

The suitability for livestock deteriorates as TDS exceeds the 2,000 to 3,000 ppm range.

Conductivity

Conductivity is measured in micro siemens per centimetre. It can be used to estimate the total dissolved solids in the water. Multiplying the conductivity by 0.65 will give a good approximation of the total dissolved solids. Conductivity tests are often used to assess water suitability for irrigation.

pH

pH is a measure of how acidic or basic the water is. The pH scale goes from zero (acidic) to 14 (basic) with seven being neutral. The generally accepted range for pH is 6.5 to 8.5 with an upper limit of 9.5.

Hardness

The harder the water is the greater its ability to neutralize soap suds. Hardness is caused primarily by calcium and magnesium, but is expressed as ppm equivalent of calcium carbonate. Hard water causes soap curd which makes bathroom fixtures difficult to keep clean and causes greying of laundry.

Hard water will also tend to form scale in hot water tanks, kettles, piping systems, etc.

Type of Water	Amount of Hardness	ppm	grains per gallon
Soft	0- 50	0-3	
Moderately Soft	50 - 100	3-6	
Moderately Hard	100 - 200	6-12	
Hard	200 - 400	12- 23	
Very Hard	400 - 600	23 - 35	
Extremely Hard	Over 600	Over 35	

Alkalinity

Alkalinity is not a specific substance but rather a combined effect of several substances. It is a measure of the resistance of a water to a change in pH. The alkalinity of most Alberta waters is in the range of 100 - 500 ppm, which is considered acceptable. Water with higher levels is often used. Alkalinity is a factor in corrosion or scale deposition and may affect some livestock when over 1,000 ppm.

Water Treatment

Water treatment equipment can often improve water quality significantly. Each type of water treatment equipment has its limitations and thus should be selected carefully. For more information on water treatment please refer to the Agdex 71 6 D series of fact sheets.

Helpful Conversions

1 ppm (part per million) = 1 mg/L (milligram per litre) 1 gpg (grain per gallon) = 17.1 ppm (parts per million)

References

Guidelines for Canadian Drinking Water Quality (1987) Health and Welfare Canada

*Federal-Provincial Subcommittee on Drinking Water of the Federal-Provincial-Territorial Committee on Environment and Occupational Health. March 2001. Summary of Guidelines for Canadian Drinking Water Quality.

Additional Information

VIDEOS

Will the Well Go Dry Tomorrow? (Mow-Tech Ltd.: 1-800 GEO WELL)
Water Wells that Last (PFRA – Edmonton Office: 780-495-3307)
Ground Water and the Rural Community (Ontario Ground Water Association)

BOOKLET

Water Wells that Last (PFRA – Edmonton Office: 780-495-3307)

ALBERTA ENVIRONMENT

WATER WELL INSPECTORS

Jennifer McPherson (Edmonton: 780-427-6429)

WATER WELL LICENSING

Rob George (Edmonton: 780-427-6429)

GEOPHYSICAL INSPECTION SERVICE

Edmonton: 780-427-3932

COMPLAINT INVESTIGATIONS

Jerry Riddell (Edmonton: 780-422-4851)

UNIVERSITY OF ALBERTA – Department of Earth and Atmospheric Sciences - Hydrogeology

Carl Mendoza (Edmonton: 780-492-2664)

UNIVERSITY OF CALGARY – Department of Geology and Geophysics - Hydrogeology

Larry Bentley (Calgary: 403-220-4512)

FARMERS ADVOCATE

Dean Lien (Edmonton: 780-427-2433)

PRAIRIE FARM REHABILITATION ADMINISTRATION (PFRA) ARM OF AGRICULTURE AND AGRI-FOOD CANADA (AAFC)

Keith Schick (Vegreville: 780-632-2919)

Tony Cowen (Edmonton: 780-495-4911)

WILDROSE COUNTRY GROUND WATER MONITORING ASSOCIATION

Dave Andrews (Irricana: 403-935-4478)

LOCAL HEALTH DEPARTMENTS

M.D. OF BONNYVILLE

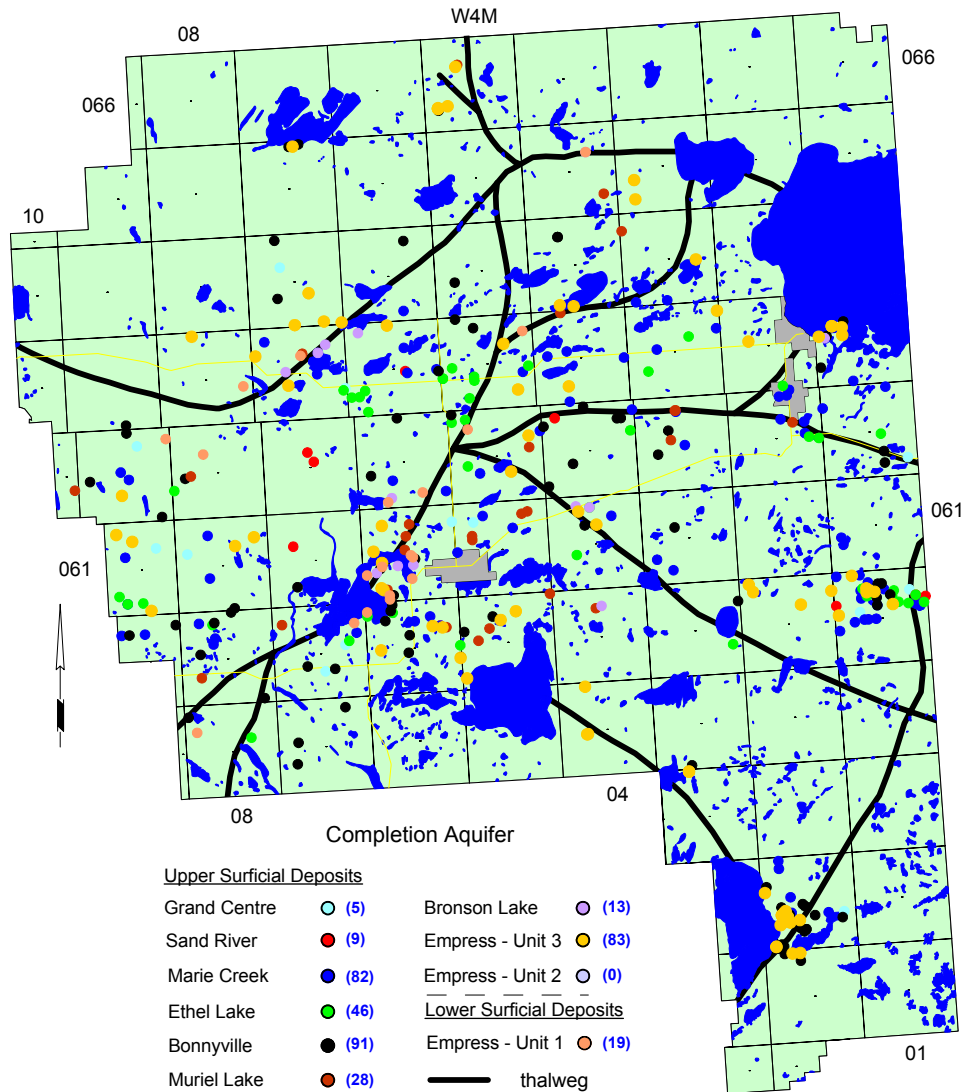
Appendix E

Water Wells Recommended for Field Verification

and

M. D.-Operated Water Wells

Water Wells Recommended for Field Verification
 (details on following pages)



WATER WELLS RECOMMENDED FOR FIELD VERIFICATION

Owner	Location	Aquifer Name	Date Water Well Drilled	Completed Metres	Depth Feet	NPWL		UID
						Metres	Feet	
Alberta Energy & Natural Resource:	11-34-065-07 W4M	Empress - Unit 3	19-Sep-76	50.59	166.0	1.16	3.8	M35377.147615
Alberta Environment	04-17-065-03 W4M	Marie Creek	20-Sep-85	9.45	31.0	6	19.7	M35377.149203
Alberta Environment	04-35-064-06 W4M	Bonnyville	30-Jul-85	77.11	253.0	10.7	35.1	M35377.149040
Alberta Environment	16-10-062-05 W4M	Bonnyville	28-Aug-91	45.11	148.0	21.46	70.4	M35377.092553
Alberta Environment	SW 28-066-05 W4M	Muriel Lake	25-Mar-82	126.18	414.0	7.62	25.0	M35377.128720
Alberta Environment	SW 27-063-07 W4M	Muriel Lake	01-Apr-82	57.30	188.0	8.15	26.7	M35377.148708
Alberta Environment	04-17-065-03 W4M	Muriel Lake	19-Sep-85	95.40	313.0	14.11	46.3	M35377.149202
Alberta Environment	04-26-065-04 W4M	Bronson Lake	02-Feb-80	95.09	312.0	23.22	76.2	M35377.149081
Alberta Environment	04-17-065-03 W4M	Empress - Unit 3	08-Sep-85	118.26	388.0	32	105.0	M35377.149200
Alberta Environment	04-28-066-05 W4M	Empress - Unit 3	15-Jul-85	149.34	490.0	13.62	44.7	M35377.150271
Alberta Environment	16-10-062-05 W4M	Empress - Unit 3	28-Aug-91	76.20	250.0	25.33	83.1	M35377.092551
Alberta Environment	04-26-065-04 W4M	Empress - Unit 1	03-Mar-78	165.80	544.0	28.35	93.0	M35377.149080
Alberta Environment	04-27-063-07 W4M	Empress - Unit 1	08-Apr-82	97.84	321.0	9.82	32.2	M35377.151710
Alberta Environment	14-25-063-05 W4M	Empress - Unit 1	16-Jul-82	135.32	444.0	18.32	60.1	M35377.087724
Alberta Environment & Katshan, A.	16-32-058-03 W4M	Marie Creek	12-Aug-86	39.01	128.0	3.29	10.8	M35377.138927
Alberta Environment & Katshan, A.	16-32-058-03 W4M	Empress - Unit 3	28-Jul-86	194.15	637.0	10.24	33.6	M35377.138924
Alberta Environment & Katshan, A.	16-32-058-03 W4M	Empress - Unit 3	22-Aug-86	131.06	430.0	10.15	33.3	M35377.138929
Alberta Forest Service	NE 34-065-07 W4M	Bonnyville	08-Sep-77	6.10	20.0	2.65	8.7	M35377.149161
Alberta Forest Service	11-34-065-07 W4M	Bonnyville	30-Sep-68	24.99	82.0	3.43	11.3	M35377.149158
Alberta Forest Service	12-34-065-07 W4M	Bonnyville	09-Sep-77	48.77	160.0	3.05	10.0	M35377.149157
Alberta Housing & Public Works	13-20-061-05 W4M	Muriel Lake	05-Nov-81	38.40	126.0	10.97	36.0	M35377.136656
Alberta Recreation & Parks	01-29-063-01 W4M	Bonnyville	08-Aug-80	38.40	126.0	6.16	20.2	M35377.146700
Albrico Services Ltd.	01-17-062-04 W4M	Bonnyville	09-Apr-85	41.45	136.0	13.72	45.0	M35377.146587
Allen, Doug	SW 04-063-01 W4M	Marie Creek	29-Mar-86	17.37	57.0	4.88	16.0	M35377.147662
Amerada Petroleum Corporation	02-33-062-03 W4M	Muriel Lake	11-Jul-66	65.23	214.0	12.89	42.3	M35377.146400
Anderson, Lyle	NW 05-061-06 W4M	Empress - Unit 3	09-Apr-83	38.71	127.0	18.29	60.0	M35377.145289
Antoniuk, Bill	08-05-062-06 W4M	Empress - Unit 1	02-Sep-81	33.53	110.0	13.72	45.0	M35377.147162
Aulotte, Lawrence	NW 19-057-02 W4M	Empress - Unit 3	01-Jul-73	45.11	148.0	34.84	114.3	M35377.139176
Axell, Albert	16-22-063-03 W4M	Ethel Lake	06-Jun-84	17.68	58.0	3.05	10.0	M35377.148160
Bacque, Roland	NE 21-061-09 W4M	Marie Creek	02-Oct-79	46.94	154.0	8.32	27.3	M35377.123680
Bauer, Brian	14-29-061-06 W4M	Empress - Unit 3	10-Dec-84	45.72	150.0	13.11	43.0	M35377.146432
Beaucage, Norman	NW 09-062-06 W4M	Marie Creek	12-Jun-85	27.43	90.0	18.29	60.0	M35377.147184
Beaver River Holdings	05-32-062-05 W4M	Ethel Lake	07-Jun-80	26.21	86.0	15.54	51.0	M35377.147014
Beaver River Holdings	NW 29-062-05 W4M	Empress - Unit 1	05-Jun-80	89.00	292.0	31.39	103.0	M35377.147000
Belanger, Ron	NE 32-059-04 W4M	Empress - Unit 3	10-Oct-81	78.63	258.0	23.16	76.0	M35377.141063
Bell, William G.	SE 06-064-03 W4M	Marie Creek	08-Aug-81	24.99	82.0	7.31	24.0	M35377.149643
Bercier, Earnest R.	SE 35-061-05 W4M	Muriel Lake	03-Jun-82	50.29	165.0	20.73	68.0	M35377.136548
Boisvert, Raymond	NW 25-060-07 W4M	Empress - Unit 1	27-Mar-84	51.20	168.0	0.46	1.5	M35377.145067
Boyd, Rob	08-05-061-06 W4M	Bonnyville	07-Jun-86	39.01	128.0	12.19	40.0	M35377.145215
BP Exploration Canada Ltd.	08-07-066-05 W4M	Bonnyville	20-Oct-83	41.15	135.0	19.81	65.0	M35377.150082
BP Exploration Canada Ltd.	09-07-066-05 W4M	Empress - Unit 3	27-Oct-76	117.95	387.0	8.96	29.4	M35377.150086
BP Exploration Canada Ltd.	09-07-066-05 W4M	Empress - Unit 3	30-Sep-76	118.26	388.0	8.78	28.8	M35377.150091
BP Exploration Canada Ltd.	09-07-066-05 W4M	Empress - Unit 3	29-Sep-76	117.95	387.0	9.08	29.8	M35377.150141
BP Exploration Canada Ltd.	11-08-066-05 W4M	Empress - Unit 3	29-Mar-78	115.51	379.0	1.52	5.0	M35377.150153
Braunstein, Steve	08-36-063-03 W4M	Empress - Unit 3	12-Mar-77	39.62	130.0	7.31	24.0	M35377.146762
Breitenstein, Henry	16-23-062-02 W4M	Marie Creek	30-Jun-80	18.29	60.0	9.75	32.0	M35377.146181
Brosseau, Raymond	SE 02-064-07 W4M	Empress - Unit 3	18-Dec-74	70.71	232.0	17.68	58.0	M35377.148877
Brousseau, Yves	SW 09-061-09 W4M	Ethel Lake	04-Jul-81	60.96	200.0	26.46	86.8	M35377.123405
Bruneau, John	SE 17-057-02 W4M	Bonnyville	04-Sep-74	33.53	110.0	24.69	81.0	M35377.139092
Burak, John	NE 04-061-09 W4M	Marie Creek	10-Aug-74	34.44	113.0	7.41	24.3	M35377.123371
Burak, John	NE 04-061-09 W4M	Ethel Lake	21-Oct-82	37.79	124.0	7.31	24.0	M35377.123373
Burak, Peter	NW 28-060-09 W4M	Marie Creek	27-Nov-78	35.66	117.0	21.33	70.0	M35377.123027
Burshinski, Donald	SW 31-059-08 W4M	Bonnyville	04-Jul-80	50.29	165.0	36.57	120.0	M35377.141461