

# WhWhatcom Chapter, Citizens' Alliance for Property Rights

Department of Ecology (DoE) May 10 2019  
Water Resources Program  
PO # 47600  
Olympia WA 98504 - 7600  
Attn: Annie Sawabini

Re: DoE's April 8 2019 draft amendments to WAC 173-501, the Nooksack Rule....  
On behalf of the board of directors and other members of the Whatcom Chapter, Citizens' Alliance for Property Rights (CAPR), please enter the following comments into the record.

Our organization has been directly involved on the Whatcom County WRIA 1 process and "Hirst" decision issues for several years; some members are active participants in the Planning Unit caucuses authorized by RCW 90.82. We've discussed the proposal's in the draft, and will focus on our priority goals, which are reasonable access to and limits on beneficial use of local public ground water resources for rural land owners for residential and agricultural use.

Our comments follow:

1. It's an important fact on this issue, here and elsewhere, that there is no quantitative data of any sort linking one, several, or hundreds, of Permit Exempt Wells (PEWs) to low stream flows in the dry season in any one drainage basin which adversely impact fish, water quality, and other valuable resources.
2. We are opposed to the new "conservation standard" rule, WAC 173-501 (5), ie the reduction of the daily water allowance from 3000 gallons per day (gpd), per RCW 90.94.020(5)(f)(ii), the 2018 "Streamflow Restoration" Act, for a home to 500 gpd for "indoor domestic use". As we said above, there is no "best available science" to support this drastic reduction.

Also, this 500 gpd rule definitely discriminates against people who want to have a larger home than the typical 3-bedroom model, in order to accommodate their extended family. There are many recently formed households like this in rural Whatcom County, including many of one particular ethnic group.

3. This same new rule would also impose a much tighter limit on water for "outdoor domestic" use, such as lawn and garden watering, pools and ponds etc. The new limit would be an area not exceed 3630 sq ft, an area of 60 x 60 ft. This limit is substantially lower (its only 17%!) than the 0.5 acre (21,780 sf) allowed now by the 1945 Ground Water law: RCW 90.44.050 (b).

It's obvious that many rural home sites have much larger lawn/garden/pond areas. Its also well known that many, perhaps most, rural residents do not water extensive lawn areas in the dry, summer season. We urge keeping the 3000 gpd allowed by current law, cited above.

4. New Rule WAC 173-501-065 (b) would drastically reduce the number of rural homes that can be served by a "group domestic" water system to 6. These privately owned "Group B" systems can use a Permit Exempt Well for up to 14 services, but Group A systems, 15 units and over, must have a water right.

Group Bs are required to provide storage if needed to keep daily withdrawals within the current 5000 gpd limit. Some are required to install meters per household. Outdoor water use can be limited if needed by system rules.

In many rural areas, here and elsewhere, due to county density/lot size restrictions and/or lack of suitable or feasible ground water or public water sources, Group B's are the only feasible source of potable water for rural residences. We don't see any public policy basis or issue in support of this new restriction. What is the problem driving this proposal?

5. New Rule WAC 173-501-065 (e) would allow DoE to require meters on all new exempt wells [in the future], "if more accurate water use data is needed for management of water resources in the area. As stated above, reliable quantitative data is not available now for such questions or analysis. Thus, there is no baseline data to justify meters.

This concludes our comments on key issues. We are also attaching a detailed analysis of the DoE draft "Rule Supporting Document, April 8 2019, on the subject rule draft. Please contact us if questions, comments.

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Citizens' Alliance for Property Rights (CAPR)

1 **0.0. Summary**

2 0.1. Purpose: this document is intended to provide an initial review of the background "Rule  
3 Supporting Document" issued by Ecology in support of its draft rule to limit new permit-exempt wells to  
4 500 gallons per day indoor use, and 1/12-acre irrigation of lawn or noncommercial garden. It is not a  
5 finished product and is best used as a resource for further work, rather than being quoted directly.

6 0.2. The scope of the rule could be subject to legal challenge based on an interpretation of the  
7 legislature's intent – it might only apply to the domestic indoor use element of the permit exemption  
8 provided by RCW 90.44.050. If so the outdoor section of the rule would be null and void.

9 0.3. The draft rule's financial impact to prospective rural homeowners, while not readily  
10 quantifiable at this time, could be significant.

11 0.4. Ecology supported the County's defense against Hirst, et al, but now appears to be siding with  
12 the Hirst proponents. Why the about-face?

13 0.5. Misinterpretation of the intent of the current instream flow rule: it is not a standard to be met.

14 0.6. New Wells impacts on streamflow: negligible, even in theory.

15 0.7. New Wells impact on streamflow: no measurable in practice.

16 0.8. Offsets: Ecology assumes few of the offset projects would work, or are they just trying to save  
17 money?

18 0.9. Impact of new rule on existing ground water users: If WRIA 1 goes into a general stream  
19 adjudication (whether launched at the state or federal level), the proposed rule could be very bad news for  
20 existing well owners.

21 0.10. All documents mentioned herein are cited in the last section.

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23 **1.0. Disagreement over the scope of RCW 90.94.020**

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

27 The relevant section of the so-called Streamflow Restoration Act, RCW 90.94.020(8) "only applies  
28 to new domestic groundwater withdrawals," and "does not restrict the withdrawal of groundwater for other  
29 uses that are exempt from permitting under RCW 90.44.050." A legislator who was involved in the details  
30 of the negotiations over the statute, Vince Buys, claims the intent of the legislature was to restrict the  
31 application of the new law to the 5,000 gallons per day domestic use exemption, as distinct from the  
32 outdoor watering of non-commercial lawn and garden of 1/2 acre or less (which has no quantity restriction).

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

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

48 **2.0. Financial impact to prospective homeowners.**

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

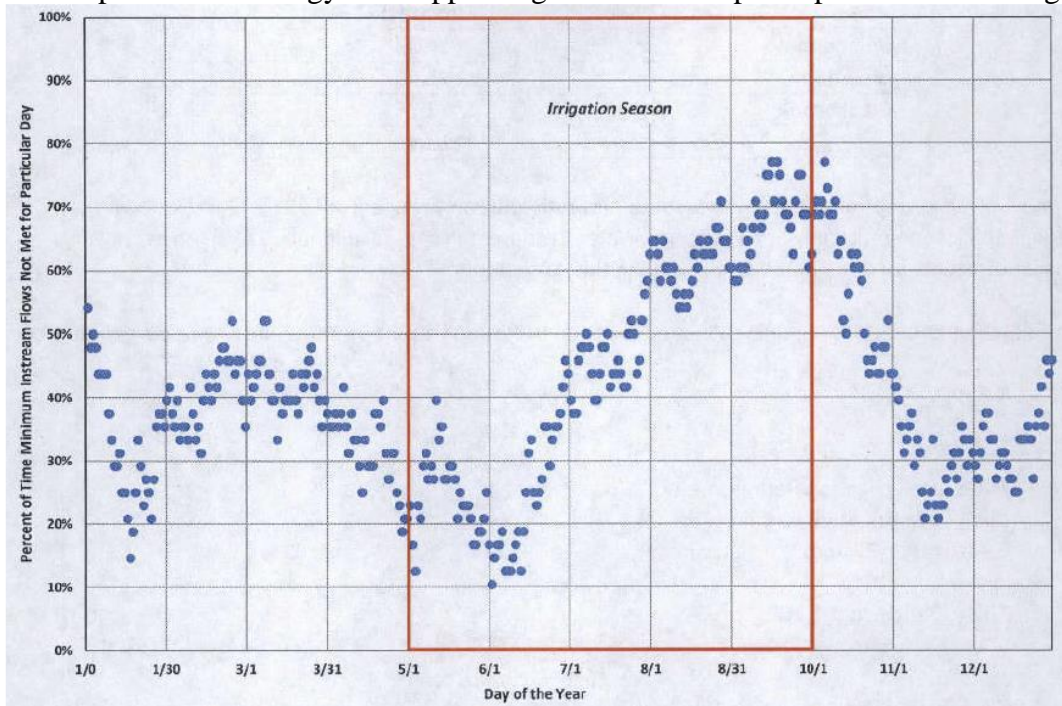
52 Caveat: All other features, like location, age of the structure(s), etc. are never equal. How the  
53 market will sort out the difference in water use might be difficult to demonstrate. If demand over the next  
54 20 years continues, on average, to outpace historical rates, it might be difficult to determine with any  
55 reasonable accuracy how much less valuable a parcel with the proposed water use restrictions would be  
56 than a comparable parcel without the restrictions.

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58 **3.0. Ecology does a policy about-face:** Recall that Ecology filed an amicus brief in support of Whatcom  
59 County's defense against Hirst, et al. Note also that the existing rule (WAC 173-501-070) states: "...  
60 when the cumulative impact of single domestic diversions begins to significantly affect the  
61 quantity of water available for instream uses, then any water rights issued after that time shall be  
62 issued for in-house use only, if no alternative source is available." In other words, Ecology reserved  
63 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  
64 to do so in 2016 when it opposed Hirst, et al, why is it now?  
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66 **4.0. Technical Matters regarding instream flow and well withdrawals impact thereon**

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68 **4.1. Possible misinterpretation of Ecology's intent in promulgating instream flow rules.** On  
69 page 10 of the Rule Supporting Document we find the following assertion:

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



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

77 Consider the statements "Data show increasing occurrence beginning in June and increasing thru  
78 September. This trend has prevented Ecology from approving new uninterrupted permitted water rights in  
79 WRIA 1." Taken together, these statements appear to suggest that stream flow deficiencies and consequent  
80 denial of water rights permits has been a recent phenomena. The document should be edited to remove any  
81 such potential misinterpretation. In fact, instream flow conditions have provided the basis for denying new  
82 consumptive water right permits since the Nooksack rule, WAC 173-501, was first adopted in January of  
83 1986. On the basis of the rule, Ecology closed most of WRIA 1 to further appropriations and began  
84 denying permits as soon as the rule was adopted.

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

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

#### 100 101 **4.2. Impact of well withdrawals upon streamflow**

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

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

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

117 The Rule Supporting Document presents summary tables of its results, spread across the nine  
118 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									Total
	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	
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.

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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									Total
	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	
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.

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Beginning page 14 of the Rule Supporting Document, Ecology presents a summary of its technical analysis that it claims justifies its 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.

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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.

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

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

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

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

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

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

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

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

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

188 "Over time, the annual volume of depletion approaches the annual volume pumped at the  
189 well, regardless of the distance of the well from the river or the pattern of withdrawal."

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

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

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

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

200 Key assumptions and conditions tested:

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

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

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

210 Of most interest are some of the assumptions and conditions:

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

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

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

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

224 The behavior of time-varying pumping on streamflow depletion is shown in the second test  
225 using the modified code and the partially penetrating stream solution ... The pumping begins after  
226 244 days and continues for 91 days and then is followed by another 91-day pumping cycle that  
227 begins after 274 days. This time series was used to represent summer irrigation pumping and a  
228 time series that begins on October 1 of a calendar year. The aquifer conditions and distance to  
229 the stream were selected to be representative of conditions encountered in the field and to yield  
230 different streamflow-depletion estimates depending on the pumping scenario used. Three  
231 pumping scenarios were tested. In the first scenario, the well is pumped at 1 ft<sup>3</sup>/s for 12 hours  
232 followed by 12 hours with no pumping for the 91-day pumping cycles ... In the second scenario,  
233 the pumping rate is set to 1 ft<sup>3</sup>/s for 3-½ days followed by no pumping for 3-½ days for the 91-day  
234 pumping cycles) .... In the third scenario, the pumping rate is equal to 0.5 ft<sup>3</sup>/s for 24 hours of  
235 continuous pumping for the 91-day pumping cycles .... Page 8

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

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



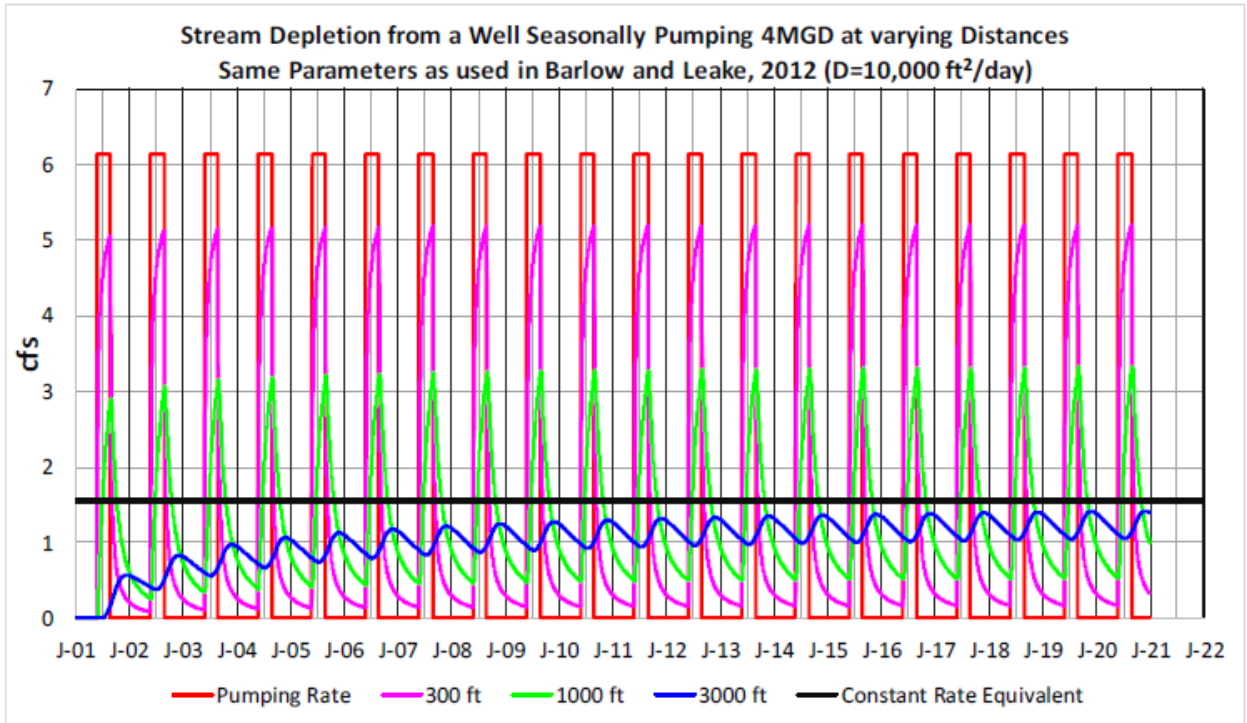


Figure 4.2. Stream depletion from a well over a twenty-year timeline. The same parameters utilized by Barlow and Leake, 2012, in their Figure 21.

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**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	
<b>Subbasin</b>	<b>AF/y</b>	<b>gpd</b>	<b>cfs:</b>
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
<b>TOTALS:</b>	<b>647.51</b>	<b>578,060</b>	<b>0.8944</b>

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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.

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

261 Similar results would obtain from the other subbasins.

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#### 263 **4.4. What about the distance-related time lag issue?**

264 Here more simple arithmetic can shed light on the issue.

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

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

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

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

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

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

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#### 283 **4.5. How do we measure actual impacts?**

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

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

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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?

346 Further still, the Ecology rep worked directly with the WRIA 1 Watershed Staff Team (WST),  
347 which produced at the last minute a proposed plan update that it had to know in advance would not be well  
348 received by a sufficient number of Planning Unit members to reach approval. Did the Ecology rep turn a  
349 blind eye to the inevitable problem the WST's behavior would cause at the Planning Unit table? Perhaps  
350 we will never know the answer to that question, either.  
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353 **7.0. Resources consulted:**

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355 RCW 90.44.050 Permit-Exempt Wells

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

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

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

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WAC 173-501-070 Exemptions:

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

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

380

381 **RCW [90.94.020](#) Authorization for new domestic groundwater withdrawals**  
382 **exempt from permitting with a potential impact on a closed water body and**  
383 **potential impairment to an instream flow—Requirements—Fees—Adoption of**  
384 **rules. <https://app.leg.wa.gov/RCW/default.aspx?cite=90.94.020>**

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December 3, 2014 Department of Ecology Presentation on Instream Flows

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<https://wria1project.whatcomcounty.org/resources/other-resources/december-3-2014-instream-flow-presentation>

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which includes:

389

Ann Wessel: How was the current Nooksack Instream Flow Rule set and how does it work?

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<https://drive.google.com/file/d/1tTryPnQIPBLuAWvGFwN1NAoIk66-vsdV/view>

391

392

Jim Pacheco Instream Flow Science

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<https://drive.google.com/file/d/1vkNfmVB-vpIrnIzBDZrXNUkLc9Chyi2T/view>

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video of both presentations: <https://www.youtube.com/watch?v=IUVAm6wsXGs>

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**Review of the December 2014 DOE presentation by Ed Kilduff**

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[attached as separate document]

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401  
402 Rule Supporting Document Amendment to Chapter 173-501 WAC Instream Resources Protection  
403 Program -Nooksack Water Resource Inventory Area (WRIA)1 Preliminary Draft for Public Comment

404 <https://fortress.wa.gov/ecy/wrdocs/WaterRights/wrwebpdf/WRIA1->  
405 [PreliminaryDraftRuleSupportingDocument-04082019.pdf](https://fortress.wa.gov/ecy/wrdocs/WaterRights/wrwebpdf/WRIA1-PreliminaryDraftRuleSupportingDocument-04082019.pdf)

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

408  
409 STRMDEPL08—An Extended Version of STRMDEPL with Additional Analytical Solutions to  
410 Calculate Streamflow Depletion by Nearby Pumping Wells By Howard W. Reeves Open-File Report  
411 2008–1166

412 [https://pubs.usgs.gov/of/2008/1166/pdf/ofr2008-1166\\_web.pdf](https://pubs.usgs.gov/of/2008/1166/pdf/ofr2008-1166_web.pdf)

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414 Dupuit–Forchheimer assumption

415 [https://en.wikipedia.org/wiki/Dupuit%E2%80%93Forchheimer\\_assumption](https://en.wikipedia.org/wiki/Dupuit%E2%80%93Forchheimer_assumption)

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417 Dupuit Equation for Steady-State Flow to a Well in an Unconfined Aquifer

418 [http://www.edumine.com/xtoolkit/xmlicon/Dupuit\\_radial\\_eqn\\_and\\_assump\\_1piez.html](http://www.edumine.com/xtoolkit/xmlicon/Dupuit_radial_eqn_and_assump_1piez.html)

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420 Darcy’s Law:

421 <http://www.gwpc.org/water-energy/hydraulic-fracturing/groundwater-protection/fluid-flow->  
422 [subsurface-darcys-law](http://www.gwpc.org/water-energy/hydraulic-fracturing/groundwater-protection/fluid-flow-subsurface-darcys-law)

423 [https://www.ldeo.columbia.edu/~martins/climate\\_water/lectures/darcy.html](https://www.ldeo.columbia.edu/~martins/climate_water/lectures/darcy.html)

424 <https://www.brighthubengineering.com/hydraulics-civil-engineering/58490-darcys-law-for->  
425 [modeling-groundwater-flow/](https://www.brighthubengineering.com/hydraulics-civil-engineering/58490-darcys-law-for-modeling-groundwater-flow/)

426  
427 Streamflow Depletion by Wells—Understanding and Managing the Effects of Groundwater  
428 Pumping on Streamflow USGS Circular 1376

429 [https://pubs.usgs.gov/circ/1376/pdf/circ1376\\_barlow\\_report\\_508.pdf](https://pubs.usgs.gov/circ/1376/pdf/circ1376_barlow_report_508.pdf)

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431 Streamflow Depletion by Wells—Understanding and Managing the Effects of Groundwater  
432 Pumping on Streamflow Leonard Konikow, Paul Barlow, & Stan Leake U.S. Geological Survey  
433 Groundwater Protection Council Annual Forum, St. Louis, September 24, 2013

434 [http://www.gwpc.org/sites/default/files/event-sessions/Konikow\\_Leonard2FINAL.pdf](http://www.gwpc.org/sites/default/files/event-sessions/Konikow_Leonard2FINAL.pdf)

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436 Transient effects of groundwater pumping and surface-water-irrigation returns on streamflow  
437 Eloise Kendy John D. Bredenhof 2006

438 <http://onlinelibrary.wiley.com/doi/10.1029/2005WR004792/full>

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440 THE PRINCIPLE OF SUPERPOSITION AND ITS APPLICATION IN GROUND-WATER  
441 HYDRAULICS Thomas E. Reilly, O. Lehn Franke, and Gordon D. Benne USGS 1987

442 [https://pubs.usgs.gov/twri/twri3-b6/pdf/twri\\_3-B6\\_a.pdf](https://pubs.usgs.gov/twri/twri3-b6/pdf/twri_3-B6_a.pdf)

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444 Lower Nooksack Water Budget 2012, Chapter 12, Existing Conditions Model Output

445 [https://drive.google.com/file/d/1e0ToTOGE0rCW\\_rLOddMtnIZrPd6X\\_wHz/view](https://drive.google.com/file/d/1e0ToTOGE0rCW_rLOddMtnIZrPd6X_wHz/view)