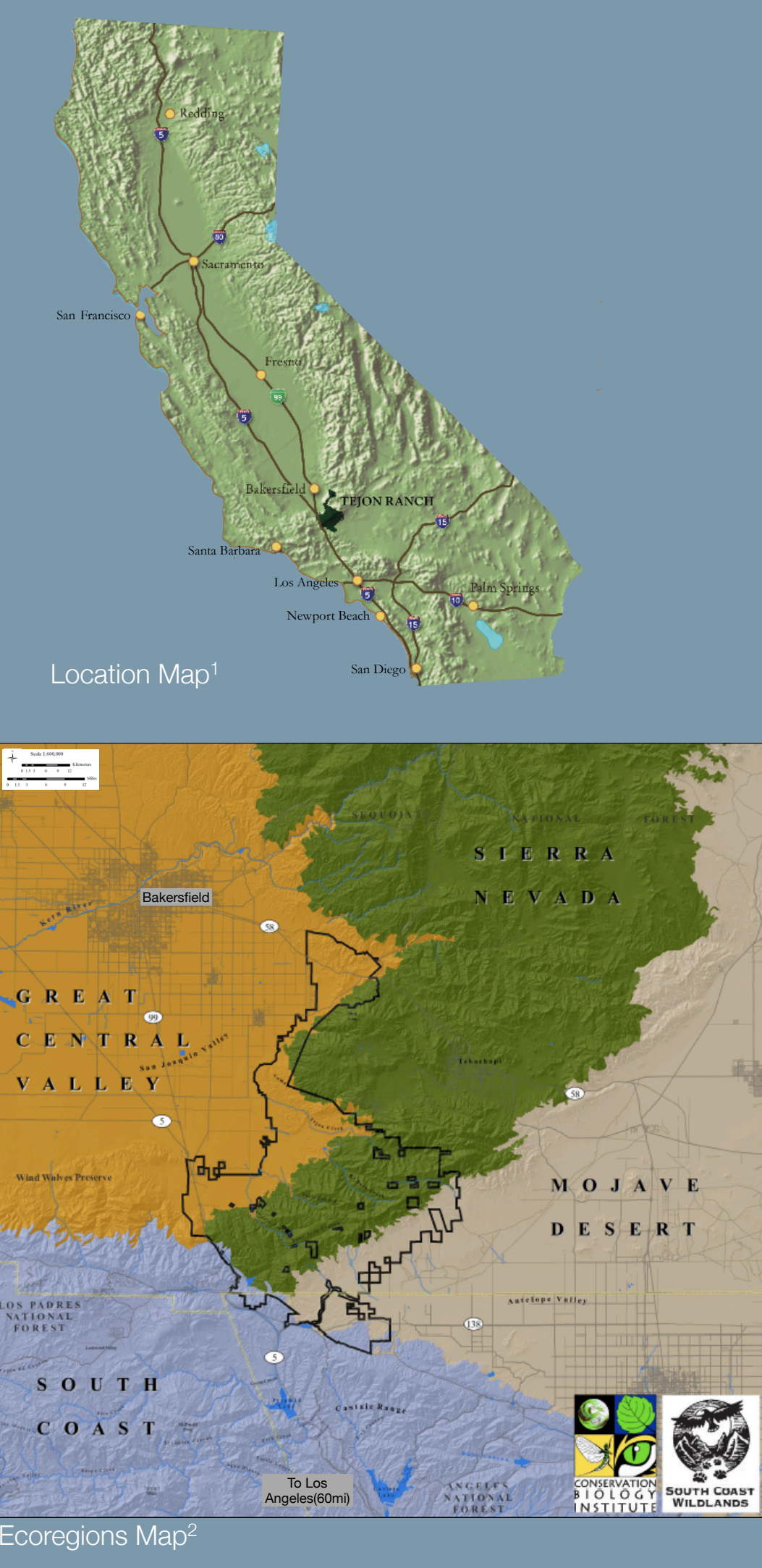# Development of conceptual models and ecological baselines to support the creation of an adaptive management plan for Tejon Ranch, California

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Client: Tejon Ranch Conservancy

TEJON RANCH

Encompassing 270,000 acres, Tejon Ranch is situated at a critical location between large tracts of National Forest and other conserved lands. It is an invaluable part of California's natural heritage, and a hotspot of biological diversity lying at the confluence of four major ecological regions.

Location Map[1]

Ecoregions Map[2]

SIGNIFICANCE

Tejon Ranch Conservancy Mission: To preserve, enhance, and restore the native biodiversity and ecosystem values of the Tejon Ranch and the Tehachapi Range for the benefit of California's future generations[3].

The Tejon Ranch Conservancy is tasked with developing an adaptive management and monitoring program in order to achieve their mission of conserving biodiversity on the Ranch. The Conservancy will apply both active and passive adaptive management within the conserved lands. Adaptive management attempts to reduce uncertainty by evaluating management actions through experimentation. It is referred to as "learning by doing," placing an emphasis on monitoring the outcomes of management in order to learn more about the ecosystem.

APPROACH

To inform the Conservancy in the development of their Ranch-wide Management Plan through:

1. Vegetation Community Descriptions

Antelope Valley Grasslands
San Joaquin Valley Grasslands
Foothill Blue Oak Woodlands
Joshua Tree Woodlands
Montane Forests
Valley Oak Savanna
Chaparral
Riparian

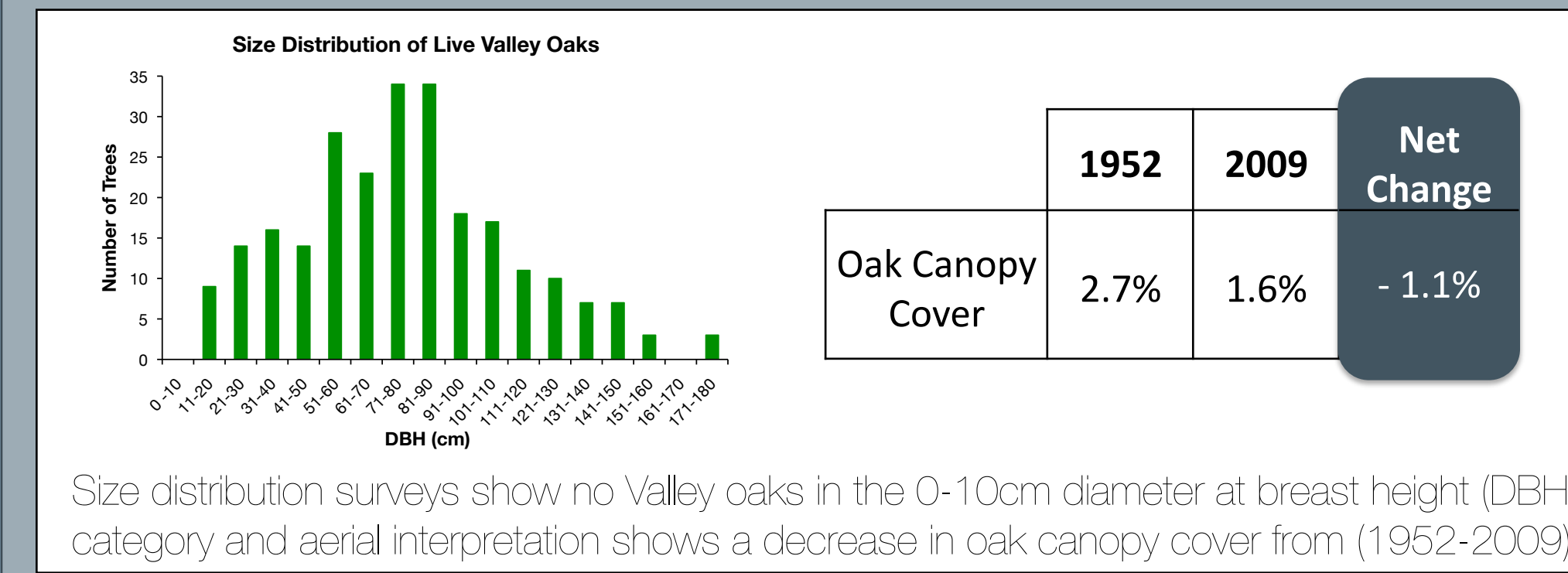### 2. Eight Conceptual Models

Valley Oak Savanna Conceptual Model
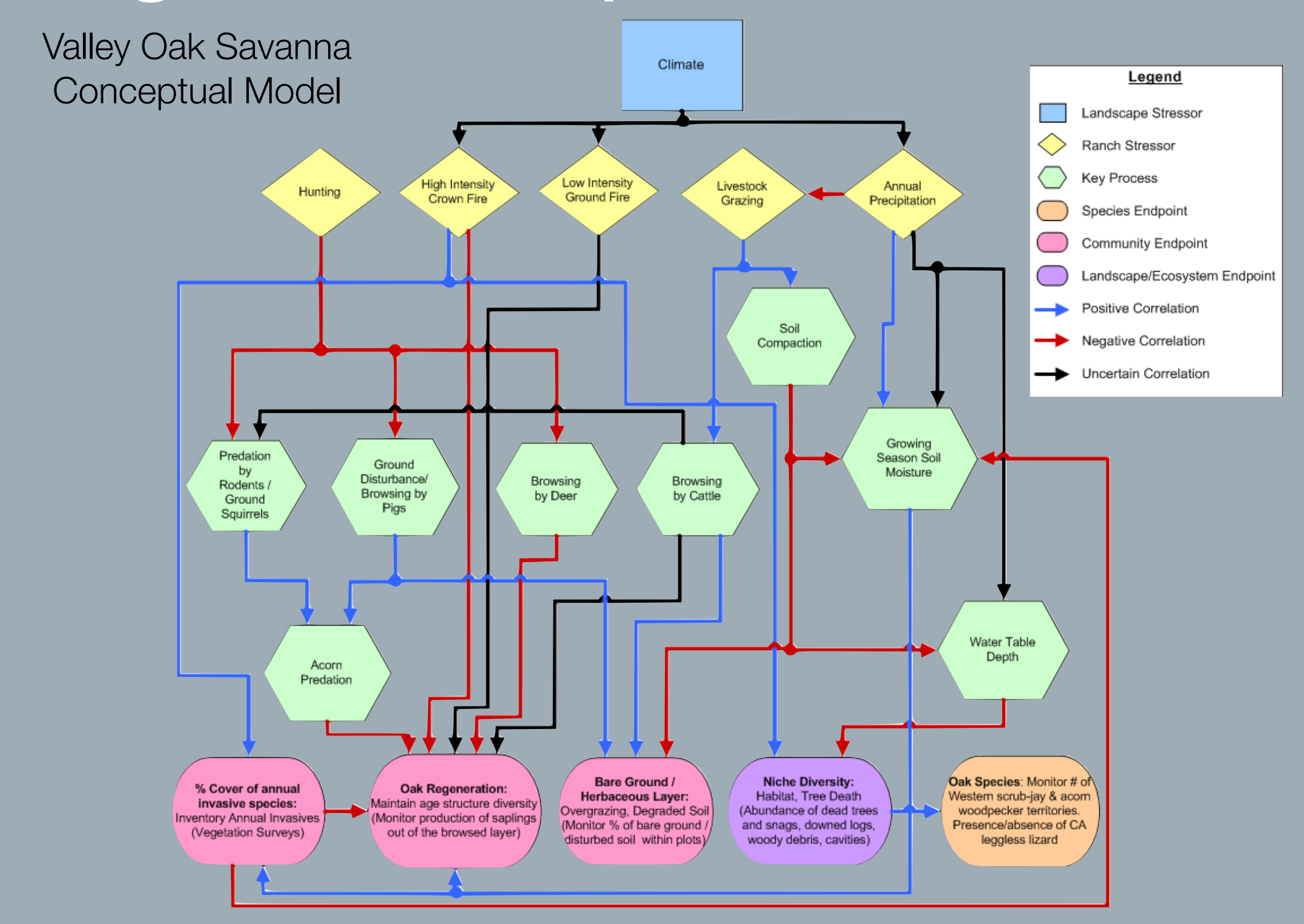
3. Baseline Conditions

Vegetation Communities:
- Riparian
- Joshua Tree Woodlands
- Valley Oak Savanna

Size Distribution of Live Valley Oaks

	1952	2009	Net Change
Oak Canopy Cover	2.7%	1.6%	- 1.1%

Size distribution surveys show no Valley oaks in the 0-10cm diameter at breast height (DBH) category and aerial interpretation shows a decrease in oak canopy cover from (1952-2009).

Stressors:
- Climate
- Air Quality
- Grazing
- Hunting
- Hydrology
- Fire

Hunting Totals by Species (2001-2008)

Time Since Fire Map[4] (1950-2008).
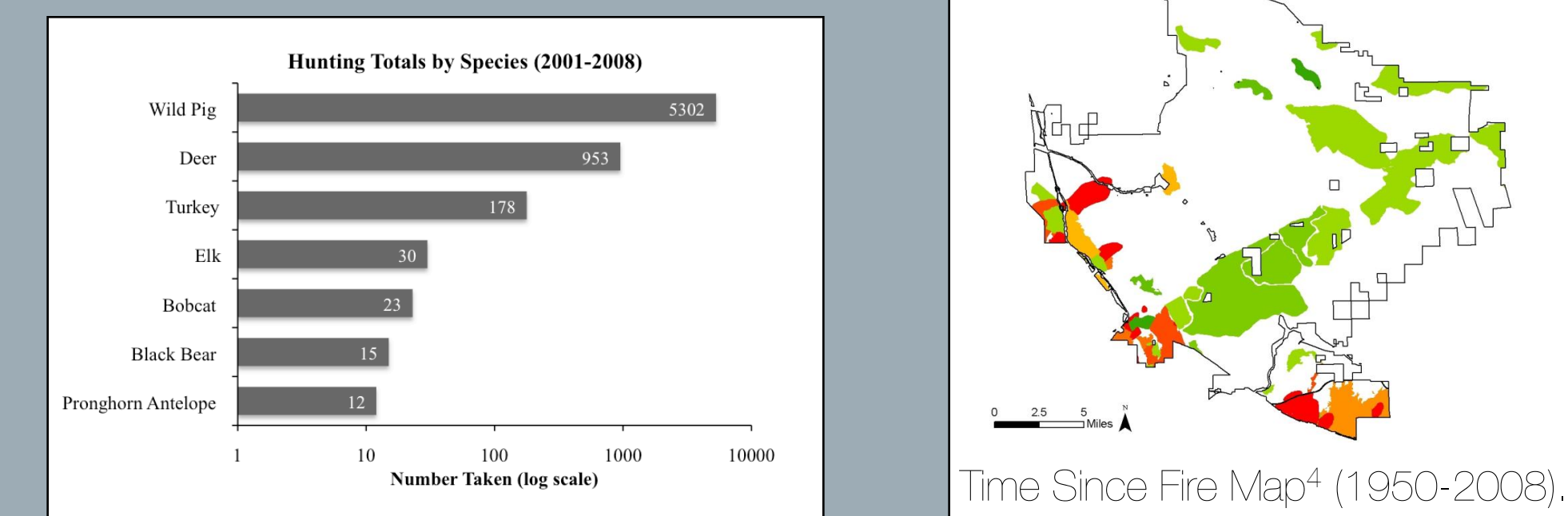
5. Monitoring Objectives

Conceptual model endpoints represent quantifiable community attributes that are responsive to management and environmental variation. These endpoints can serve as indicators of how well conservation goals are being achieved on the Ranch.

Valley Oak Savanna: Age and size surveys to monitor oak regeneration.

4. Conservation Goals

Based on our conceptual models, research, and baseline conditions, conservation goals were created for each community. These goals represent the desired outcomes of management decisions on the Ranch.

Valley Oak Savanna: Maintain adequate oak regeneration.

PRIORITY MANAGEMENT CONCERNS

The colored dots illustrate the relative level of management concern for stressors in each vegetation community. The red dots represent the highest-level management concerns where the Conservancy should focus management and monitoring efforts, due to the influence these stressors have in affecting change in certain vegetation communities. In order to resolve uncertainties about current biological conditions and/or relationships on the Ranch, management and monitoring within an adaptive management framework will be necessary to resolve such areas of uncertainty.
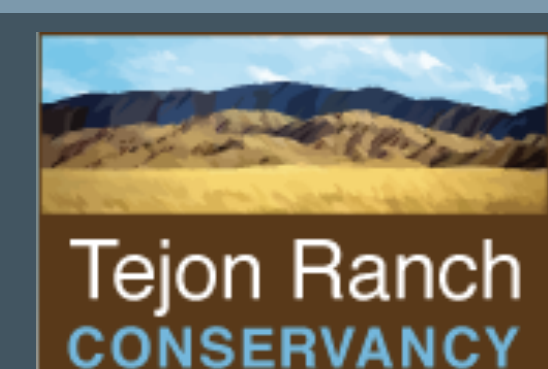
Key Ranch-level Stressors Recommendations:
- Grazing: Implementation of a rangeland health assessment survey.
- Fire: Development of an ecologically reasoned Fire Management Plan.

Key Regional-level Stressor Recommendation:
- Climate: Future management decisions need to consider the uncertainty surrounding changes in climate.

Management Concerns	Ranch Stressors				Regional Stressors	
	Grazing	Fire	Hunting	Hydrology	Climate	Air Quality
Antelope Valley Grasslands	🔴	🟠	🟢	🟠	🔴	🟠
San Joaquin Valley Grasslands	🟠	🟠	🟢	🟠	🟠	🟠
Joshua Tree Woodlands	🟠	🟠	🟢	🟢	🔴	🔴
Foothill Blue Oak Woodlands	🟠	🟠	🟠	🟢	🟠	🟢
Valley Oak Savanna	🔴	🟠	🟠	🟠	🟠	🟢
Montane Forests	🟠	🔴	🟠	🟢	🔴	🔴
Chaparral	🟢	🔴	🟢	🟢	🔴	🟠
Riparian	🔴	🟠	🟠	🔴	🟠	🟢

The colored dots depict the management concerns for the eight vegetation communities. Red circles indicate high priority areas, orange intermediate, and green low.

References
[1] Tejon Preserve. <http://tejonpreserve.org>.
[2] Conservation Biology Institute and South Coast Wildlands, 2006. Proposed Reserve Design for Tejon Ranch: A Threatened California Legacy.
[3] Tejon Ranch Company, 2009. "Tejon Ranch Conservation and Land Use Agreement: Summary of Key Provisions".
California Department of Forestry and Fire Protection (CALFIRE), 2008. Fire and Resource Assessment Program Fire Perimeter Data.

Tejon Ranch CONSERVANCY