



## Technical Memorandum

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<b>Date:</b>	April 29, 2019	<b>From:</b>	Associated Earth Sciences, Inc.
<b>To:</b>	Birch Bay Water & Sewer District	<b>Project Manager:</b>	Jay W. Chennault, L.Hg., P.E.
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	Birch Bay, Washington	<b>Project Name:</b>	On-Call Hydrogeologic Services
<b>Attn:</b>	Dan Eisses, P.E. – General Manager	<b>Project No:</b>	180074H007
<b>Subject:</b>	Instream Flow Amendment Review		

This memorandum presents AESI's review comments on Ecology's draft amendment to Chapter 173-501 WAC – Instream Resources Protection Program – Nooksack Water Resource Inventory Area (WRIA) 1 and the Rule Supporting Document. Our services for this task were completed under our February 7, 2018 On-Call Contract Agreement with the Birch Bay Water & Sewer District (District). The Contract Agreement between Associated Earth Science Inc. (AESI) and the District was authorized by Dan Eisses (District General Manager) on September 25, 2018.

### Amendment Review

AESI reviewed Ecology's preliminary draft rule language for public comment for their proposed amendment to the Instream Resources Protection Program – Nooksack Water Resource Inventory Area and noted the following:

*Amendment Language 173-501-065(5)(c): Upon issuance of a drought emergency order under RCW 43.83B.405, withdrawals from new permit-exempt wells shall be curtailed except indoor domestic water use and withdrawals to maintain up to 1/12 (one-twelfth) acre for non-commercial subsistence gardening purposes.*

Review Comments: The justification for curtailing groundwater withdrawals during a drought is not clear, as discussed in our review of the Rule Supporting Document below. This section also does not define what constitutes "non-commercial subsistence gardening". Non-commercial subsistence gardening should be defined in 173-501-065(1).

*Amendment Language 173-501-070(4): New interruptible uses may be approved from streams regulated under WAC 173-501-040 if the department determines through a water right permit application process under Chapter 90.03 RCW that the proposed use is consistent with the intent of*

*Chapter 90.94 RCW to restore and enhance streamflows, and would offset potential impacts to instream flows associated with permit-exempt domestic water use.*

Review Comments: This new language regarding new interruptible (subject to established instream flows) uses is unnecessarily tied to offsetting potential impacts related to permit-exempt domestic water use. It stands to reason that any new interruptible use that will restore and enhance streamflows should be allowed, regardless of its' association with permit-exempt water use.

To clarify this, the new language could be edited to: "...the proposed use is consistent with the intent of Chapter 90.94 RCW or Chapter 90.03 RCW to protect, restore, or and enhance streamflows, or the proposed use and would offset potential impacts to instream flows associated with permit-exempt domestic water use, or any other beneficial use."

Additionally, new interruptible uses from regulated streams face the logistical challenge that most streams regulated under WAC 173-501-040 do not have an active streamflow gage located at the control station identified in WAC 173-501-030. Only four of the 30 streams regulated streams currently have gages located at the control points identified in WAC 173-501-030 (Bertrand Creek, Hutchinson Creek, Nooksack River at Ferndale, Middle Fork Nooksack River).

## **Supporting Document Review**

### Discussion of Instream Flows

The presentation of Figure 3.1 and the discussion about the frequency of minimum instream flows not being met for the Nooksack River at Ferndale are misleading.

- 1) The discussion of instream flows and the presentation of Figure 3.1 are under subheading "3.2 Withdrawal Limit Considerations". It is unclear how the discussion of instream flows is related to considerations of withdrawal limits. The discussion on instream flows in this section implies that the frequency of time when the instream flow for the Nooksack River at Ferndale is not being met is a result groundwater withdrawals. In fact, the frequency of time when the instream flow is not met is primarily the result of how the instream flow level was originally set near the 50% exceedance flow from 1967 to 1978.
- 2) The chart is described as depicting data over "recent history". The time period is for the years 1967-2014. The term "recent history" can mean different things to different people. The use of the term "recent history" implies that the fact that instream flows are not being met is something has occurred recently. It would be clearer in the text if it just stated the range of dates the data covers.
- 3) The inclusion of the "irrigation season" on the chart implies that irrigation is related or a causative factor in the frequency when instream flows are not being met. There is no discussion in the text regarding irrigation with respect to instream flows. The irrigation

season should be removed from the chart or an explanation should be provided in the text as to why it is included. The irrigation season is also presented as May 1 through October 1, which is not consistent of the irrigation season for many water rights in Whatcom County.

- 4) The text describes that the “data show increasing occurrence beginning in June and increasing through September”. This description, combined with the first sentence regarding “recent history”, may be interpreted as suggesting that the occurrence of instream flows not being met has increased between some prior historical period and “recent history”. The data only show that the instream flow is not met more frequently in September than June.
- 5) The text describes the “increasing trend” as preventing Ecology from approving new uninterruptible permitted water rights in WRIA 1. This is not true. New uninterruptible water rights are prevented by the instream flow rule (Chapter 173-501 WAC). An uninterruptible water right is not available for any regulated stream, at any time of year.

#### Curtailment During Drought

Ecology is proposing new language as WAC 1730501-065 that would require curtailment of groundwater use from permit-exempt domestic wells during a drought emergency. There is no explanation of what curtailment is trying to accomplish during a drought. Is it to protect instream flows? Is it to protect other senior water rights from impairment? There is no technical justification provided in the supporting document regarding how curtailment of groundwater use will help instream flows or other senior water right holders during a drought.

The concept that curtailment during a drought will improve instream flows ignores the intricacies of surface water - groundwater interactions. Generally, there is a significant lag-time that exists between a period of groundwater pumping and when potential impacts of that pumping may reach a nearby stream. That lag time can range from days to years depending on many factors including distance between the well and the stream, aquifer characteristics, and groundwater recharge from precipitation.

#### Consumptive Use Safety Factor

Ecology chooses to use a “safety factor” of 1.5 to calculated consumptive use for new permit-exempt domestic wells. The technical justification of using 1.5 is not provided, only that it helps assure that offset volumes will “more than compensate” for impacts during the twenty-year planning horizon. Ecology identifies that there are uncertainties in the number of new homes, occupancy rate, per capita water use, outdoor water use, water use efficiency, and consumptive use. The estimates used for these variables in the consumptive use calculations are based on the best available information as described in the supporting document. It is unclear why a safety factor of 1.5 is necessary for these variables. Ecology also identifies “the impacts of this collective use on the instream resources” as the assumption that justifies the safety factor. However, Ecology clearly assumes that the pumping impacts from wells directly

impact surface water bodies (Section 4.2.4) so the uncertainty in the relationship between pumping and instream resources should not justify an additional safety factor.

#### Hydrogeologic Information and Assumptions

This section describes an analysis of streamflow depletion impacts from pumping wells at various distances from a stream and indicates that “over time, the annual volume of depletion approaches the annual volume pumped at the well, regardless of the distance of the well from the river or the pattern of withdrawal”. This conclusion is based on analyses using the STRMDEL08 analytical tool by the USGS. STRMDEL08 is a 1-dimensional analytical solution that ignores the lateral inflow of groundwater within the aquifer to supply water to the well as well as the effects of seasonal recharge to the aquifer. Ecology recognizes that groundwater storage is the primary source of water to a well for some time after the initiation of pumping. In a shallow water table aquifer, the reduction in groundwater storage as a result of pumping is often offset by precipitation recharge long before the effects of the pumping can result in streamflow depletion.

#### Chapter 5 Retiming High Flows to Restore and Enhance Streamflows

The discussion of potential projects to retime high flows to restore and enhance streamflow does not include anything directly related to permit-exempt domestic water use. However, the proposed exemption to WAC 173-501-070 suggests that the exemption would only apply to projects that “would offset potential impacts to instream flows associated with permit-exempt domestic water use.” The language for the exception should be clarified as suggested in our comments on the rule above.