Behavior and Conservation of Wolves In Alaska

Research in the Denali and Fortymile regions

Gordon C. Haber
October 2005

Free-living wolves feature extraordinary intelligence, expressiveness, emotional depth, sensory abilities, and physical prowess. Their family-based social systems are highly developed. They play a central role in large mammal ecosystems. However, in Alaska they are not accorded the treatment that their high sentience and these other values warrant. At least 1,200-1,500 wolves are killed each year under almost-anything-goes state and federal hunting-trapping regulations and in state-sponsored formal and de facto control programs. The existing regulations even allow heavy killing of wolves across half of Denali National Park and Preserve, along critical boundary areas, and within the entirety or major portions of every other national park in the state.

Most of this killing originates ultimately from scientific misconceptions on the part of wildlife biologists. Especially noteworthy is the widespread view that little more than area-wide numbers, i.e., "populations," need to be considered in evaluating the impacts of hunting, trapping, and control programs on wolves. Thus many wildlife biologists in Alaska, and by extension managers and policymakers, ignore the true costs of this killing and uncritically promote, accept, and/or legislate it. This research focuses on scientific and related objectives in two regions of Alaska to dispel these misconceptions, to end the heavy killing and provide a better understanding of wolves, wolf-prey systems, and societies and systems in general.

Study areas

The field work takes place primarily in two areas of Interior Alaska that add up to the combined sizes of New Hampshire, Connecticut, and Massachusetts. One of these areas, about 8,000 square miles, is centered on the northern half of Denali National Park and Preserve. The other, about 15,000 square miles, is 200 miles northeastward, in the upper Tanana-Fortymile-Yukon-Charley, i.e., "Fortymile," region of east-central Alaska. Sixteen groups of wolves (including singles and pairs) are currently under observation via aerial radio tracking, snow tracking, ground observation, and/or other means – 12 in the Denali study area and four in the Fortymile study area. Denali has been a study area since 1966, Forty-

mile since 1993. Other areas, such as just east and southeast of Denali (Game Management Units 20A and 13) and near the village of McGrath to the west, are added temporarily from time-to-time, usually when wolf control is proposed and/or carried out and there are good opportunities to meet conservation objectives (see "Related objectives").

Scientists and others have widely regarded Denali as the world's premier subarctic wolf research area since Adolph Murie's pioneering studies in 1939-1941 (Murie 1944). Denali in combination with Fortymile provides opportunities for important biological comparisons, such as between non-migratory versus migratory (caribou-dependent) wolves, multi-prey versus single-prey ecosystems, and largely protected versus heavily hunted ecosystems. These two areas also provide a good sampling of wolf hunting, trapping, and state-sponsored control activities, in units of the national park system as well as on state lands. In the early-mid 1990s, there were as many as 25-30 simultaneous Fortymile study groups. A sterilization-relocation wolf control program in 1997-2001 and an aerial shooting control program that began in 2005 have reduced this to the current four groups, primarily within Yukon-Charley Rivers National Preserve.

Scientific objectives

Wolf biology is based on two unusual evolutionary strategies among vertebrates: cooperative breeding and cooperative hunting (Haber 1977, 1996, 2002; Mech and Boitani 2003). There is also strong evidence for a third evolutionary strategy – "prudent predation" - in the way non-migratory wolves exploit moose, at least in many subarctic areas (Haber 1977; Walters et al 1981). Decades of field research in Alaska (Murie 1944; Haber 1977, 1996, 2002; Mech et al 1998) indicate that these strategies operate primarily through sophisticated interactions and interdependencies within family-based functional units, including long-lasting multiple extended families.

I responded (Haber 1996, 1998, 1999, 2002) to contrary, inaccurate claims about the biological and management preeminence of area-wide wolf numbers, high natural turnover of component family units, and an area-wide "boom-bust" relationship with caribou. I emphasized that not only are family groups the preeminent functional units but it is the behavior that predominates at this level of organization under natural conditions that most defines wolves

as a species, makes them so interesting, and warrants the most emphasis in considering the impacts of human killing.

Accordingly, this research will continue to provide information about the natural longevity of wolf family lineages, the cooperative breeding, cooperative hunting, and related behavior within these groups, and their interactions with each other and prey. A diverse mix of persistent, shorter-lived, highly territorial, and migratory family lineages, pairs, and singles is being studied to ensure appropriate emphasis of important variations.

The 16 current groups will be studied as long as they survive and can be tracked; other groups will be added when possible. In addition to the year-round aerial observations of all groups, several in Denali – Toklat, Toklat West, and Margaret - are also monitored at dens, rendezvous sites, and elsewhere via ground observation each summer (late May-September). Toklat has persisted in Denali throughout the 40 years of this research and probably since at least 1938 (Murie 1944, pers. commun. 1966; Haber 1977, 2002).

The high value of long-term observational field studies such as this is that they can describe a broad range of interacting variables in a systems context. Everything the wolves are observed to do is recorded and contributes at least in a general way toward a better understanding of behavior and ecology. In this case, the emphasis is on social (family) groups rather than populations, and on their underlying cooperative and predation strategies, including how these may relate to differences in longevity.

A better understanding of longevity among family lineages – beginning with the area-wide patterns of persistent and shorter-lived groups that can be expected under natural conditions – requires observing individual groups until they terminate and then distinguishing between the possible proximate *and* ultimate natural and human causes. It also involves information about the durability of key social relations (e.g., how long certain individuals maintain alpha and beta ranks and roles, related divisions of labor, and pair bonds) and other aspects of stability (e.g., how group sizes respond to prey changes). Continuing to record the history of Toklat, one of the world's 2-3 oldest known family lineages for any large vertebrate species in the wild, remains a high priority. At least 40 years of this history have been recorded in detail so far. This gives Toklat enormous world-class biological value for providing insights about a successful vertebrate society, especially in combination with comparative information

from the persistent Savage family (an earlier, neighboring Denali group; Haber 1977) and shorter-lived groups.

For example, only over a period of decades has it been possible to identify a major prey-related social response by Toklat. Several decades ago when Toklat was still afforded a summer abundance of caribou within a larger territory, it featured a loose, often multiple-family, social structure with frequent temporary ("even-aged") winter splitting (Haber 1977). Now, with low caribou numbers across the region year-round, Toklat still maintains about the same group size with heavier dependence on lower but seasonally more stable numbers of moose and sheep – substantially within the old Savage territory – with a tighter, more Savage-like, social structure in which there is virtually no winter splitting (Haber 1998, 2002; Mech et al 1998).

The cooperative breeding observations emphasize "helping" behavior, which in wolves is exhibited by males as well as females and established, high-ranking adults as well as juveniles. Especially valuable are opportunities to observe the permutations of helping associated with the production of simultaneous multiple litters (common in Toklat's history), such as when breeders help other breeders. Closely-related behavior is also documented whenever possible, including details about the formation and success of monogamous, polygynous, and incestuous reproductive bonds, behavioral and physiological suppression of reproduction, pseudo-pregnancy/induced lactation, and reproductive divisions of labor.

The cooperative foraging observations emphasize details about social hunting tactics and the extent to which some tactics develop uniquely in certain groups while other tactics occur widely. Related information is collected on the frequency of kills and use of winter kills (scavenging), and on hunting success rates. This is similar to the predation and scavenging information that was collected for Denali wolves in earlier years (Haber 1977), except that now it is derived mostly from "point" (radiolocation) rather than prolonged-tracking samples. Most of the observed cooperative hunting tactics, and other learned behavior - especially within- and between-summer patterns of homesite use, extend across generations. Information is collected on these and other possible traditions. Of particular interest is any information that ties a hunting (or other) tradition uniquely to a particular group and, even moreso, identifies a major difference in traditions among groups as a function of resource differences or other variables. Key aspects of wolf behavior develop during the prolonged dependency of

young, which commonly lasts until early adulthood where wolves rely heavily on moose and mountain sheep (Haber 1977). This dependency facilitates the transfer of large amounts of information from one generation to the next and ultimately the formation of long-lasting traditions. Thus there is also heavy emphasis in this study on describing early learning sequences, beginning at first emergence from the natal den.

Jointly the cooperative breeding and foraging observations provide a rare opportunity for insights from the wild about the evolutionary underpinnings of cooperative behavior, one of the most important areas in all of scientific inquiry (Kennedy and Norman 2005). This includes unique observations of the Toklat family concerning the roles of direct and indirect selection, including forms of reciprocity (Haber 2002; Clutton-Brock 2002). A better appreciation of the sophistication of wolf behavior and its applicability toward broader insights will also lead, inevitably, to more enlightened wolf management policies.

The evidence for prudent predation includes an inverse hyperbolic relationship between wolf territory sizes and prey abundance, the relative stability of moose subpopulations and likelihood of multiple stable states in wolf-moose-sheep systems, and the persistence of wolf family groups in these systems (Haber 1977, 1980, 1987, 1992, 1998, 2002; Walters et al 1981). This research continues to provide supplementary information in all of these areas, though for the most part of a general nature and as an aside to the other scientific objectives. The case has already been made strongly; the continuing research provides further opportunities for disproof based on any obvious long-term contradictions. Understanding system stability properties – whether multiple stable states or some other stability, oscillatory, or chaotic behavior prevails and possible transitions with changes in the control variables – has long been a central objective of this research, alongside the sociobiological objectives. This kind of insight is important toward identifying the wolves' prey exploitation strategies and for a broader understanding of predator-prey systems and systems in general.

Related objectives

The field observations required for the scientific objectives also provide information of high value for closely related conservation objectives.

Scientists and non-scientists are not motivated to change questionable public policies by quality science alone. They must also understand the important "hands-on" details of

these policies. Prior to this research, it was essentially only the hunters, trappers, and agency supporters who had access to the hands-on details of wolf hunting, trapping, and control activities in Alaska. Now, through regular aerial coverage, radio-telemetry, and other capabilities to monitor wolves across large, rugged areas under various state and federal management regimes, the present study provides opportunities for many more people to learn about the details of this killing from a first-hand source. It will remain a priority to share these details widely in the public domain, through popular and technical reports and publications, public lectures, the Internet, and especially state, national, and international media, including with photos, video, and by bringing reporters into the field.

Individuals and organizations are increasingly challenging wolf-killing policies in Alaska through court action, ballot initiatives, and in related ways. This research will continue to provide support for these efforts with expert testimony, in other scientific ways, and with the kinds of "hands-on" field information mentioned above. Similarly, this study has long provided information resulting in various forms of protection for wolves (e.g., summer hiking closures of denning areas), other wildlife, habitat, and wilderness values in and near Denali National Park and, to a lesser extent, in Yukon-Charley Rivers National Preserve, the Fortymile National Wild and Scenic River Corridor, and other areas. These efforts will continue. There will be particular emphasis on obtaining full hunting-trapping protection for Denali wolves within the park/preserve and in adjacent boundary areas.

Literature cited

Clutton-Brock, T. 2002. Breeding together: Kin selection and mutualism in cooperative vertebrates. Science 296: 69-72.

Haber, G.C. 1977. Socio-ecological dynamics of wolves and prey in a subarctic ecosystem. Ph.D. dissertation, Univ. of British Columbia, Vancouver. 817 pp. 1978, Special Report, Joint Federal-State Land Use Planning Commission For Alaska, Anchorage. Available from Arctic Environmental Information and Data Center, Univ. of Alaska, Anchorage.

Haber, G.C. 1980. The balancing act of moose and wolves. Natural History 89 (10): 38-51.

Haber, G.C. 1987. Exploitation of wolf-moose systems: lessons from Interior Alaska. The Alaska Wildlife Alliance, Anchorage. 141 pp. Available from Arctic Environmental Information and Data Center, Univ. of Alaska, Anchorage.

Haber, G.C. 1992. Wildlife management in Alaska: Southcentral-Interior wolf control and related issues. Wolf Haven International, Tenino, Wash. 108 pp. Available from Arctic Environmental Information and Data Center, Univ. of Alaska, Anchorage.

Haber, G.C. 1996. Biological, conservation, and ethical implications of exploiting and controlling wolves. Conservation Biology 10: 1068-1081.

Haber, G.C. 1998. Review of, The wolves of Denali. Denali National Park resource management files or ghaber@mtaonline.net. 13 pp.

Haber, G.C. 1999. A selective view of wolf ecology. Conservation Biology 13: 460-461.

Haber, G.C. 2002. Toklat, Margaret, and Sanctuary: The wolves of eastern Denali. Biological year 2001-02 responses to disruption. Research Report, Denali National Park resource management files or ghaber@mtaonline.net. 32 pp.

Kennedy, D. and C. Norman (eds). 2005. What don't we know? Special Section, Science 309: 75-102.

Mech, L.D., L.G. Adams, T.J. Meier, J.W. Burch, and B.W. Dale. 1998. The wolves of Denali. Univ. of Minnesota Press, Minneapolis. 227 pp.

Mech, L.D. and L. Boitani (eds). 2003. Wolves: behavior, ecology, and conservation. Univ. of Chicago Press, Chicago. 448 pp.

Murie, A. 1944. The wolves of Mount McKinley. National Park Service Fauna Series 5. 238 pp

Walters, C.J., M. Stocker, and G.C. Haber. 1981. Simulation and optimization models for a wolf-ungulate system. Chapter 16 (pp. 317-337) in C.W. Fowler and T.D. Smith (eds), Dynamics of large mammal populations. Wiley, New York (republished 2004, Blackburn Press, Caldwell, New Jersey). 477 pp.