# Apparent Increase In Montana's Wolf Population Is Based On Fabricated Numbers

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**Synopsis:** Populations of living organisms change over time. To understand how, scientists measure four basic components expressed by populations: births (b), deaths (d), immigration (i, join a population), and emigration (e, leave a population). The overall equation is: growth rate = (i - e) + (b - d). Montana Fish, Wildlife and Parks (FWP) is responsible for wolf management, including public hunts, and oversees how the wolf population changes from year to year. They claim that their methods are based in science, but one official has stated that no scientific protocols have been used to collect their data. This shows in FWP's annual reports in which data are collected in a haphazard manner, making it difficult to draw relevant conclusions about Montana's wolf population. Immigration numbers are never measured, yet are *assumed* in the annual reports and used to calculate the minimum number of wolves each year, or year-end totals. Over the last nine years, including 24 unverified wolves that supposedly emigrated, this represents 762 unaccounted for wolves: an average 21.4 percent error in minimum population numbers each year. Intentional or not, at least immigration numbers are fabricated and mean nothing scientifically. Minimum population numbers, therefore, are annual claims made by FWP, because they cannot be verified. This is important because these year-end numbers are used to make management decisions about wolves. For example, FWP has stated in their annual report that the number of wolves in 2011 is a 15 percent increase from 2010. However, this increase is well within the error established in FWP's numbers. In addition, a wildlife official stated that none of the wolf counts were complete. Therefore, FWP cannot know if an increase occurred because their database is so inaccurate. When the unverified wolf counts are removed from the year-end totals, the result is a difference of 25 wolves between 2010 and 2011. This represents a 5.2% increase in minimum wolf counts. According to FWP numbers, it would take 87 wolves to achieve a 15 percent increase over the 2010 year-end total. Therefore, most of the claimed 15 percent increase (62 wolves) came from the unverified immigration numbers. Regardless, FWP has used this assertion to justify an increased quota for the 2012 hunt. More importantly, the pattern of fabricated data represented in the 2011 annual report is consistent with previous years. The data collected by FWP is so incomplete and without basis in science that we could ask, "What numbers do they provide the federal government to determine if wolves should be on the endangered species list or not?"

## Overview

On September 3, 2011, I published my review of the state's wolf population numbers in a peer-reviewed scientific journal (Mallonee 2011). This paper can be downloaded for free at www.wolfandwildlifestudies.com. It documents the flawed data collected by Montana Fish, Wildlife and Parks (FWP) which is provided in their annual reports. This information is convoluted and ambiguous which can make it difficult to comprehend. However, in the following essay I use simple math and concepts to explain why their numbers make little sense. So if you can follow me through the matrix of confusion that is FWP's data, you will understand my conclusions and how they were formed. We can begin with how FWP collects their information.

Although FWP has stated that wolf management and hunts are based in science (Montana Fish, Wildlife and Parks 2010, 2011), their data are obtained using several methods which do not follow scientific protocols (Kent Laudon, Wolf Management Specialist, FWP, 7 Sep 10, personal communication). Nevertheless, FWP reports a minimum, year-end total of wolves that contains

fabricated numbers, and is used for making management decisions, including how many wolves should die in public hunts (Mallonee 2011). Models are then used with the minimum population estimates to predict the effects hunting would have on the wolf population (Kent Laudon, Wolf Management Specialist, FWP, 20 Sep 10, personal communication). The modeling information, however, is not provided in the annual reports, which only present raw data. Therefore, it is unknown how FWP comes to their conclusions based on the data they present to the public.

Modeling is a technique used by scientists to take raw data, usually numbers, and attempt to construct a mathematical or graphical representation of what the data means. All models are simplified reflections of reality and therefore provide a more straightforward understanding of what the researchers are studying. However, models can often be devoid of the real complexities in a given situation and may lead to false conclusions. There are many kinds of models for a range of circumstances. Using the wrong approach can yield inaccurate results. This is why it is important to know the modeling techniques used by FWP. However, the focus here is on the quality of data used for this kind of analysis. For example, if the data are obtained in a biased manner and ultimately show no pattern, then neither will the results of modeling. Accurate models require evaluation as to the quality of data used (Shaeffer 1980) and comparing the conclusions made by models with real data (Hamilton 1991). In other words, models must be consistent with the data collected about the phenomena being measured (Schwarz et al. 2009). Therefore, data collection is crucial and requires a scientific approach.

As seen in the annual reports, FWP's lack of applied science has resulted in made-up numbers (Mallonee 2011) and incomplete wolf counts (Kent Laudon, Wolf Management Specialist, FWP, 6 Mar 12, personal communication) which have been used to manage wolves. Given these circumstances, FWP's models of hunting effects on the wolf population cannot be accurate, and neither is their claim that the number of wolves in 2011 was a 15 percent increase from 2010, despite the second hunting season on wolves. Given the data presented in the 2011 annual report (Hanauska-Brown et al. 2012), this increase was not apparent or substantiated. This essay explains why.

**Using science to count wolves**

Populations of living organisms change over time. To understand how, scientists measure four basic components expressed by populations: births (b), deaths (d), immigration (i, join a population), and emigration (e, leave a population). The overall equation is:

$$growth\ rate = (i - e) + (b - d)$$

The number of deaths, or wolves removed from the population by other means, and births are the usual numbers reported in the annual reports. Immigration numbers are never measured. It would be virtually impossible to do so, because wolves are constantly on the move (Mallonee 2008). Emigration numbers are based on a few radio-collared wolves and do not represent the actions of the entire wolf population. Of the four population components, immigration and emigration are basically unknown, so half of the growth equation is always missing and unavailable for analysis. Therefore, the usual scientific approach of using the growth equation to understand how populations change does not apply to FWP's data, because their database is incomplete. However, the growth rate concept can still be used to demonstrate how FWP's

reported minimum numbers cannot be calculated using the data provided in the annual reports. The numbers reported for 2010 are used as an example.

Throughout 2010, as in any year, the wolf population changed. As some wolves 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 represent the minimum number of wolves for that year (Kent Laudon, Wolf Management Specialist, FWP, 6 Aug 10, personal communication). Using these concepts, the government's data provide a partial pathway that follows the changing number of wolves throughout the year (Figure 1).

In the bottom graph, 524 wolves represent the reported minimum number at the beginning of 2010. This is the end of the year total (December) for 2009. For various reasons, 188 wolves were removed, which dropped the population to 336 animals. However, FWP claims that 230 wolves were added to the population to reach the reported December total of 566 wolves (566 - 336 = 203), through births and immigration. Although immigration data were not provided, the number of births reported was 140, so 90 wolves must have immigrated into the population from out of state or Canada (230 - 140 = 90). 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. However, half of the growth rate equation is missing so there is no mathematical way to verify if the immigration number is true. There is no justification at all as to where the extra 90 wolves came from. This number is just *assumed* in the annual report and is used to arrive at the minimum number of wolves, as shown in Figure 1.

Over the last nine years, including 24 unverified wolves that supposedly emigrated, the assumed numbers represent 762 unaccounted-for wolves. This is an average 21.4 percent of the reported minimum wolf population annually: wolves that are being reported with no direct verifiable data to prove their existence. Minimum numbers, therefore, are annual claims made by FWP, because they cannot be verified. Nevertheless, these numbers are used to make management decisions about wolves, including hunting quotas.

An additional complication occurred in the 2011 annual report. The number of births (pups) was not reported as a single category as in the past. Therefore the 2011 data was not comparable to previous years. When we contacted FWP, we were told that pup counts were taken but not reported because the public had become confused by the way these numbers were presented in previous annual reports (Kent Laudon, Wolf Management Specialist, FWP, 6 Mar 12, personal communication). Instead, pack sizes are now reported as pups and adults together. Laudon told us that 164 pups was the minimum count for 2011, but added that this was only a ballpark figure. He also stated that none of the wolf counts were complete, which meant none of the data was accurate. In reference to pup counts he added, "Therefore you can imagine that accounting for all of the pups that survive to the end of the year is literally an impossible task."

Undoubtedly an accurate pup count is impossible to obtain. However, an accurate count would be necessary to claim that the wolf population increased 15 percent from 2010. This is because FWP has stated a precise increase based on fabricated and incomplete wolf counts. Therefore, their claim cannot be proven. Using their 2011 data, Figure 1 demonstrates that 316 wolves must

have been added back to the population over the year to achieve the reported end-of-the-year number of 653 wolves. However, none of this can be verified given the data presented in the 2011 report, because the pup count was not provided and is not accurate anyway according to Laudon, and immigration is unknown. Nevertheless, if the 164 pup count is used, immigration must account for 152 wolves (316 - 164 = 152). This is 23.3 percent of the minimum population. It appears that the 2011 report follows the same pattern as previous years (Mallonee 2011): the numbers do not add up in a logical way, they represent incomplete wolf counts, and many of them cannot be verified using the data presented in the annual reports.

Assume for the moment that FWP's numbers are correct. Where did the 15 percent increase occur? Immigration numbers are always unaccounted for, and when they are removed from the year-end totals 2010 had a minimum of 476 wolves (566 - 90 = 476) and 2011 had 501 wolves (653 - 152 = 501). So 2011 and 2010 had a difference of 25 wolves which represents a 5.2% increase in minimum wolf counts. According to FWP numbers, it would take 87 wolves (653 - 566 = 87) to achieve a 15 percent increase over the 2010 year-end total. Therefore, most of the claimed 15 percent increase (62 wolves) came from the unverified immigration numbers. Plus, the 21.4 percent annual error in minimum wolf population counts greatly exceeds any verifiable increase.

None of this makes any sense because the basis of all these calculations comes from the assumption that the previous year-end totals are correct. However, each year-end total contains fabricated immigration numbers. Every year is inaccurate. Regardless, the 15 percent increase is still shown to have come from unverified numbers. All this is further complicated by the fact that FWP never used scientific methodology to collect their data to begin with (Kent Laudon, Wolf Management Specialist, FWP, 7 Sep 10, personal communication). This means all of FWP's numbers are questionable. This shows in the annual reports because the data cannot be used to calculate or verify the year-end totals claimed by FWP. In other words, the numbers do not add up. Yet these totals are used to make unsubstantiated claims that make policy to kill more wolves. The data FWP collects is so bad and incomplete that we should all be asking:

1. What numbers do FWP provide the federal government to determine if wolves should be on the endangered species list or not?

2. If the total number of wolves in Montana is not known, along with FWP's failure to even provide a good guess, how is the hunting quota determined?

3. My taxpayer money contributes to the salaries that are paid to FWP employees, and this is the unprofessional service they provide? Why are they not using science to make management decisions?

4. How can FWP be so blatantly wrong and continue to kill wolves?

The answer to the last question is that the public lets them. If any of this bothers you, please go to my web site (www.wolfandwildlifestudies.com) and open the PDF that shows my email exchanges with officials throughout the FWP hierarchy. At the beginning of this document is a list of five officials and direct links to their email addresses. They have refused to answer any of

my questions, so I am hoping you will have better luck. At least let them know what you think, because nothing will change unless the public decides that wolves are important enough to fight for. If not, by default wolves will die. It will take a collective and sustained effort by many people to make FWP accountable for their actions.

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Figure 1. Wolf population changes according to data provided in the 2010 and 2011 Montana Fish, Wildlife and Parks annual reports.