

From: [Miki Ehrlich](#)
To: [Permits](#)
Subject: FW: 7Q10 for Mackenzie River at Fort Providence
Date: Monday, June 20, 2016 8:51:46 AM
Attachments: [Mackenzie near Fort Providence 7Q10 Flows.xlsx](#)

Please post email and attachment (as an excel file) to MV2016L3-0001 – Renewal App – App and related docs

Ft Providence – Flow data analysis for Mackenzie River near Ft Providence – Jun16-16

From: Heather Scott
Sent: Thursday, June 16, 2016 3:02 PM
To: Miki Ehrlich
Subject: FW: 7Q10 for Mackenzie River at Fort Providence

Heather Scott, M.A.Sc., P.Chem.

Technical Advisor

Mackenzie Valley Land and Water Board

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From: Derek Faria [mailto:Derek_Faria@gov.nt.ca]
Sent: June 16, 2016 2:33 PM
To: Heather Scott <heather.scott@mvlwb.com>
Subject: RE: 7Q10 for Mackenzie River at Fort Providence

Hi Heather,

I've completed the 7Q10 analysis of flow data from the Water Survey Canada hydrometric gauge named Mackenzie River near Fort Providence (10FB001). As you know, I performed a 7Q10 analysis of Flat River flow data for Kathleen Racher in 2012, which you forwarded to me when you requested the 7Q10 analysis for establishing effluent quality criteria a year ago, in June 2015 (attached). In that analysis a year ago I used Mackenzie River at Fort Simpson (10GC001) flow data.

As pointed out to Kathleen, the Flat River data period was barely long enough (20 years) for performing a frequency analysis estimation of return periods (Q2, Q10, Q100 etc.). The flow data record at Mackenzie River at Fort Simpson (10GC001) hydrometric station is 52 years long, for which I provided 7Q10 values in 2015.

Flow data for Mackenzie River near Fort Providence (10FB001) hydrometric station are less

adequate for frequency analyses to estimate return periods, particularly with regard to annual minima (only 11 data years) though not too bad for annual maxima (19 data years). Consequently you will notice on the plots of annual 7Q values (highs and lows) that the 95% confidence limits are spread wider for lows than for highs. The confidence limits for the analysis of the 52-year 10GC001 flow record are significantly narrower for both 7Q highs and lows (i.e. higher confidence).

Nevertheless, using the Gumbell probability distribution as before, my calculations on 10FB001 flow data resulted in 7Q10 low-flow value of 1,148 m³/s extreme low-flow condition to use in calculating dilution factors. There are no annual minima of Daily or of 7-Day mean flows prior to 1964, and no flow record 1979-1994. There are only 10 minima values 1964-1973 and one value for 1995 (11 total). Note that this low number of data years for annual minima (11) at the 10FB001 hydrometric station results in lower confidence in this 7Q10 low-flow value.

Best regards,

Derek

Derek Faria, M.Sc

Hydrologist, Water Resources Division
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From: Derek Faria
Sent: Wednesday, June 15, 2016 1:36 PM
To: 'Heather Scott'
Subject: RE: 7Q10 for Mackenzie River at Fort Providence

Ok, will do a.s.a.p.

From: Heather Scott [<mailto:heather.scott@mvlwb.com>]
Sent: Wednesday, June 15, 2016 1:34 PM
To: Derek Faria
Subject: RE: 7Q10 for Mackenzie River at Fort Providence

Flows please.

Thanks!

H

Heather Scott, M.A.Sc., P.Chem.
Technical Advisor
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From: Derek Faria [mailto:Derek_Faria@gov.nt.ca]
Sent: June 15, 2016 1:32 PM
To: Heather Scott <heather.scott@mvllwb.com>
Subject: RE: 7Q10 for Mackenzie River at Fort Providence

Hi Heather,

Are you looking for the 7Q10 flows or 7Q10 water levels?

Derek

Derek Faria, M.Sc

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From: Heather Scott [<mailto:heather.scott@mvllwb.com>]
Sent: Wednesday, June 15, 2016 10:56 AM
To: Derek Faria
Subject: 7Q10 for Mackenzie River at Fort Providence

Hi Derek-

Similar to what you did for the Fort Simpson water licencing process (below), I am wondering if you could derive a 7Q10 value for the following site:

http://wateroffice.ec.gc.ca/report/report_e.html?type=stat&stn=10FB001

Thanks-
Heather

Heather Scott, M.A.Sc., P.Chem.
Technical Advisor

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From: Derek Faria [mailto:Derek_Faria@gov.nt.ca]
Sent: June 19, 2015 4:24 PM
To: Heather Scott <heather.scott@mvlwb.com>
Subject: RE: 7Q10 for Mackenzie River at Fort Simpson

Hi Heather,

Using the Gumbell probability distribution, my calculations resulted in a 7Q10 value of 1,725 m³/s, an extreme low-flow condition to use in calculating dilution factors.

Prior to 1960 there are no annual minima for 7-day mean flows, so I used the 52 annual values available for 1960-2013.

Best regards,

Derek

Derek Faria, M.Sc

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From: Heather Scott [<mailto:heather.scott@mvlwb.com>]
Sent: Thursday, June 18, 2015 12:18 PM
To: Derek Faria
Subject: 7Q10 for Mackenzie River at Fort Simpson

Hi Derek-

As per my voice mail, I am wondering if you could calculate a 7Q10 value for me for EC's 10GC001 station on the Mackenzie River at Fort Providence. I am working on the water licence for the Village of Fort Simpson and trying to establish effluent quality criteria (EQC) for the wastewater discharge.

Thanks!
Heather

Heather Scott, M.A.Sc., P.Chem.

Technical Advisor

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