Skagit Basin
Municipal Water Right Assessment

Prepared for

Washington State Department of Ecology

Prepared by

RH2 Engineering, Inc.

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Skagit Basin Municipal Water Right Assessment

The information contained in this report was prepared by and under the direct supervision of the undersigned.

2/11/14

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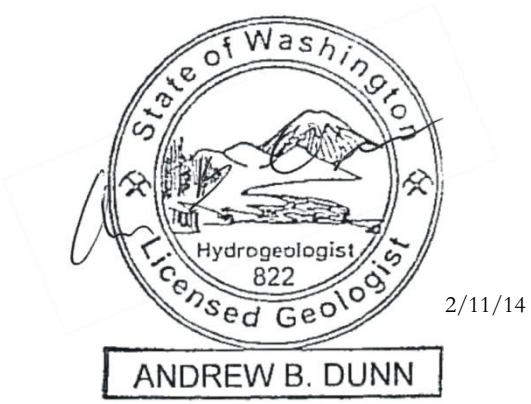

2/11/14

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EXECUTIVE SUMMARY

RH2 Engineering, Inc., (RH2) was hired by the Washington State Department of Ecology (Ecology) to assess municipal water rights upstream of Sedro-Woolley for the purpose of determining if and how any of the water right holders might be able to help meet growth in the watershed through direct water service or through donation or sale of a portion of their water rights to provide mitigation for existing and future permit-exempt groundwater withdrawals in the Skagit River Basin.

Following the analysis, the water rights were subsequently grouped into the following categories and subcategories:

1. Municipal water suppliers that have historically perfected water rights in excess of what they project to need at full buildout due to changes in water use within their community, such as through the loss of a large industrial use. This group can be further categorized as follows:
    a. Those that are willing to consider utilization of a portion of their water rights for mitigation purposes.
    b. Those that would like to preserve all of their water rights for potential future growth.

2. Municipal water suppliers that have excess water right capacity that has not previously been used. These systems may be able to serve additional parcels outside of their current service area by updating their service area and associated infrastructure. These systems all have water rights for municipal water supply purposes, are participating in water system planning, and have excess water after accounting for forecasted demand within the water system's existing service area over the 20-year planning cycle.

3. Water systems to eliminate from further consideration, which include:
    a. Water systems that have either enough water to serve just their current service area (place of use) or have a deficiency of water rights for service to their current service area and cannot expand. Common traits among these water systems are that they are not participating in water system planning and therefore cannot expand and serve parcels outside of their water right place of use, even if they have excess water rights. The water rights utilized by these systems may or may not be for municipal water supply purposes, or they may be in the water right permit stage of development so that any certificate issued in the future will only be for the quantity of water perfected and no surplus will exist.

    b. Water rights that might have met the definition of being for municipal water supply purposes at one time, but through non-use and lack of active compliance have likely since relinquished.

In addition, RH2 was tasked with reviewing all of the municipal water systems to identify opportunities for source water exchange that could be environmentally beneficial where a proportionately large impact on a tributary could be traded for a proportionately smaller impact on the Skagit River through a change in either the point of withdrawal, or diversion location.

The study area is depicted in **Figure 1** and detailed in **Table 1** in the **Project Description and Background** section.

Category 1 systems have historically perfected a larger annual volume than is currently used and possibly more than will be needed in the future. For example, a town may have had a large industry that no

longer uses water and it may be unlikely that a similar large water user will return. These systems have excess perfected water that could be available for mitigation. RH2 and the Washington Water Trust (WWT) corresponded with all of these systems to determine their interest in further discussing the sale of a portion of their water rights for mitigation. Some of the systems expressed interest in continued discussions (the Town of Darrington, Cascade River Community Club, and Skagit County Parks and Recreation Department) and others want to preserve their water rights for future long-term growth (Seattle City Light-Diablo, Seattle City Light-Newhalem, and the Town of Concrete).

The results of those preliminary meetings are summarized below, along with recommended next steps.

Town of Darrington – The Town of Darrington has a surface water right associated with an old reservoir site. The reservoir was removed due to safety considerations, and a portion of this water right was transferred to groundwater. Darrington also holds a small groundwater right that was issued for a water system that has since been connected to the larger Town system. Darrington may be interested in making all or a part of the surface water right that remains at the reservoir site available for mitigation. The Town may also be interested in making all or part of this groundwater right available for mitigation. In addition, Darrington is expanding their service area and may encompass some large water users and may acquire additional groundwater rights in the process, some of which may also be available for potential mitigation of downstream impacts.

> *Recommended Action: The WWT should conduct further discussions with Darrington to determine their level of interest in selling all or part of its existing surface water right (S1-163865CL), which remains at their historic reservoir site and also discuss whether the Town would be willing to sell its groundwater right (G1-23340C) that was originally issued to serve the Begis Tract development as a stand-alone system. WWT should also investigate the possibility of acquiring additional rights as the City continues to expand its service area and absorb existing users.*

Cascade River Community Club – Cascade River Community Club originally obtained all of its water from Boulder Creek (S1-00362C and S1-24441C) but changed to a well source some time ago. That well is located in the floodway and is subject to potential disruption due to flooding. The Cascade River Community Club wishes to retain its Boulder Creek water right as a back-up supply in case of flooding. However, there might be an opportunity to preserve the communities' desire for an emergency backup supply, as well as making some water available for mitigation.

> *Recommended Action: The WWT and Ecology should conduct further discussions and investigations to determine whether it is feasible to locate a replacement well outside of the floodway so the Cascade River Community Club would have a secure back-up supply of groundwater in the event of a flood, which could serve to make their water rights from Boulder Creek available for the trust water rights program. Another opportunity would be to see if the water right could be split to provide emergency backup supply (during flood events) and mitigation during low flow periods. These two desired use periods would seem to be mutually exclusive.*

Skagit County Parks and Recreation Department – Skagit County (County) has a water right for a well to supply water to the Howard Miller Steelhead Park in Rockport (G1-23340C). In 2002, the Skagit County Public Utility District (Skagit PUD) took over operation of the Rockport water system and began supplying potable water from Park system. The Howard Miller Steelhead Park well is reported to still be in use for some non-potable park activities. RH2 believes that the Parks and Recreation Department's use of water for park purposes, combined with the County's status as a qualifying governmental entity, results in this water right being for municipal water supply purposes. As such, water from that well may be available as a potential source of mitigation.

Recommended Action: The WWT should conduct further discussions with the Skagit County Parks and Recreation Department to further evaluate the peak historic use of the water right and determine the desired future use to determine how much of the water right is truly available to be acquired for mitigation.

Seattle City Light – Newhalem and Diablo – Although there has been a reduction in demand concomitant with the demolition of a number of residences and other structures within both Newhalem and Diablo, Seattle City Light (SCL) wishes to retain its municipal purpose water rights and does not wish to make that water available for mitigation at the present time.

Recommended Action: No further action by WWT is recommended at this time.

Town of Concrete – The Mayor indicated a desire to grow the Town of Concrete, but acknowledged that this will occur over several years. Concrete does not appear to have water for a permanent trust water right but may have water for a temporary trust donation, which could provide short-term mitigation water while a more permanent, long-term solution is sought.

Recommended Action: No further action is recommended, unless Ecology is interested in short-term mitigation water. If short-term mitigation water is acceptable, then Ecology should have the WWT meet with the Town of Concrete to discuss whether a temporary trust water right donation is feasible for Concrete and for Ecology as a short-term mitigation source.

Category 2 systems might be capable of expanding their service area to include adjacent properties, based on their water rights and willingness to participate in an update to their water system planning documents. The five water systems identified in this category (Cascade River Community Club, the Darrington Water System, Skagit PUD-Rockport, Hamilton Water Department, and Lyman Water Department) are capable of providing water inside and outside of their original service areas or original places of use with existing water rights. It should be recognized that even though a system might have sufficient water rights to serve additional connections, substantial infrastructure upgrades may be needed to actually serve that water to particular parcels. Based on current Washington State Department of Health (WDOH) calculations, these systems are already capable of supplying water to 266 additional connections within their existing service areas. Based on 20-year forecasts made in their most recent water system plans, there will be just under 500 acre-feet per year (afy) of excess water rights held by these systems but unused at the end of that planning period.

Category 3 systems do not appear to be large-scale, viable sources of water for either mitigation or potable water service outside of their existing service areas. There are many water systems included in this category and most are not participating in water system planning, and those that are show that they do not have excess water rights beyond their forecasted demand. That said, 15 of these systems are already capable of supplying water to 633 additional connections within their existing service areas, based on current WDOH calculations.

In addition, this category includes systems that were interpreted to have historically met the definition of a water right for municipal water supply purposes, but have subsequently failed to stay in active compliance with the definition. This combination, along with a long period of non-use, indicates that the water rights have likely been relinquished. Water systems in this category include the water rights that were originally issued for use at Northern State Hospital and Skagit River Woods Camp.

RH2 reviewed the points of diversion and diversion for all municipal water systems to identify any potential municipal water source exchange opportunities. For example, there may be locations where a diversion from a tributary to the Skagit River has a significant impact on the flows of that tributary but could be moved to the mainstem of the Skagit River where the impact on streamflow would be

significantly less in terms of a percentage of flow. The reduction of the proportional impact moving from the tributary to the mainstem would be seen as beneficial to the environment. RH2 was not able to identify viable opportunities for municipal water system source exchange within the study area.

PROJECT DESCRIPTION AND BACKGROUND

The Washington State Supreme Court recently overturned a 2006 amendment to the Skagit River Instream Resources Protection Program rule (Washington Administrative Code (WAC) Chapter 173-503), which had the effect of reinstating the original 2001 rule. The original 2001 rule, which became effective on April 14, 2001, did not reserve water for future uses and all water rights issued subsequent to adoption and all permit-exempt groundwater uses commencing after that date are all subject to interruption if they cause a reduction in surface water flow when the minimum instream flows are not met at specified stream management unit control stations on the Skagit River and Cultus Mountain Tributaries. Ecology would like to better understand the current water right situation for municipal water suppliers located upstream of the City of Sedro Woolley. RH2 was retained by Ecology to conduct the following analysis:

1. Identify municipal water suppliers that have inchoate water rights and might be able to provide service to vacant lots in and around their service area.
2. Identify municipal water suppliers that have historically perfected water rights in excess of what they project to need at full buildout due to changes in water use within their community, such as through the loss of a large industrial user.
3. Identify opportunities for source water exchange where a proportionately large impact on a tributary could be traded for a proportionately smaller impact on the Skagit River through a change in point of withdrawal/diversion location.

The purpose of this report is to provide Ecology and the WWT with preliminary findings so that they can determine if it is advisable to enter into negotiations with specific municipal water suppliers regarding acquisition (whether permanent or temporary) and placement of water rights into the Trust Water Program for use as mitigation for water uses that initiated post-rule.

The extent of the study area is described in **Table 1** and visually depicted in **Figure 1**.

Table 1

Skagit Basin Municipal Water Right Assessment Study Area			
Basin Location	**Township**	**Range**	**Sections**
Ross Lake to Rockport	T38N	R13E	35, 36
	T37N	R13E	1, 2, 4, 5, 6, 7, 8
	T37N	R12E	11, 14, 15, 16, 20, 21, 22, 28, 29, 30, 31
	T36N	R11E	21, 28, 29, 29, 30, 31, 32
	T35N	R11E	5, 6, 7, 8, 11, 12, 13, 14, 15, 16, 17, 18
	T35N	R10E	1, 12, 13, 14, 15, 20, 21, 22, 23, 24, 25, 26, 28, 29, 30, 31, 32
	T35N	R09E	18, 19, 20, 24, 25, 26, 27, 28, 33, 34, 35, 36
Darrington to Rockport	T34N	R09E	1, 2, 3, 10, 11, 12, 13, 25
	T34N	R10E	5, 6, 18
	T33N	R10E	5, 17, 18, 19, 20, 29, 30, 31, 32, 33, 34
	T32N	R10E	4, 5, 6, 7, 8, 9, 11, 12
	T32N	R09E	11, 12, 13, 14, 23, 24, 25, 36
Rockport to Hamilton	T35N	R08E	1, 2, 3, 4, 5, 6, 7, 8, 9 10, 11, 12, 13, 14, 15, 16, 21, 24
	T36N	R08E	15, 21, 22, 27. 28. 33, 34
	T35N	R07E	1, 2, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 22, 23, 24
Hamilton to Sedro-Woolley	T35N	R06E	2, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18,19, 20, 21, 22, 24, 28, 29, 30, 31, 32, 33
	T35N	R05E	8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 32, 33, 34, 35, 36
	T34N	R05E	2, 3, 4, 5, 8, 9

RH2 used Ecology's Water Resources Explorer to list all of the water rights in the identified study area. RH2 examined every water right and claim to determine whether the purpose of use was for group domestic or municipal and to determine, where possible, whether a water system was sufficiently large to qualify as having a municipal purpose water right. In making this determination, RH2 relied on the definition of municipal purpose water rights embodied in RCW 90.03.015(4) which reads as follows:

> (4) "Municipal water supply purposes" means a beneficial use of water: (a) For residential purposes through fifteen or more residential service connections or for providing residential use of water for a nonresidential population that is, on average, at least twenty-five people for at least sixty days a year; (b) for governmental or governmental proprietary purposes by a city, town, public utility district, county, sewer district, or water district; or (c) indirectly for the purposes in (a) or (b) of this subsection through the delivery of treated or raw water to a public water system for such use. If water is beneficially used under a water right for the purposes listed in (a), (b), or (c) of this subsection, any other beneficial use of water under the right generally associated with the use of water within a municipality is also for "municipal water supply purposes," including, but not limited to, beneficial use for commercial, industrial, irrigation of parks and open spaces, institutional, landscaping, fire flow, water system maintenance and repair, or related purposes. If a governmental entity holds a water right that is for the purposes listed in (a), (b), or (c) of this subsection, its use of water or its delivery of water for any other beneficial use generally associated with the use of water within a municipality is also for "municipal water supply purposes," including, but not limited to, beneficial use for commercial, industrial,

> irrigation of parks and open spaces, institutional, landscaping, fire flow, water system maintenance and repair, or related purposes. (RCW 90.03.015(4))

RH2 used the WDOH Sentry database to identify the public water system identification number and to evaluate the size of the system in terms of a number of factors, including the system's water distribution capacity, population served, and the number of permanent and part-time residential connections. In the next step, RH2 used Ecology's Water Rights Explorer database to evaluate the water rights for each system and to determine whether the systems appeared to have the water rights capacity to add new connections.

CATEGORY 1 – HISTORICALLY PERFECTED MUNICIPAL WATER RIGHTS ANALYSIS

Water systems were explored from upriver to downriver with focus on those systems that appear likely to have historically perfected a larger annual volume than is currently used, and potentially more than will be needed in the future. RH2 had discussions with each entity identified and, based on those discussions, has divided this category up into two subcategories; 1) Those entities that are willing to discuss utilization of a portion of their water rights for mitigation and, 2) Those entities that are not interested in further discussion of utilization of a portion of their water rights for mitigation.

For those entities willing to discuss the utilization of a portion of their water rights for mitigation, Ecology and WWT are encouraged to focus time and effort into pursuing advanced discussions and negotiations with the goal of acquiring water rights to be entered into the Trust Water Right Program to be used as mitigation for permit-exempt wells drilled and first put to use after Chapter 173-503 WAC became effective on April 14, 2001.

Entities Willing to Discuss Utilization of Their Water Rights for Mitigation

The following three entities (Town of Darrington, Cascade River Community Club, and Skagit County Parks and Recreation Department) have water rights that have the following attributes:

1. They were perfected at a use level that is higher than current and future forecasted use.
2. The water rights still qualify as being for municipal water supply purposes.
3. The water right holders have expressed an interest in continuing discussions on how a portion of their water rights may be used as mitigation.

Town of Darrington (Public Water System ID: 17950) – Remainder under S1-163865CL

The Town of Darrington is located on the Sauk River near its surface water divide with the North Fork Stillaguamish River in Water Resources Inventory Area (WRIA) 4 in Snohomish County.

Municipal Water Right Qualification

The Town of Darrington was supplied water from a surface water source from approximately 1916 to 1985. The only reason surface water usage stopped was because of dam safety concerns that led to the dam being removed. The historic water use was determined to be municipal through water right change CS1-163865CL. RH2 has determined that for S1-163865CL, the Town of Darrington is in active compliance by conformance with the beneficial use definition due to the inclusion of this water right in its water system plan, which included identifying it in the water right self-assessment table (Trepanier Engineering, 2001), and also because this portion of the water right was recognized as being valid through the 2003 and 2005 change application processes.

Historic Peak Use

Ecology performed a tentative determination on SWC 28 and S1-163865CL, which are held by Darrington, when a water right change (CS1-163865CL) was processed in 2003. The change was related to the Town's diversion of municipal water from a surface water reservoir on a stream, which had been the primary source of water for the Town from approximately 1916 through 1985. Two water rights were on file with Ecology for this source and Ecology determined them to be for the same water use. As part of the investigation for change application CS1-163865CL, Ecology performed a tentative determination analysis on both that water right and the related SWC 28. The historic use documented in that report of examination for change and in the water right file is summarized in the next sections.

Instantaneous Rate

In the report of examination for change, the total perfected annual volume was calculated, but the maximum perfected instantaneous rate was not determined. Three hundred and fifty gallons per minute (gpm) was transferred under the water right change to the new groundwater source. SWC 28 was for 1 cubic foot per second (cfs) (449 gpm) and S1-163865CL indicated that 350 gpm was being used when the claim was filed, and 1,500 gpm was claimed. In the water right file, an analysis of the instantaneous rate that could be transported to Darrington through the 10-inch-diameter asbestos-cement pipe leading from the reservoir indicated that the peak flow rate would have been approximately 1,800 gpm (4 cfs). Based on the information in the file, it seems reasonable to conclude that the full claimed instantaneous rate of 1,500 gpm under S1-163865CL had been perfected. Since 350 gpm under S1-163865CL has been transferred to the Town of Darrington's wells, this left 1,150 gpm under this claim that could now be used for mitigation.

Annual Volume

In the report of examination for change, the total perfected annual volume was calculated to have been 674 afy. Through the water right change, 570 afy was transferred to a new groundwater source (Well No. 3). The remaining 104 afy was identified as being perfected, but remained at the site of the surface water reservoir (CG1-163865CL). The 104 afy was also identified in a subsequent round of change applications processed for the Town of Darrington (CS1-163865CL@1, CG1-24424C, CG1-24653C, and CG1-25514C) in 2005 as not in use by the Town, but still available under the water right claim due to its prior perfection (see excerpt from one of the most recent report of examination for change in the Future Water Needs section below).

Current Use

There is currently no use of surface water from the Town of Darrington's old reservoir site.

Future Water Needs

The Town of Darrington told RH2 that there is no planned use of the surface water from the old Town reservoir site as all Town water will come from the Town's wells.

Following is an excerpt from the most recent round of the Town of Darrington's change applications, which were processed by Ecology in 2005. These tables support the fact that the remaining surface water right is eligible for use as mitigation.

> ***Existing Rights for the Town of Darrington***
>
> *A search of Ecology's water right database reveals six active water right documents for either the Town of Darrington or Darrington Water Works, which was the name of the water system prior to the Town taking it over.*

Table 1. Town of Darrington Water Right Certificates and Claims Currently Being Changed				
Water Right	*Qi (gpm) Primary*	*Qa (afy) Primary*	*Current Approved Point of Withdrawal*	*Location of Well*
Water right claim 163865 & SWC 28 at Well #3 site	*350*	*570*	*Well #3*	*SW ¼, SW ¼, Sec. 24, T32N, R9E*
G1-24424C	*120*	*96*	*Airport Well*	*SW ¼, SE ¼, Sec. 14, T32N, R9E**
G1-24653C	*550*	*208*	*Well #1*	*NE ¼, SE ¼, Sec. 23, T32N, R9E*
G1-25114C	*300*	*0***	*Well #2*	*NE ¼, SE ¼, Sec. 23, T32N, R9E*
Total	***1320***	***874***		

** This well is incorrectly identified as being located within the SW ½, SE ¼ on the face of the original certificate*
*** The combined annual quantity for G1-24424C, G1-24653C, and G1-25114C shall not exceed 304 acre-feet per year.*

The four water right certificates and claims listed in Table 1 all have change applications filed on them. These four water rights are all for municipal water supply purposes. The change applications request to add additional points of withdrawal so that all of the wells listed in Table 1 are approved points of withdrawal under each water right. The total amount of water that can be withdrawn under these four water rights is 1,320 gpm on an instantaneous basis and 874 acre-feet per year on an annual basis.

Table 2. Town of Darrington Water Right Certificates and Claims Currently Not Being Changed				
Water Right	*Qi (gpm) Primary*	*Qa (afy) Primary*	*Current Approved Point of Withdrawal/Diversion*	*Location of Withdrawal/Diversion*
Water right claim 163865 & SWC 28 at Old Reservoir Site	*---*	*104*	*Old Reservoir (no longer in use)*	*SW ¼, NW ¼ and NW ¼, SW ¼, Sec. 25, T32N, R9E*
G1-163866CL	*250*	*120*	*Airport Wells (July through September)*	*SW ¼, SE ¼, Sec. 14, T32N, R9E*
G1-24573C	*30*	*6*	*Begis Well*	*SE ¼, NW ¼, Sec. 25, T32N, R9E*

The three water right certificates and claims listed in Table 2 are held by the Town, but are not having changes made to them. Ground water certificate G1-24573C is for the Begis Well, which serves the plat of Begis Sauk River Tracts. This well and the associated water system are not physically connected to the Town of Darrington water system that serves the Town.

Note; As discussed below, the Town of Darrington now serves the Begis Sauk River Tract area and the groundwater right (G1-24573) may not be available for mitigation.

Excess Water Potentially Available

There are 1,150 gpm and 104 afy that have been perfected, but not transferred to the wells, and which are available to be acquired for mitigation.

Darrington Water System (32139 - Inactive) – G1-24573C

The Town of Darrington also provided satellite service to the Bagis Tracts (32139R - Inactive) under groundwater certificate G1-24573C, which was originally issued for 15 homes and is for 30 gpm and 6 afy. The WDOH Sentry database indicates that this water system was made inactive in September, 1988, and RH2 presumes that this is when the Town system was connected to the Begis system and the Town began providing water to this area. This means that the associated groundwater certificate (G1-24573C) could be available for mitigation. At the time it was made inactive, the WDOH identified this as a Group A Community system that had a residential population of 35 and a nonresidential population of 0, with 11 calculated connections. The Snohomish County Online Property Information website was reviewed on August 4, 2014, and of the 45 lots included in the Begis Sauk River Tracts, only 8 of the lots identified the use as single-family residence – detached; 2 others identify non-residential structures; and the remaining lots were identified as undeveloped (vacant) land. However, during our meeting with the Town of Darrington on September 23, 2014, the Town indicated that there were 15 to 18 homes constructed in the Begis Tracts.

Municipal Water Right Qualification

The Town of Darrington was issued this water right to serve a development of 15 homes (Bagis or Begis Tracts) that was remote from where the Town had infrastructure at the time. A water right certificate was issued in 1985 for the proposed 15-lot development. Town staff indicated that they thought there were 15 to 18 homes served by this system when it was active. RH2 has determined that, for G1-24573C, the Town of Darrington is in active compliance by conformance with the beneficial use definition due to the inclusion of this water right in its water system plan, which also included identifying it in the water right self-assessment table (Trepanier Engineering, 2001).

Historic Peak Use

No metering data exists for this water system; therefore, water use had to be estimated for the purposes of this report.

Instantaneous Rate

No pumping rate was identified in Sentry for the well that was the point of withdrawal. No well log is contained either in the water right file or within Ecology's Washington State Well Log Viewer (accessed on August 6, 2014). The report of examination indicated that the well was 35 feet deep and that a 3 horsepower pump was installed that was capable of pumping 35 gpm. A review of submersible pump curves suggest that pumping up to the water right limit of 30 gpm is reasonable with a 3 horsepower pump/motor (from http://www.berkeleypumps.com/resources/images/2274.pdf, accessed on August 6, 2014). Therefore, RH2 believes that the instantaneous rate has been fully utilized up to the water right limit of 30 gpm.

Annual Volume

Darrington's 2001 water system plan identified an average day demand per equivalent residential unit of 269 gallons per day (gpd), which equals 0.3 afy per equivalent residential unit. Assuming that the estimation of 15 homes in the Begis Tracts is correct, and that these are equivalent residential units, the highest use by the 15 homes would be 4.5 afy, which is less than the water right limit.

Current Use

There is currently no use of groundwater under this water right since the place of use is provided water through the larger Town system.

Future Water Needs

There is no planned use of groundwater under this water right since the place of use is provided water through the larger Town system.

Excess Water Potentially Available

The amount of water that is potentially available for mitigation use is estimated to be 30 gpm and 4.5 afy.

Cascade River Community Club (11494) – Surface Water Rights Only

The Cascade River Community Club water system is located east of the Town of Marblemount adjacent to the Cascade River in WRIA 4 in Skagit County, Washington. This water system holds three water rights (**Table 2**). These water rights are all identified as being for community domestic supply. The two surface water rights (S1-00362C and S1-24441C) add up to a total of 0.086 cfs (38.6 gpm) and 27 afy, and are additive to the groundwater certificate G1-20975C which allows for withdrawal of 125 gpm and 200 afy (**Table 2**). The water facilities inventory (WFI) form for Cascade River Community Club indicates that the surface water diversion from Boulder Creek went inactive in 2002. WDOH indicated that this water system is in the process of preparing a water system plan. This water system plan will give Ecology and WWT a better understanding of the history of water use and also the forecasted future demand and what portion of the groundwater right is anticipated to be used and what might be excess.

Table 2
Cascade River Community Club Water Rights

Water Right Number	Priority Date	Source	Instantaneous Rate	Annual Volume
S1-00362C	5/22/1963	Boulder Creek	0.06 cfs (26.9 gpm)	27 afy
G1-20975C	10/24/1973	Well	125 gpm	200 afy
S1-24441C	12/22/1983	Boulder Creek	0.026 cfs (11.7 gpm)	18.5 afy (non-additive to S1-00362C)
		Total	*163.6 gpm*	*227 afy*

Municipal Water Right Qualification

The Cascade River Community Club has been continuously supplied water either from Boulder Creek or a well under the water rights in **Table 2** since the mid-1960s. Over that period, water has been consistently provided for residential use for at least 15 residential service connections.

Historic Peak Use

No water use data was available for the Boulder Creek diversion. Therefore, peak historic use had to be estimated for this report.

Instantaneous Rate

The WFI form indicated that the pumping rate from Boulder Creek was 25 gpm when the source was active. It is assumed that this was the peak historic rate diverted from the creek.

Annual Volume

It is assumed that the recent metered groundwater use of up to 16.8 afy in 2008 represents a reasonable upper limit on beneficial use for the surface water rights as well when they were the source of supply (**Table 14**).

Current Use

There is currently no permanent use of surface water from Boulder Creek.

Future Water Needs

In RH2's meeting with Mr. Barnhard on September 23, 2014, he indicated that the Cascade River Community Club would like to maintain the Boulder Creek water rights for emergency/backup supply to the groundwater source since the well site is subject to flooding.

Excess Water Potentially Available

There is estimated to be 25 gpm and 16.8 afy that has been perfected under the two surface water rights, but is not currently being diverted from Boulder Creek, and is available to be used for mitigation. It might be possible to allow the Cascade River Community Club to maintain the Boulder Creek source for emergency/standby supply, along with a portion of the annual volume and still provide some of this water for mitigation, since it is highly unlikely that a period when the Cascade River is flooding would correlate with a time when the actual discharge of the Skagit River falls below the minimum instream flow levels designated in Chapter 173-503 WAC. It may also be possible to drill a replacement well that is located out of the floodplain. This would allow use of the well even during flood events and the system would be less reliant on the surface water right and it may then be available for mitigation. Ecology and WWT should consider further exploration of this option with the Club.

Howard Miller Steelhead Park (83975 – Inactive) – G1-23340C

Howard Miller Steelhead Park is located just west of the Town of Rockport in WRIA 4, on the north side of the Skagit River at its confluence with the Sauk River. The park is operated by Skagit County Parks and Recreation. The water source for this park used to be a well located within the park boundary. Water Right G1-23340C authorizes withdrawal of 60 gpm and 20 afy. In 2002, Howard Miller Steelhead Park was connected to the Skagit PUD – Rockport water system. However, as learned during a meeting on October 3, 2014, with Skagit County Parks and Recreation, the well is still used for some non-potable uses within the park.

Municipal Water Right Qualification

The water right for Howard Miller Steelhead Park was issued to Skagit County Parks, Recreation and Senior Services, which is a branch of county government. The water right was issued for the park, which RH2 believes constitutes a governmental or governmental proprietary purpose and, therefore, qualifies it as being a water right for municipal water supply purposes. Even though the public water system has been inactive for 12 years, there has still been some use from the well by the County and RH2 believes that the right has been protected from relinquishment because the water right is being used for municipal water supply purposes and was owned by a qualifying governmental entity.

Historic Peak Use

No metering data exists for the well; therefore, water use had to be estimated for this report.

Instantaneous Rate

Even though the system is inactive, the WFI form identifies the pumping rate of the well as being 60 gpm, which is equal to the water right limit. Therefore, it is likely that the well pumped at the water right limit.

Annual Volume

Water metering data from Skagit PUD for Howard Miller Steelhead Park (**Table 3**) suggests that during the period of 2002 through 2014, the highest domestic water use was 2.2 afy in 2006. So, at a minimum, this volume of water, which used to be pumped under G1-23340C prior to 2002, has been perfected and could be available for mitigation use.

Table 3
Skagit County Parks and Recreation Department
Howard Miller Steelhead Park Potable Use

Year	Annual Volume (afy)
2002	1.5
2003	1.6
2004	1.2
2005	1.3
2006	2.2
2007	1.7
2008	2.0
2009	2.1
2010	1.9
2011	1.5
2012	1.5
2013	1.9
2014[1]	1.1

Note: Data obtained from Skagit PUD
[1] Partial year

Current Use

Discussion with Mr. Brian Adams, Skagit County Parks and Recreation Director, on October 3, 2014, suggested that water is still being used from this well for landscaping irrigation but is no longer being used to supply the potable water for the park. Potable water for the park is provided by the Skagit PUD – Rockport water system. Non-potable use of landscape irrigation will continue. (Source: personal communication between Mr. Brian Adams and Andy Dunn on January 28, 2015). This irrigation is reported to be a single sprinkler running off of a garden hose that is used to irrigate areas as needed. The rate needed is 5 gpm, and the annual volume estimated for irrigation (assuming 12 hours per day between July and September) is approximately 1 afy.

Future Water Needs

There is no anticipated future domestic use under the County's groundwater right since the park is served by the Skagit PUD – Rockport water system. The landscaping irrigation is expected to continue at the same rate of approximately 1 afy.

Excess Water Potentially Available

The estimated perfected water that could be available is at least equal to 55 gpm and the historic domestic use of 2.2 afy. Additional historic information will have to be obtained from Skagit County Parks and Recreation Department before a final determination can be made on how much water has been perfected historically, which could push that number higher than just the domestic uses.

Conclusion

Table 4 summarizes the water rights, rates, and volumes that have been historically perfected and that could potentially be available for mitigation. This table has been limited to those entities that expressed an interest in continuing to discuss potential sale of a portion of their water rights for use as mitigation.

Table 4
Summary of Interested Water Right Holders and
Perfected Water Rights Potentially Available for Mitigation

Water System Name	Water Right Number	Potentially Available Qi (gpm)	Potentially Available Qa (afy)
Cascade River Community Club	Perfected Portion of S1-00362C and S1-24441C	25	16.8
Town of Darrington	Remainder under both S1-163865CL and SWC 28	1,150	104
Town of Darrington	G1-24573C	30	4.5
Skagit County Parks and Recreation Department	G1-23340C	55	2.2
	Total	***1,260***	***127.5***

The farther upstream a water right is located in the river basin, the more potential there is for it to mitigate for additional permit-exempt well development downstream (**Figure 2**). Although, any water that can be obtained for mitigation will provide benefit at the control point on the Skagit River in Mount Vernon. In summary, RH2 recommends that the WWT pursue discussions with the entities in the following order based on the rate and volume of water that might be available to purchase for mitigation and their location in the watershed:

1. Town of Darrington
2. Cascade River Community Club
3. Skagit County Parks and Recreation Department

Entities Not Interested in Considering Utilization of Their Water Rights for Mitigation

The following two entities have previously perfected and maintained water rights that could be acquired for mitigation. However, they have expressed to RH2 and/or Ecology that they are not interested in further discussing the use of a portion of their water rights for mitigation. Therefore, they are identified here, but RH2 does not recommend that Ecology or the WWT spend additional time trying to pursue acquiring municipal water from them for mitigation.

Seattle City Light – Diablo (19200) – All of SWC 1005 and Portion of G1-00490C

The Community of Diablo (19200V), located downstream of Diablo Dam, was created by Seattle City Light to house workers on its Skagit River Hydropower Project. This community is located in WRIA 4, along the north bank of the Skagit River within Whatcom County, Washington. The municipal water rights for the Community of Diablo (SWC 1005 and G1-00490C) total 300 gpm and 90 afy. Details on these water rights can be found in **Table 5**.

Table 5
Seattle City Light – Diablo Water Rights

Water Right Number	Priority Date	Source	Instantaneous Rate	Annual Volume
SWC 1005	6/16/1934	Pyramid Creek	1.78 cfs (799 gpm)	Not Specified
G1-00490C	12/13/1971	Well	300 gpm	90 afy
		Total	*1,099 gpm*	*90 afy*

Note: The report of examination for G1-00490C limits the annual volume under both SWC 1005 and G1-00490C to 90 afy.

This water system is classified by WDOH as a Group A Community system with a green operating permit and it has a residential population of 28 and a nonresidential population of 25, with a total of 42 calculated connections and 65 approved connections.

Municipal Water Right Qualification

The Diablo Water System has been continuously supplied water either from Pyramid Creek or a well under the water rights in **Table 5** since the mid-1930s. Over that period, water has been consistently provided for residential use for at least 15 residential service connections. SCL (City of Seattle) is also one of the qualifying governmental entities under RCW 90.03.015(4)(b).

Historic Peak Use

No historic metering data was provided; therefore, water use had to be estimated for this report.

Instantaneous Rate

Diablo's WFI mentions the well as Source 01 and does not mention a diversion from Pyramid Creek. The effective date of the system is identified as January 1, 1970. It is likely that Diablo stopped using Pyramid Creek as a source of municipal supply when the well was constructed. The groundwater right was issued in early 1972. The water line from the Pyramid Creek diversion was suspended from a footbridge across the Skagit River which was removed shortly after the well was constructed. (Source: Personal knowledge of Mr. Jim Bucknell, RH2, former Diablo resident). It is assumed that the historic pumping rate of the well was at least 300 gpm since the certificate issued for this rate.

Annual Volume

The peak annual volume under the two water rights likely came at different points in time. Regardless, the report of examination for G1-00490C limited the annual volume under both water rights to 90 afy. Specific data on the number of homes and per capita water use was not provided by SCL.

Over time, the population within these communities has shrunk as automation has reduced the on-site staff requirement and the passage of time has made it more economical to demolish rather than restore the homes. It is estimated that approximately 28 homes have been demolished within Diablo with the

commensurate reduction in water use (Source: Personal knowledge of Mr. Jim Bucknell, RH2, former resident of Diablo).

Current Use

Instantaneous Rate

The current capacity of the well is identified as 250 gpm on the WFI.

Annual Volume

Water use efficiency (WUE) metering data shows that over the past 5 years, the Diablo Water System well has produced from 26.5 to 70.5 afy for municipal supply, as shown in **Table 6**. This reduction in volume may be the result of a reduction in outdoor lawn irrigation of the old school yard and other common areas within the community.

Table 6
Seattle City Light - Diablo Metering Data

Year	Diablo Annual Volume (afy)
2009	32.3
2010	58.8
2011	70.5
2012	26.9
2013	26.5

Note: 2009 – 2013 data from WUE reports.

Future Water Needs

SCL's plans for the future of Diablo and its water supply are unknown, however, SCL has indicated that it desires to maintain all of its municipal water rights to prepare it for unforeseen increases in water use within Diablo.

Excess Water Potentially Available

Based on this analysis, RH2 estimates that there is at least 50 gpm and 20 afy of excess perfected water at Diablo that will no longer be needed for municipal supply. However, in December of 2014, Mr. Tom Loranger of Ecology told RH2 that SCL told him that SCL would like to maintain flexibility with this development and they are not interested in parting with a portion of the municipal water rights for mitigation purposes.

Seattle City Light – Newhalem (59250) – Portions of G1-00489C and G1-23722C

The Community of Newhalem, located near the Gorge Powerhouse, was created by SCL to house workers on its Skagit River Hydropower Project. The community is located in WRIA 4, along the Skagit River within Whatcom County, Washington. The municipal water rights for the Community of Newhalem (G1-00489C and G1-23722C) total 800 gpm and 333 afy. Details on these water rights can be found in **Table 7**.

Table 7
Seattle City Light – Newhalem Water Rights

Water Right Number	Priority Date	Source	Instantaneous Rate	Annual Volume
SWC 1172	7/21/1920	Ladder Creek	20 cfs	Not Specified
G1-00489C	12/13/1971	Well	600 gpm	312 afy
G1-23722C	11/26/1980	Well	200 gpm (additive) 600 gpm (nonadditive)	21 afy (additive) 312 afy (nonadditive)
		Total	***800***	***333***

Not Specified – Older surface water rights usually never included an explicit limit on the annual volume, as was the case with this water right.

The Ladder Creek water right (which says it was for domestic supply at Gorge Powerhouse) was the domestic supply for Newhalem before SCL drilled a well to supply the domestic supply needs of Newhalem. The last page of the application says "domestic supply for Gorge Plant to supply the construction camp and permanent operators' cottages in connection with Gorge Plant development." They listed a present population of 250 in 1920 and projected population of 750 in 1921. It lists current use at 12,500 gpd, and 37,500 gpd as the buildout, which equates to 42 afy.

This water system is classified by WDOH as a Group A Community system with a green operating permit and it has a residential population of 30 and a nonresidential population of 247, with a total of 43 calculated connections and 600 approved connection.

Municipal Water Right Qualification

The Newhalem Water System has been continuously supplied water either from Ladder Creek or a well under the water rights in **Table 7** since the early 1920s. Over that period, water has been consistently provided for residential use for at least 15 residential service connections. SCL (City of Seattle) is also one of the qualifying governmental entities under RCW 90.03.015(4)(b).

Historic Peak Use

No historic metering data was provided; therefore, water use had to be estimated for this report.

Instantaneous Rate

For surface water use, little is known about the historic water use and SCL has not provided detailed data and records of its water use.

For groundwater use, the Proof of Appropriation form for G1-23722C indicated that the well was capable of pumping 826 gpm. Upon submittal of this form, the certificate was issued for a total instantaneous rate of 800 gpm, which is the maximum instantaneous rate that could be issued under the two groundwater rights.

Annual Volume

Although SCL did not provide detailed information about the historic use of water in Newhalem, some information was available from the WDOH Sentry database, and is shown in **Table 8**. Given the historic population and the relatively large amount of landscape irrigation that routinely occurred, it is assumed that these water rights were fully perfected.

Over time, the population of Newhalem has shrunk as automation has reduced the on-site staff requirement and the passage of time has made it more economical to demolish rather than restore the homes. Based on local knowledge of the area, it is estimated that approximately 50 structures, most of which were single-family homes, have been removed by SCL in Newhalem (Source: Personal knowledge of Mr. Jim Bucknell, RH2, former resident of Diablo).

Current Water Use

Instantaneous Rate

The current capacity of the well is identified as 600 gpm on the WFI, which is less than the combined water right maximum of 800 gpm.

Table 8
Seattle City Light - Newhalem Metering Data

Year	Newhalem Annual Volume (afy)
2009	61.3
2010	43.2
2011	40.4
2012	47.0
2013	48.9

Note: 2009 – 2013 data from WUE reports.

Excess Water Potentially Available

Based on this analysis, RH2 estimates that there is at least 200 gpm and 272 afy of excess perfected water at Newhalem that will likely no longer be needed for municipal supply. However, Ecology staff mentioned to RH2 that, in December 2014, representatives of SCL told Ecology that SCL would like to maintain flexibility with this development and are not interested in parting with a portion of the municipal water rights for mitigation. Therefore, no excess water is available for mitigation.

Concrete Utilities (03950) – Portion of GWC 71-D

Concrete Utilities is a branch of town government and provides water to the Town of Concrete. The Town of Concrete is located in WRIA 4, on the north side of the Skagit River at its confluence with the Baker River. Concrete gets its water from a developed spring (referred to as Grassmere Spring or Superior Spring) to the north of Town on the south side of Burpee Hill. Water right GWC 71-D authorizes withdrawal of 750 gpm and 1,190 afy and was originally issued to the Superior Portland Cement, Inc. (**Table 9**). The Town of Concrete once had both the Washington Portland Cement Company and Superior Portland Cement, Inc. cement plants driving the economy by producing cement with locally derived limestone and clay. The Town's water right, GWC 71-D, was issued to Superior Portland Cement, Inc. based on a groundwater declaration and it recognized a priority date of 1908. The water system was gifted to the Town in 1982 from Lone Star Industries and Baker River Power, Light, and Water (formerly Superior Portland Cement Company) (Reichhardt & Ebe Engineers, 2012).

Table 9
Town of Concrete Water Rights

Water Right Number	Priority Date	Source	Instantaneous Rate	Annual Volume
GWC 71-D	1908	Grassmere Spring	750 gpm	1,190 afy
		Total	***750 gpm***	***1,190 afy***

Municipal Water Right Qualification

The Concrete Utilities Water System was originally developed by a private company (Superior Portland Cement, Inc.). The water system, which was started in 1908, provided water to not only the cement industry, but also to the other area residential and commercial water users. From 1908 to present, water has been consistently provided for residential use for at least 15 residential service connections.

Historic Peak Use

No historic metering data was provided; therefore, water use had to be estimated for this report.

Instantaneous Rate

The water system plan (Reichhardt & Ebe Engineers, 2012) indicated that the maximum discharge rate from the spring was not known but that previous investigators had measured the source capacity at 400 gpm, 291 to 325 gpm, 312 gpm, and 475 gpm. However, based on the WUE metering data, which does not include water overflowing from the Grassmere Tank, the average flow over the course of the year, as measured during 2012 and 2013, was approximately 500 gpm. Since the metering data does not account for overflow from the Grassmere Reservoir or seasonal fluctuations, we have assumed that the peak instantaneous rate is at least 10 percent higher than the average discharge, which would make it equal to 550 gpm.

Annual Volume

Review of the book, *So they called the town "Concrete"* (Dwelley, 2004) and the water system plan, and internet research on the history of the Town of Concrete provided the information in this section. The highest water use period was likely from 1912 to approximately the mid-1920s when cement was in high demand, steam trains were responsible for moving material from the quarries to the plants and from the plants to market, there were multiple lumber and shingle mills, there was an estimated peak population of 1,700 people within town limits, and a large influx of people visiting the town on weekends from surrounding areas and logging camps.

Historic Information

The Town of Concrete began as the independent communities of Cement City (east of the Baker River) and Baker (west of the Baker River). Each community had its own cement company. Cement City was built around the Washington Portland Cement plant, which was constructed starting in September 1905 with production beginning in 1906. Baker was built around the Superior Portland Cement plant, which was constructed starting in 1907 and began production in the summer of 1908. The two communities were incorporated into the Town of Concrete in the spring of 1909. The Superior Portland Cement Company installed water lines to homes and businesses shortly after incorporation and formed the Baker River Power, Light & Water Company to handle the utility systems. The source of the water was the same as it is today, which is a spring on the hillside in West Concrete. The power and water were said to be provided at reasonable rates (Dwelley, 2004).

In September 1912, Superior Portland Cement Company, was awarded a contract to furnish the cement for the Lake Washington Ship Canal and locks. When orders were numerous, the plant ran steadily; when the sales dropped off, it was the custom to fill all storage capacity and then shut down for a month or two. Except for local projects, all cement was shipped out on the railroad (Dwelley, 2004).

Cement was made using the wet process in the Washington Portland Cement plant and was originally made using the dry process in the Superior Portland Cement plant until it also converted over to the wet process in February 1918. The wet process used more water since the raw materials were mixed into a slurry to be transported around the facility and into the kilns (Dwelley, 2004).

In December 1918, Superior Portland Cement purchased Washington Portland Cement and closed the Washington Portland Cement plant and relocated its equipment to the Superior Portland Cement plant (Dwelley, 2004).

There has been a train depot in Concrete since before it became a town. By 1912, the local depot was second only to Bellingham in freight handling in northwest Washington. In 1921, the Superior plant was able to load and ship 70 railcars in one day. In 1950, the steam engines were replaced by diesel engines (Dwelley, 2004).

Other times associated with cement production and associated services were from 1923 to 1926 when the Lower Baker River dam was built, periodically from 1921 to 1961 with construction of the Skagit River Hydroelectric Project dams by Seattle City Light, and from 1933 to 1942 during construction of the Grand Coulee Dam (over half of the cement used in building this dam came from the plant at Concrete). The most recent cement boom came with the building of the Upper Baker dam, which was completed in 1959 (Dwelley, 2004). Peak production was reported to be 5,200 barrels of cement per day (Seattle Daily Journal of Commerce, June 3, 2005). The cement plant closed in January 1969 (Dwelley, 2004).

The location of the Town of Concrete, in the center of what was a thriving timber industry, meant that it was the place to spend a weekend or holiday away from the bunkhouses in the logging camps. The community was well prepared to take care of visitors with several rooming houses and hotels, bath facilities, saloons (at one time there were 17 saloons within the Town), general stores, restaurants, butcher, blacksmith, tailor, a steam laundry, bank, and barber. Civic facilities included schools, which drew students from a large area, three churches, and a hospital. Other industries in town included the Baker River Lumber Company shingle mill, which used a steam power plant (Dwelley, 2004).

Cement Production

Estimating the volume of water used for wet process cement production was based on the following estimation. A reference indicated that the finely ground limestone and clay was mixed into a slurry that was approximately 65 percent solids (http://www.epa.gov/ttnchie1/ap42/ch11/final/c11s06.pdf, accessed on July 29, 2014). Also, for every 100 units of raw material (excluding water), 69 units of finished product is produced (http://www.pavementinteractive.org/article/cement-production, accessed on July 29, 2014). Therefore, the weight of the raw materials are 145 percent of the finished weight that is packaged for transport and sale. Finished cement is measured by the barrel. One barrel of Portland cement is equal to 4 cubic feet, or 376 pounds of finished cement (http://www.sizes.com/units/barrel_USconv.htm, accessed on July 29, 2014). Therefore, for every barrel produced, there was 5.8 cubic feet of solid raw material used. Since the slurry that is created with the raw materials is 35 percent water, 5.8 cubic feet times 35 percent is equal to 2.03 cubic feet of water

(approximately 15 gallons) that is added to form the slurry that goes into making one barrel of finished cement. As referenced above, peak production was reported to be 5,200 barrels of cement per day. Five thousand two hundred barrels times 15 gallons of water per barrel is equal to 78,000 gallons per day. When a big job was being performed, it is assumed that the plant ran continuously and that would equal a total water use of 87 afy for Portland cement production.

Domestic Use

In 2009, the population of the Town was listed as approximately 840 people (Reichhardt & Ebe Engineers, 2012). This is approximately half of the population from the historic peak use period, which was approximately 1,700 people (Dwelley, 2004). If the current water use for domestic, commercial/industrial, and school use is assumed to be approximately half of what it was historically for these same uses (besides the cement plants, railroads, and mills), then these historic uses would add up to 440 afy.

The large influx of visitors to the town each weekend, which was likely more pronounced historically than it is presently, and their use of water in hotels, saloons, and barber shops likely would be similar to the domestic use, just for only 2 days per week. This would equal another 126 afy. Therefore, total domestic and associated hotel, laundry, and shop uses are estimated to be 566 afy.

Railroad

As mentioned above, the railroad depot in Concrete was moving an enormous amount of product from the Town to distant markets. Prior to 1950, all of the railroads used were steam-powered. In addition to the trains taking material to distant markets, there were railroads that were moving material from the limestone quarry and clay pits to the cement plants prior to conversion to the aerial tramway sometime around 1923 when the Lower Baker Dam was constructed (Dwelley, 2004). There were at least two trains per day used for coach fares in addition to the freight trains and company trains (Dwelley, 2004). There were also two trains running west with freight and one train running east to Rockport each day (personal communication between Jim Bucknell, RH2, and Mr. Bill Newby, long-time Skagit Valley resident, on August 5, 2014). If each train is assumed to fill its approximately 5,000-gallon tank before each trip, and it is assumed that there is at least 5 trips per day leaving the station, that would equal 25,000 gpd (28 afy) for this use.

Shingle and Lumber Mills

Report of Examination for Change CS1-163865CL, for the Town of Concrete, contained estimates that a mill would use approximately 34,000 gpd (38 afy). Assuming that there were at least two mills operating in Concrete every day, which there were in 1908 (Dwelley, 2004), this use would equal 76 afy.

Summary

Table 10 contains an estimate of the annual volume perfected under this water right for municipal supply for the Town of Concrete.

Table 10
Town of Concrete – Estimated Peak Historic Water Use

Category	Volume (afy)	Notes
Domestic and associated commercial/industrial	440	Twice current demand based on twice as big population historically.
Non-resident domestic use	126	2/7 of the resident domestic and associated commercial/industrial use.
Cement manufacturing	87	5,200 barrels of cement per day produced.
Shingle and Lumber Mills	76	Assume 2 operational every day. Per mill rate estimated based on change ROE for S1-163865CL.
Railroad operation	28	Assume filling of 5 steam trains per day with each train holding 5,000 gallons.
Total	***757 afy***	

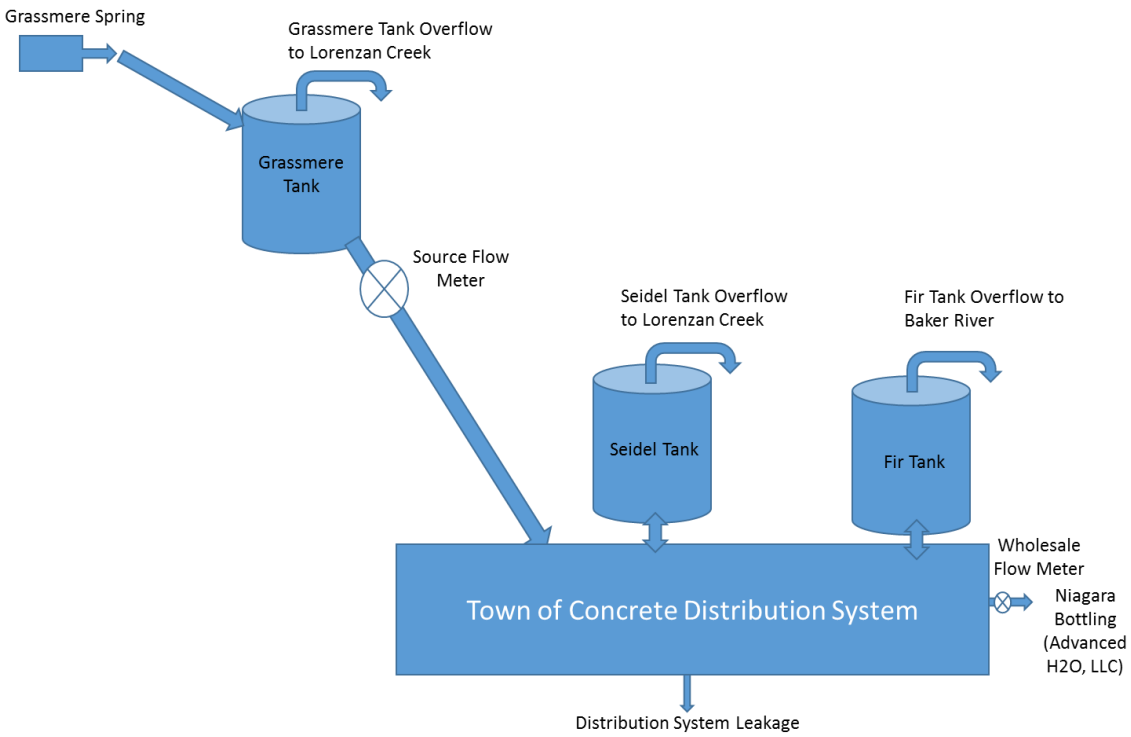
The similarity between the estimated use (approximately 757 afy) and the metered flow from the spring, minus overflow of the Grassmere Reservoir (808 afy) suggests that the full discharge of the spring was likely put to beneficial use historically. If it is assumed that, historically, there was no overflow and all water from the spring was used, that would equal 550 gpm continuously, which is equal to 887 afy. Since this is less than the water right limit, but also appears to represent the extent of the physical availability from the spring source, it will be considered as the extent of the perfected right.

Current Use

Instantaneous Rate

The Town of Concrete's water system plan (Reichhardt & Ebe Engineers, 2012) indicates that the average production capacity leaving the source reservoir (Grassmere) is 475 gpm. It is noted that the meter readings do not capture water that is overflowing the Grassmere Tank, which would increase the flow rate. If the metering data from **Table 11** is assumed to represent continuous flow, then the average flow past the source meter would have been approximately 500 gpm for 2012 and 2013. So, it appears that the average instantaneous flow rate provided in the water system plan was conservative and does not represent actual peak production from the spring. The total capacity of the spring is higher than what is recorded at the source flow meter due to the Grassmere Tank overflow, which occurs before the water passes through the source flow meter (**Figure 3**). During a September 9, 2014, meeting with the Town of Concrete, the water system operator explained that the lowest flows from the spring are often observed in spring and early summer. He also mentioned that they do restrict the amount of water that can be taken by the bottled water company (as specified in their contract) when the spring is not producing enough water to meet all demands. The water system operator indicated that most often this restriction is on the order of a day or two, but has lasted as long as 3 weeks.

Figure 3
Town of Concrete Schematic Metering Diagram



Annual Volume

According to the WUE reports, it appears that the Town of Concrete is currently using approximately 810 afy. However, according to the water system plan, and as can be seen in **Figure 3**, the meter used to provide the WUE reports records water that is consumed by customers (both retail and wholesale) and lost by distribution system leakage, but also water that overflows the Town's two lower reservoir facilities (Seidel Tank and Fir Tank).

Table 11
Town of Concrete Metering Data

Year	WUE Annual Volume (afy)	Calculated Use Annual Volume (afy)
2009	796.8	
2010	749.6	262
2011	662.9	
2012	808.4	
2013	808.1	

Notes: 2009 – 2013 data from WUE reports.
2010 Calculated Use volume from Water System Plan (Reichhardt & Ebe, 2012)
This meter records a substantial volume of water that is allowed to overflow the Town's Seidel and Fir reservoirs since everything is gravity driven. Actual use by customers is less than the metering data suggests.

The Town of Concrete's water system plan (Reichhardt & Ebe Engineers, 2012) indicates that in 2010, when the Town had 506 ERUs plus the wholesale contract with Advanced H2O, LLC (water bottling company), the total consumption and distribution system leakage (not including tank overflow), was equal to 262 afy. The average use per ERU was calculated to be 383 gpd. The wholesale use by Advanced H2O in 2010 was on average 40,173 gpd, which is equal to 45 afy.

Future Water Needs

The Town of Concrete's projected future use, which includes consumption, distribution system leakage and the wholesale contract (with assumed use of 45 afy), is 325 afy for 2022 (Reichhard & Ebe Engineers, 2012). A newspaper story suggests that the new owners of the wholesale agreement (Niagara Bottling) may be interested in expanding usage from 45 afy up to 141 afy (Skagit Herald, January 29, 2014). If this newspaper report is accurate, this would revise the 2022 projected future use up to 421 afy. RH2 assumed this higher future need for subsequent calculations.

A meeting was held with the Mayor and water system operator of the Town of Concrete on September 9, 2014, to discuss the Town's water rights and determine what plans the Town has for future water needs. The Mayor, Mr. Jason Miller, indicated that there is a desire within the Town to grow the local economy, which may include industries that will require additional water.

Excess Water Potentially Available

The amount of excess water potentially available between now and 2022 (the projection period in Concrete's water system plan) is calculated by determining the actual physical capacity of the installed collection infrastructure (which is the same as the peak historic beneficial use) and subtracting the projected future use in 2022. This calculation is shown in Table 12.

Table 12
Town of Concrete – Excess Water Potentially Available

Rate	Water Right Limit	Estimated Historic Use	Estimated 2022 Projected Future Use	Physical Capacity minus Projected Use	Potentially Available
Instantaneous (gpm)	750	550	475	75	75
Annual (afy)	1,190	887	421	466	121

Note: The estimated 2022 projected future use instantaneous rate from the water system plan (475 gpm in the water right self-assessment table). The estimated 2022 projected future use annual volume is equal to the water right self-assessment (325 afy) minus 45 afy for current wholesale and plus 141 afy for larger wholesale. Potentially available annual volume is limited to the available instantaneous rate pumped continuously year round.

The position of the Town of Concrete during the September 9, 2014, meeting, and again confirmed on December 23, 2014, was that they were not interested in selling any portion of their water right, since they felt it would be difficult to get new water rights in the future. Also, given that there are times of the year when there is not enough flow from the springs to meet the existing demand by the water bottling company and residents, there might not be physical availability from the source available for mitigation when needed.

Conclusion

Table 13 summarizes the water rights, rates, and volumes that have been historically perfected by entities that have indicated that they are not interested in having their rights considered as a potential source of mitigation. RH2 recommends that Ecology and the WWT eliminate these systems from consideration at this time but may wish to contact them again at a later date to determine whether any of them might be willing to provide water for mitigation at some point in the future.

Table 13
Summary of Perfected Water Rights Not Available for Mitigation

Water System Name	Water Right Number	Potentially Available Qi (gpm)	Potentially Available Qa (afy)
Seattle City Light - Diablo	All of SWC 1005 and a portion of G1-00490C	50	20
Seattle City Light - Newhalem	Portions of G1-00489C and G1-23722C and all of SWC 1172	200	270
Town of Concrete	GWC 71-D	75	121
	Total	***325***	***411***

CATEGORY 2 - WATER SYSTEMS WITH WATER RIGHTS THAT MIGHT EXCEED FORECASTED DEMAND

This portion of the report will discuss Group A Community systems that have been interpreted by RH2 to:

- Have water rights for municipal water supply purposes;
- Have recent water system plans; and
- Have excess water after accounting for water needed to meet all forecasted demand within the water system's existing service area over the 20-year planning cycle.

Based on these systems' water rights and demonstrated willingness to participate in an update to their water system planning documents, these systems might be capable of expanding their service area to include adjacent properties. However, because these systems have not yet fully perfected their water rights, RH2 believes that these water rights are not good candidates for the trust water rights program. While they may be able to expand within their service areas or to adjacent areas, they are not considered candidates for supplying mitigation water for downstream locations. These systems are listed here in order from upstream to downstream. Their approximate location is depicted in **Figure 2**.

Cascade River Community Club (11494) – G1-20975C only: This water system is located east of the Town of Marblemount adjacent to the Cascade River in WRIA 4 in Skagit County, Washington. This water system holds three water rights, two of which are for surface water diversion from Boulder Creek (these rights are discussed under Category 1) and one is for groundwater withdrawal from a well. The groundwater right for this system (G1-20975C) allows for withdrawal of up to 125 gpm and 200 afy. The water system is classified by WDOH as a Group A Community system with a green operating permit and it has a residential population of 30 and a nonresidential population of 0 with a total of 408 calculated connections and 416 approved connections. WDOH indicated that this water system is in the process of preparing a water system plan. The water system plan should give Ecology a better understanding of the history of water use and also the forecasted future demand and what portion of the groundwater right is anticipated to be used and what might be excess or available to serve surrounding parcels. Representatives from RH2 and the WWT met with Mr. Jim Bernhard (Vice President, Board of Directors of the Cascade River Community Club) on September 23, 2014, and discussed the water system, sources, water use, and planned future use. Metered water production has fluctuated between 8.9 and 16.8 afy over the period of 2010 through 2013, which is much lower than the water right limit of 200 afy (**Table 14**).

Table 14
Cascade River Community Club Metering Data

Year	Annual Volume (afy)
2010	10.7
2011	16.1
2012	8.9
2013	16.8

Note: 2010 – 2013 data from WUE reports.

Based on the discrepancy between the residential and nonresidential population as compared to the number of calculated connections, it is uncertain if the WUE metering data is accurate. Mr. Bernhard indicated that, in 2013, the Club provided service to 17 full time residences, 88 seasonal residences, and 303 occasional residences. In total, Mr. Bernhard indicated that the Cascade River Community Club needs to be able to provide water to 452 lots, which was the number of lots originally platted. If it is assumed that each connection will ultimately use 269 gpd per ERU (0.3 afy per ERU) and they are serving 452 full-time residences, they would serve 135.6 afy (452 times 0.3 equals 135.6 afy) leaving a remainder of 64.4 afy under the groundwater right that could be used to serve neighboring parcels. At a rate of 0.3 afy per connection that annual volume would equal an additional 214 connections beyond what they are obligated to serve. Mr. Barnhard indicated that, at the present time, the Club would likely not be interested in expanding its service area to serve additional parcels due to its isolated location.

Darrington Water System (17950) – Year-Round Regional Groundwater Rights only: The Town of Darrington is located on the Sauk River near its surface water divide with the North Fork Stillaguamish River in WRIA 4 in Snohomish County, Washington. The town currently has 4 groundwater rights that provide year round municipal water supply to the Town. Those water rights (transferred portion of S1-163865CL, G1-24424C, G1-24653C, and G1-25114C) allow for a combined withdrawal of 1,320 gpm and 874 afy. The Darrington Water System is classified by WDOH as a Group A Community system with a green operating permit and it has a residential population of 1,350 and nonresidential population of 780 with a total of 540 calculated connections and 557 approved connections. The average day demand per ERU was 269 gpd in 2001 (Trepanier Engineering, 2001).

Metering records from the Town show that the annual volume pumped from 2009 through 2013 is well below the Town's year-round municipal limit of 874 afy (**Table 15**).

Table 15
Town of Darrington Metering Data

Year	Annual Volume (afy)
1997	362.7
1999	351.0
2000	339.4
2009	362.4
2010	37.6*
2011	252.3
2012	279.3
2013	290.3

*Likely a metering reporting error based on data from other years.
Notes: 1997-2000 data from water system plan. 2009-2013 data from WUE reports.

Currently, the Town of Darrington appears to have approximately 500 afy of water available to use inside or outside of its service area. At a rate of 269 gpd per ERU (0.3 afy per ERU), that annual volume of 500 afy could provide water for an additional 1,667 ERUs. In 2020, the Town is forecast to be using 545 afy of its water rights, which leaves 329 afy available. At a rate of 0.3 afy per ERU, that equals 1,096 ERUs forecast to be available at that time.

Skagit PUD – Community of Rockport (Rockport) and Rockport State Park (73600 and SP740): The Community of Rockport is located in WRIA 4 on the north side of the Skagit River near its confluence with the Sauk River. It is currently served by two water rights associated with two active public water systems. These public water systems in this area include Rockport State Park (SP740) and Skagit PUD – Rockport (73600). Water rights associated with these systems include water rights originally issued to Washington State Parks for Rockport State Park (G1-22623C), which is now satellite managed by Skagit PUD, and a water right issued to Skagit PUD for service to the Community of Rockport (G1-25509C). Since these water rights were originally issued, the Skagit PUD now uses the State Park well as its point of withdrawal. The Skagit PUD and State Parks water rights are related through provisions, such that the cumulative limit of both rights is 100 gpm and 38.6 afy. The Skagit PUD – Rockport water system is classified by WDOH as a Group A Community system with a green operating permit. It has a residential population of 148 and a nonresidential population of 50 with a total of 53 calculated connections and 106 approved connections. The interconnection of these systems and future growth projections made by Skagit PUD suggest that they have enough water to meet anticipated growth (Skagit PUD, 2008). The average day demand for the system is 143 gpd per ERU (Skagit PUD, 2008). Metering records from the system show that the annual volume pumped from 2003 through 2012 is well below the combined system's year-round municipal limit of 38.6 afy (**Table 16**).

Table 16
Skagit PUD – Rockport Metering Data

Year	Annual Volume (afy)
2003	11.7
2004	11.7
2005	9.9
2006	11.3
2008	9.7
2009	11.8
2010	15.0
2011	9.8
2012	9.3
Notes: 2003-2006 data from water system plan. 2008-2012 data from WUE reports.	

Per Skagit PUD's water system plan, the projected use in 2027 will be approximately 13.8 afy (Skagit PUD, 2008). In 2027, there will be 24.8 afy of water available to use inside or outside of its service area. At a rate of 143 gpd per ERU (0.16 afy per ERU), that annual volume of 24.8 afy could provide water for an additional 155 ERUs.

Hamilton Water Department (30700): This water system serves the Town of Hamilton in WRIA 3. The water rights for this system (G1-20003C, G1-24015C, and G1-28066P) allow for withdrawal of up to 106 gpm and 100.86 afy for municipal supply. The wells were relocated out of the floodway through change applications processed by Ecology in 2000. This change resulted in the Town of Hamilton preparing a mitigation plan that includes augmenting flows in Little Careys Creek to offset groundwater pumping impacts. The water system is classified by WDOH as a Group A Community system with a green operating permit and it has a residential population of 328 and a nonresidential population of 210,

with a total of 140 calculated connections and 251 approved connections. Metered water production for municipal use has fluctuated between 28.1 and 63 afy over the period of 2008 through 2013 (**Table 17**).

Table 17
Town of Hamilton Metering Data

Year	Annual Volume (afy)
2008	62.1
2009	55.3
2010	62.3
2011	63.0
2012	28.1
2013	28.9

Note: 2008-2013 data from WUE reports.

The Town of Hamilton's current water system plan (Garrison Engineering, 2013) indicates that the Town reached a maximum of 174 service connections in 1978, but only served 124 connections in 2012. Average day demand, including distribution system leakage, in the water system plan was calculated to be 290 gpd per ERU. Water use forecasting in the water system plan indicates that in 20 years (2032) the forecasted demand will be 59.9 afy, leaving a surplus of 40.96 afy, which, at the current average day demand, equates to another 126 ERUs (Garrison Engineering, 2013). Growth, as estimated by the Town Council, is anticipated to be 1 new ERU per year over the 20-year planning period (Garrison Engineering, 2013).

The Town of Hamilton has a current water system plan (Garrison Engineering, 2013) along with a surplus of water beyond its 20-year growth projections (year 2032) and could elect to update its service area to include additional neighboring parcels.

Lyman Water Department (49050): This water system serves the Town of Lyman and is located approximately 3 miles west of the Town of Hamilton in WRIA 3. It holds one water right (GWC 4041) that allows for withdrawal of 700 gpm and 108 afy. The water system is classified by WDOH as a Group A Community system with a green operating permit and it has a residential population of 473 and a nonresidential population of 200, with a total of 219 calculated connections and 296 approved connections. **Table 18** shows the annual volume withdrawn from the City's two wells under the water right.

Table 18
Town of Lyman Metering Data

Year	Annual Volume (afy)
2008	57.8
2009	59.6
2010	56.6
2011	54.2
2012	53.7
2013	49.1

Notes: 2008-2013 data from WUE reports

It should also be noted that WUE reports indicate that the system's distribution system leakage has ranged from 30 to 45 percent, therefore, the actual water used by customers is even less. Even with the high distribution system leakage the Town still has approximately 48 afy of inchoate water that has likely not been perfected.

In the Town of Lyman's most recent water system plan, an average day demand of 137 gpd per ERU was combined with a system-wide distribution system leakage volume of 21,400 gpd for future forecasting (Gray & Osborne, 2013). In the year 2033, the plan estimates that there will be 302 ERUs and that the water use will be 62,800 gpd, which equates to an annual volume of approximately 70.3 afy. If the distribution system leakage is able to be maintained at 21,400 gpd as projected in the water system plan, the Town will be able to serve an additional 245 ERUs based on its water right annual volume beyond what is forecasted to be needed in 2033. If the Town of Lyman is able to reduce its distribution system leakage to 10 percent, which is the standard of WDOH's WUE program, that water could be used to serve an additional 85 ERUs.

Since the Town of Lyman has a recently approved water system plan, it would be relatively easy to update the service area to allow for service to adjacent parcels should there be demand since it appears that the Town will have sufficient water rights to cover additional lots beyond its 2033 projection.

Conclusions

The five water systems identified in this category are capable of providing water inside and outside of their original service areas or original places of use through service area updates. Based on current numbers, these systems are already capable of supplying water to 266 connections within their existing service areas. **Table 19** shows the number of connections per system. It should be recognized that even though a system might have sufficient water rights to serve additional connections, substantial infrastructure upgrades may be needed to actually serve that water to particular lots and it is possible that limiting factors other than the water rights annual volume, such as the water right instantaneous rate, might reduce these numbers as well. RH2 recommends that Ecology consider making the information presented in **Table 12** available to Skagit County and real estate businesses and lending institutions in an attempt to steer new development to water systems with existing water rights.

Table 19
Unused Connections and Water Rights in Systems that Could Expand

Water System Name	Currently Approved Unused Connections based on WDOH (connections)	Forecasted Water Right Annual Volume Excess (afy)	Forecasted Year
Cascade River Community Club	8	64.4	Full buildout
Darrington Water System	17	329	2020
Skagit PUD - Rockport	53	24.8	2027
Hamilton Water Department	111	40.96	2032
Lyman Water Department	77	37.7	2033
Total	***266***	***496.86***	-

CATEGORY 3 - WATER SYSTEMS AND WATER RIGHTS ELIMINATED FROM FURTHER CONSIDERATION

The following water systems have been eliminated from further consideration either because they will have no additional water beyond forecasted demand, or because it appears to RH2 that the water rights may have relinquished due to five or more consecutive years of non-use. Within these two groups, the systems are listed here in order from upstream to downstream. Their approximate location can be observed in **Figure 2**.

Full Quantity is Being Used or No Additional Water is Available Beyond Their Forecasted Demand

Review of water use and projected growth suggests that the water rights held by the following systems will be fully used to serve the current or original intent of the development. These systems will likely not have any water available to property owners outside of their current service area or place of use.

Skagit PUD – Marblemount (AA642): This water system is located near the confluence of the Cascade River with the Skagit River in WRIA 4. The water right for this system (G1-28137P) allows for withdrawal of 150 gpm and 9.4 afy from a well for continuous municipal supply. The water system is classified by WDOH as a Group A Community system with a green operating permit and it has a residential population of 30 and a nonresidential population of 181, with a total of 24 calculated connections and 54 approved connections. **Table 20** indicates that the highest water use in recent years has been 7.1 afy in 2009. The water right for this system is still in permit stage, which means that there will not be any excess water when the water right moves to certificate stage because the water right certificate will be issued for the amount of water actually put to beneficial use. There is a mitigation plan associated with this water right that requires water to be discharged to the Skagit River whenever minimum instream flows are not being met, regardless of whether groundwater is being withdrawn at that time or not. The Skagit PUD's current water system plan (Skagit PUD, 2008) identifies the annual volume under this water right as being the limiting factor on growth within this system so it is reasonable to conclude that no additional annual volume is available for mitigation.

Table 20
Skagit PUD – Marblemount Metering Data

Year	Annual Volume (afy)
2008	3.4
2009	7.1
2010	3.9
2011	4.7
2012	4.8
2008 – 2012 data from WUE reports.	

Bullerville Utility District (13344): This water system is located on the north side of the Skagit River approximately 0.5 miles downstream of the Town of Marblemount in WRIA 4. It primarily serves Clark's Skagit River Resort. Water right G1-158490CL went through the water right change application process in 2005 (CG1-158490CL). Through that process, Ecology determined that the extent of the water right that had been perfected and maintained through beneficial use is 38 gpm and 12 afy. The

water system is classified by WDOH as a Group A Transient Non-Community system with a green operating permit and it has a residential population of 18 and a nonresidential population of 90, with a total of 99 calculated connections and 115 approved connections[1]. No WUE metering data has been submitted to WDOH. Given the small size of the water right, it is doubtful that there is sufficient unused volume to warrant additional investigation.

Sauk Mountain Estates (17049): This Group A community water system is located on the north side of the Skagit River approximately 1.5 miles west of the Community of Rockport in WRIA 4. The water right for this system (G1-22601C) allows for withdrawal of 37 gpm and 24 afy from a well for continuous community domestic supply. The original intent of the water right was to serve the 24 lots within the Sauk Mountain Estates plat. The water right was issued in the name of Norman Robertson. The water system is classified by WDOH as a Group A Community system with a green operating permit and has a residential population of 45 with a total of 20 calculated and 24 approved connections. No WUE metering data has been submitted by this water system, so no comparison of existing and potential future use could be made.

RH2 has interpreted this water use as satisfying the definition of municipal water supply purposes under RCW 90.03.015(a) because residential service is provided to 15 or more residential service connections.

Since this water system does not have a current water system plan, or small water system management program, it is restricted to only serving water within its original place of use. For this reason, it is likely that this water right will only be used to serve the remaining four lots within the original development.

Skagit PUD – Cedargrove (11917): This water system is located across the Skagit River to the south of the Town of Concrete in WRIA 4. The combined water rights for this system (GWC 6756 and G1-25994C) equal 362 gpm and 62.8 afy. The water system is classified by WDOH as a Group A Community system with a green operating permit and it has a residential population of 400 with a total of 158 calculated connections and 466 approved connection. **Table 21** indicates that the highest water use in recent years has been 65.4 afy in 2006, although it has been reported that a large leak in 2006 is what led to the high meter read that year. The Skagit PUD water system plan (2008) identifies the annual volume under these water rights as being the limiting factor on growth within the service area, which means that the full water right is needed to serve the existing development and no additional water will be available.

[1] Calculated connections refers to the number of connections currently in the system. Approved connections refers to the total number of connections that has been approved by WDOH.

Table 21
Skagit PUD - Cedargrove Metering Data

Year	Annual Volume (afy)
2000	29.0
2001	32.8
2002	41.1
2003	37.4
2004	45.6
2005	46.6
2006[1]	65.4
2008	26.0
2009	29.1
2010	24.1
2011	23.9
2012	25.4

Notes: 2000-2009 data from water system plan. 2008-2012 data from WUE reports.
[1] High number due to large leak this year.

River Lane Community Club (72773): This water system is located on the north bank of the Skagit River 0.5 miles west of the Town of Concrete in WRIA 4. The water right for this system (G1-00554C) allows for withdrawal of 50 gpm and 10 afy. The water system is classified by WDOH as a Group A Community system with a green operating permit and it has a residential population of 34 and a nonresidential population of 1, with a total of 40 calculated connections and 40 approved connections. WUE reports indicate that the highest water use in recent years has been 5.3 afy in 2011 (**Table 22**). This system is not considered to have available water due to the small difference between the certificated volume and the volume currently used and the potential for use to increase if the residential population of the homes within the service area increases.

Table 22
River Lane Community Club Metering Data

Year	Annual Volume (afy)
2010	4.6
2011	5.3
2012	4.2
2013	3.3

Note: 2008-2012 data from WUE reports.

Skagit PUD - Skagit View Village (96879): This water system is located on the south side of the Skagit River approximately 1 mile west of the Town of Concrete in WRIA 4. The water system is classified by WDOH as a Group A Community system with a green operating permit and it has a residential population of 78 with a total of 70 calculated connections and 128 approved connections.

The water right for this system (G1-20763P) allows for withdrawal of 200 gpm and 38.4 afy. **Table 23** shows the annual volume withdrawn from the water system's well under the water right with the highest being 11.9 afy in 2010. The water right is in permit stage, which means that there will not be any excess water when the water right moves to certificate stage because the water right certificate will be issued for the amount of water actually put to beneficial use.

Table 23
Skagit PUD - Skagit View Village Metering Data

Year	Annual Volume (afy)
2006	9.7
2008	10.7
2009	11.7
2010	11.9
2011	10.1
2012	11.3

Notes: 2006 data from water system plan.
2008-2012 data from WUE reports.

Cape Horn Maintenance Company (11060): This water system is located on the south side of the Skagit River approximately 3 miles downstream of the Town of Concrete in WRIA 4. The water right for this system (G1-22613C) allows for withdrawal of 300 gpm and 119 afy. The water system is classified by WDOH as a Group A Community system with a green operating permit and it has a residential population of 700 and a nonresidential population of 4, with a total of 561 calculated connections and 581 approved connections. Water metering data, shown in **Table 24**, indicates that the highest water use in recent years occurred in 2007 when 113.9 afy was pumped. The most recent Cape Horn Maintenance Company Small Water System Management Plan update (Freeland & Associates, 2012) indicates that a total of 412 homes and 149 recreational lots will eventually be served and that the entire annual volume of the water right will be needed to serve this development.

Table 24
Cape Horn Maintenance Company Metering Data

Year	Annual Volume (afy)
2007	113.9
2008	88.1
2009	98.6
2010	81.8
2011	59.3
2012	51.7
2013	72.1

Notes: 2007-2010 data from small water system management program.
2011-2013 data from WUE reports.

Pressentin Creek Wilderness (69273): This water system is located on the south side of the Skagit River approximately 4 miles west of the Town of Concrete at the mouth of Pressentin Creek in WRIA 4. The water system is classified by WDOH as a Group A Community system with a green operating permit and it has a residential population of 76 and a nonresidential population of 2, with a total of 58 calculated connections and 65 approved connections. The water right for this system (G1-26766P) allows for withdrawal of 37 gpm and 30 afy from a well and is in permit stage, which means that there will not be any excess water when the water right moves to certificate stage because the water right certificate will be issued for the amount of water actually put to beneficial use.

Lake Tyee (44970): This Group A water system is located on the west side of Lake Shannon (Baker River) near Grandy Creek and approximately 2.5 miles north of the Town of Concrete in WRIA 4. The groundwater right for this system (G1-21115C) allows for withdrawal of 170 gpm and 141 afy from a well for continuous community domestic supply. The water right is in the name of Lands West, Inc., which is a private company. The water system is classified by WDOH as Transient Non-Community water system and has a residential population of 4 and a non-residential population of 250 with a total of 884 calculated connections and 1 approved connection. This water system currently has a blue operating permit, which will prevent it from being able to expand and serve neighboring parcels until deficiencies are remedied with the WDOH. According to the Lake Tyee RV Resort website (www.laketyee.com, accessed on July 25, 2014), there are 886 individual RV sites that are each privately owned as opposed to being owned by the Resort. Each lot may only be used for a maximum of 210 days a year. No year round residency or residential buildings are allowed.

RH2 has interpreted this water use as satisfying the definition of municipal water supply purposes under RCW 90.03.015(a) because of the high likelihood that water is served to 25 or more people living here for more than 60 days a year.

However, this water system does not have a current water system plan and it has a blue operating permit. Therefore, it will not be able to serve neighboring parcels and any water service will be restricted to the existing water right place of use.

Timberline Travelers Park Water System (88398): This water system is located approximately 4.5 miles west of the Town of Concrete on the north side of the Skagit River in WRIA 4. It holds two water rights (G1-23091C and G1-25725C) that authorize a combined withdrawal of 60 gpm and 25.5 afy. The water system is classified by WDOH as a Group A Community system with a green operating permit and it has a residential population of 50 and a nonresidential population of 1, with a total of 72 calculated connections and 75 approved connections. **Table 25** shows the water use for this system. The WUE reports filed by this system appear to be in error, because they only show approximately 0.2 afy as being withdrawn from the source. Additional investigation will be needed to determine the cause of the suspicious metering data and assess whether valid data can be obtained. If it is assumed that each connection uses approximately one-third of an acre-foot per year (equal to approximately 300 gpd per connection), then it could be assumed that current use is approximately 24 afy and use by all 75 approved connections would be approximately 25 afy, which is just below the water right limit. Therefore, it is assumed that no water will be available from this system.

Table 25
Timberline Travelers Water System Metering Data*

Year	Annual Volume (afy)
2010	0.2
2011	0.2
2012	0.2
2013	0.2

Notes: 2010-2013 data from WUE reports.
*Data appears to be erroneously low.

Grandy Creek Resort (28980): This Group A Transient Non-Community system is located on the north side of the Skagit River near Grandy Creek and approximately 5 miles west of the Town of Concrete in WRIA 4. The water right for this system (G1-20592C) allows for withdrawal of 30 gpm and 14 afy from a well for continuous community domestic supply. The water right is in the name of Jack P. Graham. The water system is classified by WDOH as Group A Transient Non-Community system with a green operating permit and it has a residential population of 4 and a non-residential population of 220 with a total of 125 calculated connections and 179 approved connections. This is a campground and the majority of water use is for people who are staying in the campground temporarily for vacation.

RH2 has interpreted this water use as not satisfying the definition of municipal water supply purposes under RCW 90.03.015(a) because policy 2030 indicates that campgrounds are usually not considered to hold water rights for municipal water supply purposes.

Creekside Camping (28977): This water system is located approximately 5 miles west of the Town of Concrete on the north side of the Skagit River in WRIA 4. It holds one water right (G1-21248C) for 75 gpm and 10 afy. The water system is classified by WDOH as a Group A Transient Non-Community system with a blue operating permit and it has a residential population of 22 and a nonresidential population of 1, with a total of 34 calculated connections and no approved connections. No metering data was publically available. The small size of the water right suggests that little if any unused water exists. In addition, RH2 has interpreted this water use as not satisfying the definition of municipal water supply purposes under RCW 90.03.015(a) because policy 2030 indicates that campgrounds are usually not considered to hold water rights for municipal water supply purposes.

Skagit County Water District No. 1 (00392): This water system is located approximately 2 miles east of the Town of Hamilton in WRIA 3. In addition to providing service to single family homes, the water system also serves Rasar State Park and Skagit River Woods, which are both campground facilities. It holds one water right (G1-24847C) which allows for withdrawal of 150 gpm and 65.5 afy. The water system is classified by WDOH as a Group A Community system with a green operating permit and it has a residential population of 270 and a nonresidential population of 1,704, with a total of 123 calculated connections and 211 approved connections. The Skagit County Water District No. 1 water system plan (Bratton, 2006) identifies the annual volume under the water right as being the limiting factor on growth within this system. Peak metered water use from 1999-2004 and 2008-2013 was 47.4 afy in 2009, while water use in 2013 was 35.7 afy (**Table 26**). The water system plan identified the average day demand in 2010 as 243 gpd/ERU (George Bratton, P.E., 2006). On the current WFI form, it indicates that the current number of connections is 123 while the total number of approved connections in 209. The water system plan identified a total of 269 ERUs within the service area assuming maximum density under

current zoning. At the current use rate of 243 gpd/ERU, the available water right will only have enough water to serve 241 ERUs. Therefore, this system will not have enough water to serve its existing service area unless it is able to reduce its average day demand per ERU. In any event, no excess water is available from this system.

Table 26
Skagit County Water District No. 1 Metering Data

Year	Annual Volume (afy)
1999	28.9
2000	32.5
2001	36.0
2002	32.5
2003	31.3
2004	38.2
2008	42.3
2009	47.4
2010	37.0
2011	36.5
2012	33.9
2013	35.7
1999 – 2004 data from water system plan. 2008 – 2013 data from WUE reports.	

Shangri La Community Club (77846): This water system is located adjacent to and east of the Town of Hamilton on the north side of the Skagit River in WRIA 3. It holds one water right (GWC 7693) that allows for withdrawal of 108 gpm and 40 afy. The water system is classified by WDOH as a Group A Community system with a green operating permit and a residential population of 38. **Table 27** shows the annual volume withdrawn from the water system's well under the water right. WDOH Sentry indicates that the system currently has 40 calculated connections and 58 approved connections. The Community Club still has approximately 25 afy of inchoate water that has likely not been fully perfected, and likely will not be, even with service to the additional 18 connections. This water system is not currently participating in water system planning with the Washington State Department of Health and therefore cannot expand its service area to serve surrounding parcels. So, even though there is likely excess water rights under its certificate, it can currently only serve properties within its existing place of use.

Table 27
Shangri La Community Club Metering Data

Year	Annual Volume (afy)
2010	8.6

2011	14.5 [1]
2012	5.9
2013	5.8
2010 – 2013 data from WUE reports. [1] Reported to be high due to leak.	

Bacus Road #1 (64327): This water system is located on the upland on the north side of the Skagit River approximately 2 miles west of the Town of Lyman in WRIA 3. The water system is classified by WDOH as a Group A Community system with a green operating permit and it has a residential population of 38 with a total of 13 calculated connections and 40 approved connections. The water right for this system (G1-25548P) is in permit stage, which means that there will not be any excess water when the water right moves to certificate stage because the water right certificate will be issued for the amount of water actually put to beneficial use.

Conclusions

The 15 water systems identified in this category will likely not provide water outside of their original service areas or original places of use. However, based on current numbers, these systems are already capable of supplying water to an additional 633 connections within their existing service areas. **Table 28** breaks out the number of available connections per system.

Table 28
Available Connections in Systems Unlikely to Expand Their Service Areas

Water System Name	Available Connections per WDOH
Skagit PUD – Marblemount	30
Bullerville Utility District	16
Sauk Mountain Estates	4
Skagit PUD - Cedargrove	308
River Lane Community Club	0
Skagit View Village	58
Cape Horn Maintenance Company	20
Pressentin Creek Wilderness	7
Lake Tyee	0
Timberline Travelers Park Water System	3
Grandy Creek Resort	54
Creekside Camping	0
Skagit County Water District No. 1	88
Shangri La Community Club	18
Bacus Road #1	27
Total	***633***

Water Rights That May Be Relinquished Due to Five or More Consecutive Years of Non-Use

In evaluating the water rights in the study area, a number of water rights were identified which, in RH2's opinion, may have been lost due to five or more consecutive years of non-use. The following systems were identified for the reasons specified below:

Superior Portland Cement, Inc. (NA): Surface water certificate 3029 was obtained by Superior Portland Cement, Inc., from which the Town of Concrete was gifted the water system. However, this water right was for diversion of water from Everett Creek, located in the foothills to the east of the Town of Concrete. It was for commercial, industrial, and mining use. Since this water right was issued to a private company and was not for domestic use, RH2 feels that it never qualified as being for municipal water supply purposes. The place of use identified on the certificate was the original quarry where the limestone was excavated. Since commercial limestone quarrying has not occurred since approximately 1967 (Seattle Daily Journal of Commerce, June 3, 2005) and the Town of Concrete does not list this water right as being owned or utilized by the Town in its water system plan (Reichhardt & Ebe Engineering, 2012), it is RH2's interpretation that this water right has been lost due to non-use.

Skagit River Woods Camp (79514 - Inactive): This system holds two water rights (G1-00611C and G1-23074C) that together allow for withdrawal of 52 gpm and 27 afy. This campground is now served by Skagit County Water District No. 1 (Bratton, 2006). The Skagit River Woods Camping Country Club website (http://www.srwcampingclub.com/sites_for_sale.html accessed on July 24, 2014) shows the water system as being inactive as of 1997. This is reflected on DOH's Sentry website where Skagit River Woods is identified as a private membership camping club. When a campsite is purchased, the member gains exclusive right to use the campsite, although the land is still owned by Skagit River Woods Camping Country Club. Based on RH2's interpretation of Policy 2030, and the requirement of active compliance, we feel that these two water rights, while they may have been for municipal water supply purposes at one time (because it appears they served a nonresidential population that is, on average, at least twenty-five people for at least sixty days a year), no longer qualify because the use of their wells has ceased. In addition, the apparent lack of use over the past 17 years suggests that the rights have been forfeited due to non-use, unless the water right holder qualifies for one of the sufficient causes for non-use.

Northern State Hospital (61700 - Inactive): This facility is located approximately 0.25 miles northeast of Sedro-Woolley on the north side of the Skagit River in WRIA 3. This facility served as a mental hospital for the State of Washington from 1912 through 1976. Over the years, the facility acquired four water rights (GWC 287, GWC 288, GWC 1731, and GWC 6978) for hospital, community domestic, domestic, irrigation, and industrial uses. The combined allocation under these water rights allowed for withdrawal of 2,700 gpm and up to 2,319 afy (it should be noted that this could be limited to 1,534 afy if GWC 1731 is deemed to be non-additive since GWC 287 and GWC 288 were not recognized in the report of examination as existing at the time of issuance).

After the state ceased to use the facility as a mental hospital, the facility was repurposed and renamed the North Cascades Gateway Center and now includes Pioneer Center North (an in-patient drug and alcohol treatment center) and the Cascades Job Corps Center, while still being owned and operated by the state. WDOH Sentry indicates that the public water system became inactive on December 1, 1986. Skagit PUD (email correspondence with Mr. Chris Shaff, 7/22/2014) confirmed that the PUD provides water service to this property and had installed water mains in the area as early as 1985. An inactive

water system status in this case identifies that the site is no longer served by a separate public water system, but instead has become integrated into the Skagit PUD system. A phone conversation on September 19, 2014, with Mr. John H. Wiggins (Construction and Maintenance Superintendent, Department of General Administration) confirmed that all water used at the facility is provided by Skagit PUD and there is no use of water from the wells. Since the State is not identified under RCW 90.03.015 as one of the entities capable of holding a governmental or governmental proprietary purpose water right and due to the approximate 30 years of assumed non-use, these water rights have likely already been forfeited due to non-use.

Conclusions and Recommendation

When public water systems cease operation or become inactive in the future, Ecology, WDOH, and the County should work together to encourage those entities to transfer their water rights at that time either to the Trust Water Right Program or to another entity that needs additional supply. If action is not taken shortly after a system ceases to operate, the water right can be lost due to non-use, such as appears to be the case with the inactive water systems described above.

IDENTIFICATION OF MUNICIPAL SOURCE EXCHANGE OPPORTUNITIES

As part of the 1996 Memorandum of Agreement Regarding Utilization of Skagit River Basin Water Resources for Instream and Out of Stream Purposes, the Skagit PUD agreed to divert water from the Skagit River mainstem as opposed to the Cultus Mountain tributaries. This is to occur when flows in the tributaries are below established minimum instream flows that were subsequently documented in WAC 173-503-040. While there is not a reduction in the rate or volume of water that can be diverted, the proportional reduction in impact moving from the tributary to the mainstem is seen as beneficial to the environment.

With this model in mind, larger water systems above Sedro Woolley were reviewed for similar opportunities. Many systems have already switched from tributary surface water to groundwater sources that are hydraulically connected to the Skagit River. One exception is the Town of Hamilton that recently moved its wells from the Skagit Valley to the nearby upland out of the floodway (change applications CG1-20003C, CG1-24015C). This move required the Town to provide and follow a mitigation plan to offset any impact to Little Careys Creek. Since the impact is mitigated, there is no reason to consider moving the well farther away from the tributary.

According to the background section of its water system plan, the Town of Lyman used to divert water from Jones Creek (Gray & Osborne, Inc., 2013). In 1961 they applied for and subsequently received a groundwater right (GWC 4041) for wells located in the valley. The surface water diversion from Jones Creek ceased in 1978. For the past 36 years, all water produced from the Town has been from the wells. No water right claim was filed for the surface water diversion, so that right does not legally exist. For this entity, source exchange from diversion from tributary surface water to a well located in the Skagit Valley has already occurred.

Cascade River Community Club (CRCC) has two surface water certificates (S1-00362C and S1-24441C) for diversion from Boulder Creek. However, CRCC's water facility inventory report indicates that the surface water diversion from Boulder Creek was classified as inactive on January 27, 1999, and is no longer used for supplying the water system and that all water is supplied by a well (WDOH Sentry website accessed 7/18/2014). The water system (Mr. Jim Bernhard) was contacted to better understand the history of the surface water use by the CRCC. Mr. Bernhard indicated that the Club wants to maintain the surface water source as an emergency/backup supply to their well. These two surface water diversions were identified in the preceding section as possible rights that could be acquired for mitigation.

The Town of Darrington used to capture surface water from a small stream that drained to the Sauk River. In 1985, the Town breached its surface water reservoir amid dam safety concerns (Trepanier Engineering, 2001). After the breaching, the Town applied for and was allowed to transfer a portion of the water rights that had been developed on this source (SWC 28 and S1-163865CL) to wells located to the north in the Sauk River Valley (CS1-163865CL). For this entity, source exchange from diversion from tributary surface water to a well located in the Sauk Valley has already occurred

The Town of Concrete currently takes water from a developed spring referred to as Grassmere Spring located to the north of the City on Burpee Hill (Reichhardt & Ebe Engineering, Inc., 2012). The City's water system plan indicates that naturally, the water from the spring would proceed to flow approximately 1 mile from the headwaters into Lorenzan Creek and finally into the Skagit River. The spring has been tapped since 1908 when Superior Portland Cement Company began to withdraw the

water for industrial and municipal uses. Currently, the Town has three reservoirs that are allowed to overflow when supply exceeds demand. The reservoirs are referred to as the Fir, Seidel, and Grassmere Reservoirs. Overflow from the Seidel and Grassmere Reservoirs eventually reaches Lorenzan Creek while the overflow from Seidel Reservoir is fed directly into the Baker River (Reichhardt and Ebe Engineering, Inc., 2012).

The Town could seek to transfer its water right to a well located in the Skagit Valley as opposed to the spring source. This would allow the water emanating from the spring to remain in its channel as it flows to the Skagit River. SalmonScape (http://apps.wdfw.wa.gov/salmonscape/map.html accessed 8/1/2014) was accessed to determine the fish distribution in Lorenzan Creek. Four salmon species were modeled as being present in the creek and one species has been documented as using the creek. The four modeled species are Fall Chum, Pink Salmon (Odd Year), Winter Steelhead, and Fall Chinook. The one documented species is Coho.

The Town of Concrete's water system is entirely gravity fed. The Town would need substantial capital investment to construct a well and associated pumping plant. Also, the Town would need to be able to pay for the increased expenses of operating a pump system vs. a gravity system. In addition, if the groundwater contains unsatisfactory levels of constituents such as manganese, which is common, a treatment facility would need to be constructed and operated. Currently, Niagara Bottling (through purchase of Advanced Refreshment LLC, which was formerly known as Advanced H2O LLC) has a wholesale contract with the Town to obtain water from the system for bottling. This company is likely interested in the water because it is derived from a spring and is untreated. The money raised for the water system through this contract is very important to keeping the water utility rates for the citizens manageable (Skagit Valley Herald, 1/29/2014). Risking this relationship to switch sources would be financially risky for the City.

On July 10, 2014, RH2 e-mailed the Swinomish Tribe (Mr. Larry Wasserman, Environmental Policy Director, Swinomish Tribe) and asked if it knew of any systems where the tributary was being impacted by a municipal diversion where that impact could be eliminated or reduced by shifting the impact to the mainstem Skagit River through change in point of diversion or point of withdrawal. On July 14, 2014, Mr. Wasserman replied that the Swinomish Tribe has not undertaken any analysis of this sort, so he couldn't provide any guidance at this time.

In summary, RH2 was not able to identify any municipal water right holders in the Skagit Watershed, above the City of Sedro-Woolley, that were strong candidates for source exchange.

REFERENCES

1996 Memorandum of Agreement Regarding Utilization of Skagit River Basin Water Resources for Instream and Out of Stream Purposes

Bratton, George, P.E., March 2006, Skagit County Water District No. 1 2006 to 2011 Water System Plan.

Dwelley, Charles M., 2004, *So they Called the Town "Concrete"*

Freeland & Associates, February 2012, Cape Horn Maintenance Company Small Water System Management Plan Update.

Garrison Engineering, May 29, 2013, Town of Hamilton Water System Plan.

Gray & Osborne, Inc., June 2013, Town of Lyman Water System Plan.

Interview with Mr. Bill Newby, longtime resident of the Skagit Valley (August 6, 2014)

Meeting with the Town of Concrete (Mayor Jason Miller and Public Works Director Allen Wilkins) and Washington Water Trust, September 9, 2014.

Meeting with the Cascade River Community Club (Jim Barnhard, Vice President Board of Directors) and Washington Water Trust, September 23, 2014.

Meeting with the Town of Darrington (Mayor Dan Rankin, Councilman Gary Willis, and Steve (last name unknown) and Rick Jones from the Public Works Department) and Washington Water Trust, September 23, 2014.

Meeting with the Skagit County Parks and Recreation Department (Director Brian Adams and Stephen Fallquist Skagit County Prosecuting Attorney's Office) and Washington Water Trust, October 3, 2014.

Personal knowledge of Newhalem and Diablo, Mr. Jim Bucknell, former resident of both

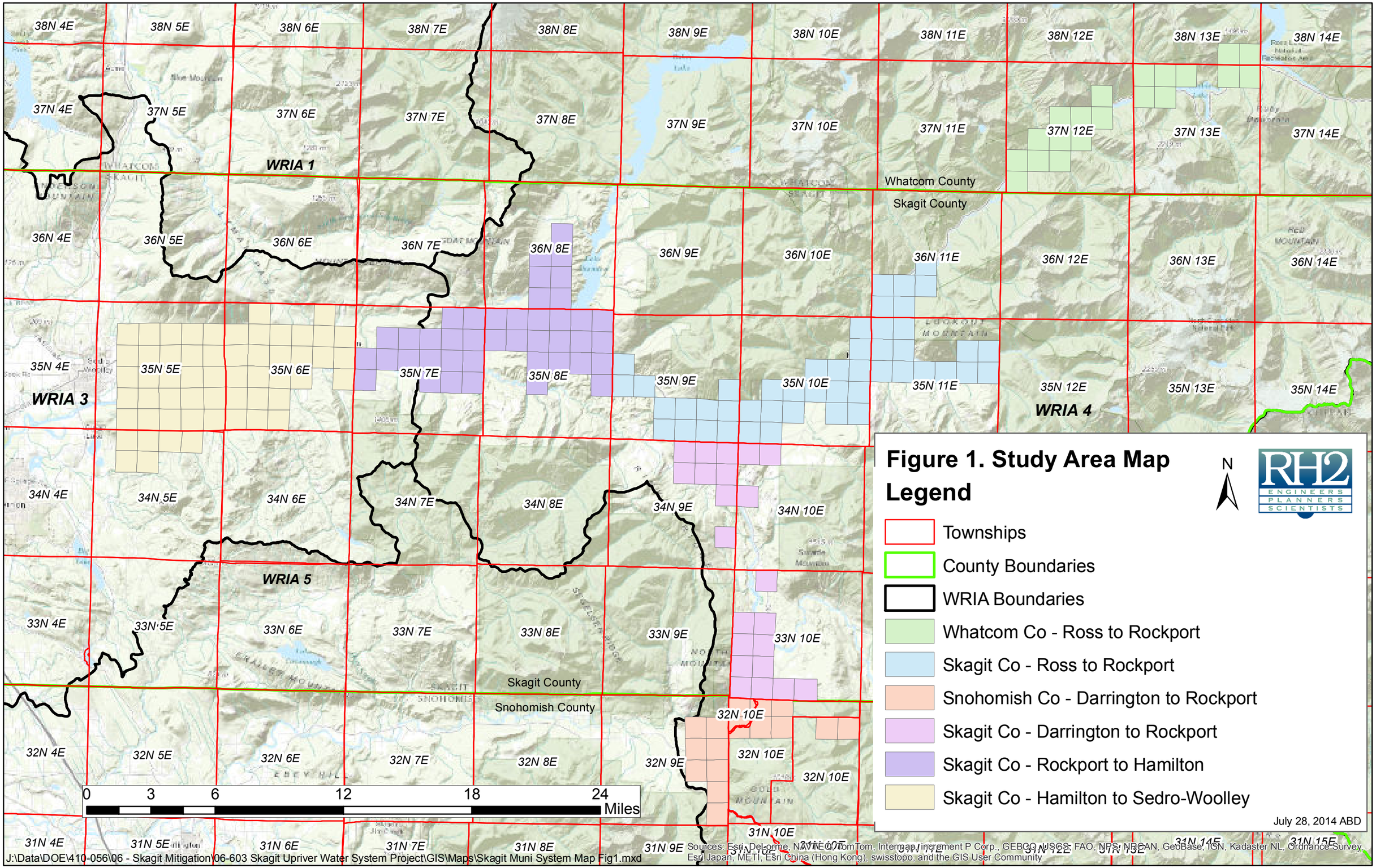
Public Utility District No. 1 of Skagit County, 2008, 2007 Water System Plan, Volume 1.

Reichhardt & Ebe Engineering, Inc., February 2012, Town of Concrete Draft 2012 Water System Plan.

Trepanier Engineering, October 25, 2001, Town of Darrington Water System Plan.

Skagit Valley Herald, January 29, 2014, Concrete turns down bottler's request to buy town's water.

Water right documents obtained from the Department of Ecology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Skagit County
Snohomish County
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31N 7E
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Figure 1. Study Area Map
Legend
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RH2 ENGINEERS PLANNERS SCIENTISTS
Townships
County Boundaries
WRIA Boundaries
Whatcom Co - Ross to Rockport
Skagit Co - Ross to Rockport
Snohomish Co - Darrington to Rockport
Skagit Co - Darrington to Rockport
Skagit Co - Rockport to Hamilton
Skagit Co - Hamilton to Sedro-Woolley
July 28, 2014 ABD
J:\Data\DOE\410-056\06 - Skagit Mitigation\06-603 Skagit Upriver Water System Project\GIS\Maps\Skagit Muni System Map Fig1.mxd
Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community

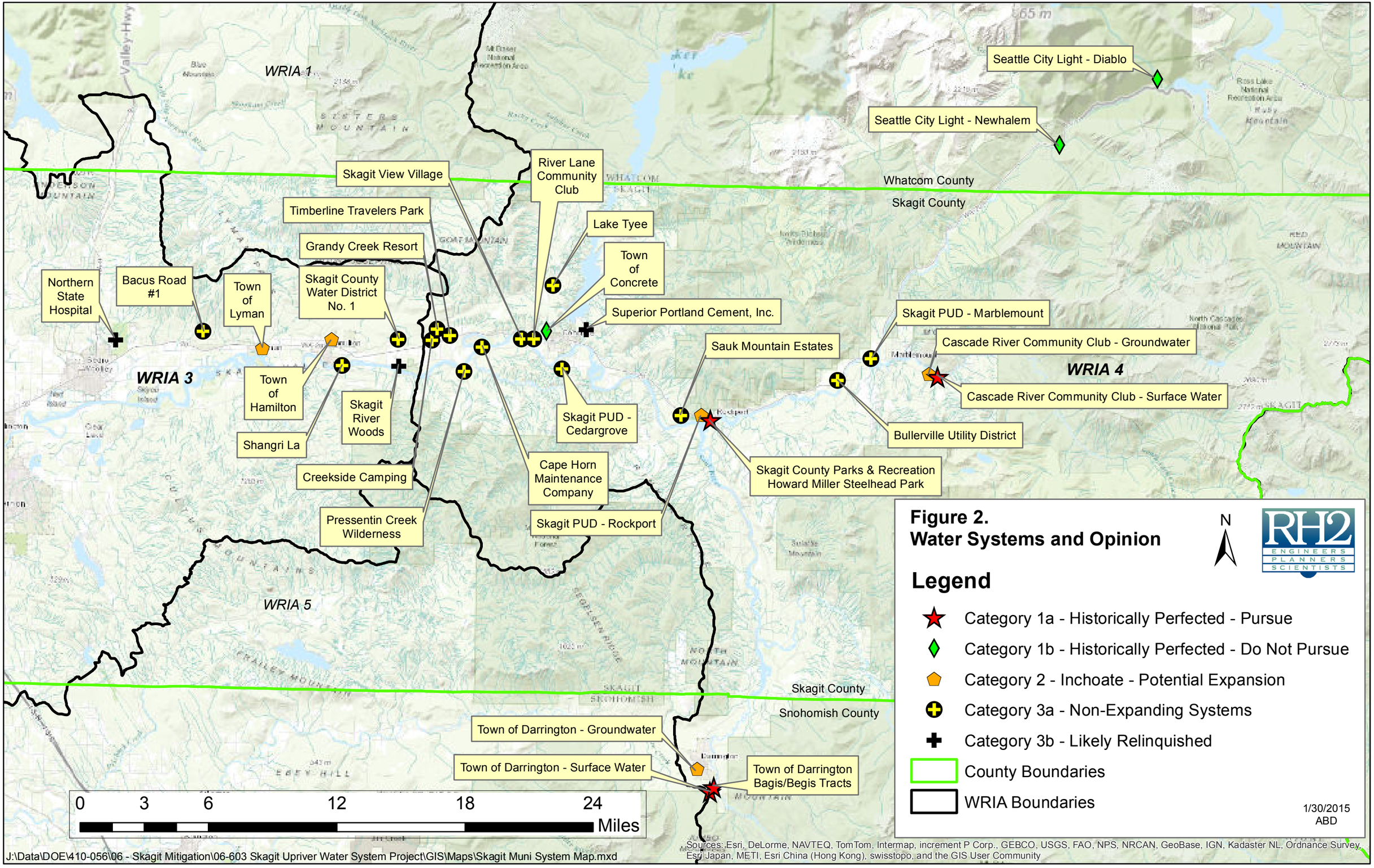

Figure 2.
Water Systems and Opinion

N

RH2 ENGINEERS PLANNERS SCIENTISTS

Legend

- Category 1a - Historically Perfected - Pursue
- Category 1b - Historically Perfected - Do Not Pursue
- Category 2 - Inchoate - Potential Expansion
- Category 3a - Non-Expanding Systems
- Category 3b - Likely Relinquished
- County Boundaries
- WRIA Boundaries

1/30/2015
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