Community Perspectives on the Vancouver Lake Watershed – A Pathway to Discovery

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The Rosemere Neighborhood Association, a volunteer neighborhood organization, has spent the past few years performing in-depth research into water quality concerns in the Vancouver/Clark County area. A vast amount of documentation has been obtained pertaining to scientific data and research regarding the sources of pollution to the watershed and its tributaries, and we urge everyone to review these documents from an annotated bibliography compiled by the Stream Net Library.

The following reference materials (listed on the Stream Net Library's Biography) are primary sources for the focus of this presentation.

·April 1977, Pilot Dredge Program Vancouver Lake, Vancouver, Washington for the Port of Vancouver

·October 1977, Master Plan for Rehabilitation of Vancouver Lake, Washington

·January 1978, Water Quality Management Plan [208 Plan]

·July 1978, Vancouver Lake Reclamation Study Final Environmental Impact Statement

·1979, Notice of Proposed Approval Action: Clark County Areawide Water Quality Management Plan [208 approval]

·March 1979, Proposal: Vancouver Lake Reclamation Operations Plan

·April 1979, Status and Inter-Relationships of 208 and Related Programs

·April 1980, Operations Plan Rehabilitation of Vancouver Lake for the Port of Vancouver : report

·1984, Vancouver Lake Restoration Project Summary and Maintenance & Operations Handbook

·September 1988, Burnt Bridge Creek Water Quality Data Trend Analysis

·November 1995, Burnt Bridge Creek Watershed Plan

·September 1998, Burnt Bridge Creek Water Quality Data Trend Analysis

·October 1999, Burnt Bridge Creek Microbial Source Tracking: Identification of Sources of Microbial Pollution in Burnt Bridge Creek Watershed

·1964, Geology and Ground-Water Conditions of Clark County, Washington with a Description of a Major Alluvial Aquifer Along the Columbia River – Mundorff Study

Columbian Article, May 13, 1979
Property Owners Have Mixed Feelings About Creek

"Government officials argue that pointing out a poor job has been done in the past is not reason to give up correcting matters now. The most visionary local officials see the creek as a natural greenbelt corridor that could cut through the heart of urban Clark County."

Burnt Bridge Creek Utility – 1981-1995

Comments have previously been made at VLWP meetings showing resistance to historical overviews of the problems with the watershed. However, community residents have been heavily invested in this watershed for the last 25 years, and they have paid many millions of dollars in fees that were earmarked for water quality improvements and controls to assist in the clean-up efforts. Taxpayers have paid about $11.9 million alone in the Burnt Bridge Creek Watershed through a utility fee and other taxes. Federal and local matching funds paid about $17 million for the Vancouver Lake Rehabilitation Project in the early 1980's, and then millions more were spent on organizing basin-wide improvement projects affiliated with the rehabilitation project. It is prudent to review the history to see what was done, to learn from the past and carry forward the knowledge base in order to formulate a plan for the future.

Note: The information contained in the following charts was forwarded separately to the VLWP and was generally referred to in the presentation. This accounting data was obtained from the Clark County Treasurer's Office.

Chart #1
Clark County Enterprise Funds
Burnt Bridge Creek Utility
Stormwater Utility for Burnt Bridge Creek Improvements

Source: Comprehensive Annual Financial Reports
Note: Charges for service to residents includes all fees

YEAR	$ AMOUNT COLLECTED FROM RESIDENTS IN BURNT BRIDGE CREEK BASISN
Lake Cleanup Studies Implemented in 1977	
1977	N/A
1978	N/A
1979	N/A
1980	N/A
1981	402,048
1982	426,757
1983	413,371
1984	424,582
1985	430,378
1986	405,239
1987	449,898
1988	772,611

1989	705,225
1990	730,039
1991	727,523
1992	778,083
1993	799,798
1994	844,121
1995	840,128
Grand Total Collected from Residents In Burnt Bridge Creek Utility Fees	**9,149,801**

Chart #2
Clark County Enterprise Funds
Burnt Bridge Creek Utility, Operating Expenses from 1981-2001

Note Explanation of Personal Services: This account is for salaries and wages, benefits (such as earned vacation and sick time, worker's compensation insurance, medical and dental coverage and retirement benefits), and employment taxes. Up until 1994, this fund supported administrative and management employees only. In 1994 maintenance personnel were added. One crew chief, one full time maintenance person, and two or more seasonal or part time employees were added in 1994 and 1995.

Description	1981	1982	1983	1984	1985
Personal Services	104,591	107,778	114,465	87,515	155,312
Supplies	5,097	2,319	2,635	2,662	533,128
Other Services	104,022	150,927	177,064	146,126	170,654
Miscellaneous	2,690	7,089	14,478	-	20,676
Interfund Services	-	-	-	-	-
Intergovernmental	-	-	-	-	-
Depreciation	-	1,094	1,094	1,094	1,094
Total Operating	**216,400**	**269,207**	**309,736**	**237,397**	**880,864**
Expenses					

Description	1986	1987	1988	1989	1990
Personal Services	98,283	114,476	166,424	33,138	105,750
Supplies	24,893	8,647	25,072	5,967	10,412
Other Services	192,693	154,809	216,308	307,643	233,911
Miscellaneous	-	-	-	-	-
Interfund Services	-	-	-	-	-

Intergovernmental	11,794	20,750	33,722	-	11,939
Depreciation	1,267	2,908	5,162	11,843	16,297
Total Operating Expenses	**328,930**	**301,590**	**446,688**	**358,591**	**378,309**

Description	**1991**	**1992**	**1993**	**1994**	**1995**
Personal Services	106,511	120,282	124,101	373,885	437,630
Supplies	33,545	19,889	26,868	23,549	21,221
Other Services	216,340	112,923	182,256	217,131	340,487
Miscellaneous	-	-	-	-	-
Interfund Services	-	-	-	-	73,784
Intergovernmental	66,202	40,994	58,575	85,834	-
Depreciation	15,634	14,700	15,153	31,230	30,651
Total Operating Expenses	**438,232**	**308,788**	**406,953**	**731,629**	**903,773**

Grant Totals	**983,562**	**879,585**	**1,163,377**	**1,327,617**	**2,162,946**

Total Operating Expenses for Burnt Bridge Creek Utility (1981-1995)
$6,517,087

Chart #3
Breakdown for the Expense Category for "Other Services and Charges"
Burnt Bridge Creek Utility
From Comprehensive Annual Financial Reports
Note: 1995 Is the earliest year that there is any breakdown of expenses beyond the CAFR categories

"Other" Services and Charges	**Expenses for 1995**	**Percentage of Total**
Temporary Employment Services	43,193	12.7%
Professional Contractors	205,937	60.5%
Equipment Maintenance/Repair	27,927	8.2%
Equipment Rental	26,835	7.9%

Printing Services	10,121	3.0%
Registrations/Tuition/Memberships	4,802	1.4%
Computer Maintenance	5,600	1.6%
Travel Expenses	1,771	0.5%
Filing Fees/Permits	9,939	2.9%
Postage	1,176	0.3%
Telephone/Utilities	2,907	0.9%
Miscellaneous	279	0.1%
Grand Totals for 1995	**340,487**	**100.0%**

Chart #4
Burnt Bridge Creek Utility
Capital Expenditures for the years 1981-1995

Capital Expense	1981	1982	1983	1984	1985
Land	0	85	68	0	278,767
Improvements	0	0	0	0	0
Machinery/ Equipment	830	10,941	0	0	0
Construction Progress	0	0	0	0	0
Totals	**830**	**11,026**	**68**	**0**	**278,767**

Capital Expense	1986	1987	1988	1989	1990
Land	382,374	277,014	91,926	299,964	472,064
Improvements	77,840	133,730	463,396	112,799	13,235
Machinery/ Equipment	903		818	0	0
Construction Progress	0	0	0	0	0
Totals	**461,117**	**410,744**	**556,140**	**412,763**	**485,299**

Capital Expense	1991	1992	1993	1994	1995
Land	0	0	0	110,110	172,000
Improvements	0	0	832,577	0	217,939

Machinery/ Equipment	0	3,998	0	0	2,593
Construction Progress	425,552	337,533	(666,961)	163,011	(192,524)
Totals	**425,552**	**341,531**	**165,616**	**273,121**	**200,008**

Total Capital Expenses from 1981-1995	
Land	$2,084,372
Improvements	$1,851,516
Machinery and Equipment	$20,083
Construction Progress	$66,611

Total Capital Expenditures from 1981-1995	**$4,022,582**

Total Operating Expenses for Burnt Bridge Creek Utility (1981-1995)	**$6,517,087**

Grand Total Expenses for Burnt Bridge Creek Utility (1981-1995)	**$10,539,669**

Less Utility Fees Collected from Residents in Basin (1981-1995)	**-$9,149,801**

Amount Paid by Local Government Above Resident Fees Collected	**$1,389,868**

Grand Total Burnt Bridge Creek Basin Improvements	**$11,929,537**

Where are we now? What is the Water Quality Assessment of the waters that contribute to the Vancouver Lake Watershed?

Columbian Article, April 19, 1998, Troubled Waters Run Parallel
"Burnt Bridge Creek was the county's first stab at watershed management. Twenty years later, the effort remains as controversial as commissioners study the proposed $41.8 million plan to improve drainage and water quality in Salmon Creek…Since 1981, Clark County has spent more than $11.6 million on the creek that flows from Orchards west through Vancouver before emptying into Vancouver Lake…County Commissioner Judie Stanton concedes that the public views Burnt Bridge Creek as a failure."

Columbian Article, April 19, 1998
Burnt Bridge Creek Violates Several Water Quality Standards
"In 1996, the Washington Department of Ecology listed Burnt Bridge Creek as failing state and federal water quality standards in four of nine categories: temperature, dissolved oxygen, pH (acidity) and fecal coliform – bacteria that indicates the presence of human or animal waste…Burnt Bridge Creek may rank as the county's worst water quality problem…But does its water quality reflect 20 years of effort and $11.6 million spent on cleanup?"

Burnt Bridge Creek feeds directly into Vancouver Lake. Vancouver Lake flows out to Lake River, and then into the Columbia River. Tidal fluctuations cause daily reversals of Lake River's flow, which then reverses into Vancouver Lake, bringing Salmon Creek Basin's pollutants into the lake as well. Silt loads from the reverse flows of Lake River have built up at the north end of Vancouver Lake, making boat and fish passage into Lake River impossible. With the implementation of the Flushing Channel in the early 1980's, Columbia River water is fed directly into Vancouver Lake. The Flushing Gates are open with water flowing from the Columbia River into Vancouver Lake, but the gates close when the Columbia River flow is lower than the level of Vancouver Lake.

Previously, VLWP members commented that Burnt Bridge Creek has practically no effect on the water quality of Vancouver Lake, and that water from Burnt Bridge Creek simply flows out of the system through Lake River. A vast amount of available data disagrees with this assessment.

Columbian Article – Nov 1, 1981
Creek Cleanup Causes Home Liens
"The creek, polluted by septic tanks and muddy oily storm runoff, had to be cleaned up to get the money to dredge Vancouver Lake. It's the lake's biggest polluter." A county engineer said "all of the runoff, smaller streams or storm sewers in this basin in some way drain into the creek."

Columbian Article, June 27, 1979
Burnt Bridge Delay Rapped
"O'Brien (Clark County's Clean Water Program Coordinator) agreed that the proposed ordinances to control erosion, storm runoff and septic tanks in the basin…could be as critical to solving the pollution problem as the drainage utility."

Failure to Meet State Water Quality Standards – Threatened or Endangered Waters

Information from the Washington State Department of Ecology shows that Vancouver Lake, Burnt Bridge Creek, Salmon Creek and the Columbia River are all on the state 303(d) list of threatened or endangered waters. All of these waterbodies are classified as Category 5 Polluted Waters, the worst designation. Pollution in Category 5 waters has caused the loss of use of those waters for swimming, fishing and other recreational activities resulting from failed water quality standards. Pollution in Burnt Bridge Creek alone makes that waterbody unsafe for human contact. A court order requires the Washington State Department of Ecology to commence a Total Maximum Daily Load (TMDL) study for all Category 5 waters within the next ten years. This study mandates a clean-up plan for all affected waters. Vancouver Lake and Burnt Bridge Creek have never benefited from the required TMDL study.

Current Category 5 listings for noted waterbodies – failed water quality standards:

Burnt Bridge Creek
Dissolved Oxygen (5 times), Fecal Coliform (8 times), Temperature (4 times)

Columbia River
Fecal Coliform (1 time), Temperature (7 times)

Salmon Creek
Dissolved Oxygen (1 time), pH [acidity] (3 times), Temperature (1 time)

Vancouver Lake
Fecal Coliform (2 times), Total PCB's [carcinogen] (1 time), Tot Phosphorus (1 time)

Note: Burnt Bridge Creek has far more failed water quality standards than any other water body in this area, yet it has not received the required TMDL study. Burnt Bridge Creek and Vancouver Lake really need a TMDL. Salmon Creek already has a TMDL in place for Fecal Coliform.

Since the Department of Ecology has hundreds of TMDLs left to do on Category 5 waters throughout the state, and there is limited time to complete this huge task, it is apparent that this agency will not be able to complete all the required tests. Regardless of this fact, clean-up or management plans should be implemented by local governments without waiting for the Department of Ecology to begin the TMDL process. At the very minimum, the VLWP should jointly recommend a TMDL study for the Vancouver Lake/Burnt Bridge Creek watershed, and provide the Department of Ecology with all available water quality data to achieve that end. The VLWP should also recommend a watershed council to implement a coordinated, multi-basin-wide management/cleanup plan with citizen involvement.

Category 4a Waters --- Those that already have an approved TMDL in progress:

Columbia River
Dioxin (3 times), Total Dissolved Gas (6 times)

Salmon Creek
Fecal Coliform (6 times)

Category 2 – Waters of Concern – Waters where there is evidence of a water quality problem but not enough to require a TMDL at this time. Testing and monitoring these waters needs to continue.

Burnt Bridge Creek
Temperature (3 times), pH (4 times)

Columbia River
Arsenic (2 times), Fecal Coliform (1 time), pH (1 time), Temperature (8 times)
Bis(2-ethylhexyl)phthalate (1 time)

The Question of Water Quality of the Columbia River

There are times when the quality of Columbia River water is not clean, and adds to the pollutants in Vancouver Lake. For example, in April 2004, a very large sewage spill hit Frenchman's Bar. Condoms, tampons, syringes, and raw sewage washed ashore, as reported by fishermen. State spill responders were summoned and the beach was closed for cleanup.

The gates of the Flushing Channel are operated passively, and when the water level of the Columbia River is higher than Vancouver Lake, Columbia River water then flows into the lake. Conversely, the flushing gates shut when the water level of Vancouver Lake is higher than the level of the Columbia River. Per the original design of the Flushing Channel, the gates were intended to be actively managed. According to the state spill responder, there was no monitoring of water quality in the Flushing Channel or Vancouver Lake to see if the sewage spill in April 2004 (including bacteria), was getting into Vancouver Lake. A Portland sewer overflow was considered a possible source for this contamination because wind and water flow supported this theory, but the source was never discovered. Every time it rains 1/10th of an inch, there are combined sewer overflows from Portland sewers. Warnings are given out that the water is unsafe along the Willamette in Portland. Yet the Flushing Channel remains open all the time. The flushing gates were originally designed to be closed during salmon runs and seasonal freshettes, but this is not happening. (A representative from Washington Department of Fish and Wildlife commented that the Endangered Species Act requires all fish passages to remain open at all times, and the Flushing Channel is a passage for salmon to travel into Vancouver Lake.)

Pollutants from combined sewer overflows in Portland can travel up the Willamette, cross the Columbia, and enter Vancouver Lake via the flushing channel. Proof of this exists in sedimentation. The Willamette River contains ultra fine sediment that is unique to that waterway – it does not naturally exist upstream in the Columbia River. This ultra fine Willamette sediment has been found inside Vancouver Lake, thus, the it is reasonable to deduce that pollutants from the Willamette do enter into Vancouver Lake via the Flushing Channel, especially since the confluence of the Willamette is situated closely upstream from the Flushing Channel.

According to the original design of the Flushing Channel, the mouth of the channel was to be maintenance dredged every three to five years. Maintenance dredging was also to take place in sediment cells (the size of football fields) that were created during the lake rehabilitation project. There are 11 of these cells. Documents show that these cells were to be regularly assessed, and were to be dredged as needed between 10 and 25 year intervals, but this has not happened either. Therefore, the lake is becoming plugged with sediments once again.

Specifics of the 208 Water Quality Improvement Plan and the Need for Basin Wide Planning

In 1978, the Environmental Protection Agency (EPA), Department of Ecology (DOE), City of Vancouver, Clark County, and Port of Vancouver entered into the Vancouver Lake Rehabilitation Project under Section 208 of the Clean Water Act. This was approved by Governor Dixie Lee Ray, and the EPA, and was contracted with the Port of Vancouver with conditions involving participation of the other jurisdictions.

A required 208 water quality improvement plan was established to clean up the watershed area based on EPA's environmental studies where sources of contamination were identified, and plans to alleviate these sources were to be implemented.

Clean Water Act Owner's Manual, by the River Network
Basin-wide water quality plans (Section 208)
"Section 208 of the Clean Water Act called for basin-wide water quality plans. Developed in the early to mid 70s, these detailed plans provide information that is still usefull...Some 208 plans have been updated regularly, and continue to be the basis of state water quality agencies' planning and action today. Those that have not been updated still contain much pertinent information , allowing for comparisons between past projections and today's realities. The idea of watershed planning gained widespread support in the 1990's, but was hardly new. In 1972, section 208 of the Clean Water Act called for the formation of basin-wide water quality management plans. EPA relied on information in these plans when it decided where to award grants for construction of new or improved sewage treatment facilities. Most 208 plans were detailed assessments of watershed resources, conditions, and trends. Many have been amended and updates in the years since and used by the states as the basis not only for sewage treatment planning but for general water quality and quantity management."

The 208 Plan for the Vancouver Lake Rehabilitation project consisted of three equally important parts:

1) Dredge the bottom of Vancouver Lake because it was too shallow.
2) Design and Build the Flushing Channel to flush the lake with Columbia River water
3) Control Pollution entering the lake from Burnt Bridge Creek

All three parts to this program were considered essential to save the lake.

Stipulations (conditions of approval of the Clean Lake Award set forth by the EPA) stated clearly that Burnt Bridge Creek, as a major contributor of pollutants to the lake, would have to be cleaned up in order for federal funds to be used in this program. The city and county were responsible for the cleanup programs of Burnt Bridge Creek, and thus the Burnt Bridge Creek Utility was formed as a funding source for 208 clean-up programs. These programs were designed to alleviate sources of pollution that were carried into Vancouver Lake via Burnt Bridge Creek. The 208 plan for Burnt Bridge Creek received a great deal of attention and support from members of the general community and various groups: The League of Women Voters, Greater Vancouver Chamber of Commerce, Design for Clark County, Clark County Audubon Society, Orchards Citizen Advisory Committee, Clark County Parks Board, Greater Vancouver Kiwanis Club, Young Democrats Club, Clark County Conservation District, Vancouver Service Center, and Lake Rehabilitation Technical Advisory Committee. Public education on the topic of the Burnt Bridge Creek 208 plan included 35 public presentations of the plan, bumper stickers that said "SAVE BURNT BRIDGE CREEK," TV, radio and newspaper features, meetings with concerned groups, a booth at the county fair, posting pollution warning signs at key public access areas to the creek, and the use of newsletters.

Columbian Article, Oct 19, 1979
Water Cleanup – Creek, Lake Plans Pass Council Hurdle
"…the federal Environmental Protection Agency has said it will not finance any lake cleanup unless the creek (Burnt Bridge Creek) is cleaned up too. The recommended plan for cleaning the creek and installing flood control measures would cost an estimated $3.4 million…Mary Legry, president of the League of Women Voters, supported the Burnt Bridge Creek plan as environmentally sound and one that would reduce the health hazards of the polluted creek while increasing its recreational value."

Main thrusts of the 208 plan to clean up the Vancouver Lake Watershed included the adoption of specific water quality standards for Burnt Bridge Creek and the establishment of enforcement procedures to assure these standards were met. Stormwater control was a big part of improving water quality in the creek, preventing urban contaminants from rushing into the creek during rain events. The 208 plan specifies that "*governmental agencies must take decisive action now to better manage waters that drain into the creek*," and "*the major pollution causes in Burnt Bridge Creek are septic tank seepage, urban runoff and construction clearing and grading*."

There were also prohibitions to be placed on septic tanks in the basin, including the requirement for areas with known septic tank problems to connect to sanitary sewers as soon as possible. There were 10 priority target locations identified as septic tank problem areas:

"Areas in Need of Connection to Public Sewer" – Per the 208 Plan
1. Oakhurst Subdivision
2. Burtonwood Subdivision
3. NE 58th Street Area
4. Nicholson Road – Linda Lane
5. 86th Avenue South of Burton Road
6. Falk Road and Algona Drive
7. Neal's Lane (Near 33rd Street Drainage)
8. Cold Creek
9. "U" Street Drainage (Rosemere Area)
10. Orchards Commercial Area (112th Avenue)

Not all of these locations were addressed or completed. The 208 plan identified the city and the county as the principal management agencies for the Burnt Bridge Creek basin plan, including the 10 targeted locations. This 208 management plan was approved by the EPA, DOE and the Governor, and was then incorporated into the EPA's Vancouver Lake Rehabilitation Project Clean Lake Award Grant, calling for project costs of nearly $17 million.

There is no coordinated interjurisdictional watershed improvement plan at this time for this basin, despite the requirement for such a plan 25 years ago. A basin-wide management plan was developed by the City and County in 1995, but it was not approved by the city. The reasons for this are unclear.

Columbian Article, Dec 6, 1995
Bringing Back Burnt Bridge Creek (about the 1995 proposed watershed management plan)
"Pesticides, Chemicals, and contaminants from failing septic tanks and domestic animal waste make the creek unfit for human contact. Fecal coliform bacteria is a health threat…The idea is to control the amount of water flowing into the creek, reduce erosion, filter out pollutants, and remove algae-growing nutrients…Pieces of the plan have worked in the Puget Sound area,

Oregon, Florida and Maryland…what makes Clark County's plan special is that it includes the whole water cycle, not just one element."

Burnt Bridge Creek as a Main Polluter to Vancouver Lake

Columbian Article, July 24, 1979
Water Pollution Grants Thought Safe
"Under a new federal rule, Clark County may be one of only three areas in the sate not facing possible reduction of water pollution planning grants...Clark County, along with Snohomish and King counties, is expected to escape the latest fray because of an earlier designation by the governor, indicating the three counties suffer from so-called non-specific surface water pollution. Because the governor acknowledged surface pollution of Salmon Creek and Burnt Bridge Creek from agricultural and septic tank runoff, the county's planning funds are protected, according to assistant attorney general Richard Kirkby."

Columbian Article, June 17, 1981
Cleaning Begins in Burnt Bridge Creek Streambed
"The drainage district also will develop standards for hooking all houses in the drainage basin using septic tanks to sewers to prevent additional pollution."

Columbian Article from circa 1979 – by Michael Gowrylow
Burnt Bridge Creek Plan Approved by City, County
"A drainage management plan that would reduce flooding and cut pollution in Burnt Bridge Creek was approved Monday by Clark County and the City of Vancouver…Septic tanks along the creek which contribute to its pollution would be banned. And water quality in the stream would be monitored…Consulting Engineers who prepared the (208) plan urged the county and the city to waste no time in implementing it."

Columbian Article – Sep 14, 1978
Burnt Bridge Creek District Formed
"The county and City of Vancouver must agree to control jointly creek drainage, budgets and staffing levels have to be figured out, and proposed financing schemes developed, according to William Appel, a Seattle bonding attorney."

Water Quality Data, Identified Pollutants and Their Sources

Comments were made at previous VLWP meetings that all the septic tanks could be removed from the Burnt Bridge Creek Basin, and a ban placed on fertilizers, but Vancouver Lake would still be overly high in phosphorus because it occurs naturally in the groundwater and in the geology. Phosphorus is one of the elements that causes the toxic blue-green algae bloom to develop, thereby causing the Lake to be closed to human contact in hot summer months. It was also stated that Burnt Bridge Creek does not affect the water quality of the Vancouver Lake because of comparatively low water flows. Following are five quotes from The EPA's Environmental Impact Study that disagree with this assessment and provide answers to the influences of phosphorus and other contaminants, and their affect on the water quality of the lake:

1. "Studies prepared during the 208 program indicated high phosphorus, septic tank intrusion and heavy metal levels reached the stream due to surface storm runoff."

2. "The sources of phosphorus and nitrogen in the lake are from the drainage basin, and from phosphorus contained in the Columbia River water which seasonally enters the lake...Nitrogen

and phosphorus values reported for Burnt Bridge Creek give an indication of the significance of the drainage basin in supplying nutrients to the lake. They are four times greater than natural background levels and are characteristic of watersheds influenced by agricultural activities and urbanization (i.e. stormwater runoff and septic tank seepage)."

3. "The phosphorus loading from Burnt Bridge Creek alone is considered to be sufficient to cause extensive cultural (human-made) eutriphication of a lake. It is believed that additional phosphorus is supplied by other streams and assorted non-point sources."

4. "Concentrations of phosphorus (in the lake) are somewhat higher during the winter, perhaps because of septic tank intrusion, and again in late spring at a time when fertilizers are applied in the basin… All of these nutrients are chronically present at concentrations sufficient to support (toxic) nuisance algal blooms in Burnt Bridge Creek. In addition, Burnt Bridge Creek is an important source of nutrients to Vancouver Lake."

5. "Urbanization in the Burnt Bridge Creek drainage basin has substantially increased storm water runoff and associated silt loads in the creek, which in turn deposits sediments and pollutants in the lake. Subsoils conditions over much of the basin are unsuitable for subsurface disposal of domestic wastewater, so that septic tank effluent enters the stream."

Bacterial Contaminants and Other Pathogens in the Lake and Creeks

Various comments have been raised by concerned citizens at the VLWP meeting regarding the serious affects of exposure to pathogens in the watershed. The following documentation addresses these concerns.

From the EPA's Environmental Impact Statement
"Total bacterial counts as high as 100,000 per 100 ml have been reported. Ten to 40 percent of the total coliform bacteria found in Vancouver Lake were fecal coliforms, indicating the presence of (waste from) warm blooded animals, birds, mammals or humans."

From the Microbial Source Tracking Report, undertaken by the City of Vancouver, draft report written October 1999. This report has never been finalized by the City of Vancouver nor were the results certified and sent to the Department of Ecology for review. This report cost the taxpayers at least $175,000. The report indicates that bacterial contamination accumulates downstream as Burnt Bridge Creek merges with Vancouver Lake, and conditions worsen with the summer heat.
"The most frequently identified source of E. coli bacteria in Burnt Bridge Creek is of human origin. As BBC flows westward, the identified E. coli from humans increases from N.E. 137th Street, near the headwaters, at 4.4 percent to 20 percent at N.E. 2nd Avenue. The data strongly indicates that the source of human E. coli in Burnt Bridge Creek is from septic tank systems and not sanitary sewer lines."

Columbian Article, Apr 19, 1998
Troubled Waters Run Parallel
"Pollution problems with Burnt Bridge Creek have been known for more than 60 years. The public was first warned that the creek was not safe for drinking or swimming when a child contracted typhoid after playing in the creek in 1936."

Columbian Article, Apr 19, 1998
Burnt Bridge Creek Violates Several Water Quality Standards

"Clark County's data show that surges of fecal coliform bacteria can occur at any time of the year. Near Northwest Second Avenue and Burnt Bridge Creek's mouth, for example, fecal coliform levels were below state standards in April, zoomed to 160 times state standards in July, dropped to 13 times state standards in August and dropped to twice the state standards in September."

Columbian Article, Jul 15, 1998
Quality in Question, How's the Water?
"Fecal coliform, especially with a source in septic tank overflow, can create a variety of adverse effects, from severe diarrhea to swimmers itch or irritated eyes, Howard said (Dave Howard, State Department of Ecology watershed coordinator)…'Testing water quality provides no real guarantee for human health,' said Noll (Judy Noll, Vancouver Clark Community Parks and Recreation Department)…'There have been high outbreaks of illness where there were no fecal coliform and no illness where bacteria were high'…Fraser agreed (Gary Fraser , Water Recreation Program Manager for the Washington Department of Health in Olympia). 'In the outbreaks we've had in this state, when we tested the water for the primary indicators like E.coli or fecal coliform, the water met all the standards.' "

Waterborne Pathogens

Bacteria	Viruses	Protozoa
Campylobacter	Norwalk-like	Cryptosporidium parvum
Escherichia coli	Entero (poliomyelitis, coxsackie, echo, rotavirus)	Giarda lamblia
Salmonella (nontyphoid)	Hepatitis A	Entamoeba histolytica
Shigella	Reovirus	
Yersinia		
Vibrio (noncholera)		
Salmonella (typhoid)		
Vibrio (cholera)		
Legionella		

Illnesses Associated with Waterborne Pathogens

In the 1950's the swimming hole on Burnt Bridge Creek at Arnold Park was closed (inflilled) after a polio outbreak occurred. The source of the outbreak was considered to be the swimming hole that was fed by water from Burnt Bridge Creek. The polio outbreak, caused by exposure to enterovirus, caused the closure of Fort Vancouver High School for many months. Signs were nailed to trees by workmen along Burnt Bridge Creek that read "Creek Polluted" (Cleaning up the Creek, Columbian Article)

All waterborne microbial pathogens are potentially infectious and capable of causing illness depending on the dose and the physical condition of the individuals exposed. It should be stressed that exposure to waterborne pathogens does not always mean infection, nor does infectivity always lead to clinical illness. Although the dose-response mechanism is still not fully understood, scientists estimate that the risk of waterborne microbial illness in the United States is approximately 1 in 1 thousand individuals. Of those infected in the general population, the mortality risk is 1 in 1 thousand (as compared to a mortality risk of 1 in 1 million for uninfected individuals).

Bacteria and protozoa generally induce gastrointestinal disorders with a wide range of severity. Bacteria also cause life-threatening diseases such as typhoid and cholera. Viruses cause serious diseases such as aseptic meningitis, encephalitis, poliomyelitis, hepatitis, myocarditis and diabetes. In addition, gastrointestinal disorders may be attributed to unidentified or unspecified microorganisms. In terms of occurrence, protozoan infections are the most common, followed by bacterial infections and then viral infections.

For most pathogens, the severity of illness ranges from mild gastrointestinal upset, fever and vomiting, and intermittent diarrhea to chronic diarrhea, dehydration, liver damage, acute respiratory illness, adverse neurological effects, depressed immune systems and death. Most healthy individuals in the general population usually experience only mild gastroenteritis that is easily controlled and of short duration.

On the other hand, certain segments of the population are especially vulnerable to acute illness (morbidity) and can exhibit high death (mortality) rates. These segments include pregnant women, infants, the elderly and those whose immune systems are compromised by cancer, AIDS, fibromyalgia, neurological disorders, or the drugs used to treat these and other conditions.

Columbian Article, Jul 31, 1991
City, County Officials Ponder Obstacles to Sewer Hookups
"The tank's effluent contaminated Burnt Bridge Creek and was seen as a threat to the area's drinking water supply…In the Oakhurst case, several septic tanks were obviously failing and neighbors complained that it was unhealthy for their children to play in their own backyards.The Southwest Washington Health District, a tri-county agency dominated by city and county officials, declared the situation a health hazard and forced the entire neighborhood to switch to sewers".

The Continuity of Water in the Vancouver Lake Watershed – How the Water Moves and How it is Used

Quotes from The Mundorff study, "Geology and Ground-Water Conditions of Clark County Washington, with a Description of a Major Alluvial Aquifer Along the Columbia River." This report was prepared in cooperation with the State of WA Dept. of Conservation, Division of Water Resources and the US Bureau of Reclamation.

1. "Groundwater in Clark County is the source of 90% of the public water supply."

2. "The watertable is continually fluctuating, rising after rain and declining in fair weather. In a humid region, such as Clark County, the water table is an undulating surface."

3. "In the Fourth Plains area the rate (of ground water movement) is estimated to range between a fraction of a foot and several feet per day, except at a few places where it is higher, perhaps as much as 100 feet per day."

The US Geological Survey of 1990 concludes that the waters of Vancouver and Clark County are part of a sole source aquifer where ground and surface water have absolute continuity. The pollutants that are in the surface water can and are transmitted into the groundwater, the source of our drinking water.

These reports indicate that the pollutants present in surface water can (and do) mix with groundwater sources, causing pollutants to enter into the source of the community's drinking

water. This, in turn, causes the need for accelerated treatment of the municipal water supply with chlorine. When chlorine comes in contact with organic matter, such as elevated nitrates in the ground water, a chemical reaction occurs that produces benzene, a carcinogenic byproduct found in municipal drinking water.

Columbian Article, Nov 10, 1993
Vancouver Readies Campaign to Control Storm Water Runoff
" 'We're basically injecting our storm-water pollutants right into the water that we need on a daily basis,' said Scott Collier, one of six members of the advisory committee on steering the project ($6.6 million water treatment project at Blandford water station and Water Works Park. resulting from industrial chemical seepage into the groundwater)… In fact, storm water runoff is collected in catch basins and underground drywells and percolated into the soil. Motor oils, antifreeze, household cleaners and paints dumped into storm drains seep into the ground water, which is eventually pumped into municipal wells."

Burnt Bridge Creek Storm and Surface Water Utility -- 1986 Annual Report
Prepared by Dept. of Public Works, Clark County
"Septic tank effluent has been found to be the main pollutant source to Burnt Bridge Creek. For this reason, the Utility (Clark County) coordinates efforts with the City of Vancouver (the sewering agency) and the SW Washington Health District to eliminate septic systems polluting the creek within the basin. "

Columbian Editorial, April 16, 2003
In Our View, Troubled Waters
"The 7,730 homes that use septic systems in the area served by city sewers, along with an estimated 3,000 more within the Hazel Dell Sewer District, pose a real and escalating threat to human health and the environment. Most of those systems are now more than 25 years old and increasingly prone to failure…The city council ought to ban new septic systems in the city limits outright…The city does have the authority and should use it."

There are also hundreds of open cesspools still operating throughout the area. Such cesspools are illegal. Septic systems are intended to be temporary systems that last only about 25 years before they must be replaced. There are currently septic systems in place throughout the area that were installed in the 1960's, that have far surpassed the recommended usage. Septic systems within the city limits are not being consistently inspected, maintained or repaired.

Finding Solutions

It is imperative for a Watershed Council to be formed, comprised of local agencies and citizens alike, to be charged with the task of formulating and implementing a basin-wide management plan to locate and alleviate the identified sources of contamination to this watershed. Available science clearly indicates that the only way to improve the water quality of Vancouver Lake is to address the sources of contamination that are entering the lake via polluted tributaries and groundwater. The RNA has long advocated for such a watershed council, and has created a working model of such a council based on the EPA's Collaborative Problem Solving Process. A study must be done in accordance with current best available science to determine the status of the Lake and watershed health, and how to best, and most economically, address those issues. While this is being done, the VLWP should consider reviewing current regulations and legislation for these combined watersheds and programs so as to address obvious environmental problems within reasonable timeframes.