

Methods: What is Historical Ecology?

DATA COLLECTION • We are collecting a wide range of historical material from local museums and historical societies, The Bancroft Library, and city and county archives. We look for early journals, diaries, and newspaper accounts that describe the ecology of the area; historical maps, surveys and aerial photographs that show where early features were located; and historical landscape photographs, drawings, and paintings that help us understand the vegetation, channel depth, and hillside

DATA COMPILATION • Once the raw historical sources are collected, the data is compiled into usable formats for analysis and synthesis. We extract and organize pertinent quotes from historical narrative sources, and ties historical maps and aerial photography to their real world map coordinates, so that they spatially match up and can be compared with contemporary

SYNTHESIS AND ANALYSIS • After compiling data, we will synthesize historical sources into geographic information system (GIS) layers describing the historical landscape and channel alignments. Habitats to be mapped in Contra Costa may include lagoons, wetlands, vernal pools, oak savanna, chaparral, grassland, alkali meadow, riparian forest, and riparian habitat types. Once in the GIS, we can make comparisons between past and present landscapes, analyzing loss of habitat type, stream modifications, and changes in variability.

REPORTS, GRAPHICS, AND PRESENTATIONS • The final report will be a well-illustrated guide to applyin understanding of historical conditions to present-day conservation challenges. The report will summarize methods and discuss results, including changes in bitat area and type, riparian conversion, channel incision/aggradation and other trends. Restoration opportunities will be discussed, with habitat remnants highlighted for conservation prioritization.

HISTORICAL ECOLOGY INFORMING RESTORATION IN EAST CONTRA COSTA COUNTY Alison Whipple In Stanford In the Contract of the Contrac

WETLAND RESTORATION OPPORTUNITIES ON A TRIBUTARY TO BRUSHY CREEK (SOUZA II PROPERTY) Son Francisco Estuary Institute, Oakland,

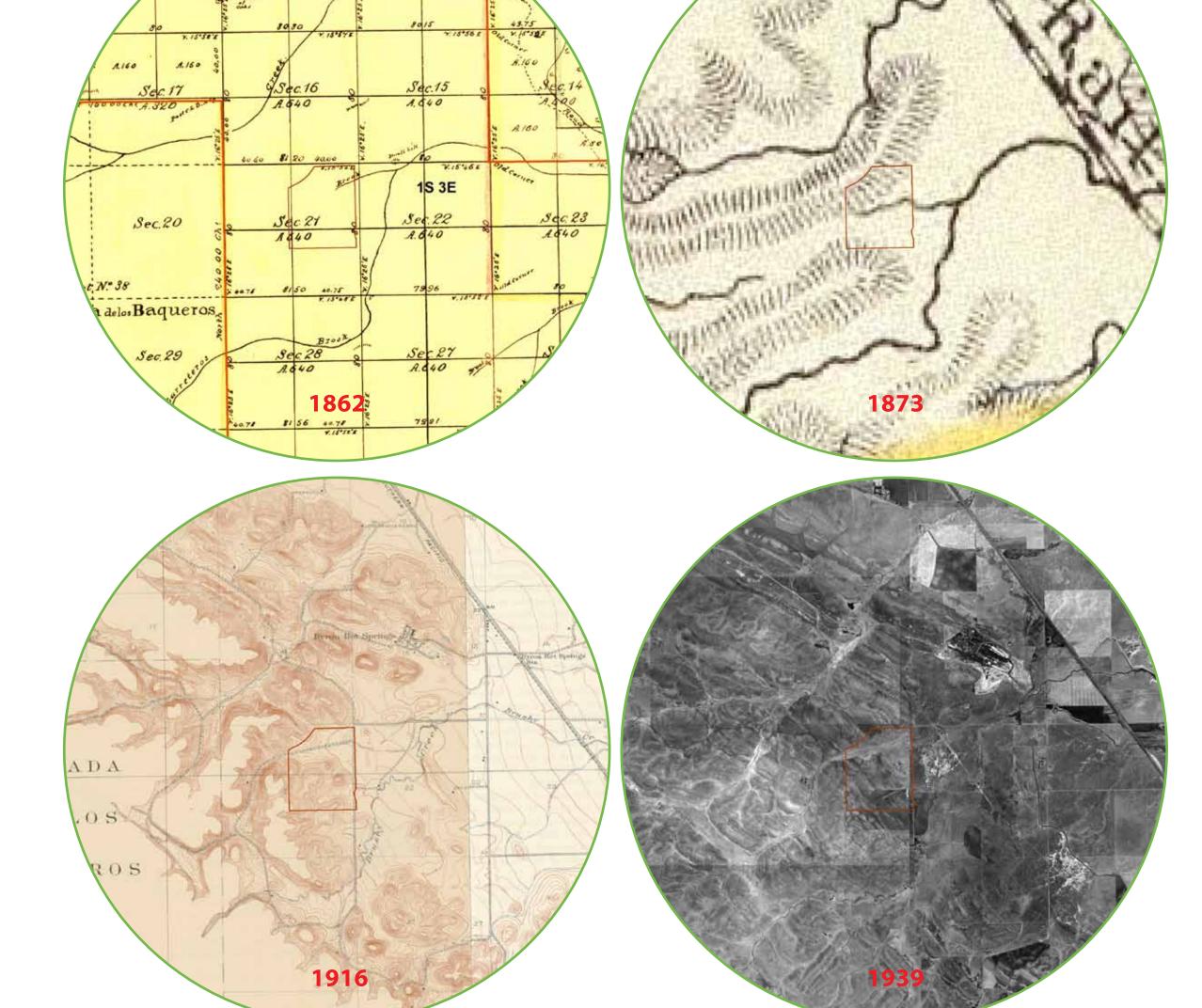
The Souza II property is an 191-acre parcel on the Eastern edge of the Diablo Range near the San Joaquin and Contra Costa counties border. Situated between Los Vaqueros Watershed Lands and the Byron Airport Habitat Management Lands the acquisition and restoration of the property is an opportunity to enhance connectivity among preserved lands and provide protection for a potentially important dispersal and migration corridor. A tributary of Brushy Creek bisects the property, flowing from west to east. The creek contains several seasonal and alkali wetland habitats, with additional seasonal wetlands outside the main channel and a pond at the property's eastern edge.



DIFFUSE DRAINAGE

Historical evidence suggested that the project area was a diffuse, seasonally flooded drainage system with alkali wetlands, possible vernal pool features, and a discontinous channel. It appeared that the system was converted to a relatively straight artifical channel in the early 20th century, presumably to improve drainage characteristics.

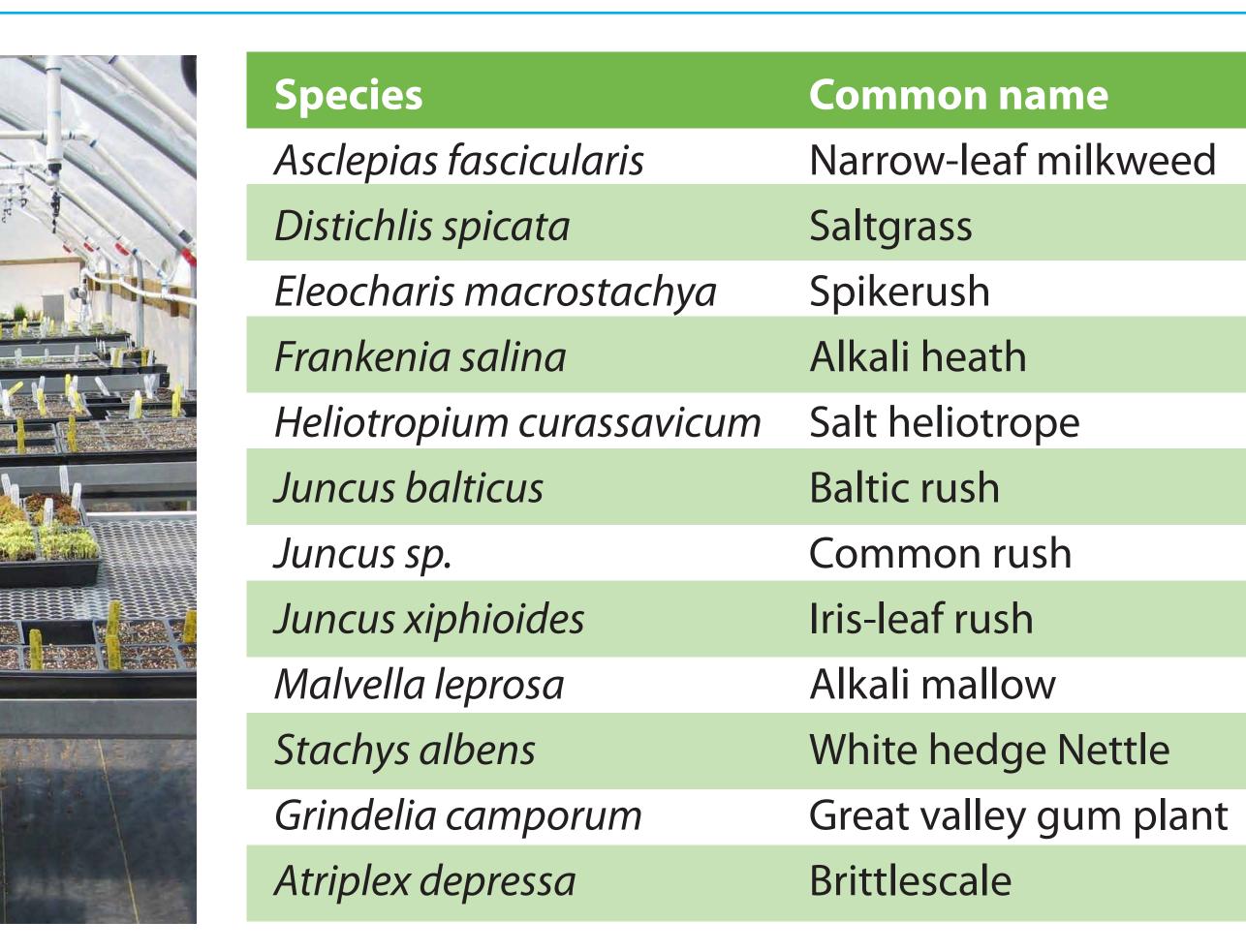
The maps to the right show how the channel was mapped as a discontinous system until 1916, when the tributary appears as a straight channel. By the time the 1939 aerial photographs were taken, the straightened channel appears deeply incised.



SPECIES AND HABITATS

Historical plant locations and descriptions from the Consortium of California Herbaria collected between 1884 and 1914 within a two-mile radius of the Souza II property show a wide variety of native species. Of the plants historically documented in the area, wetland and alkali species were predominant. In preparation for this restoration project, The Watershed Nursery started collecting seeds from native plants on the parcel as well as surrounding properties in the fall of 2008. They are propagating plants (approximately 15,000) for this project. Following the completion of earthwork in early September 2009, the site was seeded with native wetland and upland seed mixes. Plants grown by the Watershed Nursery (far right) will be planted in November 2009.

> **USDA soil map from 1933** on the left outlines alkali soils with low permeability in red. The straight and incised tributary to Brushy Creek is on poorly drained Solano silty clay, an alkali affected soil. Solano silty clay is described as having "hummocky microrelief", suggesting vernal pool conditions.







RESTORATION - DESIGN AND CONSTRUCTION

The design of the Souza II Wetland Restoration Project started in mid-2008. Initial studies explored not only the hydrology, soils, plant and animal communities, but also the historical ecological conditions. The information provided from the historical ecology assessment led the project to emphasize a diffuse drainage system, flood plain wetlands and vernal pools.

When construction is complete, the project will create an extensive seasonal swale and wetland complex on the eastern side of the parcel that echoes historical land cover and hydrology. Because of modern changes to the landscape (straightened and incised channel, Vasco Road drainage, and upstream ponds) the created and restored habitats needed to reflect modern constraints while still providing the habitat for targeted endangered species that existed prior to disturbance. Features that did not historically exist were added to the design including a seasonal pond and a 'treatment' swale to catch water run-off from Vasco Road.

Construction began in mid-August, 2009 and earthwork was completed the 1st week of September. The earthwork involved moving approximately 11,000 cubic yards of dirt to create wetlands and swales, lay back creek banks and create a new pond. The restoration will improve habitat conditions for California red-legged frog and California tiger salamander through creation of a seasonal pond and enhanced channel complexity. Several vernal pools were lined with potential vernal pool fairy shrimp innoculum. Rare plant species will be propagated in the restored habitats.

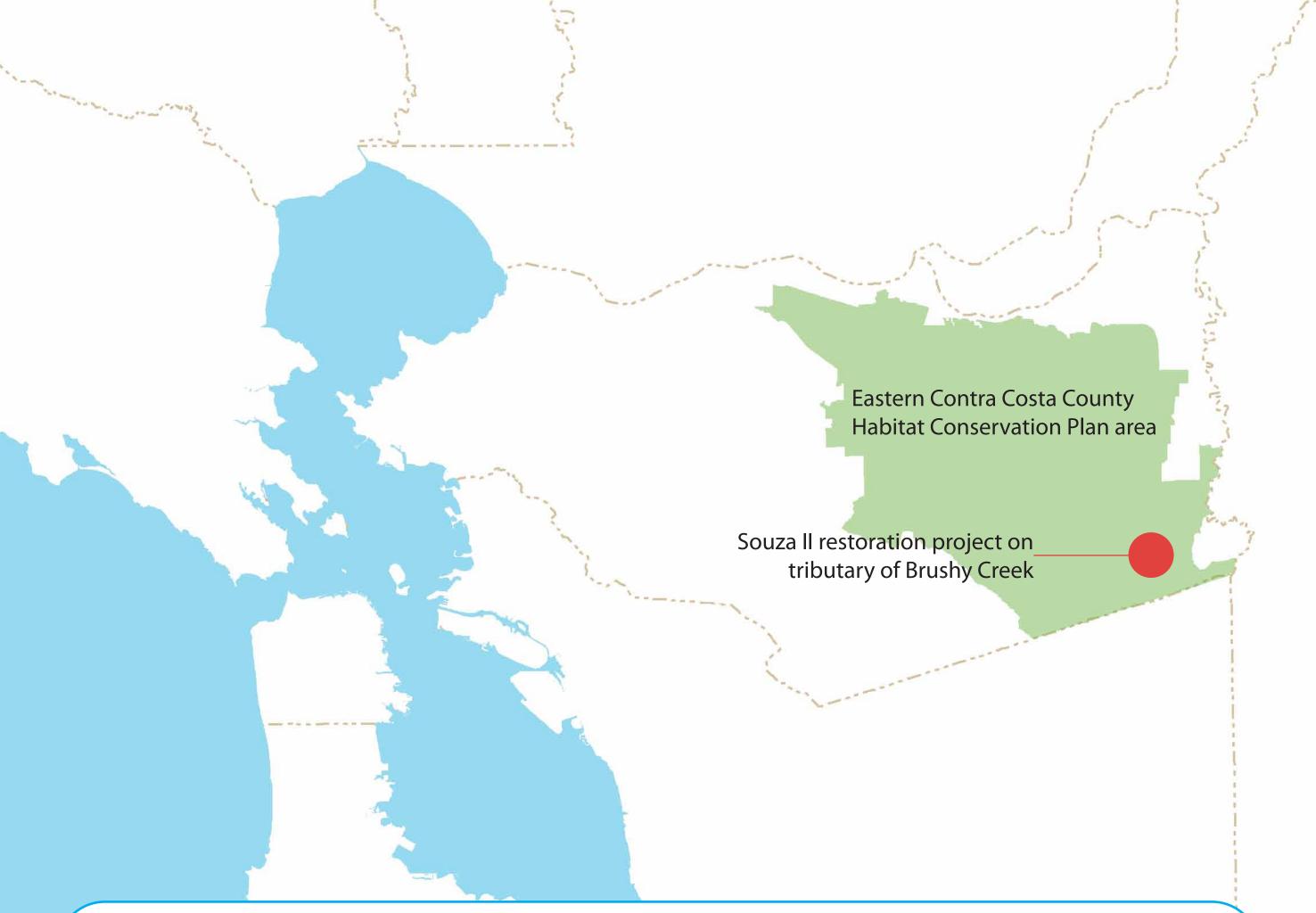
ouza II Restoration Project: Schematic of Restoration Design -- Road to Be Removed/Revegetated

Souza II Wetland Restoration and Creation Project

8.5 acres (wetland creation) 0.18 acres (pond creation) Ponds

Intermittent Streams 0.38 miles (channel restoration and creation

Grassland Restoration 15.1 acres (grassland restoration)



ABSTRACT The East Contra Costa County Habitat Conservancy and the Contra Costa Watershed Forum partnered with the San Francisco Estuary Institute to conduct an historical ecology assessment of natural resources in eastern Contra Costa County, CA. With limited money for restoration and conservation, concerned stakeholders want to use financial resources efficiently and effectively. A strong understanding of the historical distribution of habitats and their controlling factors provides a critical basis for understanding current conditions and the potential for future

A large amount of data, both textual and graphic, has been collected and georeferenced. This data from the 1800s and early 1900s provide a wealth of information to describe the general historic status of habitat in the region as well as very parcel specific information on stream courses, plant diversity and other natural features.

Though the Final Study will not be available until early in 2010, the Conservancy is already using the interim products and datasets developed to inform habitat restoration design. A case study on a tributary to Brushy Creek is presented here, demonstrating the application of this information in restoration.



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restoration.











