FINDING THE HILL RIDER IN THE STATE OF CALIFORNIA

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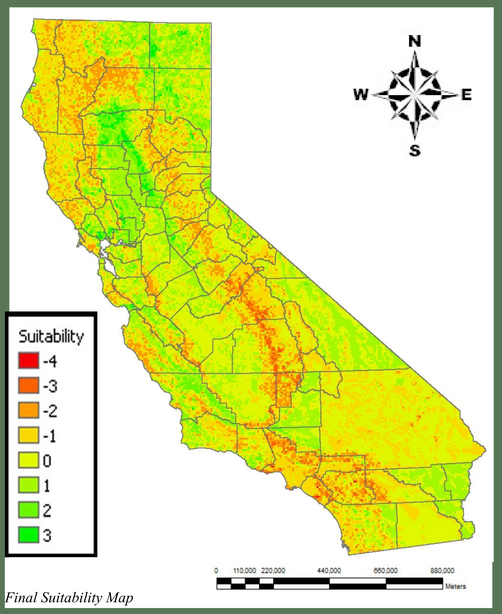
Introduction

The Hill Rider is an elusive quadruped marsupial that has been only documented by a handful of biologists in the past few decades. Many descriptions remain consistent: brown-toned fur covers its entire body with the exception of bare ankles and paws, three large ears adorn the top of its head, two large eyes are fixed at the front of the skull, and a long tail helps it to maintain balance. The lack of defined canines and incisors support observations of this animal as an insectivore, and it has also been seen digging burrows in the ground.

Despite its rarity, small skin and hair samples have been collected and analysed, revealing the Hill Rider's distinct lineage from all of the other marsupial clades. It is also endemic to California, which has stirred great interest among taxonomists and other researchers who wish to study biodiversity and speciation events in the contiguous United States. While a number of studies have produced approximate population figures in various areas of the state, a live Hill Rider has yet to be captured and studied in a controlled environment.

Purpose

The National Science Foundation is in the process of organizing a massive conservation effort in hopes of determining the status of the species in the state of California. This suitability analysis is designed to determine the areas where Hill Riders would most likely be found in California, and to compare this analysis to existing sightings and estimated population distributions.

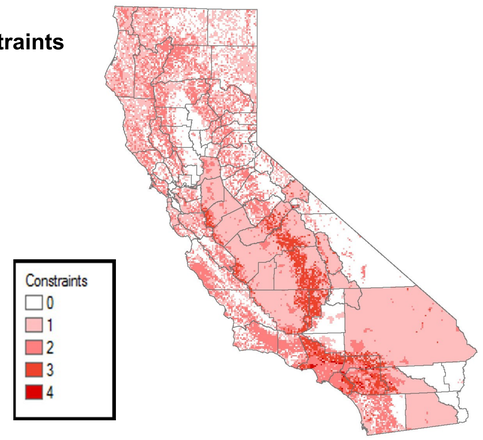


Final Suitability Map

Suitability Analysis

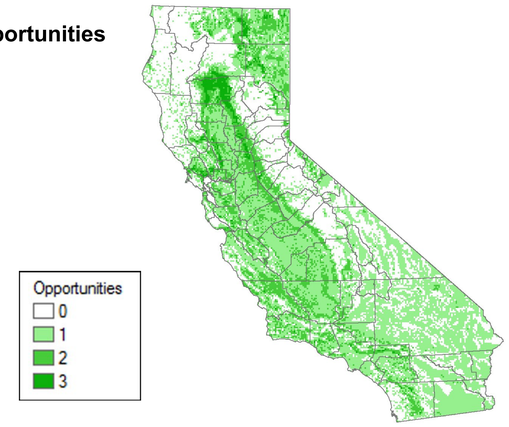
A suitability analysis was created by assessing constraints and opportunities for the Hill Rider's preferred habitat, as follows:

Constraints



- Areas with high particulate matter and ozone concentration that correspond to the moderate or serious concern areas designated by the California Air Resources Board
- Urbanized or developed areas, incorporated cities
- Areas with high fire threat
- Areas with moderate to high post-fire erosion potential

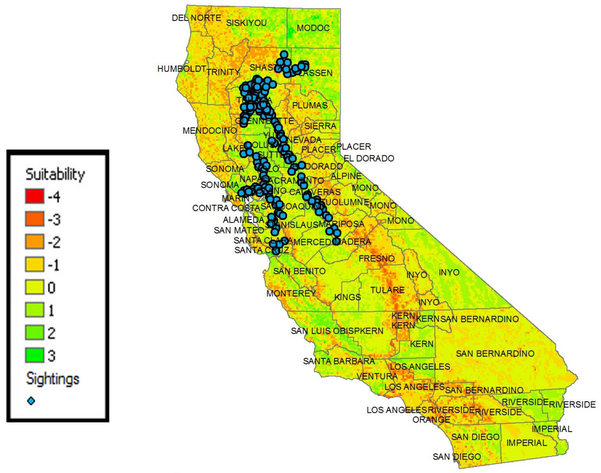
Opportunities

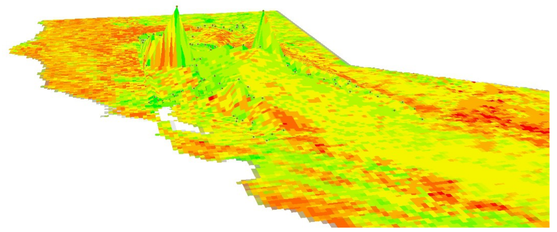


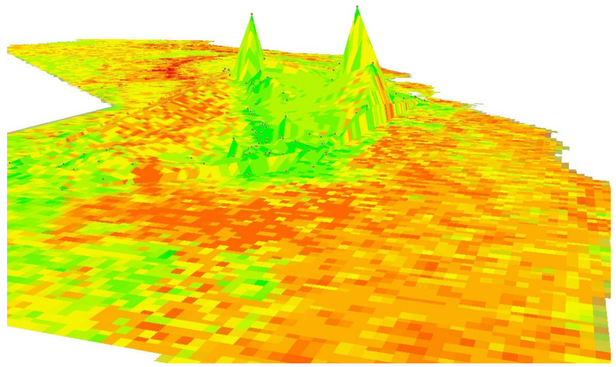
- Presence of groundwater basins
- Precipitation between 20-29 inches per year
- Areas with grasses as the primary vegetation type

Distribution Analysis of Sightings and Populations

A distribution of sightings across California was created from biologist field notes* and mapped onto a county map of California. Each sighting (point) represents a particular area where an approximate population was determined from the frequency of sightings in that area.

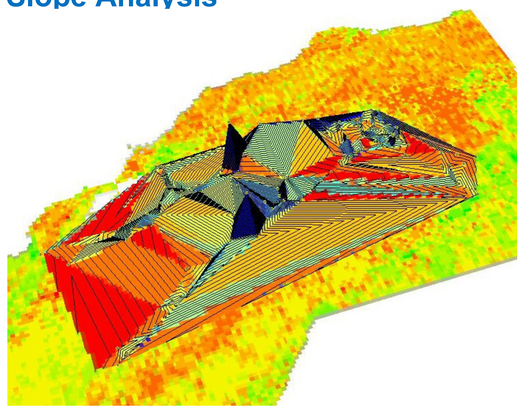


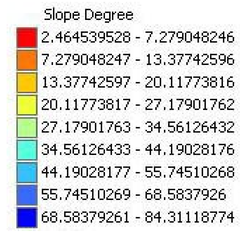




These points were then projected to display the population distribution and population density of the Hill Rider across the state of California as a TIN and finally as a 3D surface.

Slope Analysis





The Slope Analysis further illustrates the density of the estimated Hill Rider Population; a steeper slope indicates a more concentrated population confined to that particular area instead of the surrounding area.

Conclusion

The most suitable areas for the Hill Rider were largely in Northern California, especially in parts of Tehama, Butte, and Glenn Counties. As a result, the greatest number of populations were found in these counties. The highest population densities, however, were found in Sacramento and Yolo Counties. The most unsuitable areas were found to be in Central California towards Southern California, although three are areas around Trinity, Shasta, and Siskiyou Counties that have a certain degree of unsuitability.

Acknowledgements

Data Sources: California Forestry and Fire Protection, Cal-Atlas, and The California Spatial Information Library

*All information regarding the Hill Rider is fictitious and has been fabricated for the purposes of this project

Projection: NAD 1983 Albers

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Geography C188, Lab Section 106

December 1, 2010

The Great Seal