

## Assessing Large-scale Restoration Options using Fossil Data, Elk as a Case Study

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Ecosystems around the world are facing human-induced collapse of biodiversity and ecological processes. In the face of large-scale anthropogenic impacts, it is imperative to implement stewardship actions which enhance ecosystem-level resilience. Management actions which integrate lands across ownership, protection status, and human use provide both challenges and opportunities for conservation planning. The reintroduction of native megafauna to our landscapes, for instance, can enhance resilience to climate change, safeguard biodiversity, and provide ecosystem services to people. As California's largest native herbivore, elk (*Cervus canadensis*) may perform a role in restoring native grasses and oak woodlands. However, elk ranges and abundances have declined significantly from historical baselines. While elk reintroductions have been made in other parts of California, and the U.S. more broadly, the San Francisco peninsula still lacks this herbivore. Unlike many of the sites where elk have been reintroduced, this region is highly populous -- representing a diversity of human interests which must be incorporated in any landscape-level conservation planning. To contextualize current elk distributions and potential habitat, we assessed patterns in prehistoric, historic, and present elk occurrences in the San Francisco Bay Area using fossil and observational records. With this foundation, we are partnering with multidisciplinary collaborators to ascertain community opinions and encourage local engagement with nature. We hope the process identified by this study will serve as an example for future large-scale, multi-interest restoration projects in California.

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