

# Wolf color patterns: Why do some gray and black wolves turn white?

by Ted Bailey

I recently co-authored a report on wolf color patterns, which is the first study of wolf colors covering western North America and Alaska. The report included over 14,000 wolves from Alaska, and 125 wolves that we live-captured and monitored on the Kenai National Wildlife Refuge between 1982 and 2000. We also looked at wolf color patterns in Canada, Montana and Wyoming. We were particularly interested in why some “normal-colored” wolves turn white.

First, what are “normal-colored” wolves? On the Kenai Refuge, 87 percent of wolves that we live-captured between 1982 and 2000 were gray, and only 13 percent were black. A similar study of 64 wolves captured by Rolf Peterson from 1976 to 1981 found 67 percent gray and 33 percent black. Statewide in Alaska, most of the 14,702 records of wolves provided by the Alaska Department of Fish and Game were gray wolves, varying from 82 percent in the Southern Region to 72 percent in the Interior Region of the state.

Indeed, throughout most of North America, from eastern Canada to Alaska and with only a few exceptions, the predominant color pattern of the wolf is gray—hence the name “gray wolf.”

White is the dominant color of wolves only in the Canadian High Arctic tundra region of North America. For example, in the Northwest Territories of Canada, 90% of 58 captured wolves were white. In contrast, in the Arctic Region of Alaska, only 6 percent of 527 wolves were white. The incidence of white wolves generally increases from the sparsely forested regions of southern Canada northward to islands of the High Arctic.

There is little consensus about the advantage of one color pattern over another in wolves, but the color pattern of wolves that are born white and remain white is probably genetically inherited.

But what interested us was why some normal-colored wolves, both gray and black, throughout North America eventually turned white or near white, because white wolves are so rare south of Canadian Arctic.

Only seven of the 189 normal-colored wolves

that we live-captured on the Kenai National Wildlife Refuge turned white during the time that we were monitoring them. Six of these wolves were initially gray or grayish-brown and one was black.

I also vividly remember another white wolf that we never captured but that I repeatedly saw from the air. It was in a wolf pack we monitored in the 1980s in an area northwest of Tustumena Lake. Since this wolf usually was leading the pack with its tail held high I presumed it was the alpha, or head wolf, of the pack.

It remained in the pack for years, then one year a trapper reported that he had captured a large white male wolf in the pack’s territory. He had the pelt tanned and allowed us to photograph it. It was typical of a gray wolf that had turned white. Most of the hairs on these “turned-white wolves” are indeed white but there is sometimes a slight band of dark hairs running down the mane and along the top of the tail.

We speculated that there might be three reasons why gray and black wolves turn white. The first possibility is that some wolves turn white with old age. This is similar to old dogs that turn white around their muzzles. An old wolf is generally 8-10 years old or older; the maximum age of wolves is about 16 years.

But most wolves never reach such a ripe old age to become white. On the Kenai Peninsula, humans kill most wolves before they are 10 years old, and sometimes wolves kill other wolves. Our telemetry data indicated that only rarely does a wolf on the Kenai die of the complications associated with “old age.” One of the seven Kenai wolves that turned white was at least 12 years old and one at least 8 years old. Some of the gray and black wolves that turned white elsewhere in North America were also very old wolves.

A second possible reason for a wolf turning white might be physiological stress or trauma associated with injury or disease. All seven of the “turned-white” Kenai wolves were in poor condition, with six having atrophied legs, missing toes and teeth, or blindness in one eye. We also monitored one gray wolf with a leg injury whose coat had started to turn white, then after the injury healed, the coat returned to its normal gray

color.

Furthermore, nearly a third of the historically famous depredating wolves that turned white in the continental United States in the early 1900s also suffered from missing toes and teeth and deafness.

A final cause of why some gray or black wolves turn white is probably genetics. Although only partially understood, some wolves apparently possess genes that contribute to rapid and premature graying.

A similar phenomenon is also seen in humans who, unlike wolves, sometimes take extraordinary and expensive actions to mask this unusual but natural oc-

currence.

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