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Inland Waters Directorate
Western and Northern Region

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Région de l'ouest et du nord

Canada

AVAILABILITY OF SMALL WATERSHED HYDROMETRIC DATA IN ALBERTA

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ABSTRACT

Hydrometric stations on small unregulated basins (drainage area less than or equal to 100 km²) in Alberta are presented in terms of their location, drainage areas, and record lengths. This information may be useful to those involved in small scale water projects, hydrologic modelling or other hydrologic studies. There are 42 active and 89 discontinued stations with drainage areas less than or equal to 100 km². These stations are sparsely distributed throughout the province and often have short record lengths.

INTRODUCTION

Many projects including irrigation, drainage, flood control, water supply and environmental projects are undertaken in small basins. For the purpose of this study small basins are those that have drainage areas less than or equal to 100 km². Representative data is often very difficult to find. Changes in land use and land cover (both natural and man- induced) can significantly change the streamflow characteristics and runoff regime of channels. A good record of flows is important since the dynamic nature of a watershed is especially apparent at a small scale. Data for small watersheds is needed for many different hydrologic analysis techniques. The Hydrology Division recently reviewed the stations in the Alberta network considered to be monitoring small watersheds. The network and findings are summarized in this paper.

DISCUSSION

The Water Resources Branch of Environment Canada operated a network of 455 active discharge and water level stations in Alberta during 1990. Data was collected for an additional 84 active stations by Alberta Environment, TransAlta Utilities and The City of Calgary. The network in Alberta consists of 42 active and 89 discontinued stations measuring unregulated streamflow from small basins. There are another 15 stations measuring regulated flow, but this analysis was conducted using the natural flow stations only.

The stations comprising the network of small basins are sparsely distributed throughout the province. Most of these stations are in the southern part of the province and were often established near populated areas or in close proximity to each other for special projects. Examples of such special projects are: Shell Canada Waterton Gas Plant; Marmot Creek Basin for studying the effects of vegetation clearing on runoff; Tri Creek Research Basin for forestry, logging and fishery purposes; Spring Creek Research Basin for studying the effects of homesteading on the hydrology of the area; and an urban hydrology study to determine the effects of urbanization on the hydrology due to the expansion of the city of Edmonton.

A list of the stations is provided in Table 1, along with some useful information on drainage area, years of record, and the actual period of record.

Figure 1 shows the distribution of the network by drainage area. The number of active stations in each size interval is between 5 and 12, therefore, it is a relatively uniform distribution. There are, however, 42 discontinued stations representing basins smaller than 20 km² and 22 discontinued stations representing basins with areas between 21 km² and 40 km². There is a significant amount of data from the discontinued stations which should not be overlooked, especially for those drainage basins smaller than 20 km². There are 51 stations with drainage areas smaller than 20 km², but only 9 of these stations are still active.

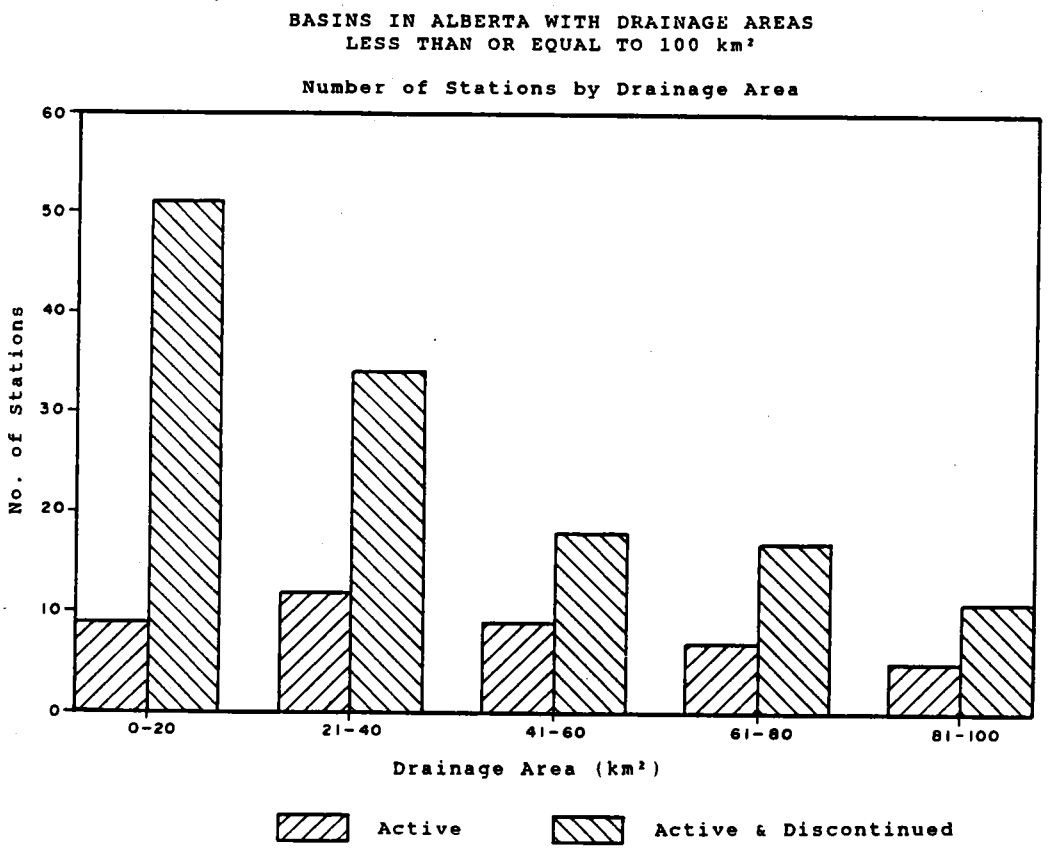

Figure 1

Figures 2 and 3 describe the small basin network in terms of record length. Only 7 stations have more than 25 years of record (the longest period of record is 55 years), and only 54 of the 131 stations have more than 10 years of data. Of these, only 21 are active, with potential for long term record. These potential long term stations are important to users and should be retained. As the number of years of record increases, the number of stations decreases rapidly, especially for the active stations. There is considerably more discontinued stations in the 1 to 5 year interval than in any other interval.

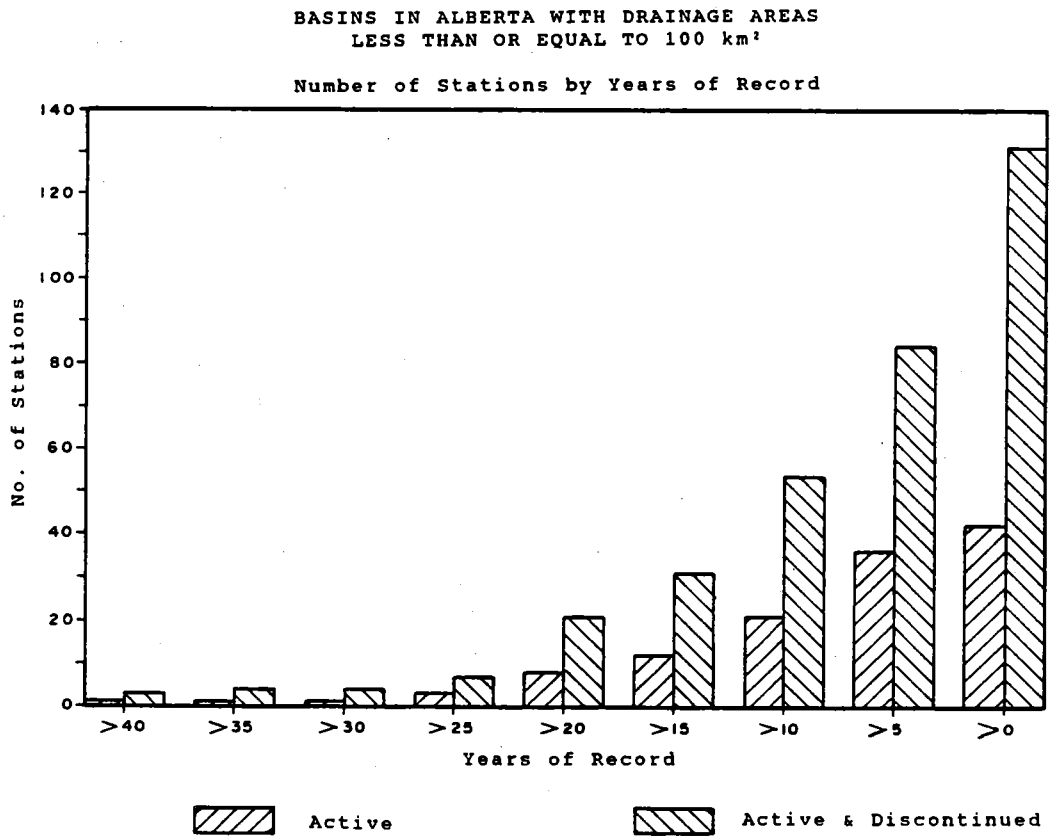

Figure 2

Figure 3 shows the distribution of stations by intervals of record length. Forty seven of the 131 stations have between 1 and 5 years of data, with only 6 of these being active stations. Fifteen active and 15 discontinued stations have between 6 and 10 years of record.

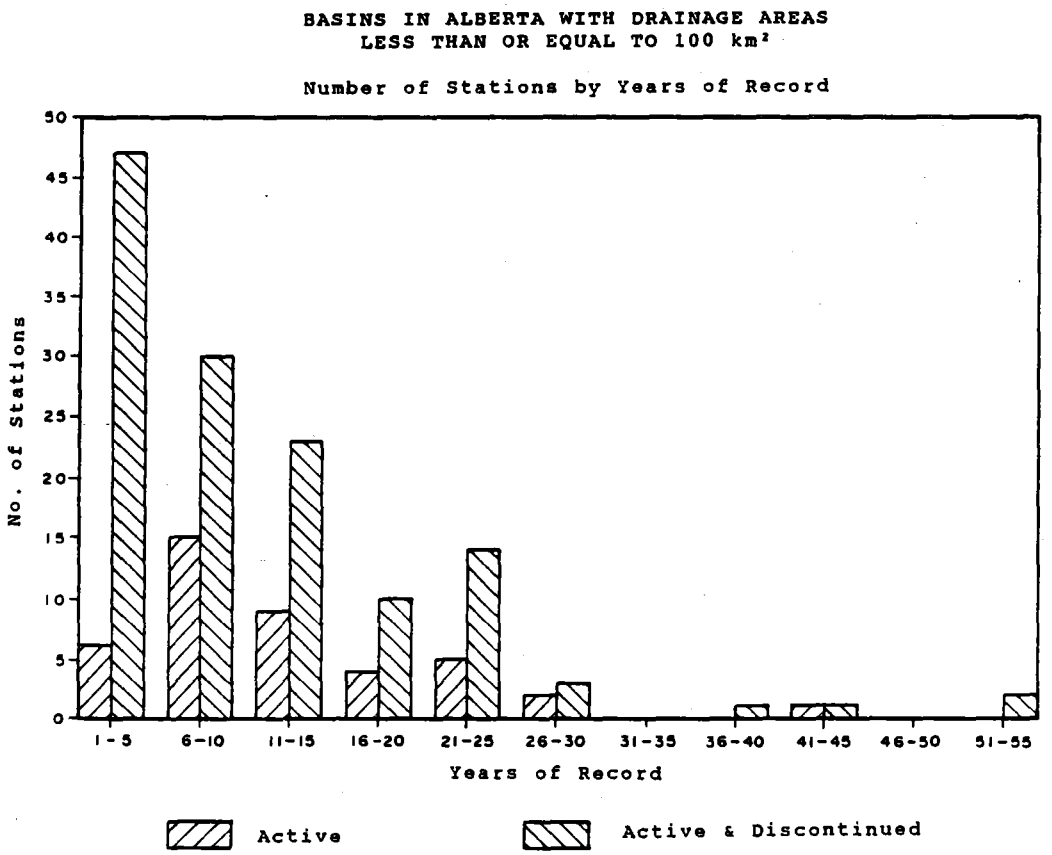

Figure 3

Figure 4 shows the 42 active stations distributed as a function of both drainage area and record length. The longer periods of record are associated with drainage areas between 0 and 40 km² and between 61 km² and 80 km². The distribution of young stations is fairly even, and shows recognition of the need for representation from the full range of basin sizes.

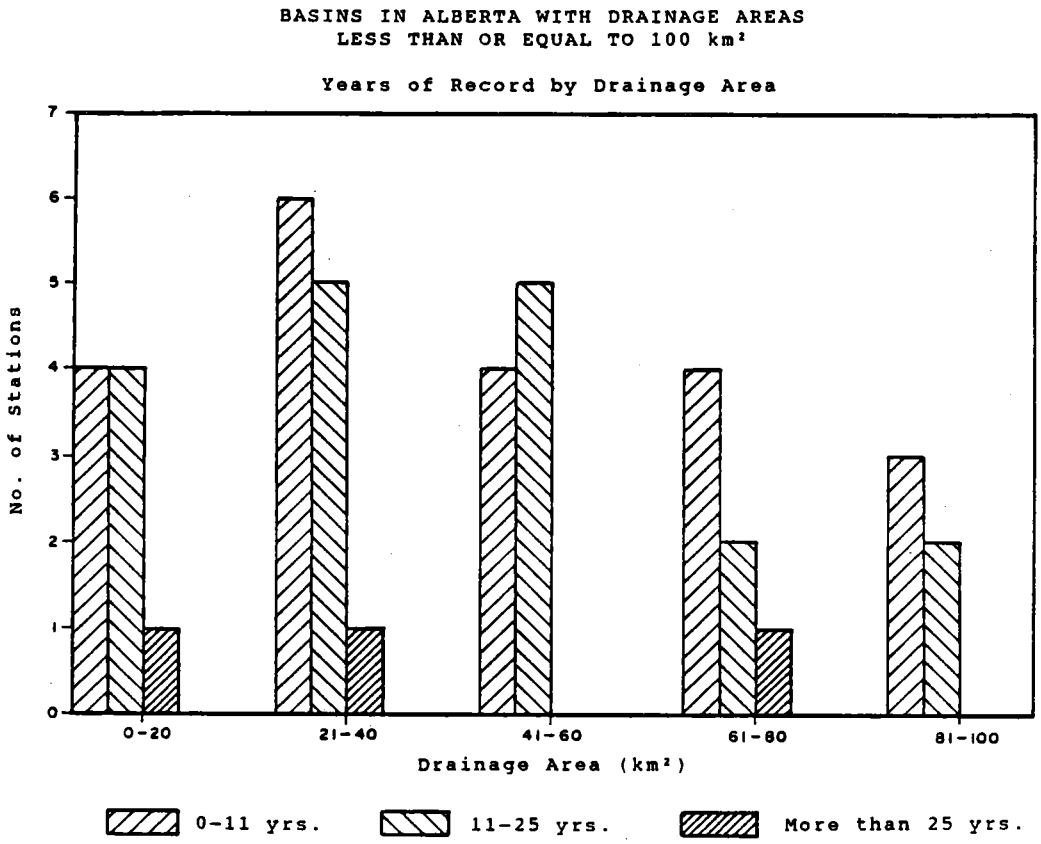

Figure 4

The need for small basin data has grown in conjunction with the development of computers and hydrologic models. Due to mainly economic reasons many hydrometric stations were originally installed on a short term project basis, rather than for the long term assessment of regional hydrology or environmental changes. The Water Resources Branch recognizes the need for a small basin network and through the efforts of the Hydrology Division's network planning will continue to improve and maintain data and information on small basins.

TABLE 1 HYDROMETRIC NETWORK OF SMALL, UNREGULATED BASINS IN ALBERTA

WRB STATION #	STATION NAME	ACTIVE (A) or DISCONTINUED (D)	DRAINAGE AREA	YEARS OF RECORD TOTAL	YEARS OF RECORD PERIOD	RECORDING* GAUGE	LATITUDE/LONGITUDE
05BA004	Louise Creek Near Lake Louise	D	25.1	6	1913-18	No	51 24 56 / 116 12 35
05BA009	Bow Glacier Outflow	D	24.9	2	1973	Yes	51 40 04 / 116 29 00
					1975	Yes	
05BA011	Balfour Creek Near The Mouth	D	38.6	2	1974-75	Yes	51 35 40 / 116 24 10
05BF004	Pocaterra Creek Near Mouth	D	63.7	11	1931-41	Yes	50 41 42 / 115 06 50
05BF011	Boulton Creek Near Mouth	D	28.2	6	1936-41	No	50 38 00 / 115 07 30
05BF015	Marmot Creek Near The Mouth	D	11.9	1	1962	Yes	50 56 50 / 115 08 30
05BF016	Marmot Creek Main Stem Near Seebe	A	9.4	28	1962-	Yes	50 57 01 / 115 09 08
05BF017	Middle Fork Creek Near Seebe	D	2.85	24	1963-86	Yes	50 57 34 / 115 10 16
05BF018	Twin Creek Near Seebe	D	2.64	24	1963-86	Yes	50 57 33 / 115 10 19
05BF019	Cabin Creek Near Seebe	D	2.12	24	1963-86	Yes	50 57 33 / 115 10 00
05BF020	Middle Fork Creek in Cirque Near Seebe	D	1.17	23	1964-86	Yes	50 57 30 / 115 11 56
05BH013	Jumpingpound Creek Near Cox Hill	A	36	14	1976-	Yes	51 00 09 / 114 56 14
05BM018	West Arrowwood Creek Near Ensign	A	29.8	5	1985-	Yes	50 30 50 / 113 20 35
05BM024	Natural Flow C Near Bow City	D	3.24	13	1972-84	Yes	50 22 40 / 112 14 40
05CA003	Deer Creek (Main Stem) Near Sundre	A	5.44	24	1966-	Yes	51 39 25 / 115 08 00
05CA005	Deer Creek East Branch	D	0.98	4	1966-69	Yes	51 40 02 / 115 07 51
05CB005	Beaverdam Creek Near Cochrane	A	45.3	14	1976-	Yes	51 21 45 / 114 26 20
05CC010	Welch Creek Tributary Near Leedale	A	53.6	14	1976-	Yes	52 34 25 / 114 34 24
05CD001	Upper Chain Lake Outlet Near Ponoka	D	76.9	2	1925-26	No	52 36 00 / 113 28 00
05CE008	Atusis Creek Near Redland	D	76.9	7	1965-71	Yes	51 19 50 / 113 03 15
05CE010	Ray Creek Near Innisfail	A	42.5	18	1967-70	Yes	52 00 03 / 113 35 55
					1976-	Yes	
05CE011	Renwick Creek Near Three Hills	A	57.2	17	1967-69	No	51 43 01 / 113 21 47
					1976-	Yes	
05CE019	Sheep Coulee Near Carstairs	A	38.3	14	1976-	Yes	51 33 44 / 114 02 09
05CG005	Atlas Mine Coulee at Western Monarch	D	52.3	5	1982-86	Yes	51 19 42 / 112 28 34
05CH009	Natural Flow A Near Pollockville	D	3.5	9	1972-80	Yes	51 08 55 / 111 47 50
05CJ011	Natural Flow B Near Princess	D	1.99	13	1972-84	Yes	50 38 20 / 111 30 20
05DA008	Peyto Creek at Peyto Glacier	D	23.6	11	1967-77	Yes	51 41 37 / 116 32 08
05DA010	Silverhorn Creek Near the Mouth	A	20.7	19	1971-	Yes	51 48 00 / 116 34 59
05DB004	Prairie Creek Near Ranger Station	D	95.6	5	1969-73	Yes	52 14 40 / 115 18 05
05DC003	Martin Creek Near Nordegg	D	3.03	4	1915-18	No	52 28 00 / 116 04 20
05DC008	Ram River at Ram Glacier	D	3.73	8	1967-74	Yes	51 51 16 / 116 11 27
05DF002	Conjuring Creek Near Wizard Lake	D	34.2	7	1924-29	No	53 06 25 / 113 49 30
					1931	No	
05DF007	Whitemud Creek (West Branch) Near Ireton	A	63.7	14	1976-	Yes	53 13 20 / 113 41 23
05EB909	Pointe-Aux-Pins Tributary No. 1 Near Ardrossan	A	17.8	9	1981-	Yes	53 34 43 / 113 08 48
05EB910	Pointe-Aux-Pins Tributary No. 2 Near Ardrossan	A	8.34	9	1981-	Yes	53 35 48 / 113 08 49
05EB911	Pointe-Aux-Pins Tributary No. 3 Near Ardrossan	A	3.55	9	1981-	Yes	53 35 44 / 113 08 47
05ED003	Moosehills Creek Near Elk Point	A	36.5	12	1978-	Yes	53 56 03 / 114 46 36
05EE005	Stretton Creek Near Marwayne	A	82.1	12	1978-	Yes	53 26 30 / 110 19 30
05EE006	Vermilion River Tributary Near Bruce	A	46.9	12	1978-	Yes	53 17 42 / 112 02 54
05EE913	Vermilion River Drainage Near Holden	A	56.4	9	1981-	Yes	53 08 02 / 112 24 19
05FA014	Maskwa Creek No. 1 Above Bearhills Lake	A	79.5	18	1972-	Yes	52 47 05 / 113 37 46
05FC007	Young Creek Near Castor	A	76.7	4	1986-	Yes	52 15 32 / 111 43 44
07AA007	Sunwapta River at Athabasca Glacier	A	29.8	42	1948-	Yes	52 13 00 / 117 13 57
07AC002	North Fox Creek Near Muskeg	D	17.6	3	1972-74	Yes	53 43 00 / 118 19 00
07AC003	East Cabin Creek Near Muskeg	D	12.4	3	1972-74	Yes	53 46 00 / 118 22 00
07AC004	Hendrickson Creek Near The Mouth	D	24.9	1	1974	Yes	53 46 37 / 118 22 03
07AC005	Vogel Creek Near The Mouth	D	11.4	1	1974	Yes	53 46 58 / 118 27 07
07AC006	Hinton Study Basin No. 14	D	12.2	1	1974	Yes	53 42 15 / 118 15 47
07AC008	Little Berland River at Highway No. 40	A	94	4	1986-	Yes	53 40 43 / 118 14 19
07AD003	Cache Percotte Creek Near Hinton	D	7.15	13	1965-77	Yes	53 24 05 / 117 30 37
07AD004	Whiskeyjack Creek Near Hinton	A	3.13	24	1965-8?	Yes	53 22 50 / 117 35 15
					1983-	Yes	

* Yes indicates that some or all of the data were obtained using automatic recorders.
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TABLE 1 HYDROMETRIC NETWORK OF SMALL, UNREGULATED BASINS IN ALBERTA

WRB STATION #	STATION NAME	ACTIVE (A) or DISCONTINUED (D)	DRAINAGE AREA	YEARS OF RECORD TOTAL	YEARS OF RECORD PERIOD	RECORDING* GAUGE	LATITUDE/LONGITUDE
05AA005	Cow Creek Near Cowley	D	82.1	8	1909-16	No	49 39 18 / 114 09 26
05AA007	Connelly Creek Near Lundbreck	D	51.5	11	1909-19	No	49 35 50 / 114 08 15
05AA010	Beaver Mines Creek Near Beaver Mines	D	62.4	11	1909-19	No	49 28 30 / 113 09 30
05AA012	Summit Creek at Crowsnest	D	12.7	4	1912-15	No	49 37 49 / 114 41 31
05AA013	McGillivray Creek Near Coleman	D	32.6	26	1907-20	No	49 38 04 / 114 31 12
					1975-86	Yes	
05AA018	Allison Creek Near Sentinel	D	47.7	11	1909	No	49 37 55 / 114 35 10
					1913-20	No	
					1923	No	
					1976	No	
05AA020	Blairmore Creek Near Blairmore	D	47.9	14	1907-12	No	49 38 00 / 114 28 00
					1914-20	No	
					1923	No	
05AA025	Snowfence Creek at Plateau Mountain	D	0.04	2	1966-67	Yes	50 12 36 / 114 32 40
05AA030	Gold Creek Near Frank	A	62.9	30	1907-20	No	49 36 08 / 114 24 00
					1923	No	
					1975-	Yes	
05AA909	Todd Creek Near Highway No. 22	A	73.8	8	1982-	Yes	49 45 40 / 114 14 00
05AB014	Five Mile Creek Near Spring Point	D	53.1	3	1921-23	No	49 43 56 / 113 51 06
05AB022	West Streeter Creek Near Nanton	D	1.37	11	1964-74	Yes	50 06 29 / 114 03 59
05AB023	Middle Streeter Creek Near Nanton	D	0.91	11	1964-74	No	50 06 31 / 114 03 00
05AB024	East Streeter Creek Near Nanton	D	0.52	11	1964-74	Yes	50 06 31 / 114 02 58
05AB030	Streeter Creek (Main Stem) Near Nanton	D	5.96	21	1966-86	Yes	50 07 24 / 114 03 20
05AD001	Mami Creek at Mountain View	D	56.7	20	1909-16	No	49 08 00 / 113 35 00
					1922-31	No	
					1935-36	No	
05AD004	Crooked Creek Near Waterton Park	D	49	36	1910-25	No	49 07 45 / 113 48 40
					1927-29	No	
					1949-65	No	
05AD006	Cameron Creek at Waterton Park	D	78.7	5	1916-20	No	49 03 06 / 113 54 57
05AD012	Cottonwood Creek Near Twin Butte	D	34.2	9	1982-85	Yes	49 09 20 / 113 51 10
05AD016	Drywood Creek Near Twin Butte	D	29.3	52	1935-86	Yes	49 18 00 / 114 00 20
05AD030	Boundary Creek Near International Boundary	D	53.9	17	1948-64	Yes	48 59 50 / 113 54 20
05AD031	Street Creek at International Boundary	D	14	9	1947-55	Yes	48 59 20 / 113 52 40
05AD033	Belly River (North Branch) at International Boundary	D	25.1	9	1947-55	Yes	48 59 20 / 113 45 50
05AD036	Drywood Creek Below South Drywood Creek	D	79.8	4	1970-73	No	49 17 43 / 113 58 20
05AD903	Cottonwood Creek Near Twin Butte	A	34.2	8	1923-31	No	49 08 35 / 113 50 50
05AD904	Galwey Brook Near Waterton Park	A	20.5	7	1983-	Yes	49 08 25 / 113 51 00
05AE017	Ralph Creek at Vaughn Ranch	D	86.5	11	1920-30	Yes	49 00 15 / 113 09 20
05AE031	Canyon Creek Near Many Glacier	D	19.7	20	1918-37	Yes	48 47 30 / 113 37 40
05AE032	Swiftcurrent Creek at Many Galcier	D	80.5	55	1912-66	Yes	48 48 10 / 113 39 20
05AE039	Tough Creek Near Beazer	A	38.6	7	1969-	Yes	49 04 00 / 113 32 00
05AE040	Lee Creek (East Branch) Near Beazer	D	37.8	16	1970-85	Yes	49 00 50 / 113 32 20
05AE904	Lee Creek Below Confluence of East Fork	A	94.5	9	1981-	Yes	49 01 30 / 113 02 30
05AF022	Grayback Coulee Near Orion	D	76.7	4	1922-25	No	49 13 50 / 110 52 30
05AG024	Natural Flow D Near Chin	D	3.32	2	1972-73	Yes	49 51 10 / 112 35 40
05AH009	Gros Ventre Creek at Tothill's Ranch	D	93.2	5	1911-15	No	49 45 20 / 110 27 50
05AH035	Ross Creek at Koenig's Ranch	D	23.1	4	1911-14	No	49 46 35 / 110 17 10
05AH047	Sam Lake Tributary Near Schuler	A	21.2	2	1982-	Yes	50 09 48 / 110 35 30
05BA001	Bath Creek Near Lake Louise	D	61.6	9	1912-20	No	51 25 25 / 116 12 30

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07AB005	Fish Creek Near Hinton	D	25.6	3	1972-74	Yes	53 39 10 / 117 39 05
07AD006	Oldman Creek Near Hinton	D	18.1	3	1972-74	Yes	53 32 00 / 117 41 00
07AD007	Cache Percotte Creek (North Fork) Near Hinton	D	2.72	6	1972-77	Yes	53 23 26 / 117 29 11
07AD008	Hinton Study Basin No. 1	D	15.2	1	1974	Yes	53 41 53 / 117 33 48
07AD009	Hinton Study Basin No. 2	D	14.5	1	1974	Yes	53 41 03 / 117 33 48
07AD010	Hinton Study Basin No. 5	D	19.7	1	1974	Yes	53 37 18 / 117 31 25
07AE002	Hinton Study Basin No. 6	D	23.8	1	1974	Yes	53 54 55 / 116 43 20
07AE003	Hinton Study Basin No. 7	D	22	1	1974	Yes	53 54 22 / 116 45 44
07AF003	Mangus Creek Near Hinton	A	25.4	24	1966-	Yes	53 09 22 / 117 15 40
07AF004	Deerlick Creek Near Hinton	A	14	24	1966-	Yes	53 09 20 / 117 14 36
07AF005	Eunice Creek Near Hinton	A	17.1	23	1967-	Yes	53 09 10 / 117 13 55
07AF006	Cabin Creek Near The Mouth	D	4.97	1	1972	No	53 05 10 / 117 25 05
07AF007	Gregg River Below Cabin Creek	D	20.7	1	1972	No	53 05 15 / 117 25 25
07AF008	Quigley Creek Near Hinton	D	15.3	3	1972-74	Yes	53 21 00 / 117 24 00
07AF009	North Anderson Creek Near Hinton	D	10.6	3	1972-74	Yes	53 19 00 / 117 24 00
07AF011	Hinton Study Basin No. 15	D	19.7	1	1974	Yes	53 18 19 / 117 18 04
07AF012	Hinton Study Basin No. 16	D	8.05	1	1974	Yes	53 18 32 / 117 17 04
07AG005	Hinton Study Basin No. 8	D	23.1	1	1974	Yes	53 49 43 / 116 44 52
07AG006	Hinton Study Basin No. 9	D	7.54	1	1974	Yes	53 50 00 / 116 40 54
07BB010	Connor Creek Near Rochfort Bridge	D	64.5	4	1975-79	No	54 22 53 / 115 02 31
07BB014	Coyote Creek Near Cherhill	A	57.8	9	1981-	Yes	53 52 22 / 114 40 10
07BE003	Porter Creek Above Baptiste Lake	A	57.2	9	1980	Yes	54 43 20 / 113 34 25
07BF007	Bridge Creek Near Enilda	D	5.13	3	1926-28	No	55 26 00 / 116 17 00
07BG004	Lily Creek Near Slave Lake	A	23.6	3	1987-	Yes	55 24 56 / 114 48 47
07CE004	Robert Creek Near Anzac	A	54.1	8	1982-	Yes	56 23 01 / 111 01 42
07FD013	Young Drainage Project Near Spirit River	A	31.6	8	1982-	Yes	55 48 00 / 118 47 00
07GF003	Wolverine Creek Near Valleyview	D	11.1	21	1967-87	Yes	54 55 17 / 117 48 32
07GF004	Spring Creek (Upper) Near Valleyview	D	33.4	21	1967-87	Yes	54 55 46 / 117 42 20
07GF005	Bridlebit Creek Near Valleyview	D	19.7	21	1967-87	Yes	54 56 10 / 117 44 02
07GF006	Rocky Creek Near Valleyview	D	18.6	21	1967-87	Yes	54 56 05 / 117 46 35
07GF007	Horse Creek Near Valleyview	D	4.27	18	1970-87	Yes	54 55 19 / 117 48 47
07HA002	Krawchuk Drainage Near McLennan	A	12.9	8	1982-	Yes	55 57 00 / 117 02 00
07HB002	Elder Creek at Highway No. 686	A	63.7	5	1985-	Yes	56 27 50 / 116 49 49
07JF004	Boyer River Near Paddle Prairie	A	94.3	11	1979-	Yes	57 54 20 / 117 36 45
07NB006	Bench Mark Creek Near Fort Smith	D	55.5	18	1967-84	Yes	59 48 50 / 111 57 45
11AA010	Deer Creek at Dickinson's Ranch	D	18.9	6	1911-16	No	49 02 00 / 111 32 30
11AA011	Deer Creek at Deer Creek Cattle Co.'s Ranch	D	29.5	1	1911	No	49 05 00 / 111 30 00
11AA023	Lindsay Coulee Near Onefour Post Office	D	26.9	7	1924-30	No	49 03 50 / 110 25 20
11AA024	Maynard Coulee Near Onefour Post Office	D	20.5	7	1924-30	No	49 04 10 / 110 26 30
11AA039	Verdigris Lake Tributary Near Milk River	A	73	3	1987-	Yes	49 13 32 / 112 05 27
11AB053	Thelma Creek at English's Ranch	D	33.2	11	1912-22	No	49 32 00 / 110 17 00
11AB111	Graburn Creek Near the Mouth	D	42	1	1967	Yes	49 38 40 / 110 01 40

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Lamers, L.

Availability of small watershed hydrometric data in Alberta.