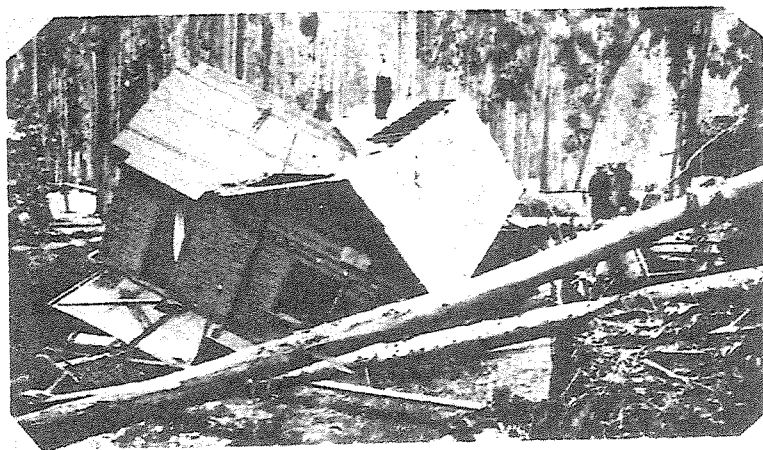


LAGUNA BEACH FLOOD HISTORY 1937 TO 2011



Compiled by Barbara Metzger and Meg Monahan

Laguna Canyon Floods, 1937–2010

Laguna Canyon has seen 14 floods causing significant structural damage in the city's lifetime. All of them occurred in years of higher than average rainfall, but not all years of excess rainfall had significant floods and some of the flood years had only slightly more rainfall than usual (see attached chart). Accounts of these floods in a 1969 Corps of Engineers report, coverage by the *South Coast News*, the *Laguna News-Post*, the *Orange County Register*, and the *Los Angeles Times*, and City Council minutes are summarized here.

1937

The first major flood in the City's history, on February 6, 1937, was the result of a two-day storm that dropped 5.59 inches of rain on the city. It started the deeply cut channel we see today, virtually filled the canyon, undercut building foundations in the Sarah Thurston Park area, forced a number of families to evacuate their homes, closed the Canyon Road, and covered the streets downtown with mud. The Red Cross dispensed relief to flood victims, and a benefit for them was held at the Community Playhouse.

1938

On March 3, 1938, a two-day storm producing 5.06 inches of rainfall caused more than \$20,000 in damage, mainly above Forest Avenue (an improved channel carried most of the flow oceanward from there). Direct damage was estimated at more than \$20,000. The Craftsman Studio factory in Laguna Canyon was undermined and heavily damaged, and part of the dog pound went into the river but, anchored by a rope, did not float away. Scores of eucalyptus trees were toppled. The Canyon Road was closed to traffic. Members of the American Legion carried a number of canyon residents to safety and assisted them in saving their homes and possessions, wading shoulder-deep in the chilly water. In the aftermath of the flood, water lines had to be repaired, and supplies were hauled out to residents from Laguna.

1941

On February 17, 1941, a one-day storm that produced 2.63 inches of rain undermined homes, and at least one home fell into the watercourse. A family of three was awakened by neighbors who helped remove the furniture from their cottage before it fell into the water.

1966

A six-day storm yielding 4.76 inches of rainfall peaked on December 5, 1966, when 2.10 inches fell on the previously soaked ground. The Canyon Road was flooded, and incoming and outgoing phone service was interrupted overnight.

1969

In January and February 1969, 16.96 inches of rainfall were recorded in Laguna Beach. A January 27, 1969, storm producing 3.66 inches in a day did extensive damage to structures in the Big Bend area, with about three feet of water in houses. The Canyon Road was closed. On February 24, 1969, after 24 hours of steady downpour, the downtown became a sea of mud when the channel at Beach Street backed up, spewing muddy water and debris over surrounding streets and parking lots. The concrete walls of the channel where it passes under Ocean and Broadway broke in two places, endangering buildings on both streets, and the structures between Beach and Forest were evacuated. Sewage from a broken sewer line at the foot of Broadway spilled onto the beach. A mudslide blocked El Toro Road near the city limits, and the Canyon Road was closed. In the Canyon Acres area, slides of mud and rocks left debris two feet deep in the streets, and about 35 families were helped out of the area by police and firemen. The animals at the SPCA shelter were evacuated from the flooded facility by SPCA crews. Canyon Acres residents Ray Unger and Jack Fontan barely escaped with their lives when their house at the far end of the road slipped off its foundations and was broken in two by a slide of mud and rocks.

1978

A three-day storm in mid-January 1978 dumped a total of 3.43 inches of rainfall in coastal areas and closed the Canyon Road all the way to the San Diego Freeway for some six hours. The block wall of a church on El Toro Road collapsed, and the debris was carried downstream into homes and businesses. Some homes were severely flooded, with water two to four feet deep. One man reported that the water had risen to a foot from his kitchen ceiling, and parents carrying their children outside left furniture floating downstairs in their home. Chaise longues were floating down the road.

1983

On March 1, 1983, the Laguna Lakes overflowed their banks and covered the road between them. The road was passable only for four-wheel-drive vehicles. The animal shelter was evacuated with the help of the contractors working on the construction of a 10-by-14 foot flood-control channel. Finished parts of the culvert were filled with mud and debris, and chunks of the road disappeared. A pickup and a car were washed into the channel and blocked it, forcing water onto Ocean and Forest Avenues and depositing several inches of mud on downtown streets. Laguna Canyon Road was closed for nearly three weeks while the road and the channel were repaired.

1995

Flooding on January 4 and January 11, 1995, attributed by a County hydrologist to two 10-to-25-year storms, damaged dozens of homes and 50 downtown businesses (where the water was waist-deep), and ripped out about 100 feet of the boardwalk. The channel at Beach Street overflowed twice. Residents upstream were evacuated. Seventy-seven children were evacuated by bus from the Boys' and Girls' Club to an emergency Red Cross shelter set up at the high school in the first storm, and in the second nearly 100 children were temporarily stranded at a preschool until firefighters

could rescue them. Laguna Canyon Road was closed for more than a week. There was damage to the Canyon Acres bridge and the animal shelter. The City sued the Transportation Corridor Agency for the cost of cleanup at Main Beach Park, and 35 Sun Valley Road neighbors and about 25 business owners also sued the agency, citing inadequate flood control in connection with grading in December 1994. The TCA blamed silt from the areas recently burned and the City's failure to improve the channel between Beach Street and the ocean. Sun Valley property owners began building brick and concrete retaining walls along the creek and rebuilt the bridge across the creek.

1997

In the course of a flood on January 7, 1997, Sandy Bush of Laguna Canyon Kennels, 20401 Sun Valley Road, was swept down the road to the Canyon Club by a four-foot-deep river and run over by a floating motorcycle. Apartments were underwater on Sun Valley Road, where a dump truck was dragged against a concrete wall, leaving deep grooves, and a Honda Civic was pushed on top of a minivan. Downtown was left under four inches of mud, and the Main Beach was closed because of a sewer break. Residents again blamed development upstream for the flooding.

On December 6, 1997, the worst rainstorm in 70 years dropped 7.2 inches of rain on Laguna in the single heaviest day of rainfall in a century. Two homes were destroyed and about 20 were severely damaged. There was also damage to City Hall, the animal shelter, and the boardwalk, and the Laguna Playhouse and the Irvine Bowl orchestra pit and backstage areas were flooded.

1998

A storm on January 23, 1998, produced 2.73 inches of rainfall in seven hours and triggered mudslides. A house on Canyon Acres split in two. The Sarabias (resident caretakers at the Bluebell Foundation for Cats) and their baby were swept downstream by mud, but all were saved. Glen Flook, having helped others in his apartment building to

escape, took refuge with others at the Quilters' house below Castle Rock and was killed in the slide that swept all of them out of the house. Nick Flores was found two days later buried under eight feet of mud in Sarah Thurston Park. The city's response was hampered by impassable roads; lifeguards in wetsuits and boots rescued dozens of people from waist-deep mud in the Big Bend area.

2010

On December 22, 2010, after a week in which more than 9 inches of rain were recorded, swift-water rescue teams pulled 25 people from vehicles or homes threatened by the raging creek. The Orange County Flood Control District reports that the 3.44 inches of rain that fell within six hours amounted to more than a 100-year storm. A number of cars and several large storage containers went into the creek, and more than 90 homes and 70 businesses were damaged. A woman and her daughters were rescued by neighbors who rigged up a garden hose to guide them to safety through chest-high water. Laguna Canyon Road was closed to all traffic for several days between the Big Bend and the toll road and in the other direction was open only to residents and business owners. The Pacific Marine Mammal Center and the animal shelter were evacuated. Laguna Koi Ponds was flooded out and its fish washed onto the road. The Beach Street storm channel overflowed, spouting water 15 feet in the air. The Main Beach boardwalk suffered broken and leaning pilings, lost planking, and a displaced stairway and settling of its rock revetment. Damage to public infrastructure amounted to more than \$12 million.

Efforts to Limit Flood Damage

Laguna Canyon creek begins in a shallow lagoon some 5 miles from the ocean and, with its tributaries, including the fork along El Toro Road and the Canyon Acres wash, drains an area of about 8 square miles. Efforts to control the creek began as early as 1928, when the City created Improvement District No. 3 and built a channel some 2,000 feet long from the ocean to Forest Avenue as part of a Pacific Coast Highway construction project. Over the years, channelization has been the main approach to limiting flood damage in the canyon.

Channelization

In 1937 the Orange County Board of Supervisors approved plans for a 10,000-foot-long open concrete channel along Laguna Canyon Road to connect with the existing channel at Forest Avenue, but after the 1938 flood residents complained that nothing had been done about it and some of the money set aside for it had been diverted to other purposes. Various extensions of the channel were constructed in the 1950s and 1960s, and by 1968 a concrete-lined channel with some covered reaches, designed for a 25-year flood, extended to the Big Bend (mile 1.9). The channel between Beach Street and Forest Avenue was reconstructed in 1969. The section from the Big Bend to the GTE property (now the dog park) was completed in 1983.

In 1991 the City Council reviewed but did not certify an EIR for the construction of a double 10-by-8-foot concrete channel from the ocean to Beach Street, instead asking for study of alternatives in the upper canyon that might reduce the need for the proposed facilities. A Broadway alignment for this part of the channel was extensively studied in the late 1990s but abandoned at an advanced stage in 2002 in response to concerns that the negative impacts would outweigh the benefits received.

A contract for the design phase of a rehabilitation of the channel from Beach Street to the ocean was awarded in June 2009.

Although channelization has been the method of choice and the County opted for an all-channel solution in 1981, a number of other approaches have been considered. A 1969 study by the U.S. Army Corps of Engineers to provide information for planning purposes spoke of guiding development by controlling the use of the floodplain through zoning, subdivision regulations, building codes, health regulations, flood protection works, or a combination of these.

Land Use Restrictions

A geological report on the Canyon Acres mudslides in 1969 recommended restriction of improvements in the area along with the design of a retaining structure.

In 1972 the Corps of Engineers wrote the County that it found “no economically feasible structural solution to the flood problem in Laguna Canyon” and recommended that the City pursue floodplain zoning—regulation of land uses to reduce flood damage. Some months later, in 1973, the County imposed floodplain zoning on the County-controlled portions of Laguna Canyon despite the objections of canyon residents and Laguna Beach officials.

The City adopted a flood damage prevention ordinance in 1980 (Zoning Code 25.38), allowing residents to qualify for subsidized flood insurance. The ordinance, using FEMA data, identifies areas of special flood hazard (of which Laguna Canyon is one) and establishes standards for any construction or alteration of structures in those areas, among them elevation above the base flood elevation, anchoring, use of flood-resistant materials and equipment, and the provision of drainage paths around structures on slopes.

A 1973 report on flood control alternatives for Laguna Canyon by the Orange County Flood Control District included as one alternative a combination of a larger-capacity channel downstream of the Big Bend and purchase of the floodplain upstream to El Toro Road.

Another of the alternatives discussed in the report was purchasing the entire watershed, a proposal championed by Jim Dilley and supporters of a Laguna greenbelt but dismissed as too costly (an estimated \$81,750,000) and possibly unsound in a county with a growing population. Today, of course, much of the watershed is in fact in public hands.

Although none of the alternatives reviewed were ever adopted, in 1977 the County proposed buying 35 acres inland of the GTE property (now the dog park) for about \$3 million, provided that the property owners agreed to sell.

While in 1968 the north side of Laguna Canyon Road to El Toro Road was zoned “medium-density residential” and the triangle between the two roads as “low-density residential,” the Land Use Element of the General Plan being prepared in 1974 shows these areas as “Preserved” and “Recreational.” The Open Space Element of the General Plan of the time included as a policy “The Laguna Canyon floodplain zone should be pre-planned to provide substantial and properly located open space to minimize flood damage and protect public health and safety.”

Dams and Retention Basins

The 1973 report mentioned above included eight alternatives, all but two of them including the extension of the concrete channel to El Toro Road and four of them proposing, in addition to the channel, a dam at the El Toro intersection, with or without check dams in the side canyons. All of the alternatives designed for a 100-year flood except the one that would purchase land included dams. The largest of these dams would have been 50–60 feet high, 600 feet long, 350 feet wide at the bottom, and 20 feet wide at the top and would have required relocating the road.

An EIR on the eight alternatives completed in 1975 concluded that Laguna Canyon flood control “did not appear to be of the utmost priority” and that the no-project alternative “should be given serious thought in view of economic considerations.” The consultants argued that floodplain zoning would make development difficult in any case and that property owners could be encouraged to take out subsidized flood insurance.

A 5.5-acre retarding basin at El Toro and Laguna Canyon Roads was suggested by the County in 1993 for inclusion the project to widen Laguna Canyon Road provided that the City would fund it. Such a basin was expected to benefit only “properties one-half to one mile downstream (the kennel and stable areas) because the upper Laguna Canyon watershed area is a small contributor to the overall storm flows experienced downstream.” The basin was estimated to be likely to reduce the statistical flooding “from a 2–3-year event to a 5–6-year event.”

The concept of runoff storage became part of the Safety Element of the General Plan, adopted in 1995, and was the subject of a hydrology report later that year that showed that the surface area necessary for retention basins that would give 10-year and 100-year flood protection was 88 acres and 259 acres, respectively, while the sites available for such basins totaled only 33.1 acres.

Controls Upstream

After the 1978 flood, the City Council adopted Resolution 78.28 urging the Board of Supervisors to (1) continue the channel to El Toro Road, (2) require future developers to restrict their runoff to less than existing, (3) require mechanical control of the Laguna Lakes to lower their level between rains, and (4) widen Laguna Canyon Road to two travel lanes and a traversable lane from south of the Big Bend to El Toro Road. In 1993 a temporary pipe was installed in Lake #3 to facilitate drainage, and Caltrans was contacted for engineering advice on the idea of pumping out the lakes.

Watercourse Protection and Restoration

In 1974 the Council passed an ordinance (Zoning Code 25.50.030) making projects that encroach into significant watercourses subject to special review and detailed design standards, including site planning requirements, setback provisions, and architectural review. The standards require a minimum 25-foot setback from the top of the bank of a blue-line stream, within which no development or disturbance of major vegetation is permitted. The Open Space/Conservation Element of the General Plan, adopted in 1984 and revised in 2006, establishes policies for the preservation and restoration of natural drainage channels, in part because “disturbance of these lands may create hazards such as flooding and mudslides.”

In connection with the planning for the Village Entrance project in 1991, the Planning Commission asked that stream restoration be considered. A hydrology report prepared in 1995 concluded that this could be done but at great cost in parking spaces and other land uses in the area, requiring an area about 85 feet wide to achieve the current capacity of the concrete channel. In 2005 a section of the creek adjacent to the dog park was planted with native riparian vegetation.

The Sarah Thurston Park Specific Plan, adopted in 1983, specifies that the ponding of storm runoff on the southern portion of Woodland Drive be ameliorated by a catch basin and associated underground storm drain pipe under the street connecting to the flood control channel and other alternatives including but not limited to “reestablishing the natural watercourse in the vicinity of the Boys’ Club property.”

Floodproofing

The 1969 Corps of Engineers report mentioned above comments that “many of the homes in the [Laguna Canyon] area are surrounded by low masonry fences with specially designed openings that may be closed off during a flood, leaving the fenced area as an

island within the flood plain” and includes photographs of boards placed between fence sections in the driveways of homes.

Similar floodproofing of structures within the Downtown Specific Plan area was required by ordinance in 1996 (Zoning Code 25.38.055). The ordinance specifies that, for additions, alterations, or remodels of less than 50% of the market value of the structure but more than \$5,000, a minimum of an additional 5% of the total remodeling cost shall be used to provide hinged and/or removable panels that can withstands the pressures of floodwater, protect windows subject to floodwaters, and apply sealants to other openings (in that order). Larger projects are subject to all the provisions of the flood damage prevention ordinance mentioned above.

Flood Protection Facilities in Laguna Canyon Today

The flood protection works in Laguna Canyon are today as they were described in a 1988 report by the Keith Companies for Laguna Canyon Channel Facility No. 102:

“The reach of Laguna Canyon Channel under study consists of improved and unimproved sections. The existing improved section extends from the Pacific Ocean to approximately 2.5 miles upstream along the canyon to the GTE facility. . . . The unimproved section extends from the GTE facility to the San Joaquin Hills Transportation Corridor. The natural channel varies in size from 20 feet wide at the bottom and 7 feet deep to 5 feet wide at the bottom and 3 feet deep. The capacity of the various reaches is discussed in the following section. . . . For purposes of this study, capacity is defined as the maximum amount of storm water the channel can convey before overtopping the channel walls or banks. . . .

Canyon Acres to 3,000 Feet North

“In this reach, a 5 by 9-foot and 4 by 9.5-foot trapezoidal channel with one-to-one side slopes has a capacity of 2,700 cfs before overtopping. This is considerably more than the design capacity of 1,840 cfs. The 2 feet of freeboard allows for this greater capacity. The four access bridges in this reach will also allow 2,700 cfs to pass without overtopping.

3,000 Feet North of Canyon Acres to the GTE Facility

“This section of the channel consists of a 12 by 9-foot RCC and RCB which transition to a 14 by 10-foot RCB at the Big Bend area. Because of the increased hydraulic losses at the entrances to the covered sections within this reach, the capacity is restricted to 2,200 cfs. Also, the transition from the 14 by 10-foot to the 12 by 9-foot RCB causes a hydraulic jump to occur which restricts the capacity within this section. The inlet to the

GTE facility is restricted to 1,840 cfs so that the downstream section will not be overtaxed. . . .

GTE Facility to San Joaquin Hills Transportation Corridor (Reach Two)

“In this reach the channel is unimproved. . . . From the GTE facility to 700 feet upstream the channel is grasslined with a 20-foot base width and a depth of about 7 feet and two-to-one side slopes. . . . The capacity in this reach is 2,000 cfs. Compared to the rest of the earthen channel, this section can carry a large amount of water. Upstream of this section the channel winds through many business areas and residential backyards. The channel is full of heavy brush and weeds. The capacity in this area varies from 400 to 600 cfs or approximately 7 to 10 percent of the 100-year discharge. The size of the channel varies from 10 to 15 feet in width and 2 to 4 feet in depth. North of El Toro Road the channel is about 5 feet wide and 3 feet deep with a capacity of 200 to 250 cfs. . . .

“The channel has an overall capacity from Beach Street to the GTE facility of 2,200 cfs, or approximately 28 percent of a 100-year storm. However, the reach from the ocean outlet to Beach Street only has a capacity of 800 cfs due to the inlet conditions at the Beach Street culvert. The capacity of the earthen channel in Reach Two varies from 200 to 600 cfs or 3 to 7 percent of the 100-year flow. . . .

Ocean Outlet to Beach Street (Reach One)

“This is the most deficient section of the improved channel system. . . . The 12 by 6-foot RCB which widens to a double 11 by 4.5 feet at Pacific Coast Highway has a capacity of 1,100 cfs. However, only 800 cfs can enter the culvert at Beach Street due to inlet conditions. . . .

Beach to Forest Avenue

“North of Beach Street to 30 feet downstream of Forest is a 14.5 by 7 to 10-foot RCC reconstructed in 1969. From 30 feet downstream of Forest Avenue to Forest Avenue is a 19 by 9-foot RCC. The capacity of this reach is 2,200 cfs. Flows greater than 2,200 cfs will overtop the channel downstream of Forest Avenue because of the reduction in width from 19 feet to 14.5 feet immediately downstream of Forest Avenue.

Forest to Canyon Acres

“There are two different sections of channel within this reach. The first section from Forest to 1,200 feet upstream is a 15 by 6-foot RCC. The design capacity is 1,840 cfs. However, including freeboard, the channel can carry up to 2,300 cfs before overtopping. The second section, from 1,200 feet upstream of Forest to Canyon Acres, is a 12 by 8-foot and 12 by 8.5-foot RCC. Nine access bridges crossing the channel within this reach constrict the flow to 2,300 cfs. Flows greater than 2,300 cfs will overtop the channel at the first bridge downstream of Canyon Acres. If improvements were to be made to this bridge, the water would overtop at the next downstream bridge. Improvements to all nine bridges would have to be made to increase the capacity within this reach.”

These facilities are variously owned and maintained. The culvert under Coast Highway belongs to Caltrans. Except for this section, the channel from the ocean to the upstream side of Beach Street is owned and maintained by the City. The section from Beach Street to the dog park is owned and maintained by the Orange County Flood Control District and is inspected regularly. From the dog park to El Toro Road the creek is on private property, and the maintenance of the natural channel is the responsibility of the individual property owners. Caltrans is responsible for the creek from El Toro Road to the toll road. There is a culvert under Laguna Canyon Road that often reaches capacity and sends water across both roads into the creek. The open drainage ditch that once existed on the north side of Laguna Canyon Road has since filled with silt and is no longer evident.

Major Flooding Events

RAINFALL IN INCHES

