**Additional file 1:**



**Figure S1**: The strength of the Pearson’s correlation (*r*) between latitude and winter date values associated with each individual in each of our 9 focal species. The dashed grey line indicates the threshold of 0.7 at which collinearity has been shown to affect model estimation and subsequent predictions.

**Reference**: Dormann C F, Elith J, Bacher S, Buchmann C, Carl G, Carré G, et al. Collinearity: a review of methods to deal with it and a simulation study evaluating their performance. Ecography. 2013;36:27–46.

**Table S1**. The sample size (i.e. total number of captured individuals for which sex and age class were determined) for each of our nine focal species in each winter between 1963/64 and 2019/20.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Winter** | **Gadwall** | **Northern Mallard** | **Northern Pintail** | **Common Pochard** | **Common Shelduck** | **Northern Shoveler** | **Eurasian Teal** | **Tufted Duck** | **Eurasian Wigeon** |
| 1963 | 0 | 673 | 0 | 0 | 0 | 0 | 148 | 0 | 0 |
| 1964 | 0 | 822 | 0 | 0 | 0 | 0 | 75 | 0 | 0 |
| 1965 | 0 | 232 | 0 | 0 | 0 | 0 | 152 | 0 | 0 |
| 1966 | 0 | 5 | 0 | 0 | 0 | 0 | 349 | 0 | 0 |
| 1967 | 0 | 163 | 0 | 0 | 0 | 0 | 469 | 4 | 30 |
| 1968 | 0 | 608 | 1 | 11 | 0 | 1 | 624 | 117 | 13 |
| 1969 | 0 | 357 | 90 | 7 | 0 | 9 | 1229 | 55 | 127 |
| 1970 | 5 | 225 | 100 | 8 | 1 | 3 | 1000 | 85 | 206 |
| 1971 | 1 | 566 | 71 | 62 | 0 | 12 | 573 | 245 | 101 |
| 1972 | 3 | 772 | 100 | 9 | 0 | 2 | 680 | 152 | 84 |
| 1973 | 13 | 1181 | 138 | 8 | 0 | 18 | 231 | 76 | 109 |
| 1974 | 0 | 717 | 42 | 5 | 0 | 7 | 298 | 49 | 72 |
| 1975 | 11 | 1273 | 34 | 3 | 0 | 6 | 525 | 68 | 413 |
| 1976 | 116 | 759 | 113 | 11 | 1 | 55 | 353 | 45 | 146 |
| 1977 | 151 | 750 | 137 | 111 | 1 | 22 | 250 | 250 | 208 |
| 1978 | 179 | 933 | 174 | 236 | 0 | 88 | 292 | 260 | 67 |
| 1979 | 80 | 871 | 29 | 79 | 0 | 7 | 209 | 229 | 74 |
| 1980 | 74 | 1100 | 59 | 54 | 0 | 11 | 184 | 83 | 160 |
| 1981 | 6 | 646 | 13 | 32 | 0 | 1 | 291 | 226 | 12 |
| 1982 | 19 | 407 | 2 | 26 | 1 | 1 | 221 | 166 | 42 |
| 1983 | 33 | 1189 | 32 | 66 | 1 | 5 | 563 | 207 | 4 |
| 1984 | 224 | 867 | 190 | 57 | 1 | 49 | 459 | 569 | 40 |
| 1985 | 28 | 852 | 48 | 223 | 0 | 3 | 349 | 243 | 25 |
| 1986 | 114 | 1075 | 79 | 430 | 3 | 47 | 430 | 271 | 18 |
| 1987 | 47 | 652 | 33 | 230 | 3 | 0 | 77 | 285 | 45 |
| 1988 | 40 | 791 | 66 | 229 | 2 | 4 | 1084 | 456 | 8 |
| 1989 | 29 | 722 | 22 | 138 | 4 | 2 | 350 | 71 | 27 |
| 1990 | 75 | 1343 | 146 | 240 | 40 | 6 | 112 | 30 | 49 |
| 1991 | 52 | 678 | 87 | 123 | 5 | 8 | 802 | 109 | 63 |
| 1992 | 15 | 267 | 44 | 144 | 36 | 1 | 150 | 81 | 12 |
| 1993 | 24 | 311 | 5 | 68 | 39 | 8 | 120 | 33 | 41 |
| 1994 | 45 | 399 | 45 | 409 | 81 | 7 | 526 | 127 | 23 |
| 1995 | 70 | 344 | 211 | 948 | 112 | 29 | 1784 | 382 | 49 |
| 1996 | 69 | 420 | 87 | 459 | 74 | 13 | 1614 | 223 | 42 |
| 1997 | 29 | 127 | 66 | 123 | 123 | 7 | 777 | 263 | 57 |
| 1998 | 19 | 102 | 56 | 177 | 50 | 0 | 1011 | 6 | 31 |
| 1999 | 6 | 155 | 57 | 158 | 216 | 2 | 1049 | 49 | 34 |
| 2000 | 16 | 257 | 24 | 13 | 69 | 0 | 680 | 19 | 29 |
| 2001 | 46 | 345 | 114 | 204 | 28 | 4 | 1263 | 25 | 59 |
| 2002 | 27 | 199 | 93 | 107 | 42 | 0 | 807 | 99 | 11 |
| 2003 | 3 | 476 | 68 | 51 | 44 | 2 | 1506 | 68 | 222 |
| 2004 | 12 | 470 | 210 | 57 | 89 | 3 | 300 | 94 | 463 |
| 2005 | 24 | 429 | 214 | 43 | 16 | 5 | 950 | 57 | 333 |
| 2006 | 16 | 678 | 179 | 60 | 184 | 5 | 967 | 73 | 269 |
| 2007 | 21 | 851 | 221 | 65 | 129 | 4 | 1324 | 51 | 314 |
| 2008 | 10 | 593 | 205 | 79 | 182 | 0 | 1211 | 39 | 27 |
| 2009 | 32 | 561 | 368 | 155 | 171 | 0 | 886 | 51 | 8 |
| 2010 | 22 | 144 | 88 | 43 | 71 | 0 | 518 | 47 | 77 |
| 2011 | 11 | 224 | 104 | 6 | 64 | 0 | 452 | 21 | 172 |
| 2012 | 0 | 224 | 90 | 60 | 100 | 0 | 56 | 44 | 10 |
| 2013 | 1 | 150 | 4 | 6 | 43 | 0 | 153 | 0 | 205 |
| 2014 | 2 | 167 | 63 | 39 | 89 | 0 | 225 | 10 | 84 |
| 2015 | 0 | 60 | 8 | 1 | 69 | 0 | 94 | 0 | 28 |
| 2016 | 0 | 134 | 31 | 0 | 2 | 0 | 424 | 2 | 191 |
| 2017 | 2 | 67 | 1 | 1 | 109 | 1 | 230 | 1 | 304 |
| 2018 | 4 | 418 | 206 | 16 | 380 | 1 | 1505 | 39 | 178 |
| 2019 | 4 | 334 | 211 | 12 | 377 | 0 | 20 | 1 | 94 |

**Table S2a**. A comparison of the support for the each of the candidate models of the between-individual variation the probability that a captured individual Gadwall would be male.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Model** | **AICc** | **ΔAICc** | **Relative likelihood** | **Akaike weights** | **Evidence ratio** | **Nagelkerke's *R*2** |
| ***i + A*** | **2469.94** | **0.00** | **1.00** | **0.292** | **1.00E + 00** | **0.0304** |
| *i + A + N* | 2471.45 | 1.51 | 0.47 | 0.137 | 2.13E + 00 | 0.0308 |
| *i + W*L *+ A* | 2471.61 | 1.67 | 0.43 | 0.127 | 2.30E + 00 | 0.0307 |
| *i + A + D* | 2471.89 | 1.95 | 0.38 | 0.110 | 2.66E + 00 | 0.0305 |
| *i + W*L + *A + N* | 2473.28 | 3.35 | 0.19 | 0.055 | 5.33E + 00 | 0.0309 |
| *i + W*L *+ A +* (*W*L:*A)* | 2473.52 | 3.58 | 0.17 | 0.049 | 5.99E + 00 | 0.0307 |
| *i + W*L *+ A + D* | 2473.55 | 3.61 | 0.16 | 0.048 | 6.09E + 00 | 0.0307 |
| *i +* (*W*L *+ W*Q) *+ A* | 2473.61 | 3.67 | 0.16 | 0.047 | 6.27E + 00 | 0.0307 |
| *i + W*L *+ A +* (*W*L:*A) + N* | 2475.15 | 5.21 | 0.07 | 0.022 | 1.35E + 01 | 0.0310 |
| *i + W*L + *A + N + D* | 2475.22 | 5.28 | 0.07 | 0.021 | 1.40E + 01 | 0.0309 |
| *i +* (*W*L + *W*Q) *+ A + N* | 2475.29 | 5.35 | 0.07 | 0.020 | 1.45E + 01 | 0.0309 |
| *i + W*L + *A +* (*W*L:*A) + D* | 2475.46 | 5.52 | 0.06 | 0.018 | 1.58E + 01 | 0.0308 |
| *i +* (*W*L + *W*Q) *+ A + D* | 2475.56 | 5.62 | 0.06 | 0.018 | 1.66E + 01 | 0.0307 |
| *i +* (*W*L + *W*Q) *+ A +* ((*W*L + *W*Q):*A*) | 2476.41 | 6.47 | 0.04 | 0.011 | 2.55E + 01 | 0.0315 |
| *i + W*L + *A +* (*W*L:*A*) *+ N + D* | 2477.08 | 7.14 | 0.03 | 0.008 | 3.56E + 01 | 0.0311 |
| *i* + (*W*L + *W*Q) *+ A + N + D* | 2477.23 | 7.29 | 0.03 | 0.008 | 3.82E + 01 | 0.0310 |
| *i +* (*W*L + *W*Q) *+ A +* ((*W*L + *W*Q):*A*) *+ N* | 2478.05 | 8.11 | 0.02 | 0.005 | 5.76E + 01 | 0.0318 |
| *i +* (*W*L + *W*Q) + *A +* ((*W*L + *W*Q):*A*) *+ D* | 2478.32 | 8.39 | 0.02 | 0.004 | 6.62E + 01 | 0.0316 |
| *i* + (*W*L + *W*Q) *+ A +* ((*W*L + *W*Q):*A*) *+ N + D* | 2479.95 | 10.01 | 0.01 | 0.002 | 1.49E + 02 | 0.0319 |
| *i* | 2509.94 | 40.00 | 0.00 | 0.000 | 4.85E + 08 | 0.0000 |
| *i + W*L | 2510.58 | 40.64 | 0.00 | 0.000 | 6.68E + 08 | 0.0010 |
| *i + D* | 2511.49 | 41.55 | 0.00 | 0.000 | 1.05E + 09 | 0.0003 |
| *i + N* | 2511.94 | 42.00 | 0.00 | 0.000 | 1.32E + 09 | 0.0000 |
| *i + W*L *+ D* | 2512.07 | 42.13 | 0.00 | 0.000 | 1.41E + 09 | 0.0014 |
| *i + W*L *+ N* | 2512.51 | 42.57 | 0.00 | 0.000 | 1.75E + 09 | 0.0011 |
| *i +* (*W*L *+ W*Q) | 2512.58 | 42.64 | 0.00 | 0.000 | 1.82E + 09 | 0.0010 |
| *i +* (*W*L *+ W*Q) + *D* | 2514.06 | 44.12 | 0.00 | 0.000 | 3.81E + 09 | 0.0014 |
| *i +* (*W*L *+ W*Q) + *N* | 2514.51 | 44.57 | 0.00 | 0.000 | 4.78E + 09 | 0.0011 |

The model with the lowest AICc value for each species is indicated in bold. Parameters: *i* = intercept, *W*L = linear trend over winters, *W*Q = quadratic trend over winters, *A*J = age class (juveniles), *D* = winter date, *N* = latitude.

**Table S2b**. A comparison of the support for the each of the candidate models of the between-individual variation the probability that a captured individual Northern Mallard would be male.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Model** | **AICc** | **ΔAICc** | **Relative likelihood** | **Akaike weights** | **Evidence ratio** | **Nagelkerke's *R*2** |
| ***i +* (*W*L + *W*Q) *+ A +* ((*W*L *+ W*Q): *A*) *+ D*** | **40345.28** | **0.00** | **1.00** | **0.627** | **1.00E + 00** | **0.0405** |
| *i +* (*W*L + *W*Q) *+ A +* ((*W*L *+ W*Q): *A*) *+ N + D* | 40347.27 | 1.99 | 0.37 | 0.232 | 2.70E + 00 | 0.0405 |
| *i +* (*W*L + *W*Q) *+ A +* ((*W*L *+ W*Q): *A*) | 40348.89 | 3.61 | 0.16 | 0.103 | 6.08E + 00 | 0.0402 |
| *i +* (*W*L + *W*Q) *+ A +* ((*W*L *+ W*Q): *A*) *+ N* | 40350.89 | 5.61 | 0.06 | 0.038 | 1.65E + 01 | 0.0402 |
| *i + W*L + *A +* (*W*L:*A*) + *D* | 40433.46 | 88.18 | 0.00 | 0.000 | 1.41E + 19 | 0.0365 |
| *i + W*L *+ A +* (*W*L:*A*) *+ N + D* | 40435.15 | 89.87 | 0.00 | 0.000 | 3.27E + 19 | 0.0365 |
| *i + W*L + *A +* (*W*L:*A*) | 40436.69 | 91.41 | 0.00 | 0.000 | 7.07E + 19 | 0.0362 |
| *i + W*L *+ A +* (*W*L:*A*) *+ N* | 40438.23 | 92.95 | 0.00 | 0.000 | 1.53E + 20 | 0.0363 |
| *i +* (*W*L *+ W*Q) *+ A* | 40841.98 | 496.70 | 0.00 | 0.000 | 7.20E + 107 | 0.0186 |
| *i +* (*W*L *+ W*Q) *+ A + N* | 40843.62 | 498.34 | 0.00 | 0.000 | 1.63E + 108 | 0.0186 |
| *i +* (*W*L *+ W*Q) *+ A + D* | 40843.87 | 498.59 | 0.00 | 0.000 | 1.85E + 108 | 0.0186 |
| *i +* (*W*L *+ W*Q) *+ A + N + D* | 40845.48 | 500.20 | 0.00 | 0.000 | 4.14E + 108 | 0.0186 |
| *i + W*L *+ A* | 40859.78 | 514.50 | 0.00 | 0.000 | 5.28E + 111 | 0.0177 |
| *i + W*L *+ A + D* | 40861.47 | 516.19 | 0.00 | 0.000 | 1.23E + 112 | 0.0177 |
| *i + W*L *+ A + N* | 40861.77 | 516.49 | 0.00 | 0.000 | 1.43E + 112 | 0.0177 |
| *i + W*L *+ A + N + D* | 40863.46 | 518.18 | 0.00 | 0.000 | 3.32E + 112 | 0.0177 |
| *i + A + N* | 40987.56 | 642.28 | 0.00 | 0.000 | 2.95E + 139 | 0.0121 |
| *i + A + D* | 40988.65 | 643.37 | 0.00 | 0.000 | 5.08E + 139 | 0.0120 |
| *i + A* | 40988.80 | 643.52 | 0.00 | 0.000 | 5.48E + 139 | 0.0119 |
| *i + (W*L *+ W*Q) *+ D* | 41049.74 | 704.46 | 0.00 | 0.000 | 9.37E + 152 | 0.0094 |
| *i + (W*L *+ W*Q) *+ N* | 41055.64 | 710.36 | 0.00 | 0.000 | 1.79E + 154 | 0.0092 |
| *i + (W*L + *W*Q) | 41056.01 | 710.73 | 0.00 | 0.000 | 2.15E + 154 | 0.0091 |
| *i + W*L *+ D* | 41061.67 | 716.39 | 0.00 | 0.000 | 3.65E + 155 | 0.0088 |
| *i + W*L | 41068.89 | 723.61 | 0.00 | 0.000 | 1.35E + 157 | 0.0084 |
| *i + W*L *+ N* | 41070.08 | 724.80 | 0.00 | 0.000 | 2.45E + 157 | 0.0084 |
| *i + D* | 41238.72 | 893.44 | 0.00 | 0.000 | 1.02E + 194 | 0.0009 |
| *i + N* | 41247.25 | 901.97 | 0.00 | 0.000 | 7.25E + 195 | 0.0005 |
| *i* | 41256.36 | 911.08 | 0.00 | 0.000 | 6.89E + 197 | 0.0000 |

The model with the lowest AICc value for each species is indicated in bold. Parameters: *i* = intercept, *W*L = linear trend over winters, *W*Q = quadratic trend over winters, *A*J = age class (juveniles), *D* = winter date, *N* = latitude.

**Table S2c**. A comparison of the support for the each of the candidate models of the between-individual variation the probability that a captured individual Northern Pintail would be male.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Model** | **AICc** | **ΔAICc** | **Relative likelihood** | **Akaike weights** | **Evidence ratio** | **Nagelkerke's *R*2** |
| ***i + (W*L *+ W*Q) *+ A +* ((*W*L *+ W*Q): *A*) *+ D*** | **6331.82** | **0.00** | **1.00** | **0.483** | **1.00E + 00** | **0.0855** |
| *i + (W*L *+ W*Q) *+ A +* ((*W*L *+ W*Q): *A*) *+ N + D* | 6333.43 | 1.60 | 0.45 | 0.217 | 2.23E + 00 | 0.0856 |
| *i + W*L + *A +* (*W*L : *A*) *+ D* | 6334.08 | 2.25 | 0.32 | 0.157 | 3.08E + 00 | 0.0839 |
| *i + W*L + *A +* (*W*L : *A*) *+ N + D* | 6335.56 | 3.73 | 0.15 | 0.075 | 6.47E + 00 | 0.0840 |
| *i + (W*L *+ W*Q) *+ A +* ((*W*L *+ W*Q): *A*) | 6336.98 | 5.16 | 0.08 | 0.037 | 1.32E + 01 | 0.0836 |
| *i + (W*L *+ W*Q) + *A +* ((*W*L *+ W*Q): *A*) *+ N* | 6337.62 | 5.80 | 0.06 | 0.027 | 1.81E + 01 | 0.0840 |
| *i + W*L + *A +* (*W*L : *A*) *+ N* | 6342.04 | 10.21 | 0.01 | 0.003 | 1.65E + 02 | 0.0818 |
| *i + W*L + *A +* (*W*L : *A*) | 6342.35 | 10.53 | 0.01 | 0.003 | 1.93E + 02 | 0.0812 |
| *i + W*L *+ A + D* | 6351.77 | 19.95 | 0.00 | 0.000 | 2.15E + 04 | 0.0788 |
| *i + W*L *+ A + N + D* | 6352.81 | 20.99 | 0.00 | 0.000 | 3.61E + 04 | 0.0790 |
| *i +* (*W*L *+ W*Q) *+ A + D* | 6353.76 | 21.94 | 0.00 | 0.000 | 5.80E + 04 | 0.0788 |
| *i + A + D* | 6353.96 | 22.14 | 0.00 | 0.000 | 6.42E + 04 | 0.0777 |
| *i +* (*W*L *+ W*Q) *+ A + N + D* | 6354.76 | 22.94 | 0.00 | 0.000 | 9.56E + 04 | 0.0790 |
| *i + W*L *+ A + N* | 6355.10 | 23.28 | 0.00 | 0.000 | 1.13E + 05 | 0.0779 |
| *i + W*L *+ A* | 6355.51 | 23.69 | 0.00 | 0.000 | 1.39E + 05 | 0.0773 |
| *i +* (*W*L + *W*Q) *+ A + N* | 6356.84 | 25.02 | 0.00 | 0.000 | 2.71E + 05 | 0.0780 |
| *i +* (*W*L *+ W*Q) *+ A* | 6356.88 | 25.05 | 0.00 | 0.000 | 2.76E + 05 | 0.0774 |
| *i + A* | 6362.92 | 31.10 | 0.00 | 0.000 | 5.65E + 06 | 0.0748 |
| *i + A + N* | 6364.78 | 32.95 | 0.00 | 0.000 | 1.43E + 07 | 0.0749 |
| *i + W*L *+ D* | 6582.39 | 250.57 | 0.00 | 0.000 | 2.57E + 54 | 0.0169 |
| *i +* (*W*L *+ W*Q) + *D* | 6583.44 | 251.62 | 0.00 | 0.000 | 4.35E + 54 | 0.0172 |
| *i + W*L *+ N* | 6595.35 | 263.53 | 0.00 | 0.000 | 1.68E + 57 | 0.0134 |
| *i +* (*W*L + *W*Q) *+ N* | 6597.26 | 265.43 | 0.00 | 0.000 | 4.34E + 57 | 0.0134 |
| *i + D* | 6598.96 | 267.14 | 0.00 | 0.000 | 1.02E + 58 | 0.0119 |
| *i + WL* | 6600.94 | 269.12 | 0.00 | 0.000 | 2.74E + 58 | 0.0113 |
| *i +* (*W*L + *W*Q) | 6602.24 | 270.42 | 0.00 | 0.000 | 5.26E + 58 | 0.0115 |
| *i* | 6640.17 | 308.35 | 0.00 | 0.000 | 9.06E + 66 | 0.0000 |
| *i + N* | 6642.03 | 310.20 | 0.00 | 0.000 | 2.29E + 67 | 0.0000 |

The model with the lowest AICc value for each species is indicated in bold. Parameters: *i* = intercept, *W*L = linear trend over winters, *W*Q = quadratic trend over winters, *A*J = age class (juveniles), *D* = winter date, *N* = latitude.

**Table S2d**. A comparison of the support for the each of the candidate models of the between-individual variation the probability that a captured individual Common Pochard would be male.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Model** | **AICc** | **ΔAICc** | **Relative likelihood** | **Akaike weights** | **Evidence ratio** | **Nagelkerke's *R*2** |
| ***i + WL + A + (WL : A) + N + D*** | **6495.44** | **0.00** | **1.00** | **0.796** | **1.00E+00** | **0.0890** |
| *i + (WL + WQ) + A + ((WL + WQ): A) + N + D* | 6498.21 | 2.77 | 0.25 | 0.200 | 3.98E+00 | 0.0893 |
| *i + WL + A + (WL : A) + D* | 6507.40 | 11.96 | 0.00 | 0.002 | 3.96E+02 | 0.0857 |
| *i + (WL + WQ) + A + ((WL + WQ): A) + D* | 6508.74 | 13.30 | 0.00 | 0.001 | 7.74E+02 | 0.0864 |
| *i + (WL + WQ) + A + N + D* | 6509.27 | 13.83 | 0.00 | 0.001 | 1.01E+03 | 0.0858 |
| *i + WL + A + N + D* | 6511.81 | 16.37 | 0.00 | 0.000 | 3.59E+03 | 0.0847 |
| *i + (WL + WQ) + A + D* | 6517.16 | 21.72 | 0.00 | 0.000 | 5.20E+04 | 0.0835 |
| *i + WL + A + D* | 6521.01 | 25.57 | 0.00 | 0.000 | 3.56E+05 | 0.0821 |
| *i + WL + A + (WL : A) + N* | 6521.49 | 26.05 | 0.00 | 0.000 | 4.53E+05 | 0.0825 |
| *i + (WL + WQ) + A + ((WL + WQ): A) + N* | 6524.54 | 29.10 | 0.00 | 0.000 | 2.08E+06 | 0.0827 |
| *i + WL + A + (WL : A)* | 6531.94 | 36.50 | 0.00 | 0.000 | 8.44E+07 | 0.0796 |
| *i + (WL + WQ) + A + N* | 6533.48 | 38.04 | 0.00 | 0.000 | 1.82E+08 | 0.0797 |
| *i + (WL + WQ) + A + ((WL + WQ): A)* | 6533.83 | 38.39 | 0.00 | 0.000 | 2.17E+08 | 0.0801 |
| *i + WL + A + N* | 6535.10 | 39.66 | 0.00 | 0.000 | 4.09E+08 | 0.0788 |
| *i + (WL + WQ) + A* | 6540.53 | 45.09 | 0.00 | 0.000 | 6.17E+09 | 0.0776 |
| *i + WL + A* | 6543.25 | 47.81 | 0.00 | 0.000 | 2.41E+10 | 0.0765 |
| *i + A + N* | 6564.79 | 69.35 | 0.00 | 0.000 | 1.15E+15 | 0.0714 |
| *i + A + D* | 6568.30 | 72.86 | 0.00 | 0.000 | 6.62E+15 | 0.0706 |
| *i + A* | 6598.40 | 102.95 | 0.00 | 0.000 | 2.27E+22 | 0.0630 |
| *i + (WL + WQ) + D* | 6705.91 | 210.47 | 0.00 | 0.000 | 5.05E+45 | 0.0384 |
| *i + WL + D* | 6711.27 | 215.83 | 0.00 | 0.000 | 7.35E+46 | 0.0366 |
| *i + (WL + WQ)* | 6741.36 | 245.92 | 0.00 | 0.000 | 2.52E+53 | 0.0294 |
| *i + (WL + WQ) + N* | 6742.44 | 247.00 | 0.00 | 0.000 | 4.32E+53 | 0.0296 |
| *i + WL* | 6745.39 | 249.95 | 0.00 | 0.000 | 1.88E+54 | 0.0279 |
| *i + WL + N* | 6745.98 | 250.54 | 0.00 | 0.000 | 2.54E+54 | 0.0283 |
| *i + D* | 6808.26 | 312.82 | 0.00 | 0.000 | 8.47E+67 | 0.0126 |
| *i + N* | 6833.09 | 337.64 | 0.00 | 0.000 | 2.08E+73 | 0.0065 |
| *i* | 6857.68 | 362.24 | 0.00 | 0.000 | 4.57E+78 | 0.0000 |

The model with the lowest AICc value for each species is indicated in bold. Parameters: *i* = intercept, *WL* = linear trend over winters, *WQ* = quadratic trend over winters, *AJ* = age class (juveniles), *D* = winter date, *N* = latitude.

**Table S2e**. A comparison of the support for the each of the candidate models of the between-individual variation the probability that a captured individual Common Shelduck would be male.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Model** | **AICc** | **ΔAICc** | **Relative likelihood** | **Akaike weights** | **Evidence ratio** | **Nagelkerke's *R2*** |
| ***i + WL + A + (WL : A) + N*** | **2878.221** | **0.00** | **1.00** | **0.170** | **1.00E+00** | **0.1134** |
| *i + WL + A + N* | 2878.387 | 0.17 | 0.92 | 0.157 | 1.09E+00 | 0.1124 |
| *i + WL + A + (WL : A)* | 2879.061 | 0.84 | 0.66 | 0.112 | 1.52E+00 | 0.1120 |
| *i + WL + A* | 2879.707 | 1.49 | 0.48 | 0.081 | 2.10E+00 | 0.1108 |
| *i + (WL + WQ) + A + N* | 2879.877 | 1.66 | 0.44 | 0.074 | 2.29E+00 | 0.1126 |
| *i + WL + A + (WL : A) + N + D* | 2880.179 | 1.96 | 0.38 | 0.064 | 2.66E+00 | 0.1134 |
| *i + WL + A + N + D* | 2880.364 | 2.14 | 0.34 | 0.058 | 2.92E+00 | 0.1124 |
| *i + (WL + WQ) + A* | 2880.515 | 2.29 | 0.32 | 0.054 | 3.15E+00 | 0.1113 |
| *i + (WL + WQ) + A + ((WL + WQ): A) + N* | 2881.046 | 2.82 | 0.24 | 0.042 | 4.11E+00 | 0.1140 |
| *i + WL + A + (WL : A) + D* | 2881.058 | 2.84 | 0.24 | 0.041 | 4.13E+00 | 0.1120 |
| *i + (WL + WQ) + A + ((WL + WQ): A)* | 2881.402 | 3.18 | 0.20 | 0.035 | 4.91E+00 | 0.1128 |
| *i + WL + A + D* | 2881.678 | 3.46 | 0.18 | 0.030 | 5.63E+00 | 0.1108 |
| *i + (WL + WQ) + A + N + D* | 2881.781 | 3.56 | 0.17 | 0.029 | 5.93E+00 | 0.1127 |
| *i + (WL + WQ) + A + D* | 2882.515 | 4.29 | 0.12 | 0.020 | 8.56E+00 | 0.1113 |
| *i + (WL + WQ) + A + ((WL + WQ): A) + N + D* | 2882.949 | 4.73 | 0.09 | 0.016 | 1.06E+01 | 0.1140 |
| *i + (WL + WQ) + A + ((WL + WQ): A) + D* | 2883.401 | 5.18 | 0.08 | 0.013 | 1.33E+01 | 0.1128 |
| *i + A + N* | 2886.918 | 8.70 | 0.01 | 0.002 | 7.74E+01 | 0.1073 |
| *i + A* | 2889.96 | 11.73 | 0.00 | 0.000 | 3.53E+02 | 0.1049 |
| *i + A + D* | 2890.189 | 11.97 | 0.00 | 0.000 | 3.97E+02 | 0.1058 |
| *i + (WL + WQ) + N* | 3066.04 | 187.82 | 0.00 | 0.000 | 6.09E+40 | 0.0200 |
| *i + WL + N* | 3068.423 | 190.20 | 0.00 | 0.000 | 2.00E+41 | 0.0178 |
| *i + (WL + WQ)* | 3069.061 | 190.84 | 0.00 | 0.000 | 2.76E+41 | 0.0175 |
| *i + (WL + WQ) + D* | 3070.598 | 192.38 | 0.00 | 0.000 | 5.94E+41 | 0.0177 |
| *i + WL* | 3074.098 | 195.88 | 0.00 | 0.000 | 3.42E+42 | 0.0139 |
| *i + WL + D* | 3076.1 | 197.88 | 0.00 | 0.000 | 9.31E+42 | 0.0139 |
| *i + N* | 3089.074 | 210.85 | 0.00 | 0.000 | 6.11E+45 | 0.0062 |
| *i + D* | 3098.305 | 220.08 | 0.00 | 0.000 | 6.17E+47 | 0.0015 |
| *i* | 3099.22 | 220.99 | 0.00 | 0.000 | 9.73E+47 | 0.0000 |

The model with the lowest AICc value for each species is indicated in bold. Parameters: *i* = intercept, *WL* = linear trend over winters, *WQ* = quadratic trend over winters, *AJ* = age class (juveniles), *D* = winter date, *N* = latitude.

**Table S2f**: A comparison of the support for the each of the candidate models of the between-individual variation the probability that a captured individual Northern Shoveler would be male. The model with the lowest AICc value for each species is indicated in bold. Parameters: *i* = intercept, *WL* = linear trend over winters, *WQ* = quadratic trend over winters, *AJ* = age class (juveniles), *D* = winter date, *N* = latitude.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Model** | **AICc** | **ΔAICc** | **Relative likelihood** | **Akaike weights** | **Evidence ratio** | **Nagelkerke's *R2*** |
| ***i + WL + A*** | **583.31** | **0.00** | **1.00** | **0.185** | **1.00E+00** | **0.0408** |
| *i + WL + A + (WL : A)* | 584.52 | 1.21 | 0.55 | 0.101 | 1.83E+00 | 0.0432 |
| *i + A* | 584.68 | 1.36 | 0.51 | 0.094 | 1.98E+00 | 0.0308 |
| *i + (WL + WQ) + A* | 585.01 | 1.70 | 0.43 | 0.079 | 2.34E+00 | 0.0417 |
| *i + WL + A + D* | 585.14 | 1.82 | 0.40 | 0.074 | 2.49E+00 | 0.0414 |
| *i + WL + A + N* | 585.31 | 1.99 | 0.37 | 0.068 | 2.71E+00 | 0.0409 |
| *i + (WL + WQ) + A + ((WL + WQ): A)* | 585.66 | 2.35 | 0.31 | 0.057 | 3.24E+00 | 0.0518 |
| *i + A + N* | 586.27 | 2.95 | 0.23 | 0.042 | 4.38E+00 | 0.0321 |
| *i + WL + A + (WL : A) + D* | 586.39 | 3.07 | 0.22 | 0.040 | 4.65E+00 | 0.0437 |
| *i + WL + A + (WL : A) + N* | 586.50 | 3.19 | 0.20 | 0.038 | 4.93E+00 | 0.0433 |
| *i + A + D* | 586.51 | 3.20 | 0.20 | 0.037 | 4.95E+00 | 0.0314 |
| *i + (WL + WQ) + A + D* | 586.63 | 3.32 | 0.19 | 0.035 | 5.26E+00 | 0.0430 |
| *i + (WL + WQ) + A + N* | 586.97 | 3.66 | 0.16 | 0.030 | 6.24E+00 | 0.0420 |
| *i + WL + A + N + D* | 587.15 | 3.83 | 0.15 | 0.027 | 6.80E+00 | 0.0415 |
| *i + (WL + WQ) + A + ((WL + WQ): A) + D* | 587.43 | 4.12 | 0.13 | 0.024 | 7.84E+00 | 0.0526 |
| *i + (WL + WQ) + A + ((WL + WQ): A) + N* | 587.67 | 4.36 | 0.11 | 0.021 | 8.85E+00 | 0.0519 |
| *i + WL + A + (WL : A) + N + D* | 588.39 | 5.07 | 0.08 | 0.015 | 1.26E+01 | 0.0438 |
| *i + (WL + WQ) + A + N + D* | 588.60 | 5.29 | 0.07 | 0.013 | 1.41E+01 | 0.0432 |
| *i + (WL + WQ) + A + ((WL + WQ): A) + N + D* | 589.45 | 6.13 | 0.05 | 0.009 | 2.15E+01 | 0.0528 |
| *i + WL* | 591.46 | 8.14 | 0.02 | 0.003 | 5.86E+01 | 0.0107 |
| *i* | 593.02 | 9.70 | 0.01 | 0.001 | 1.28E+02 | 0.0000 |
| *i + (WL + WQ)* | 593.07 | 9.76 | 0.01 | 0.001 | 1.31E+02 | 0.0120 |
| *i + WL + D* | 593.39 | 10.08 | 0.01 | 0.001 | 1.54E+02 | 0.0110 |
| *i + WL + N* | 593.48 | 10.16 | 0.01 | 0.001 | 1.61E+02 | 0.0107 |
| *i + (WL + WQ) + D* | 594.85 | 11.54 | 0.00 | 0.001 | 3.20E+02 | 0.0127 |
| *i + N* | 594.88 | 11.57 | 0.00 | 0.001 | 3.25E+02 | 0.0005 |
| *i + D* | 594.95 | 11.64 | 0.00 | 0.001 | 3.36E+02 | 0.0003 |
| *i + (WL + WQ) + N* | 595.10 | 11.79 | 0.00 | 0.001 | 3.63E+02 | 0.0120 |

**Table S2g**: A comparison of the support for the each of the candidate models of the between-individual variation the probability that a captured individual Eurasian Teal would be male. The model with the lowest AICc value for each species is indicated in bold. Parameters: *i* = intercept, *WL* = linear trend over winters, *WQ* = quadratic trend over winters, *AJ* = age class (juveniles), *D* = winter date, *N* = latitude.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Model** | **AICc** | **ΔAICc** | **Relative likelihood** | **Akaike weights** | **Evidence ratio** | **Nagelkerke's *R2*** |
| ***i + (WL + WQ) + A + ((WL + WQ): A) + N + D*** | **44224.58** | **0.00** | **1.00** | **0.907** | **1.00E+00** | **0.0099** |
| *i + (WL + WQ) + A + ((WL + WQ): A) + D* | 44229.14 | 4.56 | 0.10 | 0.093 | 9.78E+00 | 0.0096 |
| *i + (WL + WQ) + A + N + D* | 44249.70 | 25.12 | 0.00 | 0.000 | 2.85E+05 | 0.0087 |
| *i + (WL + WQ) + A + D* | 44251.16 | 26.58 | 0.00 | 0.000 | 5.91E+05 | 0.0086 |
| *i + WL + A + (WL : A) + N + D* | 44252.61 | 28.03 | 0.00 | 0.000 | 1.22E+06 | 0.0086 |
| *i + WL + A + (WL : A) + D* | 44256.22 | 31.64 | 0.00 | 0.000 | 7.42E+06 | 0.0083 |
| *i + (WL + WQ) + A + ((WL + WQ): A) + N* | 44264.10 | 39.52 | 0.00 | 0.000 | 3.82E+08 | 0.0082 |
| *i + WL + A + N + D* | 44265.97 | 41.39 | 0.00 | 0.000 | 9.72E+08 | 0.0079 |
| *i + WL + A + D* | 44267.33 | 42.75 | 0.00 | 0.000 | 1.92E+09 | 0.0078 |
| *i + (WL + WQ) + A + ((WL + WQ): A)* | 44276.17 | 51.59 | 0.00 | 0.000 | 1.59E+11 | 0.0076 |
| *i + (WL + WQ) + D* | 44280.65 | 56.07 | 0.00 | 0.000 | 1.50E+12 | 0.0073 |
| *i + (WL + WQ) + A + N* | 44292.06 | 67.48 | 0.00 | 0.000 | 4.50E+14 | 0.0069 |
| *i + WL + D* | 44293.23 | 68.65 | 0.00 | 0.000 | 8.08E+14 | 0.0067 |
| *i + (WL + WQ) + A* | 44299.51 | 74.93 | 0.00 | 0.000 | 1.87E+16 | 0.0065 |
| *i + WL + A + (WL : A) + N* | 44301.57 | 76.99 | 0.00 | 0.000 | 5.23E+16 | 0.0065 |
| *i + WL + A + (WL : A)* | 44313.00 | 88.42 | 0.00 | 0.000 | 1.59E+19 | 0.0060 |
| *i + (WL + WQ) + N* | 44313.83 | 89.25 | 0.00 | 0.000 | 2.40E+19 | 0.0059 |
| *i + WL + A + N* | 44314.97 | 90.39 | 0.00 | 0.000 | 4.25E+19 | 0.0059 |
| *i + (WL + WQ)* | 44316.91 | 92.33 | 0.00 | 0.000 | 1.12E+20 | 0.0057 |
| *i + WL + A* | 44322.81 | 98.23 | 0.00 | 0.000 | 2.14E+21 | 0.0055 |
| *i + WL + N* | 44332.37 | 107.79 | 0.00 | 0.000 | 2.55E+23 | 0.0051 |
| *i + WL* | 44336.10 | 111.52 | 0.00 | 0.000 | 1.65E+24 | 0.0048 |
| *i + A + D* | 44374.36 | 149.78 | 0.00 | 0.000 | 3.34E+32 | 0.0034 |
| *i + D* | 44387.31 | 162.73 | 0.00 | 0.000 | 2.17E+35 | 0.0028 |
| *i + A + N* | 44434.06 | 209.48 | 0.00 | 0.000 | 3.08E+45 | 0.0009 |
| *i + N* | 44435.56 | 210.98 | 0.00 | 0.000 | 6.51E+45 | 0.0008 |
| *i + A* | 44450.36 | 225.78 | 0.00 | 0.000 | 1.07E+49 | 0.0002 |
| *i* | 44452.61 | 228.03 | 0.00 | 0.000 | 3.28E+49 | 0.0000 |

**Table S2h**: A comparison of the support for the each of the candidate models of the between-individual variation the probability that a captured individual Tufted Duck would be male. The model with the lowest AICc value for each species is indicated in bold. Parameters: *i* = intercept, *WL* = linear trend over winters, *WQ* = quadratic trend over winters, *AJ* = age class (juveniles), *D* = winter date, *N* = latitude.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Model** | **AICc** | **ΔAICc** | **Relative likelihood** | **Akaike weights** | **Evidence ratio** | **Nagelkerke's *R2*** |
| ***i + WL + A + (WL : A) + N + D*** | **8450.02** | **0.00** | **1.00** | **0.554** | **1.00E+00** | **0.0490** |
| *i + (WL + WQ) + A + ((WL + WQ): A) + N + D* | 8450.46 | 0.44 | 0.80 | 0.445 | 1.25E+00 | 0.0498 |
| *i + WL + A + (WL : A) + N* | 8464.76 | 14.74 | 0.00 | 0.000 | 1.59E+03 | 0.0065 |
| *i + (WL + WQ) + A + ((WL + WQ): A) + N* | 8464.96 | 14.94 | 0.00 | 0.000 | 1.75E+03 | 0.0082 |
| *i + WL + A + N + D* | 8472.70 | 22.68 | 0.00 | 0.000 | 8.43E+04 | 0.0079 |
| *i + (WL + WQ) + A + N + D* | 8474.31 | 24.29 | 0.00 | 0.000 | 1.88E+05 | 0.0087 |
| *i + WL + A + N* | 8482.51 | 32.49 | 0.00 | 0.000 | 1.14E+07 | 0.0059 |
| *i + (WL + WQ) + A + N* | 8484.33 | 34.31 | 0.00 | 0.000 | 2.82E+07 | 0.0069 |
| *i + A + N* | 8488.36 | 38.34 | 0.00 | 0.000 | 2.11E+08 | 0.0009 |
| *i + WL + A + (WL : A) + D* | 8490.90 | 40.88 | 0.00 | 0.000 | 7.54E+08 | 0.0083 |
| *i + (WL + WQ) + A + ((WL + WQ): A) + D* | 8494.75 | 44.73 | 0.00 | 0.000 | 5.16E+09 | 0.0096 |
| *i + WL + A + (WL : A)* | 8503.16 | 53.14 | 0.00 | 0.000 | 3.46E+11 | 0.0060 |
| *i + (WL + WQ) + A + ((WL + WQ): A)* | 8506.94 | 56.92 | 0.00 | 0.000 | 2.29E+12 | 0.0076 |
| *i + (WL + WQ) + A + D* | 8534.68 | 84.66 | 0.00 | 0.000 | 2.42E+18 | 0.0086 |
| *i + WL + A + D* | 8538.38 | 88.36 | 0.00 | 0.000 | 1.54E+19 | 0.0078 |
| *i + (WL + WQ) + A* | 8540.86 | 90.84 | 0.00 | 0.000 | 5.32E+19 | 0.0065 |
| *i + A + D* | 8541.80 | 91.78 | 0.00 | 0.000 | 8.50E+19 | 0.0034 |
| *i + WL + A* | 8543.56 | 93.54 | 0.00 | 0.000 | 2.05E+20 | 0.0055 |
| *i + A* | 8547.79 | 97.77 | 0.00 | 0.000 | 1.70E+21 | 0.0002 |
| *i + WL + N* | 8554.01 | 103.99 | 0.00 | 0.000 | 3.81E+22 | 0.0051 |
| *i + (WL + WQ) + N* | 8554.59 | 104.57 | 0.00 | 0.000 | 5.10E+22 | 0.0059 |
| *i + N* | 8588.77 | 138.75 | 0.00 | 0.000 | 1.35E+30 | 0.0008 |
| *i + (WL + WQ) + D* | 8601.35 | 151.33 | 0.00 | 0.000 | 7.27E+32 | 0.0073 |
| *i + WL + D* | 8611.92 | 161.90 | 0.00 | 0.000 | 1.43E+35 | 0.0067 |
| *i + (WL + WQ)* | 8628.62 | 178.60 | 0.00 | 0.000 | 6.07E+38 | 0.0057 |
| *i + WL* | 8637.58 | 187.56 | 0.00 | 0.000 | 5.34E+40 | 0.0048 |
| *i + D* | 8638.24 | 188.22 | 0.00 | 0.000 | 7.43E+40 | 0.0028 |
| *i* | 8674.38 | 224.36 | 0.00 | 0.000 | 5.23E+48 | 0.0000 |

**Table S2i**: A comparison of the support for the each of the candidate models of the between-individual variation the probability that a captured individual Eurasian Wigeon would be male. The model with the lowest AICc value for each species is indicated in bold. Parameters: *i* = intercept, *WL* = linear trend over winters, *WQ* = quadratic trend over winters, *AJ* = age class (juveniles), *D* = winter date, *N* = latitude.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Model** | **AICc** | **ΔAICc** | **Relative likelihood** | **Akaike weights** | **Evidence ratio** | **Nagelkerke's *R2*** |
| ***i + (WL + WQ) + A + ((WL + WQ): A) + N + D*** | **7270.31** | **0.00** | **1.00** | **0.867** | **1.00E+00** | **0.0800** |
| *i + WL + A + (WL : A) + N + D* | 7275.35 | 5.03 | 0.08 | 0.070 | 1.24E+01 | 0.0780 |
| *i + (WL + WQ) + A + ((WL + WQ): A) + D* | 7275.64 | 5.33 | 0.07 | 0.060 | 1.44E+01 | 0.0784 |
| *i + WL + A + (WL : A) + D* | 7282.28 | 11.97 | 0.00 | 0.002 | 3.96E+02 | 0.0759 |
| *i + (WL + WQ) + A + ((WL + WQ): A) + N* | 7289.17 | 18.86 | 0.00 | 0.000 | 1.25E+04 | 0.0753 |
| *i + (WL + WQ) + A + ((WL + WQ): A)* | 7290.29 | 19.98 | 0.00 | 0.000 | 2.18E+04 | 0.0746 |
| *i + WL + A + (WL : A) + N* | 7292.84 | 22.53 | 0.00 | 0.000 | 7.80E+04 | 0.0735 |
| *i + WL + A + N + D* | 7294.09 | 23.78 | 0.00 | 0.000 | 1.46E+05 | 0.0732 |
| *i + (WL + WQ) + A + N + D* | 7294.11 | 23.79 | 0.00 | 0.000 | 1.47E+05 | 0.0737 |
| *i + WL + A + (WL : A)* | 7295.63 | 25.32 | 0.00 | 0.000 | 3.15E+05 | 0.0724 |
| *i + WL + A + D* | 7298.62 | 28.30 | 0.00 | 0.000 | 1.40E+06 | 0.0717 |
| *i + (WL + WQ) + A + D* | 7300.22 | 29.91 | 0.00 | 0.000 | 3.12E+06 | 0.0718 |
| *i + WL + A + N* | 7304.41 | 34.10 | 0.00 | 0.000 | 2.54E+07 | 0.0704 |
| *i + (WL + WQ) + A + N* | 7305.85 | 35.54 | 0.00 | 0.000 | 5.21E+07 | 0.0705 |
| *i + WL + A* | 7306.31 | 35.99 | 0.00 | 0.000 | 6.55E+07 | 0.0695 |
| *i + (WL + WQ) + A* | 7308.26 | 37.95 | 0.00 | 0.000 | 1.74E+08 | 0.0695 |
| *i + A + D* | 7315.47 | 45.16 | 0.00 | 0.000 | 6.40E+09 | 0.0674 |
| *i + A + N* | 7322.54 | 52.23 | 0.00 | 0.000 | 2.19E+11 | 0.0658 |
| *i + A* | 7323.96 | 53.65 | 0.00 | 0.000 | 4.46E+11 | 0.0650 |
| *i + D* | 7573.74 | 303.43 | 0.00 | 0.000 | 7.73E+65 | 0.0060 |
| *i + WL + D* | 7575.69 | 305.38 | 0.00 | 0.000 | 2.05E+66 | 0.0060 |
| *i + (WL + WQ) + D* | 7577.69 | 307.38 | 0.00 | 0.000 | 5.57E+66 | 0.0060 |
| *i + WL + N* | 7589.88 | 319.57 | 0.00 | 0.000 | 2.47E+69 | 0.0026 |
| *i + (WL + WQ) + N* | 7591.87 | 321.55 | 0.00 | 0.000 | 6.67E+69 | 0.0026 |
| *i + N* | 7594.52 | 324.20 | 0.00 | 0.000 | 2.51E+70 | 0.0010 |
| *i* | 7596.49 | 326.18 | 0.00 | 0.000 | 6.74E+70 | 0.0000 |
| *i + WL* | 7598.42 | 328.11 | 0.00 | 0.000 | 1.77E+71 | 0.0000 |
| *i + (WL + WQ)* | 7599.90 | 329.59 | 0.00 | 0.000 | 3.71E+71 | 0.0001 |

**Table S3**. The untransformed estimates of each of the fitted parameters in the best-supported model of between-individual variation in the probability that an individual of a given species would be male.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Species** | **Parameter** | **Mean** | **S.E.** | − **95% CL** | **+ 95% CL** |
| Gadwall | *i* | 0.5418 | 0.0660 | 0.4131 | 0.6719 |
|  | *A*J | −0.6153 | 0.0954 | −0.8028 | −0.4286 |
| Northern Mallard | *i* | −2780.4121 | 296.5724 | −3361.5599 | −2198.9281 |
|  | *W*L | 2.7690 | 0.2981 | 2.1845 | 3.3531 |
|  | *W*Q | −0.0007 | 0.0001 | −0.0008 | −0.0005 |
|  | *A*J | 3736.6626 | 444.4648 | 2865.6074 | 4607.9537 |
|  | *D* | 0.0006 | 0.0003 | 0.0001 | 0.0012 |
|  | *W*L : *A*J | −3.7215 | 0.4468 | −4.5974 | −2.8459 |
|  | *W*Q : *A*J | 0.0009 | 0.0001 | 0.0007 | 0.0011 |
| Northern Pintail | *i* | −1690.4869 | 843.3839 | −3341.8951 | −34.9700 |
|  | *W*L | 1.6831 | 0.8454 | 0.0236 | 3.3384 |
|  | *W*Q | −0.0004 | 0.0002 | −0.0008 | −0.0001 |
|  | *A*J | 3229.7274 | 1328.5367 | 623.1146 | 5832.2764 |
|  | *D* | 0.0022 | 0.0008 | 0.0006 | 0.0039 |
|  | *W*L : *A*J | −3.2230 | 1.3333 | −5.8348 | −0.6071 |
|  | *W*Q : *A*J | 0.0008 | 0.0003 | 0.0001 | 0.0015 |
| Common Pochard | *i* | −69.2683 | 8.9360 | −86.8602 | −51.8233 |
|  | *W*L | 0.0301 | 0.0047 | 0.0210 | 0.0393 |
|  | *A*J | 64.2998 | 15.2294 | 34.4730 | 94.1884 |
|  | *N* | 0.1928 | 0.0524 | 0.0910 | 0.2964 |
|  | *D* | 0.0049 | 0.0009 | 0.0031 | 0.0066 |
|  | *W*L : *A*J | −0.0328 | 0.0077 | −0.0478 | −0.0178 |
| Common Shelduck | *i* | −44.2460 | 11.5194 | −66.8397 | −21.6616 |
|  | *W*L | 0.0206 | 0.0058 | 0.0093 | 0.0319 |
|  | *A*J | 47.1728 | 33.1685 | −17.9792 | 112.3390 |
|  | *N* | 0.0851 | 0.0503 | −0.0138 | 0.1834 |
|  | *W*L : *A*J | −0.0244 | 0.0165 | −0.0569 | 0.0081 |
| Northern Shoveler | *i* | −40.13129 | 22.6483 | −85.4323 | −3.5431 |
|  | *W*L | 0.0207 | 0.0114 | −0.0013 | 0.0436 |
|  | *A*J | −0.6354 | 0.1999 | −1.0290 | −0.2447 |
| Eurasian Teal | *i* | −1567.0803 | 310.2991 | −2175.0695 | −958.6437 |
|  | *W*L | 1.5775 | 0.3114 | 0.9669 | 2.1878 |
|  | *W*Q | −0.0004 | 0.0001 | −0.0006 | −0.0002 |
|  | *A*J | 840.2414 | 428.1490 | 0.9278 | 1679.2940 |
|  | *N* | 0.0289 | 0.0113 | 0.0068 | 0.0510 |
|  | *D* | −0.0018 | 0.0003 | −0.0024 | −0.0013 |
|  | *W*L : *A*J | −0.8358 | 0.4301 | −1.6786 | 0.0072 |
|  | *W*Q : *A*J | 0.0002 | 0.0001 | 0.0000 | 0.0004 |
| Tufted Duck | *i* | 10.2159 | 2.5317 | 5.2600 | 15.1849 |
|  | *W*L | −0.0055 | 0.0013 | −0.0082 | −0.0029 |
|  | *A*J | 12.4293 | 3.2035 | 6.1482 | 18.7060 |
|  | *N* | 0.0266 | 0.0112 | 0.0046 | 0.0486 |
|  | *D* | −0.0020 | 0.0003 | −0.0026 | −0.0015 |
|  | *W*L : *A*J | −0.0063 | 0.0016 | −0.0094 | −0.0031 |
| Eurasian Wigeon | *i* | −1326.1525 | 866.8188 | −3023.8692 | 374.8899 |
|  | *W*L | 1.3274 | 0.8694 | −0.3786 | 3.0302 |
|  | *W*Q | −0.0003 | 0.0002 | −0.0008 | 0.0001 |
|  | *A*J | 3561.5190 | 1205.7375 | 1197.1436 | 5924.2009 |
|  | *N* | 0.1104 | 0.0408 | 0.0305 | 0.1905 |
|  | *D* | 0.0030 | 0.0007 | 0.0017 | 0.0043 |
|  | *W*L : *A*J | −3.5585 | 1.2098 | −5.9291 | −1.1862 |
|  | *W*Q : *A*J | 0.0009 | 0.0003 | 0.0003 | 0.0015 |

Parameters: *i* = intercept, *W*L = linear trend over winters, *W*Q = quadratic trend over winters, *A*J = age class (juveniles), *D* = winter date, *N* = latitude. The transformed estimates for each species are shown in Fig. 4.