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Dr. Christopher Servheen
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Dear Dr. Servheen:

On November 17, 2005, the U.S. Fish and Wildlife Service ("FWS" or "Service") published a proposal to establish the Yellowstone grizzly bear distinct population segment ("DPS") and also to propose the removal of the Yellowstone DPS from the List of Threatened and Endangered Wildlife. See 70 Fed. Reg. 69854-69884 (November 17, 2005). We submit these comments opposing the proposal on behalf of Earthjustice, Jackson Hole Conservation Alliance, Natural Resources Defense Council, and Sierra Club.

True biological recovery of grizzly bears in the lower-48 states requires reconnecting the isolated remnants of occupied grizzly bear habitat, protecting and enhancing existing grizzly bear populations, and providing meaningful habitat protections and adequate regulatory mechanisms. The FWS proposal falls far short of recovery. For the reasons itemized below, we oppose the DPS designation and the delisting proposal.

The Delisting Proposal Relies Almost Exclusively On An Analysis of Past Trends Rather Than Future Analyses. The FWS Yellowstone delisting proposal devotes virtually all of its analysis and discussion to an examination of historic grizzly bear population/habitat trends and developments. In essence, this rear-view mirror analysis sets up a simple comparison: are Yellowstone grizzly bears better off in 2005 than they were in 1975 at the time of listing? But, in proposing to remove the Endangered Species Act ("ESA") protections for Yellowstone grizzly bears, the fundamental question is: what will the future hold for Yellowstone grizzlies? Unfortunately, all the available evidence indicates that the future will be a much less hospitable place for Yellowstone grizzlies and that their very existence will be placed squarely in jeopardy.

Under the ESA, a determination of whether a species or population is threatened turns on a careful examination of what the future portends. A "threatened" species "means any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." 16 U.S.C. § 1532(20). Similarly, the definition of "endangered" species turns on an assessment whether a species will go extinct in the foreseeable future. Id. at § 1532(6). Despite this statutory focus on the future, the FWS delisting proposal is cemented firmly in the past, focusing on past trends with a heavy emphasis on a population increase from historic lows. Just because a boxer is able to pull himself up from the canvas after a knockdown doesn't mean that he will survive the rest of the round, let alone the rest of the boxing match.

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A careful examination of the future must focus on whether and how the carrying capacity of the Yellowstone area will be sustained, improved, or diminished in coming years. The Yellowstone area is in the middle of a building boom and escalating human population trends. These developments are already boxing in Yellowstone bears and increasing human presence on public lands. As FWS acknowledges, this decreases habitat quality for grizzly bears. 70 Fed. Reg. 69869 ("grizzly bear reproduction and survival is a function of both the biological needs of grizzly bears and remoteness from human activities which minimizes mortality risk for grizzly bears."); id. at 69870 ("As human population densities increase, the frequency of encounters between humans and grizzly bears also increases, resulting in more human-caused grizzly bear mortalities"); id. at 69872 ("Urban and rural sprawl (low-density housing and associated businesses) has resulted in increasing numbers of grizzly bear/human conflicts with subsequent increases in grizzly bear mortality rates. Private lands account for a disproportionate number of bear deaths and conflicts."); FWS Grizzly Bear Fact Sheet, Updated November 2005 ("Many of the current threats to the survival of grizzly bears are associated with degradation of habitat due to rural or recreational development") (emphasis added).

Even within the very core of the ecosystem, Yellowstone has suffered from regional climate warming and drought conditions, and the future will almost certainly bring further exacerbation of these trends. Due in part to these negative climate changes, core grizzly food sources are under attack throughout the Yellowstone area. Whitebark pine—the species whose seeds contribute more than any other food source to Yellowstone grizzly bear survival and fecundity—faces immediate, severe threats. See pp. 22-30 below. Yet nowhere does FWS confront these problems of decreased habitat productivity and security for Yellowstone grizzly bears or examine whether there are ways to ameliorate these major threats to the continued existence of the Yellowstone grizzly bear population.

FWS's focus on the past also overlooks much of what has been learned in recent decades about the extinction of species. Scientists have documented that small populations are at special risk of extinction. The study of how species have gone extinct has also demonstrated that there is a lag time between the destruction or adverse modification of habitat and population decline. See pp. 10-11 below. Scientists have applied this "lag effect" to the Yellowstone grizzly bear population, and demonstrated that there may be a 8–13 year time lag between habitat degradation and a detectable effect on Yellowstone grizzly bear population trend. This research is yet another reason that it is a mistake to place such heavy reliance on historic trends.

Ironically, the only area in which FWS applies a predictive approach is the one area where Congress directed that current standards be evaluated. See 16 U.S.C. § 1533 (a)(1)(D). The ESA requires that FWS evaluate "existing regulatory mechanisms." Id. (emphasis added). However, when it comes to considering existing regulatory mechanisms, FWS relies on future changes to the FWS grizzly bear recovery plan, future adoption of U.S. Forest Service forest plans, future implementation of a Conservation Strategy, and speculative future funding.

For these reasons, FWS's basic approach is fundamentally flawed. Before even considering a delisting proposal, FWS must develop a comprehensive assessment of foreseeable threats to Yellowstone-area grizzly bears and identify existing regulatory mechanisms that are adequate to secure the grizzly's future in the face of these threats. That analysis, properly performed, would indicate that delisting is inappropriate.

FWS Prematurely Solicits Public Comment On Yellowstone Grizzly Bear Delisting. FWS has requested public comment on the DPS and delisting proposal despite the fact that basic mechanisms to protect grizzly bears and their habitat are not currently in place. This approach is inconsistent with the public notice and comment process set forth in the Administrative Procedure Act. FWS has not finalized amendments to the FWS grizzly bear recovery plan that would set the habitat goals for grizzly bear recovery. FWS has recently proposed to change the methods for estimating grizzly bear population size and setting mortality thresholds, with a public comment process that is currently ongoing. See Draft Document Reassessing Methods to Estimate Population Size and Sustainable Mortality Limits for the Yellowstone Grizzly Bear (*Ursus arctos horribilis*) Population, 70 Fed. Reg. 70632-70633 (November 22, 2005). The Forest Service has not finalized amendments to the forest plans for the six national forests providing Yellowstone-area grizzly bear habitat. Even the Conservation Strategy has not yet been finalized. All of these processes need to be finalized before the Service solicits public comment on a delisting proposal. Otherwise, the public is being asked to assess recovery and delisting when the FWS itself has not defined recovery, the habitat necessary to support a recovered population, and the regulatory mechanisms to ensure population viability in the long term. This frustrates public comment.

FWS Violated the Administrative Procedure Act and the Endangered Species Act By Failing to Disclose and Consider Violations of Current FWS Recovery Plan Mortality Standards. FWS established grizzly bear mortality standards in the current 1993 FWS Grizzly Bear Recovery Plan, which include standards for ensuring that female grizzly bear mortality is not excessive. FWS explicitly stated that: "[t]hese mortality limits cannot be exceeded during any 2 consecutive years for recovery to be achieved." 1993 FWS Grizzly Bear Recovery Plan at 41. Adult female grizzly bear mortalities have an immediate and dramatic impact on mortality and fecundity rates, and thus have a crucial impact on population size and trend. The current FWS recovery plan standards for female mortality were violated in the two most recent years, 2004 and 2005. 2004 IGBST Annual Report at 25 ("female mortalities exceeded the annual mortality thresholds during 2004"); id. at 29, Table 13; Denver Post September 5, 2005.

The calculation of allowable female mortality rates under the FWS 1993 Grizzly Bear Recovery Plan—as currently implemented by FWS—starts with a calculation of a minimum population estimate. See 2004 IGBST Annual Report at 29, Table 13; Conservation Strategy, Appendix C. This is derived by summing the unduplicated females with cubs of the year initially sighted within the FWS recovery zone and a 10-mile perimeter over the last three years, subtracting known adult female mortalities within the same zone over the last three years, and dividing by .274. Using the FWS method, the current minimum population estimate for the Yellowstone ecosystem is only 361 bears (35 females with cubs of the year in 2003, 46 in 2004, and 29 in 2005 added together minus 11 dead adult female grizzlies in 2003-2005 divided by .274). IGBST pers. comm. (29 females with cubs of the year within the recovery zone and 10-mile perimeter and 2 adult female mortalities in 2005). Allowable mortality levels are derived from this minimum population estimate: that no more than 4 % of the minimum population estimate may be killed, and no more than 30 % of total human-caused mortality can be adult females. Using the FWS methods, 4 % of the minimum population is 14.4 and 30 % of 14.4 is 4.3 female grizzly bears. In calculating human-caused mortality, FWS employs a 6-year running average to dampen the effect of excessive mortality in an individual year or two. Applying these methods with 2 known adult female mortalities in 2005, the 6-year running average of female mortality was 6.2, greatly exceeding the allowable standard of 4.3. Even if there had been zero adult female mortalities in 2005, the 6-year average of female mortality would have exceeded the FWS 2005 allowable mortality standard because of a six-year trend of excessive female mortalities (6-year average of 5.8 exceeding the allowable standard of 4.4).

Nowhere in the proposed rule or supporting materials did FWS advise the public that excessive female grizzly bear mortality in 2004 and 2005 violated recovery plan standards. Instead, FWS claimed that the existing human-caused mortality standards "have not been exceeded in 2 consecutive years since 1997." 70 Fed. Reg. at 69859. This is demonstrably false and misleading. It is false because the female mortality standards were violated in 2004 and 2005; it is misleading because FWS failed to disclose that the female mortality standards had been violated in <u>any</u> year. Had FWS disclosed these critical facts, the public would have been on notice that recent mortality levels are excessive, that all recovery targets are <u>not</u> currently being met, and that under FWS's own standards, recovery has not been achieved and delisting is inappropriate. Instead, the public was led to believe that recent mortality levels were not excessive. Compounding these errors, the FWS mounted a publicity campaign promoting the delisting of the Yellowstone grizzly bear on grounds that the Yellowstone grizzly bear population had met all recovery standards. <u>See</u> FWS Grizzly Bear Fact Sheet, Updated November 2005 ("Grizzlies in the Yellowstone ecosystem have met or exceeded recovery targets since 1999);MSNBC August 18, 2005 ("all 'recovery parameters' established for the bears also have been met or exceeded"); Upper Valley Free Press, December 2005 ("all established recovery parameters have been met or exceeded").

There can be no doubt that FWS knew that its current female mortality standards had been violated: in September 2004, FWS issued two press releases advising the public that Yellowstone mortality thresholds had been met and then exceeded. September 17, 2004 Yellowstone Ecosystem Subcommittee News Release at 1 (quoting FWS Grizzly Bear Recovery Coordinator Chris Servheen: "With this death we have hit the mortality threshold for female bears established in the 1993 Recovery Plan."); September 29, 2004 IGBC Yellowstone Ecosystem Subcommittee News Release (quoting FWS Grizzly Bear Recovery Coordinator Chris Servheen: "With this death, we have exceeded the mortality threshold for female bears in the 1993 Recovery Plan."). FWS keeps close track of violations of the Yellowstone female grizzly bear mortality standards. FWS knew in September 2004 that the female mortality standards for the Yellowstone population had been violated. Failure to disclose excessive female mortality under the recovery plan standards violated the Administrative Procedure Act, which requires that proposed rulemakings provide essential information that will facilitate informed public comment. Further, FWS had more than a procedural duty to disclose these violations of its own standards; FWS is also required under the Endangered Species Act to base delisting decisions on the best available scientific data. 16 U.S.C. § 1533 (b)(1)(A). To satisfy the ESA, FWS must explain why a population that has not met current FWS recovery plan standards in the two most recent years can or should be delisted.

FWS Violated the Administrative Procedure Act and the Endangered Species Act By Failing to Disclose and Consider Violations of Proposed FWS Mortality Standards. In addition to the brief description of existing recovery plan mortality standards in the delisting rule, FWS also provided an extensive discussion of proposed mortality standards for the Yellowstone bear population. Id. at 69859-69860. Tracking its approach on the current mortality standards, FWS asserted that: "[a]pplying this method to 1999 to 2004 data, these mortality limits have not been exceeded for consecutive years for any bear class." 70 Fed. Reg. 69860. However, FWS failed to disclose that the Yellowstone grizzly bear population has violated the proposed mortality standards—which are explicitly designed to increase allowable mortality levels—in two of the last five reported years, 2000 and 2004. Reassessing Methods to Estimate Population Size and Sustainable Mortality Limits for the Yellowstone Grizzly Bear ("Reassessing Methods") at 7-8 (displaying violation of proposed male grizzly bear mortality standards in 2004); id. at 40, Table 15 (showing violations in 1995, 2000, and 2004 of proposed male grizzly bear mortality standards). Instead of revealing these basic facts that are fundamental to any consideration of whether recent Yellowstone grizzly bear mortality levels are placing the Yellowstone population at risk, FWS withheld this essential information and presented a biased interpretation of the available data. By failing to disclose the violations of the proposed mortality standards, FWS violated the Administrative Procedure Act. Further, under the ESA, FWS must explain why delisting is appropriate when the Yellowstone grizzly bear population has not even met proposed mortality standards that are designed to increase allowable mortality levels over current standards.

The sequence and process for finalizing the mortality standards after the comment period on the delisting proposal closes also violates the Administrative Procedure Act and the Endangered Species Act. Even though the proposed grizzly bear mortality methods had not been proposed for public comment at the time the delisting rule was published—let alone finalized—FWS asserted that the "revised method will be appended to the Recovery Plan and included in the Conservation Strategy." Id. at 69859. In a second Federal Register notice, published after the release of the Yellowstone DPS and delisting proposal, FWS finally released for public review and comment the proposed new methods for calculating Yellowstone grizzly bear mortality thresholds. 70 Fed. Reg. 70632-70633 (November 22, 2005). As we noted in our comments on that Reassessing Methods paper,[1] nowhere in that Federal Register notice or the attached documents does FWS ever state whether it intends to amend the existing 1993 Grizzly Bear Recovery Plan mortality thresholds or whether these standards are proposed only as mere guidance to be considered after delisting. In the latter case, the proposed mortality standards would only suggest some unenforceable guidance about what the agencies might consider excessive Yellowstone grizzly bear mortality, which might trigger an interagency review, which might trigger a petition to relist, which might trigger relisting of the Yellowstone grizzly bear population under the Endangered Species Act. Until FWS develops an adequate methodology for assessing Yellowstone population size and whether mortality levels are excessive, delisting is inappropriate.

[1] Because the mortality standards are intertwined with the Yellowstone grizzly bear delisting proposal, we incorporate by reference our comments on FWS's proposal to change population monitoring and mortality methods.

FWS Has Continued to Rely on Females-with-Cubs-of-the Year, a Population Monitoring Method Invalidated by the Fund for Animals Court. In Fund for Animals v. Babbitt, 903 F. Supp. 96, 114 (D.D.C. 1995), the D.C. federal district court ruled that the Service's use of the "females with cubs" method of monitoring bears' population status in the 1993 FWS Grizzly Bear Recovery Plan was illegal. Yet, in proposing to delist the Yellowstone grizzly bear, FWS still relies on this legally discredited measure. The district court's ruling is directly applicable here:

> The Plan explains that the "females with cubs" measurement "demonstrate[s] that a known minimum number of adult females are alive to reproduce and offset existing mortality in the ecosystem." Plan at 20. The FWS concedes, however, that the methodology will not gauge population "trends or precise population size . . ." Plan at 20. Numerous grizzly bear biologists have criticized this monitoring methodology because, despite its own acknowledged limitations, it is being relied on in the Plan as the principal determinant of whether population goals have been met. See, e.g., Comments from Metzgar to Servheen of January 7, 1990, ("Metzgar Comments"), A.R. Tab 439 at 2. Plaintiffs' foremost objection is that the "females with cubs" methodology is vulnerable to variable observer effort and for that reason has been criticized as unreliable and subjective. See Knight and Blanchard Report, A.R. Tab 258 at 7; Metzgar Comments, Tab 439 at 3. Even a report appended to the Plan acknowledges that "the application of sighting efficiency estimates [which are a base assumption of the monitoring criteria] cannot be substantiated since there is no way to assess their accuracy and they are therefore little better than guesses." Plan at 159 (Appendix C), Report of the Yellowstone Grizzly Bear Population Task Force (1988).
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> Here, however, the Plan's own acknowledgement of the limitations of the monitoring methodology and the fact that the methodology is unreliable undermines the decision of the FWS to adopt the methodology incorporated into the Plan. The Court is unable to find in the record a rational reason for the agency's decision. . . . Accordingly, the FWS must reconsider the available evidence and its decision to adopt the population monitoring methodology that it has incorporated into the G[rizzly] B[ear] R[ecovery] P[lan].

Id. at 114. Despite this ruling, FWS has continued to rely on the very same 1993 Grizzly Bear Recovery Plan, and the very same population monitoring methodology rejected by the Fund for Animals court.

Numerous scientific articles published since 1993 further demonstrate that the females-with-cubs-of-the-year population measure is inherently subjective in identifying grizzly bears in the wild and produces varied results depending on observer effort expended, the number of hours spent conducting aerial overflights, the changing nature of bear behaviors, weather conditions, and the location and availability of grizzly bear foods. Schwartz, et al. (2002); Craighead (1998); Craighead, et al. (1995); Mattson (1997*b*).

In stark contrast to the continued reliance on a flawed population monitoring method in the Yellowstone area, FWS and other federal agencies have employed a dramatically more reliable population-monitoring tool—DNA—in assessing the NCDE grizzly bear ecosystem. Apparently, the only reason this more reliable scientific method has not been employed to assess Yellowstone bear population dynamics is that FWS has been unable to obtain federal funding for the undertaking. FWS asserts, without support, that it would cost $3.5-5.0 million to accurately sample the Yellowstone grizzly bear population. Reassessing Methods at 12-13. Because FWS fails to disclose what was included in this cost estimate, it is impossible to determine why a better scientific method was rejected. The Conservation Strategy includes an annual cost estimate of $174,000 to monitor unduplicated females with cubs, $66,000 to monitor distribution of family groups, and $344,000 to maintain 25 adult females with radios, along with several other categories of grizzly bear monitoring that might be obviated by a properly conducted DNA census of the Yellowstone grizzly bear population. Conservation Strategy, Appendix H. A comparative analysis of the true costs of monitoring population size and trends via DNA sampling versus current methods might suggest that the costs are similar. The FWS conclusion that implementing a DNA monitoring program is prohibitively expensive directly contradicts an earlier scientific report co-authored by the FWS Grizzly Bear Recovery Coordinator that concluded that a DNA hair recapture population monitoring method could be implemented in the Northern Continental Divide Grizzly Bear Ecosystem much more cheaply than the radio-collar monitoring approach the agencies continue to employ in Yellowstone. Report on Methods to Determine Population Size and Rate of Change for Grizzly Bears at the Ecosystem Scale at Tables 2-3. It makes no sense to apply a more reliable grizzly bear population monitoring method in the NCDE population, which is not proposed for delisting, while continuing to rely on unreliable population monitoring methods for a population that FWS proposes to delist and subject to a public hunting season.

As a potential alternative to the flawed females-with-cubs population monitoring method, the IGBST attempted a capture-mark-recapture ("CMR") study as a means of obtaining reliable information about the Yellowstone grizzly bear population. 1998 IGBST Annual Report at 13-20. During the 1998 field season, the first year of the study, researchers determined that bear concentrations at cutworm moth feeding sites biased the results, and therefore decided to conduct the observations on earlier dates the following year so as to avoid the moth problem. Id. at 17. In that subsequent year, the researchers determined that the conditions during the spring observation period were poor, but recommended that the IGBST "continue for at least 1 more year to evaluate the potential application of this CMR estimator." Id. at 18. Instead of continuing to evaluate the research and refine the methodology, however, IGBST quietly discontinued the study.

It is not entirely clear what happened to the CMR research, or why it was abandoned in favor of the COY methodology. From what can be gleaned from public documents, it appears that the research was discontinued primarily for lack of funding. See Annual Report, 2000, Yellowstone Ecosystem Subcommittee's One-Year Work Plan (stating that the 2000 analysis was "not complete due to lack of F&WS funding"); Yellowstone Ecosystem Subcommittee 2001 Work Plan: Review of Accomplishments (December 2001) ("This analysis was not conducted in 2001 because funding was not made available. Funding was requested again this year. Based on the success of data collection efforts over the past few years, there appears to be some question about the prospects of this methodology at this point.").[2] The fact that critical research commitments such as the CMR study were abandoned midstream for lack of funding further weakens our confidence that the *increased* funding commitments detailed in the Conservation Strategy, and described in the delisting proposal as a necessary means of protecting a delisted population, 70 Fed. Reg. at 69875, are sustainable even in the very short term, let alone over the course of decades. See infra at 36-37. Because the underlying scientific data and the basic protocols have never been released to the public, it is unclear whether the mark-recapture efforts were poorly designed and/or executed, whether the agencies did not like the results produced by these studies, or whether there were some inherent, unsolvable problems in using a mark-recapture population monitoring method on the Yellowstone grizzly bear population.

Instead of pursuing the CMR research, FWS has continued to use a population monitoring methodology, females with cubs of the year, that the Service acknowledged from the very start was unreliable, that a federal court has declared illegal, and that has been reconfirmed to produce subjective and highly variable results in subsequent scientific publications. The consequences of these errors have become more profound because FWS continues to set mortality thresholds based on this discredited metric and now has proposed to use the metric to estimate total population, not a minimum population estimate. 70 Fed. Reg. 69859. The Reassessing Methods paper acknowledges that there is: "an increased level of uncertainty in estimating total population size using the methods we propose here." Reassessing Methods at 10, 43. The current delisting proposal is fundamentally flawed because it repeats and even compounds these errors of the past.

FWS's Current Methods for Assessing Population Size and Allowable Mortality Levels Are Inherently Unreliable. Despite the Fund for Animals court ruling and further scientific publications demonstrating the flawed approach of attempting to determine population size, population trend, and allowable mortality levels from observations of females with cubs of the year, FWS has remained wedded to this approach in the Yellowstone ecosystem. FWS relies on total population size estimates derived from field observations of female bears with cubs of the year to justify delisting and to claim that mortality levels are not excessive. On their face, these population size estimates are unreliable. In Reassessing Methods, page 10, table 7, the population estimates for the Yellowstone grizzly bear population are displayed. The total population size, according to FWS, for 1999 was 378 bears. In just one year, the Yellowstone bear population had increased to 514 bears in 2000. Id. Similarly, between 2001-2004, FWS's estimates for the Yellowstone bear population bounced between 508 in 2001, with a dramatic increase to 595 in 2002, and then a dramatic decline to 500 bears in 2003, then a dramatic increase to 588 bears in 2004. However, neither the FWS nor any credible scientist would assert

[2] Despite this contemporaneous record documenting funding failures for the CMR research, the Reassessing Methods paper asserts that the CMR method was rejected because agency scientists "concluded that our recapture rate was too small to return a population estimate with a reasonable confidence interval." Reassessing Methods at 12. Notably, FWS fails to disclose whether the recapture rate was stymied by inadequate funding or other causes, and fails to reveal the confidence interval for either the CMR method, the Recovery Plan method, or the variant of the Recovery Plan method proposed in the Reassessing Methods paper. Without such a comparative analysis, the FWS conclusion is unsupported and arbitrary.

that the Yellowstone grizzly bear population was actually vacillating between these numbers. Thus, the population size estimates are inherently unreliable.

Examining the field data that is used to generate these population estimates, the observed count of females with cubs increased 13 % from 1999 to 2000, increased an additional 15 % from 2000 to 2001, increased an astronomical 26 % from 2001 to 2002, crashed an unbelievable 29 % from 2002 to 2003, and then increased an unbelievable 37 % from 2003 to 2004. The various mathematical calculations employed by FWS to generate population estimates moderate these trends somewhat, but the raw data, whether treated as year-to-year variance or treated as a collection of years, is inherently unreliable. For these reasons, historically FWS treated population estimates generated from observations of females with cubs as minimum population estimates rather than total population estimates. 1993 Recovery Plan at 20; Fund for Animals, 903 F. Supp. at 114. Now, however, FWS is using this same unreliable methodology to generate a total population estimate that is the basis for the agency's delisting proposal. The inherent unreliability of the existing Yellowstone population estimates undermines the FWS's assumption that the Yellowstone grizzly bear population is suitable for delisting by virtue of its population size and trends.

FWS Violated the Administrative Procedure Act and the Endangered Species Act By Failing to Disclose and Consider The Precipitous Decline in Yellowstone Grizzly Bear Population Size in 2005 Under FWS's Methodology. Females with cubs of the year is an inherently unreliable method for assessing population size and trends. If FWS insists on using this unreliable methodology for purposes of its delisting rule, the Service must reveal that applying this methodology to the 2005 data results in a radically reduced estimate of population size. In 2005, only 31 females with cubs of the year were documented in the Yellowstone grizzly bear population. Billings Gazette, September 28, 2005. Only 29 of these females with cubs were first sighted within the FWS recovery zone and a ten-mile perimeter and are thus included in total population estimates. IGBST pers. comm. This is a dramatic decline from 49 females with cubs of the year in 2004. 2004 IGBST Annual Report at 15, Table 5. In fact, it is the lowest number of female-with-cubs-of-the-year sightings since 1995. Id. Using the FWS's preferred approach of determining total population size via methods outlined in the Reassessing Methods paper, the Yellowstone grizzly bear population crashed from 588 bears in 2004 to roughly 350 bears in 2005. Compare id. (33 females with cubs of the year in 1999) with Reassessing Methods paper at 10, Table 7 (showing 1999 total population estimate of 378, which should be roughly 6.5 % higher than a population estimate derived from 31 females with cubs of the year).

Similarly, under the current FWS 1993 Grizzly Bear Recovery Plan methods, the Yellowstone minimum population estimate for 2005 (based on three years of bear sightings) is only 361 bears. See 2004 IGBST Annual Report at 29, Table 13 (35 females with cubs of the year in 2003, 46 in 2004, and 29 in 2005 added together minus 11 dead adult female grizzlies in 2003-2005 divided by .274). Thus, under the current FWS methods for assessing population size, the Yellowstone grizzly bear population is only slightly above the 1975 crisis level when it was listed as a threatened species.[3]

FWS had a duty to disclose and analyze the radical decline in observations of females with cubs of the year in 2005 and its implications for the Yellowstone grizzly bear population. If FWS's preferred method for assessing total population is accurate, then the Yellowstone grizzly bear population has just suffered a tremendous decline that clearly puts the population at risk of extinction in the very near future. If, alternately, the radical decline in observations of females with cubs is not indicative of a crashing Yellowstone grizzly bear population, then the methods on which FWS relies to justify population size, population trend, and allowable mortality levels is a failure, and a new method needs to be developed. This is a critical issue that goes to the heart of the delisting proposal. But nowhere in any of its materials promoting delisting of the Yellowstone grizzly bear population did FWS ever disclose the shocking decline in observations of females with cubs of the year in 2005 or assess its significance. By failing to disclose and analyze the significance of the radical decline in observations of females with cubs of the year and how it affects population size and trend estimates, allowable mortality levels, and extinction risks, FWS violated the Administrative Procedure Act and the Endangered Species Act.

FWS Fails to Address Known Dynamics Between Minor Adverse Modification of Habitat and Demographic Impacts. FWS's delisting proposal is based primarily upon an allegedly increasing grizzly bear population without regard to habitat status and threats. FWS cannot rely on historic population trends as a guarantee that sufficient habitat is being provided for grizzly bears under the Conservation Strategy.

The best available science demonstrates a significant time lag between habitat loss and grizzly bear extinctions. There is usually a multi-decades lag between loss of grizzly bear habitat, and extinction of isolated, residual populations confined to the habitat islands created by habitat loss. For example, the existence of these time lags is implicit in the comparison of the 1850, 1920 and 1970 grizzly bear distributions show in Fig. 1 of Mattson and Merrill (2002). Many of the extinctions shown by Mattson and Merrill are of populations smaller than Yellowstone and thus would be expected to have a shorter time lag between habitat loss and extinction than the Yellowstone population. In general the time lag between habitat loss and extinction will be longer in large, as compared to small, populations.

The importance of such time lags in Yellowstone is buttressed by Doak (1999). Using Yellowstone grizzly bear data, Doak analyzed the relationship between relatively minor habitat degradation (0.5 % per year) and projected impacts on demographic trends. Doak determined that "habitat degradation can have highly nonlinear effects on population growth rates, with small amounts of degradation leading to large decreases in overall population growth." Id. at

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[3] In the proposed delisting rule, FWS trumpeted the "total population estimate of Yellowstone grizzly bears in 2004" of "588." 70 Fed. Reg. 69859. FWS repeatedly claimed that the revised methods were "more accurate." Id. FWS repeatedly claimed that the Yellowstone grizzly bear population was comprised of "more than 580 bears." Id. at 69857; 69881. Nowhere did FWS disclose that this "more accurate" method produced a 2005 total population estimate of roughly 350 bears, or discuss the significance of the 2005 estimate.

1378. Second, Doak concluded that the population growth rates provide "extremely poor measures of population safety or health under conditions of ongoing habitat degradation." Id. at 1377. Finally, Doak's analysis demonstrated that if degradation of habitat is slow, "long lag times can exist between critical levels of habitat degradation and any detectable change in population sizes, even when monitoring data are excellent." Id. at 1378. Doak estimated that the lag time between habitat degradation and a detectable effect on Yellowstone grizzly bear population trend was 8 to 13 years. Id. at 1377. This time lag dynamic has been documented for other species as well. See Laurance, et al. (2002) (empirical evidence of the time lag between habitat fragmentation and extinction.); Brooks, et al. (1999) (empirical examples of the time lag between habitat island creation and extinction).

FWS fails to address this crucial issue of lag time. FWS has relied exclusively on population metrics to justify recovery and to trigger consideration of discretionary management responses to population declines. FWS has failed to evaluate the impacts of lag effect on setting the habitat standards at 1998 levels, or to assess whether critical habitat thresholds with potentially catastrophic impacts on future population dynamics have already been exceeded (such as the burgeoning loss of whitebark pine to mountain pine beetle infestations). If FWS's current proposed methods for estimating total population size are reliable, 2005 may well mark the beginning of a trend in which reduced habitat productivity begins to translate into reduced population size. In light of these critically important lag time issues, FWS must develop a principled assessment regarding the full extent of habitat necessary to maintain a viable population—including consideration of lag effects—and then develop regulatory measures to protect that habitat.

FWS Fails To Draw DPS Boundaries Based On Sound Biological Principles That Further The ESA's Conservation Mandate. The ESA gives FWS the authority to list, recover, and delist "species," which are defined to include "distinct population segments." 16 U.S.C. §§ 1532(16), 1533(a)(1). While the statute does not define what constitutes a DPS, FWS published a policy interpreting the term in 1996. See 61 Fed. Reg. 4,722 (Feb. 7, 1996). As the agency made clear, "[i]t is important in light of the Act's requirement to use the best available scientific information in determining the status of species that this interpretation follows sound biological principles" and, necessarily, "[a]ny interpretation adopted should also be aimed at carrying out the purposes of the Act." Id. (emphasis added); see also Defenders of Wildlife v. Sec'y, U.S. Dep't of Interior, 354 F. Supp. 2d 1156, 1172 (D. Or. 2005) (holding that FWS' creation of DPSs for gray wolves "violated DPS policies" because the DPS boundaries were "not supported by sound biological principles").

In defining the Yellowstone grizzly bear DPS, FWS fails to draw geographic boundaries based on sound biological principles. FWS identifies "boundaries of convenience" in the form of several highways. See 70 Fed. Reg. 69854, 69862. Yet FWS never explains how this highway-bounded area relates biologically to the habitat needs of the Yellowstone grizzly population (i.e., is the habitat encompassed in these boundaries more or less than is needed to support a recovered bear population for the foreseeable future?) or how the area relates to the historic range of this population (i.e., what proportion of the Yellowstone grizzly's former range does the DPS represent and why?). FWS merely asserts that "the grizzly bear occupies all of its range within this DPS." Id. at 69886. This reveals nothing about the portion of the population's historic range that the agency is "writing off" for purposes of recovery. Further, with regard to the Yellowstone grizzly's current range, id. at 69869, the DPS boundaries do not describe the area where bears currently exist or even where bears are likely to be in the future. FWS acknowledges that the DPS includes many areas that the agency deems unsuitable for bears. See id. at 69876 (FWS deemed only "24% of the total area with the DPS boundaries" "suitable" habitat). Without further biological justification for the proposed DPS boundaries, it is unclear whether FWS is "drawing a line around a population whose conservation status differs from other populations" of grizzly bears, Defenders, 354 F. Supp. 2d at 1170, or whether the agency is arbitrarily defining the DPS in one of two ways: by "expanding the boundaries" of the DPS in order to delist large areas "without considering the listing factors," Defenders, 354 F. Supp. 2d at 1170, or defining the DPS too narrowly in order to exclude significant portions of this population's range.

FWS Fails To Address Whether The Yellowstone Population Remains Threatened Within Any Significant Portion Of Its Range. FWS fails to address whether Yellowstone grizzly bears are still threatened or endangered in "any significant portion" of their range. 16 U.S.C. § 1532(6). FWS must consider whether there are "major geographical areas in which [a species] is no longer viable but once was." Defenders of Wildlife v. Norton, 258 F.3d 1136, 1141 (9^{th} Cir. 2001). If these developed areas constitute a significant portion of the Yellowstone grizzly's historic range, that must figure into FWS' delisting analysis. See Defenders of Wildlife v. Norton, 258 F. 3d at 1145-47 (holding that FWS violated the ESA in failing to consider whether developed private lands within the historic range of the Flat-tailed Horned Lizard were "a significant portion" of the lizard's range). FWS attempts to duck the issue by asserting that "[f]or purposes of this proposed rule, the 'range' of this grizzly bear DPS is the area within the DPS boundaries where viable populations of the species now exist." 70 Fed. Reg. at 69886 (emphasis added). In short, FWS ignores historic range and assumes that the entire range of Yellowstone Grizzly bears is the area currently occupied by the Yellowstone grizzly population. Based on this circular definition of "range," FWS states that "[b]ecause the grizzly bear occupies all of its range within this DPS, we conducted the following threats assessment over the entire current range of the grizzly bear and throughout all suitable habitat within the DPS." Id. Thus, FWS focuses exclusively on the area where bears are now without regard to the much larger area where bears once were. As a result, FWS fails to consider whether the Yellowstone grizzly is still imperiled in any significant portion of its DPS range that is currently unoccupied. This violates the ESA. See Defenders, 354 F. Supp. 2d at 1165 (rejecting FWS' attempts to "define 'significant portion of its range' as the areas that ensure viability within the DPS").

Indeed, the Yellowstone grizzly bear is likely imperiled throughout a significant portion of the DPS. While FWS states that "the grizzly bear occupies all of its range within this DPS," again, FWS is illegally defining "range" to mean those lands currently occupied by bears. 70 Fed. Reg. at 69886. If "range" is properly defined to encompass the grizzly's historic range, it becomes clear that the grizzly bear currently occupies very little of its range within the DPS. FWS reports that only 24% of the DPS is "suitable habitat" and that grizzlies currently occupy only 68% of this "suitable habitat." Is the other 32% of unoccupied "suitable" habitat within the DPS a significant portion of the grizzly's historic range? Is the 76% of the total DPS area that FWS classifies as "unsuitable habitat" a significant portion of the Yellowstone grizzly's historic range? Without answers to these fundamental questions, it is impossible to assess whether the Yellowstone grizzly bears are still threatened in a significant portion of their range.

FWS cannot simply dismiss the vast majority of unoccupied habitat in the DPS as insignificant because human development has rendered it unsuitable for grizzlies. FWS must consider whether these developed areas constitute a significant portion of the Yellowstone grizzly's historic range. See Defenders of Wildlife v. Norton, 258 F.3d at 1145-47 (holding that FWS violated the ESA in failing to consider whether developed private lands within the historic range of the Flat-tailed Horned Lizard were "a significant portion" of the lizard's range).

Here, the importance of currently unoccupied historic range within the DPS is readily apparent. For instance, FWS reports that:

> [t]here are large, contiguous blocks of sheep allotments in peripheral areas of the ecosystem in the Wyoming Salt River and Wind River Mountain Ranges on the Bridger-Teton and the Targhee National Forests. This spatial distribution of sheep allotments on the periphery of suitable habitat results in areas of high mortality risk to bears within these allotments and a few small, isolated strips of suitable habitat adjacent to or within sheep allotments.

Id. at 69870. While these "large, continuous blocks" would support bears absent sheep allotments that currently create a bear mortality "sink," FWS never explains why these public lands are not a significant portion of the Yellowstone grizzly's range—or, as a practical matter, why the agency is content to delist without phasing out the sheep allotments and making this a "source" rather than a "sink" area for bears. These sheep allotments may well imperil Yellowstone grizzlies within a significant portion of the proposed DPS. FWS's failure to meaningfully address the significance of these and other unoccupied areas within the DPS violates the ESA. See Defenders, 354 F. Supp. 2d at 1165 (rejecting FWS' conclusions that gray wolves are not threatened throughout a "significant portion of their range" based solely on the habitat occupied by the "core" Yellowstone population).

FWS Fails To Consider Whether The Yellowstone Grizzly Population Is Threatened By The Loss Of Historic Range. While FWS correctly states that it must consider whether to delist the Yellowstone grizzly population based on the ESA's five listing factors, the rule contains no analysis of the "curtailment" or loss of the Yellowstone grizzly bear's historic range. This is not surprising since FWS makes no attempt to define the historic range of the Yellowstone grizzly. However, given that grizzly bears now occupy only 1% of their historic range in the lower-48 states, and given that the Yellowstone population is itself so small that it requires the influx of genetic material from other grizzly bear populations to ensure its continued viability, this is a glaring omission. In order to comply with the ESA, FWS must explain why the grizzly bear is no longer threatened by the dramatic loss of its historic range.[4]

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[4] While FWS asserts that the range of the Yellowstone grizzly bear has dramatically increased in recent years, this assertion ignores the relevant data concerning historic grizzly bear locations. For example, in the 1980 IGBST Annual Report federal biologists noted that : "Two verified sightings of lone grizzlies were reported from the Sawtooth Mountains, east of Obsidian, Idaho.

The Primary Conservation Area Is Based on Historical Accident, Not A Scientific Assessment of Grizzly Bear Habitat Needs. FWS repeatedly claims that the Primary Conservation Area ("PCA") alone is sufficient to support a recovered grizzly population, implying that the boundaries of the PCA are the product of scientific analysis. See 70 Fed. Reg. at 69860, 69872. That is simply not the case. The PCA is the product of historical accident and political compromise, not scientific analysis.

The boundaries of the PCA are identical to the boundaries of the Yellowstone Recovery Zone in the 1993 FWS Grizzly Bear Recovery Plan, see 70 Fed. Reg. 69860, which were in turn based on the Yellowstone Recovery Zone in the 1982 FWS Recovery Plan. As the 1982 FWS Recovery Plan freely admits, the original boundaries were based on a crude, inadequately informed, and disputed assessment of the current range of grizzly bears in 1979, with the desired goal of providing habitat for merely 229 bears. See 1982 FWS Recovery Plan at 47 ("almost no data on state or private lands"); see also id. at 35 (map depicting "Yellowstone Grizzly Bear Ecosystem (Occupied Habitat) 1979)."

As a threshold matter, the 1982 recovery zone boundaries were flawed because they were drawn with the goal of supporting an untenably small grizzly bear population. In 1982, FWS asserted that the Yellowstone grizzly bear population will be "viable and self-sustaining," and thus "eligible for delisting" when the population reached the "population size documented in Craighead et al.," which FWS specified as "consisting of 229 bears." Id. at 36. By any measure, the 1982 goal of 229 bears was set too low.

In designating the 1982 Yellowstone recovery zone, FWS recognized that it must "[d]etermine the habitat and space required for the achievement of the grizzly bear population goal." Id. at 45. Yet rather than setting a biologically principled population goal and then identifying the habitat needed to achieve that goal, FWS defined its task as merely "[s]tat[ing] or determine[ing] occupied space and habitat where management considerations for grizzly bears are necessary." Id. (emphasis added). FWS has never undertaken a scientific habitat assessment to determine recovery zone boundaries based on the biological needs of a recovered grizzly bear population.

Indeed, FWS failed even in its stated intent to assess the extent of occupied habitat where protective management is necessary. In order to assess occupied grizzly bear habitat in the Yellowstone area for purposes of developing the 1982 recovery plan, FWS convened a workshop in Missoula, Montana December 6-7, 1979. Id. The workshop participants developed a map that purported to depict currently occupied habitat and created a table of lands included in the FWS Yellowstone Recovery Zone. Id. However, FWS conceded that the 1979 assessment of currently occupied habitat was plagued by inadequate data, differing definitional standards for what constituted "occupied habitat," and continuing proposals for further changes in the occupied habitat delineation:

Four verified observations of a female with young and one sighting of a large lone grizzly were reported in the vicinity of Buffalo Bill Reservoir, Wyoming." Id. at 9. This historic evidence demonstrates that grizzly bears were widely dispersed in 1980, long before the alleged increase in range on which FWS relies.

NOTE: Persons attending the workshops were not in full agreement with acreages designated for occupied habitat, habitat stratification or areas for resolution. Numerous calls suggesting boundary changes were received during plan formulation, some with apparent justification and some for reasons unknown. Further, there appeared to be a variance in the interpretation of the Criteria for Grizzly Bear Critical Habitat Identification (USFS, 1975) used in the delineation of essential habitat, between forests and between forest districts; and, almost no data on state or private lands. Reconvening the workshops to review each suggested change seemed impractical. Therefore, the acreages presented will have to suffice for a beginning (see Footnote 5), the refinement of occupied habitat and habitat stratification is a plan element.

Id. at 47. Thus, by its very terms, the 1982 FWS Recovery Zone was not only designed to support an unsustainably small population of 229 bears, it was also based on incomplete and inaccurate data and unresolved differences regarding appropriate standards for assessing occupied habitat. While the 1982 recovery plan contemplated further "refinements," the originally drawn recovery zone remains the basis for the 1993 Yellowstone recovery zone boundaries, the PCA, and the delisting proposal.

The proposed PCA is fundamentally the same as the 1982 Yellowstone recovery zone. Table 2 of the 1982 Recovery Plan depicts the recovery zone's acreage, which totals 5,437,736 acres. Id. at 48. In the ensuing eleven years leading to the development of the 1993 Recovery Plan and its final fixing of the PCA boundaries, these acreages were modified only slightly. The Final Conservation Strategy states that the PCA now covers 5,893,760 acres, or 8% more acreage than was originally considered occupied in 1979 and included in the recovery zone in 1982. Conservation Strategy at 17. This minimal difference in acreage is explained almost exclusively by minor changes to the constituent areas of the six National Forests, as depicted in the following table:

National Forest	Acres (1000s) within occupied habitat c. 1979*	Acres (1000s) within PCA c. 2005**	Acreage (1000s) change 1979-2005
Beaverhead	0	69	+69
Bridger-Teton	734	724	-10
Custer	157	114	-43
Gallatin	522	909	+387
Shoshone	1,258	1,223	-35
Targhee	389	475	+86
Total	3060	3514	+454

* 1982 Grizzly Bear Recovery Plan, 47, Table 2.
** Forest Plan Amendments DEIS, 47, Fig. 10.

Neither the 1993 Recovery Plan nor the proposed delisting rule explains how the addition of 454,000 acres of Forest Service land could change the 1979 map from a depiction of occupied habitat for 229 grizzly bears into a map depicting the sufficient habitat for FWS's still-inadequate goal of 500-600 bears. The incorporation of those zones into the PCA merely cements an arbitrary line based on the flawed 1979 assessment of occupied habitat.

Ironically, the population in 1979 was likely at its lowest ebb; the Service notes that contemporary population estimates ranged from 229 to 312 bears. 70 Fed. Reg. at 69,857; see also Conservation Strategy at 27, Fig. 4 (depicting the number of females with cubs-of-the-year from 1975-2002). The 1982 FWS Grizzly Bear Recovery Plan suffered from the same flaw that afflicted many FWS recovery plans: FWS set recovery goals at or below the existing population size and below viable recovery levels, thus "managing for extinction." Tear, et al., (1993) (FWS research scientists concluding that "our analysis does not show that recovery plans attempt to save too much, but instead that recovery goals have often been set that risk extinction rather than ensure survival."). Nowhere does the Service explain how an area of habitat that was supporting roughly 250 bears in 1979 is expected to support more than twice that many bears "for the foreseeable future." 70 Fed. Reg. at 69860.

FWS takes inconsistent positions on the scientific legitimacy of the recovery zone/PCA. In a 1997 supplement to its 1993 Grizzly Bear Recovery Plan, FWS stated unequivocally: "There exists no system to evaluate the amount of habitat necessary to maintain a viable grizzly bear population." Id. at 19. Similarly, in the delisting rule FWS incorrectly asserts that "there is no known way to deductively calculate minimum habitat values" for a recovered Yellowstone grizzly bear population. 70 Fed. Reg. at 69858.[5] This is demonstrably false; a large body of science of reserve design has developed over the last thirty years. See Noss, et al. (1999).

Reserve design starts by identifying focal species (like the grizzly bear), determining a viable population level and then evaluating, mapping, designating, and managing habitat necessary to sustain the population over the long term. Id. Numerous regional conservation networks have been designed throughout the world; several have even been proposed for the northern Rockies and the lands encompassing lower-48 states grizzly bear habitat. Invariably, they have proposed the need to reconnect the existing grizzly bear populations in the lower-48 states in order to ensure sufficient habitat for long-term viability of native species, including the grizzly bear. Even the most rudimentary reserve design indicates that Yellowstone grizzly bears need far more habitat than that contained in the PCA. FWS admits that "estimates of grizzly bear densities in the Yellowstone area range from one bear per 50 sq km (20 sq mi) to one bear per 80 sq km (30 sq mi) (Blanchard and Knight 1980; Craighead and Mitchell 1982)." 70 Fed. Reg. at 69855. Multiplying these Yellowstone bear densities by FWS's biologically inadequate 500-bear population target results in a reserve of 25,000—40,000 square kilometers, much larger

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[5] FWS asserts that it "instead inductively selected 1998 levels because it was known that these habitat values supported" an increasing Yellowstone bear population "throughout the 1990s." 70 Fed. Reg. at 69858. The selection of 1998 levels is flawed for a number of reasons, including the failure to account for lag effect and the failure to acknowledge the Yellowstone grizzly bears' extensive use of habitat by outside the PCA throughout the 1990s. In addition, FWS conducted no analysis of habitat needed or used by the Yellowstone grizzly bear in 1990s, instead FWS continued to rely on its fundamentally flawed recovery zone.

than the PCA. The upper end of this calculation is very near the conservative estimate of currently occupied habitat, 37,258 square kilometers. Schwartz, et al. 2006.

FWS seems to recognize the need for reserve design when it promotes connecting corridors between grizzly bear ecosystems because they would enhance species' viability, and when it attempts to track fundamental changes in habitat capability via its Cumulative Effects Model. See Servheen and Sandstrom (1993). Instead of using this readily available reserve design science, however, FWS has merely sought to justify continued use of a line drawn with inadequate information nearly thirty years ago to provide habitat for 229 bears.

The Delisting Proposal is Fundamentally Flawed Because There Are No Habitat Protections For More Than 40 % of the Currently Occupied Grizzly Bear Habitat. In making a determination that a species is threatened or endangered under section 4 of the ESA, the Service must ensure that the species is not imperiled because of loss of habitat quality or quantity. 16 U.S.C. § 1533(a). FWS acknowledges that meaningful protection of habitat is essential to the persistence and recovery of the Yellowstone grizzly bear population. However, the only place where FWS proposes restrictions on road building and development of grizzly bear habitat is within the PCA. As discussed above, the PCA is a new name for the geographic area designated as the Yellowstone grizzly bear recovery zone in the FWS 1993 Grizzly Bear Recovery Plan. When the Grizzly Bear Recovery Plan was developed, the Yellowstone recovery zone was an estimate of those places where grizzly bears currently resided or where they could exist without generating conflicts with established developments and human activities. At no time has FWS ever developed and finalized a scientific analysis detailing those areas needed by grizzly bears to attain and maintain a biologically recovered population. Instead, the historic artifact of the Yellowstone grizzly bear recovery zone was merely rolled over into the PCA. The origin and the immutability of the areas established for grizzly bear recovery were driven by a political assessment of where the presence of grizzly bears could be tolerated with minimal societal impacts rather than by a scientific assessment of how much habitat quality and quantity were needed for grizzly bear recovery.

In the Conservation Strategy, FWS asserts, without scientific justification, that the size of the Yellowstone grizzly bear population and its habitat will be maintained at 1998 levels.[6] Nowhere does FWS demonstrate why 1998 was selected rather than 1990, 1995, 2000 or any other year. There is no analysis whatsoever of alternative years, grizzly population levels and habitat conditions in those years, or the implications for selecting any particular year as a recovery standard. This is the height of arbitrary decision making. In addition, there is nothing

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[6] FWS claims that the "1998 baseline for habitat standards was chosen because several studies (Boyce et al. 2001; Schwartz et al. 2005) showed that the Yellowstone grizzly bear population was increasing at a rate of 4 to 7 percent between 1983 and 2001, and 1998 was within the time that this rate of increase was occurring." 70 Fed. Reg. at 69866. Random selection of a single year within a time frame is by definition irrational. More fundamentally, a population that increased from 10 to 11 bears in a given year would provide no basis for a determination that the habitat in that particular year was sufficient to support a recovered population of bears. FWS also fails to account for the demonstrated lag effect between habitat destruction and documented impacts on population size or trends. See supra at pp. 10-11.

to indicate that FWS has reliable information about grizzly bear population or habitat status as they actually existed in 1998.

Even under FWS's arbitrary 1998 standard, grizzly bears were known to occupy and use much more habitat in 1998 than the areas delineated by the PCA boundaries. In August 1997 FWS was advising the public that "[i]n the 1990's, grizzly bears have been dispersing to the south and east of the [Yellowstone] recovery area boundary by as much as 25 miles." FWS Summary of the August 22 1997 Round Table Discussion at 1. Thus, FWS acknowledged that grizzly bears were using millions of acres of land outside the recovery zone prior to 1998. Even this was a conservative estimate, because grizzly bears were using habitat more than 100 miles south of Yellowstone near Pinedale, Wyoming in 1996. Christian Science Monitor, January 13, 1997.

Schwartz, et al. (2002) used different information sets to describe the geographic distribution of Yellowstone grizzly bears during 1990-2000. None of the information sets used by Schwartz, et al.(2002) was comprehensive—the paper excluded known sightings of grizzly bears that extended far beyond the areas included in the calculations. Id. at 207, 210. Nonetheless, Schwartz, et al. (2002) concluded that Yellowstone grizzly bears occupied 32,416 square kilometers of habitat, only 65.5 % of which was within the Recovery Zone. Id. at 207. Thus, more than one third of the habitat occupied by grizzly bears in the Yellowstone area during 1990-2000 was outside of the PCA. Notably, the Schwartz, et al. (2002) authors concluded their article by stating: "Grizzly bears in the G[reater] Y[ellowstone] E[cosystem] are effectively a single population and sound conservation practices must focus on all occupied habitats." Id. at 210. In an update of Schwartz, et al. (2002), that is currently in press in the scientific journal Ursus, Schwartz, et al. update their analysis to estimate a 1990-2004 distribution of the Yellowstone grizzly bear population of 37,258 square kilometers. Schwartz, et al. 2006 (cited by FWS as "Schwartz 2005, unpublished data" in the delisting rule). Under this conservative calculation, which explicitly excludes data of known grizzly bear distribution, including documented "mature resident females" that "more than likely" inhabit northern portions of the Gallatin and Custer National Forest, id. at 6-7, nearly 40 % of currently occupied grizzly bear habitat in the Yellowstone ecosystem is outside the designated recovery zone.

In its press release on the Yellowstone grizzly bear delisting proposal, FWS claims that grizzlies "have occupied 48 percent more habitat since they were listed, and biologists have sighted bears more than 60 miles from what was once thought to be the outer limits of their range." FWS November 15, 2005 Press Release. Despite this record, FWS has refused to afford any habitat protections to more than 40 % of the currently occupied habitat, and more than one third of the habitat occupied by Yellowstone grizzlies in the Service's arbitrarily selected 1998 year. Under the Service's own standards, this is fundamentally inconsistent and arbitrary.

FWS further seeks to rely on Schwartz, et al. (2006) to assert that the PCA includes "approximately 90 percent of the population of female grizzly bears with cubs." See 70 Fed. Reg. 69860, 69870, 69872, 69881. Schwartz, et al., (2002) and Schwartz, et al. (2006) do not provide a comprehensive summary of currently occupied grizzly bear habitat. The existing survey methods have focused primarily on sighting bears within the PCA; consequently analysis of these data sets would not provide reliable information on what portion of Yellowstone bears spend any time outside the PCA. The methods employed in both Schwartz publications "would result in an underestimation of range expansion and current distribution," Schwartz, et al., (2002) id. at 207, "exclude areas often used by bears," and had "limited" ability "to provide accurate estimates" of habitat use in the peripheral areas. Id. at 209. Schwartz, et al. (2006) excluded known female grizzly bears with cubs from their analysis. Id. at 6-7, 10, 11. Consequently, Schwartz, et al. (2006) offers no basis to judge the importance of occupied areas outside the PCA either for females with cubs or to the Yellowstone grizzly bear population as a whole.

To make any reliable assessment even of historic use of habitat (without addressing how future use will change due to declining food resources within the recovery zone), FWS would need reliable information about what percentage of the bear population uses areas outside the recovery zone at some time in their lives. A bear need only venture outside of the PCA once to suffer from inadequate habitat protections outside the PCA. Schwartz, et al. (2006) does not address this issue.

Consequently, delisting the Yellowstone grizzly bear population is not appropriate because at least 40 % of the habitat currently occupied by grizzly bears is not protected from human interference and development.

New U.S. Forest Service Regulations Mandate That Land Management Plans No Longer Contain Binding Legal Standards. The Service's delisting proposal erroneously relies upon National Forest Land and Resource Management Plans ("LRMPs") to provide some habitat protections that would apply solely within the PCA. FWS relies on the LRMPs for the Beaverhead, Bridger-Teton, Caribou-Targhee, Custer, Gallatin and Shoshone National Forests to ensure implementation of the grizzly bear habitat standards described in the Conservation Strategy. See 70 Fed. Reg. 69854, 69875-76. The Service's reliance on these LRMPs is misplaced because LRMP's are not binding or enforceable.

The National Forest LRMPs cited in the proposed delisting rule cannot constitute "regulatory mechanisms" within the meaning of Endangered Species Act ("ESA") section 4(a)(1)(D), 16 U.S.C. § 1533(a)(1)(D). Agency conservation plans or programs do not qualify as regulatory mechanisms under the ESA "[a]bsent some method of enforcing compliance." Oregon Natural Resources Council v. Daley, 6 F. Supp. 2d 1139, 1155 (D. Or. 1998). Thus, voluntary and unenforceable commitments do not satisfy the ESA's requirement for adequate regulatory mechanisms to substitute for the ESA's own protections. See id.; Federation of Fly Fishers v. Daley, 131 F. Supp. 2d 1158, 1167-69 (N.D. Cal. 2000) (finding voluntary and future actions inadequate regulatory mechanisms).[7]

[7] The laws and regulations on which FWS relies to "provide the legal basis for controlling mortality, providing secure habitats, managing grizzly bear/human conflicts" after delisting suffer from the same legal defect. Conservation Strategy at 68. Many of the cited authorities have little or no relevance to the stated objective. See, e.g., Wyo. Stat. Ann. § 23-2-101(e), (requiring a $500,000 balance to compensate landowners for damage done by game animals). The cited authorities are almost entirely discretionary, containing exceedingly few, if any, enforceable mechanisms. See, e.g., Mont. Code Ann. § 87-5-301 (declaring it "the policy of the state of Montana to protect, conserve, and manage grizzly bear as a rare species.").

Under the U.S. Forest Service's new forest planning regulations, the next generation of LRMPs for the Greater Yellowstone Ecosystem National Forests will necessarily lack any method of enforcing compliance with grizzly bear habitat standards. The Forest Service has made clear that forest plans under its new set of planning rules "will be strategic and aspirational in nature," rather than "prescriptive." Final Rule, National Forest System Land and Resource Management Planning, 70 Fed. Reg. 1023, 1031, 1040 (Jan. 5, 2005). In keeping with this vision of forest plans as merely "aspirational" documents, id., none of the components of a LRMP under the Forest Service's new rules could embody a regulatory commitment for grizzly bear habitat protection. The new plans will contain "desired conditions," "objectives," and "suitability" determinations, but the Forest Service has taken pains to point out that these plan components are "aspirational, but are neither commitments nor final decisions approving projects and activities." Id. at 1025-26.

Further, the new planning regulations eliminate any standards from the new plans. Under the previous planning regime, standards represented binding, enforceable commitments by the Forest Service. The new generation of plans will contain only "guidelines." See id. at 1026. As the Forest Service has made clear, "[a] Responsible Official has the discretion to act within the range of guidelines, as well as the latitude to depart from guidelines when circumstances warrant it." Id. The Forest Service has further explained that none of the components of a forest plan under the new rules "is intended to directly dictate on the ground decisions which have impacts on the environment." Id. at 1031.

Absent any method of establishing a binding, enforceable commitment for grizzly bear habitat protection, the LRMPs cited in the proposed delisting rule cannot qualify as "regulatory mechanisms" under the ESA. 16 U.S.C. § 1533(a)(1)(D). In this regard, the proposed delisting rule cites correspondence from the Forest Service assuring that any grizzly bear habitat standards adopted through the ongoing plan amendment process will be carried forward into future plan revisions undertaken pursuant to the agency's new planning rule. See 70 Fed. Reg. at 69876. However, given that the new plans lack any means to establish those habitat standards as binding, enforceable commitments, the mere fact that the habitat standards will be carried forward into the next round of plan revisions does not solve the "regulatory mechanisms" problem with respect to the Forest Service's LRMPs. Regardless whether the habitat standards are carried forward into a future round of plan revisions, they will become embodied in a planning document that is not a mandate for grizzly bear habitat protection, but merely an aspirational vision for future forest management. The prospective inclusion of habitat protections in an aspirational vision document offers no lawful justification for delisting the Yellowstone grizzly bear population under the ESA.

FWS Improperly Relies On Defunct Regulations And Unenforceable Guidance To Protect Bears From Site-Specific Habitat Development. As discussed above, the proposed rule relies on unenforceable forest planning provisions to protect grizzly habitat within the PCA. Outside the PCA, the proposed rule relies on similarly ineffective measures to protect grizzly habitat, specifically: NEPA compliance, a rescinded Forest Service "viability" regulation, and unenforceable "sensitive species" guidance.

One of the greatest threats to the Yellowstone grizzlies both inside and outside the PCA is industrial development on National Forest lands. See e.g. 70 Fed. Reg. at 69872 (reporting that "1,240 square miles of suitable habitat on National Forest lands allow surface occupancy for oil and gas development"). However, the proposed rule assumes that the "six affected National Forests … will manage the number of roads, livestock allotments, developed sites, timber harvest projects, and oil and gas wells outside of the PCA in suitable habitat to allow for a viable grizzly bear population." Id. In support of this assertion, FWS states that "the grizzly bear will be classified as a sensitive species" and that all of these activities "would require compliance with the National Environmental Policy Act and the National Forest Management Act." However, FWS fails to identify a single "regulatory mechanism" that actually affords protection to grizzly habitat.

First, compliance with NEPA does not afford any substantive protection to grizzly habitat because it is a purely procedural statute. Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, 435 U.S. 519, 558 (1978) ("NEPA does set forth significant substantive goals for the Nation, but its mandate to the agencies is essentially procedural.") Second, there is no longer any enforceable Forest Service regulation in place that requires the agency to ensure the viability of any species, including sensitive species. See Final Rule, 70 Fed. Reg. 1023 (Jan. 5, 2000) (repealing species viability standards under NFMA). "Sensitive species" designations solely implicate internal policies from the National Forest Service Manual, see Forest Service Manual 2670, and the courts have repeatedly held such policies in handbooks and manuals to be judicially unenforceable. See Western Radio Services Co. v. Espy, 79 F.3d 896, 901 (9th Cir. 1996) (holding that Forest Service Manual does not "have the independent force and effect of law"); Reed v. Avis Rent-A-Car, 29 F. Supp. 2d 1121, 1126 (N.D. Cal. 1998) (same with regard to BLM Manual), aff'd on other grounds, 231 F.3d 501 (9th Cir. 2000). Thus, "[a]bsent some method of enforcing compliance," sensitive species designations do not amount to a regulatory mechanism under the ESA. Oregon Natural Resources Council v. Daley, 6 F. Supp. 2d 1139, 1155 (D. Or. 1998). In short, FWS fails to identify any regulatory mechanisms that are adequate to protect grizzly habitat on National Forest lands.

FWS Inappropriately Relies on Importation of Grizzly Bears to Address Current and Ongoing Genetic Problems. A small population faces extinction risks arising from loss of genetic variation that may prove essential to the population's long-term survival. The Yellowstone grizzly bear population has been isolated for "approximately 100 years or more (Miller and Waits 2003)." 70 Fed. Reg. at 69865. As FWS acknowledges, "Yellowstone grizzly bears have the lowest relative heterozygosity of any continental grizzly population yet investigated (Paetkau et al. 1998; Waits et al. 1998b)." Id. Compared with the adjacent NCDE grizzly bear ecosystem, the "heterozygosity estimates at eight microsatellite loci are 55 % in the YE, significantly lower than the 69 % observed in the NCDE, only a few hundred kilometers to the north." Miller and Waits (2003). Notably the genetic diversity in the Yellowstone grizzly bear ecosystem has been gradually declining over the last 80-90 years and will continue to decline without additional gene flow from neighboring populations. Id.; 70 Fed. Reg. 69878. Yellowstone bears face significantly higher extinction risks because their genetic material is not as robust and diverse as the grizzly bears in the nearby NCDE.

The FWS has estimated that the Yellowstone population may have been reduced to roughly 200 bears in the 1970s. 70 Fed. Reg. at 69857. Currently, the genetic effective population size (N_e) is about 125 bears; much lower than the general scientific consensus of 500 for long-term persistence. See attached comment letter from concerned scientists.

Because of concerns about the loss of genetic diversity, the FWS has stated that it will continue to monitor the genetic make-up of the Yellowstone grizzly population, and "if no movements are detected by 2020, one to two grizzlies will be transplanted from the NCDE by 2022 to ensure that genetic diversity in the Yellowstone area does not decline below existing levels (Service 2003)." 70 Fed. Reg. at 69878. Thus, the proposed delisting rule contemplates continued human intervention to address persistent threats to the Yellowstone population that are not alleviated by current on-the-ground conditions. This type of human-supported "recovery" is not a basis to delist a species under the ESA. The ESA requires recovery of endangered populations in the wild; the Yellowstone grizzly bear population must be large enough to survive in the wild without chronic augmentation to address genetic concerns. 50 C.F.R. § 402.02.

In addition, FWS relies in part on the unique genetic characteristics of the Yellowstone bears to demonstrate the uniqueness of the population as a basis for a separate DPS. 70 Fed. Reg. 69864. However, because of the extremely small population size and genetic impoverishment of the Yellowstone bear population, FWS is proposing to augment the population by translocating bears. If such an approach is implemented, over time introducing genes from other populations will destroy the claimed genetic uniqueness of the Yellowstone bear population.

FWS Fails to Address Declining Whitebark Pine. The Yellowstone grizzly bears feed heavily on four key foods. All of these key grizzly bear foods are already currently in decline or face significant threats to their distribution and abundance. Decreased availability or wholesale loss of these foods will result in substantially reduced carrying capacity of the Yellowstone area and increased bear/human conflicts and grizzly bear mortalities. While FWS blithely asserts that any reduction in these traditional mainstays of the grizzly bear diet will be offset by the bears' use of other foods, the available evidence is to the contrary. Mattson (2000); Felicetti, et al. (2003); Robbins, et al. (2004) (an "abundant, easily acquired" food, salmon, was "an obligate food source for large, high-density brown bears.").

The relationship between the abundance of whitebark pine seed cones and their impact on grizzly bear demography is well studied. Schwartz, et al. (2005); Mattson et al. (1992); Blanchard and Knight (1995); Mattson (1998). Because of the key role that whitebark pine plays in the Yellowstone ecosystem, the IGBST has been documenting the abundance of whitebark seed cone production for more than 30 years. See 1975 IGBST Annual Report at 13-14. During years when they feed heavily on whitebark pine nuts, grizzly bears range in high mountainous areas distant from roads and human facilities. During years when pine nuts are unavailable, bears forage in lower-elevation habitats and search for alternate foods near humans with resulting conflicts and elevated mortality.

In poor whitebark pine mast production years, the number of bear/human conflicts and the number of grizzly bear mortalities increases substantially. Mattson (1998) (grizzly bear mortality is 1.8-3.3 times greater in years of poor nut production); Felicetti, et al. (2003) (same). Management trappings (relocations or removals of bears due to conflicts with humans) were 6.2 times more frequent in years when whitebark pine seeds were unavailable. Human-caused mortalities of adult female grizzlies were 2.3 times higher during such years. Human-caused mortalities of sub-adult male grizzlies were 3.3 times higher. Mattson, et al. (1992); Felicetti, et al. (2003). During years of good whitebark pine cone production, more than 70 % of Yellowstone-area bears consumed whitebark pine cones, with 67 % of the bears deriving "over 51 % of their assimilated sulfur and nitrogen (i.e., protein) from pine nuts." Felicetti, et al. (2003).

Whitebark pine seeds allow reproducing female grizzly sows to put on needed weight to reproduce and produce larger litter sizes. Mattson and Jonkel (1990); Lanner (1996). Adult female grizzlies eat twice as many pine seeds as do adult males especially during hyperphagia. Mattson (2000). Use of whitebark pine seeds has a positive effect on the likelihood that a female grizzly will reproduce and a strong effect on the likelihood that a female will produce a large (three-cub) litter. Female grizzlies consuming whitebark pine seeds have the lowest age of first reproduction. Id.; see also Haroldson et al. (2005). Conversely, greater consumption of roots is related to a lower likelihood of grizzly bears having a large (three-cub) litter. Id. When Yellowstone-area grizzlies consumed more roots to compensate for lack of pine seeds, grizzly bear fecundity declined. Consequently, whitebark pine mast production affects Yellowstone grizzly bear mortality and fecundity, the two key variables affecting population size and trends.

Scientists have documented the consequences of these two dynamics on Yellowstone grizzly demography: the population declines 5 % in whitebark pine nonmast years and increases 7 % in mast years. Pease and Mattson (1999). Thus, it is well established that a decline in whitebark pine seed cone production will have catastrophic consequences for Yellowstone grizzly bears. Federal agency scientists, including Dr. Servheen, acknowledge that a rapid decline in whitebark pine would produce a population crash similar to what occurred when Yellowstone Park dumps were closed. Schwartz, et al. (2005). These research results dispel any notion that Yellowstone grizzlies can simply transition to other food sources when their traditional foods run short. Unfortunately, due to a variety of factors, a decline in whitebark pine seed cone production is already well underway in the Yellowstone ecosystem.

Mountain Pine Beetle: The mountain pine beetle is an aggressive tree-killing insect that is native to the pine forests of western North America. Powell and Logan (2005). In order to successfully reproduce, the mountain pine beetle must kill its host tree. This predatory relationship has resulted in a co-evolutionary response in some pine species that have evolved significant chemical defenses to repel attacking beetles. Id. The life cycle of the beetle is initiated when the adults bore under the bark of a host tree and lay their eggs. As the first adults bore into a tree, they produce pheromones to attract other beetles to that individual tree in a mass attack strategy that overcomes tree defenses. If sufficient numbers of beetles are attracted to the tree, the tree is killed and the beetle's brood can successfully develop. Id. The larvae feed on the inner bark of the tree. The larvae then develop and emerge as adults the following summer to attack neighboring trees. While mountain pine beetles usually persist at low levels across a forest, their presence is most noticed during beetle "outbreaks" that occur when climatic and forest conditions are conducive to massive epidemics, in which hundreds or even thousands of acres of contiguous pine forest can be killed each successive year. If conditions are right, beetle outbreaks can grow exponentially over a series of generations, because each infested tree produces enough beetles to kill several similarly sized trees.

Species of trees within the mountain pine beetle's historic range, such as lodgepole and ponderosa pine, have co-evolved with the pest; mountain pine beetle does not pose a threat to the long-term health of those species under historic climatic conditions. In contrast, the beetle poses a more significant danger to whitebark pine, because whitebark pine has not evolved adequate physiological defenses or a reproductive strategy capable of weathering the beetle's attacks. Logan and Powell (2001). Infested individual whitebark pine trees can host four to seven times as many beetles as are hosted by a lodgepole pine. High Country News, July 19, 2004 (quoting University of Montana entomologist Diana Six). Because of the beetle's high reproductive rate in whitebark pine and the low defensive capabilities of the trees, mountain pine beetles infestations can increase even more rapidly in whitebark than in lodgepole pine.

In coming years, mountain pine beetle attacks will likely increase in frequency and severity throughout Yellowstone-area whitebark pine stands. See Logan and Powell (2005) ("outbreaks of increased frequency and intensity are to be expected across the current distribution of mountain pine beetle."). There are several factors that contribute to the vulnerability of whitebark pine to beetles in the Yellowstone area. Among them are the increased stress and mortality caused by drought and forest succession, and the increasing levels of infection by white pine blister rust, all factors that make the trees more susceptible to beetle infestation. An even more pervasive and irreversible factor though, is the region's warming climate. Recent research suggests that as the climate warms, mountain pine beetle outbreaks will increasingly spread into forests at higher elevations and more northerly latitudes. Modeling efforts based on the best available scientific information indicate that virtually all whitebark pine stands in the Yellowstone area, except for portions of the Absaroka Mountains and the entirety of the Wind River Range (both of which are outside of the PCA) will be decimated by mountain pine beetle infestations during the next several decades. Logan (2006) . In contrast to blister rust, which gradually kills whitebark pine trees, mountain pine beetles can kill entire stands of whitebark pine in just one summer, which would have immediate impacts on grizzly bear demography.

The life cycle of mountain pine beetles is directly controlled by temperature, from the standpoint of both weather (annual temperature variation), and climate (long-term temperature variation). Logan and Powell (2005). Under warmer conditions, the beetle is more active, and can complete its life cycle over a one-year period (i.e., the adults bore into trees and lay their eggs in mid-summer, and the larvae are ready to emerge as adults the following summer). Id. That life cycle is called "univoltine." Under colder conditions, and in colder, historic high-elevation climates, lower temperatures hamper the beetle's development, and two years are required for the beetle to complete its life cycle. This life cycle is called "semivoltine." Besides taking twice as long to produce each brood, the survivorship of semivoltine beetles is not as high, because their lifecycles are not always timed correctly to enter winter in the necessary developmental stage that permits them to cold-harden and survive winter temperatures. Historically, severe mountain pine beetle outbreaks have been geographically limited to areas that are warm enough to permit a univoltine life cycle. Id. That is because mountain pine beetles can only be successful when they kill their host, and they can only do that by attacking a tree simultaneously, and in sufficient numbers to overcome the tree's defenses. Id. 4-5. Semivoltine beetles, on the other hand, are generally less able to muster the coordinated attacks necessary to overwhelm large sections of forest.

Mathematical modeling predicts that for high-elevation forests in the northern Rockies, a 2°C increase in average annual temperature will be sufficient to shift mountain pine beetle activity from a semivoltine to a univoltine life cycle. Logan and Powell (2001). This modeling has been borne out by recent evidence gathered from a high-elevation study location in Idaho called Railroad Ridge. Although that area is generally too cold for successful beetle outbreaks, a major outbreak occurred in the 1930s, when mean July temperatures were 2°C above the average over the past 105 years. Id.; Powell and Logan (2005); Logan and Powell (2005). Mountain pine beetle populations on Railroad Ridge recently have again switched to a univoltine life cycle. In contrast to the 1930s outbreak, which resulted from a short pulse of a few years, the current mortality is the result of a continued warming trend. Mortality resulting from the current outbreak already exceeds that of the 1930s. High Country News, July 19, 2004; Powell and Logan (2005). Similarly, on all twelve sites in Idaho, Montana, and Yellowstone National Park studied by University of Montana professor Diana Six, mountain pine beetles have adopted a univoltine life cycle in recent years, with consequent mortality similar to that experienced on Railroad Ridge. Id.

Mountain pine beetle activity is currently high throughout the GYE. Between 2000 and 2004, 18,000 acres of whitebark pines in Yellowstone National Park were killed by mountain pine beetle outbreaks. Roughly 9 percent of whitebark pines in Yellowstone Park were killed by the end of 2004 in this current, ongoing epidemic. Bozeman Daily Chronicle, March 27, 2005. Through 2005, the National Park Service estimates that 29,000 acres in Yellowstone National Park were killed by mountain pine beetles in the last six years. The ongoing mountain pine beetle infestation within Yellowstone Park is especially important because all the whitebark stands within the Park are within the PCA and in backcountry areas where firearms are not permitted. Bears in these areas face little or no prospect of human-caused mortality, but with the loss of whitebark pines, they will be forced to find food in more dangerous areas of the ecosystem.

Unfortunately, bears will be increasingly unlikely to find whitebark pine seeds outside Yellowstone Park, as bark beetles are attacking whitebark stands throughout the Yellowstone ecosystem. The U.S. Forest Service monitors the spread of mountain pine beetle infestations on Forest Service and Park lands through aerial overflights. USDA Forest Service, Forest Health Program, Forest Health Technology Enterprise Team (FHTET) data. See Powell and Logan (2005); Logan and Powell (2005) for a description of the Aerial Damage Survey methodology and its application to Stanley Valley, Idaho. In 2000, the USFS Aerial Damage Survey found that 1,743 acres of whitebark pine in the Greater Yellowstone Area were killed by mountain pine beetle attacks. By 2004, a cumulative total of 113,065 acres of whitebark pine had been killed by mountain pine beetle. Merrill (2006); Mountain Pine Beetle Conditions in Whitebark Pine Stands in the Greater Yellowstone Ecosystem, February 2006.

The loss of whitebark pine to mountain pine beetle infestations has also been documented by the IGBST. In the single year between 2003 and 2004, 17.6% of the whitebark pine trees monitored by the Study Team were killed, primarily due to mountain pine beetle attacks. 2004 IGBST Annual Report at 49. Since 2002, 24% (45 of 190) of the trees on the transects have died. On some transects, all whitebark pines present were killed. Id. The increasing mountain pine beetle activity in the Yellowstone area is consistent with a series of unprecedented native bark beetle outbreaks throughout western North America. Logan and Powell (2005).

Blister Rust: Whitebark pine is also undergoing rapid decline in many portions of its range due to white pine blister rust, a disease caused by an exotic fungal pathogen. Whitebark pine is highly susceptible to white pine blister rust. Blister rust infections on any part of the stem are usually fatal except in relatively rare, highly resistant trees. Hoff, et al. (1980); McDonald and Hoff (2001); Kendall and Keane (2001). Whitebark pine mortality from the combination of blister rust and mountain pine beetle is already as high as 40-100 % in certain areas including Glacier National Park, northwestern Montana, north-central Idaho, and northern Washington. Id. Similarly, in the Yellowstone ecosystem blister rust infection rates in whitebark pine have increased significantly from 1996. Compare Kendall, et al. (1996) (reporting the rust infection rate as "mostly at low levels (<5%)") with GYA Whitebark Pine Monitoring Working Group (2006) (reporting 25 % infection rate for the overall GYE, and 27 % infection rate outside the PCA).

White pine blister rust was accidentally introduced from Europe to western Canada around 1910. McDonald and Hoff (2001). The disease enters trees by growing through the needles into the stems of the tree, where it forms cankers on individual branches and on the bole of the tree. When the canker extends completely around the circumference of a stem, the flow of nutrients is stopped, and the portion of the tree above the canker dies. Eventually, most infected trees die. Hoff (1992). Blister rust is almost invariably fatal to seedlings. Because of the short distance between a seedling's needles and its bole, any infection acquired by the seedling is likely to eventually affect the stem resulting in the seedling's death. Kendall and Keane (2001) at 226 (reporting that "[m]ost infected seedlings die within three years."); 2004 IGBST Annual Report ("[Y]oung trees that become infected almost always die relatively quickly.").

As for mature cone-bearing trees, blister rust most often kills the tops of infected trees well before the tree dies. Whitebark Pine Monitoring Program, 2005 Annual Report (80 % of whitebark trees sampled were infected by blister rust on branches; 20 % were infected on a main trunk). Because the top of the tree is where the vast majority of the cones are produced, infected trees often contribute little to cone production and regeneration in a stand. Arno and Hoff (1990); Keane and Arno (1993). When the top of the tree is killed, the tree loses photosynthetic biomass, further weakening the tree. Furthermore, a tree weakened by blister rust is more susceptible to mountain pine beetle attack. As infection in a stand increases, beetles build up in infected trees and then spill over into uninfected (and potentially, blister rust resistant) mature trees, increasing losses of valuable genetic resources and seed-bearing trees. Adams and Six (2005).

In many ecosystems in the western United States and Canada, whitebark pine forests have been decimated by blister rust and mountain pine beetles. Felicetti, et al. (2003). Since its introduction, blister rust has gradually spread south and east, so that the fungus is present in almost all whitebark pine forests. In places where blister rust has been present longest, it has drastically reduced the whitebark pine. In Washington, northern Idaho, northwest Montana, and southwest Canada, 40-100% of the whitebark pines in sampled stands are dead, and the great majority of the remaining trees are infected with the fungus. Kendall and Keane (2001). In western Montana, 42% of whitebark pines have died from blister rust in the last 20 years, and 89% of the living trees are infected. Keane and Arno (1993).

Recent surveys demonstrate that the rust is spreading in the Yellowstone ecosystem. Kendall and Keane (2001). An increasing number of whitebark pine trees in the Yellowstone area have been attacked by white pine blister rust; an increasing number of whitebark pines have reduced cone-producing capability because treetops and limbs are dead; and an increasing number of whitebark pines have been killed by blister rust. Id. In 1996, an estimated 7% of whitebark pines in Yellowstone and Grand Teton National Parks were dead, and less than 5% of the living trees were infected with the rust. Kendall, et al. (1996). The most recent results, which are "likely conservative," reveal that 36 of 51 whitebark pine transects within the PCA (71 %) and 65 of 71 transects outside the PCA (86 %) had some level of blister rust. Whitebark Pine Monitoring Program, 2005 Annual Report. After excluding the dead trees—including those whitebark pine trees killed by blister rust—17 % of live trees within the PCA and 27 % of the live trees outside the PCA were infected with white pine blister rust, totaling a 25 % infection rate of live whitebark pines in the Yellowstone ecosystem. Id. Of the whitebark pines sampled in 2004 within the PCA, 26% of the trees were dead from one cause or another. IGBST 2004 Annual Report (reporting that of 1,360 total trees on the transects, 348 were dead).[8]

In the long term, blister rust, especially when combined with mountain pine beetles and warming trends, will result in loss of most whitebark pine stands in the Yellowstone Ecosystem.[9] Some individual whitebark pine trees have demonstrated resistance to blister rust, but such resistance is extremely rare. McDonald and Hoff (2001). Furthermore, it is highly doubtful that any degree of management intervention will be able reverse this trend. Although a massive rust eradication effort was undertaken throughout the West in the early half of the last century, it was eventually abandoned after its hopelessness became apparent. Id. Artificial propagation and planting of rust-resistant strains may be useful in restoring the species over small areas, but it is infeasible to conduct such a reforestation effort across the entirety of the GYE.

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[8] In the delisting rule, FWS cites a 2001 paper to claim that "only 2 to 13 percent of whitebark pine trees display signs of infection." 70 Fed. Reg. at 69879. This cannot be squared with the available data.

[9] Whitebark pine stands are also threatened by forest succession. One study showed that around 1900, 14% of forest stands in southwest Montana were dominated by whitebark pine. By the early 1990's, none of those stands was dominated by whitebark pine, both as a result of pathogens and of forest succession caused by wildfire suppression, which has led to whitebark pine falling to the competition of shade tolerant fir species. Kendall and Keane (2001) (citing Arno, et al. (1993)).

Even if a new breed of rust-resistant trees could be developed, or if rust and mountain pine beetles could be eliminated or controlled, the grizzly population that depends on this critical food source would not be helped in the near term because it takes at least sixty to eighty years for whitebark pine trees to begin producing large cone crops, and nearly a century before most trees produce significant cone crops. McCaughey and Tomback (2001); Kendall and Arno (1989). Thus, even with a massive expenditure of effort and funding to implement as-yet-unproven restoration methods, the ongoing reduction in whitebark pine productivity will take nearly a century to return to current levels of seed cone productivity.

Global Warming and Climate Change: In addition to the ongoing and projected decrease in whitebark pine abundance and seed-cone productivity due to insects and disease, the long-term effects of global warming and climate change will reduce those areas where whitebark pine can persist and regenerate. Weaver (2001); Mattson, et al. (2001); Logan (2003) (stating expectation that climate change will intensify all aspects of mountain pine beetle outbreak behavior).

Global warming affects whitebark pine in two fundamental respects: (1) by increasing susceptibility to mountain pine beetle attacks; and (2) by making lower-elevation areas inhospitable to whitebark pine trees. With respect to the first factor, the mountain pine beetle is expected to respond immediately and predictably to a warming climate by expanding its range and shifting from a semivoltine to a univoltine lifecycle. The change in the beetle's lifecycle will be a sudden shift, because it is directly controlled by temperature. Powell and Logan (2005). Evidence for this shift is already apparent. The dominant factor behind the escalating bark beetle infestations at the continental scale in recent years has been the sequence of abnormally warm years that began during the mid-1980s. Logan and Powell (2005).

Regarding the second effect of global warming, the changing climate will make a large part of the species' current range inhospitable. Whitebark pines currently occur at high elevations exclusively. As whitebark pine responds to the warming climate by attempting to shift its range to ever higher elevations, the species will dramatically decline given the acutely convex mountains in the Yellowstone ecosystem. Pease and Mattson (1999); Romme and Turner (1991). Moreover, because these higher elevation areas contain more rocky terrain and less productive soil, the per acre productivity of whitebark pine will likely decrease as well. Thus, global climate change in the long term will result in substantially less area and less productive lands where whitebark pines can persist and regenerate. This too will result in significantly reduced carrying capacity for Yellowstone grizzly bears.

Climate change may also intensify blister rust infection. Researchers have speculated that the Yellowstone Ecosystem has not experienced the extensive blister-rust induced tree mortality seen in other parts of western North America because its relatively cool, dry climate has not been conducive to the spread of the fungus. Hoff and Hagle (1990). A warming climate may make the Yellowstone area more conducive to the spread of blister rust, leading to exponential increases in rate of infection of whitebark pines. Koteen (2001).

Whitebark Pine Monitoring Methods Currently in Place Will Not Detect Declines in Whitebark Pine Productivity in a Timely Fashion. FWS asserts that there is: "a highly sensitive system to monitor the health of the [grizzly] population and its habitat and to provide a sound scientific basis to respond to any changes or needs with adaptive management actions." 70 Fed. Reg. at 69881. This is plainly belied by the monitoring methods for assessing the production levels and availability of whitebark pine seed cones. The federal monitoring of whitebark pine throughout the GYE will not detect a whitebark population crash until after it has happened. See Cherry (2005) (2004 IGBST Annual Report, Appendix B) ("By the time there [is] convincing statistical evidence of a problem, the problem [will] have become obvious nonstatistically.").

The federal whitebark monitoring protocol is designed to measure the annual variability of seed-cone production of living trees. Observers walk fixed transects throughout the region, and count the number of cones on each living tree, thus generating the average productivity for the ecosystem. Id. This monitoring protocol ignores dead trees rather than counting their productivity as zero. 2004 IGBST Annual Report ("Dead trees were generally not replaced during 2003-04, which has resulted in a decline in the total number of trees read from 190 in 2002, to 145 this year") and Fig. 16 ("All trees on transect Q were dead from pine beetle and no replacement trees were substituted.").

By focusing on the productivity of living trees, the IGBST research has failed to shed light on a crucial problem–as more and more whitebark pines die, there will be less of this critical food source available to grizzly bears. Thus, regardless of the annual cone productivity monitored across the ecosystem between 2002 and 2004, the total number of live whitebark pine trees in the study transects decreased by 25%. While that alarming decline can be pieced together by comparing the two reports, FWS makes no mention of it or to its ramifications for the future of Yellowstone grizzlies.[10]

In 2003, the IGBST formed a separate working group called the Greater Yellowstone Whitebark Pine Monitoring Working Group ("Whitebark Pine Working Group") to focus specifically on the effects of white pine blister rust throughout the GYE. 2004 IGBST Annual Report. While the focus on cone production of living trees continues, the Whitebark Pine Working Group has developed a new methodology specifically for monitoring the effects of blister rust on whitebark pine. So far, the working group has only published data for the 2004 research year. Because the methodology is new, it will be several years before reliable information on trends in mortality, infection, and productivity of whitebark pines is available.

However, the first year's data indicates that even the revised methodology will underestimate the effect of the blister rust epidemic on the persistence of whitebark pine in the GYE. As an initial benchmark, the 2004 research attempted to quantify the variability between observers. Id. When the observers examined 60 trees in the six transects, two observers reported cankers or aecia (the fungal fruiting bodies that appear as swollen white or yellow blisters that are a sine qua non of blister rust infection) on nine trees while the third reported cankers or aecia on seven trees. But even for the two observers who observed the same number, "it [was]

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[10] In spite of available data showing marked declines in whitebark pine in recent years in the Yellowstone area, the delisting proposal declares that "[i]f there are reductions in any of these foods, they will likely be gradual reductions over decades, spanning generations of grizzly bears, thereby making adjustments to other foods gradual." 70 Fed. Reg. at 69879.

obvious that they did not identify the same 9 trees." Id. Examining the underlying data, it is evident that there was actually a minimum of eleven infected trees in the six transects (calculated by summing the highest number of infected trees in each transect reported by any of the three observers). Id. Therefore, it appears that two observers underreported the infection rate by 18% (i.e., they missed the symptoms in 2 of 11 trees) and the third underreported the infection rate by 36% (i.e., by only observing symptoms in 7 out of 11 infected trees). Thus, observer variability resulted in underreporting blister rust infection by 18-36%.

A second problem with the new monitoring protocol that will prevent it from accurately quantifying trends in the persistence of whitebark pines is that even though it notes that "young trees that become infected almost always die relatively quickly," the current methodology does not directly quantify infection rates or mortality in trees less than 1.4m high. Id. This is particularly problematic, given the recognition that "[p]ersistence of whitebark pine within the GYE depends on not only the survival of seed-producing trees, but also the recruitment of immature trees to the seed producing segment of the population." Id.

FWS's unwillingness to face the magnitude of the whitebark pine problem, combined with the inadequate existing monitoring systems, demonstrate that there is not currently in place "a highly sensitive system to monitor the health of the population and its habitat and to provide a sound scientific basis to respond to any changes or needs with adaptive management actions." 70 Fed. Reg. at 69881. The best available scientific information indicates that one of the Yellowstone grizzly population's critical foods—one that directly correlates with the grizzly population's increase and decrease—faces imminent collapse. In these circumstances, the Service cannot reasonably conclude that the fifth listing factor weighs in favor of delisting.

Whitebark Pine Summary. The ongoing loss and anticipated population crash of whitebark pine alone will have dramatic effects on the Yellowstone grizzly bear population. A recent publication by the FWS Grizzly Bear Recovery Coordinator and other agency scientists acknowledges:

> Significant loss of whitebark pine due to blister rust (Reinhart et al. 2001) or mountain pine beetle (*Dendroctonus ponderosae*; Haroldson et al. 2003) would reduce survival rates for bears, especially conflict-prone individuals. Should whitebark pine decline rapidly, we speculate we would witness a scenario similar to what occurred when dumps were closed in YNP; more management problems, particularly outside the RZ, with a substantial increase in measurable bear mortality.

Schwartz, et al. (2005) at 55.

Unfortunately, the rapid loss of whitebark pine is already underway. Nowhere does FWS disclose or analyze the available information about the ongoing and anticipated loss of whitebark pine and its catastrophic impacts for the Yellowstone bears. The grizzly bear was listed in 1975 as a threatened species in part due to the population crash associated with the closing of Yellowstone National Park dumps. A similar population crash is the likely result of the loss of whitebark pine in the Yellowstone area.

Based on this well-established scientific data, we can expect a significant increase in grizzly bear mortalities and substantially reduced carrying capacity of the Yellowstone area. FWS should be assessing how to address this impending population crash by providing increased habitat protections for lands outside the PCA that will become necessary with the substantial reduction and loss of whitebark pine in the near-term future.

Other Key Yellowstone Grizzly Bear Foods Are Also Threatened. In addition to whitebark pine, Yellowstone grizzly bears rely on three other essential food sources: Yellowstone cutthroat trout; army cutworm moths, and ungulates—primarily bison and elk. Taken together, these four food sources provide more than 90% of the Yellowstone grizzly population's caloric intake. Mattson et al. (2004); Mattson pers. comm. Yet the future abundance of these foods is extremely uncertain. Like whitebark pines, cutthroat trout, army cutworm moths, and Yellowstone's bison and elk are all in danger of major population declines.

Trout: Yellowstone cutthroat trout ("YCT") are in crisis due to the introduction of lake trout into Yellowstone Lake. See National Park Service, The Yellowstone Lake Crisis: Confronting a Lake Trout Invasion (1995). YCT have already been reduced to a tiny fraction (15%) of their historic range, nearly all of which (91%) lies within Yellowstone National Park. Unfortunately, Yellowstone Lake, historically home to the largest inland population of native cutthroat trout in the world, is no longer a safe haven for YCT. In 1994, nonnative lake trout were discovered in the Lake, and since then, lake trout numbers have rapidly multiplied with serious adverse consequences for WCT. See Kaeding, et al. (1996) (estimating lake trout population to be in the tens of thousands as of 1995). Because lake trout are effective predators that both eat and out-compete YCT, the National Park Service continues to report annual YCT population declines. See, e.g., National Park Service, Fishing in Yellowstone, February 2006 ("Fishing in Yellowstone"); Kaeding, et al. (1996). Despite aggressive Park Service efforts to control the lake trout population with extensive gill-netting, trapping, and angling, recent fall counts of YCT in Yellowstone Lake have been the lowest of any time over the past 25 years of monitoring. See Fishing in Yellowstone. Moreover, absent a costly long-term program to suppress the lake trout population, the Park Service anticipates a 50% or greater decline in YCT over the next twenty years and a 70% or greater decline in the next one hundred years. See id.; Kaeding, et al. (1996). Already, at two spawning streams monitored by the Park Service, the number of cutthroat counted by biologists has dropped by more than 90 percent since 1999. See Billings Gazette, December 2, 2005; Koel, et al. (2005).

The rise of lake trout in Yellowstone Lake and the corresponding decline of YCT, both in the Lake itself and in the 124 tributary streams to the lake, has serious implications for grizzly bears. Haroldson, et al. (2005). Historically, Yellowstone grizzlies relied heavily on YCT in late spring and early summer as major sources of net digestible energy in the GYE. Id.; Reinhart and Mattson (1990); Mattson and Reinhart (1995); Mattson, et al. (2004). Due to their high protein content, YCT can provide bears, and especially lactating females, with a means of regaining body mass after winter hibernation. Historically, "bears from a large portion of the ecosystem likely consume cutthroat trout at some point in their lives." Reinhart, et al. (2001); see also Mattson and Reinhart (1995) (explaining that "spawning cutthroat trout were and are a resource that attracts and concentrates Yellowstone's grizzly bears"). In June and July, YCT were the predominant food source for bears in the vicinity of Yellowstone Lake and its tributary streams until very recently. Mattson et al. (1991); Reinhart and Mattson (1990); Haroldson, et al. (2005). Now, however, with dramatically reduced numbers of cutthroat trout, adult male bears are more likely to dominate the remaining high-quality stream clusters where spawning cutthroat are still abundant — to the potential detriment of female bears and cubs. Haroldson et al. (2005); Reinhart et al. (2001); Koel, et al. (2005).

If spawning YCT continue to decline or eventually disappear, more Yellowstone grizzly bears will be left with a major caloric gap in their diet. Unfortunately, lake trout cannot substitute for YCT as a grizzly food source. Whereas YCT move up tributary streams to spawn in shallows where bears can readily catch them, lake trout spawn in deeper waters of Yellowstone Lake, where they are unavailable to grizzly bears. Fishing in Yellowstone. Thus, as the number of YCT in small tributary streams continues to decrease, grizzly fishing activity is also diminishing. Haroldson, et al. 2005.

Given the lag time between environmental changes and impacts on population trends, it is unclear whether grizzlies can adapt to the loss of such an important food source, especially in combination with the ongoing loss of whitebark pine trees. See supra at pp. 10-11. At the very least, the absence of spawning cutthroat reduces the carrying capacity of Yellowstone and Grand Teton National Parks. The consequence is to force more Yellowstone grizzlies out of the Park to find food, thereby exposing them to greater risk of human-caused mortality. See Billings Gazette, December 2, 2005.

Moths: Army cutworm moths are another essential food source for Yellowstone grizzly bears. Among foods available to bears in the GYE, army cutworm moths are "singularly high" in fat content. Mattson, et al. (2004). In just thirty days, a grizzly bear can consume 47% of its annual energy budget of 960,000 calories simply by feeding on moths. White, et al. (1999). Thus, grizzly bears rely on army cutworm moths to acquire needed body fat, especially during July and August. Pritchard and Robbins (1990); Mattson, et al. (1991); French, et al. (1994). As whitebark pine seeds are primarily available to bears beginning in September and spawning cutthroat trout are available in late May and June, army cutworm moths fill a "temporal vacancy in available bear foods" at a time of the year when Yellowstone grizzlies have historically lost weight. O'Brien and Lindzey (1994). Particularly among females with cubs—the bears most commonly founds at moth sites—the availability of such a rich food source improves conditioning of adult bears and is therefore likely to result in greater cub survival and increased litter sizes. Id.; see also Mattson (2000); Schwartz, et al. (2005) (linking dietary fat with adipose reserves that increase successful reproduction in female grizzlies).

From the standpoint of preventing human-caused grizzly bear mortality, moth sites have the added advantage of being located on remote talus slopes that are generally free from human interference. Thus, in much the same way that whitebark pine seed-cone foraging keeps grizzly bears out of the way of people during good seed-crop years, moths provide an abundant, high-quality food source that reduces bear-human encounters, conflicts, and bear mortality. Reinhart, et al. (2001); O'Brien and Lindzey (1994); Mattson, et al. (1992); Pease and Mattson (1999); Schwartz, et al. (2005) (all documenting increased survival during years when grizzlies consume more pine seeds, which are generally available in remote locations).

By the same token, in years when moths are less abundant, human-caused grizzly bear mortality is likely to increase. For instance, in 1993, a poor moth year, there was an unprecedented spike in human-caused mortality in the South Fork drainage of the Shoshone River, where monitoring had revealed heavy use of moth sites in preceding years. Mattson (pers. comm.).

Importantly, mountain-climbing and other human recreation in high alpine areas can disrupt grizzly feeding at moth sites and significantly reduce energy gains from moth consumption. White, et al. 1999. Unless public land managers are required to secure moth sites for grizzly bears—which is not the case under the delisting proposal—human presence may preclude bears from utilizing this key food source.

Further, army cutworm moths are threatened by climate change. In summer, moths migrate to cool, high-elevation areas, where they feed on the nectar of wildflowers. These "alpine and sub-alpine nectar resources appear[] to be essential to complete moth cycle requirements," especially, the accumulation of fat reserves in late summer and fall. Lipids, which allows moths to travel long distances back to the Great Plains, also make moths especially valuable to grizzly bears during hyperphagia. O'Brien and Lindzey (1994); White, et al. 1998; French, et al. (1997). However, global warming is likely to disrupt the moth-feeding cycle that helps grizzly bears to accumulate their own fat reserves.

Not surprisingly, moths are most abundant where nectar resources are most abundant. Id. As snow-lines recede, moths follow the alpine bloom into increasingly higher elevations, and the availability of nectar late into the summer season depends upon a late snow melt at high elevations. O'Brien and Lindzey (1994). Thus, as global warming raises temperatures and exacerbates drought cycles, causing alpine wildflowers to wither earlier in the season and eventually to give way to other less water and cold-dependent vegetation, "army cutworm moth aggregations . . . . may disappear altogether." Mattson and Reid (1991); see also Balling, et al. 1992 (discussing likely drought trends in Yellowstone under likely global warming scenarios); Picton, et al. (1985) (same).

Army cutworm moths are also considered agricultural pests in the Great Plains areas in which they originate. As caterpillars, they devastate alfalfa, corn, oats, barley and other crops before they emerge as moths that migrate to the mountains of the GYE. Because growers continue to experiment with pesticides to control cutworm outbreaks, there is significant concern that the number of moths that eventually make it to the GYE may decline with the development and increased use of effective pesticides. Felicetti, et al. (2003); see also, e.g. The Armyworm and the Army Cutworm (pesticides recommended by North Dakota State University to control army cutworms); Pale Western and Army Cutworms in Montana (similar recommendations from Montana State University). At present, it is still unclear whether moths that migrate to the GYE come from a localized source population that is vulnerable to targeted control efforts or a more diversified "portfolio" of source populations that are collectively at lesser risk from pesticide use and other natural threats such as soil pathogens. (Pers. comm. Hillary Robison).

Regardless of human control efforts, however, it is clear that army cutworm moth abundance varies significantly from year to year in the GYE. For instance, few moths appeared in the GYE from 1993 to 1995. French, et al. "Progress Report" (1997). O'Brien and Lindzey (1994) describe a typical trend in annual moth availability as follows: "[f]ollowing 1 or 2 good years, proper conditions will lead to an outbreak year, followed by an average or better year, several average years and then 2 poor years ... similar to [the trend] described for the whitebark pine." In future, more frequent drought conditions are likely to increase the number of poor moth years, and these poor years will have increasingly adverse impacts on bears because the decline of whitebark pines "magnif[ies] the importance of the moth sites." Id. A combined shortage of whitebark seeds and moths will leave bears without the two food sources most critical to weight gain and fecundity, and it will increase human-caused bear mortality as grizzlies are forced out of the backcountry to find food. Thus, the prospect that climate change will result in a sustained and irreversible downward trend for both whitebark pine and army cutworm moths is cause for alarm.

Ungulates: Finally, Yellowstone grizzly bears depend on meat from bison and elk as an essential source of protein and fat. Mattson (1997); Jacoby, et al. (1999); Mattson, et al. 2004; Felicetti, et al. (2003); Reinhart, et al. (2001). "Ungulates may provide as much as one-half the energy required by Yellowstone's grizzly bears during the non-denning season." Green, et al. (1997); see also Mattson, et al. (2004). In spring, ungulate carcasses provide an essential food source for bears emerging from their dens; in late summer and fall, ungulate tissue is second only to army cutworm moths in fat content among grizzly foods. Mattson, et al. (2004); Green, et al. (1997). In terms of relative net energy per gram consumed, ungulate tissue is one of the very most efficient energy sources for grizzly bears. Mattson, et al. 2004. Moreover, as whitebark pines decline, meat is likely to become even more important as a compensatory component of the Yellowstone grizzly diet, as evidenced by recent compensatory patterns in the GYE. Mattson (2000); Reinhart, et al. (2001); Mattson (1997).

Bison are particularly important to Yellowstone grizzly bears. Due to their size, bison carcasses remain available to bears for longer periods of time than elk and deer carcasses. Green, et al. (1997). Grizzly bears therefore consume more meat from bison than from any other species. Mattson (1997); Mattson, et al. (2004). Bison have been relatively abundant since the beginning of grizzly recovery efforts in the GYE. In 1968, the National Park Service terminated its programs to reduce bison numbers, and the bison population grew dramatically. Reinhart, et al. (2001); Green, et al. (1997); Mattson and Reid (1991). However, beginning in 1990, the Park Service, the U.S. Forest Service, and the State of Montana instituted various bison control programs with the stated goal of preventing brucellosis transmission from bison to cattle on private and National Forest lands surrounding Yellowstone National Park. During winter, many bison migrate out of the Park to lower-elevation foraging habitat, but under the current 2000 Bison Management Plan, bison that cross park boundaries are hazed, shot, and taken to slaughter. So far this winter, 845 bison have been sent to slaughter. Billings Gazette, February 17, 2006; see also Montana Standard February 16, 2006. By the end of the winter season, the test-and-slaughter program will likely result in a 20% reduction in the bison herd. With continued implementation the Bison Management Plan, bison numbers will continue to decline, and bison meat will become a less abundant food resource for grizzly bears. Reinhart, et al. (2001); Felicetti, et al. (2003). The same may be true of elk, as the State of Wyoming has begun implementing a similar test-and-slaughter program for elk to control the spread of brucellosis from elk to livestock. See Wyoming Game & Fish Department, Muddy Creek Test-and-

Removal Pilot Project Begins, February 13, 2006; Wyoming Brucellosis Coordination Team, Report and Recommendations, January 11, 2005.

The availability of meat from both bison and elk carcasses is also subject to change due to the reintroduction of wolves into Yellowstone National Park. Felicetti, et al. 2003. First, as predators, wolves are likely to affect herd compositions and total abundance of ungulate carcasses. Green, et al. (1997). Second, as scavengers, wolves will compete with bears for carcass meat. The "amount of edible biomass on dead animals that is actually available to grizzly bears" may decrease as the number of competing scavengers, namely wolves, increases. Id. Further, grizzlies that displace scavenging wolves are almost always adult males. Thus, decreased availability of spring carcasses will be especially detrimental to female grizzly bears. Mattson (2000); see also Mattson (1997); Green et al. (1997) (both documenting female grizzly reliance on spring scavenging for most meat).

Finally, grizzly bears may be obliged to contend with steep declines in the GYE elk population as well as the bison population. Elk herds in the GYE are threatened with chronic wasting disease ("CWD"), the invariably fatal equivalent of "mad cow disease" for elk and deer. Chronic wasting disease has recently been discovered in deer near Thermopolis, and biologists now believe that it is simply a matter of time before the disease is transmitted to elk in the GYE. Smith (2005); Peterson (2005). Unfortunately, if and when CWD reaches elk feedgrounds in Wyoming, high animal concentrations along feedlines will provide "ideal conditions" for a major epidemic among free-roaming elk. Peterson (2005); see also Smith (2005).

There is no cure for CWD nor any known way to curtail its transmission. Smith (2005); Peterson (2005). Further, CWD's infectious agent or "prion" persists in the environment, chronically reinfecting the population that comes into contact with it. Thus, "once well-established, our current understanding and available tools are insufficient to eliminate CWD, short of depopulation" and subsequent quarantine of outbreak areas. Smith (2005); see also Peterson (2005). Ultimately, "[b]ased on what is currently known about CWD in elk, prevalence in a chronically infected feedground herd could exceed 50% if feeding programs remain unchanged." Peterson (2005). A 50% reduction in Wyoming's elk herds would significantly diminish the abundance of elk meat for grizzly bears—potentially in years where shortages of whitebark pine, spawning cutthroat trout, and army cutworm moths put a premium on the availability of ungulate tissue. Reinhart, et al. (2001) (explaining that "any programs that reduce ungulate numbers will likely exacerbate the effects of whitebark pine and cutthroat trout declines").

Alternative Food Sources Cannot Compensate For Declines In Whitebark Pine, Yellowstone Cutthroat Trout, Army Cutworm Moths, Bison, and Elk. There are no other native alternate food sources in the GYE that can provide grizzly bears with the caloric value of these four threatened food sources. While there are alternative foods available to bears in the GYE such as ants and wasps, mushrooms, gophers, voles, yampa, biscuitroot, and other forbs and grazed foods, none comes close to cutthroat trout, army cutworm moths, and ungulates in the amount of digestible energy they can provide to grizzly bears. Mattson, et al. 2004 prepared a comprehensive monograph detailing the relative net energy (kilocalories) digested per gram of food ingested by Yellowstone grizzly bears. That analysis reveals that the net digested energy per gram (in kilocalories) is 4.62 for army cutworm moth sites, 4.50 for cutthroat spawning streams, 3.99 to 5.34 for elk, bison, and moose depending on the season and age type. The next most efficient food source is ant hills at 3.04, and then the numbers drop off precipitously: 1.71 to 1.95 for pocket gophers; 1.07 to 2.90 for voles; 2.15 for worms; 1.75 for mushrooms; 2.69 to 2.81 for berries; 2.37 to 2.73 for yampa; 2.16 to 2.36 for biscuitroot; 2.24 for sweet-cicely; 1.92 for pondweed; 72 to 1.27 for graminoids; 1.53 to 2.03 for clover; 1.69 for dandelion; 1.74 for thistle; 1.73 to 2.22 for fireweed; 1.13 for horsetail; and 1.70 for spring beauty. Moreover, there are no alternate food sources that begin to match whitebark pine seeds and army cutworm moths as a source of dietary fat for female grizzly bears. As discussed above, efficient accumulation of adipose reserves is critical to reproduction success in female grizzlies. Mattson (pers. comm.); see also Mattson (2000); Felicetti, et al. (2003) (reporting that female grizzlies use whitebark pine seeds with disproportionate intensity). In short, there are no alternative food sources that can adequately compensate for the loss of key food sources that now sustain Yellowstone grizzly bears.

Even if fish and ungulate populations remain stable, the loss of whitebark pine either alone or in combination with the loss of army cutworm moths will be devastating. Reinhart, et al. (2001); Mattson (2000); Mattson and Reid (1991). High-protein fish and meat are "primarily available during the spring and early summer, when bear ingestion rates are inherently low." Mattson and Reid (1991). Thus, they "contribute less to body fat accumulation that the high-fat whitebark pine seeds and army cutworm moths." Id. As whitebark pines continue to decline, and global warming results in the loss of alpine wildflowers on which army cutworm moths feed, "high-quality foods that might replace [them] are unknown." Id. While mushrooms, truffles, and ants are likely to become more important food sources as temperatures rise and whitebark pine stands are succeeded by lodgepole pine stands, Mattson, et al. (2002); Mattson, et al. (2001), mushrooms and ants do not have anywhere near the same nutritional value as moths and pine seeds. Mattson, et al. (2004); see also Picton, et al. (1985).

In the near term, shortages of high-quality natural foods will likely increase bear-human conflicts and human-caused bear mortality. Mattson, et al. (1992); Mattson, et al. (1998); Pease and Mattson (1999); Schwartz, et al. (2005). In the longer term, such shortages will reduce reproductive success "because of older age at first reproduction, longer between-litter intervals, decreased litter size, and lower cub survival." Reinhart, et al. (2001) (citing Boyce, et al. (2000) and Mattson (2000)); see also Schwartz, et al. (2005). Ultimately, carrying capacity for Yellowstone grizzly bears will be substantially, perhaps catastrophically, reduced in coming years. While current grizzly bear population levels fall short of biological recovery levels, the best available science indicates that the Yellowstone grizzly bear population will become even smaller due to the scarcity of high-quality foods in the future. In the face of major recognized threats to all of the Yellowstone grizzly's most essential food sources, FWS cannot determine that grizzly bears are no longer imperiled based solely on demographic data from past years. FWS must consider whether we can sustain a viable Yellowstone grizzly population notwithstanding threats to key foods posed by disease, global warming, exotic species, and ongoing wildlife management programs.

Lack of Assured Funding for Grizzly Bear Management and Habitat Monitoring. The delisting proposal explicitly relies on the successful and continued implementation of the

Conservation Strategy to maintain the Yellowstone population after delisting. 70 Fed. Reg. at 69875 ("Overall, the Conservation Strategy and the State grizzly bear management plans provide assurances to the Service that adequate regulatory mechanisms exist to maintain the Yellowstone grizzly bear population after delisting."). But the Conservation Strategy is not an adequate regulatory mechanism for the additional reason that there is no reliable source for its future funding—$3.5 million annually in perpetuity, not accounting for inflation.

The Service cannot rely on uncertain future conservation efforts when determining a species' listing status. See, e.g., Center for Biological Diversity v. Morgenweck, 351 F. Supp. 2d 1137, 1141 (D. Colo. 2004) ("The law is clear that FWS cannot consider future conservation efforts in its review of the Petition.") (citations omitted). Funding is an integral part of future conservation efforts, and its uncertainty has been an additional reason for courts to reject listing determinations that rely on that uncertainty. See Federation of Fly Fishers v. Daley, 131 F. Supp. 2d 1158, 1167-68 (N.D. Cal. 2000) (finding reliance on future conservation measures improper where "[o]ther than a budget change proposal, NMFS cited no funding that had been definitively earmarked toward realizing [the state agency's] commitments").

It is highly doubtful that the Conservation Strategy will be adequately funded even in its first years, let alone in future decades. Successful implementation of the Conservation Strategy relies on funding from no fewer than eight different entities, any of which could withdraw future funding at any time. See Conservation Strategy, Appendix H (listing the entities and their necessary contributions). The likelihood of funding shortfalls is demonstrated in part by the fact that successful implementation of the Conservation Strategy will require at least five of those entities to *increase* their annual budget allocation for Yellowstone bears, from the current total of approximately $2.5 million to a post-delisting total of $3.5 million. Id. That the agencies will be able to procure and sustain a combined 40% budget increase for the management of a non-listed species is improbable.

The FWS Grizzly Bear Recovery Coordinator has recently highlighted the uncertainty of future federal funding. Great Falls Tribune, January 22, 2006. In discussing the Service's response to the rampant poaching of grizzlies in the NCDE, Dr. Servheen is quoted as saying, "We don't have the resources to respond to the emergency of these illegal killings. . . . My budget is more like 23 percent less than it was 10 years ago." Id. If the Service cannot procure funding to respond adequately to the poaching of a federally protected species, how can it provide assurance it will be able to maintain sufficient funding to support a delisted bear population? Because the agency cannot provide that assurance, it cannot demonstrate that the hugely expensive Conservation Strategy is an adequate regulatory mechanism to prevent the population's immediate backsliding upon delisting.

The funding problem is extremely important in these circumstances, where the Service proposes delisting a population that is so fragile as to require perpetual life-support in the form of population and habitat monitoring, handling of "problem bears," and importation of additional bears to address genetic concerns. In these circumstances, the only sure method of securing adequate future funding is for the IGBC to create a permanent endowment that will generate funds indefinitely. The IGBC recognized the necessity of such a funding mechanism and contemplated its creation, but it was never created. See IGBC, Spring Meeting Minutes (March

29, 1999) (stating the goal to "[h]ave the fund developed and appropriated by the year 2002, with an initial corpus of $40 million."); IGBC Winter Meeting Minutes (January 9-11, 2001) (repeating same goal).

The delisting proposal calls for the Yellowstone grizzly population to be delisted but to remain on hugely expensive life support. Absent assured long-term funding for this chronic maintenance and support, delisting is inappropriate and illegal.

FWS Has Arbitrarily Determined That Delisting Is Appropriate In The Absence Of Any State Laws To Protect Grizzly Bears From Excessive Killing. In the event of delisting, state laws will provide the only binding and enforceable limits on human take of Yellowstone grizzly bears. Yet there are no existing laws in Montana, Wyoming, or Idaho that protect grizzly bears from over-hunting and legalized killing to prevent private property damage, including livestock depredation.

Montana: In Montana, the Fish, Wildlife & Parks Commission has unfettered discretion "to provide open and closed seasons; means of taking; shooting hours; tagging requirements for carcasses, skulls and hides; possession limits; and requirements for transportation, exportation, and importation of grizzly bear[s]." Mont. Code Ann. § 87-5-302. Under this provision, which applies exclusively to the grizzly bear, there is nothing to prevent the Commission from providing a year-round open season on grizzly bears. Nor is there any prohibition against baiting, trapping and the use of dogs — all "means of taking" that are generally prohibited with respect to game animals. See id. § 87-3-101(3). Thus, even though Montana recognizes the grizzly bears as a "rare" species, id. § 87-5-30, state law empowers the Fish, Wildlife & Parks Commission to subject grizzly bears to hunting regulations that are less protective than those applicable to elk, deer, black bears, mountain lions, and other far more abundant species.

Montana further allows any person to kill a grizzly bear if "the grizzly bear is in the act of attacking or killing livestock." Id. § 87-3-130(1). This statutory license to kill is incompatible with conserving a recovered grizzly population after delisting. In 1999, FWS stressed that delisting could not go forward absent changes to an earlier version of the same statute, which permitted any person to kill wildlife, including grizzly bears, when discovered "molesting, assaulting, killing, or threatening to kill ... livestock." Mont. Code Ann. § 87-3-130 (1999). FWS Grizzly Bear Recovery Coordinator Dr. Servheen informed both the State of Montana and the press that this provision was a firm impediment to delisting because it would allow for excessive grizzly bear mortality. As Dr. Servheen explained, "[s]ince the state law ha[d] no limit on the number of grizzly bears that could be killed, Montana officials may be unable to minimize the number of deaths." See Great Falls Tribune, April 4, 1999 (quoting Dr. Servheen as follows: "Anybody could kill a grizzly bear anytime no matter how many have already been killed."). On this basis, Dr. Servheen stated that "We won't propose a status change until that law is changed." Id.; see also Bozeman Daily Chronicle, March 23, 1999 ("Servheen told the [IGBC that] Montana will not be able to delist grizzlies for two years—until the next Legislature meets and agrees to change a law regulating grizzlies.").

Montana never amended its laws to limit grizzly mortalities associated with livestock conflicts. As discussed above, Mont. Code § 87-3-130(1) still authorizes any person to shoot a bear when it attacks livestock, "no matter how many bears have already been killed" in the Yellowstone DPS. Nevertheless, FWS is proposing to delist Yellowstone grizzly bears without necessary changes to Montana's statutory scheme. Just as the existing regulatory mechanisms in Montana were inadequate in 1999, they are still inadequate to support delisting in 2006.

Wyoming: As in Montana, there are no existing laws in Wyoming to protect bears from excessive human-cause mortality. While Wyoming classifies grizzly bears as "trophy game animals, this classification does not afford meaningful protection from over-hunting and killing associated with livestock conflicts and other private property damage. Indeed, Wyoming law allows for indiscriminate killing of grizzly bears. As Wyoming's grizzly bear management plan explicitly concedes, the Wyoming Game and Fish Commission "has authority to establish zones and areas in which trophy game animals may be taken, in the same manner as predatory animals without a license." Wyoming Grizzly Bear Management Plan at 11 (quoting Wyo. Stat. Ann. 23-1-302(a)(ii)). In short, the Wyoming Game and Fish Commission is currently empowered to authorize take of grizzly bears as predators "without a license in any manner and at any time" with only a few minor exceptions. Wyo. Stat. Ann. § 23-3-103.[11] Any legal regime that permits unregulated killing of grizzly bears is inherently inadequate to protect the Yellowstone grizzly population post-delisting.

Idaho: Idaho has failed even to classify grizzly bears under its state wildlife regulations. Thus, there are no laws in place that provide any protection whatsoever to grizzly bears in Idaho. In the absence of any regulatory mechanisms to govern grizzly management in Idaho, delisting cannot go forward.

Moreover, even if Idaho were to classify the grizzly bear as a "game animal" in keeping with its grizzly bear management plan, this would not afford bears adequate protection. See Idaho Grizzly Bear Management Plan at 16. As in Montana and Wyoming, the Idaho Fish and Game Commission has broad discretion to "prescribe the number and kind of wildlife that may be taken under authority of the several types of tags and permits." Idaho Code Ann. § 36-408. Thus, there is no guarantee that the Commission will set limits designed to avoid excessive mortality from legalized hunting. Further, Idaho allows livestock owners to kill black bears and mountain lions without a license when they are "molesting livestock." Id. § 36-1107(b). In the event Idaho ever adopts statutory provisions applicable to grizzly bears, they will likely be subject to the same permissive killing regime.

In short, none of the three states within the DPS has a legal framework in place to prevent excessive grizzly bear mortality. Nevertheless, in its promotional materials supporting grizzly bear delisting, FWS informs the public that state laws are sufficiently protective. In "Questions and Answers: Proposal to Delist the Yellowstone Ecosystem Population of Grizzly Bears," FWS states the question: "Can people shoot grizzly bears that are threatening livestock after delisting?" The answer that follows is patently false:

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[11]The only legal limitations on killing "predators" in Wyoming are as follows: (1) anyone seeking to kill predators from an aircraft must pay a nominal fee for an aerial hunting permit, see Wyo. Stat. Ann. § 11-6-105; and (2) hunting or killing predators from public highways is illegal, see Wyo. Stat. Ann. § 23-3-205(a).

No. Because all three states plan to classify grizzlies in the GYA as game animals, state laws make it illegal for citizens to shoot or injure grizzlies, unless they are threatening human lives. All such mortalities count against the mortality limits set in the Conservation Strategy so these mortalities will be strictly controlled in order to stay below the mortality limits. Outside of the national parks, grizzly bear/livestock conflicts will be addressed by State wildlife managers under procedures outlined in the Conservation Strategy.

Questions and Answers at Q10.

On the contrary, largely unregulated killing of grizzly bears is currently possible under the laws of all three states. Moreover, the Service's assurance that "mortalities count against the mortality limits set in the Conservation Strategy" is cold comfort. Regardless whether the killings are "counted," they are still legal under state law, and the Service has no means of controlling excessive mortality short of re-listing under the ESA. This cannot satisfy the ESA's requirement that existing regulatory mechanisms be adequate to prevent Yellowstone grizzlies from becoming imperiled again in the foreseeable future.

Several Wyoming County Ordinances Would Undermine Efforts to Protect Grizzly Bears and Bear Habitat After De-Listing. Fatal shortcomings in the state statutes governing grizzly bear management are exacerbated by county ordinances that are manifestly hostile to grizzly bear conservation.

Several Wyoming counties that collectively contain much of the currently occupied grizzly bear habitat in the GYE — specifically, Park, Fremont, Sublette, and Lincoln counties — have all passed ordinances and resolutions that explicitly state their intolerance of grizzly bears within their borders. For example, Fremont County resolved in 2002 that grizzly bears are an "unacceptable species" that constitutes "a threat to the public health, safety, and livelihood" of the citizens of Fremont County. Fremont County Resolution 2002-04 (March 12, 2002). The county further resolved that it "shall take any and all actions necessary to protect its citizens" from "unacceptable species." Fremont County Resolution 2002-03 (March 12, 2002).

Indeed, these counties have announced their determination to frustrate grizzly bear recovery efforts. For example, Fremont, Sublette, and Lincoln counties all passed resolutions in 2002 prohibiting the Forest Service from implementing the agency's Grizzly Bear Food Storage Orders within the counties' borders. See Fremont County Resolution 2002-06 (March 12, 2002) (resolving that the county "hereby oppose[s] and prohibit[s] the US Forest Service to implement the proposed 'Food Storage Order' within the boundaries of Fremont County"); May 1, 2002 letter from Senator Enzi to USFS Regional Forester Cables (noting that Sublette and Lincoln counties followed suit).

Since 2002, the local governments' hostility to protective grizzly bear management continues unabated. In 2004, Fremont County affirmed the earlier resolutions and declared that the Wyoming Game and Fish Department's proposal for managing grizzly bears post-delisting "is inconsistent with the Fremont County Land Use Plan, which is statutorily required by the

Wyoming Land Use Planning Act of 1975 . . . ." Fremont County Resolution 2004-20 (December 14, 2004). That resolution concludes with the pronouncement that the commissioners "do hereby prohibit the inclusion of any part of Fremont County to comprise, in whole or in part, any area for the occupation, or proposed occupation, by Grizzly bears." Id.

According to Fremont County, its powers under the state's land use planning legislation trump the bear management responsibilities of Wyoming's Game and Fish Department ("WGFD"). See Fremont County Resolution 2004-20 (December 14, 2004). It is evident that the Wyoming counties that contain the majority of the bear's habitat have determined to do everything in their power to thwart the bear's successful recovery. In light of such hostile, anti-bear county ordinances, there are clearly no "adequate regulatory mechanisms" in place to protect Yellowstone grizzly bears in the event of delisting.

The Proposed Delisting Rule Ignores the Well-Established Principles of Island Biogeography. The proposed delisting rule ignores one of the most important and best-documented patterns in population biology—the theory of island biogeography. See McArthur and Wilson (1967). Although the theory was originally proposed for oceanic islands, it also explains the increased extinction rates on continents when habitat destruction creates a few isolated habitat islands surrounded by a "sea" of human activity. See Curtis (1956); Diamond and May (1976); Wilson (1999); Crooks (2002). The study of island biogeography has included documenting mammalian extinction in National Parks of western North America. See Newmark (1986); Newmark (1987); Newmark (1995).

It is well established that such habitat fragmentation causes extinction. Fahrig (2003). This empirical finding is not only in agreement with the theory of island biogeography, but also with more detailed theoretical models describing the extinction dynamics of small populations. See, e.g. Whitlock (2000); Reed, et al. (2003), see also the following discussion of stochastic causes of extinction. Due to loss of some 98% of its historic range in the lower-48 states, the Yellowstone grizzly bears currently exist on a small habitat island, with a consequent dramatic increase in the probability of their going extinct.

A population of thousands is needed to prevent extinction due to environmental stochasticity. Scientist Letter; Thomas (1990); Reed, et al. (2003). Yet the FWS estimates that the Yellowstone grizzly population is 500-600. A genetic effective population size of at least hundreds is needed to prevent extinction, Whitlock (2000), as compared to an estimated genetic effective population size for Yellowstone of 125. Moreover, the Yellowstone habitat island is even small in relation to grizzly home ranges. The 9,200-square-mile PCA is large enough to include only 6 non-overlapping home ranges of adult male grizzlies, and 20 of adult females. Thus, simple geometric considerations demonstrate that most adult Yellowstone grizzlies will encounter the edge of the Yellowstone habitat island at some point in their life, with a consequent increase in mortality, Schwartz, et al. (2005). This is entirely consistent with the large body of literature showing more generally that individuals living on habitat island edges often suffer increased mortality and/or reduced fecundity. See, e.g. Hartley and Hunter (1998); Woodroffe and Ginsberg (1998).

The Yellowstone grizzly population currently exists on a small habitat island, and for this reason alone is in danger of extinction.

FWS Fails to Address Dramatic Fluctuations in Population Size and Trend As a Separate Extinction Risk. Small populations face greater extinction risks than large populations. The Yellowstone grizzly bear population is not only small, it also suffers from dramatic swings in population size and trends. This increases the extinction risk for the Yellowstone grizzly bear population beyond the extinction risk faced by a similarly small population that does not suffer from demonstrated swings in population size and trends. This environmental stochasticity puts the Yellowstone grizzly bear population at increased risk of extinction.

Using only the population size estimates derived from what FWS asserts is the "most biologically valid" method for assessing the total population size of the Yellowstone grizzly bear population, 70 Fed. Reg. 69859, the total population size of the Yellowstone bear population has fluctuated between 500 in 2003, 588 in 2004, and roughly 350 in 2005. Reassessing Method, Table 7.

Whitebark seed cone availability dramatically affects Yellowstone grizzly mortality rates and fecundity rates. In poor whitebark pine cone production years, bear/human conflicts increase and dramatically increased grizzly bear mortalities occur. The resulting swings in population size associated with reduced whitebark seed cone productivity and other environmental stochastistic factors (including the ongoing drought and climate change documented above) increase the extinction risk Yellowstone bear population. See Goodman (1987) ("persistence time depends strongly on the magnitude of the variance in population growth rate"); Belovsky (1987) ("populations are much more susceptible to extinction if the environment. . . . contributes to variations in birth and/or death rates"); Primack (1993). FWS fails to identify, let alone analyze, this well-documented variability of the Yellowstone grizzly bear population size and its impacts on whether the population is threatened or endangered as a result of this environmental stochasticity.

FWS Fails to Address Recent Excessive Grizzly Bear Mortality. Recent years have seen a spiraling increase in grizzly bear mortalities in the Yellowstone area. 2004 IGBST Annual Report at 28. After more than fifteen years of relatively low Yellowstone area grizzly bear mortalities, grizzly mortalities have spiked in four of the last five reported calendar years (2000-2004). Compare 2004 IGBST Annual Report at 28 with 1995 IGBST Annual Report at 13. FWS and other agency participants in the IGBC recognized that this level of grizzly bear mortality was a cause for concern. IGBC Winter Meeting Notes, December 8-10, 2004 ("The mortality spike will be the emphasis down the road with the focus on the interface between public and private land where most of [sic] conflicts are occurring."). In response to this excessive mortality level, FWS and the IGBC asserted that they would address these mortality levels in the delisting proposal. Id. ("The implications of the 2004 mortality spike will be analyzed in the context of draft rule."). However, this is yet another broken promise by the FWS and the IGBC—nowhere in the proposed delisting rule is the excessively high grizzly bear mortality levels in the last few years or the "2004 mortality spike" disclosed, let alone "analyzed." These high mortality levels are yet another reason that the Yellowstone grizzly bear should not be delisted. None of the demographic studies on which FWS relies to justify delisting evaluate the impact of these series of years with high grizzly bear mortalities on population trend or the suitability of this population for delisting.

The Conservation Strategy Is Not Enforceable and Thus Is Not A Regulatory Mechanism. FWS places great weight on the Conservation Strategy as a mechanism to preserve the Yellowstone grizzly bear population when the population crashes or habitat is rendered unsuitable for bears. Because the Conservation Strategy is not embodied in law or regulation, however, it is not enforceable and not a regulatory mechanism. Each state or federal agency is free to abandon its Conservation Strategy commitments with impunity. If for example, the state of Wyoming chose to establish a grizzly bear hunt and issue 500 hunting tags, there is nothing short of relisting the grizzly bear that could be done to control mortalities in that state. For these reasons, the Conservation Strategy fails to ensure that the Yellowstone grizzly bear population will not become threatened or endangered in the foreseeable future by virtue of inadequate regulatory mechanisms alone.

By Failing to Disclose Basic Scientific Information and Data, FWS Has Violated the Administrative Procedure Act and the Endangered Species Act. FWS has refused to release the basic grizzly bear scientific data that informed the delisting proposal. Without the release of this data, it is impossible to assess the legitimacy of many of the assertions made by FWS concerning the health and status of Yellowstone grizzlies. On November 29, 2005, we sent a letter to FWS requesting an itemized list of information and scientific analyses referenced in the delisting proposal. In its December 19, 2005 reply to that letter, FWS asserted it did not have access to, and had not relied on, the underlying raw grizzly bear data: "We do not possess nor did we rely on, read, or have access to any raw data to produce this proposed rule." This is plainly false.

The delisting proposal references the Reassessing Methods paper. That document was published in the Federal Register on November 22, 2005. See 70 Fed. Reg. 70632-70633. Dr. Christopher Servheen, the FWS Grizzly Bear Recovery Coordinator, was listed as the federal official responsible for providing further information. Dr. Servheen was listed as a participant in the "workshops held at Fort Collins, Colorado, 1-4 February, and Bozeman, Montana, 23-25 March and 11 May 2005," that led to the creation of the Reassessing Methods paper. Dr. Servheen is a co-author of the Reassessing Methods paper and a co-author of a recently published monograph that analyzes and displays Yellowstone grizzly bear demographic data. See Schwartz, et al. (2005). FWS referenced the monograph in the Reassessing Methods paper and extensively relied upon the monograph in the delisting proposal. Both the Reassessing Methods paper and the monograph include scientific calculations and data that could not be generated without the raw data of grizzly bear sightings, radio-collar information, grizzly bear locational data, grizzly bear life histories, reproductive database, grizzly conflicts data, etc. The raw data was compiled and is maintained by federal and state scientists who are co-authors of the Reassessing Methods paper and the monograph. Thus, FWS either has this data in its possession and control or could readily obtain the data.

There is also evidence that FWS provided some of the grizzly bear raw data to an outside scientist who is not a federal or state staff scientist and is thus in the same position as the independent scientists who seek the raw grizzly bear data so that they can evaluate the delisting proposal. FWS entered into a contract with Dr. Richard Harris to prepare several Yellowstone grizzly bear demographic reports. Reassessing Methods at 52. These reports could not have been developed without access to grizzly bear data that FWS has refused to release to the public. FWS must disclose all the scientific data that it has already released to Dr. Harris.

For these reasons, on January 4, 2006 we sent a second letter requesting the underlying grizzly bear data employed by the FWS in developing the Reassessing Methods paper and the delisting proposal. On February 8, 2006, FWS responded to that letter, again refusing to provide the raw grizzly bear data. As we pointed out in our letters, under ESA caselaw, FWS is required to release this data so that the public can assess the legitimacy of FWS's assertions about the threats to Yellowstone grizzly bears:

> Because the underlying raw data will establish whether or not the Service's statements are accurate and whether they support the proposed changes in population size estimates and mortality limits, it is essential that the Service release that data to allow public inspection, review, and evaluation of these basic biological propositions. The Service "cannot solicit public comments and seek peer review while withholding vital information." Center for Biological Diversity v. Norton, 240 F.Supp.2d 1090, 1106-07 (D. Ariz. 2003) (FWS violated the Endangered Species Act and Administrative Procedures Act by failing to make available a management plan as part of its critical habitat proposal); see also Idaho Farm Bureau Federation v. Babbitt, 58 F.3d 1392, 1402-04 (9th Cir. 1995) (FWS violated the APA's notice and comment provisions by failing to make a key USGS report available to the public in issuing a listing decision); Gerber v. Norton, 294 F.3d 173, 179 (D.C. Cir. 2002) (FWS violated the ESA by not making the map of a Habitat Conservation Plan's off-site mitigation available for public notice and comment); Engine Mfrs. Ass'n v. EPA, 20 F.3d 1177, 1181 (D.C. Cir. 1994) ("[T]he Administrative Procedure Act requires the agency to make available to the public, in a form that allows for meaningful comment, the data the agency used to develop the proposed rule.").

January 6, 2006 letter at 4. This refusal to release basic data is difficult to understand. The underlying data has already been used as a basis to publish peer-reviewed scientific publications. FWS has released the data to selected independent scientists, but not to others. FWS and the state and federal agencies promoting Yellowstone grizzly bear delisting have used taxpayer dollars to fund this research. Independent reviewers have agreed to sign confidentiality agreements that would prevent the public disclosure of the information, so any conceivable impact on poaching of bears is eliminated. The data is being used to justify delisting of a threatened species and to promote intentional killing of additional bears through hunting seasons in Wyoming, Montana, and Idaho. Yet FWS has steadfastly refused to release the underlying data that would permit independent review of much of the scientific analyses that are fundamental to the delisting proposal.

In order to comply with ESA caselaw, good government, and basic common sense, FWS should release the underlying data that informs its delisting and DPS proposal and initiate a new 90-day comment period that would allow the public and independent scientists to evaluate the underlying grizzly bear raw data.

The FWS Violated the Settlement Agreement in Fund for Animals v. Babbitt. In the Federal Register Notice, FWS specifically references the Fund For Animals v. Babbitt lawsuit, the district court ruling, and the Service's obligations to comply with a binding settlement agreement. 70 Fed. Reg. at 69857-858. That settlement agreement stated:

> Prior to publishing any proposed rule to delist any grizzly bear population, the Service will establish habitat-based recovery criteria for that population's ecosystem in accordance with the process set forth in paragraphs 1and 2 and applicable laws and regulations. In any such rulemaking to delist a grizzly bear population, the Service will utilize the habitat-based recovery criteria, as well as all other pertinent recovery criteria that have been established, when addressing the five factors set forth in section 4(a)(1) of the ESA.

Fund for Animals March 31, 1997 signed settlement agreement at 3-4. The reason for inclusion of such a provision in the settlement agreement was to insure that FWS developed, finalized, and adopted habitat criteria for a particular ecosystem before it reached a tentative conclusion that delisting was appropriate and formally proposed to delist a particular grizzly bear ecosystem. This required FWS to reach a definitive conclusion about the amount and quality of habitat necessary for recovery before asserting that recovery had been attained. Nonetheless, in flat defiance of these explicit settlement terms, FWS has now issued a Federal Register notice formally proposing the designation of the Yellowstone grizzly bear DPS and delisting the Yellowstone population despite the fact that the Service has not finalized "habitat-based recovery criteria" for the Yellowstone ecosystem.

Both as a matter of policy and as a matter of law, recovery targets should be finalized before proclaiming that recovery has been attained. In order to comply with the settlement agreement, FWS must withdraw its delisting proposal and first finalize habitat-based recovery criteria for the Yellowstone grizzly bear population. Then, after assessing the current status of the Yellowstone grizzly bear and the finalized recovery criteria, FWS can publishing a proposed delisting rule if it deems it appropriate. Otherwise, it is readily apparent that the recovery criteria are developed to justify the predetermined objective of delisting.

Conclusion: For the many reasons stated above, the FWS' Yellowstone DPS proposal is improper and should be withdrawn. The grizzly bears of the Yellowstone area are not suitable for delisting because they are still imperiled for all of the reasons that led to the designation of grizzly bears in the lower-48 states as a threatened species in 1975. Even the progress made in efforts to recover the Yellowstone grizzly bear population will be placed at risk if delisting proceeds. We urge you to return to the drawing board and develop a true plan for recovering grizzly bears in the lower-48 states and providing binding, long-term habitat protections to preserve and enhance the recovery gains over the long term.

Sincerely,

Douglas Honnold
Abigail Dillen