

Draft Revised Demographic Recovery Criteria (2015)

Proposed Criterion 1: Maintain a minimum population size of 500 animals and a minimum of 48 females with cubs of the year in the ~~Greater~~ Yellowstone ~~Area~~Ecosystem, as indicated by the model-averaged Chao2 estimate for that year. The estimate of total population size cannot drop below 500 in two consecutive years and the number of females with cubs of the year cannot drop below 48 in two consecutive years. This estimate will be calculated by the Study Team using data obtained within the Demographic Monitoring Area shown in Figure 1.

Text for narrative: *The Study Team has been calculating population size on an annual basis using the model-averaged Chao2 estimate 2002-2015. Because 48 adult females with cubs of the year is equivalent to a population of approximately 500 total individuals (IGBST 2005, p. 43), we are establishing a target number of 48 adult females with cubs of the year for the Yellowstone Ecosystem DMA. As the bear population has increased, Chao2 estimates have become very conservative (i.e., prone to underestimation). The Study Team has also made population estimates using the mark-resight approach (described in IGBST Report, 2012). The mark-resight approach has no known density-associated bias, and should reflect true population trends; however, current implementation of the model yields imprecise estimates. In a conservative approach, FWS will rely on the Chao2 estimate for assessing Criterion 1 at least through 2020. [JF1]The Study Team will continue to make recommendations as to the best available science for population estimation as appropriate for assessment of the population, and agencies may change methods for population estimation in the future.*

Proposed Criterion 2 (NO CHANGE): Sixteen of 18 bear management units within the Recovery Zone (Figure 2) must be occupied by females with young, with no 2 adjacent bear management units unoccupied, during a 6-year sum of observations. This criterion is important as it ensures that reproductive females occupy the majority of the Recovery Zone and are not concentrated in one portion of the ecosystem.

Proposed Criterion 3: Maintain a sustainable annual mortality rate within the Demographic Monitoring Area (Figure 1), not to exceed the following maximum mortality rate corresponding to the population size estimated by the Study Team for the DMA:

Maximum mortality rate for % of independent FEMALES.	≤674	675-747	>747
	≤7.6%	9%	10%
Maximum mortality rate for % of independent MALES.	<674	675-747	>747
	15%	20%	22%
Maximum mortality rate for % of dependent young.	<674	675-747	>747
	≤7.6%	9%	10%

If the population is < 674 [JF2], ~~the~~ The annual mortality rate, including all sources of mortality, for independent females (at least 2 years old) must not be exceeded in 3 consecutive years; and for independent males (at least 2 years old), the annual mortality rate, including all sources of mortality, must not be exceeded in 3 consecutive years. For dependent young (less than 2 years

old), the annual mortality rate, including only known and probable human-caused mortalities, must not to be exceeded in 3 consecutive years.

Text for narrative: Manage human-caused mortality within the DMA to levels that will sustain at least a stable population based on the 2002-2014 Chao2 average population estimate of 674. Adjustable mortality levels allow for higher or lower mortality rates and correspond to the upper and lower 95% confidence intervals of the 2002-2014 Chao2 average population point estimate. Higher mortality rates enable states to address higher human-bear conflict levels that may occur when the bear population is well above the recovery criteria. Lower mortality rates ensure the population does not reach the demographic recovery criterion of a population size of 500 animals in the GYA. IGBST will review the population vital rates and demographics a minimum of every 5 years to recommend appropriate adjustments to mortality rates.