# REFUGIO CREEK WATERSHED

# VISION PLAN

CITY OF HERCULES, CALIFORNIA
SEPTEMBER 2009

# Acknowledgements

The Refugio Creek Watershed Vision Plan was produced through a collaborative process led by the City of Hercules and facilitated by Restoration Design Group. Common Sense California, the State Coastal Conservancy, and the City of Hercules funded the project.

The City of Hercules would like to thank the guest speakers who contributed their time and provided their knowledge to the planning process. Speakers included:

Roger Leventhal, FarWest Engineering

Erik Stromberg, Restoration Design Group

Jim Hale, Contra Costa Fish and Wildlife Committee

Juliana Gonzalez, The Watershed Project

Phillip Bachand, Bachand & Associates

The City of Hercules would also like to thank residents and interested parties who volunteered their time and thoughts to participate in the planning process and craft the Refugio Creek Watershed Vision Plan.

The Vision Plan document was prepared for the city of Hercules by the Restoration Design Group.





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# Envision a watershed...

*"The Refugio Creek Watershed Vision Plan envisions: a watershed with healthy creeks and ponds that provide habitat for wildlife; trails that unify and celebrate the watershed; and communities that care for, learn about, and understand the watershed."*

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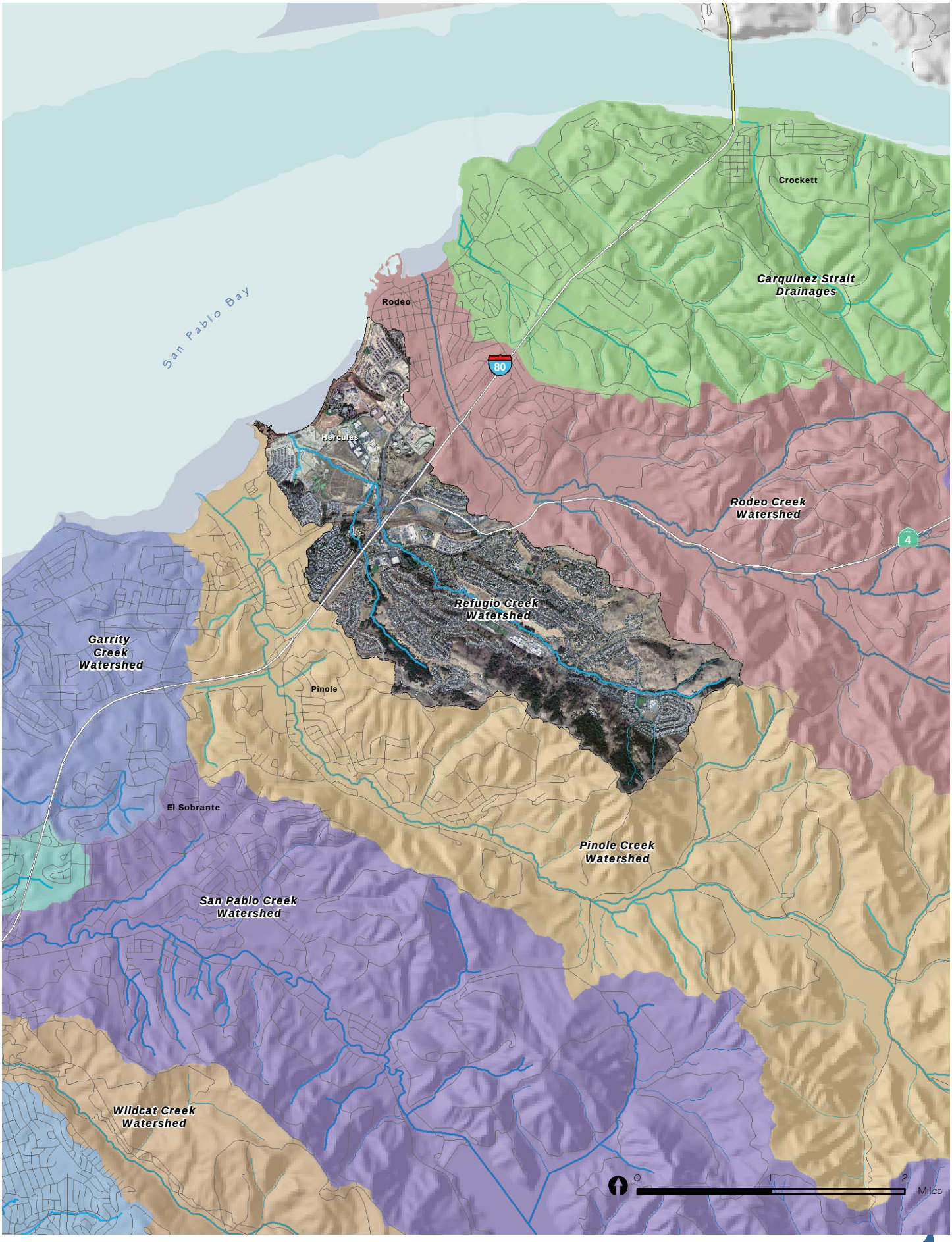
The Refugio Creek Watershed is located in Western Contra Costa County and drains into San Pablo Bay.


San Pablo Bay
Rodeo
Crockett
Carquinez Strait Drainages
80
Hercules
Rodeo Creek Watershed
4
Refugio Creek Watershed
Garrity Creek Watershed
Pinole
El Sobrante
Pinole Creek Watershed
San Pablo Creek Watershed
Wildcat Creek Watershed
0
1
2
Miles

# Introduction

Upper Refugio Creek Watershed as seen from the ridges nearby.

*(Photo courtesy of Mike Bowermaster)*

Between February and September of 2009, the citizens of the City of Hercules engaged in a vision planning exercise for the Refugio Creek Watershed - the primary watershed in the City. This report documents that process and the resulting findings and vision.

### Watershed Vision Plan

A Watershed Vision Plan is a watershed-based planning document that is meant to provide a coherent vision of future projects in the watershed. The Vision Plan is community-based, respectful of private property rights, involves only voluntary actions, and is developed through consensus. The Vision Plan can be used as a fundraising and planning tool and has the added benefit of being a collaborative experience that brings community members together to develop goals and actions to enhance the watershed.

### Public Process

The Refugio Creek Watershed Vision Planning Group met during six evening meetings and one field trip between February and September 2009. All events were open to the public. The City of Hercules publicized the process through its website, flyers, email, banners, and a pre-kickoff meeting with key stakeholders.

The visioning process was designed to be open and collaborative and lead to a consensus-seeking vision for the watershed. The meetings and field trip provided an opportunity for community members to learn about the watershed, express their interests and concerns, and formulate goal statements and action items in support of their vision.

The six evening meetings were held at the Hercules Public Library in Hercules, California. The two-hour meetings consisted of an hour of informational presentations by guest speakers, followed by an hour of group discussion. The field trip was held on a Saturday morning and visited multiple sites between the headwaters of the watershed and the mouth of the creek.

## *Meeting and Field Trip Topics*

**Meeting #1 – February 25, 2009**
Speaker Topics
*Overview of Refugio Creek Watershed*
*(Rich Walkling, Restoration Design Group)*

*Watershed Vision Plan Defined*
*(Drew Goetting, Restoration Design Group)*

Working Session Topics
*Ground Rules, Interests, and Concerns*

**Meeting #2 – March 11, 2009**
Speaker Topics
*Creeks 101*
*(Roger Leventhal, FarWest Engineering)*

Working Session Topics
*Interests and Concerns*

**Meeting #3 – April 15, 2009**
Speaker Topics
*Creeks and Cities: Tools for Designing Your Watershed*
*(Erik Stromberg, Restoration Design Group)*

Working Session Topics
*Interests and Concerns Mapping Exercise*

**Field Trip – April 25, 2009**
*Site visits to the upper watershed, Hercules Teen Center, Refugio Park, culvert at I-80/BNSF railroad, wetlands adjacent to Bayside, Duck Pond Park, mouth of Refugio Creek Watershed, and the restored area by Tsushima Street bridge.*

**Meeting #4 – May 13, 2009**
Speaker Topics
*Wildlife in Refugio Creek Watershed*
*(Jim Hale, Contra Costa Fish and Wildlife Committee)*

Working Session Topics
*Draft Goals and Actions*

**Meeting #5 – June 10, 2009**
Speaker Topics
*Forming a Watershed Group*
*(Dr. Juliana Gonzalez, The Watershed Project)*

Working Session Topics
*Draft Goals and Actions (continued)*

**Meeting #6 – September 9, 2009**
Speaker Topics
*Ponds 101*
*(Dr. Phillip Bachand, Bachand & Associates)*

Working Session Topics
*Setting Priorities and Review of Draft Watershed Vision Plan*

# Background Information

**The Watershed**

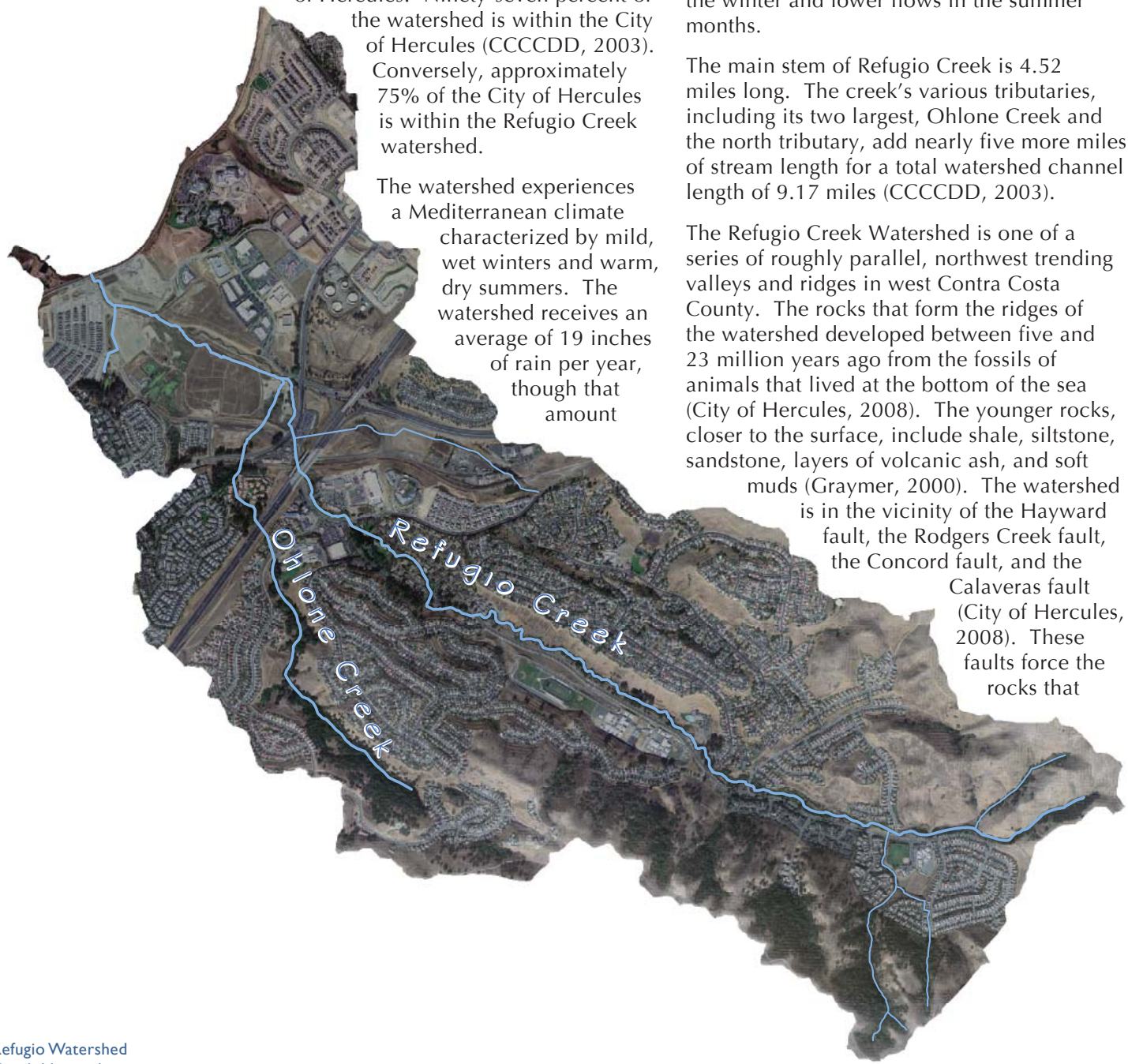
A watershed is any area of land that drains to a specified body of water. The Refugio Creek Watershed drains 4.87 square miles of northwestern Contra Costa County, California into the San Pablo Bay. The watershed includes tree-lined hills, grassy hills and lowlands, and relatively recent urban and suburban development in the City of Hercules. Ninety-seven percent of the watershed is within the City of Hercules (CCCCDD, 2003). Conversely, approximately 75% of the City of Hercules is within the Refugio Creek watershed.

The watershed experiences a Mediterranean climate characterized by mild, wet winters and warm, dry summers. The watershed receives an average of 19 inches of rain per year, though that amount varies significantly from year to year (CCCCDD, 2003).

Precipitation also varies geographically within the watershed. The hills in the upper watershed receive, on average, five inches more rainfall per year than the lowlands near the mouth. Most of the annual rainfall occurs between November and April. Refugio Creek responds in kind with higher flows in the winter and lower flows in the summer months.

The main stem of Refugio Creek is 4.52 miles long. The creek's various tributaries, including its two largest, Ohlone Creek and the north tributary, add nearly five more miles of stream length for a total watershed channel length of 9.17 miles (CCCCDD, 2003).

The Refugio Creek Watershed is one of a series of roughly parallel, northwest trending valleys and ridges in west Contra Costa County. The rocks that form the ridges of the watershed developed between five and 23 million years ago from the fossils of animals that lived at the bottom of the sea (City of Hercules, 2008). The younger rocks, closer to the surface, include shale, siltstone, sandstone, layers of volcanic ash, and soft muds (Graymer, 2000). The watershed is in the vicinity of the Hayward fault, the Rodgers Creek fault, the Concord fault, and the Calaveras fault (City of Hercules, 2008). These faults force the rocks that



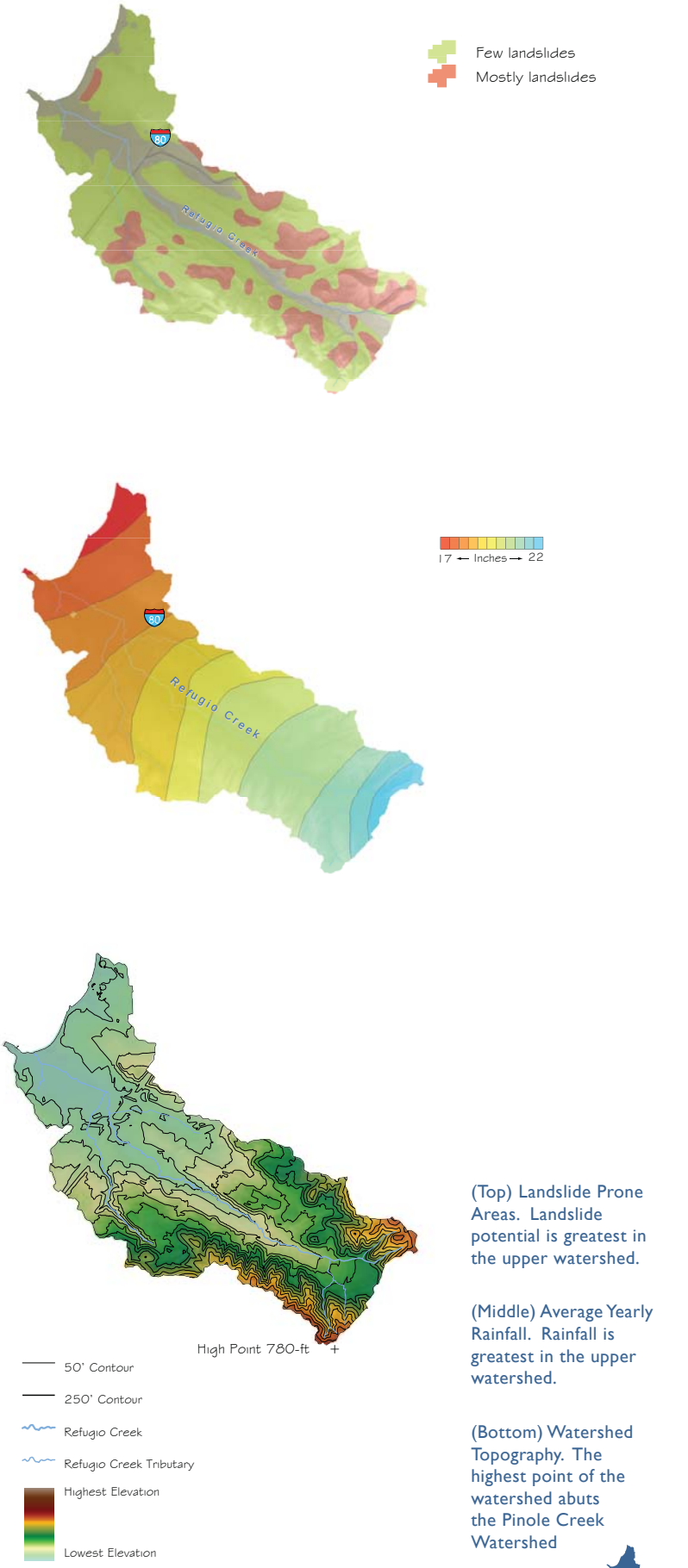
once sat on the sea floor upward at varying angles. The occasional soft layers and the tilting caused by the uplift create frequent slumping and landslides on the hill slopes (Alt and Hyndman, 1975).

The soils in the watershed are primarily clay and clay loams formed by the weathering of rocks near the surface. A loam is a soil that is composed of nearly equal amounts of clay, sand, and silt. The soils in the watershed support oaks and forbs, and the land is suitable for grazing, but they are not typically beneficial soils for intensive or high value crop agriculture (SCS, 1977).

### Watershed History

The oak trees, the freshwater in the creek, the fish and oysters in the bay, and other local resources supported the Huichin people who lived in the area prior to European colonization. Their territory extended from near present day Berkeley to somewhere north of Rodeo (Pinole Historical Society, 2009). Contra Costa County had one of the highest concentrations of native people in North America and one of the largest known village sites was just north of Refugio Creek watershed in present-day Crockett (Hale, personal communication). At the time, a broad tidal mud flat stretched from Point Pinole to the Carquinez Strait and a small tidal marsh covered much of the lower watershed near the mouth of the creek (Goals Project, 1999).

In 1823, the Mexican government granted Don Ignacio Martinez 17,000 acres of land that included the Refugio Creek Watershed. By the 1850s, a small town had formed in Pinole, just south of the Refugio Creek Watershed (Pinole Historical Society, 2009). Small farms and ranches dotted the landscape between Pinole and Port Costa (Ryan, 2001). In 1878, the Southern Pacific Railroad traversed the mouth of Refugio Creek, initiating the first major transformation of the watershed (Pinole Historical Society, 2009). The railroad formed a barrier between the tidal marsh near the mouth of the creek and the bay. In 1879, the California Powder Works purchased waterfront land in the




(Top) Landslide Prone Areas. Landslide potential is greatest in the upper watershed.

(Middle) Average Yearly Rainfall. Rainfall is greatest in the upper watershed.

(Bottom) Watershed Topography. The highest point of the watershed abuts the Pinole Creek Watershed


Historical shoreline and Creek Location and Alignment, Circa 1850's.

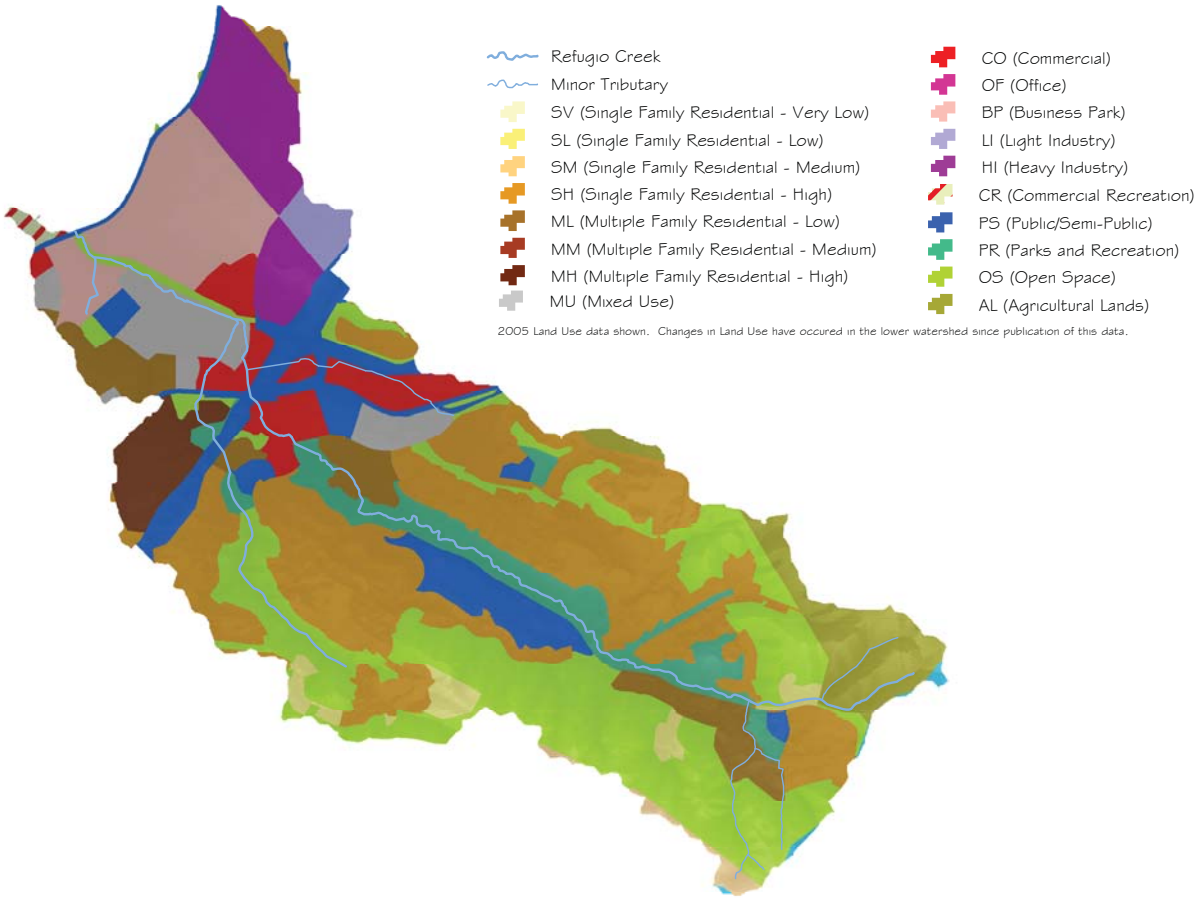
Refugio Creek watershed for its Hercules dynamite plant. The land was in proximity to the town of Pinole, but separated by a protective ridge. The company intentionally constructed its plants in gullies and ravines to buffer against explosions. To prevent the spread of fire resulting from an explosion, the company cleared the land of trees, planted Eucalyptus as barriers against explosions, and grazed sheep on the grasslands (Ryan, 2001).

Over the following century, the dynamite plant grew, as did nearby towns, and a second railroad and a highway traversed the watershed. In the 1960s, the plant ceased its manufacturing operations and began selling its land to developers (Ryan, 2001). In 1974–75, Centex Homes of California built the first large suburban development in Hercules (City of Hercules, 2000). In 1977, the plant closed permanently and Hercules Properties, Ltd. purchased the property with the intent of developing more suburban housing. The 1970s and 1980s were a time of rapid expansion in the watershed when the first traffic lights, shopping centers, and parks arrived (Ryan, 2001). Toward the end of the 1990s the City of Hercules began planning for a centralized downtown near the intersections of San Pablo Avenue, Sycamore Avenue, and Interstate 80. This resulted in the construction of several new neighborhoods in the lower watershed on what had previously been industrial lands (City of Hercules, 2000).

### Current Land Use

Land use can indicate a lot about the habitats and the hydrology of a watershed. Urban environments, agricultural lands, and open space all support different types of plants and animals. When rain falls on urban lands, it runs quickly off of buildings, roads, and parking lots to storm drains and creeks. By contrast, when rain falls on a meadow or forest, it seeps into the ground and moves slowly down slope. Some of it is used by plants and some of it will move across the surface of the land into creeks. (For more on storm water, see the storm water side bar.)

In the Refugio Creek Watershed, the two largest land uses are single-family residential (28%) and open space (22%). This land use pattern is evident when driving through the upper watershed. Streets lined with single-




Landuse within the Watershed

family homes branch off the Refugio Valley Road and cover the lower hillsides. The upper hillsides are blanketed with open spaces that reach down like fingers between neighborhoods. Most of the commercial land use is centered in the lower watershed near I-80. Downstream of the planned town center the land use is mixed use, higher-density residential, and business parks. In total, 68% of the land in the watershed is developed and 32% is dedicated to parks, open space, or agricultural land uses (CCCCDD, 2003).

## *Land Use*

| | |
|---|---|
| Single Family Residential | 28% |
| Open Space | 22% |
| Public/Semi-Public | 9% |
| Multiple Family Residential | 15% |
| Business Parks and Offices | 7% |
| Parks and Recreation | 6% |
| Commercial | 5% |
| Mixed Use | 4% |
| Agricultural Lands | 4% |
| **Total** | **100%** |

*Note: The last remaining industrial parcel in Hercules (Hilltown) was recently rezoned to Planned Commercial-Residential.*