

APPENDIX F

CHANNEL STRUCTURE FLOW DATA

Initiation of Motion - Red Deer River Reaches

Code/Reach (refer to map)	Comments
Code RD7 - Dickson to Medicine R.	
Code RD6 - Medicine R. to Blindman R.	
Code RD4&5 - Red Deer to Drumheller	
Code RD1-3 - Drumheller to border	

South Saskatchewan River Basin Instream Flow Needs Determination

Initiation of Motion - Red Deer River Reaches (using 85% of actual slope)

Reach Name (as of July/01, refer to map) Reach Code (as of Jan/03)	RD7	RD6	RD4-5	RD1-3					
Slope data									
from 1:50000 information									
Enter el. (ft)									
Enter el. (km)									
Exit el. (ft)									
Exit el. (m)									
REB Enter km									
REB Exit km									
Reach averaged slope from 1:50000 maps									
from Kellerhals									
Slope as noted in Kellerhals, Table 1, Page 57									
from ARC									
ARC slope from survey									
ARC slope from map									
Slope from HEC-2 databases									
Averaged slope from the different sources									
Slope used in calculations	0.001686	0.001218	0.001175	0.000352					
D50 Data									
from Kellerhals, Neill and Bray, 1972 (mm)									
from Shaw and Kellerhals, 1982 (mm)	21.1	25	30	0.34					
D50 used in Calculations	21.1	25	30	0.34					
Depth (m)									
with known discharge value from K,N and Bray 1972									
from HEC-2 data	1.136	1.6	2.21	0.62					
	1.28	2.23	2.74	1.044					
	1.556	2.65	3.21	1.385					
	2.042	3.01	3.82	1.94					
	2.407	3.54	4.3						
Shields Number									
$=0.85*(depth)*(slope)/((1.65)*(D50))$									
based on depth estimated from HEC-2 data	0.047	0.040	0.045	0.000					
	0.053	0.056	0.055	0.557					
	0.064	0.067	0.065	0.739					
	0.084	0.076	0.077	1.035					
	0.099	0.089	0.087						

Initiation of Motion - Bow River Reaches

Code/Reach (refer to map)	Comments
Mitford	Upstream area of interest.
Cochrane	Upstream area of interest.
SSRB Bow 1	HEC-2 and ARC data each used separately resulting in significantly different analysis results.
Code BW4 - SSRB Bow 2	No D50 sample, question the usefulness of such a short reach(6.5 km).
Code BW4 - SSRB Bow 3	HEC-2 data used in analysis.
Code BW3 - SSRB Bow 4	No D50 sample available therefore no analysis possible.
Code BW2 - SSRB Bow 5	D50 samples averaged. Note the variance in D50 samples(10.8mm to 26 mm)
Code BW2 - SSRB Bow 6	No depth-discharge info. available therefore no analysis possible.
Code BW1 - SSRB Bow 7	D50 samples averaged. Note the variance in D50 samples(6.6mm to 32 mm)

South Saskatchewan River Basin Instream Flow Needs Determination

Initiation of Motion - Bow River Reaches (using 85% of actual slope)

Reach Name (as of July/01, refer to map) Reach Code (as of Jan/03)	Mitford	Cochrane	1	2 BW4	3 BW4	4 BW3	5 BW2	6 BW2	7 BW1
Slope data									
from 1:50000 information									
Enter el. (ft)	3750	3700	3525	3375	3350	3100	2975	2750	2600
Enter el. (km)	1.141875	1.12665	1.073363	1.027688	1.020075	0.94395	0.905888	0.837375	0.7917
Exit el. (ft)	3700	3575	3400	3350	3100	2975	2750	2600	2325
Exit el. (m)	1.12665	1.0885875	1.0353	1.020075	0.94395	0.905888	0.837375	0.7917	0.707963
REB Enter km	439	426.5	397.6	370	366	325	300	243.3	188.1
REB Exit km	426.5	404.5	376	366	325	300	243.3	188.1	0.5
Reach averaged slope from 1:50000 maps	0.001218	0.0017301	0.001762	0.001903	0.001857	0.001523	0.001208	0.000827	0.000446
from Kellerhals									
Slope as noted in Kellerhals, Table 1, Page 57	0.002		0.0018				0.0012		0.00081
from ARC									
ARC slope from survey	0.002		0.0018				0.0012		0.00081
ARC slope from map	0.002		0.0022				0.0017		0.0008
Slope from HEC-2 databases		0.001934	0.001725		0.001873				
Averaged slope from the different sources	0.0018045	0.0018321	0.001857	0.001903	0.001865	0.001523	0.001327	0.000827	0.000717
Slope used in calculations	0.002	0.001934	0.001725	0.001903	0.001873	0.001523	0.0012	0.000827	0.000717
D50 Data									
from Kellerhals, Neill and Bray, 1972 (mm)	33		40				26		32
from Shaw and Kellerhals, 1982 (mm)		49.1			39.09		10.87	34.24	17.25
							24.09		8.05
									6.62
									15.05
D50 used in Calculations	33	49.1	40		39.09		20.32	34.24	15.794
Depth (m)									
with known discharge value from K,N and Bray 1972									
	0.79		0.94				0.73		1.13
	1.07		1.07				1.22		1.31
	1.43		1.71				1.58		2.41
	1.62		1.92				2.07		3.23
			3.44				2.47		
from HEC-2 data		0.42	1.43		1.31				
		0.67	2.24		2.06				
		0.77	2.49		2.29				
		0.85	2.77		2.4				
		1.03	3.33		2.57				
		1.7	4.9		3.66				
		2.48							
		3.18							
Shields Number									
=0.85*(depth)*(slope)/((1.65)*(D50))									
	0.025		0.021				0.022		0.026
	0.033		0.024				0.037		0.031
	0.045		0.038				0.048		0.056
	0.050		0.043				0.063		0.076
			0.077				0.075		
based on depth estimated from HEC-2 data		0.009	0.032		0.032				
		0.014	0.050		0.051				
		0.016	0.055		0.057				
		0.017	0.062		0.059				
		0.021	0.074		0.063				
		0.034	0.109		0.090				
		0.050							
		0.065							

Initiation of Motion - Oldman River Reaches

Code/Reach (refer to map)	Comments
Code OM7 - Dam to Pincher Cr.	
Code OM6 - Pincher Cr. To LNID	No data.
Code OM5 - LNID to Willow Cr.	
Code OM4 - Willow Cr. To Belly R.	
Code OM3 - Belly R. to St. Mary R.	No data.
Code OM2 - St. Mary R. to Little Bow R.	
Code OM1 - Little Bow R. to Grand Forks	

South Saskatchewan River Basin Instream Flow Needs Determination

Initiation of Motion - Oldman River Reaches (using 85% of actual slope)

Reach Name (as of July/01, refer to map) Reach Code (as of Jan/03)	1 OM7	2 OM6	3 OM5	4 OM4	5 OM3	6 OM2	7 OM1
Slope data							
from 1:50000 information							
Enter el. (ft)	3450	3400	3215	2990	2875	2740	2515
Enter el. (km)	1.050525	1.0353	0.978968	0.910455	0.875438	0.83433	0.765818
Exit el. (ft)	3400	3215	2990	2875	2740	2515	2300
Exit el. (m)	1.0353	0.978968	0.910455	0.875438	0.83433	0.765818	0.70035
REB Enter km	323	316.9	282.4	232.4	201.6	169.4	98.6
REB Exit km	316.9	282.4	232.4	201.6	169.4	98.6	0
Reach averaged slope from 1:50000 maps from Kellerhals	0.002496	0.001633	0.00137	0.001137	0.001277	0.000968	0.000664
Slope as noted in Kellerhals, Table 1, Page 57 from ARC	0.0016		0.0017	0.0012		0.00094	0.00044
ARC slope from survey	0.0016		0.0017	0.0012		0.00094	0.00044
ARC slope from map	0.0018		0.0014	0.001			0.00062
Slope from HEC-2 databases							
Averaged slope from the different sources	0.001874	0.001633	0.001543	0.001134	0.001277	0.000949	0.000541
Slope used in calculations	0.001874	0.001633	0.001543	0.001134	0.001277	0.000949	0.000541
D50 Data							
from Kellerhals, Neill and Bray, 1972 (mm)	43		49	30		40	67
from Shaw and Kellerhals, 1982 (mm)			46.11 33.86			34.63	19.69 26.75 70.64
D50 used in Calculations	43		42.99	30		37.315	46.02
Depth (m)							
with known discharge value from K,N and Bray 1972	0.70 0.91 1.80 2.16		0.27 0.60 1.60	0.52 0.64 1.92 2.23		0.97 1.40 2.60 3.50	0.76 1.10 2.62 3.60
from HEC-2 data							
Shields Number							
=0.85*(depth)*(slope)/((1.65)*(D50))	0.016 0.020 0.040 0.048		0.005 0.011 0.030	0.010 0.012 0.037 0.043		0.013 0.018 0.034 0.046	0.005 0.007 0.016 0.022
based on depth estimated from HEC-2 data							

Initiation of Motion - South Saskatchewan River Reaches

Code/Reach (refer to map)	Comments
Code SS2 - Grand Forks to Medicine Hat	
Code SS1 - Medicine Hat to Red Deer Confluence	

South Saskatchewan River Basin Instream Flow Needs Determination

Initiation of Motion - South Saskatchewan River Reaches (using 85% of actual slope)

Reach Name (as of July/01, refer to map) Reach Code (as of Jan/03)	SS2	SS1							
<p>Slope data</p> <p>from 1:50000 information</p> <p style="padding-left: 20px;">Enter el. (ft)</p> <p style="padding-left: 20px;">Enter el. (km)</p> <p style="padding-left: 20px;">Exit el. (ft)</p> <p style="padding-left: 20px;">Exit el. (m)</p> <p style="padding-left: 20px;">REB Enter km</p> <p style="padding-left: 20px;">REB Exit km</p> <p>Reach averaged slope from 1:50000 maps from Kellerhals</p> <p style="padding-left: 20px;">Slope as noted in Kellerhals, Table 1, Page 57</p> <p>from ARC</p> <p style="padding-left: 20px;">ARC slope from survey</p> <p style="padding-left: 20px;">ARC slope from map</p> <p style="padding-left: 20px;">Slope from Shaw and Kellerhals(1982)</p> <p style="padding-left: 20px;">Slope from HEC-2 databases</p> <p style="padding-left: 20px;">Averaged slope from the different sources</p> <p style="padding-left: 20px;">Slope used in calculations</p>	0.00041	0.00036							
<p>D50 Data</p> <p>from Shaw and Kellerhals, 1982 (mm)</p> <p style="padding-left: 20px;">17.25</p> <p style="padding-left: 20px;">8.05</p> <p style="padding-left: 20px;">6.62</p> <p style="padding-left: 20px;">15.05</p> <p style="padding-left: 20px;">8.9</p> <p style="padding-left: 20px;">10.9</p> <p style="padding-left: 20px;">12.26</p> <p style="padding-left: 20px;">D50 used in Calculations</p>	12.97	16.37							
<p>Depth (m)</p> <p>with known discharge value from K,N and Bray 1972</p> <p style="padding-left: 20px;">1.59</p> <p style="padding-left: 20px;">2.14</p> <p style="padding-left: 20px;">3.00</p> <p style="padding-left: 20px;">4.15</p> <p style="padding-left: 20px;">1.77</p> <p style="padding-left: 20px;">2.41</p> <p style="padding-left: 20px;">3.54</p> <p style="padding-left: 20px;">4.79</p> <p>from HEC-2 data</p>									
<p>Shields Number</p> <p>=0.85*(depth)*(slope)/((1.65)*(D50))</p> <p style="padding-left: 20px;">0.030</p> <p style="padding-left: 20px;">0.040</p> <p style="padding-left: 20px;">0.056</p> <p style="padding-left: 20px;">0.078</p> <p style="padding-left: 20px;">0.026</p> <p style="padding-left: 20px;">0.036</p> <p style="padding-left: 20px;">0.053</p> <p style="padding-left: 20px;">0.072</p> <p>based on depth estimated from HEC-2 data</p>									