

Ecological Redundancy and Long-Term Dynamics of Vertebrate Predators in Semiarid Chile

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Abstract

In the semidesert of Aucó, Chile, four strigiform, six falconiform, and two fox species joined the suite of endothermic vertebrate predators at various times from 1987 to 1994. Different falconiforms entered and exited the suite at times roughly correlated with long-term fluctuations in the density of small mammals, but strigiforms and foxes remained resident throughout the 7 years. Using detailed data on diets (trophic guild structure) and on resident status of the 12 predator species, we assessed whether the combination of these two criteria, if obtained in a shorter study, would have been adequate to make reasonable decisions about which species should be conserved were it possible to conserve only a subset of the 12. In particular, we evaluated whether ecological redundancy, as gauged by high diet similarity, would provide a reasonable basis for concentrating on the conservation of some species more than others. Guild structure of the predator suite at Aucó remained consistent through the first 3 years of the study, but then shifted markedly, such that conservation strategies based on apparent ecological redundancy (in diet) early on would have been misguided in the long term. Although transient species sometimes were redundant with residents, in other years the same transients played unique trophic roles, so the apparently rational strategy of concentrating conservation efforts on less-mobile, resident species would have left gaps in ecosystem function. Likewise, a short-term, intensive inventory of Aucó's predators would have underestimated in some years and overestimated in others the richness of species, depending on prey resources there. We conclude that no short-term data would have provided adequate bases for focusing conservation efforts on some species or particular habitat patches. Although realistically no such decision-making process can be delayed until a 7-year (or longer) data set has been accumulated, we suggest that short-term studies of species assemblages be used cautiously when making conservation decisions.