



Error Analysis for Application of High Flow Suspension Using the 0.5" Rainfall Trigger In Engineered/Modified Flood Control Channels that are NOT Concrete-Lined

Using rainfall data and stream gauge data from five* unlined flood control channels, we computed the decision error rate for application of the high flow suspension when the 0.5" rainfall trigger is used as a surrogate for actual stream flow.

A false positive occurs when high flow suspension is wrongly triggered (e.g. rainfall exceeded 0.5" but the actual depth-velocity product remained below 10 ft²/sec). A false negative occurs if the high flow suspension is mistakenly not triggered when a hazardous condition truly exists (e.g. rainfall was less than 0.5" but the actual depth-velocity product was greater than 10 ft²/sec).

Results from combined analysis of 1,788 storm events, in five different channels, are summarized in the following table:

High Flow Suspension	Depth-Velocity Product		Total
	<10 ft²/sec	>10 ft²/sec	
Triggered	157	310	467
Not Triggered	1,007	314	1,321
Total	1,164	624	1,788

The 0.5" rainfall criteria triggered a high flow suspension in 467 (26%) of the 1,788 rainfall events. And, there was a 66% chance that the actual stream flow were, in fact, hazardous at the time (e.g. exceeded the 10 ft²/sec threshold).

Stream flows were considered "safe" (e.g. <10 ft²/sec) in 1,164 (65%) of the 1,788 rain events. The high flow suspension was incorrectly activated by the 0.5" rainfall trigger in 157 of these 1,164 cases. Therefore, the false positive error rate is only 13.5%. However, the average Depth-Velocity Product (DVP) was greater than 4 ft²/sec. Such flows would probably not be safe for children even though the actual stream conditions do not meet the flow-based trigger criteria.

The 0.5" rainfall trigger is far more likely to underestimate the real-world hazard. Unsafe stream flows occurred in 624 (35%) of the 1788 rain events. However, the high flow suspension was only activated on 310 (50%) of these 624 occasions. Thus, the false negative error rate was also 50%. The surrogate rainfall trigger is four times more likely to NOT activate the HFS during true hazardous conditions than it is to incorrectly activate the HFS when actual stream conditions do not warrant the exemption.

* SAR-Reach 3, SAR-Reach 4, San Jacinto River, Perris Valley Channel and Salt Creek