This is a report from the Interagency Grizzly Bear Study Team (IGBST) to the Yellowstone Grizzly Coordinating Committee (YGCC)[1]

YELLOWSTONE MORTALITY and CONFLICTS REDUCTION REPORT[2]

June 5, 2009

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Executive Summary

There were a higher than usual number of grizzly bear mortalities in the Yellowstone ecosystem in 2008. Because of this, the Yellowstone Grizzly Coordinating Committee (YGCC) directed that the IGBST mortality review task force review ways to improve mortality reduction efforts in the ecosystem by reviewing past practices for efficacy and to propose new methods as necessary. The purpose of this review is to provide the YGCC with suggestions that can be implemented in 2009 and beyond to reduce grizzly mortalities and bear/human conflicts. We reviewed the current state of knowledge about mortality quantification, and the relationships between the 2008 mortality levels and den entry times, foods, spring snow conditions, and counts of females with cubs. For 2009 and beyond, we make 21 additional recommendations and implementation suggestions to reduce hunter conflict-related mortalities; 4 recommendations to reduce mistaken identification mortalities; and 8 recommendations to reduce mortality from other causes. Of these 33 suggestions, we prioritized 11 suggestions as having the highest probability of success in reducing bear deaths as well as bear-human conflicts. These 11 highlighted suggestions can be seen in Table 4 on pp. 36-37. We also review accomplishments on the mortality reduction recommendations made in the 2004 Yellowstone mortality report and report these accomplishments in detail in Appendix I on pp. 41-50.

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[1] Please reference this report as: Interagency Grizzly Bear Study Team. 2009. Yellowstone grizzly bear mortality and conflict reduction report. Interagency Grizzly Bear Study Team, Northern Rocky Mountain Science Center, Montana State University. Bozeman, Montana, USA. 53 pp.

[2] Copies of this report are available on the IGBST website, the YGCC website, and the IGBC website.

Background on Mortality Issues

Review of How Total Mortalities Are Estimated By the IGBST

IGBST is tasked with evaluating the sustainability of annual mortalities. Estimates for specific population segments are derived from the modeled-averaged annual Choa2 estimate for females with COY.

There is some confusion on how the IGBST estimates total mortality for each segment of the population. Here we provide an example for independent female bears, but the same methods apply to independent males except sustainable mortality is 15%. Sustainable mortality for independent aged (≥2 years) females is set at 9% of the estimated size for this segment of the population (IGBST 2005, 2006, USFWS 2007). Thus, female mortalities are within sustainable limits if,

$$\hat{D}_F \leq \hat{N}_F * 0.09,$$

where, $\hat{N}_F$ is the estimated population size for independent aged females and $\hat{D}_F$ is the estimated total mortality for independent aged females. All sources of mortality are used to evaluate sustainability for independent aged bears, which included an estimate of the unreported loss (Cherry et al. 2002, IGBST 2005). We code bear deaths into one of 3 categories depending upon how they are reported. We assume we know about all sanctioned agency management removals (A_F termed "agency removal") and bears that die while wearing a radio collar (R_F "found because of the radio collar"). Therefore bears classed in these 2 categories (A_F and R_F) are assumed to be 100% known and no adjustment is made to account for unknown and unreported mortality. Bears not categorized as agency management removals or wearing an active radio collar are treated as belonging to the B_F (Bayesian estimate) category. The number of bears reported as dead in this category is adjusted upward to account for unknown and unreported mortality. Table 1 shows how these adjustments are made. Columns (x) represents the actual number of bears reported, whereas the column labeled B_F represents the reported and estimated unreported mortality combine. So, for example, if 3 bears are reported as dying for reasons other than A_F or R_F, than x = 3 and B_F is estimated to be 7. In this example, 3 bears are known to have died and 4 additional bears are considered dead but unreported.

Table 1. Estimated reported and unreported loss (B_F) from reported loss (x).

(x)	B_F
0	1
1	2
2	5
3	7
4	10
5	13
6	15

7	18
8	21
9	23
10	26
11	29
12	32
13	34
14	37
15	40

Total mortality ($\hat{D}_F$)is then estimated as,

$$\hat{D}_F = A_F + R_F + \hat{B}_F, \quad (1)$$

where A_F is the number of sanctioned agency removals of independent females (including radio-marked individuals), R_F is the number of radio-marked bears lost (excluding sanctioned removals), and B_F is the median of the creditable interval for the estimated reported and unreported loss (Cherry et al. 2002).

We continue to use the definitions provided in Craighead et al. (1988) to classify grizzly bear mortalities in the GYE relative to the degree of certainty regarding each event. Those cases in which a carcass is physically inspected or when a management removal occurs are classified as "known" mortalities. Those instances where evidence strongly suggests a mortality has occurred but no carcass is recovered are classified as "probable." When evidence is circumstantial, with no prospect for additional information, a "possible" mortality is designated. Possible mortalities are excluded from assessments of sustainability. We continue to tabulate possible mortalities because at the least they provide an additional source of location information for grizzly bears in the GYE.

What Do We Know About The Causes Of The 2008 Mortalities?

Causes of Mortality

Four of 20 mortality causes (table 1) showed significant increases over the average over the past 10 years. These included natural mortalities due to predation, and human-caused mortalities due to hunter self defense of life, hunting mistaken identification, and management removals due to cattle depredations.

Table 1. Specific causes of known and probable grizzly bear mortalities observed in the Greater Yellowstone Ecosystem during 2008 with the averages by cause for 1998-2007. Significant increases in the 2008 human-caused mortality figures from past averages are highlighted in turquoise while significant increases in naturally-caused mortalities are highlighted in brown. (DL = defense of life; ID = identity)

Specific cause	1998-2007	Mean 1998-2007	2008
Natural injury or deformity	2	0.20	0
Predation	9	0.90	3
Malnutrition	1	0.10	1
Old age	2	0.20	2
Poached/Malicious	12	1.20	2
Hunting DL	38	3.80	14
Hunting Mistaken ID	10	1.00	5
Backcountry camp Illegal	1	0.10	0
Backcountry camp DL	8	0.80	1
Front country DL	2	0.20	2
Front country Mgt Removal	44	4.40	5
Human aggr/injury/fatality - Mgt removal	1	0.10	1
Sheep related illegal	1	0.10	0
Sheep depredation Mgt removal	3	0.30	0
Cattle depredation Mgt removal	8	0.80	4
Mgt capture mortality	2	0.20	0
Res capture mortality	4	0.40	2
Road Kill	13	1.30	1
Specific undetermined	52	5.20	5
Poisoning	1	0.10	0
Total	214		48

Distribution of Mortality

As the population has expanded in numbers and range, the distribution of mortalities has changed over the last 3 decades (Figures 1-3).

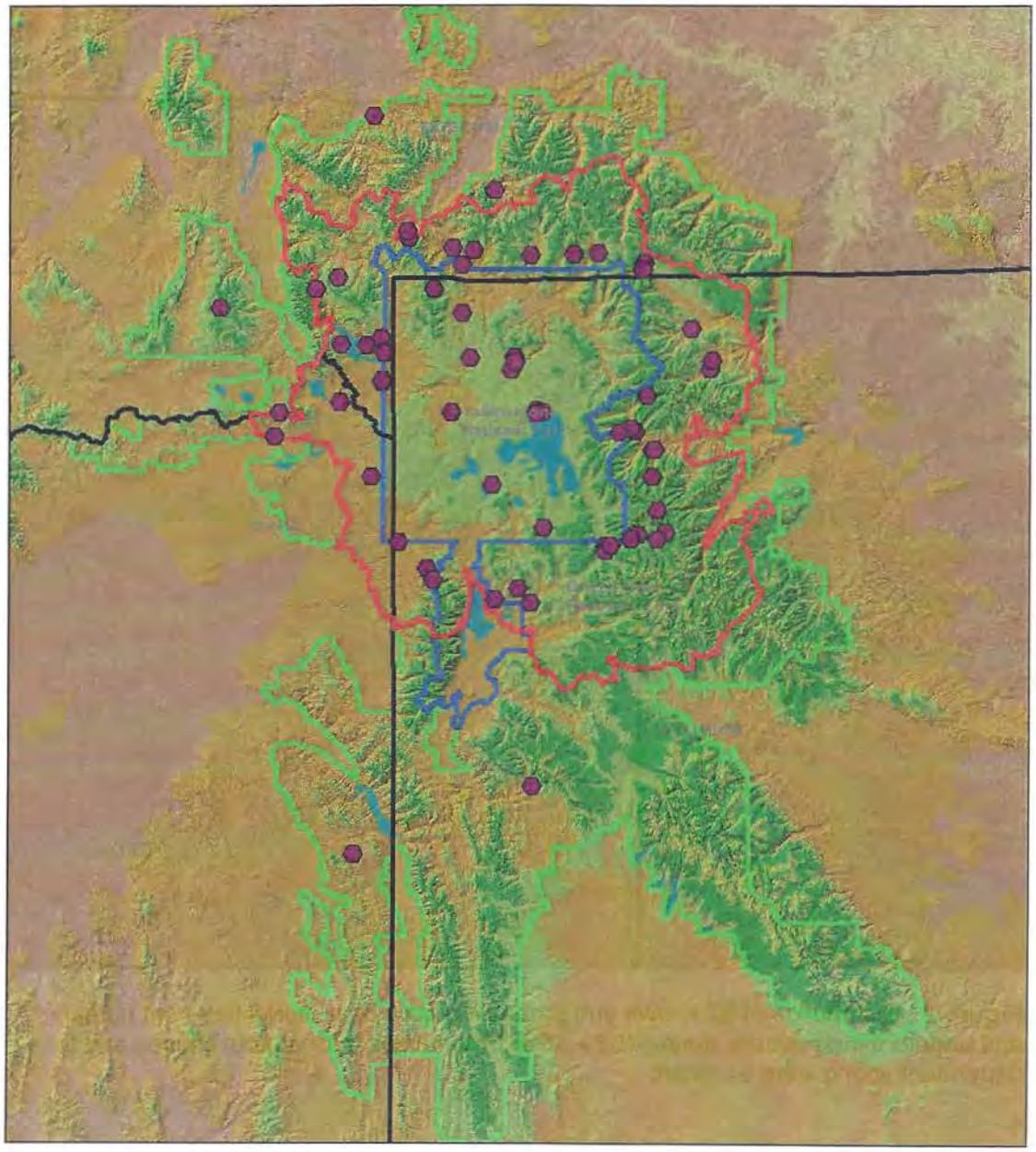

Figure 1. Distribution of 68 known and probable grizzly bear mortalities from human and undetermined causes during 1979–1988. Mortalities from natural causes and for dependent young were excluded.

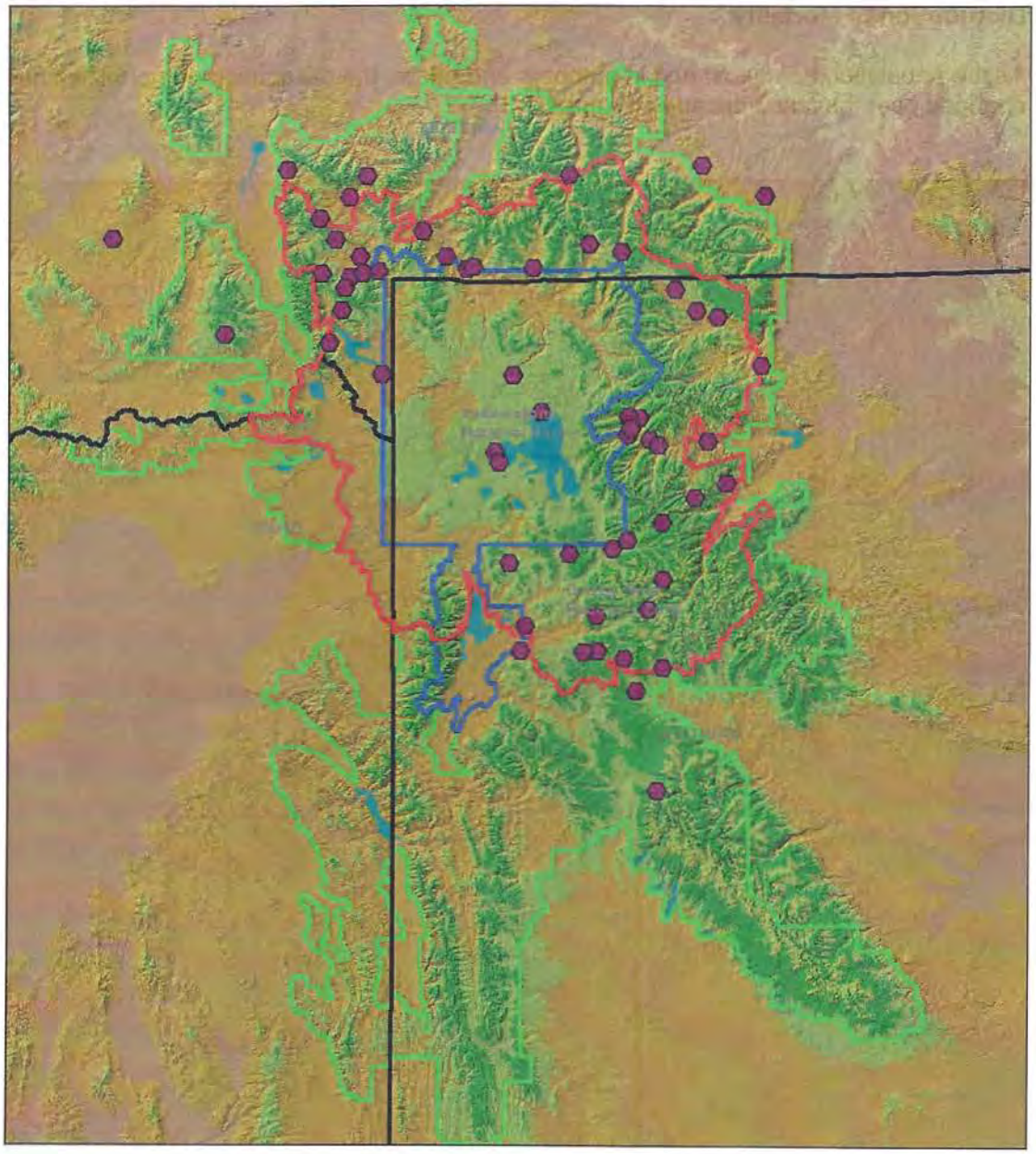

Figure 2. Distribution of 62 known and probable grizzly bear mortalities from human and undetermined causes during 1989–1998. Mortalities from natural causes and for dependent young were excluded.

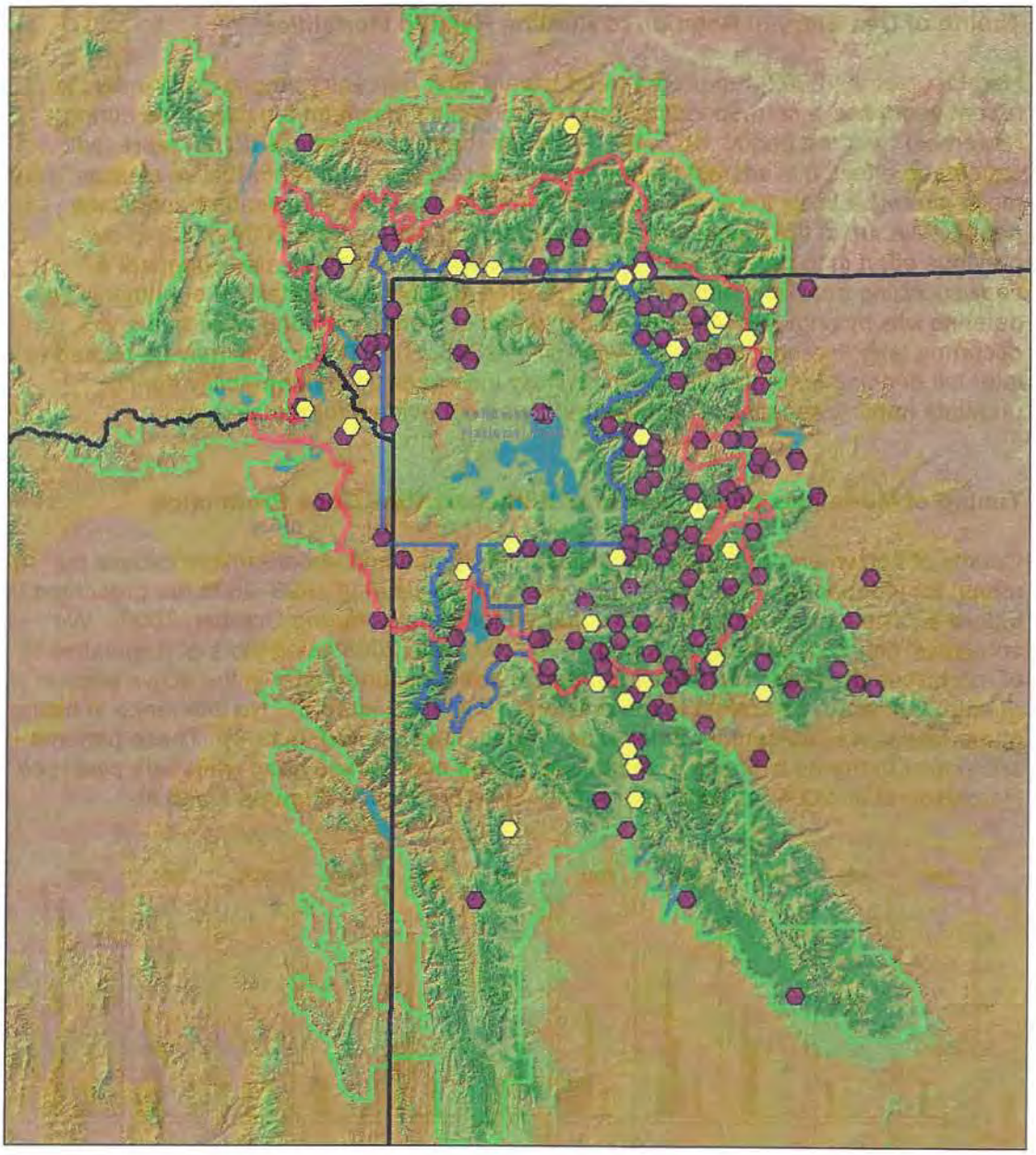

Figure 3. Distribution of 174 known and probable grizzly bear mortalities from human and undetermined causes during 1999–2008. Mortalities from 2008 are shown in yellow. Mortalities from natural causes and for dependent young were excluded.

Timing of Den Entry in Relation to Hunting Related Mortalities

Haroldson et al. (2002) reported a trend toward later den entry among adult males in recent years and a corresponding trend of increasing minimum temperatures during November over the period 1975–99. Although these observations do not represent cause and effect, it is interesting that among all sex, age, and reproductive classes, adult males are most likely to remain active if foods are available and weather conditions permit. We are in the process of including denning events from 2000–2008 to our previous effort in to determined if these trends persist. We have also observed a corresponding trend in timing of hunting related grizzly bear mortality (i.e. primarily self-defense kills by ungulate hunters). Mean week of mortality among male bears is occurring later in recent years (Pearson's $r = 0.346$, $P = 0.049$). This may be related to later fall denning for males bears which likely increases their vulnerability during ungulate hunting seasons. A similar trend was not evident for female bears.

Timing of Mortalities and Influence of Whitebark Pine Cone Production

Counts of known and probable mortalities from human and undetermined causes by month for independent aged bears (≥ 2 years of age) during 1998–2008 are presented in Figure 4. The highest monthly total occurred for females during October, 2008. We compared timing of mortalities during 1998–2007 with 2008 using plots of cumulative % of mortalities by week. Mortalities for female bears occurred later in the active season during 2008 when compared to the previous 10 years (Figure 5). No difference in timing of mortalities was evident for independent aged male bears (Figure 6). These patterns are similar to trends in timing of mortalities during poor verses good whitebark pine (see Haroldson et al. 2004 for WBP year rating) cone production (Figures 7 and 8).

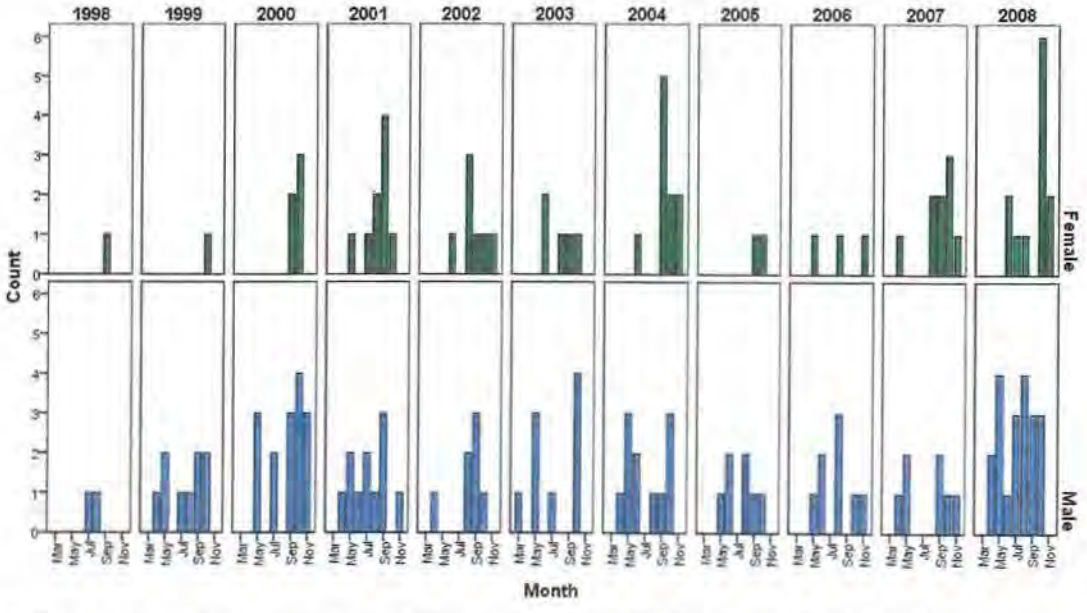

Figure 4. Counts of known and probable mortalities from human and undetermined causes by month for independent aged (≥ 2 years of age) bears during 1998-2008.

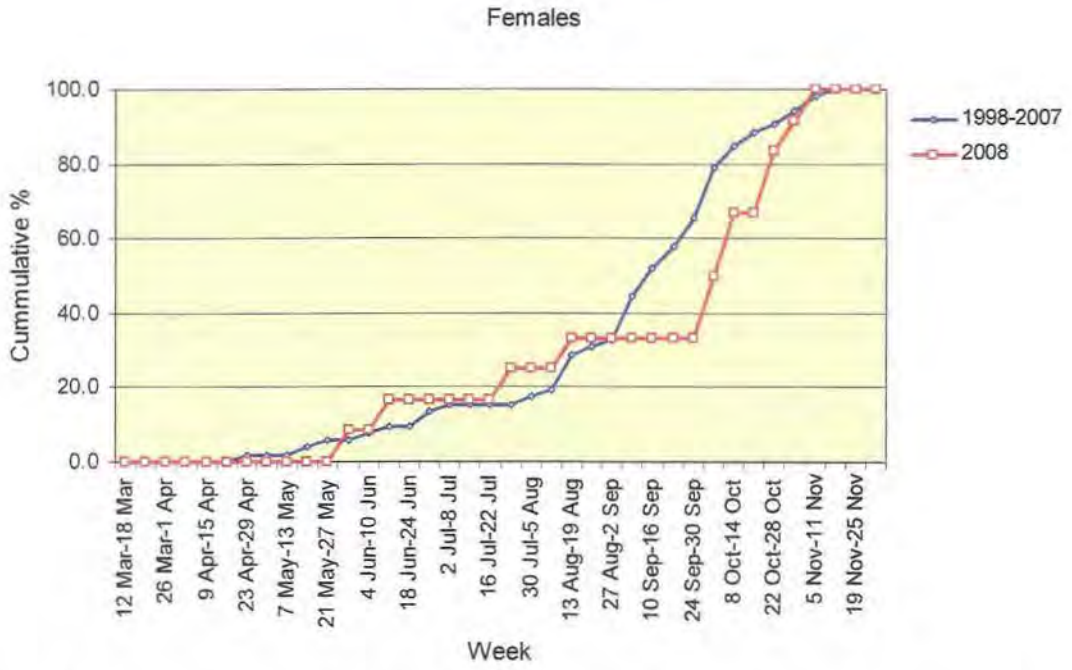

Figure 5. Cumulative % of known and probable mortalities from human and undetermined causes by week for independent aged (≥ 2 years of age) female bears during 2008 compared with the previous 10 years.

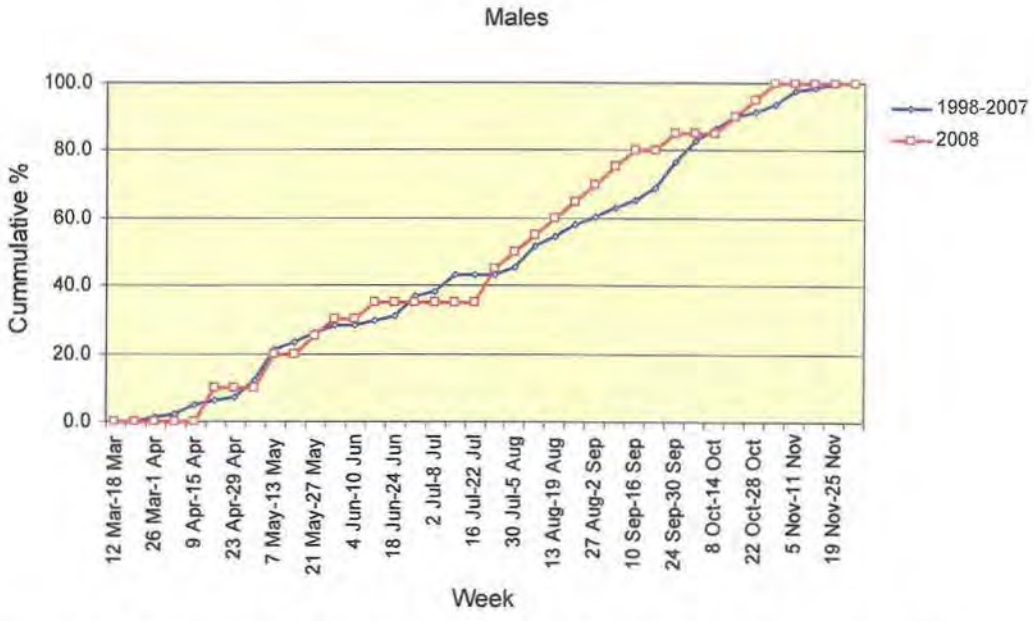

Figure 6. Cumulative % of known and probable mortalities from human and undetermined causes by week for independent aged (≥ 2 years of age) male bears during 2008 compared with the previous 10 years.

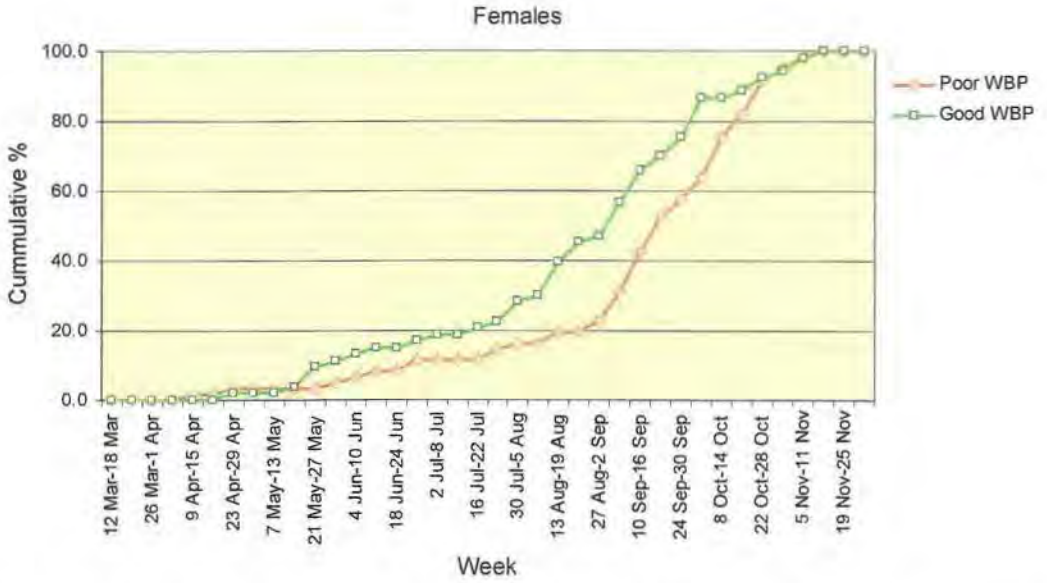

Figure 7. Cumulative % of known and probable mortalities from human and undetermined causes by week for independent aged (≥ 2 years of age) female bears during years with poor and good whitebark pine cone production, 1980–2008.

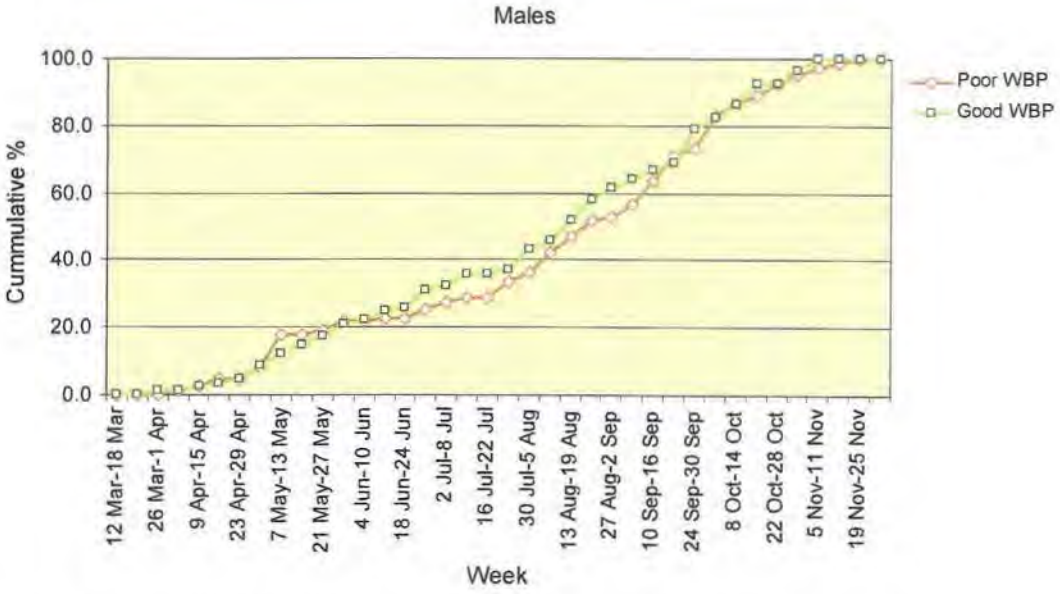

Figure 8. Cumulative % of known and probable mortalities from human and undetermined causes by week for independent aged (≥ 2 years of age) male bears during years with poor and good whitebark pine cone production, 1980–2008.

The impact of WBP cone production on a variety of life history and demographic parameters for grizzly bears in the GYE is well documented. WBP cone production influence rates of movements (Blanchard and Knight. 1991), diet (Mattson et al. 1991,

Mattson 1997, Felicetti et al. 2003), number of mortalities (Blanchard 1990, Mattson et al. 1992), distribution of bears (Haroldson et al. 2004), probability of survival (Haroldson et al. 2006), and fecundity (Schwartz et al. 2006).

We investigate further the inverse relationship between cone production and fall mortalities first reported by Blanchard (1990). We use AIC (Akaike's Infromation Criteria, Burnham and Anderson 2002) to evaluate a suite of linear regression models intended to explain fall (month > 7) human and undetermined caused mortalities for independent aged grizzly bears. Independent variables include annual estimates of females with cubs of the year (Chao2, Keating et al. 2002, Cherry et al. 2007), a model averaged estimate (ModAveC2) of Chao2 (Harris et al. 2007), and WBP cone production (median cones/tree, Figure 9). These data were available for the period 1983–2008. We excluded data from 1988; the year extensive fires burn from July through mid September in the GYE.

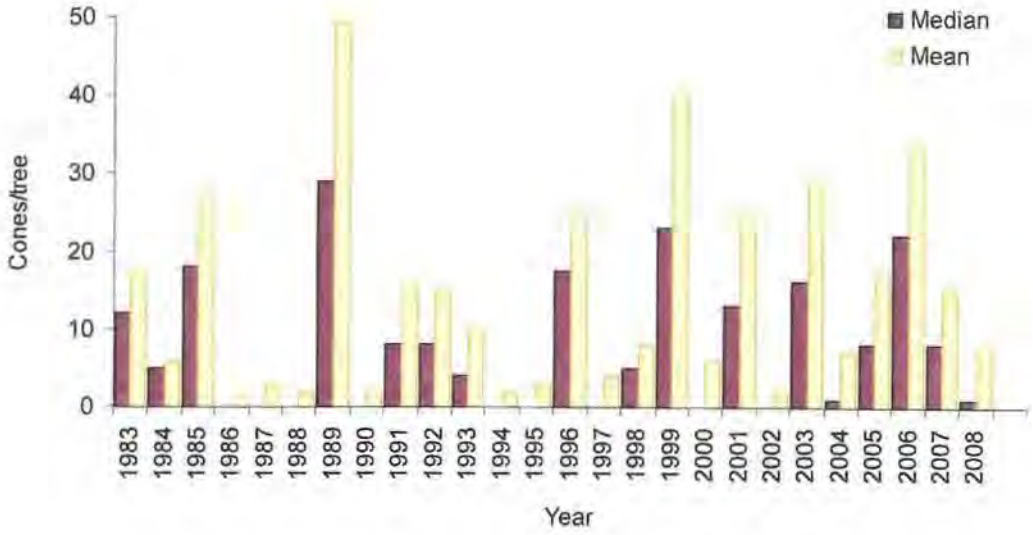

Figure 9. Median and mean cones/tree on established Whitebark pine production transects, 1980–2008. Correlation between mean and median cones/tree is $r = 0.98$.

Among the suite of models and covariates evaluated for female bears, AIC indicated unambiguous support for the model that includes WBP, Chao2, and Chao2^2 (Table 2, Figure 10). This model explains 73% of the variation in fall female mortality and all independent covariates were significant (WBP $P = 0.020$, Chao2 $P = 0.022$, Chao2^2 $P = 0.003$). Predicted fall female mortality using this regression is most influenced by changes in Chao2 (Figure 11). This is likely because the Chao2 estimate of females with cub(s) increases through the period 1983–2008 and is predictive of population trend for grizzly bears in the GYE (Harris et al. 2007). The Chao2 also expresses annual variation in cub production from natural processes (Harries et al. 2007). During falls with poor WBP cone production, females with dependent young (cubs or yearlings) are generally a large proportion (average = 45 %) of the female mortalities.

Table 2. Models selection results for estimating fall (month > 7) mortalities for independent aged (≥ 2 years of age) female bears.

Fall Female Models[a]	N	RSS[b]	K[c]	Negative Log-Likelihood values	Delta-AICc[d]	AICc value	AICc weights
WBP+Chao2+Chao2^2	25	46.992	5	7.89	0.00	28.94	0.82
Chao2+Chao2^2	25	61.151	4	11.18	3.43	32.36	0.15
WBP+Chao2	25	72.015	4	13.22	7.51	36.45	0.02
WBP+ModAveC2	25	78.803	4	14.35	9.77	38.70	0.01
Chao2	25	92.667	3	16.38	10.96	39.90	0.00
ModAveC2	25	116.015	3	19.19	16.58	45.51	0.00
WBP	25	135.216	3	21.10	20.41	49.34	0.00

[a] Covariates: WBP = Annual Median cones/tree on surveyed cone production transects; Chao2 = annual estimates of females with cubs of the year; ModAveC2 = model averaged estimate of females with cubs of the year.
[b] Residual Sum of Squares.
[c] K = number of parameters including intercept +1.
[d] Akaike's Infromation Criteria for small sample sizes.

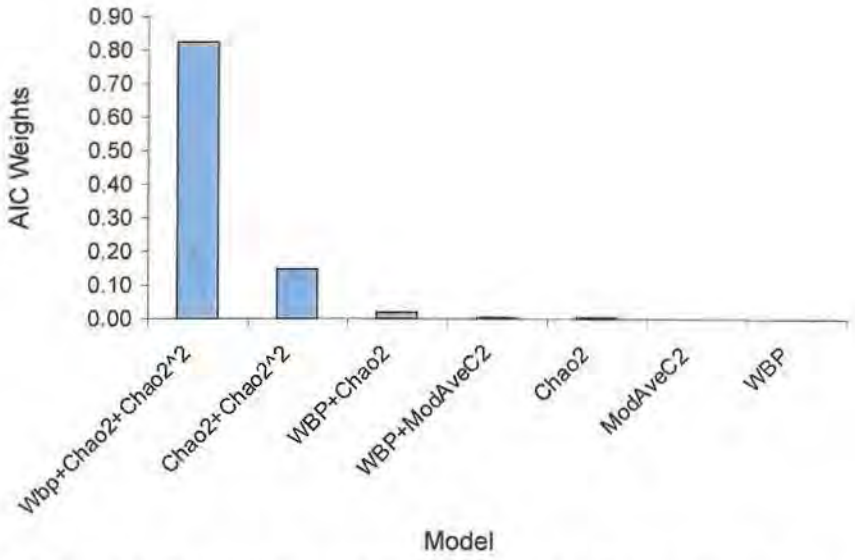

Figure 10. AIC weight for models predicting fall (month >7) mortalities (known and probable, human and undetermined causes) for independent aged (≥2 years of age) female bears.

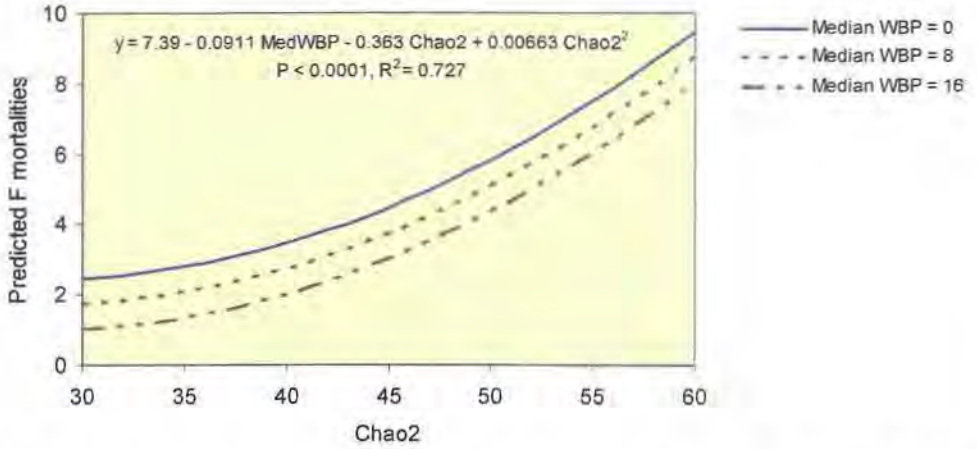

Figure 11. Predicted fall (month > 7) mortality for independent aged (≥2 years of age) female bears using the regression.

We evaluate the same suite of models for fall male mortalities (Table 3, Figure 12). The model with the most support contains only Chao2, which as state previously, is reflective of population tend. This model explains 43% of the variation in fall male mortality. Median WBP production was not a significant covariate in any of the models predicting fall male mortality and likely occurs in the 2nd best model due to the presence of Chao2 in the model. Thus results suggest that WBP is not predictive of fall male mortality.

Table 3. Models selection results for estimating fall (month > 7) mortalities for independent aged (≥ 2 years of age) male bears.

Fall Male Models [a]	N	RSS [b]	K [c]	Negative Log-Likelihood values	Delta-AICc [d]	AICc value	AICc weights
Chao2	25	111.991	3	18.74	0.00	44.63	0.43
WBP+Chao2	25	107.615	4	18.25	1.86	46.49	0.17
WBP+ModAveC2	25	109.963	4	18.52	2.40	47.03	0.13
Chao2+Chao2^2	25	110.944	4	18.63	2.62	47.25	0.12
ModAveC2	25	124.489	3	20.07	2.64	47.28	0.11
WBP+Chao2+Chao2^2	25	107.09	5	18.18	4.90	49.53	0.04
WBP	25	189.23	3	25.30	13.11	57.75	0.00

[a] Covariates: WBP = Annual Median cones/tree on surveyed cone production transects; Chao2 = annual estimates of females with cubs of the year; ModAveC2 = model averaged estimate of females with cubs of the year.
[b] Residual Sum of Squares.
[c] K = number of parameters including intercept +1.
[d] Akaike's Infromation Criteria for small sample sizes.

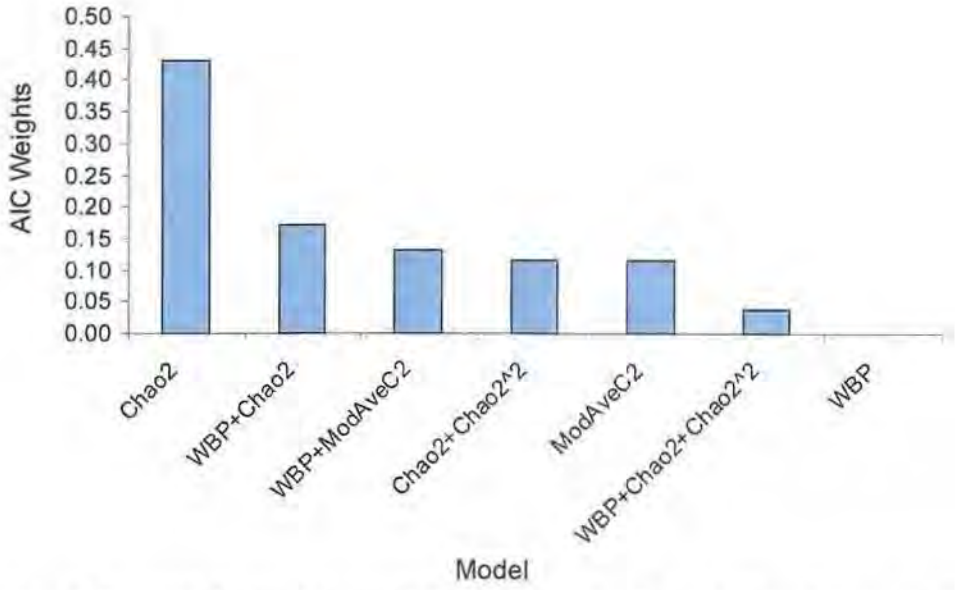

Figure 12. AIC weight for models predicting fall (month >7) mortalities (known and probable, human and undetermined causes) for independent aged (≥2 years of age) male bears.

In summary, we document more human and undetermined caused mortalities for independent aged females during falls with poor WBP cone production, and during recent years with increases in population size. Evidence suggests numbers of independent males lost during fall months increased with population size, but we did not detect an affect associated with WBP abundance. The majority of female loss during autumn months is associated with ungulate hunting (this report). This is likely related to the increased use of meat from ungulates by bears during years with poor cone production (Mattson 1997, Felicetti et al. 2003). Rates of movement also increase during autumn months in years with poor cone production (Blanchard and Knight 1991). This may increase encounters between hunters and bears. We have also documented changes in distribution of bears from inside protected lands (i.e., NPS) to areas open to autumn ungulate hunting, a trend which increases during autumns with poor cone production (Haroldson et al. 2004). These relationships may have implication for managing mortalities in the future if abundance and cone production of WBP are reduced by mountain pine beetle and blister rust.

2008 Grizzly Bear Body Condition and the Contribution of Spring Snow Cover to Spring Body Condition

IGBST had 39 research captures of 30 grizzly bear during 2008. Estimates of % body fat (Farley and Robbins 1994, Hilderbrand et al. 1998, Schwartz et al. 2003) were obtained on all 30 individuals. Mean condition estimates obtained during June and July 2008 were lower (Figure 13) than mean condition for these same months from previous

years combined (2000–2007). However, 95% CI's for each sampling period overlapped. By August and through the fall months of September–October 2008, mean conditions estimates were comparable to those from previous years combined. Persistent snow during June and early July 2008 throughout the higher elevations of the GYE (Figure 14) likely contributed to the poorer spring condition of sampled bears. Fall conditions were comparable. All condition estimates obtained after August are from bears captured on National Park lands. This is because we do not conduct research trapping operations on multiple use public land when ungulate hunting season are open. Archery seasons in all 3 states generally open by the last week in August. Telemetry records suggest that many bears captured inside National Parks use areas outside park boundaries, especially during autumn (Haroldson et al. 2004). Because our autumn samples come from bears captured inside park boundaries, comparisons between 2008 and previous years are valid. However, inference to bears residing entirely outside park service lands must be made with caution since we did not sample there.

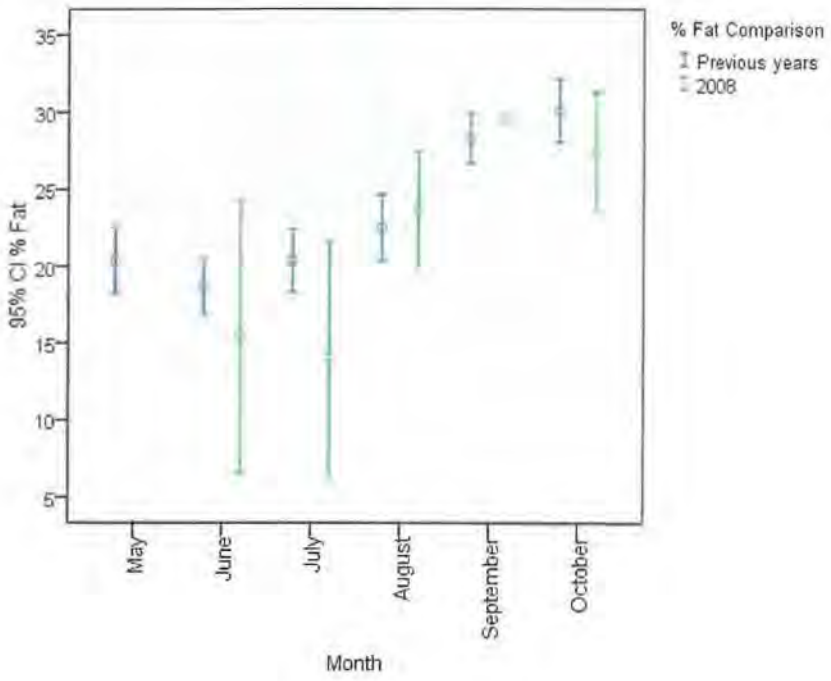

Figure 13. Mean % fat and 95% CI by month for grizzly bears captured during 2008 (n = 31), compared with estimates from 2000-2007 (n = 231).

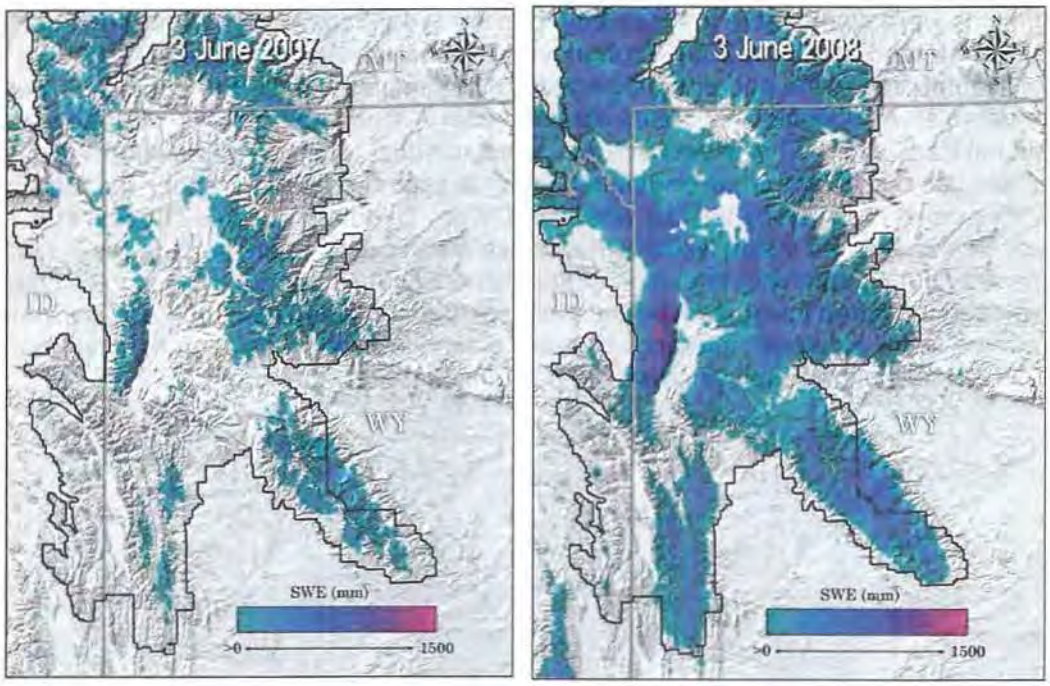

Figure 14. Comparisons of snow water equivalents for 3 June during 2007 and 2008 in the Greater Yellowstone Ecosystem demonstrating the late spring snow conditions that existed in 2008. Graphics are courtesy of Paul Cross, USGS, Northern Rocky Mountain Science Center, Bozeman, Montana.

Additional Background Information

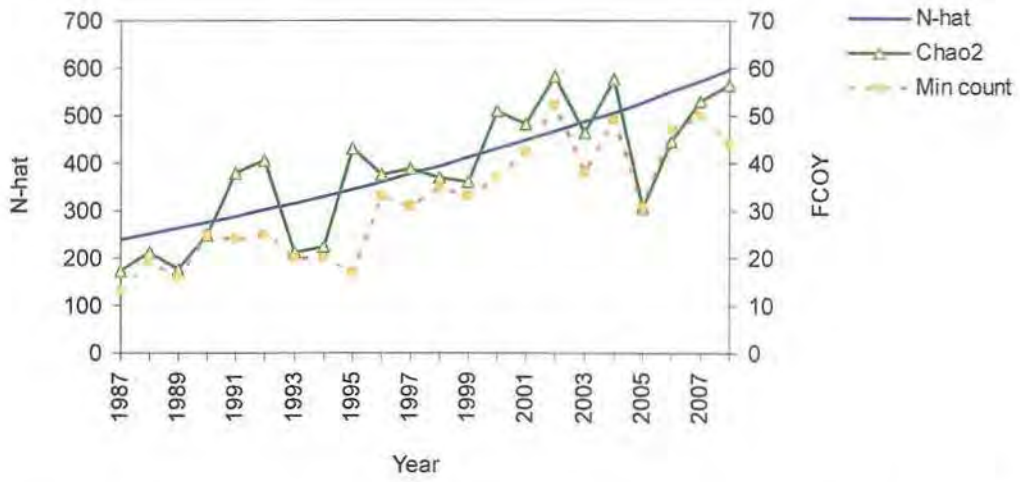

Figure 15. Estimated number of female grizzly bears with cubs of the year, and total population size for grizzly bears in the Greater Yellowstone Ecosystem, 1987-2008.

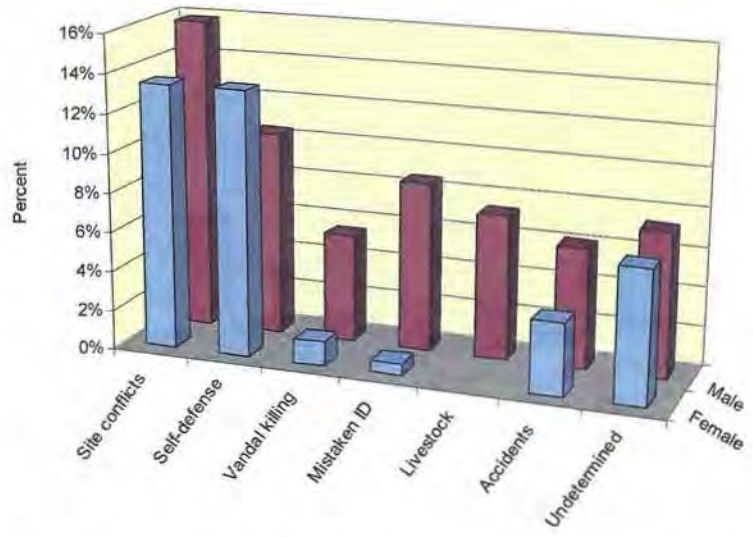

Figure 16. Percent (of total) for known and probable, human and undetermined caused mortalities by category and sex for independent aged bears during 1999-2008. Natural mortalities were excluded.

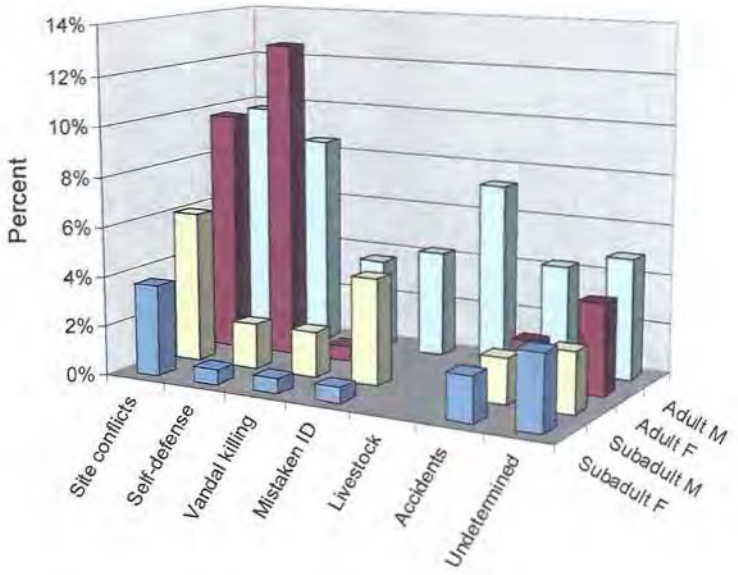

Figure 17. Percent (of total) for known and probable, human and undetermined caused mortalities by category and sex-age class during 1999-2008. Natural mortalities and dependent aged bears were excluded.

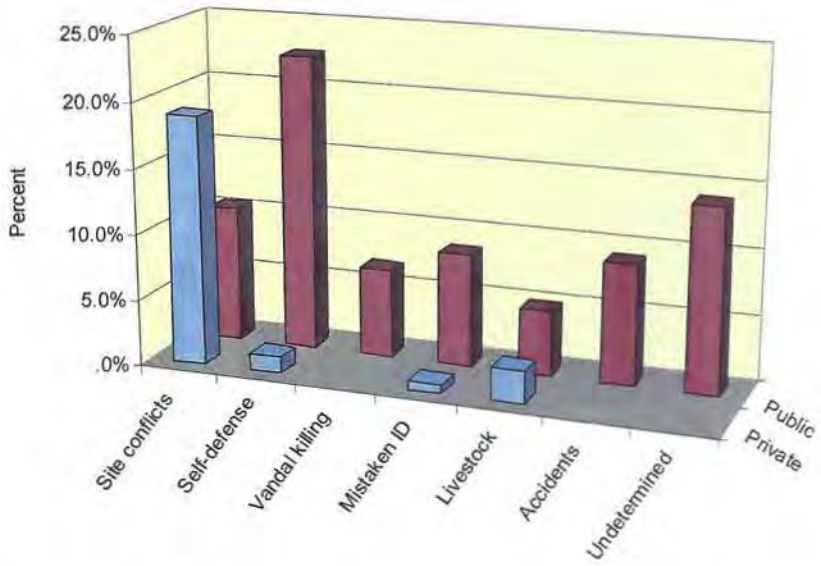

Figure 18. Percent of total for known and probable mortalities by categories and land ownership during 1999-2008. Natural mortalities and dependent young were excluded.

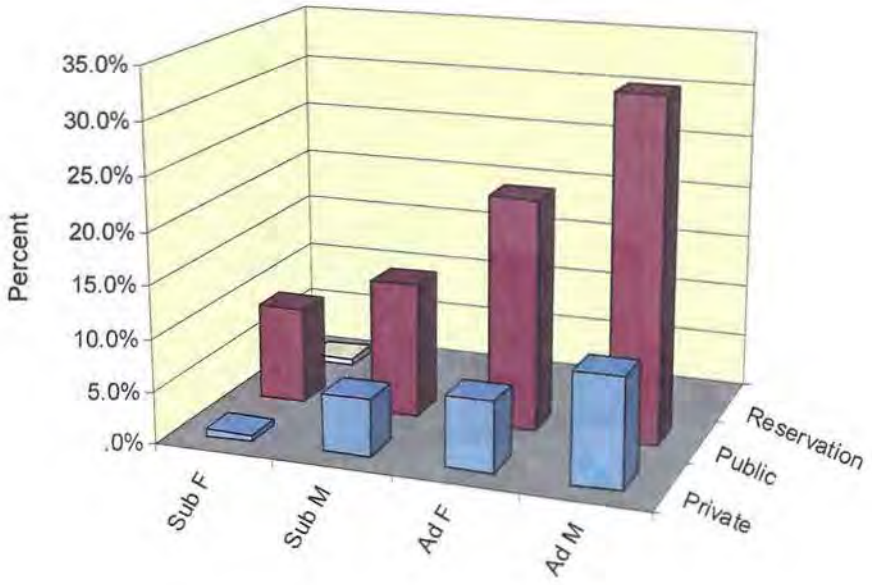

Figure 19. Percent of total for known and probable, human and undetermined caused mortalities by sex-age class and land ownership during 1999-2008. Documented mortalities from natural causes and dependent aged bears were excluded, as were bear for which sex or age was unknown.

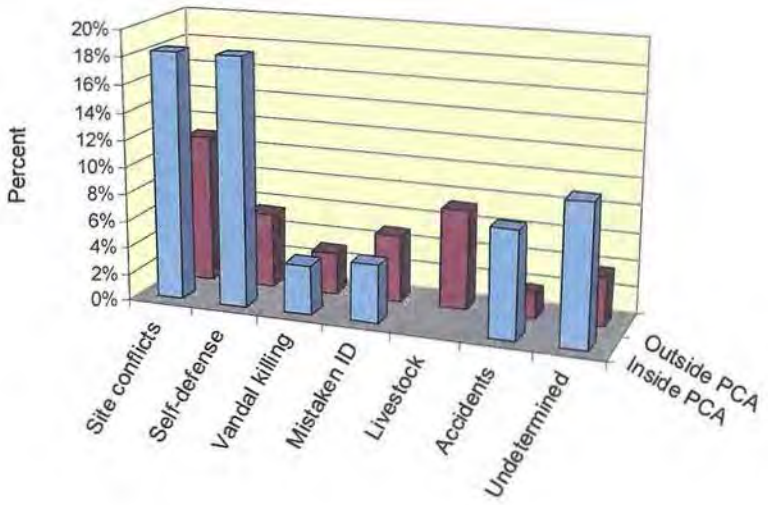

Figure 20. Percent of total for known and probable mortalities from human and undetermined causes by location relative to the grizzly bear primary conservation area during 1999-2008. Dependent aged bears were excluded.

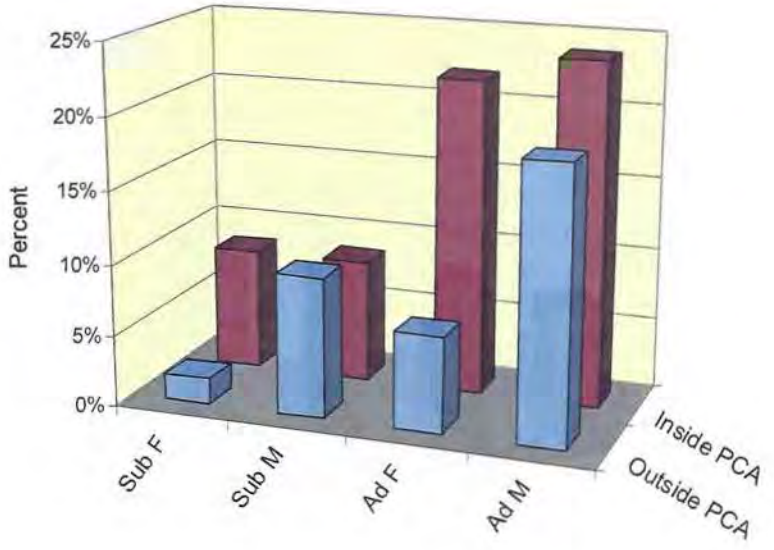

Figure 21. Percent of total for known and probable mortalities from human and undetermined causes by sex-age classes and location relative to the grizzly bear recovery zone during 1999-2008. Mortalities of dependent young excluded.

Recommendations to Reduce Future Grizzly Mortalities

This is a list of recommendations developed by the mortality review team to reduce grizzly mortality and bear/human conflicts. We considered the opportunities and possible problems with the implementation of each of these new recommendations. These implementation considerations are listed by agency source below each recommendation.

Hunter Conflict Related Mortalities

1. **Better outreach and education on the value of bear spray as a deterrent and that it enhances the safety of hunters. Use the Smith et al. as an effective demonstration that spray works.**
   - ID - This should be supported by IGBC, YGCC and all three states. Currently Idaho sends a brochure to elk tag purchasers in the Yellowstone ecosystem but bear spray is only mentioned briefly.
   - ID - Extend work contract of summer Bear Education Technician on Caribou-Targhee National Forest farther into fall hunting seasons to allow for greater one-on-one contact with hunters at camps & trailheads.
   - ID - Provide bear safety education training for IDFG staff and increase amount of contact time available during fall hunting season out in the field with hunters. Combine bear education with existing OHV Enforcement Activities.
   - GTNP - will include summary of Smith et al. paper along with other bear information in mailings to elk reduction program license holders.
   - MT - IGBC and/or YGCC supported information release.
   - MT - Document and annually report situations where bear spray was used, effective or not.
   - WY - Press releases, PSA's, group presentations, spokesman from outfitting industry and hunting community, hunter safety classes, department web sites, develop a hunting in bear country video, magazine articles, agency field personnel should carry spray as an example, mailings insert with hunting license. Need to re-emphasize the **effectiveness** of bear spray. Develop a better carrying system for hunters. Chest or firearm mount is better than on the hip.
   - USFS - Visitor kiosks available at various government offices and sporting goods stores with CDs to watch and other info on bear spray
     - Factual information (Smith et al.) on bear spray available at hunter/visitor kiosks.
     - Partner with a bear spray manufacturer for coupons for a percentage off the canister and attach to completion of bear ID quiz, or hunter safety class certificate.
     - Announcements on bear spray on TV/radio prior to and during hunting season.
     - Putting a bear spray video or message on UTube or Facebook or some other popular media form (make it entertaining and it will spread like wildfire).

2. **Develop a database with all encounters and mortalities with specific details on each incident. A possible list of data could include but not be limited to the information below. The IGBST and the states should work up a full, detailed table and compile these data for all encounters and mortalities for at least the last 5 years, and for all such incidents from now on.**

Mort ID	Date/ time	Spray avail.	UTM	Elev.	Hunter numbers	Carcass present, distance	Surprise?	Resident or non	History of hunter	Camp? distance	Sight dist.	

3. **Make the carrying bear spray in an immediately accessible fashion a requirement. This might be a USFS and/or a FG requirement. USFS could require this for permitted activities (i.e. outfitters and clients) but not the general public. Leading by example would be valuable by having all agency personnel carry bear spray in the field.**
   - ID - This would be very difficult at this time due to the diverse nature of public hunting on NF lands. Could and should be strongly suggested along with education efforts.
   - ID - Create and distribute to all late season hunters a flyer about the importance of carrying bear spray and how and when to use it.
   - ID - Work to educate the Idaho Fish & Game Commission on importance of bear spray and work to moving them towards a formal policy requiring the carrying of bear spray (We are still working on requiring hunter orange, so this process could take a long time!)
   - GTNP - carrying bear spray already a requirement of hunting elk in the park.
   - MT - Requirement nearly impossible due to numerous (all publics, boundaries, legal) issues. Need to promote "It is strongly recommended or advised to carry and know how to use bear pepper spray".
   - WY - This would take a regulatory action by the Wyoming Game and Fish Department and/or possibly a action by the legislature. I think the WGFD is in favor of increasing the educational effort prior to taking a regulatory action.
   - USFS - Require outfitters to educate their clients about bear spray and to loan it to them.
     - Provide loaner bear spray canisters to clients/outfitters, especially out-of-staters who may want to purchase it but can't fly home with it.
     - Provide some incentive to hunters/outfitters, etc. for carrying bear spray (cheaper license?).
     - Set up more loaner programs for bear resistant camps (panniers and backpacker canisters) and bear safety (bear spray).
     - USFS may not have the authority to require hunters/outfitters to carry bear spray.

4. **Better understanding of bear behavior by the hunters = more hunter directed education. This is particularly important to minimize the encounters that occur before elk are killed and elk carcasses attract bears. This will help minimize chance encounters.**
   - ID - This has certainly improved in recent years through signing, public ed forums and hunter contacts but there is a long way to go in Idaho.

- ID - More people on the ground contacting hunters would help, as well as more press releases aimed at hunters/fall users in bear country.
- ID - Conduct special "Hunting In Bear Country" workshops at the start of the fall hunting season, co-hosted by larger vendors such as Sportsmen's Warehouse.
- ID - Work with local TV news stations to get news package during fall season about "Hunting in Bear Country". Shoot video of proper techniques for care of game and carrying of bear spray.
- GTNP - More contact with hunters in the field would help. In GTNP rangers contact about 30-35% of all permitted hunters each year, and talk to hunters about bear safety while camping and hunting.
- MT - Long-term program of signing, personal contacts and news articles has greatly improved the hunting public's knowledge in Montana.
- WY - Hunter safety classes, hunter group presentations, PSA's, hunting magazines articles, spokespeople from the outfitting and hunting communities. Signage in high hunter traffic areas. Intensive user group specific outreach and education (e.g. bowhunters, outfitters). Reach hunters in hunter specific media (e.g. Outdoor Life, Outdoor Channel, etc.). Have a "Hunter Teach Hunter" program where hunters teach other hunters how to successfully hunt in grizzly country.
- USFS - Approach this as a hunter safety issue:
    - Encourage hunters to hunt with a buddy for safety when hunting and handling carcasses.
    - Allow/Encourage electric fence to protect carcasses on the ground a legal distance from camps and trails.
    - Discourage late shooting due to increased risk of bear encounters.
    - Prepare hunters to tolerate a bear in the area while they are hunting.
    - Don't shoot near dark if you cannot leave the carcass in a safely viewed location.

5. **Tell bow hunters not to call alone, to have their bear spray out and to look around them with their hunting partner while calling. They need to know that elk calling in the fall is very attractive to grizzlies and they are just as likely to get a grizzly to respond as they are to get an elk to respond.**
    - ID - This should be included in all hunting information and would make a good PSA topic for radio/TV.
    - ID - Include on all agency websites.
    - ID - Write a news release for use across ecosystem giving "Safety Tips" for hunting in bear country.
    - GTNP does not allow using artificial calls during the elk reduction program.
    - MT - Use MT archery DVD PSA....or similar product.
    - MT - Included in all (not archery specific) hunting information (signing, contacts, articles, regulations).
    - WY - Hunter safety classes, hunter group presentations, PSA's, hunting magazines articles, spokespeople from the outfitting and hunting communities. Partner with "Bow hunters of Wyoming" to educate the bow hunting community.
    - USFS - Encourage bow hunters to hunt with a buddy.

- Encourage bugling from a safe location.
- Discourage hiking after dark or before dawn in bear country.
- Encourage hunters to tolerate the presence of a bear when they are hunting.

6. **Reevaluations of the opening day of elk season and extending the end of the season due to climate change impacts and with the idea of reducing the overlap between hunters and bears and thereby reduce conflicts. Frame this in the scope of increasing elk hunter opportunity. Perhaps try this in some where there have been serious bear/hunter conflicts. This could be a test area for hunting seasons like the bear-safe community effort started by WYGF in the North Fork. Need to document any changes in den entry dates over time in relation to hunting seasons – IGBST is doing this.**
   - ID - This may be useful in specific small areas but would likely reduce tolerance of grizzlies if used ecosystem wide as it would reduce snow free opportunities for elk harvest.
   - GTNP - Because the value of hunter-related meat is so high to bears, my guess is that they will shift with whatever hunting dates are established during the non-denning season. Delaying opening dates not practical in some areas where elk are harvested during migration. This also would not be popular with wilderness hunters and outfitters, as snow-free hunting is at a premium.
   - MT - Difficult to change with elk management objectives, hunter opportunity, and economic concerns, while not diminishing tolerance/acceptance of grizzly bears.
   - WY - I really doubt that there is much opportunity to modify elk seasons to realistically reduce hunter caused mortality. In northwest Wyoming our elk seasons are very complex to address migratory herds, hunter and landowner issues, damage, opportunity, access, etc. The season structures have evolved over years of trying to deal with these issues. I think we would ultimately do a disservice and loose support for bears if the hunting public felt the seasons were modified to address bear conservation given we have more bears now than we have had in the past 50 years, and I cant think of any way to increase elk hunting opportunity by modifying season dates. I think a better approach is try and build ownership in the conservation of bears through education, and hopefully, bear hunting opportunity. The WGFD does not endorse modifying ungulate seasons at this time.
   - USFS - Examine hunting season data to determine success in the earlier part of the season in order to present hunters with factual data on increasing hunting success by changing season dates
     - Consider early season closure in areas of known high risk for conflict due to bear presence (especially females with young)

7. **Educate the public on the relationship between WBP crops and food shifts by bears. This way people would know about food switching and the increased potential for conflict during low WBP years. Will this work or will it just make for more jumpy hunters and more dead bears? Need better educational efforts about bear ecology, and the movements and food habits of bears in good and bad WBP years so people are more aware and**

careful in poor WBP years. Need to emphasize in outreach efforts the food switching behavior differences between males and females in poor WBP years.

- ID - This should be used in news releases and PSA's in a general sense not as an outcry.
- ID - Collect video and still images of white bark pines and cones to use in news stories about WBP in relation to grizzly bears.
- GTNP hunt areas are at low elevation and do not include WBP habitats.
- MT - In Montana, the public has been informed that in low WBP years, bears will not be concentrated at higher elevations, but will be utilizing all elevations in search of other food sources, including game carcasses and unnatural attractants. Information in an alarming manner is not healthy for bears.
- WY - I think it will work if we educate people on what to do to prevent conflicts during low WBP years. I suggest all the education strategies listed above and a increased field presence of agency personnel.
- USFS - Teach hunters to identify whitebark pine.
    - Encourage fall hunters to avoid whitebark pine habitats.
    - Provide educational information to the public on the value of whitebark pine and bear behavior related to the annual crop success/failure- perhaps at public info kiosks mentioned above.

8. **Emergency closures in areas where conflicts are occurring and/or when the mortality limit is approached.**
    - ID - Specific temporary closures for conflicts should be standard on federal lands, this may not be used as often as it should be, Closure because the mortality limit is being approached would be much less palatable to hunters and state agencies.
    - ID - During fall hunting season create a TWITTER network of all YGCC related agencies so that all members would be kept up to speed as mortalities occur. Members would be responsible for either creating Tweet or contacting someone who could, so that all members could be kept plugged in and make immediate and informed decisions.
    - GTNP implements these on a regular basis, but mostly during in response to visitor safety concerns, not anticipated hunter conflicts.
    - MT - Temporary emergency closures have been successfully used in situations that have an increase potential for continued conflicts leading to human injuries and bear mortalities. This should be a standard option on public lands. It would be difficult to close an area due to mortality limits without specific conflict situations. Where do you choose and predict it will occur? Hunting public would not be supportive.
    - WY - Areas closed to human activity is the jurisdiction of the land management agency, hunting activity closures are the jurisdiction of the wildlife agency. I think an area closure should only be used on a case by case basis when an unusual threat to humans exists (that also may result in a bear death). An emergency hunting season closure would be nearly impossible to get done from the process and implementation standpoint. I think education focused mortality reduction strategies are a better approach
    - USFS - This is critical and should be carefully considered when we know we have had an incident in an area or even have a known presence of a sow

with young. MFWP and USFS need to coordinate closely. Do not succumb to public pressure on opening these up prematurely.

- This should definitely occur if we believe we have a wounded bear in the area or a major attractant (e.g. dead horse or other carcass) near a public trail.

9. **Hunting in limited numbers and relate to hunting opportunities. If mortalities are high then sport hunting opportunities would be eliminated.**
   - ID - I assume this relates to grizzly tags? Limited hunting opportunity would likely build trust and support/tolerance for grizzly bear management and possibly lower mortality.
   - ID - Stress importance of relationships between current big game hunting, mortalities, and future grizzly bear hunting whenever possible to public and media.
   - GTNP - Need to be careful here about not creating more animosity among hunters towards bears and bear-related hunting restrictions.
   - MT - If certain areas or drainages that have a chronic bear mortality issue, discussions should be generated to determine if limited hunts would help reduce conflicts leading to human safety and bear mortalities.
   - WY - I believe that we will build ownership and a consumptive user advocacy base and a protective mindset in the hunting community if they feel that there may be a realistic opportunity to participate in grizzly bear hunting. My suggestions are that we have a limited hunt as soon as possible and stress to the hunting public through information and education channels that preventable mortalities reduce the huntable surplus of bears. Increase education on how the mortality thresholds work. We should talk to individuals, group presentations, hunting articles, outdoor sections of newspapers.
   - USFS - Educate the hunting public regarding the cost of dead bears in relation to their future potential bear hunting opportunity. (A dead bear does not always = 1)

10. **Increased presence by agencies. This would require more people assigned to the backcountry in grizzly habitat during the hunting season. This would be FG and USFS agency representatives. More people in the field means more contacts, sanitation checking, outreach and education directed at the hunting community. Find out how many agency people do this now and where these people are and where these people are. Existing data on conflict and mortality locations should be used to direct agency backcountry presence to conflict areas rather than random patrols. This will take more funding and points out the benefits of a "carnivore trust" or some source to help fund this important agency presence in conflict areas. Suggest this is something that needs to be emphasized/elevated to upper level agency decision-makers so that they realize this is an important funding need.**
    - ID - In Idaho the IDFG and C-T NF have been coordinating for approx 5 years on "hunter patrols". This has worked fairly well during September archery

- ID - Provide bear safety education training for IDFG staff and increase amount of contact time available during fall hunting season out in the field with hunters. Combine bear education with existing OHV Enforcement Activities.
- GTNP has a high field presence by uniformed rangers, who make contact with a high percentage of hunters. This is an area that could make a big difference.
- MT - In Montana, the USFS details personnel from the Hebgen and Gardiner Ranger Districts to conduct front and backcountry contacts with the hunting public. MFWP also, has wildlife and enforcement personnel in the field during September and October to help reduce bear/human conflicts. Most crucial or effective time is from general rifle opening in late October to the 2nd week of November.
- WY - Incorporate into WGFD annual hunting season work schedule for bear management personnel, game wardens, biologists, regional supervisors. Focus efforts when potential for conflicts is highest.
- USFS - High priority in both front and backcountry during hunting season.
    - Follow-up ASAP when sanitation or safety problems are reported.
    - Make this a priority on USFS where bears occur.

11. Improve carcass management associated with elk hunting. Time of removal and other ideas. Portable electric fences around carcasses.

- ID - Carcass mgt. is discussed in brochure sent to elk tag holders in Idaho portions of the GYE. This should be included in PSA's as well. FS food storage order also addresses this issue.
- ID - Develop video news packages to highlight use of electric fencing.
- GTNP - elk hunters are encouraged to not leave carcasses overnight and to contact a ranger if a bear is observed on a carcass.
- MT - Determine if more meat poles/racks can be placed in areas of traditional campsites. In the overall bear information for hunters, include game carcass guidelines/recommendations.
- MT - I need more convincing on the electric fences on carcasses. I can see a loss of urgency and accepted methods by hunters when dealing with carcasses.
- WY - Increase education on proper carcass management at the site of the kill and in camp. Relocate agency meat poles away from campsites as part of maintenance and replacement. Stress quick retrieval of carcasses from the field. Stress pre-planning strategies and equipment for carcass management and speedy carcass removal from the field. Create an on-line test for carcass management.
- USFS - Encourage immediate removal of the carcass in daylight, and careful return to a carcass left the day before.
    - Encourage leaving carcass in a very visible location if it must be left.
    - Return to the carcass with at least one buddy.

12. Replace tags for hunters who think grizzlies are on their elk.

- ID - This may work but has not been done in Idaho.
- ID - Mechanism for this already exists, but a protocol would need to be established in writing so that the public could be informed of this option.
- GTNP - This idea has merit but many potential pitfalls. Hard to imagine how it could be implemented without abuse by hunters.
- MT - If the enforcement division determines that a hunter(s) has made a honest timely attempt to remove game carcass from the field or has been displaced from a carcass by a bear, a replacement tag has been issued. In MT, the info is out for hunters to report conflicts regarding carcasses. If it is advertised that a "sure bet" replacement tag is available, hunters can become unconcerned, leaving numerous carcasses in the field.
- WY - Wyoming law prevents replacing the tags. Make hunters aware that they can purchase left over or additional licenses, if they are available. Advise that they can be put on a meat donation list if a carcass becomes available.
- USFS - Make it relatively easy for a hunter to get another tag in this situation but attempt to determine hunter veracity.

13. Requiring hunter to pack their meat out first and the antlers last.

- ID - This should be required since states already have "wanton waste laws" in place.
- ID - Encourage hunters in bear areas to adopt this behavior through use of direct mailing.
- GTNP - This is a good idea and should be possible with change in state regulations. GTNP would follow state regs in this regard.
- MT - Tough sell as is. It may be possible to require that a portion of the carcass (meat) must be removed with the antlers.
- WY - We need to be careful that we do not push hunters into conflict situations. They will probably be bolder with retrieving their antlers, even if a bear is on a gut pile. I think we promote "quick" retrieval of all parts as the best approach.
- USFS - Require this if the entire animal is not all packed out in one trip. This leaves less of an attractant out on the ground for a shorter amount of time. Or at least pack out antlers with a portion of the meat.

14. Link elk tags to a discount on bear spray so if you have an elk tag you get a 20% discount on bear spray. The discount could also be linked to watching the video or taking an online hunter conflict prevention education class (this would have to be produced by someone).

- ID - This should be linked to websites (video and printable certificate) and license sales locations and would need support from manufacturers of bear spray. IGBC and or YGCC would need to take lead on getting manufacturer support possibly through CWI.
- ID - Discussion regarding this and similar mandated programs would require working with the Idaho Fish & Game Commission in an attempt to educate them so that they would hopefully agree to move in this direction.
- GTNP would follow state lead on this.

- MT - Create a web-link to a hunting/bear spray information and test (similar to black bear ID test) that would produce an individual's certificate. The certificate would be worth a % discount on the purchase of approved/recommended bear spray brands. Need to check into funding and manufacturer for discount.
- WY - Mail coupons in licenses, have coupons available at regional offices, downloadable and printable coupons after completing online bear education (e.g. conflicts, carcass removal), discount coupons available at retailer's or wholesaler's websites.
- USFS - Need some incentive or break for those purchasing bear spray. Perhaps also tie discount to a hunter safety class.

15. **Check into a full page add in outdoor life type magazines in September promoting bear spray for safety – smart hunters carry it – innovative marketing efforts like "catchy" photos of people holding bear spray. Use photos of agency people and outfitters carrying bear spray. Should approach manufacturers to see if they would like to partner in this effort.**
    - ID - This should be supported agency wide across all jurisdictions. Photos should not be the "bloody, I survived" type but rather "I always go prepared" type.
    - ID - Great idea, but very costly. Use of banner ads on major hunting websites would probably be cheaper and reach more hunters.
    - GTNP - CWI help with funding this?
    - MT - "General campaign" by IGBC and/or YGCC through CWI to use a standard by all agencies in ecosystem.
    - WY - Maybe a better use of the money would be to do it in local newspapers. Many have a "Fall Hunting Edition" that targets the group we are trying to inform. Have a "Fall Hunting Edition" website page linked to all agencies.
    - USFS - Put more info on state websites where people might go if they are checking out hunting opportunities. Reach hunters (esp. out-of-state) through license purchase and bear ID video.
        - Consider "Bugle" magazine with RMEF as a partner.
        - Concern with expense vs. how many actually reached.

16. **Link reductions in encounter mortalities to eventual grizzly seasons – if mortality continues to increase there will never be a grizzly season because the mortalities are too high to have a season.**
    - ID - See #8 above.
    - GTNP - This is a better way to get hunter support, as opposed the threatening elk season changes.
    - MT - News articles/stories informing the public of the mortality limits and how different causes of mortalities and excess can affect legal hunting.
    - MT - Must be cautious in this, for it may lead to **no reporting** of conflicts and dead bears.
    - WY - I think this is a good one to get at the hunting demographic. I believe that we will build ownership and a consumptive user advocacy base and a protective mindset in the hunting community if they feel that there may be a realistic opportunity to participate in grizzly bear hunting. My suggestions are

that we have a limited hunt as soon as possible and stress to the hunting public through information and education channels that preventable mortalities reduce the huntable surplus of bears. We should talk to individuals, group presentations, hunting articles, outdoor sections of newspapers.

- USFS - Same as #8. Hunter education on this topic.

17. **Require hunters in grizzly habitat to view an online Hunting in Grizzly Habitat video and print a certificate that shows they watched the video. This would require the production is a good hunting safety in grizzly habitat in Yellowstone video (10-12 minutes). Get this video in every sporting goods store by the license counter.**
    - ID - Link with #13 - Must watch to buy elk tag and get discount on bear spray.
    - ID -This idea is good, but hinges on production of affordable and attractive video. Hopefully, University of Montana film program will be able to help with this.
    - MT - This could be combined with #13 above. An option vs a requirement.
    - WY - I would like to start this as voluntary with incentives to view the video. Possibly linking the video to a bear spay coupon, a certificate, boys scout badge (for kids), etc. In house video personnel or MSU video program may be able to produce a quality product. It would be nice to be able to distribute it for free. We could give DVD's away at selected locations.
    - USFS - Also get this video into agency kiosks at offices in bear country such as FS districts.

18. **Enhance outreach and education to Tribal members who may hunt under Tribal rights in grizzly habitat.**
    - ID - State agency and USFS communication needs to increase, only current contact in Idaho is when hunters are encountered during patrols.
    - ID - Relationships with the Shoshone-Bannock Tribe regarding resource management issues are tense, at best, but a dialogue could be started to see if they would be willing to move towards this idea.
    - MT - State wildlife agency communication.
    - WY - In Wyoming, they should benefit from WGFD efforts as the geographic areas that we target with our efforts encompass the WRIR. We will work with the tribes and the USFWS tribal assistance office to enhance education efforts.
    - USFS - Arrange interagency intergovernmental meetings with tribes such as the Nez Perce to discuss safe hunting in grizzly bear habitat (bear ID, bear spray, etc.). Provide information and perhaps bear spray. Offer bear ID video etc. Go to tribal location for these meetings.

19. **Enhance Wind River efforts on mortality management.**
    - WY - We will work with the tribes and the USFWS tribal assistance office to implement mortality management efforts.

20. **Promote R & D on new products and techniques to minimize conflicts and encounters and increase human safety.**
    - ID-Contact the Idaho National Environmental Engineering Laboratory to see if they might have sportsman/scientists interested in pursuing a project related to this goal.
    - MT - Any new product should be reviewed by Mortality Team before recommendation of further testing, use or agency approval.
    - WY - Set up a program to test deterrent systems with WSU-Pullman and/or Yellowstone Grizzly Bear Discovery Center, discuss bear spray modifications with manufacturers, fund graduate project focusing on product development in engineering department of universities.

21. **Send letter to all permitted operations get a letter from both the USFS and the outfitter state boards saying people should carry bear spray and know how to use it and say how effective it is.**
    - ID - This needs to be general public information as well so clients can ask outfitters about it and increase pressure from the user group side.
    - MT - If implemented, we need to inform the general public that all permitted operations are given this information.
    - WY - Coordinate between state agencies and USFS to get this done.
    - USFS - This could be done in conjunction with annual billing or with a new or renewed permit.

Mistaken ID mortalities

1. **Extend the bear identification efforts to all bear hunters in all grizzly habitats. This will improve the knowledge base. IDFG is currently updating their website on this issue. The relationship between bear baiting and mistaken ID mortalities is unclear. This is an issue that would benefit from some careful analysis of existing data, perhaps by the IGBST.**
    - ID - Make requirement in all three states.
    - ID - Work with Idaho Fish & Game Commission to have hunters in grizzly country be required to pass an online test similar to Montana.
    - MT – Make requirement in all three states.
    - WY - Press releases, PSA's, group presentations, spokesman from outfitting industry and hunting community, hunter safety classes, department web sites, develop a bear ID video, magazine articles, mailings insert with hunting license. Efforts should include bear hunters statewide.
    - USFS - Emphasize "Don't shoot if you're not sure."
        - Let hunters know where they may be seeing grizzly bears (i.e.let them know where both species of bears occur).

2. **Describe bear density in hunting units so hunters know that have chosen a high density grizzly area to hunt and they need to be especially careful.**
    - ID - Some information available in Idaho regulation could be beefed up.
    - ID - Continue to share with the public and media the Google Map images of the movement of collared bears. Post images at trailheads of highly utilized

areas to help provide a visual image to hunters of how bears use the area they are about to enter.
- MT - Have in state general hunting regulations and in black bear regulations.
- WY - Incorporate into all black bear hunting orders. Highlight high density areas.
- USFS - Can this be done in association with the annual FWP hunting unit maps and regs? This would be a good place to put bear safety information as well if it is not there now.

3. **We need to evaluate the effectiveness of all outreach and education including actions like the online bear ID education. We need a formal evaluation of these outreach materials. This will help understand what works with hunters and what does not. Focus groups may be a way to get feedback from the public on the effectiveness of outreach and education materials. Recommendations to do outreach without evaluation of success are a poor way to implement effective action.**
   - ID - Idaho/C-TNF Education Tech is looking for a graduate project for this. This should include other non- hunting related sources of conflict as well.
   - ID - We lack the staffing to pursue this goal, but hopefully someone else can address this.
   - MT - Through Dan Tyers – USFS, they have conducted a survey of hunter knowledge and bear spray use/possession in the backcountry area north of YNP.
   - WY - Use human dimension programs to address this or make it a graduate project.
   - USFS - Perhaps set up a standard interview form and get interview information at check stations.
   - Set an interview form up on the bear ID website for folks to complete as they do that, or as a requirement for license purchase.

4. **Reduce the opening hour and closing hour for shooting hours for black bear seasons. This is a high period of activity for bears and they are difficult to see and ID in poor light at dawn and dusk. Determine if the dawn and dusk periods are those times when most mistaken identification kills occur. Document peak hours of daily activity with research results – IGBST has this and needs to make it available.**
   - ID - This would need to be "sold" to game commissions in all three states. Would need good science on bear activity periods to make the case.
   - ID - The current Yellowstone grizzly bear management plan prohibits the changing of any other big game hunting regulations on behalf of a recovered grizzly bear population. A dialogue needs to begin with the commissioners, legislators, and even the governor to work towards having this restriction removed.
   - MT - Agency/commission approval needed. Would take an agency "buy-in" to accomplish. If acceptable, all three states should try to implement.
   - WY - This would take a regulatory action by Wyoming Game and Commission. I would prefer to go the education route.

Other Mortality Sources

1. **Front country conflicts - Need to proactively think of where bears will be in the next 10 years and expand outreach and sanitation work in these areas now before the problems in these places get to be future problems. Need to document new areas of range expansion using location and tracking data – this is an IGBST task.**
   - ID - This is being done at some level with IDFG/C-TNF ed tech in Idaho. National Forest food storage and sanitation efforts are already moving into these areas.
   - MT - Identify the organized groups in area, (ie watershed association) and present bear information to determine community interest/participation.
   - MT - Agency efforts (i.e. camera sites, observations) in verifying distribution will aid in public interest.
   - WY - Work with waste management companies, county commissions, local governments, public land permittees, homeowners associations, educate individuals and groups. Use human dimension programs to address our effectiveness. Long term outreach and education should focus on children.
   - USFS - Get front public and private country campgrounds and picnic areas set up with infrastructure needed to insure bear resistant containers are present (where it is not pack it out).
     - Gradually provide backcountry food poles in areas into which bears are expanding.

2. **Sheep conflicts - Enhance outreach to and consideration of sheep operations in areas where bears will be soon as the population expands. Think of the allotment buy out approach in these key areas to promote a win-win to the allotee and wildlife. The USDA Sheep Experiment Station is in an area where grizzly expansion and conflicts are likely to occur – they need to be aware of this.**
   - ID - There is a limit to the social acceptance of expansion and closing of allotments and we may be very close to that now in Idaho. Closing through "buy out" of particular high conflict allotments may still be acceptable on case by case basis.
   - ID - Need to work with USFS to identify those sheep allotments that are outside, but adjacent to the PCA and work to identify potential spots where bears may be moving in. Once hot spots have been identified then work to swap out allotments to reduce potential for conflicts.
   - MT - Need for willing rancher, FS district, and potential outside funding. Based on state and federal bear knowledge. *There is a limit as to how far allotments can be moved and bears be accepted.
   - WY - Other wildlife, and at times, the livestock producers benefit from allotment buyouts, exchanges, or both. Work with NGO's and land management agencies to identify priority areas and develop objectives and strategies.
   - USFS - Proactively contact sheep permittees in the Continental Divide area and portions of the B-D.
     - Also make contact with private land sheep owners in these areas.

3. **Need to <u>trace individual bears as to their history</u> to see if bears involved in conflicts have histories in other conflict types. Look at conflict history, release sites, timing of conflicts. This will identify the original causes that got bears into conflict situations.**
   - ID - This data is already available.
   - MT - We already know/record what type of conflict originally got an individual bear into a management action situation. I am not sure this is necessary, as we evaluate every management situation on an individual basis and determine the most logical action.
   - WY - Regularly analyze conflict data to identify changes, trends, and increase overall understanding of conflict management.

4. **<u>Front country conflicts -</u> Need to find a funding source for maintenance for bear-resistant containers as these need constant repair due to use. No ready source of this maintenance funding – maintenance is important as they eventually break down. Placement of containers is not the end of this work - successful conflict resolution must include regular container maintenance as well. Need to build a data base of container types that work and don't work and what can be done to make them more durable and workable. Need to identify areas where no secure storage facilities exist. The development of a comprehensive sanitation strategy on all public and private land where bears are in the Yellowstone ecosystem would be very useful. Such a document would show where secure facilities exist and where they do not and could be used to implement a strategically organized program to increase sanitation throughout the ecosystem.**
   - ID - This should be very limited need as federal agencies should all ready be budgeting for this and private sanitation companies certainly budget for this.
   - ID - Until realistic funding can be achieved, site related conflicts related to sanitation will only continue to grow, putting recovery efforts in jeopardy.
   - MT - For public containers only.
   - WY - NGO's, individual donors, establish a fund to assist communities with this effort.
   - USFS - Attempt to build in infrastructure maintenance to annual Forest and State budgets. Make this part of recreation and wildlife budgets, and also consider paying for with CIP or other funds.

5. **<u>Research capture mortalities -</u> IGBST needs to detail the protocol they have implemented to minimize capture mortalities.**
   - IGBST - During August 2008 IGBST personnel conducted research trapping efforts on the Caribou Targee National Forest, Idaho. Between 9–26 August crews captured 9 individual grizzly bears on 11 occasions. Two handling related deaths occurred. Both bears (males #563 and #595) were captured in culvert traps and handled on 24 August. In both instances standard protocols were followed and characteristics of the anesthesia, handling events, and recoveries were unremarkable. Bear #595 was found dead by a hunter on 31 August. Necropsy and subsequent laboratory analysis was

completed by the Wildlife Health Laboratory, Idaho Department of Fish and Game and attributed cause of death to a Clostridial (*Clostridium spp.*) infection at the anesthesia injection site. A similar pathology was suspected but specific cause of death could not be confirmed for bear #563 because the carcass was not discovered until 4 September and decomposition was more advanced. Clostridium as an agent in handling related mortalities of bears is rare, appearing only once in the literature (Barnes and Rogers 1980). Clostridial infections are known to cycle with weather and moisture conditions and incidents of complication from the bacteria were high in ruminates in the general vicinity of these captures during 2008 (Phil Mamer, Wildlife Veterinary Medical Officer, Idaho Department of Fish and Game). As a result of these mortalities handling protocols were reviewed and amended to included application of a prophylactic antibiotic (Dual-Pen) that is affective for Clostridium.

- ID - New protocols need to be written up and distributed to states as well as Wildlife Services before summer 2009.
- WY - It may be important to state that capturing and handling wildlife has its risks.

6. <u>Front country conflicts -</u> **Better management of bears and people along the NF on the Shoshone primarily at bear jams. Most of these bears die due to some cause like food rewards, vehicle collisions, habituation, etc. Would it be possible to ask WDOT to reduce the speed limit on the North Fork highway? Perhaps use of electronic reader board signs at sites of recent road side bear activity in an effort to slow traffic down?**
   - WY - More agency presence in the North Fork, more enforcement of food storage a bear-human proximity regulations.

7. <u>Livestock allotment conflicts –</u> **Explore the possibility of extending the non-use period on allotments with recurring conflicts with grizzly bears. In addition, take a look at alternative grazing strategies to minimize conflicts. Cow/calf operations in grizzly habitat are much more vulnerable than yearling operations. This may require changes in USFS allotment management guidelines/standards.**
   - WY - Better educate livestock producers about bear-livestock conflicts and compensation programs, possibly use allotment buyout programs.
   - USFS - Allow resource protection nonuse to continue beyond the normal timeframe when it is reducing likely conflicts with predators.

8. **There is a need for improved subdivision regulations relating to sanitation and development in bear habitat. Teton County, WY and Park County, ID have new regulations. Montana is developing wildlife specific subdivision regulations that will be avail be in mid-2009. These will be distributed to all YGCC agencies.**

Table 4. Ratings of mortality reduction suggestions. These are subjective and relative ratings. Highlighted items show the highest priority issues where the greatest gains can be made in morality reduction. Of the 33 suggestions listed, 11 are highlighted as priority items.

Issue	Important	Effective action?	$$ Cost	Public support cost	Time	Lead agency	Overall value mort. reduction	Realistic
Reduce Hunter-Related Mortalities								
1. Outreach on use of spray	Medium	Medium	Low	Low	Long	I & E	Medium	Yes
2. Database on death causes	High	High	Low	Low	Short	IGBST	High	Yes
3. Require carry of spray	Medium	Medium	Low	Medium	Long	States	Medium	No
4. Better knowledge of bear behavior by public	medium	Medium	Low	Low	Long	All	Low/medium	Yes
5. Don't call alone	High	High	Low	Low	Short	States	High	Yes
6. Season date changes	Low	Low/medium	High	High	Long	States	Low	No
7. Better knowledge of WBP and behavior	High	High	Low	Low	Short	All	High	Yes
8. Emerg. closures in key conflict areas	Yes	High	Medium	High	Short	All	High	Yes
9. Hunting limits if mortality increases	Yes	High	High	High	Long	States	Medium	No
10. Increased agency presence	High	High	High	Low	Long	States USFS	High	Yes
11. Better carcass mgt.	Medium	Medium	Low	Medium	Short	States	Medium	Yes
12. Replace tags if conflict	Medium	Medium	Low	Low	Low	States	Medium	Yes
13. Pack meat out first	Medium	Low/medium	Low	High	Medium	States	Medium	No
14. Link tag spray discount	Medium	Low	Low	Low	Medium	States	Low	Yes
15. Full page ads	Low	Medium	High	Low	Medium	I & E	Low	No
16. Link mortalities to grizz season	High	High	Low	Low	Short	States	High	Yes
17. Require video viewing	Medium	Medium	Low	Low	Medium	States	Medium	Yes
18. More Tribal outreach	Low	Medium	Low	Low	Medium	Tribes	Low	No
19. Tribal mort management	Low	Medium	Low	Low	Medium	Tribes	Low	No

Table 4 (continued). Ratings of mortality reduction suggestions. These are subjective and relative ratings. Highlighted items show the highest priority issues where the greatest gains can be made in morality reduction. Of the 33 suggestions listed, 11 are highlighted as priority items.

Issue	Important	Effective?	$$ Cost	Support cost	Time	Lead	Overall value mort. reduction	Realistic
20. New products	Low	Medium	Low	Low	Long	Private	Low	No
21. Letter to outfitters on spray	High	Medium	Low	Medium	Short	States/USFS	Medium	Yes
Reduce Mistaken Identity Kills								
1. More ID efforts	High	High	Low	Low	Short	States	High	Yes
2. Describe density	Medium	Medium	Low	Low	Short	States	Medium	Yes
3. Measure outreach	High	High	Medium	Low	Medium	All	High	Yes
4. Change shoot hours	Low	Medium	Medium	High	Long	States	Medium	No
Reduce Other Sources of Mortality								
1. Project future distribution	Low	Low	Low	Low	Medium	IGBST	Medium	Yes
2. Enhance sheep outreach	High	Medium	Low	Medium	Short	USFS/states	Medium	Yes
3. Trace bear history	Low	Medium	Low	Low	Short	IGBST/states	Medium	Yes
4. Overall sanitation strategy	High	High	Low	Low	Medium	YGCC	High	Yes
5. Research handling improved	High	High	Low	Low	Short	IGBST	Medium	Yes
6. NF highway fix	Medium	Medium	Medium	Medium	Long	States/USFS	Medium	Yes
7. Allotment non-use changes	High	High	Low	Medium	Medium	USFS	High	Yes
8. Better subdivision regulations	High	High	Low	Low	Medium	Counties/states	High	Yes

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Appendix I. Actions proposed in the 2004 Yellowstone Mortality Report and actions implemented and accomplished 2004-2008.

Issue	Agency	Actions Proposed in 2004	Actions Accomplished since 2004
Site Conflicts	All	Bear- proof all garbage facilities	MT: improve securing at collection sites within PCA and beyond. ID/CT - Attempted to seek funding for pilot project in Island Park. While funding has yet to come through, local trash hauler has been very open to working with residents and thanks to funding from USFWS via CT, more and more bear resistant containers have been placed at public locations. GTNP: accomplished prior to 2004. In addition, in 2007 we initiated the "Wildlife Brigade" program to manage bear jams and provide increased capacity for food storage compliance. In 2008: 1) we hired a permanent bear management office coordinator to supervise the Wildlife Brigade and coordinate all bear management actions among all divisions park-wide. The Wildlife Brigade was comprised of 11 people that included 2 paid staff, 2 paid interns, and 7 volunteers. This crew responded to 212 bear jams during the summer to manage the human-bear interface and contacted thousands of visitors in the process. One hundred twenty two (58%) of these were grizzly bear jams. Management of people and bears along roadsides was successful and resulted in no park visitors being injured by bears along roadsides, and no roadside habituated bears had to be captured or removed from roadsides in management actions; 2) initiated a new bear food storage box campaign in coordination with Grand Teton National Park Foundation. Purchased and installed 52 large food storage boxes in front country campgrounds and picnic areas. Plan to continue this program until all front country facilities have food storage boxes; 3) began installing latches on mailbox-type dumpsters and garbage cans to safeguard them from bears that learn to access this type of receptacle. GYA National Forests from 2004-2008 purchased and installed 69 dumpsters, 124 food boxes, 6 garbage cans, 171 food poles, and 4 garbage trailers. Significant signing for Food Storage Orders (FSO) occurred during this time. See Figures 1 and 2 below. Forests have worked to ensure that dumpsters ordered are compatible with requirements of garbage haulers. Extensive FSO I&E signing work has occurred from 2004-2008 on and around the GYA National Forests. See Figure 3 below. Since 2006, much of this work was accomplished with USFWS funding. As the bear range expands, more infrastructure work is needed. SNF has increased field presence during hunting season in the last 2 years.
		Work with haulers	WGFD: Worked with Teton County, WY to pass a regulation

		Distribute articles on Arizona mauling highlighting liabilities of poor food storage	requiring bear proof garbage storage and proper hanging of bird feeders. Attempts at passing a similar regulation in Park Co., WY failed. WGFD: Sold reduced price bear resistant garbage cans in Park Co., WY. Waste management companies in Park, Fremont, Teton, and Sublette counties in Wyoming offer bear resistant garbage containers to customers in grizzly bear habitat. WGFD: Worked with numerous private property owners in Wyoming to properly store bear attractants. MT- Hauler cooperation in Gallatin, Carbon and Sweet Grass Counties. IDFG and C-TNF have worked cooperatively with haulers and Island Park businesses to provide bear resistant containers in the community and "bear proof" two organizational camps. 30 bear proof dumpsters, 30 residential containers and 70 food storage boxes have been distributed. WGFD: Arizona bear mauling liability was discussed with select individuals in the public and local governments
	States	Use NF Shoshone as sanitation demonstration area - fund person dedicated to it As part of #1 - establish a bear-safe community as an ecosystem example Work harder to get private partnership for sanitation – private lands	WGFD: Hired a Bear Wise Community Coordinator to lead Bear Wise Community projects in Park and Teton counties, WY. WGFD: The North Fork Bear Wise Working Group was established and has taken numerous actions to reduce human-bear conflicts in the Wapiti area of Wyoming. ID/CT – While not official, Island Park, ID has been the focal point of efforts to work with the local government to increase sanitation awareness. Local ordinance was modified to address sanitation issues. MT: Co-op efforts with Gardiner Chamber Commerce and Boulder River Watershed Association ID/CT – Sanitation projects completed at North Fork Club & Island Park Boy Scout Camp in conjunction with private club & BSA and Defenders to place bear resistant trash containers & food storage boxes. ID- Business "cost share" for dumpsters in 2008 was successful. Defenders of Wildlife and GYC have been helpful. Creation of multi funded Carnivore position that focuses on bear mgt during snow free months with USFS and WCS. WGFD: Waste management companies in Park, Fremont, Teton, and Sublette counties in Wyoming offer bear resistant garbage containers to customers in grizzly bear habitat.
	Counties	Highlight public safety of proper garbage/food storage	Tri -county Bear Committee (Clark, Fremont and Teton counties) in Idaho with USFWS, FS, IDFG, Idaho Parks and Rec. and public participation to focus work help with funding etc. Since 2006.

		Evaluate all existing garbage/human – food regs. and highlight problems Resolve jurisdictional problems on mgt of bear viewing on NF Shoshone	WGFD: Worked with Teton County, WY to pass regulation requiring bear proof garbage storage and proper hanging of bird feeders. Attempts at passing a similar regulation in Park Co., WY failed. Numerous presentations on bear-resistant waste management have been made to local governments. ID- Tri County Sanitation Group formed to work with IDFG & USFS in addressing bear related concerns, primarily related to sanitation issues. ID-A Grizzly Bear Communications MOU was drafted and approved amongst local, state, & federal agencies to outline protocol for dealing with grizzly related emergency situations.
	USFS	Work harder to get private partnerships for sanitation on public lands Fix lack of public funding and commitment to sanitation on public lands Internal support for infrastructure for easier compliance w/food storage Proper carcass management/ current system needs improvement	The GYA Forests have made many attempts to work with private partners and have had some successes (e.g. C-T w/ Island Park community businesses, etc) There have been fairly good efforts in recent years, but budget declines make maintenance demands difficult to meet, much less needs for additional sanitation equipment in areas where bears are starting to appear. Significant internal support for infrastructure for FSO compliance-on most of the B-T and entire GNF front country Forest-wide has wildlife-resistant food and garbage storage available. C-T has expanded food storage and sanitation infrastructure to areas outside the PCA in occupied habitat and is currently working on expected expansion areas. There has been significant work to improve the types and availability of bear resistant containers between the USFS or and the Montana Technical Development Center (MTDC). Inspection and testing of containers is ongoing for containers to be used on either private or public lands. Products may be tested with live bears at the Grizzly Bear and Wolf Discovery Center in West Yellowstone. Products received star ratings, and food storage lockers and garbage containers must have 4 or 5 stars to be used on public lands where food storage is required. Courtesy inspections are available for containers built for personal use only, and these containers receive and IGBC sticker and inspection report. New products continue to be tested. More information is available from this website including many products that have passed the test of being 'bear resistant'. http://www.igbconline.org/html/container.html under IGBC Certified Bear-Resistant Containers. In some communities, the FS has worked with local retailers to

			make bear resistant backpacking canisters available. Some Forests loan out bear resistant equipment such as panniers and backpacker caches. B-T personnel, during outfitter/guide annual operating plan meetings, are encouraging outfitters to have bear spray available for use by guides and clients, with the guides providing clients information on use of the spray.
	NGOs	Magazine articles in birding magazine on feeding birds in bear country	ID-Summer 2007 issue of Teton Living magazine featured story on living in bear country, discussing issues related to bird seed and bears.
Self Defense	All	Promote pepper spray Hunter ed. Classes Work w/ retailers & interest groups such as guides, media, etc. See Yell I&E plan	MT: Recommended on signs, literature, website, & verbally. ID – Thanks donation of 1,000+ training canisters of bear spray by the Sierra Club, hundreds of small and large-scale demonstrations have been given. Bear spray has been featured on no less than a dozen TV news stories in Idaho since 2004, with reporters demonstrating use of training canisters. GTNP: use of bear spray recommended in bear-related park literature and training. Carrying bear spray required by all elk reduction program participants. Bear spray issued to all park staff with field duties. IDFG/C-TNF Education Tech makes public contacts, individual home contacts, public meetings and outreach education since 2004. WGFD: Numerous PSA's, newspaper articles, press releases, public presentations, and demonstrations on the use of bear spray and bear safety. USFS employees usually carry bear spray in the field during the non-winter seasons (for some Forests it is mandatory). MT- Addition of bear safety to Archery & Hunter Ed courses. ID – Teacher workshops such as Project WILD & WILD in the Yellowstone Ecosystem have all had a bear smart component and all teachers (300+) have had the chance to shoot spray from training canisters. WGFD: Education and training in all hunter education classes in the state. Hunter/bear safety info posted at sporting good stores. WGFD: Numerous presentations, PSA's, newspaper articles, press releases on bear behavior and ecology WGFD: Presentation to Wyoming Association of Outfitters and Guides annual meeting.

		Better marketing of multi species benefits of access Issues Work to change perspectives on dangers and behavior of bears	GYA Forests have presented numerous I&E presentations on grizzly bears, bear safety and bear spray from 2004-2008 (see Figure 3). A number of Forests are in the process or partially completed with Travel Management Planning, and the consequences of actions for all species of wildlife are addressed. Generally, significant mileage of motorized routes is being closed during Plan implementation. GNF has MS student working on over 10 yrs of data collected in the A/B Wilderness regarding bear and human behavior, bear safety, bear spray, effectiveness of I&E, etc. Data is currently undergoing analysis. B-T is a participant in an interagency/county/NGO committee sharing a multi-media message on living in bear country in Teton County ID-Specific television, newspaper, and radio news stories have been done in 2006, 2007, 2008 to alert hunters of potential grizzly encounters in Island Park near high-fence operation where elk gut piles were being dumped and bear attack occurred in fall 2007. Bear behavior/biology promoted on website.
	States FWS	Meet with prosecutors/legislators on the needs for successful Law Enforcement	MT: County Attorney support of illegal cases. WGFD: Penalties for mistaken ID killings have increased significantly to >$10,000 in some cases.
	States	Possible benefits of future grizzly season Improve all hunter I&E Evaluate black bear season structure	MT: Departmental discussions and public support when biologically sound and authorized. WGFD: Have made the public aware that mortalities in excess of the quota reduces the harvestable surplus of bears. MT- Increased hunter/bear info – signs, PSA, literature, presentations. Mandatory ID test for all black bear hunters. ID- Every year hunters holding late season elk tags in units where grizzly bears might be encountered receive by mail a copy of the IDFG publication, Hunting in Bear Country. GTNP: now distributes hunter-grizzly bear conflict information in all mailings to elk reduction program participants. IDFG/C-TNF Education Tech makes public contacts, individual home contacts, public meetings and outreach education since 2004. Creation of multi funded Carnivore position that focuses on bear mgt during snow free months with USFS and WCS. WGFD: Hunter-bear conflict training is part of all mandatory hunter education classes.

			WGFD: There has been no change in black bear season structures
	States NGOs	Enhance reward system for illegal kills/advertise Rewards	MT: Tip-Mont program has ability for cash rewards. ID- Major PR campaign was done to promote joint rewards for Sawtell Peak sow & cub poaching. Outcome of trial was promoted in print, radio, & TV and drew lots of public interest. WGFD: $10,000+ rewards offered for illegal kills WGFD: Press releases advertising rewards.
		Magazine articles – NGOs magazines/TV spots /editorials/education efforts	ID-Living in Bear Country presentations given to Idaho Environmental Educators Conference in 2008 and at the Idaho Museum of Natural History in 2007. 2007 event resulted in feature article in Idaho State Journal in Pocatello, Idaho.
	USFS	Enforcement of existing regulations/internal support	USFS law enforcement increased warnings and tickets from 2004-2007 for all Forests with a slight decline in 2008 (see Figure 4 below)
		Need more funding for enforcement	Declining budgets are a concern for efforts to provide a field presence on the Forests during hunting seasons.
Vandal Killing	All	Promote pepper spray	MT: Same as self-defense efforts. ID- IDFG website had a special section created to specifically address grizzly bear related issue and linked to IGBC & CWI sites. Online reporting form was created and promoted to public to help keep track of movement of grizzly bears. IDFG/C-TNF Education Tech makes public contacts, individual home contacts, public meetings and outreach education since 2004. Bear education is included in hunter ed classes in SE Idaho. Creation of multi funded Carnivore position that focuses on bear mgt during snow free months with USFS and WCS. USFS employees usually carry bear spray in the field during the non-winter seasons (for some Forests it is mandatory).
		Hunter ed classes	GTNP: In 2007 conducted thorough review of park-wide bear information and education program. Updated and revitalized program with "be bear aware" as a consistent message on all materials. Added new signing throughout the park. New materials provided to all elk reduction program participants. WGFD: Numerous PSA's, newspaper articles, press releases, public presentations, and demonstrations on the use of bear spray and bear safety.
		Work w/retailers & interest groups such as guides, media, etc.	WGFD: Education and training in all hunter education classes in the state. B-T personnel, during outfitter/guide annual operating plan meetings, are encouraging outfitters to have bear spray available for use by guides and clients, with the guides providing clients

		See Yell I&E plan Better marketing of multi-species benefits of access Issues Work to change perspectives on dangers and behavior of bears	information on use of the spray. WGFD: Presentation to Wyoming Association of Outfitters and Guides annual meeting WGFD: Numerous presentations, PSA's, newspaper articles, press releases on bear behavior and ecology A number of Forests are in the process of Travel Management Planning, and the benefits to all species of wildlife are addressed. USFS teaches bear safety and bear spray classes to all employees each spring or as new employees arrive on the Forest. B-T is a participant in an interagency/county/NGO committee sharing a multi-media message on living in bear country in Teton County. The USFS offers bear safety information and operates 2 visitor kiosks with information on bears running on monitors. ID-Between 2004 & present, IDFG staff have given dozens of bear safety talks or included bear safety as part of presentations made to school groups, community groups, scout groups, and sportsmen's groups.
	State FWS	Meet with prosecutors/legislators on the need for successful LE	MT: Same as self-defense efforts. WGFD: Penalties for mistaken ID killings have increased significantly to >$10,000 in some cases.
	States	Possible benefits of future grizzly season Improve all hunter I&E Evaluate black bear season structure	WGFD: Have made the public aware that mortalities in excess of the quota reduces the harvestable surplus of bears. WGFD: Hunter-bear conflict training is part of all mandatory hunter education classes. MT: Same as self-defense efforts. IDFG- Hunter contacts in field, and brochure sent to elk tag holders in Idaho portion of GYE. WGFD: There has been no change in black bear season structures
	States NGOs	Enhance reward system for illegal kills/advertise rewards Magazines articles – NGO magazines/TV spots /editorials/education efforts	MT: Same as self-defense efforts. WGFD: $10,000+ rewards offered for illegal kills WGFD: Press releases advertising rewards.
	USFS	Enforcement of existing regulations/internal support/ need more funding for enforcement	USFS has patrolled and citations and warnings for FSO violations have increased from 2004-2007 with a slight decline in 2008 which could be due to decreased patrols or increased compliance or both; good internal support for fall hunter patrols, patrols and summer

			patrols in the Teton and Gros Ventre Wilderness areas on the B-T but not always the funding to accompany it.
Mistaken ID	**All**	Promote bear spray	MT: Same as self-defense efforts. ID- Fall of 2007 & 2008 the large, Bear Country Display was placed in the lobby area of the Idaho Falls Airport for the months of October through January for all airport passengers to view. ID/CT- Programs such as Beers & Bears have been conducted in Island Park & Victor to help educate the public. IDFG/C-TNF Education Tech makes public contacts, individual home contacts, public meetings and outreach education since 2004. Creation of multi funded Carnivore position that focuses on bear mgt during snow free months with USFS and WCS. USFS employees usually carry bear spray in the field during the non-winter seasons (for some Forests it is mandatory)
		Hunter ed classes	B-T personnel during outfitter/guide annual operating plan meetings are encouraging outfitters to have bear spray available for use by guides and clients, with the guides providing clients information on use of the spray. WGFD: Numerous PSA's, newspaper articles, press releases, public presentations, and demonstrations on the use of bear spray and bear safety. WGFD: Education and training in all hunter education classes in the state.
		Work w/retailers & interest groups such as guides, media, etc.	WGFD: Presentation to Wyoming Association of Outfitters and Guides annual meeting WGFD: Numerous presentations, PSA's, newspaper articles, press releases on bear behavior and ecology
		See Yell I&E plan	
		Better marketing of multi species benefits of access Issues	A number of Forests are in the process of Travel Management Planning, and the benefits to all species of wildlife are addressed. The GNF and B-T Travel Plans have major benefits for wildlife, including grizzly bears.
		Work to change perspectives on dangers and behavior of bears	USFS teaches bear safety and bear spray classes to all employees each spring or as new employees arrive on the Forest. Also see Figure 3 below on I&E presentations. . B-T is a participant in an interagency/county/NGO committee sharing a multi-media message on living in bear country in Teton County.
	States FWS	Meet with prosecutors/legislators on the needs for successful LE	MT: Same as self-defense efforts. WGFD: Penalties for mistaken ID killings have increased significantly to >$10,000 in some cases.

	States	Possible future grizzly season Improve all hunter I&E Evaluate black bear season structure	WGFD: Have made the public aware that mortalities in excess of the quota will reduce the harvestable surplus of bears. WGFD: Hunter-bear conflict training is part of all mandatory hunter education classes. WGFD: PSA's, articles, training, and handouts on bear ID MT: Same as self-defense efforts. Bear education is included in hunter ed classes in SE Idaho. Hunter contacts in field, and brochure sent to elk tag holders in Idaho portion of GYE. WGFD: There has been no change in black bear season structures
	States NGOs	Enhance reward system for illegal kills/advertise rewards Magazine articles – NGO magazines/TV spots/editorials/education efforts	MT: Same as self-defense efforts. WGFD: $10,000+ rewards offered for illegal kills WGFD: Press releases advertising rewards.
	USFS	Enforcement of existing regulations/internal support/ need more funding for enforcement	USFS has patrolled and citations and warnings for FSO violations have increased from 2004-2007 with a slight decline in 2008 which could be due to decreased patrols or increased compliance or both; good internal support for fall hunter patrols, but not always the funding to accompany it.
Livestock	States FWS	Increased R&D on and use of deterrents such as electric fencing, guard dogs	MT: Numerous tests and successful applications of electric fencing. WGFD: Obtained funding and built one electrified sheep night pen. WGFD: No additional R&D. WGFD: Obtained funding started carcass management program on private lands.
	States	Develop partnership with state DOTs and FHWA	MT: Good relations regarding animal carcasses & securing attractants.
	GTNP	Cattle grazing management	Since 2004 permanently moved legislatively authorized cattle from allotment within PCA (good bear habitat) to vacant allotment south of PCA (poor bear habitat). Operator changed livestock from cow/calf to yearling operation.
	USFS	Proper carcass management/current system needs improvements Opportunistically phase out sheep allotments to minimize conflicts Require deterrent use as part of grazing permits for livestock on public lands	B-D and B-T have a carcass handling protocol in place for carcasses located in hazardous locations. FSO's have 'distance from camp and trail' requirements. GNF - Phased out all sheep allotments and do not plan to restock them. Some of these are officially closed. Few, if any, conflicts between bears and cattle allotments in MT. There is internal support to minimize conflicts. SNF has eliminated cattle grazing on 2 pastures (DuNoir allotment) with consistent bear/cattle conflicts. There continues to be cattle depredation on the B-T. There is only one any active sheep allotment located partially on a National Forest (C-T) within the PCA. This is the US Sheep Experimental Station in the Centennials. There are also active

		Promote internal support for proper allotment management to minimize conflicts	sheep allotments in areas where the bear population is expanding (B-D and B-T). Some Forests encourage or require range riders in some locations.

Figure 1. Major additions to GYA Forest Food Storage Order infrastructure from 2004-2008.

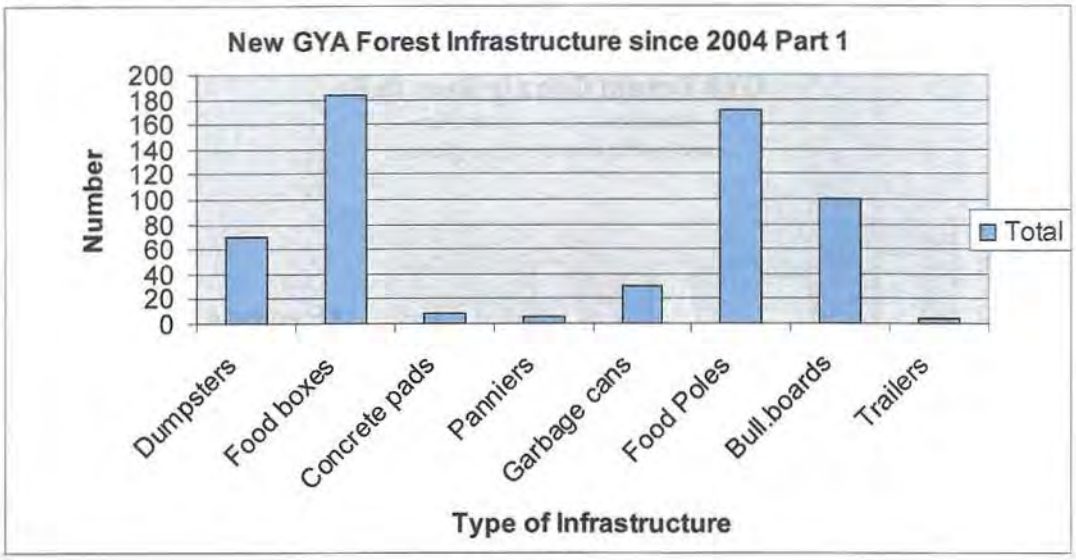

Figure 2. Increased Food Storage Order signing on GYA National Forests from 2004-2008.

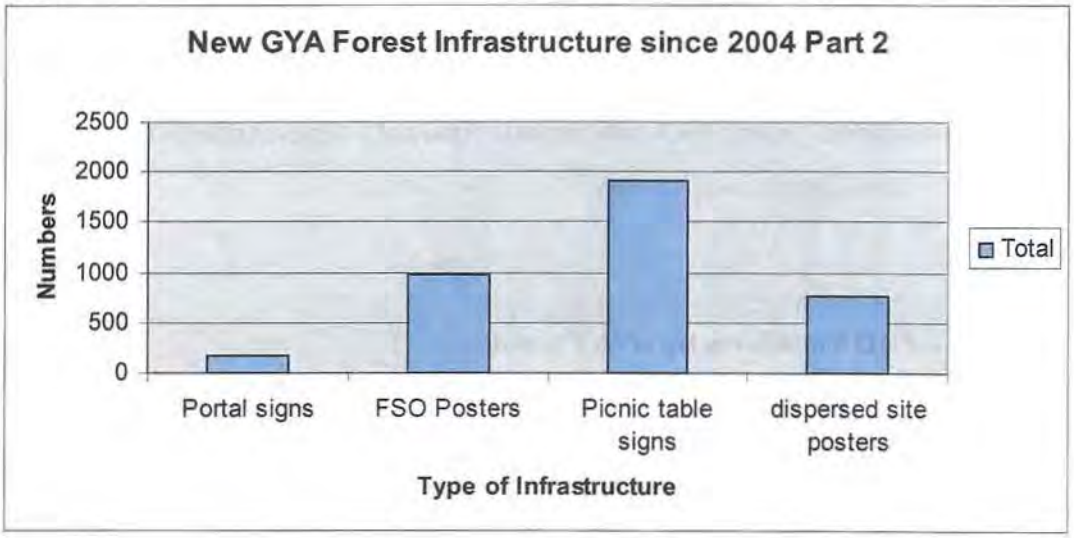

Figure 3. GYA Forest grizzly bear I&E presentations made to the public. (This figure does not include door to door contacts occurring in some communities such as Island Park, ID.

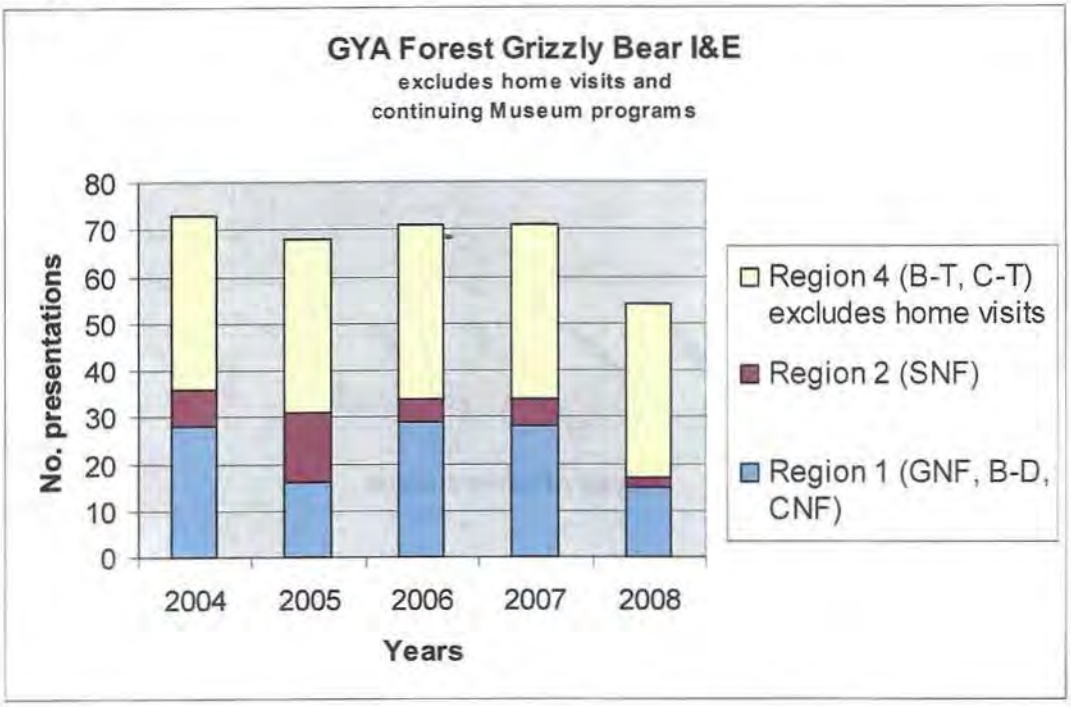
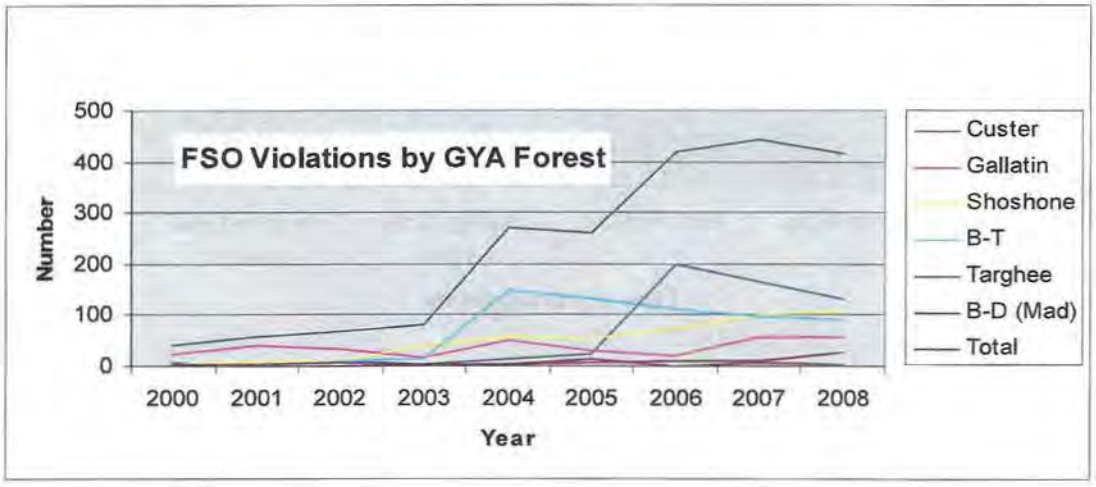
Figure 4. Food Storage Order Violations (warnings, incident reports, tickets) by GYA Forest from 2000-2008. Note that many Forests expanded their Food Storage Orders during this time period. Many FSOs now include National Forest outside of the PCA.