Section 8 –Issues with Potential Implications for Public Water Systems in Whatcom County

This section is subject to revisions based on the contents of the final update. Marked revisions are tentative at best.

Section 8 –Issues with Potential Implications for Public Water Systems in Whatcom County

8.0 Introduction

The Coordinated Water System Plan (CWSP) encourages implementation of regional solutions to resource issues commonly shared by water utilities throughout the area. During development of the 1993 and 2000 CWSPs, several issues were identified as impediments to adequately meeting current and future water service responsibilities. In this section, a brief summary of the status of some of the issues are presented.

The purpose of this section is to identify issues that may affect the management of water by and for public water systems in Whatcom County. The discussions provided below are summary in nature and are intended to provide general awareness and understanding of the various issues. It is not the role of the CWSP to propose or implement solutions for these issues. Rather, the CWSP is intended to serve as a part of the County's larger overall efforts related to water supply issues. These issues would best be addressed as part of an overall water supply plan that would address all beneficial uses of water and which would ultimately also inform the County's comprehensive plan as it relates to water supply and water use in the County. The inclusion of the issues presented in this section is intended to make public water systems aware of the issues so that they may consider the potential ramifications of those issues on the operation and maintenance of their systems and to encourage consideration of these issues, as appropriate, in the broader, comprehensive planning effort mentioned above.

8.1 Lummi Indian Nation

The Lummi Indian Nation are signatories of the 1855 Treaty of Point Elliott. The Lummi Nation has a reservation located in western Whatcom County.

8.1.1 Lummi Peninsula Groundwater Settlement

In January 2003, the United States, in its own right and on behalf of the Lummi Indian Nation, commenced suit in United States District Court for the Western District of Washington against landowners who owned wells on a portion of the Lummi Reservation, referred to here as the Lummi Peninsula, and against Ecology. The Lummi Indian Nation intervened in the suit as a plaintiff, and the Court ordered the plaintiffs to join all non-Lummi landowners within the litigation area. Negotiations between the parties occurred and the Settling Parties filed a Notice of Filing, along with the revised Settlement Agreement and all exhibits, on November 13, 2007. On November 20, 2007 Judge Zilly signed and filed the Order and Judgment in this case, which approved the November 13, 2007, settlement agreement as it was filed with amendments required by the court. This concluded the litigation at the district court. The settlement agreement was appealed by some objectors and twice the 9th Circuit Court of Appeals affirmed the District Court's judgment approving the Settlement Agreement.

Figure #### shows the extent of the area included in the settlement agreement in relation to the entire Lummi Reservation.

The settlement agreement provided clarity to all users of groundwater on the Lummi Peninsula and established a framework for Ecology to appropriate the remainder of the State's allocation.

The agreement laid out the rights and obligations of all parties and developed a framework to protect the groundwater resource and ensure compliance with the settlement agreement. It also established metering requirements, maximum annual volume that can be pumped, water quality monitoring requirements, replacement well setbacks, and reporting requirements.

The Department of Ecology is charged with making sure that all of the public water systems and individual water users pumping water from the State's allocation comply with the settlement agreement. The Lummi Nation is charged with making sure that the Lummi Nation peninsula water system and all of the individual tribal water users pumping water from the Tribe's allocation comply with the settlement agreement. A Federal Water Master has been assigned to guarantee compliance by all parties with the settlement agreement.

The state-regulated water users were originally granted 120 acre-feet of water per year and the Lummi Nation could take the remainder of the water physically available (estimated to be up to 780 afy based on groundwater modeling). Even though the Lummi Nation could assert that its water rights are senior, since they date from the time of formation of the reservation (1855), it agreed through the settlement negotiations to not assert the senior priority of water rights on the state water users as long as the conditions of the settlement were followed. Under the settlement, water quality monitoring and triggers were put in place to protect the resource from saltwater intrusion. Setbacks were established between single and group domestic wells to prevent a new well from being drilled within a specified distance of an existing well to help spread out the withdrawal over the aquifer and reduce interference drawdown between neighboring wells. All wells supplying single homes were granted an annual volume of 0.39 acre-feet per year, which equates to an annual average withdrawal of 350 gallons per day per home. Public water systems were either granted the volume of water listed on the face of their water right documents, or were granted 0.39 acre-feet for each connection if the system was served by a permit-exempt well (Harnden Island Water Association is limited to 11 connections on a permit-exempt well and Bell Bay Community Water Association is limited to 5 connections on a permit-exempt well). The public water systems included in the settlement are shown in **Table 8-1** and on **Figure ##**.

Table 8-1: Public Water Systems within the Lummi Peninsula Settlement Area that are Currently Regulated under the CWSP

Water System Name	PWS ID	Group	Water System Type	Annual Volume (afy)
Sunset Water Association	86200	A	Comm	35.0 [1]
Georgia Manor Water Association	27450	A	Comm	20.0 [1]
Leeward/Northgate Water Association	64916	B	-	7.0 [1]
Harnden Island View Water Association	31366	B	-	4.29 [2]
Bell Bay Community Water Association	05400	B	-	1.95 [2]

[1] Volume from Water Right Documents

[2] Volume from number of lots served and an allocation of 0.39 afy per lot.

On the Lummi Indian Reservation, the CWSSA, and also the CWSP, are only applicable to fee lands within existing service areas which are under State and County jurisdiction and which are not currently receiving water service from the Lummi Indian Nation. The settlement agreement allows individuals and public water systems that have rights to the state allocation to transfer their rights to the Lummi Nation in exchange for being connected to the larger Lummi Nation peninsula water system. Some public water systems have done this since the last CWSP update.

In 2004, the Gooseberry Point Water Association settled separately with the Lummi Nation and agreed to have their water system integrated into the larger Lummi Nation peninsula water system. With this change, the Gooseberry Point Water Association no longer falls within the definition of the CWSSA and is, therefore, no longer included in the CWSP.

In 2007, shortly after the settlement agreement was implemented, Gulfside Mobile Home Park, which served six connection, was purchased by the Lummi Nation. In 2011, this system was connected to the larger Lummi Nation peninsula water system. With these changes, the Gulfside Mobile Home park public water system no longer falls within the definition of the CWSSA and is therefore no longer included in the CWSP.

The Lummi Nation disputes any jurisdiction by the State of Washington or Whatcom County within the external boundary of the reservation, regardless of the status of land ownership and water purveyor. DOH indicated that the U.S. Environmental Protection Agency (EPA) has jurisdiction over those systems on the Reservation which are either tribally owned or which have been integrated into the Lummi Water System and EPA can, but currently does not, regulate the non-tribal systems that are on the reservation. DOH is in discussions with the EPA to identify which agency has authority over systems within the Lummi Reservation. In the absence of EPA exerting its authority, the non-tribal systems within the Reservation are, for the purposes of this CWSP update, considered to be under the jurisdiction of the DOH. For this reason, Whatcom County has elected to continue to include those state and county-regulated water systems located on the reservation as part of this CWSP.

8.1.2 Public Water Systems on the Lummi Reservation Outside of the Peninsula Settlement Area

There are also a few non-tribal public water systems that are located within the boundaries of the reservation, but that are outside of the peninsula settlement area discussed above. These water systems are identified in **Table 8-2**.

Table 8-2: Public Water Systems outside the Lummi Peninsula Settlement Area but on the Lummi Reservation that are Currently Regulated under the CWSP

Water System Name	Group	PWS ID	Water System Type	Annual Volume (afy) [1]
Sandy Point Improvement Company	A	76105	Comm	143
Fertile Meadows Water Association	B	24900	- [2]	187 or 107 (uncertainty in water right record) [3]
Neptune Beach Water Association	A	58950	Comm	35

[1] Volume from Water Right Documents.

[2] Group B water systems are not categorized by water system type.

[3] Fertile Meadows Water Association and River Rd Water Association utilize the same well as a source.

The service areas of these water systems are either wholly located within the boundaries of the Lummi Reservation, or they straddle the Reservation boundary (**Figure ##**). These systems are included in this CWSP.

8.1.3 Tribal Claims of Treaty-Reserved Fishing and Water Rights

In addition to the settlement efforts related to the groundinterconnections between public water systems permitting exchange or delivery of water between those systems for other than emergency supply purposes, where such exchange or delivery is within established instantaneous and annual withdrawal rates specified in the systems' existing water right permits or certificates, or contained in claims filed pursuant to chapter 90.14 RCW, and which results in better management of public water supply consistent with existing rights and obligations. Interties include interconnections between public water systems permitting exchange or delivery of water to serve as primary or secondary sources of supply, but do not include development of new sources of supply to meet future demand.water of the Lummi Peninsula, in March, 2011, the Nooksack Tribe, in a letter to the U.S. Department of the Interior, requested "that the United States commence litigation against the State of Washington for the purpose of obtaining a declaratory judgment that quantifies the Nooksack Tribe's treaty reserved water rights and enjoins the issuance of, or reliance upon, state water permits that would impair these rights."

In their letters, the Nooksack Tribe and the Lummi Nation make three principal assertions:

1. The Lummi Nation and the Nooksack Indian Tribe have federal reserved water rights for instream flows necessary to support its treaty fishery;
2. The Lummi Nation and the Nooksack Indian Tribe have federal reserved rights in an amount necessary to fulfill the "homeland" purposes of their reservations, including, but not limited to, instream flow for treaty fisheries; and
3. Federal action is necessary to protect and preserve Lummi Nation and Nooksack Tribe water rights and the Lummi Nation and Nooksack Tribe treaty fishery.

The water rights in the Nooksack Basin (WRIA 1) have not been the subject of a general stream adjudication. The Lummi Nation and Nooksack Tribe's assertion of treaty-based water rights

held in trust by the Federal government has not been established by the Court's and no such rights have been quantified either by the Federal government or by a general stream adjudication.

In their letters to the Department of the Interior, the Lummi Nation and Nooksack Tribe cited the failure of on-going negotiations to resolve these issues locally. As of publication of this plan, no response has been provided by the United States. The ultimate resolution of these issues will have significant implications for all water users in Whatcom County. All water users, including public water systems, are encouraged to closely monitor any actions taken by the United States on behalf of the Lummi Nation and the Nooksack Tribe and to become actively involved in any local efforts aimed at the resolution of these issues which are beyond the scope of the CWSP update.

8.2 Water Rights

A water right summary for each of the Group A community water systems is contained in Appendix A and is discussed in more detail in Section 3. Appendix ZZ includes a brief description of the water rights procedures that have been in place for many years. The appendix also highlights some of the recent changes in water right procedures since 2000 that are applicable to public water supplies.

8.2.1 Background

The water rights procedures that have been in place for many years in the State of Washington are based on the State Surface Water Code of 1917 (Chapter 90.03 RCW), the State Ground Water Code of 1945 (Chapter 90.44 RCW), and the various state regulations adopted by Ecology and its' predecessor agencies for administration of these two codes.

Historically, Ecology has been charged with processing water right applications. The typical process applies to either a new application to appropriate public surface or ground waters, or an application for change to an existing right. The typical steps for this process are included in Appendix ZZ.

8.2.2 Recent Changes Related to Water Rights

As a result of Washington State Supreme Court decisions and other factors affecting the complex decision-making process for water rights, Ecology has revised some policies and procedures that may affect public water supply projects.

Postema v. Pollution Control Hearings Board, et al. (2000) raised issues as to what Ecology's obligations are when analyzing an application to withdraw ground water that is interconnected to surface water ("hydraulic continuity").

The Supreme Court ruled that the legal test of impairment (i.e., whether the withdrawal of ground water affects the volume of surface water that it is connected with) is "no impairment." Hydraulic continuity between ground water and a stream where instream flows are not met part of the year is not sufficient to find impairment; impairment must be determined on a case-by-case basis. And finally, the Court also ruled that an application for a withdrawal from ground water in hydraulic continuity with a closed stream must be denied if that withdrawal will affect the flow or level of the surface water. This is the decision that is often referred to as the "one-molecule rule" for the determination of hydraulic continuity

8.2.2.1 Municipal Water Law

In 2003, the Washington State Legislature significantly amended Washington water law to provide clarity on the nature of water rights issued for municipal supply purposes, and to provide flexibility to municipal water suppliers in exercising their water rights (SES S HB 1338; Chapter 5, Laws of 2003; 58th Legislature; 2003 1st Special Session; Municipal Water Supply – Efficiency Requirements. In a unanimous decision on October 28, 2010, the Washington State Supreme Court upheld the constitutionality of this Municipal Water Law).

Traditionally, Ecology issued water right certificates to public water systems when they demonstrated the ability to serve water to customers within their service area, regardless of whether or not water was actually being provided to the entire area. This was in recognition of the fact that many systems construct their distribution system but recognize that it may be some time before the area is fully built out and all parcels within the service area are using water. Such certificates have come to be known as pumps and pipes certificates because they were issued when the utility could demonstrate that they had installed the necessary pumps and pipes to provide water within their service area. The Supreme Court found that Ecology erred in issuing such certificates and Ecology no longer issues such certificates but now waits until water is actually placed to beneficial use before issuing a water right certificate. The Court's decision raised questions about the validity of the pumps and pipes certificates. The Court decreed that such certificates are in good standing (see RCW 90.03.330(3)).

Water that is in the water right certificate stage but which has not yet been placed to beneficial use is an inchoate water right. The Supreme Court decision meant that the inchoate portions of a water right that are found to be in good standing are eligible for change or transfer, which could allow that inchoate water to be transferred to another municipal water supplier or integrated into a regional water supply system.

The Municipal Water Law defines the terms "municipal water supplier" and "municipal water supply purposes", defines when the "place of use" could be the same as a municipal water supplier's service area, establishes that municipal water rights were not limited to the stated number of connections but to the number of connections approved in a water system plan, and required specific WUE practices and planning. Under the law, utilities must use water efficiently.

The Washington Departments of Health and Ecology share responsibilities under the Municipal Water Law, and have developed agreements to coordinate planning, engineering, and public health and safety matters relating to water systems and water resources. The Department of Health is responsible for ensuring safe and reliable drinking water, and reviews and approves planning and engineering documents for water systems. The Department of Ecology administers Washington State's Water Resource Program, including water rights administration and watershed planning.

The Municipal Water Law was intended to clarify which water rights were for municipal water supply purposes and to enable the holders of those water rights to more easily meet the demands of serving growing communities. In addition, the law also required the holders of such rights to engage in WUE measures in order to improve the efficiency of their systems.

The law included the following definitions: (see RCW 90.03.015 Definitions)

> (3) "Municipal water supplier" means an entity that supplies water for municipal water supply purposes.
> (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.

Note that, in identifying the "governmental entities" which are eligible to hold municipal purpose water rights, the legislature identified cities, towns, PUDs, counties, sewer districts, and water districts.

If the beneficial use of water by a public water system meets the definition of municipal water supply purposes, then that entity is considered a municipal water supplier regardless of the purpose of use stated on their water right. The result is that all water systems whose purpose of use on their water rights is domestic, community domestic, group domestic, or some other term but whose use meets the definition, are now considered municipal water suppliers. Such right holders are not required to modify their water rights but may request that Ecology "conform" their rights to municipal purpose if desired under RCW 90.03.560.

RCW 90.14.160 states that "any person entitled to divert or withdraw waters of the state . . . who abandons the same, or who voluntarily fails, without sufficient cause, to beneficially use all or any part of said right to divert or withdraw for any period of five successive years after July 1, 1967, shall relinquish such right or portion thereof, and said right or portion thereof shall revert to the state, and the water affected by said right shall become available for appropriation in accordance with RCW 90.02.250."

RCW 90.14.140 provides exemptions from the relinquishment provision above by defining what constitutes "sufficient cause" for the nonuse of all or a portion of the water by the owner of a water right for a period of five or more consecutive years. RCW 90.14.140(2)(d) states that: "If such right is claimed for municipal water supply purposes under chapter 90.03 RCW." Thus, municipal water supplies are not subject to relinquishment. Note, however, that such water rights

can be lost in cases where the water right is found to be abandoned. (See Okanogan Wilderness League, Inc., 133 Wash.2nd at 781).

In addition to the issuance of pumps and pipes certificates as discussed above, Ecology also often included the anticipated maximum number of connections that would be served by the public water system and viewed this number as a limitation on the water right. In other words, if the applicant sought an amount of water to serve 65 homes, they would be limited to serving water only to 65 homes, even if the applicant still had water remaining in their water right. The Supreme Court ruled that the number of connections identified in the water right record is not a limiting factor for a water right. Also, DOH is responsible for determining the approved number of connections. (Note that other water right provisions such as the requirement for metering and reporting data and screening intakes still apply).

All water rights describe a place of use in which the water may be placed to beneficial use. Generally speaking, if a water right holder wanted to change the place of use of their water right, they were required to submit a water right change application and Ecology would need to process that application and make a determination of whether the change could be approved. This process often took a long time due, in part, to the backlog of water rights, but it did allow for notification of potentially affected third parties via a legal notice process. The municipal water law provided another avenue for changing the place of use of a municipal purpose water right.

A municipal water supplier may now modify their place of use of water by amending their water system plan or an engineering document that is approved by DOH. In submitting the document to DOH, the system must attest that the change is in compliance with their water system plan and is "not inconsistent" with other local planning documents. This change eliminated the need to file a water right change application with Ecology.

In response to the municipal water law legislation, the legal challenges, and the decision of the Washington State Supreme Court, Ecology developed its 2003 Municipal Water Law Interpretive and Policy Statement, POL-2030. This policy is included as **Appendix XX** of this update.

Another key element of the municipal water law related to water use efficiency (WUE). This is discussed in more detail in Section 8.7, Water Use Efficiency, below.

8.2.2.2 Changes or Transfers of Water Rights

In 2001, the legislature amended RCW 90.03.380 and RCW 90.44.100, and clarified that Ecology could process applications for changes to existing water rights in a separate line from applications requesting new water rights. This bifurcation of the processing lines has reduced the processing time for change applications considerably.

8.2.2.3 Exempt Well Consolidation

Under RCW 90.44.105, it is possible for a water system to obtain additional water rights when it connects an entity that was previously supplied by a permit-exempt withdrawal. For this to happen, all of the following must be satisfied:

1. The water system must hold a ground water right whose point of withdrawal taps the same body of public groundwater as the permit-exempt well

2. Use of the permit-exempt well shall be discontinued upon approval of the consolidation.
3. A legally enforceable agreement must prohibit construction of another exempt well to serve the area previously served by the permit-exempt well and that agreement must be binding on future property owners.
4. The permit-exempt well must be properly decommissioned.
5. Other existing water rights cannot be impaired because of the consolidation.

The rate and volume of water added to the water system's ground water right is equivalent to the permit-exempt use that has been established through beneficial use, not to exceed 5,000 gpd. Ecology is required to make a decision on exempt well consolidation applications within 60 days of the end of the comment period following public notice. So, the process is faster than the typical water right change application process.

Exempt well consolidation is generally supported within the CWSSA because it reduces the number of wells in a particular source, does not impact the amount of water available for the water system to serve existing or future customers, and has the potential to improve the quality of the water delivered to the end user.

8.2.2.4 New or Replacement Wells

In 1997, the Legislature enacted provisions of RCW 90.44.100 (the State Groundwater Code). RCW 90.44.100(3) and RCW 90.44.100(4) state:

> 3) The construction of a replacement or new additional well or wells at the location of the original well or wells shall be allowed without application to the department for an amendment. However, the following apply to such a replacement or new additional well: (a) The well shall tap the same body of public groundwater as the original well or wells; (b) if a replacement well is constructed, the use of the original well or wells shall be discontinued and the original well or wells shall be properly decommissioned as required under chapter 18.104 RCW; (c) if a new additional well is constructed, the original well or wells may continue to be used, but the combined total withdrawal from the original and additional well or wells shall not enlarge the right conveyed by the original water use permit or certificate; (d) the construction and use of the well shall not interfere with or impair water rights with an earlier date of priority than the water right or rights for the original well or wells; (e) the replacement or additional well shall be located no closer than the original well to a well it might interfere with; (f) the department may specify an approved manner of construction of the well; and (g) the department shall require a showing of compliance with the conditions of this subsection (3).
>
> 4) As used in this section, the "location of the original well or wells" is the area described as the point of withdrawal in the original public notice published for the application for the water right for the well.

The "location of the original well or wells" means within the same area advertised as the point of withdrawal in the legal notice that was published for the original water right. While this is typically the quarter-quarter section, it varies and whatever is listed in the published legal notice constitutes the "location of the original well or wells."

The drilling of a new or replacement well under this section does not require an application to change an existing water right but simply requires submittal of a notarized "showing of compliance" to Ecology identifying the changes made and compliance with the terms of this section. A copy of the Showing of Compliance form is included as **Appendix XX**. Ecology does not approve or deny such submittals. The affidavit is simply to provide notification to Ecology of the changes being made. Public water systems making such changes are advised to also notify DOH of the additional or replacement wells to ensure that the system obtains source approval from DOH for these new facilities.

Use of RCW 90.44.100(3) is only available to holders of state-issued ground water permits and certificates. This process is not available to holders of a water right claim since water right claims did not go through the public notice process. This process is also not available to holders of surface water rights.

8.3 Financial Viability of Small Systems

Financial viability is defined as "the ability to obtain sufficient funds to develop, construct, operate, maintain, and manage a public water system in full compliance with local, state, and federal requirements on a continuous basis. DOH urges that water systems should be run like a business.

Due to financial constraints, many small water systems are not able to make required system improvements or upgrades and thus are not considered financially viable. Currently, DOH records indicate that there are 183 active Group A water systems in Whatcom County with 164 within the CWSSA and 19 outside of the CWSSA. It is not known how many of these systems are financially viable.

DOH identified the following benefits of financial viability for small water systems:

1. Predictable funding for capital improvements
2. Improved system efficiency
3. Cost savings
4. Eligibility for grants and loans
5. Emergency response
6. Peace of mind

DOH identified the following five guidelines for public water systems to work towards financial viability:

1. Develop an operating budget
2. Evaluate rates for adequacy
3. Create and fund an operating cash reserve
4. Create and fund an emergency reserve
5. Create and fund reserves for capital improvements and equipment replacement

It is recommended that all public water systems evaluate their systems according to the DOH guidelines and identify any needed changes to ensure their long-term financial viability. To that

end, the Rural Community Assistance Corporation has free Financial Viability Software available on-line at http://www.rcac.org/home

For additional information, go the DOH Drinking Water website at:

http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater

8.4 Existing and Potential Water Quality Problems

Water quality data in this section was obtained from DOH's Sentry Database. No attempt was made to identify additional data, nor to verify that all systems required to report have done so.

Water quality issues throughout the County can be categorized as follows:

8.4.1 Bacteriological Contamination

According to DOH records, 38 water systems in the CWSSA performed coliform tests that showed a presence of the bacteria in 2013.

In general, causes for these violations are attributed to improper well construction, groundwater under the direct influence of surface water (GWI), lack of reservoir maintenance, improper disinfection of repairs and new lines, improper sampling technique, disinfection system malfunction, and cross connections. Except for unusual circumstances, such as a direct conduit of sewage into an aquifer in the immediate vicinity of a well, the causes of bacteriological contamination in distribution systems are easily corrected through operation and maintenance procedures.

8.4.2 Surface Water and Groundwater Under the Influence of Surface Water Sources

Surface water sources must be consistently treated to remove bacteria. Failure to operate and maintain the treatment system will usually result in bacteriological MCL violations.

Public water systems using groundwater under the influence of surface water (GWI) are at risk of contamination by microbiological pathogens and are required to treat under the Surface Water Treatment Rule (SWTR). Potential GWI is defined in WAC 246-290-010(189) and the GWI determination process is defined in WAC 246-290-640.

DOH considers all spring sources and wells less than 50 feet deep and within 200 feet of surface water to be potential GWI sources. These water systems must either conduct water quality monitoring, or they may conduct a hydrogeologic investigation to determine if the source is hydraulically connected with the surface water. Water quality monitoring includes 12 months of testing the source water and surface water for water quality parameters such as temperature, turbidity and conductivity. Other GWI sources include springs, water systems with bad water quality, and water systems associated with a disease outbreak. If at the conclusion of the initial monitoring the source appears to be "hydraulically connected" to surface water, the water system must reconstruct the source to eliminate any surface water, install disinfection with a minimum contact time (CT) of 6 (concentration x contact time), and conduct microscopic particulate analysis (MPA) to determine the source's relative risk to the presence of surface water organisms such as giardia and cryptosporidium. If these surface water organisms are present, the source is classified as a surface water source and treatment is required.

The 7 systems in the CWSSA listed in **Table 8-4**, below, were evaluated by DOH in (c. 2005) as "potential" groundwater under the direct influence of surface water (GWI). All 7 of these systems were determined not to be GWI as described in the table below, "GWI Status" column.

Table 8-4: Status of Systems Evaluated for GWI In the CWSSA

Water System Name	PWS ID	Group	Water System Type	GWI Status*
Samish Park	15064	A	TNC	D-GW(MPA)
Deming Water Association	18800	A	Comm	D-GW(MPA)
Double L Mobile Home Park	19890	A	Comm	D-GW(MPA)
Evergreen Retreat MHP	24164	A	Comm	D-GW(MPA)
Glacier Springs Water System	27755	A	Comm	D-GW
Plantation Range	52681	A	TNC	D-GW(MPA)
Slavic Gospel Church Water System	AA034	A	TNC	D-GW(MPA)

*GWI Status key:

D-GW(MPA) means system was determined to be groundwater based on water quality monitoring (MPA results) and are required to disinfect to CT6.

D-GW means source was determine to be groundwater based on water quality monitoring (temp, conductivity) and no disinfection treatment needed.

DOH indicated that, now that the groundwater rule is in effect, they may conduct "assessment source water monitoring" under WAC 246-290-300(3)(e) which could lead to new interpretation and implementation around the definition of potential GWI. This may occur, particularly for wells that tap shallow, unconfined aquifers with indicators of surface contamination risk (e.g. nitrates in agricultural areas).

8.4.3 Nitrate

In 1997, six water systems exceeded the MCL for nitrate which is 10.0 mg/L and 15 water systems were above 5 mg/L for nitrate. In 1998, seven water systems exceeded the MCL for nitrate and 16 water systems were above 5 mg/L for nitrate. As shown in **Table 8-5** and on **Figure ###**, according to DOH data, 18 active public water systems have had at least one water quality sample that has exceeded the MCL for nitrate at least one time from January 2005 to June 2015. Of those systems, 10 have average nitrate concentrations that are greater than 10.0 mg/L, five have average nitrate concentrations that are between 5.0 and 10.0 mg/L, and three have average nitrate concentrations that are less than 5.0 mg/L. This data suggests that nitrate contamination of public water supply wells is a real threat that is projected to continue to increase into the future.

Table 8-5: Public Water Systems with a Source that has had a Water Quality Sample that Exceeded the Nitrate MCL of 10.0 mg/L at least once since January 1, 2005

Water System Name	Public Water System ID	Group	Water System Type	Total Number of Samples	Category
Delta Water Association	18750	A	Comm	85	Average and maximum concentration greater than 10.0 mg/L
East Badger Water Association	37823	B	-	26	
Ehlers Labor Camp	58951	A	TNC	11	
Hoag Acres Water System	59730	B	-	4	
Line Road Water Association	47385	B	-	1	
Lynden Valley View Association	91001	B	-	1	
Northwood Park	62135	A	Comm	41	
Northwood Water Association	62150	A	Comm	43	
Rader Farms Labor Camp	56829	A	TNC	66	
Rathbone Park Water Association	71290	A	Comm	81	
Belfern West	09899	A	Comm	54	Average concentration between 5.0 and 10.0 mg/L. Maximum concentration greater than 10.0 mg/L
Century Water Association	00601	A	Comm	45	
Delta Grocery Water System	08255	A	TNC	9	
Evergreen Drive Water Association	02400	B	-	4	
Vicente Farms & Sons – Enterprise	56831	A	TNC	40	
Covenant Christian School	15596	A	NTNC	41	Average concentration less than 5.0 mg/L. Maximum concentration greater than 10.0 mg/L
Raspberry Ridge Water Association	27631	A	Comm	16	
Wiser Lake Kingdom Hall Jehovahs	61494	A	TNC	36	

Comm = Community; NTNC = Nontransient Noncommunity; TNC = Transient Noncommunity

Most of the impacted systems are located in the northern part of the county, near the City of Lynden, with the source of supply being the Sumas-Abbotsford aquifer (**Figure** ##). This particular aquifer is susceptible to nitrate contamination due to the fact that the aquifer is unconfined, it is relatively thin (approximately 40 feet thick), and the depth to the water table is often less than 10 feet.

Public water systems are required to monitor nitrates quarterly for new sources and where annual monitoring indicates nitrate levels above 5 mg/L. Any system with a nitrate sample greater than 10 mg/L (the MCL) must collect a confirmation sample. For systems treating for nitrates, monthly sampling is required to ensure that the treatment is working properly.

Nitrate sources include failing on-site sewage systems, and past and present improper manure or fertilizer application or storage. The July 1992 Environment Canada study of nitrates and pesticides in the Abbotsford aquifer shows nitrate levels over 10 mg/L in 60 percent of the wells sampled in the south Matsqui area. This study is significant to Whatcom County because the regional groundwater flows in the southern part of the Abbotsford-Sumas aquifer is generally southward, according to the Environment Canada Study.

In May 1998, Ecology completed the Sumas-Blaine Surficial Aquifer Nitrate Characterization Study (publication No.98-310). This study concluded that of the 250 sources sampled for nitrate over a ten-week period, about 21 percent exceeded the 10 mg/L MCL for nitrate. According to the study, sources of elevated nitrate in drinking water sources are associated with up-gradient agricultural land use practices. The level of nitrate in drinking water ranged from less than the detection limit (0.01 mg/L) to 53 mg/L. The results of this study indicate the Sumas-Blaine Surficial Aquifer has elevated nitrate concentration in the groundwater.

The United States Geological Survey completed a study titled: Hydrogeology, Ground-Water Quality, and Sources of Nitrate in Lowland Glacial Aquifers of Whatcom County, Washington, and British Columbia, Canada (Water-Resources Investigations Report 98-4195) in 1999. This study similarly showed that the majority of nitrate contamination to groundwater occurs in the Abbotsford-Sumas aquifer. This study concluded that the main contributors to nitrate in groundwater were primarily dairy manure applied to cropland, mineralization of soil organic matter, inorganic nitrogen fertilizers, leakage from manure lagoons, redisposition of nitrogen volatilized from manure, septic tank effluent, and residential fertilizer use.

Figure ### shows the spatial distribution of the water system service areas that are impacted by nitrate concentrations above the MCL in at least one of their sources. Some systems are blending sources to reduce the nitrate concentration before the water is distributed, while other water systems continue to exceed the MCL.

Options to assist water systems dealing with high nitrate groundwater include transmission of water from uncontaminated sources, such as the City of Blaine, City of Sumas, Whatcom PUD, and City of Lynden. The most difficult part of this potential solution is the distance between the more distant sources (Blaine, Sumas, and the PUD) and the water right uncertainty for the City of Lynden.

8.4.4 Arsenic

In the 2000 CWSP update, it was reported that only one public water system exceeded the MCL for arsenic (50 ppb) and, historically, arsenic problems in general appeared to be limited to four public water systems on Lummi Island. In 2001, EPA adopted a new lower standard for arsenic in drinking water of 10 ppb. As of January 23, 2006, all water systems must now comply with the new standard and new water systems or source or expansions of systems exceeding the MCL will not be approved without installation of an approved treatment system.

In 2013, all Group A water systems with sources that are above the MCL are either not using those sources, are blending to reduce the distribution system concentration to below the MCL, or are treating the water to reduce it to below the MCL. Table 8-6 lists the water systems that are currently blending or treating to remove arsenic or that have had exceedances since 2005.

Table 8-6: Public Water Systems with Raw Water from a Source that has Exceeded the Arsenic MCL of 10 ppb from 2005 through June 2015

Water System Name	Public Water System ID	Group	Water System Type [1]
Acme Water District No. 18	00250	A	Comm
Fairfield MHP	02601	A	Comm
Hilltop Water Owners Association [2]	33364	A	Comm
Isle Aire Beach Association [2]	36368	A	Comm
Pleasant Valley Water System	67900	A	Comm
Sandy Point Improvement Company	76105	A	Comm
Cornwall Church of God Water System	07028	A	NTNC
Glen Community Association	87772	A	TNC
Lummi Point Water Association [2]	48875	A	TNC
Lake Terrell Mobile Ranch	44593	B	- [3]
Marine View Estates Water System [2]	50155	B	- [3]
Miller Water Association [2]	58901	B	- [3]
Peace Meadow	03194	B	- [3]
Penturbia Well H2O Association	03195	B	- [3]
Samish Woods North	AD085	B	- [3]
Yew Tree Acres Water Association	04352	B	- [3]

[1] Comm = Community; NTNC = Nontransient Noncommunity; TNC = Transient Noncommunity

[2] System located on Lummi Island

[3] Group B water systems are not characterized by water system type

Arsenic in groundwater in the county is a result of the natural weathering of bedrock and sediments, as opposed to human contamination. **Figure** ### shows that elevated arsenic in groundwater is most prevalent in southern and western Whatcom County with five of the systems being located on northern Lummi Island.

Any new sources of water should be evaluated to determine whether they contain arsenic at levels of concern. If they do, appropriate actions should be taken ranging from a decision not to develop that source of water to blending with other sources to achieve adequate water quality or treating the water to reduce arsenic concentrations to acceptable levels.

8.4.5 Seawater Intrusion

Seawater intrusion occurs from over-pumping of groundwater in areas where the aquifer is hydraulically connected to seawater. Seawater intrusion can lead to excessive levels of chloride, which is usually used to assess seawater intrusion impacts. The MCL for chloride is 250 mg/L. While seawater intrusion was reported to have been a historic issue for systems located along the marine shoreline, there are currently no public water systems exceeding the MCL due to seawater intrusion.

There is no established MCL for sodium at this time. DOH can require treatment for chloride based on the Policy for Treatment of Secondary Contaminants, which considers consumer complaints.

8.4.6 Relic Saltwater

In many parts of the County west of the National Forest, there is evidence of relic saltwater, especially in the deeper sediments. It is generally believed this relic saltwater is due to seawater that was "trapped" either within glacial sediments that were deposited when marine water covered the area, or in sediment and bedrock that was already in place when marine water covered the area. Chloride levels in this relic saltwater can exceed the MCL of 250 mg/L. The presence of relic saltwater is not considered a significant problem but can be an issue in localized areas where it prevents the use of groundwater for potable supply.

8.4.7 Deep Wells

Deep wells have been drilled in many locations of the county primarily for the following reasons: searching for a source that is not contaminated with nitrates or relic saltwater; searching for a deep aquifer that is not in hydraulic continuity with surface water bodies with the hopes of obtaining new water rights; and searching for a suitable aquifer storage and recovery reservoir. Some deep wells have been successful at finding productive aquifers with good water quality (primarily located in the vicinity of the City of Blaine) while the remainder drilled in the CWSSA have only tapped marginal, deep, unconsolidated and bedrock aquifers that typically contain relic saltwater, as described above.

As of 2015, a suitable deep aquifer for aquifer storage and recovery has not yet been identified.

8.4.8 Volatile Organic Chemicals (VOCs) and Pesticides

Sandy soils overlying the aquifer in the County allow chemicals applied to the ground to easily enter the drinking water. Many studies have been conducted since 1984 that provide information about water quality in the north County. Ecology, among other agencies, has conducted several studies in Whatcom County, such as the 1986 Phase I Investigation of Sites in Whatcom County, the 1990 Washington State Agricultural Chemicals Pilot Study, and the 1991 Bertrand Creek EDB Site Study which show the presence of soil fumigants such as 1,2-DCP and EDB in groundwater. Results from these investigations indicate that water contaminated with 1,2-dichloropropane (1,2-DCP) and ethylene dibromide (EDB) is limited to specific areas of the County.

Historically, five water systems have detected 1,2-DCP, but the levels were below the MCL. In 1998, only one water system detected 1,2-DCP, and the sample results were below the MCL which is 5.0 mg/L. In 1998, of the water systems that sampled, no EDB was detected. Historically, no EDB was detected in public water system sources. Since 2000, no systems have

exceeded the MCL for volatile organic chemicals although, as discussed below, some individual ground water wells have been found to have some volatile organic contaminants.

Ecology, Lynden, and WCHD collaborated to construct a pipeline to supply Nooksack River water for domestic supply to properties where the groundwater was contaminated with EDB and/or 1,2-DCP. The pipeline, called either the Bertrand Creek Water Main Extension or EDB-line, is connected to the City of Lynden's water system. The extension consists of 5.4 miles of distribution system for domestic service to approximately 51 existing residences with wells that were contaminated at the time of construction. The system has the capacity to serve up to 86 equivalent residential units. The system is located on the following roads:

> Birch Bay Lynden from Tromp Road to 500 feet west of Bob Hall Road; Bob Hall Road from Birch Bay Lynden Road to 1000 feet north of Birch Bay-Lynden Road; Rathbone and Wiley's Lake roads from Birch Bay Lynden Road to 7700 feet south of Birch-Bay Lynden Road; Berthusen Road between Birch Bay-Lynden and Loomis Trail Road.; Loomis Trail Road from Berthusen Road to approximately 600 feet west of Weidkamp Road; Weidkamp Road for 1,000 feet north of Loomis Trail.

For the purposes of this project, domestic supply refers to the use of water for uses typically associated with human hygiene in a residence, specifically including potable supply for drinking and cooking, toilet flushing, hand washing, showers, bathing, etc. It also includes the use of water outside of the residence for up to one-half acre of non-commercial lawn and garden watering and other typical residential uses such as car washing. The human hygiene uses described above may also be associated with pre-existing commercial operation, but the water may not be used for commercial purposes such as food processing, parts washing, industrial cooling, or any other kinds of industrial process activities. (Source: Protested ROE for S1-28116, Department of Ecology)

In 2002, Ecology issued a water right permit to the City of Lynden (S1-28116P) for the water supply to serve the extension in an amount not to exceed an instantaneous diversion rate of 0.57 cfs (approximately 266 gallons per minute) and an annual volume of 70 acre-feet per year.

The water right established the following criteria under which a property is eligible to receive water:

> Only property where 1,2-DCP has been detected by a certified laboratory at or above 2.5 parts per billion (one-half of the Maximum Contamination Level, or MCL, of 5.0 parts per billion or where EDB has been detected at or above 0.01 parts per billion (one-half the MCL of 0.02 parts per billion) are eligible to receive water pursuant to this permit. The level of 0.01 parts per billion is also the Practical Quantification Limit which is essentially the lowest level at which a substance can be reliable detected.

In 2007, a follow-up study was conducted to determine the current state of pesticides in groundwater in the Sumas-Blaine aquifer. The results of this study indicated that pesticides were still present in groundwater and that EDB, 1,2-DCP, and nitrates also remained contaminants of concern for users of wells in the Sumas-Abbotsford aquifer.

Metering data for 2004 through 2013 show that the amount of water utilized by those along the Bertrand Creek Water Main Extension has ranged from 11.83 afy in 2013 up to 19.31 afy in 2009.

8.4.9 Iron/Manganese

Iron (Secondary Maximum Contaminant Level [SMCL] = 0.3 mg/L) and manganese (SMCL = 0.05 mg/L) are aesthetic water quality problems through much of the sand and gravel aquifers in the County. Iron and manganese are naturally occurring substances that do not pose a known health threat, but can cause taste and staining problems if untreated. They are relatively common throughout much of the County but can generally be treated with relative ease and reasonable costs.

8.5 Lack of Water Quality and Quantity Data and Data Management

8.5.1 Data Management

Implementation of many State laws, such as the State Environmental Policy Act, the Water Pollution Control Act, and the Water Resources Act of 1971, requires various agencies to collect water data. In addition, water data is generated from private well testing, solid waste site monitoring wells, surface and groundwater studies, hatchery facilities, and public water system testing. Water data is captured and maintained by a variety of federal, State, and local governments. There is no uniformity to the format, nomenclature, or units of measurement used in the data at this time.

At the State level, DOH's current drinking water database is referred to as Sentry. The database is available through the Internet and provides local health departments and the general public with current information on public water systems in the County and the State. WCHD uses the Sentry database and is able to map Sentry data as needed. Data for private one- and two-party wells is captured as a scanned document and is not in a searchable database format so cannot readily be extracted for reports or mapping.

8.5.2 Quantity

Several groundwater studies have been conducted in the County, such as the Blaine GWMS, the LENS GWS, and the Lummi Island GWS. Due to funding limitations, the major focus of these studies has been on water quality. The LENS study, for example, was unable to thoroughly explore the physical availability and quality of groundwater at bedrock depths. If a "deep" aquifer existed it would probably not be in hydraulic continuity with the closed surface water sources.

Since passage of the municipal water law, most public water systems are collecting data on current water usage and reporting that data to WDOH on an annual basis. This data has been used in this plan and will be useful to those interested in reviewing the volume of water withdrawn and diverted for public water system use in the future. Most systems have source meters and all systems will eventually have individual service meters installed to enable data collection and analysis for different user categories. Water use data is necessary to evaluate the effectiveness of WUE efforts.

In addition, due to shallow aquifers, some water systems have wells that go dry during the summer and early fall. For these sources, interties with other water systems, emergency sources and WUE measures may be options for increasing source reliability year-round.

The adoption of the WRIA 1 Watershed Management Plan was followed by development of the Lower Nooksack Strategy, which presented a number of action items necessary to meet the Plan goals identified for the Lower Nooksack Sub-basin. This included development of a water budget for the area, a part of which was to be a groundwater model to gain a better understanding of the hydrogeology and ground/surface water interaction potential in the region.

The decision to move ahead with this groundwater modeling effort was made in late 2014. The study area will focus on what is commonly referred to as the LENS area of Whatcom County. The LENS area is a term introduced by the United States Geologic Survey (USGS) for the general area located between and in the immediate vicinity of the cities of Lynden, Everson, Nooksack, and Sumas. The primary objective for this project is to develop a groundwater model that ultimately has the ability to estimate potential temporal and spatial impacts to surface water resources from activities ranging from general (large-scale) changes in land use to the use of an individual domestic/irrigation groundwater supply well.

The project team consists of representatives of the County, PUD, City of Bellingham, Lummi Nation, Nooksack Indian Tribe, Bertrand Watershed Improvement District (Bertrand WID), and the Washington State Department of Ecology (Ecology). Gary Stoyka (Whatcom County) is the Groundwater Project Team Lead and will serve as the primary point of contact between the Consultant Team and the project team.

8.5.3 Quality

DOH maintains a database of water quality results as submitted by public water systems. This data is publically available.

Although the County has collected some information on water quality in the past, there is not a comprehensive "map" of groundwater sources, aquifer recharge areas, flow directions, aquifer yields, or aquifer discharging areas for water purveyors to use when selecting new sources or trying to protect their existing sources from contamination.

Under the 1996 amendments to the SDWA, Washington State is required to implement Source Water Assessment Programs (SWAP). DOH has addressed this requirement by implementing, among other programs, a wellhead protection program. This program ensures Group A water systems delineate the 1-, 5-, and 10-year time-of-travel for groundwater around the source(s), inventory of potential contamination sources in the time-of-travel and conduct a susceptibility assessment conducted for each drinking water source. Most water systems can use a calculated fixed radius approach, but are encouraged to use a more sophisticated method (i.e. a hydrogeological consultant) if needed.

By developing the time-of-travel around the source water, water systems will be able to comment on proposed land use issues that may impact water quality in the future. Furthermore, water systems can educate the water system users on protecting the groundwater through septic system maintenance, conserving water and limiting the use of herbicides and pesticides on lawns and gardens.

The WUCC expressed concern, however, that the County lacks a process to incorporate results from delineating wellhead recharge areas or vital source protection areas into the Comprehensive Plan. The State and federal mandate for water utilities to delineate time-of-travel zones and wellhead protection plans is ineffective if these areas are not reflected as critical aquifer recharge areas by GMA and incorporated into land use decisions. Goal 11F, and especially Goal 11F.3, of the Comprehensive Plan should be coordinated with water resource information and protection efforts of water systems.

8.6 Lack of Joint Facilities and System Interties

8.6.1 Joint Facilities

Many times water systems will plan improvements without taking into account the plans of neighboring utilities. Through coordination, sharing a facility can sometimes eliminate duplication of facilities. Several types of shared source projects have proven to be very effective solutions to quantity, quality, and economic problems in the State of Washington. Examples are listed below.

- ❑ Combining sources can assist a utility in meeting water needs until additional sources can be developed.
- ❑ Neighboring systems experiencing quality programs can jointly afford the construction and maintenance costs of a treatment facility that is too expensive for each to provide.
- ❑ System reliability problems can be resolved through using different sources of supply during different periods of time.
- ❑ Water of marginal quality may be combined with higher quality water to avoid the costs of treatment.

8.6.2 Interties

An intertie is an interconnection between public water systems, which permits the exchange or delivery of water between the systems. An intertie can be for emergency or seasonal use, for use during repairs or facility maintenance only, or used on a continual basis. Interties are recognized as a valuable management tools for public water systems because they improve overall system reliability, enhance the manageability of the system, provide opportunities for conjunctive use, or delay the need to develop new water sources.

Legislation related to public water system interties was enacted in 1991 which enables utilities to address water right matters related to system interties through submittal of water system plans or CWSPs to DOH. Its provisions are now codified as RCW 90.03.383 and summarized as follows:

- Interties are recognized as a valuable management tool for public water systems and are defined to allow other than emergency use of water by systems other than the one holding the water right subject to certain conditions.
- The place of use of water resulting from interties which were existing and in use as of January 1, 1991, shall be recognized for water right purposes subject to certain conditions.
- System interties where use commenced after January 1, 1991, are to be incorporated into the CWSP or utility's water system plan (WSP) for review and approval by DOH and

Ecology as part of the plan review process. Water right requirements are to be addressed in this process. The plan is to state how the intertie will improve overall system reliability, enhance the manageability of the system, provide opportunities for conjunctive use, or delay or avoid the need to develop new water sources.

- Interties may be necessary to supply adequate potable water to those areas planned for growth, since water rights are not always perfectly aligned with anticipated growth. Interties also avoid the need to develop new water sources and they provide a valuable tool to ensure reliable public water supplies. When facilities join together to share water treatment facilities, reservoirs and water lines, the cost of operating the water systems will lower capital facility costs for the county as a whole.

Table 8-7 lists the existing permanent and emergency interties between Group A water systems within the CWSSA as identified through the Sentry database. The geographic locations of the systems that are intertied are shown on **Figure** ####. Public water systems should identify interties in their water system plans. In those plans, the utility providing the water should identify the receiving utility's service area as all or part of their wholesale service area and the receiving system should indicate the existence of the intertie in their water system plan as well. Systems should also identify emergency interties in their water system plans but do not need to include the receiving area as a wholesale service area.

Table 8-7: Existing Interties Between Group A Water Systems

System Providing Water	Providing System PWS ID	Receiving Water System	Receiving System PWS ID	Usage
Bellingham-Water Department, City of	05600	Deer Creek Water Assn/Guide South	AB912	Permanent
		Glen Cove Water Association	27950	Permanent
		LWWSD - Eagleridge	08118	Permanent
		LWWSD - South Shore Water System	95910	Emergency
		Whatcom County Water District No. 2	95700	Permanent
		Whatcom County Water District No. 7	95900	Permanent
Birch Bay Water & Sewer District	95904	Bell Bay Jackson Water Association	05450	Emergency
Blaine, City of	07300	Bell Bay Jackson Water Association	05450	Permanent
		Birch Bay Water & Sewer District	95904	Permanent
Delta Water Association	18750	Valley View Water Association	91000	Emergency[1]
Everson, City of	24200	Everson Water Association	24195	Permanent
		Hampton Water Association	30800	Permanent
		Nooksack	59800	Emergency
Ferndale	24850	Central City Water Association	12150	Emergency
		Mountain View Water Association	56900	Emergency
		North Star Water Association	61350	Emergency
		Northwest Water Association, Inc.	62000	Permanent
		Thornton Water Association	88050	Emergency
Hemmi Road Water	32350	Meridian School Complex	AB234	Permanent
Lynden Water Department	49150	Berthusen Road Water Association	05875	Permanent
		Meadowbrook Water Association	53250	Emergency
Sumas Water Dept.	84870	Nooksack	59800	Permanent
		Nooksack Valley	59850	Permanent
		Sumas Rural Water Association	84850	Permanent
Greater Vancouver Water District	NA	Point Roberts Water District No. 4	95750	Permanent

[1] Water can also be moved from Valley View Water Association to Delta Water Association through this emergency intertie.

8.7 Water Use Efficiency (WUE)

8.7.1 Introduction

This discussion of Water Use Efficiency (WUE) is intended to provide public water systems owners, operators, managers, and customers with an understanding of what is required of them in terms of WUE and what options they have in establishing WUE goals and designing their WUE program to meet those goals. Specific information about individual water systems and their use of water is available in their comprehensive water system plans and in their WUE efficiency reports on file with DOH-Office of Drinking Water.

Water use efficiency can fulfill a variety of differing objectives. Due to the various WUE tools now available, WUE can offer a variety of different benefits to utilities and their customers. This is important because the design of WUE programming needs to be carefully matched to the objectives of the utility, so the desired benefits can be achieved.

Some of the objectives that might be achieved from the wise use of water through WUE are:

- Manage the Scale and Timing of New Supply and Treatment

  In recent years, it has become increasingly difficult to develop new sources of water supply due to limitations on the availability of new water rights. This trend is likely to

continue as growth increases the need for water while at the same time environmental and water quality requirements grow more stringent.

WUE planning can reduce, or delay, the need for new sources of supply, while increasing public support for new sources of supply if and when they are needed. At the same time, increased regulatory requirements for water treatment have driven up the cost of supplying potable water. By reducing water needed, WUE can also lower the cost of water treatment.

- Reduce Utility Operating Expenses

  Reducing water consumption and system losses allows a corresponding reduction in chemical usage, energy consumption and carbon footprint. This can lead to considerable savings in utility operating expenses. In addition, a comprehensive leak detection and repair program can reduce expenditures on emergency repairs.

- Reduce or Delay Investments in Wastewater Capacity

  Given the connection between water consumption and wastewater flows, WUE also offers a means to reduce demand on wastewater collection and treatment systems. This, in turn, can reduce or delay capital expenditures on wastewater collection and treatment capacity.

- Minimize Impacts on Natural Resources

  By reducing the amount of water diverted from streams or pumped from aquifers that recharge rivers and wetlands, WUE provides a tool for utilities and their customers to minimize their impacts on the natural environment.

- Water Use Efficiency as an Ethic and for a Sustainable Future

  Citizens and public officials acknowledging water as a scarce resource can manage its use efficiently to ensure its continued availability. In this case, WUE may be implemented even though it is not the most cost-effective alternative to other supply development options because it has greater social or environmental benefits.

- Giving Customers Tools for Managing Expenditures, Reducing Carbon Footprint, and Reducing Climate Change Impacts

  The rising costs of water supply and treatment, as well as wastewater treatment, are usually passed on directly to customers in the form of monthly rates. In addition, energy expended on heating water can add up to a significant fraction of the total cost of water use. WUE techniques can provide tools for managing expenditures. Providing information and WUE devices to allow customers to control their water use can offer significant improvements to reduce personal utility rates.

- Regulatory Compliance

  As discussed in Section 8.7, the municipal water law included water use efficiency (WUE) elements. In response to the municipal water law, WDOH promulgated WAC 246-290-800 through 840 related to water use efficiency and added metering requirements to WAC 246-290-496. The purpose was to define the requirements of water

use efficiency programs in water system plans developed under WAC 246-290-100 and small water systems management programs developed under WAC 246-290-105. This included the following elements;

- Establish a water distribution system leakage standard;
- Define a process requirement for water use efficiency goal setting; and
- Establish annual water use efficiency performance reporting requirements.

To summarize, municipal water suppliers must:

- Publicly establish water savings goals for their customers and to the public through a public forum occurring at a minimum once every six years;
- Evaluate or implement specific water saving measures to achieve customer-based goals based on the number of active connections;
- Develop a WUE planning program to support the established goals;
- Install meters on all customer connections by January 22, 2017;
- Achieve a standard of no more than 10% water loss; and, if over the standard, develop and implement a water loss control action plan to achieve compliance;
- Report total production, authorized consumption, and DSL volumes and percent annually and include a short narrative about progress towards achieving these goals.

The WDOH specified that any Group A community water system that serves at least 15 residential service connections must comply with the Water Use Efficiency Rule, whether they are publicly or privately owned. WAC 246-290-800 through 840, and WAC 246-290-496 are included in **Appendix XX** of this report. Additional details are available in the WDOH Water Use Efficiency Guidebook, Third Edition, January 2011, DOH 331-375 (Revised).

8.7.2 Water Use Efficiency Program Measures

The term WUE embraces a range of programs of both supply and demand efficiency measures. Measures are identified once supply and demand characteristics are evaluated and factored into the final WUE goal decision. Activities may include, but are not limited to: system-wide water audits, documenting authorized uses; conducting leak surveys; and repairs on meters, lines, storage facilities, and valves. WAC 246-290-810(4) provides details on the water use efficiency program that is required of municipal purpose water suppliers.

Supply side WUE measures can be implemented readily and may be among the most cost effective tools available for managing water use. Supply side measures include, but are not limited to:

- ❑ Leak detection and repair
- ❑ Main replacement
- ❑ Corrosion prevention
- ❑ Management of hydrant flushing

- Meter repair, replacement, and calibration

Demand side measures can involve customers in a variety of ways. These WUE measures can range from customer education, offering financial incentives for installing water-saving equipment, developing rate structures that build in an economic incentive to reduce consumption, or imposing regulatory requirements on plumbing fixtures, landscaping, or water use. In addition, demand side WUE measures can be designed to reduce base water use, peak use, or both. Some common demand side WUE measures include:

- Broadly packaged information and outreach (e.g. Advertising, billing inserts)
- Narrowly targeted information and outreach (e.g. Free water-use audits for businesses or homeowners)
- Water bill showing consumption history
- Improved metering
- Hardware retrofit programs
- Appliance rebate programs
- Conservation-based rate structure
- Landscaping ordinances
- Seasonal outdoor use restrictions
- Recycling or re-use programs

Utilities are encouraged to reference the WDOH Water Use Efficiency Guidebook for additional information on planning WUE program measures.

In 2003, the American Water Works Association (AWWA) adopted improved best practice methods for defining and measuring water loss in water distributions systems. The AWWA abandoned the use of the term "unaccounted for water" because all water sent into the distribution system can be accounted for. The term now used is "non-revenue water (NRW)." NRW is specifically defined to include the sum of specific types of water loss and any authorized, unbilled consumption that occurs within water distribution systems. The AWWA states that "it is important to understand that all water utility distribution systems incur leakage (real losses). Similarly, all water utilities fail to recover revenue from all of the water that is (or should be) billed to customers (apparent losses). Although every system is unique, all water utilities should employ leakage control and revenue recovery programs that strive to keep losses contained to appropriate, economically justified levels. AWWA's Manual: *Water Audits and Loss Control Programs* (M36) and the AWWA FREE Audit Software (http://www.awwa.org/resources-tools/water-knowledge/water-loss-control.aspx) provide a robust pathway for utilities to develop data-driven program to cost-effectively manage all water loss components (apparent and real) in distribution systems, as shown below in the International Water Association (IWA)/AWWA Water Balance, **Table 8-8**.

Table 8-8

<table>
<tr><th colspan="6">The IWA/AWWA Water Balance</th></tr>
<tr><td rowspan="2">Volume from Own Sources (corrected for known errors)</td><td rowspan="10">System Input Volume</td><td>Water Exported (corrrected for known errors</td><td colspan="3">Billed Water Exported</td><td>Revenue Water</td></tr>
<tr><td rowspan="9">Water Supplied</td><td rowspan="3">Authorized Consumption</td><td>Billed Authorized Consumption</td><td>Billed Metered Consumption</td><td>Revenue Water</td></tr>
<tr><td rowspan="2">Unbilled Authorized Consumption</td><td>Unbilled Metered Consumption</td><td rowspan="9">Non-revenue Water</td></tr>
<tr><td>Unbilled Unmetered Consumption</td></tr>
<tr><td rowspan="8">Water Losses</td><td rowspan="3">Apparent Losses</td><td>Customer Metering Inaccuracies</td></tr>
<tr><td>Unauthorized Consumption</td></tr>
<tr><td>Systematic Data Handling Errors</td></tr>
<tr><td rowspan="5">Water Imported (corrected for known errors)</td><td rowspan="5">Real Losses</td><td>Leakage on Transmission and</td></tr>
<tr><td>Leakage and Overflows at Utility's</td></tr>
<tr><td>Leakage on Service Connections up to the Point of Customer Metering</td></tr>
<tr><td colspan="6">NOTE: All data in volume for the period of reference, typically one year.</td></tr>
</table>

8.7.3 Costs of Water Use Efficiency

The complete program of supply and demand side measures that is the most cost-effective in achieving the utility's WUE goals will vary considerably from one utility to another. Since WUE programs may involve both up-front expenditures and continuing investments over time, it is valuable to develop levelized costs that provide equivalent comparisons. In addition, it is important to consider not only the costs and savings to the utility, but those experienced by the customer as well.

While performing an analysis of expected costs and benefits is important to WUE planning, it should be recognized that, in many cases, water savings cannot be projected with precision. Therefore, decisions on WUE programming require careful consideration of the importance of other factors besides cost-effectiveness. For example, as a matter of policy, the utility may decide to promote WUE in order to respond to community desires or offer increased protection to an environmental resource. In addition, it is important to consider the impact on a variety of customer classes and income groups in designing a complete WUE program. Finally, utilities need to consider the revenue implications of reduced water usage and modify their rate structure as necessary to maintain financial viability as WUE goals are achieved. These revenue implications need to be assessed in terms of wastewater system needs as well.

The CWSP recommends that WUCC members initiate WUE efforts that can be jointly implemented by several utilities and achieve cost savings through combined purchasing. Specific recommendations are for joint contracting of leakage detection analysis and the procurement of public education material. The DOH and AWWA are sources of literature and material, which could be tailored for the Whatcom County area. This material can also be customized to acknowledge the WUCC organization or specific utilities on brochures and other literature.

8.8 Reclaimed Water

Reclaimed water is a water supply produced by treatment of municipal or domestic wastewater. The treatment processes are designed to ensure that the water is safe and suitable for the intended use. Sometimes called water recycling or water reuse, the process of reclaiming water involves an engineered treatment system that speeds up nature's restoration of water quality.

In Washington, reclaimed water can be used for a wide variety of non-potable beneficial uses such as irrigation, industrial processes and cooling water, toilet flushing, dust control, and construction activities. Under current law it cannot be used for potable uses. It can also be used as a resource for creating, restoring, and enhancing wetlands and for recharging ground water supplies and to increase flows in rivers and streams.

A hurdle for many reclaimed water projects is the issue of impairment. A use of reclaimed water may not impair a water right existing at the time of the reclamation of the water. For example, where a facility has been discharging to a water body and that discharge is reduced or eliminated by reclaiming that water for other uses, the reduction in that discharge may not impair a downstream user, including a minimum instream flow established in WAC, which has historically relied on the flow provided by the historic discharge. In such cases, the reclamation of water may not be allowed or the party reclaiming the water may have to provide mitigation to the party whose use of water is impaired. It is easier for a wastewater treatment facility that discharges directly to marine water to get authorization to reclaim water since there are no impairment concerns.

8.8.1 Reclaimed Water in Whatcom County

8.8.1.1 City of Blaine

In 2010, the City of Blaine initiated operation of a new Class A water reclamation facility which features membrane bio-reactor (MBR) technology and can treat as much as 3.1 million gallons per day. The reclaimed water is not acceptable for drinking but is acceptable for human contact, irrigation, and industrial use. The treated water is being piped and re-sold to large customers such as the Semiahmoo Resort where it will be used for golf course irrigation and will also be used by the City for street cleaning and other industrial uses. It is being sold at about 80 percent of the cost of fresh water. Use of reclaimed water can help to stretch available existing supplies of potable water into the future.

8.8.1.2 City of Lynden

The City has been looking at reclaimed water options, but have yet to plan for delivery outside of the wastewater treatment facility. Currently, the City utilizes reclaimed water in its wastewater treatment facility for cleaning and wash-down. The current range of average use is between 300,000 and 500,000 gallons per day and averages 350,000 gallons per day.

8.8.1.3 Birch Bay and PUD #1 of Whatcom County

Whatcom Public Utility District is completing a "Water Reclamation Study" which is looking at opportunities to work with some of its customers at Cherry Point to re-claim and / or reuse water those customers now buy from the PUD. As the source of that water is the mainstem of the Nooksack River, any reduction in take of that water will increase streamflow in the Nooksack downstream from the PUD's diversions.

Two opportunities the PUD is considering (both very early in that consideration) are:

- Diverting BBWSD wastewater discharge to industrial customers at Cherry Point for use in the refining process, which would decrease wastewater discharge into the Cherry Point Aquatic reserve, and reduce a small portion of the water taken from the Mainstem of the Nooksack, and
- Discharging some of the Cherry Point industrial processing discharge water now going to the Sound back into the mainstem of the Nooksack.

Ecology's Water Quality Program is proposing a new rule, Chapter 173-219 WAC Reclaimed Water, directed by the state Legislature under Chapter 90.46 RCW. The purpose is to establish an efficient, effective, and consistent statewide implementation framework, including standards and permit requirements.

APPENDIX FOR SECTION 8

The following discussion identifies the typical steps involved in the processing of a water right application by the Department of Ecology:

1. Submittal of an application to Ecology, with the appropriate application fee.
2. Ecology preparation of a legal notice for the applicant to have published once a week for two consecutive weeks.
3. Ecology solicits comments on the proposed application from the Department of Fish and Wildlife, Nooksack Tribe, and Lummi Nation.
4. Applicant submits an Affidavit of Publication to Ecology.
5. There is a 30-day period after the last date of publication for submittal of protests to the proposed application to appropriate water.
6. Ecology conducts a field examination and evaluates comments from the Department of Fish and Wildlife, Indian tribes, and any protests to the application, and reviews Chapter 173-501 WAC to determine if affected water bodies have minimum instream flows assigned, or if they are closed to future consumptive appropriation.
7. Ecology prepares a draft Report of Examination that is posted on its web site for 30 days to allow for review by the public and collection of additional public comment.
8. If no substantive comments are received, Ecology prepares a final Report of Examination with copies to anyone who has protested the application, either approving, approving it with conditions, or denying the application. If the application is approved, Ecology includes a request for submittal of the appropriate permit fee.
9. Appeals of the Ecology decision in the Report of Examination can be filed with the Pollution Control Hearings Board within 30 days of this decision.
10. Upon submittal of the permit fee, and after the 30 day period for appeals has expired, Ecology issues a permit containing the development schedule from the Report of Examination.
11. The development schedule in the permit contains dates for beginning of construction, completion of construction, and putting the water to beneficial use.
12. When the water authorized in the permit has been put to beneficial use, and the appropriate fees are received, Ecology issues a certificate of water right or a certificate of change.(see also the discussion of Certified Water Rights Examiners, below)

Alternative Means of Water Rights Processing

Alternative Means of Water Rights Processing

As a means of addressing the water rights backlog, the legislature has established alternative means of water rights processing that can be employed under certain conditions. These alternative methods are discussed briefly in Appendix ZZ:

8.2.2.3.1 Cost-Reimbursement: Cost reimbursement is a contract between a water right applicant and Ecology. Under this contract, applicants assume the full cost of processing their water right application, with some or all of the work performed by Ecology's consultant. Presently, Ecology has eight consulting firms pre-approved to do this work.

The cost reimbursement option allows a private consultant to do the work that Ecology hydrogeologists and permit writers would ordinarily do. This helps free up Ecology staff to work with other applicants' on their water right applications.

The consultant conducts a site investigation, performs the environmental and hydrogeologic analyses, identifies whether the water is available or would impair other water users, prepares a report with his or her findings, and recommends whether to approve the application. Ecology posts the draft report on the internet to solicit comments. Once the comment period is closed, Ecology works with the consultant to make any needed changes. Ecology makes the final decision on the application and then posts the final report the internet for a 30-day appeal period.

The cost reimbursement process consists of two phases. In Phase One, the application is evaluated to identify the boundaries of the source of water. This is the area that could be affected by a proposed water withdrawal. In the case of groundwater applications, this requires a preliminary delineation of the affected body of public groundwater. A Phase One analysis includes looking at whether there are other prior applications requesting water from the same source of supply. It will also identify likely issues that require further evaluation, and may provide a scope and cost estimate for completing Phase Two of the evaluation.

In Phase Two, Ecology's consultant prepares a Report of Examination for the application(s). The Report of Examination consists of the background and technical analysis necessary for the particular water right or water right change requested.

If the applicant has Ecology contract with a pre-approved consultant to conduct Phase One, a report will be provided to the applicant with scope and a cost estimate for Phase Two. If the applicant used his or her own consultant to prepare the Phase One report, the report will be forwarded to Ecology's consultant (chosen by either the applicant or Ecology from Ecology's pre-approved list). With the report will be a request to provide a scope of work and fee estimate for Phase Two.

Ecology recommends that any applicant considering the cost reimbursement process first consult with Ecology regional staff. Regional staff will be able to give an applicant an idea of how many other applications are in the same watershed, share their knowledge of watershed issues, and provide an initial impression of the likelihood that the application can be approved.

Ecology staff also will be able to discuss what type of costs the applicant must pay, such as:

- Consultant services
- Ecology time spent reviewing the consultant's work and managing the contract

- Certain legal costs

(Source: WDOE FAQ: Cost Reimbursement)

8.2.2.3.2 Water Conservancy Boards: Water conservancy boards (boards) allow for the processing of water-right transfer applications by an independent branch of local county government. The boards are separate units of government that process water right change applications within an identified geographic area. A board can serve a single watershed, multiple watersheds, a county, or multiple counties. They also issue a report of examination and record of decision. Boards were authorized by the 1997 Legislature, under Chapter 90.80 RCW, as an alternative to the conventional application process, to assist Ecology with the backlog of pending water right change applications, and to provide timelier water right change decisions. All board decisions are ultimately reviewed and affirmed, reversed, or modified by Ecology.

Each board consists of three or five commissioners with up to two alternates. All board commissioners and alternates must initially receive 32 hours of training from Ecology, and maintain 8 hours per year of continuing education after that.

Whatcom County established a water conservancy board in December, 1999, but it was dissolved by the Whatcom County Council in July, 2008 due to the inability to recruit volunteer board members. The Board approved two water right transfers in Water Year 2003, one for ground water and one for surface water.

(Source: https://fortress.wa.gov/ecy/publications/publications/0811046.pd

8.2.3 Certified Water Right Examiners (CWRE)

Historically, when a permit holder had completed their development, they filed a proof of appropriation form with Ecology attesting to the rate and sometimes volume of water that had been beneficially used. Ecology staff would then perform a proof examination, which consisted of a review of the water right file followed by a site visit, to determine to what extent the water right permit had been beneficially used. After this review, Ecology would issue the water right holder a water right certificate up to the limit of the beneficial use or the permit, whichever was lower, and this would conclude the development schedule of the permit.

In 2010, the legislature created RCW 90.03.665, which allowed Ecology to establish CWREs in the State of Washington, which they did in 2012, with the adoption of Chapter 173-165 WAC. CWREs are individuals that have been certified by Ecology as qualified to perform proof examinations and prepare a report necessary for Ecology to issue a water right certificate. A water right permit holder that is ready to advance to certificate stage contracts directly with a CWRE for preparation of the necessary report. Ecology reviews the document and, once in agreement, issues the water right certificate. Similar to cost reimbursement, this program pushes the responsibility and cost for completing work onto the entity that is interested in the work being performed.

8.2.4 Decision-Making Process on Water Right Applications

Ecology adopted Chapter 173-152 WAC, Water Rights, in March 1998, which established a framework for processing water right applications and applications for change. This regulation contains the following pertinent provisions:

- The department will make decisions on water right applications and applications for change from the same water source in the order the application was received.
- Applications from more than one water source may be investigated at one time.
- The department may conduct basin assessments to assemble and correlate information related to multiple applications from the same basin for decision-making purposes on all pending applications in the basin or the same water source.
- Multiple basin assessments may be conducted at the same time.
- Upon completion of the basin assessment and consultation with interested parties and agencies, the department will make decisions on the competing applications.
- Applications may be processed prior to competing applications if the department determines the application:
    - Meets certain criteria related to public health or safety,
    - Is a non-consumptive use,
    - Would substantially enhance the quality of the natural environment,
    - Would result in providing public water supplies to meet the general needs of the public, or
    - Is included in a pending adjudication of water rights.