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Seattle District - U.S. Army Corps of Engineers  
PO Box 3755  
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Feb. 3, 2017

**RE: Corps Review of Impacts of Proposed Floodway Alterations - Sammamish River**

WA Sensible Shorelines Association (WSSA) is an organization formed to represent shoreline property owners in the region. Our interests include assuring achievement of sound environmental goals and protection of property.

WSSA is contacting this office regarding Lake Sammamish; in particular its water levels and impacts thereto from reduced flood protection originally assured by the Corps' project in the Sammamish River. WSSA, its members, and shoreline residents have been involved for nearly a decade in bringing attention to this matter. We continue that effort with this correspondence<sup>1</sup>.

**BACKGROUND**

The Corps will soon receive preliminary plans from King County for modification of this flood control project. This effort, known as the Willowmoor Project (Willowmoor), proposes to make changes to the floodway (aka Transition Zone or TZ) at Marymoor Park, as well as the weir - the control structure ahead of the TZ.

WSSA was represented on King County's recent "interested parties" input committee as part of preliminary planning for Willowmoor. WSSA includes as Attachment #1 it's key comments provided to the County.

Retrospectively, in a 2004 study<sup>2</sup> of water levels on Lake Sammamish, the City of Bellevue found that the Ordinary High Water Mark (OHWM) had been substantially raised from that which the Corps's project provided for some 40 years following construction.

Recently, County studies, conducted as part of Willowmoor Project planning, acknowledged a primary reason for this shift was poor maintenance of vegetation<sup>3</sup>. Most important, that vegetation had been placed on a trial basis in the floodway in the 1990's.

Despite warnings from the Corps to the County in the early 2000's that lack of maintenance was impacting Lake Sammamish water levels and would cause flooding, it took lake resident involvement circa 2009 to bring attention to the impacts these changes had imposed.

Unfortunately, renewed maintenance efforts by King County have not mitigated the effects of earlier, reduced maintenance. Our report provides comparative data underlining this fact.

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<sup>1</sup> Please include the input provided here and our prior comments as part of the record for the flood protection project.

<sup>2</sup> ["City of Bellevue OHWM Study - Final Report", The Watershed Company, 2004.](#)

<sup>3</sup> "... It is interesting to note that nearly 90 percent of the events where the lake has exceeded 29 feet NGVD (32.6 feet NAVD) since 1964 have occurred since 1989, when annual TZ maintenance was discontinued.", [Willowmoor Restoration Design Hydrology, Phase 1 – Hydrologic Characterization](#), King County, 2013.

## ISSUES AT HAND

WSSA writes now to request that the Corps exercise its authority and responsibility to assure that the proposed Willowmoor Project's design clearly assure that historic water levels will be returned so as to reduce damages to our properties and the lake environment. Key considerations include the following.

### **1. Do the Weir & TZ Respond to Existing Conditions?**

**Our report demonstrates, using agency provided data, that the weir and TZ, despite enhanced County maintenance, do not adequately manage routine, high level flows arriving to the lake. Further, a gate-like structure replacing the static weir would have environmental as well as flood protection benefits.**

WSSA provides in Attachment #2 a report demonstrating the need for the floodway to be adjusted in some manner to accommodate in-flow to the lake. As reflected in Attachment 1, we have previously suggested to King County a change be made to the weir to make it dynamic to better manage in and out-flows and thereby better regulate lake levels. A more flexible structure would allow lowering the lake in advance of wetter periods. And, during drier/warmer periods, out-flow could be reduced to store water for release when salmon runs begin.

### **2. How Will Willowmoor Impact Our Shorelines?**

**The impact of proposed changes to the floodway must be on anticipated impacts to lake shores, not simply forecast water levels at the weir/TZ.**

Decisions regarding Willowmoor's effectiveness in resolving raised lake levels will be made based on computer models prepared by County consultants. These models should report anticipated water levels on the lake, not just downstream at the weir. Agency data shows substantial difference exists between actual levels reported by gages on the lake versus those at the weir. These differences range from 4 to 6 inches on average; often higher<sup>4</sup>. This difference needs to be taken into consideration during design.

### **3. What Is the Impact of Obstructions in the River?**

**The Willowmoor Project should be a first step in assuring the Sammamish Flood Control project is returned to flood protection standards. At the least, an assessment should be made of the impacts of obstructions in the river and corrective actions should be added to Willowmoor.**

In 2008 the Corps inspected the entire Sammamish River Project, found it did not meet flood control standards, and declared it ineligible for federal funds. To date there has not been a comprehensive effort to identify actions needed to restore the project to an active status.

Provided below are pictures of typical deficiencies present in the river between the lake and the TZ. These appear to be reducing the out-flow capacity from the lake thereby contributing to lake flooding. If so, the obstructions should be removed as part of the Willowmoor Project.

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<sup>4</sup> Lake Sammamish's [USGS Gage 12122000](#) provides data for comparison to levels reported at the TZ via [County Gage 51m](#).

## Typical Obstructions - Headwaters of Sammamish River Flood Project



Obstructions Along Sides of Channel



Obstructions In The Channel

### CONCLUSIONS

WSSA has provided these comments in a continuing effort to encourage the Corps of Engineers and King County to resolve long standing water level and flooding issues on Lake Sammamish as part of the Willowmoor Project.

The above information shows that:

- (a) In its current condition, the floodway at Marymoor does not adequately respond to today's conditions and results in water levels that have raised the OHWM (Ordinary High Water Mark ) above the level provided by the Corps' project;
- (b) Evaluation of Willowmoor should be based on anticipated lake levels, not water levels at the weir; and,
- (c) To be comprehensive, impacts from obstructions in the river need to be assessed and needed maintenance included in Willowmoor and revised maintenance agreements.

WSSA has endeavored to provide productive input to the Corps and County in an effort to assure prudent expenditure of tax payer dollars. With preliminary estimates that the Willowmoor Project will exceed \$10 million, it is critical that it correct deficiencies that have shifted lake levels higher, that also cause periodic flooding, and that have negated the benefits of the original river flood protection system.

In a recent presentation by King County Council member Claudia Balducci to Bellevue's Council, she acknowledged what Willowmoor should accomplish, stating<sup>5</sup> -

*"The Flood Control District is moving forward with the Willowmoor Project to reconfigure the outflow between Lake Sammamish and the Redmond area at Marymoor Park. The failure some years passed to maintain the area was contributing to major flooding along Lake Sammamish shorelines."*

In addition to flood protection, WSSA points to the essential companion objective of insuring improved lake water level control. To this end, we have recommended several features that should be incorporated to Willowmoor's design such as a dynamic weir, and completion of deferred maintenance from the river's headwaters through the length of the Transition Zone.

WSSA asks that the Corps assure WSSA is a party of record to the Willowmoor Project review process prior to issuance of any permits allowing changes to the Sammamish River Flood Control Project.

WSSA thanks you for your attention in this matter. Your acknowledgement of receipt of this correspondence is requested.



Laurie Lyford, Board President  
WA Sensible Shorelines Association  
Post Office Box 6773  
Bellevue WA 98008

CC: King County Flood Control District  
Cities of Bellevue, Redmond, Issaquah, and Sammamish

Attachments: #1 - Key Lake Sammamish Water Level Issues  
#2 - Update On Lake Sammamish Water Levels, Impacts, and Options



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<sup>5</sup> City of Bellevue, Extended Study Session, Item 16-414, County Council Briefing, Nov. 28, 2016.

**Attachment #1**

## Key Lake Sammamish Water Level Issues WSSA - Feb. 2016

Lake Sammamish shoreline property owners face a series of issues with respect to water level impacts to their properties. These issues and key information are presented below by answering a series of questions. This information has been prepared by members of WA Sensible Shorelines Association.

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**Question 1: By returning to annual maintenance in 2010-2011 and removing half of the accumulated sediment in the Transition Zone (TZ), didn't the County resolve lake level issues?**

**Response: No.**

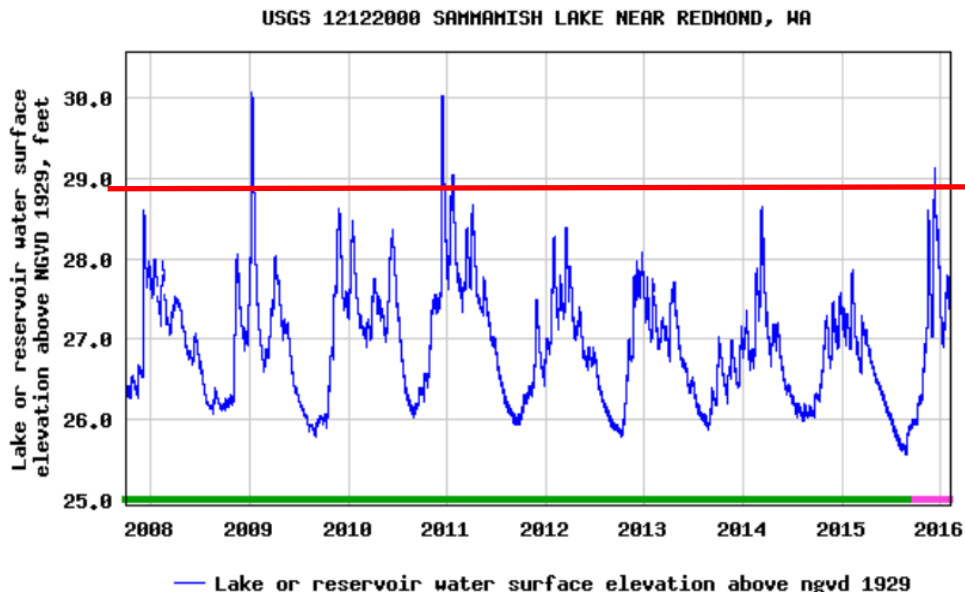
Current, day-to-day lake levels, reported by USGS, exceed historic values. This has resulted in an artificially raised OHWM (Ordinary High Water Mark/Level) which penalizes shoreline property owners. As explained below, the Corps of Engineer's (Corps) OHWM should be in use until the flood control project is returned to conditions and outflows which were maintained for more than 30 years.

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**Question 2: Isn't the flood control channel at Marymoor Park meeting flow requirements?**

**Answer: No. The County's computer models show that at very high lake levels, design flow might be achieved. But recent lake levels show that flows are reduced compared to expected flows.**

The Corps of Engineer's designed the Marymoor weir and floodway (called the Transition Zone) to pass a certain flow in an extraordinary storm. The Corps' storm was one anticipated to occur "once in 10 years". And, they forecast that such a storm would produce a lake level of 29 ft.<sup>6</sup> The **red line** in the following graph indicates how infrequently the lake is raised to this level. It's the more common, lower lake levels that are impacting properties on the lake more and more often. Why is this?



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<sup>6</sup> The design was carried out under the 1929 NGVD29 datum. That was changed in 1988 to the NAVD88 datum. A level reported in 1988 is actually 3.6 ft. higher than a 1929 level. Often the two are confused, so one must be certain which is being quoted.

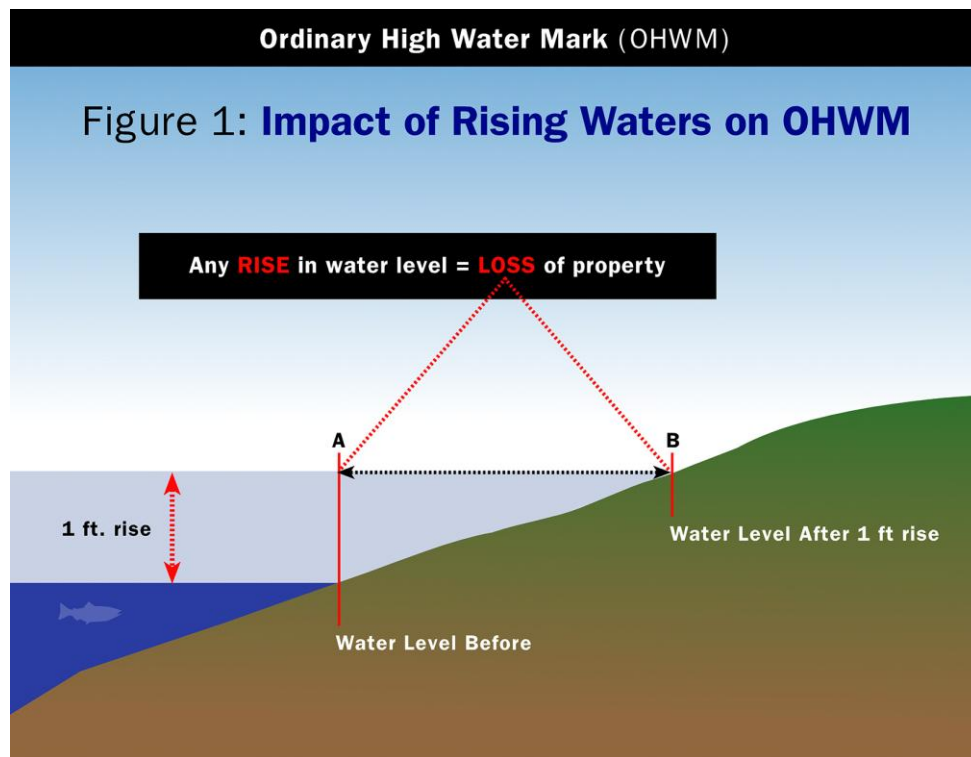
Floodways, such as at Marymoor, must be maintained or they will not function properly. If not maintained, extended periods of raised water levels occur. As bad, there will be less storage capacity available in the lake should a rare storm occur.

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**Question 3: Shouldn't residents be more concerned about rare, severe storms than day-to-day conditions?**

**Response: Quite the contrary. Improvements such as docks are legally built to a lower level and will be submerged and destroyed at a lake level of 29 ft. and erosion will occur.**

Adequate flow is not occurring at lower lake levels. The result of over a decade of poor maintenance has been a shift higher in the Ordinary High Water Mark (OHWM). Slower outflow results in water being retained and the lake rising. Left at elevated levels for extended periods, the OHWM has been shifted upland onto private properties. Since the OHWM is the boundary for shoreline parcels, this results in a "taking" of property. Figure 1 illustrates this.



Beyond the "taking" of their property by this shift in OHWM, residents also witness major damages to improvements they've placed along the shore, such as to docks and bulkheads.

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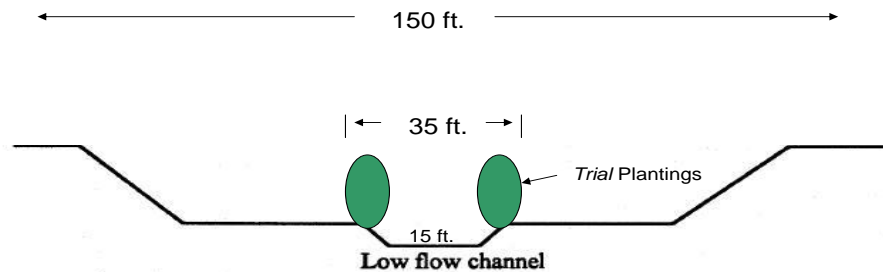
**Question 4: Is the County justified in stating their current level of maintenance of the TZ is costly?**

**Response: No. The County failed to provide agreed upon annual maintenance for more than a decade. This resulted in higher costs in order to correct accumulated deficiencies. AND, the County and State agencies have required costly mitigation for what should have been routine maintenance.**

Recent costs have been unreasonable for the following reasons:

(1) Ironically, in the late 1990's the Corps agreed to **trial** placement of a narrow, 10 ft. wide strip of tall vegetation on either side of the center, low flow channel in the TZ floodway. This was to provide shade for passing fish and is illustrated in the next figure.

### 1990's Corps Agreed to Trial Plantings



(2) But the County did not adequately maintain this vegetation for years, and, with resulting excessive growth and accumulation of debris, then began imposing costly mitigation on needed maintenance actions. (Note: the current width of vegetation is in excess of 80 ft. in the channel.)

(3) The Corps prepared its own Biologic Assessment (BA) and found that maintenance should not require mitigation.

(4) As important, the Corps repeatedly warned the County that the "trial" vegetation was reducing outflow; even asking that the County to forewarn the public of the consequences, namely higher lake levels and flood damages.

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**Question 5: Will maintenance of the TZ be carried out annually now and after construction of the Willowmoor Project?**

**Response: No, not according to the objectives listed for the Project.**

A primary project objective (listed by staff to the Willowmoor Advisory Committee) is the elimination of maintenance of the TZ - due primarily to cost concerns. Maintenance would only occur to replace new native vegetation placed along the new fish stream.

Decision makers should ask that annual maintenance be carried out in the floodway/TZ. AND, it should be kept in mind that recent maintenance has not been sufficient to allow the TZ to pass adequate flow levels. The result has been raised water levels, and an OHWM shifted higher onto private properties. Only with consistent, robust annual maintenance will outflow be sufficient to assure the OHWM is returned to normal, historic levels.



**Question 6: When deciding to live on the lake shore, shouldn't residents have understood the OHWM would naturally shift higher over time?**

**Response: Historic data plus recent studies during the Willowmoor planning process show the shift has not been a natural change.**

For 30 years after construction of the flood control system by the Corps, lake levels, on average, did not exceed 27 ft. (1929 datum) more than 60 days per year. Following placement of the trial vegetation, that changed dramatically rising to more than 250 days in 2010 as the Corps forewarned.

Actions taken by the County, given pressure by shoreline residents, began reducing this measure of performance, but it has not been returned to the earlier pattern (and the Willowmoor Project does not anticipate returning to it.) That is why residents insist on completion of maintenance (including removal of remaining sediment, overgrowth, and other flow blockages.)

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**Question 7: Impacts to shoreline properties really have not been that excessive, have they?**

**Response: They have exceeded a million dollars or more per year.**

WSSA polled a sample of lake residents about damages that they've suffered under raised water levels. Of 220 respondents, 84% reported definable losses amounting to more than \$1 million per year. The diagram below indicates the type of losses suffered and proportion of people affected.



**Question 8: Hasn't the lake's OHWM been authorized to change by permits?**

**Response: No one has issued a permit to raise the OHWM on Lake Sammamish.**

WA RCW calls out the following definition of the OHWM (emphasis added) -

*" (The) Ordinary high water mark" on all lakes, streams, and tidal water is that mark that will be found by examining the bed and banks and ascertaining where the presence and action of waters are so common and usual, and so long continued in all ordinary years, as to mark upon the soil a character distinct from that of the abutting upland, in respect to vegetation as that condition exists on June 1, 1971, as it may naturally change thereafter, or as it may change thereafter in accordance with permits issued by a local government or the department: PROVIDED, That in any area where the ordinary high water mark cannot be found, the ordinary high water mark adjoining salt water shall be the line of mean higher high tide and the ordinary high water mark adjoining fresh water shall be the line of mean high water.*

Some staff have cited the above definition, construing it to mean that building permits issued by a jurisdiction allow the OHWM to be raised. They don't. Issuance of permits connotes that actions to be taken under the permit will meet certain standards and that there has been sufficient analysis of the proposed actions to assure this. No such evaluation has occurred, to the public's knowledge. In addition, permit processes require a public disclosure process. No public involvement has occurred.

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**Question 9: Will completing maintenance, as requested by lake residents, result in downstream flooding?**

**Response: Completing maintenance will avoid the potential of flooding both downstream in Redmond and on lakeshore properties.**

As noted above, flow at lower lake levels (26 to 28 ft.) is being impeded by remaining overgrowth and sediment. In addition, similar blockages are evident downstream AND the County reports that Bear Creek has been allowed to bring in more flow than the Corps designed for.

By improving flow at lower lake levels, there will be earlier draw down of lake waters, and thus, more capacity in the lake and without raising its water level excessively. But, if there are downstream issues, then a full evaluation of the river basin should be undertaken before any changes are made by Willowmoor or other projects.

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**Question 10: Aren't lake residents opposed to the Willowmoor Project?**

**Response: Not true.**

Residents' primary concern is that the opportunity to correct accumulated deficiencies be included in Willowmoor along with the assurance of robust maintenance going forward.

Improvements to habitat, creation of a secondary fish stream, or cooling of river waters are fine, if properly evaluated/justified and engineered.

**Attachment #2**

**Update On Lake Sammamish Water Levels, Impacts, and Options**  
**M. Nizlek, PhD for WA Sensible Shorelines Association**  
**January 2017**

**Background and Issue Summary**

The following information is intended to support WSSA and shoreline property owner concerns that the Transition Zone (TZ) at Marymoor Park has not been fully restored to the Corps of Engineers (Corps) flood protection project's original flow capacity and characteristics. As a result, Lake Sammamish water levels have been raised and have resulted in extended periods above the Corps' intended OHWM of 27 ft. NGVD.

WSSA has proposed that the weir, located at the beginning of the TZ, be made more dynamic so that flows can be better managed - increasing outflow to protect the Corps' OHWM goal, thus minimizing flooding, damages to property improvements, and impacts to the shoreline environment.

The following report illustrates that the weir & TZ are not adequately responding to in-flows to the lake.

**What Has Been the Pattern of Lake Water Levels?**

Historically, Lake Sammamish water levels remained at or below a level of 27 ft. (NGVD) for the bulk of the year. On average, for the first 40 years after construction, lake levels did not exceed 27 ft. for more than 60 days (2 months) each year. In the 1990's vegetation was placed along the edges of the low flow, center channel. Soon there after, King County ceased required annual maintenance. By 2010 the lake remained over 27 ft. for more than 200 days. Through persistence of residents, King County renewed annual brush trimming in 2011. The next year the County removed accumulated sediment, but only for half the length of the TZ. The net result has been an average annual period of 120 days per year above the 27 ft. OHWM; not the desired target of 60 days per year. And, unfortunately, the Willowmoor Project only aims to reduce the value to 90 days per year.

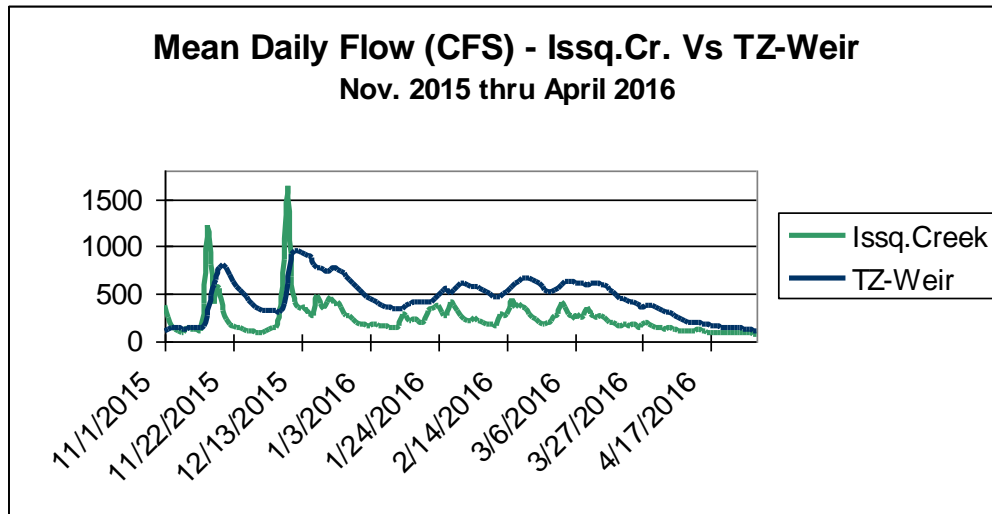
**Example Impacts and Damages to Shoreline Properties**



**How Is The Transition Zone Operating Today?**

WSSA members have monitored lake in and out flows as well as resulting lake levels using information from both County and US Geological Survey (USGS) resources. The following figure reflects the most recent, agency approved, information on flows into and out of the lake. Since Issaquah Creek is the

primary inflow point, carrying 50-60% or more of storm waters, one would expect the weir/TZ to be able to handle such input. The Corps flood project design engineers had Issaquah Creek information in hand when they were designing the flood control project. Logically, they would have wanted the flood channel to handle routine, heavy flows as shown here.



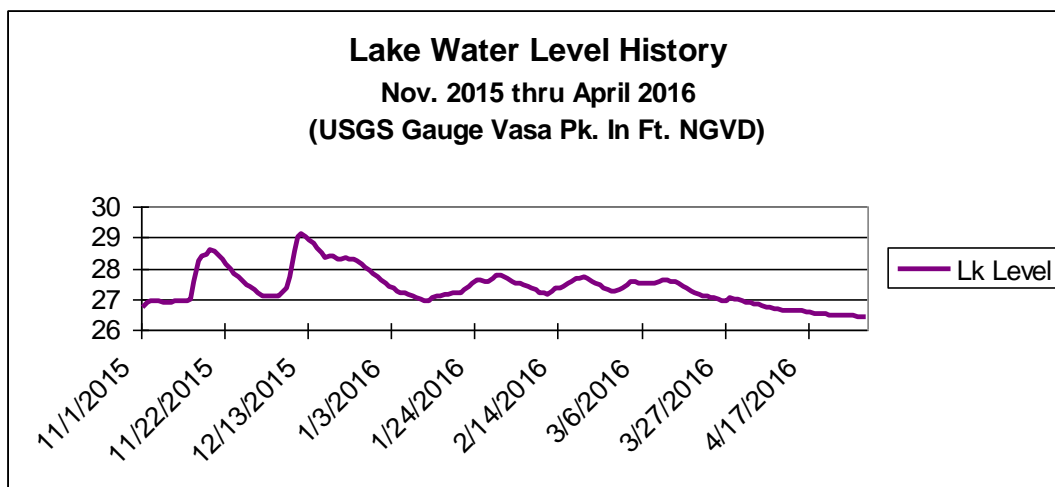
(Source Data: IssCreek - USGS gage 12121600; TZ - County gage 51m)

Facts reflected above include the following:

- 1) During the start of Water Year 2016 (i.e., Oct. 2015), two rainfall events occurred that resulted in Issaquah Creek exceeding an average daily flow of 1200 cfs (cubic feet per second).
- 2) But, in response to these two heavy inflows, flow at the weir into the TZ never reached 1000 cfs.

### What Impact Did This Have on Lake Levels?

The next figure displays the lake water level pattern during the period reported above.

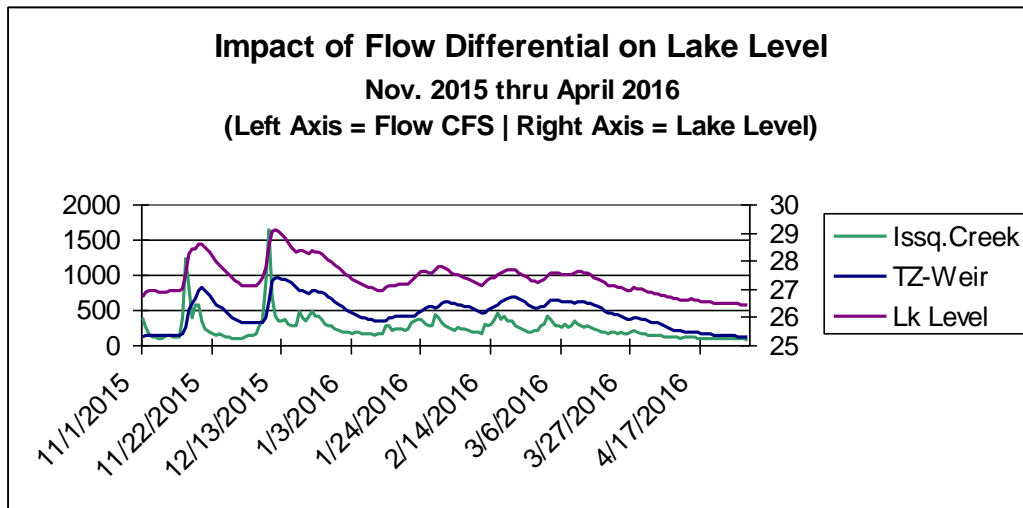


(Source Data: Vasa - USGS gage 12122000)

Observations that can be made here include:

- 3) Initially the lake had been under 27 ft. (NGVD). In November and December it rose above 28 ft., and peaked at more than 29 ft.
- 4) Except for a short period in early 2016, the lake remained at or above 27 ft. for more than 120 days into the spring.

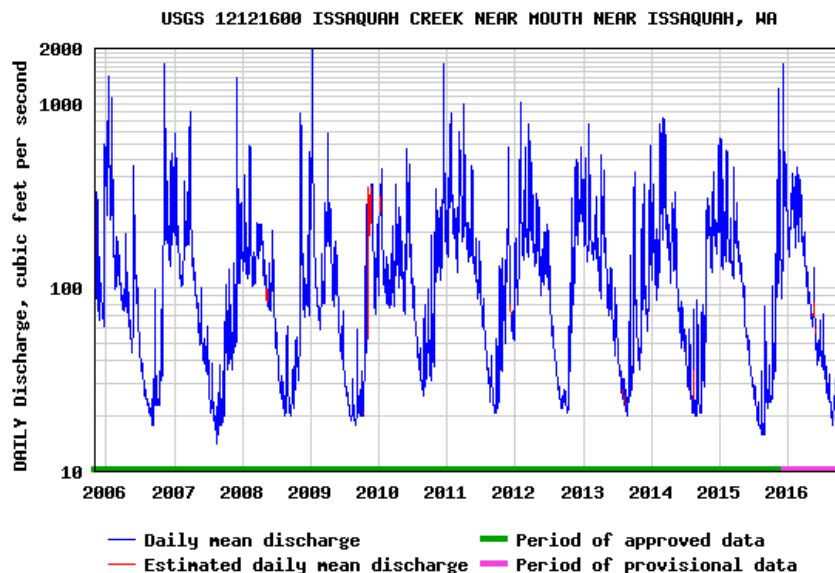
To aid in interpreting the chronology of these patterns, both graphs have been combined in the next figure. It emphasizes that Issaquah Creek has, even more than expected, a major impact on lake levels via such events.



(Source Data: As noted above)

### Does Issaquah Creek Often Witness Flows in Excess of 1000 cfs?

USGS data, shown in the following figure, indicates that over the last decade the Creek has witnessed flows of 1000 cfs or more on nearly an annual basis.



## **Conclusions**

Lake water levels have not been returned to patterns which existed prior to deferred maintenance.

Regular rainfall patterns expose the lake to heavy direct flow from its major tributary.

The weir and TZ appear unable to respond to such events so as to mitigate lake level impacts.

As a result, instead of an historic pattern of two months with levels over 27 ft. (NGVD), even with increased maintenance levels remain above this standard for 4 months.

Lacking the ability to control in-flow to the lake, it is logical to recommend increased outflow capacity whether through a dynamic (gated) weir, some other modification, or removal of obstructions.