Hunting Wolves In Montana - Where Is The Data?

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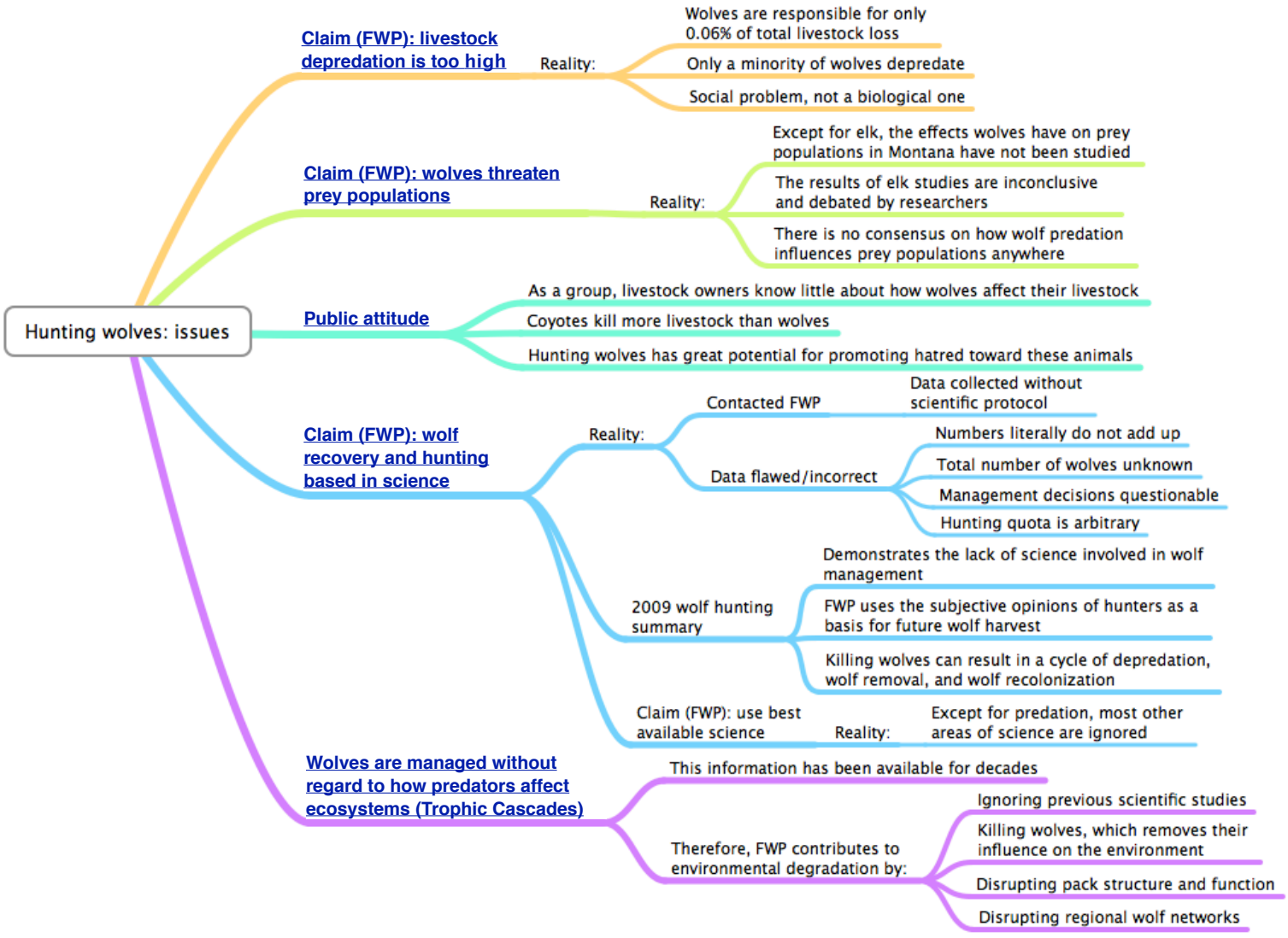
Abstract

Management agencies have claimed that the recovery and public hunting of wolves is based in science. A review of their statistics demonstrated that data collection methods did not follow a scientific protocol which resulted in flawed and often blatantly incorrect data. Consequently, agencies do not know the total number of wolves in Montana, a major reference point used by wolf managers. Therefore, the quotas proposed for public wolf hunts are completely arbitrary, and management decisions in general have not been based on facts. Management methods, and now hunting, contribute to the current ecological crisis produced by the elimination and manipulation of predator species, which form the top of food chains. These consumers produce a powerful "top-down" influence throughout ecosystems which can even determine the surrounding vegetation species. Also reviewed were public attitudes toward wolves, along with political approaches to solving the "wolf problem." The total effect of these processes has produced a wolf management system that lacks scientific perspective and does not utilize what is known about the wolves' role in sustaining healthy ecosystems. Instead, the data demonstrates that management decisions have been based on agenda and propelled by opinion, bigotry, and politics.



Introduction

As an independent research biologist, I have studied wolves in several states and in captivity since 1992. This has included a 9-year study of the Fishtrap pack in northwest Montana. They, like all packs in Montana, Idaho, and Wyoming, have been subject to wolf recovery: a complex and convoluted social-political process in which the wolves must contend with some negative public opinions as well as official management, which now includes annual wolf hunts by the public. Management agencies have stated that wolf hunts are based in science (Montana Fish, Wildlife, and Parks 2010a, 2011b). From a scientific perspective, however, I reviewed the government's data on wolf management (state and federal) in Montana and found that this was not true. The issues associated with hunting wolves can be complex and difficult to follow. Therefore, the chart above summarizes the entire paper and provides a table of contents that shows the flow of ideas and conclusions in each section of the paper. Readers can jump to these topics by using the links provided in the diagram.

The process of wolf recovery has generated a great deal of emotion with the general public, and misconceptions about wolves have only fueled the debate. Therefore, like a scientific paper, this essay is fully referenced so that readers can access the source material and judge for themselves the conclusions made here. When available, live web links allow direct access to this information, both in the text and in Literature Cited. Should these become unavailable in the future, alternate links to pdf archives of source material are provided under Literature Cited. Several editorial components are also based on science and experience. However, this is a review paper rather than a scientific publication, and was written so that the layperson can understand scientific principles and how they apply to wolves.

Background

Since 1974, with the passage of the Endangered Species Act of 1973 (ESA) (U. S. Congress 1973), wolves in the northern Rocky Mountains have been classified as endangered by the U. S. Fish and Wildlife Service (USFWS). This is the federal agency responsible for defining which species are endangered, placing them on the Endangered Species List, and eventually recover their numbers so that federal protection is no longer necessary. In May 2009, the USFWS determined that wolf populations in Montana and Idaho had recovered enough to remove them from the list (Montana Fish, Wildlife, and Parks 2009a). The responsibilities of wolf management then shifted to state agencies. Wolves in Montana fell under the jurisdiction of Montana Fish, Wildlife, and Parks (FWP), and by fall 2009 both Montana and Idaho had begun an annual hunting season to augment their current management techniques. Because Wyoming had not yet submitted a comprehensive management plan to the federal government, wolves in this state remained on the Endangered Species List. This eventually led to a legal dilemma.

On August 5, 2010, U.S. District Judge Donald Molloy of Missoula, Montana, ruled that the USFWS could not delist wolves in only two of the three wolf recovery states. Wolves must be listed as endangered or not endangered in all three states simultaneously. Therefore, wolves in Montana and Idaho were again placed on the Endangered Species List, which cancelled the fall 2010 hunt in both states. Within hours of Molloy's decision, FWP officials expressed their disappointment in losing the hunt as a management tool (Volz 2010). A coalition was eventually formed among livestock producers, outfitters, hunters and the state of Montana to continue finding ways to kill wolves, despite their endangered status (Bryon 2010). Various proposals made by state agencies seemed to echo the past when wolves were exterminated from the lower 48 states: burying pups in their dens then poisoning them with carbon monoxide gas, allow "research" hunts, and the more modern approach of surgically sterilizing adult wolves (Brown 2010). Mostly, however, it has been the actions of politicians that have led to the current situation regarding wolves.

Near the end of 2010, Montana Congressman Denny Rehberg, who had been up for reelection in November, introduced legislation to amend the Endangered Species Act and prohibit the classification of wolves as either endangered or threatened (Peterson 2010). The ESA is considered one of the strongest pieces of environmental legislation, because species are designated as threatened or endangered based on science rather than politics (U. S. Congress 1973, Raven and Berg 2004). Rehberg's bill contradicted this premise and catered instead to a region of the United States that is intolerant of wolves. Montana senators Max Baucus and Jon Tester also introduced legislation to remove wolves from Endangered Species Act protection (Chaney 2010b). Ultimately, Tester provided a rider to the 2011 federal budget bill that called for the delisting of wolves, and was passed by Congress in April. Unlike past delisting rules, however, this Congressional action prevents judicial review of the new ruling, even though wolves have little to do with the nation's budget. However, wolf management must still comply with federal guidelines to ensure that each state (Montana, Idaho, Wyoming) maintain a population level of at least 100 wolves and 10 breeding pairs, along with two other contingencies, or wolves could again be placed back on the Endangered Species List (Montana Fish, Wildlife, and Parks 2011a, 2011b). FWP has already prepared for a fall 2011 public wolf hunt in Montana and has proposed a quota of 220 wolves (Byron 2011), but out of how many?

Using the data that FWP has collected to determine wolf population numbers, this essay will demonstrate that the state of Montana does not actually know how many wolves they have. This is because the raw data provided by FWP was not collected in a scientific manner and therefore is extremely flawed, if not outright incorrect. The number of wolves they have decided to kill is completely arbitrary. Nevertheless, FWP has stated that their 2011 wolf hunting season will be based on rigorous science (Montana Fish, Wildlife, and Parks 2011b) and cited two justifications for eliminating wolves through annual public hunts:

FWP believes its prudent to begin a wolf hunting season now due to increasing levels of wolf-livestock conflicts as the wolf population has increased, and due to concerns about the status of some deer and elk populations where wolves and other predators exist (Montana Fish, Wildlife, and Parks 2010a).

Livestock depredation (back to top)

Depredation is the term used by biologists when predators kill domesticated livestock rather than their natural prey. Each year a summary of the wolf recovery process, including livestock loss to predators, is published in the USFWS Annual Reports. This data is public information and anyone can access it. The reports review wolf numbers and population trends in each of the three recovery areas: Yellowstone National Park (reintroduction), central Idaho (reintroduction), and northwest Montana (natural recovery). In the 2010 Annual Report (Sime et al. 2011), a table is provided that shows the numbers of livestock lost to wolves in the state of Montana:

Table 5b: Northern Rocky Mountain Confirmed Wolf Depredation[1], 1987-2010, by State.

(Within the NRM Federal Recovery Area only; does not include Oregon, Washington, or Utah. See Table 5c.)

YEAR	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	TOTAL
Montana																									
cattle	6	0	3	5	2	1	0	6	3	10	19	10	20	14	12	20	24	36	23	32	75	77	97	87	582
sheep	10	0	0	0	2	0	0	0	0	13	41	0	25	7	50	84	86	91	33	4	27	111	202	64	850
other [3]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	5	0	3	2	2	14	16	6	11	63
dogs	0	0	0	1	0	0	0	0	4	1	0	1	2	5	2	5	1	4	1	4	3	2	4	2	42
wolves moved	0	0	4	0	3	0	0	2	8	22	20	0	14	6	17	0	0	0	0	0	0	0	0	0	96
wolves killed[2]	4	0	1	1	0	0	0	0	0	5	18	4	19	7	8	26	34	40	35	53	73	110	145	141	724

In science, there is a basic tenet that states: *compared to what?* A number by itself means nothing. For example, 97 cattle were lost in 2009, out of how many? Government statistics show that 2.6 million cattle, including calves, live in Montana (U. S. Department of Agriculture 2007, U. S. Department of

Agriculture 2009). Ninety-seven out of 2.6 million is only 0.004%. To be fair, these cattle are not evenly distributed across the landscape. Western Montana, where the wolves live, has fewer cattle than on the east side of the state. As of 2009, there were 494,100 cattle (U. S. Department of Agriculture 2009). However, only 97 of these animals were killed by wolves, or 0.02% of the western cattle population. Similar low percentages apply to sheep. There were approximately 33,000 sheep, including lambs, in western Montana in 2009 (U. S. Department of Agriculture 2009). Using the table above, wolves were documented to have killed 0.6% of these animals. In 2009, therefore, wolves were responsible for about 0.06% of total livestock loss.

Note that the table contains "confirmed" kills by wolves on livestock. I have worked with the ranchers in my area since 1993, and I currently live on one of these ranches. I've experienced how their cattle have been lost each year, mostly through accidents, illness, or the birthing process. Undoubtedly there have been other depredations by wolves that could not be confirmed by government biologists or ranchers. The number remains unknown, however (Sime et al. 2007). Even if 1,000 cattle were reported for 2009, this would only be 0.2% or less of the cattle in western Montana killed by wolves.

Statistically, the wolf depredation "problem" barely exists. Socially and economically, however, those who lost their cattle would likely disagree. There is nothing "statistical" about suffering a real financial loss, sometimes thousands of dollars, often accompanied by a range of emotions. I think most people can empathize with this because we have all experienced loss in some form. I might be angry too if a wolf killed my dog, for example. However, I would not condemn and entire species for the indiscretion of a few individuals. Rather, many incidents with wolves could have been prevented by using some caution. For example, some ranchers have prevented problems by using clean ranching practices: dispose of placentas during the birthing season or placing pregnant livestock into a smaller area where they can be observed. Although some ranchers have lost a good number of livestock to wolves, the statistics do not show how many animals they had to begin with. Losing 9 out of a thousand animals would be quite different from 9 out of 10 animals.

Despite the statistics, FWP insists that a hunting season is necessary to help prevent livestock losses to wolves (Sime et al. 2007, Dennison 2010, Volz 2010, Chaney 2010a). However, the vast majority of wolf packs have not depredated on livestock. Even Ed Bangs helped to determine that compared to all causes of livestock death, those caused by wolves have been relatively rare (Bangs et al. 2005). When depredations have occurred, non-lethal methods have worked well to deter wolves from killing livestock, although 10 - 12 percent of the wolf population were removed annually to prevent repeated attacks (Sime et al. 2007). It appears that some wolf management is necessary, but annual hunts remain unjustified. Must wolves in the Northwest die for problems created by wolves in the Southwest and vice versa, especially for events that rarely occur?

Threat to prey populations (back to top)

As confirmed by Kent Laudon, Wolf Management Specialist for northwest Montana (Montana Fish, Wildlife, and Parks, personal communication), there has been no relevant research conducted in northwest Montana to determine the effects wolves have on wild prey populations. Elk populations, however, have been studied in southwest Montana and Yellowstone National Park - a very different habitat than where most of Montana's wolves live. This research concluded that wolves at best had mixed impacts on these herds: some declined, some increased (southwestern Montana), and others showed little or no effect from wolves (Hamlin and Cunningham 2009, Sime et al. 2009). Many other factors, such as weather and predation by grizzly bears and other animals, also affected the total elk population (Mech et al. 2001). More recent studies have shown the same pattern in southwest Montana, in which some elk herds increase and others decrease, all in the presence of wolves (Chaney 2011).

The environment is infinitely complex and we may never fully understand how it works. Nevertheless, the "potential" threat to prey populations, specifically elk, has been used as another reason to kill additional wolves annually (Montana Fish, Wildlife, and Parks 2010a). Yet, no data is available to support this contention. There is still no scientific consensus on how wolf predation influences prey population dynamics anywhere, currently or in the past (Mech and Peterson 2003). This is because of unpredictable environmental conditions, such as colder than normal winters, heat spells, disease, predation effects of other predators, and the interactions among all species in the environment which science does not yet fully understand.

Without doubt, wolves influence prey populations. This is their food base, and wolves and prey have co-evolved for thousands of years. In Montana, prey population numbers are not measured annually. So from year to year, as population numbers vary, it remains unknown how many deer, elk, and moose are really in the environment. However, some estimates are available for white-tailed deer, elk, and mule deer (Montana Fish, Wildlife, and Parks 2007, 2008a, 2008b). Therefore, without research in specific areas, such as the elk studies, the influence of wolves remains unknown. If it is found that wolves have a negative affect on prey in certain areas, FWP could deal with those animals rather than hunt all wolves for a problem that is only implied in a small number of areas.

Public attitude (back to top)

The public and livestock owners have always voiced their views about wolf depredation, especially since the fall wolf hunt was cancelled by Judge Molloy's decision last August 2010. Congressman Rehberg had been holding public meetings around the state of Montana to promote his proposed legislation to amend the Endangered Species Act so that wolves could continue to be killed. To gain more experience with this point of view, I attended the meeting in Kalispell, Montana, on October 6, 2010. All dozen or so panel members voiced anti-wolf sentiments for a variety of reasons, ranging from depredations to fear of wolves. Many people in the crowd of over 150 also voiced resentment toward wolves. Most of the views expressed were biased and not supported by science, or even common sense in some cases. No numbers were presented by the panel and no scientific studies were cited to support their contentions. Furthermore, their views did not represent all livestock owners nor were they necessarily accurate. Over a 10 period (1996 through 2006), only 50% of owner complaints about wolves to management agencies were confirmed as wolf damage (Sime et al. 2007).

In 2005, the National Agricultural Statistics Service conducted a survey (Sime et al. 2007) in which Montana cattle producers reported they had lost 66,000 cattle, including calves, to all causes. Predators were responsible for 3,000 of these losses, or 4.5%. Of the 3,000 cattle, 2,400 were calves. According to the cattle producers, coyotes had killed 54% of these calves. The remainder were killed by all other predator species combined, with an unknown number by wolves. So despite the rhetoric of some cattle producers about wolf depredation, they didn't know how many cattle had been killed by wolves. In the 2005 annual report, USFWS reported that 23 wolf depredations on cattle had been confirmed (table above). During the same year, sheep producers claimed that 200 sheep, including lambs, had been killed by wolves. This was 1.4% of reported loss of sheep to predators. Yet only 33 depredations were confirmed by management agencies (table above). Coyotes, however, were claimed to have killed 10,100 sheep, or 72% of reported predator depredation on sheep. Even when given the opportunity to express themselves, livestock owners as a group seem to know little about how wolves affect their livestock, and apparently they are angry at the wrong species.

Coyotes can be hunted year round in Montana, but are still the leading cause of livestock loss to predators (Collinge 2008, Adams 2010). Nevertheless, there have been no public meetings, with Members of Congress in attendance, to deal with the "coyote problem." Perhaps this is a perceptual issue in which livestock owners perceive that hunting has given them some "control" over coyotes. However, it seems to have done little good. Wolves cause only minimal damage, but they are under federal protection, which gives the appearance that everyone's hands are tied when it comes to solving depredation issues. Given this kind of frustration, I can see how hatred becomes the path of least resistance. It takes effort to find the truth and accept it for what it is. Livestock owners do not have to like wolves, but it would behoove them to at least work with the basic facts to create a clear perspective of the issues.

Despite the negative attitude some livestock owners have toward wolves, the ranchers I have worked with saw and heard wolves all the time, yet took responsibility for their actions. Consequently, wolves have been only an occasional problem, even though they were constantly present. Dealing with these issues on an individual basis has often worked, even to the point of removing the pack in the local problem area (Sime et al. 2007). Perhaps a better question to ask than how many livestock wolves have killed, would be how often does free range cattle encounter predators throughout the year and nothing happens? Hundreds of thousands of times? Perhaps allowing cattle to roam is not that risky. Ranchers and I have worked together to avoid potential conflicts with wolves. We found that wolves were often mixed in with the cattle but did nothing to harm them (Mallonee unpublished data). Throughout the state most ranchers that have experienced wolf depredation were not hit again (Sime et al. 2007). Perhaps those that were could examine how their ranching techniques may have attracted predators, rather than deter them.

Although some people perceive wolves as a threat to livestock or prey populations, others hate them simply because they are wolves. Such intolerance has no basis in reality, and alternate viewpoints only enrage these people further. This is bigotry, no different from what we have shown toward other races of people, religions, and animals. It is like a disease and can spread and infect entire towns, even nations. Bigotry is a force that cannot be reasoned with. It feels no remorse, no pity, and no compassion. By allowing people to vent this kind of anger, hunting wolves has great potential for promoting and perpetuating these attitudes.

Is the data collected by FWP based in science? (back to top)

For a clearer understanding of how their data is analyzed, I contacted FWP and was told they work with their biostatistician and the University of Montana Wildlife Coop to create models and predictions of how hunting affects the wolf population (Kent Laudon, Wolf Management Specialist, Montana Fish, Wildlife, and Parks, personal communication). The modeling results, however, have not been published, and the only data available for viewing by the public is mostly in the annual reports. Some of it is the raw data used in the modeling procedure. For an accurate view of wolf populations, data collection is critical because its analysis can only be as good as the quality of data that was collected. Therefore, a scientific approach is necessary. Because the modeling results are not available to view, some discrepancies in the annual report data will need some explanation from FWP.

Their data was collected using several methods. The most accurate numbers were from flights that located radio-collared wolves (Kent Laudon, Wolf Management Specialist, Montana Fish, Wildlife, and Parks, personal communication). From the signals, biologists knew an animal's location and identification, and therefore its gender and approximate age. Other data, from depredations and human-caused mortality, such as management and hunting, have also been fairly accurate. Like the information

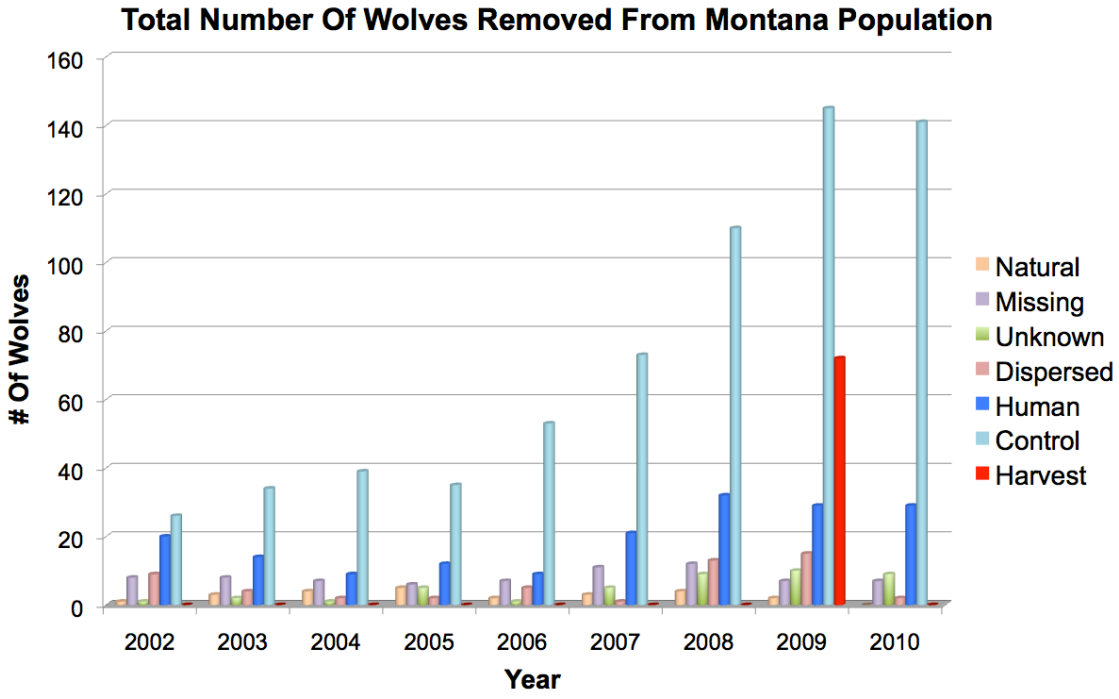
from collared wolves, there was something tangible that could be measured, i.e., a body, radio signals, and even sightings. Overall, however, the wolves in these categories represent the minority of the total population.

Collecting information about the remaining majority of wolves has been problematic and does not follow a scientific protocol (Kent Laudon, Wolf Management Specialist, Montana Fish, Wildlife, and Parks, personal communication). Some of this data has been opportunistic, including anecdotal information from the public (Montana Fish, Wildlife, and Parks 2010c, Kent Laudon, Wolf Management Specialist, Montana Fish, Wildlife, and Parks, personal communication), yet is used to estimate the minimum total number of wolves each year. How many wolves live in Montana? This basic question has been the center of controversy among the public and management agencies for many years. The number is crucial in determining how wolves are managed and how many are hunted, so it needs to be accurate. Using unscientific techniques, however, can produce data that is inaccurate and questionable, which can be seen in the annual reports:

Number Of Wolves Removed
From Montana Population

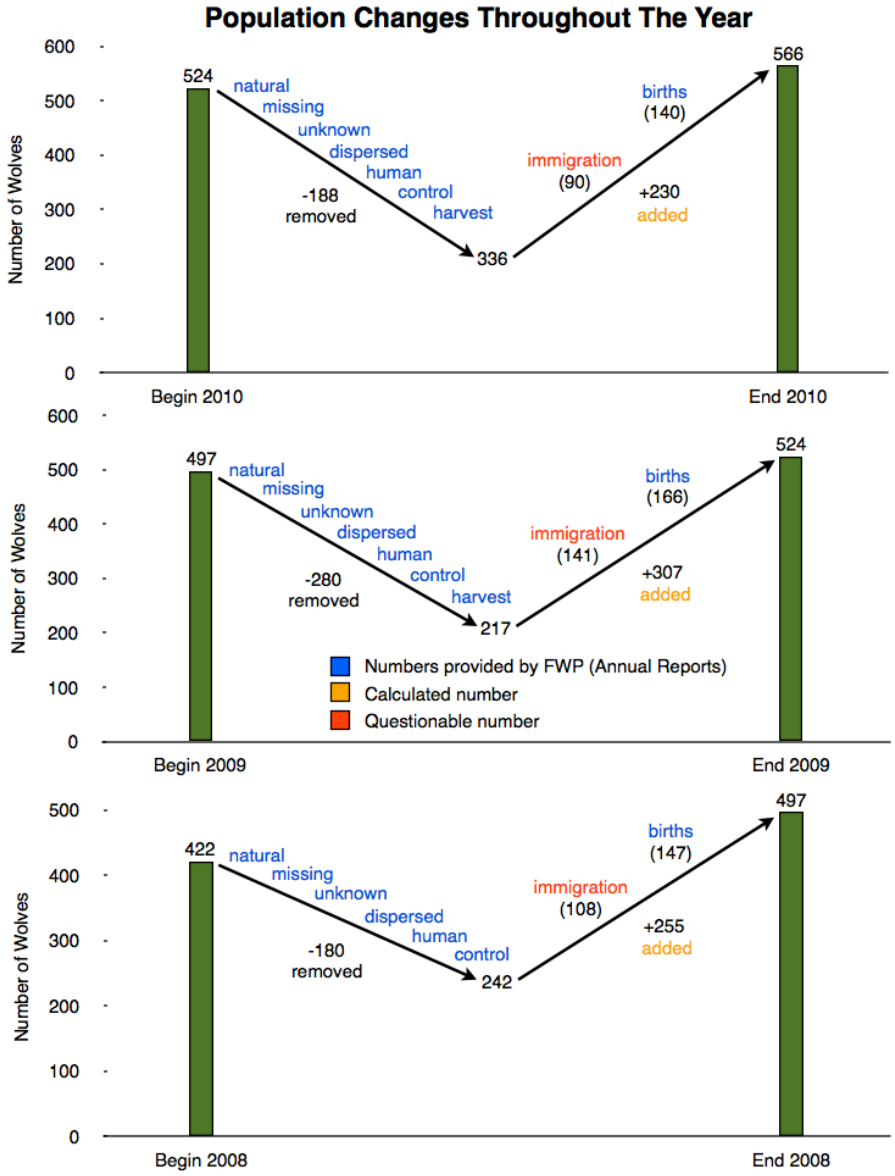
Year	# Wolves (Dec)	Natural	Missing	Unknown	Dispersed	Human	Control	Harvest	Total Gone	Total Wolves (for year)	Percent of Population Removed
2002	184	1	8	1	9	20	26	0	65	249	26.1
2003	182	3	8	2	4	14	34	0	65	247	26.3
2004	153	4	7	1	2	9	39	0	62	215	28.8
2005	256	5	6	5	2	12	35	0	65	321	20.2
2006	316	2	7	1	5	9	53	0	77	393	19.6
2007	422	3	11	5	1	21	73	0	114	536	21.3
2008	497	4	12	9	13	32	110	0	180	677	26.6
2009	524	2	7	10	15	29	145	72	280	804	34.8
2010	566	0	7	9	2	29	141	0	188	754	24.9

The table above summarizes the population numbers from 2002 through the present (U. S. Fish and Wildlife Service et al. 2003, 2004, 2005, 2006, 2007, 2008, Sime et al. 2009, 2010, 2011). The different categories of wolf mortality, along with other factors that remove wolves from the population, are listed as seen in the reports. The numbers for human causes of mortality are light blue to highlight the fact that



by far people have caused the most deaths observed in Montana's wolf population each year. The graph above is another way to view the same information. It gives a more visual aspect to what the data represents instead of only numbers. The columns in blue and red are the human factors that affect Montana's wolf population and are grouped together. Some biologists who are involved in wolf management have stated that human influence is only another of many factors the wolves must deal with each year. Their own data clearly demonstrates that *humans are the primary factor*.

Populations are dynamic and change over time. This usually involves four components: births, deaths, immigration, and emigration. The overall equation is represented as: growth rate = (i - e) + (b - d) (Raven 2004). In 2009, for example, 804 wolves apparently existed in the wolf population (table above), but not all at once. As some were born or joined the population from other places (immigration), others died or left the population, i.e., dispersed (emigration). The wolves remaining in December are viewed as a "working" number by management agencies and represents the minimum number of wolves for that year (Kent Laudon, Wolf Management Specialist, Montana Fish, Wildlife, and Parks, personal communication). Using these concepts, the government's data provides a partial pathway that follows the changing number of wolves throughout the year (graphs below).



Assume for the moment that the numbers reported by FWP are accurate. In the middle graph, 497 wolves represent the minimum number at the beginning of 2009. This is the end of the year total (December) for 2008. The population changed, however, throughout the year. For various reasons (table above), 280 wolves were removed, which dropped the population to 217 animals. However, FWP claims that 307 wolves were added to the population to reach the December total of 524 wolves (524 - 217 = 307), through births and immigration. Although immigration data was not provided, the number of births reported were 166, so 141 wolves must have immigrated into the population from out of state or Canada (307 - 166 = 141).

Because wolves are constantly on the move (Mallonee 2008), immigration numbers are virtually impossible to collect and are missing from the database. Even emigration numbers are based on only a few radio collared wolves and undoubtedly are not representative of the entire population. Regardless, wolves that have dispersed from their own packs do not necessarily immigrate to other states, but instead join another pack within their home state. For example, the total number of dispersed wolves reported for Wyoming and Idaho in 2009 was 17 (Sime et al. 2010). Even if the number of missing wolves was considered (31), there would have been a potential of only 48 wolves leaving both states. It would be incorrect to assume they had all immigrated to Montana and stayed. Therefore, 141 seems like an astounding number of wolves to have joined the Montana wolf population in only one year. Where did they come from? The numbers for 2008 and 2010 show the same trend.

In reality, all four components of population growth (births, deaths, immigration, emigration) would need to be known for an accurate assessment of wolf population numbers. As previously mentioned, the number of deaths, and perhaps births, are probably the most accurate data provided by FWP. However, emigration is a guess and immigration is completely unknown. Together, they are half of the equation to determine the total number of wolves, either throughout the year or by December. Plus, most of this data is collected in the summer when the weather is good and only reported at the end of the year. Anything could have happened to those wolves in the subsequent 4 - 5 months until December. The numbers for total wolves, therefore, are highly questionable. This matches well with how the majority of data is collected: opportunistic and without scientific protocol. Although the data analysis appears to be scientific, data collection is not. Therefore, the claim that wolf hunts are based in science is incorrect. FWP's data appears to suffer from the same problems as past studies that have attempted to assess wolf populations in which pup mortality rates, dispersal, immigration, and other key factors remained virtually unknown (Fuller et al. 2003). Consequently, management decisions, including an annual wolf hunt, are based on incomplete and therefore misleading information.

The FWP summary of the 2009 Montana wolf hunting season

On their website, FWP posted the summary of the 2009 wolf hunt in Montana (Montana Fish, Wildlife, and Parks 2010c). It summarizes how wolf recovery in Montana works and the lack of science involved, both in thought and practice. Key statements point this out:

Hunters report seeing wolves while hunting deer and elk, and it appears that they are able to detect wolves in their relative degrees of abundance on the western Montana landscape. Therefore knowledge about deer and elk hunter effort and success will provide important insight into future wolf harvest management.

Apparently FWP uses opportunistic data collection as a basis for management policy. They obtain "data" from the people who paid for the opportunity to kill wolves. Although I can understand the necessity of collecting as much data as possible about these animals, impressions about their abundance

from hunters is not science. There are no controls in the data collection, and hunters do not necessarily like wolves, given the fact they want to kill them. Therefore the data has great potential for bias.

Total license revenue was $325,916.
When the state of Montana created revenue by killing its own wolves, hunting them became a self-serving process, as with the hunting of all managed wildlife. Comments in the news by wildlife officials reflect this attitude: "We have 20 people scattered throughout the state, and it's becoming more and more work, which is stretching them thinner and thinner," a statement made by John Steuber the Montana director of U. S. Wildlife Services (Associated Press 2010). This is the agency that typically shoots problem wolves. In the same news article, Ed Bangs said, "You can see from the wolf reports that we've been heading toward this for years - more depredations so there's more control. When we started, we would move problem animals around, capturing them and putting them somewhere else, but there's enough now that we just kill them." He went on to say, "That's one of the reasons that hunting can be so important. You can have hunters pay to remove wolves rather than use tax payers' money to go after them. It's a good management tool to reduce conflicts and costs."

There are several concerns about these statements. Before the wolf hunting season, wolf management officials often killed problem wolves. Yet, according to Sime et al. (2007), in which Bangs was a co-author, "Removal results in a cycle of wolf colonization, depredation, and wolf removal that repeats itself (Bradley 2004, Musiani et al. 2005)." Thus, the killing of wolves can continue in a cyclic manner in certain places. By using a hunting season, FWP can adjust wolf quotas in areas where depredations may be a consistent problem for that year (Kent Laudon, Wolf Management Specialist, Montana Fish, Wildlife, and Parks, personal communication) and the state receives a revenue from hunting fees and permits. Now hunters can do the job instead, but without making the distinction between the "problem" wolves, of which there are few, and all the others. The state of Montana made $325,916 in a hunting season that lasted only 23 days. That was $99,062 per week. The hunting summary states that "hunter harvest did not appear to accelerate or contribute to livestock conflicts." This conflicts with the statement Bangs made that hunting is a good management tool to reduce conflicts and costs. Apparently, hunting wolves had no affect on any existing "conflicts," according to FWP data. So why hunt them?

Wolf recovery is a business. Hunting wolves can save the state money by reducing costs, creating revenue, collecting opportunistic data from hunters, and in helping to reduce the stress of apparently overworked government employees. Therefore, money and convenience are some of the reasons to hunt wolves, and the problem of wolf depredation remains unsolved - a problem that statistically barely exists. What is still missing, however, is scientific accountability for hunting these animals. It seems that until a solution is found that makes the conservation of wolves profitable, they will be killed.

Wolf hunter harvest decreased the size of individual packs by one to four wolves just ahead of the February 2010 breeding season. But even so, the level of hunter harvest combined with all other mortality in 2009 will not harm Montana's wolf population.
To state with any certainty that hunting will not harm the wolf population would require a follow up study of any affects the killing had on wolf packs. The fact that FWP wanted to increase the 2010 wolf hunt to 186 wolves before it was cancelled indicates that no follow up study was planned. Even so, there is no baseline data to use as comparison on general wolf behavior and pack structure before the hunt occurred.

By default, hunting wolves harms their population. That is the point of hunting them, to cut back on their numbers. Presumably, FWP meant that plenty of wolves survived the hunt to procreate and produce more wolves for the future. However, there are plenty of ways to harm wolves. We just do not readily see the effects, or they are of no concern to us. Carolyn Sime was reported as saying, "Even if

we kill all the wolves, wolves will re-colonize" (Puckett 2010). Even if true, I doubt this statement was meant to be taken literally. Nevertheless, it demonstrates that it is the number of wolves that FWP concentrates on, not the quality of their population or even an appreciation of how wolf populations work.

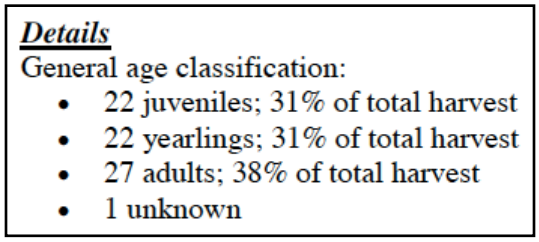
Throughout their 15 month tenure of officially managing wolves, before they were placed back on the Endangered Species List, FWP posted policy information on their website and made the following statement:

FWP considers wolves as its does all other wildlife species it is charged to conserve and manage. An annual, regulated, well planned, and ***science-based hunt*** *serves as one tool among many for Montana to use to conserve, manage and maintain a wild wolf population that's in balance with its habitat, other wildlife, and the people who live in Montana* (Montana Fish, Wildlife, and Parks 2010a).

The reality is that wolves are not like any other wildlife species. They are not hunted for meat and consumed. Wolves are killed mostly out of fear, hatred, and a perceived competition for the other animals that we do eat. Research has revealed a good deal about the complex social nature of these sentient animals, their intelligence, how they work together as a group to survive, and the complex affects they have on their surrounding environment (Allen 1979, Mech and Boitani 2003, Packard 2003, Hebblewhite et al. 2005, Mallonee 2008, Mallonee 2010). When pushed to their physical and psychological limits, they can also suffer emotional disorders similar to those observed in humans (Mallonee and Joslin 2004). Wolf packs are a process in which all members participate (Mech and Boitani 2003, Mallonee 2008), and these processes are linked in geographic regions to form networks (Miklosi 2007). Such a widespread social system cannot be managed, at least in the traditional sense. Hunts cause harm to wolf populations by removing a large number of individuals in a short time and disrupting the population network, which already helps to control wolf numbers (Packard and Mech 1980, Miklosi 2007, Rutledge et al. 2009).

It is a matter of perspective on what is meant by "harming" the wolf population. As predators, they greatly influence the environment through all trophic levels (Allen 1979, Hebblewhite et al. 2005, Eisenberg 2010). Disruption of this process by lethal removal can result in continued wolf depredation on livestock (Bradley 2004, Musiani et al. 2005) and interfere with the daily complexities of pack assembly (Mallonee 2008, Mallonee unpublished data) and social patterns over time (Rutledge et al. 2009). This is because wolf packs act as family units (Mech and Boitani 2003) year round, unlike other predators, such as cougars and bears which are solitary most of the year (Hummel et al. 1991).

There were no biological red flags in the harvest.
Data provided in the 2009 hunting summary demonstrated that out of 72 wolves killed, 61% were subadults. This should be a biological red flag, because subadults are the future of wolf packs, both


Details
General age classification:
- 22 juveniles; 31% of total harvest
- 22 yearlings; 31% of total harvest
- 27 adults; 38% of total harvest
- 1 unknown

reproductively and socially. Killing mostly these age groups provides fewer wolves to replace those that will die or leave the pack during the year. Juveniles and yearlings are also still learning social skills and their place in the pack (Packard 2003), which may cause disruption of family units and the ability of the

pack as a whole to fend for itself, i.e., hunting effectively. For example, human-caused mortality for wolves outside of Algonquin Park, Canada, was found to affect the evolution of important social patterns for wolf packs inside the protected park (Rutledge et al. 2009). This research demonstrated the need to consider the effects of hunting on social behavior as well as population numbers. Killing mostly the young of virtually any mammalian population would potentially cause the greatest influence on future population levels, ranging from slow population recovery to social and genetic effects (Raven and Berg 2004). Creel and Rotella (2010) demonstrated that human hunting of wolves caused a super-additive increase in wolf mortality, meaning additional wolves died as a result of human harvest than only those that were shot and killed. This contradicts the conventional belief by some management agencies, such as FWP, that wolf populations can sustain a high mortality rate of 30 percent or more, no matter the cause (Kent Laudon, Wolf Management Specialist, Montana Fish, Wildlife, and Parks, personal communication).

The State Wildlife Chief Ken McDonald stated that increasing the hunting quota will allow for a decrease in the population while keeping within the objectives of the management plan's goals (Backus 2010). Federal law requires Montana to maintain a minimum of 100 wolves and 10 breeding pairs (Montana Fish, Wildlife, and Parks 2009b), although no scientific data has been provided to suggest these numbers have any significance. No one knows the minimum number of wolves it would take to support an overall wolf population over time. Instead, FWP is attempting to create a population level that is in "balance" with its surrounding habitat, local economics, and social tolerance of these animals, based primarily on the number of wolves they can estimate annually. These estimates, therefore, would need to be accurate and ideally based in science, but they are not.

The best available science is not used

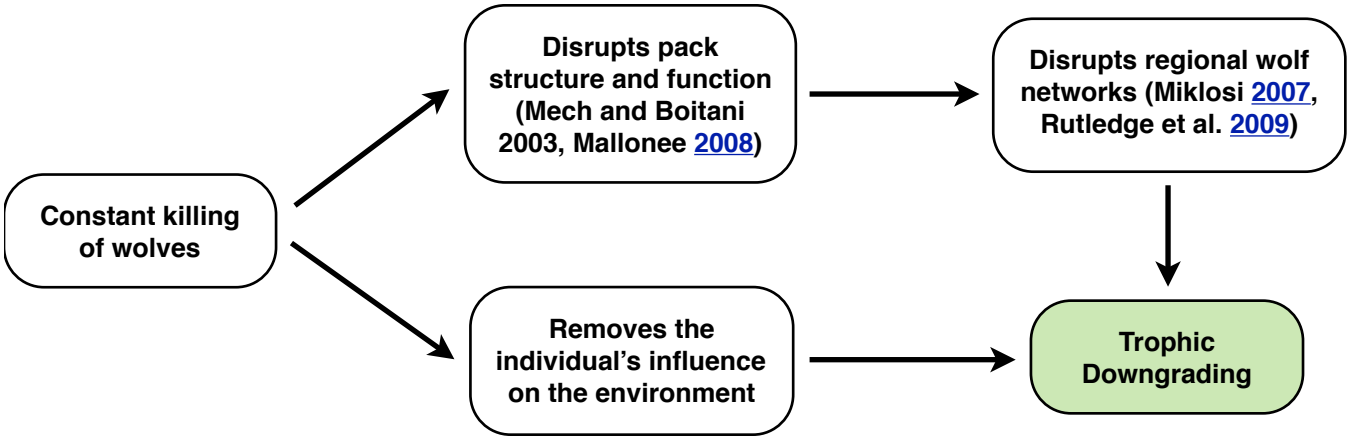
Montana Fish, Wildlife and Parks has not considered wolf research in other areas of science, which is apparent in the large reference section of their annual reports. Nevertheless, Ed Bangs, the Wolf Recovery Coordinator for USFWS stated, "The bottom line is, by law, the Fish and Wildlife Service is required to use the best available science. We're mandated if there's new information that indicates the recovery goal should be lower or higher to look at that" (Hatch 2010). Perhaps they have looked at different areas of wolf research, but ignored them. For example, outside of Yellowstone National Park, I have had the longest running behavioral study of wolves in the state of Montana. I have even discovered wolf pack behavior never before documented, which demonstrated that at least the Fishtrap pack likely spent the minority of time fully assembled (Mallonee 2008). This is because rather than a "thing," a wolf pack is a dynamic process. It is greater than the sum of its parts. The parts consist of pack members interacting with each other and with their surrounding environment. The net result is a force that changes over time as the pack reacts to endless environmental variations such as increasing or decreasing prey populations, prey migration, climatic changes, or when pack members come and go. Despite these findings, my research has never been cited in any management documents, and neither have the sources I've used in my area of expertise. Unless it is about wolf predation, animal behavior research and other areas of science have not been perceived as relevant to the wolf management process. This includes decades of research regarding the wolves' role in the environment, i.e., trophic cascades.

Loss of predators downgrades ecosystems (back to top)

For the most part, wildlife managers have ignored research that demonstrates wolves have a profound and positive affect on their natural surroundings, and possess complex social behavior and emotions (Mallonee and Joslin 2004, Miklosi 2007, Mallonee 2008, Rutledge et al. 2009, Bekoff 2010, Eisenberg 2010). A scientific paper entitled *Trophic Downgrading of Planet Earth* was recently published by some of the most prominent scientists in the fields of ecology and biology (Estes et al. 2011). They reviewed the scientific literature regarding predator loss (trophic downgrading) and confirmed that these top consumers influence the entire food chain, down to the selection of grass species, the rise and fall of

diseases, and even the physical and chemical processes of the biogeochemical cycles. This "top-down" process is known as trophic cascading.

The loss of predator species, such as wolves, disrupts ecosystems around the world, both terrestrial and aquatic. The consequences have been devastating to the global environment, mostly fueled by habitat destruction, poaching, pollution, and other human activities. It can be argued that wolf management and hunting contributes to trophic downgrading in several ways by not using the best available science, especially information that demonstrates the role of wolves in maintaining a functional ecosystem. Managing only by numbers can potentially lead to a series of repercussions that result in degradation of the environment:



Summary and conclusions

There is little science involved in the killing of Montana's wolves. FWP has been unable to provide the appropriate data necessary to justify the two main reasons for such a program: livestock depredation and threat to prey populations. The fact that wolves have been slaughtered for no justifiable reason should be a concern to everyone, both morally and financially. Tax payer money is used to finance the hunting of wolves and other management practices. To claim that wolf management and hunting will "maintain a wild wolf population that's in balance with its habitat, other wildlife, and the people who live in Montana" is without merit.

As a research biologist, my experiences with these animals, both in captivity and in the field, have taught me they are something quite different from what most people have imagined. Wolves are not crops to be harvested and then regrown each year. They are societies of individuals that have complex social interactions and emotions, all of which develop over time. For example, one of the wolves I studied in captivity had come from the Ninemile pack in southwest Montana where she had been chased twice by government biologists from a helicopter and darted each time. She was eventually placed into captivity where she was shot two more times with tranquilizers during escape attempts. By the time I arrived nine months later, she had developed post-traumatic stress which I verified through scientific study (Mallonee and Joslin 2004).

Wolves, like other animals that have been abused, can suffer emotional trauma. However, this has not been considered throughout the wolf recovery process. I presented these results to the park official who was in charge of the captive wolves in Yellowstone National Park during the beginning of reintroduction in the mid-1990s. The wolves had been taken from Canada and placed into captive facilities before their release into the park. After viewing my paper, he made it clear that he "was not there to monitor a bunch of wacko wolves, only to release them." The study was not against reintroduction, only to suggest that wildlife managers could show some sensitivity towards the animals they manipulate and use the best available science.

I have experienced this attitude repeatedly over the 19 years I have studied wolves, most often from wolf recovery agencies and their officials. Even the board members of a wolf sanctuary tried to silence me, because the results of my study inadvertently demonstrated that their system of housing wolves contributed to the post-traumatic stress of the main study animal (Mallonee and Joslin 2004). After they understood the reality of the situation, the board members chose to ignore the wolf's problems, which raised a plethora of moral issues. Wolf managers have done the same thing. Should they feel that their authority or numbers have been questioned, management agencies have lashed out at those who challenge them, such as myself and other scientists. For example, the research of a Montana State University professor, Scott Creel, recently challenged the proposed wolf hunt for fall 2011. As part of his study, Creel used FWP data (which is available to anyone) to arrive at conclusions that contradicted those of FWP. This prompted FWP to state that they will end their financial and intellectual cooperation with the university after 60 years if both institutions cannot continue to "collaborate" in the future (Scott Creel, Montana State University, personal communication, Creel and Rotella 2010, Schontzler 2010).

Such compassionless attitudes help demonstrate our cultural perception that morals and ethics are different for humans versus other life forms. As stated by Marc Bekoff (2010), "It is individuals who personally feel pain and suffer, not species." Bekoff is a prominent ethologist who has studied animal behavior around the world for decades. Because of his experiences and those of other scientists, he and Jane Goodall cofounded Ethologists for the Ethical Treatment of Animals: Citizens for Responsible Animal Behavior Studies. Consequently, hunting wolves is also a moral issue. In response to comments by pro-wolf conservation groups, Ed Bangs was quoted in the news as saying, "People will argue that the recovery goal should be higher. That's a moral judgement. A population of 45 breeding pairs and 450 wolves will never be threatened" (Hatch 2010). Because of their actions, FWP has made the moral decision to eliminate additional wolves through public hunts to augment their management practices, and with no scientific justification.

Overall, hunting seasons on a variety of species have turned our forests into giant game farms. However, instead of paying the owners to hunt on their land, we pay the government by way of game tags and hunting permits. Adding wolves to this practice makes no scientific sense. The current system of "killing wolves to protect them" is a paradoxical approach to solving our perceived conflicts with these animals (Herring 2010). To do so demonstrates another potential reason for killing wolves: it is the easiest and cheapest way of dealing with them, and it creates revenue for the state. Regardless, wolf management is in dire need of reform. It promotes our agendas rather than what is best for the environment and wolves. Given the money involved, wolf recovery appears to be a morally flexible, self-serving process that blatantly ignores vast areas of science to achieve its goals, such as animal behavior, emotions, intelligence, interactions among life forms, and some basic ecological principles. The process may include empathetic and compassionate people, but their views are superseded by the system in which they work. Although some management may be necessary, hunting wolves remains scientifically unjustified.

Ultimately we have the greatest influence on how many deer, elk, wolves, and other predators are present in our ecosystems. Until the current management paradigm changes, along with public attitude, there is no permanent solution to the apparent "wolf problem." I can appreciate how hard FWP works to obtain data on wolves and I know they do their best. Their best, however, is not science as they have claimed. Future solutions will have to take into account the full range of what science knows about wolves. Until that happens, agendas, opinions, and politics will guide wolf management over problems that are either mostly unknown (effects on prey populations) or rarely happen (depredations). This is a social issue, not a biological one.

Author background

Jay Mallonee is a research biologist with a master's degree in neurobiology/animal behavior. Through his business of Wolf & Wildlife Studies, he has researched wolves in various states since 1992, along with a 9-year study of the Fishtrap pack in northwest Montana (Project HOWL). Previous research has included the documentation of traumatic stress displayed by a wild wolf placed into captivity, and behavioral studies on rodents, primates, and a variety of cetaceans, such as gray whales and bottlenose dolphins. Details of his studies can be found at www.wolfandwildlifestudies.com. He also authored the book *Timber - A Perfect Life*, that chronicles the profound 16 year journey with his canine companion. Mallonee is a college professor and has taught a wide range of science classes for Michigan Tech University, U. C. Santa Barbara, San Francisco State University, and several community colleges.

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