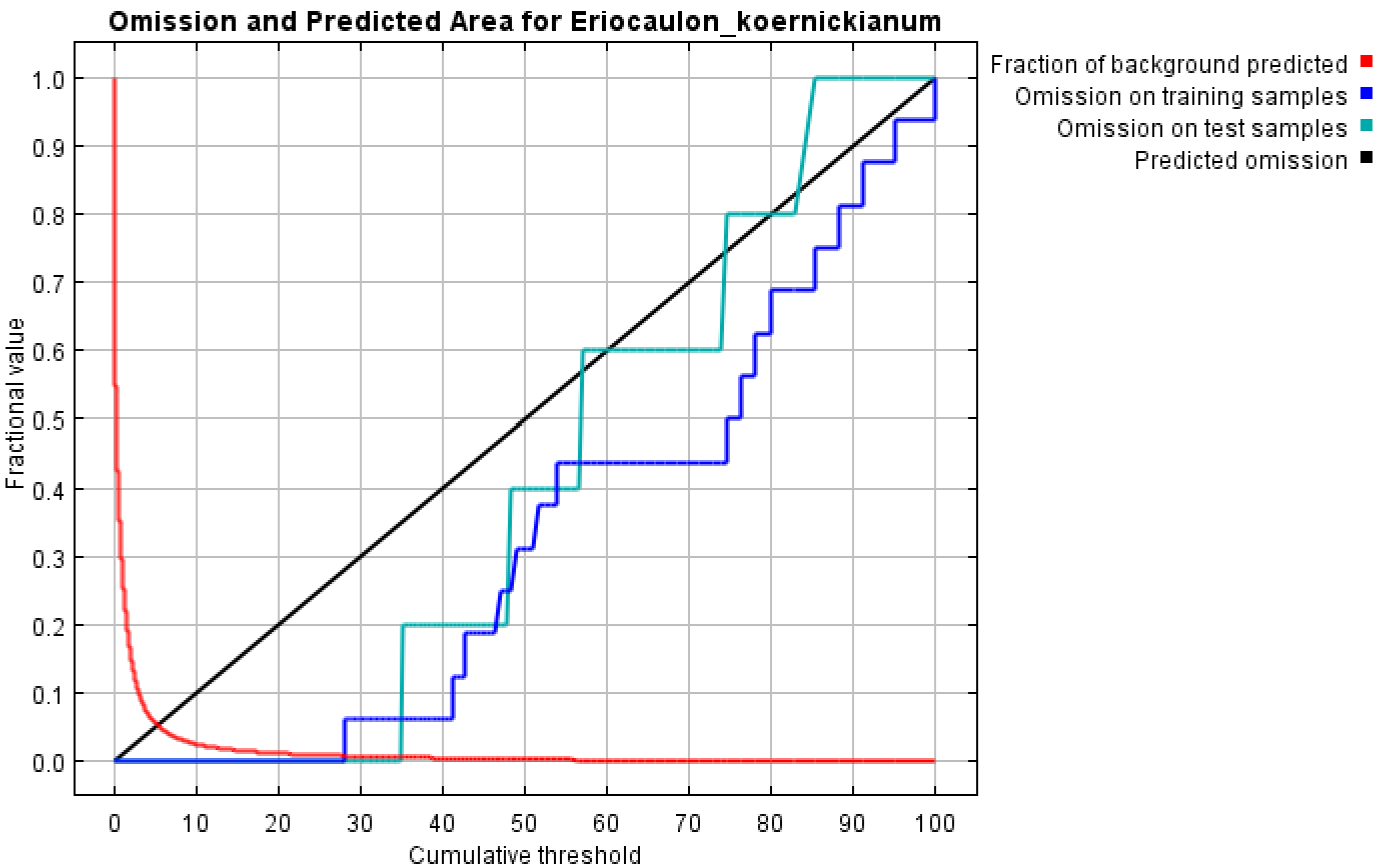
Maxent model for Eriocaulon_koernickianum

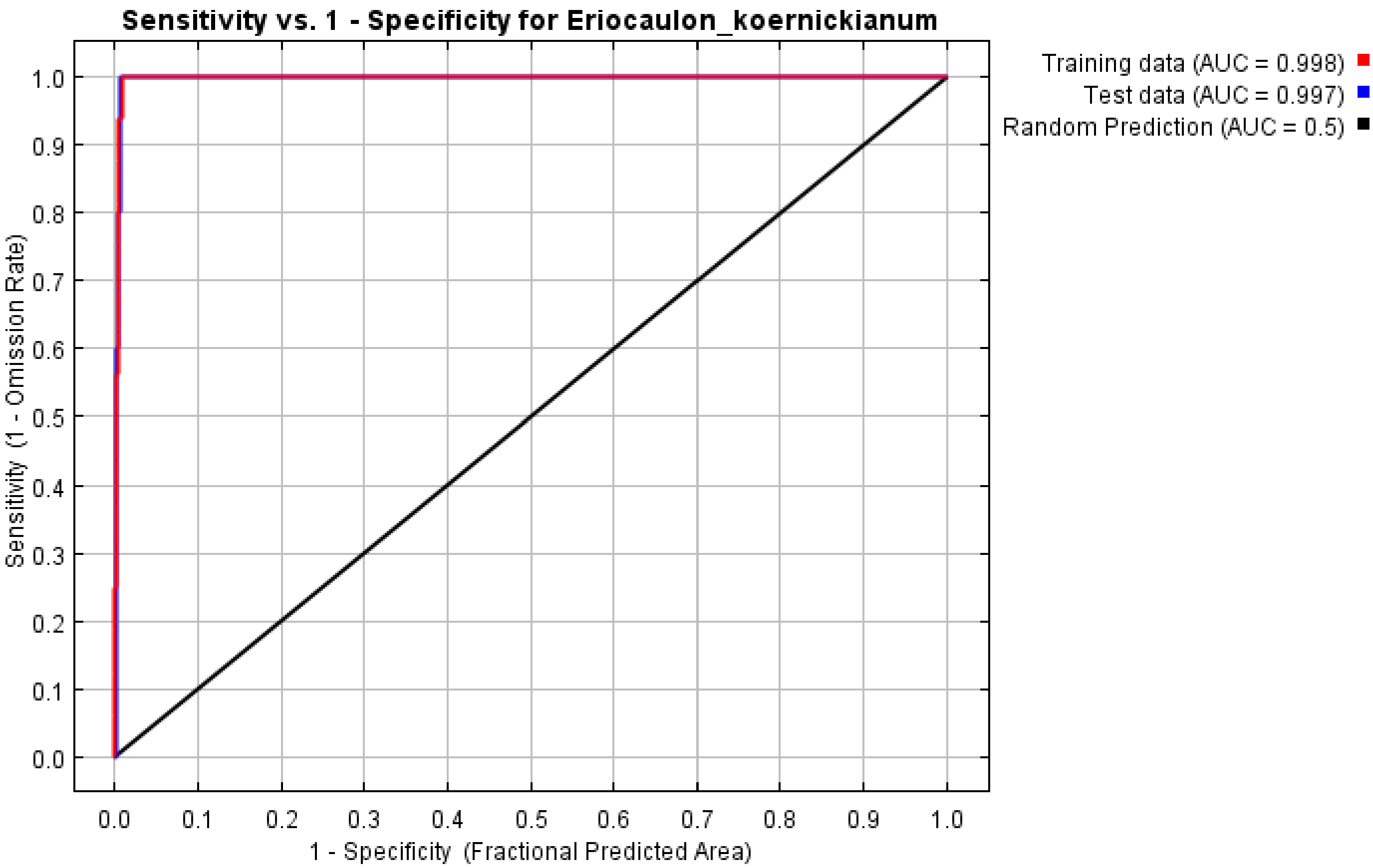
This page contains some analysis of the Maxent model for Eriocaulon_koernickianum, created Tue Feb 23 13:52:34 EST 2021 using Maxent version 3.4.1. If you would like to do further analyses, the raw data used here is linked to at the end of this page.

Analysis of omission/commission

The following picture shows the omission rate and predicted area as a function of the cumulative threshold. The omission rate is is calculated both on the training presence records, and (if test data are used) on the test records. The omission rate should be close to the predicted omission, because of the definition of the cumulative threshold.



The next picture is the receiver operating characteristic (ROC) curve for the same data. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). This implies that the maximum achievable AUC is less than 1. If test data is drawn from the Maxent distribution itself, then the maximum possible test AUC would be 0.978 rather than 1; in practice the test AUC may exceed this bound.



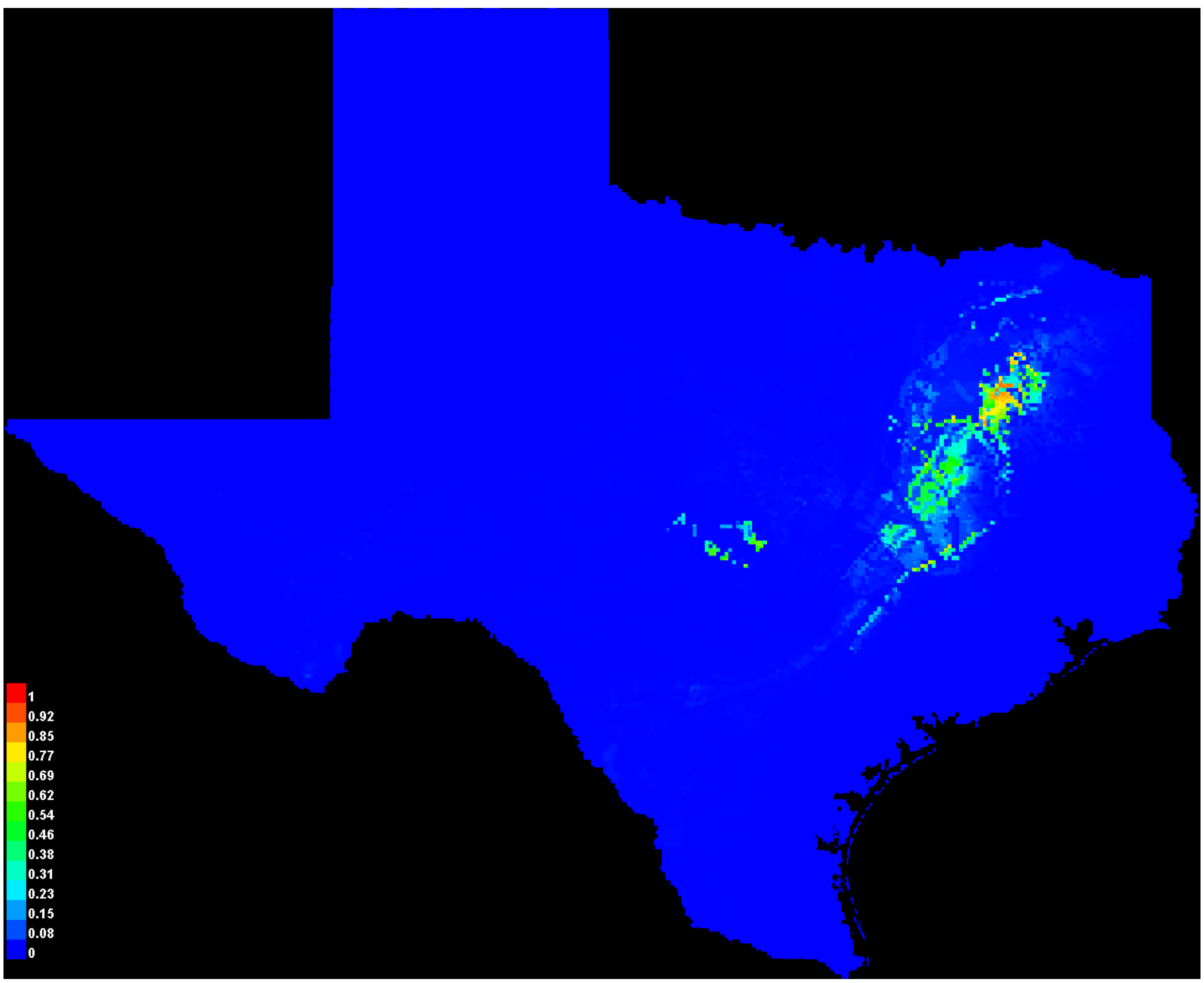
Some common thresholds and corresponding omission rates are as follows. If test data are available, binomial probabilities are calculated exactly if the number of test samples is at most 25, otherwise using a normal approximation to the binomial. These are 1-sided p-values for the null hypothesis that test points are predicted no better than by a random prediction with the same fractional predicted area. The "Balance" threshold minimizes 6 * training omission rate + .04 * cumulative threshold + 1.6 * fractional predicted area.

Cumulative threshold	Logistic threshold	Description	Fractional predicted area	Training omission rate	Test omission rate	P-value
1.000	0.001	Fixed cumulative value 1	0.269	0.000	0.000	1.421E-3
5.000	0.018	Fixed cumulative value 5	0.056	0.000	0.000	5.271E-7
10.000	0.073	Fixed cumulative value 10	0.026	0.000	0.000	1.091E-8
27.932	0.384	Minimum training presence	0.008	0.000	0.000	4.402E-11
41.177	0.507	10 percentile training presence	0.005	0.062	0.200	3.093E-9
27.932	0.384	Equal training sensitivity and specificity	0.008	0.000	0.000	4.402E-11
27.932	0.384	Maximum training sensitivity plus specificity	0.008	0.000	0.000	4.402E-11

34.995	0.463	Equal test sensitivity and specificity	0.006	0.062	0.000	1.065E-11
34.995	0.463	Maximum test sensitivity plus specificity	0.006	0.062	0.000	1.065E-11
3.684	0.009	Balance training omission, predicted area and threshold value	0.078	0.000	0.000	2.864E-6
11.681	0.103	Equate entropy of thresholded and original distributions	0.022	0.000	0.000	4.884E-9

Pictures of the model

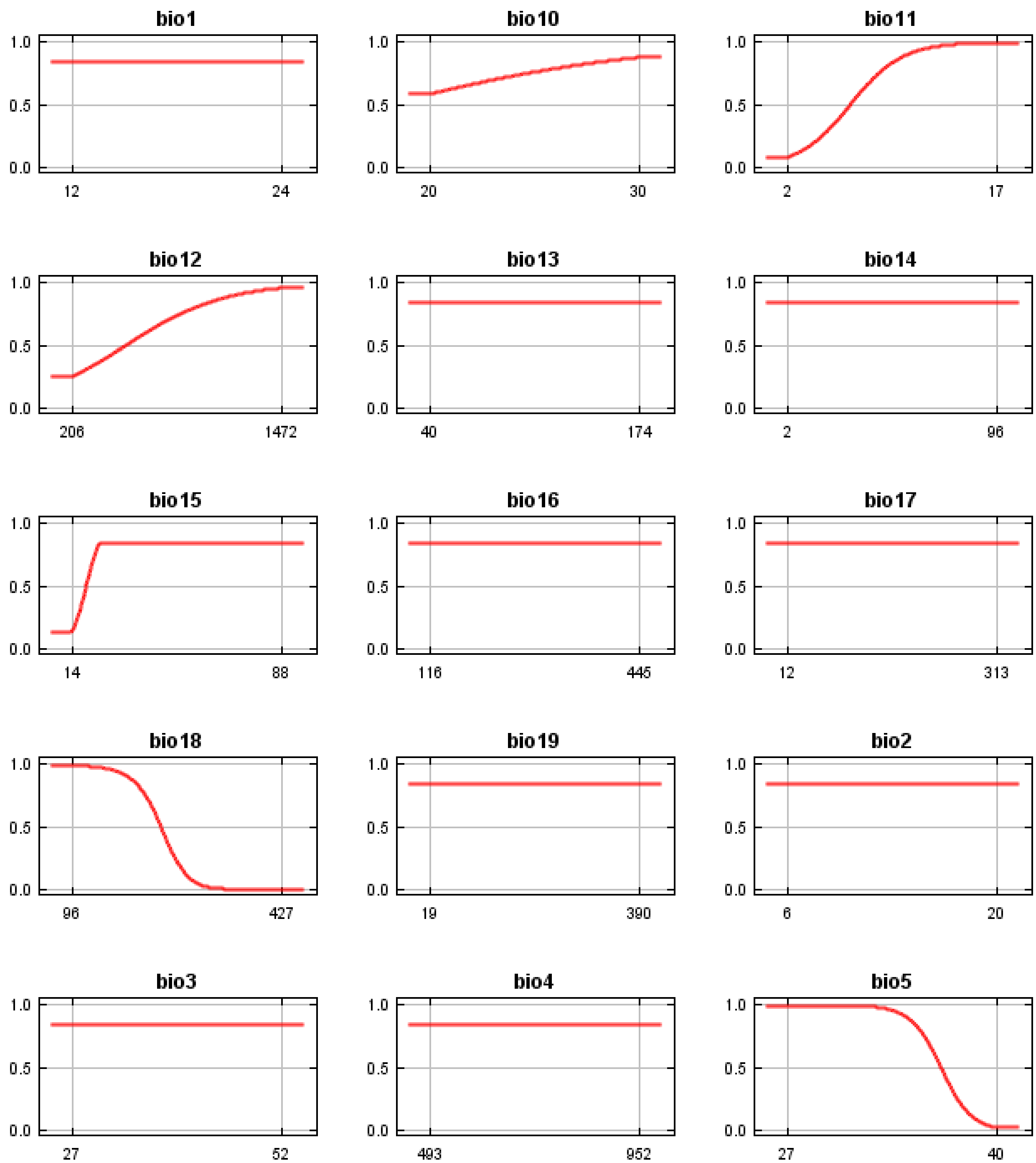
This is a representation of the Maxent model for Eriocaulon_koernickianum. Warmer colors show areas with better predicted conditions. White dots show the presence locations used for training, while violet dots show test locations. Click on the image for a full-size version.



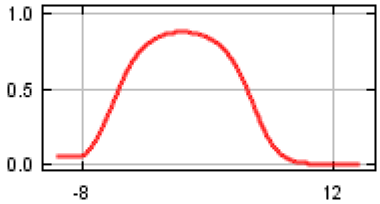
Click here to interactively explore this prediction using the Explain tool. If clicking from your browser does not succeed in starting the tool, try running the script in F:\MaxEnt Output\Eriocaulon_1km\Eriocaulon_koernickianum_explain.bat directly. This tool requires the environmental grids to be small enough that they all fit in memory.

Response curves

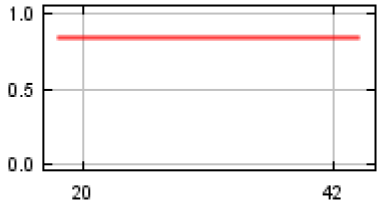
These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together.



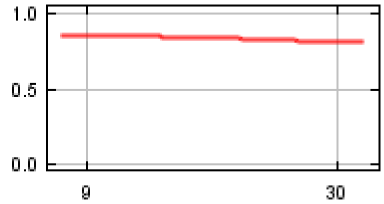
bio6



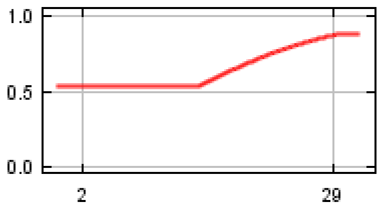
bio7



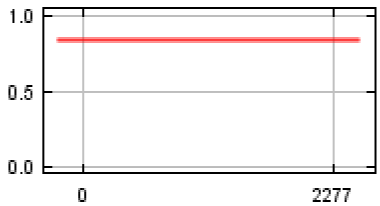
bio8



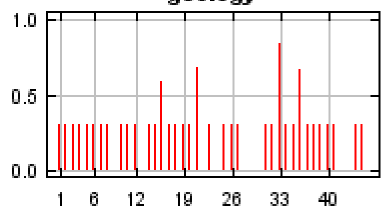
bio9



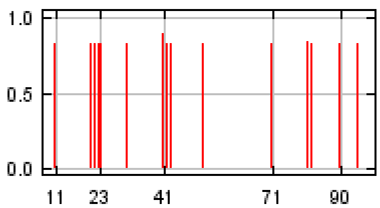
dem



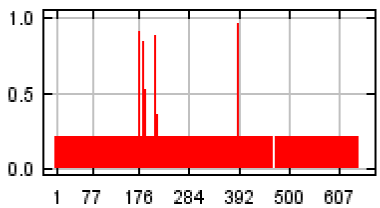
geology



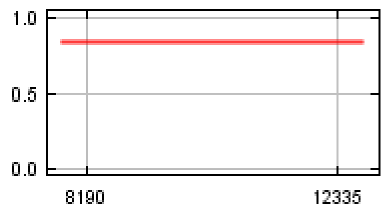
nlcd



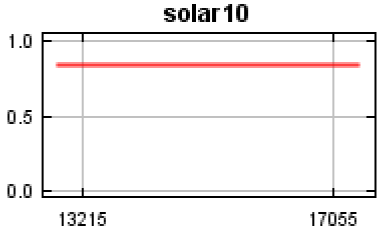
soil



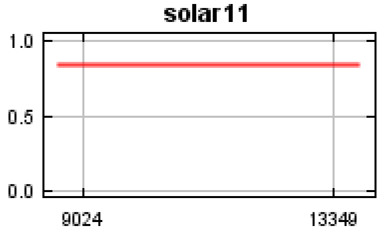
solar1



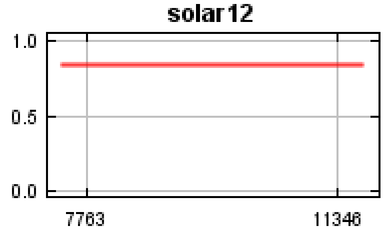
solar10



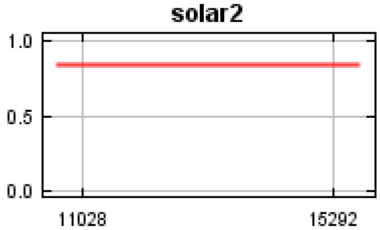
solar11



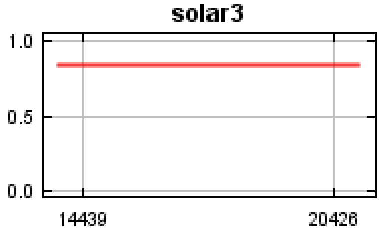
solar12



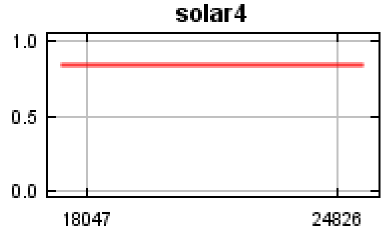
solar2



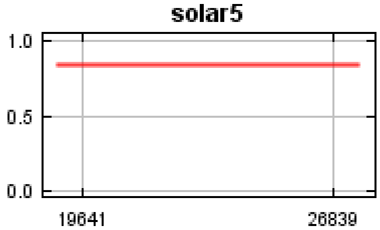
solar3



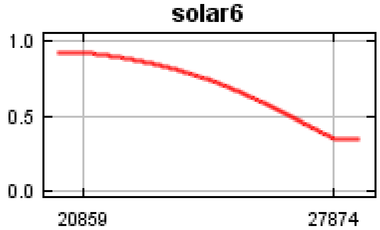
solar4



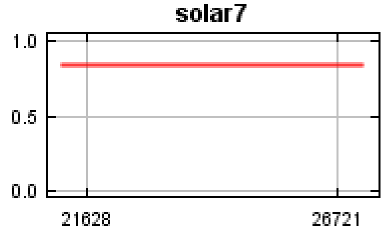
solar5

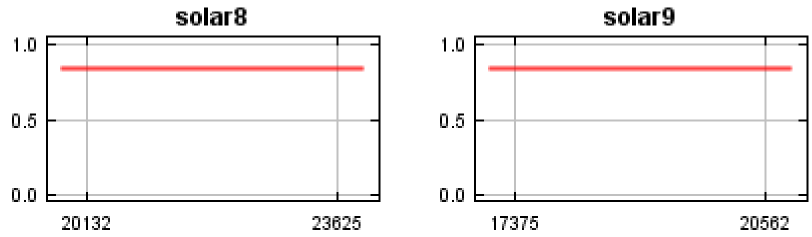


solar6

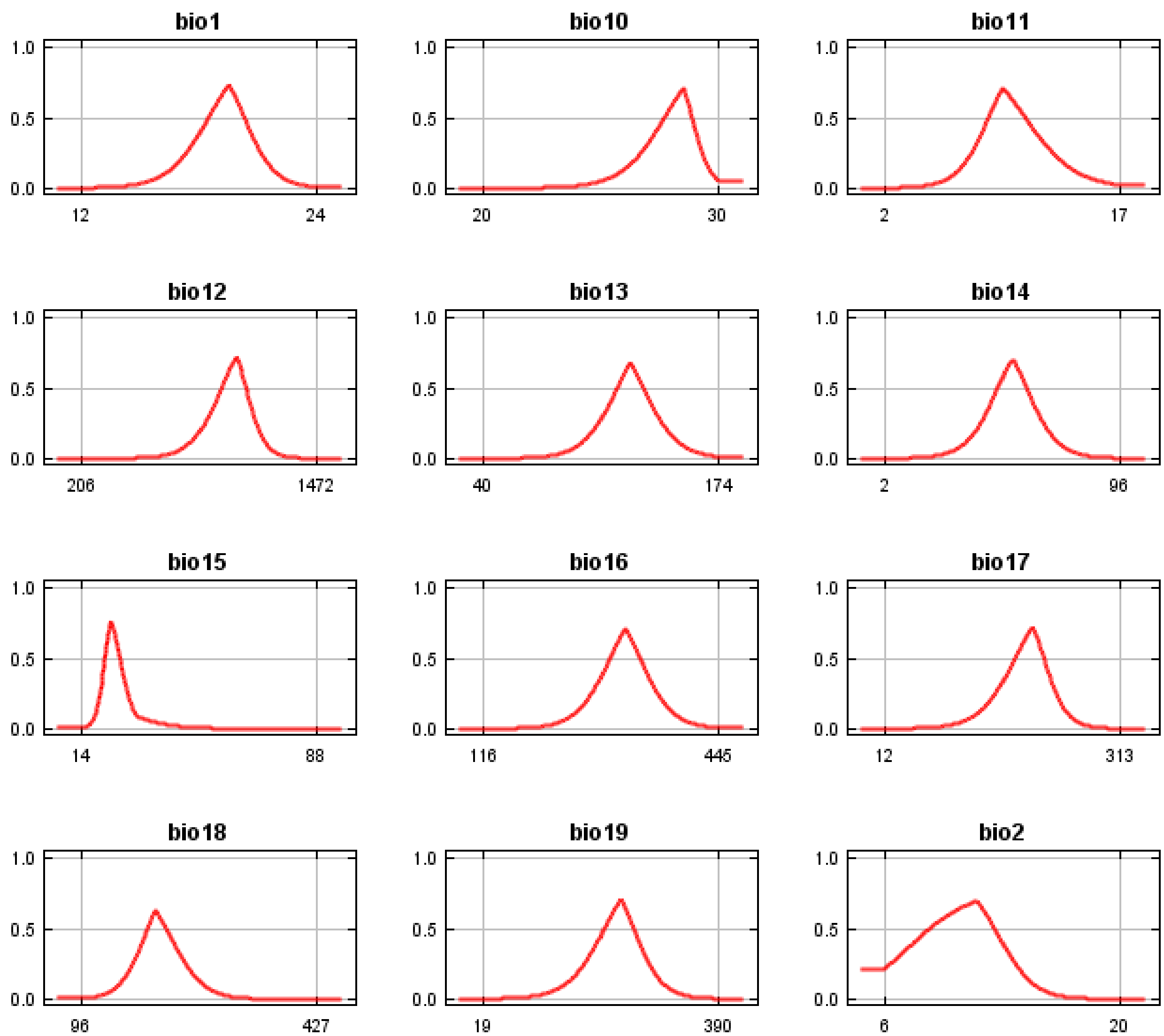


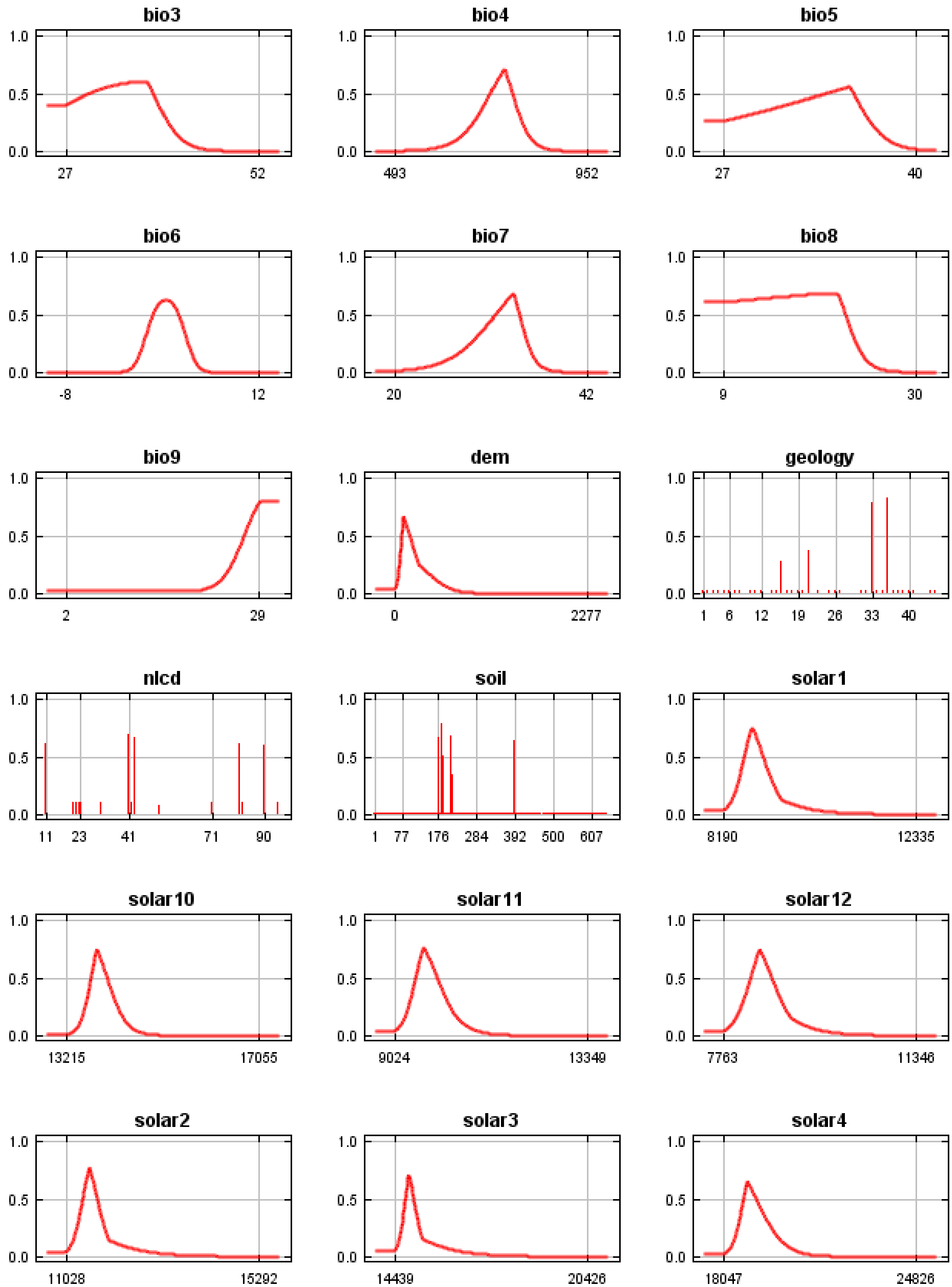
solar7

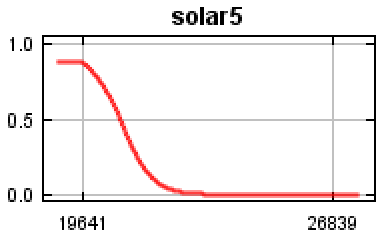


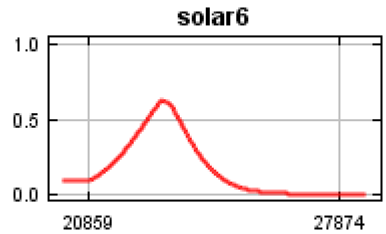


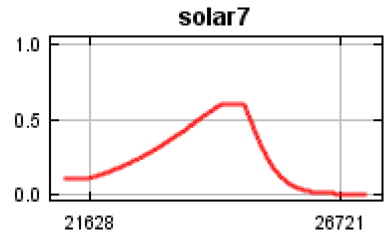
In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.

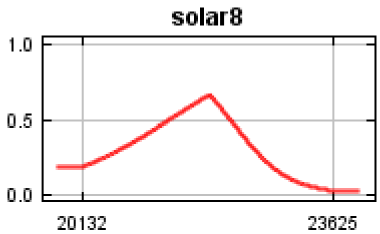


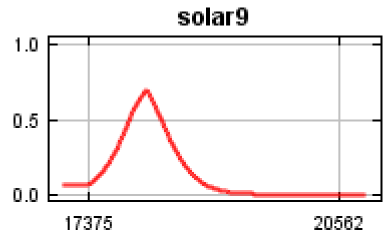

bio3
27
52
bio4
493
952
bio5
27
40
bio6
-8
12
bio7
20
42
bio8
9
30
bio9
2
29
dem
0
2277
geology
1 6 12 19 26 33 40
nlcd
11 23 41 71 90
soil
1 77 176 284 392 500 607
solar1
8190
12335
solar10
13215
17055
solar11
9024
13349
solar12
7763
11346
solar2
11028
15292
solar3
14439
20426
solar4
18047
24826
1.0
0.5
0.0











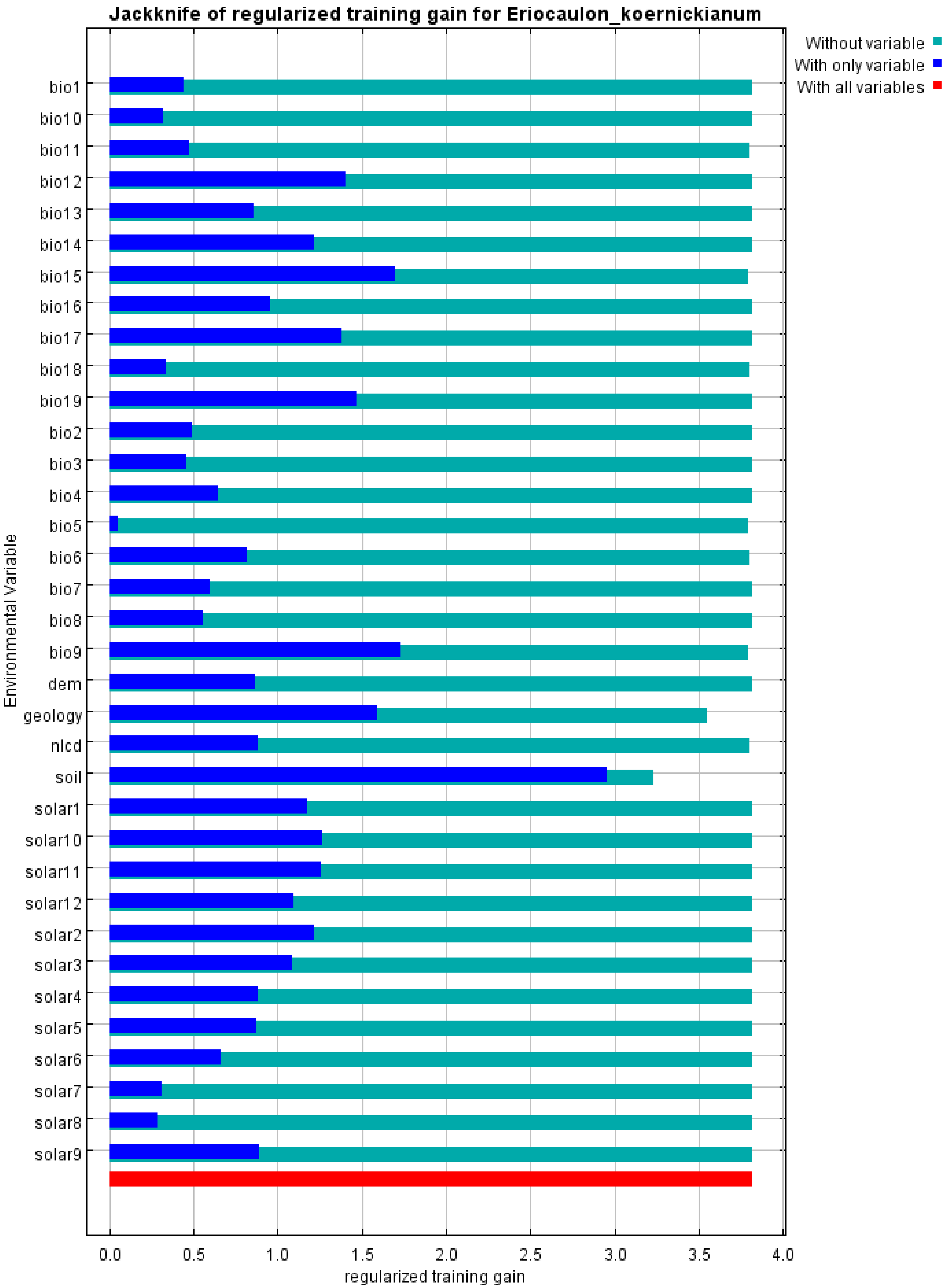
Analysis of variable contributions

The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated.

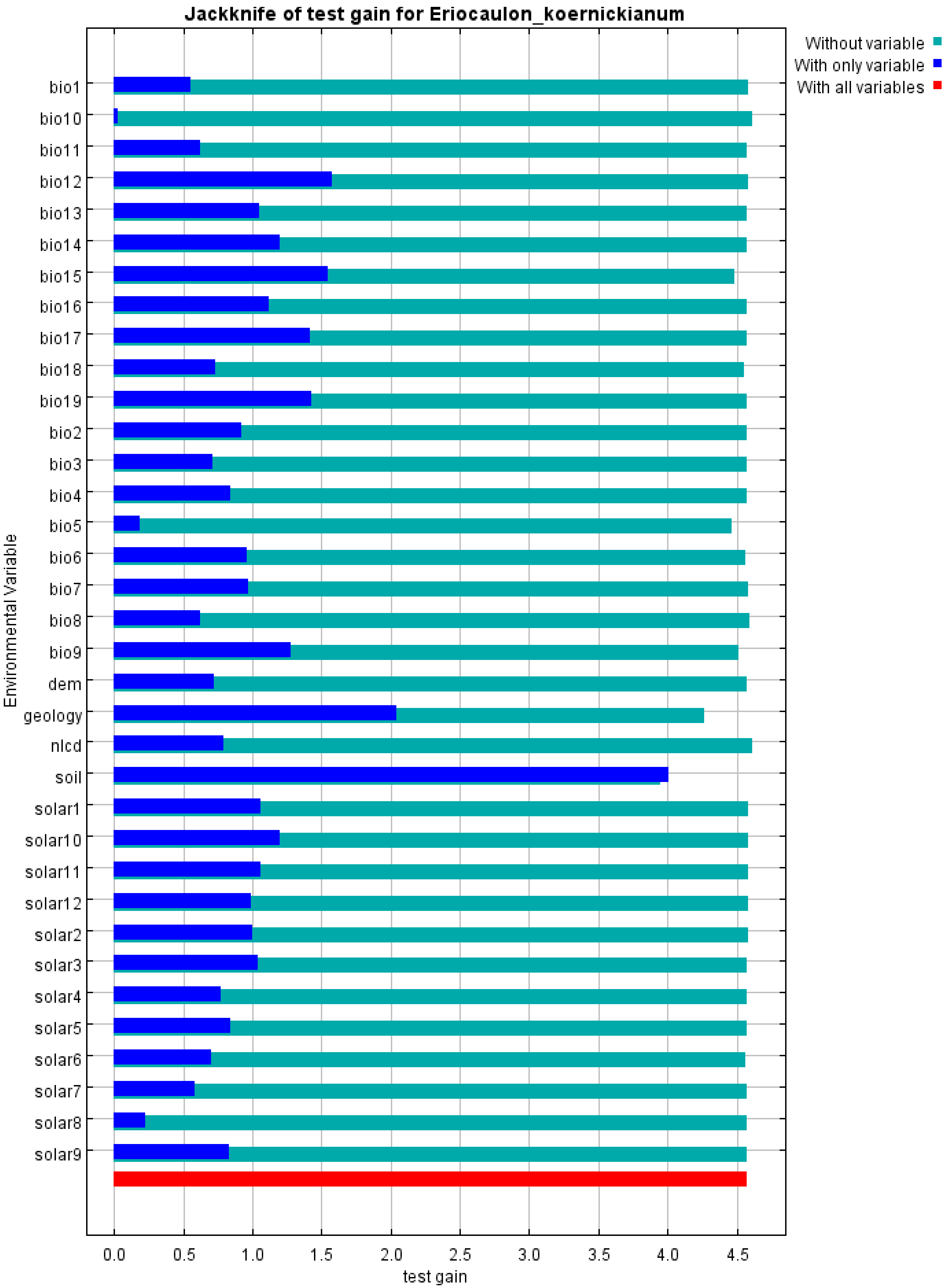
Variable	Percent contribution	Permutation importance
soil	38	19.7
bio9	37.6	2.3
geology	14.8	4.7
bio15	7.5	1.8
nlcd	0.7	0.2
bio5	0.4	5.8
bio11	0.3	21.8
bio6	0.2	19.2
bio18	0.2	16.1
bio10	0.1	0.2
bio8	0.1	0
solar6	0	2
bio12	0	6.2
solar1	0	0
bio2	0	0
bio19	0	0

bio17	0	0
bio16	0	0
bio14	0	0
bio13	0	0
solar9	0	0
solar8	0	0
solar7	0	0
solar5	0	0
solar4	0	0
solar3	0	0
solar2	0	0
solar12	0	0
solar11	0	0
solar10	0	0
dem	0	0
bio7	0	0
bio4	0	0
bio3	0	0
bio1	0	0

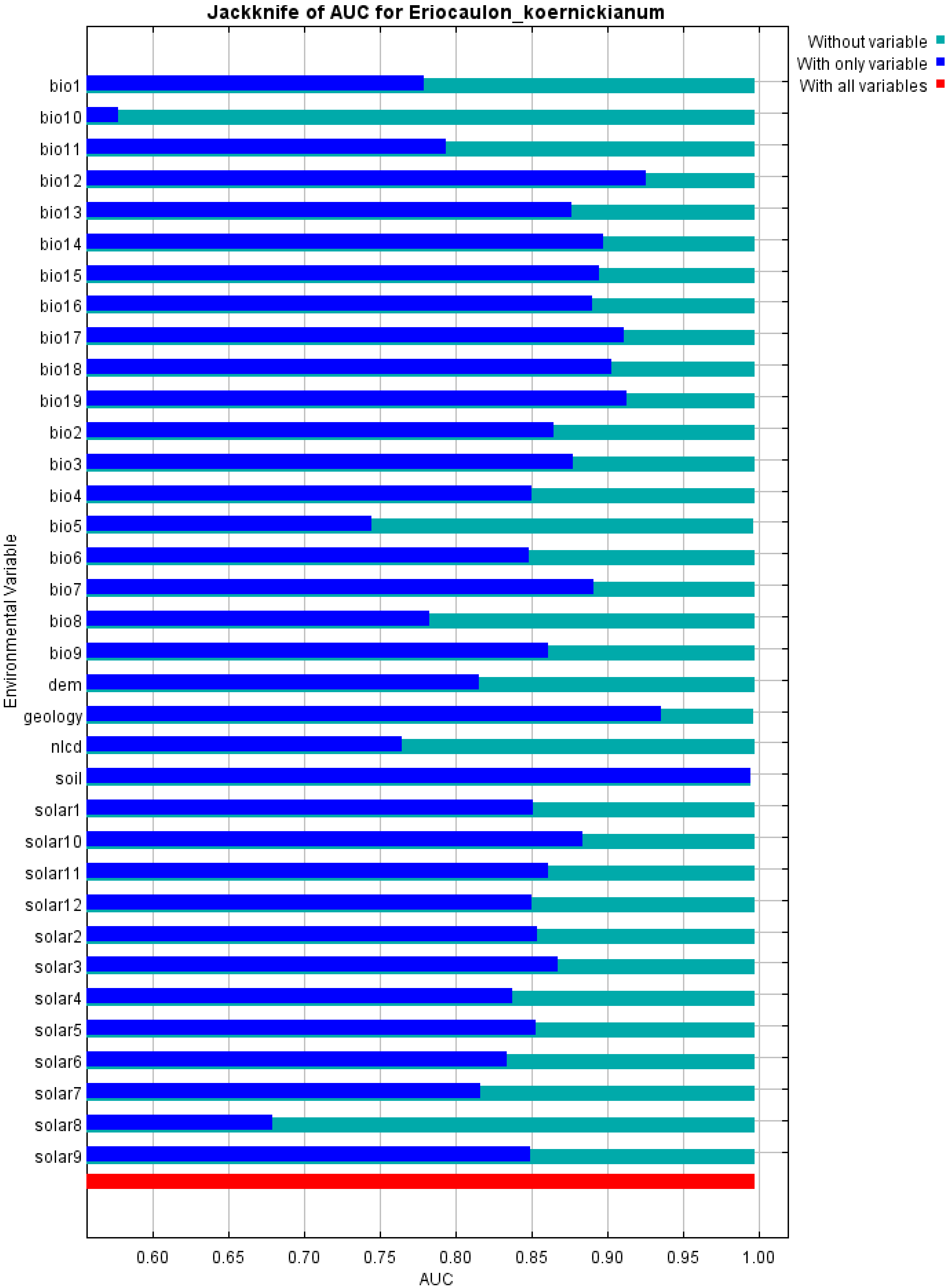
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is soil, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is soil, which therefore appears to have the most information that isn't present in the other variables.


Jackknife of regularized training gain for Eriocaulon_koernickianum
Without variable
With only variable
With all variables
Environmental Variable
bio1
bio10
bio11
bio12
bio13
bio14
bio15
bio16
bio17
bio18
bio19
bio2
bio3
bio4
bio5
bio6
bio7
bio8
bio9
dem
geology
nlcd
soil
solar1
solar10
solar11
solar12
solar2
solar3
solar4
solar5
solar6
solar7
solar8
solar9
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
regularized training gain

The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.


Jackknife of test gain for Eriocaulon_koernickianum
Without variable
With only variable
With all variables
bio1
bio10
bio11
bio12
bio13
bio14
bio15
bio16
bio17
bio18
bio19
bio2
bio3
bio4
bio5
bio6
bio7
bio8
bio9
dem
geology
nlcd
soil
solar1
solar10
solar11
solar12
solar2
solar3
solar4
solar5
solar6
solar7
solar8
solar9
Environmental Variable
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
test gain

Lastly, we have the same jackknife test, using AUC on test data.



Raw data outputs and control parameters

The data used in the above analysis is contained in the next links. Please see the Help button for more information on these.
The model applied to the training environmental layers
The coefficients of the model
The omission and predicted area for varying cumulative and raw thresholds
The prediction strength at the training and (optionally) test presence sites
Results for all species modeled in the same Maxent run, with summary statistics and (optionally) jackknife results

Regularized training gain is 3.821, training AUC is 0.998, unregularized training gain is 4.859.
Unregularized test gain is 4.578.
Test AUC is 0.997, standard deviation is 0.001 (calculated as in DeLong, DeLong & Clarke-Pearson 1988, equation 2).
Algorithm converged after 880 iterations (40 seconds).

The follow settings were used during the run:
16 presence records used for training, 5 for testing.
10016 points used to determine the Maxent distribution (background points and presence points).
Environmental layers used: bio1 bio10 bio11 bio12 bio13 bio14 bio15 bio16 bio17 bio18 bio19 bio2 bio3 bio4 bio5 bio6 bio7 bio8 bio9 dem geology(categorical) nlcd(categorical) soil(categorical) solar1 solar10 solar11 solar12 solar2 solar3 solar4 solar5 solar6 solar7 solar8 solar9
Regularization values: linear/quadratic/product: 0.543, categorical: 0.286, threshold: 1.840, hinge: 0.500
Feature types used: hinge linear quadratic
responsecurves: true
jackknife: true
outputformat: logistic
outputdirectory: F:\MaxEnt Output\Eriocaulon_1km
samplesfile: F:\Eriocaulon_koernickianum_1km.csv
environmentallayers: F:\ASCII_layers
randomseed: true
randomtestpoints: 25
replicatetype: subsample
writebackgroundpredictions: true
writeplotdata: true
maximumiterations: 5000
adjustsampleradius: -6
applythresholdrule: 10 percentile training presence
Command line used:

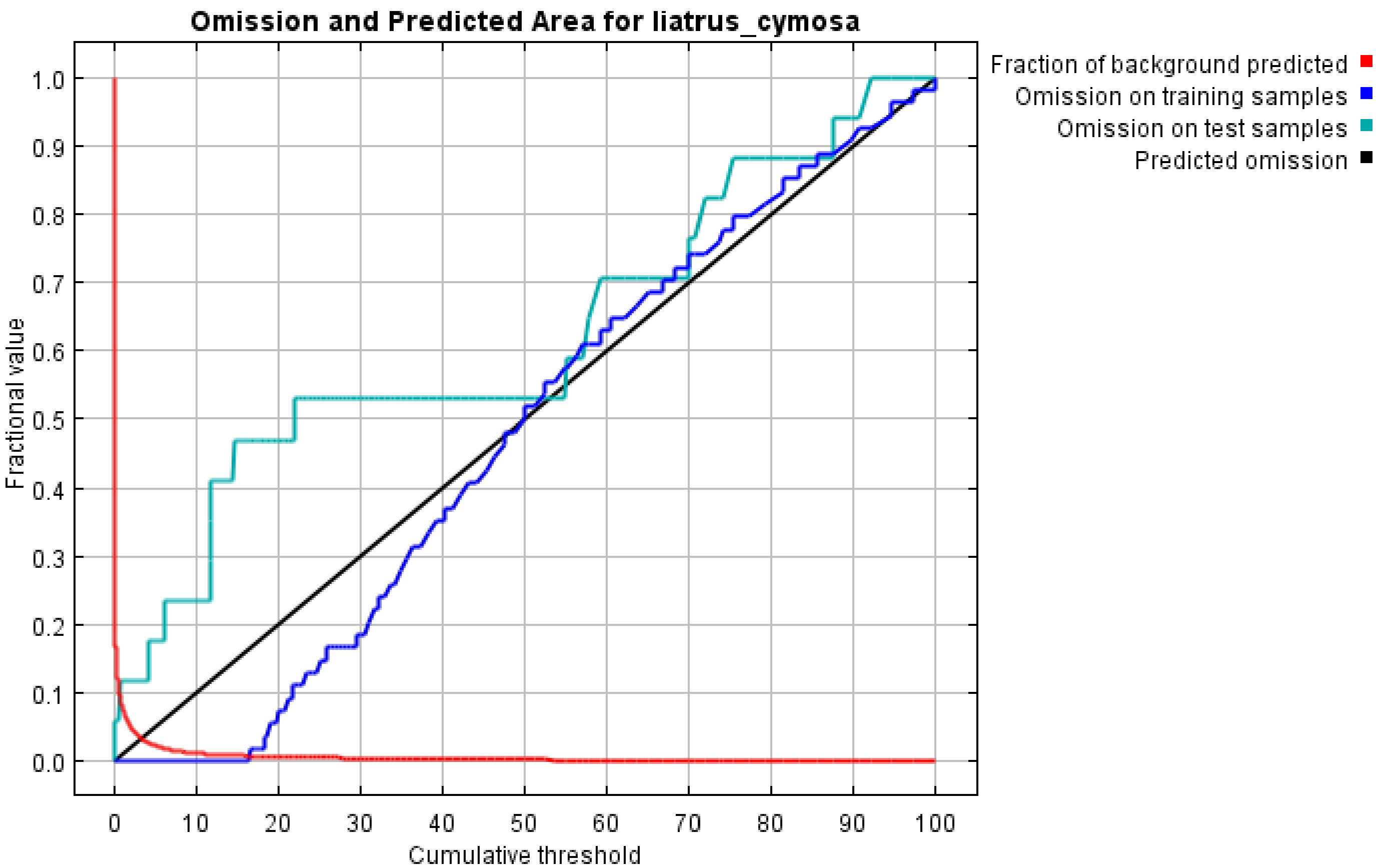
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Eriocaulon_koernickianum responsecurves jackknife outputformat=logistic "outputdirectory=F:\MaxEnt Output\Eriocaulon_1km" samplesfile=F:\Eriocaulon_koernickianum_1km.csv environmentallayers=F:\ASCII_layers randomseed randomtestpoints=25 replicatetype=subsample writebackgroundpredictions writeplotdata maximumiterations=5000 adjustsampleradius=-6 "applythresholdrule=10 percentile training presence" -t geology -t nlcd -t soil

Maxent model for liatrus_cymosa

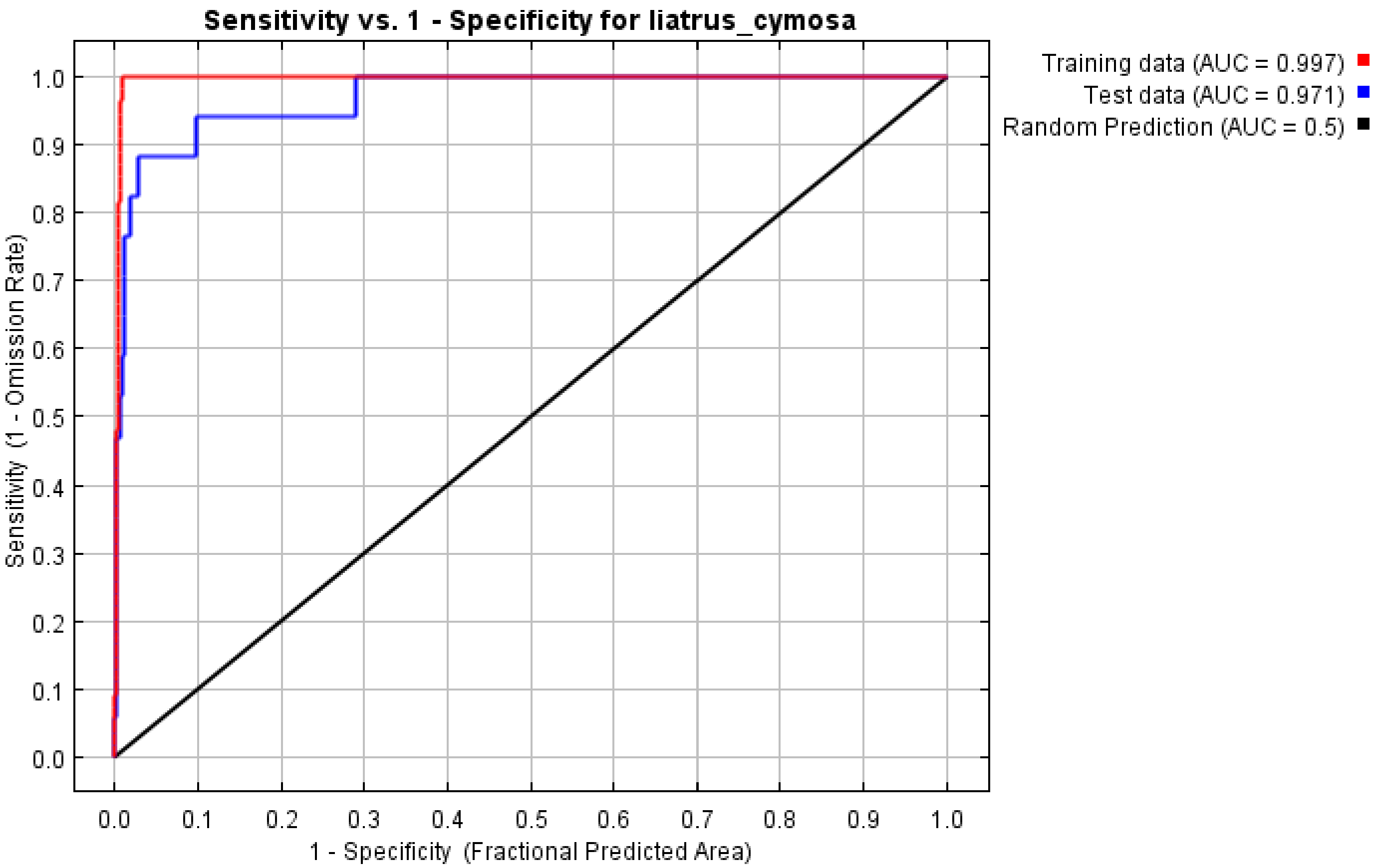
This page contains some analysis of the Maxent model for liatrus_cymosa, created Tue Jan 21 15:18:27 CST 2020 using Maxent version 3.4.1. If you would like to do further analyses, the raw data used here is linked to at the end of this page.

Analysis of omission/commission

The following picture shows the omission rate and predicted area as a function of the cumulative threshold. The omission rate is is calculated both on the training presence records, and (if test data are used) on the test records. The omission rate should be close to the predicted omission, because of the definition of the cumulative threshold.



The next picture is the receiver operating characteristic (ROC) curve for the same data. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). This implies that the maximum achievable AUC is less than 1. If test data is drawn from the Maxent distribution itself, then the maximum possible test AUC would be 0.992 rather than 1; in practice the test AUC may exceed this bound.



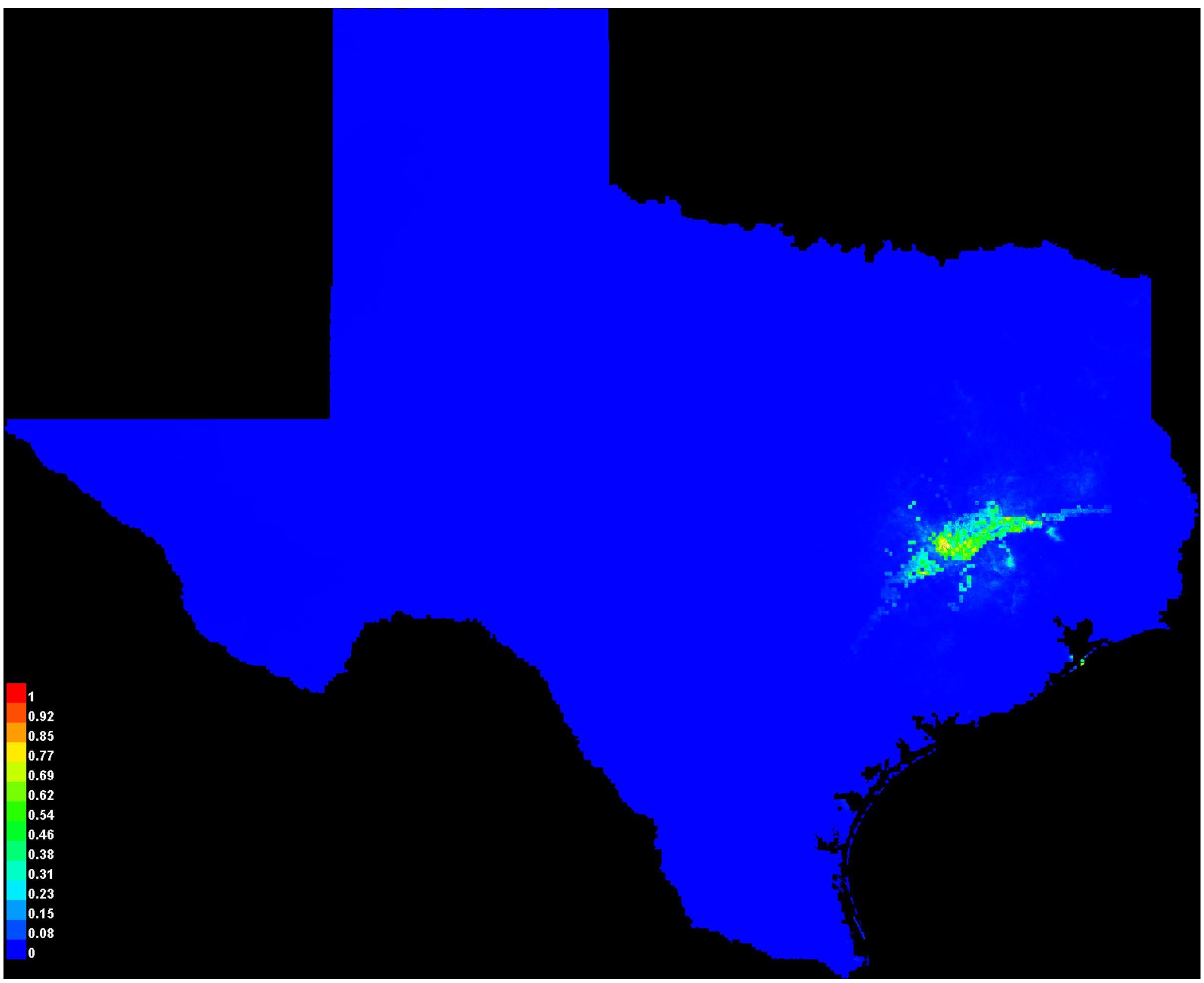
Some common thresholds and corresponding omission rates are as follows. If test data are available, binomial probabilities are calculated exactly if the number of test samples is at most 25, otherwise using a normal approximation to the binomial. These are 1-sided p-values for the null hypothesis that test points are predicted no better than by a random prediction with the same fractional predicted area. The "Balance" threshold minimizes 6 * training omission rate + .04 * cumulative threshold + 1.6 * fractional predicted area.

Cumulative threshold	Logistic threshold	Description	Fractional predicted area	Training omission rate	Test omission rate	P-value
1.000	0.003	Fixed cumulative value 1	0.077	0.000	0.118	2.455E-15
5.000	0.031	Fixed cumulative value 5	0.023	0.000	0.176	9.259E-21
10.000	0.117	Fixed cumulative value 10	0.012	0.000	0.235	3.131E-22
16.440	0.267	Minimum training presence	0.008	0.000	0.471	4.082E-15
21.605	0.362	10 percentile training presence	0.007	0.093	0.471	7.821E-16
16.440	0.267	Equal training sensitivity and specificity	0.008	0.000	0.471	4.082E-15
16.440	0.267	Maximum training sensitivity plus specificity	0.008	0.000	0.471	4.082E-15

0.610	0.002	Equal test sensitivity and specificity	0.099	0.000	0.118	9.45E-14
4.246	0.024	Maximum test sensitivity plus specificity	0.027	0.000	0.118	3.938E-22
1.550	0.006	Balance training omission, predicted area and threshold value	0.059	0.000	0.118	4.886E-17
8.569	0.087	Equate entropy of thresholded and original distributions	0.014	0.000	0.235	2.012E-21

Pictures of the model

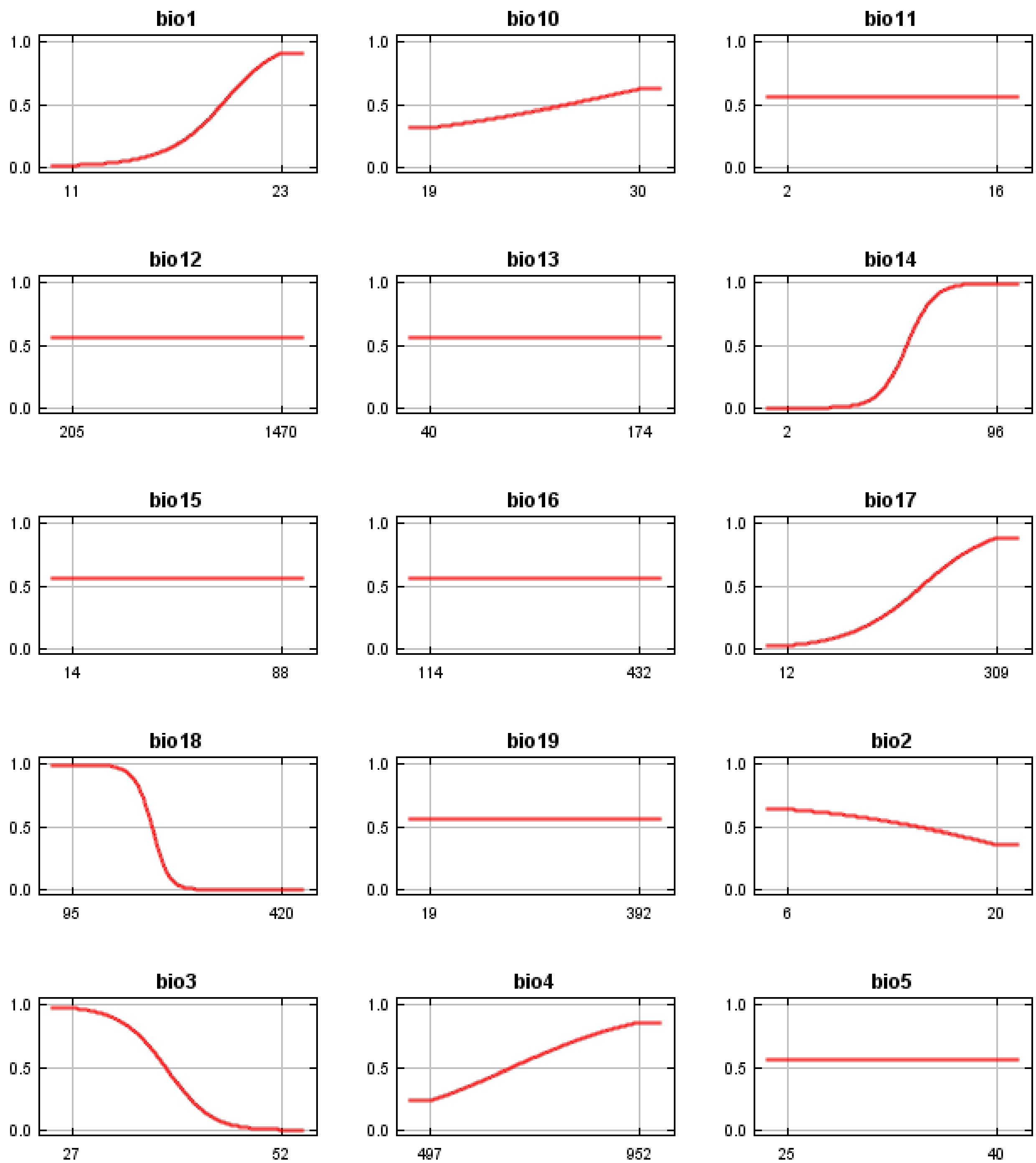
This is a representation of the Maxent model for liatrus_cymosa. Warmer colors show areas with better predicted conditions. White dots show the presence locations used for training, while violet dots show test locations. Click on the image for a full-size version.



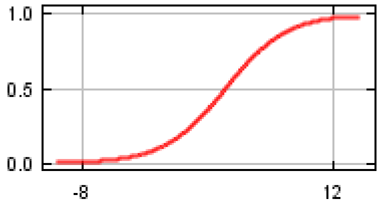
Click here to interactively explore this prediction using the Explain tool. If clicking from your browser does not succeed in starting the tool, try running the script in I:\MaxEnt Output\liatrus_cymosa_explain.bat directly. This tool requires the environmental grids to be small enough that they all fit in memory.

Response curves

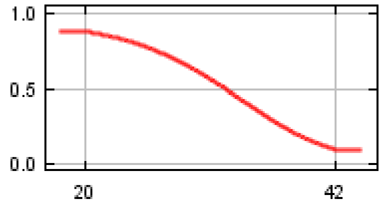
These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together.



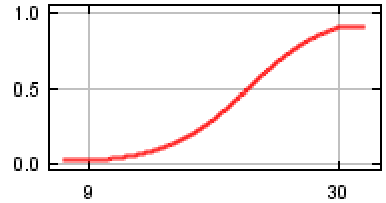
bio6



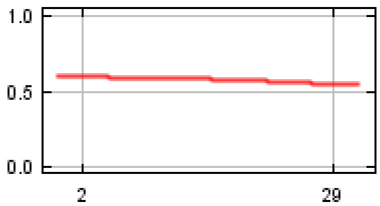
bio7



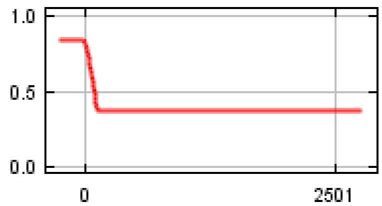
bio8



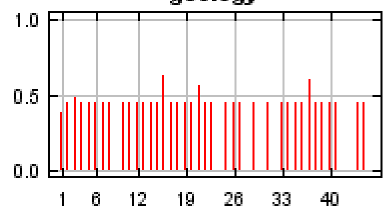
bio9



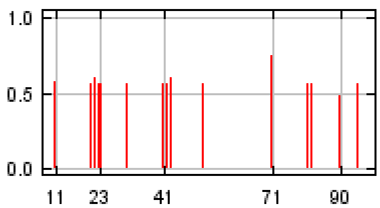
dem



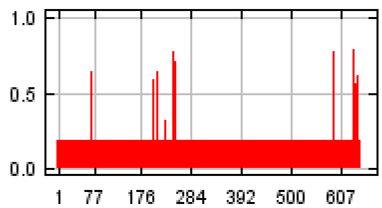
geology



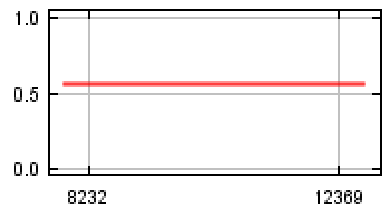
nlcd



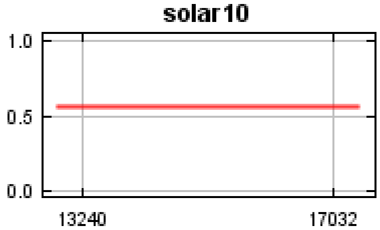
soil



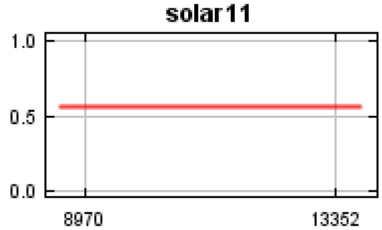
solar1



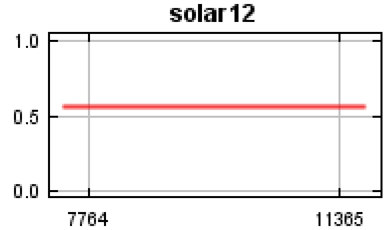
solar10



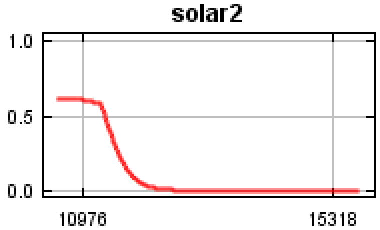
solar11



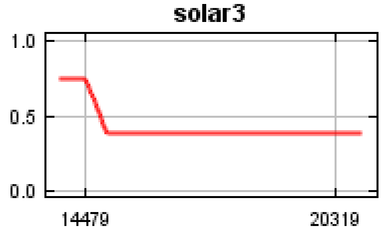
solar12



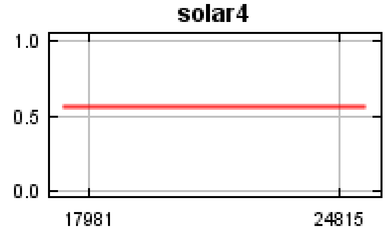
solar2



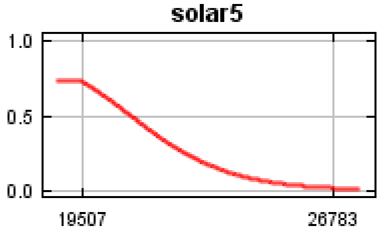
solar3



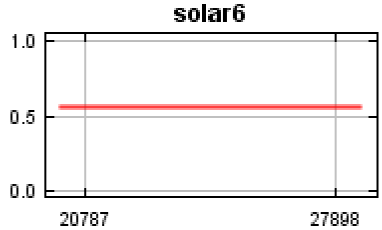
solar4



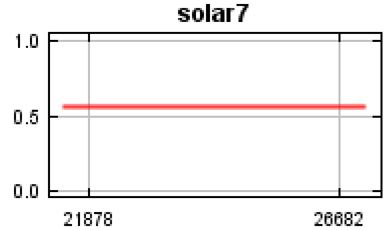
solar5



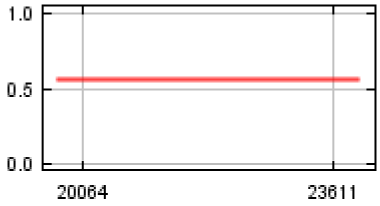
solar6



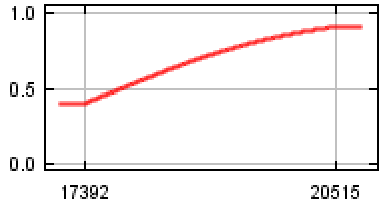
solar7



solar8

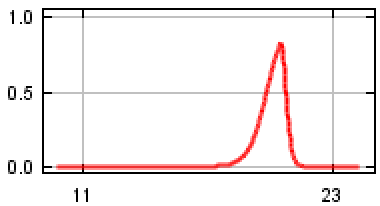


solar9

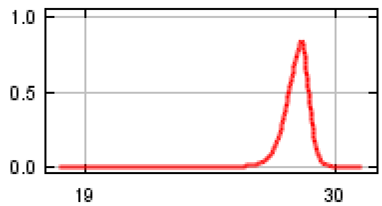


In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.

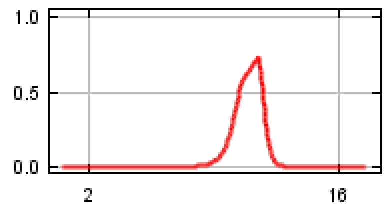
bio1



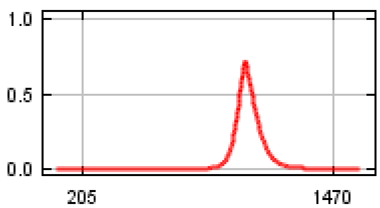
bio10



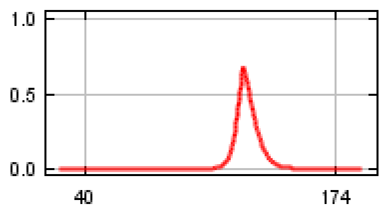
bio11



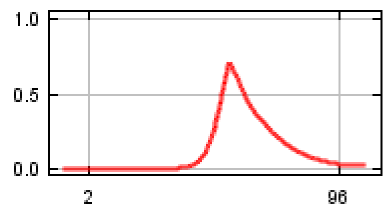
bio12



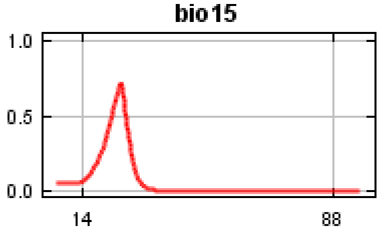
bio13



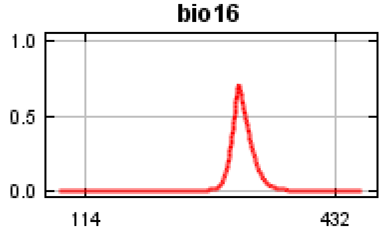
bio14



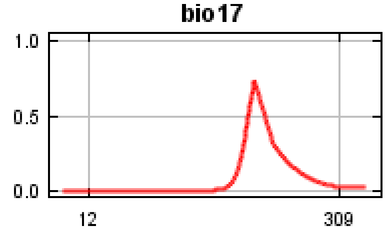
bio15



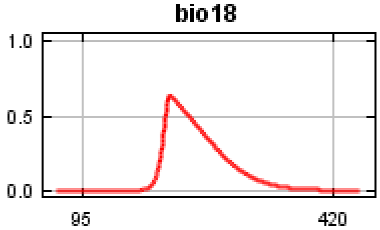
bio16



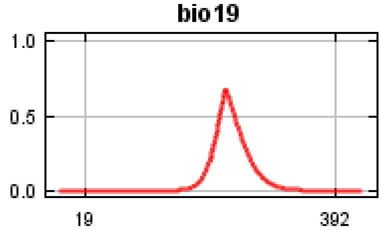
bio17



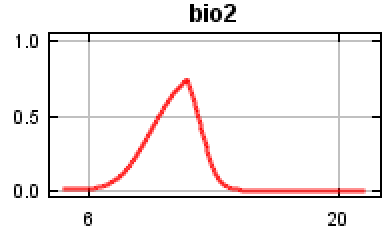
bio18

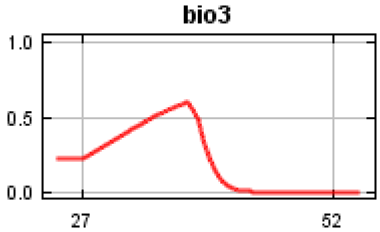


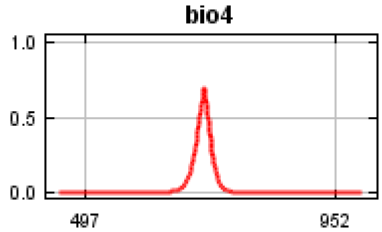
bio19

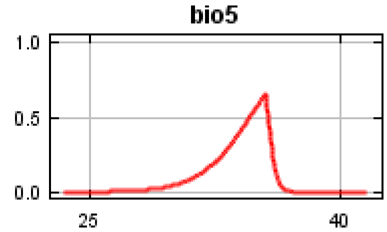


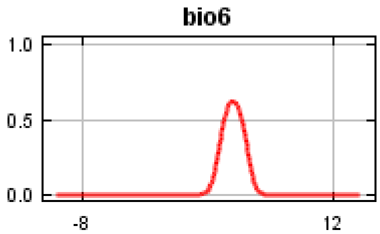
bio2

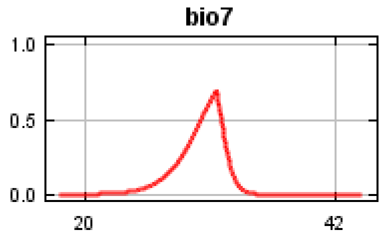


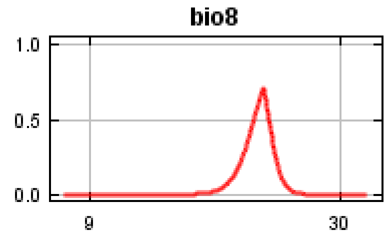

bio3
1.0
0.5
0.0
27
52

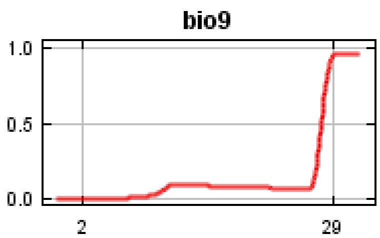

bio4
1.0
0.5
0.0
497
952

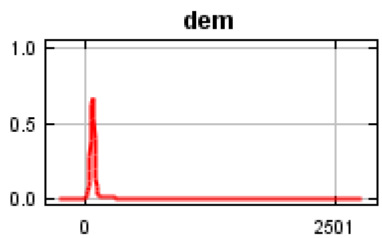

bio5
1.0
0.5
0.0
25
40

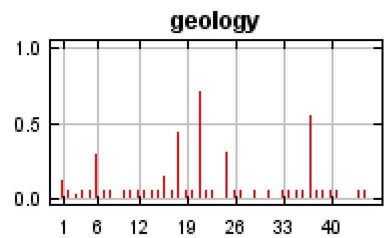

bio6
1.0
0.5
0.0
-8
12

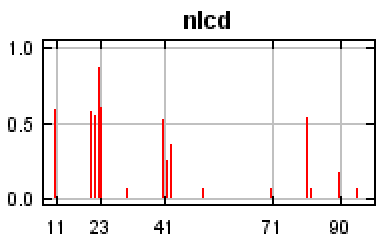

bio7
1.0
0.5
0.0
20
42

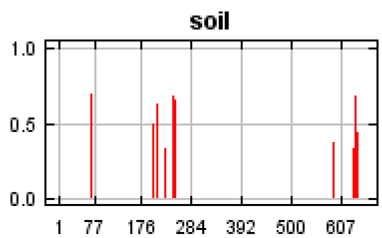

bio8
1.0
0.5
0.0
9
30

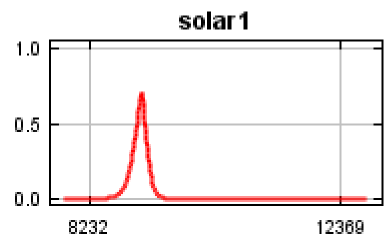

bio9
1.0
0.5
0.0
2
29

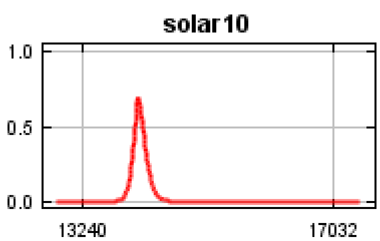

dem
1.0
0.5
0.0
0
2501

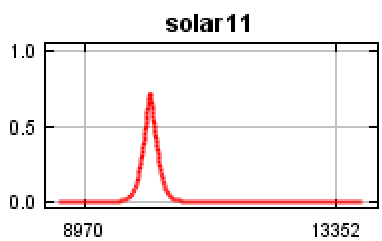

geology
1.0
0.5
0.0
1
6
12
19
26
33
40

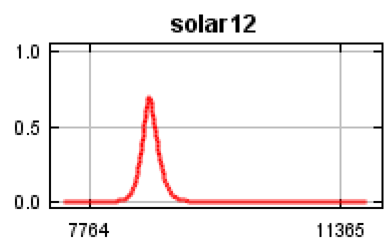

nlcd
1.0
0.5
0.0
11
23
41
71
90

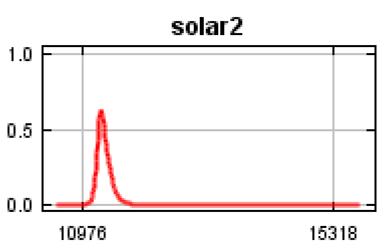

soil
1.0
0.5
0.0
1
77
176
284
392
500
607

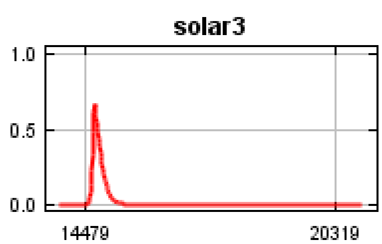

solar1
1.0
0.5
0.0
8232
12369

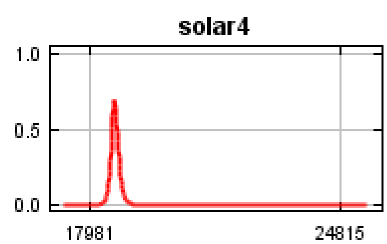

solar10
1.0
0.5
0.0
13240
17032

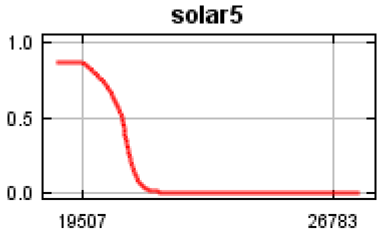

solar11
1.0
0.5
0.0
8970
13352

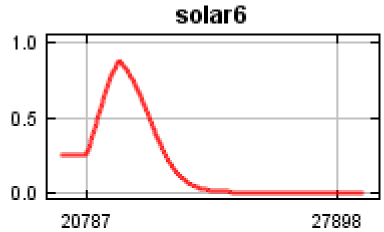

solar12
1.0
0.5
0.0
7764
11365

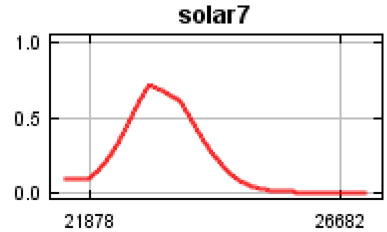

solar2
1.0
0.5
0.0
10976
15318

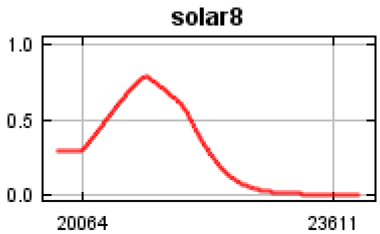

solar3
1.0
0.5
0.0
14479
20319

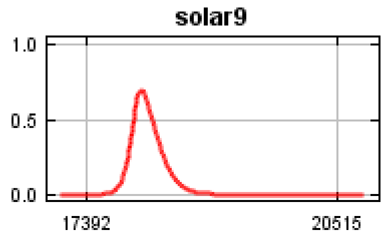

solar4
1.0
0.5
0.0
17981
24815











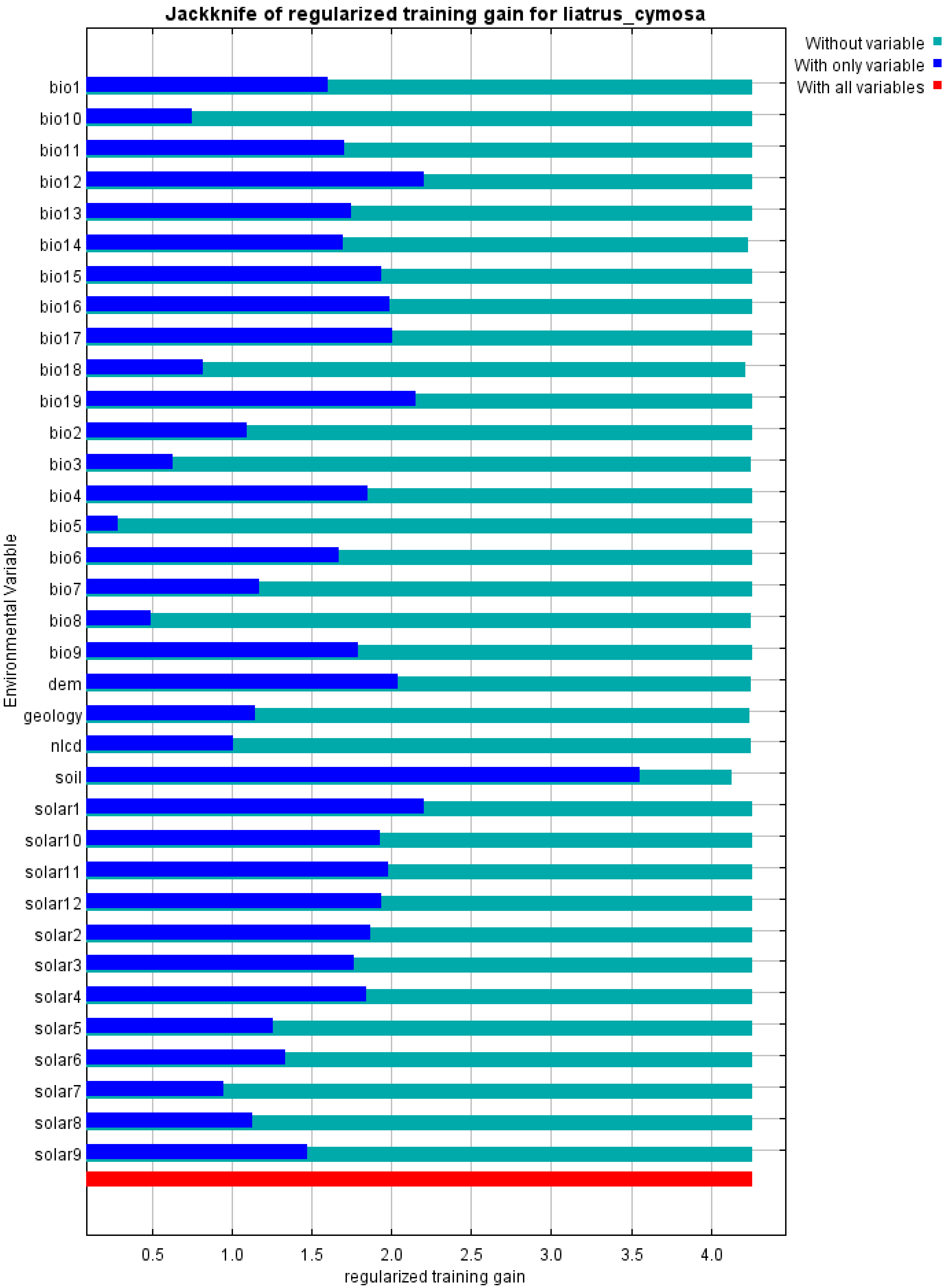
Analysis of variable contributions

The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated.

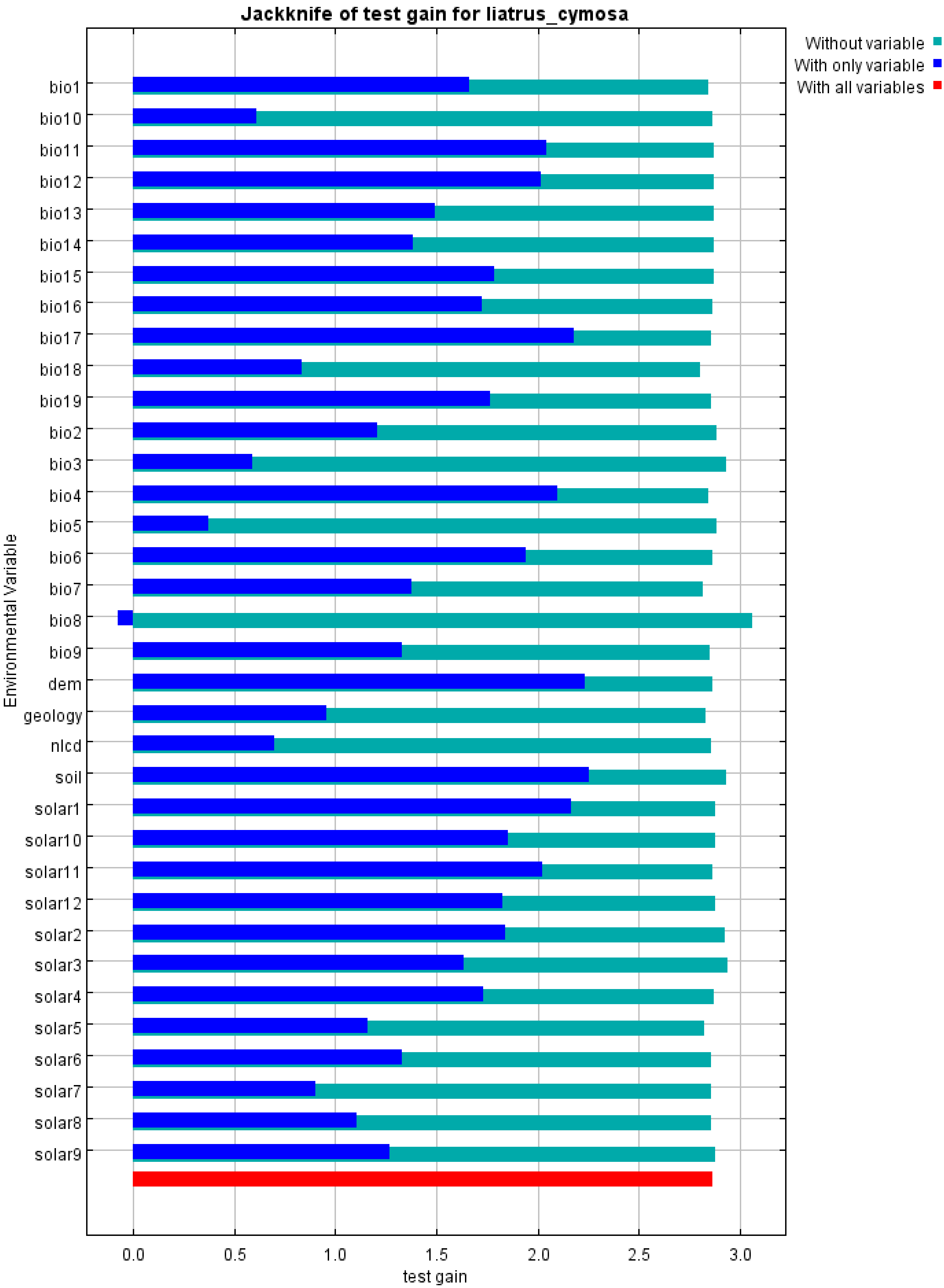
Variable	Percent contribution	Permutation importance
soil	39.1	0.6
bio19	30.1	0
bio9	8.3	0
geology	6.9	0.1
solar1	5.8	0
solar11	2.4	0
dem	2.2	0.3
nlcd	1.1	0.1
bio18	0.8	30.8
solar3	0.7	0.1
bio14	0.6	16.7
solar2	0.5	44
bio3	0.4	1.2
solar5	0.3	0.5
bio8	0.2	0.5
solar4	0.1	0

bio15	0.1	0
bio7	0.1	0.4
solar9	0.1	0.1
bio13	0.1	0
bio6	0	2.3
bio1	0	0.7
bio17	0	1
bio10	0	0.1
bio4	0	0.3
bio2	0	0
solar7	0	0
solar8	0	0
bio5	0	0
bio12	0	0
bio11	0	0
solar10	0	0
solar12	0	0
solar6	0	0
bio16	0	0

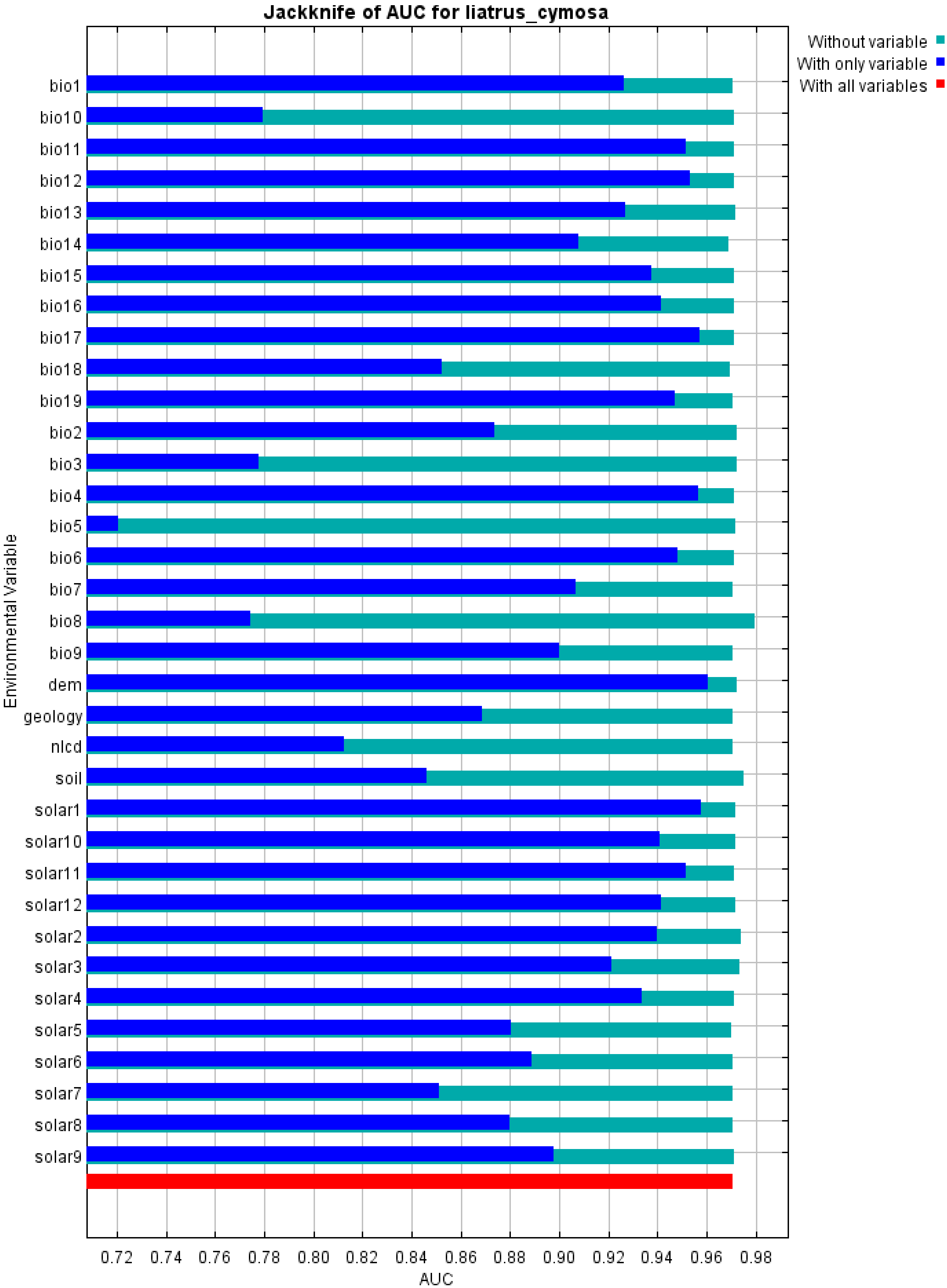
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is soil, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is soil, which therefore appears to have the most information that isn't present in the other variables.


Jackknife of regularized training gain for liatrus_cymosa
Without variable
With only variable
With all variables
Environmental Variable
bio1
bio10
bio11
bio12
bio13
bio14
bio15
bio16
bio17
bio18
bio19
bio2
bio3
bio4
bio5
bio6
bio7
bio8
bio9
dem
geology
nlcd
soil
solar1
solar10
solar11
solar12
solar2
solar3
solar4
solar5
solar6
solar7
solar8
solar9
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
regularized training gain

The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.


Jackknife of test gain for liatrus_cymosa
Without variable
With only variable
With all variables
Environmental Variable
bio1
bio10
bio11
bio12
bio13
bio14
bio15
bio16
bio17
bio18
bio19
bio2
bio3
bio4
bio5
bio6
bio7
bio8
bio9
dem
geology
nlcd
soil
solar1
solar10
solar11
solar12
solar2
solar3
solar4
solar5
solar6
solar7
solar8
solar9
0.0
0.5
1.0
1.5
2.0
2.5
3.0
test gain

Lastly, we have the same jackknife test, using AUC on test data.



Raw data outputs and control parameters

The data used in the above analysis is contained in the next links. Please see the Help button for more information on these.
The model applied to the training environmental layers
The coefficients of the model
The omission and predicted area for varying cumulative and raw thresholds
The prediction strength at the training and (optionally) test presence sites
Results for all species modeled in the same Maxent run, with summary statistics and (optionally) jackknife results

Regularized training gain is 4.262, training AUC is 0.997, unregularized training gain is 4.664.
Unregularized test gain is 2.866.
Test AUC is 0.971, standard deviation is 0.017 (calculated as in DeLong, DeLong & Clarke-Pearson 1988, equation 2).
Algorithm converged after 1820 iterations (48 seconds).

The follow settings were used during the run:
54 presence records used for training, 17 for testing.
10053 points used to determine the Maxent distribution (background points and presence points).
Environmental layers used: bio1 bio10 bio11 bio12 bio13 bio14 bio15 bio16 bio17 bio18 bio19 bio2 bio3 bio4 bio5 bio6 bio7 bio8 bio9 dem geology(categorical) nlcd(categorical) soil(categorical) solar1 solar10 solar11 solar12 solar2 solar3 solar4 solar5 solar6 solar7 solar8 solar9
Regularization values: linear/quadratic/product: 0.181, categorical: 0.250, threshold: 1.460, hinge: 0.500
Feature types used: hinge linear quadratic
responsecurves: true
jackknife: true
outputformat: logistic
outputdirectory: I:\MaxEnt Output
samplesfile: I:\TXDOT Species Info\liatris_cymosa.csv
environmentallayers: I:\ASCII_layers
randomseed: true
randomtestpoints: 25
replicatetype: subsample
writebackgroundpredictions: true
writeplotdata: true
maximumiterations: 5000
adjustsampleradius: -6
applythresholdrule: 10 percentile training presence
Command line used:

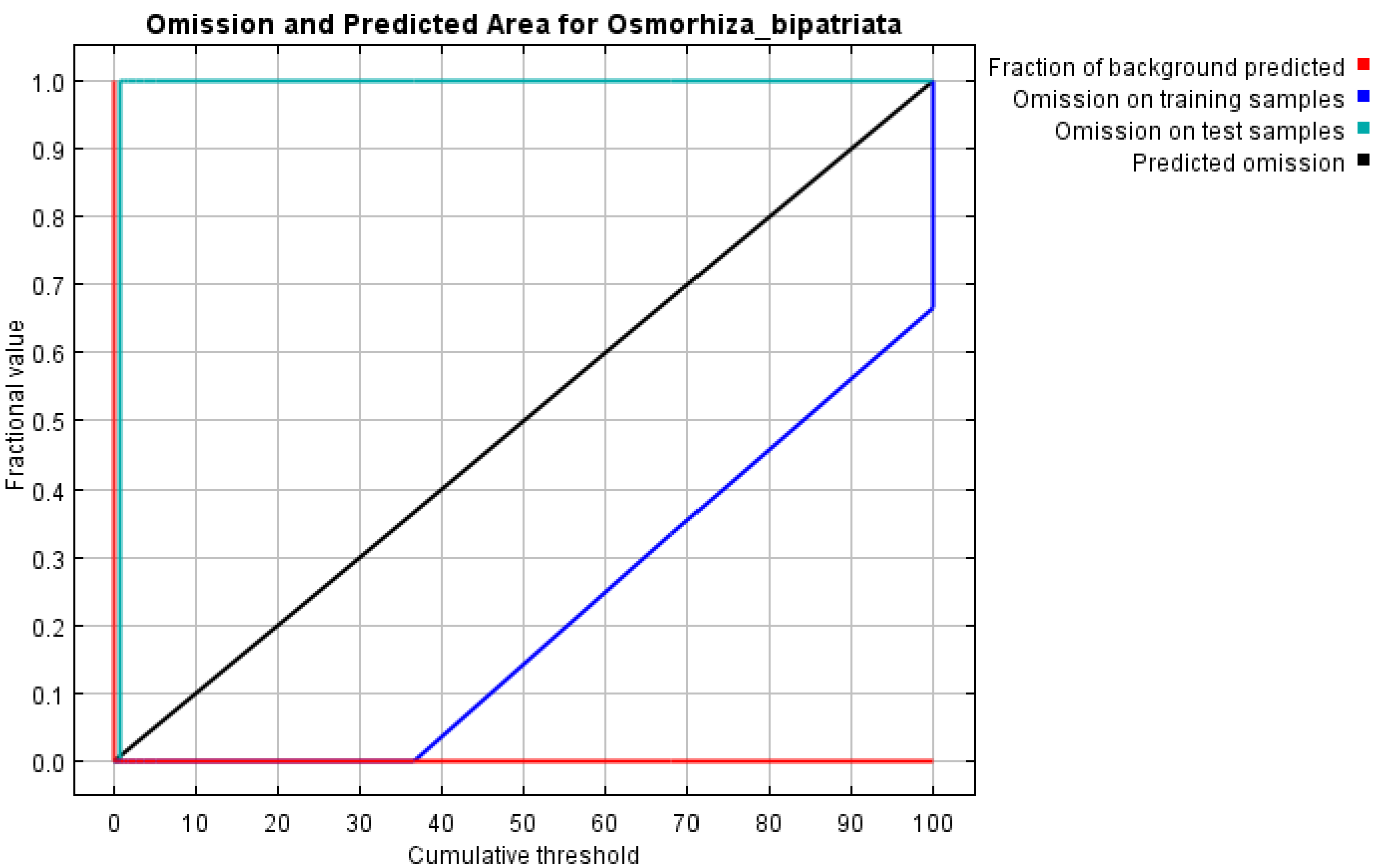
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E liatrus_cymosa responsecurves jackknife outputformat=logistic "outputdirectory=I:\MaxEnt Output" "samplesfile=I:\TXDOT Species Info\liatris_cymosa.csv" environmentallayers=I:\ASCII_layers randomseed randomtestpoints=25 replicatetype=subsample writebackgroundpredictions writeplotdata maximumiterations=5000 adjustsampleradius=-6 "applythresholdrule=10 percentile training presence" -t geology -t nlcd -t soil

Maxent model for Osmorhiza_bipatriata

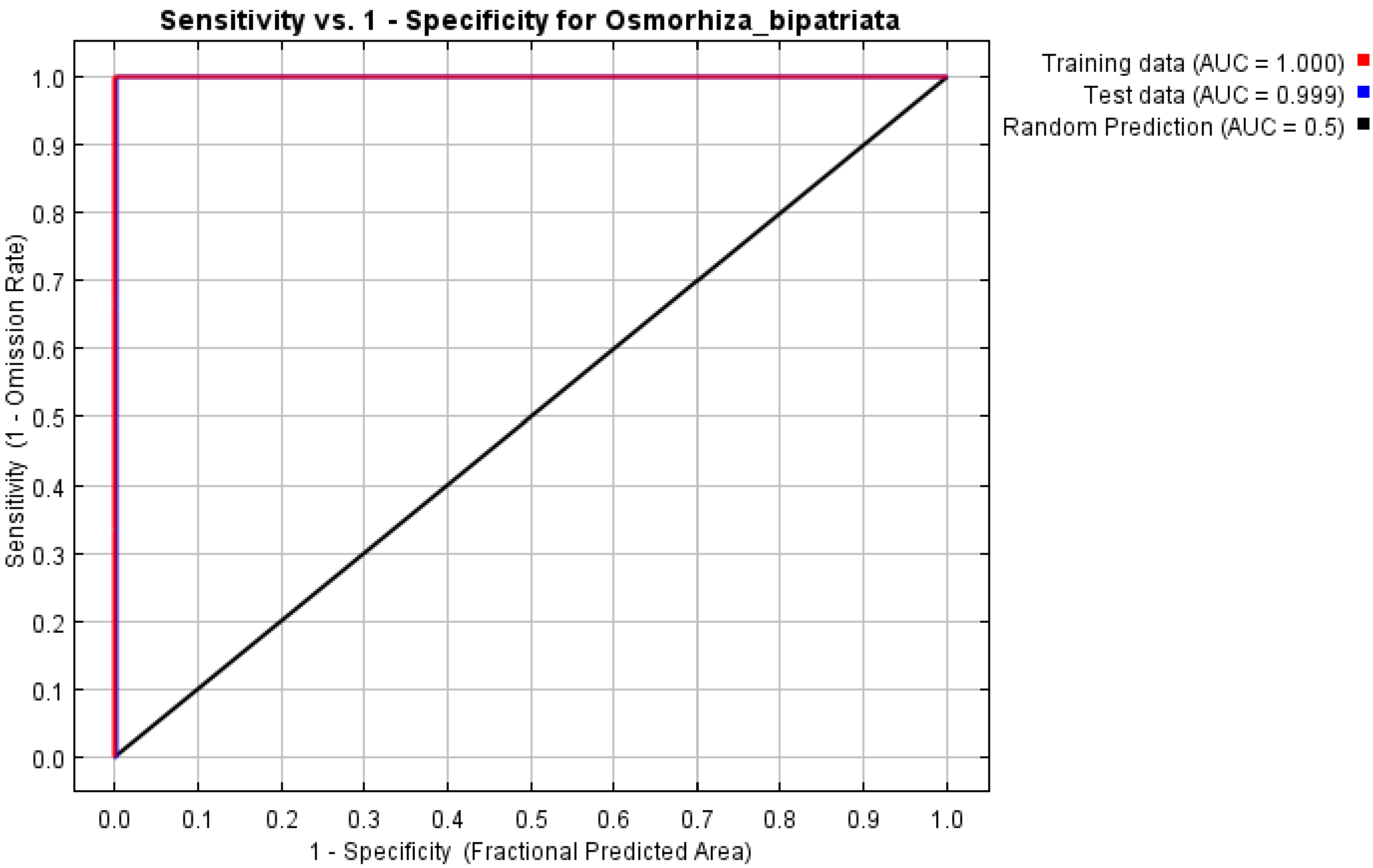
This page contains some analysis of the Maxent model for Osmorhiza_bipatriata, created Wed Jan 22 13:29:53 CST 2020 using Maxent version 3.4.1. If you would like to do further analyses, the raw data used here is linked to at the end of this page.

Analysis of omission/commission

The following picture shows the omission rate and predicted area as a function of the cumulative threshold. The omission rate is is calculated both on the training presence records, and (if test data are used) on the test records. The omission rate should be close to the predicted omission, because of the definition of the cumulative threshold.



The next picture is the receiver operating characteristic (ROC) curve for the same data. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). This implies that the maximum achievable AUC is less than 1. If test data is drawn from the Maxent distribution itself, then the maximum possible test AUC would be 0.999 rather than 1; in practice the test AUC may exceed this bound.



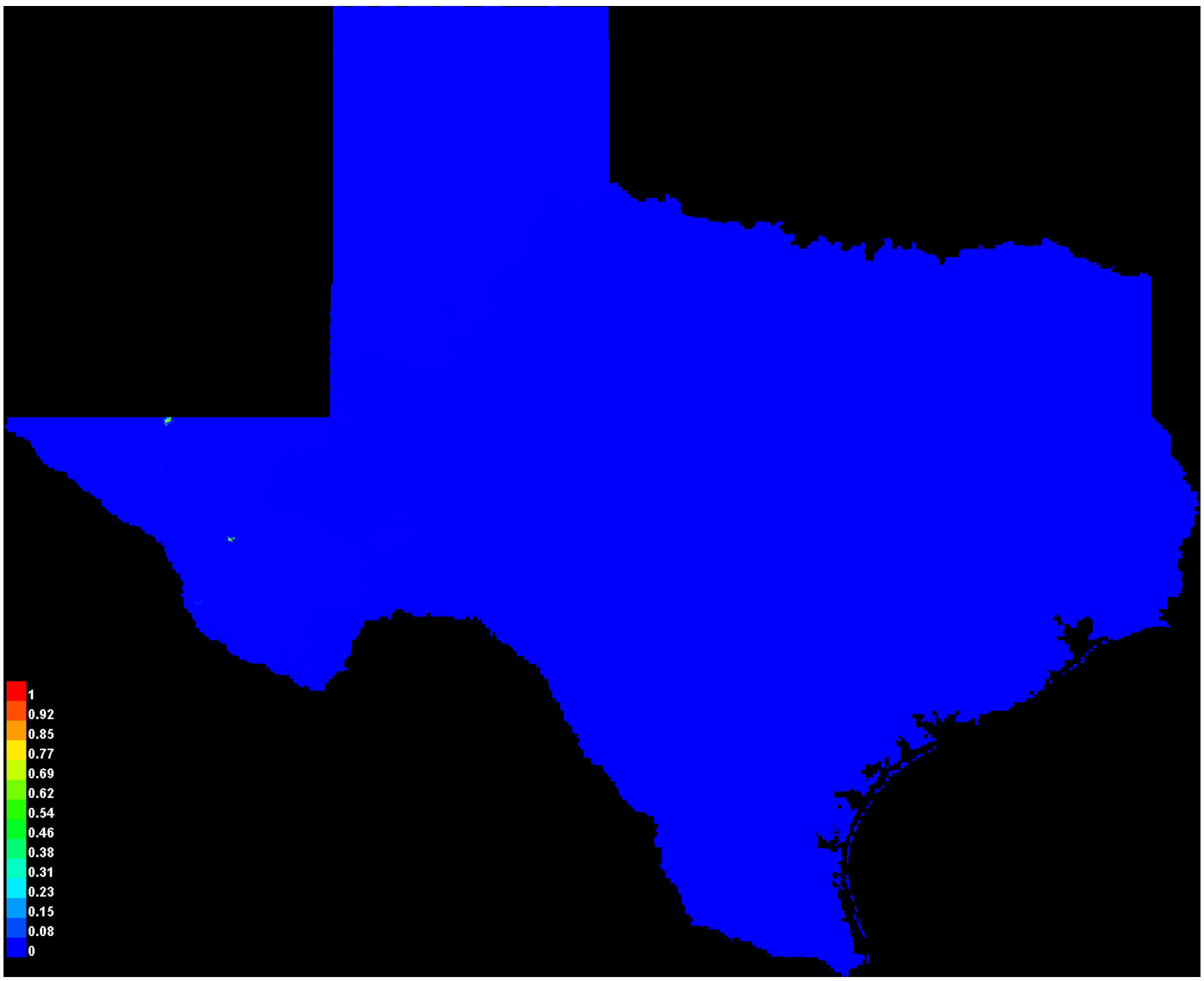
Some common thresholds and corresponding omission rates are as follows. If test data are available, binomial probabilities are calculated exactly if the number of test samples is at most 25, otherwise using a normal approximation to the binomial. These are 1-sided p-values for the null hypothesis that test points are predicted no better than by a random prediction with the same fractional predicted area. The "Balance" threshold minimizes 6 * training omission rate + .04 * cumulative threshold + 1.6 * fractional predicted area.

Cumulative threshold	Logistic threshold	Description	Fractional predicted area	Training omission rate	Test omission rate	P-value
1.000	0.017	Fixed cumulative value 1	0.001	0.000	1.000	1E0
5.000	0.052	Fixed cumulative value 5	0.000	0.000	1.000	1E0
10.000	0.549	Fixed cumulative value 10	0.000	0.000	1.000	1E0
36.547	0.549	Minimum training presence	0.000	0.000	1.000	1E0
36.547	0.549	10 percentile training presence	0.000	0.000	1.000	1E0
36.547	0.549	Equal training sensitivity and specificity	0.000	0.000	1.000	1E0
36.547	0.549	Maximum training sensitivity plus specificity	0.000	0.000	1.000	1E0
0.830	0.011	Equal test sensitivity and specificity	0.001	0.000	0.000	8.997E-4
0.830	0.011	Maximum test sensitivity plus specificity	0.001	0.000	0.000	8.997E-4

0.061	0.000	Balance training omission, predicted area and threshold value	0.003	0.000	0.000	3.199E-3
36.547	0.549	Equate entropy of thresholded and original distributions	0.000	0.000	1.000	1E0

Pictures of the model

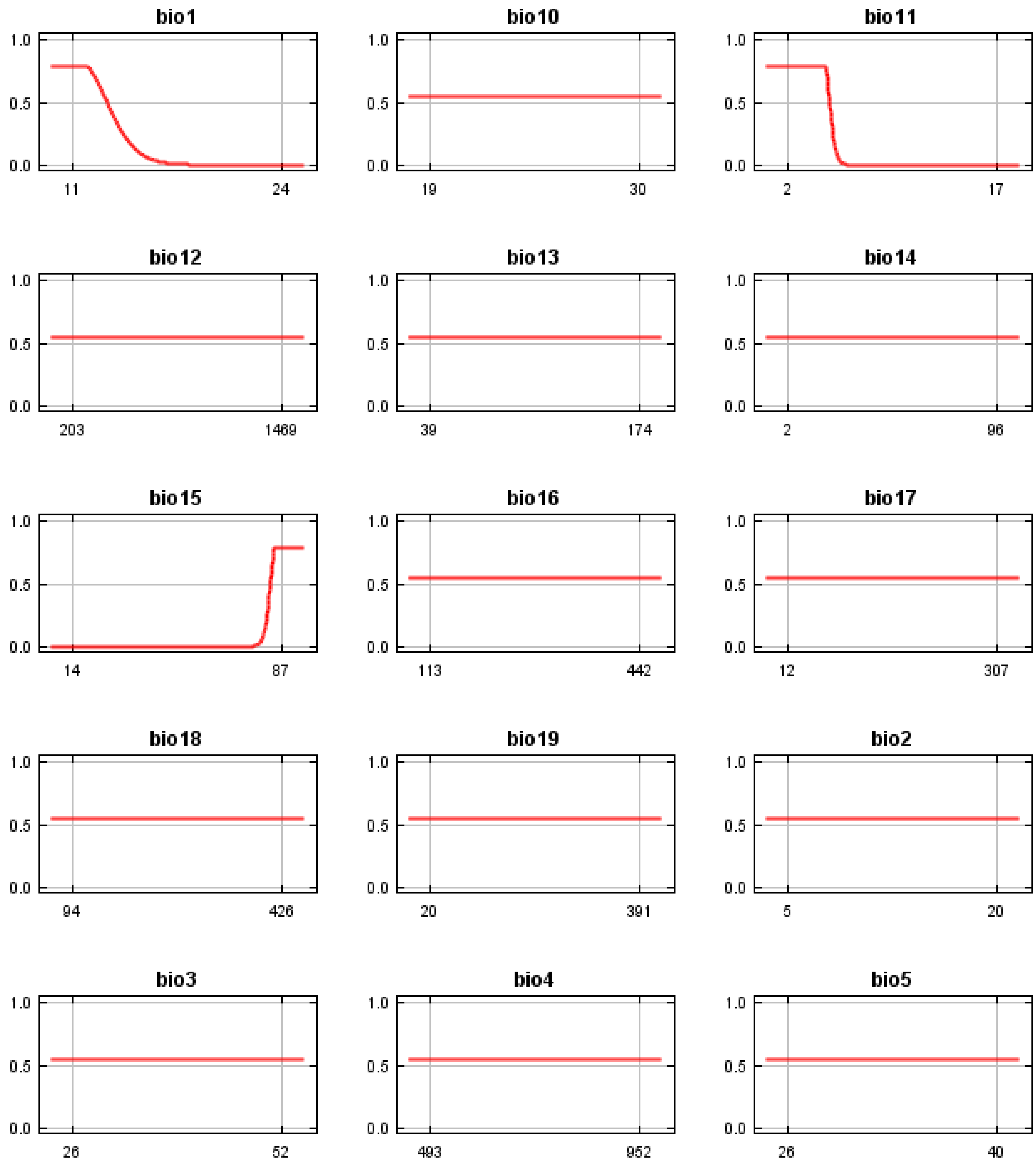
This is a representation of the Maxent model for Osmorhiza_bipatriata. Warmer colors show areas with better predicted conditions. White dots show the presence locations used for training, while violet dots show test locations. Click on the image for a full-size version.



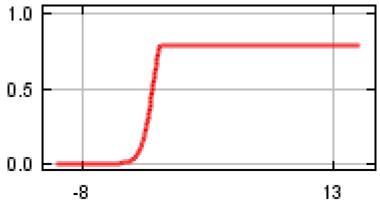
Click here to interactively explore this prediction using the Explain tool. If clicking from your browser does not succeed in starting the tool, try running the script in I:\MaxEnt Output\Osmorhiza_bipatriata_explain.bat directly. This tool requires the environmental grids to be small enough that they all fit in memory.

Response curves

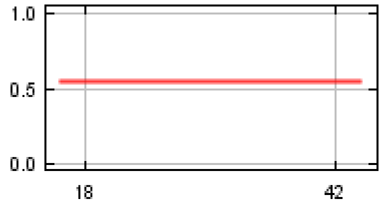
These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together.



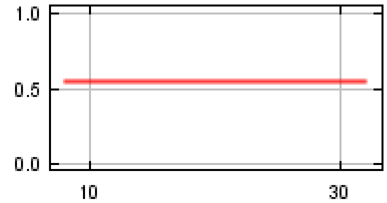
bio6



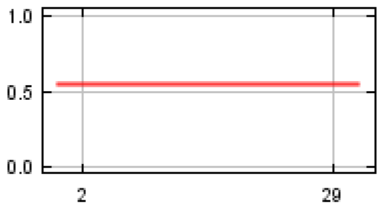
bio7



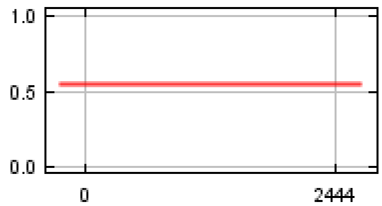
bio8



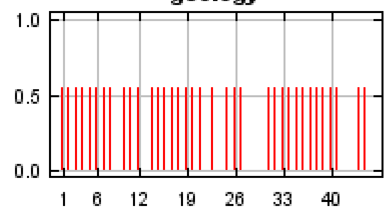
bio9



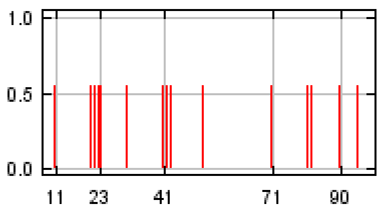
dem



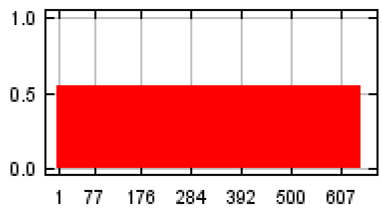
geology



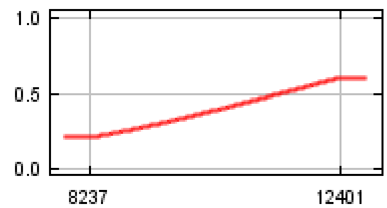
nlcd



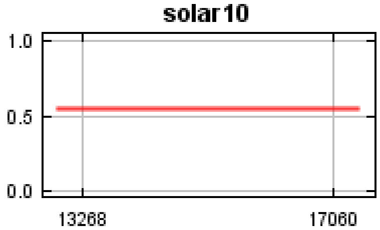
soil



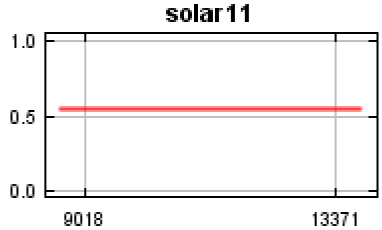
solar1



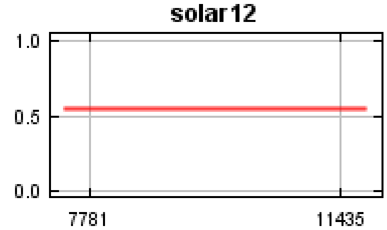
solar10



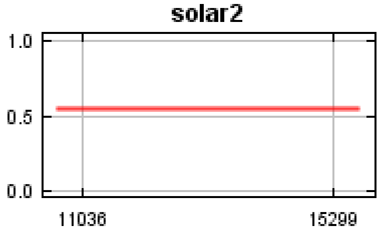
solar11



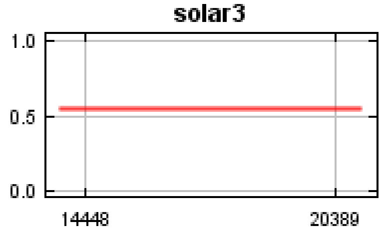
solar12



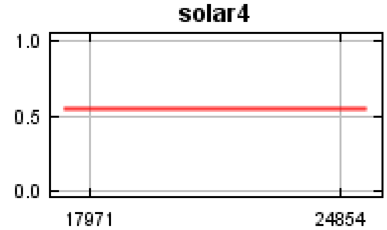
solar2



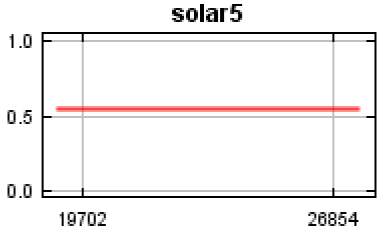
solar3



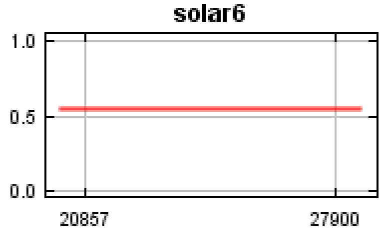
solar4



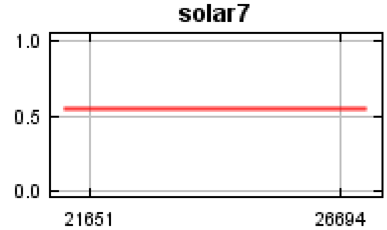
solar5

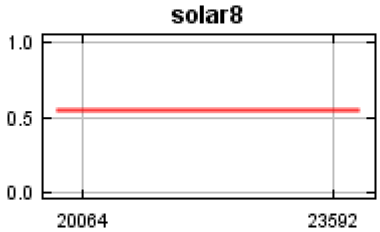


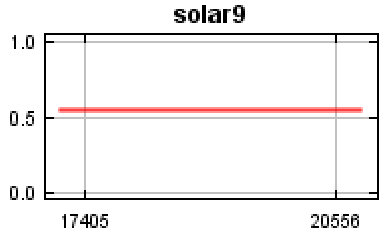
solar6



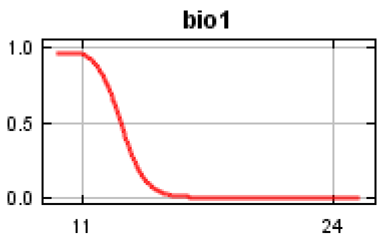
solar7

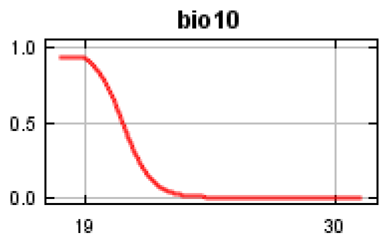


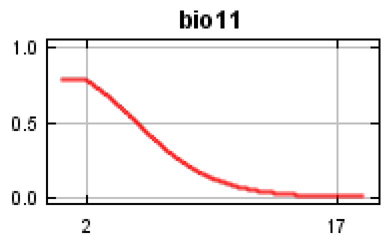


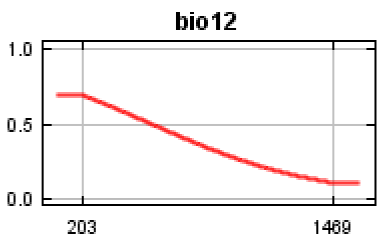


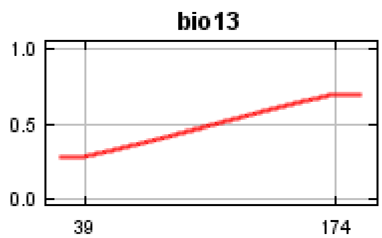
In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.

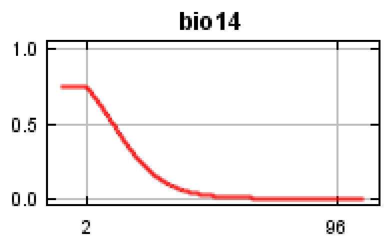


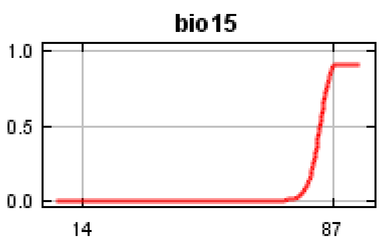


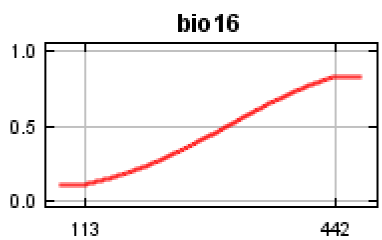


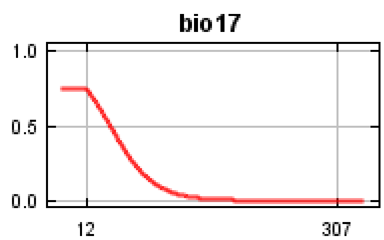


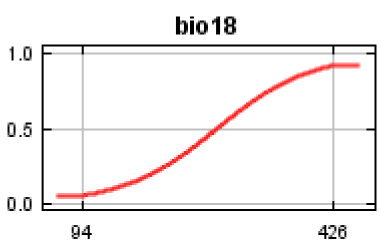


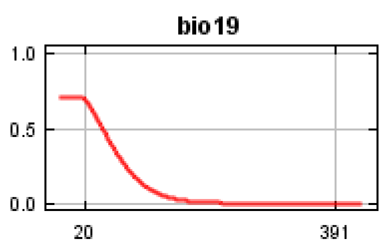


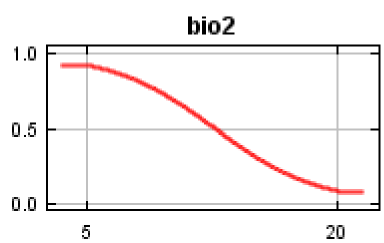




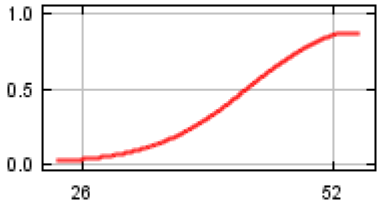




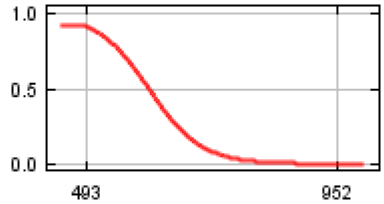




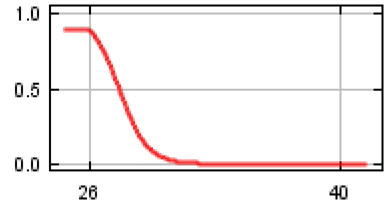
bio3



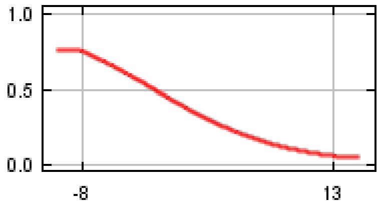
bio4



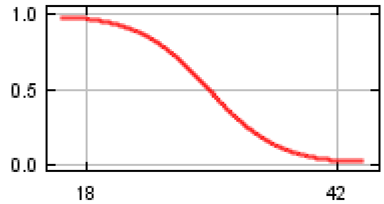
bio5



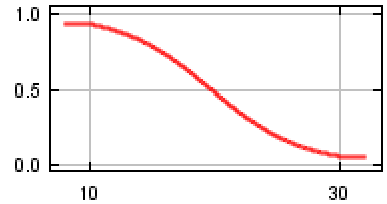
bio6



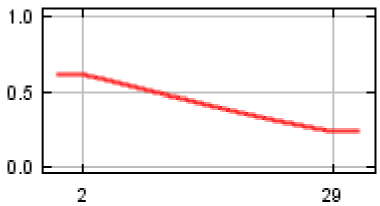
bio7



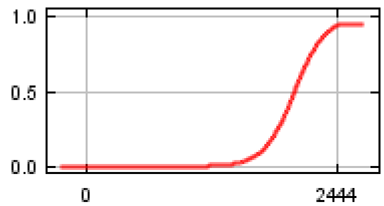
bio8



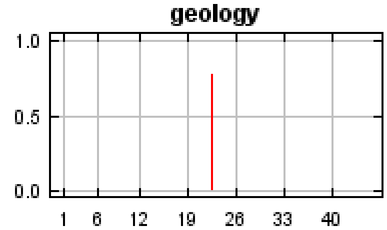
bio9



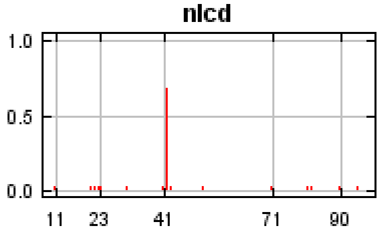
dem



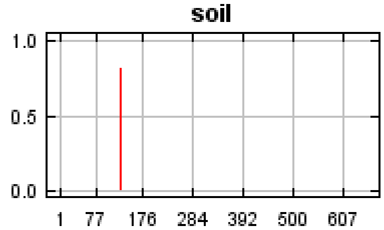
geology



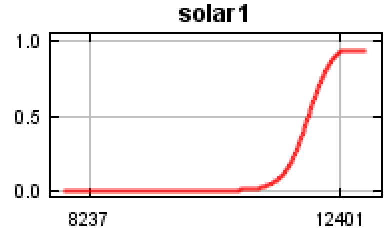
nlcd



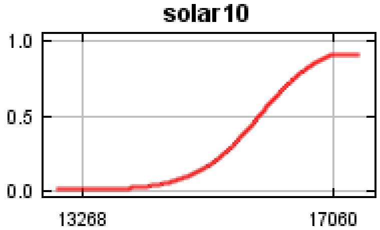
soil



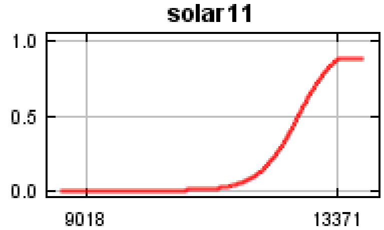
solar1



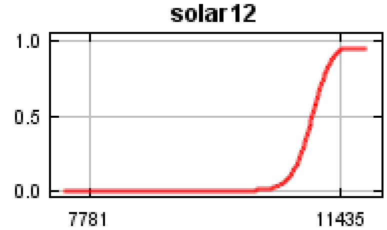
solar10



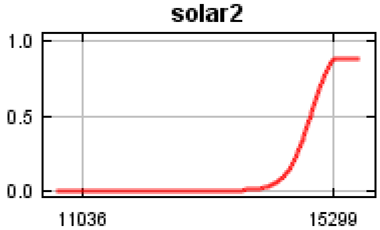
solar11



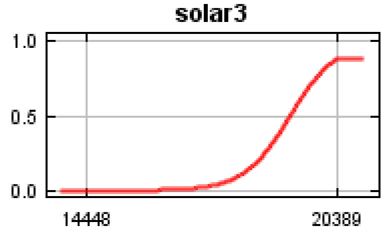
solar12



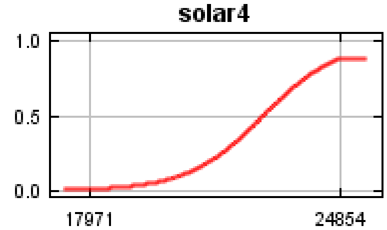
solar2

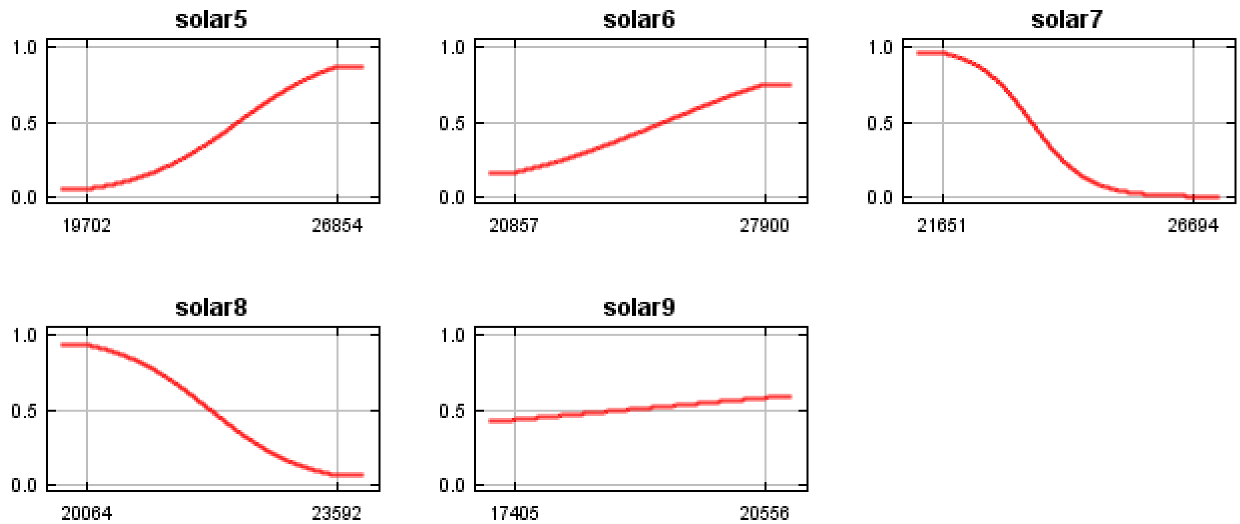


solar3



solar4





Analysis of variable contributions

The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated.

Variable	Percent contribution	Permutation importance
soil	53.5	0
geology	25.8	0
bio15	5.1	72.4
dem	4.1	0
bio11	3.3	23.8
bio1	2.4	0
bio5	1.4	0
nlcd	1.1	0
solar4	0.9	0
solar12	0.8	0
solar8	0.5	0
bio6	0.3	3.8
solar1	0.3	0
solar7	0.2	0
bio4	0.1	0
solar5	0.1	0

bio13	0	0
bio12	0	0
bio10	0	0
solar9	0	0
solar6	0	0
solar3	0	0
solar2	0	0
solar11	0	0
solar10	0	0
bio9	0	0
bio8	0	0
bio7	0	0
bio3	0	0
bio2	0	0
bio19	0	0
bio18	0	0
bio17	0	0
bio16	0	0
bio14	0	0

Raw data outputs and control parameters

The data used in the above analysis is contained in the next links. Please see the Help button for more information on these.
The model applied to the training environmental layers
The coefficients of the model
The omission and predicted area for varying cumulative and raw thresholds
The prediction strength at the training and (optionally) test presence sites
Results for all species modeled in the same Maxent run, with summary statistics and (optionally) jackknife results

Regularized training gain is 7.858, training AUC is 1.000, unregularized training gain is 8.060.
Unregularized test gain is 3.389.
Test AUC is 0.999, standard deviation is -1.000 (calculated as in DeLong, DeLong & Clarke-Pearson 1988, equation 2; a value of -1 indicates that only one test point was used).
Algorithm converged after 220 iterations (0 seconds).

The follow settings were used during the run:
3 presence records used for training, 1 for testing.
10003 points used to determine the Maxent distribution (background points and presence points).
Environmental layers used: bio1 bio10 bio11 bio12 bio13 bio14 bio15 bio16 bio17 bio18 bio19 bio2 bio3 bio4

bio5 bio6 bio7 bio8 bio9 dem geology(categorical) nlcd(categorical) soil(categorical) solar1 solar10 solar11 solar12 solar2 solar3 solar4 solar5 solar6 solar7 solar8 solar9
Regularization values: linear/quadratic/product: 1.000, categorical: 0.605, threshold: 1.970, hinge: 0.500
Feature types used: linear
responsecurves: true
outputformat: logistic
outputdirectory: I:\MaxEnt Output
samplesfile: I:\TXDOT Species Info\Osmorhiza bipatriata.csv
environmentallayers: I:\ASCII_layers
randomseed: true
randomtestpoints: 25
replicatetype: subsample
writebackgroundpredictions: true
writeplotdata: true
maximumiterations: 5000
adjustsampleradius: -6
Command line used:

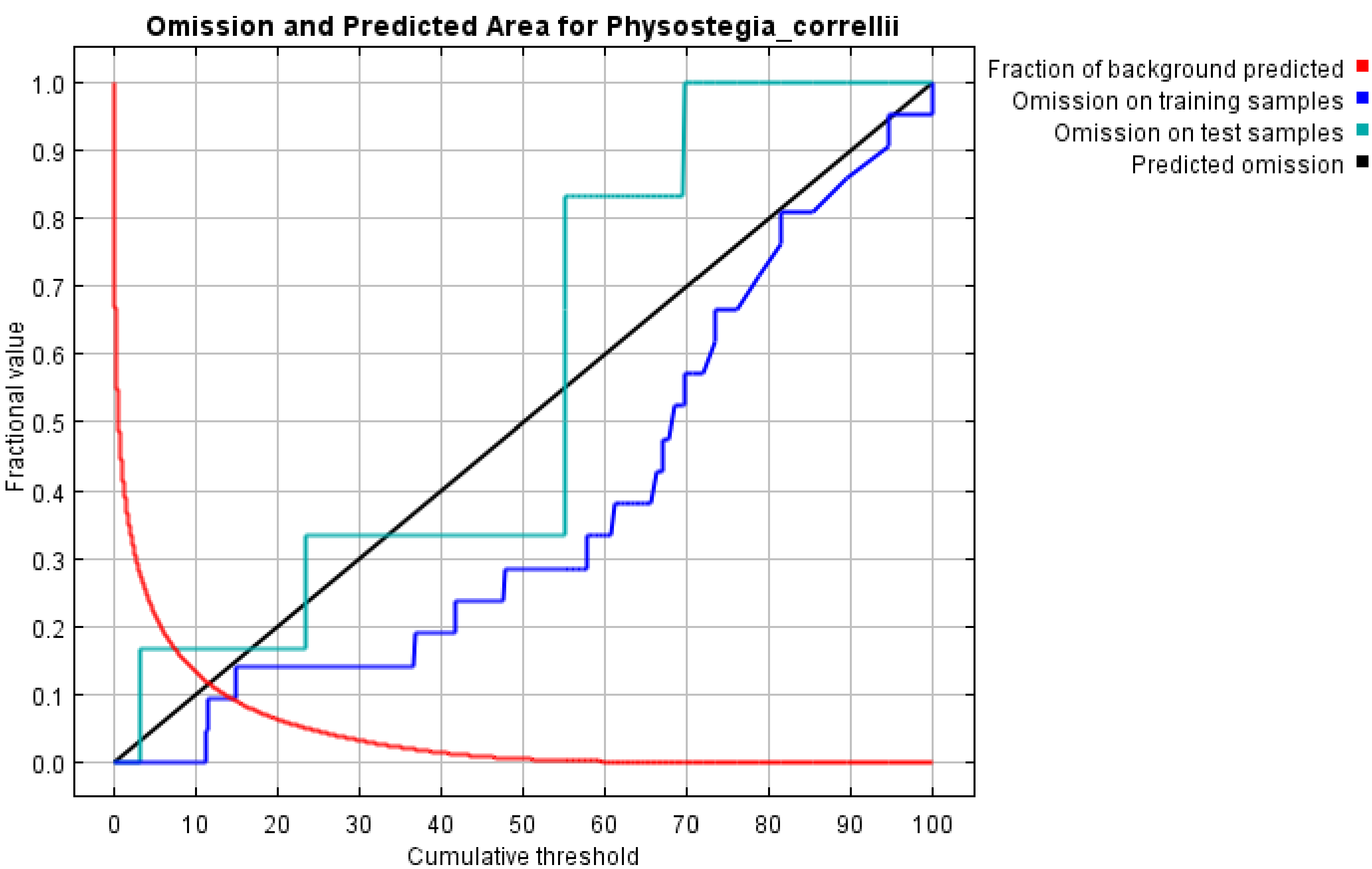
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Osmorhiza_bipatriata responsecurves outputformat=logistic "outputdirectory=I:\MaxEnt Output" "samplesfile=I:\TXDOT Species Info\Osmorhiza bipatriata.csv" environmentallayers=I:\ASCII_layers randomseed randomtestpoints=25 replicatetype=subsample writebackgroundpredictions writeplotdata maximumiterations=5000 adjustsampleradius=-6 -t geology -t nlcd -t soil

Maxent model for Physostegia_correllii

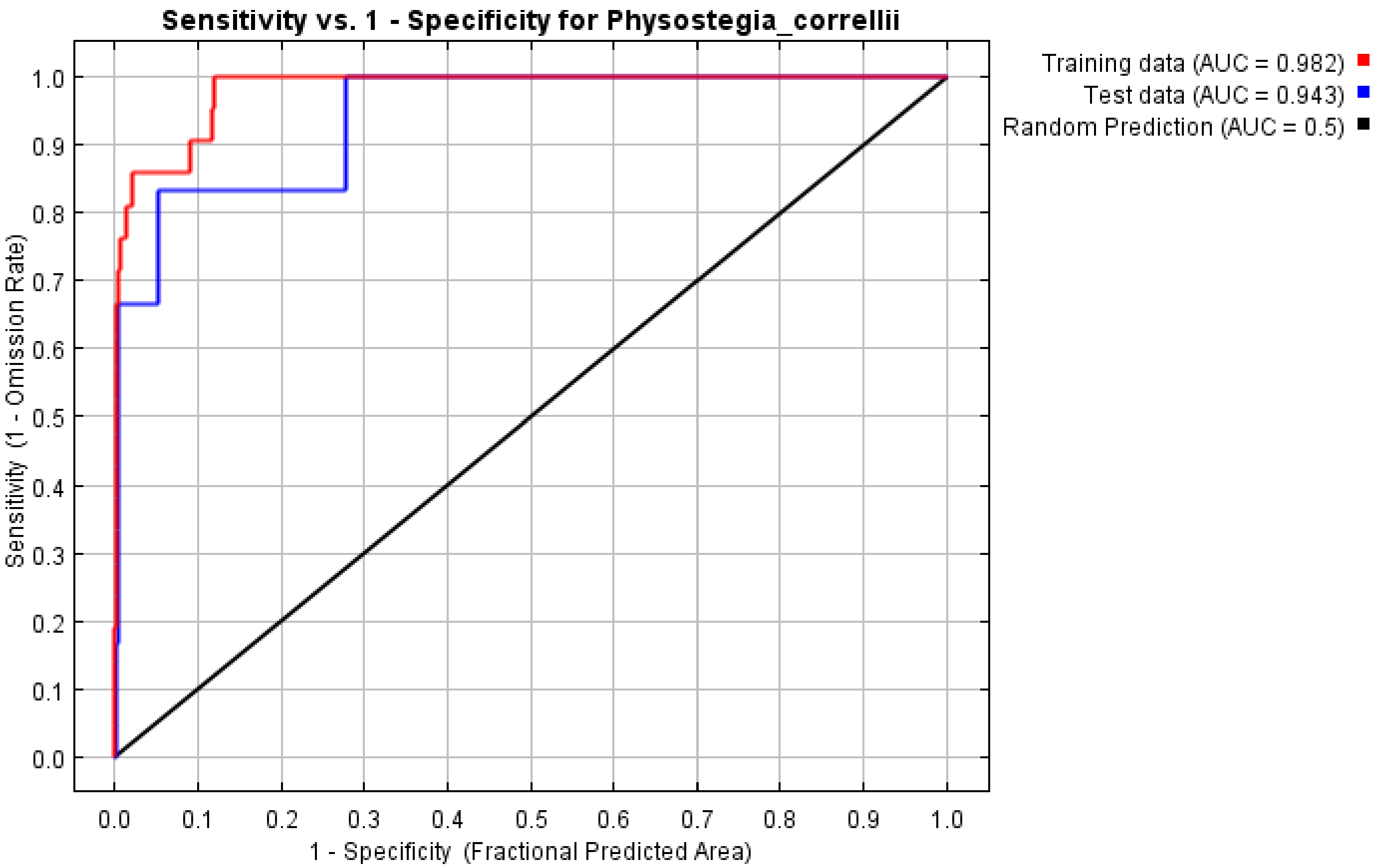
This page contains some analysis of the Maxent model for Physostegia_correllii, created Tue Jun 01 19:32:31 EDT 2021 using Maxent version 3.4.1. If you would like to do further analyses, the raw data used here is linked to at the end of this page.

Analysis of omission/commission

The following picture shows the omission rate and predicted area as a function of the cumulative threshold. The omission rate is is calculated both on the training presence records, and (if test data are used) on the test records. The omission rate should be close to the predicted omission, because of the definition of the cumulative threshold.



The next picture is the receiver operating characteristic (ROC) curve for the same data. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). This implies that the maximum achievable AUC is less than 1. If test data is drawn from the Maxent distribution itself, then the maximum possible test AUC would be 0.948 rather than 1; in practice the test AUC may exceed this bound.



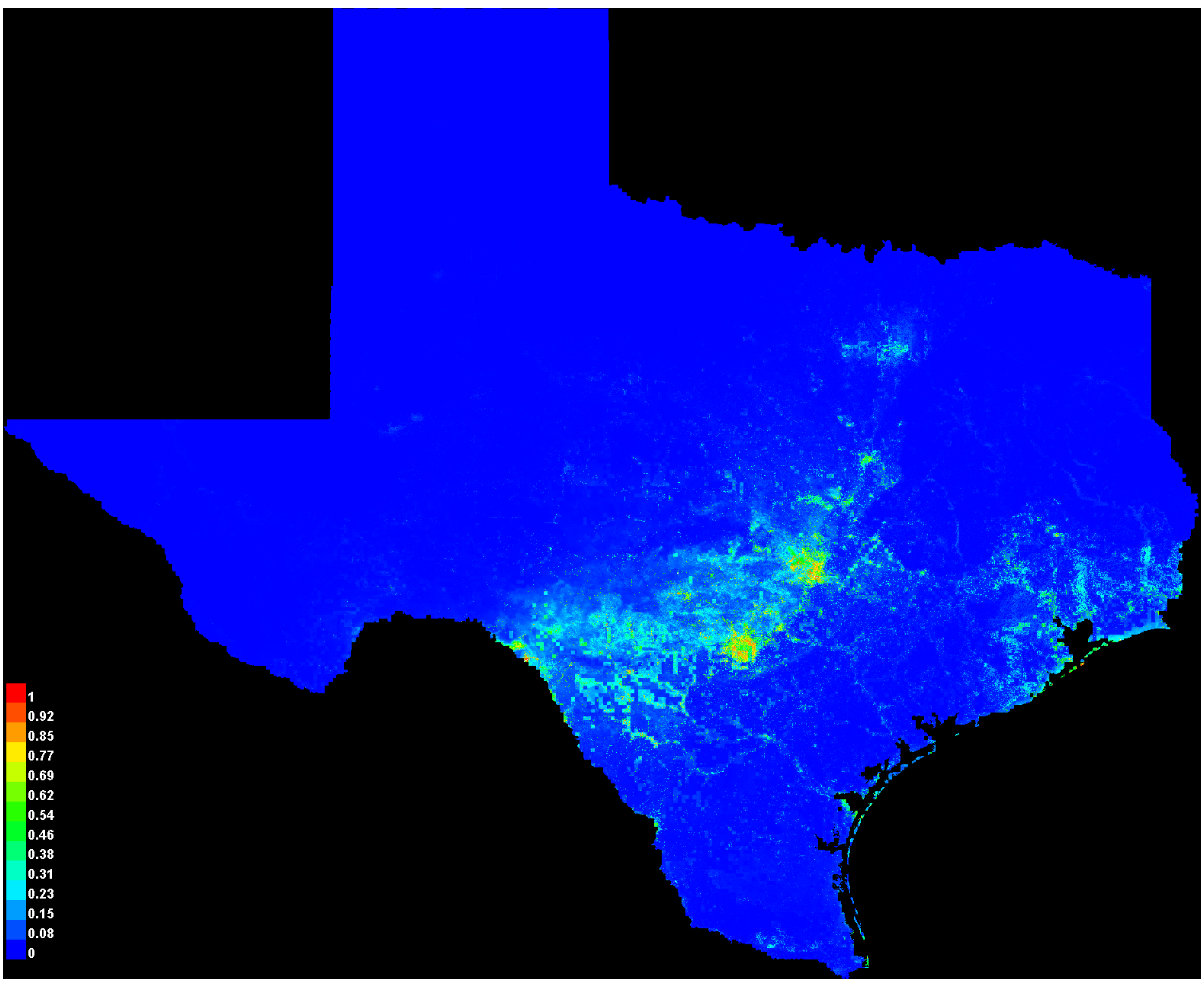
Some common thresholds and corresponding omission rates are as follows. If test data are available, binomial probabilities are calculated exactly if the number of test samples is at most 25, otherwise using a normal approximation to the binomial. These are 1-sided p-values for the null hypothesis that test points are predicted no better than by a random prediction with the same fractional predicted area. The "Balance" threshold minimizes 6 * training omission rate + .04 * cumulative threshold + 1.6 * fractional predicted area.

Cumulative threshold	Logistic threshold	Description	Fractional predicted area	Training omission rate	Test omission rate	P-value
1.000	0.004	Fixed cumulative value 1	0.426	0.000	0.000	5.977E-3
5.000	0.019	Fixed cumulative value 5	0.217	0.000	0.167	2.388E-3
10.000	0.044	Fixed cumulative value 10	0.133	0.000	0.167	2.246E-4
11.283	0.051	Minimum training presence	0.120	0.000	0.167	1.346E-4
14.837	0.072	10 percentile training presence	0.092	0.095	0.167	3.575E-5
14.305	0.069	Equal training sensitivity and specificity	0.095	0.095	0.167	4.32E-5
11.283	0.051	Maximum training sensitivity plus specificity	0.120	0.000	0.167	1.346E-4

7.495	0.031	Equal test sensitivity and specificity	0.167	0.000	0.167	6.641E-4
23.348	0.135	Maximum test sensitivity plus specificity	0.052	0.143	0.167	2.16E-6
5.200	0.020	Balance training omission, predicted area and threshold value	0.212	0.000	0.167	2.132E-3
23.528	0.136	Equate entropy of thresholded and original distributions	0.051	0.143	0.333	9.622E-5

Pictures of the model

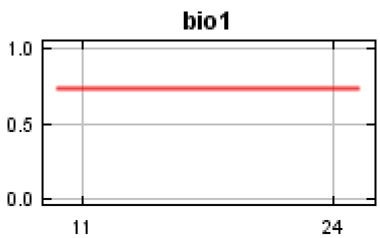
This is a representation of the Maxent model for Physostegia_correllii. Warmer colors show areas with better predicted conditions. White dots show the presence locations used for training, while violet dots show test locations. Click on the image for a full-size version.

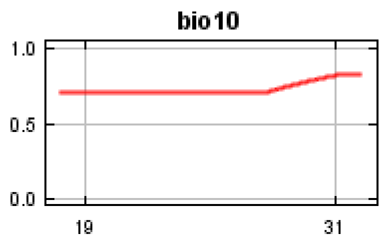


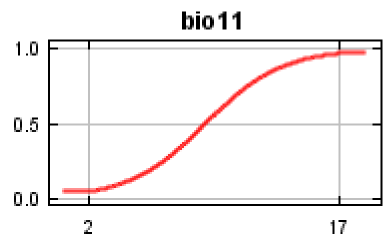
Click here to interactively explore this prediction using the Explain tool. If clicking from your browser does not succeed in starting the tool, try running the script in F:\MaxEnt Output\Physostegia_correllii_explain.bat directly. This tool requires the environmental grids to be small enough that they all fit in memory.

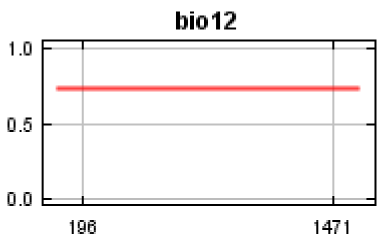
Response curves

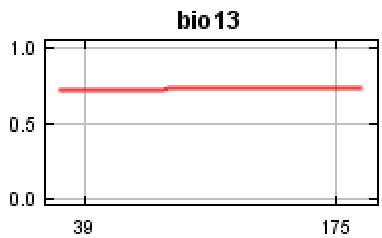
These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together.

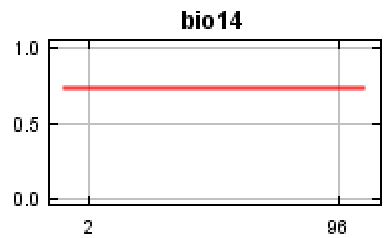


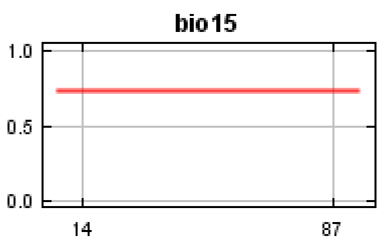


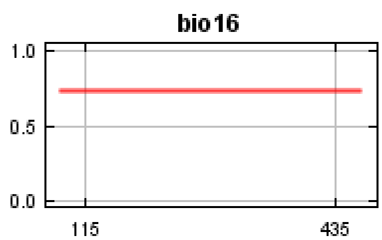


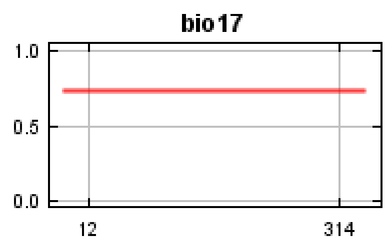


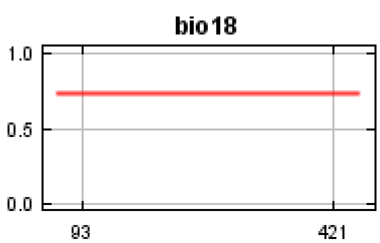


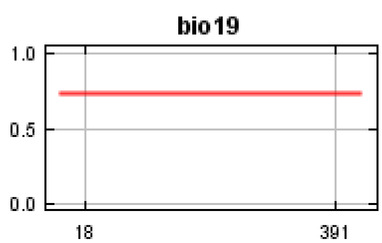


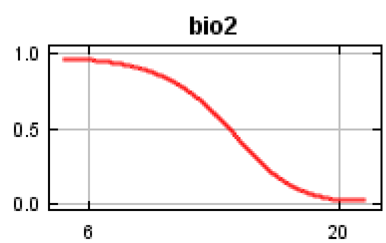


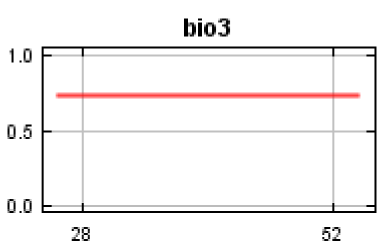


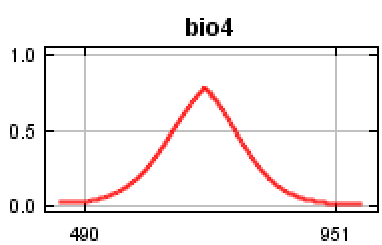


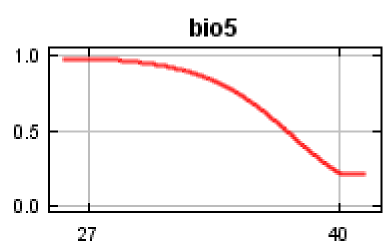




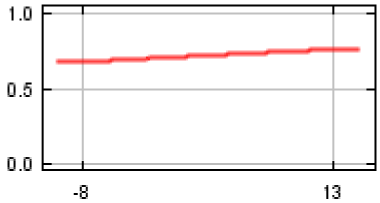




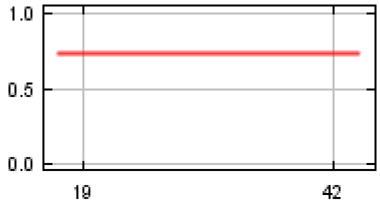




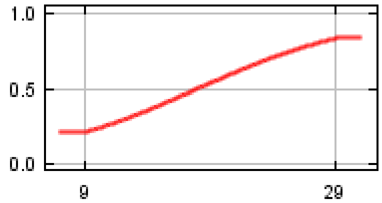
bio6



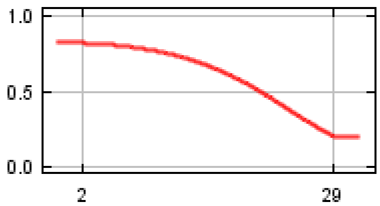
bio7



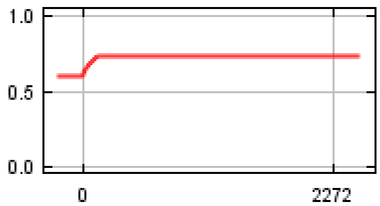
bio8



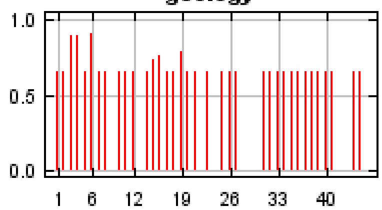
bio9



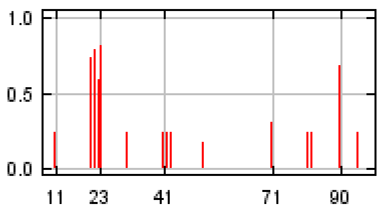
dem



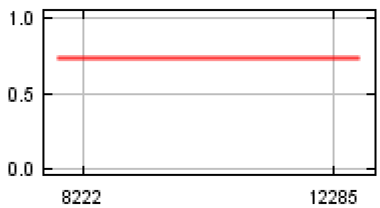
geology



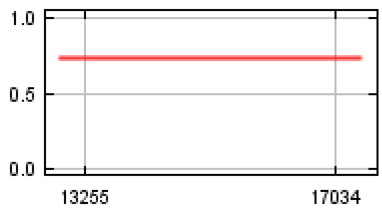
nlcd



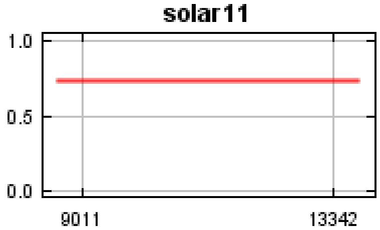
solar1



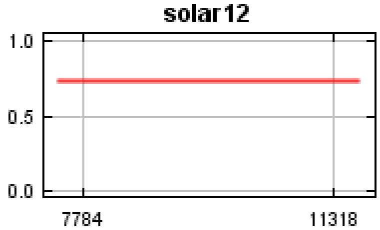
solar10



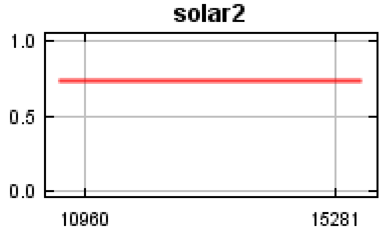
solar11



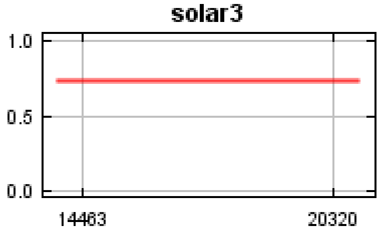
solar12



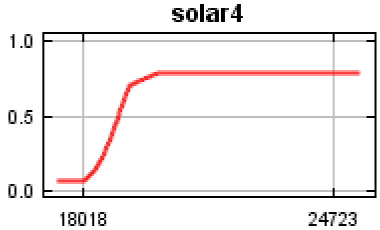
solar2



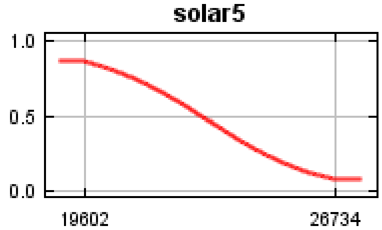
solar3



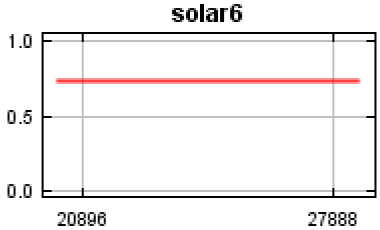
solar4



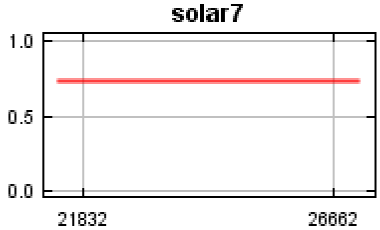
solar5



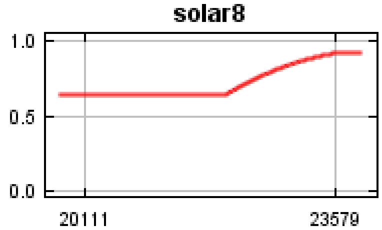
solar6

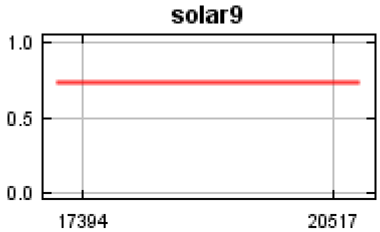


solar7

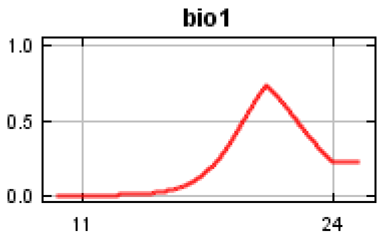


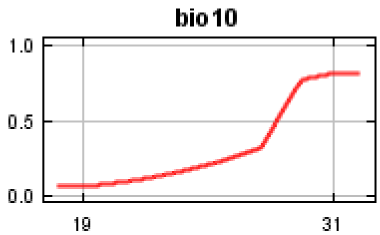
solar8

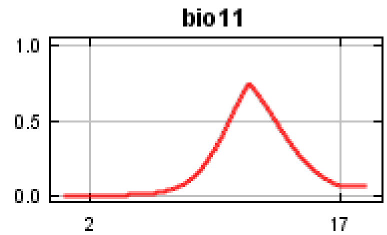


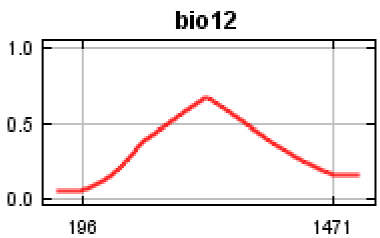


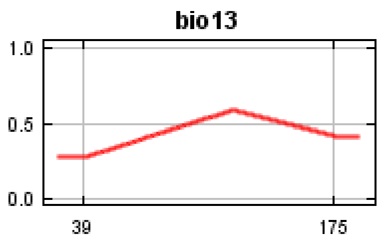
In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.

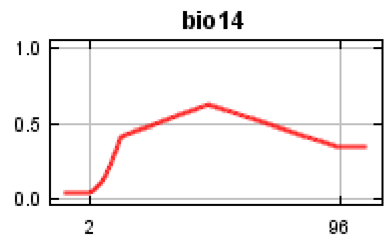


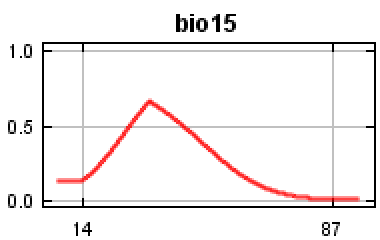


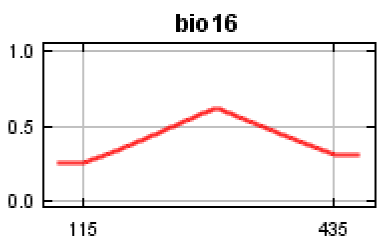


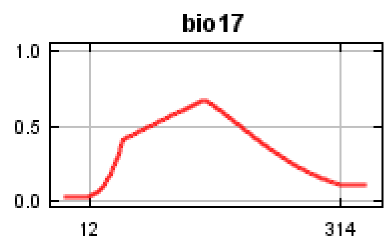


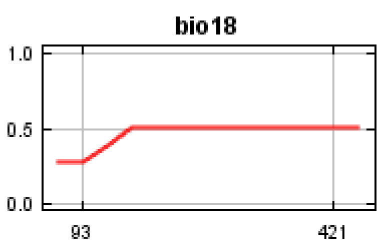


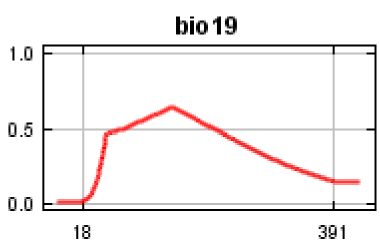


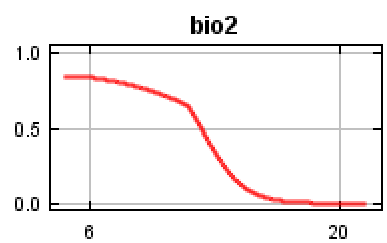


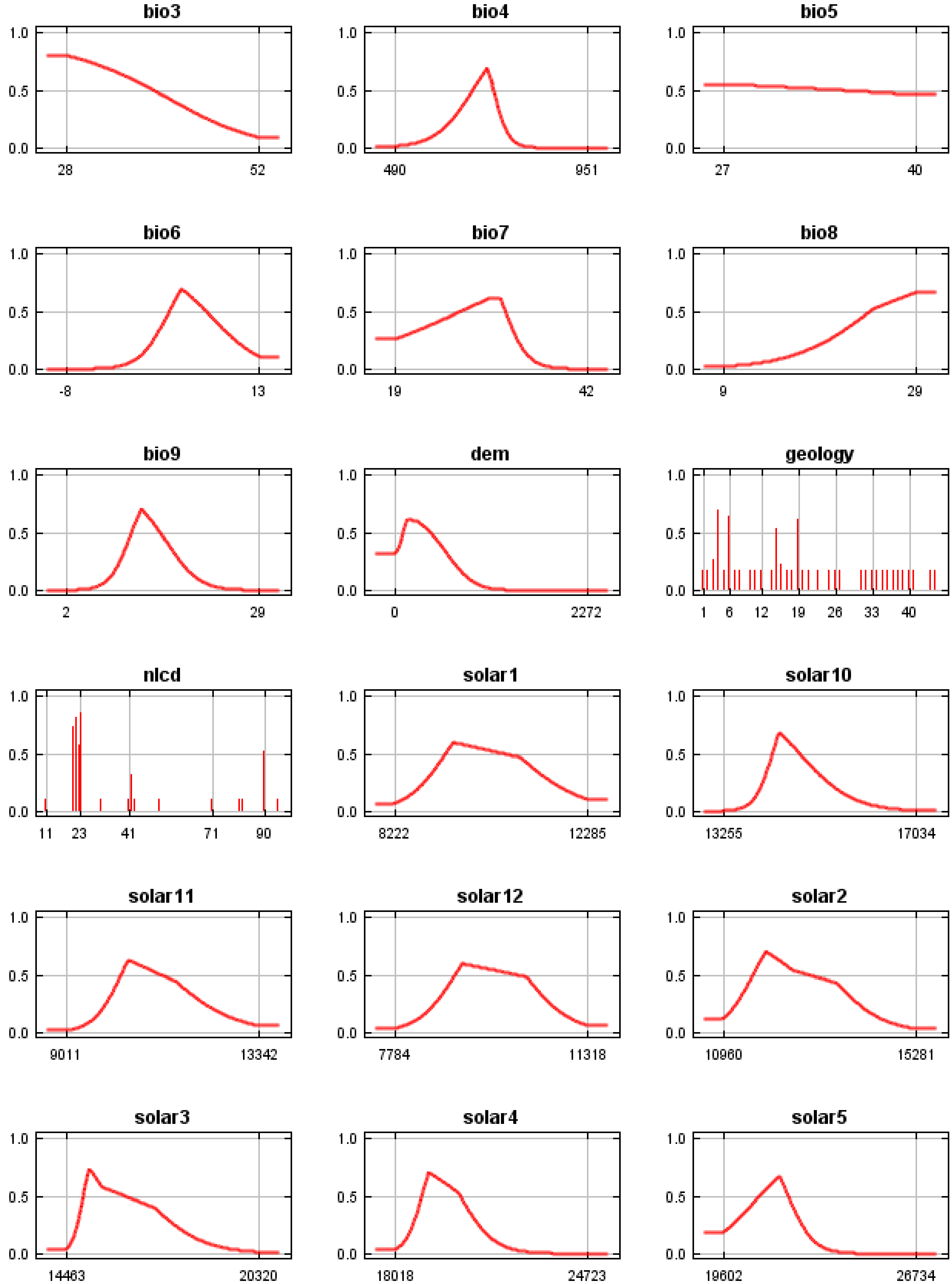











bio3
1.0
0.5
0.0
28
52
bio4
490
951
bio5
27
40
bio6
-8
13
bio7
19
42
bio8
9
29
bio9
2
29
dem
0
2272
geology
1
6
12
19
26
33
40
nlcd
11
23
41
71
90
solar1
8222
12285
solar10
13255
17034
solar11
9011
13342
solar12
7784
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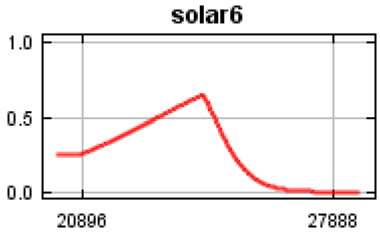
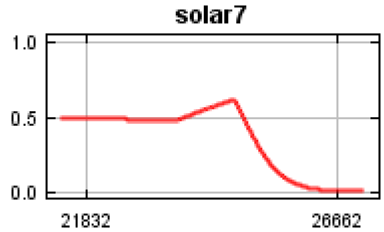
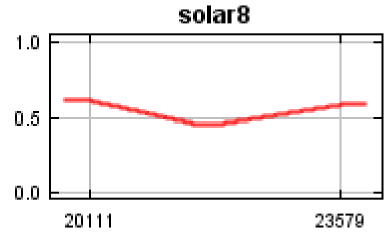
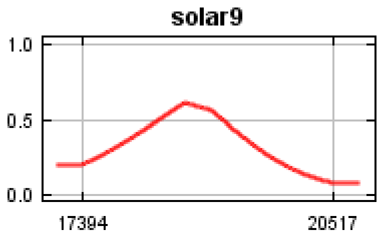
solar5
19602
26734









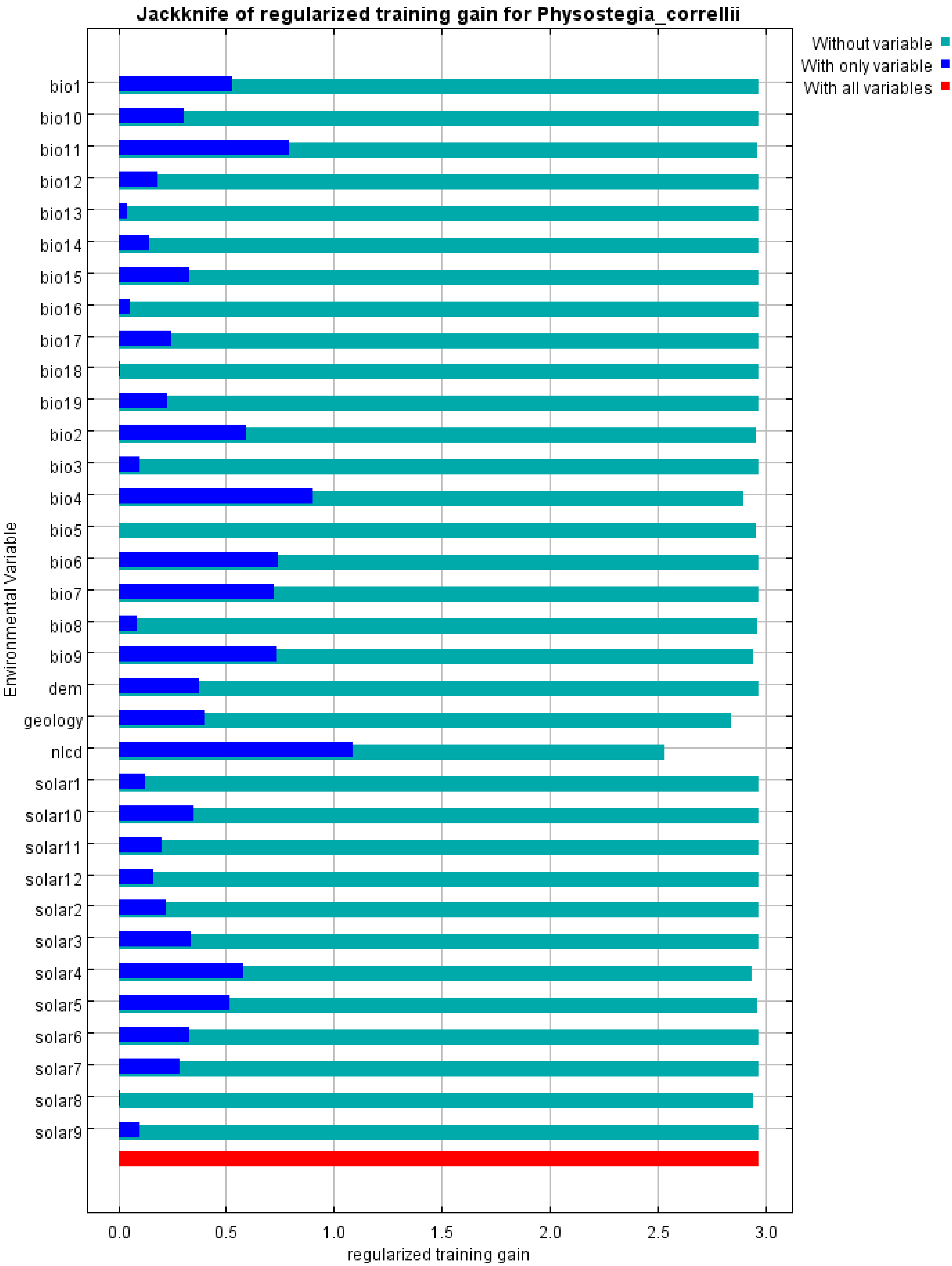
Analysis of variable contributions

The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated.

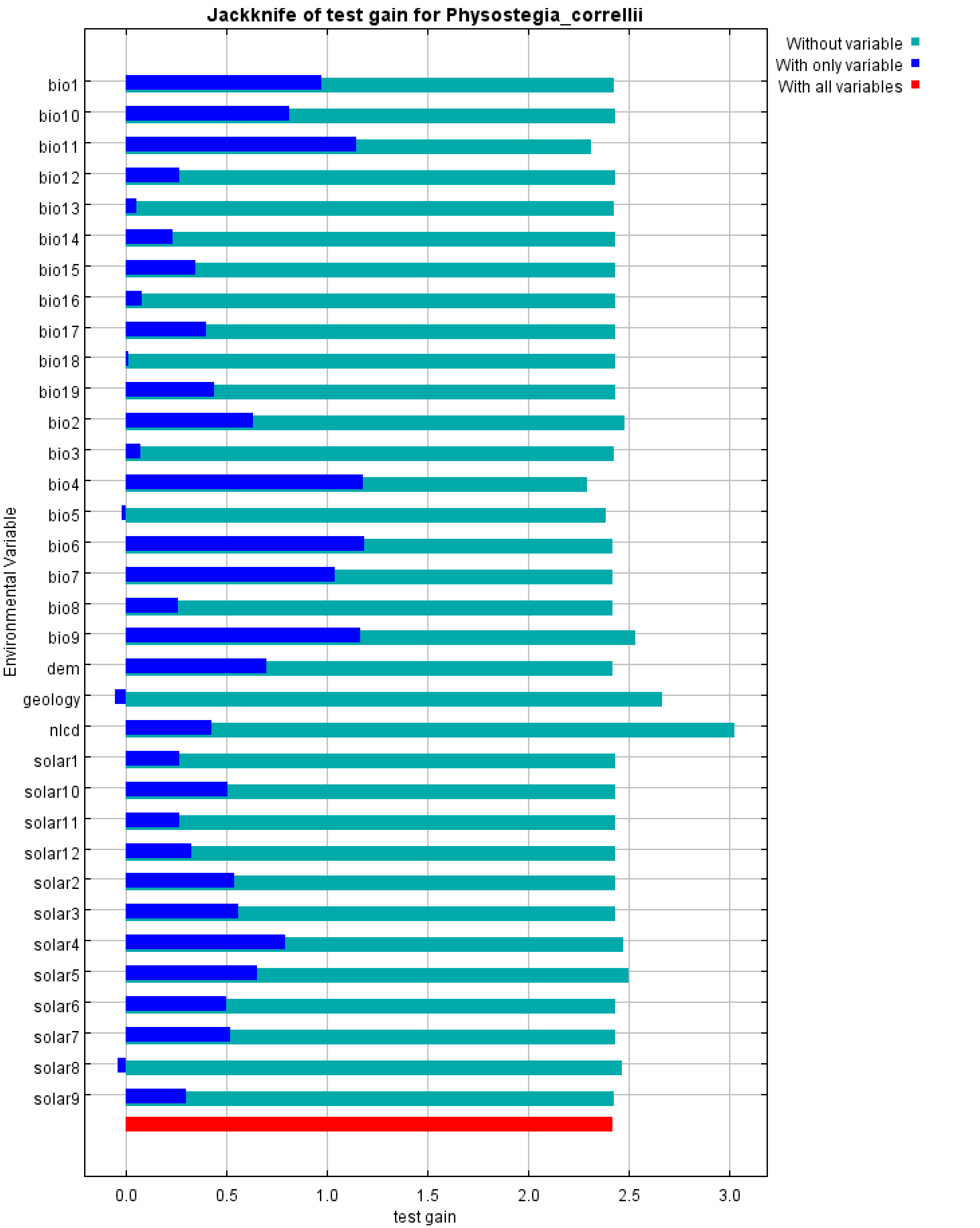
Variable	Percent contribution	Permutation importance
nlcd	33	16.9
bio7	18.2	0
solar4	11	20.9
bio4	9.6	13.7
geology	9.4	18.2
bio9	6.9	0
bio2	3.8	0
bio10	3.1	0
solar8	2.7	0
bio3	0.8	0
solar5	0.8	12.9
dem	0.3	0.7
bio11	0.1	7.7
bio5	0.1	4.2
bio8	0.1	4.6
bio13	0	0.1

bio6	0	0
solar9	0	0
solar7	0	0
solar6	0	0
solar3	0	0
solar2	0	0
solar12	0	0
solar11	0	0
solar10	0	0
solar1	0	0
bio19	0	0
bio18	0	0
bio17	0	0
bio16	0	0
bio15	0	0
bio14	0	0
bio12	0	0
bio1	0	0

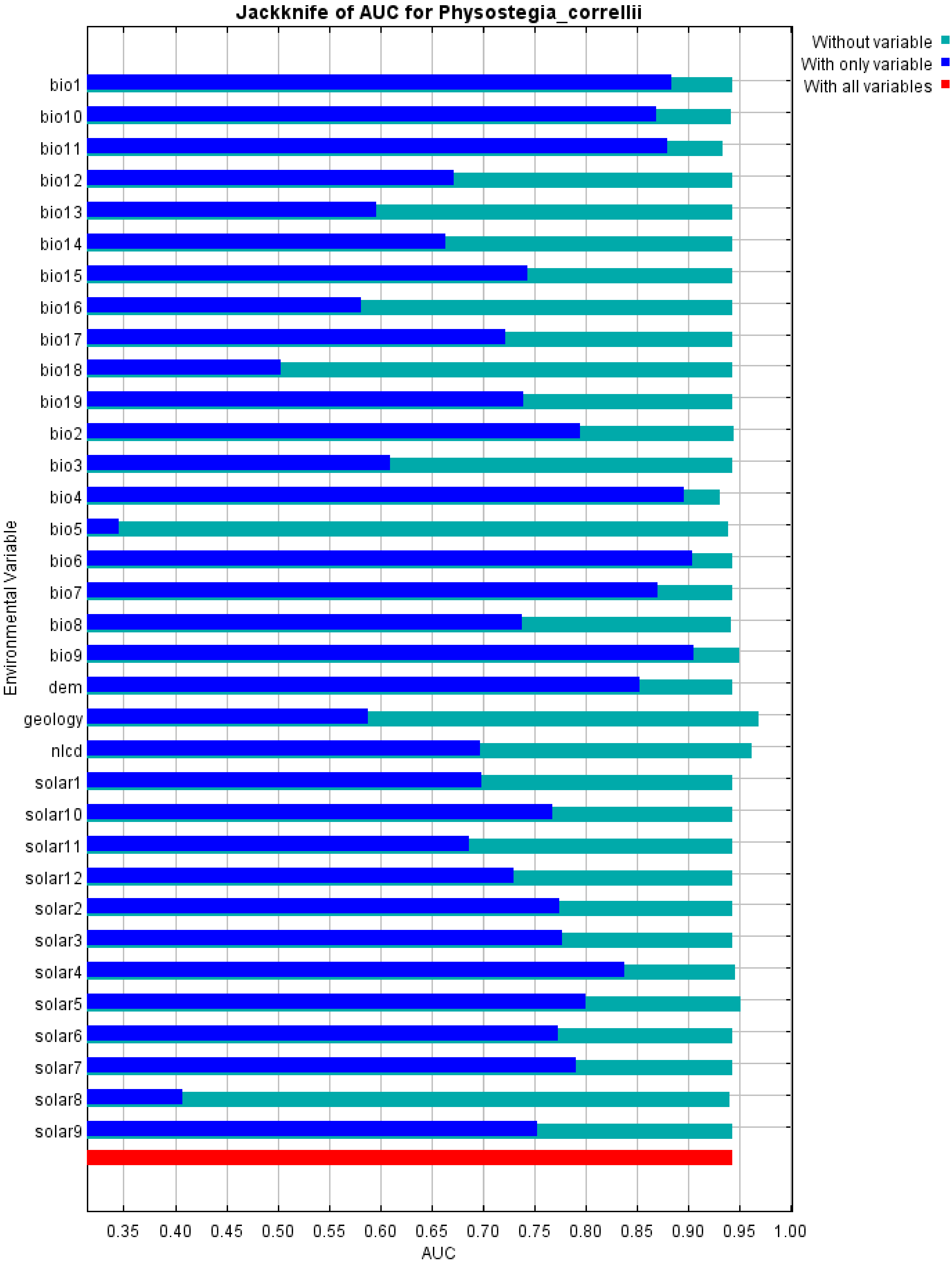
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is nlcd, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is nlcd, which therefore appears to have the most information that isn't present in the other variables.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



Raw data outputs and control parameters

The data used in the above analysis is contained in the next links. Please see the Help button for more information on these.
The model applied to the training environmental layers
The coefficients of the model
The omission and predicted area for varying cumulative and raw thresholds
The prediction strength at the training and (optionally) test presence sites
Results for all species modeled in the same Maxent run, with summary statistics and (optionally) jackknife results

Regularized training gain is 2.969, training AUC is 0.982, unregularized training gain is 3.965.
Unregularized test gain is 2.420.
Test AUC is 0.943, standard deviation is 0.041 (calculated as in DeLong, DeLong & Clarke-Pearson 1988, equation 2).
Algorithm converged after 1060 iterations (49 seconds).

The follow settings were used during the run:
21 presence records used for training, 6 for testing.
10021 points used to determine the Maxent distribution (background points and presence points).
Environmental layers used: bio1 bio10 bio11 bio12 bio13 bio14 bio15 bio16 bio17 bio18 bio19 bio2 bio3 bio4 bio5 bio6 bio7 bio8 bio9 dem geology(categorical) nlcd(categorical) solar1 solar10 solar11 solar12 solar2 solar3 solar4 solar5 solar6 solar7 solar8 solar9
Regularization values: linear/quadratic/product: 0.423, categorical: 0.250, threshold: 1.790, hinge: 0.500
Feature types used: hinge linear quadratic
responsecurves: true
jackknife: true
outputformat: logistic
outputdirectory: F:\MaxEnt Output
samplesfile: F:\TXDOT Species Info\Physostegia correllii.csv
environmentallayers: F:\ASCII_layers
randomseed: true
randomtestpoints: 25
replicatetype: subsample
writebackgroundpredictions: true
writeplotdata: true
maximumiterations: 5000
adjustsampleradius: -6
applythresholdrule: 10 percentile training presence
Command line used:

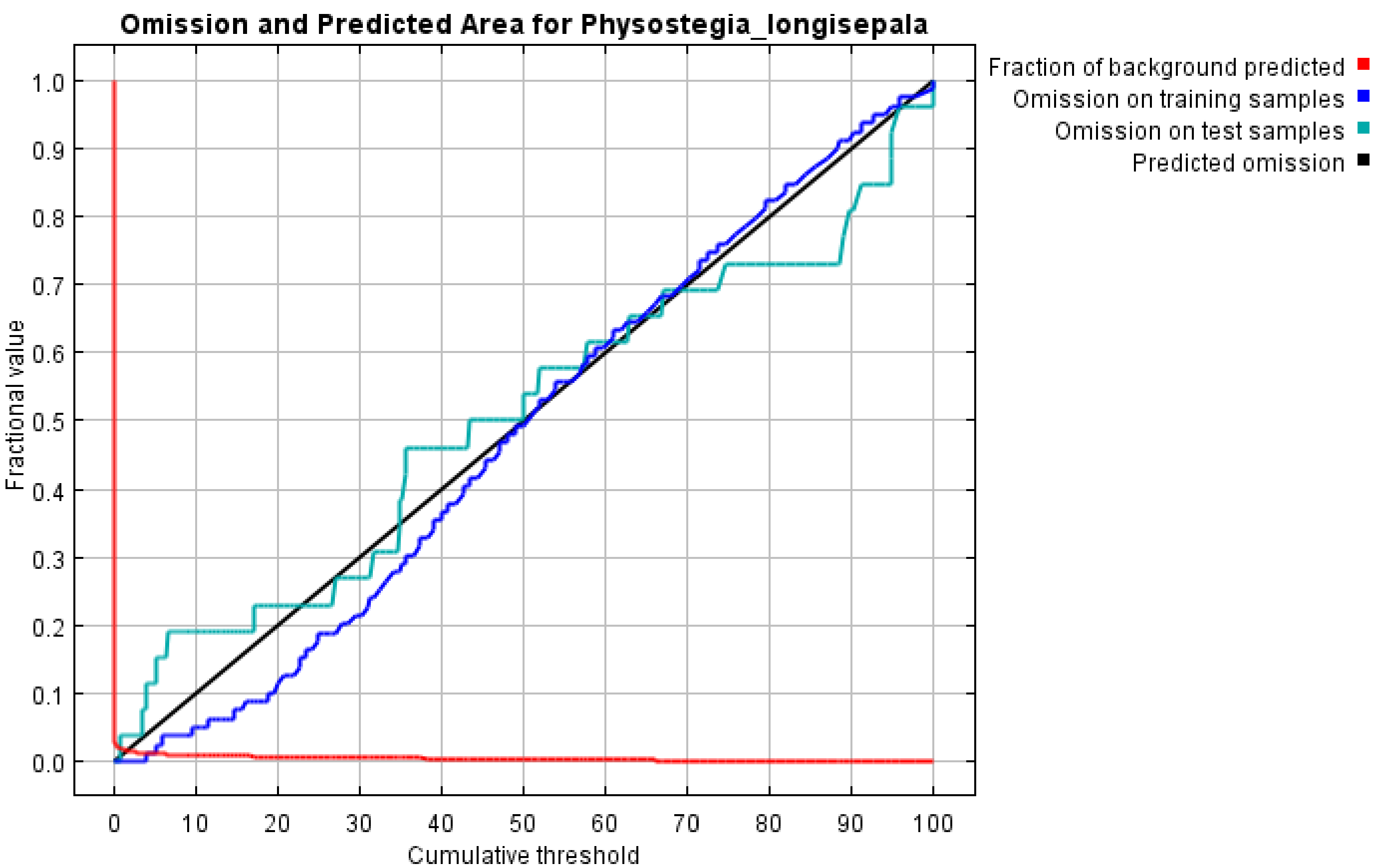
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Physostegia_correllii responsecurves jackknife outputformat=logistic "outputdirectory=F:\MaxEnt Output" "samplesfile=F:\TXDOT Species Info\Physostegia correllii.csv" environmentallayers=F:\ASCII_layers randomseed randomtestpoints=25 replicatetype=subsample writebackgroundpredictions writeplotdata maximumiterations=5000 adjustsampleradius=-6 "applythresholdrule=10 percentile training presence" -N soil -t geology -t nlcd

Maxent model for Physostegia_longisepala

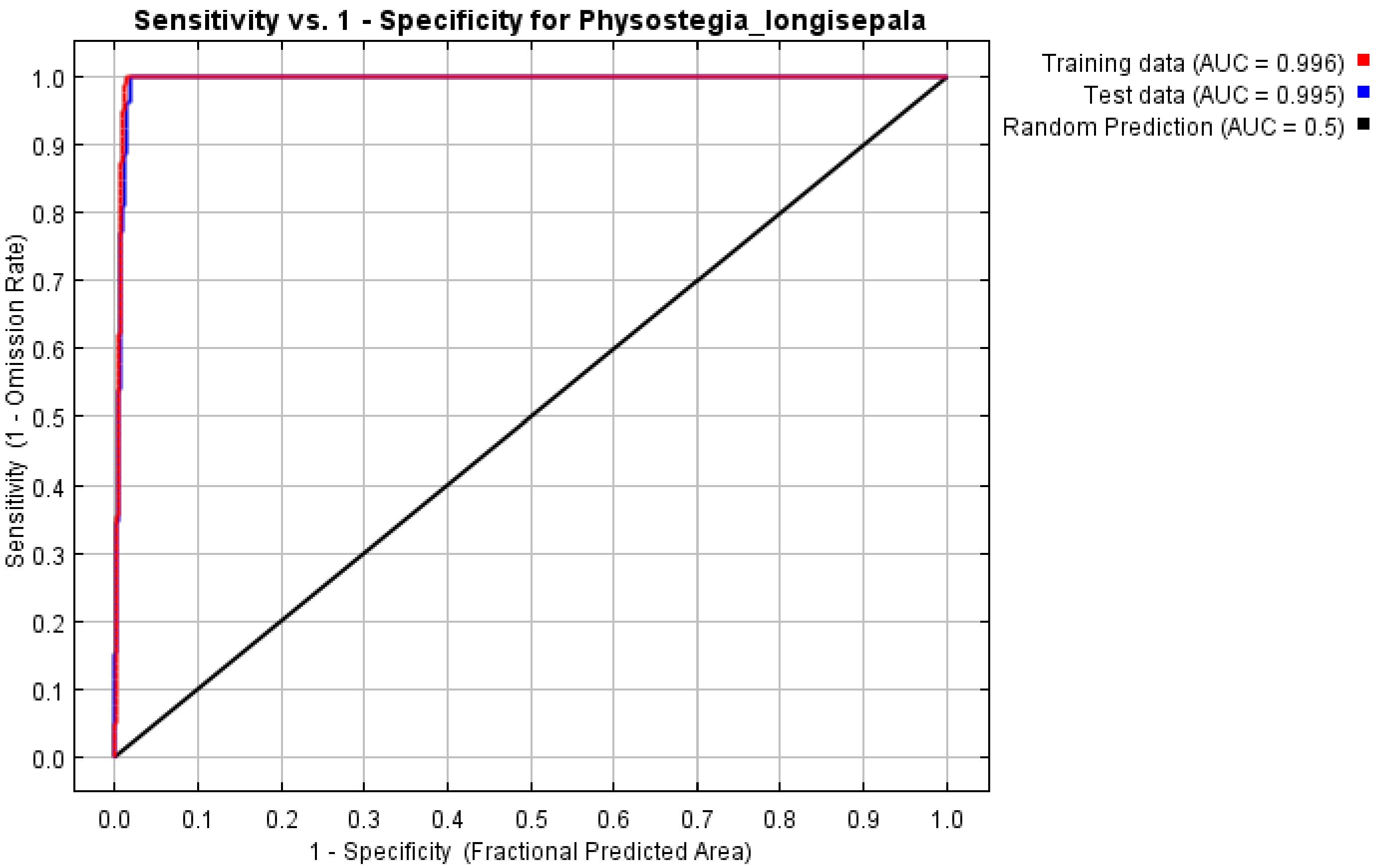
This page contains some analysis of the Maxent model for Physostegia_longisepala, created Thu Jan 23 13:28:01 CST 2020 using Maxent version 3.4.1. If you would like to do further analyses, the raw data used here is linked to at the end of this page.

Analysis of omission/commission

The following picture shows the omission rate and predicted area as a function of the cumulative threshold. The omission rate is is calculated both on the training presence records, and (if test data are used) on the test records. The omission rate should be close to the predicted omission, because of the definition of the cumulative threshold.



The next picture is the receiver operating characteristic (ROC) curve for the same data. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). This implies that the maximum achievable AUC is less than 1. If test data is drawn from the Maxent distribution itself, then the maximum possible test AUC would be 0.995 rather than 1; in practice the test AUC may exceed this bound.



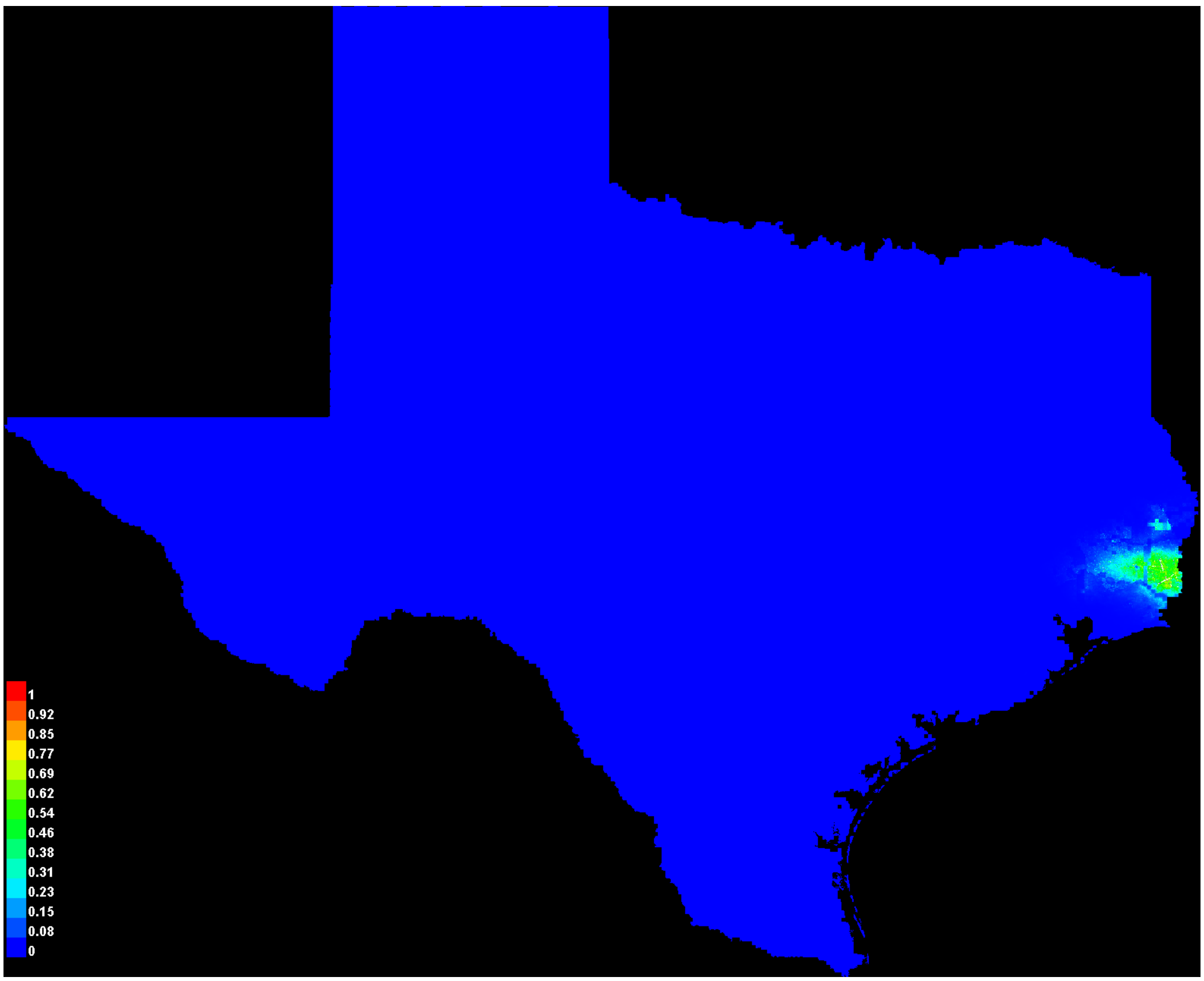
Some common thresholds and corresponding omission rates are as follows. If test data are available, binomial probabilities are calculated exactly if the number of test samples is at most 25, otherwise using a normal approximation to the binomial. These are 1-sided p-values for the null hypothesis that test points are predicted no better than by a random prediction with the same fractional predicted area. The "Balance" threshold minimizes 6 * training omission rate + .04 * cumulative threshold + 1.6 * fractional predicted area.

Cumulative threshold	Logistic threshold	Description	Fractional predicted area	Training omission rate	Test omission rate	P-value
1.000	0.028	Fixed cumulative value 1	0.019	0.000	0.038	0E0
5.000	0.159	Fixed cumulative value 5	0.012	0.013	0.115	0E0
10.000	0.294	Fixed cumulative value 10	0.010	0.051	0.192	0E0
3.899	0.127	Minimum training presence	0.013	0.000	0.115	0E0
18.837	0.435	10 percentile training presence	0.008	0.089	0.231	0E0
4.385	0.140	Equal training sensitivity and specificity	0.013	0.013	0.115	0E0
3.899	0.127	Maximum training sensitivity plus specificity	0.013	0.000	0.115	0E0
0.841	0.025	Equal test sensitivity and specificity	0.019	0.000	0.038	0E0
0.839	0.025	Maximum test sensitivity plus specificity	0.019	0.000	0.000	0E0

0.175	0.005	Balance training omission, predicted area and threshold value	0.026	0.000	0.000	0E0
4.137	0.136	Equate entropy of thresholded and original distributions	0.013	0.013	0.115	0E0

Pictures of the model

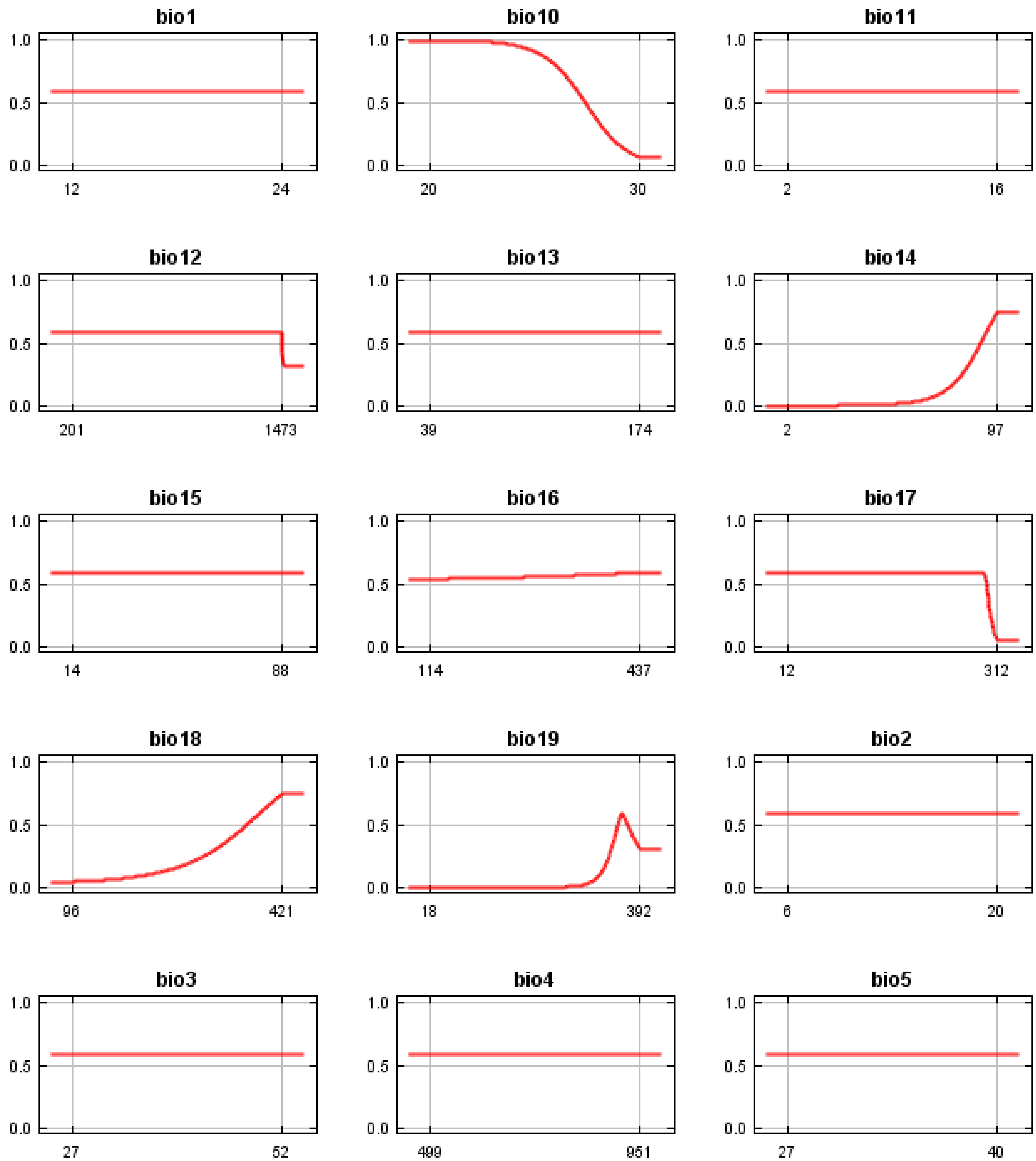
This is a representation of the Maxent model for Physostegia_longisepala. Warmer colors show areas with better predicted conditions. White dots show the presence locations used for training, while violet dots show test locations. Click on the image for a full-size version.

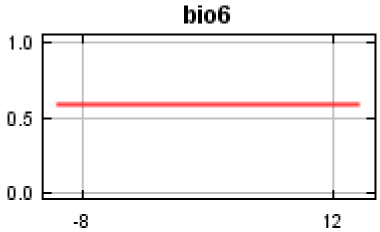


Click here to interactively explore this prediction using the Explain tool. If clicking from your browser does not succeed in starting the tool, try running the script in I:\MaxEnt Output\Physostegia_longisepala_explain.bat directly. This tool requires the environmental grids to be small enough that they all fit in memory.

Response curves

These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together.

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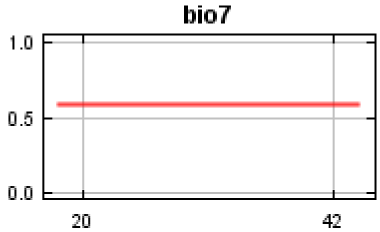
-8
12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0.0
20
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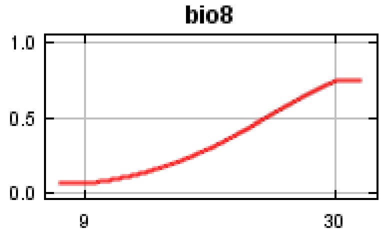
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0.0
9
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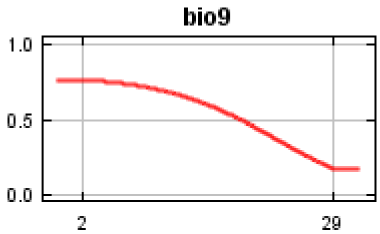
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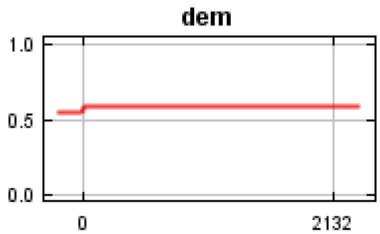
0.0
2
29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0.0
0
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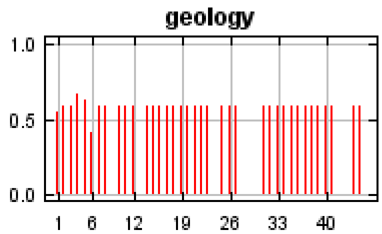
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33
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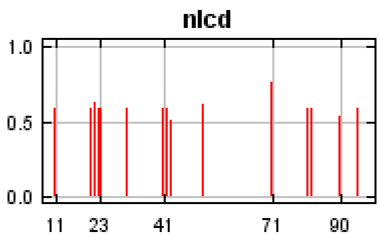
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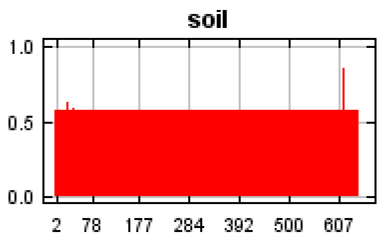
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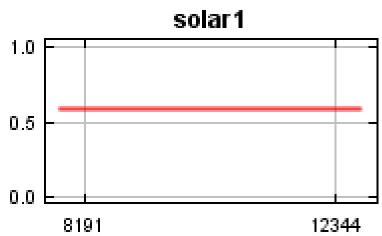
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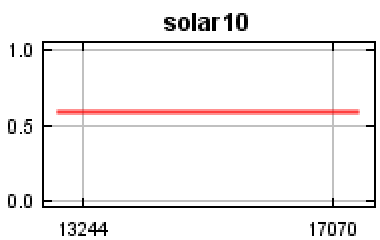
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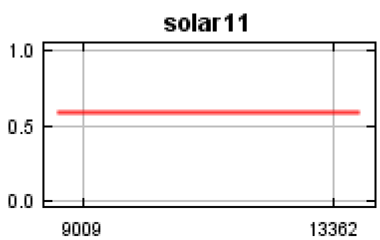
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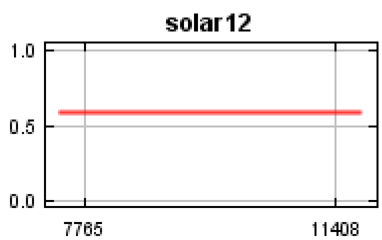
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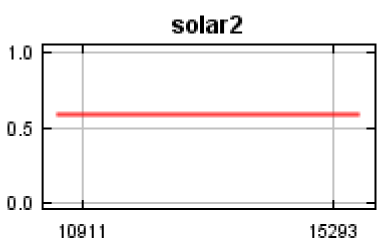
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10911
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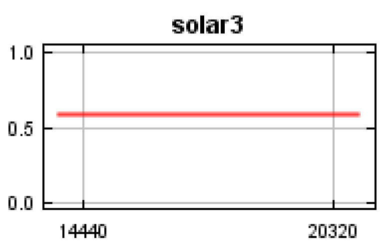
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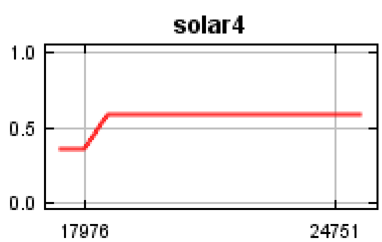
20320


solar4
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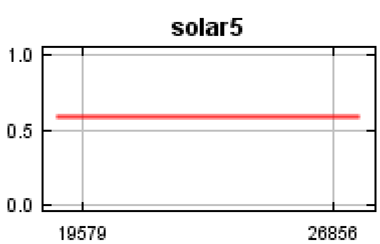
0.5
0.0
17976
24751


solar5
1.0
0.5
0.0
19579
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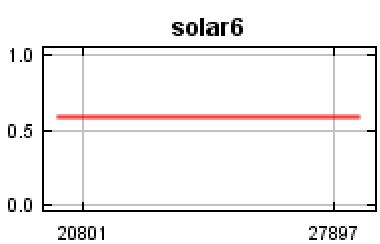
solar6
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20801
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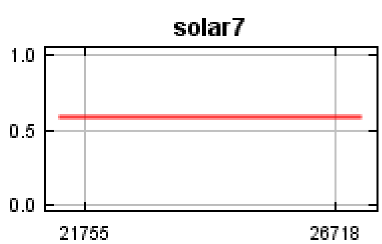
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21755
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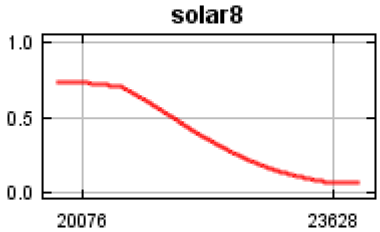
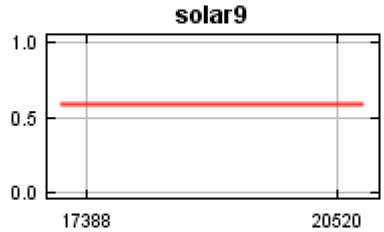
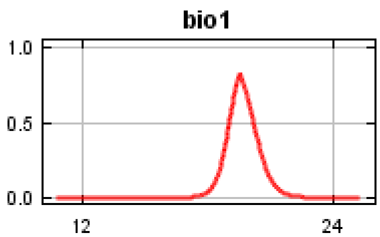
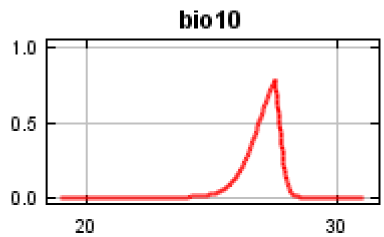
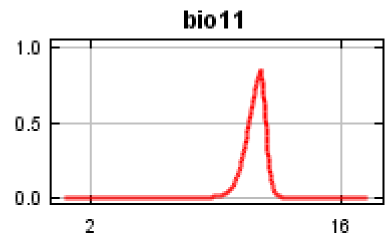


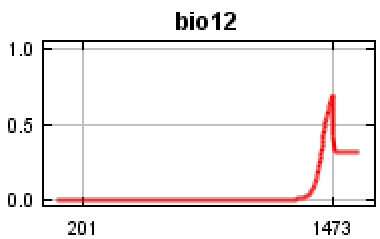


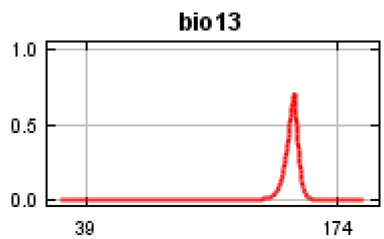
In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.

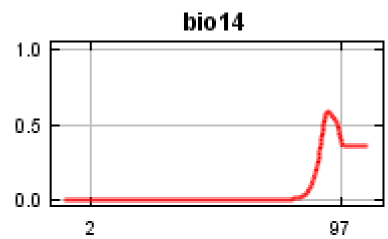


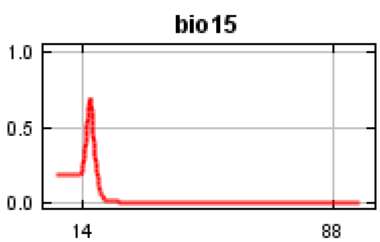


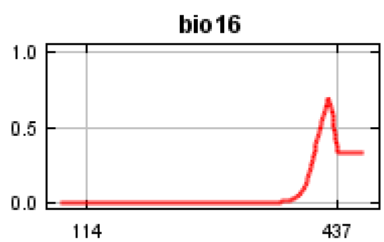


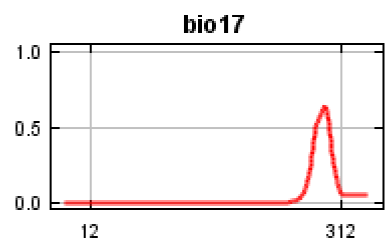


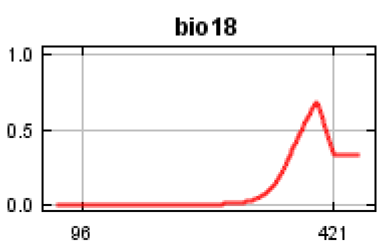


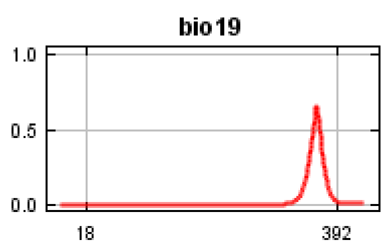


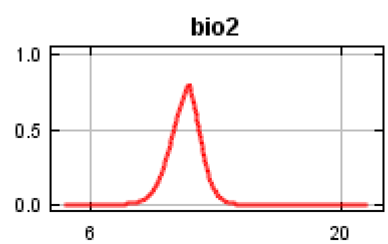












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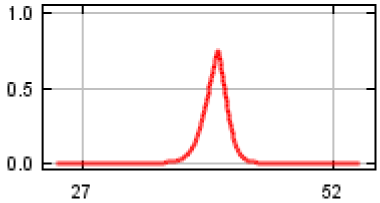
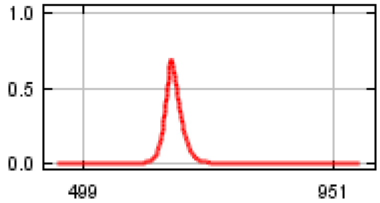
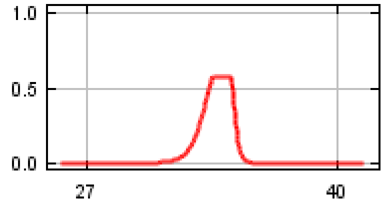


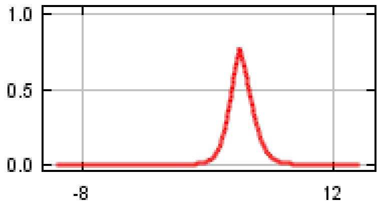
bio4



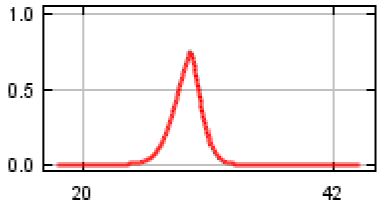
bio5



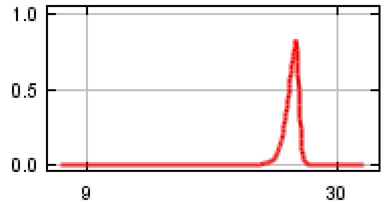
bio6



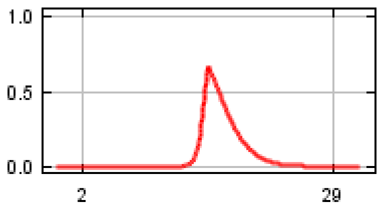
bio7



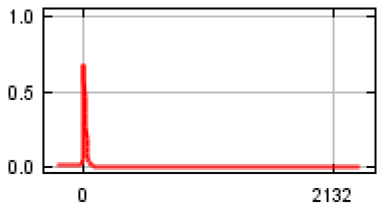
bio8



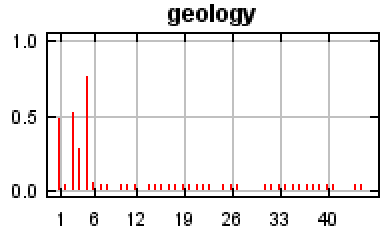
bio9



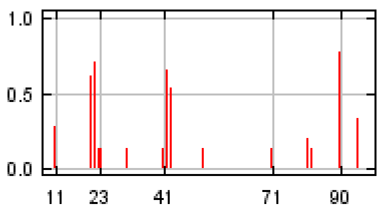
dem



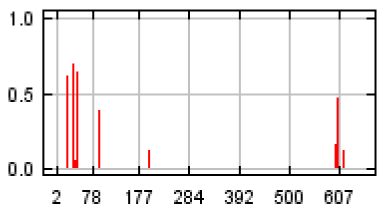
geology



nlcd



soil



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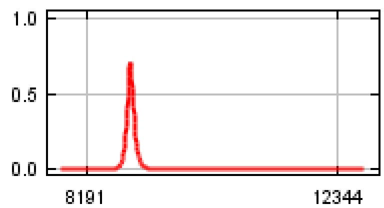
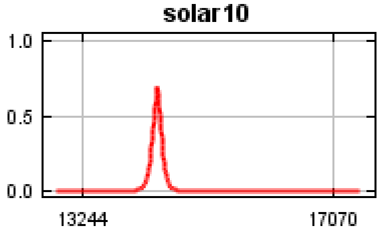
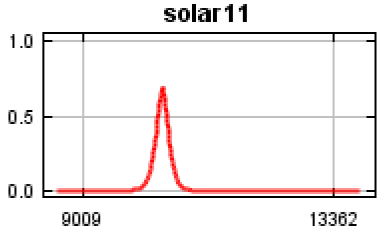


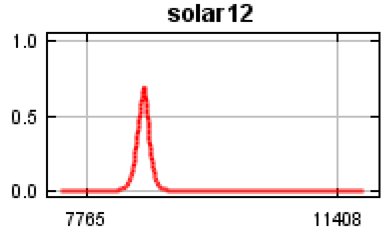
solar10



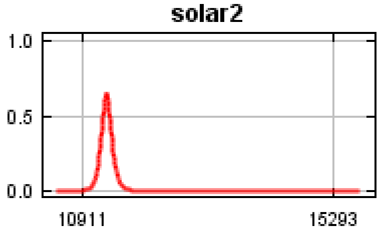
solar11



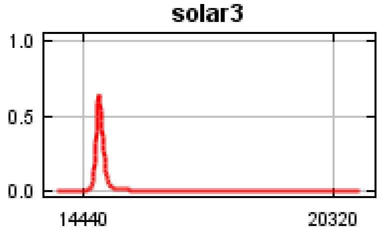
solar12



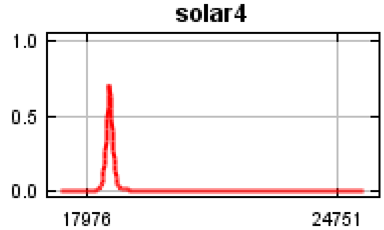
solar2

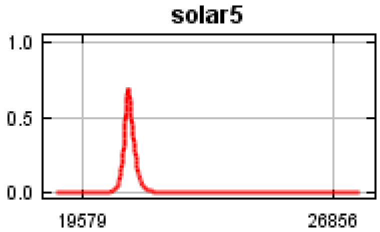


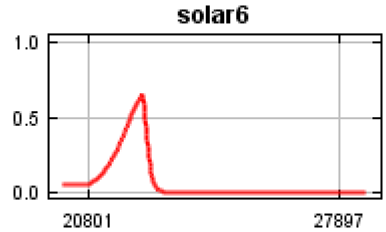
solar3

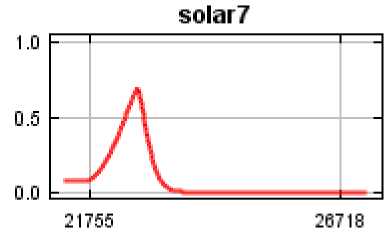


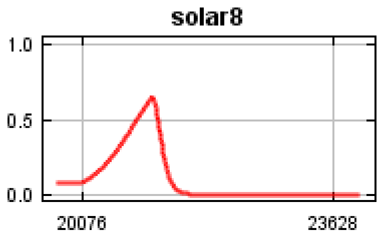
solar4

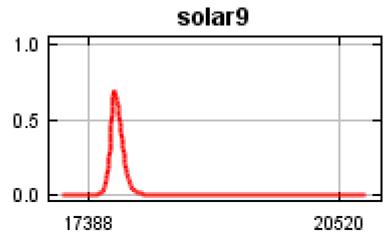












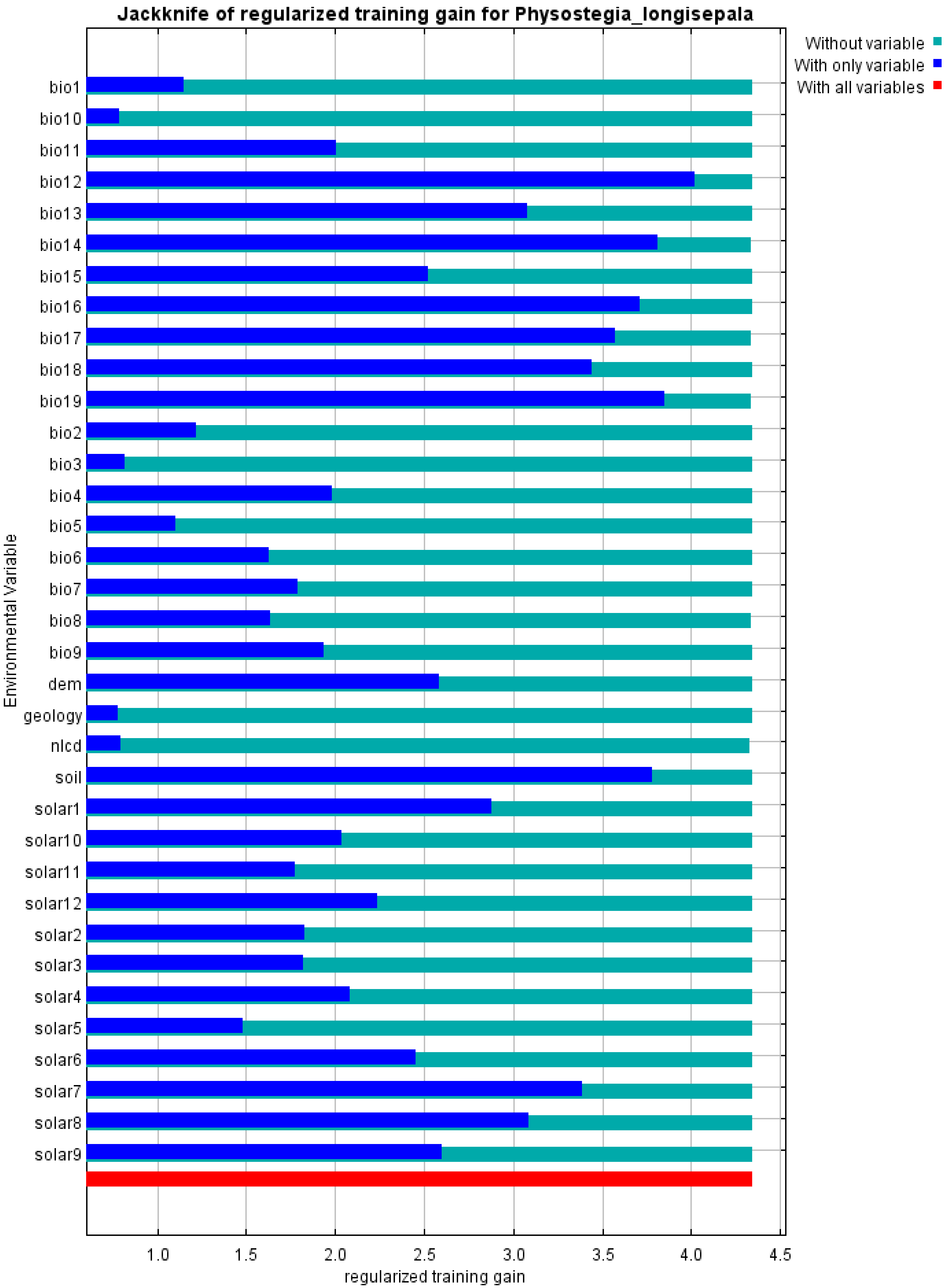
Analysis of variable contributions

The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated.

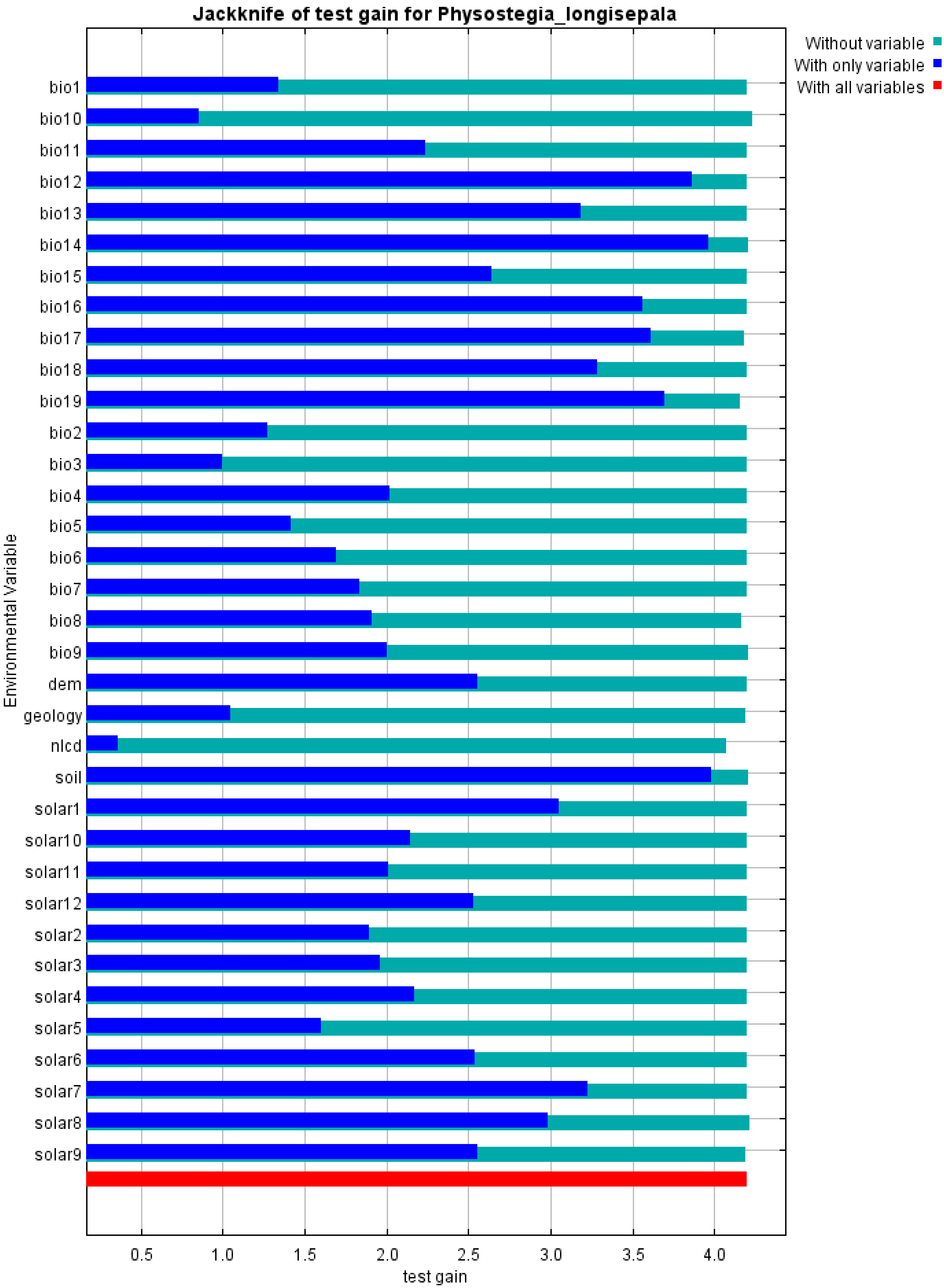
Variable	Percent contribution	Permutation importance
bio12	63.3	0.2
bio14	13.7	4.4
bio19	8.7	81.5
soil	5.8	0.1
bio16	4.7	0
bio13	0.9	0
bio8	0.7	1.1
nlcd	0.5	0.7
bio17	0.4	0.9
geology	0.4	0.3
dem	0.2	0
solar12	0.1	0
bio18	0.1	2.5
solar3	0.1	0
solar1	0.1	0
solar8	0.1	2.2

bio11	0	0
bio15	0	0
bio9	0	1.3
solar4	0	0.1
bio10	0	4.7
solar9	0	0
solar7	0	0
solar6	0	0
solar5	0	0
solar2	0	0
solar11	0	0
solar10	0	0
bio7	0	0
bio6	0	0
bio5	0	0
bio4	0	0
bio3	0	0
bio2	0	0
bio1	0	0

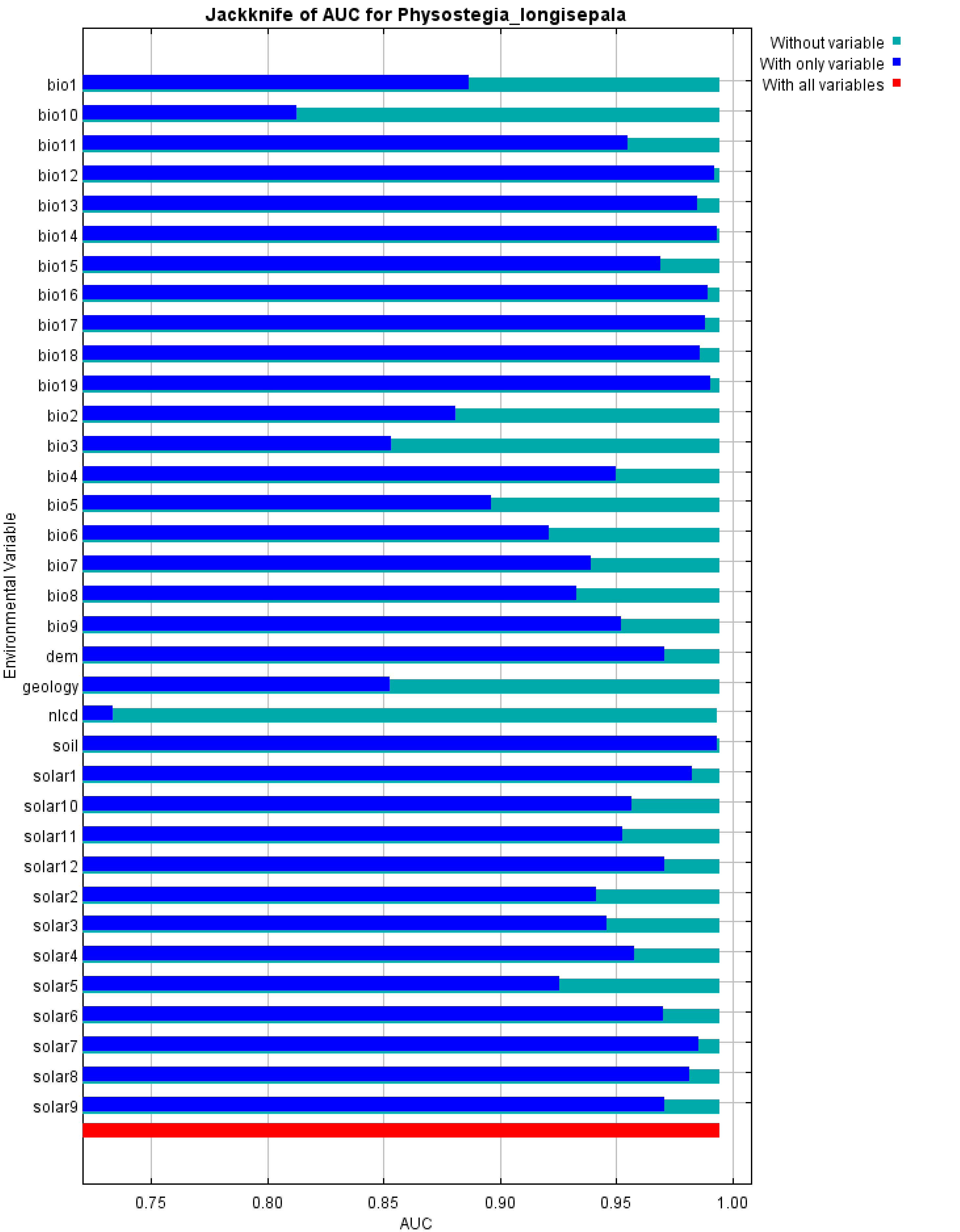
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio12, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is nlcd, which therefore appears to have the most information that isn't present in the other variables.


Jackknife of regularized training gain for Physostegia_longisepala
Without variable
With only variable
With all variables
Environmental Variable
bio1
bio10
bio11
bio12
bio13
bio14
bio15
bio16
bio17
bio18
bio19
bio2
bio3
bio4
bio5
bio6
bio7
bio8
bio9
dem
geology
nlcd
soil
solar1
solar10
solar11
solar12
solar2
solar3
solar4
solar5
solar6
solar7
solar8
solar9
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
regularized training gain

The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.


Jackknife of test gain for Physostegia_longisepala
Without variable
With only variable
With all variables
Environmental Variable
bio1
bio10
bio11
bio12
bio13
bio14
bio15
bio16
bio17
bio18
bio19
bio2
bio3
bio4
bio5
bio6
bio7
bio8
bio9
dem
geology
nlcd
soil
solar1
solar10
solar11
solar12
solar2
solar3
solar4
solar5
solar6
solar7
solar8
solar9
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
test gain

Lastly, we have the same jackknife test, using AUC on test data.



Raw data outputs and control parameters

The data used in the above analysis is contained in the next links. Please see the Help button for more information on these.
The model applied to the training environmental layers
The coefficients of the model
The omission and predicted area for varying cumulative and raw thresholds
The prediction strength at the training and (optionally) test presence sites
Results for all species modeled in the same Maxent run, with summary statistics and (optionally) jackknife results

Regularized training gain is 4.346, training AUC is 0.996, unregularized training gain is 4.483.
Unregularized test gain is 4.196.
Test AUC is 0.995, standard deviation is 0.001 (calculated as in DeLong, DeLong & Clarke-Pearson 1988, equation 2).
Algorithm converged after 740 iterations (19 seconds).

The follow settings were used during the run:
79 presence records used for training, 26 for testing.
10078 points used to determine the Maxent distribution (background points and presence points).
Environmental layers used: bio1 bio10 bio11 bio12 bio13 bio14 bio15 bio16 bio17 bio18 bio19 bio2 bio3 bio4 bio5 bio6 bio7 bio8 bio9 dem geology(categorical) nlcd(categorical) soil(categorical) solar1 solar10 solar11 solar12 solar2 solar3 solar4 solar5 solar6 solar7 solar8 solar9
Regularization values: linear/quadratic/product: 0.110, categorical: 0.250, threshold: 1.210, hinge: 0.500
Feature types used: hinge linear quadratic
responsecurves: true
jackknife: true
outputformat: logistic
outputdirectory: I:\MaxEnt Output
samplesfile: I:\TXDOT Species Info\physostegia_longisepala.csv
environmentallayers: I:\ASCII_layers
randomseed: true
randomtestpoints: 25
replicatetype: subsample
writebackgroundpredictions: true
writeplotdata: true
maximumiterations: 5000
adjustsampleradius: -6
Command line used:

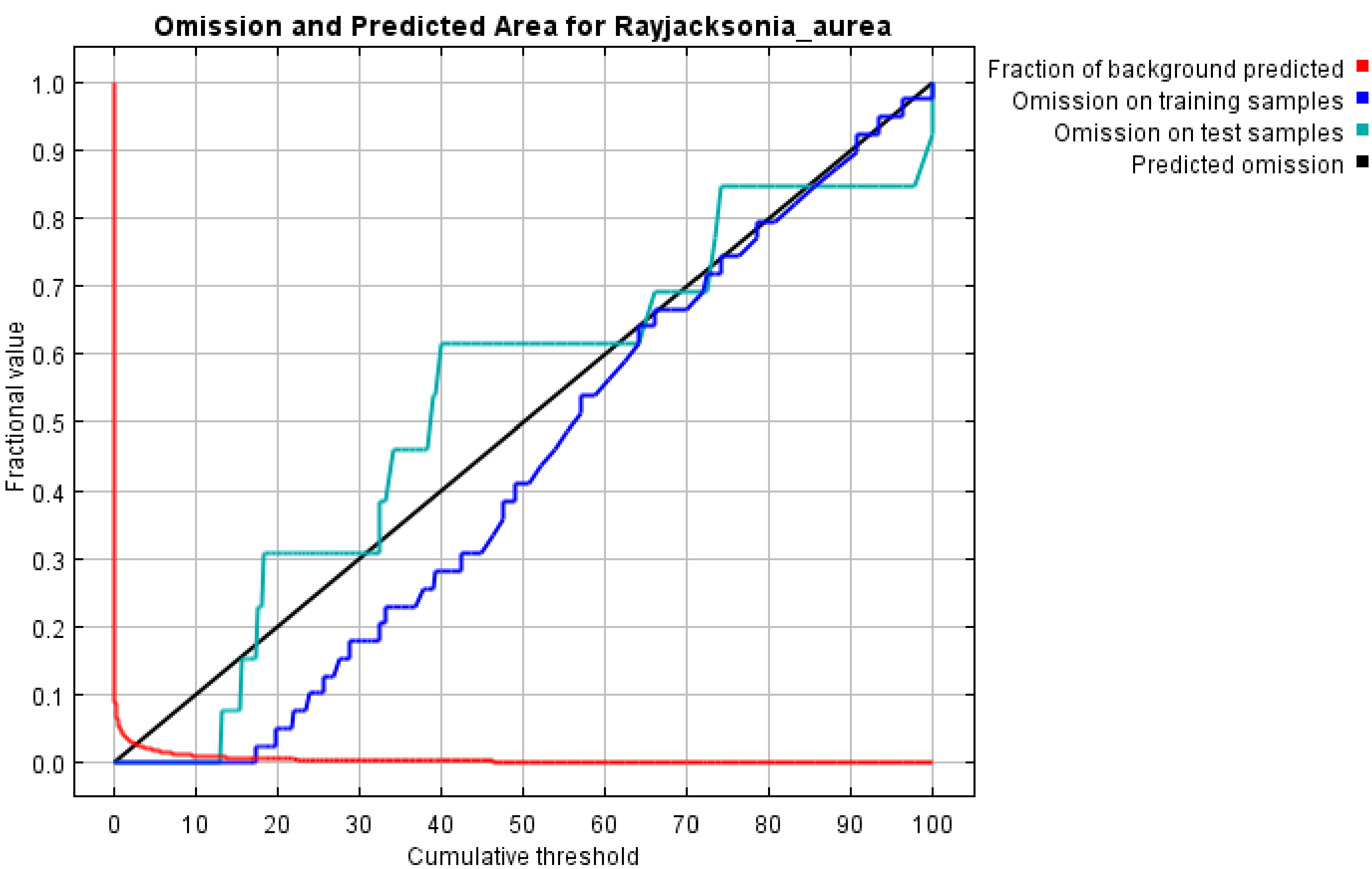
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Physostegia_longisepala responsecurves jackknife outputformat=logistic "outputdirectory=I:\MaxEnt Output" "samplesfile=I:\TXDOT Species Info\physostegia_longisepala.csv" environmentallayers=I:\ASCII_layers randomseed randomtestpoints=25 replicatetype=subsample writebackgroundpredictions writeplotdata maximumiterations=5000 adjustsampleradius=-6 -t geology -t nlcd -t soil

Maxent model for Rayjacksonia_aurea

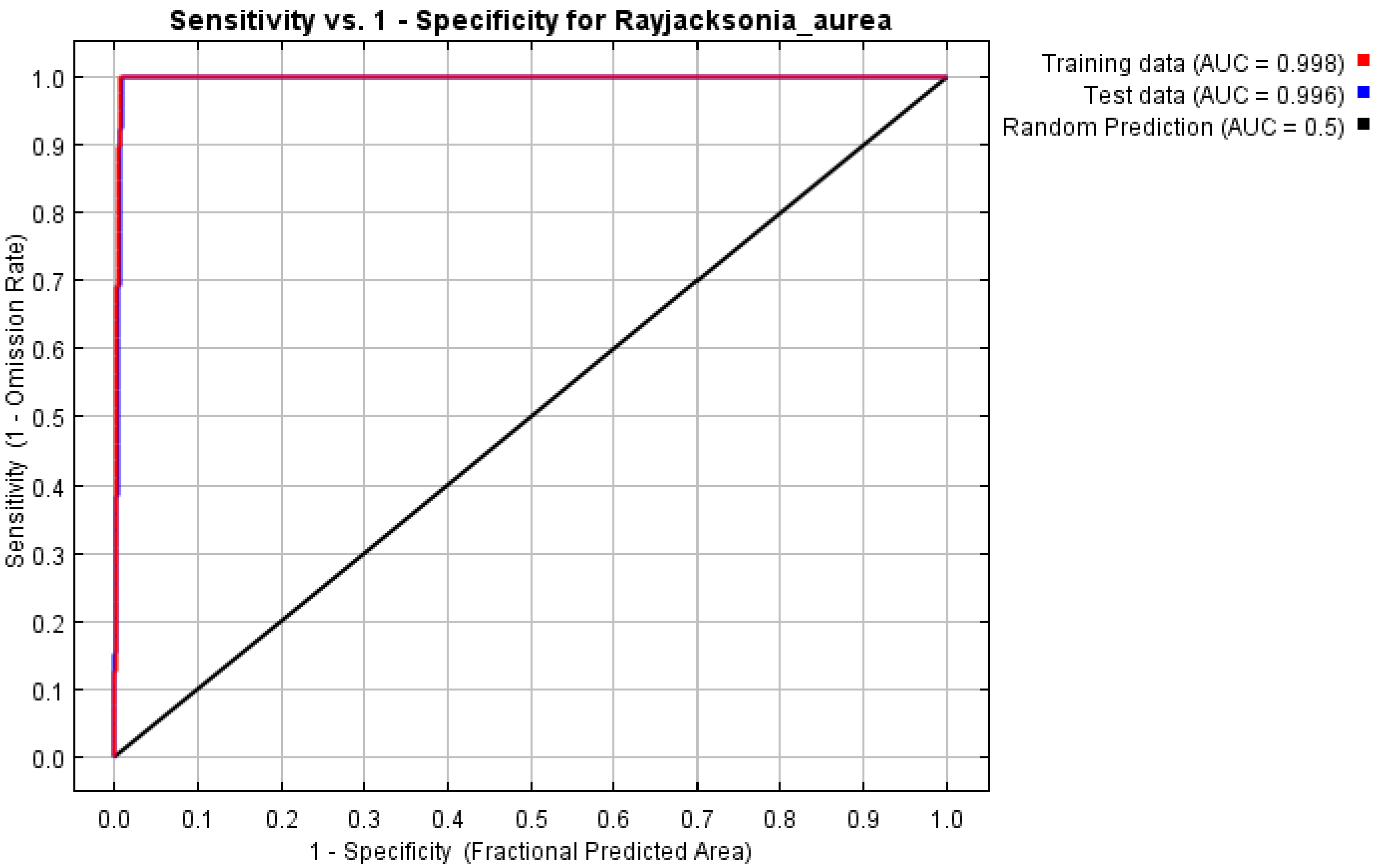
This page contains some analysis of the Maxent model for Rayjacksonia_aurea, created Thu Jan 23 14:09:59 CST 2020 using Maxent version 3.4.1. If you would like to do further analyses, the raw data used here is linked to at the end of this page.

Analysis of omission/commission

The following picture shows the omission rate and predicted area as a function of the cumulative threshold. The omission rate is is calculated both on the training presence records, and (if test data are used) on the test records. The omission rate should be close to the predicted omission, because of the definition of the cumulative threshold.



The next picture is the receiver operating characteristic (ROC) curve for the same data. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). This implies that the maximum achievable AUC is less than 1. If test data is drawn from the Maxent distribution itself, then the maximum possible test AUC would be 0.994 rather than 1; in practice the test AUC may exceed this bound.



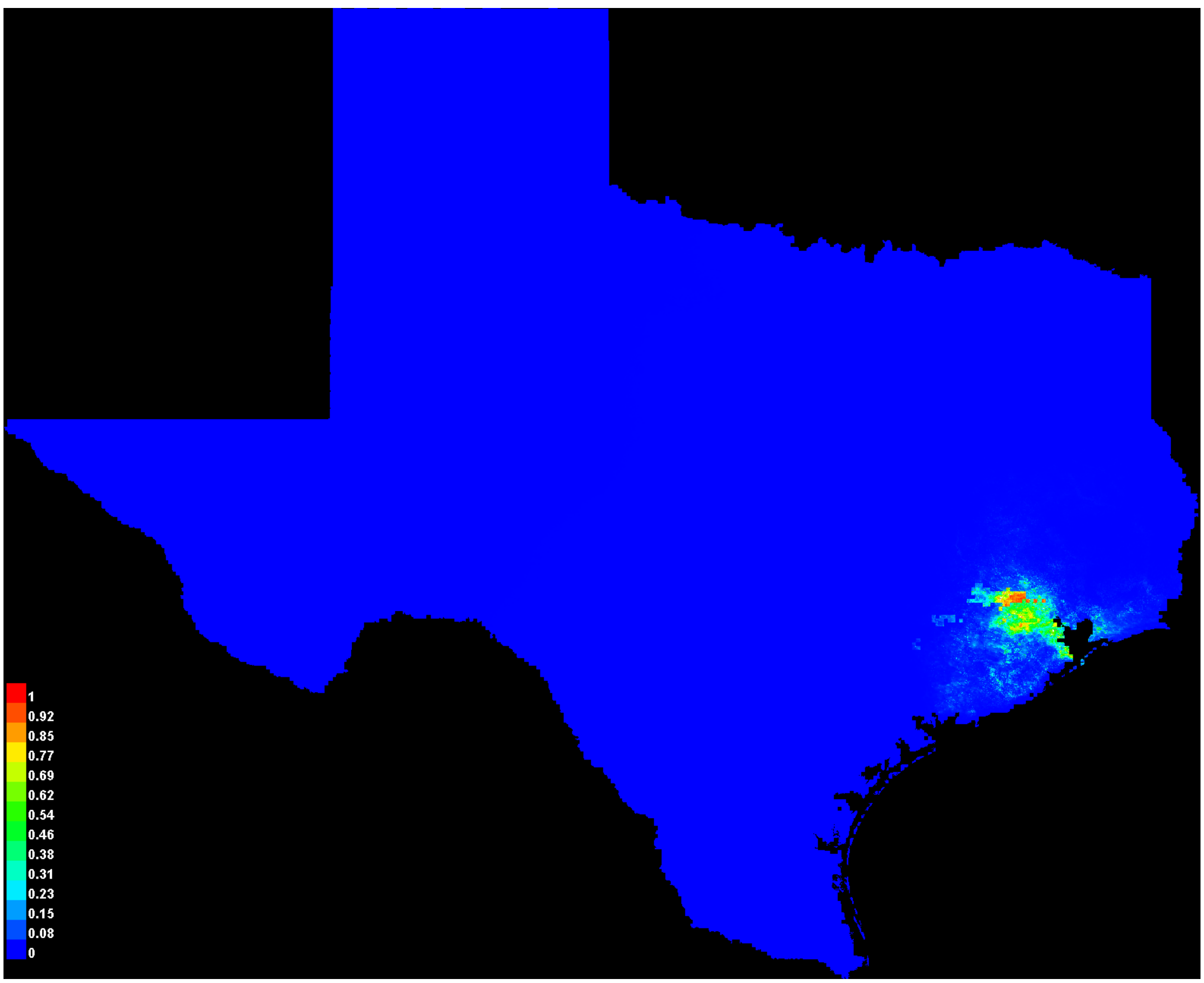
Some common thresholds and corresponding omission rates are as follows. If test data are available, binomial probabilities are calculated exactly if the number of test samples is at most 25, otherwise using a normal approximation to the binomial. These are 1-sided p-values for the null hypothesis that test points are predicted no better than by a random prediction with the same fractional predicted area. The "Balance" threshold minimizes 6 * training omission rate + .04 * cumulative threshold + 1.6 * fractional predicted area.

Cumulative threshold	Logistic threshold	Description	Fractional predicted area	Training omission rate	Test omission rate	P-value
1.000	0.006	Fixed cumulative value 1	0.044	0.000	0.000	2.138E-18
5.000	0.041	Fixed cumulative value 5	0.019	0.000	0.000	3.733E-23
10.000	0.114	Fixed cumulative value 10	0.011	0.000	0.000	3.282E-26
17.303	0.261	Minimum training presence	0.007	0.000	0.154	1.246E-22
23.492	0.377	10 percentile training presence	0.005	0.077	0.308	2.235E-18
17.303	0.261	Equal training sensitivity and specificity	0.007	0.000	0.154	1.246E-22
17.303	0.261	Maximum training sensitivity plus specificity	0.007	0.000	0.154	1.246E-22

13.043	0.168	Equal test sensitivity and specificity	0.009	0.000	0.000	1.804E-27
13.043	0.168	Maximum test sensitivity plus specificity	0.009	0.000	0.000	1.804E-27
0.777	0.005	Balance training omission, predicted area and threshold value	0.049	0.000	0.000	8.462E-18
9.315	0.104	Equate entropy of thresholded and original distributions	0.012	0.000	0.000	7.319E-26

Pictures of the model

This is a representation of the Maxent model for Rayjacksonia_aurea. Warmer colors show areas with better predicted conditions. White dots show the presence locations used for training, while violet dots show test locations. Click on the image for a full-size version.

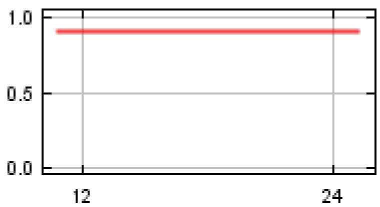


Click here to interactively explore this prediction using the Explain tool. If clicking from your browser does not succeed in starting the tool, try running the script in I:\MaxEnt Output\Rayjacksonia_aurea_explain.bat directly. This tool requires the environmental grids to be small enough that they all fit in memory.

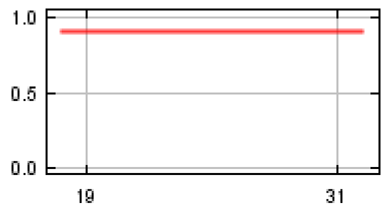
Response curves

These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together.

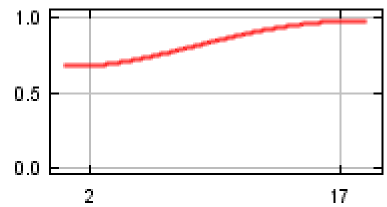
bio1



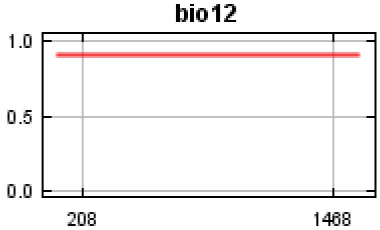
bio10



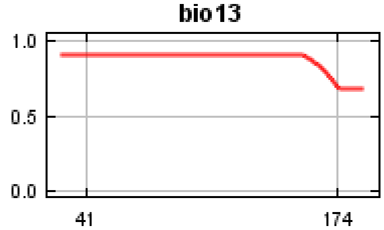
bio11



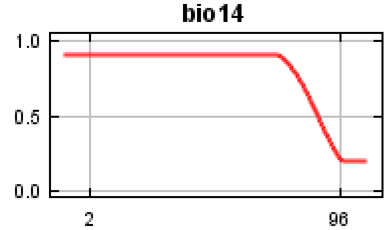
bio12



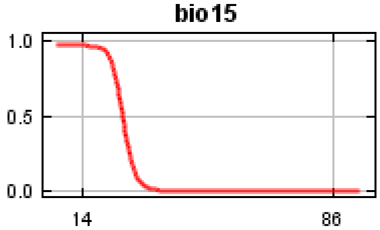
bio13



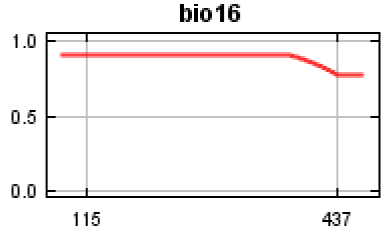
bio14



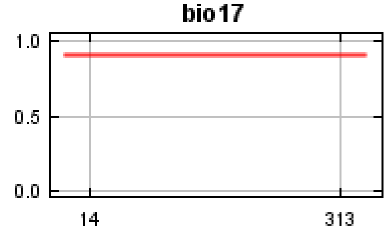
bio15



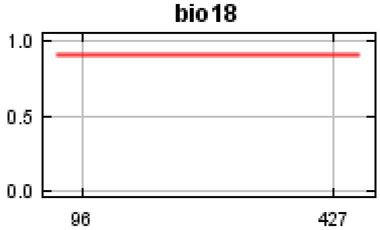
bio16



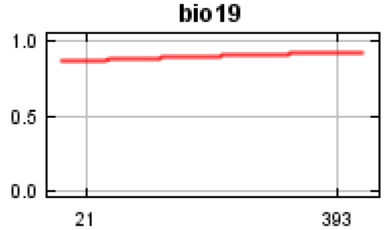
bio17



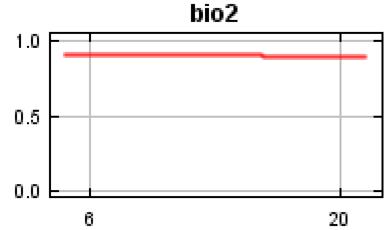
bio18



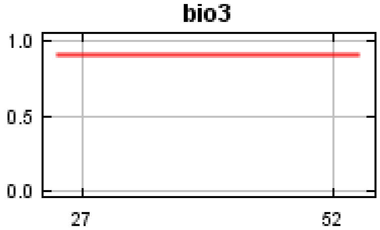
bio19



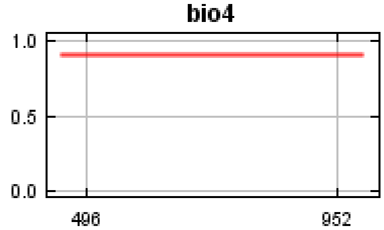
bio2



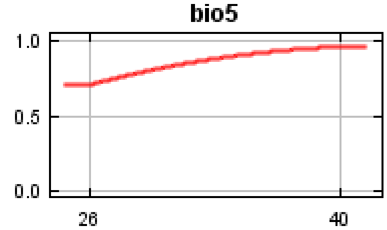
bio3

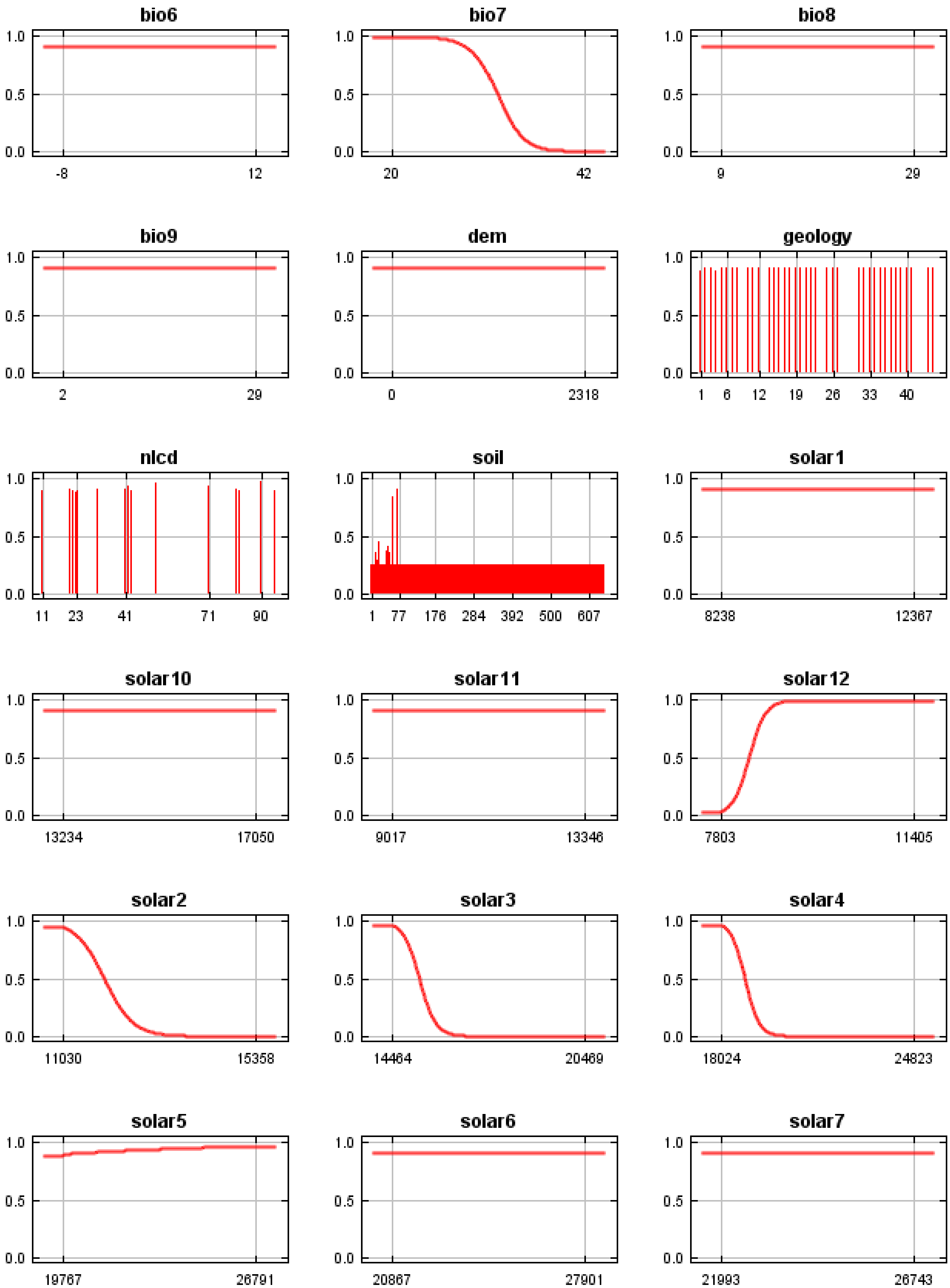


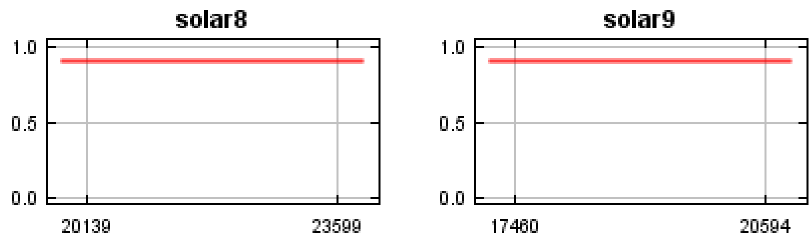
bio4



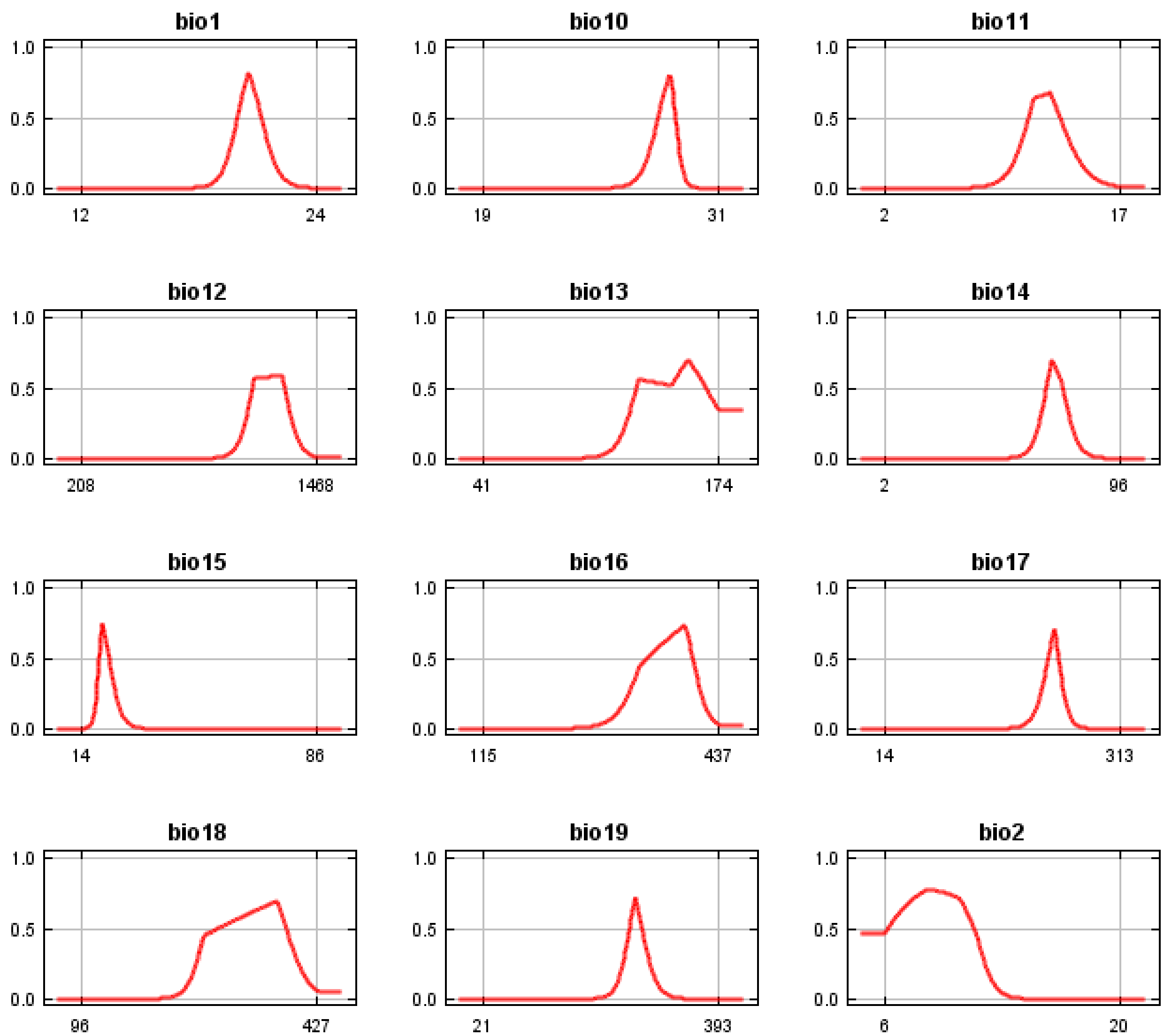
bio5



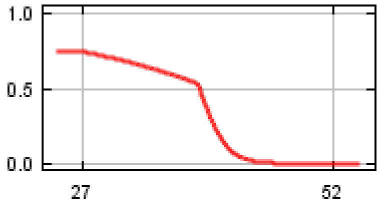

bio6
1.0
0.5
0.0
-8
12
bio7
20
42
bio8
9
29
bio9
2
29
dem
0
2318
geology
1
6
12
19
26
33
40
nlcd
11
23
41
71
90
soil
1
77
176
284
392
500
607
solar1
8238
12367
solar10
13234
17050
solar11
9017
13346
solar12
7803
11405
solar2
11030
15358
solar3
14464
20469
solar4
18024
24823
solar5
19767
26791
solar6
20867
27901
solar7
21993
26743



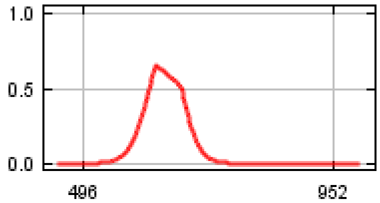
In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.



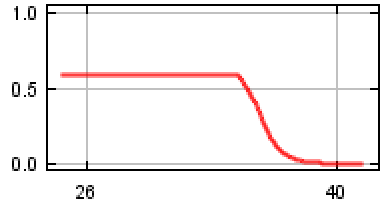
bio3



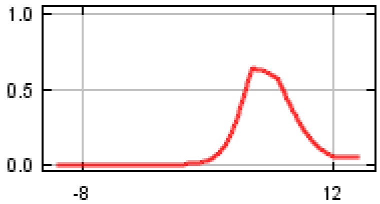
bio4



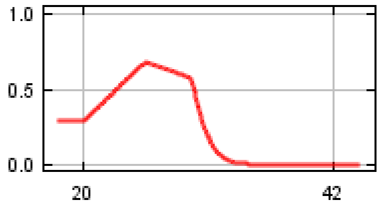
bio5



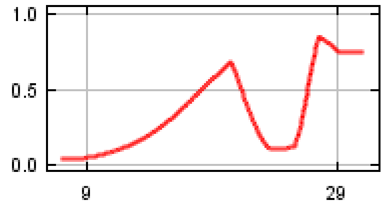
bio6



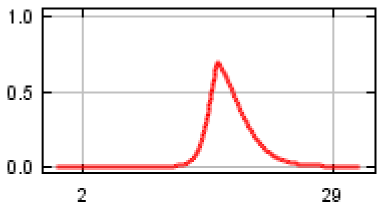
bio7



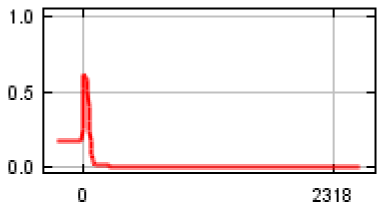
bio8



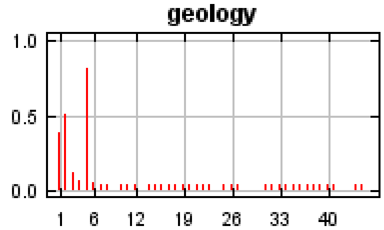
bio9



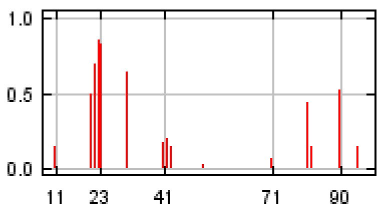
dem



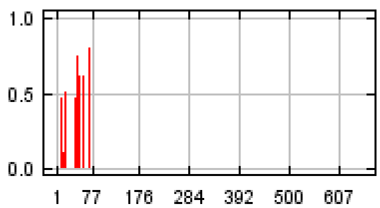
geology



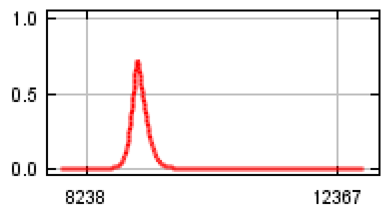
nlcd



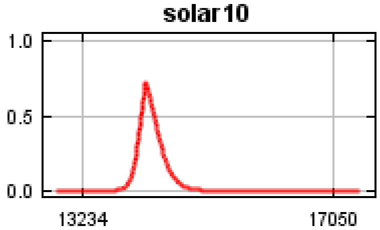
soil



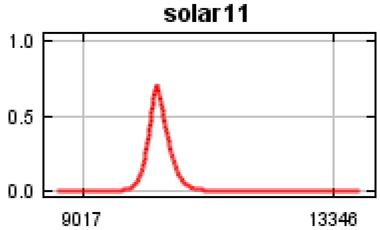
solar1



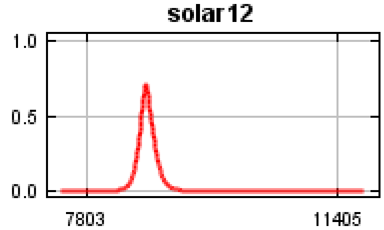
solar10



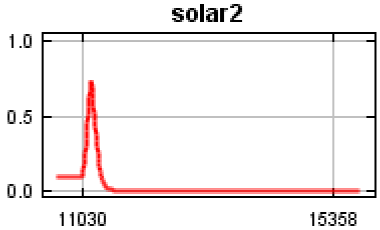
solar11



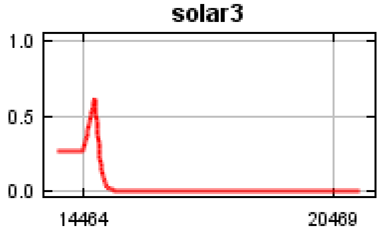
solar12



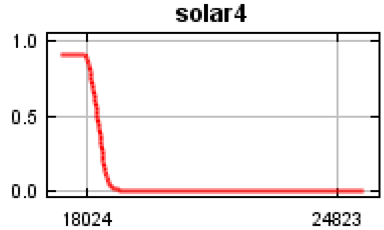
solar2

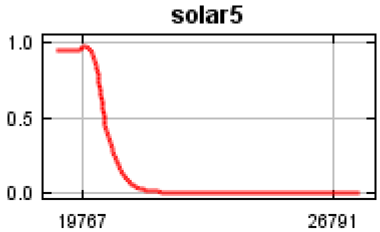


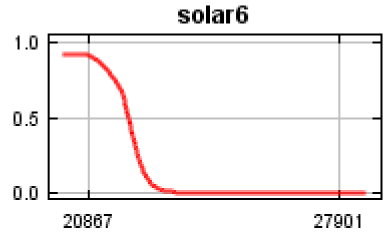
solar3

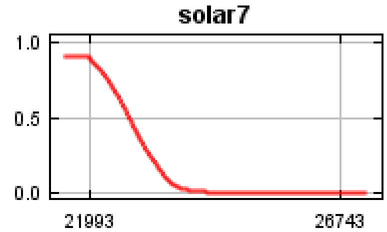


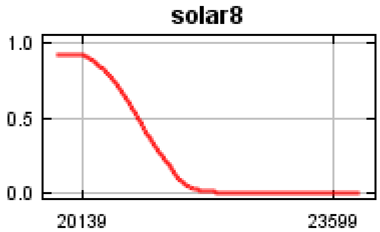
solar4

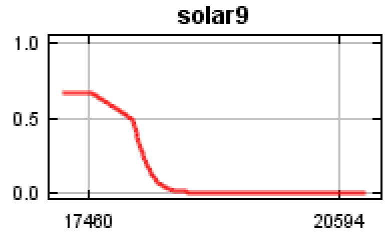












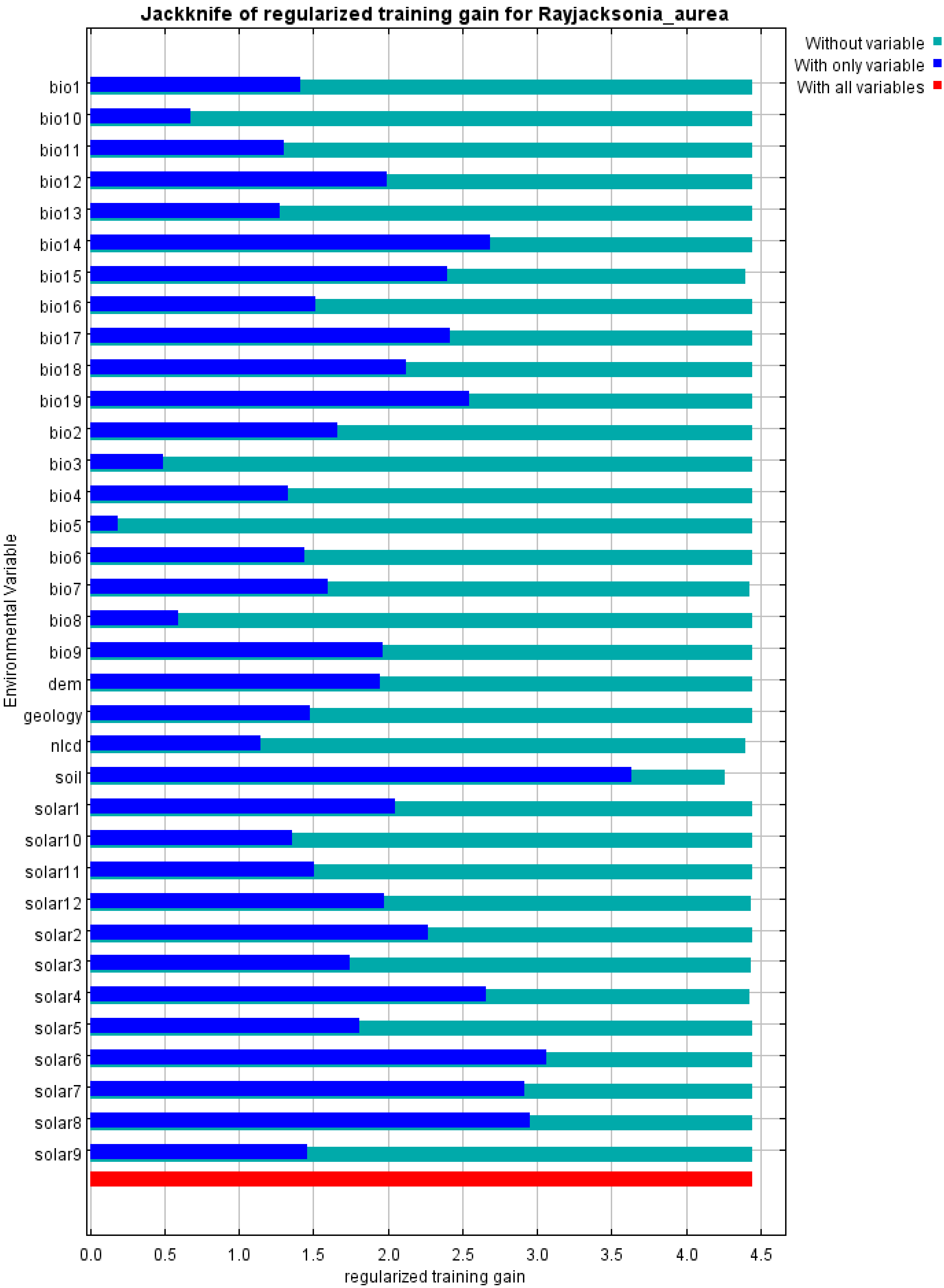
Analysis of variable contributions

The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated.

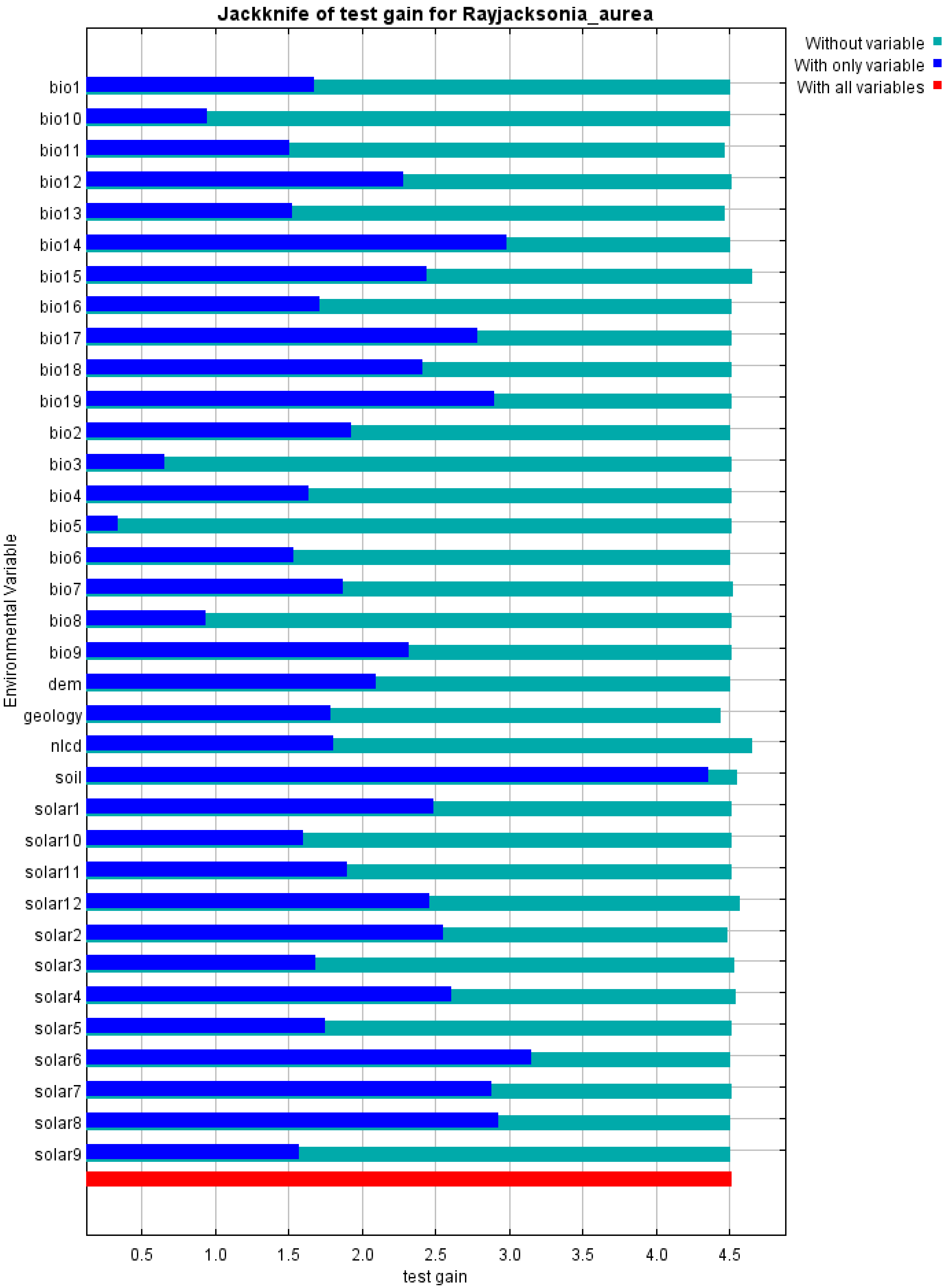
Variable	Percent contribution	Permutation importance
solar7	45.3	0
bio19	17	0
soil	16.4	0.7
solar3	5.3	17.2
geology	5	0
nlcd	2	0.2
bio15	1.9	43.7
solar8	1.7	0
bio9	1.1	0
bio2	1	0
solar9	0.7	0
bio7	0.5	5.3
bio14	0.4	0.1
solar4	0.3	16.3
bio18	0.3	0
bio12	0.3	0

dem	0.1	0
solar12	0.1	12
solar2	0.1	4.2
bio13	0.1	0
bio17	0.1	0
bio11	0.1	0.1
bio8	0	0
bio6	0	0
bio16	0	0
bio5	0	0
solar5	0	0
solar11	0	0
bio3	0	0
bio4	0	0
solar1	0	0
solar10	0	0
solar6	0	0
bio10	0	0
bio1	0	0

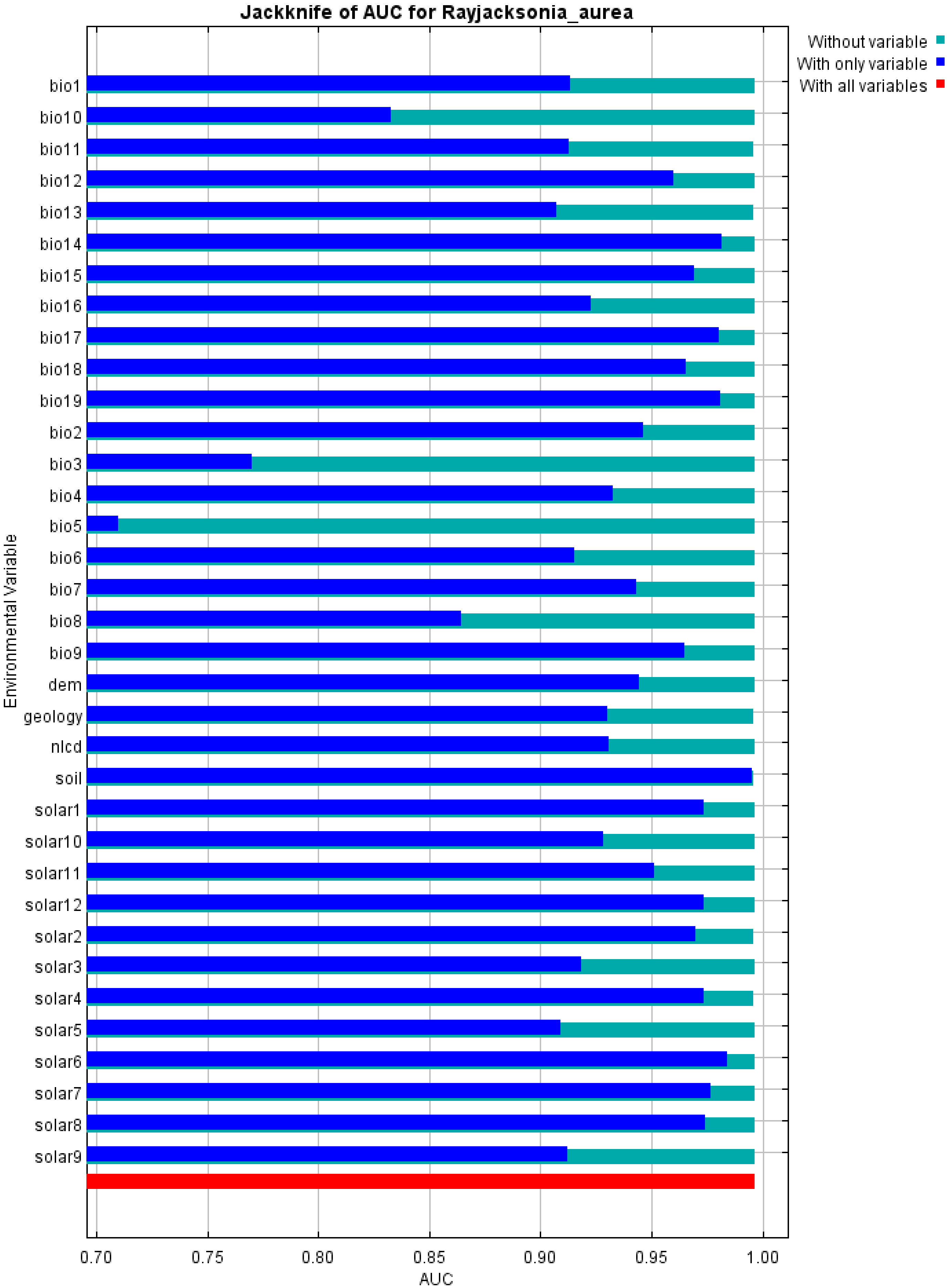
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is soil, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is soil, which therefore appears to have the most information that isn't present in the other variables.


Jackknife of regularized training gain for Rayjacksonia_aurea
Without variable
With only variable
With all variables
Environmental Variable
bio1
bio10
bio11
bio12
bio13
bio14
bio15
bio16
bio17
bio18
bio19
bio2
bio3
bio4
bio5
bio6
bio7
bio8
bio9
dem
geology
nlcd
soil
solar1
solar10
solar11
solar12
solar2
solar3
solar4
solar5
solar6
solar7
solar8
solar9
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
regularized training gain

The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.


Jackknife of test gain for Rayjacksonia_aurea
Without variable
With only variable
With all variables
Environmental Variable
bio1
bio10
bio11
bio12
bio13
bio14
bio15
bio16
bio17
bio18
bio19
bio2
bio3
bio4
bio5
bio6
bio7
bio8
bio9
dem
geology
nlcd
soil
solar1
solar10
solar11
solar12
solar2
solar3
solar4
solar5
solar6
solar7
solar8
solar9
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
test gain

Lastly, we have the same jackknife test, using AUC on test data.



Raw data outputs and control parameters

The data used in the above analysis is contained in the next links. Please see the Help button for more information on these.
The model applied to the training environmental layers
The coefficients of the model
The omission and predicted area for varying cumulative and raw thresholds
The prediction strength at the training and (optionally) test presence sites
Results for all species modeled in the same Maxent run, with summary statistics and (optionally) jackknife results

Regularized training gain is 4.450, training AUC is 0.998, unregularized training gain is 4.934.
Unregularized test gain is 4.514.
Test AUC is 0.996, standard deviation is 0.001 (calculated as in DeLong, DeLong & Clarke-Pearson 1988, equation 2).
Algorithm converged after 1640 iterations (44 seconds).

The follow settings were used during the run:
39 presence records used for training, 13 for testing.
10039 points used to determine the Maxent distribution (background points and presence points).
Environmental layers used: bio1 bio10 bio11 bio12 bio13 bio14 bio15 bio16 bio17 bio18 bio19 bio2 bio3 bio4 bio5 bio6 bio7 bio8 bio9 dem geology(categorical) nlcd(categorical) soil(categorical) solar1 solar10 solar11 solar12 solar2 solar3 solar4 solar5 solar6 solar7 solar8 solar9
Regularization values: linear/quadratic/product: 0.224, categorical: 0.250, threshold: 1.610, hinge: 0.500
Feature types used: hinge linear quadratic
responsecurves: true
jackknife: true
outputformat: logistic
outputdirectory: I:\MaxEnt Output
samplesfile: I:\TXDOT Species Info\Rayjacksonia_aurea.csv
environmentallayers: I:\ASCII_layers
randomseed: true
randomtestpoints: 25
replicatetype: subsample
writebackgroundpredictions: true
writeplotdata: true
maximumiterations: 5000
adjustsampleradius: -6
Command line used:

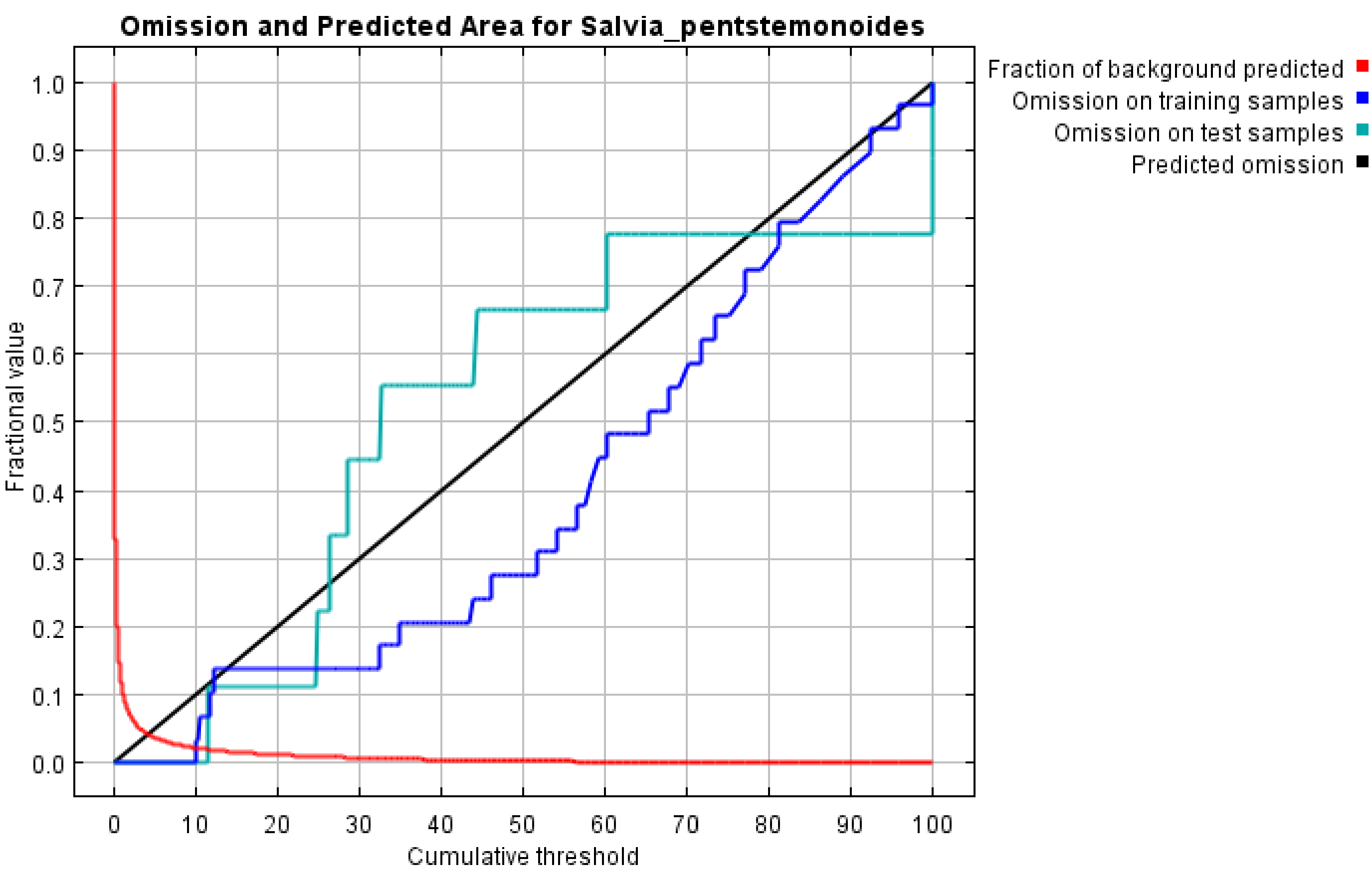
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Rayjacksonia_aurea responsecurves jackknife outputformat=logistic "outputdirectory=I:\MaxEnt Output" "samplesfile=I:\TXDOT Species Info\Rayjacksonia_aurea.csv" environmentallayers=I:\ASCII_layers randomseed randomtestpoints=25 replicatetype=subsample writebackgroundpredictions writeplotdata maximumiterations=5000 adjustsampleradius=-6 -t geology -t nlcd -t soil

Maxent model for Salvia_pentstemonoides

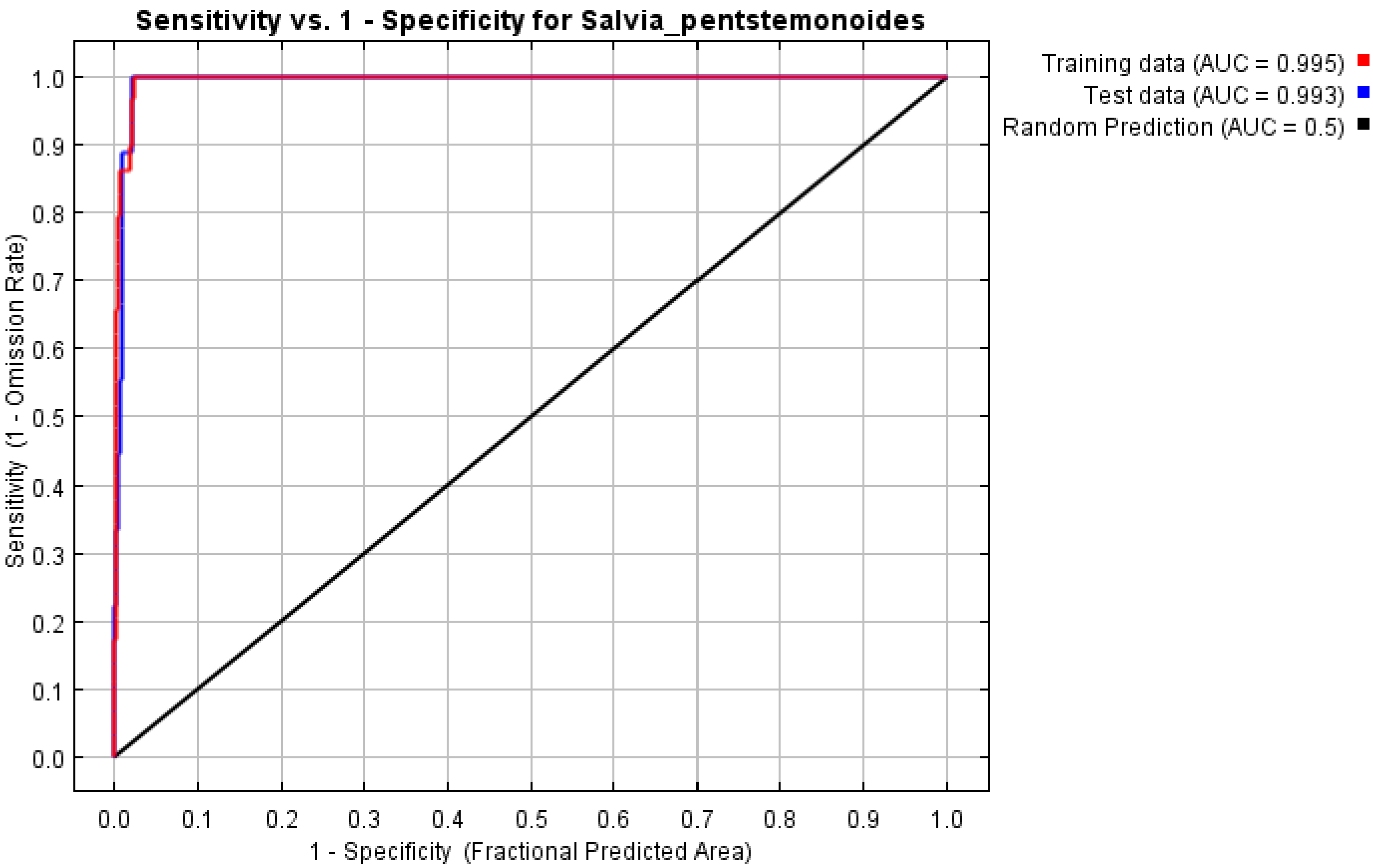
This page contains some analysis of the Maxent model for Salvia_pentstemonoides, created Sat Dec 05 23:19:12 EST 2020 using Maxent version 3.4.1. If you would like to do further analyses, the raw data used here is linked to at the end of this page.

Analysis of omission/commission

The following picture shows the omission rate and predicted area as a function of the cumulative threshold. The omission rate is is calculated both on the training presence records, and (if test data are used) on the test records. The omission rate should be close to the predicted omission, because of the definition of the cumulative threshold.



The next picture is the receiver operating characteristic (ROC) curve for the same data. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). This implies that the maximum achievable AUC is less than 1. If test data is drawn from the Maxent distribution itself, then the maximum possible test AUC would be 0.986 rather than 1; in practice the test AUC may exceed this bound.



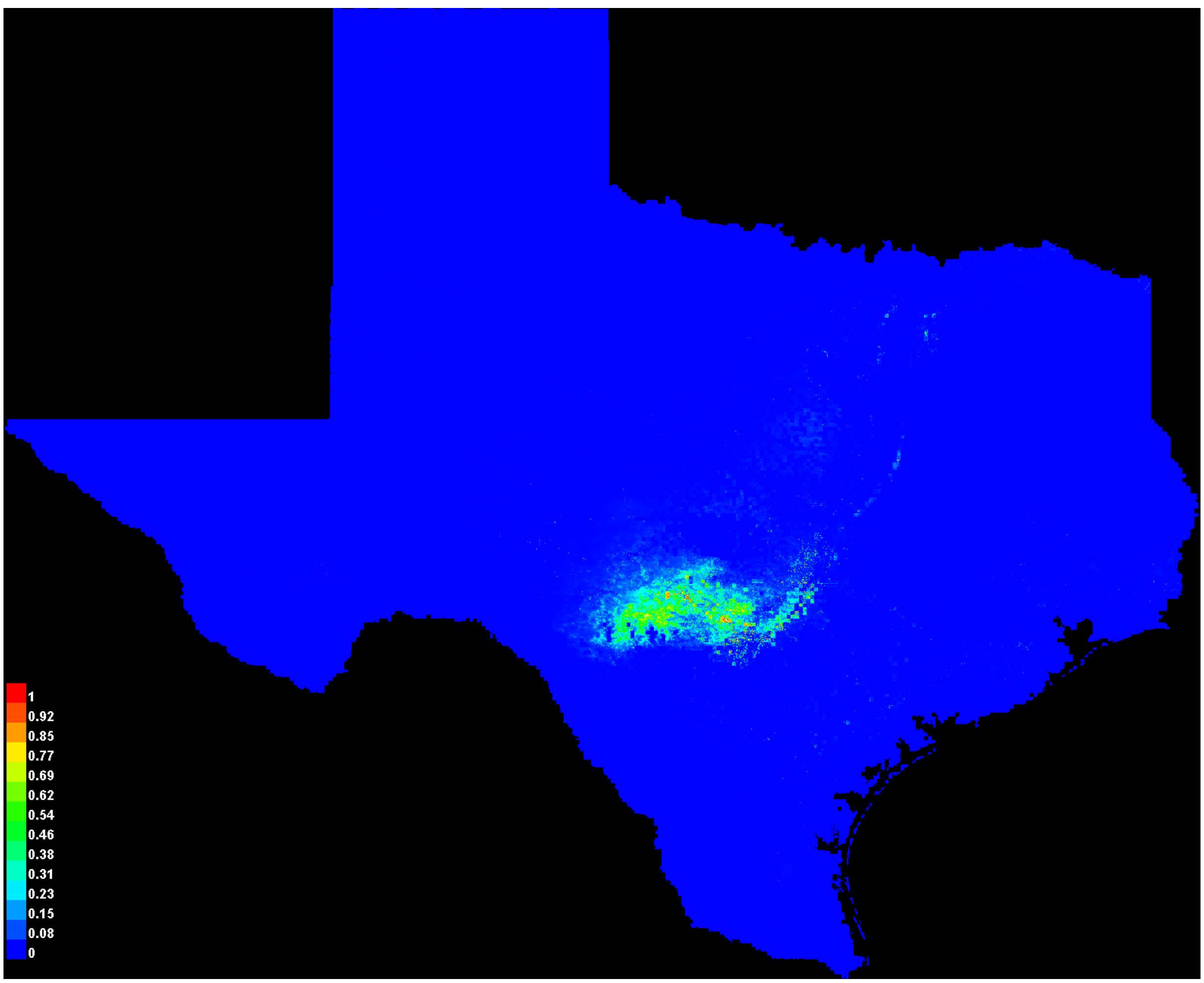
Some common thresholds and corresponding omission rates are as follows. If test data are available, binomial probabilities are calculated exactly if the number of test samples is at most 25, otherwise using a normal approximation to the binomial. These are 1-sided p-values for the null hypothesis that test points are predicted no better than by a random prediction with the same fractional predicted area. The "Balance" threshold minimizes 6 * training omission rate + .04 * cumulative threshold + 1.6 * fractional predicted area.

Cumulative threshold	Logistic threshold	Description	Fractional predicted area	Training omission rate	Test omission rate	P-value
1.000	0.003	Fixed cumulative value 1	0.107	0.000	0.000	1.852E-9
5.000	0.037	Fixed cumulative value 5	0.037	0.000	0.000	1.463E-13
10.000	0.101	Fixed cumulative value 10	0.022	0.000	0.000	1.44E-15
10.002	0.101	Minimum training presence	0.022	0.000	0.000	1.383E-15
11.698	0.127	10 percentile training presence	0.020	0.069	0.111	2.041E-13
10.058	0.101	Equal training sensitivity and specificity	0.022	0.034	0.000	1.383E-15
10.002	0.101	Maximum training sensitivity plus specificity	0.022	0.000	0.000	1.383E-15

11.463	0.125	Equal test sensitivity and specificity	0.020	0.069	0.000	5.456E-16
11.463	0.125	Maximum test sensitivity plus specificity	0.020	0.069	0.000	5.456E-16
1.834	0.008	Balance training omission, predicted area and threshold value	0.073	0.000	0.000	5.665E-11
11.625	0.127	Equate entropy of thresholded and original distributions	0.020	0.069	0.111	2.211E-13

Pictures of the model

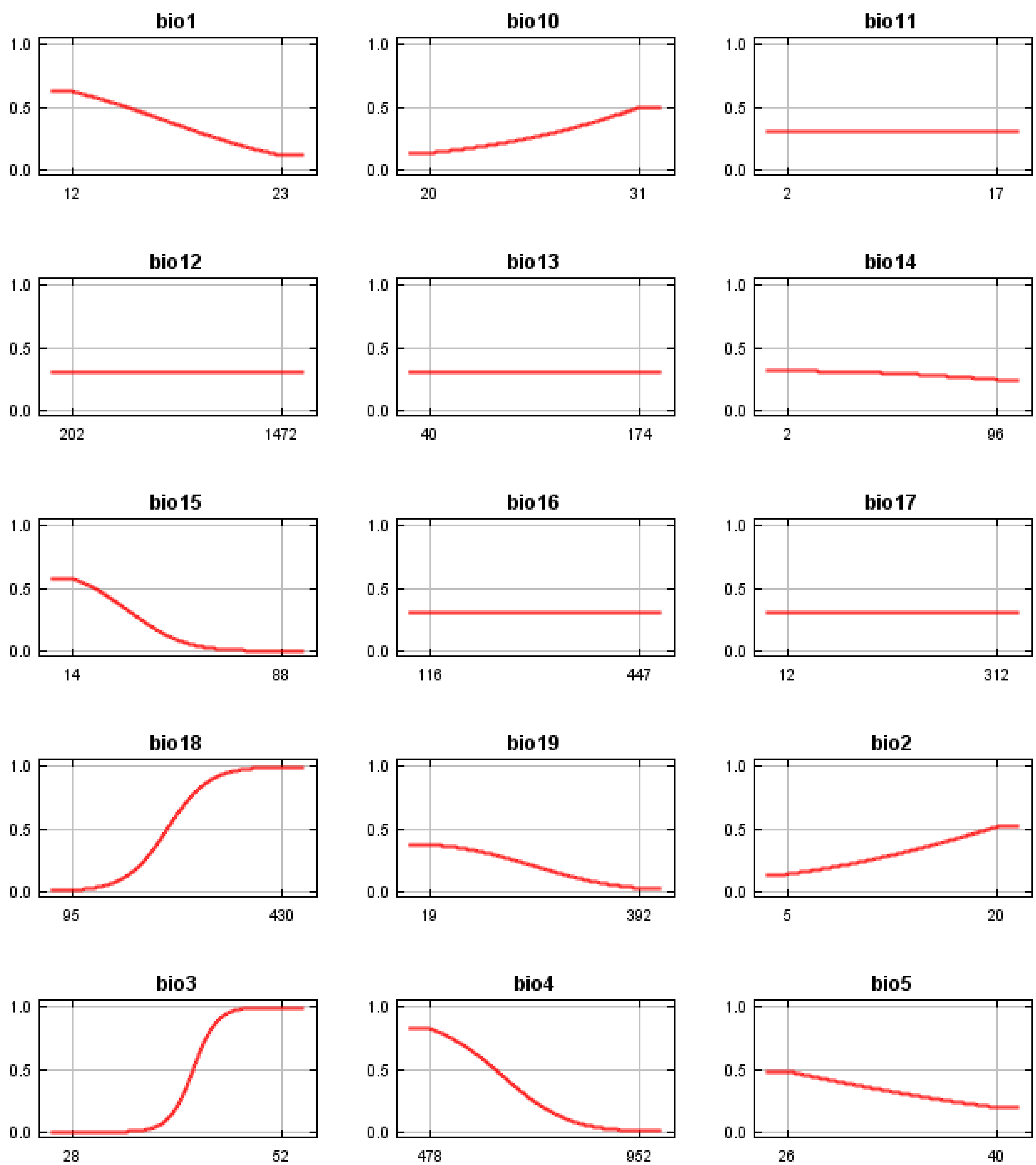
This is a representation of the Maxent model for Salvia_pentstemonoides. Warmer colors show areas with better predicted conditions. White dots show the presence locations used for training, while violet dots show test locations. Click on the image for a full-size version.

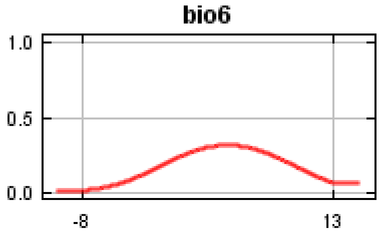


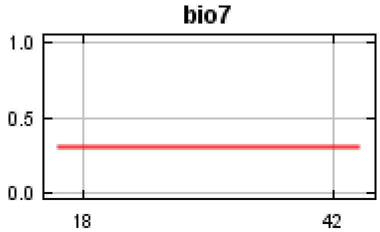
Click here to interactively explore this prediction using the Explain tool. If clicking from your browser does not succeed in starting the tool, try running the script in F:\MaxEnt Output\Salvia_pentstemonoides\Salvia_pentstemonoides_explain.bat directly. This tool requires the environmental grids to be small enough that they all fit in memory.

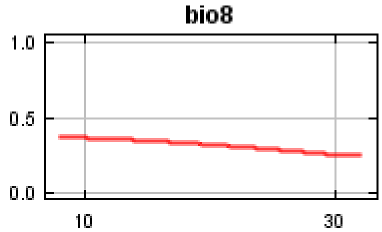
Response curves

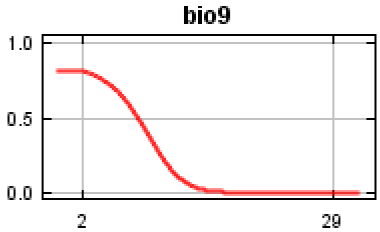
These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together.

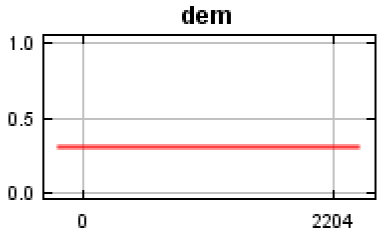


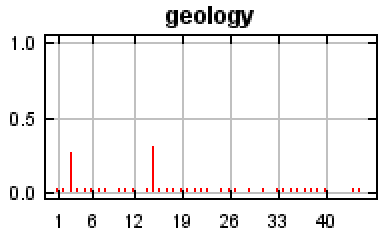

bio6
1.0
0.5
0.0
-8
13

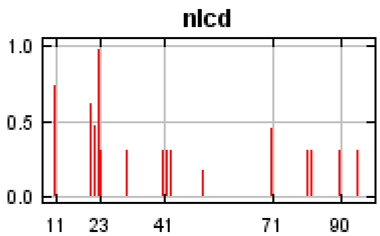

bio7
1.0
0.5
0.0
18
42

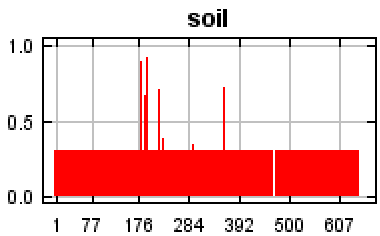

bio8
1.0
0.5
0.0
10
30

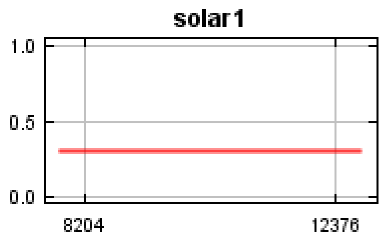

bio9
1.0
0.5
0.0
2
29

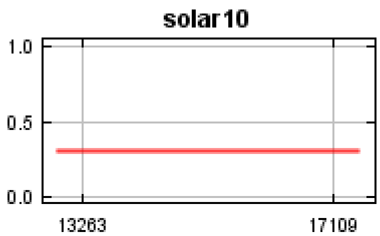

dem
1.0
0.5
0.0
0
2204

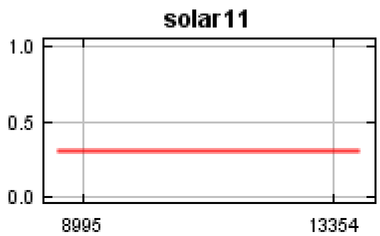

geology
1.0
0.5
0.0
1
6
12
19
26
33
40

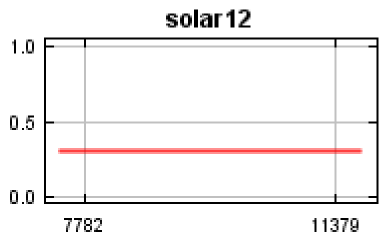

nlcd
1.0
0.5
0.0
11
23
41
71
90

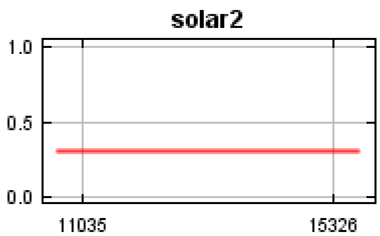

soil
1.0
0.5
0.0
1
77
176
284
392
500
607

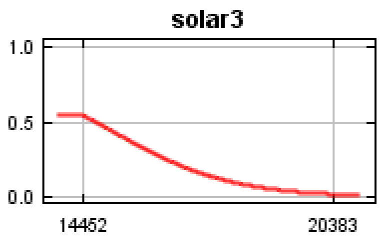

solar1
1.0
0.5
0.0
8204
12376

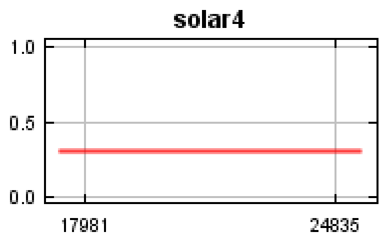

solar10
1.0
0.5
0.0
13263
17109

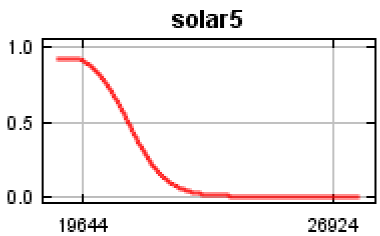

solar11
1.0
0.5
0.0
8995
13354

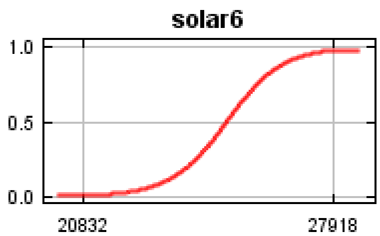

solar12
1.0
0.5
0.0
7782
11379

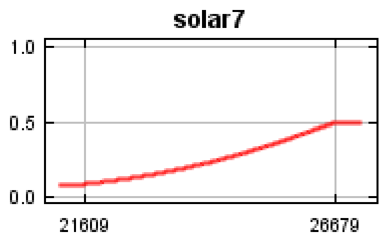

solar2
1.0
0.5
0.0
11035
15326


solar3
1.0
0.5
0.0
14452
20383

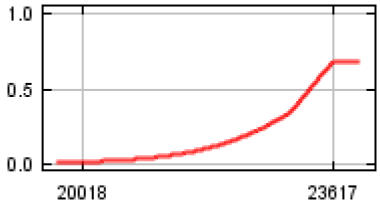

solar4
1.0
0.5
0.0
17981
24835


solar5
1.0
0.5
0.0
19644
26924

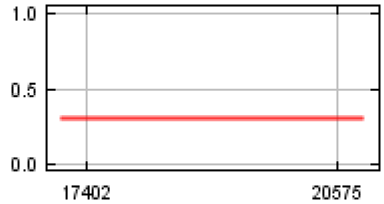

solar6
1.0
0.5
0.0
20832
27918


solar7
1.0
0.5
0.0
21609
26679

solar8

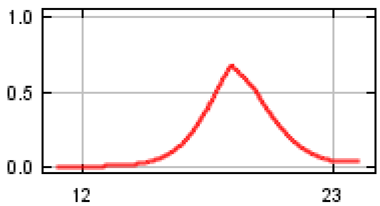


solar9

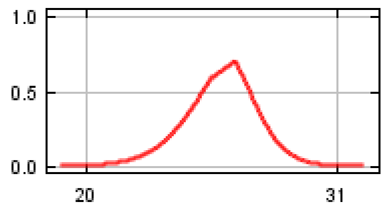


In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.

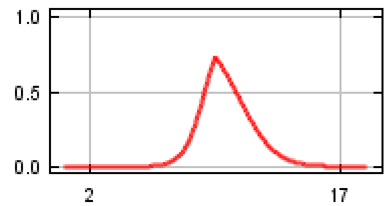
bio1



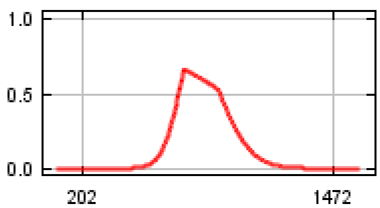
bio10



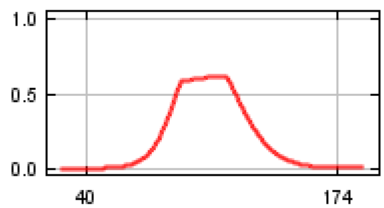
bio11



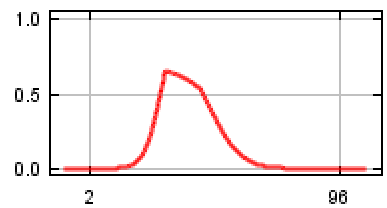
bio12



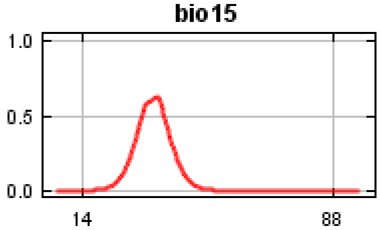
bio13



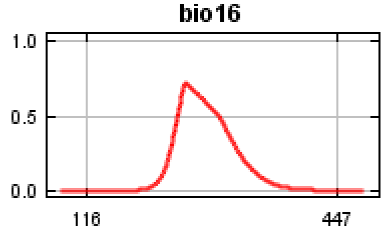
bio14



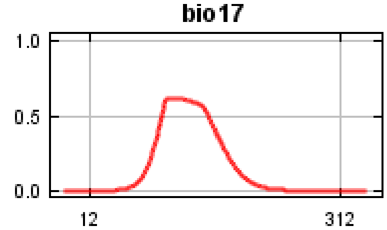
bio15



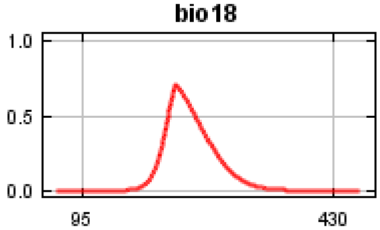
bio16



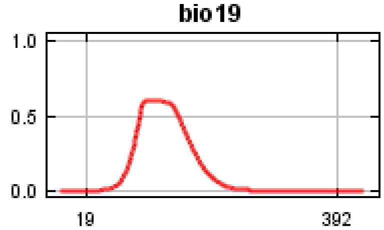
bio17



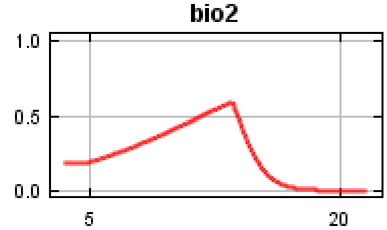
bio18

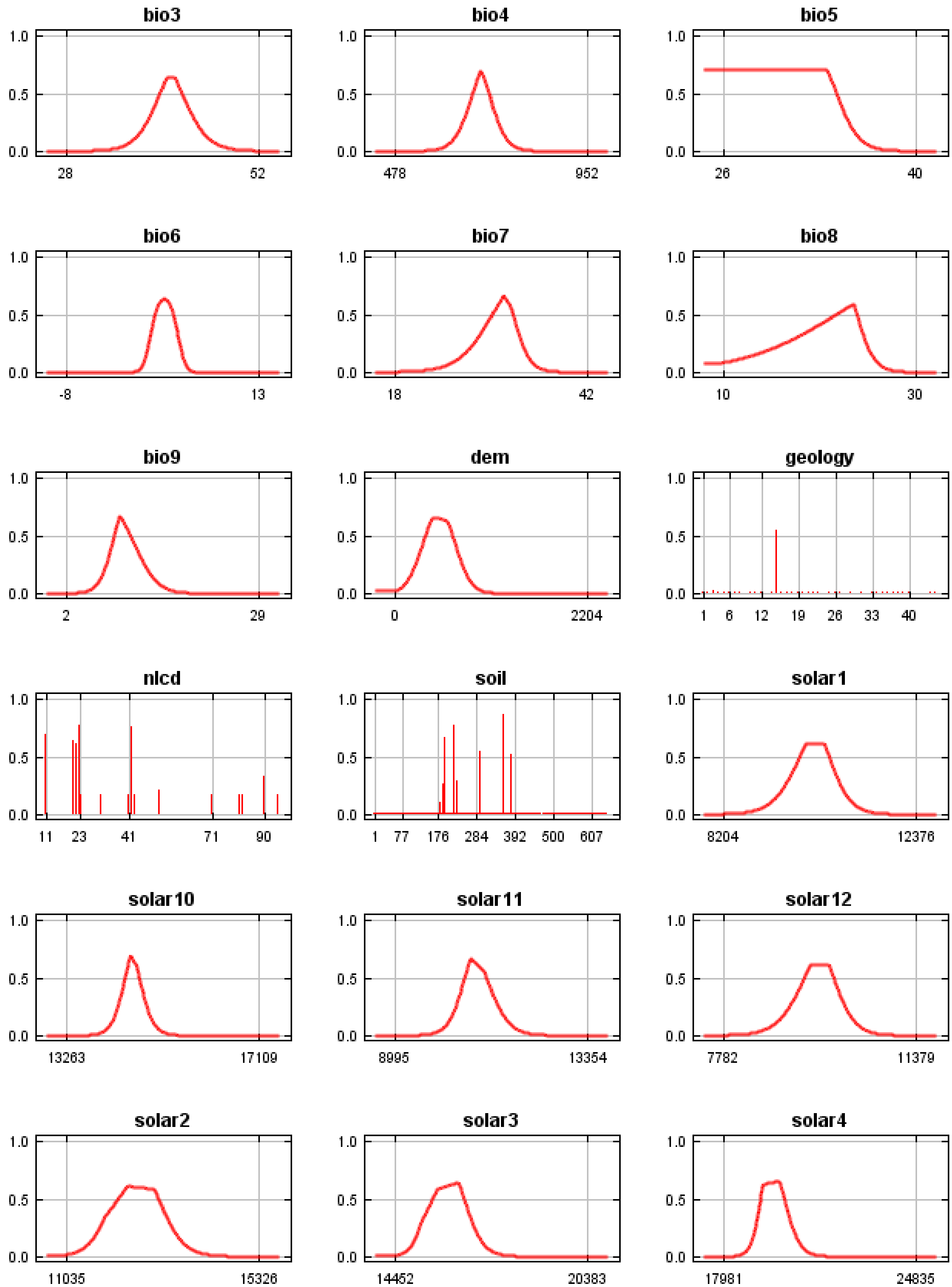


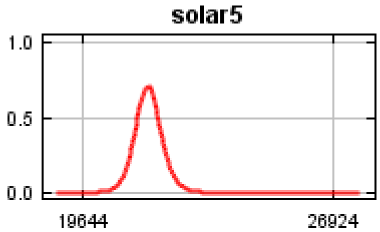
bio19

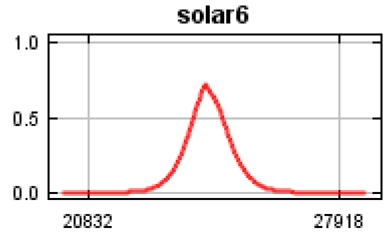


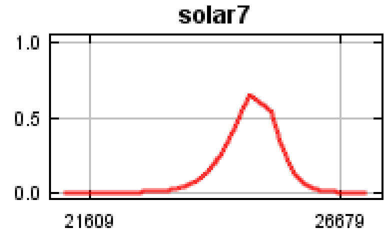
bio2

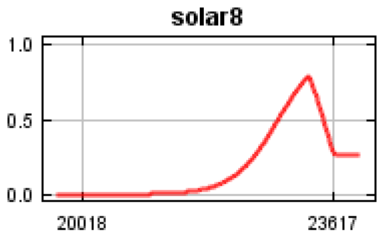


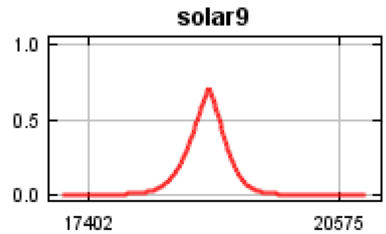

bio3
1.0
0.5
0.0
28
52
bio4
478
952
bio5
26
40
bio6
-8
13
bio7
18
42
bio8
10
30
bio9
2
29
dem
0
2204
geology
1 6 12 19 26 33 40
nlcd
11 23 41 71 90
soil
1 77 176 284 392 500 607
solar1
8204
12376
solar10
13263
17109
solar11
8995
13354
solar12
7782
11379
solar2
11035
15326
solar3
14452
20383
solar4
17981
24835











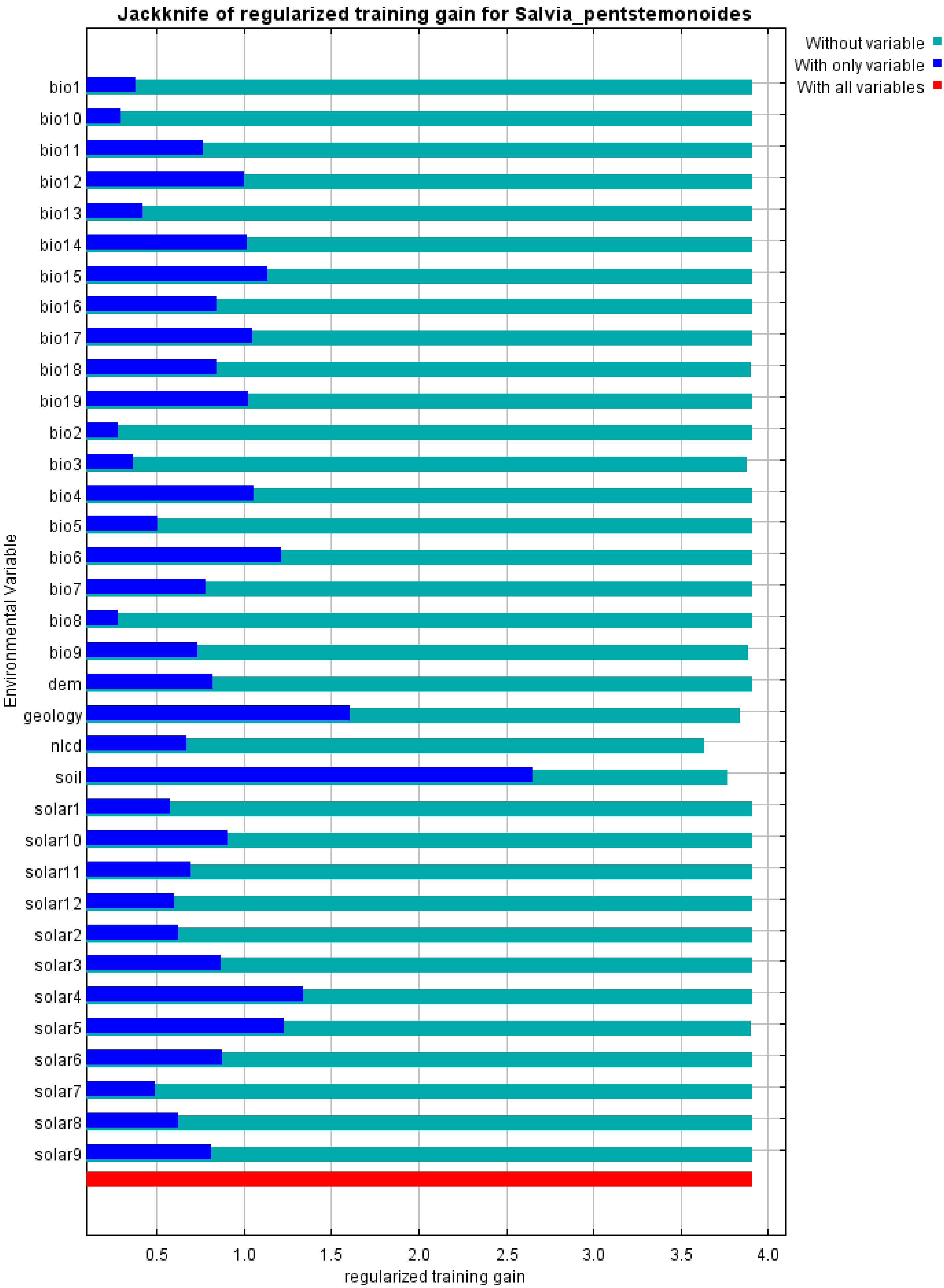
Analysis of variable contributions

The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated.

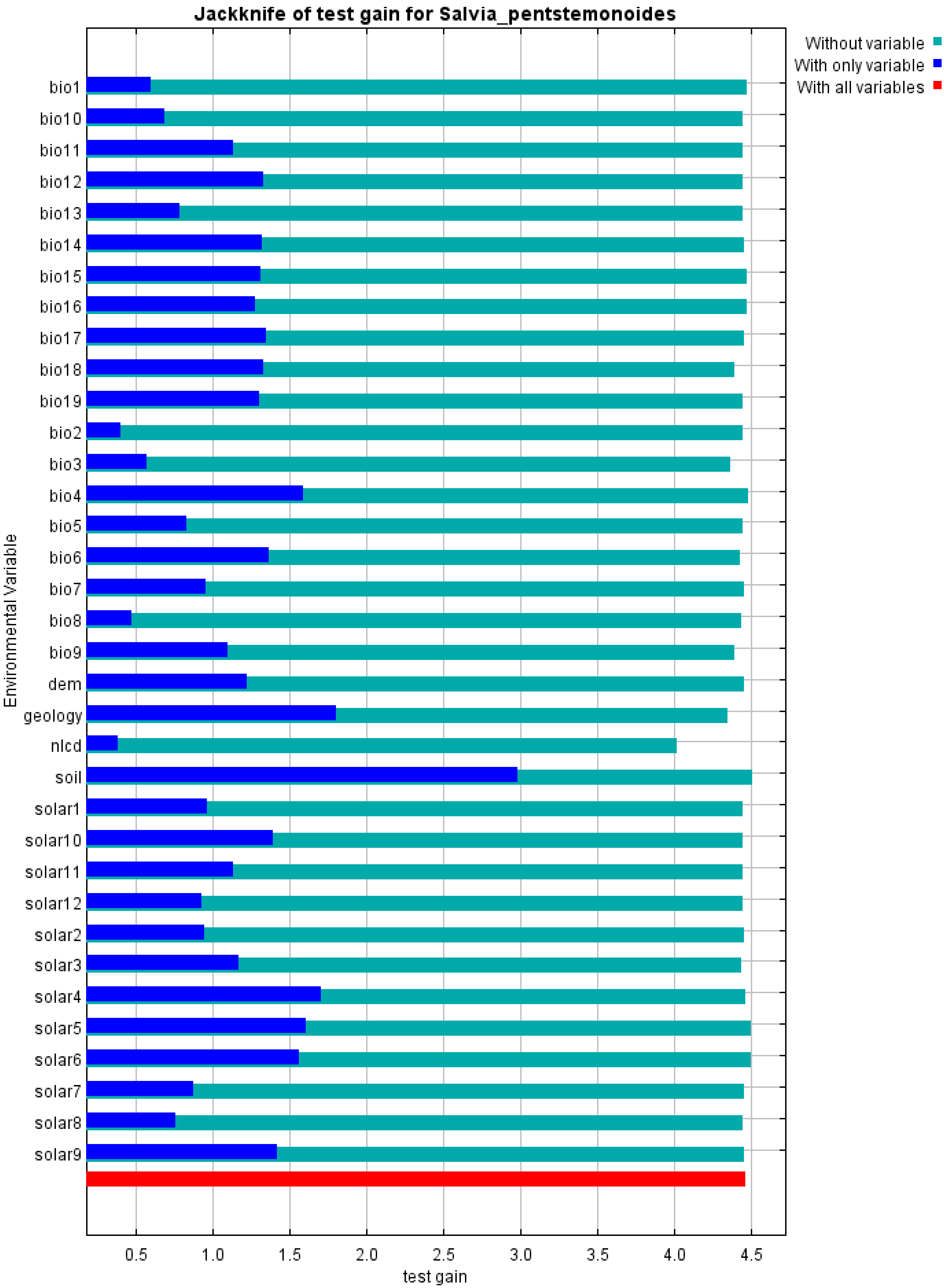
Variable	Percent contribution	Permutation importance
geology	43.5	4
soil	18.2	1.1
bio14	10.2	0
nlcd	8.9	2.4
bio18	8.1	2.5
bio4	5.1	1.8
solar8	2.5	0.5
bio3	1.3	6.3
bio9	0.6	55.5
bio15	0.4	3
bio19	0.3	0.1
dem	0.3	0
solar3	0.2	2.8
bio6	0.1	0.3
solar5	0.1	15.3
solar2	0.1	0

solar6	0	3.7
bio2	0	0
solar4	0	0
bio5	0	0
bio1	0	0.3
solar7	0	0.2
bio16	0	0
bio10	0	0
bio8	0	0
bio7	0	0
bio17	0	0
solar1	0	0
solar10	0	0
solar11	0	0
bio13	0	0
bio12	0	0
bio11	0	0
solar12	0	0
solar9	0	0

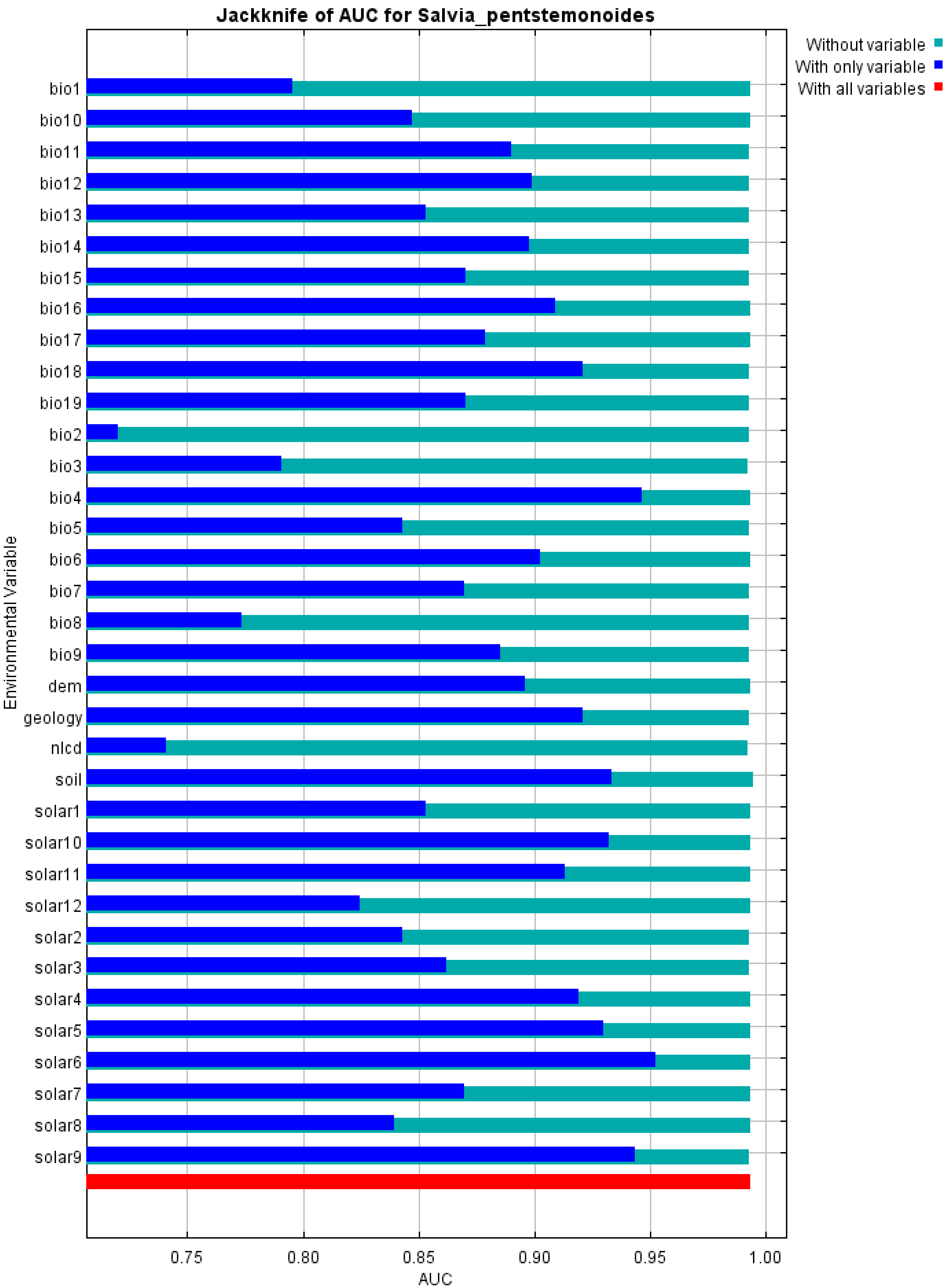
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is soil, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is nlcd, which therefore appears to have the most information that isn't present in the other variables.


Jackknife of regularized training gain for Salvia_pentstemonoides
Without variable
With only variable
With all variables
Environmental Variable
bio1
bio10
bio11
bio12
bio13
bio14
bio15
bio16
bio17
bio18
bio19
bio2
bio3
bio4
bio5
bio6
bio7
bio8
bio9
dem
geology
nlcd
soil
solar1
solar10
solar11
solar12
solar2
solar3
solar4
solar5
solar6
solar7
solar8
solar9
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
regularized training gain

The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.


Jackknife of test gain for Salvia_pentstemonoides
Without variable
With only variable
With all variables
Environmental Variable
bio1
bio10
bio11
bio12
bio13
bio14
bio15
bio16
bio17
bio18
bio19
bio2
bio3
bio4
bio5
bio6
bio7
bio8
bio9
dem
geology
nlcd
soil
solar1
solar10
solar11
solar12
solar2
solar3
solar4
solar5
solar6
solar7
solar8
solar9
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
test gain

Lastly, we have the same jackknife test, using AUC on test data.



Raw data outputs and control parameters

The data used in the above analysis is contained in the next links. Please see the Help button for more information on these.
The model applied to the training environmental layers
The coefficients of the model
The omission and predicted area for varying cumulative and raw thresholds
The prediction strength at the training and (optionally) test presence sites
Results for all species modeled in the same Maxent run, with summary statistics and (optionally) jackknife results

Regularized training gain is 3.913, training AUC is 0.995, unregularized training gain is 4.463.
Unregularized test gain is 4.465.
Test AUC is 0.993, standard deviation is 0.002 (calculated as in DeLong, DeLong & Clarke-Pearson 1988, equation 2).
Algorithm converged after 1460 iterations (77 seconds).

The follow settings were used during the run:
29 presence records used for training, 9 for testing.
10029 points used to determine the Maxent distribution (background points and presence points).
Environmental layers used: bio1 bio10 bio11 bio12 bio13 bio14 bio15 bio16 bio17 bio18 bio19 bio2 bio3 bio4 bio5 bio6 bio7 bio8 bio9 dem geology(categorical) nlcd(categorical) soil(categorical) solar1 solar10 solar11 solar12 solar2 solar3 solar4 solar5 solar6 solar7 solar8 solar9
Regularization values: linear/quadratic/product: 0.269, categorical: 0.250, threshold: 1.710, hinge: 0.500
Feature types used: hinge linear quadratic
responsecurves: true
jackknife: true
outputformat: logistic
outputdirectory: F:\MaxEnt Output\Salvia_pentstemonoides
samplesfile: F:\TXDOT Species Info\salvia_pentstemonoides.csv
environmentallayers: F:\ASCII_layers
randomseed: true
randomtestpoints: 25
replicatetype: subsample
writebackgroundpredictions: true
writeplotdata: true
maximumiterations: 5000
adjustsampleradius: -6
applythresholdrule: 10 percentile training presence
Command line used:

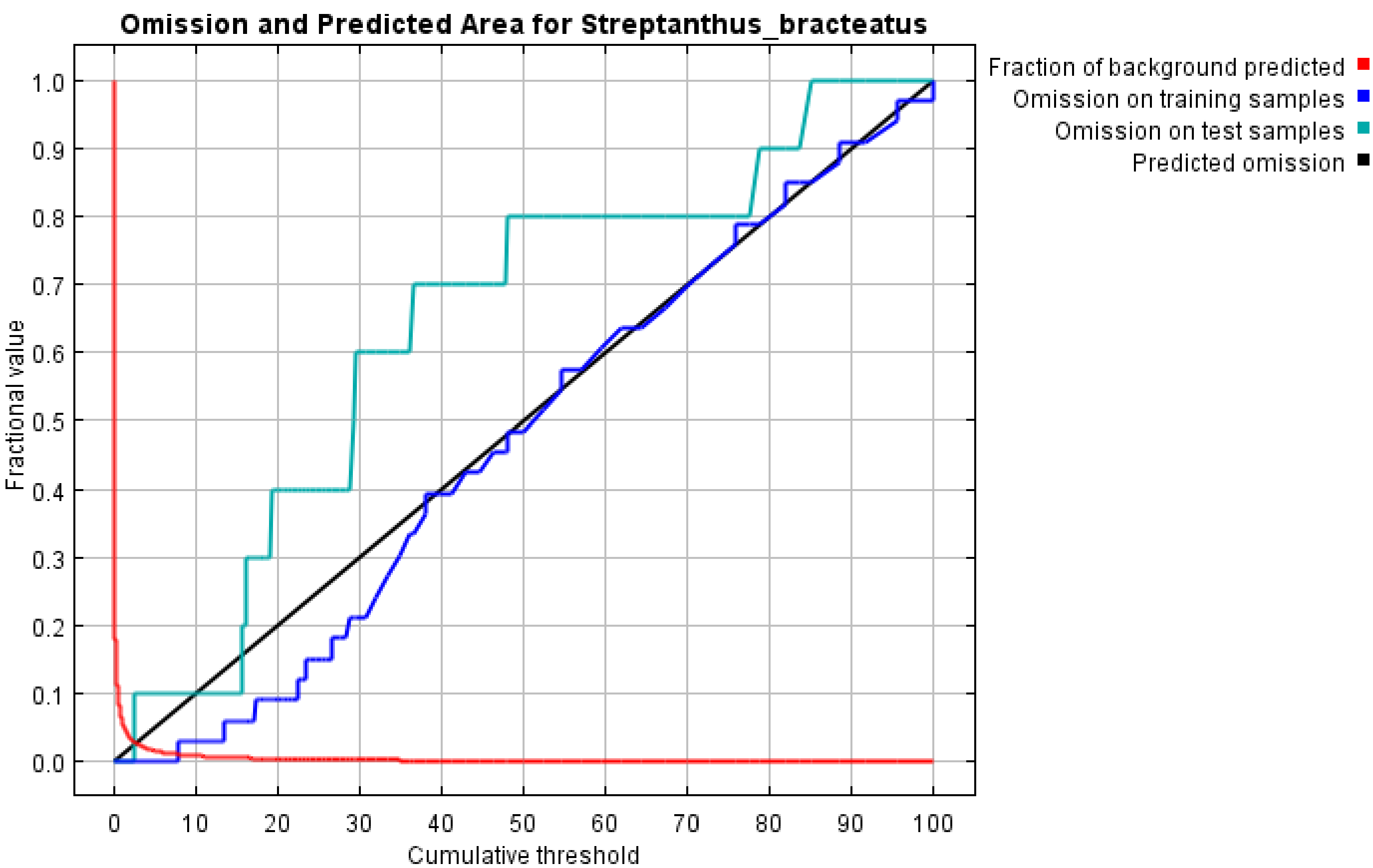
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Salvia_pentstemonoides responsecurves jackknife outputformat=logistic "outputdirectory=F:\MaxEnt Output\Salvia_pentstemonoides" "samplesfile=F:\TXDOT Species Info\salvia_pentstemonoides.csv" environmentallayers=F:\ASCII_layers randomseed randomtestpoints=25 replicatetype=subsample writebackgroundpredictions writeplotdata maximumiterations=5000 adjustsampleradius=-6 "applythresholdrule=10 percentile training presence" -t geology -t nlcd -t soil

Maxent model for Streptanthus_bracteatus

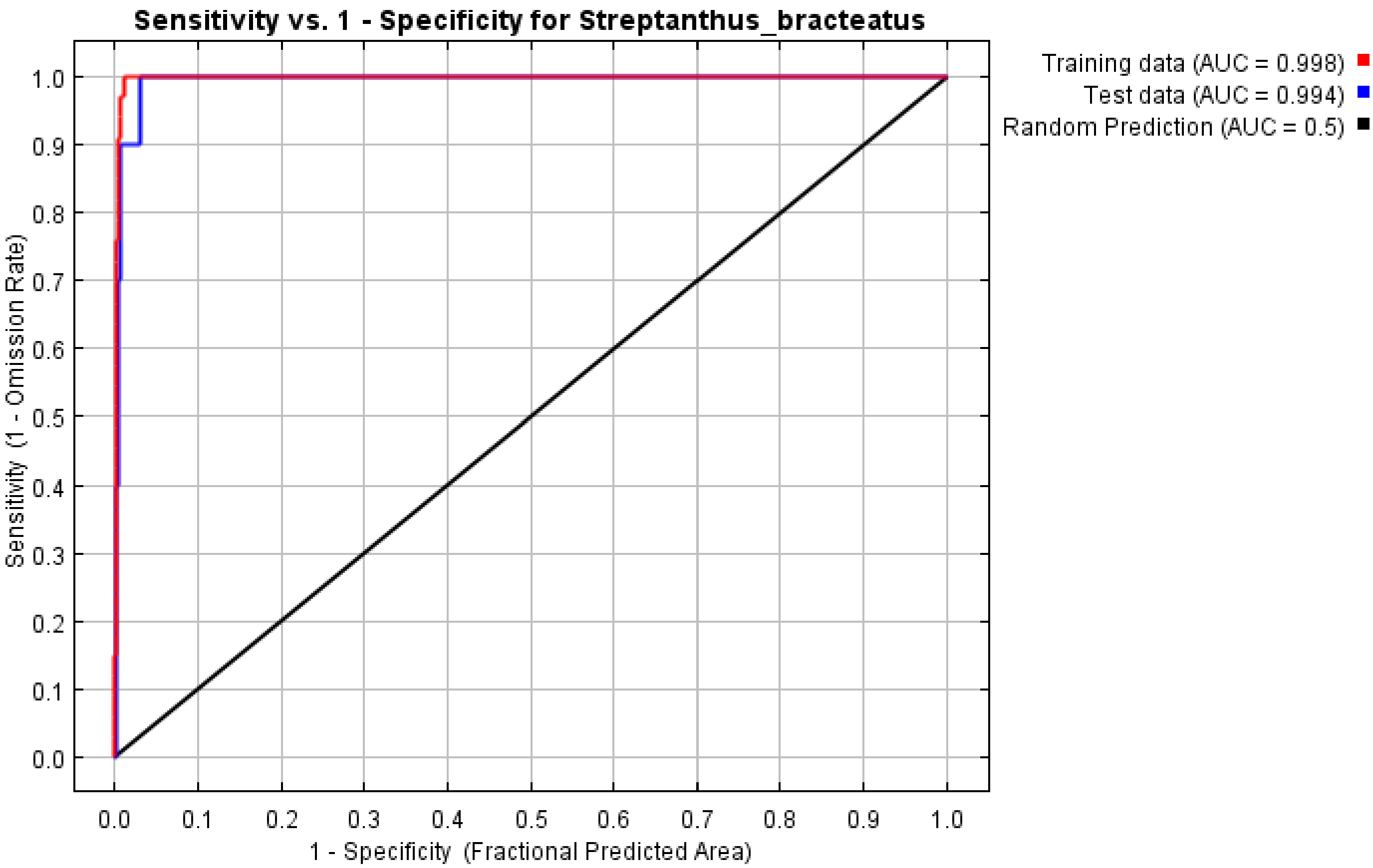
This page contains some analysis of the Maxent model for Streptanthus_bracteatus, created Thu Jan 23 14:40:46 CST 2020 using Maxent version 3.4.1. If you would like to do further analyses, the raw data used here is linked to at the end of this page.

Analysis of omission/commission

The following picture shows the omission rate and predicted area as a function of the cumulative threshold. The omission rate is is calculated both on the training presence records, and (if test data are used) on the test records. The omission rate should be close to the predicted omission, because of the definition of the cumulative threshold.



The next picture is the receiver operating characteristic (ROC) curve for the same data. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). This implies that the maximum achievable AUC is less than 1. If test data is drawn from the Maxent distribution itself, then the maximum possible test AUC would be 0.992 rather than 1; in practice the test AUC may exceed this bound.



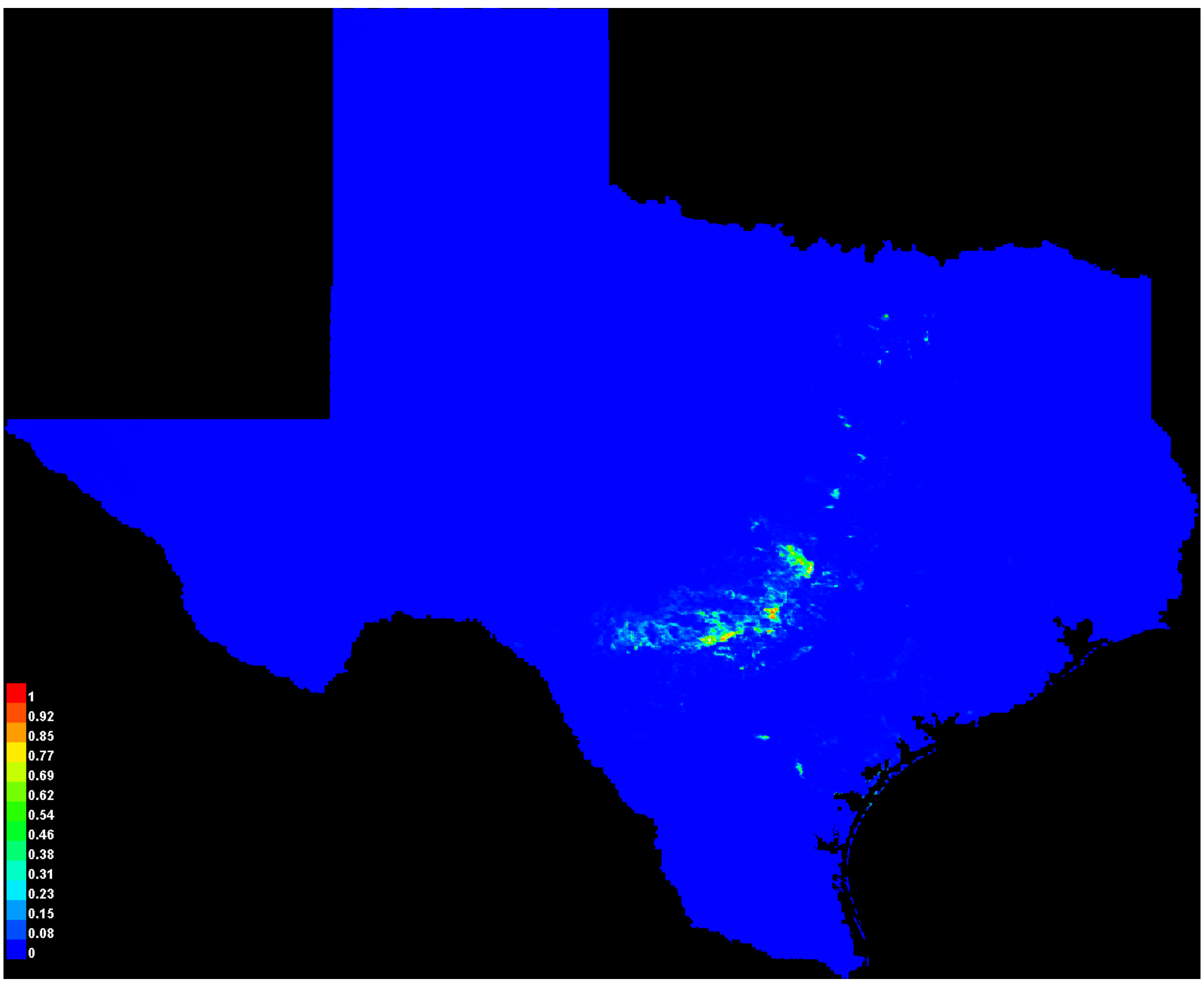
Some common thresholds and corresponding omission rates are as follows. If test data are available, binomial probabilities are calculated exactly if the number of test samples is at most 25, otherwise using a normal approximation to the binomial. These are 1-sided p-values for the null hypothesis that test points are predicted no better than by a random prediction with the same fractional predicted area. The "Balance" threshold minimizes 6 * training omission rate + .04 * cumulative threshold + 1.6 * fractional predicted area.

Cumulative threshold	Logistic threshold	Description	Fractional predicted area	Training omission rate	Test omission rate	P-value
1.000	0.002	Fixed cumulative value 1	0.059	0.000	0.000	5.203E-13
5.000	0.032	Fixed cumulative value 5	0.017	0.000	0.100	9.153E-16
10.000	0.102	Fixed cumulative value 10	0.009	0.030	0.100	4.546E-18
7.903	0.075	Minimum training presence	0.011	0.000	0.100	2.887E-17
22.326	0.332	10 percentile training presence	0.004	0.091	0.400	9.644E-13
7.903	0.075	Equal training sensitivity and specificity	0.011	0.000	0.100	2.887E-17
7.903	0.075	Maximum training sensitivity plus specificity	0.011	0.000	0.100	2.887E-17

2.346	0.009	Equal test sensitivity and specificity	0.030	0.000	0.000	6.311E-16
2.346	0.009	Maximum test sensitivity plus specificity	0.030	0.000	0.000	6.311E-16
1.407	0.004	Balance training omission, predicted area and threshold value	0.045	0.000	0.000	3.521E-14
10.057	0.102	Equate entropy of thresholded and original distributions	0.009	0.030	0.100	4.546E-18

Pictures of the model

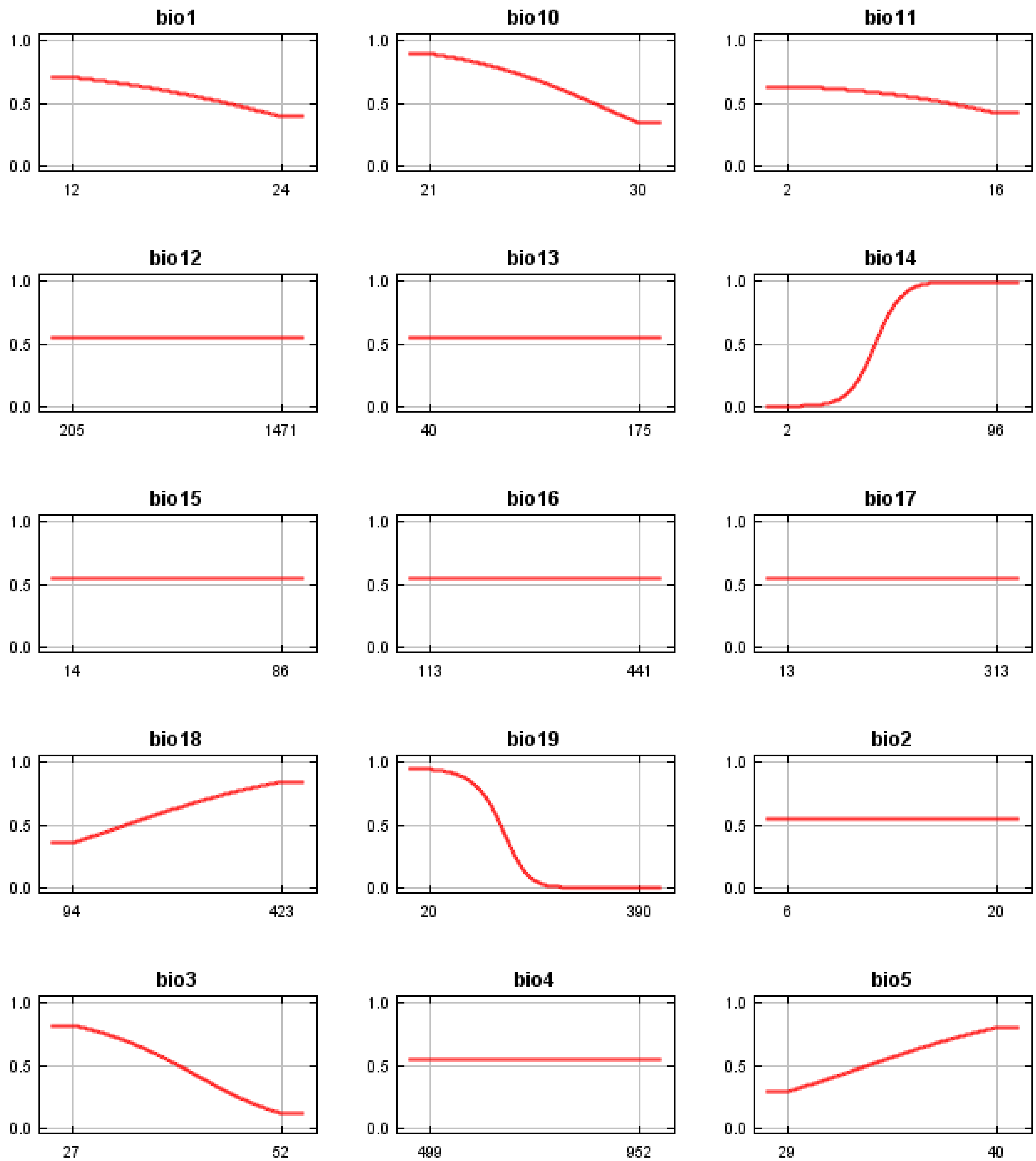
This is a representation of the Maxent model for Streptanthus_bracteatus. Warmer colors show areas with better predicted conditions. White dots show the presence locations used for training, while violet dots show test locations. Click on the image for a full-size version.

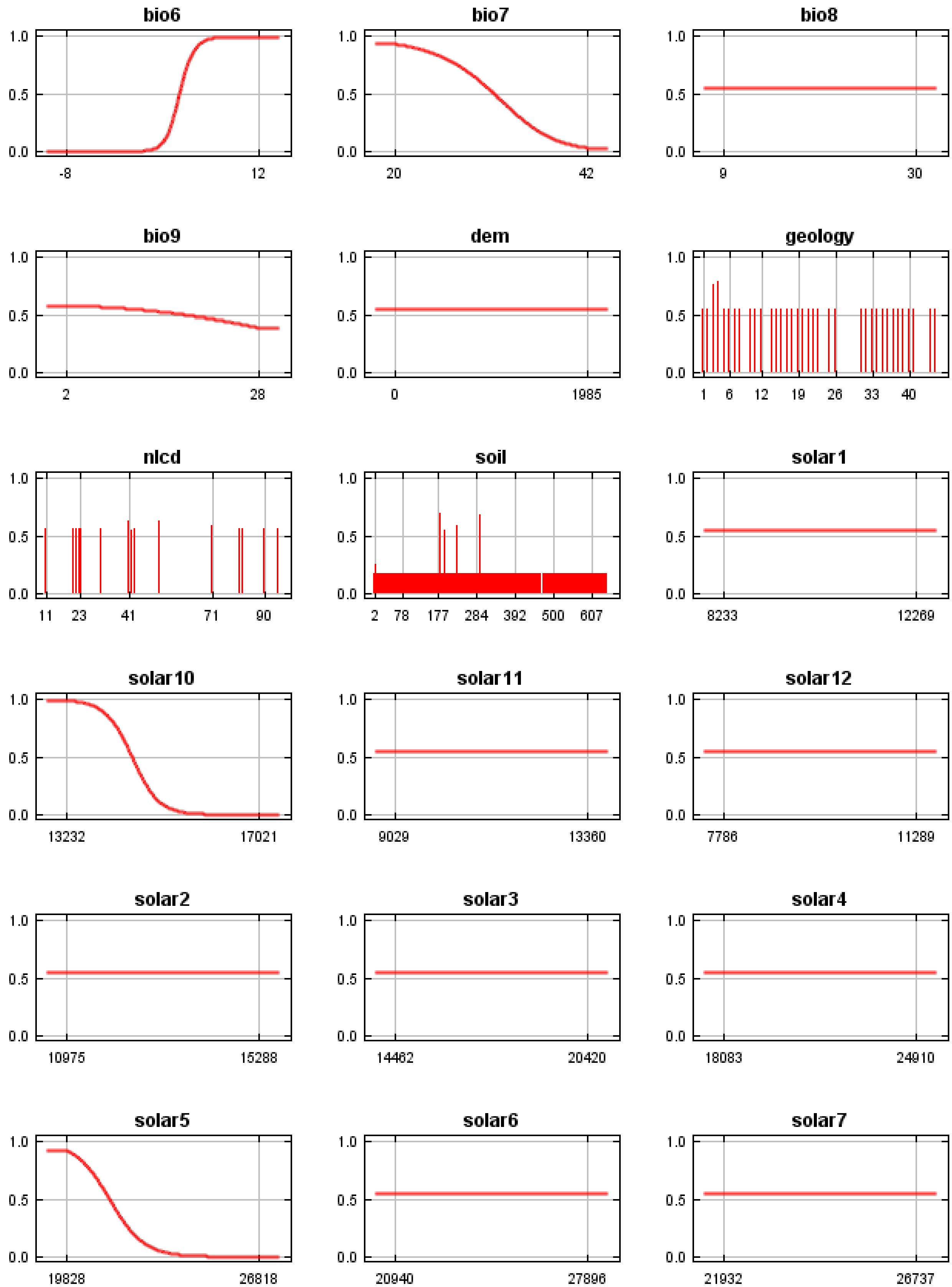


Click here to interactively explore this prediction using the Explain tool. If clicking from your browser does not succeed in starting the tool, try running the script in I:\MaxEnt Output\Streptanthus_bracteatus_explain.bat directly. This tool requires the environmental grids to be small enough that they all fit in memory.

Response curves

These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together.




bio6
1.0
0.5
0.0
-8
12
bio7
20
42
bio8
9
30
bio9
2
28
dem
0
1985
geology
1
6
12
19
26
33
40
nlcd
11
23
41
71
90
soil
2
78
177
284
392
500
607
solar1
8233
12269
solar10
13232
17021
solar11
9029
13360
solar12
7786
11289
solar2
10975
15288
solar3
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solar6
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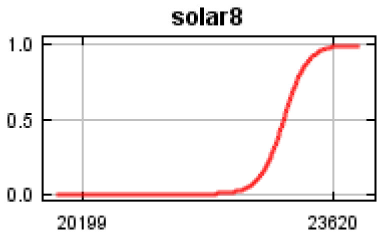
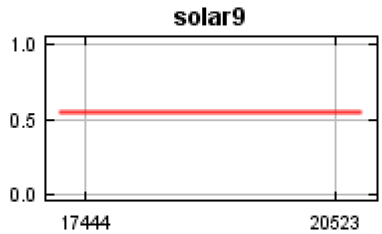
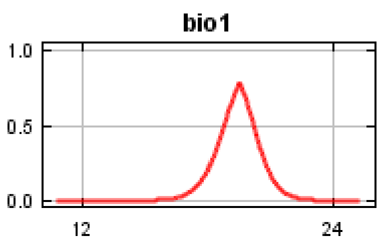
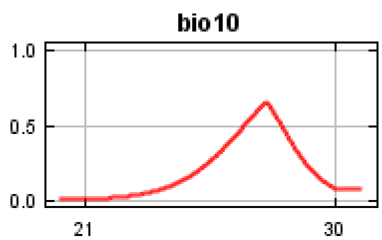
27896
solar7
21932
26737

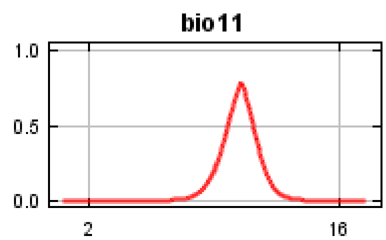


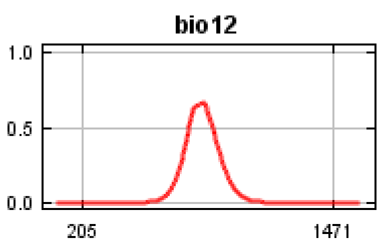


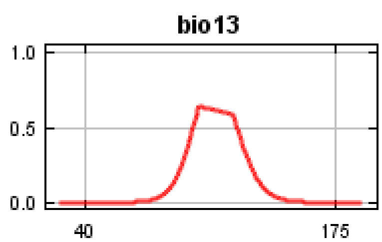
In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.

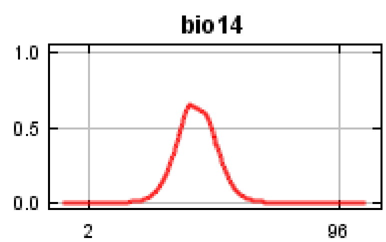


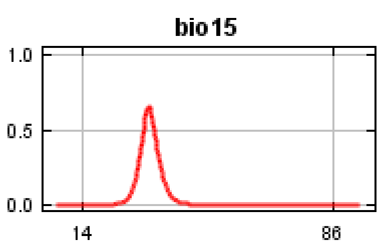


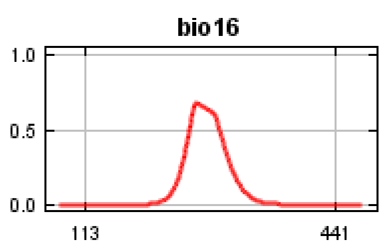


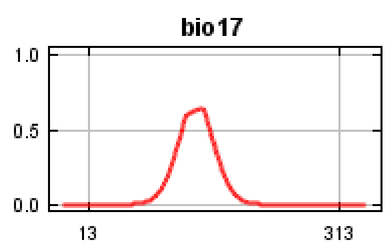


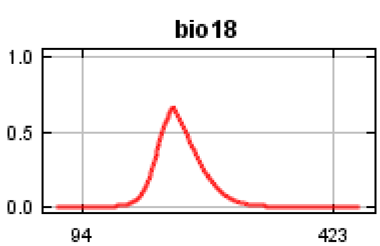


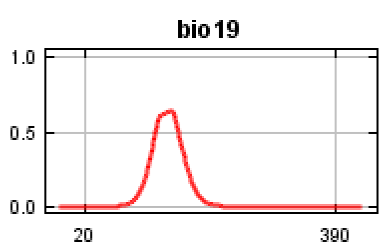


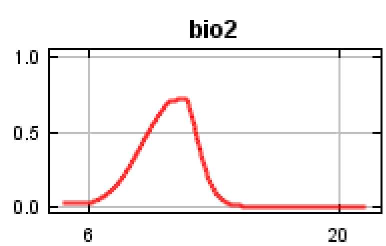


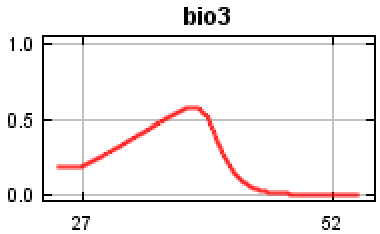








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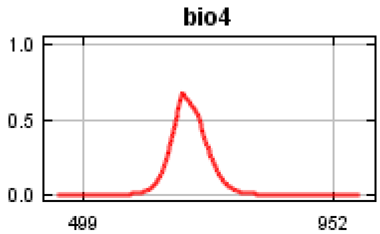
0.5
0.0
27
52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0.0
499
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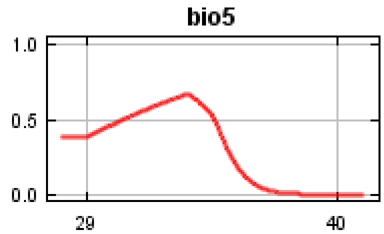
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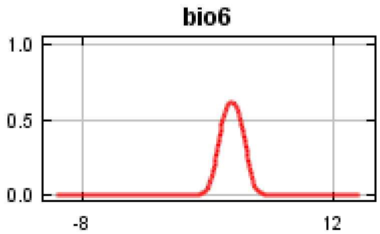
0.0
29
40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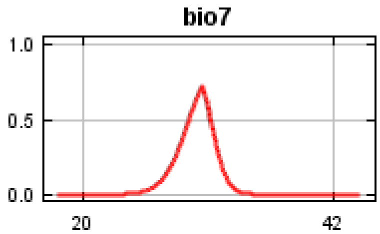
0.0
-8
12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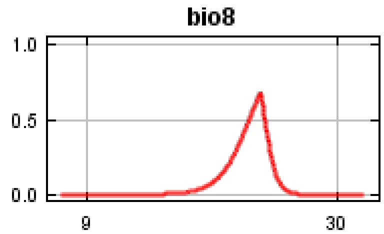
0.0
20
42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9
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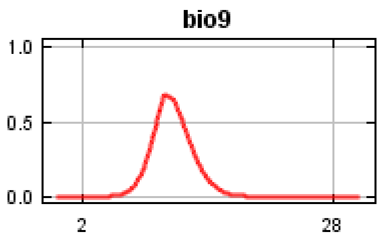
bio9
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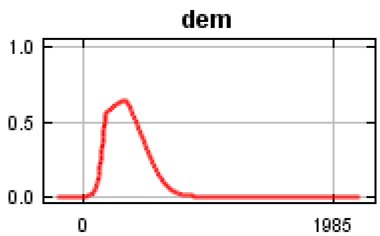
0.0
2
28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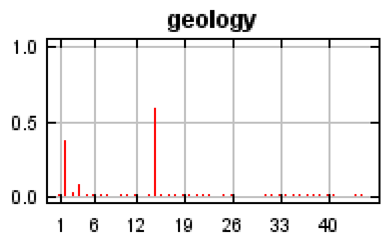
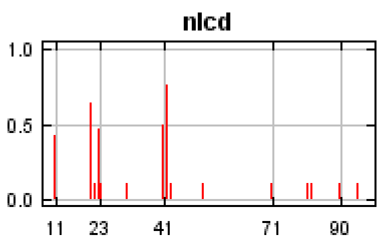
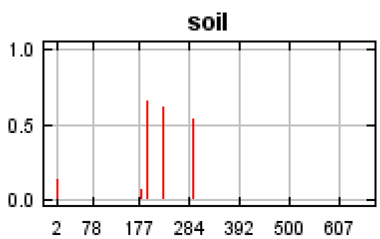
0.5
0.0
0
1985


geology
1.0
0.5
0.0
1
6
12
19
26
33
40


nlcd
1.0
0.5
0.0
11
23
41
71
90


soil
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0.0
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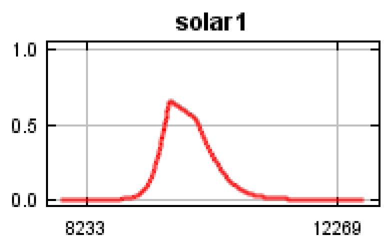
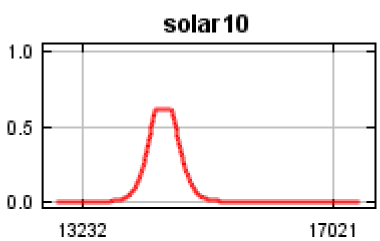
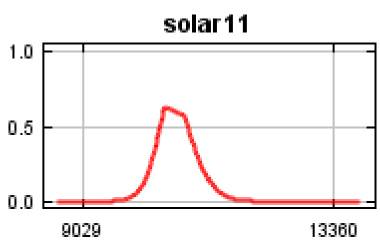
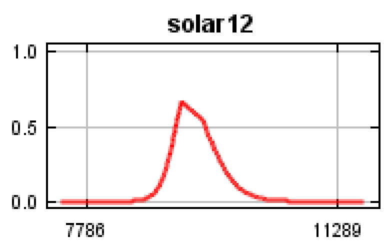
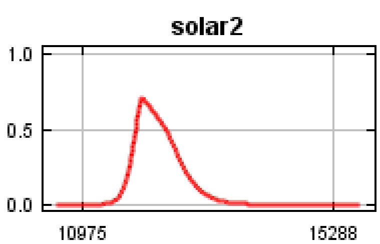
177
284
392
500
607

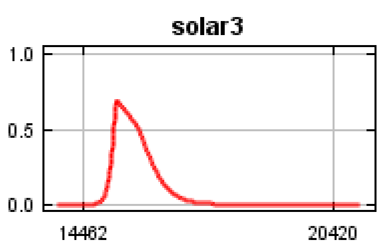

solar1
1.0
0.5
0.0
8233
12269

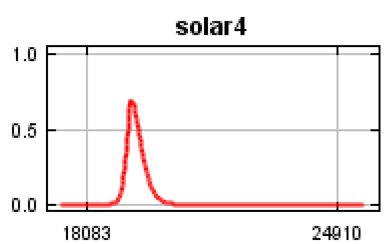

solar10
1.0
0.5
0.0
13232
17021

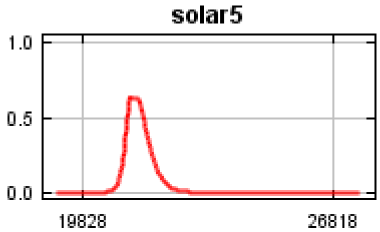

solar11
1.0
0.5
0.0
9029
13360

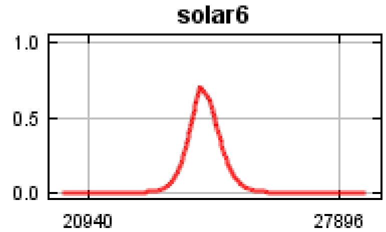

solar12
1.0
0.5
0.0
7786
11289

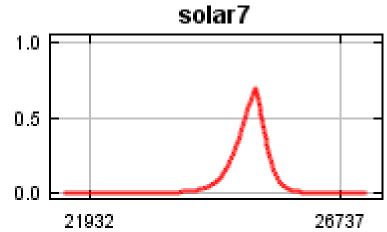

solar2
1.0
0.5
0.0
10975
15288

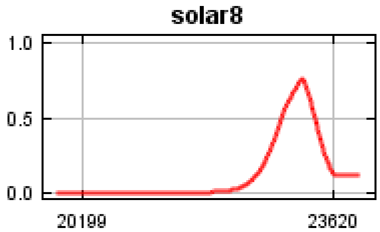

solar3
1.0
0.5
0.0
14462
20420

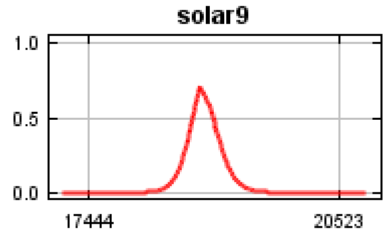

solar4
1.0
0.5
0.0
18083
24910











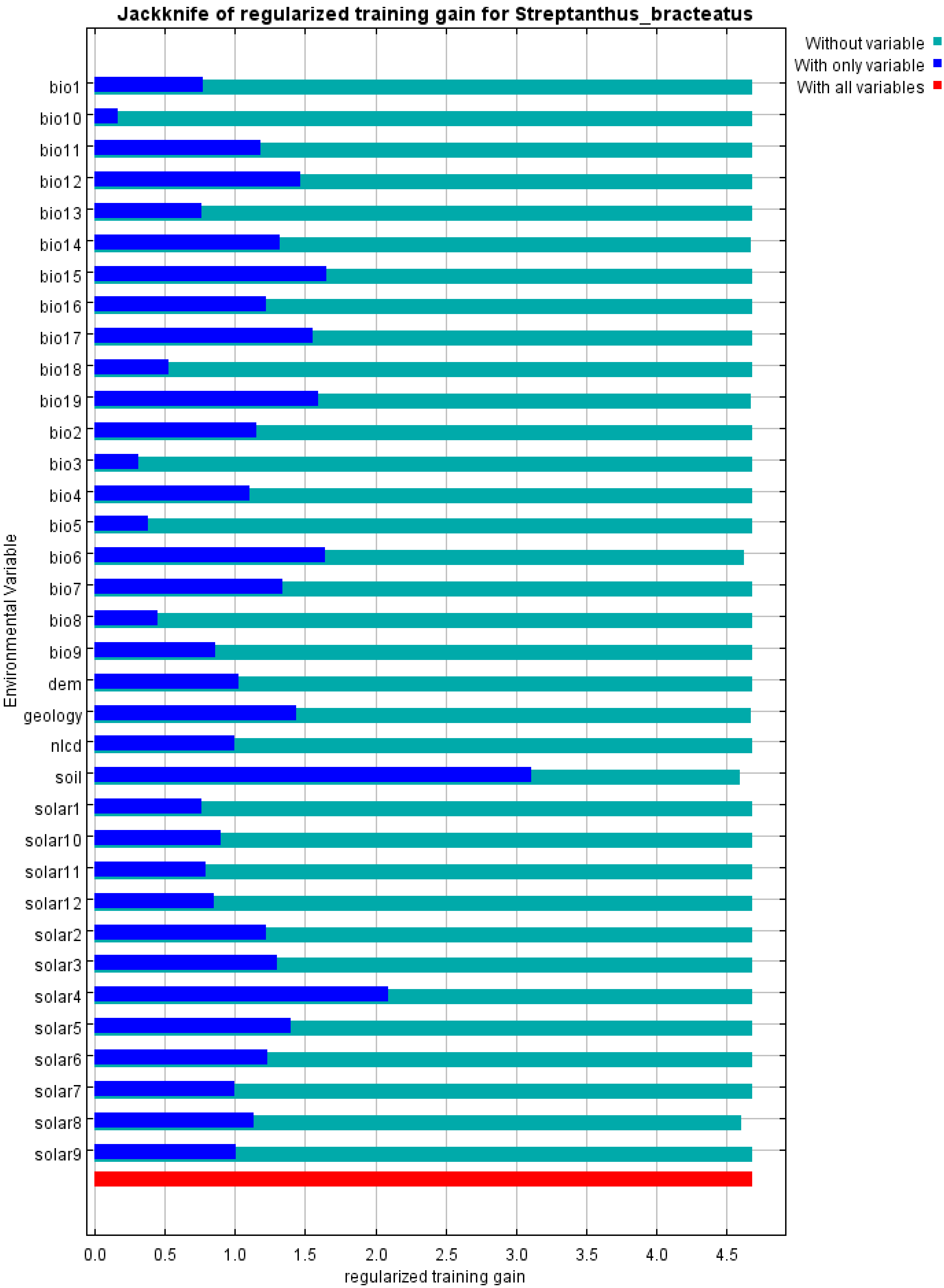
Analysis of variable contributions

The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated.

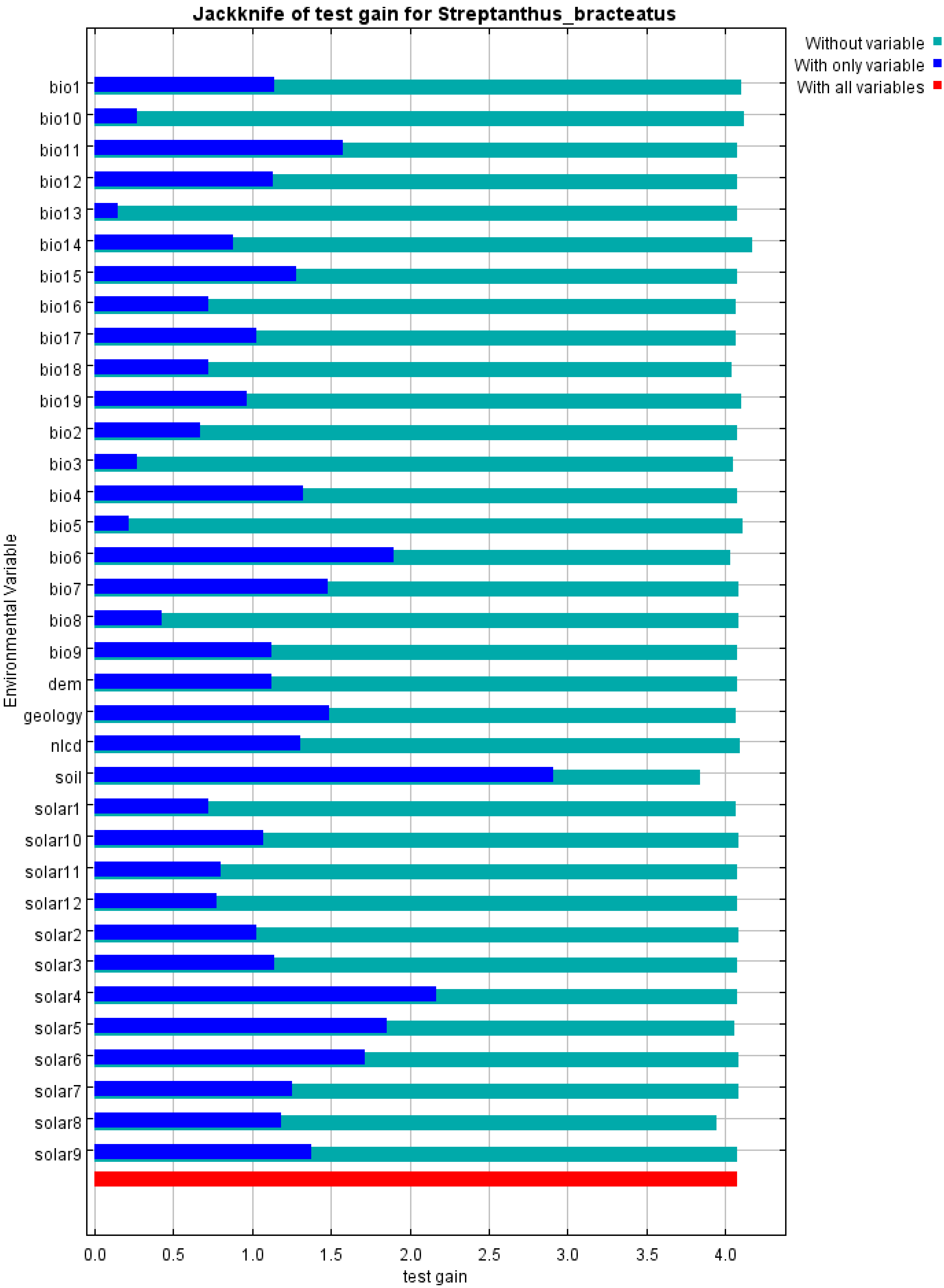
Variable	Percent contribution	Permutation importance
soil	38	0.3
geology	23.4	0.1
bio19	13.1	20.1
solar8	13.1	29.1
nlcd	4.3	0
bio6	2.6	35.7
dem	2.2	0
solar4	1.2	0
solar9	0.8	0
bio14	0.6	9.4
solar3	0.3	0
bio3	0.2	0
solar5	0.1	2.3
bio7	0	0.4
solar10	0	2.4
bio10	0	0.1

bio5	0	0
bio9	0	0
bio11	0	0
bio1	0	0
bio18	0	0
bio4	0	0
solar11	0	0
bio2	0	0
solar12	0	0
solar1	0	0
bio17	0	0
bio16	0	0
bio15	0	0
solar2	0	0
bio13	0	0
bio12	0	0
solar6	0	0
solar7	0	0
bio8	0	0

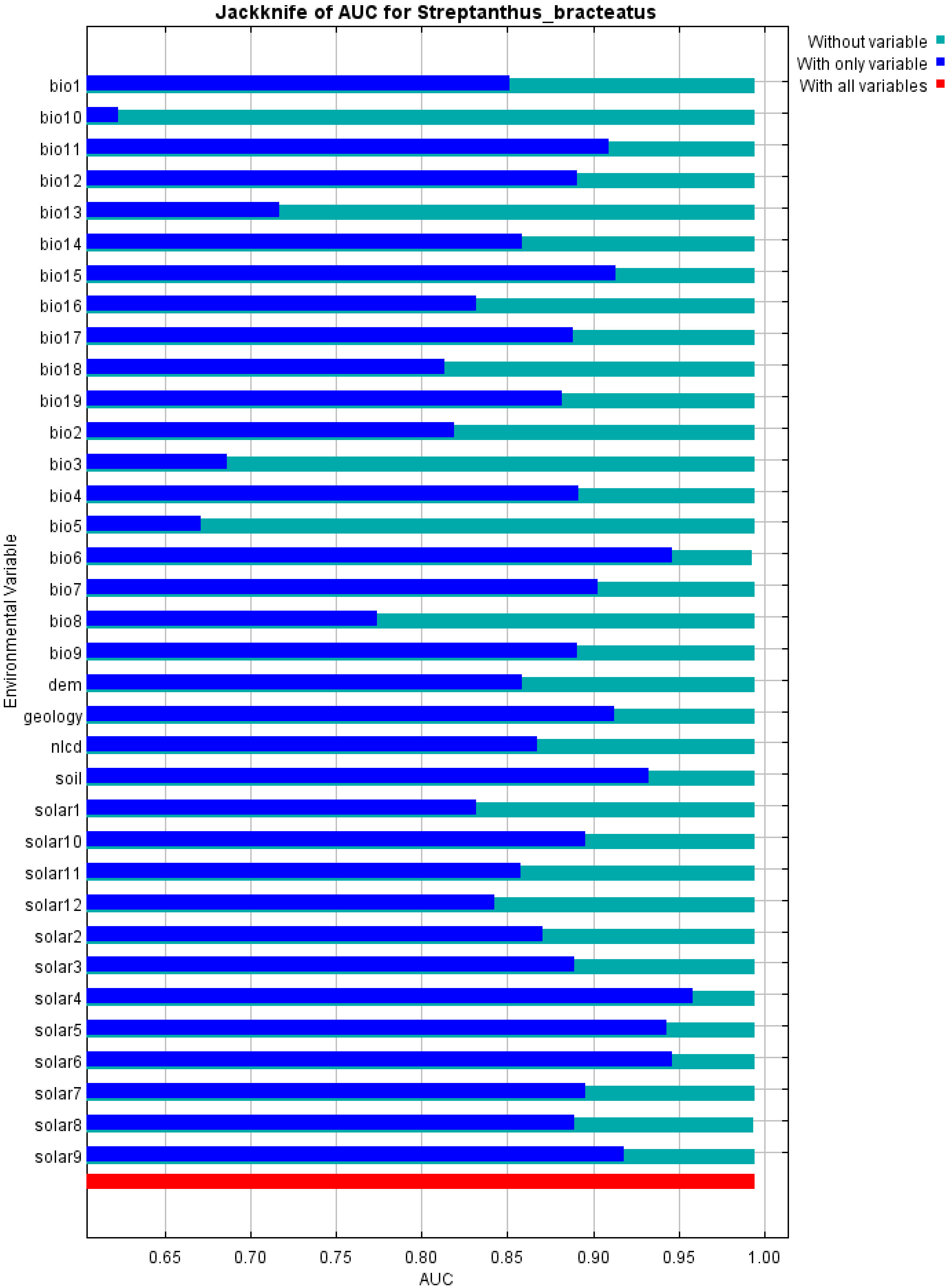
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is soil, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is soil, which therefore appears to have the most information that isn't present in the other variables.


Jackknife of regularized training gain for Streptanthus_bracteatus
Without variable
With only variable
With all variables
Environmental Variable
bio1
bio10
bio11
bio12
bio13
bio14
bio15
bio16
bio17
bio18
bio19
bio2
bio3
bio4
bio5
bio6
bio7
bio8
bio9
dem
geology
nlcd
soil
solar1
solar10
solar11
solar12
solar2
solar3
solar4
solar5
solar6
solar7
solar8
solar9
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
regularized training gain

The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.


Jackknife of test gain for Streptanthus_bracteatus
Without variable
With only variable
With all variables
Environmental Variable
bio1
bio10
bio11
bio12
bio13
bio14
bio15
bio16
bio17
bio18
bio19
bio2
bio3
bio4
bio5
bio6
bio7
bio8
bio9
dem
geology
nlcd
soil
solar1
solar10
solar11
solar12
solar2
solar3
solar4
solar5
solar6
solar7
solar8
solar9
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
test gain

Lastly, we have the same jackknife test, using AUC on test data.



Raw data outputs and control parameters

The data used in the above analysis is contained in the next links. Please see the Help button for more information on these.
The model applied to the training environmental layers
The coefficients of the model
The omission and predicted area for varying cumulative and raw thresholds
The prediction strength at the training and (optionally) test presence sites
Results for all species modeled in the same Maxent run, with summary statistics and (optionally) jackknife results

Regularized training gain is 4.684, training AUC is 0.998, unregularized training gain is 5.048.
Unregularized test gain is 4.077.
Test AUC is 0.994, standard deviation is 0.003 (calculated as in DeLong, DeLong & Clarke-Pearson 1988, equation 2).
Algorithm converged after 1160 iterations (32 seconds).

The follow settings were used during the run:
33 presence records used for training, 10 for testing.
10033 points used to determine the Maxent distribution (background points and presence points).
Environmental layers used: bio1 bio10 bio11 bio12 bio13 bio14 bio15 bio16 bio17 bio18 bio19 bio2 bio3 bio4 bio5 bio6 bio7 bio8 bio9 dem geology(categorical) nlcd(categorical) soil(categorical) solar1 solar10 solar11 solar12 solar2 solar3 solar4 solar5 solar6 solar7 solar8 solar9
Regularization values: linear/quadratic/product: 0.241, categorical: 0.250, threshold: 1.670, hinge: 0.500
Feature types used: hinge linear quadratic
responsecurves: true
jackknife: true
outputformat: logistic
outputdirectory: I:\MaxEnt Output
samplesfile: I:\TXDOT Species Info\Streptanthus_bracteatus.csv
environmentallayers: I:\ASCII_layers
randomseed: true
randomtestpoints: 25
replicatetype: subsample
writebackgroundpredictions: true
writeplotdata: true
maximumiterations: 5000
adjustsampleradius: -6
Command line used:

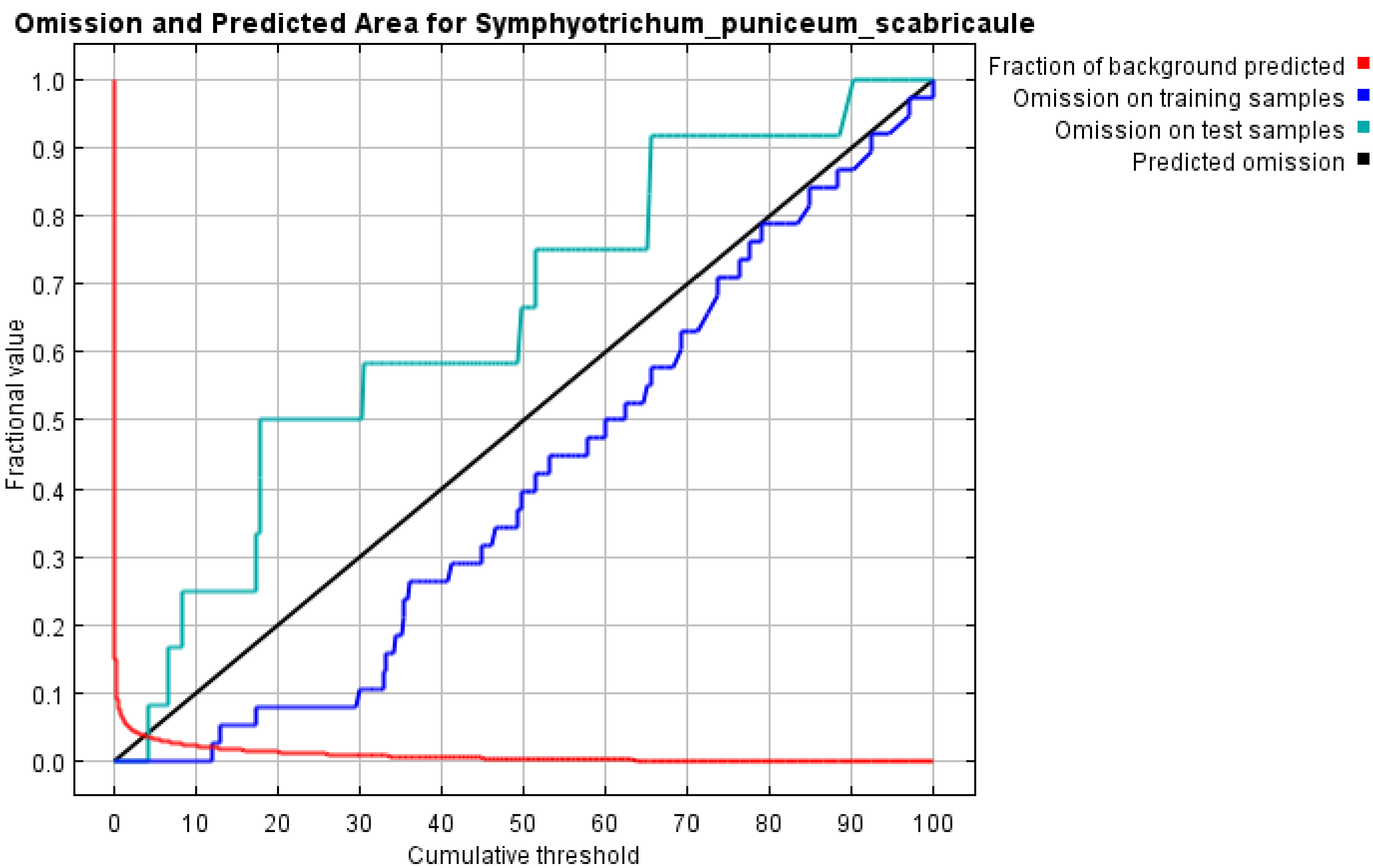
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Streptanthus_bracteatus responsecurves jackknife outputformat=logistic "outputdirectory=I:\MaxEnt Output" "samplesfile=I:\TXDOT Species Info\Streptanthus_bracteatus.csv" environmentallayers=I:\ASCII_layers randomseed randomtestpoints=25 replicatetype=subsample writebackgroundpredictions writeplotdata maximumiterations=5000 adjustsampleradius=-6 -t geology -t nlcd -t soil

Maxent model for Symphyotrichum_puniceum_scabricaule

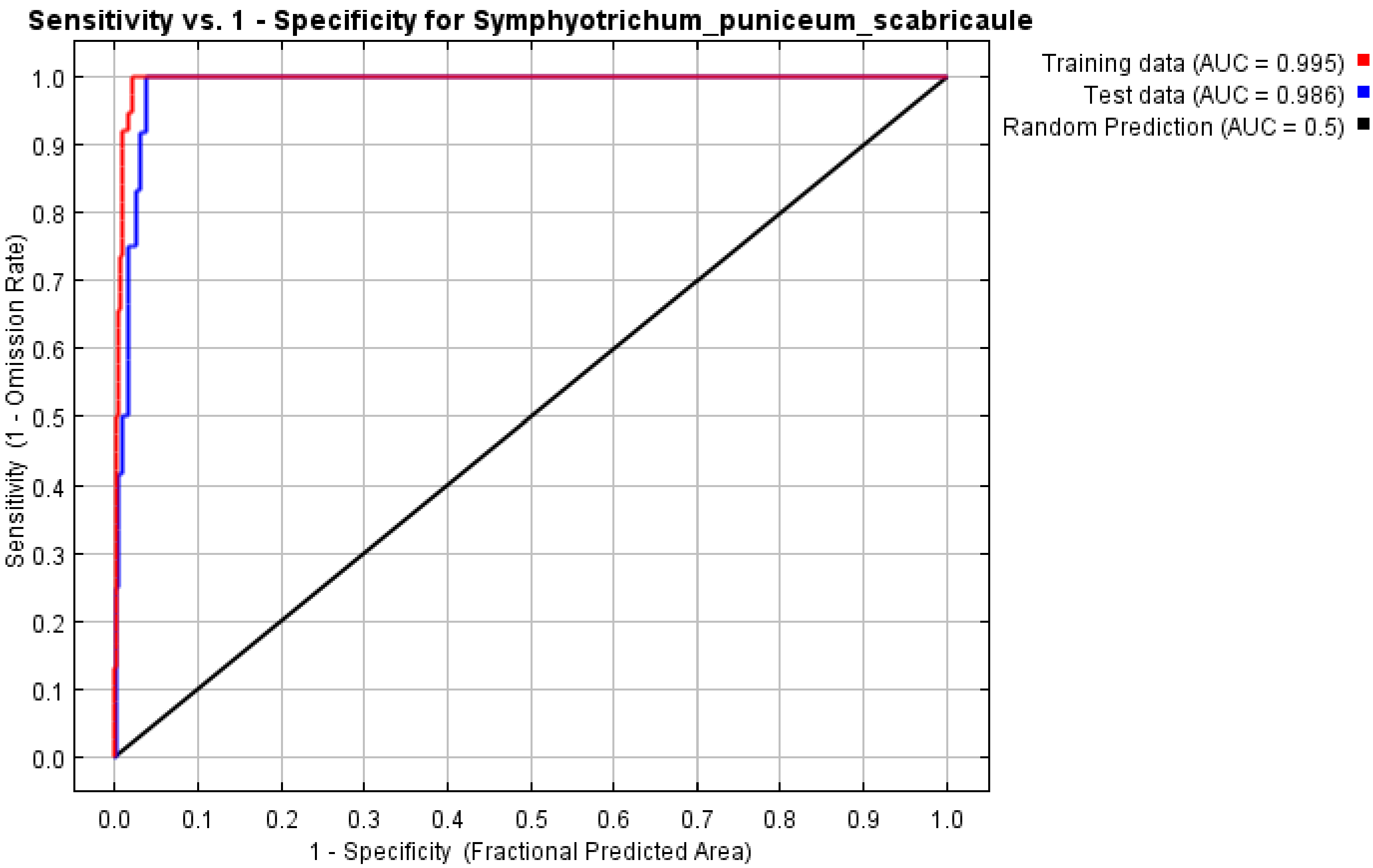
This page contains some analysis of the Maxent model for Symphyotrichum_puniceum_scabricaule, created Tue Feb 04 15:42:45 CST 2020 using Maxent version 3.4.1. If you would like to do further analyses, the raw data used here is linked to at the end of this page.

Analysis of omission/commission

The following picture shows the omission rate and predicted area as a function of the cumulative threshold. The omission rate is is calculated both on the training presence records, and (if test data are used) on the test records. The omission rate should be close to the predicted omission, because of the definition of the cumulative threshold.



The next picture is the receiver operating characteristic (ROC) curve for the same data. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). This implies that the maximum achievable AUC is less than 1. If test data is drawn from the Maxent distribution itself, then the maximum possible test AUC would be 0.989 rather than 1; in practice the test AUC may exceed this bound.



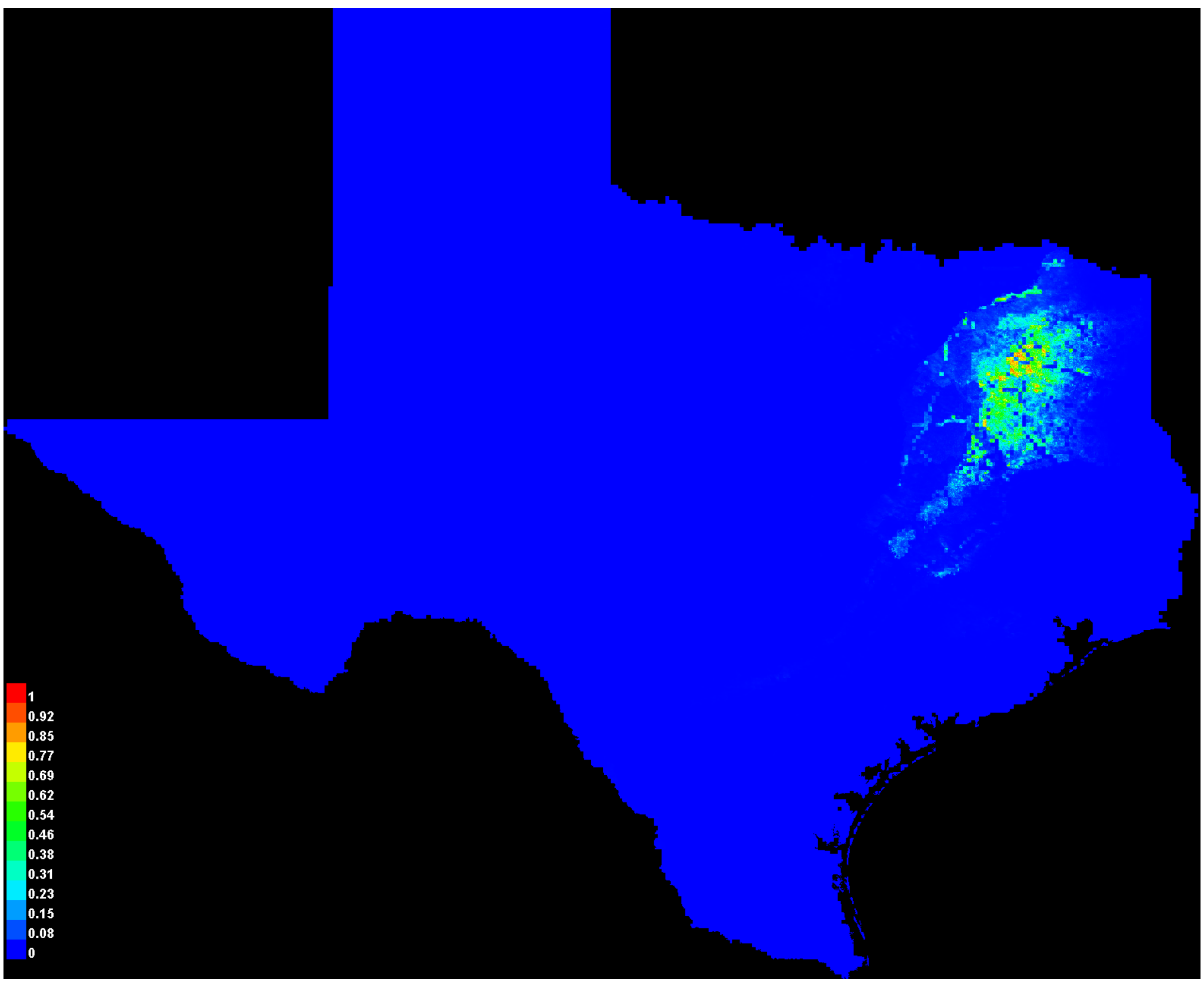
Some common thresholds and corresponding omission rates are as follows. If test data are available, binomial probabilities are calculated exactly if the number of test samples is at most 25, otherwise using a normal approximation to the binomial. These are 1-sided p-values for the null hypothesis that test points are predicted no better than by a random prediction with the same fractional predicted area. The "Balance" threshold minimizes 6 * training omission rate + .04 * cumulative threshold + 1.6 * fractional predicted area.

Cumulative threshold	Logistic threshold	Description	Fractional predicted area	Training omission rate	Test omission rate	P-value
1.000	0.010	Fixed cumulative value 1	0.064	0.000	0.000	4.428E-15
5.000	0.069	Fixed cumulative value 5	0.034	0.000	0.083	7.103E-16
10.000	0.140	Fixed cumulative value 10	0.023	0.000	0.250	4.197E-13
11.849	0.166	Minimum training presence	0.021	0.000	0.250	1.595E-13
29.611	0.385	10 percentile training presence	0.010	0.079	0.500	7.608E-10
11.937	0.168	Equal training sensitivity and specificity	0.021	0.026	0.250	1.595E-13
11.849	0.166	Maximum training sensitivity plus specificity	0.021	0.000	0.250	1.595E-13

4.101	0.056	Equal test sensitivity and specificity	0.037	0.000	0.000	5.894E-18
4.101	0.056	Maximum test sensitivity plus specificity	0.037	0.000	0.000	5.894E-18
0.965	0.009	Balance training omission, predicted area and threshold value	0.065	0.000	0.000	5.238E-15
10.350	0.144	Equate entropy of thresholded and original distributions	0.023	0.000	0.250	3.598E-13

Pictures of the model

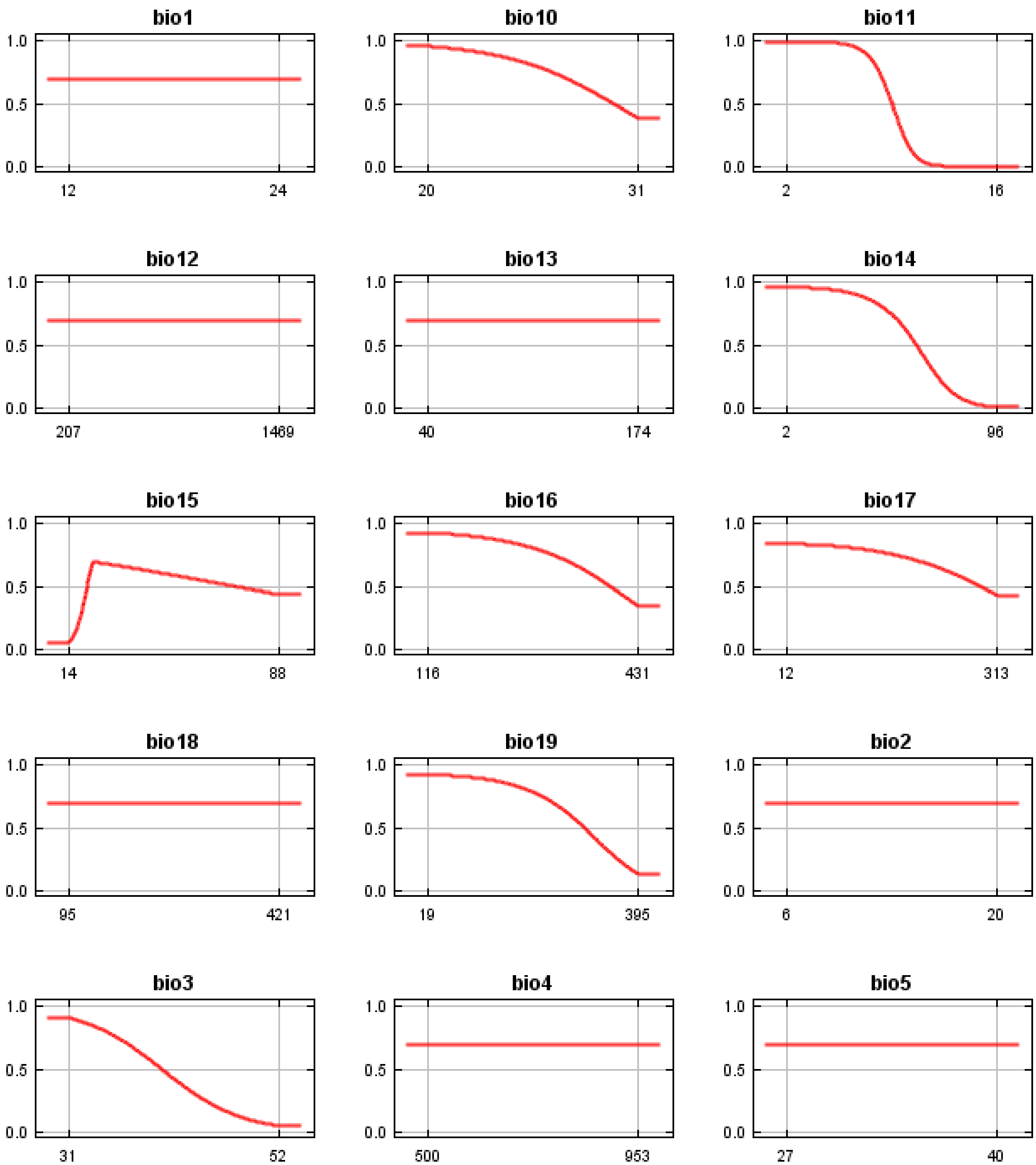
This is a representation of the Maxent model for Symphyotrichum_puniceum_scabricaule. Warmer colors show areas with better predicted conditions. White dots show the presence locations used for training, while violet dots show test locations. Click on the image for a full-size version.

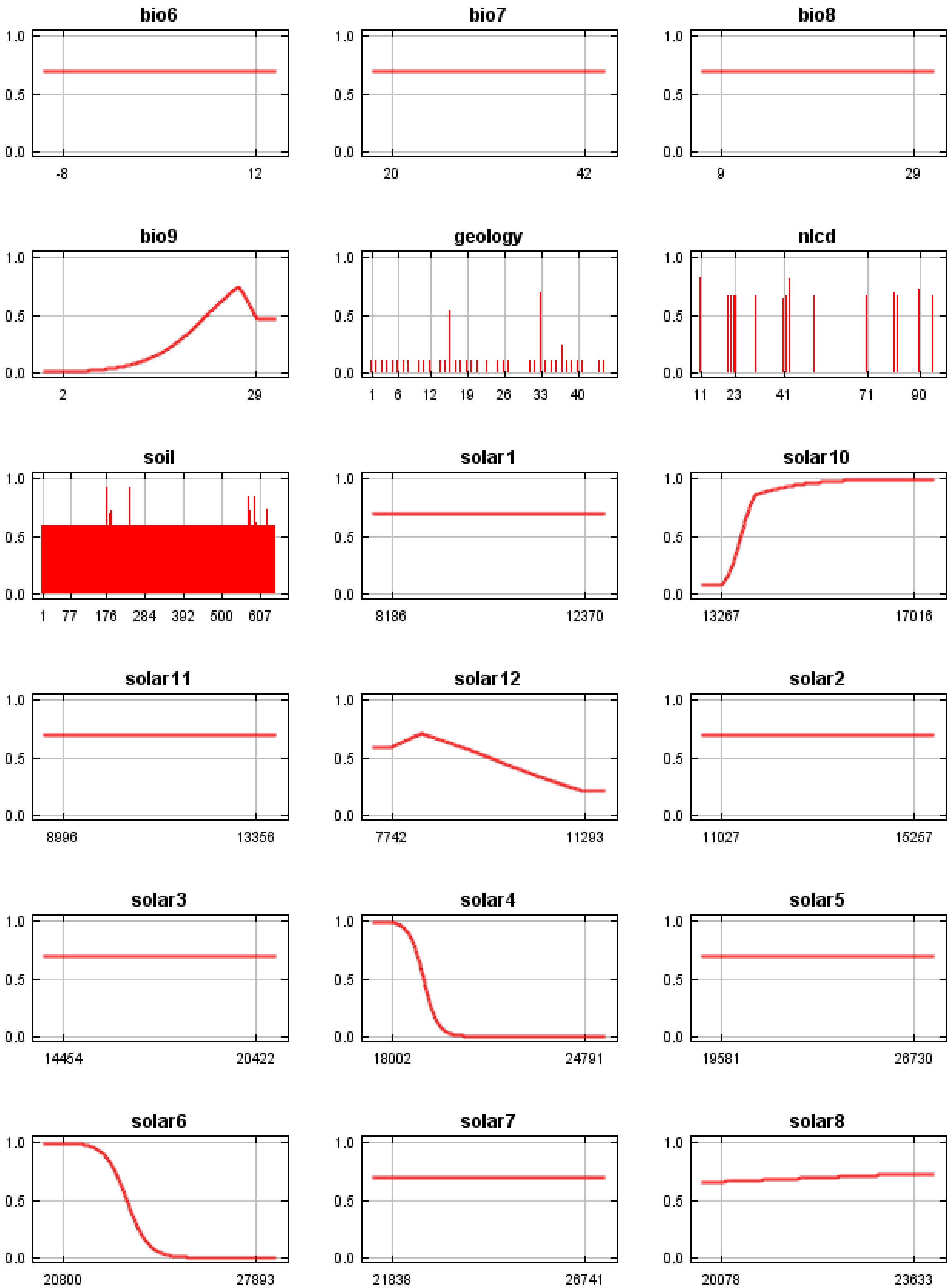


Click here to interactively explore this prediction using the Explain tool. If clicking from your browser does not succeed in starting the tool, try running the script in I:\MaxEnt Output\Symphyotrichum_puniceum_scabricaule_explain.bat directly. This tool requires the environmental grids to be small enough that they all fit in memory.

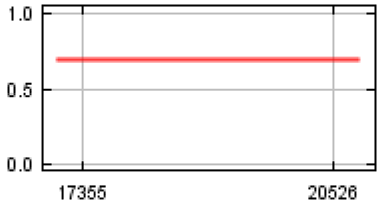
Response curves

These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together.



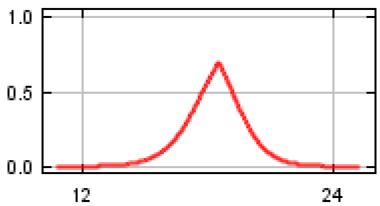

bio6
-8 12
bio7
20 42
bio8
9 29
bio9
2 29
geology
1 6 12 19 26 33 40
nlcd
11 23 41 71 90
soil
1 77 176 284 392 500 607
solar1
8186 12370
solar10
13267 17016
solar11
8996 13356
solar12
7742 11293
solar2
11027 15257
solar3
14454 20422
solar4
18002 24791
solar5
19581 26730
solar6
20800 27893
solar7
21838 26741
solar8
20078 23633
1.0
0.5
0.0

solar9

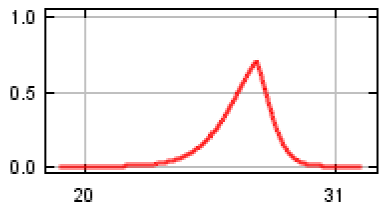


In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.

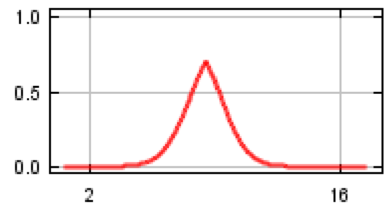
bio1



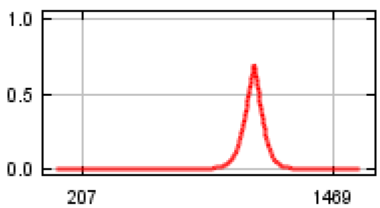
bio10



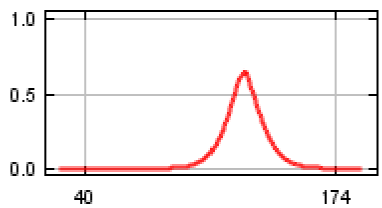
bio11



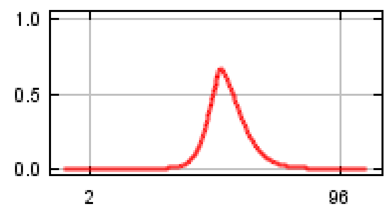
bio12



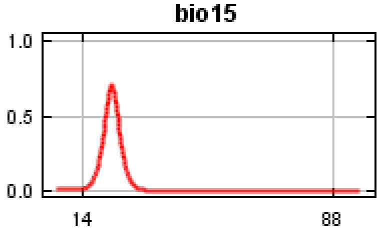
bio13



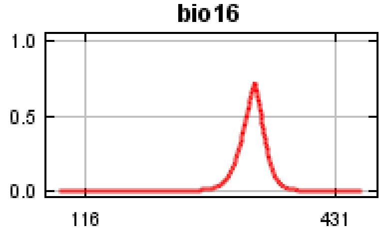
bio14



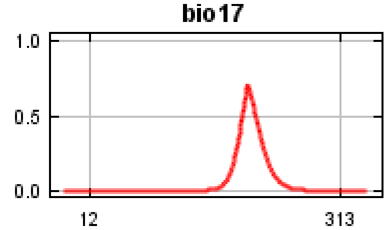
bio15



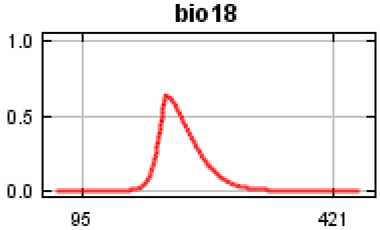
bio16



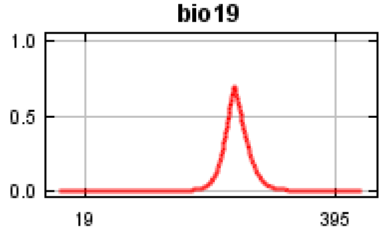
bio17



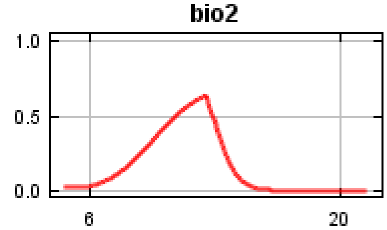
bio18

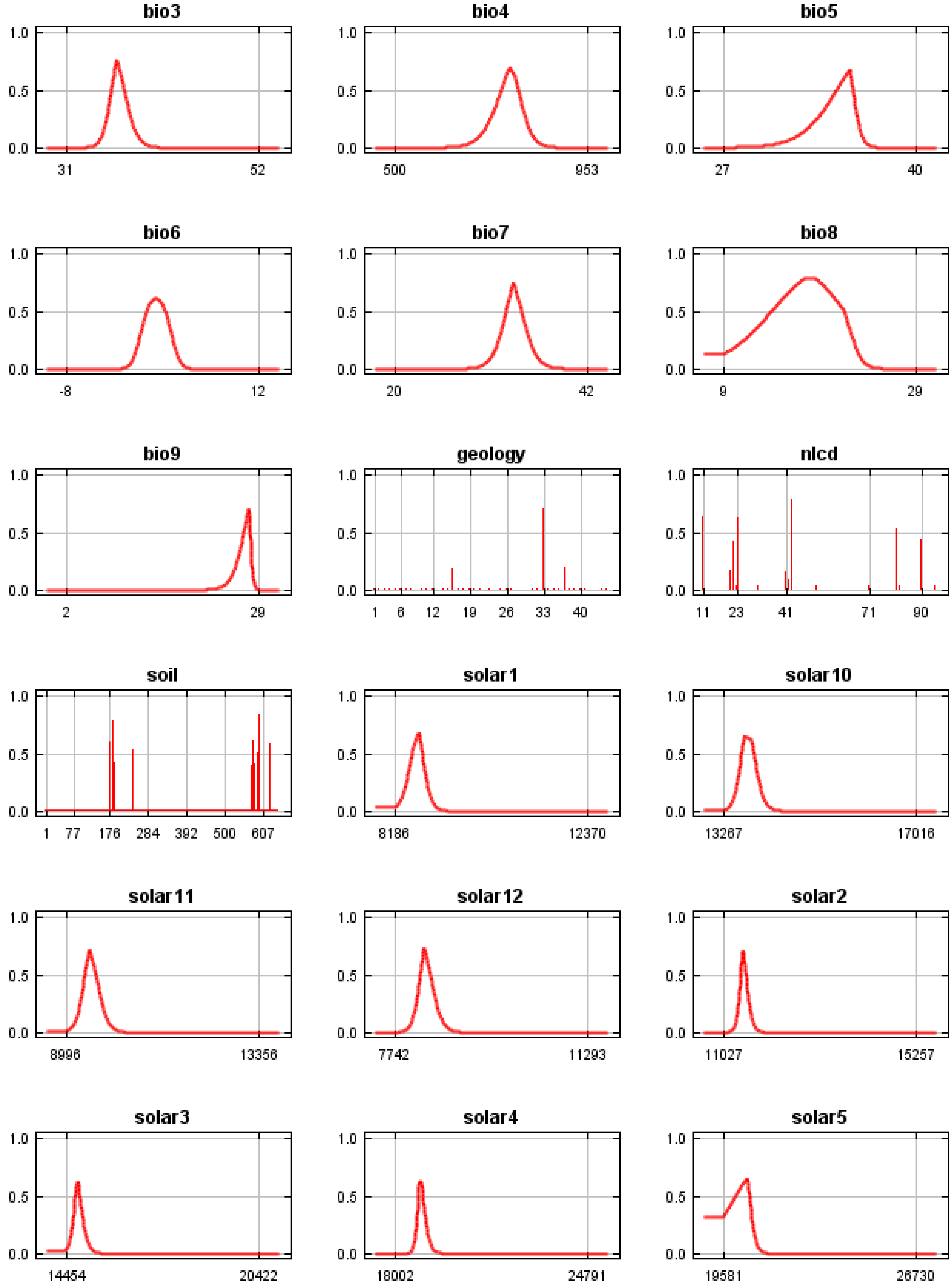


bio19



bio2




bio3
1.0
0.5
0.0
31
52
bio4
500
953
bio5
27
40
bio6
-8
12
bio7
20
42
bio8
9
29
bio9
2
29
geology
1 6 12 19 26 33 40
nlcd
11 23 41 71 90
soil
1 77 176 284 392 500 607
solar1
8186
12370
solar10
13267
17016
solar11
8996
13356
solar12
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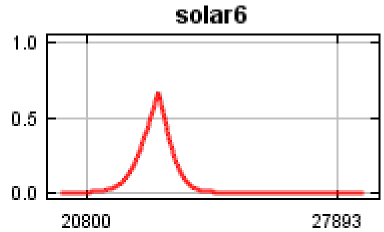
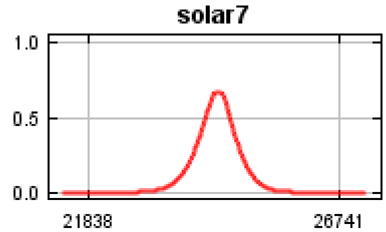
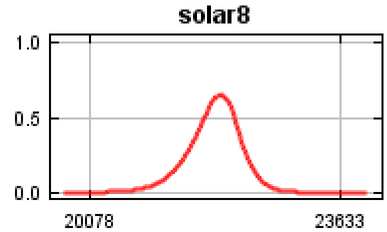
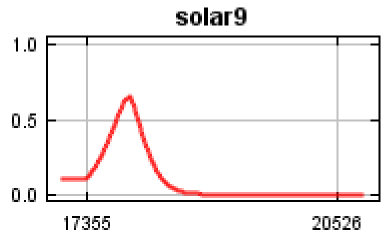
24791
solar5
19581
26730









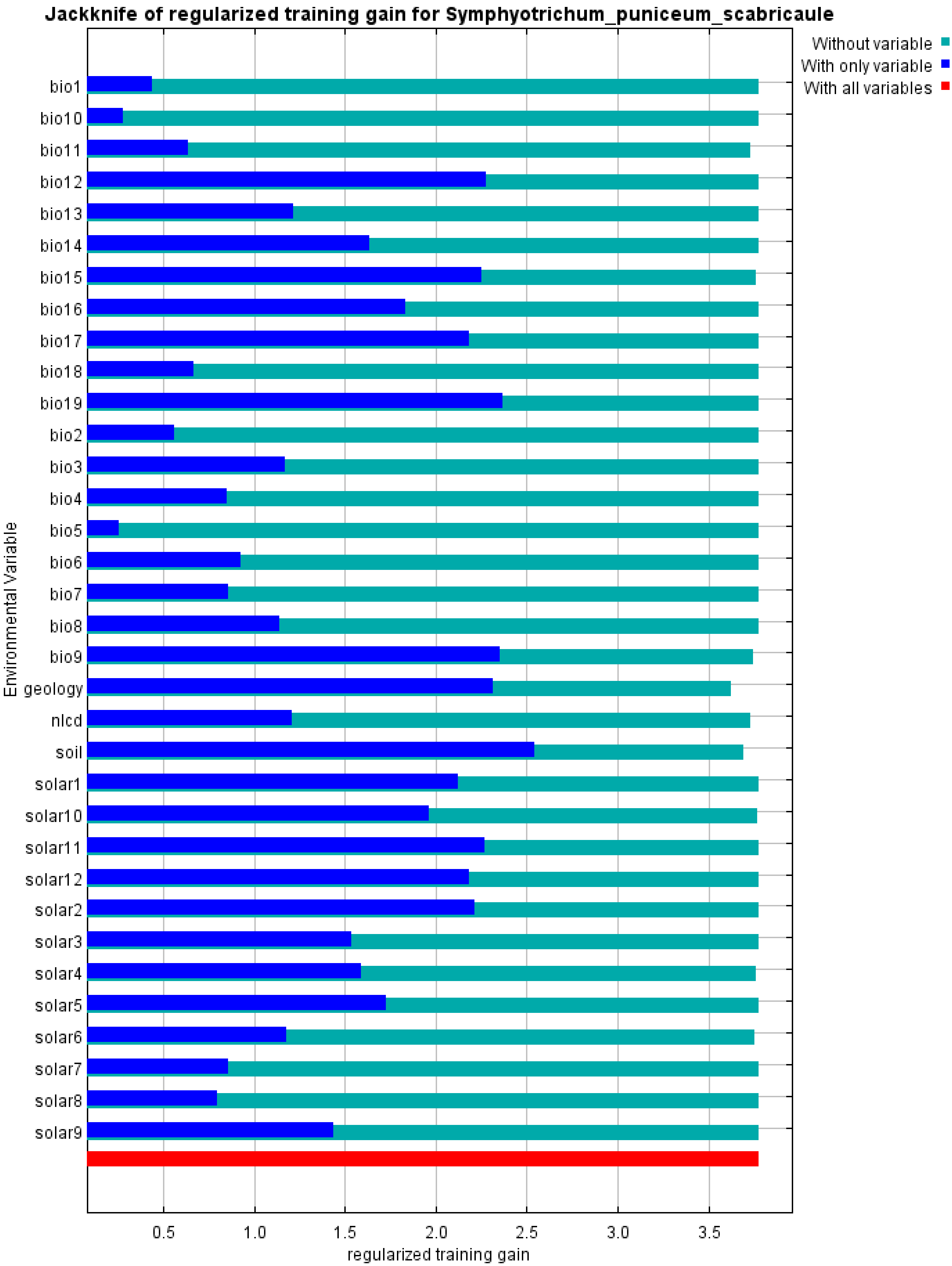
Analysis of variable contributions

The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated.

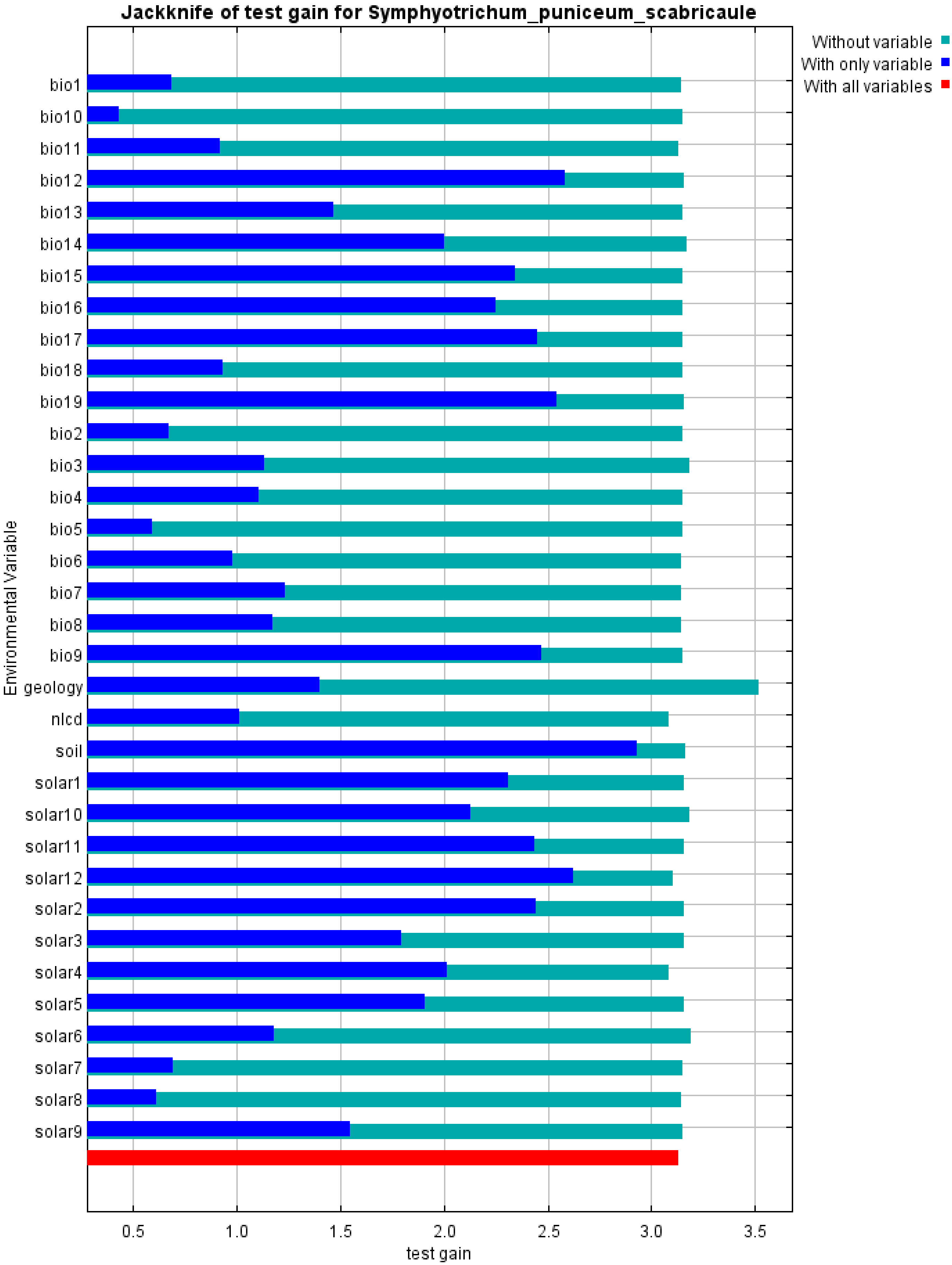
Variable	Percent contribution	Permutation importance
bio9	39.9	2.5
geology	32.7	1.3
soil	8.3	0.4
bio15	6.3	0.6
solar12	5.3	0.2
nlcd	2.3	0.1
bio11	1.3	21
solar2	1.3	0
solar6	0.7	11.8
solar4	0.7	55.9
bio19	0.4	0.9
solar10	0.3	1
bio12	0.2	0
bio14	0.1	3
bio10	0.1	0.3
solar8	0	0

bio16	0	0.1
bio3	0	0.7
bio17	0	0.1
solar9	0	0
solar7	0	0
solar5	0	0
solar3	0	0
solar11	0	0
solar1	0	0
bio8	0	0
bio7	0	0
bio6	0	0
bio5	0	0
bio4	0	0
bio2	0	0
bio18	0	0
bio13	0	0
bio1	0	0

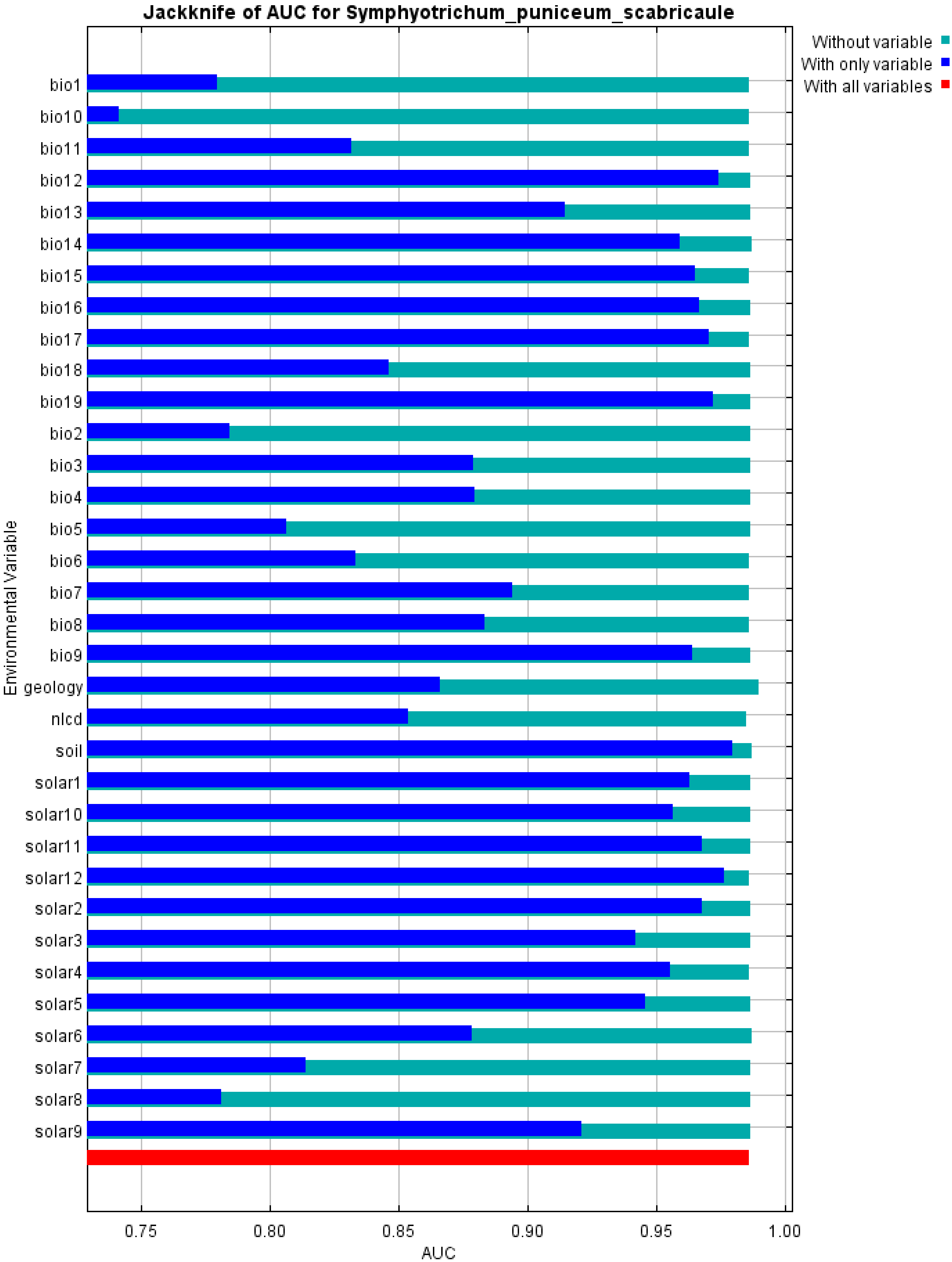
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is soil, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is geology, which therefore appears to have the most information that isn't present in the other variables.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



Raw data outputs and control parameters

The data used in the above analysis is contained in the next links. Please see the Help button for more information on these.
The model applied to the training environmental layers
The coefficients of the model
The omission and predicted area for varying cumulative and raw thresholds
The prediction strength at the training and (optionally) test presence sites
Results for all species modeled in the same Maxent run, with summary statistics and (optionally) jackknife results

Regularized training gain is 3.778, training AUC is 0.995, unregularized training gain is 4.247.
Unregularized test gain is 3.133.
Test AUC is 0.986, standard deviation is 0.003 (calculated as in DeLong, DeLong & Clarke-Pearson 1988, equation 2).
Algorithm converged after 1040 iterations (26 seconds).

The follow settings were used during the run:
38 presence records used for training, 12 for testing.
10038 points used to determine the Maxent distribution (background points and presence points).
Environmental layers used: bio1 bio10 bio11 bio12 bio13 bio14 bio15 bio16 bio17 bio18 bio19 bio2 bio3 bio4 bio5 bio6 bio7 bio8 bio9 geology(categorical) nlcd(categorical) soil(categorical) solar1 solar10 solar11 solar12 solar2 solar3 solar4 solar5 solar6 solar7 solar8 solar9
Regularization values: linear/quadratic/product: 0.227, categorical: 0.250, threshold: 1.620, hinge: 0.500
Feature types used: hinge linear quadratic
responsecurves: true
jackknife: true
outputformat: logistic
outputdirectory: I:\MaxEnt Output
samplesfile: I:\TXDOT Species Info\Symphyotrichum_puniceum_scabricaule.csv
environmentallayers: I:\ASCII_layers
randomseed: true
askoverwrite: false
randomtestpoints: 25
replicatetype: subsample
writebackgroundpredictions: true
writeplotdata: true
maximumiterations: 5000
adjustsampleradius: -6
applythresholdrule: 10 percentile training presence
Command line used:

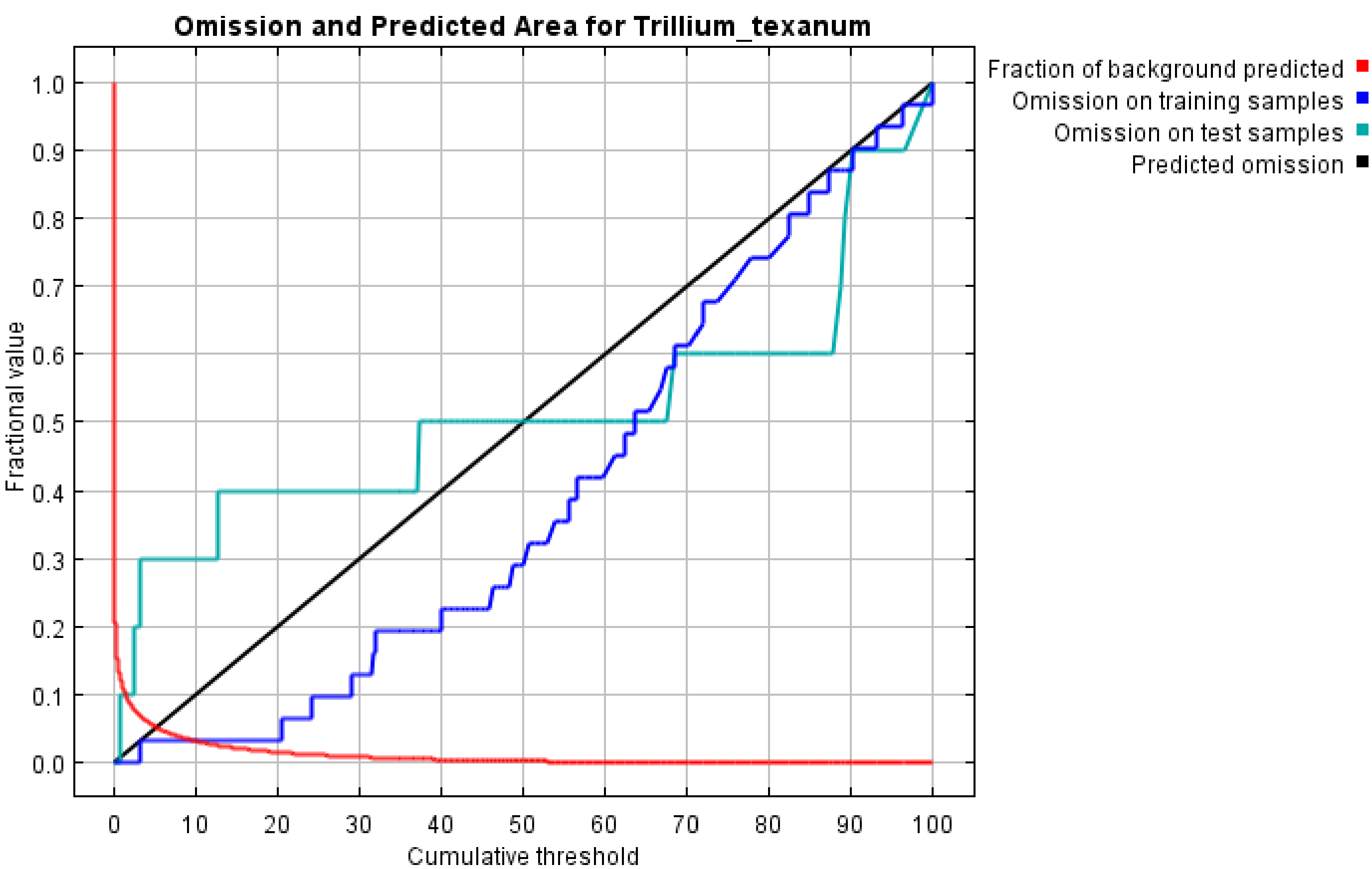
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Symphyotrichum_puniceum_scabricaule responsecurves jackknife outputformat=logistic "outputdirectory=I:\MaxEnt Output" "samplesfile=I:\TXDOT Species Info\Symphyotrichum_puniceum_scabricaule.csv" environmentallayers=I:\ASCII_layers randomseed noaskoverwrite randomtestpoints=25 replicatetype=subsample writebackgroundpredictions writeplotdata maximumiterations=5000 adjustsampleradius=-6 "applythresholdrule=10 percentile training presence" -N dem -t geology -t nlcd -t soil

Maxent model for Trillium_texanum

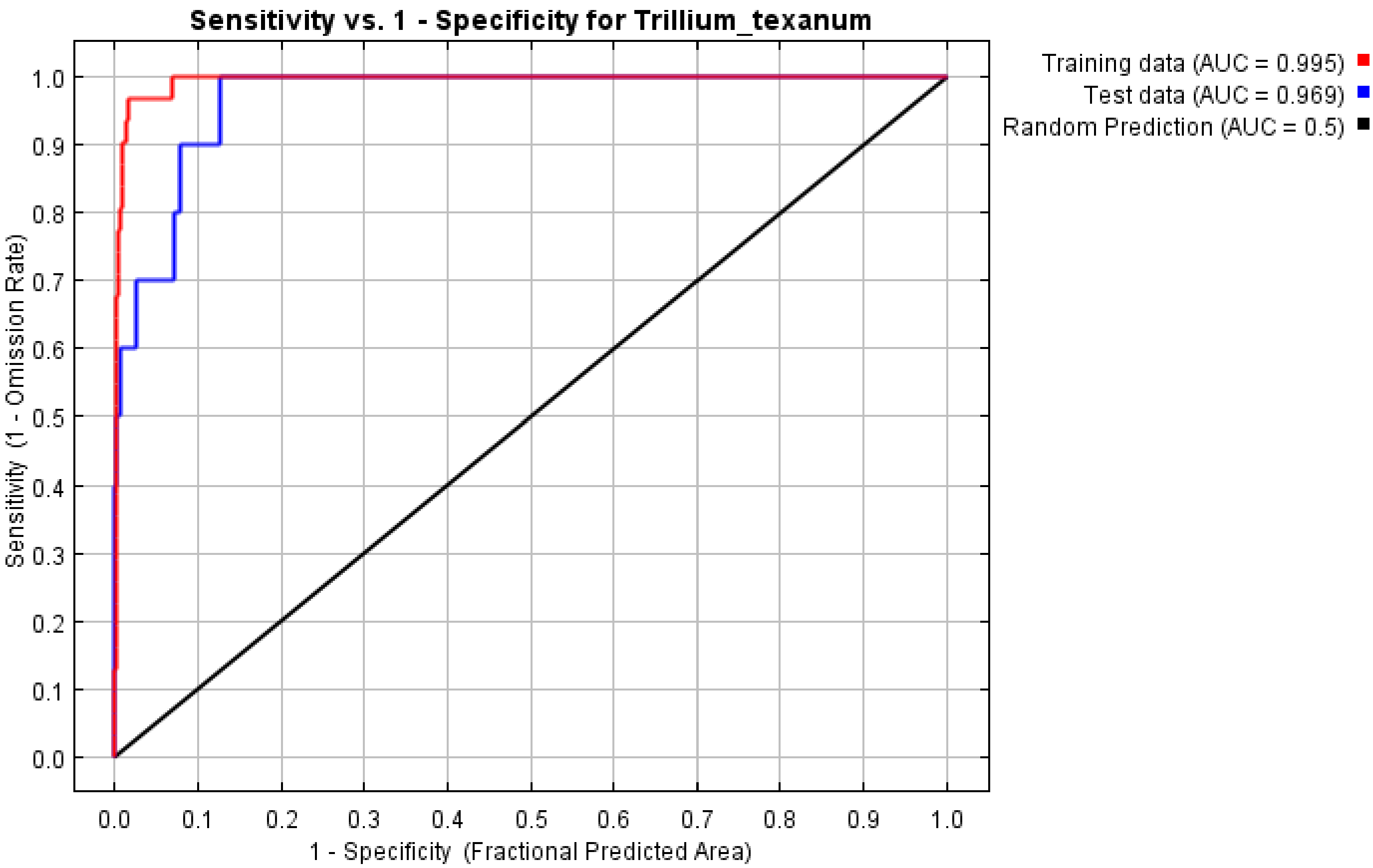
This page contains some analysis of the Maxent model for Trillium_texanum, created Sun Dec 06 15:15:38 EST 2020 using Maxent version 3.4.1. If you would like to do further analyses, the raw data used here is linked to at the end of this page.

Analysis of omission/commission

The following picture shows the omission rate and predicted area as a function of the cumulative threshold. The omission rate is is calculated both on the training presence records, and (if test data are used) on the test records. The omission rate should be close to the predicted omission, because of the definition of the cumulative threshold.



The next picture is the receiver operating characteristic (ROC) curve for the same data. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). This implies that the maximum achievable AUC is less than 1. If test data is drawn from the Maxent distribution itself, then the maximum possible test AUC would be 0.985 rather than 1; in practice the test AUC may exceed this bound.



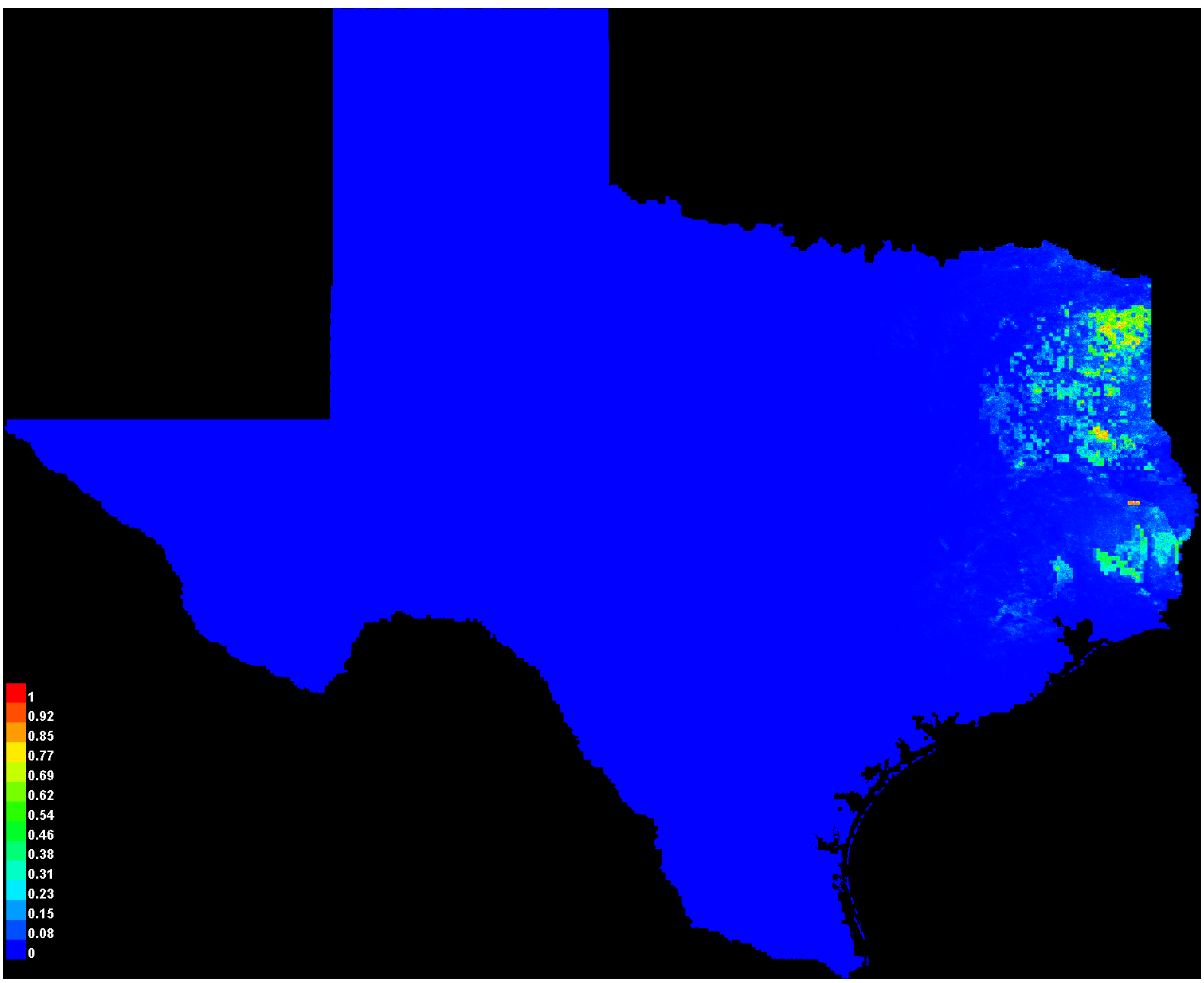
Some common thresholds and corresponding omission rates are as follows. If test data are available, binomial probabilities are calculated exactly if the number of test samples is at most 25, otherwise using a normal approximation to the binomial. These are 1-sided p-values for the null hypothesis that test points are predicted no better than by a random prediction with the same fractional predicted area. The "Balance" threshold minimizes 6 * training omission rate + .04 * cumulative threshold + 1.6 * fractional predicted area.

Cumulative threshold	Logistic threshold	Description	Fractional predicted area	Training omission rate	Test omission rate	P-value
1.000	0.006	Fixed cumulative value 1	0.114	0.000	0.100	2.861E-8
5.000	0.033	Fixed cumulative value 5	0.054	0.032	0.300	1.343E-7
10.000	0.074	Fixed cumulative value 10	0.032	0.032	0.300	4.126E-9
3.263	0.020	Minimum training presence	0.069	0.000	0.300	7.404E-7
29.072	0.305	10 percentile training presence	0.010	0.097	0.400	1.561E-10
10.055	0.074	Equal training sensitivity and specificity	0.032	0.032	0.300	4.039E-9
20.433	0.185	Maximum training sensitivity plus specificity	0.016	0.032	0.400	2.925E-9

1.419	0.008	Equal test sensitivity and specificity	0.100	0.000	0.100	9.092E-9
0.708	0.004	Maximum test sensitivity plus specificity	0.127	0.000	0.000	1.118E-9
1.605	0.009	Balance training omission, predicted area and threshold value	0.095	0.000	0.100	5.767E-9
14.684	0.125	Equate entropy of thresholded and original distributions	0.023	0.032	0.400	2.608E-8

Pictures of the model

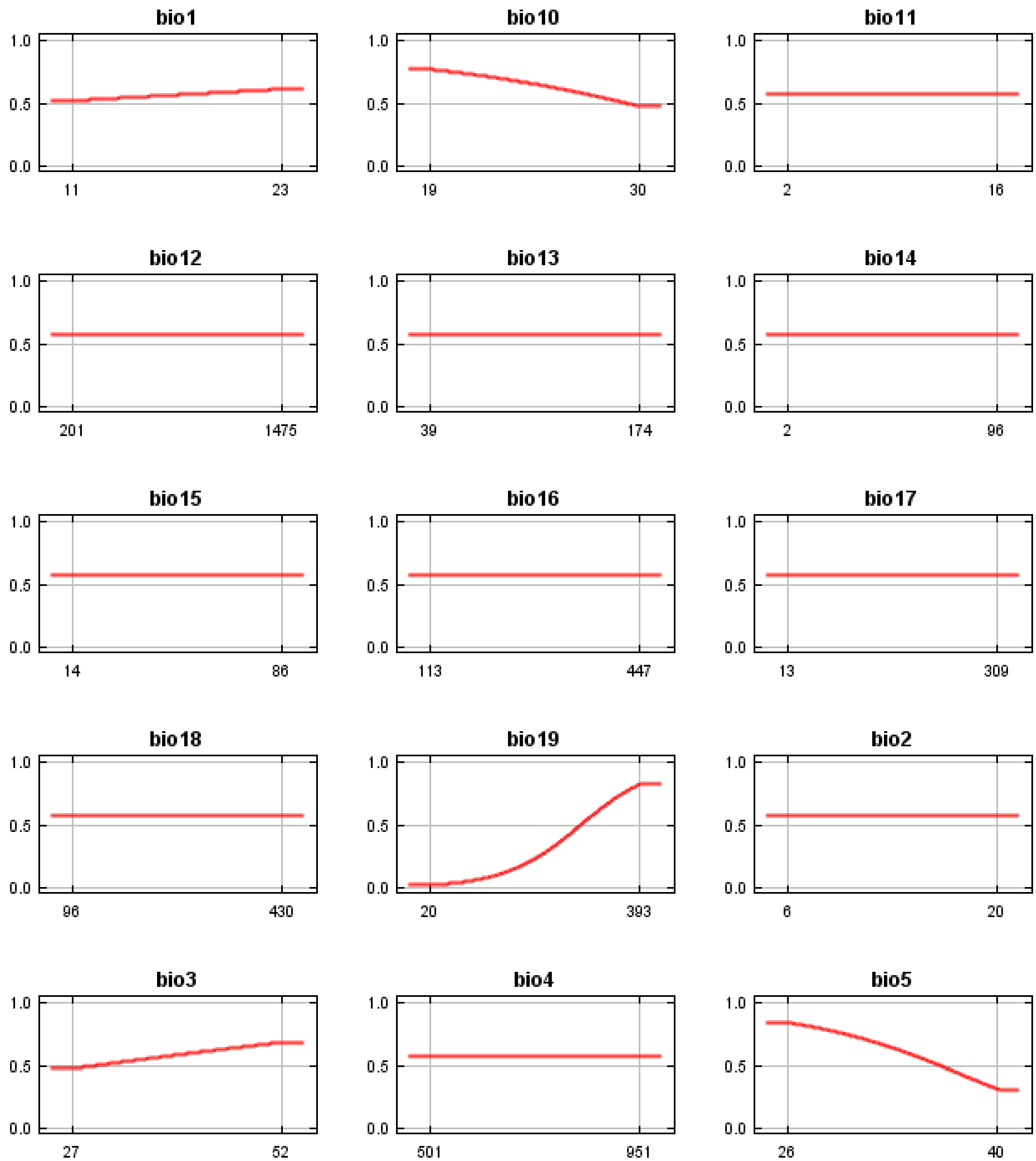
This is a representation of the Maxent model for Trillium_texanum. Warmer colors show areas with better predicted conditions. White dots show the presence locations used for training, while violet dots show test locations. Click on the image for a full-size version.



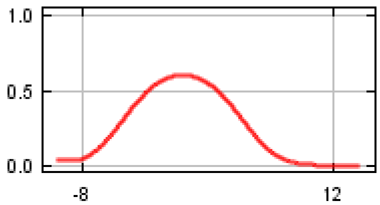
Click here to interactively explore this prediction using the Explain tool. If clicking from your browser does not succeed in starting the tool, try running the script in F:\MaxEnt Output\Trillium_texanum_1km\Trillium_texanum_explain.bat directly. This tool requires the environmental grids to be small enough that they all fit in memory.

Response curves

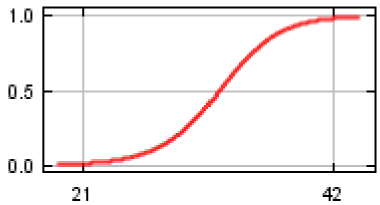
These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together.



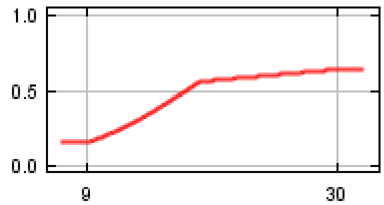
bio6



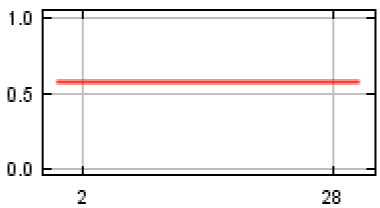
bio7



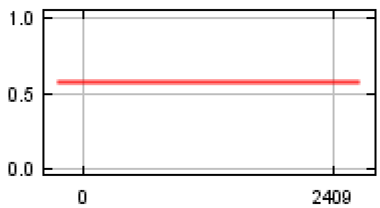
bio8



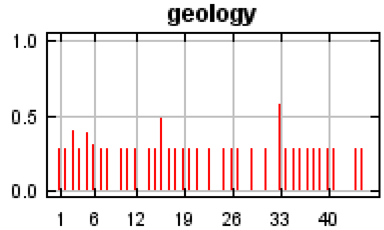
bio9



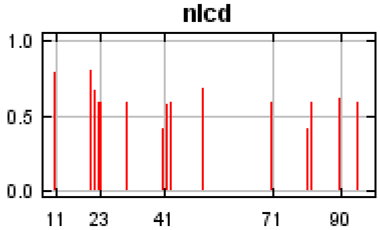
dem



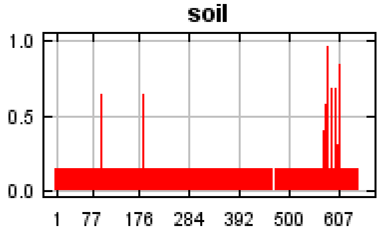
geology



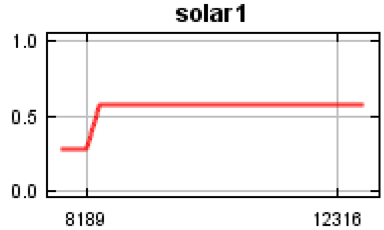
nlcd



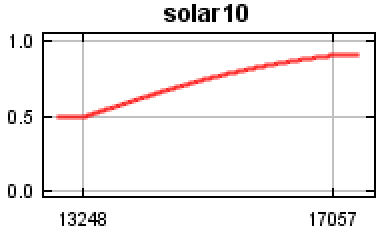
soil



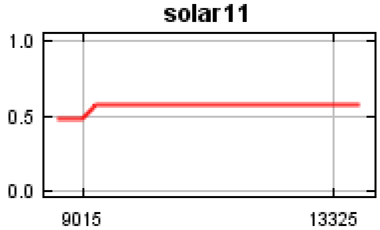
solar1



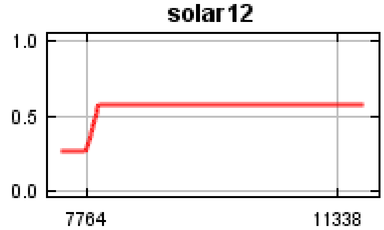
solar10



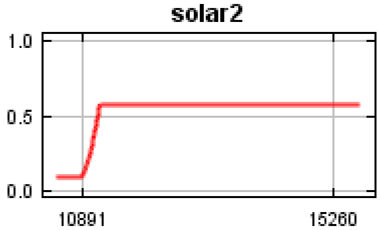
solar11



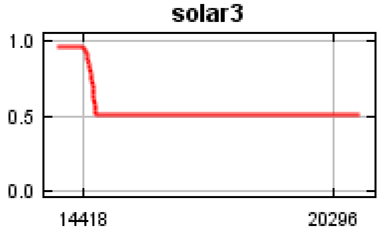
solar12



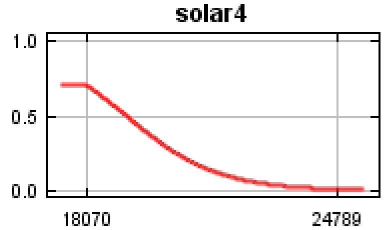
solar2



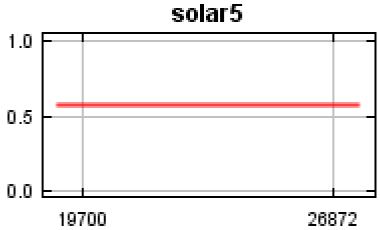
solar3



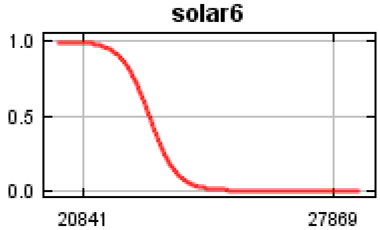
solar4



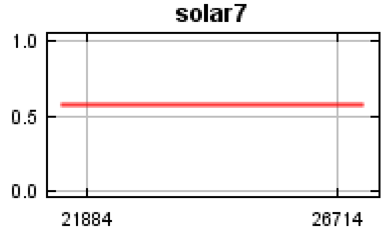
solar5

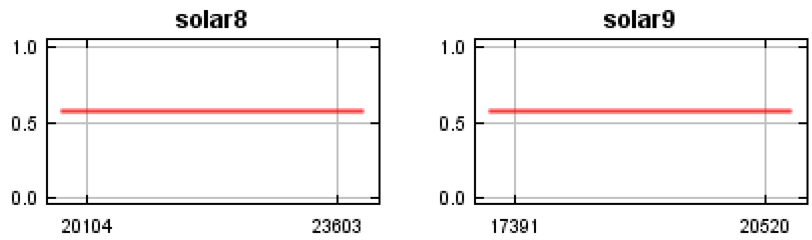


solar6

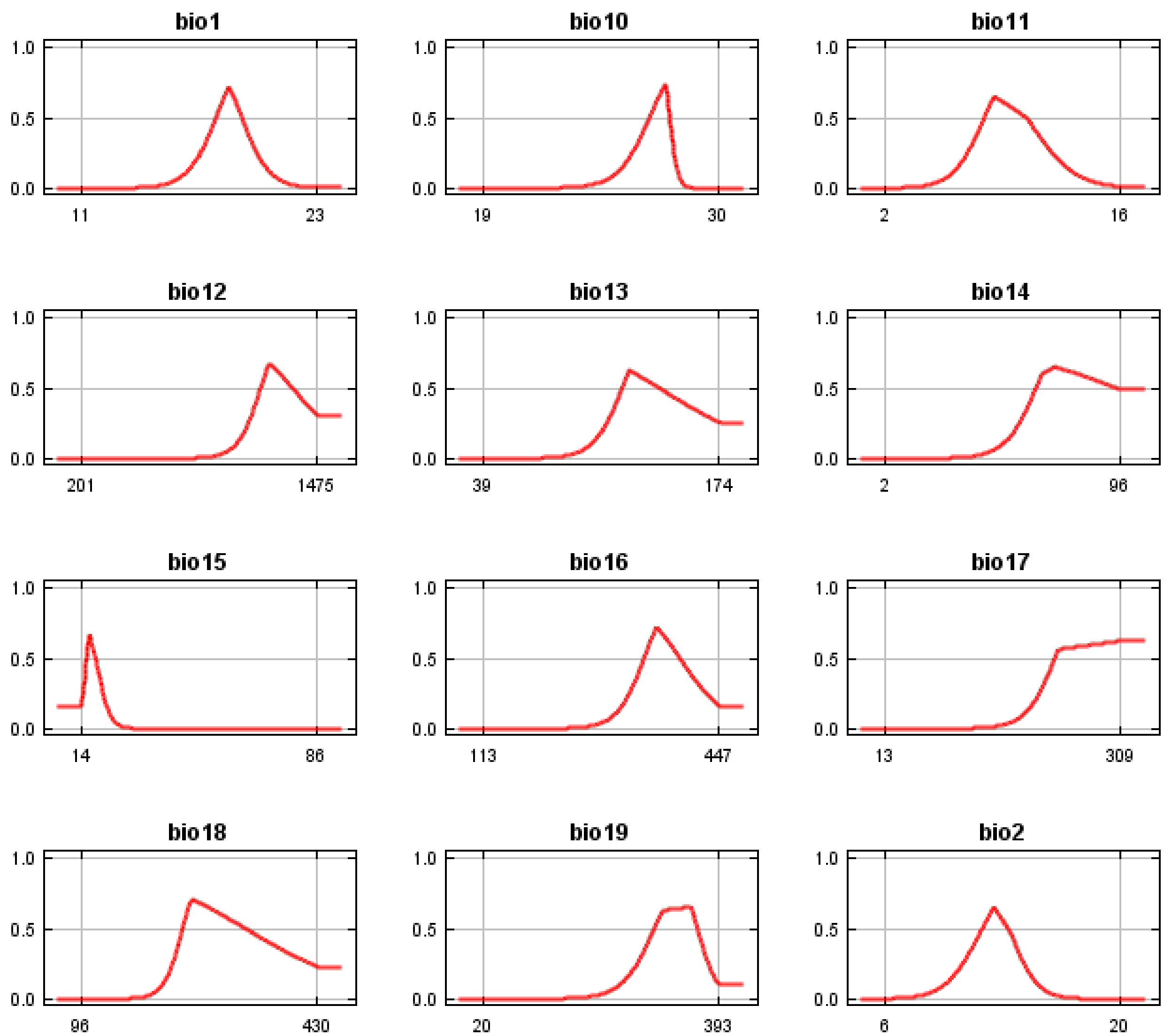


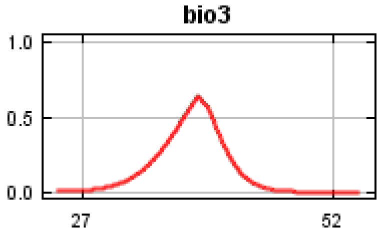
solar7

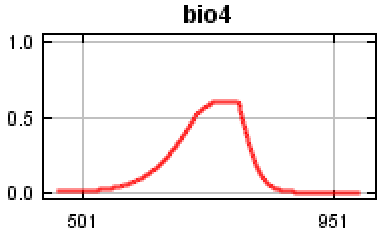


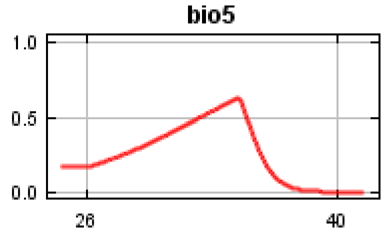


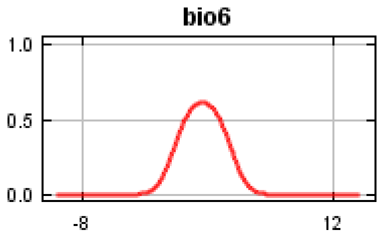
In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.

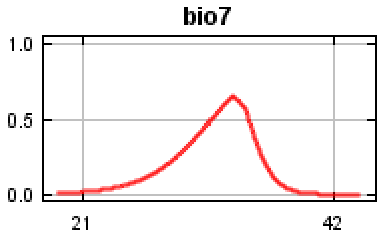


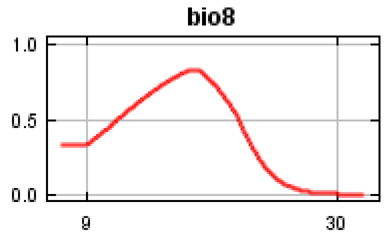

bio3
1.0
0.5
0.0
27
52

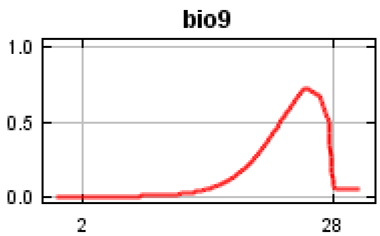

bio4
1.0
0.5
0.0
501
951

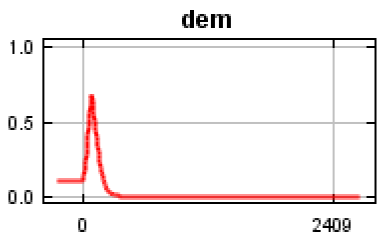

bio5
1.0
0.5
0.0
26
40

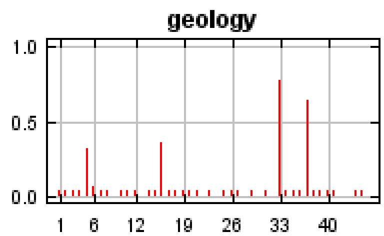

bio6
1.0
0.5
0.0
-8
12

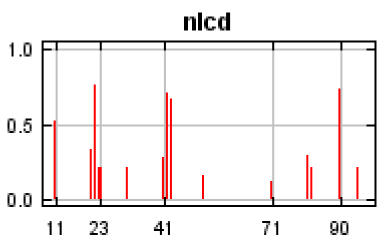

bio7
1.0
0.5
0.0
21
42

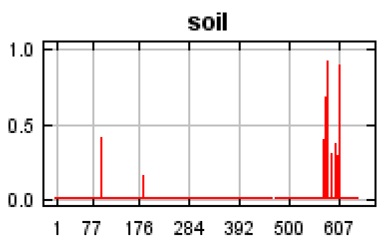

bio8
1.0
0.5
0.0
9
30

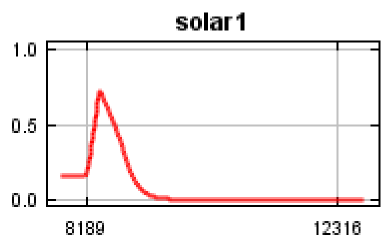

bio9
1.0
0.5
0.0
2
28

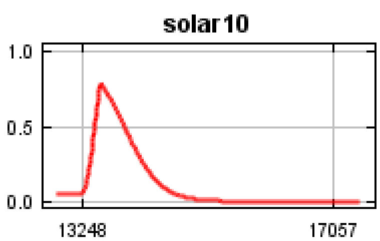

dem
1.0
0.5
0.0
0
2409

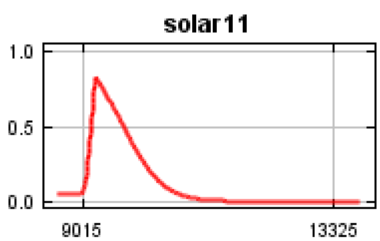

geology
1.0
0.5
0.0
1
6
12
19
26
33
40

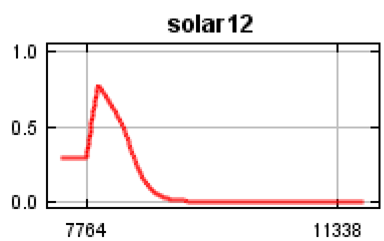

nlcd
1.0
0.5
0.0
11
23
41
71
90

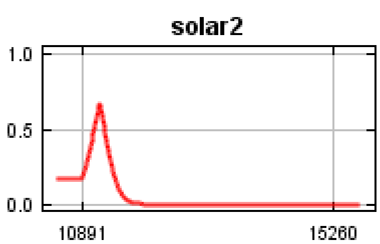

soil
1.0
0.5
0.0
1
77
176
284
392
500
607

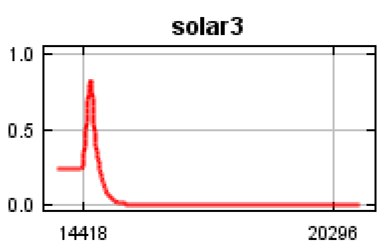

solar1
1.0
0.5
0.0
8189
12316

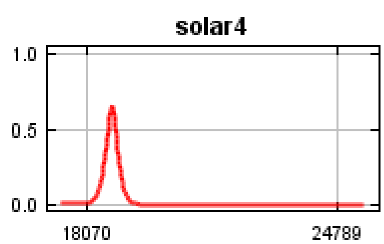

solar10
1.0
0.5
0.0
13248
17057

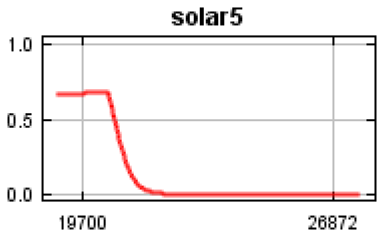

solar11
1.0
0.5
0.0
9015
13325

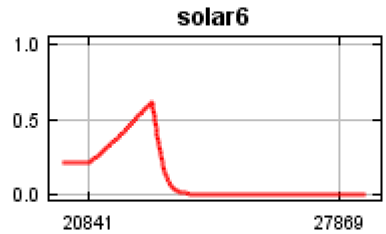

solar12
1.0
0.5
0.0
7764
11338

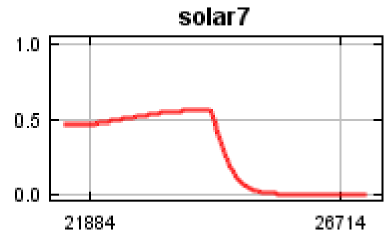

solar2
1.0
0.5
0.0
10891
15260

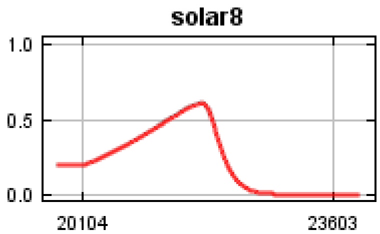

solar3
1.0
0.5
0.0
14418
20296

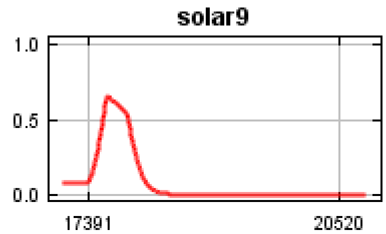

solar4
1.0
0.5
0.0
18070
24789











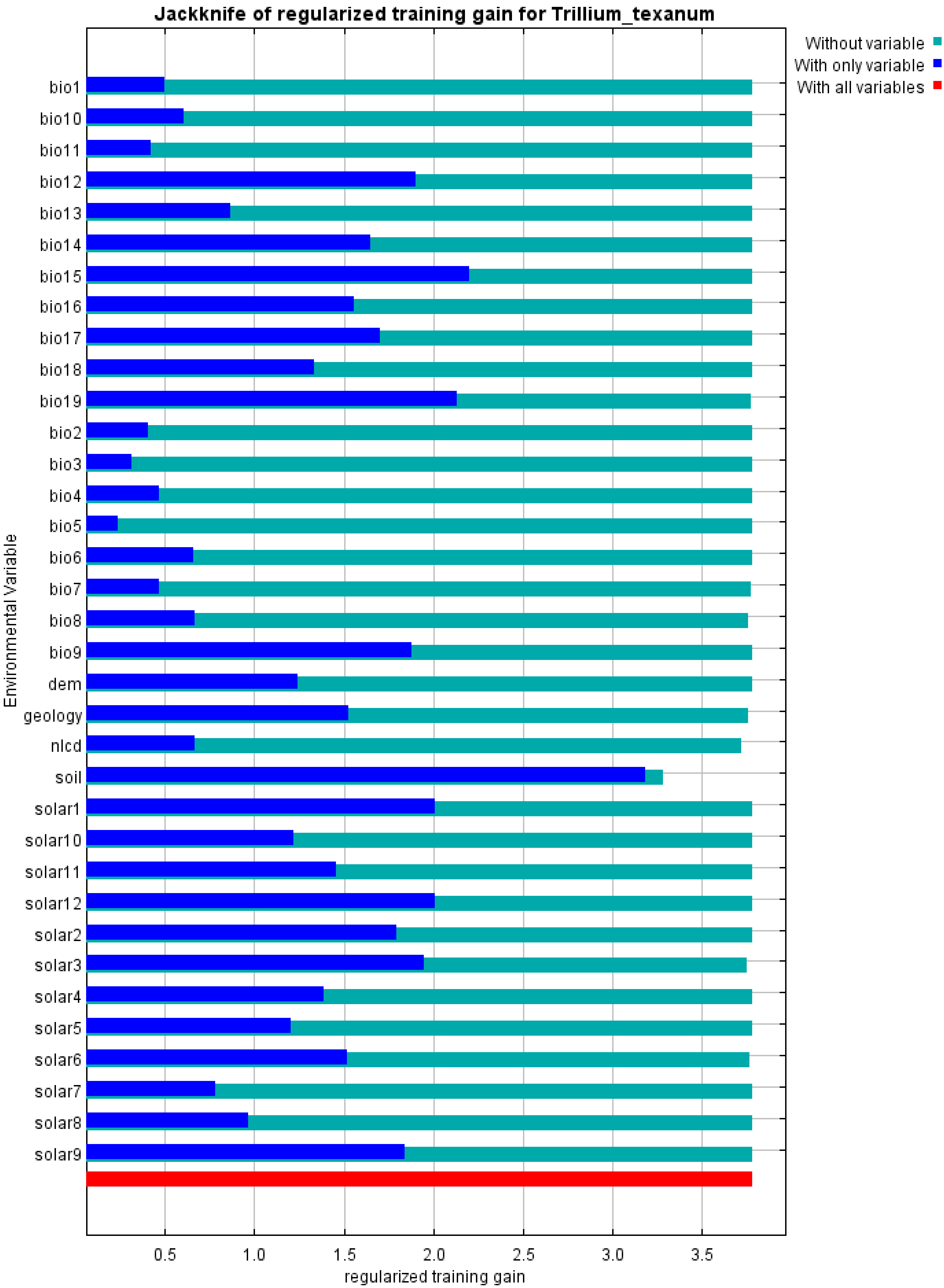
Analysis of variable contributions

The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated.

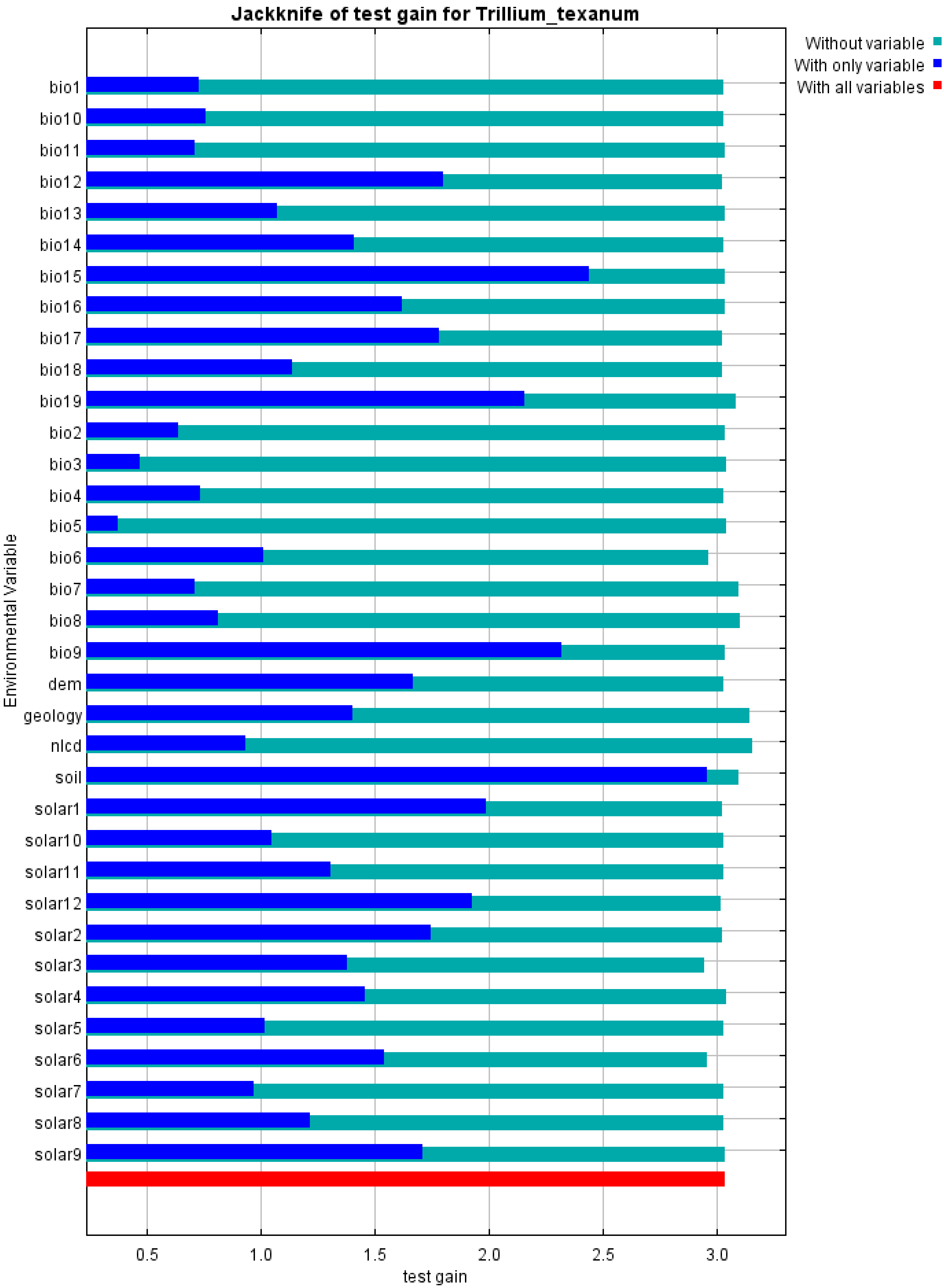
Variable	Percent contribution	Permutation importance
soil	38	5.7
bio15	30.3	0
bio19	15.7	5.6
solar12	4.2	0.1
geology	4.1	1.1
bio9	2	0
nlcd	1.7	0.4
solar3	1.3	0
bio8	1.1	0.5
solar2	0.4	0.2
bio6	0.4	2
solar6	0.2	76.1
solar11	0.2	0
bio7	0.1	5.9
solar8	0.1	0
solar1	0.1	0.1

solar10	0	0.5
solar4	0	1.9
bio5	0	0
bio3	0	0
bio10	0	0
solar7	0	0
bio1	0	0
bio2	0	0
dem	0	0
bio18	0	0
bio17	0	0
bio16	0	0
solar5	0	0
bio14	0	0
bio13	0	0
bio12	0	0
bio11	0	0
solar9	0	0
bio4	0	0

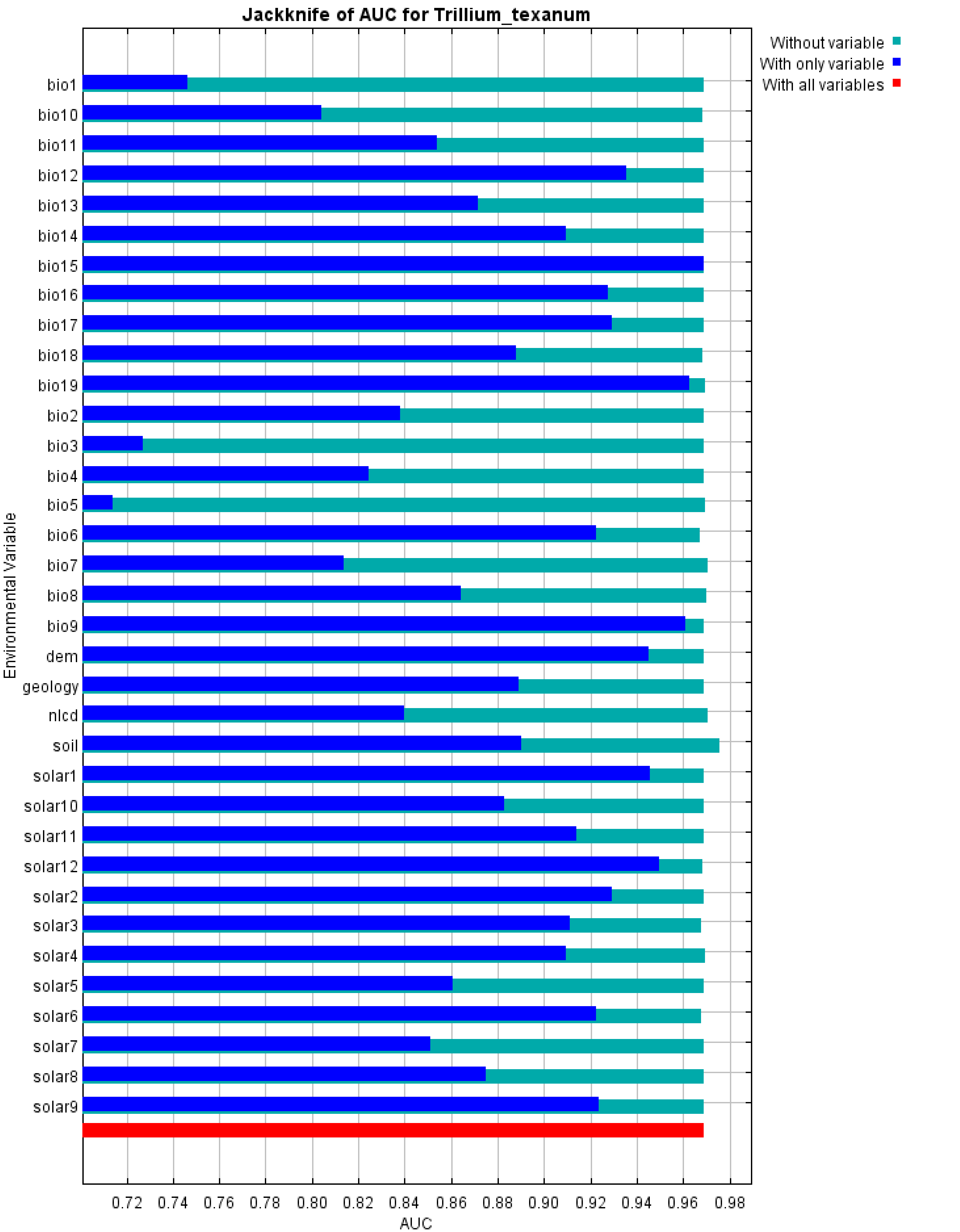
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is soil, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is soil, which therefore appears to have the most information that isn't present in the other variables.


Jackknife of regularized training gain for Trillium_texanum
Without variable
With only variable
With all variables
Environmental Variable
bio1
bio10
bio11
bio12
bio13
bio14
bio15
bio16
bio17
bio18
bio19
bio2
bio3
bio4
bio5
bio6
bio7
bio8
bio9
dem
geology
nlcd
soil
solar1
solar10
solar11
solar12
solar2
solar3
solar4
solar5
solar6
solar7
solar8
solar9
0.5
1.0
1.5
2.0
2.5
3.0
3.5
regularized training gain

The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.


Jackknife of test gain for Trillium_texanum
Without variable
With only variable
With all variables
bio1
bio10
bio11
bio12
bio13
bio14
bio15
bio16
bio17
bio18
bio19
bio2
bio3
bio4
bio5
bio6
bio7
bio8
bio9
dem
geology
nlcd
soil
solar1
solar10
solar11
solar12
solar2
solar3
solar4
solar5
solar6
solar7
solar8
solar9
Environmental Variable
0.5
1.0
1.5
2.0
2.5
3.0
test gain

Lastly, we have the same jackknife test, using AUC on test data.



Raw data outputs and control parameters

The data used in the above analysis is contained in the next links. Please see the Help button for more information on these.
The model applied to the training environmental layers
The coefficients of the model
The omission and predicted area for varying cumulative and raw thresholds
The prediction strength at the training and (optionally) test presence sites
Results for all species modeled in the same Maxent run, with summary statistics and (optionally) jackknife results

Regularized training gain is 3.786, training AUC is 0.995, unregularized training gain is 4.463.
Unregularized test gain is 3.035.
Test AUC is 0.969, standard deviation is 0.014 (calculated as in DeLong, DeLong & Clarke-Pearson 1988, equation 2).
Algorithm converged after 1100 iterations (51 seconds).

The follow settings were used during the run:
31 presence records used for training, 10 for testing.
10031 points used to determine the Maxent distribution (background points and presence points).
Environmental layers used: bio1 bio10 bio11 bio12 bio13 bio14 bio15 bio16 bio17 bio18 bio19 bio2 bio3 bio4 bio5 bio6 bio7 bio8 bio9 dem geology(categorical) nlcd(categorical) soil(categorical) solar1 solar10 solar11 solar12 solar2 solar3 solar4 solar5 solar6 solar7 solar8 solar9
Regularization values: linear/quadratic/product: 0.247, categorical: 0.250, threshold: 1.690, hinge: 0.500
Feature types used: hinge linear quadratic
responsecurves: true
jackknife: true
outputformat: logistic
outputdirectory: F:\MaxEnt Output\Trillium_texanum_1km
samplesfile: F:\TXDOT Species Info\Trillium texanum WGS1984.csv
environmentallayers: F:\ASCII_layers
randomseed: true
randomtestpoints: 25
replicatetype: subsample
writebackgroundpredictions: true
writeplotdata: true
maximumiterations: 5000
adjustsampleradius: -6
applythresholdrule: 10 percentile training presence
Command line used:

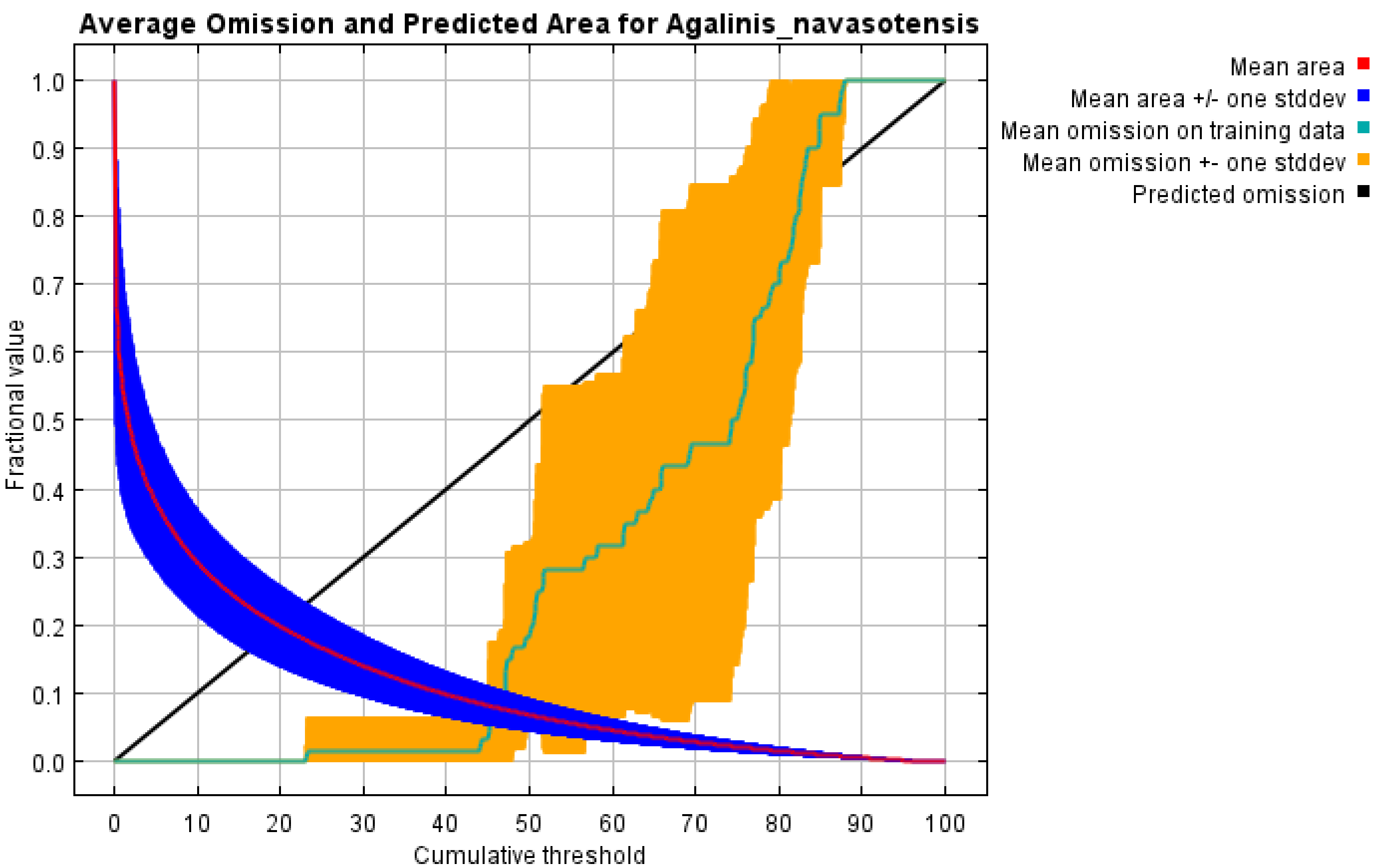
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Trillium_texanum responsecurves jackknife outputformat=logistic "outputdirectory=F:\MaxEnt Output\Trillium_texanum_1km" "samplesfile=F:\TXDOT Species Info\Trillium texanum WGS1984.csv" environmentallayers=F:\ASCII_layers randomseed randomtestpoints=25 replicatetype=subsample writebackgroundpredictions writeplotdata maximumiterations=5000 adjustsampleradius=-6 "applythresholdrule=10 percentile training presence" -t geology -t nlcd -t soil

Replicated maxent model for Agalinis_navasotensis

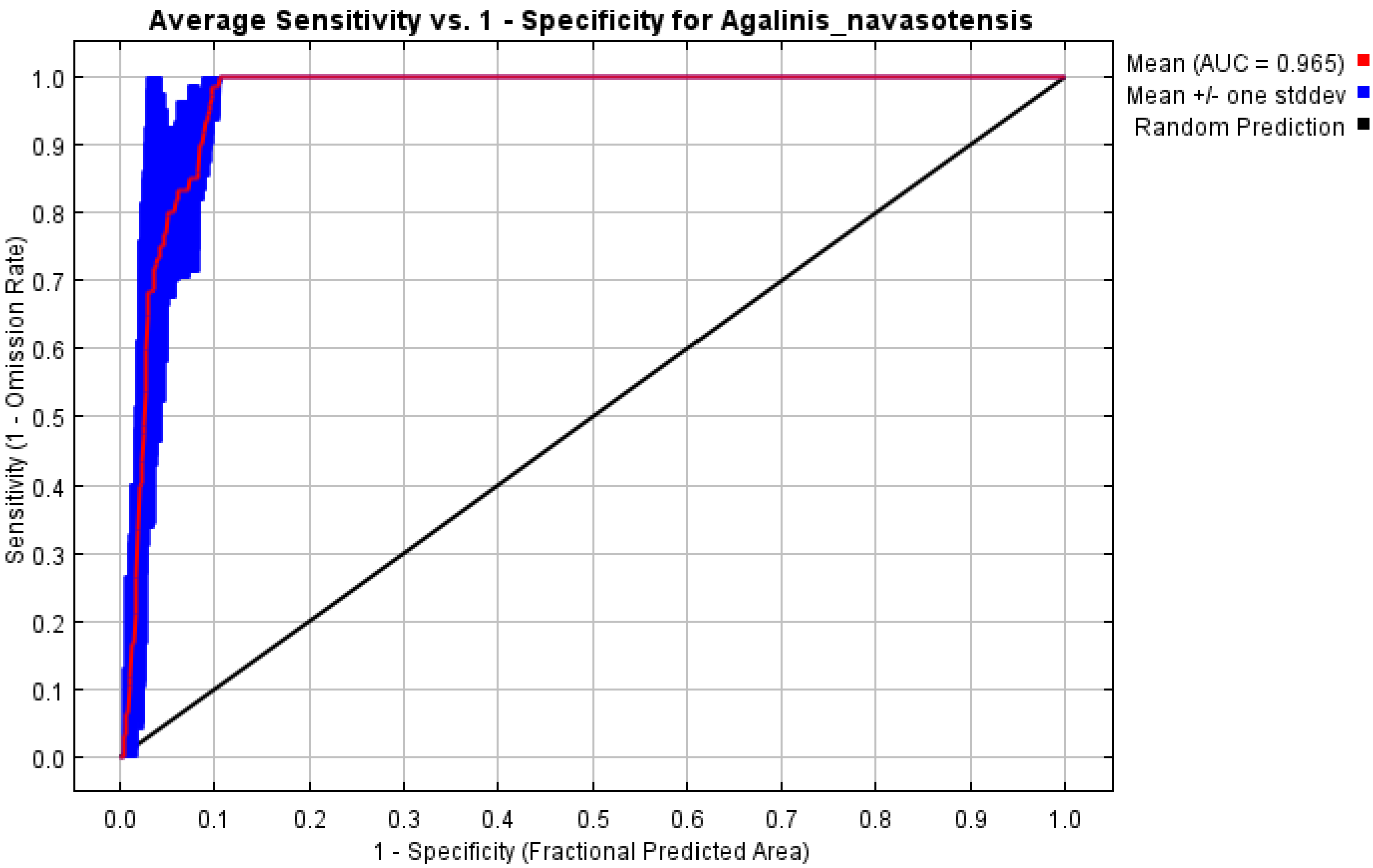
This page summarizes the results of 10 bootstrap models for Agalinis_navasotensis, created Sat Oct 30 11:43:39 CDT 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4] [5] [6] [7] [8] [9]

Analysis of omission/commission

The following picture shows the training omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs.

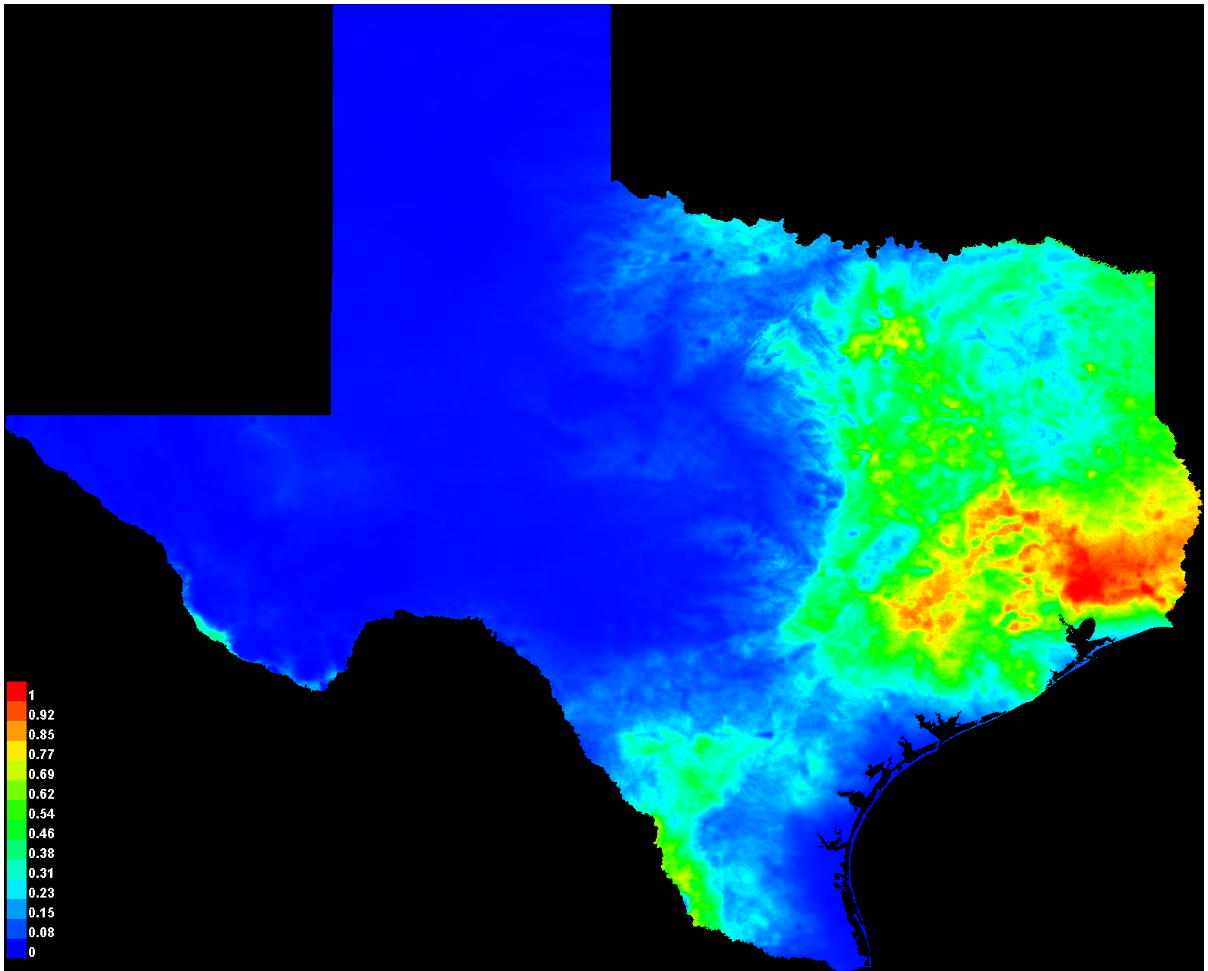


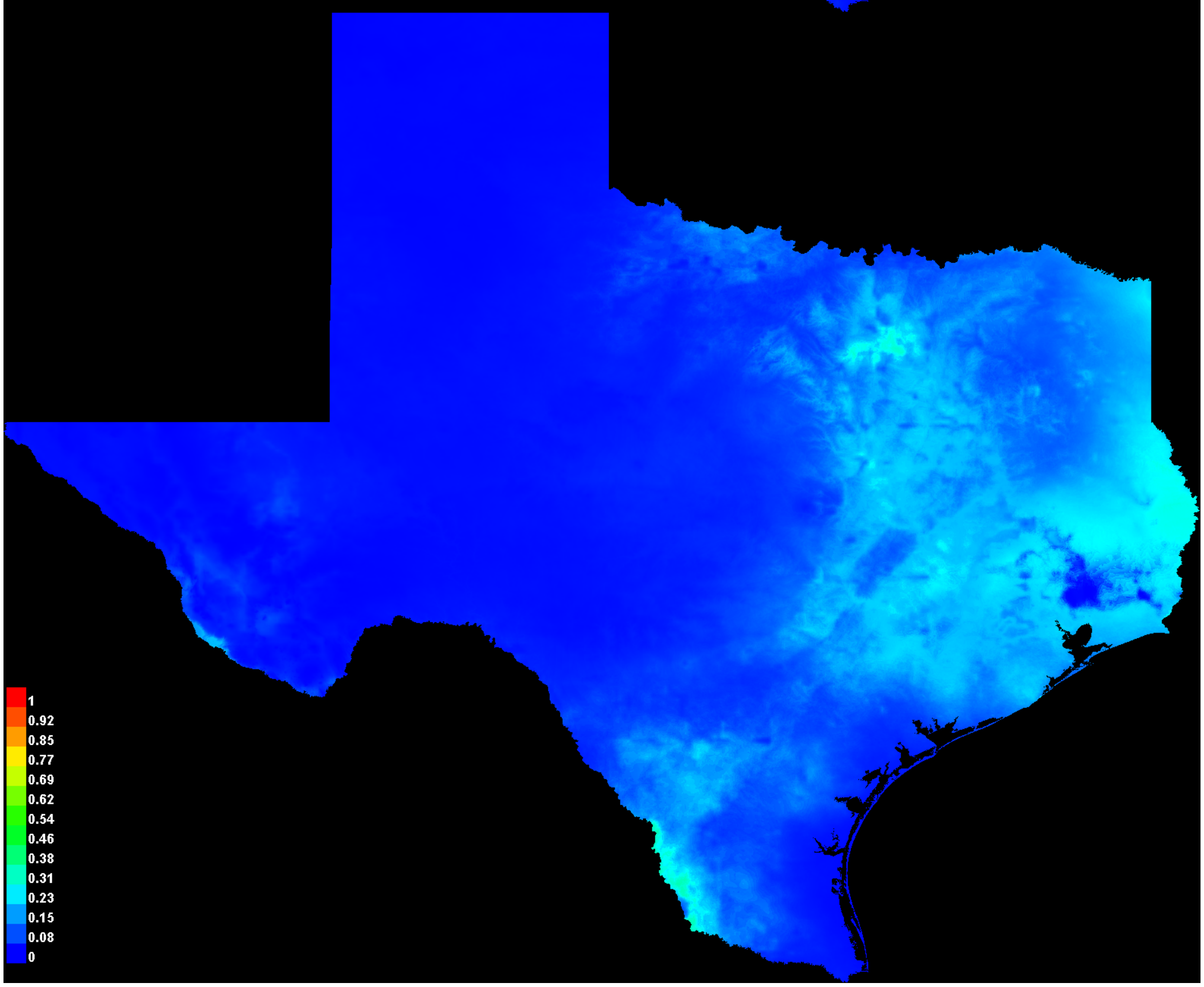
The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average training AUC for the replicate runs is 0.965, and the standard deviation is 0.013.



Pictures of the model

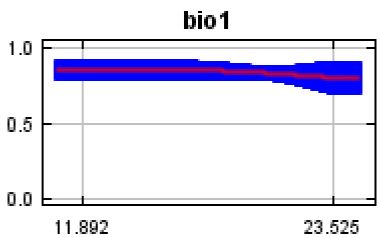
The following two pictures show the point-wise mean and standard deviation of the 10 output grids. Other available summary grids are min, max and median.

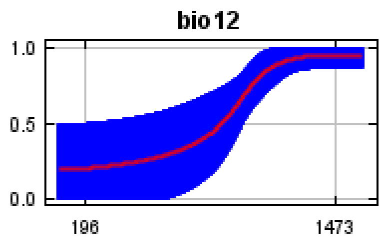

1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

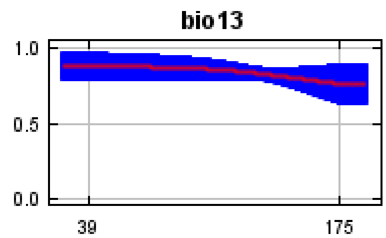

1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

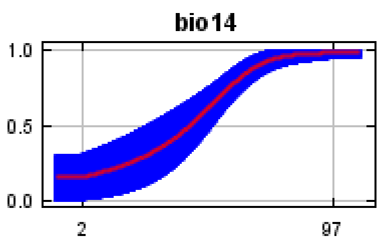
Response curves

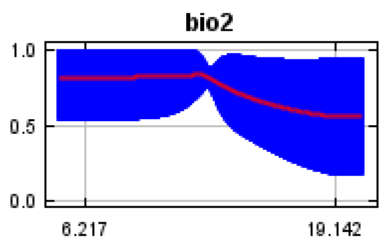
These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 10 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).

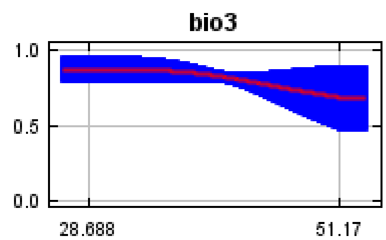


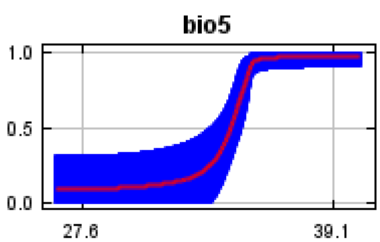


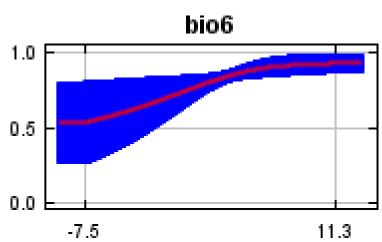


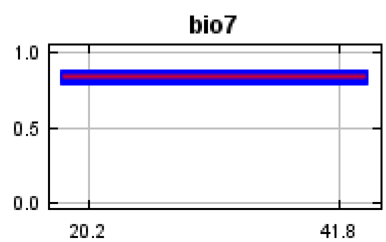




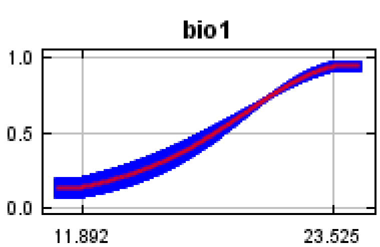


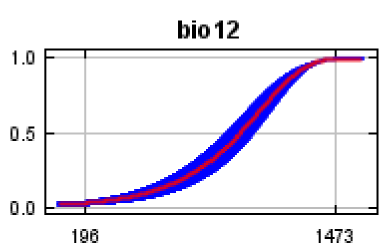


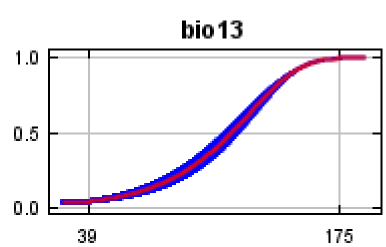


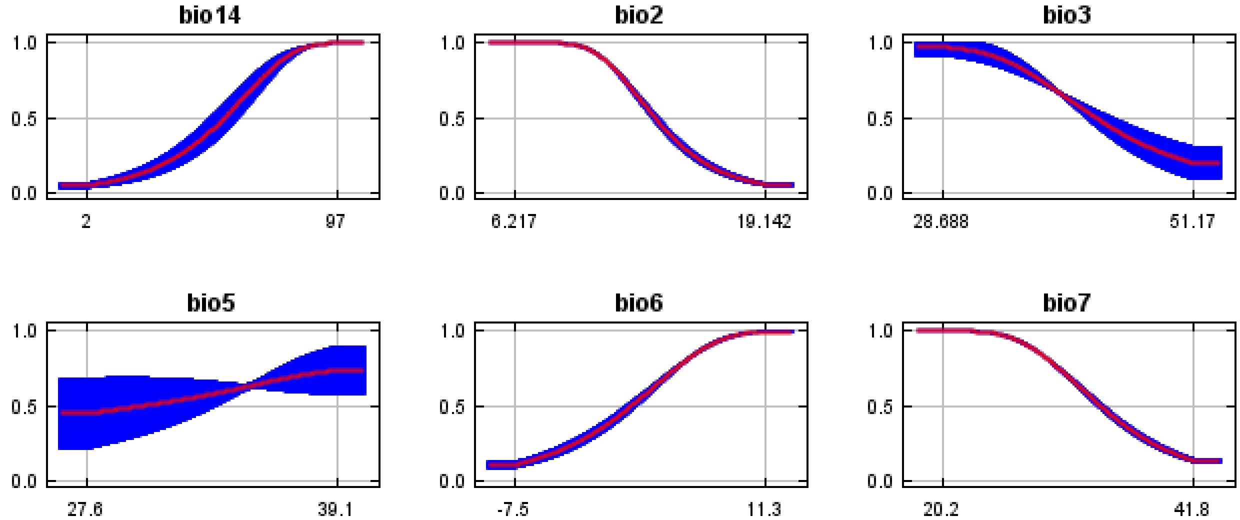


In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.







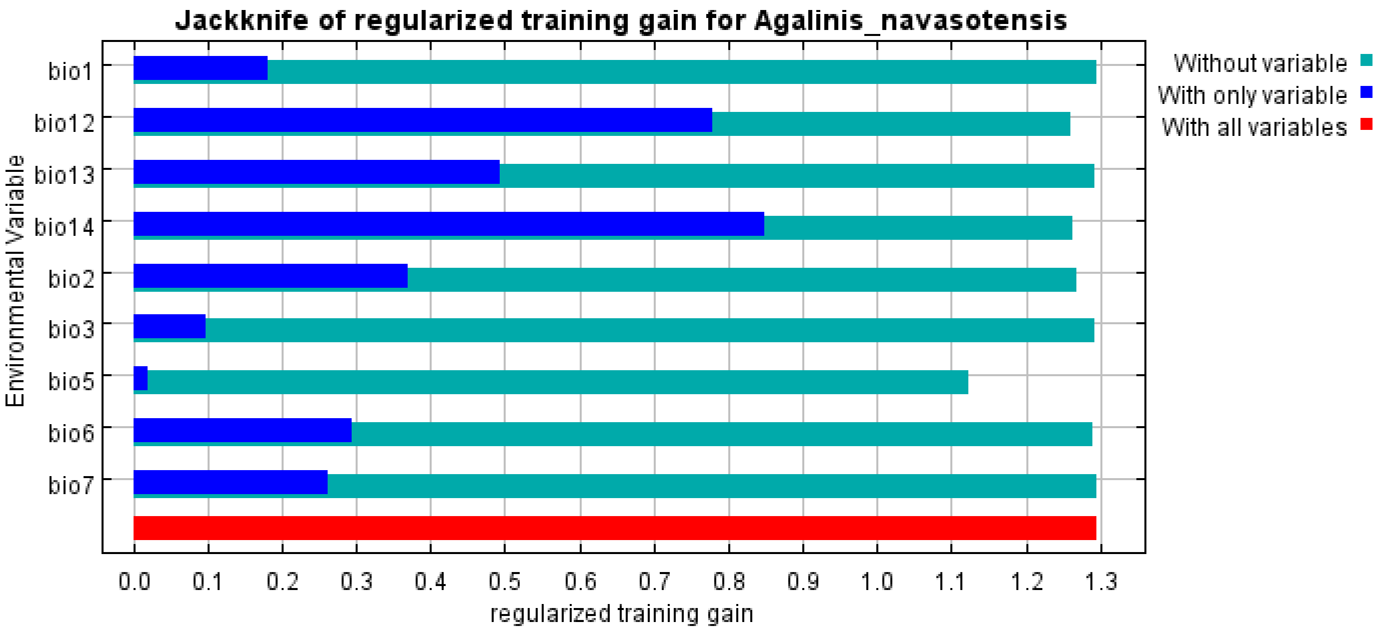


Analysis of variable contributions

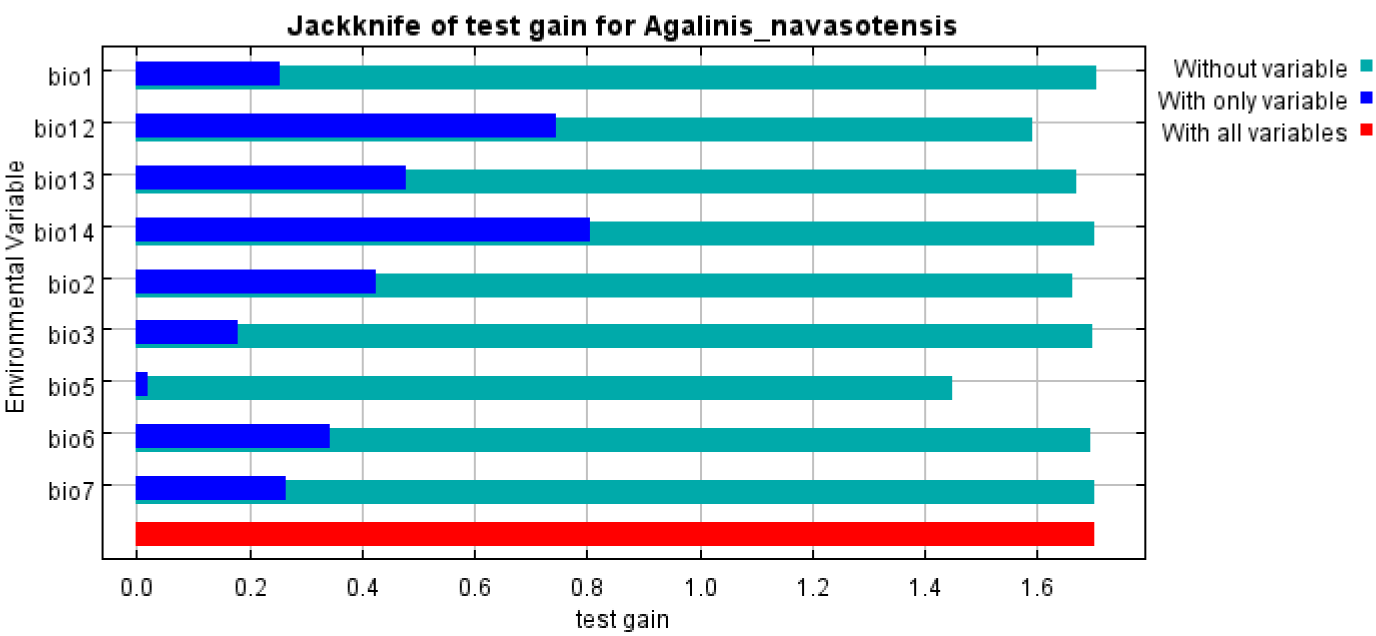
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio14	74.8	35.6
bio5	14.5	18.2
bio1	5.7	0
bio12	2.1	32.2
bio3	1.4	3.1
bio2	1	7.6
bio6	0.5	2.6
bio13	0	0.5
bio7	0	0

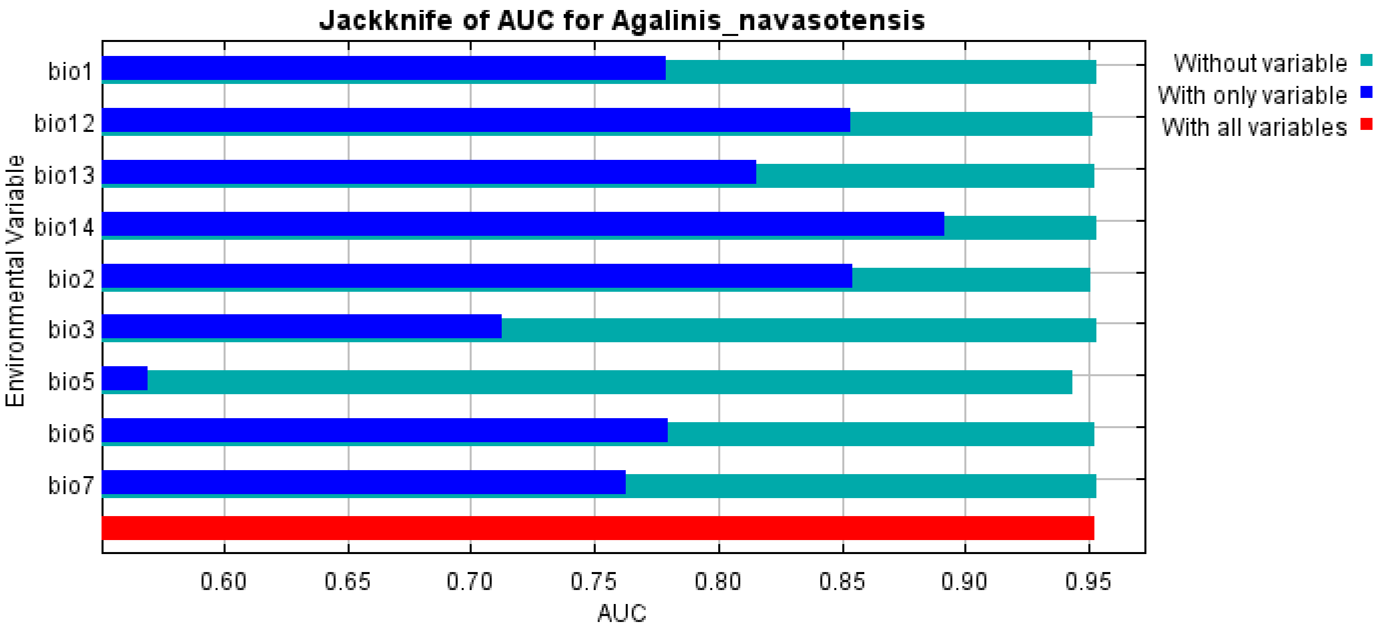
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio14, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio5, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



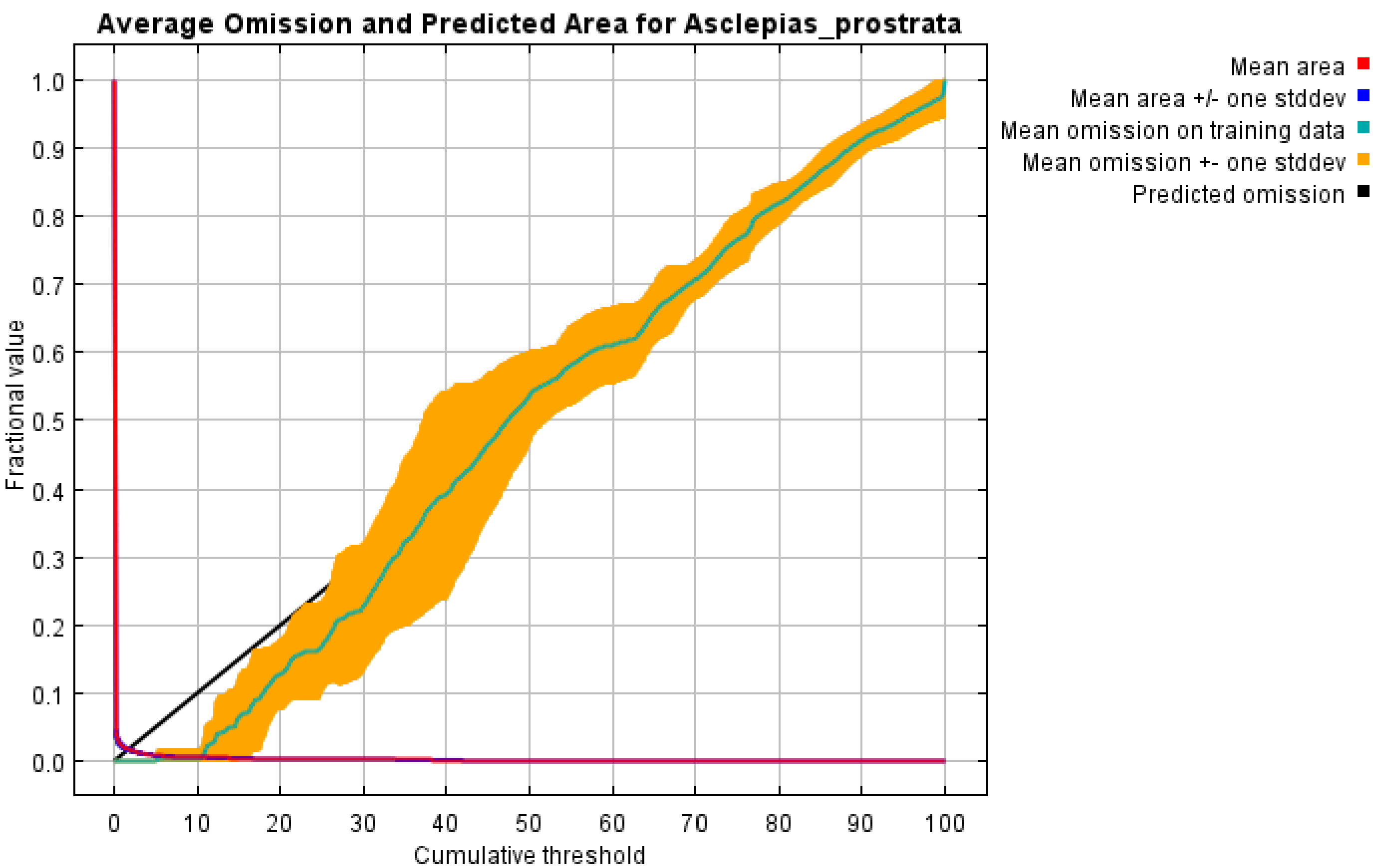
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Agalinis_navasotensis responsecurves jackknife outputdirectory=E:\TXDoT_TXScale\Results\Agalinis_bio "samplesfile=E:\TXDoT_TXScale\spp_csv\Agalinis navasotensis obs.csv" environmentallayers=E:\TXDoT_TXScale\Bio_TX_Ascii randomseed randomtestpoints=25 replicates=10 replicatetype=bootstrap -N perm -N ph -N poro

Replicated maxent model for Asclepias_prostrata

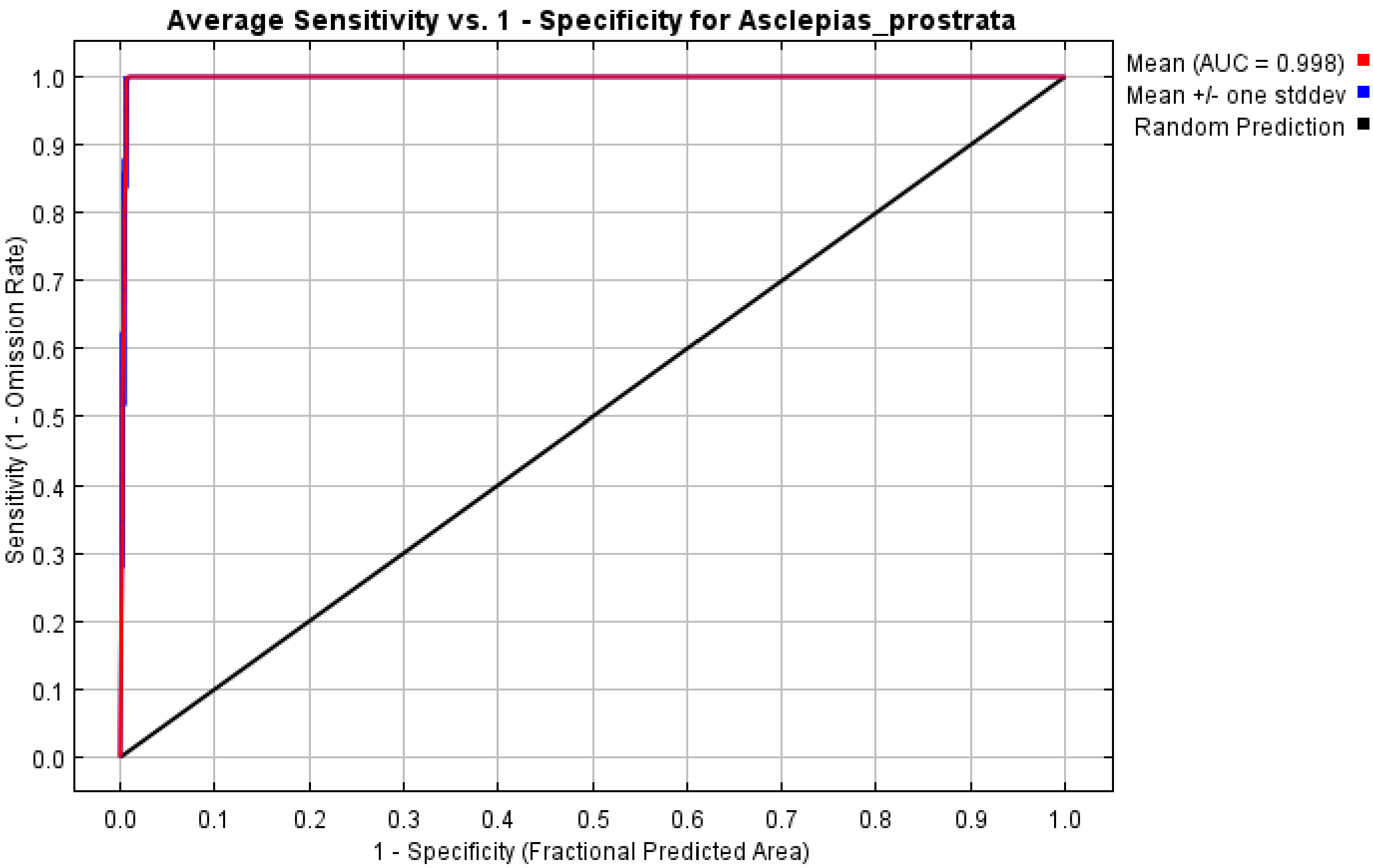
This page summarizes the results of 10 bootstrap models for Asclepias_prostrata, created Sat Oct 30 12:05:00 CDT 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4] [5] [6] [7] [8] [9]

Analysis of omission/commission

The following picture shows the training omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs.

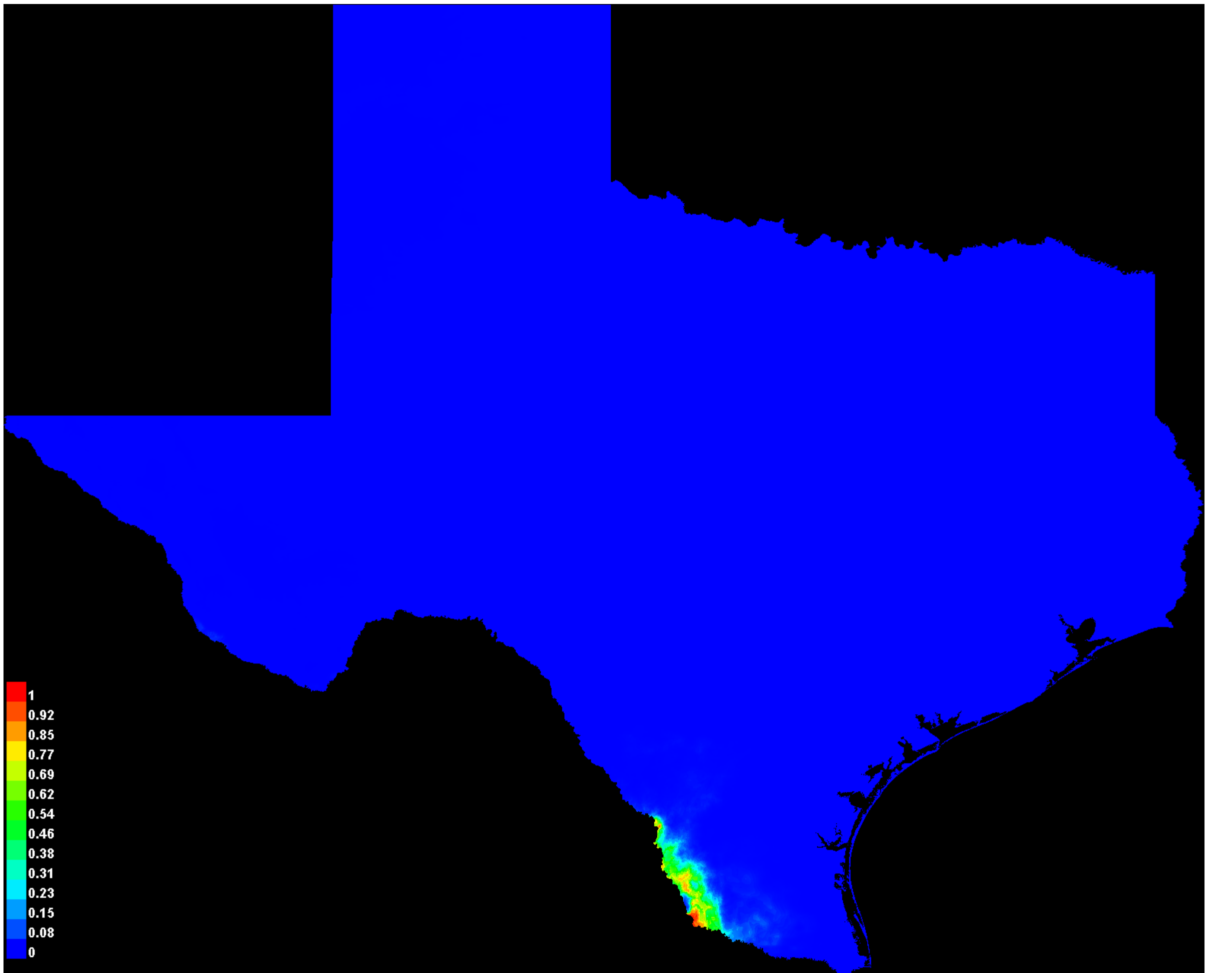


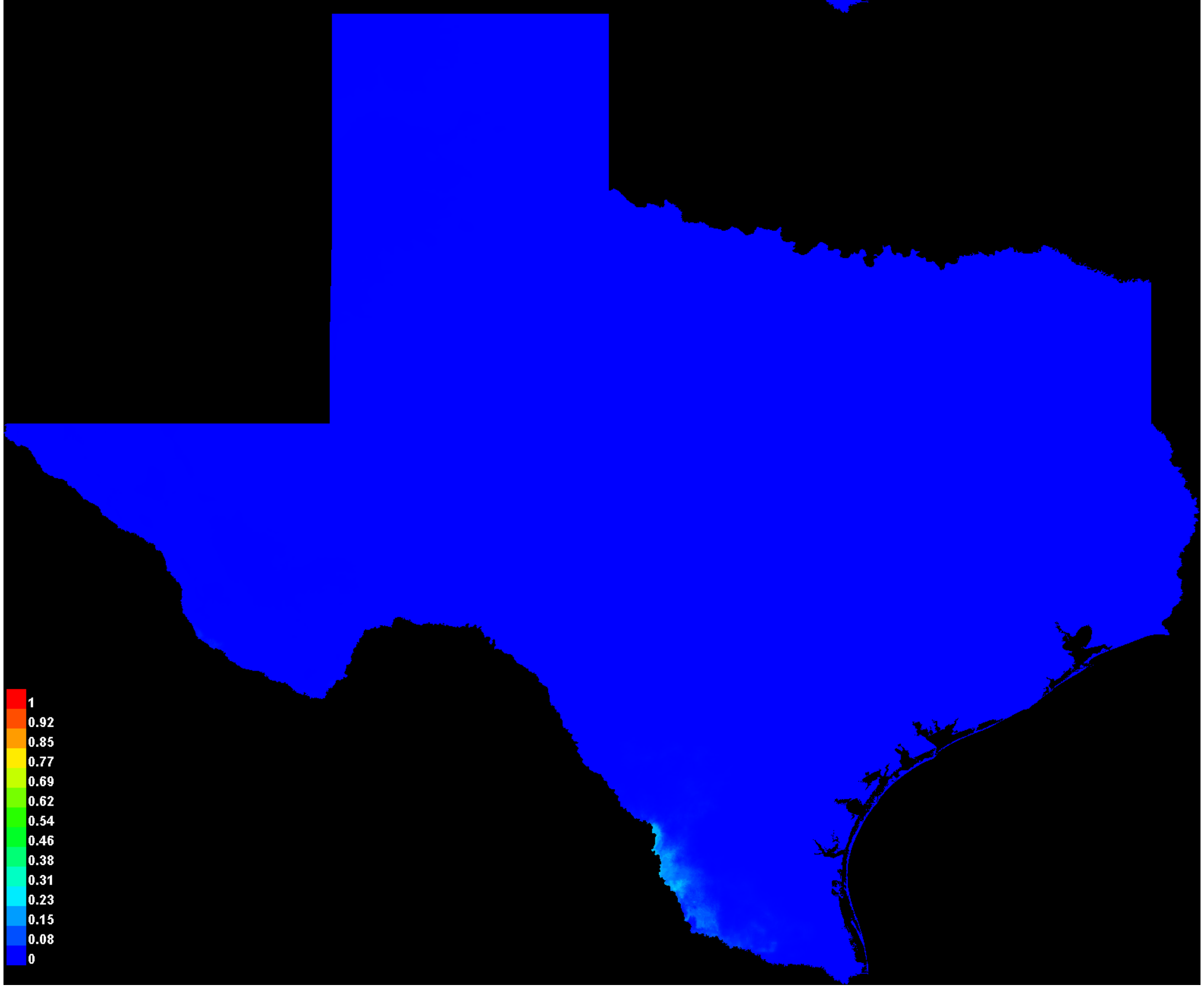
The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average training AUC for the replicate runs is 0.998, and the standard deviation is 0.000.



Pictures of the model

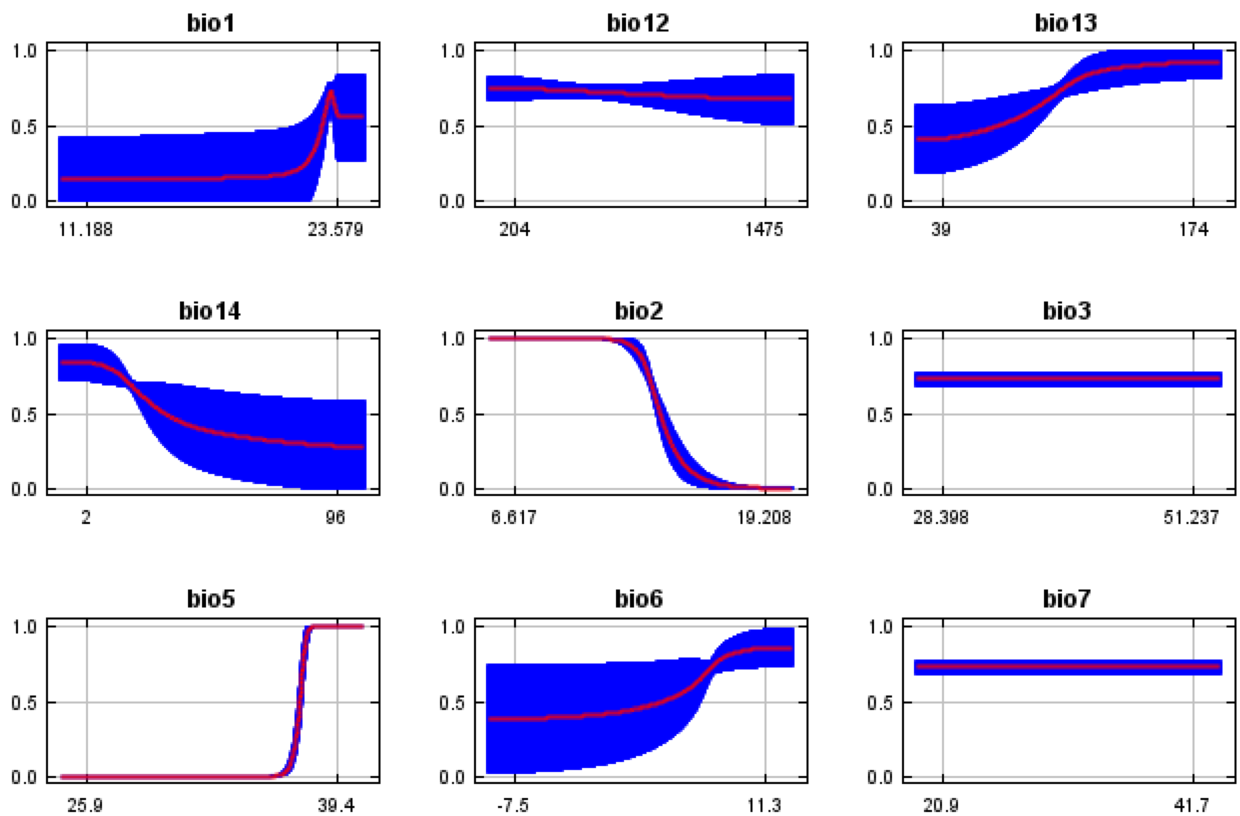
The following two pictures show the point-wise mean and standard deviation of the 10 output grids. Other available summary grids are min, max and median.


1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

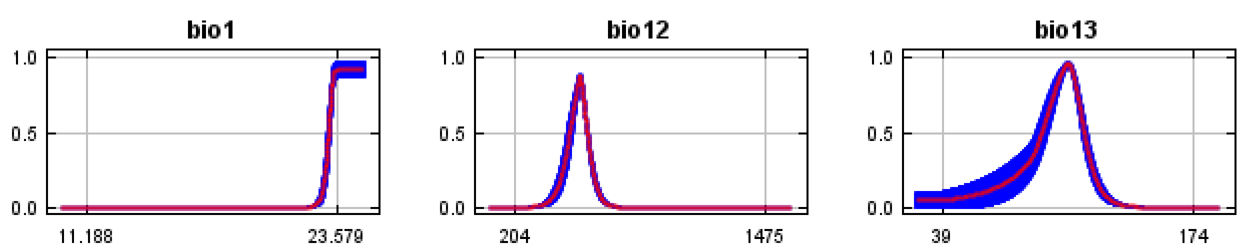

1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

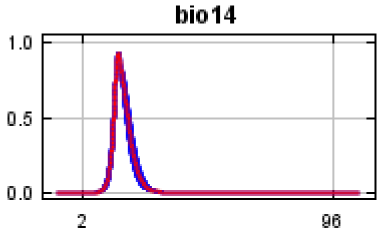
Response curves

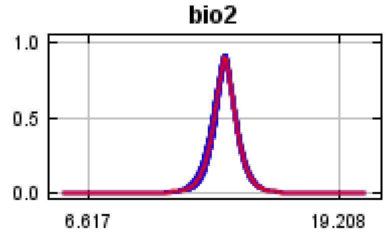
These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 10 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).

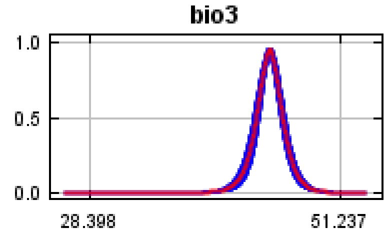


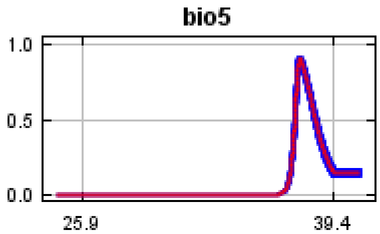
In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.

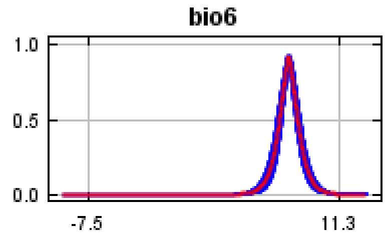


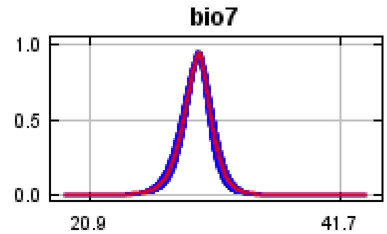










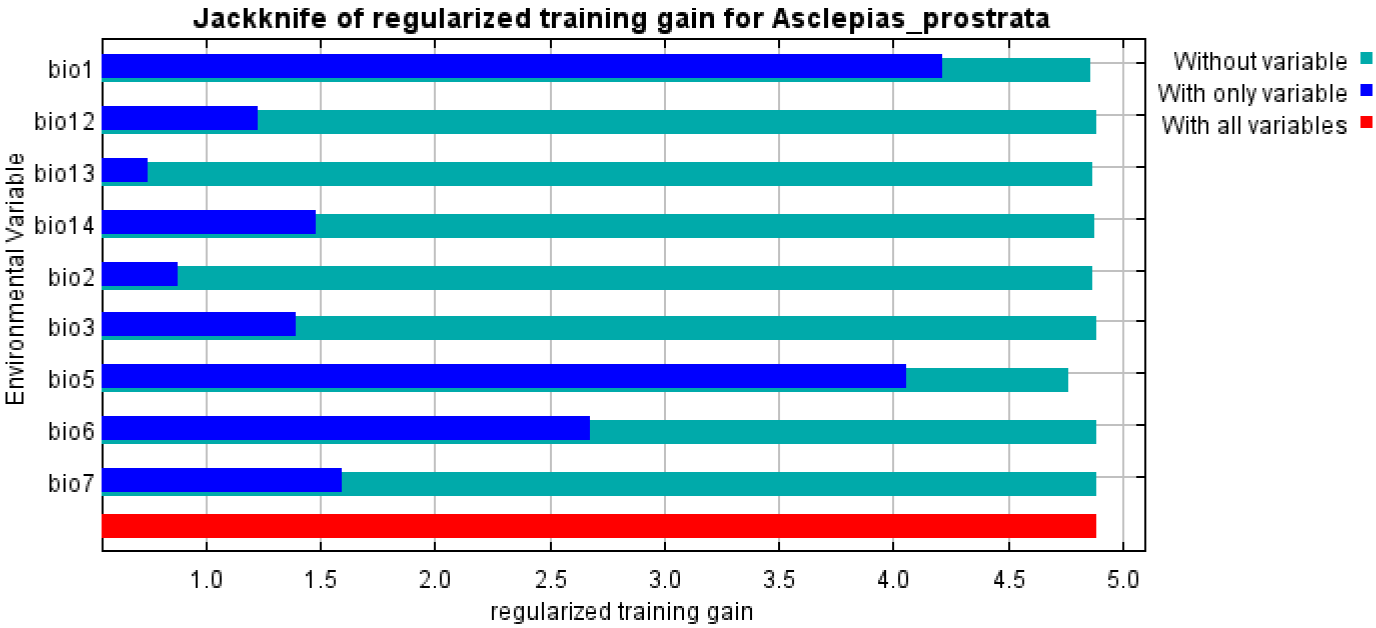


Analysis of variable contributions

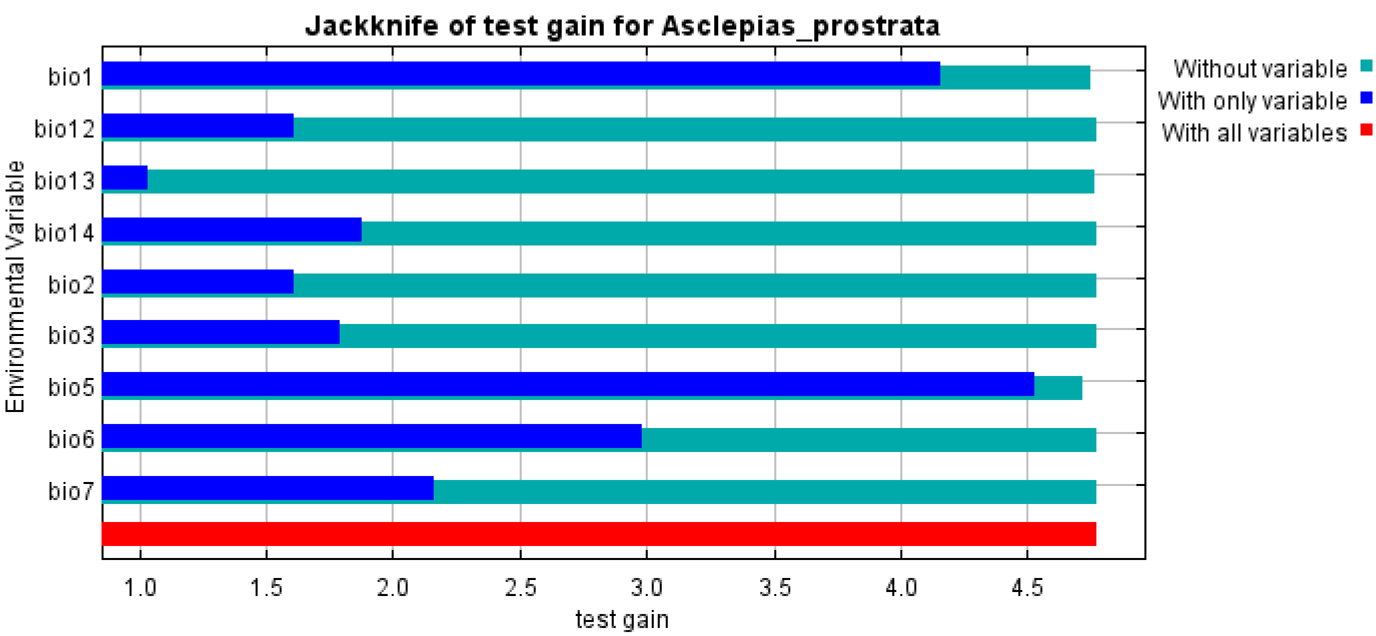
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio1	83.2	26.6
bio5	15.1	65.3
bio7	1	0
bio13	0.2	1
bio2	0.2	3.5
bio12	0.1	0
bio3	0.1	0
bio14	0.1	1.3
bio6	0	2.2

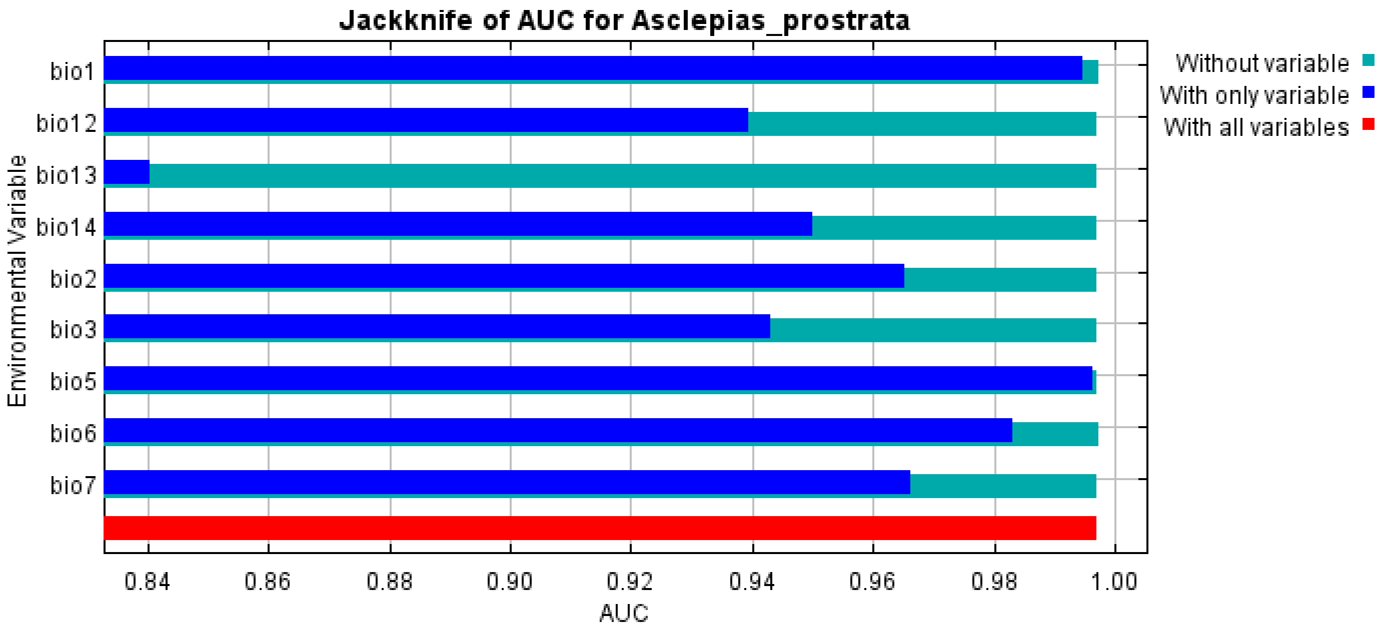
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio1, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio5, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



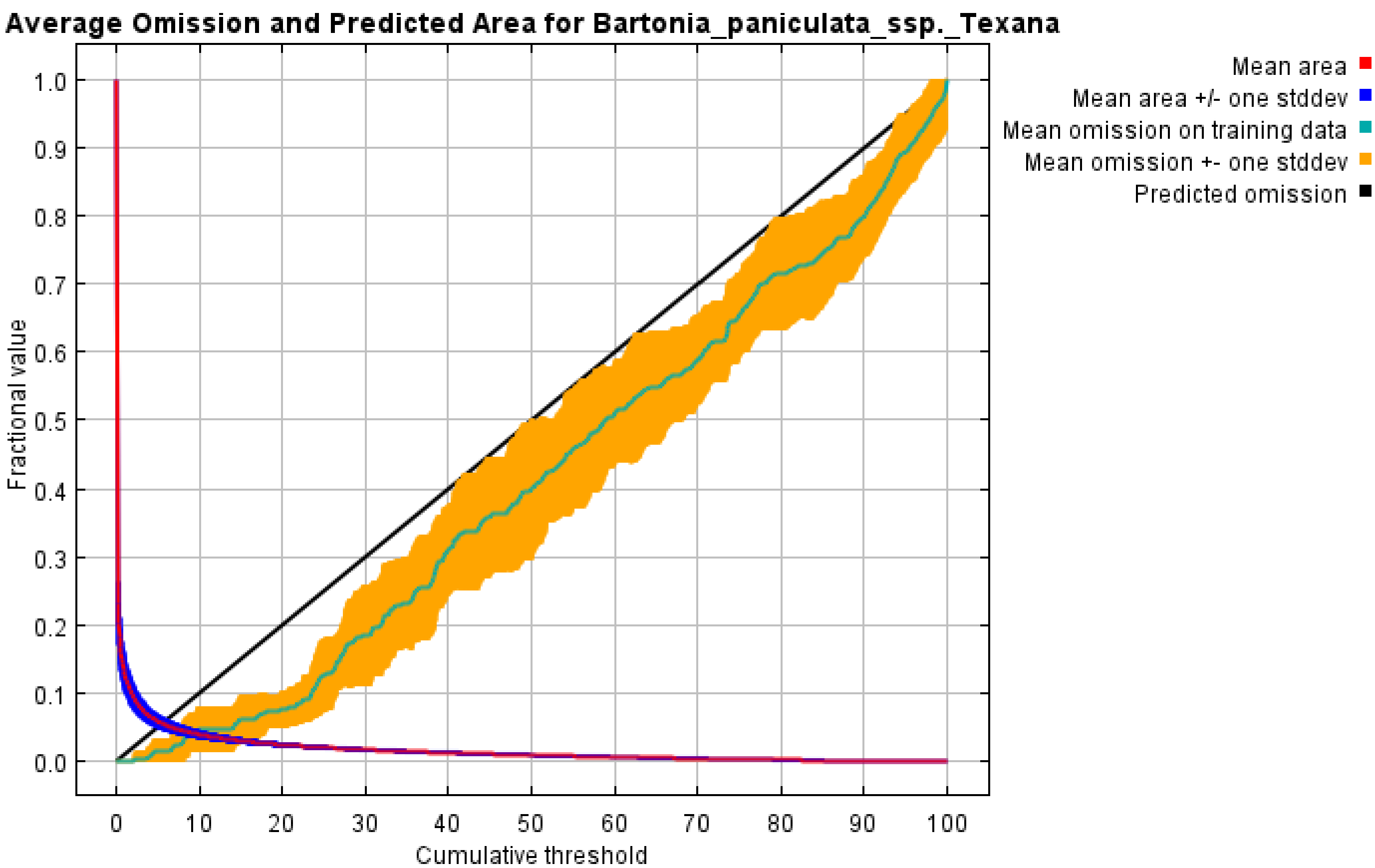
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Asclepias_prostrata responsecurves jackknife outputdirectory=E:\TXDoT_TXScale\Results\Aclepias_bio "samplesfile=E:\TXDoT_TXScale\spp_csv\Asclepias prostrata obs.csv" environmentallayers=E:\TXDoT_TXScale\Bio_TX_Ascii randomseed randomtestpoints=25 replicates=10 replicatetype=bootstrap -N perm -N ph -N poro

Replicated maxent model for Bartonia_paniculata_ssp._Texana

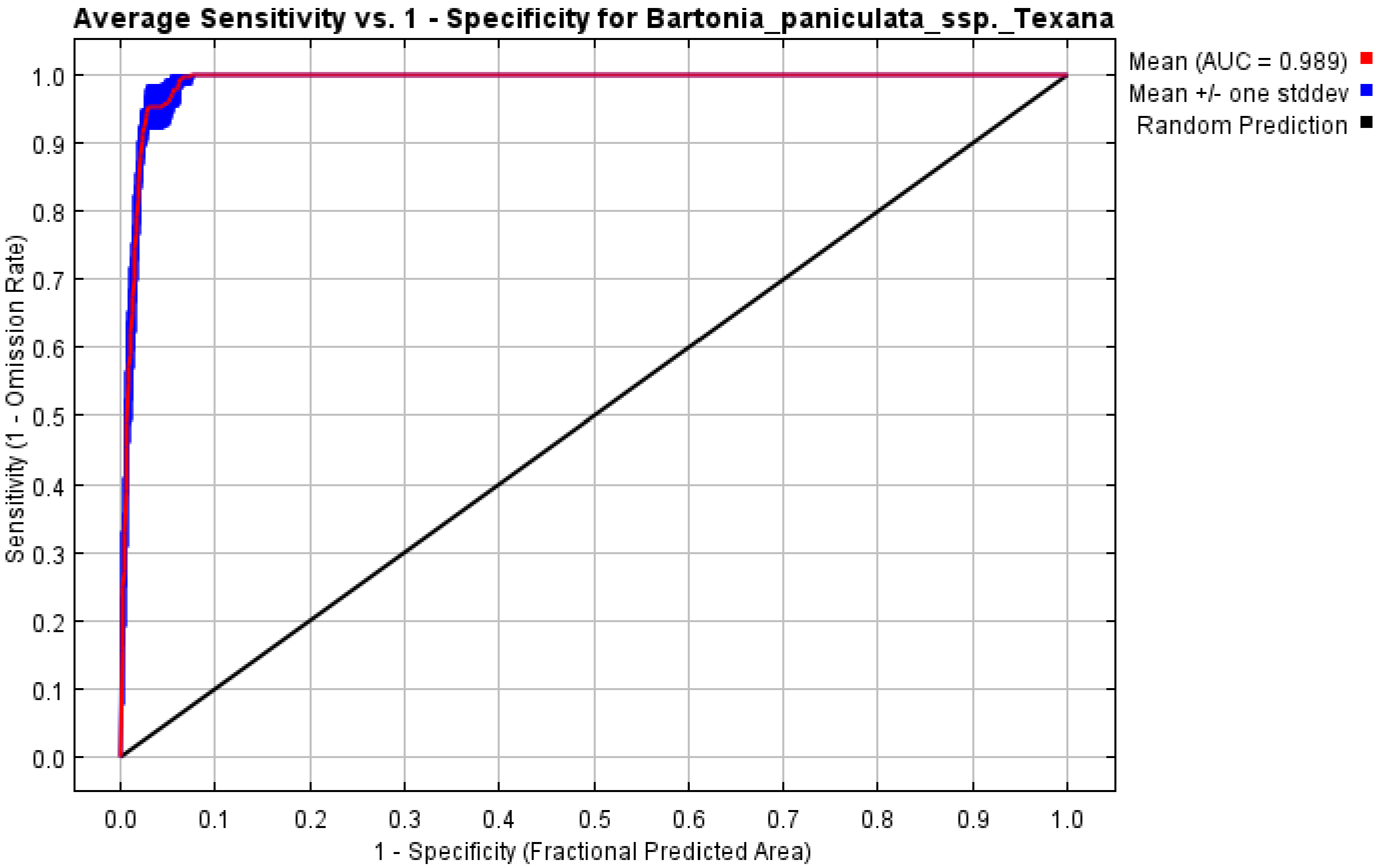
This page summarizes the results of 10 bootstrap models for Bartonia_paniculata_ssp._Texana, created Sat Oct 30 12:28:02 CDT 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4] [5] [6] [7] [8] [9]

Analysis of omission/commission

The following picture shows the training omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs.

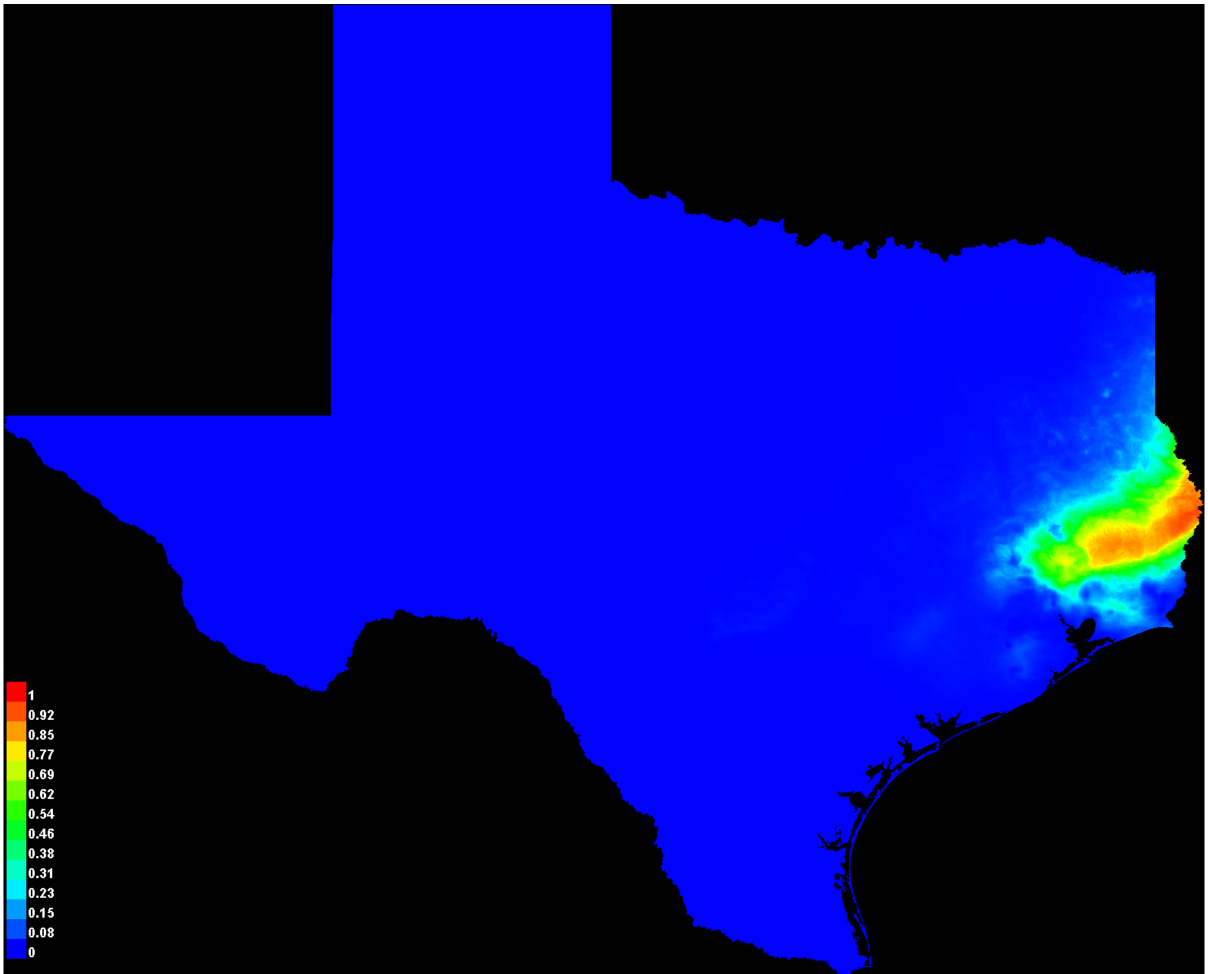


The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average training AUC for the replicate runs is 0.989, and the standard deviation is 0.001.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 10 output grids. Other available summary grids are min, max and median.


1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
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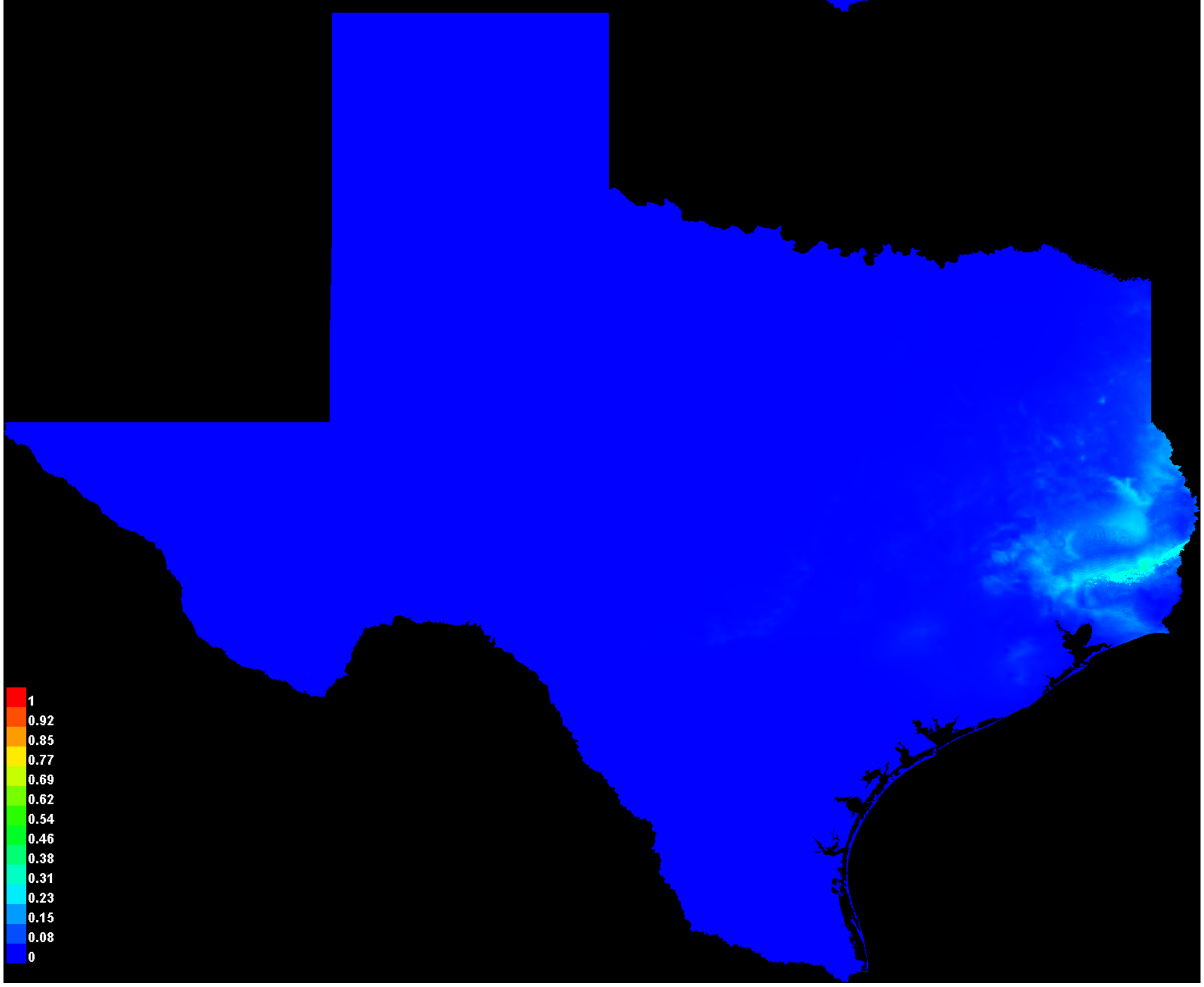
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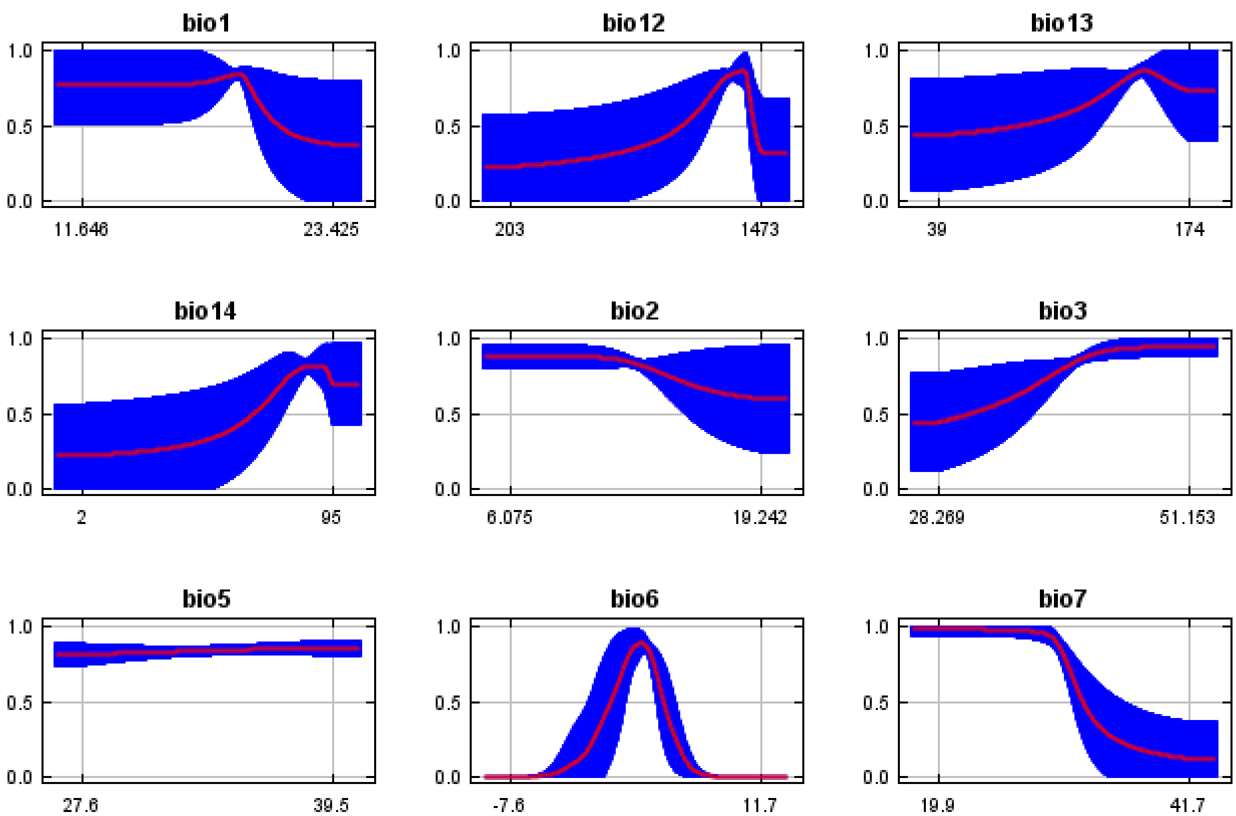
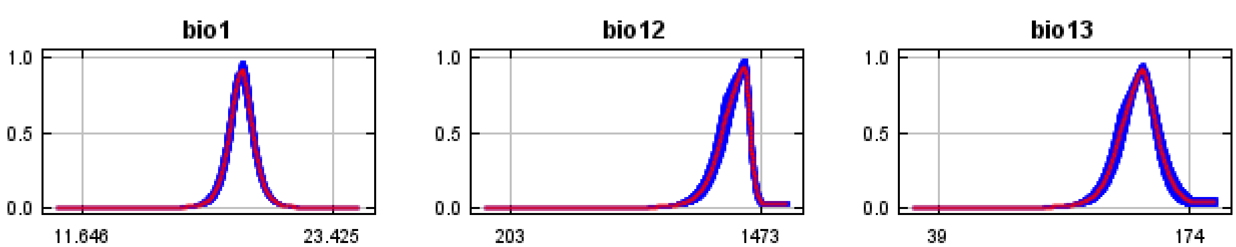
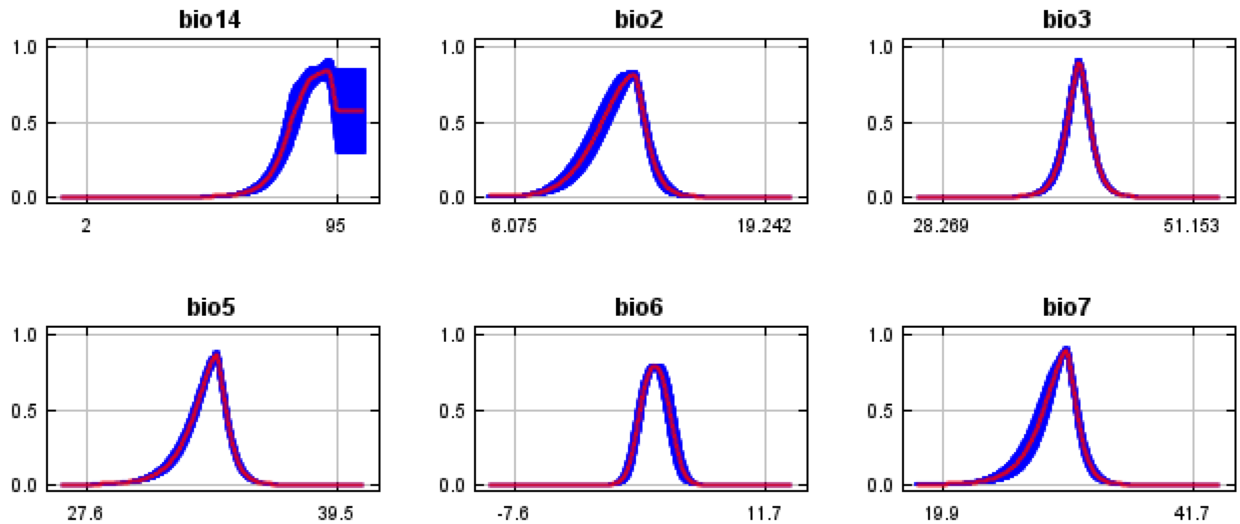
Response curves

These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 10 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).



In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.



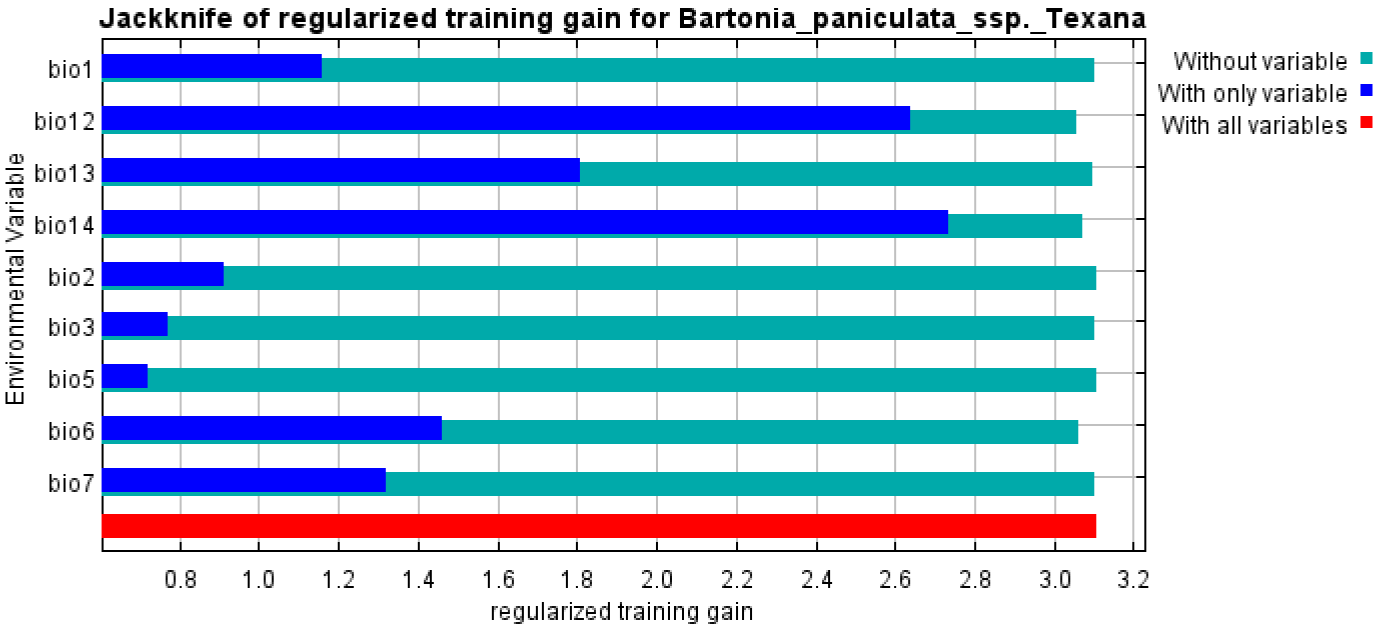


Analysis of variable contributions

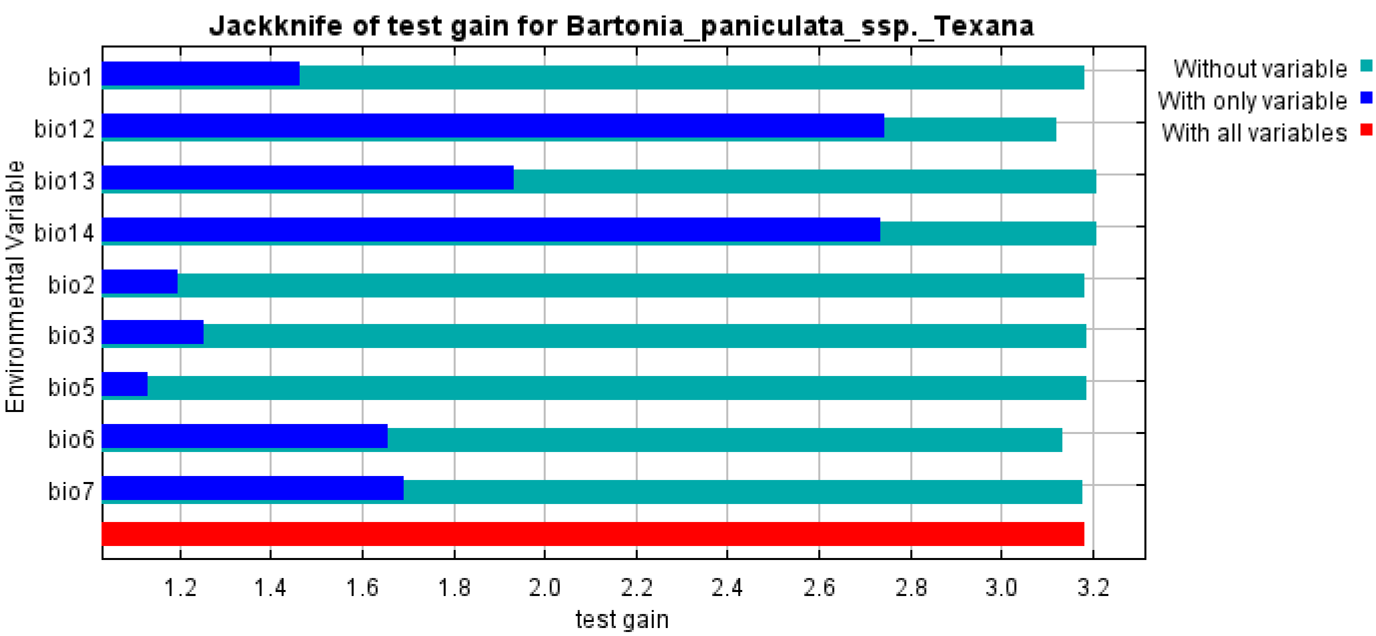
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio14	81.8	16.6
bio12	9.6	16.6
bio1	4.6	4
bio6	1.1	44.1
bio3	1.1	1
bio13	1	4
bio7	0.8	13.2
bio2	0	0.5
bio5	0	0

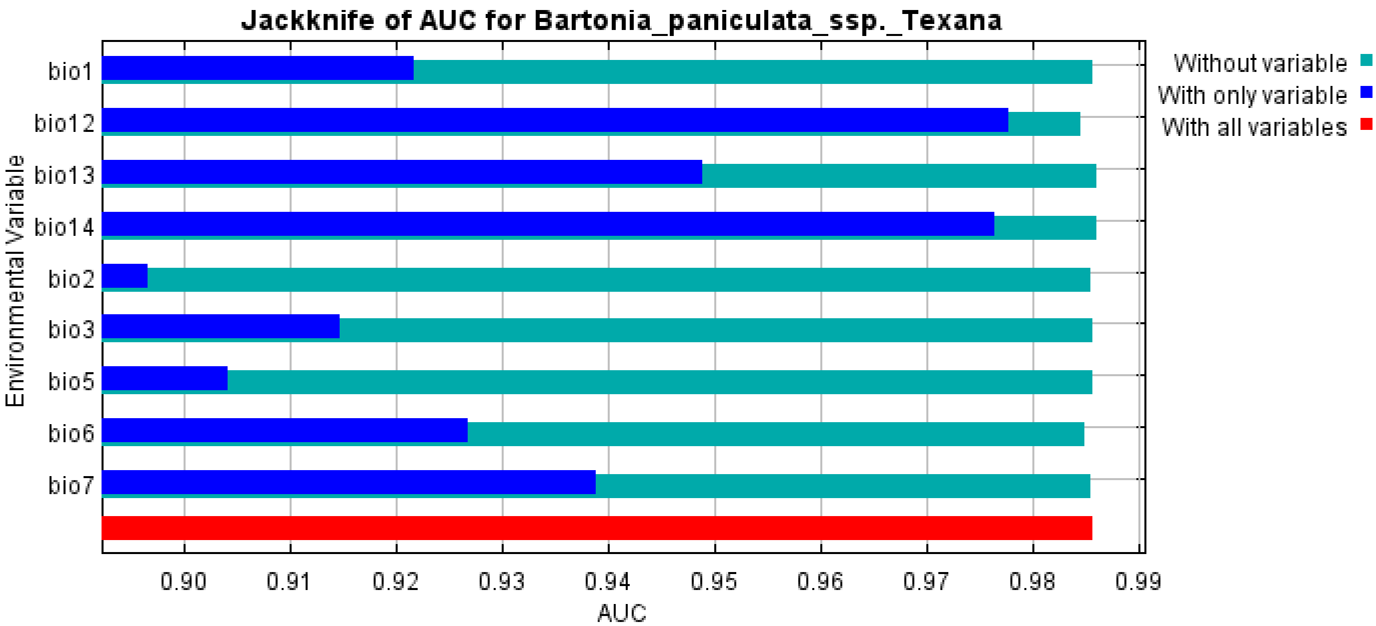
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio14, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio12, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



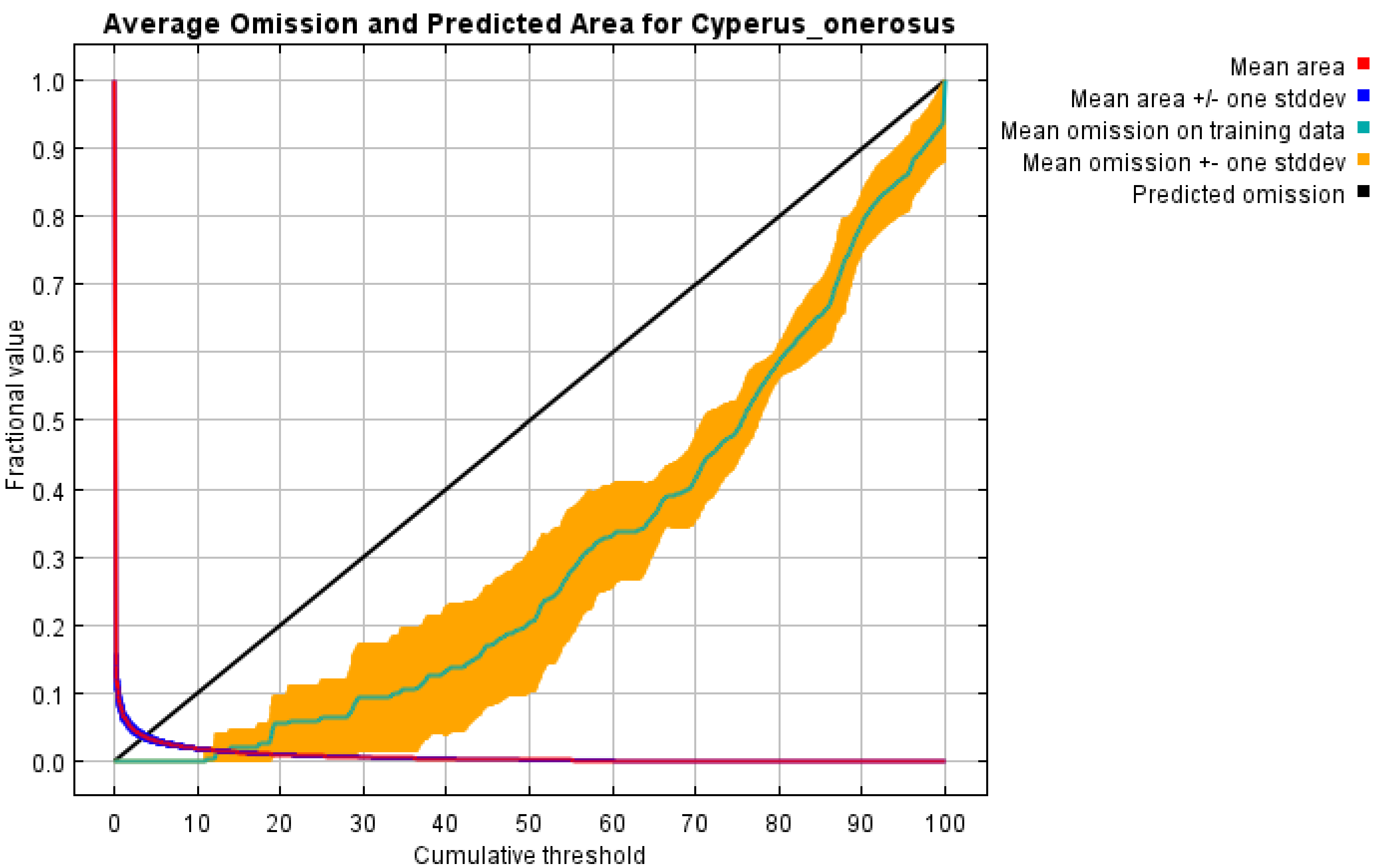
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Bartonia_paniculata_ssp._Texana responsecurves jackknife outputdirectory=E:\TXDoT_TXScale\Results\Bartonia_bio "samplesfile=E:\TXDoT_TXScale\spp_csv\Bartonia texana obs.csv" environmentallayers=E:\TXDoT_TXScale\Bio_TX_Ascii randomseed randomtestpoints=25 replicates=10 replicatetype=bootstrap -N perm -N ph -N poro

Replicated maxent model for Cyperus_onerosus

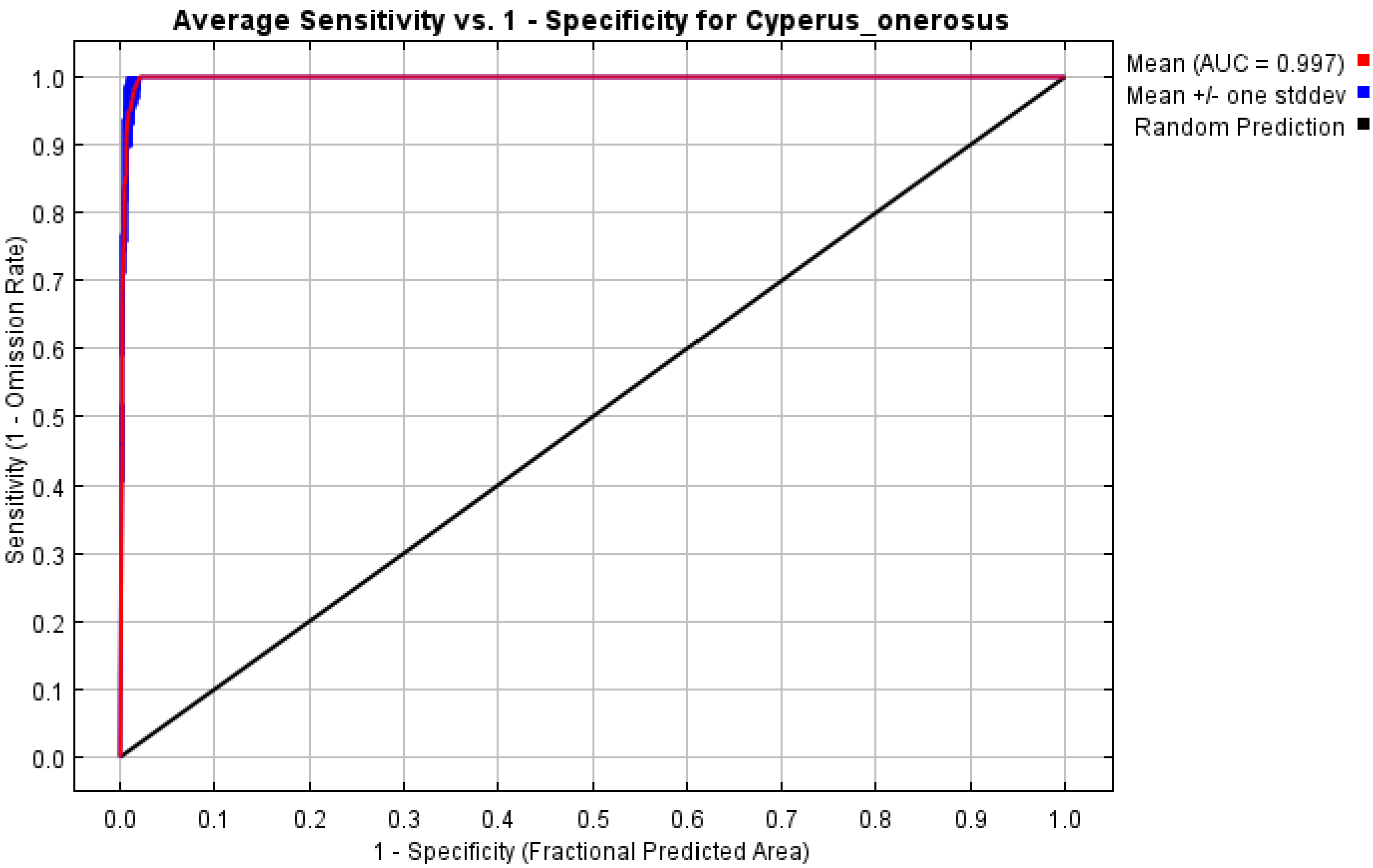
This page summarizes the results of 10 bootstrap models for Cyperus_onerosus, created Sat Oct 30 12:35:23 CDT 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4] [5] [6] [7] [8] [9]

Analysis of omission/commission

The following picture shows the training omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs.

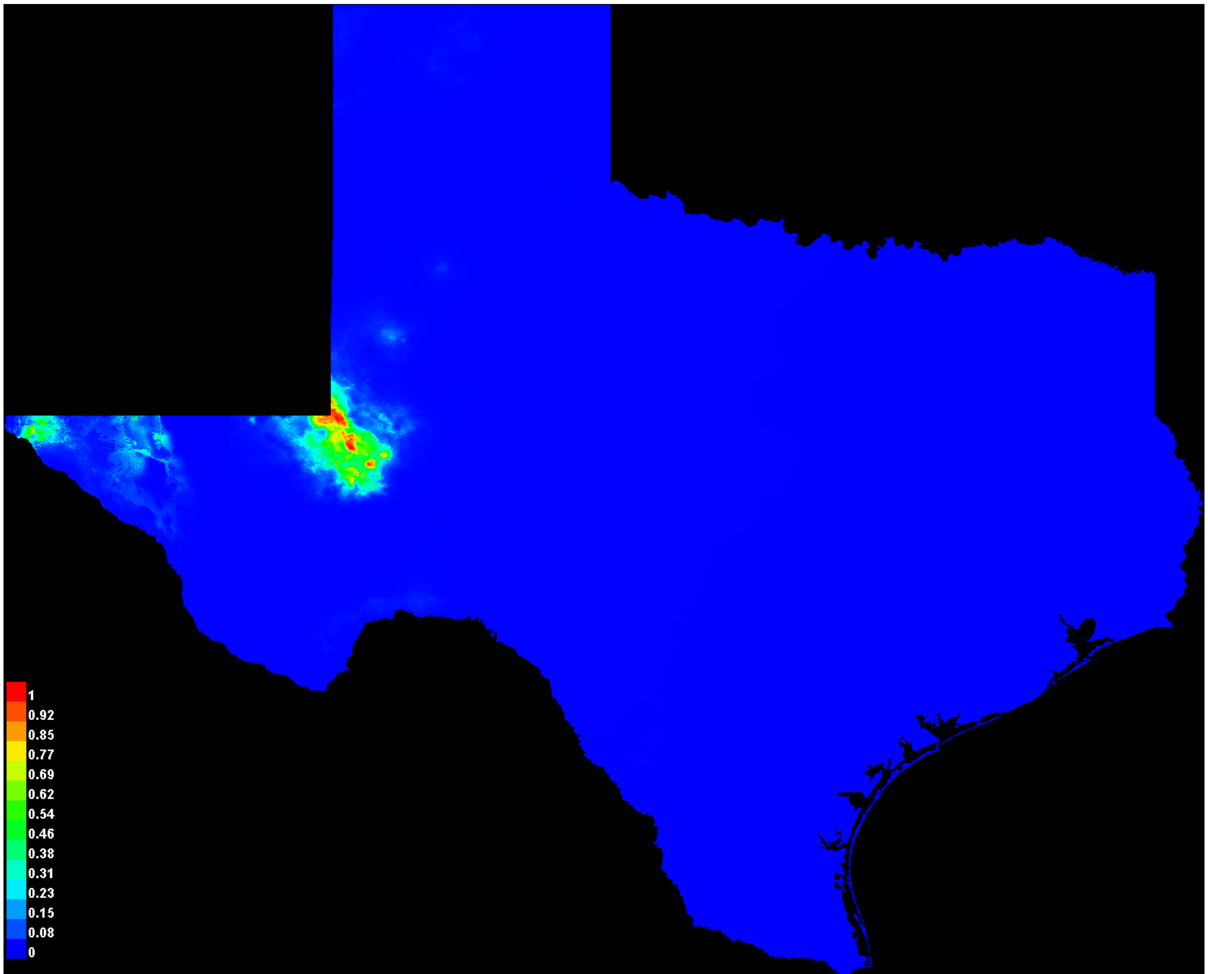


The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average training AUC for the replicate runs is 0.997, and the standard deviation is 0.001.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 10 output grids. Other available summary grids are min, max and median.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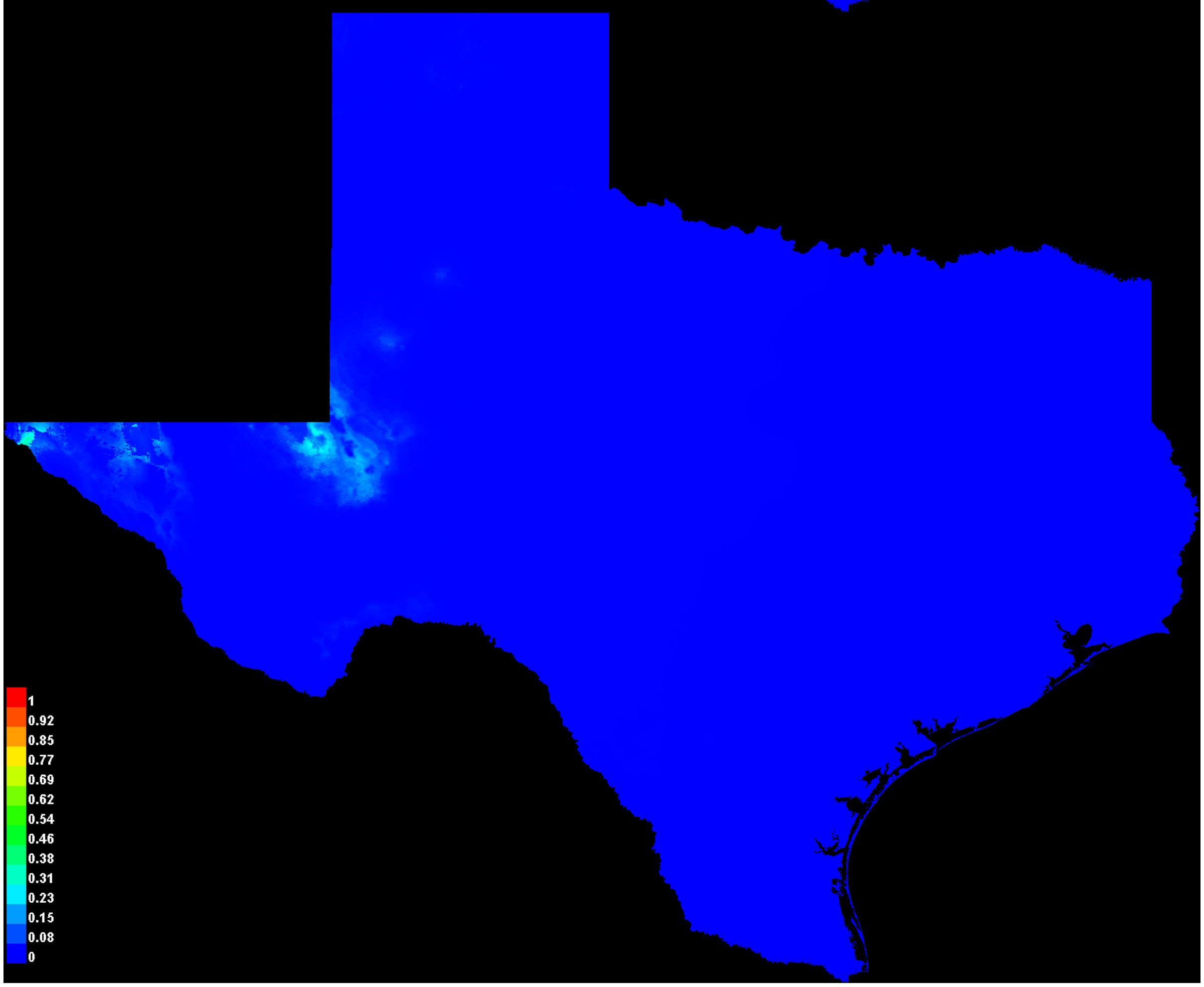
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0.08
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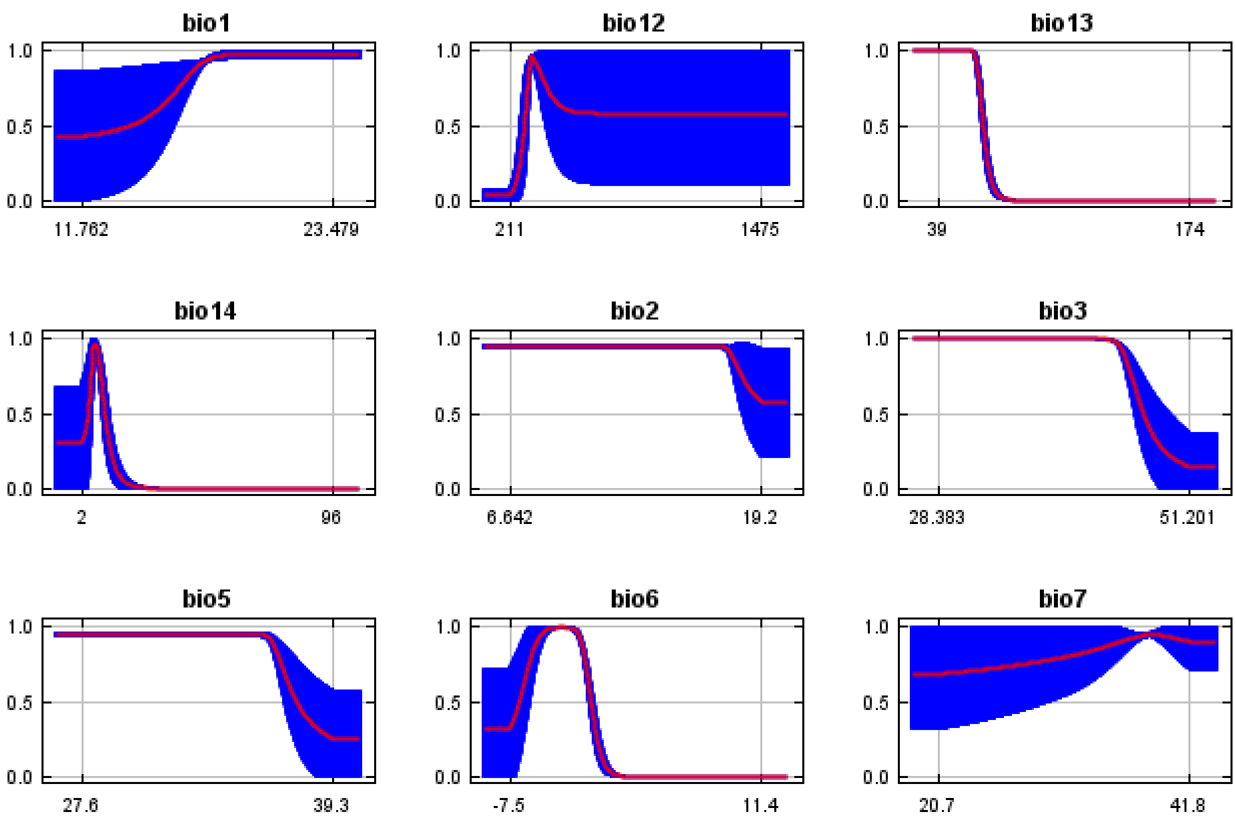
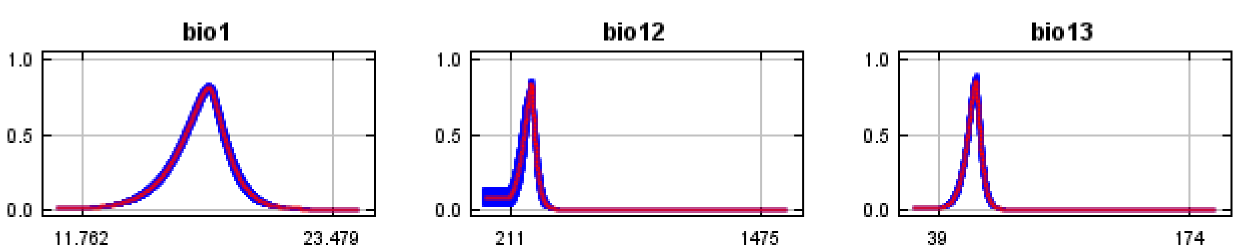
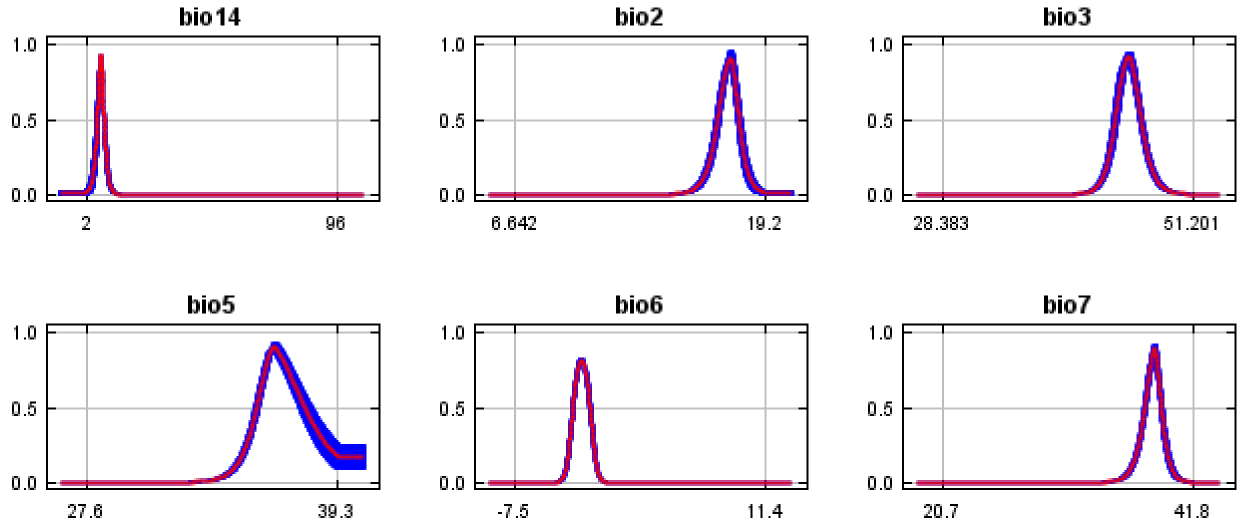
Response curves

These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 10 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).



In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.



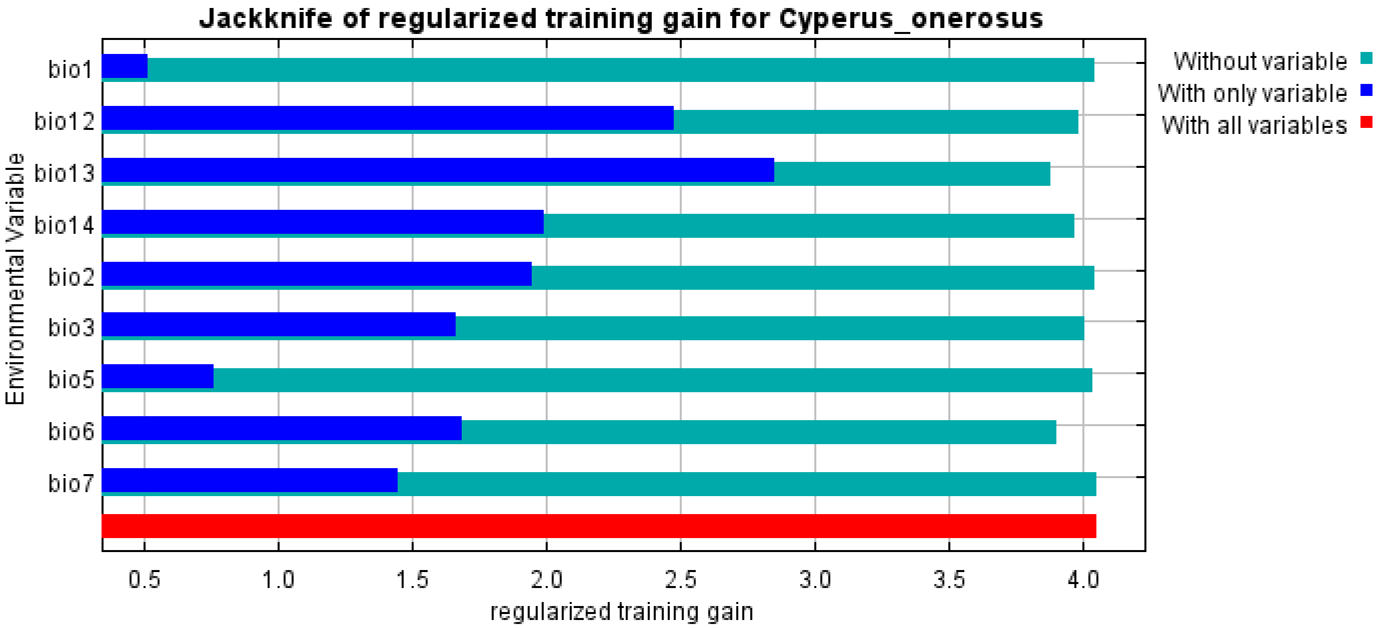


Analysis of variable contributions

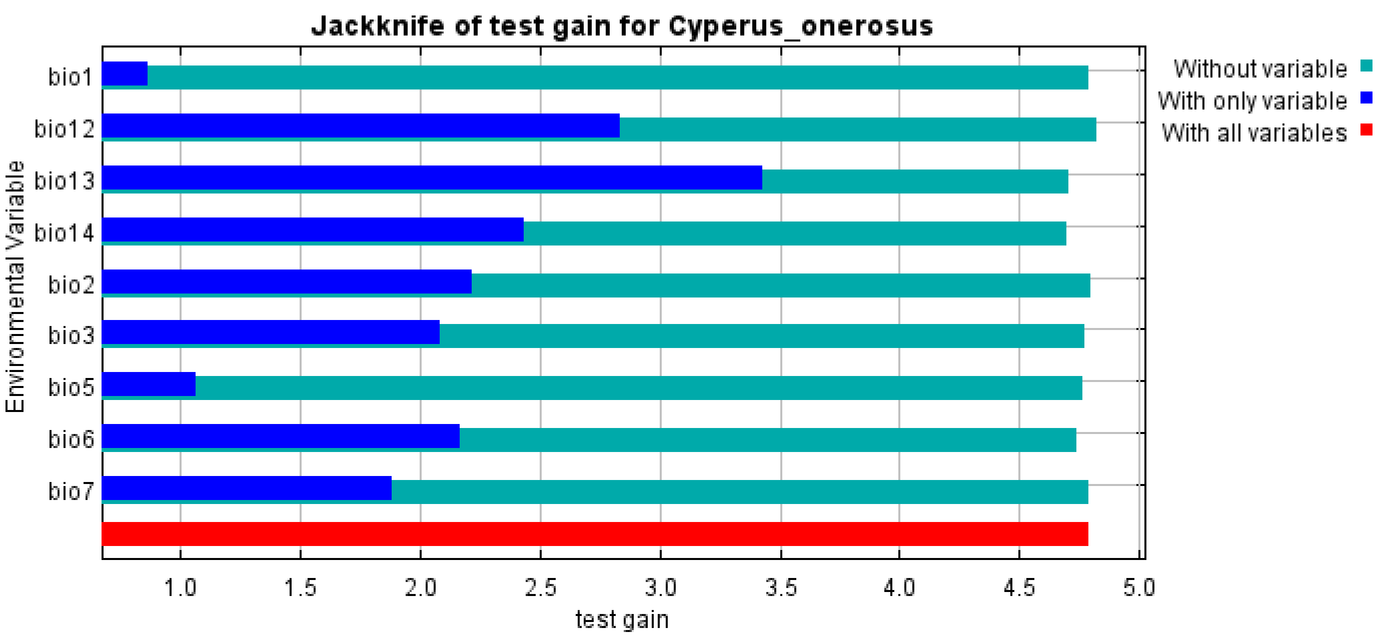
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio12	55.7	8.7
bio13	11.4	31.4
bio3	8.9	2.1
bio14	7.3	24.6
bio7	5.1	0.2
bio1	4.4	1
bio2	3.6	0.1
bio6	2.1	31.7
bio5	1.5	0.1

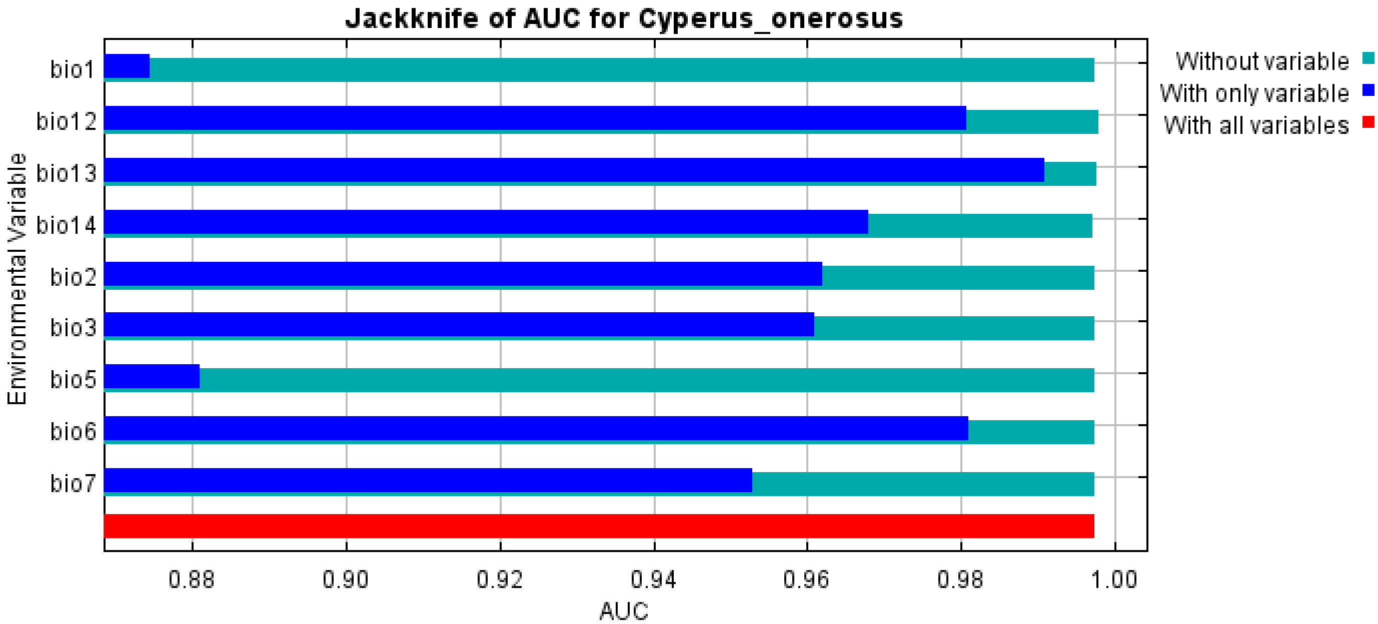
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio13, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio13, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



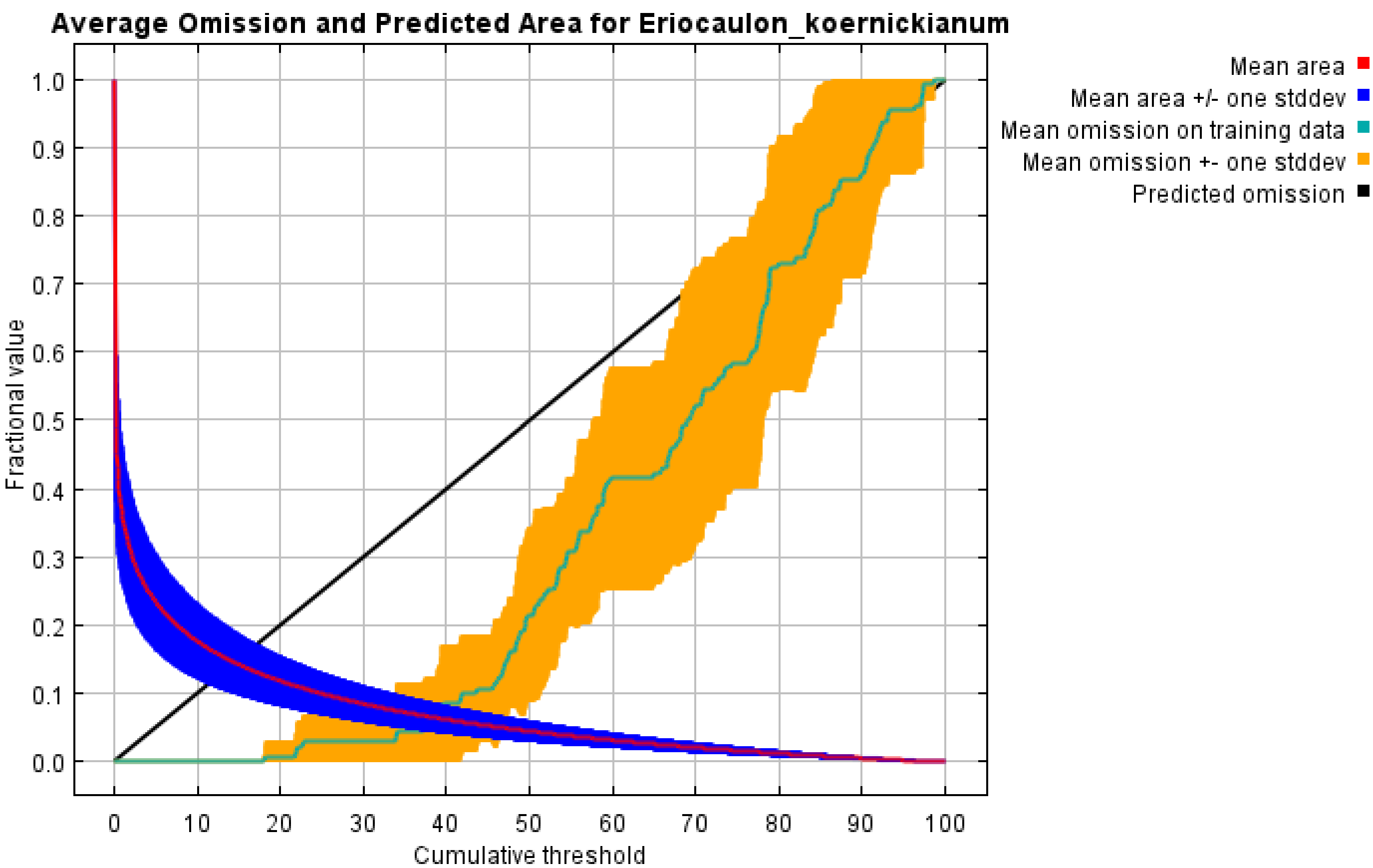
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Cyperus_onerosus responsecurves jackknife outputdirectory=E:\TXDoT_TXScale\Results\Cyperus_bio "samplesfile=E:\TXDoT_TXScale\spp_csv\Cyperus onerosus obs.csv" environmentallayers=E:\TXDoT_TXScale\Bio_TX_Ascii randomseed randomtestpoints=25 replicates=10 replicatetype=bootstrap -N perm -N ph -N poro

Replicated maxent model for Eriocaulon_koernickianum

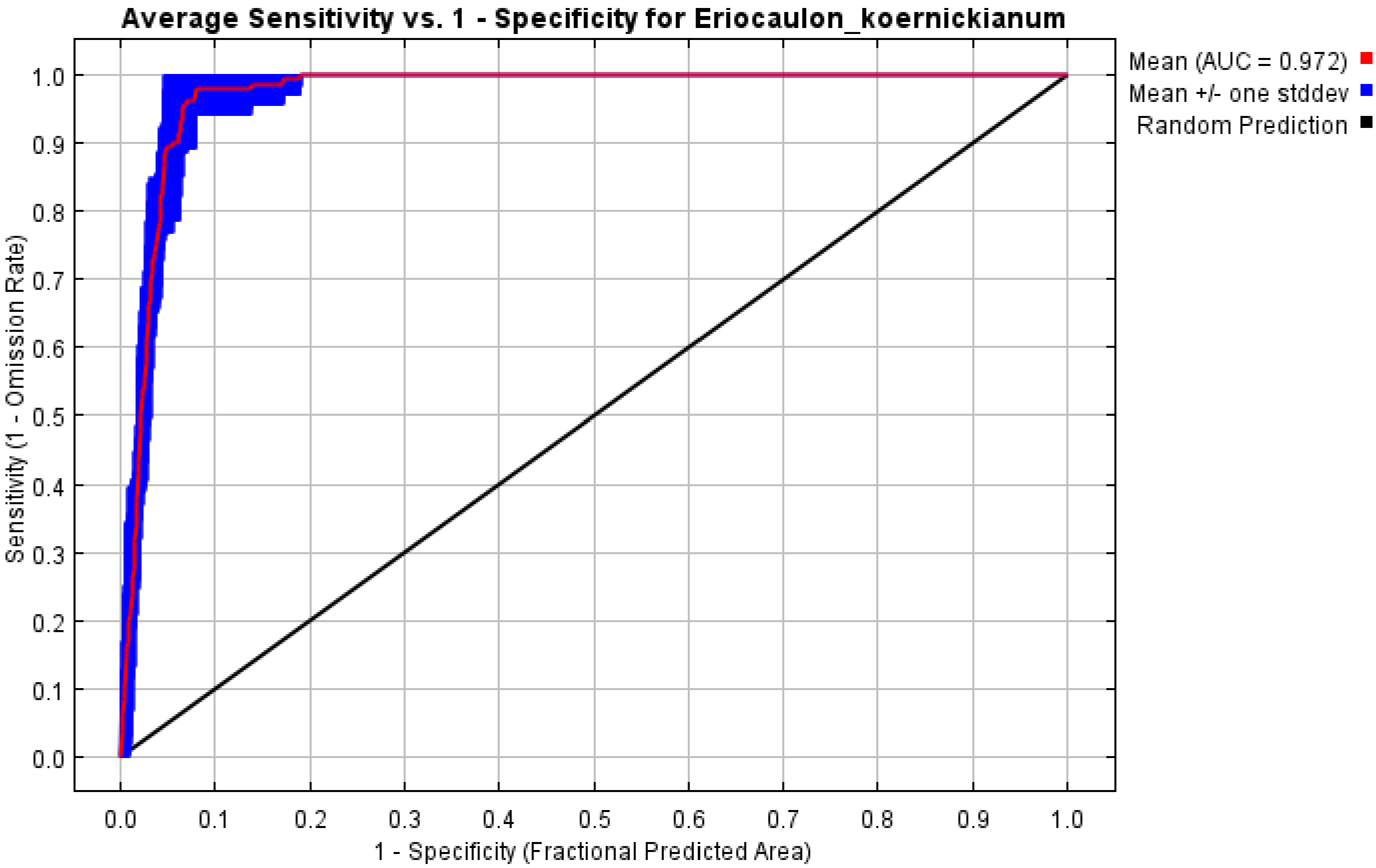
This page summarizes the results of 10 bootstrap models for Eriocaulon_koernickianum, created Sat Oct 30 13:01:18 CDT 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4] [5] [6] [7] [8] [9]

Analysis of omission/commission

The following picture shows the training omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs.

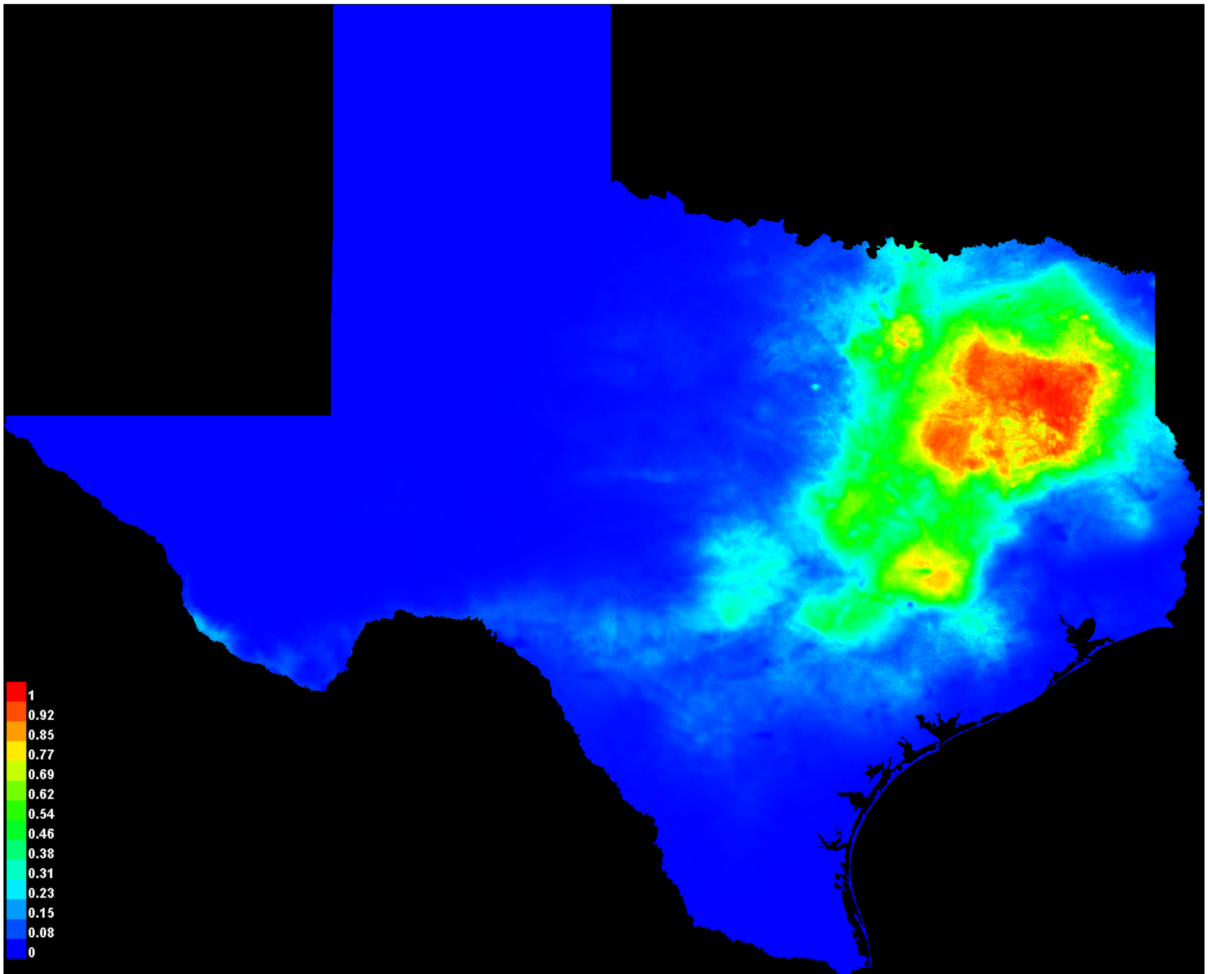


The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average training AUC for the replicate runs is 0.972, and the standard deviation is 0.009.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 10 output grids. Other available summary grids are min, max and median.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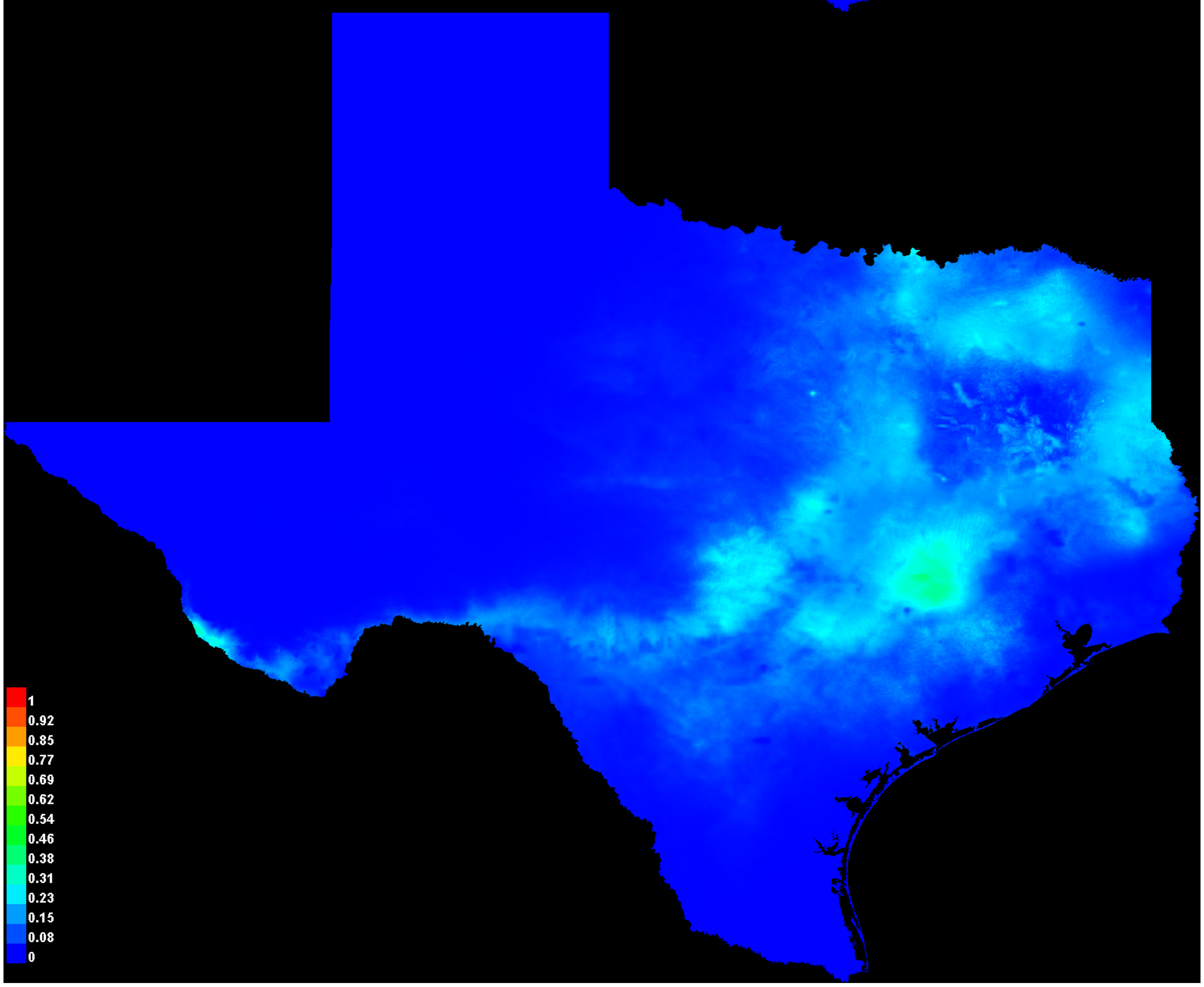
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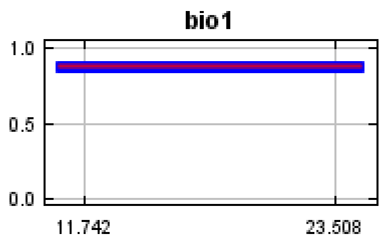
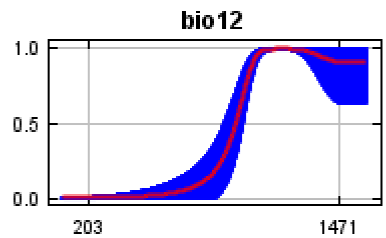
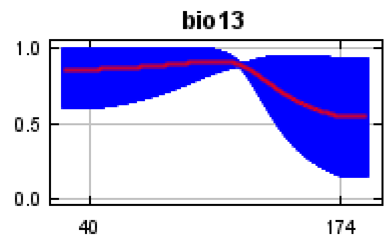
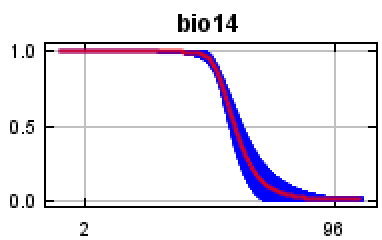
Response curves

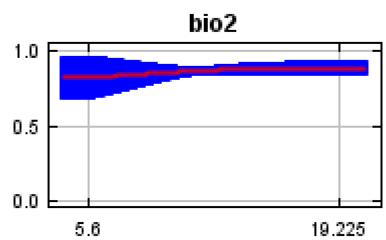
These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 10 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).

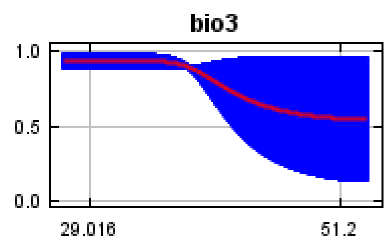


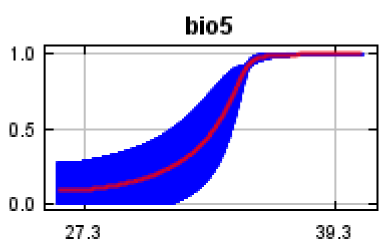


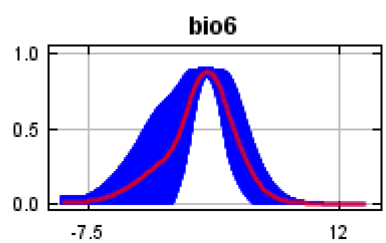


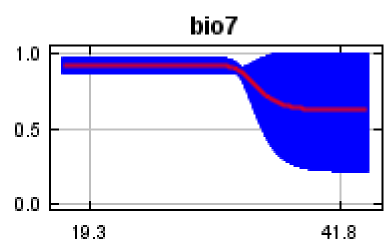




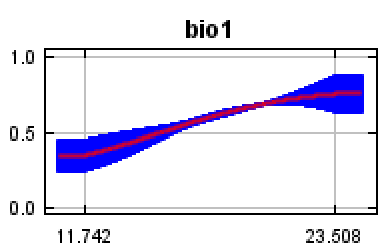


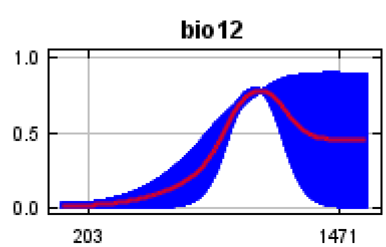


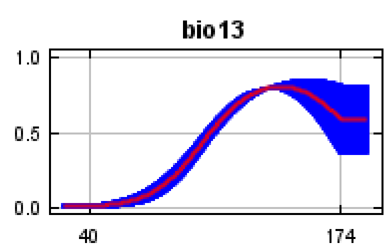


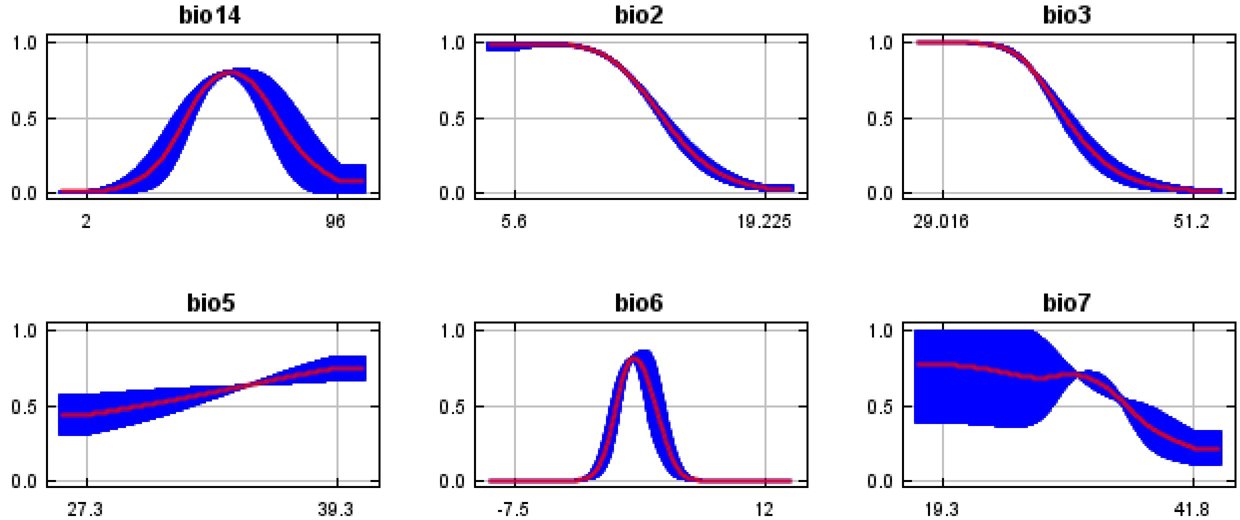


In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.







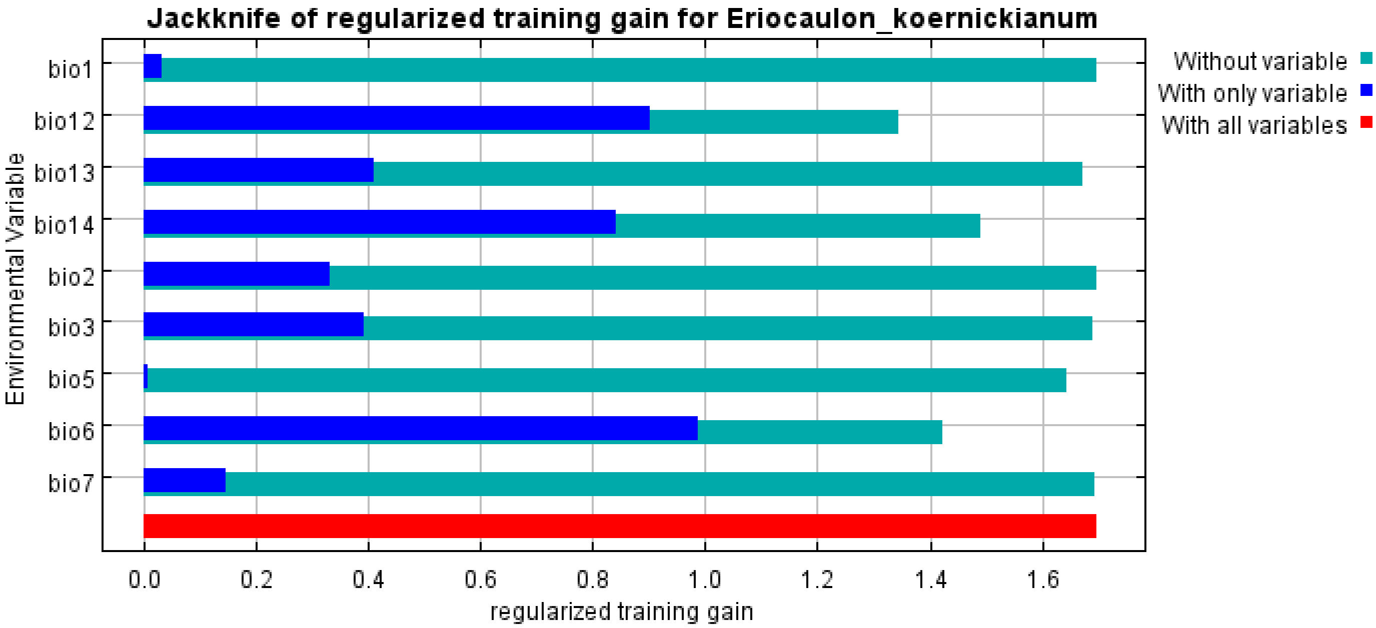


Analysis of variable contributions

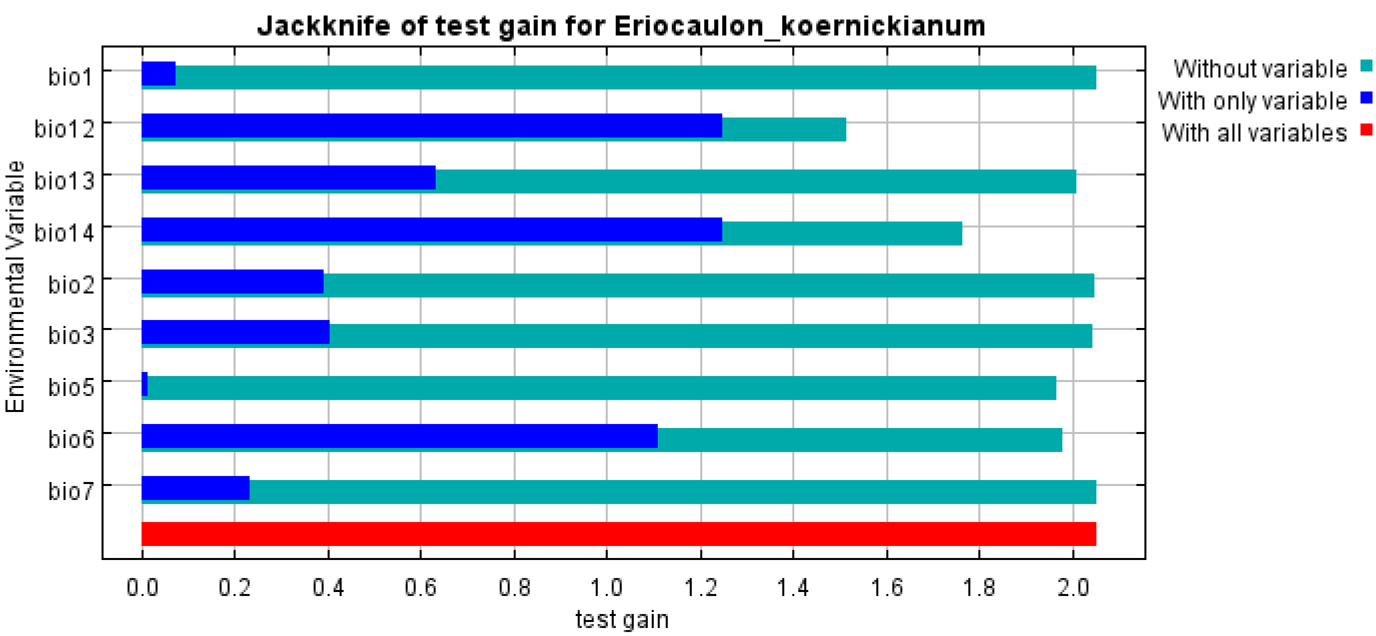
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio12	43.9	45.9
bio6	34.9	30.7
bio14	12.5	11.2
bio5	3.9	5
bio3	3.6	1.6
bio13	0.9	2.9
bio7	0.2	2.6
bio2	0.1	0
bio1	0	0

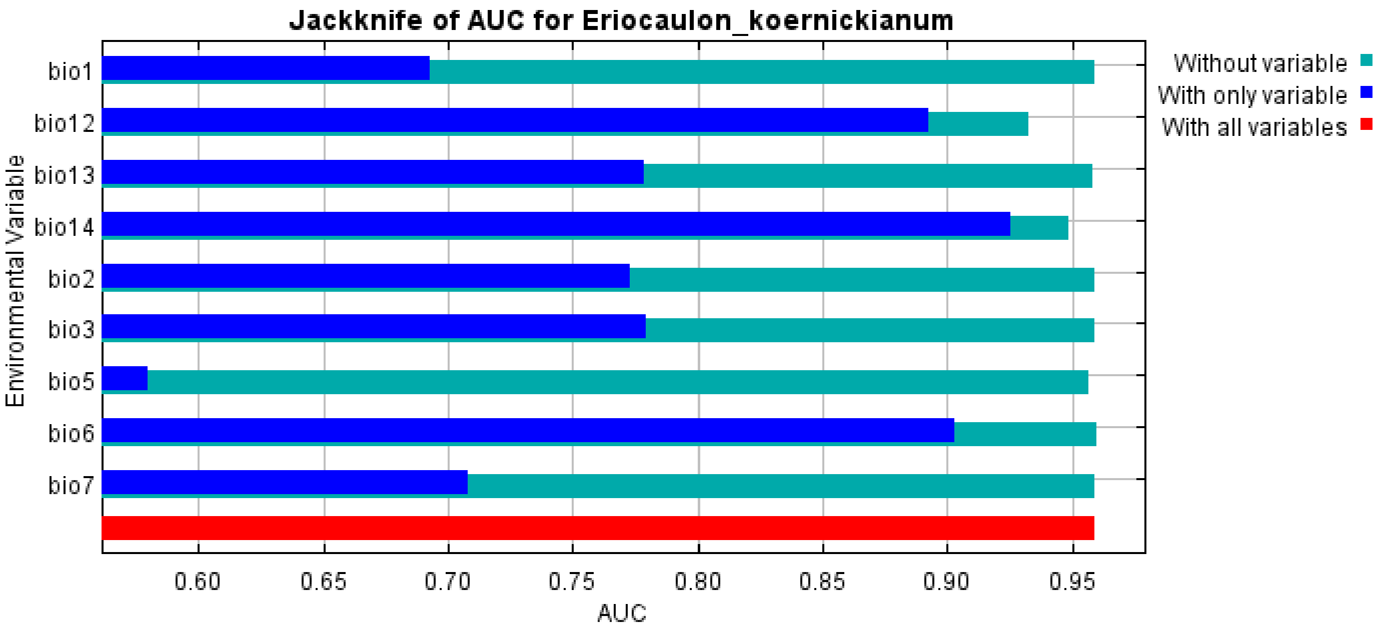
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio6, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio12, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



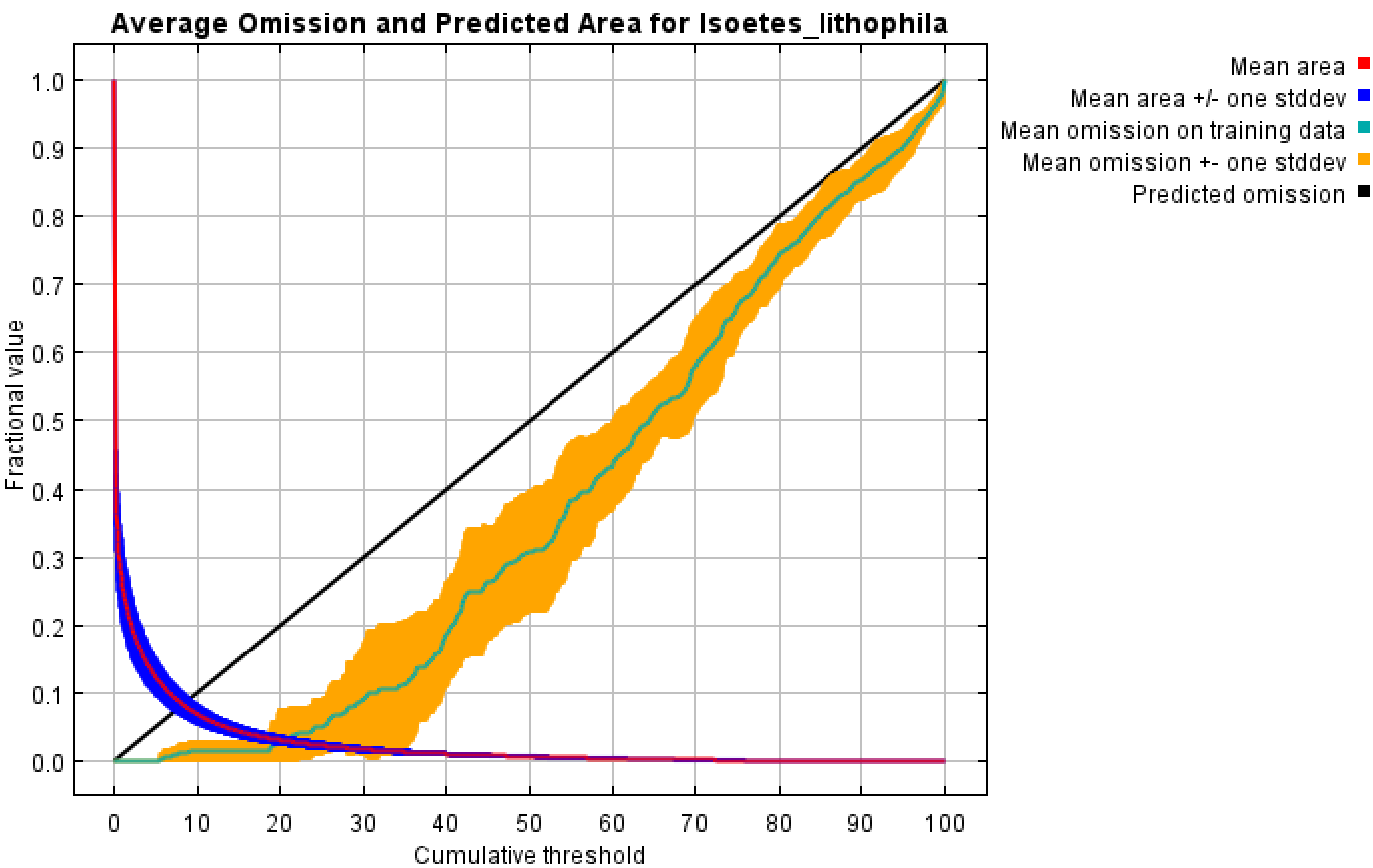
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Eriocaulon_koernickianum responsecurves jackknife outputdirectory=E:\TXDoT_TXScale\Results\Eriocaulon_bio "samplesfile=E:\TXDoT_TXScale\spp_csv\Eriocaulon koernickianum obs.csv" environmentallayers=E:\TXDoT_TXScale\Bio_TX_Ascii randomseed randomtestpoints=25 replicates=10 replicatetype=bootstrap -N perm -N ph -N poro

Replicated maxent model for Isoetes_lithophila

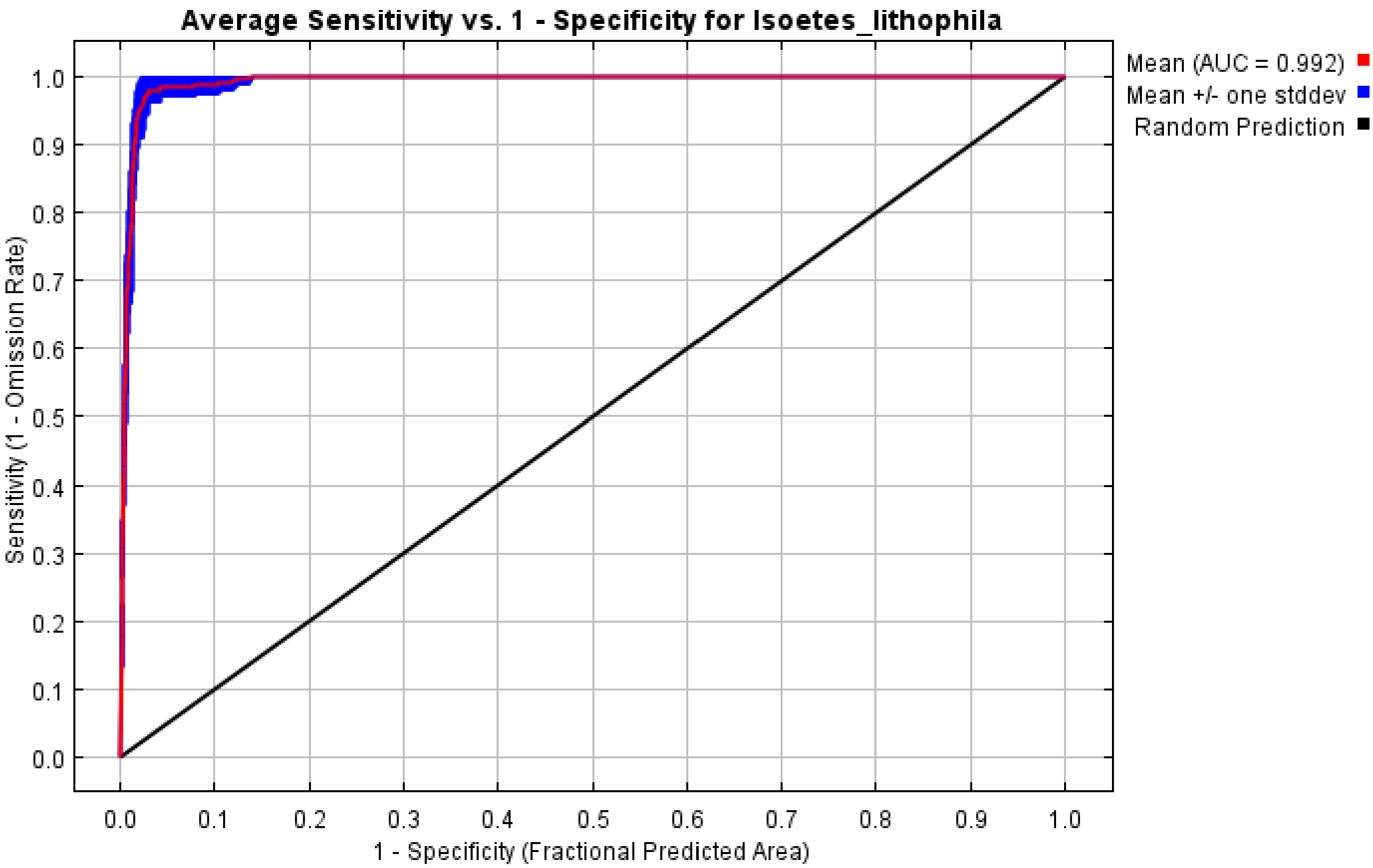
This page summarizes the results of 10 bootstrap models for Isoetes_lithophila, created Sat Oct 30 13:10:20 CDT 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4] [5] [6] [7] [8] [9]

Analysis of omission/commission

The following picture shows the training omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs.

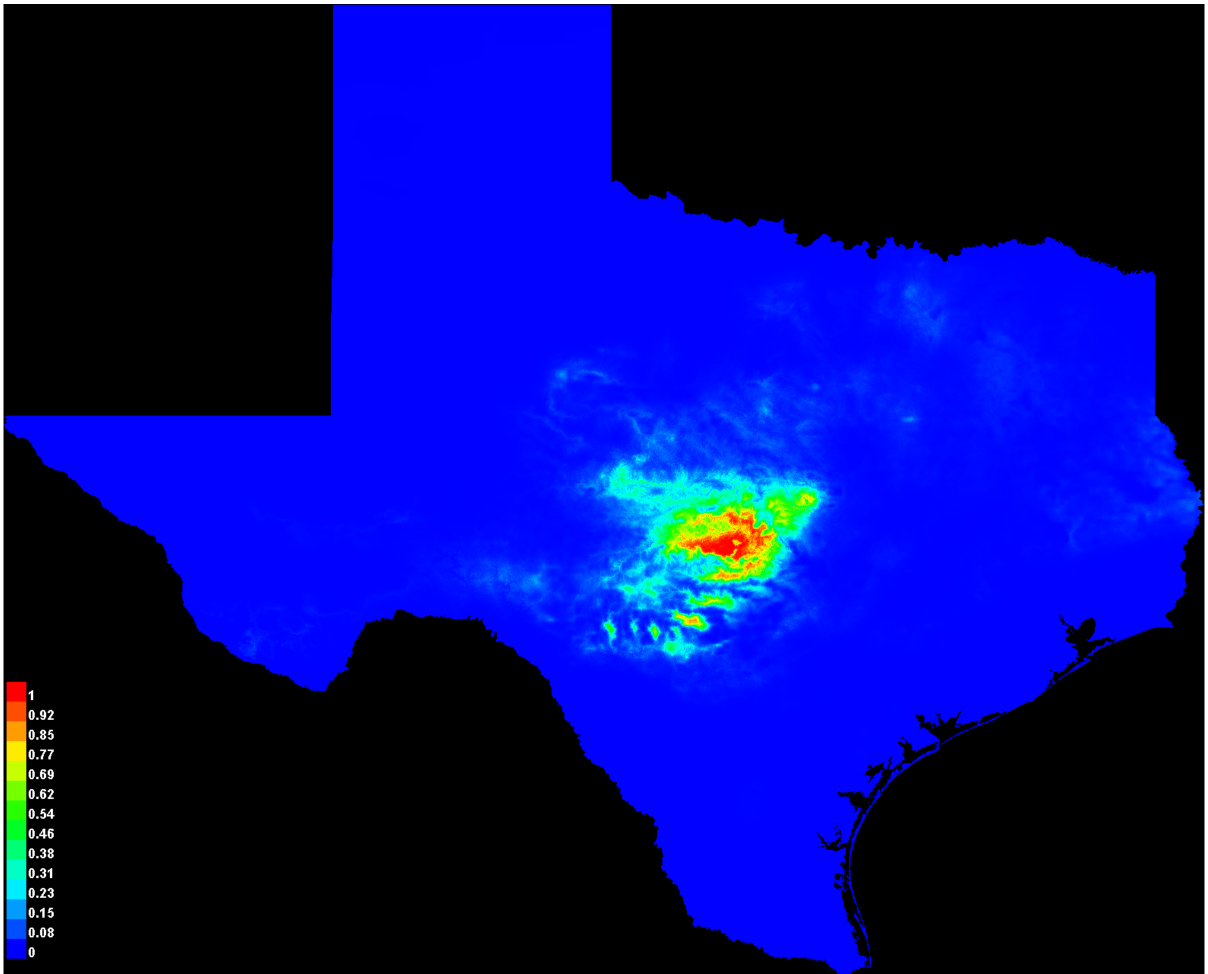


The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average training AUC for the replicate runs is 0.992, and the standard deviation is 0.002.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 10 output grids. Other available summary grids are [min](), [max]() and [median]().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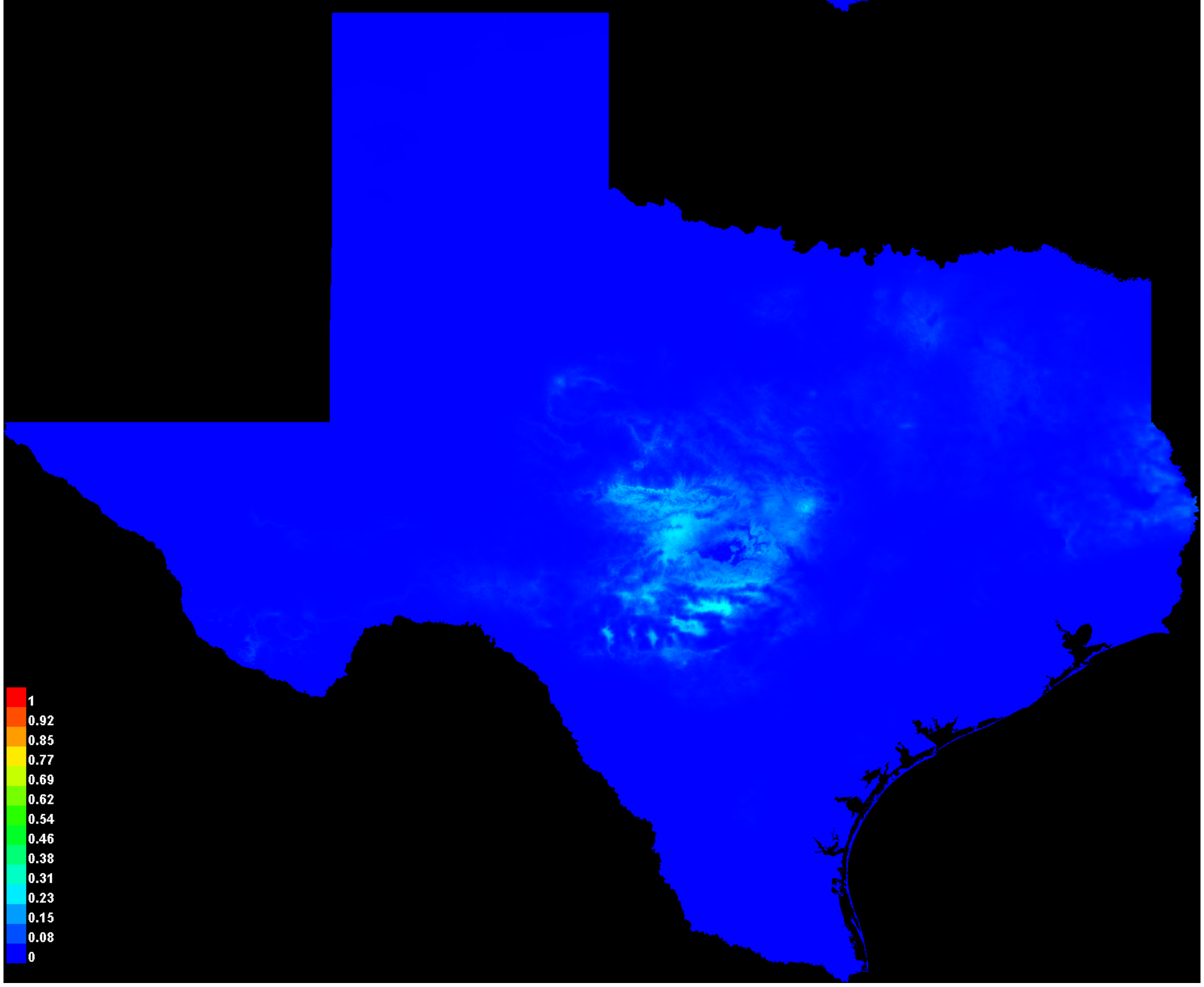
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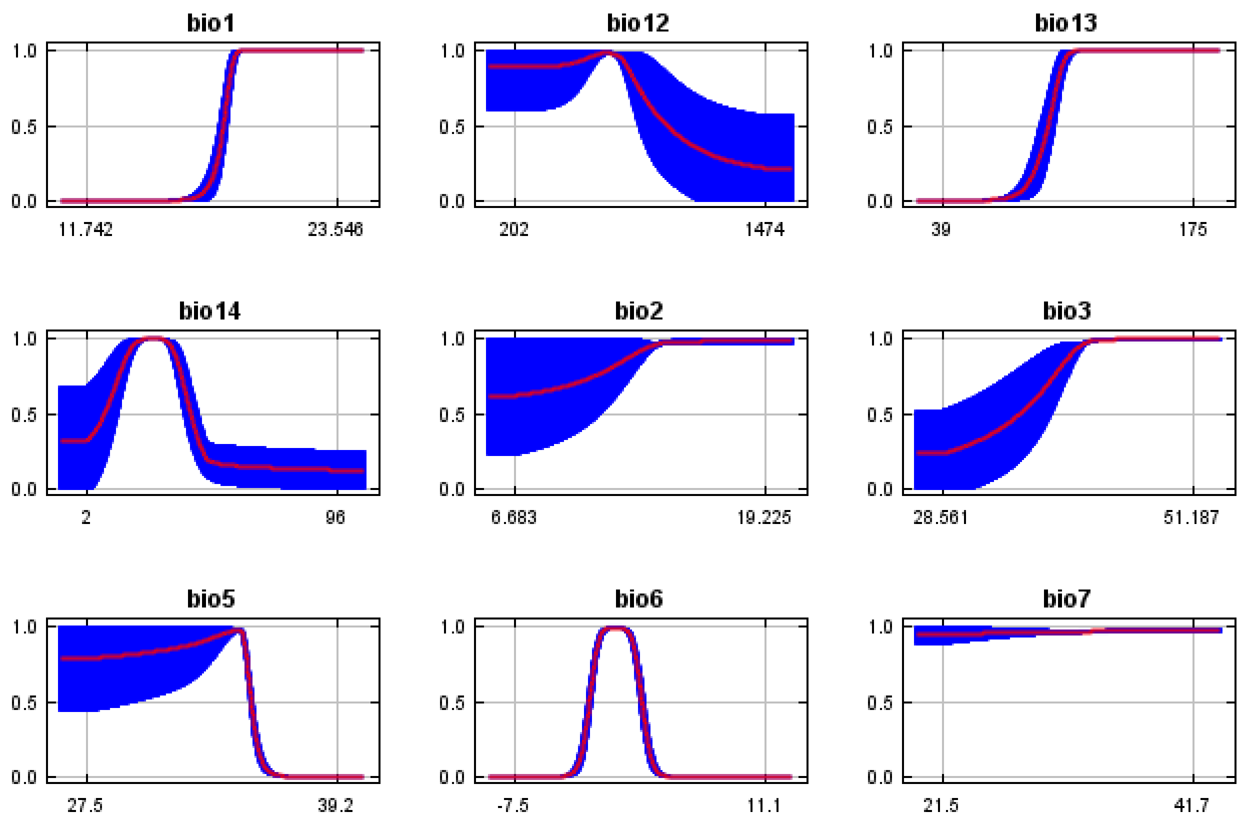
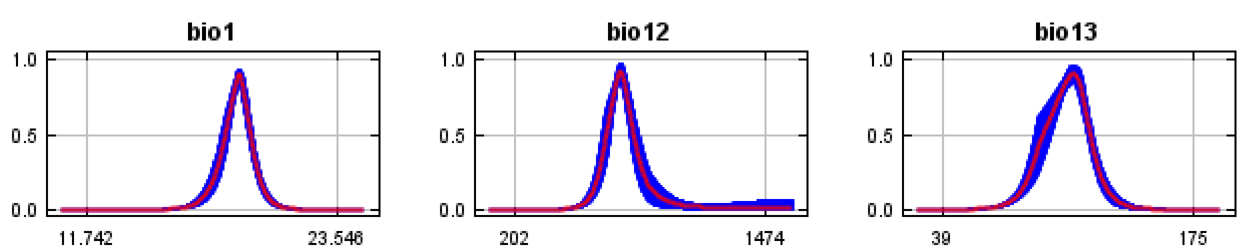
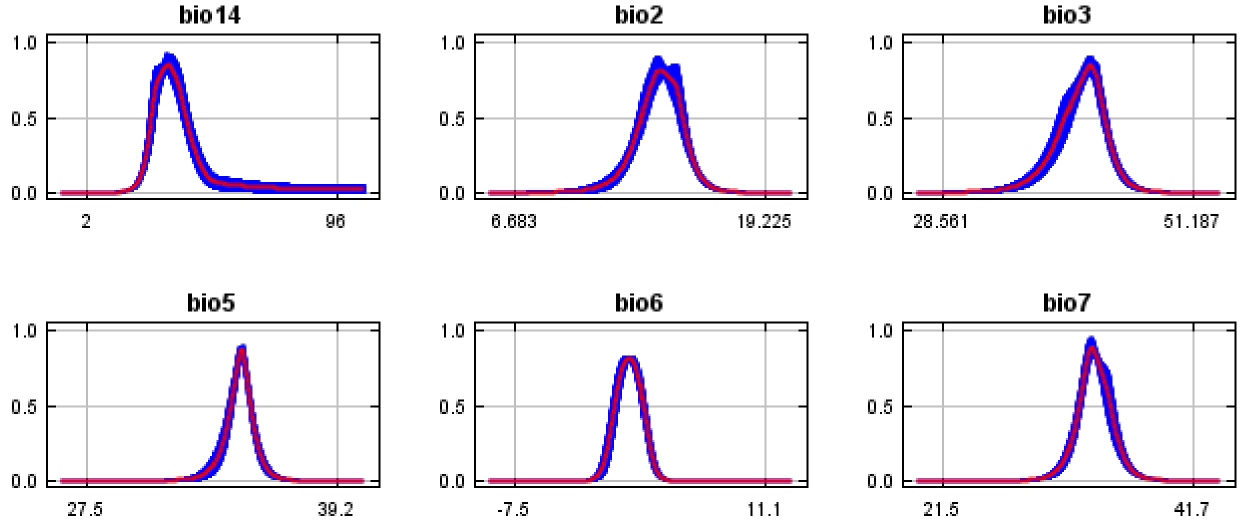
Response curves

These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 10 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).



In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.



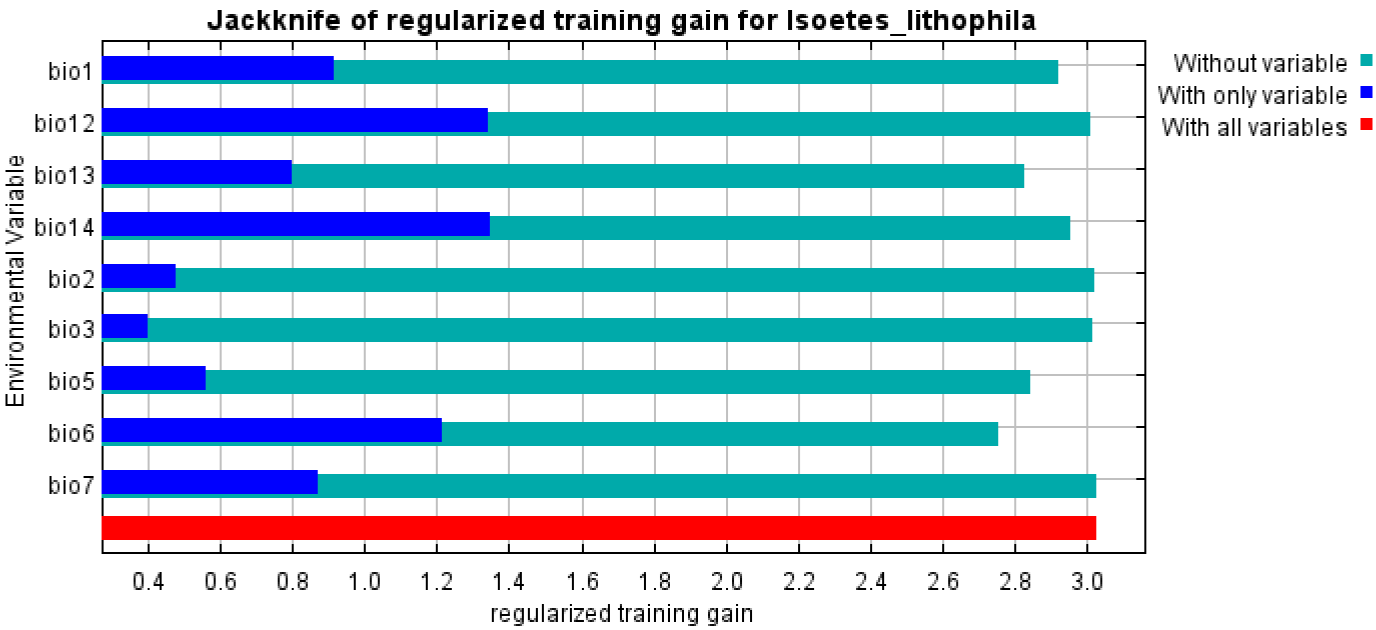


Analysis of variable contributions

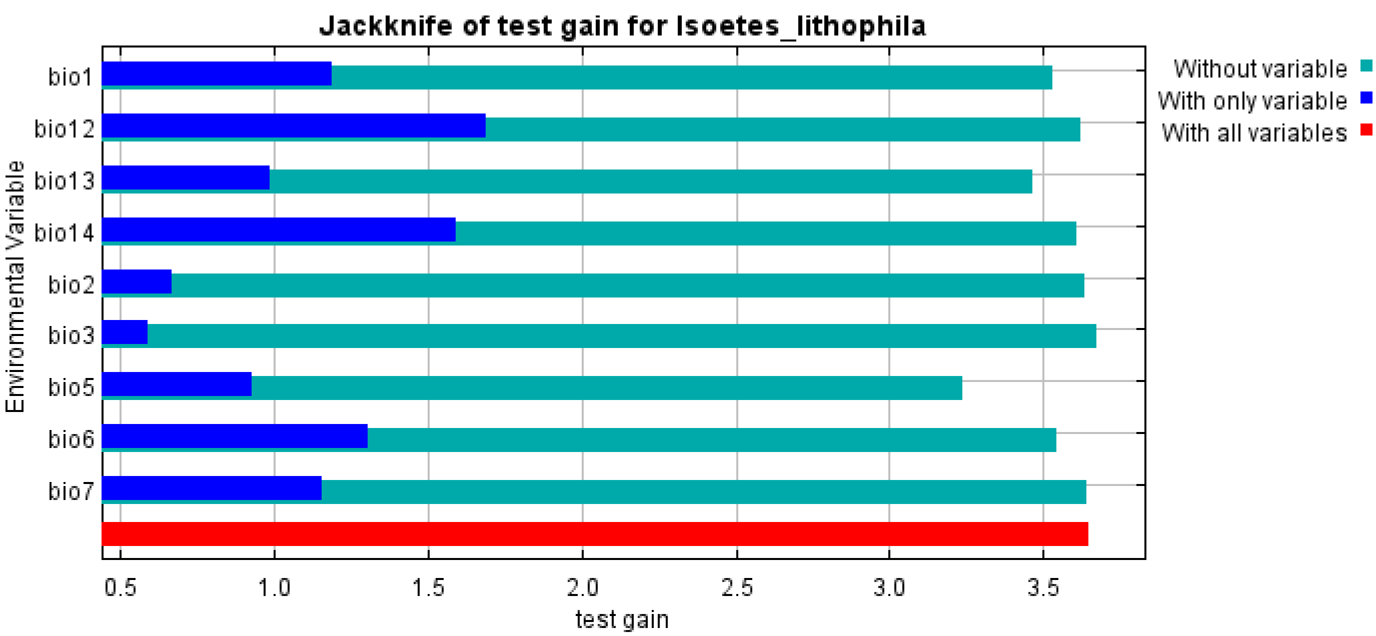
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio14	30.4	11.3
bio12	21.2	4.7
bio1	12.3	22.1
bio7	9.2	0
bio13	8.7	18.5
bio3	7.2	1.8
bio6	6.3	35.2
bio5	4.6	5.7
bio2	0.1	0.8

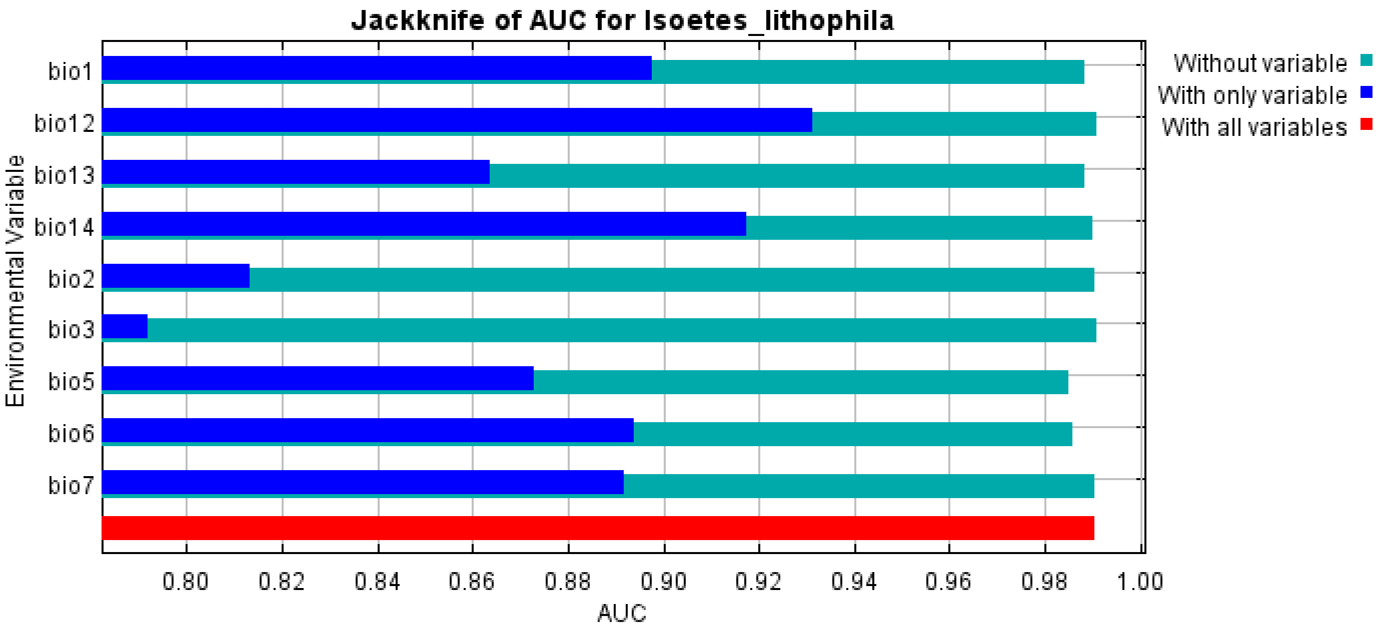
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio14, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio6, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



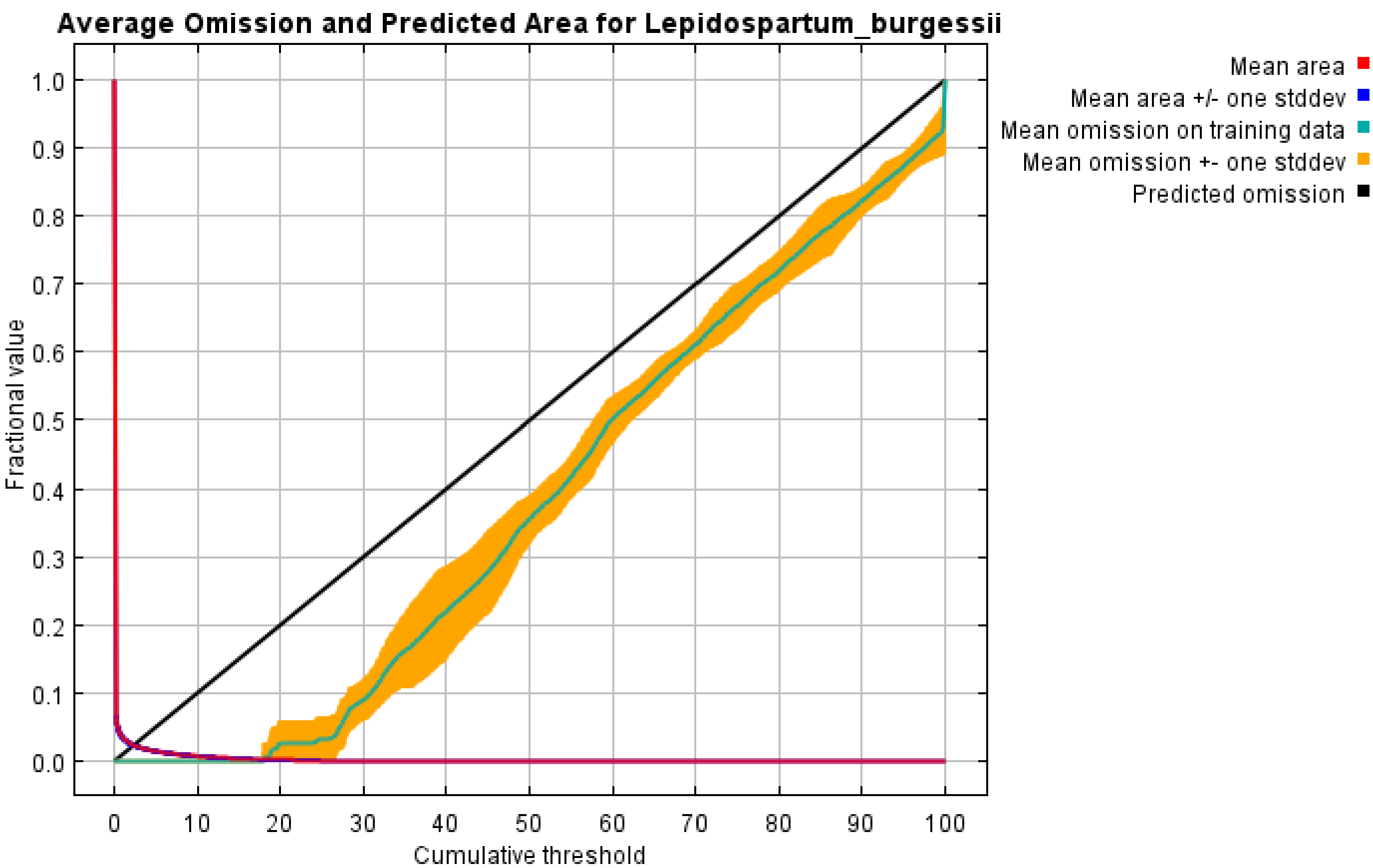
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Isoetes_lithophila responsecurves jackknife outputdirectory=E:\TXDoT_TXScale\Results\Isoetes_bio "samplesfile=E:\TXDoT_TXScale\spp_csv\Isoetes lithophila obs.csv" environmentallayers=E:\TXDoT_TXScale\Bio_TX_Ascii randomseed randomtestpoints=25 replicates=10 replicatetype=bootstrap -N perm -N ph -N poro

Replicated maxent model for Lepidospartum_burgessii

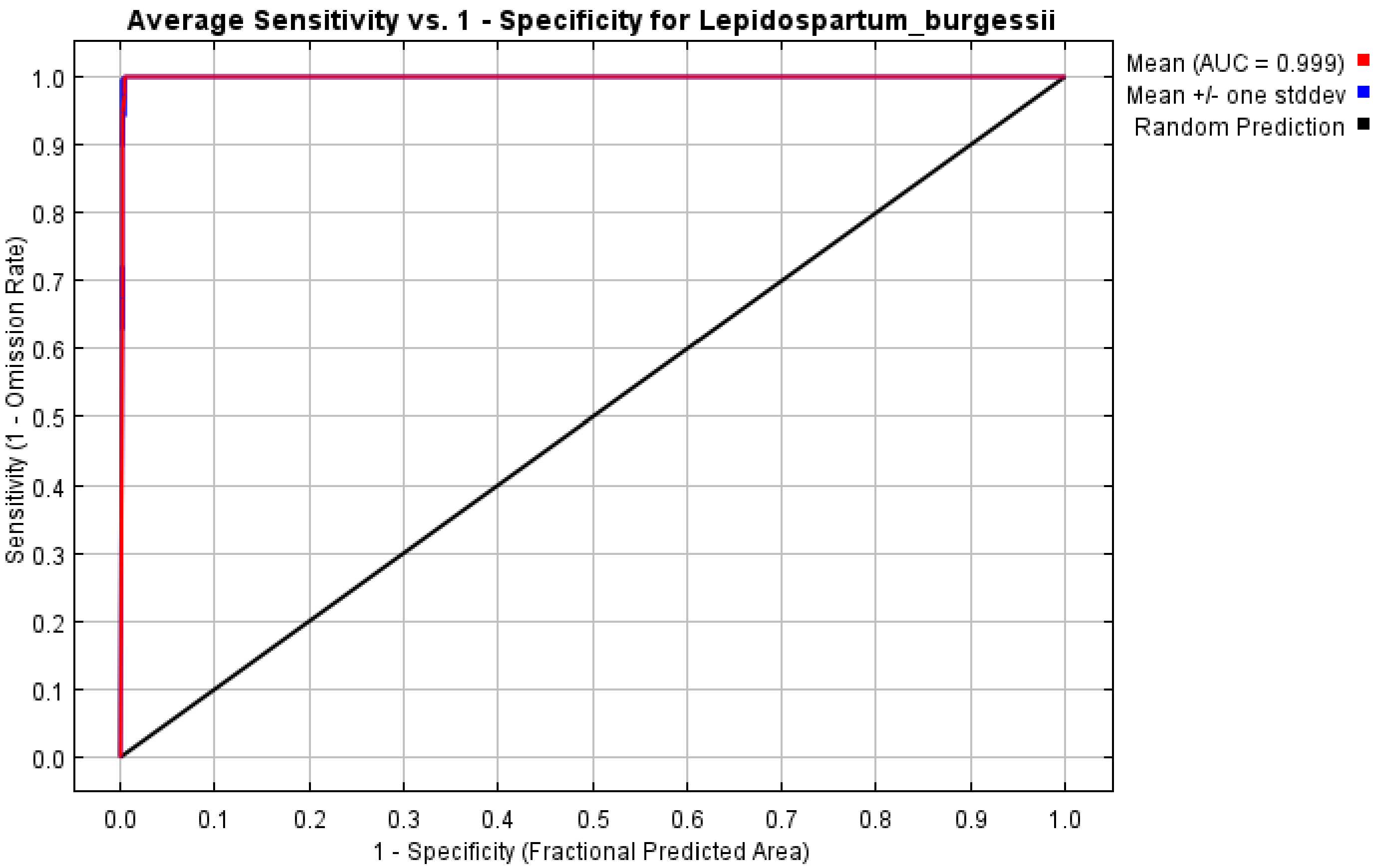
This page summarizes the results of 10 bootstrap models for Lepidospartum_burgessii, created Tue Dec 07 15:01:31 CST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4] [5] [6] [7] [8] [9]

Analysis of omission/commission

The following picture shows the training omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs.

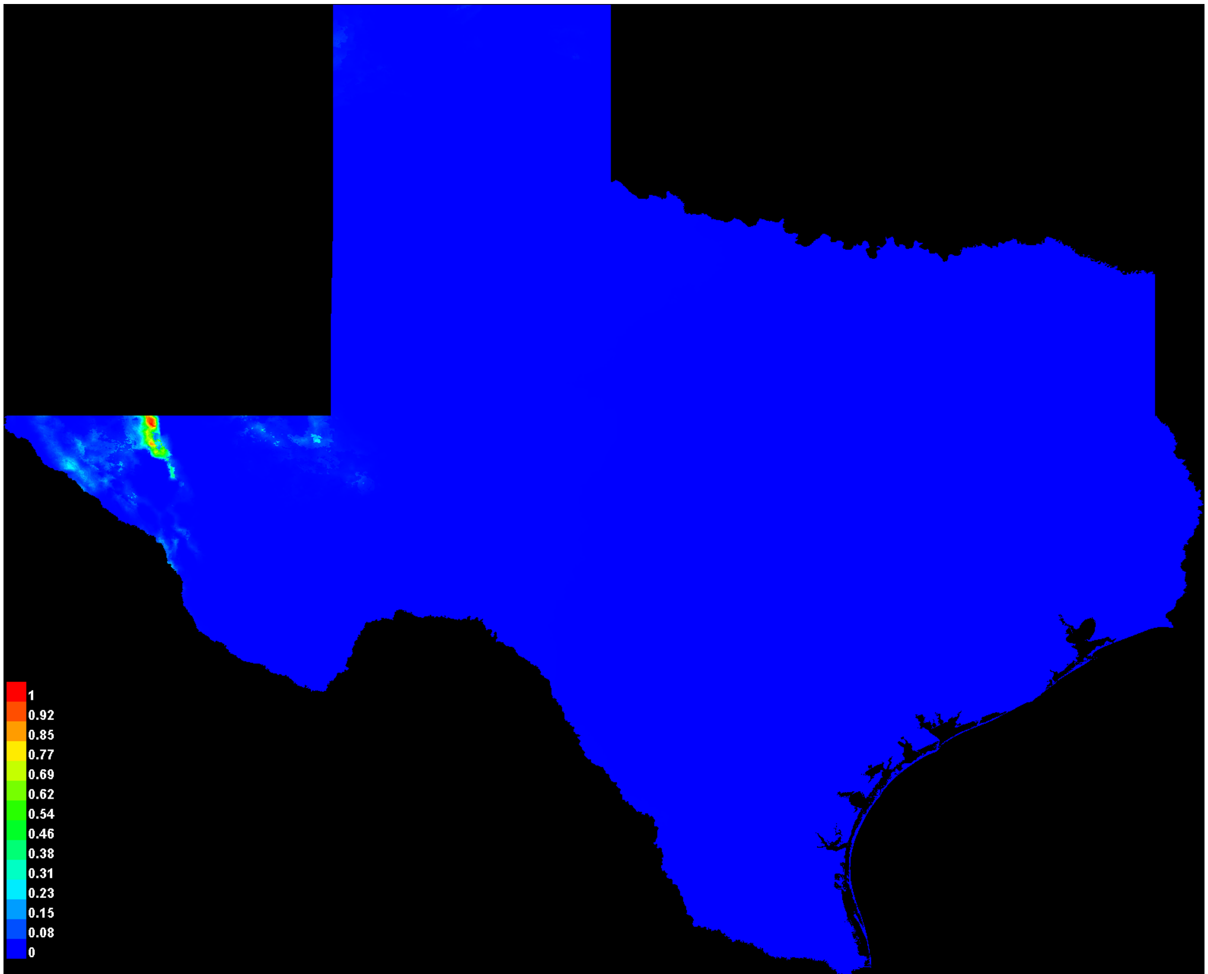


The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average training AUC for the replicate runs is 0.999, and the standard deviation is 0.000.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 10 output grids. Other available summary grids are [min](), [max]() and [median]().


1
0.92
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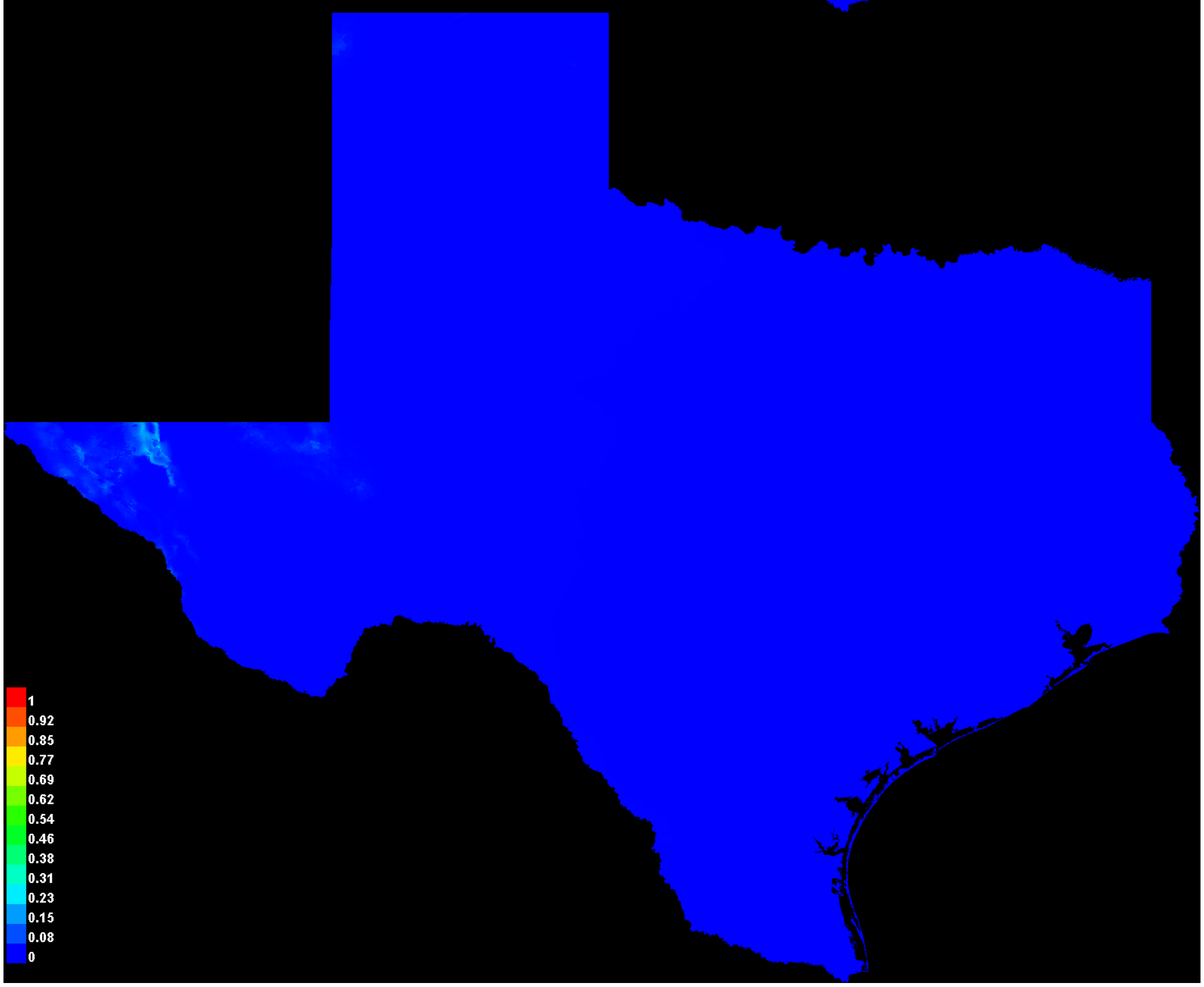
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0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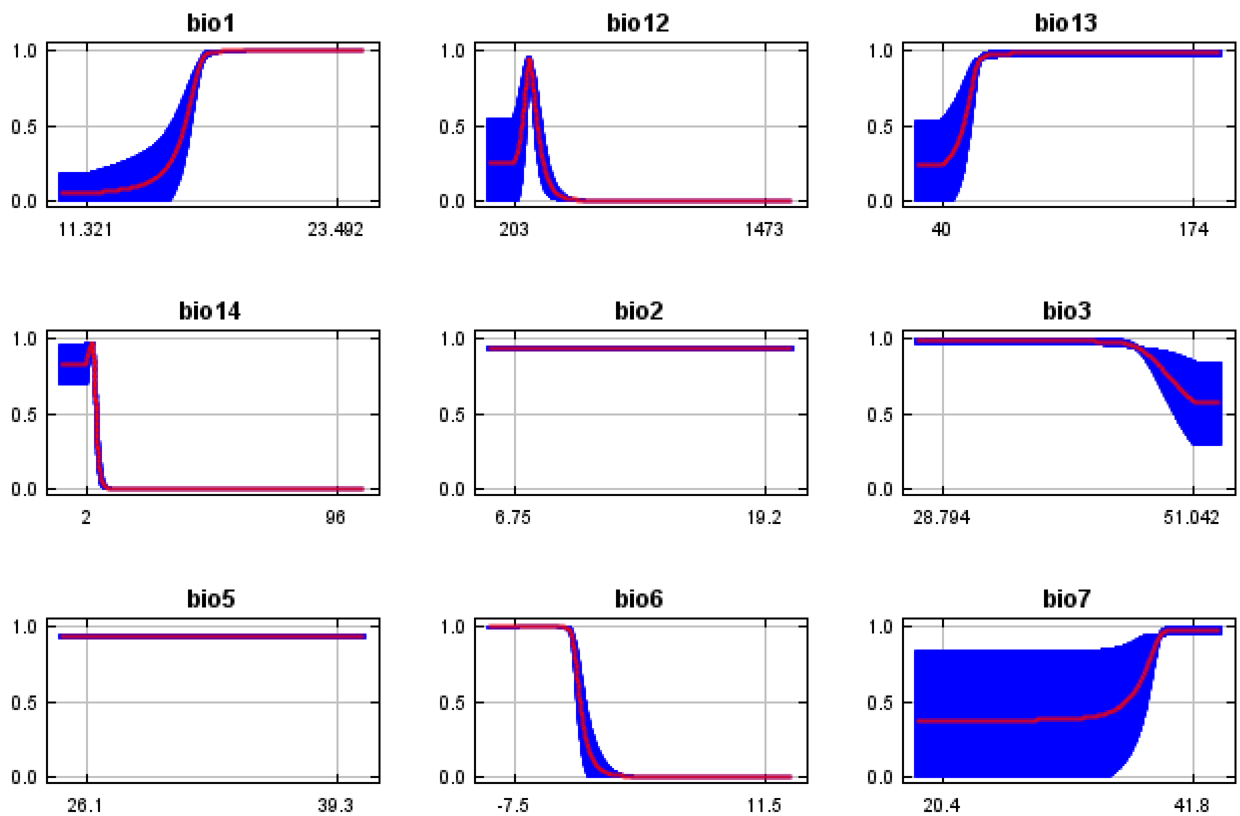
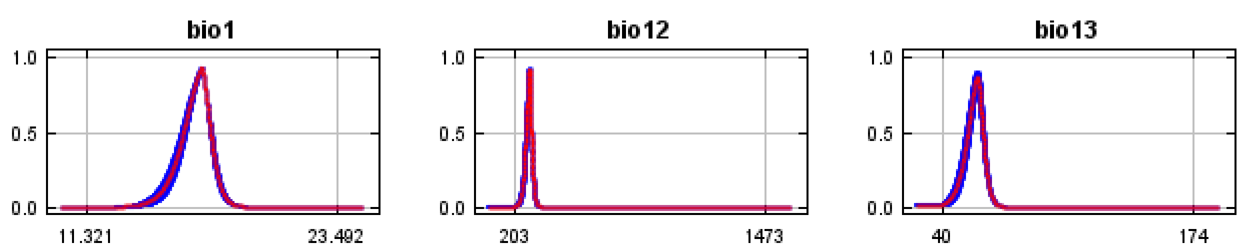
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

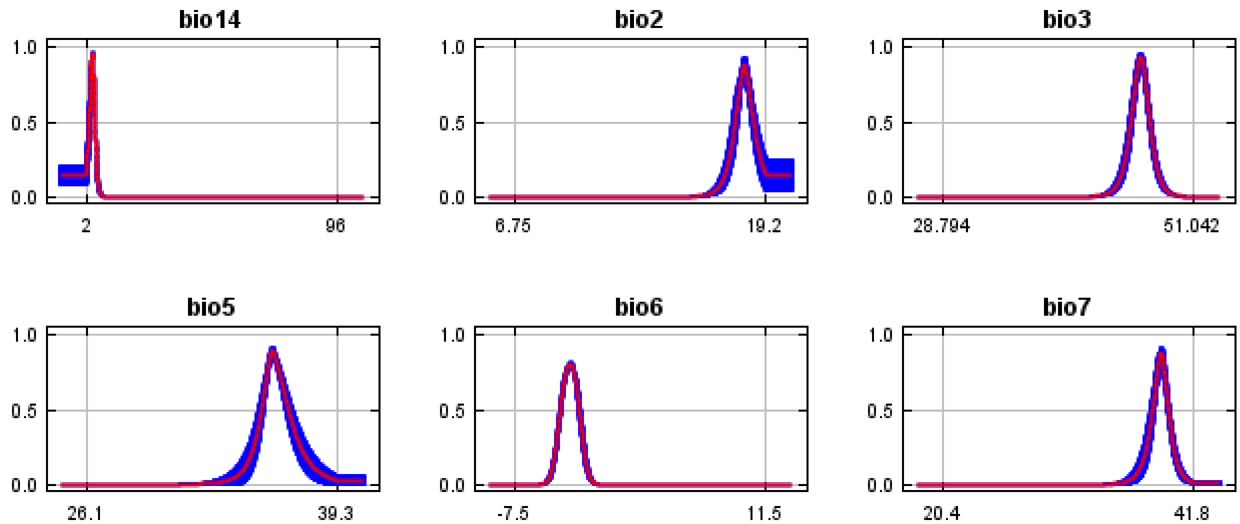
Response curves

These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 10 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).



In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.



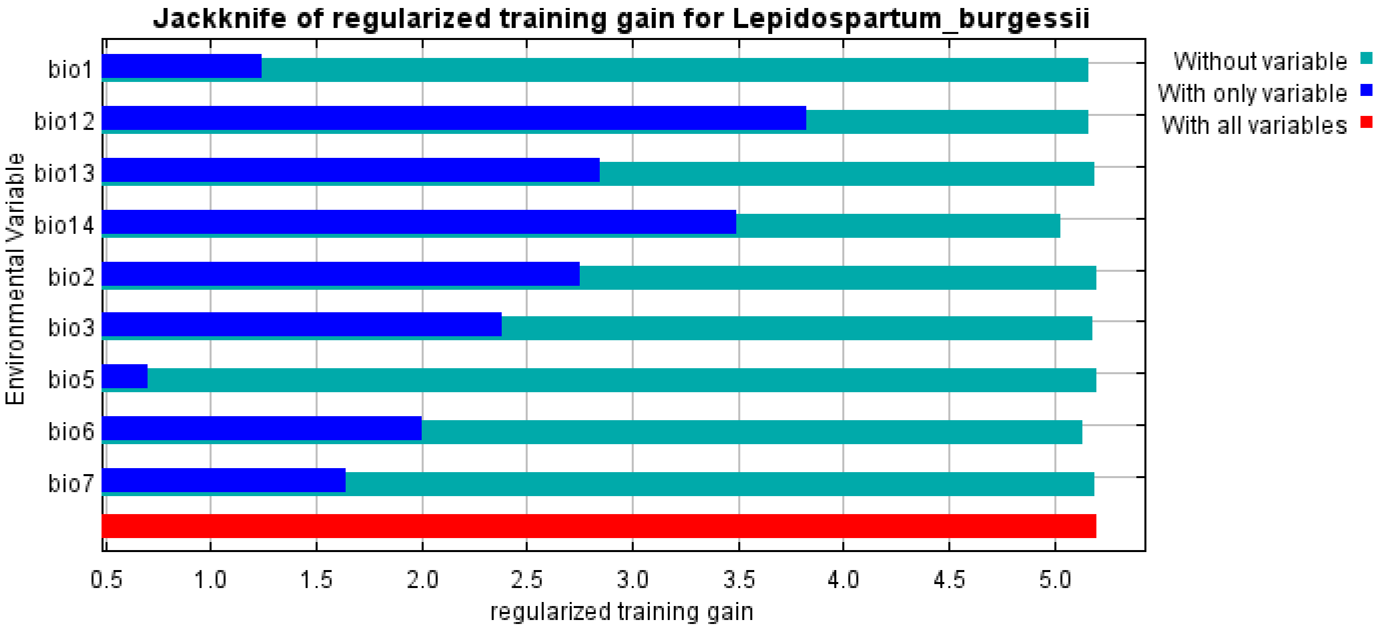


Analysis of variable contributions

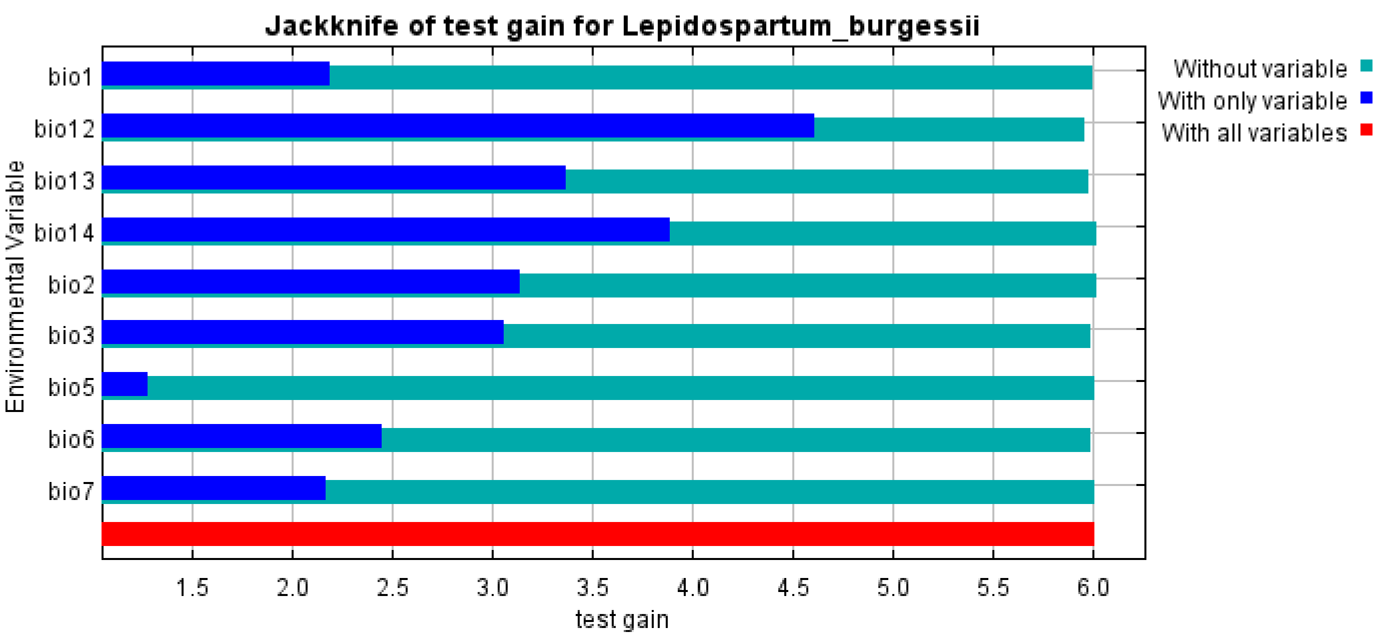
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio14	60.7	67.6
bio2	11.3	0
bio13	7	0.9
bio12	6.8	12.6
bio7	6.3	1
bio3	6.1	0
bio1	0.8	3.3
bio6	0.8	14.6
bio5	0.2	0

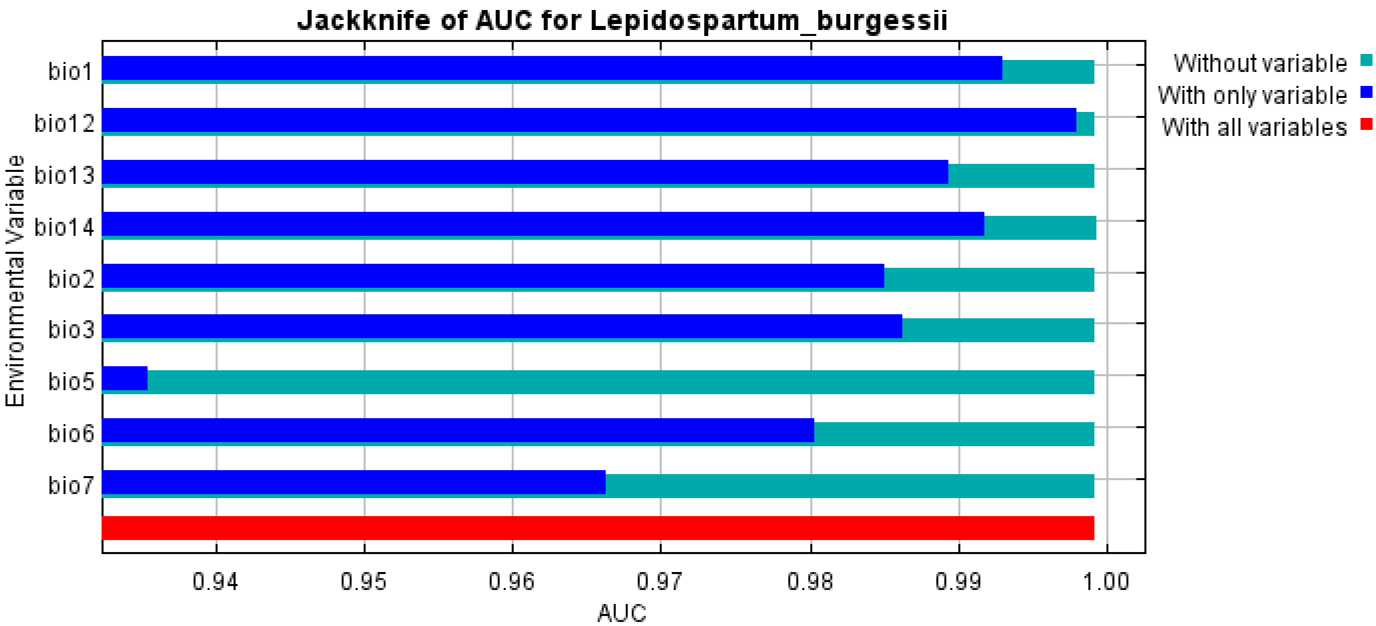
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio12, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio14, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



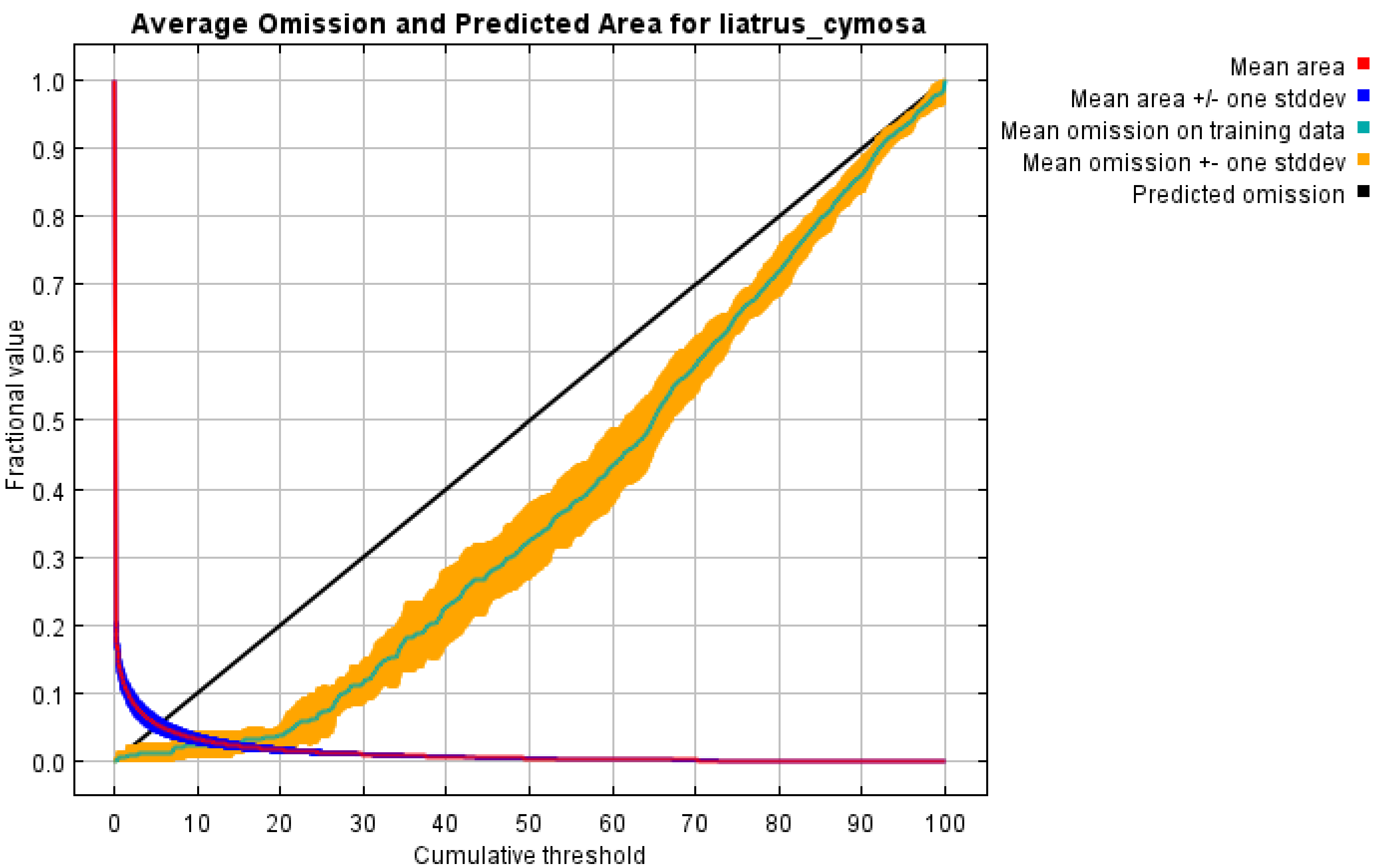
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Lepidospartum_burgessii responsecurves jackknife outputdirectory=E:\TXDoT_TXScale\Results\Lepidospartum_bio "samplesfile=E:\TXDoT_Range Scale_Bioclim\spp_csv\Lepidospartum_burgessii.csv" environmentallayers=E:\TXDoT_TXScale\Bio_TX_Ascii randomseed randomtestpoints=25 replicates=10 replicatetype=bootstrap writebackgroundpredictions -N perm -N ph -N poro

Replicated maxent model for liatrus_cymosa

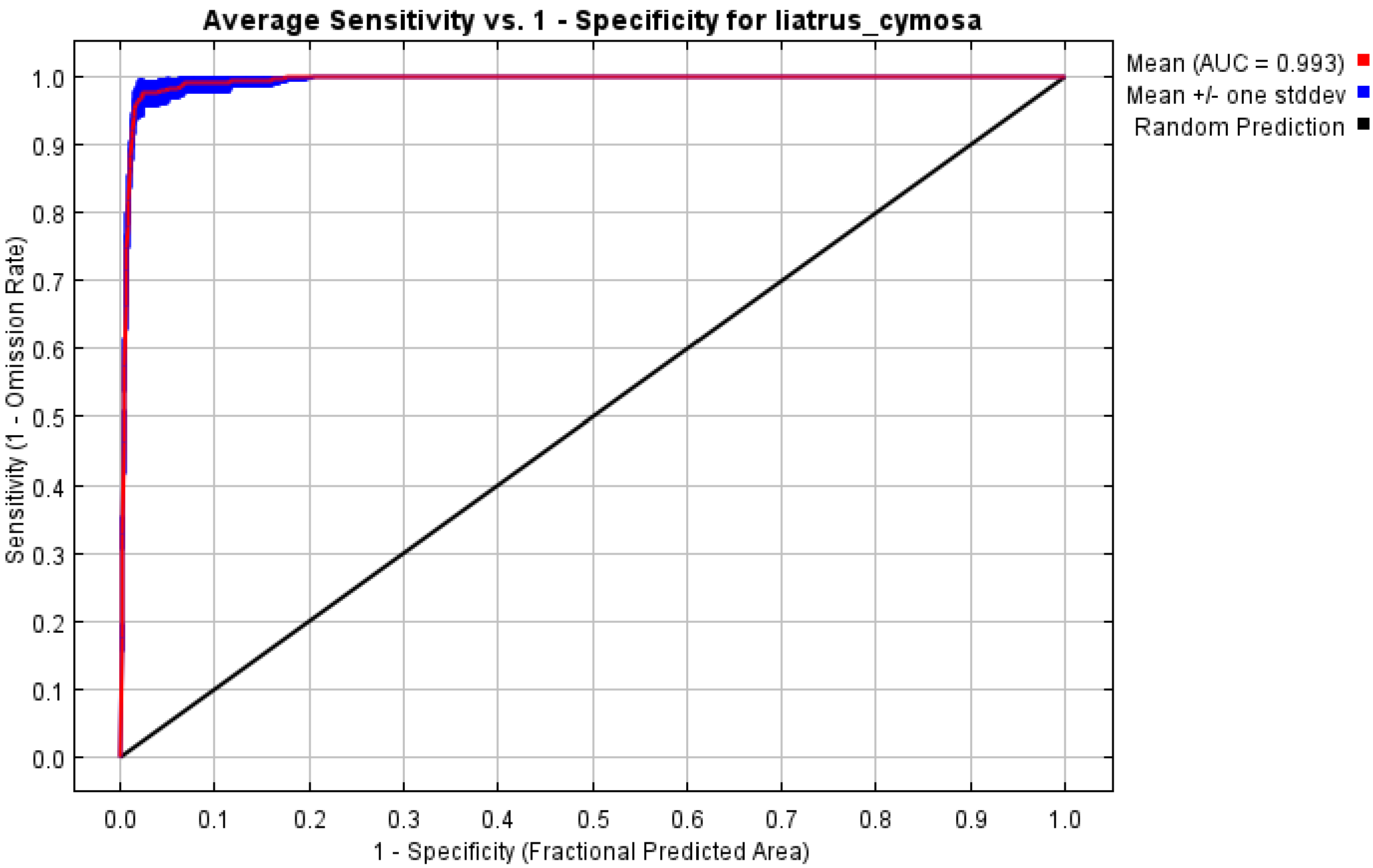
This page summarizes the results of 10 bootstrap models for liatrus_cymosa, created Sat Oct 30 13:30:08 CDT 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4] [5] [6] [7] [8] [9]

Analysis of omission/commission

The following picture shows the training omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs.

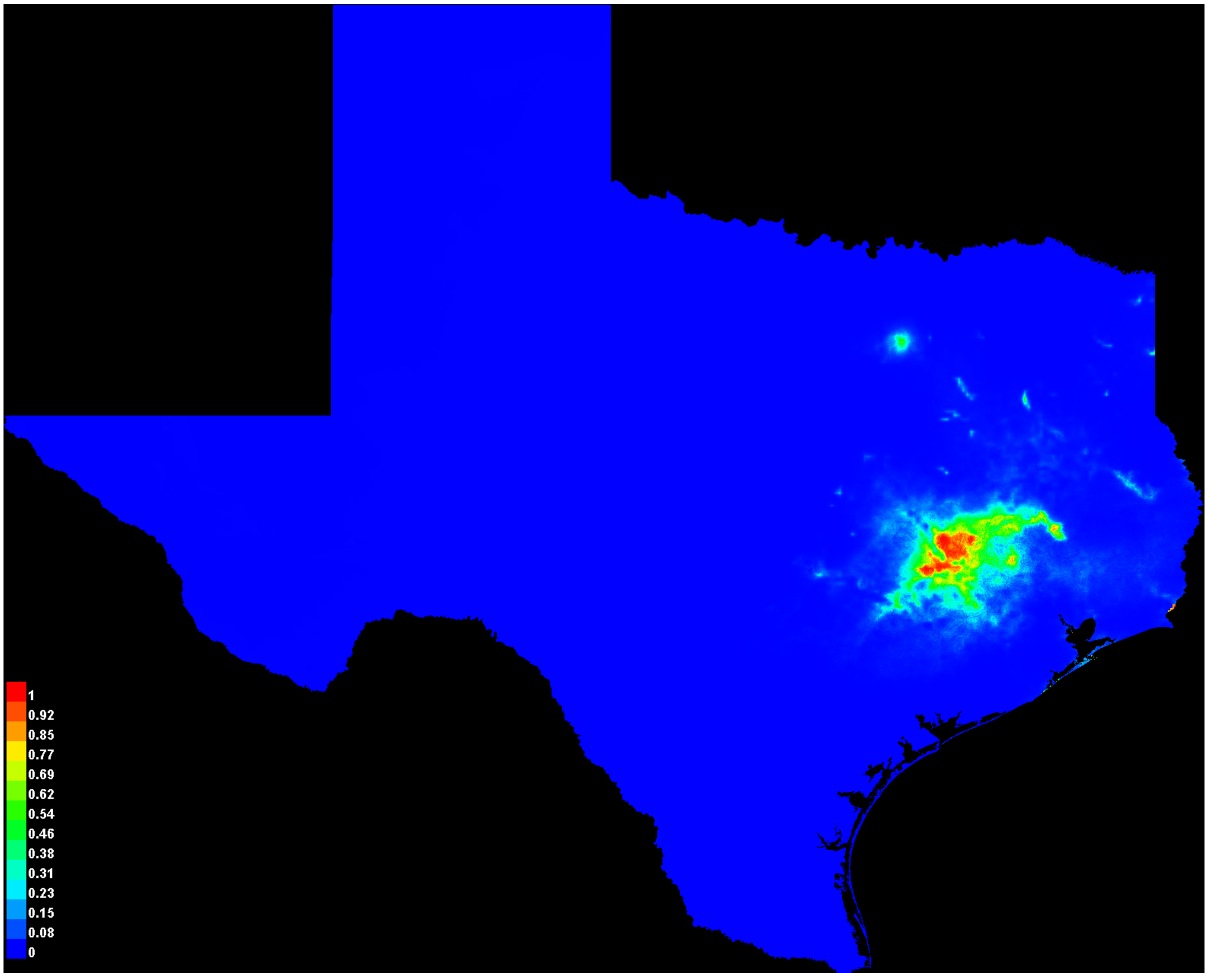


The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average training AUC for the replicate runs is 0.993, and the standard deviation is 0.002.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 10 output grids. Other available summary grids are min, max and median.


1
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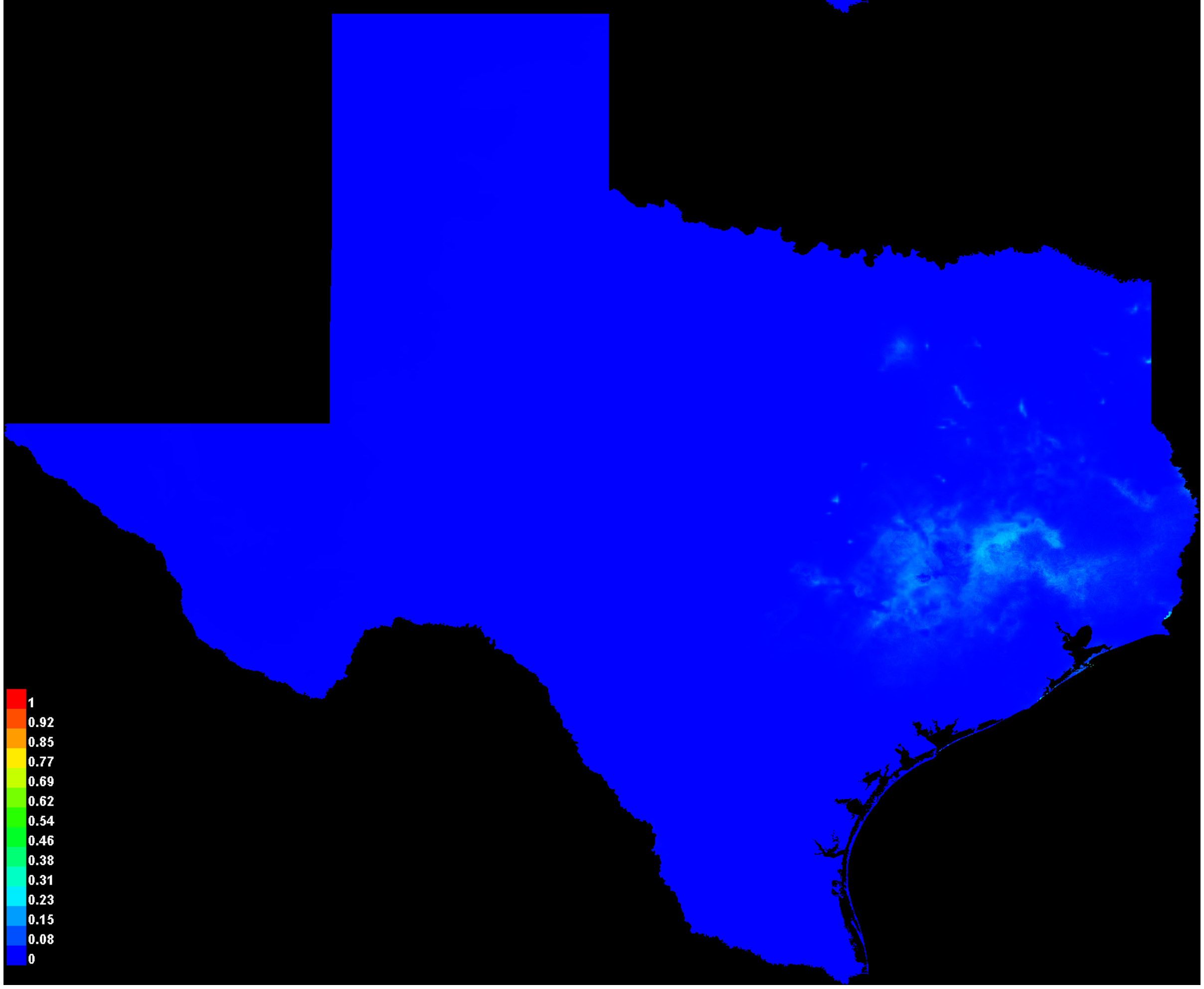
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0.85
0.77
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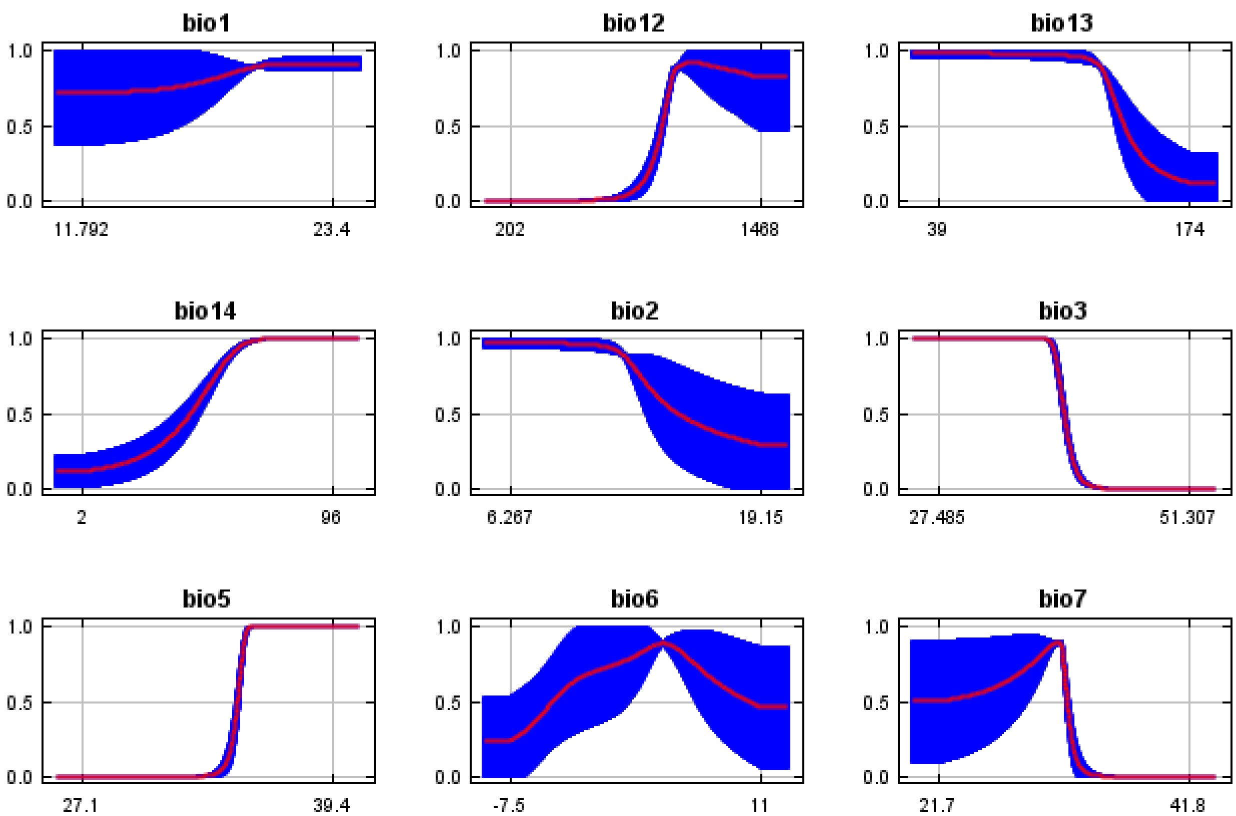
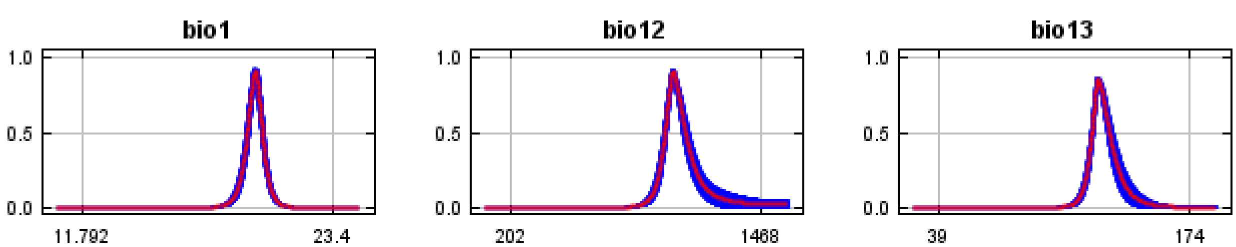
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

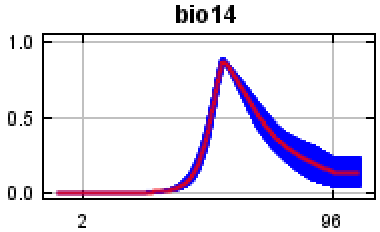
Response curves

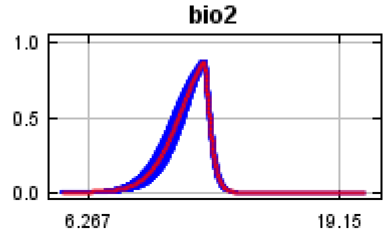
These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 10 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).

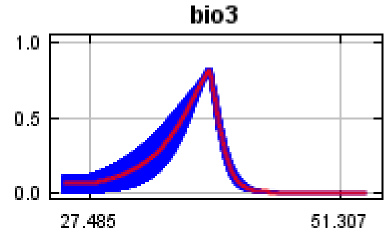


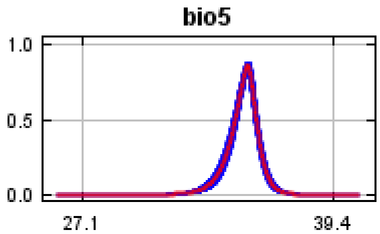
In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.

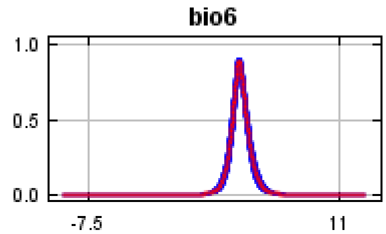


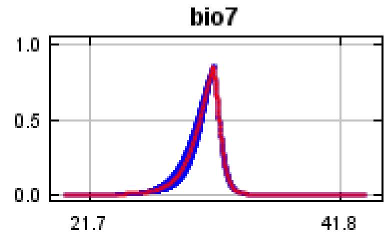










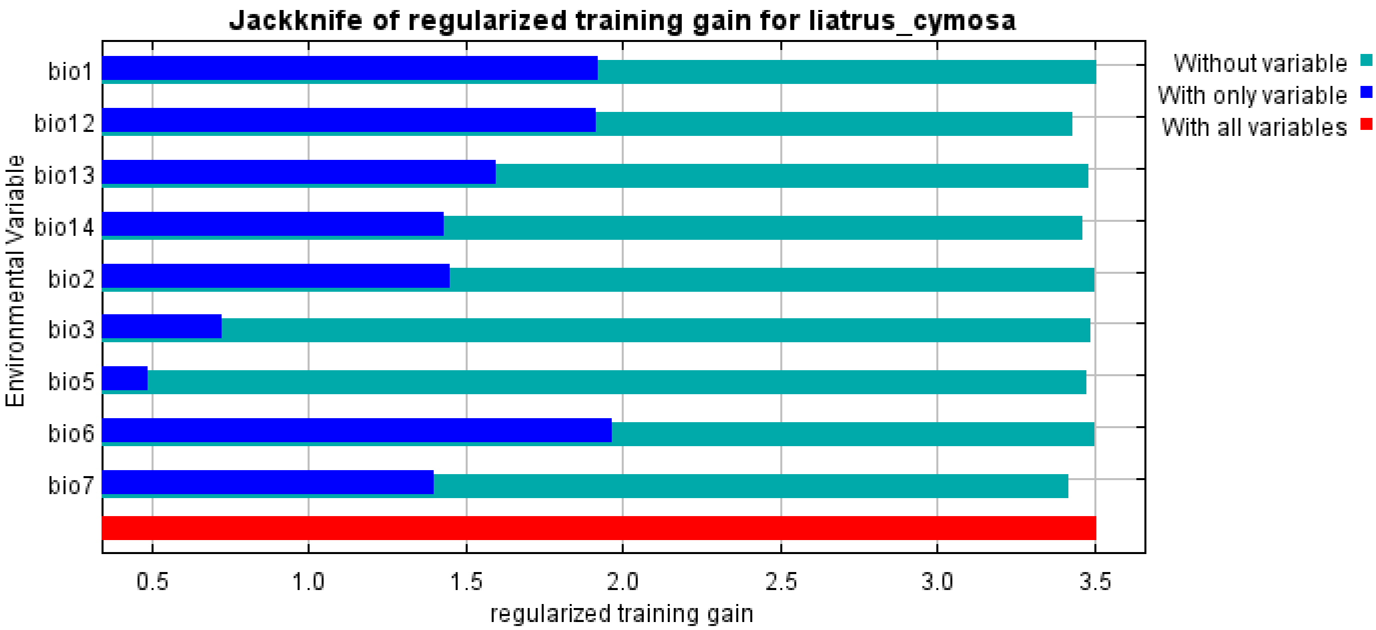


Analysis of variable contributions

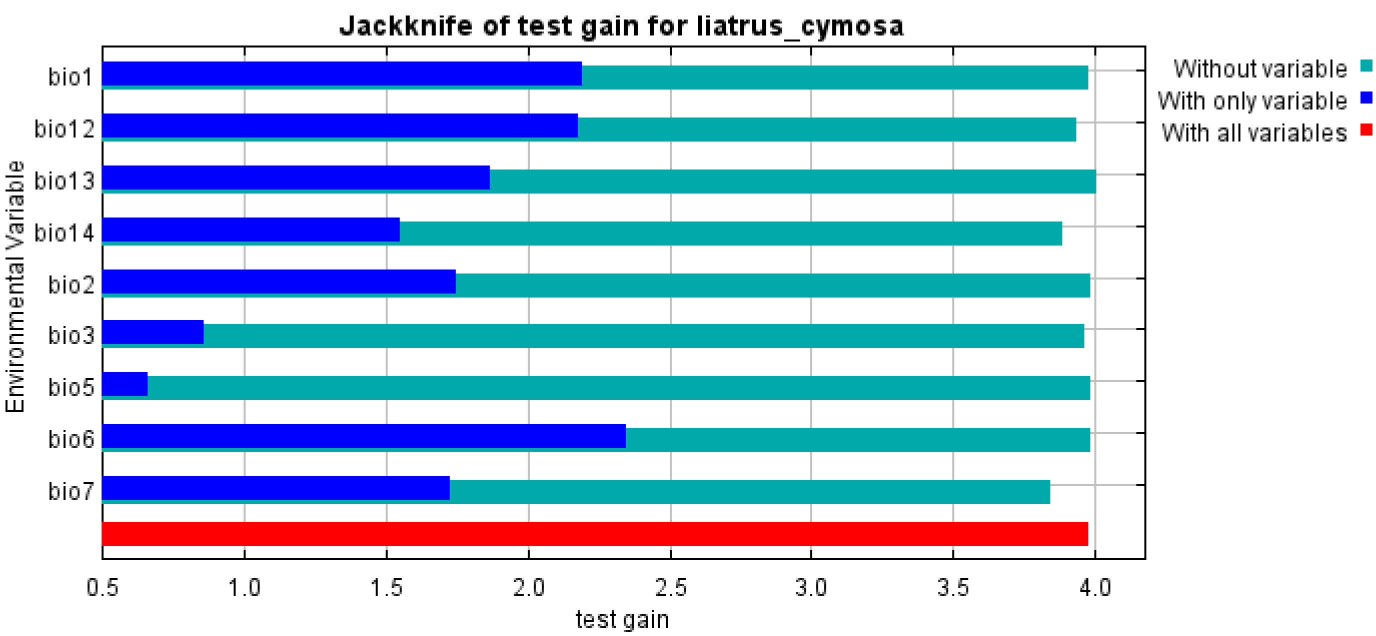
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio14	30.9	3.2
bio6	28.4	2.5
bio12	16.9	20.4
bio3	10.7	21.1
bio13	8.6	2.4
bio5	2.2	15.5
bio7	2	32.8
bio1	0.2	0.2
bio2	0.1	2

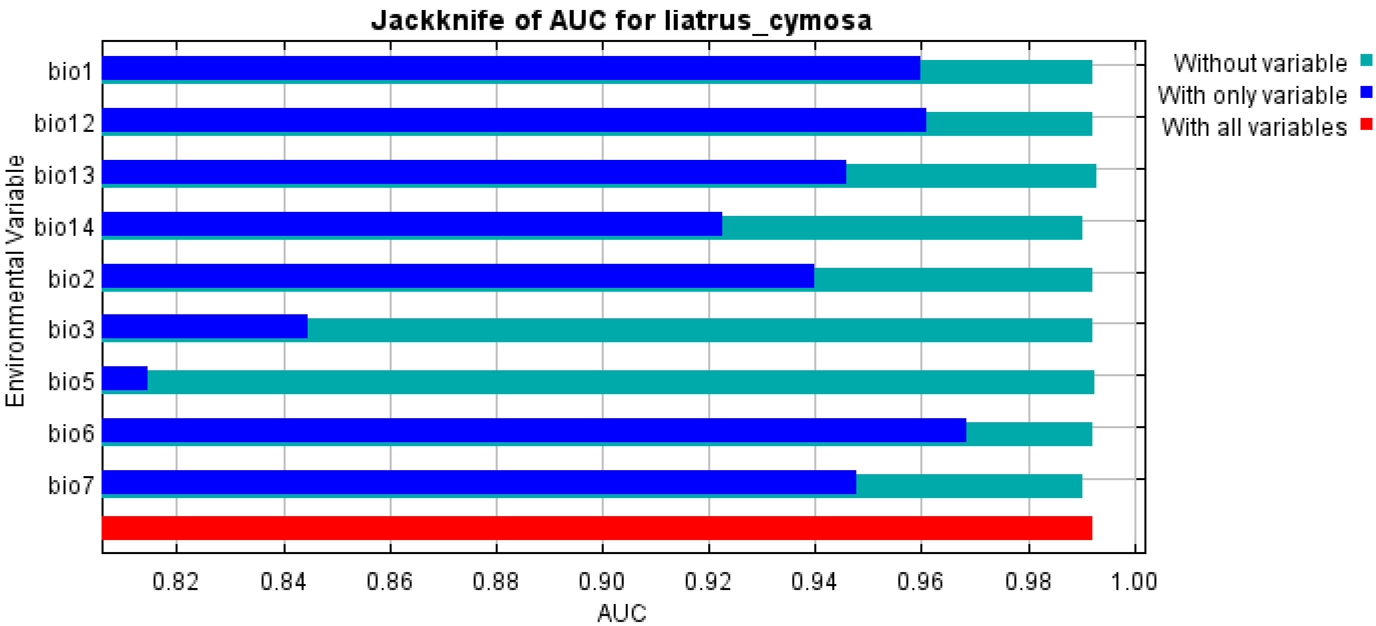
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio6, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio7, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



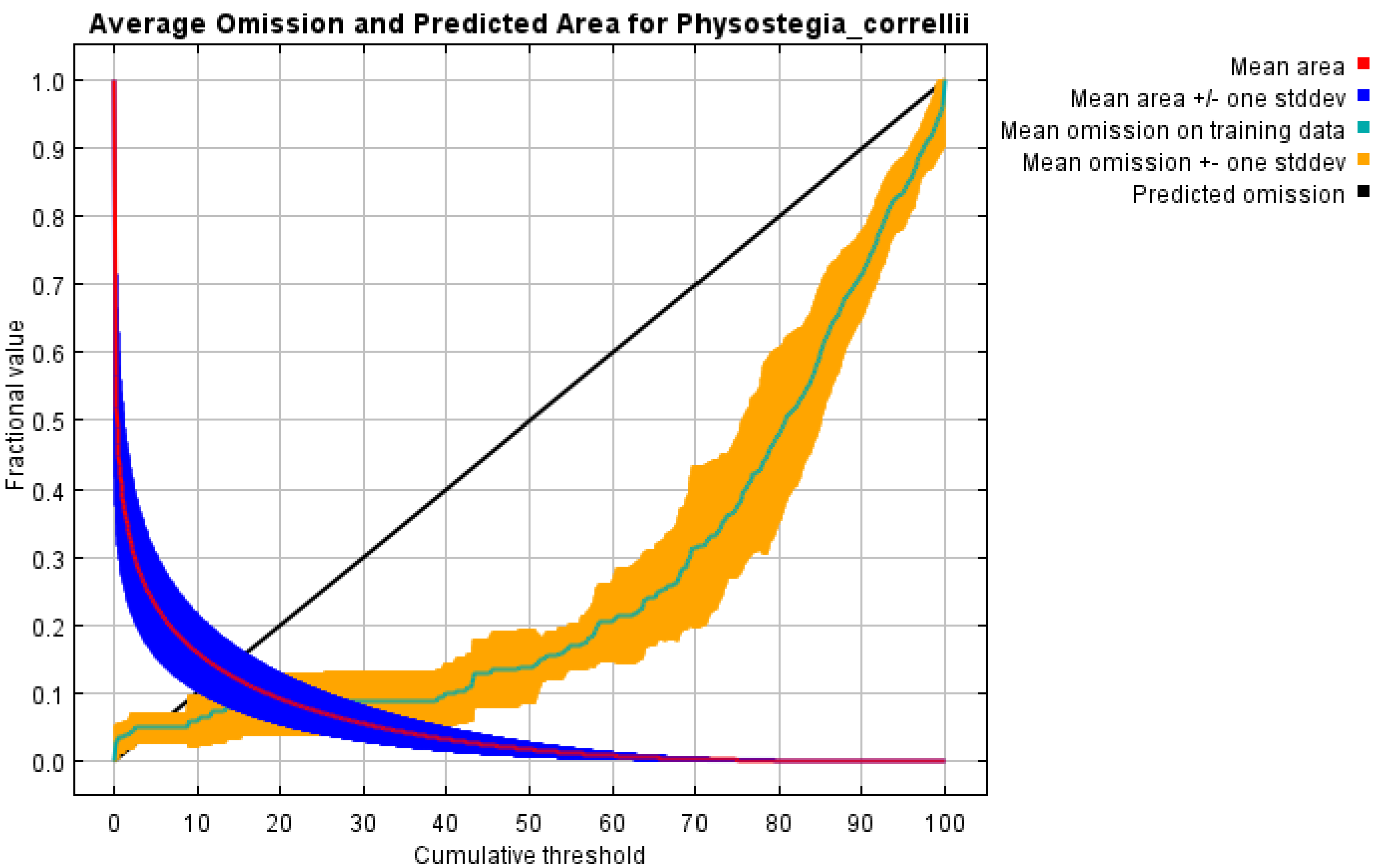
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E liatrus_cymosa responsecurves jackknife outputdirectory=E:\TXDoT_TXScale\Results\Liatrus_bio samplesfile=E:\TXDoT_TXScale\spp_csv\liatris_cymosa.csv environmentallayers=E:\TXDoT_TXScale\Bio_TX_Ascii randomseed randomtestpoints=25 replicates=10 replicatetype=bootstrap -N perm -N ph -N poro

Replicated maxent model for Physostegia_correllii

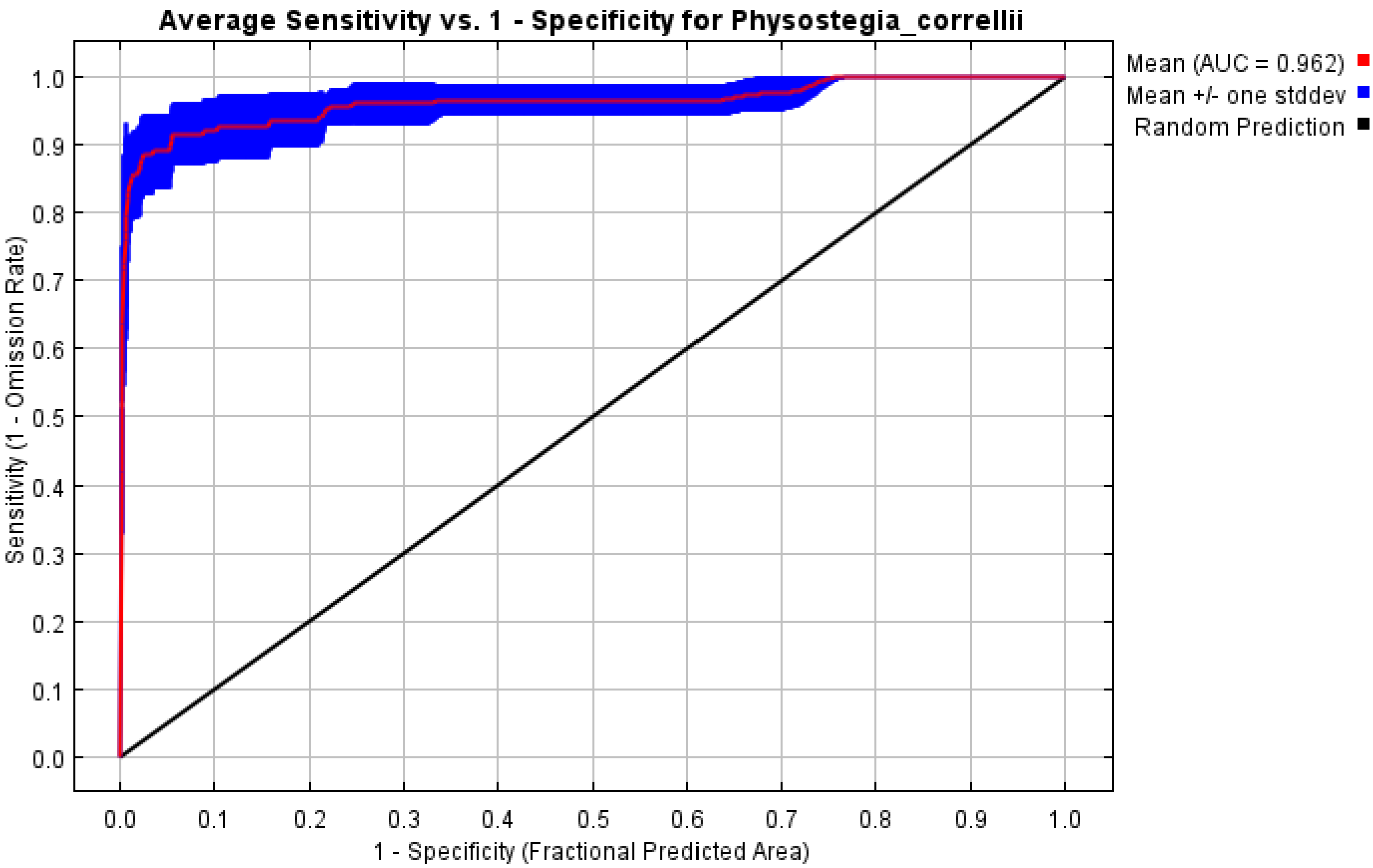
This page summarizes the results of 10 bootstrap models for Physostegia_correllii, created Sat Oct 30 13:54:40 CDT 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4] [5] [6] [7] [8] [9]

Analysis of omission/commission

The following picture shows the training omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs.

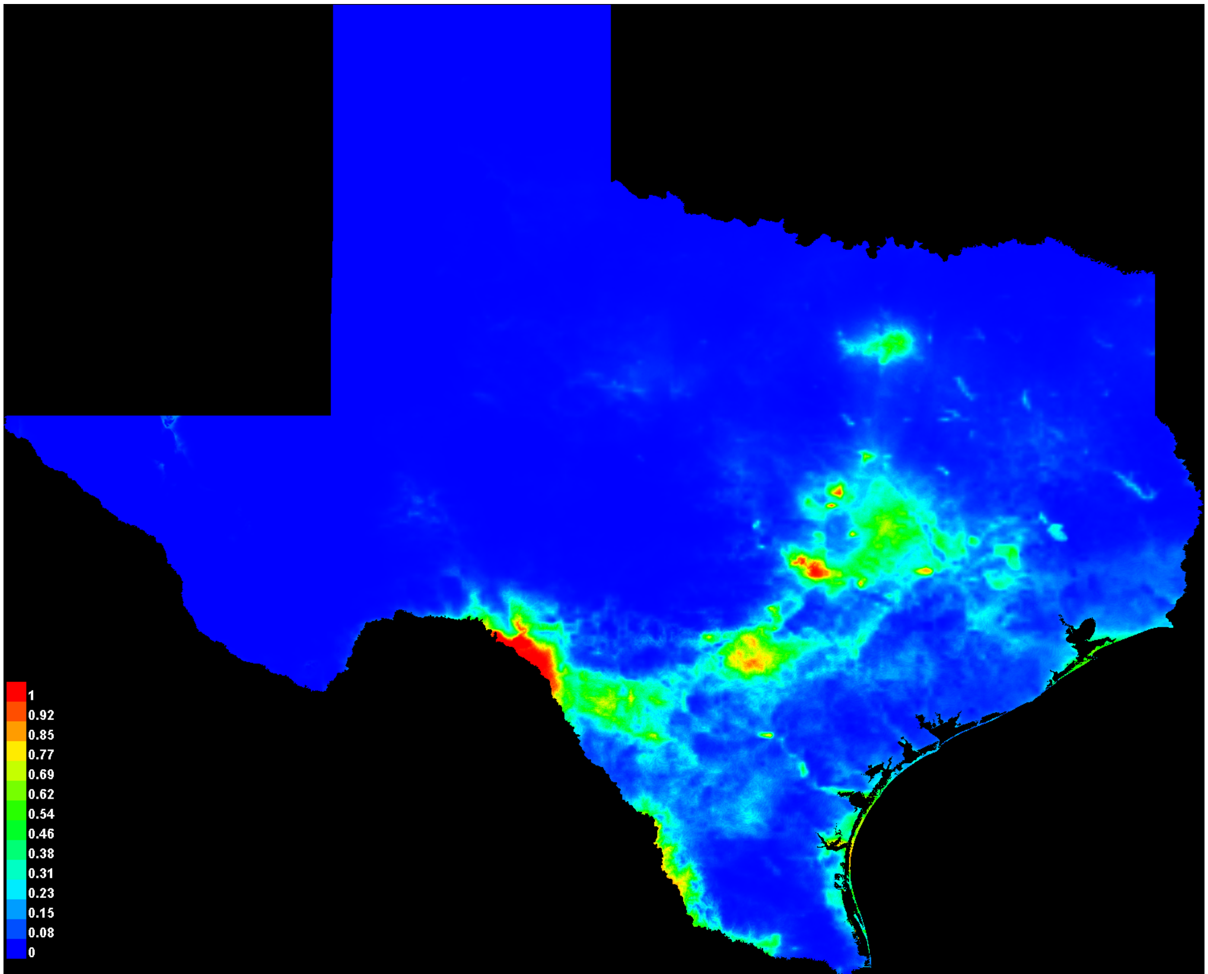


The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average training AUC for the replicate runs is 0.962, and the standard deviation is 0.018.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 10 output grids. Other available summary grids are min, max and median.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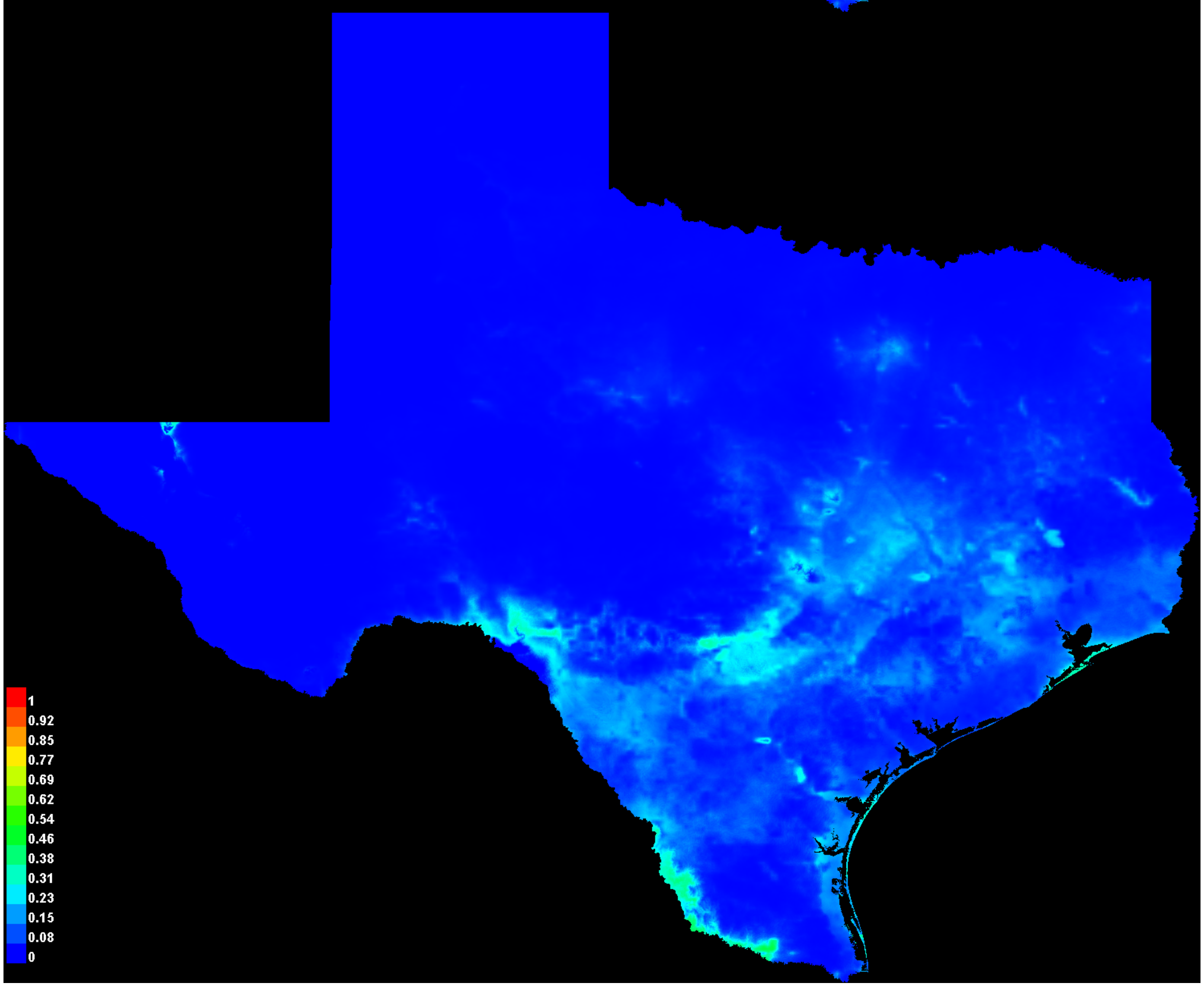
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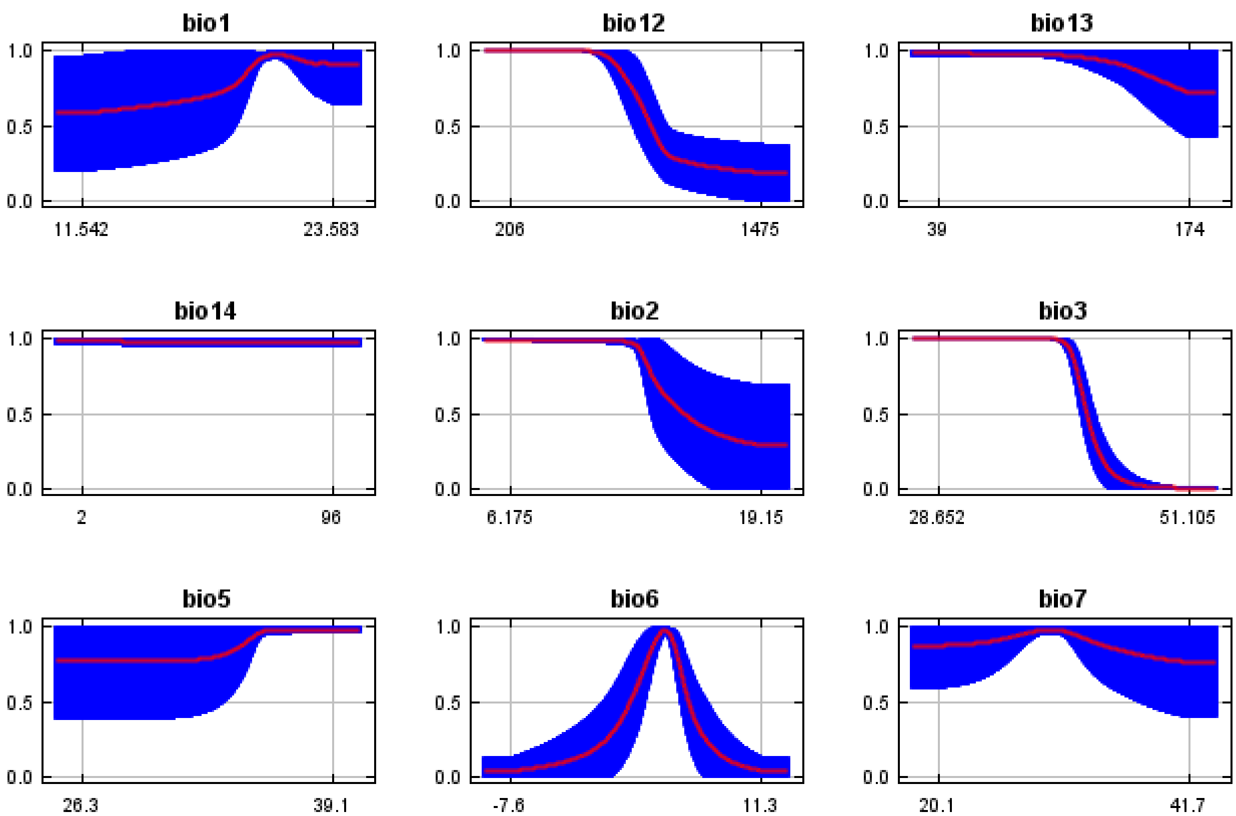
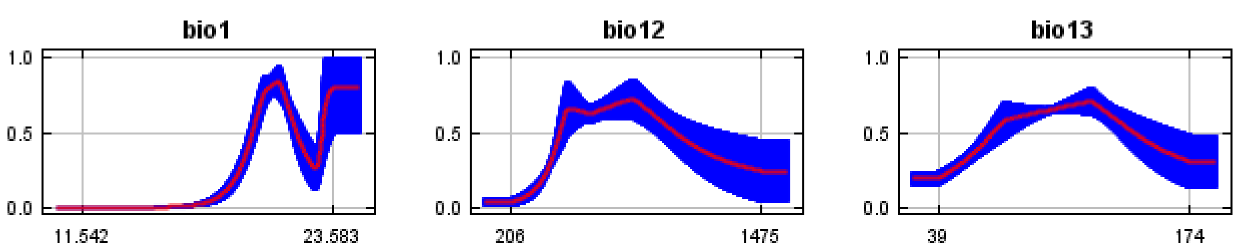
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

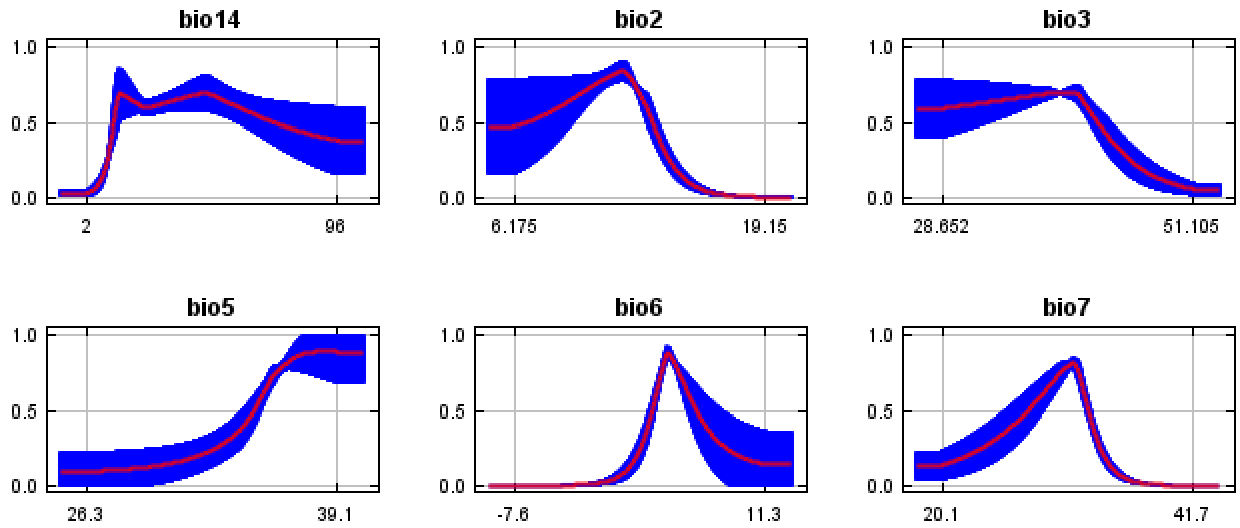
Response curves

These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 10 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).



In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.



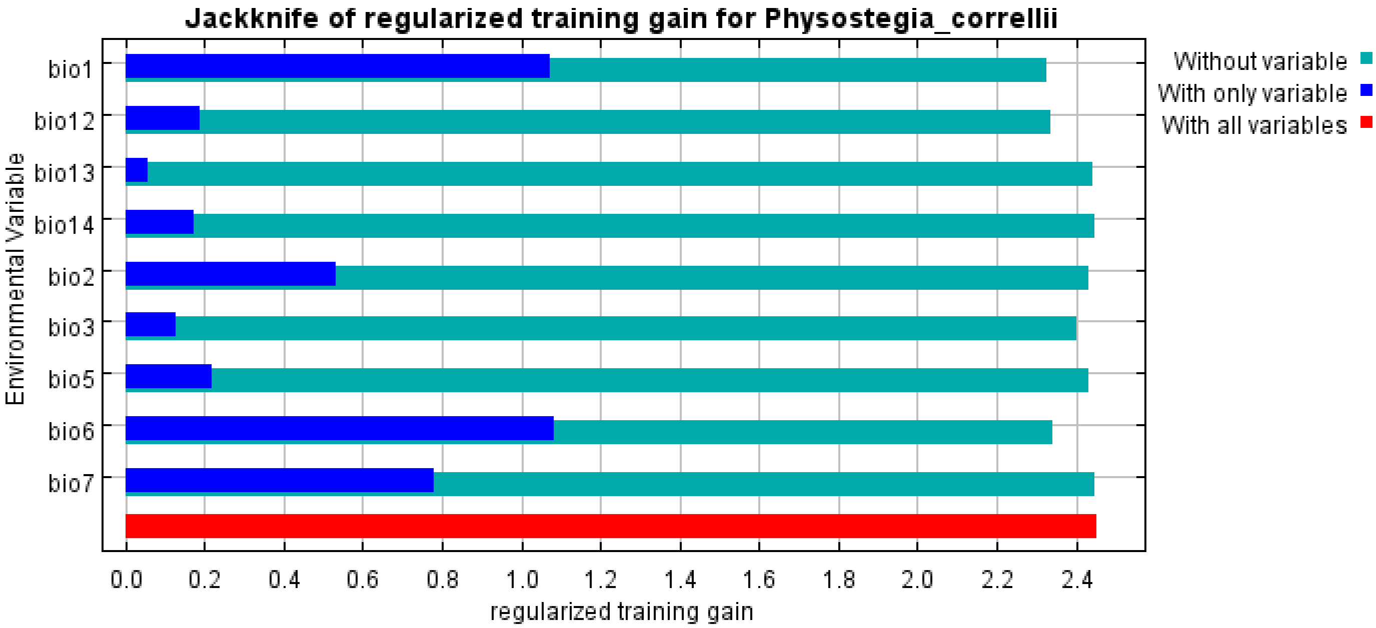


Analysis of variable contributions

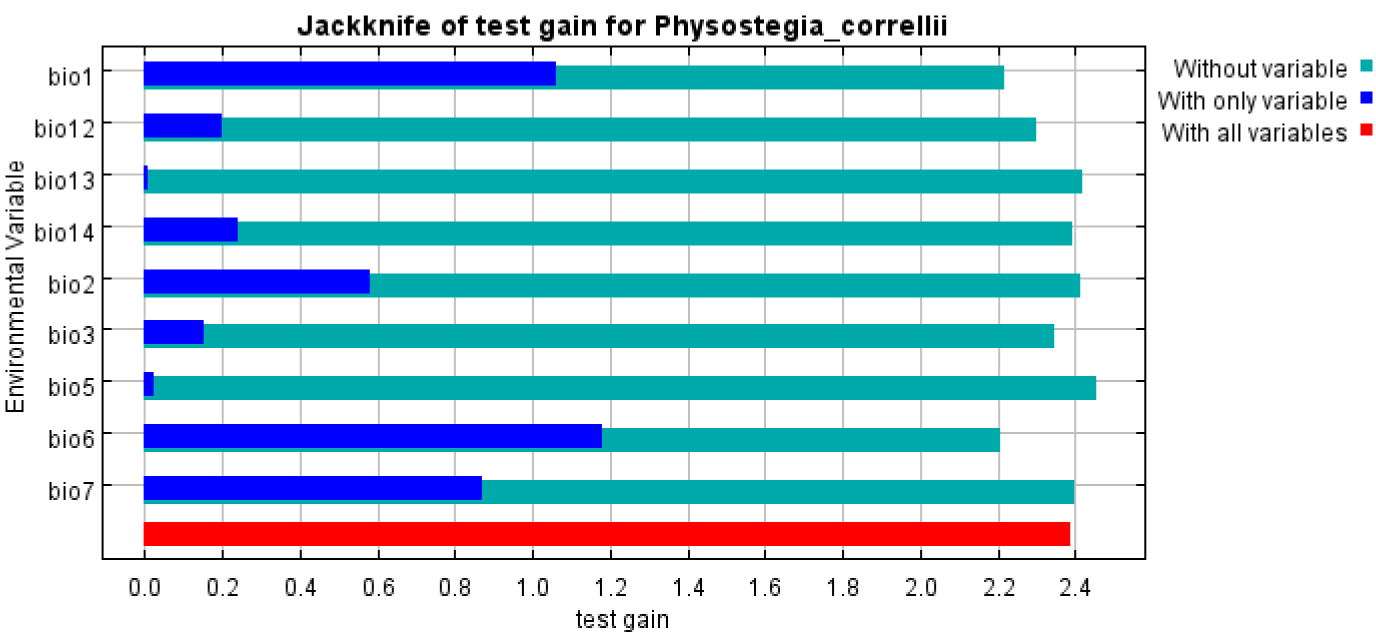
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio6	51.2	36.9
bio3	20.3	16.6
bio12	12.1	20.3
bio1	9	6.9
bio13	3.4	0.2
bio14	2.3	0.3
bio7	0.8	4.1
bio2	0.6	14.3
bio5	0.3	0.5

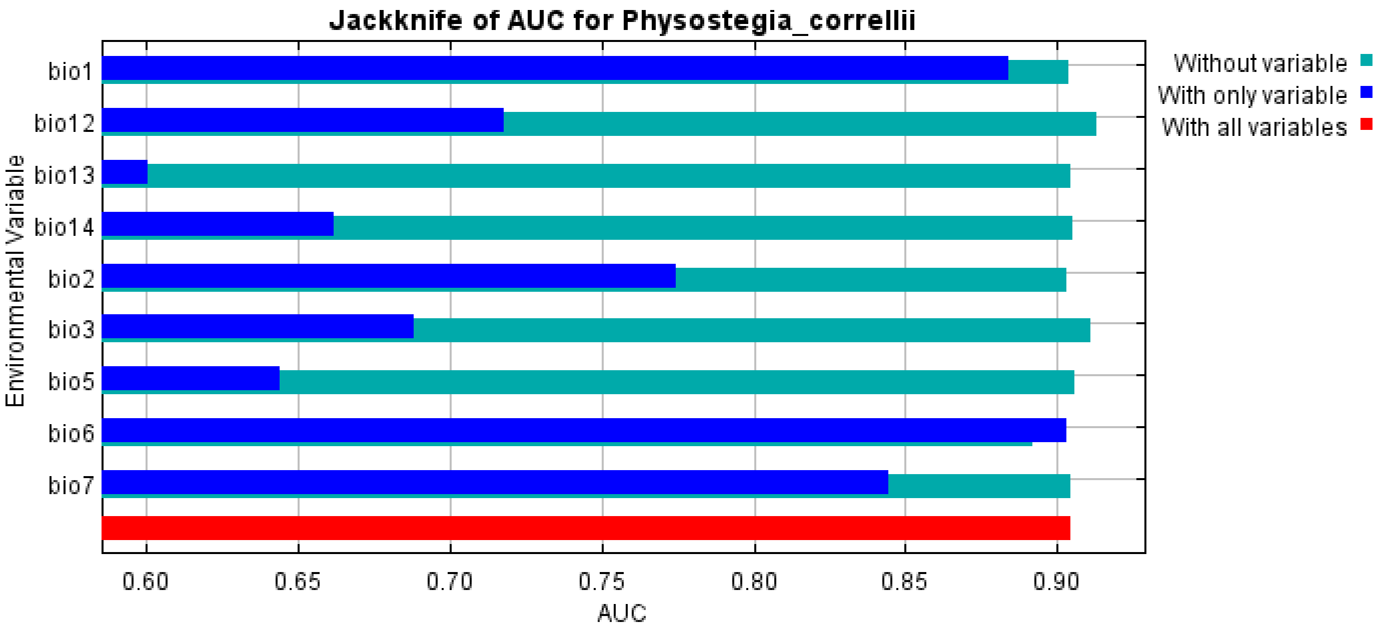
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio6, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio1, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



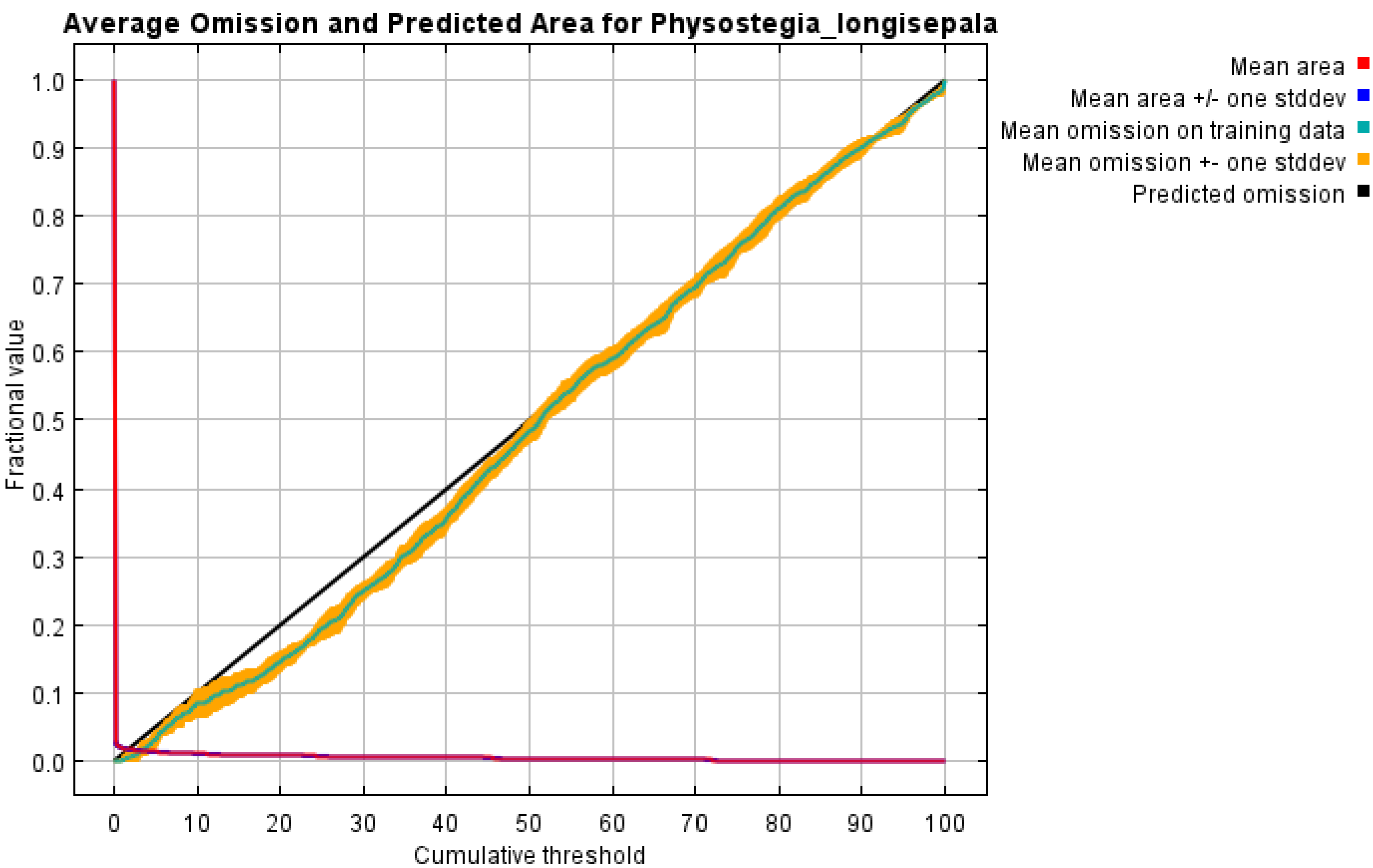
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Physostegia_correllii responsecurves jackknife outputdirectory=E:\TXDoT_TXScale\Results\Physostegia_bio "samplesfile=E:\TXDoT_TXScale\spp_csv\Physostegia correllii.csv" environmentallayers=E:\TXDoT_TXScale\Bio_TX_Ascii randomseed randomtestpoints=25 replicates=10 replicatetype=bootstrap -N perm -N ph -N poro

Replicated maxent model for Physostegia_longisepala

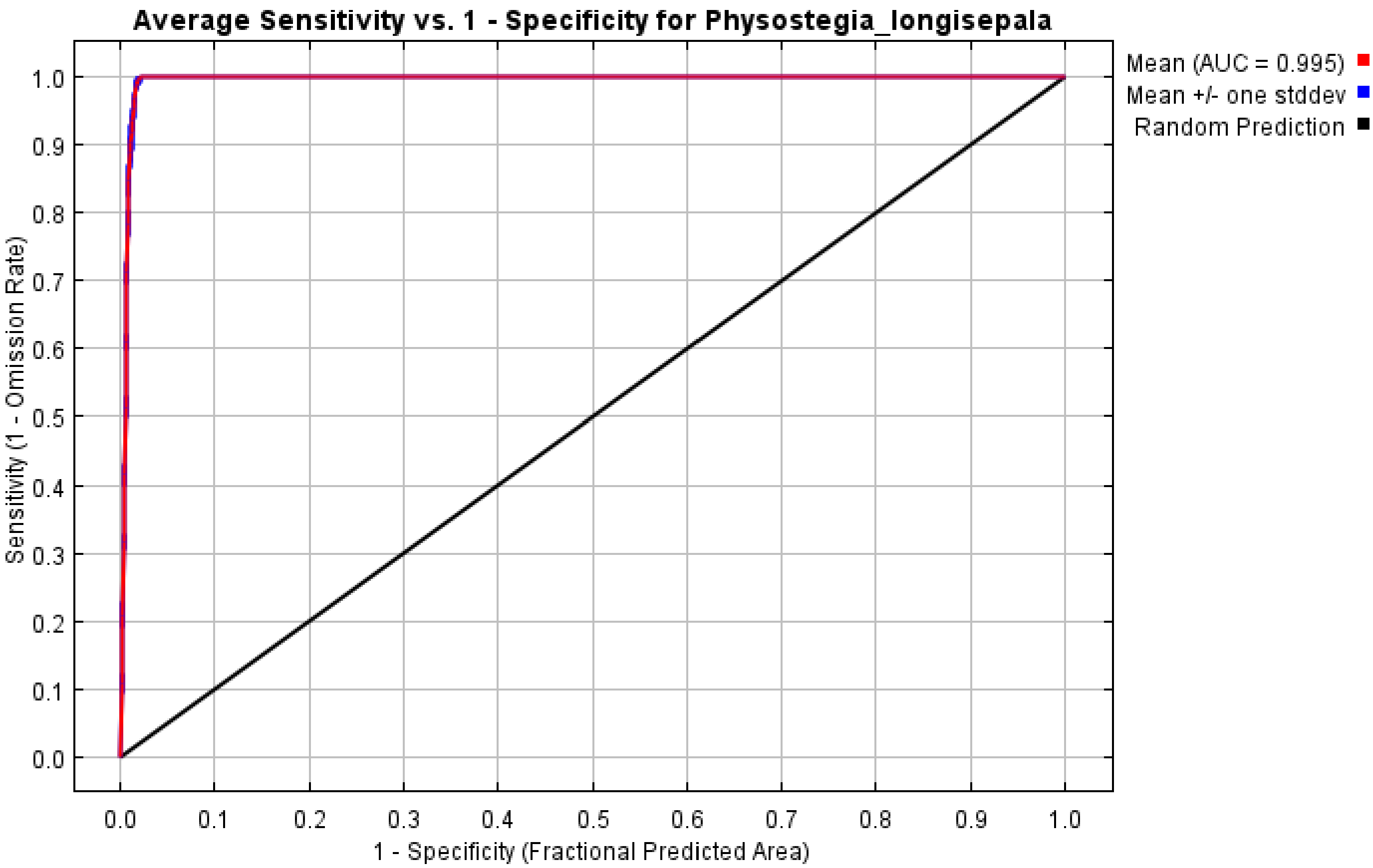
This page summarizes the results of 10 bootstrap models for Physostegia_longisepala, created Sat Oct 30 14:01:49 CDT 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4] [5] [6] [7] [8] [9]

Analysis of omission/commission

The following picture shows the training omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs.

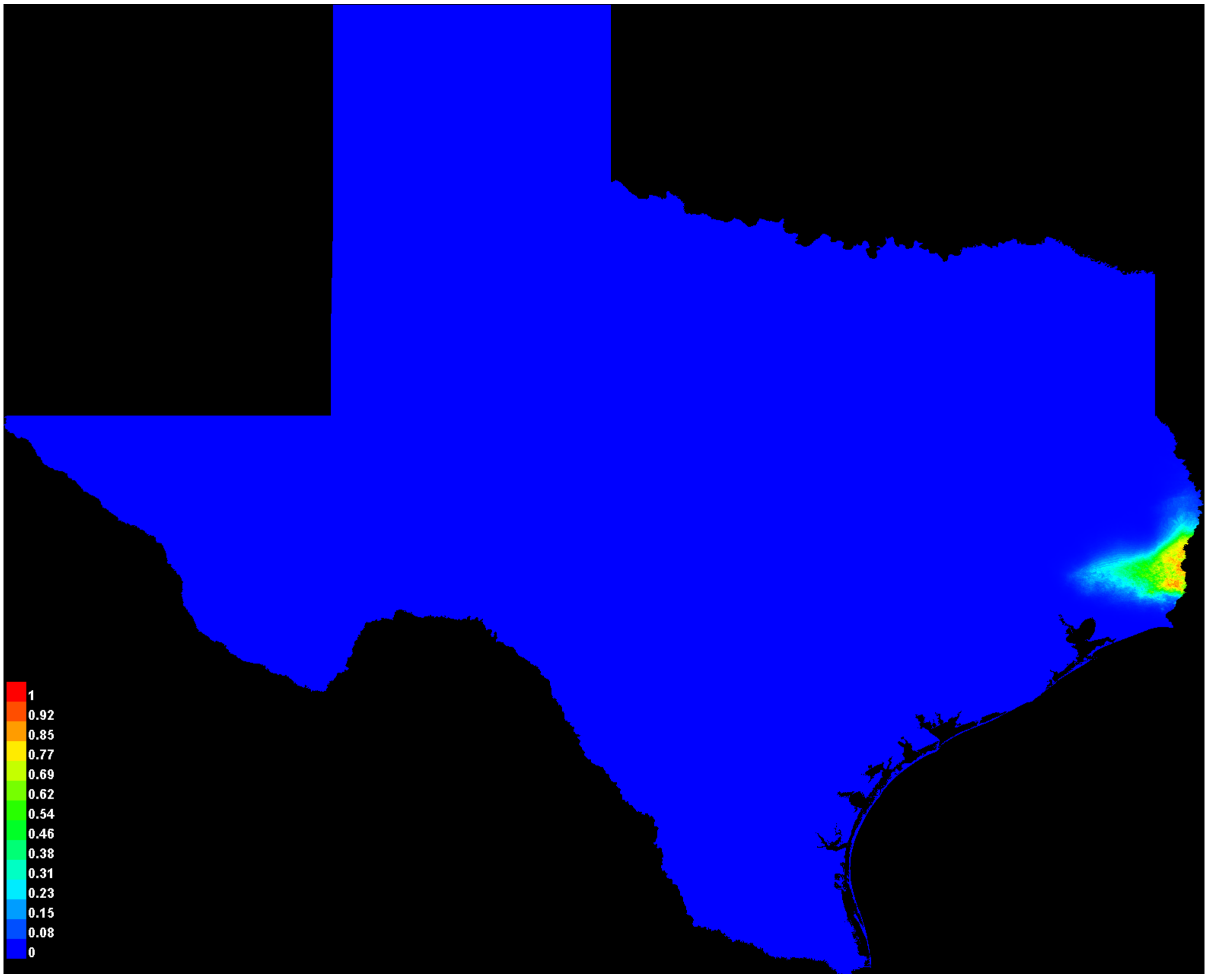


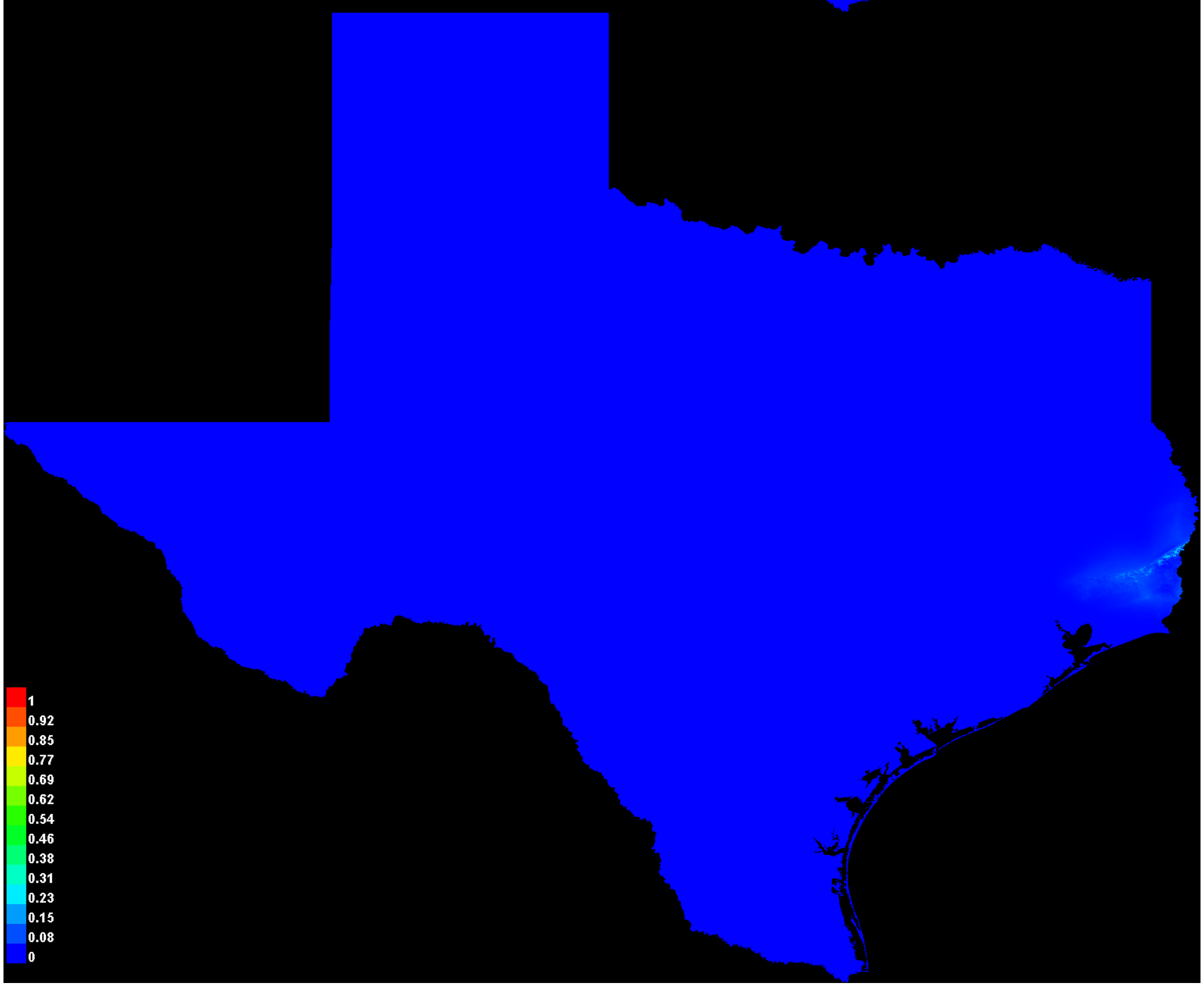
The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average training AUC for the replicate runs is 0.995, and the standard deviation is 0.000.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 10 output grids. Other available summary grids are min, max and median.

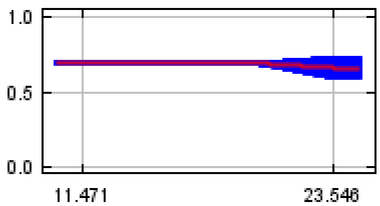

1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0


1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

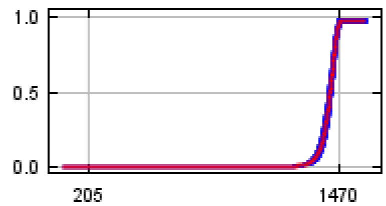
Response curves

These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 10 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).

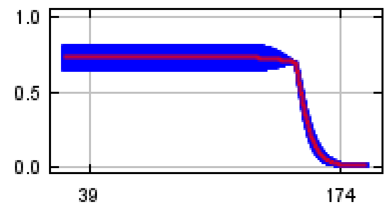
bio1



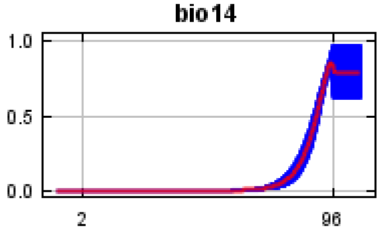
bio12



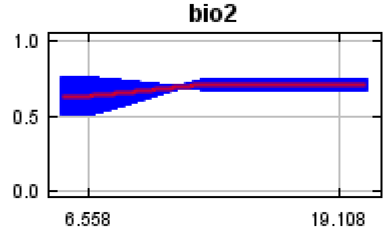
bio13



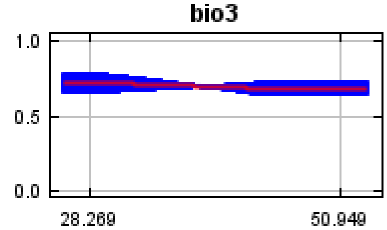
bio14



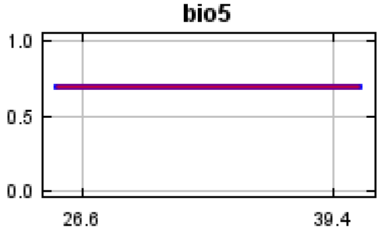
bio2



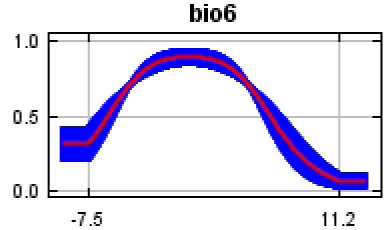
bio3



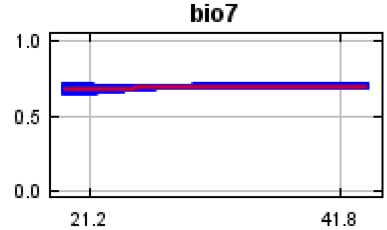
bio5



bio6

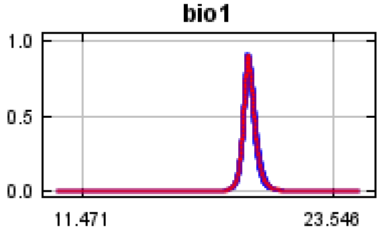


bio7

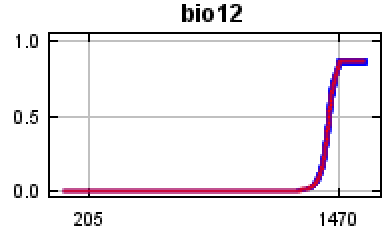


In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.

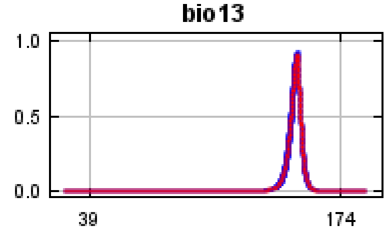
bio1

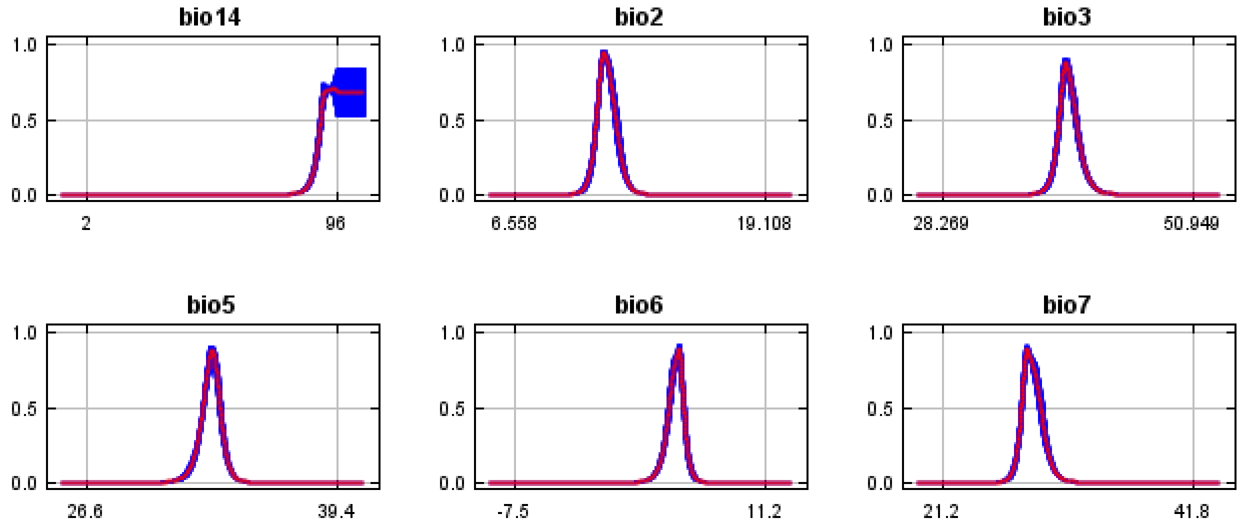


bio12



bio13



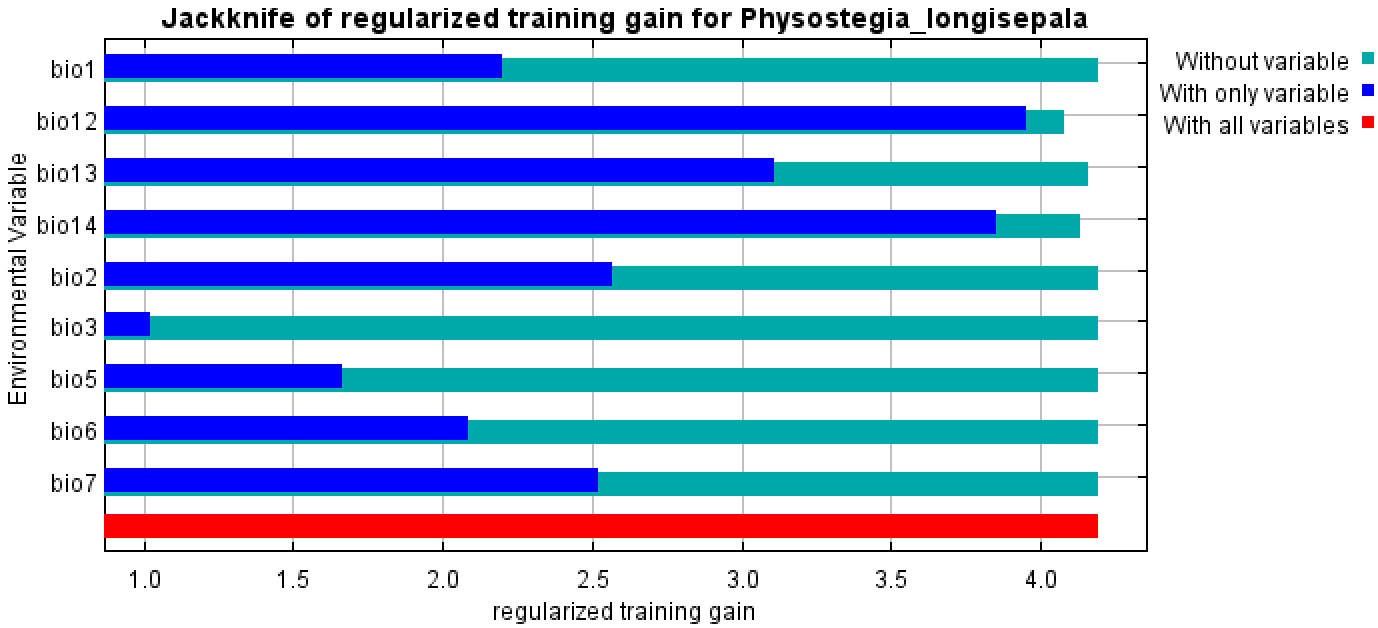


Analysis of variable contributions

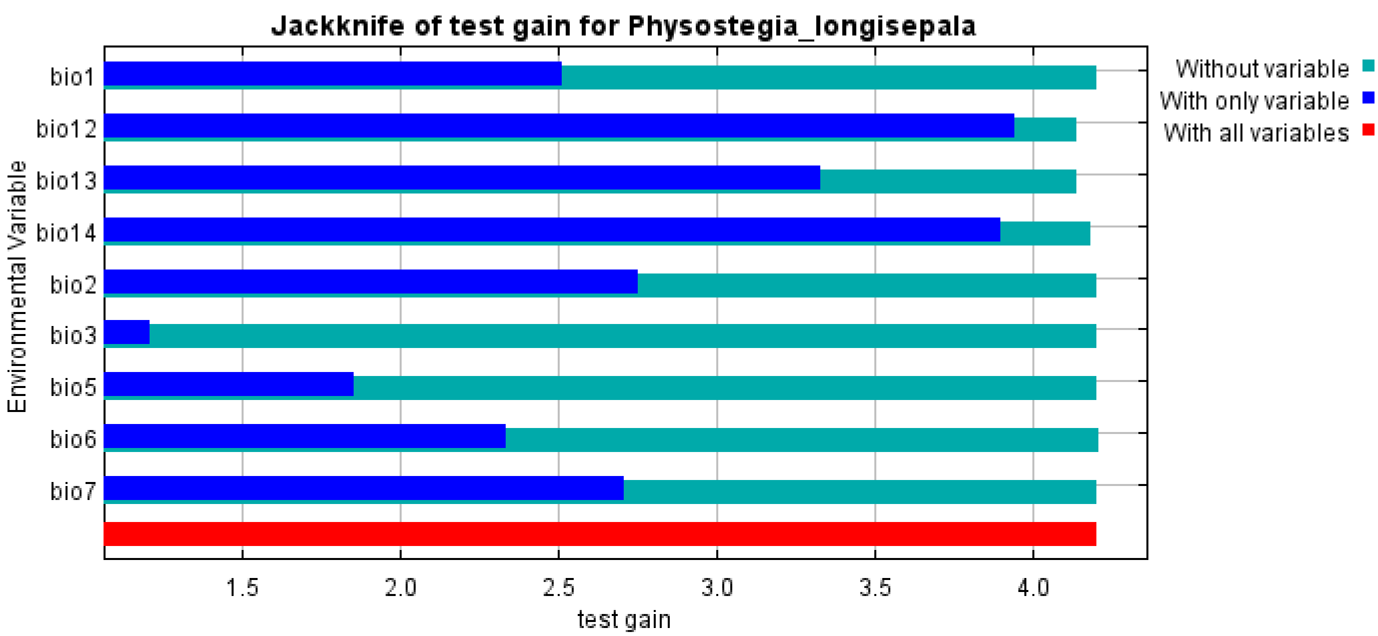
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio12	73.3	89.6
bio14	21.4	10.1
bio13	2.5	0.2
bio3	1.6	0
bio7	0.6	0
bio5	0.2	0
bio1	0.2	0
bio2	0.2	0
bio6	0.1	0.1

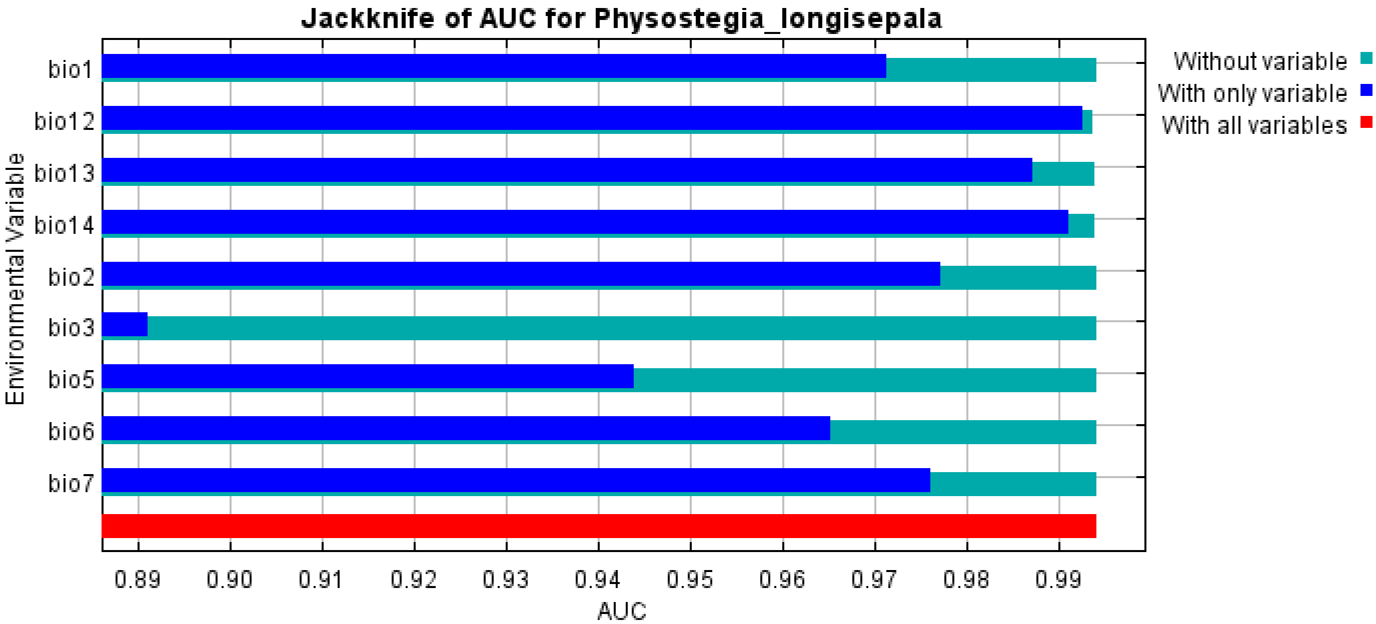
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio12, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio12, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



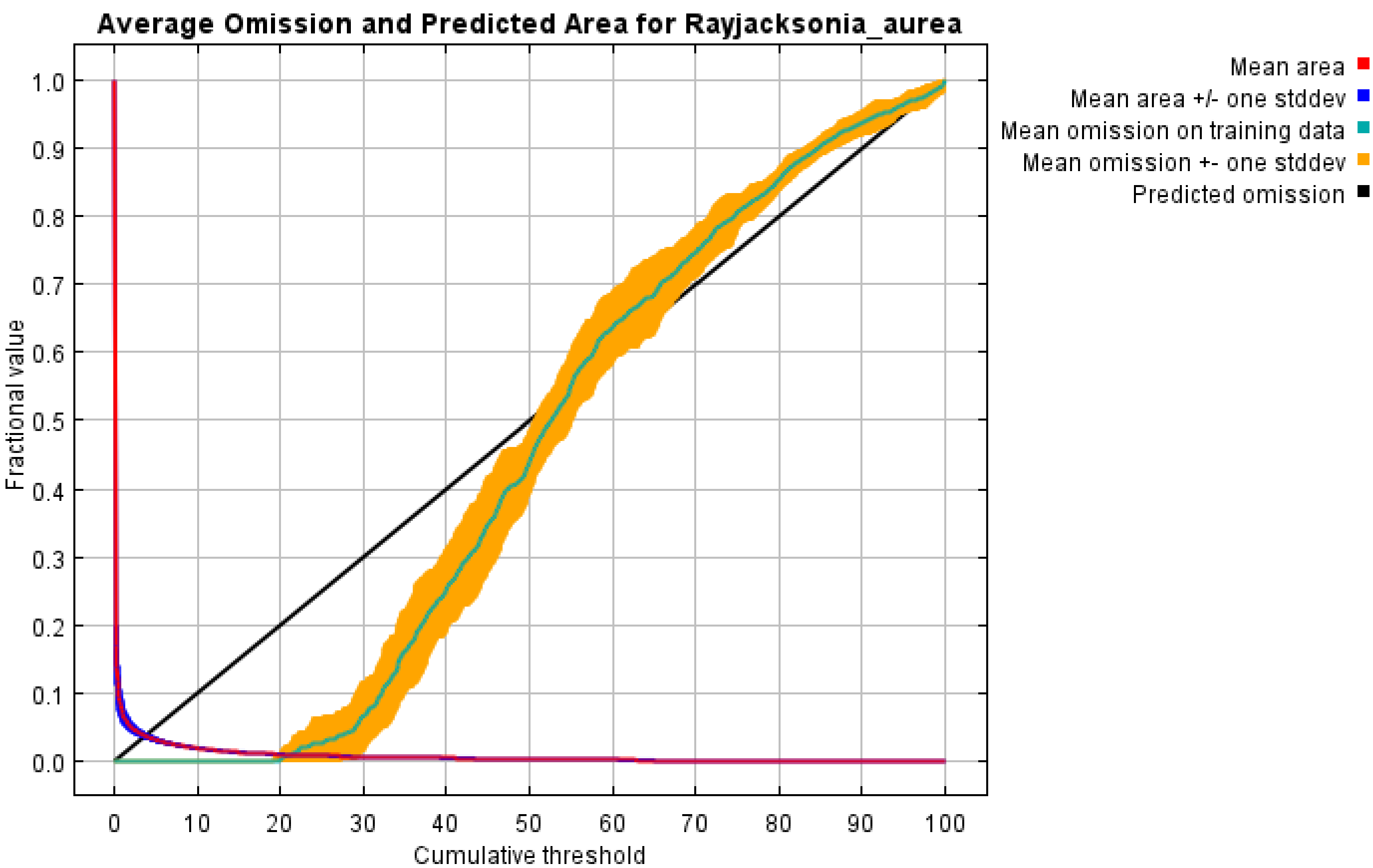
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Physostegia_longisepala responsecurves jackknife outputdirectory=E:\TXDoT_TXScale\Results\Physostegia_L_bio samplesfile=E:\TXDoT_TXScale\spp_csv\physostegia_longisepala.csv environmentallayers=E:\TXDoT_TXScale\Bio_TX_Ascii randomseed randomtestpoints=25 replicates=10 replicatetype=bootstrap -N perm -N ph -N poro

Replicated maxent model for Rayjacksonia_aurea

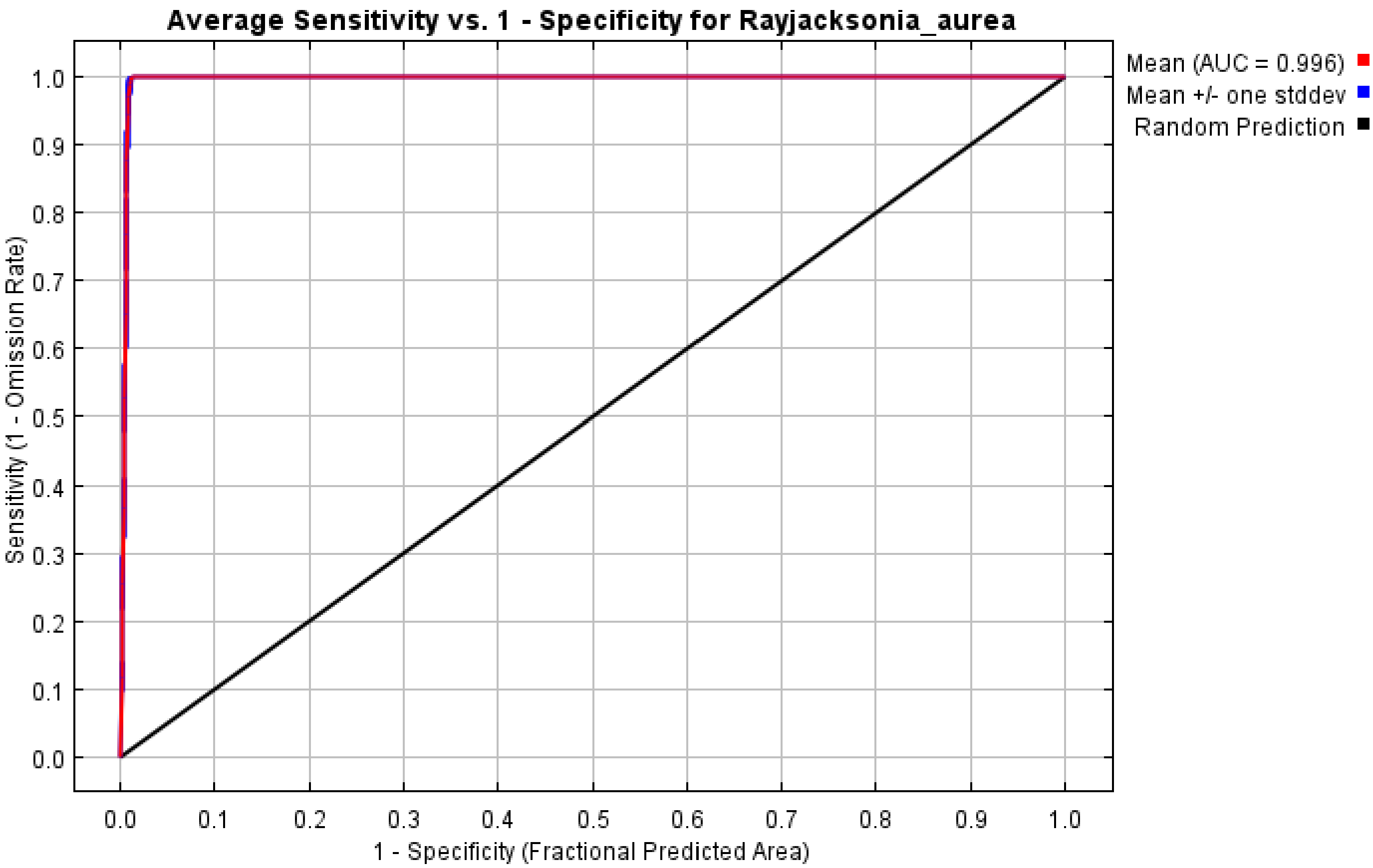
This page summarizes the results of 10 bootstrap models for Rayjacksonia_aurea, created Sat Oct 30 14:14:57 CDT 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4] [5] [6] [7] [8] [9]

Analysis of omission/commission

The following picture shows the training omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs.

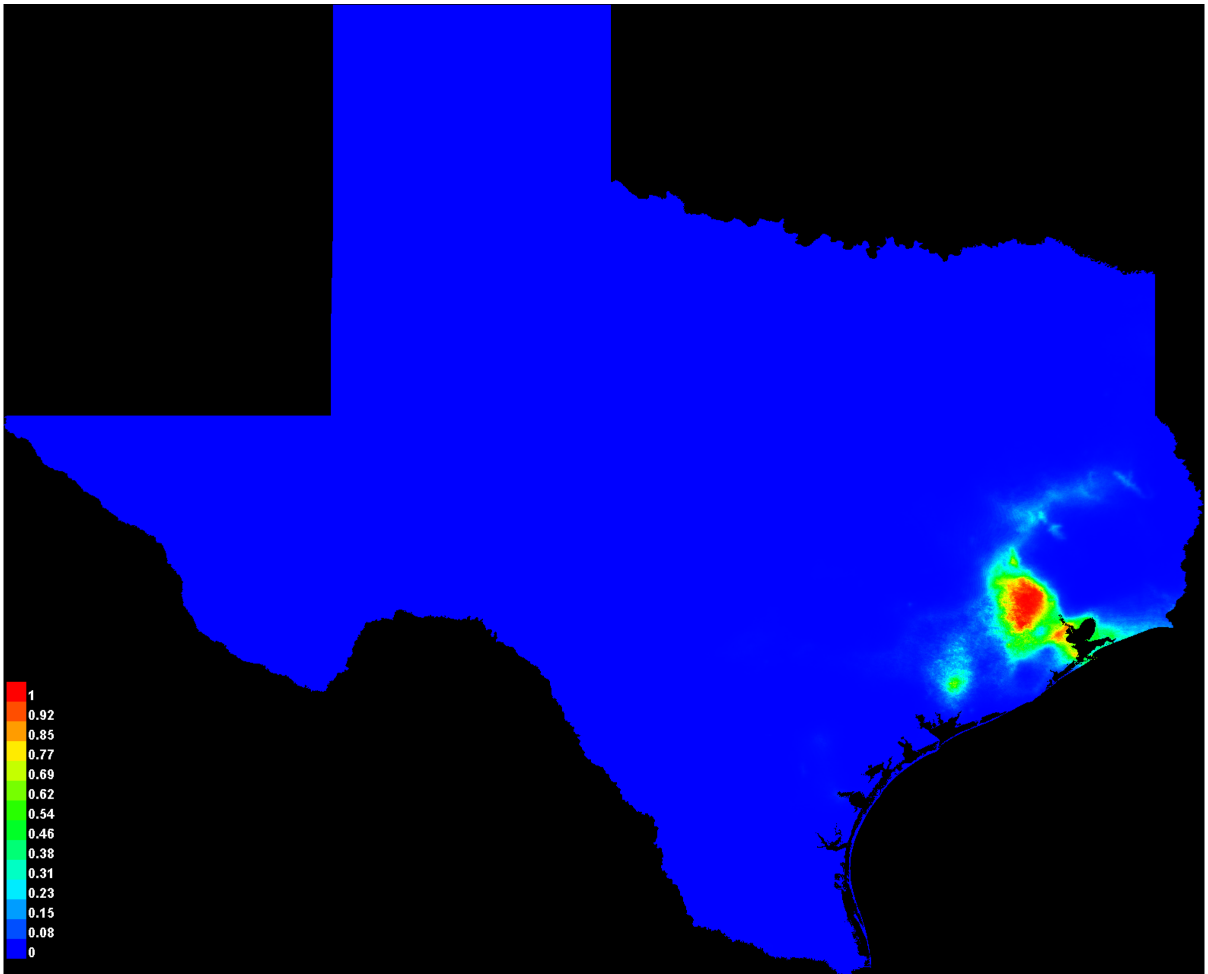


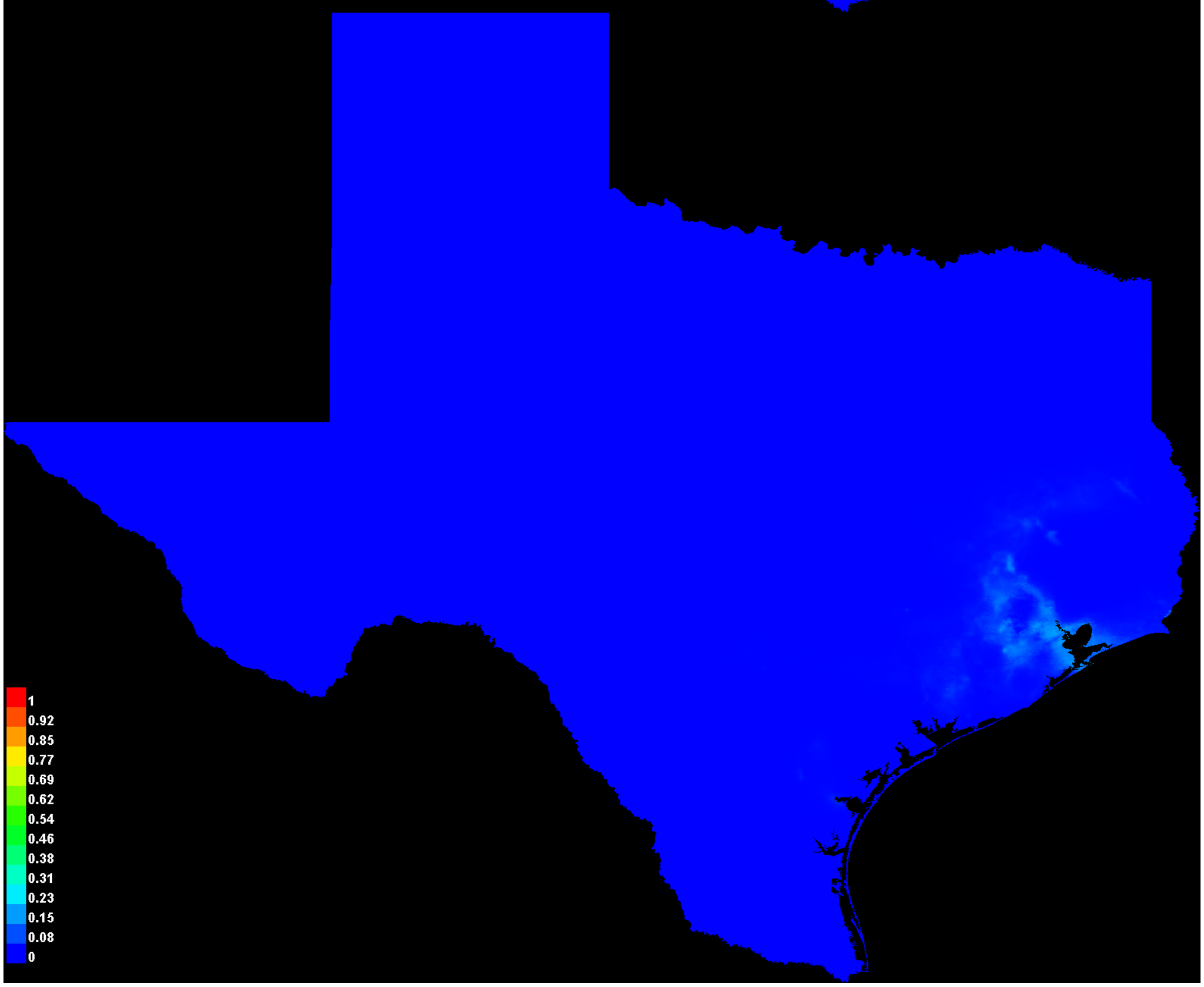
The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average training AUC for the replicate runs is 0.996, and the standard deviation is 0.000.



Pictures of the model

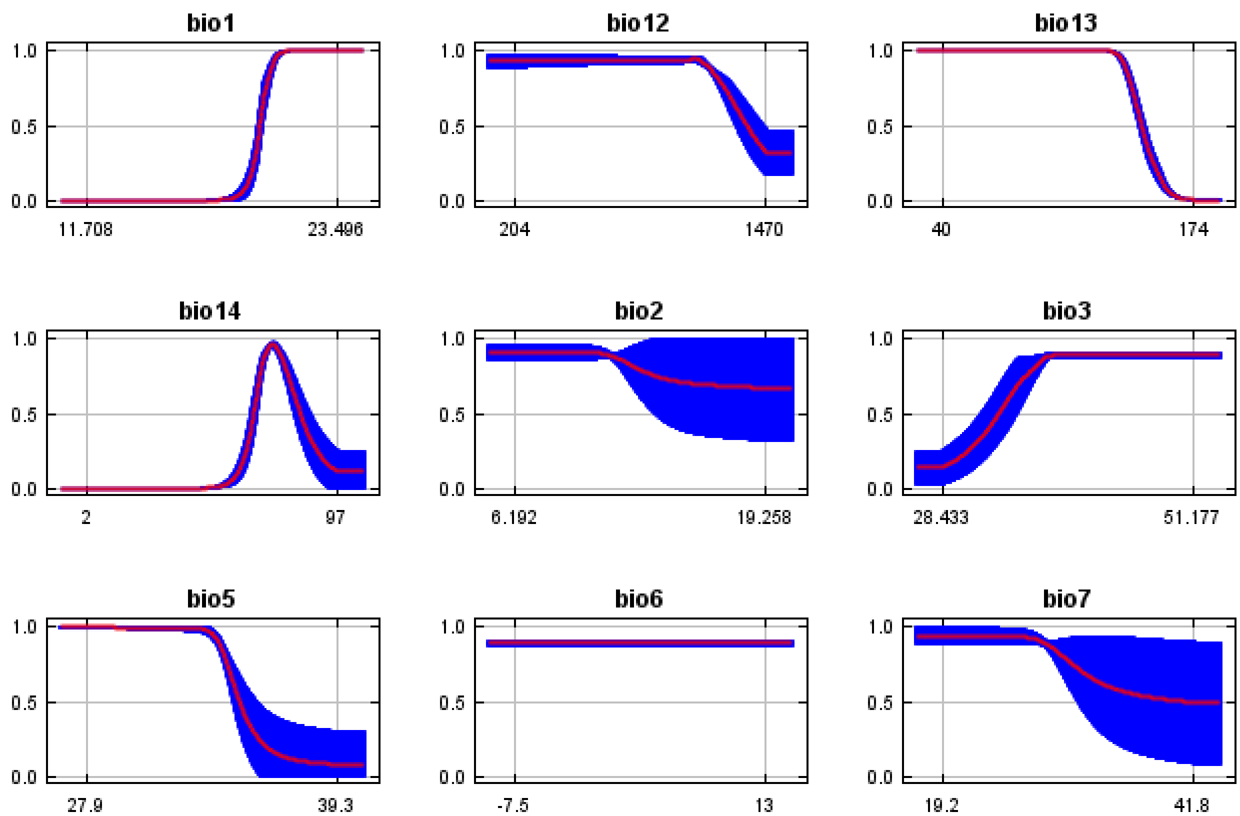
The following two pictures show the point-wise mean and standard deviation of the 10 output grids. Other available summary grids are min, max and median.


1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

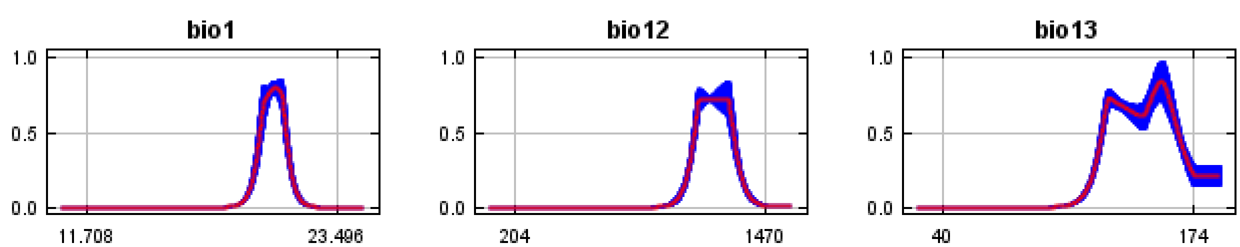

1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

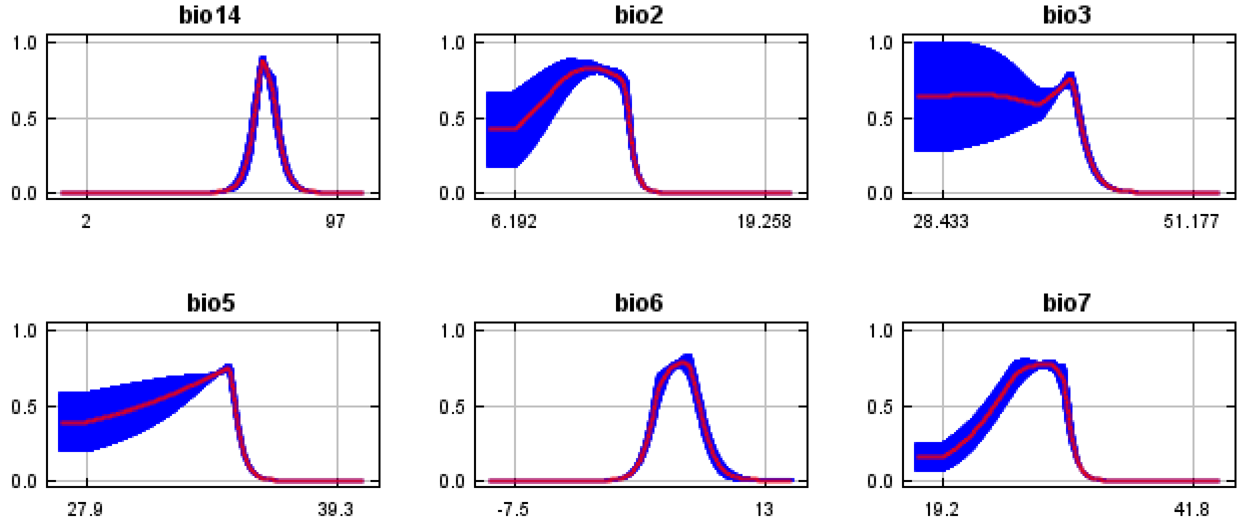
Response curves

These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 10 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).



In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.



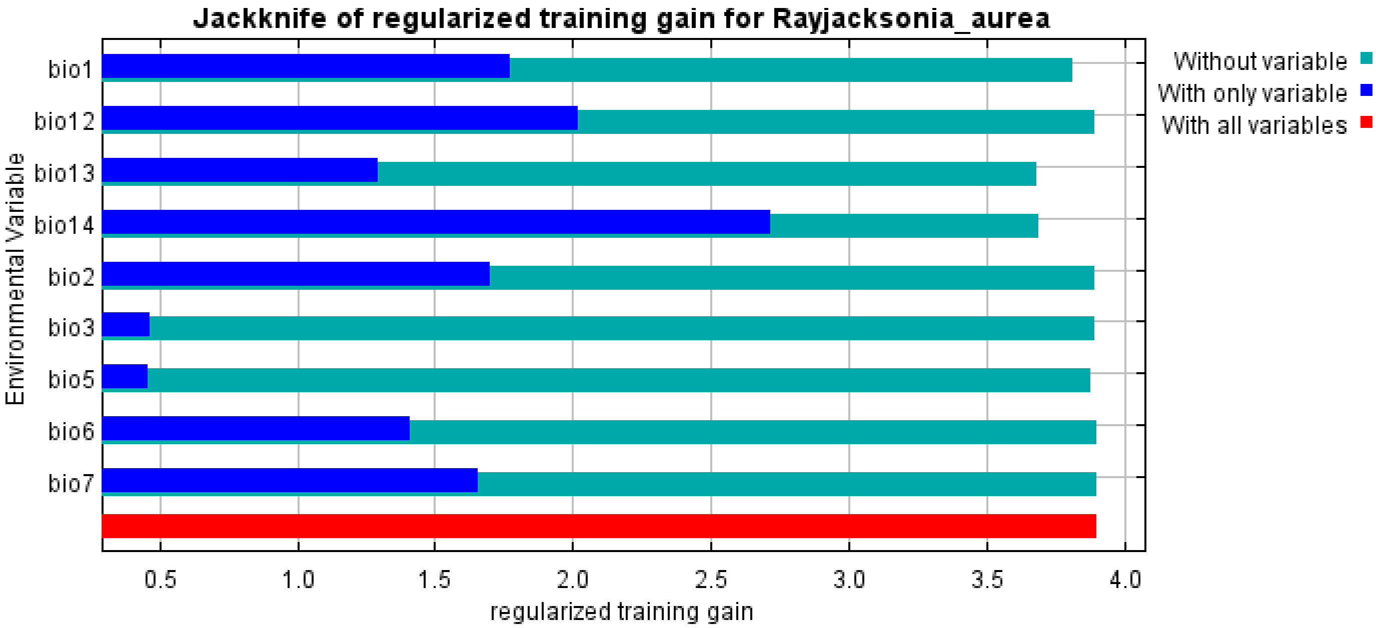


Analysis of variable contributions

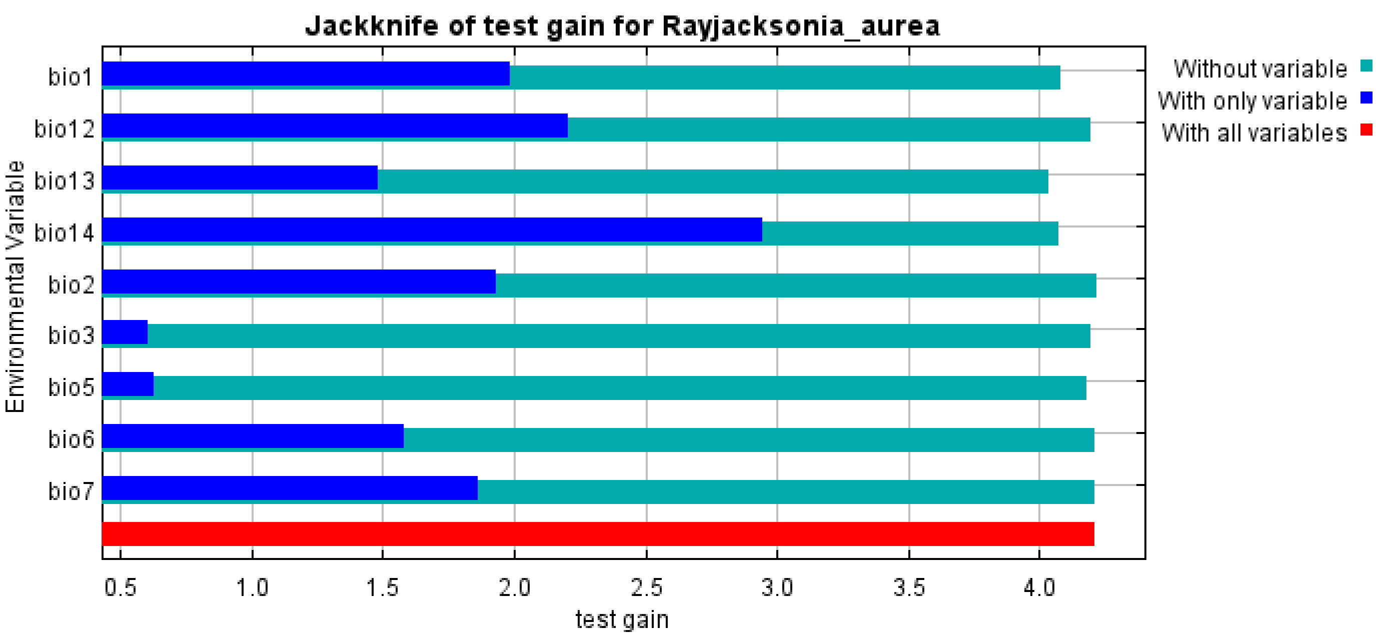
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio14	65.3	62.2
bio7	25.8	1.4
bio13	4.8	3.3
bio1	3	30.2
bio12	0.4	0.2
bio5	0.2	1.9
bio2	0.1	0.7
bio3	0.1	0.2
bio6	0.1	0

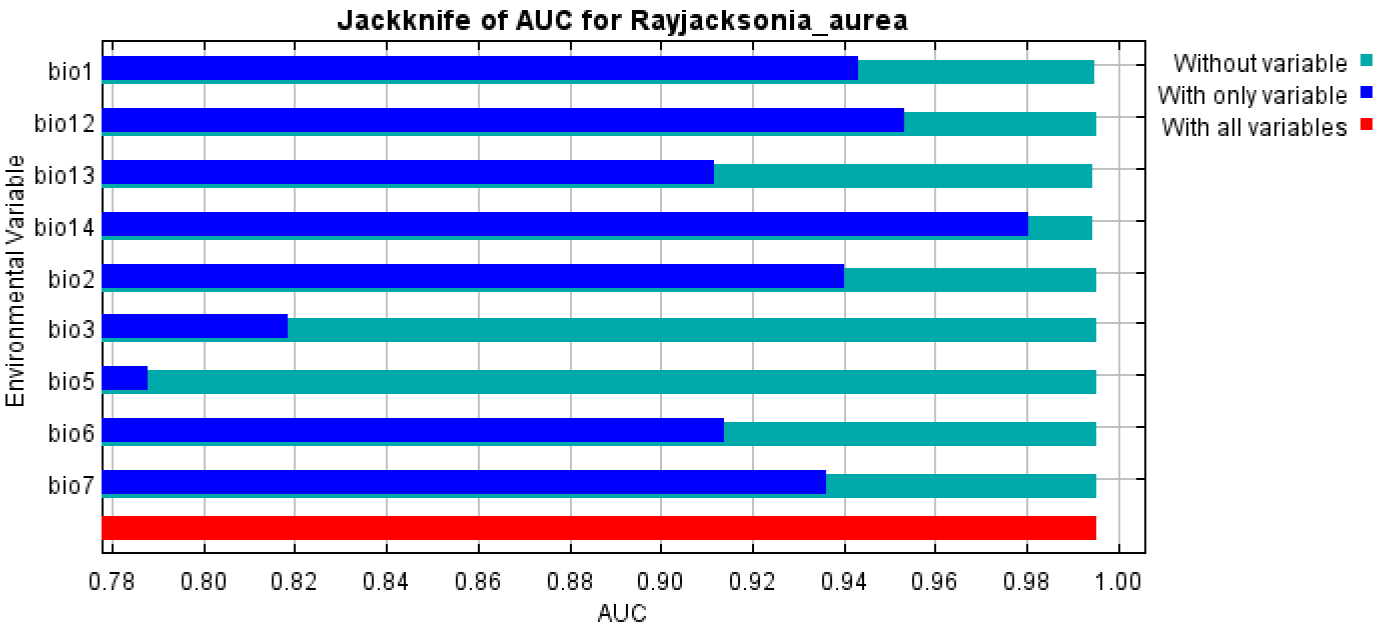
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio14, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio13, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



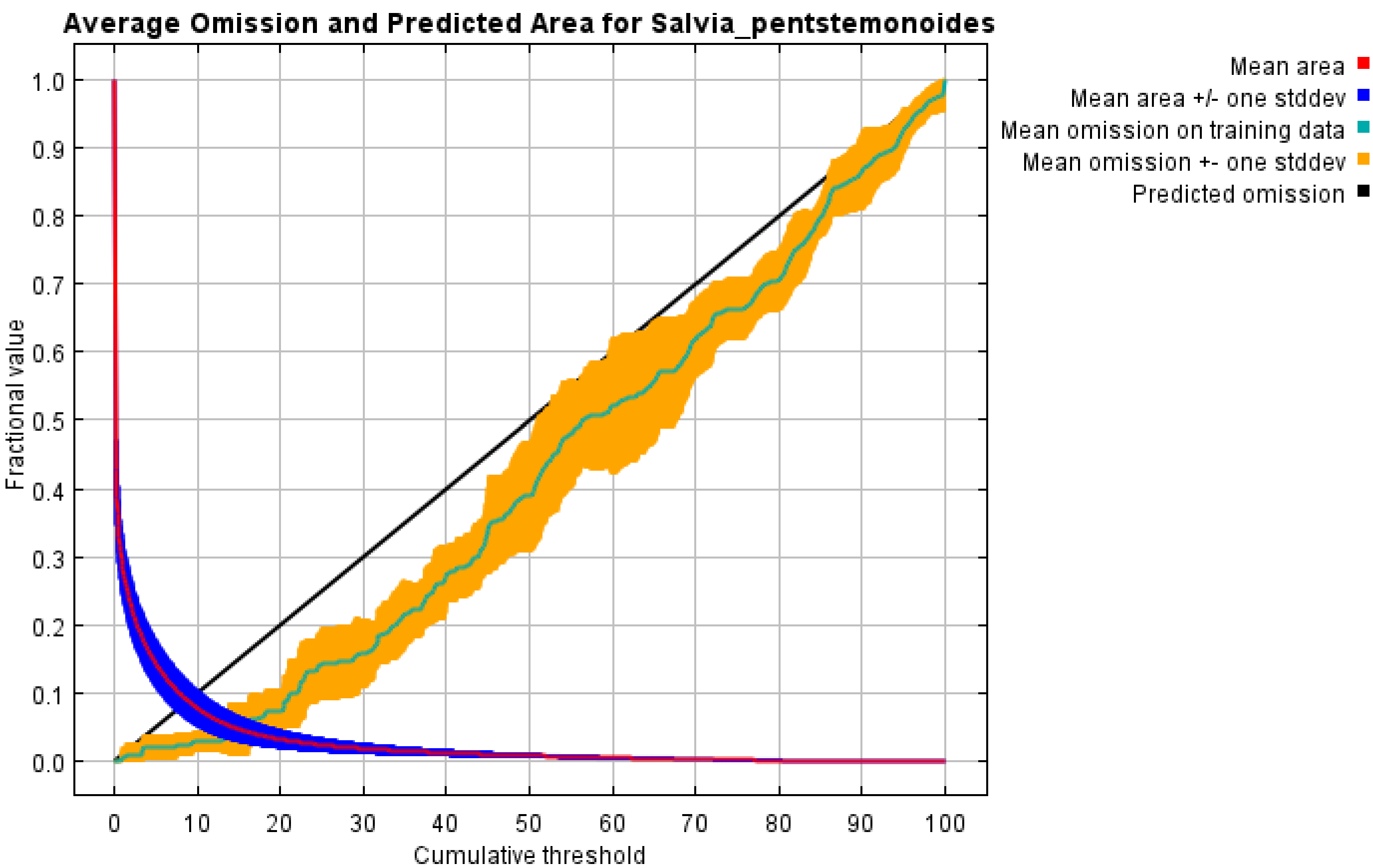
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Rayjacksonia_aurea responsecurves jackknife outputdirectory=E:\TXDoT_TXScale\Results\Rayjacksonia_bio samplesfile=E:\TXDoT_TXScale\spp_csv\Rayjacksonia_aurea.csv environmentallayers=E:\TXDoT_TXScale\Bio_TX_Ascii randomseed randomtestpoints=25 replicates=10 replicatetype=bootstrap -N perm -N ph -N poro

Replicated maxent model for Salvia_pentstemonoides

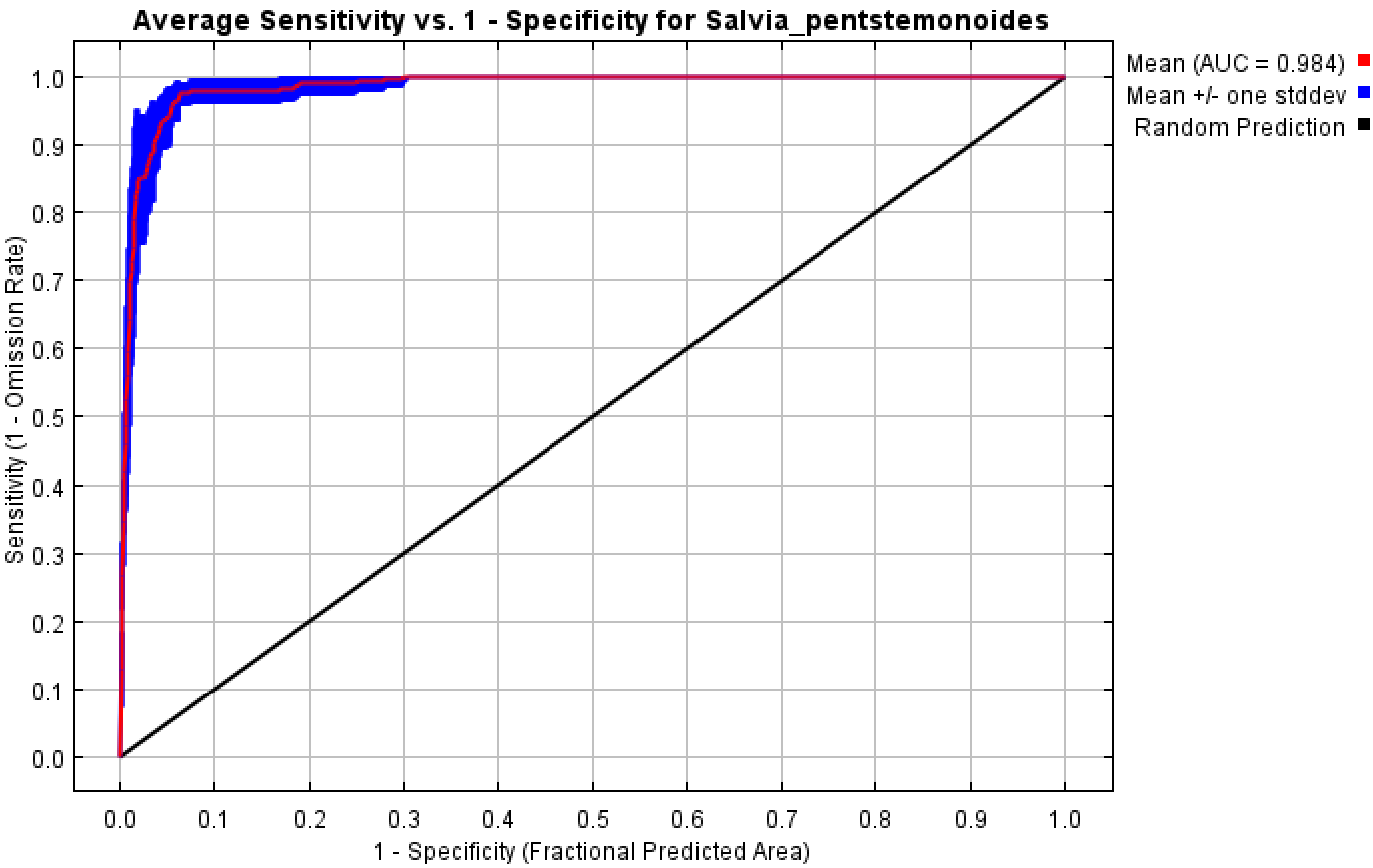
This page summarizes the results of 10 bootstrap models for Salvia_pentstemonoides, created Tue Dec 07 14:53:47 CST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4] [5] [6] [7] [8] [9]

Analysis of omission/commission

The following picture shows the training omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs.

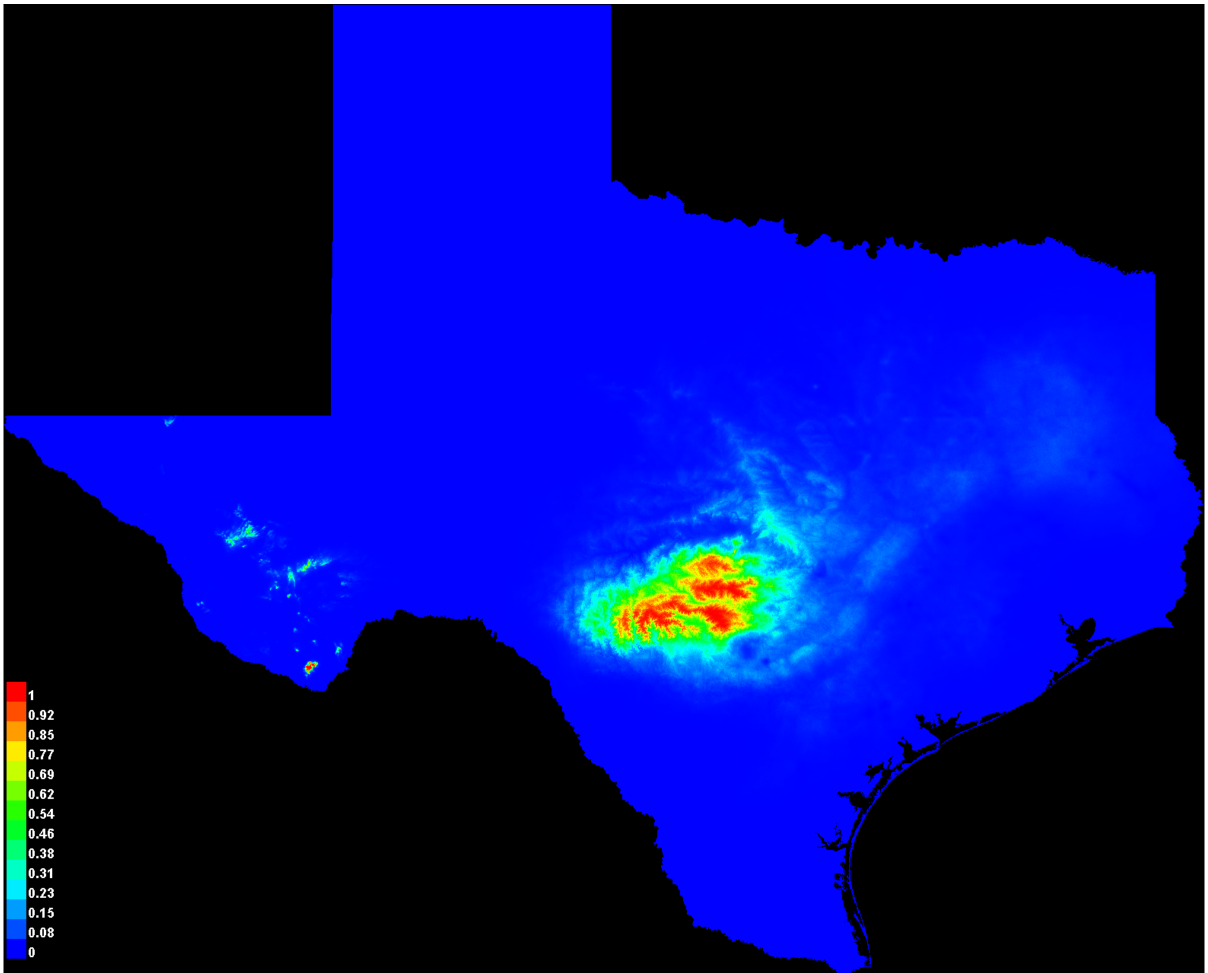


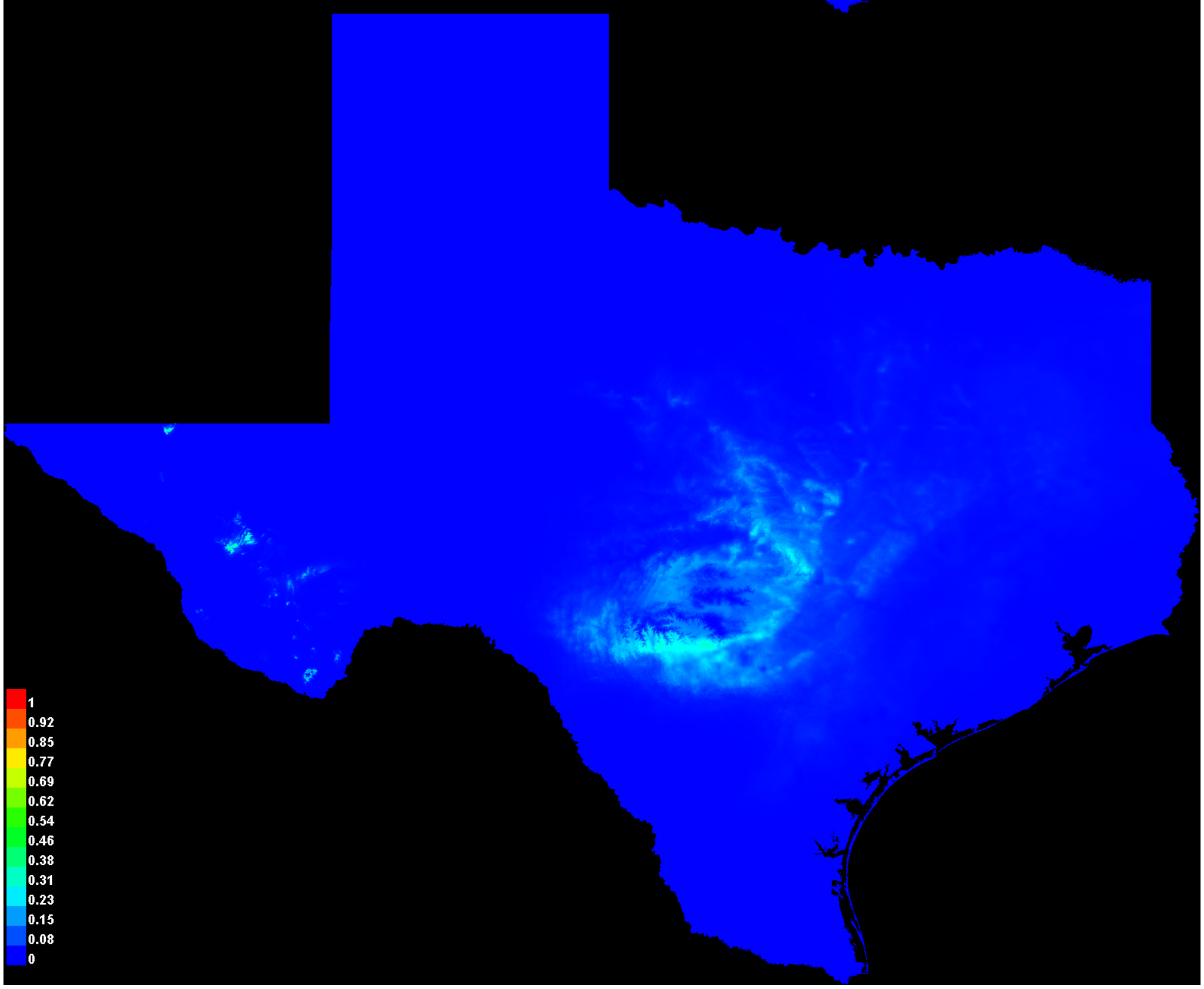
The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average training AUC for the replicate runs is 0.984, and the standard deviation is 0.004.



Pictures of the model

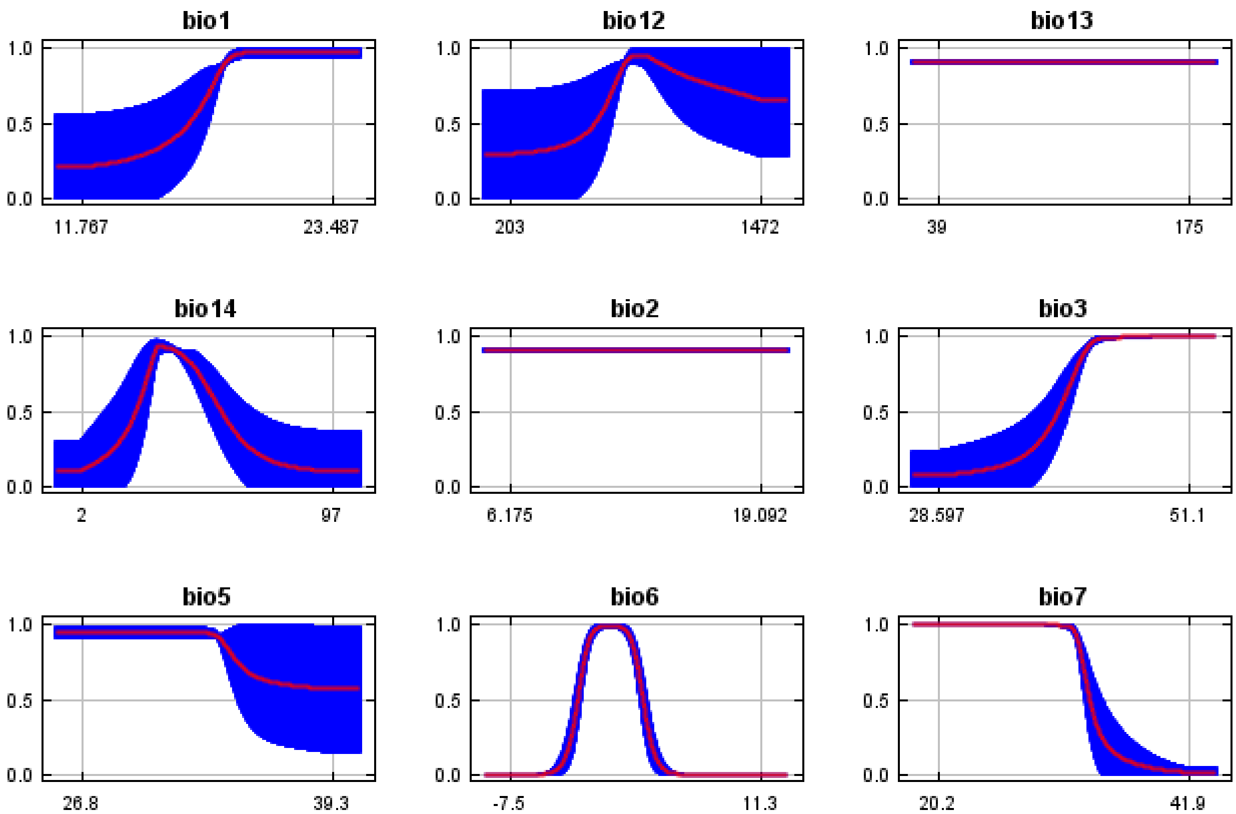
The following two pictures show the point-wise mean and standard deviation of the 10 output grids. Other available summary grids are min, max and median.


1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

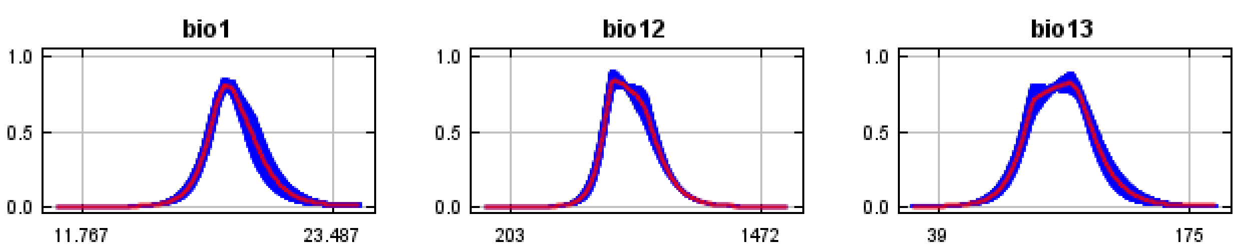

1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

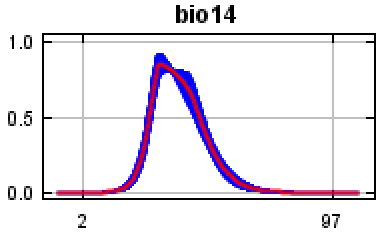
Response curves

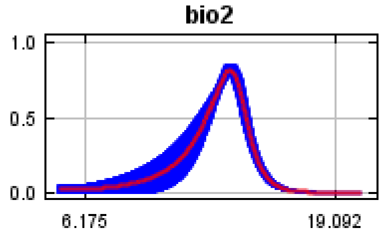
These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 10 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).

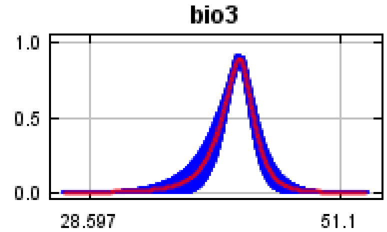


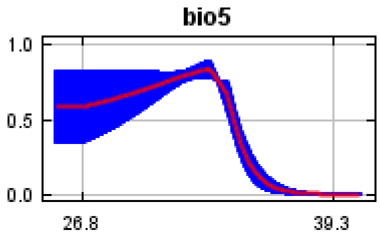
In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.

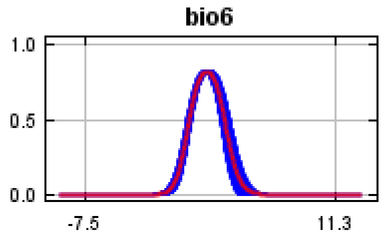


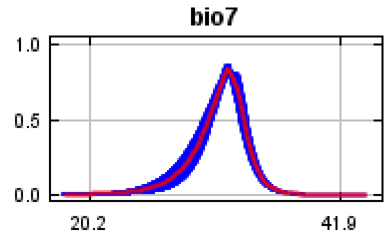










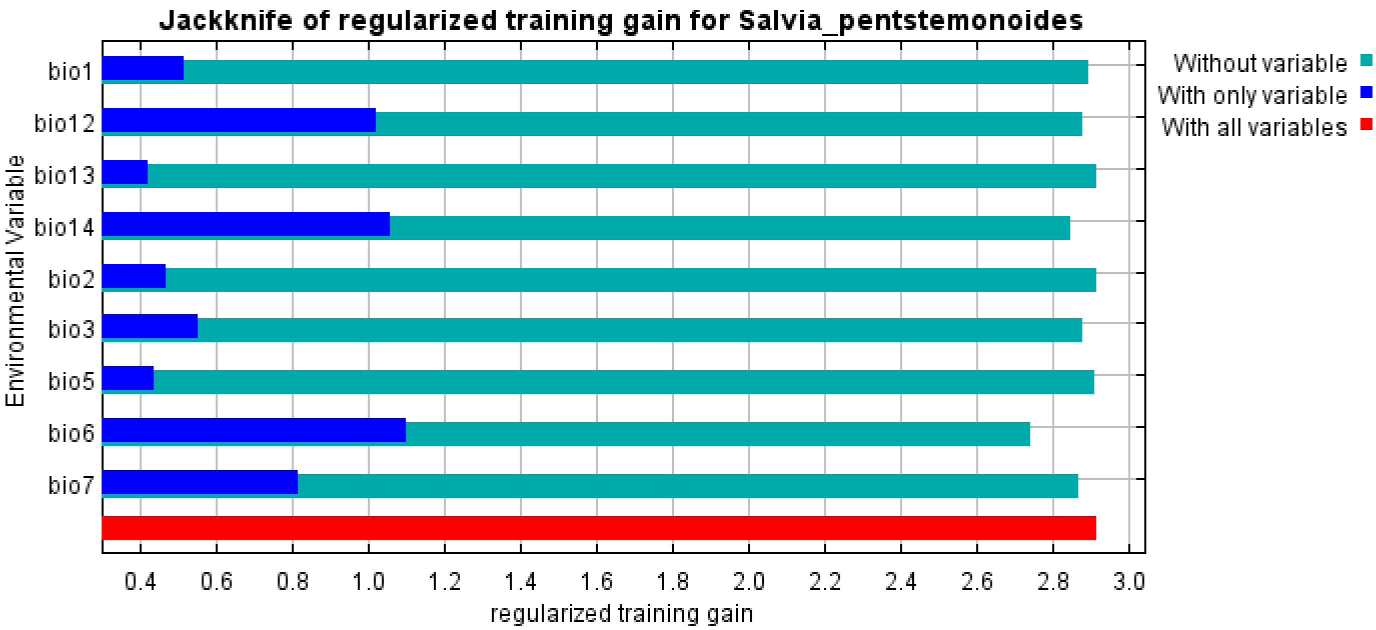


Analysis of variable contributions

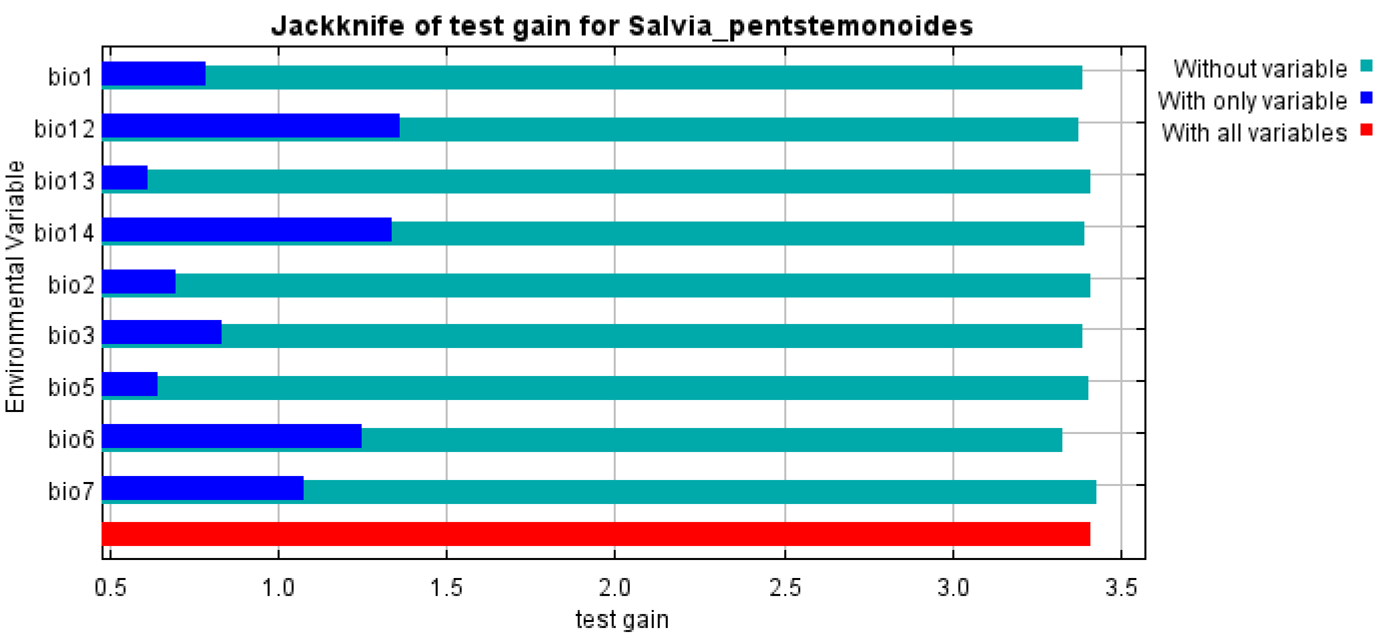
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio14	23.1	12.8
bio5	22	4.1
bio7	19.2	30.3
bio12	18.2	9.6
bio3	7.7	5.9
bio1	6.7	6.3
bio6	2.8	31.1
bio13	0.3	0
bio2	0	0

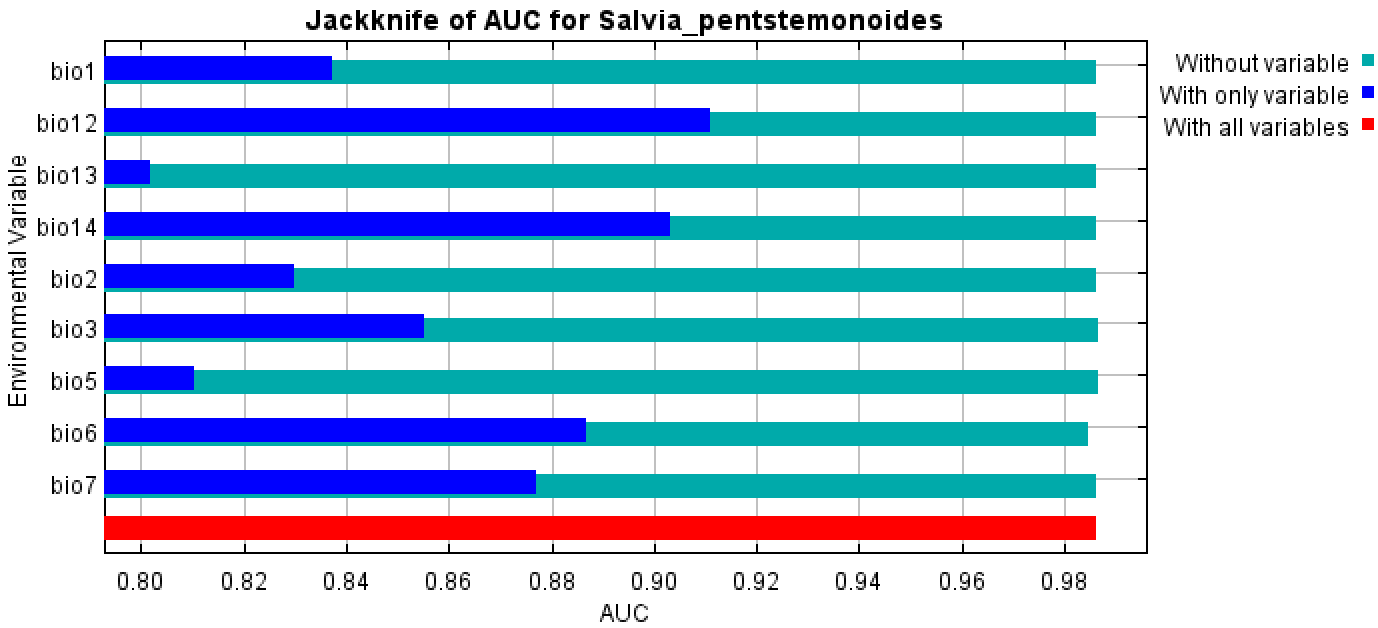
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio6, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio6, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



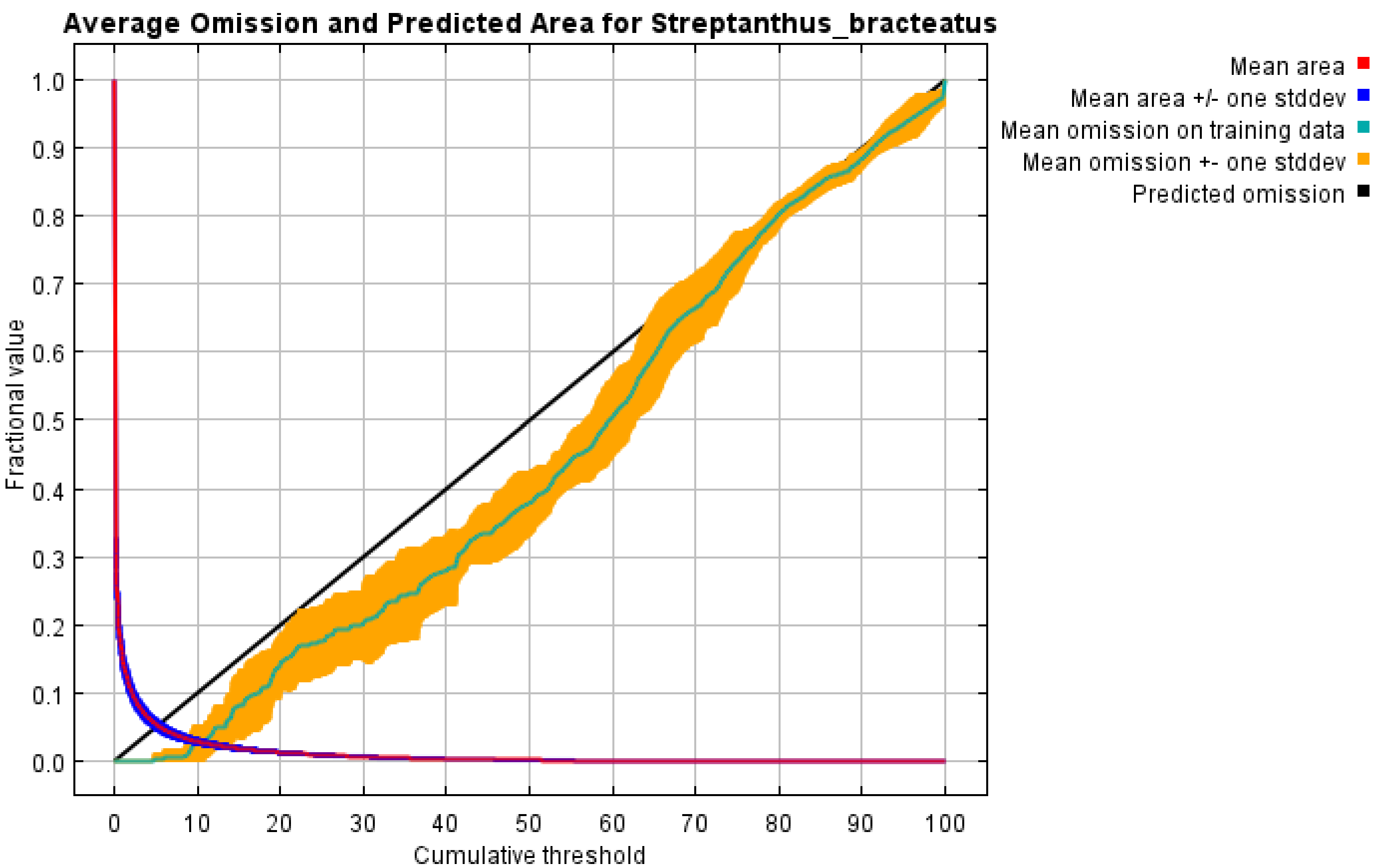
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Salvia_pentstemonoides responsecurves jackknife outputdirectory=E:\TXDoT_TXScale\Results\Salvia_bio "samplesfile=E:\TXDoT_Range Scale_Bioclim\spp_csv\Salvia_pentstemonoides.csv" environmentallayers=E:\TXDoT_TXScale\Bio_TX_Ascii randomseed randomtestpoints=25 replicates=10 replicatetype=bootstrap writebackgroundpredictions -N perm -N ph -N poro

Replicated maxent model for Streptanthus_bracteatus

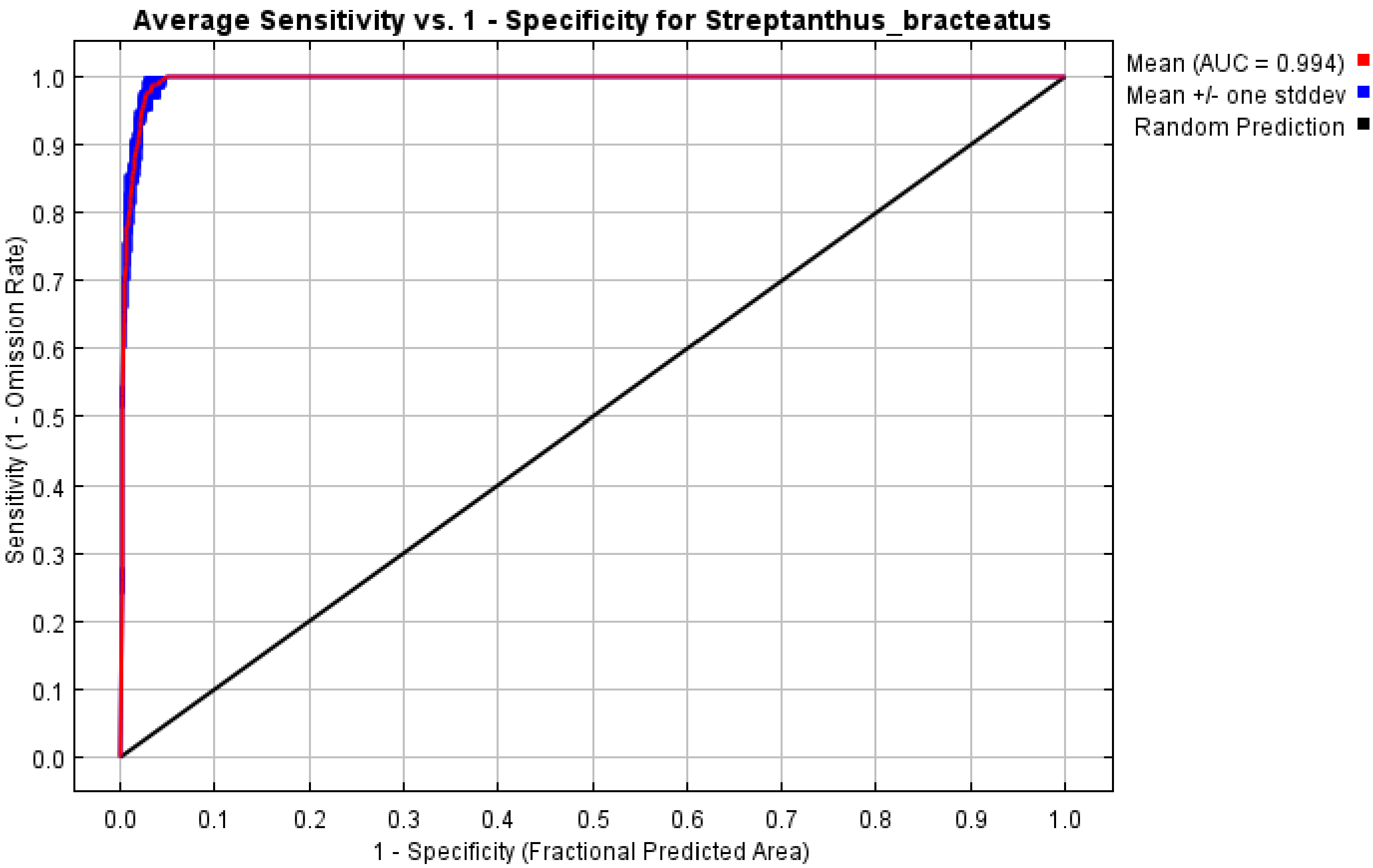
This page summarizes the results of 10 bootstrap models for Streptanthus_bracteatus, created Sat Oct 30 14:20:55 CDT 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4] [5] [6] [7] [8] [9]

Analysis of omission/commission

The following picture shows the training omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs.

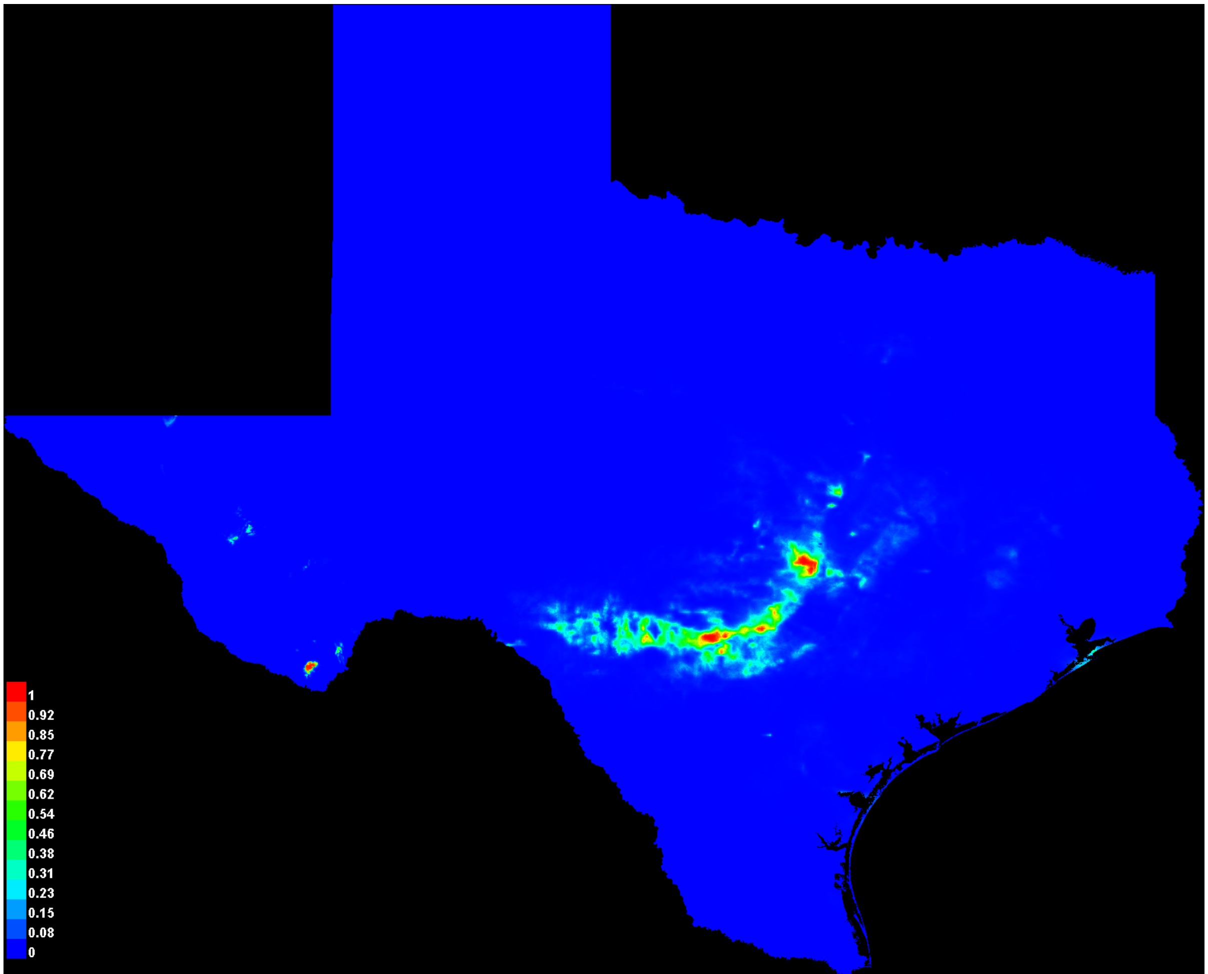


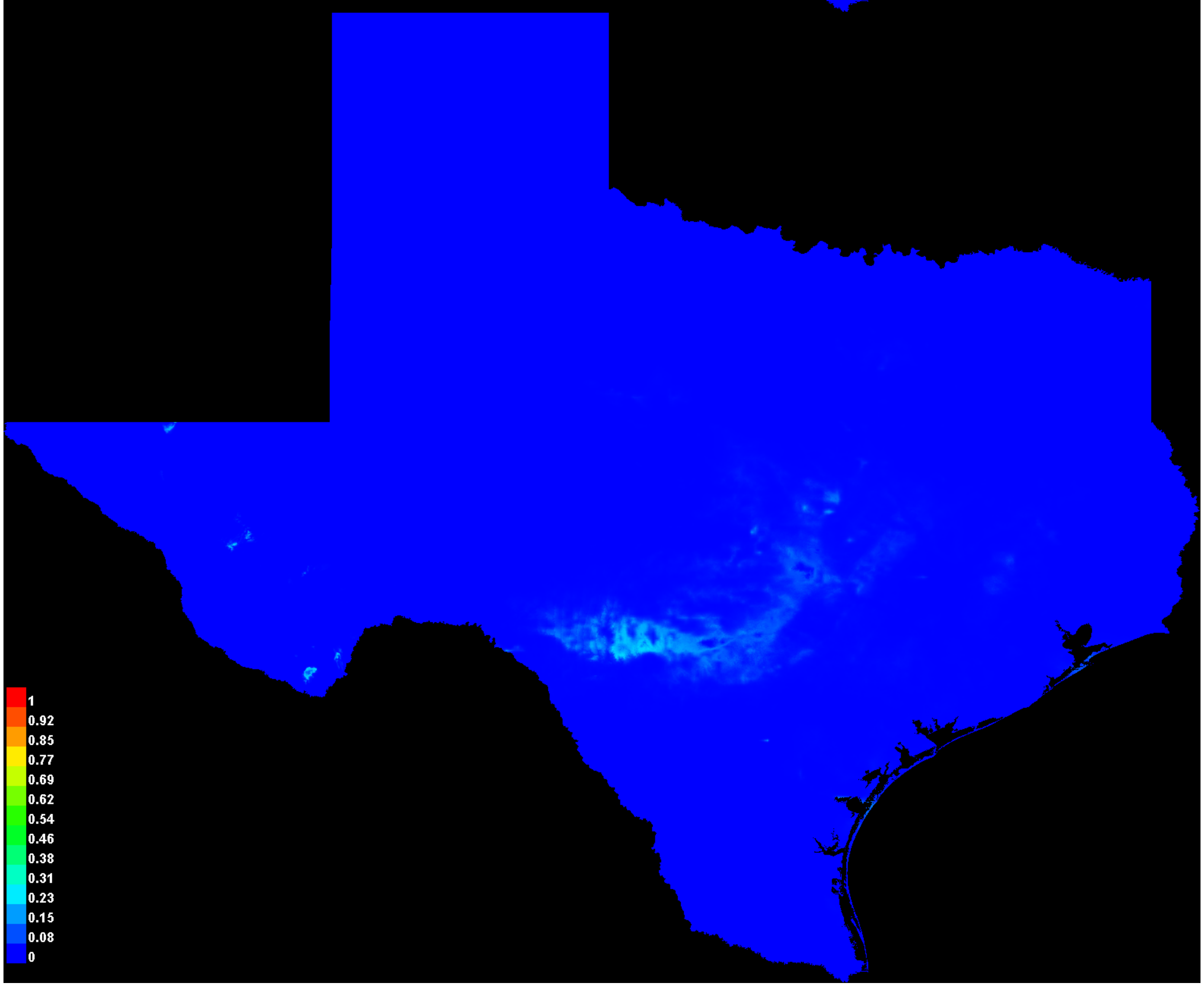
The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average training AUC for the replicate runs is 0.994, and the standard deviation is 0.001.



Pictures of the model

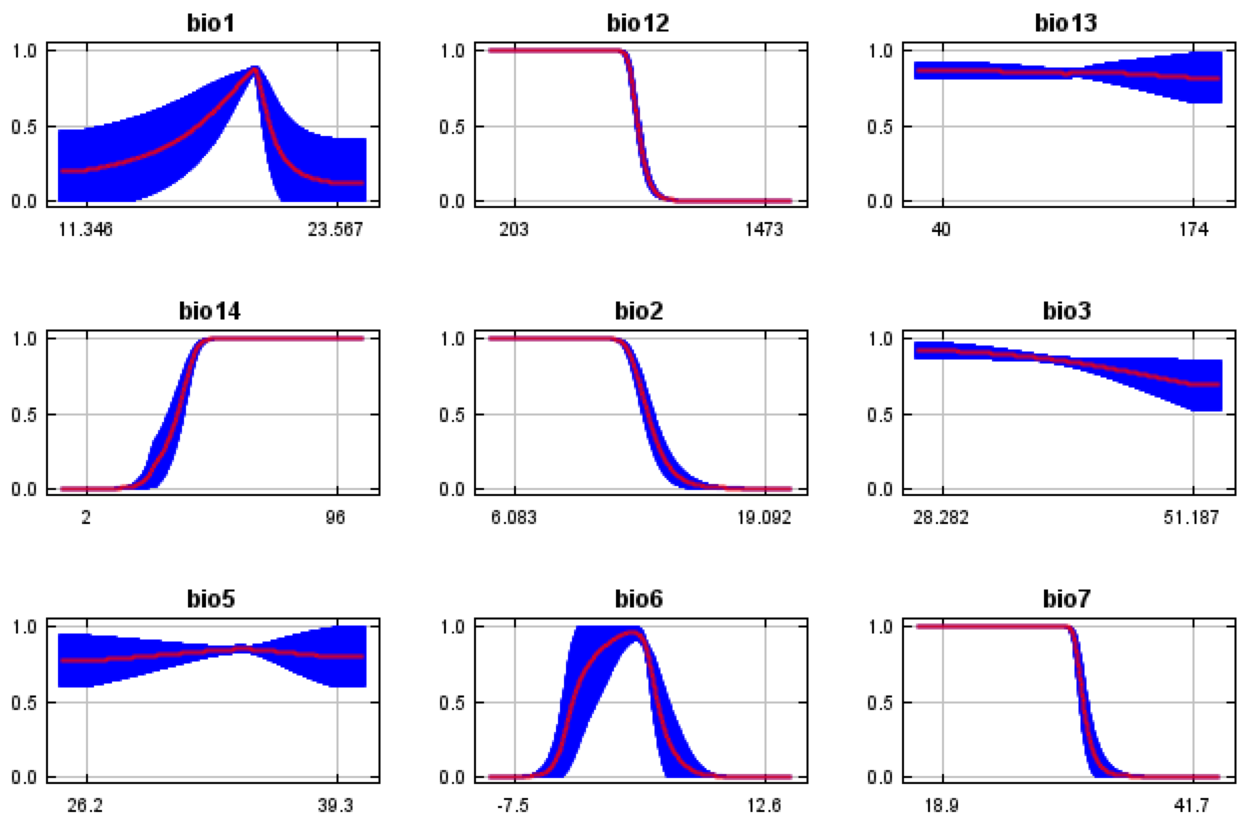
The following two pictures show the point-wise mean and standard deviation of the 10 output grids. Other available summary grids are min, max and median.


1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

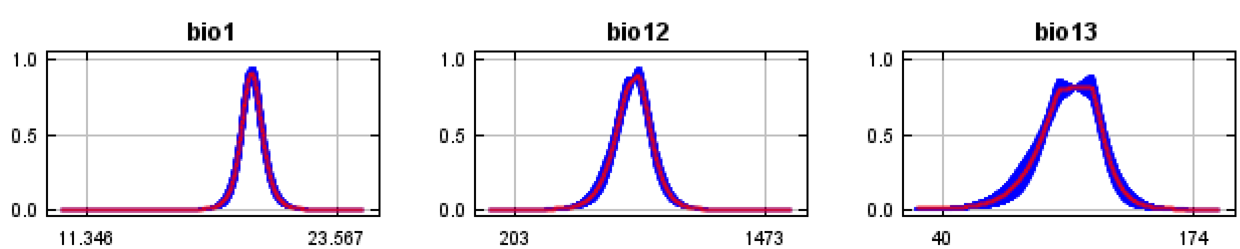

1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

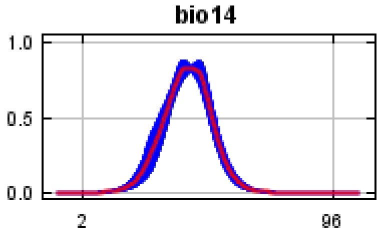
Response curves

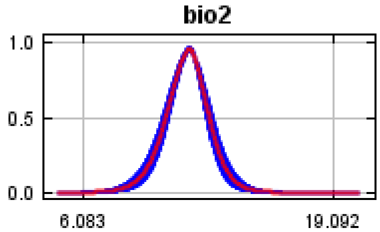
These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 10 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).

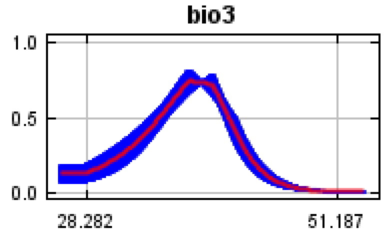


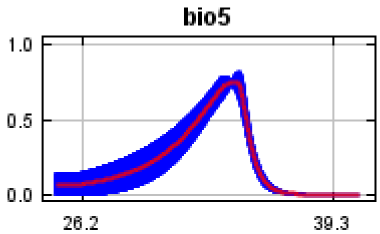
In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.

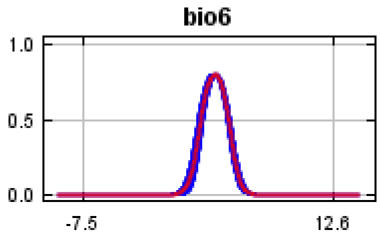


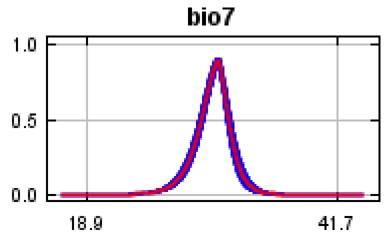










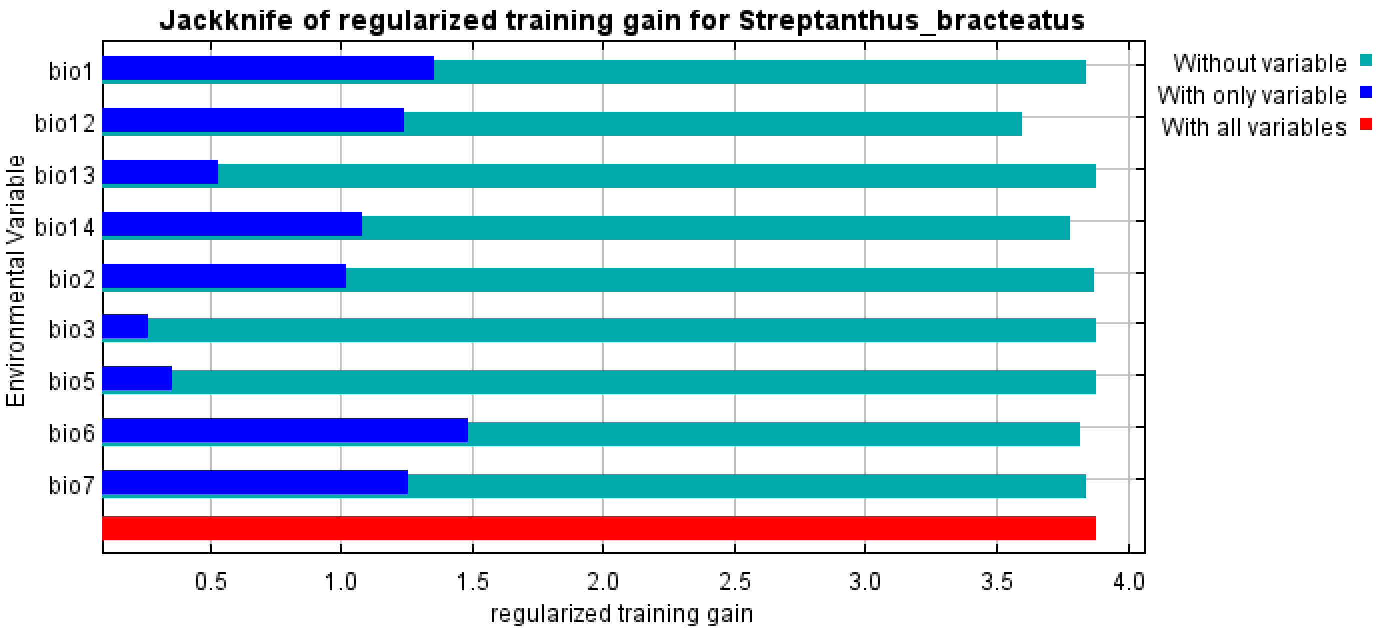


Analysis of variable contributions

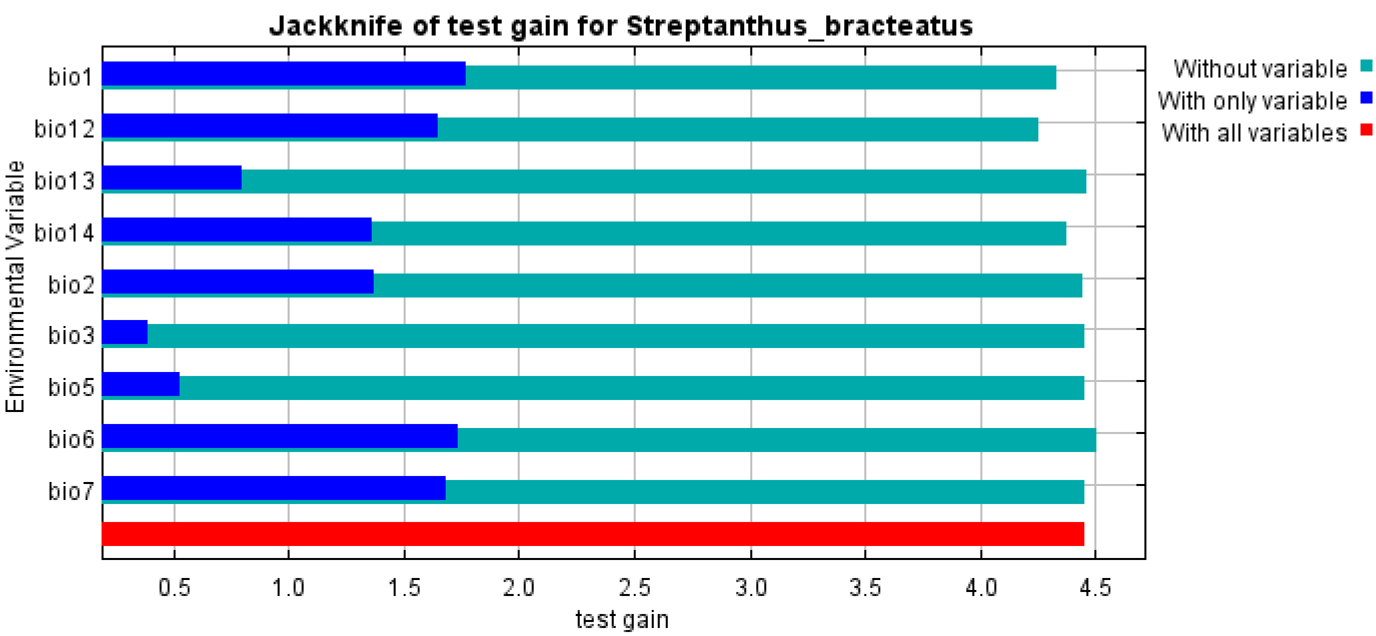
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio7	42.6	29.7
bio12	22.1	27.9
bio1	16.6	4.1
bio14	12.6	20.7
bio2	3.1	5.3
bio5	1.6	0
bio6	1	12.3
bio3	0.3	0
bio13	0.2	0

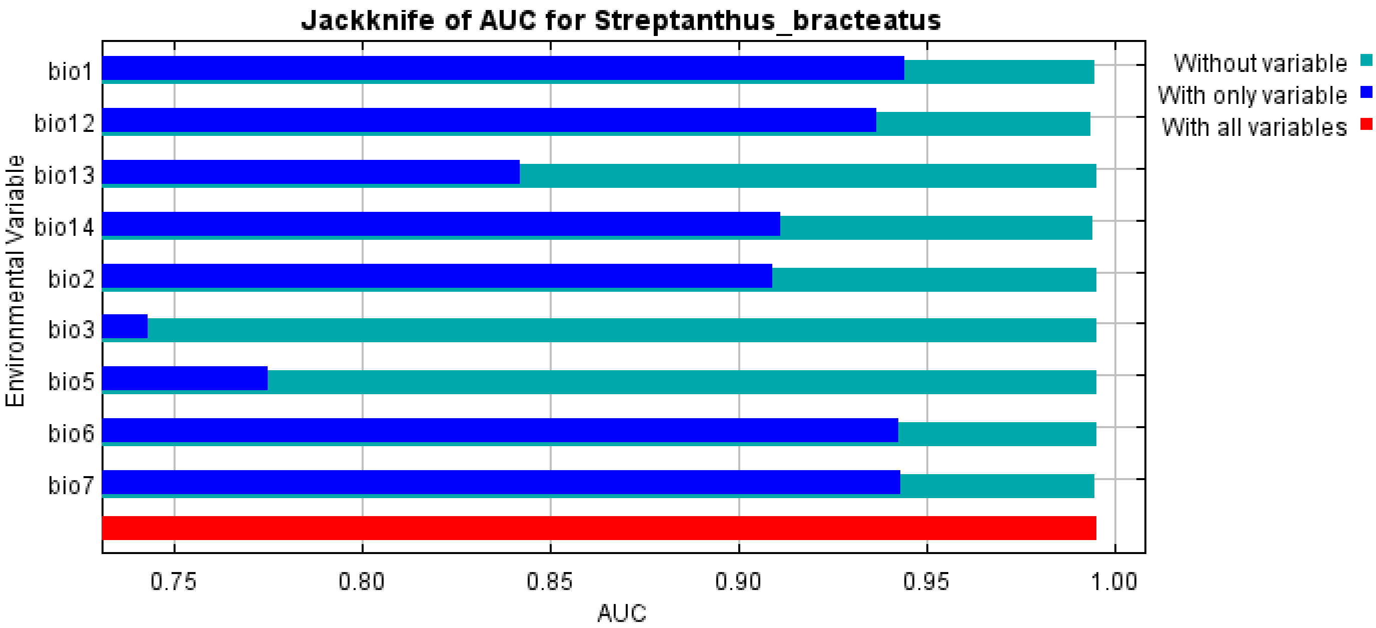
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio6, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio12, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



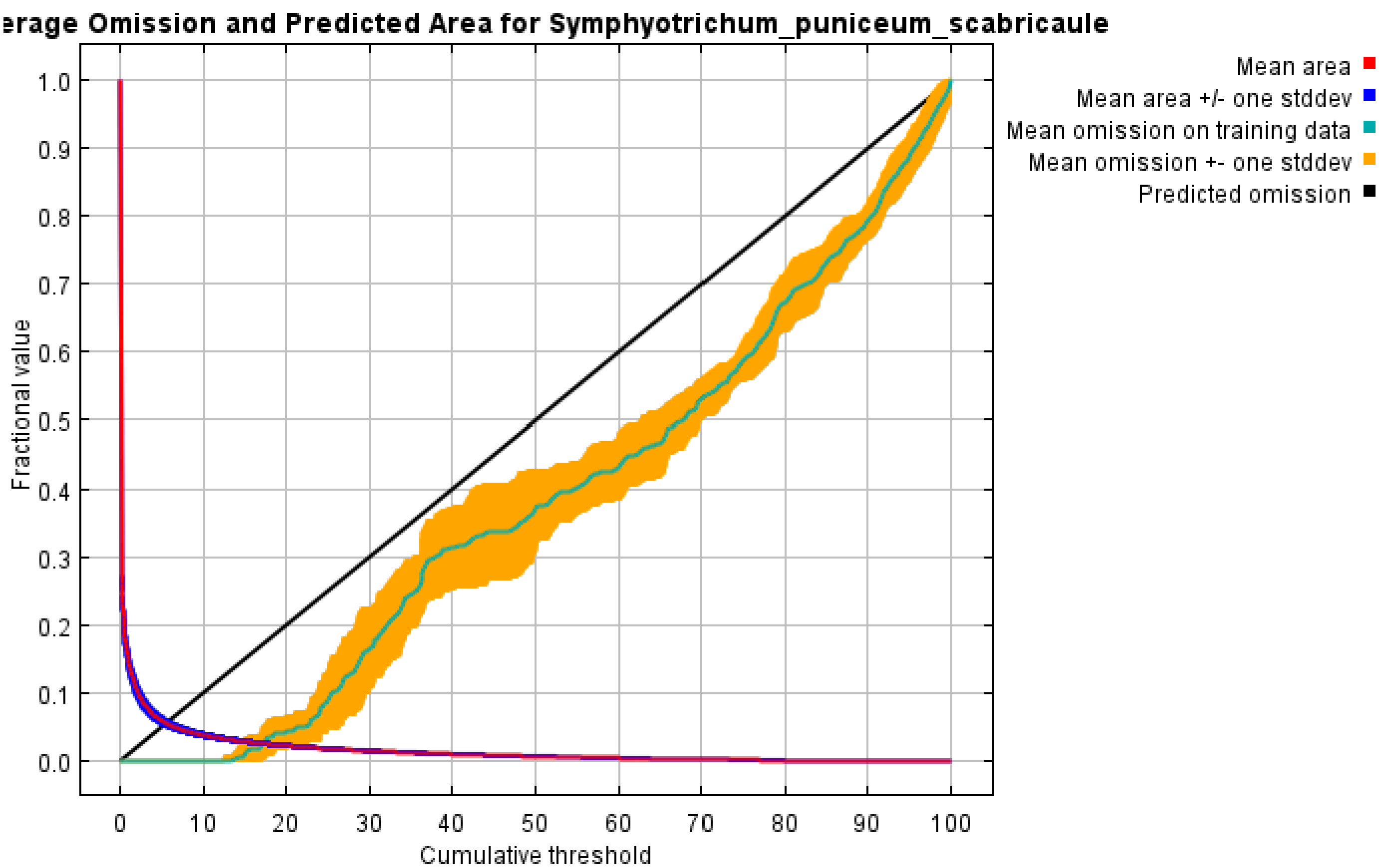
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Streptanthus_bracteatus responsecurves jackknife outputdirectory=E:\TXDoT_TXScale\Results\Streptanthus_bio samplesfile=E:\TXDoT_TXScale\spp_csv\Streptanthus_bracteatus.csv environmentallayers=E:\TXDoT_TXScale\Bio_TX_Ascii randomseed randomtestpoints=25 replicates=10 replicatetype=bootstrap -N perm -N ph -N poro

Replicated maxent model for Symphyotrichum_puniceum_scabricaule

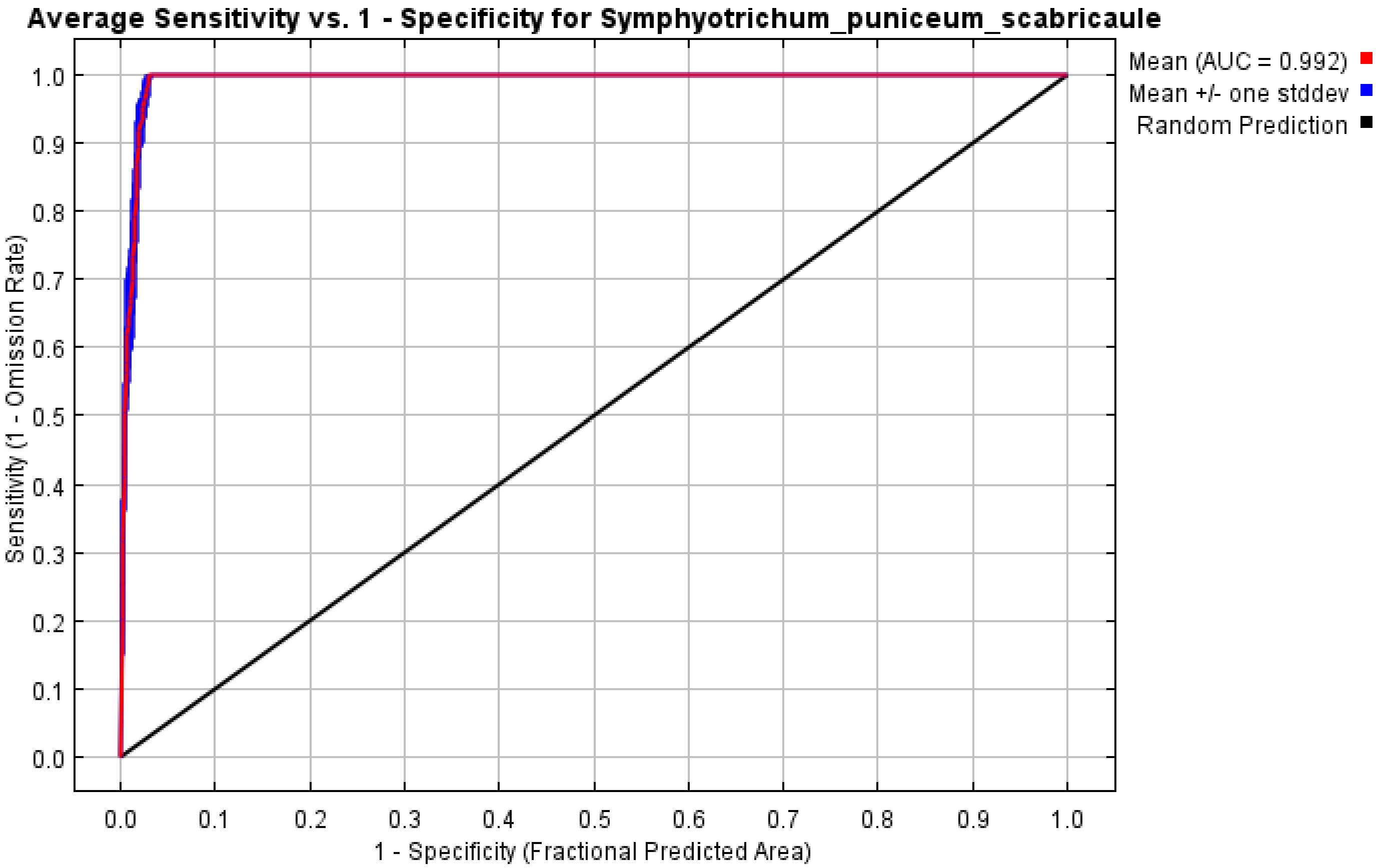
This page summarizes the results of 10 bootstrap models for Symphyotrichum_puniceum_scabricaule, created Sat Oct 30 14:30:22 CDT 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4] [5] [6] [7] [8] [9]

Analysis of omission/commission

The following picture shows the training omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs.

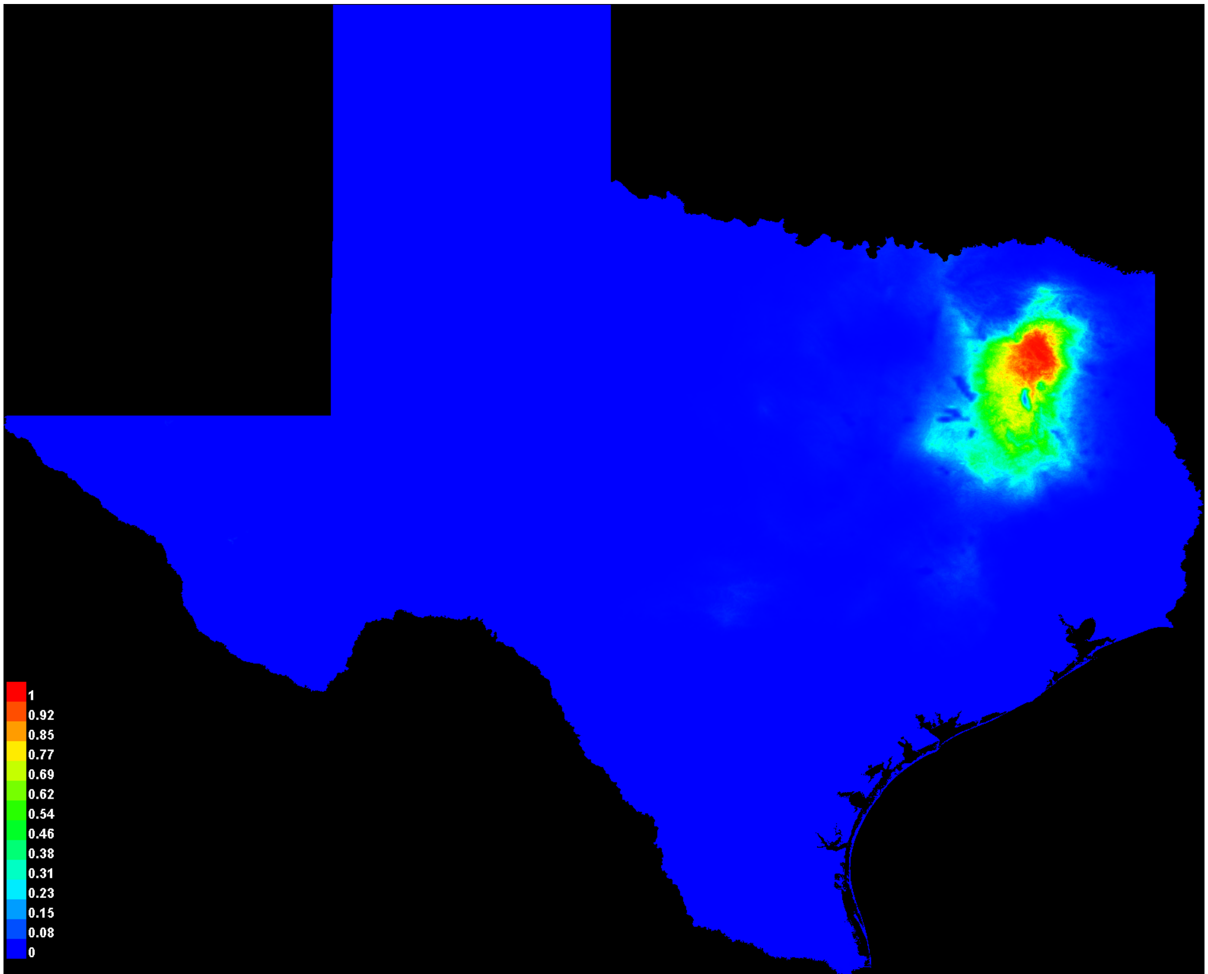


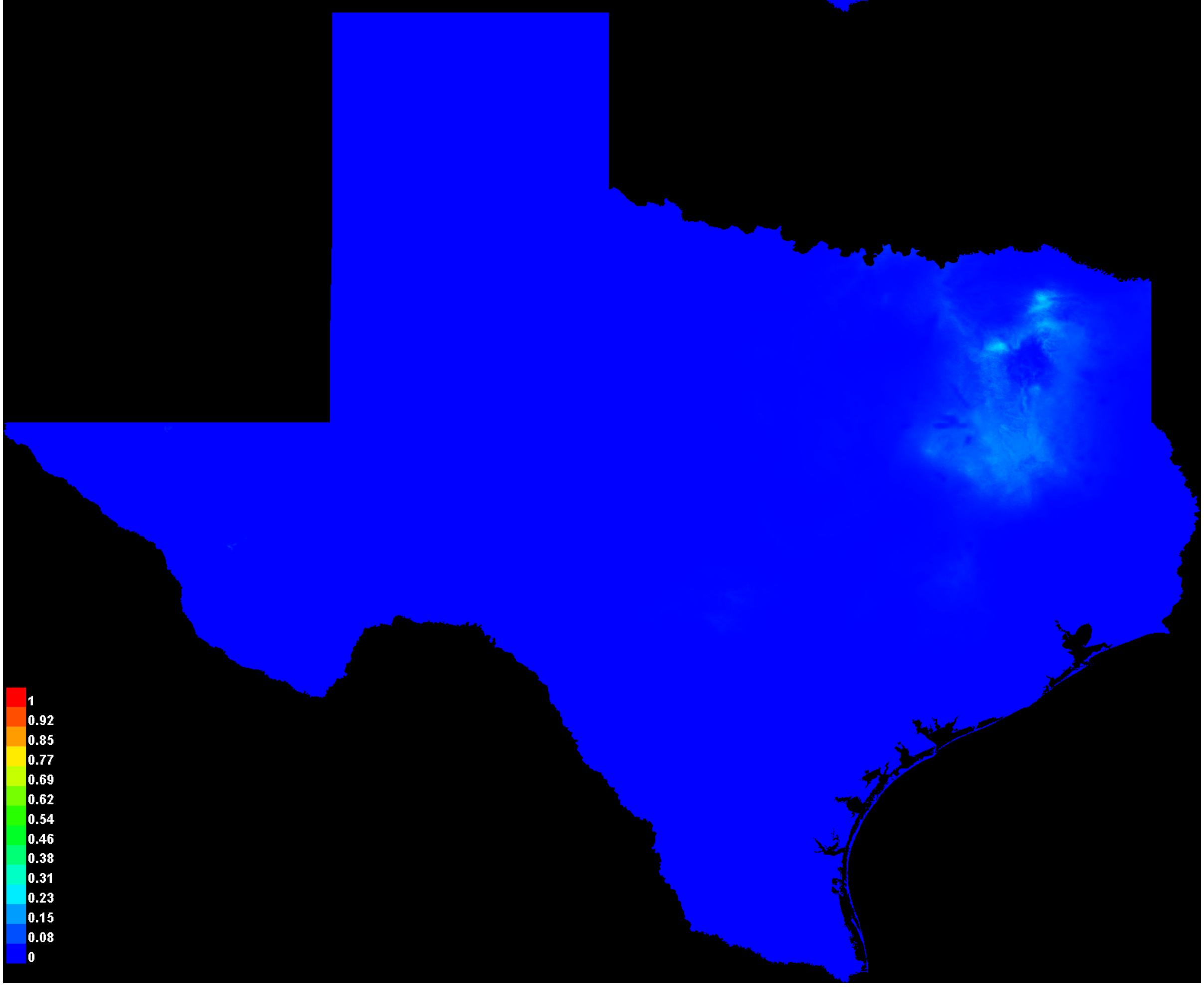
The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average training AUC for the replicate runs is 0.992, and the standard deviation is 0.001.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 10 output grids. Other available summary grids are min, max and median.

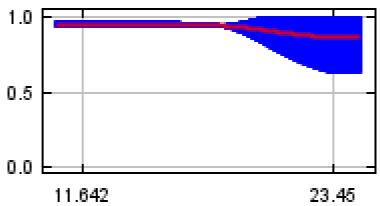

1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0


1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

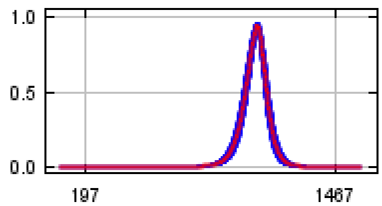
Response curves

These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 10 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).

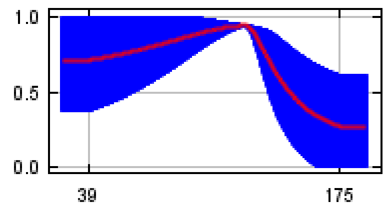
bio1



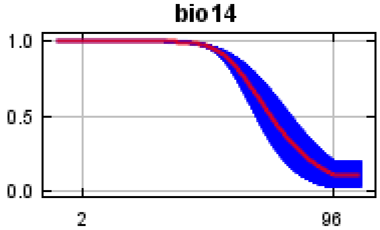
bio12



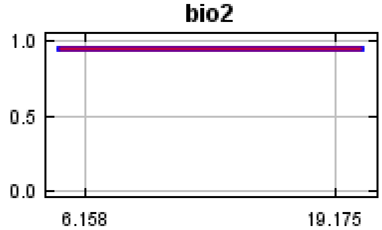
bio13



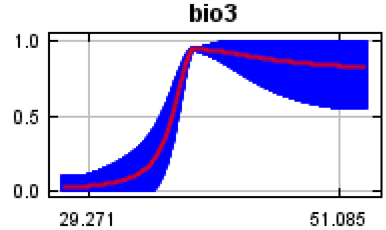
bio14



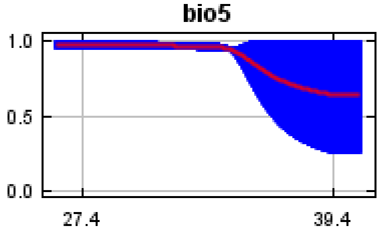
bio2



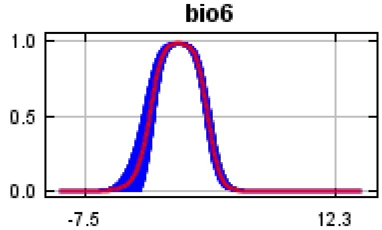
bio3



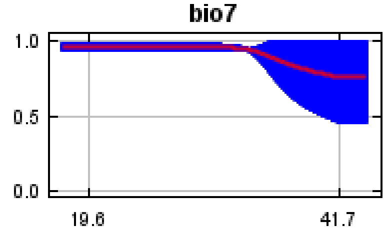
bio5



bio6

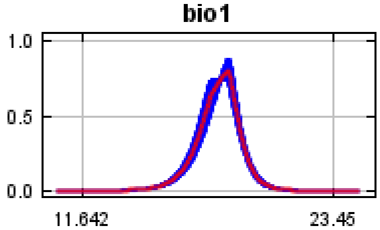


bio7

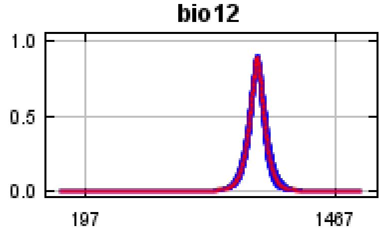


In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.

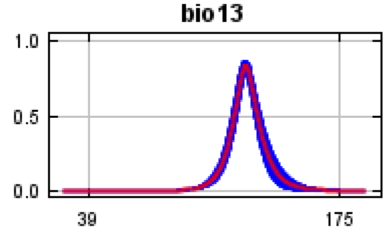
bio1

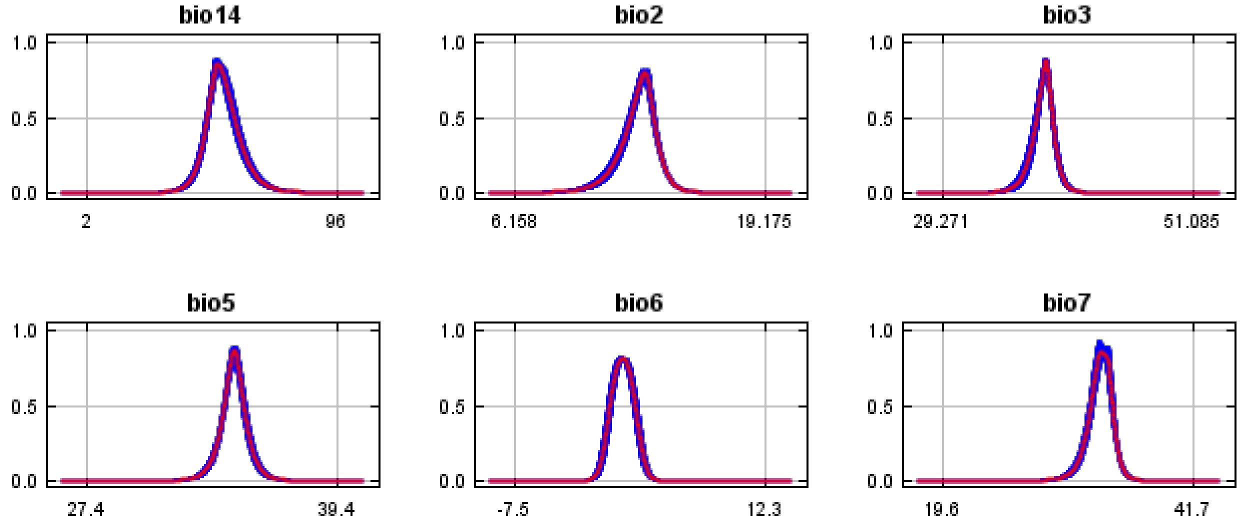


bio12



bio13



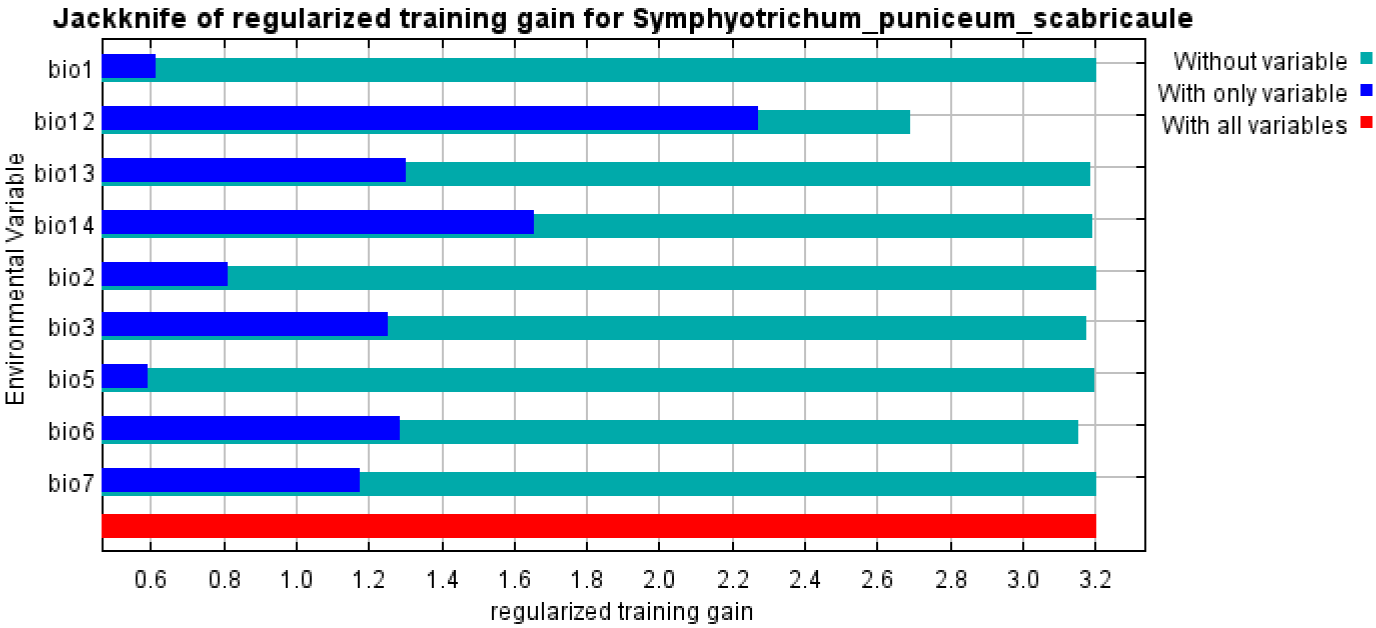


Analysis of variable contributions

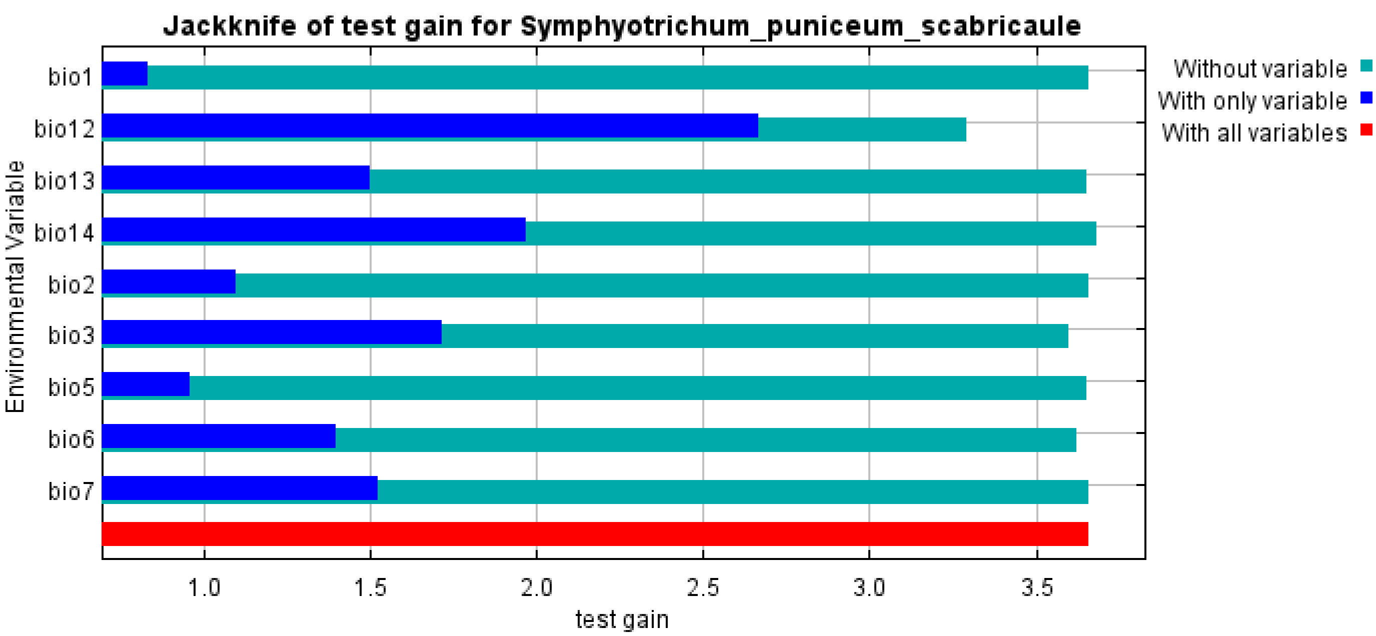
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio12	47.4	75.8
bio14	29	0.7
bio1	11.8	0.1
bio13	4.8	0.8
bio3	4.1	1.1
bio6	2.8	20.4
bio5	0.1	0.5
bio7	0	0.6
bio2	0	0

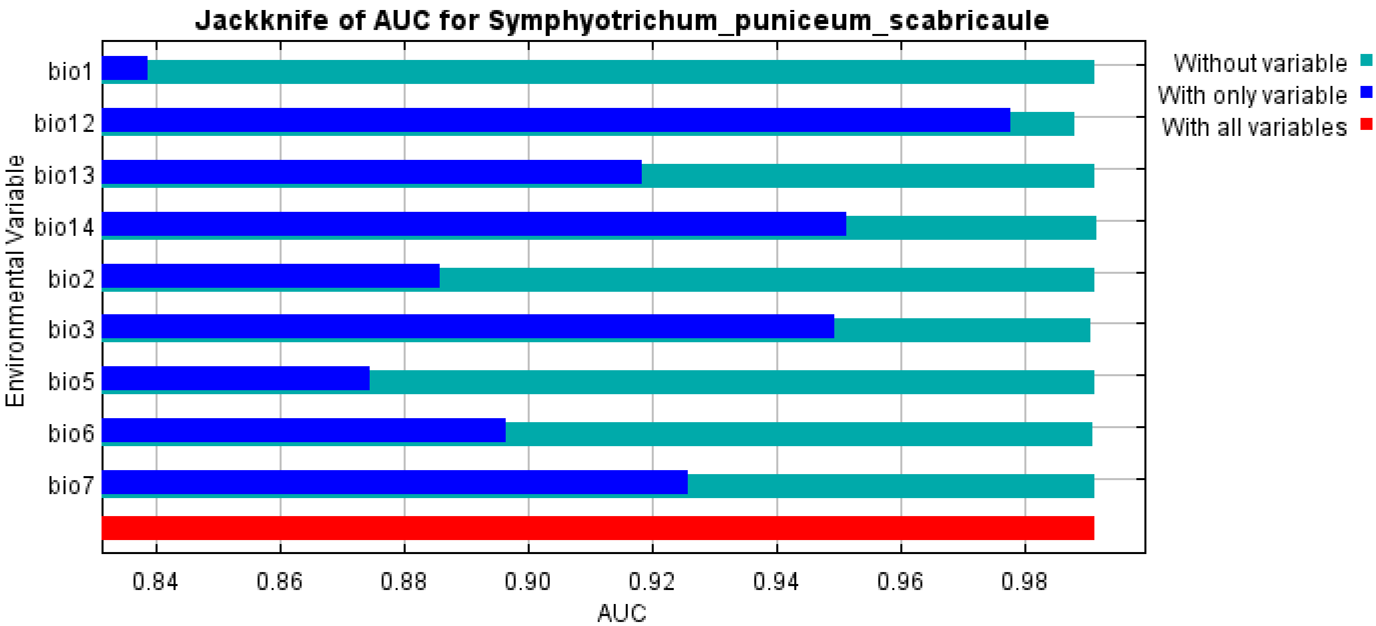
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio12, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio12, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



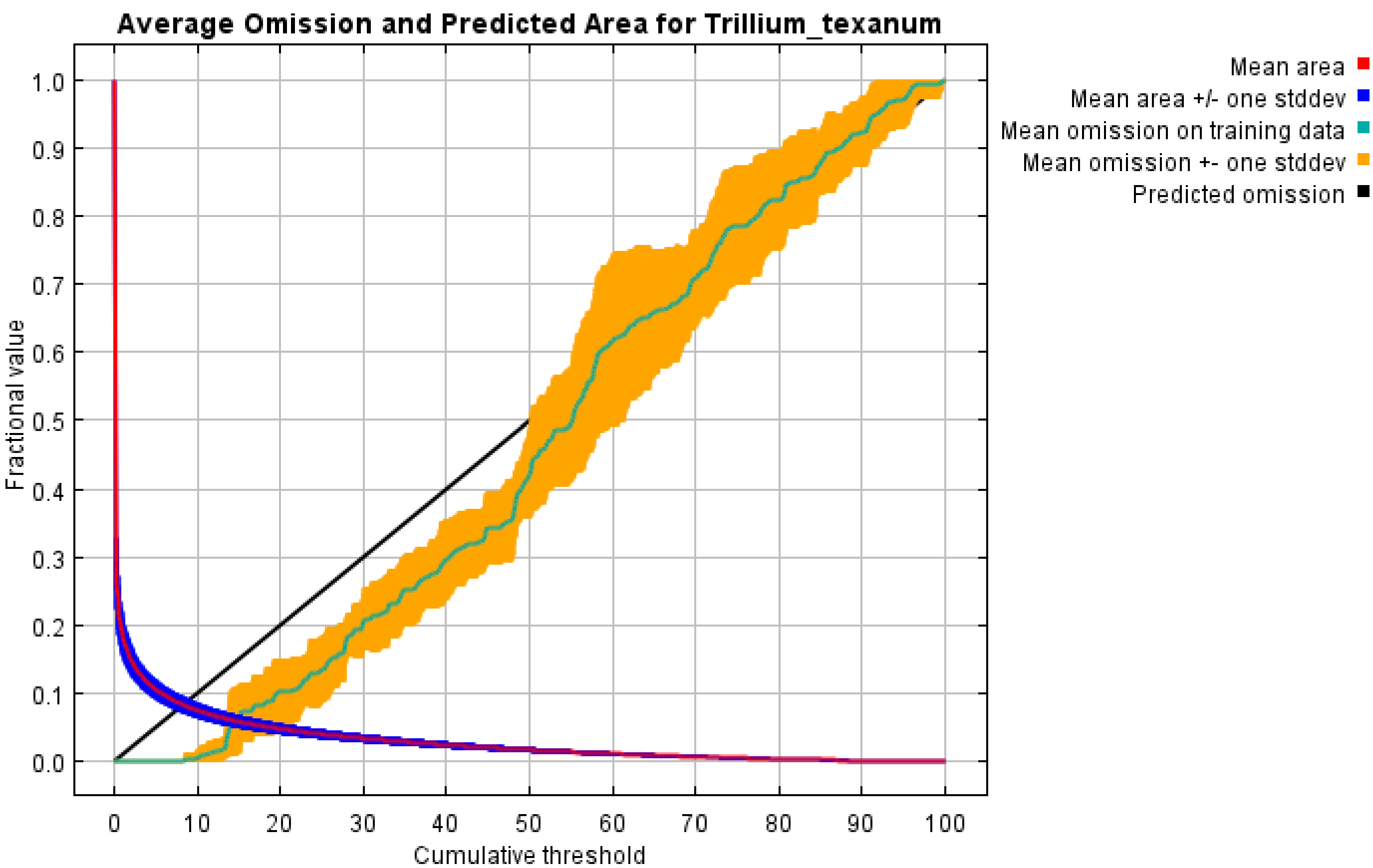
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Symphyotrichum_puniceum_scabricaule responsecurves jackknife outputdirectory=E:\TXDoT_TXScale\Results\Symphyotrichum_bio samplesfile=E:\TXDoT_TXScale\spp_csv\Symphyotrichum_puniceum_scabricaule.csv environmentallayers=E:\TXDoT_TXScale\Bio_TX_Ascii randomseed randomtestpoints=25 replicates=10 replicatetype=bootstrap -N perm -N ph -N poro

Replicated maxent model for Trillium_texanum

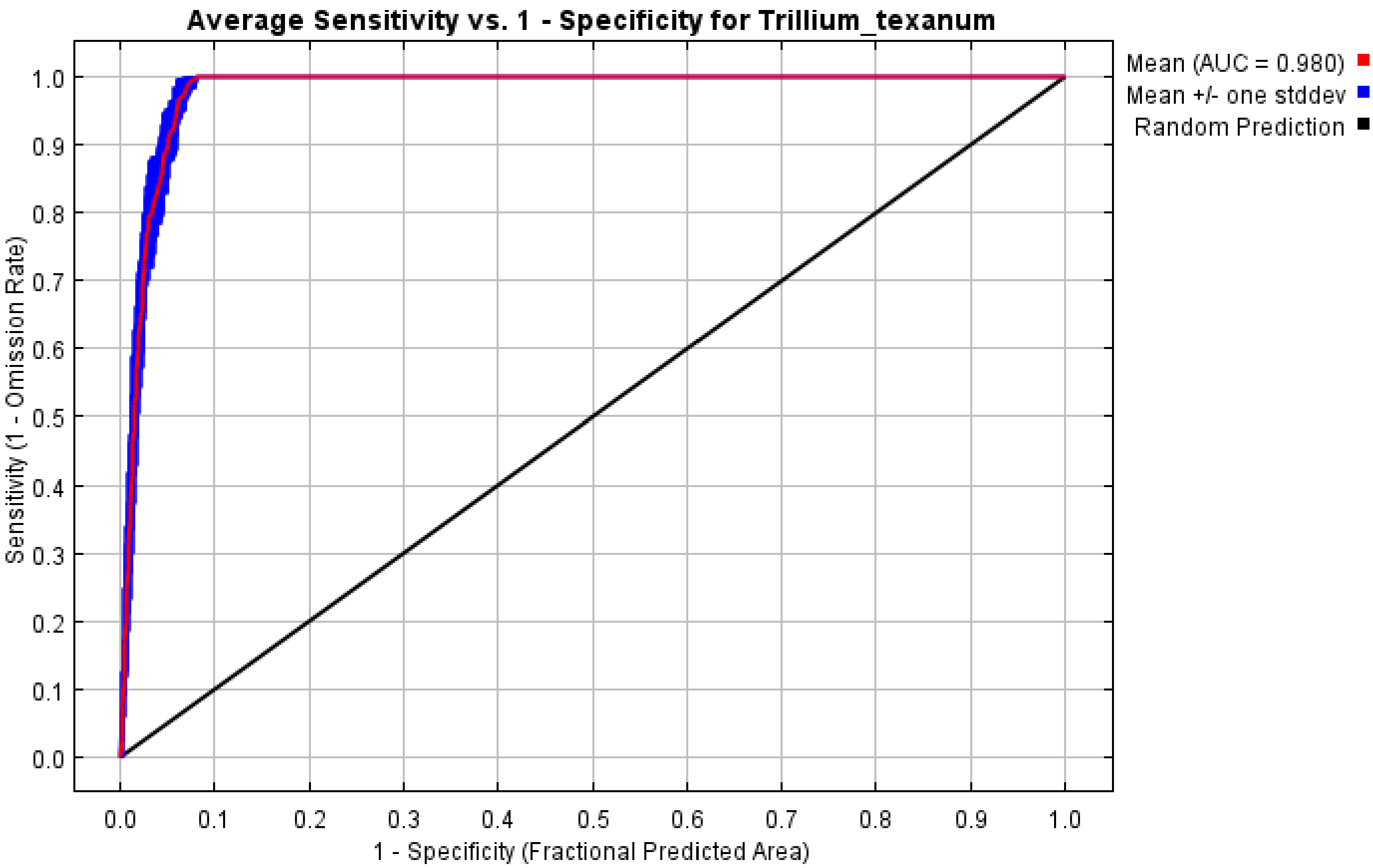
This page summarizes the results of 10 bootstrap models for Trillium_texanum, created Sat Oct 30 14:36:51 CDT 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4] [5] [6] [7] [8] [9]

Analysis of omission/commission

The following picture shows the training omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs.

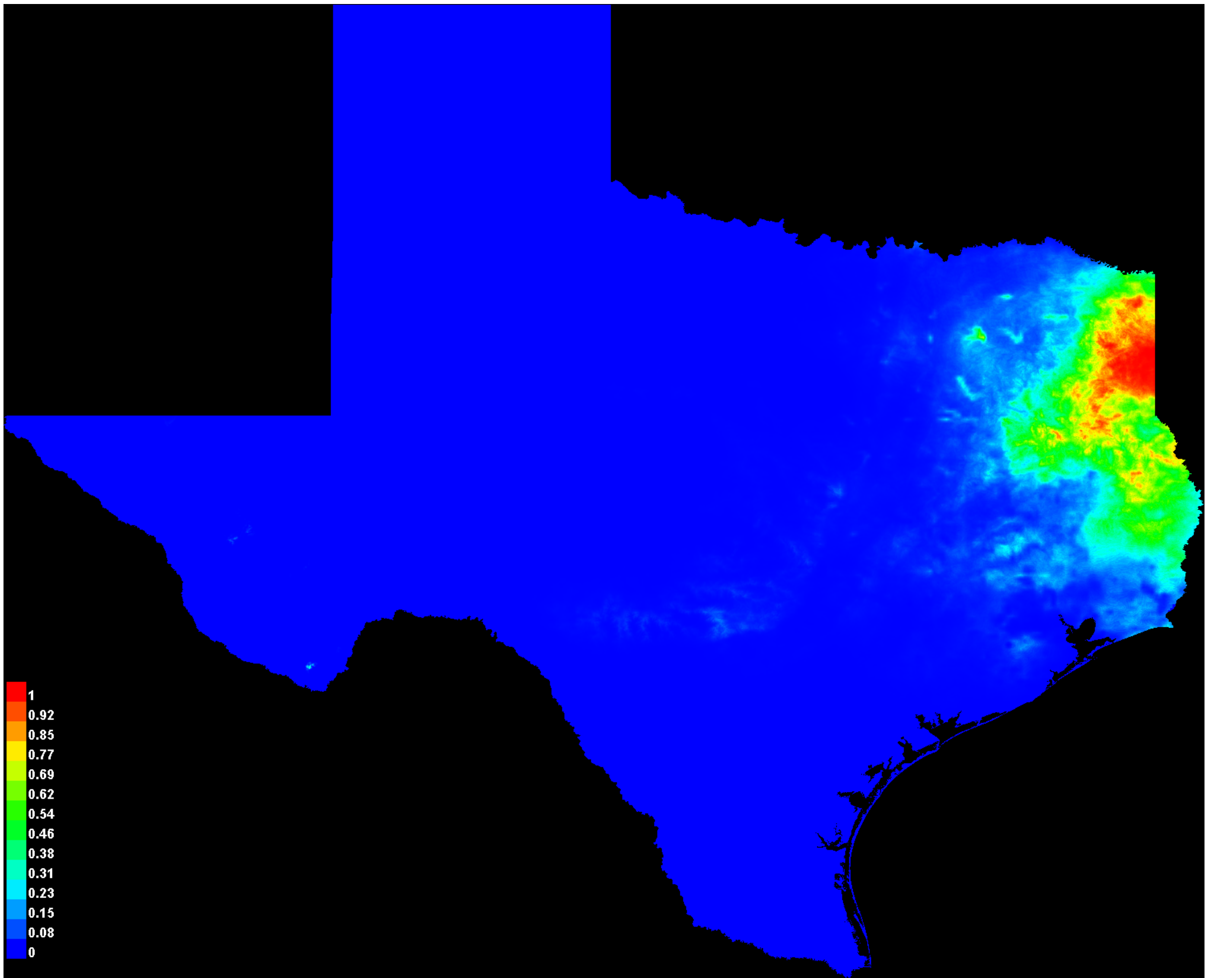


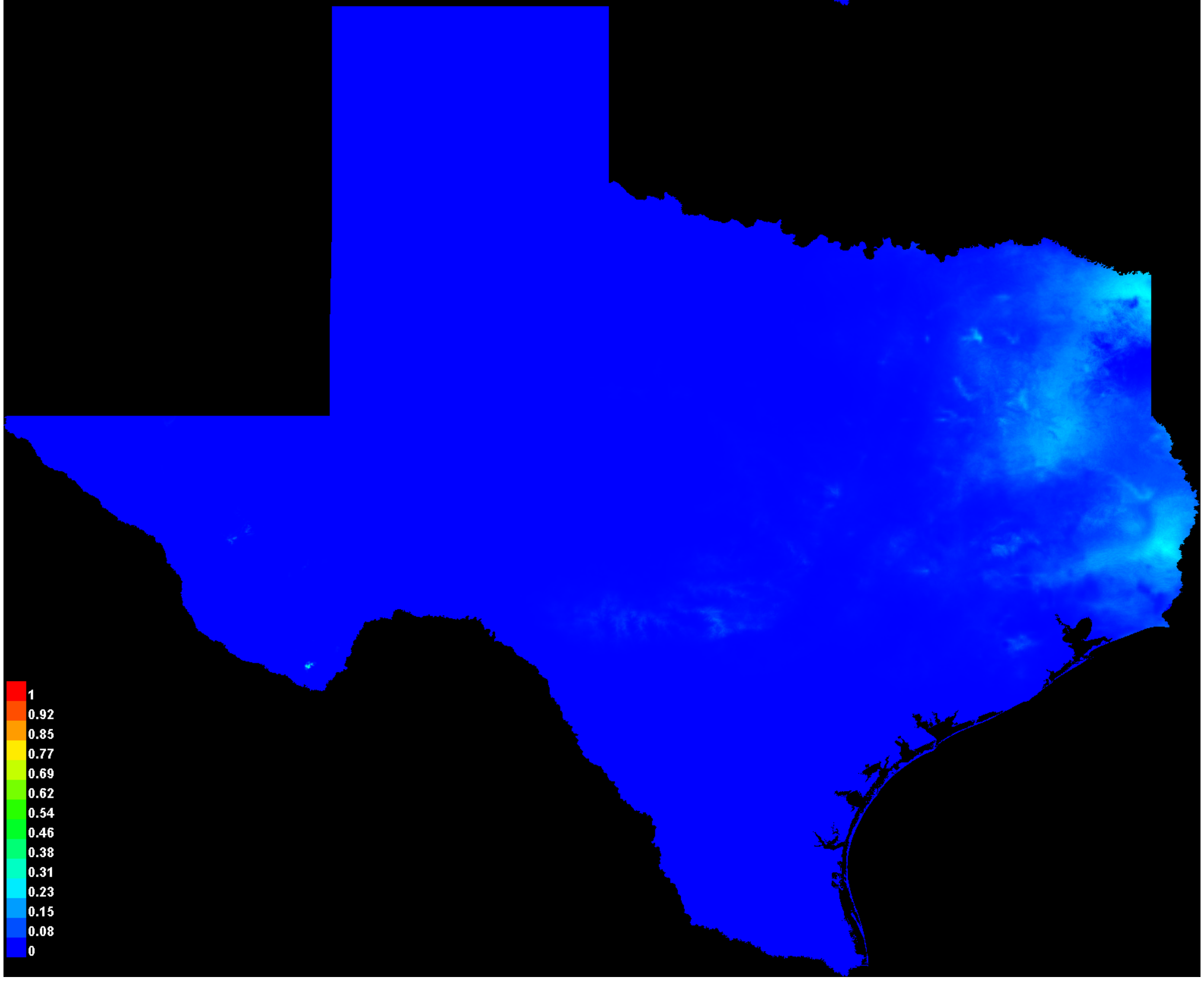
The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average training AUC for the replicate runs is 0.980, and the standard deviation is 0.003.



Pictures of the model

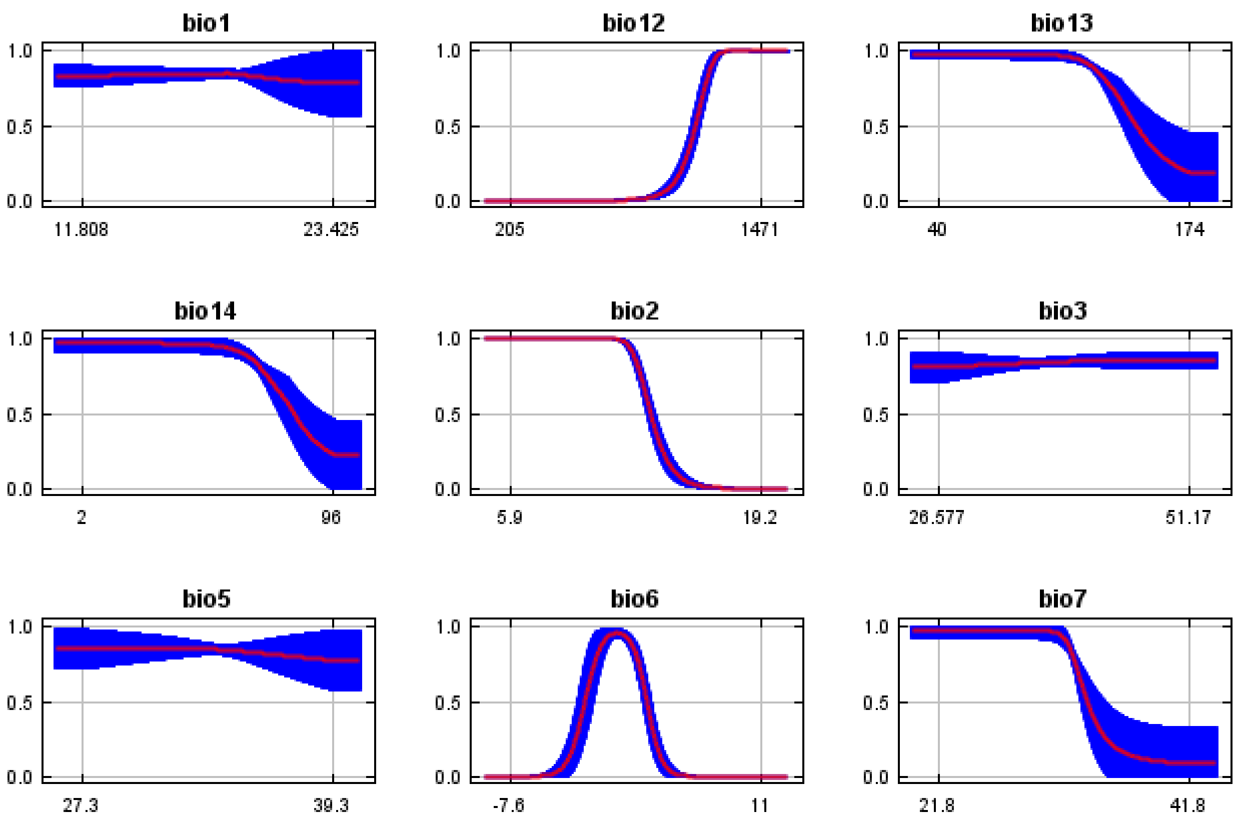
The following two pictures show the point-wise mean and standard deviation of the 10 output grids. Other available summary grids are min, max and median.


1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

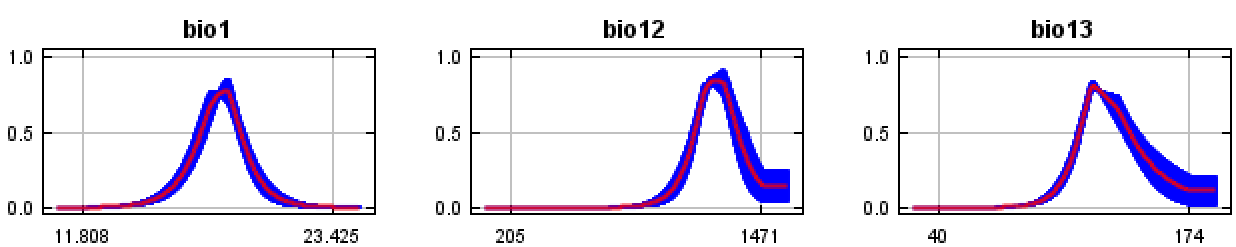

1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

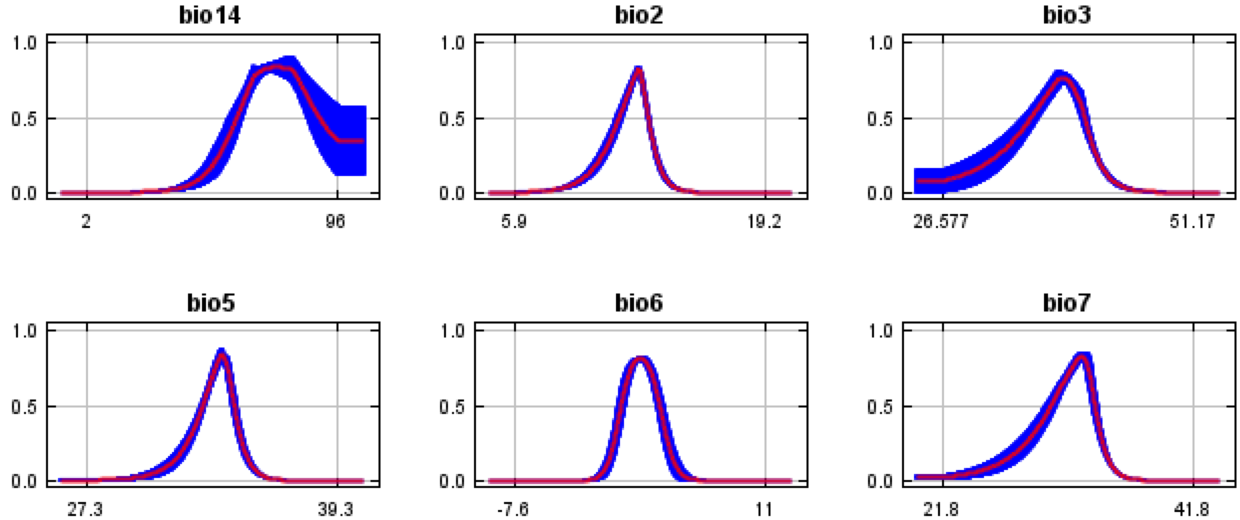
Response curves

These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 10 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).



In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.



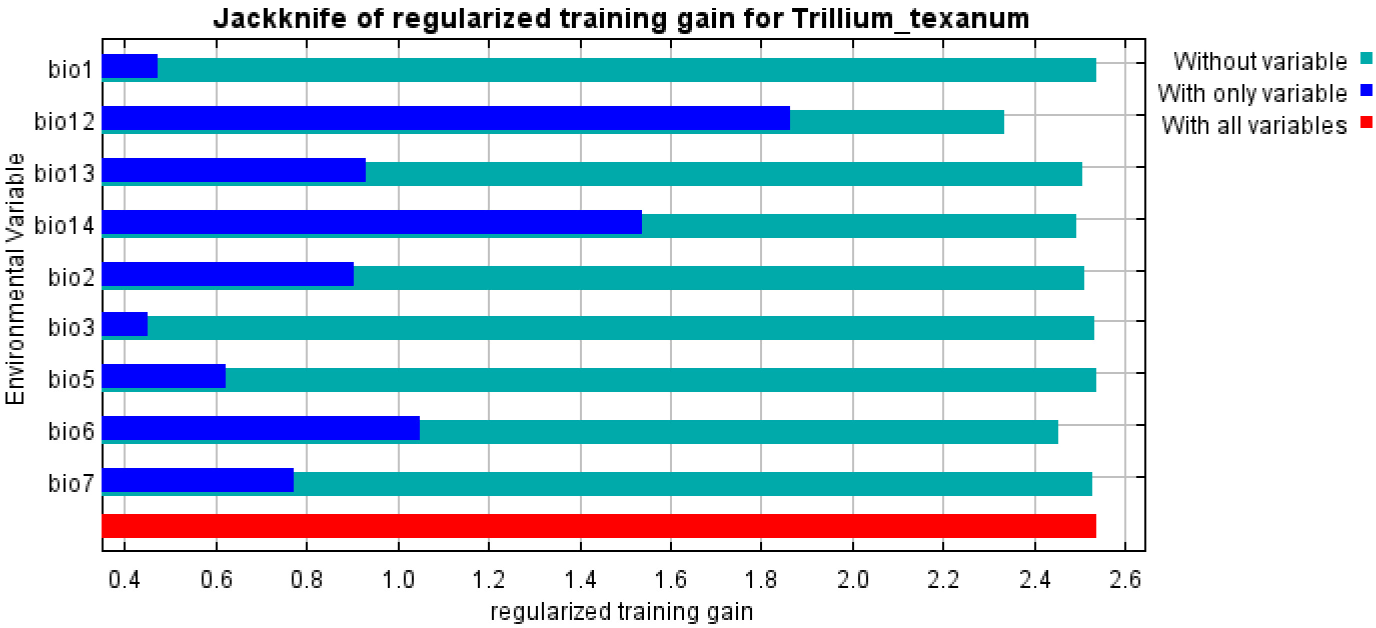


Analysis of variable contributions

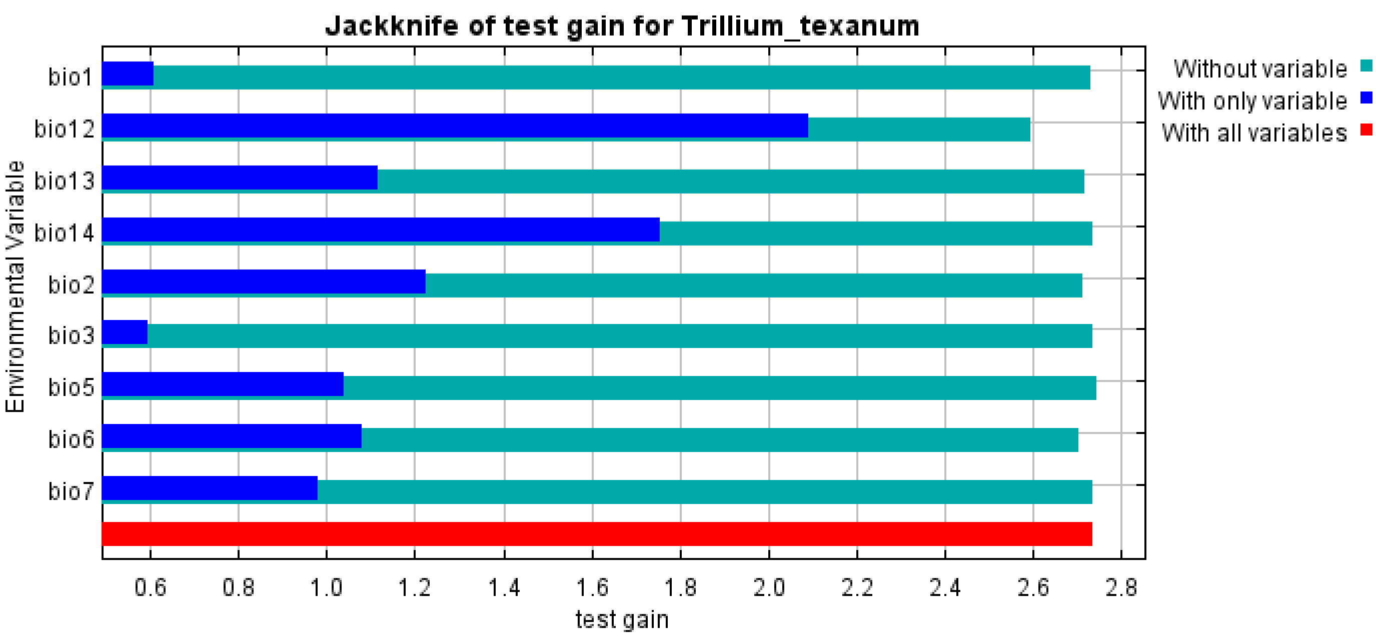
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio12	40.6	48.6
bio14	35	2.9
bio1	12.3	0.2
bio13	6.2	2.6
bio7	2.7	7
bio6	1.8	26.4
bio5	0.9	0
bio2	0.6	12.2
bio3	0	0

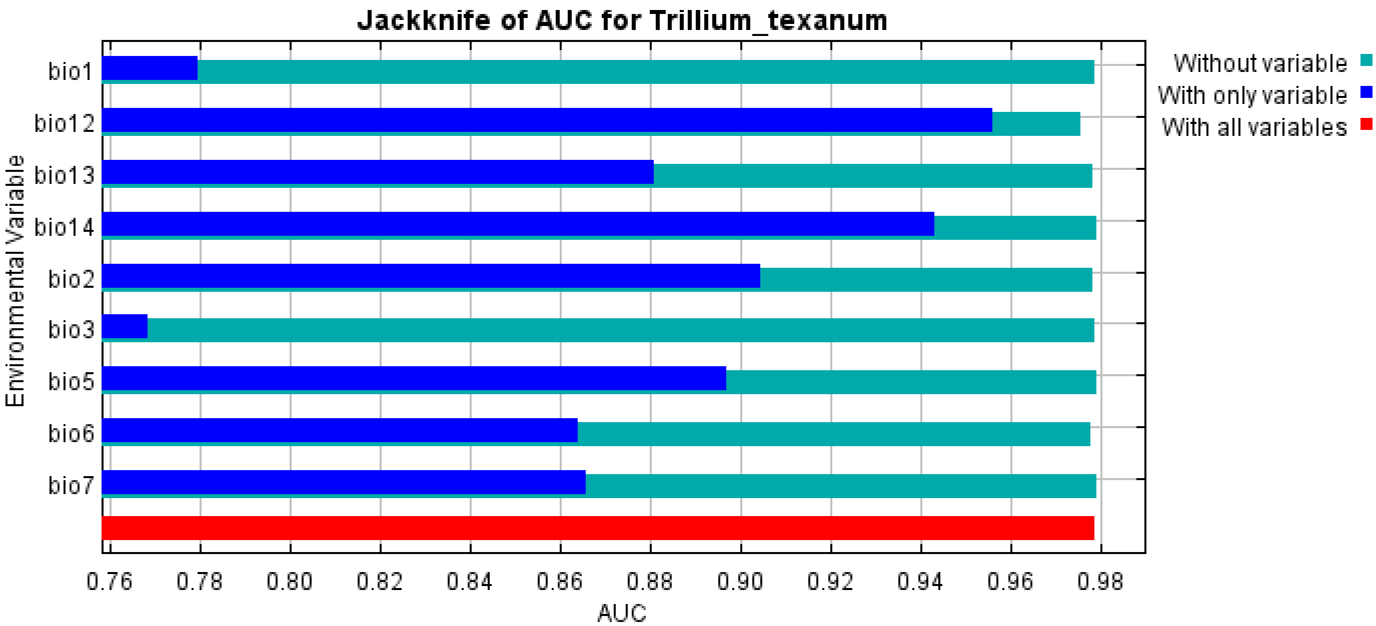
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio12, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio12, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



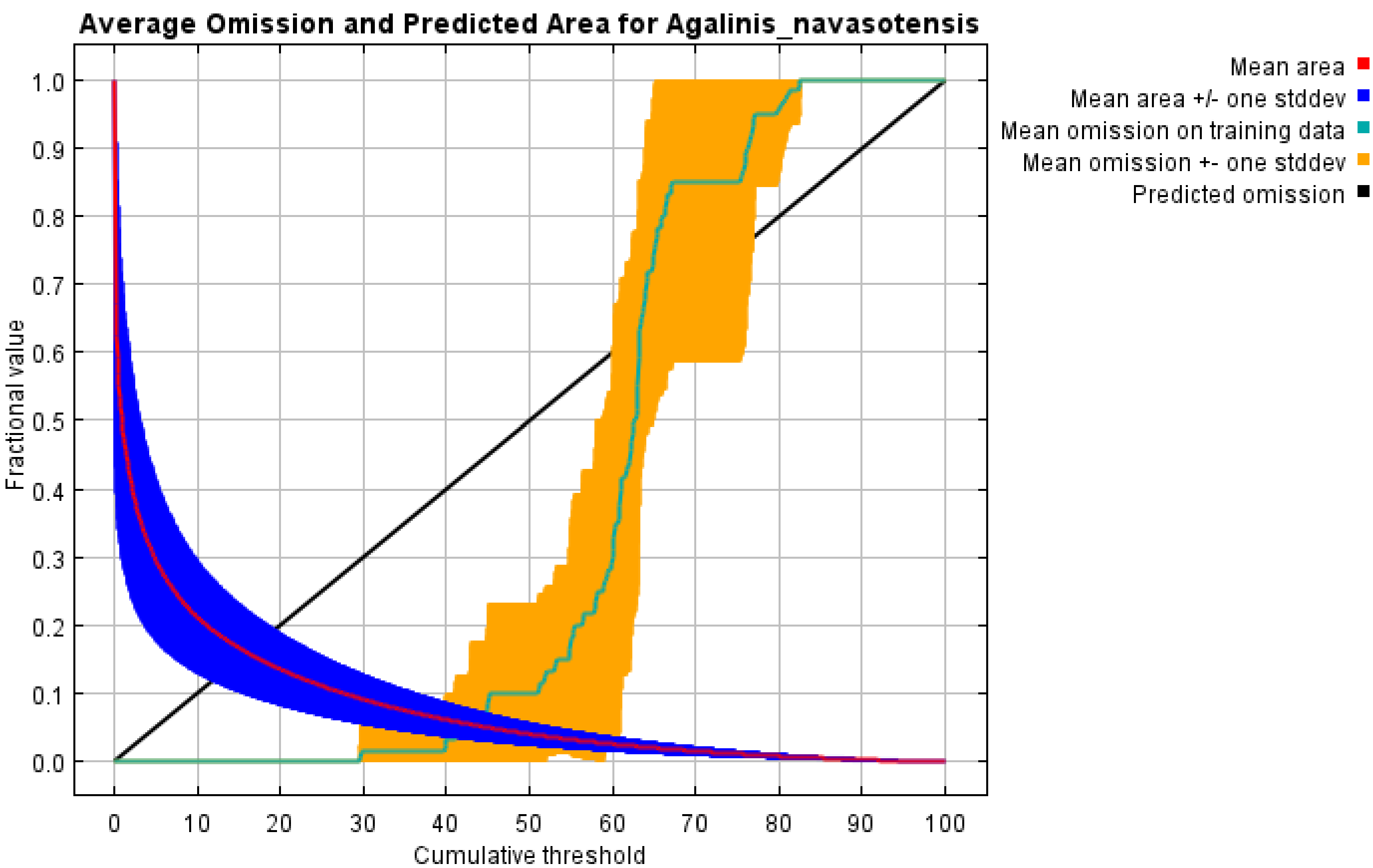
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Trillium_texanum responsecurves jackknife outputdirectory=E:\TXDoT_TXScale\Results\Trillium_bio samplesfile=E:\TXDoT_TXScale\spp_csv\trillium.csv environmentallayers=E:\TXDoT_TXScale\Bio_TX_Ascii randomseed randomtestpoints=25 replicates=10 replicatetype=bootstrap -N perm -N ph -N poro

Replicated maxent model for Agalinis_navasotensis

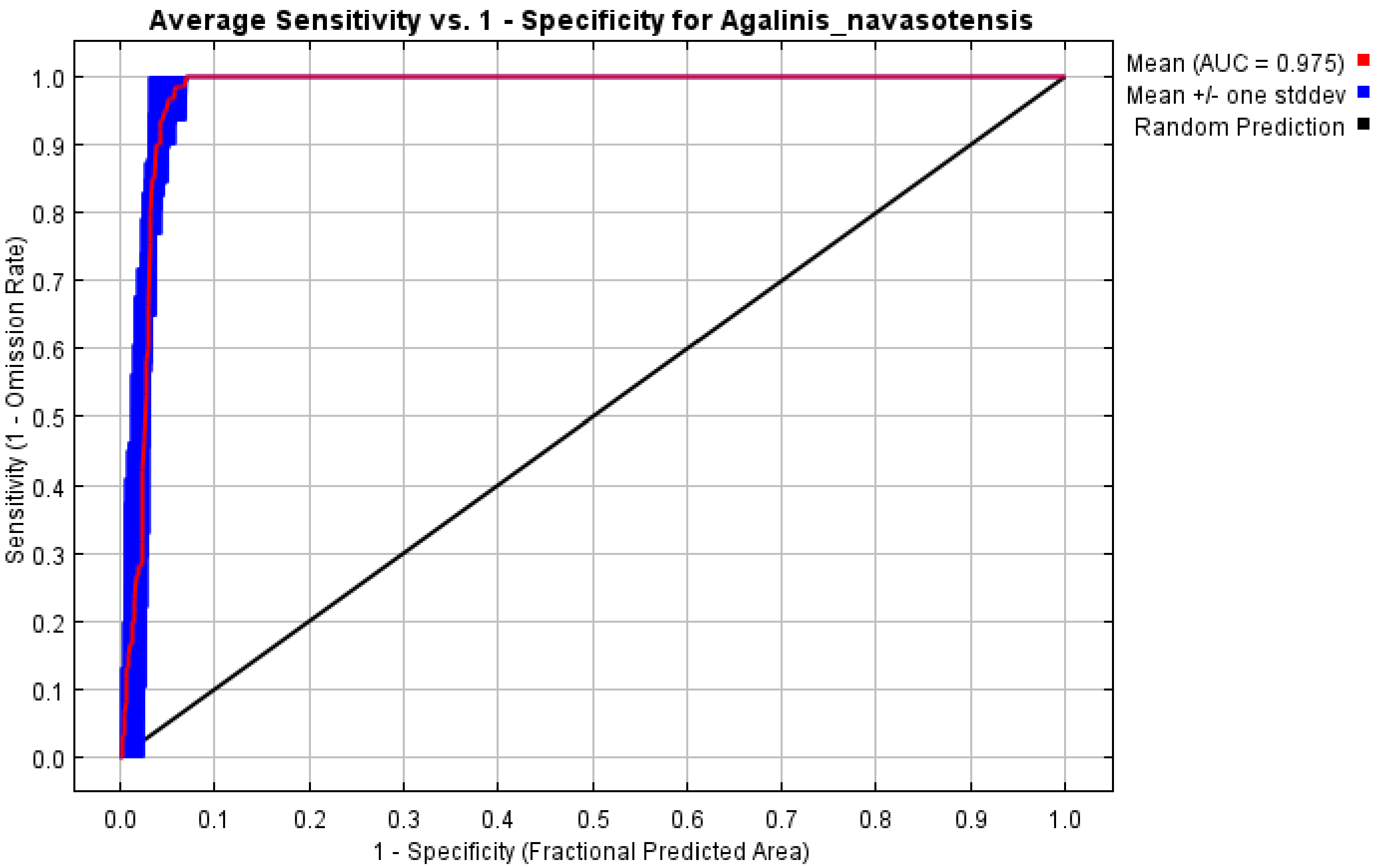
This page summarizes the results of 10 bootstrap models for Agalinis_navasotensis, created Fri Nov 26 13:27:06 CST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4] [5] [6] [7] [8] [9]

Analysis of omission/commission

The following picture shows the training omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs.

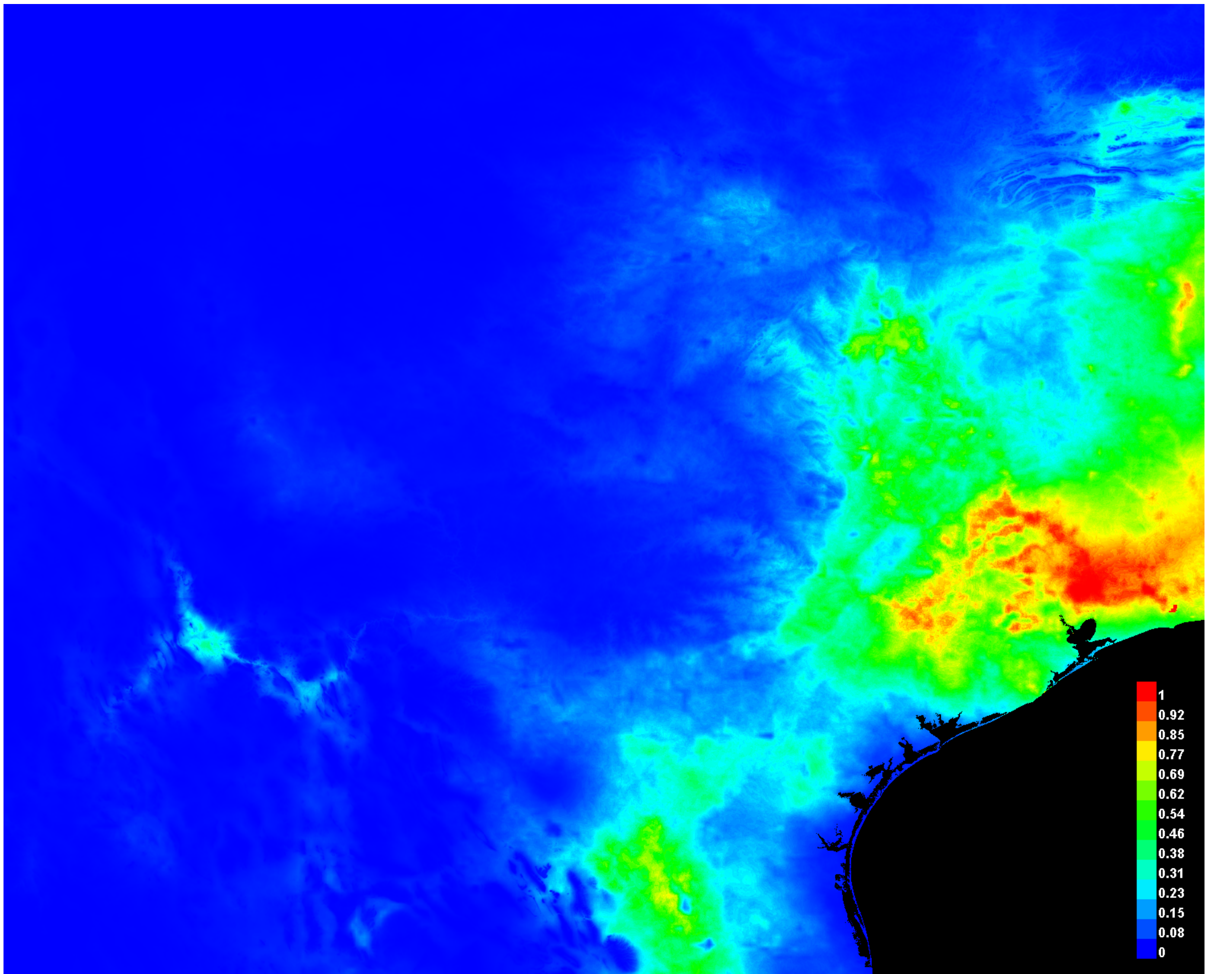


The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average training AUC for the replicate runs is 0.975, and the standard deviation is 0.009.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 10 output grids. Other available summary grids are min, max and median.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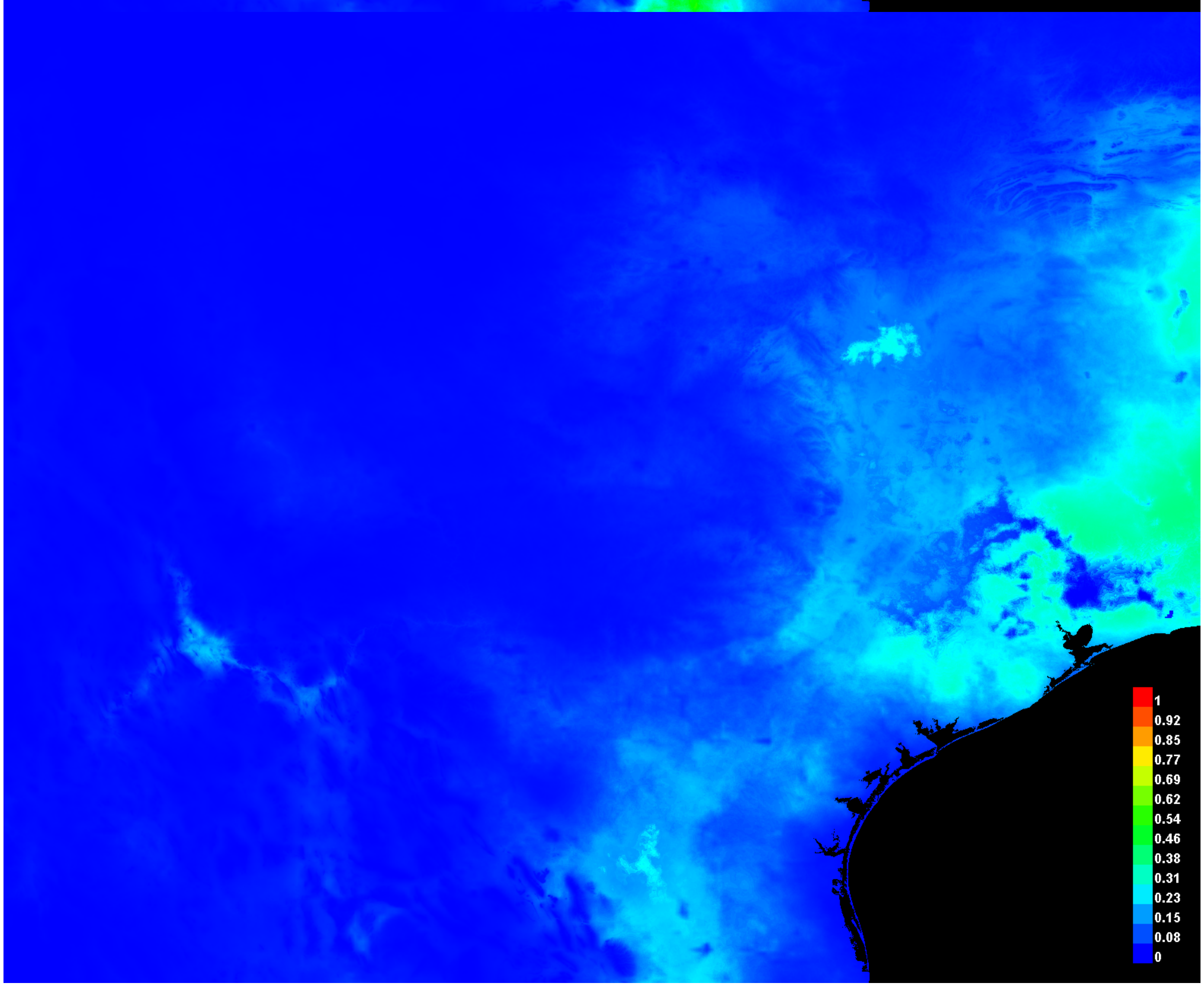
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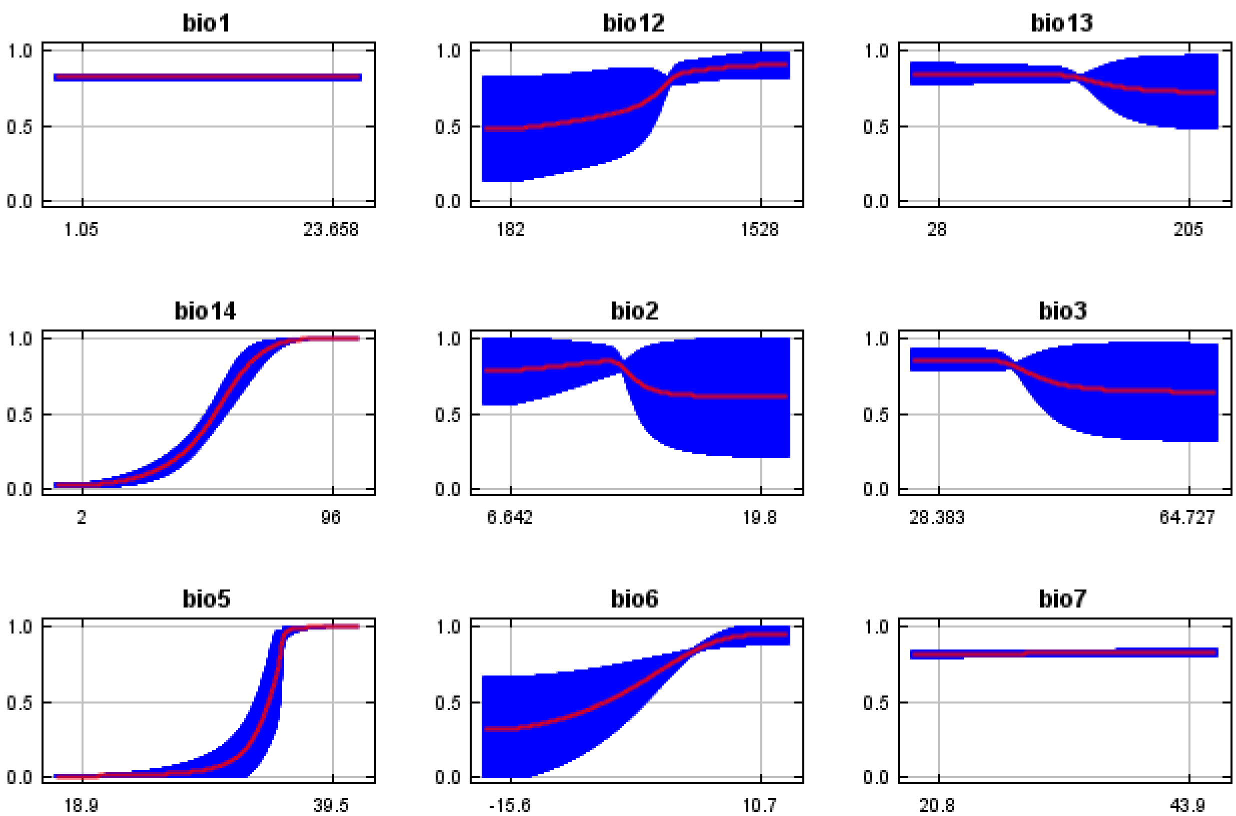
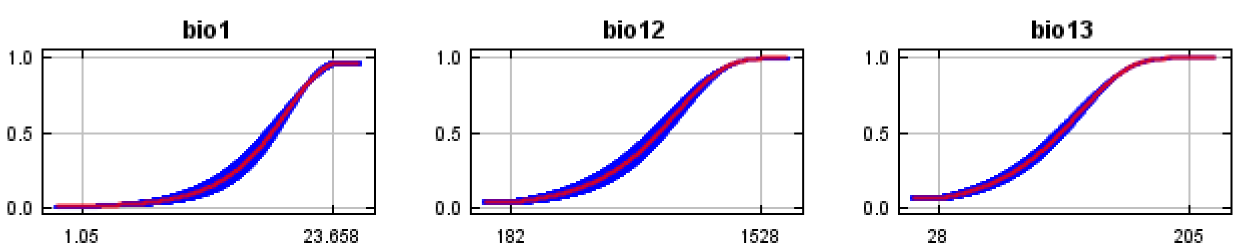
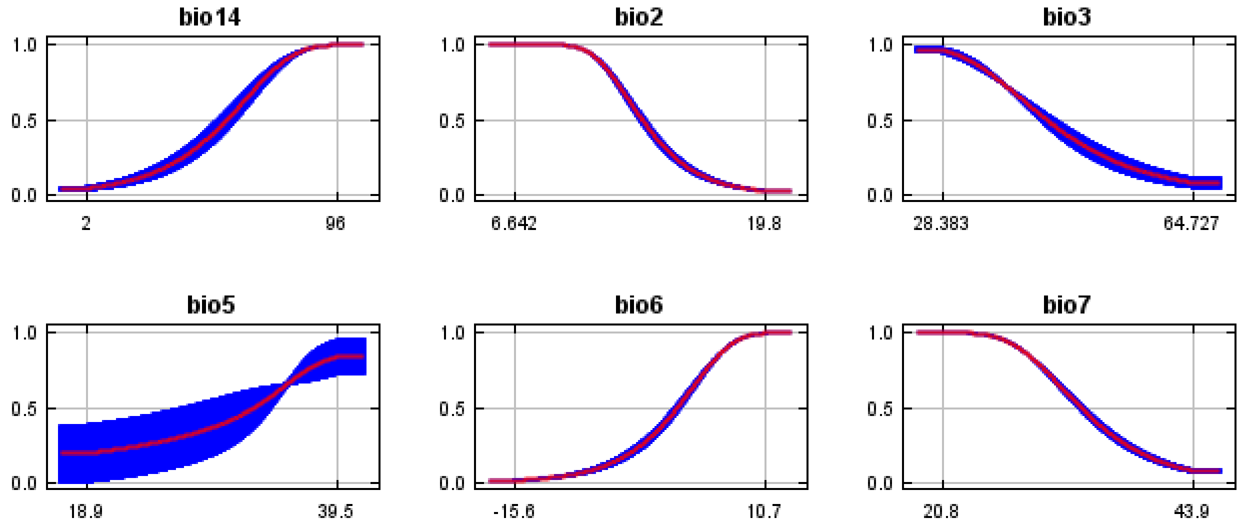
Response curves

These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 10 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).



In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.



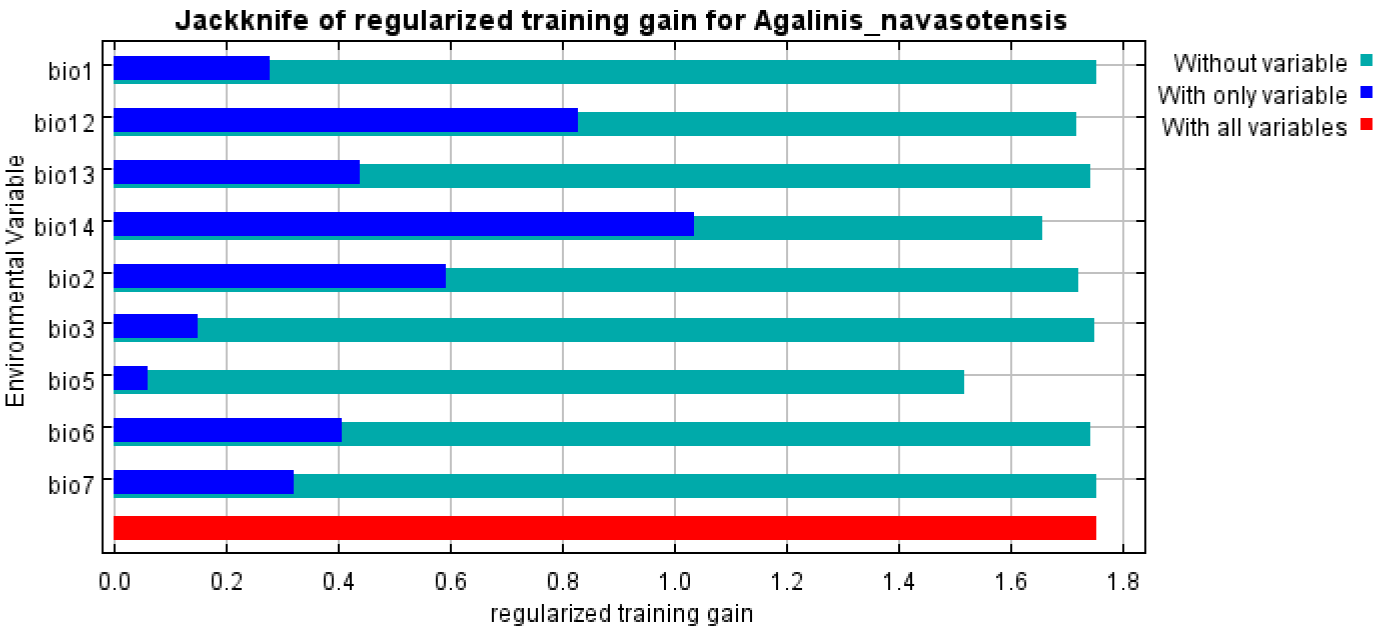


Analysis of variable contributions

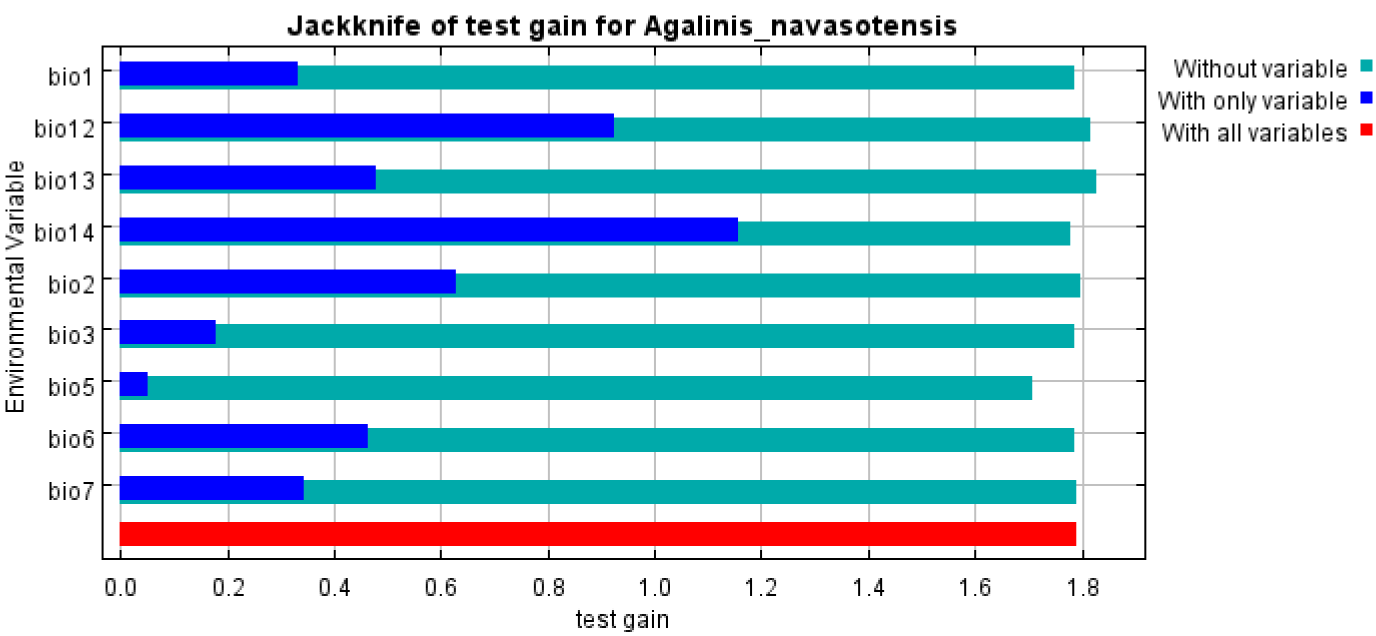
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio14	70.3	53.3
bio5	14.1	31.4
bio6	10.6	3.3
bio1	2	0
bio3	1.7	0.9
bio12	0.7	5.8
bio2	0.5	5
bio13	0.1	0.3
bio7	0	0

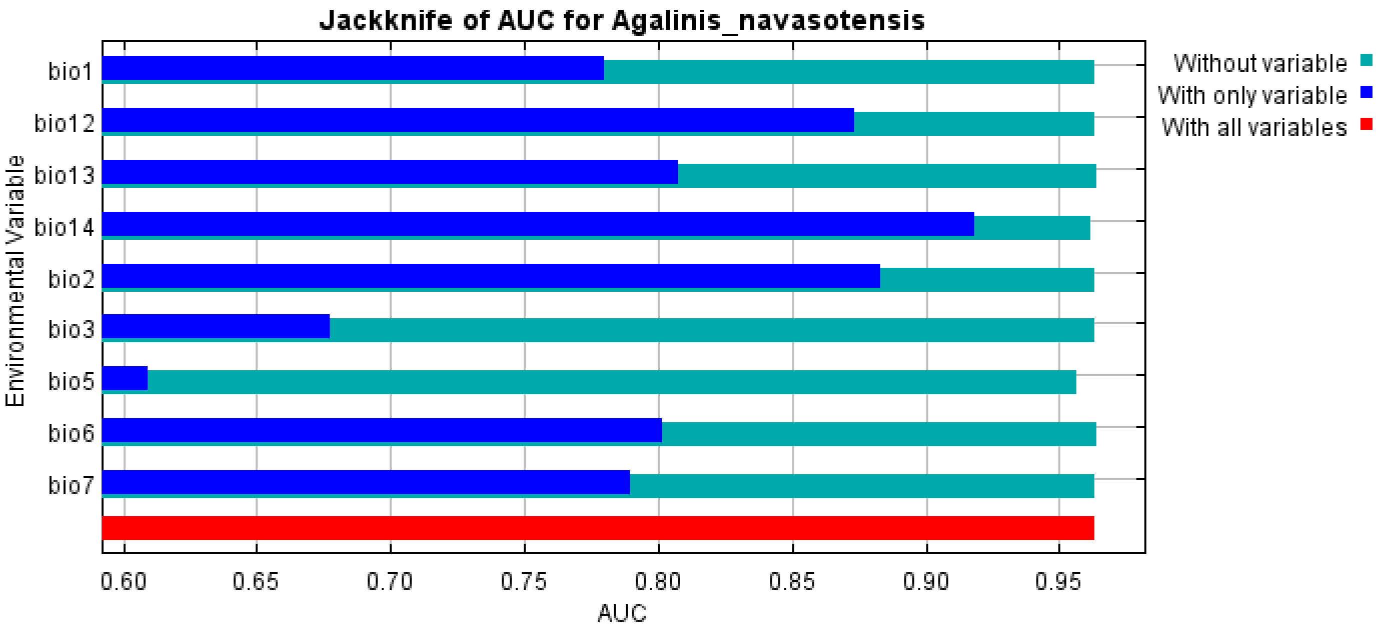
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio14, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio5, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



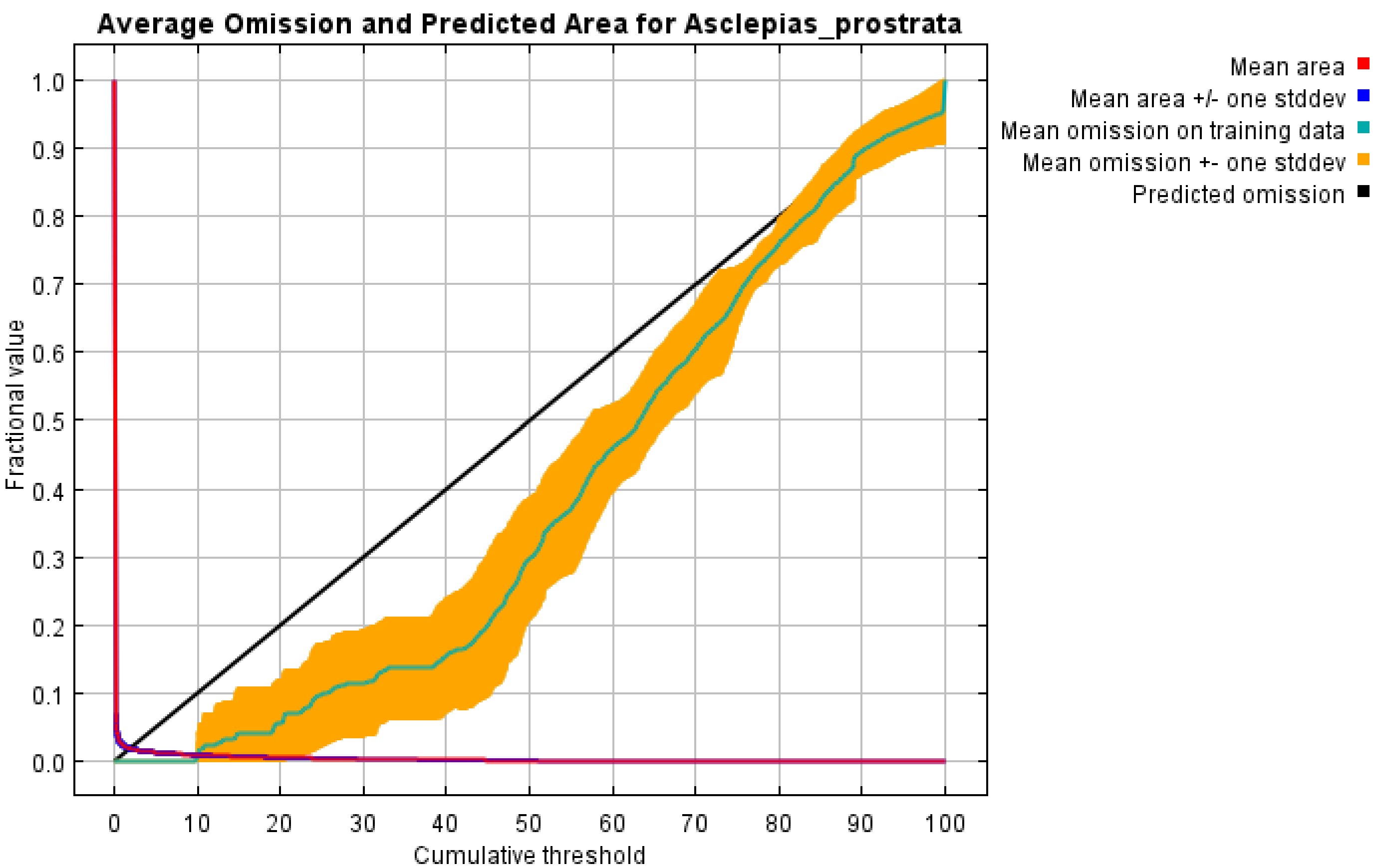
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Agalinis_navasotensis responsecurves jackknife "outputdirectory=E:\TXDoT_Range Scale_Bioclim\Results\1Reg\Agalinis" "samplesfile=E:\TXDoT_Range Scale_Bioclim\spp_csv\Agalinis navasotensis obs.csv" "environmentallayers=E:\TXDoT_Range Scale_Bioclim\Ascii" randomseed nowriteclampgrid randomtestpoints=25 replicates=10 replicatetype=bootstrap writebackgroundpredictions -N bio0

Replicated maxent model for Asclepias_prostrata

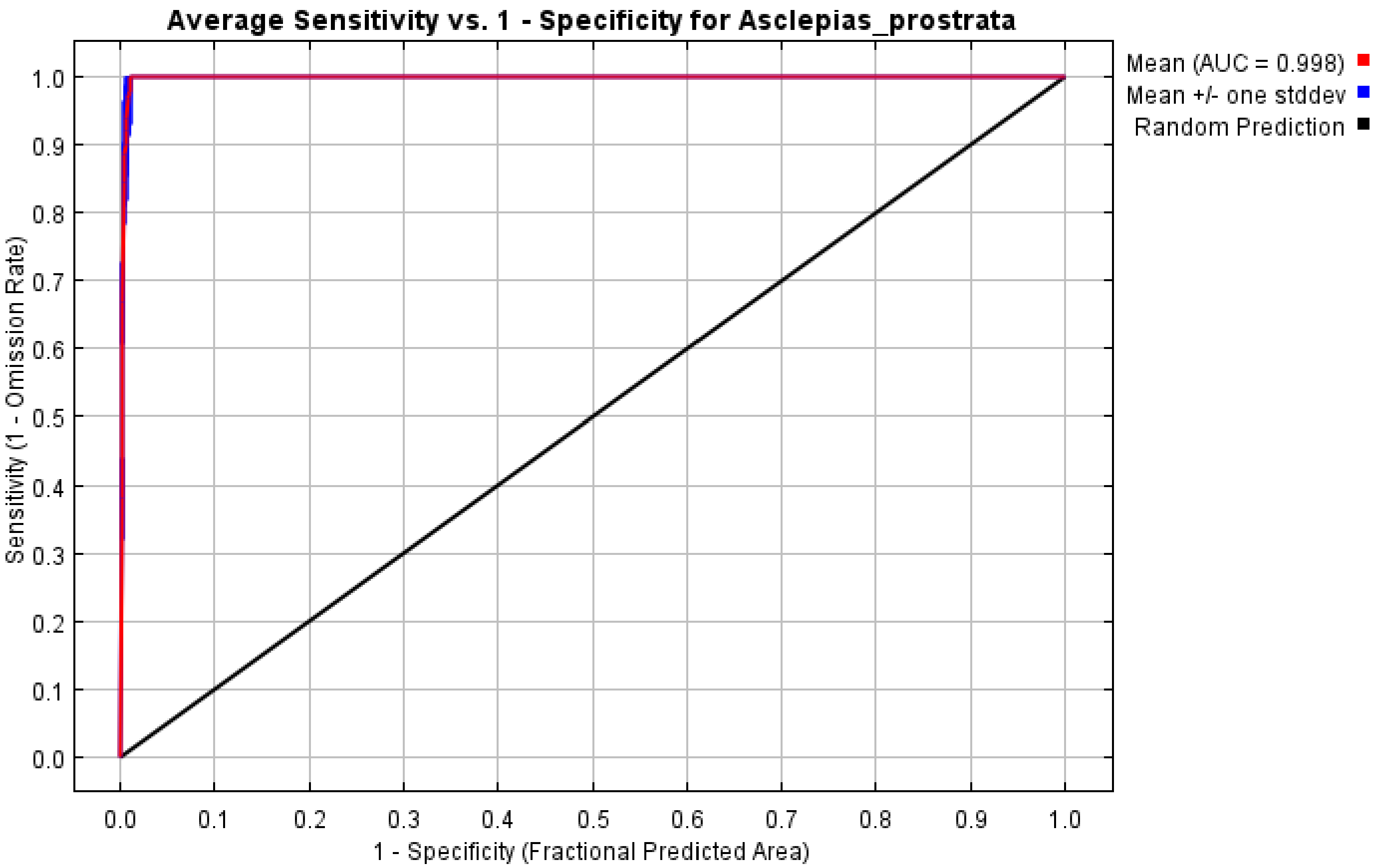
This page summarizes the results of 10 bootstrap models for Asclepias_prostrata, created Tue Dec 07 15:20:08 CST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4] [5] [6] [7] [8] [9]

Analysis of omission/commission

The following picture shows the training omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs.

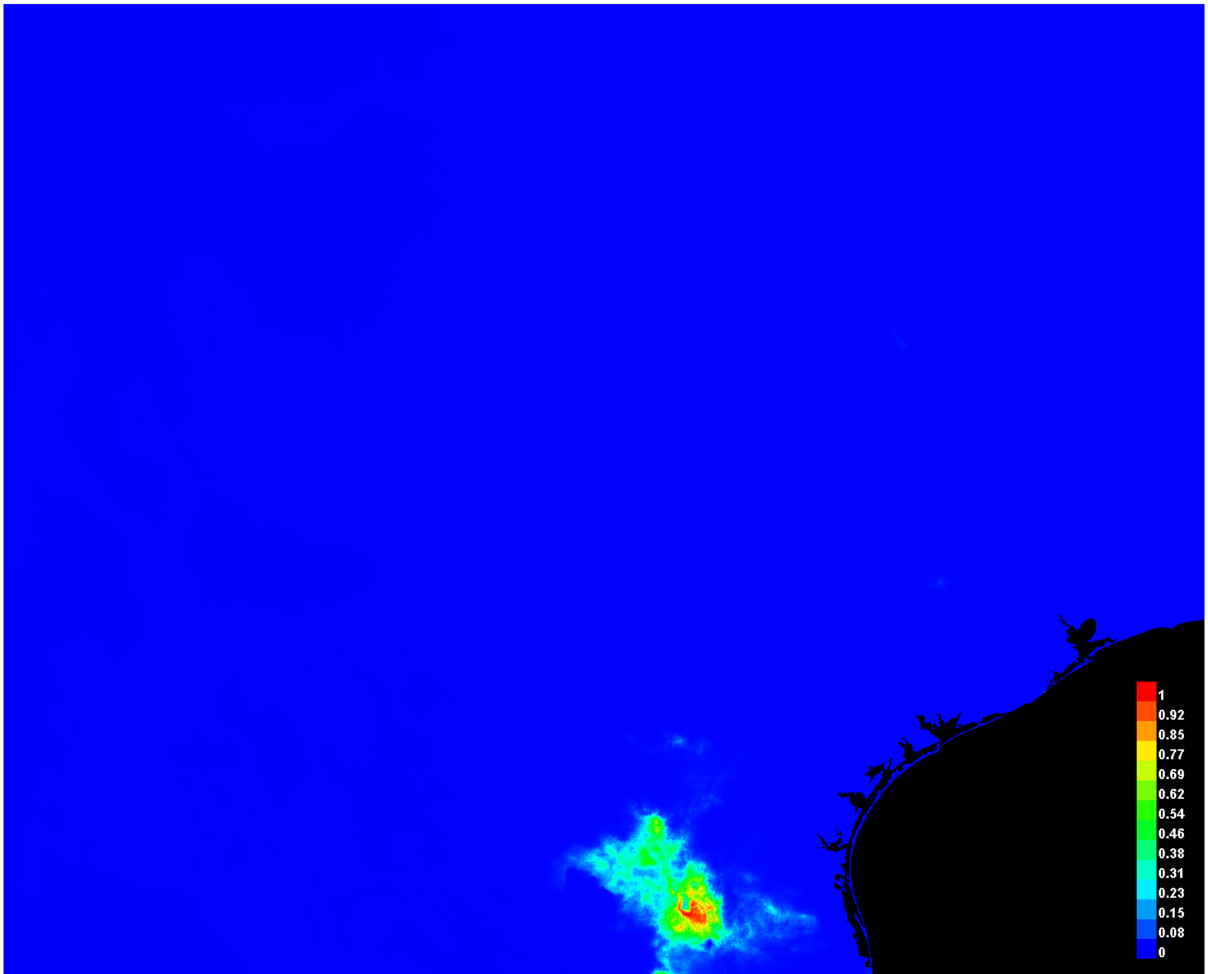


The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average training AUC for the replicate runs is 0.998, and the standard deviation is 0.001.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 10 output grids. Other available summary grids are min, max and median.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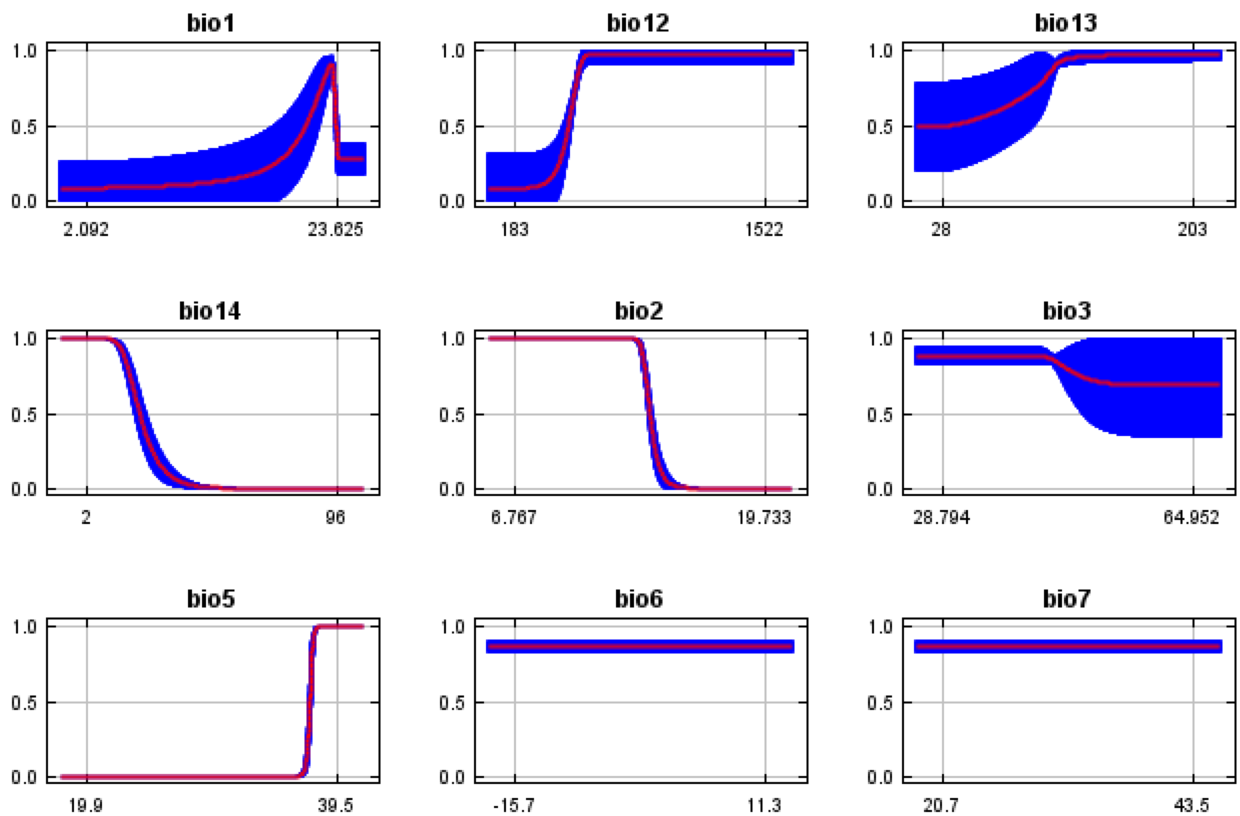
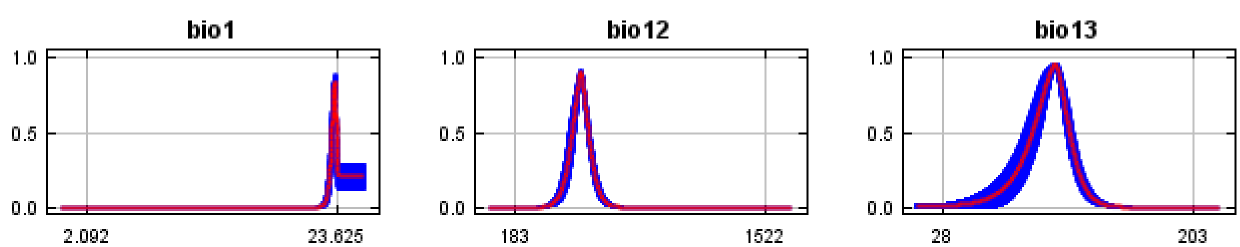
0.08
0

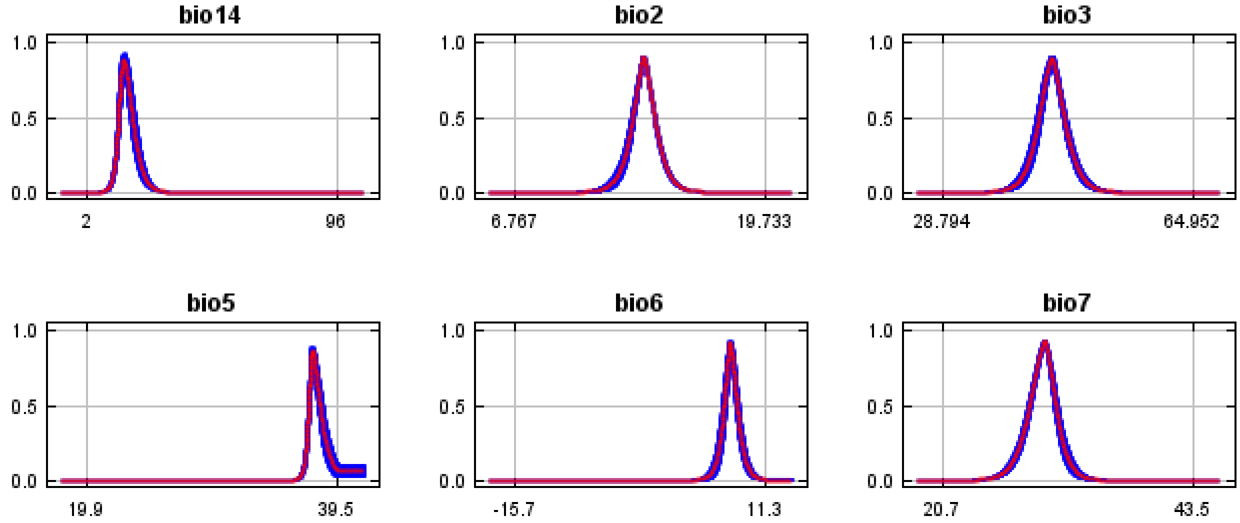
Response curves

These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 10 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).



In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.



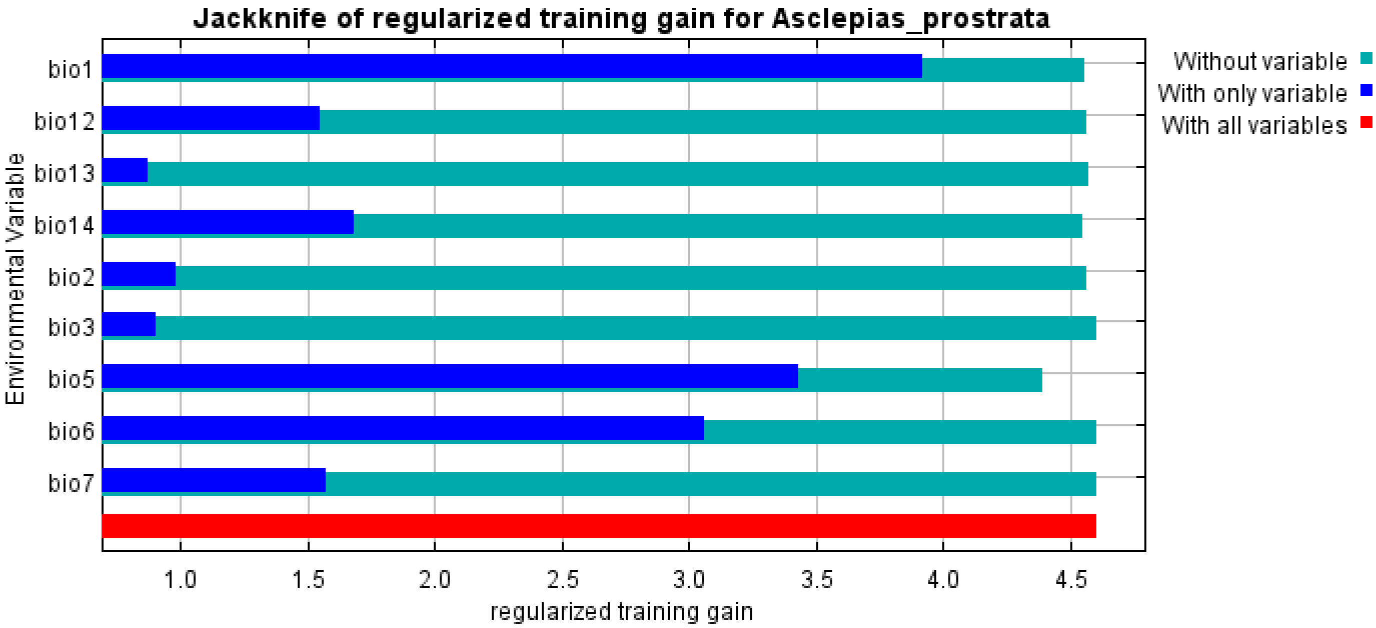


Analysis of variable contributions

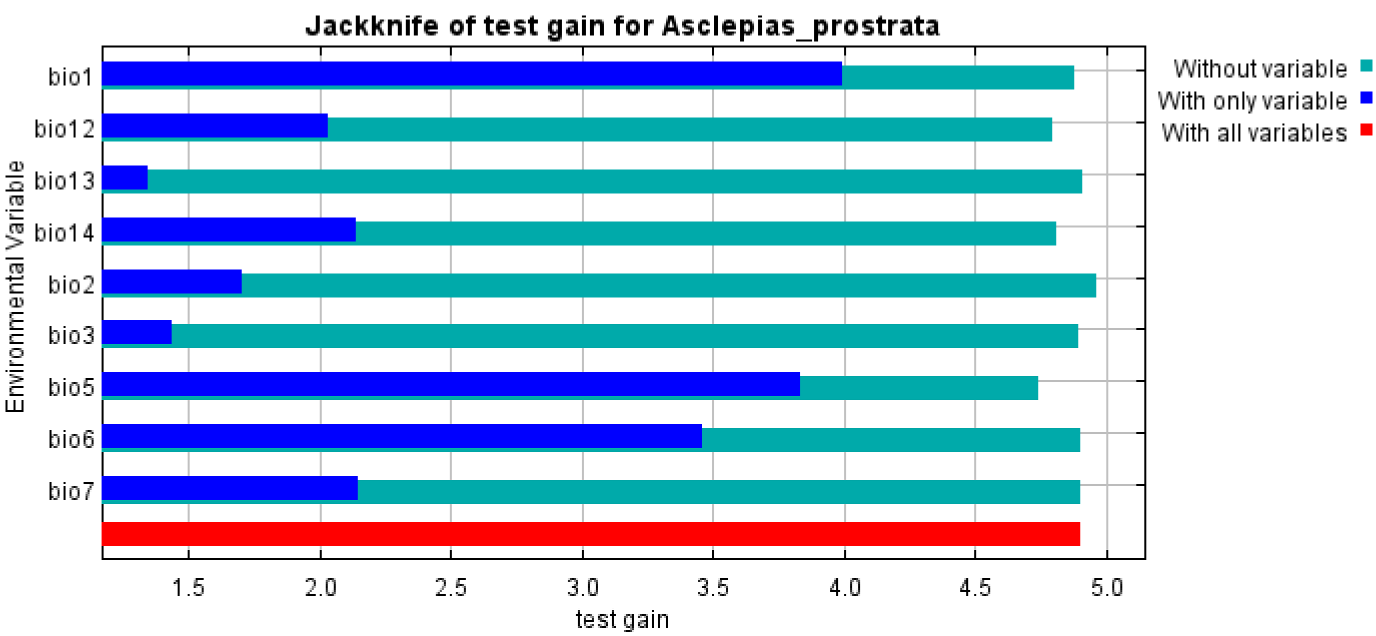
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio1	88.1	1.5
bio5	6	74.8
bio13	2.1	0.9
bio7	1.4	0
bio12	0.7	4.2
bio3	0.7	0.1
bio14	0.5	10.2
bio2	0.4	8.2
bio6	0.1	0

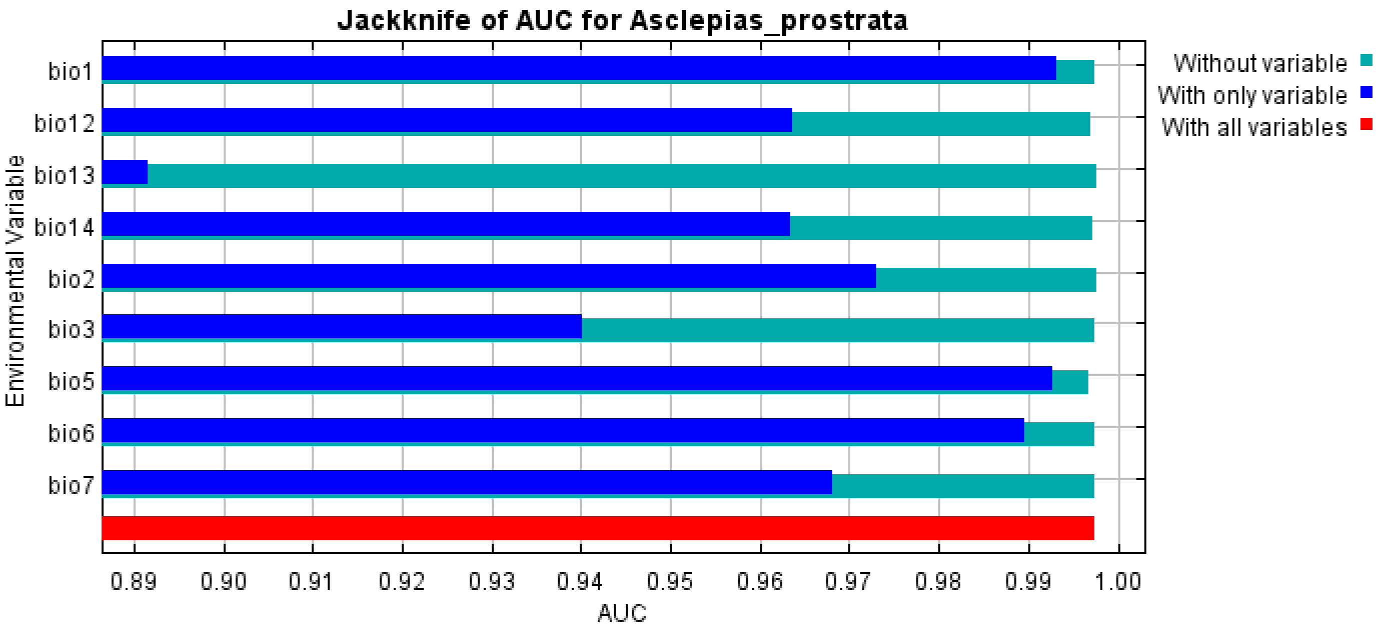
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio1, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio5, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



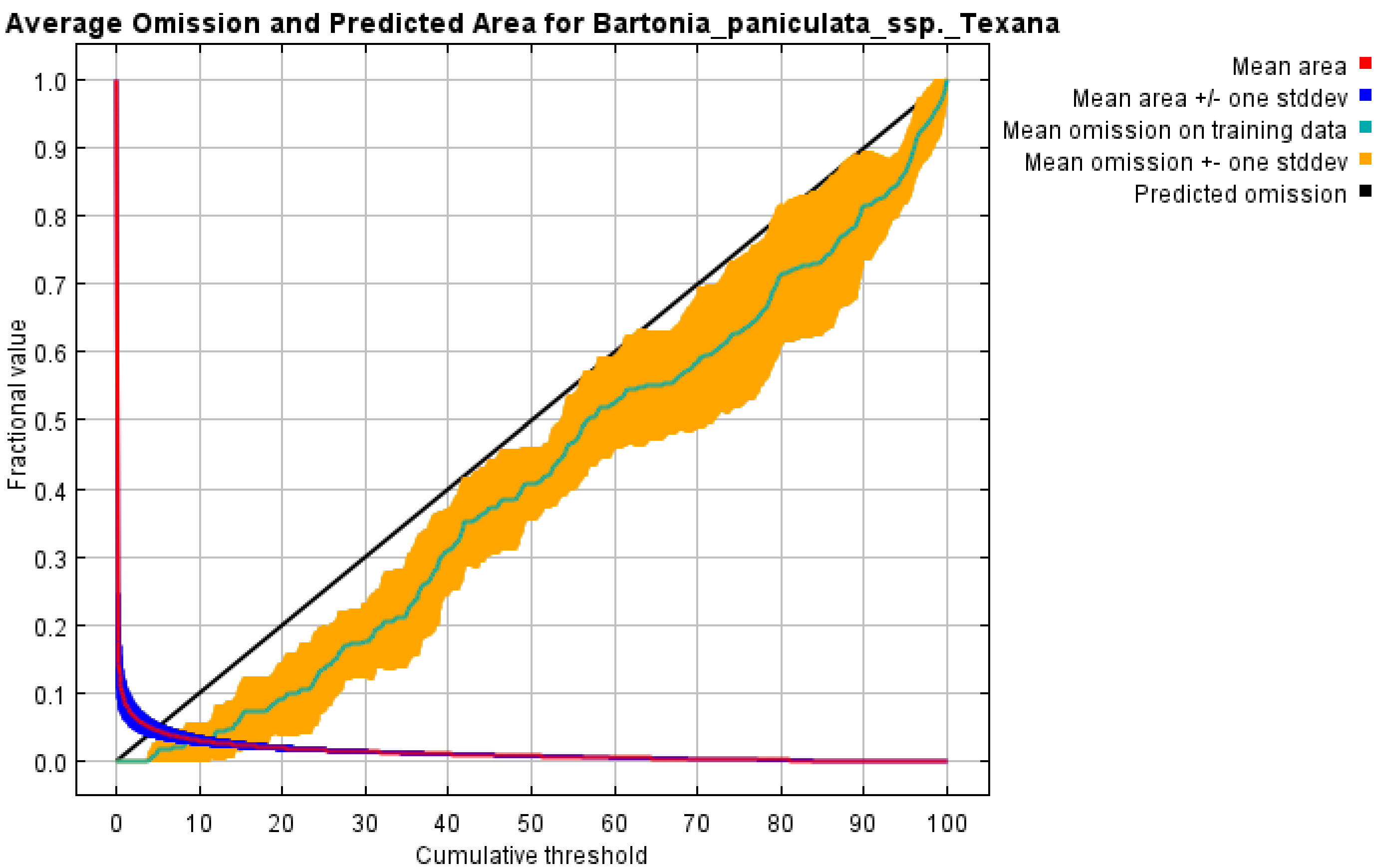
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Asclepias_prostrata responsecurves jackknife "outputdirectory=E:\TXDoT_Range Scale_Bioclim\Results\1Reg\Asclepias" "samplesfile=E:\TXDoT_Range Scale_Bioclim\spp_csv\Asclepias prostrata obs.csv" "environmentallayers=E:\TXDoT_Range Scale_Bioclim\Ascii" randomseed randomtestpoints=25 replicates=10 replicatetype=bootstrap writebackgroundpredictions -N bio0

Replicated maxent model for Bartonia_paniculata_ssp._Texana

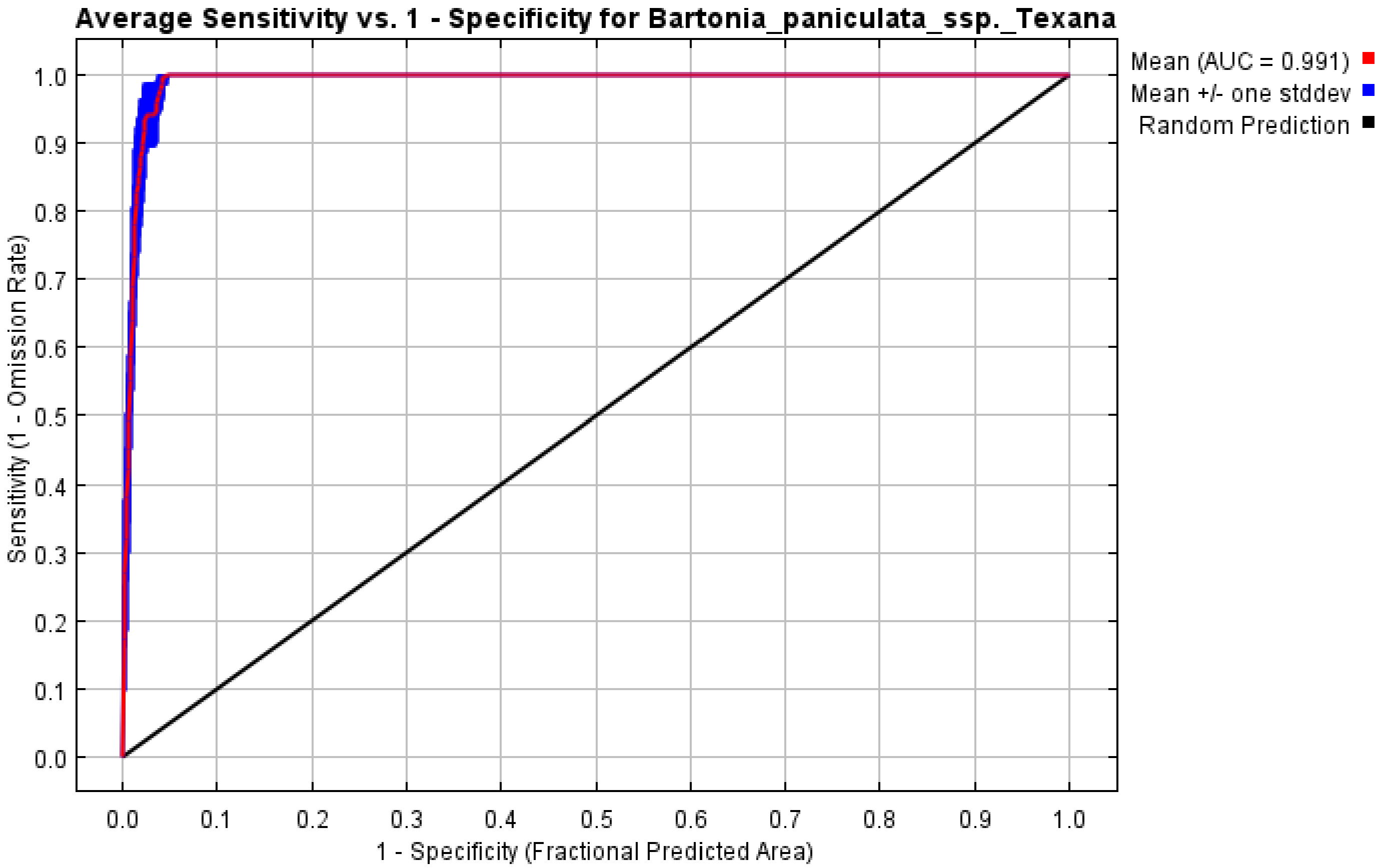
This page summarizes the results of 10 bootstrap models for Bartonia_paniculata_ssp._Texana, created Tue Dec 07 15:26:07 CST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4] [5] [6] [7] [8] [9]

Analysis of omission/commission

The following picture shows the training omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs.

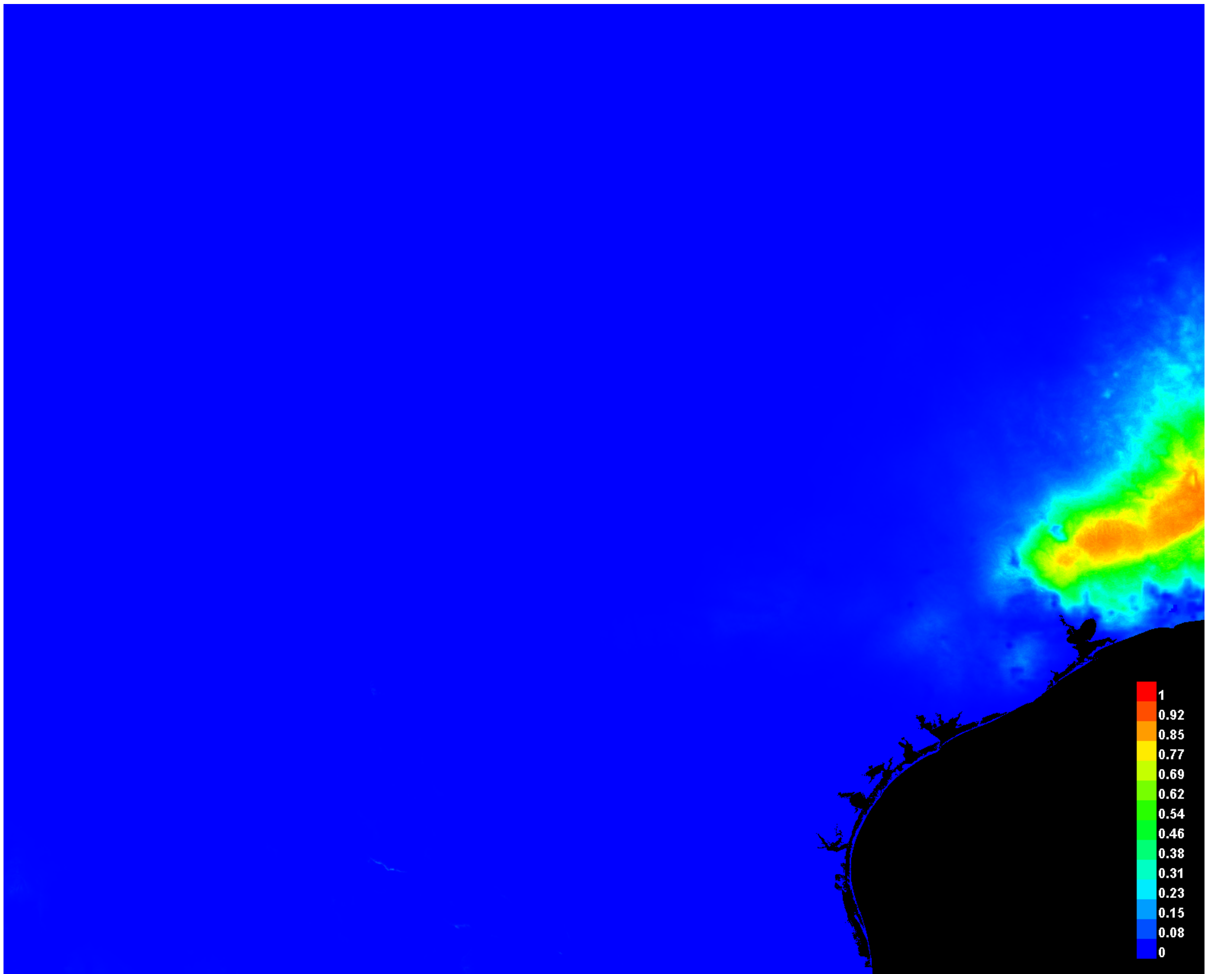


The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average training AUC for the replicate runs is 0.991, and the standard deviation is 0.002.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 10 output grids. Other available summary grids are min, max and median.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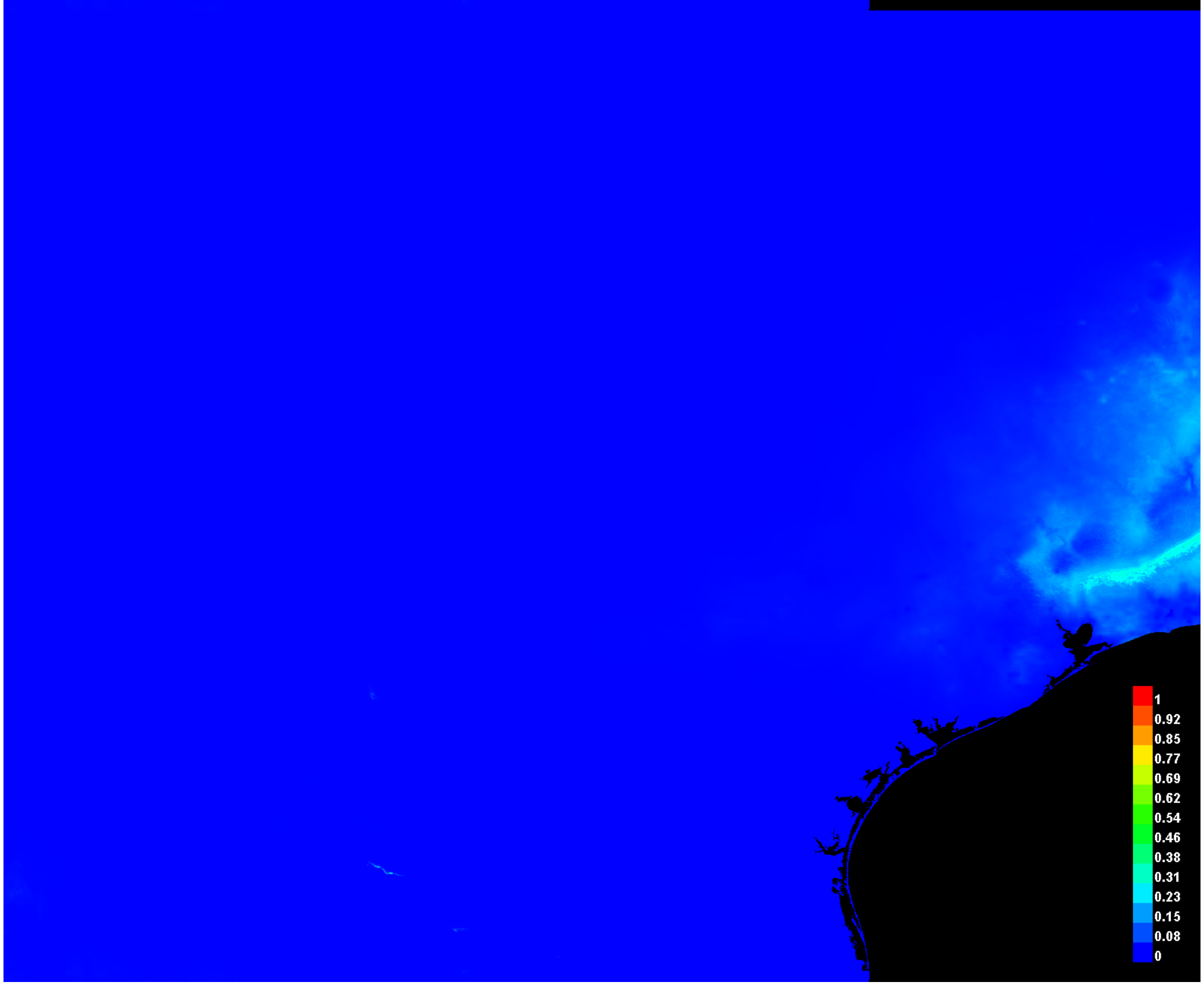
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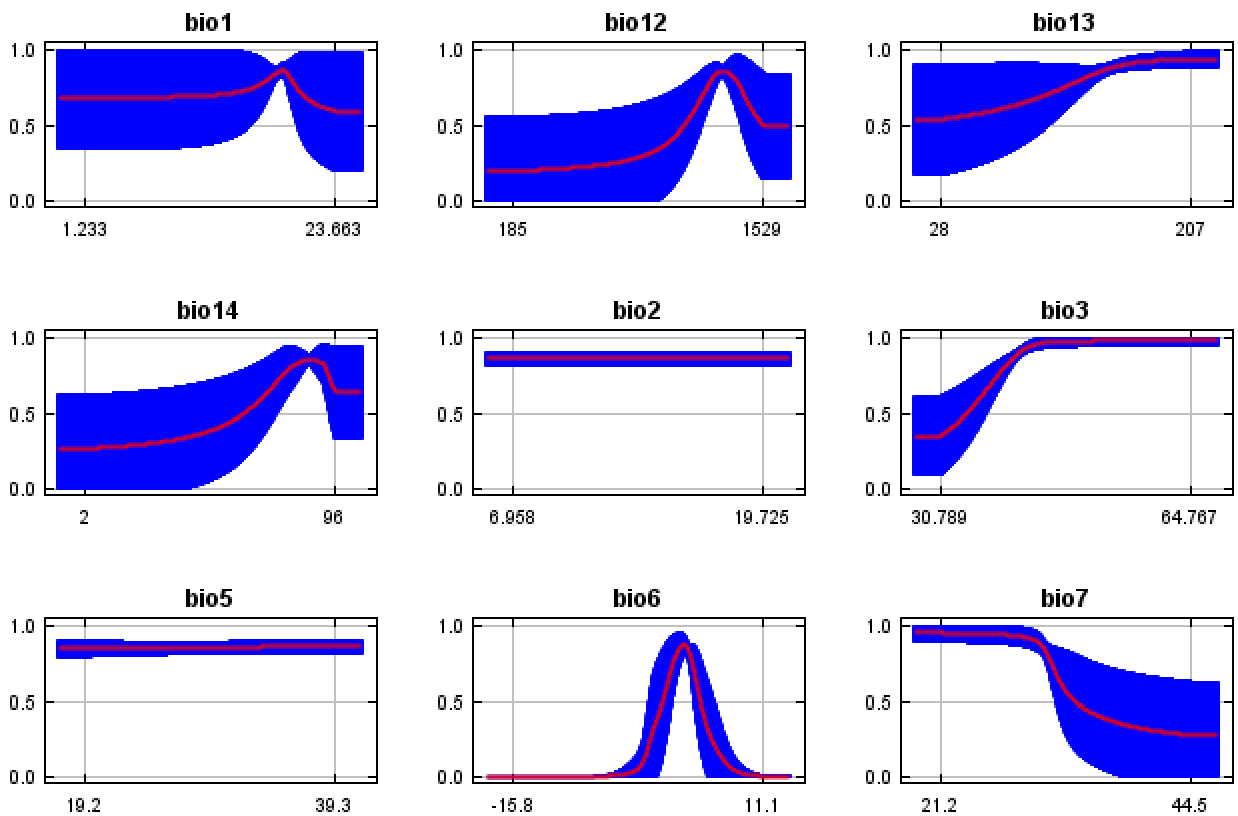
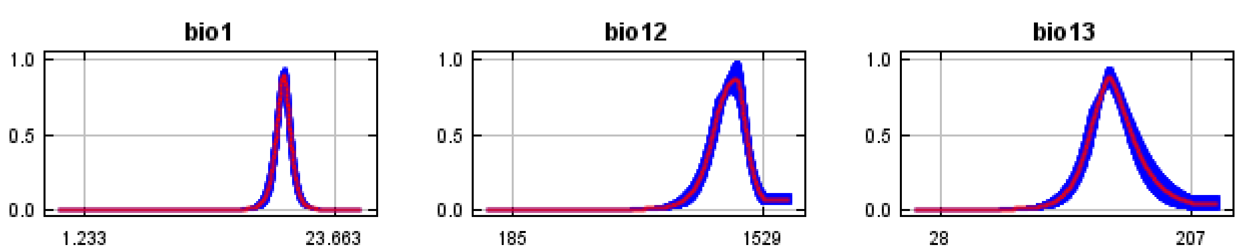
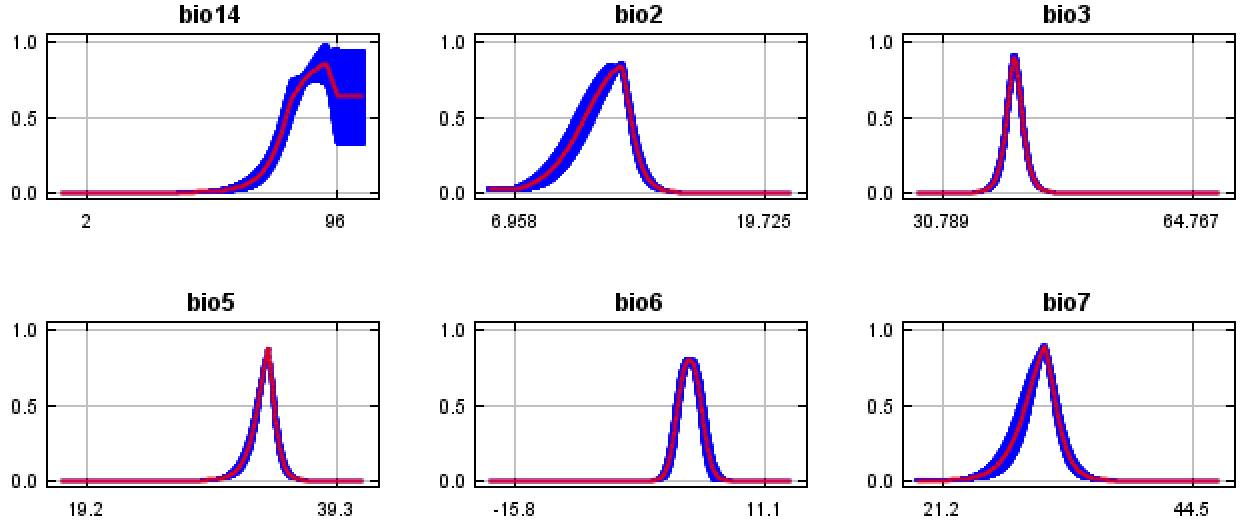
Response curves

These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 10 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).



In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.



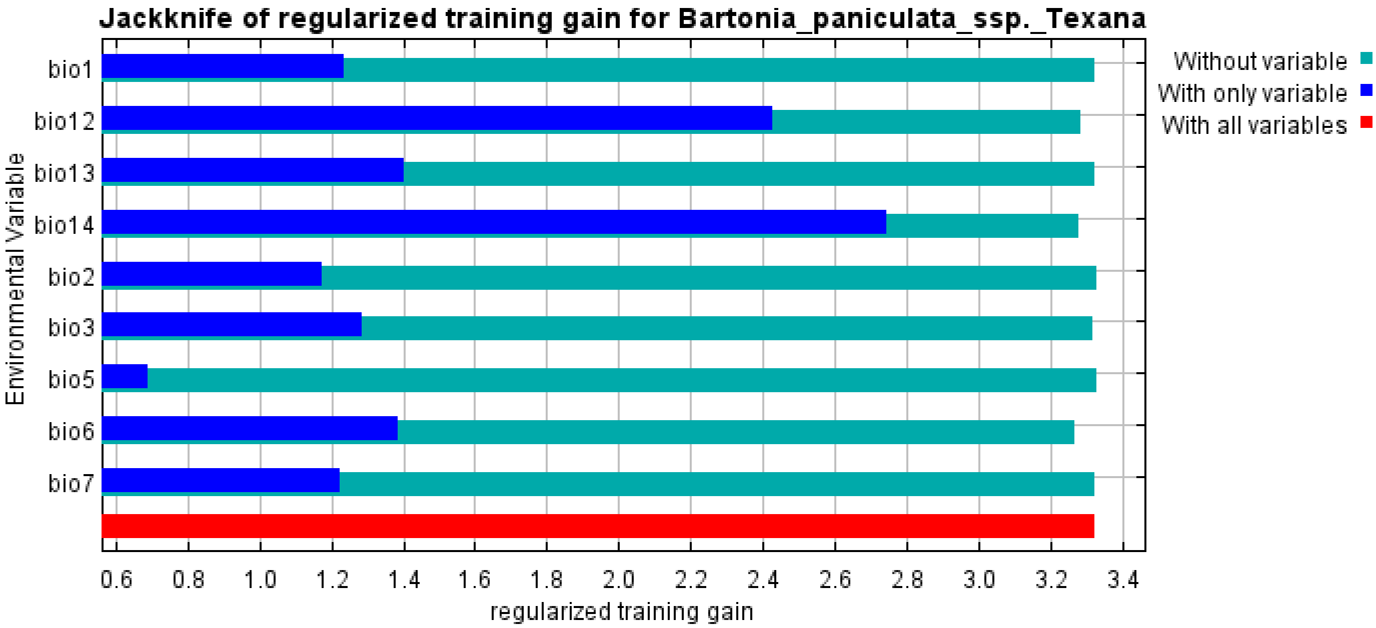


Analysis of variable contributions

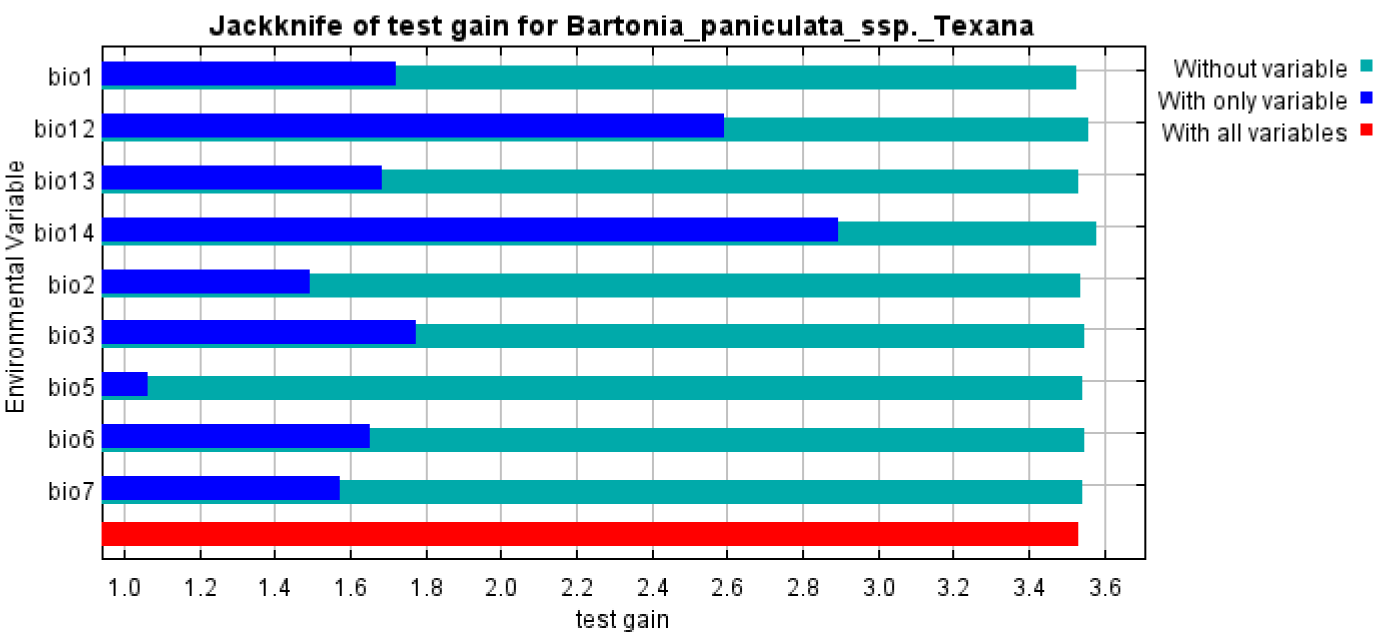
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio14	78.7	16
bio3	11.5	1.2
bio12	5.6	13.1
bio1	1.7	1
bio6	1.4	63.9
bio7	1	4.7
bio13	0.1	0.1
bio2	0	0
bio5	0	0

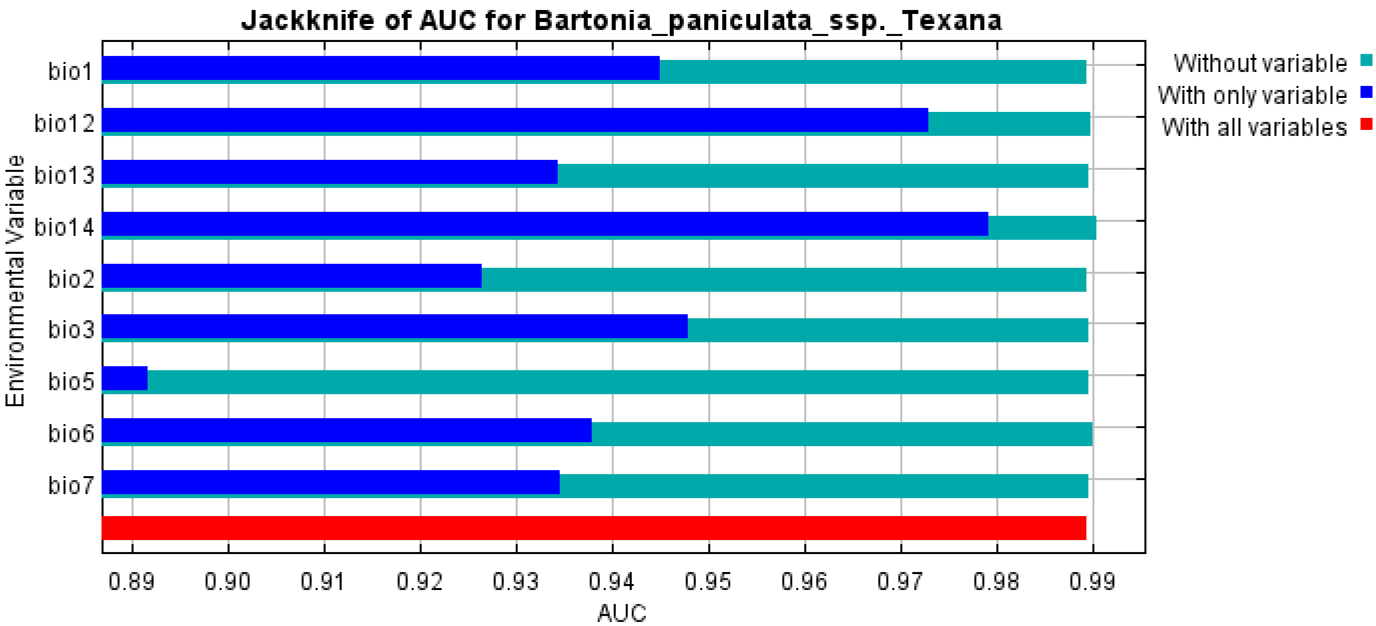
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio14, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio6, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



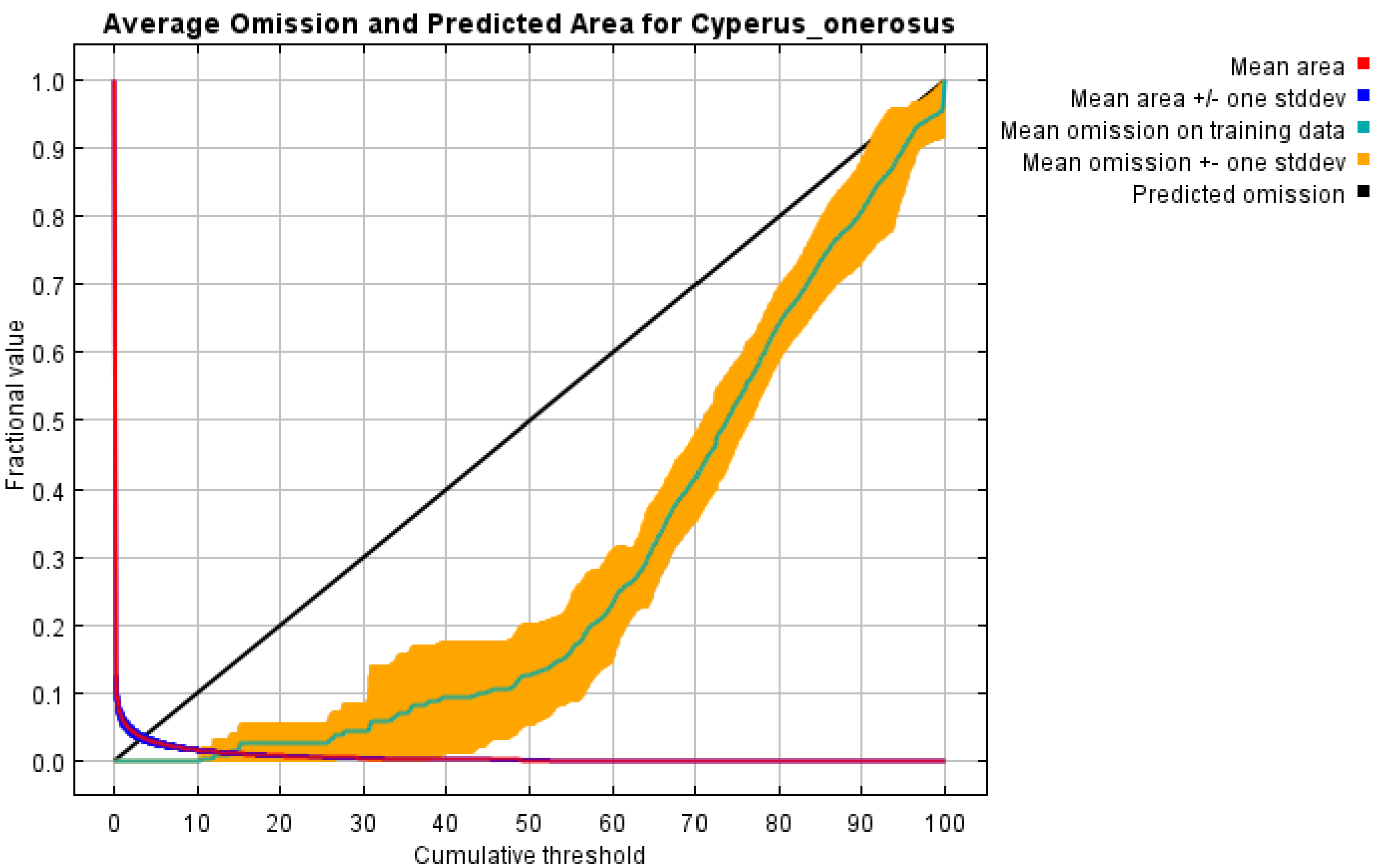
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Bartonia_paniculata_ssp._Texana responsecurves jackknife "outputdirectory=E:\TXDoT_Range Scale_Bioclim\Results\1Reg\Bartonia" "samplesfile=E:\TXDoT_Range Scale_Bioclim\spp_csv\Bartonia texana obs.csv" "environmentallayers=E:\TXDoT_Range Scale_Bioclim\Ascii" randomseed randomtestpoints=25 replicates=10 replicatetype=bootstrap writebackgroundpredictions -N bio0

Replicated maxent model for Cyperus_onerosus

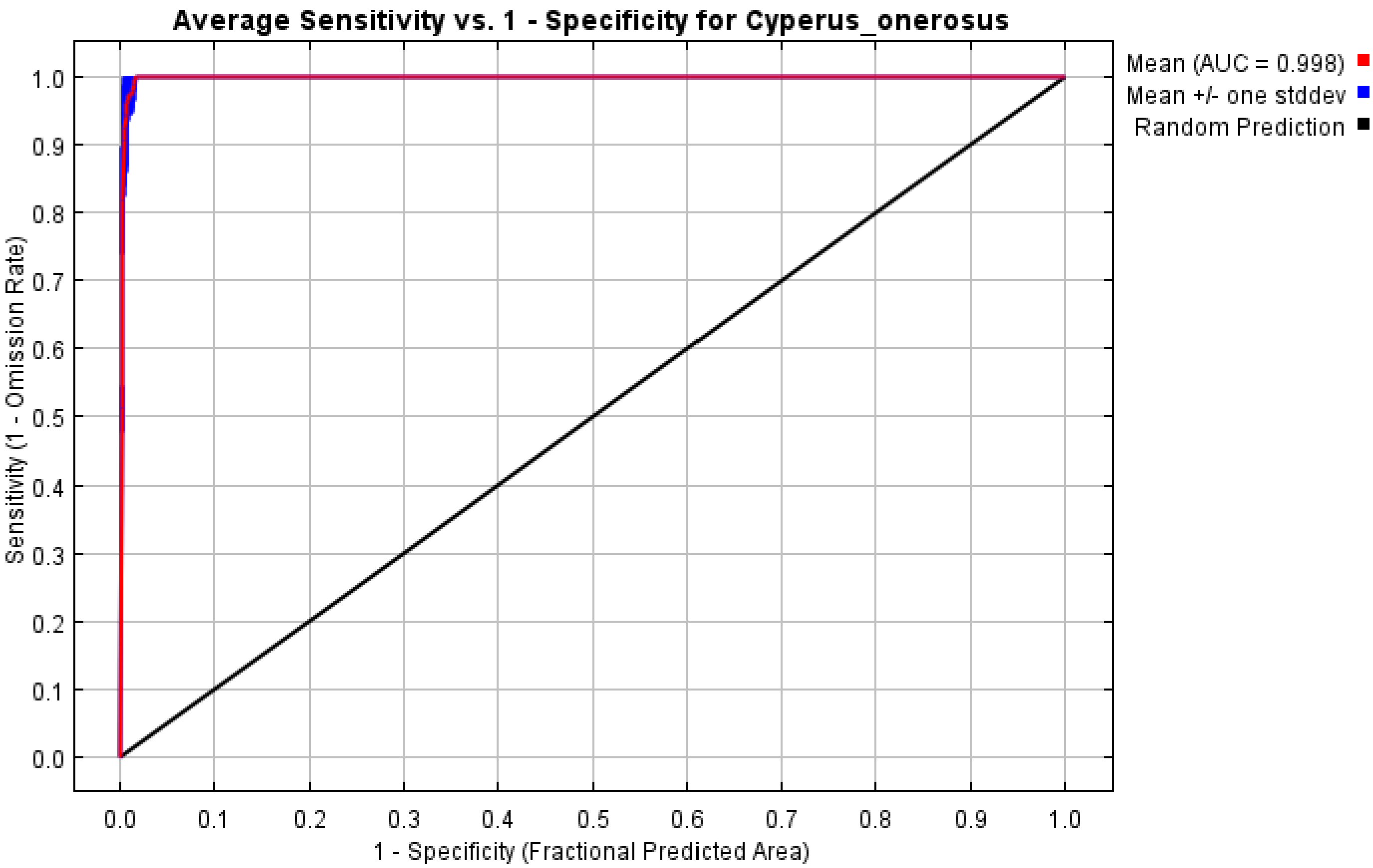
This page summarizes the results of 10 bootstrap models for Cyperus_onerosus, created Tue Dec 07 15:32:04 CST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4] [5] [6] [7] [8] [9]

Analysis of omission/commission

The following picture shows the training omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs.

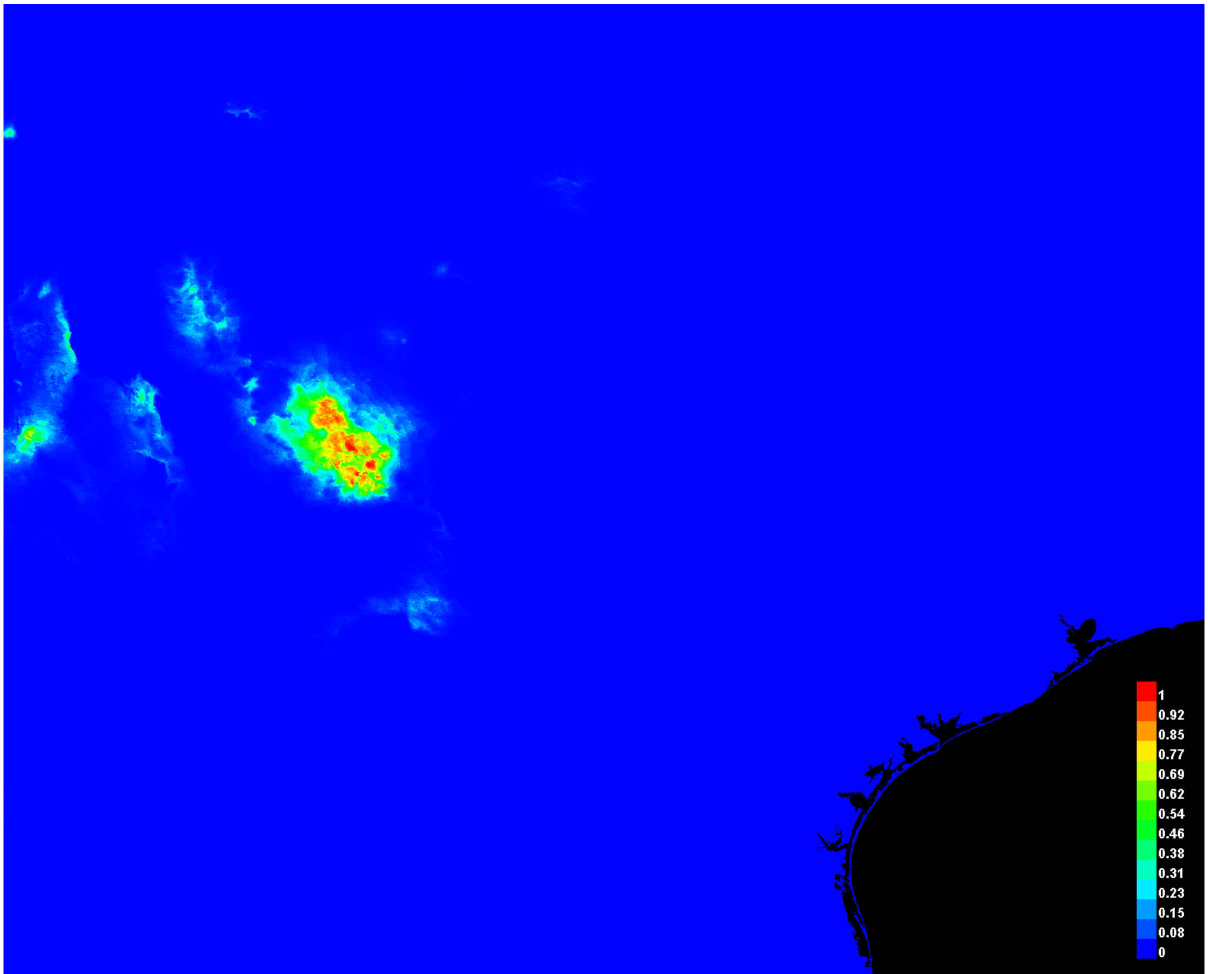


The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average training AUC for the replicate runs is 0.998, and the standard deviation is 0.001.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 10 output grids. Other available summary grids are min, max and median.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0.08
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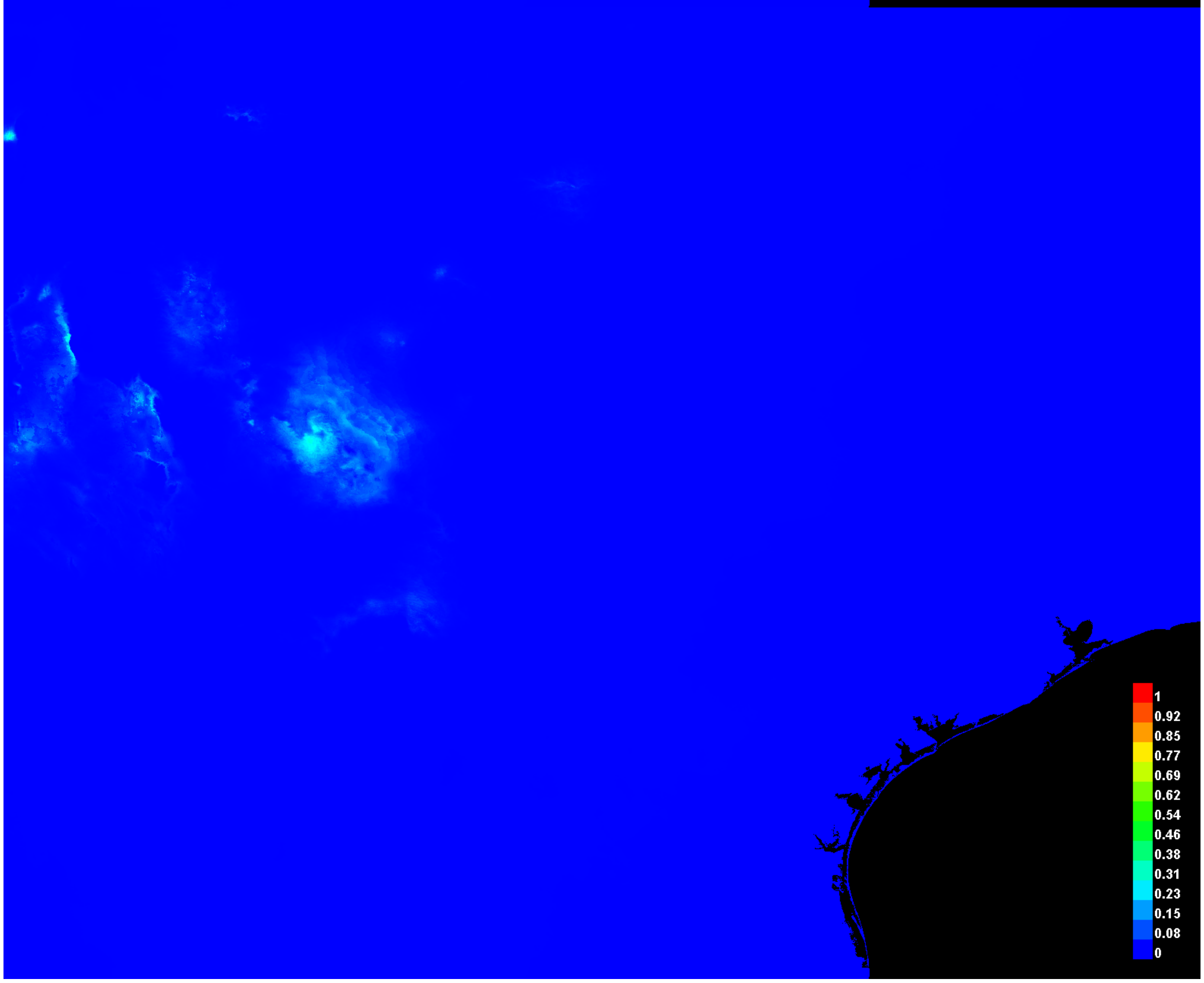
1
0.92
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0.46
0.38
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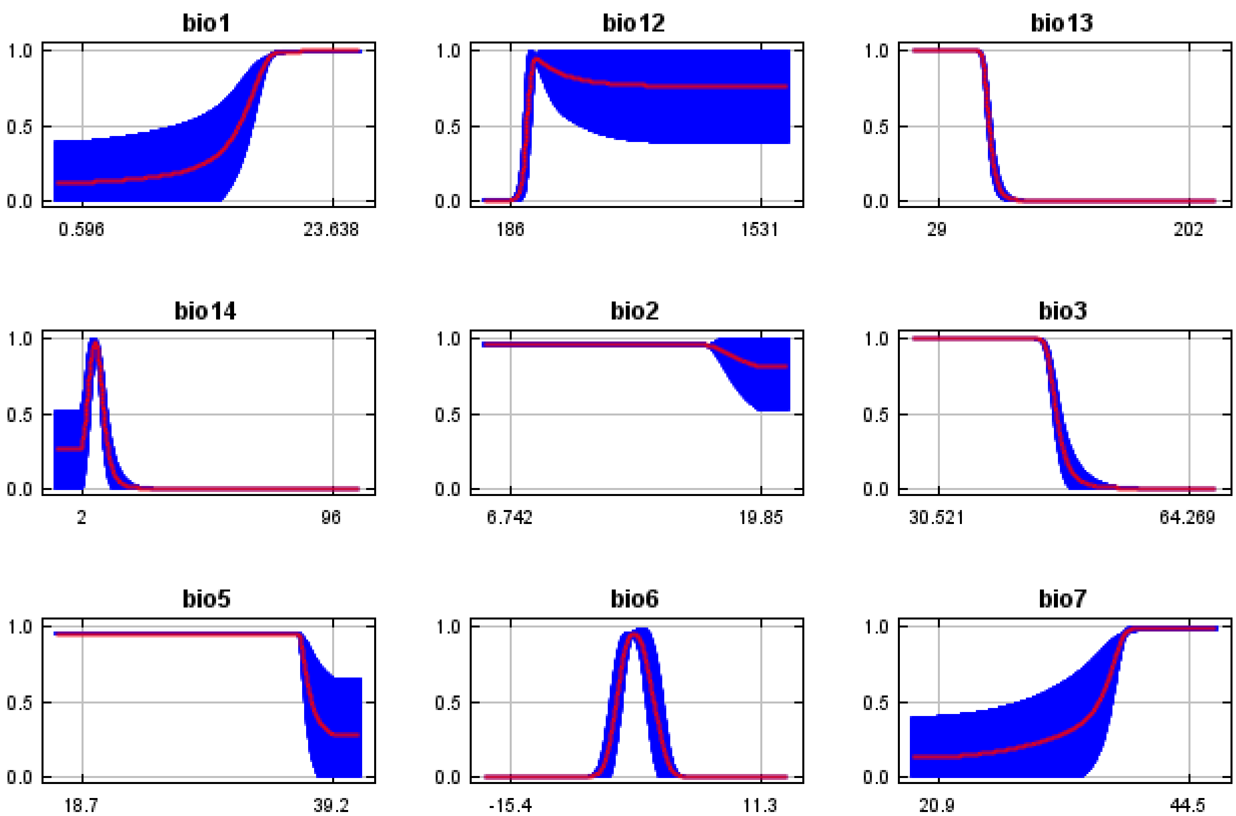
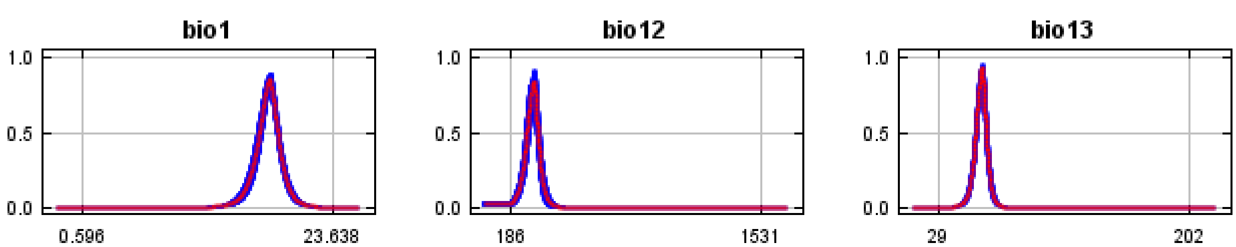
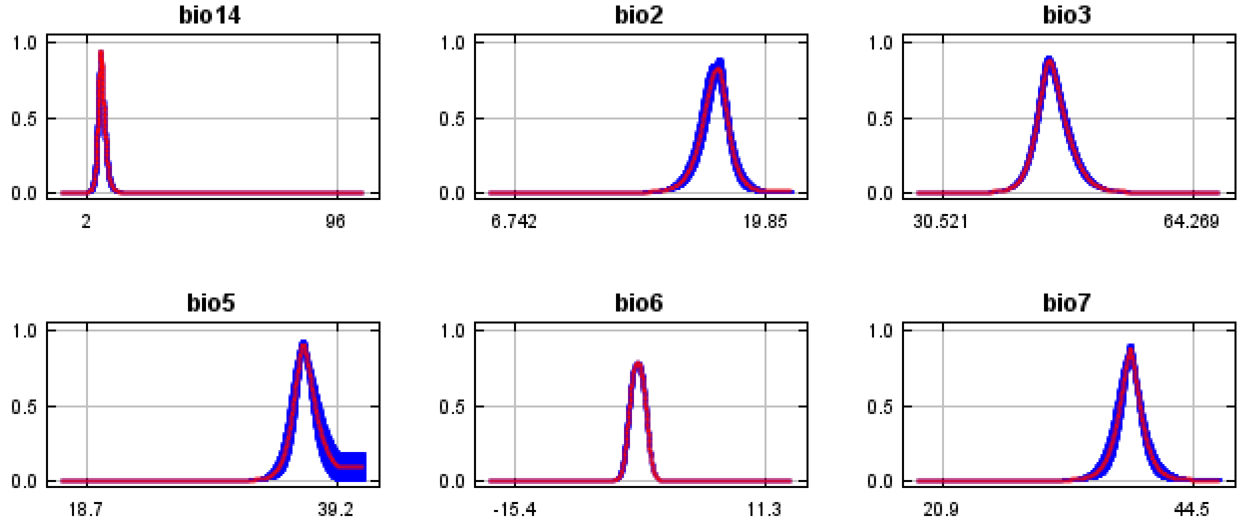
Response curves

These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 10 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).



In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.



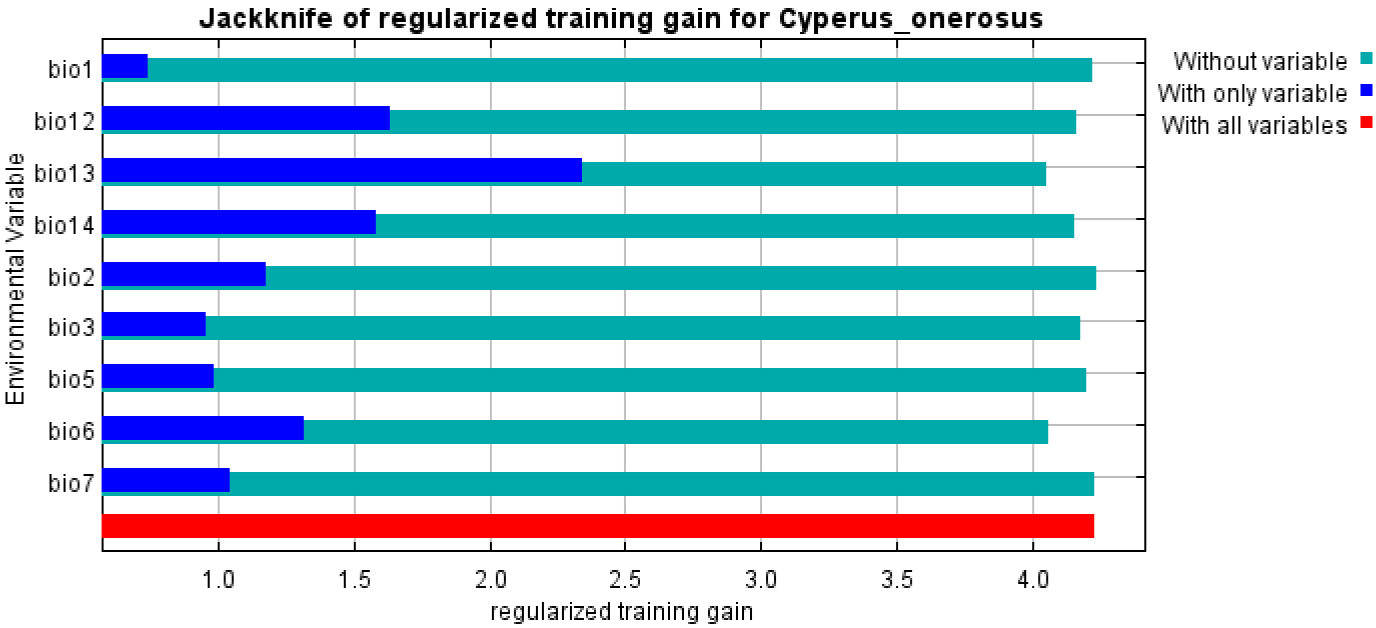


Analysis of variable contributions

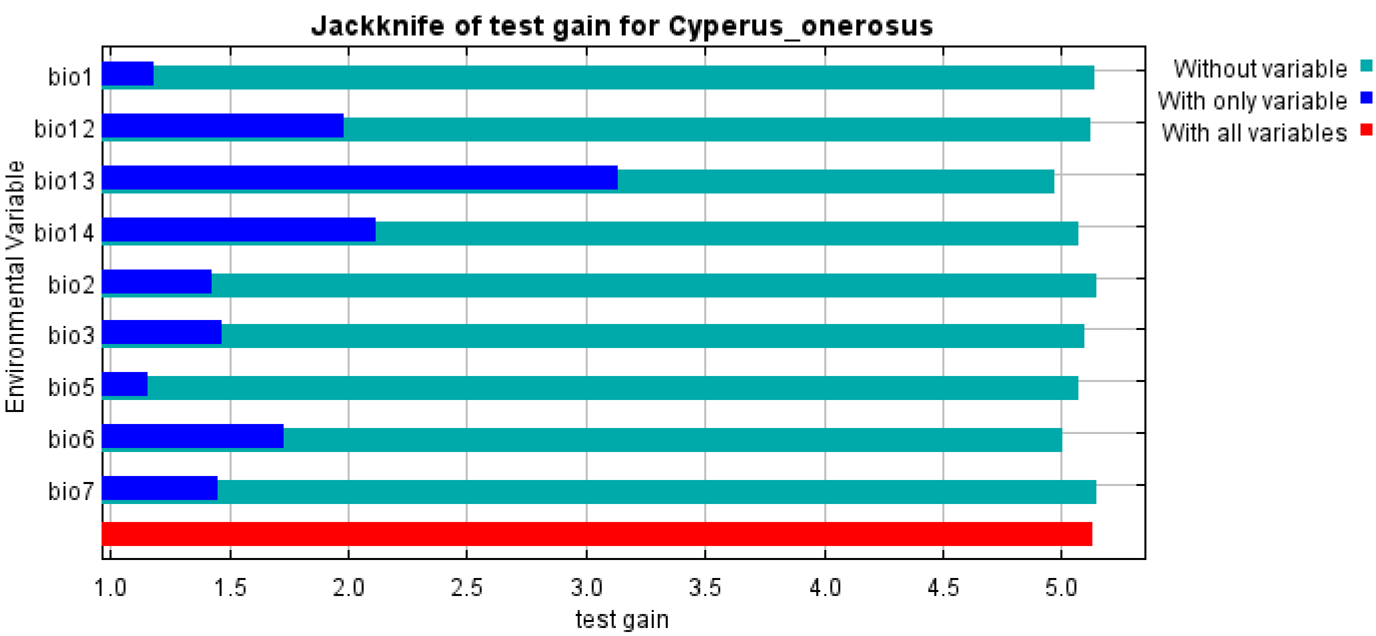
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio12	28.7	3
bio5	16.8	0.2
bio13	11.9	30.9
bio14	9.8	24.2
bio7	9.3	3.4
bio2	8.6	0
bio6	7.9	30.7
bio1	6	1.5
bio3	0.9	6

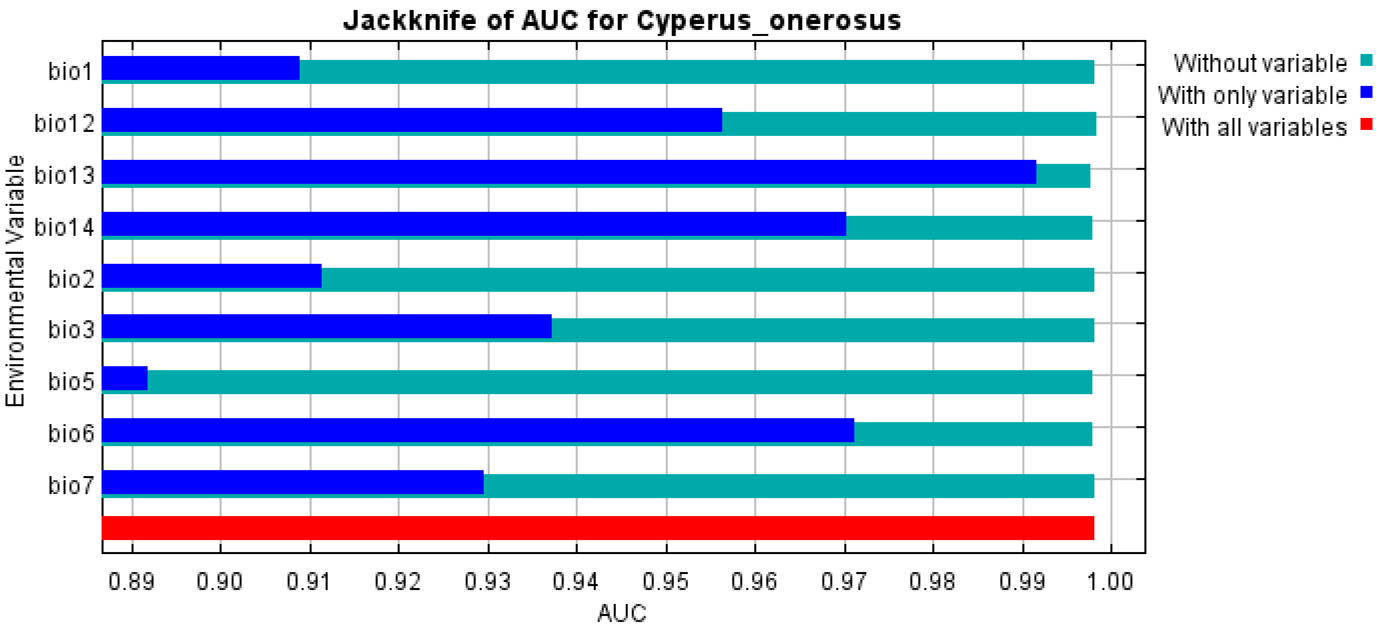
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio13, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio13, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



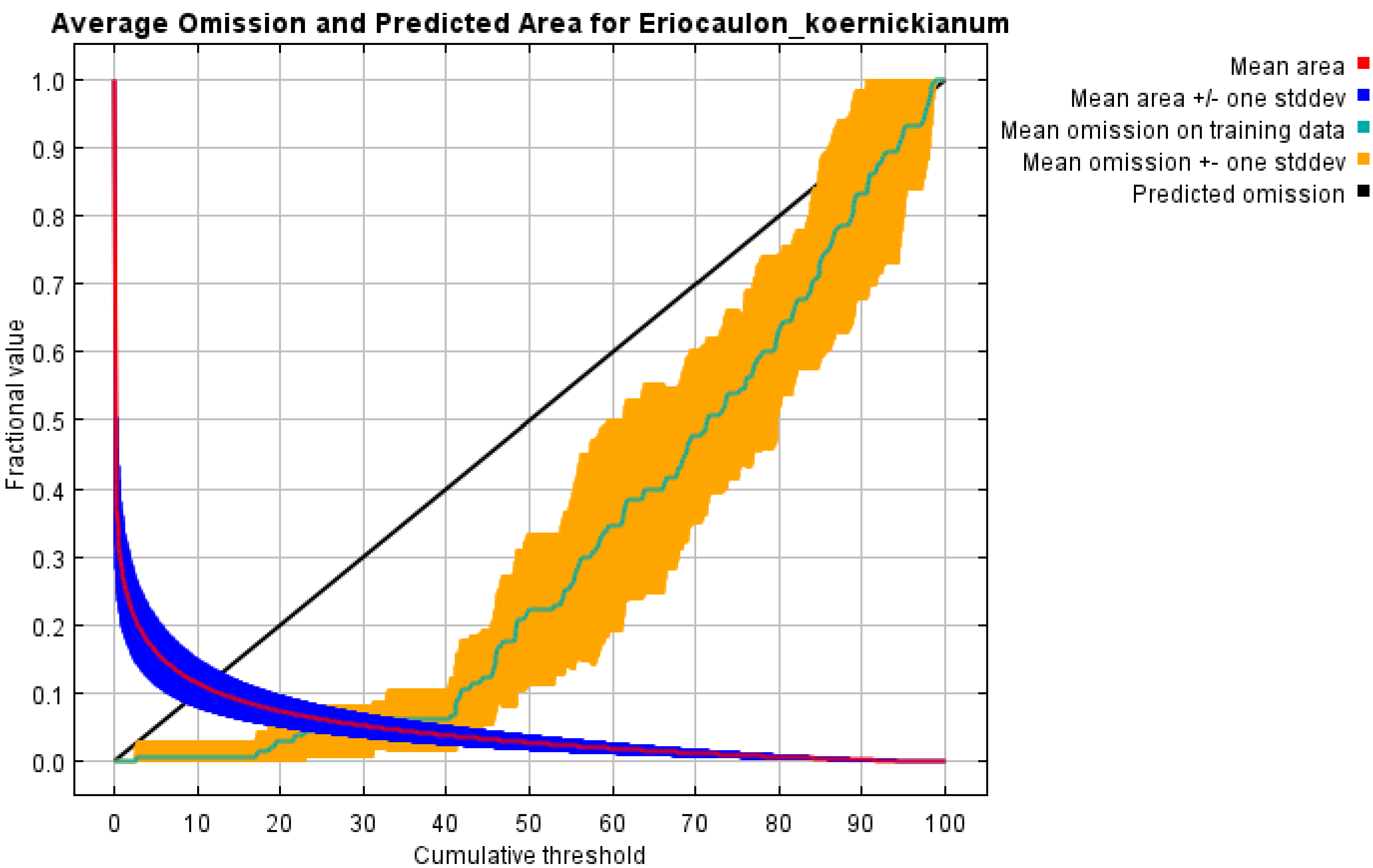
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Cyperus_onerosus responsecurves jackknife "outputdirectory=E:\TXDoT_Range Scale_Bioclim\Results\1Reg\Cyperus" "samplesfile=E:\TXDoT_Range Scale_Bioclim\spp_csv\Cyperus onerosus obs.csv" "environmentallayers=E:\TXDoT_Range Scale_Bioclim\Ascii" randomseed randomtestpoints=25 replicates=10 replicatetype=bootstrap writebackgroundpredictions -N bio0

Replicated maxent model for Eriocaulon_koernickianum

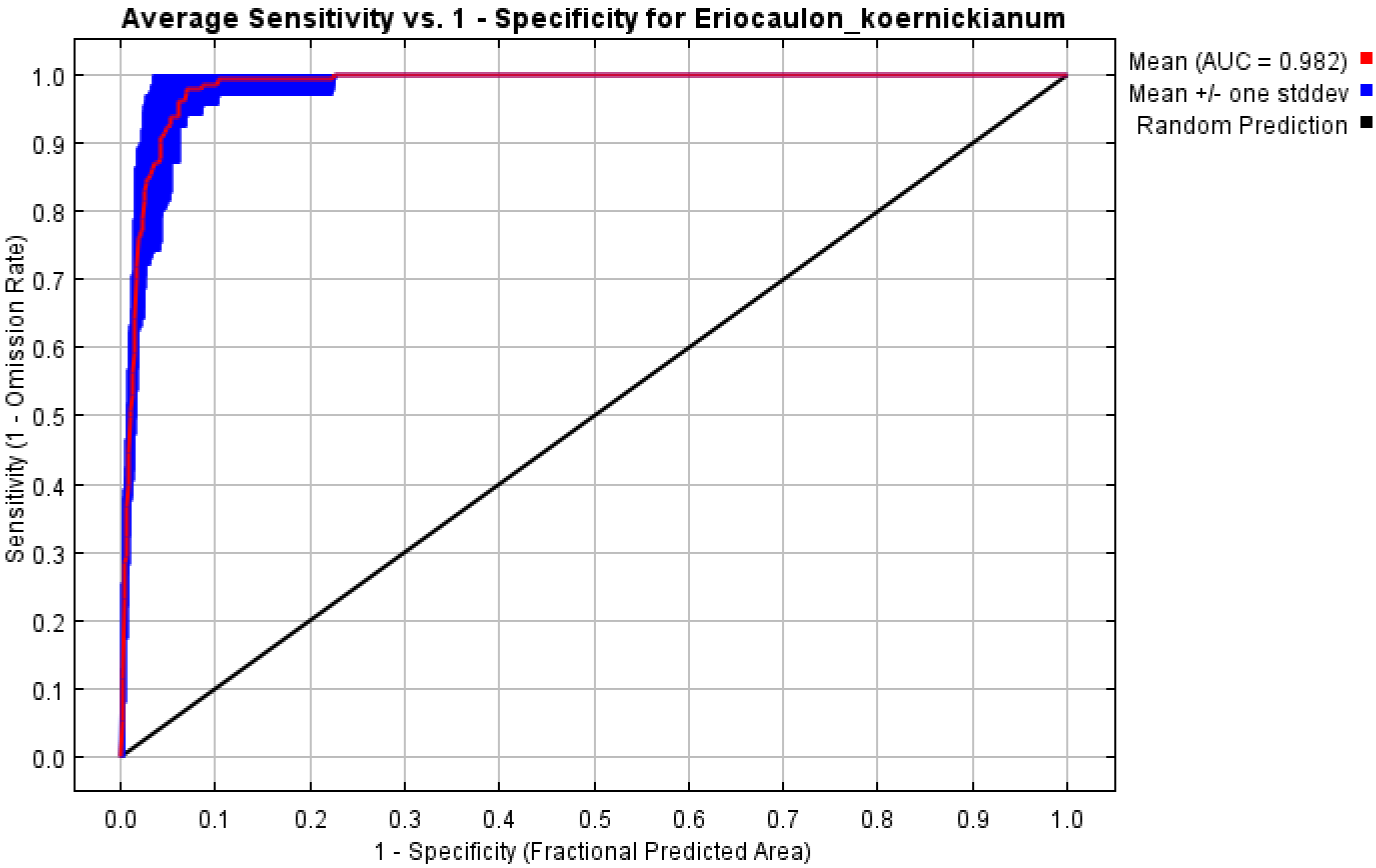
This page summarizes the results of 10 bootstrap models for Eriocaulon_koernickianum, created Sat Dec 04 14:29:50 CST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4] [5] [6] [7] [8] [9]

Analysis of omission/commission

The following picture shows the training omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs.

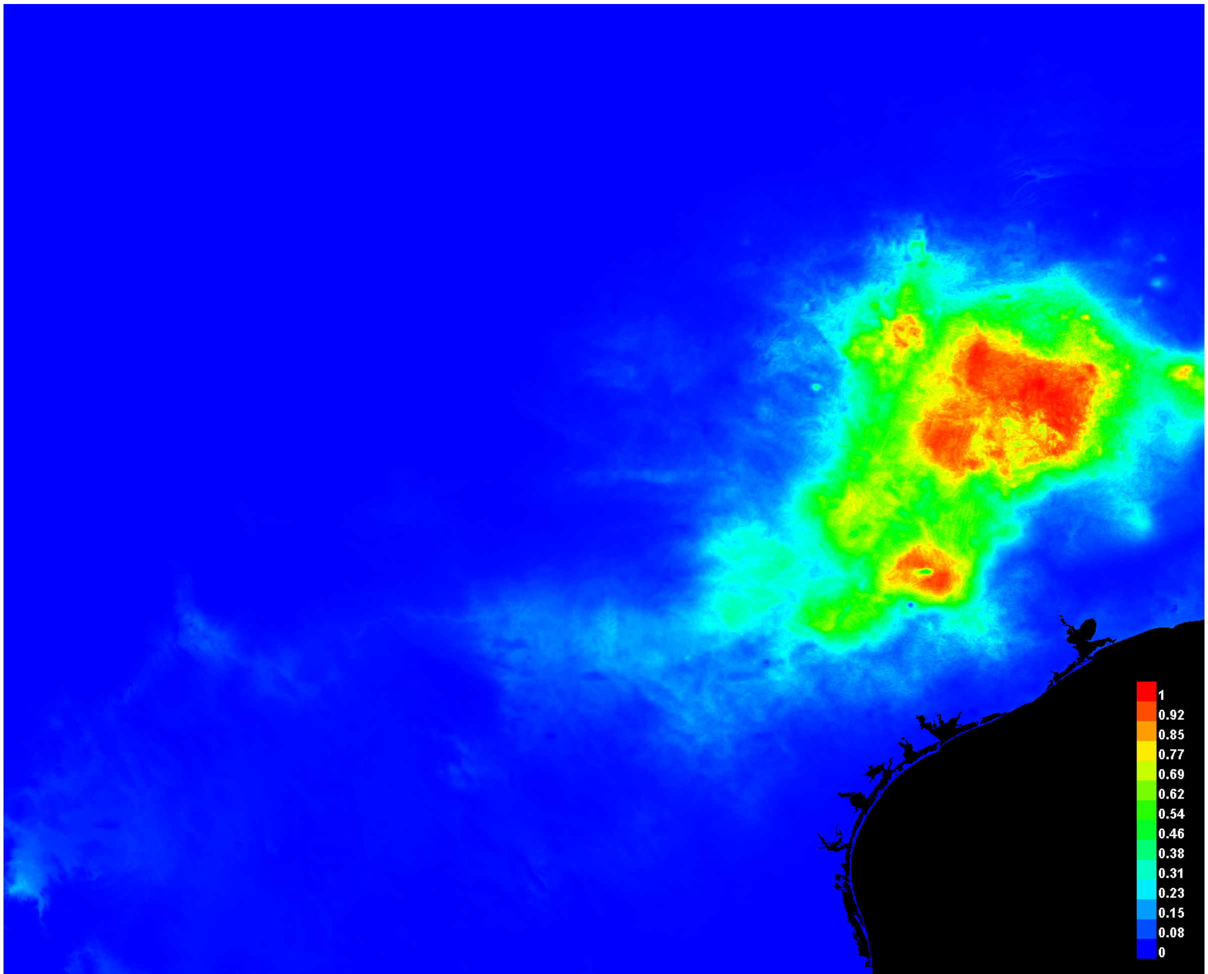


The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average training AUC for the replicate runs is 0.982, and the standard deviation is 0.007.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 10 output grids. Other available summary grids are min, max and median.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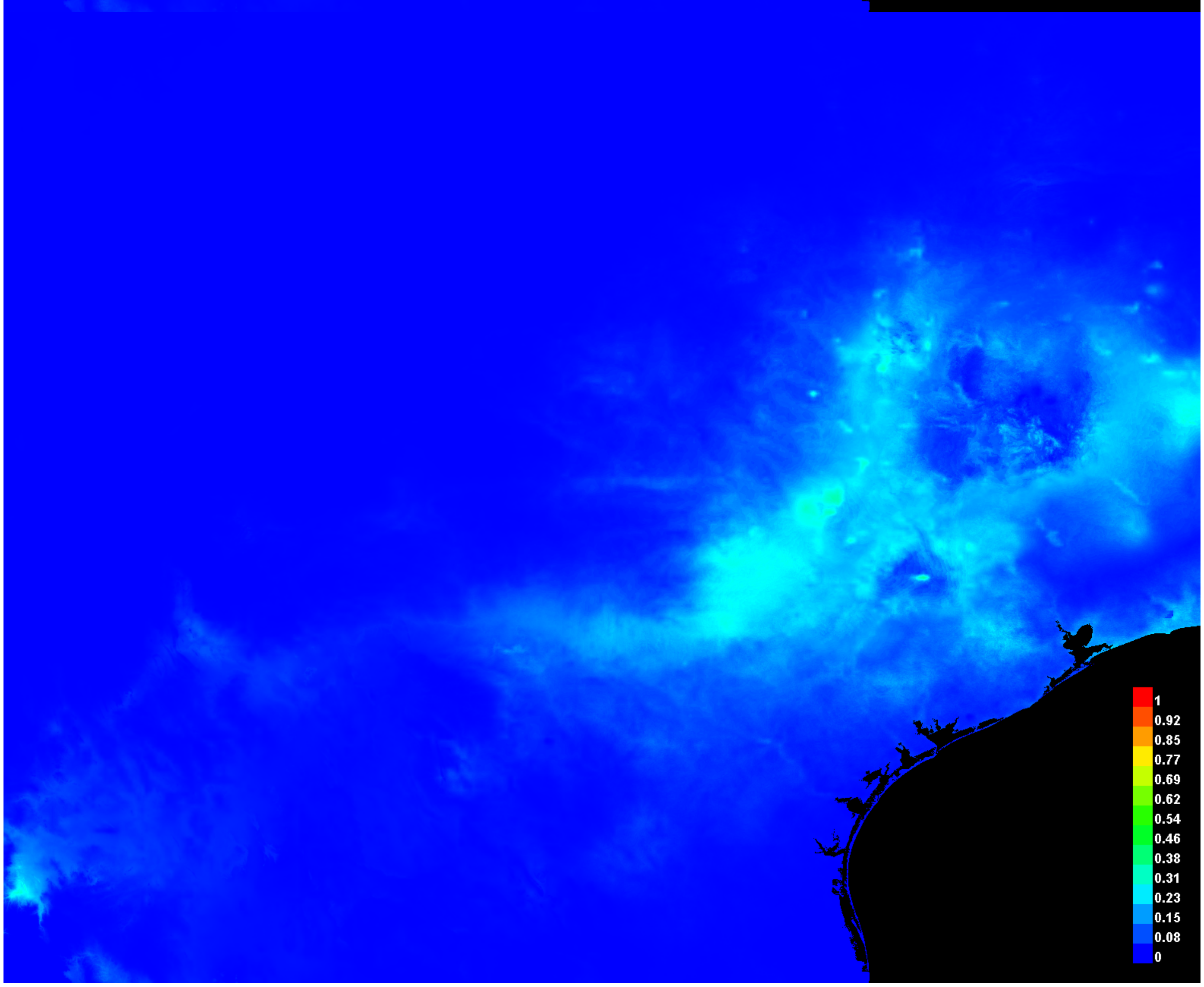
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0.85
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0.62
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0.46
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0.31
0.23
0.15
0.08
0

Analysis of variable contributions

The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio6	36.7	25
bio12	25.7	41.7
bio14	19.7	13.4
bio2	9.8	0.4
bio1	3.5	0
bio5	3.5	8.2
bio7	0.6	6.9
bio13	0.4	1.1
bio3	0.2	3.2

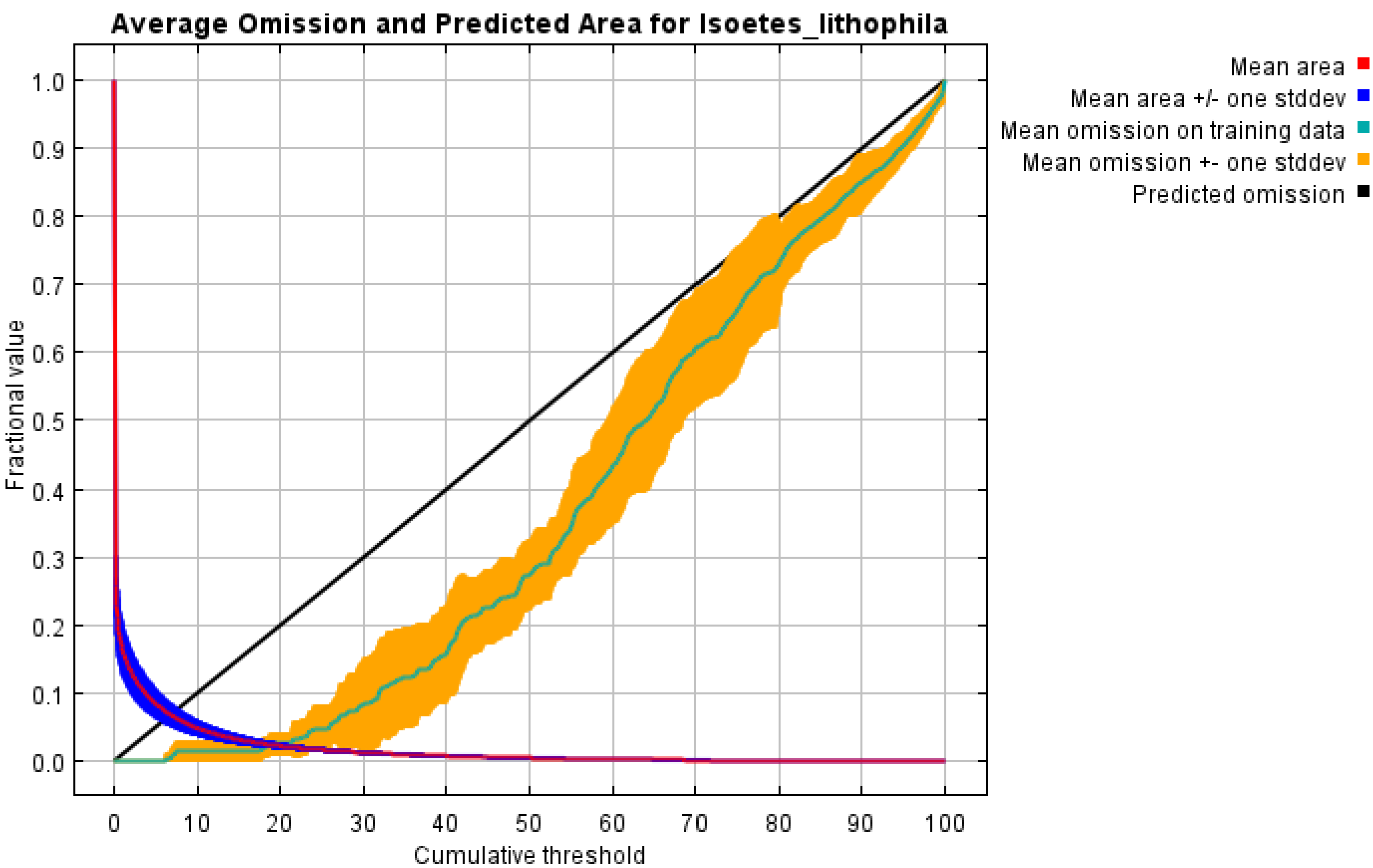
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Eriocaulon_koernickianum "outputdirectory=E:\TXDoT_Range Scale_Bioclim\Results\1Reg\Eriocaulon" "samplesfile=E:\TXDoT_Range Scale_Bioclim\spp_csv\Eriocaulon koernickianum obs.csv" "environmentallayers=E:\TXDoT_Range Scale_Bioclim\Ascii" randomseed randomtestpoints=25 replicates=10 replicatetype=bootstrap writebackgroundpredictions -N bio0

Replicated maxent model for Isoetes_lithophila

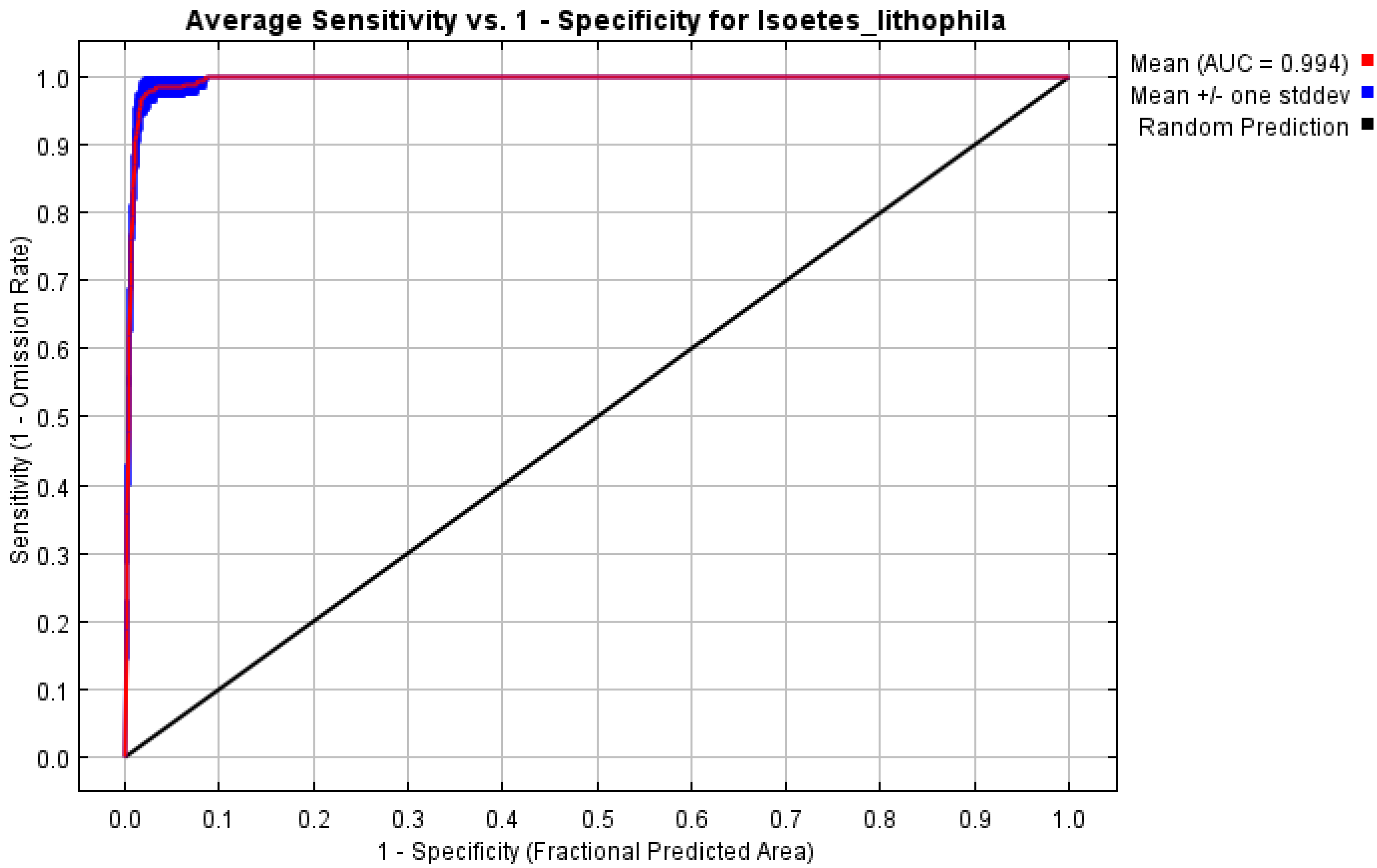
This page summarizes the results of 10 bootstrap models for Isoetes_lithophila, created Tue Dec 07 15:39:50 CST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4] [5] [6] [7] [8] [9]

Analysis of omission/commission

The following picture shows the training omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs.

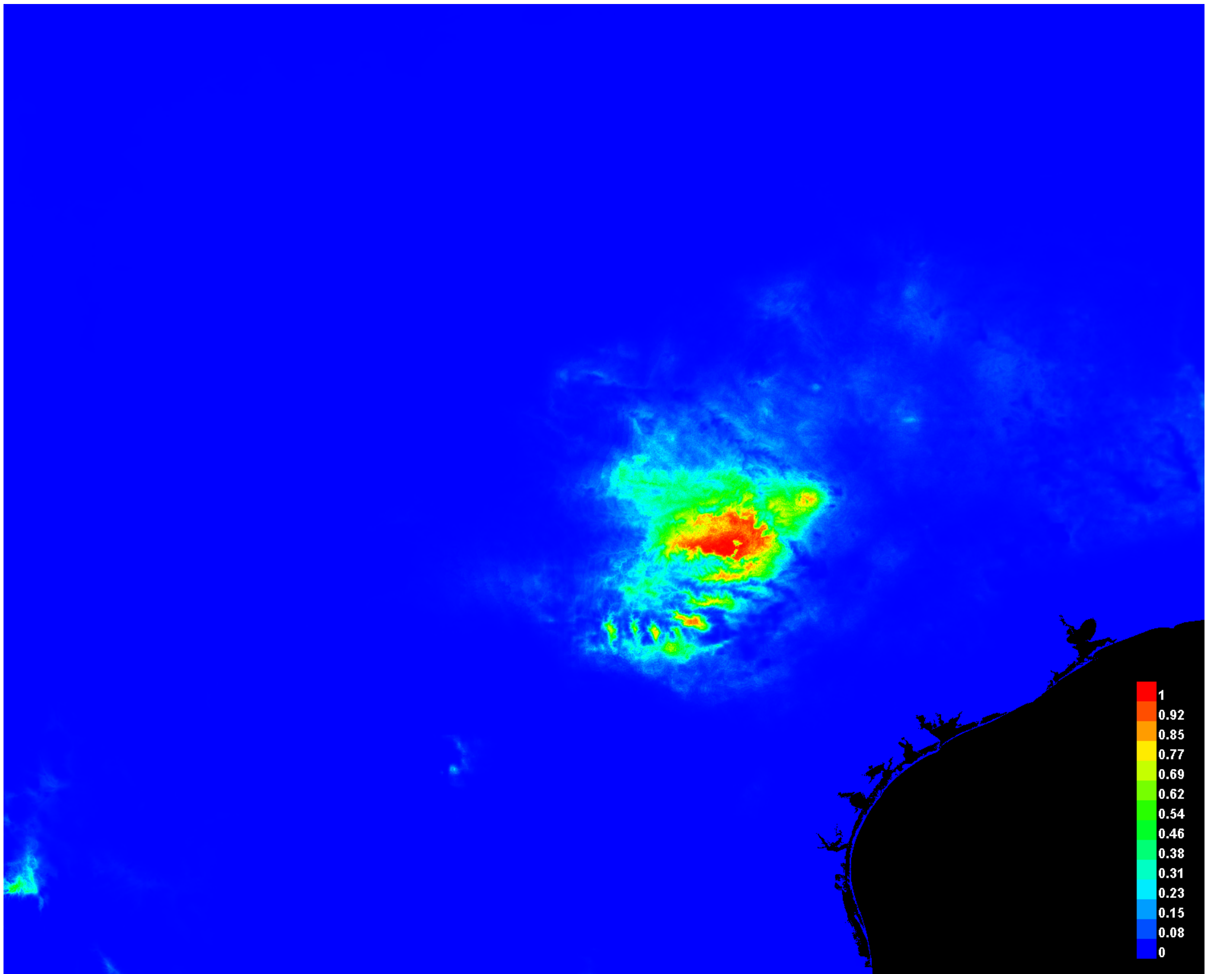


The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average training AUC for the replicate runs is 0.994, and the standard deviation is 0.001.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 10 output grids. Other available summary grids are min, max and median.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0.54
0.46
0.38
0.31
0.23
0.15
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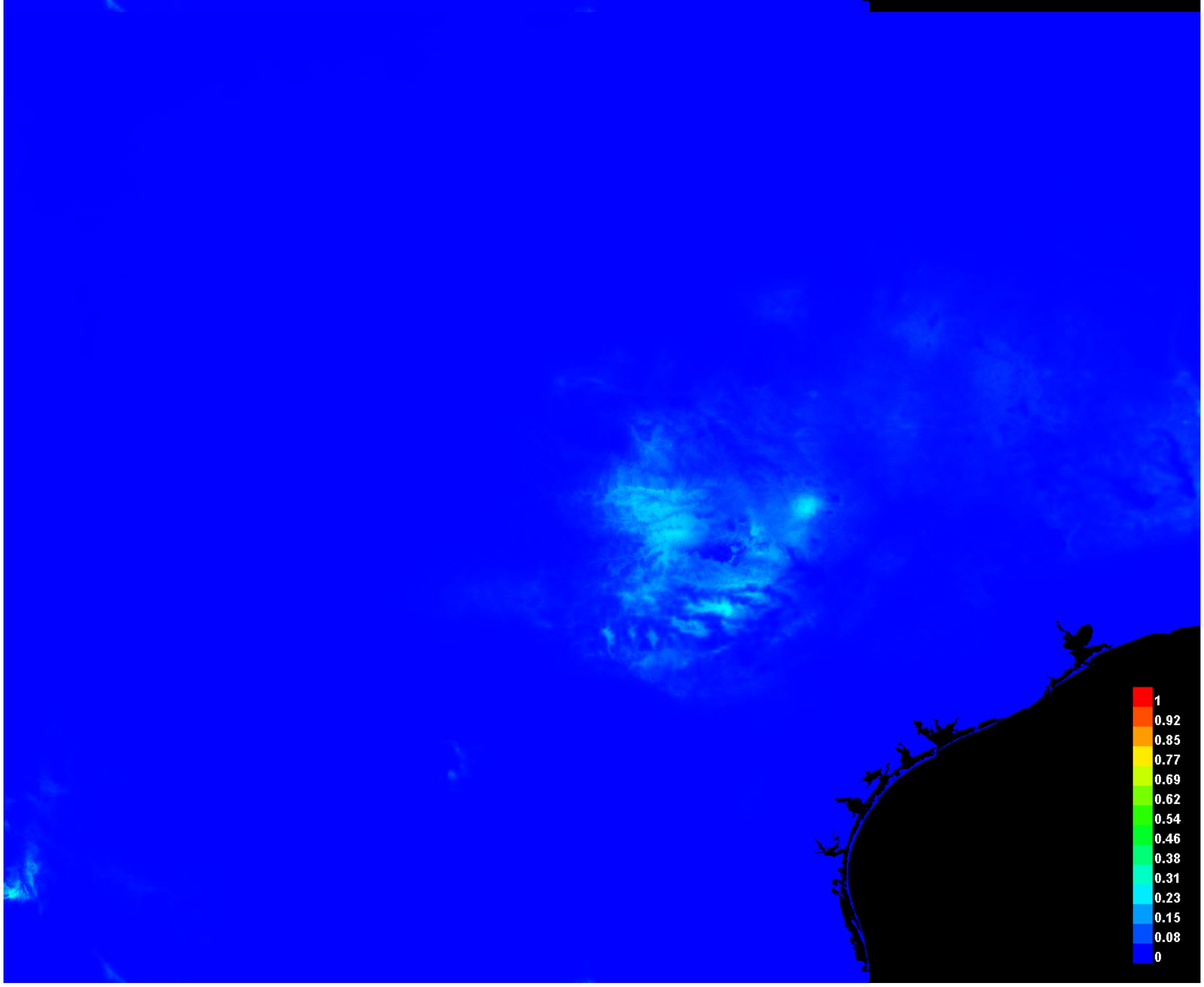
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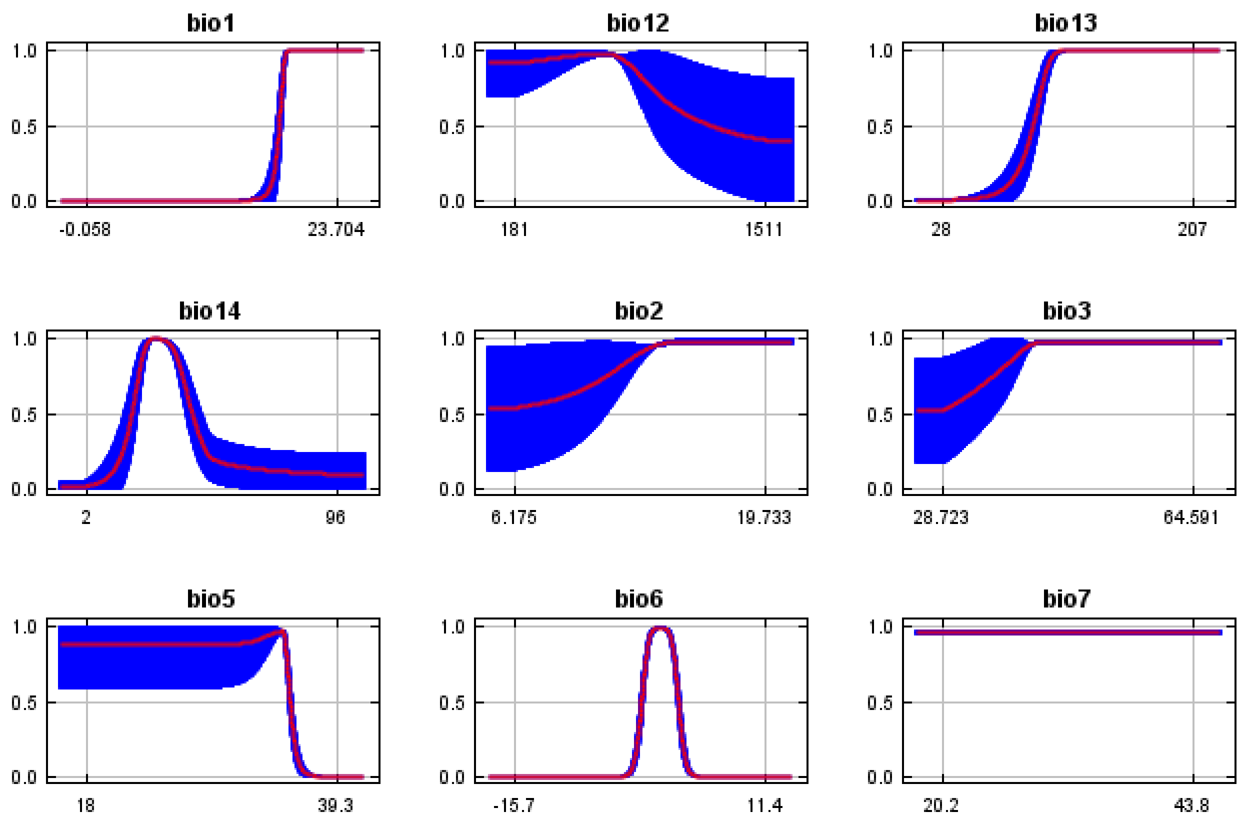
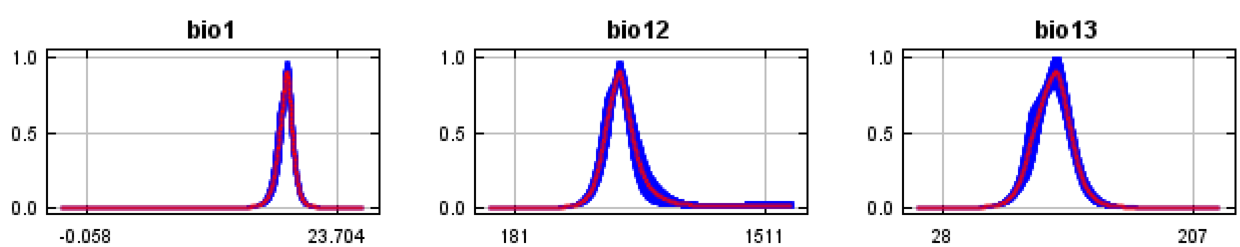
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

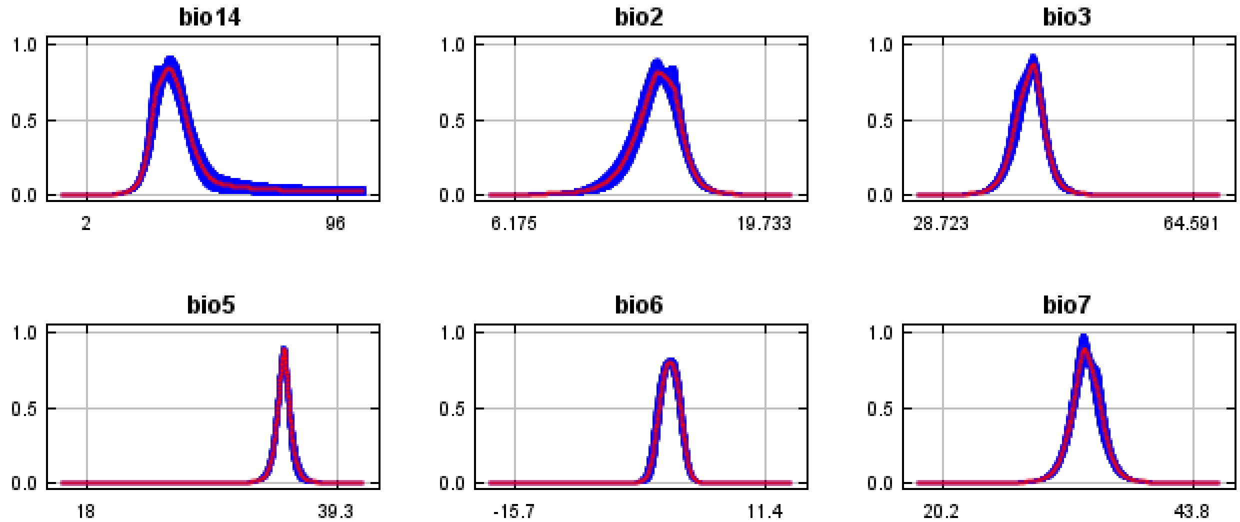
Response curves

These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 10 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).



In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.



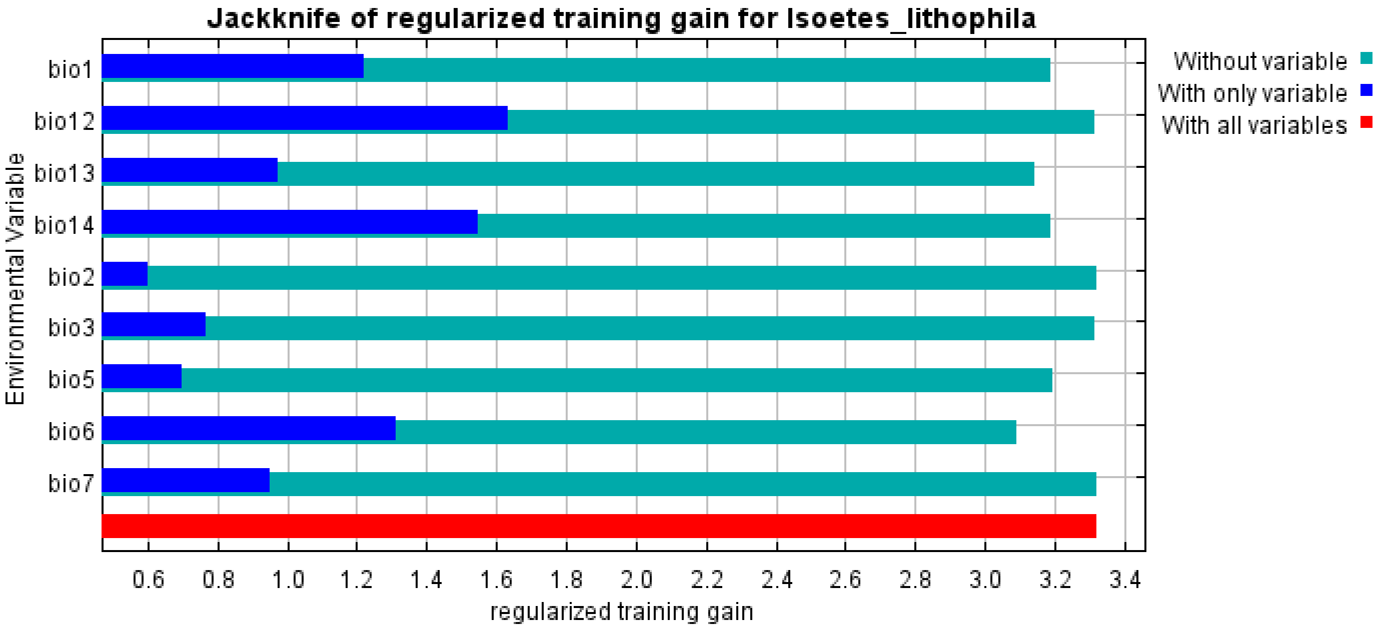


Analysis of variable contributions

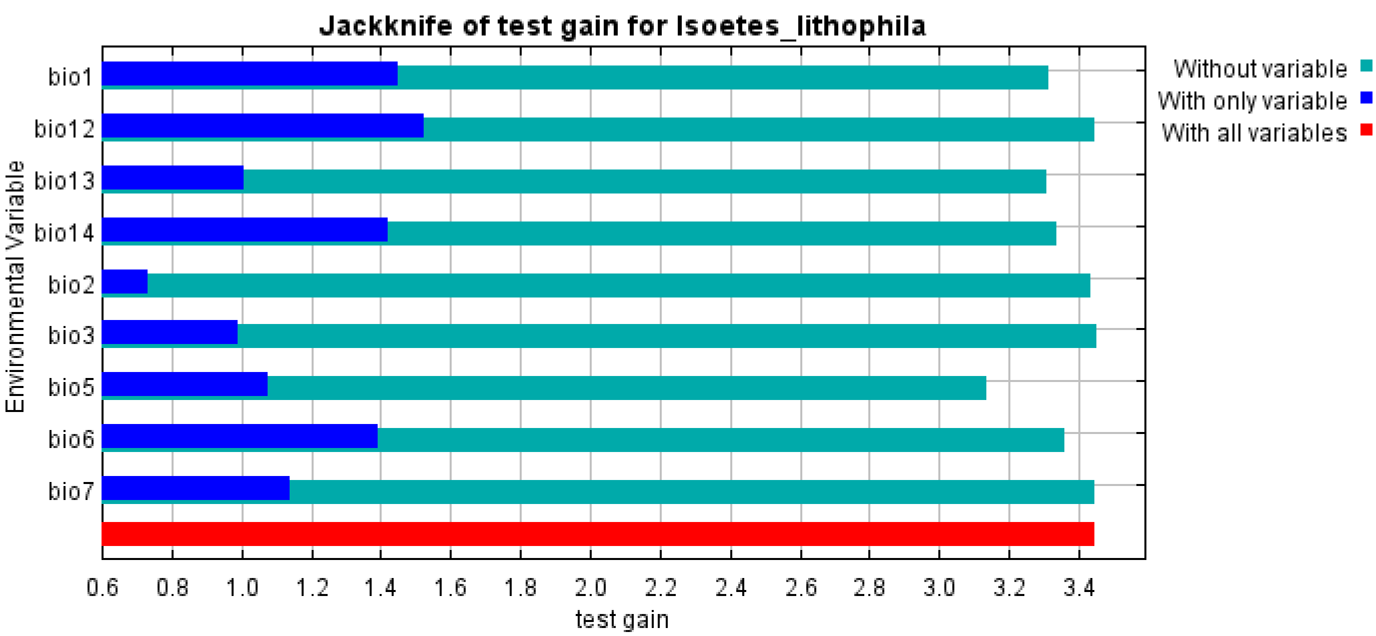
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio14	37	13.6
bio12	20.3	1.6
bio1	9.7	29.1
bio7	9.5	0
bio3	9.3	0.7
bio6	6.6	40.4
bio13	6.5	10.9
bio5	1.2	3
bio2	0.1	0.8

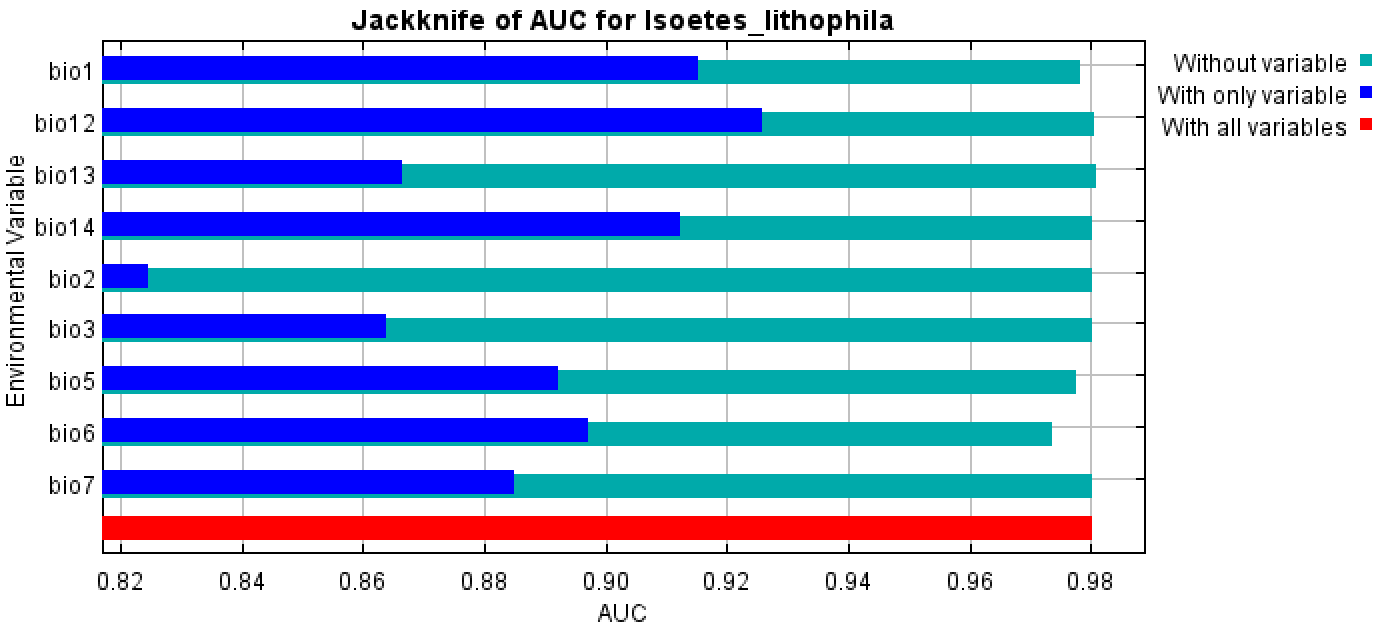
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio12, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio6, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



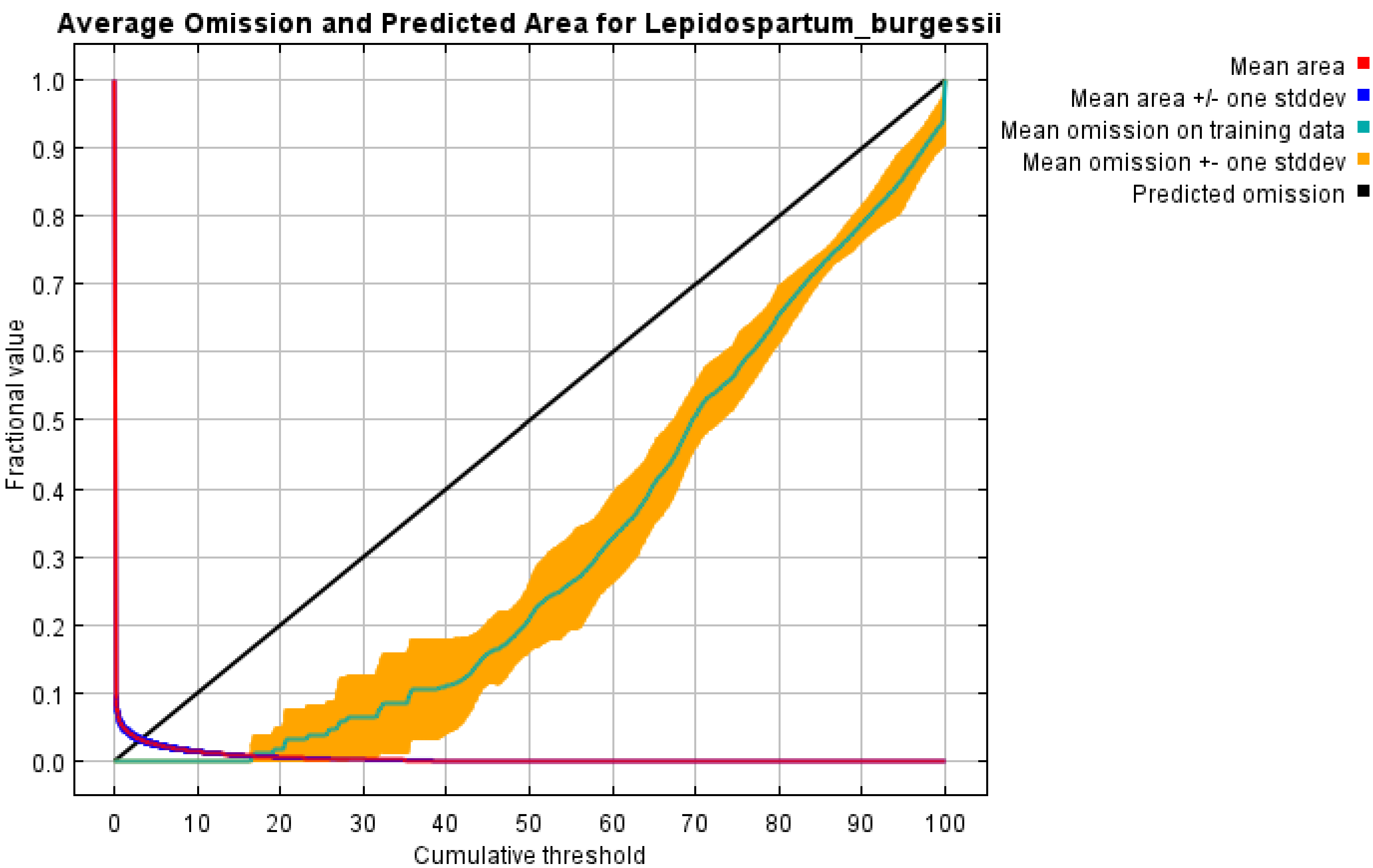
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Isoetes_lithophila responsecurves jackknife "outputdirectory=E:\TXDoT_Range Scale_Bioclim\Results\1Reg\Isoetes" "samplesfile=E:\TXDoT_Range Scale_Bioclim\spp_csv\Isoetes lithophila obs.csv" "environmentallayers=E:\TXDoT_Range Scale_Bioclim\Ascii" randomseed randomtestpoints=25 replicates=10 replicatetype=bootstrap writebackgroundpredictions -N bio0

Replicated maxent model for Lepidospartum_burgessii

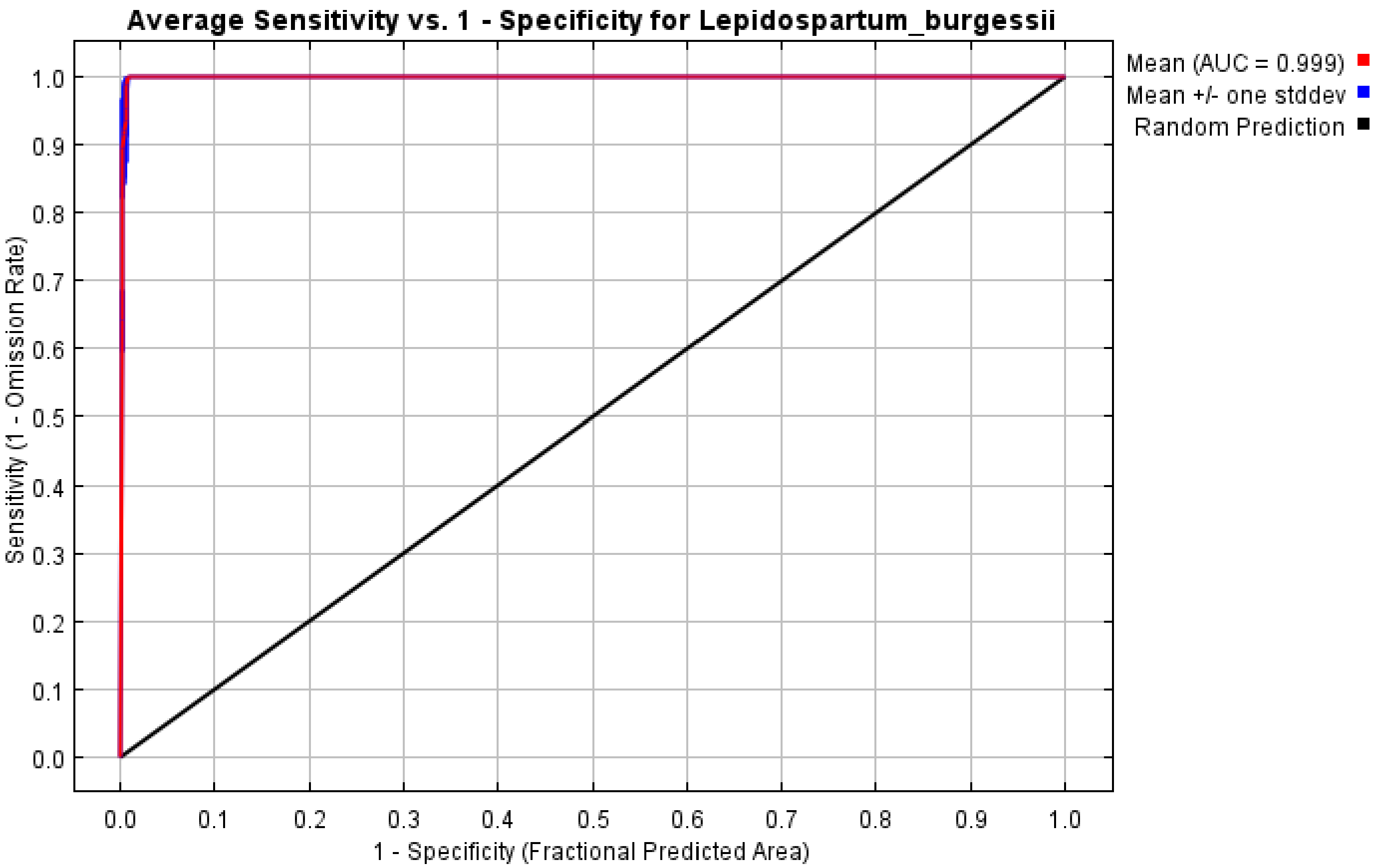
This page summarizes the results of 10 bootstrap models for Lepidospartum_burgessii, created Tue Dec 07 12:58:41 CST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4] [5] [6] [7] [8] [9]

Analysis of omission/commission

The following picture shows the training omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs.

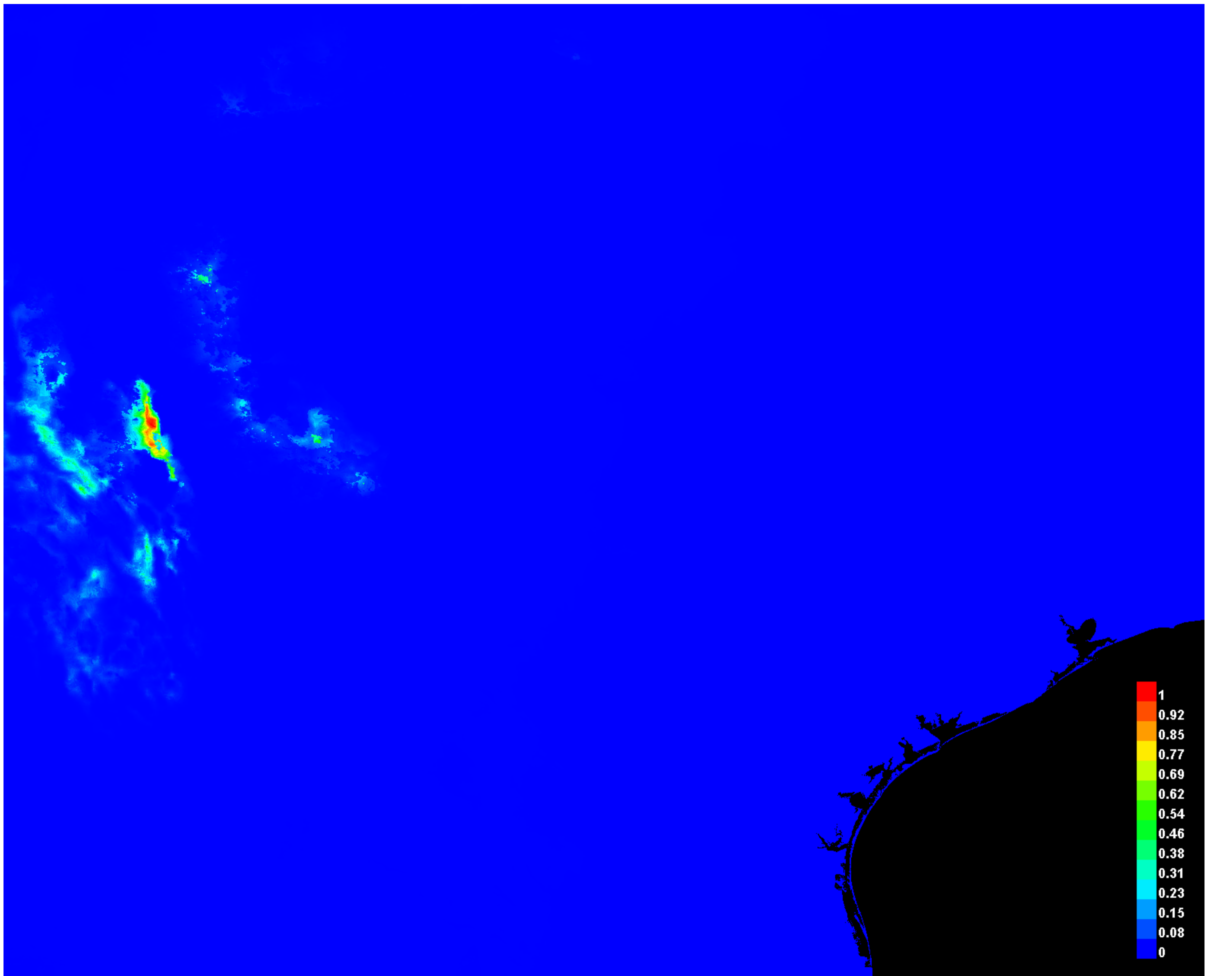


The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average training AUC for the replicate runs is 0.999, and the standard deviation is 0.000.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 10 output grids. Other available summary grids are min, max and median.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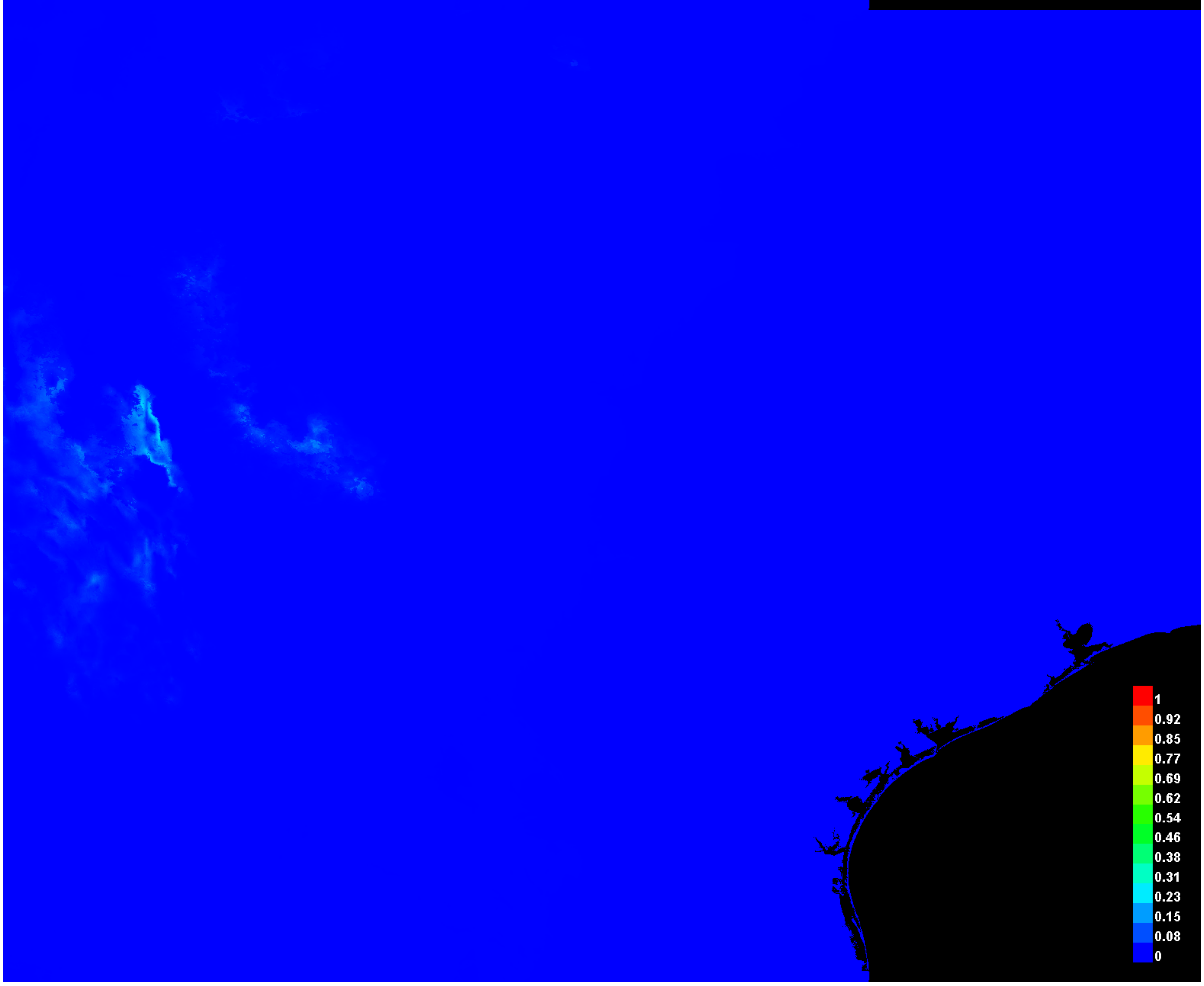
1
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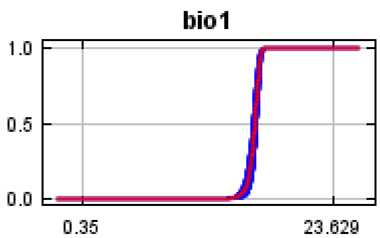
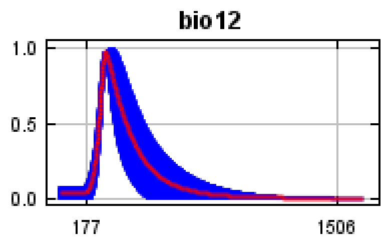
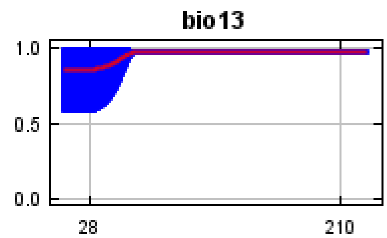
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

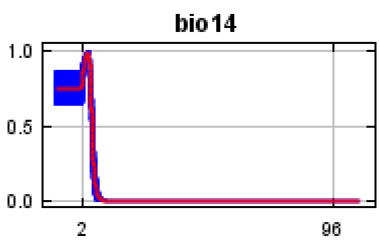
Response curves

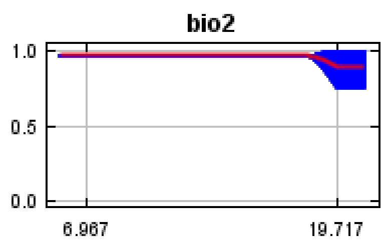
These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 10 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).

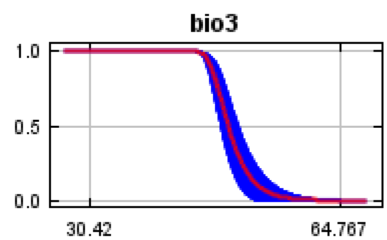


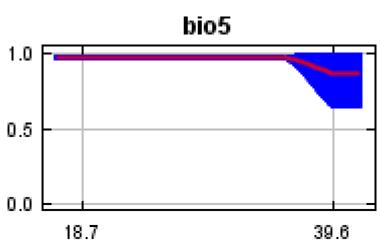


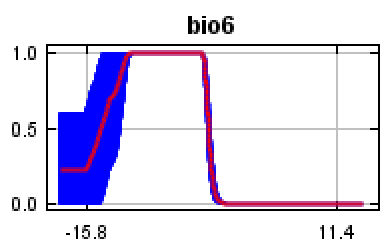


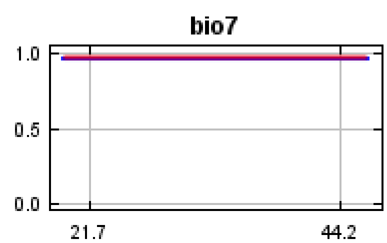




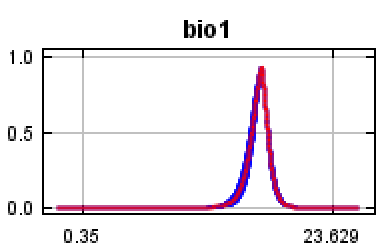


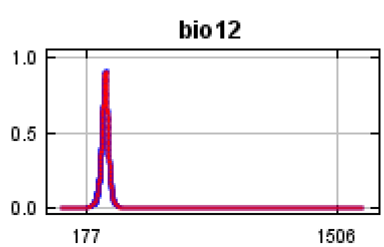


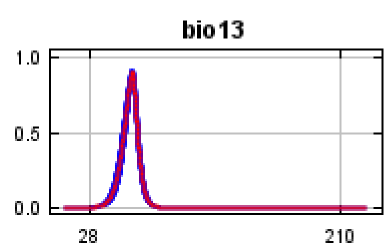


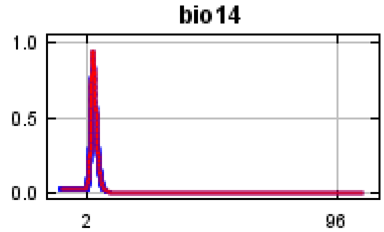


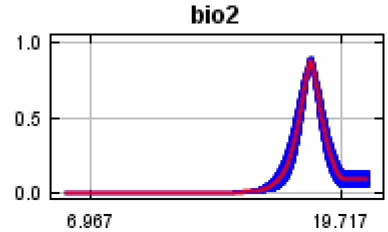
In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.

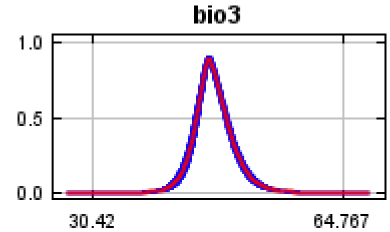


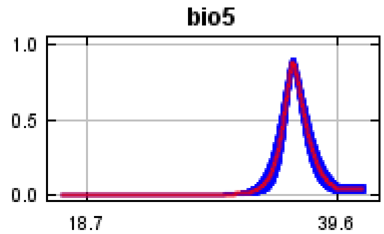


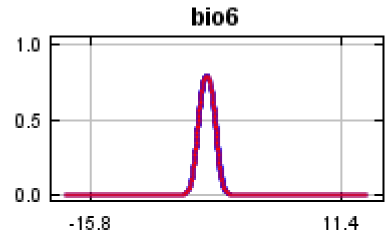


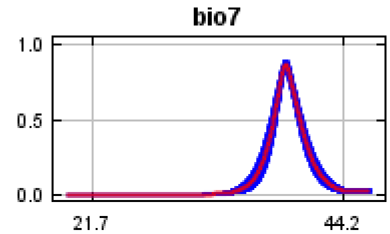










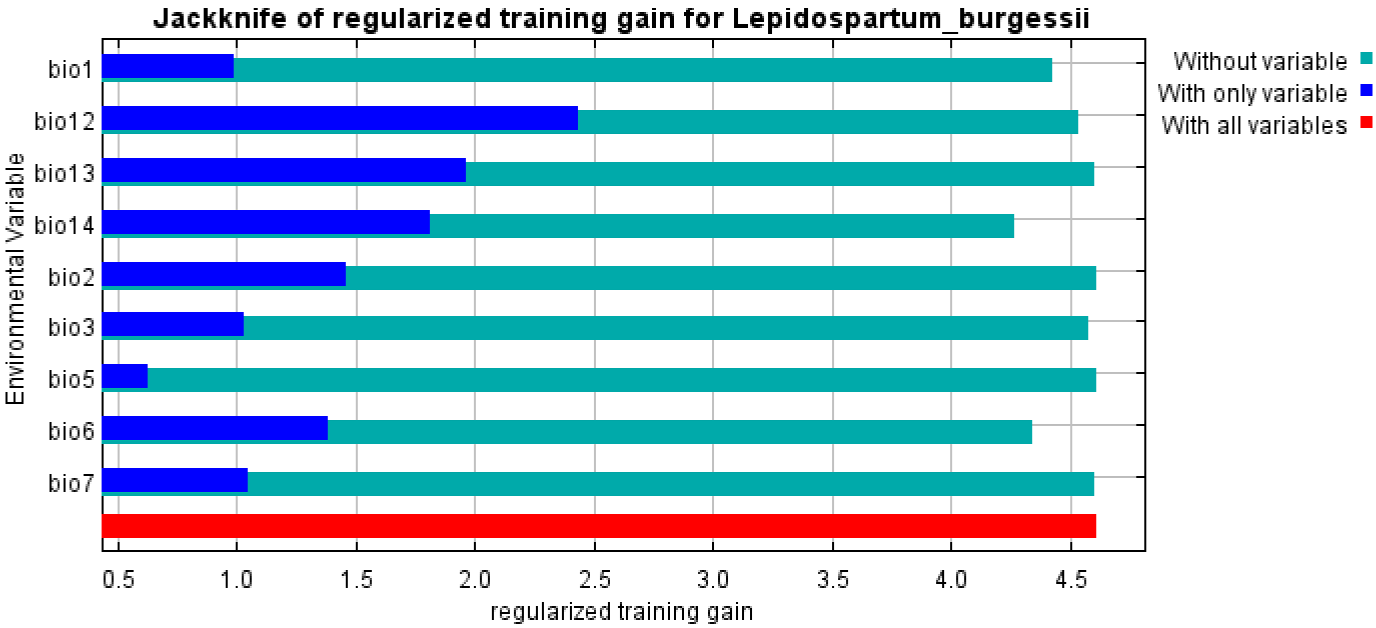


Analysis of variable contributions

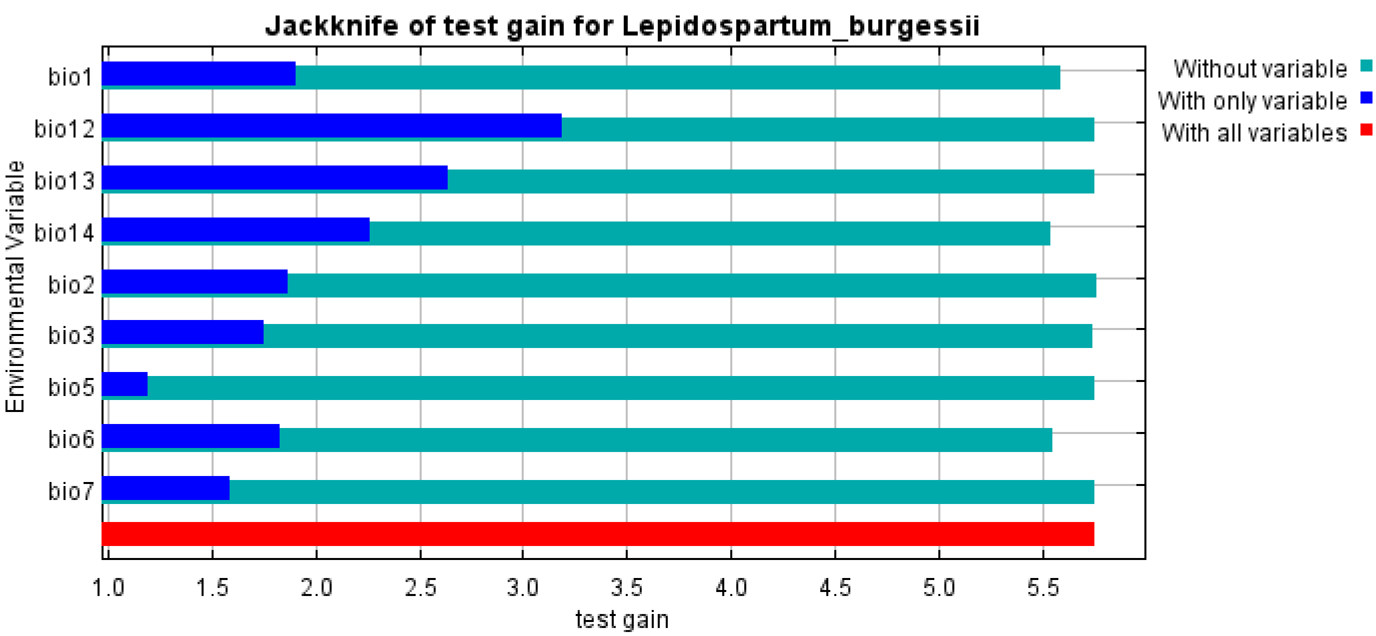
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio14	35.1	40.5
bio12	28.4	8.2
bio7	18.8	0
bio6	6.9	34.6
bio1	5.3	14.2
bio2	3	0
bio3	1.6	2.2
bio5	0.6	0
bio13	0.3	0.3

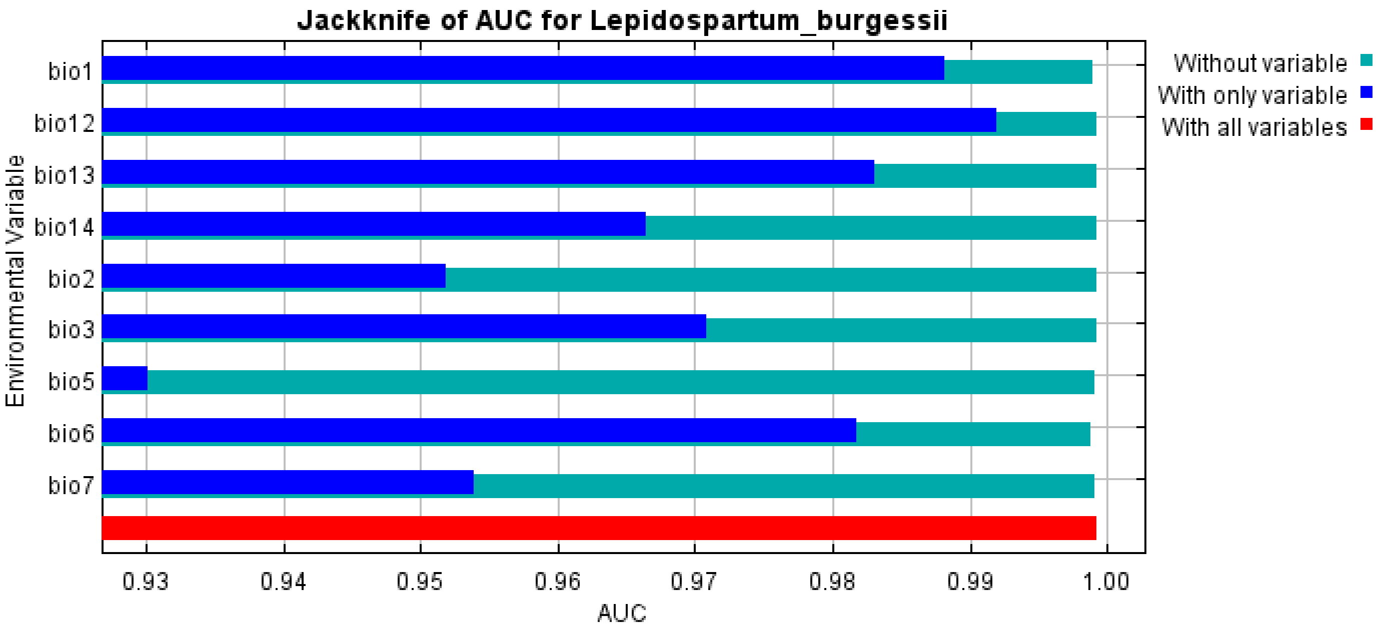
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio12, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio14, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



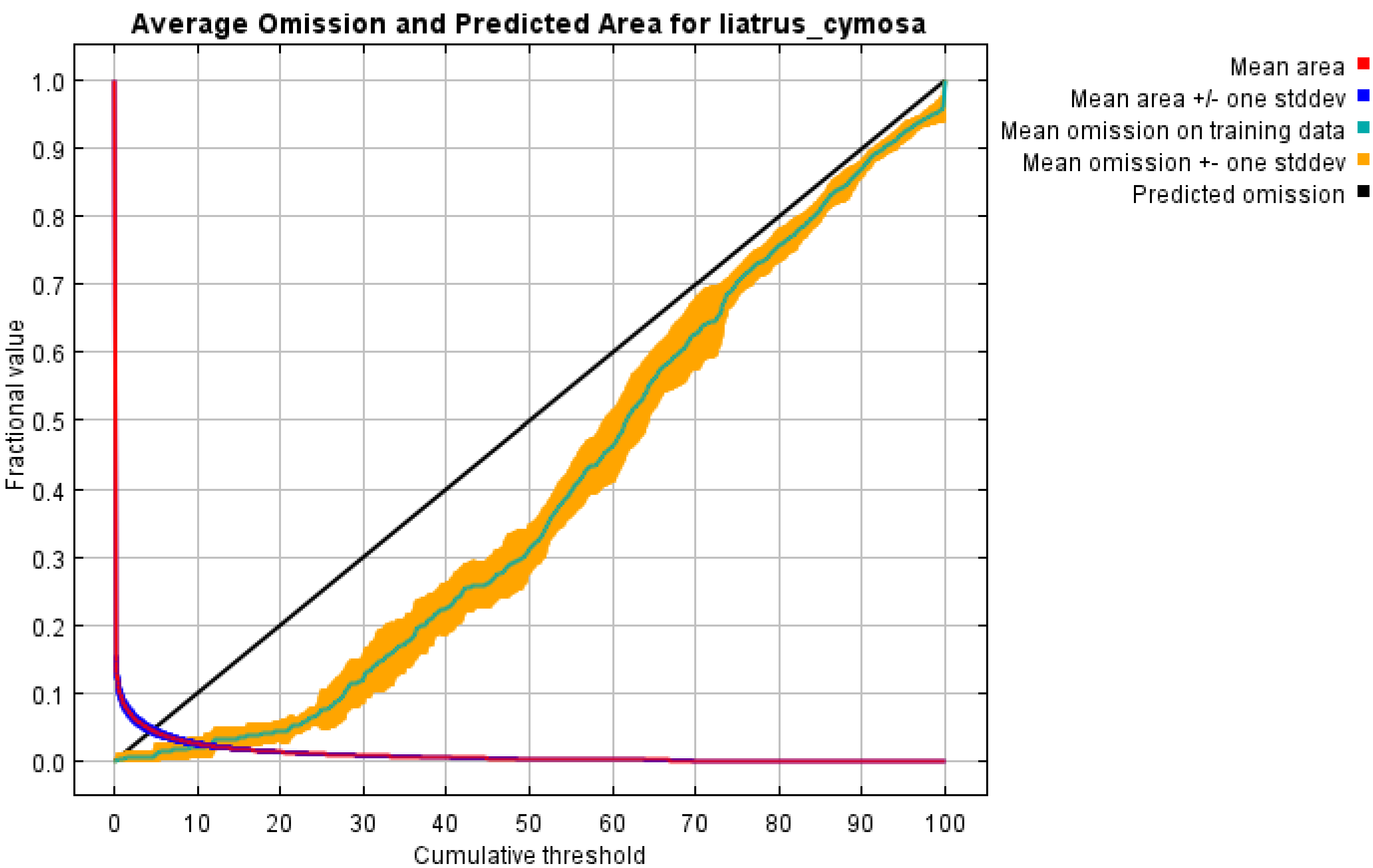
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Lepidospartum_burgessii responsecurves jackknife "outputdirectory=E:\TXDoT_Range Scale_Bioclim\Results\1Reg\Lepidospartum" "samplesfile=E:\TXDoT_Range Scale_Bioclim\spp_csv\Lepidospartum_burgessii.csv" "environmentallayers=E:\TXDoT_Range Scale_Bioclim\Ascii" randomseed randomtestpoints=25 replicates=10 replicatetype=bootstrap writebackgroundpredictions -N bio0

Replicated maxent model for liatrus_cymosa

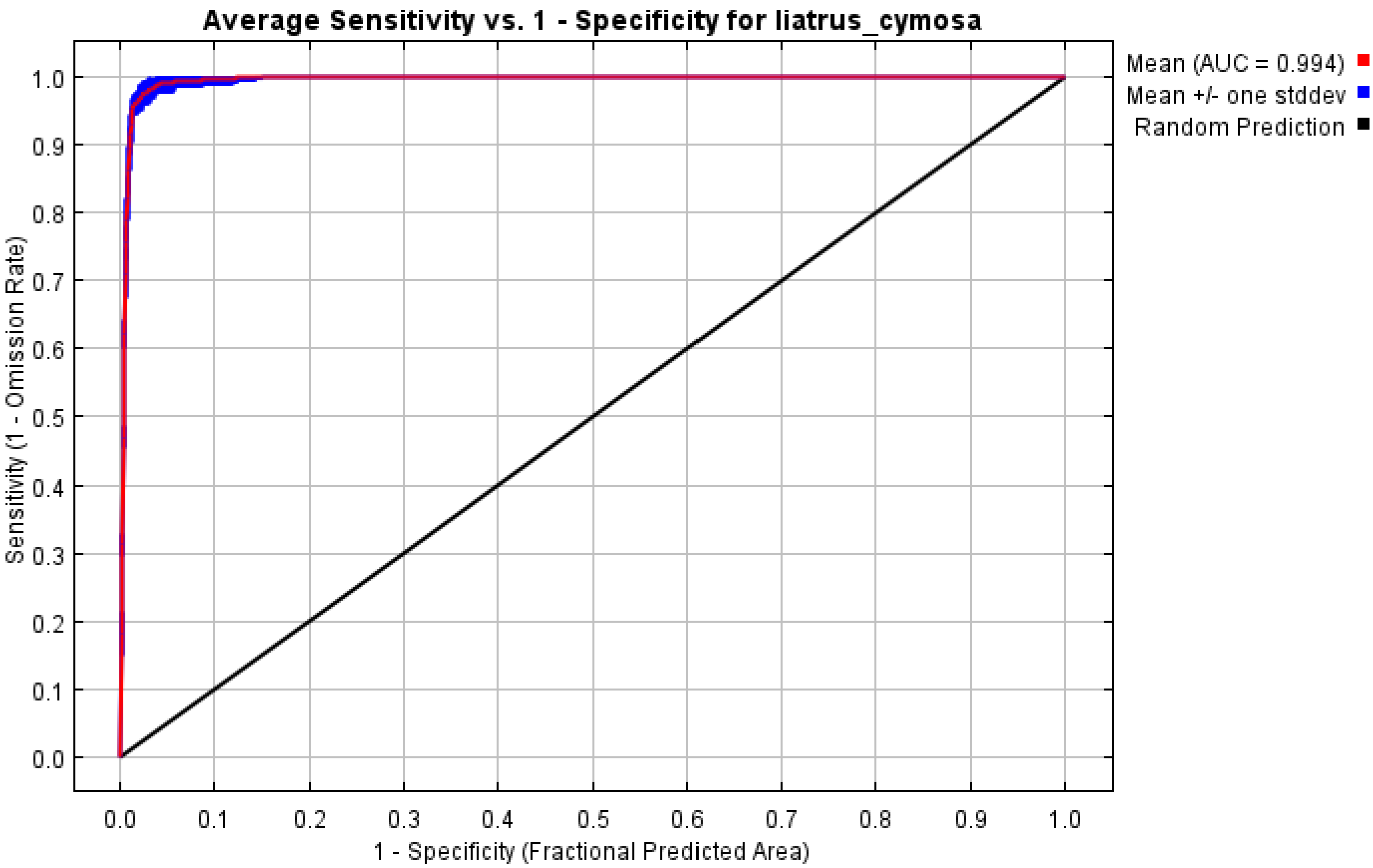
This page summarizes the results of 10 bootstrap models for liatrus_cymosa, created Tue Dec 07 15:46:14 CST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4] [5] [6] [7] [8] [9]

Analysis of omission/commission

The following picture shows the training omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs.

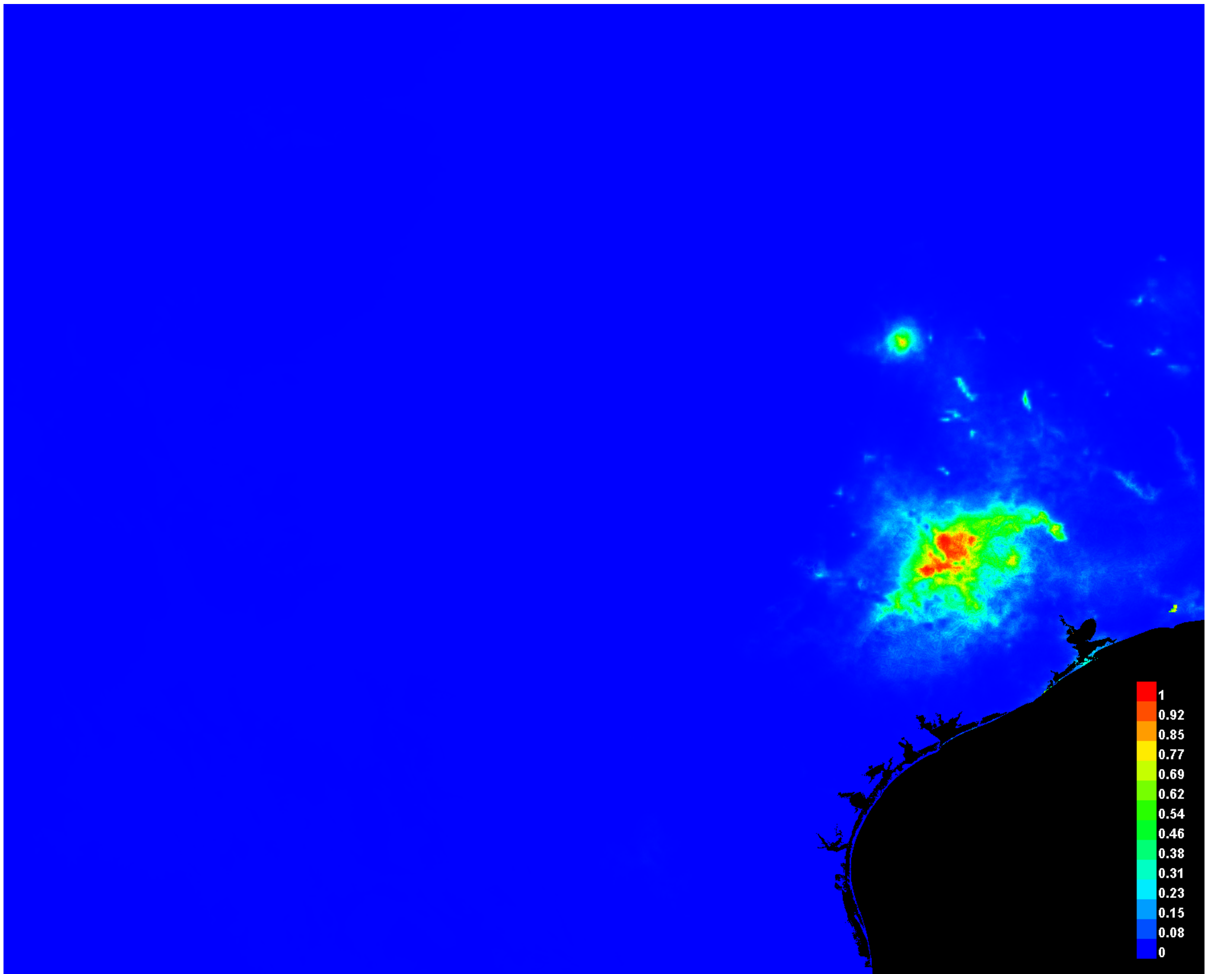


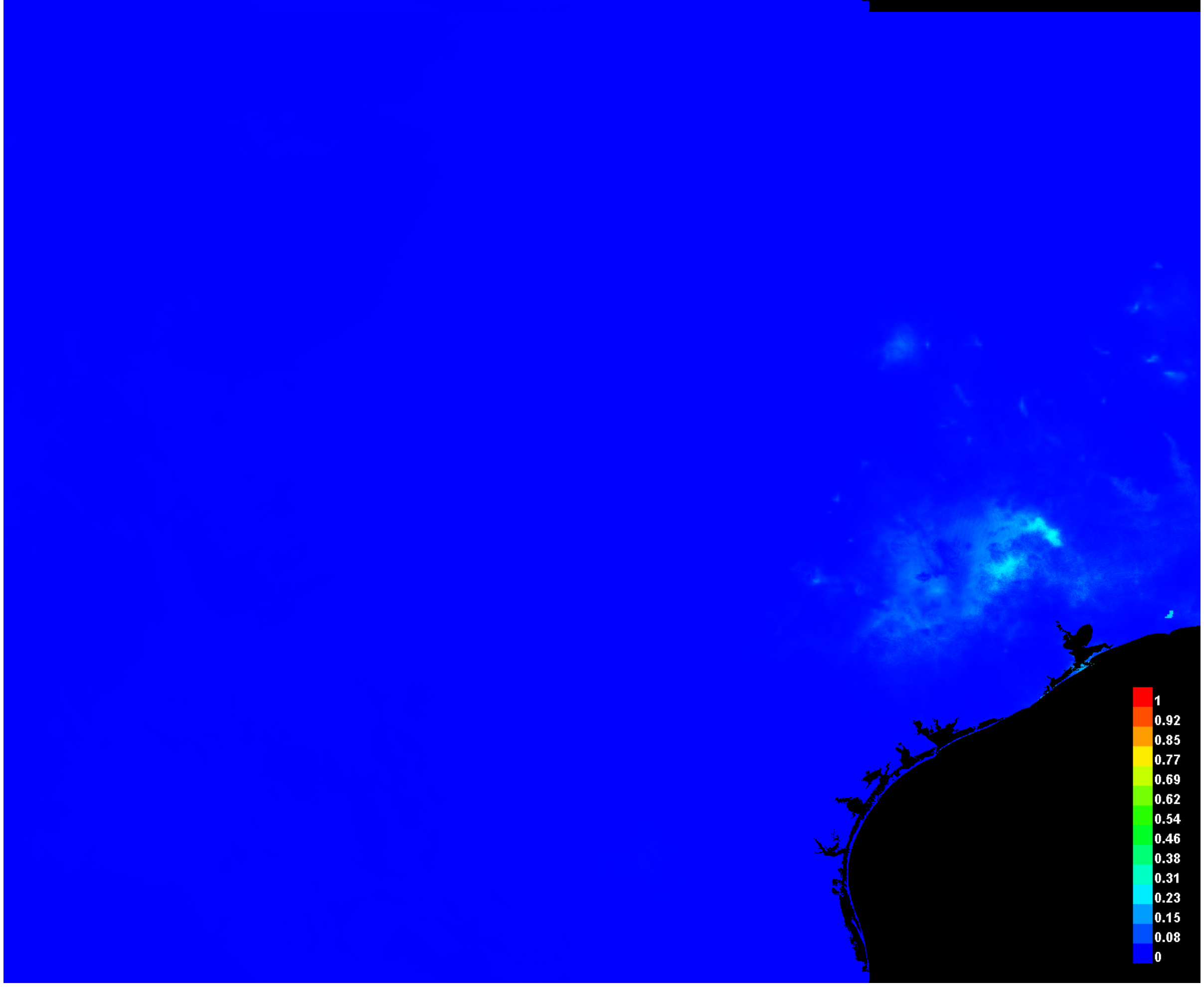
The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average training AUC for the replicate runs is 0.994, and the standard deviation is 0.001.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 10 output grids. Other available summary grids are min, max and median.


1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0


1
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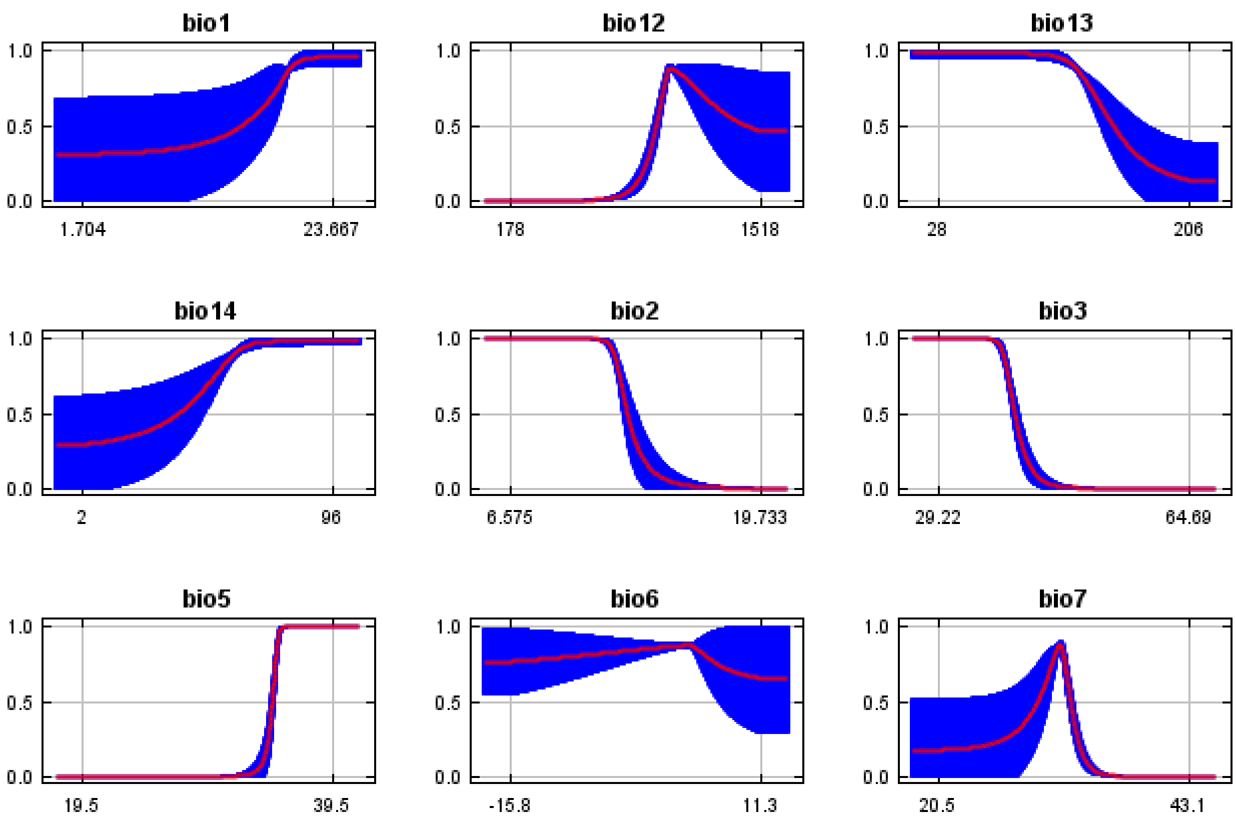
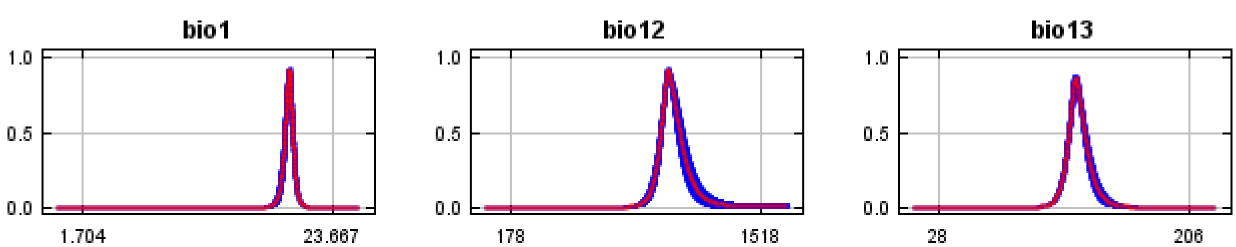
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

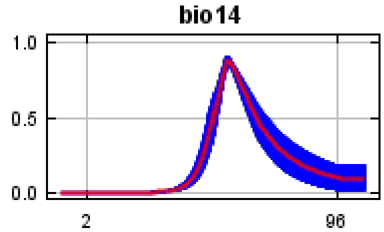
Response curves

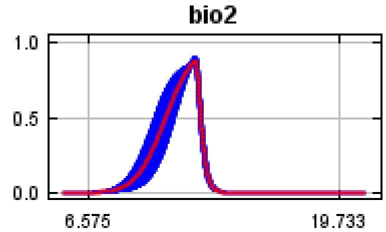
These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 10 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).

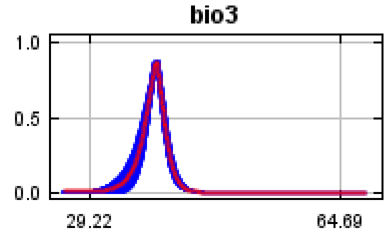


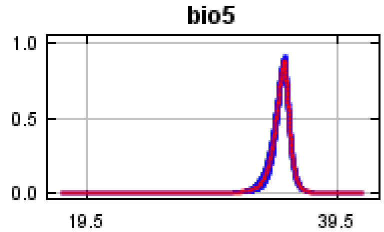
In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.

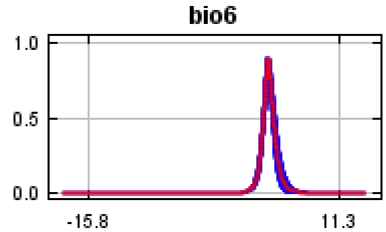


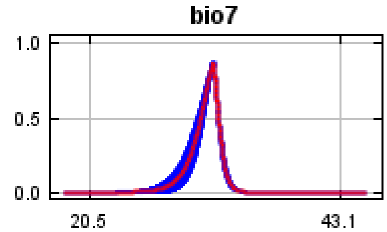










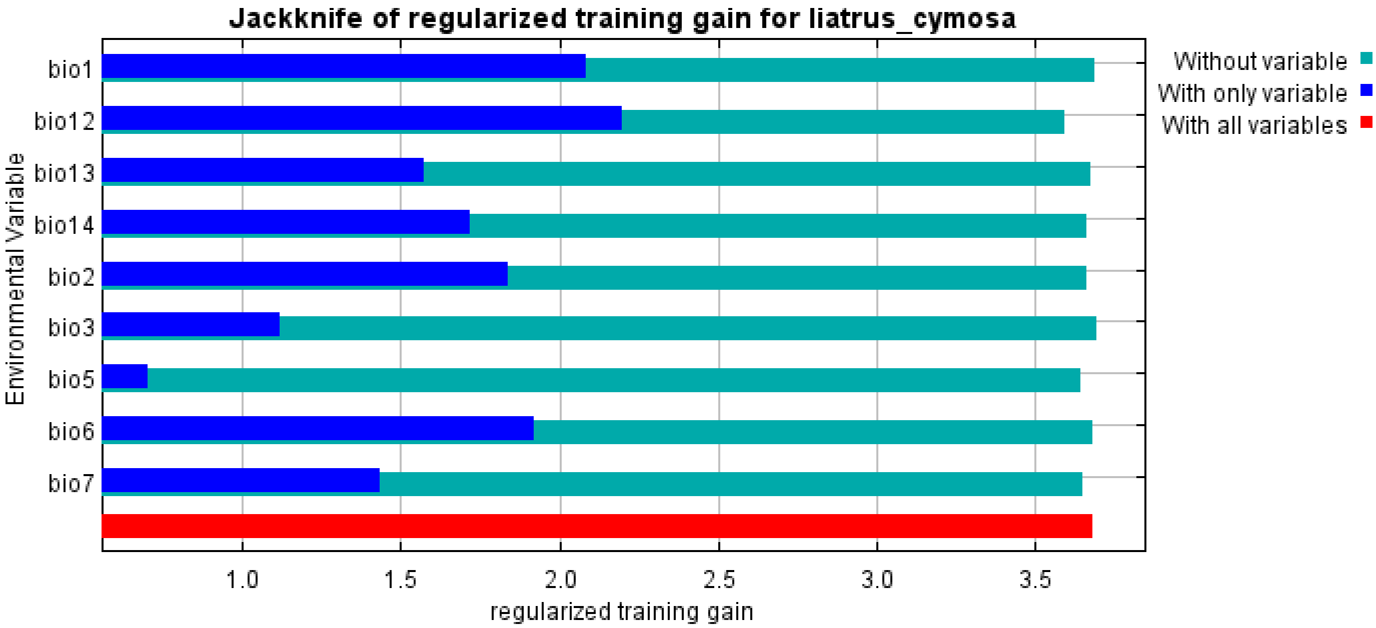


Analysis of variable contributions

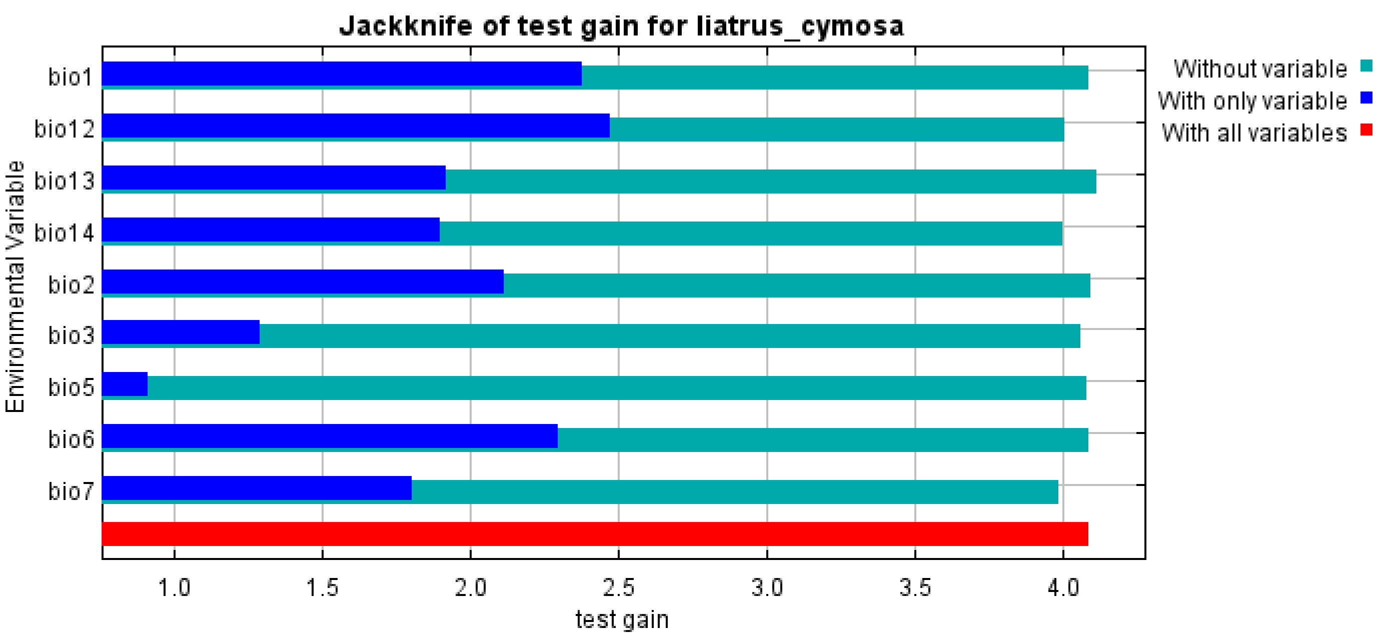
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio14	38.8	3.3
bio7	27.4	22.7
bio12	22.7	22.7
bio3	4.5	15.3
bio5	2.4	16.9
bio13	1.5	0.9
bio6	1.1	0.1
bio1	0.8	2.2
bio2	0.7	16

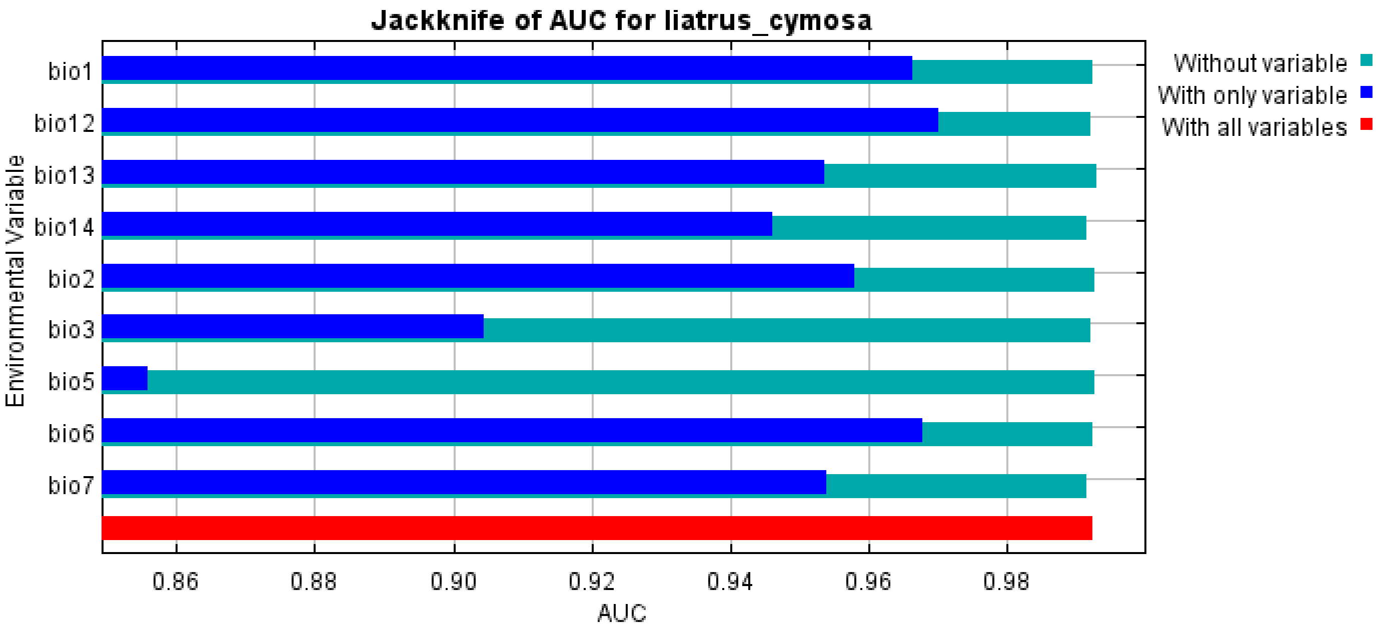
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio12, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio12, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



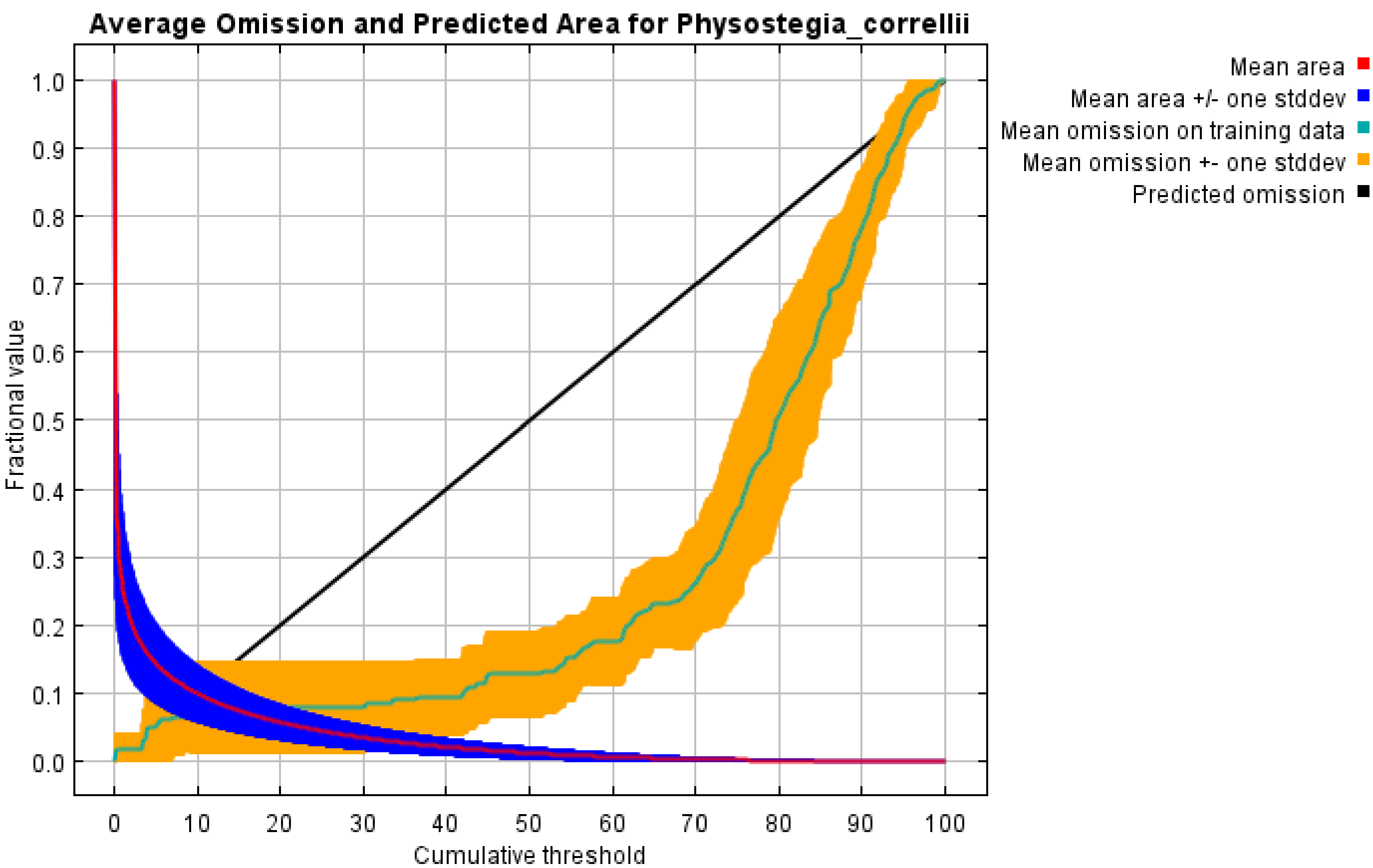
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E liatrus_cymosa responsecurves jackknife "outputdirectory=E:\TXDoT_Range Scale_Bioclim\Results\1Reg\Liatris" "samplesfile=E:\TXDoT_Range Scale_Bioclim\spp_csv\liatris_cymosa.csv" "environmentallayers=E:\TXDoT_Range Scale_Bioclim\Ascii" randomseed randomtestpoints=25 replicates=10 replicatetype=bootstrap writebackgroundpredictions -N bio0

Replicated maxent model for Physostegia_correllii

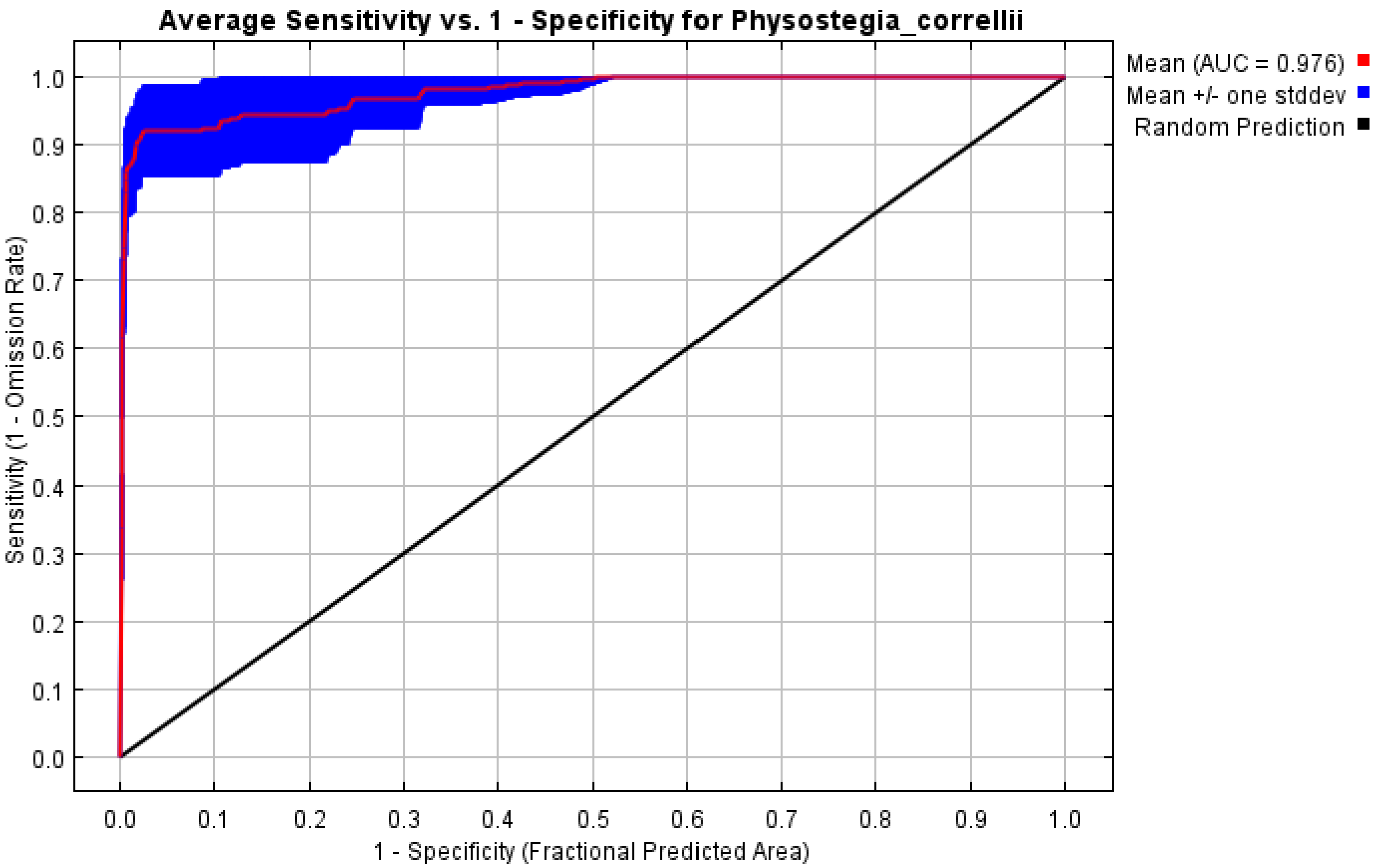
This page summarizes the results of 10 bootstrap models for Physostegia_correllii, created Sat Dec 04 15:53:18 CST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4] [5] [6] [7] [8] [9]

Analysis of omission/commission

The following picture shows the training omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs.

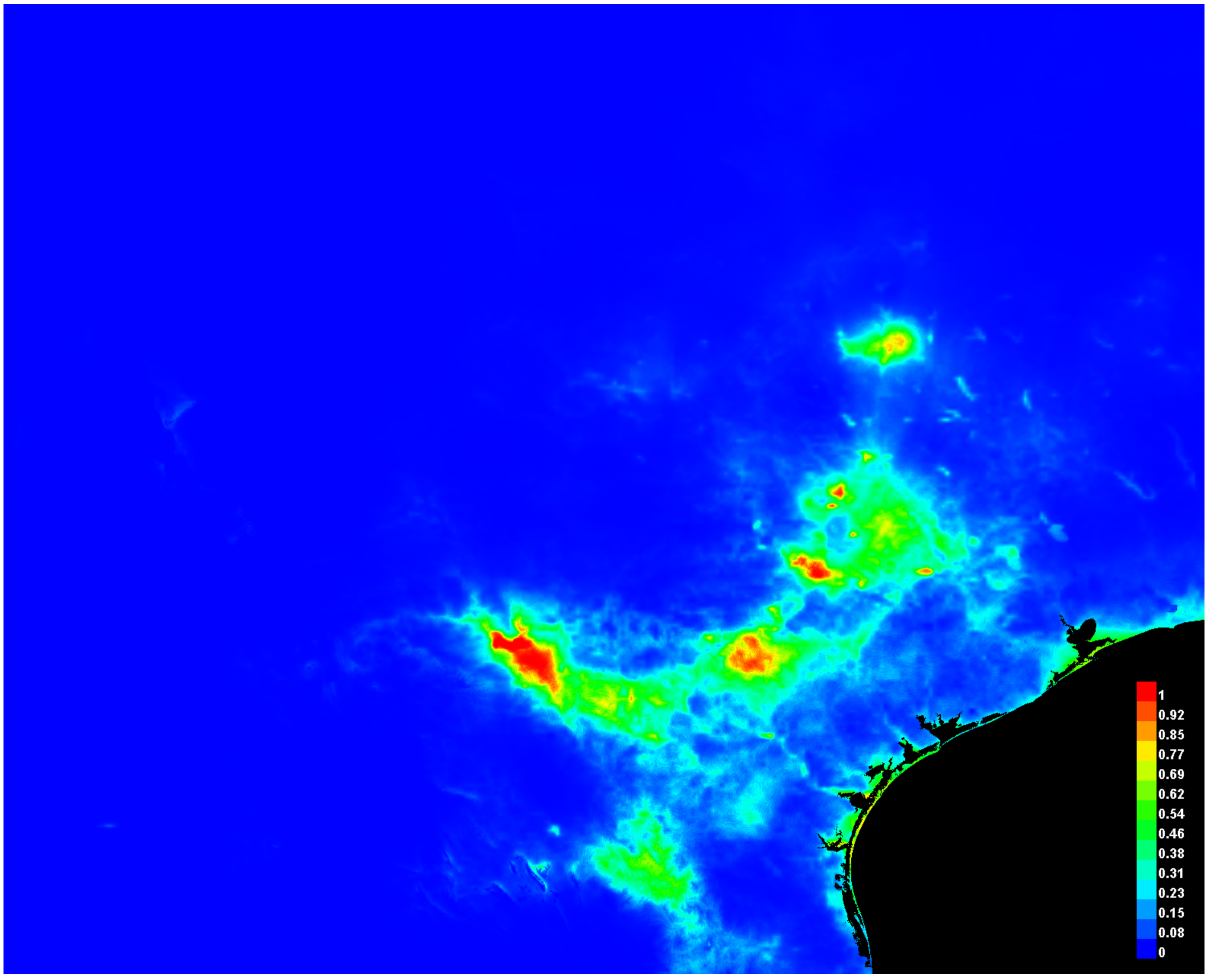


The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average training AUC for the replicate runs is 0.976, and the standard deviation is 0.018.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 10 output grids. Other available summary grids are min, max and median.


1
0.92
0.85
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0.46
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0.31
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0.15
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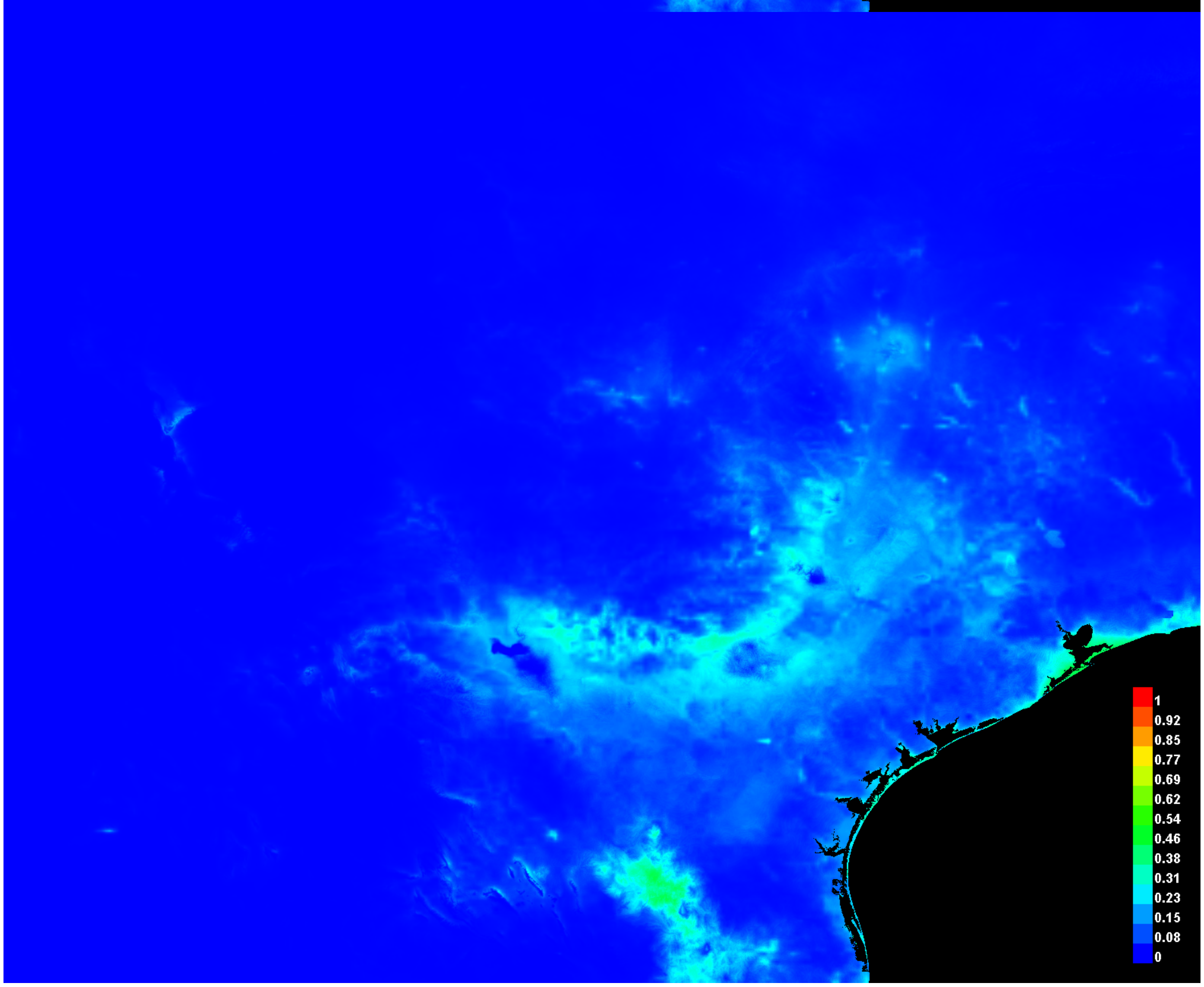
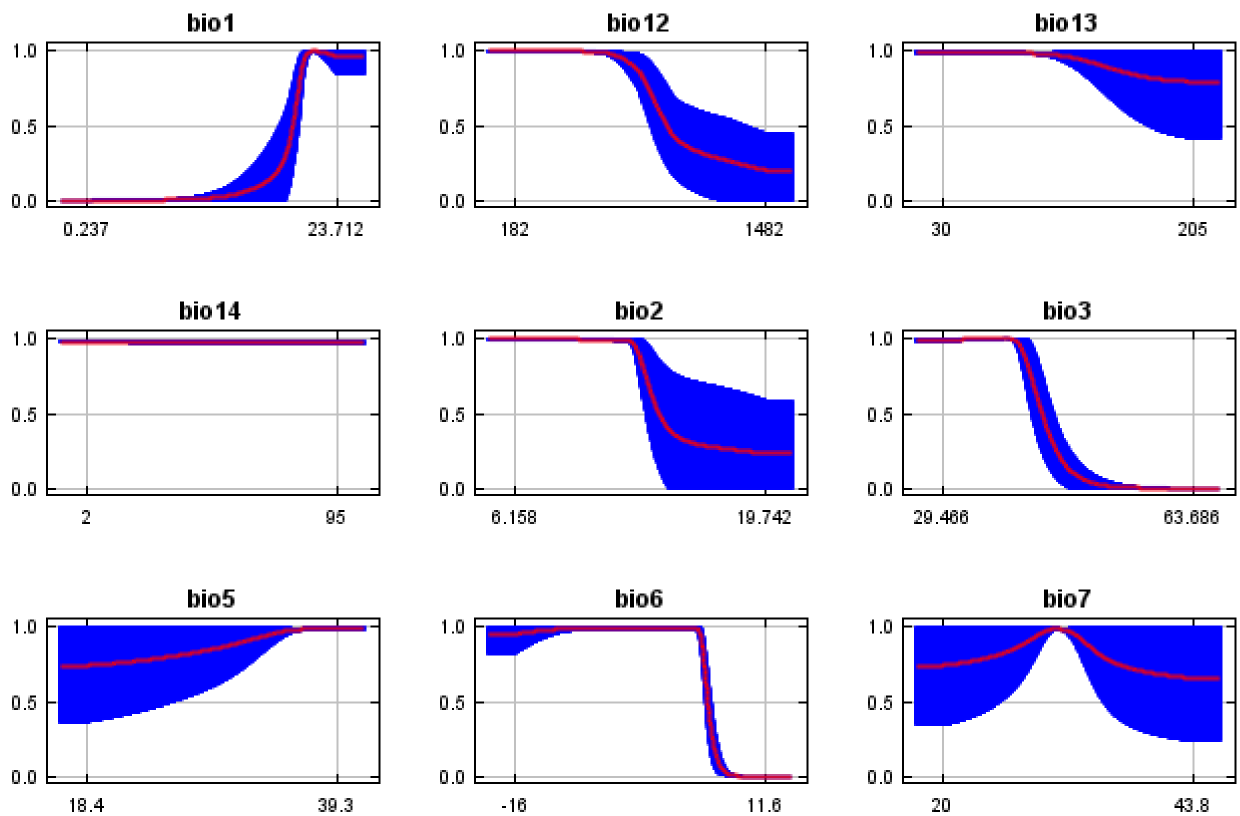
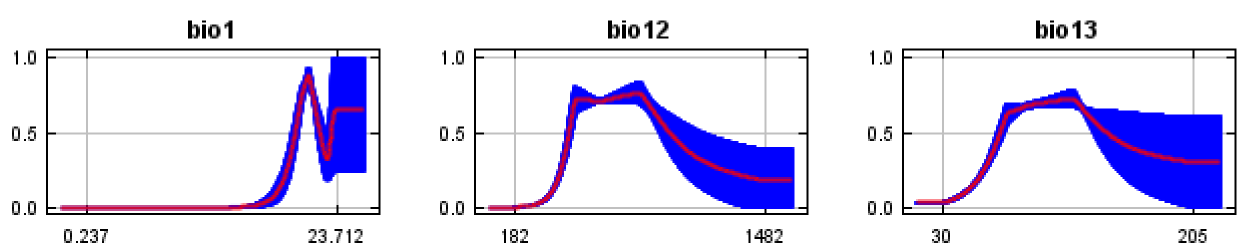

1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

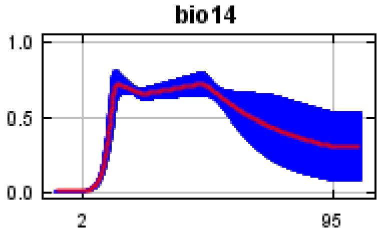
Response curves

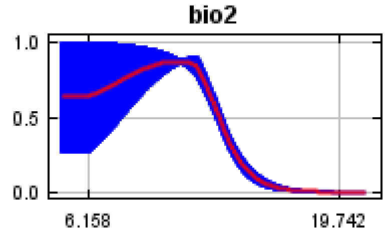
These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 10 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).

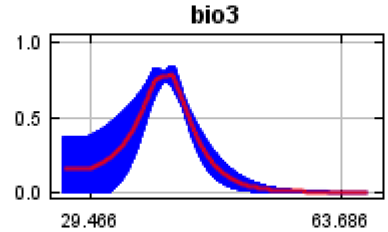


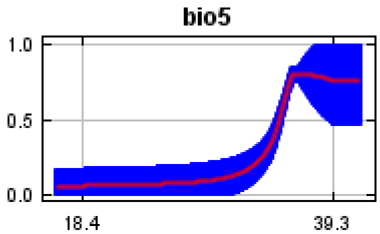
In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.

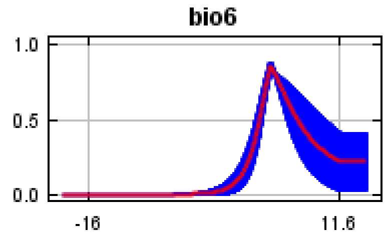


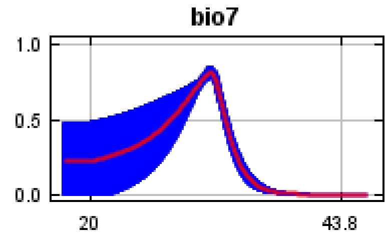










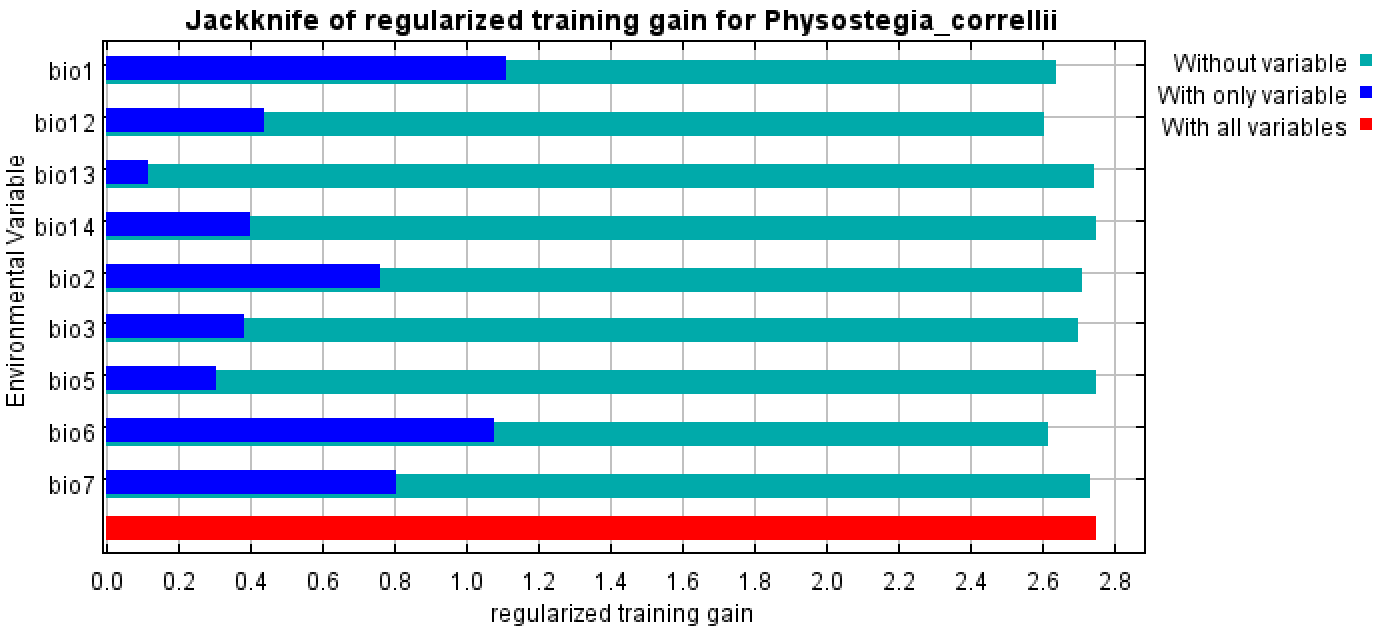


Analysis of variable contributions

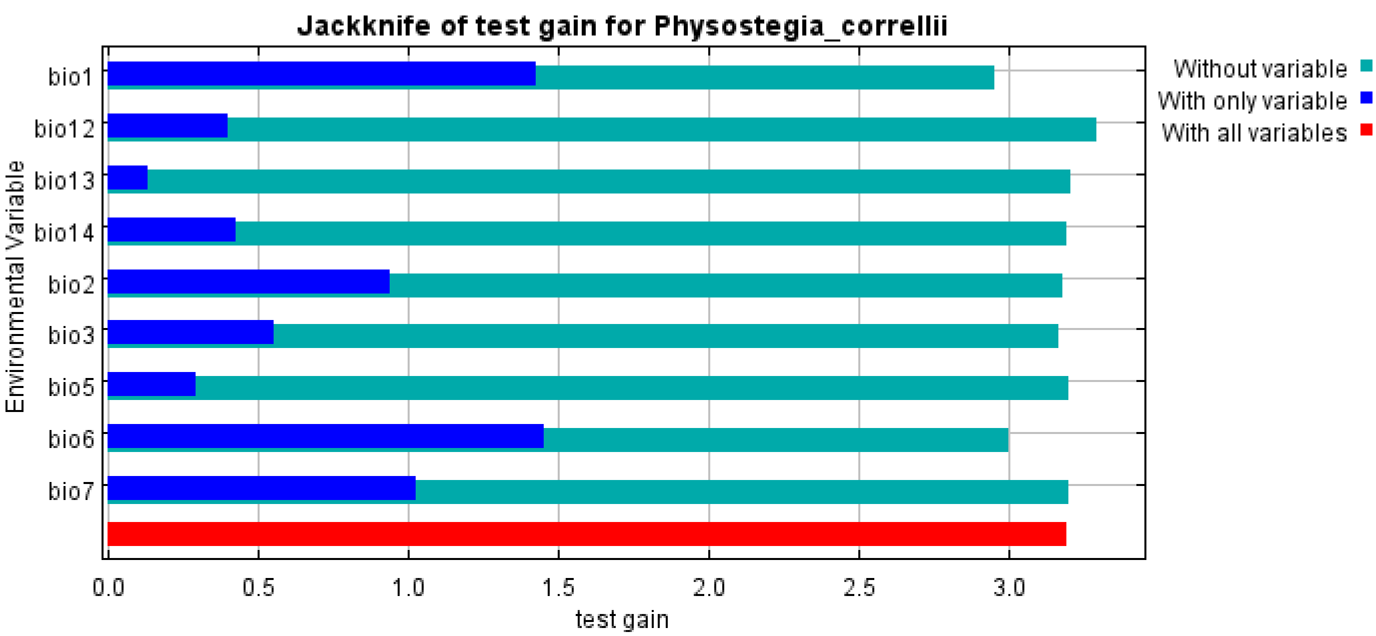
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio2	22.7	25.6
bio7	19.3	6.9
bio1	18.8	37.8
bio12	11.9	5.3
bio3	10.4	17.9
bio6	10.2	6.1
bio14	4.9	0
bio13	1.2	0.2
bio5	0.6	0.1

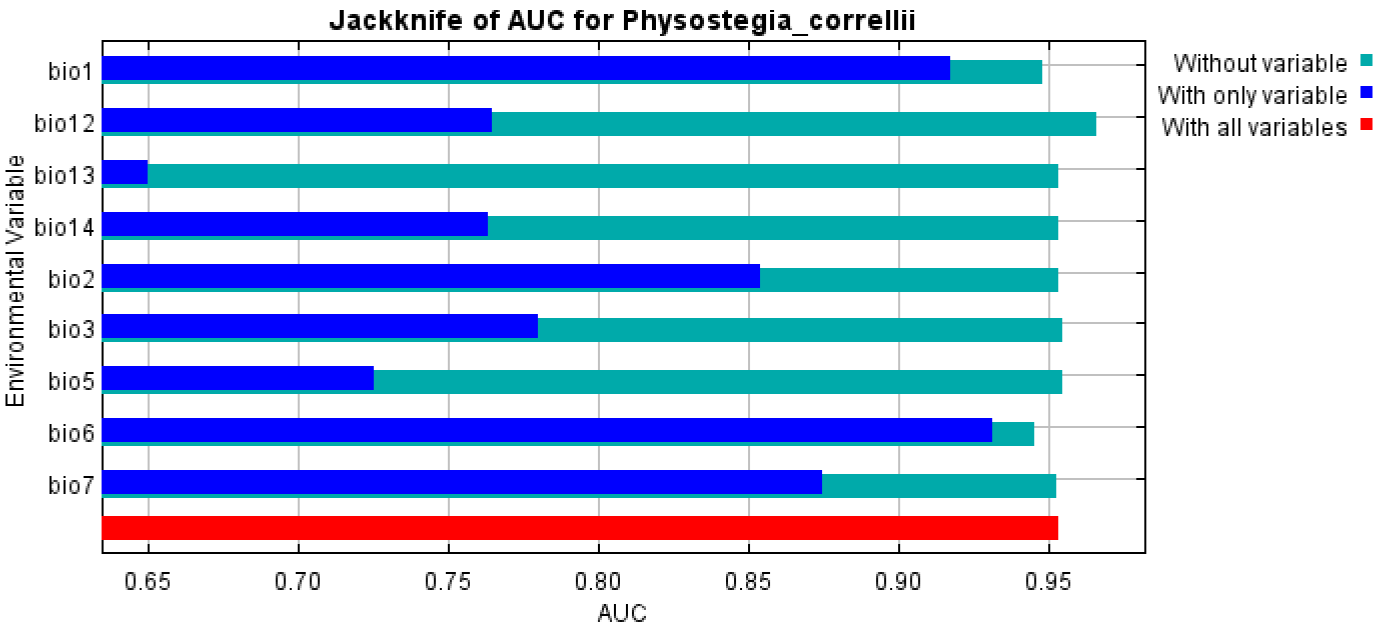
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio1, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio12, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



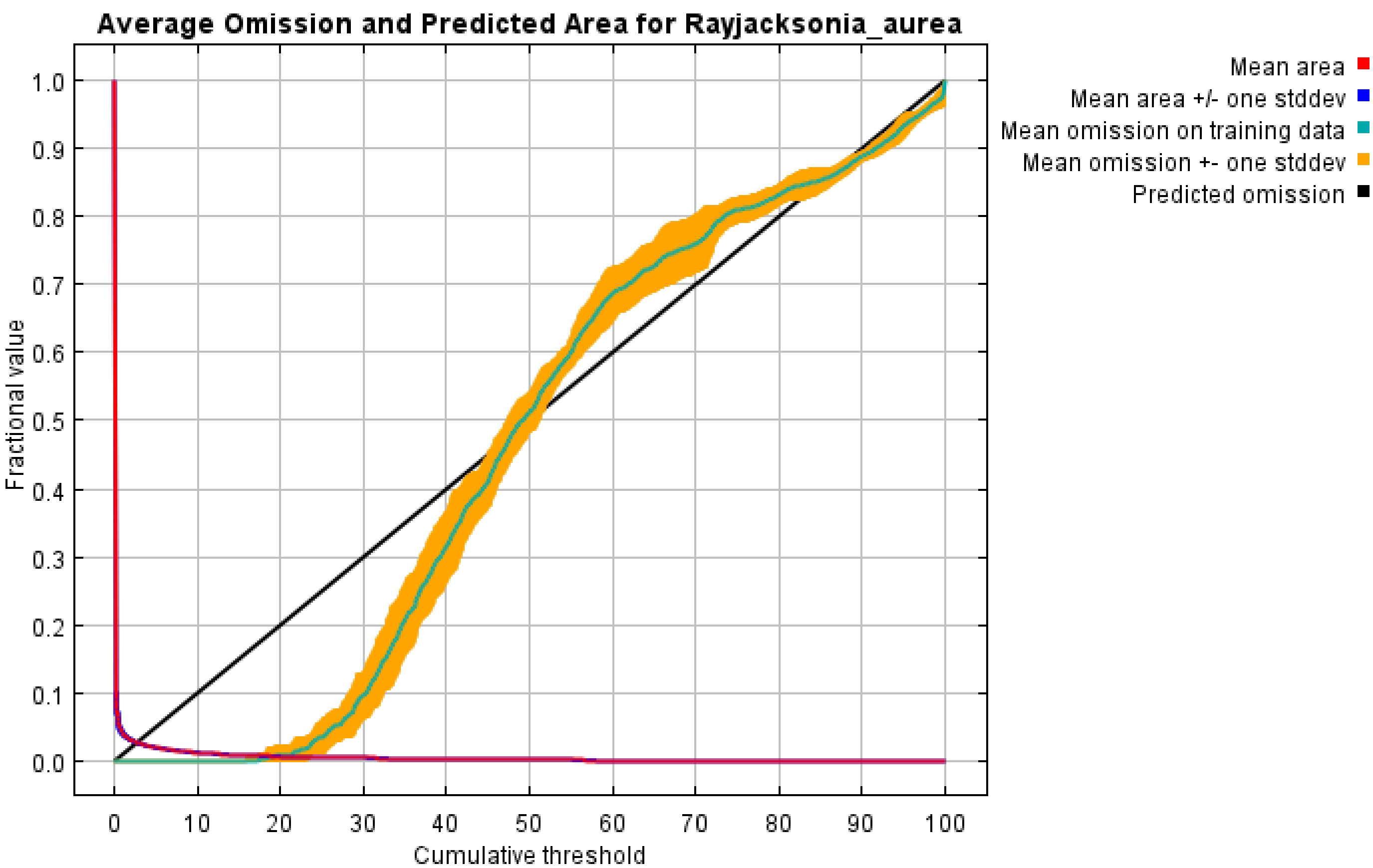
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Physostegia_correllii responsecurves jackknife "outputdirectory=E:\TXDoT_Range Scale_Bioclim\Results\1Reg\Physostegia_C" "samplesfile=E:\TXDoT_Range Scale_Bioclim\spp_csv\Physostegia correllii.csv" "environmentallayers=E:\TXDoT_Range Scale_Bioclim\Ascii" randomseed randomtestpoints=25 replicates=10 replicatetype=bootstrap writebackgroundpredictions -N bio0

Replicated maxent model for Rayjacksonia_aurea

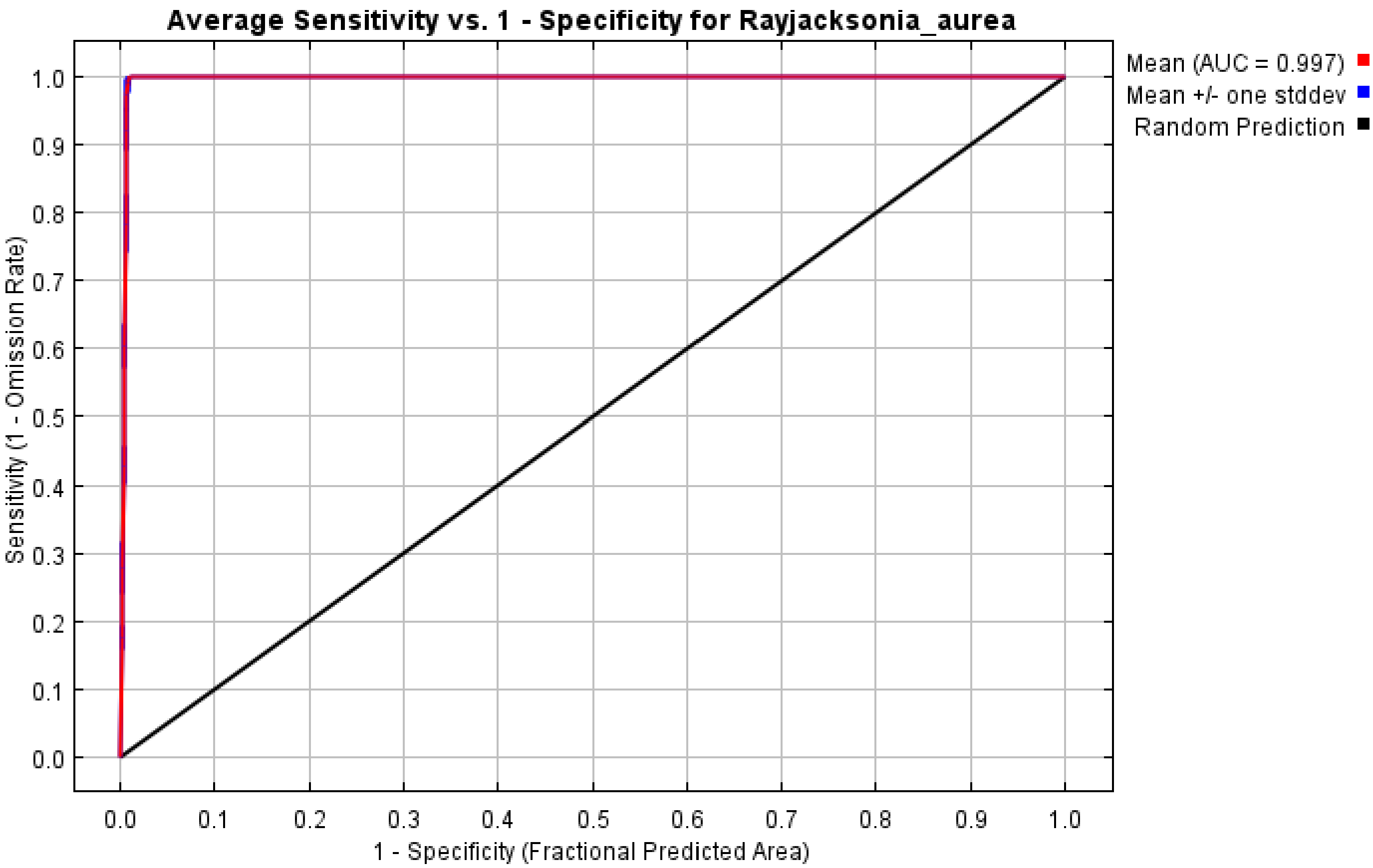
This page summarizes the results of 10 bootstrap models for Rayjacksonia_aurea, created Tue Dec 07 16:02:52 CST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4] [5] [6] [7] [8] [9]

Analysis of omission/commission

The following picture shows the training omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs.

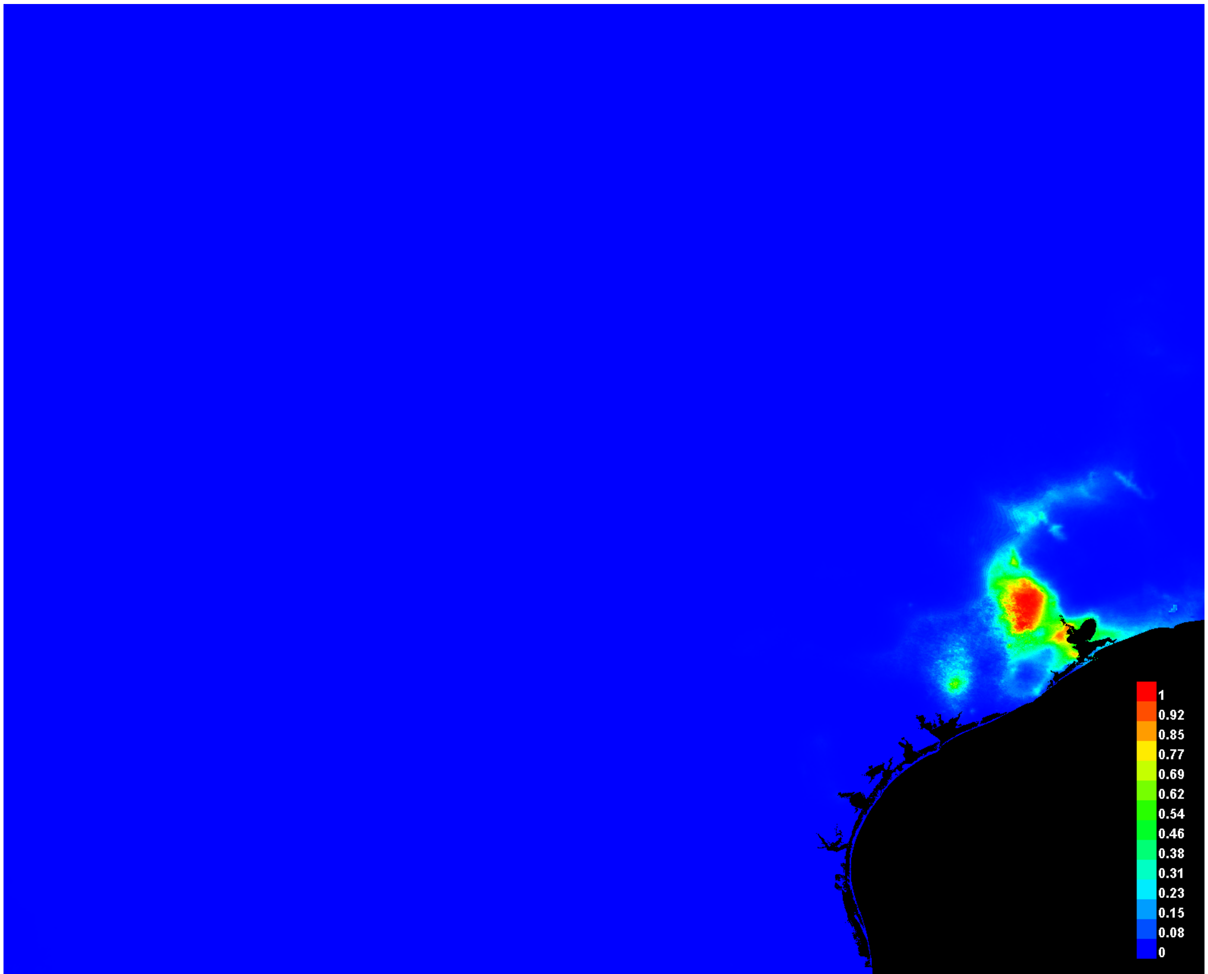


The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average training AUC for the replicate runs is 0.997, and the standard deviation is 0.000.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 10 output grids. Other available summary grids are min, max and median.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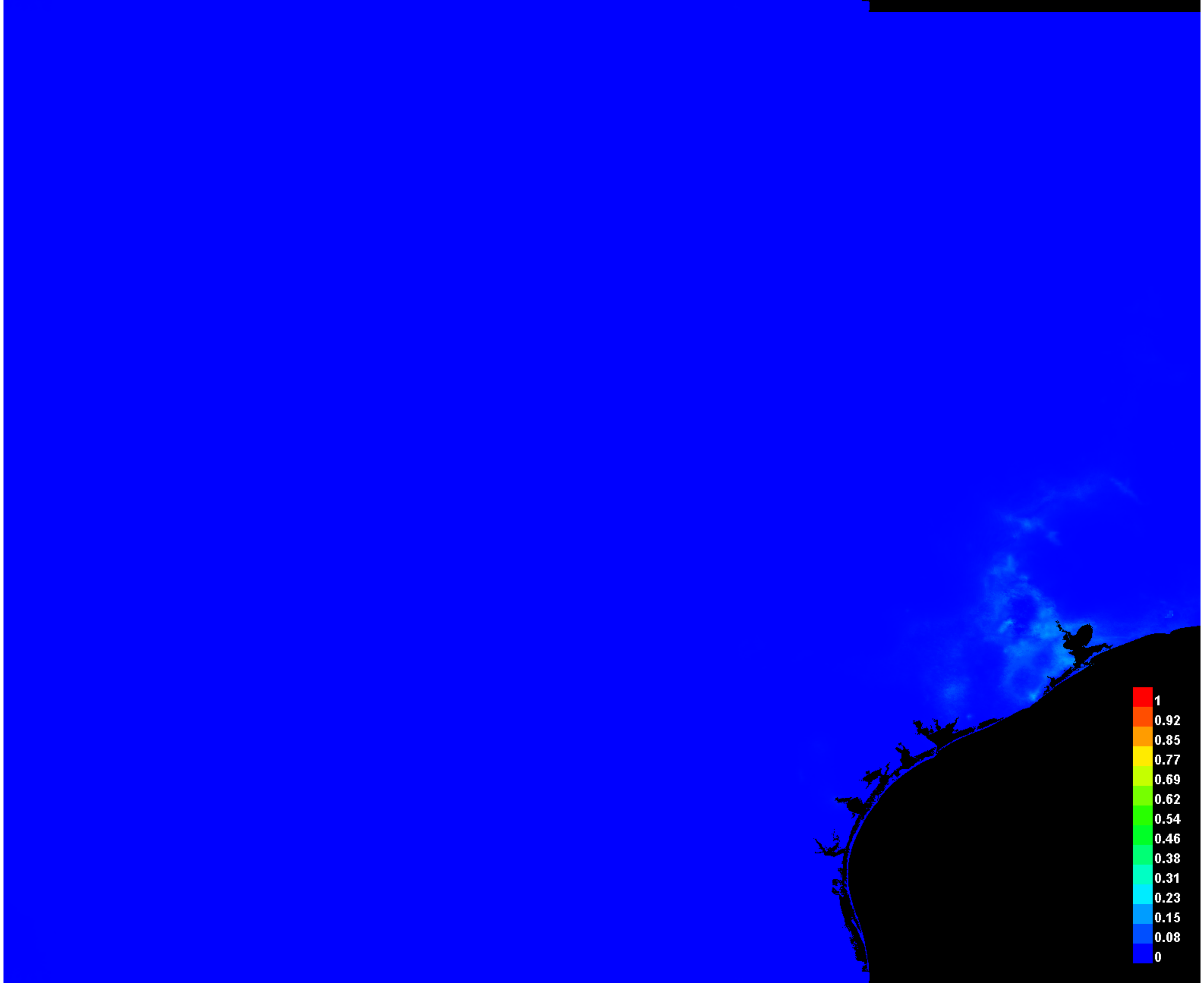
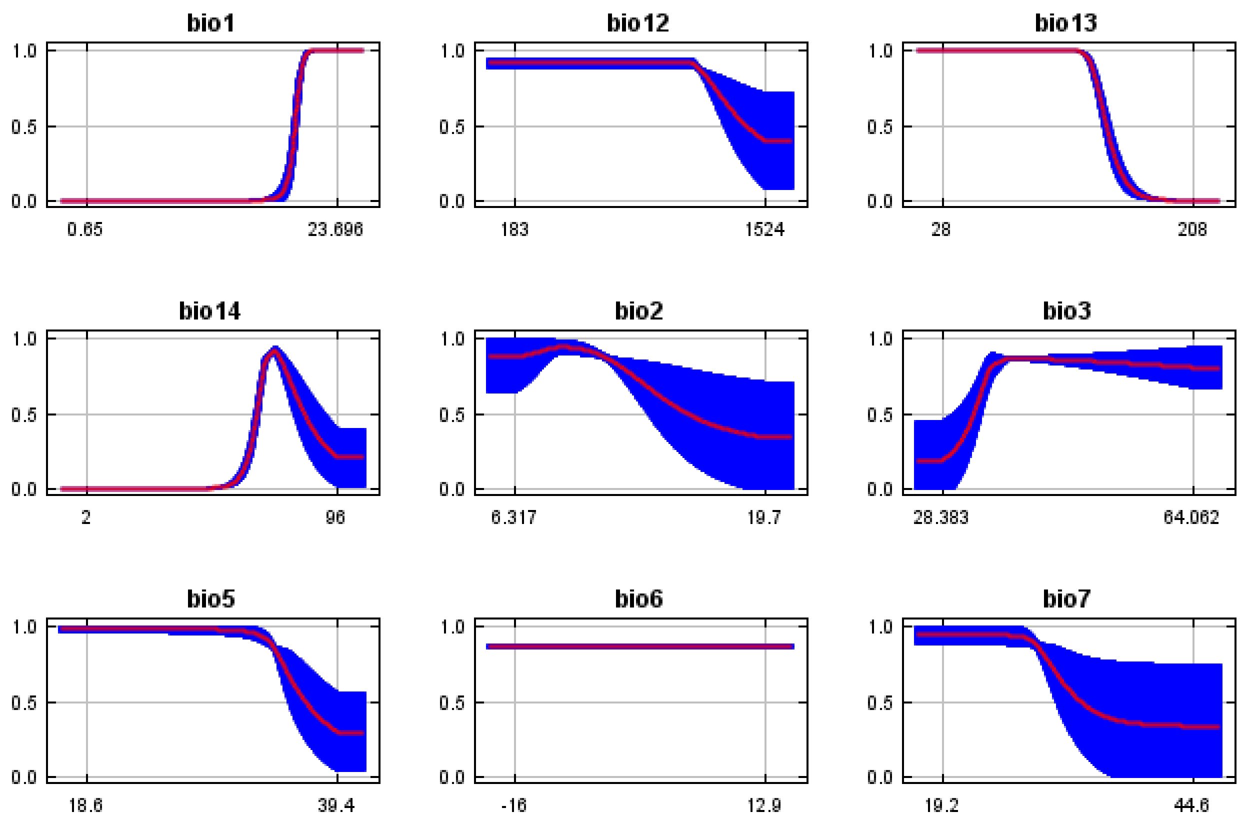
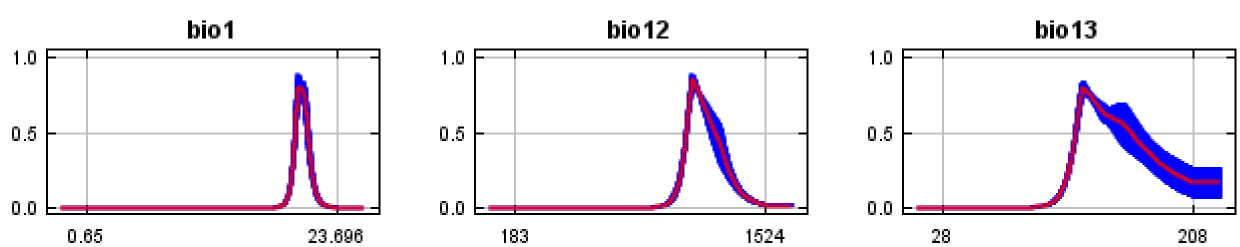

1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

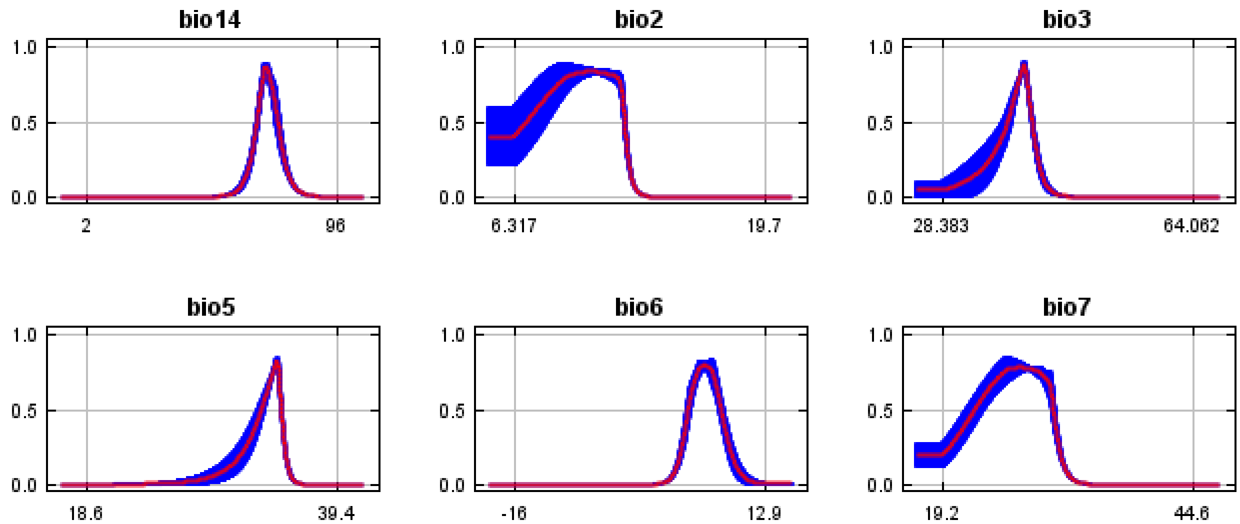
Response curves

These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 10 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).



In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.



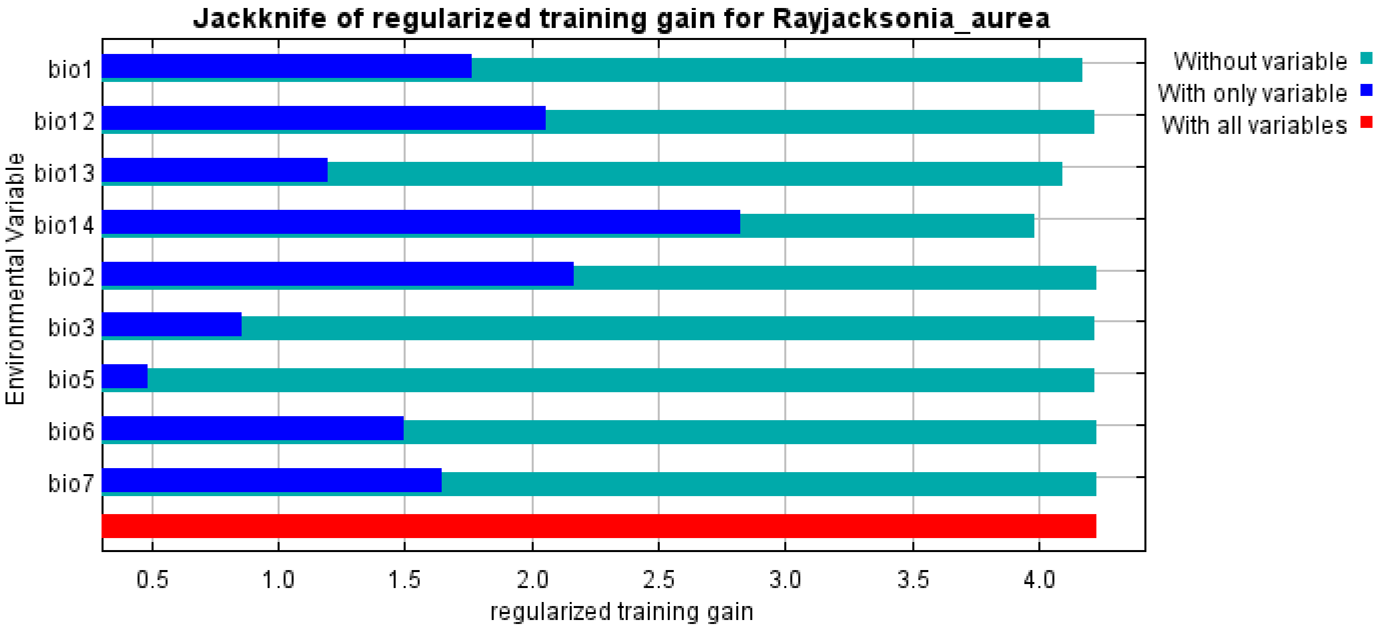


Analysis of variable contributions

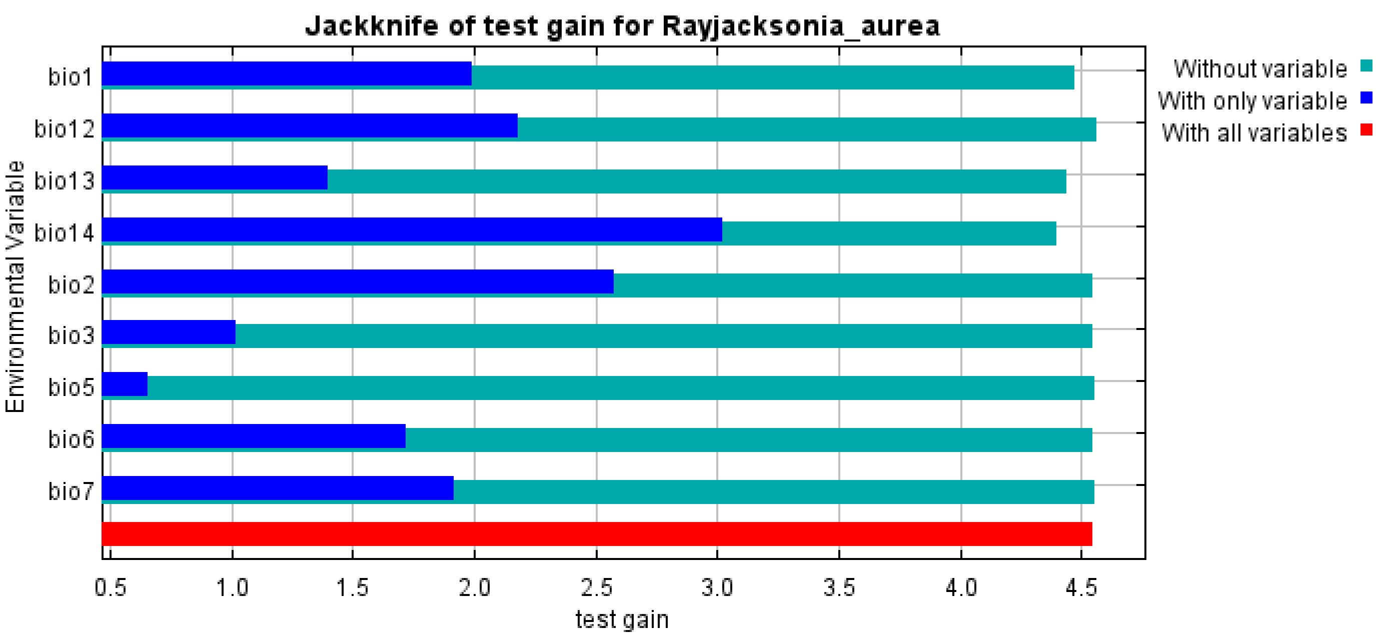
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio14	63.8	75.4
bio7	26.4	2.2
bio1	5.9	17.4
bio13	3.3	3.8
bio3	0.2	0.1
bio12	0.2	0.1
bio2	0.1	0.4
bio5	0	0.5
bio6	0	0

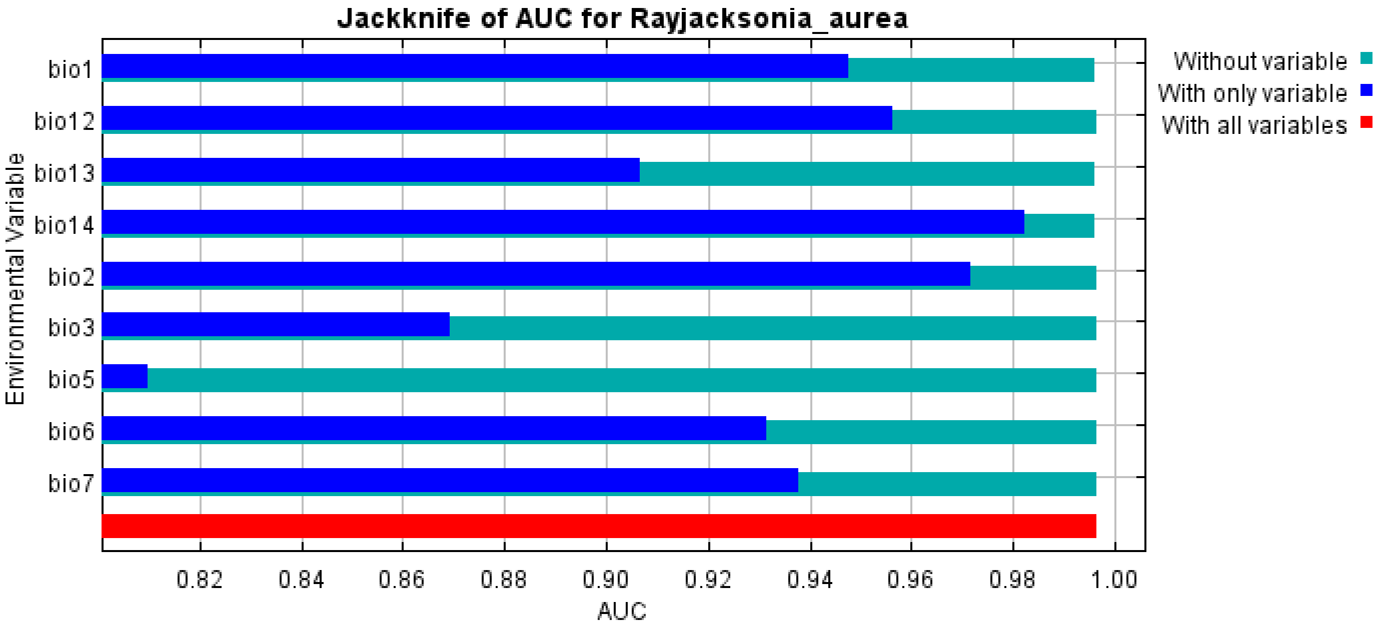
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio14, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio14, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



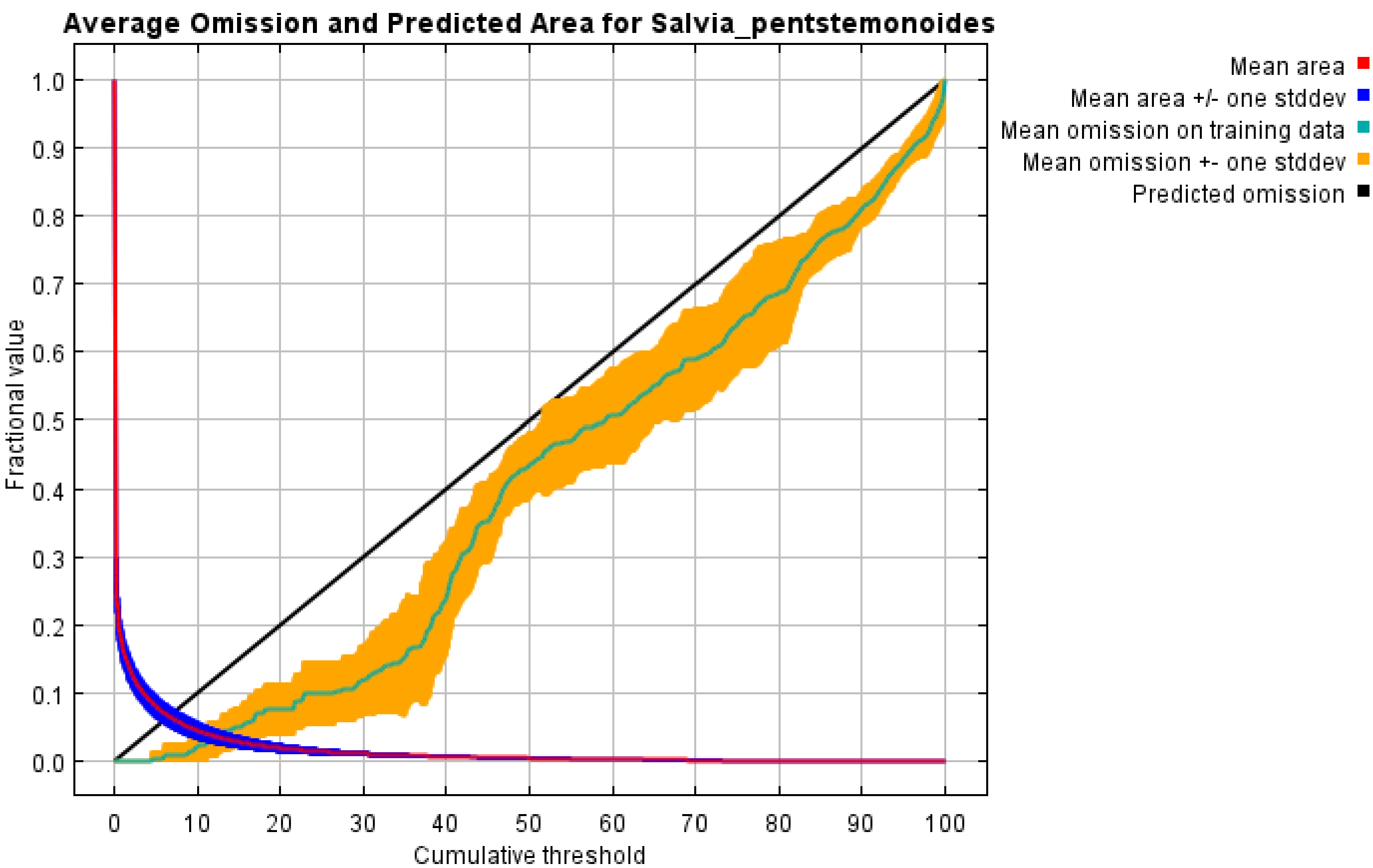
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Rayjacksonia_aurea responsecurves jackknife "outputdirectory=E:\TXDoT_Range Scale_Bioclim\Results\1Reg\Raylacksonia" "samplesfile=E:\TXDoT_Range Scale_Bioclim\spp_csv\Rayjacksonia_aurea.csv" "environmentallayers=E:\TXDoT_Range Scale_Bioclim\Ascii" randomseed randomtestpoints=25 replicates=10 replicatetype=bootstrap writebackgroundpredictions -N bio0

Replicated maxent model for Salvia_pentstemonoides

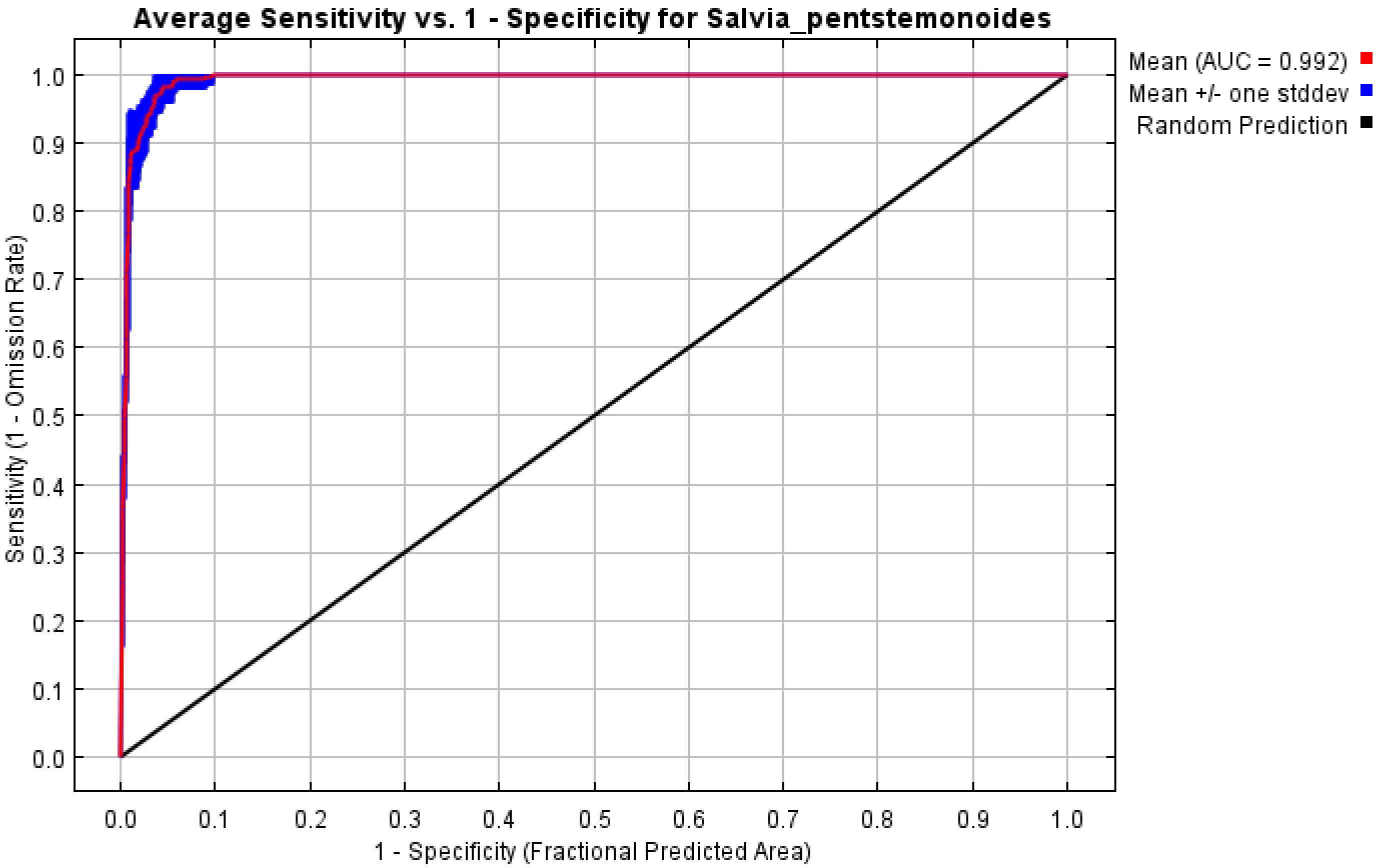
This page summarizes the results of 10 bootstrap models for Salvia_pentstemonoides, created Sat Dec 04 14:52:44 CST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4] [5] [6] [7] [8] [9]

Analysis of omission/commission

The following picture shows the training omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs.

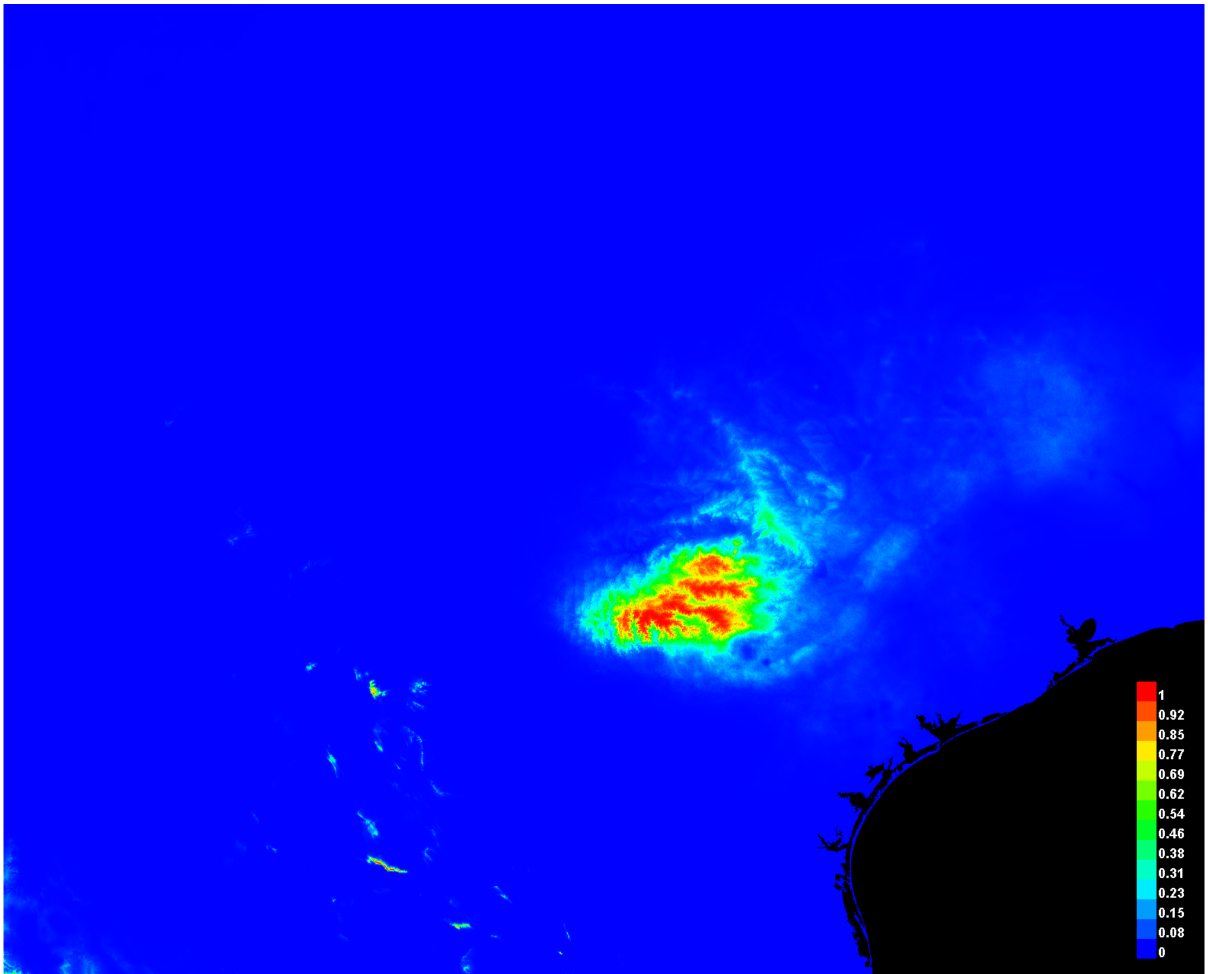


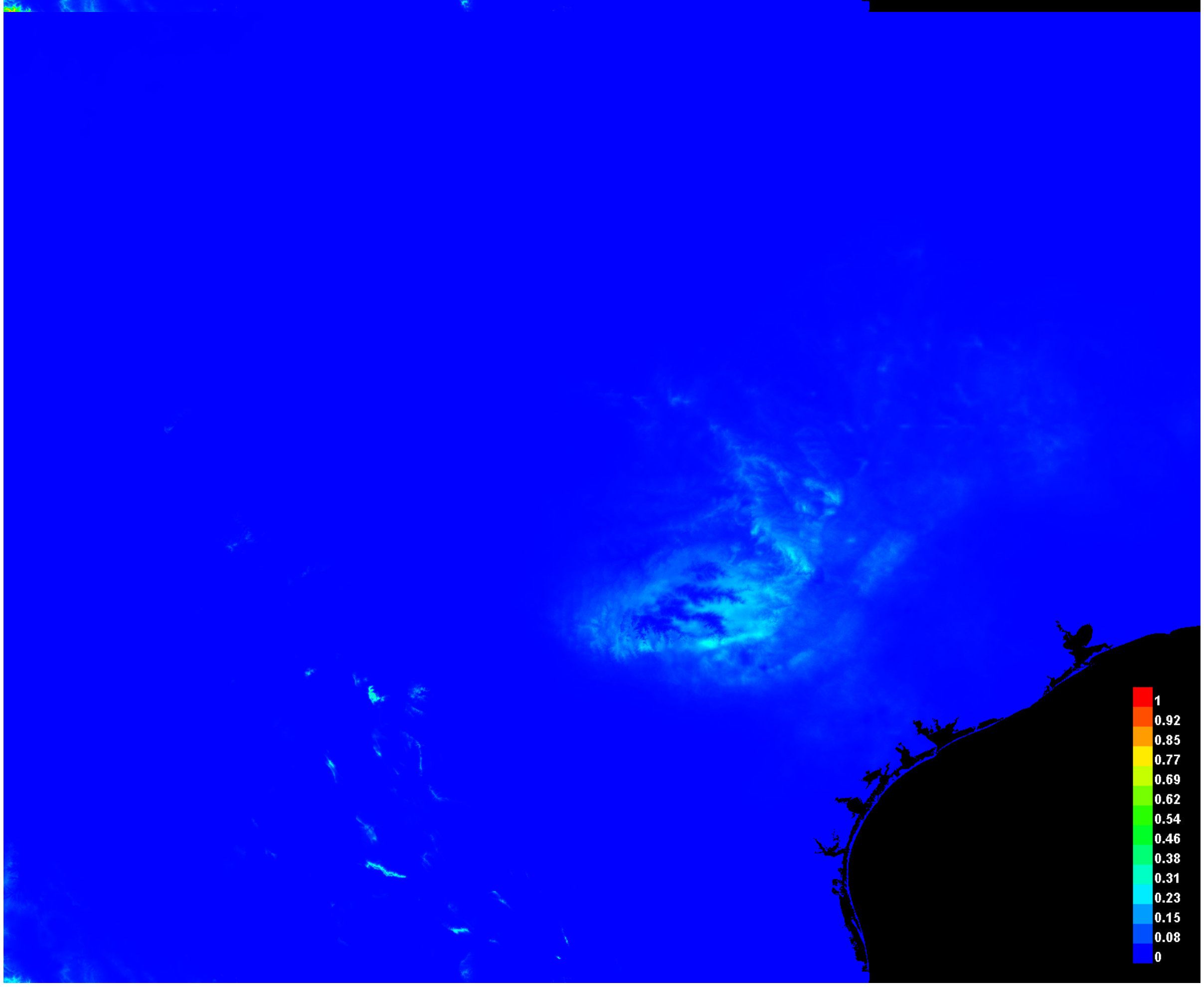
The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average training AUC for the replicate runs is 0.992, and the standard deviation is 0.002.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 10 output grids. Other available summary grids are min, max and median.


1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0


1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

Analysis of variable contributions

The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio14	32.2	20.3
bio7	16.6	11.1
bio12	15.2	4.9
bio5	14.6	7.4
bio3	11.3	2.1
bio1	5.8	13
bio6	4.2	41.3
bio13	0	0
bio2	0	0

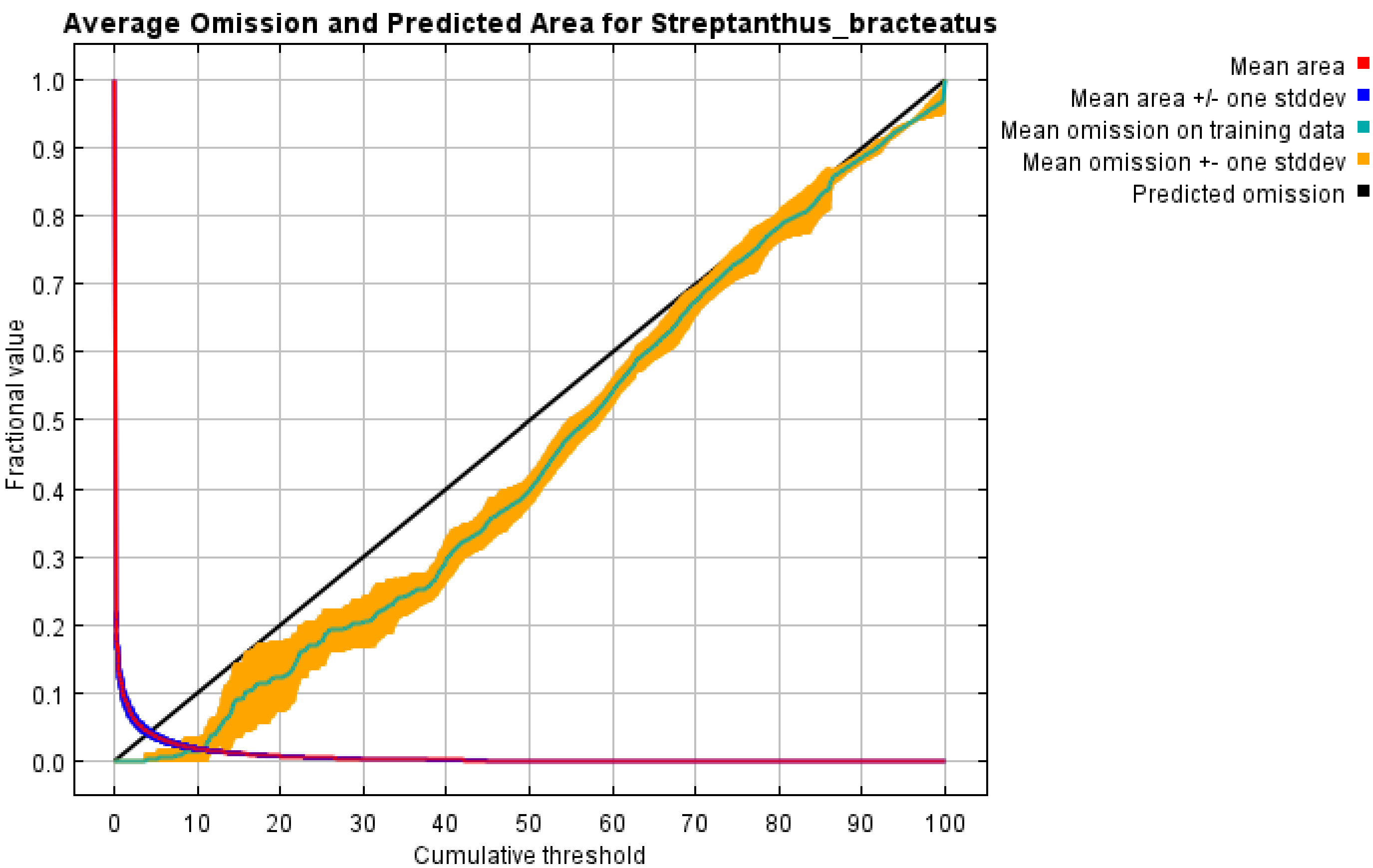
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Salvia_pentstemonoides "outputdirectory=E:\TXDoT_Range Scale_Bioclim\Results\1Reg\Salvia" "samplesfile=E:\TXDoT_Range Scale_Bioclim\spp_csv\Salvia_pentstemonoides.csv" "environmentallayers=E:\TXDoT_Range Scale_Bioclim\Ascii" randomseed randomtestpoints=25 replicates=10 replicatetype=bootstrap writebackgroundpredictions -N bio0

Replicated maxent model for Streptanthus_bracteatus

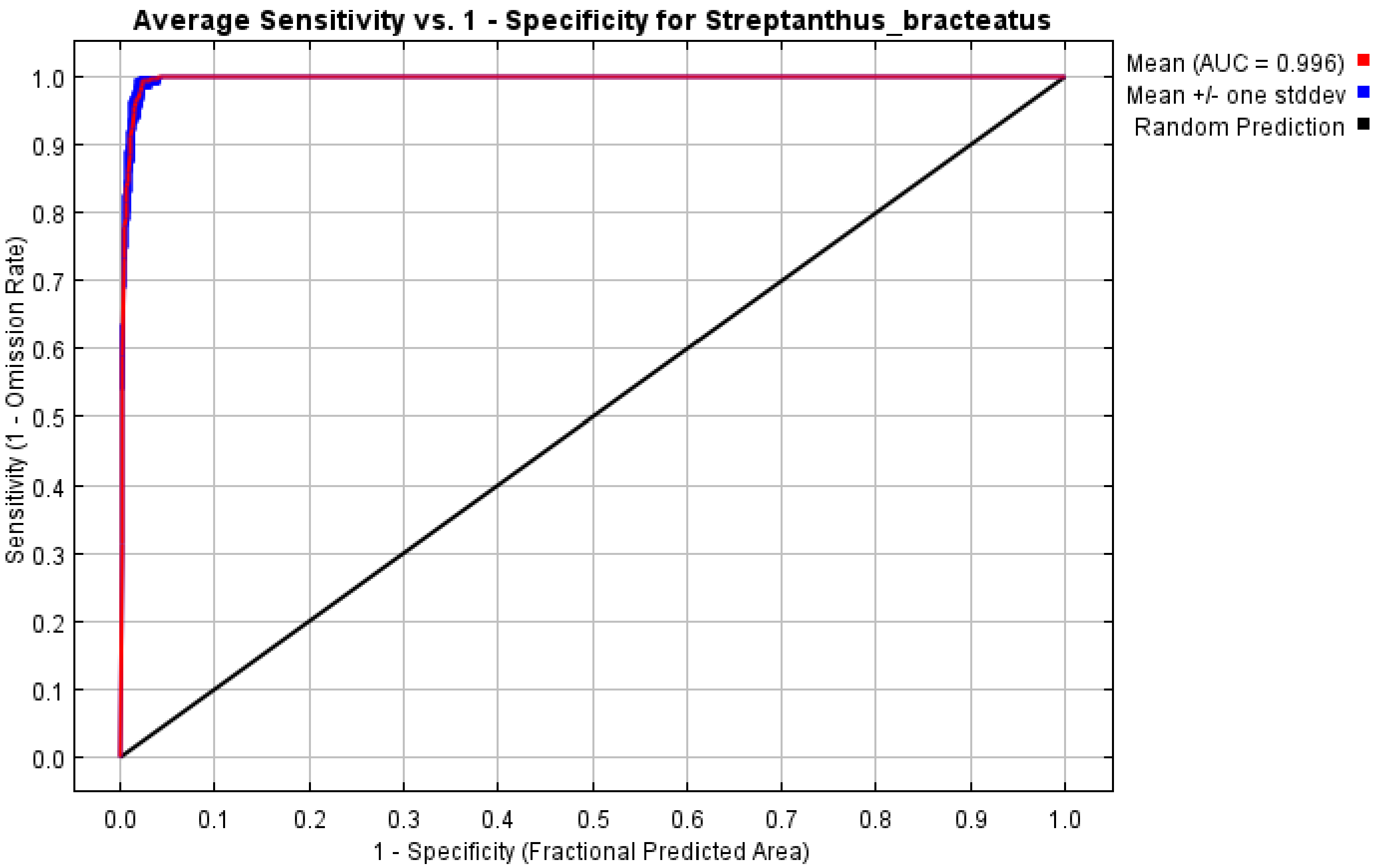
This page summarizes the results of 10 bootstrap models for Streptanthus_bracteatus, created Tue Dec 07 16:10:22 CST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4] [5] [6] [7] [8] [9]

Analysis of omission/commission

The following picture shows the training omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs.

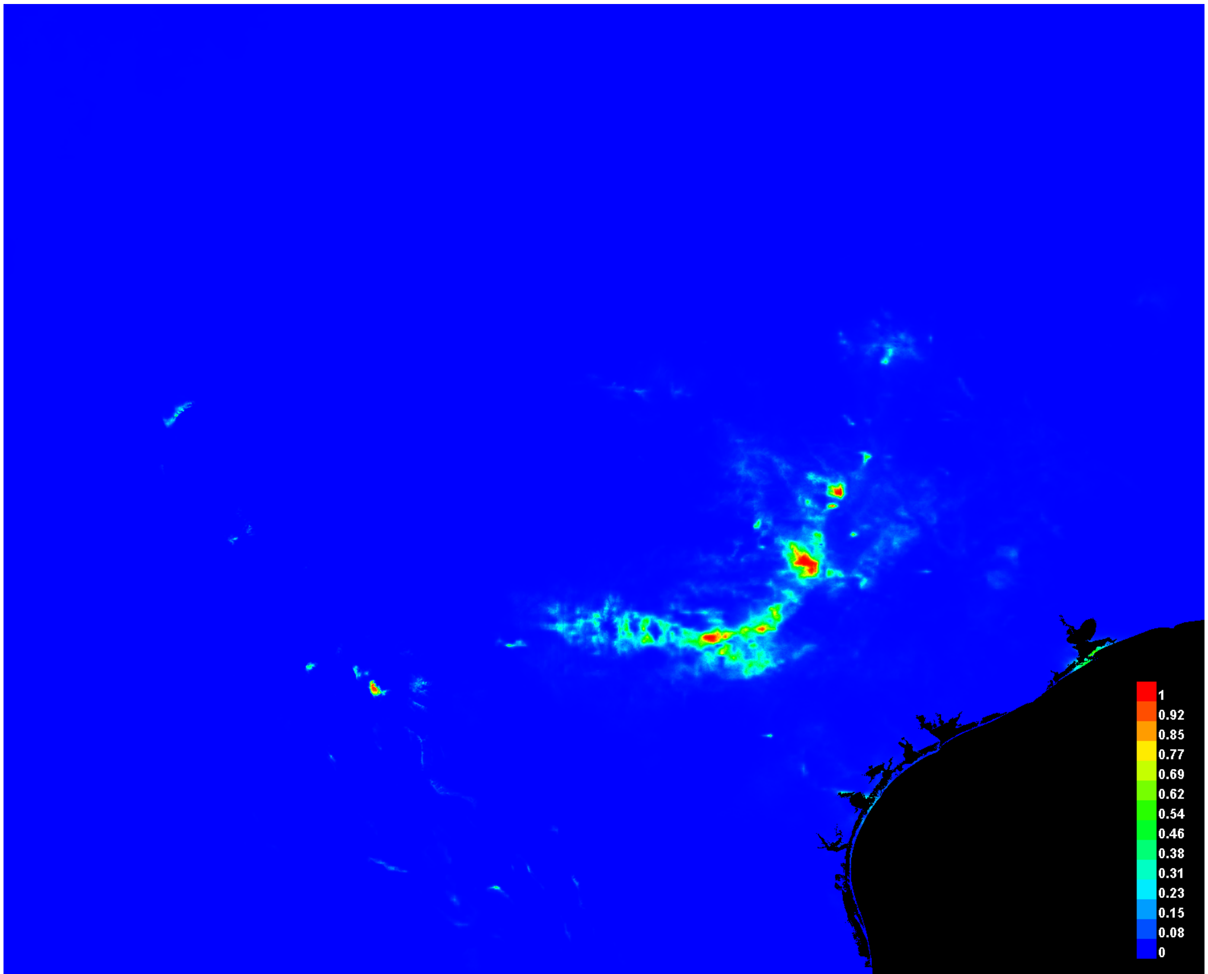


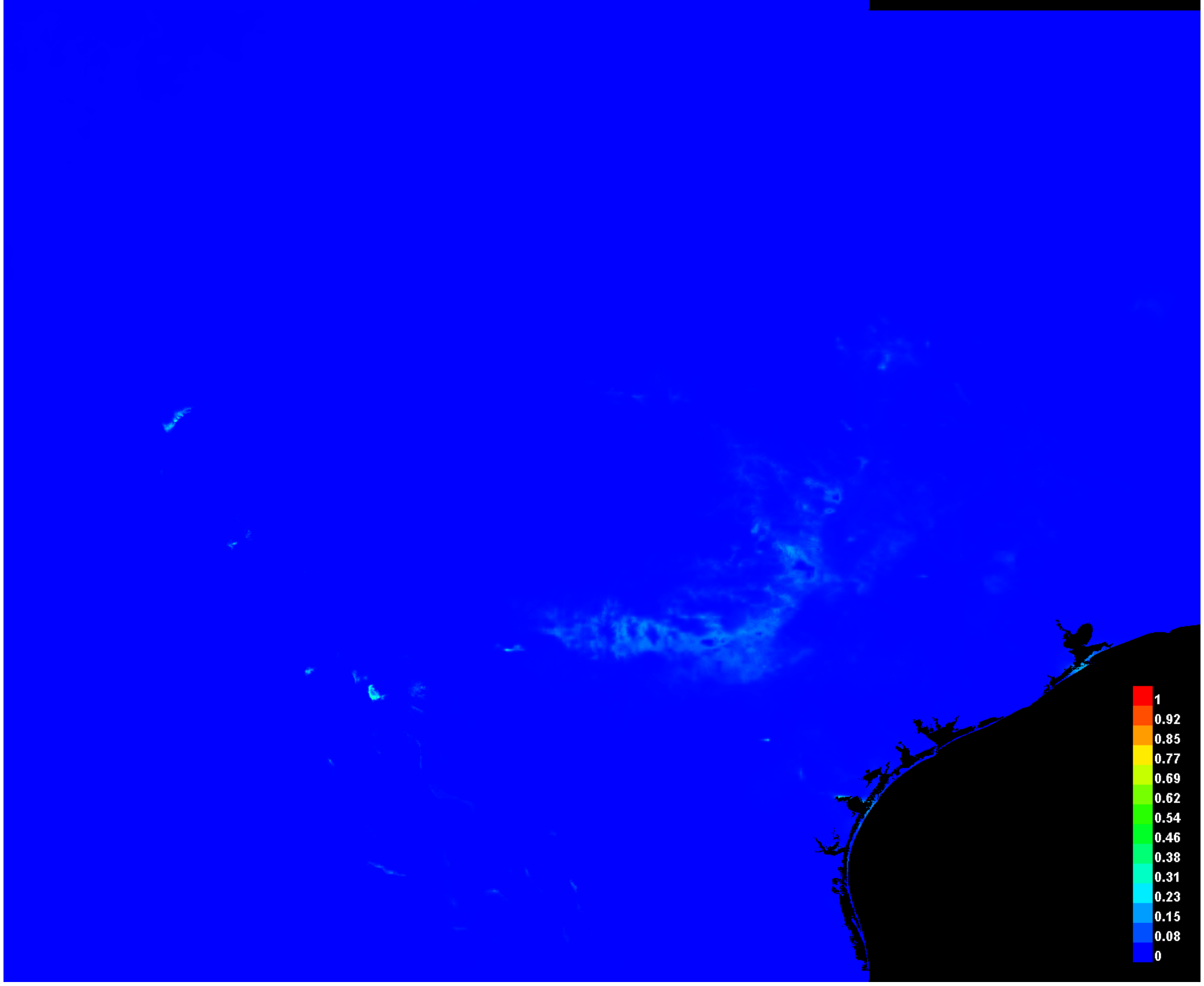
The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average training AUC for the replicate runs is 0.996, and the standard deviation is 0.001.



Pictures of the model

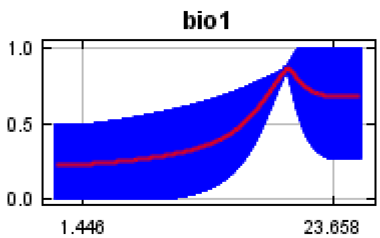
The following two pictures show the point-wise mean and standard deviation of the 10 output grids. Other available summary grids are min, max and median.

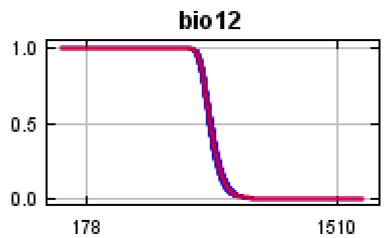

1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

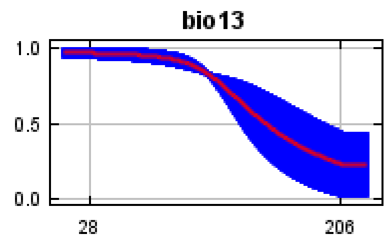

1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

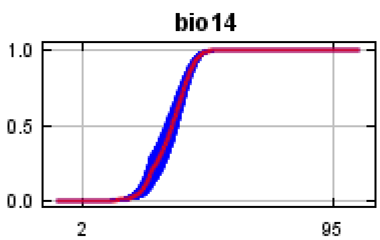
Response curves

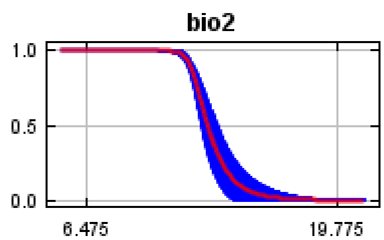
These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 10 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).

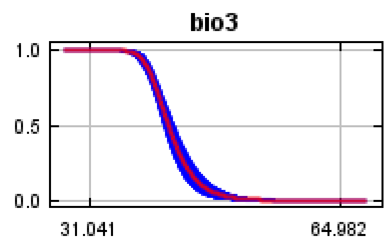


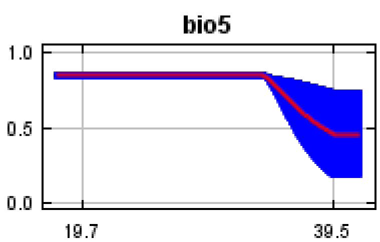


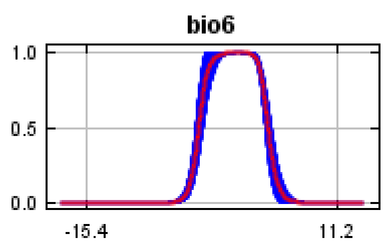


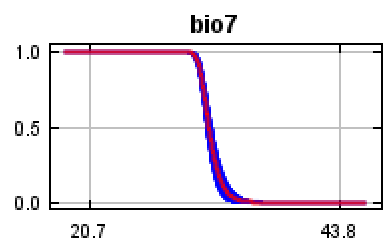




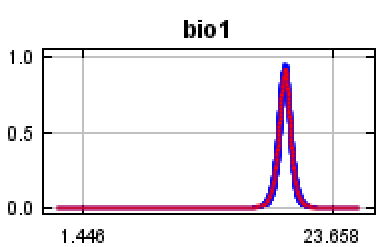


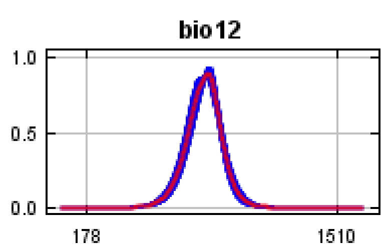


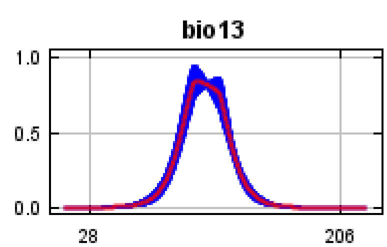


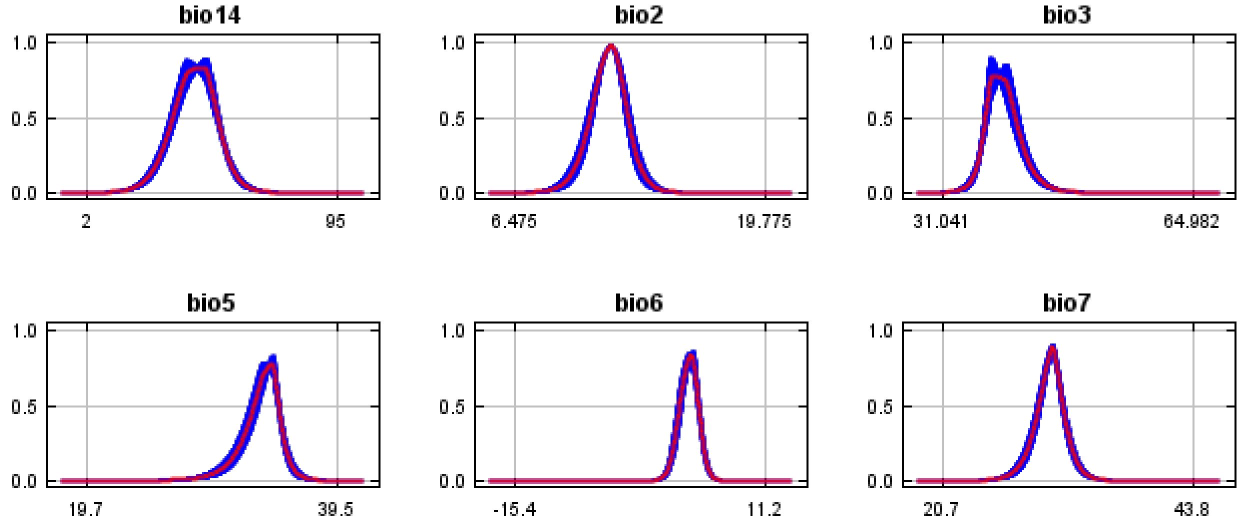


In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.







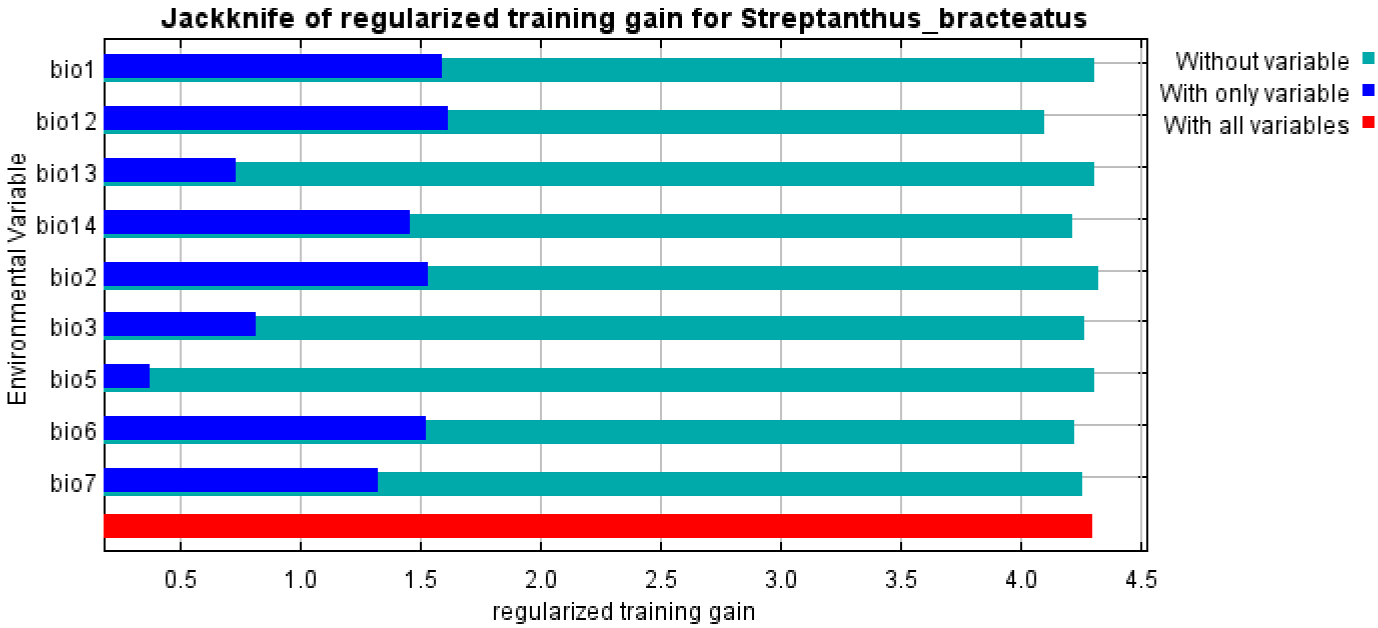


Analysis of variable contributions

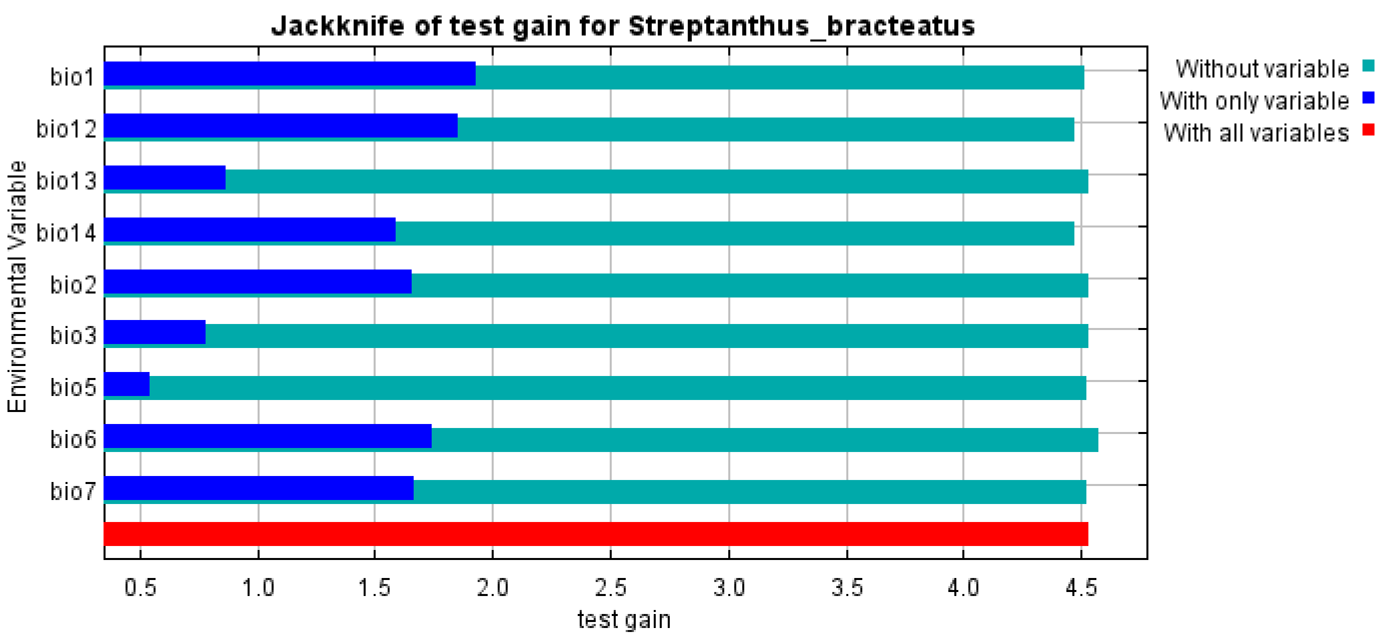
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio7	31.2	21.6
bio14	30	25.5
bio12	21.2	23.5
bio1	9.3	0.2
bio2	3.8	9.7
bio5	2.6	0.1
bio6	0.8	13.4
bio3	0.8	5.7
bio13	0.4	0.4

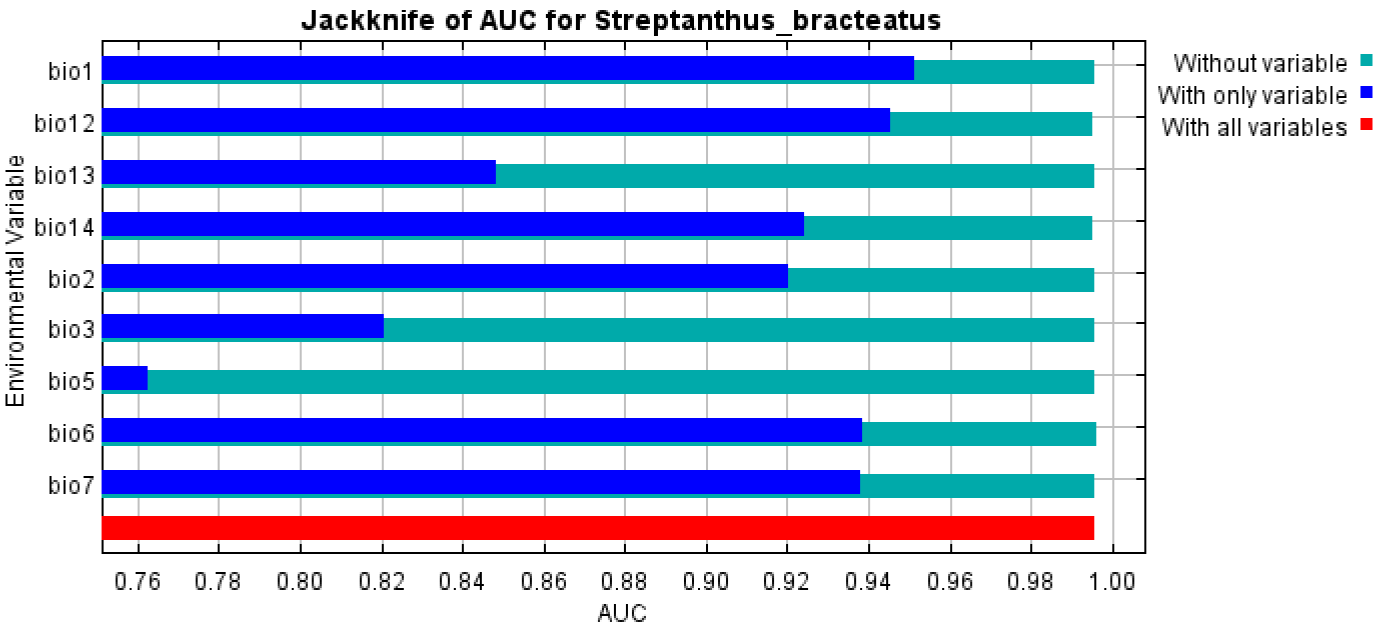
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio12, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio12, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



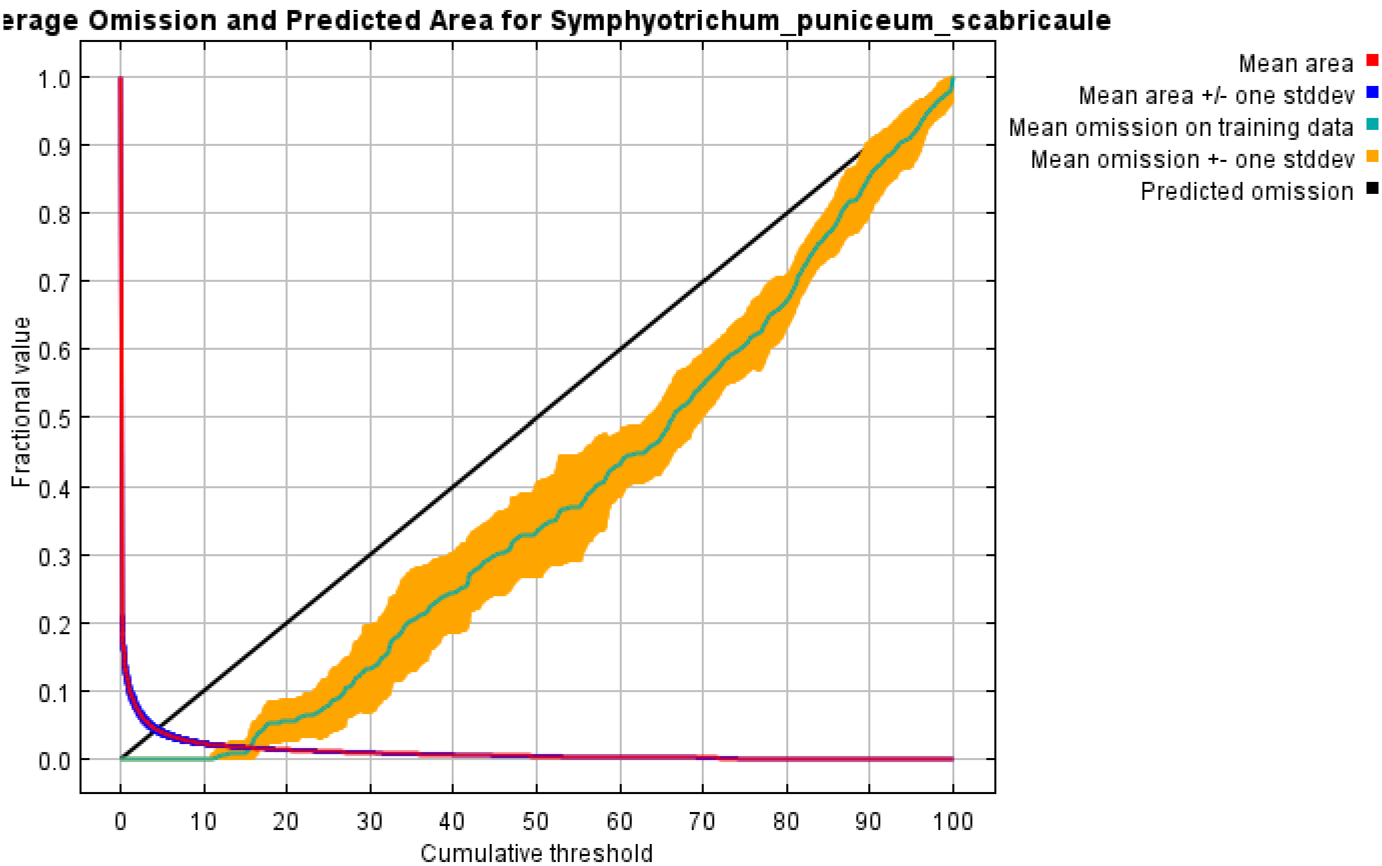
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Streptanthus_bracteatus responsecurves jackknife "outputdirectory=E:\TXDoT_Range Scale_Bioclim\Results\1Reg\Streptanthus" "samplesfile=E:\TXDoT_Range Scale_Bioclim\spp_csv\Streptanthus_bracteatus.csv" "environmentallayers=E:\TXDoT_Range Scale_Bioclim\Ascii" randomseed randomtestpoints=25 replicates=10 replicatetype=bootstrap writebackgroundpredictions -N bio0

Replicated maxent model for Symphyotrichum_puniceum_scabricaule

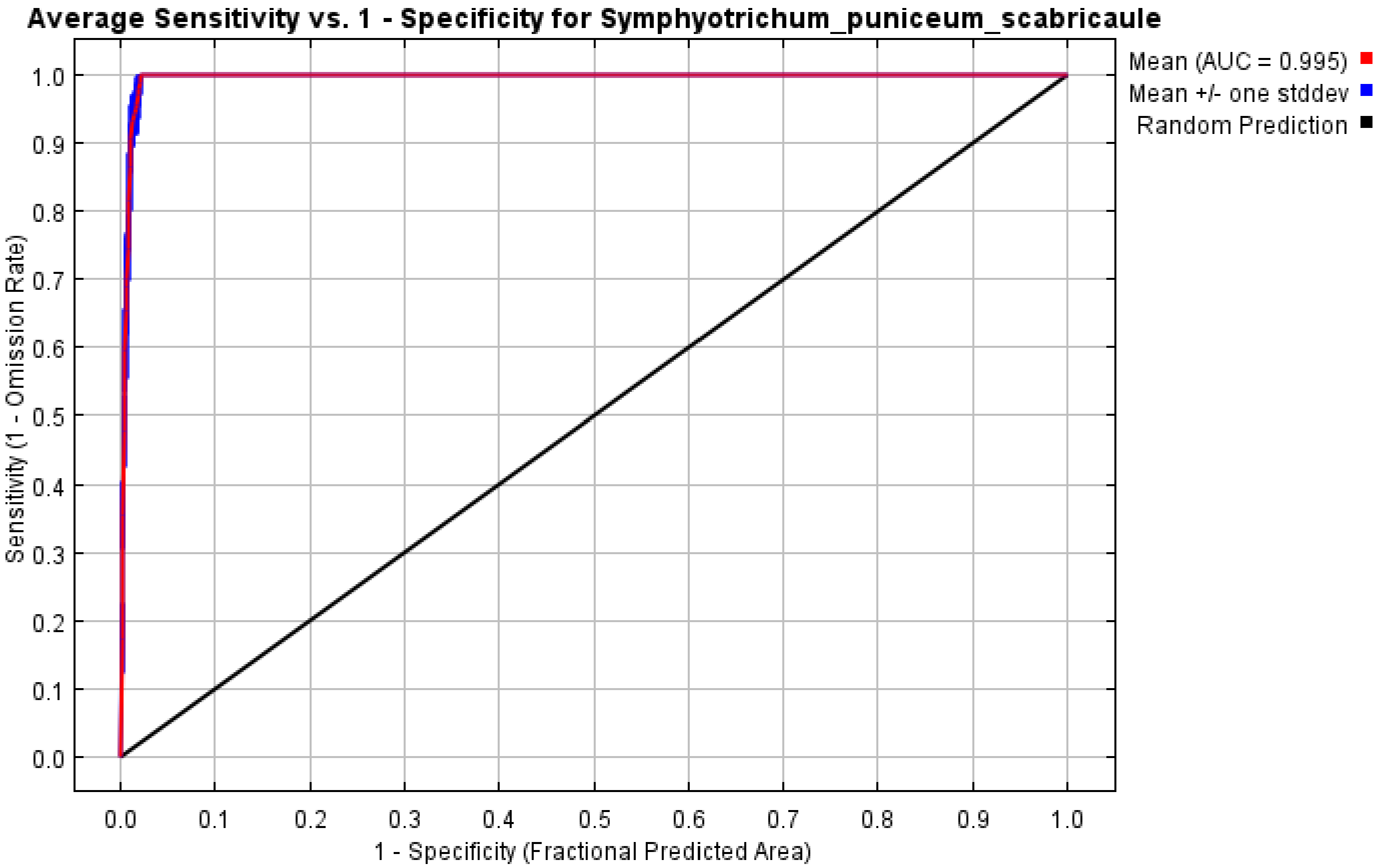
This page summarizes the results of 10 bootstrap models for Symphyotrichum_puniceum_scabricaule, created Tue Dec 07 16:17:36 CST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4] [5] [6] [7] [8] [9]

Analysis of omission/commission

The following picture shows the training omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs.

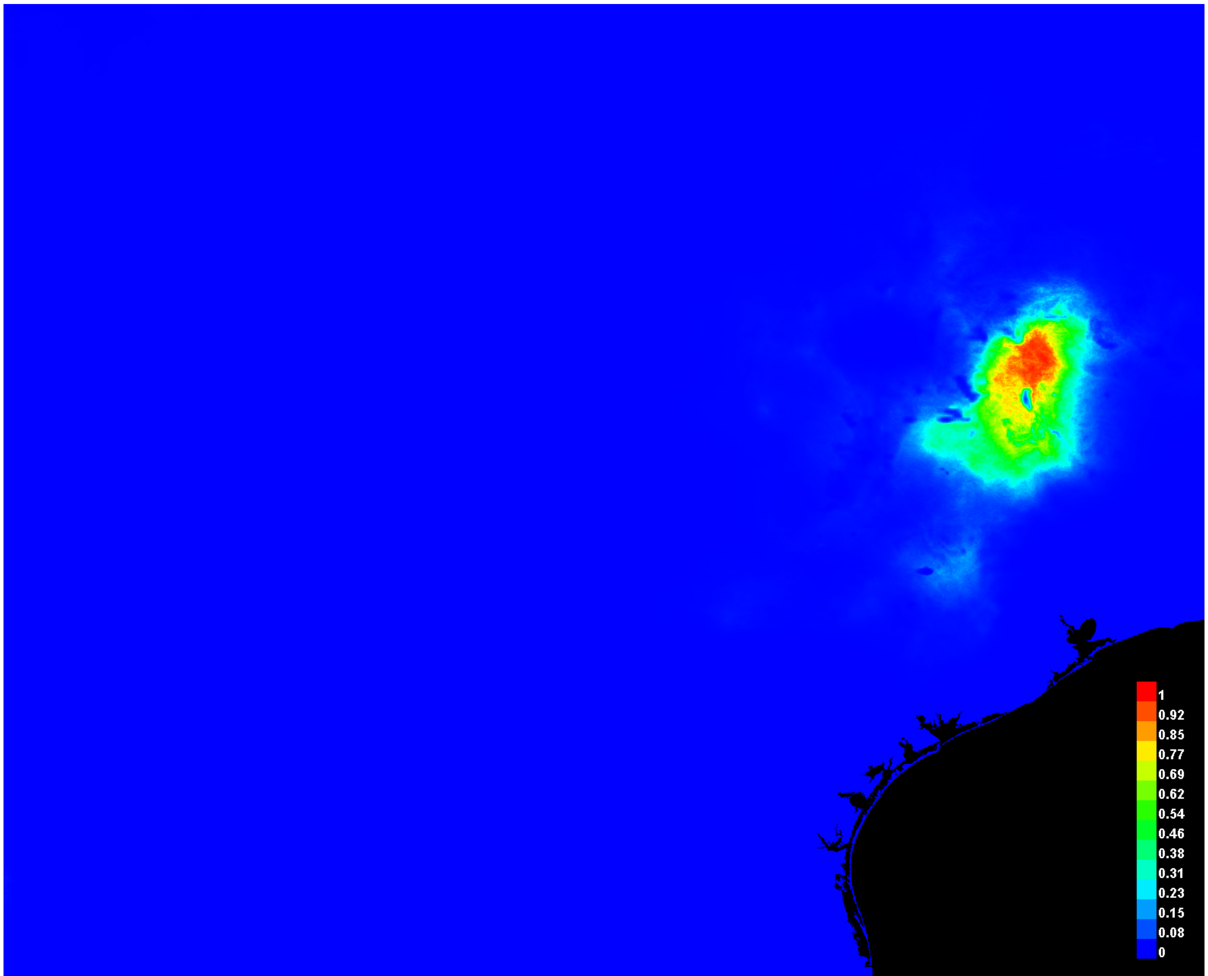


The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average training AUC for the replicate runs is 0.995, and the standard deviation is 0.001.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 10 output grids. Other available summary grids are min, max and median.


1
0.92
0.85
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0.69
0.62
0.54
0.46
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0.31
0.23
0.15
0.08
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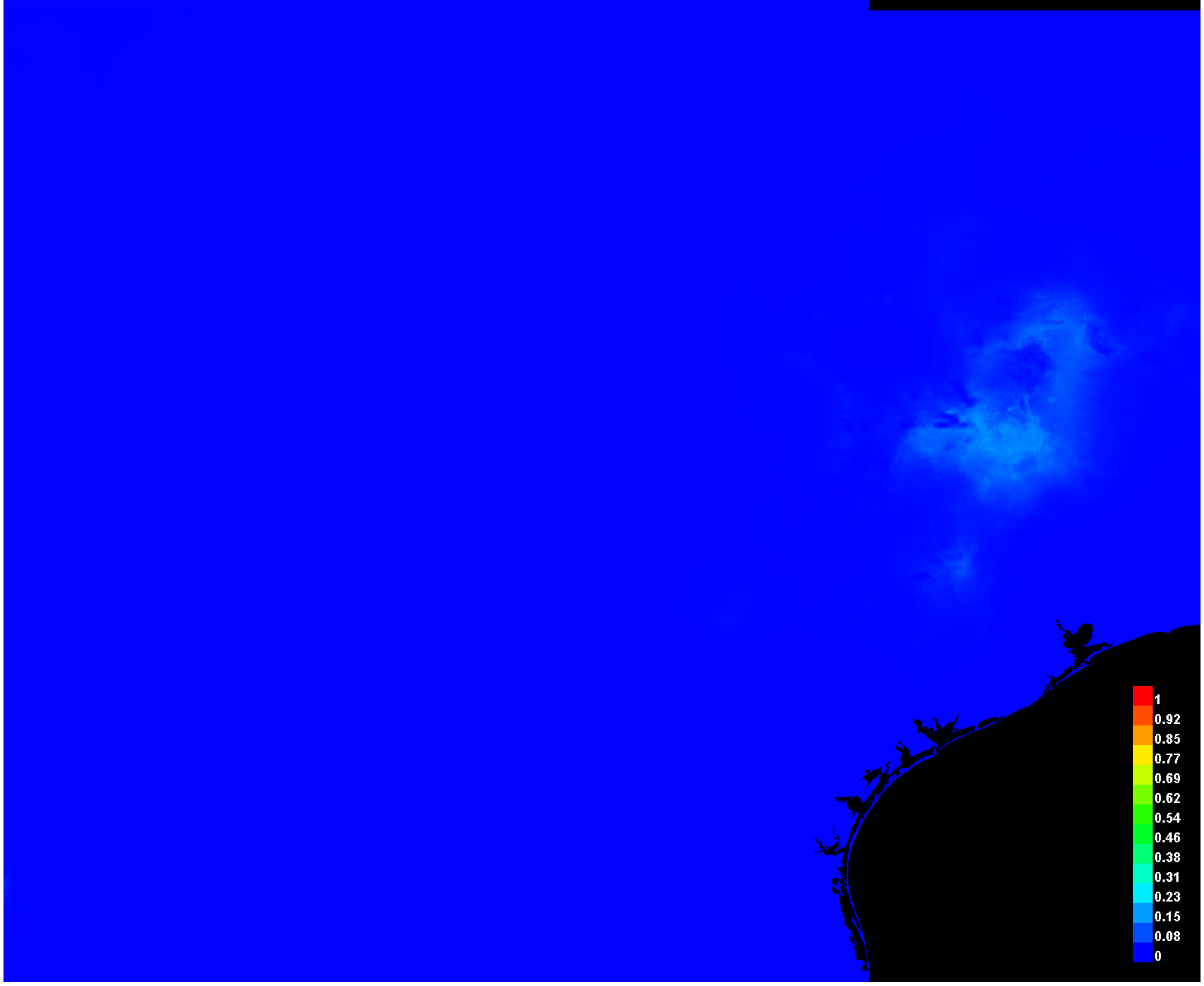
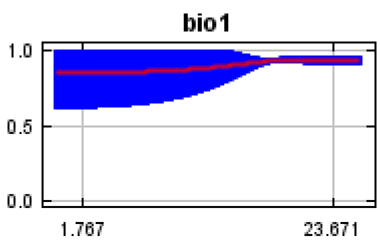
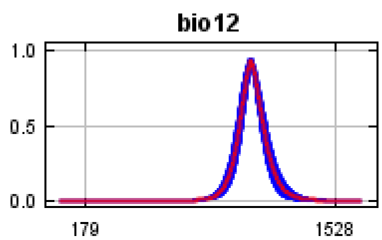
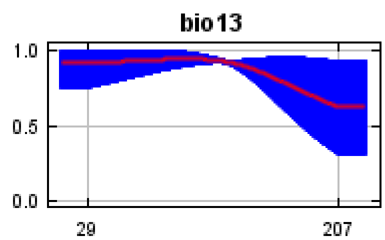

1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

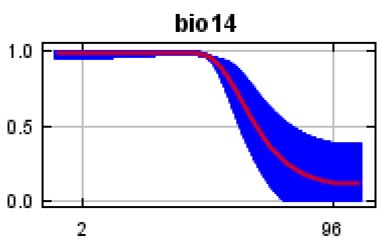
Response curves

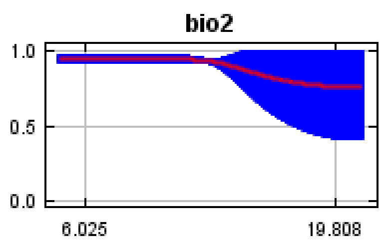
These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 10 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).

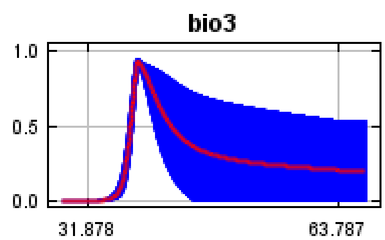


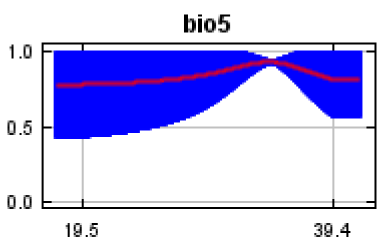


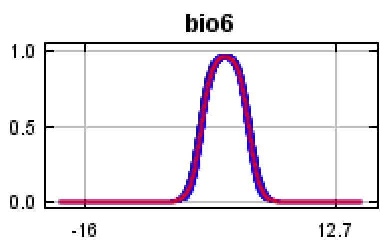


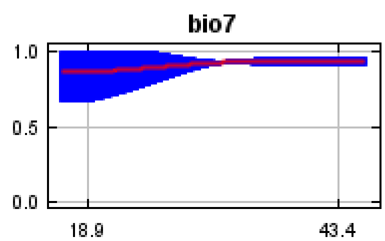




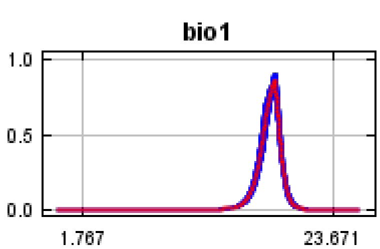


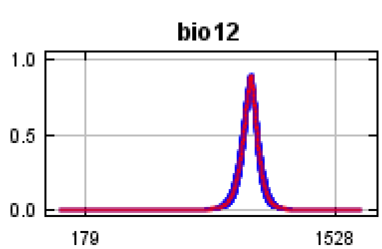


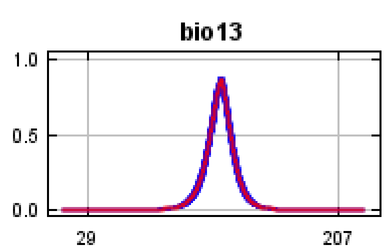


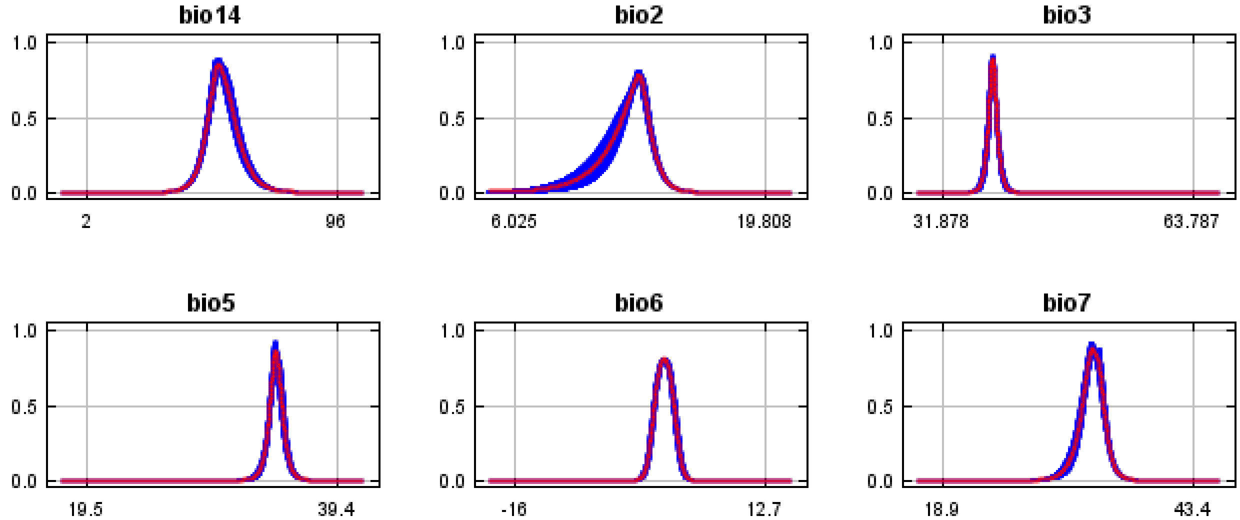


In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.







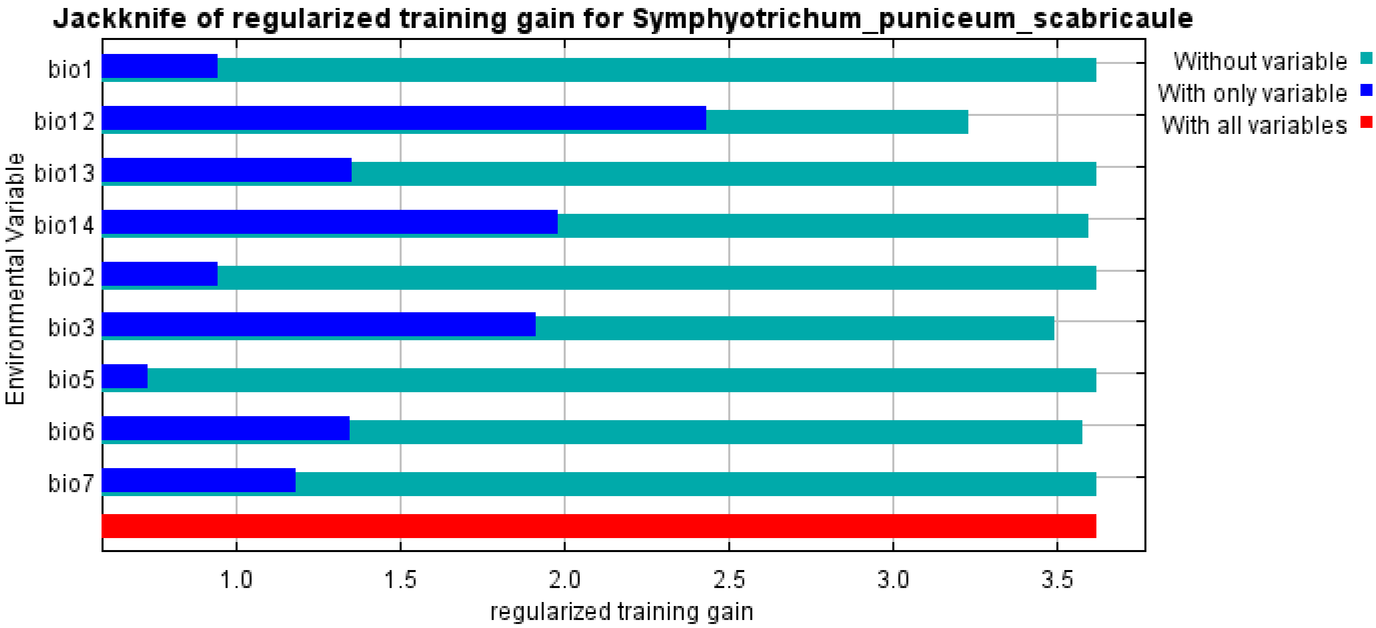


Analysis of variable contributions

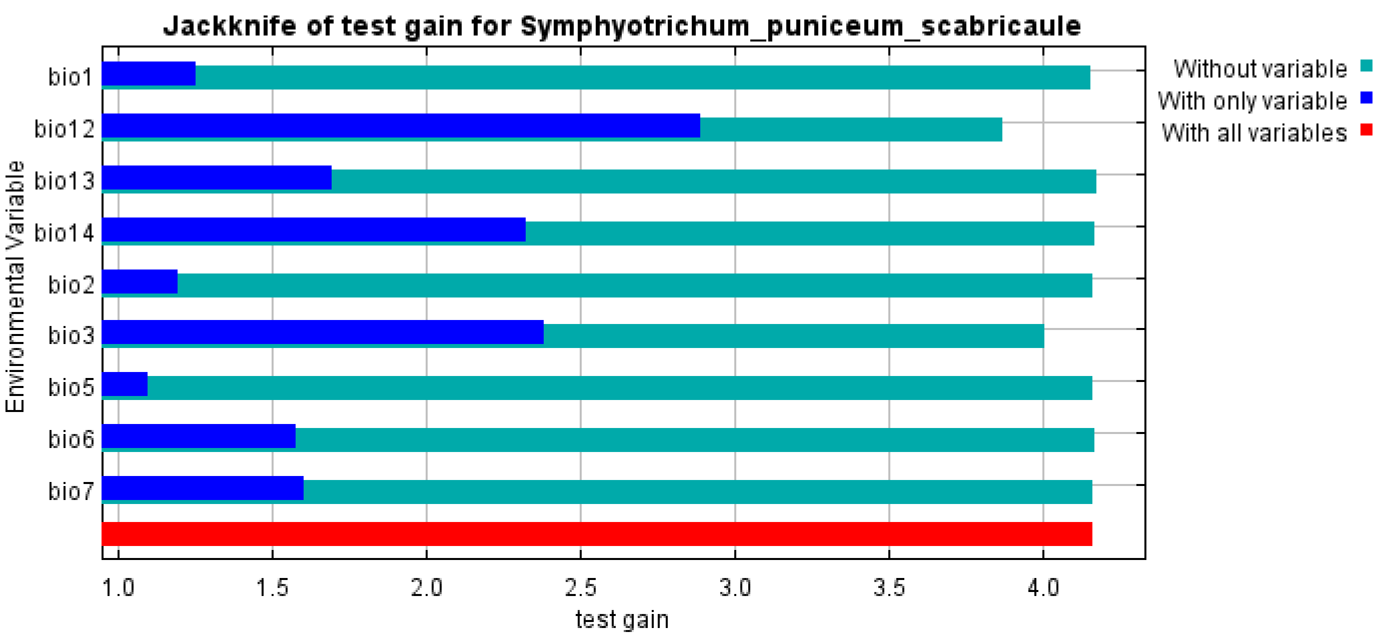
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio14	49.7	2.2
bio12	24.3	72.3
bio3	15.1	10.7
bio1	8.7	0.1
bio6	2.2	14.3
bio5	0	0.2
bio13	0	0.1
bio2	0	0.1
bio7	0	0

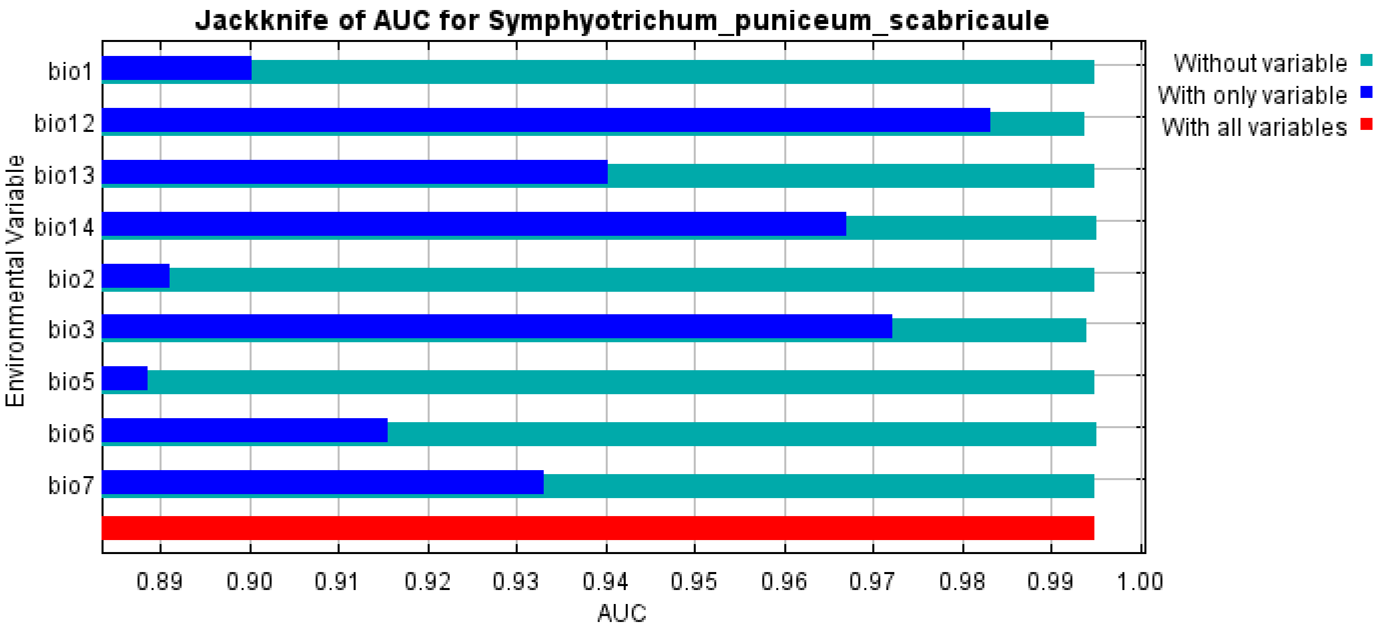
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio12, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio12, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



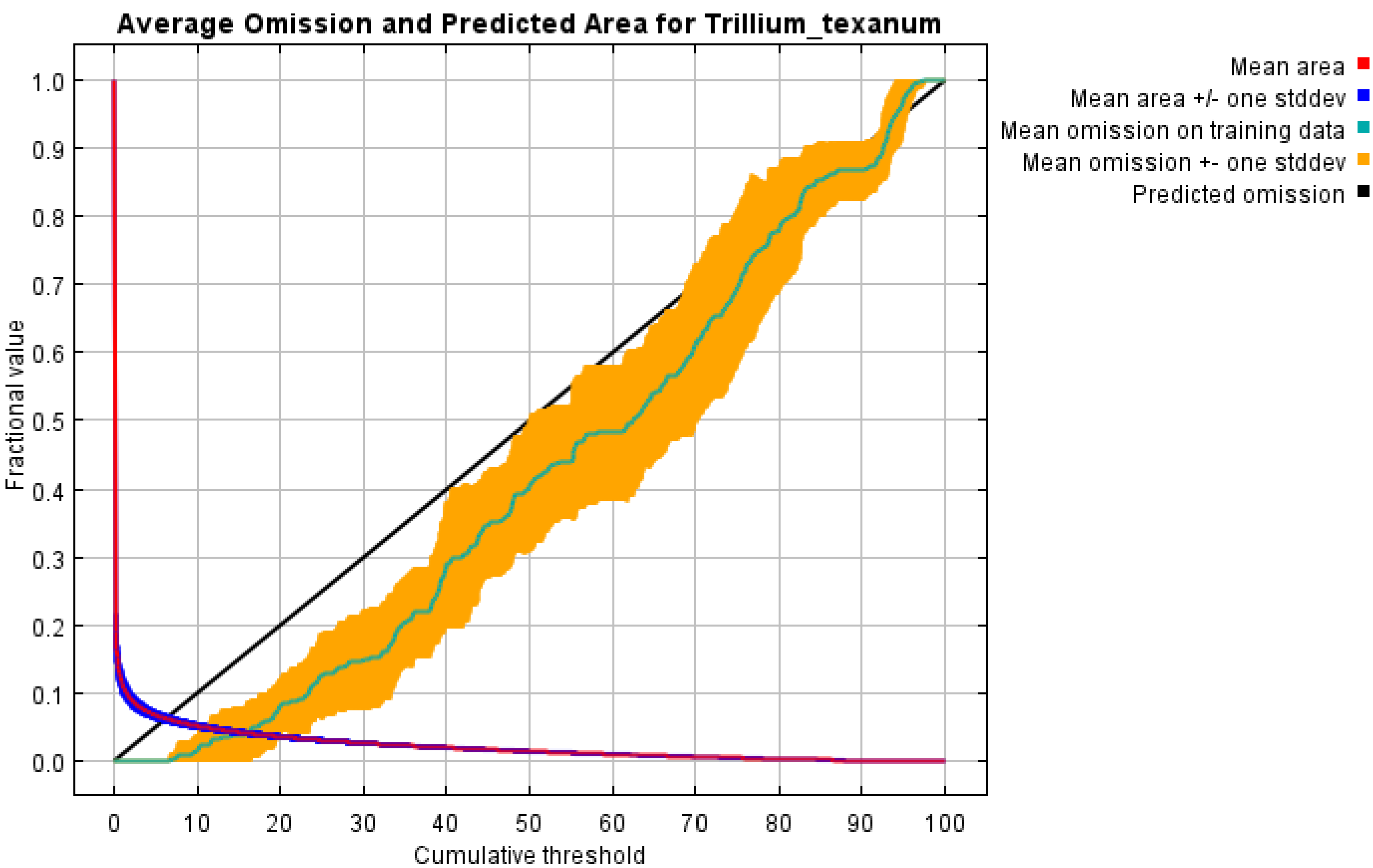
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Symphyotrichum_puniceum_scabricaule responsecurves jackknife "outputdirectory=E:\TXDoT_Range Scale_Bioclim\Results\1Reg\Symphyotrichum" "samplesfile=E:\TXDoT_Range Scale_Bioclim\spp_csv\Symphyotrichum_puniceum_scabricaule.csv" "environmentallayers=E:\TXDoT_Range Scale_Bioclim\Ascii" randomseed randomtestpoints=25 replicates=10 replicatetype=bootstrap writebackgroundpredictions -N bio0

Replicated maxent model for Trillium_texanum

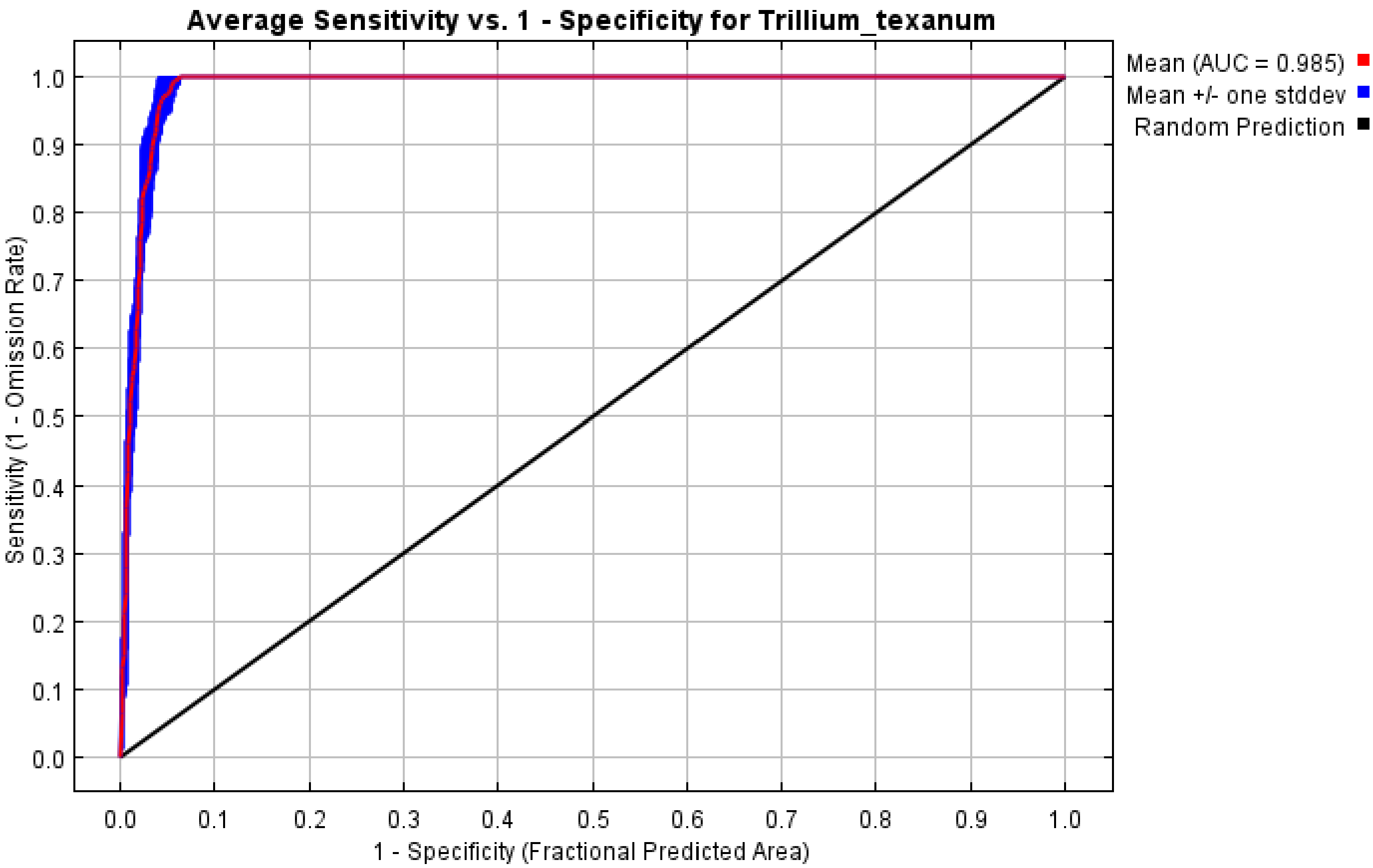
This page summarizes the results of 10 bootstrap models for Trillium_texanum, created Thu Dec 02 23:30:48 CST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4] [5] [6] [7] [8] [9]

Analysis of omission/commission

The following picture shows the training omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs.

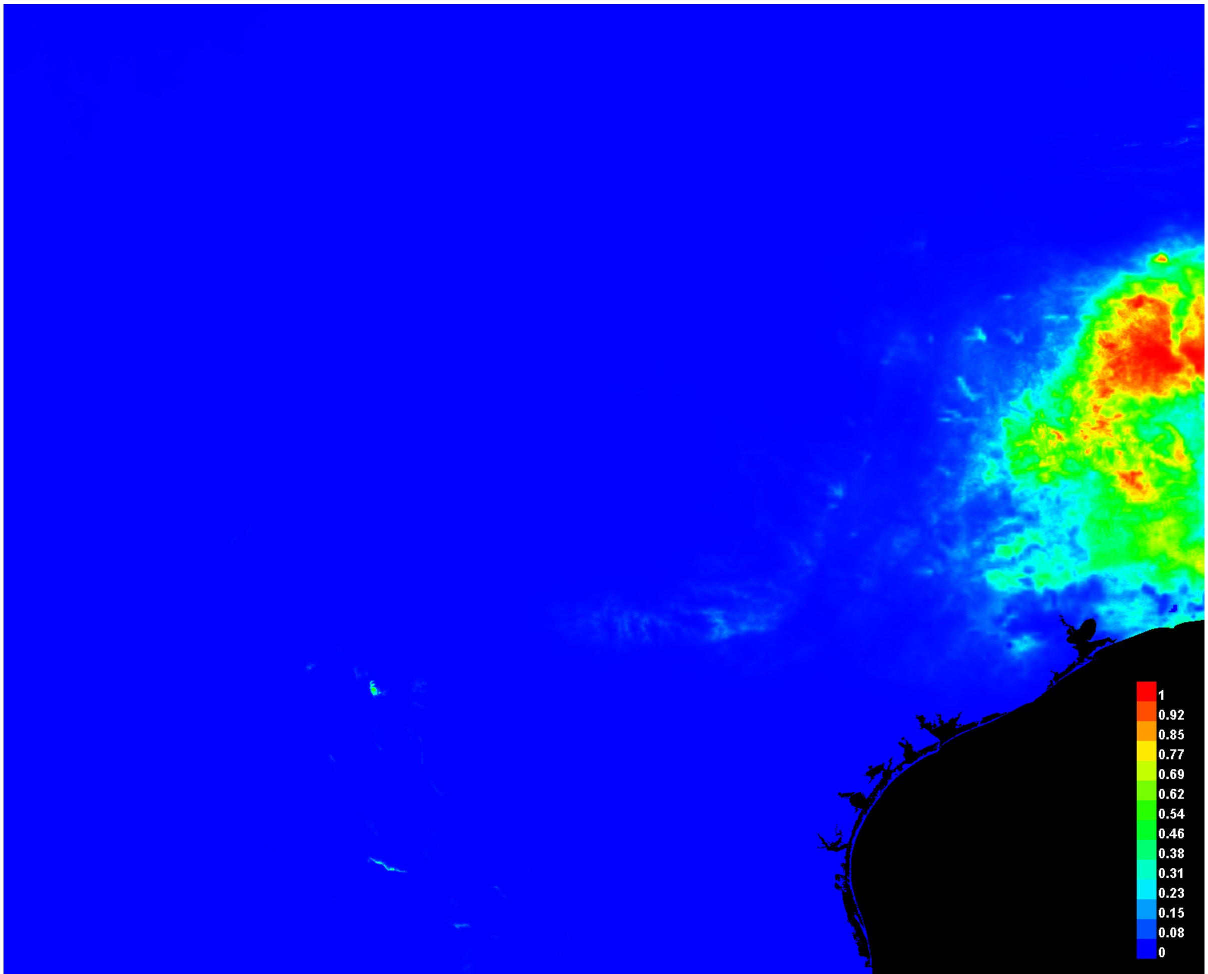


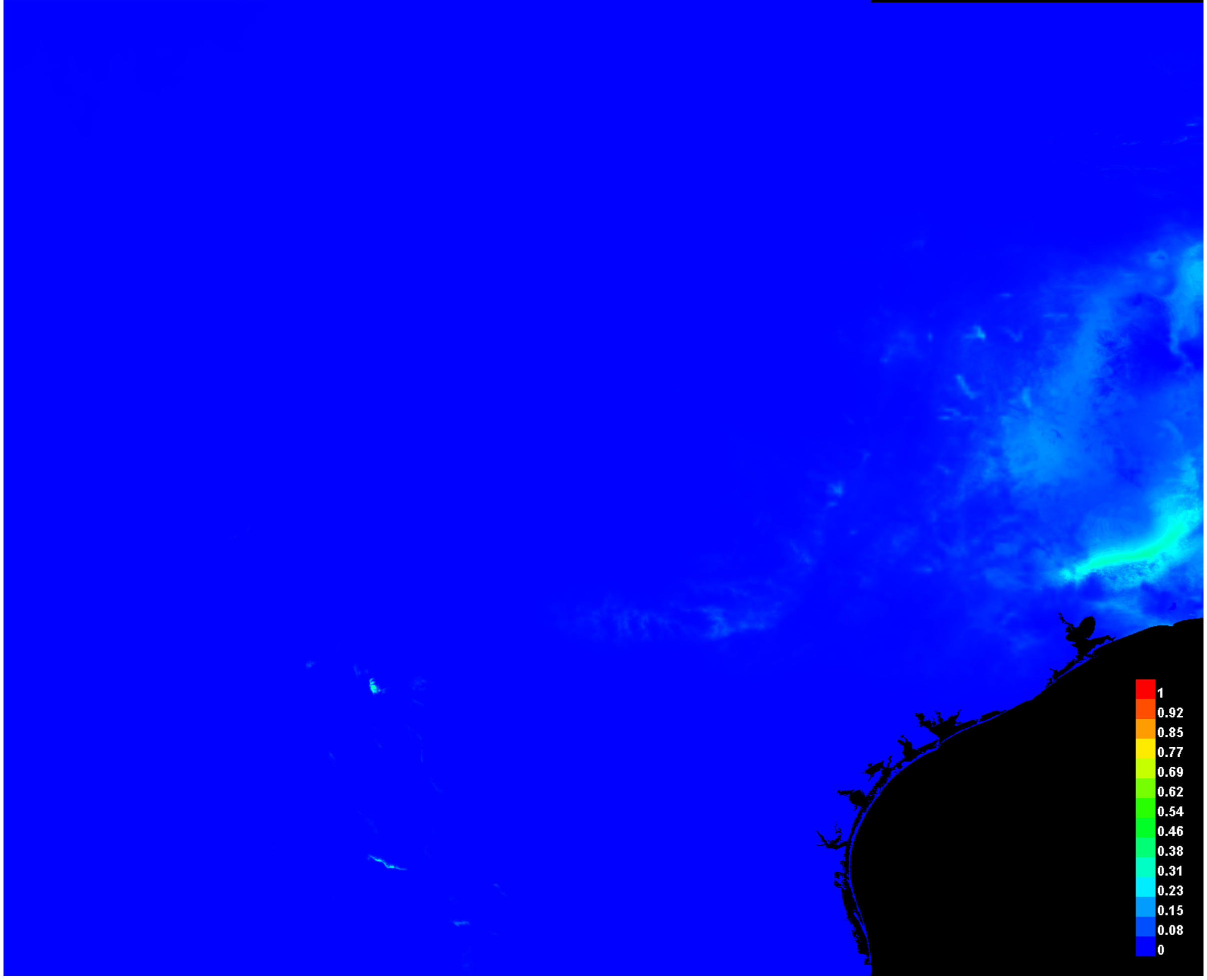
The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average training AUC for the replicate runs is 0.985, and the standard deviation is 0.002.



Pictures of the model

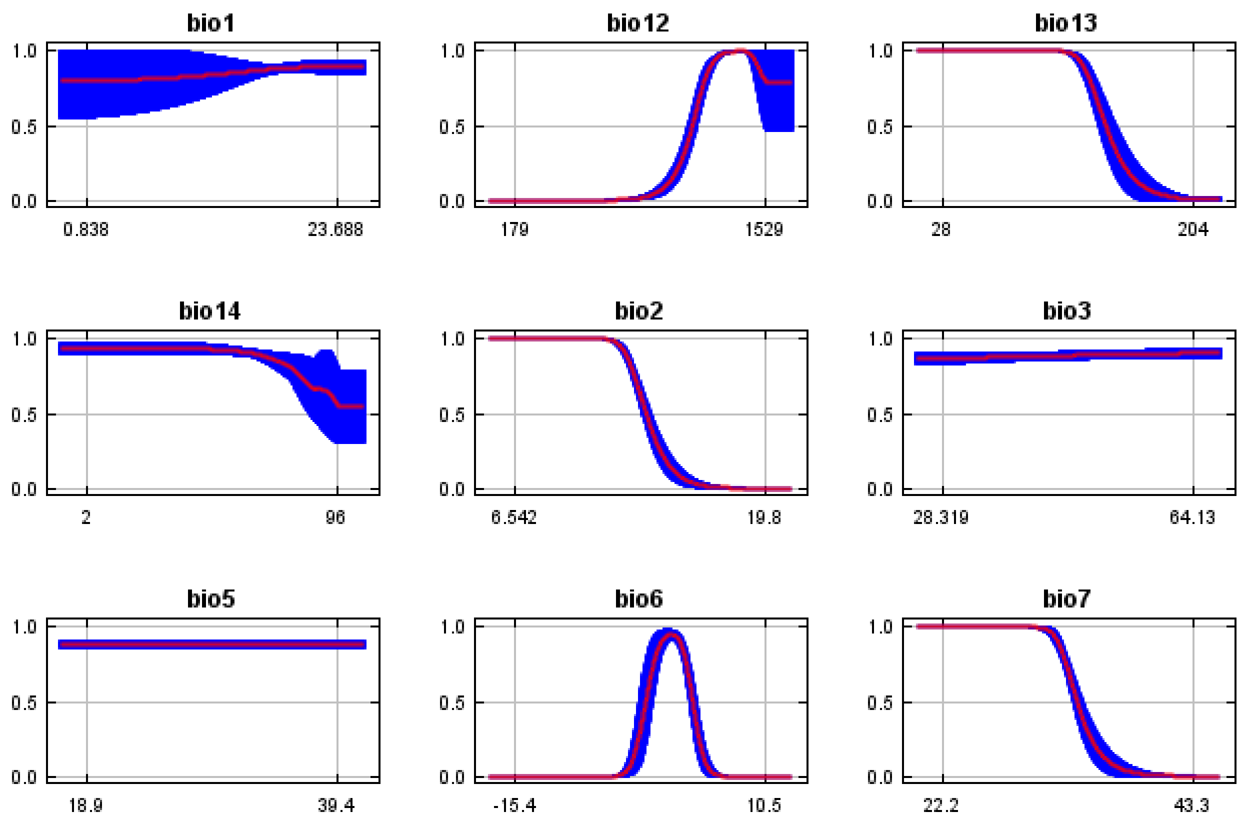
The following two pictures show the point-wise mean and standard deviation of the 10 output grids. Other available summary grids are min, max and median.


1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

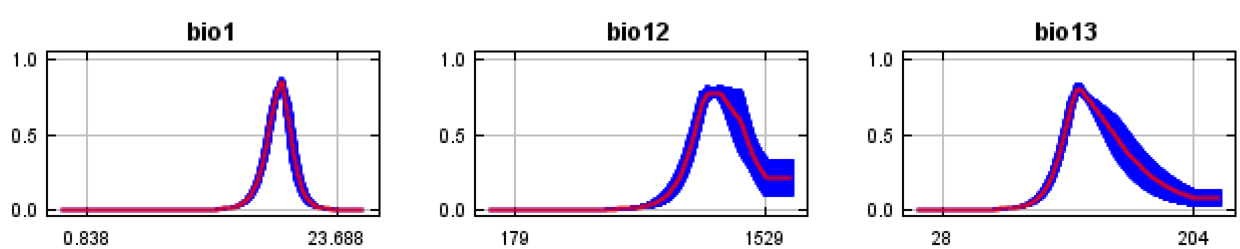

1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

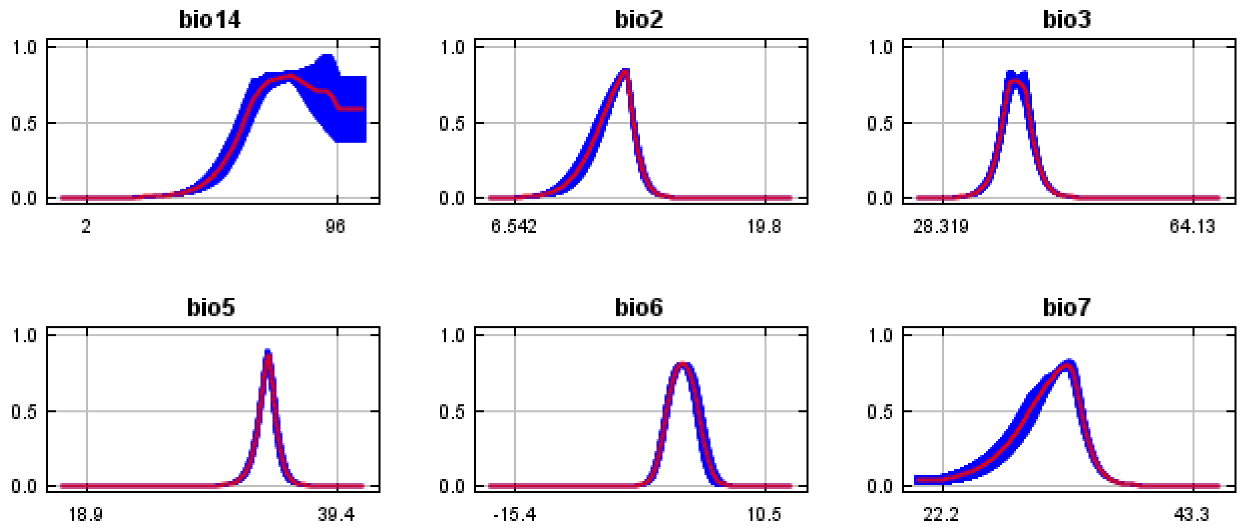
Response curves

These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 10 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).



In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.



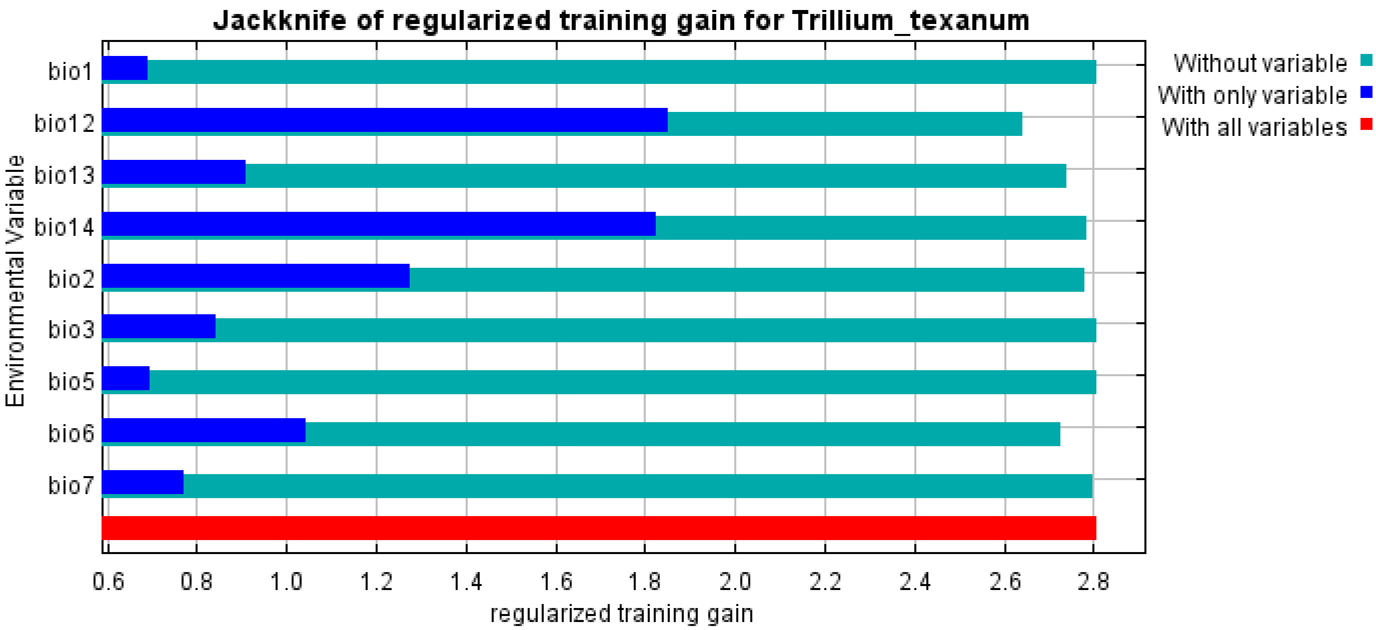


Analysis of variable contributions

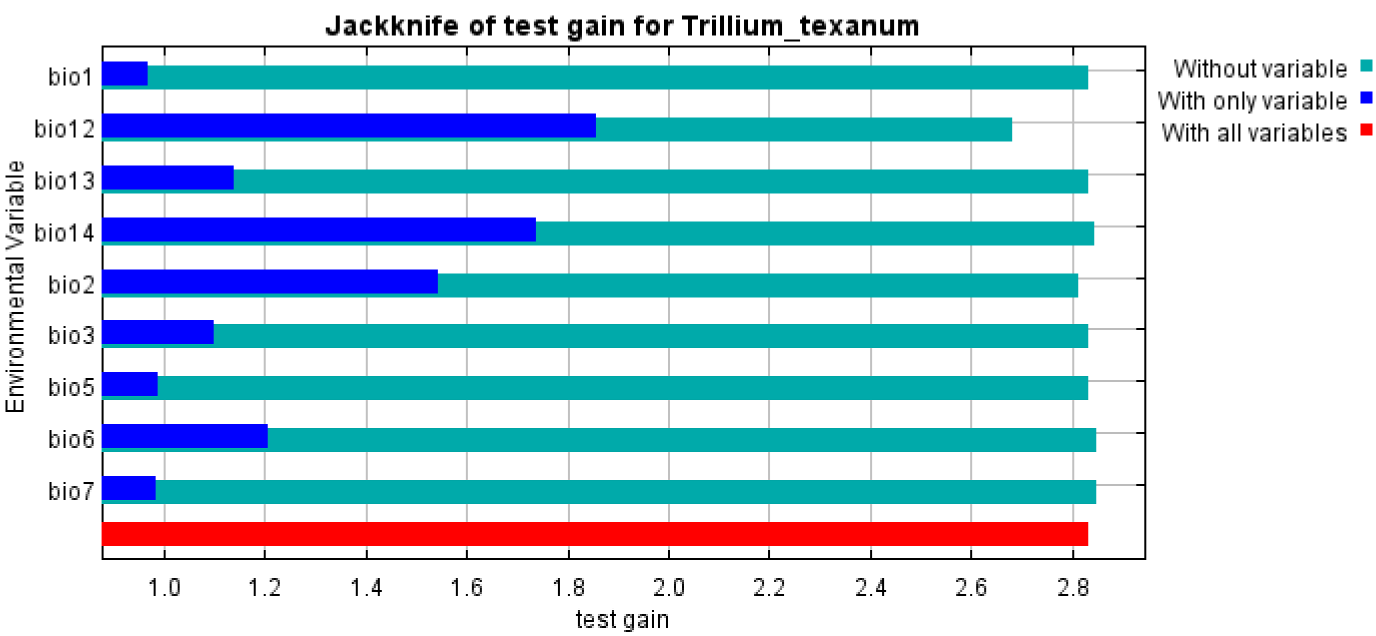
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio14	66.2	0.3
bio7	11.3	12.7
bio12	6.7	47.3
bio1	6.5	0
bio13	5.8	6.5
bio6	1.8	23.2
bio2	0.8	9.9
bio5	0.7	0
bio3	0.1	0

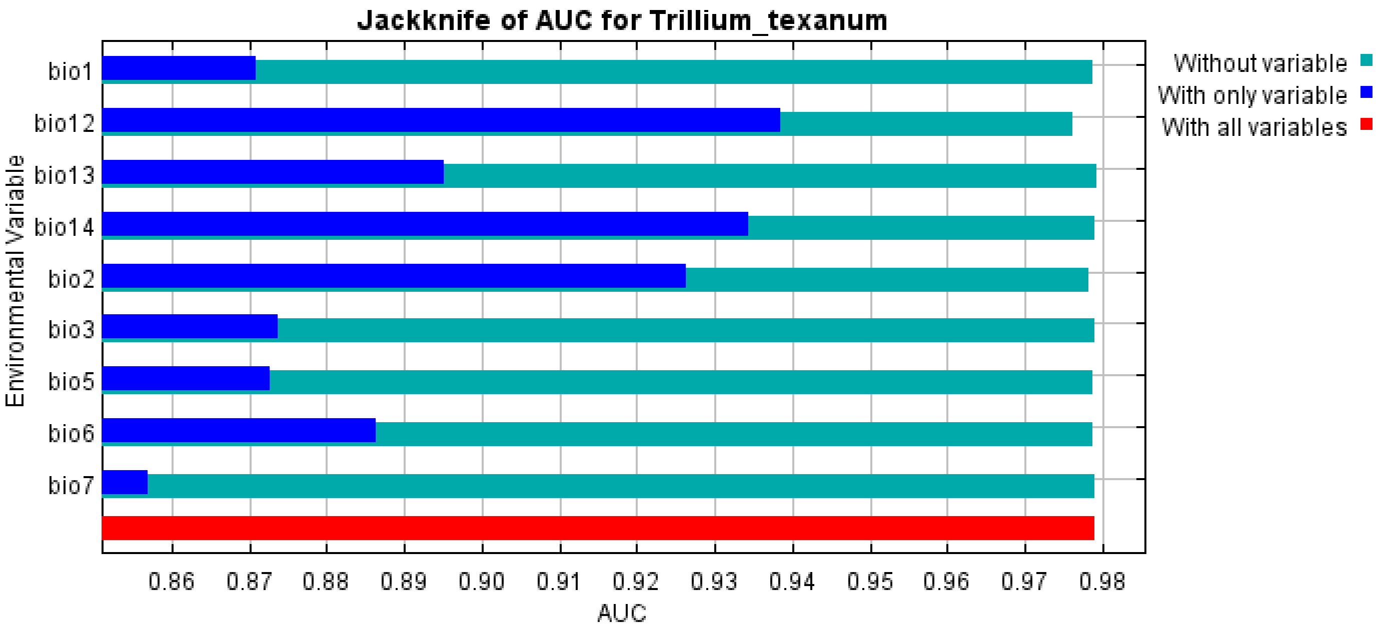
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio12, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio12, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



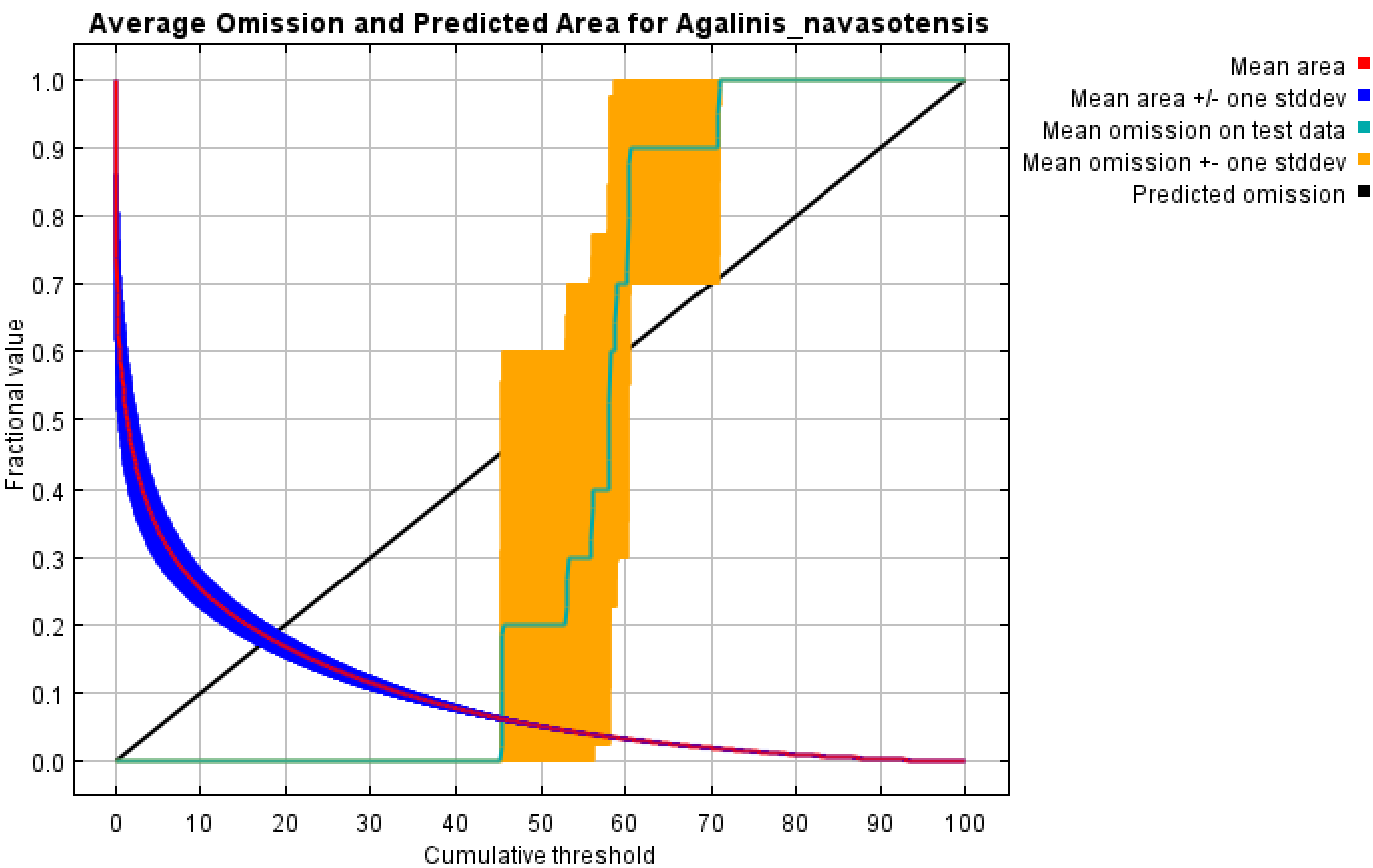
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Trillium_texanum responsecurves jackknife "outputdirectory=E:\TXDoT_Range Scale_Bioclim\Results\1Reg\Trillium" samplesfile=E:\TXDoT_TXScale\Trillium\Trillium_filter.csv "environmentallayers=E:\TXDoT_Range Scale_Bioclim\Ascii" randomseed noaskoverwrite randomtestpoints=25 replicates=10 replicatetype=bootstrap writebackgroundpredictions -N bio0

Replicated maxent model for Agalinis_navasotensis

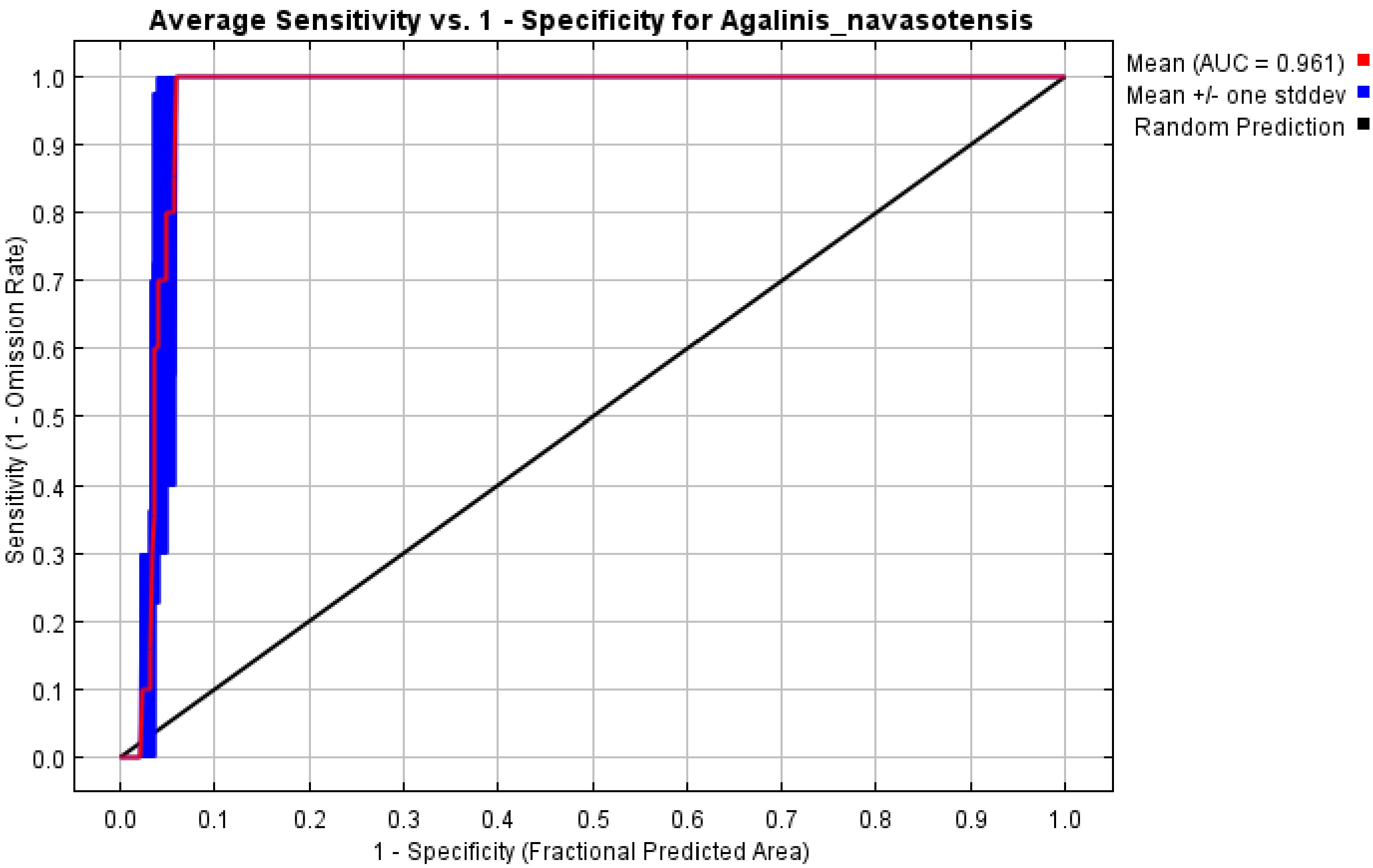
This page summarizes the results of 5-fold cross-validation for Agalinis_navasotensis, created Fri Dec 03 20:08:42 CST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4]

Analysis of omission/commission

The following picture shows the test omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs. The omission rate should be close to the predicted omission, because of the definition of the cumulative threshold.

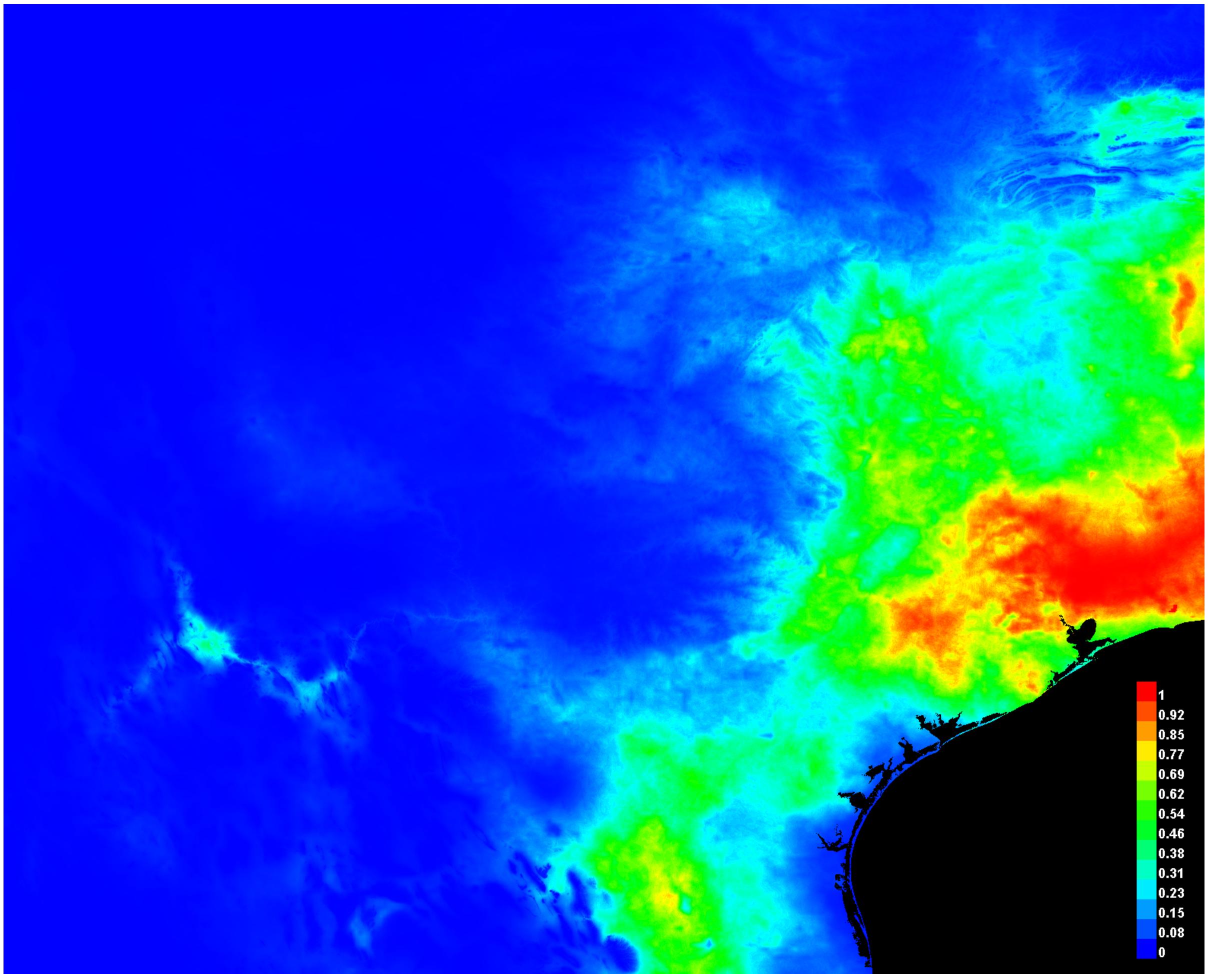


The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average test AUC for the replicate runs is 0.961, and the standard deviation is 0.009.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 5 output grids. Other available summary grids are min, max and median.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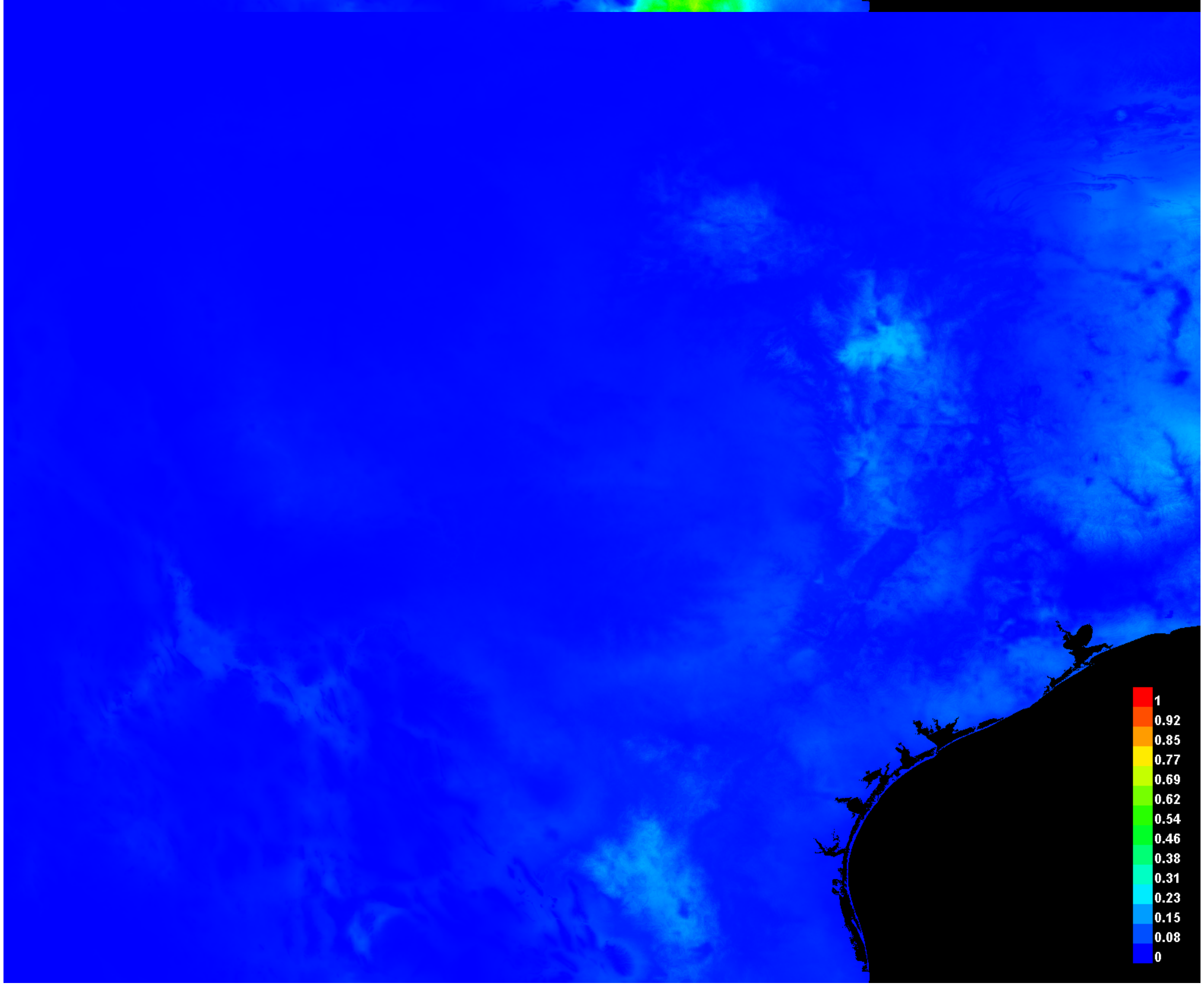
1
0.92
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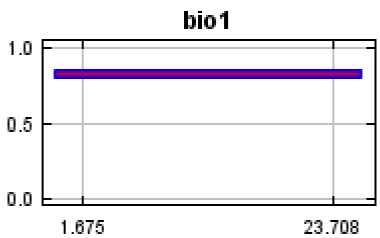
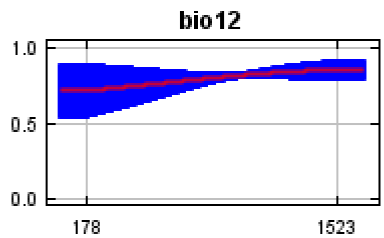
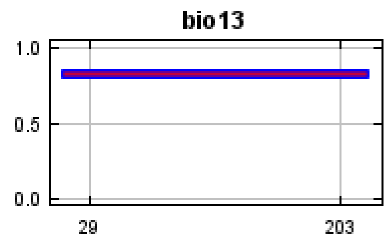
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

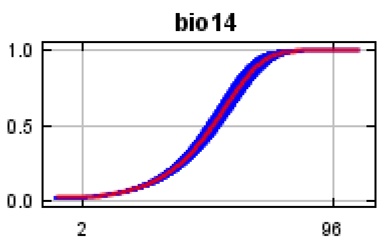
Response curves

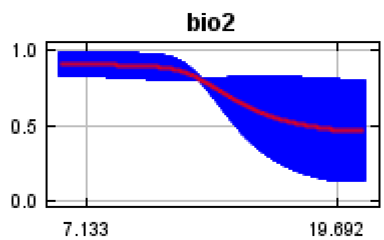
These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 5 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).

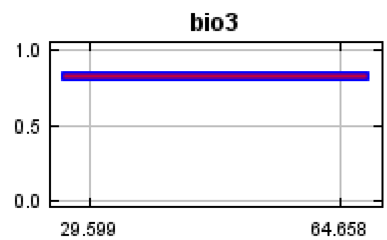


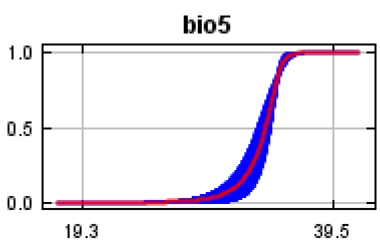


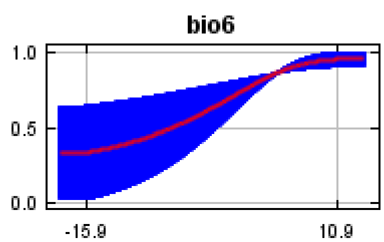


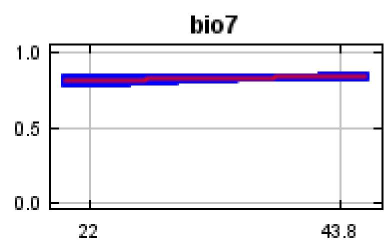




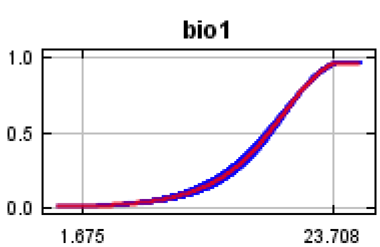


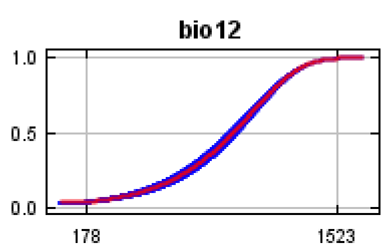


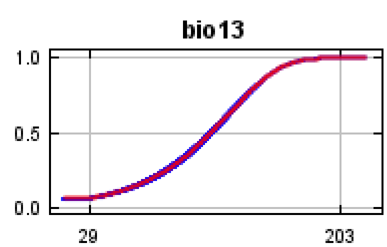


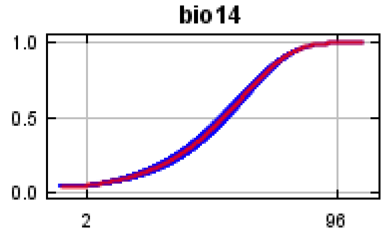


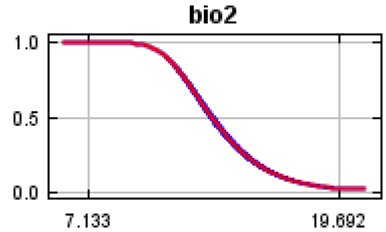
In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.

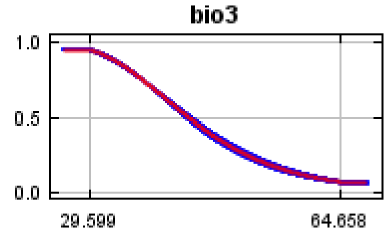


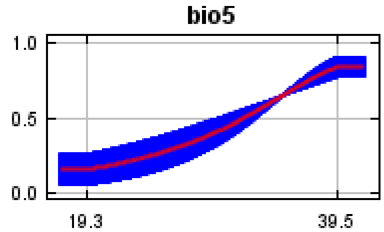


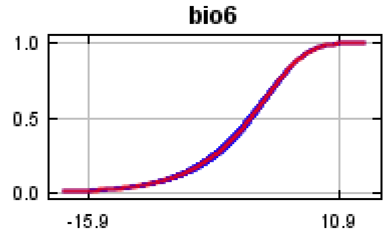


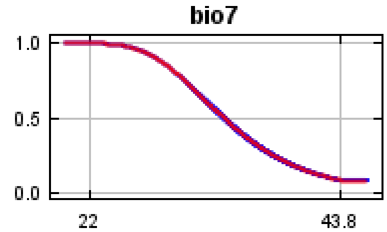










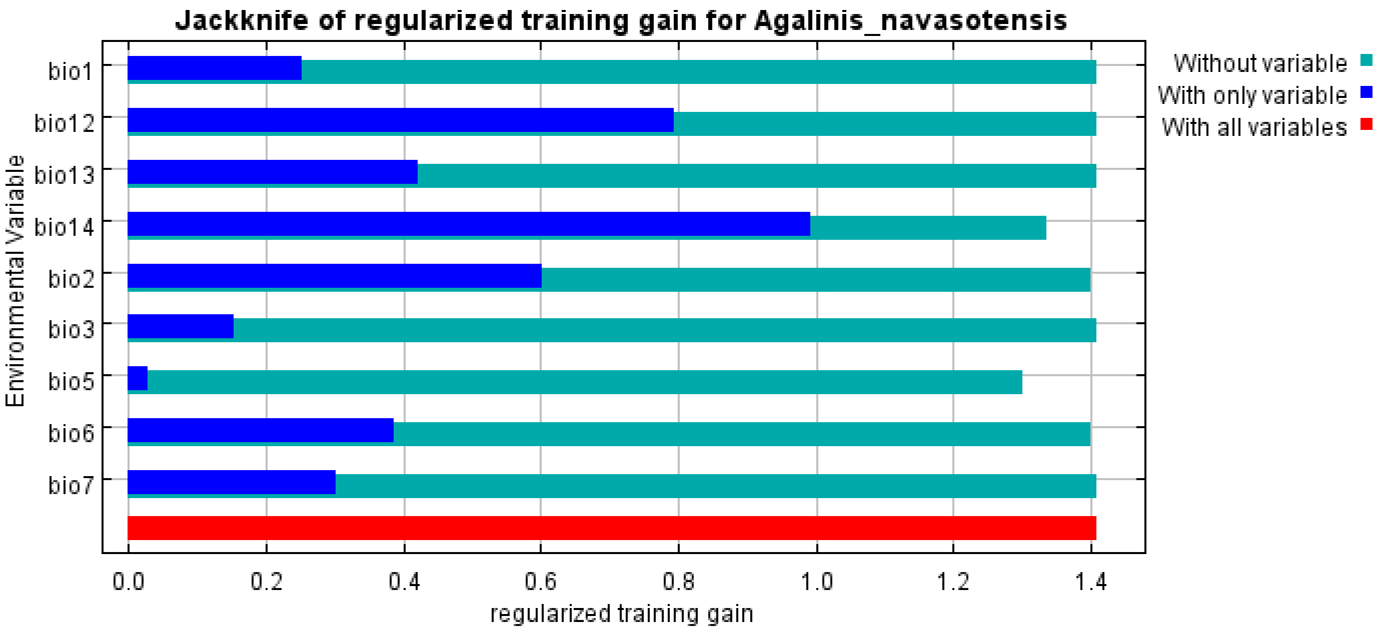


Analysis of variable contributions

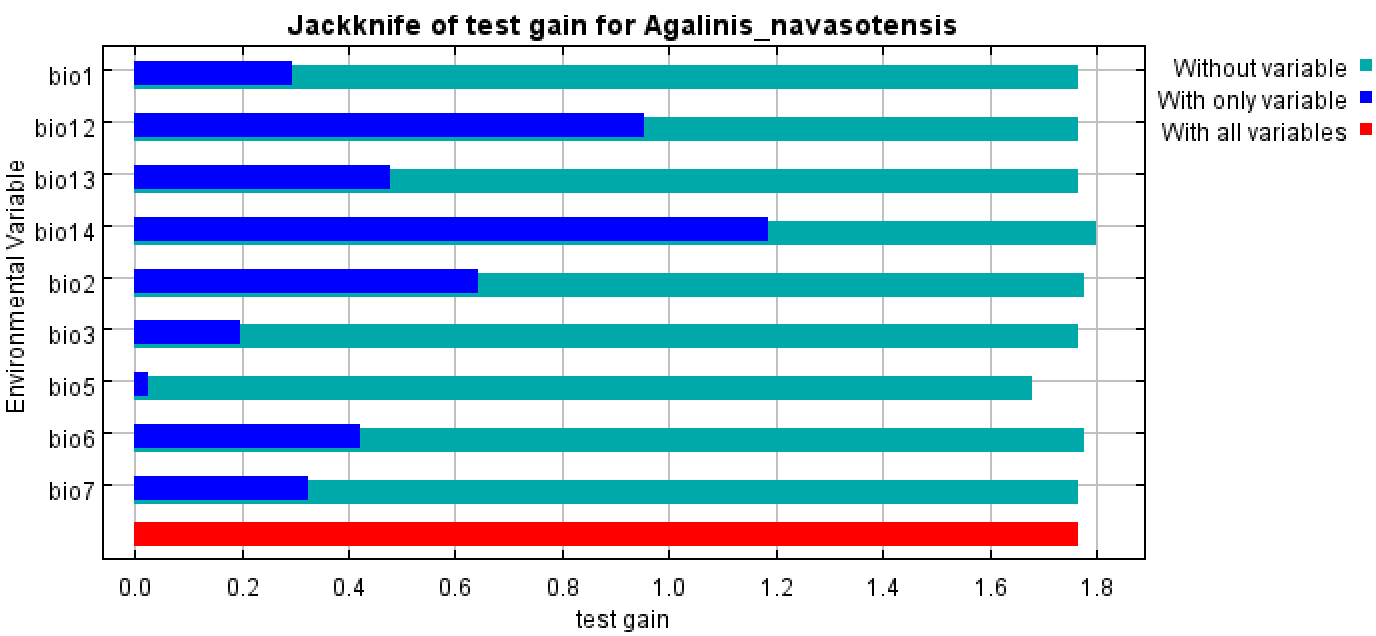
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio14	72.9	76.3
bio6	13.7	4.4
bio5	10.5	13.4
bio1	2.1	0
bio3	0.3	0
bio2	0.3	5.6
bio12	0.2	0.2
bio7	0.1	0.1
bio13	0	0

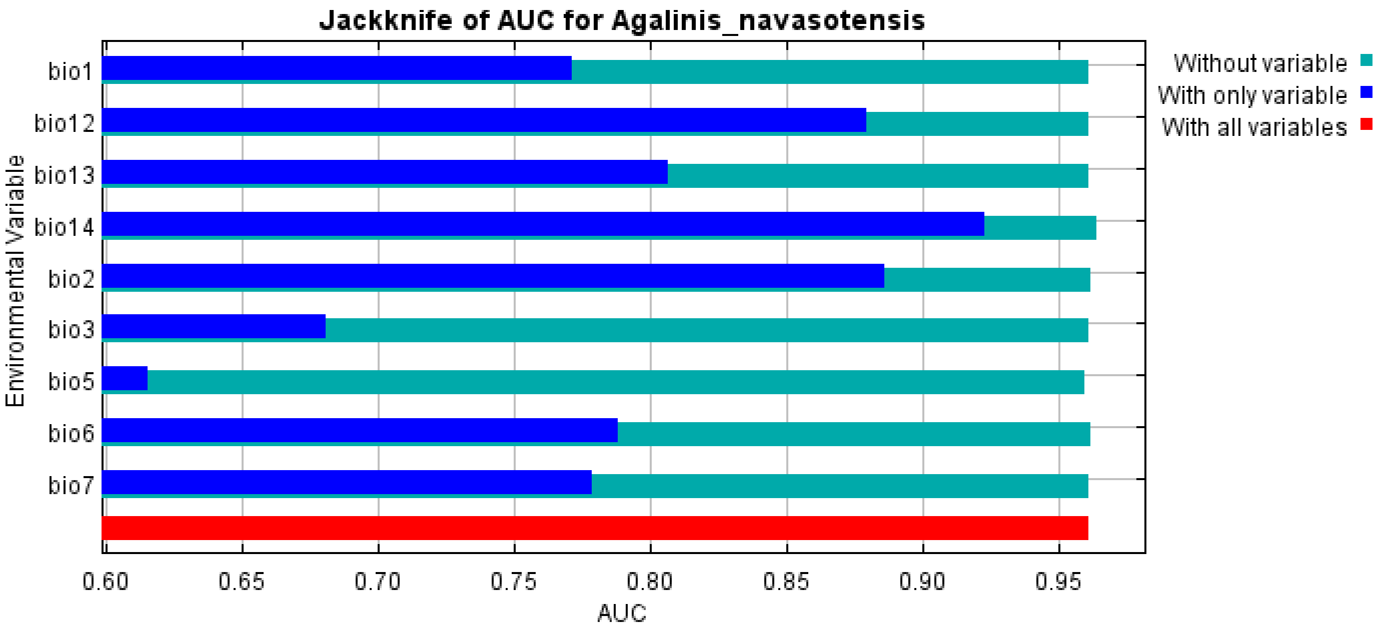
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio14, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio5, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



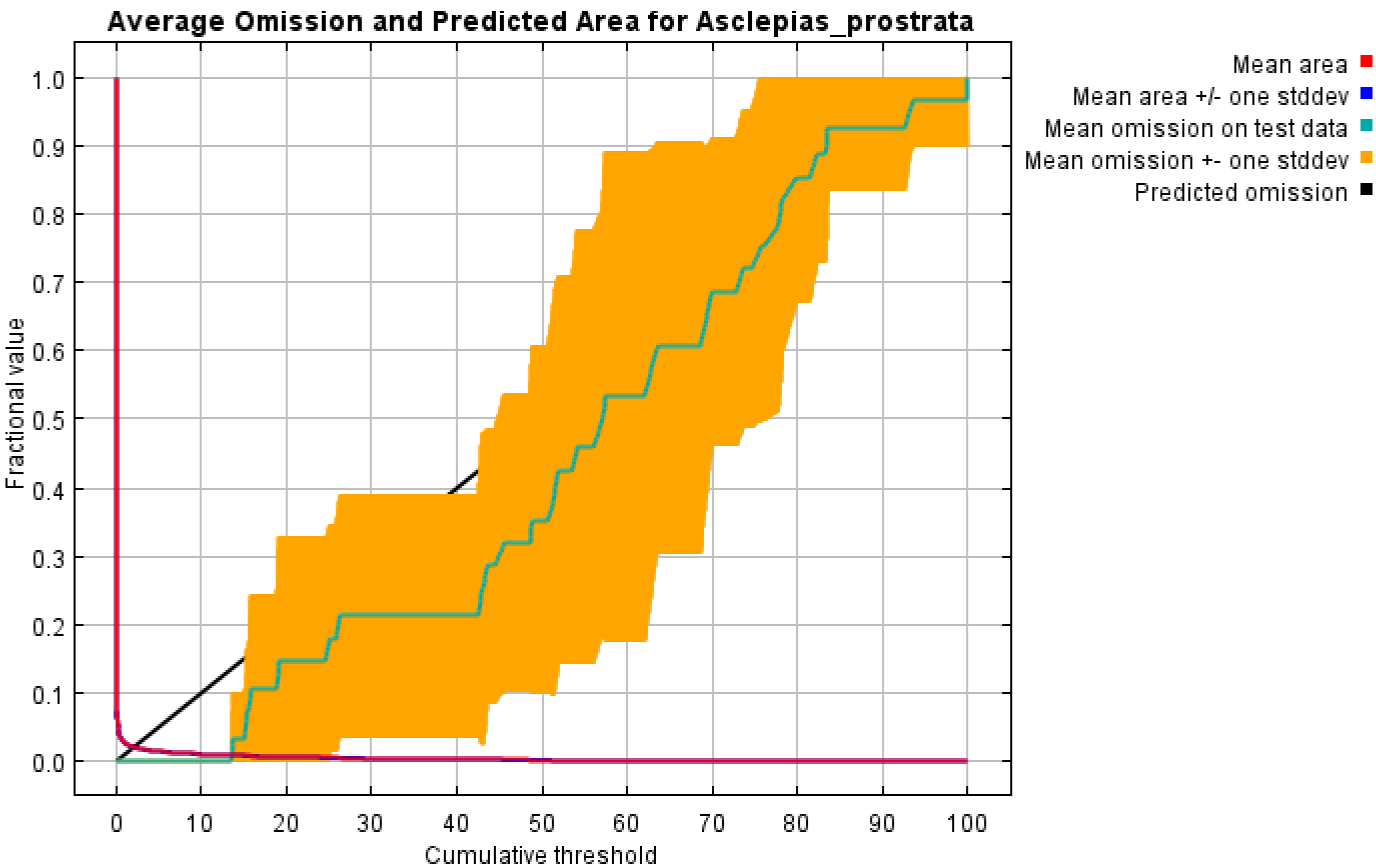
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Agalinis_navasotensis responsecurves jackknife "outputdirectory=E:\TXDoT_Range Scale_Bioclim\CrossVal_Results\1reg\Agalinis" "samplesfile=E:\TXDoT_Range Scale_Bioclim\spp_csv\Agalinis navasotensis obs.csv" "environmentallayers=E:\TXDoT_Range Scale_Bioclim\Ascii" replicates=5 writebackgroundpredictions -N bio0

Replicated maxent model for Asclepias_prostrata

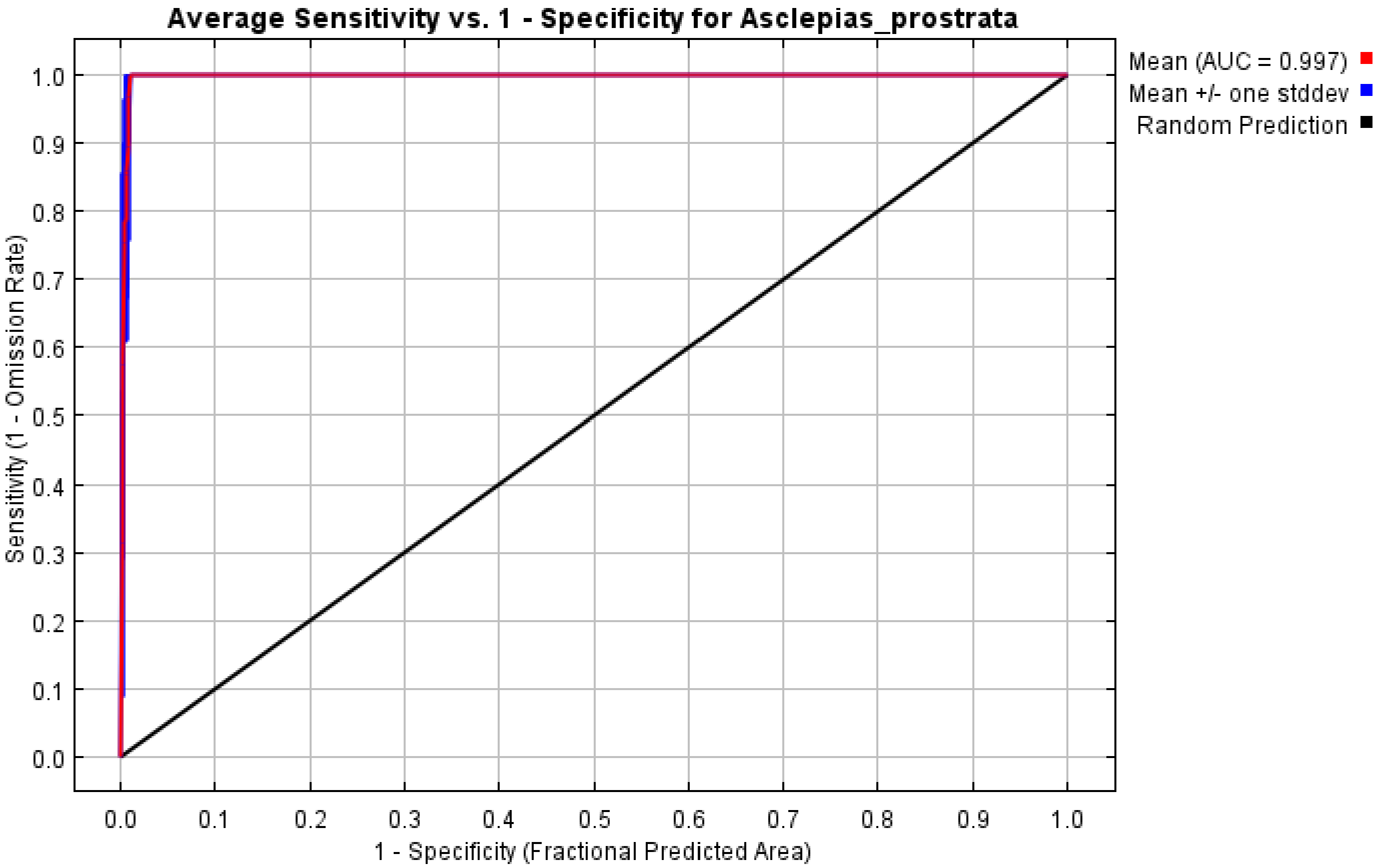
This page summarizes the results of 5-fold cross-validation for Asclepias_prostrata, created Fri Dec 03 20:16:46 CST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4]

Analysis of omission/commission

The following picture shows the test omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs. The omission rate should be close to the predicted omission, because of the definition of the cumulative threshold.

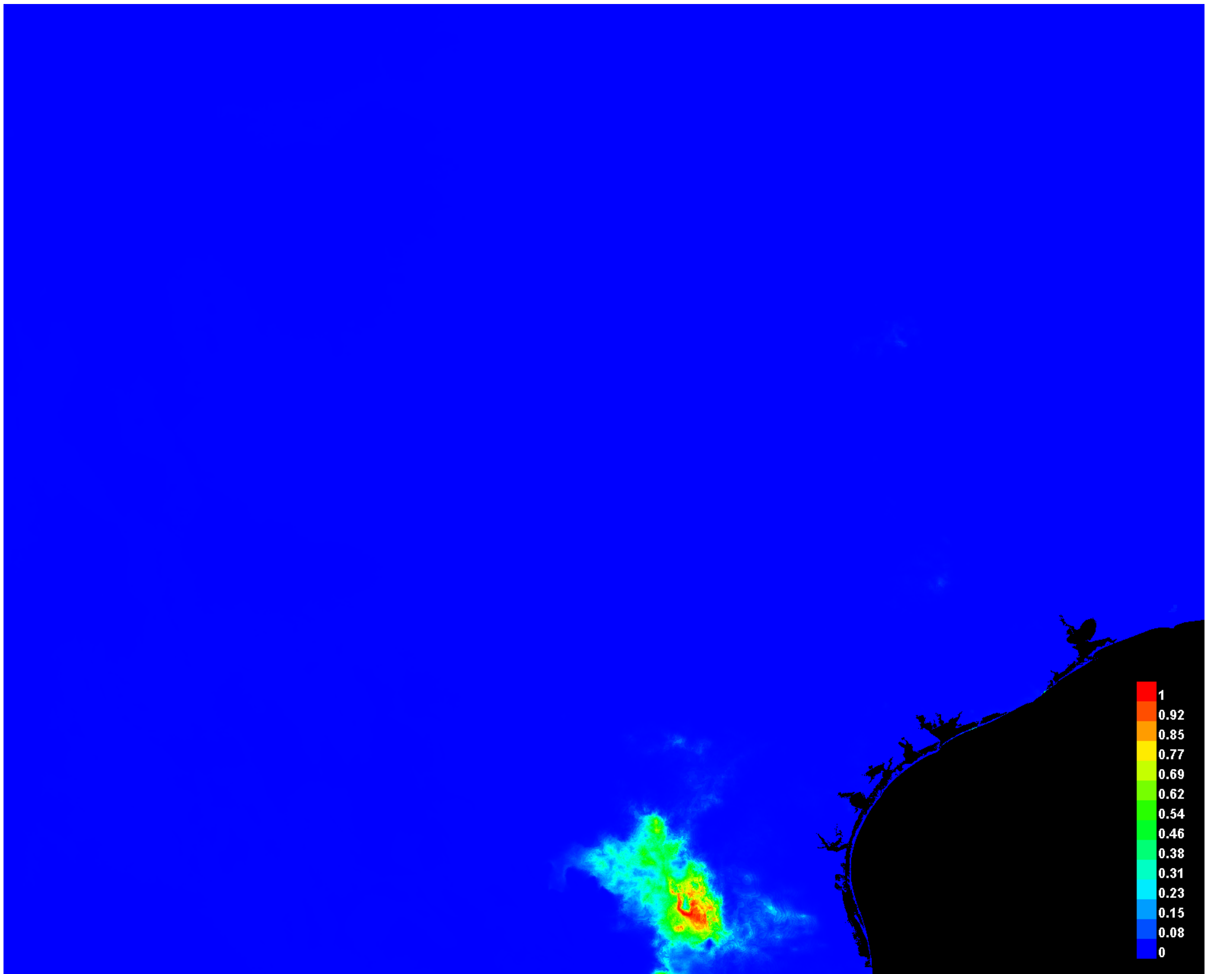


The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average test AUC for the replicate runs is 0.997, and the standard deviation is 0.001.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 5 output grids. Other available summary grids are min, max and median.


1
0.92
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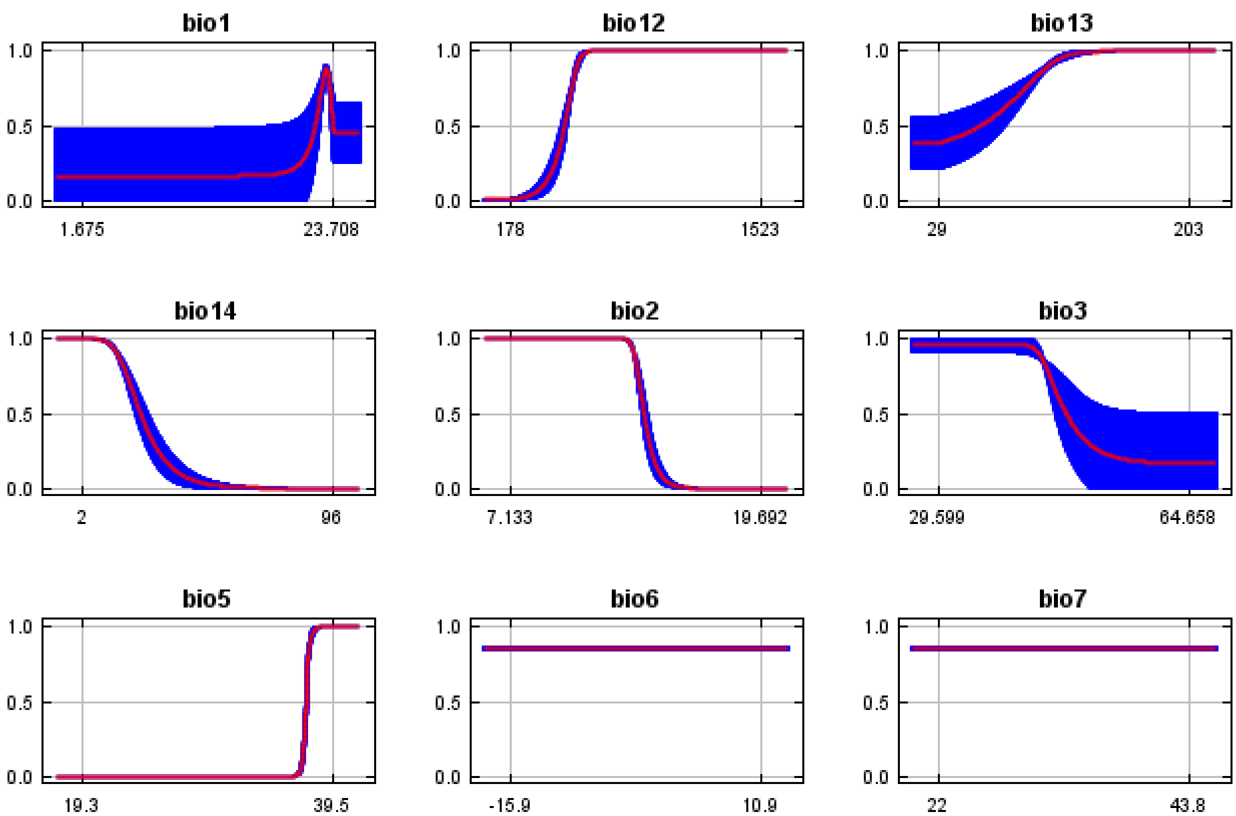
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

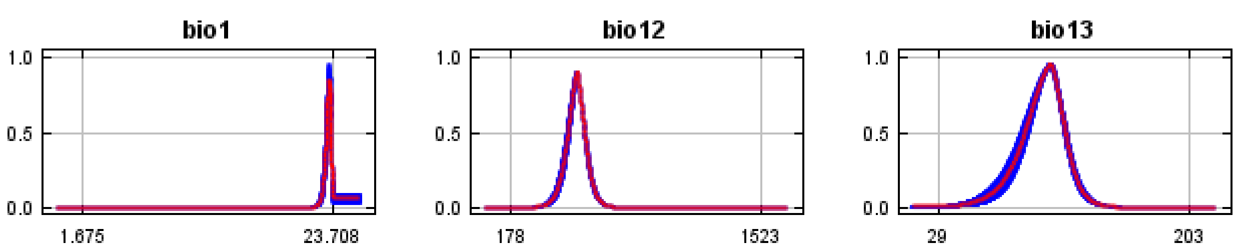

1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

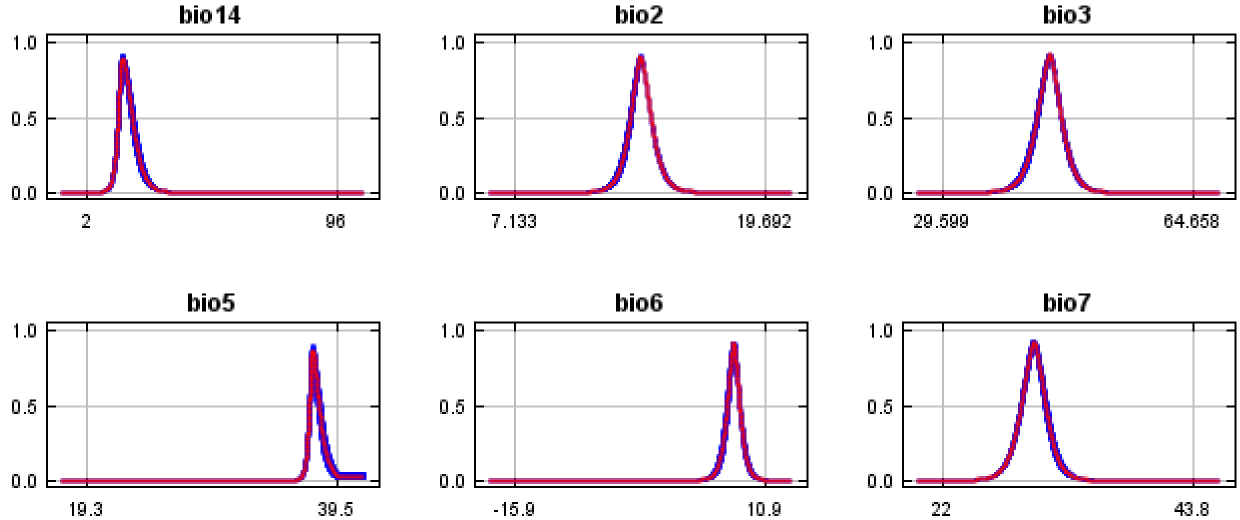
Response curves

These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 5 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).



In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.



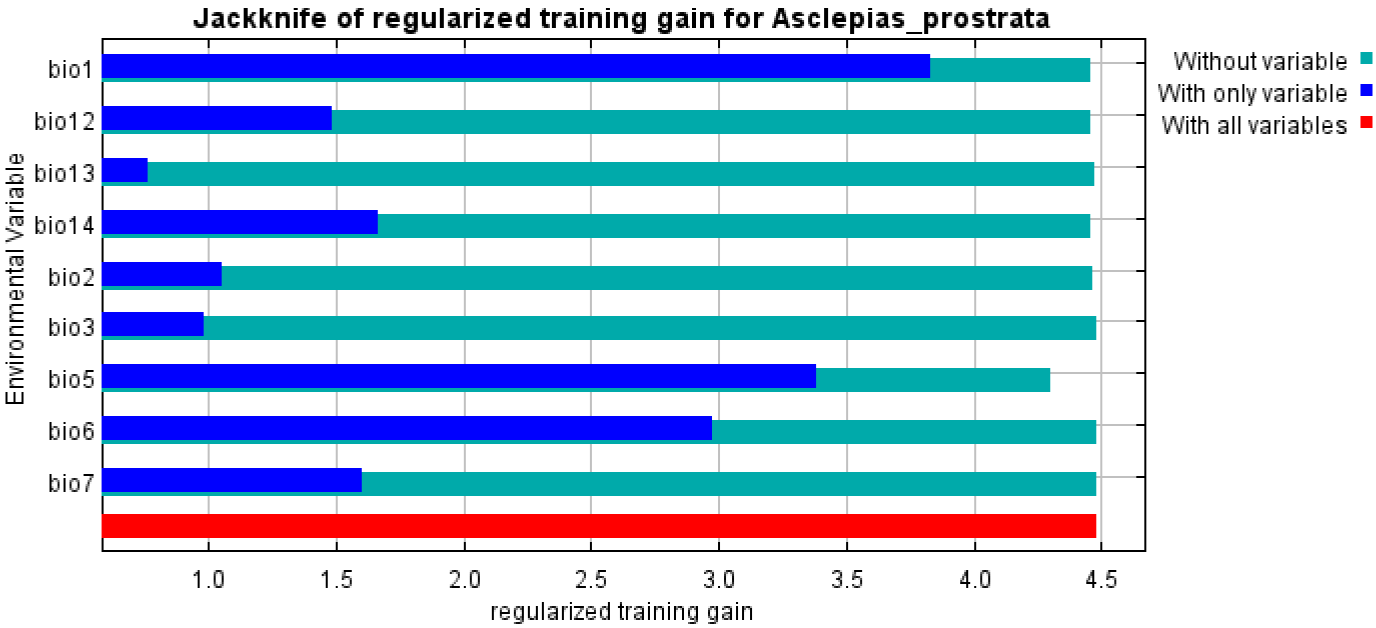


Analysis of variable contributions

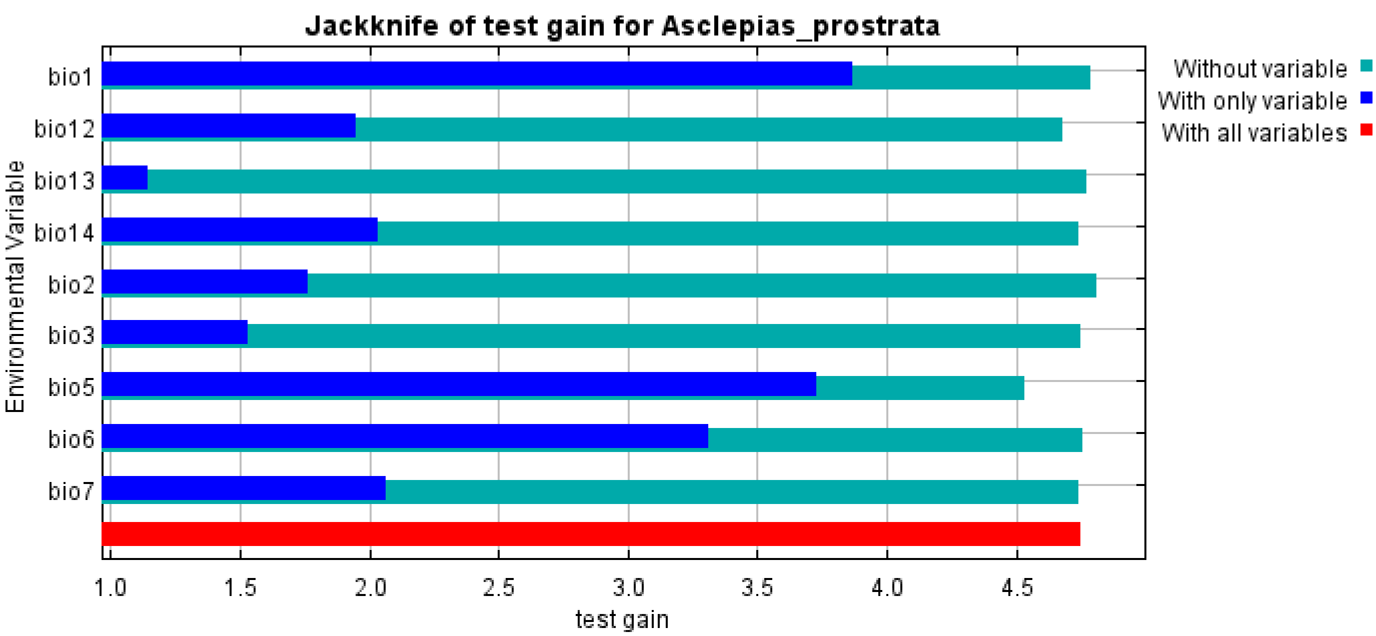
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio1	87.8	10
bio5	5.9	65.3
bio7	2.4	0
bio13	1.6	0.5
bio3	0.7	0.7
bio14	0.5	9.3
bio2	0.4	10.5
bio12	0.4	3.7
bio6	0.2	0

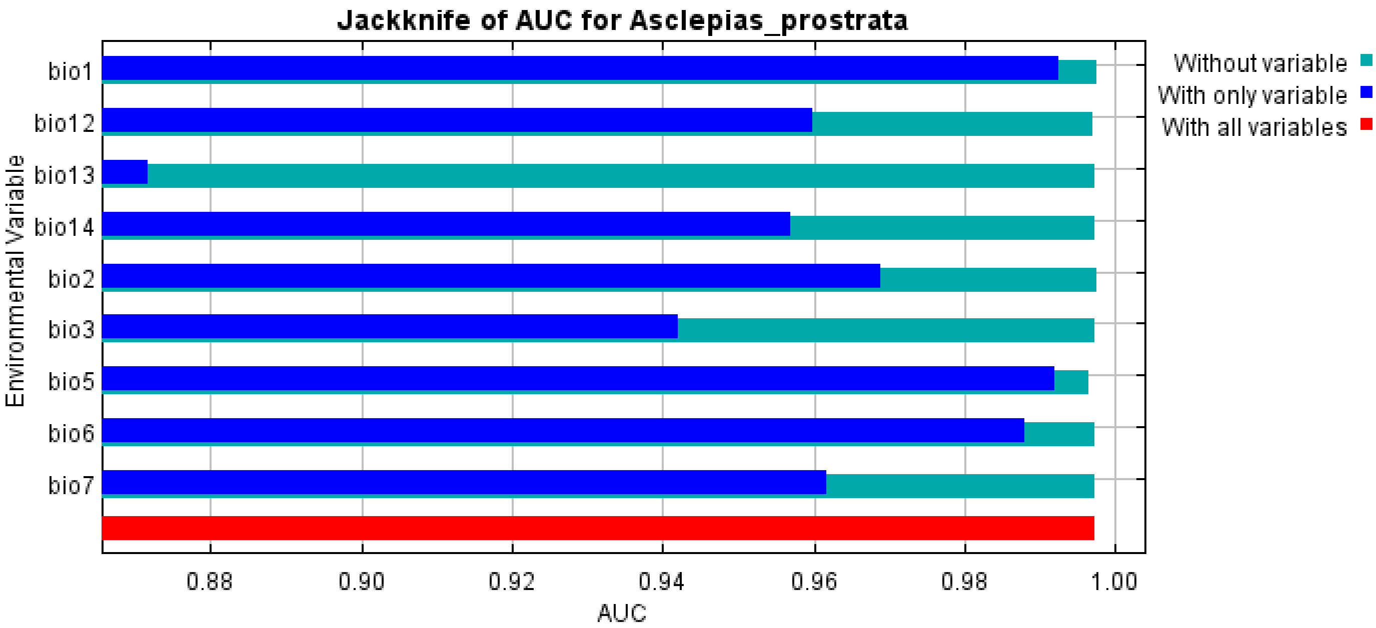
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio1, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio5, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



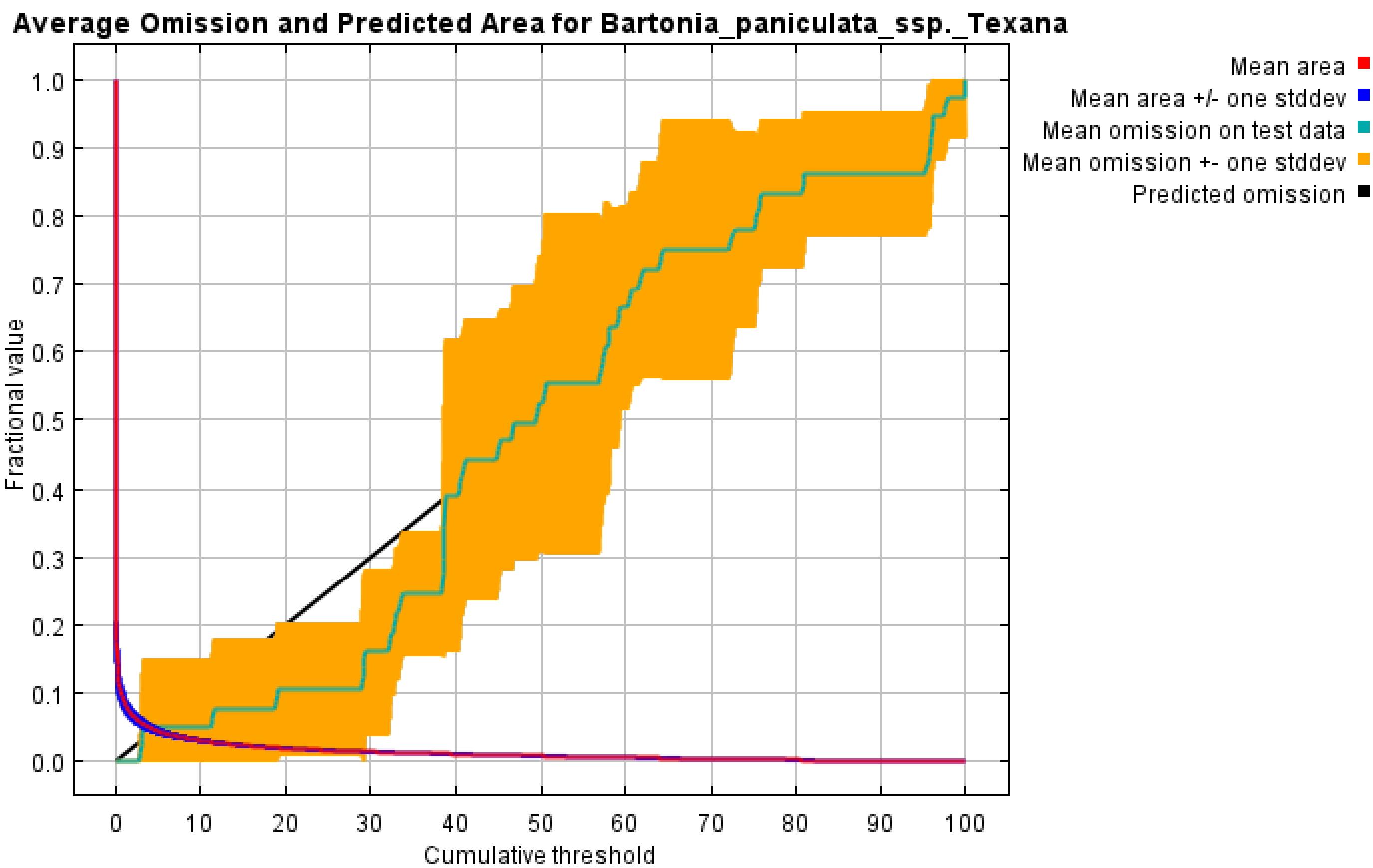
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Asclepias_prostrata responsecurves jackknife "outputdirectory=E:\TXDoT_Range Scale_Bioclim\CrossVal_Results\1reg\Aclepias" "samplesfile=E:\TXDoT_Range Scale_Bioclim\spp_csv\Asclepias prostrata obs.csv" "environmentallayers=E:\TXDoT_Range Scale_Bioclim\Ascii" replicates=5 writebackgroundpredictions -N bio0

Replicated maxent model for Bartonia_paniculata_ssp._Texana

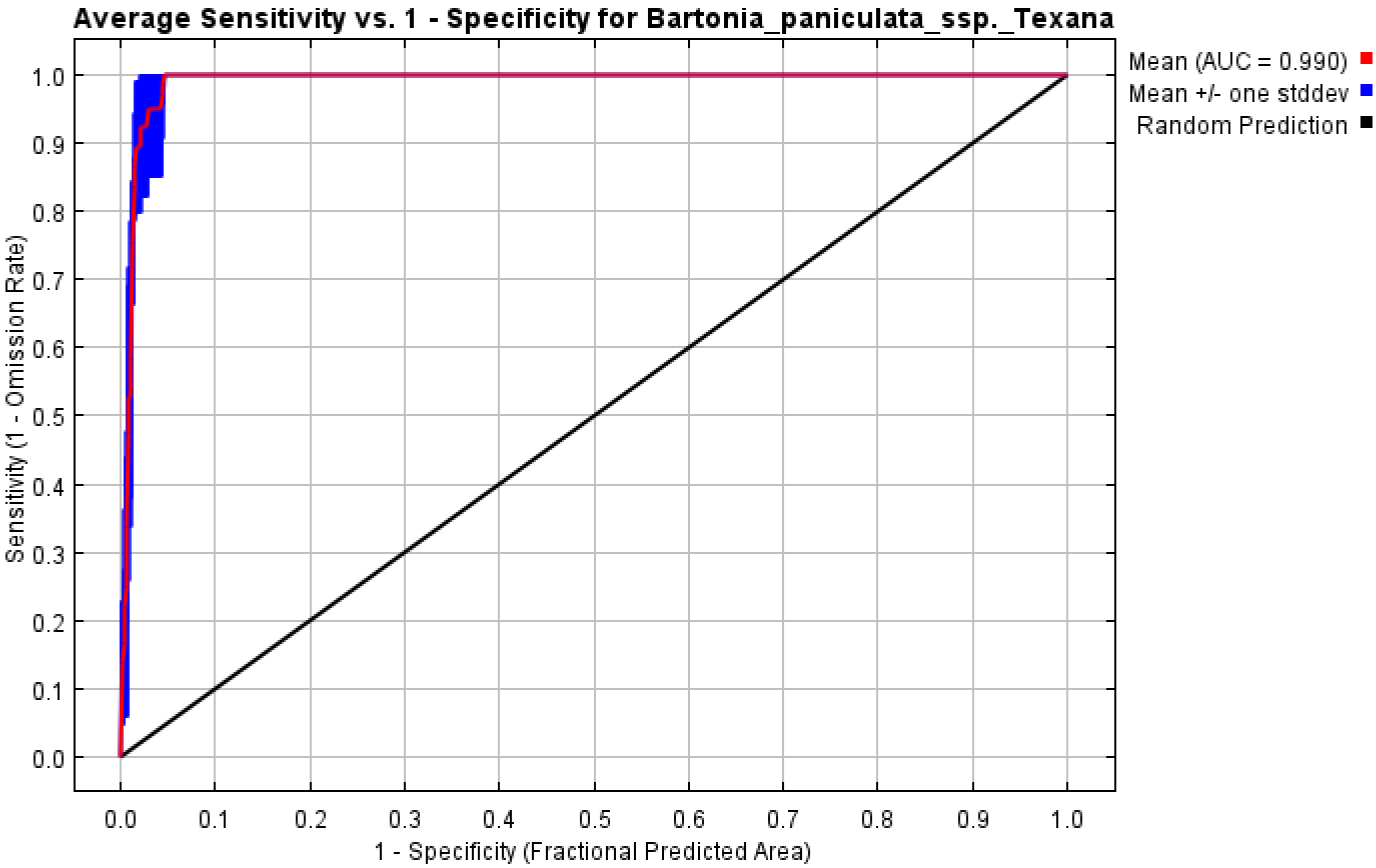
This page summarizes the results of 5-fold cross-validation for Bartonia_paniculata_ssp._Texana, created Fri Dec 03 20:25:15 CST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4]

Analysis of omission/commission

The following picture shows the test omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs. The omission rate should be close to the predicted omission, because of the definition of the cumulative threshold.

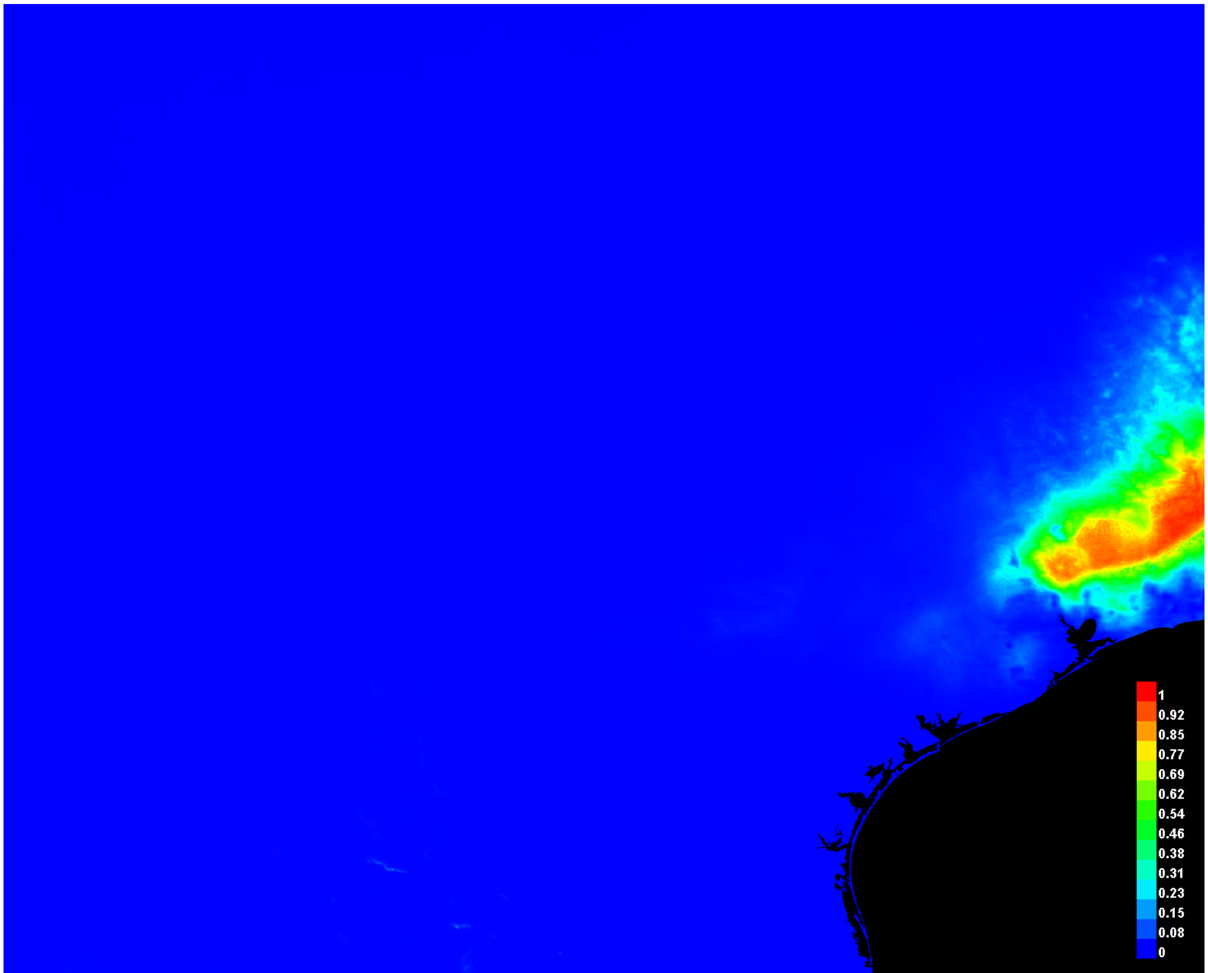


The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average test AUC for the replicate runs is 0.990, and the standard deviation is 0.003.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 5 output grids. Other available summary grids are min, max and median.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0.92
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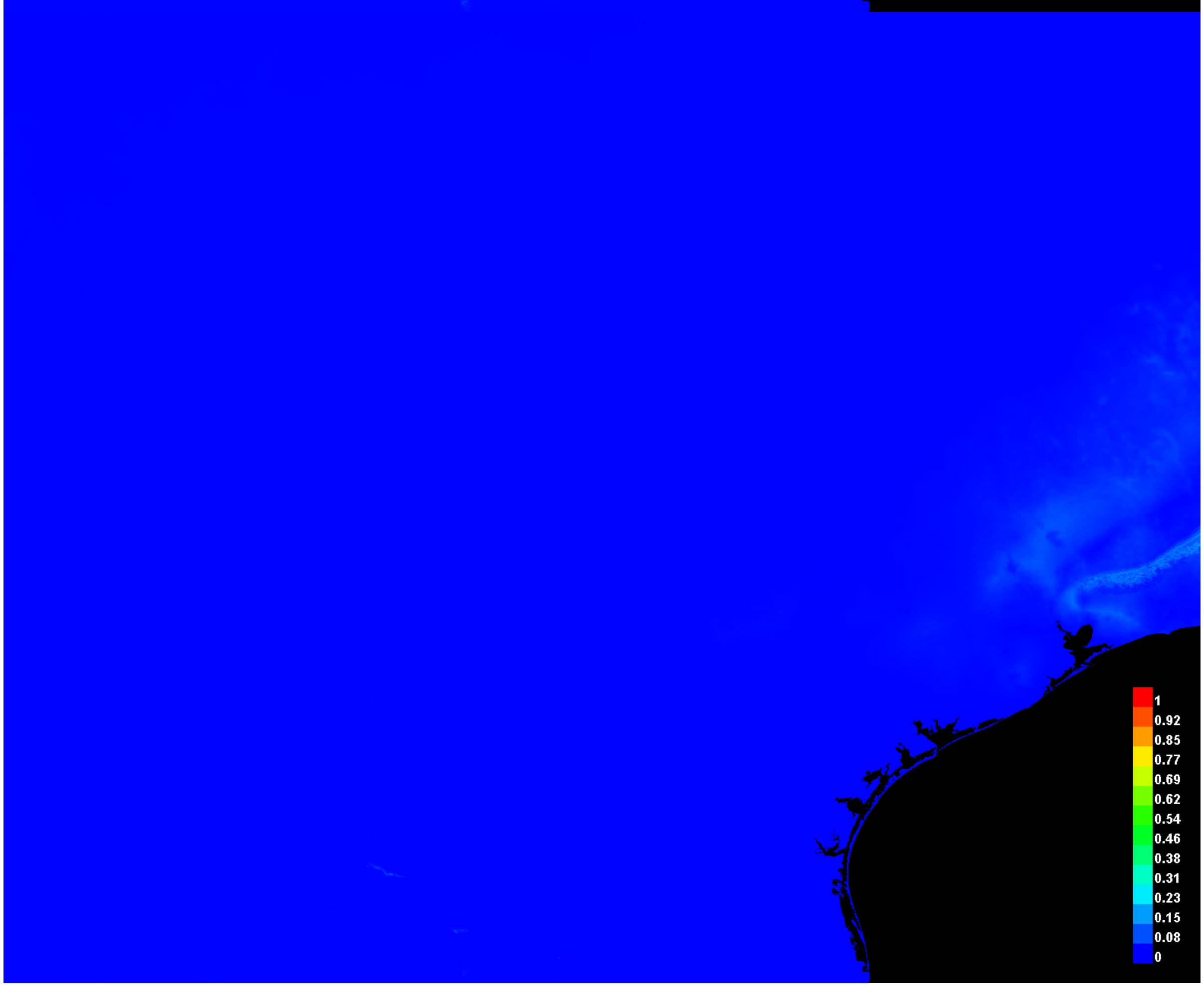
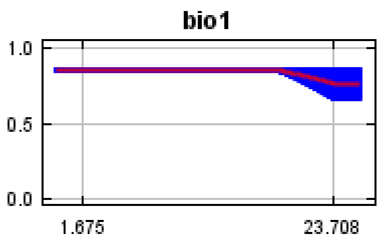
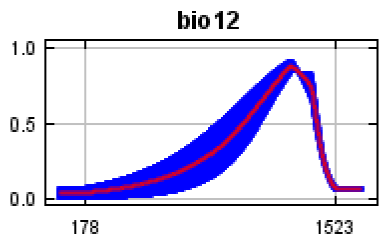
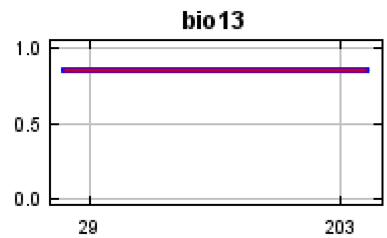

1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

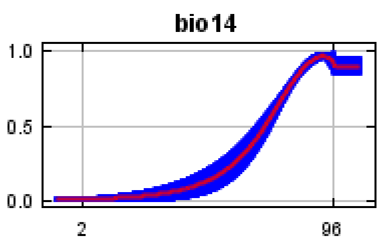
Response curves

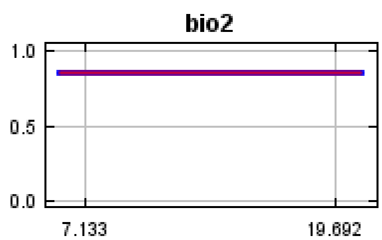
These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 5 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).

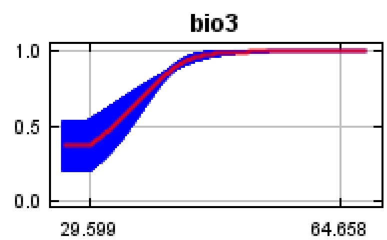


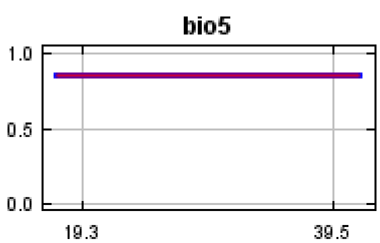


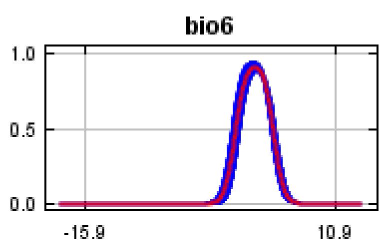


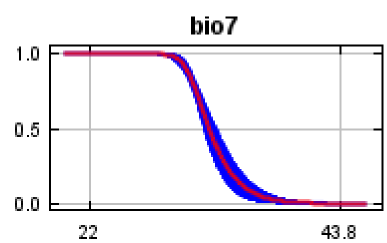




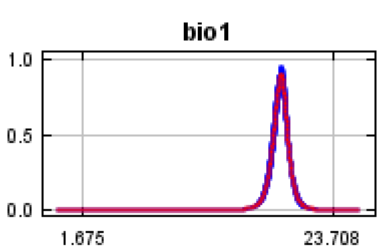


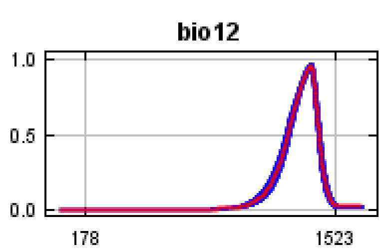


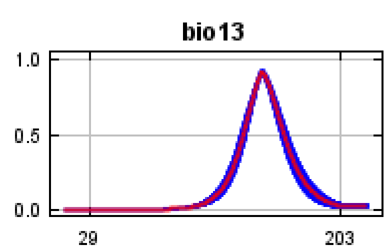


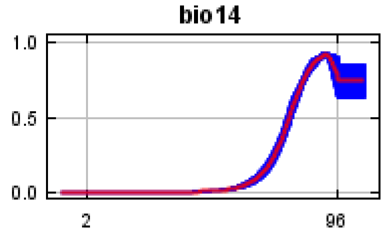


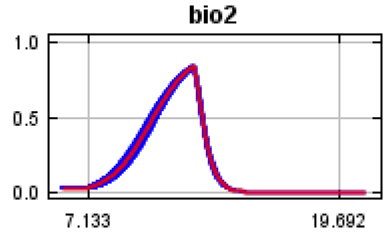
In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.

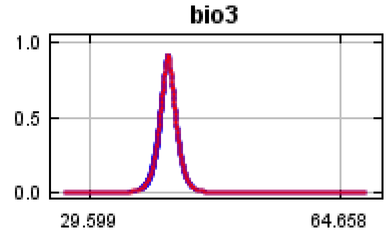


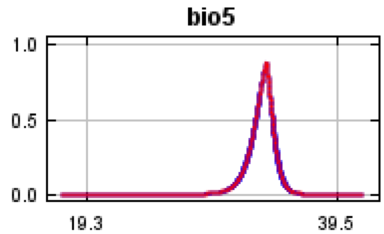


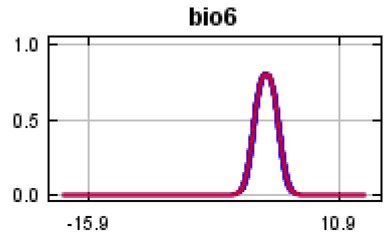


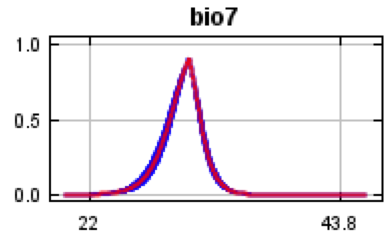










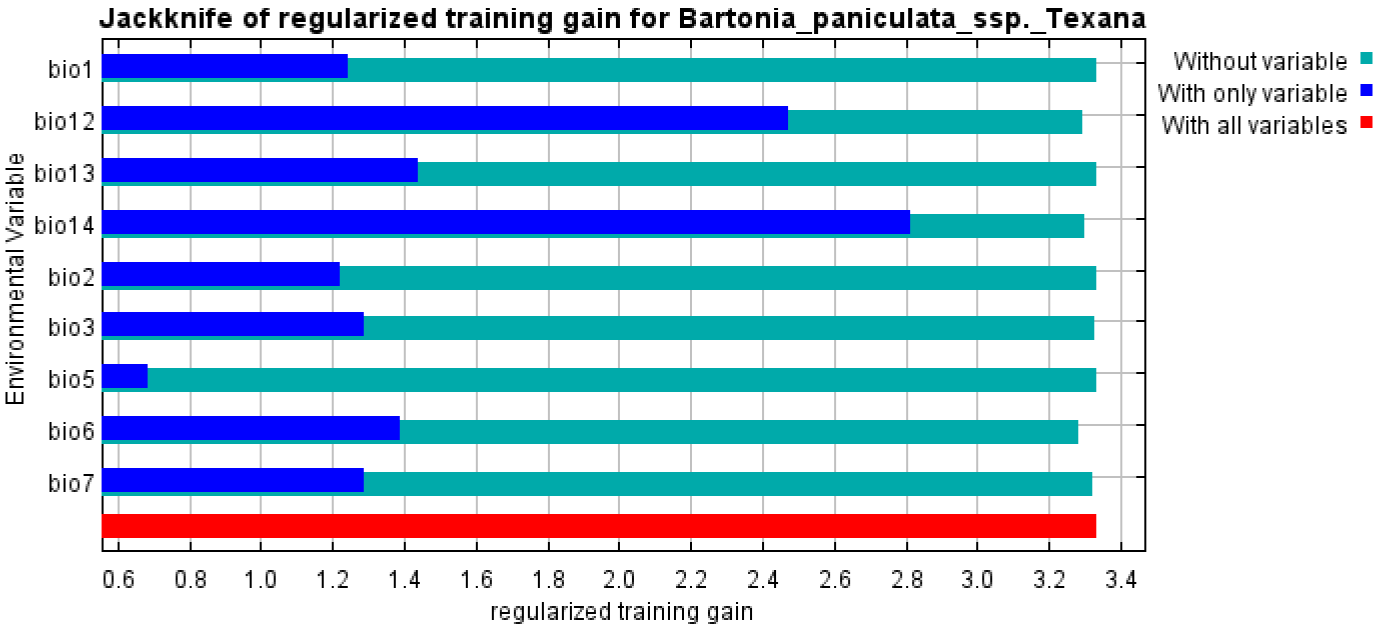


Analysis of variable contributions

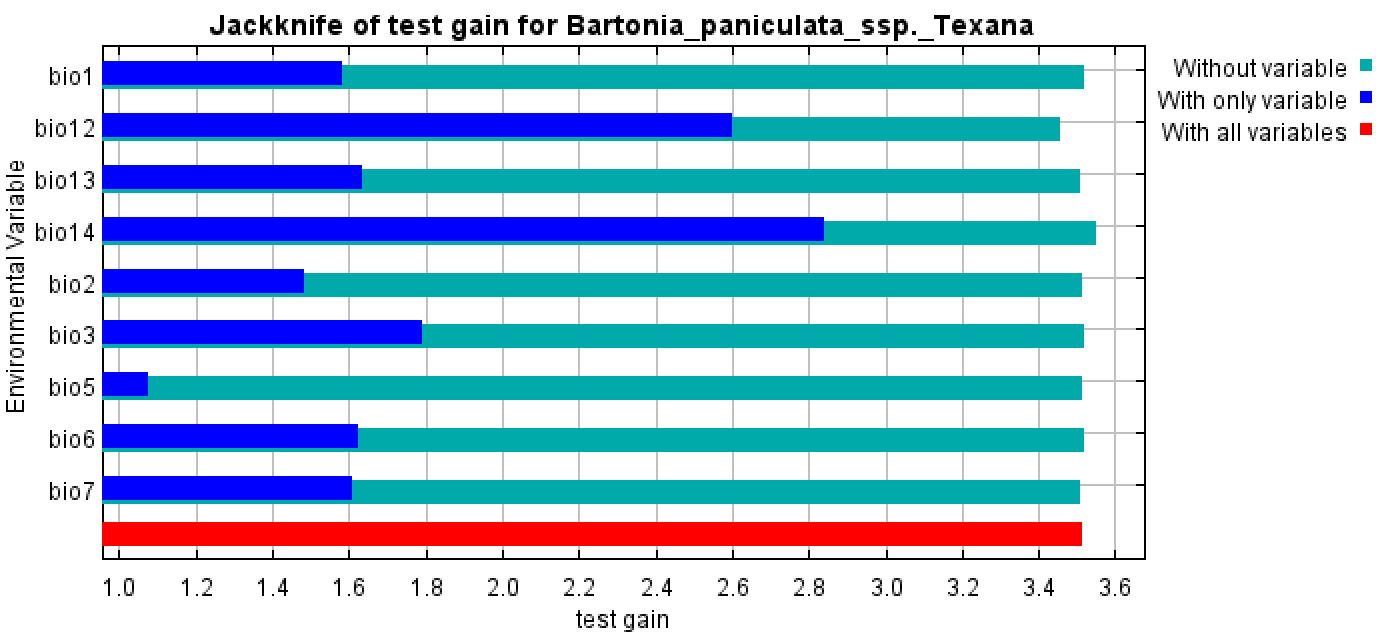
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio14	79.5	21.3
bio3	9.3	1.2
bio12	7.2	9.1
bio7	1.5	10.6
bio1	1.3	0
bio6	1.1	57.8
bio2	0	0
bio5	0	0
bio13	0	0

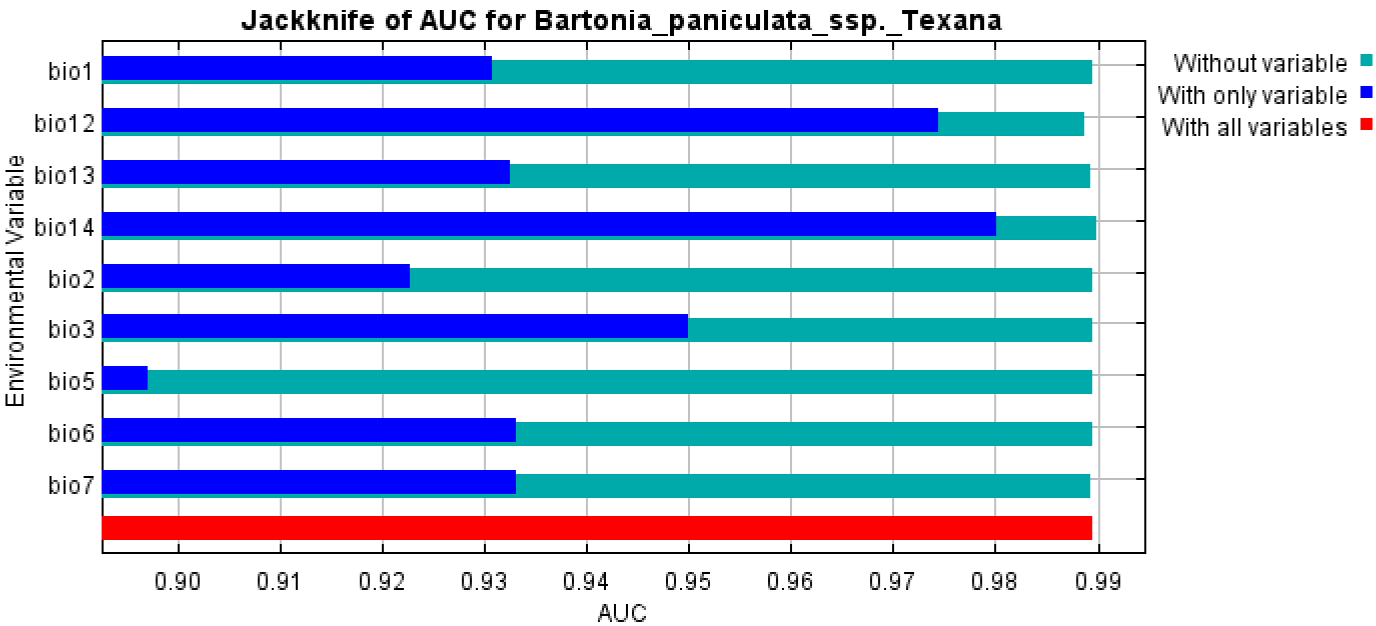
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio14, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio6, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



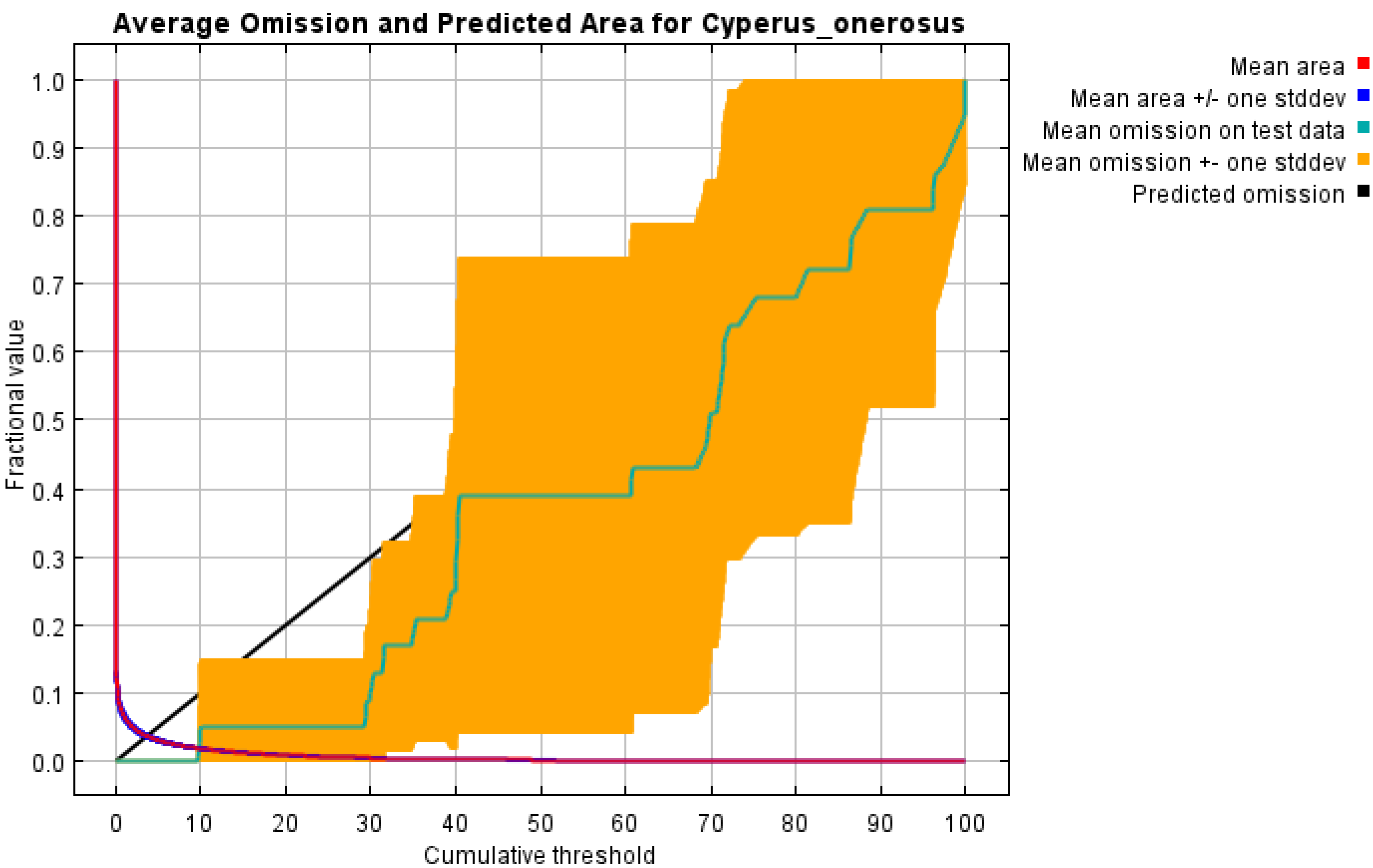
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Bartonia_paniculata_ssp._Texana responsecurves jackknife "outputdirectory=E:\TXDoT_Range Scale_Bioclim\CrossVal_Results\1reg\Bartonia" "samplesfile=E:\TXDoT_Range Scale_Bioclim\spp_csv\Bartonia texana obs.csv" "environmentallayers=E:\TXDoT_Range Scale_Bioclim\Ascii" replicates=5 writebackgroundpredictions -N bio0

Replicated maxent model for Cyperus_onerosus

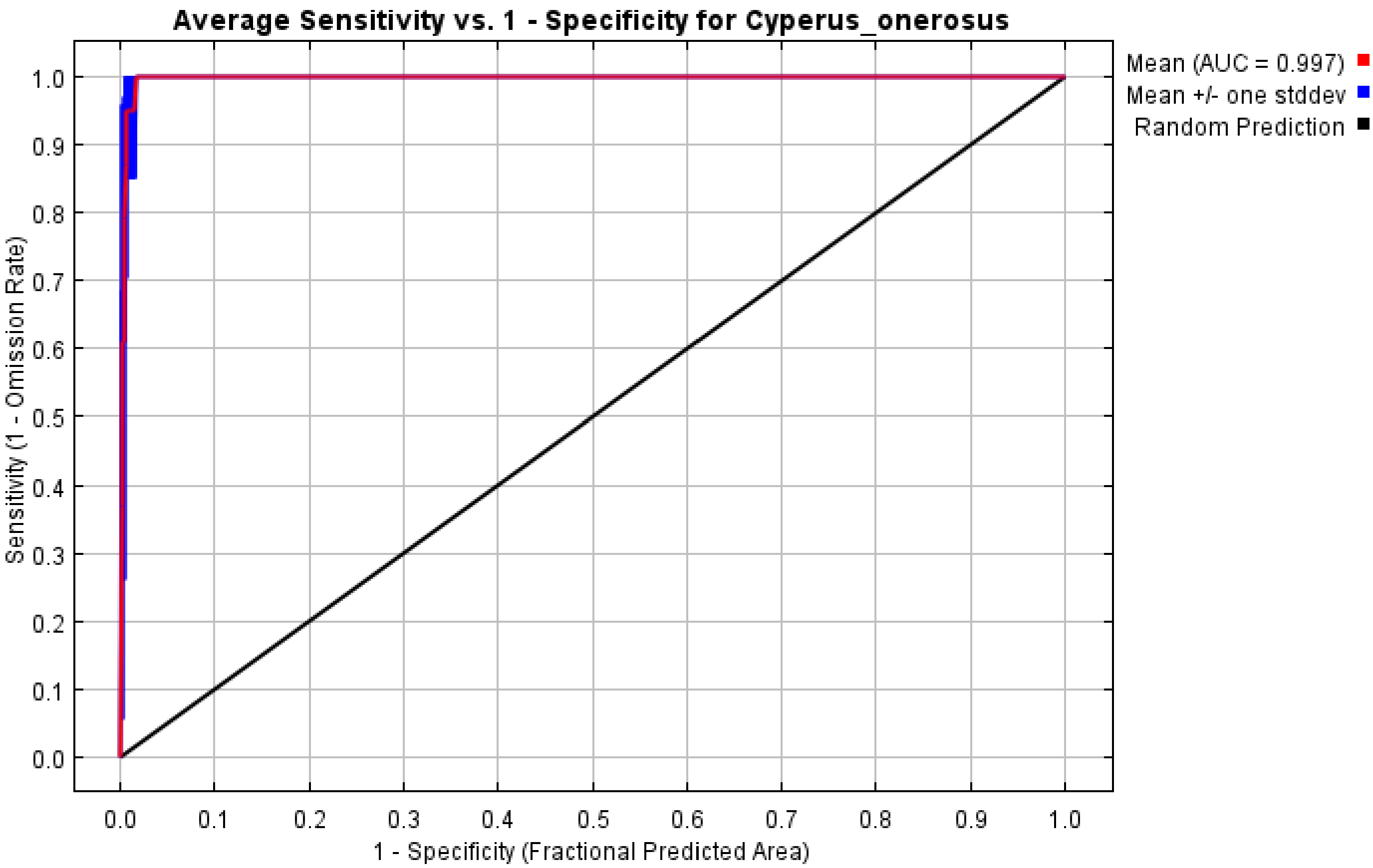
This page summarizes the results of 5-fold cross-validation for Cyperus_onerosus, created Fri Dec 03 20:29:40 CST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4]

Analysis of omission/commission

The following picture shows the test omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs. The omission rate should be close to the predicted omission, because of the definition of the cumulative threshold.

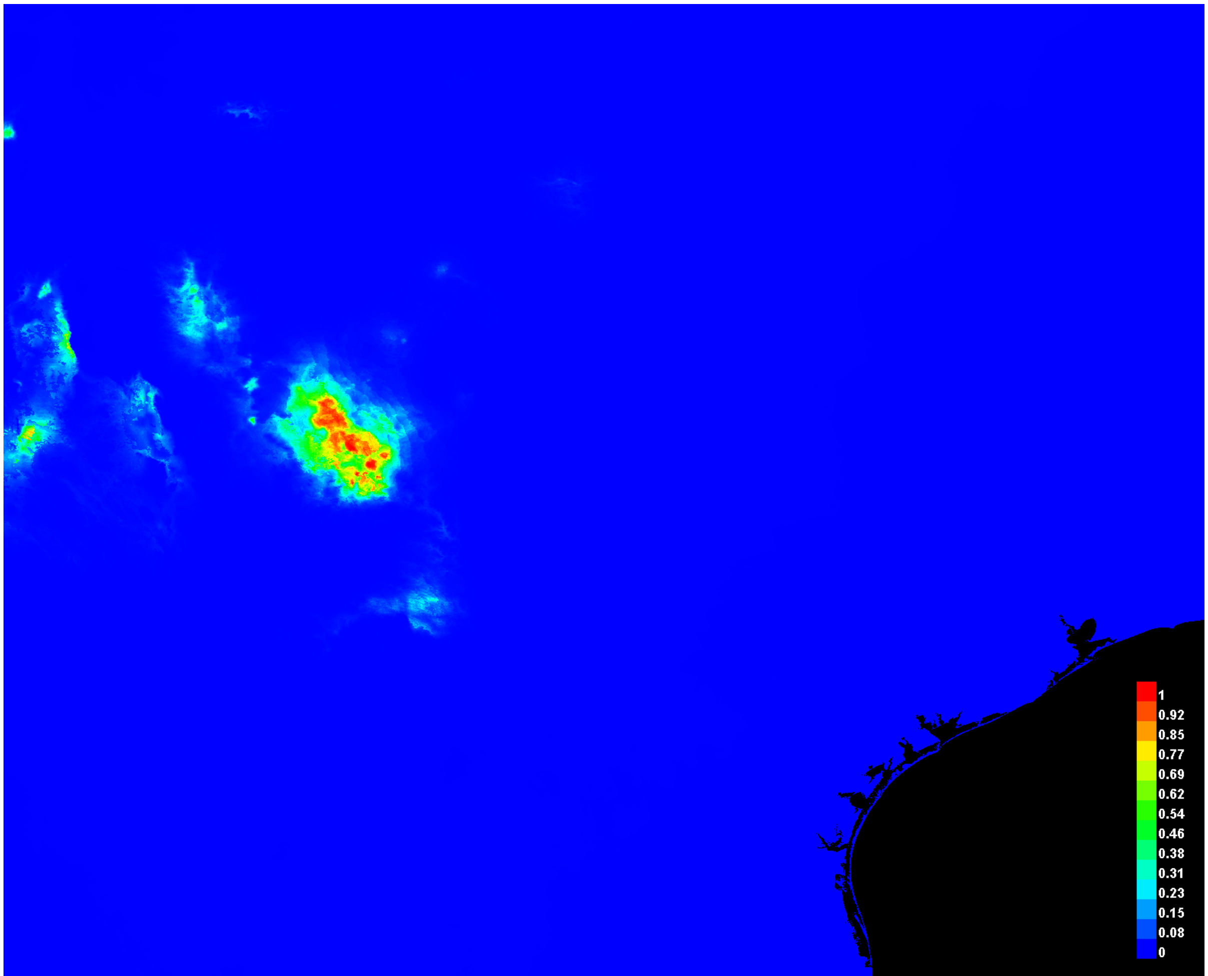


The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average test AUC for the replicate runs is 0.997, and the standard deviation is 0.002.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 5 output grids. Other available summary grids are min, max and median.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0.38
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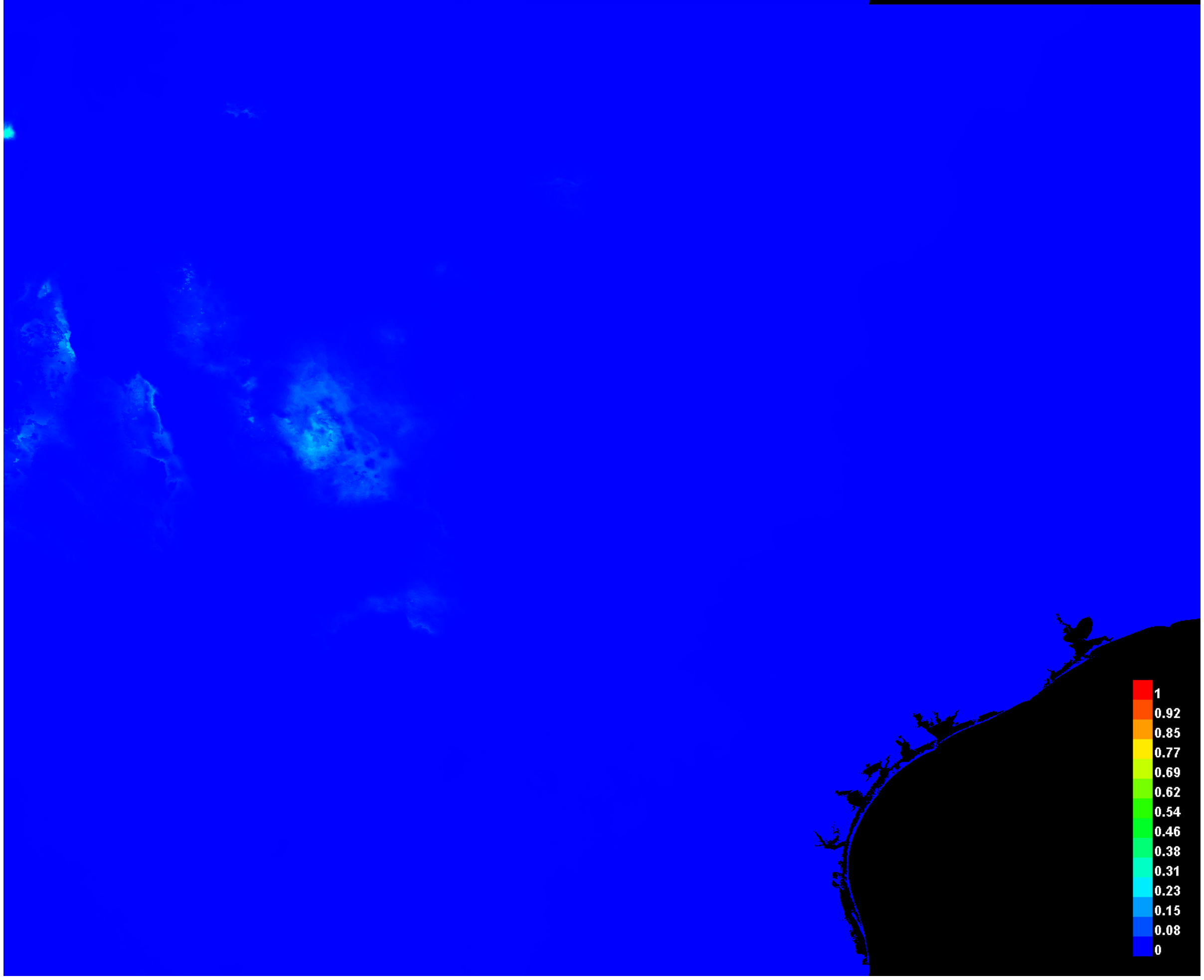
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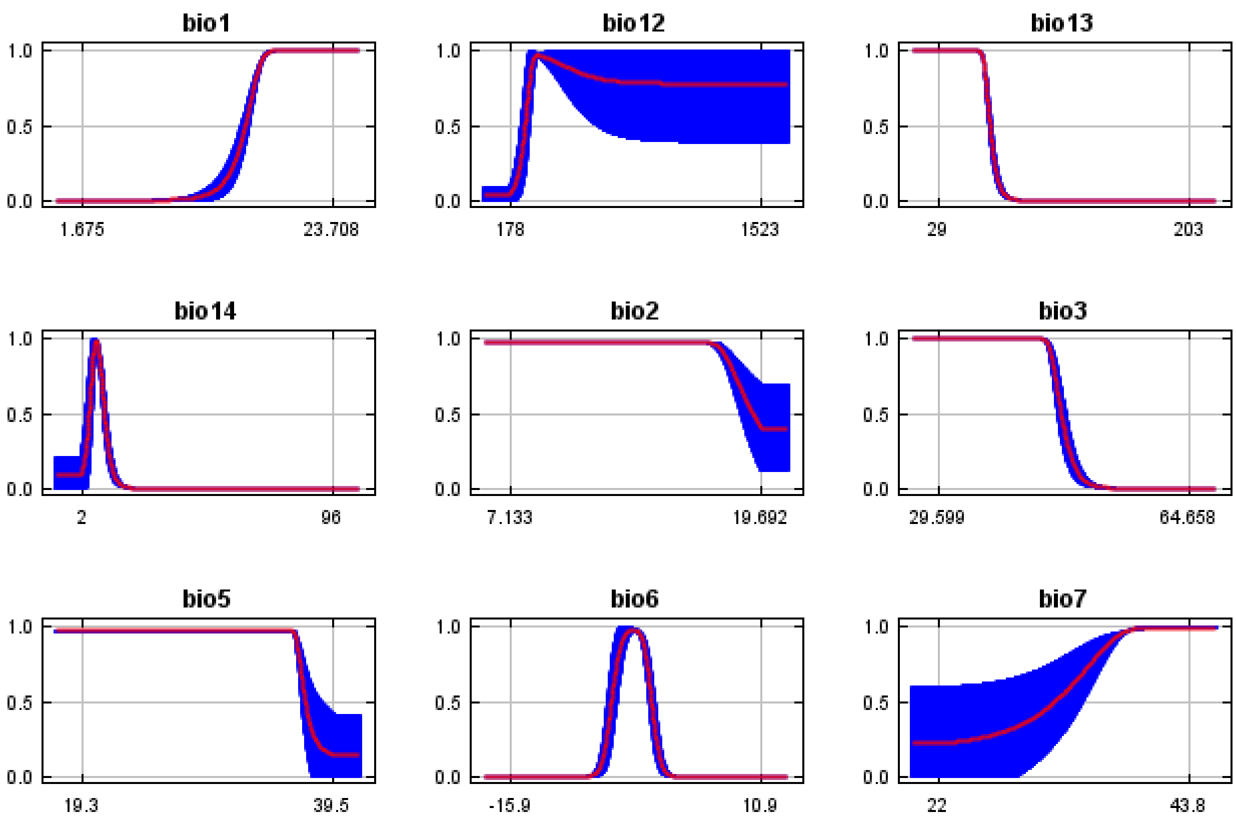
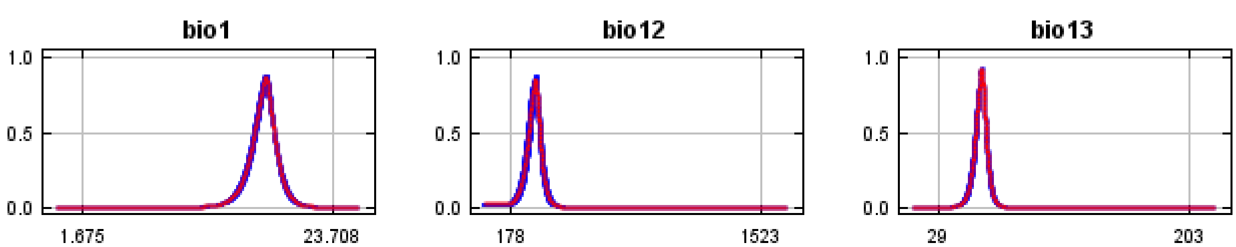
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

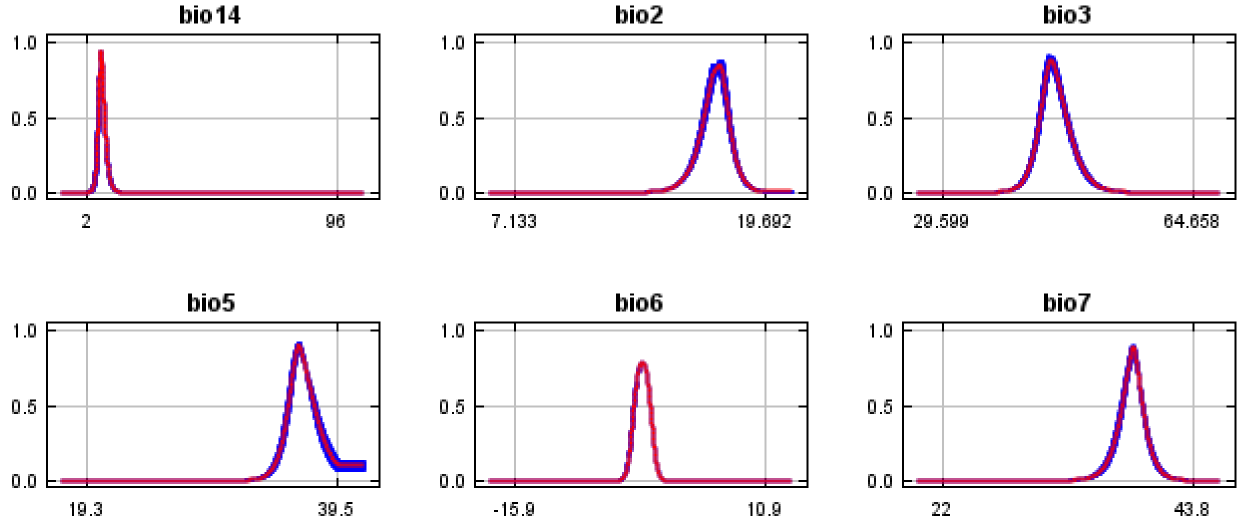
Response curves

These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 5 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).



In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.



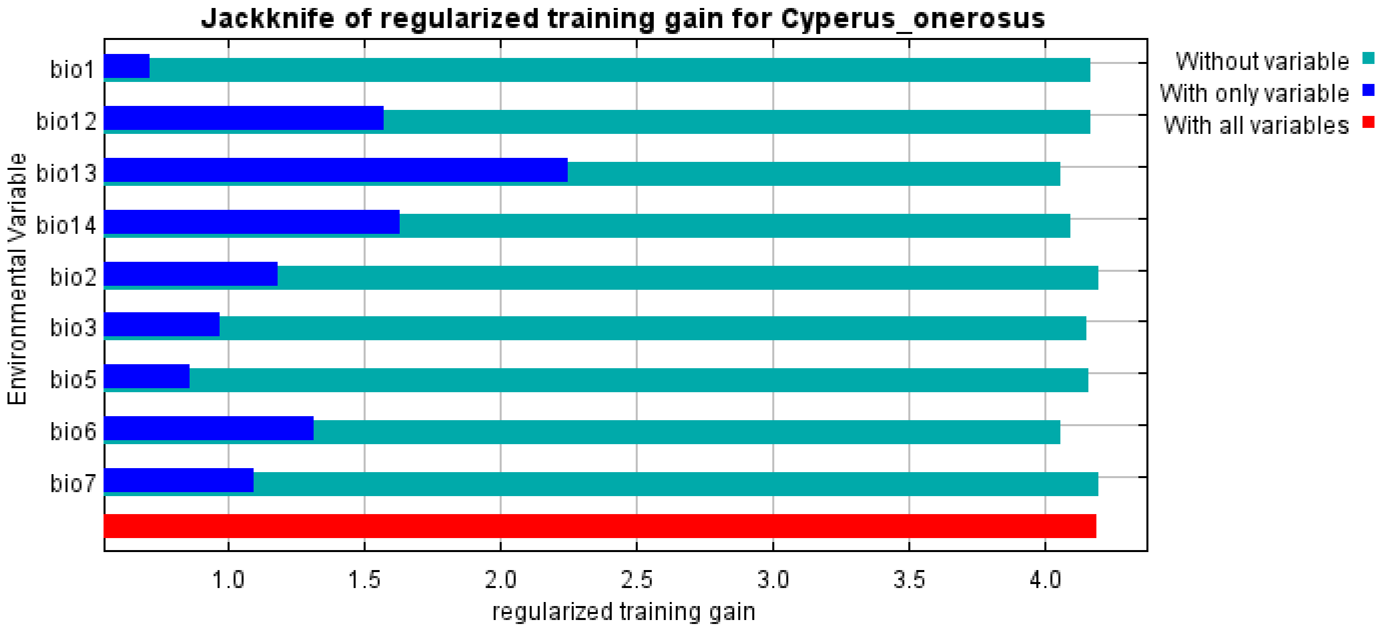


Analysis of variable contributions

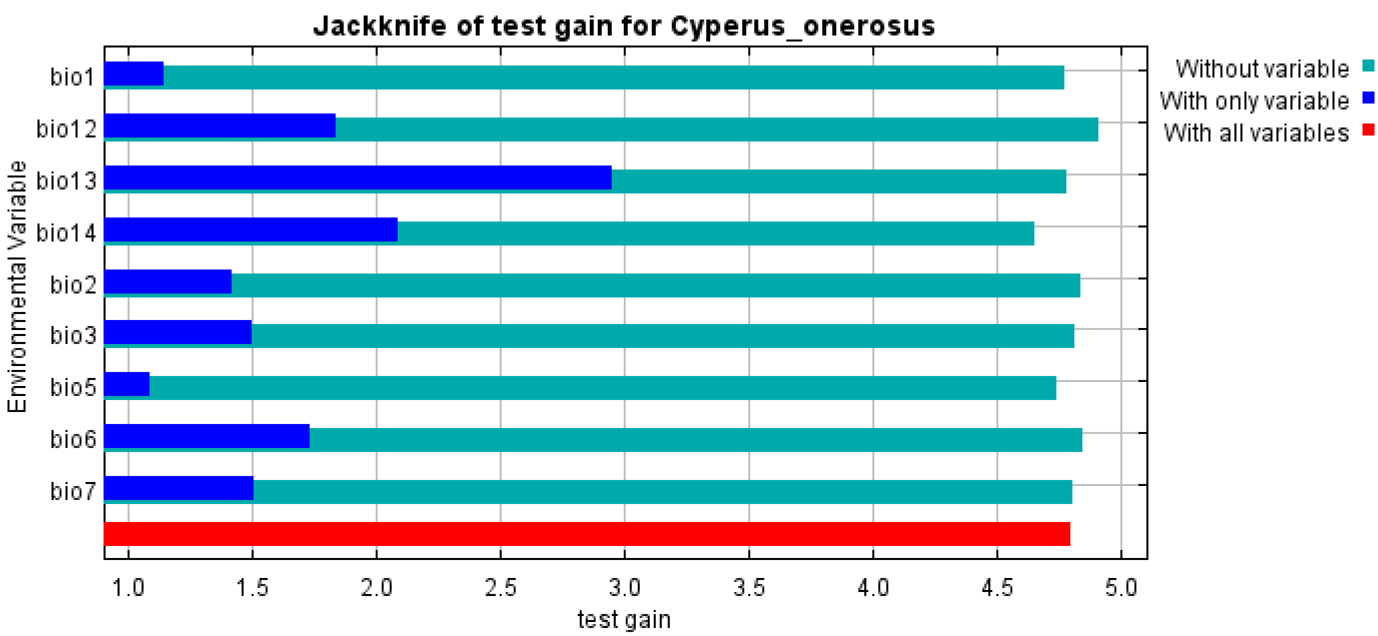
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio12	24.8	0.7
bio13	13.6	37.3
bio7	12.2	0.2
bio5	12	0.1
bio14	11	23.6
bio2	10.7	0.1
bio6	8.7	26.4
bio1	6.3	6.1
bio3	0.8	5.5

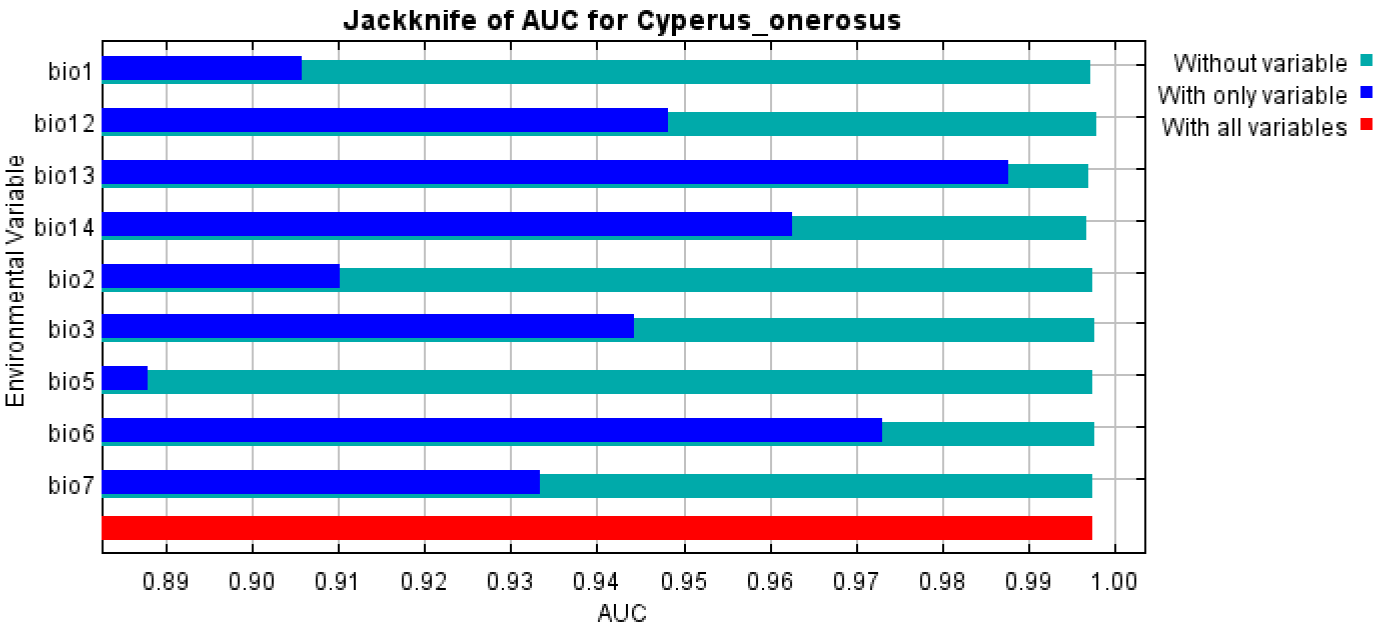
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio13, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio13, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



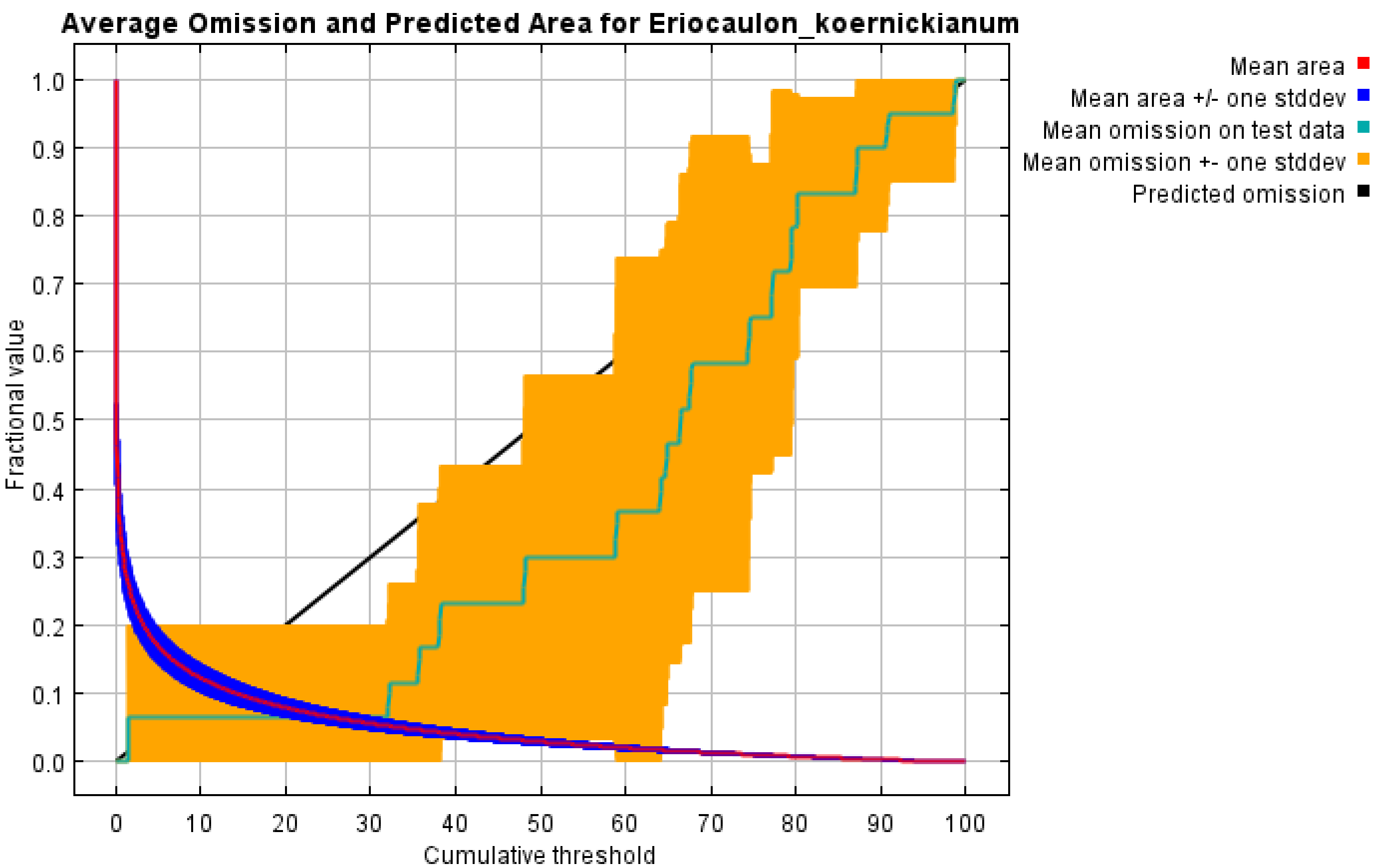
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Cyperus_onerosus responsecurves jackknife "outputdirectory=E:\TXDoT_Range Scale_Bioclim\CrossVal_Results\1reg\Cyperus" "samplesfile=E:\TXDoT_Range Scale_Bioclim\spp_csv\Cyperus onerosus obs.csv" "environmentallayers=E:\TXDoT_Range Scale_Bioclim\Ascii" replicates=5 writebackgroundpredictions -N bio0

Replicated maxent model for Eriocaulon_koernickianum

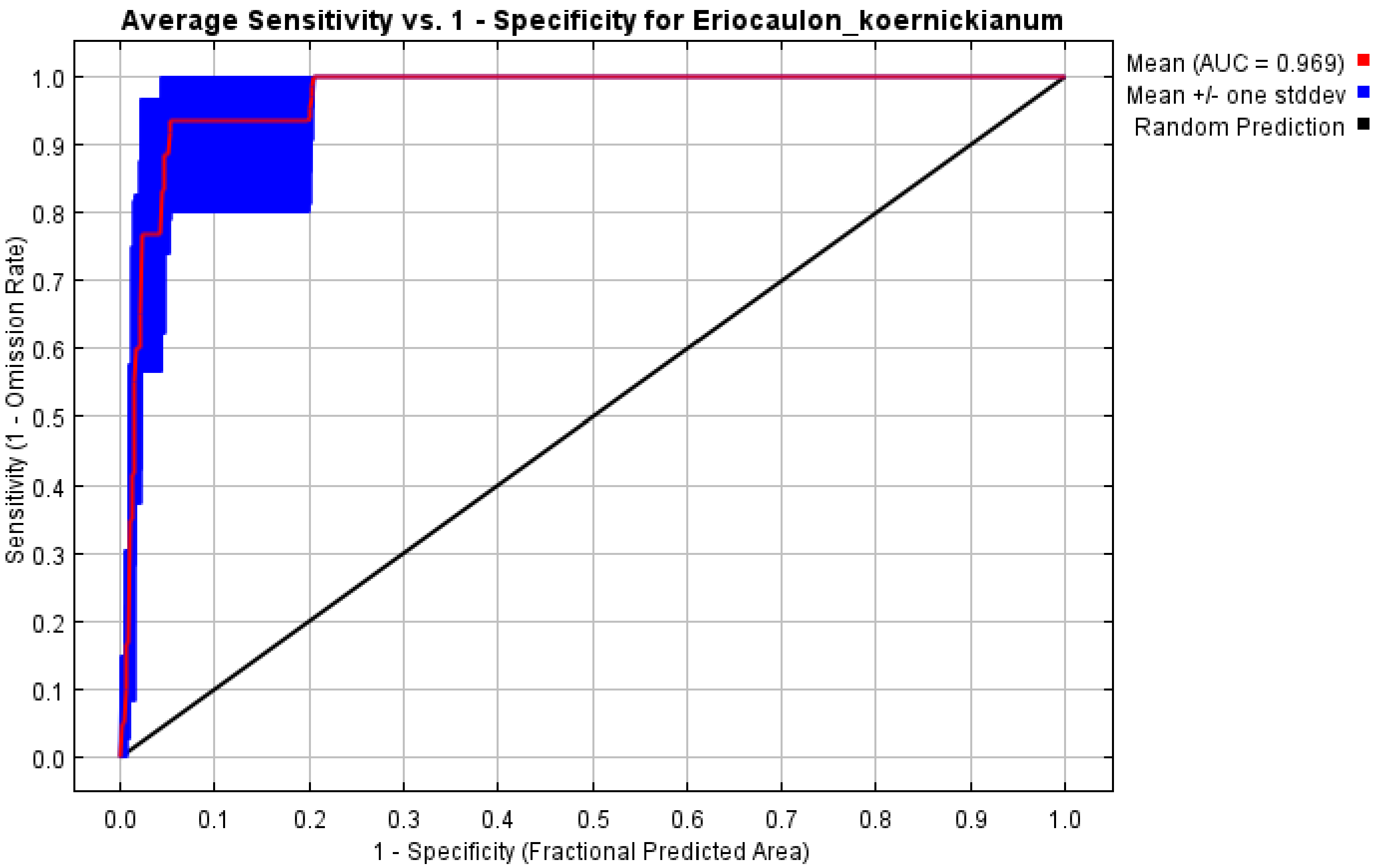
This page summarizes the results of 5-fold cross-validation for Eriocaulon_koernickianum, created Fri Dec 03 20:40:50 CST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4]

Analysis of omission/commission

The following picture shows the test omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs. The omission rate should be close to the predicted omission, because of the definition of the cumulative threshold.

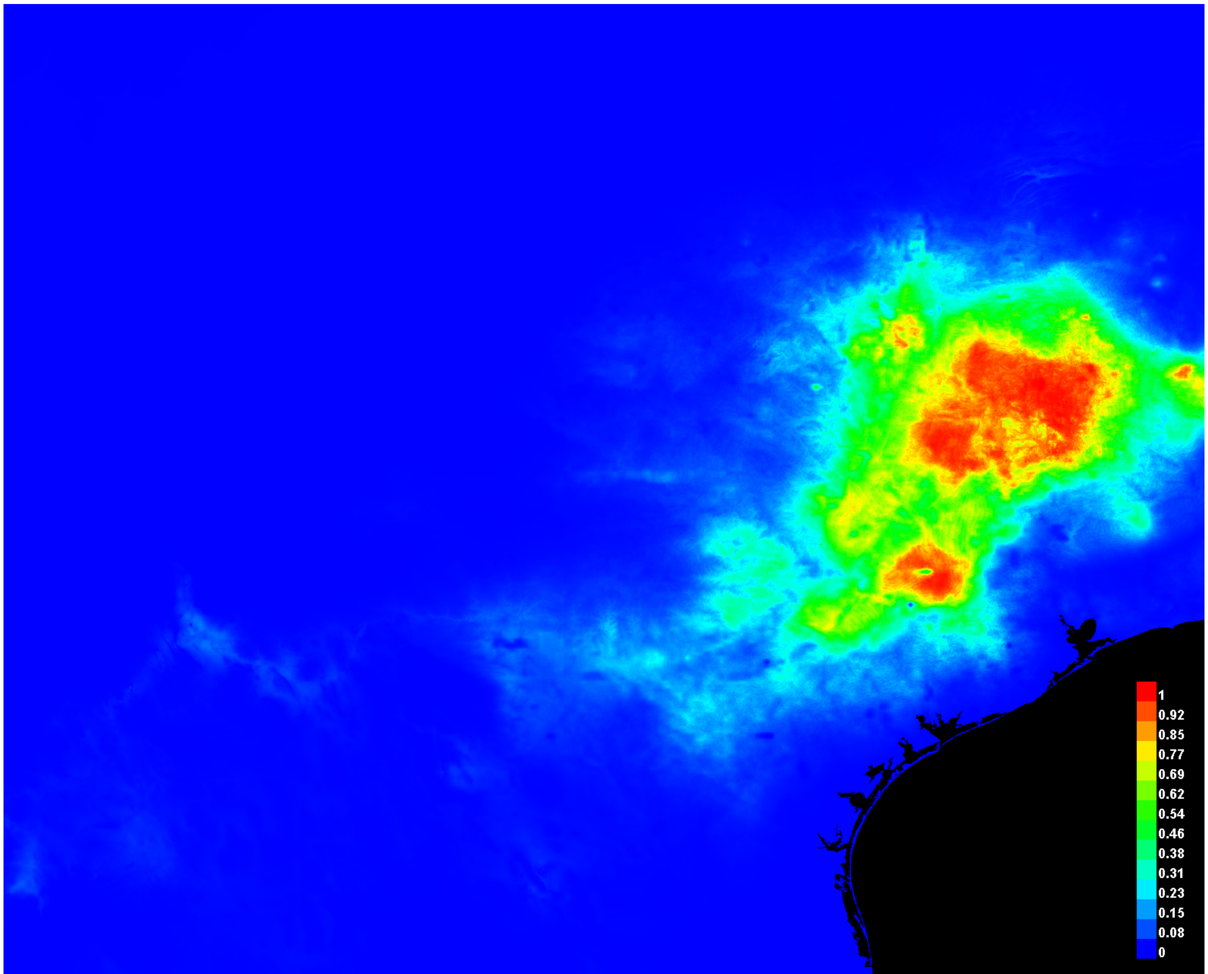


The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average test AUC for the replicate runs is 0.969, and the standard deviation is 0.025.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 5 output grids. Other available summary grids are min, max and median.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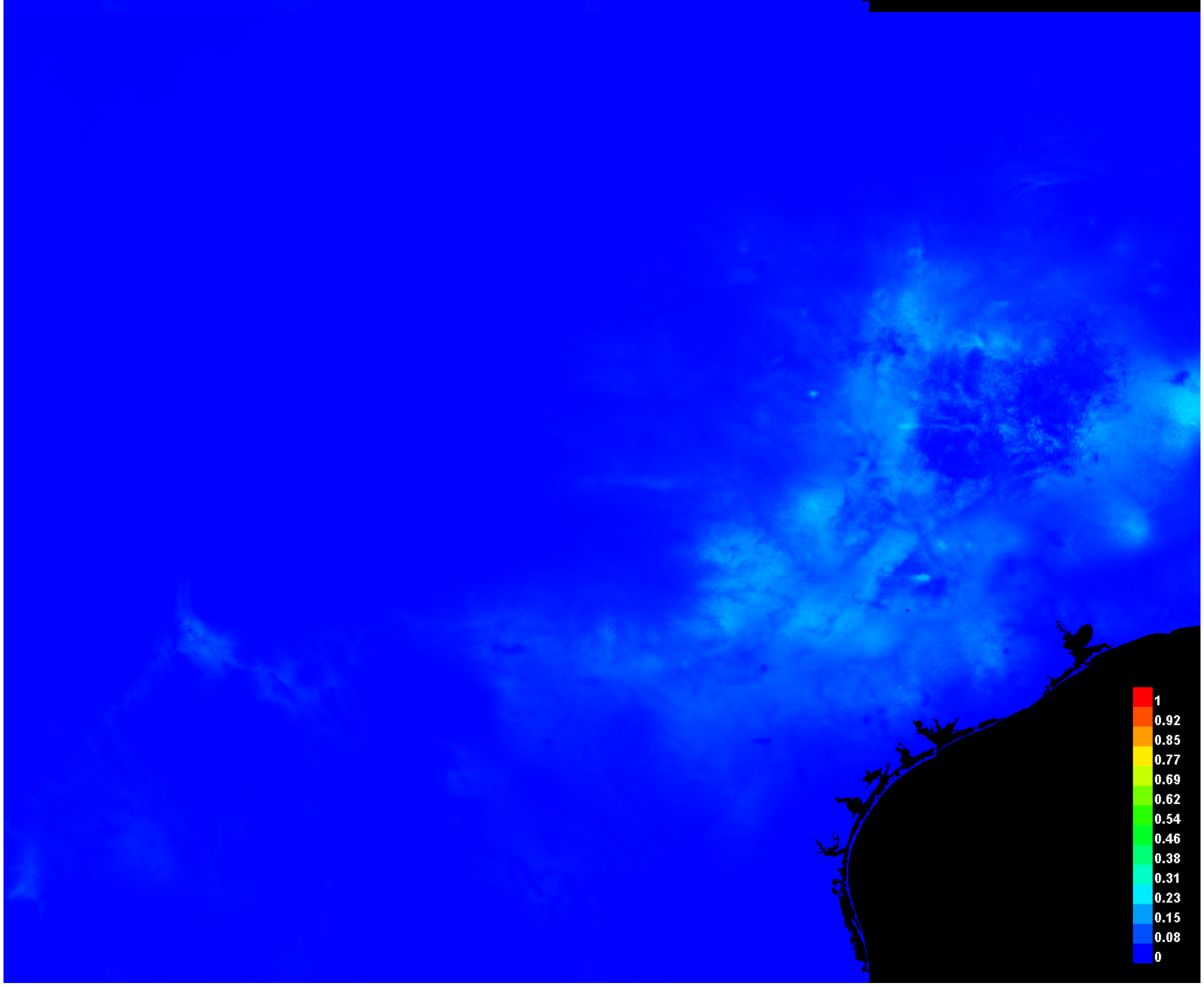
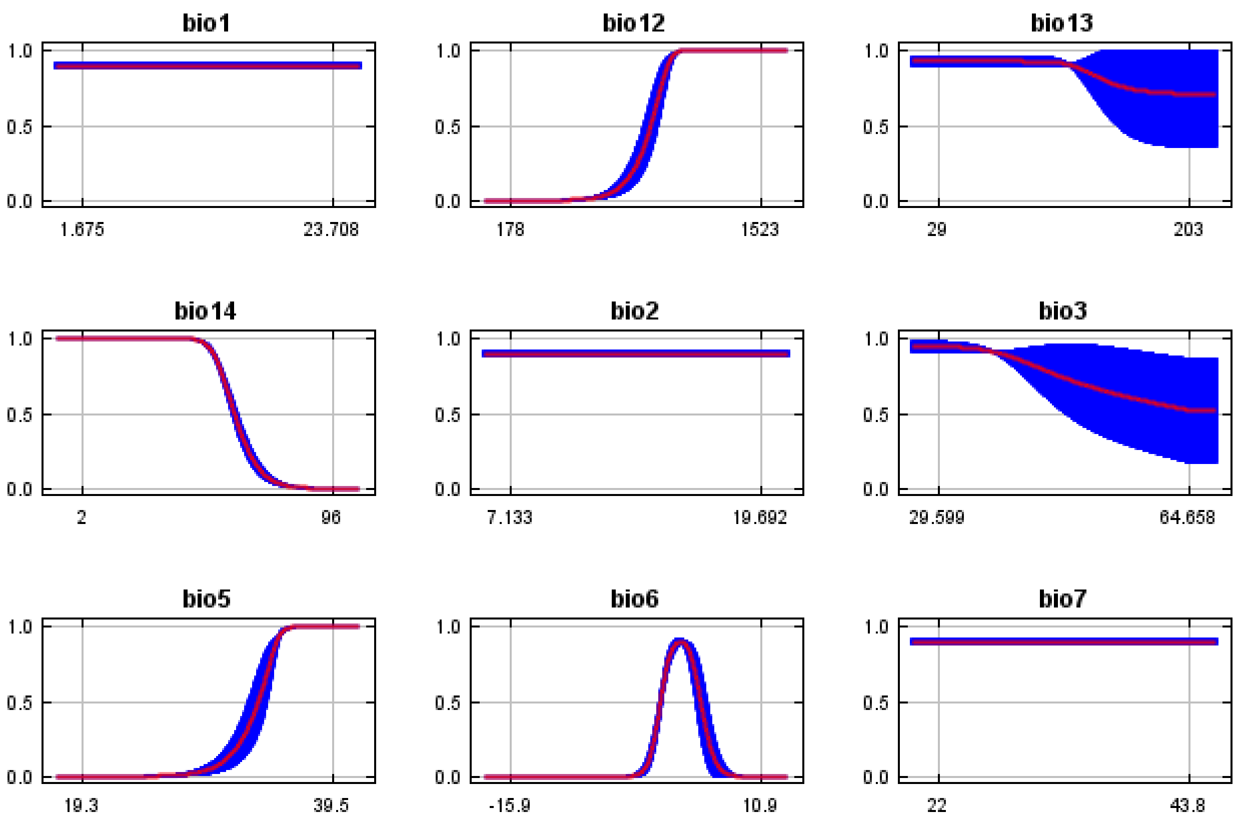
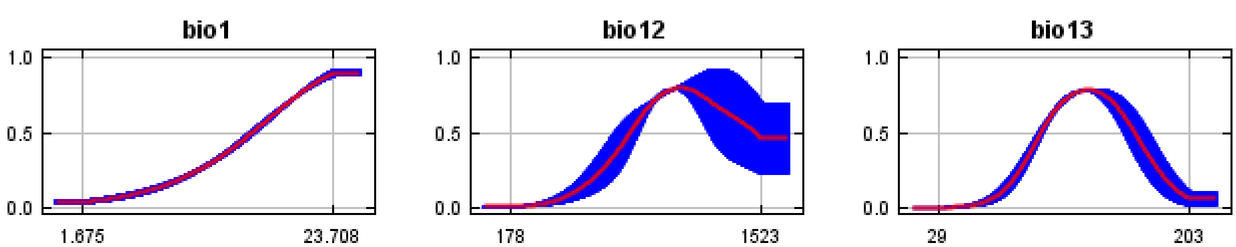

1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

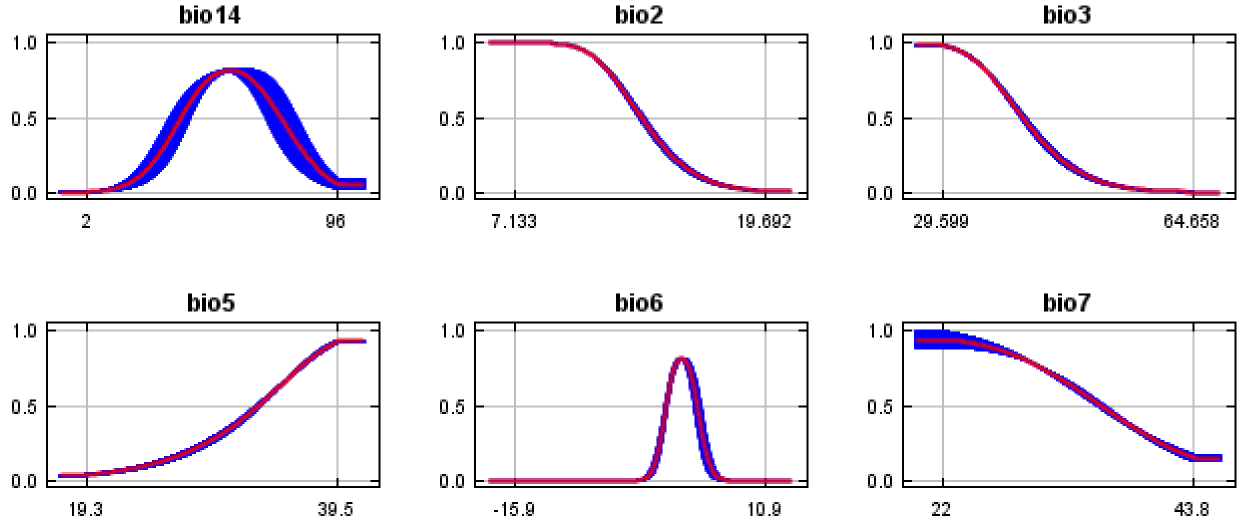
Response curves

These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 5 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).



In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.



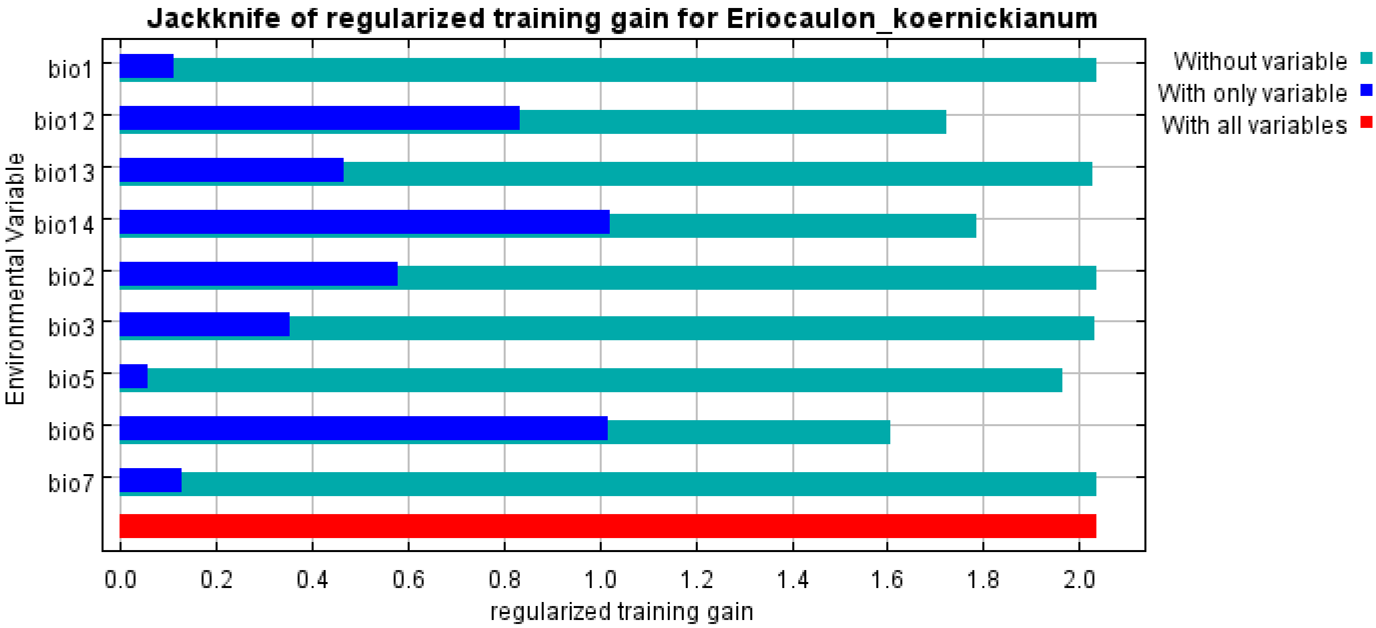


Analysis of variable contributions

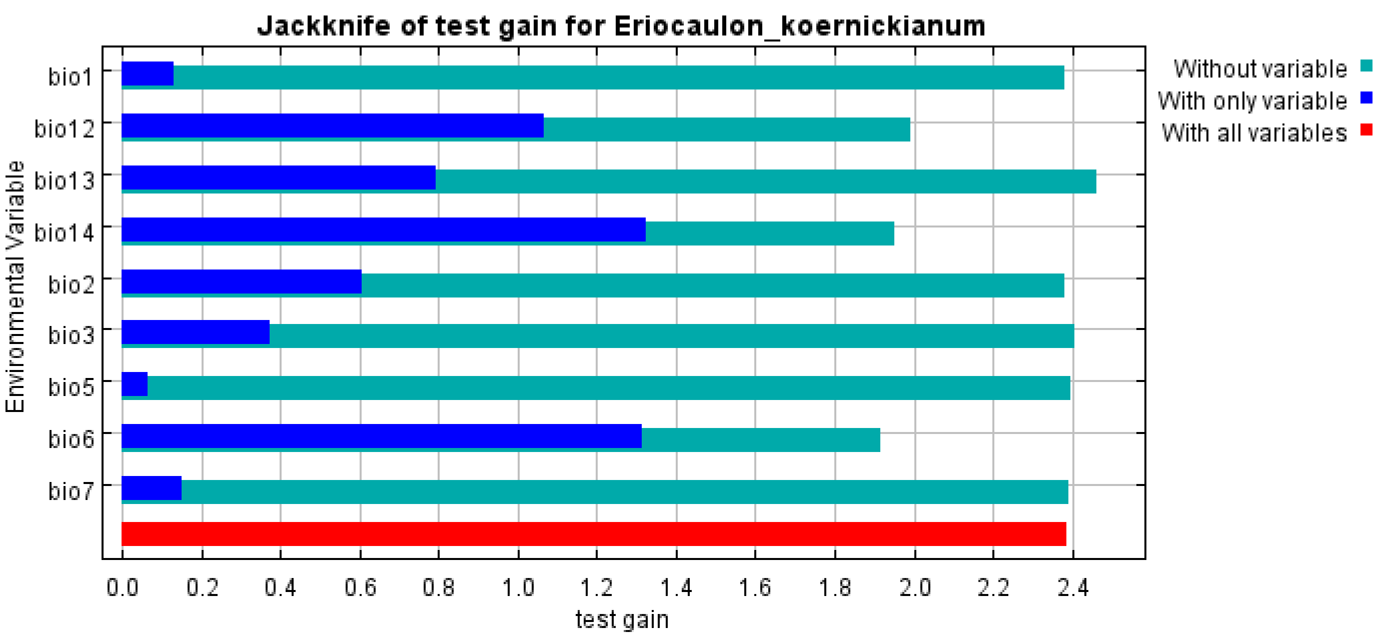
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio6	38.4	42.1
bio12	24.1	43
bio14	23	8
bio2	8	0
bio5	4.2	4.7
bio1	1.8	0
bio13	0.5	1.2
bio3	0	0.9
bio7	0	0

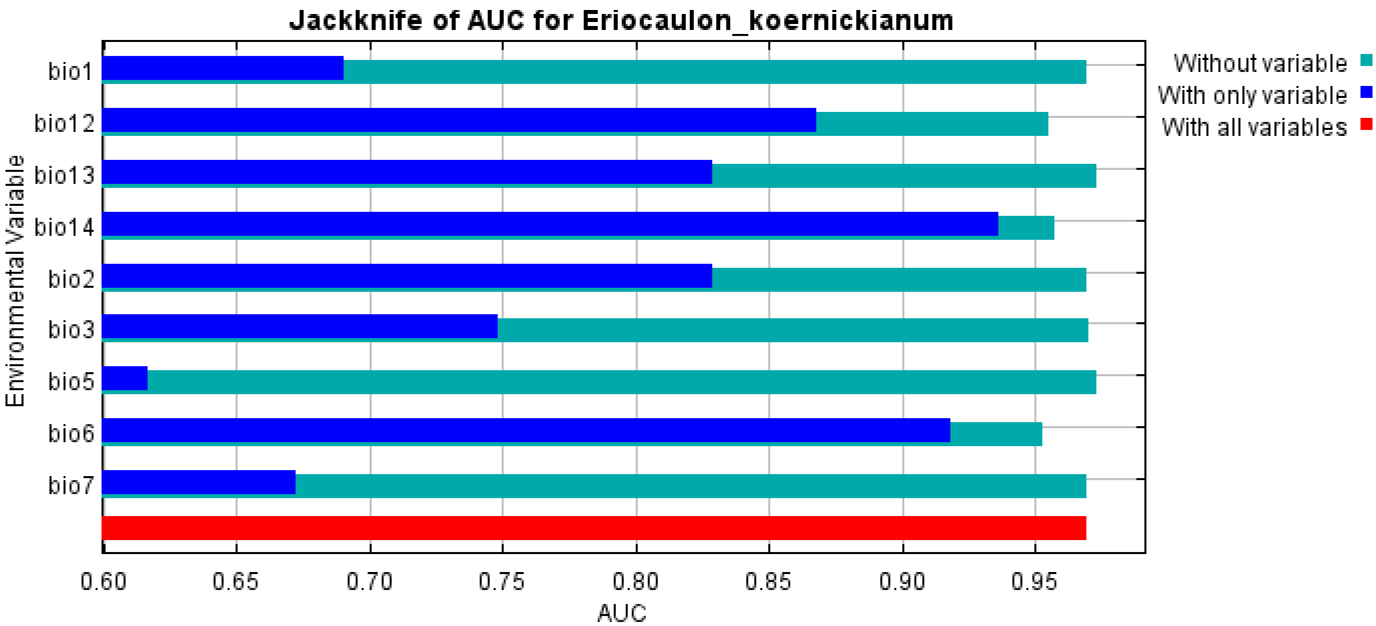
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio14, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio6, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



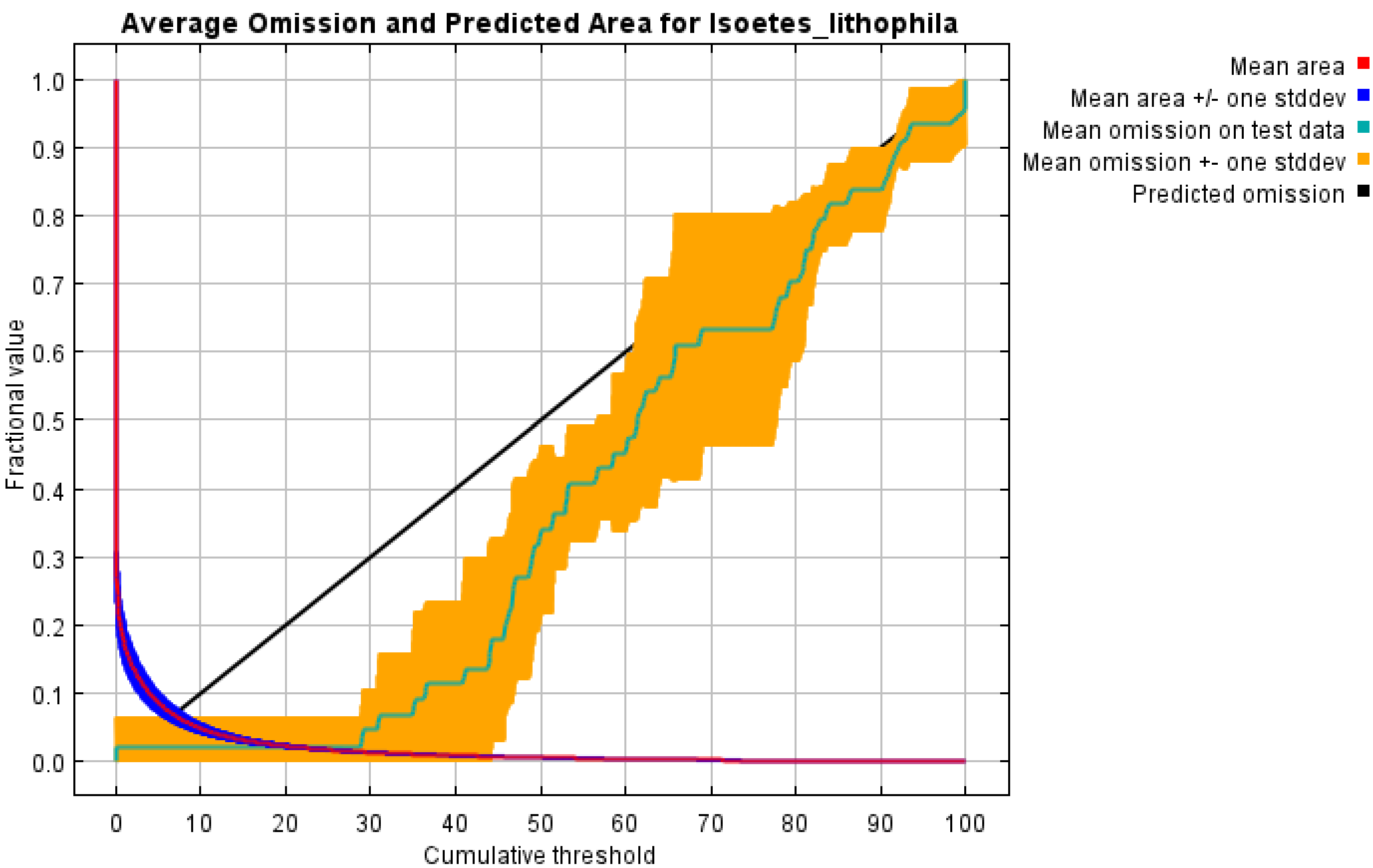
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Eriocaulon_koernickianum responsecurves jackknife "outputdirectory=E:\TXDoT_Range Scale_Bioclim\CrossVal_Results\1reg\Eriocaulon" "samplesfile=E:\TXDoT_Range Scale_Bioclim\spp_csv\Eriocaulon koernickianum obs.csv" "environmentallayers=E:\TXDoT_Range Scale_Bioclim\Ascii" replicates=5 writebackgroundpredictions -N bio0

Replicated maxent model for Isoetes_lithophila

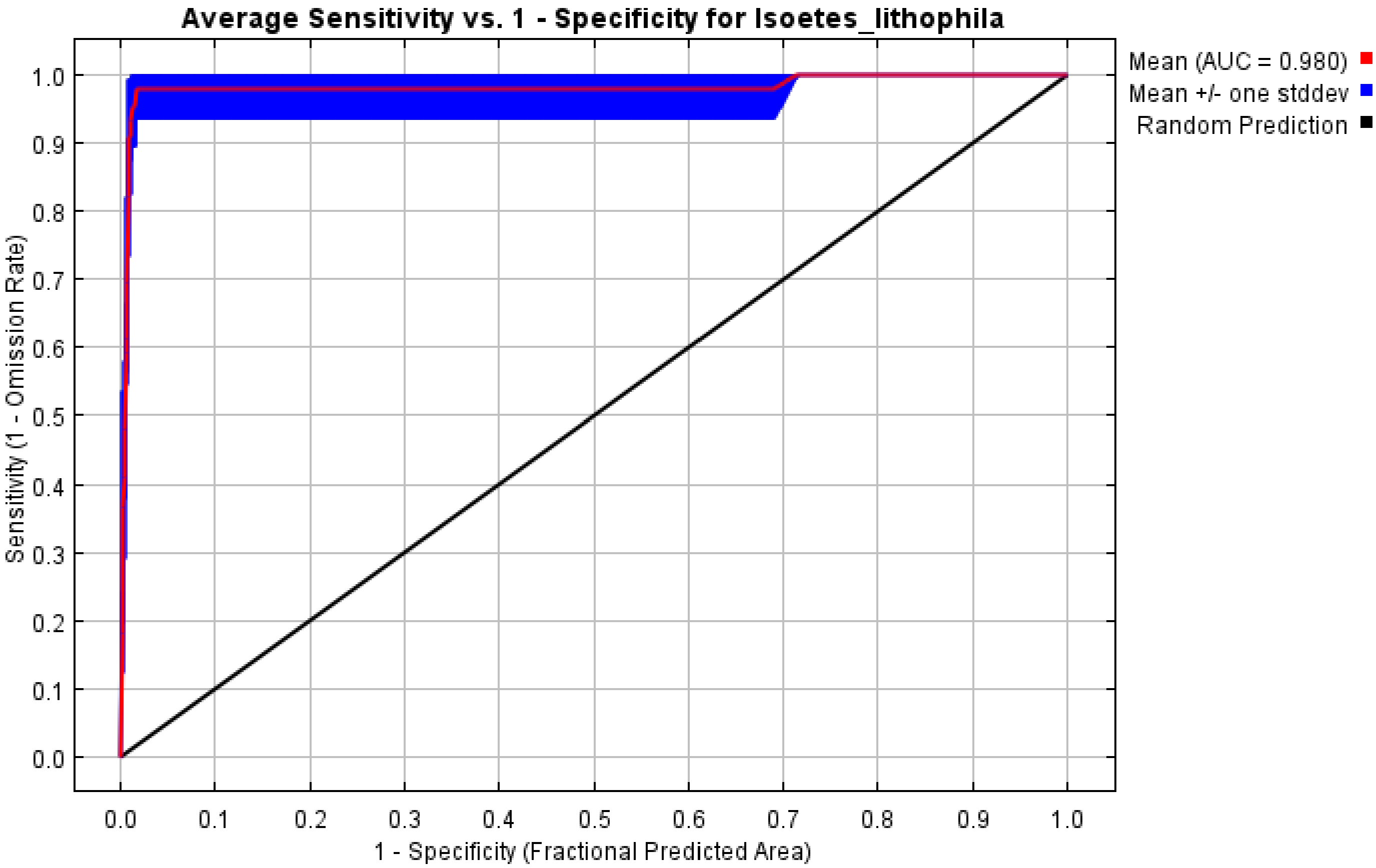
This page summarizes the results of 5-fold cross-validation for Isoetes_lithophila, created Fri Dec 03 20:45:20 CST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4]

Analysis of omission/commission

The following picture shows the test omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs. The omission rate should be close to the predicted omission, because of the definition of the cumulative threshold.

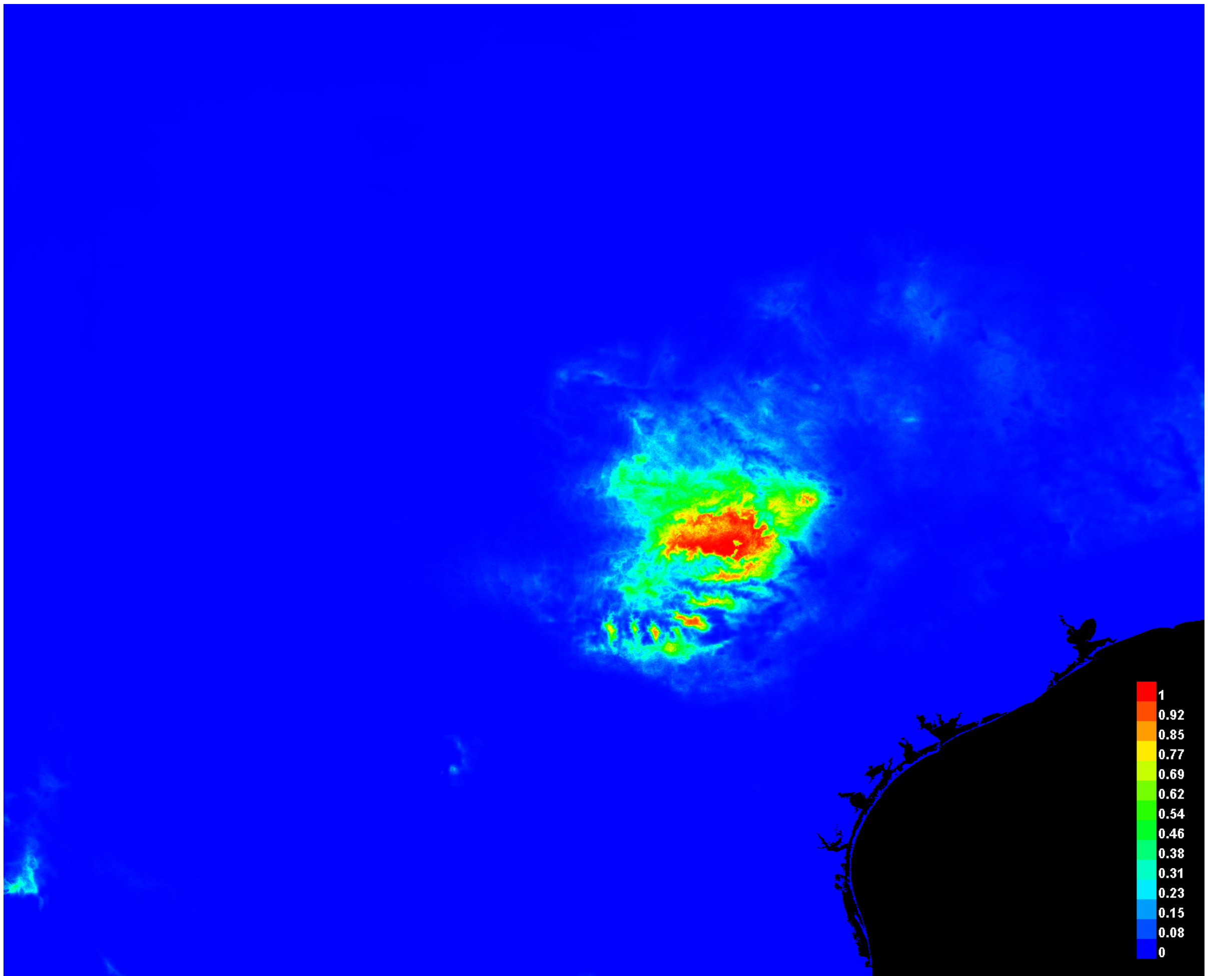


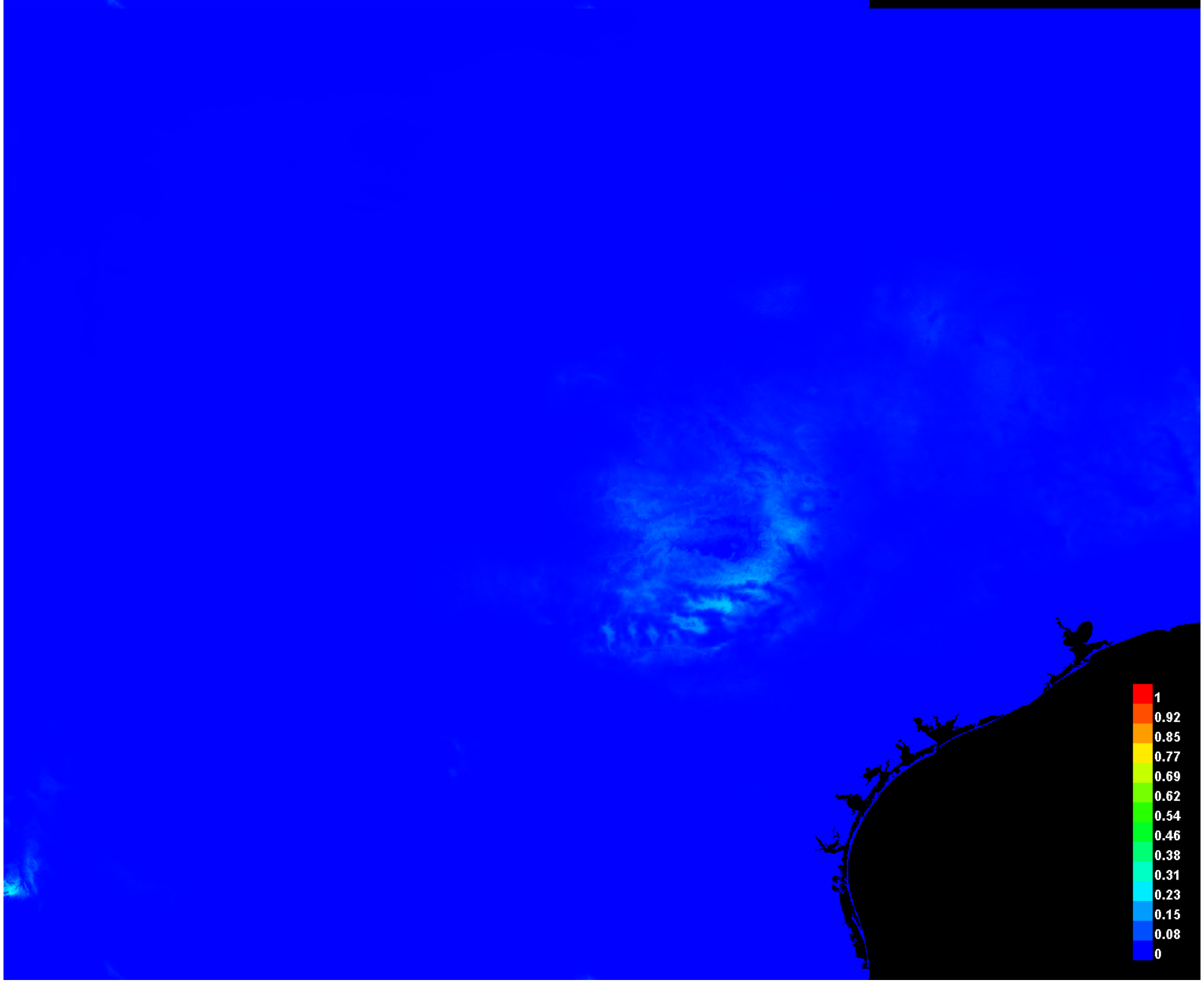
The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average test AUC for the replicate runs is 0.980, and the standard deviation is 0.031.



Pictures of the model

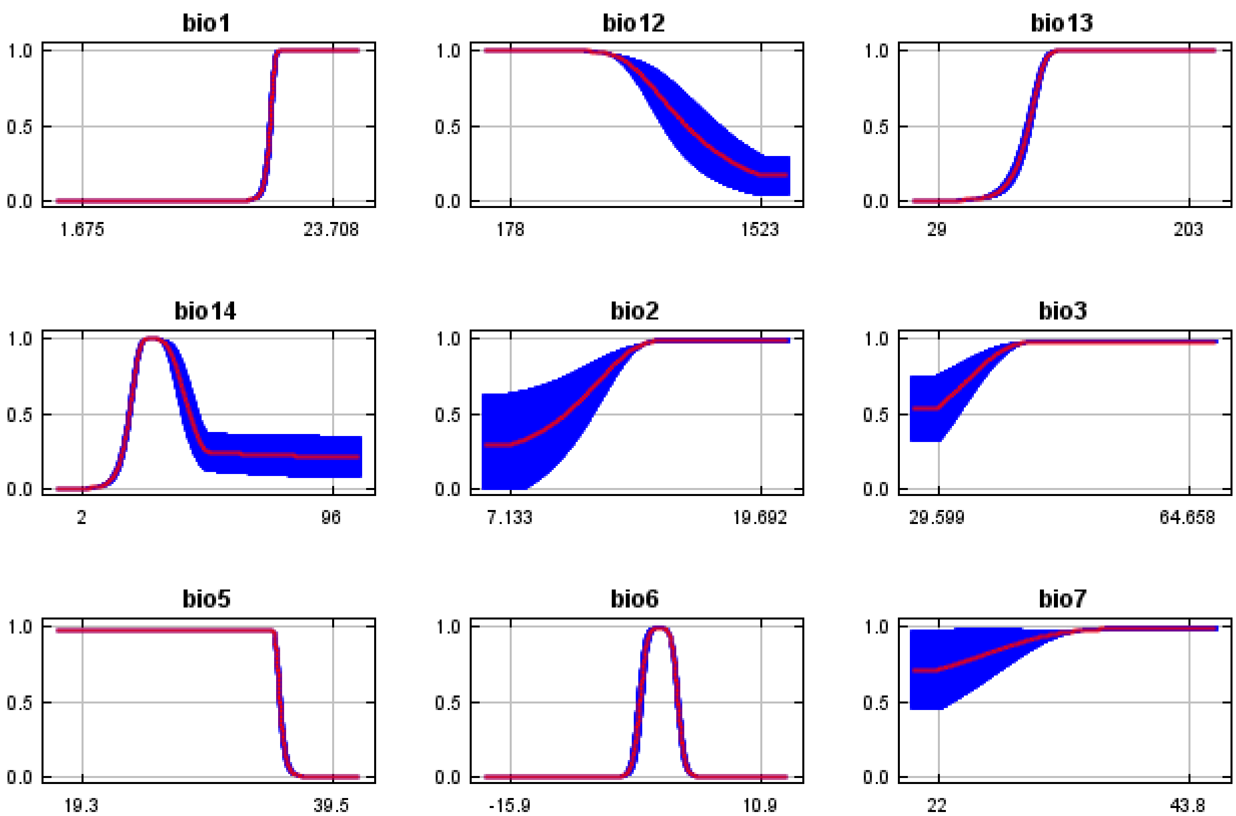
The following two pictures show the point-wise mean and standard deviation of the 5 output grids. Other available summary grids are min, max and median.


1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

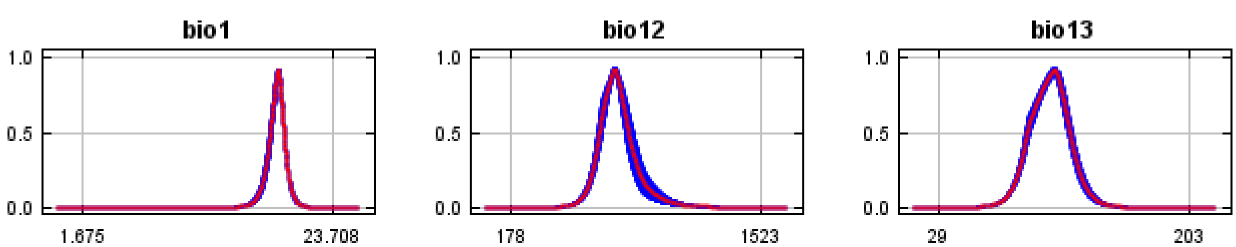

1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

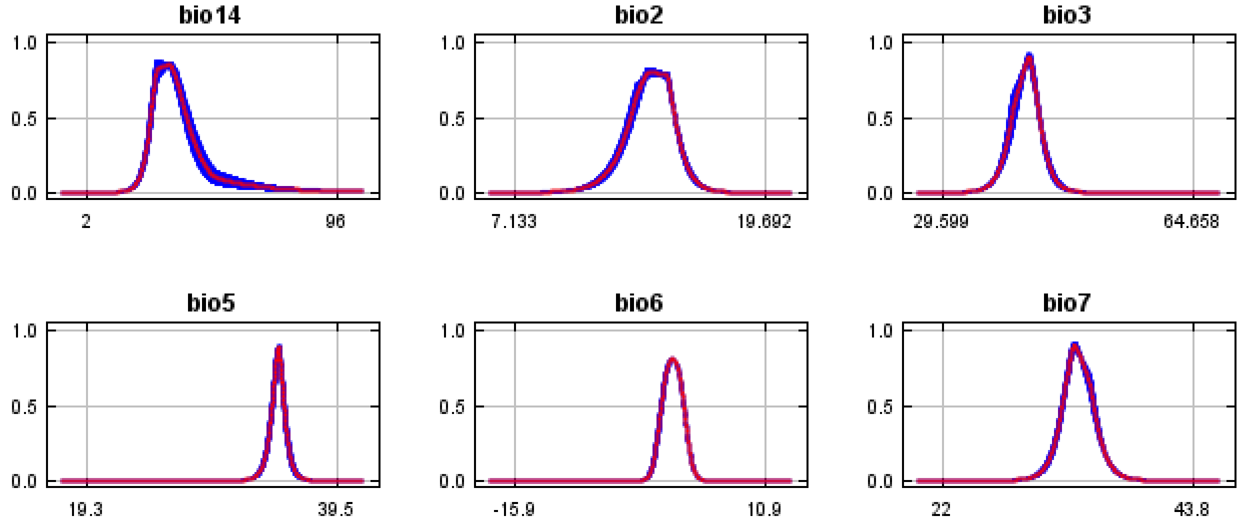
Response curves

These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 5 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).



In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.



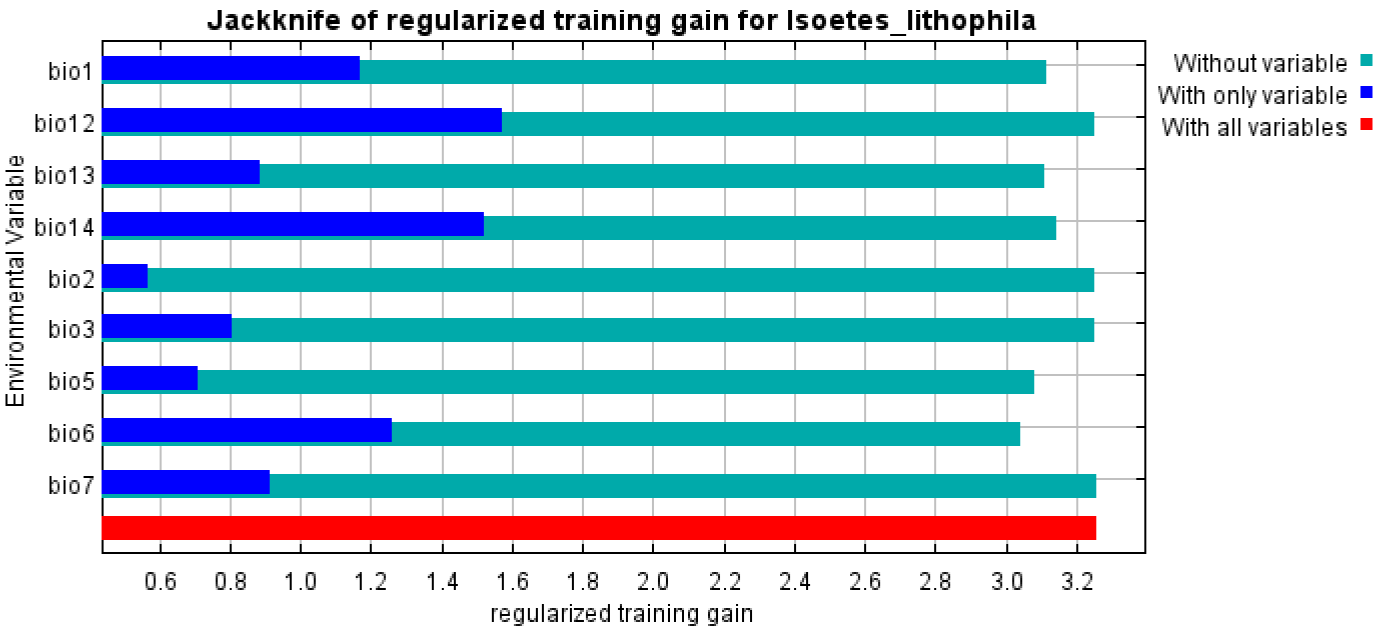


Analysis of variable contributions

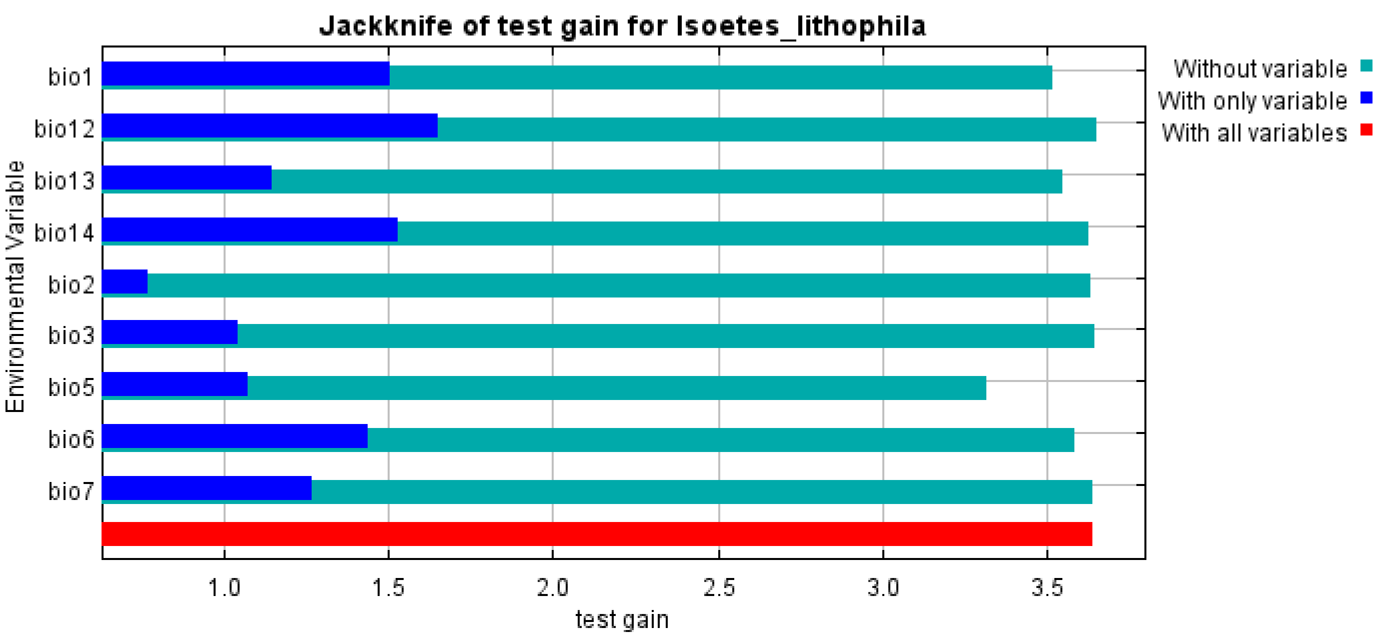
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio14	38.3	15.3
bio12	18.8	1.4
bio3	13.2	0.2
bio1	9	27.6
bio6	6.9	37.5
bio13	6.1	11
bio7	6.1	0
bio5	1.4	6.3
bio2	0.2	0.6

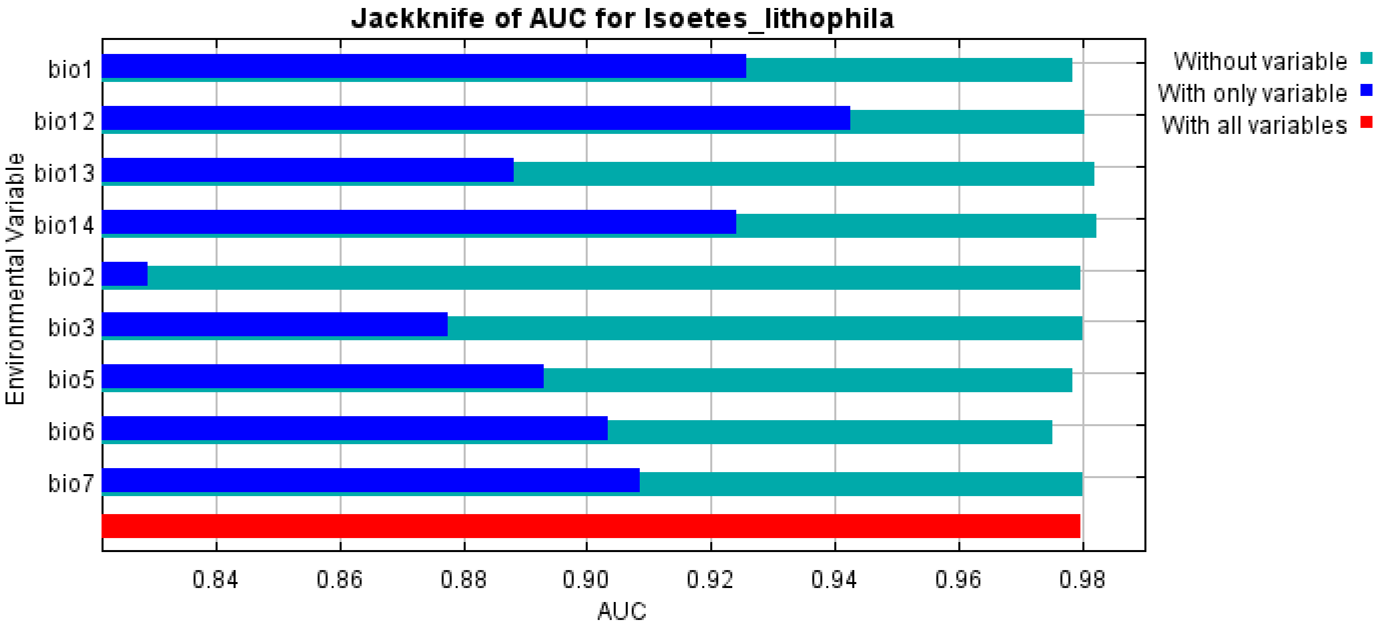
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio12, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio6, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



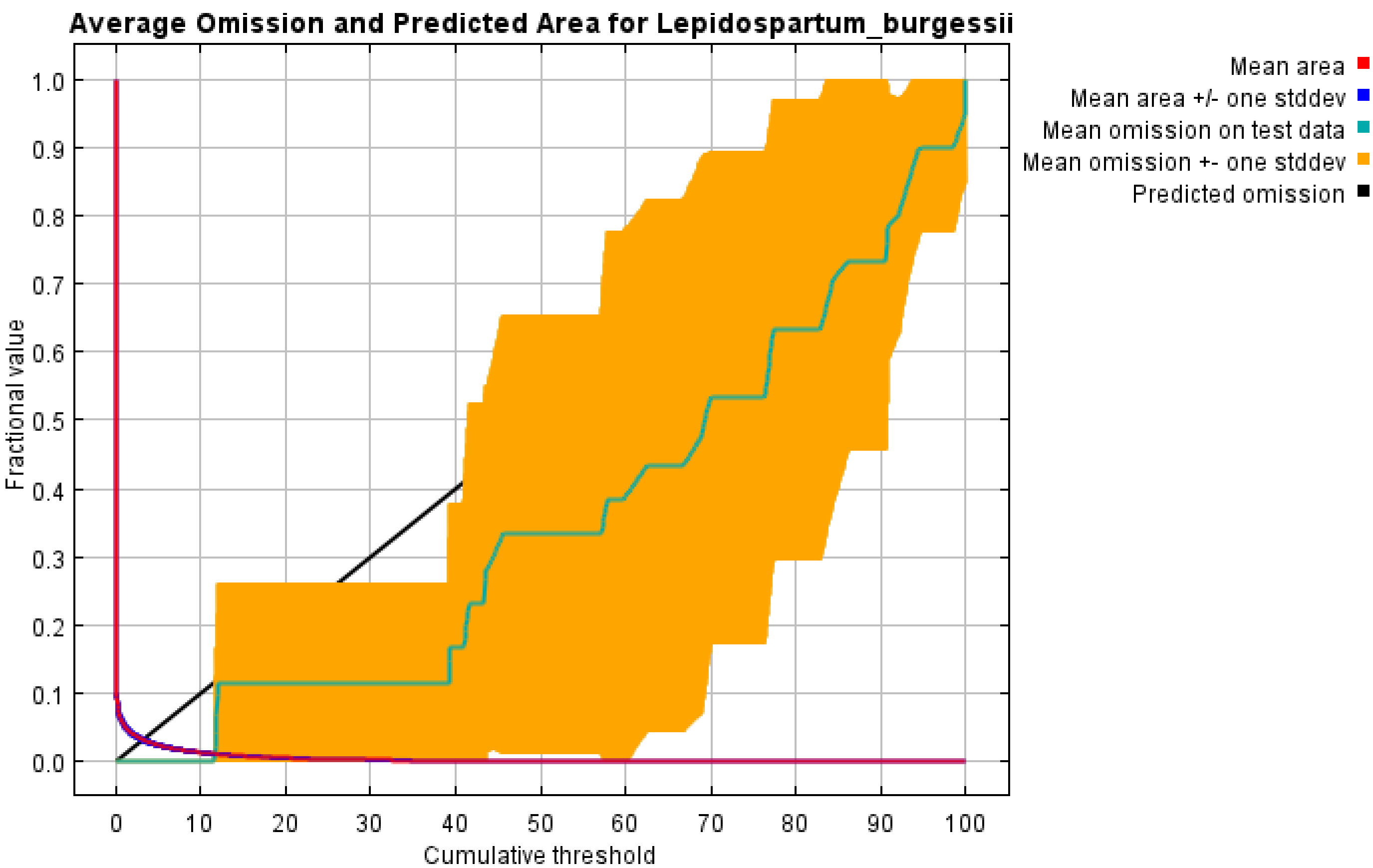
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Isoetes_lithophila responsecurves jackknife "outputdirectory=E:\TXDoT_Range Scale_Bioclim\CrossVal_Results\1reg\Isoetes" "samplesfile=E:\TXDoT_Range Scale_Bioclim\spp_csv\Isoetes lithophila obs.csv" "environmentallayers=E:\TXDoT_Range Scale_Bioclim\Ascii" replicates=5 writebackgroundpredictions -N bio0

Replicated maxent model for Lepidospartum_burgessii

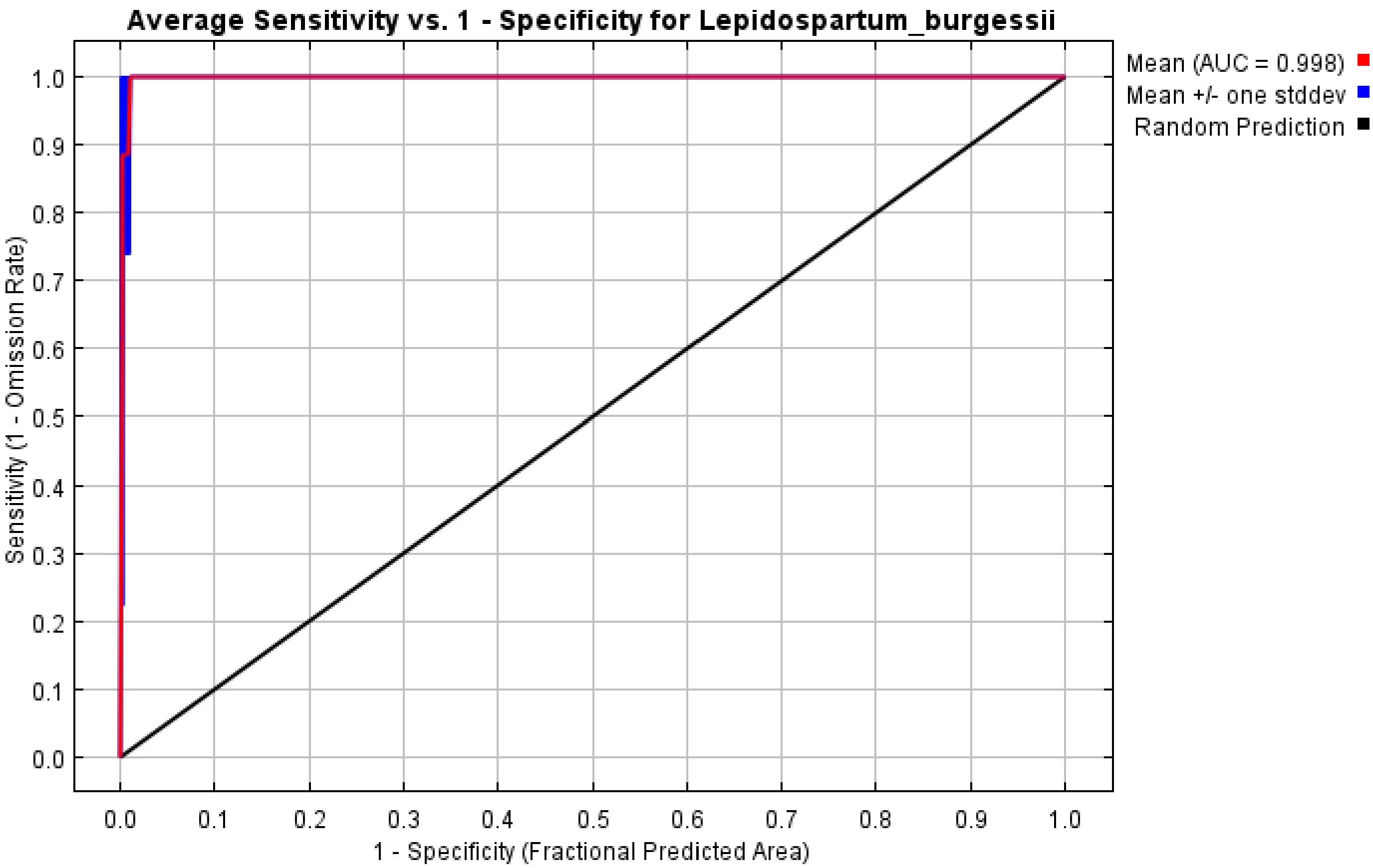
This page summarizes the results of 5-fold cross-validation for Lepidospartum_burgessii, created Fri Dec 03 20:57:39 CST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4]

Analysis of omission/commission

The following picture shows the test omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs. The omission rate should be close to the predicted omission, because of the definition of the cumulative threshold.

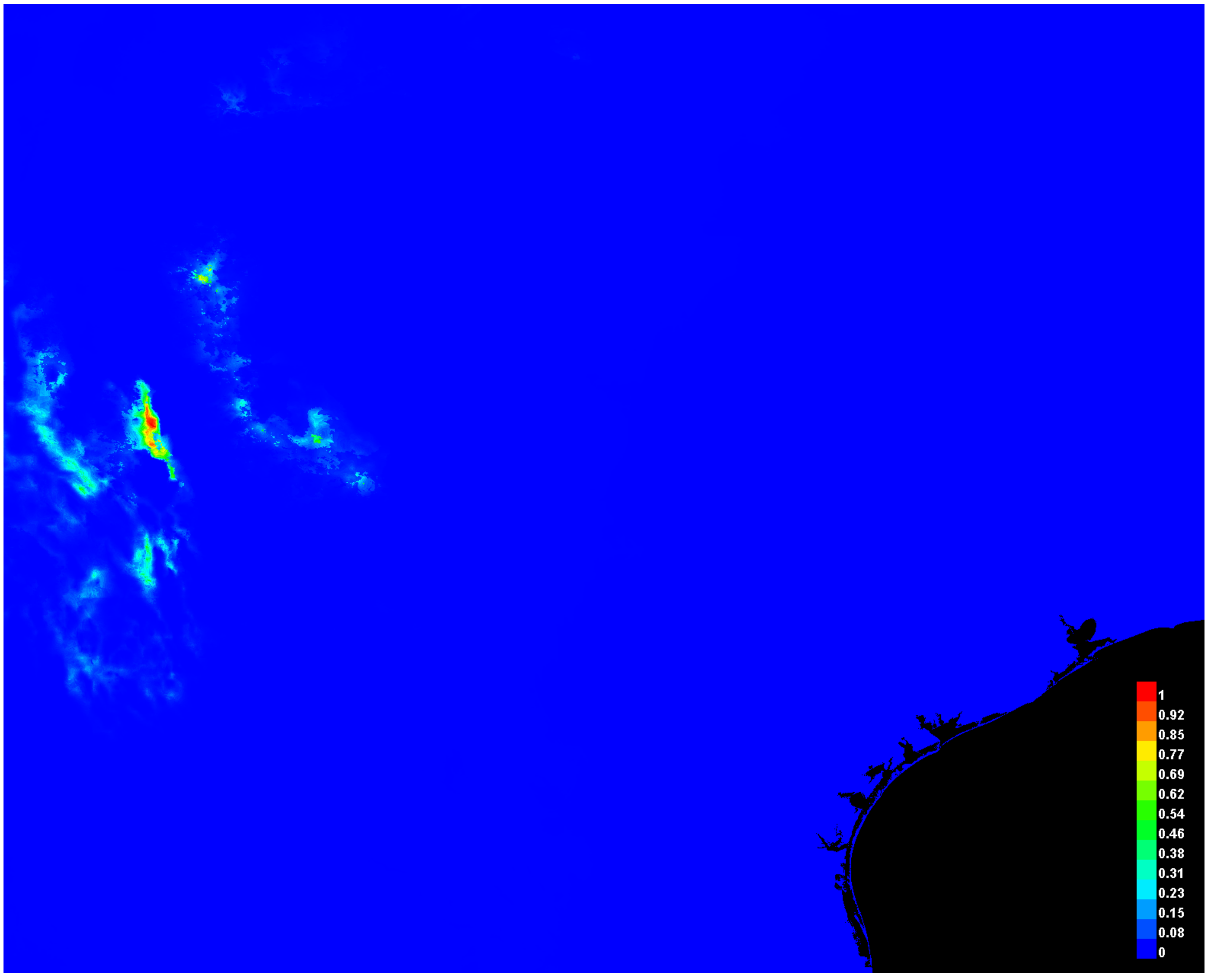


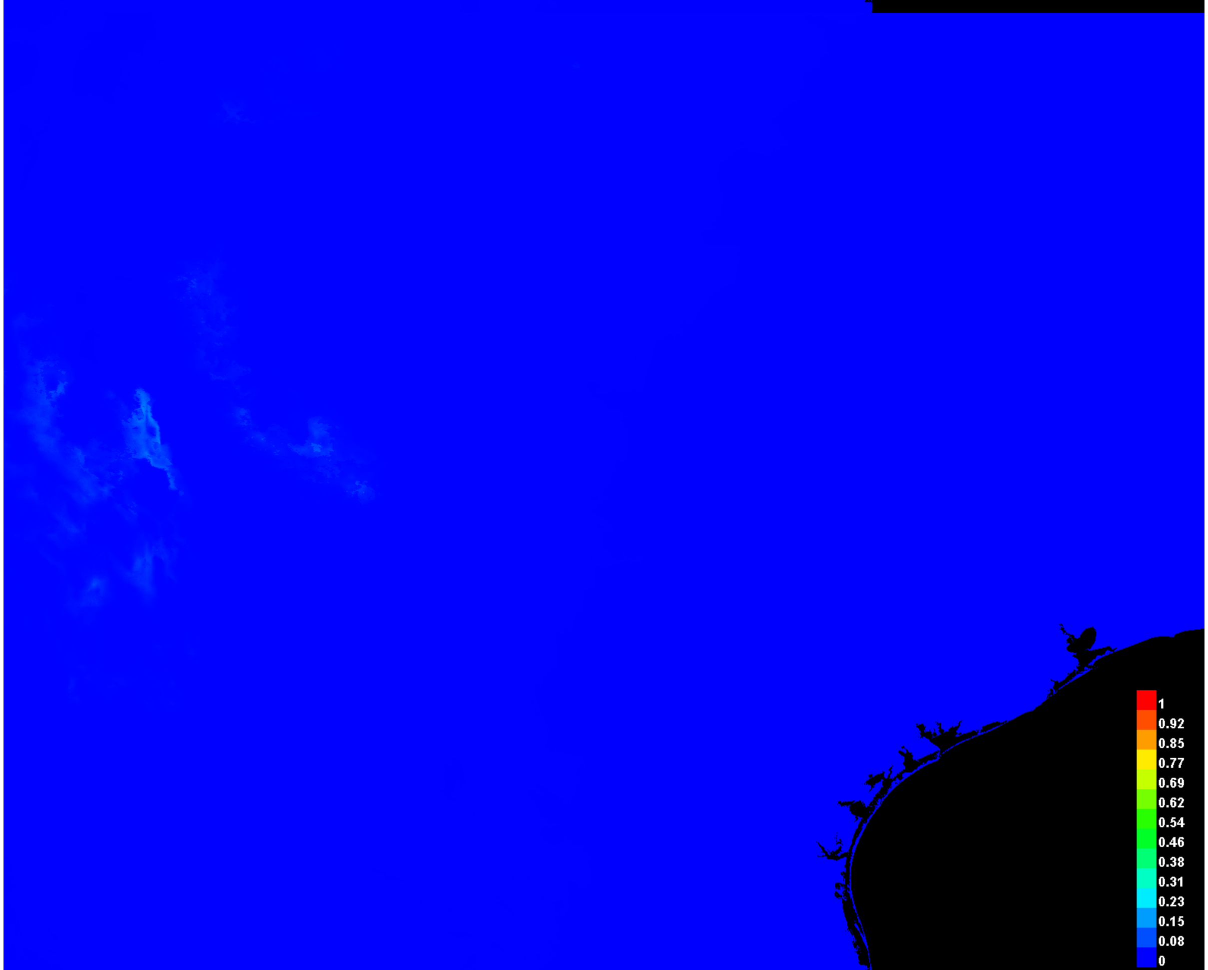
The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average test AUC for the replicate runs is 0.998, and the standard deviation is 0.002.



Pictures of the model

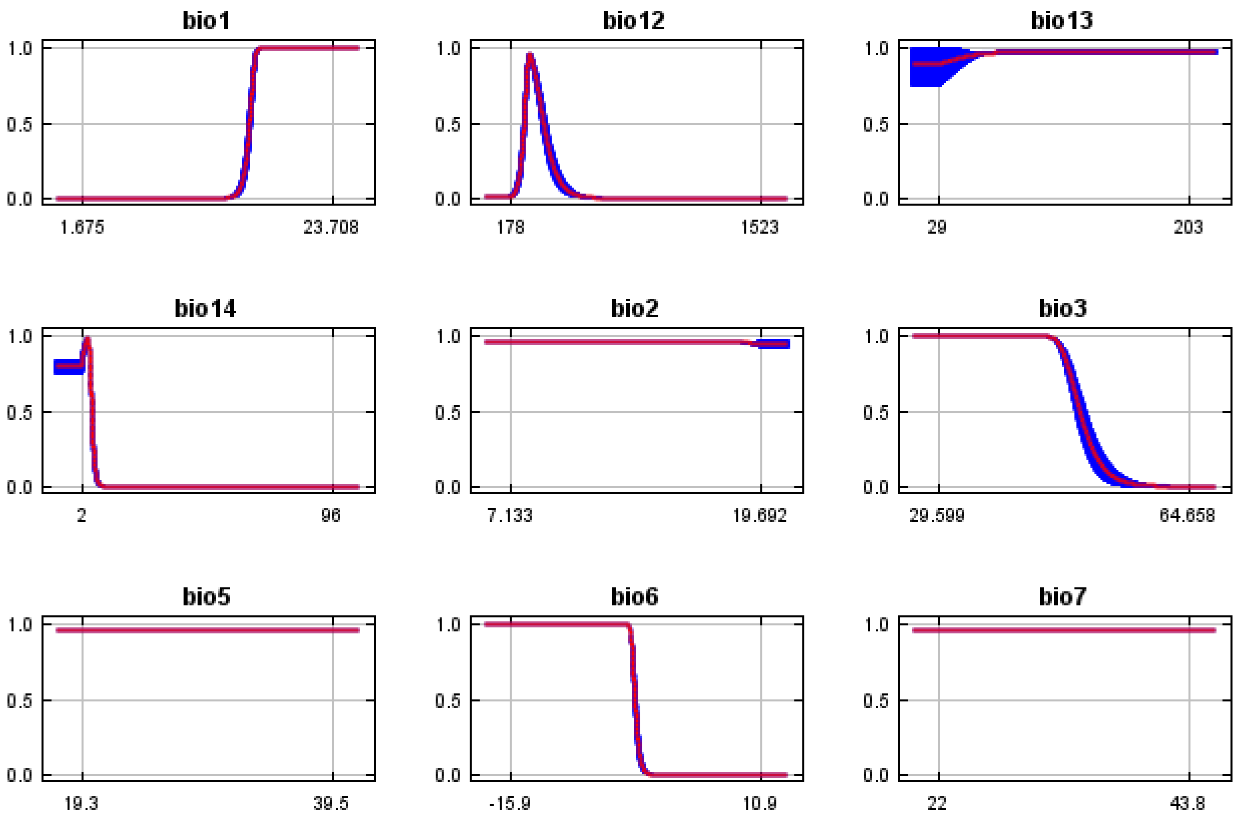
The following two pictures show the point-wise mean and standard deviation of the 5 output grids. Other available summary grids are min, max and median.


1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

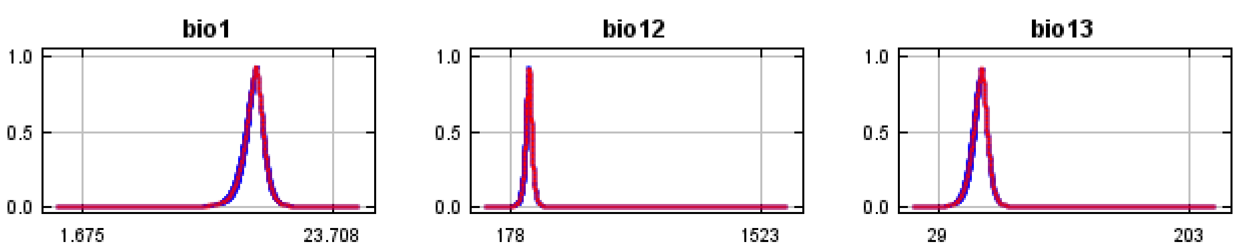

1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

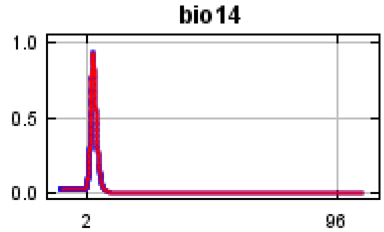
Response curves

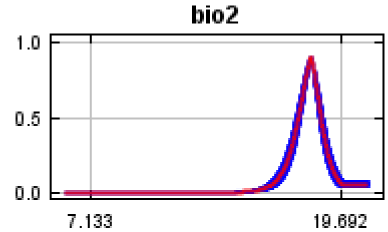
These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 5 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).

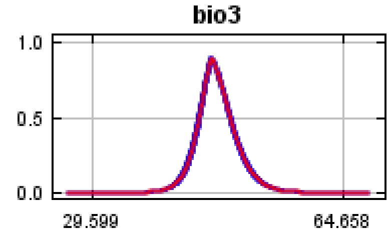


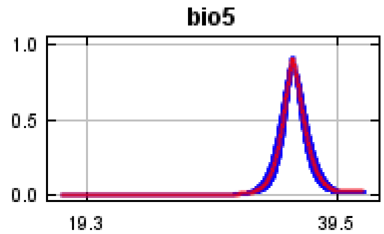
In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.

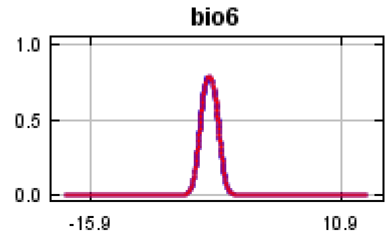


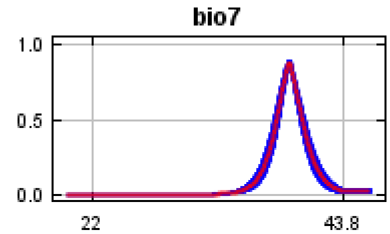










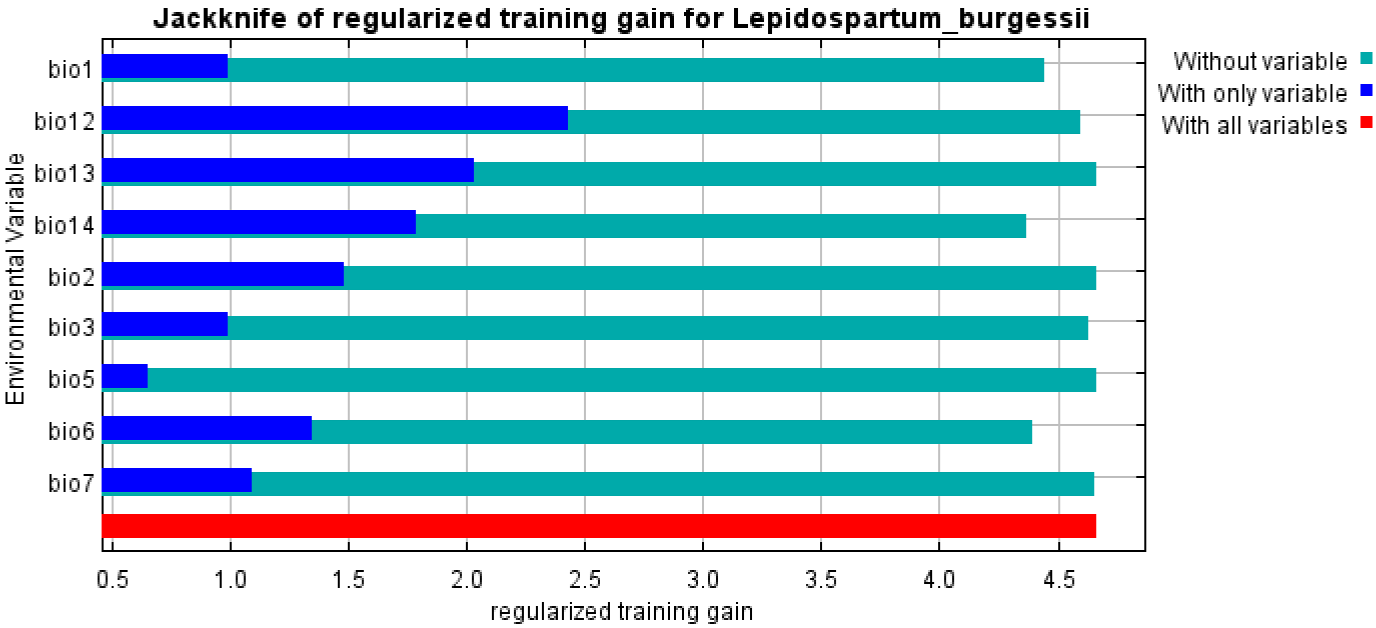


Analysis of variable contributions

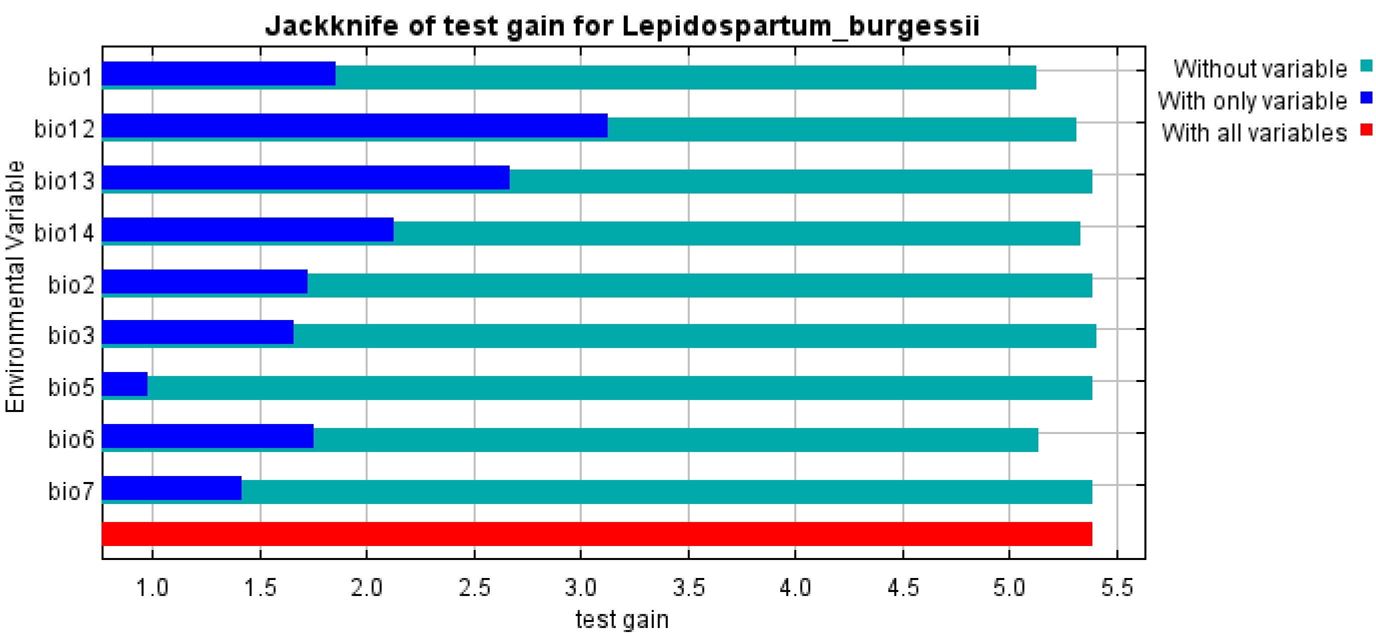
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio14	37	42.9
bio12	25.5	6
bio7	17.7	0
bio6	10.7	35.4
bio1	4.1	14.3
bio2	2.7	0
bio3	1.3	1.3
bio5	0.6	0
bio13	0.3	0

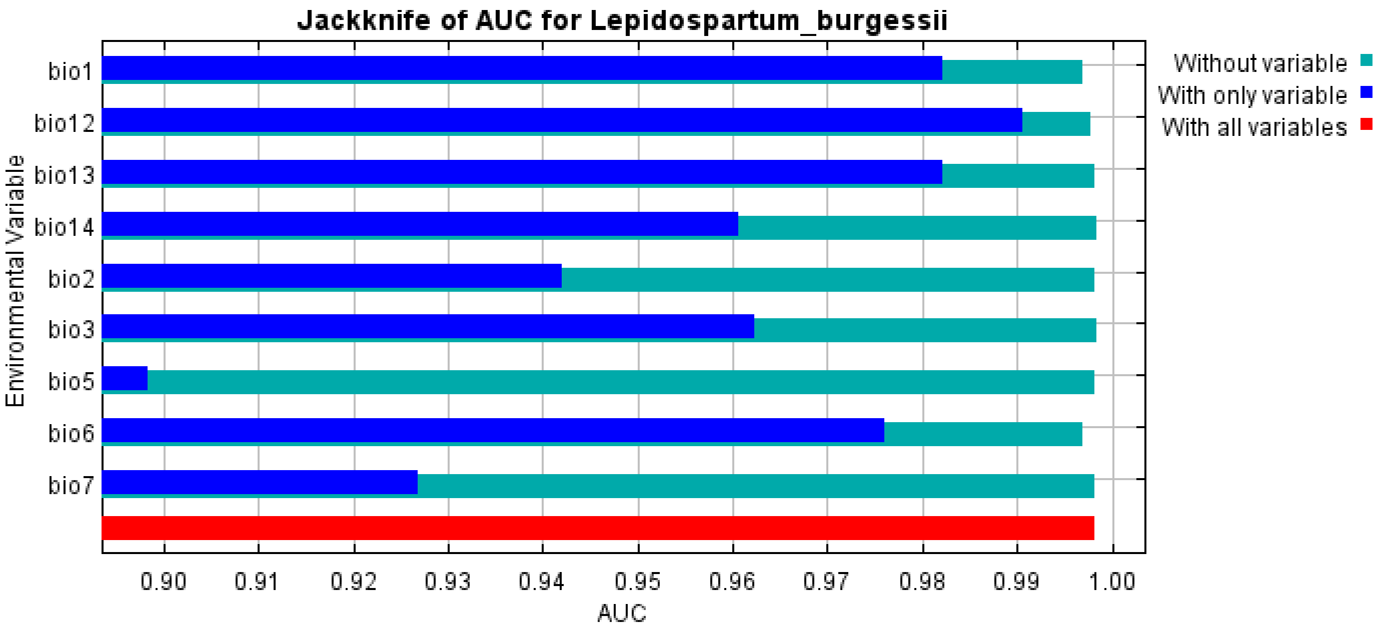
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio12, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio14, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



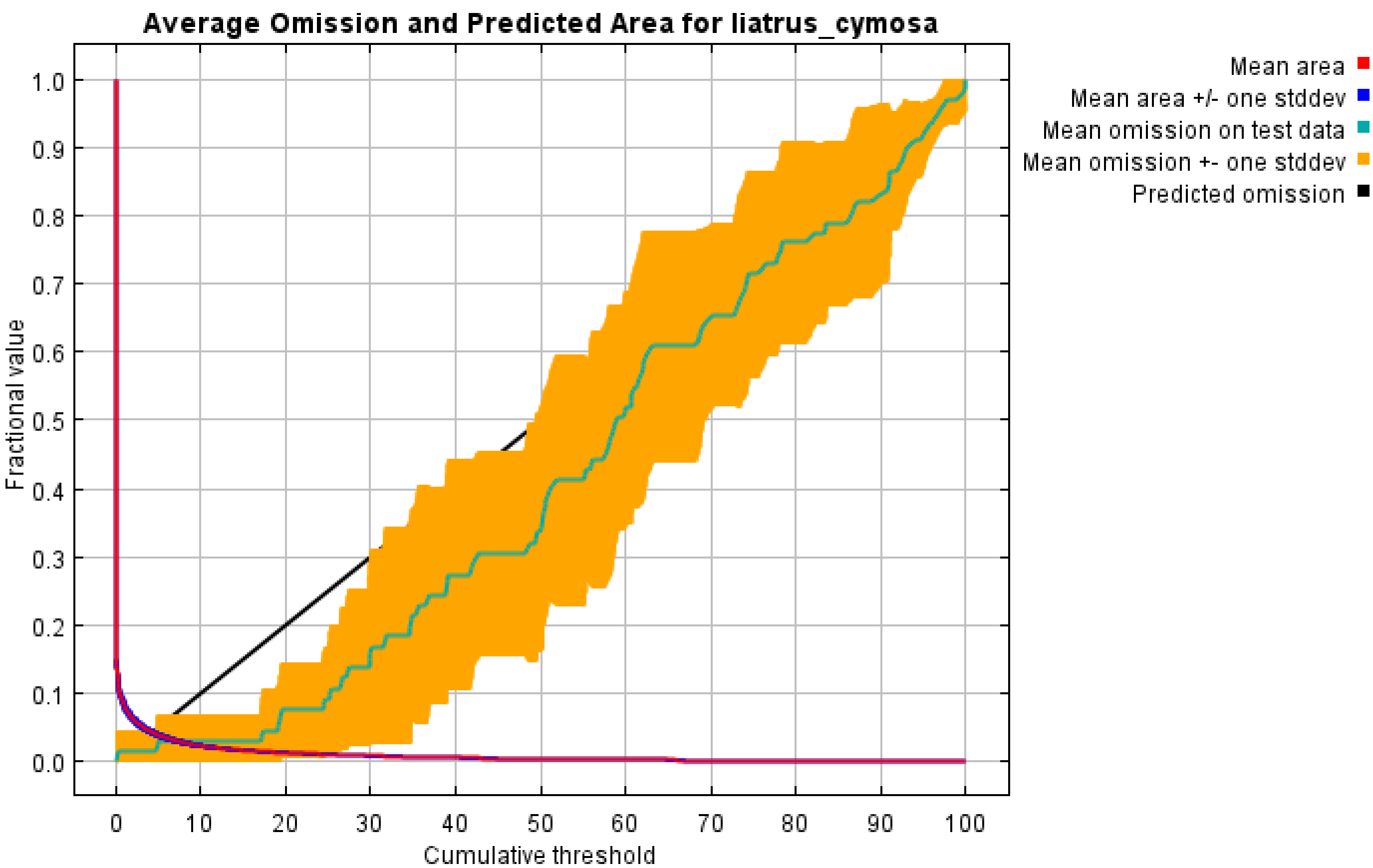
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Lepidospartum_burgessii responsecurves jackknife "outputdirectory=E:\TXDoT_Range Scale_Bioclim\CrossVal_Results\1reg\Lepidospartum" "samplesfile=E:\TXDoT_Range Scale_Bioclim\spp_csv\Lepidospartum_burgessii.csv" "environmentallayers=E:\TXDoT_Range Scale_Bioclim\Ascii" noaskoverwrite replicates=5 writebackgroundpredictions -N bio0

Replicated maxent model for liatrus_cymosa

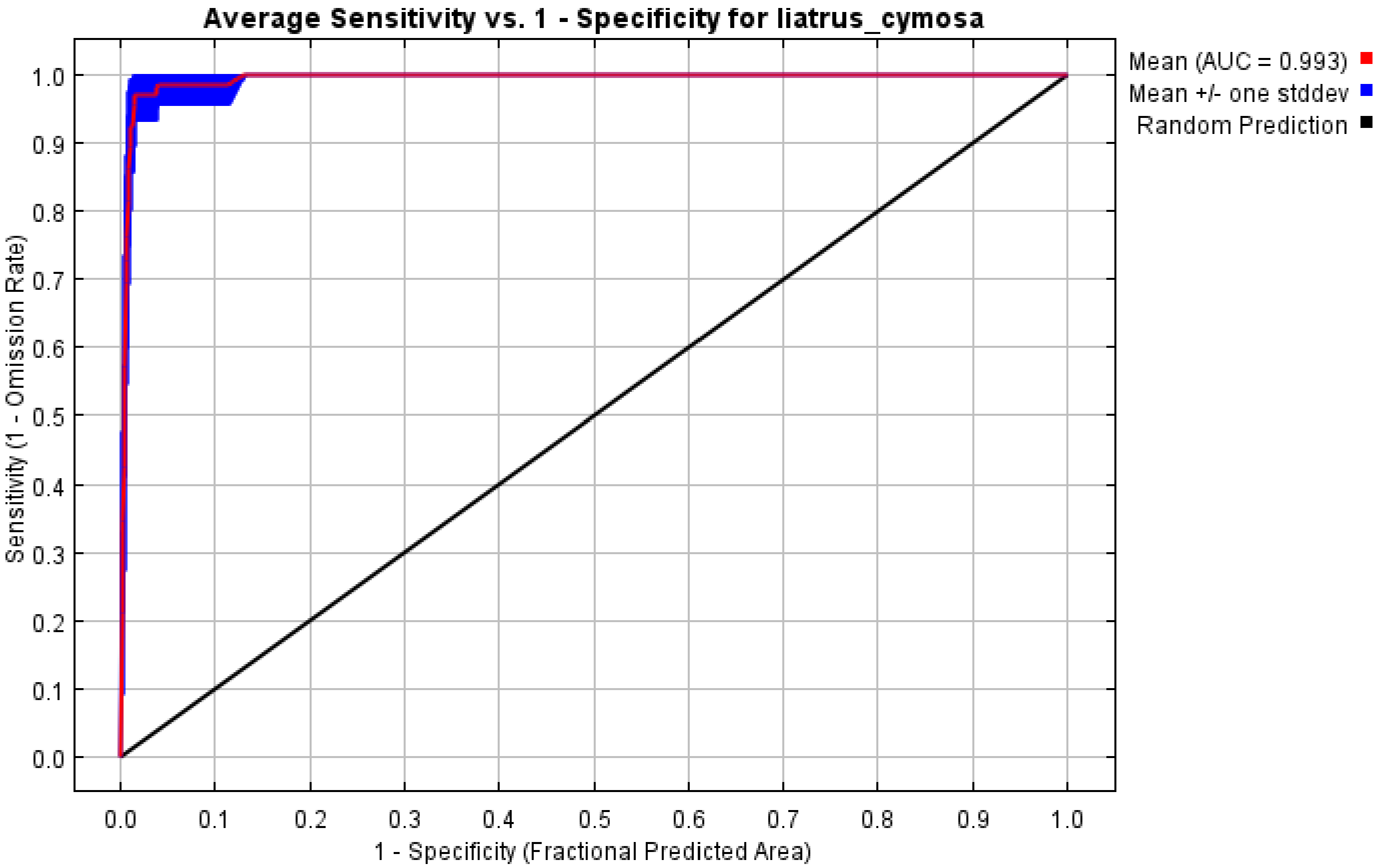
This page summarizes the results of 5-fold cross-validation for liatrus_cymosa, created Fri Dec 03 21:01:30 CST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4]

Analysis of omission/commission

The following picture shows the test omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs. The omission rate should be close to the predicted omission, because of the definition of the cumulative threshold.

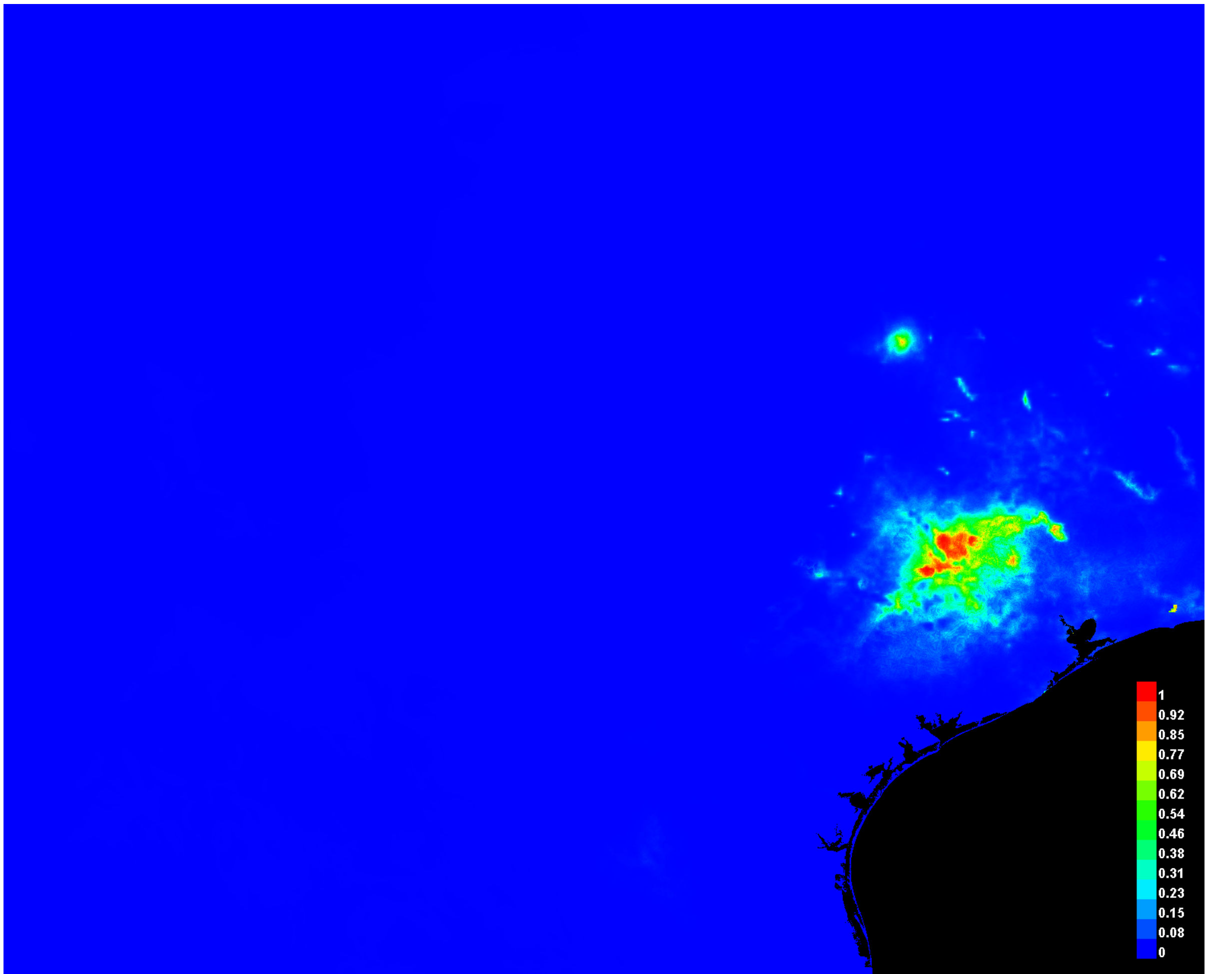


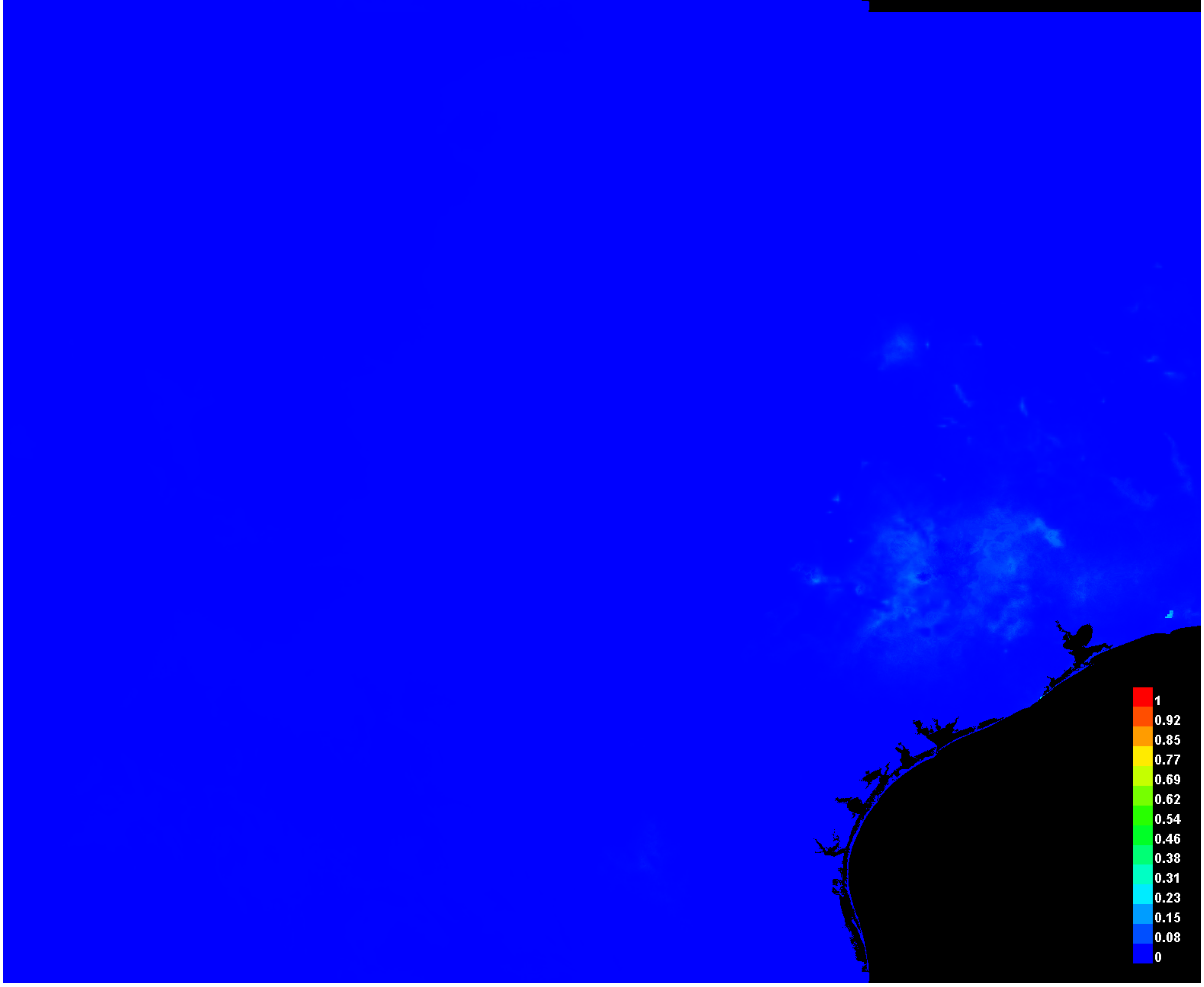
The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average test AUC for the replicate runs is 0.993, and the standard deviation is 0.004.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 5 output grids. Other available summary grids are min, max and median.

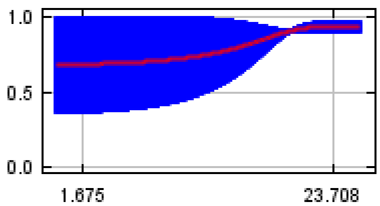

1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0


1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

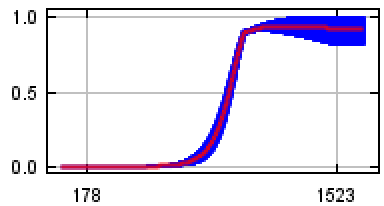
Response curves

These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 5 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).

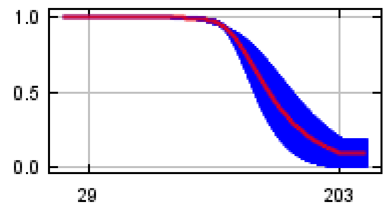
bio1



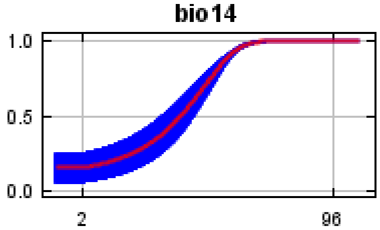
bio12



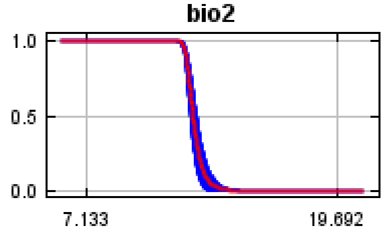
bio13



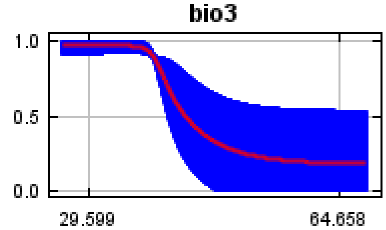
bio14



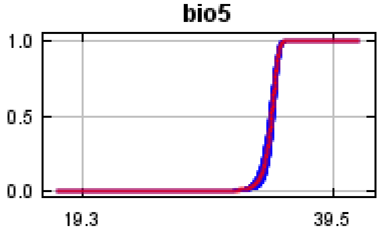
bio2



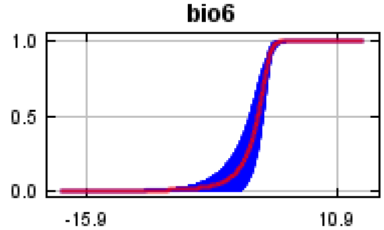
bio3



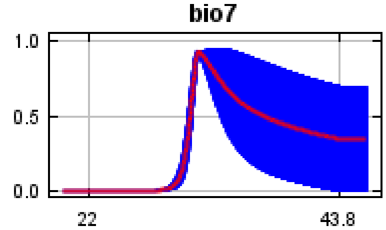
bio5



bio6

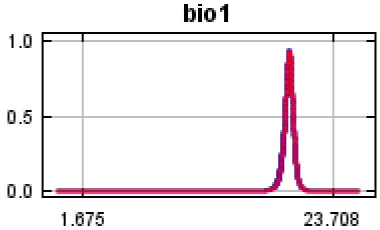


bio7

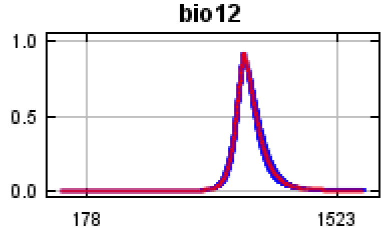


In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.

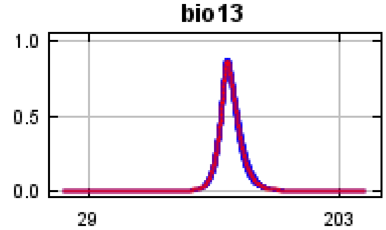
bio1

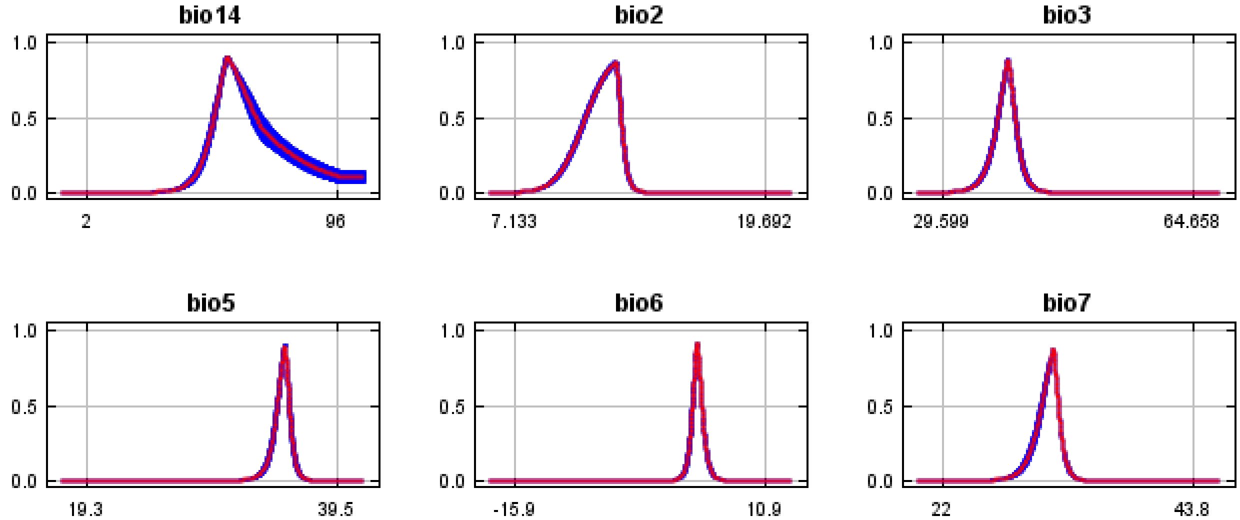


bio12



bio13



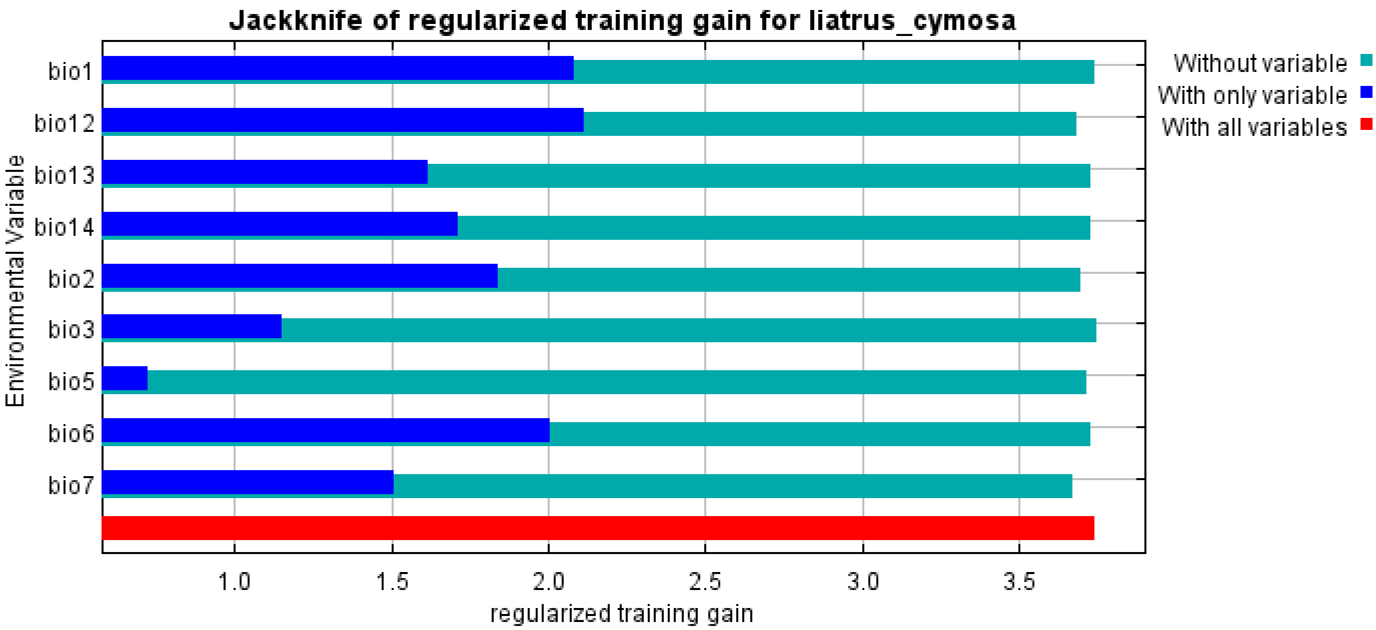


Analysis of variable contributions

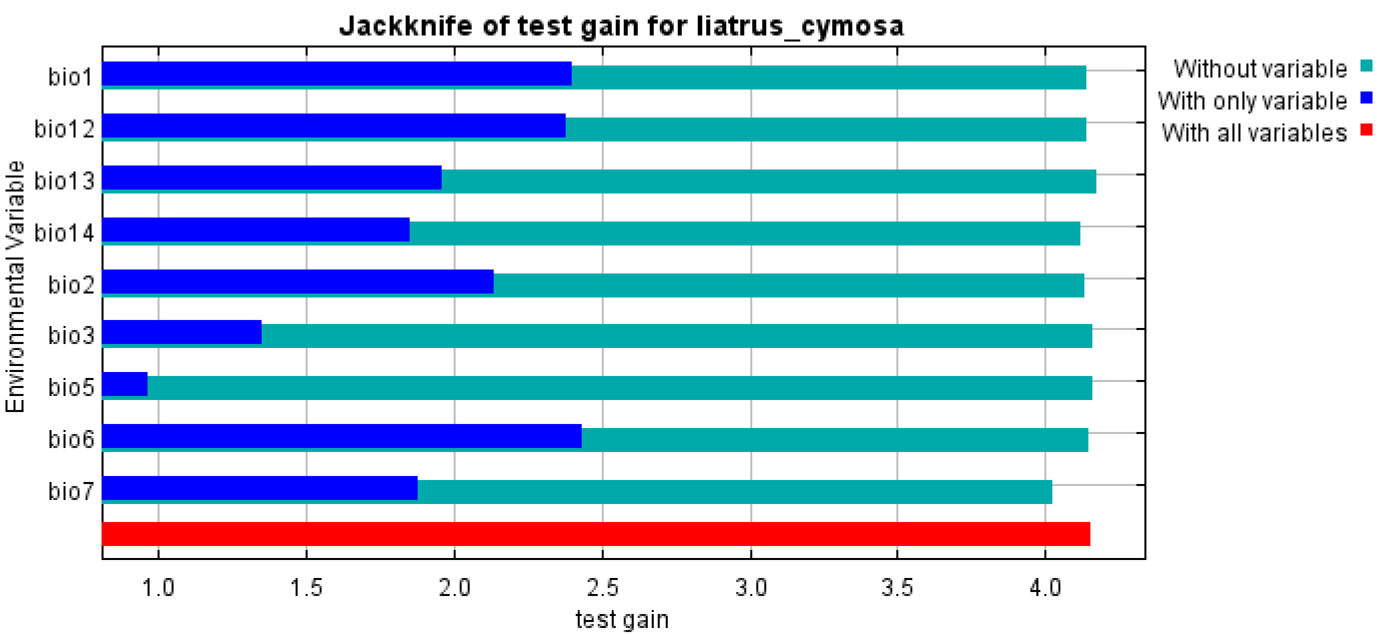
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio14	37.6	2.2
bio7	29.3	12.3
bio12	20.9	15.3
bio3	4.3	2.9
bio13	2.3	0.7
bio2	1.7	40.6
bio5	1.6	11.4
bio6	1.5	14.6
bio1	0.8	0.1

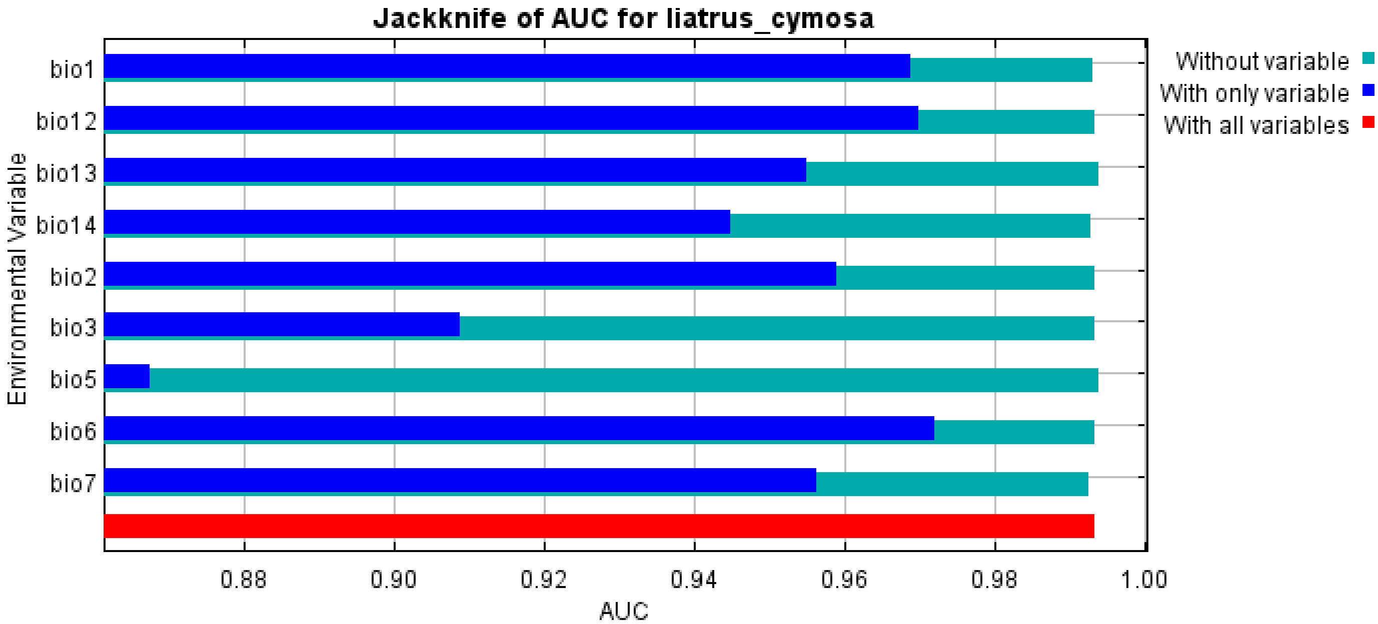
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio12, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio7, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



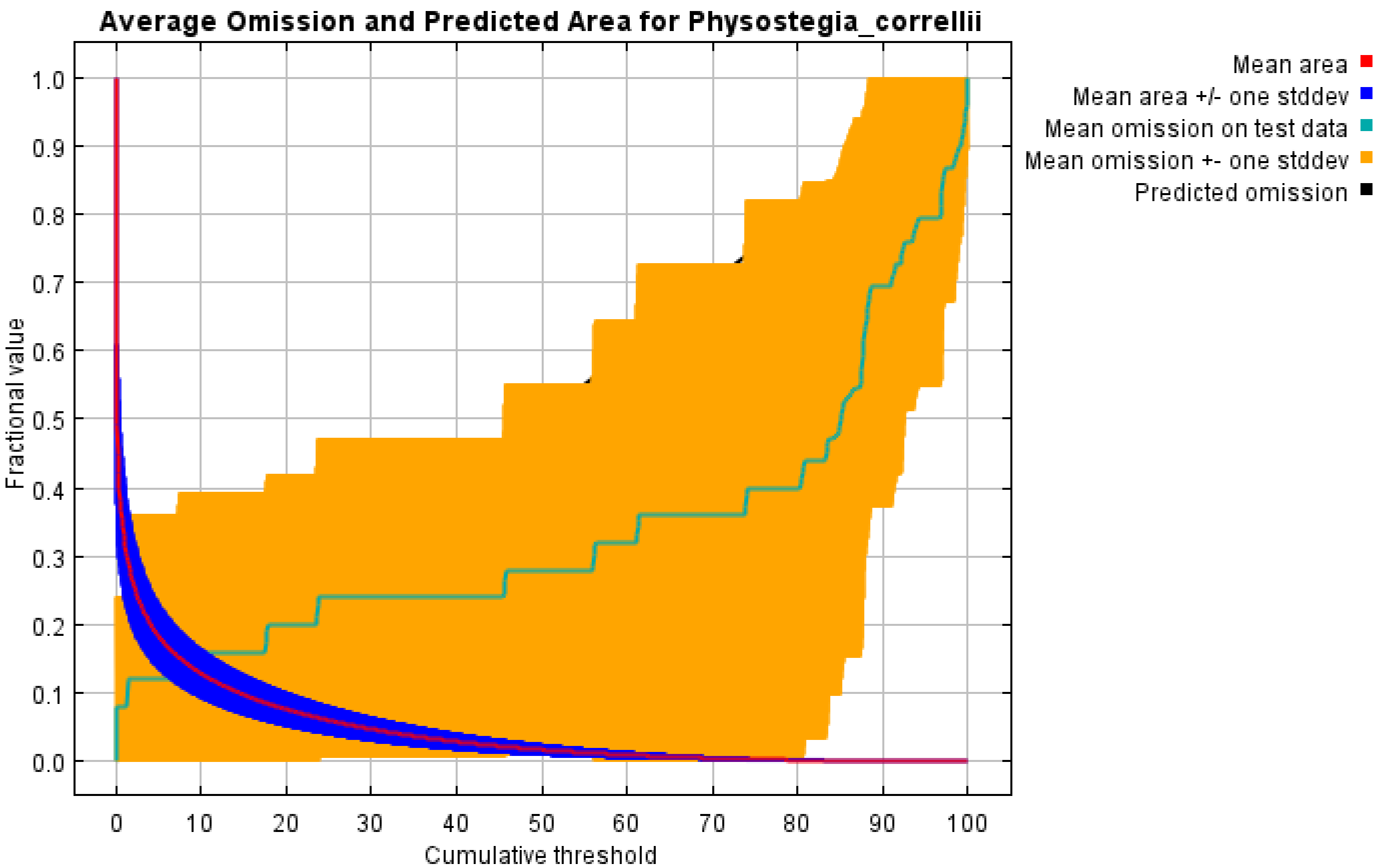
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E liatrus_cymosa responsecurves jackknife "outputdirectory=E:\TXDoT_Range Scale_Bioclim\CrossVal_Results\1reg\Liatris" "samplesfile=E:\TXDoT_Range Scale_Bioclim\spp_csv\liatris_cymosa.csv" "environmentallayers=E:\TXDoT_Range Scale_Bioclim\Ascii" replicates=5 writebackgroundpredictions -N bio0

Replicated maxent model for Physostegia_correllii

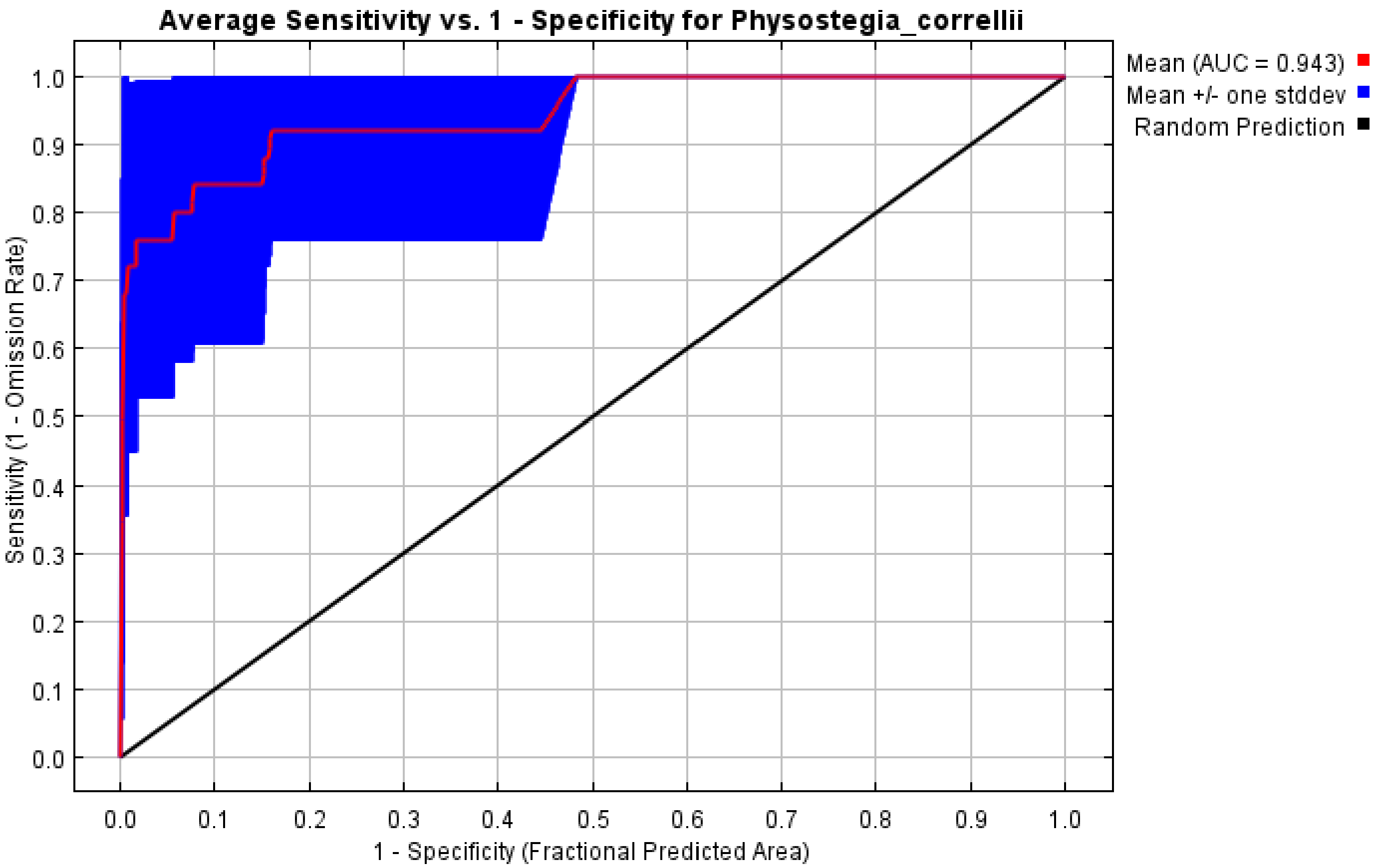
This page summarizes the results of 5-fold cross-validation for Physostegia_correllii, created Fri Dec 03 21:09:55 CST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4]

Analysis of omission/commission

The following picture shows the test omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs. The omission rate should be close to the predicted omission, because of the definition of the cumulative threshold.

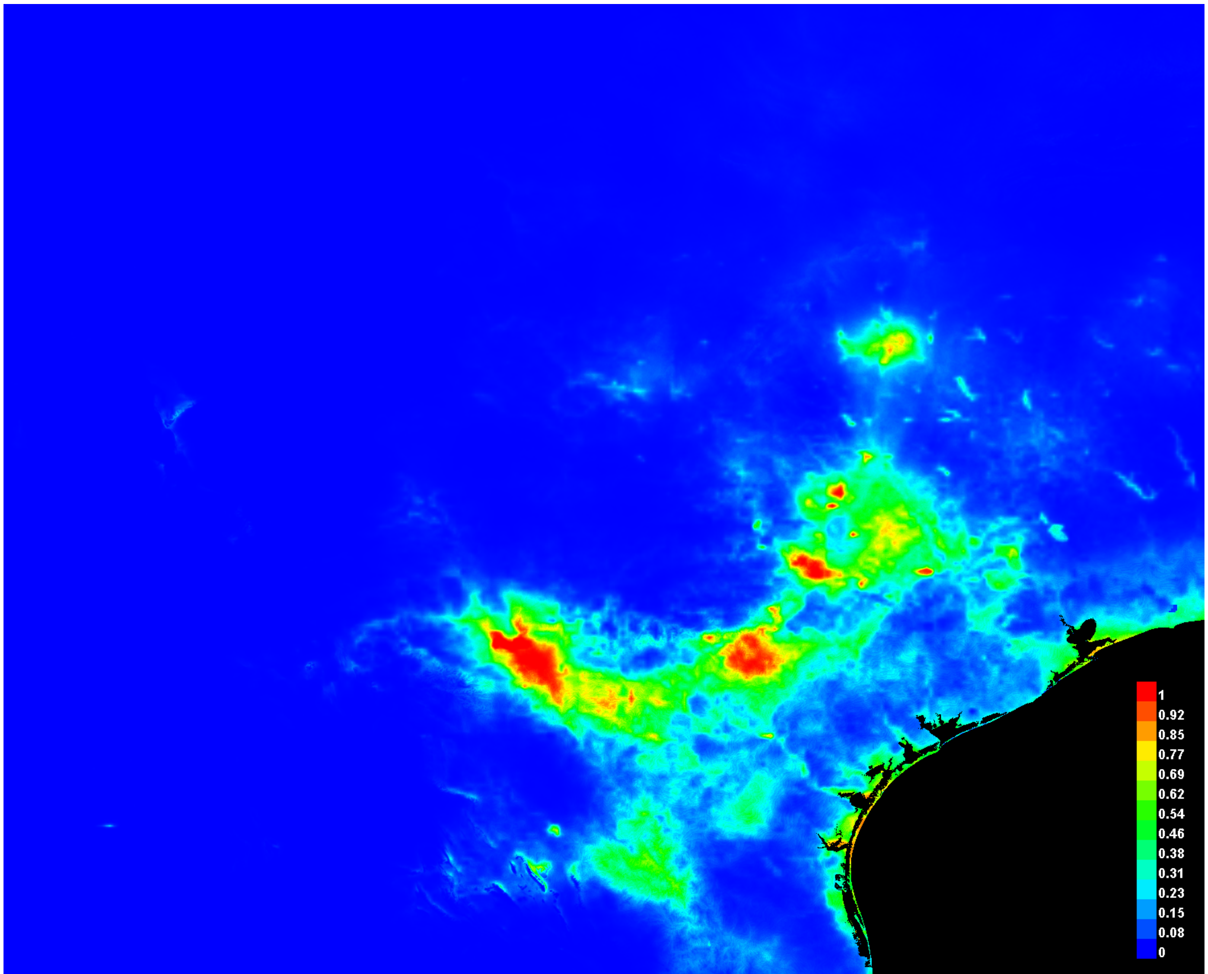


The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average test AUC for the replicate runs is 0.943, and the standard deviation is 0.082.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 5 output grids. Other available summary grids are min, max and median.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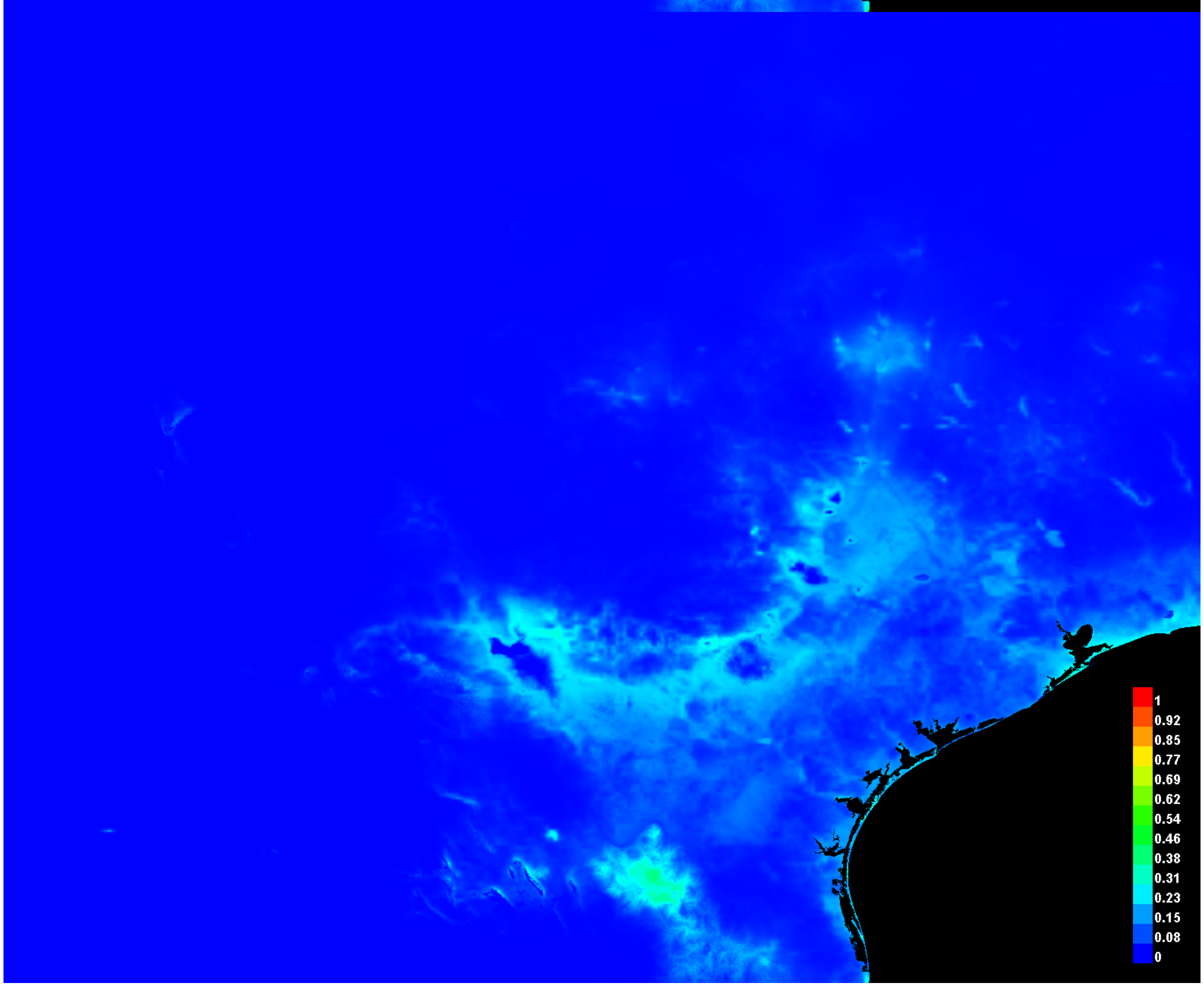
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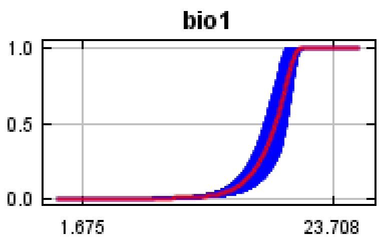
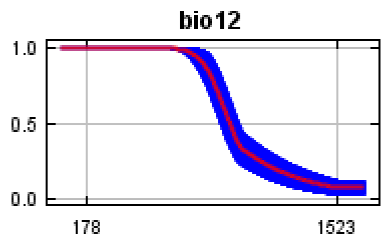
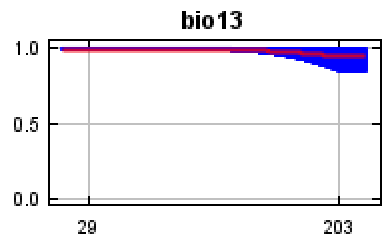
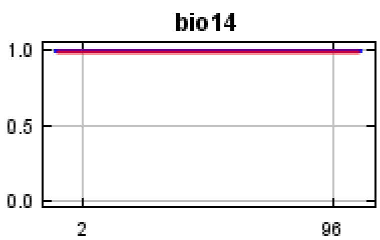
Response curves

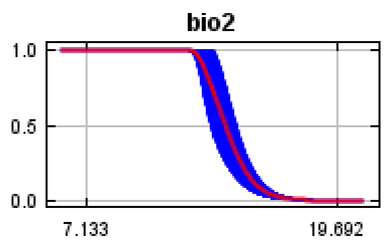
These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 5 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).

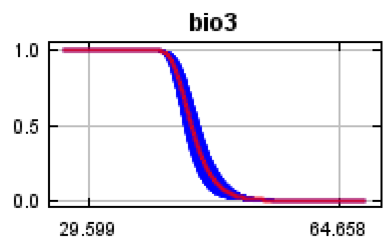


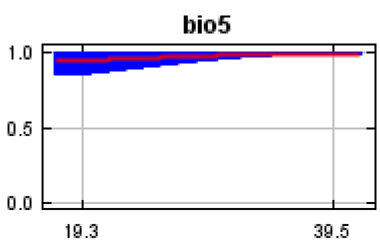


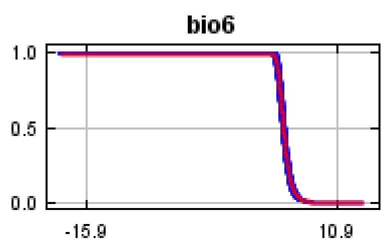


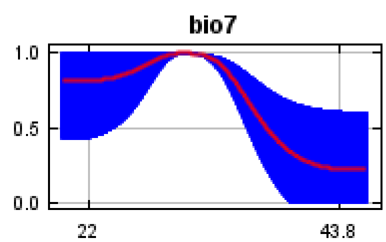




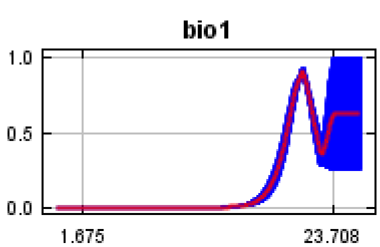


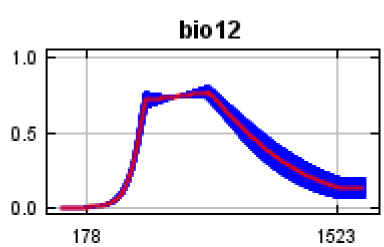


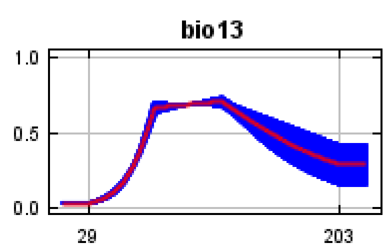


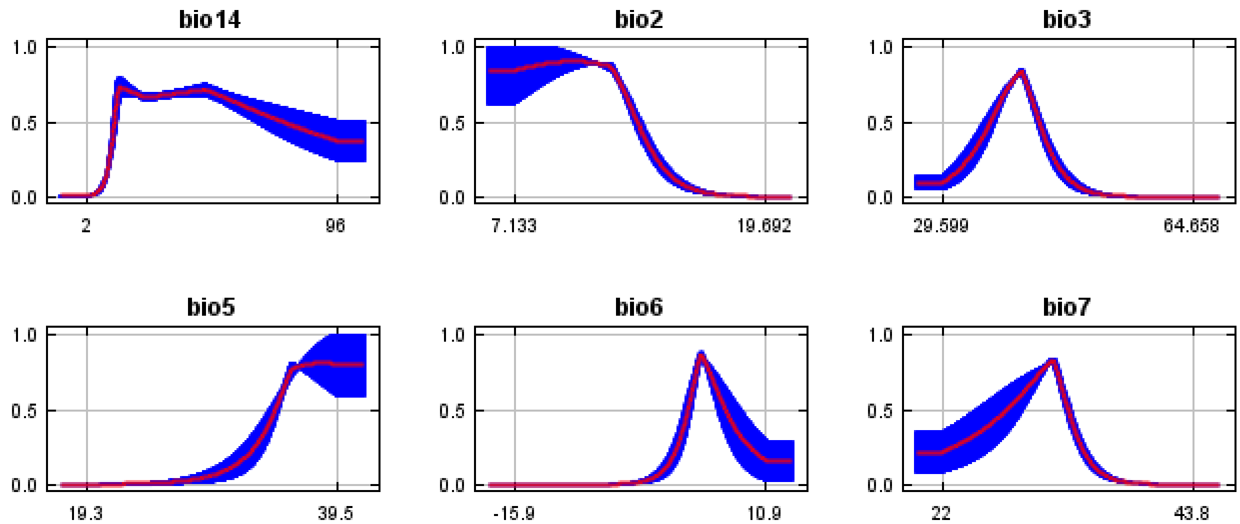


In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.







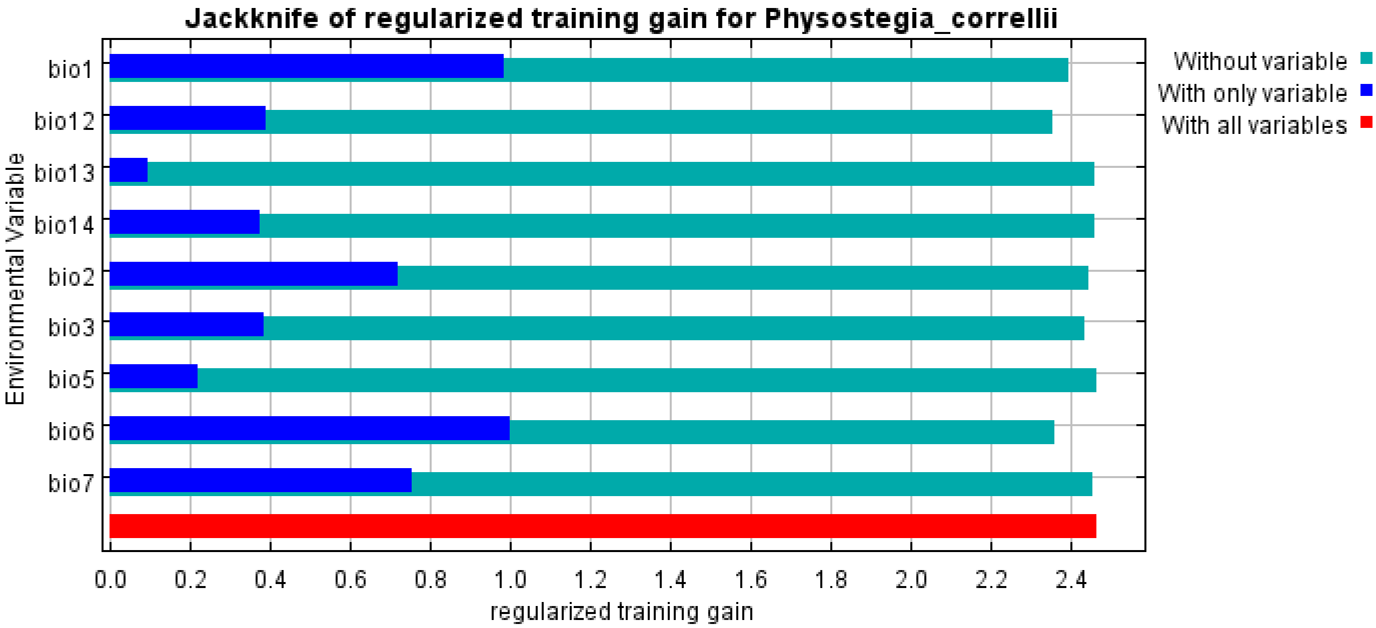


Analysis of variable contributions

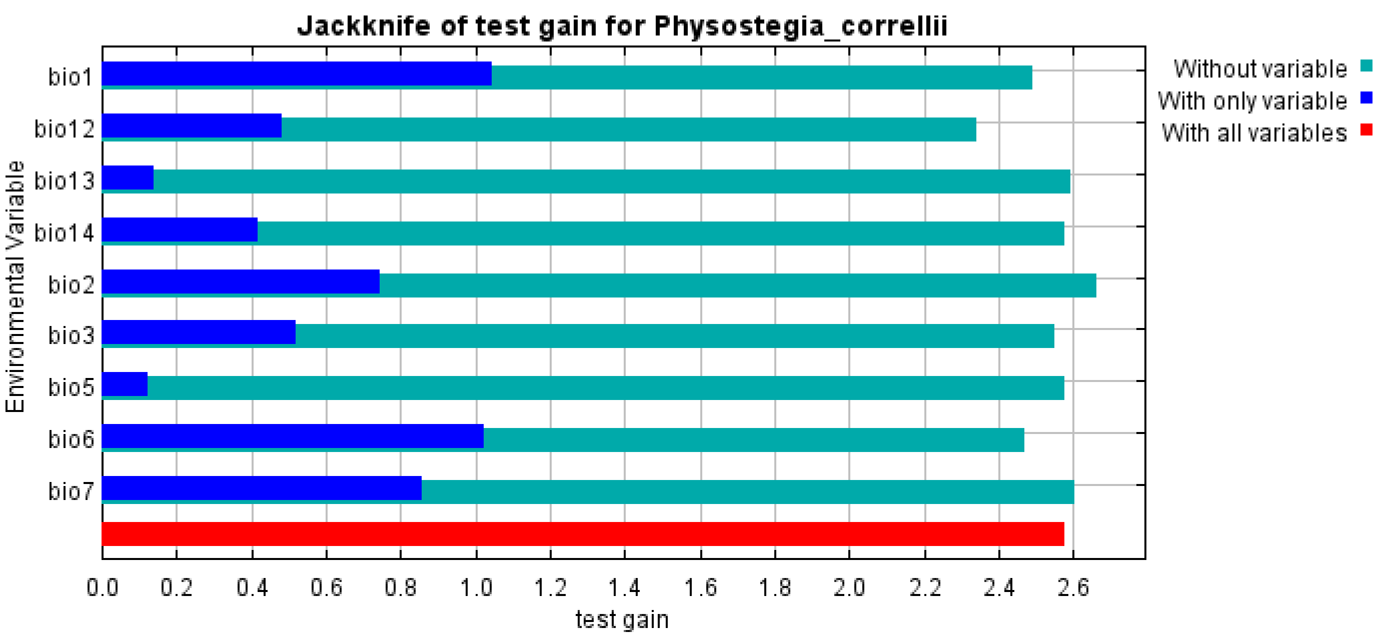
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio7	24.4	6.6
bio2	21.5	22.2
bio12	13	18.3
bio1	12.2	27.2
bio6	10.3	8
bio3	8.8	17.5
bio14	8.1	0
bio13	1.8	0.1
bio5	0	0

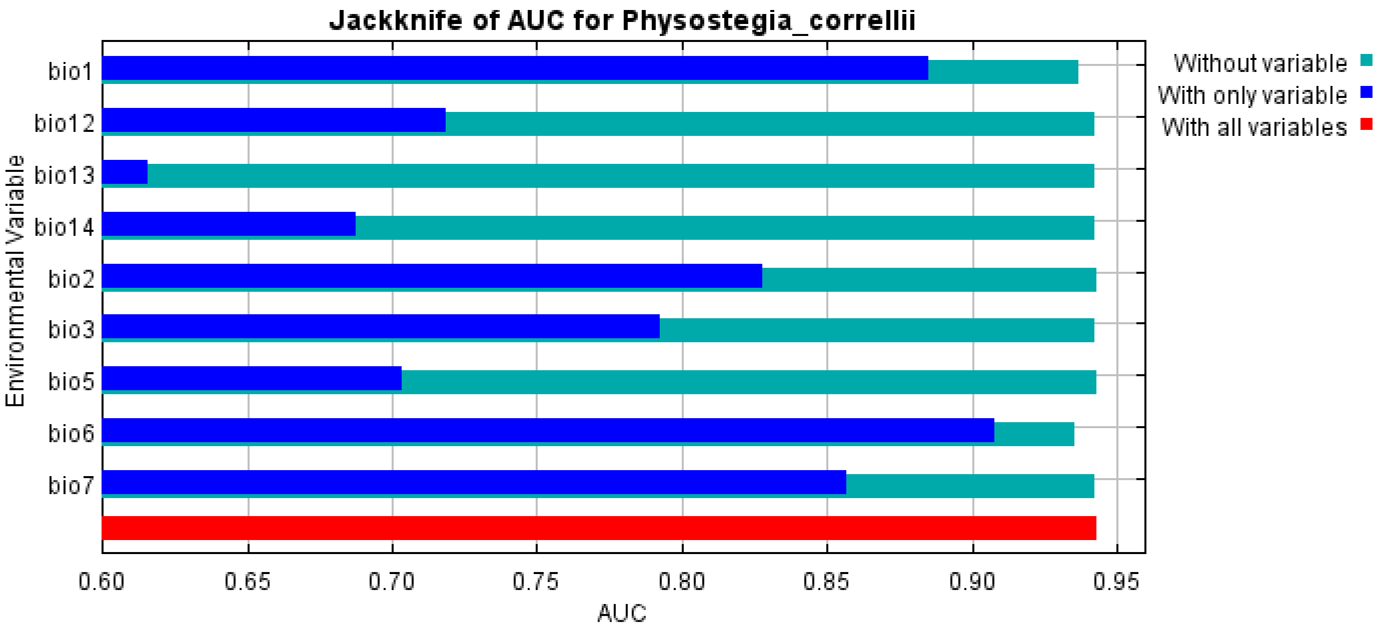
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio6, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio12, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



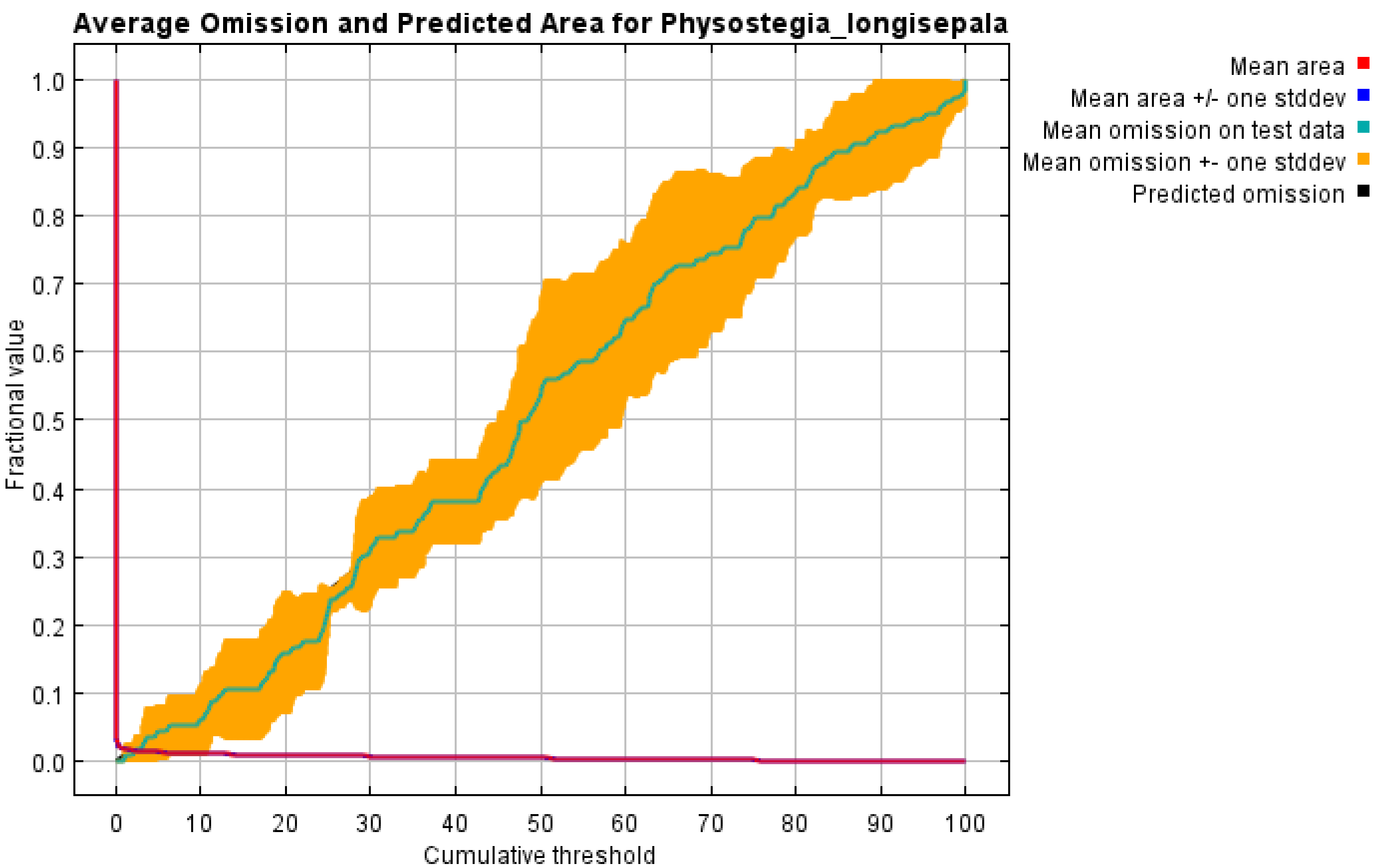
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Physostegia_correllii responsecurves jackknife "outputdirectory=E:\TXDoT_Range Scale_Bioclim\CrossVal_Results\1reg\Physostegia" "samplesfile=E:\TXDoT_Range Scale_Bioclim\spp_csv\Physostegia correllii.csv" "environmentallayers=E:\TXDoT_Range Scale_Bioclim\Ascii" replicates=5 writebackgroundpredictions -N bio0

Replicated maxent model for Physostegia_longisepala

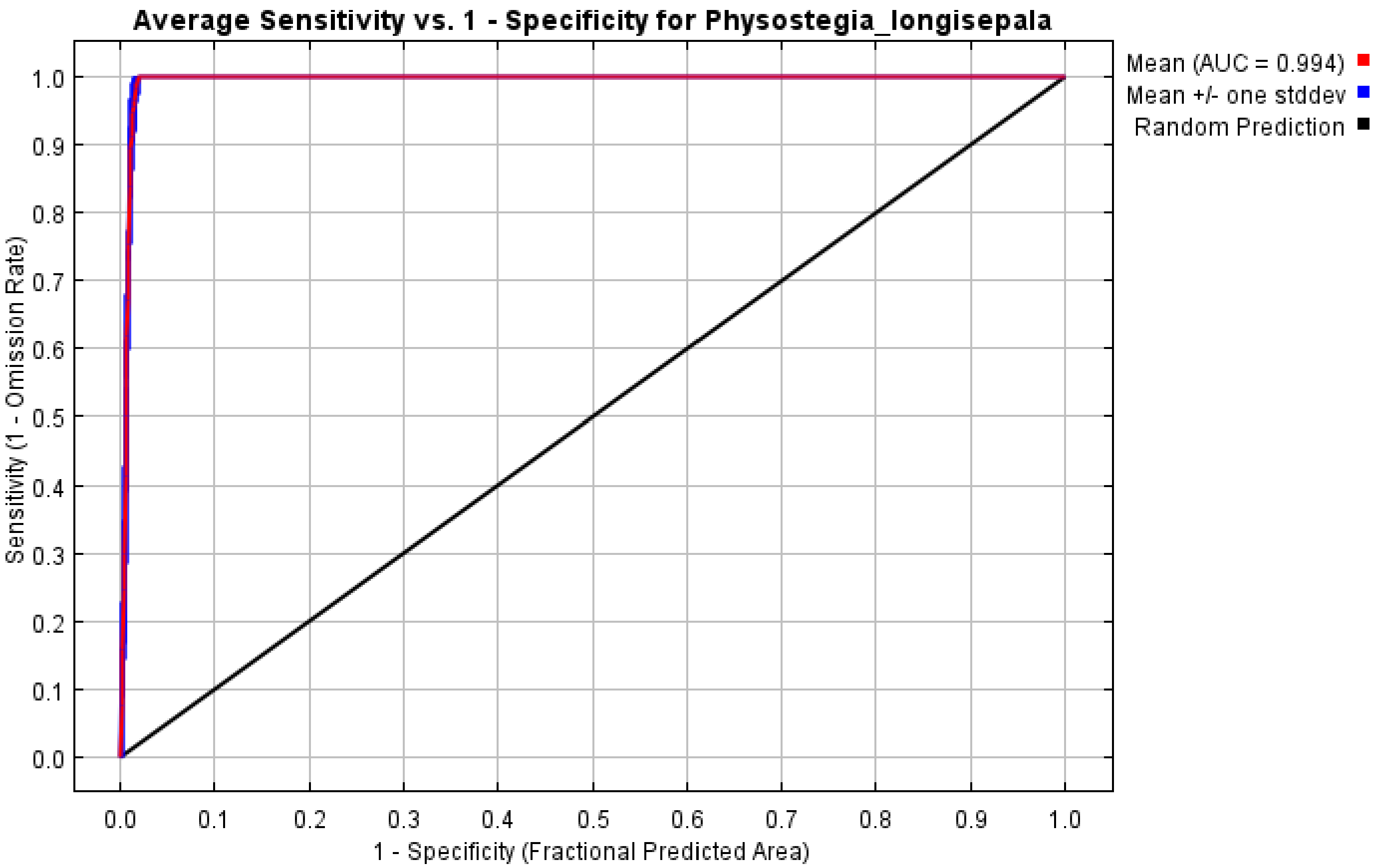
This page summarizes the results of 5-fold cross-validation for Physostegia_longisepala, created Fri Dec 03 21:14:34 CST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4]

Analysis of omission/commission

The following picture shows the test omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs. The omission rate should be close to the predicted omission, because of the definition of the cumulative threshold.



The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average test AUC for the replicate runs is 0.994, and the standard deviation is 0.001.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 5 output grids. Other available summary grids are min, max and median.


1
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0.69
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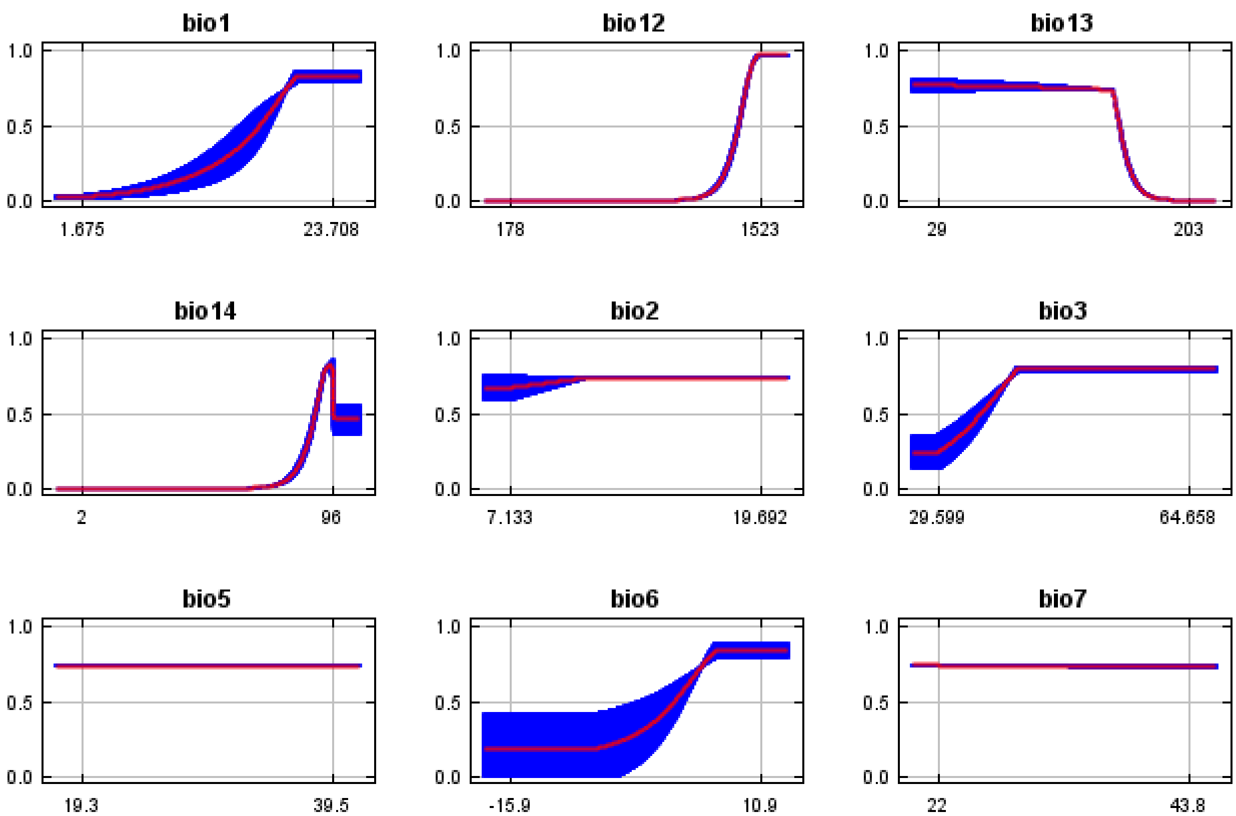
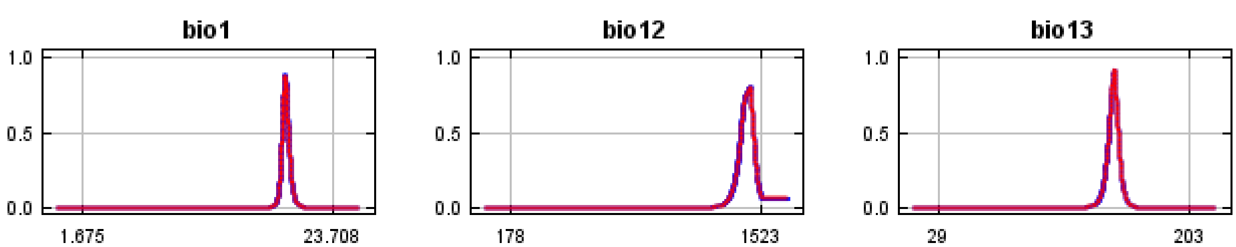
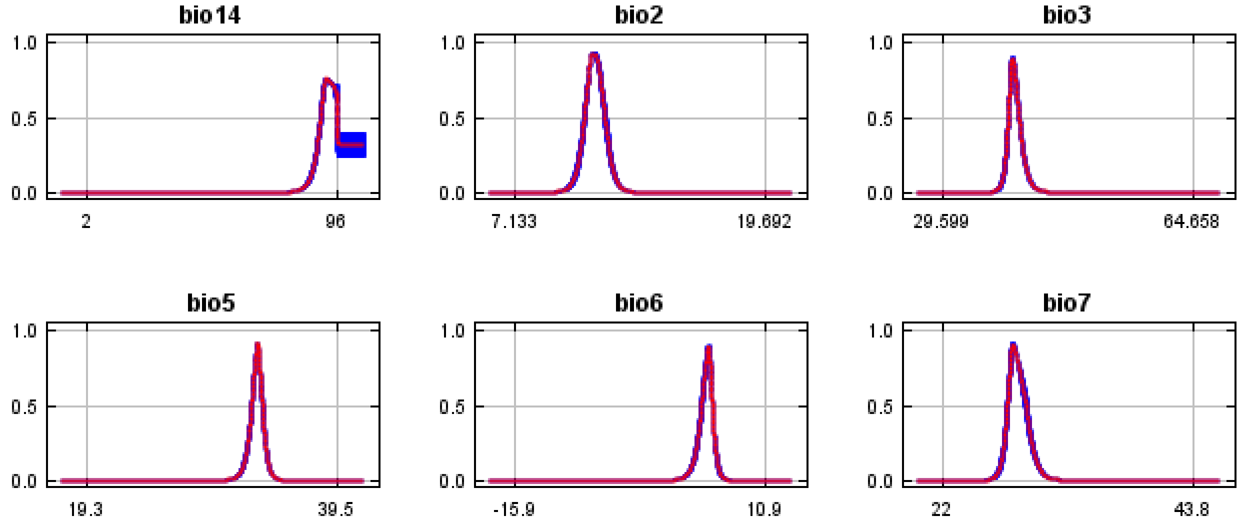
Response curves

These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 5 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).



In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.



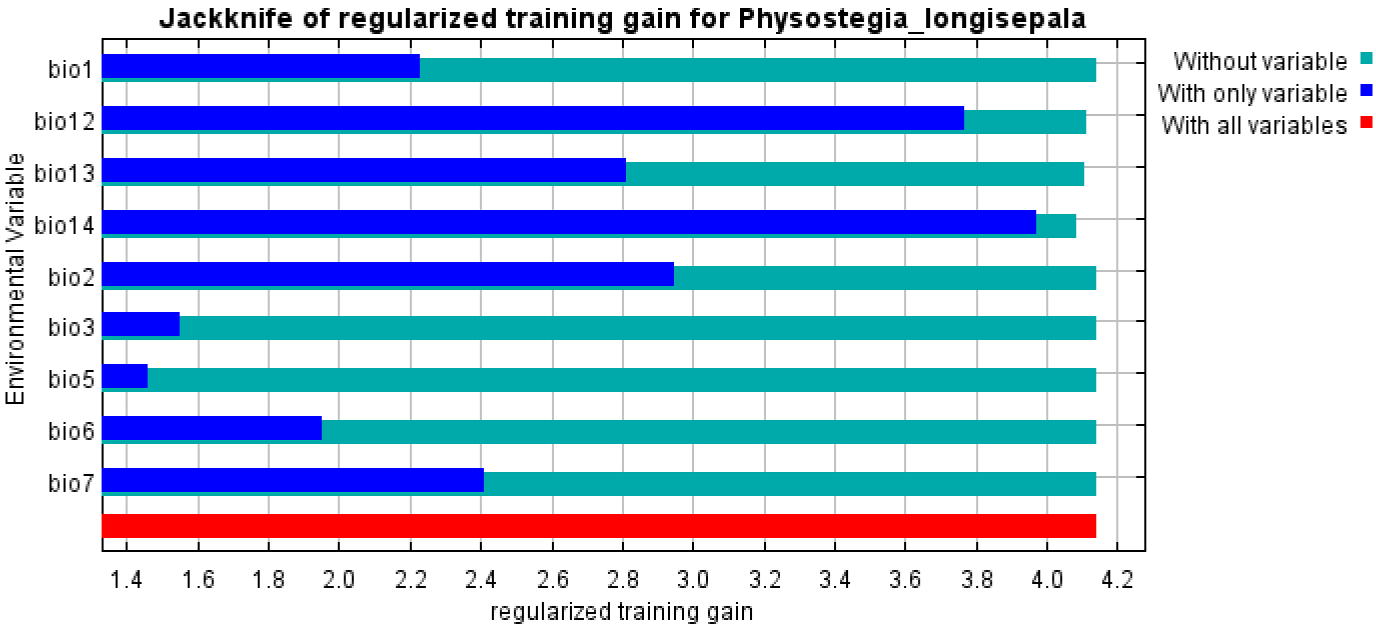


Analysis of variable contributions

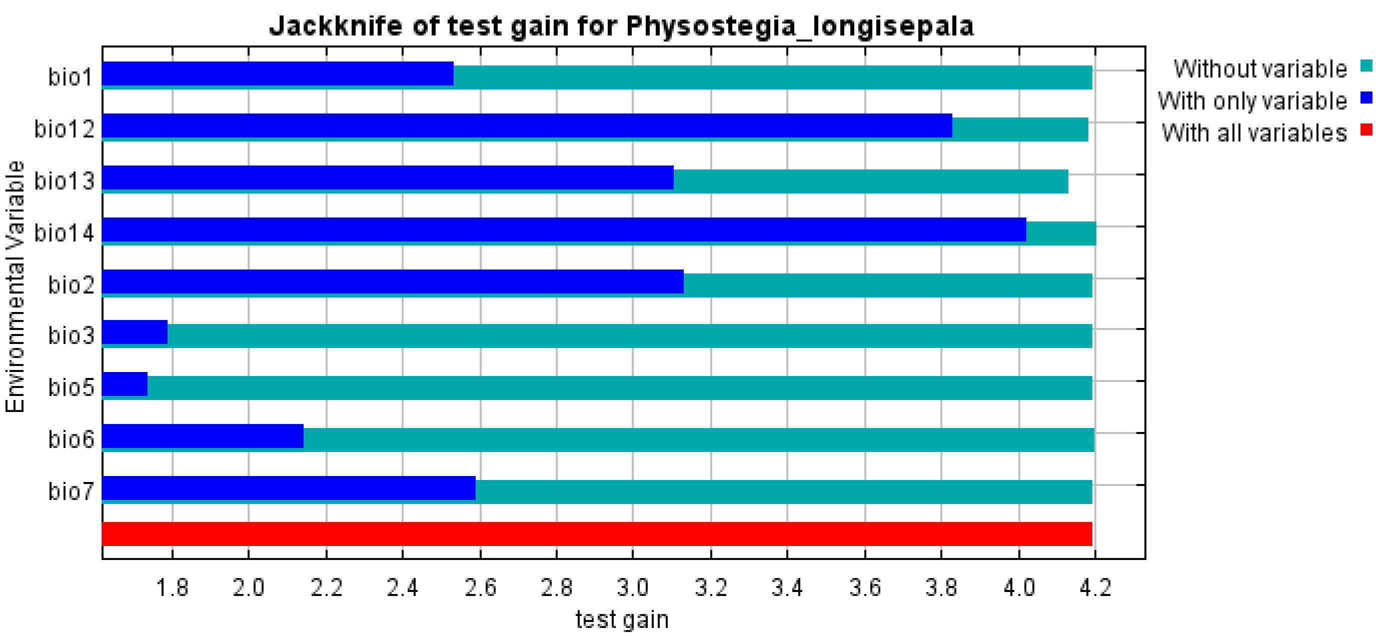
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio14	78.2	55.1
bio12	7.4	43.1
bio1	5.4	0.7
bio13	3.7	0.3
bio5	1.6	0
bio2	1.6	0
bio7	1.3	0
bio3	0.6	0.2
bio6	0.3	0.6

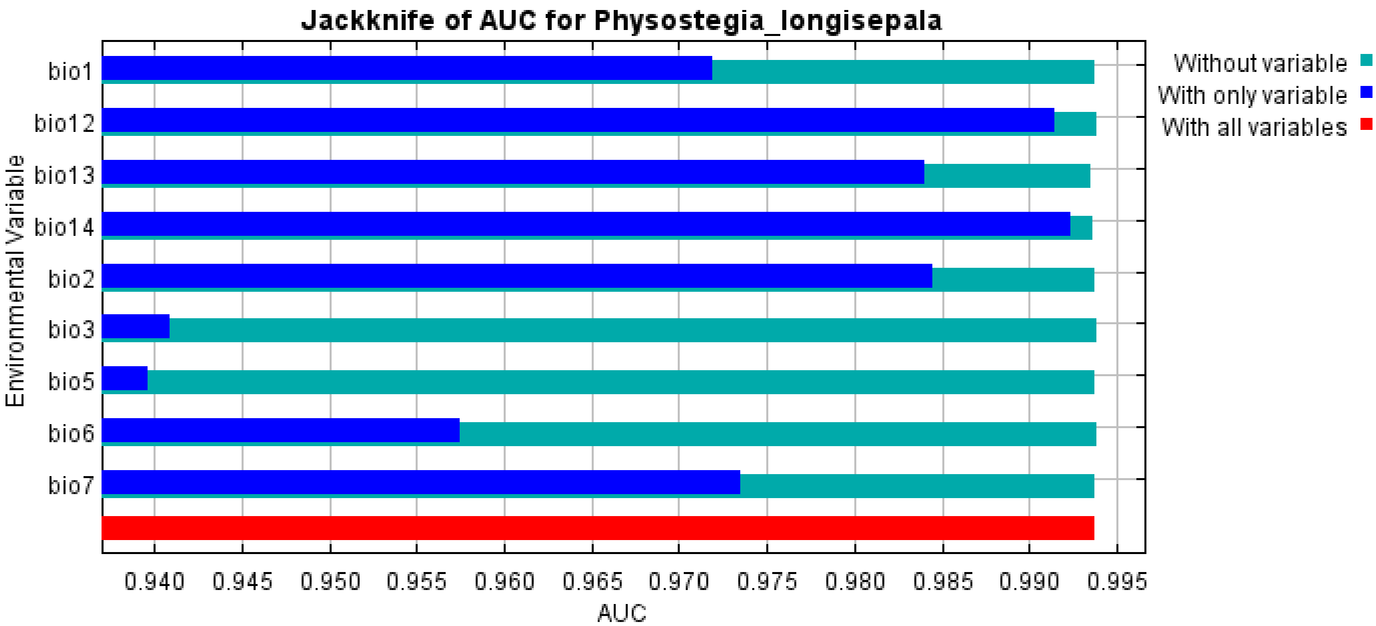
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio14, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio14, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



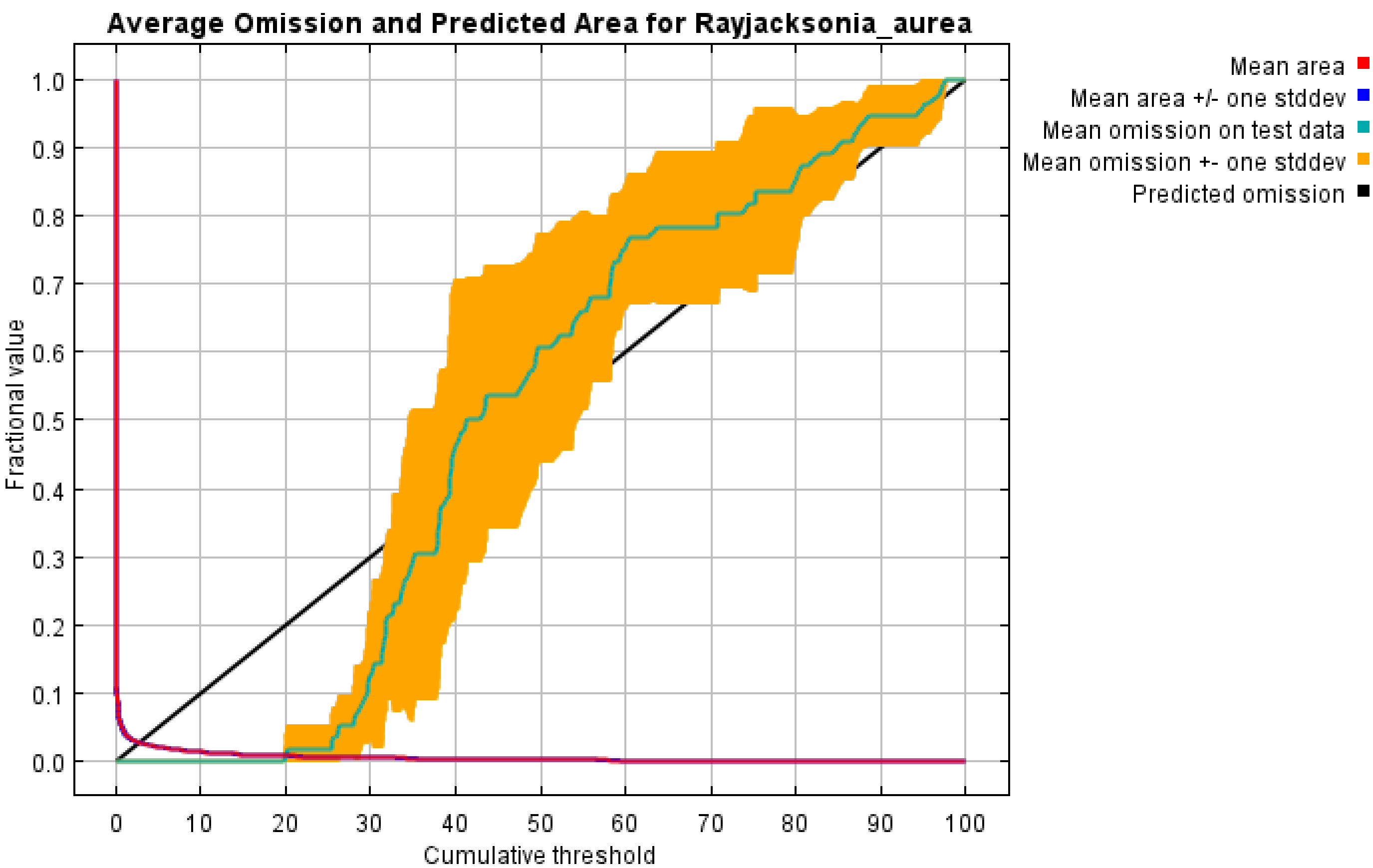
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Physostegia_longisepala responsecurves jackknife "outputdirectory=E:\TXDoT_Range Scale_Bioclim\CrossVal_Results\1reg\Physostegia_L" "samplesfile=E:\TXDoT_Range Scale_Bioclim\spp_csv\physostegia_longisepala.csv" "environmentallayers=E:\TXDoT_Range Scale_Bioclim\Ascii" replicates=5 writebackgroundpredictions -N bio0

Replicated maxent model for Rayjacksonia_aurea

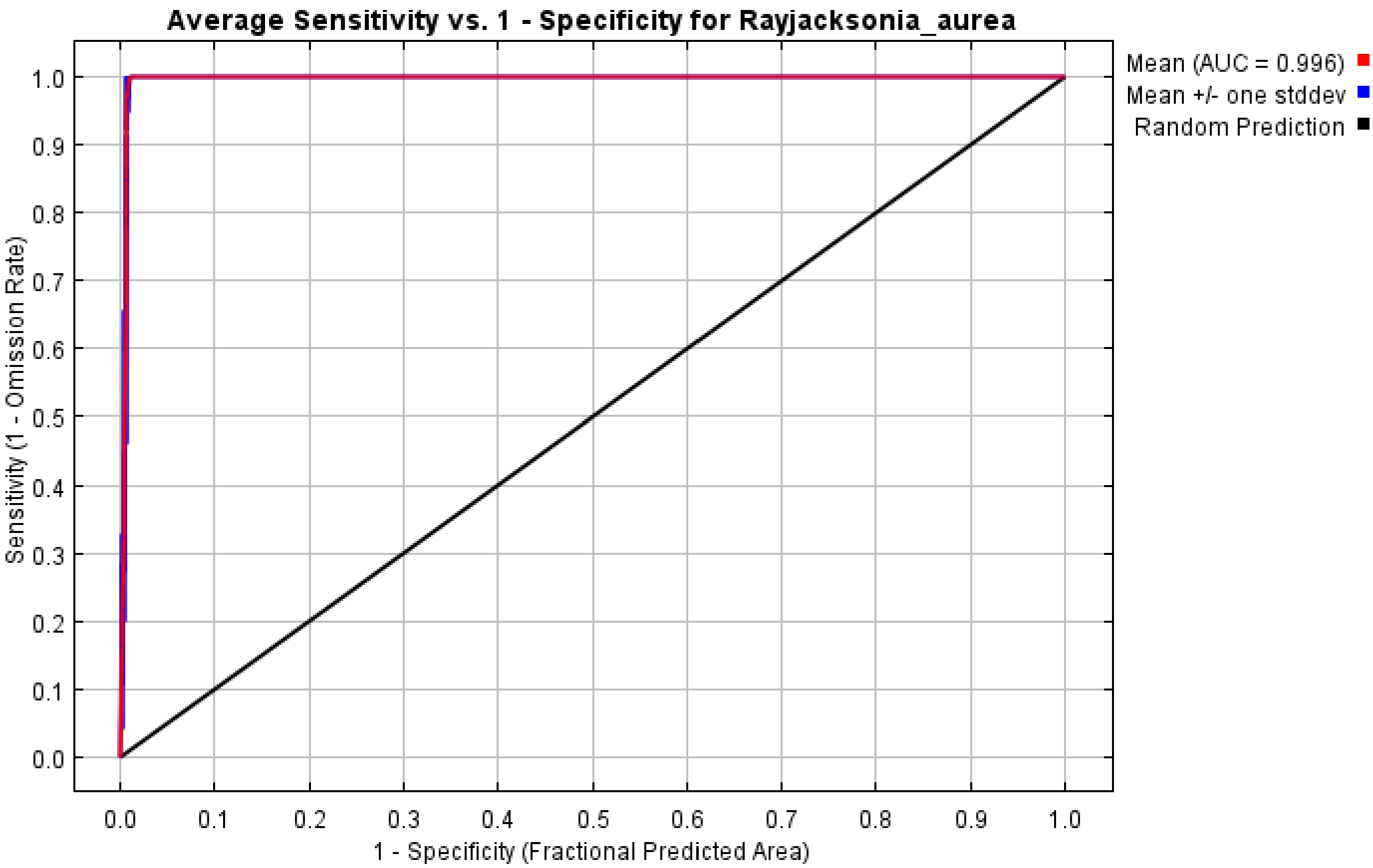
This page summarizes the results of 5-fold cross-validation for Rayjacksonia_aurea, created Fri Dec 03 21:20:14 CST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4]

Analysis of omission/commission

The following picture shows the test omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs. The omission rate should be close to the predicted omission, because of the definition of the cumulative threshold.

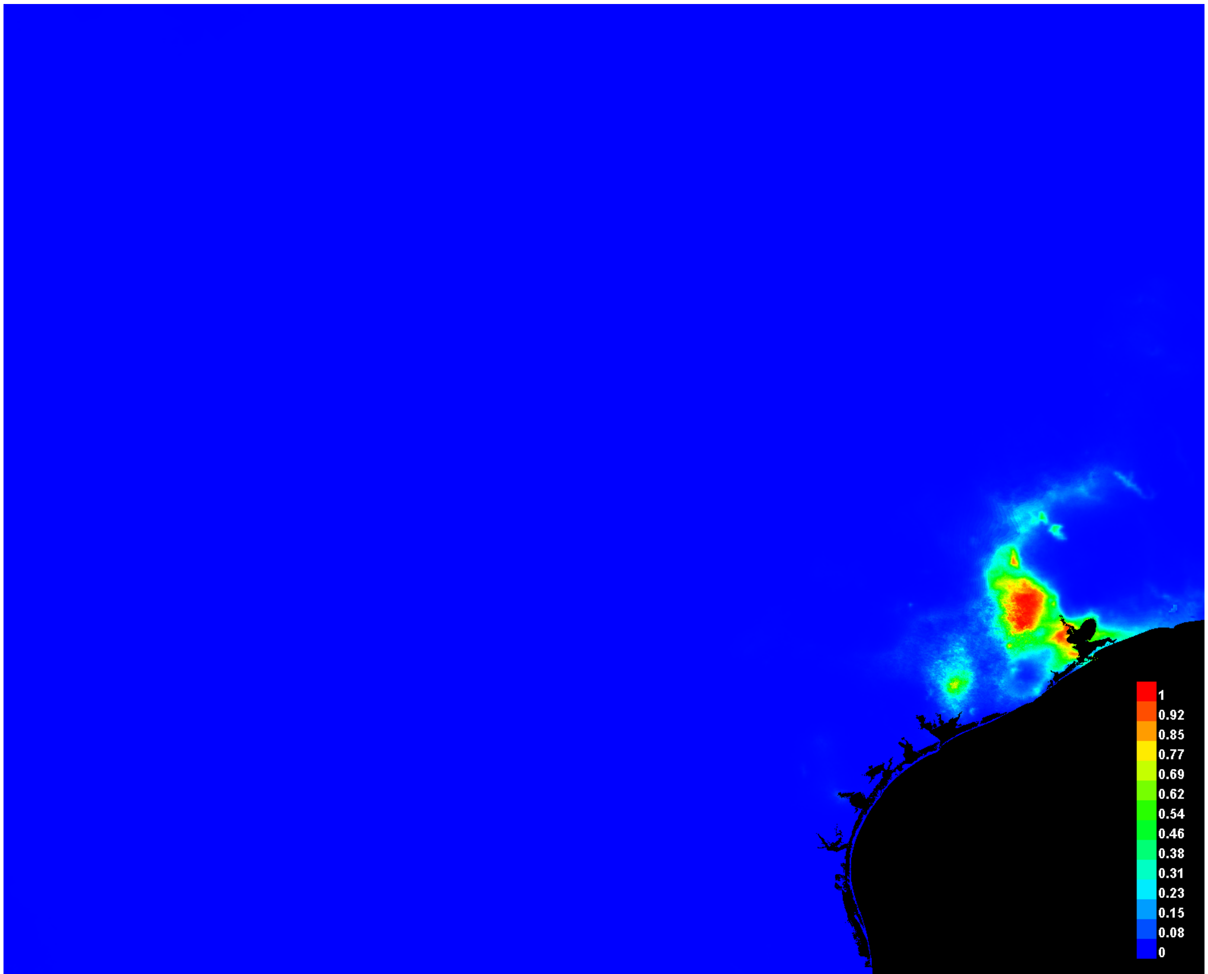


The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average test AUC for the replicate runs is 0.996, and the standard deviation is 0.001.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 5 output grids. Other available summary grids are min, max and median.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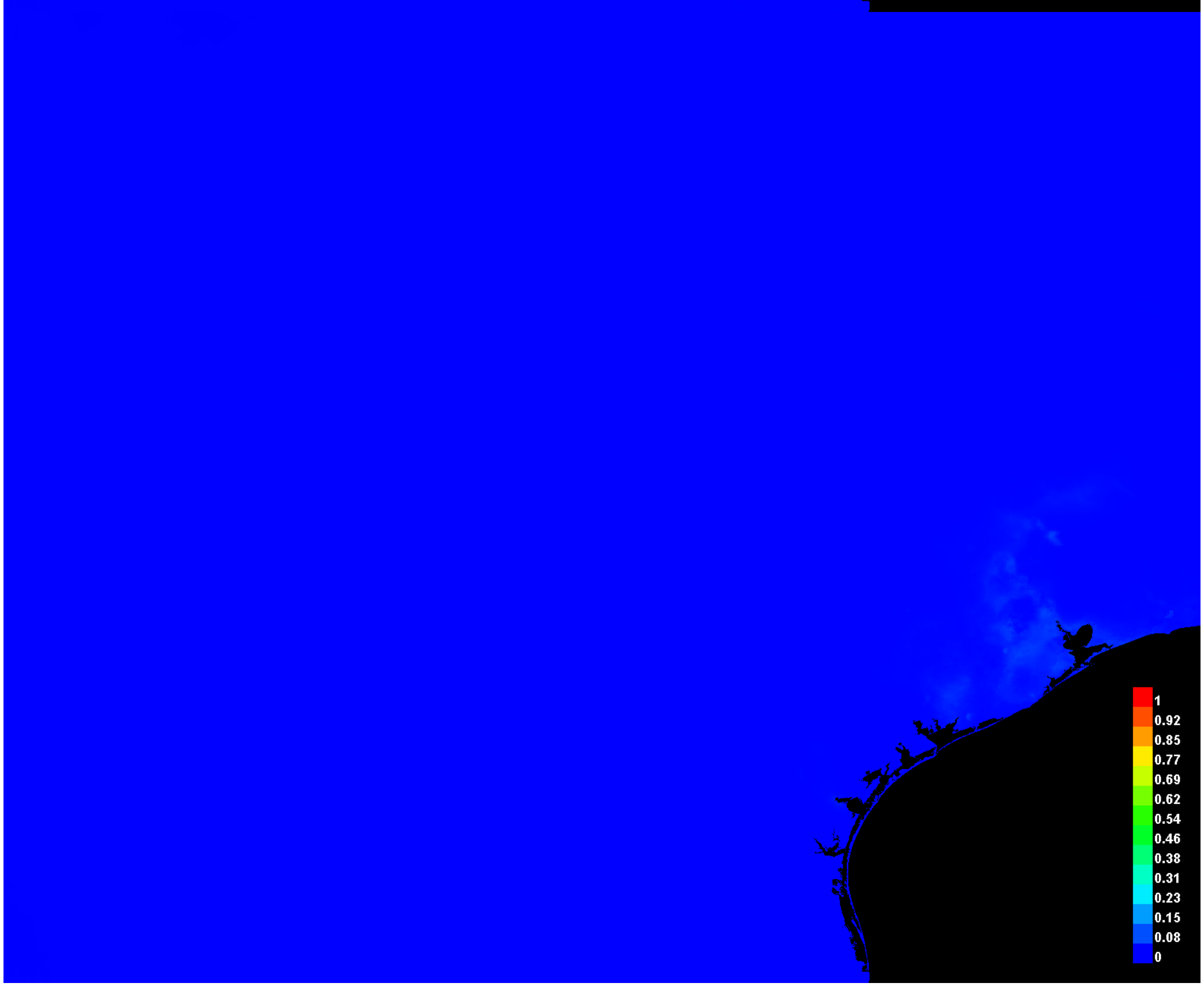
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0.69
0.62
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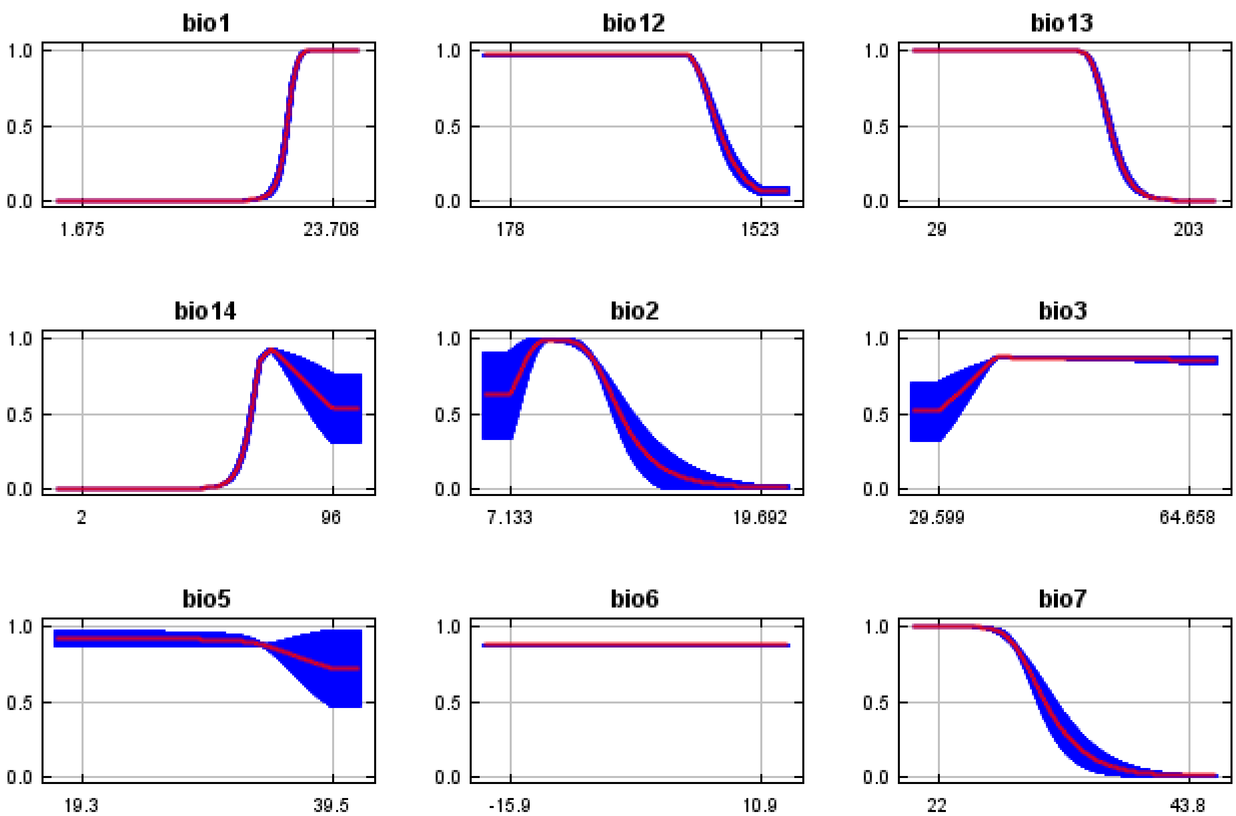
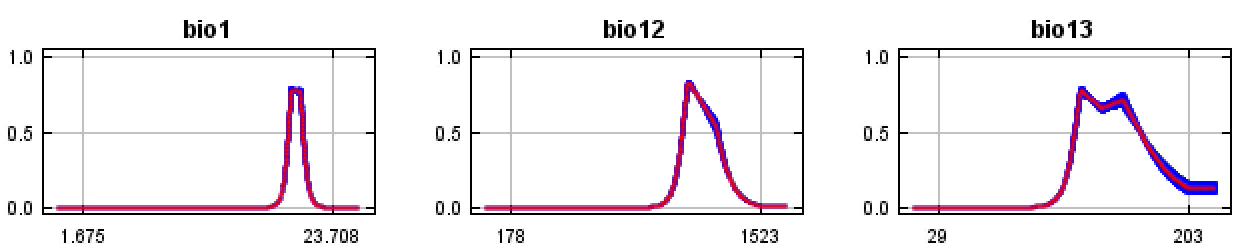
0.08
0

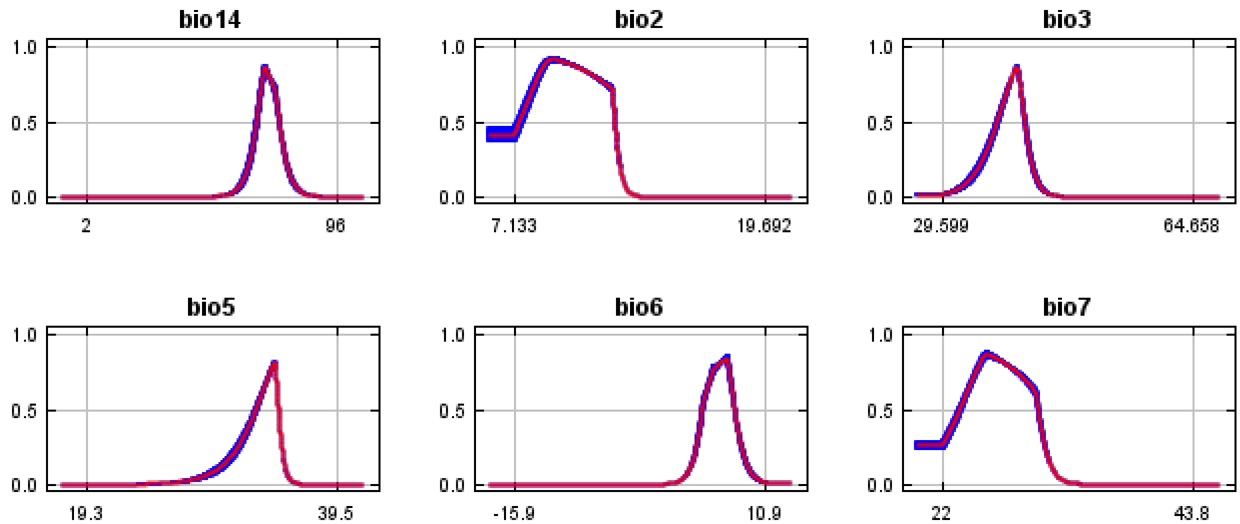
Response curves

These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 5 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).



In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.



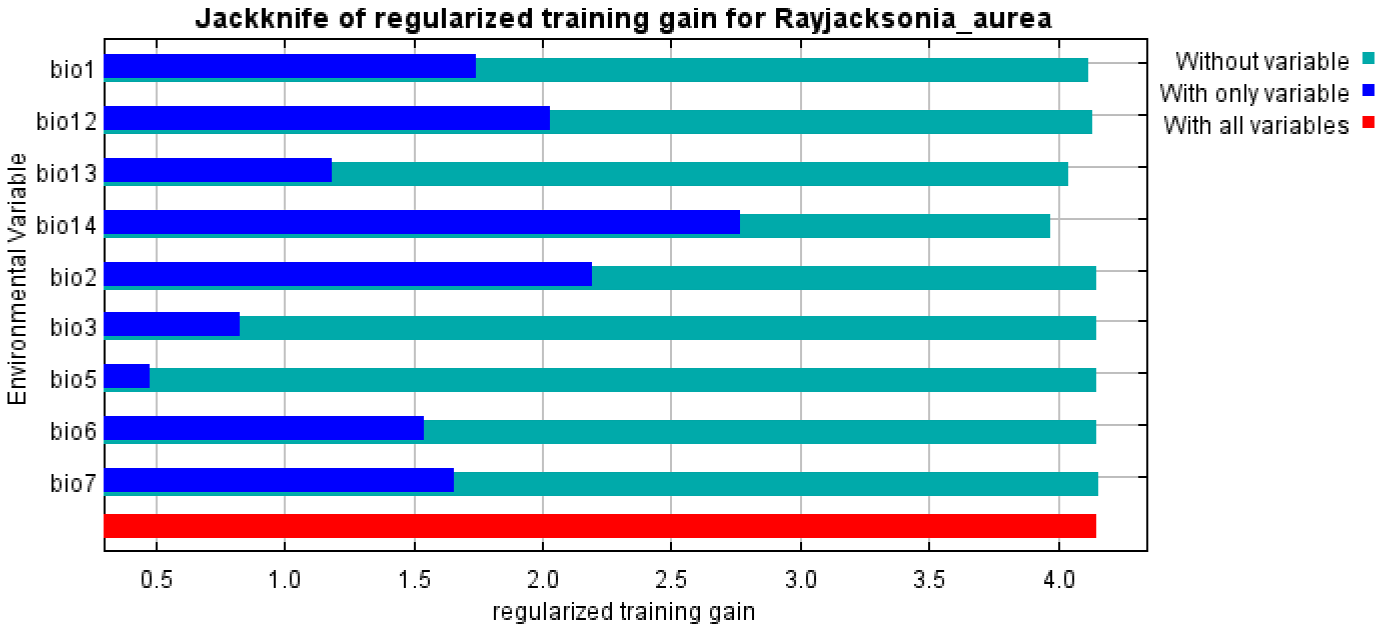


Analysis of variable contributions

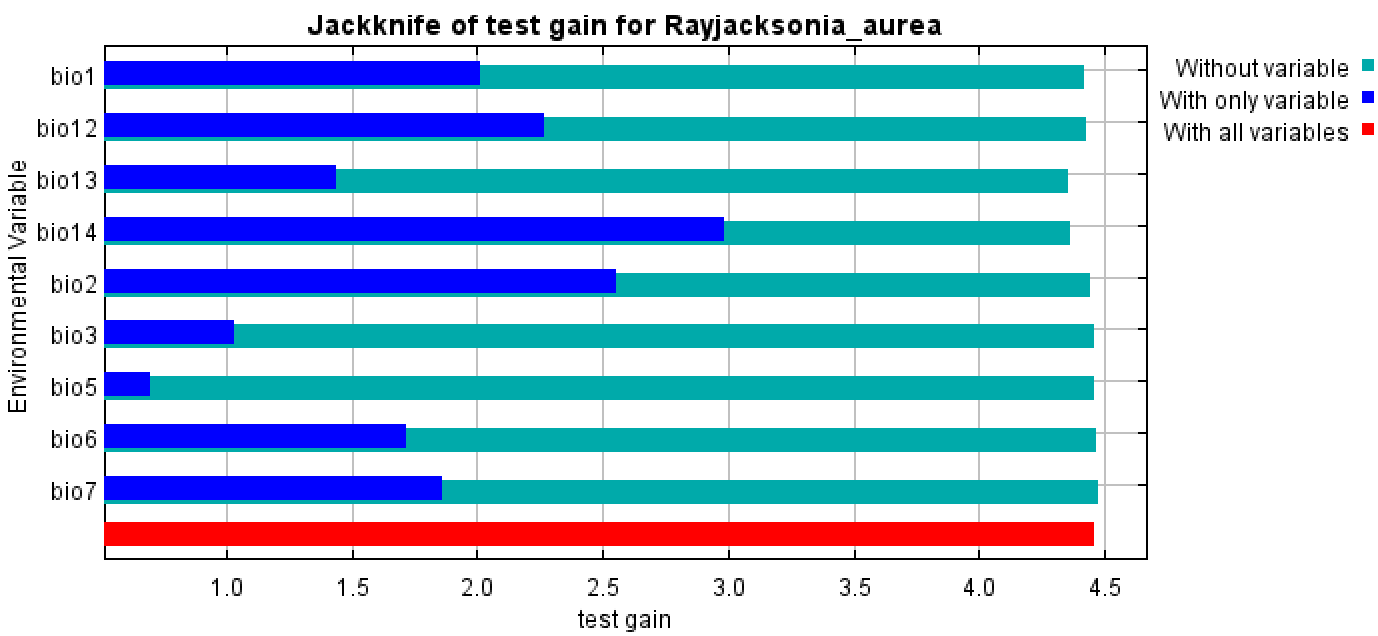
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio14	61.7	78.1
bio7	30.1	2.6
bio13	4.4	3.1
bio6	1.5	0
bio1	1.4	12.9
bio2	0.5	2.7
bio12	0.3	0.6
bio3	0.1	0.1
bio5	0	0.1

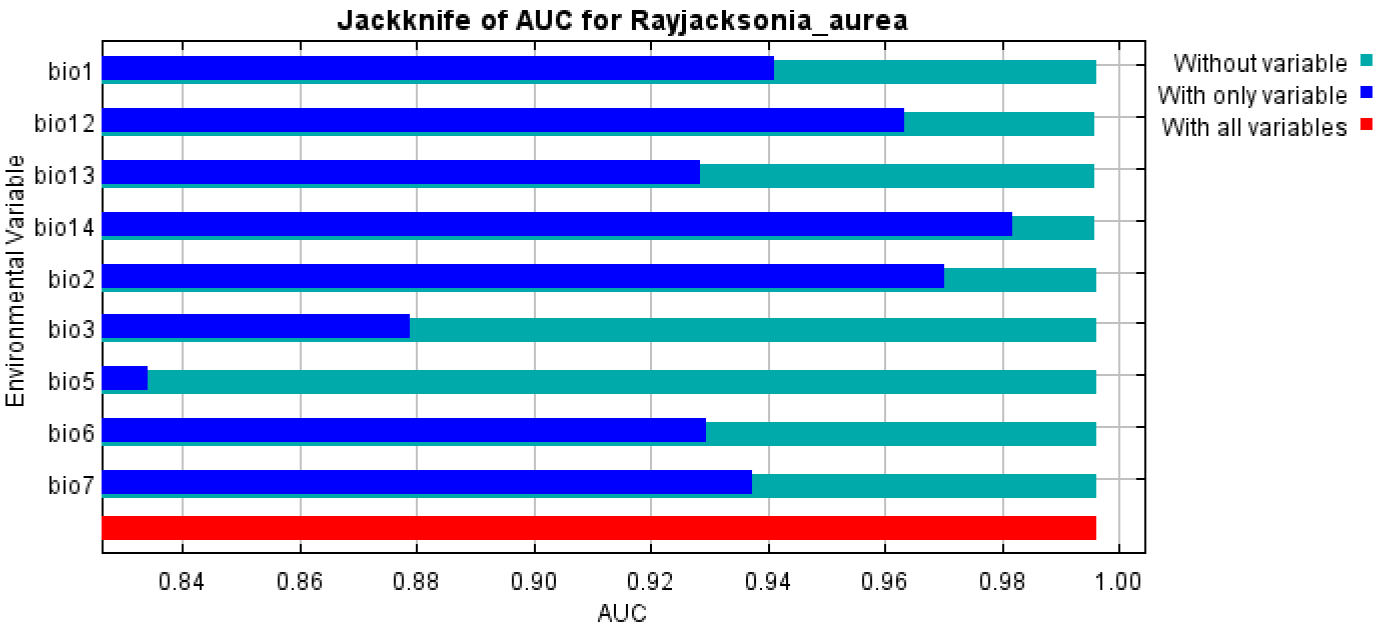
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio14, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio14, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



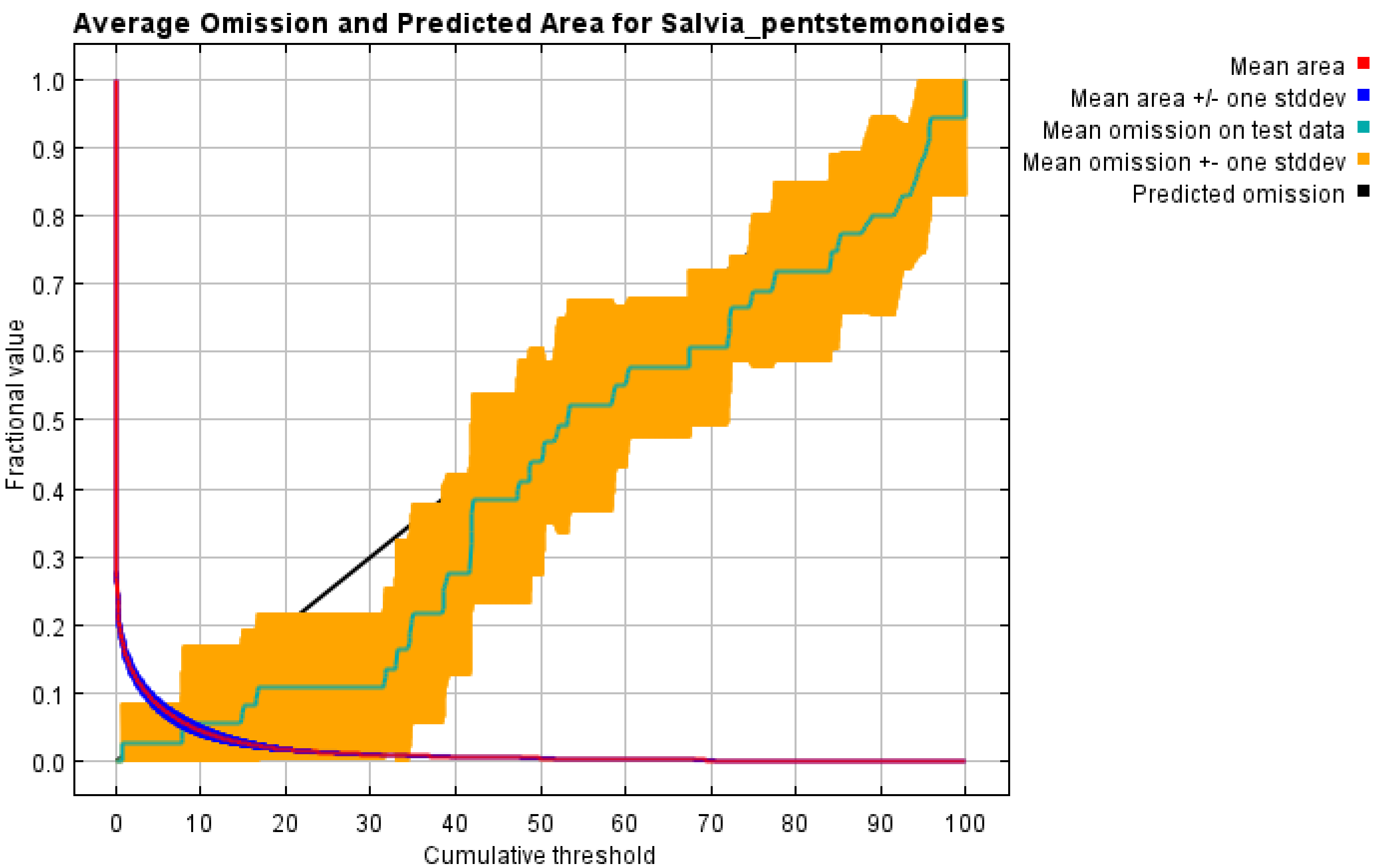
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Rayjacksonia_aurea responsecurves jackknife "outputdirectory=E:\TXDoT_Range Scale_Bioclim\CrossVal_Results\1reg\Rayjacksonia" "samplesfile=E:\TXDoT_Range Scale_Bioclim\spp_csv\Rayjacksonia_aurea.csv" "environmentallayers=E:\TXDoT_Range Scale_Bioclim\Ascii" replicates=5 writebackgroundpredictions -N bio0

Replicated maxent model for Salvia_pentstemonoides

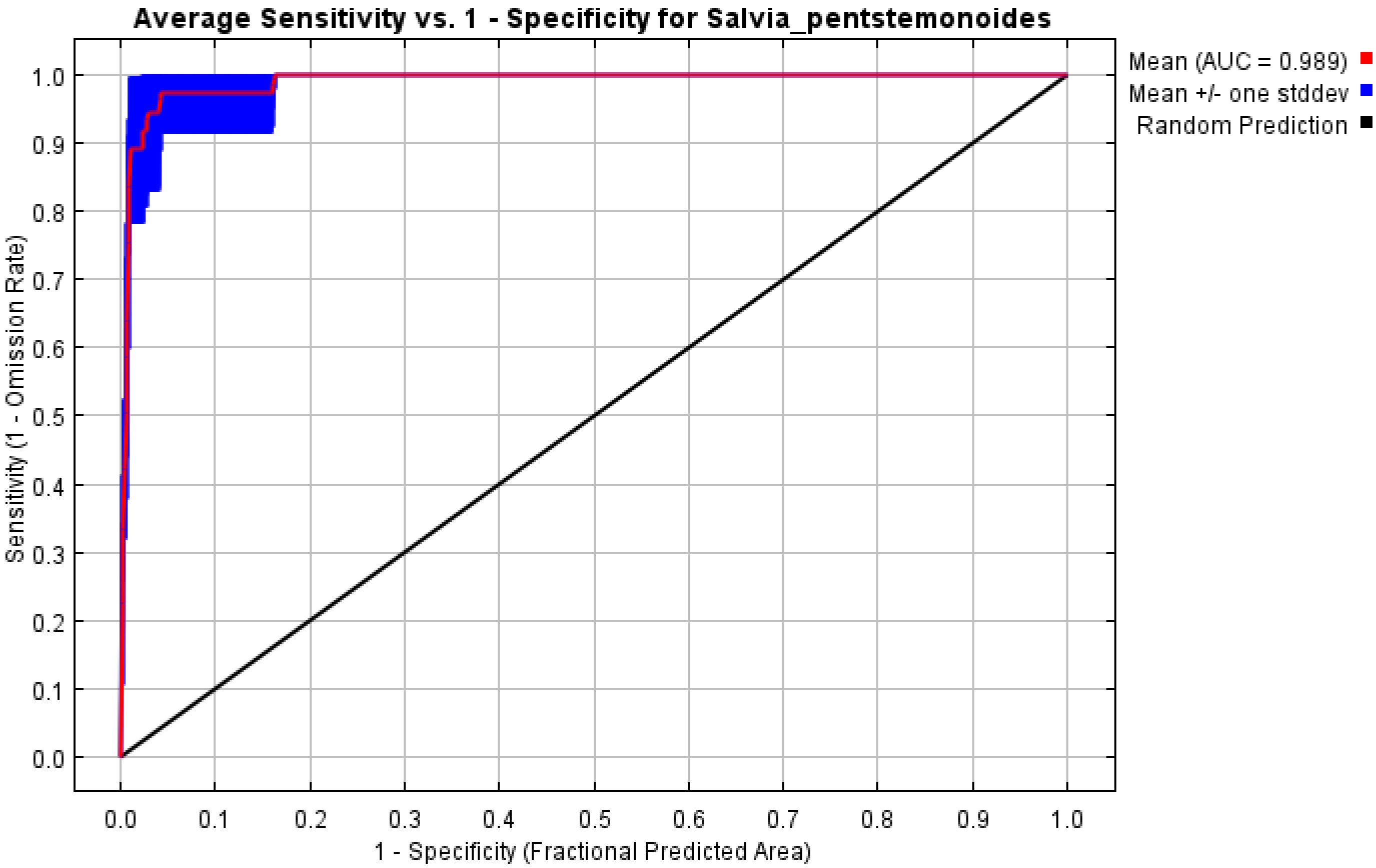
This page summarizes the results of 5-fold cross-validation for Salvia_pentstemonoides, created Fri Dec 03 21:24:27 CST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4]

Analysis of omission/commission

The following picture shows the test omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs. The omission rate should be close to the predicted omission, because of the definition of the cumulative threshold.

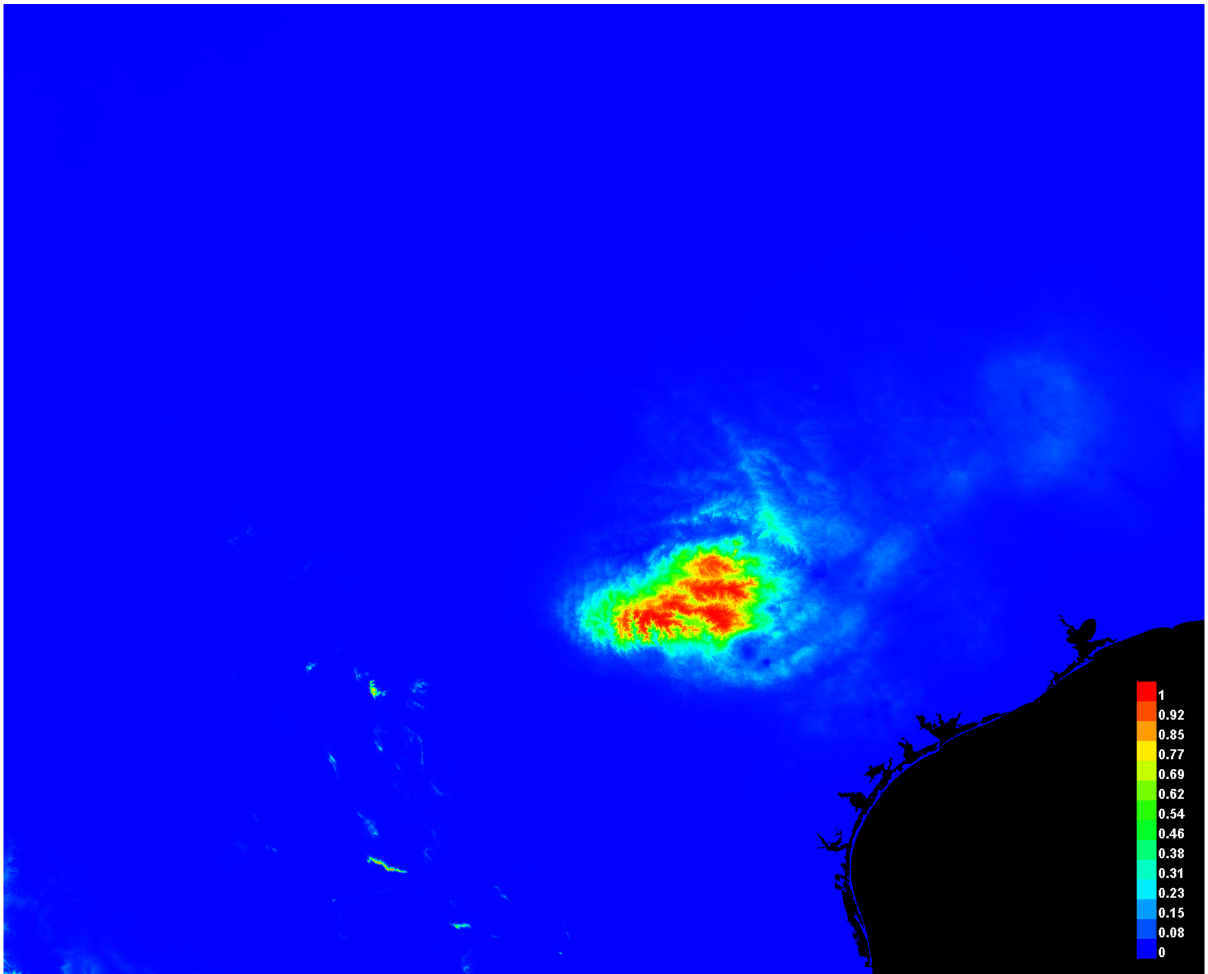


The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average test AUC for the replicate runs is 0.989, and the standard deviation is 0.010.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 5 output grids. Other available summary grids are min, max and median.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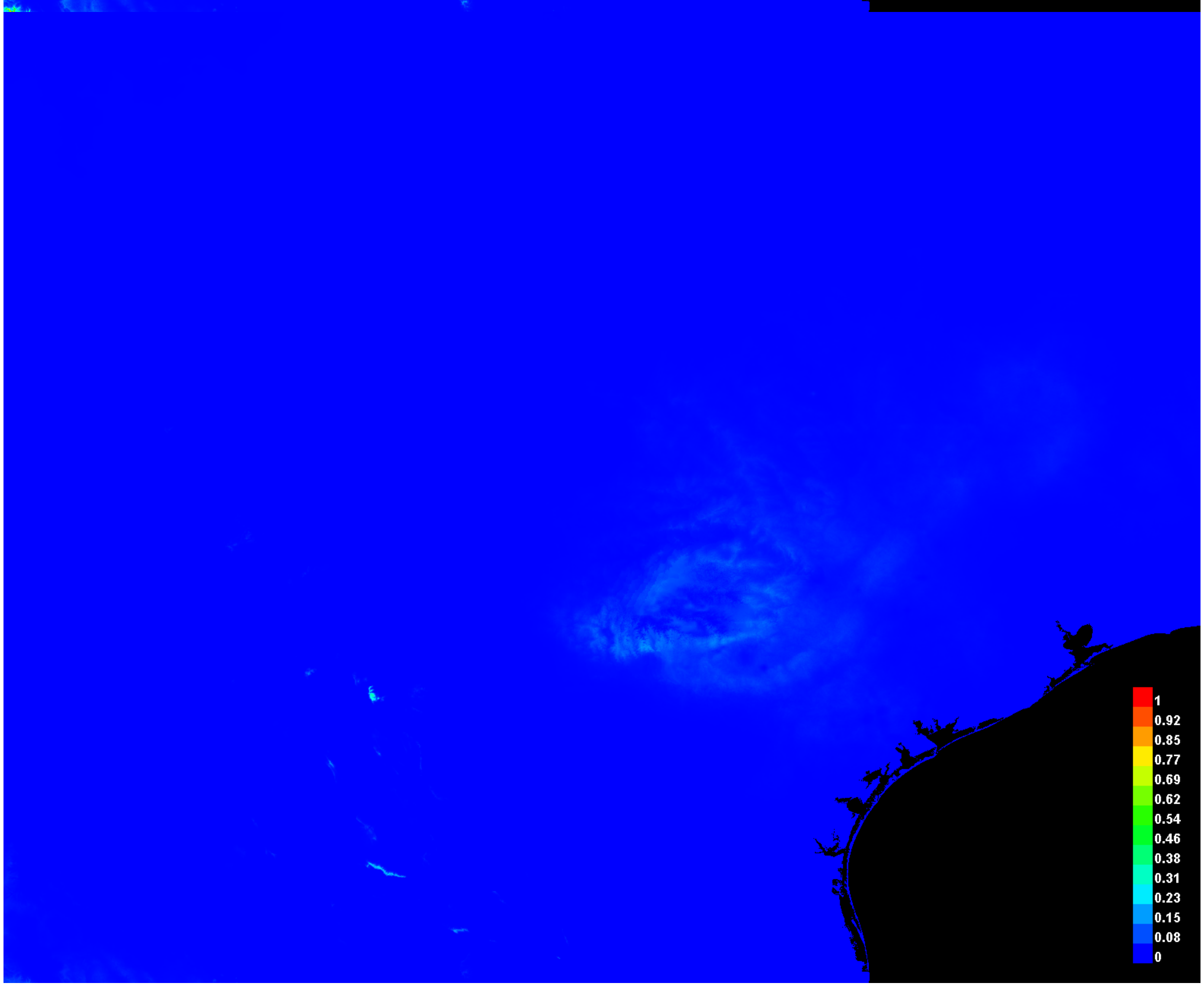
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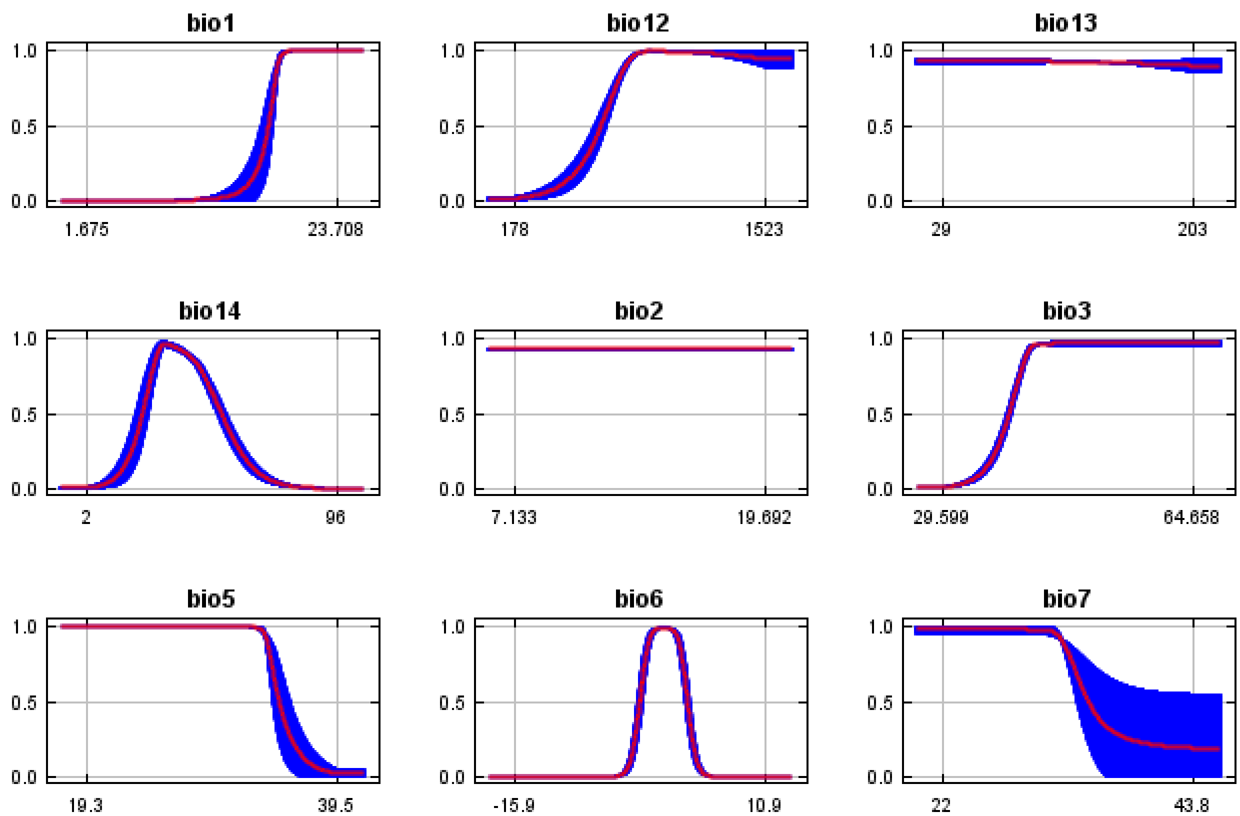
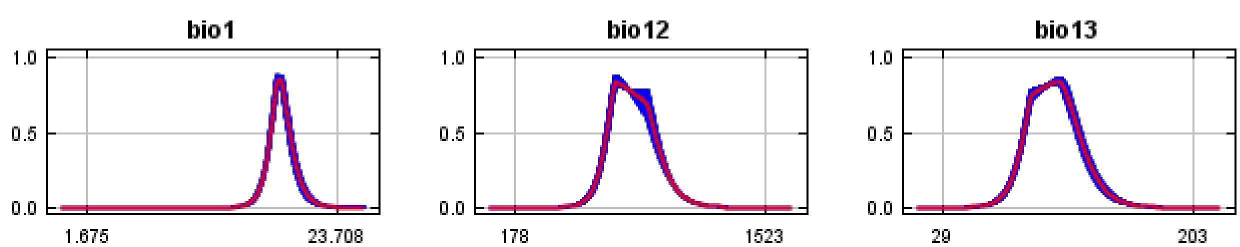
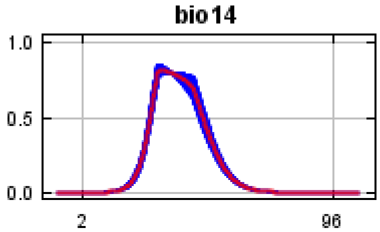
Response curves

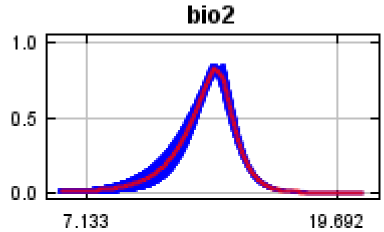
These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 5 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).

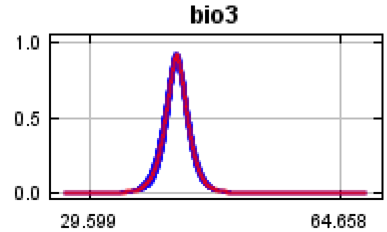


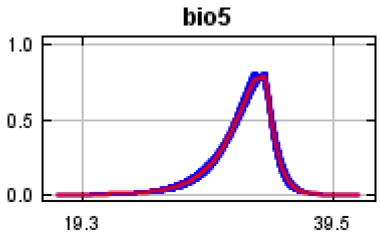
In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.

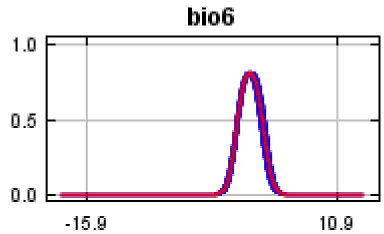


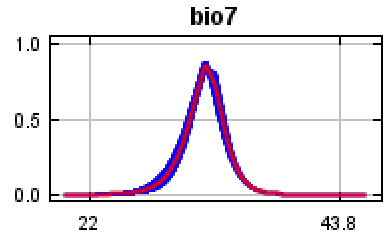










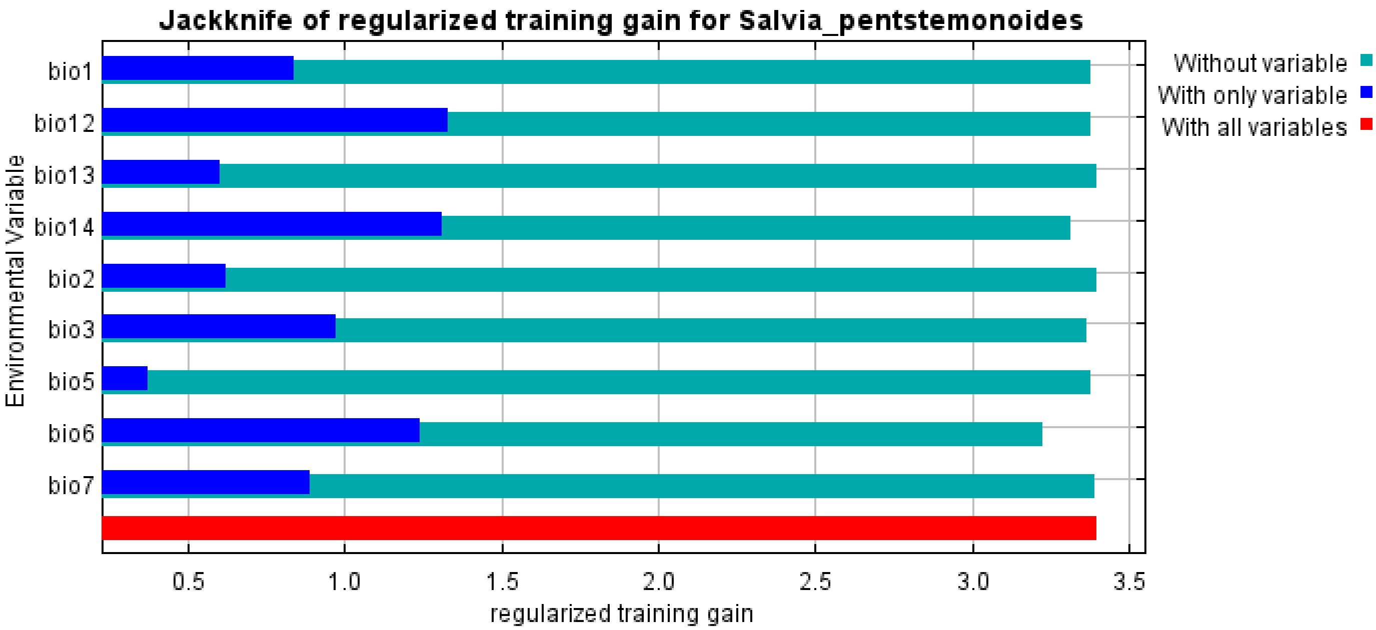


Analysis of variable contributions

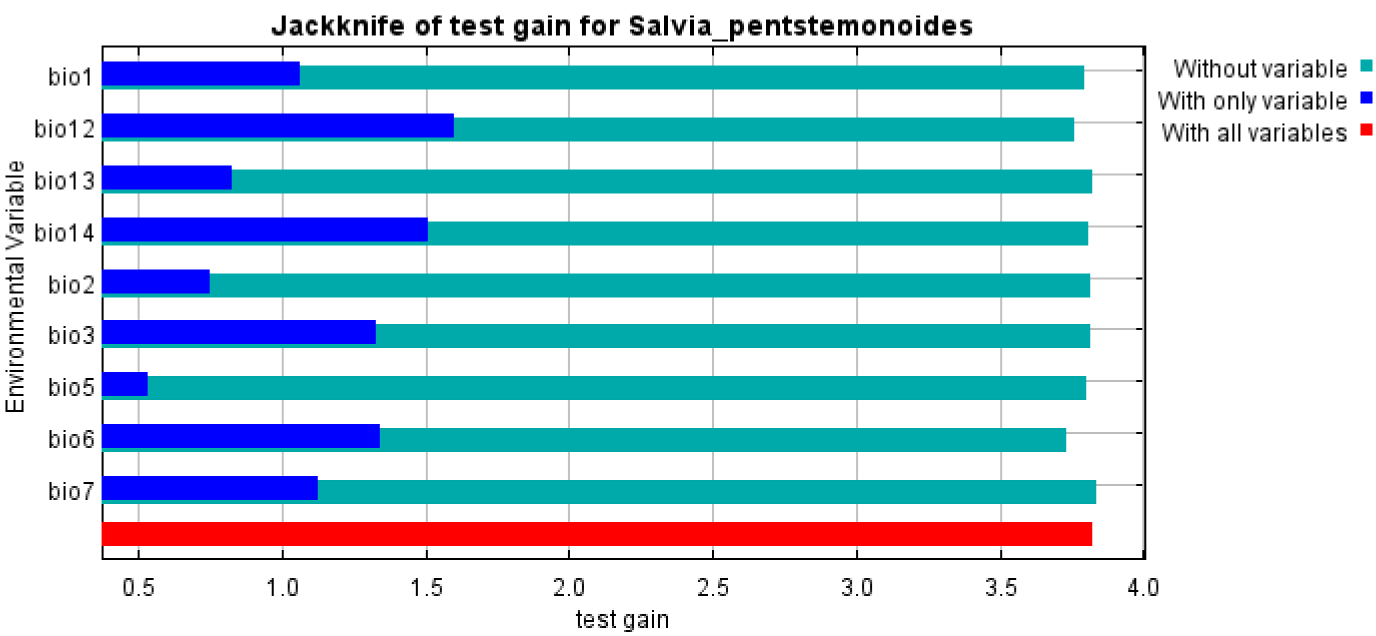
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio14	34.1	21.4
bio3	17.2	4.1
bio12	14	8.1
bio5	13.5	10
bio7	12.1	10.3
bio6	4.7	31.4
bio1	4.3	14.8
bio13	0	0
bio2	0	0

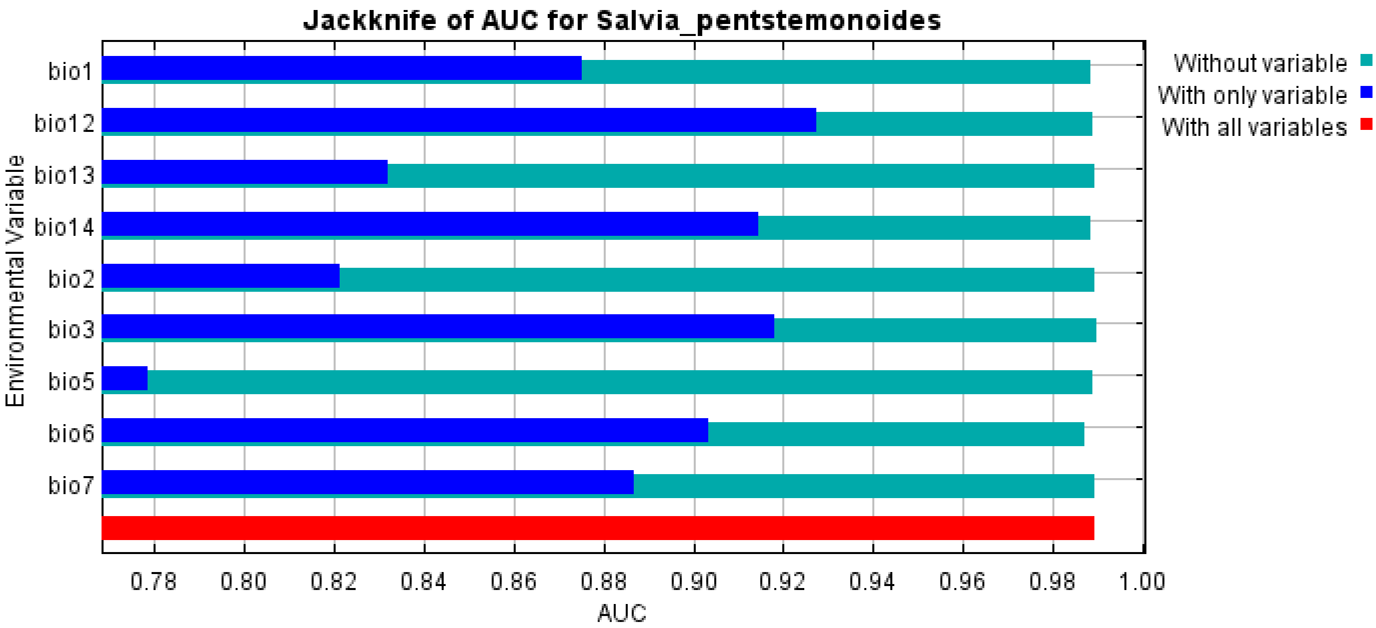
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio12, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio6, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



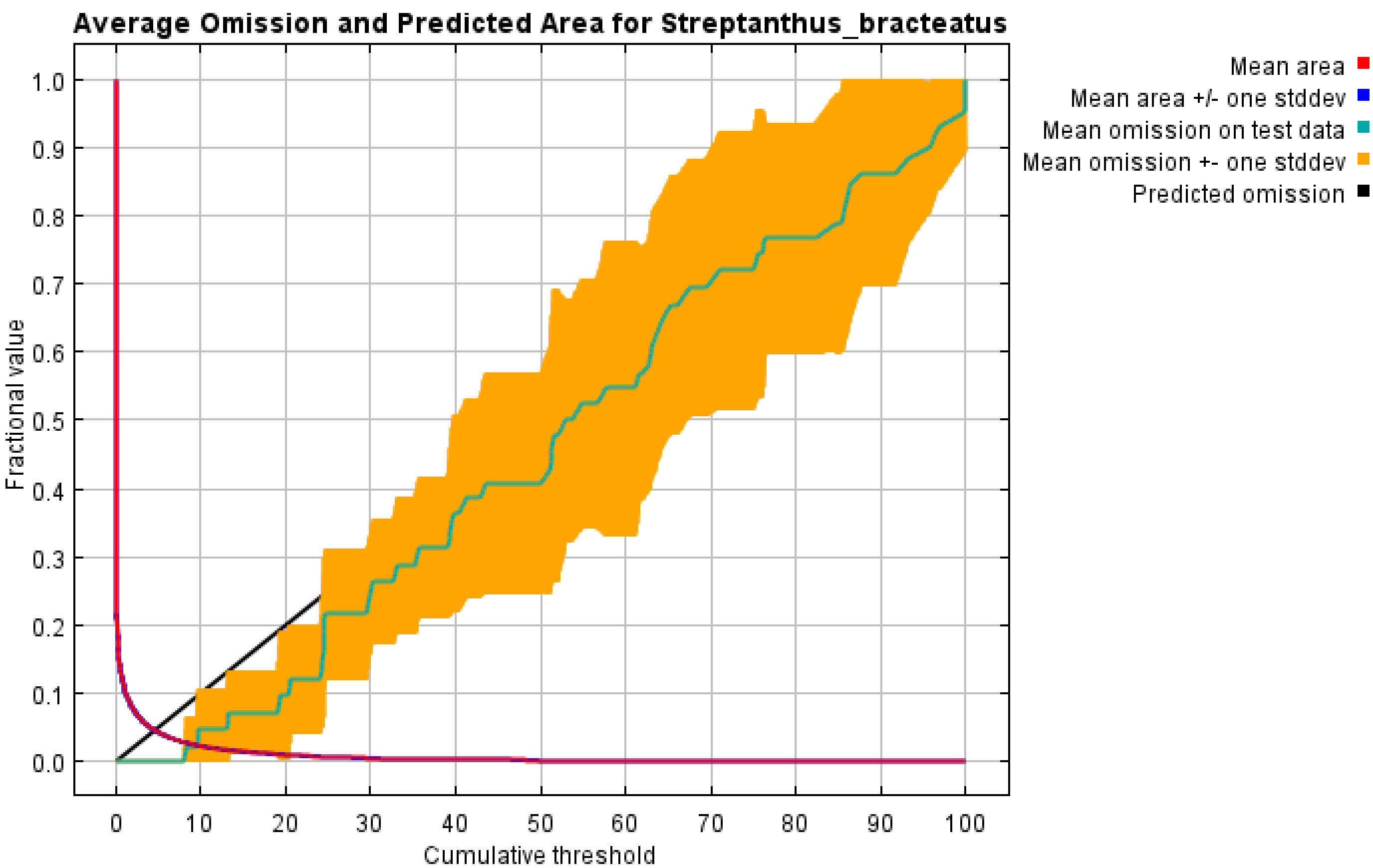
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Salvia_pentstemonoides responsecurves jackknife "outputdirectory=E:\TXDoT_Range Scale_Bioclim\CrossVal_Results\1reg\Salvia" "samplesfile=E:\TXDoT_Range Scale_Bioclim\spp_csv\Salvia_pentstemonoides.csv" "environmentallayers=E:\TXDoT_Range Scale_Bioclim\Ascii" replicates=5 writebackgroundpredictions -N bio0

Replicated maxent model for Streptanthus_bracteatus

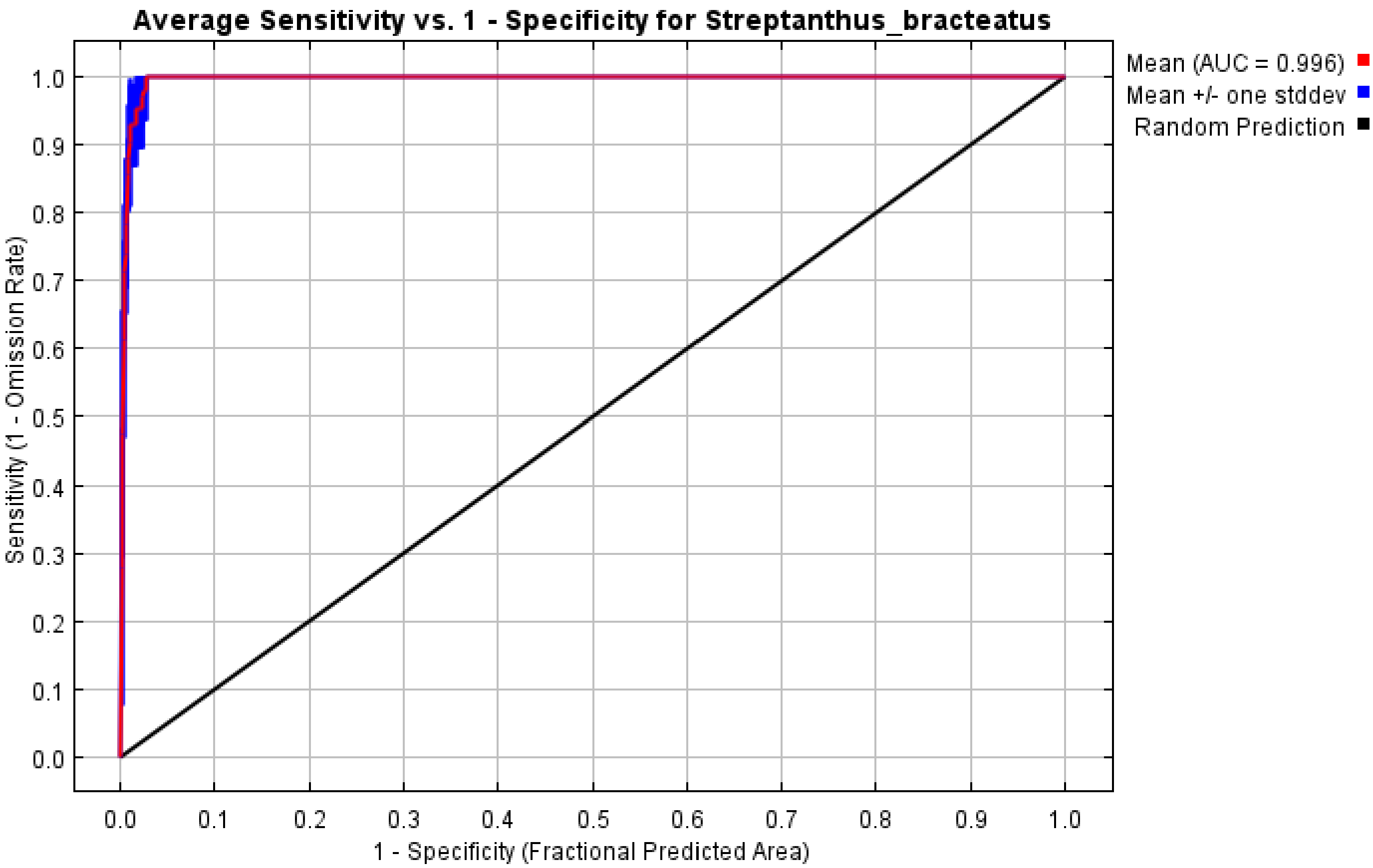
This page summarizes the results of 5-fold cross-validation for Streptanthus_bracteatus, created Fri Dec 03 21:29:39 CST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4]

Analysis of omission/commission

The following picture shows the test omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs. The omission rate should be close to the predicted omission, because of the definition of the cumulative threshold.

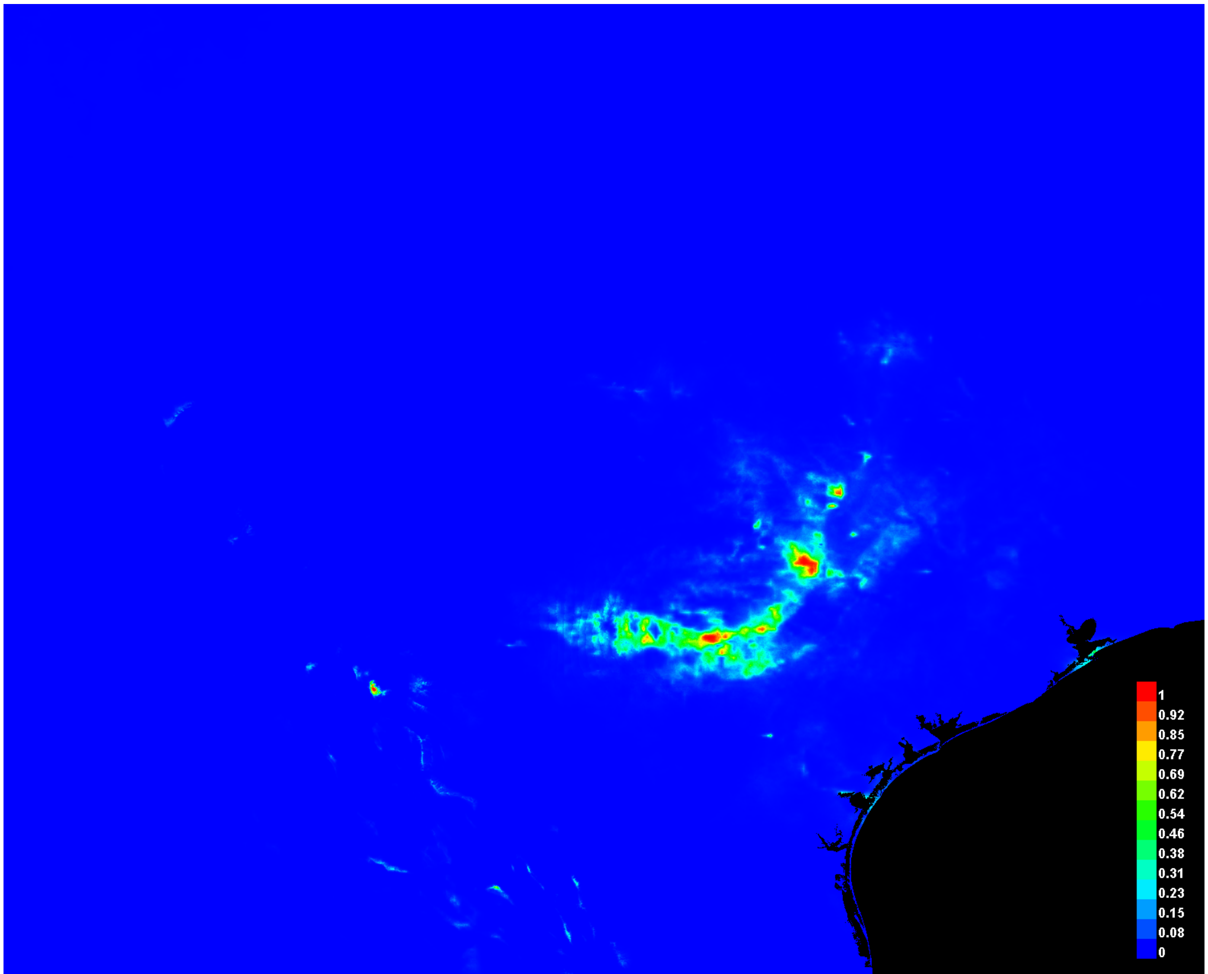


The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average test AUC for the replicate runs is 0.996, and the standard deviation is 0.001.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 5 output grids. Other available summary grids are min, max and median.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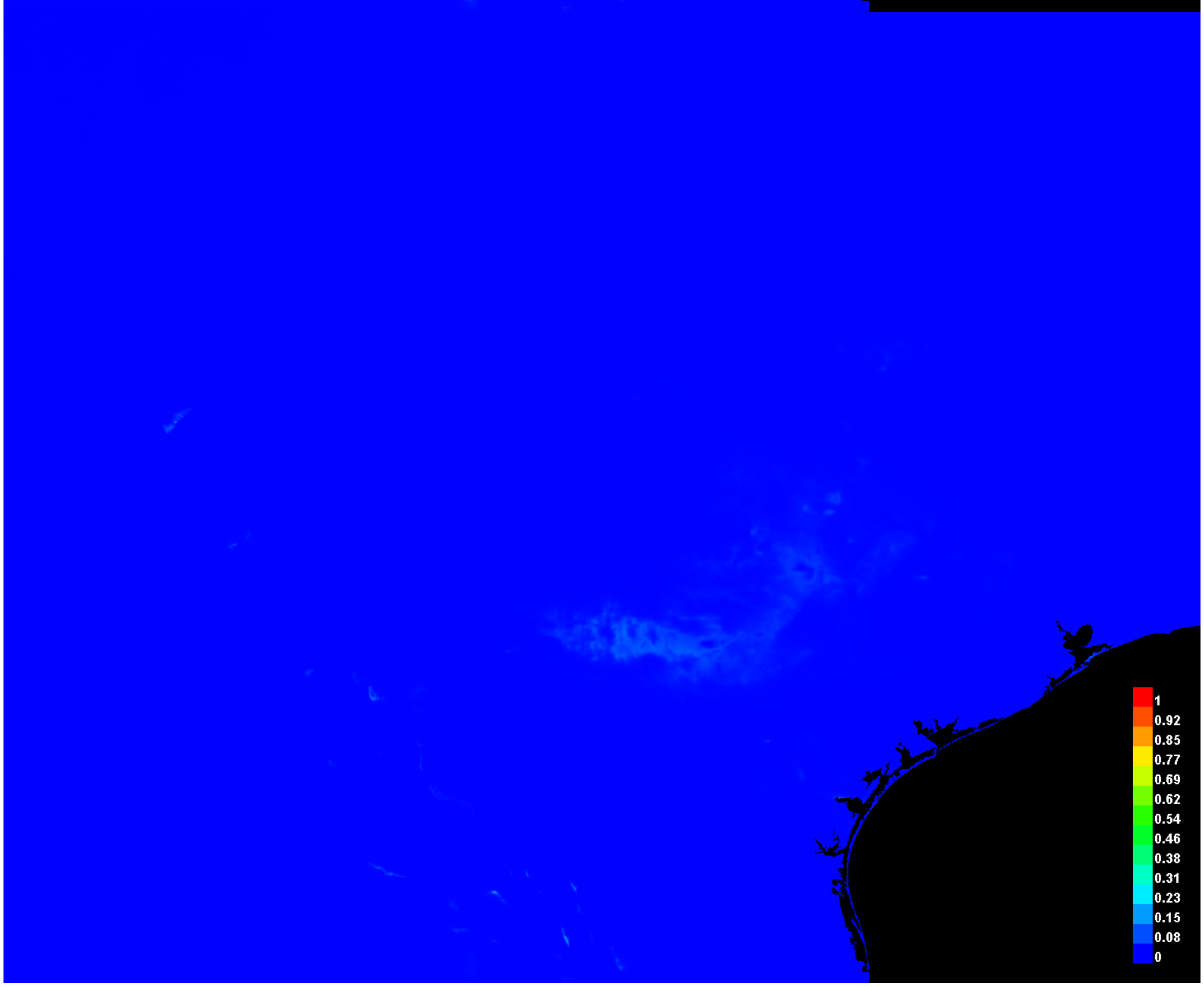
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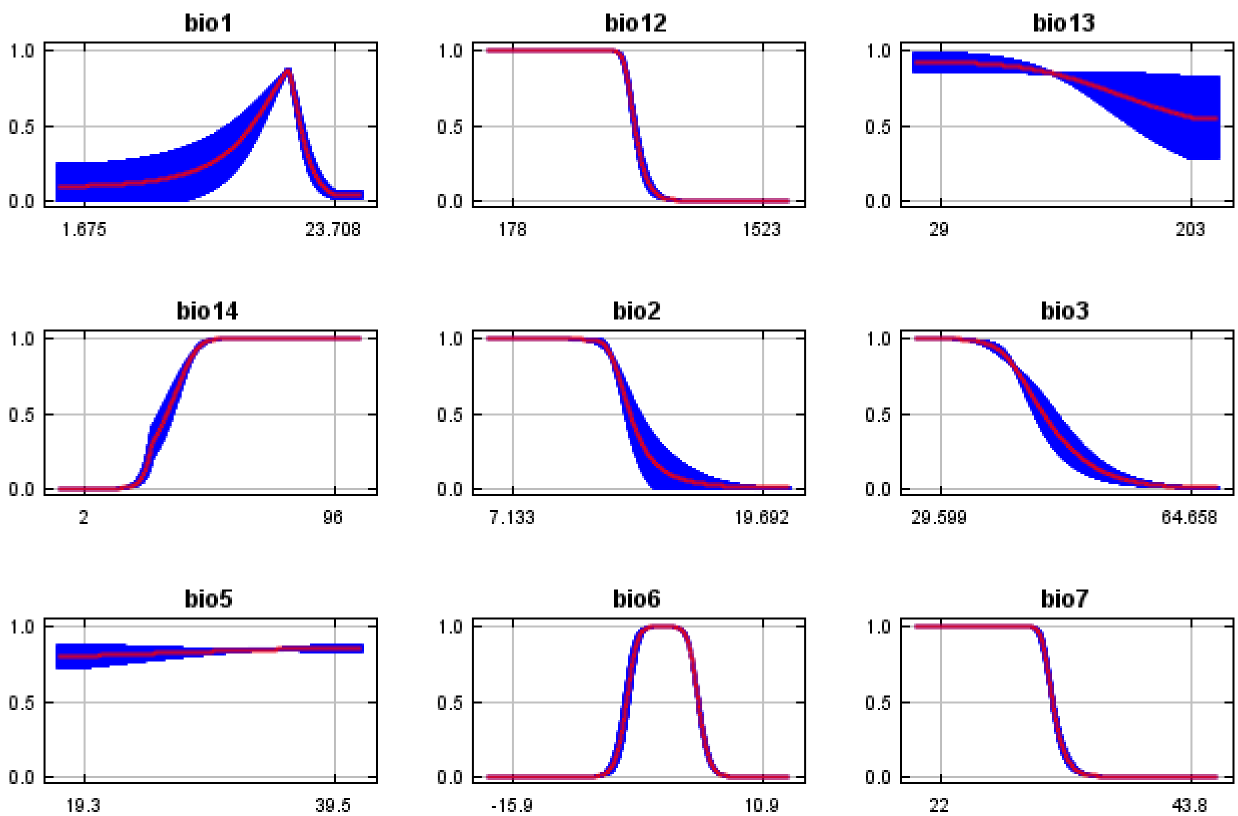
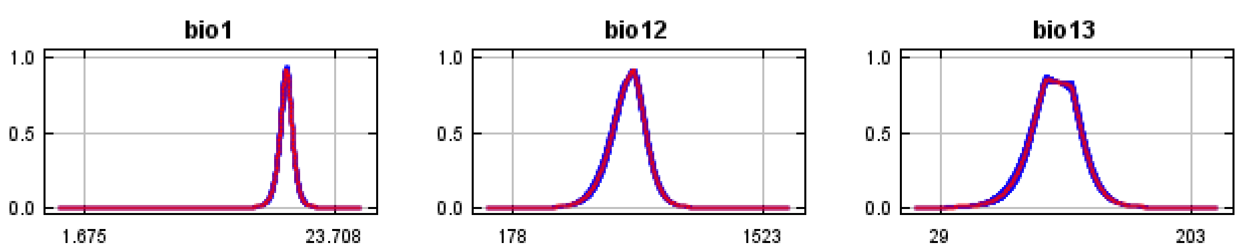
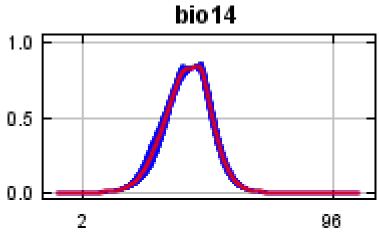
Response curves

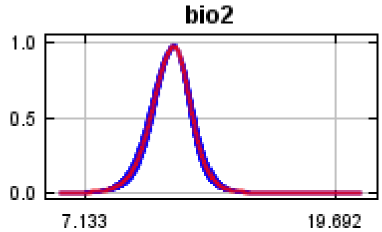
These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 5 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).

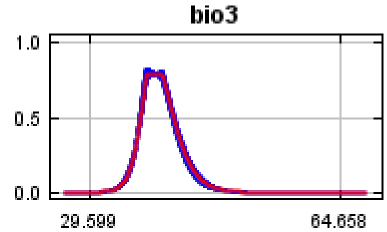


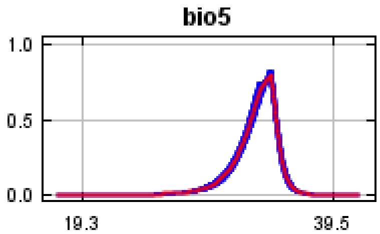
In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.

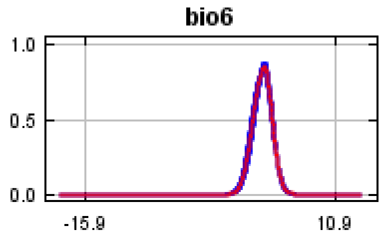


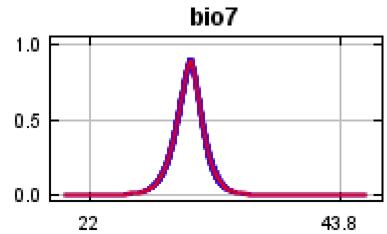










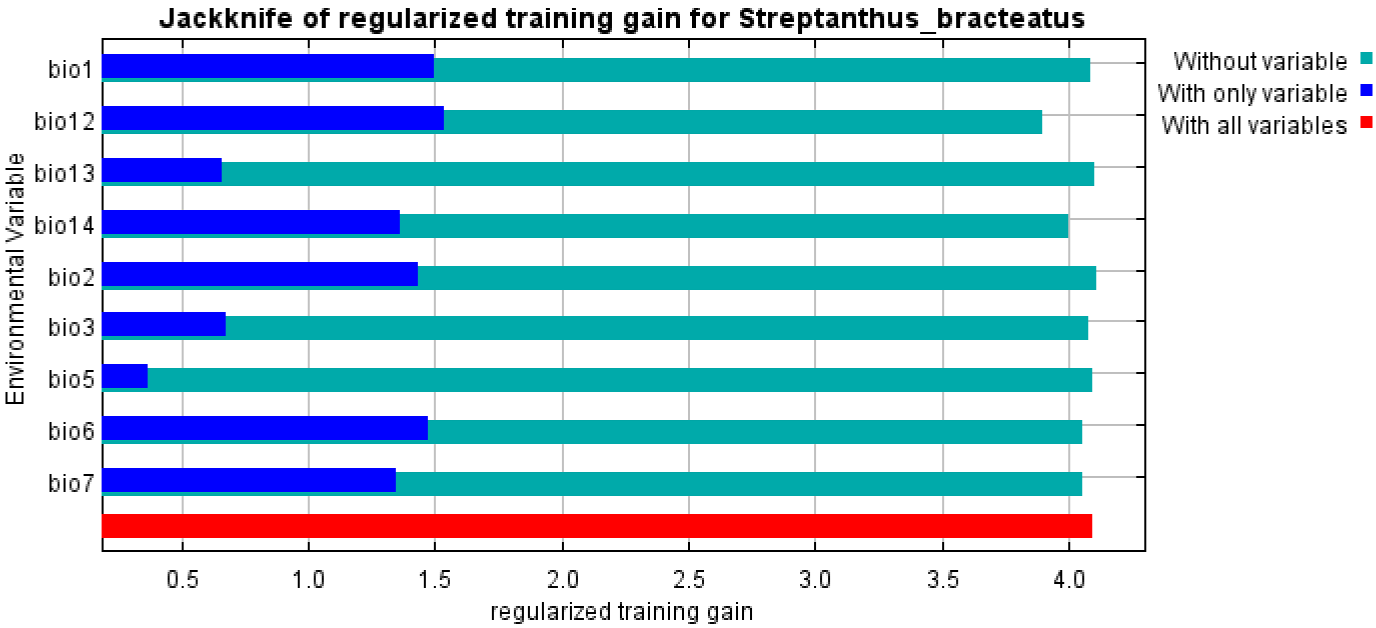


Analysis of variable contributions

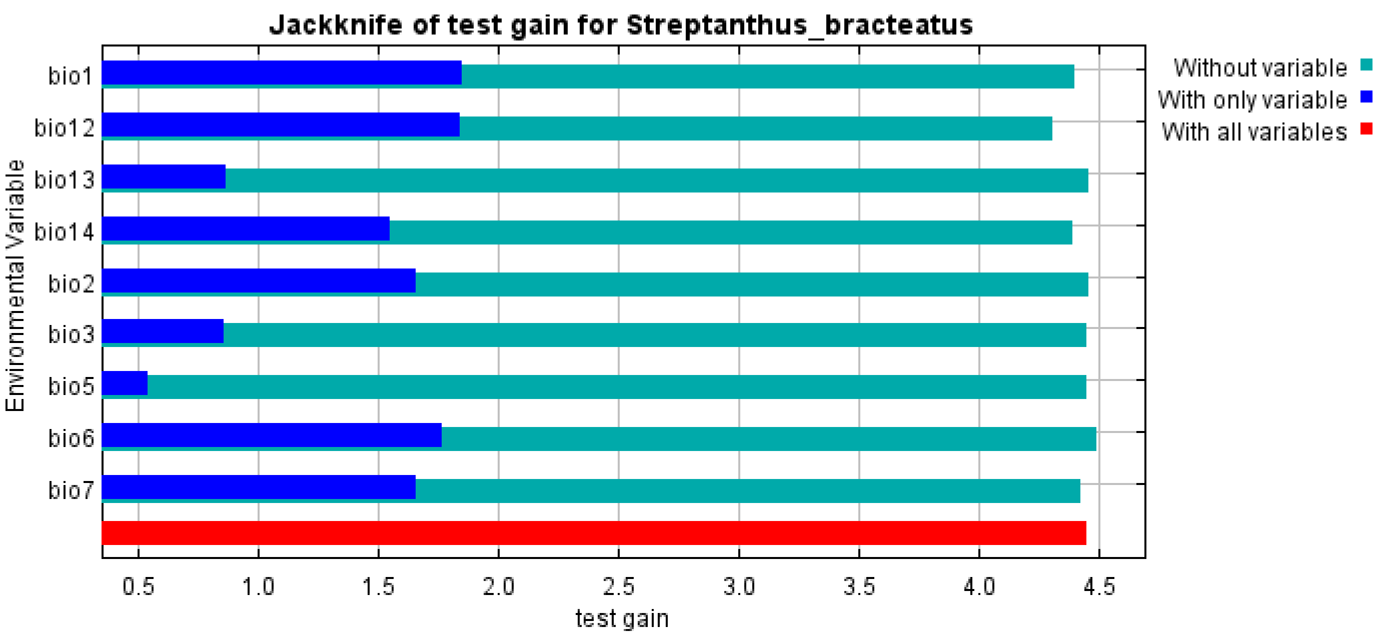
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio7	35.1	29.4
bio14	28.6	28.9
bio12	20.3	23.7
bio1	10.9	0.4
bio2	2.9	9.5
bio5	1.5	0
bio6	0.4	6.3
bio13	0.3	0.1
bio3	0.1	1.8

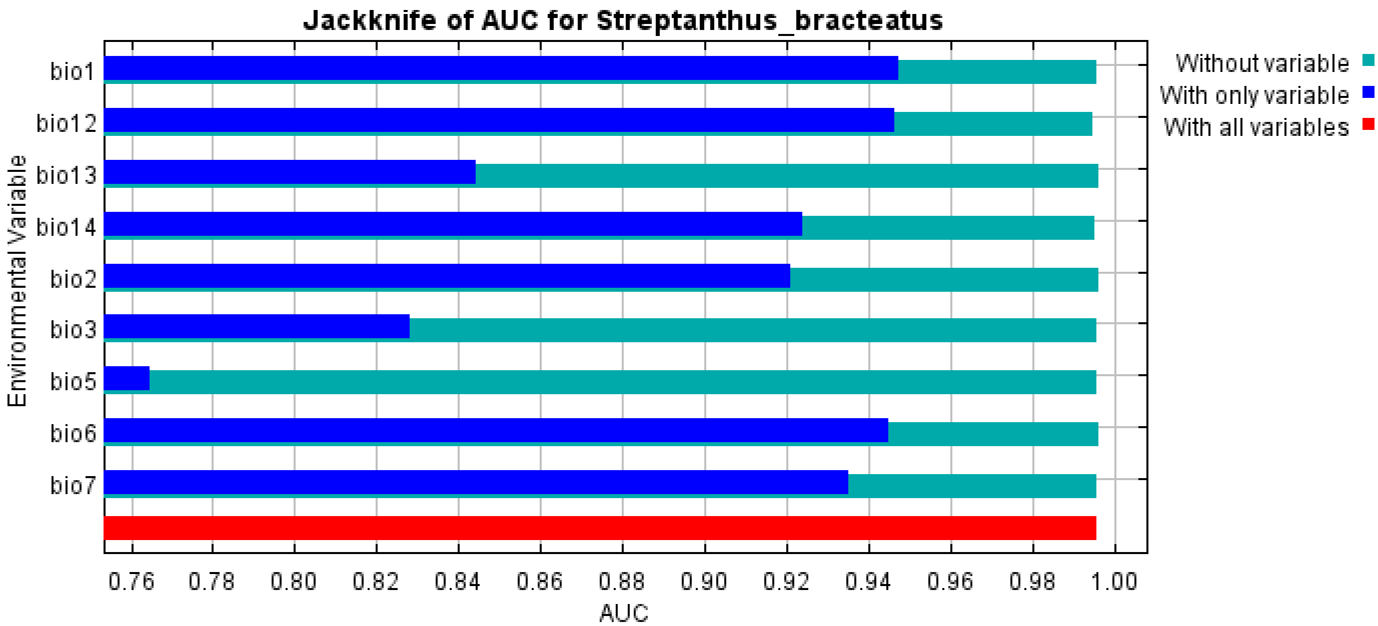
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio12, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio12, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



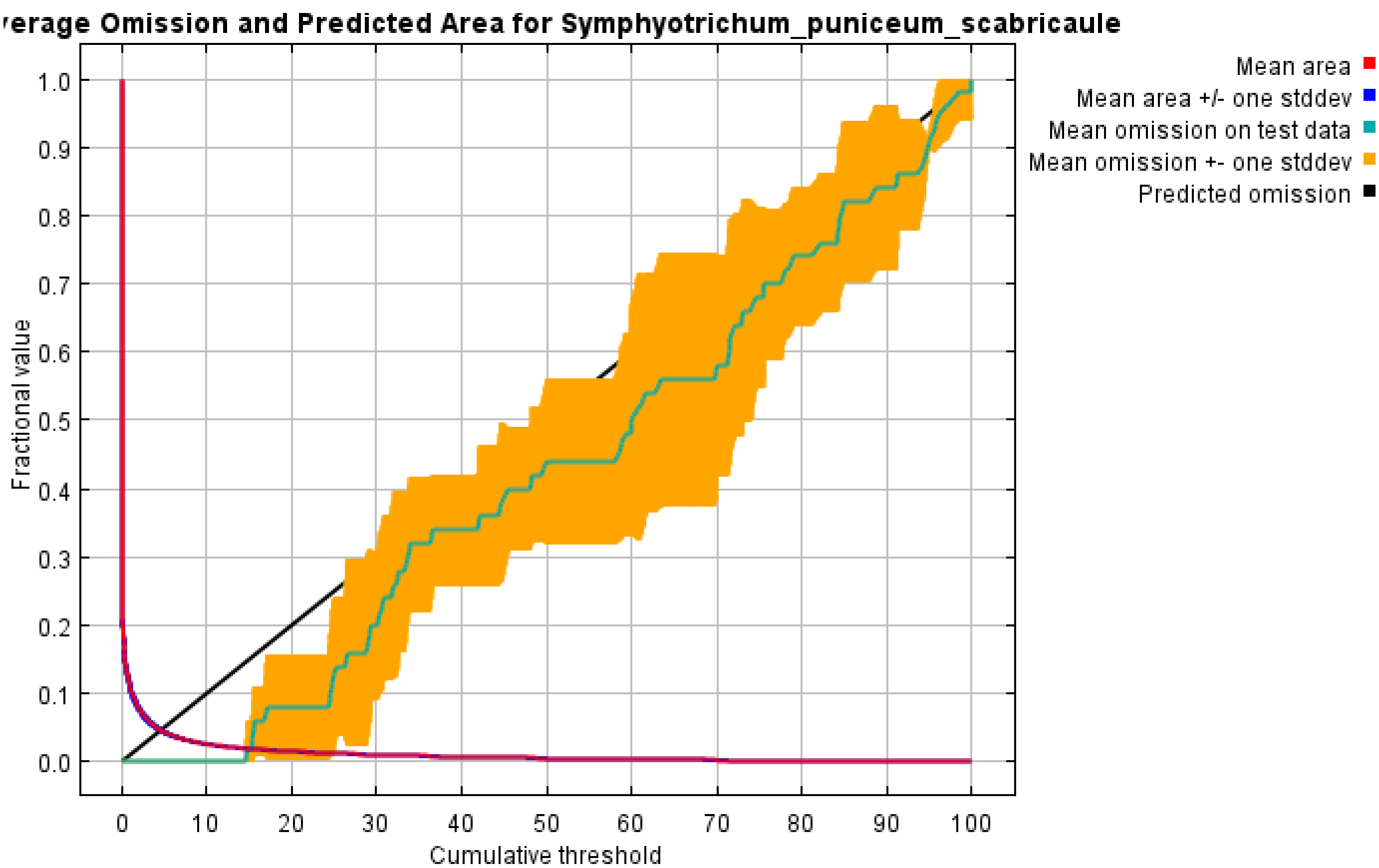
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Streptanthus_bracteatus responsecurves jackknife "outputdirectory=E:\TXDoT_Range Scale_Bioclim\CrossVal_Results\1reg\Streptanthus" "samplesfile=E:\TXDoT_Range Scale_Bioclim\spp_csv\Streptanthus_bracteatus.csv" "environmentallayers=E:\TXDoT_Range Scale_Bioclim\Ascii" replicates=5 writebackgroundpredictions -N bio0

Replicated maxent model for Symphyotrichum_puniceum_scabricaule

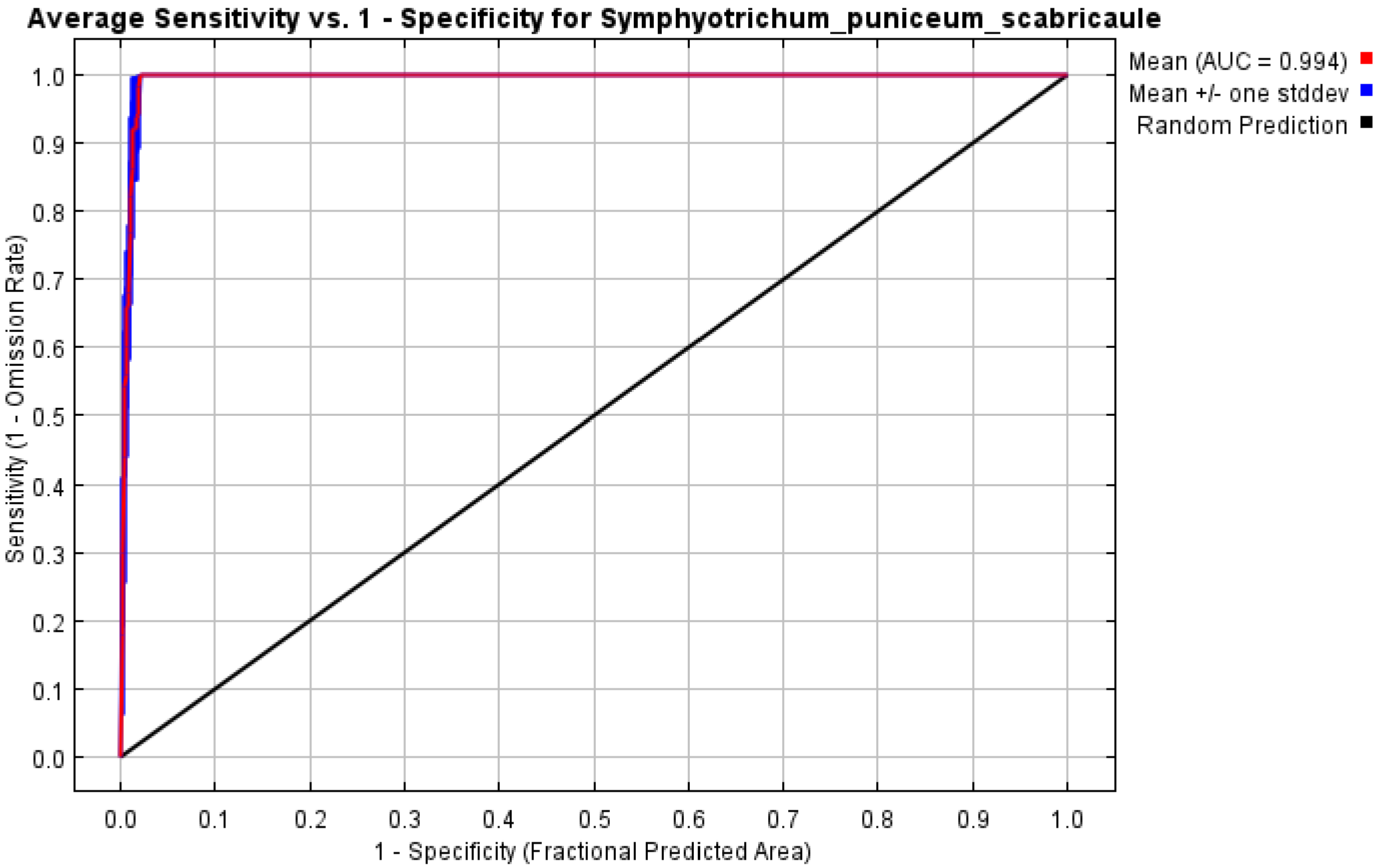
This page summarizes the results of 5-fold cross-validation for Symphyotrichum_puniceum_scabricaule, created Fri Dec 03 21:35:34 CST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4]

Analysis of omission/commission

The following picture shows the test omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs. The omission rate should be close to the predicted omission, because of the definition of the cumulative threshold.

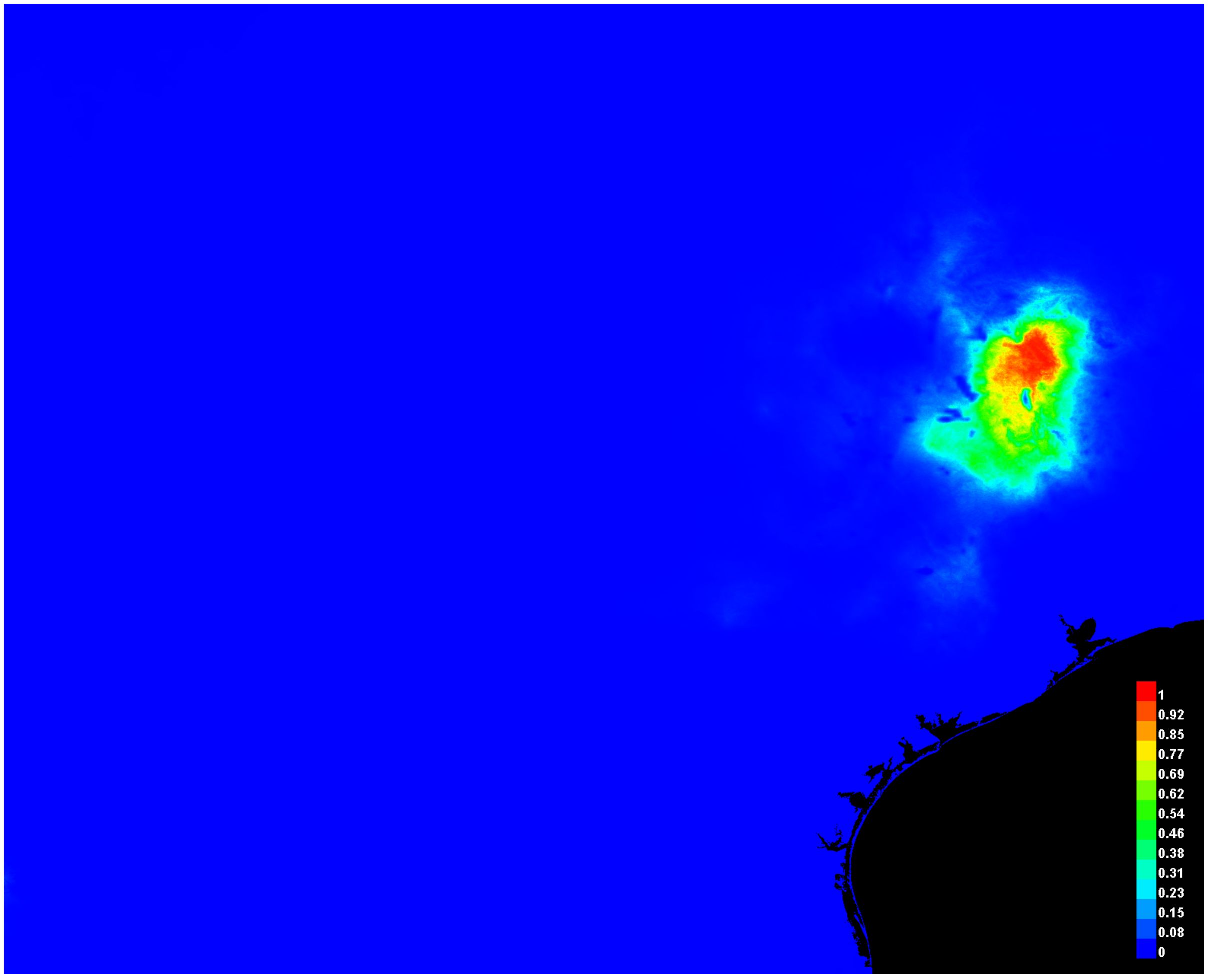


The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average test AUC for the replicate runs is 0.994, and the standard deviation is 0.001.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 5 output grids. Other available summary grids are min, max and median.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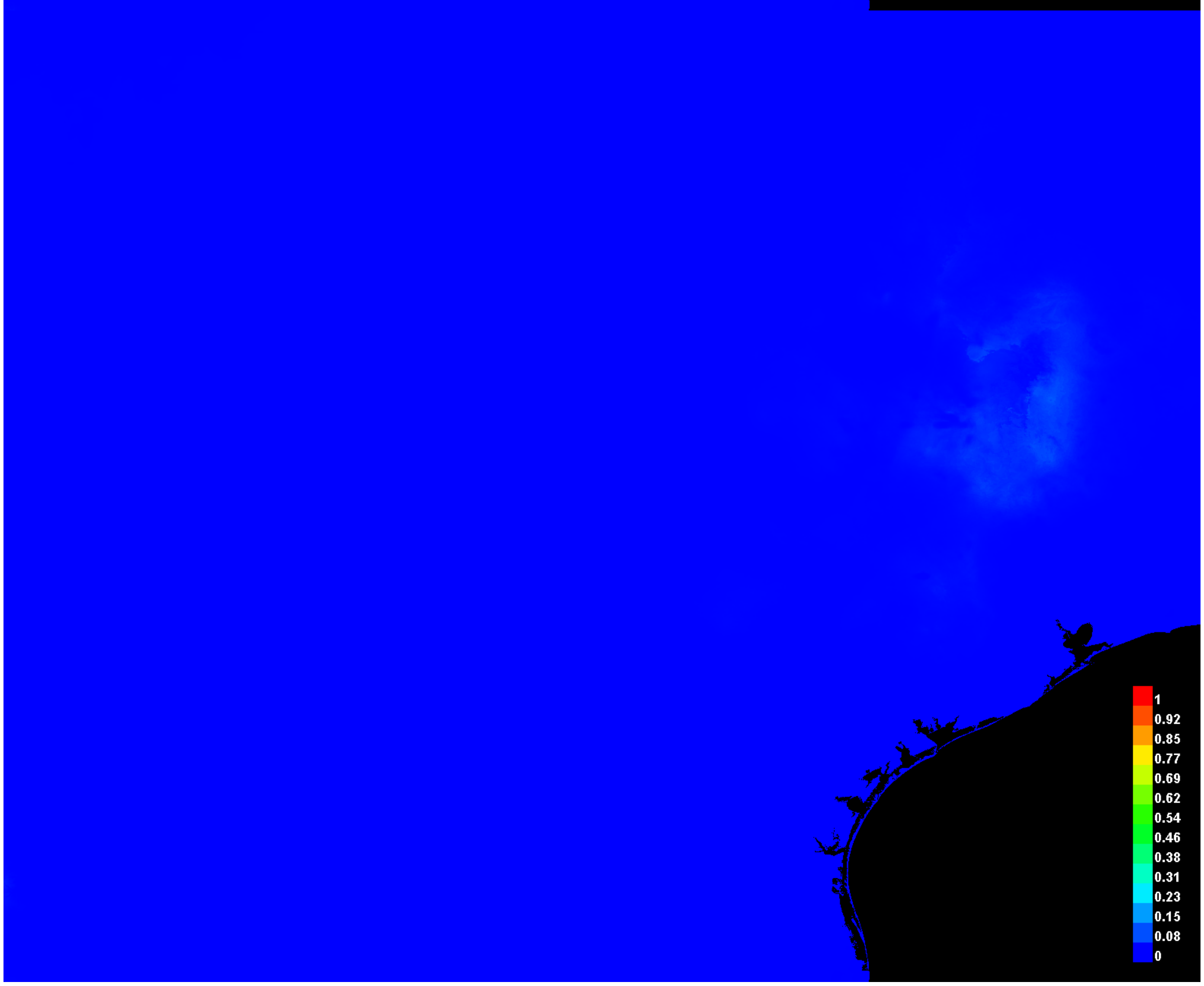
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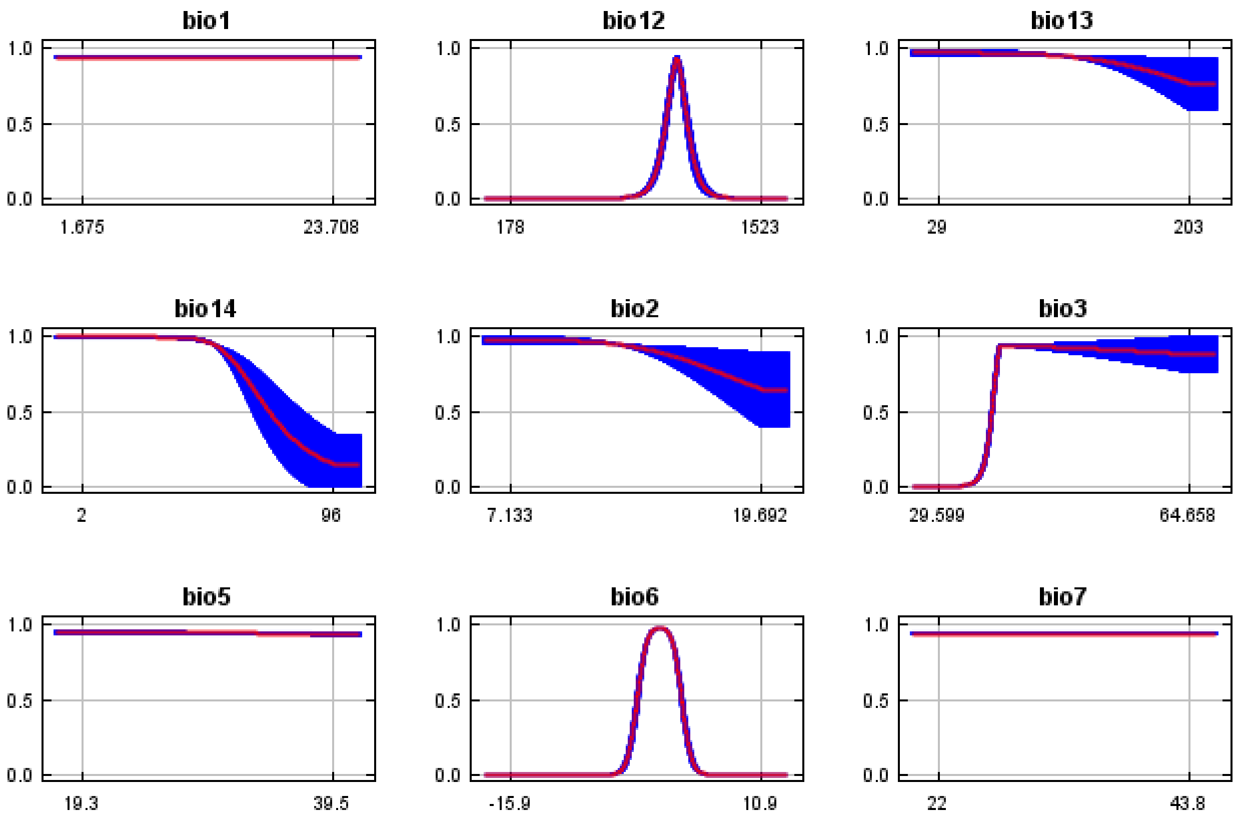
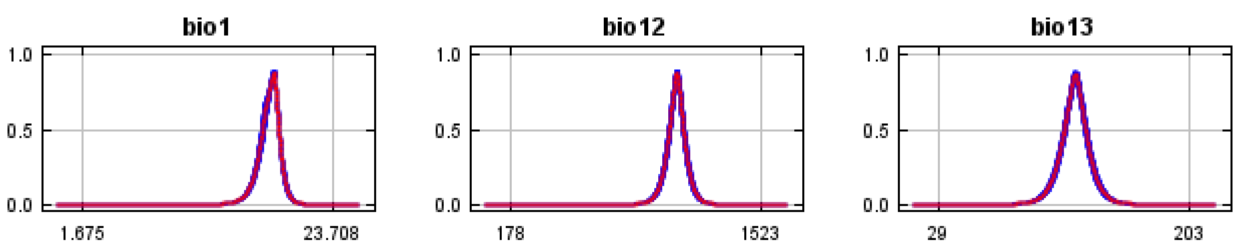
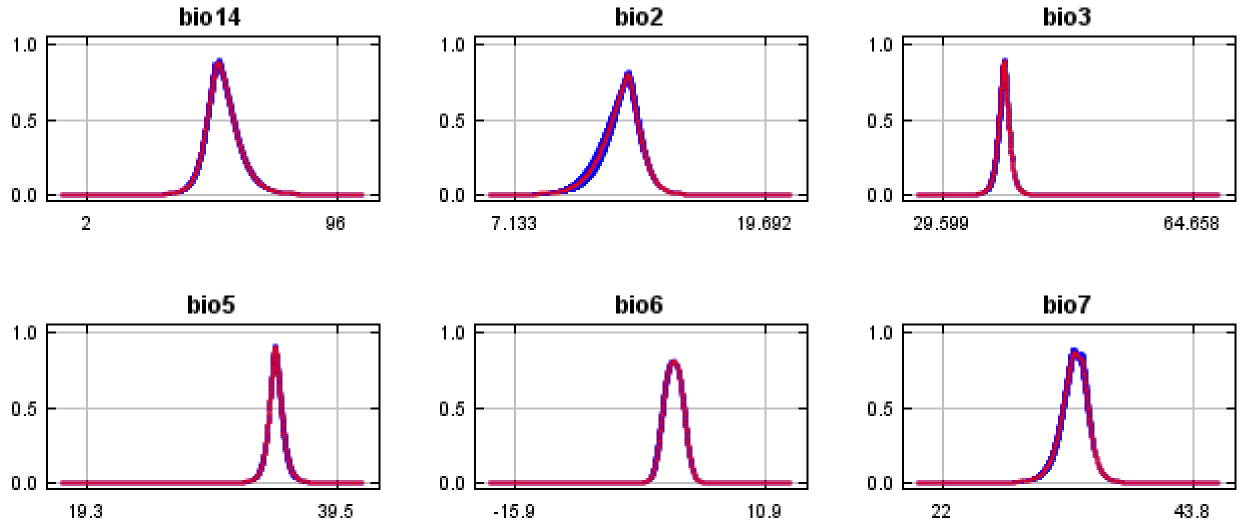
Response curves

These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 5 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).



In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.



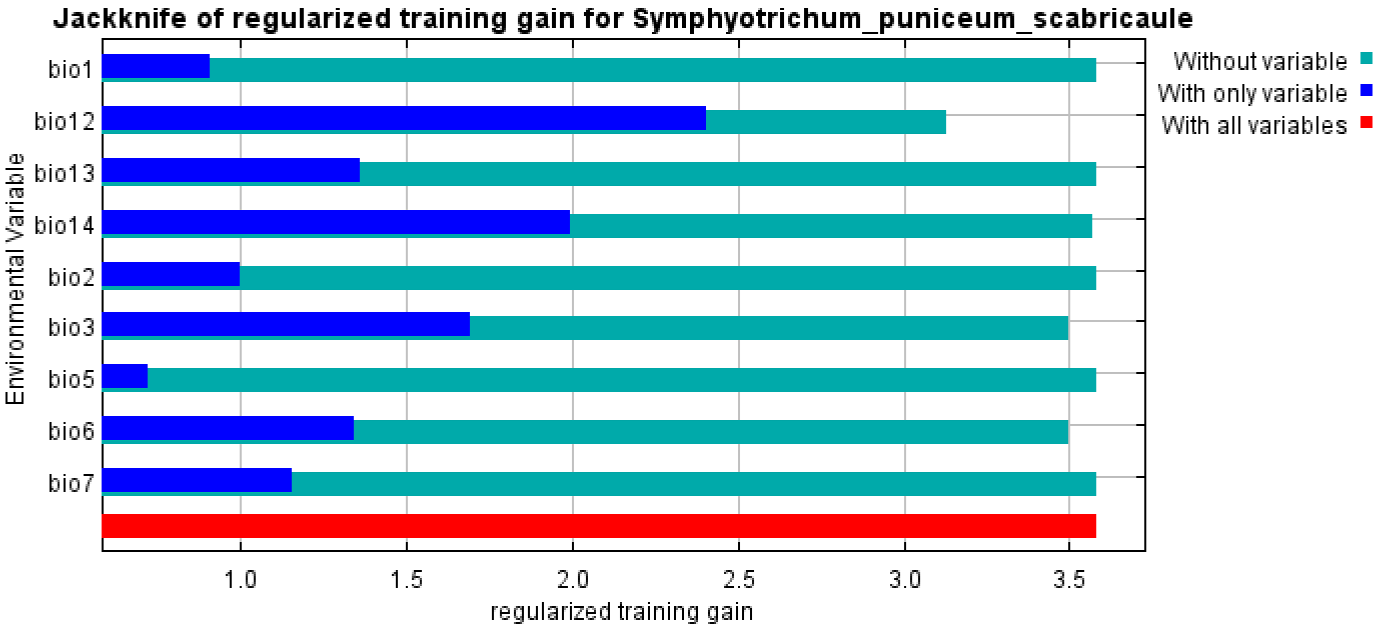


Analysis of variable contributions

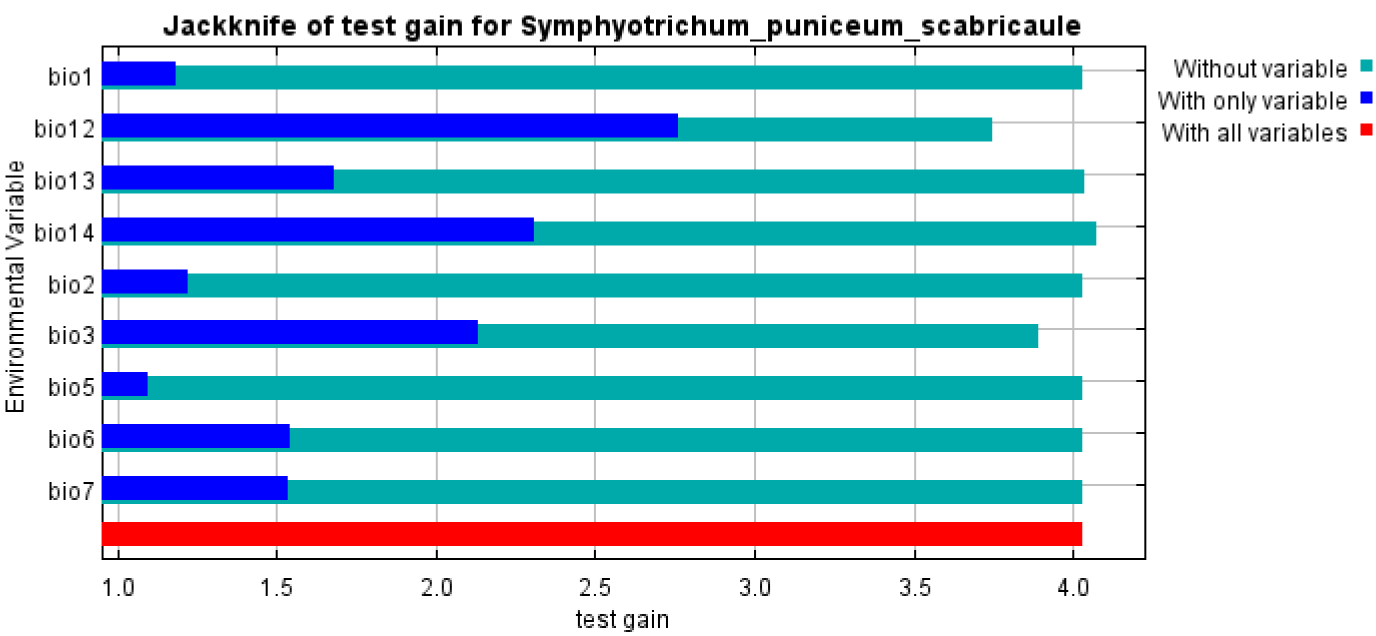
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio14	48.8	1.3
bio12	26.4	71.9
bio3	13.3	4.1
bio1	8.4	0
bio6	2.7	22.5
bio13	0.4	0
bio2	0	0.1
bio7	0	0
bio5	0	0

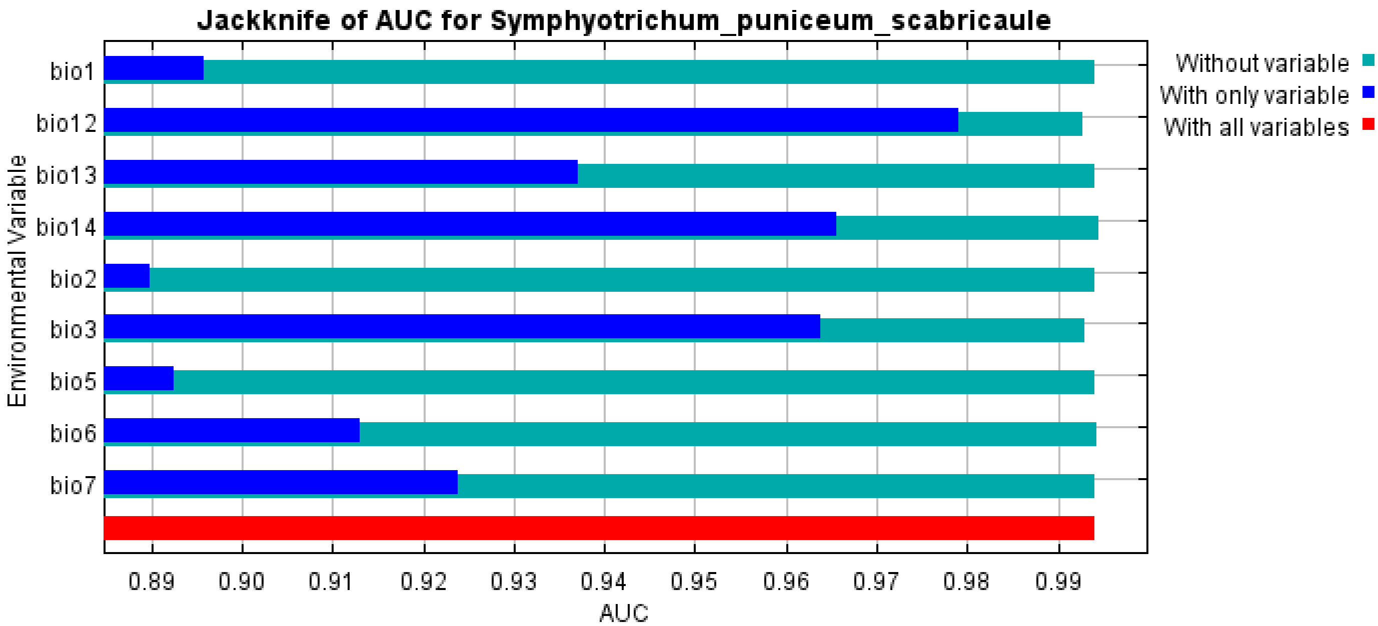
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio12, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio12, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



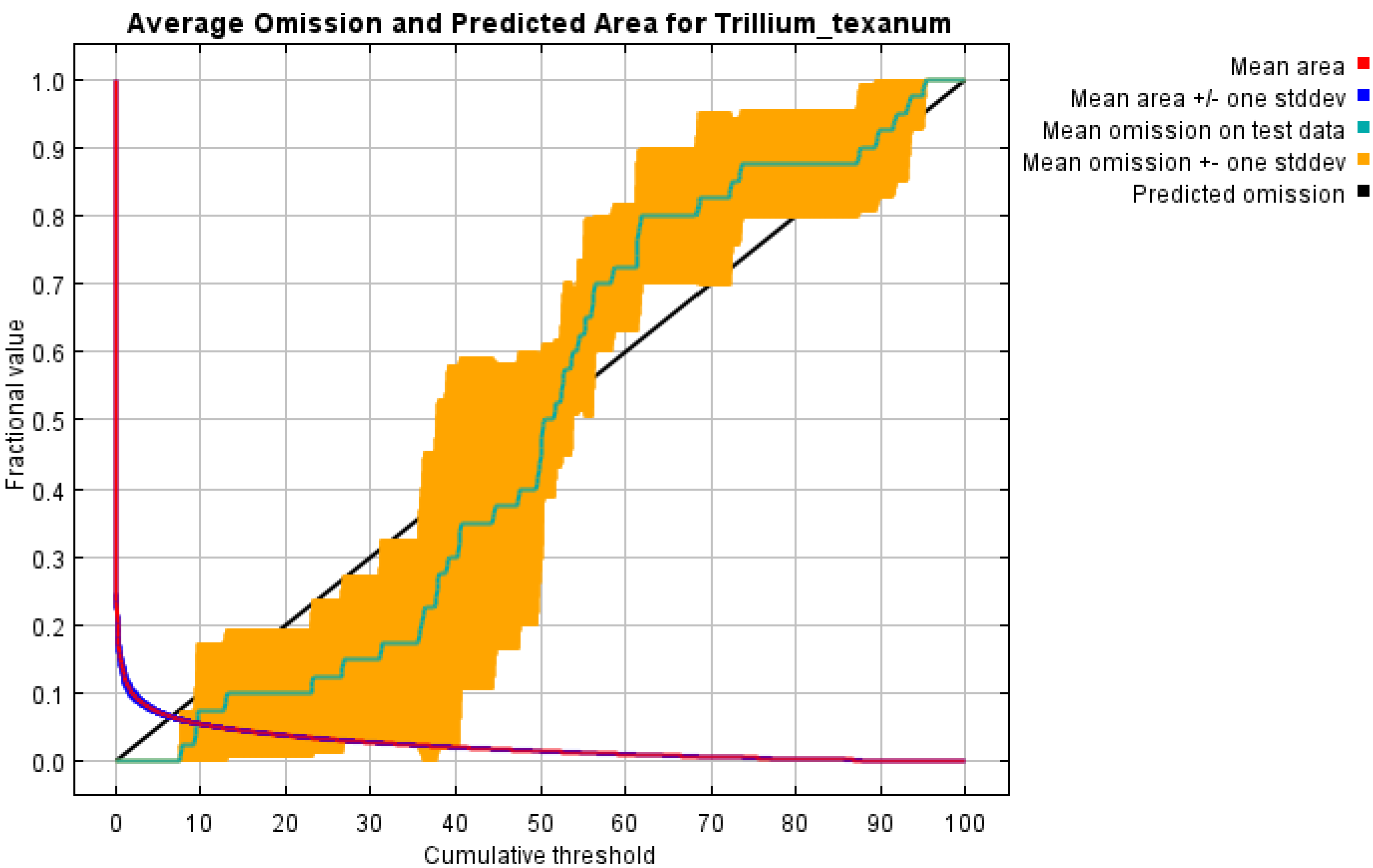
Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Symphyotrichum_puniceum_scabricaule responsecurves jackknife "outputdirectory=E:\TXDoT_Range Scale_Bioclim\CrossVal_Results\1reg\Symphyotrichum" "samplesfile=E:\TXDoT_Range Scale_Bioclim\spp_csv\Symphyotrichum_puniceum_scabricaule.csv" "environmentallayers=E:\TXDoT_Range Scale_Bioclim\Ascii" replicates=5 writebackgroundpredictions -N bio0

Replicated maxent model for Trillium_texanum

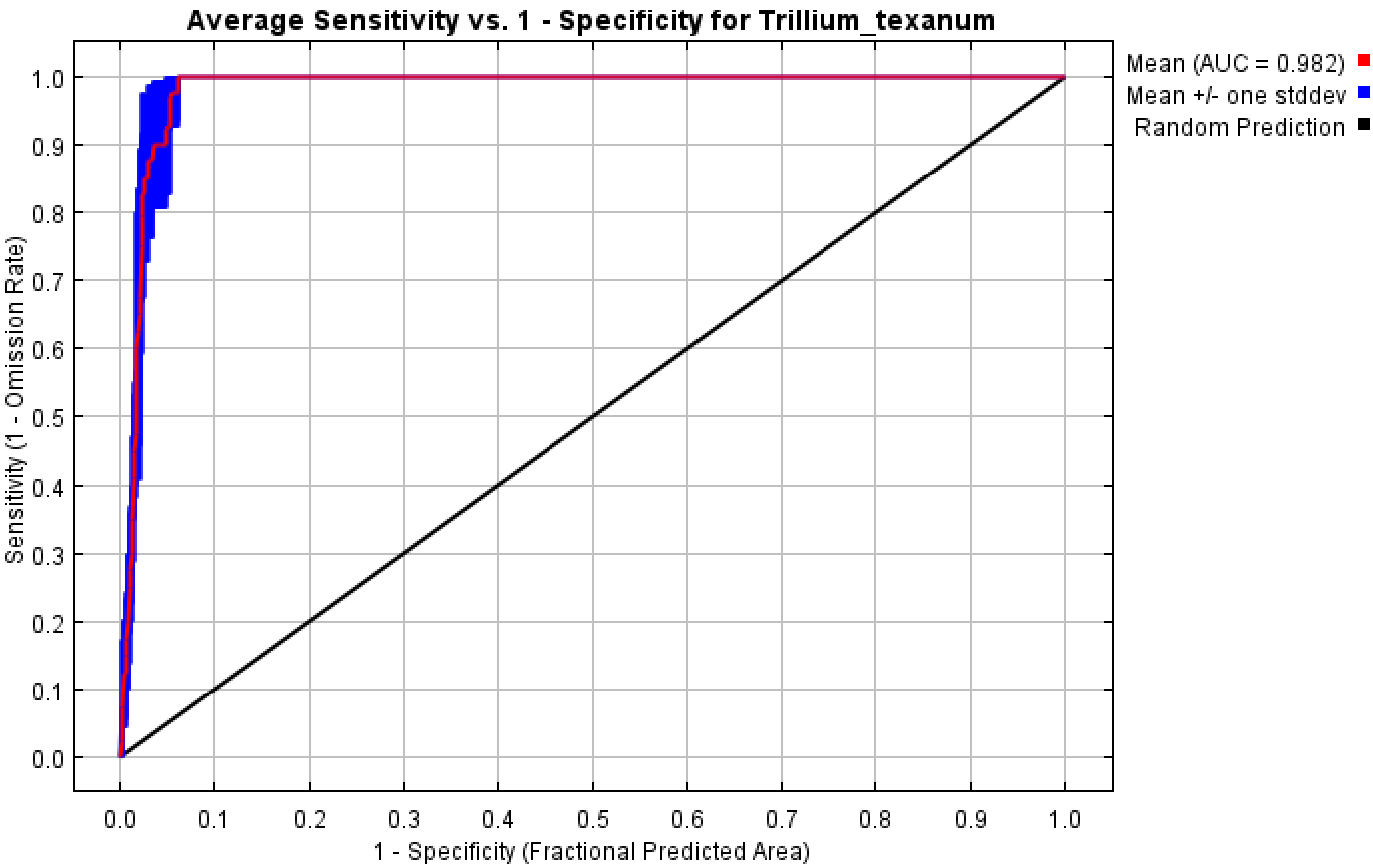
This page summarizes the results of 5-fold cross-validation for Trillium_texanum, created Fri Dec 03 13:01:35 CST 2021 using Maxent version 3.4.1. The individual models are here: [0] [1] [2] [3] [4]

Analysis of omission/commission

The following picture shows the test omission rate and predicted area as a function of the cumulative threshold, averaged over the replicate runs. The omission rate should be close to the predicted omission, because of the definition of the cumulative threshold.

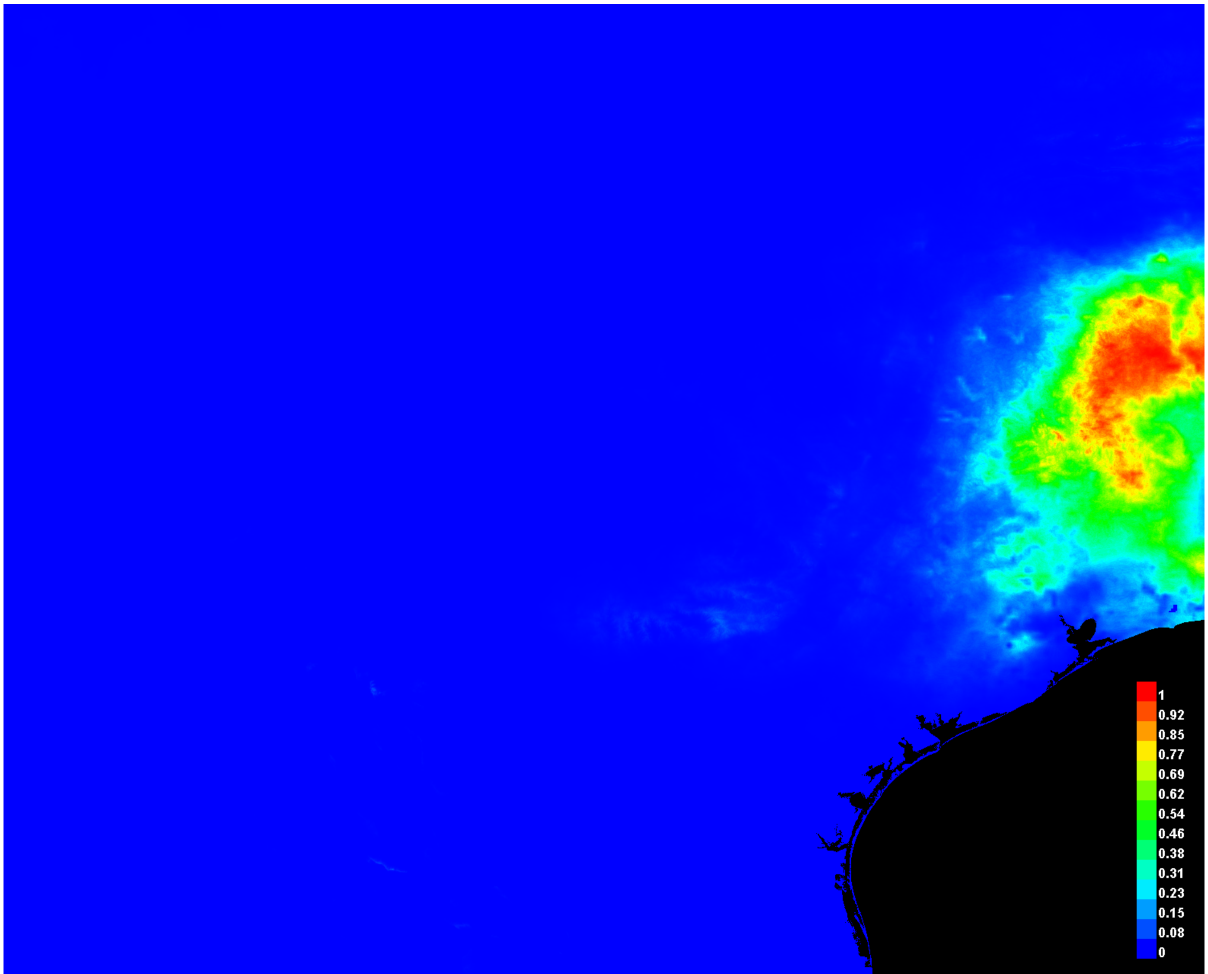


The next picture is the receiver operating characteristic (ROC) curve for the same data, again averaged over the replicate runs. Note that the specificity is defined using predicted area, rather than true commission (see the paper by Phillips, Anderson and Schapire cited on the help page for discussion of what this means). The average test AUC for the replicate runs is 0.982, and the standard deviation is 0.004.



Pictures of the model

The following two pictures show the point-wise mean and standard deviation of the 5 output grids. Other available summary grids are min, max and median.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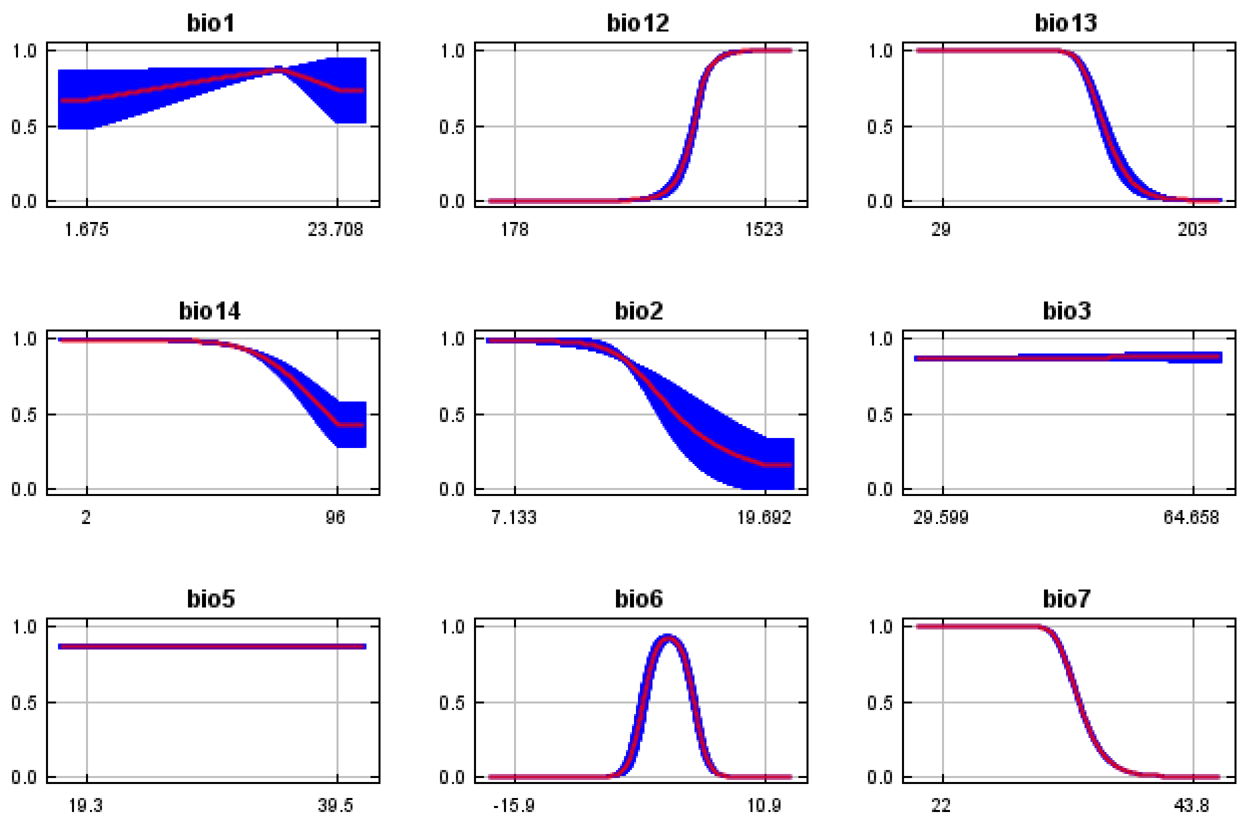
0.38
0.31
0.23
0.15
0.08
0

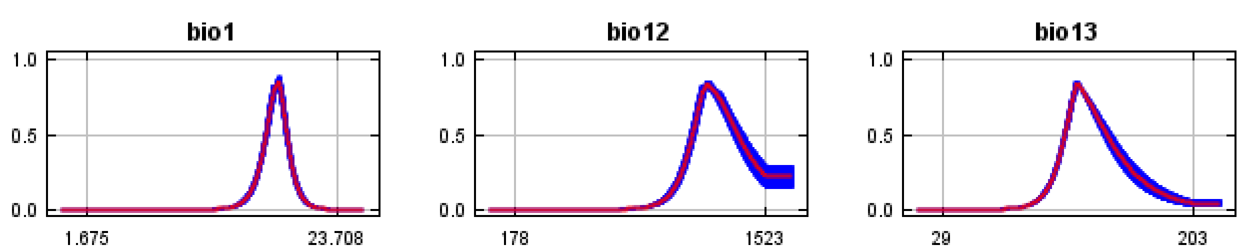

1
0.92
0.85
0.77
0.69
0.62
0.54
0.46
0.38
0.31
0.23
0.15
0.08
0

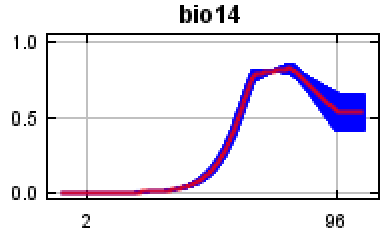
Response curves

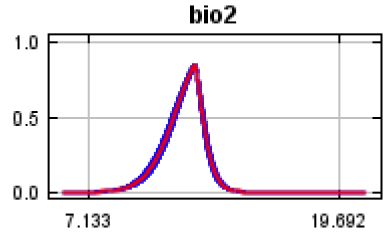
These curves show how each environmental variable affects the Maxent prediction. The curves show how the predicted probability of presence changes as each environmental variable is varied, keeping all other environmental variables at their average sample value. Click on a response curve to see a larger version. Note that the curves can be hard to interpret if you have strongly correlated variables, as the model may depend on the correlations in ways that are not evident in the curves. In other words, the curves show the marginal effect of changing exactly one variable, whereas the model may take advantage of sets of variables changing together. The curves show the mean response of the 5 replicate Maxent runs (red) and and the mean +/- one standard deviation (blue, two shades for categorical variables).

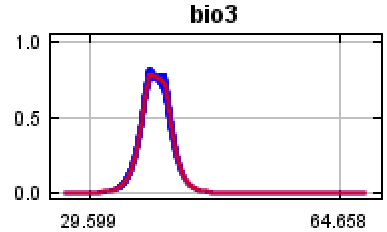


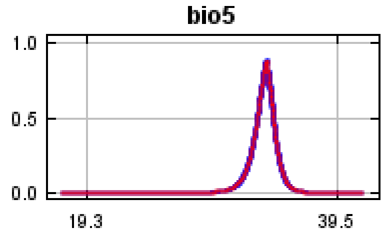
In contrast to the above marginal response curves, each of the following curves represents a different model, namely, a Maxent model created using only the corresponding variable. These plots reflect the dependence of predicted suitability both on the selected variable and on dependencies induced by correlations between the selected variable and other variables. They may be easier to interpret if there are strong correlations between variables.

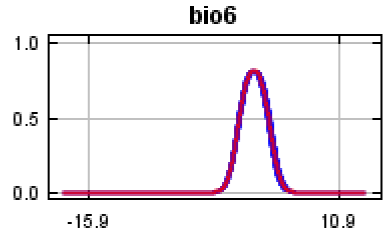


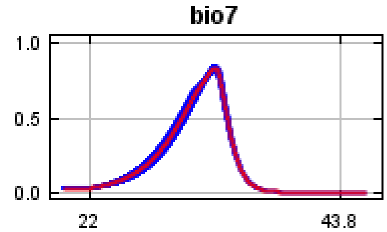










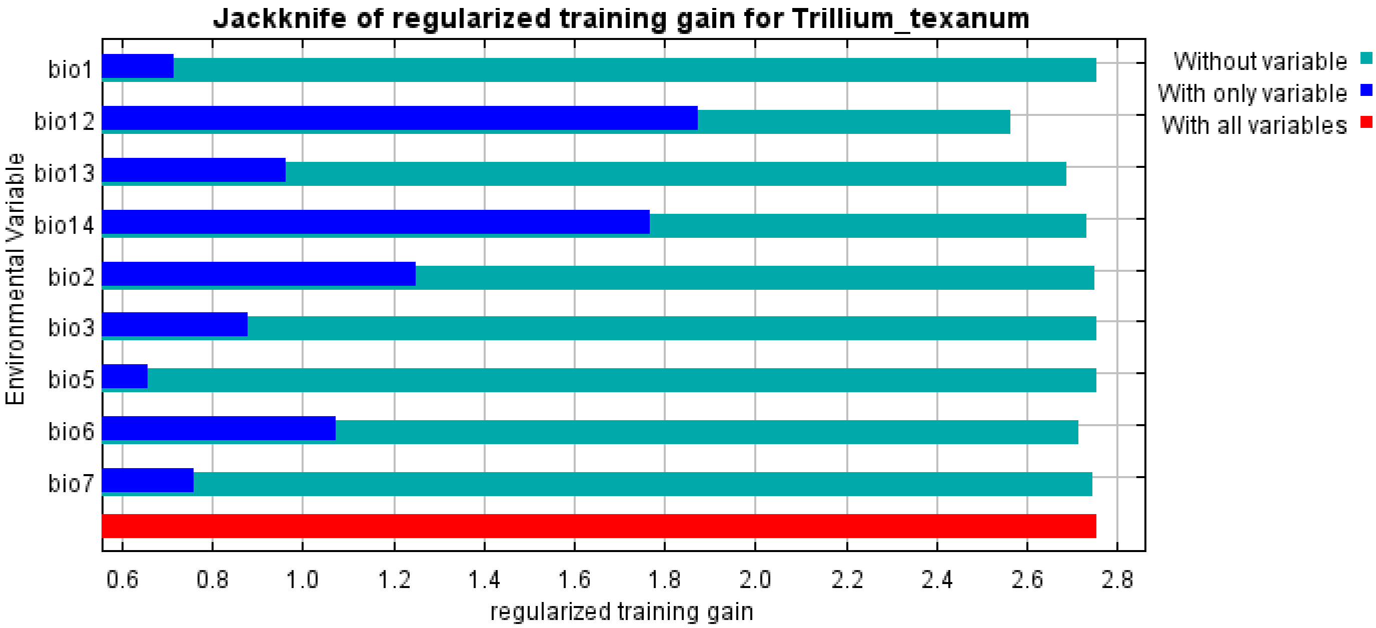


Analysis of variable contributions

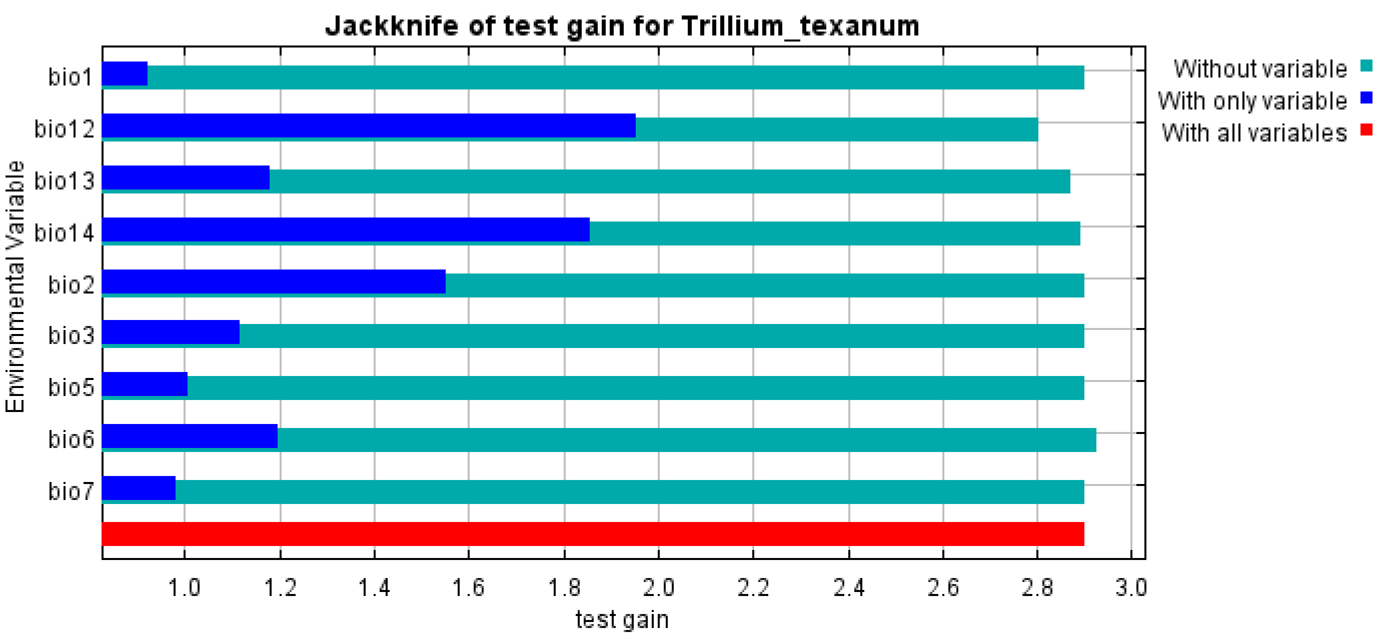
The following table gives estimates of relative contributions of the environmental variables to the Maxent model. To determine the first estimate, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative. For the second estimate, for each environmental variable in turn, the values of that variable on training presence and background data are randomly permuted. The model is reevaluated on the permuted data, and the resulting drop in training AUC is shown in the table, normalized to percentages. As with the variable jackknife, variable contributions should be interpreted with caution when the predictor variables are correlated. Values shown are averages over replicate runs.

Variable	Percent contribution	Permutation importance
bio14	64.3	0.5
bio7	11.3	7.3
bio12	9.5	74.4
bio13	7.1	3.1
bio1	6.3	0.1
bio6	1.3	12.2
bio2	0.1	2.5
bio3	0.1	0
bio5	0	0

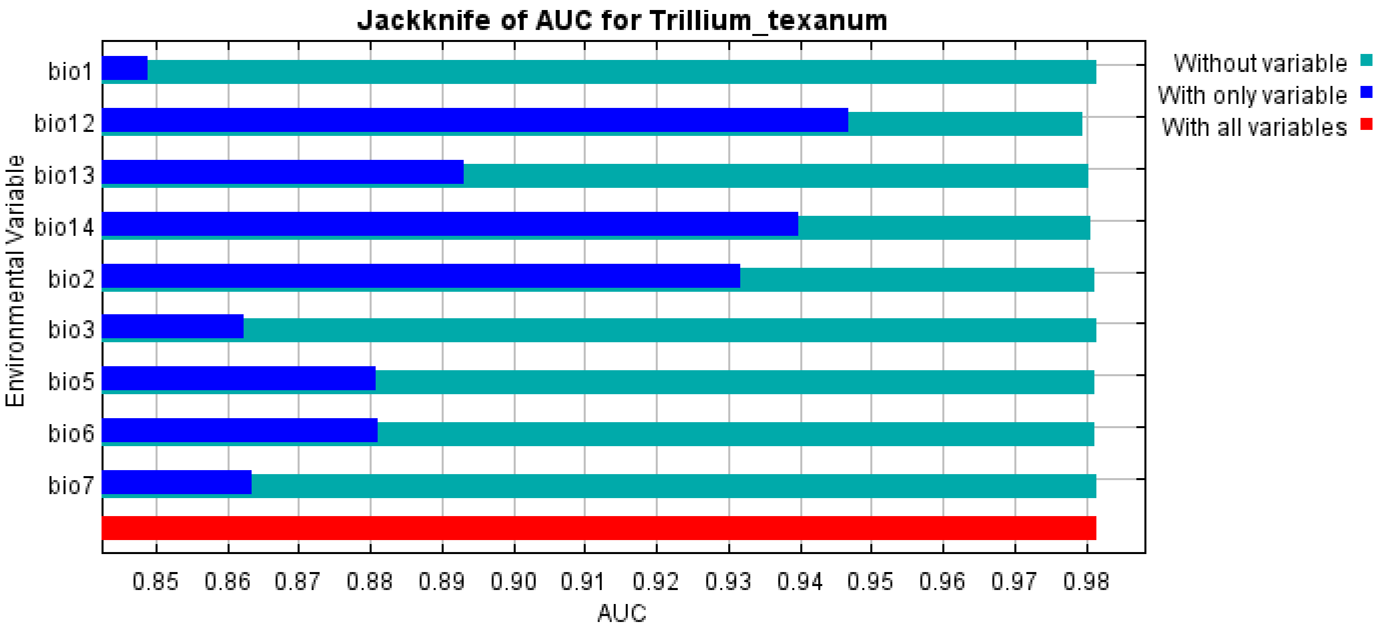
The following picture shows the results of the jackknife test of variable importance. The environmental variable with highest gain when used in isolation is bio12, which therefore appears to have the most useful information by itself. The environmental variable that decreases the gain the most when it is omitted is bio12, which therefore appears to have the most information that isn't present in the other variables. Values shown are averages over replicate runs.



The next picture shows the same jackknife test, using test gain instead of training gain. Note that conclusions about which variables are most important can change, now that we're looking at test data.



Lastly, we have the same jackknife test, using AUC on test data.



Command line to repeat this species model: java density.MaxEnt nowarnings noprefixes -E "" -E Trillium_texanum responsecurves jackknife "outputdirectory=E:\TXDoT_Range Scale_Bioclim\CrossVal_Results\1reg\Trillium" samplesfile=E:\TXDoT_TXScale\Trillium\Trillium_filter.csv "environmentallayers=E:\TXDoT_Range Scale_Bioclim\Ascii" replicates=5 writebackgroundpredictions -N bio0