APPENDIX 1 RESULTS OF PRIORITY SPECIES MODELLING

Introduction

This appendix presents the results of analysis described in section 4.3 of the report.

Guide to interpreting the results

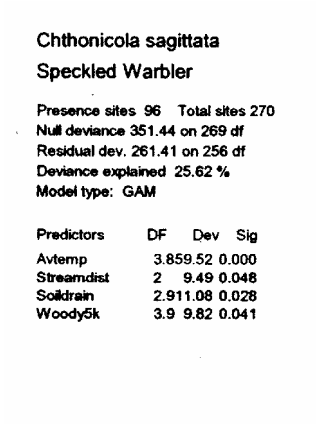
Interpreting the statistical outputs

Splus produces a series of tables for each species analysed, these tables provide information about the analysis and predictive model produced. The first table (figure 1) presents a mathematical summary of the analysis. Contents of the table are:

- the name of the species modelled,
- the number of presence sites and total sites used in the analysis
- the null deviance and residual deviance of the fitted model. Deviance being the measure of closeness of fit of the model to the data used to derive the model. It measures the variation between the actual observations obtained at survey sites (presence or absence of the species) and the probability of presence as predicted by the model. Null deviance is the measure of the inherent variation, or noise, in the data prior to modelling. Residual deviance is the deviance remaining after a model has been fitted using the environmental predictors. Degrees of freedom (df) are provided for the estimates. The deviance explained by the model is presented as a percentage which is calculated as:

$$100 \times \frac{\text{Null Deviance} - \text{Residual Deviance}}{\text{Null Deviance}}$$

  This provides an approximate indication of the proportion of variation in the data 'explained' by the fitted model.
- Information on the environmental variables that made a significant contribution in explaining the distribution of the species, as evaluated by the stepwise variable selection procedure.



Chthonicola sagittata

Speckled Warbler

Presence sites 96 Total sites 270
Null deviance 351.44 on 269 df
Residual dev. 261.41 on 256 df
Deviance explained 25.62 %
Model type: GAM

Predictors	DF	Dev	Sig
Avtemp	3.85	9.52	0.000
Streamdist	2	9.49	0.048
Soildrain	2.91	1.08	0.028
Woody5k	3.9	9.82	0.041

Figure 1 Mathematical summary table

The graphs depict the modelled relationship between the environmental variable or covariate and the likelihood of occurrence of the species. Tick marks across the top indicate the location of sites at which the species was recorded in relation to the environmental variable or covariate. The tick marks on the bottom of each graph represent survey sites at which the species was not recorded (figure 2)

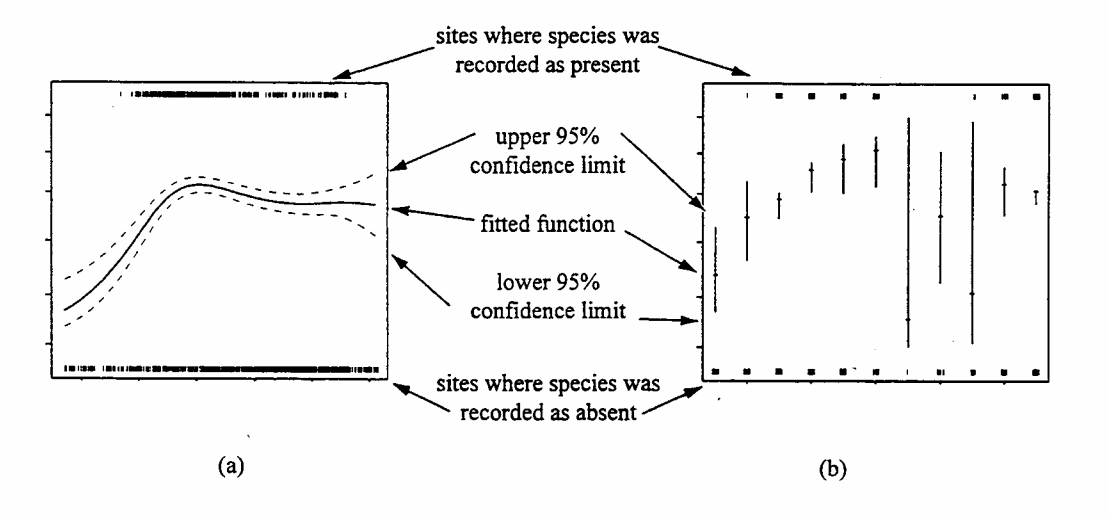


Figure 2 Features of model output graphs for (a) a continuous predictor and (b) a categorical predictor (from NPWS 1994).

The graphs should be interpreted with the understanding that each graph depicts only one variable within a multivariate model.

General layout

The two- page presentation for each species includes the following components;

- A short block of text discussing the model and predicted distribution and relating these to the biology of the species,
- An evaluation of how the model preformed when compared to an independent data set,
- A graphical presentation of the statistical summary tables,
- A predicted distribution map with the independent records and records used to develop the model overlayed.

EXAMPLE MODEL

Speckled Warbler *Chthonicola sagittata-* *(The name of the species modeled)*

Maximum predicted value (likelihood) = (the highest predicted likelihood estimated by the model)

Test of model with independent records *(a basic test of the models ability to predict presences of species using records for the species withheld from the analysis process and overlaying them on the predicted distribution)*

Number of test records = *(the number of independent records overlayed on the predictive surface)*
Mean predicted value = *(the mean predicted value (% likelihood of occurrence) where each independent record coincided with the model)*
Standard deviation = *(the standard deviation of the predicted value where each independent record coincided with the model)*

Number of records which fall in the upper 50% of predicted values = (the number and percentage of independent records which fell into the upper 50% of the predicted values)
Number of records which fall in the upper 10% of predicted values = (the number and percentage of independent records which fell into the upper 50% of the predicted values)

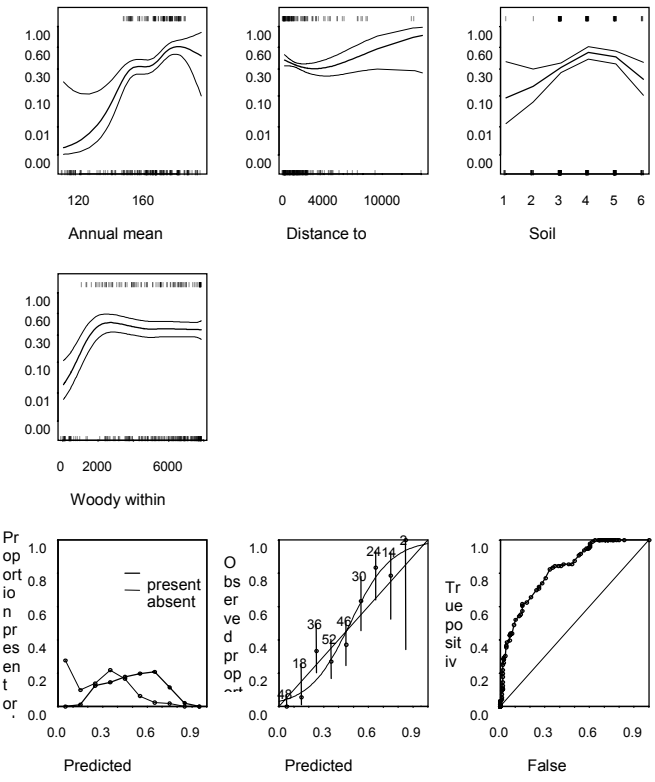
Statistical outputs

The output tables from Splus used to develop the predicted surface are presented here.

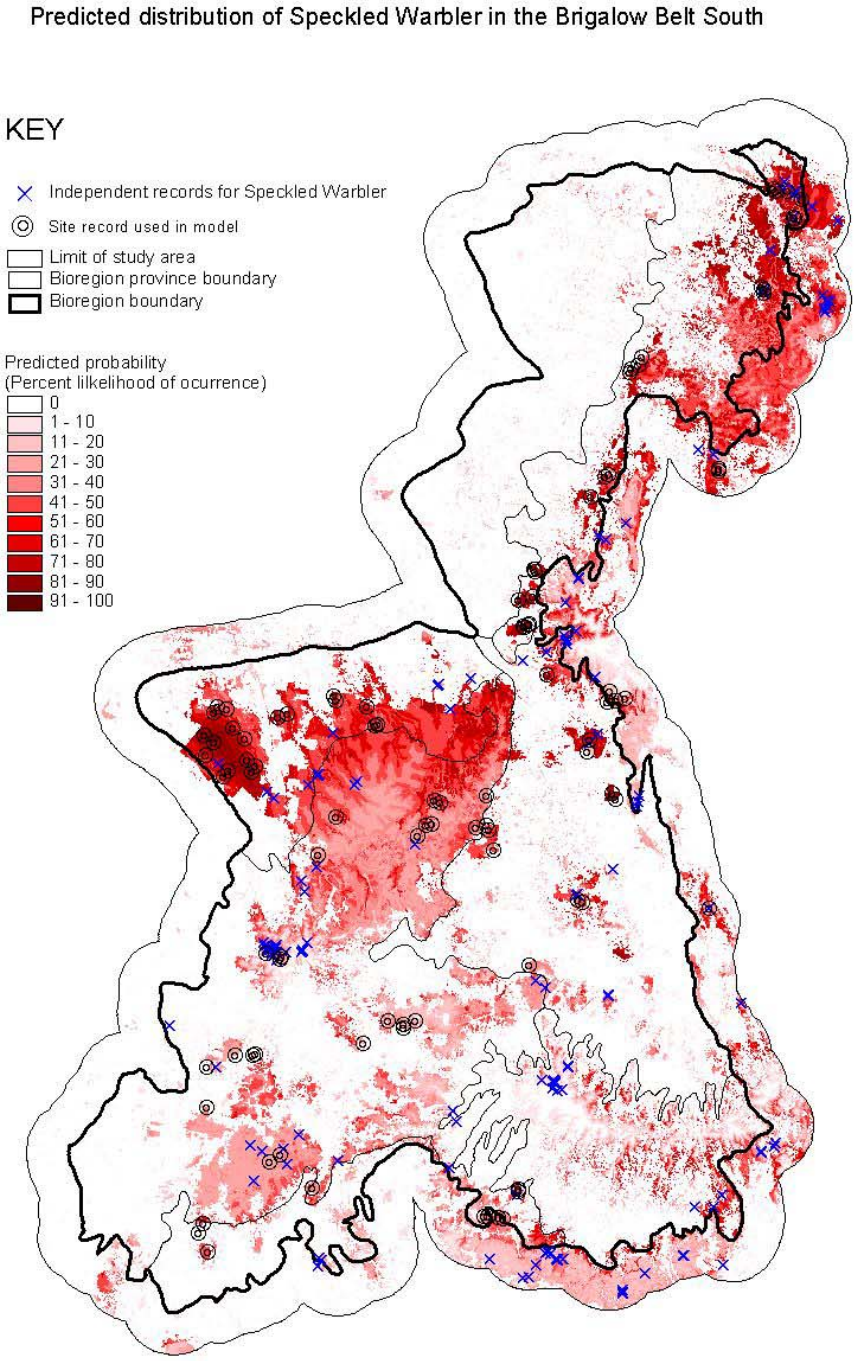
Chthonicola
Speckled

Presence sites 96 Total sites 270
Null deviance 351.44 on 269 df
Residual dev. 261.41 on 256 df
Deviance explained 25.62 %
Model type: GAM

Predictors	DF	Dev	Sig
Avtemp	3.8	59.52	0.000
Streamdist	2	9.49	0.048
Soildrain	2.9	11.08	0.028
Woody5k	3.9	9.82	0.041



Sample of a predicted distribution map with independent records overlayed.
It is important when viewing this map to be aware that it is a generalised representation of a much more detailed map (25-metre definition) derived and stored in digital form.



PRIORITY SPECIES MODELS

Each model will be presented here in the format described previously

Arboreal Mammals

Common Brush-tailed Possum *Trichosurus vulpecula*

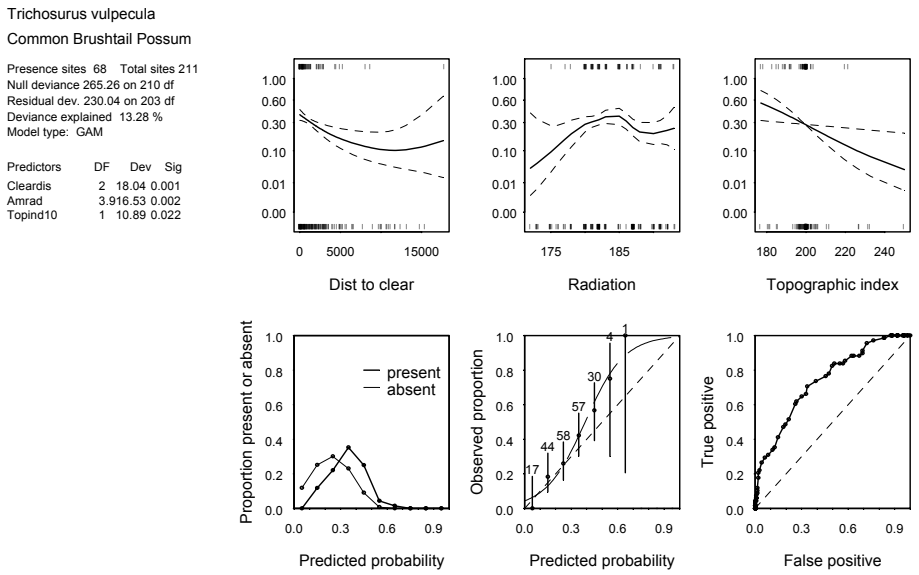
Maximum predicted value (likelihood) = 97%

Test of model with independent records

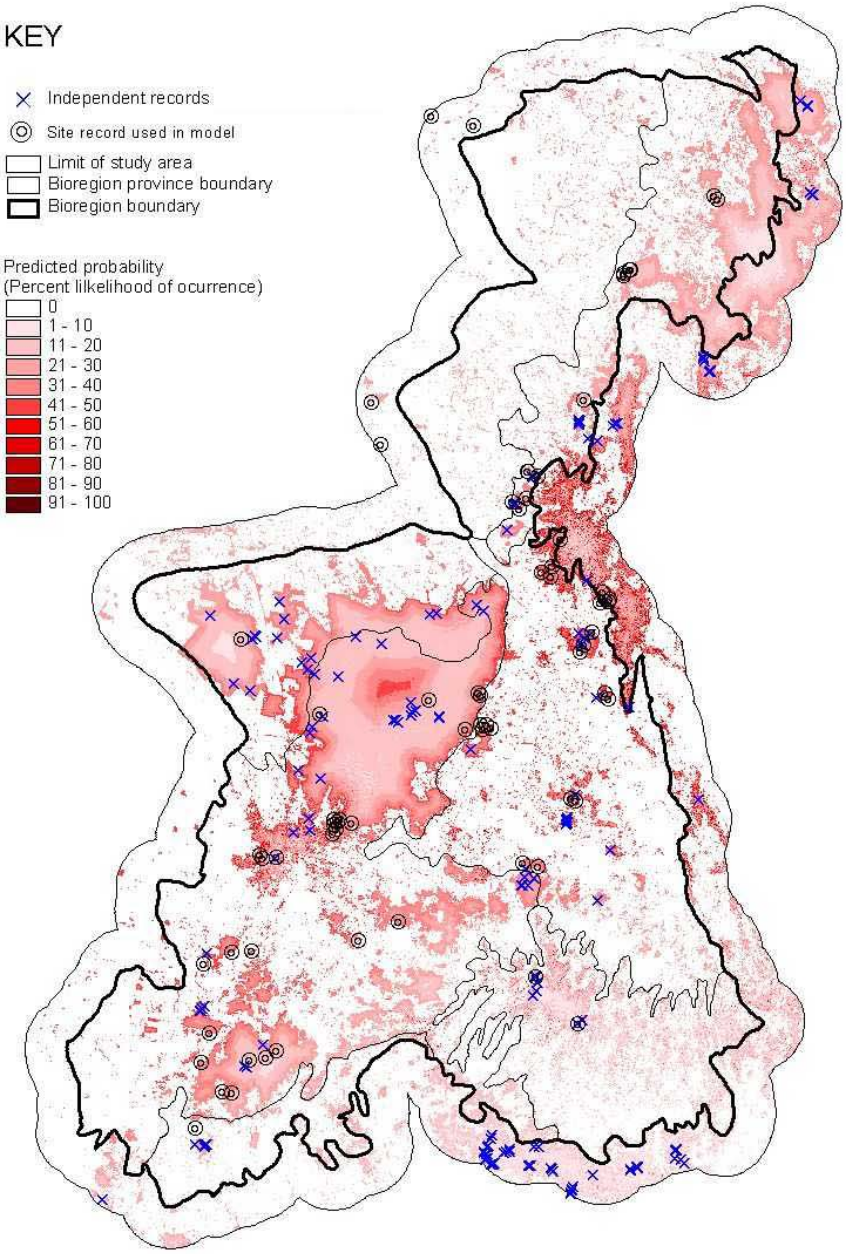
Number of test records = 227
Mean predicted value = 23
Standard deviation = 13

Number of records which fall in the upper 50% of predicted values = 4 (2%)
Number of records which fall in the upper 10% of predicted values = 0

Statistical outputs



Predicted distribution of Common Brushtail Possum in the Brigalow Belt South



Common Ring-tailed Possum *Pseudocheirus peregrinus*

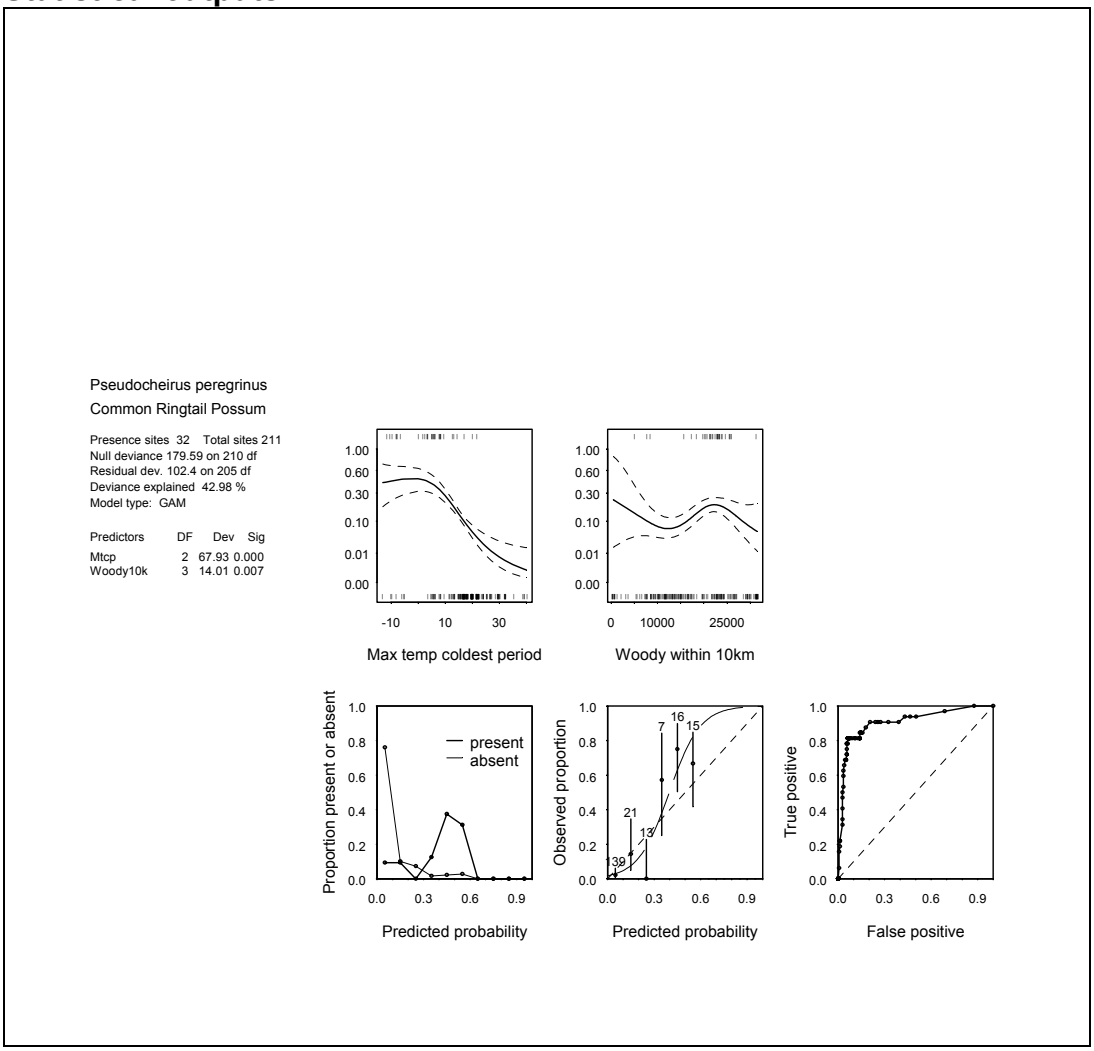
Maximum predicted value (likelihood) = 61%

Test of model with independent records

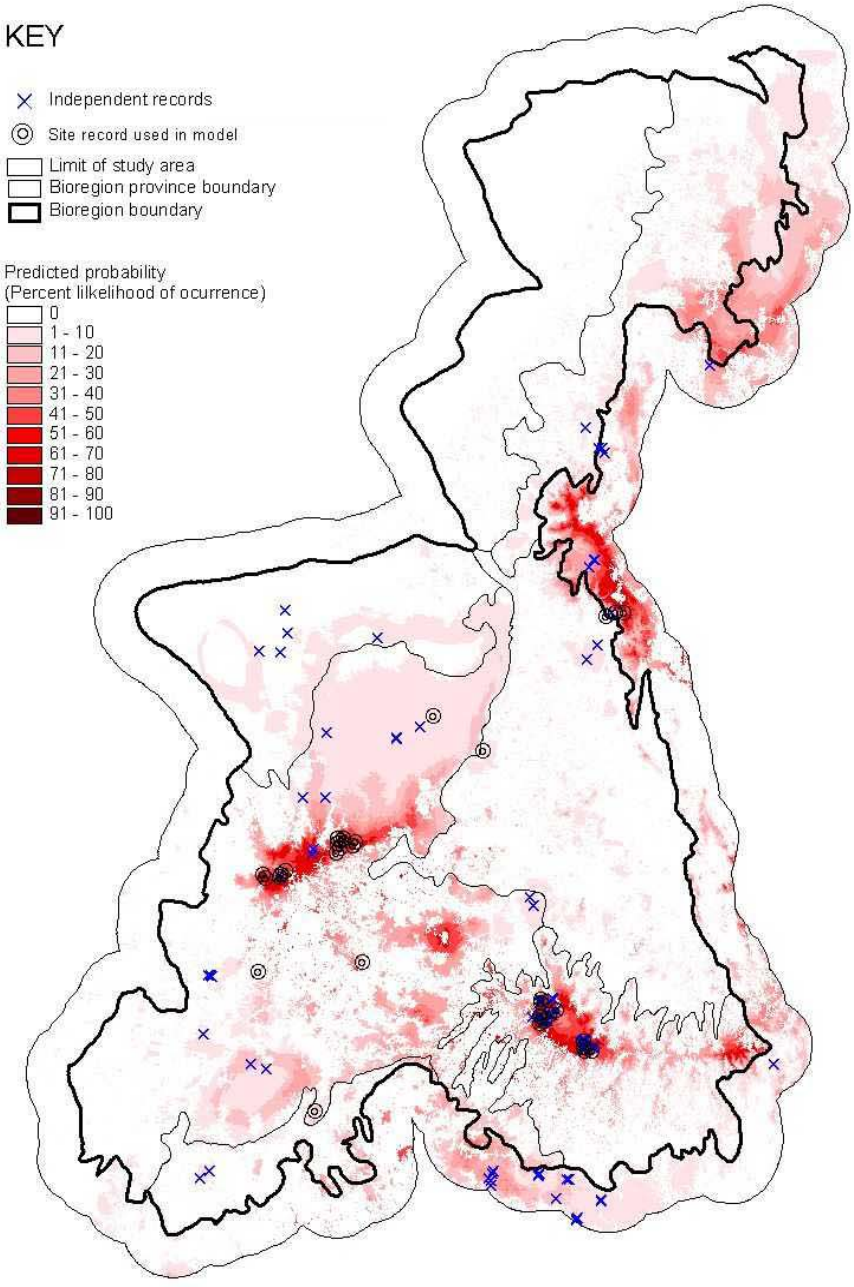
Number of test records = 108
Mean predicted value = 33
Standard deviation = 21

Number of records which fall in the upper 50% of predicted values = 58 (54%)
Number of records which fall in the upper 10% of predicted values = 4 (4%)

Statistical outputs



Predicted distribution of Common Ringtail Possum in the Brigalow Belt South



Squirrel Glider *Petaurus norfolcensis*

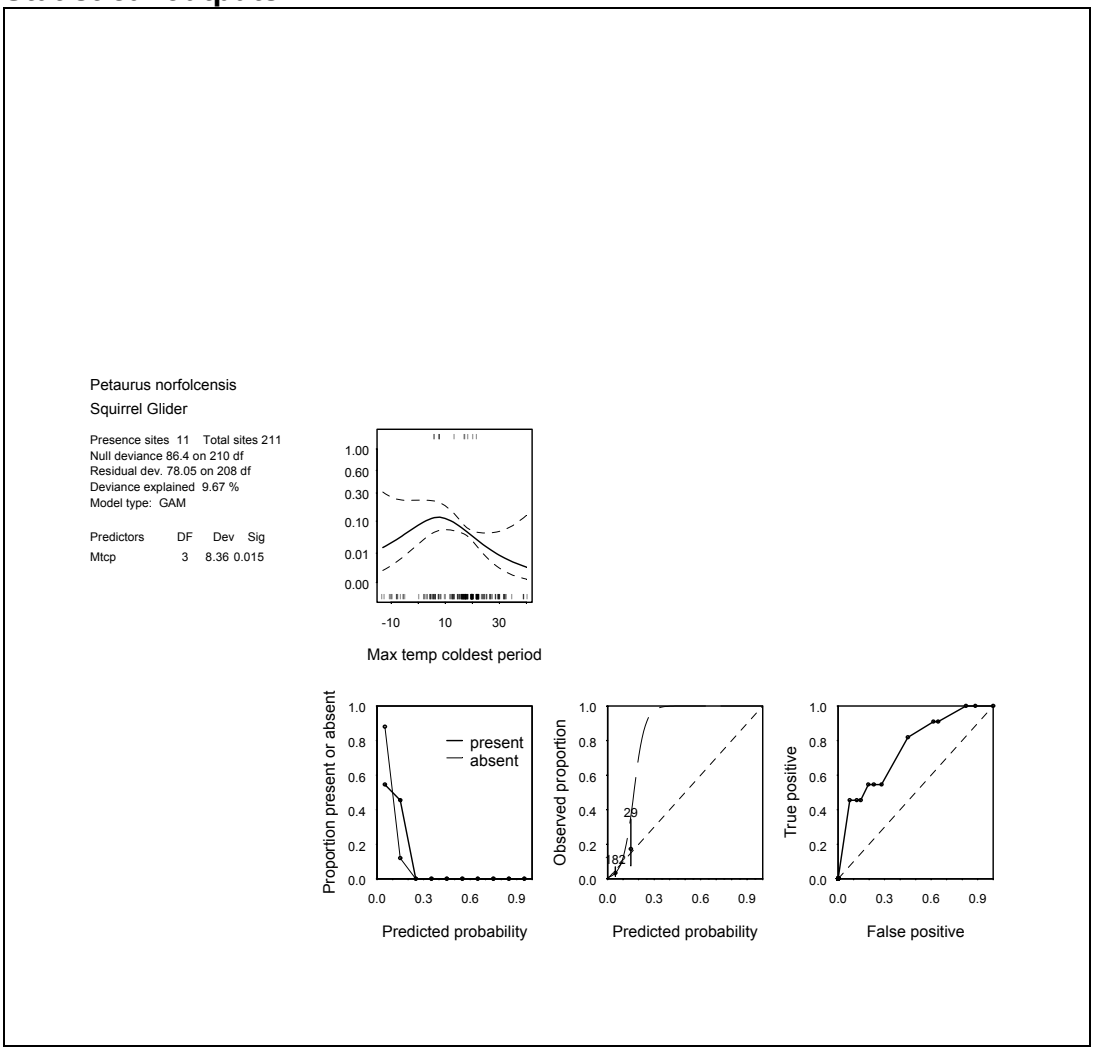
Maximum predicted value (likelihood) = 11%

Test of model with independent records

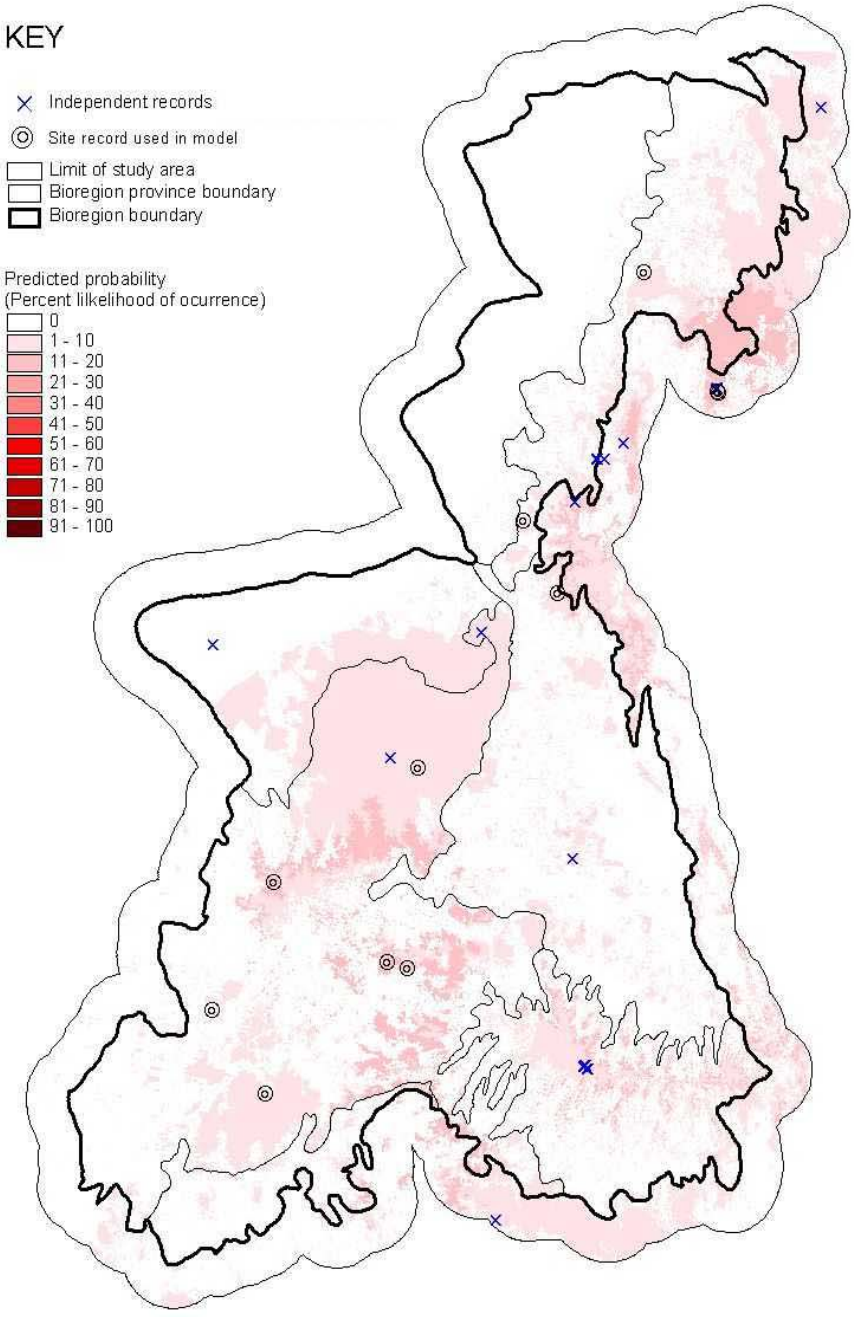
Number of test records = 22
Mean predicted value = 5
Standard deviation = 3

Number of records which fall in the upper 50% of predicted values = 12 (55%)
Number of records which fall in the upper 10% of predicted values = 4 (18%)

Statistical outputs



Predicted distribution of Squirrel Glider in the Brigalow Belt South



Feather-tailed Glider *Acrobates pygmaeus*

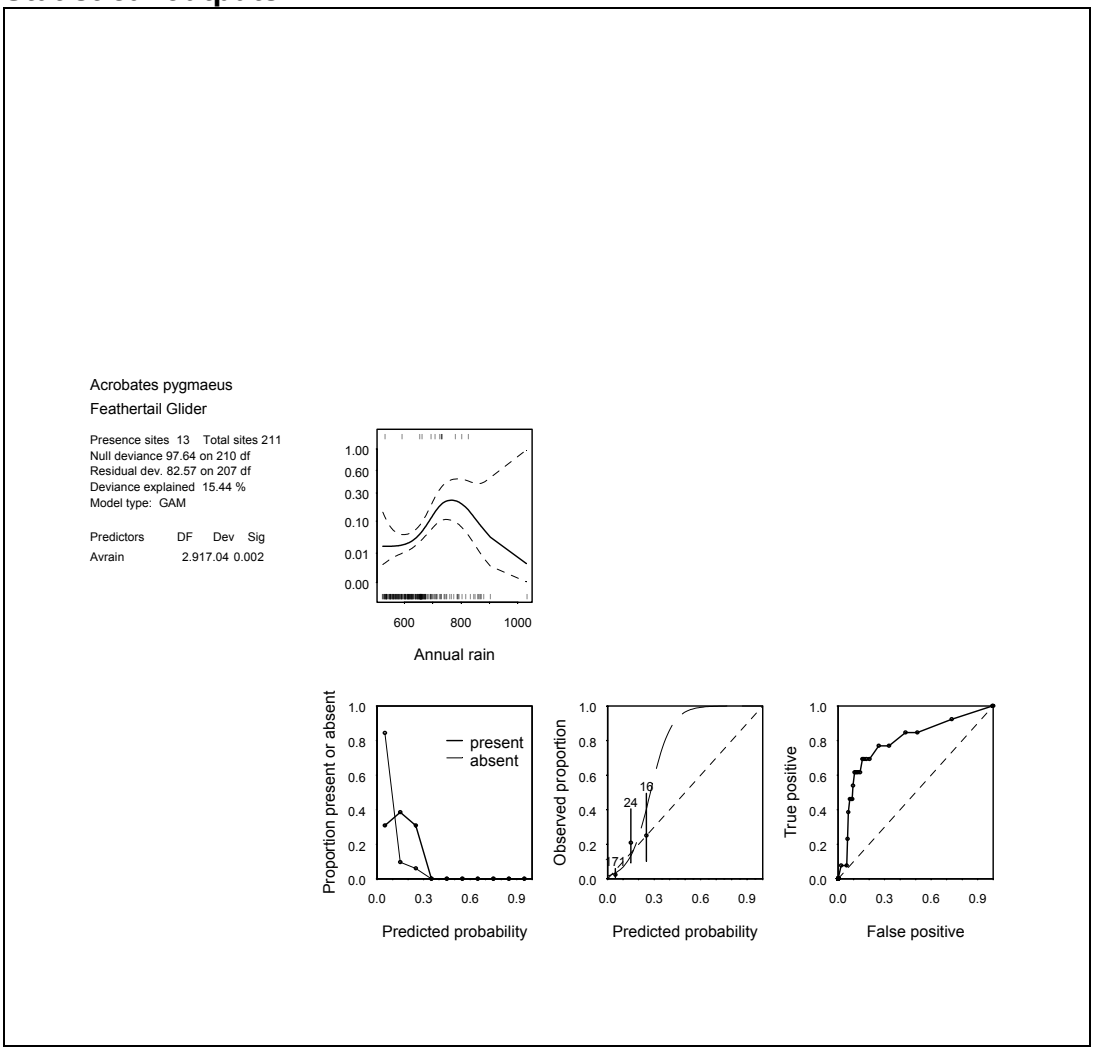
Maximum predicted value (likelihood) = 23%

Test of model with independent records

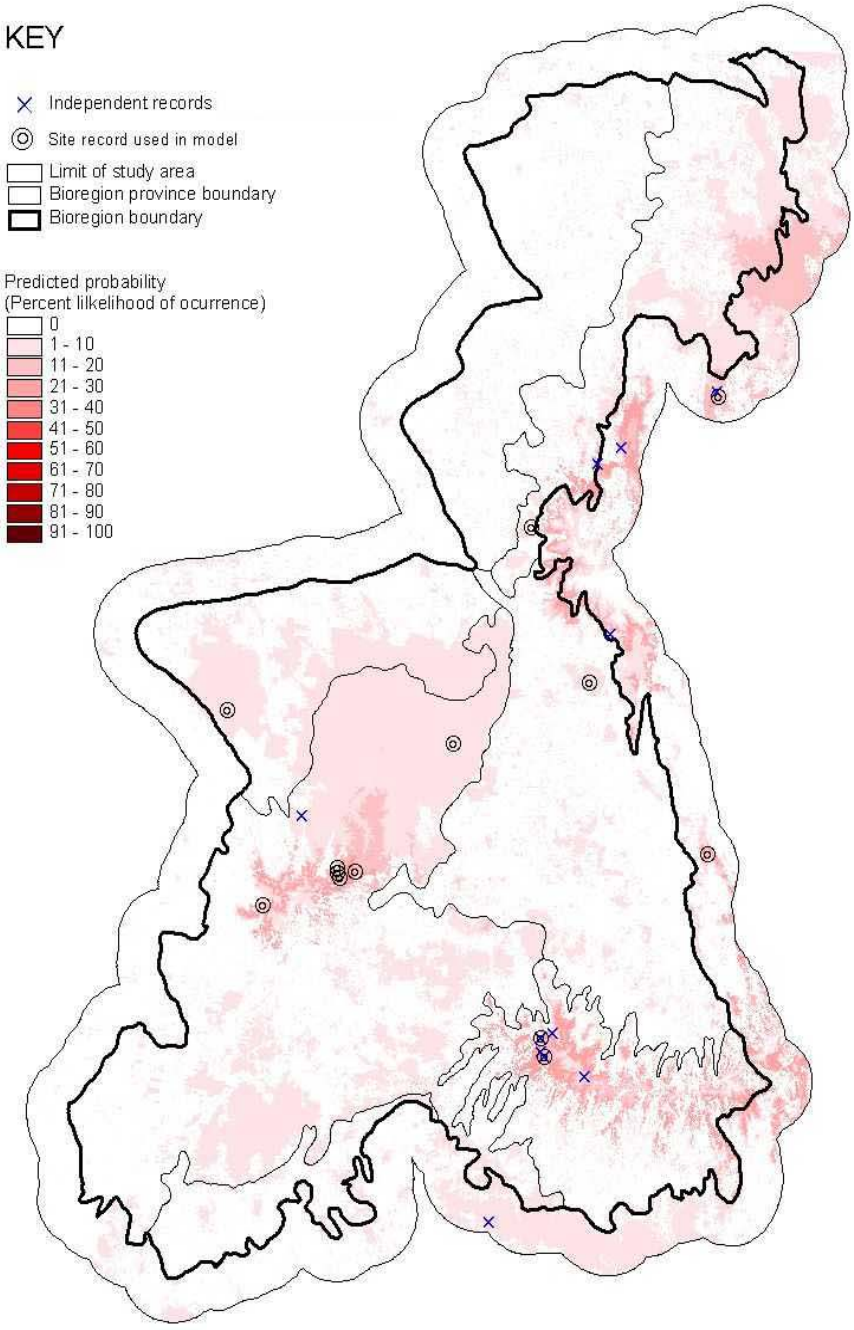
Number of test records = 12
Mean predicted value = 13
Standard deviation = 8

Number of records which fall in the upper 50% of predicted values = 8 (66%)
Number of records which fall in the upper 10% of predicted values = 4 (33%)

Statistical outputs



Predicted distribution of Feathertail Glider in the Brigalow Belt South



Koala *Phascolarctos cinereus*

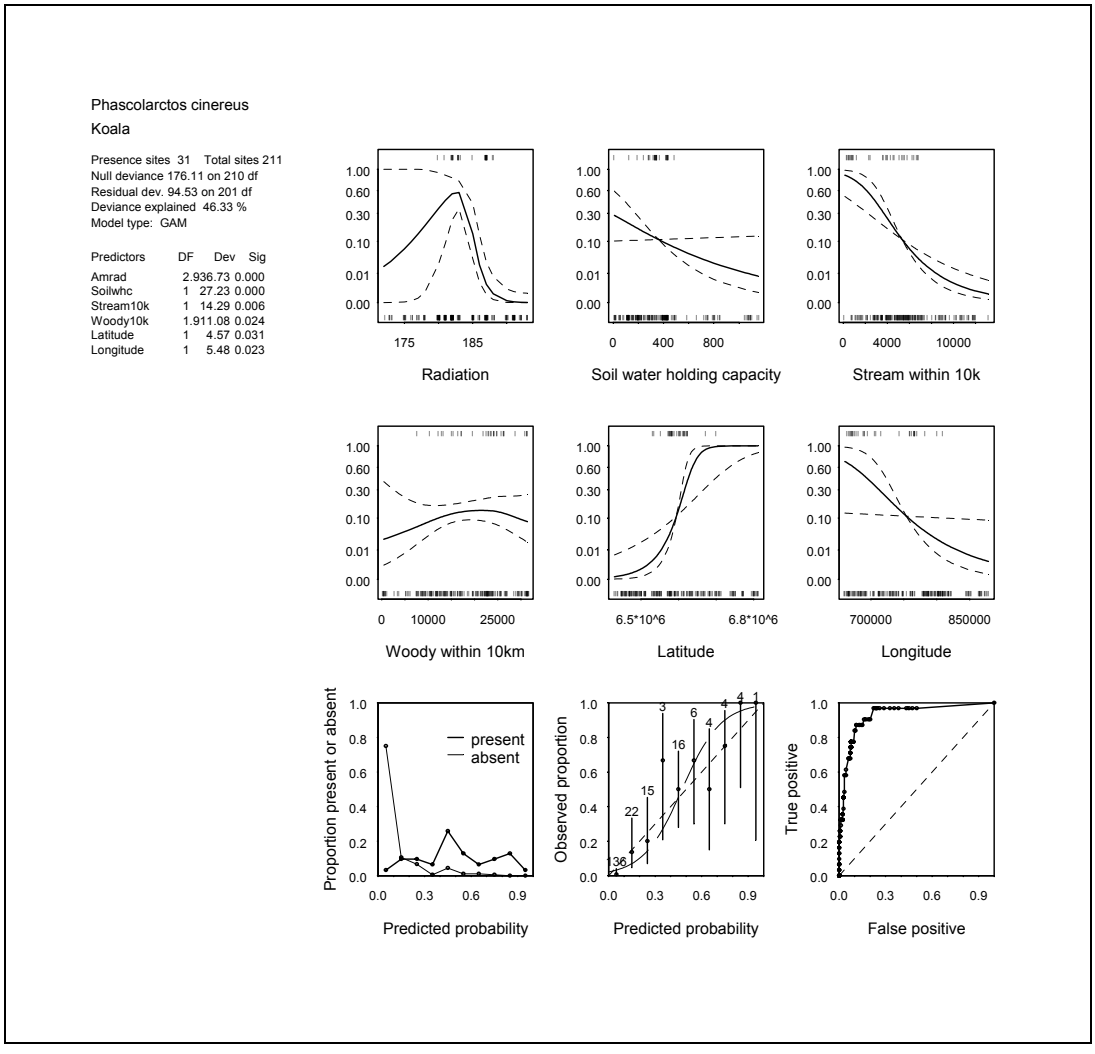
Maximum predicted value (likelihood) = 96%

Test of model with independent records

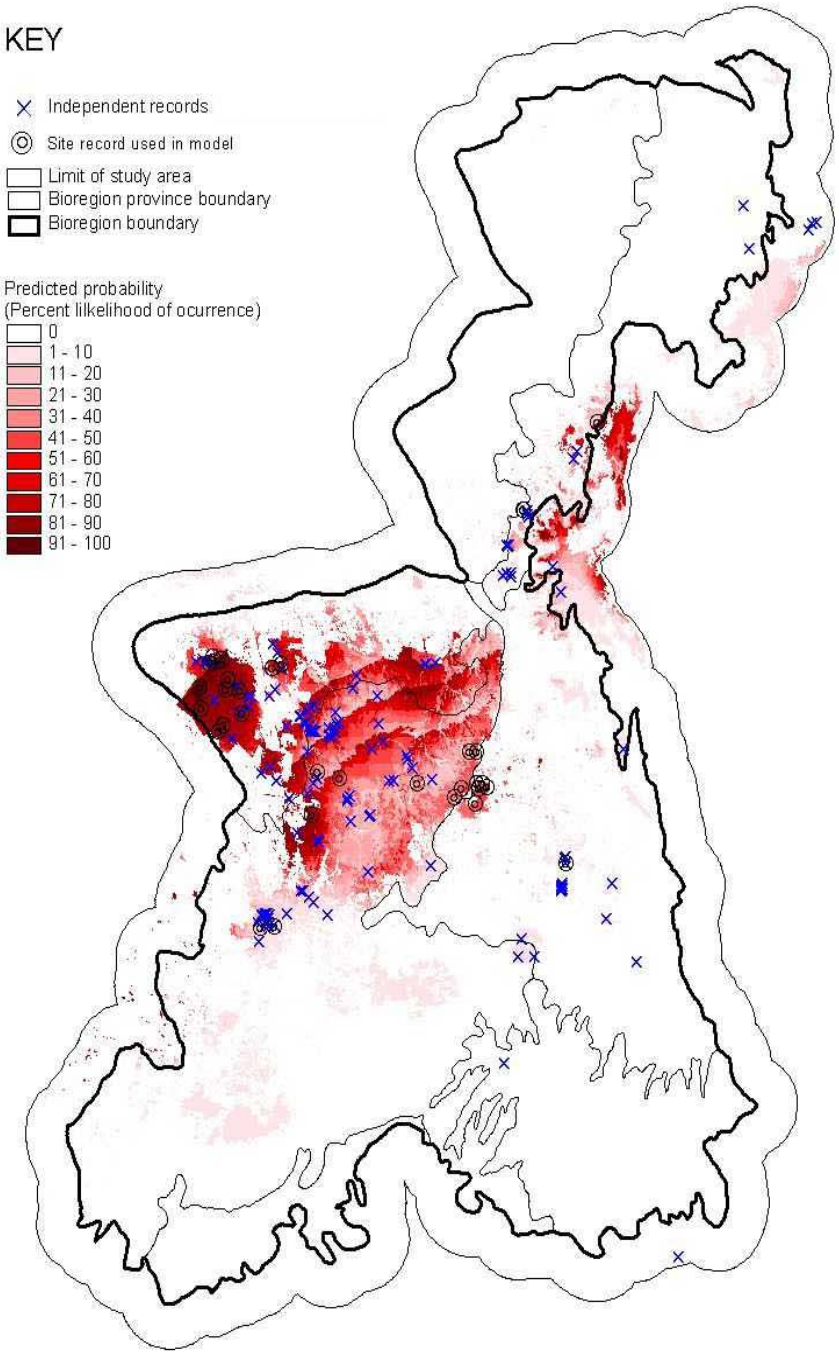
Number of test records = 230
Mean predicted value = 31
Standard deviation = 27

Number of records which fall in the upper 50% of predicted values = 69 (30%)
Number of records which fall in the upper 10% of predicted values = 5 (2%)

Statistical outputs



Predicted distribution of Koala in the Brigalow Belt South



Small mammals

Yellow-footed Antechinus *Antechinus flavipes*

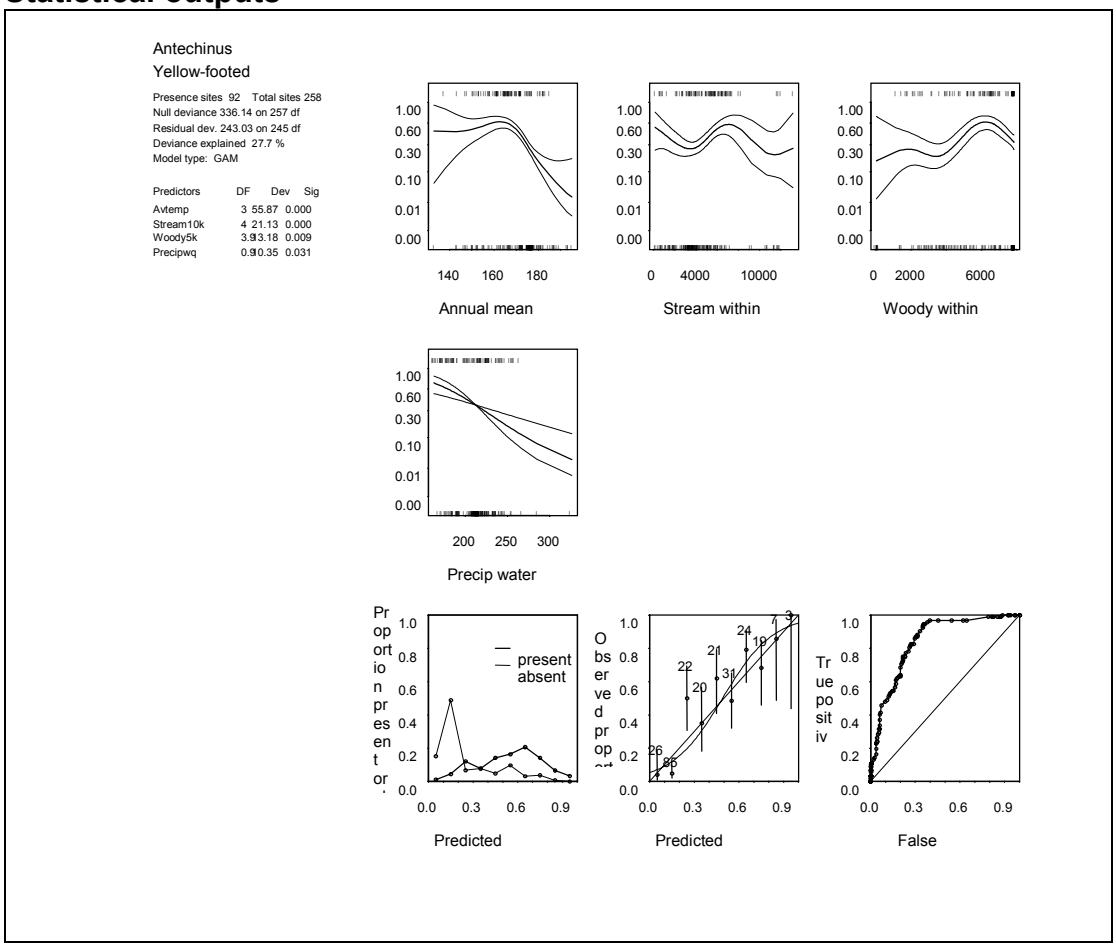
Maximum predicted value (likelihood) = 97%

Test of model with independent records

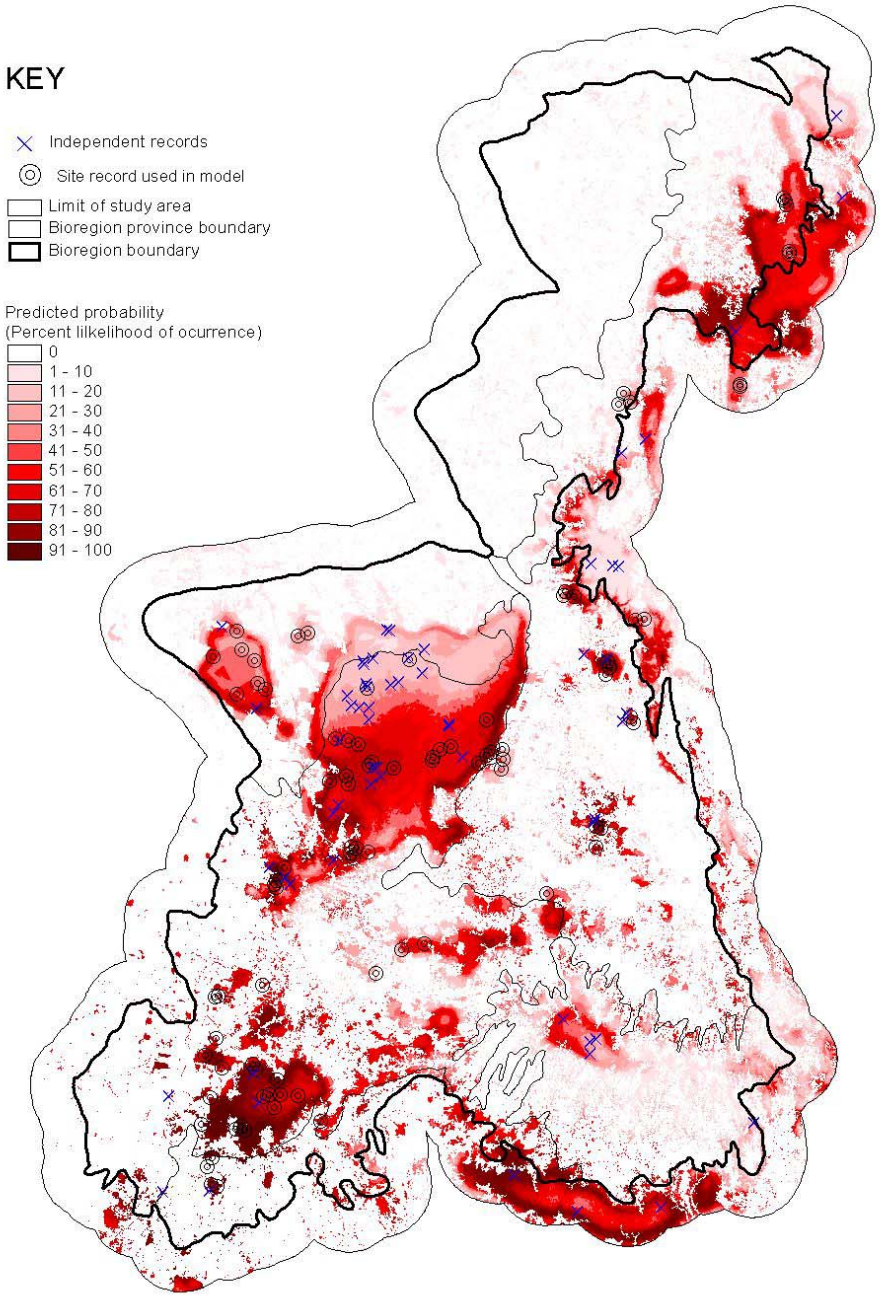
Number of test records = 96
Mean predicted value = 47
Standard deviation = 23

Number of records which fall in the upper 50% of predicted values = 46 (47%)
Number of records which fall in the upper 10% of predicted values = 1 (1%)

Statistical outputs



Predicted distribution of Yellow-footed Antechinus in the Brigalow Belt South



Common Dunnart *Sminthopsis murina*

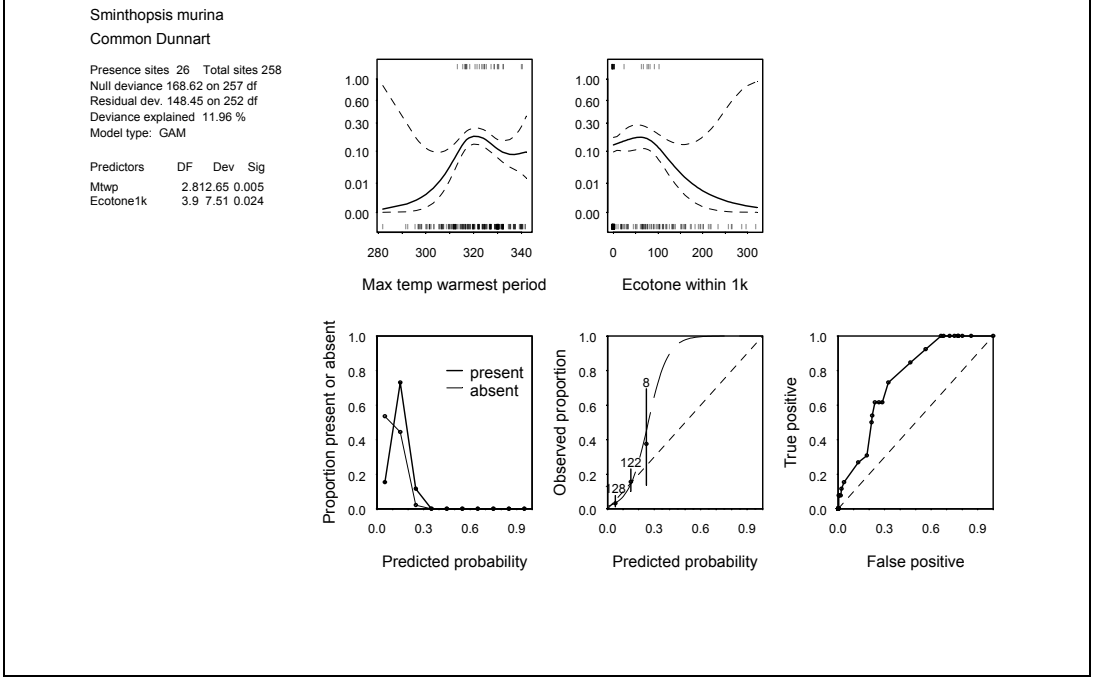
Maximum predicted value (likelihood) = 25%

Test of model with independent records

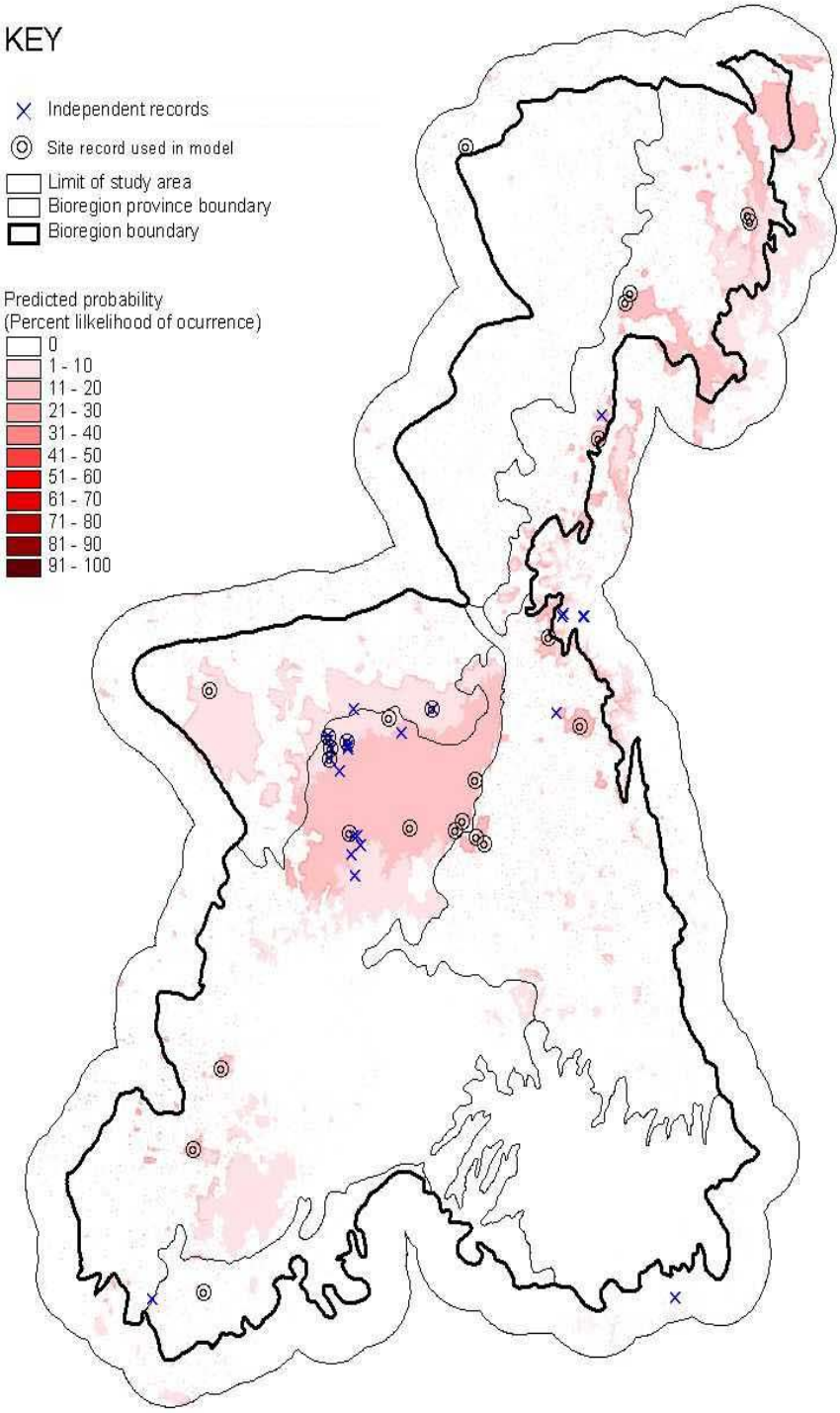
Number of test records = 45
Mean predicted value = 10
Standard deviation = 10

Number of records which fall in the upper 50% of predicted values = 22 (48%)
Number of records which fall in the upper 10% of predicted values = 0

Statistical outputs



Predicted distribution of Common Dunnart in the Brigalow Belt South



Pilliga mouse *Pseudomys pilligaensis (delicatulus?)*

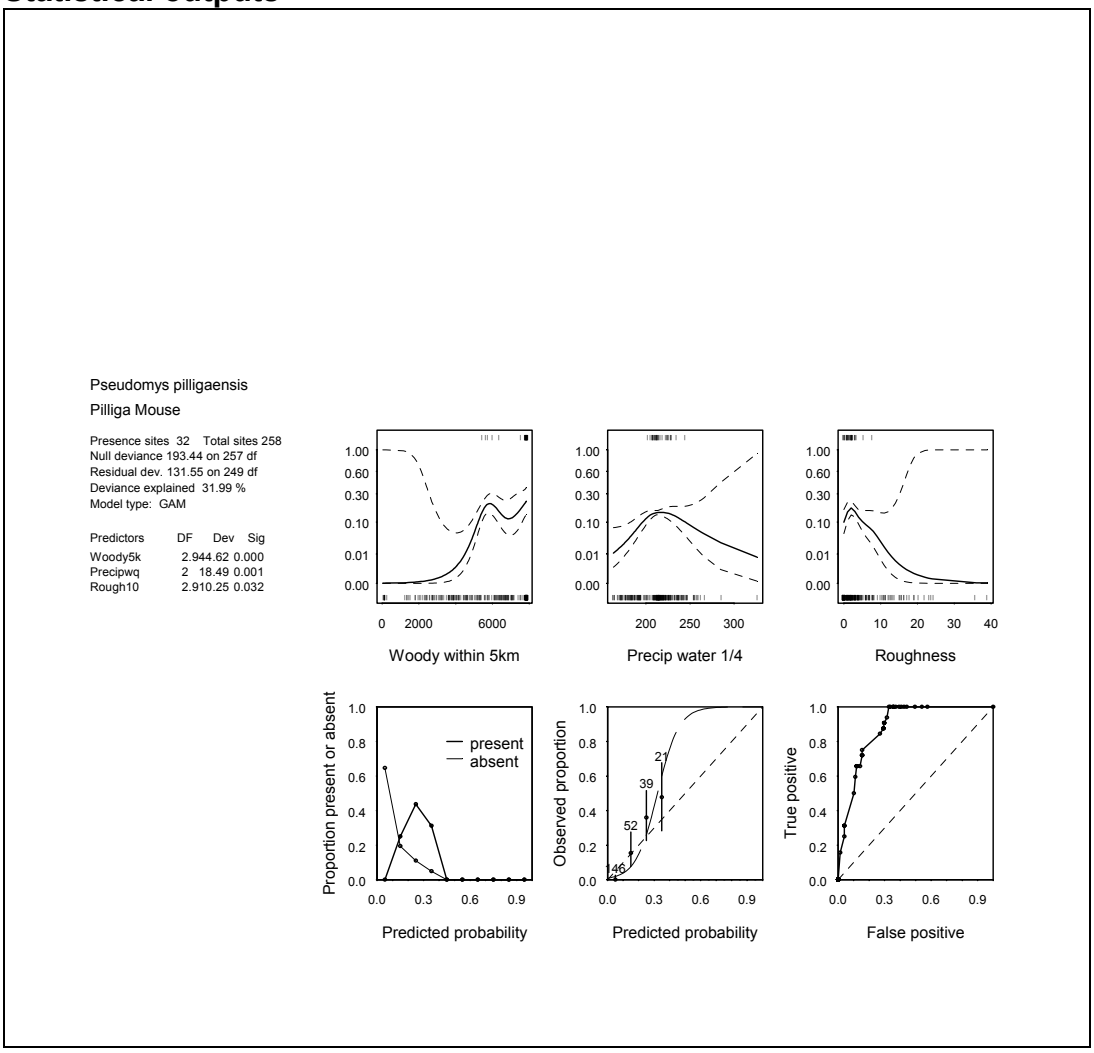
Maximum predicted value (likelihood) = 32%

Test of model with independent records

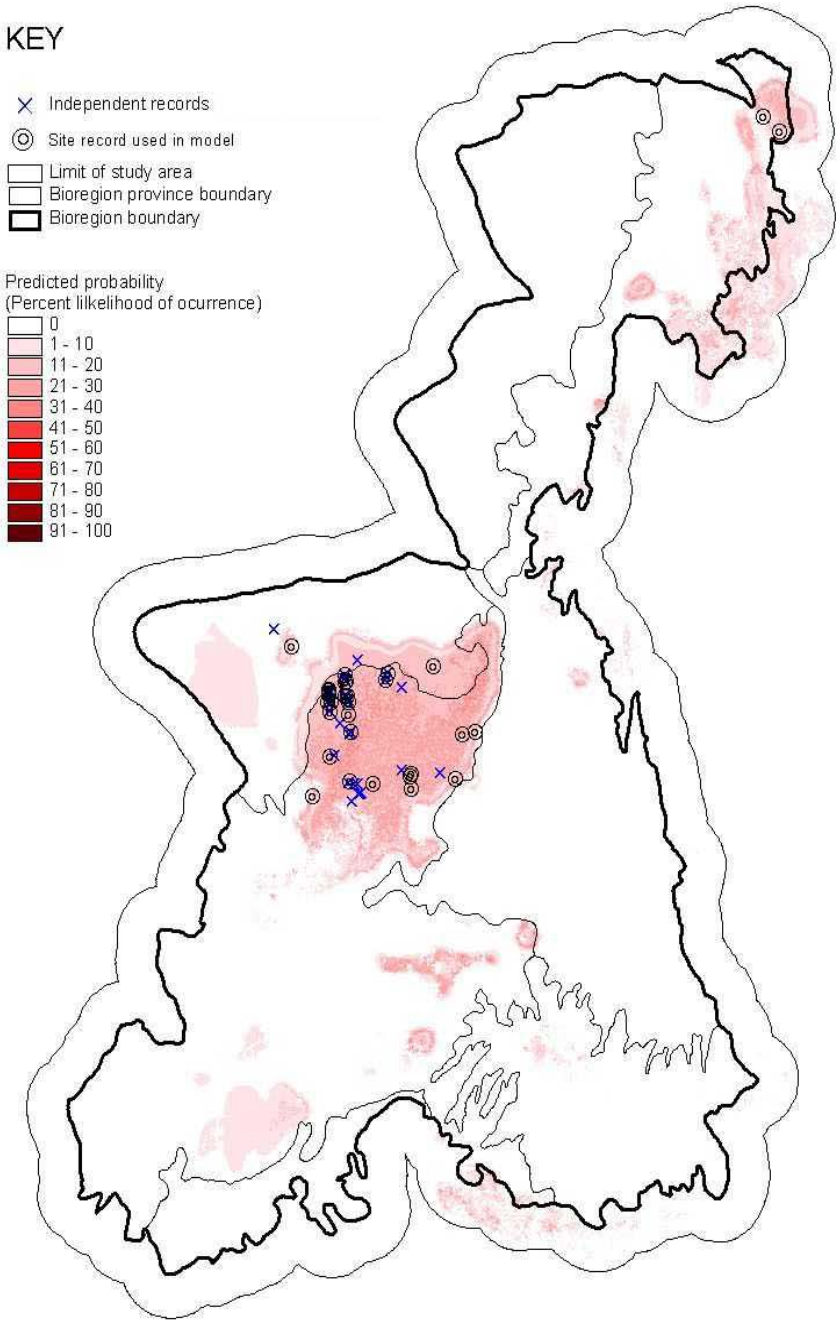
Number of test records = 108
Mean predicted value = 19
Standard deviation = 6

Number of records which fall in the upper 50% of predicted values = 98 (91%)
Number of records which fall in the upper 10% of predicted values = 20 (19%)

Statistical outputs



Predicted distribution of Pilliga Mouse in the Brigalow Belt South



1.1.1 Microchiropteran bats

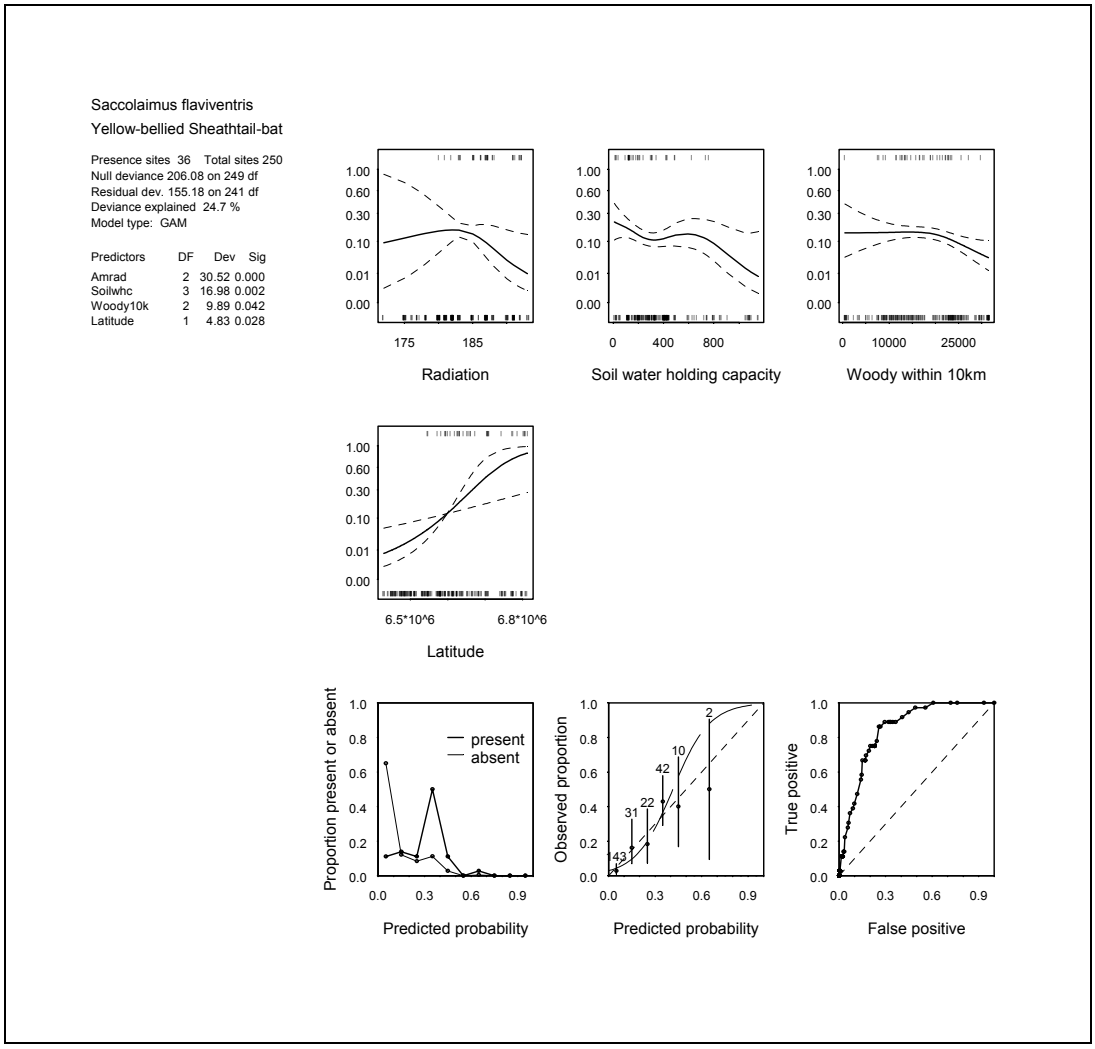
Yellow-bellied Sheathtail Bat *Saccolaimus flaviventrus*

Maximum predicted value (likelihood) = 71%

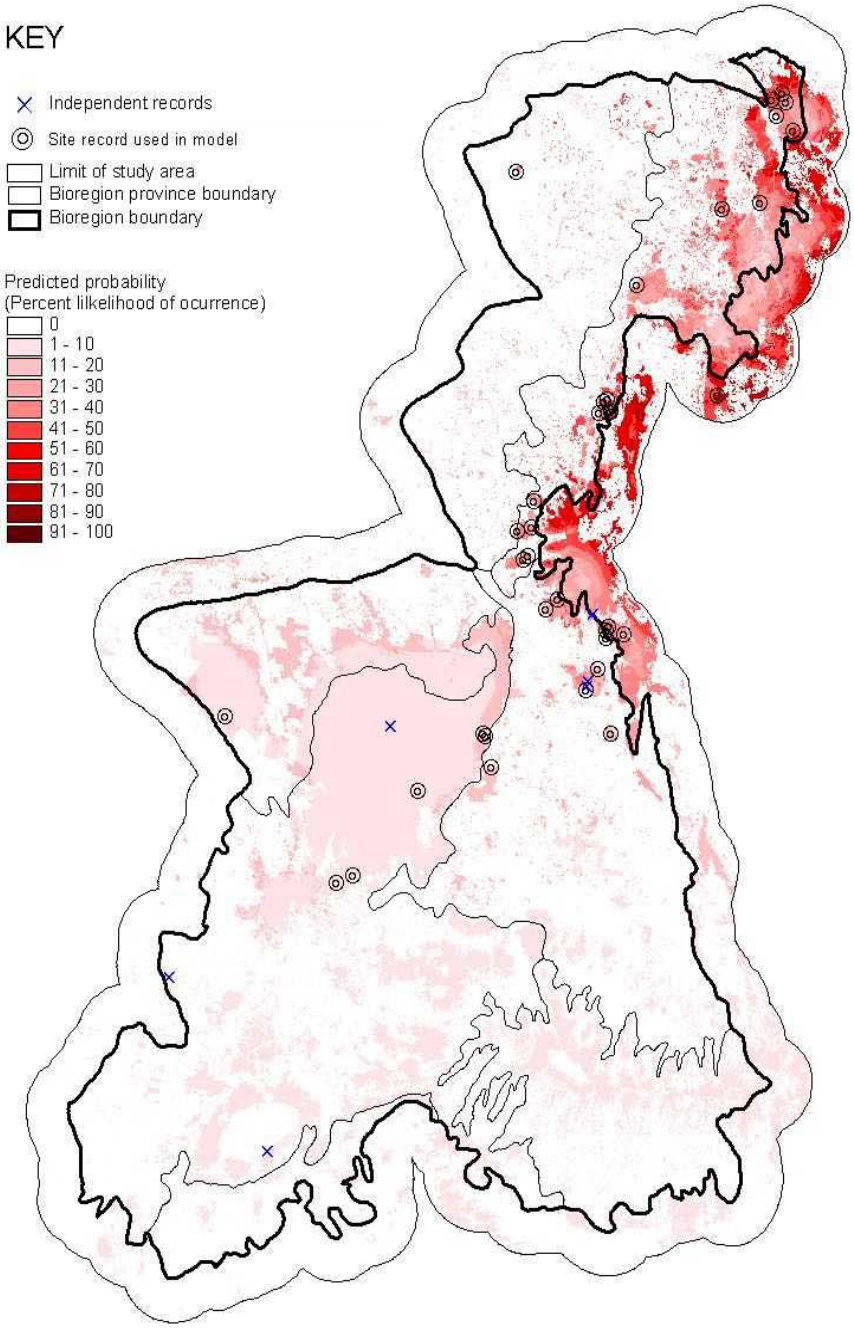
Test of model with independent records

Number of test records = 7
Mean predicted value = 10
Standard deviation = 10
Number of records which fall in the upper 50% of predicted values = 0
Number of records which fall in the upper 10% of predicted values = 0

Statistical outputs



Predicted distribution of Yellow-bellied Sheathtail-bat in the Brigalow Belt South



Greater Long-eared Bat *Nyctophillus timoriensis*

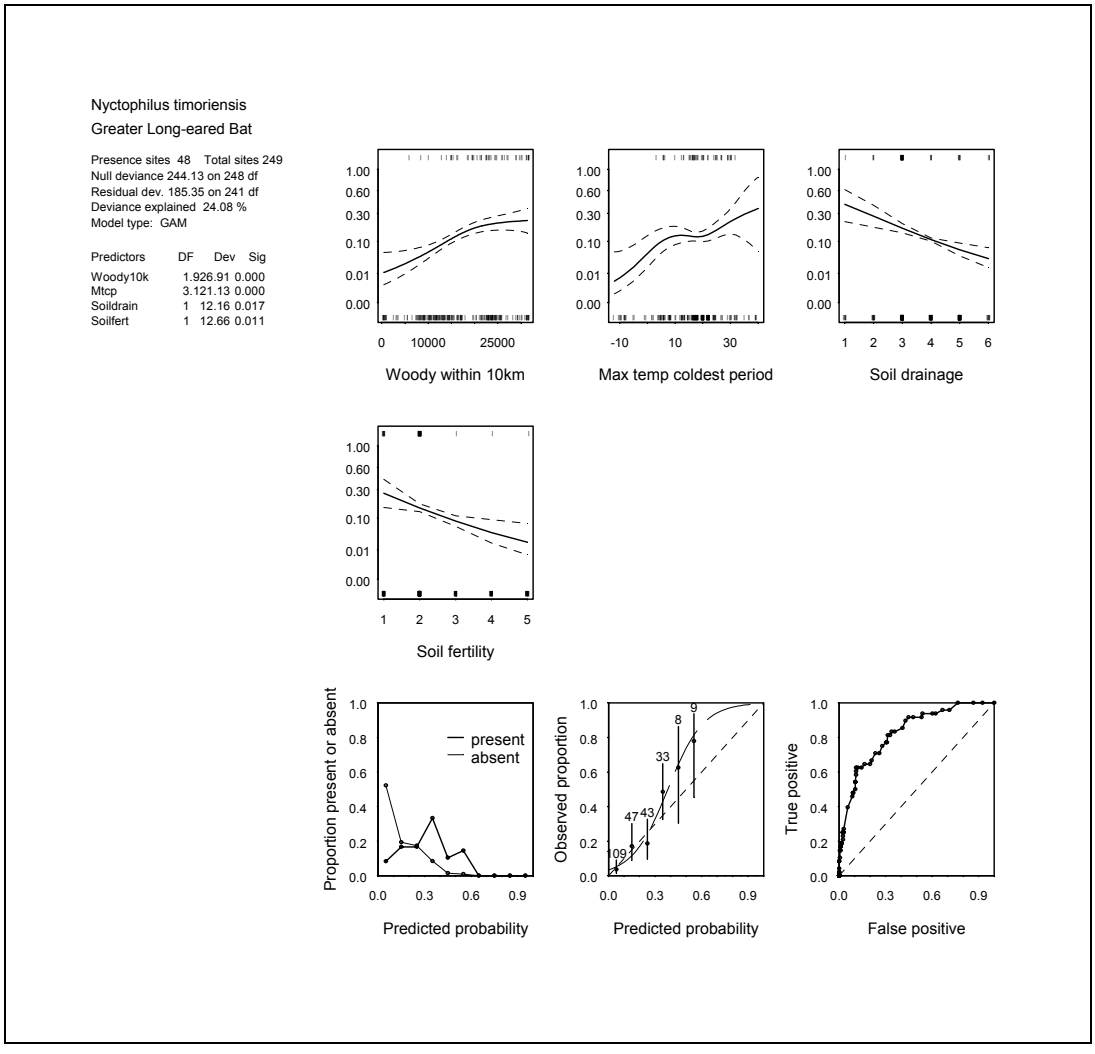
Maximum predicted value (likelihood) = 69%

Test of model with independent records

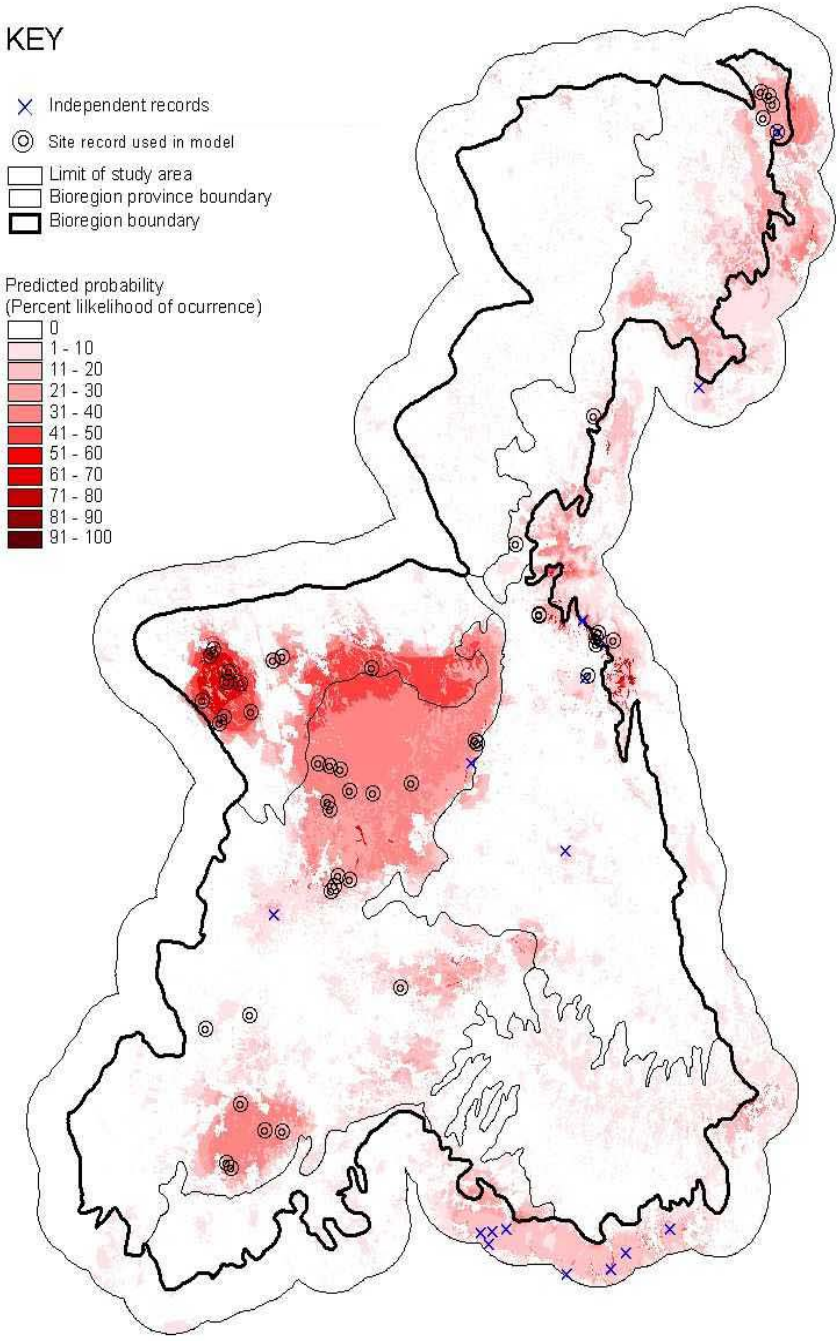
Number of test records = 19
Mean predicted value = 22
Standard deviation = 17

Number of records which fall in the upper 50% of predicted values = 4 (21%)
Number of records which fall in the upper 10% of predicted values = 1 (5%)

Statistical outputs



Predicted distribution of Greater Long-eared Bat in the Brigalow Belt South



Common Bent-wing Bat *Miniopterus schreibersii*

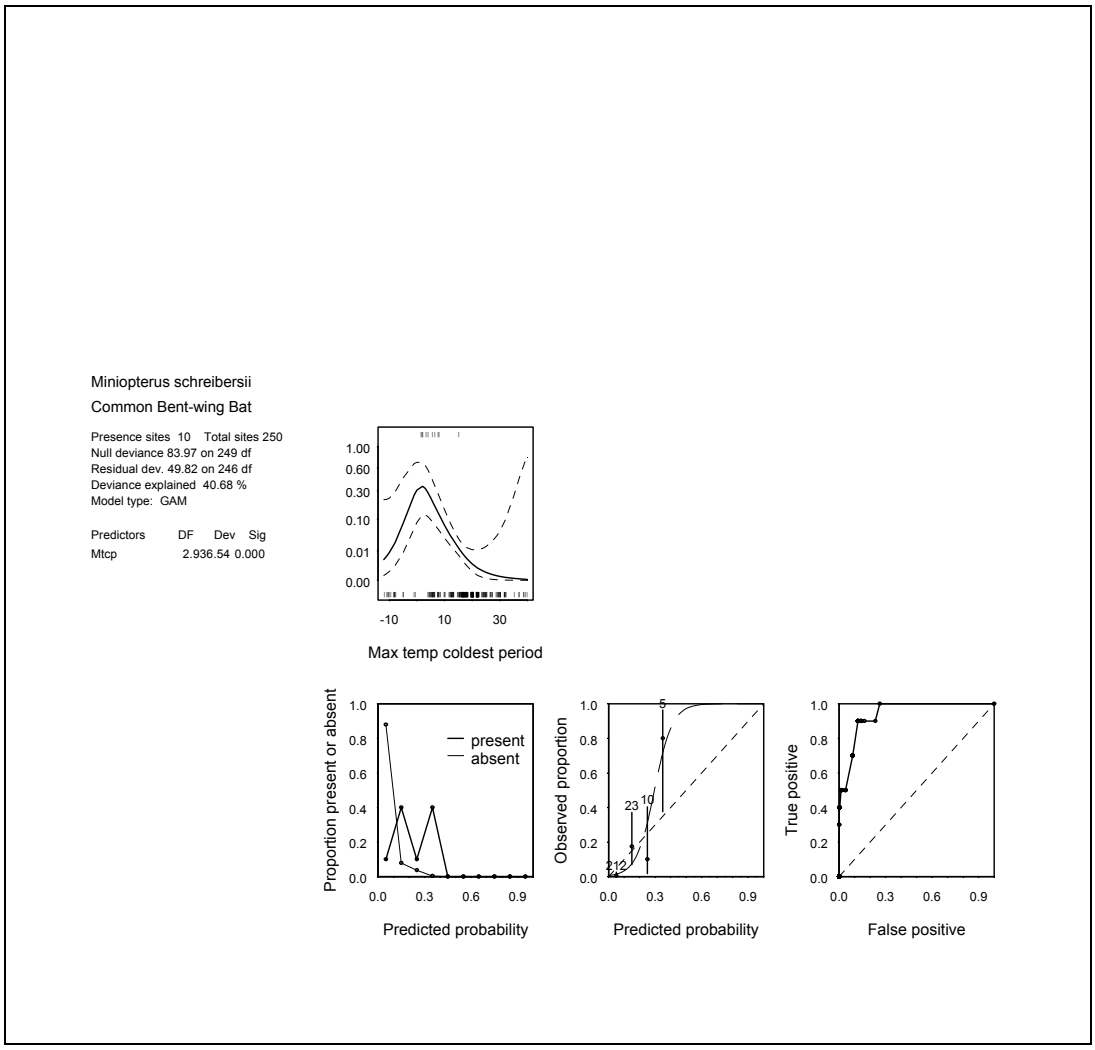
Maximum predicted value (likelihood) = 34%

Test of model with independent records

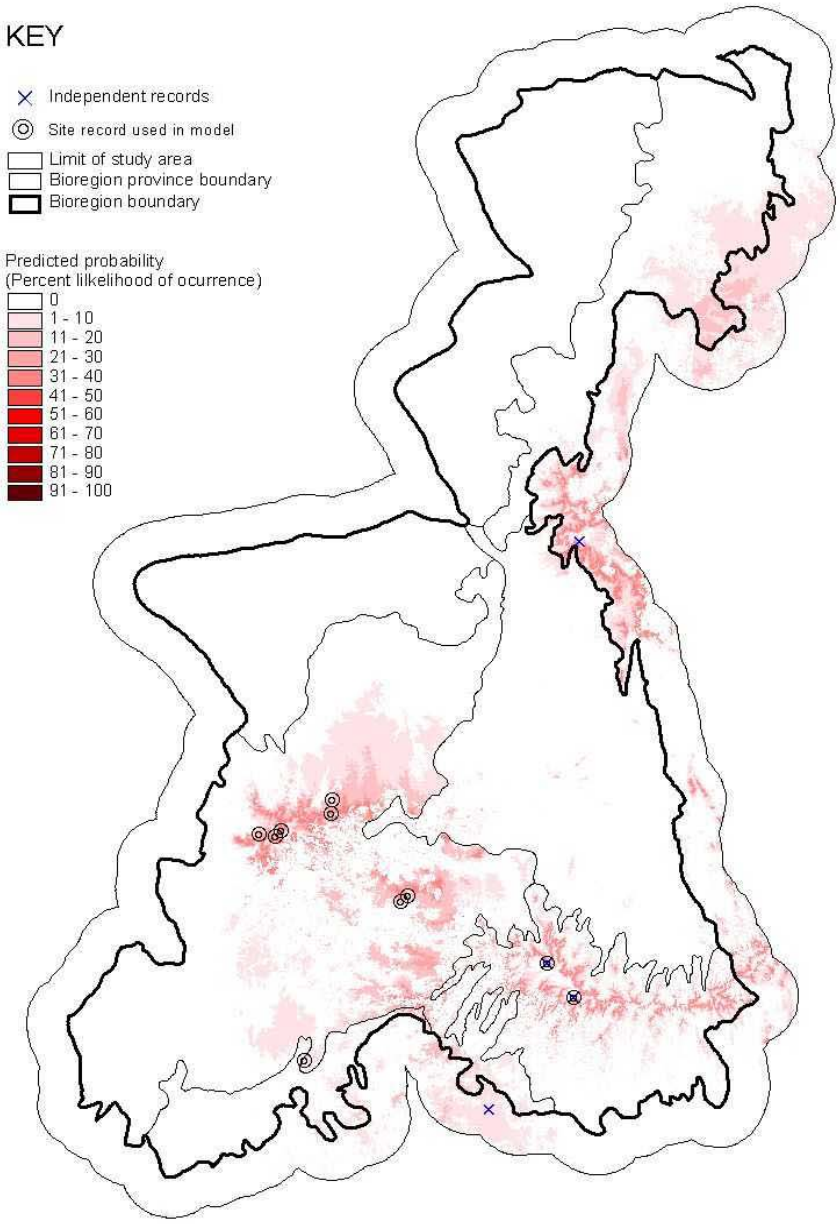
Number of test records = 9
Mean predicted value = 22
Standard deviation = 16

Number of records which fall in the upper 50% of predicted values = 6 (66%)
Number of records which fall in the upper 10% of predicted values = 6 (66%)

Statistical outputs



Predicted distribution of Common Bent-wing Bat in the Brigalow Belt South



Little Pied Bat *Chalinolobus picatus*

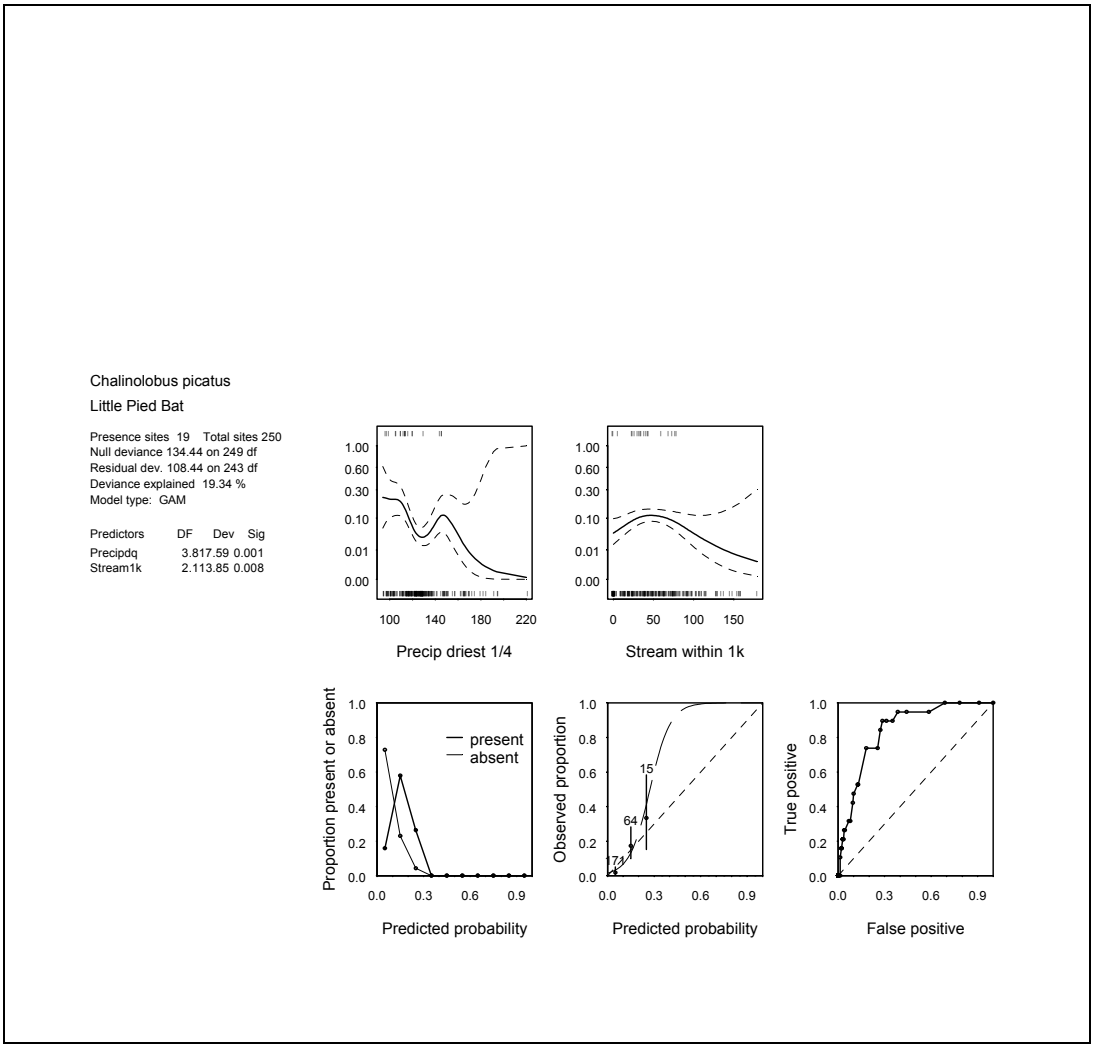
Maximum predicted value (likelihood) = 32%

Test of model with independent records

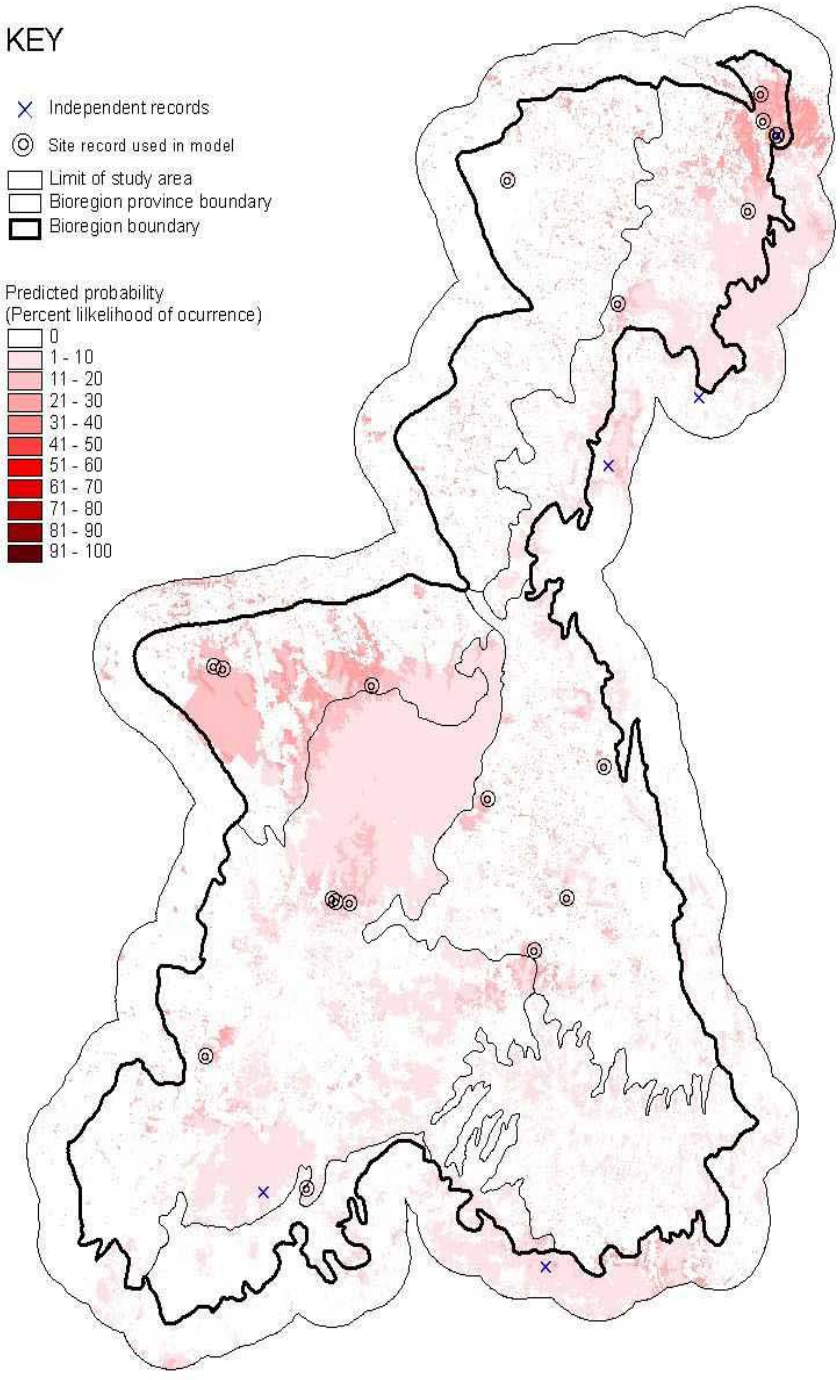
Number of test records = 5
Mean predicted value = 7
Standard deviation = 6

Number of records which fall in the upper 50% of predicted values = 0
Number of records which fall in the upper 10% of predicted values = 0

Statistical outputs



Predicted distribution of Little Pied Bat in the Brigalow Belt South



Large Pied Bat *Chalinolobus dwyeri*

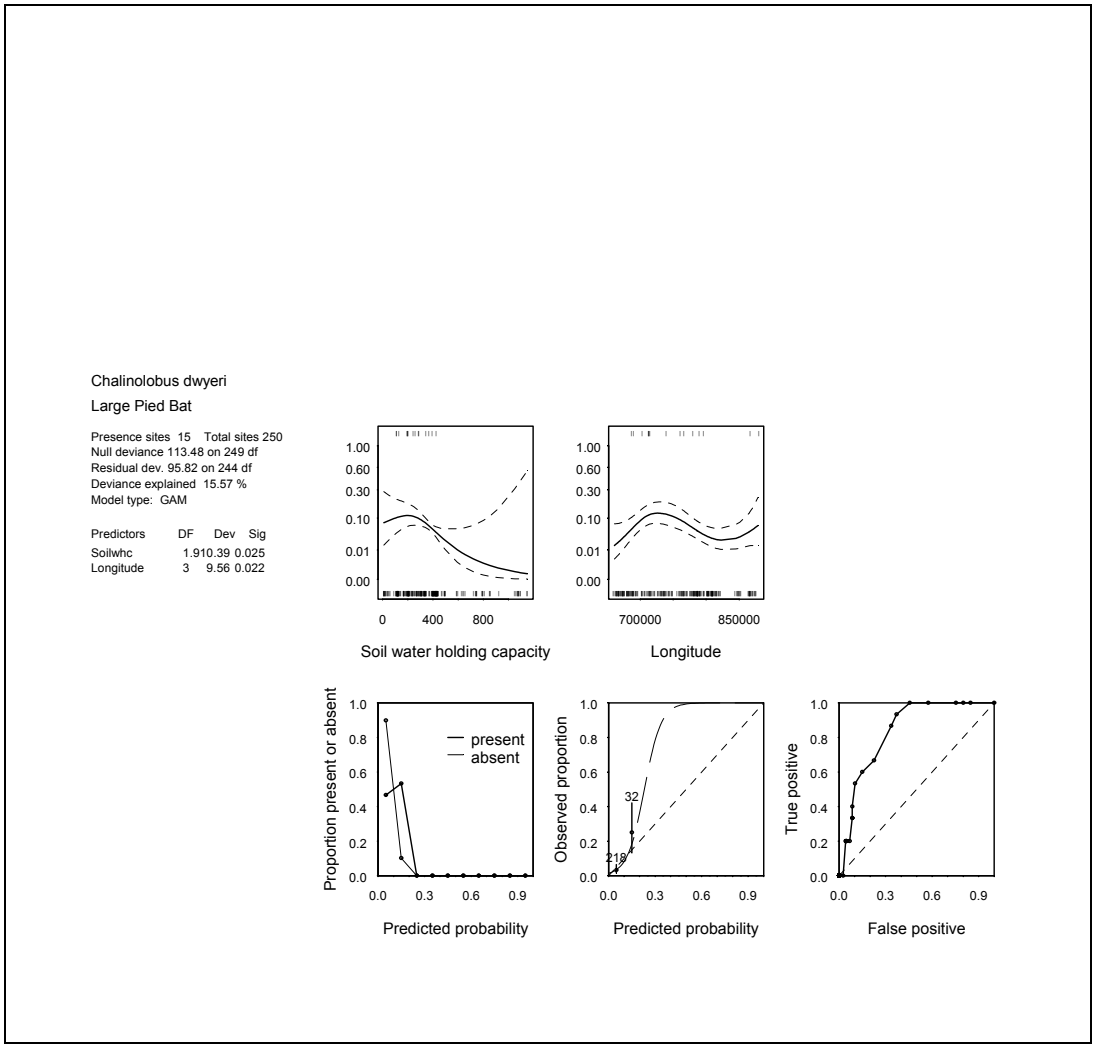
Maximum predicted value (likelihood) = 20%

Test of model with independent records

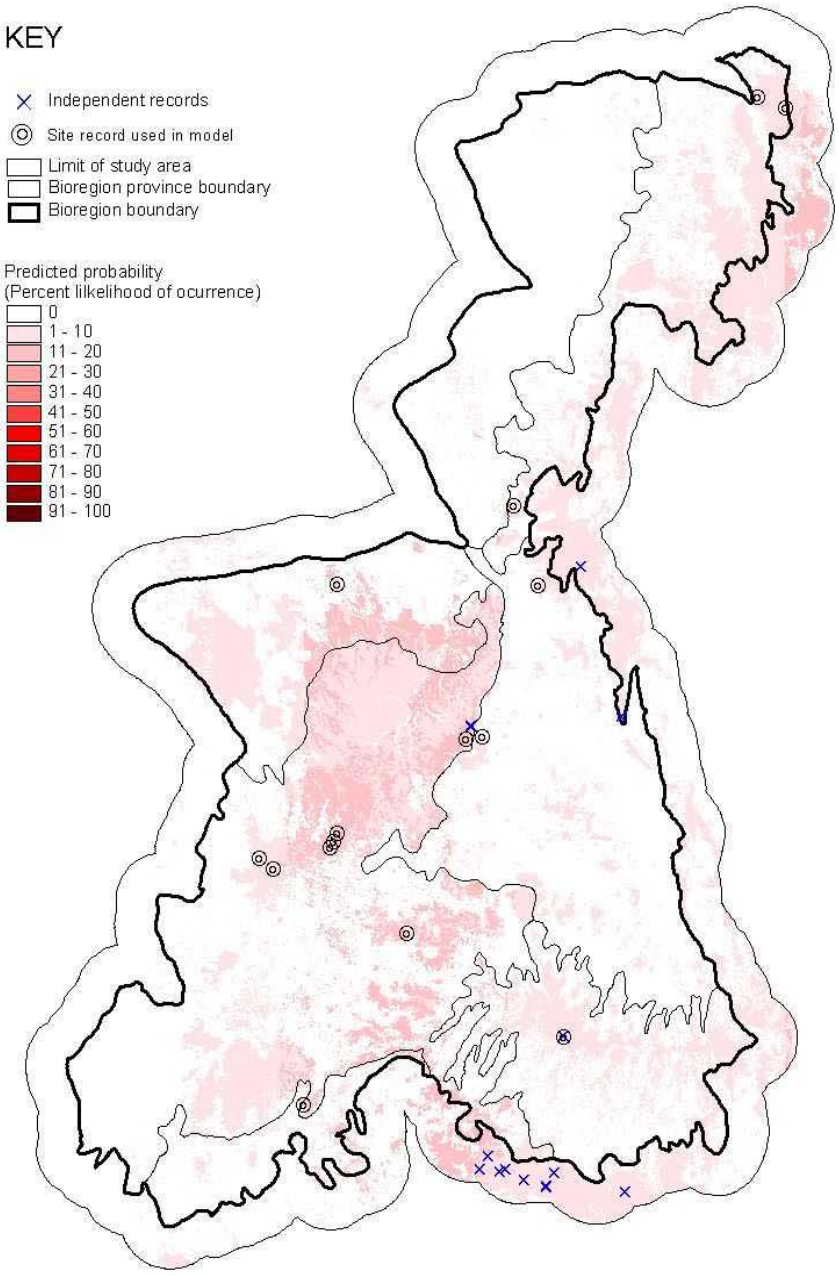
Number of test records = 16
Mean predicted value = 7
Standard deviation = 3

Number of records which fall in the upper 50% of predicted values = 1 (6%)
Number of records which fall in the upper 10% of predicted values = 0

Statistical outputs



Predicted distribution of Large Pied Bat in the Brigalow Belt South



1.3.4 Diurnal Birds

Emu *Dromaius novaehollandiae*

Maximum predicted value (likelihood) = 97%

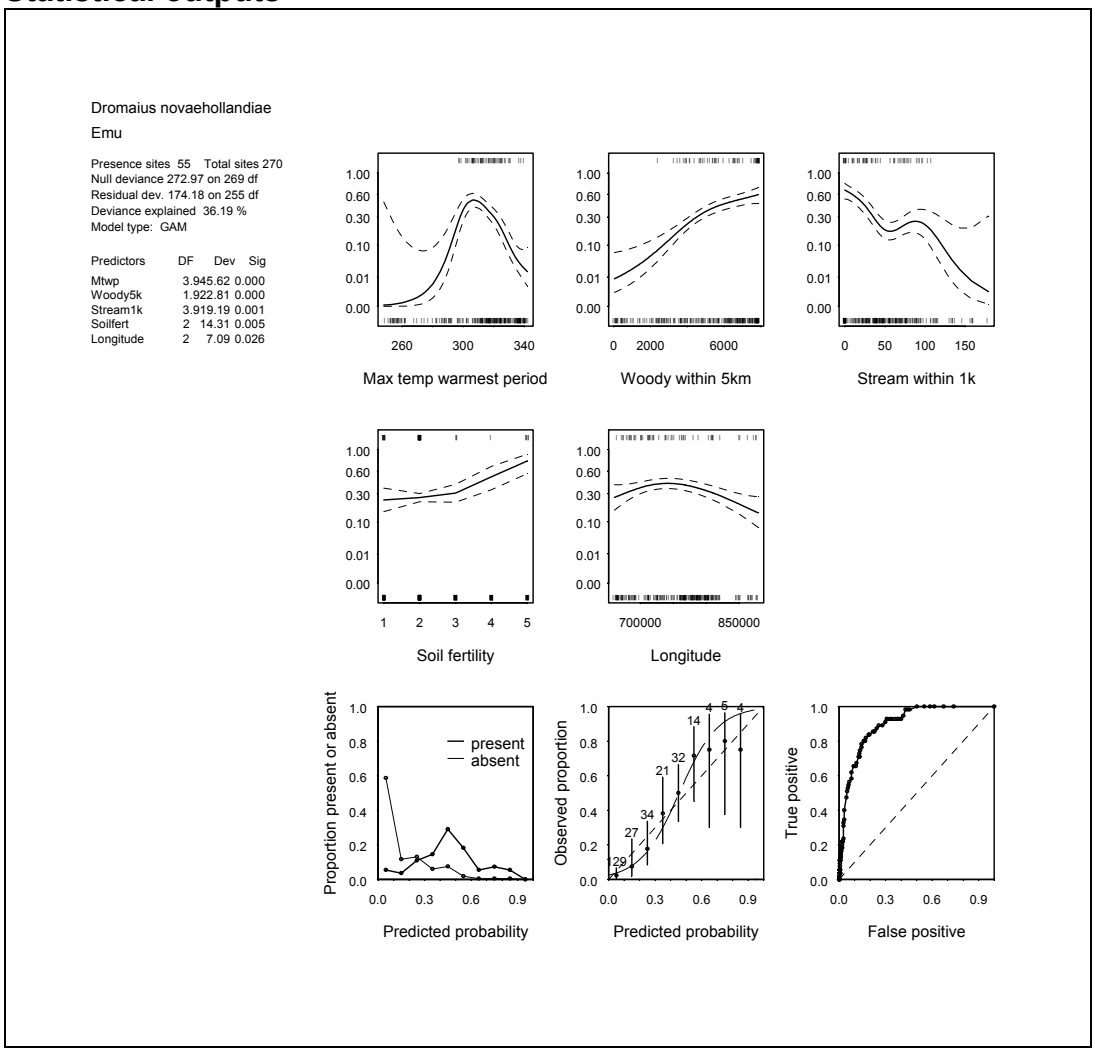
Test of model with independent records

Number of test records = 146
Mean predicted value = 38
Standard deviation = 24

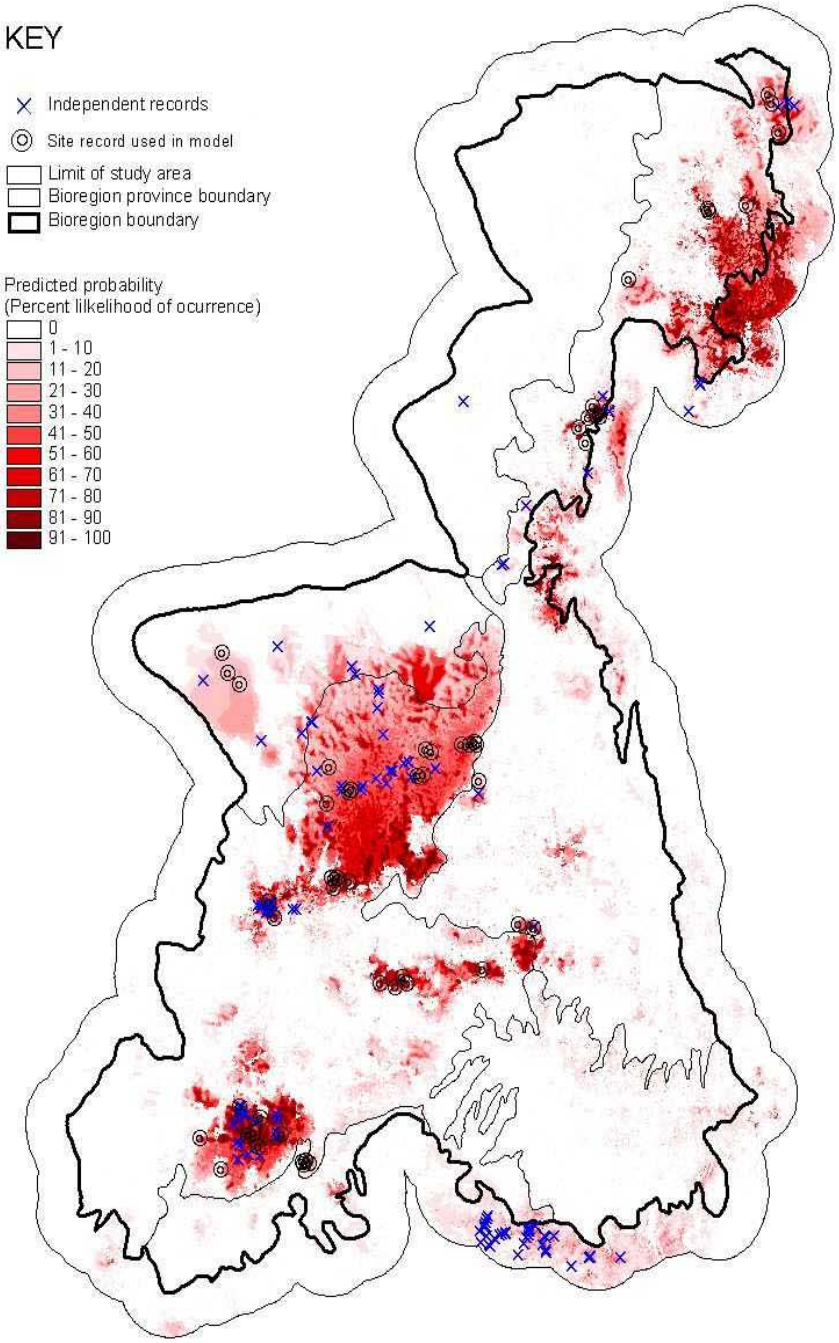
Number of records which fall in the upper 50% of predicted values = 54 (37%)

Number of records which fall in the upper 10% of predicted values = 8 (5%)

Statistical outputs



Predicted distribution of Emu in the Brigalow Belt South



Painted button-quail *Turnix varia*

Maximum predicted value (likelihood) = 16%

Test of model with independent records

Number of test records = 19
Mean predicted value = 7
Standard deviation = 5

Number of records which fall in the upper 50% of predicted values = 10 (53%)

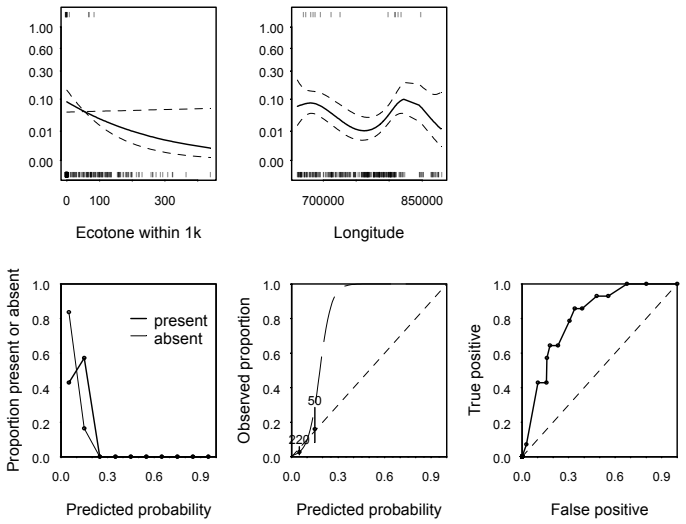
Number of records which fall in the upper 10% of predicted values = 0

Statistical outputs

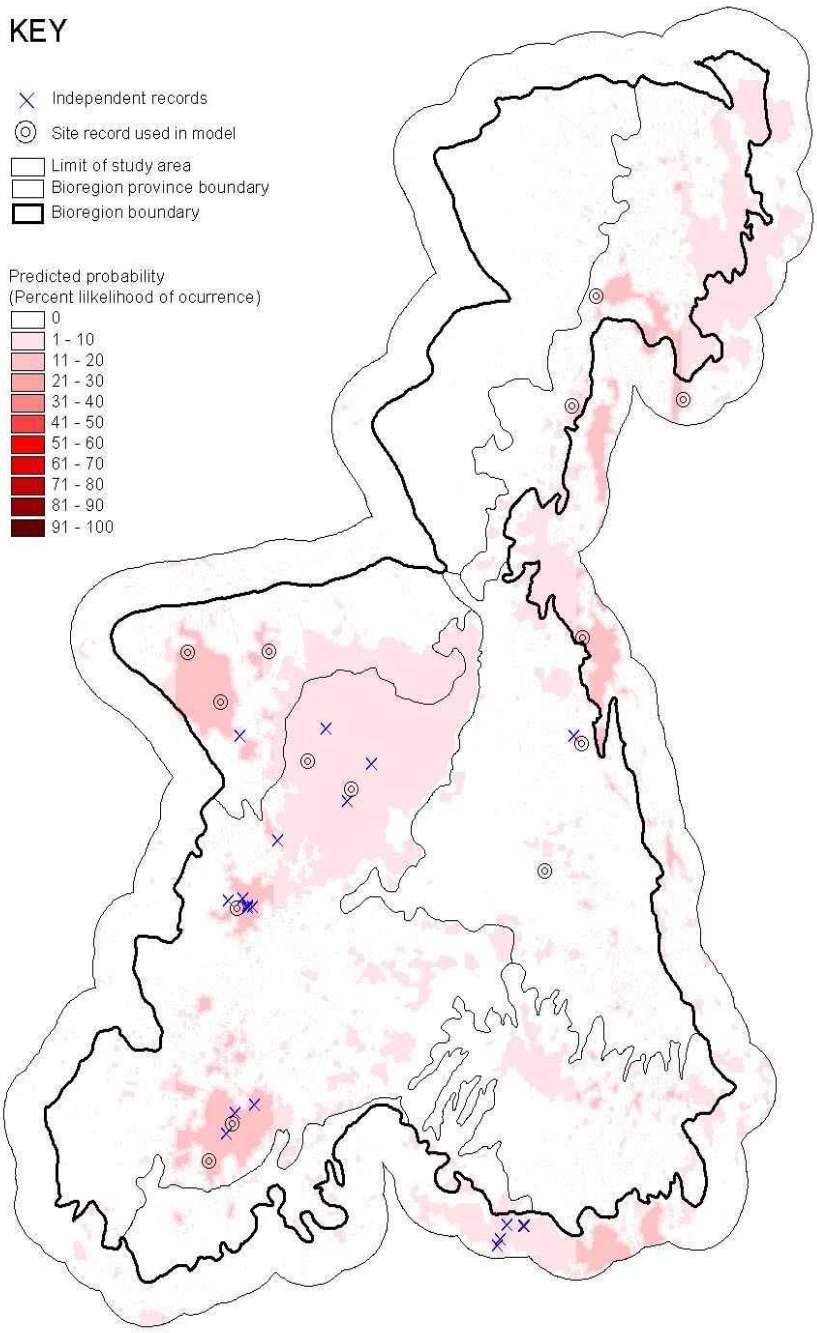
Turnix varia
Painted Button-quail

Presence sites 14 Total sites 270
Null deviance 110.12 on 269 df
Residual dev. 93.89 on 264 df
Deviance explained 14.74 %
Model type: GAM

Predictors	DF	Dev	Sig
Ecotone1k	1	9.39	0.041
Longitude	4	11.35	0.022



Predicted distribution of Painted Button-quail in the Brigalow Belt South



Glossy black cockatoo *Calyptorhynchus lathami*

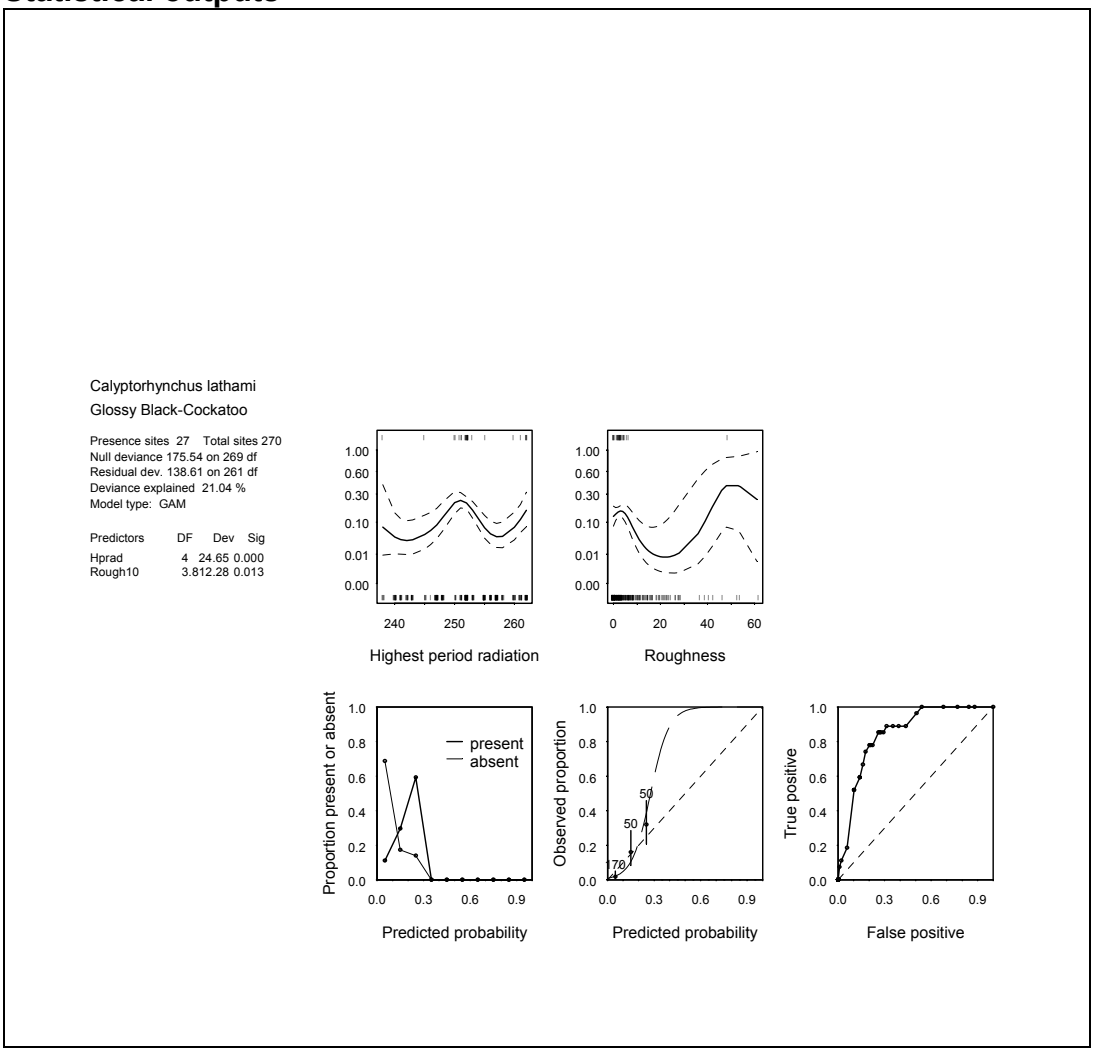
Maximum predicted value (likelihood) = 59%

Test of model with independent records

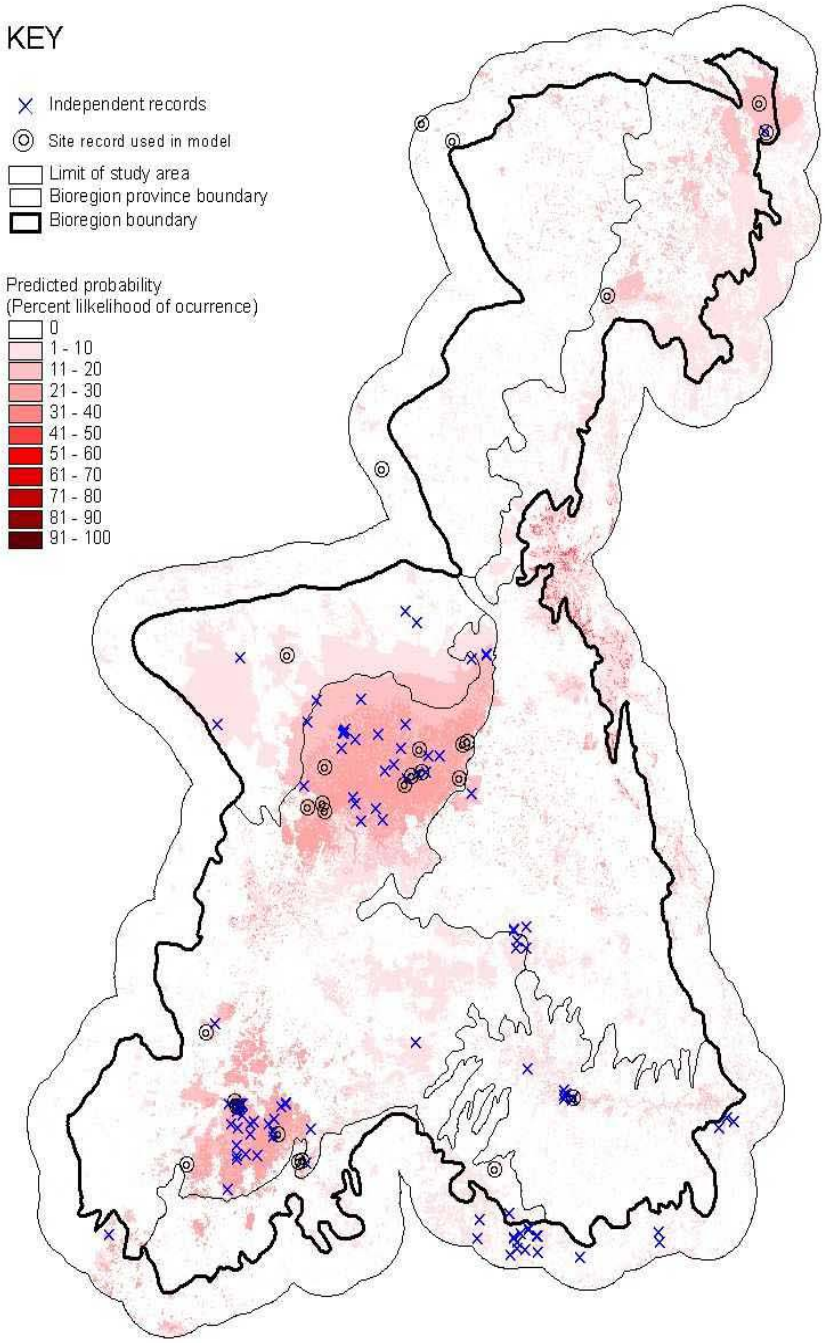
Number of test records = 170
Mean predicted value = 17
Standard deviation = 9

Number of records which fall in the upper 50% of predicted values = 0
Number of records which fall in the upper 10% of predicted values = 0

Statistical outputs



Predicted distribution of Glossy Black-cockatoo in the Brigalow Belt South



Pale-headed rosella *Platycercus adscitus*

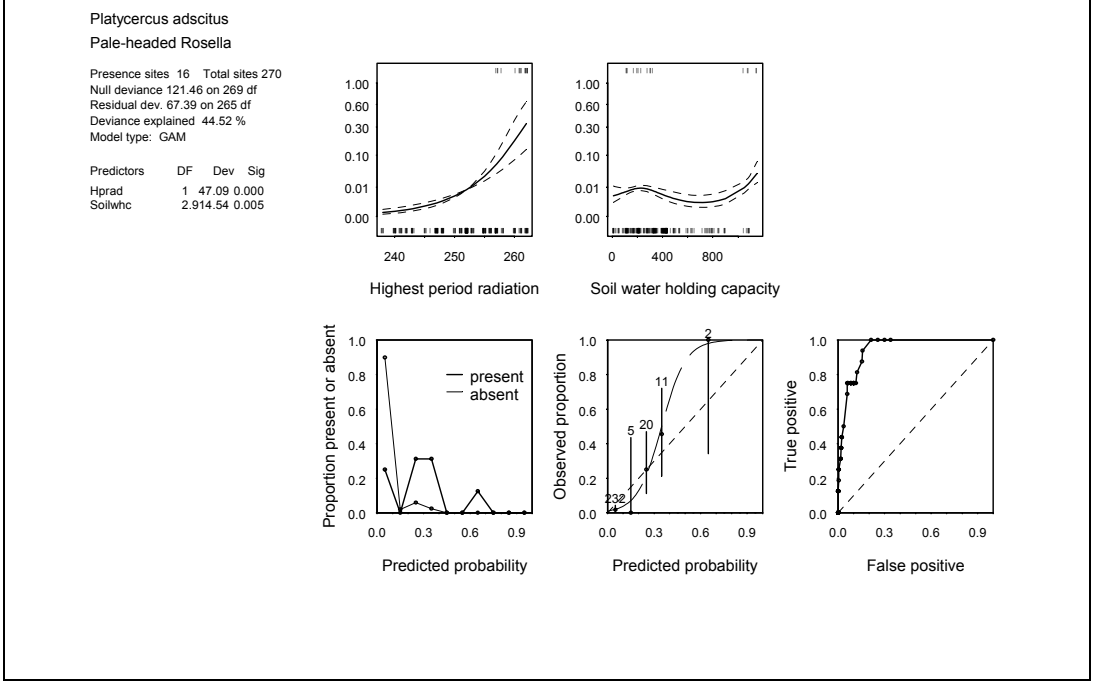
Maximum predicted value (likelihood) = 71%

Test of model with independent records

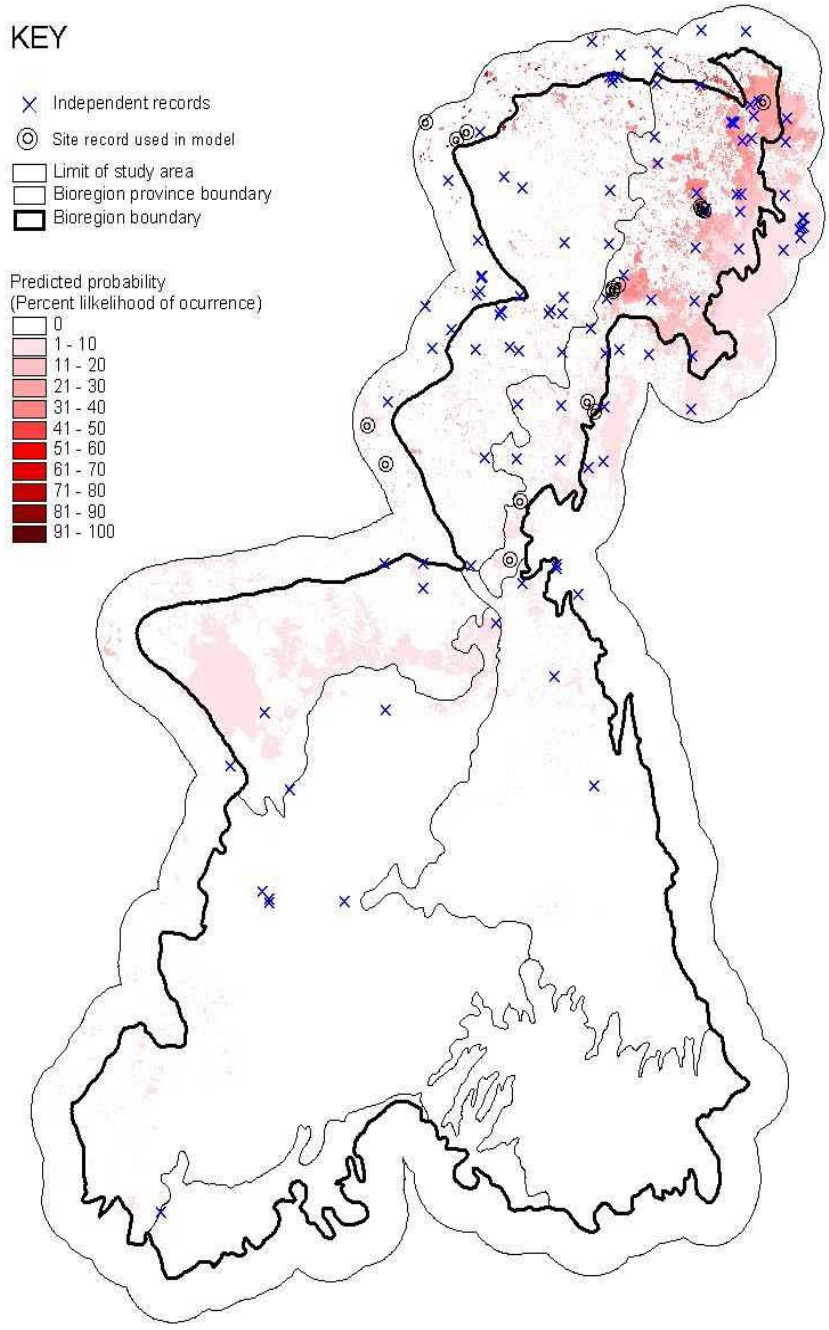
Number of test records = 20
Mean predicted value = 14
Standard deviation = 12

Number of records which fall in the upper 50% of predicted values = 0
Number of records which fall in the upper 10% of predicted values = 0

Statistical outputs



Predicted distribution of Pale-headed Rosella in the Brigalow Belt South



Turquoise parrot *Neophema pulchella*

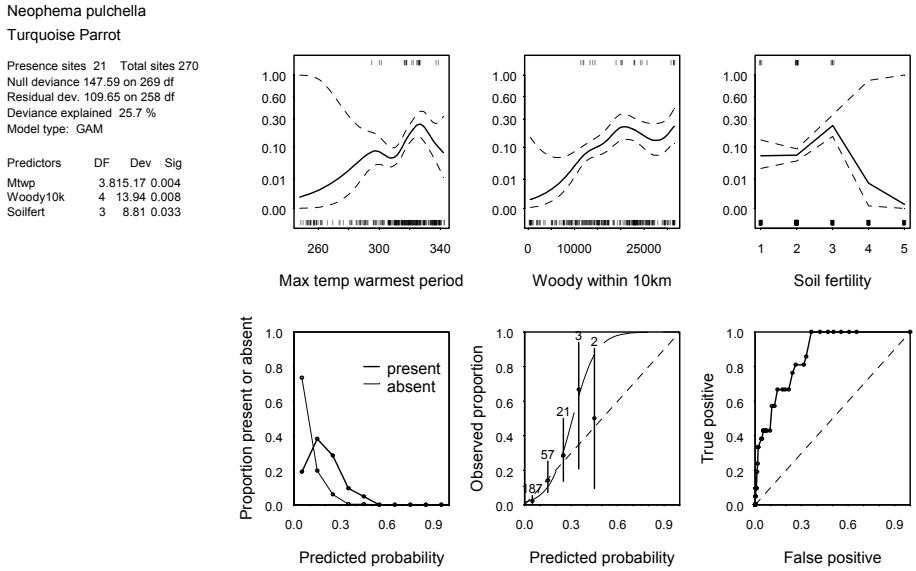
Maximum predicted value (likelihood) = 68%

Test of model with independent records

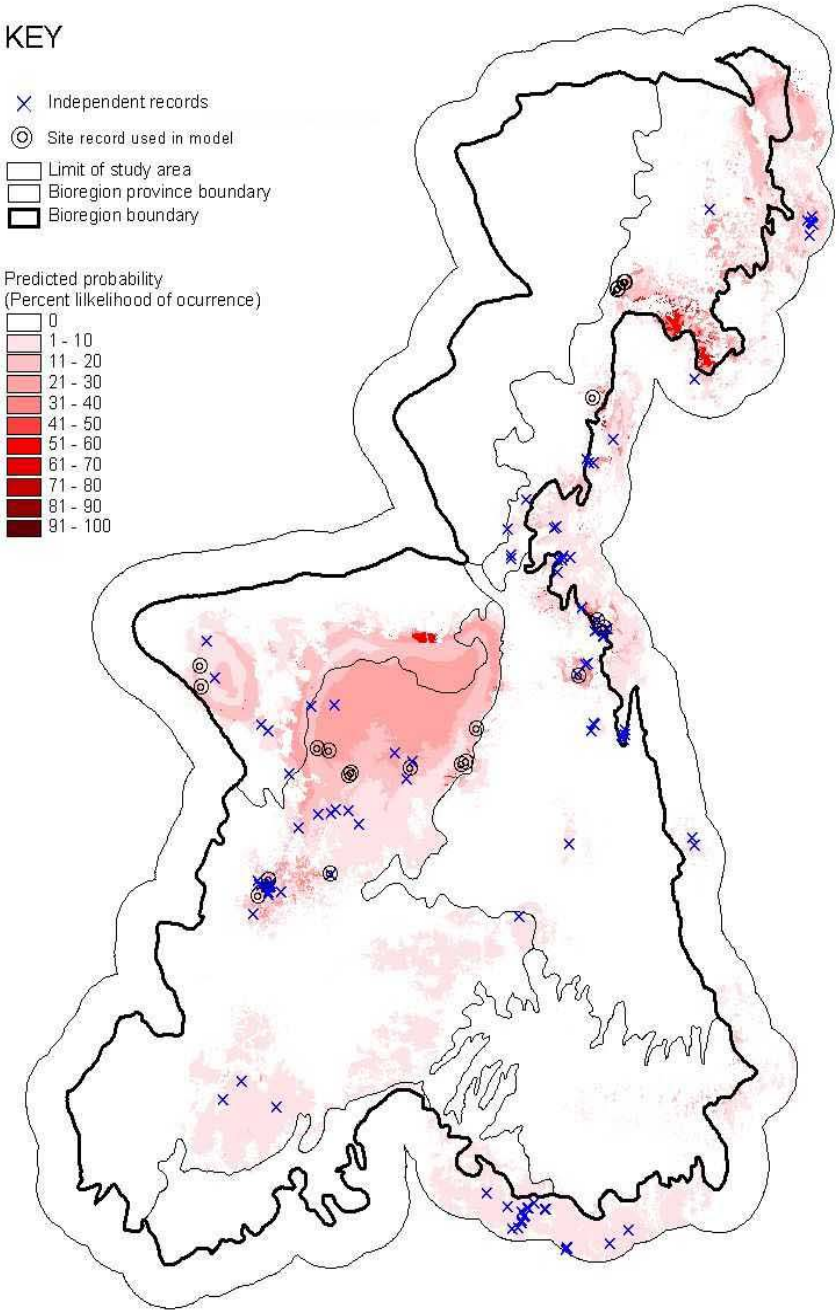
Number of test records = 118
Mean predicted value = 8
Standard deviation = 9

Number of records which fall in the upper 50% of predicted values = 4 (3%)
Number of records which fall in the upper 10% of predicted values = 0

Statistical outputs



Predicted distribution of Turquoise Parrot in the Brigalow Belt South



Restless flycatcher *Myiagra inquieta*

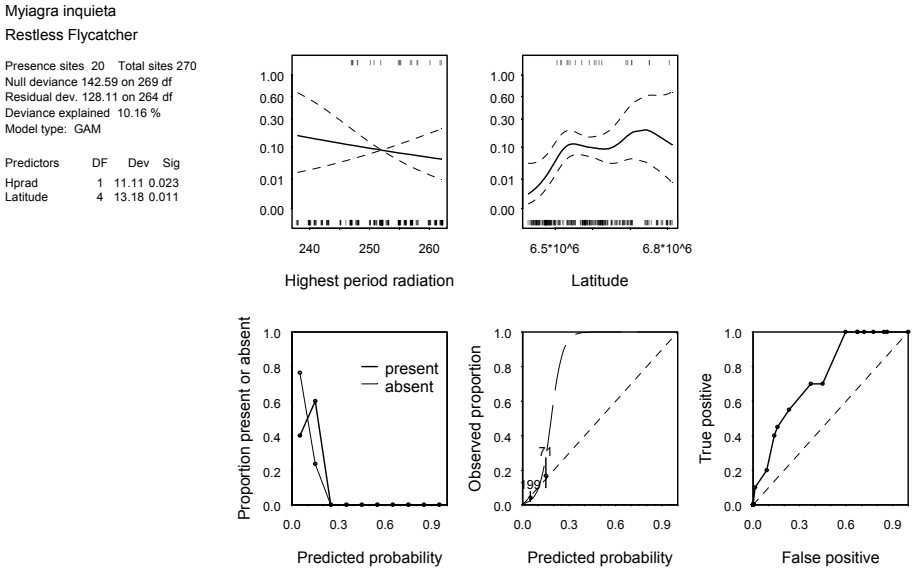
Maximum predicted value (likelihood) = 17%

Test of model with independent records

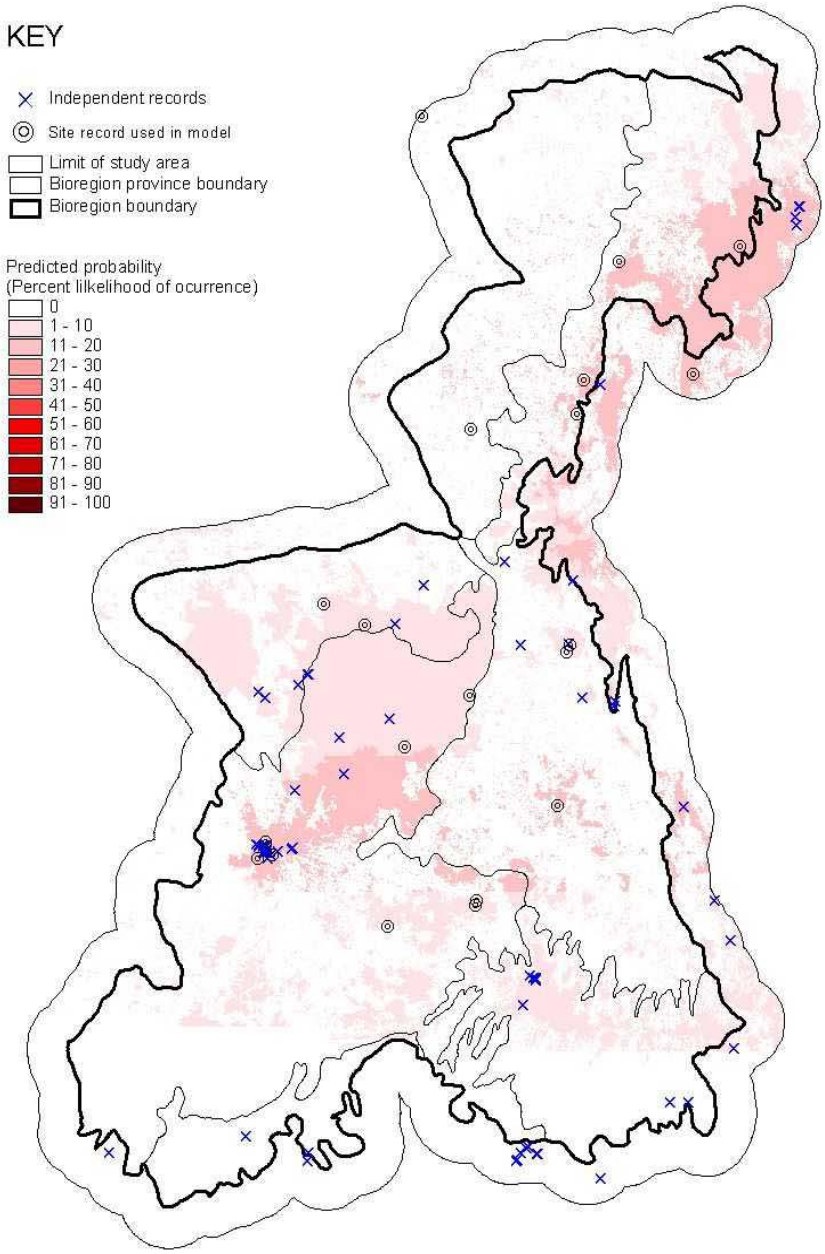
Number of test records = 86
Mean predicted value = 8
Standard deviation = 5

Number of records which fall in the upper 50% of predicted values = 55 (64%)
Number of records which fall in the upper 10% of predicted values = 0

Statistical outputs



Predicted distribution of Restless Flycatcher in the Brigalow Belt South



Jacky Winter *Microeca fascinans*

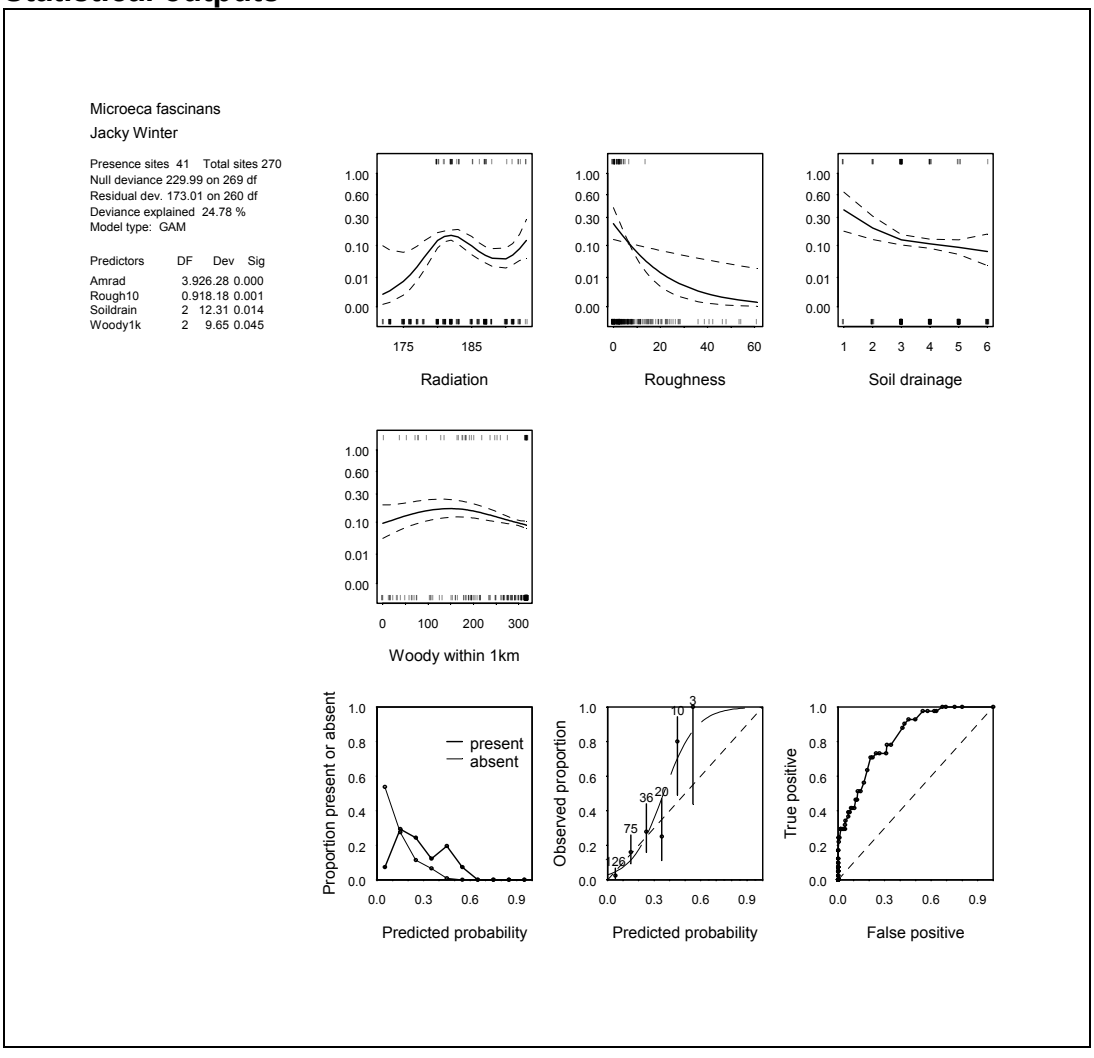
Maximum predicted value (likelihood) = 81

Test of model with independent records

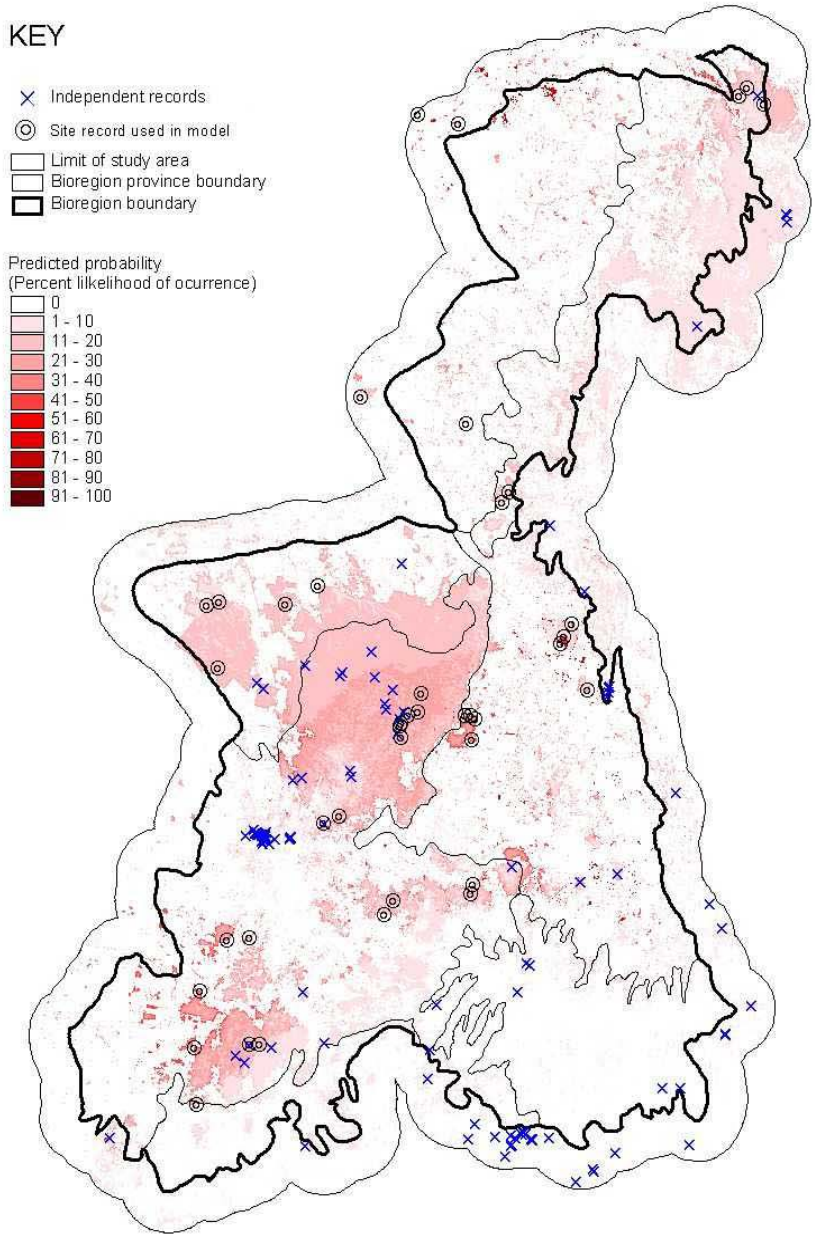
Number of test records = 159
Mean predicted value = 11
Standard deviation = 15

Number of records which fall in the upper 50% of predicted values = 11 (7%)
Number of records which fall in the upper 10% of predicted values = 0

Statistical outputs



Predicted distribution of Jacky Winter in the Brigalow Belt South



Red-capped robin *Petroica goodenovii*

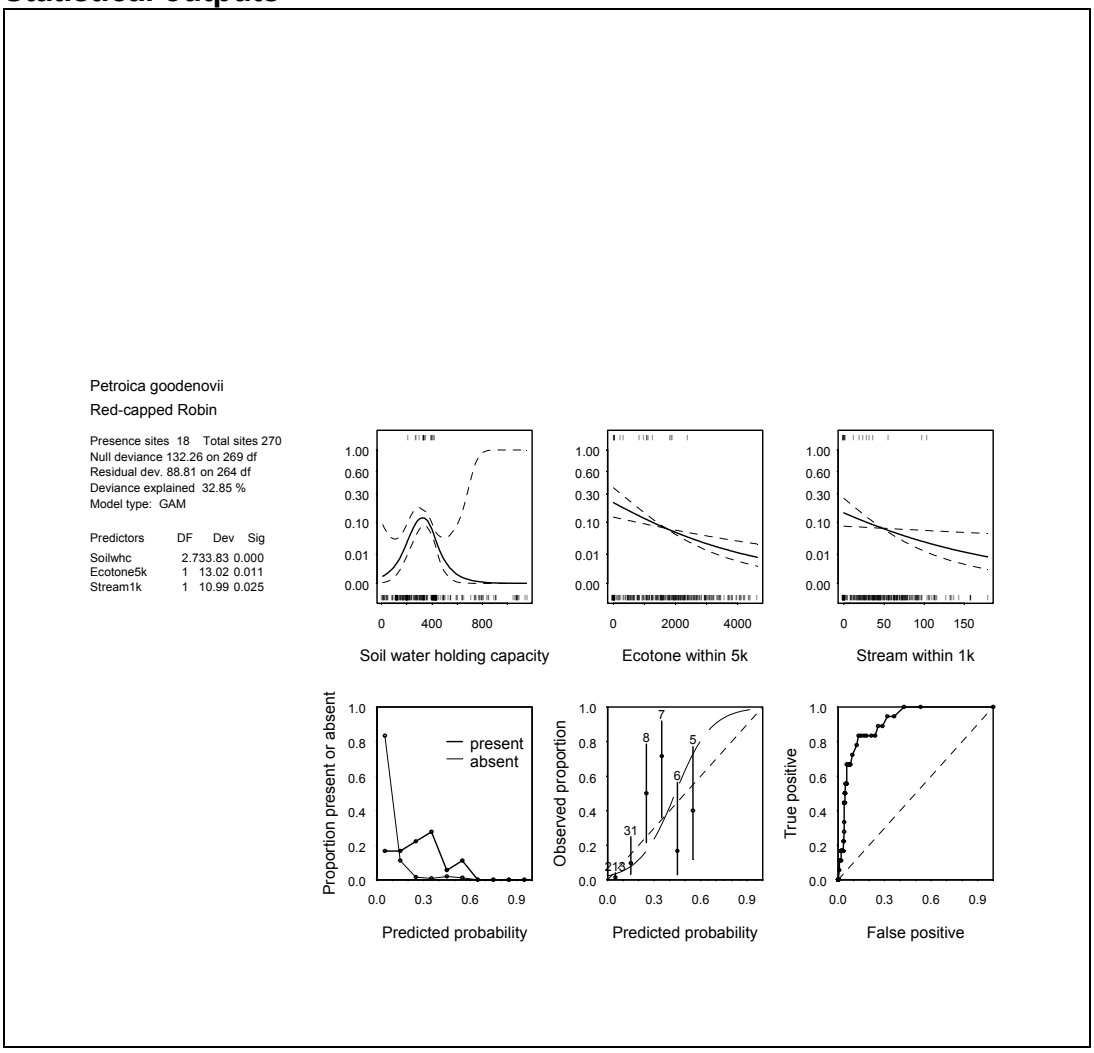
Maximum predicted value (likelihood) = 53%

Test of model with independent records

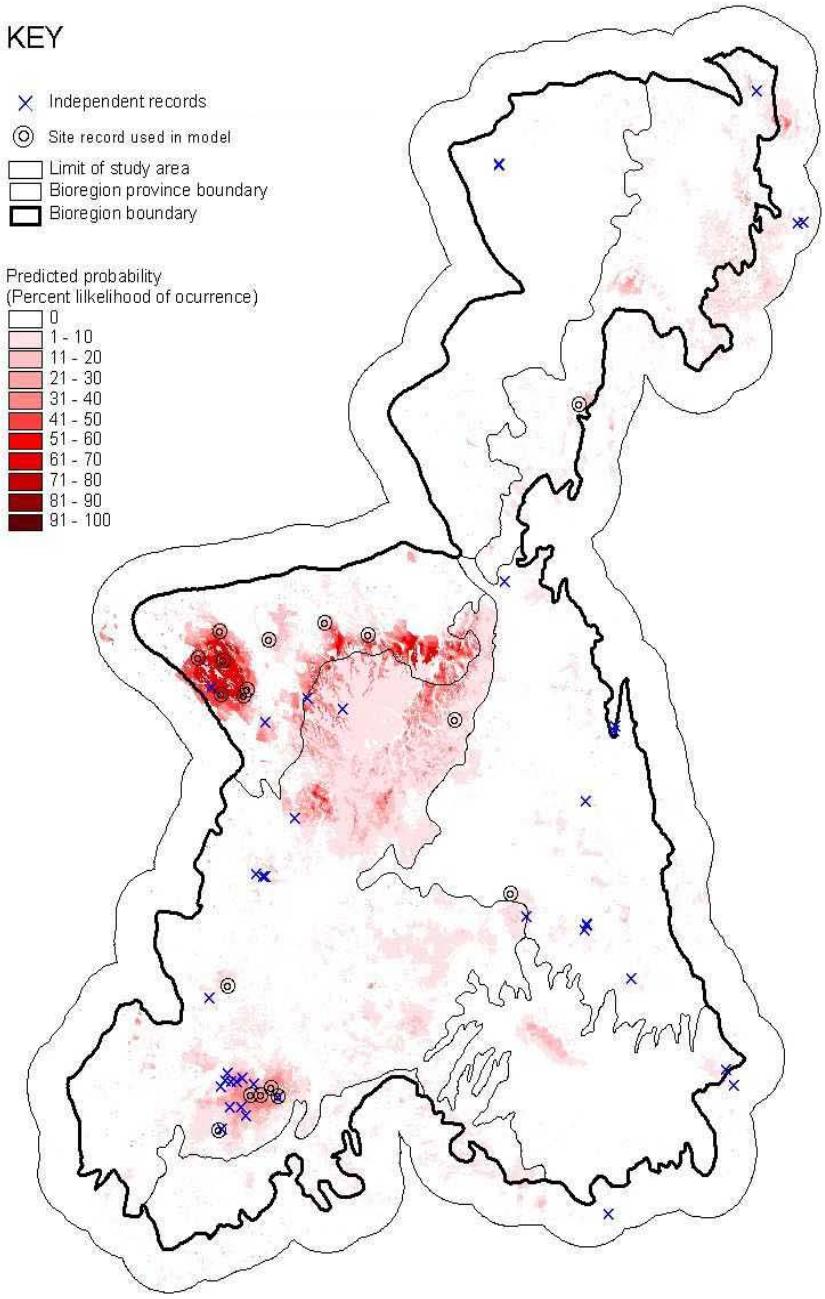
Number of test records = 48
Mean predicted value = 10
Standard deviation = 12

Number of records which fall in the upper 50% of predicted values = 4 (8%)
Number of records which fall in the upper 10% of predicted values = 1 (2%)

Statistical outputs



Predicted distribution of Red-capped Robin in the Brigalow Belt South



Crested shrike-tit *Falcunculus frontatus*

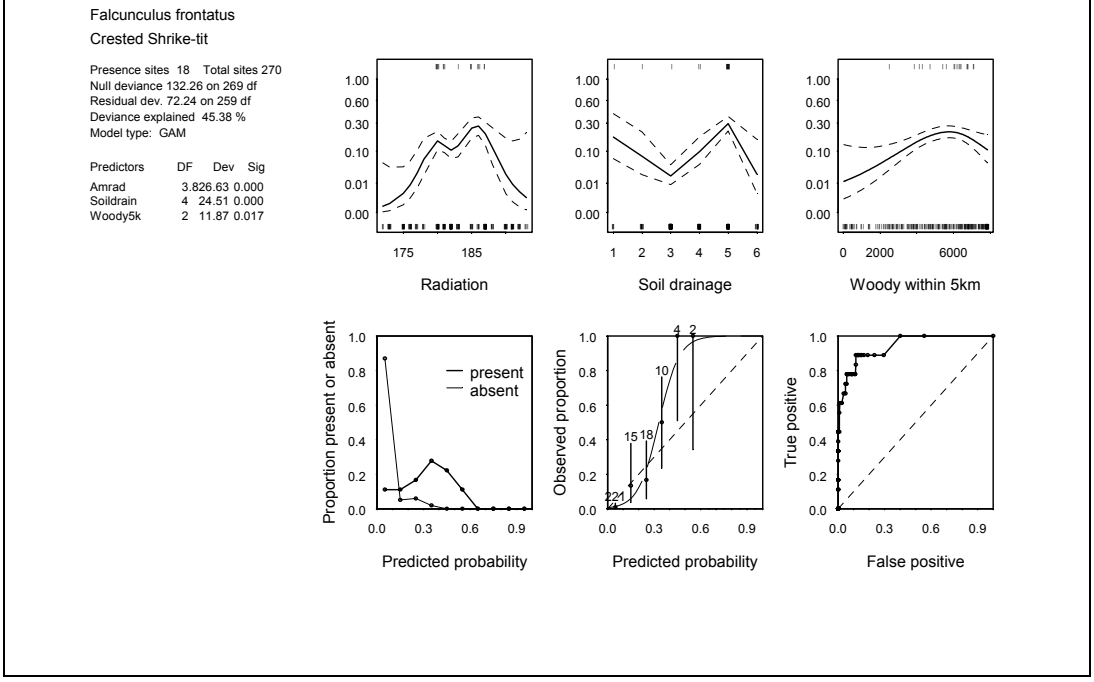
Maximum predicted value (likelihood) = 57%

Test of model with independent records

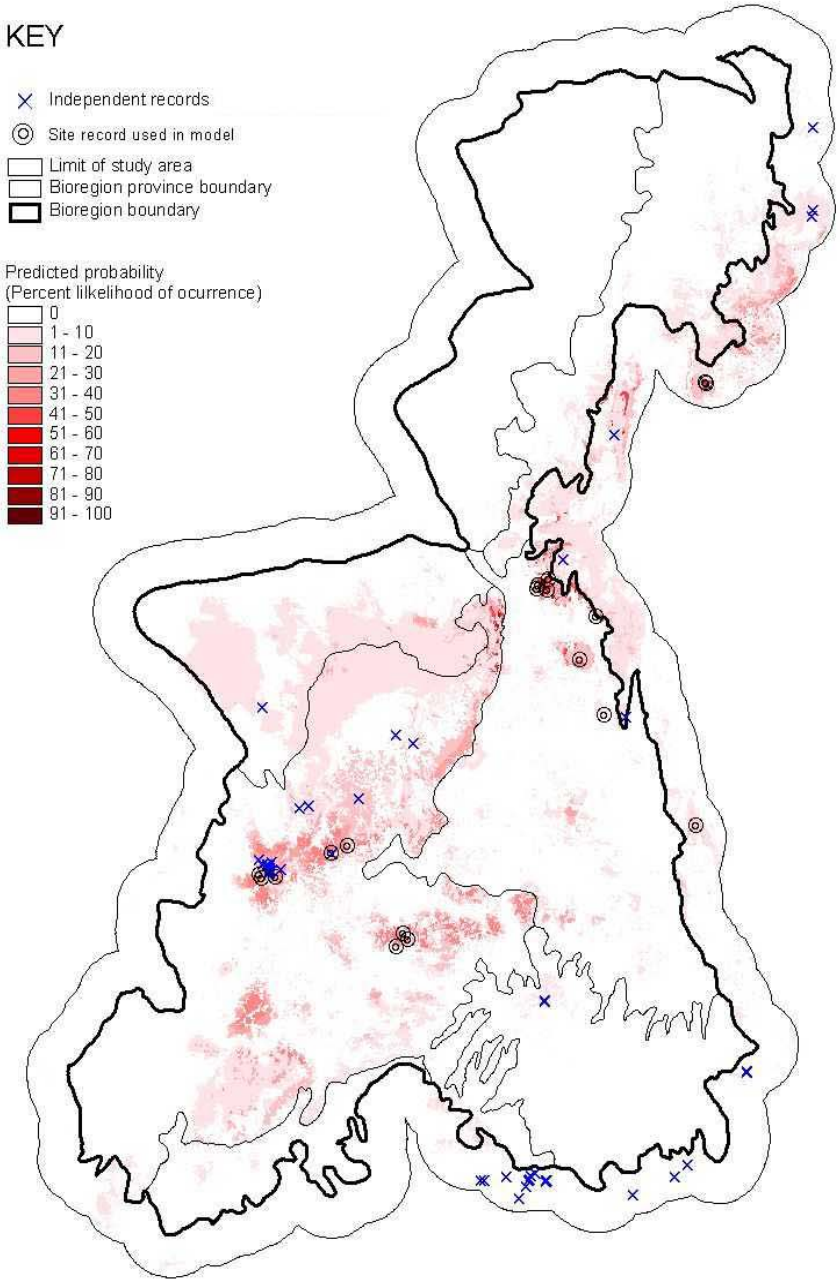
Number of test records = 57
Mean predicted value = 7
Standard deviation = 9

Number of records which fall in the upper 50% of predicted values = 2 (4%)
Number of records which fall in the upper 10% of predicted values = 0

Statistical outputs



Predicted distribution of Crested Shrike-tit in the Brigalow Belt South



Grey-crowned babbler *Pomatostomus temporalis*

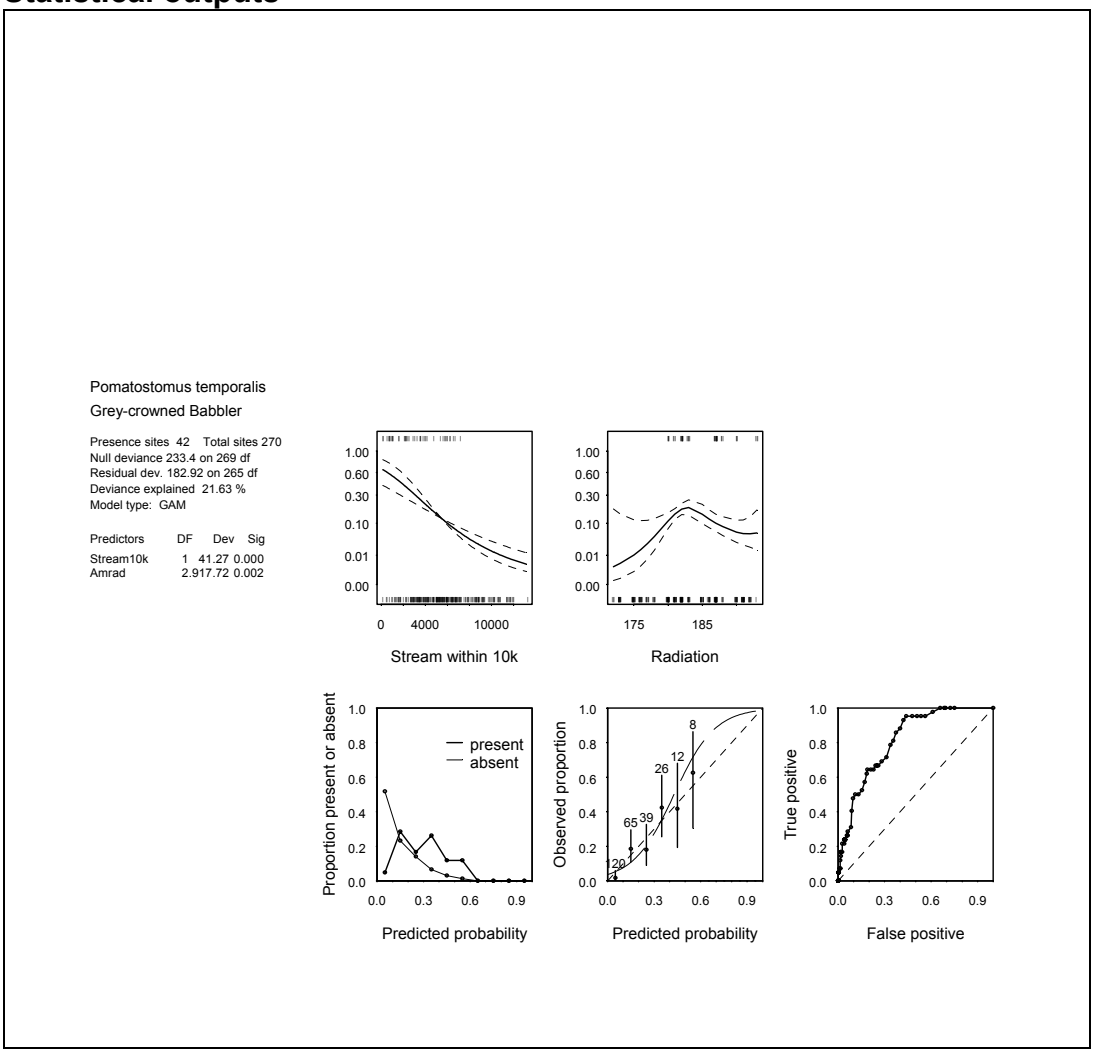
Maximum predicted value (likelihood) = 73%

Test of model with independent records

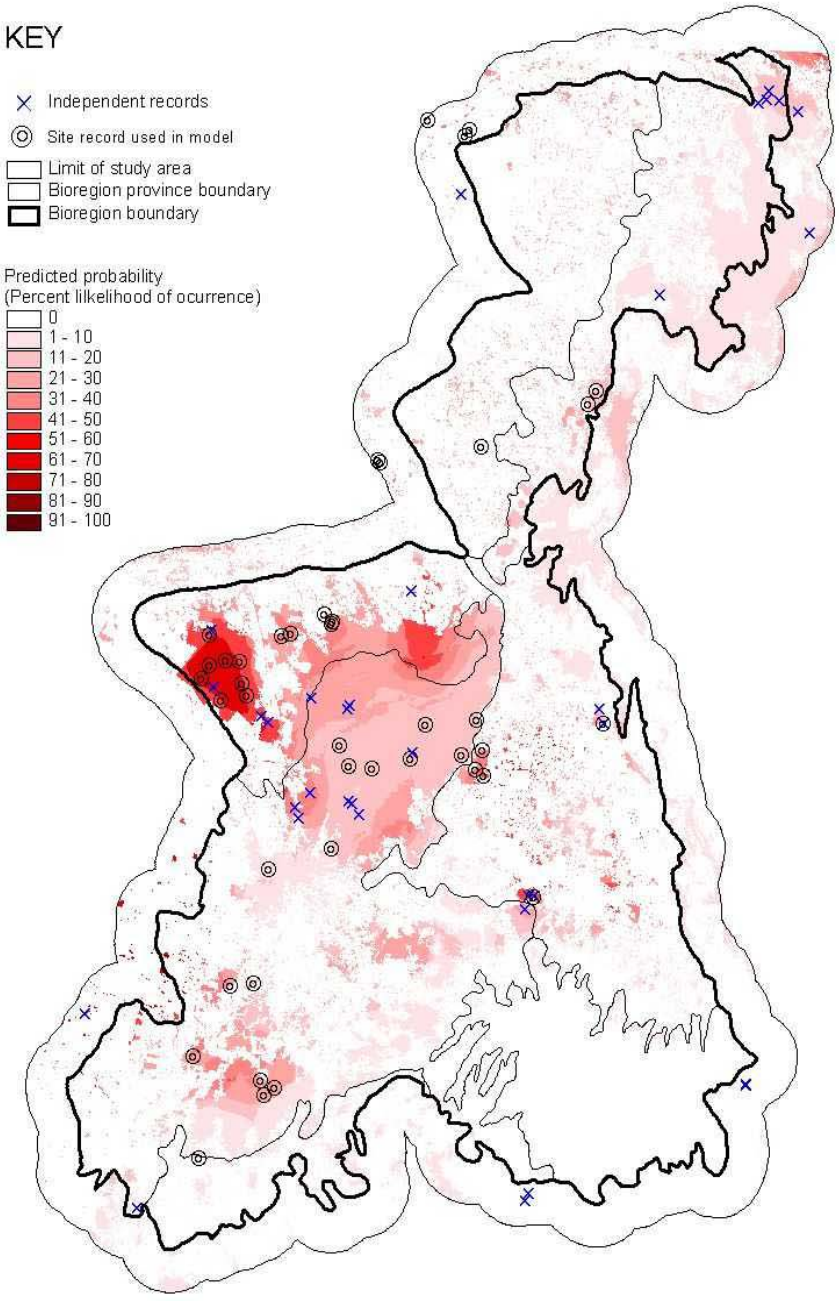
Number of test records = 44
Mean predicted value = 24
Standard deviation = 18

Number of records which fall in the upper 50% of predicted values = 13 (23%)
Number of records which fall in the upper 10% of predicted values = 1 (2%)

Statistical outputs



Predicted distribution of Grey-crowned Babbler in the Brigalow Belt South



White-browed babbler *Pomatostomus superciliosus*

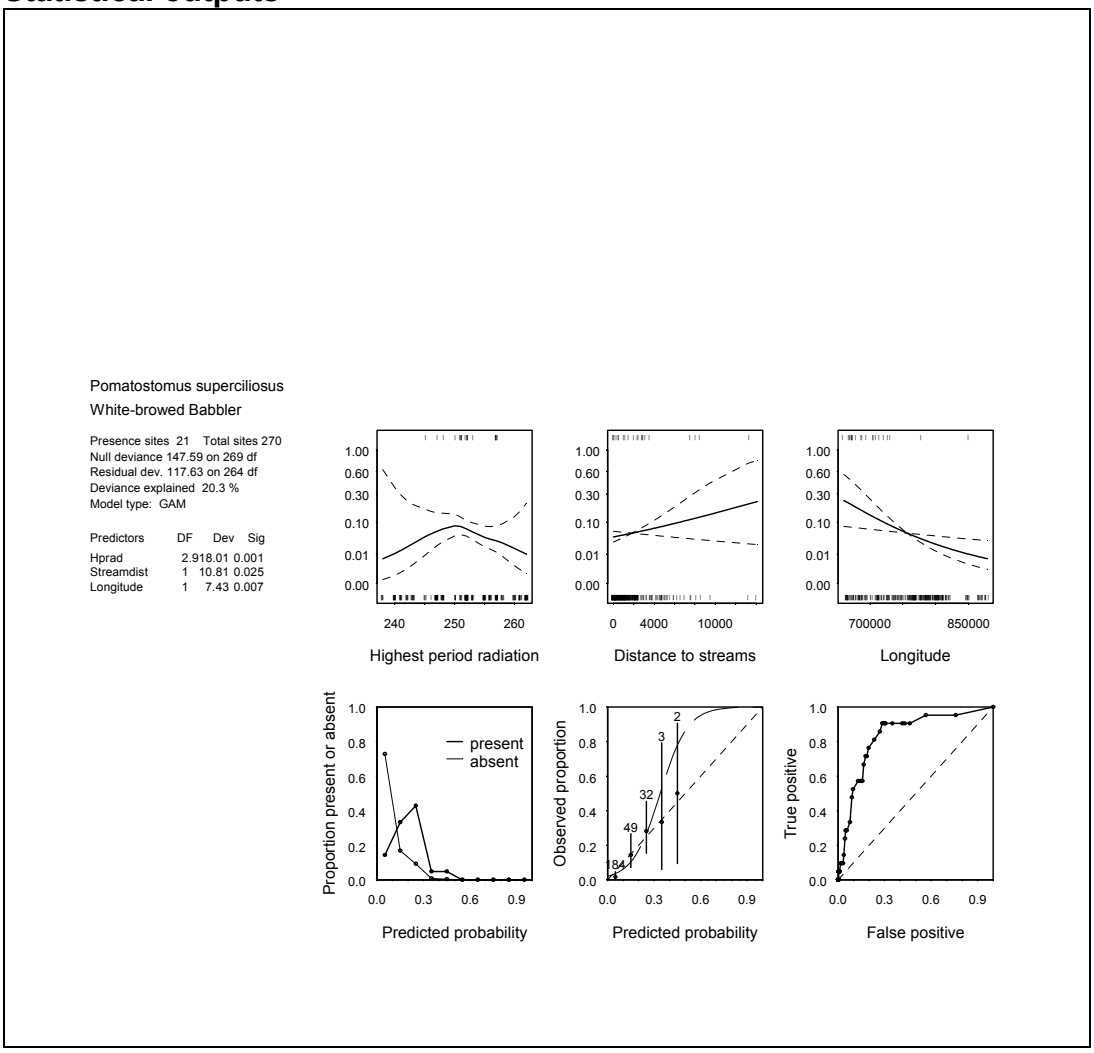
Maximum predicted value (likelihood) = 60%

Test of model with independent records

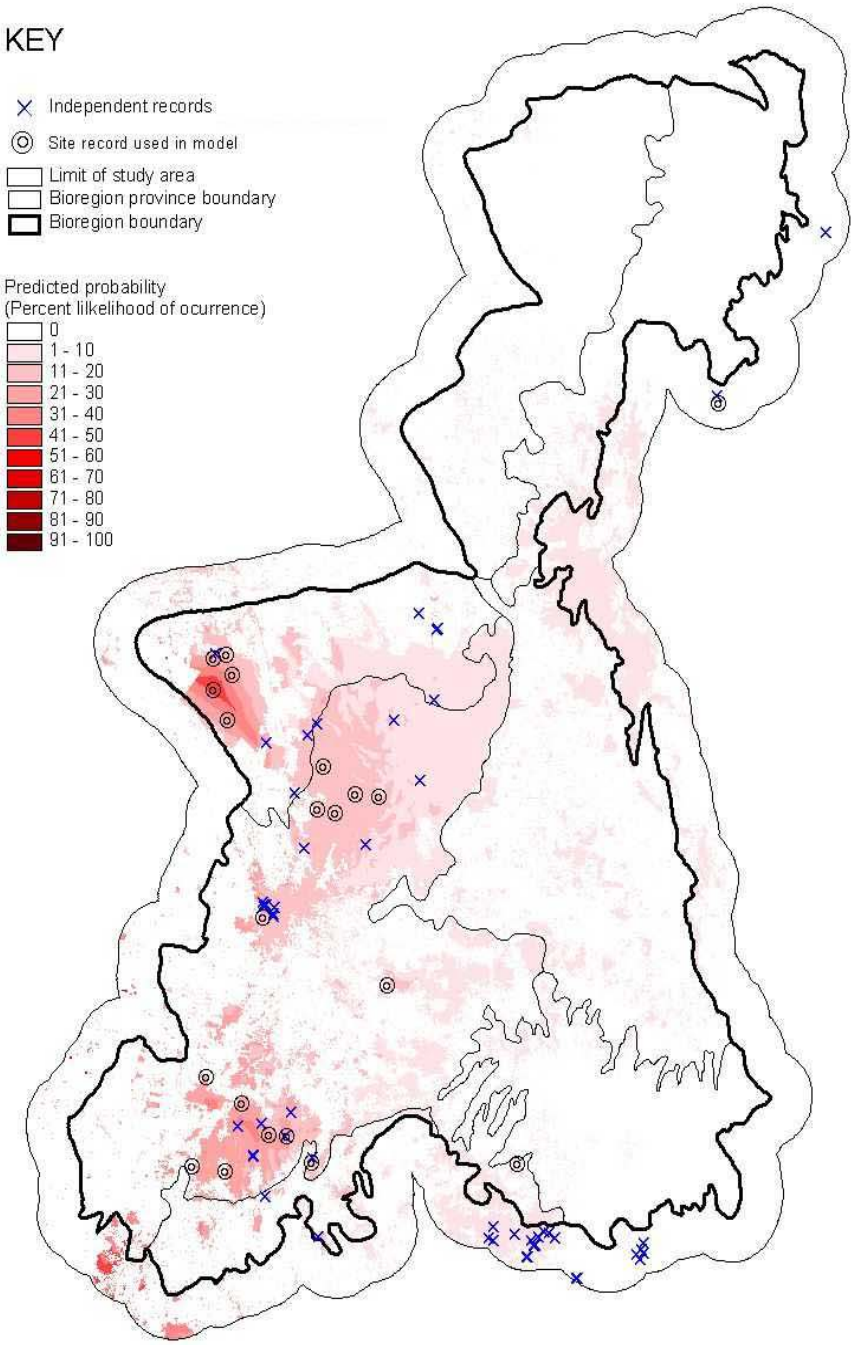
Number of test records = 70
Mean predicted value = 11
Standard deviation = 9

Number of records which fall in the upper 50% of predicted values = 0
Number of records which fall in the upper 10% of predicted values = 0

Statistical outputs



Predicted distribution of White-browed Babbler in the Brigalow Belt South



Chestnut-rumped thornbill *Acanthiza uropygialis*

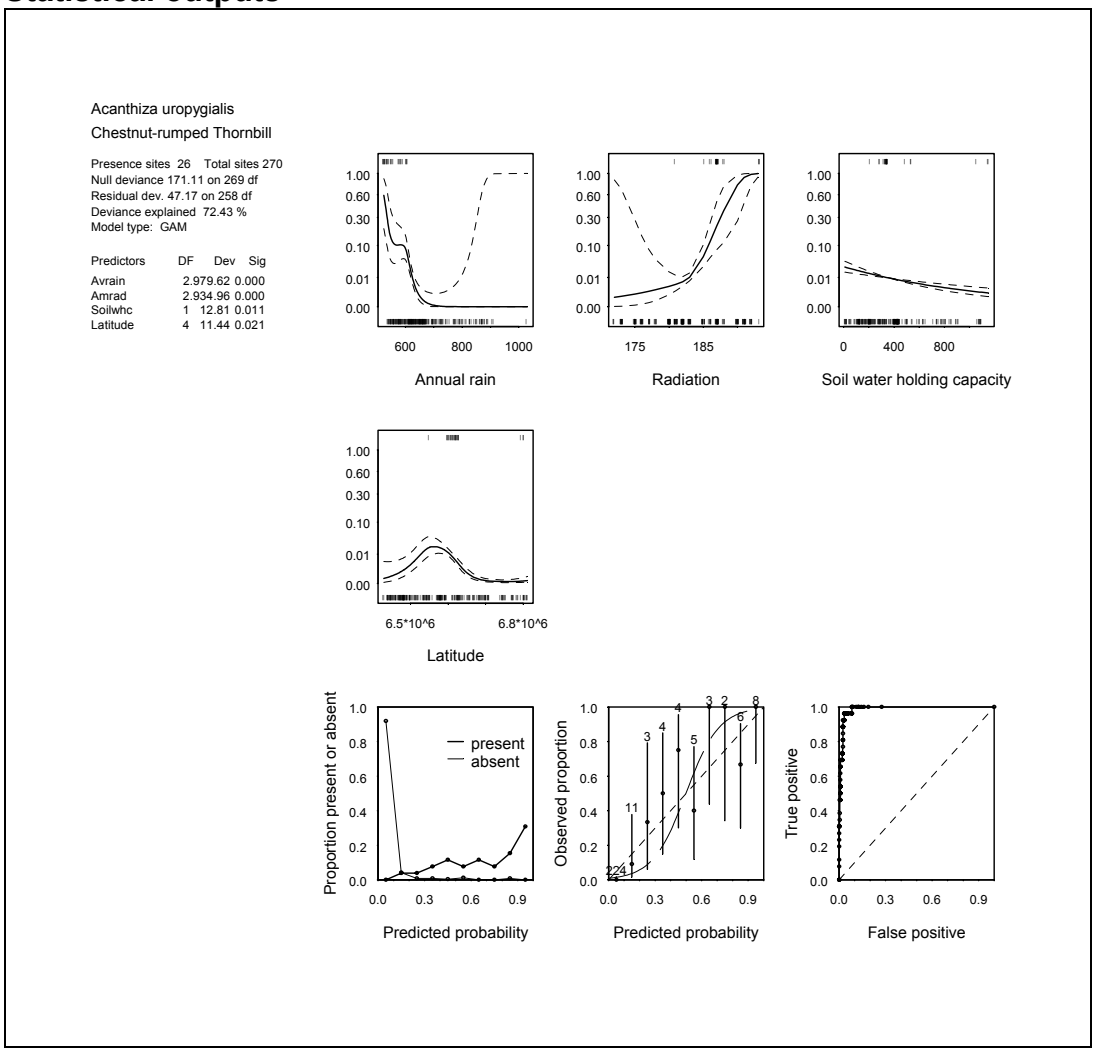
Maximum predicted value (likelihood) = 99%

Test of model with independent records

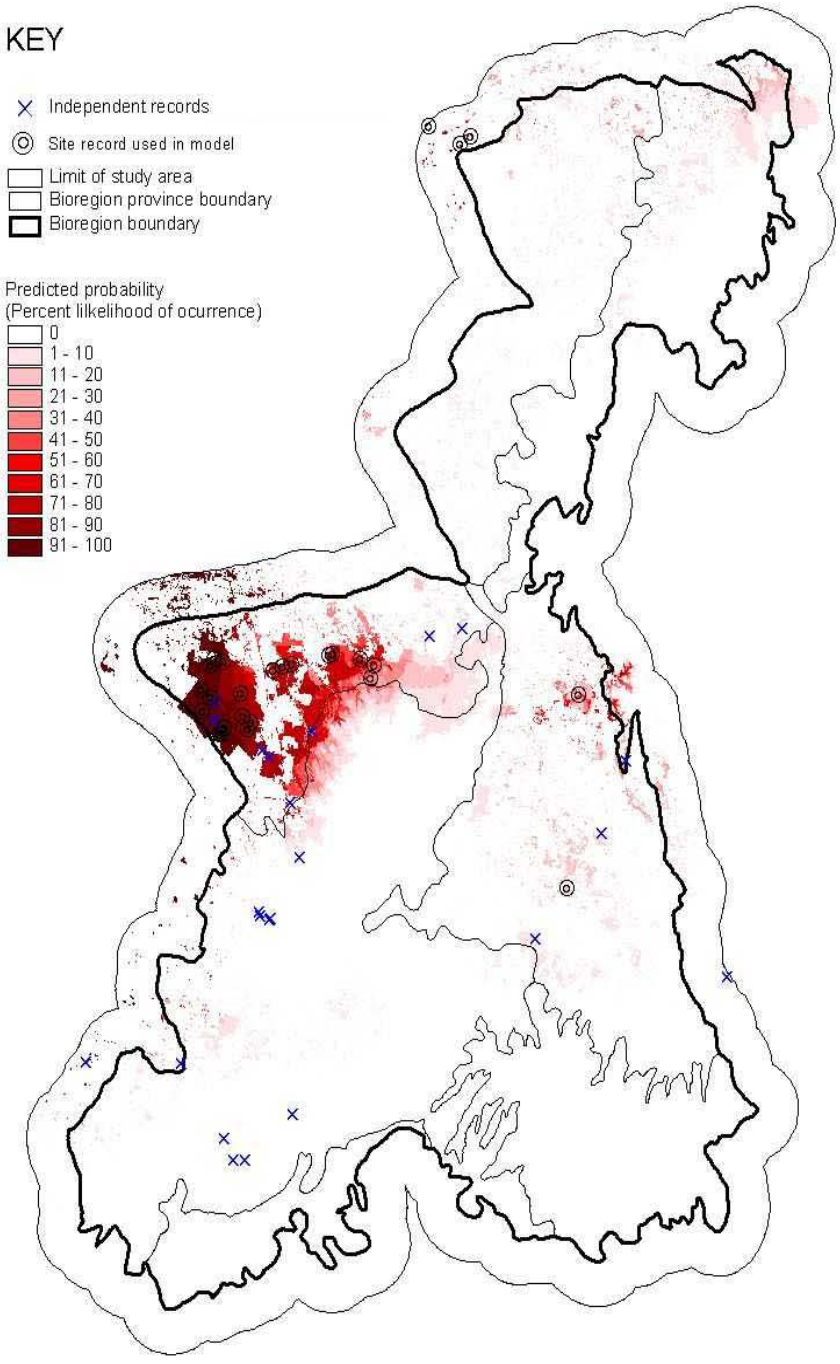
Number of test records = 31
Mean predicted value = 28
Standard deviation = 36

Number of records which fall in the upper 50% of predicted values = 10 (32%)
Number of records which fall in the upper 10% of predicted values = 3 (10%)

Statistical outputs



Predicted distribution of Chestnut-rumped Thornbill in the Brigalow Belt South



Chestnut-rumped heathwren *Hylacola pyrrhopygia*

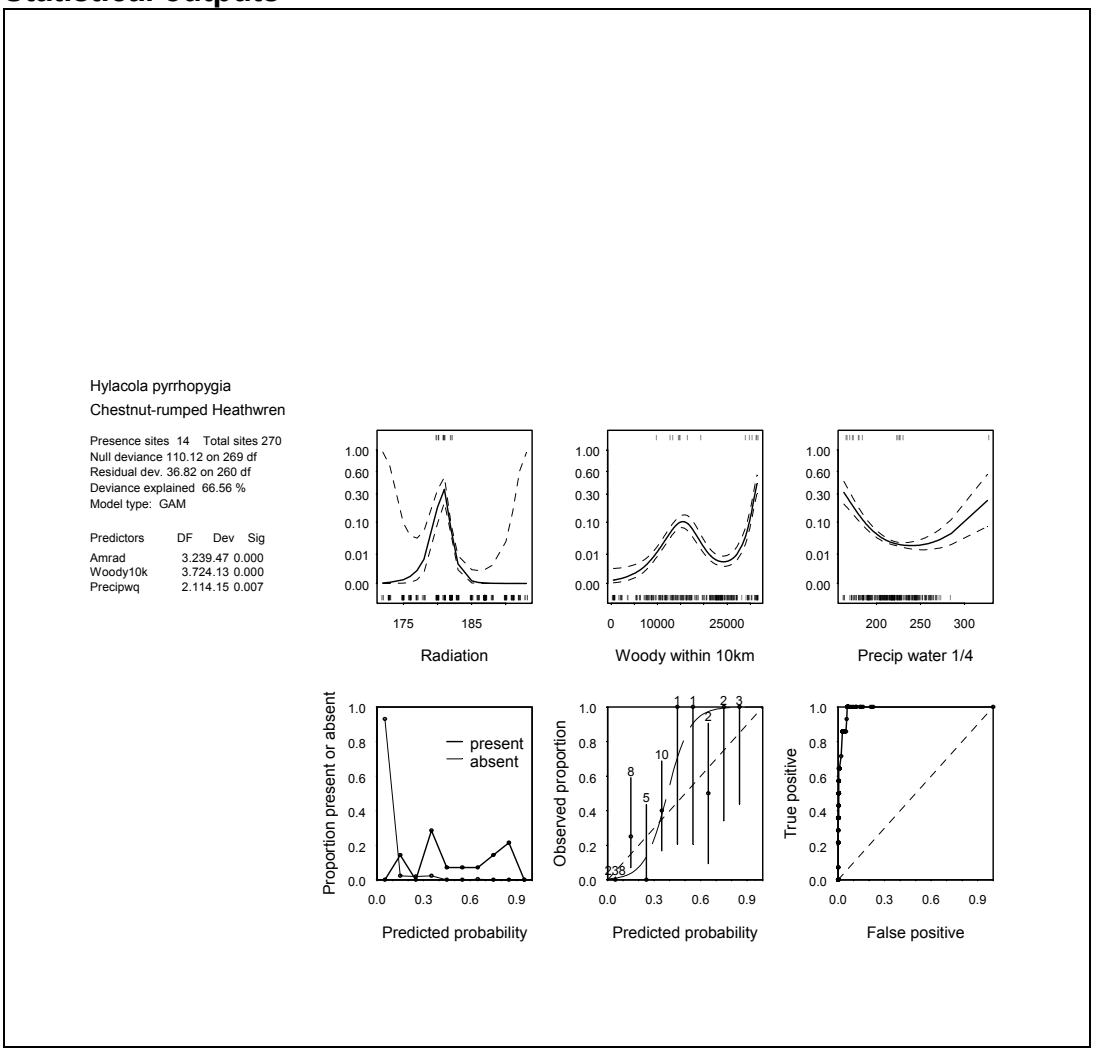
Maximum predicted value (likelihood) = 99%

Test of model with independent records

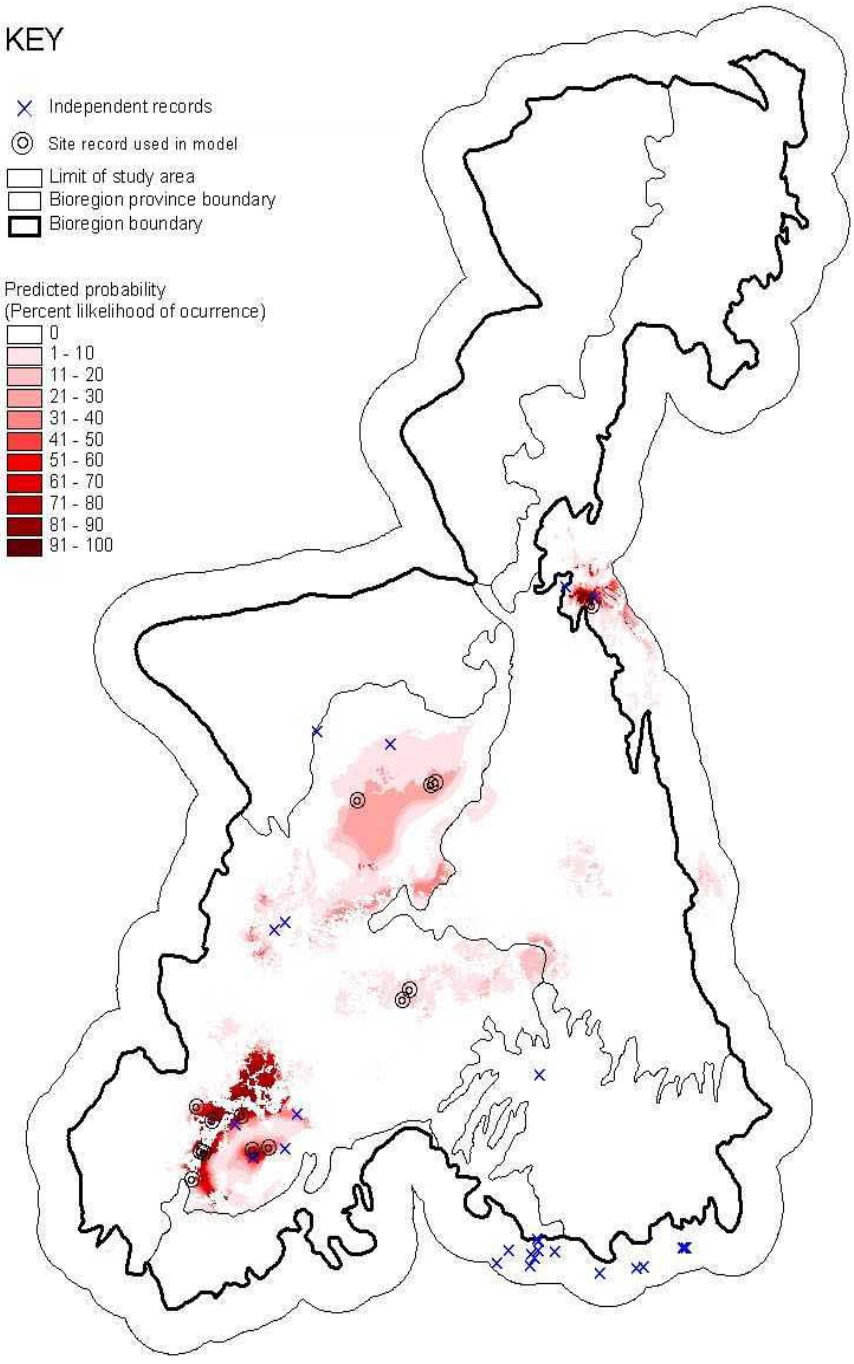
Number of test records = 27
Mean predicted value = 27
Standard deviation = 14

Number of records which fall in the upper 50% of predicted values = 0
Number of records which fall in the upper 10% of predicted values = 0

Statistical outputs



Predicted distribution of Chestnut-rumped Heathwren in the Brigalow Belt South



Speckled warbler *Chthonicola sagittata*

Maximum predicted value (likelihood) = 91%

Test of model with independent records

Number of test records = 177
Mean predicted value = 34
Standard deviation = 13

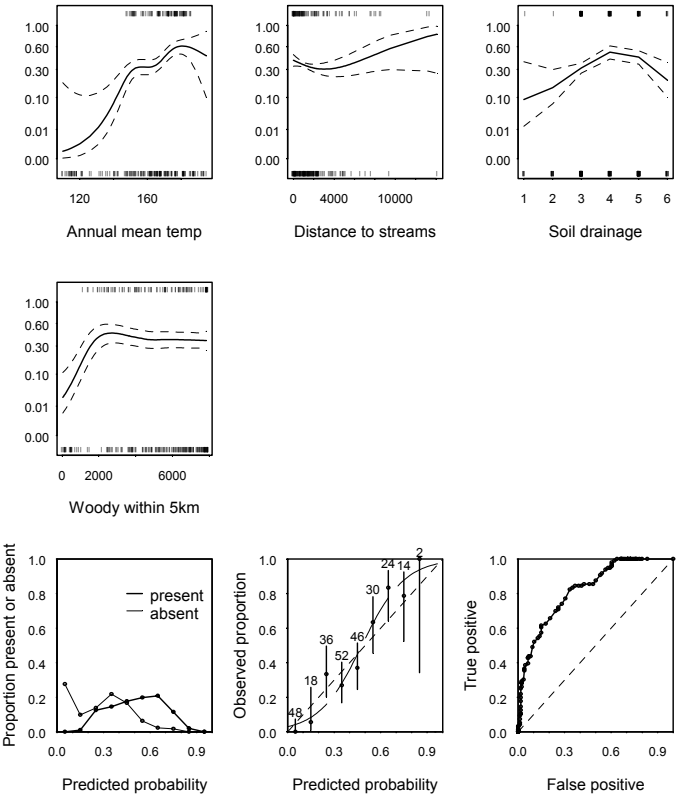
Number of records which fall in the upper 50% of predicted values = 45 (25%)
Number of records which fall in the upper 10% of predicted values = 0

Statistical outputs

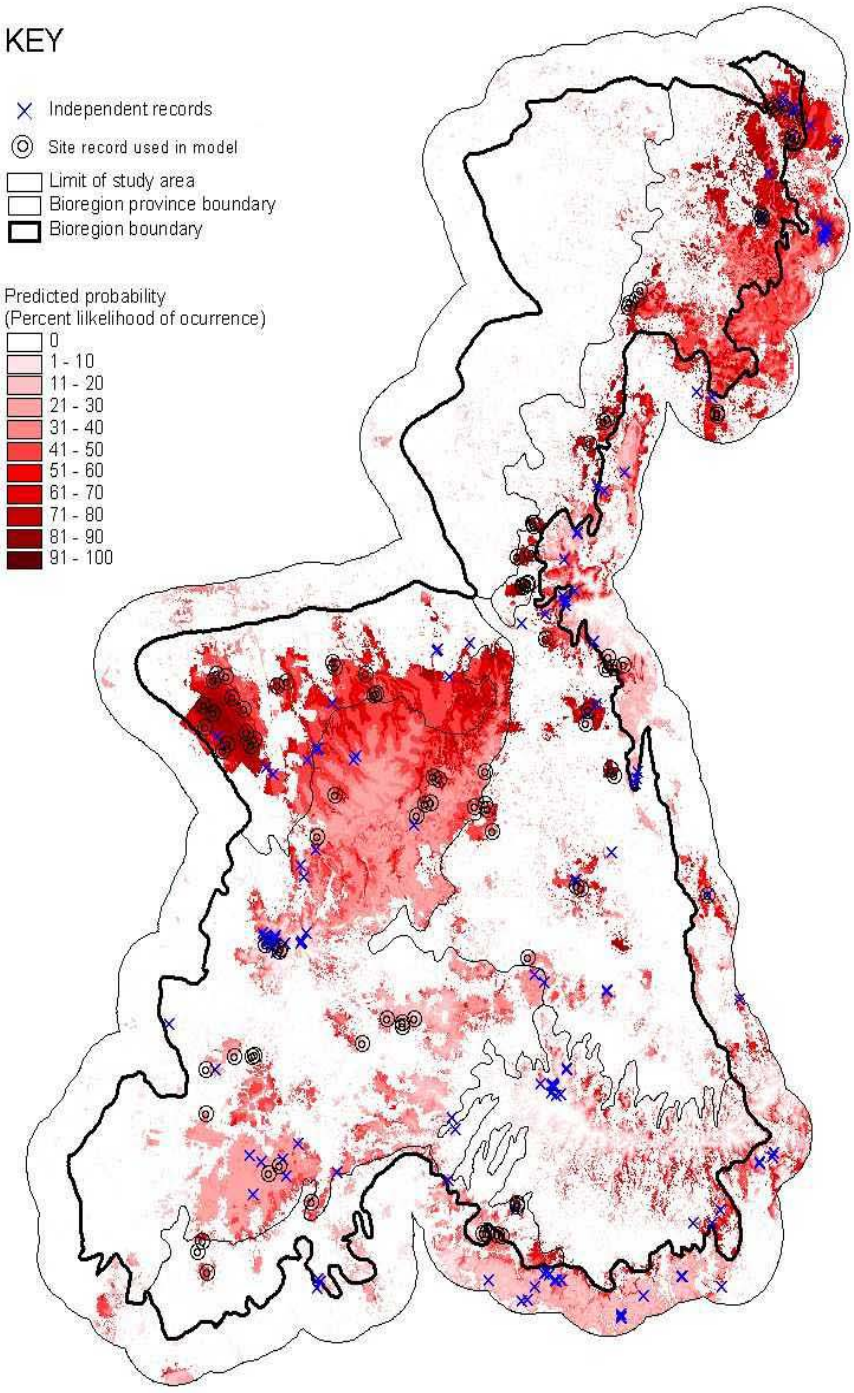
Chthonicola sagittata
Speckled Warbler

Presence sites 96 Total sites 270
Null deviance 351.44 on 269 df
Residual dev. 261.41 on 256 df
Deviance explained 25.62 %
Model type: GAM

Predictors	DF	Dev	Sig
Avtemp	3.85	9.52	0.000
Streamdist	2	9.49	0.048
Soildrain	2.91	1.08	0.028
Woody5k	3.9	9.82	0.041



Predicted distribution of Speckled Warbler in the Brigalow Belt South



Brown treecreeper *Climacteris picumnus*

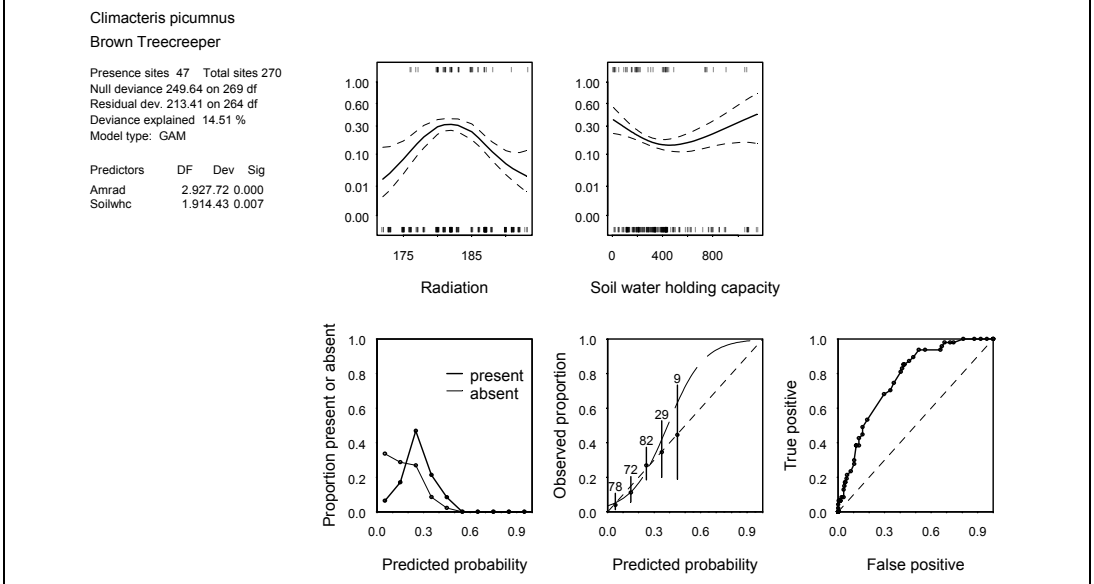
Maximum predicted value (likelihood) = 67%

Test of model with independent records

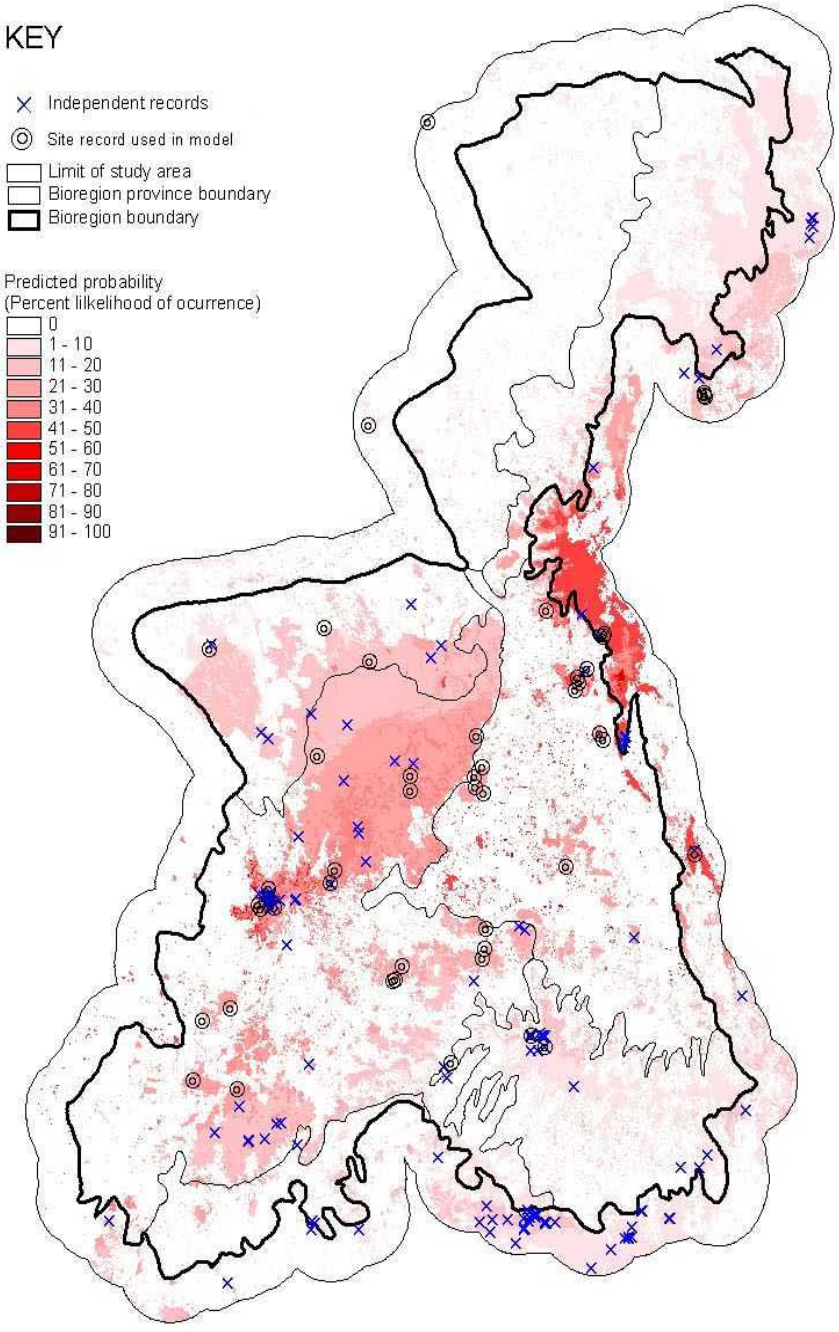
Number of test records = 186
Mean predicted value = 18
Standard deviation = 13

Number of records which fall in the upper 50% of predicted values = 26 (14%)
Number of records which fall in the upper 10% of predicted values = 0

Statistical outputs



Predicted distribution of Brown Treecreeper in the Brigalow Belt South



Painted Honeyeater *Grantiella picta*

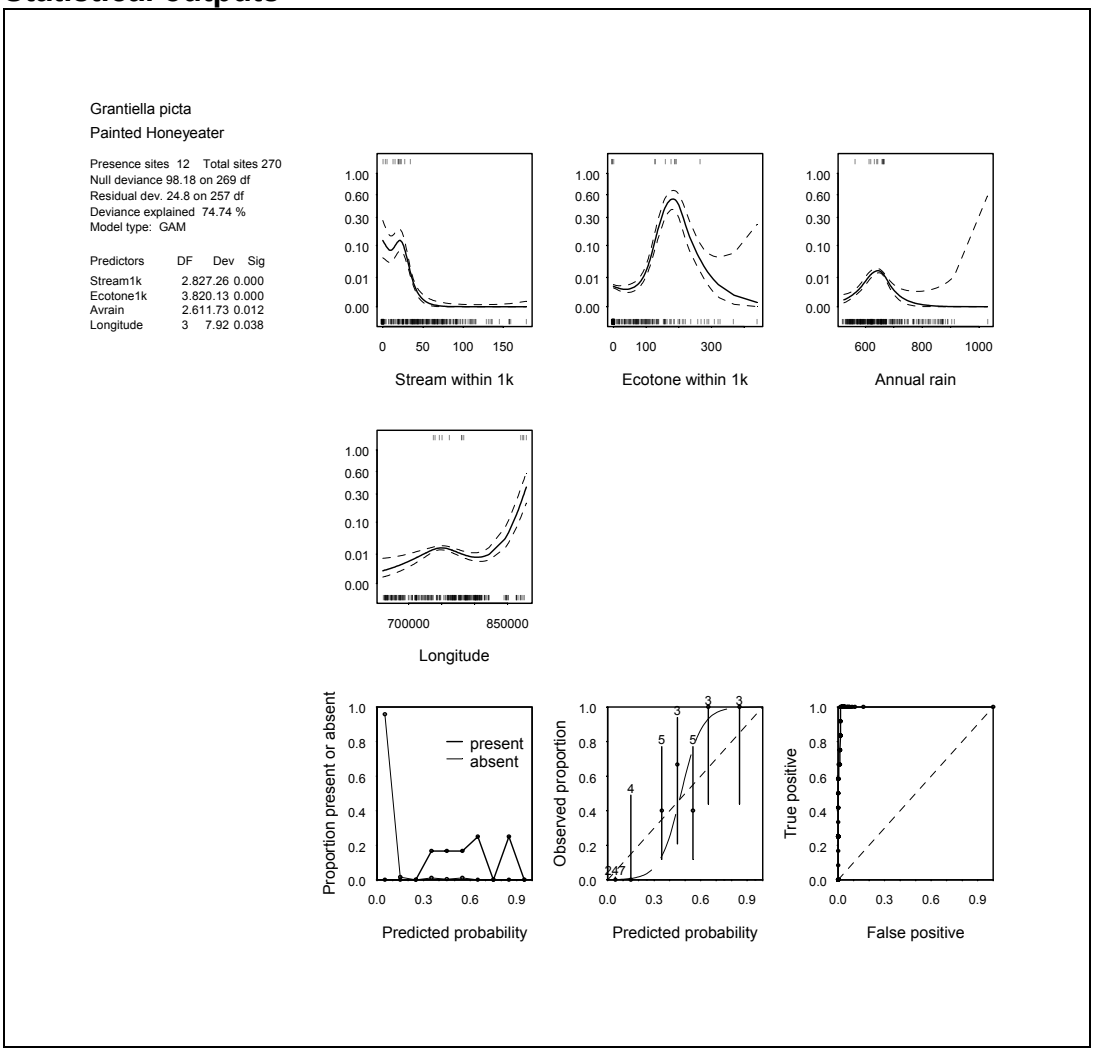
Maximum predicted value (likelihood) = 99%

Test of model with independent records

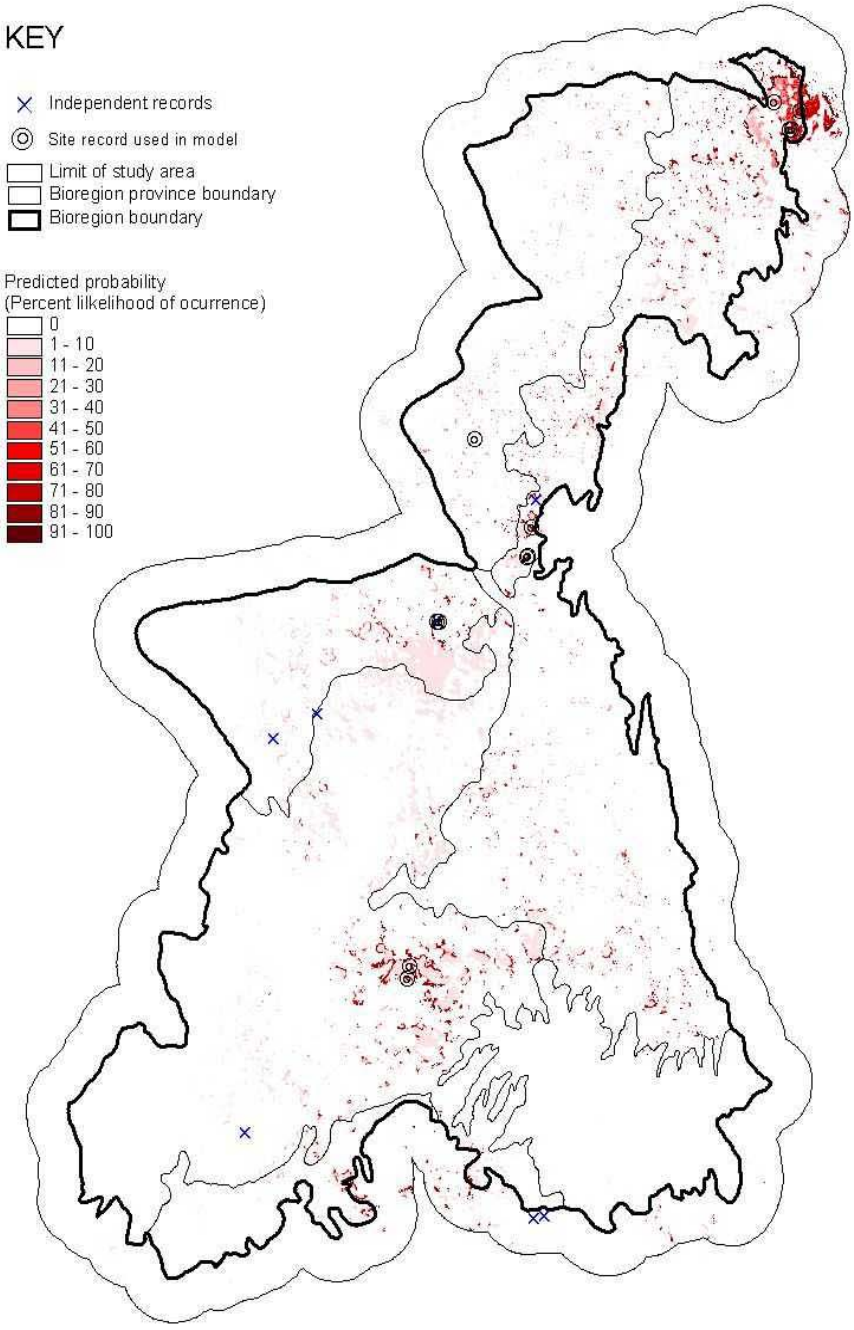
Number of test records = 8
Mean predicted value = 5
Standard deviation = 13

Number of records which fall in the upper 50% of predicted values = 0
Number of records which fall in the upper 10% of predicted values = 0

Statistical outputs



Predicted distribution of Painted Honeyeater in the Brigalow Belt South



1.3.5 Nocturnal birds

Barking Owl *Ninox connivens*

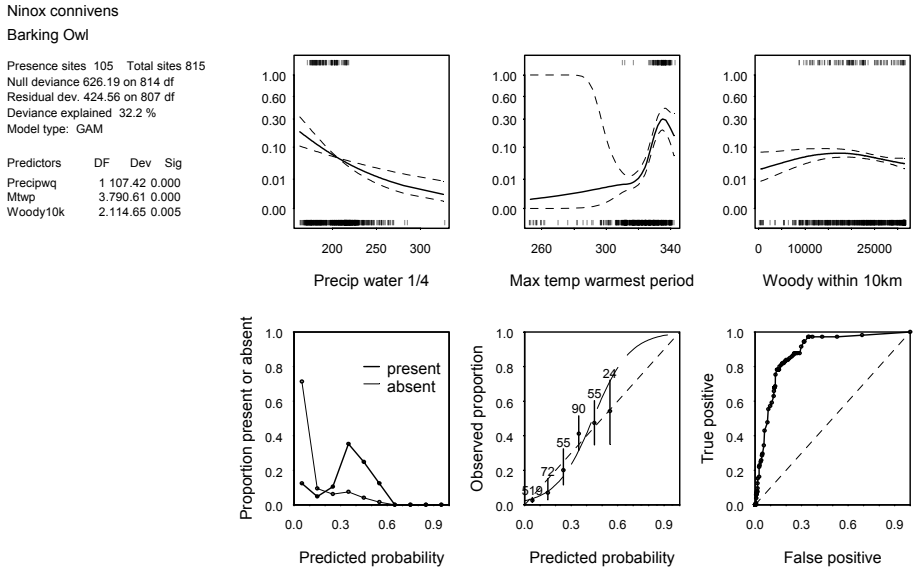
Maximum predicted value (likelihood) = 61%

Test of model with independent records

Number of test records = 27
Mean predicted value = 6
Standard deviation = 14

Number of records which fall in the upper 50% of predicted values = 2 (7%)
Number of records which fall in the upper 10% of predicted values = 1 (4%)

Statistical outputs



Predicted distribution of Barking Owl in the Brigalow Belt South