

RE: Request for Maintenance Actions and Project Criteria

WSSA (WA Sensible Shorelines Association) is represented on the County Willowmoor project and, over the last several years, has been an active voice, through its members, in seeking resolution to ongoing issues with lake water levels and property flooding. This correspondence expresses our continued concern with both subjects and urges the County to move forward this year to complete sediment removal from the Transition Zone (TZ) at Marymoor Park.

In addition, WSSA finds a series of facts and information in the Willowmoor studies to date and in earlier information that need to be considered in selecting and evaluating project alternatives.

SUMMARY

WSSA recognizes the desire of the County to restore habitat in the Sammamish River through the Willowmoor Project. However, our ability to be supportive must be coupled with assurance that historic water levels and outflow conditions will be restored and maintained. The project H&H (Hydrology & Hydraulics) report documents both the history and need for the project to achieve this. In addition, it is evident that routine maintenance, in the interim, should include completion of removal of several feet of accumulated sediment and debris in the TZ.

BACKGROUND FACTS AND INFORMATION

Most immediate, we find that **partial sediment removal** and the recent return to routine maintenance appear to have been beneficial to lake water level management. Statements by staff and County consultants support this observation. However, given the length of time until fruition of the Willowmoor project, we request the County complete sediment removal in the remainder of the TZ as soon as possible. This should include complete removal of the log(s) and willow root balls that block the center channel behind the fish resting pool at the weir.

We supply the following information to support the above request and to guide the Willowmoor project as it moves forward.

1. Design Storm - The ACOE intended the lake not to exceed **29 ft. (NGVD) under 10 year annual design storm** conditions. This level needs to be clearly acknowledged and specified in the Willowmoor project objectives and related documents.

2. Design Flow - The consultant H&H report in Figure 10 (inserted below) shows **Issaquah Creek** historically and regularly has contributed inflows of 1500 cfs. This information was available to the ACOE in the 1960's and they most likely used it to establish their original design criteria. Obviously, **1500 cfs should be specified** in the Willowmoor project documents and used to guide project alternatives and their evaluation.

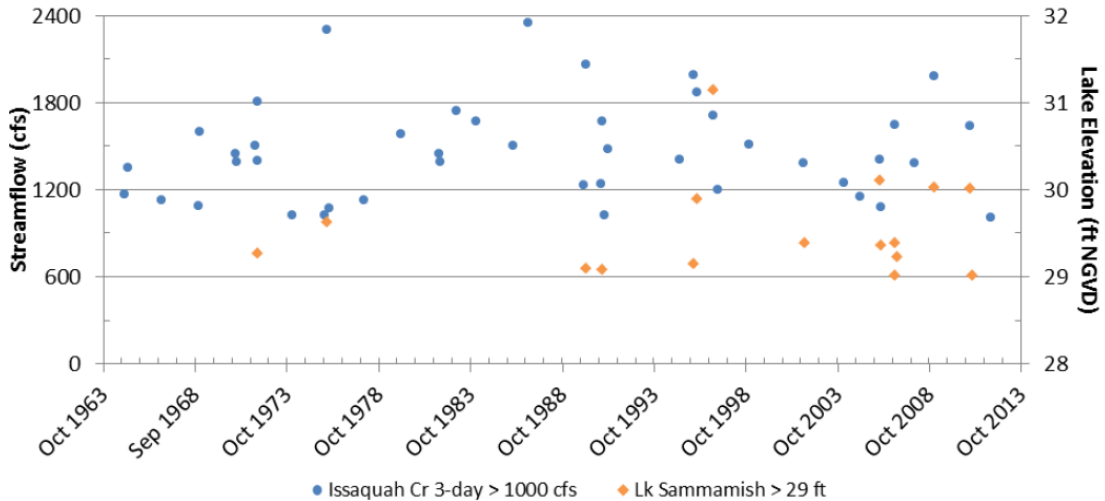


Figure 10 - Comparison Issaquah Creek flow events and Lake Sammamish stage (H&H pg 25)

3. Deferred Maintenance - Following reconstruction of the weir in 1998, the ACOE permitted **trial placement of limited vegetation** in a 10 ft. wide strip on either side of the low flow channel. Within several years the ACOE warned the County that vegetation and lack of maintenance had become problematic, noting that -

“... While the Corps supports your concern for providing for fish habitat, we are also constrained by flood control requirements and the safety of people for whom we are providing protection¹... the transition zone in the Sammamish River was not designed to accommodate extensive vegetation, and may compromise the flood control effectiveness of this operating project. ... our preliminary assessment indicates the existing vegetation does cause higher lake levels... the project will likely not meet it’s authorized design performance criteria. ... King County should advise the public of repeated and potential adverse impacts to lake elevations.”²

King County's hydraulic consultant reports an upward trend in lake levels since construction of weir modifications in 1998; stating -

"... there has been a coincident increase in moderate lake levels as well. The duration of lake levels exceeding 27 feet NGVD (30.6 feet NAVD) since 1998 is about 50 percent higher than the long-term average, and statistical tests indicate that post-1998 lake levels are distinctly different from pre-1998 levels.³

The trend reported by the consultant H&H was made clear in Figure 7 of their report⁴ as reproduced here with trend lines added.

¹ Attention is brought to this statement as an indication that the Corps' project provides flood protection to residents upstream of the project (i.e., on Lake Sammamish.)

² Communication from B. Applebury, ACOE Chief, Operations Division to N. Hansen, Manager, King County WLRD, 1999

³ "Willowmoor Restoration Design Hydrology Phase 1 – Hydrologic Characterization", NHC, 2013, Pgs. 28-29

⁴ "Willowmoor Restoration Design Hydrology Phase 1 – Hydrologic Characterization", NHC, 2013, pg. 19

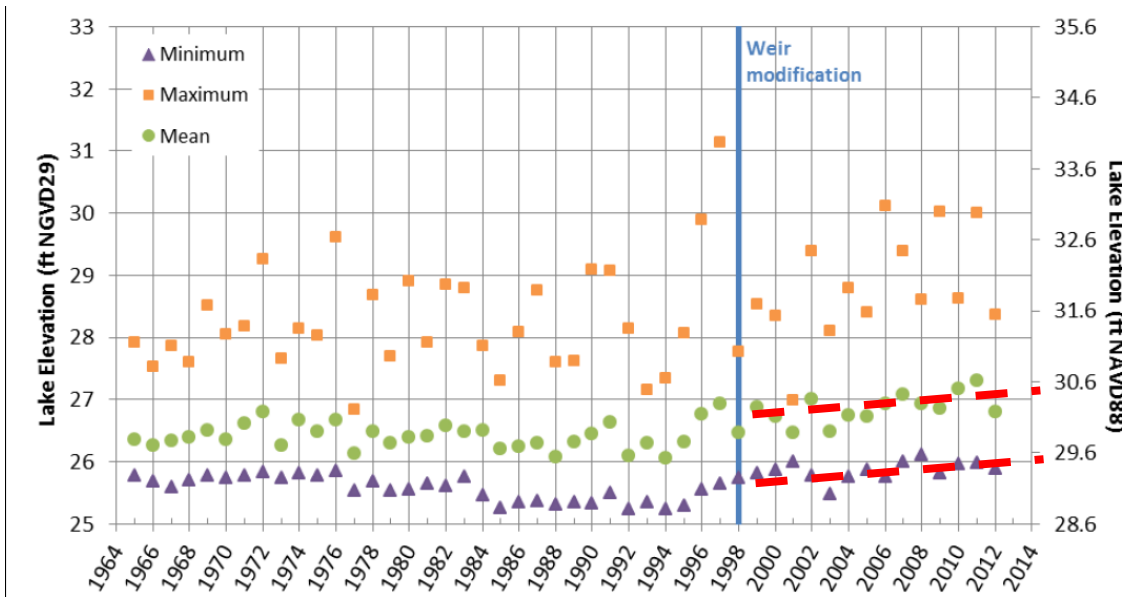
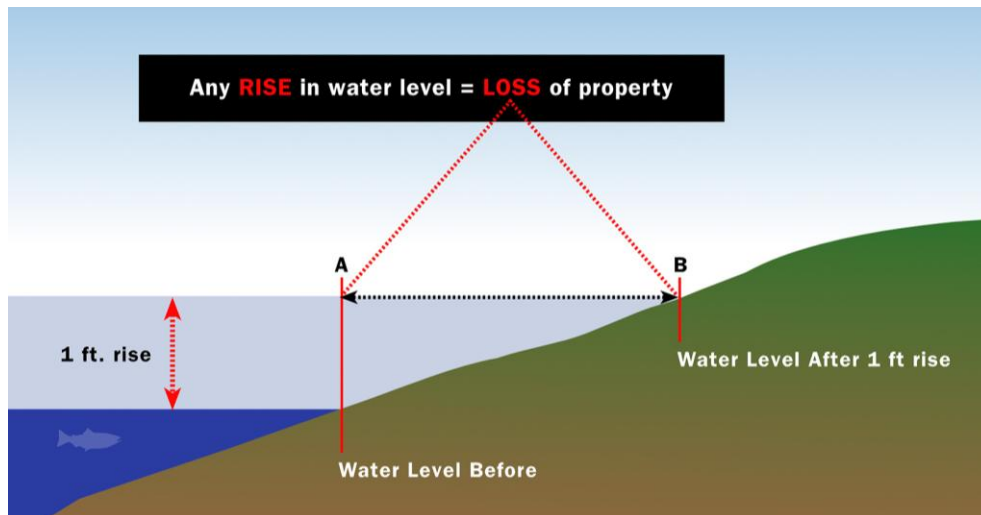


Figure 7. Annual distribution of daily lake stage. Minimum, mean, and maximum daily values are plotted for each water year.

Certainly a "fixed" weir would not cause this increasingly higher trend in water levels. Increasing levels of vegetation and sediment obstructing the high flow channels would.

The minutes of the Willowmoor SAC meeting held Feb. 12th state *recent low to moderate lake level (deteriorated) conditions are attributed to the weir modifications (of 1998)*. No mention is made that the report also implicates vegetation and blockages in the TZ. The project records and reports should be modified to include recognition of these causes.

4. Shoreline Impacts - The altered conditions in the transition zone have led to sustained, higher lake levels. These conditions were reported by the City of Bellevue in a year 2004 study of the Ordinary High Water Mark (OHWM) which the County H&H consultant cites. Lake waters now extend 10 to 15 feet higher on many shore properties than normal (as reflected in the following diagram); resulting in unnecessary changes and damages. In addition, the unnatural shift in the location of the OHWM, under such conditions, resulted in a shift of our property boundary without requisite compensation.



WSSA and lakeside residents will not support an alternative that fails to provide sufficient lake level stability to minimize shoreline property losses as well as minimize impacts such as erosion, benching, sedimentation, tree/landscaping loss, bulkhead destabilization, dock destruction, etc.

5. Normative Lake Levels - Our analysis shows the long term, historic average number of days the lake has exceeded 27 ft. (NGVD) to be in less than 75 days per year. Given the influence of deferred maintenance on lake outflow and its water levels, we concentrated further analysis on the decade prior to the 1998 weir modification and found the following results:

Days Lake Level Over 27 ft. Based on Water Year											
1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Average
19	75	83	123	22	8	N/A	69	153	157	33	74

We recommend a value of 75 days per year as the target in evaluating Willowmoor alternatives. This can best be accomplished, in the short term, by complete removal of sediment and obstructions in the TZ (the exception being the agreed upon 10 ft. vegetation on either side of the low flow, center channel.)

It is readily apparent that shifts higher in Lake Sammamish's Ordinary High Water Mark (OHWM) have been caused by poor maintenance practices. The 27 ft. level has been the Corps of Engineer's standard for decades. A return to that level and re-establish this line along the Lake's shoreline should be an objective of the Willowmoor project.

The consultant H&H Phase 1 report is also revealing with respect to the historic OHWM and the ability to pass the requisite flows at 29 ft. NGVD (and as important, flows at lower levels). Figure 11 of the H&H report reflects a period of 10 years from 1988 to 1998 (green dots in graph). The rating curve, which we have added (**dashed red line**) reflects the ability to pass greater amounts of flow than in subsequent periods; even reaching the 1500 cfs level when the lake was at 29 ft. NGVD.

While the consultant attributes the OHWM shift to a change in the elevation of the top of the reconstructed weir, one cannot exclude other, concurrent factors - namely: (A) the introduction of vegetation along the low flow channel and, (B) poor maintenance practices that ensued shortly after construction of the new weir.

We also point to other revelations in Figure 11. The **orange dots** are associated with years 2012 - 2013. Note that these are shifted in a more favorable direction with respect to flow (greater flow at lower lake levels). This attests to the effectiveness of the return to required levels of maintenance. However, since this 2012-2013 rating curve is not as low as the 1988-98 period, other action is appropriate - namely removal of the remaining sediment.

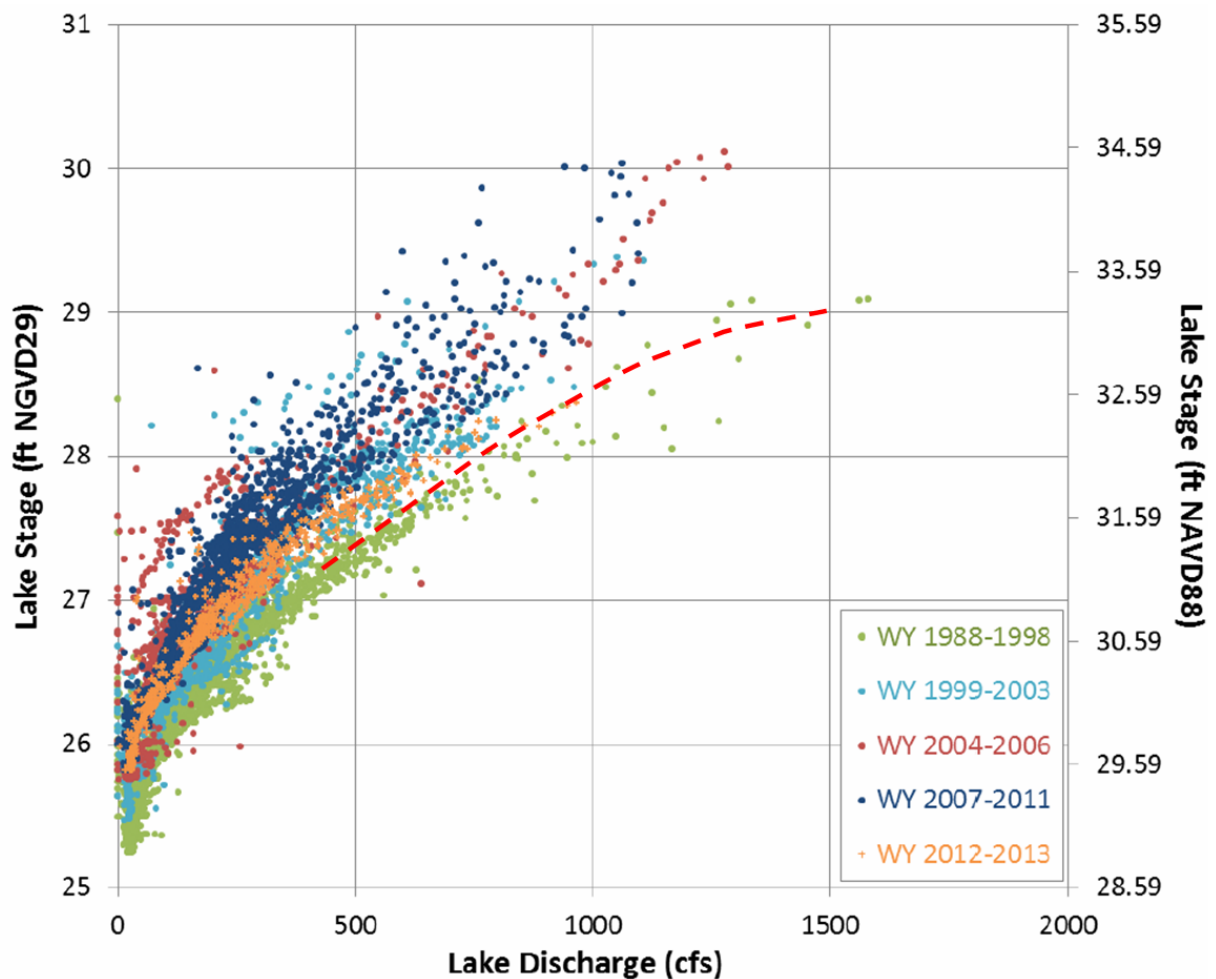


Figure 11 Relationship between lake discharge and lake elevation for 5 sub-periods (H&H pg. 26)

6. Water Temperature & Salmon Impacts - WSSA, like Save Lake Sammamish (SLS), expresses its concern that efforts to mitigate temperatures in the project area, with the intent to benefit fish, are neither warranted nor economically justified or practical. A more important aspect of any alternative to be considered in the TZ is the issue of **inadvertent impacts to migratory salmon**.

These concerns include, but are not limited to: (1) creation of predator fish habitat, and (2) creation of hostile environments (such as germ laden areas created by attempts to add new breeding/rearing grounds at Willowmoor - something no one has proven ever existed) - both of which could work to destroy the established fishery runs which transit this corridor to Lake Sammamish tributaries.

The issue of *inadvertent impacts to salmon* has been mentioned by knowledgeable SAC participants as well as County fisheries expert, Hans Berge, but have yet to be addressed by Willowmoor staff.

RECOMMENDED PROJECT OBJECTIVES

With the above facts, findings, and requested actions in mind, we recommend the following project objectives:

- A. Assure that TZ/weir flow is equal to or greater than 1500 cfs (at 29 ft. NGVD).
- B. Limit the number of days the lake is over 27 ft. to 75 days per year.
- C. Maintain a minimum lake level of 26 ft. NGVD during summer months.
- D. Establish requisite flows at specific increments of water level (26, 27, 28, 29, 30 ft. or stages) and specify the responsible party(-ies) to respond (and actions to be taken) when these conditions are not met. (This reflects the obligations found in the original ACOE O&M manual as well as sound flood management practice).
- E. Establish estimates of the cost of property “takings” which would result from any alternative that would raise normal lake levels or shift the OHWM higher than its “pre-deferred maintenance”, historic level.
- F. Before further expenditures, acquire in writing the ACOE's position with respect to any reduction in outflow (with concomitant raised OHWM), and requirements necessary for them to accept any changes to the TZ/weir or the O&M manual.
- G. Clearly distinguish in each project alternative the boundaries between flow facilities and areas to be left in a “native” or “natural” state.
- H. Identify tributaries and drainage facilities coming into Lake Sammamish and document their current, baseline characteristics so as to assess potential impacts during project design and to evaluate post-project impacts.
- I. Clearly document basin-level development and lake inflows. This should be accomplished for: (a) previous studies (such as the ACOE 1964 effort), as well as (b) current, and (c) forecast conditions including Bear Creek's drainage basin. Provide this information to all governing bodies and interested public for guidance of future basin-level water management efforts.
- J. Document lake ecologic conditions at a variety of sample points (esp. at north end of lake) so as to monitor Willowmoor project impacts and accomplishments in the future.
- K. Provide boating access to park facilities or, at the least, preserve an area that will accommodate such access in the future.
- L. Assure the selected alternative preserves the navigability of this section of the river for small watercraft. Appropriate signage should be included for safety and awareness of boaters.

CLOSURE

WSSA has been an active participant in encouraging both short term and long term County actions on water related issues impacting shoreline residents, their properties, and the lake. We recognize the desire of the County to undertake projects to restore habitat in the Sammamish River. Our ability to be supportive of those efforts must be coupled with assurance that historic water levels and outflow conditions will be restored and maintained. No substantive evidence has been presented that indicates this is not possible.

The above comments and recommendations are not intended to replace or limit other submissions we have provided the County. We request all of our submissions be made part of the record of the project.



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Board Member & On Behalf of WSSA



CC: County Council Members Lambert & Hague
Bellevue City Council
Board - WA Sensible Shorelines Assoc.
Seattle District, US ACOE