

= Sulphur Creek (California) =

Sulphur Creek is a 4 @. @ 5 @-@ mile (7 @. @ 2 km) tributary of Aliso Creek in Orange County in the U.S. state of California . Draining about 6 square miles (16 km²) of mostly residential land in the southern San Joaquin Hills , it is Aliso Creek 's largest tributary .

Geologically the Sulphur Creek watershed was once part of a large and shallow sea that covered most of southern California . As the San Joaquin Hills rose and river sediments were deposited , land gradually emerged to form the present @-@ day Orange County coast . Sulphur Creek is located in a crumpled , hilly area in the southern part of this range , formed differently from the continuous mountain chain to the north . Historically , being south of Aliso Creek , the Sulphur Creek watershed was part of the territory of the semi @-@ nomadic Acjachemen Indian group , conquered by Spanish conquistadors in the 17th and 18th centuries and renamed the Juaneño by them .

During the 19th century , the watershed became part of a rancho . In 1966 , the creek was dammed to form Laguna Niguel Lake , while the surrounding hills were leveled as residential communities were constructed in the area following the ' 60s and ' 70s . The creek 's basin eventually became part of the cities of Laguna Hills , Laguna Niguel , and a small portion in San Juan Capistrano . Increasing urban runoff in the 1960s caused most of the flow in the creek to be unnatural . The creek has since been channelized along most of its length to prevent floods from inundating the roads and houses that now line much of its banks .

The Sulphur Creek watershed includes parts of Laguna Niguel Regional Park and Aliso and Wood Canyons Regional Park . Despite its heavy pollution and increasing population of exotic species , for much of its length the creek is a riparian corridor .

= = Course = =

The creek begins as a storm culvert exiting into daylight downstream of a shopping center near the intersection of Crown Valley Parkway and Greenfield Drive . It then flows generally south through a concrete storm channel , then diverted into another culvert that takes it underneath a small access road . For the next few miles , the creek parallels Crown Valley Parkway as it winds west and south through a valley almost entirely filled by residential development . The creek flows through a concrete channel and three more culverts before regaining its natural riverbed . At the third of these four culverts , the creek enters Sulphur Creek Park , which follows the Sulphur Creek riparian corridor to where it turns west @-@ northwest into Crown Valley Park , just upstream of Laguna Niguel Regional Park . Here , it receives two small tributaries (Niguel Storm Drain and an unnamed creek flowing from a spring on the hillside) on the left bank . The creek then enters a box @-@ cut concrete channel that takes it to Sulphur Creek Reservoir , a 44 @-@ acre (0 @. @ 18 km²) lake about 1 @. @ 5 miles (2 @. @ 4 km) long , formed by a dam at its north end . At the lake , another small unnamed tributary , from a filled @-@ in canyon on the east side , joins Sulphur Creek .

The creek then exits the dam from the concrete spillway on the east side , flowing into a small valley inside Laguna Niguel Regional Park . About 0 @. @ 5 miles (0 @. @ 80 km) downstream from Sulphur Creek Reservoir , it receives the water of a large storm drain on the right bank . This storm drain is responsible for much of the pollution problems in the Sulphur Creek watershed . It then flows past a small mountain on the north , known as Kite Hill , and is diverted into a large culvert underneath Alicia Parkway that drains it to a small canyon . The creek then flows into Aliso Creek , just outside the boundary of Aliso and Wood Canyons Regional Park .

= = Geology = =

About ten million years ago , much of western and southern Orange County and most of coastal Southern California was part of a warm and shallow sea . This sea receded over time , leaving a large and flat coastal plain . Over 1 @. @ 22 million years ago , the uplift of the San Joaquin Hills began along a blind thrust fault that stretches north into the Los Angeles Basin , eventually rising to an average of 500 to 700 feet (150 to 210 m) above sea level , with the highest peaks topping out

at about 1 @, @ 000 feet (300 m) . Rising at about 0 @. @ 6 to 0 @. @ 8 feet (0 @. @ 18 to 0 @. @ 24 m) per one thousand years , a series of marine terraces formed along with the hills ' uplift . This uplift changed the course of Sulphur Creek to run north to Aliso Creek , instead of flowing south to Salt Creek (see Watershed) .

River sediments helped to create the broad and flat terrain and river valleys between the San Joaquin Hills and the much higher Santa Ana Mountains to the east . Sulphur Creek 's watershed is located in a southern area of the San Joaquin Hills where many smaller hills have formed in a wider area instead of a single , tall , narrow mountain chain . These lower hills are composed primarily of sedimentary rocks and date from the Miocene period . The oldest rocks in this area are referred to as the Vaqueros Formation , while the younger are named the Monterey Formation . This hilly area is drained by Sulphur Creek to the northwest , Salt Creek to the south , small and unnamed coastal canyons to the southwest , and small tributaries of Trabuco and Oso Creeks to the east . This area is located northwest of the San Juan Creek valley , southeast of the Aliso Creek valley , and west of the Oso Creek drainage .

= = Watershed = =

The Sulphur Creek subwatershed covers about 17 percent of the entire Aliso Creek watershed , encompassing about 6 square miles (16 km²) in the southwesternmost corner of the 35 @-@ square @-@ mile (91 km²) Aliso Creek basin . Primarily residential , it is bordered on the north by the Aliso Hills Channel drainage area (tributary to Aliso Creek) , on the south and southwest by the basin of Salt Creek , and to the west by the Oso Creek watershed , a tributary basin of the Trabuco Creek watershed . Most of the basin of Sulphur Creek is hilly , but not very mountainous , although the creek has been largely changed by human occupation . Several canyons that originally drained into the creek have been filled in with material excavated from the surrounding mountain @-@ tops , creating smoother terrain . Many present @-@ day storm drains still follow the original course of these canyons . About 30 percent of the creek 's course has been inundated by the Sulphur Creek Reservoir , formed in the 1950s by a large dam across a broad north @-@ trending valley .

The Sulphur Creek watershed has had a long history of water pollution , which can be attributed to residential development . While no raw sewage flows into the creek , the creek is contaminated by large quantities of urban runoff from impervious paved surfaces that collects toxins before pouring untreated into the creek . There are over four large storm drain outlets that pour directly into Sulphur Creek . Such untreated runoff has caused E. coli and Enterovirus to increasingly harm the creek and its remaining biodiversity . Channelization is also another factor , and standing water in the Sulphur Creek Reservoir has suffered eutrophication . The primary source of bacteria contamination is the largest tributary of Sulphur Creek , now mostly underground . The channel joins the creek not too far from its mouth . It has been proved that 87 percent of the Sulphur Creek mainstem is severely degraded .

= = History = =

Located to the southwest of Aliso Creek , Sulphur Creek historically lay in the territory of the Acjachemen Indian group , whose main population center was actually farther south , at the confluence of San Juan and Trabuco creeks . A nearby village , Niguili , was located near the mouth of Aliso Creek likely near the confluence of Aliso and Sulphur Creeks . Present @-@ day Laguna Niguel takes its name from this settlement . The Acjachemen were renamed the Juaneño by Spanish priests in the 18th century , who established a mission at the present @-@ day location of San Juan Capistrano . Following the Spanish arrival , most Juaneño clustered around the mission in the south . Like many other once widespread Juaneño villages , Niguili was likely abandoned soon after , and there is no trace of it remaining .

From 1842 to the 1960s , the entire land area was known as Rancho Niguel , a Mexican land grant originally belonging to Juan Avila . Eventually , after passing through several ownerships , the ranch was purchased in 1881 by Lewis Moulton and Jean Pierre Daguerre , who expanded it to 21 @, @

000 acres (85 km²) . By the 1960s , the City of Laguna Niguel bought a large portion of the ranch from the Moulton family ; it was later donated to the county for recreational use . Resultantly , the upper and lower sections of the creek are now under county ownership , and the Sulphur Creek Reservoir is managed by the Orange County Flood Control District .

In the 1950s , a large dam , about 485 feet (148 m) long and 42 feet (13 m) high , was raised across lower Sulphur Creek by the U.S. Army Corps of Engineers to create Sulphur Creek Reservoir (otherwise known as Laguna Niguel Lake) . This flooded 1 @. @ 5 miles (2 @. @ 4 km) and 44 acres (0 @. @ 18 km²) of the original course of the creek , creating a 520 acre foot (640 @, @ 000 m³) impoundment . This lake was annually stocked with fish , and by the 1960s , residential communities began to rise on the hills west of the main (southward @-@ flowing) segment of the creek , while increasingly contaminated urban runoff began to contribute to the creek 's flow . These hills originally consisted of high , narrow ridges dissected by steep but shallow and short canyons but were leveled to make way for buildings . In 1973 the 236 @-@ acre (0 @. @ 96 km²) Laguna Niguel Regional Park was established in the lower third of the creek course , covering the extent of the creek from the head of Sulphur Creek Reservoir to where the creek crosses Alicia Parkway through a large culvert . In 1990 the final reach of the creek became part of Aliso and Wood Canyons Regional Park .

= = Wildlife and flora = =

Historically , the Sulphur Creek watershed was mostly hilly terrain consisting of chaparral and coastal sage scrub , with native riparian vegetation , likely consisting of live oak , sycamores , and alders (the namesake of Aliso Creek ; Aliso is the Spanish translation of Alder) and other small trees , lined the small and seasonally flowing creek . Fish were likely nonexistent in the historic Sulphur Creek watershed - although Aliso Creek was perennial , steelhead trout were found to not have inhabited Aliso Creek even during flow periods , despite claims of some residents . (See Wildlife of Aliso Creek for a detailed explanation on the absence of steelhead .)

With the introduction of non @-@ native species , predominantly giant reed , castor bean and tobacco tree , native plant species in the watershed began to die out . As giant reed is not suitable habitat for many species , areas infested by giant reed are biologically dead in comparison with unaffected areas . It can grow extremely fast , removing too much water from the creek , and during flood events , many parts of the giant reed can wash downstream and re @-@ establish themselves as a new colony , increasing the problem . Along with increasing concentrations of nutrients from fertilizer and other substances contained in runoff , algal blooms began to hurt the water quality of the creek , especially above Sulphur Creek Reservoir . The historically seasonal creek was replaced with a constant flow of polluted water from several large storm drains and many smaller ones . Fish thrived for a limited time in Sulphur Creek between the introduction of perennial flows and the devastating floods at the end of the 20th century . These floods wiped out many of the remaining riparian areas lining waterways in the watershed . Despite the massive environmental degradation in the Sulphur Creek watershed , it is not biologically dead , yet and still supports some native species . Work is under way in the watershed to remove non @-@ native species and restore native riparian vegetation .

Aliso and Wood Canyons Regional Park , which is located at the lower extreme of Sulphur Creek , supports far more native species than the Sulphur Creek watershed (see Wildlife of Aliso Creek for detail) .

= = Recreation = =

Sulphur Creek Reservoir is the primary recreational facility in the watershed and is said to be one of the largest fisheries of Southern Orange County . The lake is annually stocked with bluegill , catfish , and bass . Aside from the reservoir , there is no body of water in the watershed that is navigable . There are several other parks in the watershed ; these are Crown Valley Park , Sulphur Creek Park , and others . A paved trail follows Sulphur Creek from near the terminus of Crown Valley Park to

near its mouth at Alicia Parkway .

= = Etymology = =

The Geographic Names Information System lists " Arroyo Salada " (Spanish : Salt Canyon) as a variant name . Cañada Salada , translated to " Valley of Salt " or " Salt Canyon " (Durham 's Place Names of the Greater Los Angeles Area , 2001) is another name for the lower section of the creek . These names , dating to Spanish times , imply that the creek was naturally salty or briny . As Salt Creek to the south bears a name of similar meaning , and that the " Arroyo Salada " Storm Channel occupies the lower section of the prehistoric Sulphur Creek watershed , there is further proof by salt concentrations that the two watersheds were once linked (see Watershed) .