

### *Mapping hurricane exposure*

A DEM and information on windspeed and direction as the hurricane passed by Jamaica or made landfall are needed to create EV maps. The BSM of the bay was used in place of a DEM and information on windspeed and direction was obtained from actual and proxy images of the three hurricanes. These were available as processed ultra-high resolution QuikSCAT Scatterometer images of Hurricane Ivan and Dean (available at: <http://www.scp.byu.edu/data/Quikscat/HRStorms.html>) and were obtained as a .gif file and rectified to the Jamaican datum, JAD 2001. The images included the circular hurricane wind bands color-coded according to wind speed (in knots) that were overlaid with wind flags (wind direction) (Figure A4). Images of Ivan at its closest point to and after it passed Jamaica were available, but there were no images of Hurricane Ivan before, Dean before and Dean as it passed by Jamaica, and there were no images of Hurricane Gilbert, because the QuikSCAT images are only available for the period 1999–2009. As such, images of Ivan and Dean after they passed Jamaica, and a proxy processed ultra-high resolution QuikSCAT image that closely matched a satellite image of Hurricane Gilbert (Hurricane Ivan (September 11, 2004)) as it passed over Jamaica were used [36,52] (Figure A4).

Before the EV maps were generated, tracks of three hurricanes were downloaded as an ESRI point shapefile file from the National Oceanic and Atmospheric Administration (NOAA), NOAA's International Best Track Archive for Climate Stewardship (IBTrACS) website (<https://www.ncei.noaa.gov/products/international-best-track-archive>) [86,87] and re-projected to the Jamaican datum, JAD 2001. The imagery 'Georeference' function in ArcGIS Pro was used to center the image of Hurricane Dean and the proxy image of Gilbert on track point locations, which represented the approximate location of the hurricane's eye before they passed, at their closest point to and after they went passed Jamaica. The two images of Hurricane Ivan did not need to be centered, but an image of the hurricane after it passed Jamaica was centered on a point corresponding to the proximate location of the eye before it passed Jamaica (Figure A4). At each location, wind flags found close to Bluefields Bay were digitized as polylines in ArcGIS Pro and the 'Linear Directional Mean' function was used to determine wind direction from the polylines. Windspeed was estimated from the colour coded wind bands by using the upper range or value for wind speeds  $\geq 35$  knots ( $64 \text{ km hr}^{-1}$ ). There were no wind speed values  $> 50$  knots ( $93 \text{ km hr}^{-1}$ ), which were generally found closer to the track points. Windspeed was therefore estimated by averaging windspeed at the track point where the image was centered (this information was available in the attribute table of the tracks) and  $93 \text{ km hr}^{-1}$ . Maps of topographic exposure for various wind directions were generated using the 'hillshade' function/feature in ArcGIS Pro with the BSM (following [88,89]). Wind direction was used as the azimuth angle and a fixed wind inflection angle of  $20^\circ$  was used (following [52]) in the 'hillshade' function. Hillshade maps of exposure for each location and for each hurricane were generated and used in the following formula in the raster calculator in ArcGIS Pro:

$$EV = (\sum_{i=1}^n (\text{wind speed}_i * \text{hillshade map of exposure}_i)) / n, \quad (1)$$

where  $i$  is one of several locations where the actual or proxy hurricane image(s) was (were) located or centered and evaluated (e.g., location ( $i$ ) = 1, 2, 3, 4...) and  $n$  is the total number of locations evaluated/hillshade maps created.

**Table S1.** Validation criteria for finals models that included the most important predictors of the probability of submerged aquatic vegetation (SAV) loss in the Bluefields Bay Special Fish Conservation Area (BBSFCA), Westmoreland, Jamaica, for 23, 2 – 4-year periods, generated using a 5-fold cross validation of spatial Bayesian Integrated Nested Laplace Approximation (INLA) generalized linear mixed models. The validation criteria used included: mean squared error (MSE), root mean squared error (RMSE), mean absolute error (MAE), mean absolute percentage error (MAPE), bias (a measure of consistent under- or over-forecasting; BIAS), relative bias (rBIAS), and relative mean separation (rMSEP). Also included are the calculated values for the receiver operating characteristic (ROC) curve (AUC), deviance information criterion (DIC), and marginal R-squared (mR<sup>2</sup>).

Period	Predictors	AUC	DIC	mR <sup>2</sup>	MSE	RMSE	MAE	MAPE	BIAS	rBIAS	rMSEP
1984 - 1985	aspect+ aspect <sup>2</sup>	0.817	517.6	-2.1	31.42	5.60	5.54	557.26	-5.54	-1598.15	1.02
	bsm	0.714	529.8	-1.2	31.95	5.65	5.57	583.32	-5.57	-1602.25	1.04
	<b>dist+ bsm</b>	<b>0.728</b>	<b>525.9</b>	<b>-0.6</b>	<b>31.17</b>	<b>5.58</b>	<b>5.49</b>	<b>571.58</b>	<b>-5.49</b>	<b>-1579.07</b>	<b>1.04</b>
1985 - 1986	<b>dir</b>	<b>0.944</b>	<b>500.3</b>	<b>13.0</b>	<b>69.06</b>	<b>8.30</b>	<b>8.07</b>	<b>328.81</b>	<b>-8.07</b>	<b>-1332.97</b>	<b>1.05</b>
	bsm	0.956	548.2	6.1	101.52	10.07	9.27	344.93	-9.27	-1532.28	1.20
	bsm + slope	0.954	543.9	7.8	101.72	10.08	9.27	339.69	-9.27	-1532.57	1.20
1986 - 1987	<b>dist + dir</b>	<b>0.845</b>	<b>2643.5</b>	<b>13.7</b>	<b>16.95</b>	<b>4.12</b>	<b>3.90</b>	<b>198.36</b>	<b>-3.87</b>	<b>-94.65</b>	<b>1.12</b>
	dist + bsm+ bsm <sup>2</sup> + bsm <sup>3</sup>	0.868	2986.9	12.0	36.68	6.05	5.17	304.15	-5.17	-126.16	1.37
	dist+ dir + aspect	0.851	2638.1	13.7	17.11	4.14	3.92	198.30	-3.89	-95.01	1.12
	dist+ aspect + slope	0.849	3135.3	10.1	21.88	4.68	4.29	321.38	-4.29	-105.07	1.17
	dist+ aspect + bsm+ bsm <sup>2</sup> + bsm <sup>3</sup>	0.874	2929.0	12.6	35.86	5.98	5.12	289.81	-5.12	-124.82	1.37
1987 - 1988	dist	0.712	127.3	-0.2	45.68	7.35	7.35	590.37	-7.35	-8489.57	1.03
	dir	0.764	132.5	-0.2	48.83	7.56	7.48	610.01	-7.48	-8692.97	1.06
	<b>aspect</b>	<b>0.725</b>	<b>134.1</b>	<b>-0.1</b>	<b>41.08</b>	<b>6.96</b>	<b>7.01</b>	<b>644.02</b>	<b>-7.01</b>	<b>-8176.68</b>	<b>1.01</b>
	bsm	0.817	122.6	-0.3	54.78	8.07	7.96	582.33	-7.96	-9230.55	1.05
	dist + bsm	0.866	109.4	-1.1	84.37	9.86	9.68	525.11	-9.68	-	1.09
1988 - 1990										11219.13	
	dist + dist <sup>2</sup>	0.877	893.1	6.5	39.43	6.28	6.04	406.04	-6.04	-715.33	1.08
	<b>dist + dist<sup>2</sup> + aspect+ aspect<sup>2</sup></b>	<b>0.879</b>	<b>889.7</b>	<b>6.3</b>	<b>39.47</b>	<b>6.28</b>	<b>6.04</b>	<b>402.69</b>	<b>-6.04</b>	<b>-714.91</b>	<b>1.08</b>
	dist + dist <sup>2</sup> + bsm	0.898	825.2	11.5	50.66	7.11	6.76	377.87	-6.76	-800.35	1.12
	Aspect + aspect <sup>2</sup> + bsm	0.889	888.4	5.9	46.02	6.78	6.39	401.55	-6.39	-758.92	1.14

	dist + dist <sup>2</sup> + dir + bsm	0.901	819.1	9.3	48.71	6.98	6.63	361.86	-6.63	-785.33	1.11
1990-1993	<b>dir + bsm + bsm<sup>2</sup> + bsm<sup>3</sup></b>	0.760	<b>3426.4</b>	<b>14.2</b>	<b>14.05</b>	<b>3.75</b>	<b>3.64</b>	<b>339.69</b>	<b>-3.64</b>	<b>-90.73</b>	<b>1.06</b>
	dist + dist <sup>2</sup> + dir + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	0.805	3355.9	14.3	15.57	3.95	3.79	328.55	-3.79	-94.59	1.08
	dir + aspect + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	0.804	3346.3	14.0	14.77	3.84	3.71	333.64	-3.71	-92.66	1.06
	dir + slope + slope <sup>2</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	0.821	3285.7	14.0	15.37	3.92	3.78	323.89	-3.78	-94.30	1.07
	dist + dist <sup>2</sup> + dir + aspect + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	0.832	3272.2	14.2	16.50	4.06	3.89	322.23	-3.89	-96.94	1.09
	dist + dist <sup>2</sup> + dir + slope + slope <sup>2</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	0.839	3244.5	14.4	16.71	4.09	3.91	317.46	-3.91	-97.60	1.09
	dir + aspect + slope + slope <sup>2</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	0.844	3213.9	14.2	16.04	4.01	3.85	318.13	-3.85	-96.03	1.08
	dist + dist <sup>2</sup> + dir + aspect + slope + slope <sup>2</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	0.856	3170.7	14.7	17.55	4.19	3.99	311.65	-3.99	-99.65	1.10
1993-1994	dir	0.980	532.9	-36.9	547.31	22.59	21.55	149.50	-21.43	-1925.46	1.11
	<b>bsm + bsm<sup>2</sup> + bsm<sup>3</sup></b>	<b>0.947</b>	<b>922.3</b>	<b>9.8</b>	<b>135.69</b>	<b>11.49</b>	<b>10.43</b>	<b>324.67</b>	<b>-10.43</b>	<b>-907.19</b>	<b>1.23</b>
	dir + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	0.987	563.5	38.6	254.53	15.88	15.01	174.60	-15.01	-1362.07	1.13
	dist + dir + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	0.987	561.3	35.5	196.68	14.02	13.24	108.99	-13.24	-1095.90	1.14
	dist + aspect + aspect <sup>2</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	0.945	856.2	12.0	142.57	11.94	10.82	271.46	-10.82	-895.76	1.23
1994 - 1995	dist	0.975	396.7	5.8	453.76	21.28	18.21	341.71	-18.21	-3540.77	1.34
	<b>dir + dir<sup>2</sup></b>	<b>0.907</b>	<b>511.6</b>	<b>2.1</b>	<b>35.73</b>	<b>5.97</b>	<b>5.90</b>	<b>417.45</b>	<b>-5.90</b>	<b>-1270.88</b>	<b>1.02</b>
	dir + dir <sup>2</sup> + aspect + aspect <sup>2</sup>	0.922	490.4	4.7	41.65	6.45	6.33	425.66	-6.33	-1361.70	1.04
1995 - 1996	dist	0.680	1353.9	0.2	18.59	4.31	4.28	505.79	-4.28	-399.54	1.01
	dir	0.724	1195.6	3.0	22.83	4.78	4.70	441.00	-4.70	-443.05	1.03
	<b>aspect + aspect<sup>2</sup> + aspect<sup>3</sup> + aspect<sup>4</sup></b>	<b>0.673</b>	<b>1331.6</b>	<b>-1.3</b>	<b>18.42</b>	<b>4.28</b>	<b>4.23</b>	<b>484.96</b>	<b>-4.23</b>	<b>-397.36</b>	<b>1.02</b>
	dist + aspect + aspect <sup>2</sup> + aspect <sup>3</sup> + aspect <sup>4</sup> + slope	0.680	1333.8	-0.9	18.72	4.32	4.26	483.93	-4.26	-430.92	1.03
	dir + aspect + aspect <sup>2</sup> + aspect <sup>3</sup> + aspect <sup>4</sup>	0.751	1192.6	2.3	22.58	4.75	4.66	428.18	-4.66	-439.21	1.03
1996 - 1997	dist	0.886	239.3	-1.1	86.7	9.3	8.7	573.6	-8.7	-5281.8	1.1
	dir	0.990	149.1	-6.0	260.64	16.13	15.64	325.79	-15.64	-8601.72	1.06

	<i>aspect</i>	<b>0.637</b>	<b>281.9</b>	<b>-0.2</b>	<b>35.44</b>	<b>5.95</b>	<b>5.94</b>	<b>679.23</b>	<b>-5.94</b>	<b>-3721.99</b>	<b>1.00</b>
	dist + slope	0.915	237.8	-0.4	102.42	10.11	9.34	558.21	-9.34	-5832.06	1.16
	aspect + slope	0.738	239.3	-1.1	86.7	9.3	8.7	573.6	-8.7	-5281.8	1.1
1997 – 1999	<i>dir</i>	<b>0.713</b>	<b>907.5</b>	<b>3.6</b>	<b>27.59</b>	<b>5.25</b>	<b>5.18</b>	<b>488.98</b>	<b>-5.18</b>	<b>-731.55</b>	<b>1.03</b>
	dist + dir	0.743	895.0	3.0	29.42	5.42	5.29	474.80	-5.29	-738.02	1.04
	dist + bsm	0.880	839.0	2.7	41.85	6.47	6.14	424.68	-6.14	-858.44	1.12
	dist + aspect + bsm	0.883	831.8	1.0	40.50	6.36	6.03	406.05	-6.03	-841.72	1.12
	aspect + bsm + slope	0.878	846.4	1.0	40.13	6.33	6.00	408.66	-6.00	-839.98	1.13
1999 - 2000	dist	0.856	1650.9	4.9	35.63	5.96	5.50	395.56	-5.50	-316.53	1.16
	dir	0.842	1405.0	12.8	27.25	5.22	5.07	323.70	-5.07	-292.04	1.05
	<b>bsm + bsm<sup>2</sup></b>	<b>0.832</b>	<b>1641.4</b>	<b>6.8</b>	<b>25.04</b>	<b>5.00</b>	<b>4.82</b>	<b>392.83</b>	<b>-4.82</b>	<b>-277.13</b>	<b>1.09</b>
	dist + dir	0.887	1387.6	13.4	31.91	5.65	5.45	329.09	-5.45	-313.34	1.07
	dist + aspect	0.862	1638.3	4.7	34.99	5.91	5.46	386.83	-5.46	-313.74	1.16
2000 - 2002	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + dir	0.9190	1312.6	8.9	70.37	8.39	7.74	356.47	-7.74	-440.45	1.18
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + aspect	0.8843	1442.2	6.5	51.04	7.14	6.54	390.41	-6.54	-372.90	1.20
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	0.9315	1233.0	13.1	60.73	7.79	7.20	320.41	-7.20	-410.38	1.19
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + aspect + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	0.9345	1221.2	13.6	60.78	7.80	7.21	319.77	-7.21	-411.30	1.18
	<b>aspect + bsm + bsm<sup>2</sup> + bsm<sup>3</sup></b>	<b>0.7614</b>	<b>1677.3</b>	<b>2.8</b>	<b>22.92</b>	<b>4.79</b>	<b>4.66</b>	<b>455.95</b>	<b>-4.66</b>	<b>-265.14</b>	<b>1.06</b>
2002 - 2006	<b>dir + dir<sup>2</sup> + dir<sup>3</sup> + aspect + aspect<sup>2</sup> + aspect<sup>3</sup></b>	<b>0.708</b>	<b>5685.3</b>	<b>15.8</b>	<b>7.737</b>	<b>2.781</b>	<b>2.656</b>	<b>261.240</b>	<b>-2.655</b>	<b>-28.643</b>	<b>1.091</b>
	dist + dir + dir <sup>2</sup> + dir <sup>3</sup> + aspect + aspect <sup>2</sup> + aspect <sup>3</sup>	0.760	5556.9	16.8	8.178	2.859	2.706	249.316	-2.699	-29.110	1.134
	dist + dir + dir <sup>2</sup> + dir <sup>3</sup> + bsm + bsm <sup>2</sup>	0.775	5530.9	15.4	8.184	2.858	2.687	240.470	-2.680	-29.110	1.191
	dir + dir <sup>2</sup> + dir <sup>3</sup> + aspect + aspect <sup>2</sup> + aspect <sup>3</sup> + bsm + bsm <sup>2</sup>	0.731	5600.6	16.7	8.163	2.857	2.720	257.870	-2.717	-29.276	1.125
	dist + dir + dir <sup>2</sup> + dir <sup>3</sup> + aspect + aspect <sup>2</sup> + aspect <sup>3</sup> + slope + slope <sup>2</sup> + slope <sup>3</sup> + slope <sup>4</sup>	0.794	5382.8	15.4	7.963	2.822	2.616	208.265	-2.581	-26.916	1.219
2006 - 2008	<i>dist</i>	<b>0.817</b>	<b>3837.8</b>	<b>9.1</b>	<b>16.28</b>	<b>4.03</b>	<b>3.72</b>	<b>317.68</b>	<b>-3.72</b>	<b>-70.35</b>	<b>1.15</b>

	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + bsm + bsm <sup>2</sup>	0.867	3132.9	13.2	65.93	8.12	6.24	193.45	-6.24	-119.04	1.70
	dir + bsm + bsm <sup>2</sup>	0.839	3640.7	8.5	50.17	7.08	5.44	283.38	-5.44	-102.94	1.72
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + dir + bsm + bsm <sup>2</sup>	0.876	3106.5	16.7	65.17	8.07	6.29	211.45	-6.29	-115.90	1.65
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + bsm + bsm <sup>2</sup> + Dean	0.846	4499.5	-391.4	0.05	0.23	0.07	98.06	-0.06	-1.06	0.96
2008 - 2010	<b><i>dir + dir<sup>2</sup></i></b>	<b>0.846</b>	<b>2050.8</b>	<b>19.2</b>	<b>19.21</b>	<b>4.38</b>	<b>4.30</b>	<b>334.31</b>	<b>-4.30</b>	<b>-166.52</b>	<b>1.04</b>
	dist + dir + dir <sup>2</sup>	0.867	1978.9	19.2	24.46	4.95	4.74	321.83	-4.74	-183.64	1.08
	dir + dir <sup>2</sup> + bsm + bsm <sup>2</sup>	0.874	1913.3	18.5	21.18	4.60	4.47	291.21	-4.46	-172.81	1.07
	dist + dir + dir <sup>2</sup> + bsm + bsm <sup>2</sup>	0.874	1892.9	19.7	23.19	4.82	4.65	296.32	-4.65	-180.17	1.07
	dist + dir + dir <sup>2</sup> + Ivan	0.864	1986.4	18.9	23.62	4.86	4.63	298.37	-4.63	-181.65	1.03
	dir + dir <sup>2</sup> + bsm + bsm <sup>2</sup> + Ivan	0.878	1909.8	18.0	21.01	4.58	4.44	283.74	-4.44	-169.50	1.04
	dist + dir + dir <sup>2</sup> + bsm + bsm <sup>2</sup> + Avg	0.874	1890.7	20.1	23.49	4.85	4.68	298.99	-4.68	-181.38	1.05
2010 - 2013	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + slope + slope <sup>2</sup>	0.691	3576.6	1.5	12.65	3.56	3.34	365.99	-3.34	-84.71	1.14
	<b><i>dist+ dist<sup>2</sup> + dist<sup>3</sup> + dist<sup>4</sup> + Avg</i></b>	<b>0.673</b>	<b>3609.9</b>	<b>1.5</b>	<b>11.85</b>	<b>3.44</b>	<b>3.26</b>	<b>368.13</b>	<b>-3.26</b>	<b>-82.12</b>	<b>1.07</b>
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + aspect + slope	0.699	3625.3	1.5	11.90	3.45	3.27	360.75	-3.27	-81.28	1.12
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + aspect + Ivan	0.661	3628.4	1.5	12.36	3.52	3.27	363.49	-3.27	-87.62	1.11
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + Dean	0.673	3614.7	1.5	12.19	3.49	3.30	371.69	-3.30	-83.19	1.10
2013 - 2015	<b><i>dist+ dist<sup>2</sup> + dist<sup>3</sup></i></b>	<b>0.935</b>	<b>305.9</b>	<b>9.8</b>	<b>71.77</b>	<b>8.46</b>	<b>8.20</b>	<b>379.33</b>	<b>-8.20</b>	<b>-2875.17</b>	<b>1.07</b>
	bsm	0.962	284.6	7.9	187.64	13.57	12.49	392.63	-12.49	-4252.76	1.20
	aspect + aspect <sup>2</sup> + bsm	0.960	282.6	11.2	185.93	13.51	12.47	393.98	-12.47	-4244.73	1.19
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + bsm	0.968	239.9	24.9	191.96	13.69	12.86	336.27	-12.86	-4385.65	1.15
	dir + aspect + aspect <sup>2</sup> + bsm	0.962	285.9	5.0	137.47	11.70	10.90	309.02	-10.90	-3807.03	1.17
2015 - 2016	<b><i>dir</i></b>	<b>0.728</b>	<b>3945.4</b>	<b>6.5</b>	<b>10.49</b>	<b>3.24</b>	<b>3.17</b>	<b>344.72</b>	<b>-3.17</b>	<b>-65.88</b>	<b>1.04</b>
	dir + bsm	0.724	3924.9	6.7	11.09	3.33	3.24	344.40	-3.24	-67.32	1.04
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dir + bsm	0.736	3897.6	7.0	10.98	3.31	3.22	337.42	-3.22	-66.88	1.05
	dir + bsm + slope + slope <sup>2</sup>	0.745	3870.5	6.6	11.09	3.33	3.22	330.85	-3.22	-66.94	1.06
	<b><i>dist+ dist<sup>2</sup> + dist<sup>3</sup> + dir + aspect + aspect<sup>2</sup> + bsm</i></b>	<b>0.740</b>	<b>3889.7</b>	<b>6.7</b>	<b>10.66</b>	<b>3.26</b>	<b>3.16</b>	<b>329.58</b>	<b>-3.16</b>	<b>-65.72</b>	<b>1.05</b>
2016 - 2017	bsm + bsm <sup>2</sup>	0.743	1142.2	1.9	23.302	4.826	4.747	457.111	-4.747	-465.102	1.046

	dist + dir	0.789	1174.7	2.1	28.554	5.343	5.137	484.099	-5.137	-503.440	1.067
	<b>dist + bsm + bsm<sup>2</sup></b>	<b>0.801</b>	<b>1107.2</b>	<b>2.4</b>	<b>25.811</b>	<b>5.080</b>	<b>4.944</b>	<b>437.092</b>	<b>-4.944</b>	<b>-484.426</b>	<b>1.055</b>
	dist + dir + bsm + bsm <sup>2</sup>	0.775	1103.7	5.4	27.931	5.285	5.139	449.426	-5.139	-503.842	1.056
	dist + dir + slope	0.788	1175.7	2.1	27.984	5.288	5.092	477.800	-5.092	-499.277	1.065
2017 - 2019	slope + slope <sup>2</sup> + slope <sup>3</sup> + slope <sup>4</sup>	0.669	603.8	-1393.5	9.17	2.17	2.08	283.08	-2.06	-504.19	1.05
	dir + slope + slope <sup>2</sup> + slope <sup>3</sup> + slope <sup>4</sup>	0.739	2410.4	-3915.2	4.68	1.16	1.12	190.75	-1.12	-311.60	1.02
	aspect + aspect <sup>2</sup> + slope + slope <sup>2</sup> + slope <sup>3</sup> + slope <sup>4</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup> + bsm <sup>4</sup>	0.724	550.9	2.6	36.35	6.02	5.95	576.60	-5.95	-1242.79	1.03
2019 - 2020	<b>dir</b>	<b>0.778</b>	<b>116.9</b>	<b>0.2</b>	<b>49.96</b>	<b>7.07</b>	<b>7.05</b>	<b>779.01</b>	<b>-7.05</b>	<b>-</b> <b>13222.51</b>	<b>1.01</b>
	bsm	0.900	103.2	0.3	82.44	9.07	8.78	1024.29	-8.78	-	1.07
	dir + aspect + aspect <sup>2</sup>	0.751	112.2	-0.3	72.43	8.49	8.29	833.84	-8.29	-	1.04
										15041.75	
2020 - 2021	dir	0.770	2022.4	19.3	21.658	4.654	4.522	318.179	-4.522	-170.827	1.057
	dir + aspect	0.771	2018.8	19.4	21.734	4.662	4.528	316.885	-4.528	-171.061	1.058
	<b>dir + slope</b>	<b>0.773</b>	<b>2018.8</b>	<b>19.2</b>	<b>21.512</b>	<b>4.638</b>	<b>4.501</b>	<b>312.531</b>	<b>-4.501</b>	<b>-170.047</b>	<b>1.060</b>
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + bsm	0.937	1769.6	18.5	102.702	10.121	8.667	251.874	-8.665	-325.583	1.371
	dir + aspect + slope	0.774	2015.5	19.3	21.649	4.653	4.515	312.464	-4.514	-170.563	1.061

dir = direction from river mouth; dis = distance from river mouth; bsm = bathymetric surface model (depth); Ivan = exposure vulnerability (EV) for Hurricane Ivan; Dean = EV for Hurricane Dean; Avg. = average EV for Ivan and Dean.

**Table S2.** Validation criteria for finals models that included the most important predictors of the probability of submerged aquatic vegetation (SAV) gain in the Bluefields Bay Special Fish Conservation Area (BBSFCA), Westmoreland, Jamaica, for 23, 2 – 4-year periods, generated using a 5-fold cross validation of spatial Bayesian Integrated Nested Laplace Approximation (INLA) generalized linear mixed models. The validation criteria used included: mean squared error (MSE), root mean squared error (RMSE), mean absolute error (MAE), mean absolute percentage error (MAPE), bias (a measure of consistent under- or over-forecasting; BIAS), relative bias (rBIAS), and relative mean separation (rMSEP). Also included are the calculated values for the receiver operating characteristic (ROC) curve (AUC), deviance information criterion (DIC), and marginal R-squared ( $mR^2$ ).

Period	Predictors	AUC	DIC	$mR^2$	MSE	RMSE	MAE	MAPE	BIAS	rBIAS	rMSEP
1984 - 1985	dir	0.716	2086.9	8.9	18.27	4.27	4.19	384.44	-4.19	-182.56	1.04
	bsm + bsm <sup>2</sup>	0.829	1996.3	8.5	19.68	4.44	4.31	354.77	-4.31	-187.83	1.08
	dist + bsm + bsm <sup>2</sup>	0.817	1985.8	9.0	19.91	4.46	4.33	353.47	-4.33	-188.83	1.08
	dir + slope + slope <sup>2</sup> + slope <sup>3</sup> + slope <sup>4</sup>	0.723	2088.5	8.8	19.02	4.36	4.13	374.38	-4.13	-184.16	1.10
	<b>dist + slope + slope<sup>2</sup> + slope<sup>3</sup> + slope<sup>4</sup> + bsm + bsm<sup>2</sup></b>	<b>0.819</b>	<b>2001.5</b>	<b>7.8</b>	<b>16.82</b>	<b>3.69</b>	<b>3.39</b>	<b>290.45</b>	<b>-3.39</b>	<b>-151.26</b>	<b>1.15</b>
1985 - 1986	dist	0.724	787.8	0.4	27.23	5.22	5.14	550.06	-5.14	-886.39	1.02
	<b>aspect</b>	<b>0.675</b>	<b>760.4</b>	<b>0.3</b>	<b>24.80</b>	<b>4.98</b>	<b>4.93</b>	<b>511.95</b>	<b>-4.93</b>	<b>-804.13</b>	<b>1.02</b>
	dist + aspect	0.761	758.1	0.6	28.71	5.36	5.26	522.95	-5.26	-907.86	1.03
	dist + bsm	0.782	754.8	0.1	29.91	5.47	5.35	520.65	-5.35	-924.86	1.05
	dist + slope + slope <sup>2</sup>	0.732	787.0	0.4	27.38	5.23	5.14	552.42	-5.14	-916.55	1.03
1986 - 1987	ns										
1987 - 1988	<b>dir + bsm + bsm<sup>2</sup> + bsm<sup>3</sup></b>	<b>0.898</b>	<b>2395.5</b>	<b>25.7</b>	<b>25.95</b>	<b>5.09</b>	<b>4.74</b>	<b>227.63</b>	<b>-4.73</b>	<b>-117.92</b>	<b>1.16</b>
	dist + dir + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	0.889	2392.1	28.3	27.70	5.26	4.90	238.63	-4.90	-123.11	1.15
	dir + aspect + aspect <sup>2</sup> + aspect <sup>3</sup> + aspect <sup>4</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	0.914	2316.4	29.7	28.59	5.35	4.97	233.26	-4.97	-123.74	1.16
	dist + dir + aspect + aspect <sup>2</sup> + aspect <sup>3</sup> + aspect <sup>4</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	0.907	2325.4	29.5	29.49	5.43	5.05	232.80	-5.04	-125.60	1.16
	dir + aspect + aspect <sup>2</sup> + aspect <sup>3</sup> + aspect <sup>4</sup> + Gilbert	0.843	2516.4	-7.0	17.32	4.16	3.92	178.78	-3.80	-95.51	1.09
1988 - 1990	dir	0.833	614.4	5.7	38.47	6.20	6.09	434.01	-6.09	-1104.39	1.04

	<i>dir + slope</i>	<b>0.861</b>	<b>595.4</b>	<b>4.1</b>	<b>38.41</b>	<b>6.20</b>	<b>6.08</b>	<b>433.51</b>	<b>-6.08</b>	<b>-963.42</b>	<b>1.04</b>
	dist + dir + slope	0.877	566.6	4.3	41.37	6.43	6.29	425.70	-6.29	-769.67	1.05
1990 - 1993	dist+ dist <sup>2</sup> + dist <sup>3</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup> + bsm <sup>4</sup>	0.933	930.2	16.8	68.14	8.25	7.77	315.45	-7.77	-555.03	1.14
	dist + dir	0.915	896.0	18.9	46.83	6.84	6.65	278.06	-6.65	-474.76	1.06
	dir + aspect	0.920	894.6	19.2	47.32	6.88	6.69	277.98	-6.69	-477.46	1.05
	<i>dir + bsm</i>	<b>0.932</b>	<b>846.4</b>	<b>18.3</b>	<b>46.41</b>	<b>6.81</b>	<b>6.61</b>	<b>267.96</b>	<b>-6.61</b>	<b>-472.02</b>	<b>1.07</b>
	dist + dir + aspect	0.916	894.0	19.5	46.88	6.85	6.65	275.14	-6.65	-474.77	1.06
1993- 1994	dist+ dist <sup>2</sup> + dir + dir <sup>2</sup> + dir <sup>3</sup>	0.781	3214.9	11.7	14.99	3.87	3.71	326.23	-3.71	-90.98	1.09
	<i>dir + dir<sup>2</sup> + dir<sup>3</sup> + bsm</i>	<b>0.698</b>	<b>3434.9</b>	<b>6.8</b>	<b>11.79</b>	<b>3.43</b>	<b>3.35</b>	<b>346.18</b>	<b>-3.35</b>	<b>-82.09</b>	<b>1.05</b>
	dist+ dist <sup>2</sup> + dir + dir <sup>2</sup> + dir <sup>3</sup> + aspect	0.814	3160.4	10.6	15.24	3.90	3.73	312.81	-3.73	-91.27	1.10
	dist+ dist <sup>2</sup> + dir + dir <sup>2</sup> + dir <sup>3</sup> + bsm	0.811	3154.1	12.0	15.16	3.89	3.70	307.05	-3.70	-90.74	1.10
	dist+ dist <sup>2</sup> + dir + dir <sup>2</sup> + dir <sup>3</sup> + aspect + bsm	0.830	3101.1	10.6	15.36	3.92	3.70	290.69	-3.70	-90.54	1.12
1994 - 1995	dist	0.803	632.5	0.5	36.54	6.04	5.82	537.54	-5.82	-1334.13	1.07
	dir + dir <sup>2</sup> + dir <sup>3</sup>	0.836	698.1	-5064.5	0.00	0.07	0.01	98.81	0.00	-0.88	0.98
	<i>aspect</i>	<b>0.608</b>	<b>674.1</b>	<b>-0.2</b>	<b>26.34</b>	<b>5.13</b>	<b>5.09</b>	<b>570.57</b>	<b>-5.09</b>	<b>-1165.06</b>	<b>1.01</b>
	dist + aspect	0.803	623.5	0.7	37.33	6.10	5.90	534.18	-5.90	-1355.01	1.06
	dist + bsm	0.843	601.9	0.9	40.80	6.39	6.17	513.78	-6.17	-1412.19	1.07
1995 - 1996	dist	0.863	701.6	0.5	59.52	7.71	7.12	459.66	-7.12	-1165.03	1.16
	<i>aspect</i>	<b>0.661</b>	<b>811.2</b>	<b>0.1</b>	<b>25.65</b>	<b>5.06</b>	<b>5.01</b>	<b>545.40</b>	<b>-5.01</b>	<b>-821.97</b>	<b>1.02</b>
	bsm	0.901	650.2	3.7	57.19	7.56	7.11	430.66	-7.11	-1166.18	1.15
1996 - 1997	dist	0.737	1602.9	1.5	19.34	4.40	4.32	478.60	-4.32	-307.35	1.03
	dir	0.796	1336.8	7.3	24.33	4.93	4.83	387.00	-4.83	-343.86	1.04
	dist + dir	0.842	1323.6	3.3	23.52	4.85	4.71	359.85	-4.71	-335.64	1.06
	<i>dist + slope</i>	<b>0.726</b>	<b>1587.2</b>	<b>1.1</b>	<b>19.19</b>	<b>4.38</b>	<b>4.30</b>	<b>469.66</b>	<b>-4.30</b>	<b>-302.53</b>	<b>1.04</b>
	dist + slope	0.822	1336.7	4.5	22.44	4.74	4.62	349.54	-4.62	-332.89	1.05
1997 – 1999	dist	0.926	706.1	4.0	109.46	10.45	9.29	411.09	-9.29	-1396.50	1.25
	<i>dir</i>	<b>0.904</b>	<b>625.1</b>	<b>10.4</b>	<b>47.28</b>	<b>6.87</b>	<b>6.71</b>	<b>367.33</b>	<b>-6.71</b>	<b>-1008.49</b>	<b>1.05</b>



	dist + dir	0.954	578.8	14.9	139.95	11.76	10.81	355.71	-10.81	-1628.37	1.17
	dist + bsm	0.959	577.3	11.5	110.73	10.52	9.72	332.77	-9.72	-1464.16	1.18
1999 - 2000	<b>dir</b>	<b>0.859</b>	<b>454.8</b>	<b>8.4</b>	<b>49.65</b>	<b>7.04</b>	<b>6.90</b>	<b>427.56</b>	<b>-6.90</b>	<b>-1713.09</b>	<b>1.04</b>
	bsm	0.960	406.5	5.3	123.34	11.09	10.22	361.24	-10.22	-2527.80	1.19
	dist + dir	0.885	446.2	11.1	54.75	7.39	7.18	420.04	-7.18	-1782.38	1.06
	dir + bsm	0.965	377.0	3.5	91.35	9.54	8.98	308.19	-8.98	-2223.87	1.14
	dist + dir + bsm	0.970	369.6	5.7	99.74	9.97	9.37	301.48	-9.37	-2320.26	1.15
2000 - 2002	dist + dist <sup>2</sup> + dist <sup>3</sup> + aspect + slope + slope <sup>2</sup>	0.881	1751.9	6.0	39.56	6.29	5.87	365.04	-5.87	-327.84	1.15
	dist + dist <sup>2</sup> + dist <sup>3</sup> + slope + slope <sup>2</sup>	0.877	1757.5	6.1	39.81	6.31	5.88	368.05	-5.88	-328.49	1.15
	dir + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	0.891	1544.3	12.4	123.37	11.11	8.46	332.73	-8.46	-472.41	1.74
	<b>dir + slope + slope<sup>2</sup></b>	<b>0.818</b>	<b>1653.5</b>	<b>11.6</b>	<b>25.89</b>	<b>5.09</b>	<b>4.96</b>	<b>359.30</b>	<b>-4.96</b>	<b>-276.86</b>	<b>1.05</b>
	dir + bsm + bsm <sup>2</sup> + bsm <sup>3</sup> + slope + slope <sup>2</sup>	0.901	1538.7	12.5	132.31	11.50	8.66	327.75	-8.66	-484.02	1.78
2002 - 2006	dist + dir + Ivan	0.895	532.8	1.2	59.87	7.74	7.32	424.04	-7.32	-1576.08	1.22
	dist+ slope + slope <sup>2</sup> + bsm	0.918	499.9	3.3	51.17	7.15	6.91	405.45	-6.91	-1385.78	1.11
	dist+ dir + slope + slope <sup>2</sup> + bsm	0.925	489.8	-139.3	42.56	6.51	6.11	247.42	-6.10	-1241.89	1.19
2006 - 2008	dir + dir <sup>2</sup> + dir <sup>3</sup> + slope + slope <sup>2</sup> + slope <sup>3</sup> + slope <sup>4</sup>	0.779	3750.3	-486.0	0.99	0.60	0.35	120.22	-0.15	-3.62	15.73
	<b>bsm + bsm<sup>2</sup> + bsm<sup>3</sup> + Ivan</b>	<b>0.718</b>	<b>3292.8</b>	<b>12.2</b>	<b>11.72</b>	<b>3.42</b>	<b>3.34</b>	<b>321.85</b>	<b>-3.33</b>	<b>-77.90</b>	<b>0.96</b>
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + aspect + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	0.843	2815.8	11.3	18.24	4.26	3.92	241.84	-3.89	-91.52	1.26
	dir + dir <sup>2</sup> + dir <sup>3</sup> + dir <sup>4</sup> + slope + slope <sup>2</sup> + slope <sup>3</sup> + slope <sup>4</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	0.727	2831.8	-516.5	0.04	0.21	0.06	97.37	-0.05	-0.99	0.96
	bsm + bsm <sup>2</sup> + bsm <sup>3</sup> + Avg	0.696	3343.0	11.9	11.98	3.46	3.39	338.51	-3.38	-79.17	1.04
2008 - 2010	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup>	0.735	2800.7	1.5	16.19	4.02	3.81	377.16	-3.81	-112.62	1.11
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + dir	0.783	2720.6	2.8	16.89	4.11	3.88	350.16	-3.88	-120.97	1.12
	dir + bsm + bsm <sup>2</sup> + bsm <sup>3</sup> + bsm <sup>4</sup>	0.692	2914.9	1.8	14.20	3.77	3.63	390.09	-3.63	-121.14	1.08
	<b>aspect + bsm + bsm<sup>2</sup> + bsm<sup>3</sup> + bsm<sup>4</sup></b>	<b>0.726</b>	<b>2876.4</b>	<b>1.2</b>	<b>13.65</b>	<b>3.69</b>	<b>3.54</b>	<b>377.66</b>	<b>-3.54</b>	<b>-111.90</b>	<b>1.09</b>
2010 - 2013	<b>dist+ dist<sup>2</sup> + dist<sup>3</sup> + bsm</b>	<b>0.930</b>	<b>3024.0</b>	<b>37.2</b>	<b>21.79</b>	<b>4.67</b>	<b>4.33</b>	<b>178.08</b>	<b>-4.27</b>	<b>-66.27</b>	<b>1.20</b>

	dist+ dist <sup>2</sup> + dist <sup>3</sup> + bsm + slope + slope <sup>2</sup>	0.936	2963.1	37.3	23.02	4.80	4.43	178.87	-4.35	-67.53	1.22
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + bsm + Avg.	0.930	3003.3	36.3	21.94	4.68	4.32	179.95	-4.24	-65.83	1.32
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + bsm + slope + slope <sup>2</sup> + Avg.	0.936	2933.8	38.4	23.63	4.86	4.49	182.91	-4.40	-69.07	1.30
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + bsm + slope + slope <sup>2</sup> + Ivan	0.935	2960.1	37.5	23.09	4.80	4.44	179.75	-4.36	-67.64	1.25
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + bsm + Dean	0.930	2992.3	38.4	22.67	4.76	4.40	179.57	-4.34	-67.35	1.28
2013 - 2015	<b>dist+ dist<sup>2</sup> + dist<sup>3</sup> + dist<sup>4</sup> + dir + aspect + slope + slope<sup>2</sup></b>	<b>0.704</b>	<b>5268.8</b>	<b>5.6</b>	<b>7.94</b>	<b>2.82</b>	<b>2.71</b>	<b>302.82</b>	<b>-2.71</b>	<b>-38.65</b>	<b>1.07</b>
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + dir + Ivan	0.688	5321.6	5.8	8.12	2.85	2.76	316.04	-2.76	-39.38	1.02
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + dir + aspect + Ivan	0.695	5308.2	5.8	8.04	2.84	2.74	312.14	-2.74	-39.12	1.03
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + dir + slope + slope <sup>2</sup> + Ivan	0.702	5276.7	5.7	8.05	2.84	2.73	306.43	-2.73	-38.99	1.03
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + dir + Avg.	0.687	5323.1	5.7	8.03	2.83	2.74	314.53	-2.74	-39.12	1.04
2015 - 2016	bsm	0.950	227.9	5.8	150.83	12.06	11.24	465.03	-11.24	-5843.99	1.17
	<b>dist+ dist<sup>2</sup> + dist<sup>3</sup></b>	<b>0.919</b>	<b>250.4</b>	<b>6.9</b>	<b>66.50</b>	<b>8.15</b>	<b>7.98</b>	<b>461.08</b>	<b>-7.98</b>	<b>-4492.31</b>	<b>1.04</b>
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dir	0.937	242.1	4.0	67.36	8.21	8.00	426.72	-8.00	-4538.80	1.05
	dir + bsm	0.949	235.8	2.3	103.02	10.13	9.57	380.00	-9.57	-5388.82	1.14
2016 - 2017	<b>dist+ dist<sup>2</sup> + dir + dir<sup>2</sup> + dir<sup>3</sup></b>	<b>0.655</b>	<b>2954.4</b>	<b>0.4</b>	<b>10.80</b>	<b>3.29</b>	<b>3.24</b>	<b>400.90</b>	<b>-3.24</b>	<b>-108.61</b>	<b>1.02</b>
	dist+ dist <sup>2</sup> + dir + dir <sup>2</sup> + dir <sup>3</sup> + aspect	0.658	2947.8	0.0	10.93	3.30	3.25	399.65	-3.25	-109.07	1.02
	dist+ dist <sup>2</sup> + dir + dir <sup>2</sup> + dist <sup>3</sup> + bsm	0.662	2905.3	1.2	12.34	3.51	3.45	407.10	-3.45	-115.66	1.02
2017 - 2019	<b>dir</b>	<b>0.726</b>	<b>2250.2</b>	<b>11.0</b>	<b>17.67</b>	<b>4.20</b>	<b>4.10</b>	<b>345.91</b>	<b>-4.10</b>	<b>-154.69</b>	<b>1.05</b>
	dist + dir	0.863	2142.1	11.9	25.35	5.03	4.77	336.99	-4.77	-179.85	1.10
	dist + bsm + bsm <sup>2</sup>	0.859	2190.1	10.2	25.31	5.03	4.72	338.53	-4.72	-178.08	1.13
	dir + aspect	0.734	2244.6	10.9	17.86	4.23	4.12	345.45	-4.12	-155.53	1.05
	dist + dir + aspect	0.865	2137.7	11.8	25.49	5.05	4.78	335.50	-4.78	-180.30	1.10
2019 - 2020	dist + dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + dir	0.912	1654.0	36.3	40.76	6.38	5.95	167.82	-5.92	-187.55	1.17
	dir + bsm + bsm <sup>2</sup>	0.921	1806.1	33.5	36.86	6.07	5.70	231.35	-5.70	-180.08	1.13
	<b>dist + dist<sup>2</sup> + dist<sup>3</sup> + dist<sup>4</sup> + dir + aspect</b>	<b>0.914</b>	<b>1701.7</b>	<b>32.7</b>	<b>36.74</b>	<b>6.05</b>	<b>5.65</b>	<b>144.04</b>	<b>-5.60</b>	<b>-192.83</b>	<b>1.18</b>
	dir + aspect + bsm + bsm <sup>2</sup>	0.923	1786.8	33.8	37.20	6.10	5.72	227.30	-5.72	-180.91	1.13
	dir + slope + bsm + bsm <sup>2</sup>	0.928	1765.3	34.2	37.75	6.14	5.77	223.43	-5.77	-182.35	1.13

	dir + aspect + slope + bsm + bsm <sup>2</sup>	0.930	1747.7	34.5	38.05	6.17	5.79	219.10	-5.79	-182.98	1.14
2020 - 2021	<i>dist + dist<sup>2</sup></i>		<b>202.7</b>	<b>-0.4</b>	<b>38.43</b>	<b>6.71</b>	<b>6.76</b>	<b>570.82</b>	<b>-6.76</b>	<b>-4331.92</b>	<b>1.02</b>
	dir + dir <sup>2</sup>		176.6	-1.7	42.26	6.96	7.11	506.86	-7.11	-4559.38	1.01

dir = direction from river mouth; dis = distance from river mouth; bsm = bathymetric surface model (depth); Ivan = exposure vulnerability (EV) for Hurricane Ivan; Dean = EV for Hurricane Dean; Avg. = average EV for Ivan and Dean.

**Table S3.** Validation criteria for finals models that included the most important predictors of submerged aquatic vegetation (SAV) percentage cover change in the Bluefields Bay Special Fish Conservation Area (BBSFCA), Westmoreland, Jamaica, for 23, 2 – 4-year periods, generated using a 5-fold cross validation of spatial Bayesian Integrated Nested Laplace Approximation (INLA) generalized linear mixed models. The validation criteria used included: mean squared error (MSE), root mean squared error (RMSE), mean absolute error (MAE), mean absolute percentage error (MAPE), bias (a measure of consistent under- or over-forecasting; BIAS), relative bias (rBIAS), and relative mean separation (rMSEP). Also included are the calculated values for the deviance information criterion (DIC), and marginal R-squared (mR<sup>2</sup>).

Period	Predictors	DIC	mR <sup>2</sup>	MSE	RMSE	MAE	MAPE	BIAS	rBIAS	rMSEP
1984 - 1985	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup> + bsm <sup>4</sup>	47181.8	15.2	3.92	1.98	1.47	445.48	0.0001	0.04	0.85
	slope + bsm + bsm <sup>2</sup> + bsm <sup>3</sup> + bsm <sup>4</sup>	47600.9	11.9	4.06	2.02	1.50	319.60	-0.0003	0.04	0.88
	<b>dist+ dist<sup>2</sup> + dist<sup>3</sup> + dist<sup>4</sup> + aspect + aspect<sup>2</sup> + bsm + bsm<sup>2</sup> + bsm<sup>3</sup>+ bsm<sup>4</sup></b>	<b>47115.0</b>	<b>15.7</b>	<b>3.89</b>	<b>1.97</b>	<b>1.47</b>	<b>438.14</b>	<b>0.0001</b>	<b>0.04</b>	<b>0.84</b>
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + slope + bsm + bsm <sup>2</sup> + bsm <sup>3</sup> + bsm <sup>4</sup>	47182.0	15.2	3.92	1.98	1.47	445.57	0.0001	0.04	0.85
	<b>dist+ dist<sup>2</sup> + dist<sup>3</sup> + dist<sup>4</sup> + aspect + aspect<sup>2</sup> + slope + bsm + bsm<sup>2</sup> + bsm<sup>3</sup>+ bsm<sup>4</sup></b>	<b>47115.4</b>	<b>15.8</b>	<b>3.89</b>	<b>1.97</b>	<b>1.47</b>	<b>438.35</b>	<b>0.0001</b>	<b>0.04</b>	<b>0.84</b>
1985 - 1986	<b>dist+ dist<sup>2</sup> + dist<sup>3</sup> + dist<sup>4</sup> + dir + dir<sup>2</sup></b>	<b>22003.5</b>	<b>11.3</b>	<b>0.41</b>	<b>0.64</b>	<b>0.49</b>	<b>754.78</b>	<b>-0.0001</b>	<b>0.001</b>	<b>0.89</b>
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup> + bsm <sup>4</sup>	22080.4	10.7	0.42	0.64	0.49	808.13	-0.0001	0.002	0.89
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup>	22375.4	8.3	0.43	0.65	0.50	832.29	-0.0001	0.001	0.92
	aspect + aspect <sup>2</sup> + aspect <sup>3</sup> + aspect <sup>4</sup> + slope + slope <sup>2</sup> + slope <sup>3</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup> + bsm <sup>4</sup>	22865.2	4.3	0.45	0.67	0.51	743.04	0.00004	0.002	0.96
	slope + slope <sup>2</sup> + slope <sup>3</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup> + bsm <sup>4</sup>	22914.2	3.8	0.45	0.67	0.51	729.59	0.00002	0.001	0.96
1986 - 1987	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	17980.5	31.9	0.29	0.54	0.43	564.6	-	0.0003	0.68
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + dir + dir <sup>2</sup> + dir <sup>3</sup> + dir <sup>4</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	17577.8	34.4	0.28	0.53	0.42	481.6	0.00004	0.0001	0.66
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + slope + slope <sup>2</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	17881.7	32.6	0.29	0.54	0.42	547.9	0	0.0002	0.68
	<b>dist+ dist<sup>2</sup> + dist<sup>3</sup> + dist<sup>4</sup> + dir + dir<sup>2</sup> + dir<sup>3</sup> + dir<sup>4</sup> + slope + slope<sup>2</sup> + bsm + bsm<sup>2</sup> + bsm<sup>3</sup></b>	<b>17505.6</b>	<b>34.8</b>	<b>0.28</b>	<b>0.53</b>	<b>0.42</b>	<b>471.5</b>	<b>0.0001</b>	<b>0.0001</b>	<b>0.65</b>
	dir + dir <sup>2</sup> + dir <sup>3</sup> + dir <sup>4</sup> + slope + slope <sup>2</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	18819.0	26.7	0.31	0.56	0.44	512.9	0.0001	0.00008	0.74

1987 - 1988	$dist + dist^2 + dist^3 + dist^4 + dir + dir^2 + dir^3 + dir^4$	<b>19893.1</b>	<b>42.2</b>	<b>0.34</b>	<b>0.58</b>	<b>0.47</b>	<b>792.57</b>	<b>-0.0001</b>	<b>0.0001</b>	<b>0.58</b>
	$dist + dist^2 + dist^3 + dist^4 + dir + dir^2 + dir^3 + dir^4 + Gilbert$	<b>19884.4</b>	<b>42.3</b>	<b>0.34</b>	<b>0.58</b>	<b>0.47</b>	<b>785.17</b>	<b>-0.0002</b>	<b>0</b>	<b>0.58</b>
	$dir + dir^2 + dir^3 + dir^4 + aspect + aspect^2 + aspect^3 + aspect^4 + slope + slope^2 + slope^3 + Gilbert$	22187.4	29.3	0.42	0.65	0.52	888.98	-0.0001	0.0002	0.71
	$dir + dir^2 + dir^3 + dir^4 + aspect + aspect^2 + aspect^3 + aspect^4 + slope + slope^2 + slope^3$	22407.1	29.1	0.42	0.65	0.52	900.69	-0.0001	0.0002	0.71
	$dir + dir^2 + dir^3 + dir^4 + slope + slope^2 + slope^3 + Gilbert$	22275.9	28.7	0.42	0.65	0.52	909.27	-0.0001	0.0003	0.72
1988 - 1990	$dist + dist^2 + dist^3 + dist^4 + dir + dir^2 + dir^3 + dir^4 + bsm + bsm^2 + bsm^3$	11982.4	31.0	0.17	0.41	0.31	530.52	-	0.0001	0.69
	$dist + dist^2 + dist^3 + dist^4 + dir + dir^2 + dir^3 + dir^4 + slope + slope^2 + slope^3 + bsm + bsm^2 + bsm^3$	11953.0	31.2	0.17	0.41	0.31	543.87	-0.0001	-0.0002	0.69
	$dist + dist^2 + dist^3 + dist^4 + dir + dir^2 + dir^3 + dir^4 + bsm + bsm^2 + bsm^3 + Gilbert$	11968.0	31.1	0.17	0.41	0.31	526.65	-	0	0.69
	$dist + dist^2 + dist^3 + dist^4 + dir + dir^2 + dir^3 + dir^4 + aspect + bsm + bsm^2 + bsm^3 + Gilbert$	<b>11963.2</b>	<b>31.1</b>	<b>0.17</b>	<b>0.41</b>	<b>0.31</b>	<b>518.22</b>	<b>0</b>	<b>0.0001</b>	<b>0.69</b>
	$dist + dist^2 + dist^3 + dist^4 + dir + dir^2 + dir^3 + dir^4 + aspect + slope + slope^2 + slope^3 + bsm + bsm^2 + bsm^3 + Gilbert$	11939.3	31.3	0.17	0.41	0.31	530.53	-0.0001	-0.0003	0.69
1990- 1993	$bsm + bsm^2 + bsm^3 + bsm^4$	<b>3135.8</b>	<b>27.4</b>	<b>0.08</b>	<b>0.27</b>	<b>0.21</b>	<b>105.05</b>	<b>-0.003</b>	<b>0.004</b>	<b>0.70</b>
	$dist + dist^2 + dist^3 + dist^4 + dir$	5231.5	12.6	0.09	0.31	0.24	142.30	-0.005	0.006	0.86
	$dist + dist^2 + dist^3 + dist^4 + aspect$	5403.8	11.2	0.10	0.31	0.24	147.05	-0.005	0.005	0.88
	$aspect + bsm + bsm^2 + bsm^3 + bsm^4$	3111.0	27.5	0.08	0.27	0.21	105.56	-0.003	0.003	0.70
	$dist + dist^2 + dist^3 + dist^4 + dir + aspect$	5176.5	13.0	0.09	0.30	0.24	142.42	-0.005	0.006	0.86
1993- 1994	$dist + dist^2 + dist^3 + dir + dir^2 + dir^3$	24537.5	21.7	0.52	0.72	0.57	248.79	-	0.00008	0.78
	$dist + dist^2 + dist^3 + bsm + bsm^2 + bsm^3 + bsm^4$	25268.1	16.5	0.55	0.74	0.59	287.90	-	0.00004	0.84
	$dir + dir^2 + dir^3 + bsm + bsm^2 + bsm^3 + bsm^4$	25432.4	15.3	0.56	0.75	0.59	258.54	-	0.00006	0.85

	$dist + dist^2 + dist^3 + dir + dir^2 + dir^3 + bsm + bsm^2 + bsm^3 + bsm^4$	24175.6	24.2	0.50	0.71	0.56	250.51	- 0.00004	0.00002	0.76
	$dist + dist^2 + dist^3 + slope + slope^2 + bsm + bsm^2 + bsm^3 + bsm^4$	25237.5	16.7	0.55	0.74	0.59	282.75	- 0.00004	0.00004	0.83
1994 - 1995	$dir + dir^2 + dir^3 + dir^4$	23522.6	12.9	0.47	0.69	0.53	438.30	-0.0001	0.01	0.87
	$dist + dist^2 + dist^3 + dist^4 + dir + dir^2 + dir^3 + dir^4$	22171.8	22.8	0.42	0.65	0.50	390.63	0.0001	0.01	0.77
	$dist + dist^2 + dist^3 + dist^4 + aspect$	23489.8	13.1	0.47	0.68	0.52	356.43	0.00004	0.01	0.87
	$dist + dist^2 + dist^3 + dist^4 + bsm + bsm^2 + bsm^3 + bsm^4$	23343.4	14.3	0.46	0.68	0.52	384.40	0.0001	0.01	0.86
	$dir + dir^2 + dir^3 + dir^4 + bsm + bsm^2 + bsm^3 + bsm^4$	23219.0	11.9	0.48	0.69	0.53	414.60	0.0145	-0.06	0.88
1995 - 1996	$dist + dist^2 + dist^3$	28916.1	16.2	0.76	0.87	0.67	635.43	- 0.00004	0.21	0.84
	$dir + dir^2 + dir^3 + dir^4$	30191.2	6.2	0.85	0.92	0.69	484.47	0.0001	0.18	0.94
	$dir + dir^2 + dir^3 + dir^4 + aspect + aspect^2 + aspect^3$	30039.8	7.5	0.84	0.91	0.69	517.05	0.00004	0.20	0.93
	$dir + dir^2 + dir^3 + dir^4 + aspect + aspect^2 + aspect^3 + slope + slope^2 + slope^3 + slope^4$	30084.9	7.1	0.84	0.92	0.69	511.67	0.0003	0.19	0.93
1996 - 1997	$dir + dir^2 + dir^3 + dir^4$	26967.8	4.3	0.63	0.80	0.60	761.44	- 0.00006	0.002	0.96
	$dist + dist^2 + dist^3 + dist^4 + dir + dir^2 + dir^3 + dir^4$	26376.9	8.6	0.61	0.78	0.60	888.80	- 0.00004	0.003	0.92
	$dist + dist^2 + dist^3 + dist^4 + bsm + bsm^2 + bsm^3$	26929.1	3.9	0.64	0.80	0.61	692.12	0.0001	0.004	0.96
	$dir + dir^2 + dir^3 + dir^4 + aspect$	26875.9	4.4	0.63	0.80	0.60	743.82	-0.0001	0.002	0.96
	$dir + dir^2 + dir^3 + dir^4 + slope$	26875.0	4.4	0.63	0.80	0.60	768.01	-0.0001	0.002	0.96
1997 – 1999	$dist + dist^2 + dist^3 + dist^4 + dir + dir^2 + dir^3 + dir^4$	6936.3	22.6	0.11	0.33	0.25	524.16	0	0.0013	0.77
	$dist + dist^2 + dist^3 + dist^4 + slope + slope^2 + slope^3$	5622.5	31.1	0.10	0.31	0.24	607.85	0.00004	0.0011	0.69
	$dir + dir^2 + dir^3 + bsm + bsm^2 + bsm^3 + bsm^4$	6831.6	23.3	0.11	0.33	0.25	531.90	- 0.00002	0.0012	0.77
	$dir + dir^2 + dir^3 + bsm + bsm^2 + bsm^3 + bsm^4 + slope + slope^2 + slope^3$	7876.9	15.9	0.12	0.34	0.27	670.95	0	0.0011	0.84
1999 - 2000	$dist + dist^2 + dist^3 + dist^4 + dir + dir^2 + dir^3 + dir^4$	56256.7	11.2	8.51	2.92	2.19	660.81	-0.0003	0.006	0.89
	$dist + dist^2 + dist^3 + dist^4 + bsm + bsm^2 + bsm^3$	56655.2	8.0	8.82	2.97	2.19	665.53	-0.0001	0.005	0.92

	<i>dist+ dist<sup>2</sup> + dist<sup>3</sup> + dist<sup>4</sup> + dir + dir<sup>2</sup> + dir<sup>3</sup> + dir<sup>4</sup> + slope + slope<sup>2</sup></i>	<b>56337.5</b>	<b>11.3</b>	<b>8.51</b>	<b>2.92</b>	<b>2.19</b>	<b>651.03</b>	<b>-0.0007</b>	<b>0.006</b>	<b>0.89</b>
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + aspect + aspect <sup>2</sup> + aspect <sup>3</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	56632.8	8.2	8.80	2.97	2.19	666.19	-0.0003	0.005	0.92
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + aspect + aspect <sup>2</sup> + aspect <sup>3</sup> + slope + slope <sup>2</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	56632.9	8.3	8.80	2.97	2.20	661.64	-0.0004	0.005	0.92
2000 - 2002	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup>	8981.4	33.4	0.13	0.36	0.28	343.23	0.004	-0.02	0.66
	<i>dist+ dist<sup>2</sup> + dist<sup>3</sup> + dist<sup>4</sup> + dir</i>	<b>8972.2</b>	<b>33.5</b>	<b>0.13</b>	<b>0.36</b>	<b>0.28</b>	<b>326.03</b>	<b>0.003</b>	<b>-0.02</b>	<b>0.66</b>
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + bsm + bsm <sup>2</sup>	8628.5	35.5	0.12	0.35	0.27	442.10	0.005	-0.03	0.64
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + dir + bsm + bsm <sup>2</sup>	8579.1	35.8	0.12	0.35	0.28	403.65	0.004	-0.03	0.64
2002 - 2006	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup>	9973.7	12.8	0.15	0.38	0.30	509.2	0.00004	0.00060	0.9
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + dir + dir <sup>2</sup> + dir <sup>3</sup>	9649.7	15.4	0.14	0.38	0.30	480.6	0.00014	0.00034	0.8
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + aspect + aspect <sup>2</sup> + aspect <sup>3</sup>	9939.4	13.1	0.15	0.38	0.30	500.1	0.00004	0.00068	0.9
	<i>dist+ dist<sup>2</sup> + dist<sup>3</sup> + dist<sup>4</sup> + dir + dir<sup>2</sup> + dir<sup>3</sup> + aspect + aspect<sup>2</sup> + aspect<sup>3</sup></i>	<b>9609.2</b>	<b>15.8</b>	<b>0.14</b>	<b>0.38</b>	<b>0.30</b>	<b>471.6</b>	<b>0.00008</b>	<b>0.00036</b>	<b>0.8</b>
	dir + dir <sup>2</sup> + dir <sup>3</sup> + aspect + aspect <sup>2</sup> + aspect <sup>3</sup> + slope + slope <sup>2</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	9949.5	13.1	0.15	0.38	0.30	394.5	0.00006	0.00038	0.9
2006 - 2008	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup> + bsm <sup>4</sup>	15692.1	43.2	0.25	0.50	0.38	285.4	-0.0001	-0.0003	0.6
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + dir + dir <sup>2</sup> + dir <sup>3</sup> + dir <sup>4</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup> + bsm <sup>4</sup>	15282.6	45.4	0.24	0.49	0.38	286.2	-0.0002	-0.0005	0.5
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup> + bsm <sup>4</sup> + Ivan	15680.8	43.3	0.25	0.50	0.38	286.8	-0.0001	-0.0002	0.6
	<i>dist+ dist<sup>2</sup> + dist<sup>3</sup> + dist<sup>4</sup> + dir + dir<sup>2</sup> + dir<sup>3</sup> + dir<sup>4</sup> + bsm + bsm<sup>2</sup> + bsm<sup>3</sup> + bsm<sup>4</sup> + Ivan</i>	<b>15265.0</b>	<b>45.5</b>	<b>0.24</b>	<b>0.49</b>	<b>0.38</b>	<b>287.6</b>	<b>-0.0002</b>	<b>-0.0004</b>	<b>0.5</b>
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup> + bsm <sup>4</sup> + Dean + Dean <sup>2</sup>	15691.4	43.3	0.25	0.50	0.38	286.0	-0.0002	-0.0006	0.6
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + dir + dir <sup>2</sup> + dir <sup>3</sup> + dir <sup>4</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup> + bsm <sup>4</sup> + Dean + Dean <sup>2</sup>	15283.0	45.4	0.24	0.49	0.38	286.4	-0.0002	-0.0005	0.5
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + slope + bsm + bsm <sup>2</sup> + bsm <sup>3</sup> + bsm <sup>4</sup> + Dean + Dean <sup>2</sup>	15696.7	43.3	0.25	0.50	0.38	286.3	-0.0002	-0.0009	0.6

	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + dir + dir <sup>2</sup> + dir <sup>3</sup> + dir <sup>4</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup> + bsm <sup>4</sup> + Avg	15278.0	45.3	0.24	0.49	0.38	288.5	0.0001	0.0009	0.5
2008 - 2010	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dir + dir <sup>2</sup> + dir <sup>3</sup> + dir <sup>4</sup>	17588.3	35.7	0.28	0.53	0.40	350.8	0	-0.97	0.6
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dir + dir <sup>2</sup> + dir <sup>3</sup> + dir <sup>4</sup> + aspect + aspect <sup>2</sup> + aspect <sup>3</sup>	17504.5	35.8	0.28	0.53	0.41	301.7	-0.0005	-1.57	0.6
	<b>dist+ dist<sup>2</sup> + dist<sup>3</sup> + dir + dir<sup>2</sup> + dir<sup>3</sup> + dir<sup>4</sup> + bsm + bsm<sup>2</sup> + bsm<sup>3</sup> + bsm<sup>4</sup></b>	<b>17492.9</b>	<b>36.2</b>	<b>0.28</b>	<b>0.53</b>	<b>0.40</b>	<b>380.3</b>	<b>-</b> <b>0.00002</b>	<b>-0.98</b>	<b>0.6</b>
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + aspect + aspect <sup>2</sup> + aspect <sup>3</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup> + bsm <sup>4</sup>	18367.6	31.1	0.30	0.55	0.42	346.7	0.00004	-1.04	0.7
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dir + dir <sup>2</sup> + dir <sup>3</sup> + dir <sup>4</sup> + aspect + aspect <sup>2</sup> + aspect <sup>3</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup> + bsm <sup>4</sup>	17475.0	36.4	0.28	0.53	0.40	377.0	-	-1.00	0.6
2010 - 2013	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + dir + dir <sup>2</sup> + dir <sup>3</sup> + dir <sup>4</sup>	14272.7	36.9	0.21	0.46	0.35	206.64	-	0.0022	0.63
								0.00006		
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + dir + dir <sup>2</sup> + dir <sup>3</sup> + dir <sup>4</sup> + slope + slope <sup>2</sup>	14260.5	37.0	0.21	0.46	0.35	206.10	-	0.0020	0.63
								0.00010		
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + dir + dir <sup>2</sup> + dir <sup>3</sup> + dir <sup>4</sup> + Ivan	14255.4	37.0	0.21	0.46	0.35	207.80	-	0.0023	0.63
								0.00006		
2013 - 2015	<b>dist+ dist<sup>2</sup> + dist<sup>3</sup> + dist<sup>4</sup> + dir + dir<sup>2</sup> + dir<sup>3</sup> + dir<sup>4</sup> + slope + slope<sup>2</sup> + bsm + bsm<sup>2</sup> + bsm<sup>3</sup> + bsm<sup>4</sup></b>	<b>14080.4</b>	<b>38.1</b>	<b>0.20</b>	<b>0.45</b>	<b>0.34</b>	<b>203.11</b>	<b>-</b> <b>0.00012</b>	<b>0.0019</b>	<b>0.62</b>
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + dir + dir <sup>2</sup> + dir <sup>3</sup> + dir <sup>4</sup> + slope + slope <sup>2</sup> + Ivan	14243.9	37.1	0.21	0.46	0.35	207.34	-	0.0020	0.63
								0.00010		
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + dir + dir <sup>2</sup> + dir <sup>3</sup> + dir <sup>4</sup> + Avg	14312.2	36.9	0.21	0.45	0.35	205.61	-	-0.0154	0.63
								0.00353		
2013 - 2015	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + dir + dir <sup>2</sup> + dir <sup>3</sup> + dir <sup>4</sup>	38383.7	9.6	1.75	1.32	1.01	270.9	0	0.036	0.91
	<b>dir + dir<sup>2</sup> + dir<sup>3</sup> + dir<sup>4</sup> + bsm + bsm<sup>2</sup> + bsm<sup>3</sup> + bsm<sup>4</sup></b>	<b>37814.9</b>	<b>14.0</b>	<b>1.65</b>	<b>1.28</b>	<b>0.98</b>	<b>256.9</b>	<b>0.009</b>	<b>0.090</b>	<b>0.86</b>
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + dir + dir <sup>2</sup> + dir <sup>3</sup> + dir <sup>4</sup> + aspect	38366.5	9.7	1.75	1.32	1.01	269.7	0.00004	0.036	0.90
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + dir + dir <sup>2</sup> + dir <sup>3</sup> + dir <sup>4</sup> + aspect + Dean	38383.7	9.7	1.73	1.32	1.01	247.1	0.009	0.094	0.90
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + dir + dir <sup>2</sup> + dir <sup>3</sup> + dir <sup>4</sup> + Avg	38373.1	9.6	1.75	1.32	1.01	267.6	0.00002	0.035	0.91
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + dir + dir <sup>2</sup> + dir <sup>3</sup> + dir <sup>4</sup> + slope + Avg	38371.0	9.7	1.75	1.32	1.01	265.3	0.00016	0.036	0.90



2015 - 2016	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	30904.9	52.0	0.73	0.86	0.66	316.4	0.0001	0.0004	0.48
	<b>dist+ dist<sup>2</sup> + dist<sup>3</sup> + dist<sup>4</sup> + dir + dir<sup>2</sup> + dir<sup>3</sup> + dir<sup>4</sup> + bsm + bsm<sup>2</sup> + bsm<sup>3</sup></b>	<b>27722.6</b>	<b>54.6</b>	<b>0.69</b>	<b>0.83</b>	<b>0.64</b>	<b>304.7</b>	<b>-0.0007</b>	<b>0.0013</b>	<b>0.45</b>
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + aspect + aspect <sup>2</sup> + aspect <sup>3</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	28304.1	52.1	0.73	0.86	0.66	318.5	0.0001	0.0004	0.48
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + slope + slope <sup>2</sup> + slope <sup>3</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	28300.3	52.1	0.73	0.86	0.66	320.3	-0.0001	0.0006	0.48
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + aspect + aspect <sup>2</sup> + aspect <sup>3</sup> + slope + slope <sup>2</sup> + slope <sup>3</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	28273.1	52.3	0.73	0.85	0.66	322.3	-0.0001	0.0006	0.48
2016 - 2017	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dir + dir <sup>2</sup> + dir <sup>3</sup>	31930.9	21.2	1.01	1.00	0.78	1681.7	0.0005	0.08	0.79
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dir + dir <sup>2</sup> + dir <sup>3</sup> + aspect + aspect <sup>2</sup>	23902.6	21.7	0.99	1.00	0.77	1501.3	0.0109	-0.03	0.79
	<b>dist+ dist<sup>2</sup> + dist<sup>3</sup> + dir + dir<sup>2</sup> + dir<sup>3</sup> + slope + slope<sup>2</sup></b>	<b>23892.4</b>	<b>21.8</b>	<b>0.99</b>	<b>0.99</b>	<b>0.77</b>	<b>1729.7</b>	<b>0.0105</b>	<b>-0.02</b>	<b>0.78</b>
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dir + dir <sup>2</sup> + dir <sup>3</sup> + aspect + aspect <sup>2</sup> + aspect <sup>3</sup> + slope + slope <sup>2</sup>	31748.4	22.3	1.00	1.00	0.78	1275.2	0.0004	0.08	0.78
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + aspect + aspect <sup>2</sup> + aspect <sup>3</sup> + slope + slope <sup>2</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	32947.4	13.5	1.11	1.05	0.83	2649.8	0.0003	0.09	0.87
2017 - 2019	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + dir + dir <sup>2</sup> + dir <sup>3</sup> + dir <sup>4</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	13069.5	28.8	0.19	0.43	0.31	551.2	- 0.00010	0.0007	0.71
	<b>dist+ dist<sup>2</sup> + dist<sup>3</sup> + dist<sup>4</sup> + dir + dir<sup>2</sup> + dir<sup>3</sup> + dir<sup>4</sup> + aspect + aspect<sup>2</sup> + aspect<sup>3</sup> + aspect<sup>4</sup> + bsm + bsm<sup>2</sup> + bsm<sup>3</sup></b>	<b>13068.3</b>	<b>28.8</b>	<b>0.19</b>	<b>0.43</b>	<b>0.31</b>	<b>547.5</b>	<b>- 0.00008</b>	<b>0.0008</b>	<b>0.72</b>
	<b>dist+ dist<sup>2</sup> + dist<sup>3</sup> + dist<sup>4</sup> + dir + dir<sup>2</sup> + dir<sup>3</sup> + dir<sup>4</sup> + slope + slope<sup>2</sup> + slope<sup>3</sup> + slope<sup>4</sup> + bsm + bsm<sup>2</sup> + bsm<sup>3</sup></b>	<b>13059.3</b>	<b>28.9</b>	<b>0.19</b>	<b>0.43</b>	<b>0.31</b>	<b>553.0</b>	<b>0.00004</b>	<b>0.0013</b>	<b>0.71</b>
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + dir + dir <sup>2</sup> + dir <sup>3</sup> + dir <sup>4</sup> + aspect + aspect <sup>2</sup> + aspect <sup>3</sup> + aspect <sup>4</sup> + slope + slope <sup>2</sup> + slope <sup>3</sup> + slope <sup>4</sup> + bsm + bsm <sup>2</sup> + bsm <sup>3</sup>	13058.7	28.9	0.19	0.43	0.31	549.5	0.00008	0.0014	0.71
	dist+ dist <sup>2</sup> + dist <sup>3</sup> + dist <sup>4</sup> + dir + dir <sup>2</sup> + dir <sup>3</sup> + dir <sup>4</sup> + aspect + aspect <sup>2</sup> + aspect <sup>3</sup> + aspect <sup>4</sup> + slope + slope <sup>2</sup> + slope <sup>3</sup> + slope <sup>4</sup>	14420.3	19.8	0.21	0.46	0.33	520.0	0.00002	0.0017	0.81
2019 - 2020	<b>dist+ dist<sup>2</sup> + dist<sup>3</sup> + dist<sup>4</sup> + dir + dir<sup>2</sup> + dir<sup>3</sup> + dir<sup>4</sup></b>	<b>20352.5</b>	<b>36.4</b>	<b>0.36</b>	<b>0.60</b>	<b>0.45</b>	<b>276.2</b>	<b>0.00012</b>	<b>-0.00080</b>	<b>0.64</b>

	$\text{dir} + \text{dir}^2 + \text{dir}^3 + \text{dir}^4 + \text{bsm} + \text{bsm}^2 + \text{bsm}^3$	21429.6	30.0	0.39	0.63	0.48	322.3	0.00006	-0.00038	0.70
	$\text{dir} + \text{dir}^2 + \text{dir}^3 + \text{dir}^4 + \text{slope} + \text{slope}^2 + \text{slope}^3$	21748.3	28.0	0.41	0.64	0.49	315.5	0	0	0.72
	$\text{dir} + \text{dir}^2 + \text{dir}^3 + \text{dir}^4 + \text{slope} + \text{slope}^2 + \text{slope}^3 + \text{bsm} + \text{bsm}^2 + \text{bsm}^3$	21353.2	30.5	0.39	0.63	0.48	320.6	0.00002	0.00002	0.70
	$\text{dist} + \text{dist}^2 + \text{dist}^3 + \text{dist}^4 + \text{aspect} + \text{aspect}^2 + \text{aspect}^3 + \text{slope} + \text{slope}^2 + \text{slope}^3 + \text{bsm} + \text{bsm}^2 + \text{bsm}^3$	21817.4	27.6	0.41	0.64	0.48	270.8	0.00016	-0.00050	0.73
2020 - 2021	$\text{dist} + \text{dist}^2 + \text{dist}^3 + \text{dist}^4 + \text{dir} + \text{dir}^2 + \text{dir}^3$									
		21061.7	37.3	0.38	0.62	0.46	740.9	0.00008	0.0038	0.63
	$\text{dist} + \text{dist}^2 + \text{dist}^3 + \text{bsm} + \text{bsm}^2 + \text{bsm}^3 + \text{bsm}^4$	21946.6	32.2	0.41	0.64	0.48	888.0	0.00014	0.0044	0.68
	$\text{dist} + \text{dist}^2 + \text{dist}^3 + \text{dist}^4 + \text{dir} + \text{dir}^2 + \text{dir}^3 + \text{bsm} + \text{bsm}^2 + \text{bsm}^3 + \text{bsm}^4$	20473.5	41.1	0.36	0.60	0.45	778.0	0.00012	0.0033	0.59
	$\text{dist} + \text{dist}^2 + \text{dist}^3 + \text{aspect} + \text{aspect}^2 + \text{aspect}^3 + \text{aspect}^4 + \text{bsm} + \text{bsm}^2 + \text{bsm}^3 + \text{bsm}^4$	21945.2	32.3	0.41	0.64	0.48	900.9	0.00016	0.0042	0.68
	<b><math>\text{dist} + \text{dist}^2 + \text{dist}^3 + \text{dist}^4 + \text{dir} + \text{dir}^2 + \text{dir}^3 + \text{aspect} + \text{aspect}^2 + \text{aspect}^3 + \text{aspect}^4 + \text{bsm} + \text{bsm}^2 + \text{bsm}^3 + \text{bsm}^4</math></b>	<b>20362.5</b>	<b>41.2</b>	<b>0.36</b>	<b>0.60</b>	<b>0.45</b>	<b>783.0</b>	<b>0.00010</b>	<b>0.0033</b>	<b>0.59</b>

dir = direction from river mouth; dis = distance from river mouth; bsm = bathymetric surface model (depth); Gilbert = exposure vulnerability (EV) for Hurricane Gilbert; Ivan = EV for Hurricane Ivan; Dean = EV for Hurricane Dean; Avg. = average EV for Ivan and Dean.

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