



Water Conservation Planning Session

Madleine Martin
 Infrastructure Resource Officer
 Local Government Infrastructure & Finance Division
 Ministry of Community, Sport, & Cultural Development

Take-Away

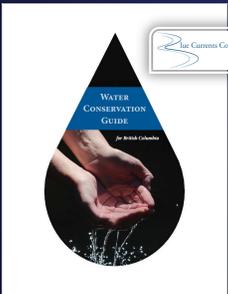
You can create a water conservation plan for your community using the Water Conservation Guide and Calculator



Water Conservation Planning Session

- Introduction to new guide and calculator
- Step through planning process
- Discuss own issues & opportunities
- Work through example

Water Conservation Guide



Collaborators:



Reviewers:

- Columbia Basin Trust
- District of Clearwater
- City of Quesnel
- City of Dawson Creek
- City of Fort St. John
- District of Sicamous
- Regional District of Nanaimo

Water Conservation Guide Features

- Sequential “how to” text
- 7 steps

Step 1 Laying Your Plans Foundation

Setting your goals for water conservation requires you to think about why, how, when, who, what and where. In the rest of this chapter, you'll learn how to build a solid foundation for your water conservation plan.

Overview of Step 1: Planning Process

1. Establish your conservation vision
2. Set your conservation objectives
3. Define your water, energy, and money goals
4. Determine how you will measure and track progress

1.1 Establish Your Vision and Purpose

The first step is to define the purpose for your plan. What do you want to achieve through conservation? Are you looking to reduce consumption, save money, or improve your overall environmental footprint, or a combination of these goals?

- To be clearly, consistently, and consistently in focus
- To be measurable, trackable, and achievable
- To align the need to build a new world through sustainability
- To identify a strategy that addresses water, energy, and money goals, and that is consistent with your overall environmental goals

1.2 Develop Your Objectives

This guide offers a framework for water conservation planning. You can modify the ideas shared to suit your community's unique needs. Before you develop the strategy, first you have to define your objectives. For this guide, the focus is on water conservation. You can modify the focus for other areas, such as energy or waste.

- What are your goals? What are you trying to achieve or avoid each day?
- How will you measure the success of your objectives?
- What resources do you have available? What resources do you need?
- How will you plan to do this while conserving resources?

Water Conservation Guide Features

- **EXAMPLES** after each step explain how “Anytown, BC” carried out that part of the process

Step Example: Anytown's Water Conservation Objectives

Anytown, BC, is a small town with a population of 10,000. The town council has set a goal to reduce water consumption by 10% over the next five years. The town council has also set a goal to reduce energy consumption by 10% over the next five years. The town council has also set a goal to reduce waste by 10% over the next five years.

Step 5: Factor Demand

The town council has identified the following factors that contribute to water demand:

- Residential
- Commercial
- Industrial
- Public Works
- Agriculture
- Golf Courses
- Parks and Recreation
- Schools
- Government

Figure 7: Anytown's Water Demand by Sector from the Water Conservation Calculator

Water Conservation Guide Features

- **WRITING CHECKLISTS** - what to put into a written plan

Writing Checklist: Choosing Your Conservation Measures

A. Local Incentive Criteria: Describe how you developed local criteria (A.1 & A.2)

Local Incentive Criteria - What criteria did you develop to evaluate your conservation measures and what incentives did you develop to encourage them? (What incentives are you offering to encourage the following activities for each?)

- Incentive type
 - What is required to receive?
 - Are you using cash incentives or non-cash incentives?
 - Are you using a combination of cash and non-cash incentives?
- Incentive value - Which criteria are the most important for your decision making (e.g., how do you weigh the value of the incentive against the cost of the incentive)?

Incentive Value - Did you build a scoring system and evaluate the value of the different criteria based on your chosen criteria, and the results of the scoring system? (What are the results of the scoring system?)

Incentive Criteria - Which criteria were most important to you in developing your written plan? (What are the results of the scoring system?)

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Water Conservation Guide Features

- **WORKSHEETS** to help you gather needed information
- Will also be provided online in Excel format

Water Demand Worksheet

This worksheet is used to gather information about water demand in your community. It includes sections for:

- General Characteristics
- Water Demand Worksheet
- Detailed Conservation Data

The worksheet includes columns for Sector, Estimated Demand (L/day), and Estimated Conservation Potential (L/day).

Purpose - 1st Part of Planning Process



Objectives & Action Plan

- What do you want your community's 'water' future to look like? Values



- How will you get there? – people, method, available data, resources, engagement
- Obtain support from decision makers



What is Your Current Situation?

Create Baseline

- **Watershed**
 - water sources, ownership & control, environmental, social, cultural, and economic uses, water quality
- **Community**
 - who / how many water users, population growth, water demands
- **Infrastructure**
 - service connections, metering, distribution system, treatment, costs



Current Situation - **Watershed**



- Governance
- Social, cultural, economic reliance?
- Factors affecting
 - Water quantity
 - Water quality
 - Ecological health
 - Climate change



Current Situation – Water Sources

- What is your Supply Capacity?
 - Annual (by source)
 - Maximum daily system capacity
 - Peak hour system capacity
- Source and water system intake locations, service areas



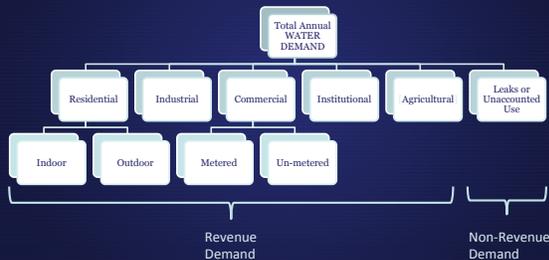
Current Situation - Community

- Rural or urban? Industries?
- Who are your water users?
- Year round vs. seasonal population
- Expected growth?
- How much water do they use? Water Demand

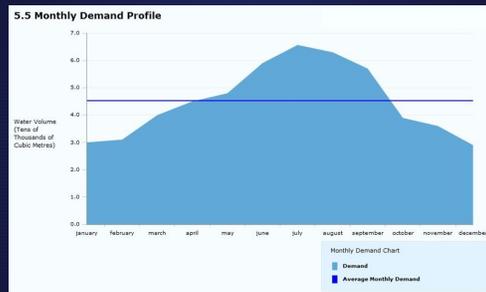


Current Situation – Water Demand

- Identify high use areas



Current Situation – Water Demand



Current Situation – Water Demand

Per Capita Daily / Annual Demand

- Water used per person per day or year

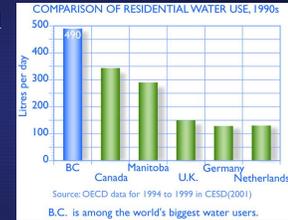


- Compare with other communities

Current Situation – Water Demand

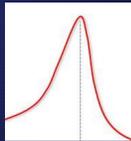
Per capita daily demand averages

- BC – 490 litres
- Canada – 266 litres
- Europe – 130 litres



Current Situation – Water Demand

- **Average** daily demand
 - Total annual demand/365 days OR
 - Pump rate x run time x efficiency of pump
- **Maximum** daily demand
 - Volume of water used on the highest use DAY of the year
 - Peak hour demand
 - Volume of water used in the highest use HOUR of the year
 - Peak demand data by sector



Current Situation - Infrastructure

- Service connections – info can show where water use is high
 - # connections by sector
 - Annual demand by connection
 - Metered connections
- Treatment - type & cost, % water treated
- Distribution infrastructure – condition, water loss



Current Situation - Infrastructure

- Annual system budget
 - Expenditure, revenue, average water rate
- What kind of pricing structure are you using?
 - Flat rate, volume based, increasing block rate
- System energy consumption



EXAMPLE (Page 1 – 3)

- Current information for “Anytown, BC” provided:
 - Water demand -System
 - Supply -Watershed
- Determine the residential per capita daily demand and compare to national average
- Review current data to identify issues & opportunities for conservation

» Page 3

EXAMPLE

- **Community**
 - Semi-arid
 - Population of 2500 (500 seasonal)
 - Coarse filtration and chlorination
 - Semi-rural
 - Agriculture, tourism, small business
 - Recreational fishing
- **Drivers**
 - Concerns of water shortages
 - Maintain healthy streams
 - Manage costs



EXAMPLE

- **Challenges**
 - No residential metering
 - Lack of awareness of issues
 - Climate change will make issues worse in future
 - Aging infrastructure with high leakage
- **Opportunities**
 - Reducing leakage
 - Industrial, Commercial, Institutional, and Agricultural properties or metered, but are not yet charged for water based on cost per volume

EXAMPLE

Permanent service population	2,000 people
Seasonal service population	500 people
Annual Water Supply Capacity	1,054,700 m ³
Annual Water Demand	1,021,931 m ³
Average Annual Residential Water Use	542,687 m ³



- Determine the residential per capita daily demand (litres) and compare to national average

EXAMPLE

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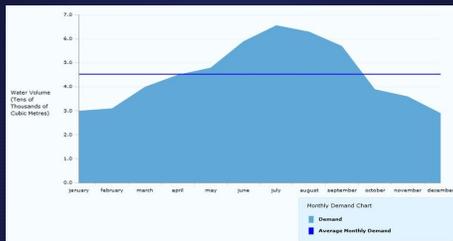
CALCULATE: Residential Water Use Data

Average Annual Residential Water Use (m ³)	Population Supplied With Water	Average Daily Demand Per Capita (litres)
		= [Average annual residential water use] / [Population supplied with water] / 365 days * 1000
542,687 m ³	2500	595 litres

Comparison with Other Communities:

BC - 490 litres Canada - 266 litres Europe - 130 litres

EXAMPLE



- Review current data to identify issues & opportunities for conservation

Present...to Future

- Now we know about the current situation....
- What about what might happen in the future?



Future Water Supply Forecast - Climate Change

- Increases in average temperatures
- Sea level rise
- Snow pack losses – earlier peak flows and lower flows in summer
- More frequent storm events, floods & droughts
- Pacific Climate Impacts Consortium – Plan2Adapt Tool for regional predictions – www.pacificclimate.org/tools-and-data/plan2adapt

Future Water Demand Forecast

- Per capita method** of water demand forecasting

$$\text{Future water use} = \text{Annual per capita water use} \times \text{Future population}$$

- Water demand forecasting **by user group**

$$\text{Future water use} = \text{Annual water use by sector} \times \text{Sector growth}$$

EXAMPLE (Page 4)

- Forecast future **water demand** for ‘Anytown’ using the per capita method

$$\text{Future water use} = \text{Annual per capita water use} \times \text{Future population}$$

- Compare future water demand with water supply



EXAMPLE (Page 4)

Forecast Service Population (annual growth rate = 1.2% per year):

Present	5 Years	10 Years	20 Years	50 Years
2,500	2,653	2,816	3,173	4,485

CALCULATE: Water Demand and Supply Forecast

Total Annual System Demand (m3)	Calculation (per yr forecast)	Current Year	5 Years	10 years	20 years	50 years
Population Served	[(Current population served) x (Annual growth rate)] + [(Current population served)]	2,500	2,653	2,816	3,173	4,485
Annual Water Demand	[(Current demand) / (Current population) x [Future population]	1,922,931	Ex 1,021,931 m ³ [2,500 people x 2,653 people = 3,084,473 m ³]	1,151,103	1,297,035	1,833,344
Annual Supply Capacity*	[Current supply capacity] x [1% - % decrease in water storage]	1,854,700	1,041,582	1,028,627	1,003,199	930,624
Difference Between Annual Supply Capacity & Annual Water Demand**	[Annual supply capacity] - [Annual water demand]	32,769	-42,891	-122,476	-293,836	-902,720

* Decrease in water storage of 0.25% per year due to climate change is assumed

** If the difference is negative, shortages are predicted in the future due to lack of supply. If it is positive, a surplus is anticipated.

Explore Options (update table)

Measure Type	Measures	Water Savings	Costs	Enforceable or Voluntary	Technology or Behavior Change Focused
Legal Measures	Mandatory water restrictions*	△△	\$ - \$\$	Enforceable	Behavior change
	Municipal bylaws, standards, regulations, building and plumbing codes	△-△△△	\$ - \$\$	Enforceable	Technology and/or behavior change
Economic and Financial Measures	Conservation-oriented pricing and rate structures	△△-△△△	\$ - \$\$	Enforceable	Behavior change
	Rebate programs or free retrofitting programs	△△-△△△	\$\$ - \$\$\$	Voluntary	Technology
Operations and Management Measures	Water loss management and leak repair*	△-△△△	\$ - \$\$\$	Enforceable or Voluntary	Technology
	Metering programs**	△-△△△	\$\$ - \$\$\$	Enforceable or Voluntary	Technology and/or behavior change
	Water recovery, reclamation, reuse and recycle programs*	△△-△△△	\$\$\$	Enforceable or Voluntary	Technology and/or behavior change
	Rainwater harvesting programs	△	\$	Voluntary	Technology and/or behavior change
Community Engagement Measures	Voluntary restrictions	△	\$	Voluntary	Behavior change
	Education and outreach programs	△-△△	\$ - \$\$	Voluntary	Behavior change
	Partnerships and collaborative initiatives	△-△△△	\$ - \$\$\$	Voluntary	Behavior change

△ = Order of magnitude range of water savings

* Immediate water savings benefits can be expected once this measure is put in place

\$ = Order of magnitude range of costs

** Metering can realize immediate water savings if it is tied to conservation-based water pricing

EXAMPLE (Page 5)

- Which water conservation measures would you want to explore for 'Anytown'?



Choosing Conservation Measures

- What are the important criteria in selecting measures?

✓	✓	✓	✓	✓
Water savings	Targets high use	Available technology	Social acceptance	Reliability

- Score your measures based on criteria
- Compare final scores
- Select most appropriate measures for your community

EXAMPLE (Page 5)

- Criteria have been set out to score the water conservation measures
- Include measures that you identified on Page 5 of your booklet in the first column
- Score and rank your water conservation measures



Put Your Plan into Action

- Turn each selected conservation measure into a project
 - Project scope & target population
 - Anticipated water savings
 - Project costs and financing
 - Existing in-house capacity
 - Roles & responsibilities
 - Risk management
- Obtain support from decision makers

Questions?



Madelaine Martin
Infrastructure Resource Officer
Madelaine.Martin@gov.bc.ca
250.953.4035

Resources

- Electronic copy of Guide found on Resources section of event website OR email Madelaine.Martin@gov.bc.ca
- Calculator tool:
www.waterconservationcalculator.ca