

Interagency Grizzly Bear Study Team Research and Monitoring Summary 2016

**This presentation contains
preliminary data**

Do not cite these data



Photography by Jake Davis

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Overview

- Population estimates and trend
- Occupancy by females with offspring
- Mortalities and mortality rates
- Evaluating “claims” about the GYE population

Some results are preliminary

Greater Yellowstone Ecosystem

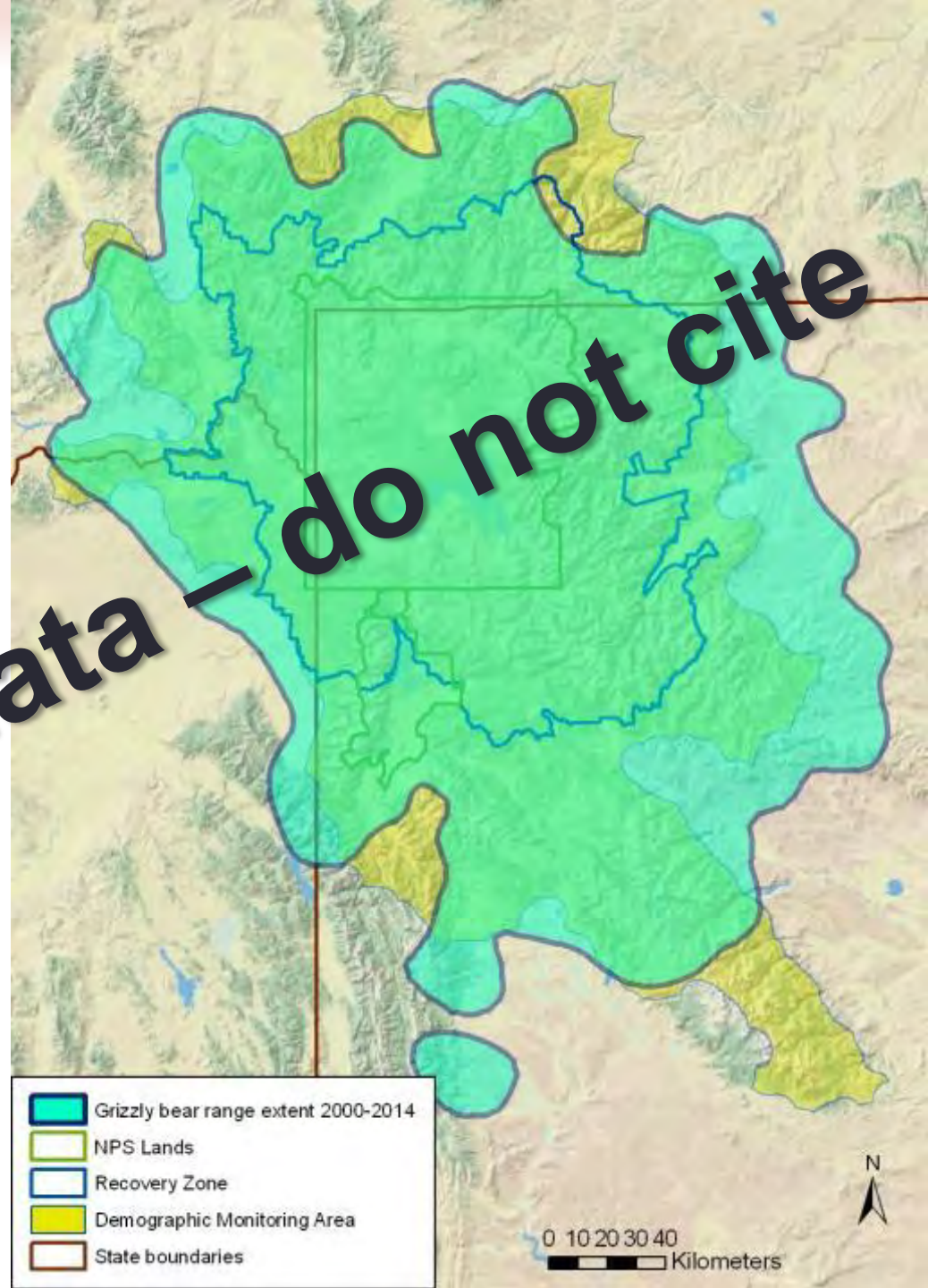
- National Parks = 10,344 km²
- Recovery Zone = 23,828 km²
- Demographic Monitoring Area (DMA) = 49,931 km²



Greater Yellowstone Ecosystem

- National Parks = 10,344 km²
- Recovery Zone = 23,828 km²
- Demographic Monitoring Area (DMA) = 49,931 km²
- Grizzly bear distribution 2000-2014 = 58,314 km²

Preliminary data — do not cite

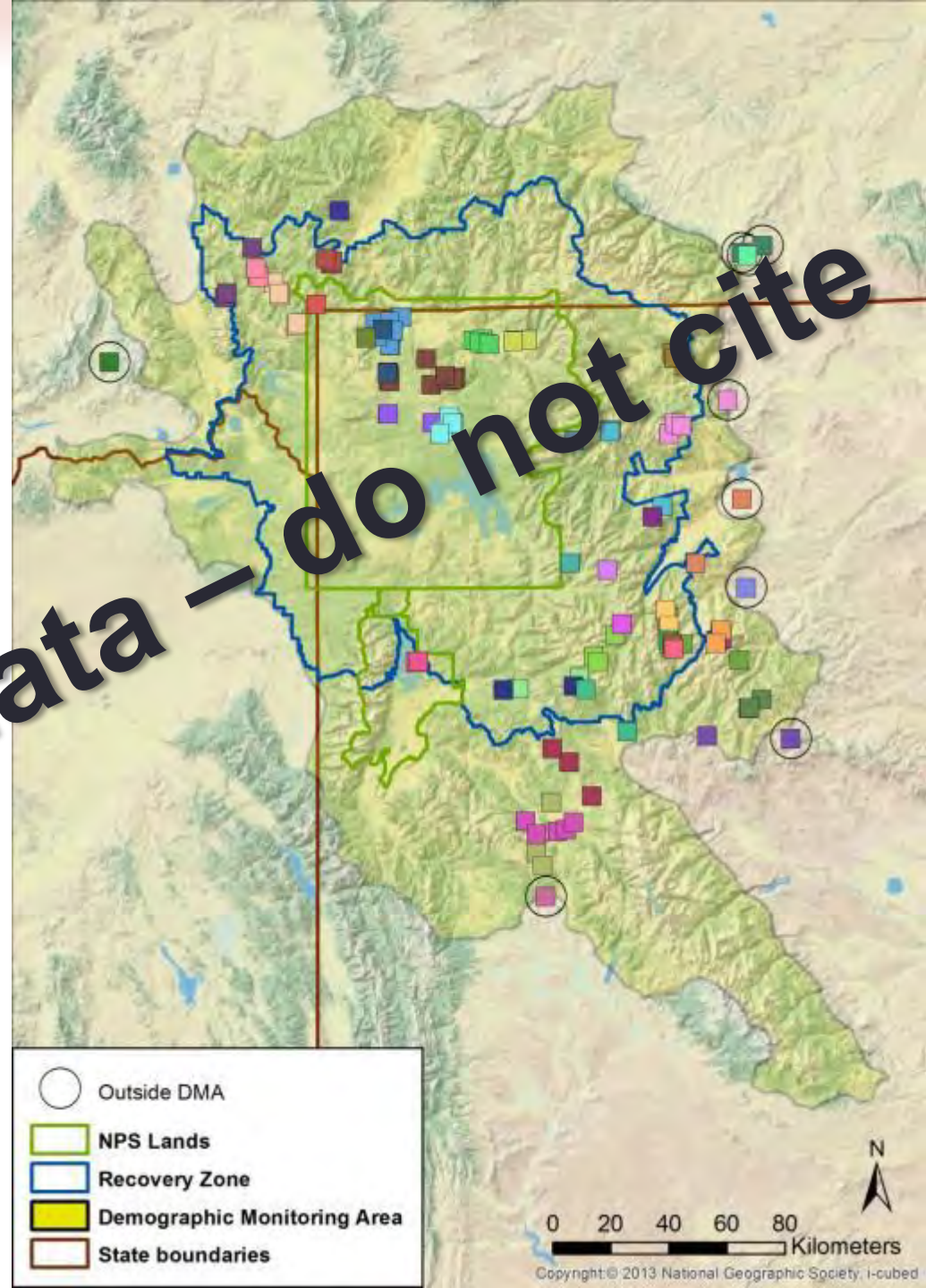


Population and Trend Estimation

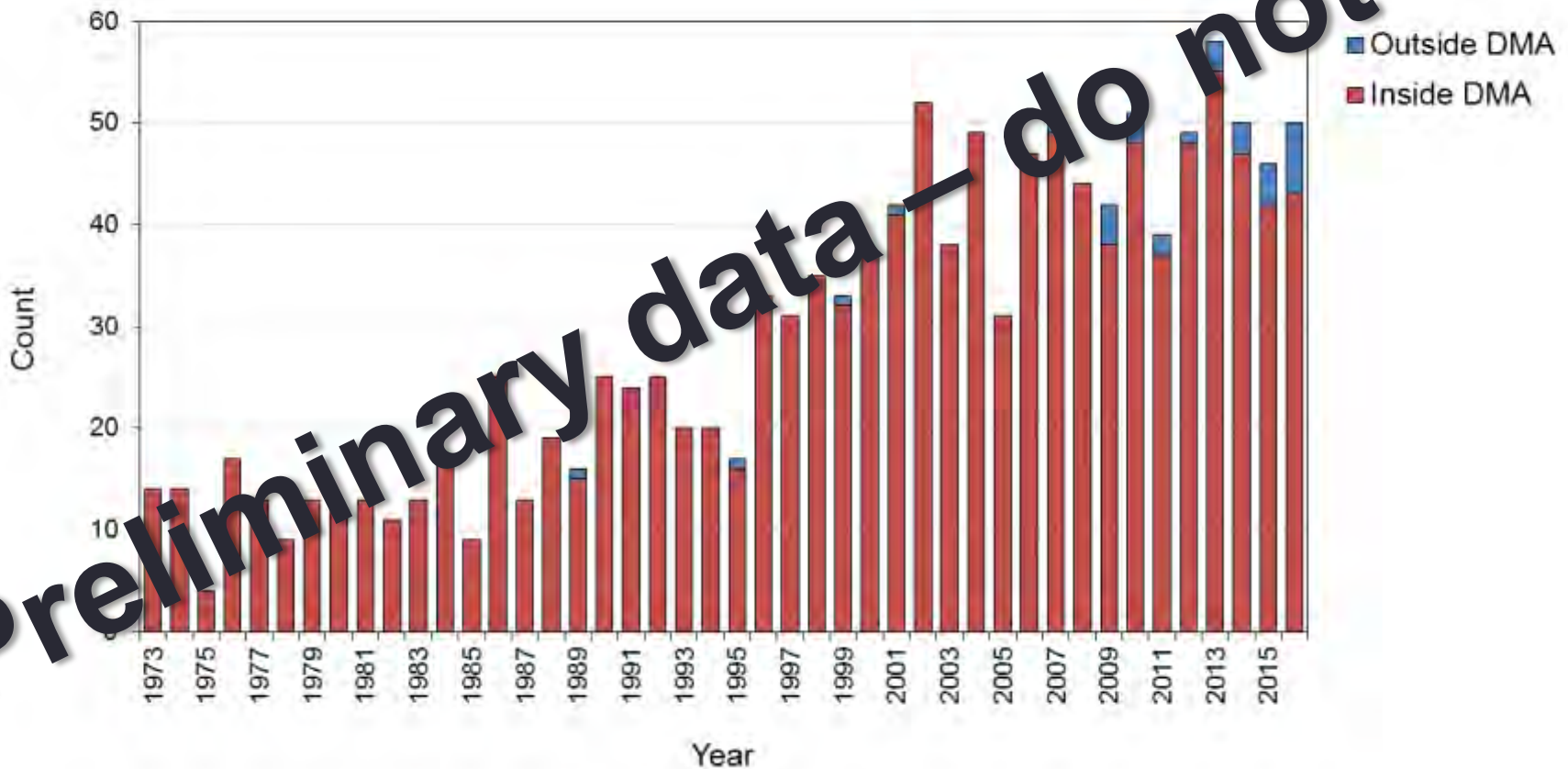
Females with cubs 2016

- **144 observations**
47% aerial, 53% ground
- **Unique females with cubs**
50 in entire GYE
45 in DMA
Mean litter size = 1.96

Preliminary data — do not cite



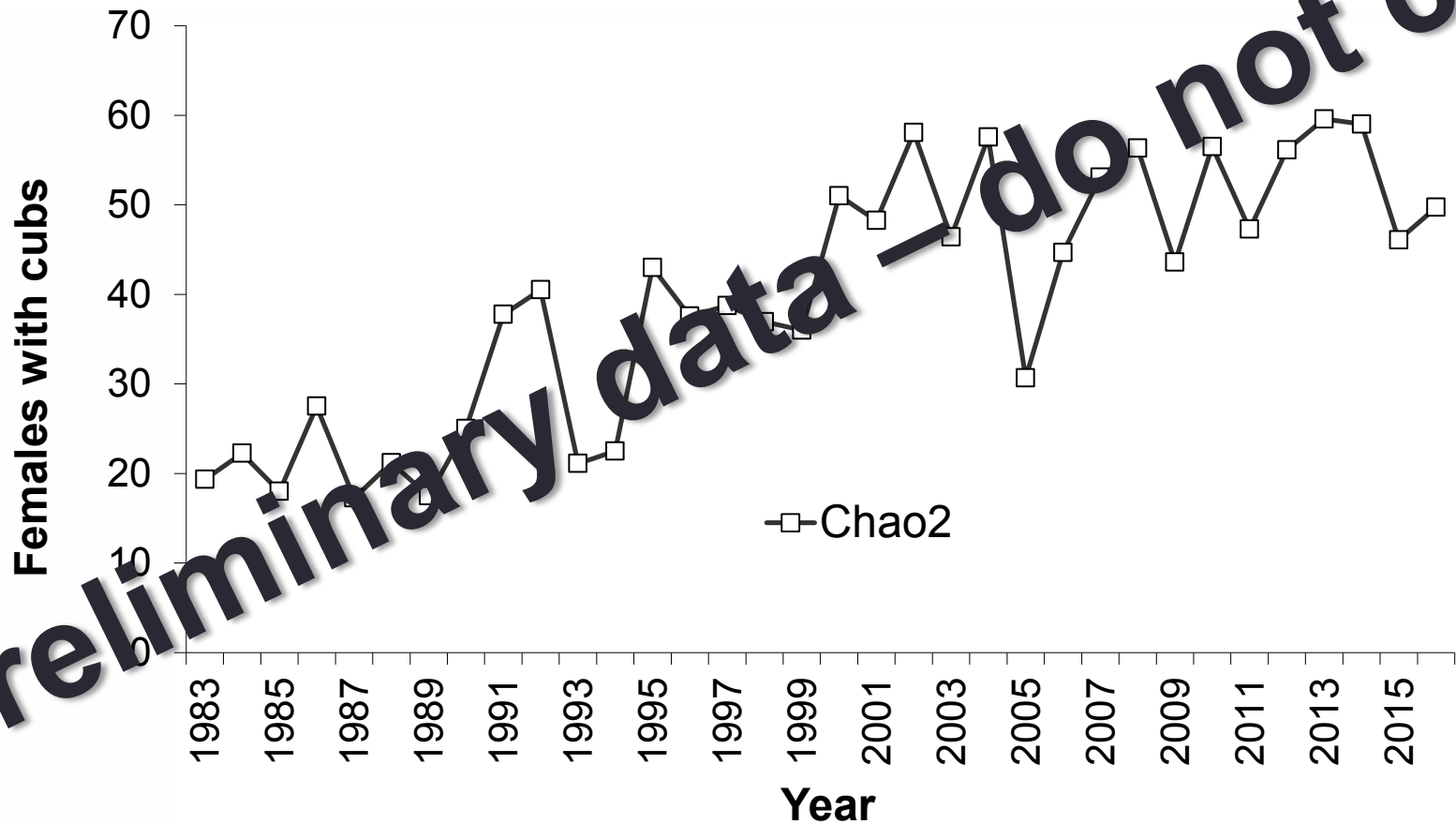
Initial sightings of females with cubs inside and outside DMA 1973-2016



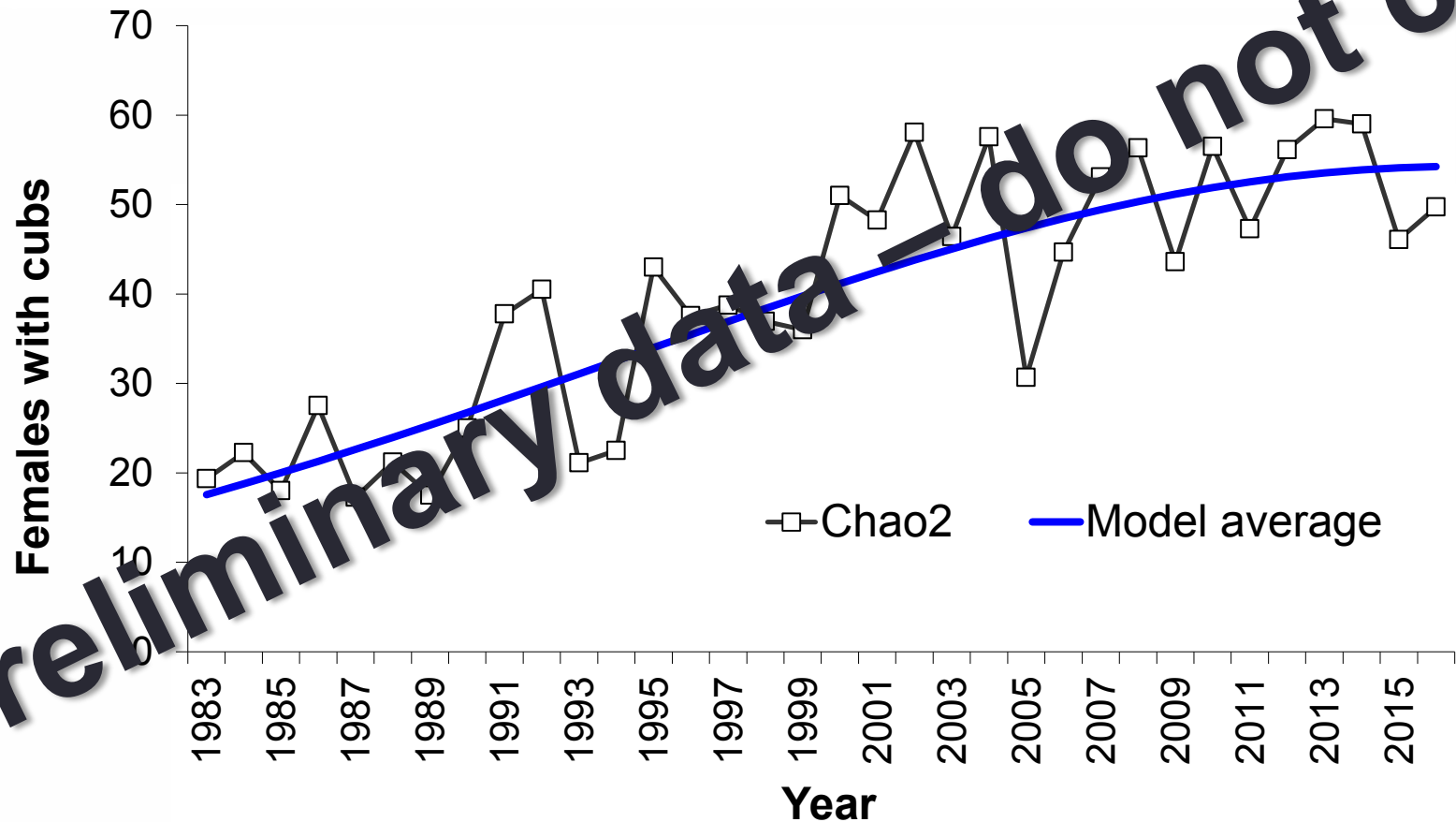
Number of females with cubs 2016 (DMA only)

Parameter	Estimate
Unique females with cubs	45
Chao2	50
Model-averaged Chao2	54

Annual estimates of females with cubs 1983-2016 (DMA only)



Trend in annual estimates of females with cubs 1983-2016 (DMA only)



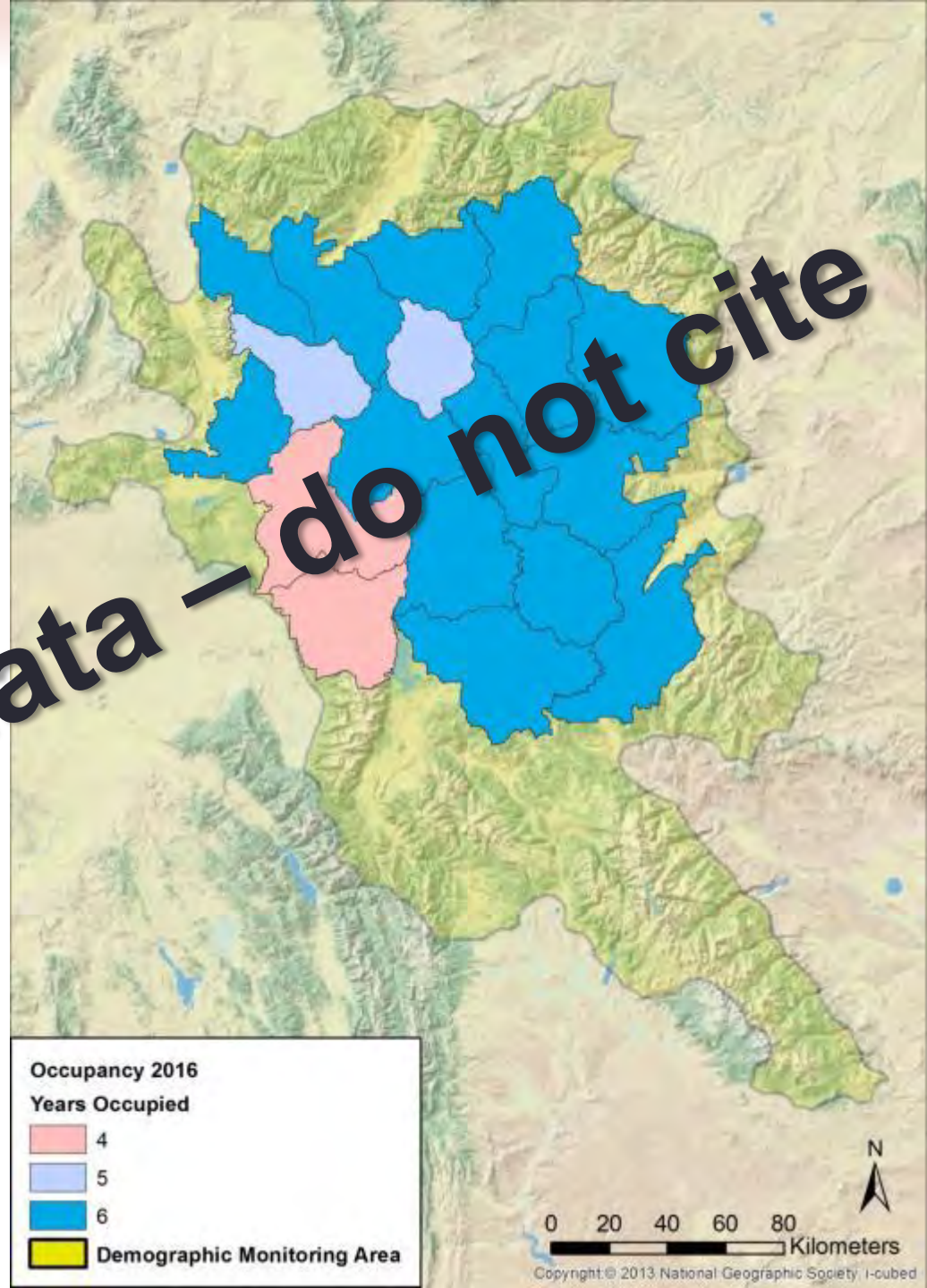
Total population estimate 2016 (Chao2 estimator; DMA only)

Population segment	Estimate	95% CI	
		Lower	Upper
Independent females (≥ 2 yrs old)	238	190	287
Independent males (≥ 2 yr old)	238	186	291
Dependent young (cubs and yearlings)	213	192	234
Total	690	615	764

Occupancy by Females with Young

Occupancy by females with young (cubs, yearlings, or 2-year-olds) 2016

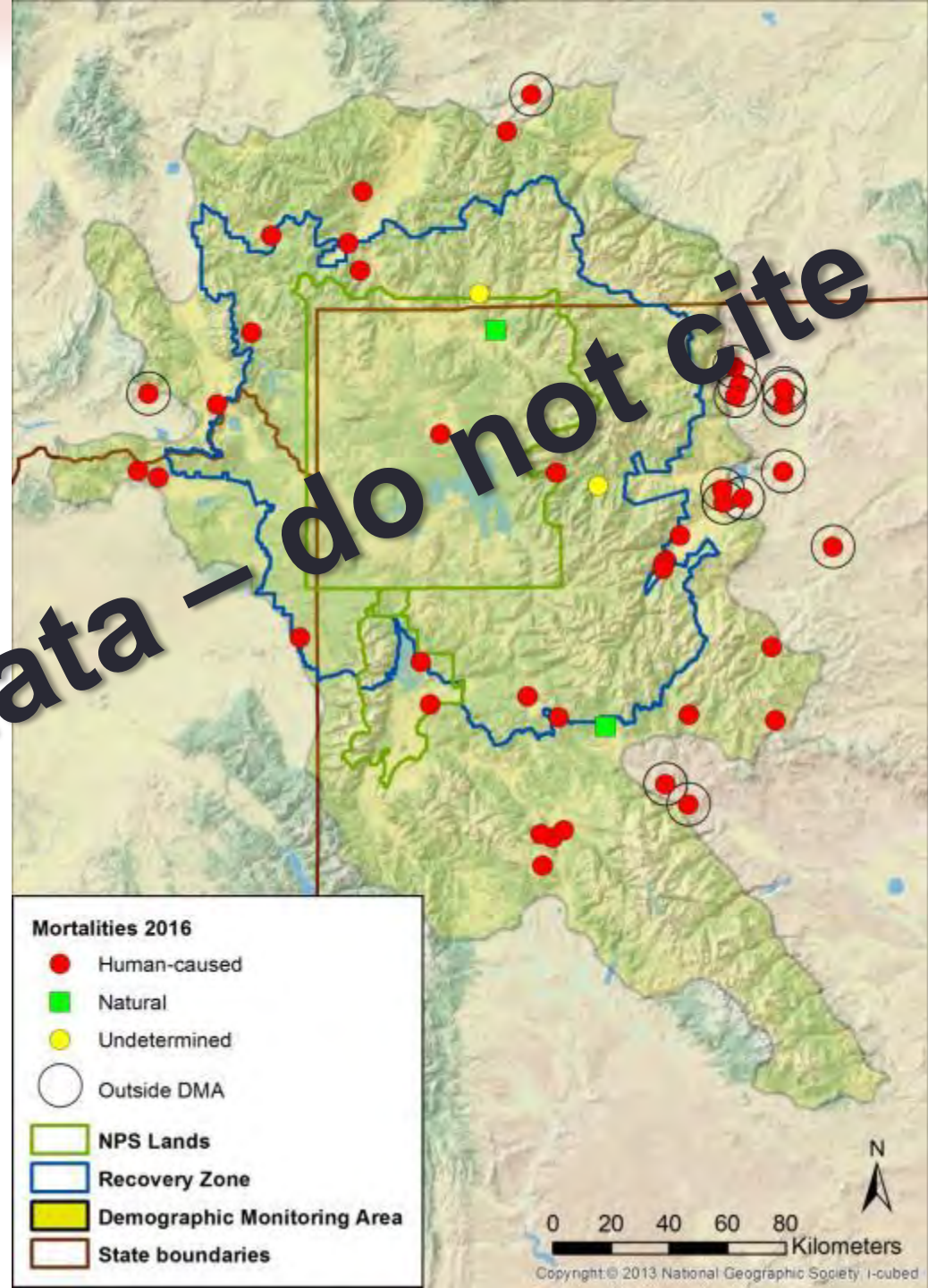
- 18 of 18 Bear Management Units (BMUs) occupied during 2016
- 18 of 18 BMUs occupied at least 4 of last 6 years (2011-2016)



Mortalities and Mortality Rates

Known and probable mortalities 2016

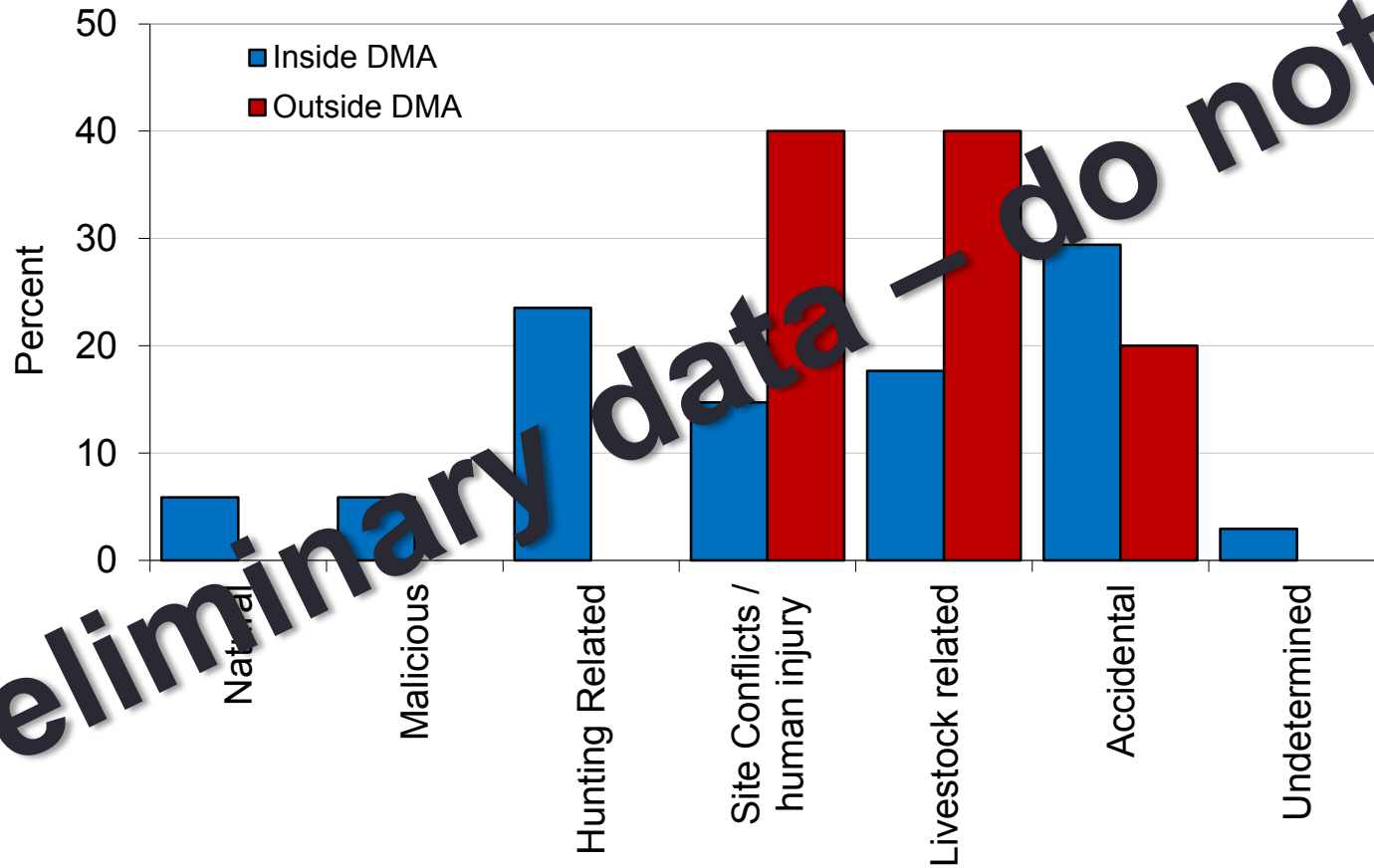
- 34 known and probable mortalities in DMA
 - 31 human-caused
 - 2 natural
 - 1 undetermined cause
- 20 outside the DMA
 - All 20 human-caused
- 1 additional mortality from 2015 documented, sex unknown



Known and probable mortalities by area, sex, and age class 2016

Area	Sex	Age class		Total
		Dependent (<2 years old)	Independent (≥2 years old)	
Inside DMA	Female	6	6	12
	Male	2	19	21
	Unknown	1	0	1
	Total	9	25	34
Outside DMA	Female	1	3	4
	Male	2	14	16
	Unknown	0	0	0
	Total	3	17	20

Mortality causes in and out DMA 2016



Preliminary data – do not cite

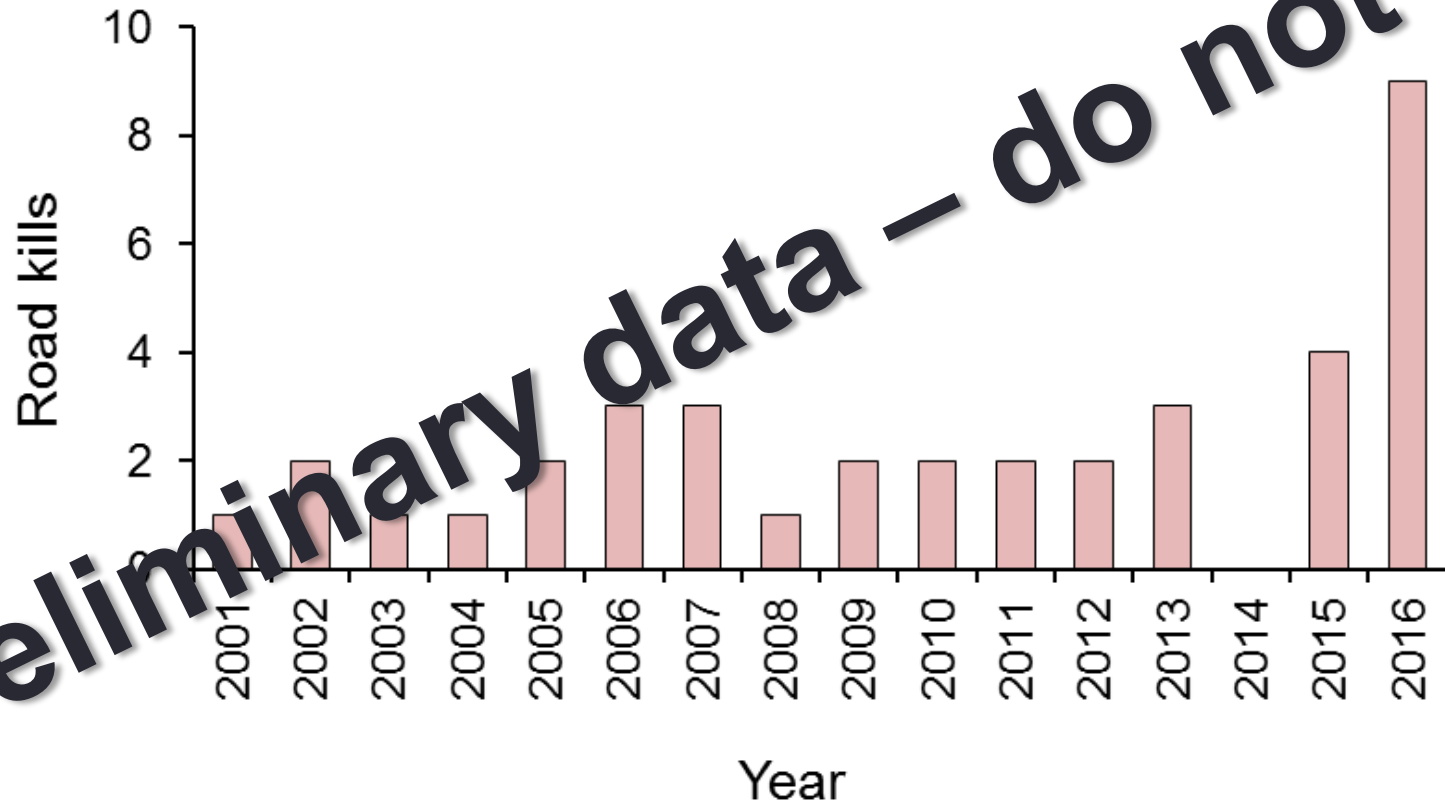
9 mortalities from vehicle strikes in 2016

- 7 males (5 subadults)
- 2 females (subadults)

Preliminary data – do not cite



Known and probable mortality from vehicle strikes 2001–2016



3 grizzly bears drowned in 2016

- All adult males

Preliminary data — do not cite

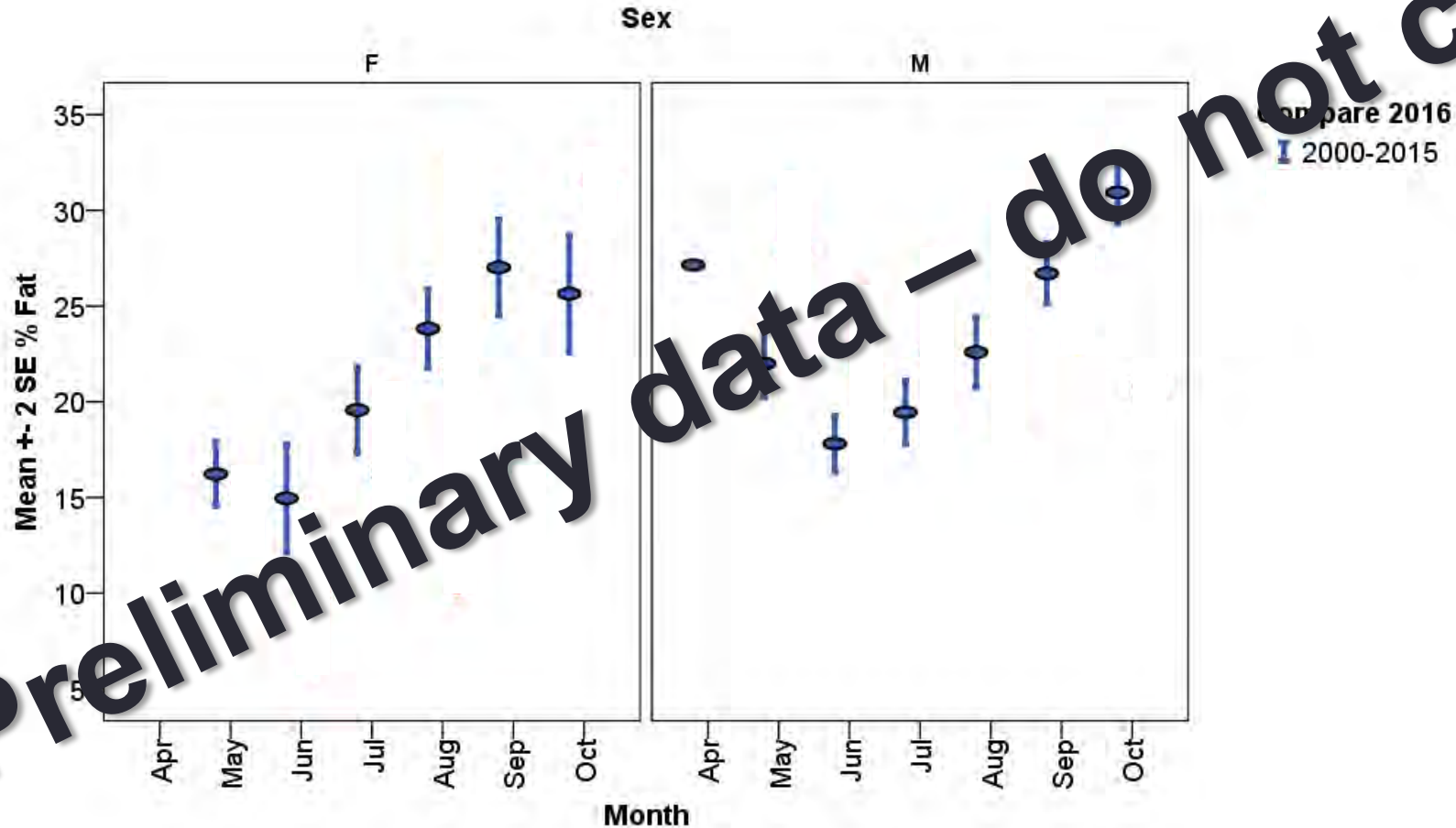


Estimated percent mortality for population segments (DMA only)

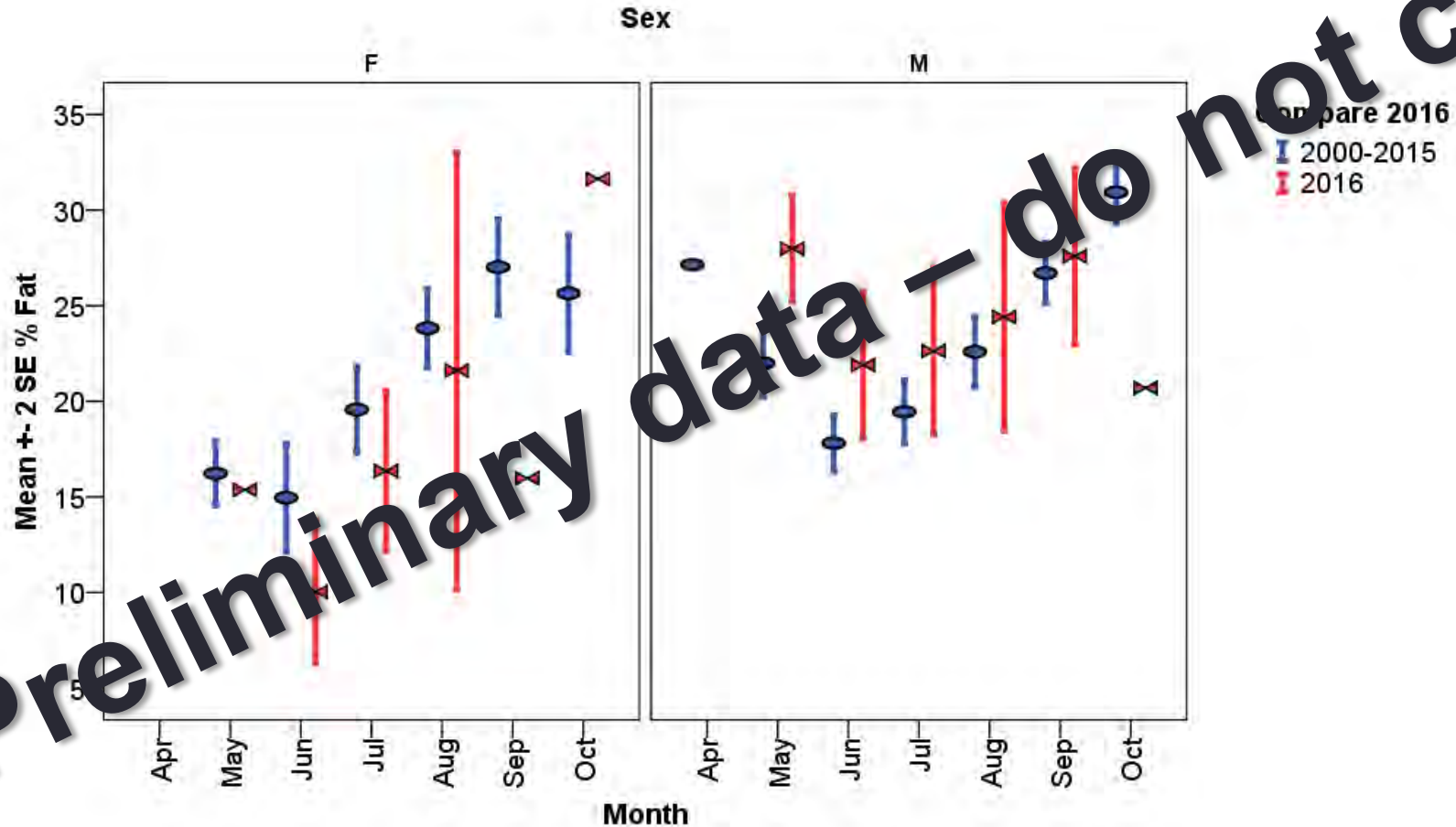
Population segment	Estimated n	Documented mortality	Estimated total mortality	Estimated % mortality
Independent females (≥ 2 yrs old)	238	6	12	5.0
Independent males (≥ 2 yrs old)	238	19	37	15.5
Dependent young (< 2 yrs old)	213	9		4.2

Body Condition and Genetic Monitoring

% body fat by month 2000–2015, and 2016



% body fat by month 2000–2015, and 2016



Genetic monitoring

- Results through 2014
- Over 900 individuals genotyped (20 microsatellite markers)
- No evidence of non-GYE ancestry in any of the individuals genotyped to date



IGBST

Let's Check Some Claims.....

Quote of the day

*“When you are studying any matter, or considering any philosophy, ask yourself only what are the facts and what is the truth that the facts bear out. Never let yourself be diverted either by what you **wish to believe**, or by what you think would have beneficent social effects if **it were believed**. But look only, and solely, at what are the facts.”*

– Bertrand Russell

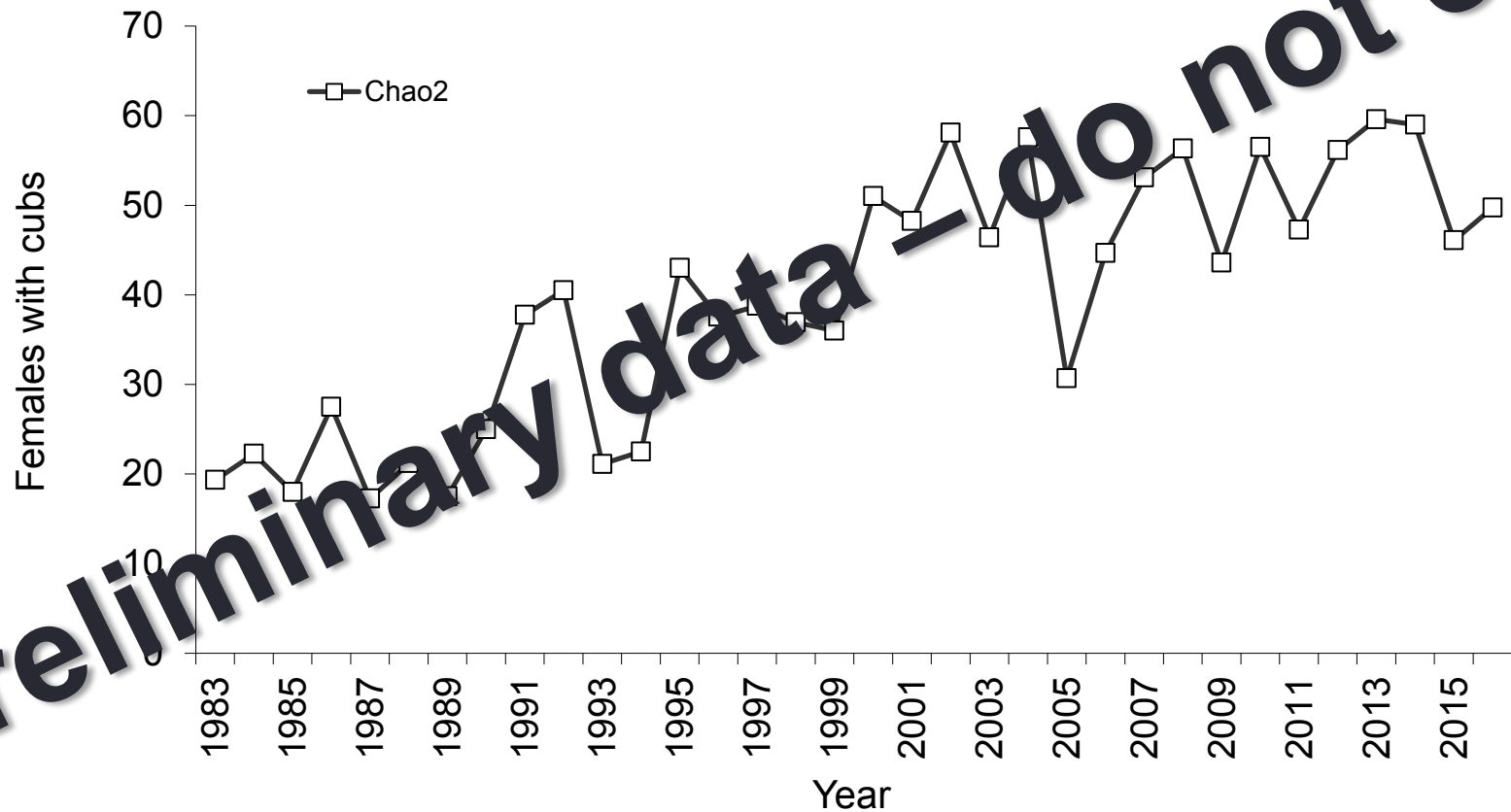
Claim:

the population is declining

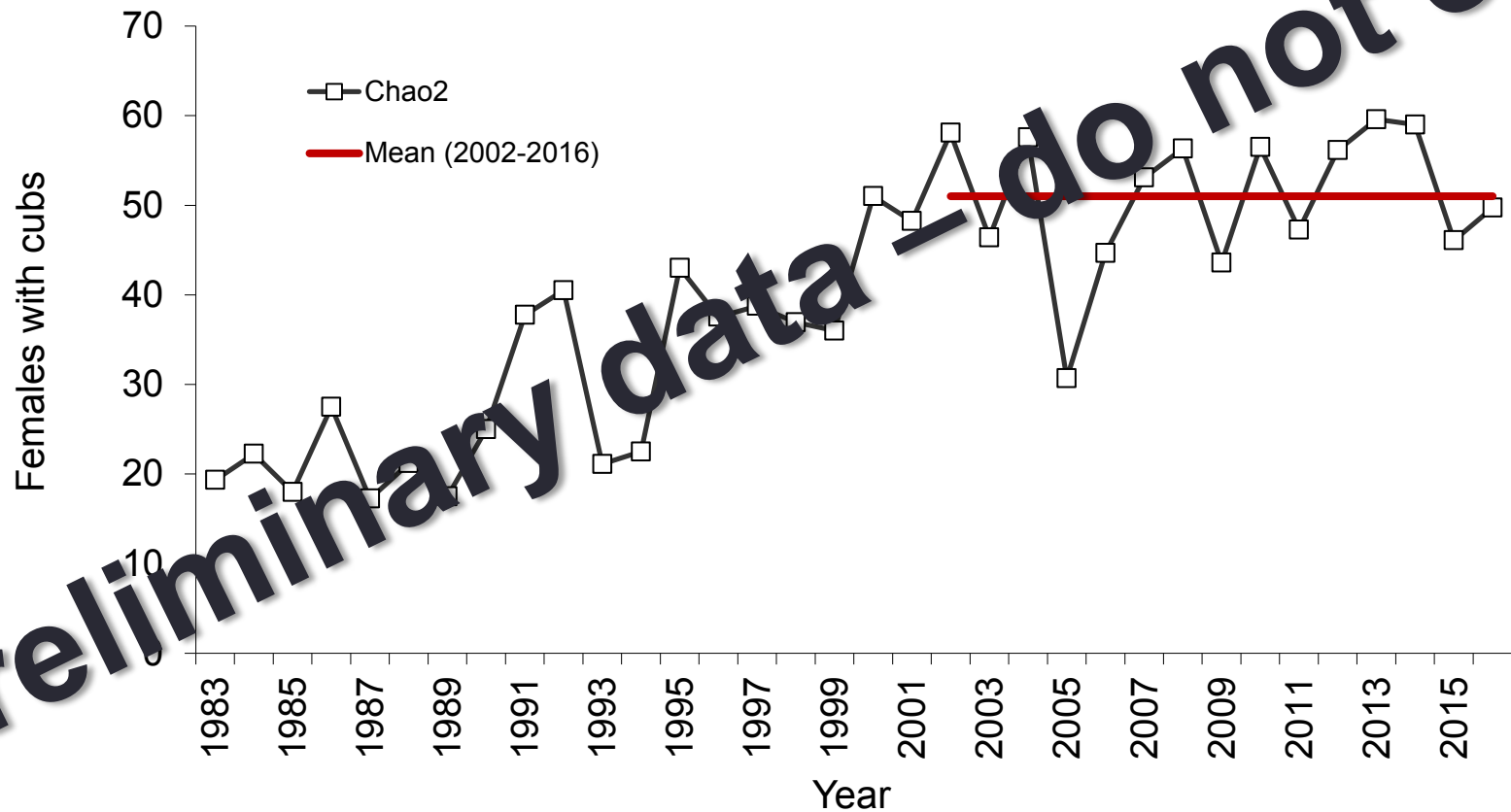
Claim:

**the population may be smaller than
estimated**

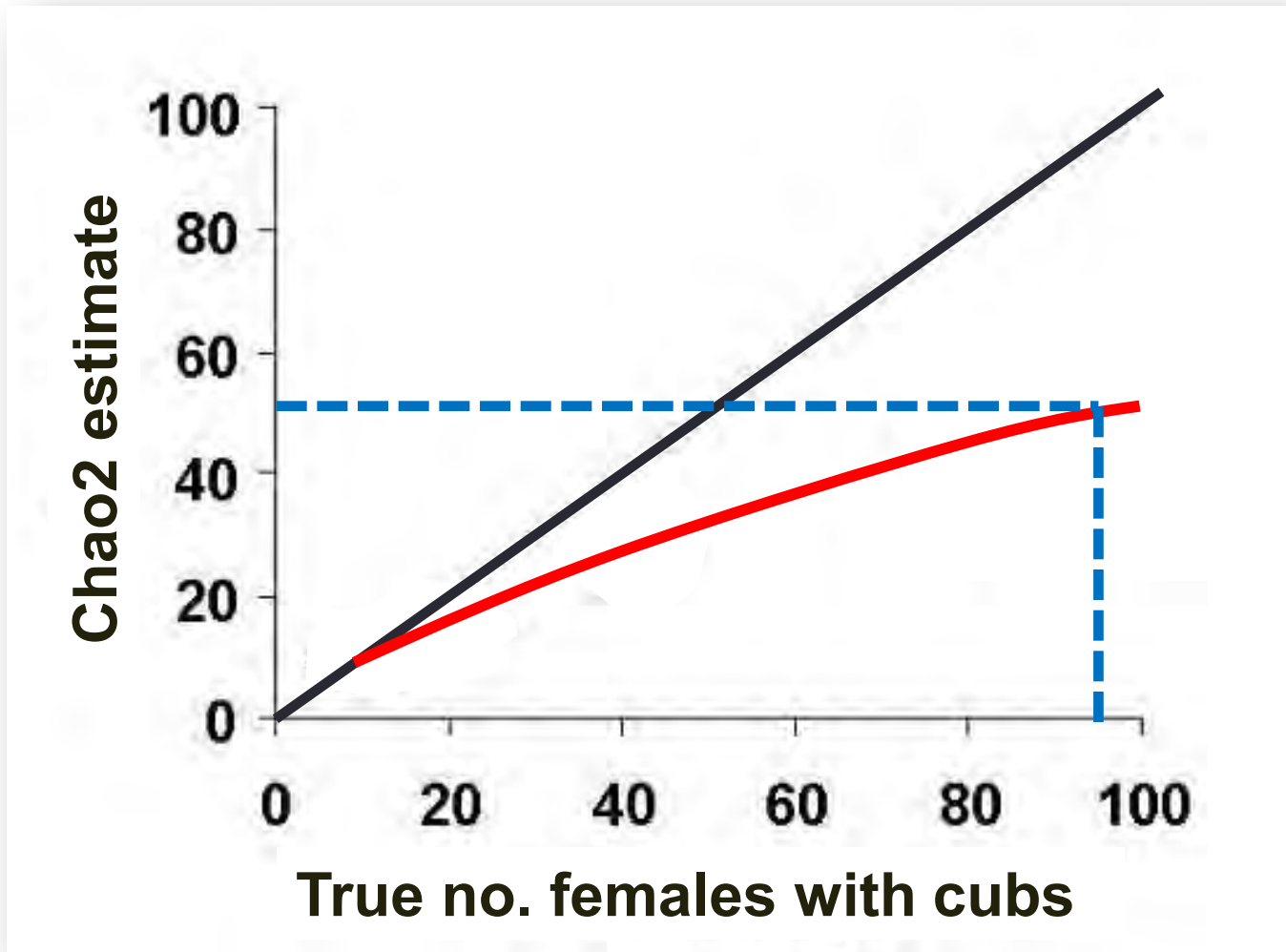
Trend in annual estimates of females with cubs 2002-2016 (DMA only)



Trend in annual estimates of females with cubs 2002-2016 (DMA only)



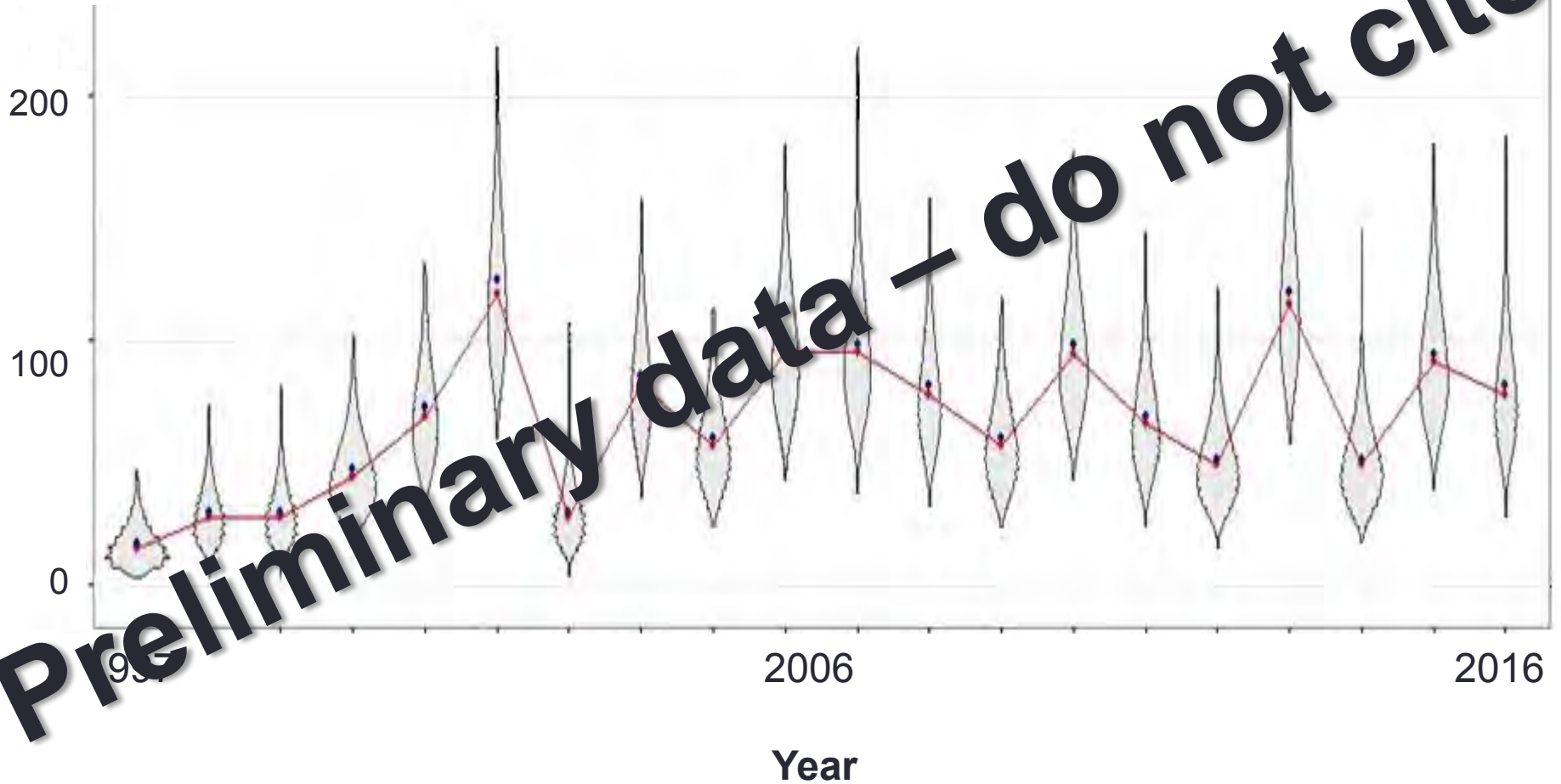
Bias in Chao2 estimator



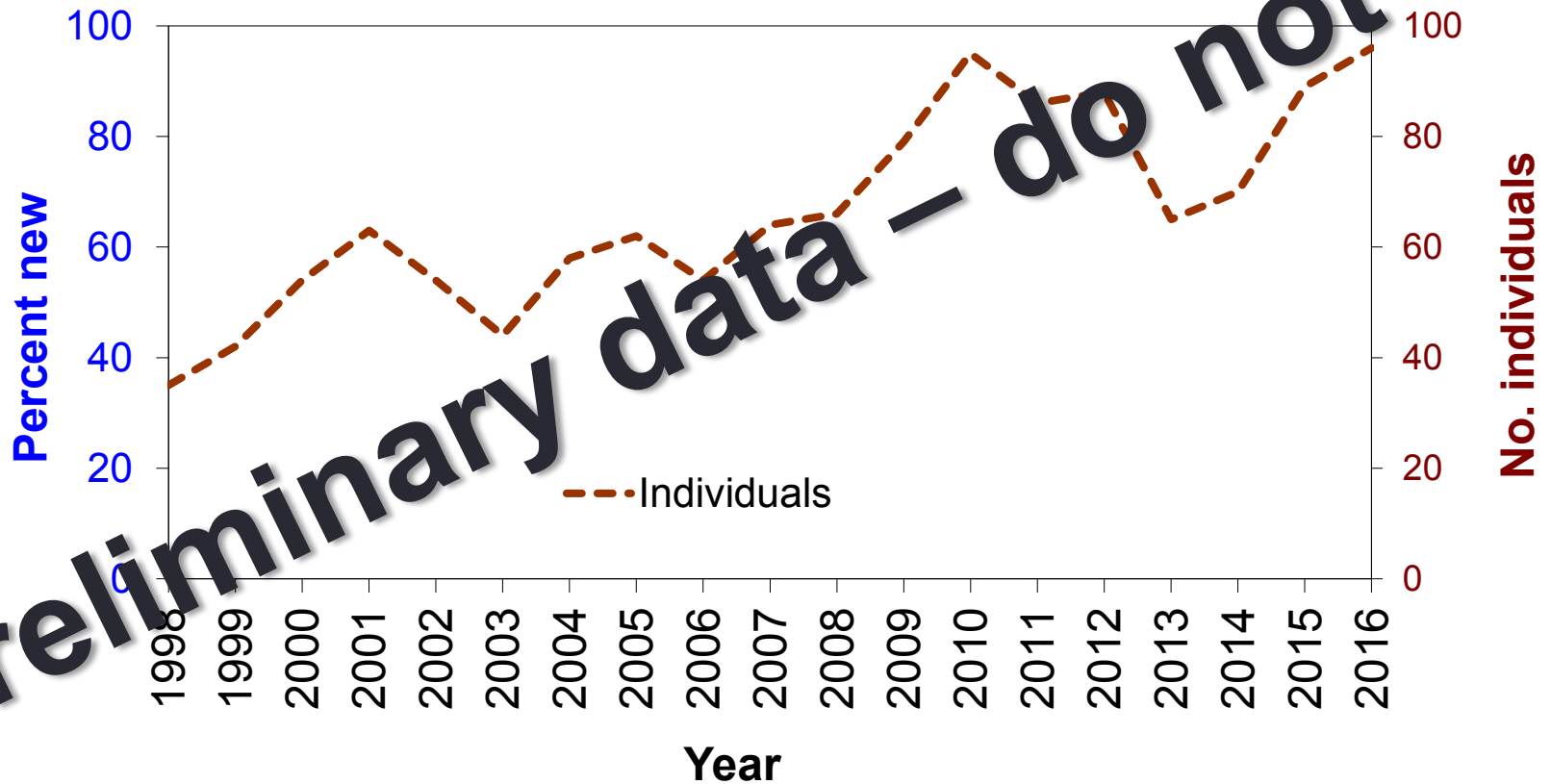
Schwartz et al. (2008)

Mark-Resight estimates 1997–2016

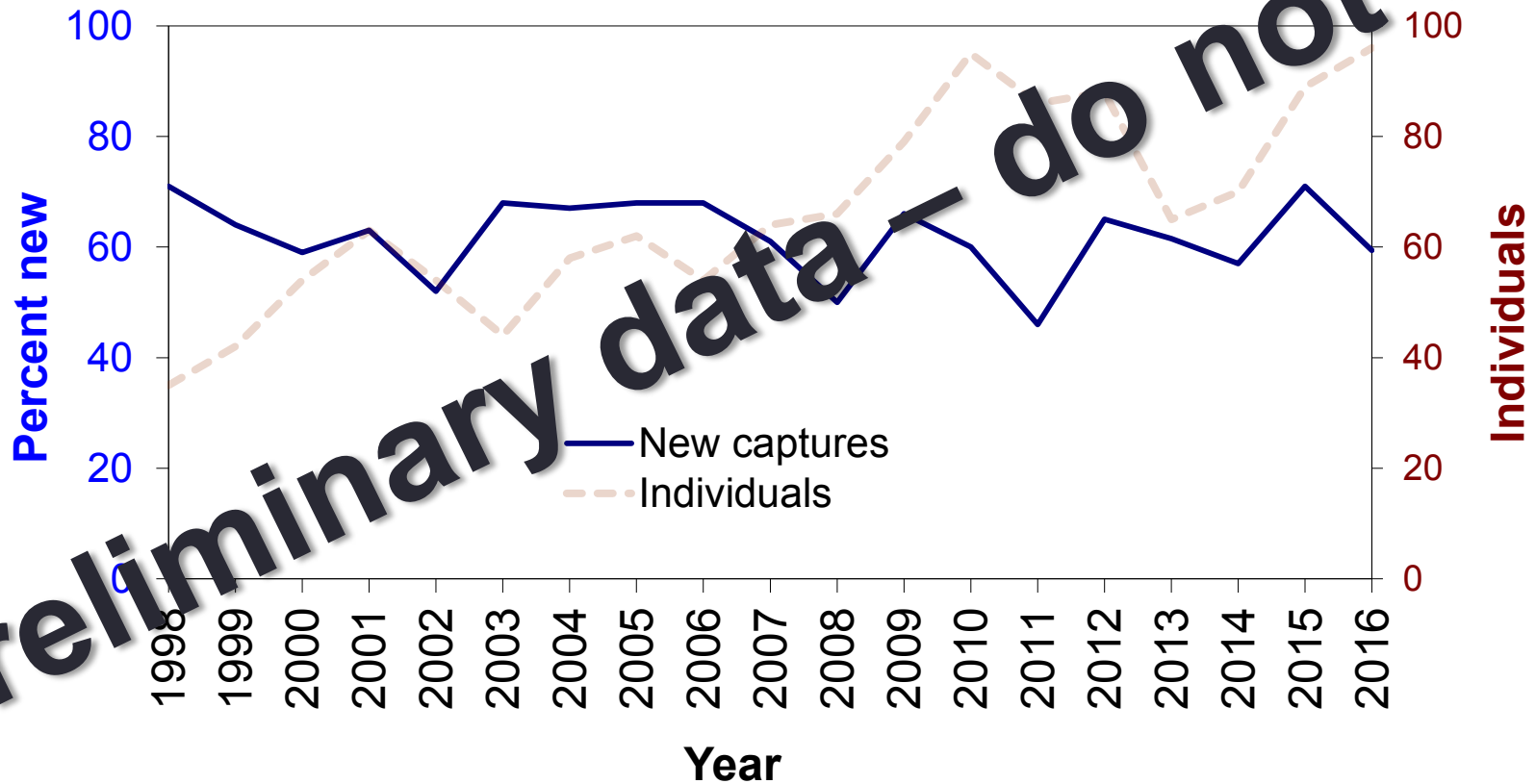
No. Females with cubs



Number of individuals and percent new captures 1998–2016



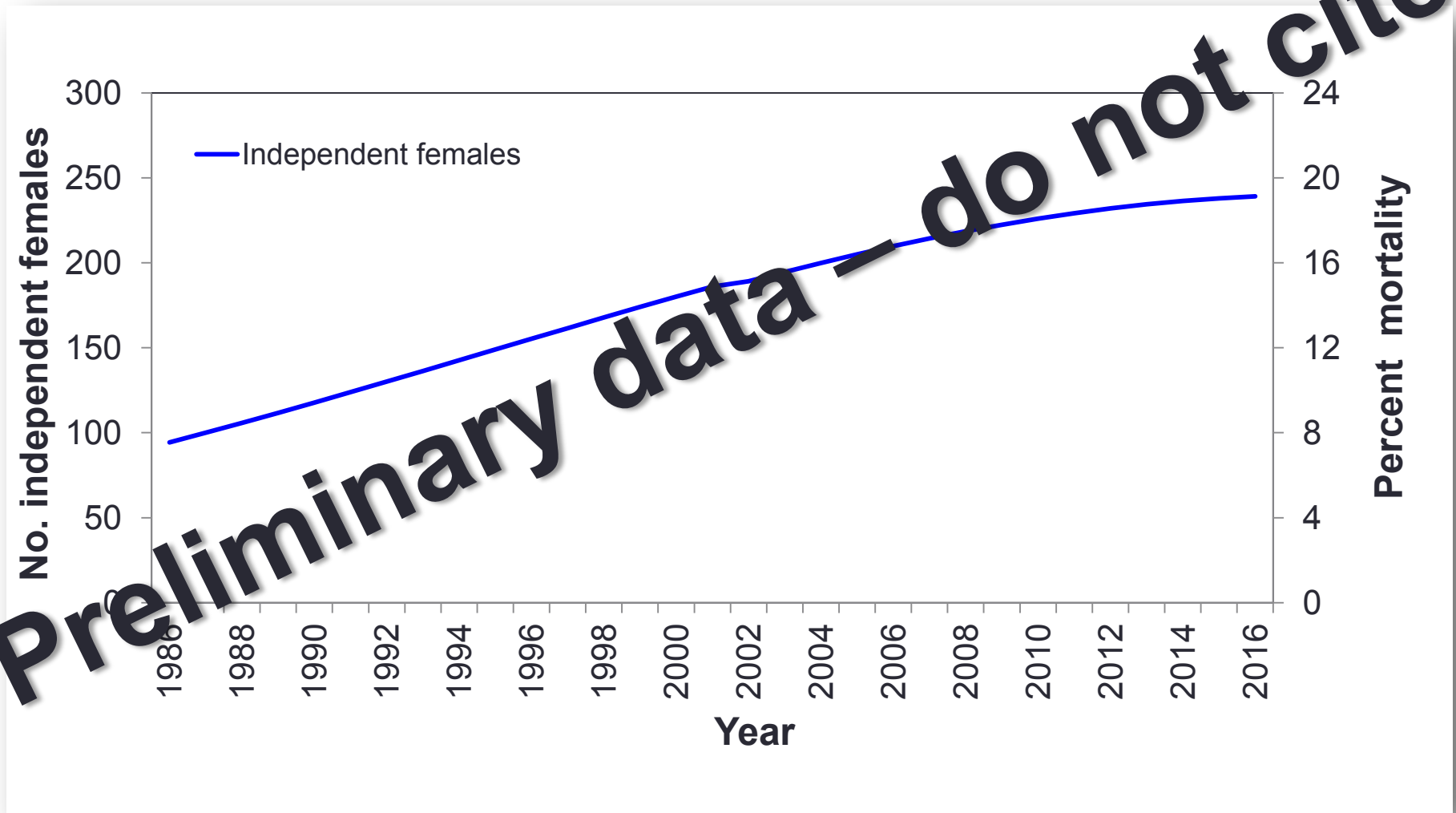
Number of individuals and percent new captures 1998–2016



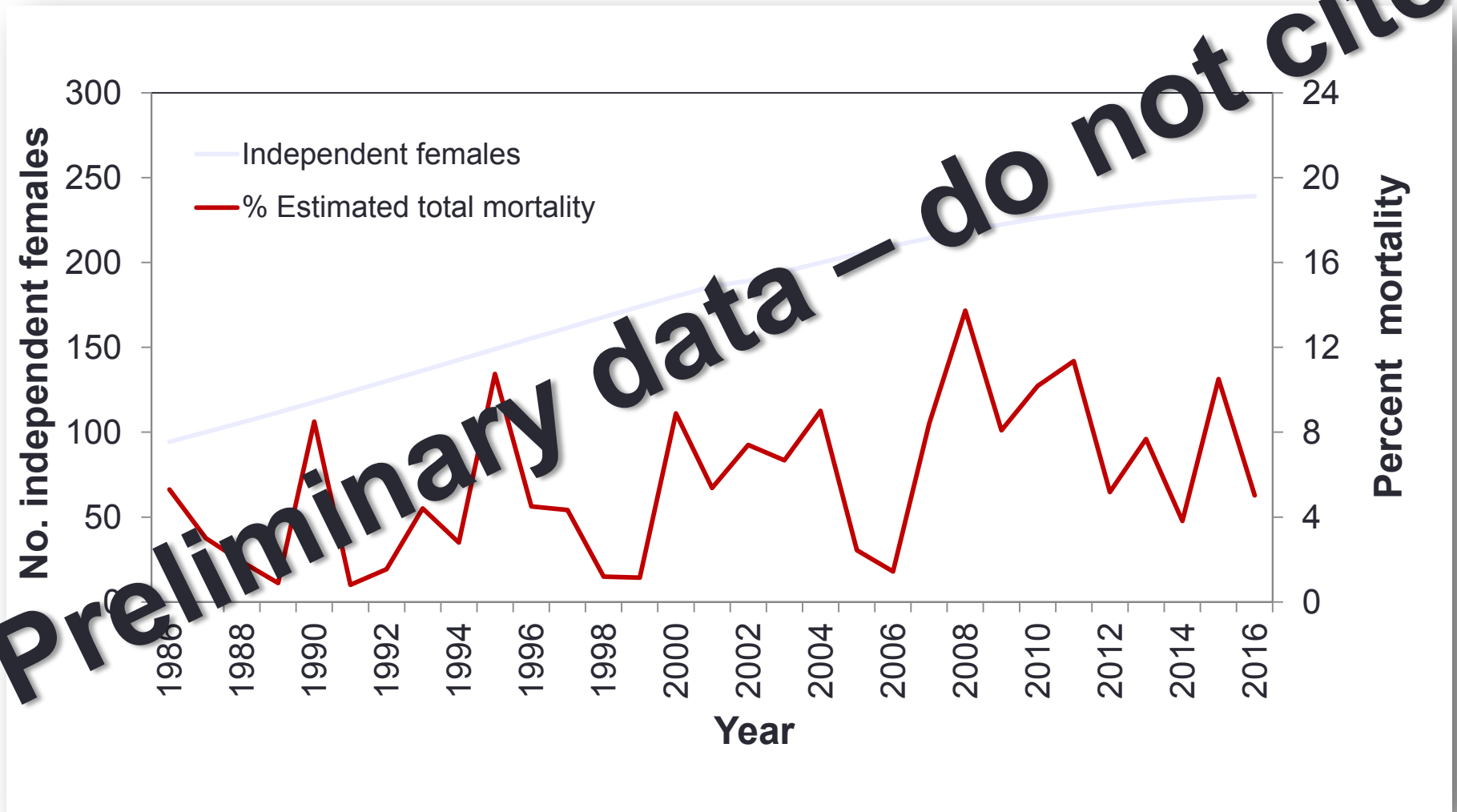
Claim:

mortality is at record highs

Mortality rate of independent females 1998–2016 (DMA only; total mortality)



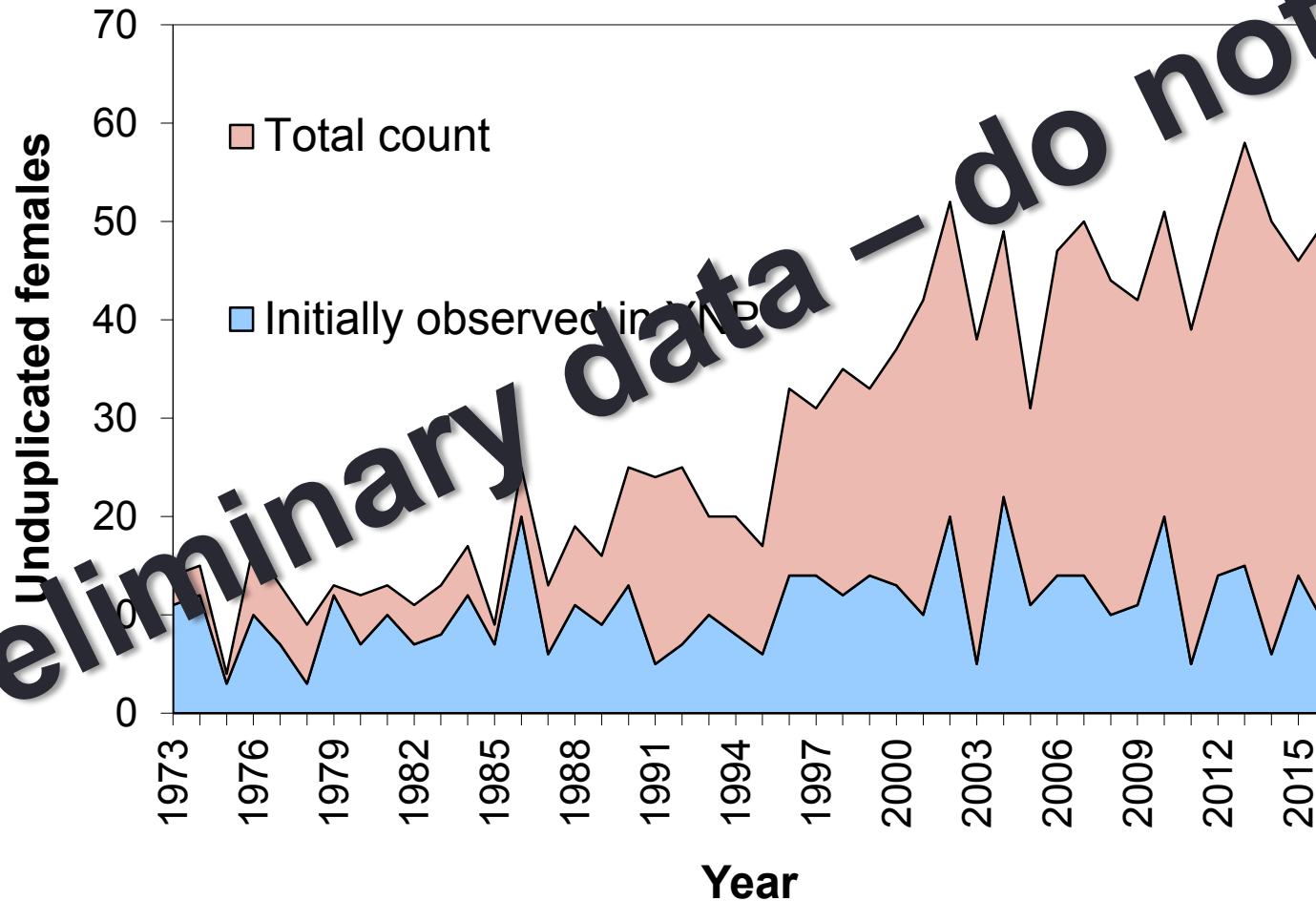
Mortality rate of independent females 1998–2016 (DMA only; total mortality)



Claim:

bears are leaving core areas

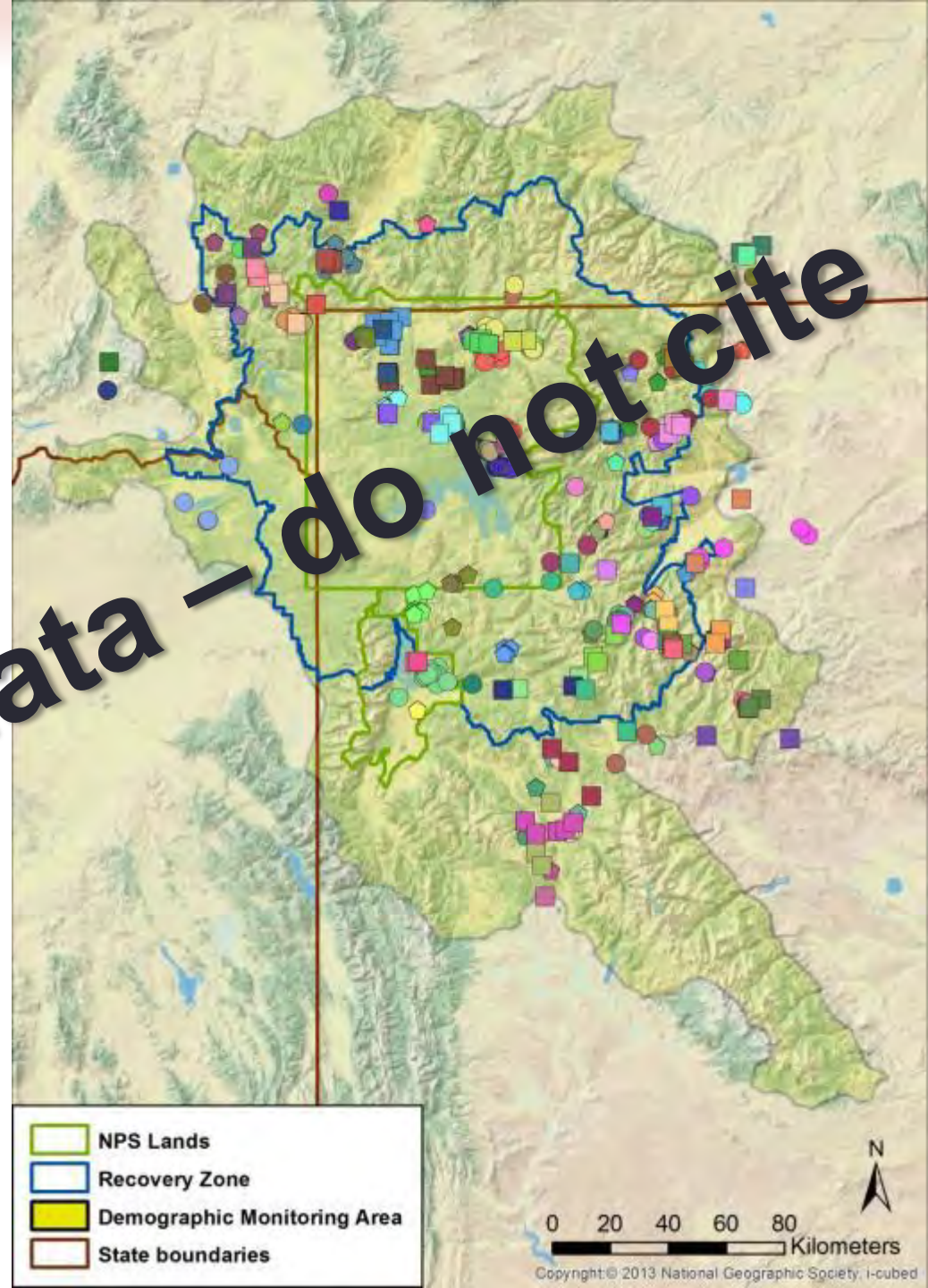
Unique females with cubs in Yellowstone NP vs. GYE, 1973-2016



Unique females with cubs 2014–2016

- 146 in GYE
- 136 in DMA

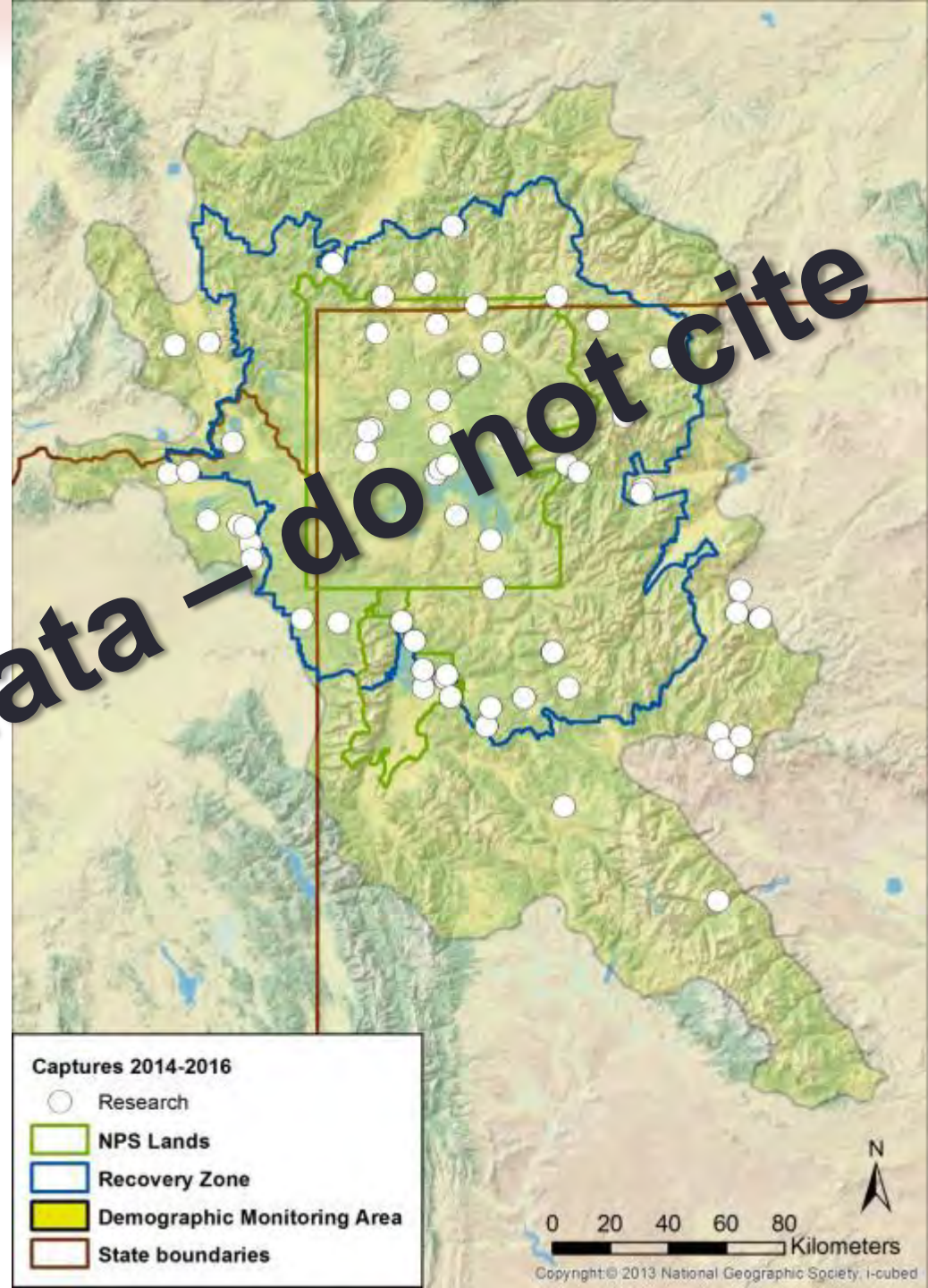
Preliminary data — do not cite



Research captures 2014–2016

- Total captures = 144

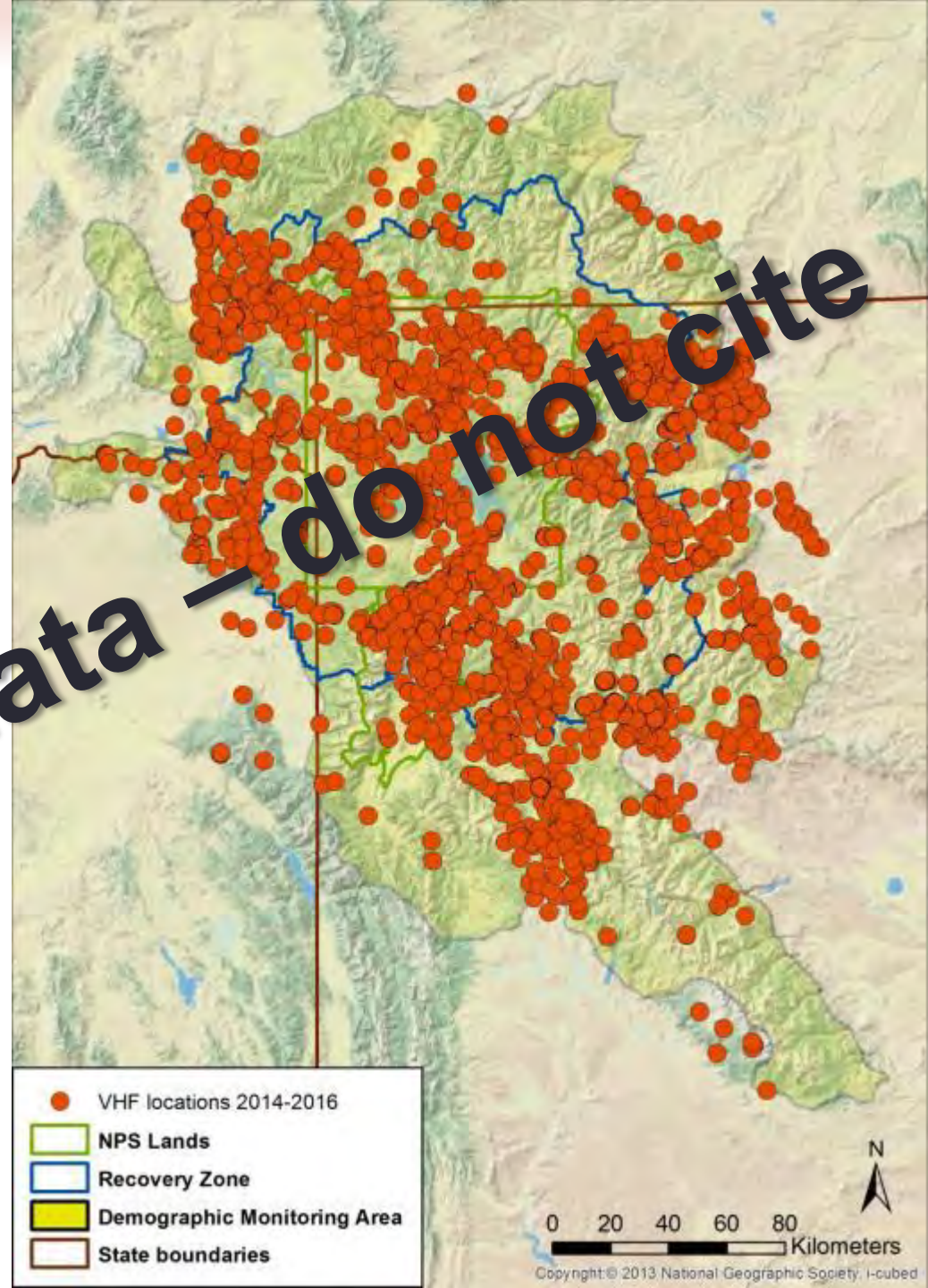
Preliminary data — do not cite



VHF telemetry 2014–2016

- Flight hours = 820
- Total locations >2300
- Observations of radio-marked bears = 555

Preliminary data — do not cite



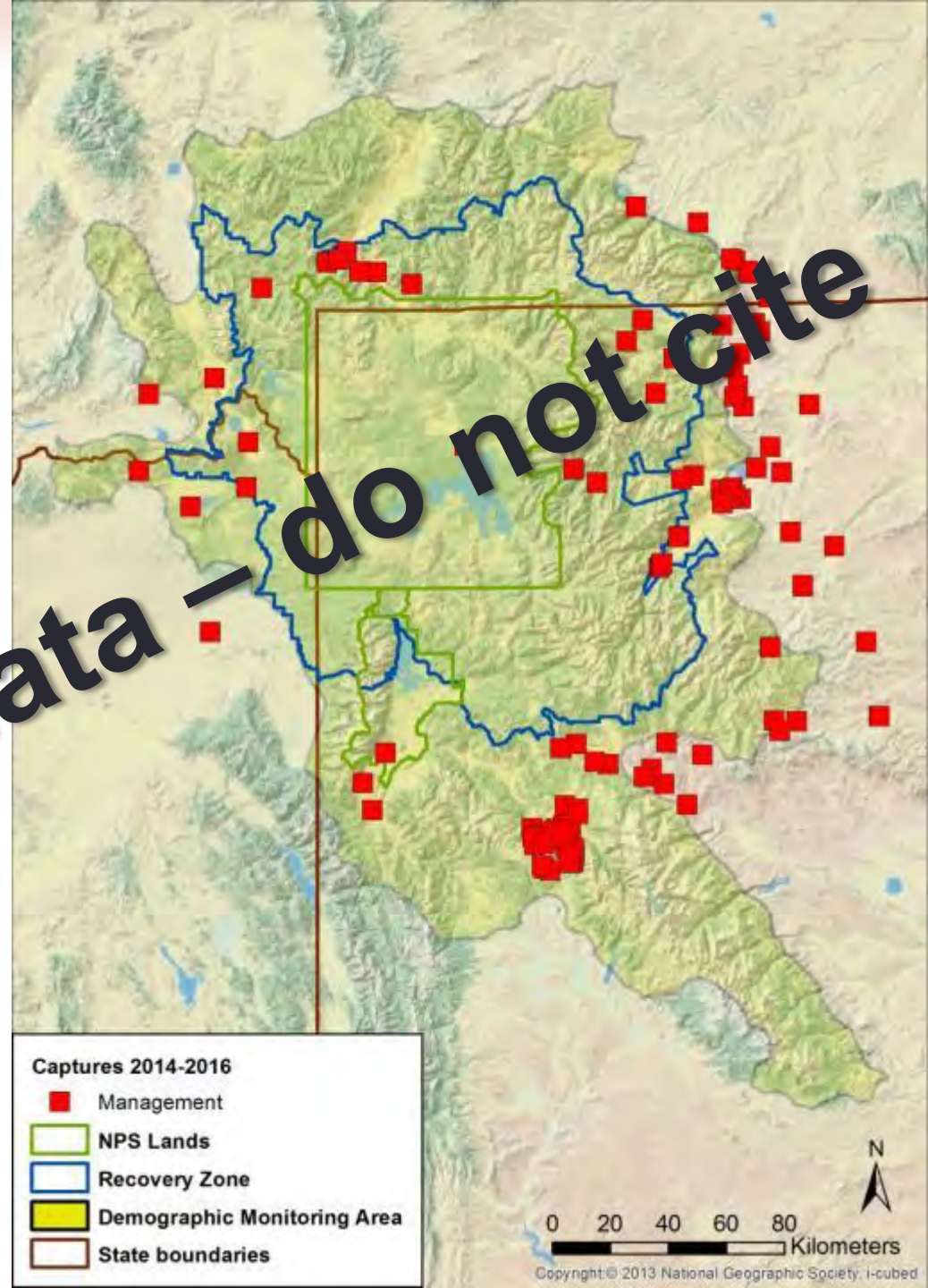
Claim:

**increased conflicts indicate bears
are not finding enough food
resources**

Management captures 2014–2016

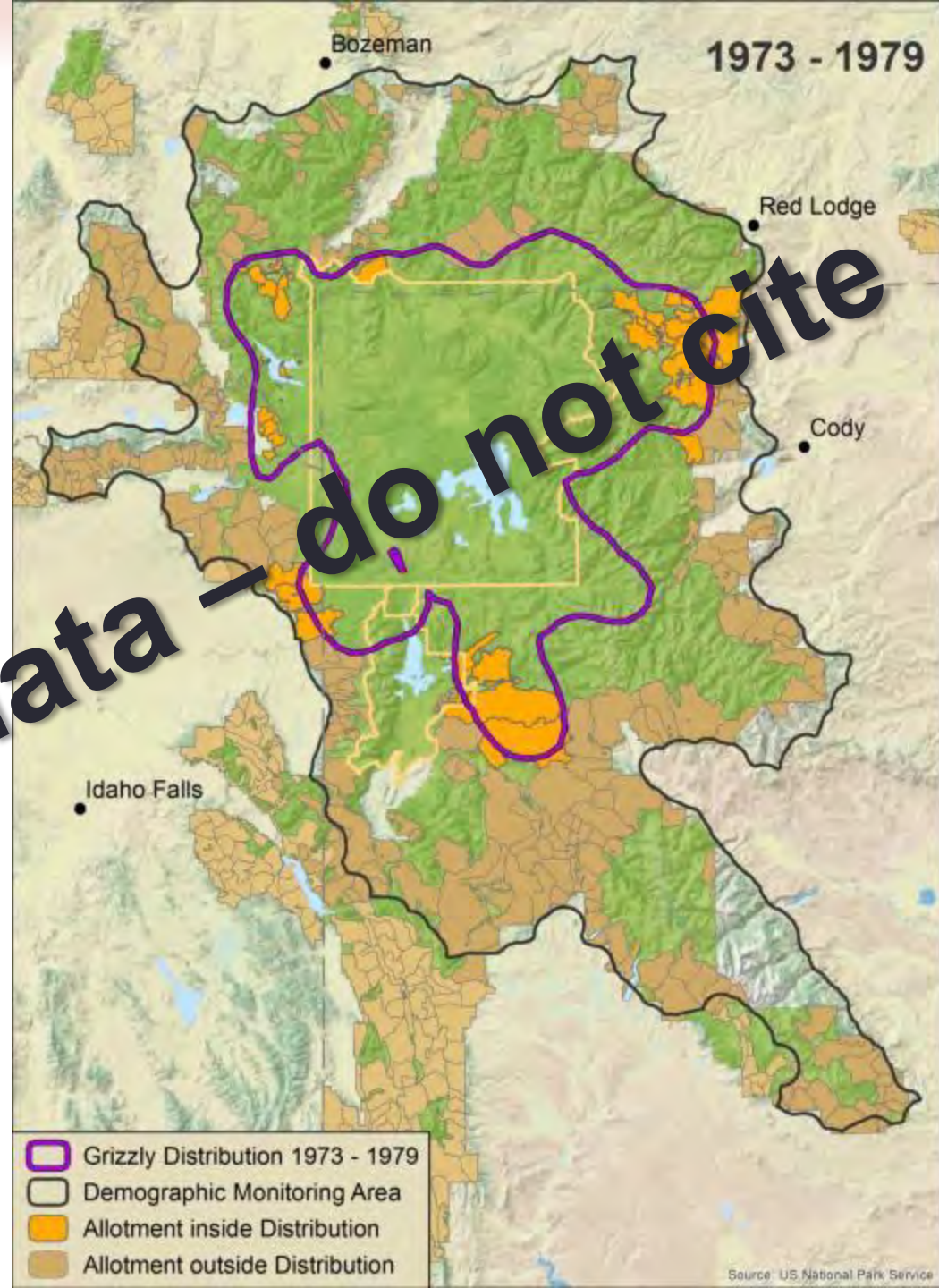
- Total captures = 151

Preliminary data — do not cite



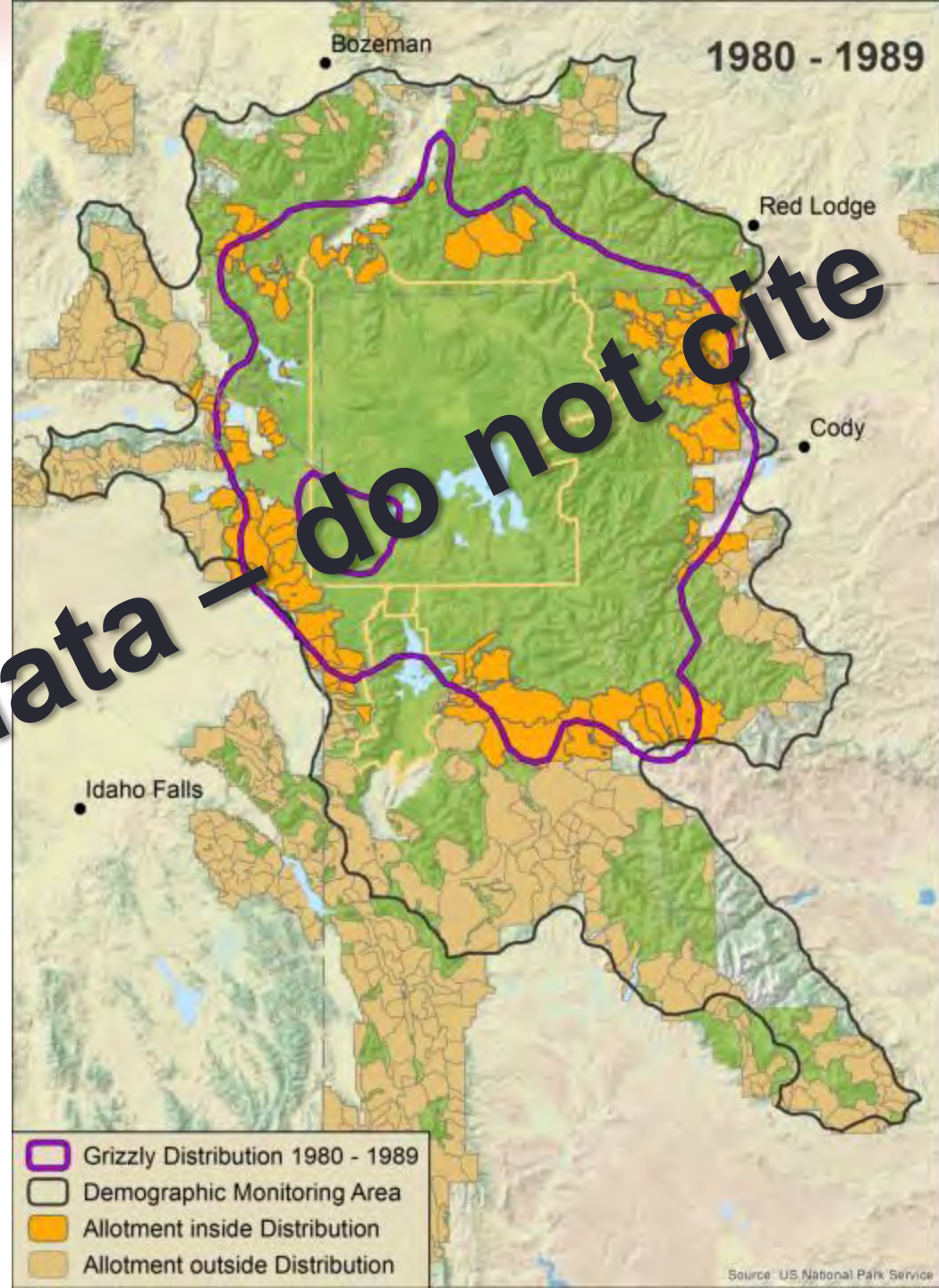
Grizzly bear distribution and USFS allotments, 1973–1979

Preliminary data – do not cite



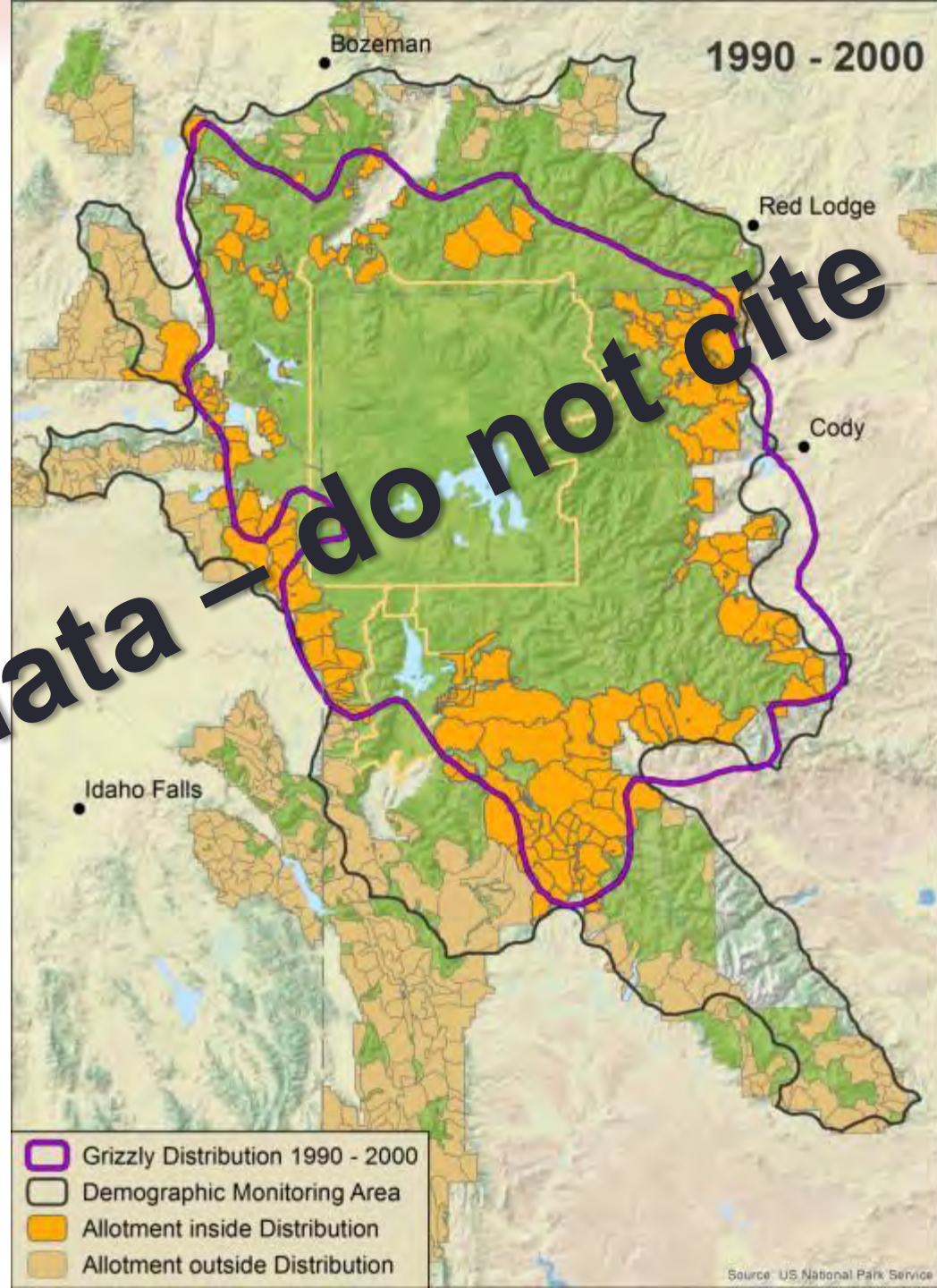
Grizzly bear distribution and USFS allotments, 1980–1989

Preliminary data – do not cite



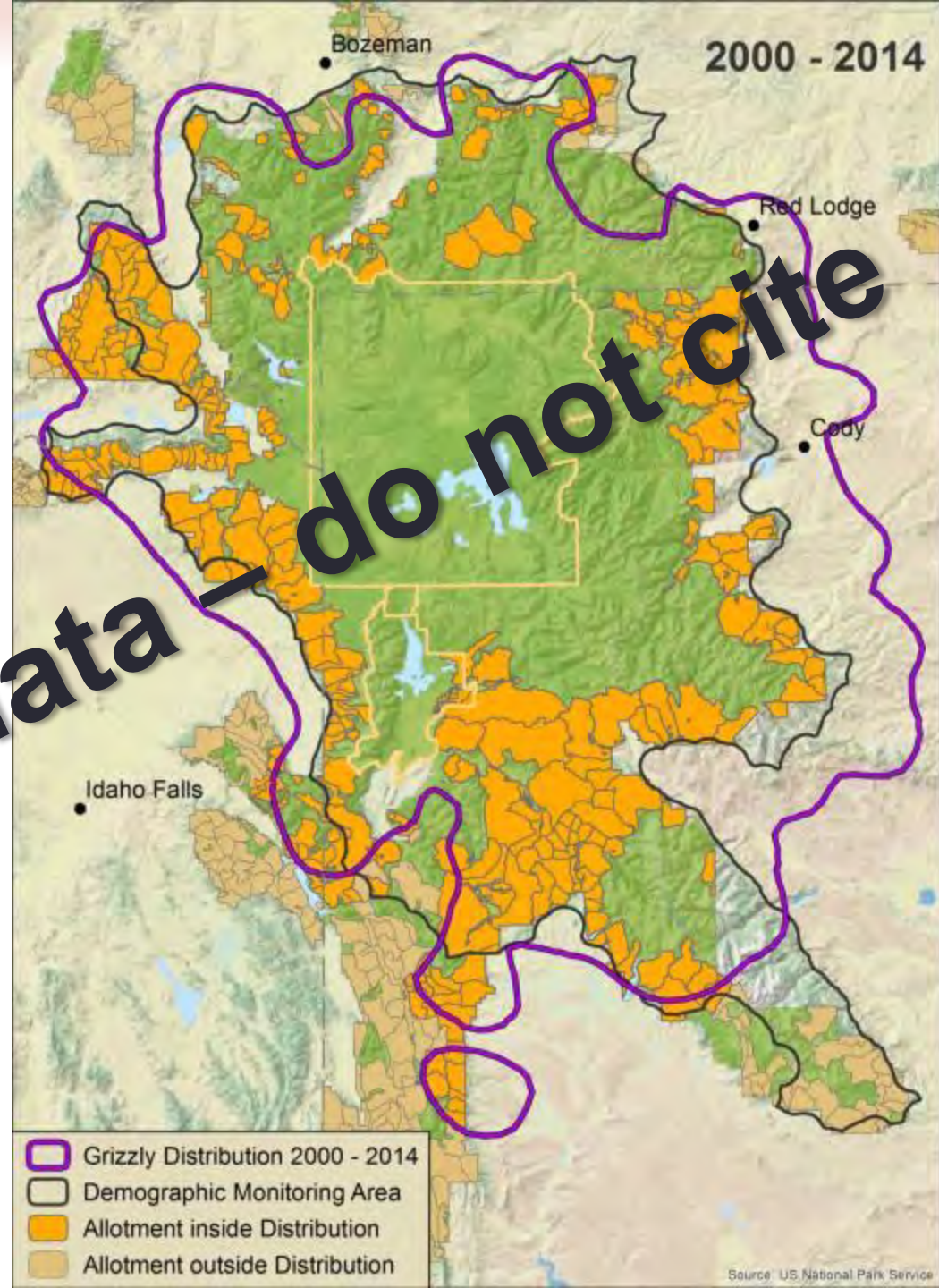
Grizzly bear distribution and USFS allotments, 1990–2000

Preliminary data – do not cite



Grizzly bear distribution and USFS allotments, 2000–2014

Preliminary data — do not cite



Claim:

**Federal and state scientists are
biased**

Bruskotter et al. (2016)

- Based on surveying 200 “experts” (co-authors on grizzly bear papers)
- 43% self-reported no knowledge of the Yellowstone grizzly population or no experience with grizzly/brown bears
- Key conclusions:
 - State and federal scientists were 2-3 times more likely to recommend delisting than academics
 - “scientists in state and federal agencies can face strong, top-down pressure to reach a particular decision”
- 1 IGBST member responded

Critique by Garshelis and Noyce (2016)

International Bear News (fall issue)

- “Bruskotter et al. suggest that a process is needed to overcome biased thinking. But we already have such a process: it is called the **peer-reviewed literature**. It is not the scientists’ personal opinions that decide delisting; rather, it is a matter of whose science is best supported. In this case, the **agency scientists directly involved in grizzly delisting have produced a remarkable body of peer-reviewed scientific literature**, and we find it odd to suggest that academics are less inclined to believe this literature than are agency people.”
- “...we just don’t think the survey uncovered the true reason for this disparity or provided useful guidance for better ways of approaching these sorts of issues in the future.”

Summary

- **Population**

- Population estimate = 690
- No major change in trend since early 2000s
- No evidence of bears leaving core of ecosystem

- **Mortality**

- 38% of all mortalities occurred outside the DMA
- Primary causes: livestock, accidental (road kills and drownings), and site conflicts
- 2016 mortality rates in DMA
 - Within thresholds for independent females
 - Just over 15% for independent males

- **Year of relatively good food supply**

- Low availability of winter-killed carcasses
- Good berry production
- Above average whitebark pine cone production

A close-up photograph of a animal's fur, showing a mix of brown, tan, and greyish-brown strands. The fur appears thick and slightly matted. Overlaid on this background is yellow text with a black outline.

**Annual Reports, data, maps,
and other products available at
IGBST website**

Google “IGBST”

Acknowledgments 2016



- IDFG: P. Atwood, R. Cavallaro, C. de Caussin, J. Farr, K. Guy, C. Hendricks, C. Johnson, D. Kelsey, L. Lane, J. Nicholson, D. Petersen, J. Rydalch;
- MSU: S. Cherry, C. Peck;
- MTFWP: J. Cunningham, D. Fagone, K. Frey, C. Kerin, J. Knarr, B. Lloyd, A. Nelson, J. Ramsey, J. Smith, D. Scott, J. Smolczynski, S. Stewart;
- NPS: K. Atkins, C. Ausprung, D. Bergum, N. Bowersock, E. Boyd, S. Consolo-Murphy, R. Coscarelli, S. Dewey, Erwin, C. Flaherty, K. Gunther, D. Gustine, K. Harrigan, D. Harris, Q. Harrison, J. Jakicic, E. Johnston, E. Laubach, S. Mayberry, J. Mohr, E. Reinertson, T. Ritter, J. Roper, W. Scherer, D. Schneider, J. Schwabedissen, K. Simpson, J. Stephenson, K. Szcodronski, B. Tatu, T. Tatu, J. Warren, K. Wilmot, T. Wyman;
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- USFWS: Baker, S. Conrad, D. Dewey, P. Hnilicka, C. Hoover, M. Mazur, C. Servheen, S. Stoinski, B. Stone;
- USGS: C. Dickinson, M. Ebinger, M. Haroldson, B. Karabensh, M. Kurzen, F. van Manen, V. Villalobos, C. Whitman;
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- WGFD: G. Anderson, C. Atkinson, K. Bales, B. Baker, D. Bjornlie, M. Boyce, J. Clapp, R. Clapp, C. Clark, A. Courtemanch, Crane, B. Debolt, L. Ellsbury, Gerharter, P. Gerrity, M. Gocke, Haley, Hunter, R. Kindermann, J. Kraft, B. Kroger, K. Lash, D. Lasseter, D. Lemon, S. Lockwood, D. McWhirter, K. Mills, P. Quick, Richins, Ryder, Sculloch, J. Stephens, S. Stephens, S. Stewart, D. Thompson, Z. Turnbull, J. Winter, Wood.