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CURRENT DISTRIBUTION OF THE AMERICAN MARTEN, *MARTES AMERICANA,* IN CALIFORNIA

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We describe the current distribution of the American marten, *Martes americana*, in California based on field surveys conducted between 1989 and 1995 that used either sooted track-plates or cameras. The Sierra Nevada marten, *M. a. sierrae*, occupies much of Its historic range from northwestern Shasta County to the southern Sierra Nevada. The Humboldt marten, *M.a. humboldtensis*, in Humboldt and Del Norte counties, is extremely rare or extinct. We recommend defining the current distributions of rare or secretive species by techniques that produce verifiable records rather than relying on historic or anecdotal reports.

INTRODUCTION

The American marten, *Martes americana*, a small (500-1200 g) mustelid endemic to North America, historically occurred in forests across the continent from the tree line in the north to montane areas of central California and northern New Mexico (Hagmeier 1956, Hall 1981, Gibilisco 1994). In the eastern and Great Lakes regions of North America, the southern limit of distribution of American marten has retreated northward as a result of habitat loss and heavy trapping. Some of this range is being reoccupied, both by natural expansions and with the aid of translocations (Gibilisco 1994). In western North America, there is concern about the effects of loss and fragmentation of mature coniferous forests on American marten because of its association with these forests (Buskirk and Powell 1994).

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However, recent data on regional distribution in the western United States are few.

Based on specimens taken at known localities in California, Grinnell et al. (1937:209) concluded that "two well-marked races occur within the State." The Humboldt marten, *M. a. humboldtensis*, occurred in the coastal redwood, *Sequoia sempervirens*, zone from the Oregon border south to Fort Ross, Sonoma County. The Sierra Nevada marten, *M. a. sierrae*, occurred from Trinity and Siskiyou counties east to Mt. Shasta and south through the Sierra Nevada to Tulare County.

Empirical data on the distribution of American marten in California since Grinnell et al. (1937) are few. Trapping data indicate that martens were taken in at least 21 counties, including Humboldt and Del Norte, until trapping was prohibited in 1953 (California Department of Fish and Game [CDFG], unpublished data). Twining and Hensley (1947) expressed concern about the status of the Humboldt marten. Data on the occurrence of American marten are not included in the California Natural Diversity Data Base (E. Burkett, CDFG, pers. comm.). Yocum, (1974) presented locations of reported sightings of American martens in northern California between 1961 and 1973 and Schempf and White[1] (1977) summarized existing information on their distribution throughout the state. The most recent description of the distribution of American marten in North America (Gibilisco 1994), including California, was based on responses to a survey mailed to agency personnel in 1990-91. Thus, none of these more recent documents is based on field surveys or locations of verifiable specimens, photographs, or tracks.

Since 1989, several efforts have occurred throughout much of California to document empirically the distribution of American marten and other carnivores of conservation interest such as the fisher, *M. pennanti*, and wolverine, *Gulo gulo*, through standardized detection techniques (Zielinski and Kucera[2] 1995). These techniques produce a verifiable record, either a photograph or a track, of the presence of an animal at a point location. The objectives of the present paper are to describe the current distribution of the American marten in California based on these recent surveys and to document that such efforts are feasible and valuable for management of rare or secretive carnivores.

METHODS

Detections of American martens reported here were produced by one of three techniques: baited track-plates (Barrett 1983, Fowler and Golightly[3] 1993,

[1] Schempf, P.F. and M. White 1977. Status of six furbearer populations in the mountains of northern California. Unpublished report, USDA Forest Service, California Region, San Francisco, California, USA.

[2] Zielinski W. J. and T. E. Kucera, editors. 1995. American marten, fisher, lynx, and wolverine: survey methods for their detection. USDA Forest Service General Technical Report PSW-GTR-157.

[3] Fowler, C. and R. Golightly. 1993. Fisher and marten survey techniques on the Tahoe National Forest. Final Report, Agreement No. PSW-90-0034CA, Humboldt State University and USDA Forest Service.

Zielinski[4] 1995); 110-size remote camera stations (Jones and Raphael[5] 1993, Kucera et al.[6] 1995); and remote, 35-mm camera stations (Kucera and Barrett 1993a, Kucera et al.[6] 1995). These techniques produce either a track or a photograph from a known location.

The data came from three types of surveys: i) local studies to determine animal presence within an area of a potential habitat alteration such as a timber sale or recreational development, ii) regional studies to determine animal distribution across one or several watersheds, and iii) statewide efforts to detect rare carnivores. Many of the first type of survey were conducted according to the Forest Service Region 5 protocol (Zielinski[7] 1992) in which >10 track-plate stations were installed at 0.8-km intervals along roads in areas of proposed timber sales. Surveys of the second type were conducted across a landscape with detection stations arrayed in a grid with nodes l-l.6 km apart. The third type included individual camera stations placed in areas of historic wolverine range in an attempt to detect wolverines (Kucera and Barrett 1993b). Although the first two types included multiple detection stations in a single survey, they will be represented as one location. Surveys of the third type always comprised single detection stations. In some cases surveys were conducted with the intention of detecting fishers, and thus were at elevations and in habitats where martens are not expected to occur (Schempf and White[1] 1977, Buskirkand Powell 1994).

All work was conducted from October 1989 to March 1995. Surveys occurred through much of the historic range of the American marten from Del Norte and Humboldt counties east to Lassen County and as far south as northern Kern County. Details on specific locations, techniques, and results are on file at the Department of Environmental Science, Policy, and Management at the University of California, Berkeley, California, and the Pacific Southwest Research Station, Redwood Sciences Laboratory, Arcata, California.

RESULTS

We report data from 479 survey locations, ranging from Del Norte and Siskiyou counties to Kern County (Figs. 1 and 2). American martens were detected at 114 of

[4] Zielinski, W.J. 1995. Track-pIates. Pages 67-89 in: W.J. Zielinski and T.E. Kucera, editors. American marten, fisher, lynx, and wolverine: survey methods for their detection. USDA Forest Service General Technical Report PSW-GTR-157.

[5] Jones, L.L.C. and M.G. Raphael. 1993. Inexpensive camera systems for detecting martens, fishers, and other animals: guidelines for use and standardization. USDA Forest Service Pacific Northwest Research Station General Technical Report PNW-GTR-306.

[6] Kucera, T.E., A.S. Soukkala, and W.E. Zielinski. 1995. Photographic bait stations. Pages 25-65 *in:* W.J. Zielinski and T.E. Kucera, editors. American marten, fisher, lynx, and wolverine: survey methods for their detection. USDA Forest Service General Technical Report PSW-GTR-157.

[7] Zielinski, W.J. 1992. A survey protocol to monitor forest carnivores in proposed management activity areas. Unpublished report, USDA Forest Service, Pacific Southwest Forest and Range Experimental Station, Arcata, California, USA.

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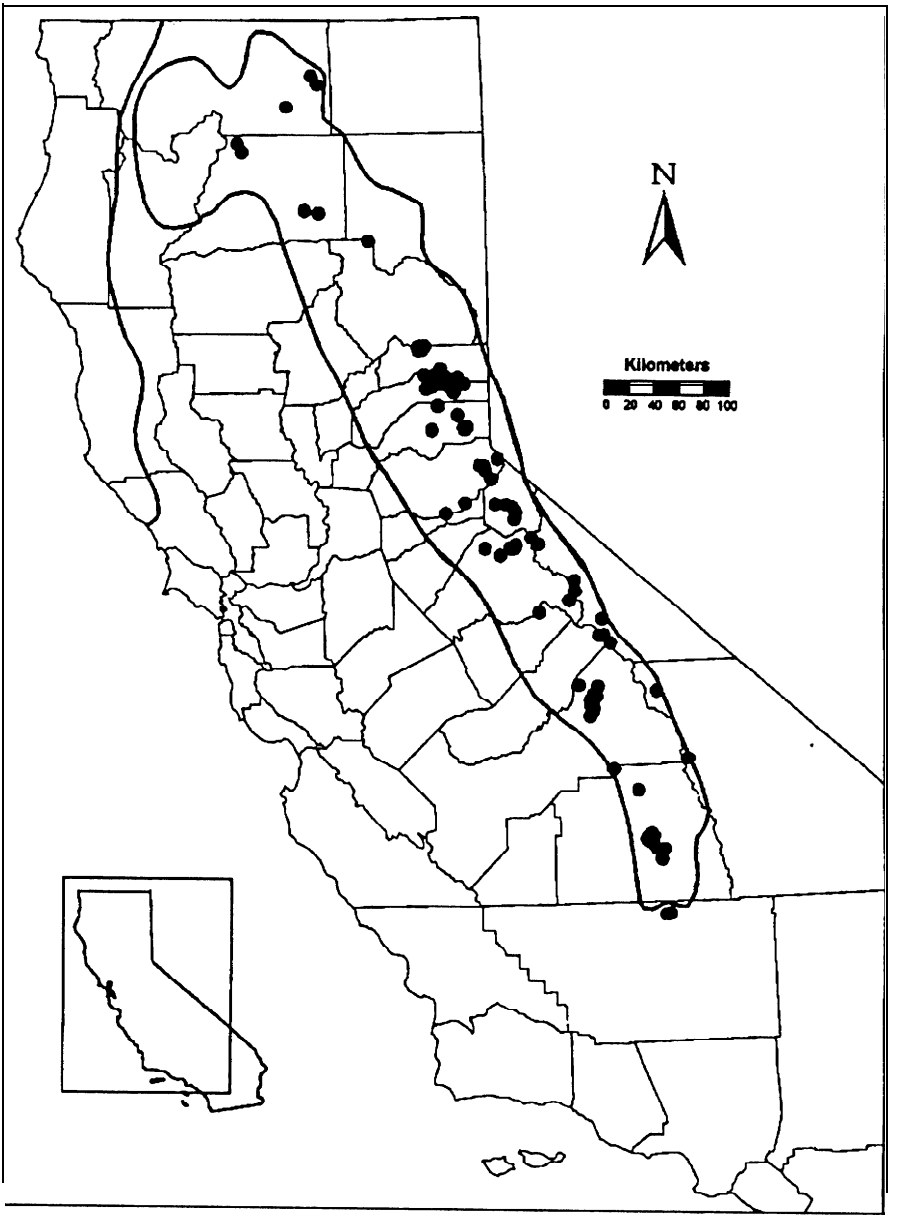

Figure 1. Locations of surveys in California that detected American martens, 1989-1995. Survey locations included those with a single detection device, such as a remote camera, and those with multiple devices, such as track-plate boxes along a transect. Outlines of counties are also shown. Heavy irregular lines enclose the ranges of *M. a. humboldtensis* (northwest California) and *M.a. sierrae* described by Grinnell et al. (1937).

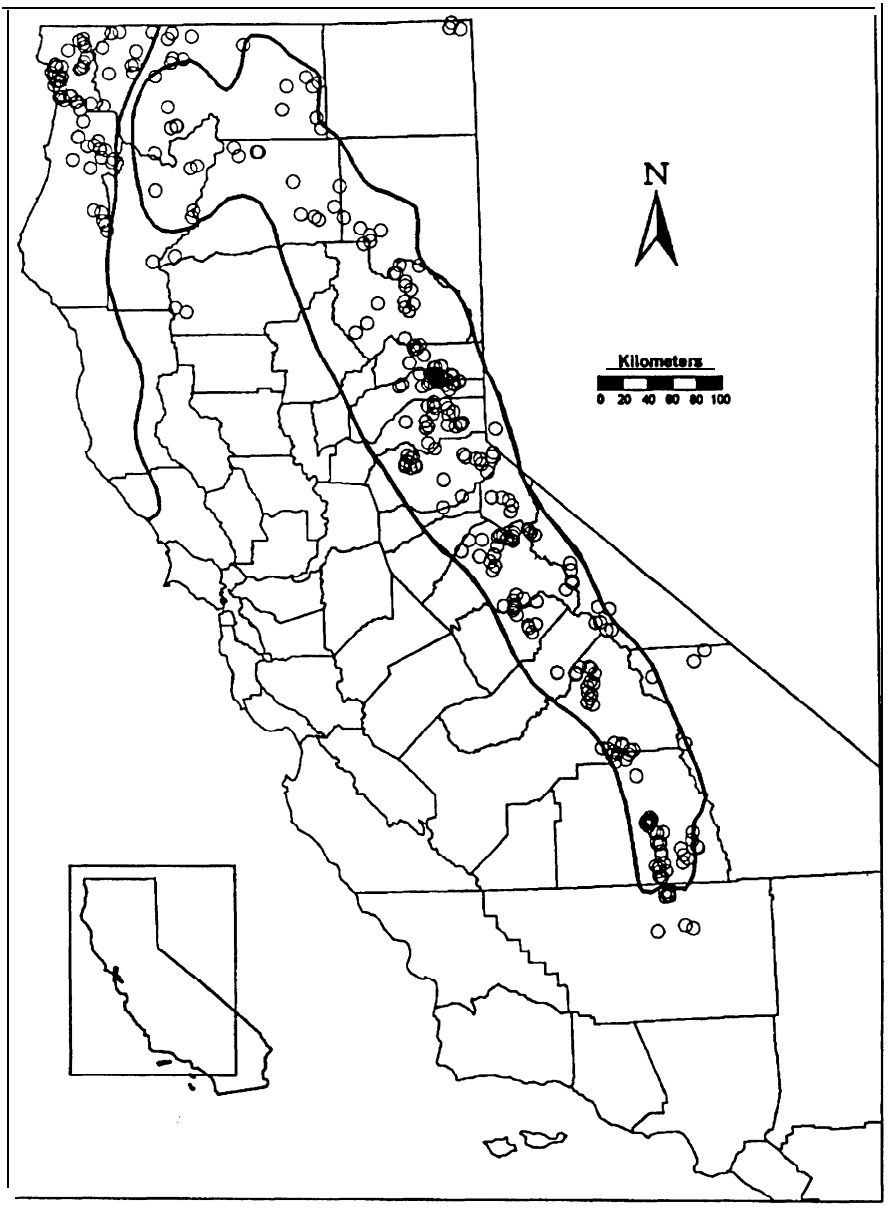

Figure 2. Locations of surveys for American martens in California, 1989-1995. Survey locations include those with a single detection device, such as a remote camera, and those with multiple devices, such as track-plate boxes along a transesct. Outlines of counties are also shown. Heavy irregular lines enclose the ranges of *M. a. humboldtensis* (northwest California) and *M. a. sierrae* described by Grinnell et al. (1937).

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these, from eastern Siskiyou and northwestern Shasta counties through the western slope of the Sierra Nevada to northern Kern County. American martens were detected on the eastern slope of the Sierra Nevada as far south as central-western Inyo County. No American martens were detected in Del Norte or Humboldt counties. The several clusters of detections reflect intensive work in those particular areas and do not necessarily indicate American marten population density.

DISCUSSION

The American marten at present appears to occupy much of its historic range in California, particularly in the Sierra Nevada and south and east of the Trinity Mountains. We emphasize that the data presented here indicate the current regional distribution of American marten in California. These data do not address trends in populations or habitat or the habitat requirements of American marten; such information can be produced only by a more planned and systematic approach to sampling.

However, noticeable gaps exist in the distribution of American marten. The most serious is that no martens were detected in the range of the Humboldt marten in Del Norte and Humboldt counties despite numerous survey efforts there (Fig. 2): Other recently completed surveys in Del Norte and Humboldt counties, the results of which are not included here, also failed to detect martens (R. Golightly, Humboldt State University, pers. comm.). We have no quantitative measure of the probability that negative results in a survey mean in fact that no American marten's occur in a particular survey area. However, the ease with which American martens are typically detected at bait stations strongly suggests that Humboldt martens are at best extremely rare at the locations where surveys occurred, and may be extinct. Negative results also occurred in central Plumas and southern Tulare counties at numerous locations.

Given its apparent rarity, the Humboldt marten should be included in ecosystem management and biodiversity planning efforts in the coastal redwood zone along with listed, forest-dwelling species such as the marbled murrelet, *Brachyramphus marmoratus*, and northern spotted owl, *Strix occidentalis*, and candidates for listing such as the Pacific fisher. If future surveys fail to detect the Humboldt marten, we suggest that the CDFG consider reintroduction of American martens to areas of remaining habitat within the historic range of the Humboldt marten such as Redwood National Park and Humboldt Redwoods State Park.

There are several omissions in areas surveyed. One is in southern Humboldt and northern Mendocino counties, where Yocum (1974) reported sightings of Humboldt martens in 1961 and 1971, respectively. The higher-elevation areas of Trinity County have not been surveyed, yet the habitat suggests that American martens could occur there. Finally, forested areas of the White Mountains in eastern Mono and northern Inyo counties, reported by Schempf and White[1] (1977) to have American martens, have not been surveyed adequately. Gibilisco (1994) discussed the importance of American marten populations that occur on isolated mountain ranges

to the understanding of its distributional dynamics; documenting American marten presence in the isolated White Mountains may contribute to that understanding in one of the most southerly parts of its range.

We emphasize that the data reported here are based on verified tracks or photographs of American martens; they do not include reports of sightings. Sighting data need to be treated cautiously because they are impossible to verify, although reliability indices can be developed (Aubry and Houston 1992; E. Burkett, pers. comm). For example, there are locations where surveys failed to confirm the existence of American martens but where National Forests report a number of recent sightings (e.g. Six Rivers National Forest). Although several of these reports are unreliable (G. Schmidt, Six Rivers National Forest, pers. comm.), others include areas that have yet to be surveyed and may have merit. We recommend that federal and state agencies support the survey of rare carnivores using detection methods that can produce verifiable results (Zielinski and Kucera[2], 1995). Reliable sighting data should be used to augment, not substitute for, surveys using cameras or track-plates.

The American marten in the early 1990s occurs in much of its historic range in California with the apparent exception of the coastal redwood areas. This presents land managers with the opportunity to understand the ecology and habitat requirements of American marten, and the effects of management activities on it, in what is presently a non-crisis environment. We advocate that this opportunity not be missed.

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