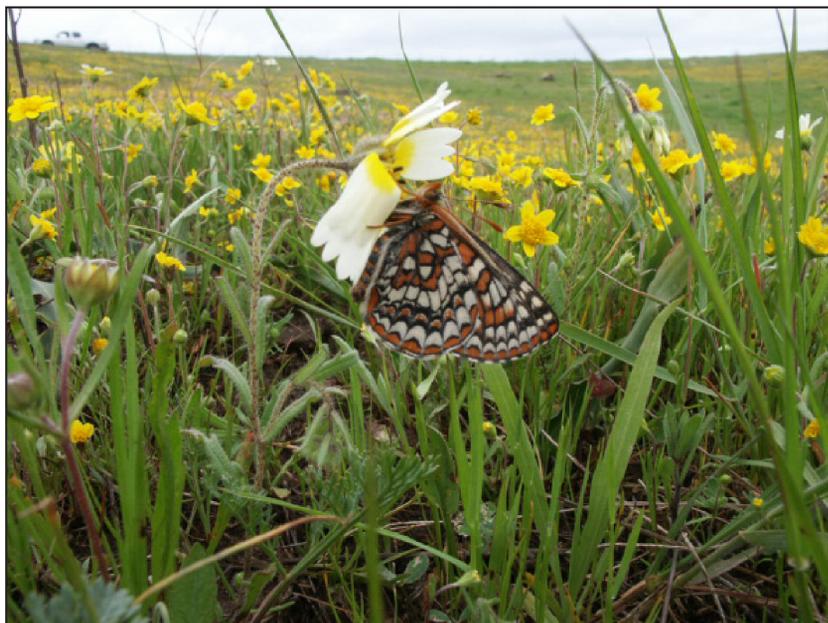


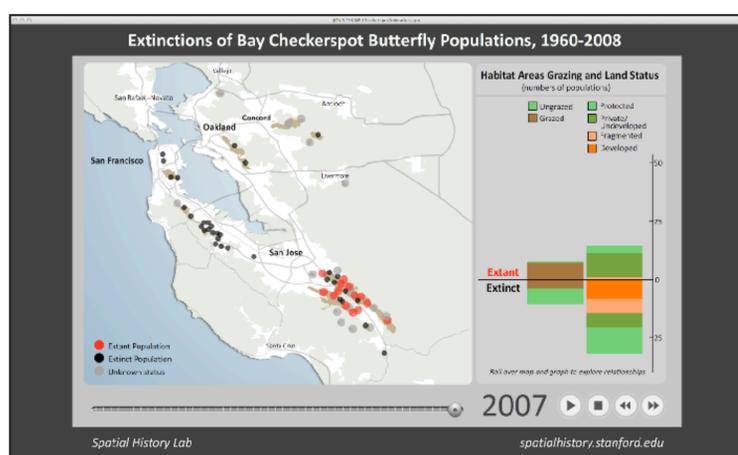
Critical Habitat: A Spatial History of Extinction and Reintroduction

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1. A Model Species

This research grew out of a multidisciplinary team studying the feasibility of reintroducing the Bay checkerspot butterfly, a threatened species, to Jasper Ridge Biological Preserve in the coast range foothills on the Stanford campus, where it disappeared in 1998. Paul Ehrlich found this butterfly on Jasper Ridge and in the early 1960s turned it into a model species for population biology — like the fruitfly is for genetics — at the same time that he was writing *The Population Bomb*. The checkerspot research became a landmark in conservation biology, while scientists watched the butterfly's populations go up and down and eventually go extinct locally.

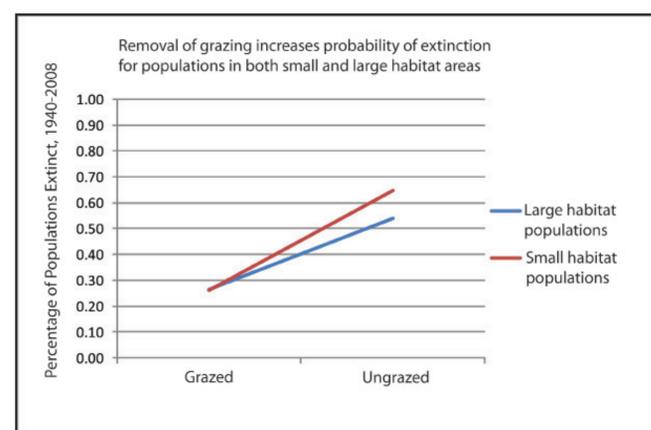


2. Visualizing Extinction

Using field records of lepidopterists, scientific publications, natural history museum specimens, environmental impact statements, and federal records associated with the Endangered Species Act, I have constructed a comparative history of more than 50 populations of the Bay checkerspot since the early 1960s. Using a Geographic Information System database and visualization software programs designed by the Spatial History Lab at Stanford, I have analyzed and shown that two-thirds of the populations have gone extinct during this period. But while half of those populations have disappeared because their habitat was developed, the other half disappeared in parks and protected areas. The most likely cause of their demise is habitat change. And the most likely cause of habitat change was removal of grazing. Bay checkerspot populations survive on private lands that continue to be grazed.

3. Narratives and Data

The history that has been told about the transformation of California's grasslands by cattle and their portmanteau biota of annual grasses seems to have contributed to the demise of the Bay checkerspot butterfly. This history conceived of spaces where the butterfly and the native plants that it depends on survived as refuges from history. Thus ecologists conceived of these spaces as places that needed to be protected from change and disturbance. Spatial data derived from observations and narratives complicated this history.



4. Experimenting with Reintroduction

As a result, we have now recommended an experimental reintroduction of the Bay checkerspot butterfly at Jasper Ridge Biological Preserve. This, however, challenges the conception of the preserve as a space in which changes in nature can simply be studied rather than managed. Instead, the preserve is now considering how best to study management of a changing environment and species on the move through carefully designed experiments.



5. Making Environmental History Practical

Environmental history does not provide a baseline to which we can return. We cannot rewind the clock of environmental change. But history can contribute to a practical conversation about our present and future prospects in a changing environment. These conversations are most productive in a multidisciplinary context, in which a historical perspective can open narratives and data to new questions, new combinations, the creation of new knowledge, and perhaps even the recovery of possibilities once thought lost.