B.C. IRRIGATION MANAGEMENT GUIDE

Chapter 3

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Prepared by

B.C. Ministry of Agriculture, Food and Fisheries
Resource Management Branch

Published by

Irrigation Industry Association of British Columbia

2005 ISSUE

LIMITATION OF LIABILITY AND USER'S RESPONSIBILITY

The primary purpose of this B.C. Irrigation Management Guide is to provide irrigation professionals and consultants with a methodology to assess the irrigation system performance and manage the system effectively.

While every effort has been made to ensure the accuracy and completeness of these materials, additional materials may be required to complete more advanced assessments. Advice of appropriate professionals and experts may assist in completing assessments that are not covered in this Guide.

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3 CLIMATE

Climate plays an important part in determining crop water use. It determines the rate at which the crop uses water and how much water the crop will require over the entire irrigation season. Climate information for over 80 locations in British Columbia is available online at www.farmwest.com.

www.farmwest.com

3.1 Climate Information

Evapotranspiration

Evapotranspiration (ET) is a combination of the evaporation of moisture from the soil and plant surfaces and water transpired through the plant. ET can be measured by using evaporation pans or atmometers, or calculated using climate data from a weather station. The amount of ET depends on temperature, solar radiation, relative humidity and wind speed (Figure 2.1). The hotter and windier it is, the higher the ET rate will be. ET is important to know because it is directly related to crop water use and therefore irrigation water requirement.

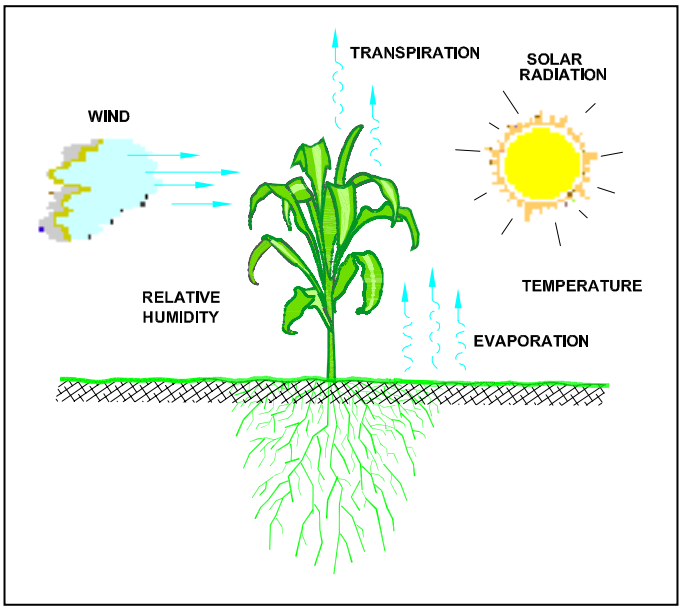

Figure 2.1 Elements of Evapotranspiration

ET may be reported in a number of different ways depending on how it is measured or calculated:

- ET_o is a reference ET for a well-watered grass crop of 10 to 15 cm
- ET_R is ET for an alfalfa reference crop
- ET_p is ET measured from a pan or atmometer

The type of reference crop ET used to report ET is important because this determines the crop coefficient that is used to convert the measured ET into the actual crop water use. This document and Farmwest use ET_o values.

Climate Monitoring, Chapter 7

Effective Precipitation

Effective precipitation (EP) is the amount of precipitation that is actually added and stored in the soil. During drier periods, rainfall of less than 5 mm would not be considered effective because the precipitation would most likely evaporate from the surface before soaking into the ground. For extended periods of cool wet weather, all rainfall over a couple of millimetres may be considered effective. Very large rainfall events may not all be effective as more moisture than the soil's available water storage capacity (AWSC) may be applied to the soil.

Dry Periods

During extended warm dry periods, rainfall of less than 5 mm may not add any moisture to the soil reservoir because it is evaporated before entering the soil. This rainfall is therefore not considered effective. Consequently, on the Farmwest website (www.farmwest.com), if daily rainfall is less than 5 mm, a value of 0 is reported for effective precipitation. In addition, only 75% of the rainfall over 5 mm is considered as effective precipitation. During dry periods, no changes need to be made to the effective precipitation reported on Farmwest. Equation 3.1 shows how to determine EP.

Equation 3.1 Effective Precipitation (EP)

$$EP = (RAIN - 5) \times 0.75$$

where
EP = effective precipitation [mm]
RAIN = measured rainfall [mm]

Wet Periods

During prolonged cool wet periods, more of the rainfall that falls as daily showers may be considered to be effective. This is because the soil and air temperatures are cooler and humidity is higher, allowing the rainfall to soak into the soil before it evaporates. The judgement of whether or not rainfall is effective would be made after a number of days. Soil moisture monitoring could be helpful in determining how much of the rainfall is effective.

Large Amounts of Precipitation

Very large rainfall events may apply more moisture than the soil's holding capacity, or exceed the soil's infiltration capabilities. If rainfall intensity is greater than the soil infiltration rate, precipitation will be lost to runoff and will not be stored in the root zone. The effective amount of rainfall recorded may be much more than what is being stored in the field. A portion of the precipitation may be lost due to deep percolation or runoff.

➔ **Climate Monitoring, Chapter 7**

3.2 Historical Climate Information for Irrigation Planning

Historical regional climate information that can be used for irrigation planning is summarized in this section. This information is used for planning water requirements on the farm, and to set up a basic irrigation schedule that can be adjusted using real-time climate data and soil moisture measurements.

Peak Flow Rate and Annual Crop Water Requirements

Tables 3.1 through 3.4 are used to estimate peak flow rates and annual crop water requirements for sprinkler irrigation systems. The peak flow rate values should also be used for trickle systems; however, annual requirements can be reduced due to a smaller application area and higher system efficiencies Chapter 4 includes methodology to reduce the annual water requirements for crops irrigated with a drip/trickle system.

Table 3.1 lists the historical peak evapotranspiration (ET) rates for locations in B.C. locations using maximum soil water deficit (MSWD) of 1 in (2.5 m) to 5 in (12.5 cm). The irrigation system flow rate requirement can be estimated using peak ET value chosen in Table 3.1 and comparing with the flow rates assigned to the peak ET values in Table 3.2. The values shown are for a risk factor of 10% (the crop will be short of water once every 10 years). Table 3.3 provides a quick reference for peak flow rates for various British Columbia locations.

The estimated annual crop water requirements for various B.C. locations are listed in Table 3.4. The irrigation system application efficiency (Table 6.1 of Chapter 6) must be applied to the values in Table 3.4 to determine annual water use. An efficiency of 72% should be used for licensing purposes.

When planning the annual amount and peak flow of water required for a farm, the values in these tables should be used regardless of the type of irrigation system or crop grown. This way, enough water will be available for the land to be productive regardless of the crop grown and the type of irrigation system used.

The values in these tables are used to estimate a licensed water requirement for irrigation throughout the province, and to ensure sufficient water is available to manage the irrigation system effectively.

Peak flow rate and annual crop water requirements will vary depending on:

- crop type
- soil type
- rooting depth
- irrigation system efficiency
- climate and field elevation that determined peak ET rates (farms at the bottom of valleys have higher peak ET than those in the same area but at a higher elevation)

Table 3.1 Peak Evapotranspiration Rates for Various B.C. Locations

Location	Maximum Soil Water Deficit (Depth of Water)									
	1 in★ in/d	2.5 m★ mm/d	2 in In/d	5 cm mm/d	3 in in/d	7.5 cm mm/d	4 in in/d	10 cm mm/d	5 in in/d	12.5 cm mm/d
Abbotsford	0.18	4.6	0.16	4.1	0.15	3.8	0.14	3.6	0.14	3.6
Agassiz	0.18	4.6	0.16	4.1	0.15	3.8	0.14	3.6	0.14	3.6
Alexis Creek	0.18	4.6	0.16	4.1	0.15	3.8	0.14	3.6	0.14	3.6
Armstrong	0.26	6.6	0.23	5.8	0.21	5.3	0.20	5.1	0.19	4.8
Ashcroft	0.36	9.1	0.32	8.1	0.30	7.6	0.29	7.4	0.28	7.1
Aspen Grove	0.27	6.9	0.23	5.8	0.21	5.3	0.20	5.1	0.20	5.1
Barriere	0.24	6.1	0.21	5.3	0.20	5.1	0.19	4.8	0.18	4.6
Baynes Lake	0.28	7.1	0.26	6.6	0.25	6.4	0.24	6.1	0.23	5.8
Campbell River	0.28	7.1	0.22	5.6	0.20	5.1	0.18	4.6	0.17	4.3
Canal Flats	0.30	7.6	0.28	7.1	0.26	6.6	0.25	6.4	0.25	6.4
Castlegar	0.36	9.1	0.33	8.4	0.31	7.9	0.30	7.6	0.29	7.4
Cawston	0.38	9.7	0.34	8.6	0.32	8.1	0.31	7.9	0.30	7.6
Chase	0.24	6.1	0.22	5.6	0.21	5.3	0.20	5.1	0.20	5.1
Cherryville	0.23	5.8	0.22	5.6	0.21	5.3	0.20	5.1	0.20	5.1
Chilliwack	0.21	5.3	0.19	4.8	0.17	4.3	0.16	4.1	0.16	4.1
Clinton	0.26	6.6	0.24	6.1	0.23	5.8	0.22	5.6	0.22	5.6
Cloverdale	0.18	4.6	0.16	4.1	0.14	3.6	0.13	3.3	0.13	3.3
Comox	0.28	7.1	0.22	5.6	0.20	5.1	0.18	4.6	0.16	4.1
Creston	0.20	5.1	0.19	4.8	0.18	4.6	0.18	4.6	0.17	4.3
Dawson Creek	0.21	5.3	0.19	4.8	0.19	4.8	0.18	4.6	0.18	4.6
Douglas Lake	0.23	5.8	0.21	5.3	0.21	5.3	0.20	5.1	0.20	5.1
Duncan	0.20	5.1	0.17	4.3	0.16	4.1	0.15	3.8	0.15	3.8
Ellison	0.27	6.9	0.24	6.1	0.23	5.8	0.21	5.3	0.21	5.3
Fort Fraser	0.22	5.6	0.20	5.1	0.19	4.8	0.18	4.6	0.18	4.6
Fort Steele	0.26	6.6	0.23	5.8	0.22	5.6	0.21	5.3	0.20	5.1
Fort St. John	0.21	5.3	0.19	4.8	0.19	4.8	0.18	4.6	0.18	4.6
Golden	0.17	4.3	0.15	3.8	0.15	3.8	0.14	3.6	0.14	3.6
Grand Forks	0.21	5.3	0.19	4.8	0.19	4.8	0.18	4.6	0.18	4.6
Grandview Flats	0.29	7.4	0.27	6.9	0.25	6.4	0.24	6.1	0.24	6.1
Grasmere	0.26	6.6	0.23	5.8	0.22	5.6	0.21	5.3	0.20	5.1
Grindrod	0.19	4.8	0.16	4.1	0.14	3.6	0.14	3.6	0.13	3.3
Hazelton	0.22	5.6	0.19	4.8	0.19	4.8	0.19	4.8	0.19	4.8
Hixon	0.18	4.6	0.16	4.1	0.16	4.1	0.15	3.8	0.15	3.8
Hope	0.28	7.1	0.25	6.4	0.22	5.6	0.21	5.3	0.20	5.1
Invermere	0.27	6.9	0.25	6.4	0.23	5.8	0.22	5.6	0.21	5.3
Kamloops	0.33	8.4	0.30	7.6	0.28	7.1	0.27	6.9	0.26	6.6
Kelowna	0.28	7.1	0.25	6.4	0.24	6.1	0.23	5.8	0.22	5.6
Keremeos	0.31	7.9	0.30	7.6	0.29	7.4	0.28	7.1	0.28	7.1
Kersley	0.24	6.1	0.23	5.8	0.22	5.6	0.22	5.6	0.22	5.6
Kettle Valley	0.29	7.4	0.28	7.1	0.27	6.9	0.26	6.6	0.26	6.6
Kimberley	0.34	8.6	0.32	8.1	0.30	7.6	0.28	7.1	0.27	6.9
Ladner	0.16	4.1	0.14	3.6	0.13	3.3	0.13	3.3	0.12	3.0
Langley	0.17	4.3	0.14	3.6	0.14	3.6	0.13	3.3	0.12	3.0
Lillooet	0.33	8.4	0.30	7.6	0.28	7.1	0.27	6.9	0.26	6.6

Table 3.1 Peak Evapotranspiration Rates for Various B.C. Locations

Location	Maximum Soil Water Deficit (Depth of Water)									
	1 in★ in/d	2.5 m★ mm/d	2 in In/d	5 cm mm/d	3 in in/d	7.5 cm mm/d	4 in in/d	10 cm mm/d	5 in in/d	12.5 cm mm/d
Lister	0.23	5.8	0.21	5.3	0.21	5.3	0.20	5.1	0.20	5.1
Lumby	0.27	6.9	0.24	6.1	0.23	5.8	0.22	5.6	0.21	5.3
Lytton	0.36	9.1	0.32	8.1	0.30	7.6	0.28	7.1	0.28	7.1
Malakwa	0.23	5.8	0.20	5.1	0.19	4.8	0.19	4.8	0.18	4.6
Merritt	0.30	7.6	0.28	7.1	0.26	6.6	0.25	6.4	0.25	6.4
Nanaimo	0.26	6.6	0.21	5.3	0.19	4.8	0.17	4.3	0.16	4.1
Natal	0.21	5.3	0.19	4.8	0.18	4.6	0.17	4.3	0.17	4.3
Notch Hill	0.24	6.1	0.21	5.3	0.20	5.1	0.19	4.8	0.18	4.6
Oliver	0.29	7.4	0.26	6.6	0.24	6.1	0.23	5.8	0.23	5.8
100 Mile House	0.26	6.6	0.24	6.1	0.23	5.8	0.22	5.6	0.22	5.6
Osoyoos	0.33	8.4	0.30	7.6	0.28	7.1	0.27	6.9	0.26	6.6
Oyster River	0.14	3.6	0.13	3.3	0.12	3.0	0.11	2.8	0.11	2.8
Parksville	0.21	5.3	0.17	4.3	0.16	4.1	0.15	3.8	0.14	3.6
Pitt Meadows	0.16	4.1	0.14	3.6	0.13	3.3	0.12	3.0	0.12	3.0
Port Alberni	0.28	7.1	0.23	5.8	0.20	5.1	0.19	4.8	0.18	4.6
Prince George	0.18	4.6	0.16	4.1	0.15	3.8	0.15	3.8	0.14	3.6
Princeton	0.28	7.1	0.26	6.6	0.25	6.4	0.23	5.8	0.23	5.8
Quesnel	0.29	7.4	0.27	6.9	0.26	6.6	0.25	6.4	0.25	6.4
Radium	0.23	5.8	0.21	5.3	0.20	5.1	0.19	4.8	0.19	4.8
Riske Creek	0.31	7.9	0.29	7.4	0.28	7.1	0.27	6.9	0.27	6.9
Saanichton	0.19	4.8	0.17	4.3	0.16	4.1	0.15	3.8	0.15	3.8
Salmon Arm	0.19	4.8	0.17	4.3	0.17	4.3	0.16	4.1	0.16	4.1
Smithers	0.18	4.6	0.16	4.1	0.15	3.8	0.14	3.6	0.14	3.6
Spillimacheen	0.23	5.8	0.20	5.1	0.19	4.8	0.18	4.6	0.18	4.6
Sumas	0.20	5.1	0.18	4.6	0.17	4.3	0.16	4.1	0.15	3.8
Summerland	0.30	7.6	0.28	7.1	0.26	6.6	0.24	6.1	0.24	6.1
Terrace	0.32	8.1	0.31	7.9	0.30	7.6	0.29	7.4	0.28	7.1
Vancouver	0.24	6.1	0.20	5.1	0.18	4.6	0.17	4.3	0.16	4.1
Vanderhoof	0.21	5.3	0.20	5.1	0.20	5.1	0.19	4.8	0.19	4.8
Vernon	0.26	6.6	0.23	5.8	0.22	5.6	0.21	5.3	0.21	5.3
Walhachin	0.31	7.9	0.30	7.6	0.29	7.4	0.28	7.1	0.27	6.9
Westwold	0.30	7.6	0.28	7.1	0.27	6.9	0.26	6.6	0.25	6.4
Williams Lake	0.30	7.6	0.29	7.4	0.28	7.1	0.27	6.9	0.26	6.6

★ Values in the 1-inch (2.5-cm) column should not be used except for special circumstances. They are shown here for comparison only.

Peak Flow Rate

Figure 3.2 gives a general overview of flow rates in B.C. The flow rates provided in tables and figures in this section are for general guidance only. Use one of the following methods to obtain peak flow rate:

1. If an irrigation water licence indicates a peak flow rate, use the flow rate stated on the licence.
2. If water is supplied by a water purveyor, use the flow rate established by the purveyor.
3. If a farm is near one of the locations listed in Table 3.1, the following options can be used:

   Option 1 (recommended)

   - Follow Examples 5.3(a) and (b) to obtain maximum soil water deficits (MSWD – the amount of water stored in the soil that is readily available to the plant).
   - Use the closest MSWD value available in Table 3.1 to determine peak ET rates.
   - Locate the corresponding flow rate in Table 3.2. If the flow rate is between two values in Table 3.2, choose the lower one. These flow rate estimates are based on a 10% risk factor, meaning the farm may be short of water once in ten years.

   Option 2

   Table 3.3 gives quick estimates of peak irrigation flow rates based on ET rates, average deep-rooted crop in a medium-textured soil with a 3-inch (average) MSWD.

   Option 1 is recommended since MSWD is taken into account instead of using an average value; therefore, a more accurate peak flow rate may be obtained.

➔ **Maximum Soil Water Deficit, Chapter 5**

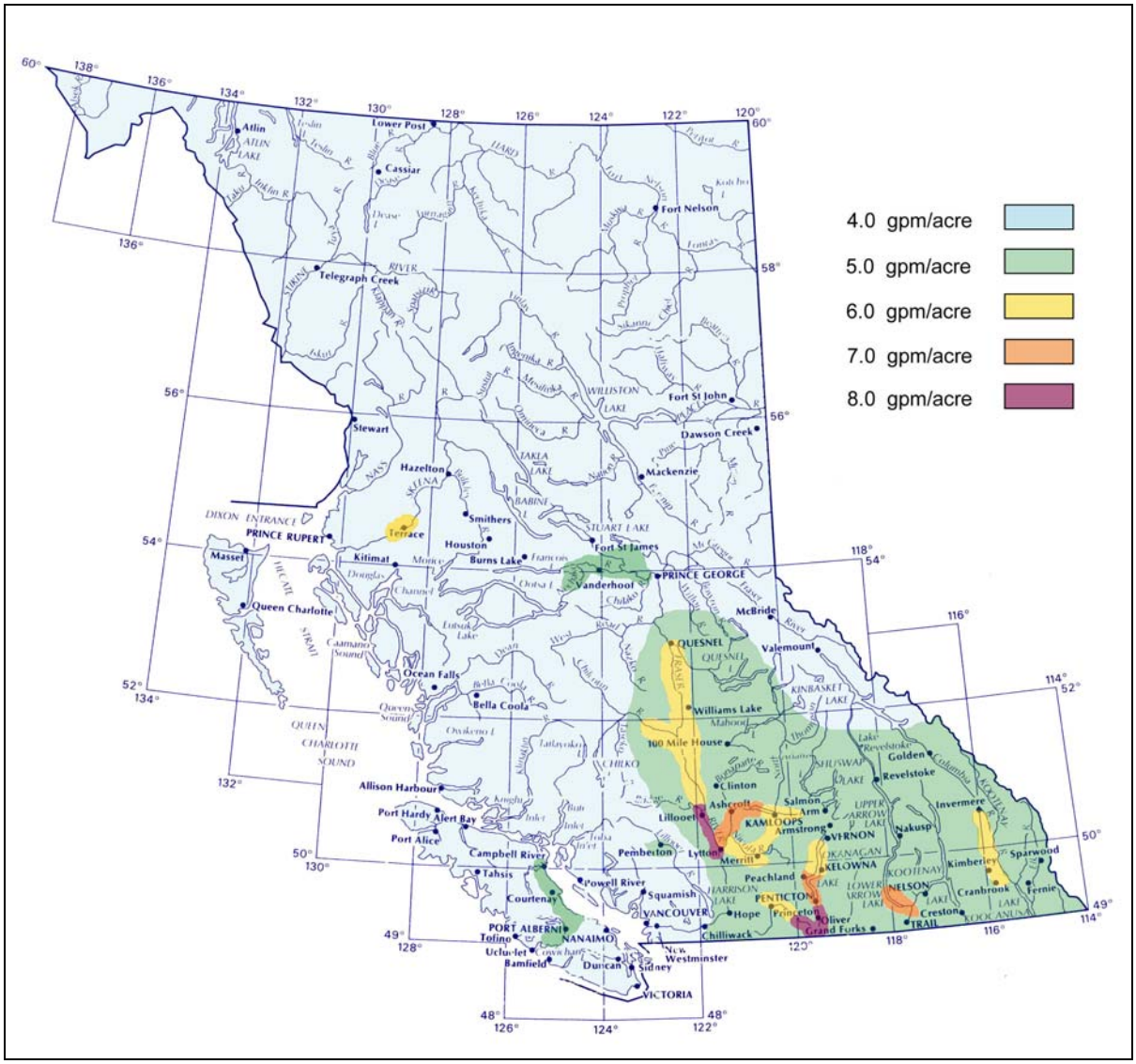

Figure 3.2 Estimated Peak Irrigation Flow Rate Requirements in B.C. [US gpm/acre]

Table 3.2 Estimated Peak Irrigation System Flow Rate Requirements Based on Peak ET Rates (with 10% risk factor)			
ET		Irrigation System Flow Rates	
[in/d]	[mm/d]	[US gpm/acre]	[m^3/hr/ha]
0.16	4.1	4.0	2.24
0.18	4.6	4.5	2.52
0.20	5.1	5.0	2.80
0.22	5.6	5.5	3.10
0.23	5.8	6.0	3.36
0.25	6.4	6.5	3.64
0.27	6.9	7.0	3.92
0.29	7.4	7.5	4.20
0.31	7.9	8.0	4.48

Table 3.3 Estimated Peak Irrigation Flow Rate Requirements for B.C. Locations[1,2]					
Location	Flow Rate [US gpm/acre][3]	Location	Flow Rate [US gpm/acre][3]	Location	Flow Rate [US gpm/acre][3]
Abbotsford	4.0	**Golden**	4.0	**Oliver**	6.5
Agassiz	4.0	**Grand Forks**	5.0	**100 Mile House**	5.5
Alexis Creek	4.0	**Grandview Flats**	5.5	**Osoyoos**	7.5
Armstrong	5.0	**Grasmere**	5.5	**Oyster River**	4.0
Ashcroft	8.0	**Grindrod**	4.0	**Parksville**	4.0
Aspen Grove	5.0	**Hazelton**	5.0	**Pitt Meadows**	4.0
Barriere	5.0	**Hixon**	4.0	**Port Alberni**	5.0
Baynes Lake	6.5	**Hope**	5.0	**Prince George**	4.0
Campbell River	5.0	**Invermere**	6.0	**Princeton**	6.0
Canal Flats	6.0	**Kamloops**	6.5	**Quesnel**	6.0
Castlegar	8.0	**Kelowna**	6.0	**Radium**	5.0
Cawston	8.0	**Keremeos**	7.5	**Riske Creek**	7.0
Chase	5.0	**Kersley**	5.5	**Saanichton**	4.0
Cherryville	5.0	**Kettle Valley**	7.0	**Salmon Arm**	4.5
Chilliwack	4.5	**Kimberley**	7.0	**Smithers**	4.0
Clinton	6.0	**Ladner**	4.0	**Spillimacheen**	5.0
Cloverdale	4.0	**Langley**	4.0	**Sumas**	4.5
Comox	5.0	**Lillooet**	7.5	**Summerland**	6.5
Creston	4.5	**Lister**	5.0	**Terrace**	5.5
Dawson Creek	4.0	**Lumby**	5.5	**Vancouver**	4.5
Douglas Lake	5.0	**Lytton**	8.0	**Vanderhoof**	5.0
Duncan	4.0	**Malakwa**	5.0	**Vernon**	5.0
Ellison	6.0	**Merritt**	6.5	**Walhachin**	6.5
Fort Fraser	5.0	**Nanaimo**	5.0	**Westwold**	6.5
Fort Steele	5.5	**Natal**	4.5	**Williams Lake**	6.0
Fort St. John	4.0	**Notch Hill**	5.0		

1 Based on peak evapotranspiration rates on an average deep-rooted crop in a medium-textured soil (values in Table 2.1), as well as overall topographic knowledge of each location.
2 Based on 10% risk factor, i.e., water shortage once in 10 years.
3 Multiply values in US gpm/acre by 0.156 to convert to L/s/ha.

Annual Crop Water Requirement

Figure 3.3 gives a general overview of annual crop water requirements in B.C. If a farm is near one of the locations listed in Table 3.4, use the annual crop water requirement from this table in the worksheet calculations. Again, for more accurate estimates, calculate the MSWD using Equation 5.2 as shown in Examples 5.3(a) and (b). Then, use the closet MSWD value available in Table 3.4 to obtain the annual crop water requirement.

High summer temperatures mean a high peak flow rate. An area with a high peak flow rate does not necessarily give a high annual irrigation requirement. However, the annual crop water requirement is lower for a short irrigation season than a longer one. For example, Terrace and Kelowna have the same peak flow rate, but Kelowna has a much longer growing season; thus, a larger annual crop water requirement.

➔ **Maximum Soil Water Deficit, Chapter 5**

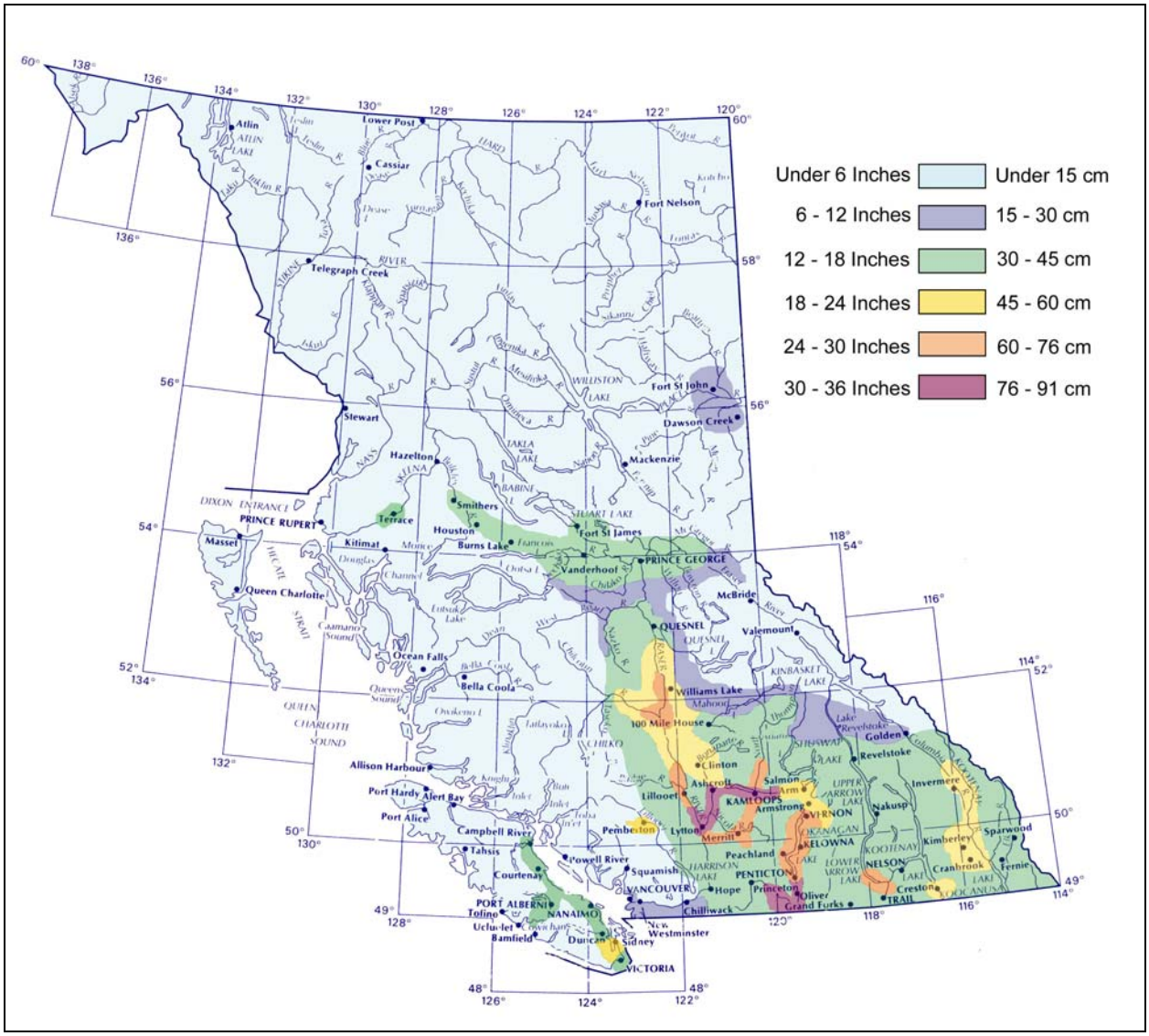

Figure 3.3 Estimated Annual Crop Water Requirements in B.C. [inches or cm]

Table 3.4 Estimated Annual Crop Water Requirements for Various B.C. Locations

Location	Maximum Soil Water Deficit (Depth of Water)									
	1 in★	2.5 m★	2 in	5 cm	3 in	7.5 cm	4 in	10 cm	5 in	12.5 cm
	in	mm	in	mm	in	mm	in	mm	in	mm
Abbotsford	18	457	12	311	9	220	6	146	4	91
Agassiz	13	329	6	165	4	109	3	73	1	37
Alexis Creek	19	475	14	348	11	274	9	220	6	165
Armstrong	21	531	16	402	12	311	10	256	8	201
Ashcroft	38	969	30	768	25	640	22	567	19	494
Aspen Grove	22	567	17	420	13	329	11	274	9	220
Barriere	22	549	16	402	13	329	10	256	9	220
Baynes Lake	27	695	20	512	17	420	14	348	12	292
Campbell River	18	457	12	311	10	256	8	201	6	165
Canal Flats	24	603	18	457	14	366	12	311	10	256
Castlegar	33	841	25	640	21	531	18	457	15	384
Cawston	38	969	30	768	25	640	22	567	19	494
Chase	26	658	19	494	15	384	13	329	10	256
Cherryville	24	622	17	439	14	348	12	292	10	256
Chilliwack	14	348	6	165	5	128	4	91	2	55
Clinton	27	677	20	512	17	439	14	366	12	311
Cloverdale	15	384	10	256	7	183	5	128	3	73
Comox	19	494	14	366	12	292	9	238	8	201
Creston	24	603	19	475	16	402	13	329	12	292
Dawson Creek	15	384	10	256	7	183	5	128	3	73
Douglas Lake	24	622	19	475	16	402	14	348	12	292
Duncan	15	384	11	274	9	220	7	183	6	146
Ellison	27	677	20	512	17	420	14	366	12	311
Fort Fraser	15	384	11	274	8	201	6	146	4	91
Fort Steele	19	475	13	329	10	256	8	201	6	146
Fort St. John	15	384	10	256	7	183	5	128	3	73
Golden	19	494	14	348	11	274	9	238	8	201
Grand Forks	19	475	14	348	11	274	9	220	7	183
Grandview Flats	29	732	22	549	18	457	16	402	14	348
Grasmere	22	567	17	420	13	329	11	274	9	220
Grindrod	14	366	10	256	7	183	5	128	3	73
Hazelton	7	183	4	109	2	55	1	18	0	0
Hixon	15	384	9	238	6	165	4	91	2	55
Hope	20	512	12	311	9	238	7	183	5	128
Invermere	28	714	21	531	17	439	14	348	12	292
Kamloops	32	823	26	658	23	585	20	512	19	475
Kelowna	30	750	22	567	19	475	17	420	14	366
Keremeos	32	823	26	658	23	585	20	512	19	475
Kersley	17	420	12	311	9	238	7	183	6	146
Kettle Valley	30	750	22	567	18	457	15	384	13	329
Kimberley	29	732	22	549	17	439	14	366	12	311
Ladner	15	384	11	274	8	201	6	165	4	109
Langley	14	366	9	220	6	165	5	128	4	91

Table 3.4 Estimated Annual Crop Water Requirements for Various B.C. Locations

Location	Maximum Soil Water Deficit (Depth of Water)									
	1 in★	2.5 m★	2 in	5 cm	3 in	7.5 cm	4 in	10 cm	5 in	12.5 cm
	in	mm	in	mm	in	mm	in	mm	in	mm
Lillooet	30	750	23	585	19	494	17	420	14	366
Lister	24	622	19	475	16	402	13	329	11	274
Lumby	24	622	19	475	15	384	13	329	11	274
Lytton	37	932	29	732	25	640	22	567	19	494
Malakwa	16	402	12	292	9	220	6	165	5	128
Merritt	32	805	24	622	21	531	18	457	15	384
Nanaimo	18	457	13	329	10	256	8	201	6	146
Natal	19	494	14	348	10	256	8	201	6	146
Notch Hill	23	585	17	439	14	366	12	292	10	256
Oliver	35	896	27	695	24	622	22	549	19	494
100 Mile House	27	677	20	512	17	439	14	366	12	311
Osoyoos	36	914	29	732	25	640	22	567	20	512
Oyster River	13	329	9	220	6	165	4	109	3	73
Parksville	18	457	13	329	10	256	9	220	7	183
Pitt Meadows	13	329	9	220	6	146	3	73	1	37
Port Alberni	19	494	14	366	12	292	9	238	7	183
Prince George	17	439	13	329	10	256	8	201	6	165
Princeton	30	750	21	531	18	457	16	402	14	366
Quesnel	16	402	12	292	9	238	7	183	6	146
Radium	21	531	15	384	12	311	9	238	7	183
Riske Creek	25	640	19	475	16	402	13	329	11	274
Saanichton	18	457	12	311	10	256	9	220	7	183
Salmon Arm	21	531	16	402	13	329	11	274	9	220
Smithers	16	402	12	292	9	220	6	165	5	128
Spillimacheen	24	603	17	439	14	348	11	274	9	220
Sumas	16	402	10	256	6	165	4	109	3	73
Summerland	30	768	23	585	19	494	17	439	15	384
Terrace	16	402	12	292	9	220	7	183	6	146
Vancouver	18	457	14	348	11	274	9	220	7	183
Vanderhoof	17	420	12	292	8	201	6	146	4	91
Vernon	24	622	19	475	16	402	14	348	12	292
Walhachin	31	786	24	603	20	512	17	439	14	366
Westwold	31	786	24	603	20	512	18	457	16	402
Williams Lake	22	567	17	420	13	329	11	274	9	220

★ Values in the 1-inch (2.5-cm) column should not be used except for special circumstances. They are shown here for comparison only.