**Species distribution modelling using bioclimatic variables to determine the impacts of a changing climate on the western ringtail possum (*Pseudocheirus occidentals*; Pseudocheiridae)**

SHAUN W. MOLLOY, ROBERT A. DAVIS, EDDIE J. B. VAN ETTEN

**APPENDIX 1**



**Figure S1** Comparison of ngwayir predictions using baseline climate data and three GCM 2050 scenarios as undertaken with the three SDMs. Data is given as presence-absence in that pixels with a probability value of < 5% are not displayed.



**Figure S2** Conservation/forestry vested estate with ngwayir core area count (see Fig. 2 in text) overlaid.

**Table S1** Kappa analyses of variable suitability for both SVM-TC and Domain.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *TC SVM: Based on WRP (2\_class)* | | | *Domain: Based on WRP (extract)* | | |
| *Variable* | *With only variable: Kappa* | *Without variable: Kappa* | | *With only variable: Kappa* | *Without variable: Kappa* |
| *Bio 1* | 0.143769 | 0.710622 | | 0.084754 | 0.970691 |
| *Bio 2* | 0.276338 | 0.652922 | | 0.044331 | 0.923615 |
| *Bio 3* | 0.257780 | 0.672743 | | 0.000000 | 0.925690 |
| *Bio 4* | 0.276158 | 0.631778 | | 0.512489 | 0.762014 |
| *Bio 5* | 0.337488 | 0.638824 | | 0.298348 | 0.770207 |
| *Bio 6* | 0.018493 | 0.640919 | | 0.000000 | 0.771858 |
| *Bio 7* | 0.314547 | 0.612912 | | 0.255751 | 0.763644 |
| *Bio 8* | 0.006408 | 0.622398 | | 0.008333 | 0.766917 |
| *Bio 9* | 0.070975 | 0.630227 | | 0.016401 | 0.768560 |
| *Bio 10* | 0.279917 | 0.742019 | | 0.193038 | 0.972905 |
| *Bio 11* | 0.004758 | 0.725412 | | 0.003612 | 0.970691 |
| *Bio 12* | 0.399418 | 0.652334 | | 0.733373 | 0.959721 |
| *Bio 13* | 0.502570 | 0.678986 | | 0.583136 | 0.964089 |
| *Bio 14* | 0.002498 | 0.723176 | | 0.001799 | 0.966283 |
| *Bio 15* | 0.364282 | 0.716788 | | 0.206059 | 0.959721 |
| *Bio 16* | 0.520031 | 0.760190 | | 0.621643 | 0.942505 |
| *Bio 17* | -0.000834 | 0.690658 | | 0.007013 | 0.942505 |
| *Bio 18* | 0.009255 | 0.721611 | | 0.004653 | 0.942505 |
| *Bio 19* | 0.454846 | 0.692416 | | 0.621643 | 0.915378 |

**Table S2** Kappa index and AUC values for Domain and SVM-TC models along with sample number used in each model.

|  |  |  |
| --- | --- | --- |
|  | *SVM-TC* | *Domain* |
| *AUC* | 0.924 | 0.977 |
| *Kappa* | 0.7314 | 0.7193 |
| *Number* | 392 | 261 |

**Table S3** Areas from ngwayir core area overlay (Fig. 2 in text) with corresponding total core areas for each tree species (Fig. 4 in text) both individually and merged, and areas of conservation/forestry vested lands (Fig. S2) in hectares.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *Ngwayir count* |  | *Total*  *area* | *Conservation land* | *Forestry* | *Peppermint* | *Marri* | *Jarrah* | *Tree sp.*  *merged* |
| 1 |  | 283 385 | 89 556 | 133 602 | 44 088 | 106 773 | 68 941 | 219 803 |
| 3 |  | 217 748 | 28 537 | 60 203 | 28 420 | 91 542 | 17 971 | 137 933 |
| 3 |  | 475 669 | 38 349 | 150 268 | 295 179 | 82 248 | 100 | 377 526 |
| Totals |  | 976 802 | 156 442 | 344 073 | 367 687 | 280 563 | 87 012 | 735 262 |

**Table S4** Variable contributions, 10% training presence and number of training presences for the model projections for habitat trees (Fig. 4 in text).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Variable* | *Description* | *Jarrah* | *Marri* | *Peppermint* |
| *BIO1* | Annual mean temperature | 3.5 | 1.9 | 0.3 |
| *BIO2* | Mean diurnal range (max temp – min temp) (monthly average) | 0.1 | 0 | 3.6 |
| *BIO3* | Isothermality (BIO1/BIO7) × 100 | 0.9 | 0.9 | 2.0 |
| *BIO4* | Temperature seasonality (coefficient of variation) | 0.9 | 1.6 | 14.7 |
| *BIO5* | Max temperature of warmest period | 1.5 | 0.3 | 1.9 |
| *BIO6* | Min temperature of coldest period | 0.1 | 0.5 | 6.9 |
| *BIO7* | Temperature annual range (BIO5 – BIO6) | 0.1 | 0.1 | 0.1 |
| *BIO8* | Mean temperature of wettest quarter | 0.4 | 1.0 | 0.1 |
| *BIO9* | Mean temperature of driest quarter | 1.3 | 1.8 | 0 |
| *BIO10* | Mean temperature of warmest quarter | 3.9 | 2.6 | 0.2 |
| *BIO11* | Mean temperature of coldest quarter | 0.2 | 1.3 | 4.1 |
| *BIO12* | Annual precipitation | 47.3 | 32.8 | 55.1 |
| *BIO13* | Precipitation of wettest period | 14.3 | 8.1 | 2.0 |
| *BIO14* | Precipitation of driest period | 0.6 | 0.5 | 0.7 |
| *BIO15* | Precipitation seasonality (coefficient of variation) | 4.8 | 4.0 | 1.2 |
| *BIO16* | Precipitation of wettest quarter | 2.5 | 15.1 | 3.2 |
| *BIO17* | Precipitation of driest quarter | 0.1 | 0.2 | 0.5 |
| *BIO18* | Precipitation of warmest quarter | 1.1 | 0.7 | 0.8 |
| *BIO19* | Precipitation of coldest quarter | 16.4 | 26.6 | 2.7 |
| 10% | 10% training presence | 0.288 | 0.359 | 0.291 |
| N | Number of training presences | 506 | 345 | 375 |