

APPENDIX H

City of Kelowna



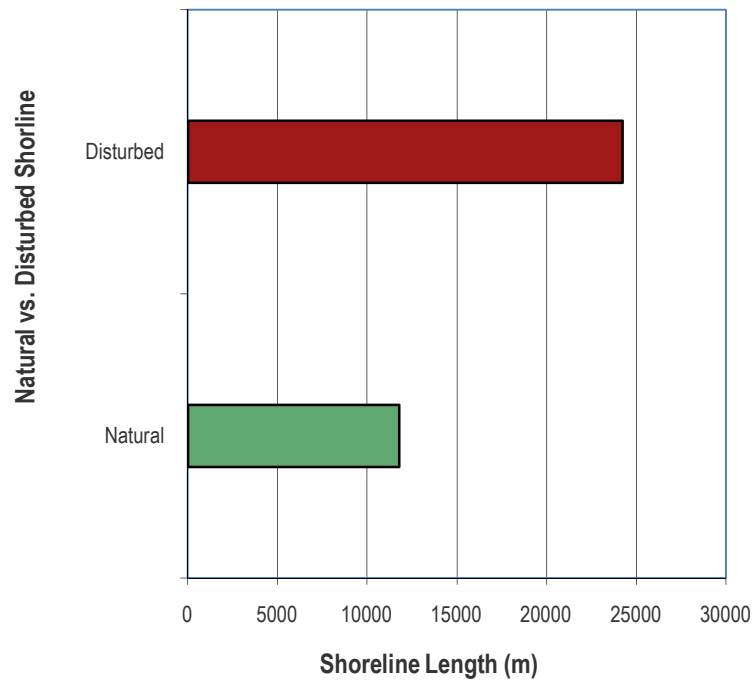


Figure 1: The percent of natural and disturbed shoreline.

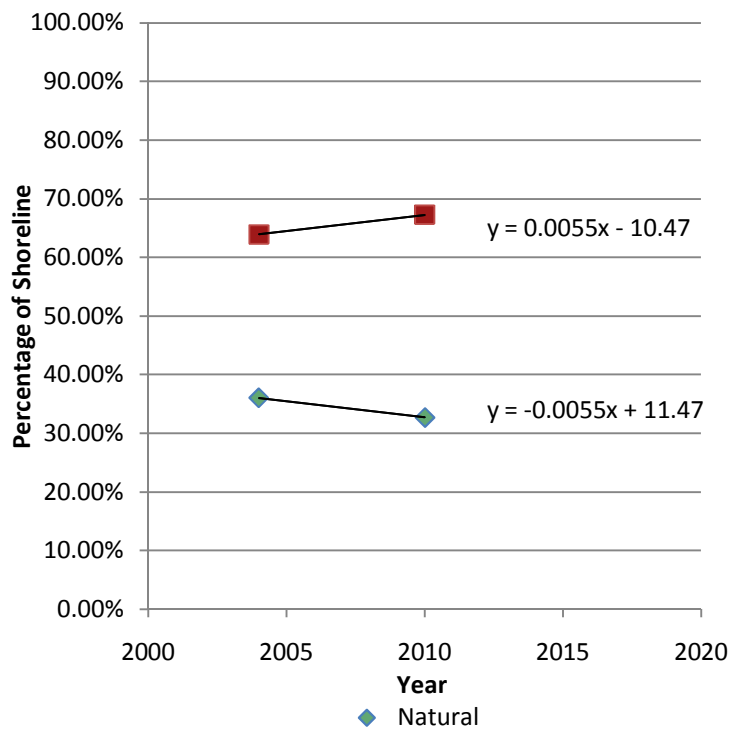


Figure 2: The percent of natural and disturbed shorelines in 2004 and 2010.



Table 1: The total shore length of percentage of shore length along Okanagan Lake in 2004 and 2010.

	2010		2004	
	% of Shoreline	Shore Length (m)	% of Shoreline	Shore Length (m)
Natural	32.73%	11794	36.06%	12992.14
Disturbed	67.27%	24239	63.94%	23040.85
Total		36033.0		36033.0

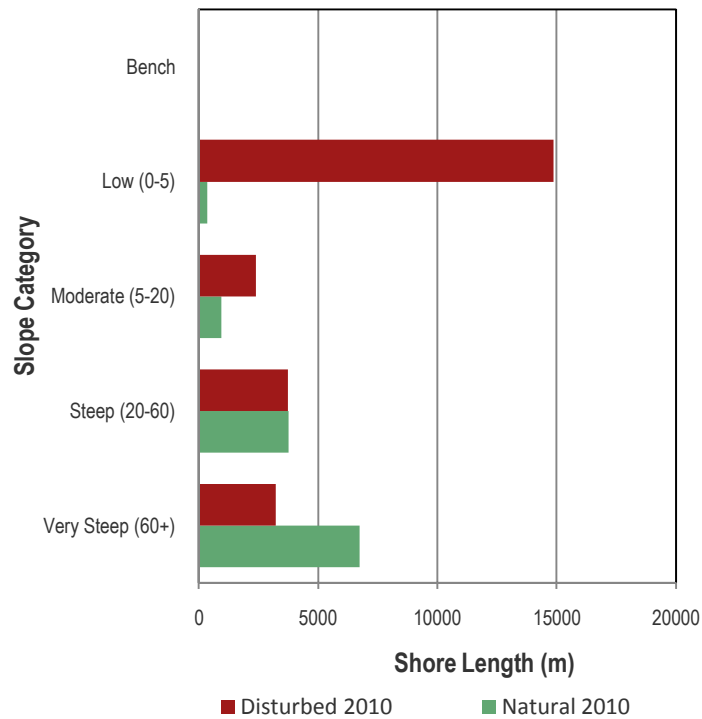


Figure 4: The length of natural and disturbed shorelines in each slope category.



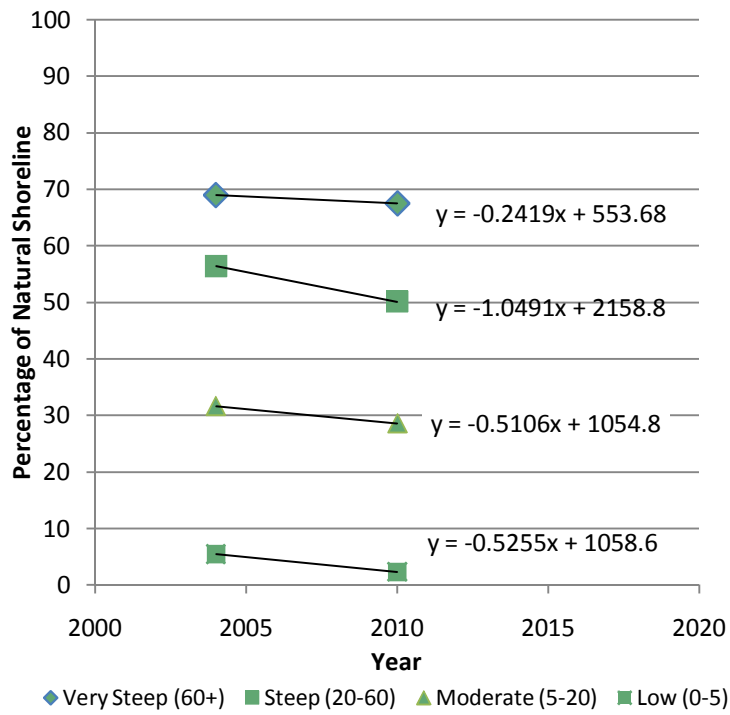


Figure 5: The percent of natural shoreline in each slope category in 2004 and 2010.



Table 2: The percentage of natural and disturbed shore lengths within each of the different slope categories on Okanagan Lake in 2004 and 2010.

2004							2010						
Slope	% of Total Shore Length	Total Shore Length (m)	Shore Length Natural (m)	Shore Length Disturbed (m)	% Natural	% Disturbed	Slope	% of Total Shore Length	Total Shore Length (m)	Shore Length Natural (m)	Shore Length Disturbed (m)	% Natural	% Disturbed
Very Steep (60+)	28	9974	6880	3095	69	31	Very Steep (60+)	27.7	9974	6735	3239	67.5	32.5
Steep (20-60)	21	7485	4222	3263	56	44	Steep (20-60)	20.8	7485	3751	3734	50.1	49.9
Moderate (5-20)	9	3340	1057	2283	32	68	Moderate (5-20)	9.3	3340	955	2386	28.6	71.4
Low (0-5)	42	15234	833	14400	5	95	Low (0-5)	42.3	15234	353	14881	2.3	97.7
Bench	0	0	0	0	0	0	Bench	0.0	0	0	0	0	0
Total	100.0	36033	12992	23041	36.1	63.9	Total	100.0	36033	11794	24239	32.7	67.3



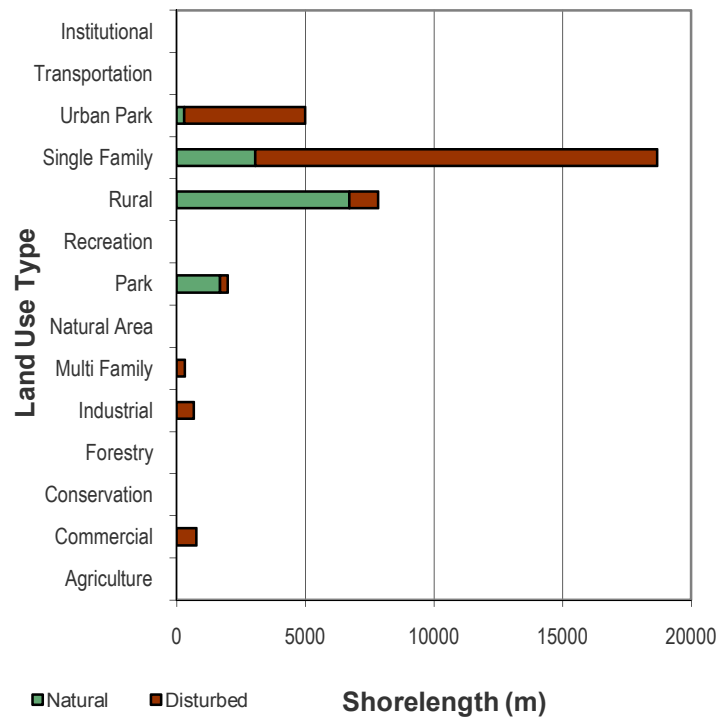


Figure 6: The length of natural and disturbed shoreline in each land use category

Table 3: The total length of natural and disturbed shorelines and their associated land uses around Okanagan Lake in 2004 and 2010.

	% of Shoreline Length	Shoreline Length (m)	Natural Shore Length (m)	Disturbed Shore Length (m)	% Natural	% Disturbed
Agriculture	0.0%	0	0	0	0	0
Commercial	2.1%	761	0	761	0.0%	100.0%
Conservation	0.0%	0	0	0	0	0
Forestry	0.0%	0	0	0	0	0
Industrial	1.9%	680	0	680	0.0%	100.0%
Multi Family	0.9%	333	0	333	0.0%	100.0%
Natural Area	0.0%	0	0	0	0	0
Park	5.5%	1990	1687	303	84.8%	15.2%
Recreation	0.0%	0	0	0	0	0
Rural	21.7%	7830	6714	1116	85.8%	14.2%
Single Family	51.9%	18692	3067	15625	16.4%	83.6%
Urban Park	13.9%	5008	301	4707	6.0%	94.0%
Transportation	2.1%	739	0	739	0.0%	100.0%
Institutional	0.0%	0	0	0	0	0



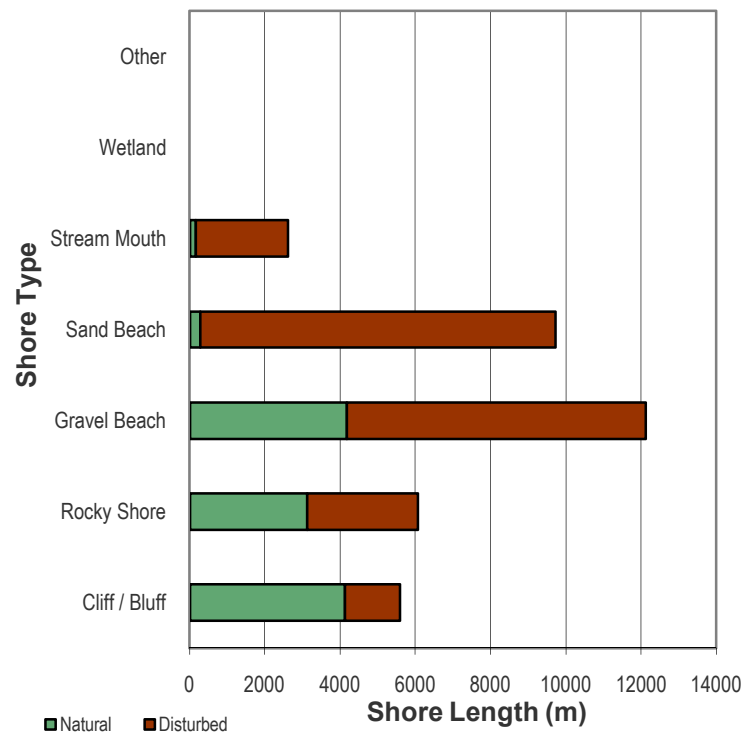


Figure 7: The length of natural and disturbed shoreline in each shore type category

Table 4: The total length of natural and disturbed shoreline and associated percentages within the different shore types that occur around Okanagan Lake in 2004 and 2010.

Shore Type	% of Total	Total Shoreline Length (m)	Natural Shore Length (m)	Disturbed Shore Length (m)	% Natural	% Disturbed
Cliff / Bluff	15.5%	5579	4106	1473.0	73.6%	26.4%
Rocky Shore	16.8%	6056	3118	2938.2	51.5%	48.5%
Gravel Beach	33.6%	12102	4163	7938.1	34.4%	65.6%
Sand Beach	26.9%	9706	268	9437.9	2.8%	97.2%
Stream Mouth	7.2%	2604	151	2452.8	5.8%	94.2%
Wetland	0.0%	0	0	0.0	0	0
Other	0.0%	0	0	0.0	0	0
Total	100.00%	36047				



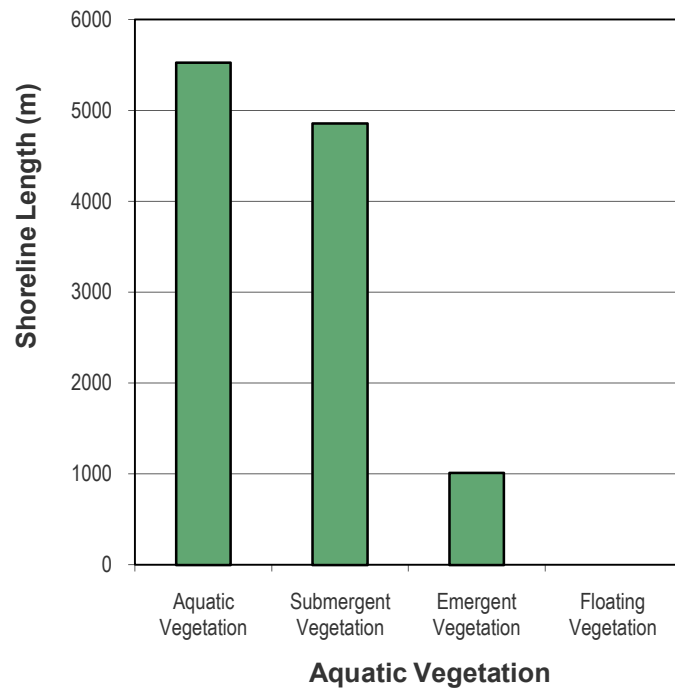


Figure 8: The shore length of each different type of aquatic vegetation.

Table 5: The total shoreline length and percentage that has aquatic, submergent, emergent, and floating vegetation along Okanagan Lake in 2004 and 2010.

Type	% of Total Shoreline Length	Shoreline Length (m)
Aquatic Vegetation	15.3%	5521
Submergent Vegetation	13.5%	4854
Emergent Vegetation	2.8%	1012
Floating Vegetation	0.0%	0



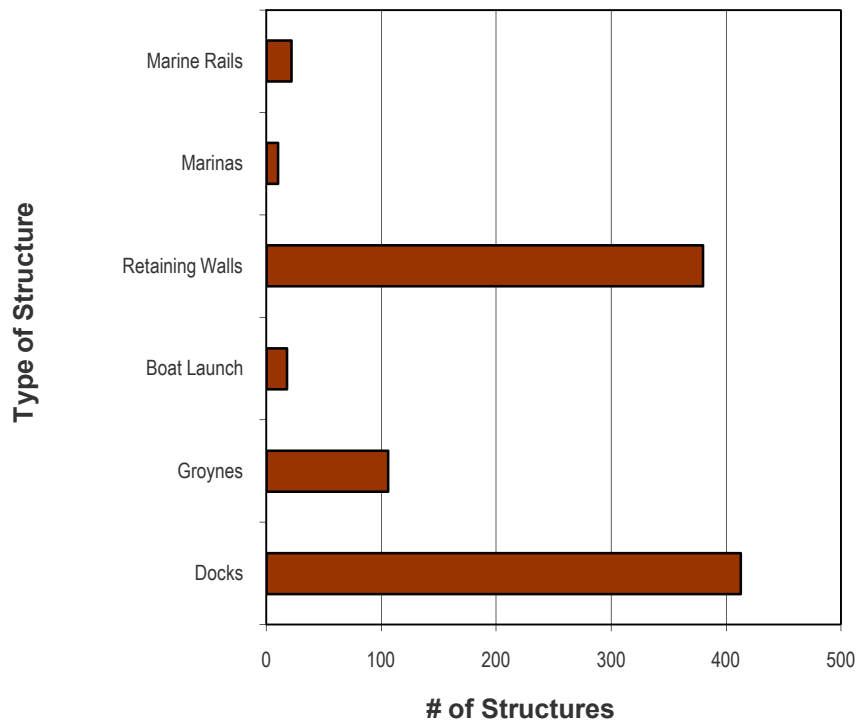


Figure 9: The total number of different types of modifications on Okanagan Lake

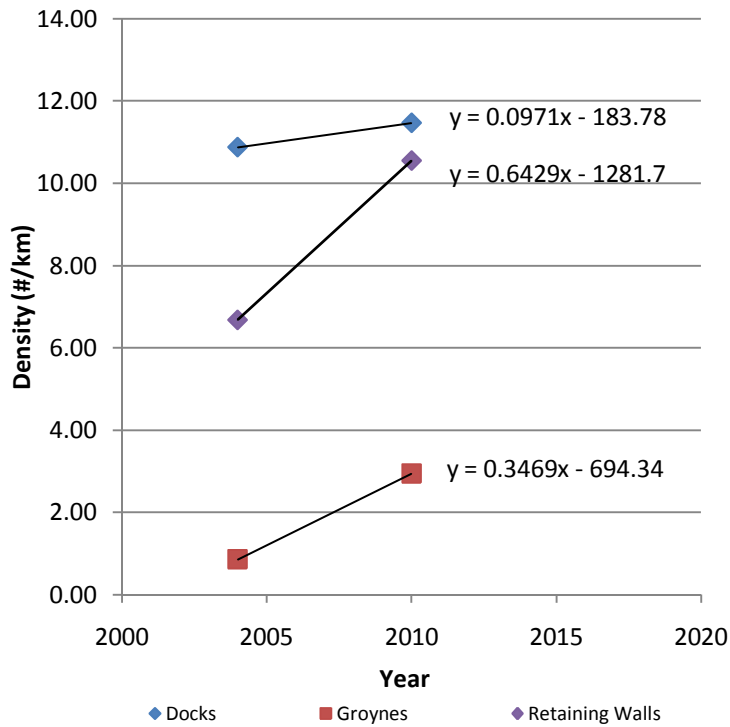
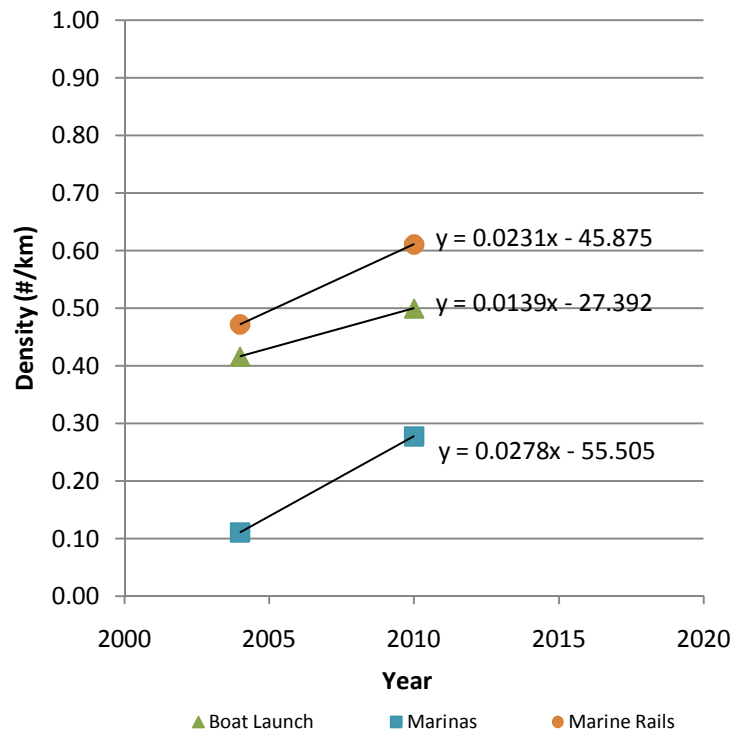


Figure 10: The density of docks, groynes, and retaining walls on Okanagan Lake in 2004 and 2010.



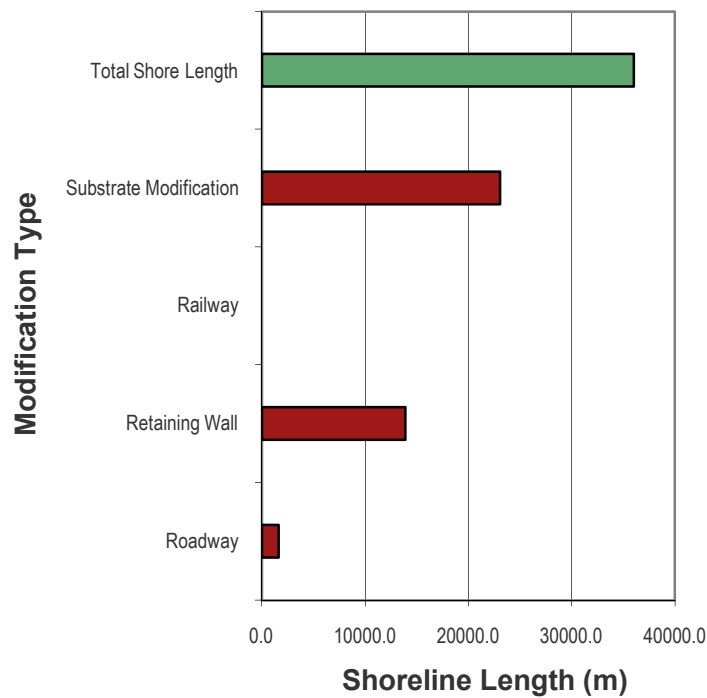


. **Figure 11:** The density of boath launches, marinas, and marine rails on Okanagan Lake in 2004 and 2010.

Table 6: The total number and density (# per km) of different shoreline modifications occurring around Okanagan Lake in 2004 and 2010.

2004			2010		
Type	Total #	# Per km	Type	Total #	# Per km
Docks	392	10.88	Docks	413	11.46
Groynes	31	0.86	Groynes	106	2.94
Boat Launch	15	0.42	Boat Launch	18	0.50
Retaining Walls	241	6.69	Retaining Walls	380	10.55
Marinas	4	0.11	Marinas	10	0.28
Marine Rails	17	0.47	Marine Rails	22	0.61

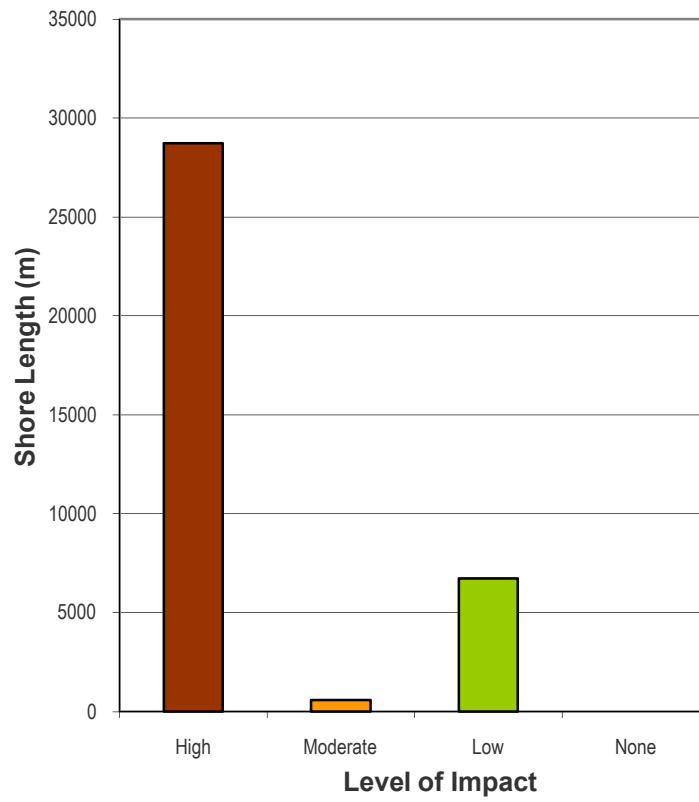




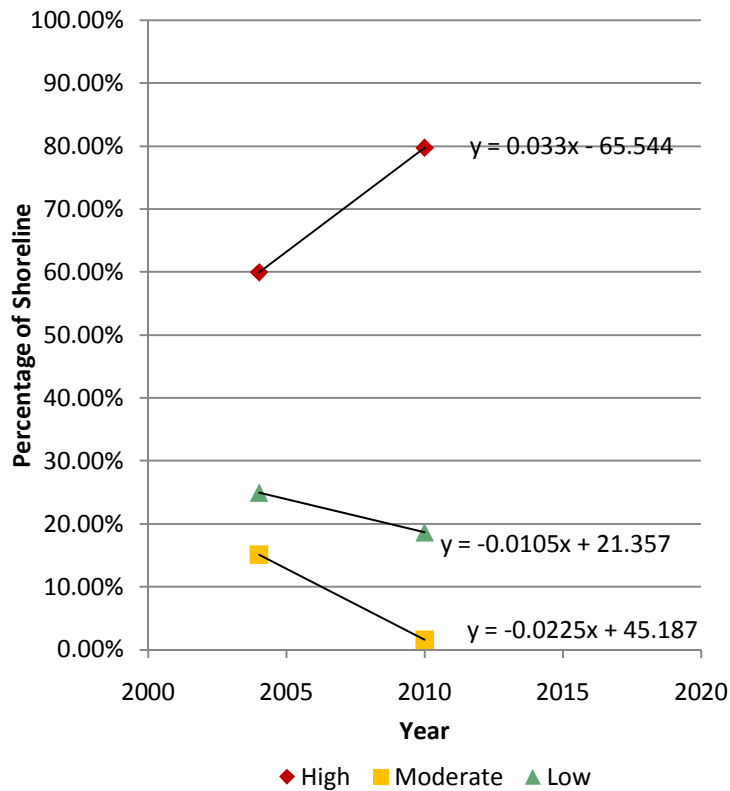
. **Figure 12:** The shore length of different shore modifiers were observed.

Table 7: The approximate shoreline length that has been impacted by substrate modification, road and railways, and retaining walls along Okanagan Lake in 2004 and 2010.

Category	% of Shoreline	Shorelength (m)
Roadway	5%	1634.4
Retaining Wall	39%	13903.4
Railway	0%	0.0
Substrate Modification	64%	23049.8
Total Shore Length		36033.0



. **Figure 13:** The shore length of different levels of impact on Okanagan Lake..



. **Figure 14:** The percentage of the shoreline classified as High, Moderate or Low Level of Impact in 2004 and 2010 on Okanagan Lake..

Table 8: The Level of Impact around Okanagan Lake (High > 40%, Moderate (10-40%), Low (<10%), None (0%)) in 2004 and 2010.

Level of Impact	2004		2010		Shore Length	
	% of Shoreline	Shore Length	Level of Impact	% of Shoreline		
High	59.97%	21607	High	79.77%	36033.0	
Moderate	15.07%	5431	Moderate	1.59%		
Low	24.96%	8995	Low	18.64%		
None	0.00%	0	None	0.00%		
					Shore Length	36033.0



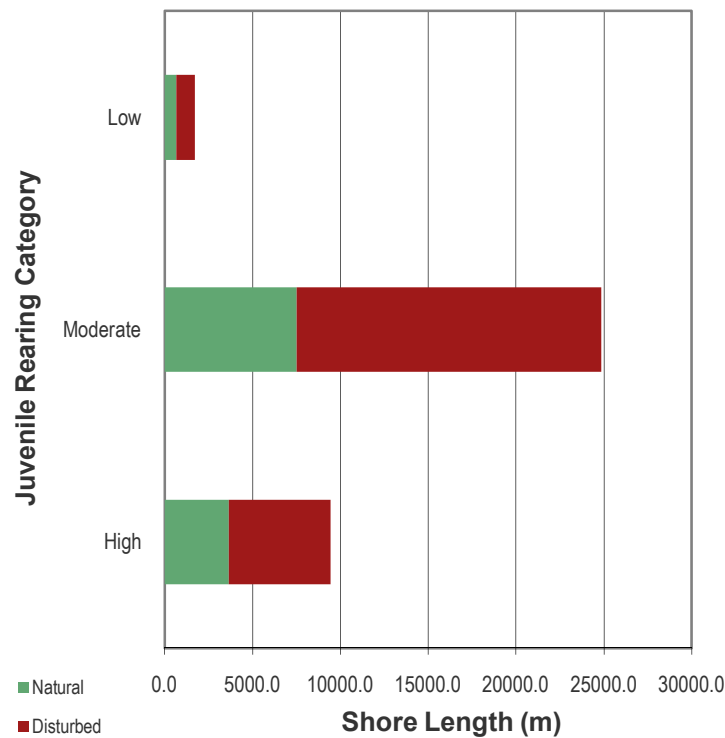


Figure 15: The natural and disturbed shore length of areas classified as having and High, Moderate, or Low Juvenile Rearing ranking.

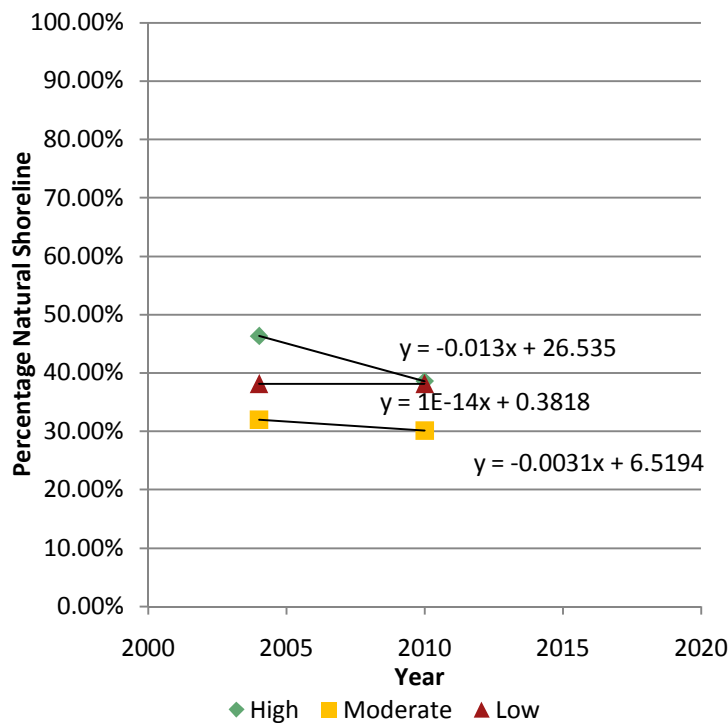


Figure 16: The percentage of High, Moderate, or Low Juvenile Rearing ranking in 2004 and 2010.



Table 9: The shore length and percentage of shoreline areas classified as having High, Moderate, or Low Juvenile Rearing Value on Okanagan Lake in 2004 and 2010.

Juvenile Rearing Category	# of Segments	2004					2010						
		Shore Length (m or %)					Shore Length (m or %)						
		Natural (m)	Natural (%)	Disturbed (m)	Disturbed (%)	Total	Natural (m)	Natural (%)	Disturbed (m)	Disturbed (%)	Total		
High	16	4377.4	46.36%	5065.07	53.64%	9443.0	High	16	3640.4	38.6%	5802.1	61.4%	9442.9
Moderate	40	7954.7	32.00%	16907	68.00%	24862.0	Moderate	40	7493.2	30.1%	17368.4	69.9%	24862.0
Low	3	660.0	38.18%	1068.8	61.82%	1729.2	Low	3	660.0	38.2%	1068.8	61.8%	1729.2
													36034.1

Table 10: The length of natural and disturbed shorelines within the different Okanagan Large Lakes Protocol Kokanee Shore Spawning areas in 2004 and 2010.

2004								2010							
Black		Red		Yellow		No Colour		Black		Red		Yellow		No Colour	
Natural	Disturbed	Natural	Disturbed	Natural	Disturbed	Natural	Disturbed	Natural	Disturbed	Natural	Disturbed	Natural	Disturbed	Natural	Disturbed
73.05%	26.95%	52.31%	47.69%	15.21%	84.79%	14.72%	85.28%	70.5%	29.5%	50.0%	50.0%	12.4%	87.6%	10.5%	89.5%
6817.99	2515.44	3096.27	2822.66	611.874	3410.72	2466.01	14292	6583	2750	2960	2959	499	3524	1752	15006



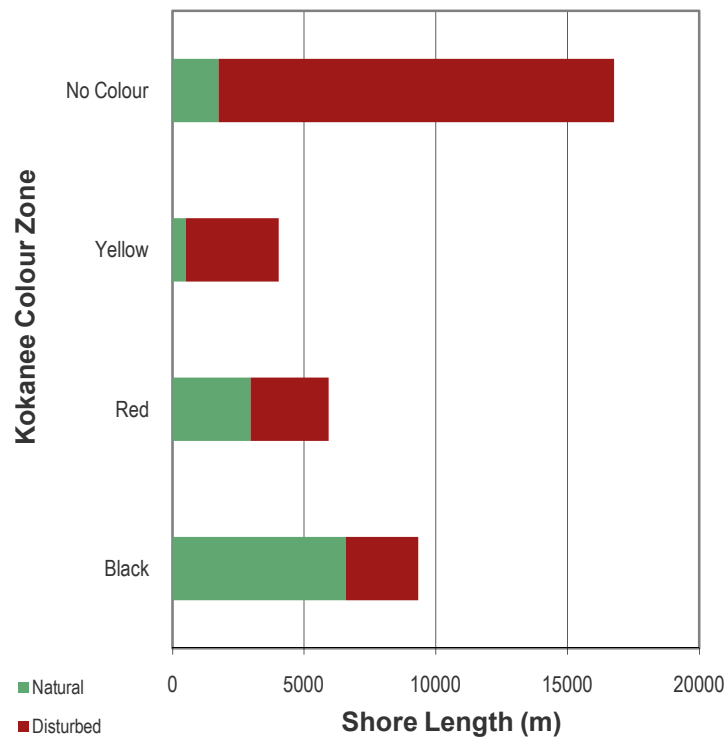


Figure 17: The length of natural and disturbed shoreline in the different shore spawning kokanee zones.

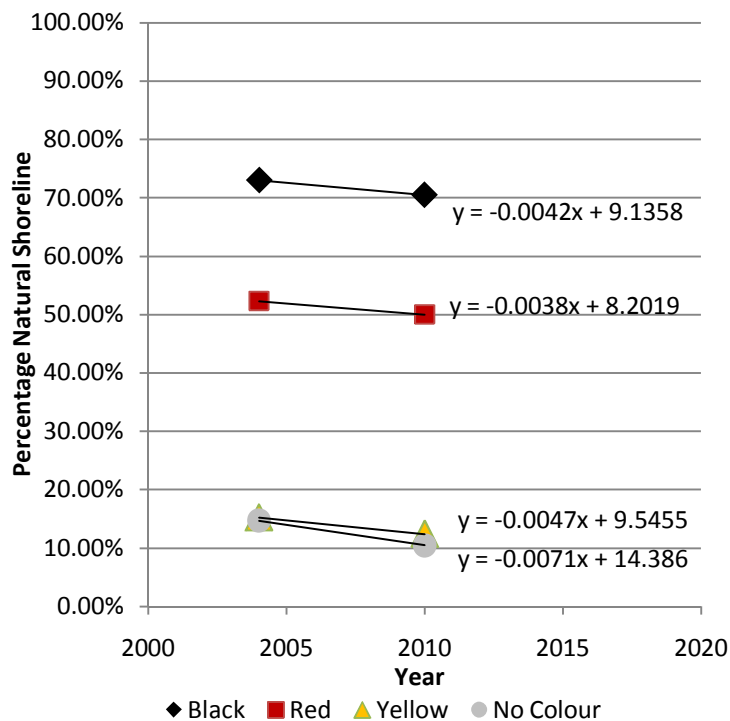


Figure 18: The percentage of natural shoreline in the different shore spawning kokanee zones in 2004 and 2010.



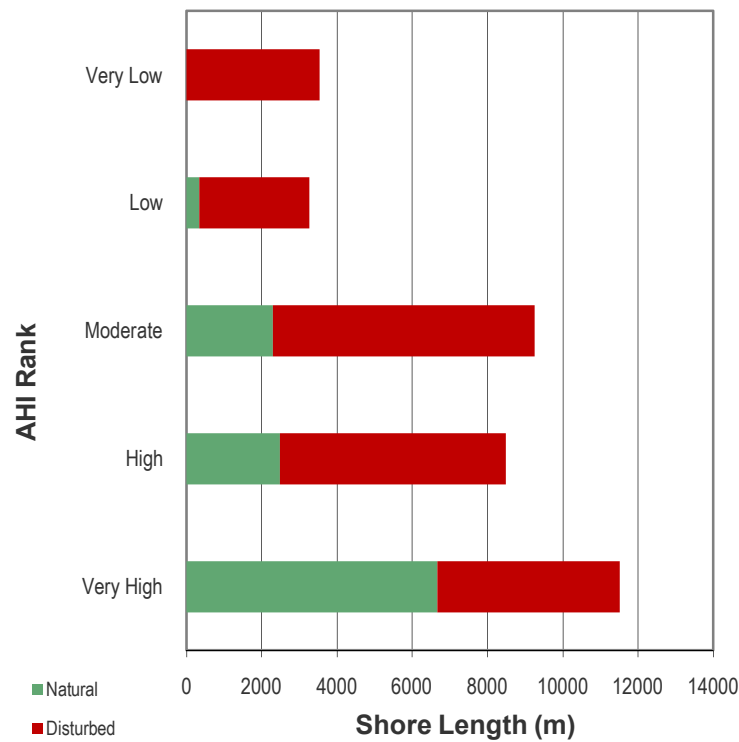


Figure 18: The length of natural and disturbed shoreline in the different AHI rankings.

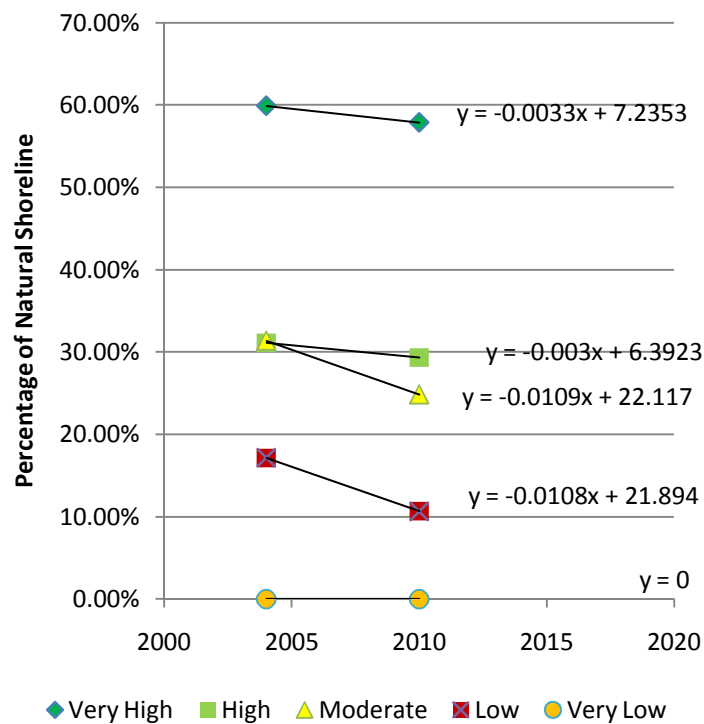


Figure 19: The length of natural shoreline in the different AHI rankings in 2004 and 2010.



Table 11: The shoreline that is natural and disturbed (m and %) within each of the different AHI rankings in 2004 and 2010.

AHI Rank	2004				AHI Rank	2010					
	Natural		Disturbed			Natural		Disturbed			
	m	%	m	%		m	%	m	%		
Very High	6889.05	59.88%	4616.19	8	40.12%	Very High	6660.44	57.9%	4844.80	5	42.1%
High	2643.64	31.13%	5847.58	6	68.87%	High	2489.05	29.3%	6002.18	2	70.7%
Moderate	2900.51	31.38%	6343.46	6	68.62%	Moderate	2297.07	24.8%	6946.91	3	75.2%
Low	558.928	17.16%	2698.94	5	82.84%	Low	347.048	10.7%	2910.82	4	89.3%
Very Low			3534.65		100.00%	Very Low			3534.65		100.0%
Low	0	0.00%	3		%	Very Low	0	0.0%	3		%