

A priori assessment of reintroduction strategies for a native ungulate: using HexSim to guide release site selection.

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Reintroduction of native species to unoccupied portions of their historical range is a common management strategy to enhance the future viability of animal populations. This approach has met with mixed success, due to unforeseen impacts caused by human or other factors. Some of these impacts could potentially be mitigated through the use of anticipatory modeling coupled with appropriate management strategies prior to release. As part of an ongoing restoration program, we evaluated a portion of the former range of the tule elk (*Cervus elaphus nannodes*) in the Central Valley of California for potential reintroduction of a free-ranging herd. We used a new spatially explicit population model (HexSim) to analyze four different elk release scenarios. Each scenario corresponded to a different release location, and the model was used to compare simulated elk movement and population dynamics 25 years into the future. We also used HexSim to identify likely locations of human-elk conflict. Population forecasts after the 25-year period were highest (mean female population size of 169.6 per iteration) and potentially harmful barrier interactions were lowest (mean 8.6 per iteration) at the East Bear Creek site. These results indicate the East Bear Creek site release scenario as the most likely to result in a successful elk reintroduction, producing the most elk and generating the fewest human conflicts. We found HexSim to be a useful tool for this type of reintroduction planning and believe that other reintroduction efforts could benefit from this type of anticipatory modeling.