

WOLF PACK SIZE

How Did The Druid Peak Pack Get To Be So

BIG

?

by DOUGLAS SMITH and RICK MCINTYRE

It is an impressive and unforgettable sight: 37 wild wolves greeting each other and playfully romping around their rendezvous site. Yellowstone National Park's Druid Peak pack grew from just 8 wolves in 1999 to 27 in 2000 to 37 in 2001. This may be the largest pack of wolves ever documented. How did the pack get so big, and how does it compare to other large packs in recorded wolf history? We hope to answer this question, but along the way we will discuss pack size in general, for it is an interesting and important aspect of wolf behavior and ecology.

What determines how many wolves live in a pack is an old ques-



tion frequently asked by wolf biologists. Arguably it is one of the first and most basic questions to ask. Answers presented so far include killing efficiency, benefits of sociality, territory defense, prey size, and population density. These answers are probably not mutually exclusive; in other words, several factors contribute both to the evolution of wolves living in groups (families) and to the optimal size of those groups. We will not discuss all these factors in detail but reflect on a few, using the Druid Peak pack as an example.

The most basic pack structure and the kind encountered most frequently is a mated pair of wolves and their pups. Average litter size for wolves in North America is about 5 or 6, so most wolf packs range between 5 and 10 wolves, varying because of litter size, mortality and dispersal. Larger packs build on this basic structure when more pups are born in a year before all the pups from the previous year die or leave.

The Druid Peak pack of 37 wolves may be the largest pack ever documented.

Low mortality is one contributor to large packs. Protected areas, like Yellowstone National Park, where human-caused mortality—often the leading type of mortality for wolves—is low will typically support larger wolf packs.

Often large packs are multi-generational, meaning that wolves of various age classes live in the pack. All but one of the park's nine wolf packs are multigenerational, and the one was recently formed, so it is a pair with pups. Average pack size in the park is a whopping 14.6 wolves/pack. Just over the park boundary average pack size declines to 5.8, because of higher human-caused mortality and more youthful packs (pairs with pups).

In addition to mortality, prey size may influence the size of packs. Early on, biologists, including Adolph Murie in 1944, proposed that wolves need to hunt in packs because their prey are larger than they are: "Because wolves rely mainly on large animals, the pack is an advantageous manner in which to hunt" (*The Wolves of Mount McKinley*, p. 45). After time and further study, this idea has gone out of vogue, but prey size may still play a role in pack size.

We now know that one wolf can kill amazingly large prey, a bison or musk ox, for example. Murie went on to say that if the kill is not large enough, some wolves will go hungry, suggesting that prey size may impose limits on pack size. We feel that prey



Wolf #21 is the alpha male of the Druid Peak pack.

size may have something to do with why the Druid Peak pack is so large; at 37 wolves none is going hungry.

Wolves feed on prey that range widely in size, from white-tailed deer to moose and bison. Do pack sizes vary based on size of their main prey? The answer is, not much, but it is important to look beyond averages. Packs that feed on larger prey tend to be the ones that get big.

R. A. Rausch recorded a pack of 36 wolves in Alaska during the 1960s. Their primary prey was moose. Another large pack of 29 was observed in Alaska by Layne Adams and Tom Meier. These wolves also ate primarily moose. Ludwig Carbyn recorded a pack of 42 wolves in Wood Buffalo National Park in northern Alberta, an area where wolves prey

predominantly on bison, but he was not certain that it was a single pack. It might have been an aggregation of several. He recorded five other packs of greater than 20 wolves, although he stated that the average in winter appeared to be from 12 to 16. These studies and others suggest that packs over 20 wolves are exceptionally big and uncommon, and their size may be linked to the amount of food the wolves can procure.

In Yellowstone National Park the Rose Creek pack reached 24 individuals in 1998, and their predominant prey was elk, a much smaller prey item than moose or bison. Interestingly, the Rose Creek pack was not able to maintain its high numbers very long. The pack declined quickly after reaching its high count. By late 2000 it had broken into two packs of five, and during spring 2001 one of those groups did not reproduce and has since split up.

Part of the Rose Creek pack's decline may be related to the extremely large size of the Druid Peak pack. The Druid Peak pack's territory abuts the Rose Creek pack's. Until the winter of 2001 the larger Rose Creek pack had no trouble keeping Druid Peak wolves away, in spite of many territorial skirmishes, because since 1996 the Druid Peak pack had always numbered fewer than 10 wolves. In 2000 the pack produced three litters of pups, burgeoning to 27 wolves—a lot more mouths to feed.

To feed that many wolves, the Druid Peak pack had to find more elk. With its number declining, the Rose Creek pack would have a hard time defending its prey-rich territory against the now much larger Druid Peak pack. Last winter that is exactly what happened: Druid Peak wolves made many raids into Rose Creek territory, some of which we observed, and Druid Peak eventually took over a large chunk of Rose Creek territory. Druid Peak had

In 1998 the Rose Creek pack numbered 24 wolves, 16 of which were photographed near Slough Creek. They numbered 24 only temporarily as their numbers declined rapidly due to mortality and dispersal. In 2000 the pack split into two groups of five, and in 2001 is a group of nine and a group of two, named the Rose Creek II pack and Tower pack, respectively.

Photos by Douglas Smith/NPS



Christopher and Miranda Bly

Left: This wolf is #224, a very bold male yearling of the Druid Peak pack. The rest of the pack had moved on, but he decided to do a little exploring on his own.

Average pack size in Yellowstone National park is a whopping 14.6 wolves/pack.

found more elk to maintain its large pack. Interestingly, the three largest packs in Yellowstone in December 2001, the Druid Peak (37 wolves), the Nez Perce (20+ wolves) and the Yellowstone Delta (16 wolves), are making extraterritorial forays, probably trying to find enough elk to eat. The other, smaller packs are within their normal territories.

In April 2001 the Druid Peak pack was audacious enough to use an old Rose Creek pack den, one dug in 1996 under a large boulder. The Druid Peak wolves also denned in their traditional den in Lamar Valley. At least 2 Druid females gave birth to 12 pups. Now the Druid Peak pack, with 5 or 6 adults, 20 yearlings, and 12 pups, numbers 37 or 38, although since we cannot always find the twelfth pup, we count the pack size as 37 wolves. The sight of these wolves moving across Lamar Valley is awe inspiring. We have seen this huge aggregation of wolves all together only once; they have been operating as subgroups because the pack is probably too large to function efficiently together.

Given the idea that prey size regulates pack size, how can such a

large pack maintain itself? Size of the pack is related to food abundance, which can vary because of factors other than prey size. Prey acquisition rate is another variable that can affect food abundance and keep the amount of food for the pack steady enough to support it. The Rose Creek pack declined in number probably because it could no longer maintain the kill rates necessary to feed the entire pack. To feed its many wolves, the Druid Peak pack must increase how many elk they feed on. We predict that this extremely large pack, like the Rose Creek pack, will not be able to maintain its size. By mid-winter, wolves will begin leaving or dying, keeping the pack in tune with what the environment can support.

Will our predictions be correct? Will the Druid Peak pack split into permanent, nonintermingling subgroups and subdivide its territory?

Will the Rose Creek pack increase again and retake its old territory? One of the adult females in the Druid Peak pack is being picked on and could leave, and this year the Rose Creek wolves produced at least 6 pups. These are signs of change, but we don't know now what will happen. This is an ongoing story—one that we are eager to follow. ■

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