0.0. Summary

0.1. Purpose: this document is intended to provide an initial review of the background "Rule Supporting Document" issued by Ecology in support of its draft rule to limit new permit-exempt wells to 500 gallons per day indoor use, and 1/12-acre irrigation of lawn or noncommercial garden. It is not a finished product and is best used as a resource for further work, rather than being quoted directly.

0.2. The scope of the rule could be subject to legal challenge based on an interpretation of the legislature's intent – it might only apply to the domestic indoor use element of the permit exemption provided by RCW 90.44.050. If so the outdoor section of the rule would be null and void.

0.3. The draft rule's financial impact to prospective rural homeowners, while not readily quantifiable at this time, could be significant.

0.4. Ecology supported the County's defense against Hirst, et al, but now appears to be siding with the Hirst proponents. Why the about-face?

0.5. Misinterpretation of the intent of the current instream flow rule: it is not a standard to be met.

0.6. New Wells impacts on streamflow: negligible, even in theory.

0.7. New Wells impact on streamflow: no measurable in practice.

0.8. Offsets: Ecology assumes few of the offset projects would work, or are they just trying to save money?

0.9. Impact of new rule on existing ground water users: If WRIA 1 goes into a general stream adjudication (whether launched at the state or federal level), the proposed rule could be very bad news for existing well owners.

0.10. All documents mentioned herein are cited in the last section.

1.0. Disagreement over the scope of RCW 90.94.020

The scope of RCW 90.44.050 was made clear by a state attorney general opinion, AGO 2009 No. 6: "1. The statutory exemption from permitting requirement for use in watering lawns and noncommercial gardens is not included within the exemption for domestic use."

The relevant section of the so-called Streamflow Restoration Act, RCW 90.94.020(8) "only applies to new domestic groundwater withdrawals," and "does not restrict the withdrawal of groundwater for other uses that are exempt from permitting under RCW 90.44.050." A legislator who was involved in the details of the negotiations over the statute, Vince Buys, claims the intent of the legislature was to restrict the application of the new law to the 5,000 gallons per day domestic use exemption, as distinct from the outdoor watering of non-commercial lawn and garden of ½ acre or less (which has no quantity restriction).

Ecology disagrees. The guidance documents Ecology issued to address the water use estimate requirement of the Act included all domestic uses plus the outdoor watering of noncommercial lawn and garden. Beginning with its promulgation of the Nooksack Rule (WAC 173-501), in fact, Ecology appears to have conflated the indoor domestic use and outdoor area watering elements (possibly also the stockwatering, or at least the non-commercial portion of it), as follows: "WAC 173-501-070 Exemptions: … (2) Single domestic, (including up to 1/2 acre lawn and garden irrigation and associated noncommercial stockwatering) shall be exempt from the provisions established in this chapter." To date no challenge appears to have been made regarding this language, most likely because Ecology has never faced a situation where it had to enforce its interpretation. Now it does.

The standard recourse in such situations is to seek an attorney general's opinion. If such opinion supported Ecology's interpretation, the last recourse would be to file a court case. Given the likelihood of such a case winding up before the same set of state supreme court justices who issued the bogus ***Hirst*** decision that caused this whole mess in the first place, the prospects of relief from that quarter cannot be taken for granted.

2.0. Financial impact to prospective homeowners.

All other features being equal, on its face a home on five acres with a well to which was installed when the existing rule applied is inherently more valuable than one with the curtailed water uses as proposed in the draft rule.

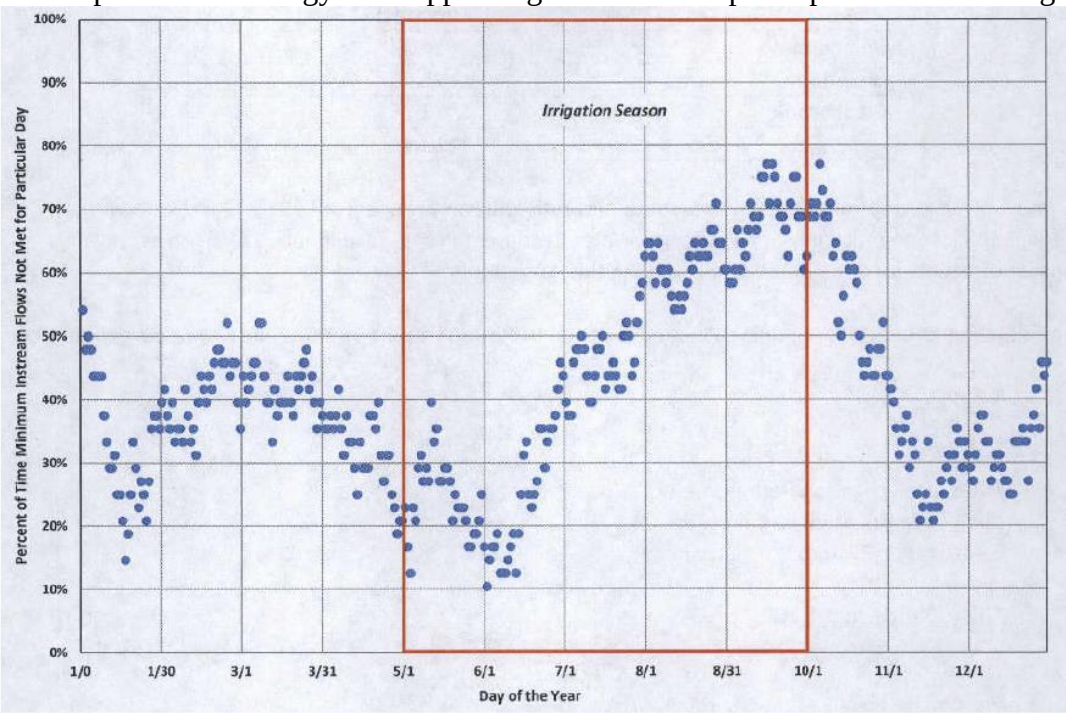
Caveat: All other features, like location, age of the structure(s), etc. are never equal. How the market will sort out the difference in water use might be difficult to demonstrate. If demand over the next 20 years continues, on average, to outpace historical rates, it might be difficult to determine with any reasonable accuracy how much less valuable a parcel with the proposed water use restrictions would be than a comparable parcel without the restrictions.

3.0. Ecology does a policy about-face: Recall that Ecology filed an amicus brief in support of Whatcom County's defense against Hirst, et al. Note also that the existing rule (WAC 173-501-070) states: " … when the cumulative impact of single domestic diversions begins to significantly affect the quantity of water available for instream uses, then any water rights issued after that time shall be issued for in-house use only, if no alternative source is available." In other words, Ecology reserved the right to step in and reduce permit-exempt well use to indoor only had it seen fit to do so. If it was not fit to do so in 2016 when it opposed Hirst, et al, why is it now?

4.0. Technical Matters regarding instream flow and well withdrawals impact thereon

4.1. Possible misinterpretation of Ecology's intent in promulgating instream flow rules. On page 10 of the Rule Supporting Document we find the following assertion:

"Figure 3.1 illustrates the frequency that minimum instream flows are not met at the Ferndale gage over recent history. Data show increasing occurrence beginning in June and increasing thru September. This trend has prevented Ecology from approving new uninterruptible permitted water rights in WRIA 1."



These statements contain misleading or potentially misleading information and should be corrected to reflect the level of accuracy upon which any rule should be based.

Consider the statements "Data show increasing occurrence beginning in June and increasing thru September. This trend has prevented Ecology from approving new uninterruptible permitted water rights in WRIA 1." Taken together, these statements appear to suggest that stream flow deficiencies and consequent denial of water rights permits has been a recent phenomena. The document should be edited to remove any such potential misinterpretation. In fact, instream flow conditions have provided the basis for denying new consumptive water right permits since the Nooksack rule, WAC 173-501, was first adopted in January of 1986, On the basis of the rule, Ecology closed most of WRIA 1 to further appropriations and began denying permits as soon as the rule was adopted.

Even more potentially misleading is the first sentence: "Figure 3.1 illustrates the frequency that minimum instream flows are not met at the Ferndale gage over recent history." The inference could be drawn that the instream flow levels set by rule in 1986 are standards that are supposed to be met and that the residents of WRIA 1 are somehow out of compliance with the existing rule. Senior Ecology officials Ann Wessel and Jim Pacheco confirmed repeatedly during their presentation to the WRIA 1 Planning Unit on December 3, 2014 that the flow levels set by rule are not standards to be met. Rather, the flow levels are regulatory tools to enable Ecology, working within the narrow framework of existing water law, to deny permit applications for new diversions or withdrawals. They claim they had to set the flow levels high enough that they would not be met in order to justify denying permits so as to protect the instream resource from further depletion.

The distinction may appear technical but it is not. Ecology is responsible for complying with its rule by closing basins to further appropriations and denying additional permits for consumptive use – both of which is has done consistently since the rule was adopted. The residents of WRIA 1 are not now, nor have they ever been out of compliance with WAC 173-501, nor could they be as it is not their responsibility to enforce the rule.

4.2. Impact of well withdrawals upon streamflow

The Rule Supporting Document states, on page 10: "Based on the information reviewed, Ecology determined that a quantity limit standard that promotes conservation is necessary to protect instream resources."

What information did Ecology review that led it to arrive at such a unambiguous and forceful conclusion?

After summarizing the results of the RH2 memo that estimated the consumptive use of permit-exempt wells over the next 20 years, on page 13 the Rule Supporting Document states: "In order to analyze the effects of conditions under the proposed WRIA 1 rule, Ecology obtained the [RH2] report and underlying data, and reconstructed the spreadsheets that support all of RH2's calculations. This allowed the agency to build on this body of work and to explore other water use scenarios in support of this rulemaking effort." Ecology reworked RH2's spreadsheet to reflect its proposed outdoor irrigation reduction from ½ acre to 1/12 acre, which resulted in a reduction of 647 acre-feet per year (AFY) at the end of the 20-year period, as estimated by RH2, to 260 AFY, or about 40 percent of the original RH2 estimate. The Rule Supporting Document goes on to state: "This represents the target offset volume required to meet the consumptive use impacts within the WRIA as a whole."

The Rule Supporting Document presents summary tables of its results, spread across the nine subbasins, thus:

RCW 90.94 WRIA 1 (Whatcom and Skagit County) Future Use (2018 through 2038) Scenarios and Calculated Total Consumptive Water Use											
		Aggregated Subbasins Acre feet per year of Consumptive Use									
		1 - Coastal North	2 - Coastal South	3 - Coastal West	4 - Lake Whatcom	5 - Lower Nooksack	6 - Middle Fork Nooksack	7 - North Fork Nooksack	8 - South Fork Nooksack	9 - Sumas	Total
Anticipated New Homes per Subbasin		594	241	290	145	561	9	126	22	162	2,150
	Per Connection Assumptions										
	154 gpd (2.56*60 gpd) and 1/12 acre	74.32	28.74	37.26	16.48	67.18	1.00	14.06	2.45	18.07	259.57
	500 gpd and 1/12 acre	97.37	38.09	48.52	22.11	88.95	1.35	18.95	3.31	24.36	343.00

Table 4.1. Results of analyses to calculate new domestic permit-exempt well consumptive use (in acre-feet per year) from 2,150 anticipated new wells over the twenty-year planning horizon. Calculated by aggregated subbasin. Assumptions include outdoor water efficiency = 75% (pop-up sprinklers); outdoor use is 80% consumptive; indoor use is 10% consumptive.

Then it added a "safety factor" of 50% to arrive at its final figures:

RCW 90.94 WRIA 1 (Whatcom and Skagit County) Future Use (2018 through 2038) Scenarios and Calculated Total Consumptive Water Use											
		Aggregated Subbasins Acre feet per year of Consumptive Use									
		1 - Coastal North	2 - Coastal South	3 - Coastal West	4 - Lake Whatcom	5 - Lower Nooksack	6 - Middle Fork Nooksack	7 - North Fork Nooksack	8 - South Fork Nooksack	9 - Sumas	Total
Anticipated New Homes per Subbasin		594	241	290	145	561	9	126	22	162	2,150
	Per Connection Assumptions										
	1.5 Multiplier added as a buffer	111.48	43.11	55.90	24.73	100.77	1.51	21.09	3.68	27.11	389.36

Table 4.2. Water Offset Volumes in acre-feet per year needed to meet the requirements of RCW 90.94.020 with a 1.5 Multiplier (150% total estimated consumptive volume) applied to account for uncertainty.

Beginning page 14 of the Rule Supporting Document, Ecology presents a summary of its technical analysis that it claims justifies it conclusion regarding the need for the proposed quantity restrictions. Adequate justification for many of the key assertions contained therein is lacking.

The first paragraph of that section reads as follows:

4.2.4 Hydrogeologic Information and Assumptions

The numbers presented in Table 4.2 reflect annualized pumping impacts (acre-feet per year). The offset volumes listed in the table assume that the impacts from 2,150 additional wells directly impact surface water bodies within the watershed and that those impacts fully impact surface water bodies by the end of the twenty-year timeframe. This will likely be the case for shallow wells located near streams. However, deeper confined wells and wells located at a greater distance to their connected surface water bodies will experience lag times such that their impacts may not be fully developed by the end of the 20-year window. We propose to offset the entire projected volume ignoring any of these potential time lag issues, which provides additional assurance that the impacts will be offset. Pumping volumes will be seasonally distributed with significantly more water pumped during the irrigation season for outdoor watering than the relatively stable indoor component that occurs over the entire year. The impacts from seasonal pumping components on surface water bodies will be a function of the aquifer parameters and distance from each individual well to its connected surface water sources.

Let's take this paragraph apart sentence by sentence. "The offset volumes listed in the table assume that the impacts from 2,150 additional wells directly impact surface water bodies within the watershed and that those impacts fully impact surface water bodies by the end of the twenty-year timeframe." Strictly as it reads, the sentence is confusing and could do with some editing. The 2150 additional wells will only be there at the end of the twenty-year time frame. The impacts to surface water bodies is mentioned twice in a confusing and/or redundant manner.

"This [presumed well pumping impact to streamflow levels] will likely be the case for shallow wells located near streams." Fair enough, with the caveat that no attempt was made to quantify the meaning of "…located near streams."

The next sentence reads: "However, deeper confined wells and wells located at a greater distance to their connected surface water bodies will experience lag times such that their impacts may not be fully developed by the end of the 20-year window."

That notion is reinforced in the last sentence in that paragraph: "The impacts from seasonal pumping components on surface water bodies will be a function of the aquifer parameters and distance from each individual well to its connected surface water sources."

While there are likely many shallow wells located "near" streams (which the proposed rule will not cover), any new wells will have to meet current county standards for depth (Health) and distance from streams (PDS). So how many new wells are likely to be shallow and near streams?

Turns out Ecology doesn't care. It admits it has a shapefile of the location of permit-exempt wells over the period 2000-2014. It could ask County PDS to look at the last few years' worth of permits for rural homes using permit-exempt wells and determine how close to streams the wells were located, adding more data points to improve the estimate of future well locations with respect to streams.

Nevertheless, Ecology says "We propose to offset the entire projected volume ignoring any of these potential time lag issues, which provides additional assurance that the impacts will be offset."

Yet, parts of the analysis that follows this first paragraph of this section of the Rule Supporting Document seems to cast doubt upon, if not directly contradict, Ecology's casual dismissal of "these potential time lag issues … " while other statements within the analysis seem to contradict one another.

The diffusive properties of aquifers dampen the variability and amplitude of pumping effects on streamflow depletion. Key variables are aquifer parameters like hydraulic diffusivity and the distance from the well to its connected stream. The USGS created an analytical tool (STRMDEPL08) for calculating streamflow depletion caused by nearby groundwater pumping (Reeves, 2008). Calculations performed with this tool suggest that the amplitude of the annual depletion rate is largest when the well is placed close to the river, but is substantially reduced as the distance to the river is increased. As the distance of the well from the river increases, a cyclic pumping pattern indicative of summer outdoor watering has an effect on streamflow depletion that more closely resembles the annualized equivalent constant pumping rate pattern (Figure 4.2). For some time after the initiation of pumping, groundwater storage is the primary source of water to the well, and on an annual basis, the volume of depletion to the stream is less than the annual volume withdrawn by the well.

Thus far, from the above, rather than minimizing it's importance, it sounds like the USGS report calls out the value of knowing the distance of the well in determining the actual impact of pumping on streamflow. But wait, the last sentence in that paragraph reads:

"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."

Does this statement not contradict the prior sentences? Well, maybe not. To seek clarity, a review of the USGS report cited in the Rule Supporting Document is in order.

The document, available from USGS, titled as follows; STRMDEPL08—An Extended Version of STRMDEPL with Additional Analytical Solutions to Calculate Streamflow Depletion by Nearby Pumping Wells By Howard W. Reeves Open-File Report 2008–1166.

The document describes enhancements to a computer model of streamflow depletion by well pumping to enable to model to consider two more well-aquifer-streambed configurations. The adjusted model's results were tested against prior results and the results of other investigators' equations describing

the same scenarios, with almost perfect agreement. NOTE: the model uses analytical solutions that were validated against other models, apparently not by empirical data.

Key assumptions and conditions tested:

From page 5, "The first set of test cases examines the performance of the model under constant pumping. … The results from the modified code for 100 days of pumping are identical for the three solution options (fig. 2). These results demonstrate that the modified code is evaluating the equations correctly."

Of course, pumping continuously for 100 days is not a realistic test of actual permit-exempt well pumping regime (and thus, impact thereof on streamflow) regardless of distance, intervening material properties or any other relevant factor.

The model was then tested for time-varying pumping regimes. Once again the results agreed with existing analytical solutions.

Of most interest are some of the assumptions and conditions:

The only modification to the superposition algorithm programmed in STRMDEPL was that the time increment was changed from a fixed value of 1 day to an optional variable input by the user. The program still requires an input time series of pumping rates at a fixed increment, but the increment can be different than 1 day. The length of the increment in days also is read by the program. Note that because this is an analytical solution, the time increment used is only to allow variation in the pumping rate; the solution is accurate for any time interval evaluated. The output series produced by the code is identical to the input series. Page 8

While the described improvements to the model's time step capacity would presumably enable testing of a more realistic pump time for permit-exempt wells, such as several hours a day, the report states:

Two input time intervals were tested: a half-day interval and a 1-day interval. Page 8

Further, the well pump rate was the same as the 100-day continuous pumping test case: 250 gallons per minute. That's 72 times greater than a permit-exempt well pumping at its statutory rate of 5,000 gpd. It is more in line with commercial irrigation, as the follow excerpt suggests:

The behavior of time-varying pumping on streamflow depletion is shown in the second test using the modified code and the partially penetrating stream solution …The pumping begins after 244 days and continues for 91 days and then is followed by another 91-day pumping cycle that begins after 274 days. This time series was used to represent summer irrigation pumping and a time series that begins on October 1 of a calendar year. The aquifer conditions and distance to the stream were selected to be representative of conditions encountered in the field and to yield different streamflow-depletion estimates depending on the pumping scenario used. Three pumping scenarios were tested. In the first scenario, the well is pumped at 1 ft^3/s for 12 hours followed by 12 hours with no pumping for the 91-day pumping cycles … In the second scenario, the pumping rate is set to 1 ft^3/s for 3-½ days followed by no pumping for 3-½ days for the 91-day pumping cycles) …. In the third scenario, the pumping rate is equal to 0.5 ft^3/s for 24 hours of continuous pumping for the 91-day pumping cycles …. Page 8

How appropriate is it to draw conclusions about permit-exempt well use by relying on a paper that addresses pumping rates and durations more commonly found with commercial irrigation?

The figure below is offered in the Rule Supporting Document (Page 18) as relevant to the discussion, but note the rate of pumping appears to be 4,000 gallons per day … or is that 4 million gallons per day?

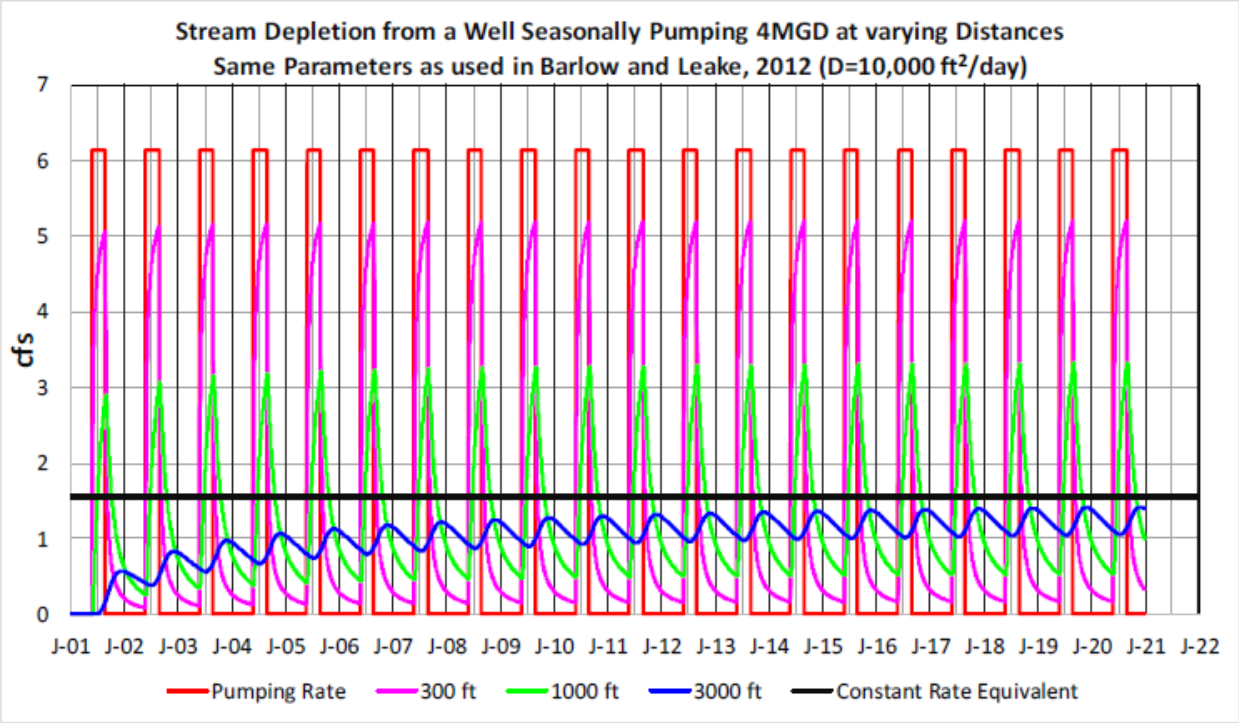


Figure 4.2. Stream depletion from a well over a twenty-year timeline. The same parameters utilized by Barlow and Leake, 2012, in their Figure 21.

4.3. The arithmetic of water

The utility of the output of models based on analytical solutions grounded in mathematical equations, solid as they may be, is questionable if the assumptions and conditions input to the analytical models do not reflect the actual circumstances addressed by the proposed new rule.

To get a better handle on that issue, let's look at the RH2 estimated consumptive use numbers in simple terms. At year 20, RH2 estimated total consumptive use across the nine sub-basins of WRIA 1 as follows:

	S404	adjusted August 2018	
Subbasin	**AF/y**	**gpd**	**cfs:**
Coastal north	184.73	164,917	0.2552
Coastal south	41.11	36,701	0.0568
Coastal west	139.02	124,109	0.1920
Lake Whatcom	22.50	20,087	0.0311
Lower Nooksack	193.59	172,826	0.2674
Middle Fork	0.86	768	0.0012
North Fork	23.03	20,560	0.0318
South Fork	4.70	4,196	0.0065
Sumas	37.97	33,897	0.0524
TOTALS:	647.51	578,060	0.8944

While the figures represent annual quantities (acre-feet per year, AF/y) converted into instantaneous quantities (cubic feet per second, cfs), it is not unreasonable to assume that all of that consumptive use takes place during the dry (irrigation) season.

Even making this conservative assumption, the quantities of water, after the next twenty years of exempt wells are installed, is miniscule. Consider, for example, that for Bertrand Creek Drainage alone, the streamflow rate in July, when irrigation is highest, is over 24 cfs at the mouth. And there are 15 drainages in the Lower Nooksack subbasin (not including the main stem of the Nooksack). Those drainages have a total streamflow rate at their mouths of over 140 cfs, which means that the 0.2674 cfs from the new wells will amount to 0.1 percent of the total.

Similar results would obtain from the other subbasins.

4.4. What about the distance-related time lag issue?

Here more simple arithmetic can shed light on the issue.

If the rate of travel from the stream to the wellhead were 10 feet per day and the distance from the wellhead to the stream were 1,000 feet, it would take 100 days for water from the streambed itself to reach the well, assuming constant pumping. By the time the stream water reaches the wellhead, the irrigation season would be over.

At the other end of the spectrum, if the rate of travel were 100 feet per day and the wellhead were located only 300 feet from the well, then in just three days water from the stream itself would begin to flow up the pipe, again assuming constant pumping.

In any such scenario where there is continuity between well and stream, it can be argued that as soon as the pump goes on water otherwise destined for the stream begins to head in the direction of the well, thus streamflow impacts begin immediately. The magnitude of such impacts matter, however.

And, of course, pumping is <u>not</u> constant, and as soon as the well's pump shuts off the "gravity pump" of the stream's head resumes drawing those errant water molecules back toward the stream. Nothing in the Reeves UGSG paper suggests otherwise.

Look again at Figure 4.2 copied from the Rule Supporting Document, in Section 4.3 agove.

In short, the distance and rate of travel <u>does</u> matter, if Ecology wants to write a rule that will be defensible in court against takings claims based on the ***Dolan v. Tigard*** standard of nexus and proportionality.

4.5. How do we measure actual impacts?

While the WRIA 1 Planning Unit was attempting to meet the statutory deadline to produce a plan update that Ecology would approve, it found no harm in assuming that the consumptive use estimate produced by RH2 would equate directly to streamflow impact. Any offsets that overcompensated due to "time lag issues" would inure to the benefit of streams, thus provided net ecological benefit. So long as the plan was adopted and it identified projects sufficient to provide the total offset needed, the Planning Unit saw no value in attempting to determine net impacts to streams from the consumptive use estimate. The issue was raised, however, with the contractor who is developing a groundwater model for the subject area, Associated Earth Sciences. In a memo dated June 17, 2017, its principal stated as follows;

> Pg. 1 " > It is important to note that models do not <u>provide data</u>. Rather, models synthesize available data into a framework that captures the essential elements of a complex natural system. The model is being developed with the intent of being able to provide Ecology with information necessary for the evaluation of water right applications and to provide estimates of impacts that could be used to develop mitigation plans. The overall reliability of the model to predict potential impacts associated with a proposed water right appropriation will vary throughout the model domain, depending on the amount and quality of the available model input/calibration data and the specific characteristics of the water right application."

> Pg. 5 "Even in areas of the proposed numerical model with high data density, and good calibration data (Bertrand Creek drainage), the extremely conservative estimate of maximum potential impact to surface water from the use of 100 permit-exempt wells will be significantly less than the lowest possible streamflow measurement error that will be used to calibrate the model. The more realistic potential impact of 0.027 afd is less than 6% of the potential error associated with the streamflow measurement data. Therefore, any simulated predicted impact to the stream based on this scenario would be statistically insignificant and not defensible."

In other words, the impact on streamflow of the 2,150 permit-exempt wells expected to be spread over the entire WRIA in 20 years will not be measurable. That is not to say that there will be zero impact, but that such impacts can only be determined by theoretical models, not actual data.

Is that a solid basis for amending the Nooksack instream flow rule?

5.0. Offsets

Despite generating over 12,000 acre-feet worth of projects designed to offset potential impacts of new permit-exempt wells on streamflow, it was expected that many of them might not pan out. The entire project had to be completed in one year, whereas the initial 2005 WRIA 1 Watershed Management Plan, Phase 1, which was far less bold in its actions, required six years to be approved.

Further, the listed projects, even if they all panned out, would not offset projected consumptive use in each sub-basin, because there simply wasn't enough time to find and evaluate projects for each sub-basin. One of the projects, regarding the evaluation of a suite of water use efficiency measures, might have covered the shortfalls, but it was proposed late in the process providing insufficient time to evaluate the elements of the propose suite.

The proposed rule appears based on the assumption that there will never be, within the twenty-year time frame, sufficient projects found to offset the 647 AF/y of estimated consumptive use, hence the reduction by a factor of 6 of the amount of lawn and garden that can be irrigated by new permit-exempt wells, plus the reduction of the 3,000 gpd domestic use quantity to 500 gpd.

How can Ecology be so sure, at this early date, that an insufficient number of the projects that totaled over 12,000 AF/y will not pan out that it can justify major changes to the quantities allotted to domestic and outdoor watering?

6.0 Did Ecology Representative to the WRIA 1 Planning Unit act in bad faith?

Throughout the 2018 planning process the Ecology Representative to the WRIA 1 Planning Unit appeared to be helping the process along in a variety of ways, including timely response to questions from other Planning Unit members, and a constant reminder of how much time was left to compete the process.

Nevertheless, when the Planning Unit took votes on matters relating to the plan update, the Ecology rep usually either abstained from voting or chose to recuse. Since recusal is usually reserved for situations in which a participant finds themselves in an inadvertent conflict of interest, it appeared the Ecology rep was acting in the highest and best interests of both the agency and the process.

When the final vote came regarding the final proposal for a plan update, however, the Ecology rep voted against it, and in so doing refused to provide language to amend the proposal that would enable the Ecology rep to vote yes, despite being asked repeatedly to do so. Thus, the Ecology rep broke the Planning Unit's rules. Further, if it was appropriate to recuse prior to the final vote, what changed in the situation that enabled the Ecology rep to vote at all on the final plan proposal?

Further still, the Ecology rep worked directly with the WRIA 1 Watershed Staff Team (WST), which produced at the last minute a proposed plan update that it had to know in advance would not be well received by a sufficient number of Planning Unit members to reach approval. Did the Ecology rep turn a blind eye to the inevitable problem the WST's behavior would cause at the Planning Unit table? Perhaps we will never know the answer to that question, either.

7.0. Resources consulted:

RCW 90.44.050 Permit-Exempt Wells

After June 6, 1945, no withdrawal of public groundwaters of the state shall be begun, nor shall any well or other works for such withdrawal be constructed, unless an application to appropriate such waters has been made to the department and a permit has been granted by it as herein provided: EXCEPT, HOWEVER, That any withdrawal of public groundwaters for stock-watering purposes, or for the watering of a lawn or of a noncommercial garden not exceeding one-half acre in area, or for single or group domestic uses in an amount not exceeding five thousand gallons a day, or as provided in RCW 90.44.052, or for an industrial purpose in an amount not exceeding five thousand gallons a day, is and shall be exempt from the provisions of this section, but, to the extent that it is regularly used beneficially, shall be entitled to a right equal to that established by a permit issued under the provisions of this chapter: PROVIDED, HOWEVER, That the department from time to time may require the person or agency making any such small withdrawal to furnish information as to the means for and the quantity of that withdrawal: [etc]

https://app.leg.wa.gov/rcw/default.aspx?cite=90.44.050

WAC 173-501 INSTREAM RESOURCES PROTECTION PROGRAM—NOOKSACK WATER RESOURCE INVENTORY AREA (WRIA) 1

WAC 173-501-070 Exemptions:

(2) Single domestic, (including up to 1/2 acre lawn and garden irrigation and associated noncommercial stockwatering) shall be exempt from the provisions established in this chapter, except that Whatcom Creek is closed to any further appropriation, including otherwise exempted single domestic use. For all other streams, when the cumulative impact of single domestic diversions begins to significantly affect the quantity of water available for instream uses, then any water rights issued after that time shall be issued for in-house use only, if no alternative source is available.

https://apps.leg.wa.gov/wac/default.aspx?cite=173-501-070

RCW 90.94.020 Authorization for new domestic groundwater withdrawals exempt from permitting with a potential impact on a closed water body and potential impairment to an instream flow—Requirements—Fees—Adoption of rules. https://app.leg.wa.gov/RCW/default.aspx?cite=90.94.020

December 3, 2014 Department of Ecology Presentation on Instream Flows
https://wria1project.whatcomcounty.org/resources/other-resources/december-3-2014-instream-flow-presentation
which includes:

Ann Wessel: How was the current Nooksack Instream Flow Rule set and how does it work?
https://drive.google.com/file/d/1tTryPnQIPBLuAWvGFwN1NAoIk66-vsdV/view

Jim Pacheco Instream Flow Science
https://drive.google.com/file/d/1vkNfmVB-vpIrnlZBDZrXNUkLc9Chyi2T/view

video of both presentations: https://www.youtube.com/watch?v=lUVAm6wsXGs

Review of the December 2014 DOE presentation by Ed Kilduff

[attached as separate document]

Rule Supporting Document Amendment to Chapter 173-501 WAC Instream Resources Protection Program -Nooksack Water Resource Inventory Area (WRIA)1Preliminary Draft for Public Comment
https://fortress.wa.gov/ecy/wrdocs/WaterRights/wrwebpdf/WRIA1-PreliminaryDraftRuleSupportingDocument-04082019.pdf

DOE: 100 Years of Water Law: https://www.youtube.com/watch?v=hTubPXaCk6I

STRMDEPL08—An Extended Version of STRMDEPL with Additional Analytical Solutions to Calculate Streamflow Depletion by Nearby Pumping Wells By Howard W. Reeves Open-File Report 2008–1166
https://pubs.usgs.gov/of/2008/1166/pdf/ofr2008-1166_web.pdf

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