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# Updated Sea-Level Rise and Flooding Estimates for New Brunswick Coastal Sections

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Based on IPCC 5<sup>th</sup>  
Assessment Report

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2014

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## Estimated Extreme Total Sea Levels for Years 2010, 2030, 2050 and 2100<sup>5,6,7</sup> (metres above reference-CGVD28)

Table A- 1. Zone 1: Restigouche County

Zone 1: Restigouche County, HHWLT 1.6 m ± 0.2 (CGVD28) <sup>8,9</sup>					
Return Period	Surge Residual <sup>10</sup>	Level 2010	Level 2030	Level 2050	Level 2100
1-Year	0.60 ± 0.20	2.20 ± 0.40	2.31 ± 0.47	2.41 ± 0.54	2.79 ± 0.78
2-Year	0.74 ± 0.20	2.34 ± 0.40	2.45 ± 0.47	2.55 ± 0.54	2.93 ± 0.78
5-Year	0.92 ± 0.20	2.52 ± 0.40	2.63 ± 0.47	2.73 ± 0.54	3.11 ± 0.78
10-Year	1.06 ± 0.20	2.66 ± 0.40	2.77 ± 0.47	2.87 ± 0.54	3.25 ± 0.78
25-Year	1.24 ± 0.20	2.84 ± 0.40	2.95 ± 0.47	3.05 ± 0.54	3.43 ± 0.78
50-Year	1.38 ± 0.20	2.98 ± 0.40	3.09 ± 0.47	3.19 ± 0.54	3.57 ± 0.78
100-Year	1.52 ± 0.20	3.12 ± 0.40	3.23 ± 0.47	3.33 ± 0.54	3.71 ± 0.78

<sup>5</sup> Total Sea Level is defined as the sum of HHWLT, sea-level rise and storm surge return-period values for each return-period and for each of the years 2010, 2030, 2050 and 2100.

<sup>6</sup> Surge Residual range of uncertainty of 0.2 m includes the 0.08 m from *Storm Surge Extremal Analysis (Bernier, 2005)* and a further value of 0.12 m linked to the application of tide gauge-specific storm surge statistics to a wider coastal zone.

<sup>7</sup> Range of uncertainty for the Level 2010, 2030, 2050 and 2100. Extreme Total Sea Levels is the sum of the uncertainties for the HHWLT, Surge Residual and the respective Total Sea Level Changes from Table 5.

<sup>8</sup> Range of uncertainty represents the difference between the selected HHWLT value for Zone and the range of HHWLT values for Zone.

<sup>9</sup> It is noted that a new geodetic reference is being implemented in 2014 (CGVD2013) and that a correspondence to CGVD28 will need to be considered when applying the scenarios from this report into a CGVD2013 model.

<sup>10</sup> Storm surge residual estimated as average between Rivière-au-Renard and Escuminac tide gauge statistics (95% confidence value).

**Table A- 2. Zone 2: Gloucester County - County Line to Grande-Anse (inclusive)**

<b>Return Period</b>	<b>Surge Residual<sup>12</sup></b>	<b>Level 2010</b>	<b>Level 2030</b>	<b>Level 2050</b>	<b>Level 2100</b>
1-Year	0.60 ± 0.20	2.10 ± 0.30	2.22 ± 0.37	2.34 ± 0.44	2.76 ± 0.68
2-Year	0.74 ± 0.20	2.24 ± 0.30	2.36 ± 0.37	2.48 ± 0.44	2.90 ± 0.68
5-Year	0.92 ± 0.20	2.42 ± 0.30	2.54 ± 0.37	2.66 ± 0.44	3.08 ± 0.68
10-Year	1.06 ± 0.20	2.56 ± 0.30	2.68 ± 0.37	2.80 ± 0.44	3.22 ± 0.68
25-Year	1.24 ± 0.20	2.74 ± 0.30	2.86 ± 0.37	2.98 ± 0.44	3.40 ± 0.68
50-Year	1.38 ± 0.20	2.88 ± 0.30	3.00 ± 0.37	3.12 ± 0.44	3.54 ± 0.68
100-Year	1.52 ± 0.20	3.02 ± 0.30	3.14 ± 0.37	3.26 ± 0.44	3.68 ± 0.68

<sup>11</sup> Range of uncertainty represents the difference between the selected HHWLT value for Zone and the range of HHWLT values for Zone.

<sup>12</sup> Storm surge residual estimated as average between Rivière-au-Renard and Escuminac tide gauge statistics (95% confidence value).

**Table A- 3. Zone 3: Gloucester County - Grande-Anse to Pointe-Sauvage (inclusive)****Zone 3: Gloucester County - Grande-Anse to Pointe-Sauvage (inclusive), HHWLT 1.2 m ± 0.2 (CGVD28)<sup>13</sup>**

<b>Return Period</b>	<b>Surge Residual<sup>14</sup></b>	<b>Level 2010</b>	<b>Level 2030</b>	<b>Level 2050</b>	<b>Level 2100</b>
1-Year	0.59 ± 0.20	1.79 ± 0.40	1.91 ± 0.47	2.03 ± 0.54	2.46 ± 0.78
2-Year	0.67 ± 0.20	1.87 ± 0.40	1.99 ± 0.47	2.11 ± 0.54	2.54 ± 0.78
5-Year	0.79 ± 0.20	1.99 ± 0.40	2.11 ± 0.47	2.23 ± 0.54	2.66 ± 0.78
10-Year	0.97 ± 0.20	2.17 ± 0.40	2.29 ± 0.47	2.41 ± 0.54	2.84 ± 0.78
25-Year	1.11 ± 0.20	2.31 ± 0.40	2.43 ± 0.47	2.55 ± 0.54	2.98 ± 0.78
50-Year	1.23 ± 0.20	2.43 ± 0.40	2.55 ± 0.47	2.67 ± 0.54	3.10 ± 0.78
100-Year	1.34 ± 0.20	2.54 ± 0.40	2.66 ± 0.47	2.78 ± 0.54	3.21 ± 0.78

<sup>13</sup> Range of uncertainty represents the difference between the selected HHWLT value for Zone and the range of HHWLT values for Zone.

<sup>14</sup> Storm surge residual estimated as average between Rivière-au-Renard and Escuminac tide gauge statistics (mean value).

**Table A- 4. Zone 4: Gloucester County - Pointe-Sauvage to Northumberland County**

<b>Zone 4: Gloucester County - Pointe-Sauvage to Northumberland County Line, HHWLT 1.0 m ± 0.1 (CGVD28)<sup>15</sup></b>					
<b>Return Period</b>	<b>Surge Residual<sup>16</sup></b>	<b>Level 2010</b>	<b>Level 2030</b>	<b>Level 2050</b>	<b>Level 2100</b>
1-Year	0.59 ± 0.20	1.59 ± 0.30	1.72 ± 0.37	1.84 ± 0.44	2.28 ± 0.68
2-Year	0.67 ± 0.20	1.67 ± 0.30	1.80 ± 0.37	1.92 ± 0.44	2.36 ± 0.68
5-Year	0.79 ± 0.20	1.79 ± 0.30	1.92 ± 0.37	2.04 ± 0.44	2.48 ± 0.68
10-Year	0.97 ± 0.20	1.97 ± 0.30	2.10 ± 0.37	2.22 ± 0.44	2.66 ± 0.68
25-Year	1.11 ± 0.20	2.11 ± 0.30	2.24 ± 0.37	2.36 ± 0.44	2.80 ± 0.68
50-Year	1.23 ± 0.20	2.23 ± 0.30	2.36 ± 0.37	2.48 ± 0.44	2.92 ± 0.68
100-Year	1.34 ± 0.20	2.34 ± 0.30	2.47 ± 0.37	2.59 ± 0.44	3.03 ± 0.68

<sup>15</sup> Range of uncertainty represents the difference between the selected HHWLT value for Zone and the range of HHWLT values for Zone.

<sup>16</sup> Storm surge residual estimated as average between Rivière-au-Renard and Escuminac tide gauge statistics (mean value).

**Table A- 5. Zone 5: Gloucester County - Tracadie-Sheila (Tracadie Bay)**

<b>Zone 5: Gloucester County - Tracadie-Sheila (Tracadie Bay), HHWLT 0.7 m (CGVD28)<sup>17</sup></b>					
<b>Return Period</b>	<b>Surge Residual<sup>18</sup></b>	<b>Level 2010</b>	<b>Level 2030</b>	<b>Level 2050</b>	<b>Level 2100</b>
1-Year	0.59 ± 0.20	1.29 ± 0.20	1.42 ± 0.27	1.54 ± 0.34	1.98 ± 0.58
2-Year	0.67 ± 0.20	1.37 ± 0.20	1.50 ± 0.27	1.62 ± 0.34	2.06 ± 0.58
5-Year	0.79 ± 0.20	1.49 ± 0.20	1.62 ± 0.27	1.74 ± 0.34	2.18 ± 0.58
10-Year	0.97 ± 0.20	1.67 ± 0.20	1.80 ± 0.27	1.92 ± 0.34	2.36 ± 0.58
25-Year	1.11 ± 0.20	1.81 ± 0.20	1.94 ± 0.27	2.06 ± 0.34	2.50 ± 0.58
50-Year	1.23 ± 0.20	1.93 ± 0.20	2.06 ± 0.27	2.18 ± 0.34	2.62 ± 0.58
100-Year	1.34 ± 0.20	2.04 ± 0.20	2.17 ± 0.27	2.29 ± 0.34	2.73 ± 0.58

<sup>17</sup> Range of uncertainty represents the difference between the selected HHWLT value for Zone and the range of HHWLT values for Zone.

<sup>18</sup> Storm surge residual estimated as average between Rivière-au-Renard and Escuminac tide gauge statistics (mean value).

**Table A- 6. Zone 6: Northumberland County (Miramichi Bay)**

<b>Zone 6: Northumberland County (Miramichi Bay), HHWLT 1.0 m ± 0.1 (CGVD28)<sup>19</sup></b>					
<b>Return Period</b>	<b>Surge Residual<sup>20</sup></b>	<b>Level 2010</b>	<b>Level 2030</b>	<b>Level 2050</b>	<b>Level 2100</b>
1-Year	0.63 ± 0.20	1.63 ± 0.30	1.77 ± 0.37	1.89 ± 0.44	2.36 ± 0.68
2-Year	0.79 ± 0.20	1.79 ± 0.30	1.93 ± 0.37	2.05 ± 0.44	2.52 ± 0.68
5-Year	1.00 ± 0.20	2.00 ± 0.30	2.14 ± 0.37	2.26 ± 0.44	2.73 ± 0.68
10-Year	1.16 ± 0.20	2.16 ± 0.30	2.30 ± 0.37	2.42 ± 0.44	2.89 ± 0.68
25-Year	1.37 ± 0.20	2.37 ± 0.30	2.51 ± 0.37	2.63 ± 0.44	3.10 ± 0.68
50-Year	1.53 ± 0.20	2.53 ± 0.30	2.67 ± 0.37	2.79 ± 0.44	3.26 ± 0.68
100-Year	1.69 ± 0.20	2.69 ± 0.30	2.83 ± 0.37	2.95 ± 0.44	3.42 ± 0.68

<sup>19</sup> Range of uncertainty represents the difference between the selected HHWLT value for Zone and the range of HHWLT values for Zone.

<sup>20</sup> Storm surge residual estimated as Escuminac tide gauge statistics (95% confidence value).



**Table A- 7. Zone 7: Kent County - County Line to Saint Édouard-de-Kent (inclusive)**

<b>Zone 7: Kent County - County Line to Saint Édouard-de-Kent (inclusive), HHWLT 0.9 m ± 0.1 (CGVD28)<sup>21</sup></b>					
<b>Return Period</b>	<b>Surge Residual<sup>22</sup></b>	<b>Level 2010</b>	<b>Level 2030</b>	<b>Level 2050</b>	<b>Level 2100</b>
1-Year	0.78 ± 0.20	1.68 ± 0.30	1.80 ± 0.37	1.95 ± 0.44	2.43 ± 0.68
2-Year	0.95 ± 0.20	1.85 ± 0.30	1.99 ± 0.37	2.12 ± 0.44	2.60 ± 0.68
5-Year	1.18 ± 0.20	2.08 ± 0.30	2.22 ± 0.37	2.35 ± 0.44	2.83 ± 0.68
10-Year	1.35 ± 0.20	2.25 ± 0.30	2.39 ± 0.37	2.52 ± 0.44	3.00 ± 0.68
25-Year	1.58 ± 0.20	2.48 ± 0.30	2.62 ± 0.37	2.75 ± 0.44	3.23 ± 0.68
50-Year	1.75 ± 0.20	2.65 ± 0.30	2.79 ± 0.37	2.92 ± 0.44	3.40 ± 0.68
100-Year	1.93 ± 0.20	2.83 ± 0.30	2.97 ± 0.37	3.10 ± 0.44	3.58 ± 0.68

<sup>21</sup> Range of uncertainty represents the difference between the selected HHWLT value for Zone and the range of HHWLT values for Zone.

<sup>22</sup> Storm surge residual estimated as average between Escuminac and Shediac tide gauge statistics (95% confidence value).

**Table A- 8. Zone 8: Kent County - Saint-Édouard-de-Kent to Westmorland County****Zone 8: Kent County - Saint-Édouard-de-Kent to Westmorland County Line, HHWLT  
0.8 m ± 0.1 (CGVD28)<sup>23</sup>**

<b>Return Period</b>	<b>Surge Residual<sup>24</sup></b>	<b>Level 2010</b>	<b>Level 2030</b>	<b>Level 2050</b>	<b>Level 2100</b>
1-Year	0.92 ± 0.20	1.72 ± 0.30	1.87 ± 0.37	2.00 ± 0.44	2.48 ± 0.68
2-Year	1.11 ± 0.20	1.91 ± 0.30	2.06 ± 0.37	2.19 ± 0.44	2.67 ± 0.68
5-Year	1.36 ± 0.20	2.16 ± 0.30	2.31 ± 0.37	2.44 ± 0.44	2.92 ± 0.68
10-Year	1.54 ± 0.20	2.34 ± 0.30	2.49 ± 0.37	2.62 ± 0.44	3.10 ± 0.68
25-Year	1.79 ± 0.20	2.59 ± 0.30	2.74 ± 0.37	2.87 ± 0.44	3.35 ± 0.68
50-Year	1.98 ± 0.20	2.78 ± 0.30	2.93 ± 0.37	3.06 ± 0.44	3.54 ± 0.68
100-Year	2.17 ± 0.20	2.97 ± 0.30	3.12 ± 0.37	3.25 ± 0.44	3.73 ± 0.68

<sup>23</sup> Range of uncertainty represents the difference between the selected HHWLT value for Zone and the range of HHWLT values for Zone.

<sup>24</sup> Storm surge residual estimated as Shediac tide gauge statistics (95% confidence value).

**Table A- 9. Zone 9: Westmorland County - County Line to Cape Spear**

<b>Zone 9: Westmorland County - County Line to Cape Spear, HHWLT 0.7 m ± 0.1 (CGVD28)<sup>25</sup></b>					
<b>Return Period</b>	<b>Surge Residual<sup>26</sup></b>	<b>Level 2010</b>	<b>Level 2030</b>	<b>Level 2050</b>	<b>Level 2100</b>
1-Year	0.92 ± 0.20	1.62 ± 0.30	1.78 ± 0.37	1.91 ± 0.44	2.39 ± 0.68
2-Year	1.11 ± 0.20	1.81 ± 0.30	1.97 ± 0.37	2.10 ± 0.44	2.58 ± 0.68
5-Year	1.36 ± 0.20	2.06 ± 0.30	2.22 ± 0.37	2.35 ± 0.44	2.83 ± 0.68
10-Year	1.54 ± 0.20	2.24 ± 0.30	2.40 ± 0.37	2.53 ± 0.44	3.01 ± 0.68
25-Year	1.79 ± 0.20	2.49 ± 0.30	2.65 ± 0.37	2.78 ± 0.44	3.26 ± 0.68
50-Year	1.98 ± 0.20	2.68 ± 0.30	2.84 ± 0.37	2.97 ± 0.44	3.45 ± 0.68
100-Year	2.17 ± 0.20	2.87 ± 0.30	3.03 ± 0.37	3.16 ± 0.44	3.64 ± 0.68

<sup>25</sup> Range of uncertainty represents the difference between the selected HHWLT value for Zone and the range of HHWLT values for Zone.

<sup>26</sup> Storm surge residual estimated as Shediac tide gauge statistics (95% confidence value).

**Table A- 10. Zone 10: Westmorland County - Cape Spear to Port Elgin**

<b>Zone 10: Westmorland County - Cape Spear to Port Elgin, HHWLT 1.2 m ± 0.1 (CGVD28)<sup>27</sup></b>					
<b>Return Period</b>	<b>Surge Residual<sup>28</sup></b>	<b>Level 2010</b>	<b>Level 2030</b>	<b>Level 2050</b>	<b>Level 2100</b>
1-Year	0.92 ± 0.20	2.12 ± 0.30	2.28 ± 0.37	2.42 ± 0.44	2.90 ± 0.68
2-Year	1.11 ± 0.20	2.31 ± 0.30	2.47 ± 0.37	2.61 ± 0.44	3.09 ± 0.68
5-Year	1.36 ± 0.20	2.56 ± 0.30	2.72 ± 0.37	2.86 ± 0.44	3.34 ± 0.68
10-Year	1.54 ± 0.20	2.74 ± 0.30	2.90 ± 0.37	3.04 ± 0.44	3.52 ± 0.68
25-Year	1.79 ± 0.20	2.99 ± 0.30	3.15 ± 0.37	3.29 ± 0.44	3.77 ± 0.68
50-Year	1.98 ± 0.20	3.18 ± 0.30	3.34 ± 0.37	3.48 ± 0.44	3.96 ± 0.68
100-Year	2.17 ± 0.20	3.37 ± 0.30	3.53 ± 0.37	3.67 ± 0.44	4.15 ± 0.68

<sup>27</sup> Range of uncertainty represents the difference between the selected HHWLT value for Zone and the range of HHWLT values for Zone.

<sup>28</sup> Storm surge residual estimated as Shediac tide gauge statistics (95% confidence value).

**Table A- 11. Zone 11: Charlotte County (including Grand Manan)**

<b>Zone 11: Charlotte County (including Grand Manan), HHWLT 4.0 m ± 0.3 (CGVD28)<sup>29</sup></b>					
<b>Return Period</b>	<b>Surge Residual<sup>30</sup></b>	<b>Level 2010</b>	<b>Level 2030</b>	<b>Level 2050</b>	<b>Level 2100</b>
1-Year	0.47 ± 0.20	4.47 ± 0.50	4.63 ± 0.57	4.77 ± 0.64	5.31 ± 0.88
2-Year	0.54 ± 0.20	4.54 ± 0.50	4.70 ± 0.57	4.84 ± 0.64	5.38 ± 0.88
5-Year	0.64 ± 0.20	4.64 ± 0.50	4.80 ± 0.57	4.94 ± 0.64	5.48 ± 0.88
10-Year	0.71 ± 0.20	4.71 ± 0.50	4.87 ± 0.57	5.01 ± 0.64	5.55 ± 0.88
25-Year	0.80 ± 0.20	4.80 ± 0.50	4.96 ± 0.57	5.10 ± 0.64	5.64 ± 0.88
50-Year	0.87 ± 0.20	4.87 ± 0.50	5.03 ± 0.57	5.17 ± 0.64	5.71 ± 0.88
100-Year	0.94 ± 0.20	4.94 ± 0.50	5.10 ± 0.57	5.24 ± 0.64	5.78 ± 0.88

<sup>29</sup> Range of uncertainty represents the difference between the selected HHWLT value for Zone and the range of HHWLT values for Zone.

<sup>30</sup> Storm surge residual estimated as Saint John tide gauge statistics (95% confidence value).

**Table A- 12. Zone 12: Saint John County - County Line to Cape Spencer**

<b>Zone 12: Saint John County - County Line to Cape Spencer, HHWLT 4.4 m ± 0.2 (CGVD28)<sup>31</sup></b>					
<b>Return Period</b>	<b>Surge Residual<sup>32</sup></b>	<b>Level 2010</b>	<b>Level 2030</b>	<b>Level 2050</b>	<b>Level 2100</b>
1-Year	0.47 ± 0.20	4.87 ± 0.40	5.04 ± 0.47	5.18 ± 0.54	5.73 ± 0.78
2-Year	0.54 ± 0.20	4.94 ± 0.40	5.11 ± 0.47	5.25 ± 0.54	5.80 ± 0.78
5-Year	0.64 ± 0.20	5.04 ± 0.40	5.21 ± 0.47	5.35 ± 0.54	5.90 ± 0.78
10-Year	0.71 ± 0.20	5.11 ± 0.40	5.28 ± 0.47	5.42 ± 0.54	5.97 ± 0.78
25-Year	0.80 ± 0.20	5.20 ± 0.40	5.37 ± 0.47	5.51 ± 0.54	6.06 ± 0.78
50-Year	0.87 ± 0.20	5.27 ± 0.40	5.44 ± 0.47	5.58 ± 0.54	6.13 ± 0.78
100-Year	0.94 ± 0.20	5.34 ± 0.40	5.51 ± 0.47	5.65 ± 0.54	6.20 ± 0.78

<sup>31</sup> Range of uncertainty represents the difference between the selected HHWLT value for Zone and the range of HHWLT values for Zone.

<sup>32</sup> Storm surge residual estimated as Saint John tide gauge statistics (95% confidence value).

**Table A- 13. Zone 13: Albert County - Alma to Hopewell (Shepody Bay)**

<b>Zone 13: Albert County - Alma to Hopewell (Shepody Bay), HHWLT 6.5 m ± 0.5 (CGVD28)<sup>33</sup></b>					
<b>Return Period</b>	<b>Surge Residual<sup>34</sup></b>	<b>Level 2010</b>	<b>Level 2030</b>	<b>Level 2050</b>	<b>Level 2100</b>
1-Year	0.54 ± 0.20	7.04 ± 0.70	7.22 ± 0.77	7.36 ± 0.84	7.91 ± 1.08
2-Year	0.62 ± 0.20	7.12 ± 0.70	7.30 ± 0.77	7.44 ± 0.84	7.99 ± 1.08
5-Year	0.73 ± 0.20	7.23 ± 0.70	7.41 ± 0.77	7.55 ± 0.84	8.10 ± 1.08
10-Year	0.81 ± 0.20	7.31 ± 0.70	7.49 ± 0.77	7.63 ± 0.84	8.18 ± 1.08
25-Year	0.92 ± 0.20	7.42 ± 0.70	7.60 ± 0.77	7.74 ± 0.84	8.29 ± 1.08
50-Year	1.00 ± 0.20	7.50 ± 0.70	7.68 ± 0.77	7.82 ± 0.84	8.37 ± 1.08
100-Year	1.08 ± 0.20	7.58 ± 0.70	7.76 ± 0.77	7.90 ± 0.84	8.45 ± 1.08

<sup>33</sup> Range of uncertainty represents the difference between the selected HHWLT value for Zone and the range of HHWLT values for Zone.

<sup>34</sup> Storm surge residual estimated as Saint John tide gauge statistics (95% confidence value) + 15%.

**Table A- 14. Zone 14: Westmorland County - Rockport to Sackville**

<b>Zone 14: Westmorland County - Rockport to Sackville, HHWLT 7.5m ± 0.5 (CGVD28)<sup>35</sup></b>					
<b>Return Period</b>	<b>Surge Residual<sup>36</sup></b>	<b>Level 2010</b>	<b>Level 2030</b>	<b>Level 2050</b>	<b>Level 2100</b>
1-Year	0.57 ± 0.20	8.07 ± 0.70	8.25 ± 0.77	8.40 ± 0.84	8.95 ± 1.08
2-Year	0.65 ± 0.20	8.15 ± 0.70	8.33 ± 0.77	8.48 ± 0.84	9.03 ± 1.08
5-Year	0.76 ± 0.20	8.26 ± 0.70	8.44 ± 0.77	8.59 ± 0.84	9.14 ± 1.08
10-Year	0.85 ± 0.20	8.35 ± 0.70	8.53 ± 0.77	8.68 ± 0.84	9.23 ± 1.08
25-Year	0.96 ± 0.20	8.46 ± 0.70	8.64 ± 0.77	8.79 ± 0.84	9.34 ± 1.08
50-Year	1.04 ± 0.20	8.54 ± 0.70	8.72 ± 0.77	8.87 ± 0.84	9.42 ± 1.08
100-Year	1.13 ± 0.20	8.63 ± 0.70	8.81 ± 0.77	8.96 ± 0.84	9.51 ± 1.08

<sup>35</sup> Range of uncertainty represents the difference between the selected HHWLT value for Zone and the range of HHWLT values for Zone.

<sup>36</sup> Storm surge residual estimated as Saint John tide gauge statistics (95% confidence value) + 15%.