

THE BIOGEOGRAPHIC HISTORY OF SMALL MAMMALS IN THE GREAT BASIN: OBSERVATIONS ON THE LAST 20,000 YEARS

DONALD K. GRAYSON

*Department of Anthropology and Burke Memorial Museum, University of Washington,
Seattle, WA 98195*

ABSTRACT.—Evidence from archaeological and paleontological sites meets key predictions drawn from J. H. Brown's argument that boreal mammals colonized the Great Basin during the Pleistocene, only to become isolated on, and differentially extinct across, Great Basin mountains during the Holocene. *Sylvilagus idahoensis* decreased in abundance here at about 7,000 years ago, apparently at about the same time that *Ochotona princeps* became extinct in the lowlands of the northern half of the Great Basin. These shifts seem correlated with a decrease in effective precipitation inferred from paleobotanical data. Hares (*Lepus* sp.) appear to have been more abundant during the earlier Holocene than during later times in many more northerly parts of the Great Basin, while several sites suggest survival of the extinct noble marten (*Martes nobilis*) until a few thousand years ago. The fact that boreal mammals are isolated on Great Basin mountains has important implications for the management of high altitude habitats in this region.

The Great Basin of the western United States is a vast, arid region characterized by internal drainage and by long, north-south trending valleys flanked by mountain ranges (Fig. 1). The distribution of the nearly 100 species of mammals that occupy this area is fairly well known, but the history of these mammals has been the focus of intense research only during the past two decades. Here, I discuss the implications of recently gained knowledge of the history of Great Basin small mammals during late Wisconsin and Holocene times.

MATERIALS AND METHODS

Numerous archaeological and paleontological sites provide crucial information on the late Wisconsin and Holocene history of Great Basin mammals, but relatively few provide deep, well-dated, paleontologically rich sediments representing much or all of this period. The heart of the Holocene chronological sequence for Great Basin small mammals is provided by Gatecliff Shelter (Grayson, 1963; Thomas, 1983), Hidden Cave (Grayson, 1985; Thomas, 1985), the Connley Caves (Bedwell, 1973; Grayson, 1979), and Danger Cave (Jennings, 1957). My analysis relies heavily on the dated deposits of these sites. All abundances presented here are simple numbers of identified specimens (see Grayson, 1984b). References to specific sites provided in the tables are not repeated in the text. This paper expands on arguments presented in Grayson (1982).

RESULTS AND DISCUSSION

Boreal Mammals in the Great Basin

Many small mammals are discontinuously distributed within the Great Basin, occurring only on the middle and upper reaches of mountain ranges, especially in the central and southern portion of the region. None of these montane species is found on all Great Basin ranges (see Tables 1 and 2). This discontinuous distribution could have originated in a number of ways. Hall (1946), for example, suggested that at least some montane mammals might cross Great Basin valleys during times of winter snow cover, thus avoiding high summer temperatures and lack of adequate ground cover in spring and fall. Brown (1971, 1978), however, suggested a very different mechanism to account for the modern distribution of montane mammals in the Great Basin.

Brown defined Great Basin boreal mammals as those inhabiting pinyon-juniper woodland or habitats of higher elevation. Although not all of these mammals are truly boreal, I follow Brown's usage here for consistency. He discovered that there is no significant correlation between the number of boreal species on Great Basin mountains and variables likely to affect the probability of colonization of those mountains. Accordingly, he concluded that the distribution of boreal