

VACCINE

Visual Analytics for Command, Control, and Interoperability Environments
A U.S. Department of Homeland Security Center of Excellence

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Benefit: The Herbaria tool allows quick and easy retrieval of a hierarchically ordered large (>300k objects) data set for display and exploration of georeferenced point objects. Further, providing graphical representations of temporal aggregations at two scales (years and months) allows the study of pattern in both linear and cyclical forms. All of this is possible by leveraging aggregation by ecoregion to make data transfer quicker and easier between server and client.

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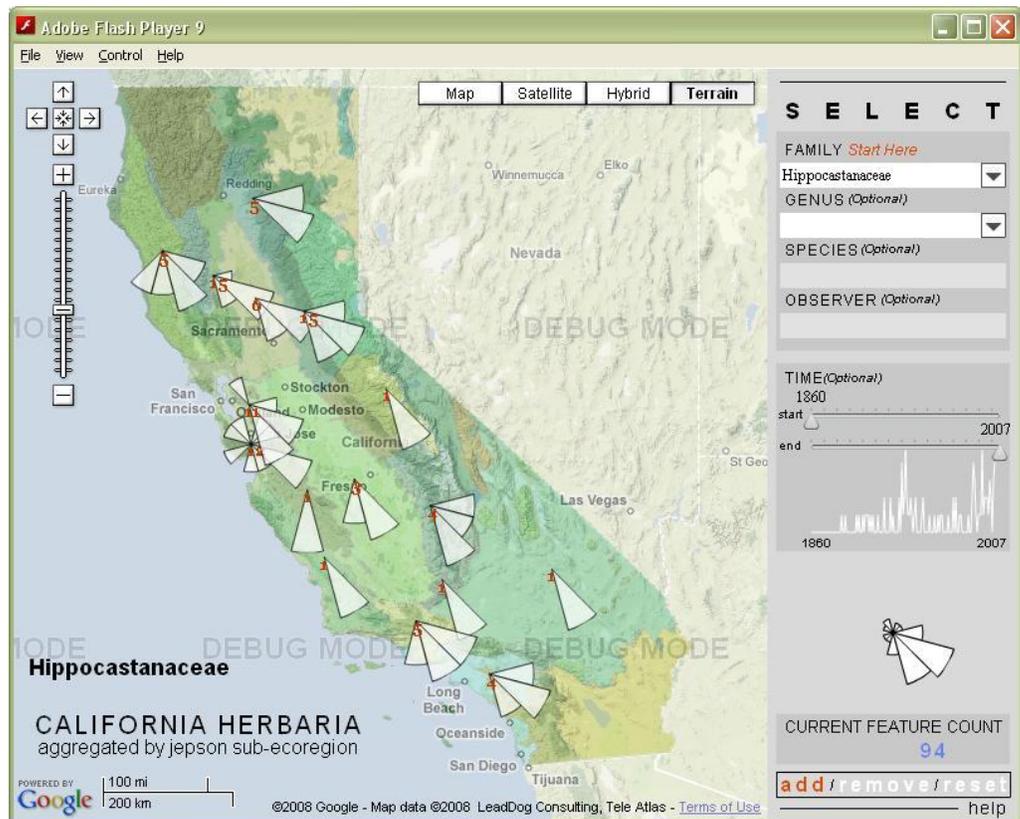
California Herbaria

A tool for spatiotemporal filter and query of georeferenced objects

Navigating, querying, and displaying large collections of georeferenced point data creates unique challenges for existing web map applications. Datasets composed of hundreds of thousands to millions of records require innovative yet intuitive filtering pathways for discovering and comparing patterns in both time and space. To better understand the history and evolution of a large spatio-temporal dataset, data reduction methods that combine categorical queries, spatial aggregation and temporal filtering can facilitate exploration by reducing the visual complexity of the dataset.

The California Herbaria tool (<http://www.geovista.psu.edu/herbaria/v3/index.html>) uses a powerful hierarchical query structure to access a large database (~377,000 records) of plant samples collected in California between 1860 and 2007. The records are first filtered by taxonomy (Family, Genus, Species) and can be further focused based on the date of observation or the name of the observer. Query results are then aggregated spatially by Jepson ecoregion and plotted on the ecoregion centroids. A temporal sparkline along with both aggregate and individual polar area chart symbols provide information about collection patterns using both linear (yearly) and cyclical (monthly) time scales.

The California Herbaria employs PostgreSQL, PostGIS, and GeoServer database tools to provide a scalable architecture for a dataset that continues to grow beyond its current 377,000 spatially referenced records. This open-source solution provides powerful search, query, update, and management capabilities at low cost.



California Herbaria: This screen shot shows the important features of the tool at the broadest scale. Hierarchical family selection brings up a temporal sparkline of all data across 148 years. Adding this selection to the map produces polar area charts centered on ecoregions, revealing cyclical patterns as data is aggregated by months. Mousing over individual plots on the map will highlight them in the legend.

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<http://www.VisualAnalytics-CCI.org>