

THE NAMING OF BEARS

CLINTON HART MERRIAM AND THE GENUS *URSUS* IN NORTH AMERICA

Boone and Crockett Club member Clinton Hart Merriam (1855-1942) was easily one of the most distinguished biologists in the history of the United States. His lengthy and highly productive scientific career included significant contributions to the study of North American birds and mammals, as well as research in fields as diverse as entomology, ethnography, geography, ecology, and medical science. He helped to establish numerous professional and scientific societies, including the American Ornithological Union, the National Geographic Society, the Biological Society of Washington, and the American Society of Mammalogists. For his contributions to the latter field, he is known as the “father of mammalogy.” In 1902, he was appointed by his good friend President Theodore Roosevelt to the National Academy of Science.

Among many firsts, Merriam was the first to apply the concept of “life zones” to characterize the distribution of animals and plants in North America. Many biologists, beginning with Alexander von Humboldt in 1805, had noticed that different animal and plant species lived at different elevations on tall mountains. Merriam observed this same phenomenon during a visit to the San Francisco Peaks near Flagstaff, Arizona, in 1889 and proposed a series of seven “life zones,” each with its own distinctive plant and animal species, ranging from subtropical to boreal. He noted that these life zones corresponded with increasing elevation on the mountain-side and increased latitude as one moves north across the continent.

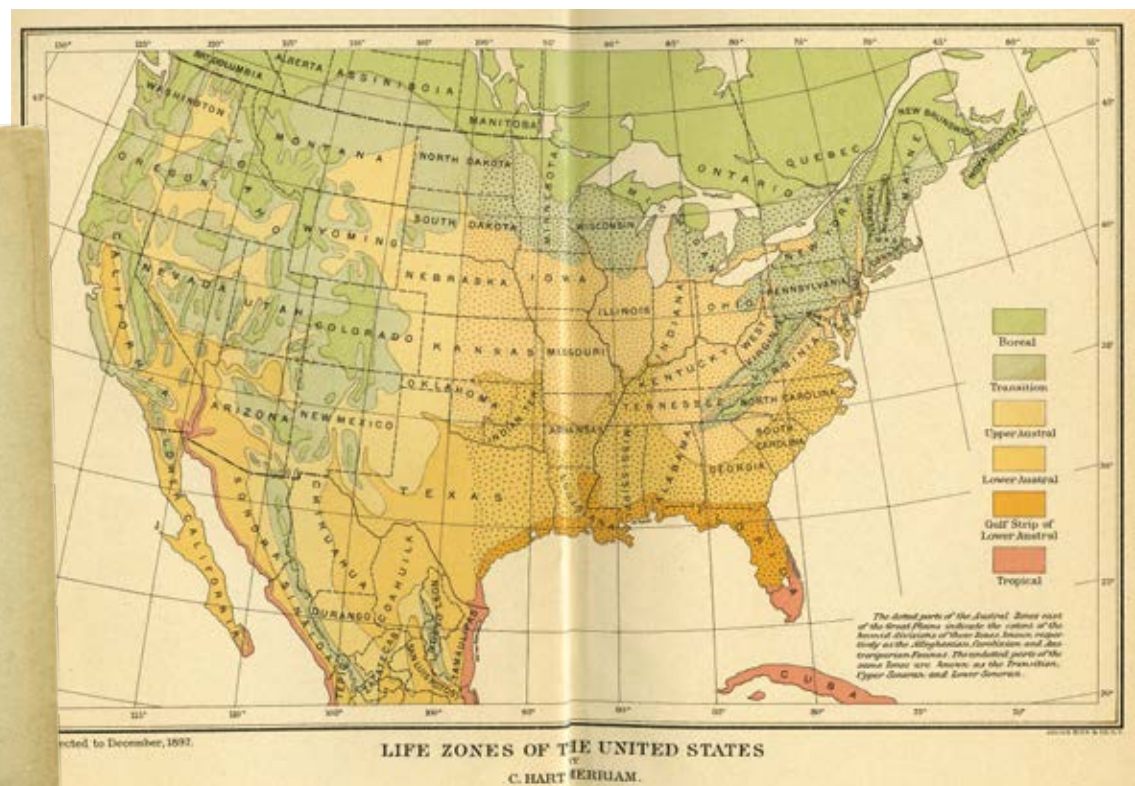
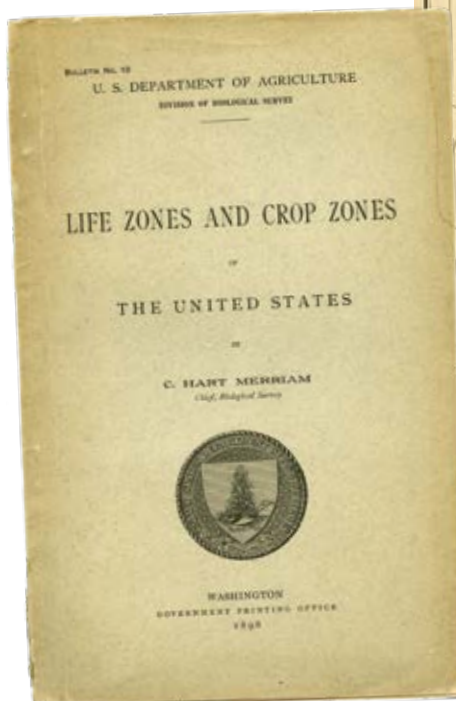
Merriam also founded an important precursor to the U. S. Bureau of Biological Survey and led this group for 25 years. The Survey was created in 1885 (thanks in part to Merriam’s lobbying through the American Ornithological Union) as the Section of Economic Ornithology under the Division of Entomology in the United States Department of Agriculture, with Merriam as its first head. In 1886, Congress added mammals to the survey’s portfolio, making it the Division of Economic Ornithology and Mammalogy. In 1905, this Division was renamed the Division of Biological Survey, five years before Merriam’s official retirement in 1910. In 1934, the Division became the Bureau of Biological Survey, with Boone and Crockett Club member Jay “Ding” Darling



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as its first chief. Six years later, the Bureau of Biological Survey was combined with the Bureau of Fisheries to form the Fish and Wildlife Service within the Department of the Interior. Merriam’s vision for the scientific management of American wildlife lives on in the modern-day U. S. Fish and Wildlife Service.

One of Merriam’s great passions was the taxonomy or scientific naming of animal species, especially mammals. He described his first new species, the marsh shrew (*Atrophyax bendirii*), in 1884,



and he went on to describe some 660 species, subspecies, and forms of mammals. Slightly more than 100 of these are currently listed in Wikipedia as valid taxa; the others have been sunk in synonymy by subsequent generations of taxonomists as they discover that the names proposed by Merriam actually apply to species that have already received scientific names in earlier publications.

This is where the story of Clinton Hart Merriam, brilliant American scientist, intersects the theme of this issue of *Fair Chase* magazine. It is virtually impossible to discuss Merriam's scientific career without addressing his scientific publications on the taxonomy of bears in North America. Merriam was intensely interested in the nomenclature of our wild bears, and amassed a very large collection of specimens, mostly skulls, from some 1,864 individual bears. Many were "last of" bears, the last individual bear found by government trappers or homesteaders in some remote mountain range or canyon. Other bears were collected by sporting men and women who ventured into the great American wilderness in search of big game. Perhaps the most famous of these bears was Old Bigfoot, immortalized by Boone and Crockett Club member Aldo Leopold in his essay "Escudilla." This essay is an eloquent account of the demise of the last grizzly bear in the Escudilla Mountains of eastern Arizona. In Merriam's hands, Old Bigfoot's skull became USNM [United States National Museum, an alternate name for the Smithsonian Institution] #177332, and

also the holotype of Merriam's species *Ursus arizonae*.

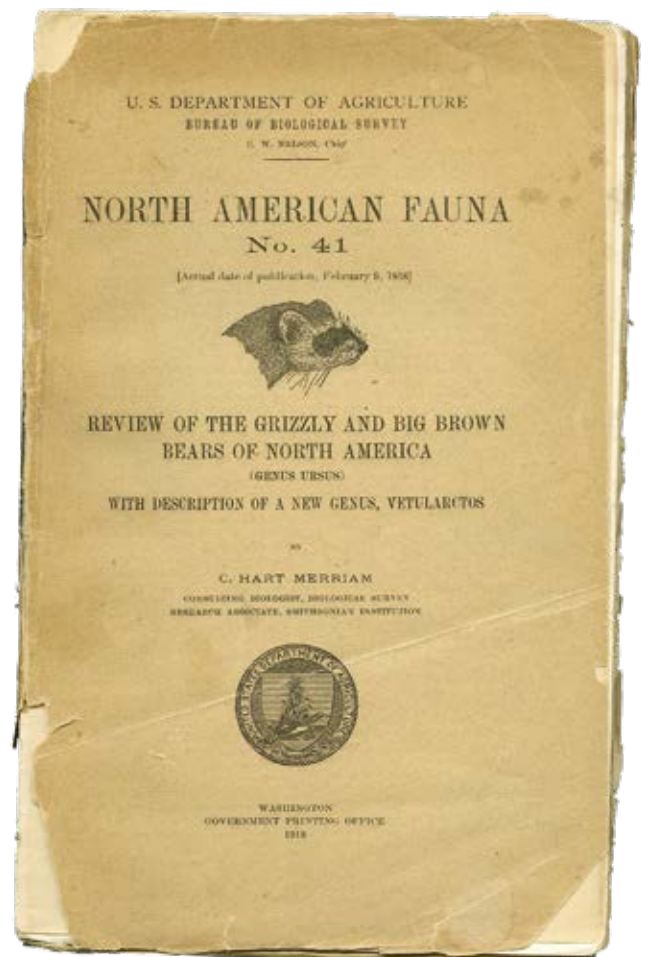
Merriam set forth his views on the classification of our North American bears in a series of papers that appeared over several decades in two friendly journals, the *Proceedings of the Biological Society of Washington* and the *North American Fauna* series of the Bureau of Biological Survey. His conclusions can be summed up chronologically: in 1896, he recognized eight bear species from North America; in 1902, he described two new bear species from the Alaska Peninsula; in 1904 Merriam described four new bear species; in 1914 he described 30 new grizzly bear species from North America; in 1916 he described another 19 grizzly and brown bear species; and in his 1918 taxonomic review of the genus *Ursus* in North America, he recognized a full 86 forms of grizzly bears (species and subspecies).

Given that today we recognize just one species of grizzly bear in North America, something went drastically awry with Merriam's efforts to classify North America's bears. It is well known that taxonomists are often considered either "lumpers" (who tend to recognize fewer species or other taxa) or "splitters" (who recognize more taxa). By this classification, Merriam certainly stands at the extreme end of the "splitters" regarding North American bears.

But simply labeling Merriam a splitter does not explain what happened with

Merriam published countless volumes of biological data during his career.

By the end of the 20th century, mammalogists had largely repudiated and rejected Merriam's expanded classification of grizzly bears. Yet the specimens he collected have taken on a second scientific life. New techniques have allowed new generations of scientists to extract DNA from these representatives of historic bear populations. In 2006, researchers at the University of Idaho reported the successful extraction and analysis of mitochondrial DNA from 108 historic grizzly bear specimens, at least 73 of which were collected or acquired by Merriam.



his classification of bears. In my library I have several publications by Merriam, including the classic 1918 monograph with its 86 grizzly bears, as well as more popular publications that he wrote for the Boone and Crockett Club membership. In reviewing his taxonomic publications, I was impressed by the careful descriptions he provides of the skulls he is examining, the use of a consistent set of quantitative measurements, the clear points of difference that he notes, and the photographic illustrations he provides of key characteristics as well as individual skulls. Merriam comes across as a meticulous observer and recorder of the bear skulls available to him for study.

So, what went wrong with Merriam's understanding of our bears? First and foremost, many of the specimens he examined were

unique single specimens—the last bear from a particular mountain range, canyon, or other geographic area. It is impossible to fully understand the variation in skull size and characters in a particular bear population from such limited samples. Under such conditions, individual variations can easily be confused with characters that delimit whole species. Second, Merriam had the misfortune of choosing characters that can be highly variable within individual grizzly bear populations. Subsequent researchers were able to study variation in skulls of grizzly bears from individual populations and discovered that many of Merriam's characters vary considerably within a single population. In his previous work on mammals, Merriam had found that measurements of the skull and teeth could be valuable characters in distinguishing

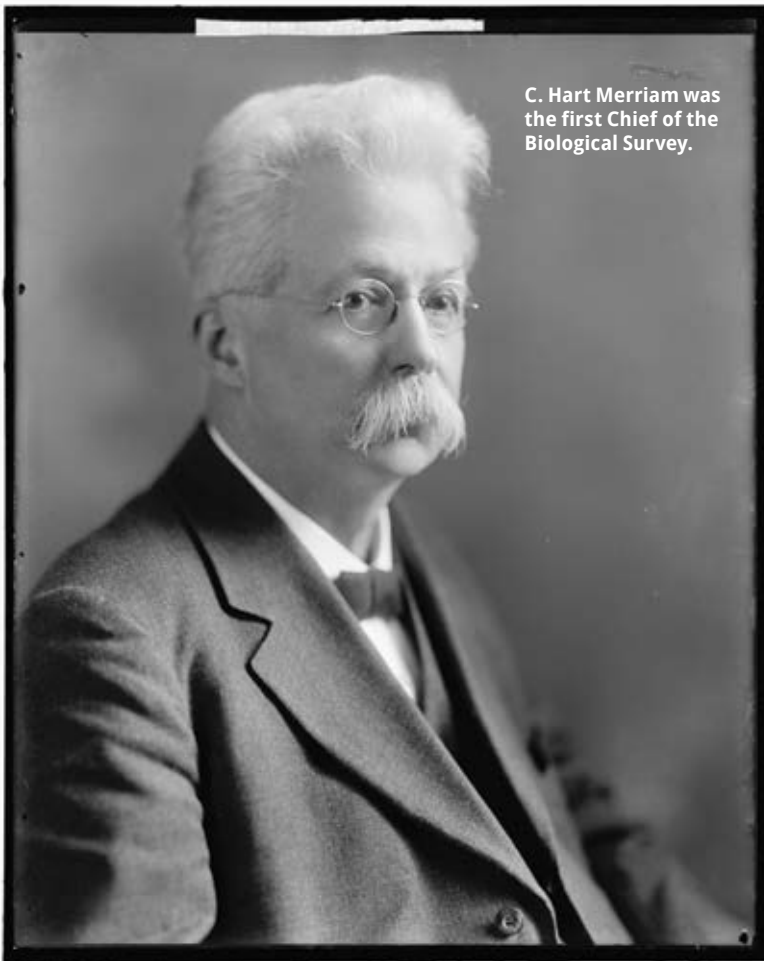
species and subspecies. Later studies demonstrated that these characteristics simply didn't work for classifying grizzly bears.

Merriam's grizzly bear classification was controversial at the time. According to Adolph Murie's classic 1981 book *The Grizzlies of Mount McKinley*, Theodore Roosevelt took great exception to Merriam's proposed bear taxonomy, and the two men engaged in a vigorous discussion at the Cosmos Club in Washington, D.C., regarding the appropriate classification of two bear skulls which Merriam had brought for the occasion. In his essay "Escudilla," Aldo Leopold touches on this controversy when he reports that "all he [the last grizzly] left was a skull in the National Museum and a quarrel among scientists over the Latin name of the skull." Certain Boone and Crockett Club members also took a skeptical

eye toward Merriam's bear classification; in my library, I have a reprinted chapter from the Club's 1932 *Records of North American Big Game* titled "The Bears of America" by Dr. C. Hart Merriam. In this chapter, Merriam alludes to the large number of bear species he has found in North America. Still, when it comes to the actual records of bear specimens, these are listed according to the more conventional categories: Alaskan brown bear, grizzly bear, black bear, and polar bear.

By the end of the 20th century, mammalogists had largely repudiated and rejected Merriam's expanded classification of grizzly bears. Yet the specimens he collected have taken on a second scientific life. New techniques have allowed new generations of

scientists to extract DNA from these representatives of historic bear populations. In 2006, researchers at the University of Idaho reported the successful extraction and analysis of mitochondrial DNA from 108 historic grizzly bear specimens, at least 73 of which were collected or acquired by Merriam. These analyses give us insights into the population history and dynamics of long-vanished grizzly bear populations. Further analyses with nuclear genes and now whole genomes extracted from historic bear specimens are helping us understand the relationships and population size and status of bears across their historic range. The same is true for black bears and other bear species whose skeletal remains were collected by Merriam and other pioneering scientists more than a century ago. From these analyses and additional information, we can learn how historic bear populations responded to drought, climate change, and variations in prey populations and food availability. Much of this information is directly relevant to ongoing efforts at state and federal levels to manage bear populations in the face of resource shifts, changing climates, and increased human-bear interactions. All of us who admire these magnificent carnivores can be grateful to Merriam and his colleagues for their efforts to collect and preserve this material from long-vanished bear populations. Merriam's bear classification may be extinct, but the historic bear specimens he collected continue to provide fresh insights that inform our management of these magnificent wildlife species. ■



C. Hart Merriam was the first Chief of the Biological Survey.