



Nanaimo's Most Precious Resource



CITY OF NANAIMO AND GREATER NANAIMO WATER DISTRICT



WATER *Nanaimo's Natural Resource*

At the turn of a tap we receive one of the world's most precious natural resources. Water is essential to our health and vital to our growing community. Yet, as a gift of nature, it is too often taken for granted, even neglected. Most of us rarely think of this invaluable resource until we are without. Imagine for a moment, the places in the world where people live with scarce or tainted water. We as Canadians do not have to reach back very far in our history to see how the "dust bowl" of the Great Depression changed the course of our own lives. Local weather conditions play a primary role on the amount of water that we receive and

consume. And the reality is, as our population increases, so does our need for water.

Water management involves community choices. How much do we need? How can we protect our water supply and ensure its safety? How do we make sure that there will be enough for our future? These are the questions that the City of Nanaimo and the Greater Nanaimo Water District must ask on a regular basis. We recognize the necessity of long term planning that will guarantee a clean, constant supply of water for our future. It is our responsibility, and one we do not take lightly, to educate our community to use our water wisely.

GNWD *Greater Nanaimo Water District*

The GNWD was established in 1953 by an Act of the British Columbia Legislature. The Act empowers the Water District with specific authority to regulate water usage, emergency conditions, security and pollution offences and to finance and construct the facilities necessary to supply water to the City of Nanaimo and the Community of Extension.

The GNWD is governed by a five-member board that consists of four elected representatives from City Council and the elected member for Area C of the Regional District of Nanaimo, which includes the Community of Extension. City of Nanaimo staff and alternates from the two communities support the GNWD board.



FROM SOURCE TO TAP *An Incredible Journey*



From high up in the central Vancouver Island mountains to your faucet, our water system is a complex, sophisticated operation. The journey begins with rainfall and snowmelt that flows through mountain rivers, streams and brooks in the watershed of the South Fork of the Nanaimo River. Covering 230 square kilometres, an area three times the size of the City of Nanaimo the watershed is located 20 kilometres south west of the City.

Two large storage lakes, Jump Lake and South Fork Lake, collect water, rain and snowmelt flowing from the mountains. The watershed is protected and access is strictly limited to safeguard our water supply from human contamination and other pollutants. Since the watershed is privately owned, a partnership between the City and Weyerhaeuser was formed to protect the source and the quality of our water.

Smooth runs the water . . .

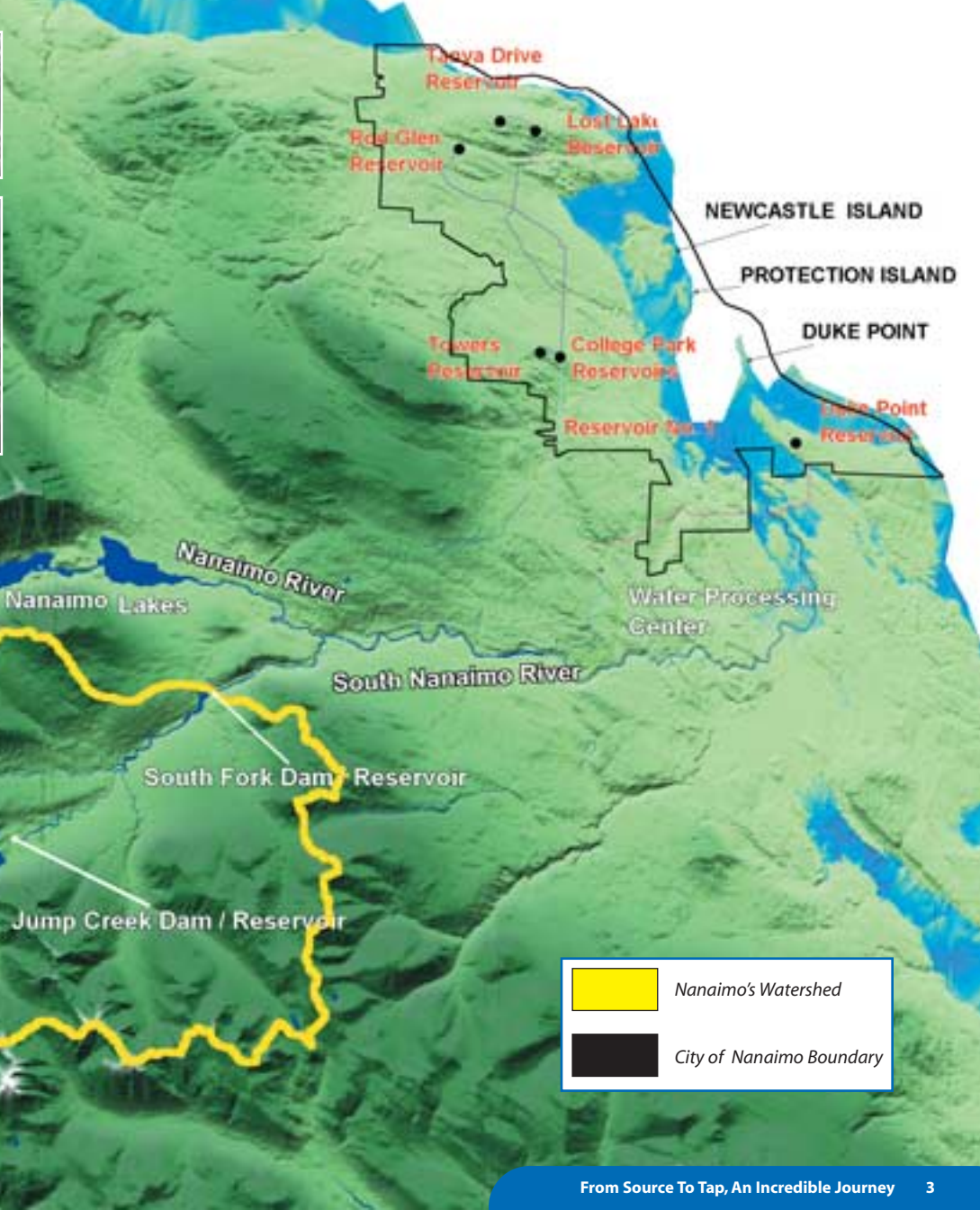
Water is transported to the City of Nanaimo and the Community of Extension through a complex network of dams, supply and distribution mains, treatment facilities, reservoirs and pumping stations. Dedicated staff work to ensure an adequate, safe supply. Nanaimo's water system is operated on a

self-sustaining basis. Current water rates and development charges cover water usage, the maintenance of existing facilities, new capital projects to sustain growth and the administration of water regulations. Water supplied to our customers is metered individually and rates are set in an expanding block rate to promote water conservation.

*Smooth runs the water
where the brook is deep.*

~ William Shakespeare





WOODEN PIPES AND DATA STREAMS:

122 Years of Water Management



Nanaimo's first public water system began just five years after the City was incorporated, when in 1879, the Vancouver Coal Company built the first wooden pipes to deliver water to the public from a spring on Wesley Street. In the early 1900's the Colliery Dams were built, one of which still serves as a balancing reservoir for the residents of South Nanaimo. Significant progress was made when the City acquired water licenses for the Nanaimo River and built the South Fork Dam in 1930, setting a new benchmark for the public water utility. The concrete arch dam, which measures 50 metres across, stands 30 metres high, and retains nearly 2 million cubic metres of water in South Fork Lake, was a progressive structure in its day.

From the South Fork Dam, the water supply travels through parallel pipelines. The smaller of the two was constructed in 1954 and supplies up to 50,000 cubic metres of water per day. As demand increased, a second larger pipeline was constructed in sections, on an as needed basis. Completed in 1993, this pipeline increased the volume capacity to 240,000 cubic metres per day.

Keeping pace with Nanaimo's growth and increased requirements for water, the Jump Creek Dam was constructed above the South Fork in the early 1970's. Floodgates were added to the dam's spillway, which increased storage by 50%, to a total of 17 million cubic metres. This addition

allowed the smaller downstream dam to maintain full reservoir storage during peak summer periods. In addition, snow-pack information is monitored by two automated measuring systems located in the watershed. This information is used to forecast stream flows and regulate the floodgates for summer storage.

Eight balancing reservoirs are located throughout the city to meet peak domestic demand and emergency fire flows. Emergency fire flows can exceed supply system capacity and draw reservoirs down for several hours. To serve the growing north end of the city the first balancing reservoir was constructed at Lost Lake in 1969 followed by reservoirs at College Park and Rutherford Road. Additional reservoirs and pipelines were built at Duke Point Industrial Park, College Park and Tanya Drive, to meet heavy growth in the 1980's.

Today's water management system dates back to earlier times when our predecessors had the foresight to envision an ample water supply for Nanaimo's future citizens. Technology may have changed; however, the City of Nanaimo's commitment to maintaining a safe, abundant and cost-effective water supply for its citizens remains the same. The long-range capital plan has identified the need for more storage in the watershed. Four more balancing reservoirs will be phased in over the next 10 to 25 years, in tandem with the City of Nanaimo's growth patterns.



YOUR WATER SYSTEM *At A Glance*

First Water Main:	Constructed in 1879 by the Vancouver Coal Company
Population Served (2001):	75,000
Member Communities Served:	City of Nanaimo & Community of Extension
Distribution System, Land Area:	85 sq. kilometers (33 sq. miles)
Watershed Area:	230 sq. kilometers (89 sq. miles) (See map on page 3)
Dams:	Colliery Dam, South Forks Dam, & Jump Creek Dam
Storage Lakes:	Jump Lake & South Fork Lake - total capacity 18.6 million cubic meters (4.1 billion gallons)
Treatment Facilities:	Village of Extension & Nanaimo Lakes Road
Service Reservoirs:	Eight - total capacity 96,000 cubic metres (18 million gallons)
Pumping Stations:	Seven - total capacity 900 litres per second (11,500 gallons per min.)
Supply Mains:	80 kilometers (50 miles)
Distribution Mains:	500 kilometers (310 miles)
Record 1 Day Consumption:	86 million litres (19 million gallons)
Cost of Water:	\$0.65/1000 litres (\$2.95/1000 gallons)
Value of Assets:	\$100,000,000
Replacement cost:	\$300,000,000



THE JOURNEY BEGINS

South Forks Reservoir



WATER Regulations & Safety

A multi-barrier approach is used to protect our water quality. This is accomplished by:

- i) restricting access to the watershed to protect source water
- ii) disinfecting to protect water from micro-organisms
- iii) conducting a rigid water testing program to confirm that our water is safe

To protect the water from human pathogens and pollutants, security is tightly monitored on a 24-hour basis. Personnel having access to the watershed are trained to protect it. Operations staff members perform daily water quality tests in the watershed and distribution systems, with over 2,000 samples taken on raw and treated water annually. The Central Vancouver Island Health Region monitors the results, which consistently exceed the Canadian Drinking Water Standards.

Water Regulations

The GNWD must comply with the BC Safe Drinking Water Regulation (1992) and also adheres to the Guidelines for Canadian Drinking Water Quality (1996). In addition the American Water Works Association is used as a model for regulatory requirements and to keep abreast of new technologies.

Regulatory Bodies

Provincial Jurisdiction

The Ministry of Environment, Lands and Parks; the Ministry of Forests; and the Forest Land Reserve regulate logging practices in the watershed under the jurisdiction of the Land Reserve Commission. The Ministry of Sustainable Resource Management is responsible for the allocation of water to license holders.

Municipal

The Greater Nanaimo Water District (GNWD) was established under a Provincial Act in 1953 and empowers the Water District with specific authority for water infrastructure, emergency conditions, security and pollution control.

History teaches us that men and nations behave wisely once they have exhausted all other alternatives.

~ Abba Eban



WATERSHED *Management*



While Nanaimo is fortunate to have an abundant supply of high-quality water that requires minimal treatment, the GNWD is responsible to ensure that our water is clean, clear and safe. A number of programs have been implemented to protect our water quality and ensure that it consistently meets the regulations of the Canadian Drinking Water Standards and BC Ministry of Health.

While the Greater Nanaimo Water District owns the storage lakes and dams, Weyerhaeuser and TimberWest own the watershed region. Since the watershed has been actively logged for many years, its jurisdiction falls primarily under the Land Reserve Commission, The Ministry of Forests and The Ministry of Environment, Land and Parks.

Heavy rain and snowfall during the winter can turn peaceful streams into raging rivers. This can cause the level of water flowing over the South Fork Dam to increase from one to eight feet in a twenty-four hour period and can lead to turbidity or cloudiness in the water. To minimize the

impact of these events, a well-administered maintenance plan has been implemented by GNWD and Weyerhaeuser:

- Ongoing discussions with Weyerhaeuser have resulted in programs to protect the watershed. Some of these include road maintenance, road deactivation, stream channel protection, culvert installation, maintenance and tree planting.
- Turbidity is measured continually at our treatment facilities. Spot testing is carried out in the watershed streams to confirm that safe operating practices are being followed.
- Watershed patrols are carried out daily by watershed inspectors.
- A number of alternate water intakes have been constructed on the Nanaimo River and lakes within city boundaries to ensure our water supply in the event of a disaster, such as an earthquake.



WATER *Supply & Conservation*

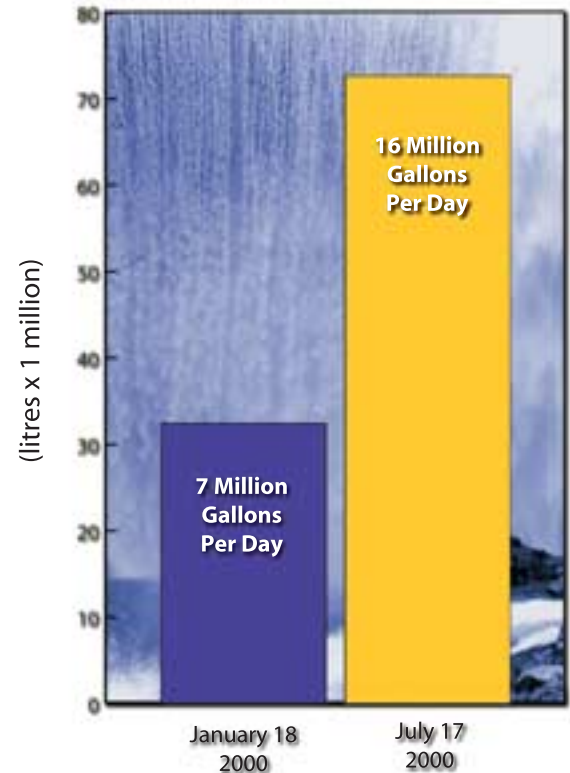


In a region that receives so much rainfall (1,144 mm/45 inches annually), water conservation may seem unnecessary. But consider for a moment when rain falls and how it must be stored. About 70% of our rain falls in the autumn and winter, yet the greatest proportion of water consumption happens in the summer. This requires the construction of costly storage facilities to meet typical summer demands. Fortunately by using water wisely, we can better manage the continuing challenge of water storage and user demand. Reducing unnecessary water usage is an essential step. It makes environmental sense; and it makes economic sense.

Did you know?

- The average person uses 600 litres of water daily at a cost of 39 cents per day. One litre of bottled water costs \$1.29 at your local supermarket.
- Nanaimo Citizens use 35 million litres of water per day
- Summer demands increase the consumption of water to 2.5 times and result in peak daily consumption of 86 million litres per day.

WATERFLOW
Peak Winter Day Vs. Peak Summer Day



WATER *Supply & Conservation*



Water Usage Regulations:

(Water Usage Regulations are in effect from June 1st until September 30th annually.)

1. No watering between 10:00 AM and 4:00 PM.
2. Watering is allowed on even days of the month (i.e. June 2, 4, 6, etc.) for residence unit numbers or address numbers ending in an even number.
3. Watering is allowed on odd days of the month (i.e. June 1, 3, 5, etc.) for residence unit numbers or address numbers ending in an odd number.
4. Washing of automobiles will only be permitted on regular watering days within the allowable hours.
5. Parking lot or driveway washing is not permitted during the summer months.

These restrictions are intended to ensure that all residents receive an adequate supply of water throughout the summer and that sufficient reserve supplies are available for emergency fire fighting purposes.

What Can You Do to Conserve Water?

- Ensure your dishwasher and washing machine have full loads.
- Avoid running your tap when it is not needed: fill sink to rinse dishes, keep a jug of cold water in fridge instead of running faucet for cold water, turn off faucet when brushing teeth or shaving.
- Install low flow shower heads.
- Toilets account for 40% of all indoor household water use. Try installing volume-reducing devices that take up space in toilet water closets, or low-flush toilets.

Looking to the future:

By taking steps to conserve water today we can postpone adding costly storage for 15 to 20 years. If we choose to do a better job of conservation we can add 5 years to that figure. Please use water wisely.

For water regulation updates refer to:

**www.city.nanaimo.bc.ca
or call (250) 758-5222**

FREQUENTLY Asked Questions...



i) How much water is used per person per day in Nanaimo?

Approximately 600 litres per capita per day. This figure increases to a peak summer usage of 1,150 litres per person per day.

ii) Why do we have sprinkling restrictions?

There are several reasons for sprinkling restrictions. The present storage reservoirs have enough water capacity to supply the city for another 15 to 25 years depending on our consumption and conservation. Without restrictions these estimates would be reduced, requiring significant capital costs for improvements and would result in higher water rates. Afternoon water restrictions allow the balancing reservoirs to recharge on a daily basis and avoid excessive evaporation losses from sprinkling in the hottest time of the day.

iii) When can I wash my car?

You may wash your car on your watering day except between the restricted hours of 10 AM to 4 PM.

iv) How hard is my water?

Nanaimo's water is very soft measuring just 5 milligrams per litre (mg/l) and has a low mineral content. Soft water is typically 0-17 mg/l. Hard water typically 120-180 mg/l.

v) Why does my water occasionally smell or taste of chlorine?

The Ministry of Health requires the GNWD to disinfect our water for health and safety reasons. To satisfy this requirement, chlorine is administered at a dosage that will result in 1.2 milligrams per litre of free chlorine after a 20-minute contact time. Occasionally, in the late summer, natural processes in our reservoirs react with the chlorine to form Chloramines. While this procedure can alter the taste or odour of water, the treated water is safe to consume. Storing drinking water in open containers in the refrigerator will help to eliminate the taste/odour of chlorine.

vi) Is our water safe?

Yes! Nanaimo is fortunate to have a high-quality source of water and a controlled watershed catchment area. The watershed is privately owned and is co-managed by the GNWD. Access to the watershed is restricted. The risk of contamination is extremely low. Water safety programs are closely monitored by outside regulatory bodies including the Ministry of Health. In addition, ongoing results of our stringent testing program continually demonstrates that our water is clean, clear and safe.

FREQUENTLY Asked Questions...

vii) What testing does the City do?

City & Regional Health staff perform daily water quality tests on over 170 samples of raw and treated water monthly. Water is tested for total and fecal coliforms, giardia, cryptosporidium and many other potential contaminants. Full spectrum analysis is carried out semi-annually and includes testing on all trace elements, a wide range of herbicides, pesticides and other compounds.

viii) What emergency programs are in place for our water system?

In 1990 the GNWD developed an Emergency Water Plan for Nanaimo. To ensure an adequate water supply in the event of a disaster such as an earthquake, recommendations were made for the construction of several emergency water intakes. As a result, emergency intakes were built on the Nanaimo River and on Long Lake. An additional intake is under construction at Westwood Lake and others will be built over the next several years.

In the event of a water safety emergency, a mandatory "boil water advisory" will be posted and remain in effect until the water system is deemed safe by the Ministry of Health. If necessary, bottled water will be distributed to Nanaimo citizens during an emergency.

ix) How can I get my water tested?

As a rule, the City of Nanaimo does not carry out tests for individuals. The results of the water testing program and other information is available on our Website at www.city.nanaimo.bc.ca (Water Works) or you may call Public Works at (250) 758-5222. For further information about water testing, contact the Ministry of Water, Land and Air Protection in Nanaimo at (250) 751-3100, the Ministry of Health at (250) 755-6200 or Provincial Enquiries at 1-800-663-7867.



"And our water, the universal solvent, present in the air, in the soil, in plants, animals and man. Without it life could not endure."

~J. A. Toodgood, Our Soil and Water



INFORMATION

Public Works

Tel: 250.758.5222

Web Site

www.city.nanaimo.bc.ca