

## **An objective review of the science that SJRA has stated is the basis for renewing the Lake Conroe seasonal lake lowering program**

**Executive summary** – the Freese & Nichols study assessed the impact of a 100 and 500 year rain event on the recommended water discharge rate from Lake Conroe with either no lowering from the normal pool level of 201' MSL or a 2' to 3' lowering of the pool level resulting in starting levels of 199' MSL and 198' MSL respectively.

### **Key Conclusions:**

In both cases of a 100 year and 500 year rain event the water level rise at the end point of the study model (the junction of I45 and the West Fork San Jacinto River) showed a decrease of 9-10" in the flood water height due to the lowered lake level of 2' and starting level of 199' MSL.

This 9-10" difference (rounded to 12" in the F&N report) is a reduction in the total estimated flood level of 8 feet in the 100 year storm event and 12 feet in the 500 year storm event.

**These 9-10 inches are a very small reduction of total flood rise level in both storm events.**

Using the exact numbers from F&N the reduction in the 100 year storm event is 9.4% (9 in / 96 in which is 8FT) and for the 500 year storm event is 6.67% (9.6 in / 144 in which is 12 feet).

**These reductions of 6-9% of the flood height due to 2 feet of lake level lowering were assessed by F&N as "generally not enough to be considered wholesale improvements to the flood hazard and show minimal differences in spatial extent." Direct quote from F&N study** (note spatial extent means spread of flood water)

**Study deficiencies or key factors that further support the lake lowering program offers no material flood improvement downstream of the dam.**

The study did not model the flows beyond I45 to Lake Houston which is another 25+ miles further south and 157 feet lower than Lake Conroe. It would be expected the flood water will spread out and the water height will further decrease as it flows into the southern West Fork watershed. It is reasonable to expect a further reduction of 35-65% or more in the flood water height depending on downstream rainfall.

In all cases of major rain events (those likely to cause downstream flooding) significant flow discharges must be made to protect the Lake Conroe dam. The storage capacity and duration that water can be held is minimal in a heavy rain. Only in a very brief and low rainfall event at Lake Conroe can the SJRA hold back and not release water. **Zero releases would be very rare.**

The reductions in Lake Conroe water flows from the F&N study estimated releases in both storm events and were only 8-9% less water flowing into the West Fork. Compared to Harvey flows these lower flow rates (7,000 cfs to 11,000 cfs less) would have meant **only about 2-3% less peak flow into the Lake Houston basin.** The 500 year event rainfall in the model is very close to Lake Conroe rainfall during Harvey and validates the 2-3% incremental flow estimates

*This full summary addresses the November 2019 SJRA press release comments on the “science” behind the lake level lowering program and the Freese and Nichols Conroe Dam Gate Operations Modification Analysis Report - all of which can be found on the SJRA website.*

## **Full Summary and Details**

On April 18, 2018 Freese and Nichols (F&N) published the results of their engineering study requested by the San Jacinto River Authority (SJRA). The study evaluated the impact of the beginning water level of Lake Conroe prior to two types of major rainfall events – one called a 100 year event (1% probability to occur in a given year) and a 500 year event (.02% probability to occur in a given year) which would be similar to the rainfall that fell during Hurricane Harvey. Using three different beginning lake levels – normal at 201’ MSL, 2’ below normal at 199’ MSL and 3’ below normal at 198’ MSL F&N estimated the impact on several key parameters, such as the rise rate and highest lake level, the recommended dam release rate and duration, and the subsequent increases in water levels in the San Jacinto River channel at the boundary of I-45.

**F&N Study Conclusions** – (direct quotations from F&N study in bold blue italics and the analysis and interpretation produced by the Lake Conroe Association is in bold black font)

***“This analysis shows the reduction in normal pool elevation does provide some benefit to areas upstream of Lake Conroe for flood events.”***

**In all cases studied, including the normal lake level of 201’ MSL, the highest water levels on Lake Conroe never exceeded the typically defined safe operating level of the Lake Conroe Dam of 207’ MSL in either the 100 or 500 year rain event.**

The peak water level of the lake, in the event of a 100 year storm, when starting at the normal pool level of 201’ MSL does not exceed 205.1’ MSL and is only 6 inches higher than in the case that the lake is drained and held at 199’ MSL. Lowering of the lake by two feet only gives six inches of headroom and is not needed to avoid lake flood levels. **It should be concluded that there is no real benefit from the current lake lowering program in preventing flooding on Lake Conroe in the event of a 1 in 100 year storm. The long history of our non-flood lake levels during significant rain events would bear out this conclusion.**

In the case of a 500 year storm event peak lake levels are the same regardless of the starting lake level and reach approximately 205.7’ MSL, approximately one foot below the 207’ MSL safe operating level of the dam. Dam water release levels in the normal pool level case of 201’ MSL are only 26% higher than in the 199’ MSL level case and represent a very modest flow volume of about 11,000 cfs. **It can be concluded from the F&N study results that even in the case of a 500 year event peak lake levels do not vary whether the starting lake level is at normal or reduced by 2 feet. Even starting at the normal level, the peak level will not exceed safe operating levels for the dam assuming moderate water releases from the lake.**

In all cases water must be released and cannot be held back in order to keep the dam safe and avoid over topping and an uncontrolled water release to the San Jacinto river. This conclusion and result are consistent with the Hurricane Harvey experience where releases were not made until the dam was at risk and then the volumes released were at unprecedented rates – 79,000 cfs which is well above the F&N study recommendation.

Key question - Do the recommended releases in the F&N study have a significant impact on downstream flooding? Their answer is found below.

*The average change in downstream water surface elevation for a normal pool elevation of 199 ft-msl is a reduction of approximately 1.0 feet for both the 100-year and 500-year storm events. These reductions are relative to flows that are on average 8 feet above the channel banks in the 100-year event, and more than 12 feet above the channel banks in the 500-year event. The benefits to those downstream, though the water surfaces are reduced by a foot or more in places, are generally not enough to be considered wholesale improvements to the flood hazard and show minimal differences in spatial extent. (note spatial extent means spread of flood water)*

The F&N study concludes that the lake lowering program offers no “wholesale improvement to the flood hazard and shows minimal differences in the spatial extent” of the downstream river basin area flooding. A reduction of 9-10 inches is not material compared to 8-12 feet.

It should be noted that the rise in river level estimated at I45 by F&N not only includes the water contributed by the releases from Lake Conroe Dam but also from water flowing from Lake Creek. In all cases studied by F&N the uncontrollable flow from Lake Creek was anywhere from 2.5 to 4 times greater than the water releases and flow from the Lake Conroe Dam.

Our conclusion, consistent with the F&N study, is that the SJRA temporary seasonal lake lowering program of two feet in August and September does not materially reduce the flood risk for Lake Conroe nor materially reduce the impact of downstream flooding in either a 100 year or 500 year event.

Lake Conroe Association