

From: [Hanauska-Brown, Lauri](#)
To: [Servheen, Chris](#)
Cc: [Shoemaker, Rebecca](#)
Subject: FW: SW Montana plan (population dynamics section)
Date: Monday, July 29, 2013 3:51:37 PM

Chris...we are aiming to release our draft of the SW plan sometime next week. Hopefully the below language meshes with what you and Rebecca are working on. ??

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Population Dynamics

Grizzly bears are long-lived animals that range over large geographic areas making it difficult to census and assess population levels. Generally, researchers agree that grizzlies have low reproductive rates and that grizzly populations are very susceptible to human impacts. Grizzly populations are also very sensitive to changes in female survival rates. Age at first reproduction for females is generally between 4-7 years old and male bears reach sexual maturity around 5 years of age. The average litter size for bears in the Yellowstone area is two cubs (range 1-4) and females typically produce cubs every third year. Breeding occurs in late spring with cubs born in the den the following winter.

As with all other bear population in the world, it is not possible to determine definitively the actual numbers of bears in the GYA. Therefore, any figure is a result of some form of estimation. Using garbage dump census data collected by the Craighead team, and a census efficiency determined by ratios of collared to uncollared mortalities inside and outside YNP, the pre-dump closure bear population was estimated at 312 animals. The population declined to about 230 bears following the closures but began increasing in the late 1980s. After that time researchers calculated that the grizzly population grew 4-7% per year for an average growth rate of 4.6% per year, up until the late 1990's or early 2000's.

These rates of change are calculated as a function of the number of unduplicated females with cubs of the year (COY). Females with COY are readily visible and uniquely identifiable. However, these counts are influenced by counting effort, seasonal cover, and the total number of animals. A standardized and conservative counting approach has been adopted to avoid duplication of females counted. These records have been maintained by the IGBST since 1973. The female with COY count has been steadily increasing since the late 1980s. The population estimation protocol used until 2007 indicated rates of increase between 4% and 7% from 1983-2001. For the year 2001, the IGBST reported a minimum population estimate of 361 (IGBST, 2012.)

New population estimation techniques were adopted in 2007 following considerable analyses. The new technique is still a function of delineating unique females with COY but results in a population estimate rather than the earlier conservative index of population size. An attempt is made to estimate the total number of females with COY present from the distribution of the frequencies of individual sightings. Then a Chao2 estimator is used to estimate an annual population total (IGBST, 2012.) From the 2012 IGBST Demographic Workshop, analysis of the 2002-2011 data indicates that since 2002, the overall rate of growth of the bear population in GYE has stabilized or slowed.

The population estimate for 2012 was 610 grizzly bears using the 2007 estimation techniques. Actual bear numbers are no doubt higher, but improved counting efforts and the refined estimation technique has increased confidence in these point estimates. Analysis of the 2002 -2011 data set from the 2012 IGBST Workshop paper (Table 4.2), looked at the overall population by zones, revealing that the increase in bear numbers is due primarily to growth & survivorship of bears outside YNP within the Recovery Zone and bears outside the Recovery Zone. Population growth has slowed or leveled off within YNP. Analysis also revealed that male bear survivorship (point estimate vital rate of .94) had increased outside of YNP and outside of the Recovery Zone during the 2002 to 2011 period compared to the 1983 to 2001 data set vital rates (.874) thus accounting for more male bears in the overall population. Adult female bear vital rates remained nearly constant during the same time period. Using these current vital rates derived from 2002 to 2011 data, the population estimate and expanded distribution of where bears were counted resulted in a population estimate of 716 grizzlies. Using the old vital rates (1983-2001), the overall population estimate increased 32% from 2002 (416) to 2012 (610). Using the new analysis vital rates, and the 2002-2012 data, the population point estimate (716) actually increased by 42% from 2002 to 2012.

These new data sets and analysis came from the 2012 IGBST workshop to further refine protocols for estimating population size of the GYA grizzlies, evaluate mortality limits and discuss the possibility of zoning the ecosystem for mortality limits given the expanding population (IGBST 2012). Efforts like this will continue to ensure the use of the best available science in grizzly bear management and to ensure demographic criteria are met. The USFWS 1993 Recovery Plan established demographic criteria for recovery, including females with cubs of the year, mortality limits, and occupancy requirements. Current information on these parameters and their relationship to recovery plan goals are shown in Tables 2 and 3. All of the regional demographic criteria are currently being met for this population.

From: Hanauska-Brown, Lauri
Sent: Monday, July 08, 2013 2:23 PM
To: 'Servheen, Chris'; Frey, Kevin
Cc: Shoemaker, Rebecca
Subject: RE: SW Montana plan

Yes, Kevin and I have discussed how these two processes may overlap. We'll have to adjust accordingly I suppose. Attached is a tentative schedule for document completion and while this is not set in stone it would be nice to stay as close to it as possible or we'll never get this thing done.

Thanks for the reminder.

From: Servheen, Chris [<mailto:grizz@umontana.edu>]
Sent: Monday, July 08, 2013 1:47 PM
To: Hanauska-Brown, Lauri; Frey, Kevin
Cc: Shoemaker, Rebecca
Subject: SW Montana plan

Laurie and Kevin,

We are not sure where you are at the moment with revising the SW Montana Plan but we need to coordinate with you when we respond to the public comments on revision to the demographic section of the Yellowstone chapter. The public comment period has now closed on the chapter revisions and we are formulating responses, some of which will likely overlap with the SW Montana plan. We will be getting back to you in the next few weeks about these issues and hope your effort is not too far along at this point. Bottom line: let's work together as we formulate our documents.

Thanks,
Chris