

Home range use by grizzly bears: long-term fidelity, emigration, and implications for hunted or recovering populations

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A knowledge of movement patterns by brown bears (*Ursus arctos*) of all sex and ages can be crucial to understanding how emigration, immigration, and fidelity to home range affect the dynamics of any selected population. Such information is difficult to gather because it requires (1) a commitment to long-term research, (2) observation of individual bears for periods required to determine pertinent data, and (3) family history and maternal home range data for young-age bears, which are the segment of the population most prone to disperse. Because bears often shed radiocollars and transmitter battery life is limited to 2-4 years, observation of individuals often can not be maintained from year to year. Contact with young growing bears is especially difficult to maintain for >1-2 years because they can only be fitted with break-away collars, which must be replaced annually, and because dispersal may take them beyond the normal range of telemetry searches of a study area.

For these reasons, most studies of bear population dynamics either do not address rates of emigration/immigration or make the reasonable assumption that the effects of one equals the effects of the other (in terms of sex, age and extent of the movement pattern). Some have described one rate but not the other (Yodzis and Kolenosky 1986); home ranges are often described but fidelity to home range is usually not. Others have described isolated, remnant, or island populations for which emigration and immigration were probably negligible (Craighead et al. 1974), or have defined population size described within an area large enough so that the effects of emigration/immigration are negligible (Taylor et al. 1987a, 1987b). Population models may address emigration or immigration broadly or not at all (Tait 1983; Taylor et al. 1987a, 1987b) but some specifically account for them (Harris et al. 1986). Although these may be reasonable assumptions, even in declining populations, there is usually little documentary evidence upon which to base them.

Analyses of size, density, and demography of brown bear populations usually assume population closure or attempt to account for it. In the northcentral Alaska Range, I studied patterns of brown bear emigration, immigration, and fidelity to maternal or established home range to reduce the biases in my estimates of the population size. Population estimates were based on both mark-recapture estimates and direct counts within the study area (Reynolds et al. 1987, Reynolds 1993, Miller et al. In press). In this study, determining movement pattern was especially important because annual presence or absence in the study area affect the direct count and some calculations of population size, density, and dynamics.

Home range fidelity, emigration from maternal home range, and immigration patterns of brown bears were examined in the northcentral Alaska Range during 1981-94. No emigration or abandonment of home ranges occupied by adult or juvenile females was documented. Some adult males moved outside of the study area and returned, remaining within their apparent home ranges. Fidelity of young-aged grizzlies to their maternal home ranges was related to the sex of the bear; no emigration from the vicinity of their maternal home ranges was documented for females, but all males emigrated within 2 years of weaning. No males initially captured at age >4 abandoned their established home ranges.

If the patterns of home range fidelity and emigration observed here can be widely applied, then several management implications are apparent. In order to accomplish non-augmented recovery, overharvested or relict populations will have to rely solely on production from within the population rather than immigration of females from adjacent areas. On the other hand, relatively high mortality of males can probably occur without causing a decline in

the populations' productive capacity, especially if the area of high harvest is adjacent to a refugium or highly productive population that can supply immigrants. If female home ranges are abandoned or broadly expanded, this may indicate reduced home range habitat quality or the recent appearance of a high quality food supply.



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ABSTRACTS



Oso	АА
Bär	Ours
Björn	MeHBeAb
Orso	Bsa
Björn	Medved
Samgo	Bear
ᄇᄇ	Shash
Ht	Bèruang
Bhalou	Karhu
Ápktoš	Bear

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