The following supplements accompany the article

Modeling the distribution of the North Atlantic right whale *Eubalaena glacialis* off coastal Maine by areal co-kriging

Brooke Wikgren[1,*], Hauke Kite-Powell[2], Scott Kraus[1]

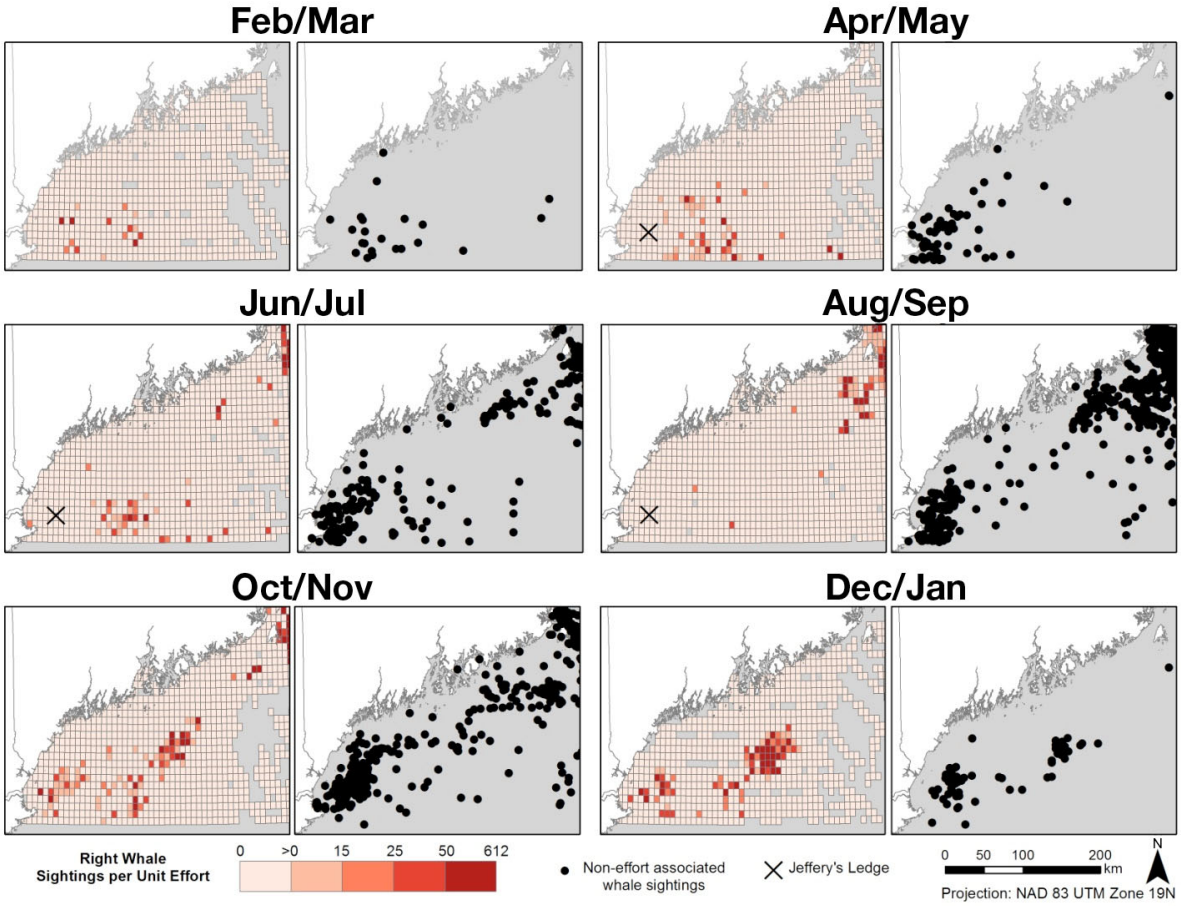
[1]New England Aquarium, John H. Prescott Marine Laboratory, Central Wharf, Boston, Massachusetts 02110, USA
[2]Woods Hole Oceanographic Institution, Marine Policy Center, MS 41, Woods Hole, Massachusetts 02543, USA

*Corresponding author: bwikgren@neaq.org

Endangered Species Research 24: 21–31 (2014)

Supplements. The supplementary materials include maps of right whale sightings per unit effort (SPUE) and SPUE in relation to sightings data, the Moran's I statistic and the results, the number of whale presence records per 2 mo aggregations, Kaplan-Meier survivorship curves, the default parameter settings for the Maxent program, and the covariance plots for the spherical areal co-krging model

Supplement 1. Right whale sightings per unit effort (left panels) and off-effort right whale sightings (right panels) per 2 mo aggregation



Supplement 2. Moran's *I* statistic for spatial autocorrelation as defined by the Environmental Systems Research Institute (ESRI) is:

$$I = \frac{n}{S_0} \frac{\sum_{i=1}^{n} \sum_{j=1}^{n} w_{i,j} z_i z_j}{\sum_{i=1}^{n} z_i^2}$$

where z_i is the deviation of an attribute for feature *i* from its mean $(x_i - \bar{X})$, $w_{i,j}$ is the spatial weight between feature *i* and *j*, *n* is equal to the total number of features, and S_0 is the aggregate of all the spatial weights:

$$S_0 = \sum_{i=1}^{n} \sum_{j=1}^{n} w_{i,j}$$

The z_I-score for the statistic is computed as:

$$z_I = \frac{I - E[I]}{\sqrt{V[I]}}$$

where:

$$E[I] = -1/(n-1)$$

$$V[I] = E[I^2] - E[I]^2$$

$$E[I^2] = \frac{A - B}{C}$$

$$A = n[(n^2 - 3n + 3)S_1 - nS_2 + 3S_0^2]$$

$$B = D[(n^2 - n)S_1 - 2nS_2 + 6S_0^2]$$

$$C = (n-1)(n-2)(n-3)S_0^2$$

$$D = \frac{\sum_{i=1}^{n} z_i^4}{(\sum_{i=1}^{n} z_i^2)^2}$$

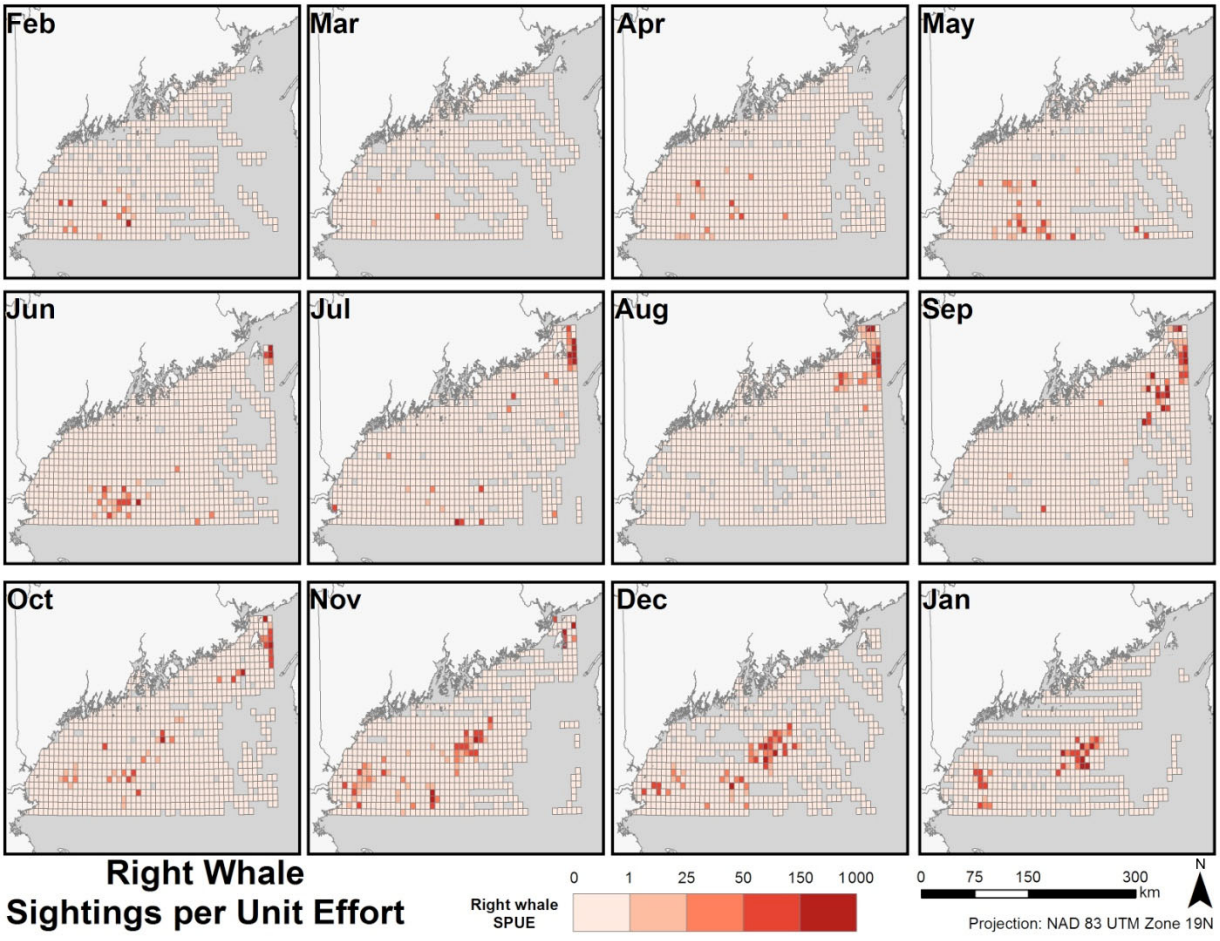
$$S_1 = (1/2) \sum_{i=1}^{n} \sum_{j=1}^{n} (w_{i,j} + w_{j,i})^2$$

$$S_2 = \sum_{i=1}^{n} \left(\sum_{j=1}^{n} w_{i,j} + \sum_{j=1}^{n} w_{j,i} \right)^2$$

Supplement 3. Moran's *I* results. See 'Current practices and methodology considerations' in the main article for definition of SPUE

Moran's *I* results: 5' × 5' SPUE values		
Month	p-value	*z*-score
Dec/Jan	0.0	25.706942
Feb/Mar	0.0	5.991199
Apr/May	0.0	13.610567
Jun/Jul	0.0	23.21061
Aug/Sep	0.0	28.897673
Oct/Nov	0.0	18.626536

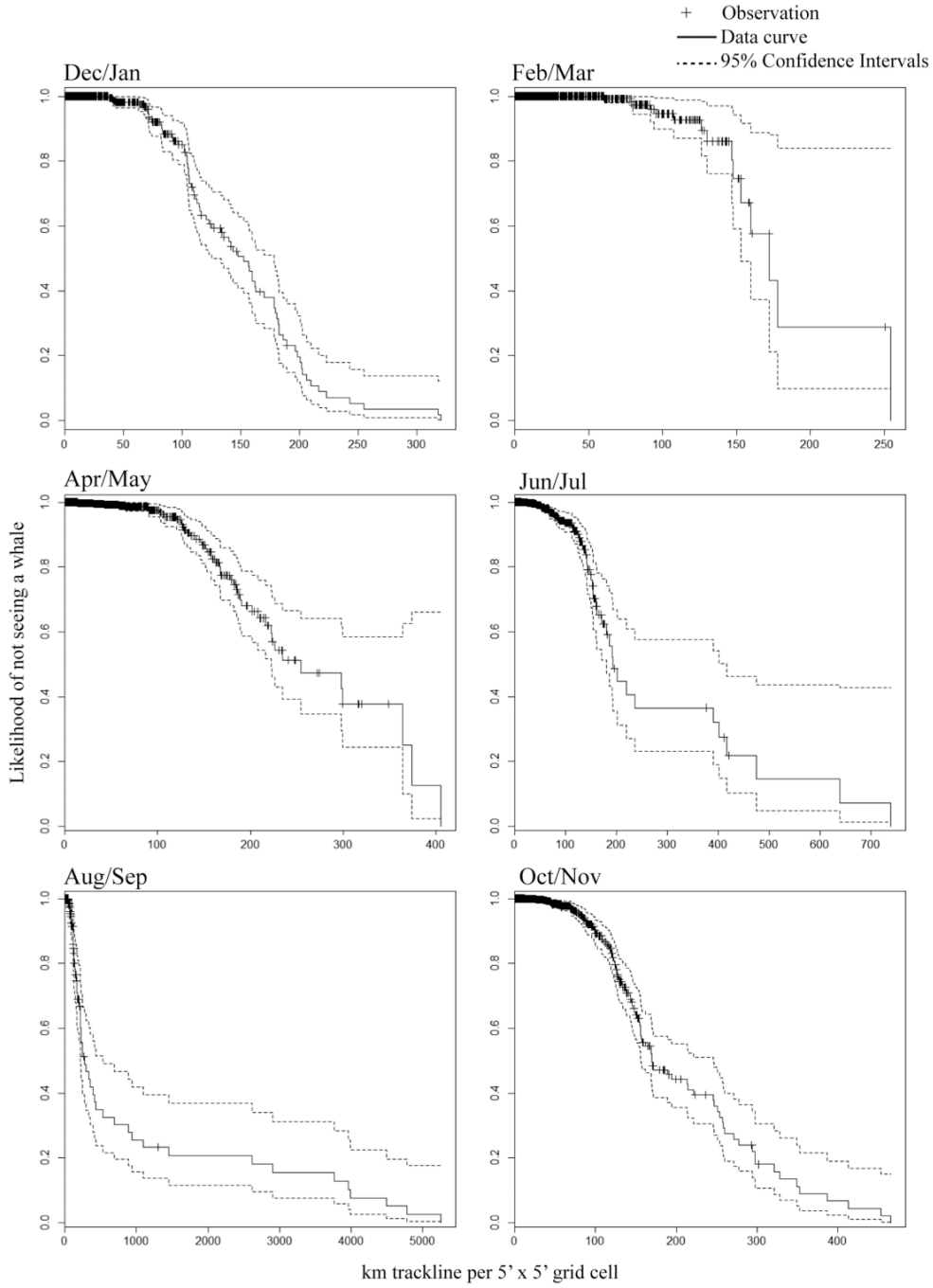
Supplement 4. Monthly right whale sightings per unit effort (SPUE)



Supplement 5. Number of right whale presence records per 2 mo aggregation

Season	Number of records
Dec/Jan	259
Feb/Mar	46
Apr/May	135
Jun/Jul	1169
Aug/Sep	4333
Oct/Nov	940
Total	6882

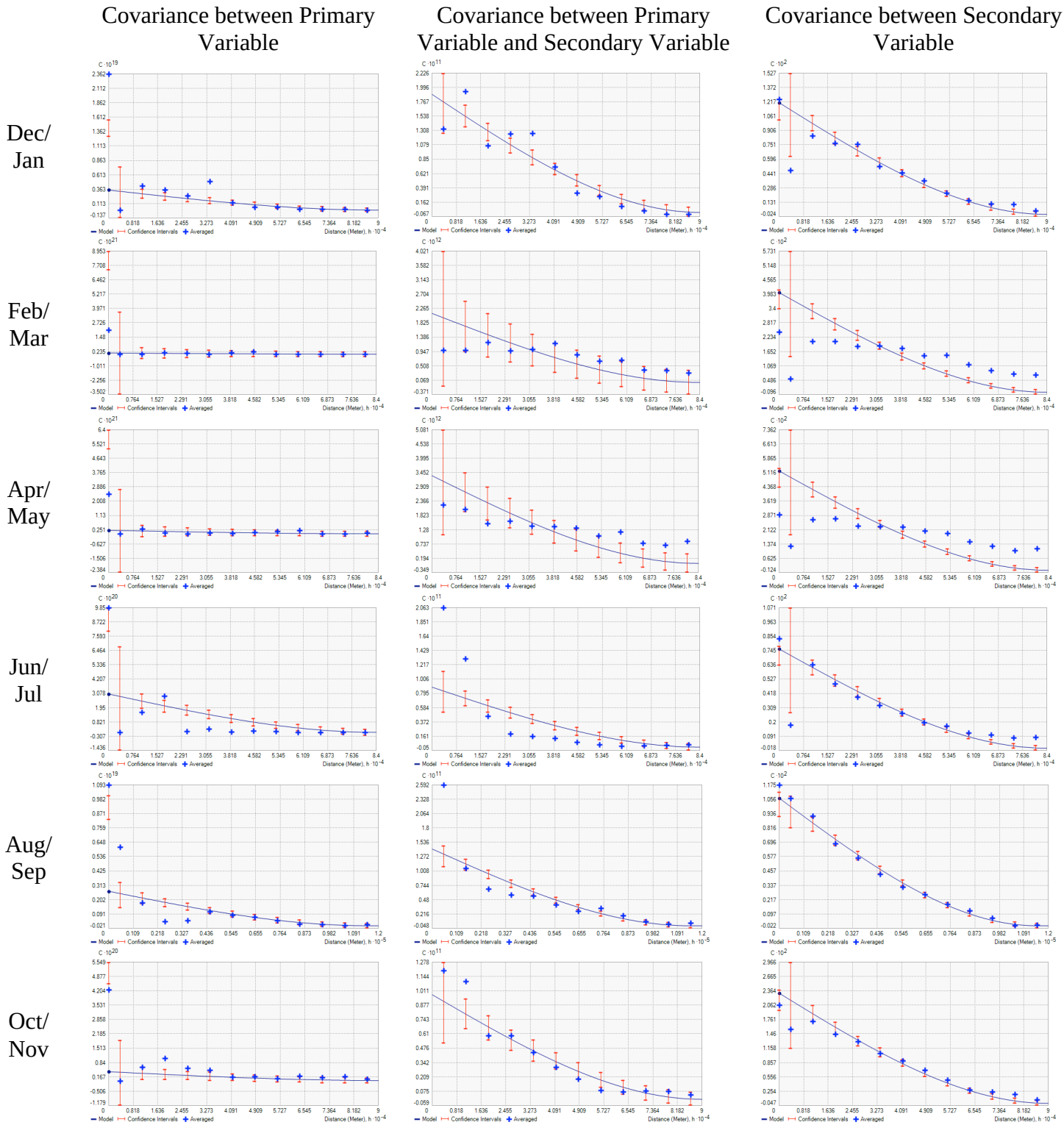
Supplement 6. Kaplan-Meier survivorship curves. Solid line: data curve; dashed lines: 95% confidence intervals; (+): observation



Supplement 7. Maxent ver. 3.3.3e default parameter settings. lq: linear and quadratic feature functions; lqp: linear, quadratic, and product feature functions

Parameter	Value
Maximum iterations	500
Coverage threshold	0.00001
Adjust sample radius	0
Default prevalence	0.5
Threads	1
lq to lq threshold	80
Linear to lq threshold	10
Hinge threshold	15
Beta threshold	–1
Beta categorical	–1
Beta lqp	–1
Beta hinge	–1

Supplement 8. Covariance plots of spherical model



Supplement 9. Estimates of environmental co-variate relative contributions to the Maxent model

Variable Percent Contribution to Maxent model							
Month	Depth	SST	Dist. to shore	Dist. to phys. regions	Lat.	Long.	Slope
Dec/Jan	1.3	7.9	29.6	11.1	24.2	24.9	0.9
Feb/Mar	0	18.2	1.4	11.8	2.8	63.2	2.6
Apr/May	7.2	1	11	0.4	19.2	60.6	0.7
Jun/Jul	2	1.8	14.4	16.7	22.5	42.4	0.3
Aug/Sep	4.6	1.9	8.3	15.6	32.1	37.4	0
Oct/Nov	12.4	6.9	29.1	26.8	1.9	22.3	0.7