Malibu Coastal Land Conservancy

Malibu Creek Bridge at Cross Creek Road
October 17, 2004 through January 10, 2004 Rain Storms

Malibu Creek Bridge at Cross Creek Road
Oct 17, 2004 through Jan 9, 2004 Rain Storms

The rains came early to Malibu. The first storm dumped 1 inch of rain into the Creek on October 17, 2005, 8 days after the deck had been poured. There was no damage to the bridge. False work that was supporting the deck during the concrete curing period remained in place. Water flowed under the bridge. On October 19th there was a second storm carrying **3** inches of rain. Again there was no damage and all water flowed under the bridge. The contractor recovered all the false work and the Arizona Crossing slabs that had been used on the creek bed to support the false work.

On October 26, 2004 there was another **2.3** inch storm The picture to the right was taken in the early morning of the 27th, just after the storm ended. By this time all false work had been removed and additional erosion control measures added. At that time it was anticipated that the Creek would not dry up until the late spring. The temporary water line was relocated; the K-Rails used for water diversion were removed and the construction access road for vehicles entering the Creek removed.

Note: All rainfall values are from the Los Angeles County Real Time Alert Rain Gauge 317 at Agoura in the Malibu Creek Watershed

The next set of storms began on December 28, 2004 and extended through December 29, 2004. **4.96** inches of rain fell. The ground was saturated and the soil was not absorbing the rain. The storm water over topped the bridge and carried lots of debris, much of it dead arundo. The picture on the right shows how high the water went over the bridge deck. The release mechanisms for the rails did not work as specified. At a lull in the storm on the 28th the local residents released the shear pins used on the down stream rails; collapsed any upstream rails that did not fold; and cleaned debris. The bridge was returned to service shortly after water dropped below the road way.

A much smaller storm (**1.56** inches) occurred on December 31, 2004. The road remained open.

Again on January 2 and 3 another storm deposited **3.6** inches of rain. The bridge was again over topped. By keeping the rails collapsed the damming phenomena experienced in the December 28, 2004 storm was avoided. After the water subsided the bridge was restored to service. The down stream West side bank experienced some erosion. The upstream West side bank experienced erosion around the filter. This has been filled in preparation for the next storm. The East side downstream bank is being carefully watched. Rip Rap was installed many years ago under a Coastal Permit. Some erosion occurred in the first storm close to the abutment. The area has been filled with gravel.

Rain within the Malibu Creek Watershed

The County of Los Angeles as part of their Alert system has installed automatic recording rain gauges throughout Los Angeles County. These stations have tipping buckets. When the bucket has 0.04 inches of rain it tips and the data is automatically transmitted. The raw data is then posted, with the data from all County Alert Rain Gauges, on the County Public Works Web site in close to real time. Alert Rain Gauge 317 located in Agoura has been used as the source for this report. Since October a total of **28.20** inches of rain has been reported as of the end of day **January10, 2005**. A second Alert Rain Gauge 319 in Monte Nido has recorded **33.80** inches of rain in the same period.

The following table provides daily rainfall data from Agoura.

Agoura Station 317	
Date	**Amount-Inches**
2004-10-17	**1.08**
2004-10-18	0.12
2004-10-19	**3.00**
2004-10-20	0.80
2004-10-21	0.04
2004-10-26	**2.32**
2004-10-27	0.24
2004-10-28	0.04
2004-11-20	0.16
2004-11-27	0.04
2004-12-05	0.48
2004-12-07	0.08

Agoura Station 317	
Date	**Amount-Inches**
2004-12-28	**3.88**
2004-12-29	**1.08**
2004-12-31	**1.56**
2005-01-02	0.76
2005-01-03	**2.84**
2005-01-04	0.08
2005-01-07	**2.20**
2005-01-08	0.08
2005-01-09	**3.62**
2005-01-10	**1.96**
Total	**28.20**

The bridge is returned to service in the morning of January 11, 2004 after **5.58** inches of rain

The rains keep on coming. A smaller storm measuring only **2.2** inches occurred on January 7, 2004. The railings are down and the bridge is ready for the raging water expected in a series of storms over the next few days. Notice the grass popping through the straw mat; the sycamores still in place; and the willows sprigs in the water. Unfortunately, time between completion of the bridge and stabilization by the bio-engineered erosion and vegetation planning was insufficient to properly protect the banks. The new storms continued on January 9 and 10 with **5.58** inches of rain. The expected storm on January 11 did not materialize. The pictures below taken on January 9th show the storm reaching the exit road level. Water over the bridge continued until morning on January 11th.

Water Flow within the Malibu Creek Watershed

A better indication of water problems in Malibu Creek is stream flow data. The County Stream Gauge at Cold Creek (F130R) collects data on about 95% of the water that flows into the Creek and Lagoon from the Malibu Creek Watershed. This data is available in 5 minute increments, but not in real time. Initial estimates are that the flow rates in the biggest storms were greater than the 8 year recurrence interval. The bridge is designed to pass 2500 cubic feet per second(cfs) beneath the road bed. The design criteria for fish passage provided by the National Marine Fisheries Service is a flow rate of 2000 cfs.

The maximum flow rate from October 2004 through January 2005 was 12,704 cfs (5.7 million gallons per minute) on January 9, 2005 at 10:53AM. The Creek overflows the banks at about 13,000 cfs. The Creek has overflowed its banks 3 times in the last 20 years.

The table below provides data for each storm showing when the flow began to exceed 2500 cfs, the time of the maximum flow and the maximum flow rate, the time the flow dropped below 2500 cfs and the amout of time the bridge was overtopped.

Flow rates at County Stream Gauge F130R – Cold Creek

Start – 2500cfs	Maximum Flow	Time	Stop – 2500cfs	Hours:Min
12/28/04 at 5:30AM	7,428 cfs	12/28/04 at 8:10AM	12/28/04 at 11:30AM	6
12/29/04 at 2:45AM	2,685 cfs	12/29/04 at 3:45AM	12/29/04 at 4:30AM	1:45
12/31/04 at 10:15AM	3,106 cfs	12/31/04 at 11:45AM	12/31/04 at 1:05PM	2:50
01/03/05 at 5:10AM	8,114 cfs	01/03/05 at 6:55AM	01/03/05 at 1:20PM	8:10
01/08/05 at 10:30PM	12,704 cfs	01/09/05 at 10:53AM	01/10/05 at 8:20PM	45:50
01/11/05 at 12:25AM	3,079 cfs	01/11/05 at 1:45AM	01/11/05 at 5:10AM	4:45

There were three storms in October, 2004. The maximum flow was 1,458 cfs.