

Appendix 2: Redistribution of wintering American Common Eiders (*Somateria mollissima dresseri*)
 Gutowsky SE, Robertson GJ, Mallory ML, McLellan NR, Gilliland SG

Appendix 2: Model results from GLMs with negative binomial distributions and year (trend) effects for Christmas Bird Count (CBC) circles meeting model filtering criteria for the period 2000-2020. Models were run independently for each circle (identified by CBC circle name abbreviation, ‘Abbrev’) with R package ‘MASS’ (Venables and Ripley 2002). We report the beta regression coefficient for year (β), with standard error (SE), the Z-statistic and *p*-value. θ is the dispersion parameter of the negative binomial distribution, reflecting a measure of overdispersion with respect to the Poisson distribution, reported with SE. Smaller values of θ correspond to higher variance and more overdispersion, where variance = $\mu + \mu^2/\theta$. λ was calculated from the year β regression coefficient on the response scale (i.e., exponentiated, where $\lambda = e^\beta$), reported with 95% confidence intervals ([lower confidence limit (lcl), upper confidence limit (ucl)]). Circles are ordered by descending latitude within regions. Region acronyms reflect provinces and states (NS – Nova Scotia, NB – New Brunswick, ME – Maine, NH – New Hampshire, MA – Massachusetts, RI – Rhode Island, CT – Connecticut, NY – New York, NJ – New Jersey, DE – Delaware, MD – Maryland, VA - Virginia) with the exception of GSL (Gulf of St. Lawrence) and SE NL (Southeast Newfoundland, eastward and inclusive of St. Pierre and Miquelon, France).

region	Abbrev	Lat	Lon	$\beta \pm SE$	Z	<i>p</i>	$\theta \pm SE$	λ [lcl, ucl]
GSL	NLBB	49.51	-57.88	-0.11 ± 0.07	-1.71	0.09	0.31 ± 0.12	0.89 [0.76, 1.03]
GSL	QCFO	48.82	-64.29	0.06 ± 0.03	1.78	0.08	1.17 ± 0.33	1.06 [0.99, 1.13]
GSL	QCPE	48.53	-64.33	0.03 ± 0.03	0.89	0.38	1.59 ± 0.45	1.03 [0.97, 1.08]
GSL	QCTA	48.18	-69.62	0.15 ± 0.05	2.77	0.01	0.49 ± 0.16	1.16 [1.05, 1.28]
GSL	NBIL	47.81	-64.63	0 ± 0.04	0.08	0.94	1.00 ± 0.32	1.00 [0.92, 1.10]
GSL	PEPE	46.38	-63.13	-0.13 ± 0.08	-1.59	0.11	0.20 ± 0.06	0.88 [0.74, 1.05]
GSL	NSSY	46.18	-60.29	0.23 ± 0.07	3.17	0.00	0.37 ± 0.11	1.25 [1.02, 1.51]
GSL	NSGB	46.14	-59.95	0.17 ± 0.04	4.22	0.00	1.25 ± 0.38	1.19 [1.07, 1.31]
GSL	NBCT	46.12	-63.92	0.03 ± 0.03	1.08	0.28	1.25 ± 0.35	1.04 [0.97, 1.11]
GSL	NSPI	45.68	-62.62	0.09 ± 0.04	1.96	0.05	0.95 ± 0.37	1.09 [1.00, 1.18]
GSL	NSAN	45.60	-61.91	0.07 ± 0.07	0.95	0.34	0.28 ± 0.09	1.07 [0.90, 1.32]
SE NL	NLSJ	47.58	-52.72	0.10 ± 0.05	1.77	0.08	0.45 ± 0.12	1.10 [0.95, 1.28]
SE NL	NLFL	46.99	-52.91	-0.04 ± 0.06	-0.73	0.47	0.58 ± 0.17	0.96 [0.83, 1.14]
SE NL	FRIS	46.78	-56.19	0.03 ± 0.02	1.71	0.09	6.03 ± 1.97	1.03 [0.99, 1.07]
SE NL	NLCR	46.74	-53.12	-0.04 ± 0.05	-0.84	0.40	0.68 ± 0.23	0.96 [0.84, 1.11]
NS	NSLO	45.92	-59.93	0.05 ± 0.03	1.97	0.05	1.73 ± 0.49	1.06 [0.98, 1.14]
NS	NSSC	45.60	-61.32	-0.02 ± 0.03	-0.59	0.55	1.96 ± 0.63	0.98 [0.93, 1.04]

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NS	NSKI	44.99	-64.95	0.05 ± 0.03	1.53	0.13	1.41 ± 0.46	1.05 [0.97, 1.13]
NS	NSHD	44.61	-63.49	-0.09 ± 0.02	-5.09	0.00	4.19 ± 1.25	0.91 [0.88, 0.95]
NS	NSLU	44.41	-64.26	0 ± 0.03	-0.07	0.94	1.69 ± 0.50	1.00 [0.94, 1.06]
NS	NSBI	44.27	-66.49	-0.01 ± 0.02	-0.59	0.56	2.26 ± 0.67	0.99 [0.94, 1.04]
NS	NSBC	44.23	-64.45	-0.1 ± 0.03	-3.93	0.00	1.97 ± 0.57	0.90 [0.86, 0.95]
NS	NSWP	43.97	-64.74	-0.09 ± 0.03	-2.93	0.00	2.17 ± 0.69	0.92 [0.87, 0.98]
NS	NSYA	43.83	-66.09	-0.04 ± 0.03	-1.38	0.17	2.03 ± 0.61	0.97 [0.92, 1.01]
NS	NSCS	43.48	-65.62	-0.13 ± 0.03	-4.95	0.00	1.91 ± 0.56	0.88 [0.83, 0.92]
NB	NBSA	45.18	-67.07	-0.17 ± 0.02	-7.04	0.00	2.30 ± 0.67	0.85 [0.81, 0.89]
NB	NB05	45.15	-66.45	-0.11 ± 0.04	-2.77	0.01	0.95 ± 0.29	0.89 [0.82, 0.98]
NB	NBBH	45.05	-66.79	-0.07 ± 0.04	-2.01	0.04	0.96 ± 0.27	0.93 [0.86, 1.00]
NB	NBGM	44.68	-66.80	-0.10 ± 0.03	-3.73	0.00	2.22 ± 0.68	0.90 [0.86, 0.95]
ME	MECA	44.95	-67.18	-0.14 ± 0.07	-2.00	0.05	0.27 ± 0.08	0.87 [0.72, 1.03]
ME	MEMB	44.67	-67.33	0.04 ± 0.02	1.66	0.10	2.79 ± 0.88	1.04 [0.99, 1.08]
ME	MEBF	44.51	-68.94	-0.01 ± 0.04	-0.18	0.86	0.82 ± 0.24	0.99 [0.89, 1.11]
ME	MEBH	44.43	-68.59	-0.05 ± 0.03	-1.87	0.06	2.46 ± 0.75	0.95 [0.90, 1.00]
ME	MESP	44.43	-68.11	-0.15 ± 0.02	-6.69	0.00	2.45 ± 0.71	0.86 [0.82, 0.89]
ME	MEMD	44.34	-68.31	-0.08 ± 0.02	-3.97	0.00	3.49 ± 1.07	0.92 [0.89, 0.96]
ME	MEDI	44.23	-68.68	-0.11 ± 0.02	-4.44	0.00	2.15 ± 0.62	0.90 [0.85, 0.95]
ME	METR	44.08	-69.17	-0.03 ± 0.02	-1.50	0.13	2.58 ± 0.76	0.97 [0.92, 1.01]
ME	MEPD	43.93	-69.47	-0.04 ± 0.02	-2.49	0.01	4.01 ± 1.20	0.96 [0.92, 0.99]
ME	MEFB	43.82	-70.03	-0.05 ± 0.02	-3.00	0.00	4.65 ± 1.43	0.95 [0.92, 0.98]
ME	MEBP	43.78	-69.74	-0.10 ± 0.02	-4.21	0.00	2.38 ± 0.69	0.91 [0.87, 0.95]
ME	MEPA	43.59	-70.22	-0.09 ± 0.02	-4.93	0.00	3.62 ± 1.07	0.91 [0.88, 0.95]
ME	MEBK	43.44	-70.48	-0.07 ± 0.02	-4.30	0.00	4.69 ± 1.41	0.93 [0.90, 0.96]
ME	MEYC	43.18	-70.63	-0.01 ± 0.01	-0.39	0.70	7.81 ± 2.40	0.99 [0.97, 1.02]
NH + MA	NHCS	42.98	-70.83	0.05 ± 0.02	2.51	0.01	3.16 ± 0.98	1.05 [1.01, 1.10]
NH + MA	MANE	42.74	-70.90	0.06 ± 0.03	2.03	0.04	1.71 ± 0.49	1.06 [1.01, 1.11]

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NH + MA	MACA	42.61	-70.73	0.01 ± 0.01	0.44	0.66	7.94 ± 2.47	1.01 [0.98, 1.03]
NH + MA	MAGB	42.40	-71.10	-0.06 ± 0.01	-4.76	0.00	7.02 ± 2.13	0.94 [0.91, 0.96]
NH + MA	MAQU	42.22	-70.93	-0.05 ± 0.01	-3.40	0.00	6.45 ± 1.95	0.95 [0.93, 0.98]
NH + MA	MAMA	42.10	-70.65	-0.07 ± 0.02	-2.75	0.01	2.15 ± 0.62	0.93 [0.89, 0.98]
NH + MA	MATR	41.98	-70.04	0.02 ± 0.03	0.60	0.55	1.31 ± 0.39	1.02 [0.94, 1.10]
NH + MA	MAPL	41.87	-70.60	-0.05 ± 0.03	-1.48	0.14	1.32 ± 0.37	0.95 [0.90, 1.01]
NH + MA	MACC	41.72	-70.00	0.05 ± 0.02	2.23	0.03	2.19 ± 0.63	1.06 [1.00, 1.12]
NH + MA	MAMC	41.70	-70.30	-0.07 ± 0.02	-2.85	0.00	2.39 ± 0.69	0.94 [0.90, 0.98]
NH + MA	MABB	41.65	-70.62	0.01 ± 0.03	0.23	0.82	1.62 ± 0.46	1.01 [0.94, 1.08]
NH + MA	MANF	41.60	-70.87	-0.11 ± 0.02	-5.40	0.00	2.94 ± 0.87	0.89 [0.86, 0.93]
NH + MA	MAMV	41.36	-70.52	-0.21 ± 0.03	-5.93	0.00	1.06 ± 0.29	0.81 [0.76, 0.87]
NH + MA	MANA	41.29	-70.09	0.05 ± 0.05	1.06	0.29	0.57 ± 0.15	1.05 [0.95, 1.17]
NH + MA	MATI	41.27	-70.35	0.21 ± 0.05	4.03	0.00	0.52 ± 0.14	1.23 [1.12, 1.36]
RI + CT + NY	RINC	41.54	-71.16	-0.06 ± 0.03	-2.01	0.04	1.51 ± 0.42	0.94 [0.90, 0.99]
RI + CT + NY	RISK	41.43	-71.56	-0.02 ± 0.03	-0.43	0.67	1.06 ± 0.29	0.99 [0.91, 1.07]
RI + CT + NY	CTNL	41.32	-72.10	0.14 ± 0.06	2.29	0.02	0.34 ± 0.10	1.15 [1.00, 1.35]
RI + CT + NY	RINT	41.32	-71.82	0.05 ± 0.04	1.33	0.18	1.42 ± 0.42	1.05 [0.98, 1.12]
RI + CT + NY	RIBI	41.21	-71.57	0.03 ± 0.03	0.87	0.39	1.20 ± 0.33	1.03 [0.96, 1.11]
RI + CT + NY	NYOR	41.10	-72.34	0.29 ± 0.04	7.95	0.00	1.18 ± 0.39	1.34 [1.23, 1.46]
RI + CT + NY	NYMK	41.05	-72.00	0.03 ± 0.03	0.90	0.37	1.53 ± 0.43	1.03 [0.97, 1.09]
RI + CT + NY	NYQW	40.86	-72.45	0.38 ± 0.05	7.93	0.00	0.60 ± 0.17	1.46 [1.26, 1.70]
RI + CT + NY	NYCS	40.83	-72.78	0.23 ± 0.07	3.48	0.00	0.29 ± 0.09	1.26 [1.10, 1.50]
RI + CT + NY	NYCA	40.70	-73.25	0.22 ± 0.07	3.30	0.00	0.32 ± 0.10	1.24 [1.08, 1.45]
RI + CT + NY	NYSN	40.63	-73.59	0.21 ± 0.06	3.67	0.00	0.41 ± 0.12	1.23 [1.05, 1.46]
RI + CT + NY	NYBR	40.62	-73.94	0.23 ± 0.07	3.12	0.00	0.27 ± 0.10	1.26 [1.05, 1.55]
NJ + DE + MD + VA	NJLB	40.25	-74.06	0.16 ± 0.08	1.97	0.05	0.21 ± 0.08	1.17 [1.03, 1.38]
NJ + DE + MD + VA	NJBA	39.67	-74.17	0.19 ± 0.05	4.03	0.00	0.62 ± 0.17	1.2 [1.06, 1.39]
NJ + DE + MD + VA	NJCM	39.01	-74.88	0.02 ± 0.05	0.52	0.60	0.64 ± 0.21	1.02 [0.90, 1.19]

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NJ + DE + MD + VA	DECH	38.81	-75.19	-0.13 ± 0.07	-1.89	0.06	0.28 ± 0.10	0.88 [0.72, 1.11]
NJ + DE + MD + VA	DERE	38.60	-75.11	0.17 ± 0.06	2.84	0.00	0.63 ± 0.33	1.19 [1.08, 1.32]
NJ + DE + MD + VA	MDOC	38.31	-75.21	0.15 ± 0.04	3.53	0.00	0.76 ± 0.24	1.16 [1.05, 1.30]