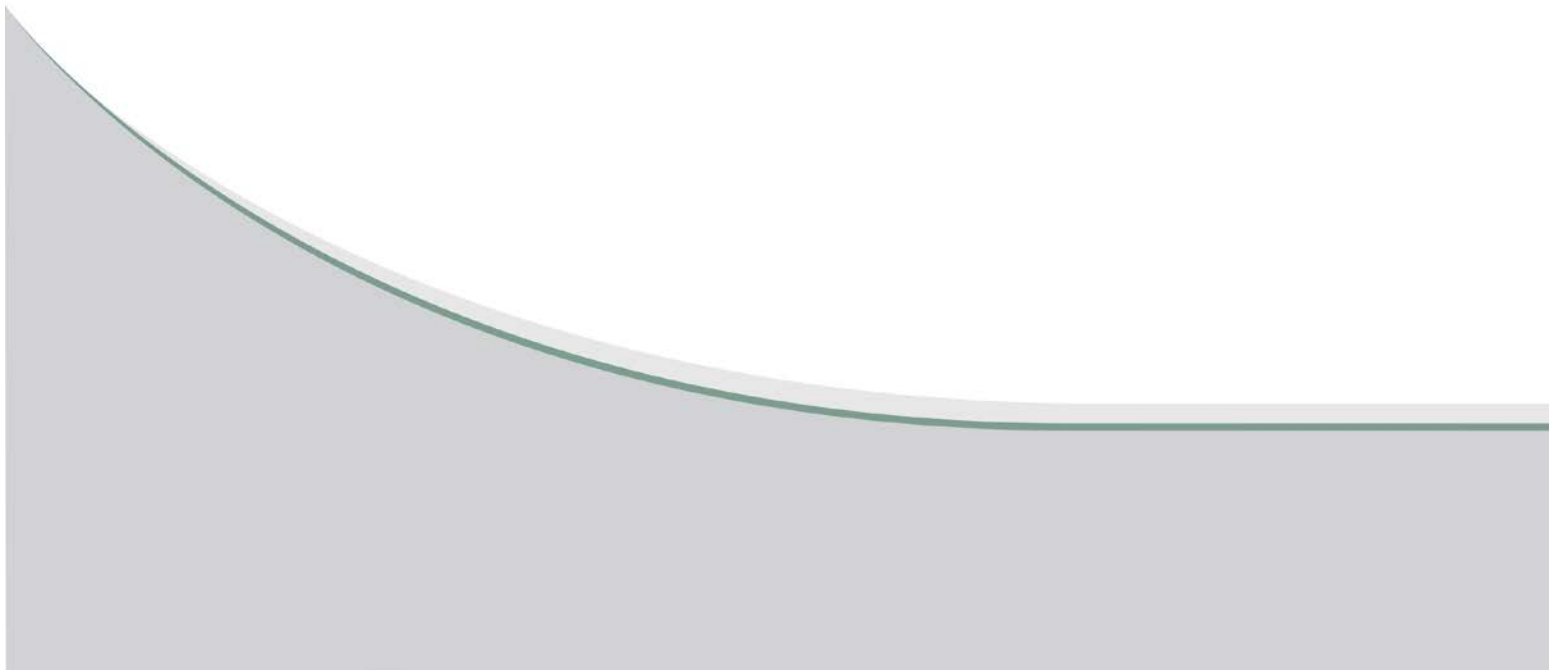


**APPENDIX A**  
**SAMPLE RUNOFF CALCULATION**



## Sample Daily Runoff Calculation for January 1, 1975

- 1) Determine measured water levels and E-P from observed data:

	Big Quill Lake		Little Quill Lake	
	12/31/74 (1)	01/01/75 (2)	12/31/74 (1)	01/01/75 (2)
Water Level (m)	515.173	515.185	518.235	518.236
E-P (m)	-0.00105	-0.00105	-0.00105	-0.00105

- 2) Calculate lake level with E-P correction:

Big Quill Lake:  $WL_{E-P,1} = WL_1 + (E-P)_1 = 515.173 - (-0.00105) = 515.172 \text{ m}$   
 $WL_{E-P,2} = WL_2 + (E-P)_2 = 515.185 - (-0.00105) = 515.184 \text{ m}$

Little Quill Lake:  $WL_{E-P,1} = WL_1 + (E-P)_1 = 518.235 - (-0.00105) = 518.234 \text{ m}$   
 $WL_{E-P,2} = WL_2 + (E-P)_2 = 518.236 - (-0.00105) = 518.235 \text{ m}$

- 3) Determine storage volume for measured lake level:

Use Figure 7 to interpolate storage volumes using measured lake levels.

Big Quill Lake:  $V_1 = 470,748 \text{ dam}^3$  (using lake level of 515.173 m)  
 $V_2 = 474,060 \text{ dam}^3$  (using lake level of 515.185 m)

Little Quill Lake:  $V_1 = 386,202 \text{ dam}^3$  (using lake level of 518.235 m)  
 $V_2 = 386,408 \text{ dam}^3$  (using lake level of 518.236 m)

- 4) Determine Storage volume corresponding to lake level with E-P correction:

Use Figure 7 to interpolate storage volumes using lake levels with E-P correction.

Big Quill Lake:  $V_{2,E-P} = 473,769 \text{ dam}^3$  (using lake level of 515.174 m)

Little Quill Lake:  $V_{2,E-P} = 386,204 \text{ dam}^3$  (using lake level of 518.235 m)

- 5) Determine  $\Delta$ Storage for measured lake levels:

Big Quill Lake:  $\Delta S = V_2 - V_1 = 474,060 - 470,748 = 3.312 \text{ dam}^3$

Little Quill Lake:  $\Delta S = V_2 - V_1 = 386,408 - 386,202 = 0.206 \text{ dam}^3$

6) Determine  $\Delta$ Storage due to E-P:

Big Quill Lake:  $\Delta S_{E-P} = V_{2,E-P} - V_2 = 473,769 - 474,060 = -0.291 \text{ dam}^3$

Little Quill Lake:  $\Delta S_{E-P} = V_{2,E-P} - V_2 = 386,204 - 386,408 = -0.204 \text{ dam}^3$

7) Determine spill volume from Little Quill Lake to Big Quill Lake

Use Figure 6 to interpolate spill volume using Little Quill Lake level 518.235 m ( $WL_1$ )

**Note:** Water only spills when  $WL_1 > 518.2 \text{ m}$

Big Quill Lake:  $V_{SPILL} = 4 \text{ dam}^3$

Little Quill Lake:  $V_{SPILL} = 4 \text{ dam}^3$

8) Determine spill volume from Big Quill Lake to Last Mountain Lake

Use Figure 7 to interpolate spill volume using Big Quill Lake level 515.173 m ( $WL_1$ )

**Note:** Water only spills when  $WL_1 > 521.47 \text{ m}$

Big Quill Lake:  $V_{LML} = 0 \text{ dam}^3$

9) Calculate total runoff for each lake:

Big Quill Lake:  $R_{BQL} = \Delta S + \Delta S_{E-P} - V_{Spill} = 3,312 + (-291) - 4 = 3,017 \text{ dam}^3$

Little Quill Lake:  $R_{LQL} = \Delta S + \Delta S_{E-P} - V_{Spill} = 206 + (-204) + 4 = 6 \text{ dam}^3$

10) Calculate total runoff:

$$R = R_{BQL} + R_{LQL} = 3,017 + 6 = 3,023 \text{ dam}^3$$