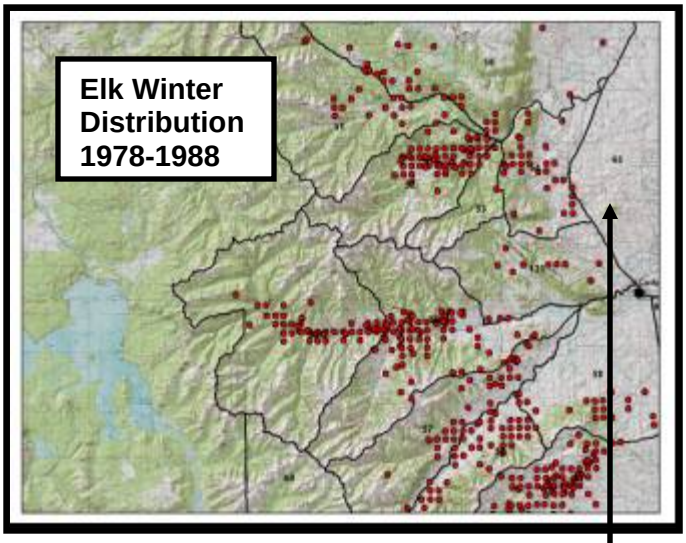
# Absaroka Elk Ecology Project

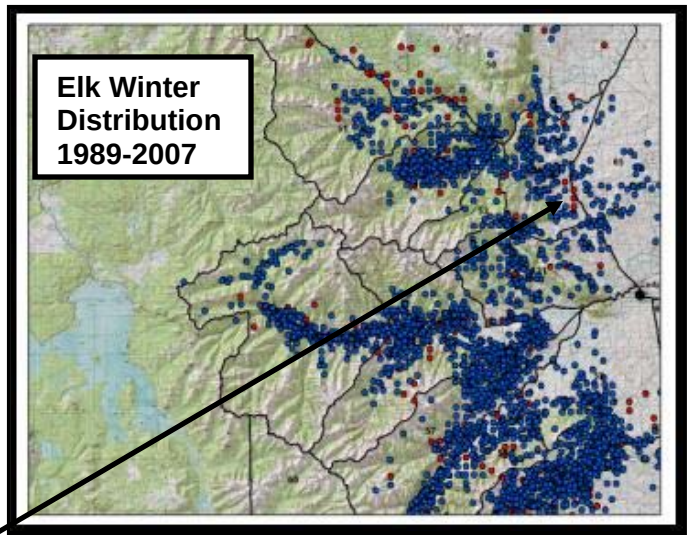
## 2009 Update

**Introduction**

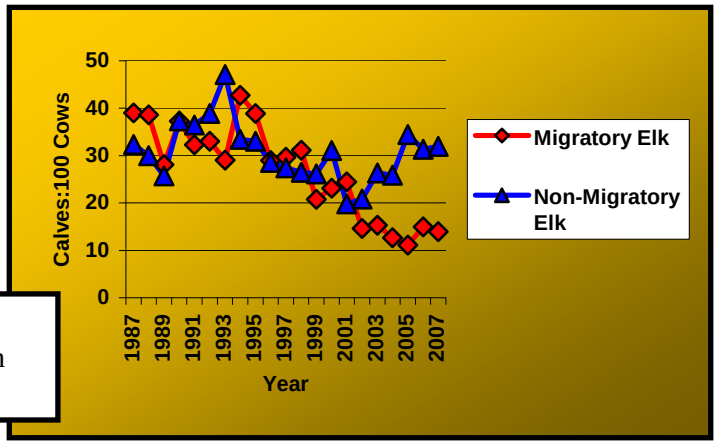
The Wyoming Game & Fish Department, the University of Wyoming, and the U.S. Fish & Wildlife Service initiated the Absaroka Elk Ecology Project in January 2007. Objectives of this project include:

- *Determine the status of migratory and non-migratory elk in the Clark's Fork Herd Unit.*
- *Determine the timing of migrations and routes used by migratory elk.*
- *Increase understanding of elk use of private lands.*
- *Determine adult female survival rates.*
- *Develop habitat selection models to determine critical habitats for migratory and non-migratory elk.*
- *Evaluate the influence of wolves on elk habitat selection and movements.*

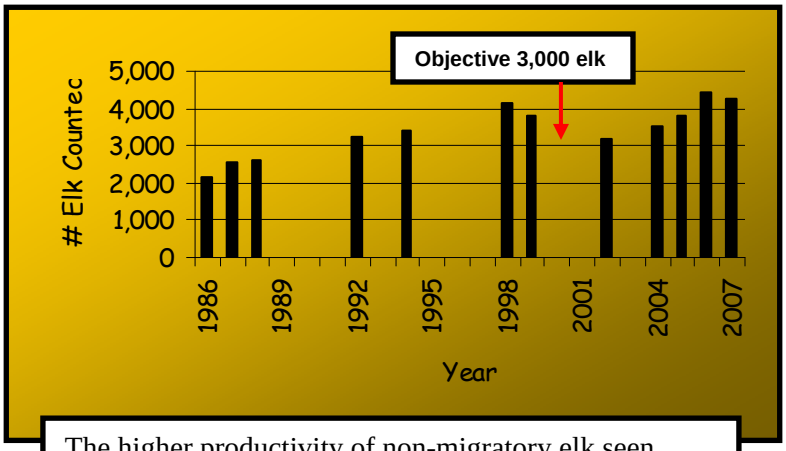


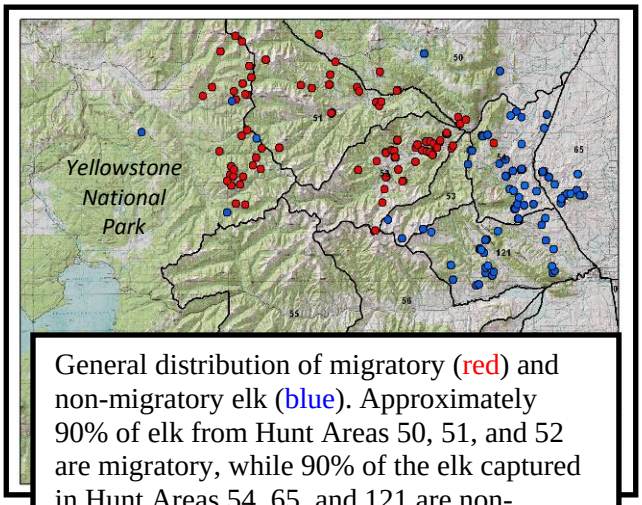

In the last 20 years a dramatic shift in elk distribution has occurred, with more elk frequenting low elevation areas along the Absaroka Front. Most of these areas are on private land.




When compared to migratory elk, non-migratory elk on private lands have been considerably more productive with higher calf-cow ratios in recent years.




The higher productivity of non-migratory elk seen recently has allowed the Clark's Fork herd to grow well above the population objective of 3,000 elk.

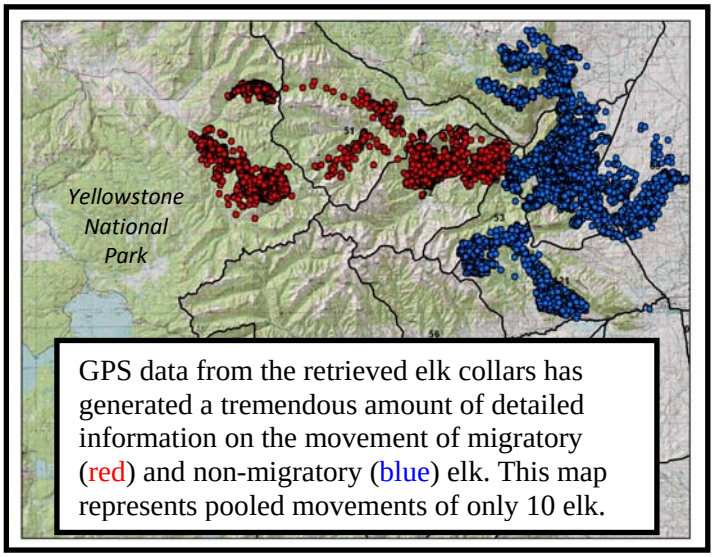



General distribution of migratory (red) and non-migratory elk (blue). Approximately 90% of elk from Hunt Areas 50, 51, and 52 are migratory, while 90% of the elk captured in Hunt Areas 54, 65, and 121 are non-migratory.

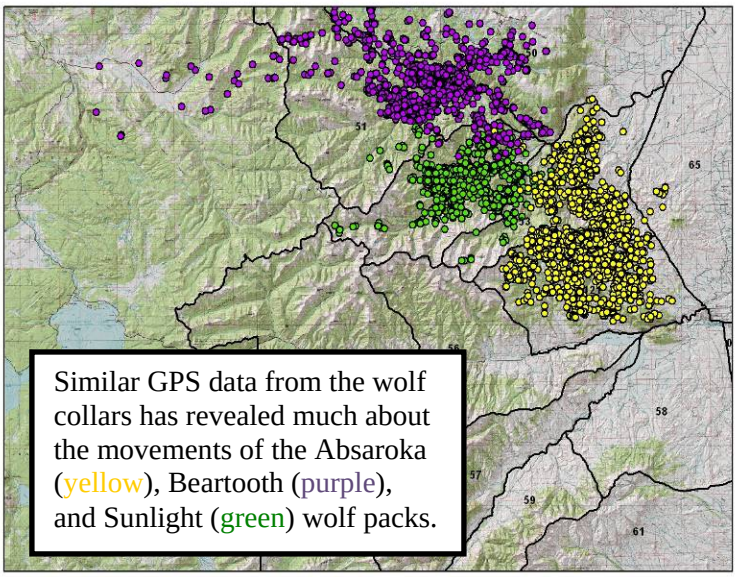
To address the objectives of the study, a total of 75 adult female elk were captured in 2007 and 2008 and fitted with GPS radio collars. An additional 20 adult females were captured and fitted with conventional VHF radio-collars.

To date, 31 mortalities of collared elk have been documented. These include 16 hunter kills, 4 possible wounding losses, and 11 due to unknown causes.

Wolves captured by USFWS and USDA-Wildlife Services are GPS-collared and monitored in relation to elk distribution and movements. Additional collaring efforts are planned for winter 2010.

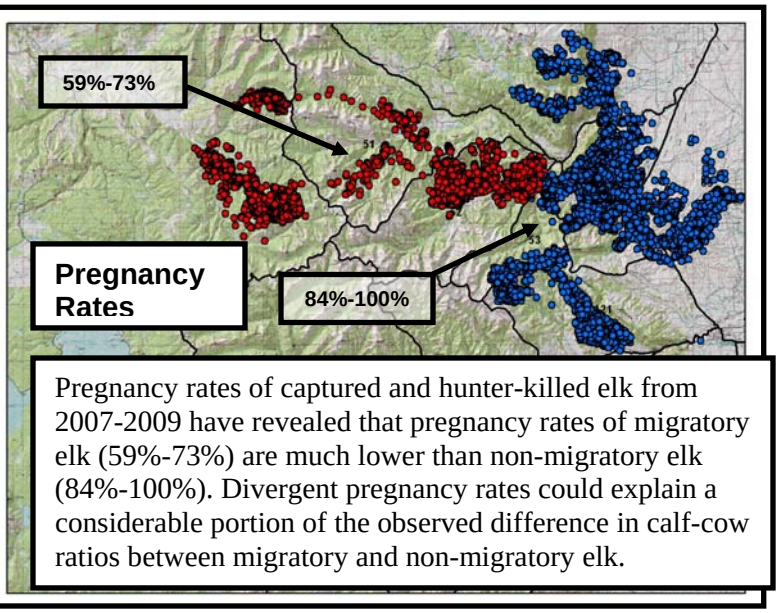



GPS data from the retrieved elk collars has generated a tremendous amount of detailed information on the movement of migratory (red) and non-migratory (blue) elk. This map represents pooled movements of only 10 elk.



Similar GPS data from the wolf collars has revealed much about the movements of the Absaroka (yellow), Beartooth (purple), and Sunlight (green) wolf packs.

Hunter checks and blood and tooth samples from hunter-harvested elk give data on age, pregnancy status, lactation status, and body condition. Information from hunter-killed elk is an important contribution to this study.



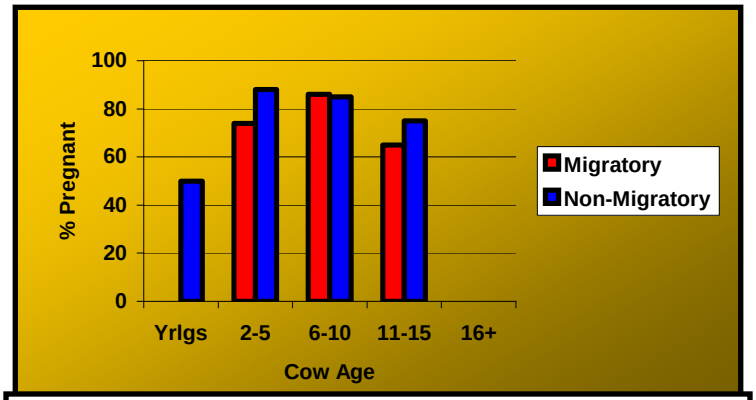

Pregnancy rates of captured and hunter-killed elk from 2007-2009 have revealed that pregnancy rates of migratory elk (59%-73%) are much lower than non-migratory elk (84%-100%). Divergent pregnancy rates could explain a considerable portion of the observed difference in calf-cow ratios between migratory and non-migratory elk.

Classifications of elk in late summer and early fall support pregnancy rate findings: calf-cow ratios of migratory elk were between 14:100 and 16:100 from 2007-2009, versus non-migratory elk calf-cow ratios between 38:100 and 41:100 during the same three years.

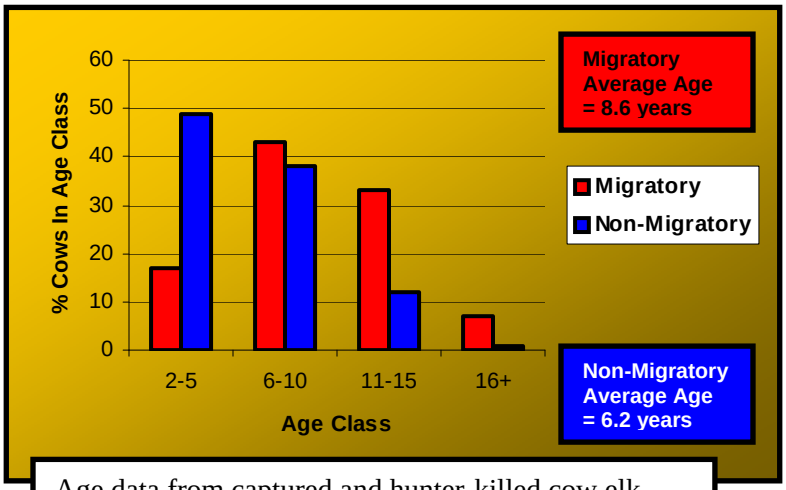
The pregnancy rate for migratory Clarks Fork elk is exceptionally low for Rocky Mountain elk, but why? To address this question, **additional project objectives** were developed. They include evaluation of how pregnancy rates might be influenced by:

- *Bull availability during the breeding season.*
- *Female age structure.*
- *Elk habitat selection.*
- *Elk body condition.*
- *Summer forage conditions.*
- *Wolf predation risk.*

Late summer-early fall classifications reveal that migratory adult bull-cow ratios (21:100) are not low enough to affect pregnancy rates. Yearling bull-cow ratios, however, are quite low (3:100) as a result of poor calf crops (non-migratory yearling bull-cow ratios are 11:100). This finding has major implications for future bull hunting opportunities for migratory elk, and in spring 2009 the local Sunlight-Crandall Elk Working Group relied on this and other information to recommend substantial harvest management changes before the Game and Fish Commission.



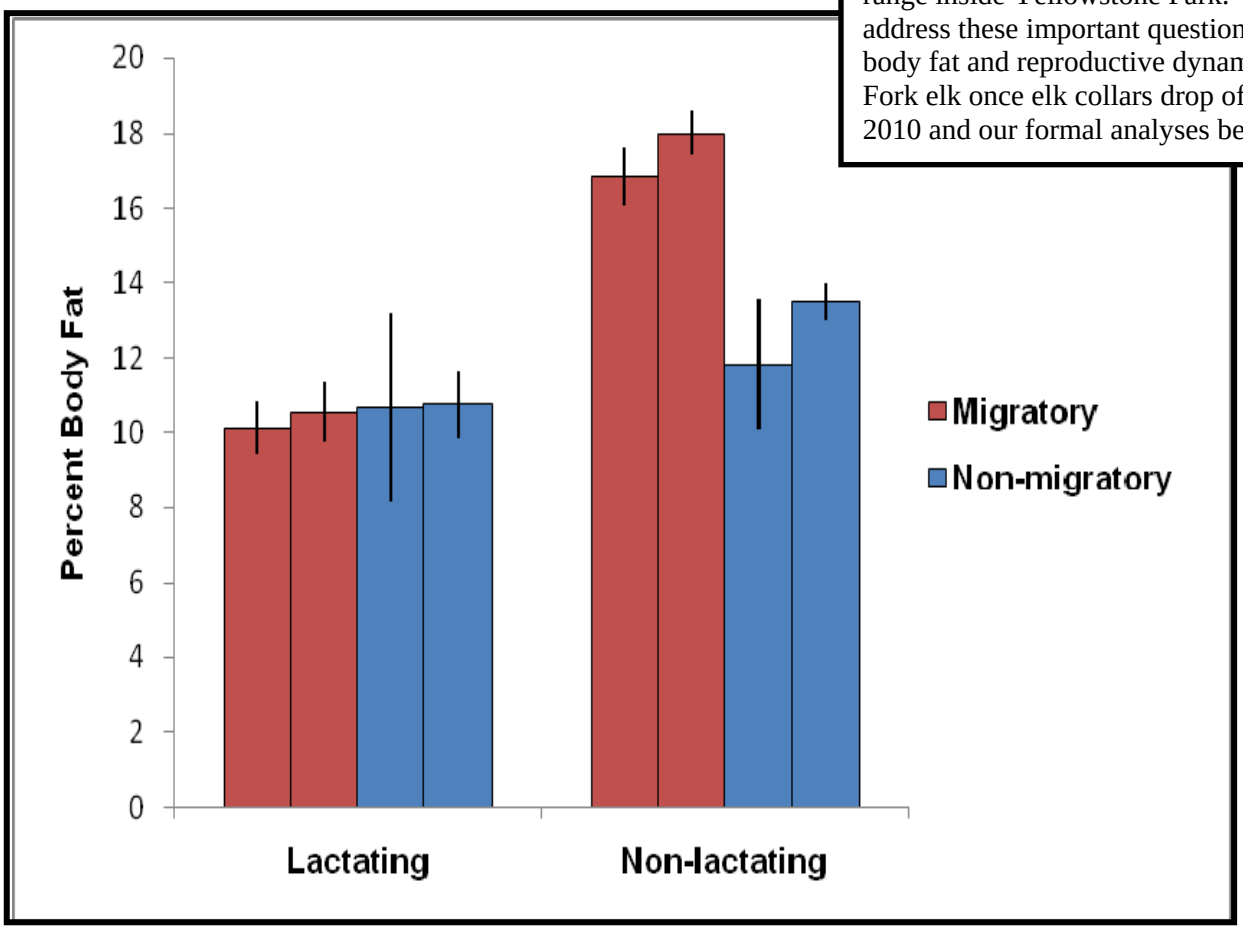

Pregnancy rates by age class seem to be different for migratory and non-migratory elk. Although migratory and non-migratory elk have similar pregnancy rates in the 6-10 year old age class, non-migratory elk have higher pregnancy rates in the younger age classes (yearlings and 2-5 year-olds) and older age classes (11-15 year olds). Younger cows with higher pregnancy rates suggest better nutrition for non-migratory elk and lower pregnancy rates for older cows may mean earlier reproductive senescence for migratory elk.

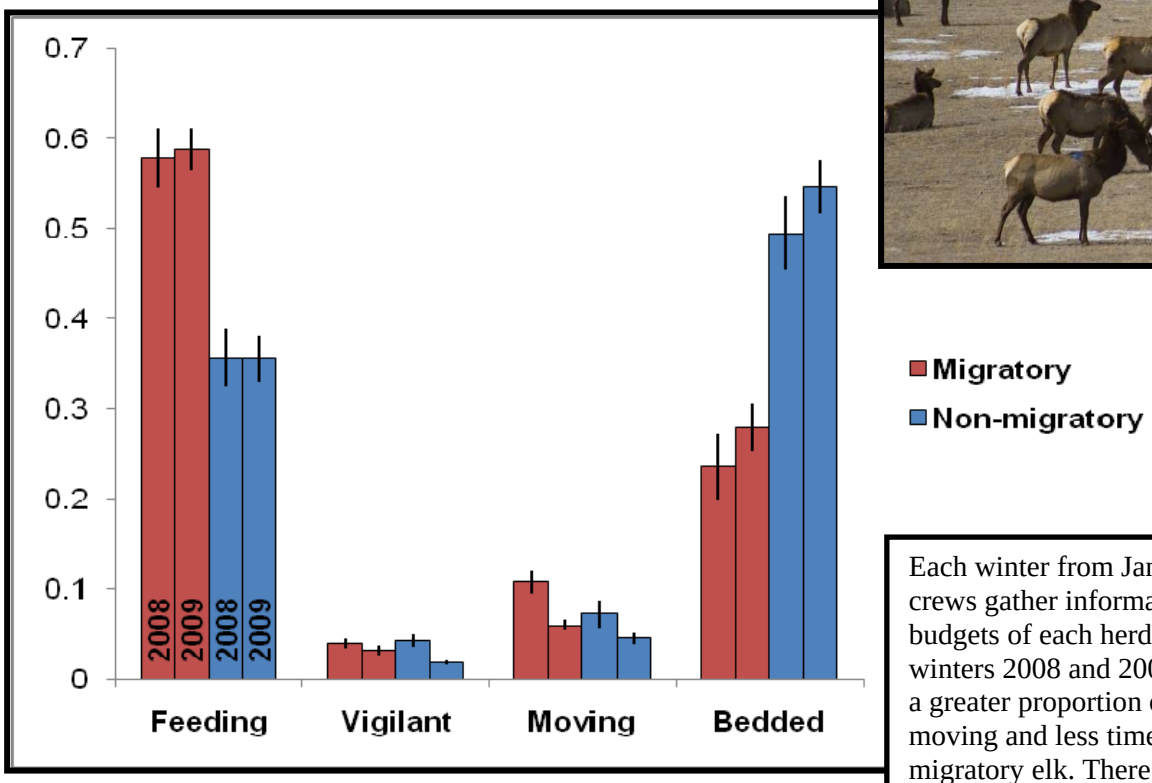



Age data from captured and hunter-killed cow elk show that non-migratory elk are younger in general, with more cows in the 2-5 year age class than migratory elk. Both migratory and non-migratory elk have relatively similar proportions of cows in the 6-10 year old class, and migratory elk have more 11-15 year, and 16+ year old cows. Still, average ages of migratory elk (8.6 years) were not dramatically different from that of non-migratory elk (6.2 years) to explain observed pregnancy rate differences.

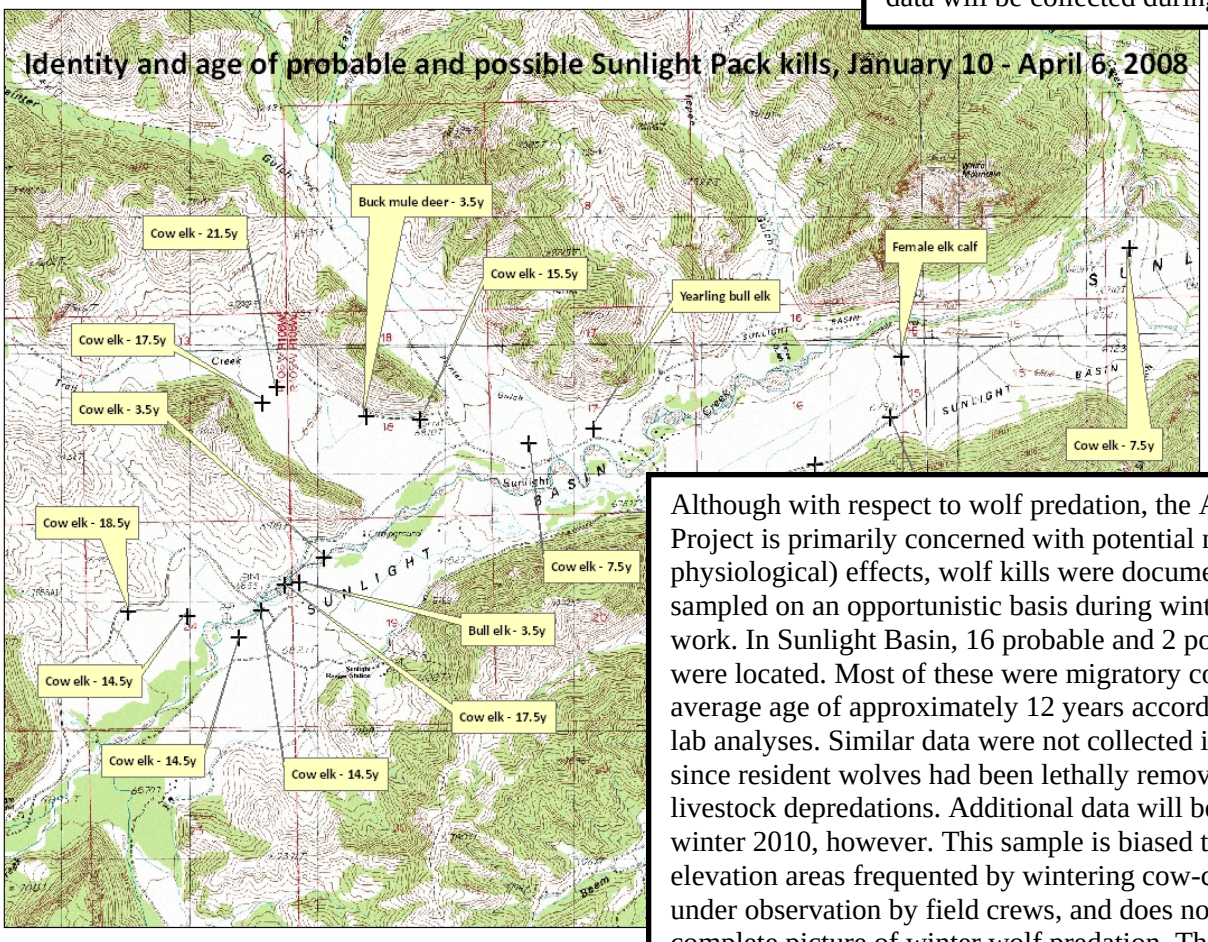
We sampled body condition and reproductive status of radio-collared elk during March and September 2008 and 2009. Both migratory and non-migratory elk came through winter in reasonably good condition both years. In March 2008, the differences were negligible at 5.6% body fat for migrants versus 6.1% for residents. In winter 2009, however, migrants were significantly fatter at 8.2% versus 5.3% for non-migrants. This slightly counterintuitive result – higher body fat for the herd segment believed to be facing poor nutritional conditions – is probably due to the combined effects of a particularly good precipitation year and a very low number of migratory elk carrying the high costs of lactation annually. Body sizes of both herd segments were quite small, averaging 434 lb for migratory elk and 429 lb for non-migratory elk. These are among the smallest body sizes of Rocky Mountain elk documented, which may be explained by nutritional limitations.

The September body condition sampling revealed that few (20%) migratory elk sampled were lactating, while most (80%) non-migratory elk were lactating, again supporting trends inr2 pregnancy rates and calf:cow ratios. Body fat levels of lactating cows were 10.4% for migratory elk and 10.7% for non-migratory elk. At this relatively low fat level for late summer, delays in breeding, delays in birthing, reduced growth rates of calves and yearlings, and smaller-sized adults would be predicted, but not necessarily the reduced pregnancy rates observed. The effect of good growing season precipitation in 2008 and the interaction of summer calf predation and adult nutrition could explain these findings. Interestingly, non-lactating migratory elk were exceptionally fat at 17.4%, which might be explained by lower pregnancy and higher rates of neonate predation on their summer range inside Yellowstone Park. We will better address these important questions about the body fat and reproductive dynamics of Clarks Fork elk once elk collars drop off in April 2010 and our formal analyses begin.






Each winter from January to April, field crews gather information on the time budgets of each herd segment. During winters 2008 and 2009, migratory elk spent a greater proportion of time feeding and moving and less time bedded than non-migratory elk. There were no significant differences in vigilance despite higher wolf densities on migratory range. Additional data will be collected during winter 2010.




Although with respect to wolf predation, the Absaroka Elk Project is primarily concerned with potential non-lethal (i.e., physiological) effects, wolf kills were documented and sampled on an opportunistic basis during winter 2008 field work. In Sunlight Basin, 16 probable and 2 possible kills were located. Most of these were migratory cow elk, with an average age of approximately 12 years according to state vet lab analyses. Similar data were not collected in winter 2009, since resident wolves had been lethally removed after livestock depredations. Additional data will be taken in winter 2010, however. This sample is biased toward the low-elevation areas frequented by wintering cow-calf elk groups under observation by field crews, and does not provide a complete picture of winter wolf predation. The information will nevertheless prove useful to regional wildlife managers.

Along with information being collected on elk habitat selection and wolf pack movements, data is being gathered on the forage quality of habitats that elk select. This will make it possible to determine the relationship between elk habitat selection, habitat/forage quality, and elk body condition (and thus pregnancy rates), and the possible influences of wolves and weather upon these relationships.

Data collection will continue through April 2010 when elk GPS collars are programmed to fall off. The addition of more data as the project continues should help shed light on the many complicated relationships between elk, their habitat, and wolves with the ultimate goal of increasing understanding and improving elk population and habitat management in the Absaroka Mountains of Wyoming.


*Thanks for continuing support from many cooperators and contributors!*

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**— Wyoming Game & Fish Department —**
**— Wyoming Animal Damage Management Board —**
**— Rocky Mountain Elk Foundation —**
**— US Fish & Wildlife Service —**

***Many agency cooperators make this project possible:***

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**USDA-APHIS Wildlife Services**
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