Whatcom County
South Lake Samish
Regional Source Feasibility Study

Department of Health Contract N20513

Deliverable Number 3
Final Feasibility Study

November 25, 2014

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Executive Summary

The goal of the feasibility study is to evaluate water system restructuring / consolidation options on south Lake Samish to ensure safe and reliable drinking water for the decades to come. The study includes review of regional sources of supply and treatment options in the Lake Samish basin. It also looks at governance and finance issues associated with implementing long-term solutions. The study is intended to inform and engage the south Lake Samish community so that they can choose the option that best their needs.

Approximately 95% of the 560 existing residents living around Lake Samish rely on the lake for their domestic water because there is no Municipal Public Water system serving the Samish basin. In 1969 Bellingham and Whatcom County Health Department concluded that the water of Lake Samish is not suited for human consumption due to the very high bacteria count. While the lake does not generally exceed surface water quality standards, the residents drawing their water from the south end of Lake Samish are particularly susceptible to blue-green Algae blooms in the late summer months which periodically result in warnings from the health department to stop using lake water as a potable supply due to the potential health effects of cyanobacteria toxins to humans and animals.

A community meeting was held on August 2, 2014 where preliminary findings were presented.

- The existing Calmor Cove Community water treatment plant is at the end of its design life. This presents a unique, limited time, opportunity to pool resources to secure a long-term drinking water supply for not only Calmor Cove members, but for an expanded south Lake Samish community.

- Skagit PUD Judy Reservoir water is the most economically viable, reliable, and sufficient source of supply when compared to life cycle costs of replacing / expanding existing water treatment facilities over a similar time period. Implementation of this option requires investment in a 4 mile transmission main and storage by Skagit PUD, plus new distribution piping at the south end of the lake. In general, the more people participating in this solution, the less costly it will be per connection.

- Other benefits to importing water into the Lake Samish basin include reduced demand on the lake and improved in-stream flows to Friday Creek

- Low interest State Revolving Fund loans are available through the Washington State Department of Health to finance infrastructure construction. If water system consolidations occurs, up to 50% of construction costs may be subsidized.

The study recommends formation of a non-profit property owners association to survey and inform community members on their preferred option. The association, speaking with one voice, is then positioned to request assistance from the Samish Water District or Whatcom PUD in the formation of a local improvement district to implement the preferred solution. If Skagit PUD is unable to supply water to the south Lake Samish community, the non-profit property owners association would then be positioned to pursue an expanded community water treatment facility.

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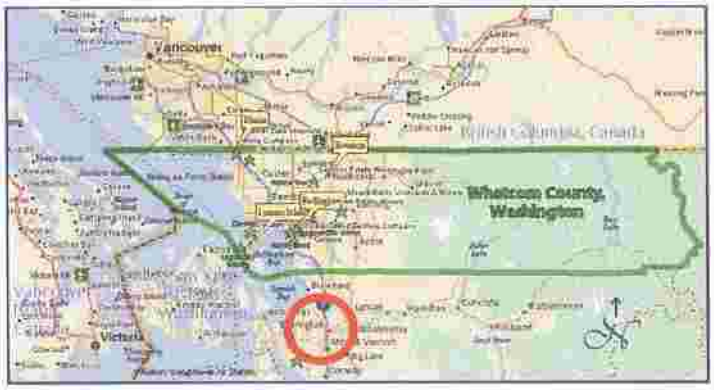
Introduction

The Washington State Department of Health (DOH) has entered into an interagency agreement with the Public Utility District No. 1 of Whatcom County (PUD) to prepare and submit a South Lake Samish Regional Source Feasibility Study. Cornerstone Management has been retained as a consultant by the PUD to manage this study.



Map 1: Regional Vicinity Map

The primary goal of this feasibility study is to evaluate regional source and treatment options to provide safe and reliable drinking water to South Lake Samish property owners and associated water utility ownership and governance options. Source options include wheeling drinking water from Skagit PUD and Lake Samish surface water which requires treatment.

The secondary goal will be to evaluate regional drinking water supply opportunities that would result in restructuring or consolidation of neighboring drinking water systems in the study area including individual sources. The regional source solution is not intended to provide water for future growth beyond the proposed service area which include existing water systems and individual residential drinking water demand.

There have been several efforts to establish a public drinking water system in the Samish basin around Lake Samish but in each case those broad efforts failed to achieve public support. In 2010 a grass roots effort among property owners at the south end of Lake Samish began pursuing the possibility of a smaller regional public water supply for South Lake Samish residents. The primary issue driving this grass roots effort is water quality concerns associated with periodic blooms of cyanobacteria (blue-green algae) during the summer months and the potential health effects of cyanobacteria toxins to humans and animals.

Acknowledgement

This study could not have been accomplished without the assistance and proactive efforts of the community and in particular Roy Bush and Stuart Affleck ofCalmor Cove, and Stewart Thomas of Shallow Shores. Roy, Stuart, and Stewart were instrumental in the grass roots effort to explore opportunities for a community water system.

Background

Lake Samish Community

Lake Samish is located in the southwest corner of Whatcom County, Washington just south of the City of Bellingham. The 8160 acre lake is a valuable resource for public recreation such as boating, fishing, swimming, and other water and lakeshore activities. Heavily traveled I-5 traverses the watershed and runs adjacent to the eastern lakeshore for three miles. Forestry land comprises 67% of the basin area, with active logging typically underway somewhere in the basin at all times. The lake serves as a water supply for 95 percent of the 560 existing residences with an estimated population of 1,300 that live around its shores. While a public sewer system currently serves most residential development around the lake, there is no Municipal Public Water system serving the Samish basin around the lake.

The residents living around Lake Samish rely on the lake for their domestic water needs through surface water diversions or wells. The majority of residents employ point-of-use residential water treatment systems or use the water untreated. However, there are several small private and non-profit water systems around the lake with about 173 calculated connections representing an estimated residential population of 161 and non-residential population of 210. (See Map 1a: Lake Samish Water System Service Areas)

Lake Samish Water Systems

Lake Samish water systems include four at the north end: one Group B Water System (Autumn Mobile Home Park #03421-Surface Water), two Group A Transient Non-Community water systems (Samish Park #15064-Ground Water/Spring and Camp Lutherwood #12641-Surface Water), and one Group A Community water system (Lake Samish Terrace Mobile Home Park #445402-Ground Water Well); and four at the south end: three Group B water systems (Samish Woods North #AD085, Samish Woods South #AB841, and Samish Woods East #AD111-Ground Water Wells), and one Group A Community water system (Calmor Cove #105628-Surface Water). Information for each of these systems is found in the Appendix as Exhibit 1-8 and includes where applicable:

- General Information from Department of Health Sentry Data Base
- Source Information/Water Rights from Ecology Water Resources Explorer Database
- Water Facilities Inventory (Sentry Data Base)
- Water Quality/Exceedances (Sentry Data Base)

Drinking Water Planning

Since its formation in 1973, Samish Water District (SWD) (formerly Whatcom County Water District No. 12) has maintained an up-to-date comprehensive sewer plan for the public sewer system surrounding Lake Samish. Samish Water District Service Area can be seen outlined in orange on Map 2 in the Appendix. On three separate occasions (circa 1975, 1992, and 2001), the District undertook comprehensive drinking water supply planning at the request of residents. Each of these planning efforts explored the feasibility and cost of implementing a public water system to serve residents around the lake. Each effort failed to garner sufficient public support for implementation and there are currently no known planning efforts for establishment of a Municipal Public Water System in the basin.

In 2010, a group of south Lake Samish residents presented a proposal to Samish Water District for the District to provide public water to the South Lake Samish Community. Samish Water District hired Wilson Engineering to review the presentation by the South Lake Samish Group and the report was presented at the October 14 2010 Commissioners meeting. The report outlined the issues and questions that would need to be addressed before moving forward.

Water Quality

A public water system must furnish its consumers with safe reliable drinking water that meets or exceeds the Safe Drinking Water standards. Safe Water may be defined as one free of pathogenic organisms, poisonous substances, and excessive amounts of mineral and organic matter; aesthetically pleasing water may be defined as free or nearly free of color, turbidity, taste, and odor, of moderate temperature, and aerated.

In 1969 Bellingham and Whatcom County Health Department conducted a study with respect to Lake Samish water quality for human consumption and concluded that the water of Lake Samish is not suited for human consumption due to the very high bacteria count. The source of the lake pollution is from one or all of three sources: human waste material, primarily from septic tank drain fields leaching into the lake; animal contaminants; and surface run-off that can contain organic, inorganic, and biological contaminants.

In 1997, Samish Water District initiated a three-year water quality study to determine the overall quality of the lake for public water supply use and to establish baseline levels for selected chemicals in the lake. Water Samples were analyzed for metals, fecal coliform, petroleum hydrocarbons, herbicides, pesticides, nitrate, nitrite, and hardness. While no immediate health risks were identified by this study, final recommendations called for periodic future sampling of the lake to determine trends.

Lake Samish residents are keenly aware of the potential for both acute and chronic risks to water quality. However, the lake does not generally exceed surface water quality standards, so protection and preventing further degradation is the goal.

Land use in the basin includes forestry, recreational activity near the lakeshore and on the lake. Each of these land uses can impair water quality in the basin by introduction of nutrients, pollutants, and sediment into runoff to the lake and its tributaries. (See Map 2: Lake Samish Land Use) Urban-quality storm water runoff contains sediment, nutrients, fecal coliform, petroleum hydrocarbons and metals, which are all of concern. Sediment from residential development, forestry, and lake shore recreation creates alluvial fans at creek mouths and collets behind the Friday Creek outlet dam.

While some gradual changes in lake trophic status are naturally occurring, stakeholders do not want to accelerate any process that leads to excess algal growth and murky waters unsuitable for drinking and contact recreation.

Water Quality Issues and Risks as a Public Water Supply

Residents that draw their potable water from the south end of Lake Samish are impacted by shallower, warmer water that is prone to blue-green Algae blooms in the late summer months. During Algae blooms both private and community treatment systems at the south end of the lake may not meet water quality standards. Poor lake water quality due to blue-green Algae blooms has periodically resulted in warnings from the health department to stop using lake water as a potable supply.

Lake Samish also faces significant risk of sudden contamination from three different sources: (1) a hazardous material spill from traffic on I-5, (2) and overflow or breach of the Samish Water District sanitary sewer facilities around the lake, or (3) an isolated residential spill that enters the drainage system flowing to the lake. A significant spill of aviation fuel resulted from an accident on I-5 in 1995. A much smaller fuel spill (10-15 gallons to the I-5 roadside) occurred in 2010. There have been no known leaks or overflows from the public sewer system within the last 15 years, but the potential exists since a portion of the sewer is actually underwater at the lake's edge.

Sedimentation is also a challenge at the outflow of the lake further impacting water quality and quantity concerns in the Lake Samish Basin and watershed.

Water Quantity & Instream Flow

The Samish Basin is located in Water Resources Inventory Area (WRIA) No. 3, and is entirely outside the City of Bellingham Urban Growth Area (UGA) in unincorporated Whatcom County. (See Map 3: Lake Samish Basin) Lake Samish discharges at the outlet of the Samish Basin into Friday Creek, a salmon spawning tributary of the Samish River. Friday Creek drains the lake through a series of wetlands and beaver ponds on the lake's south end. Although stream flow exceeds 500 cubic-feet per second (cfs) during winter storms, the late-summer low streamflow approaches zero which reduces fish habitat and concerns the Washington Department of Fish and Wildlife (WDFW).

The low flows occur naturally, but are exacerbated to some extent by the lake withdrawals. Ecology is aware that the basin outlet, Friday Creek, may not have sufficient flow and this is a priority for the Department of Ecology. After a 1992 agreement between Ecology and Whatcom County Lake Management District No. 1 there were approximately 280 appropriations approved in the Lake Samish basin. Ecology is not currently processing applications in this watershed.

Residents of Lake Samish withdraw about 140 acre-ft. year of water from the lake and most of the Lake Samish area is served by sewer which is exported from the watershed thereby reducing the mean-annual stream flow of Friday Creek. Although withdrawals consume only a small portion of the 32,000 acre-feet of water stored in the lake, they do effect streamflow in Friday Creek, especially low flows in the late summer and there is concern that this loss of water significantly impacts the fisheries resources of Friday Creek, the outflow of Lake Samish. The lake withdrawals have their greatest effect for a period of about six days, usually in August although there have been very low flows in September and October before fall rains arrive. This is usually when the weir has exhausted its reserves of stored water. Withdrawals cause lowest streamflow to occur about three days earlier and to last about three days longer than under natural conditions. Continued development around the lake will require more withdrawals.

Whatcom County Lake Management District No. 1 (LMD No. 1)

In 1989, Ecology informed the residents of Lake Samish that several Washington State resource agencies, Whatcom County Planning and Development Services, Whatcom County Health Department, and several Lake Samish riparian landowners were concerned about the long-term effects of increasing water withdrawals from Lake Samish and Friday Creek due to population growth in the basin. The impacts of low streamflow on fish habitat were a major concern. Ecology indicated at that time that property owners around the lake would be required to stop drawing water from the lake unless they developed and implemented a plan to augment the streamflow in Friday Creek (the outlet of Lake Samish).

In 1991, lake residents petitioned Whatcom County for the formation of a lake management district, which would control lake level in order to attain the required minimum instream flows. Whatcom County Council created the Lake Management District No. 1 in 1992, and that entity became responsible for operation and maintenance of the flow control dam at the lake outlet. The dam's wall height is typically raised in mid-April and lowered in mid-September each year. Operation and maintenance of the flow control dam is now performed by Whatcom County Public Works.

Since 1992, an agreement between the Washington State Department of Ecology (Ecology) and Whatcom County Lake Management District No. 1 (LMD) has required that the outflow from Lake Samish into Friday Creek be sustained at 2 cubic feet per second (cfs) or higher to preserve fish habitat. The current method for sustaining instream flow throughout the summer is to raise the lake level during the wet season and draw down the level during the dry season by increasing the weir height of the retention dam at the outlet of the lake.

As part of the agreement between Ecology and LMD, about 280 water right permits were issued to property owners with existing diversions around the Lake Samish basin in an effort for resolve unauthorized use in the basin. Included in the permits issued are provisions to help ensure that the flows

at the outflow from Lake Samish into Friday Creek are sustained at 2 cfs. One of the provisions states that all non-essential water use, such as outdoor irrigation, authorized under the permit may be curtailed in extreme drought years. Essentially this would apply to periods when the minimum flow of 2.0 cfs is not maintained in Friday Creek. A copy of the provisions provided as Exhibit 9.

Prior to Ecology issuing the permits as part of the 1992 Agreement, an extensive effort was made by Ecology to ensure that all existing diversions and/or withdrawals were identified and further that all property owners were given an opportunity to submit a permit application. Based on this effort by Ecology it is believed there are very few if any unpermitted diversions around the lake.

Instream Flow Rule Making

The Samish Basin, from which Calmor Cove and individual residents around Lake Samish draw their water, is expected to undergo review for instream flow rule. At the basin outlet, Friday Creek needs to maintain sufficient streamflow to support fish habitat. As previously noted, the 1992 agreement between Ecology and LMD has required that the outflow from Lake Samish into Friday Creek be sustained at 2 cubic feet per second (cfs) or higher to preserve fish habitat but, no instream rule has been formally adopted.

If an instream flow rule is adopted, the next step will be management and enforcement of the rule. Prior to the 1992 agreement between Ecology and LMD, Ecology had indicated that property owners around the lake would be required to stop drawing water from the lake unless they developed and implemented a plan to augment the stream flow in Friday Creek (the outlet of Lake Samish). Ecology is aware that existing streamflow still may not be sufficient to support fish habitat and therefore further measures may be required in the basin to achieve adequate streamflow in addition to existing water right provisions shown in Exhibit 9. It is important to note that the WDFW has already recommended closure of the Friday Creek drainage shown in dark green with red border directly below Lake Samish in Map 4.

Water Rights

The Samish Basin is geographically small with a finite amount of water and the goal is to ensure sufficient water both in quality and quantity for both people and fish. As water quantity becomes scare and water quality deteriorates, there is increasing concerns about how the resource is shared. This study considers augmenting Samish Basin water with a new source of drinking water originating outside the basin, helping to ensure sufficient quality and quantity for both people and fish.

It is important at this point to understand that Washington State Water Law is based on the principle of "First in Time, First in Right". This means that the most senior water rights (oldest) have priority over junior water rights. In the event of a water shortage junior water rights holders may be required to reduce or stop using water until the demand of senior water holders is satisfied. It is also possible, although unlikely, that the basin could be subject to adjudication of all water rights. This means that the courts identify all water rights in the basin, review them for validity and list them in order of seniority. Then based on the water determined to be available in the basin, water is allocated based on seniority.

Watershed Planning

In August 2003, the Skagit Watershed Planning Unit issued the Water Resource Inventory Area #3 (WRIA 3) Samish River Sub-basin Watershed Management Plan. (See Map 4: WRIA 3 Lower Skagit River) The goal of the planning effort was to ensure adequate water supplies remain avaitable. The plan recommended various alternative and strategies to manage in stream flow needs and the water withdrawal needs for agriculture use, commerciat use, and population and economic growth.

Inter-Agency and Stakeholder Cooperation within the Basin

Due to its geographic location, land use, zoning, recreational opportunities, and the presence of I-5, the

Lake Samish Basin involves many significant public and private stakeholders. Because the basin drains south through Skagit County to Samish Bay, there are even more downstream stakeholders reliant, in part, on the quality and quantity of flow from the basin. Success of basin management activities for Lake Samish area will be dependent upon the level of interagency and stakeholder cooperation.