

BACK IN THE DAY: Documenting 125 Years of Vegetation Change

AN UNTAPPED DATA TROVE

A huge amount of data on Sonoma County's vegetation was collected by surveyors working for the U.S. Department of Interior's General Land Office between the 1850s and the 1890s.

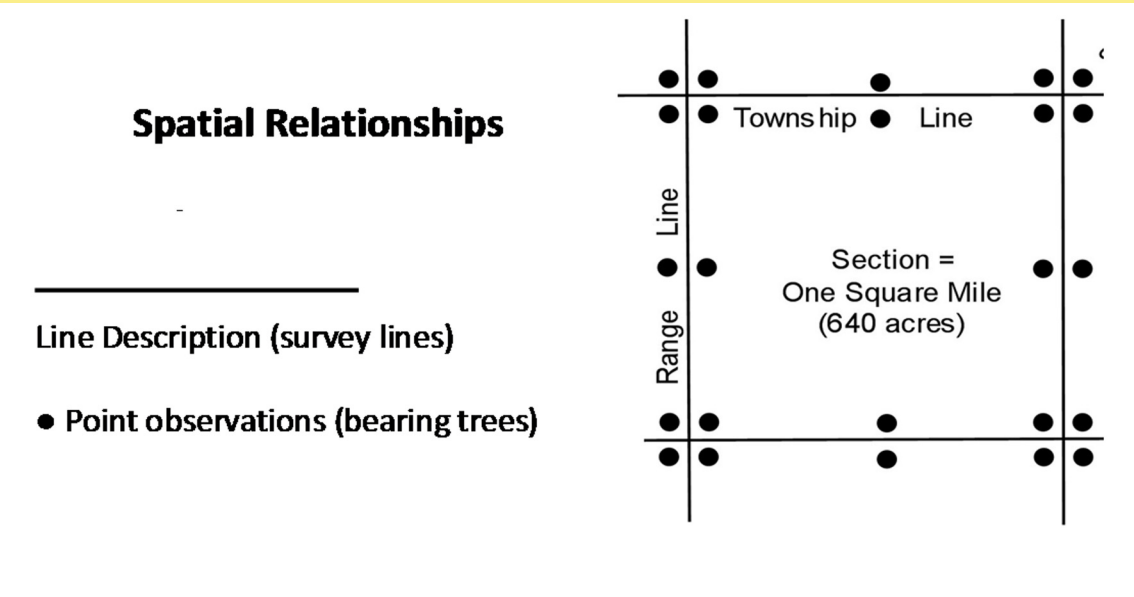
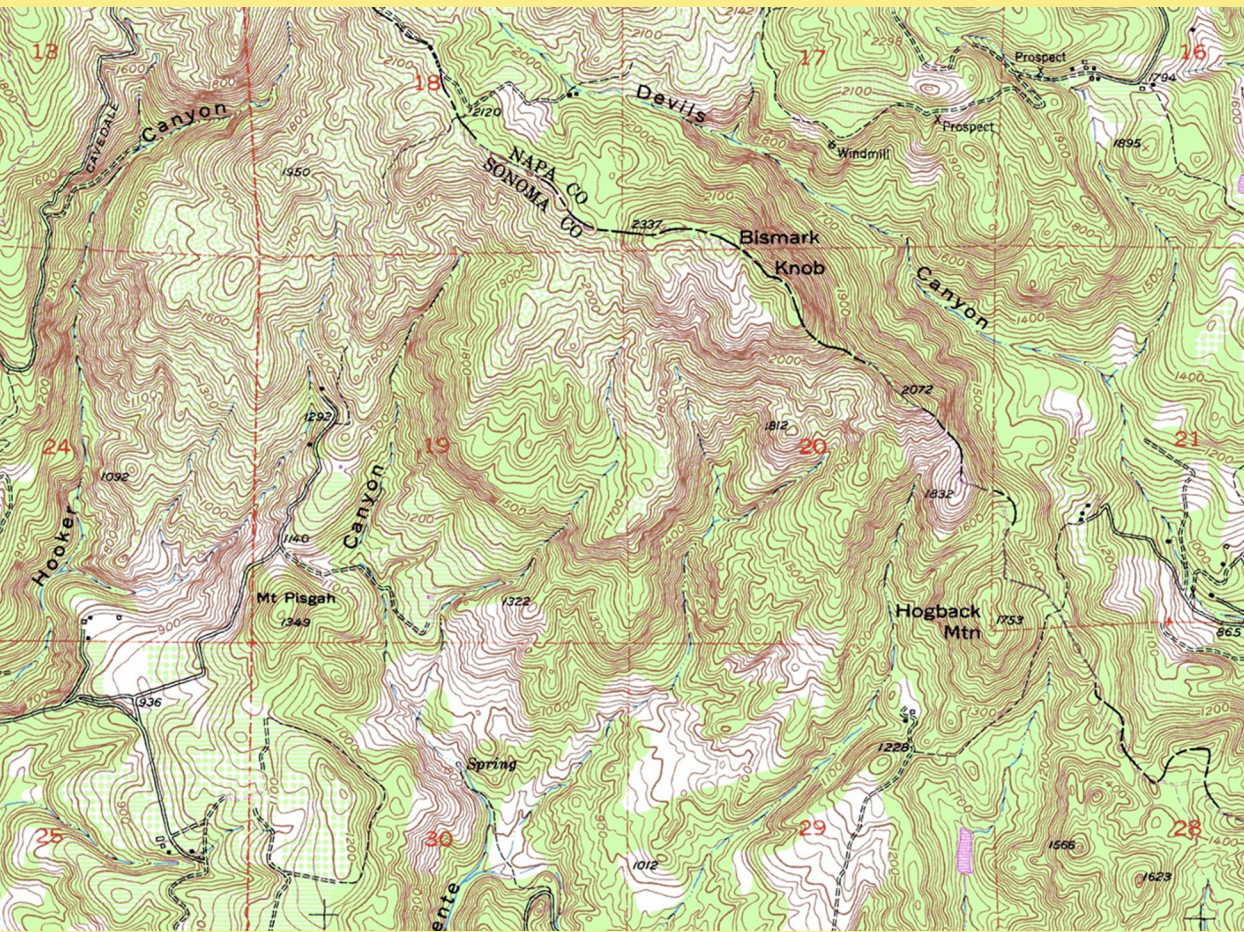
They recorded more than 15,000 observations along about 2000 miles of township and range lines in the county (shown in red on modern topo maps).

Surveyors collected **two types of vegetation data**:

Point Observations: Surveyors were required to mark trees every half mile and record their type*, diameter and distance from the survey point.

Line Descriptions: For each surveyed mile, surveyors were also required to record the "types of trees and undergrowth in the order of their predominance."

*tree types usually identifiable to modern botanical group or species level



ACCURACY

Compass bearings were recorded to the nearest 1/4 degree. Accuracy = 90 feet per mile surveyed.

Distances were measured with a **surveyor's chain**, which was divided into 100 links. One chain = 66 feet and one link = 7.92 inches. Distances were often rounded to the nearest 10 links, or 6.6 feet.

A project at Pepperwood Preserve in 2008 relocated survey points on the ground to within **200 feet** or better, as checked against landscape features (creeks, hilltops etc.)



Field Notes of the Subdivision Lines of
Township 9 North Range 8 West Mount Diablo Meridian
Wm. Minto, Deputy Surveyor
June 2 – June 7, 1873

North between Secs. 15 & 16

Distances in Chains
80 chains = 1 mile

26.50	Deep ravine course S.W.
40.00	Set post on high ridge for ¼ section corner
	Black Oak 24 in. dia. bears N. 55 W. 54 links
61.00	Ravine courses N.W.
74.30	Old road E. & W.
80.00	Set a post for cor. To Secs. 9, 10, 15 & 16
	A Black Oak 14 in. dia. bears N. 42 E. 137 links
	A Fir 5 in. dia. bears S. 22 W. 30 links
	A Madrona 15 in. dia. bears S. 28 E 98 links

POINT OBSERVATIONS

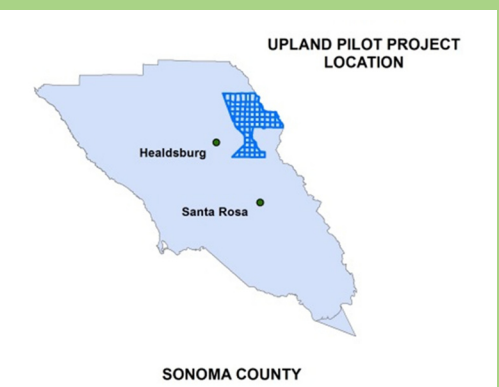
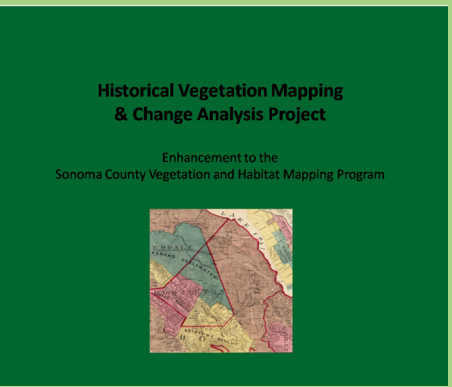
Oak with some Madrona & Fir

LINE DESCRIPTION

North between 9 & 10 ...

SAMPLE SURVEY RECORD

A PILOT PROJECT to develop and refine techniques for working with this data was recently completed with funding from the Sonoma County Agricultural Preservation & Open Space District and Audubon Canyon Ranch.



The pilot covered about **75 square miles** in the county's north-eastern corner, from the Modini-Mayacamas Preserve to Pepperwood Preserve.

Baseline Consulting would like to thank the Sonoma County Agricultural Preservation & Open Space District and Audubon Canyon Ranch for funding the Upland Pilot of the Historical Vegetation Mapping and Change Analysis Project. Appreciation also to Pepperwood Preserve, the Sonoma Land Trust, and Margaret Spaulding for supporting earlier projects which provided vital background experience in pursuing this study.

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TRANSLATING

line descriptions into modern lifeform groups:

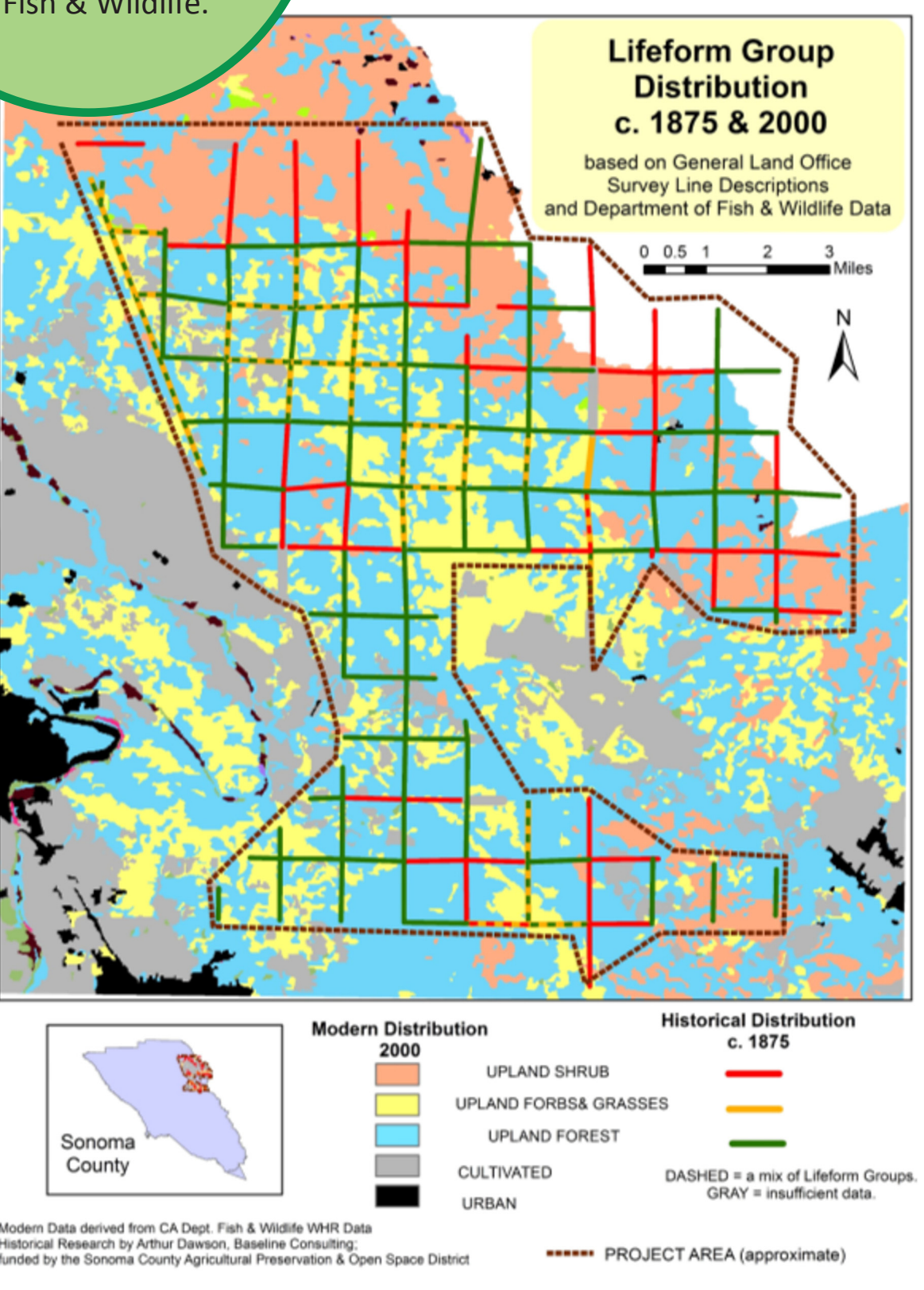
"Grazing" = Upland Forbs & Grasses
"Chamise, chaparral" etc. = Upland Shrub
Trees (e.g. "oak and fir") = Upland Forest

Initial work identified **surveyor bias** in the choice of bearing trees (point observations). Because this data does not represent a random sample, we choose to use line descriptions as the primary source of historical data. No biases have been identified for this data type.

Line Descriptions:

- Are roughly equivalent to modern vegetation transects
- Can be 'translated' into modern lifeform groups:
 - Upland Forbs & Grasses (grassland)
 - Upland Shrub (chaparral)
 - Upland Forest
- Can detect large-scale, long-term shifts
- Can be used for finer-scale characterizations in places

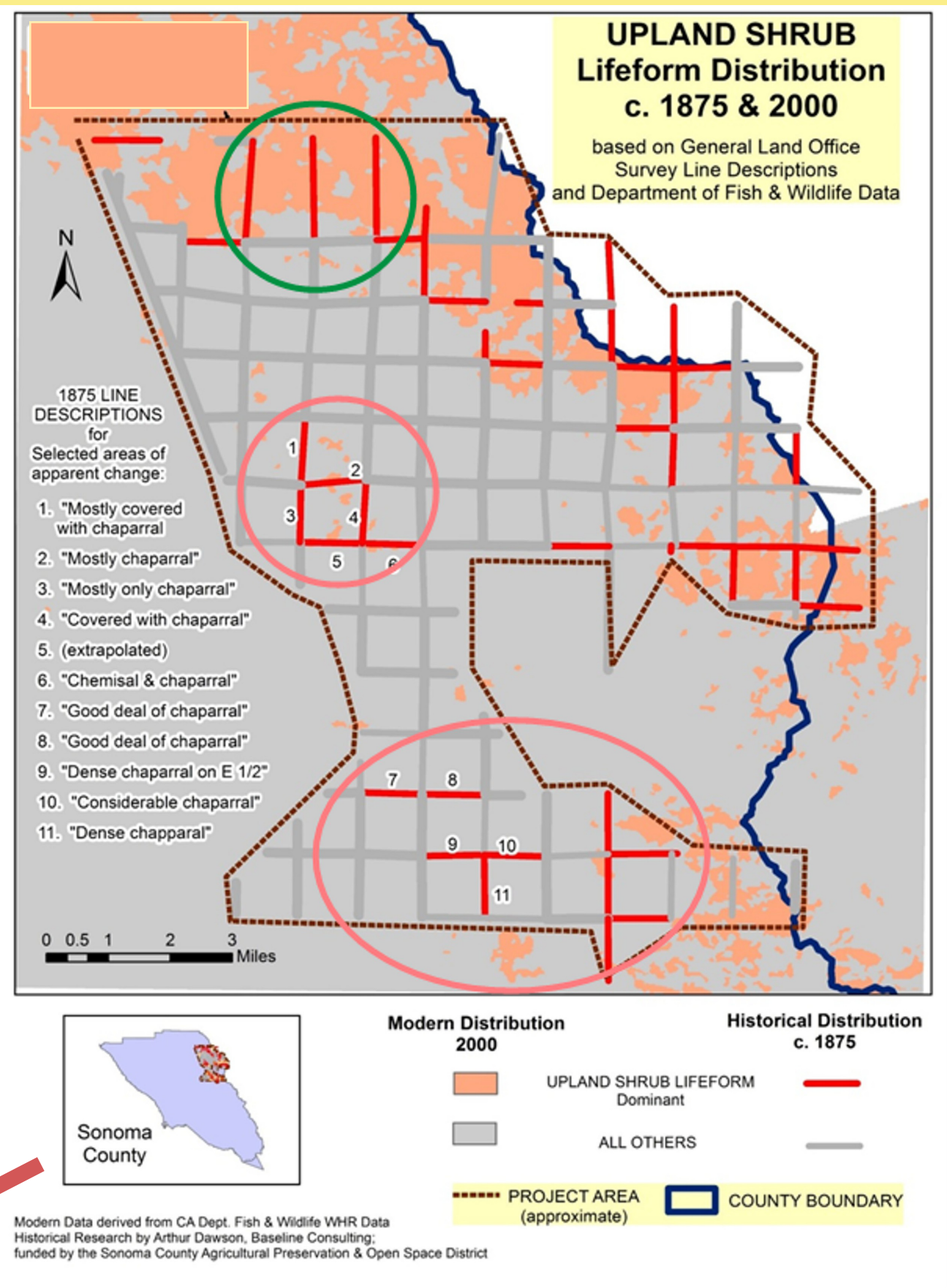
This map shows the **historical data in a grid** (as it was recorded) overlaying recent vegetation data (2000), shown as **polygons**, from the California Department of Fish & Wildlife.



RESULTS

The largest apparent change has been a **35% decrease in the area covered by Upland Shrub (Chaparral)**.

The map at right highlight changes in Upland Shrub cover by greying out the other lifeform types. The **transition from shrub to forest** has been confirmed during field work at nearby sites in the Mayacamas.



Habitat Loss



Habitat Resilience