IGBST Response to IBA Comments



Anchorage

15 June 2016

5:00-7:00 PM

USGS science for a changing world

Montana Fish, Wildlife & Parks

IDAHO FISH & GAME

Jake Davis

IGBST Expectations

- Clarify and discuss issues of agreement and disagreement with IBA review
- Obtain feedback from committee
- Provide feedback to IBA on review process

IGBST Response

1. Science (Frank)

- The status of GYE grizzly bears in 3 slides
- Specific topics
  - Food resources and density dependence
  - Population estimation

2. Policy (Chris)

The Forest, or the Trees?

"….. Recovery should be seen as the provision of biological security [and] delisting should be understood as requiring the additional provision of regulatory security outside the ESA, such that the special regulatory protections of the ESA are no longer necessary."

--H. Doremus, cited in Martha Williams, *Lessons from the Wolf Wars*, p. 149

The Big Picture

Demographics

- Occupied range increased >3-fold from 1970s to current (>58,000 km^2)
- Chao2 estimate is very conservative and increased ~3-fold since listing
- Bias-corrected Chao2 and Mark-Resight estimates are similar, currently at approximately 100 females with cubs annually
- 4 population monitoring methods show slowing of population growth starting in early 2000s
- No statistical analysis supports population decline
- Proximate cause(s) known: lower juvenile survival and reproductive suppression
- Independent-male survival increased
- Bear density correlated with lower cub survival and reproduction
- Demographic changes began occurring prior to major changes in food resources

The Big Picture

Food resources

- Food resources in the GYE have historically been dynamic (e.g., variable mast, 1988 fires, cutthroat decline, wolf reintroduction, ungulate herds)
- Some foods have declined since early 2000s, others stable or increasing
- Selection for WBP stands, duration of use, and start of use reduced 2000-2011
- Evidence of shifts towards animal matter in fall diets
- No change in body mass for males or females 2000-2010; limited data on % body fat

Movements and Home Ranges

- Home-range size not associated with availability of whitebark pine
- No change in daily movement distance and activity radius 2000-2011
- Home range sizes of females declined from 1989-1999 to 2007-2012
- Female home-range size negatively associated with index of bear density and less variable at higher bear densities 1989-1999 and 2007-2012

The Big Picture

Mortality

- Total estimated mortality for independent-aged females averaged 7.3% during the last 10 years using the negatively biased Chao2
- Total estimated mortality for independent-aged females using bias-corrected Chao2 or Mark-Resight would likely be under 5%, corresponding to known-fate survival estimate
- Ranges for known and probable mortalities estimated using 95% fix kernels expanding 9,275 km^2 per decade since; expansion motivated by male dispersal

Genetics

- 3- to 4-fold increase in effective population size since the early 1980s, matching trend in Chao2
- N_e nearing 500 (estimator by parentage assignment)
- High N_e/N_c ratio for Chao2 supports notion of underestimation
- No decline in genetic diversity or increase in inbreeding

Specific Topics

1) Changes in food resources and density dependence

"*…it is too soon to conclude that declines in key grizzly bear foods in the GYE have not affected vital rates of grizzly bears, despite the failure to statistically detect such effect in the analyses presented to date*" -- IBA letter

"*Based on the cumulative body of literature on nutrition and demography of bears in North America (e.g., Elowe and Dodge 1989, Costello et al. 2003, Obbard and Howe 2008, McLellan 2015), we believe that declining food resources must have played some role in recent reductions in population growth and is an important factor warranting consideration in management and monitoring in the future.*" -- IBA Review Committee

Specific Topics

2) Population estimation

"…..the sole reliance on Chao2 for monitoring this population has an associated risk of bias and inaccuracy that is not acknowledged in the Rule or Conservation Strategy (CS)….. In sum, the Chao2 estimator is likely no longer the "best available science" for continued monitoring of this population."

-- IBA Review Committee

Considerations for Future Reviews

- Objectives of IBA reviews
- Challenges associated with review of complex materials and time constraints
- Context is crucial
- Requests for clarification

Uncertainty and Type II Error

"Thus, we see no escape from uncertainty. To claim that no decision about what has occurred should be adopted until uncertainty is removed or to claim that the only acceptable decision adopts some lower confidence limit as truth is to reject the role of science. If the possibility of population decline is treated as the fact of population decline (even where overwhelming evidence suggests otherwise), there is no need to spend money on research or monitoring because the management approach would be identical regardless of what data were produced. Because it is impossible to absolutely reject the hypothesis of decline, one would always manage as though a decline had occurred. To us this would seem poor policy."

--Schwartz et al. 2006