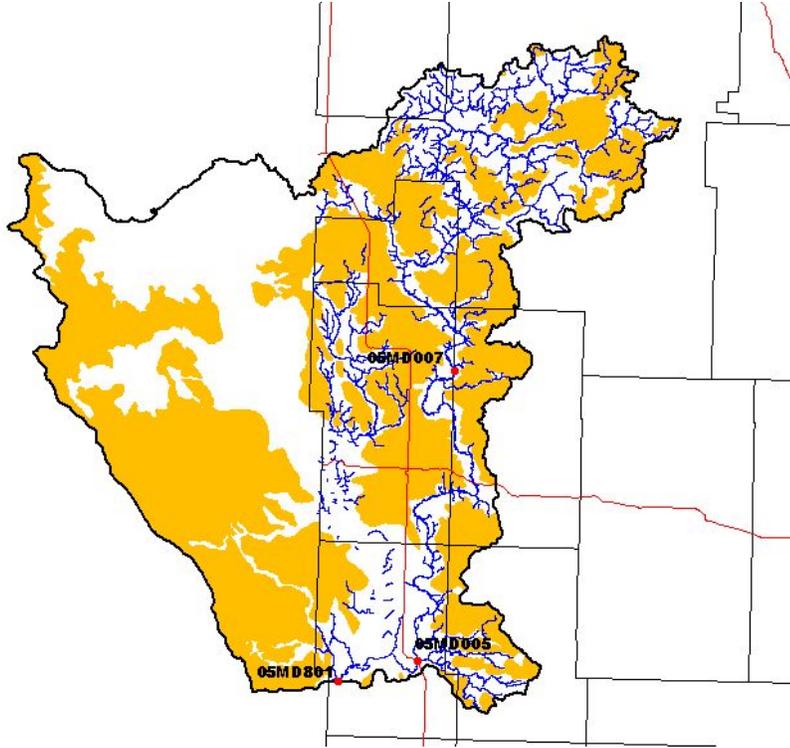


Shell River Watershed Hydrology

Hydrometric Data – Peak Flows



There are 3 Water Survey of Canada streamflow gauging stations located in the watershed and are located as shown above. Streamflow data has been collected at these stations within the Shell River Watershed for varying time periods since 1914.

A statistical frequency analysis of data collected at each station was conducted to determine peak daily flow rates for varying flow frequencies. This data is summarized and presented in Table 2.

Station Name	Station Number	Period Of Record	Years of Data	Gross Area (mi ²)	Maximum Daily Discharges (cfs)							
					1%	2%	3%	5%	10%	20%	30%	50%
Assiniboine River at Shellmouth Dam	05MD801	1913-1970 C 1971-1998 M	75	7062	21400	17700	15700	13200	9960	6960	5300	3290
Shell River Near Inglis	05MD005	1914-1921, 1948-1999 R 1922-1928 E	68	772.1	3181	2737	2479	2165	1741	1317	1073	752
Shell River Near Roblin	05MD007	1963-1993 R, 1922-1928 E	61	513.7	2765	2362	2147	1854	1487	1133	925	657

Note: R - recorded
E - estimated
M - modified

The water survey gauging stations were operated annually during the period March through October up until the mid 1990s. In 1994, the operating period was reduced to the spring freshet period only, namely March through May.

Streamflow Characteristics

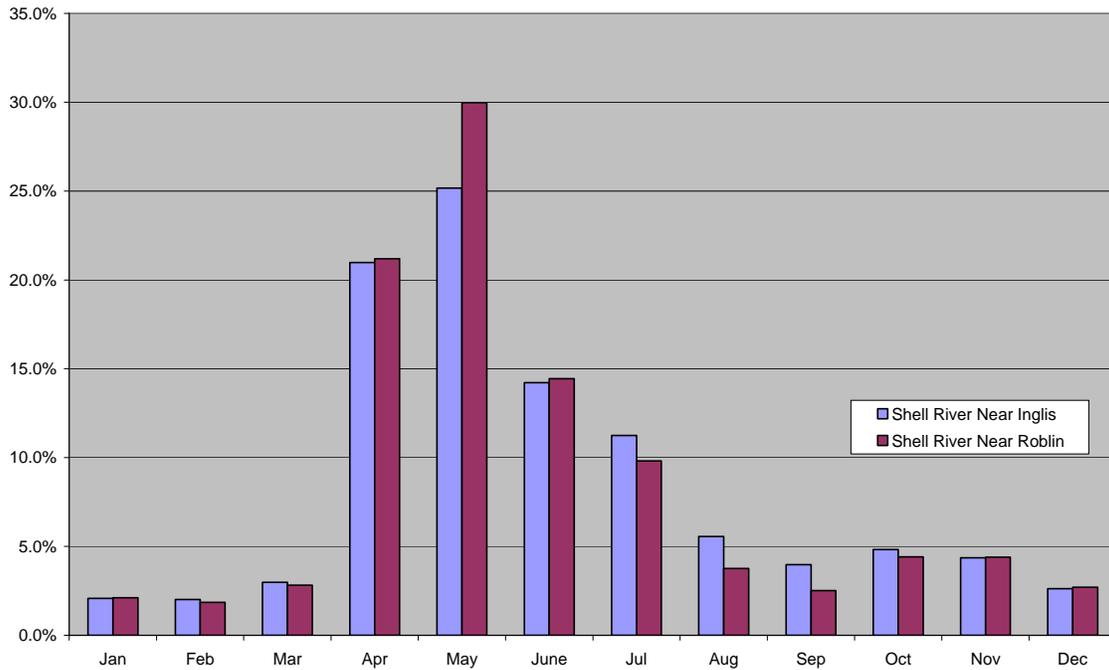
The daily discharge data for the gauging stations were statistically analyzed to determine runoff characteristics for the watershed. Table 1 lists the effective and gross drainage areas associated with the gauging stations located in the watershed.

The gross drainage area boundary is defined as the topographic limit of the watershed, commonly called the drainage divide. This area might be expected to entirely contribute runoff under extremely wet conditions. The effective drainage area is that portion of the watershed which can be expected to contribute runoff to the main stream during a median (1:2 year event) runoff year. This area excludes marsh and slough area and other natural storage areas, which would prevent runoff from reaching the main stream in a year of average runoff. The effective to gross drainage area ratio is an indication of how well an area is drained.

Station Name	Station Number	EDA (mi ²)	GDA (mi ²)	EDA/GDA Ratio
Assiniboine River at Shellmouth Dam	05MD801	2792	7064	0.4
Shell River Near Inglis	05MD005	435.1	772.1	0.56
Shell River Near Roblin	05MD007	290.3	513.7	0.56

Figure 2 illustrates the distribution of runoff for the gauging stations located in the watershed. It can be seen from this graph that the majority of the runoff occurs during the months of March-May, and that there is very little flow in the fall and winter months.

Annual Distribution of Flows



Streamflow on the praires varies considerably over the months and years. It can be seen from Figure 2, that the Shell River behaves like a perennial stream in that it flows year round. A review of the flow data also revealed that there was never a year of no flow at any of the gauging stations.

Timing of Runoff Peak

The recorded data was reviewed to determine when the maximum flow occurred each year. A summary of this analysis and the time peak occurred is shown in the table below.

		Time Peak Flow Occurred			Total
		Spring	Summer	Fall	
Shell River Near Inglis	05MD005	40	11	0	51
Shell River Near Roblin	05MD007	31	3	0	34

On the major watercourses, spring flooding is more significant than flooding from summer precipitation events. Smaller drainage areas (less than 10 mi²) are sensitive to rainfall events, and localized flooding can occur in the smaller poorly drained areas of the watershed from excessive rainfall.

Water Allocation

Aquifer or stream water budgets have not been established for the Shell River watershed, therefore, the total amount of water available for allocation has not been determined. The water supplies in the watershed include the Lake of the Prairies and the Hatfield Buried Valley Aquifer, neither of which has been significantly developed to date. There are presently 6 surface water projects on file with the Water Licensing Branch in the Shell River Watershed of which four are for irrigation projects and two are for other purposes. There are presently five groundwater projects on file with the Water Licensing Branch of which one is an agriculture project, one is for irrigation, one is for industrial use, and two are for municipal distribution systems in Inglis and Roblin, utilizing approximately 48.6 and 304 ac-ft per year respectively.

The following tables present all of the projects on file with the Water Licensing Branch for licensing in the Shell River watershed:

Licences:

Purpose	Licenses Issued		Total Licenses
	Groundwater	Surface Water	
Agricultural	1	0	1
Industrial	0	0	0
Irrigation	0	3	3
Municipal	1	0	1
Other	0	1	1
Total	2	4	6

Applications:

Purpose	Applications		Total Applications
	Groundwater	Surface Water	
Agricultural	0	0	0
Industrial	1	0	1
Irrigation	1	1	2
Municipal	1	0	1
Other	0	1	1
Total	3	2	5

Allocations:

Purpose	Allocated Under License (ac-ft)		Total Allocation (ac-ft)
	Groundwater	Surface Water	
Agricultural	4.5	0	4.5
Industrial	0	0	0
Irrigation	0	330.0	330.0
Municipal	50.3	0	50.3
Other	0	56.0	56.0

Total	54.8	386.0	440.8
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State of the Watershed Report Assessment:

With the exception of the Assiniboine River, no allocation limits have been set for the major watercourses in this watershed. Current allocations are believed to be below the sustainable yield of the major streams, based on site specific water budget evaluations carried out during the course of issuing water rights licenses.

Recommended Actions – Allocation limits need to be established for this watershed. As well, a review of present water allocations should be reviewed to ensure the ecological needs of the watercourse are met throughout the entire year.