

# Understanding Sonoma Valley Watersheds

## What is a Watershed?

***No matter where you are, you are in a watershed!***

A **watershed** is an area of land that catches rain and snow and drains it into a body of water, such as a creek, pond, estuary, bay, lake, or ocean. A watershed is also called a drainage basin. Ridgetops of hills or mountains form the boundaries between watersheds.

A drop of water falling on the top of a ridge will flow by gravity into one watershed or another depending upon the topography or lay of the land. Watershed boundaries often cross private property, county, state, and even international borders.

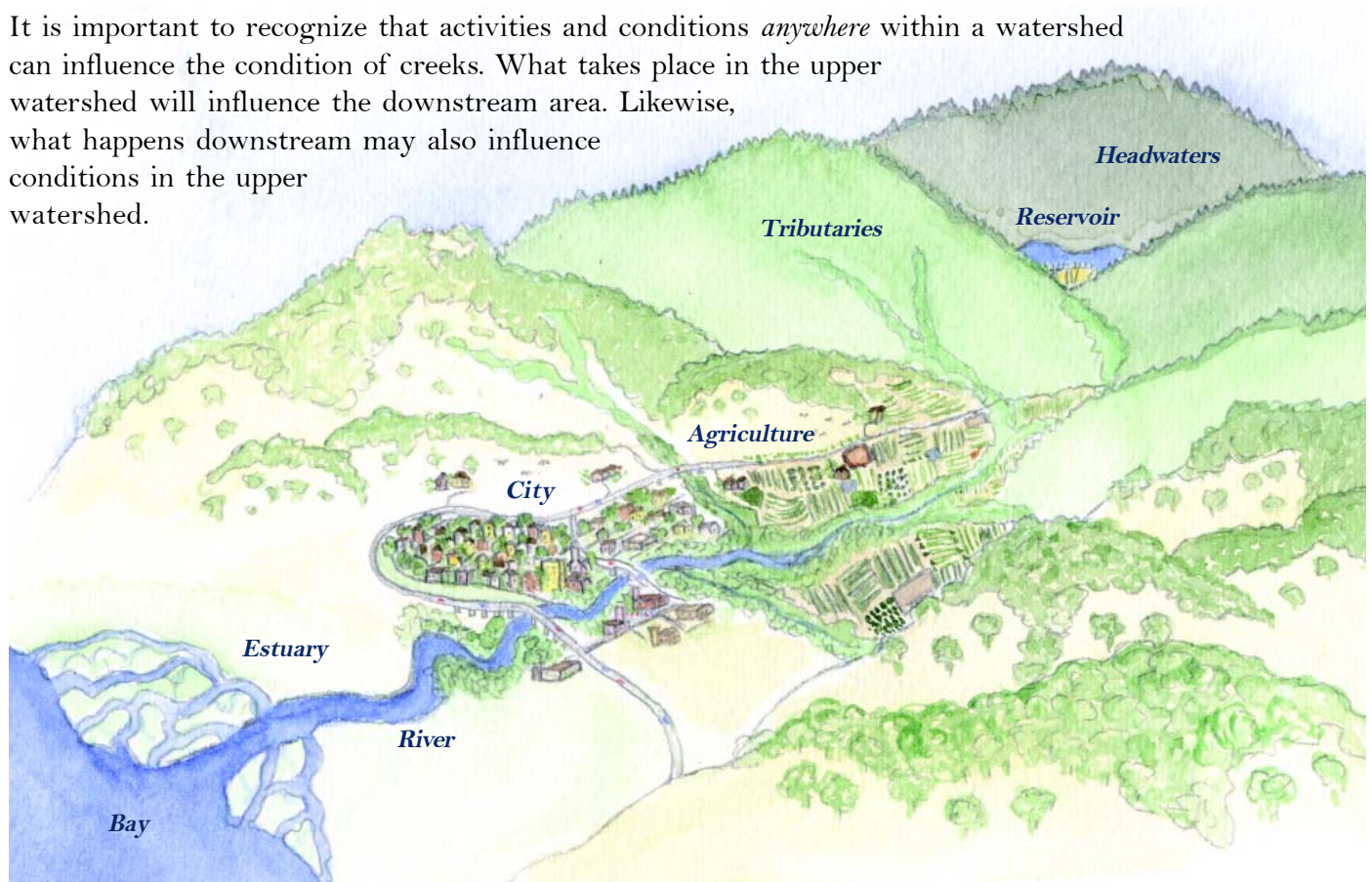
The upstream areas of a watershed are called the **headwaters**.

As you move downhill and downstream, tiny rivulets and streams combine to form larger rivers which eventually empty into a larger body of water such as a lake or bay.

The area of land in a watershed can be immense or it can be very small. Large watersheds often are composed of several smaller watersheds, called **sub-watersheds** or sub-drainages. For example, Carriger Creek flows into Sonoma Creek and has its own watershed, which is part of the even larger Sonoma Creek watershed.

It is important to recognize that activities and conditions *anywhere* within a watershed can influence the condition of creeks. What takes place in the upper watershed will influence the downstream area. Likewise, what happens downstream may also influence conditions in the upper watershed.

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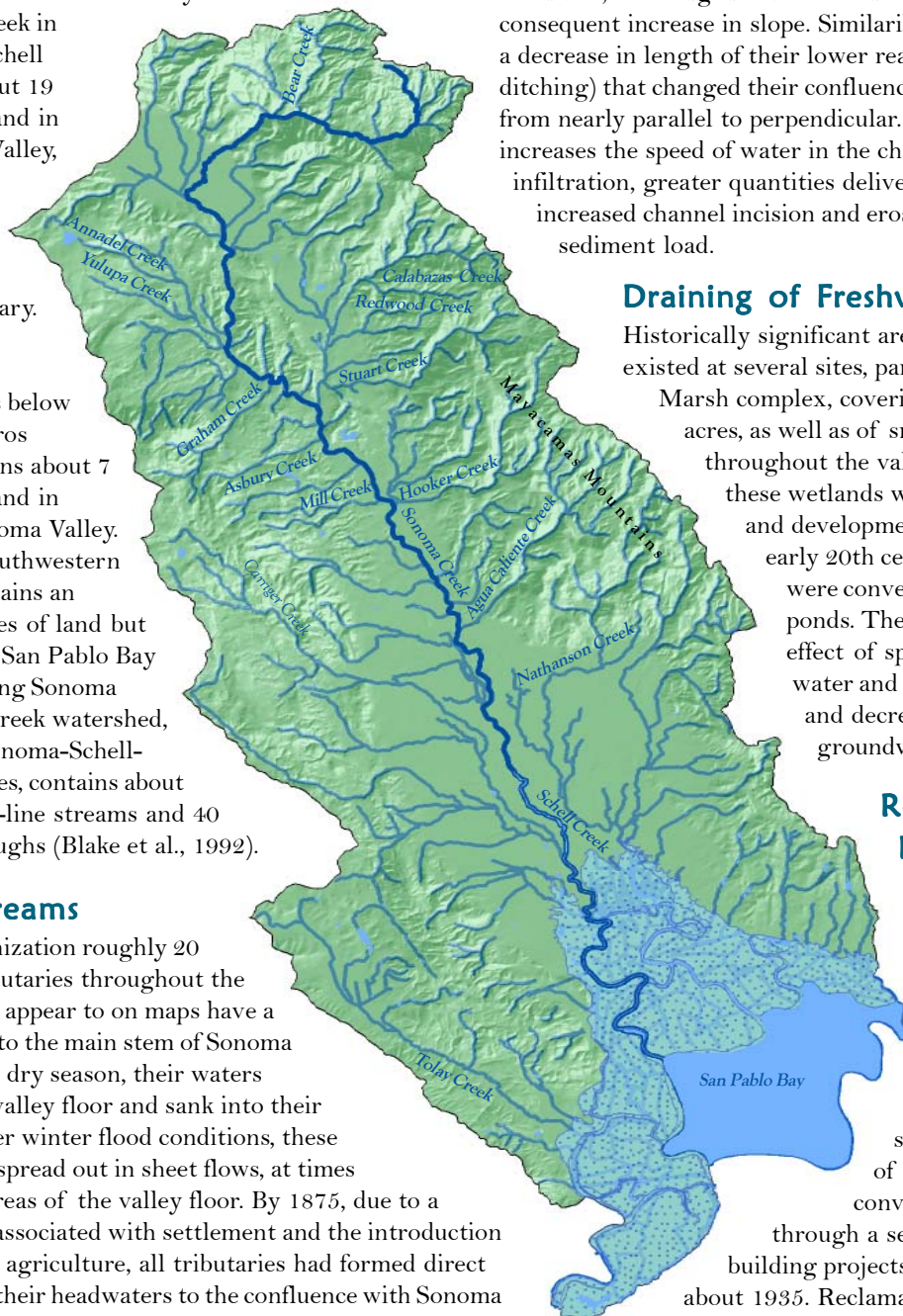
# SONOMA VALLEY WATERSHEDS

Sonoma Creek drain a watershed of approximately 100 square miles that discharges into San Pablo Bay in the northern part of San Francisco Bay.

Another major creek in Sonoma Valley, Schell Creek, drains about 19 square miles of land in eastern Sonoma Valley, joining Sonoma Creek downstream of the tidally influenced boundary. Also joining the Sonoma-Schell combined sloughs below tide line is Carneros Creek, which drains about 7 square miles of land in southeastern Sonoma Valley. Tolay Creek in southwestern Sonoma Valley drains an additional 40 miles of land but drains directly to San Pablo Bay without first joining Sonoma Creek. Sonoma Creek watershed, comprising the Sonoma-Schell-Carneros drainages, contains about 465 miles of blue-line streams and 40 miles of tidal sloughs (Blake et al., 1992).

## Tributary Streams

Prior to U.S. colonization roughly 20 percent of the tributaries throughout the watershed did not appear to on maps have a direct connection to the main stem of Sonoma Creek. During the dry season, their waters descended to the valley floor and sank into their alluvial fans. Under winter flood conditions, these streams probably spread out in sheet flows, at times converging large areas of the valley floor. By 1875, due to a variety of factors associated with settlement and the introduction of European-style agriculture, all tributaries had formed direct connections from their headwaters to the confluence with Sonoma Creek. These direct connections increased the speed and quantity of storm water and sediment delivered to the Sonoma Creek mainstem and decreased groundwater recharge on the valley floor.



## Straightening of Channels

Historical evidence shows a straightening of some mainstem meanders, resulting in a decrease in channel length and thus a consequent increase in slope. Similarly several tributaries show a decrease in length of their lower reaches (possibly due to ditching) that changed their confluences with Sonoma Creek from nearly parallel to perpendicular. Channel straightening increases the speed of water in the channel, resulting in less infiltration, greater quantities delivered downstream, and increased channel incision and erosion contributing to the sediment load.

## Draining of Freshwater Marshes

Historically significant areas of freshwater marsh existed at several sites, particularly the Kenwood Marsh complex, covering approximately 400 acres, as well as of smaller marshes and ponds throughout the valley. About 95 percent of these wetlands were drained for agriculture and development in the late 19th and early 20th centuries. Some marshes were converted to freshwater farm ponds. The conversion has had the effect of speeding up delivery of water and sediment to the mainstem and decreasing the recharge of groundwater.

## Reclaiming of the Baylands

The lower end of the watershed originally supported 15,000 acres of tidal marsh connected by an intricate network of sloughs. Beginning with hand labor, which was soon replaced by steam dredges, 90 percent of the baylands were converted to agricultural lands through a series of massive levee-building projects that were completed about 1935. Reclamation has effectively decreased food storage capacity in the lower watershed and increased sedimentation in the lower reaches of the mainstem.

This fact sheet was prepared by Rebecca Lawton, Arthur Dawson & Kasey Allen of the Sonoma Ecology Center.