DECLARATION OF DAVID MATTSON

I, David Mattson, declare as follows:

1. My 30 plus years of professional training and experience have focused on the ecology and management of grizzly bears and mountain lions as well as on the role of science in natural resources policy. I have a Bachelor's Degree in Forest Management, an M.S. Degree in Forest Ecology, and a Ph.D. Degree in Wildlife Ecology from the University of Idaho. Prior to my retirement in 2013, I was Research Wildlife Biologist and Leader of the Colorado Plateau Research Station with the U.S. Geological Survey (USGS). I also held positions as Visiting Scholar at the Massachusetts Institute of Technology (MIT) and a related position as Western Field Director of the MIT-USGS Science Impact Collaborative. I currently hold positions as Lecturer and Senior Visiting Scientist at the Yale School of Forestry & Environmental Studies, Adjunct Faculty at Northern Arizona University, and Research Associate with the Northern Rockies Conservation Cooperative. I co-teach courses at Yale on, among other things, the conservation of large carnivores, large-scale conservation, and natural resources policy.

2. My investigations of Yellowstone's grizzly bears date back to 1979 when, beginning with that field season, I annually covered over 1500 miles on foot in the backcountry of the Yellowstone Ecosystem studying the habitat and behaviors of grizzly bears. My fieldwork in the Yellowstone Ecosystem continued through 1993, including a period from 1984-1993 when I held primary responsibility for investigating grizzly bear diet, habitat use, and relations with humans as a member of the Interagency Grizzly Bear Study Team. More recently, during 2003-2013, I led investigations of mountain lion ecology and demography in 7 different study areas in the southwestern United States. Specific to the content of this declaration, my investigations of the demography of populations of large carnivores have spanned 1990 through the present. I have authored or co-authored a number of publications of relevance to the demography of the Yellowstone grizzly bear population, including two papers on the effects of food variability and habituation to humans (Mattson et al. 1992; Pease and Mattson 1999), two papers on methods used for population monitoring (Mattson 1997; Mattson 1998), one paper on factors implicated in West-wide extirpations of grizzly bears (Mattson and Merrill 2002), and three papers on the extent and nature of habitat suitable for supporting grizzly bear populations in the northern U.S. Rocky Mountains (Merrill et al. 1999; Merrill and Mattson 2003; Mattson and Merrill 2004). My grizzly bear-related work has been covered by journals such as *Science*, and reported in invited lectures at venues such as the *Smithsonian Institute* and the *American Museum of Natural History*. My attached resume (Exhibit 1) provides additional information. A bibliography of literature cited in this declaration is attached as Exhibit 2 to this declaration.

3. The Yellowstone grizzly bear population has recently experienced catastrophic losses of two key foods—whitebark pine seeds and cutthroat trout. A recent climate-driven mountain pine beetle epidemic killed most mature whitebark pine trees in the ecosystem (Macfarlane et al. 2013)—trees that had produced seeds that were a major source of food for grizzly bears, especially for adult females (Mattson 2000). The maximum losses of whitebark pine occurred between roughly 2003 and 2007 (Macfarlane et al. 2013). Somewhat earlier, during the late 1990s and early 2000s, predation by non-native Lake trout, introduced during the mid-1990s into Yellowstone Lake, functionally eliminated the native cutthroat trout that had

been a major source of energy for most of the bears living near Yellowstone Lake (Mattson and Reinhart 1995; Haroldson et al. 2005; Teisberg et al. 2014). Unlike cutthroat trout, the Lake trout do not spawn in tributary streams, but rather in the depths of Yellowstone Lake, and are therefore not available as a food source for grizzly bears.

4. The most recent estimates of size published for the Yellowstone grizzly bear population by the Interagency Grizzly Bear Study Team (IGBST) in its 2013 Annual Report, using the current preferred Mark-Resight method, show that the population has not increased since the early 2000s (Haroldson et al. 2014; see Figure 1a). This conclusion is consistent with a statement I understand was made by the current IGBST Leader, Frank van Manen, to managers at the 9-10 December, 2014, meeting of the Interagency Grizzly Bear Committee (Chaney 2014). Moreover, if a trend line is fit to a 3-yr running average of IGBST annual population estimates for the period 2007-2013, there is evidence of a population decline (Figure 1b). This 2007-2013 period follows the catastrophic loss of whitebark pine and cutthroat trout as grizzly bear food sources for the Yellowstone population. All referenced figures are set forth in Exhibit 3.

5. Recently published research suggests that Yellowstone's grizzly bears are compensating for recent catastrophic losses of whitebark pine and cutthroat trout by eating more meat (Middleton et al. 2013; Schwartz et al. 2014). Part of this increase involves bears scavenging the remains of hunter-killed elk (Orozco & Miles 2013) as well as depredating on livestock, primarily on the periphery of the ecosystem in areas such as the Upper Green River drainage (DeBolt et al. 2013, 2014). Increased consumption of meat from livestock is indicated by the substantial increase in depredation-related human-grizzly bear conflicts since 2007 (data from IGBST Annual Reports, 2000-2013).

6. Coincident with this transition by grizzly bears to heavier reliance on meat as a food source, the number of known grizzly bear mortalities in the Yellowstone population has sharply increased. The IGBST's published statements and data, most recently in its 2013 Annual Report (Haroldson & Frey 2014), show that cub and yearling survival rates have likely declined in recent years at the same time that ecosystem-wide numbers of known and probable grizzly bear deaths have increased (since 2007) to unprecedented levels, even after considering a decline during 2013 and 2014 (van Manen quoted in Dayton 2014; see Figure 2). Deaths caused by both elk hunters and by individuals responding to livestock conflicts have contributed substantially to this increase, although deaths by other causes have increased as well (see Figure 3). Deaths caused by hunters increased steeply after 2007 and, although fewer during 2012-2013, remain higher than during any other period of record keeping, despite a decline in numbers of sport hunters in grizzly bear range (Clapp et al. 2014; Figure 3b).

7. In summary, invoking weight of evidence, this information leads to the following conclusions: The Yellowstone grizzly bear population has not grown since the early 2000s and may have even declined since 2007. The recent increases in grizzly bear deaths from meat-related conflicts with humans (i.e., conflicts involving livestock and big game either killed or pursued by hunters) are related, in turn, to increased reliance by bears on meat. This turn to meat is plausibly related to recent catastrophic losses of two key foods—whitebark pine seeds and cutthroat trout.

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct. Executed on December 22, 2014, in Livingston, Montana.

David Mattson

Mattson Declaration
Exhibit 1

David J Mattson, Ph.D.

Short Biography

Dr. David Mattson is currently Lecturer and Visiting Senior Scientist at the Yale School of Forestry and Environmental Studies, Adjunct Faculty at Northern Arizona University, and Research Associate with the Northern Rockies Conservation Cooperative. His former positions, prior to retirement from the U.S. Geological Survey, include Research Wildlife Biologist, Leader of the Colorado Plateau Research Station, and Western Field Director of the MIT-USGS Science Impact Collaborative, all with the USGS. He holds degrees in Forest Resource Management and Forest Ecology and a doctorate in Wildlife Resource Management from the University of Idaho. Dr. Mattson has studied large carnivores for 30 years and has incorporated ecological information from pumas and grizzly bears into demographic, habitat, and risk management models. His ecological research has also included focus on details of carnivore behaviors, including foraging, predation, and relations with humans. His human dimensions research has focused on conservation policy issues dealing with social, political, and organizational dynamics that shape policies and practices of carnivore and other conservation programs. David teaches classes on relations between science and policy. His work has been featured in *Science*, *Ecology*, *Conservation Biology*, *Biological Conservation*, *The Journal of Wildlife Management*, and the *Journal of Mammalogy*, and invited talks at the Smithsonian, American Museum of Natural History, the American Institute of Biological Sciences, and International Conferences on Bear Research and Management.

Areas of research

- Behavioral ecology and demography of large carnivores
- Spatial models of habitat suitability and demography
- Human-large carnivore relations
- Public interest leadership
- Conservation policy and decision-making
- Relations between science and policy

Past and present research projects

- Demography, foraging behavior, and relations with humans and habitat, Yellowstone grizzly bears, 1979-present
- Demography and relations with humans and habitat, Kluane grizzly bears, Yukon Territory, 1992-2006
- Models of habitat suitability for grizzly bears in western North America, 1995-present
- Conservation policy systems for grizzly bears, mountain lions, and wildlife water developments, 1995-present
- Practices to foster coexistence between ranchers and grizzly bears, western Montana, 1998-present
- Demography, foraging behavior, and relations with humans and habitat, mountain lions in Arizona, Utah, and Nevada, 2002-present
- Leadership and stakeholder perspectives in conservation practice, 2004-present

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Exhibit 3

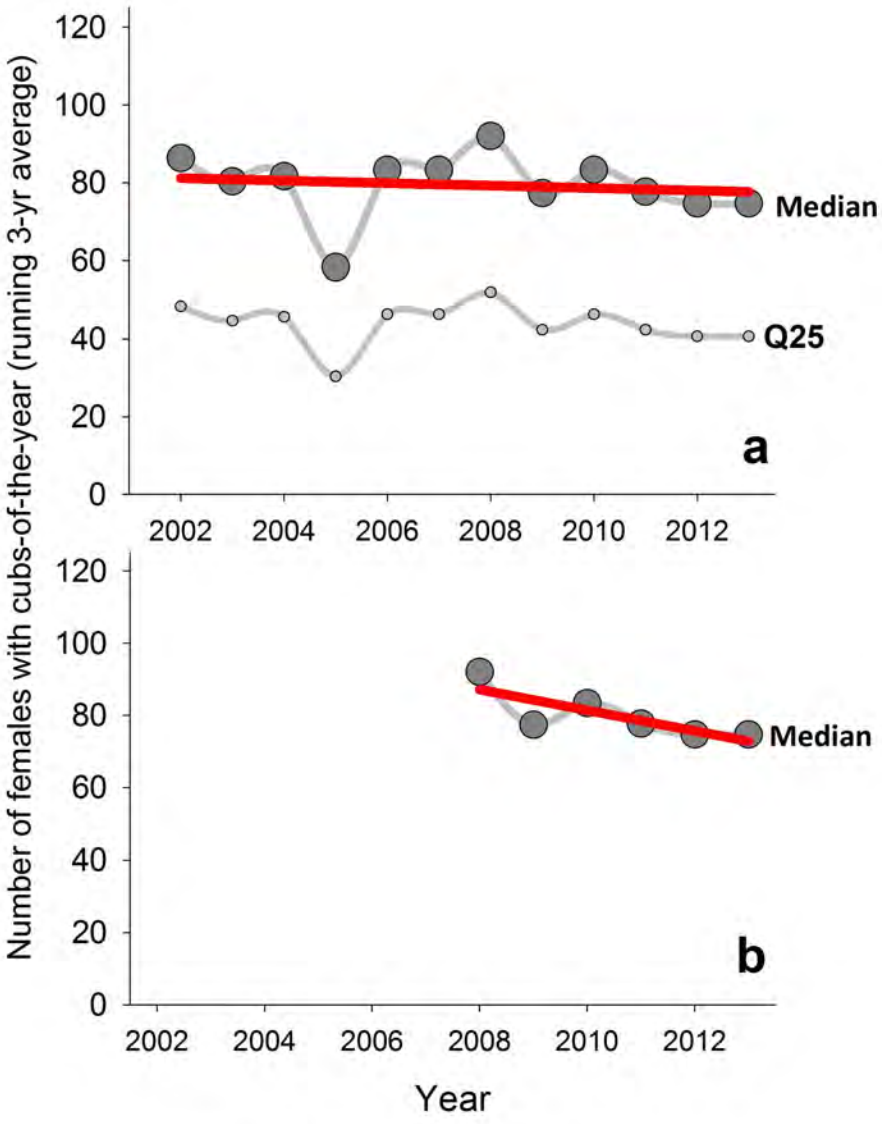

Figure 1. Three-year running average of total number of females with cubs-of-the-year (COY) estimated by the current preferred Mark-resight method. Estimates of total population size are essentially a simple multiplication of this number to account for other sex-age classes. The top figure (**a**) shows the median estimate of numbers of females with COY in the Yellowstone grizzly bear population as dark gray dots and the lower quartile bound of this estimate (Q25) as smaller lighter gray dots. A linear trend line (in red) has been fit to the median estimates showing no increase in population size. The bottom figure (**b**) repeats the information for median estimates, but only for the years 2007-2013. Invoking weight of evidence, the fitted trend line is more consistent with a declining rather than stable population.

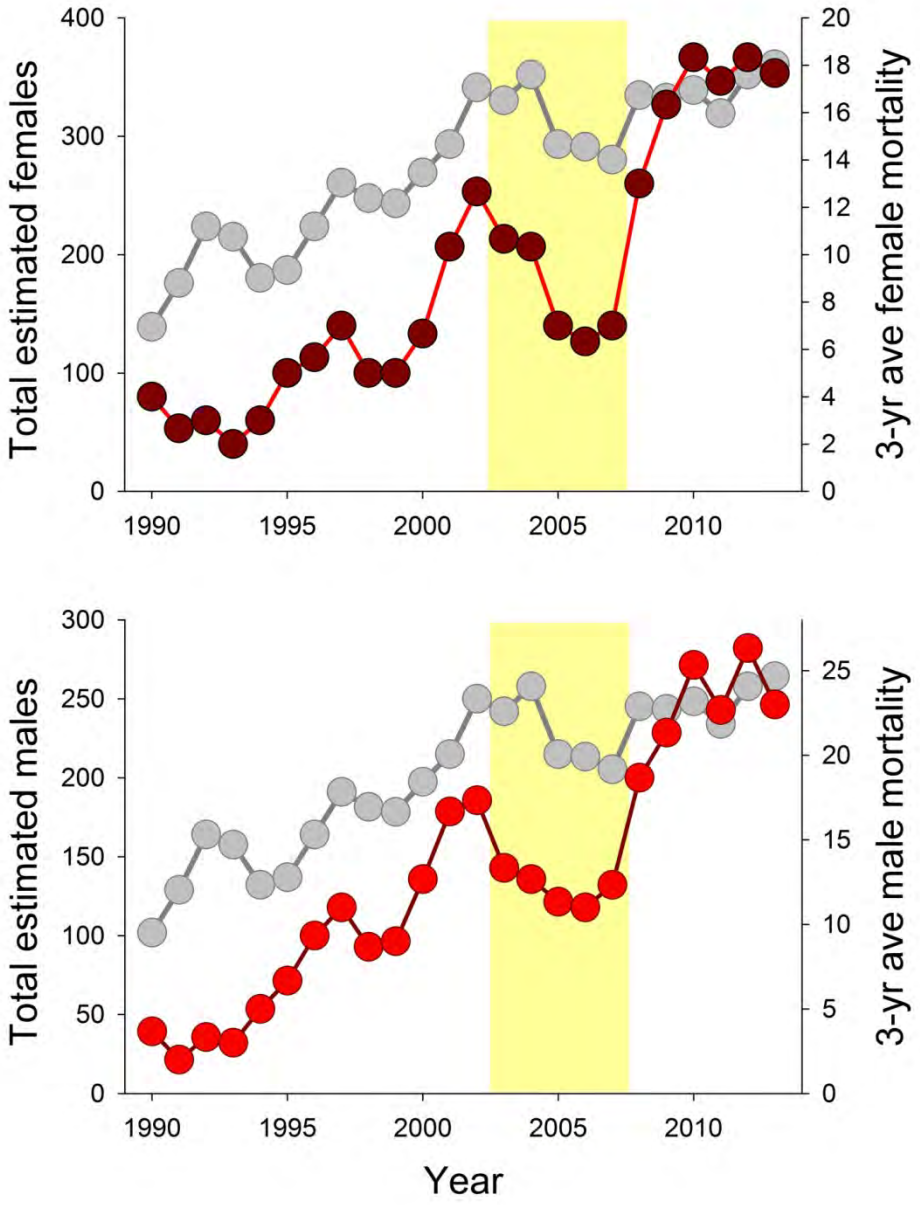

Figure 2. Three-year running averages of total female (top) and male (bottom) deaths, both in shades of red, superimposed on total numbers of male and female bears estimated for the population, shown in gray. Mortalities are from all causes, and with cubs and yearlings for which sex is unknown allocated to the respective sexes based on an assumed 1:1 sex ratio. Total numbers of bears are derived from Chao2-based estimates of population size, and using pre-2012 estimates of population structure. The yellow-shaded area denotes the time period during which maximum losses of whitebark pine occurred. The obvious points to be made here are that mortalities of both sexes increased substantially during recent years at the same time that there was no estimated increase in population size, and immediately after the period when most whitebark pine was lost. These conclusions are robust to any nuances in method.

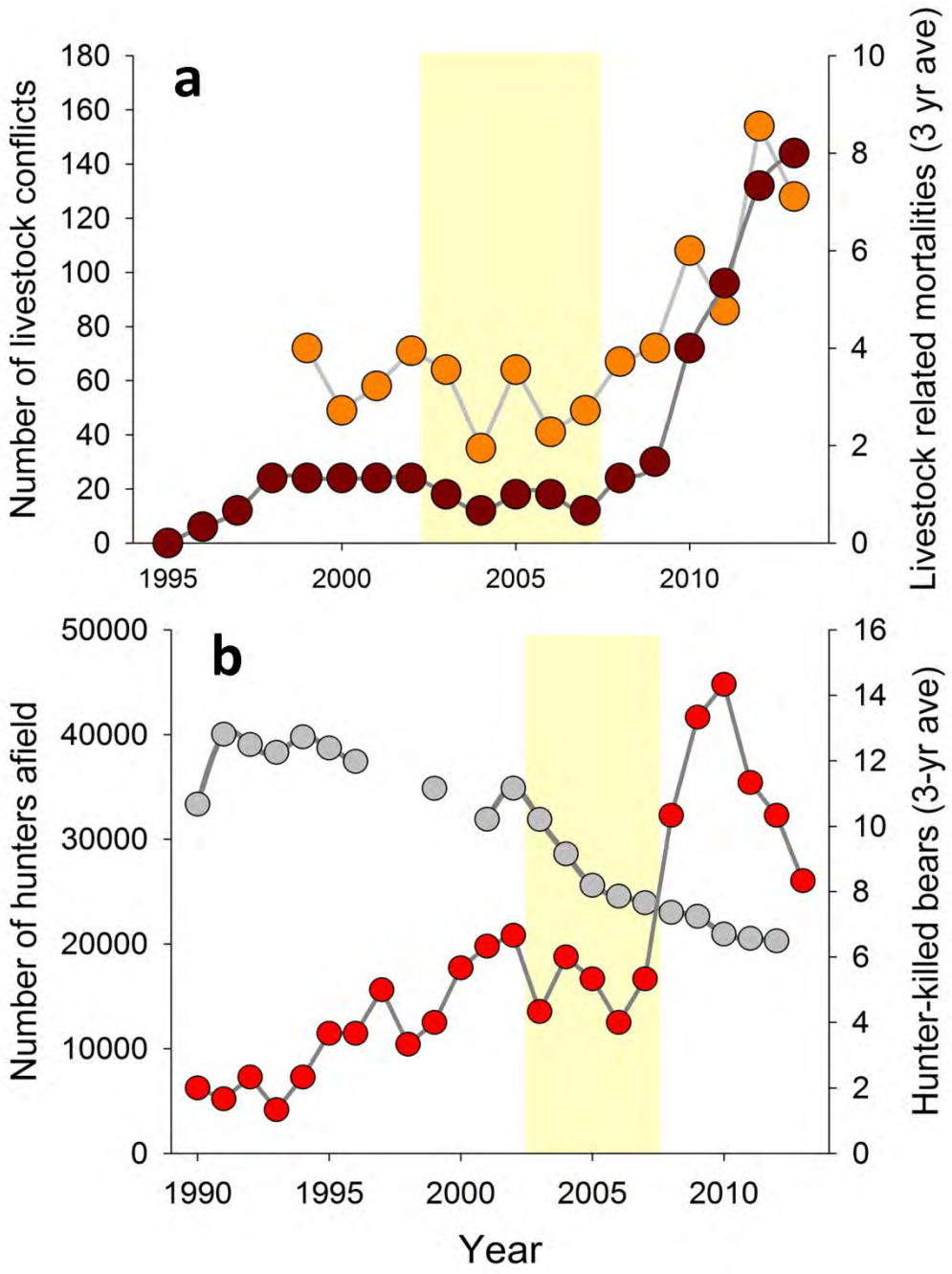

Figure 3. (**a**) Total numbers of livestock-related conflicts, shown by orange dots, and known and probable grizzly bear deaths related to livestock conflicts, shown by dark red dots. Mortality figures represent a 3-year running average. (**b**) Total numbers of grizzly bears known to have been killed, or probably killed, by hunters in association with their hunting activities, shown by the red dots. These activities included camping and traveling while on a hunt. The gray dots denote numbers of sport hunters within or near occupied grizzly bear habitat. As in figure 2, the yellow shaded areas denote the period when most whitebark pine was lost in the ecosystem. The obvious point to be made here is that conflicts and mortalities related to human-associated meat increased dramatically immediately after the period with most whitebark pine was lost.