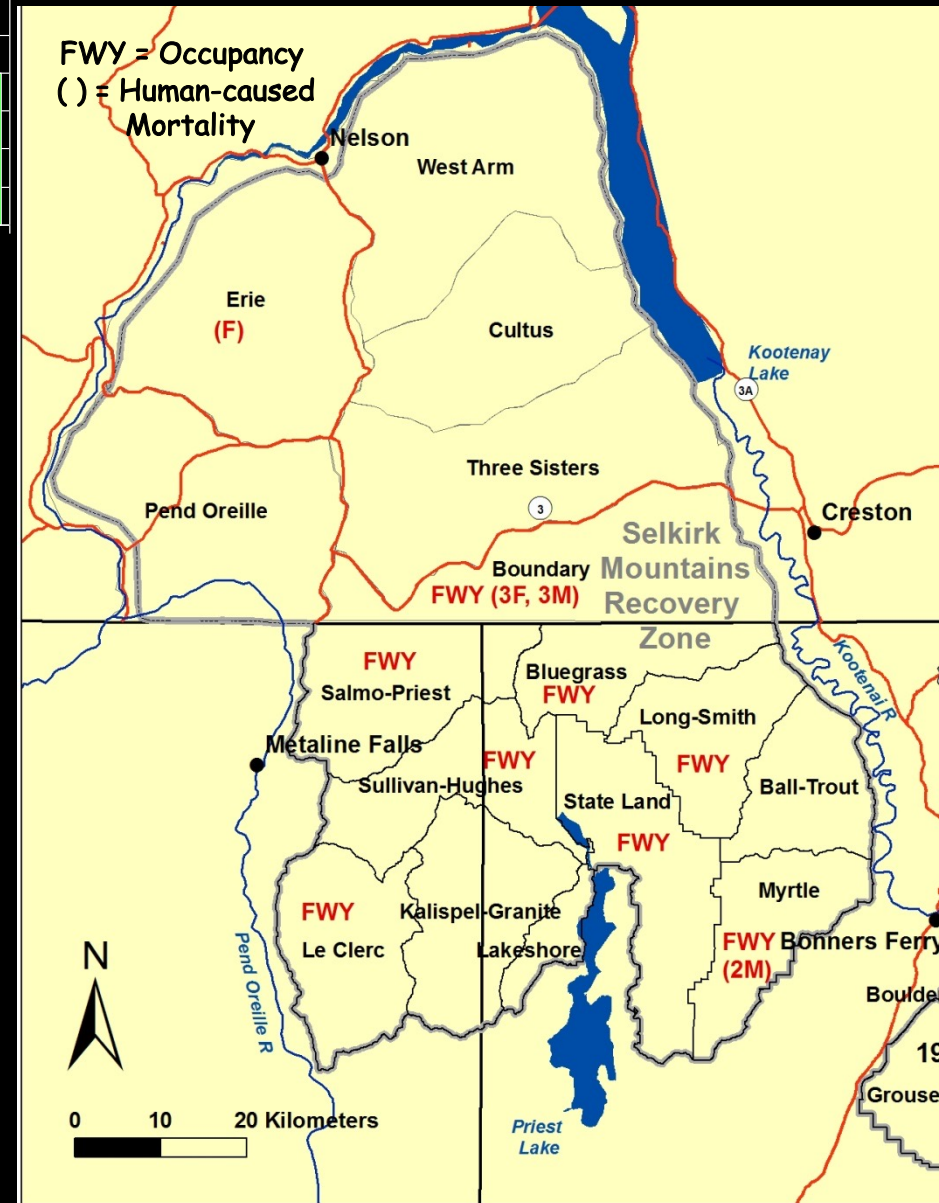


Females with cubs average 3.5 per year (Goal = 6.0)

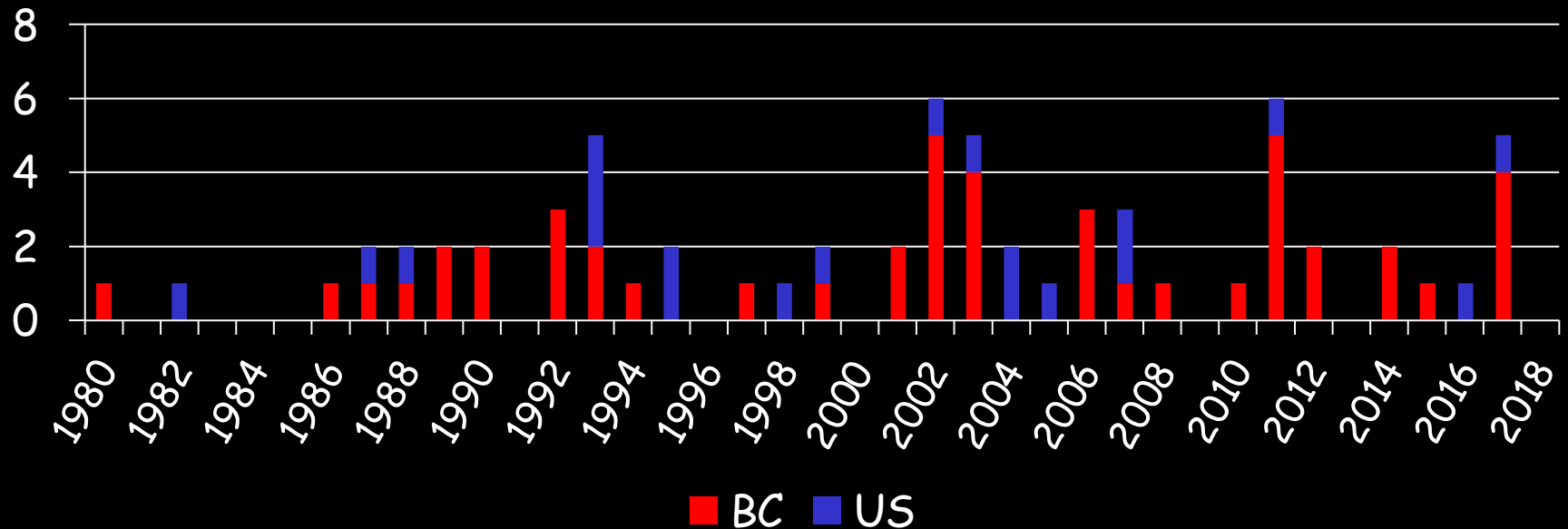
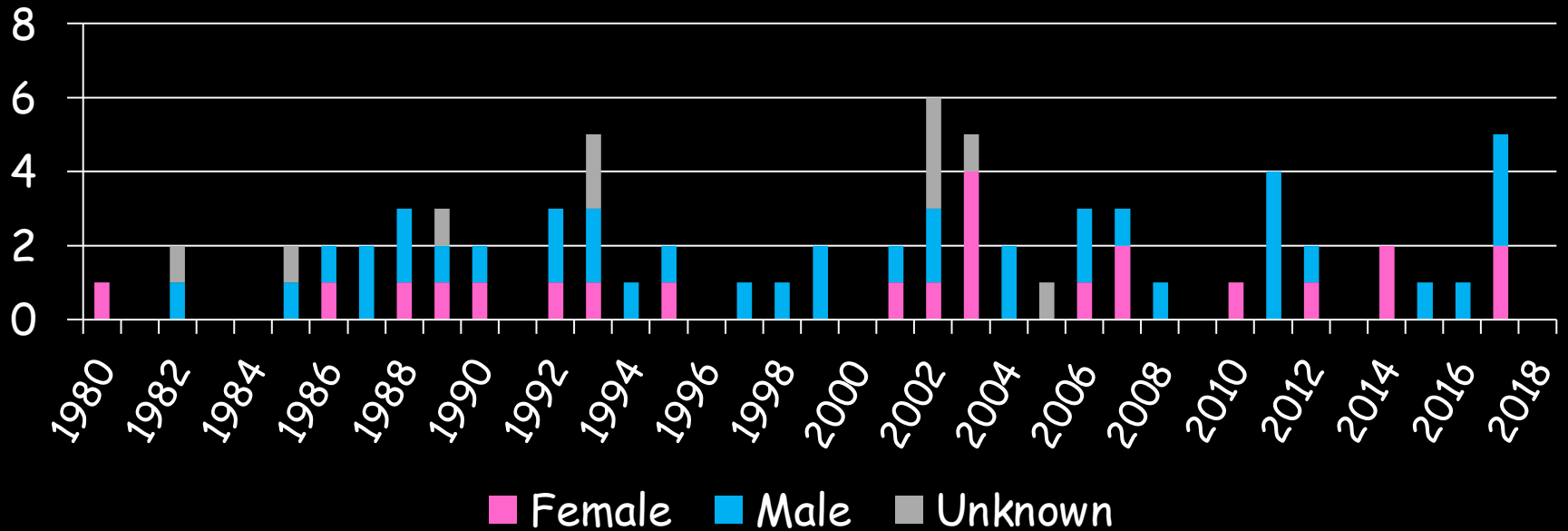
2013-18 = 9 Human Caused Mortalities (1.5 per year)
 2.4% mortality (Goal less than 4%)
 4 of 9 Mortalities were female = 44% (Goal less than 30%)

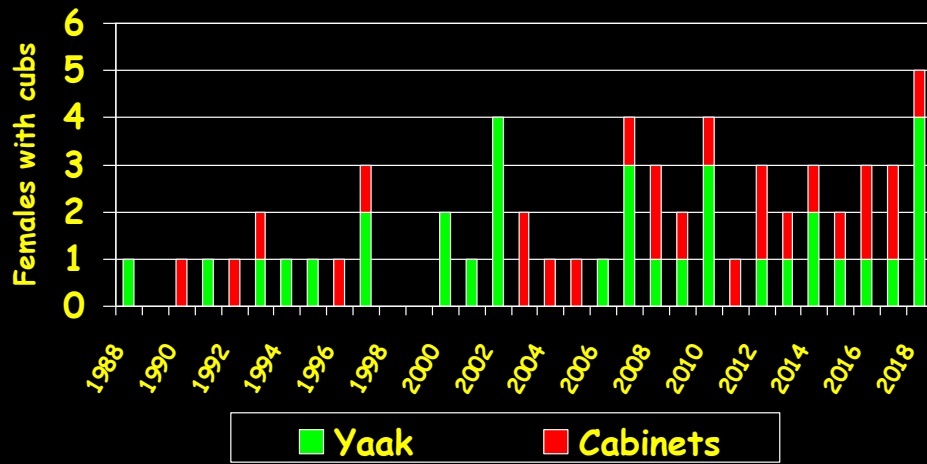
7 of 10 BMUs occupied (Goal 7 of 10)

Female with young BMU occupancy and Human-caused Mortality, 2013-18



Selkirk Mountains Known Human Caused Mortality



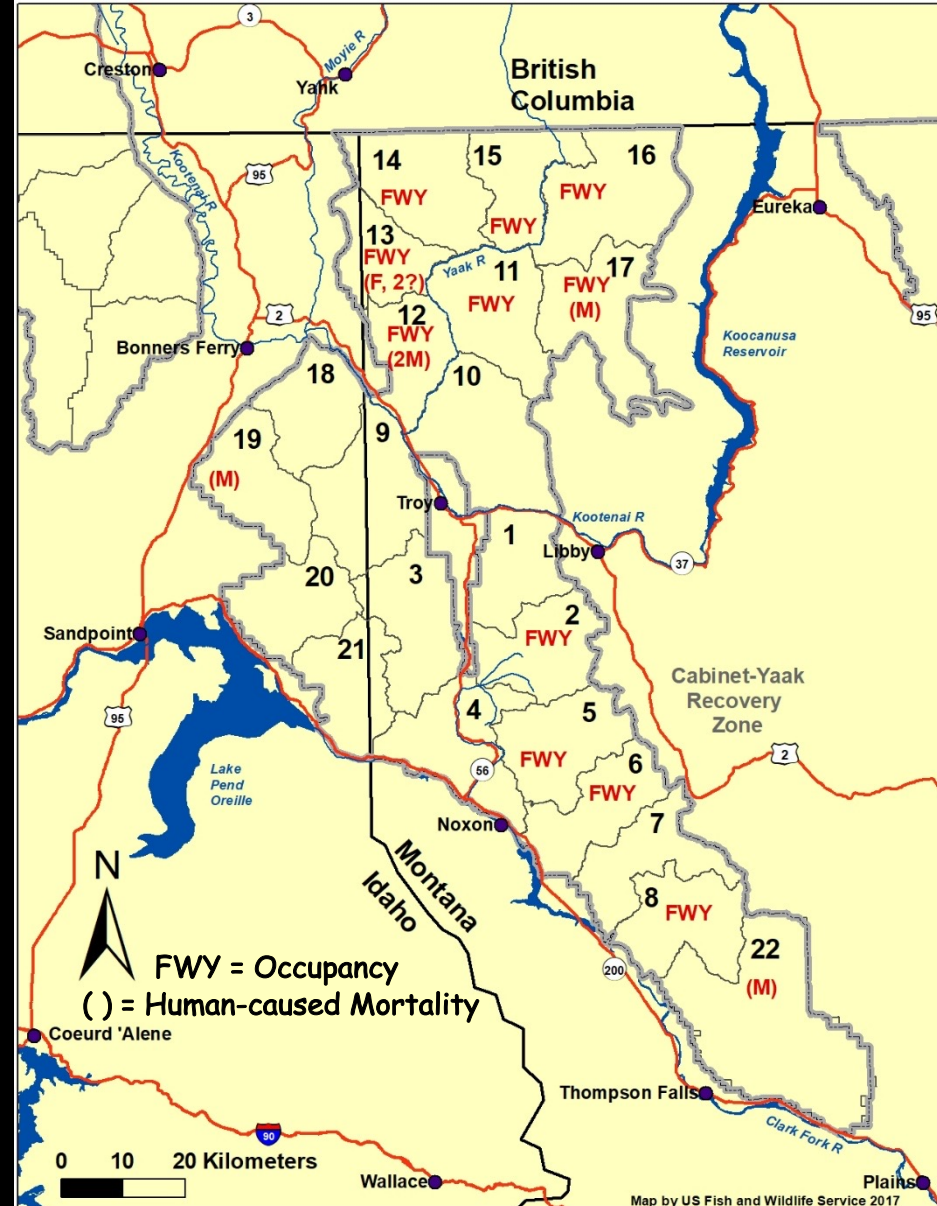


Females with cubs average 3.0 per year (Goal = 6.0)

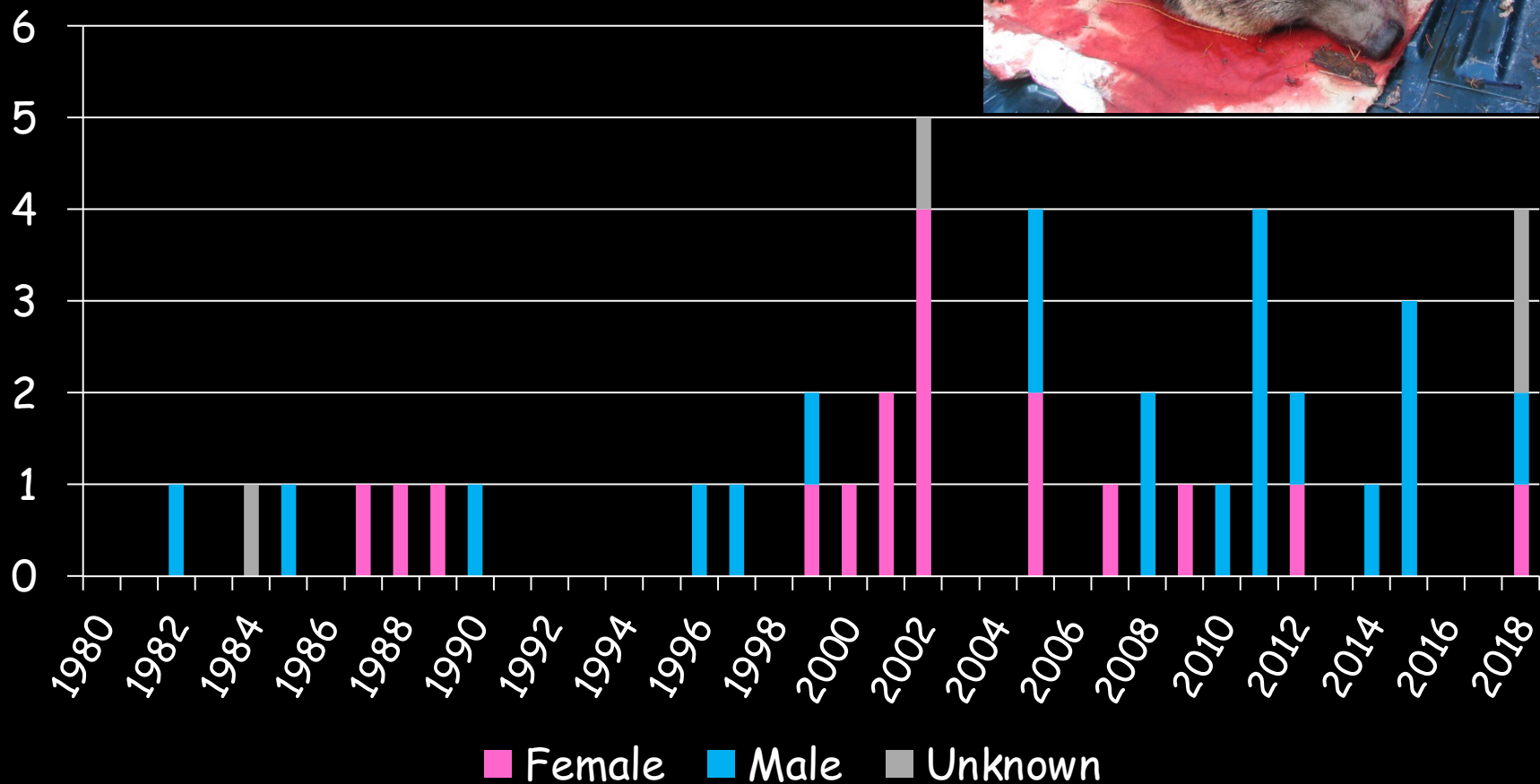
2013-18 = 8 Human Caused Mortalities (1.2 per year)
 2.3% mortality (Goal less than 4%)
 1 of 8 Mortalities were female = 12% (Goal less than 30%)

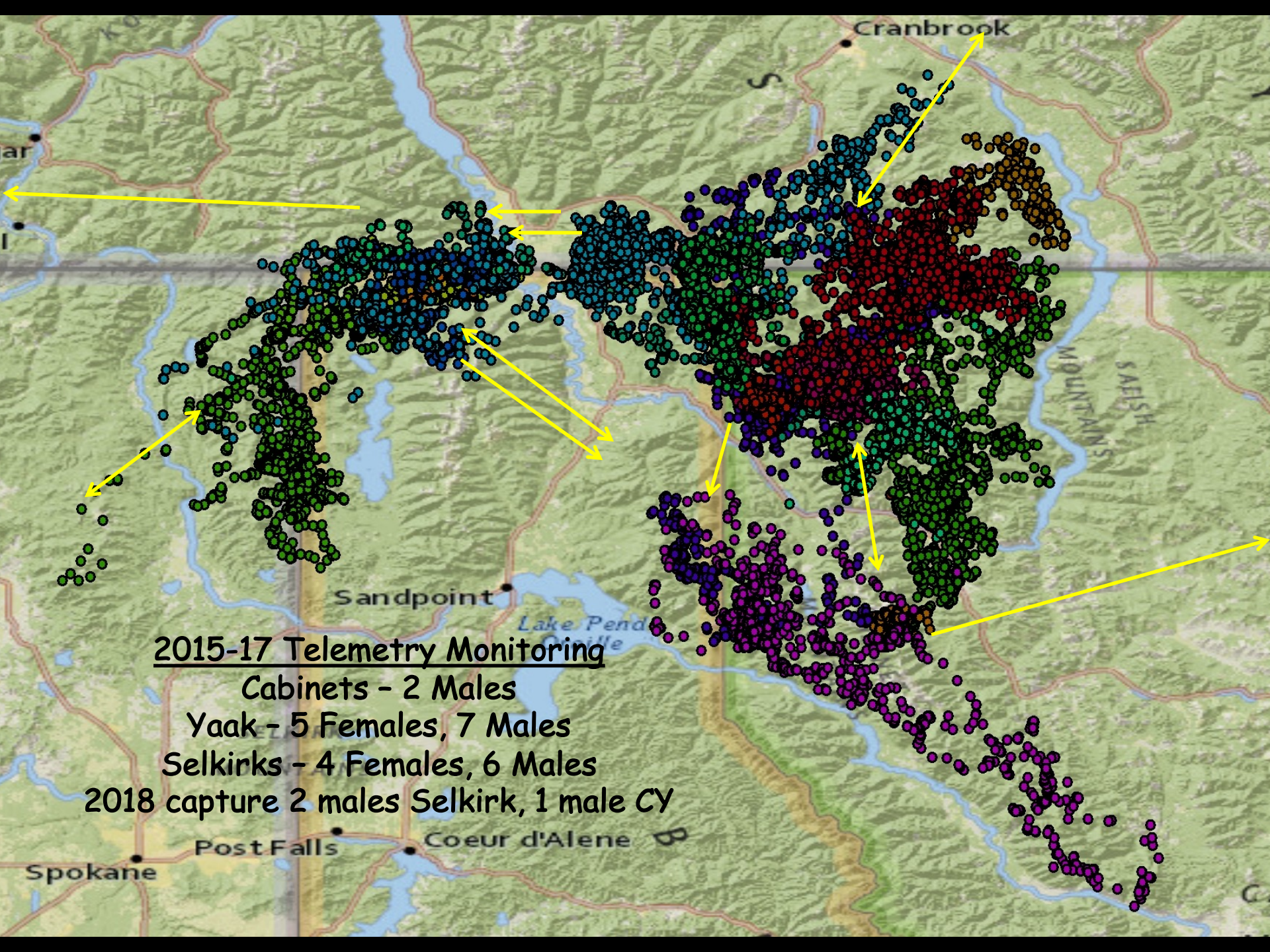
11 of 22 BMUs occupied (Goal 18 of 22)

Female with young BMU occupancy and Human-caused Mortality, 2013-18



Cabinet Yaak Known Human Caused Mortality





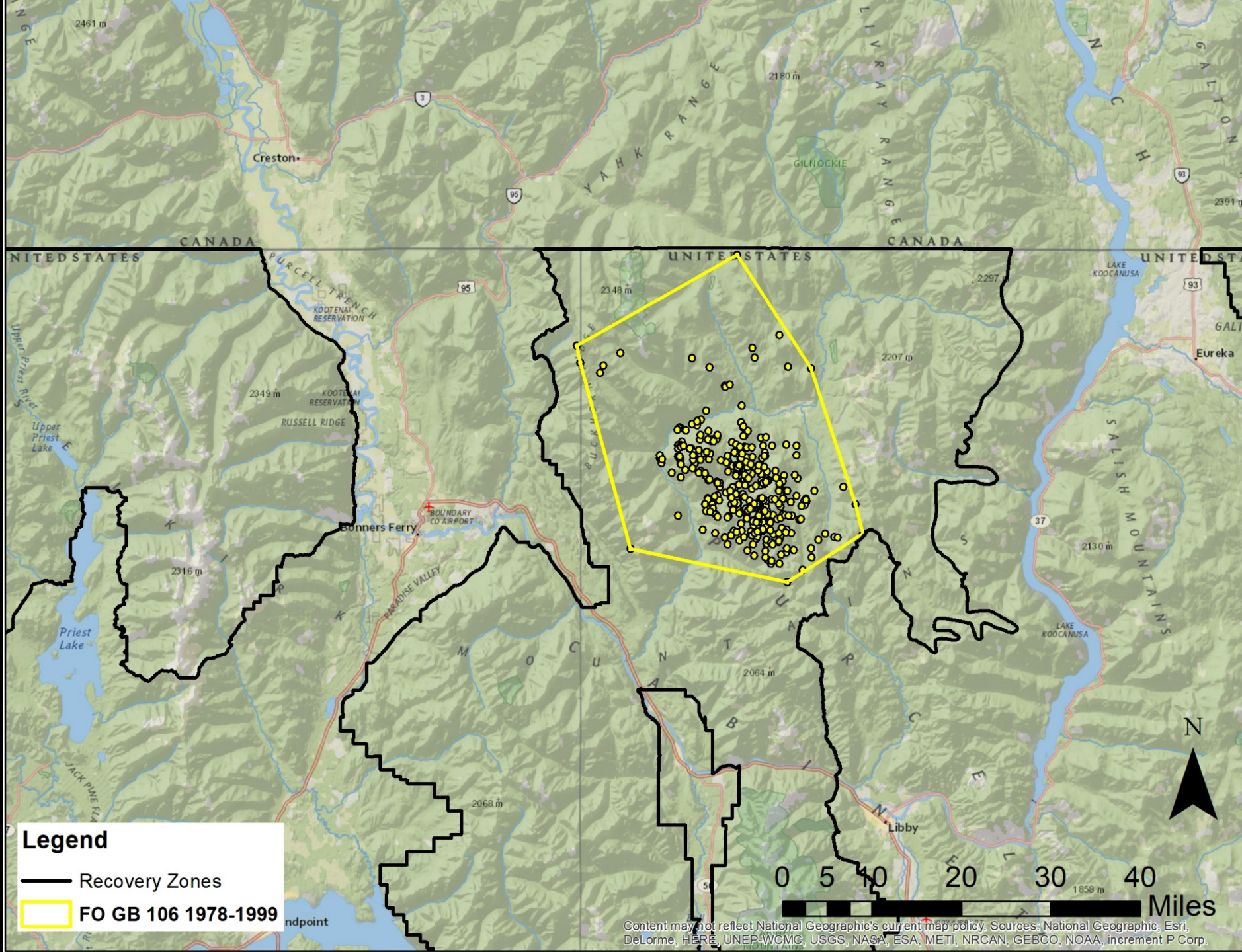
2015-17 Telemetry Monitoring

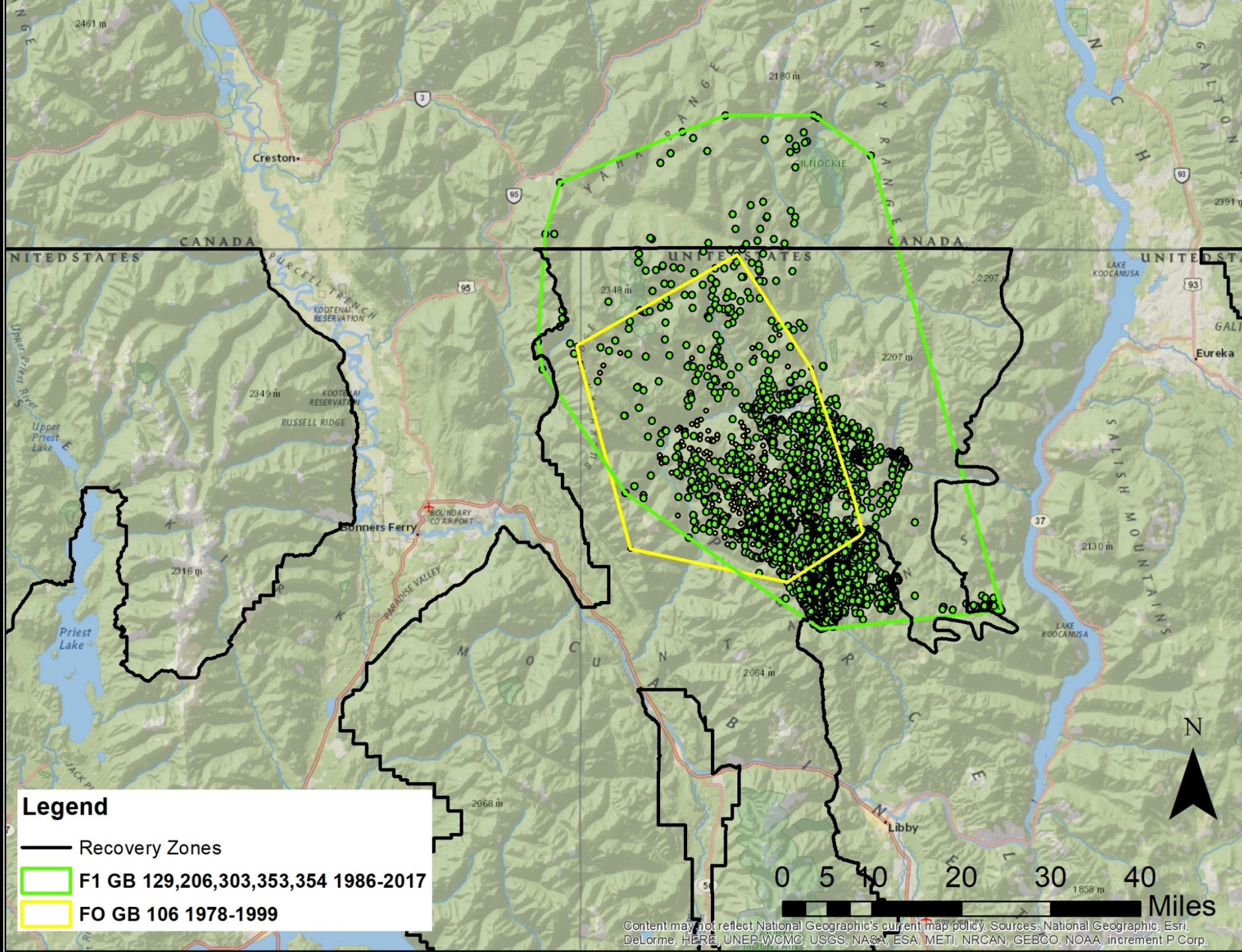
Cabinets - 2 Males

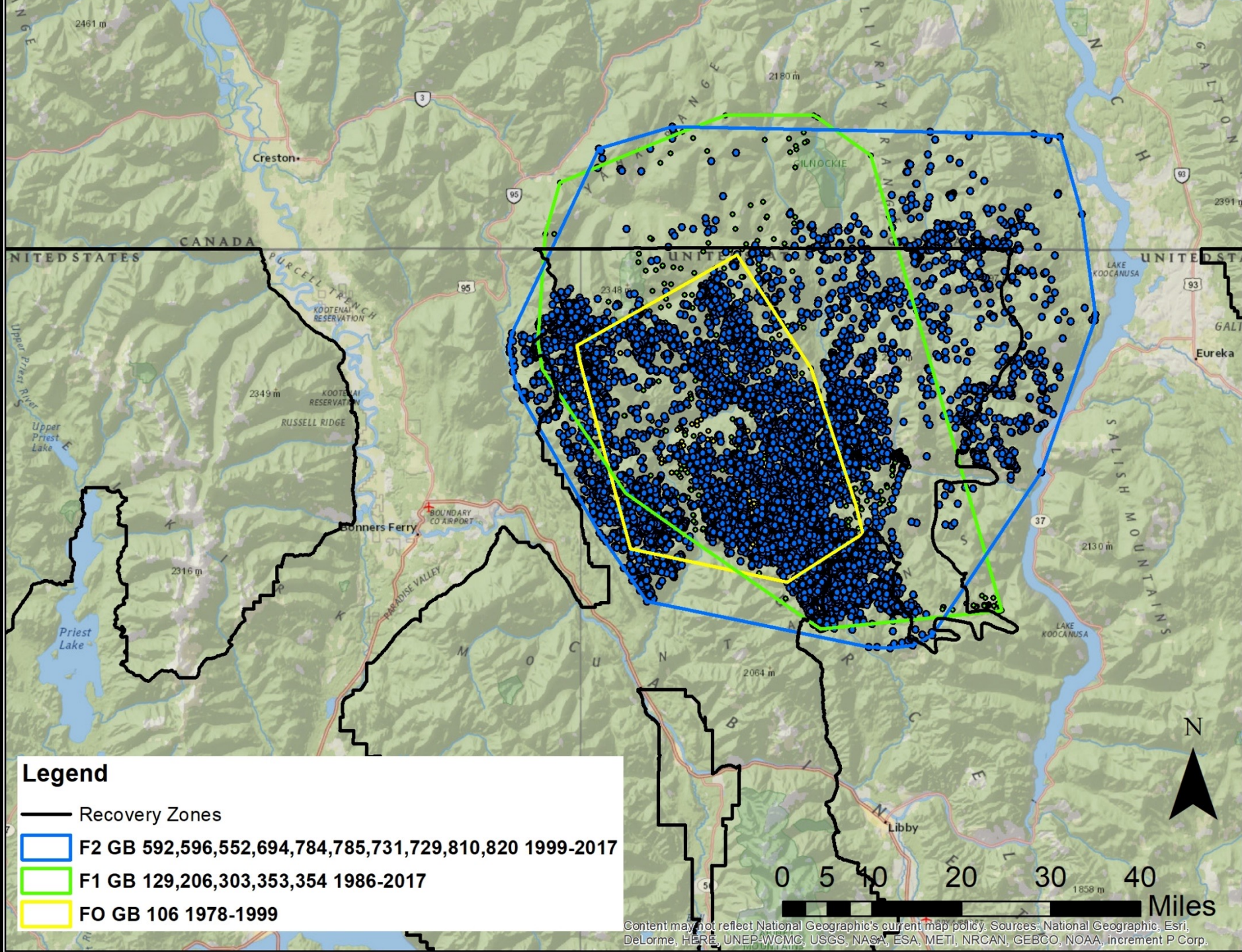
Yaak - 5 Females, 7 Males

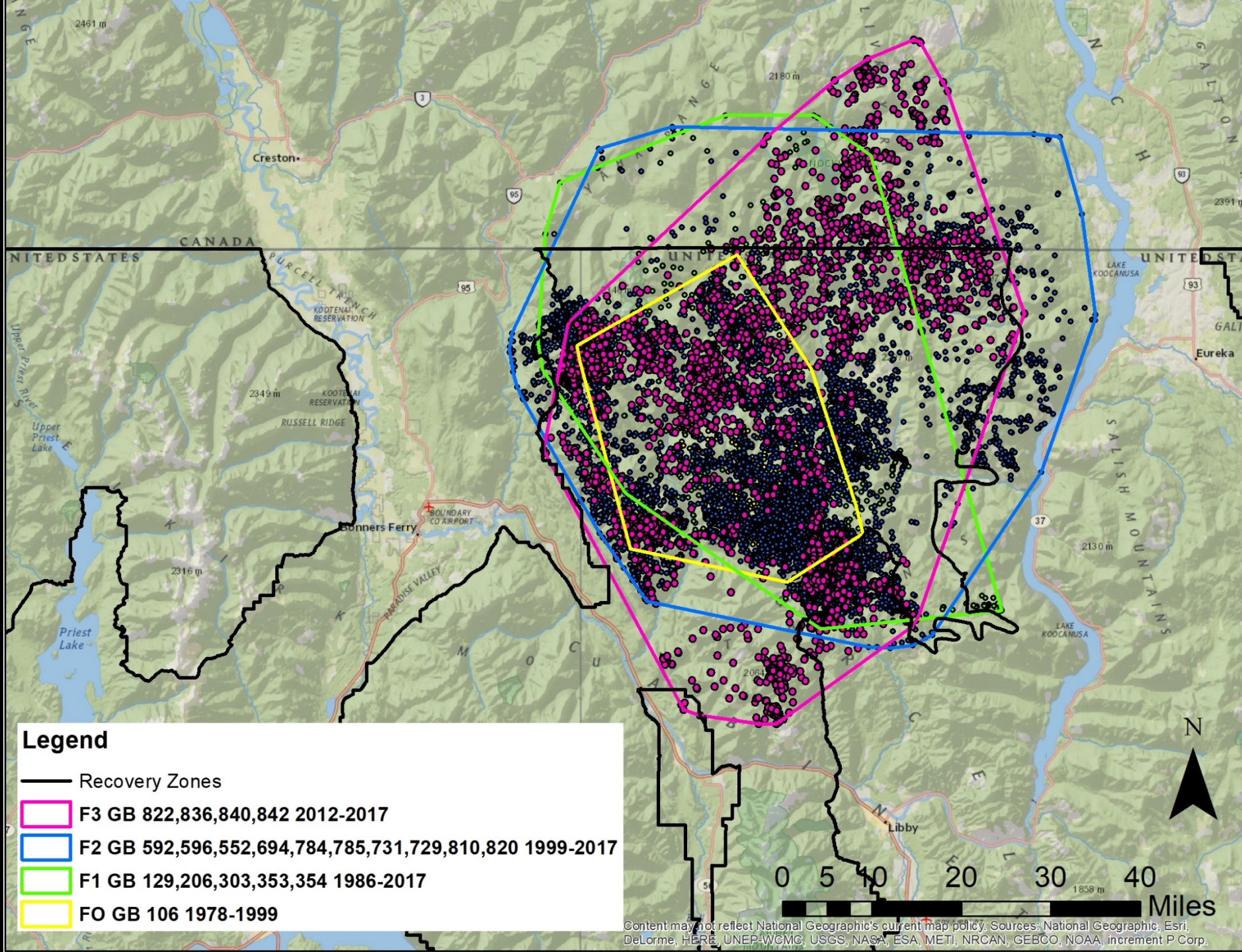
Selkirks - 4 Females, 6 Males

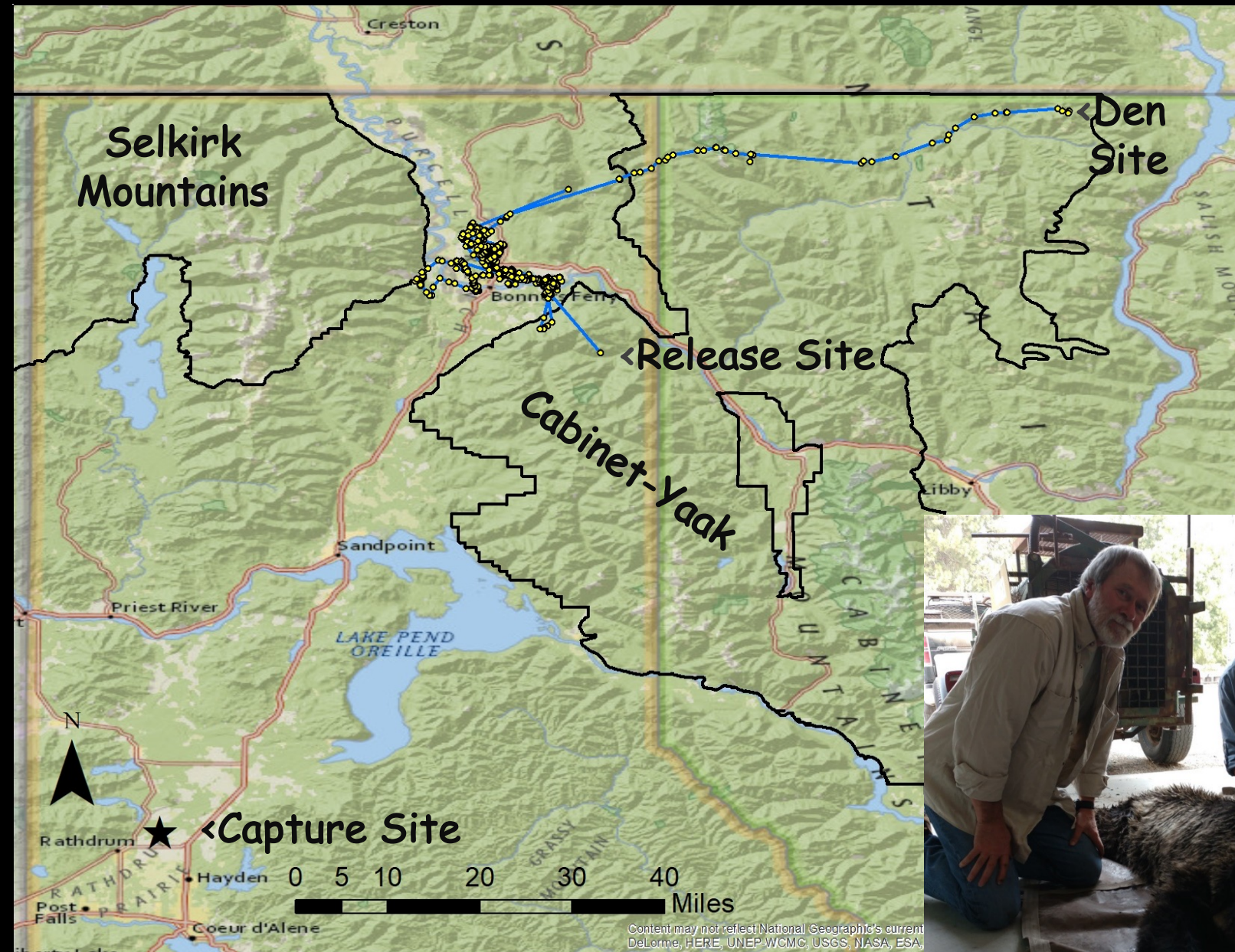
2018 capture 2 males Selkirk, 1 male CY











**Grizzly Bear 865 2 Years-old, 176 pounds
Captured north of Rathdrum 8/15/18**



Radio collared bears are the basis for determining population trend

- Survival information based on time wearing collar alive
- Mortality cause information
- Reproduction data
- Survival of young
- Calculations compare reproductive rates with survival/mortality rates to determine if population growing



Selkirk and Cabinet-Yaak Population Trend

- Selkirk = 1.8% annual growth rate in 2002
- Cabinet-Yaak = 2.1% annual growth rate as of 2017
- CY Population 2012 = 48-50
- 2013-2017 Add 5 augmentation bears but 2 known dead
- Current Population?

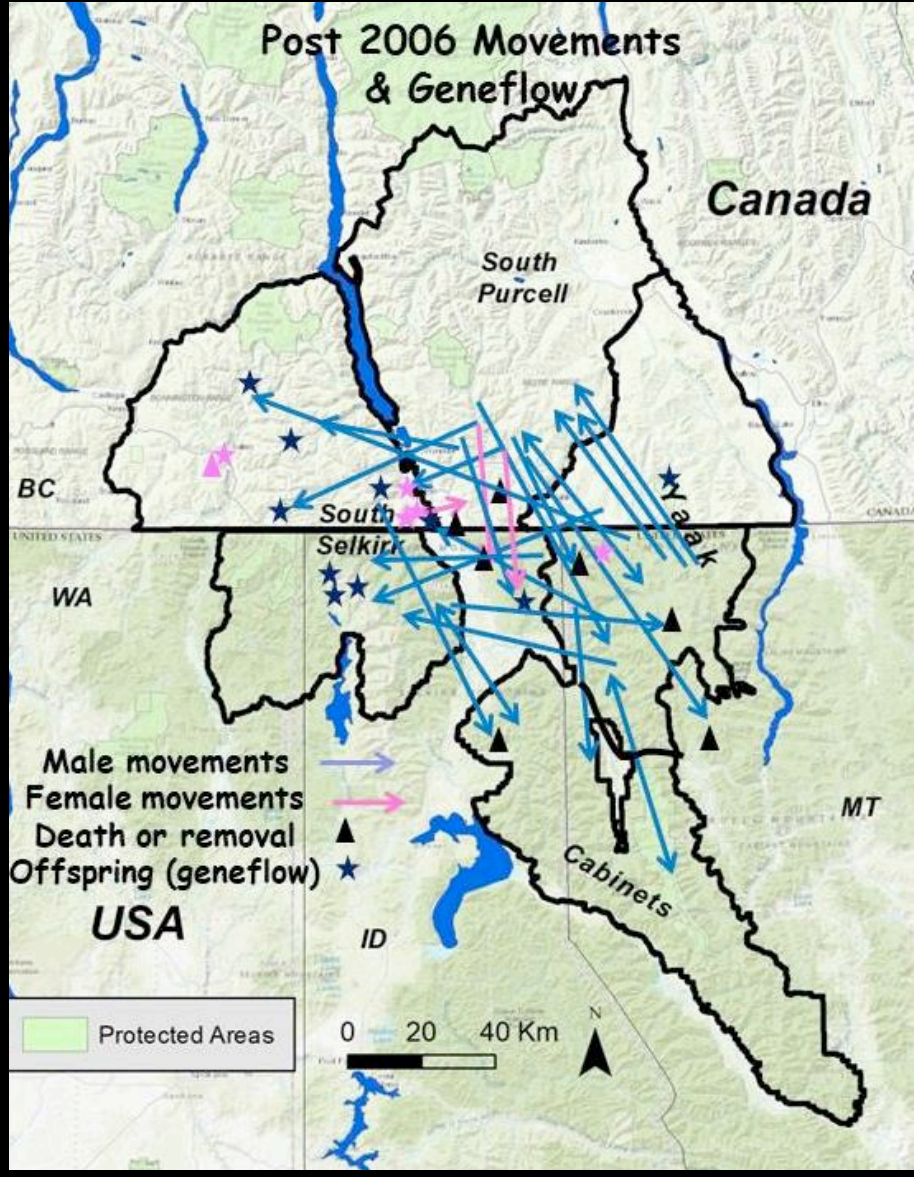
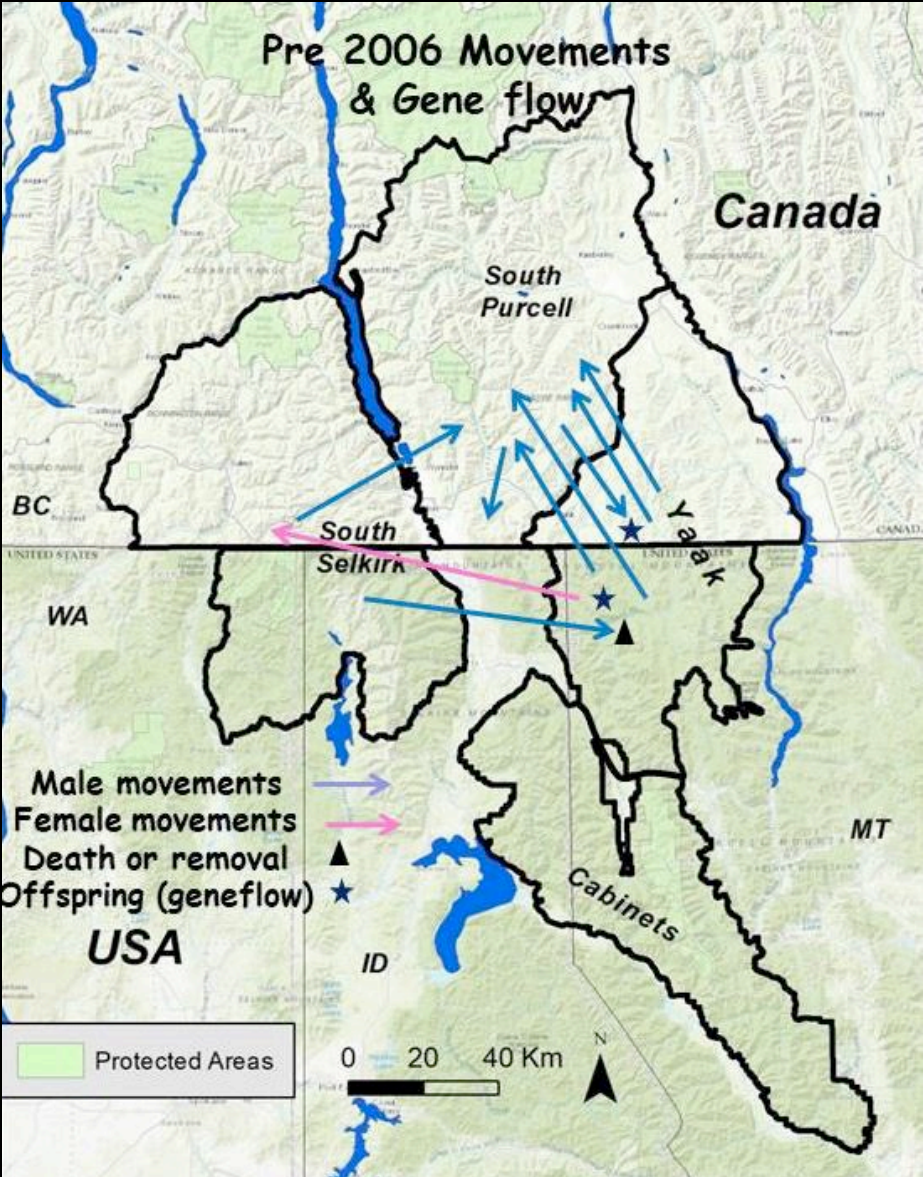


New Projects

Genetics

- Hair samples from captures, rub trees and corrals with cameras
- We get species, sex, individual genotype, and parentage
- Propose to evaluate changes in genetic diversity over time. Document gene flow and effective linkage in support of eventual delisting for both Selkirks and Cabinet Yaak

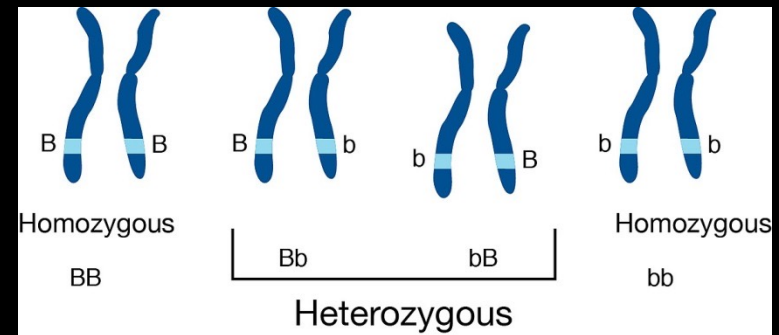
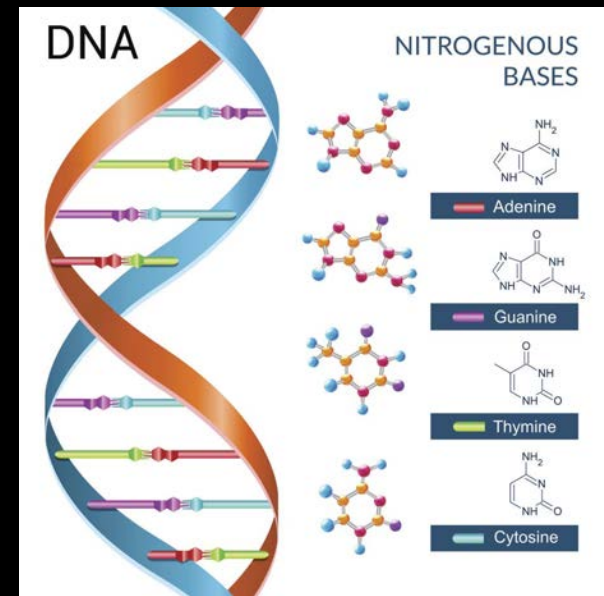




Genetic Analysis

Heterozygosity (H_e)

- 2004 NCDE $H_e = 0.67$
- 2007 YE $H_e = 0.57$
- 2005 Cabinets $H_e = 0.62$
- 2005 Yaak $H_e = 0.63$
- 2005 Selkirk $H_e = 0.54$
- 2017 Selkirk $H_e = 0.57$
- 13 of 15 loci tested show an increase in H_e
- 13 of 15 loci had new alleles

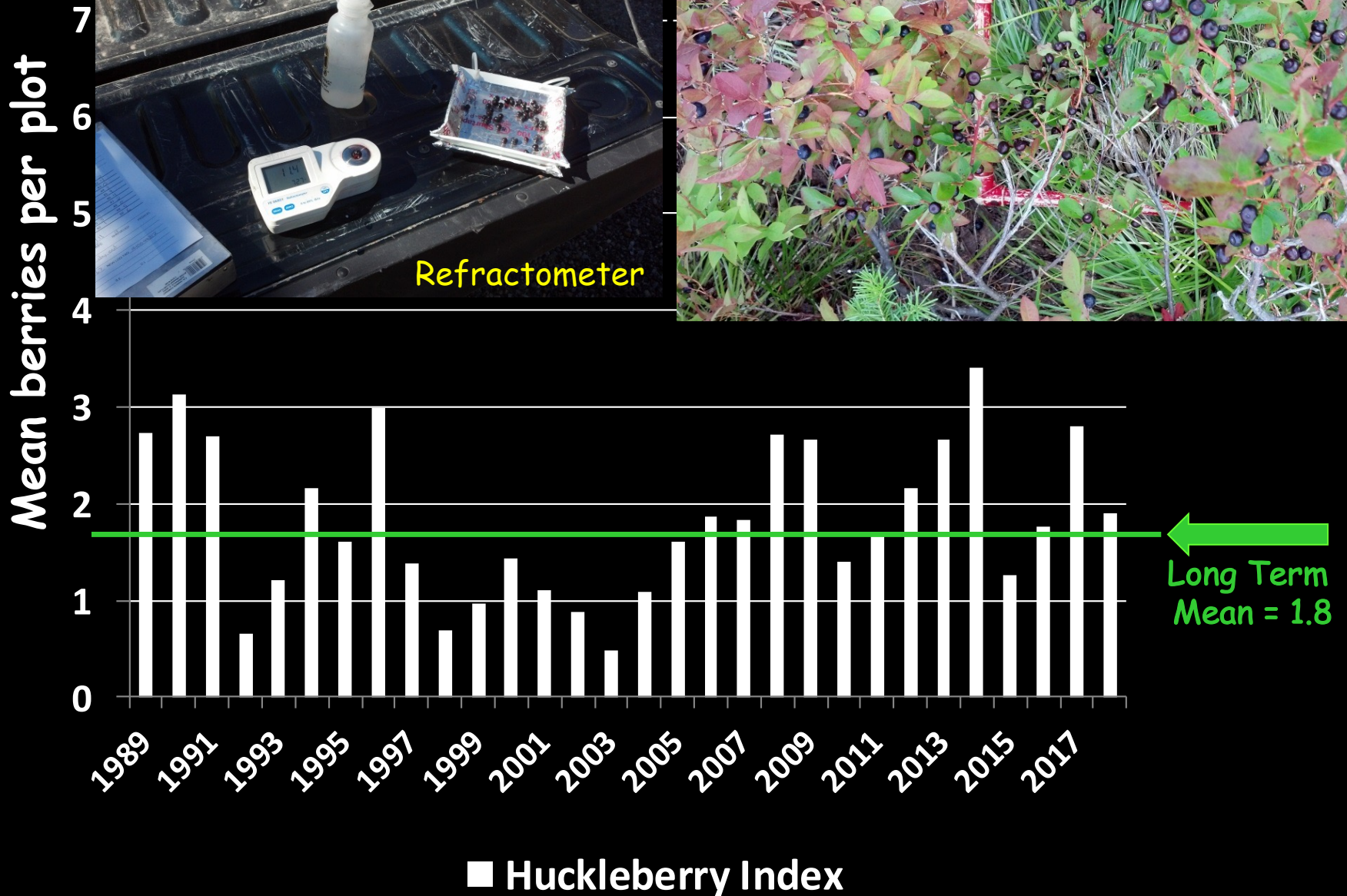


Heterozygosity defined

H = % heterozygous genotypes for a particular locus
 = % heterozygous individuals for a particular locus
 = probability that a given individual randomly selected from the population will be heterozygous at a given locus

$$H_{\text{estimated}} = \frac{\% \text{ heterozygous loci}}{\text{those examined}}$$

CY Huckleberry Production



New Projects: Huckleberry contribution to Grizzly Bear diets

- Hair, tissue and blood samples are used in isotope analysis to determine diet fractions of terrestrial meat, vegetation, fish
- Developing a method to determine fraction of berries in diet from isotope analysis
- Preliminary results suggest berries are about 20% of annual calories consumed
- Huckleberries contain 10-20% sugar which is converted readily to fat
- Females require at least 20% fat level at denning to produce cubs



New Projects

Huckleberry research in US through Graduate Student

- Companion study to BC effort by M. Proctor
- Utilize a Graduate Student for most analysis through University of Montana (Alex Welander)
- Identify US sampling sites based on July-September telemetry
- Began field effort in 2018 to visit sites heavily used by bears and characterize sites during August
- Utilize US data layers to develop a predictive model if possible
- Provide history of productive berry sites (fire, timber harvest, etc.)



Amber Kornak was injured in a Grizzly Bear attack in the Cabinet Mountains on May 17, 2018

She used bear spray to end the attack and walked out two miles to her truck. Amber suffered a fractured skull., but returned to work on limited duty for this project in September. Amber is now working for Idaho Fish and Game and hopes to return to this project next year.



QUESTIONS?

Reports found at: <https://www.fws.gov/mountain-prairie/es/grizzlyBear.php>

We wish to extend a special thanks to the citizens of the province of British Columbia for allowing us to remove grizzly bears from the Flathead River drainage to augment populations in the Cabinet Mountains.



Funders: BC Fish Wildlife Compensation Program, BC Habitat Trust Foundation, Columbia Basin Trust, Colville National Forest, Claiborne-Ortenberg Foundation, Mr. E.O. Smith, Federal Highway Administration, Great Northern Landscape Conservation Cooperative, National Fish and Wildlife Foundation, Idaho Fish and Game, Idaho Panhandle National Forest, Kalispell Tribe, Kootenai Tribe of Idaho, Kootenai National Forest, Montana Fish, Wildlife, and Parks, Nature Conservancy Canada, Turner Endangered Species Fund, U.S. Borax and Chemical Corp., Wilburforce Foundation, Yellowstone to Yukon Conservation Initiative, and the U.S. Fish and Wildlife Service