Lydia Wagner
Dept. of Ecology
RE: Ecology's Requested Response to Nov 3 Meetings Questions

Dear Lydia
First thank you for arranging the first opportunity for our CLIPA representative and expert Dr Dave Milne to meet with Ecology Modeling Staff Mindy Roberts, Greg Pelletier, and Anise Ahmed and others. This was CLIPA'S first opportunity to have an in-depth give-and-take discussion with Mindy Roberts and her staff to better understand the boundaries/limitations and design of the Ecology water quality model on lower Budd Inlet.

At the end of the meeting, Mindy Roberts provided each of us with six "Draft Science Summary Statements—November 3, 2014" and asked us to respond to the listed statements. We indicated that our response could not be a short statement, but rather we would need to review them, put them in the context of the expanded information provided at that November 3 meeting, and then reply in writing. We wanted to ensure that our message could be documented and posted on the Ecology Website to share with others. This letter provides our response.

WATER QUALITY MODEL. THE BOUNDARIES MODELED, AND THE LIMITS OF USEFULNESS OF ECOLOGY'S MODEL FOR A COMMUNITY DECISION ON THE FUTURE MANAGEMENT AND CHANGES TO CAPITOL LAKE AND THE DESCHUTES URBAN WATERSHED.

INITIAL REFLECTIONS ON THE ECOLOGY MODEL'S USEFULNESS.

The Budd Inlet Model limits its inputs to factors that do not include all of the major conditions that impact water quality. It does not consider cost/ benefit relationships of the alternative strategies; it does not include a thorough consideration of Community Priorities;

it is based on a supposed “natural” condition (estuary) not representative of the existing (lake) situation for “lake scenarios” necessary for assessing alternative future improvements to water quality.

Even if the model is considered to be validated within the limits of what Ecology used to model projected dissolved oxygen benefits, those projected benefits will cost more than $258 million in initial costs to remove the Tide Gate and clean up the accumulated sediment, while at the same time the resulting project will destroy many of the other Community amenities of Capitol Lake; it will result in a lost marine boating channel; and there is no identified method or community support to finance the $258 million in upfront cost. The following are additional comments that support our conclusions.

- A MODEL IS A TOOL, NOT A DECISION FINALIZER. CLIPA believes that any computer based model is a tool meant to be used for consideration of future decisions – not to proscribe them. The limitations of the tool are defined by various boundary constraints, the input information, and the level of accuracy to which the model can realistically identify the existing and changing environmental conditions that the tool is designed to simulate.

- ECOLOGY’S WATER QUALITY MODEL RESULTS ARE CONSTRAINED BY ITS BOUNDARY LIMITS AND INTERNAL SET POINTS. We understand from the Nov 3 meeting that Ecology’s model attempts to simulate changes in oxygen levels in lower Budd Inlet under a variety of future conditions. The model seeks to predict changes in other water quality parameters as well, and then seeks to compare its findings under a ‘Natural Condition” to those of a “Current Condition” (with the Tide Gate installed). Ecology also attempts to allocate portions of these causes of environmental change to various anthropogenic- and non-anthropogenic sources and natural watershed contributions to current conditions. Ecology specifically addressed the LOTT discharge, and then associated all other impacts to the Capitol Lake/Tide Gate design. We are not

told how Moxlie Creek , the storm water sources discharging below Tumwater Falls, the position of the LOTT outfall, 30 years of neglected (= not dredged) sediment and other "fixable" sources are distinguished from the effect of the dam in Ecology's designation of Capitol Lake as the largest human contributor to oxygen depletion in Budd Inlet.

- NATURAL BEFORE DEVELOPMENT VS STAFF/ATTORNEY OPINION VS CURRENT REALITY. Ecology modelers that said the model's "natural baseline" is based on the advice of one of their attorneys. They concluded that their analysis of water quality conditions in Puget Sound should be compared with "Natural Conditions—before human impacts" – that is, an estuary -- and should not include a parallel baseline condition (a lake) that would enable determination of effects of improvements by simple maintenance. At the Nov 3 meeting, Mindy Roberts mentioned that DOE is actually not using the true "Natural Condition---i.e. a 2000 foot opening at the Fourth Ave Bridge, the absence of the Railroad bridge/berm across the Capitol Lake basin, or Budd Bay Harbor full of sediment (absent pre-harbor dredging which began at the turn of the Century) and subsequent flood stage adjustments to sediment routing of low flow conditions below the Tumwater Falls. Ecology instead has fabricated a set of limits for the model that has no baseline reference to any true Natural or Existing conditions.

- REGULATORY STANDARDS---LAKE vs RIVER, IMPOUNDMENT STANDARDS. When asked why Ecology is modeling the potential "water quality violations of the Clean Water Act as if Capitol Lake is a Lake rather than as an impounded River per State definition, they said their attorney mandated that they use a lake definition. It is difficult for CLIPA to accept that an attorney general would intervene in a scientific investigation in such a specific way.

- SOURCES OF HUMAN OXYGEN-IMPACTING CONTAMINANTS IN LOWER BUDD INLET. When asked how Ecology integrated into the model their own field data that shows over 80% of the Budd Bay Inlet nitrogen loading

comes from Northern Puget Sound (some 40 times that added by the Deschutes River Watershed), they said the model was "adjusted to do so." The contaminant load from the North includes significant input from human sources and, being fixable, could be considered as an option in the Capitol Lake Management Plan. Nevertheless, Ecology finds that a Tide Gate removal project (calculated by CLIPA to cost $258 million) would be beneficial even though even though the huge contaminant loading in Budd Inlet that comes from the North would not be reduced by this expenditure.

- CAPITOL LAKE AS AN EXISTING LOW COST, POSITIVE IMPACT ON BUDD INLET WATER QUALITY. When asked how Ecology factored in the benefits of a potential "plant harvesting system in Capitol Lake" to remove the "natural plant accumulated contaminant load from the Deschutes Watershed" as a practical solution to the long term water quality improvements for lower Budd Bay, they said it was not cost effective. We have not seen any documents that support that finding. (Note: a routine lake dredging program would include a plant harvest program at little additional cost and could be implemented within a year or two.)

- DO SOLIDS/SEDIMENTS FACTOR INTO ECOLOGY'S LONG TERM WATER QUALITY IMPROVEMENT MODEL? The meeting time was too short to ask this question, but it is a major significant part of both water quality considerations and management of the Deschutes Urban Watershed, including lower Budd Inlet. In the absence of information on how sediment impacts the physical flow patterns, and how turbidity/sediment/solids are factored into the water quality objectives for the lower Budd Inlet, the model is limited in value to the community decision process. Management of solids and sediments is a primary achievable practice that impacts the entire watershed and the alternative plans and costs.

- RIVER AND INLET HYDRAULICS BEFORE THE ISTHMUS/DAM AND HOW EXISTING HARBOR RESPONDS AND IMPACTS WATER QUALITY THROUGHOUT LOWER PUGET SOUND. Ecology said that Capitol Lake increases the "residency time of the water in East Bay and is the cause of the poor water quality in there. High concentrations of bacterial contaminants and nitrogen coming from the urban watershed of Moxlie Creek and the shallow waters near Swan Town were not isolated as possible significant contributors to water quality there. Until that is done, we cannot be sure that Capitol Lake has any effect on East Bay. We are unsure of how much residency time in Capitol Lake itself has been modeled, since the Lake is now essentially full of sediment and its residency time is now very reduced. Ecology does not credit Capitol Lake for Flood Management benefits because of its limited capacity to impound water as a River Impoundment/Flood Control system (due primarily to tidal, flood flow and tide gate mechanical flow/timed released management benefits). These are effects and benefits that must be discussed openly.

- LIMITED MODEL INPUT, LIMITS MODEL OUTPUT. Ecology limited our discussion on Nov 3 to only those questions related to the design of the model, and not how the model might be used by the State Capitol Committee (SCC) and the Community in making a major decision on the future management of Capitol Lake. Therefore, when Ecology documents suggest that the removal of the Capitol Lake Tide Gates "might improve the water quality in Budd Inlet as it relates to oxygen depletion", such statements must be footnoted with the above 8 items and related questions. The fact that the Ecology based conclusion do not incorporate the many State Environmental Protection Act (SEPA) or the National Environmental Protection Act (NEPA) required factors on which a final environmental permitting decision must be made, *the model's findings must be considered advisory* and not all inclusive in the environmental permitting process. The Ecology conclusions related to their model are just that, an Ecology staff conclusion that their model, as designed, suggests that "Capitol Lake is the largest (accumulation of upstream/and physical factors) contributor of human factors that

impacts oxygen levels in Budd Bay of the projected sources from the Deschutes Watershed (not including the human sources incoming from the North".

COMMENTS BY OTHERS AT NOVEMBER 3 MEETING.

- CLIPA representatives (Wubbena and Holman) emphasized that CLIPA's objectives were consistent with some of Ecology's stated TMDL objectives in that we both want to improve and manage water quality in the Deschutes River Watershed, including Budd Bay to the Priest Point Park area. However the program must be inclusive of all of the Urban Watershed needs and part of a long term management plan.

- CLIPA's expert, Dr Dave Milne, referenced his previous Peer Review and written response documents that are posted on the Ecology Website, and then presented an update on his documented statements about the validity of the Ecology model. (See attached Power Point presentation and the recording of the meeting.)
    - Squaxin Tribe representative Scott Steltzenr clarified that the Squaxin Nation is not a part of the Pro Estuary group, but rather they are focusing on water quality issues impacting Puget Sound and healthy salmon runs. His power point was not limited to Capitol Lake or Budd Inlet, but he spoke more generally of the tribes interests. It was unclear how their support for a $20m fish hatchery above the Tumwater Falls is coordinated with the future management options for Capitol Lake. He also spoke to the limited qualifications of four of the Evergreen Professors that "endorsed Dr Milne's Peer Review and response documents, and then introduced Dr Frodge as the tribe's "invited expert to comment".
    - Dr Frodge spoke in general statements, gave some opinions on the Lake plant issue and its relationship to the oxygen discussion, but added no new information except for some comparable findings from Lake Washington and other Washington lakes. He did not offer additional specific information on the Ecology model or the local conditions.

CLIPA'S RESPONSE TO ECOLOGY'S "DRAFT SCIENCE SUMMARY STATEMENTS (agree, disagree, other) as requested by Ecology.

- ECOLOGY' STATEMENT-Evaluating oxygen depletion requires the combined effects of physics, chemistry, and biology.

CLIPA would add "time" as part of this list. We agree with this statement and would caution that the evaluation is shaped, limited, or even invalidated if the input data are incorrect or incomplete. (See above comments.)

- ECOLOGY'S STATEMENT-Capitol Lake produces the largest detrimental impact on dissolved oxygen compared with any other human activity, including local wastewater discharges, local non-point sources and external anthropogenic sources.

CLIPA disagrees. We suggest that this statement is premature and that any such claim must be supported by a clear published demonstration that the model is actually capable of accurate, consistent replication of real water quality conditions known to exist in Budd Inlet. That demonstration – a "validation of the model" – has not been provided. (See above comments.) Capitol Lake is an accumulator of many human and natural watershed impacts that are manifested in different forms and in different ways ---flood stage, low flow conditions from an impounded river that has a widely varying flow rate, watershed discharge violations that are slowly being addressed by Ecology and local governments. Ecology is using a model that has a fabricated and misleading "natural baseline". The nexus of measuring the model results is Budd Bay. The effects of the 80% loading including Northern human contributions, Moxlie Creek contributions, and varied sediment and plant life conditions in Capitol Lake add complexity to the real world situation that does not appear to have been isolated and identified by the Model. The limits placed on the model "by an attorney's opinion" puts the "Ecology Science Summary Statement" into a questionable category of being correct. The Model, with its many limitations, omissions, and dubious "mandated" baseline conditions may suggest what Ecology strongly concludes, but CLIPA believes it does not. The many

shortcomings of the Model severely limit the value of the Model Output as informative to making any regulatory or community decisions.

- ECOLOGY--The Capitol Lake dam increases the residence time of East Bay, which degrades dissolved oxygen by itself, independent of carbon or nitrogen loading.

CLIPA does not agree. There are many other factors that might (and probably do) cause the DO anomalies in East Bay as previously explained to Ecology by Dr Milne. Other observers (Holcomb, Wubbena) hold that this conclusion by Ecology can be better explained by the hydraulic modeling of the Deschutes River low flow to flood stage conditions under the alternative "filled conditions that have been in varying stages since the last dredge in 1985". Timing of flood stage and tidal influences, along with Dr Milne's view of shallow-water biological activity do not support the Ecology conclusion as it relates to the complete story. We do not know if Ecology's "natural conditions" include a legitimate open flow condition vs the existing land mass, tide gate, and the sediment shaping flows in lower Budd Inlet. The Ecology reported "residence time effect" in East Bay must be isolated from Moxlie Creek's contribution to oxygen depletion, which must be compared with the potential contribution from the "Deschutes River contribution and the 80% contaminant load from the humans to the North, before the DOE statement can be considered valid.

- ECOLOGY'S STATEMENT-Capitol Lake transforms nitrate to organic nitrogen and discharges to Budd Inlet. The lake is shallow, so has little retention.

CLIPA agrees to the basic statement. The important question in this situation is whether the transformed nitrogen goes to Budd Inlet immediately or after the growing season. As Dr Milne has presented in his written analysis, the seasonal changes in water quality are associated with the form of chemistry in the natural biological process, flow, time and what assumptions the model places on the limits of measurement. Is it a lake or is it an impounded river? On the statement that the lake "is shallow, so has little retention", we are unsure of which statement Ecology believes is correct. See previous statement about

residence time and other CLIPA comments. We assume that since Ecology prepared these six statements that they believe that the six statements are valid, internally consistent and are used to shape the Ecology Water Quality Model. Is this correct?

- ECOLOGY'S STATEMENT-Capitol Lake also converts C (carbon) from air into organic carbon,(sic) much more delivery of TOC to Budd Inlet. This causes oxygen to decline in Budd Inlet. More organic carbon gets produced in the lake than if it were to be an estuary.

CLIPA agrees with the statement if you track the carbon in its various forms under either scenario—lake or no lake. However the amount of carbon formed and changed is essentially the same under either the lake or no-lake scenarios. It simply appears at different times and locations. We expect that, under an ecologically realistic lake scenario, the net result will be that the lake can be used as a low cost natural treatment process that will benefit the long term water quality conditions in Budd Inlet. (See Dr Milne's Peer Reviews and his Power Point presentation from the AHSS (July) meeting.

- ECOLOGY'S STATEMENT-Capitol Lake is a eutrophic lake, based on phosphorus levels.

CLIPA agrees. However, eutrophic conditions in a lake or impoundment often occurs naturally and do not necessarily denote a negative situation. A eutrophic plant-filled water body can be managed to operate as a natural nutrient removal system. We agree that phosphorus levels are higher than if watershed management practices were improved and that as a result, the current level of phosphorus coming into the impoundment (lake) from the watershed contributes to a localized eutrophic condition in portions of the impoundment----in between the flood stage run offs from the watershed. When properly maintained and managed, the impoundment phosphorus levels can be managed. Compared to the true lake conditions in the other water bodies in Thurston County, this is a temporary problem waiting for the SCC to implement a properly designed Capitol Lake Management Program.

SUMMARY OF CLIPA'S RESPONSE TO ECOLOGY'S MODEL/COMMENTS

In summary, we appreciate the help from the Ecology staff to arrange for this exchange of information and clarification of the Ecology Model design. The limits of the Ecology Budd Bay/Capitol Lake model are now better known and documented for discussion with the State Capitol Committee and Community decision makers as they develop a long term management plan for the Deschutes Urban Watershed.

CLIPA will continue to participate in public meetings arranged by Ecology to discuss the TMDL studies related to the Deschutes River, and will continue to provide written input from a Community's perspective and our understanding of how the entire Deschutes Watershed functions under current conditions.

We look forward to Ecology's role as an objective consultant in assisting the SCC, CLIPA and the Community in better defining all of the conditions that are important in preparing an effective Deschutes Urban Watershed Management Plan. A good plan should address most of the objects of the TMDL objectives, while being fully responsive, in addition, to the needs of all present and future users of the Deschutes Urban Watershed.

Sincerely

Capitol Lake Improvement and Protections Association
Co-Chairs, Jack Havens, Denis Curry, Bob Wubbena
Cc
State Capitol Committee, Gov Inslee, Lt Gov Owen, Sec of State Wyman, Commissioner of Lands Goldmark
Squaxin Tribal Council
Ecology, Director Maia Bellon
DES, Director Chris Liu
WDFW, Dep Director Joe Stohr
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