Worksheet to Calculate Lakeshore Erosion Potential

If submitting as part of an application to receive regulatory approval for an erosion control project, complete the applicant information below.

Location:

Site Assessment Location ¼ Sec. Twp. Rge. W_M	Lot Parcel Block Plan No.	Name of Subdivision	Name of Water Body if known

Applicant's Name and Address:

Print Name or Registered Company Name:		Home Telephone: ( )	Bus. Telephone: ( )
Address (Street, P.O. Box, etc.)	Place, Province:	Postal Code:	Fax: ( )

Is the applicant the riparian land owner? ☐ Yes ☐ No If no, PROVIDE written consent from the riparian land owner.

Is the applicant a Canadian citizen? ☐ Yes ☐ No Has the applicant attained the age of 18 years? ☐ Yes ☐ No

Is the applicant an employee of the Government of Alberta or member of the Legislative Assembly?

☐ No ☐ Yes Department. _____

Authorized Representative (if not the same as Applicant):

Print Name or Company Name:		Home Telephone: ( )	Bus. Telephone: ( )
Address (Street, P.O. Box, etc.)	Place, Province:	Postal Code:	Fax: ( )

PART A: Bank & Shoreline Features

Shoreline Variables	Descriptive Categories Erosion Intensity Value is Located in Parenthesis on Left Side of Each Category Box					Assigned EI
Bank Height (m) - height of bank (metres), measure from toe of the bank to top of the bank–lip.	(1) <0.3 m	(2) 0.3 – 1.5 m	(3) 1.5 – 3 m	(4) 3 – 6 m	(5) > 6 m	
Influence of Adjacent Structures – likelihood that adjacent structures are causing flank erosion at the site	(0) no hard armouring on either adjacent property	(1) hard armouring on one adjacent property	(2) hard armouring on both adjacent properties	(3) hard armouring on one adjacent property with measurable recession	(4) hard armouring on both adjacent properties with measurable recession adjacent to both structures	
Bank Vegetation - type and abundance of the vegetation occurring on the bank face and immediately on top of the bank lip	(0) bank composed of rocky outcropping unable to support vegetation	(1) dense vegetation, upland trees, shrubs and grasses, including lawns	(4) clumps of vegetation alternating with areas lacking vegetation	(7) lack of vegetation (cleared), crop or agricultural land		
Bank Stability - The degree to which bank and adjacent area (within 3 metres of the bank–lip) is stabilized by natural ground, shrub, and canopy vegetation (outside a 3 m pier access Corridor). Human disturbance is typified by tree removal, brushing, mowing, and lawn establishment.	(0) moderate to dense canopy trees with moderate to dense natural shrub layer; or other natural features prevents establishment of vegetation.	(1) moderate to dense natural ground vegetation and canopy trees with shrub layer substantially reduced; or few canopy trees with moderate to dense natural shrub layer.	(4) established lawn with moderate to dense canopy trees	(7) established lawn with few canopy trees		
Shoreline Geometry - general shape of the shoreline at the point of interest plus 180 metres on either side.	(1) coves or bays	(4) irregular shoreline or straight shoreline	(8) headland, point, or island			
Boat Wakes - proximity to and use of boat channels	(1) slow boat use and no water skiing or wake boarding	(6) Open to but far from water skiing, wake boarding and fast boat use	(12) Close to wake boarding area, water skiing and fast boat use			
Erosion Intensity Score (EI)						

PART A SCORE

PART B/C: MATRICES AND ATTENUATION MODIFICATIONS

Fetch Length

Step 1: Determine Fetch Length Base Score 1 by measuring the distance to the opposite shore of the lake perpendicular to the shoreline at the point of interest

Length	<0.5	0.5-1	1-2	2-4	4-16	16-48	>48	
Base Score	0	1	2	3	4	5	6	BASE SCORE 1

Fetch considers ice and waves due to wind strees in ice sheets leading to rafting

Step 2: Determine the Fetch Length Base Score Modifier 1-1 due to ***Aquatic Vegetation*** by comparing observation of vegetation in the offshore with the classicfation photos attached

Aquatic Vegetation

Density	None	Sparse or sub-mergent	Moderate or Scattered Patches	Dense or Abundant	
Modifier	0	0	-1	-2	MODIFIER 1-1

Modifier based on field observations of emergent vegetation attenuation effects on waves on Sylvan Lake

Step 3: Determine the Fetch Length Base Score Modifier 1-2 due to ***Nearshore Slope*** based on measurement of water depth at *6 m* and at

Nearshore Slope

	Depth (m) at 30 m	Depth (m) at 6 m <0.3	0.3 to 0.9	0.9 to 1.8	1.8 to 3.7	>3.7	
	<0.3	-1	-1	-1	-2	-2	
Slope	0.3 to 0.9	0	-1	-1	-2	-2	
Modifier	0.9 to 1.8	0	0	-1	-1	-1	
	1.8 to 3.7	+1	+1	0	-1	-1	
	>3.7	+1	+1	0	-1	-1	MODIFIER 1-2

Modifier based on attenuation of waves by shoreline type after RWG Carter 1991 Coastal Environments, Table 6 Morpodynamic Indices, Pg 102-103

Step 4: Determine the Fetch Length Modified Score

Modified Score 1 = Base Score 1 (Step 1) + Modifier 1-1 (Step 2) + Modifier 1-2 (Step 3) — MODIFIED SCORE 1

If Modified Score is less than 0, enter 0 in box to right

Record Modified Score 1 on Matrix 1 (see Step 6 below)

Shore Orientation

Step 5: Determine Shore Orientation Base Score 2, and select it on MATRIX 1 below

	Direction	Very Low <0.5 km fetches	Low 360(0)-135	Moderate 180-270	High 135-180	Very High 270-360	
Red Deer Region							or
	Base Score	0	1	2	3	4	
Edmonton Region	Direction	Very Low <0.5 km fetches	Low 360(0)-120	Moderate 180-270	High 120-180	Very High 270-360	or
	Base Score	0	1	2	3	4	
Cold Lake Region	Direction	Very Low <0.5 km fetches	Low 330-70	Moderate 135-240	High 70-135	Very High 240-330	or
	Base Score	0	1	2	3	4	
Lac La Biche Region	Direction	Very Low <0.5 km fetches	Low 315-135	Moderate 180-270	High 135-180	Very High 270-315	or
	Base Score	0	1	2	3	4	
Slave Lake Region	Direction	Very Low <0.5 km fetches	Low 135-270	Moderate 315-90	High 90-135	Very High 270-315	
	Base Score	0	1	2	3	4	

Based on wind rose diagrams derived from Stantec 2004 report. — BASE SCORE 2

Record Base Score 2 on Matrix 1 (see Step 6 below)

MATRIX 1 EXPOSURE

Step 6: Using the Fetch Length Modified Score (Step 4) and Shore Orientation Base Score (Step 5), establish the EROSION POTENTIAL of the shoreline by cross-referencing the Scores on the Matrix. The Matrix Score is the product of the two Modified Scores.

Fetch Length Modified Score [ ] From Step 4 — Shore Orientation Base Score [ ] From Step 5

Fetch Length Modified Score	Shore Orientation Base Score 0	1	2	3	4	5	
0	0	0	0	0	0	0	
1	0	1	2	3	4	5	
2	0	2	4	6	8	10	
3	0	3	6	9	12	15	
4	0	4	8	12	16	20	
5	0	5	10	15	20	25	MATRIX SCORE 1
6	0	6	12	18	24	30	
7	0	7	14	21	28	35	
8	0	8	16	24	32	40	
9	0	9	18	27	36	45	
10	0	10	20	30	40	50	
11	0	11	22	33	44	55	

EROSION POTENTIAL is cross-product of Scores

Bank Composition

Step 7: Determine Bank Composition Base Score 3 based on comparison with reference photos

Type	Bedrock or Armoured (manmade and boulder shores)	Hard Till (doesn't break up easily with a shovel), cobbles	Loose Till (breaks up easily with a shovel)	Loose Sands, Silts, Topsoil	Organics (marsh, ooze)	Loess (dunes)	
Base Score	0	1	2	3	4	5	BASE SCORE 3

Based on typical surficial geology for Alberta

Step 8: Determine the Bank Composition Base Score Modifier 3-1 by ***Bank Slope*** from available topographic profile data or from measurement in the field of the slope of the bank at the shoreline

Bank Slope

	Qualitative	Shallow	Moderate	Steep	Very Steep	
	Measured Slope	Shallower than 5 degrees	Between 5 and 25 degrees	Steeper than 25 degrees	Steeper than 45 degrees	
Material	Bedrock	0	0	0	0	
Type	Hard Till	-1	0	0	+3	MODIFIER 3-1
Modifier	Loose Till	-1	0	+1	+3	
	Sands, Silts	-1	0	+1	+4	
	Organics	0	+1	+1	+4	
	Loess	0	+1	+2	+4	

Slope Classes based on slope classes in:
Resources Inventory Committee. 1995. BC Physical Shorezone Mapping System, v 1.0
Howes and Kenk. 1997. Terrain Classification System for BC, 2nd Ed.

Step 9: Determine the Bank Composition Modified Score 3

Modified Score 3 = Base Score 3 (Step 7) + Modifier 3-1 (Step 8) — MODIFIED SCORE 3

Step 10: Multiply the EROSION POTENTIAL from Matrix 1 (Step 6) by the Bank Composition Modified Score (Step 9) to determine the FINAL SCORE

FINAL PART B/C SCORE = Matrix 1 Score (Step 6) times Modified Score 3 (Step 9) — PART B/C SCORE

PART D: SCORE SUMMARY

To calculate your final Erosion Potential Score simply add the Part A and Part B/C scores together to obtain you final score

PART A SCORE	+	PART B/C SCORE	=	FINAL SCORE