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# APPENDIX 2 – MODEL SUMMARIES

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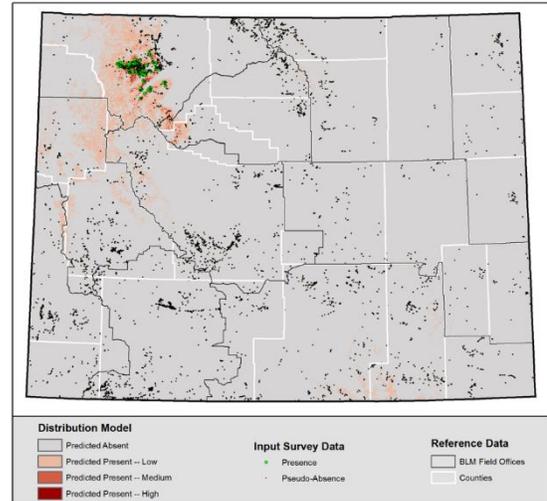
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# Overview

This appendix provides summary information for the models produced as part of this project, in alphabetical order by common name. The summary for each species' model comprises 3-5 pages and includes an overview map, details on modeling software, model thresholds and statistics, and graphs of variable importance and univariate responses for each predictor used in the model. Each of these components are described below, with accompanying sample images.

At the top of the first page of each model summary is the species' common and scientific name, followed by a model version. The version is simply the date the model was produced, in YYYY-MM-DD format, to distinguish these models from any previous or subsequent models generated for the species. Below this header is a map showing a four-category representation of the model. In this representation, gray indicates areas where the species is not predicted to occur; the predicted probability values in this category range from 0 to the lowest predicted probability assigned to any known presence location used in building the model. The next three categories define low, medium, and high predicted probabilities of occurrence for the species, and were defined by applying the 25<sup>th</sup> and 75<sup>th</sup> percentiles of predicted probabilities at known presence locations as thresholds between the three categories.

Absaroka beardtongue (*Penstemon absarokensis*)  
Model version: 2015-08-28



In the “**Model Information**” section, the algorithm and software used for modeling are indicated first. The “Binary Threshold (MaxTSS)” provided next give a probability threshold that can be used to produce a binary (i.e., “predicted presence/predicted absence”) map that maximizes the True Skill Statistic (TSS; see report for references). A binary representation of the model created by applying this threshold would balance the tradeoff between sensitivity (correctly classifying known presence as such), and specificity (minimizing the amount of unoccupied area falsely predicted as presence). Next, a reclassification table gives the thresholds applied to each model to produce the four-category expression of the model shown above.

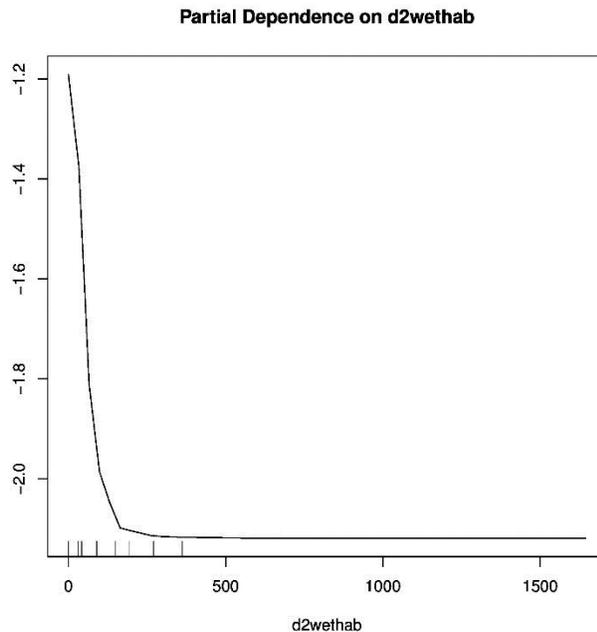
The “**Model Details**” section gives the number of presence locations used to generate the model, along with model statistics including Out-of-Bag (OOB) error, TSS, Kappa, Sensitivity, and Specificity (see report text for references). Each of these metrics is based on a binary version of the model created with an arbitrary probability threshold of 50%, using data that was averaged over “out of sample” data in each tree in the model. TSS may be the most important and informative statistic, as it integrates both sensitivity and specificity, and is not sensitive to the relative number of presence and absence points, unlike Kappa or the OOB error.

The “**Model Comments**” section at the top of the next page provides comments from WYNDD’s lead botanist on model interpretation or limitations. In many cases these comments can be applied as an additional “verbal model” that can be layered on top of the statistical model, helping a model user to hone in on specific habitats or areas within areas predicted present by the model, if related GIS layers or

other resources allow. In other cases, they indicate limitations in modeling that might be addressed as new data become available.

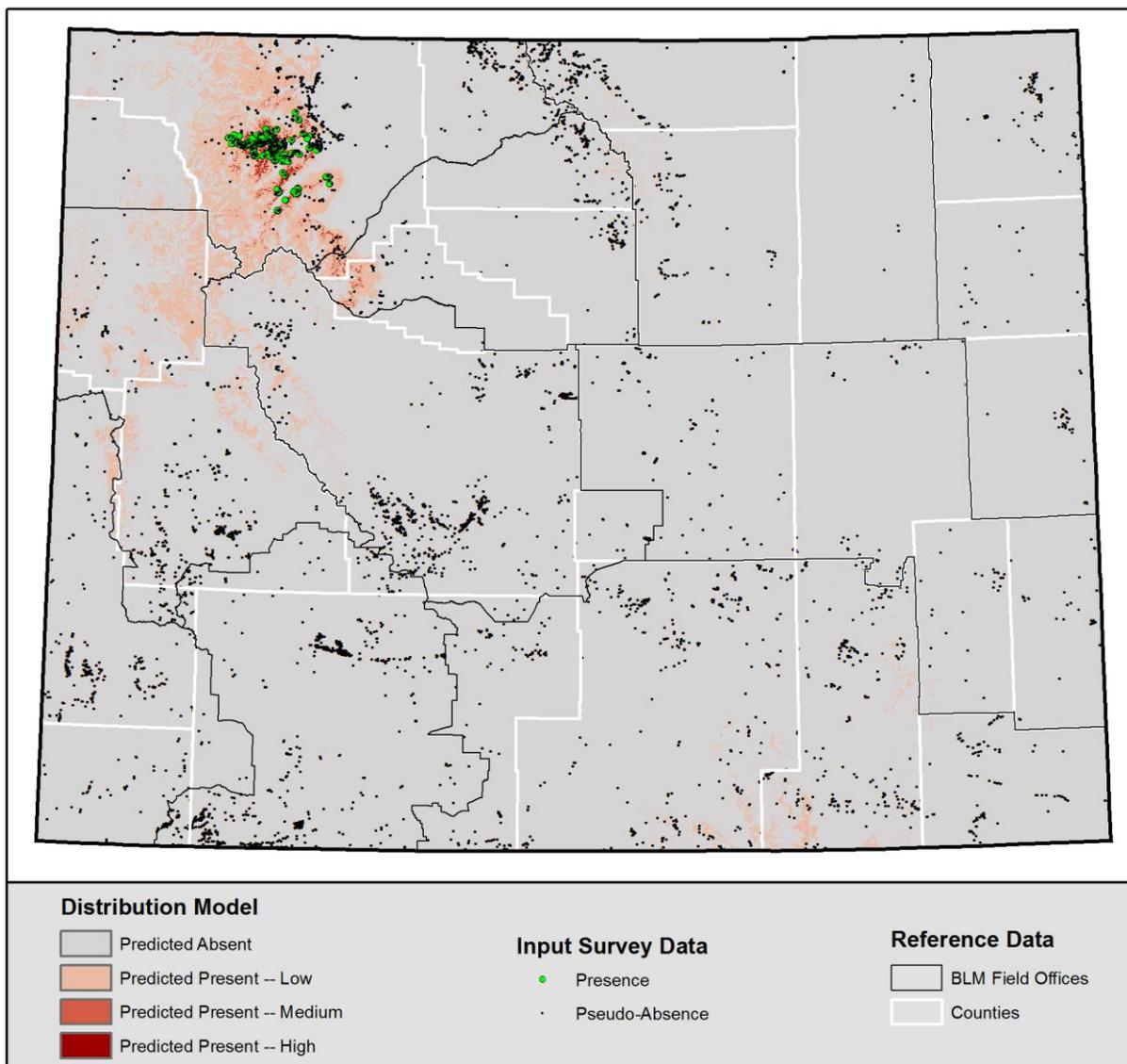
The relative importance of each predictor used in producing a model is illustrated in the variable importance plots in the “**Predictor Variable Importance**” section. Two different measures of variable importance are presented in side-by-side plots here, and the difference between the two measures is explained further in text. Briefly, the further to the right a point representing each predictor falls, the more important and informative the predictor layer was for this model. “MeanDecreaseAccuracy,” depicted in the graph on the left, is generally thought to be a more reliable indicator of importance.

Finally, the “**Partial Plots**” section shows the relationship between a given environmental predictor and its effect on the predicted probability for the species, holding all other predictor values constant. Although the y-axis does not present predicted probability *per se*, the basic interpretation is that higher values on the line or bar indicate higher likelihood of occurrence, for given values on the x-axis. For example, the partial plot on the right shows the relationship between the “d2wethab” predictor and the predicted likelihood of occurrence for Colorado butterfly plant. As expected, this riparian species is predicted to be most likely to occur in areas nearest to mapped wetland habitats, and the predicted likelihood of occurrence drops sharply as the distance from wetland features increases.



# Absaroka beardtongue (*Penstemon absarokensis*)

Model version: 2015-08-28



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); random Forest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.591
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.262	Predicted Absent (0)
0.262	0.930	Low (1)
0.930	0.974	Medium (2)
0.974	1	High (3)

## Model Details

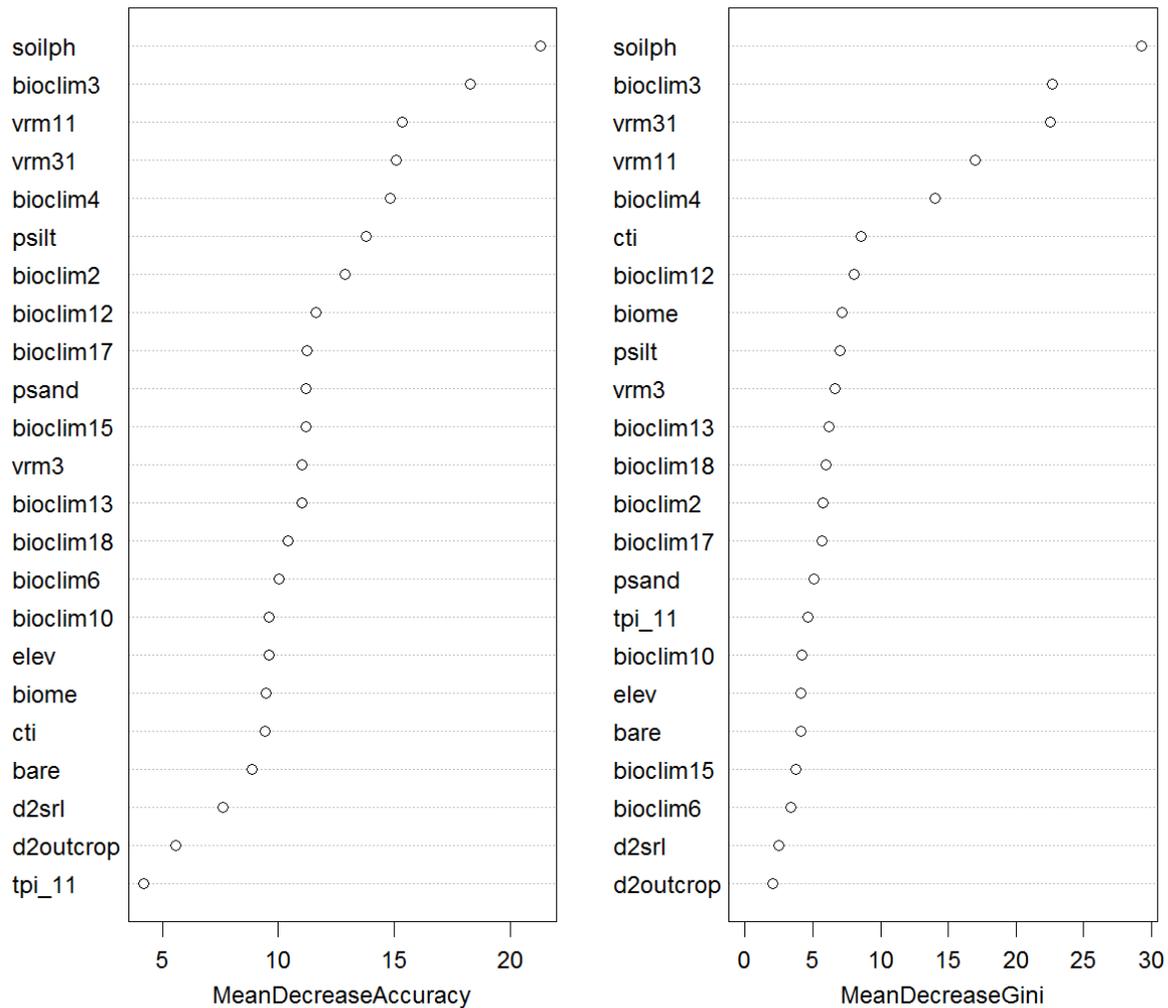
- **Number of Locations:** 134
- **Out-of-Bag Error:** 6.8%
- **TSS:** 83.9%
- **Kappa:** 82.3%
- **Sensitivity:** 89.5%
- **Specificity:** 94.5%

## Model Comments:

Endemic plant species that are restricted to specific soil conditions are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. Absaroka beardtongue is limited to substrates derived from Absaroka volcanics, but bedrock geology was not included among environmental layers and it would eliminate most low probability potential habitat.

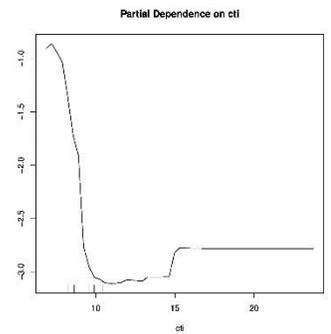
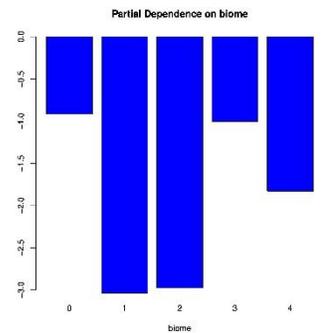
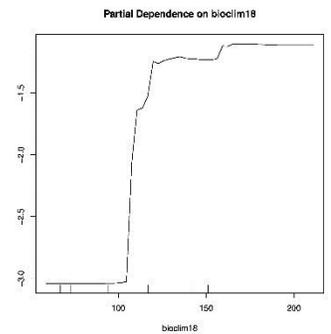
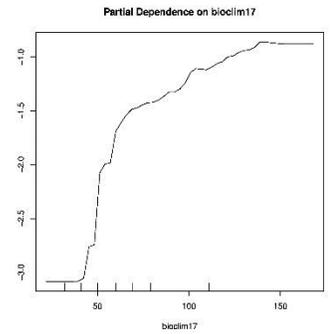
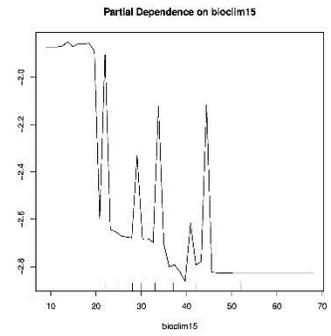
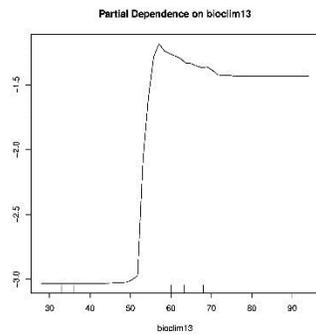
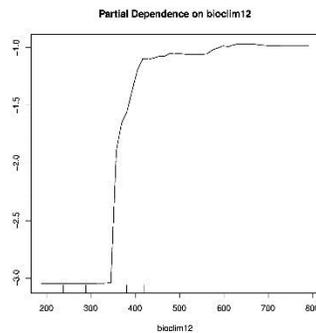
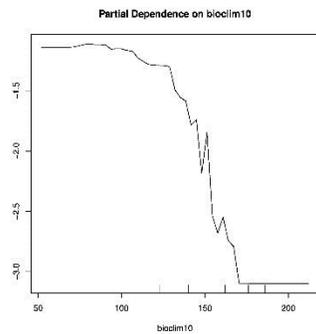
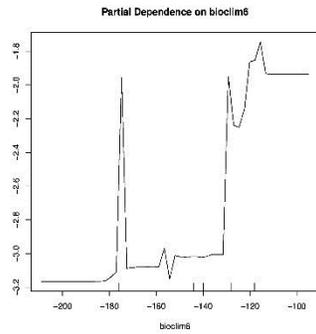
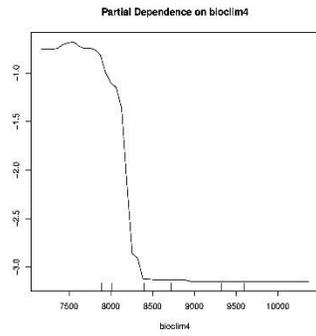
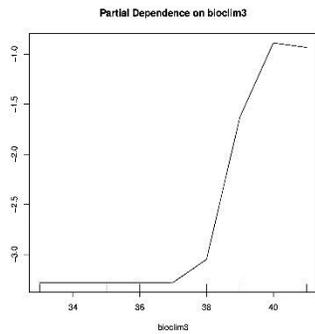
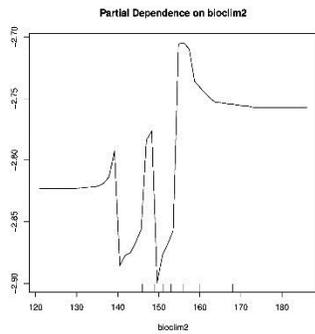
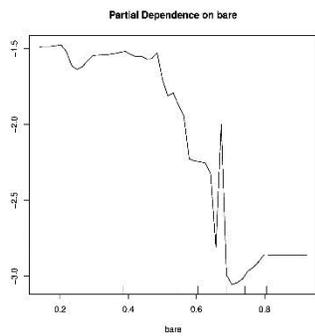
## Predictor Variable Importance:

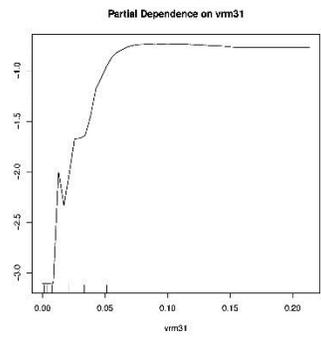
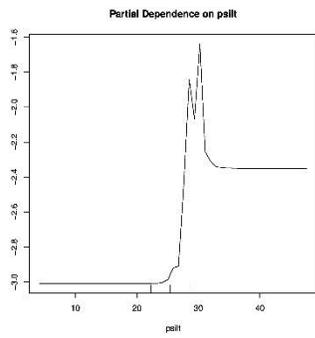
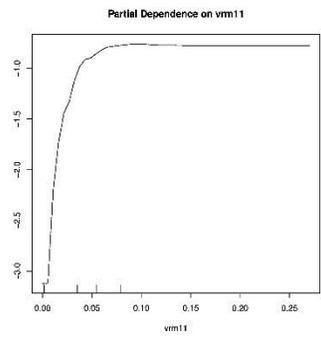
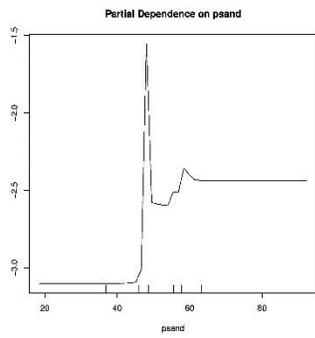
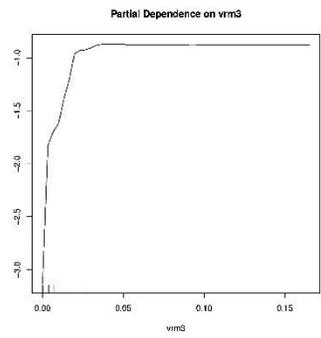
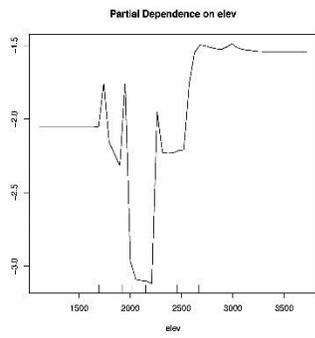
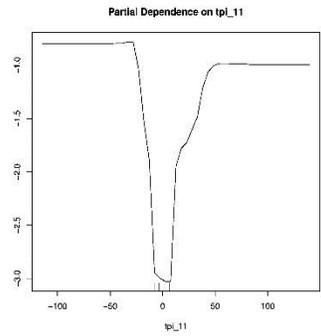
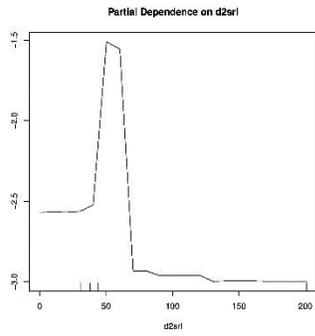
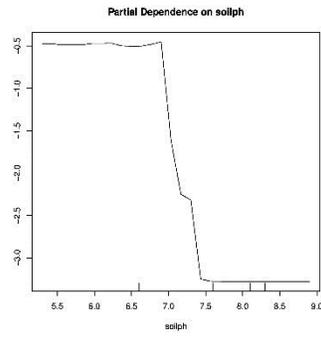
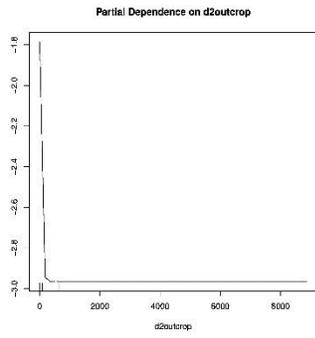
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

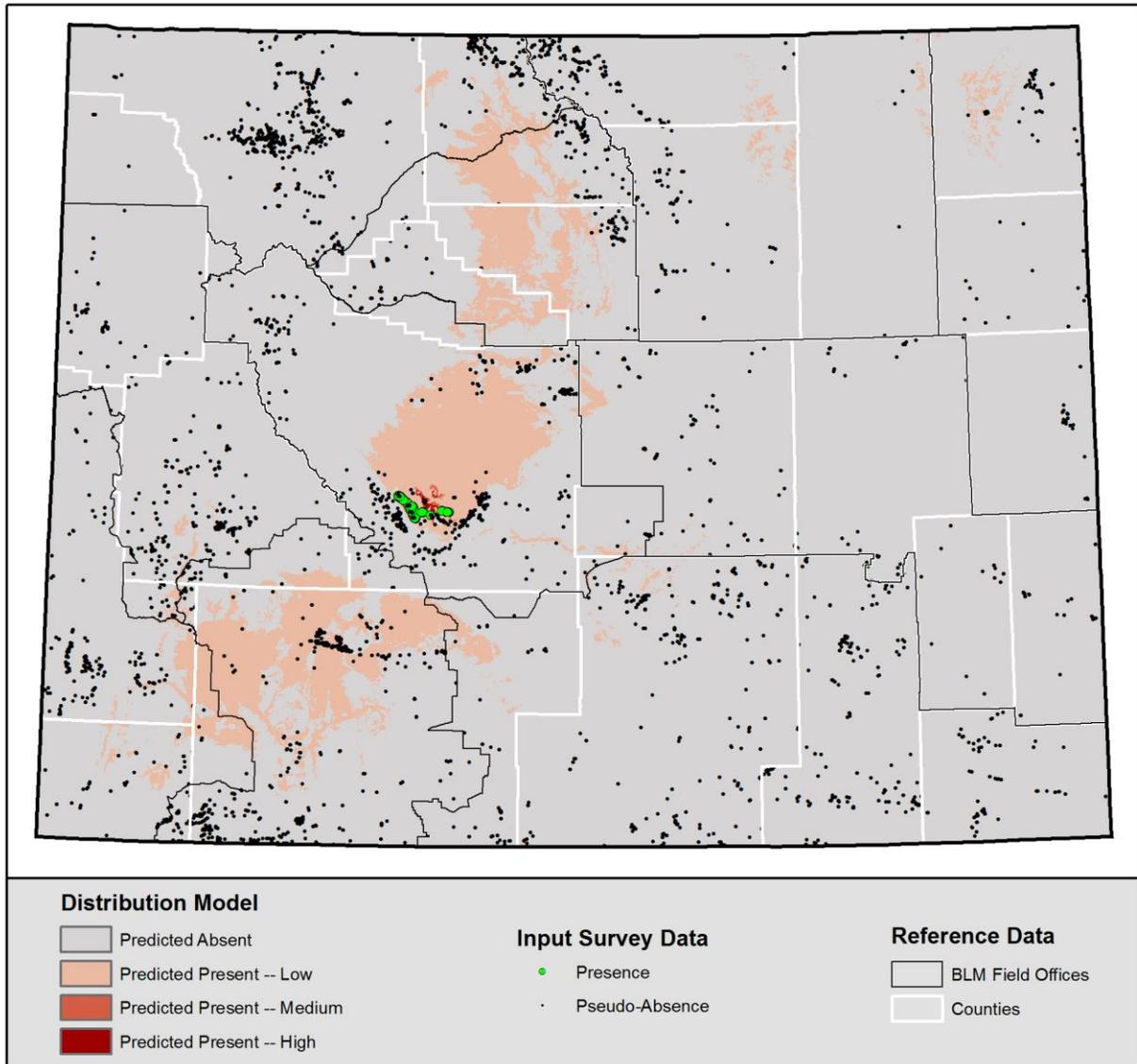
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Barneby's clover (*Trifolium barnebyi*)

Model version: 2014-07-25



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.487
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.198	Predicted Absent (0)
0.198	0.874	Low (1)
0.874	0.986	Medium (2)
0.986	1	High (3)

## Model Details

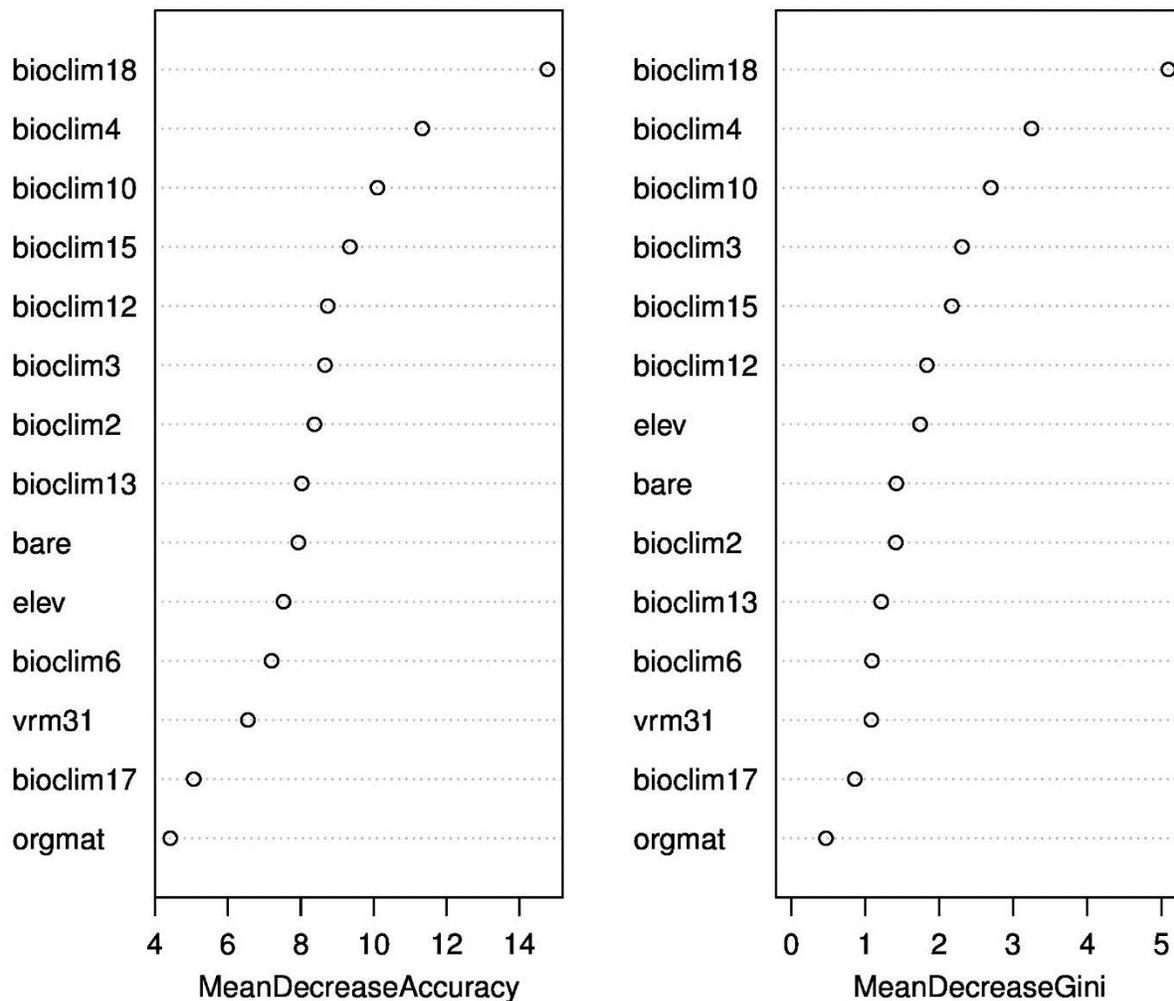
- **Number of Locations:** 18
- **Out-of-Bag Error:** 4.4%
- **TSS:** 87.7%
- **Kappa:** 88.2%
- **Sensitivity:** 90.3%
- **Specificity:** 97.4%

## Model Comments:

Endemic plant species that are restricted to specific soil conditions are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. Barneby's clover is limited to coarse substrates, mainly the Nuggett Formation, and to a lesser extent, adjoining formations, but bedrock geology was not included among environmental layers and it would eliminate most low probability potential habitat.

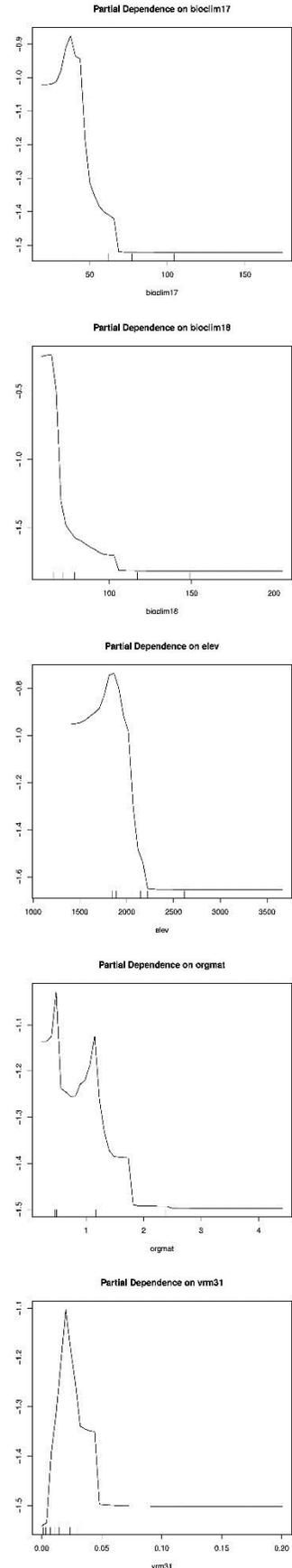
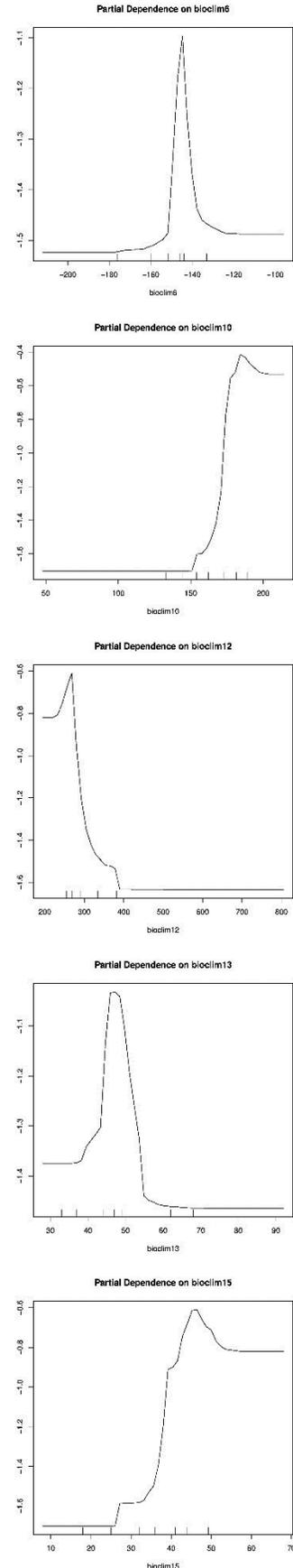
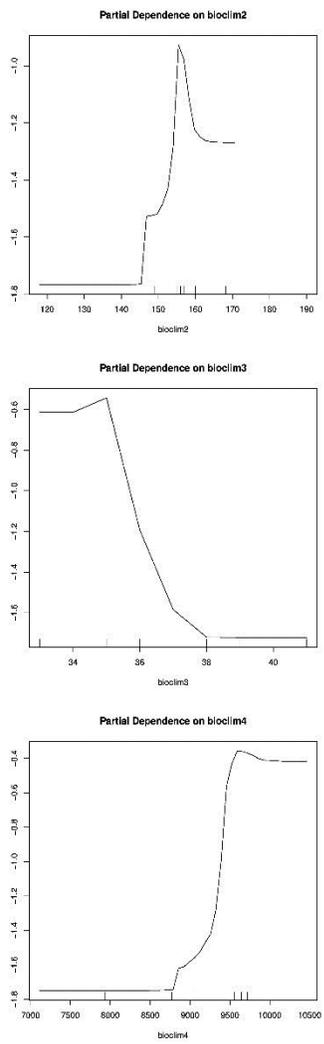
## Predictor Variable Importance:

The graph below indicates the relative importance of predictors in modeling distribution for this species. "MeanDecreaseAccuracy" calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than "MeanDecreaseGini," which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



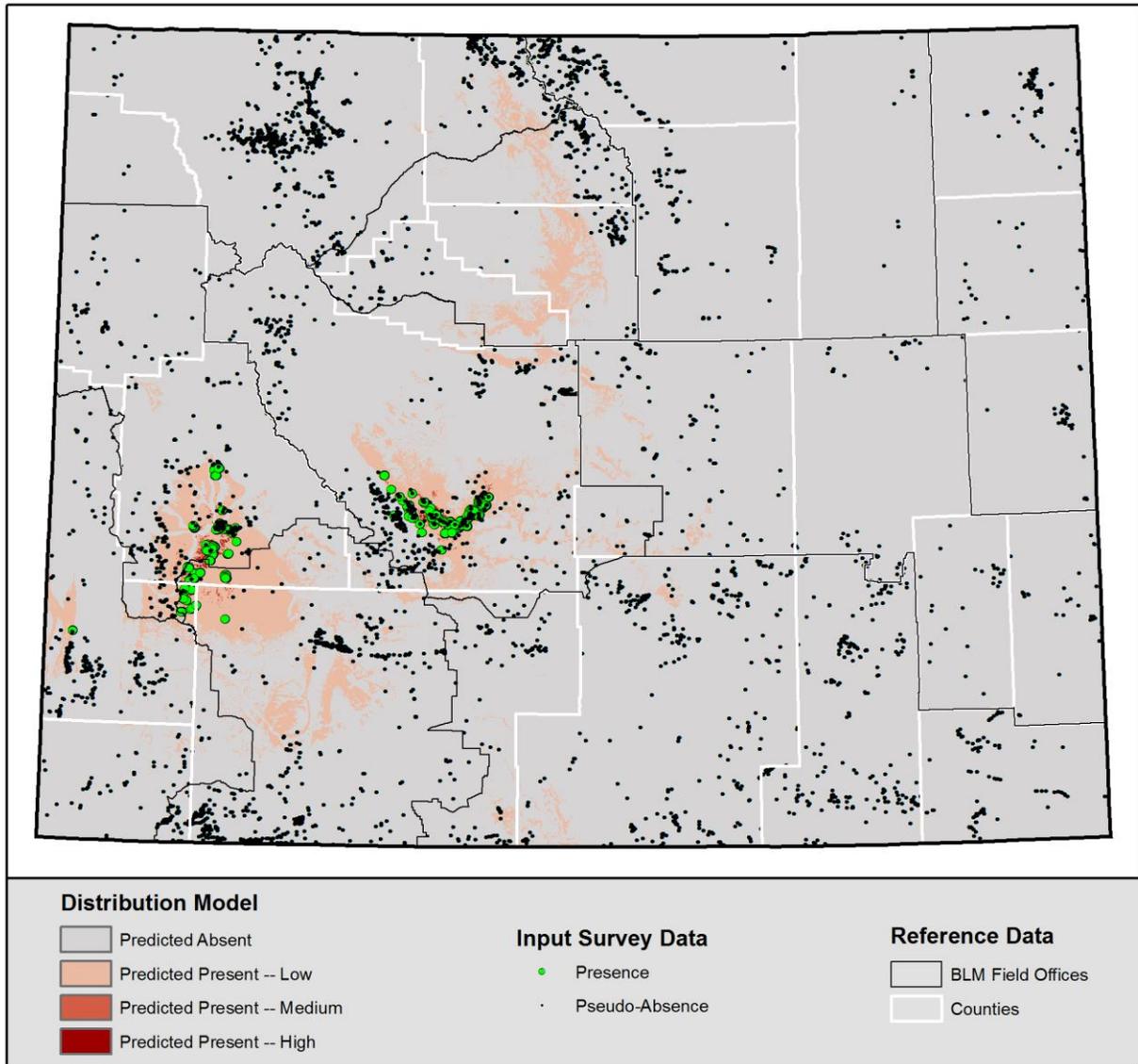
# Partial Plots

Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.



# Beaver rim phlox (*Phlox pungens*)

Model version: 2015-08-28



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.478
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.164	Predicted Absent (0)
0.164	0.842	Low (1)
0.842	0.958	Medium (2)
0.958	1	High (3)

## Model Details

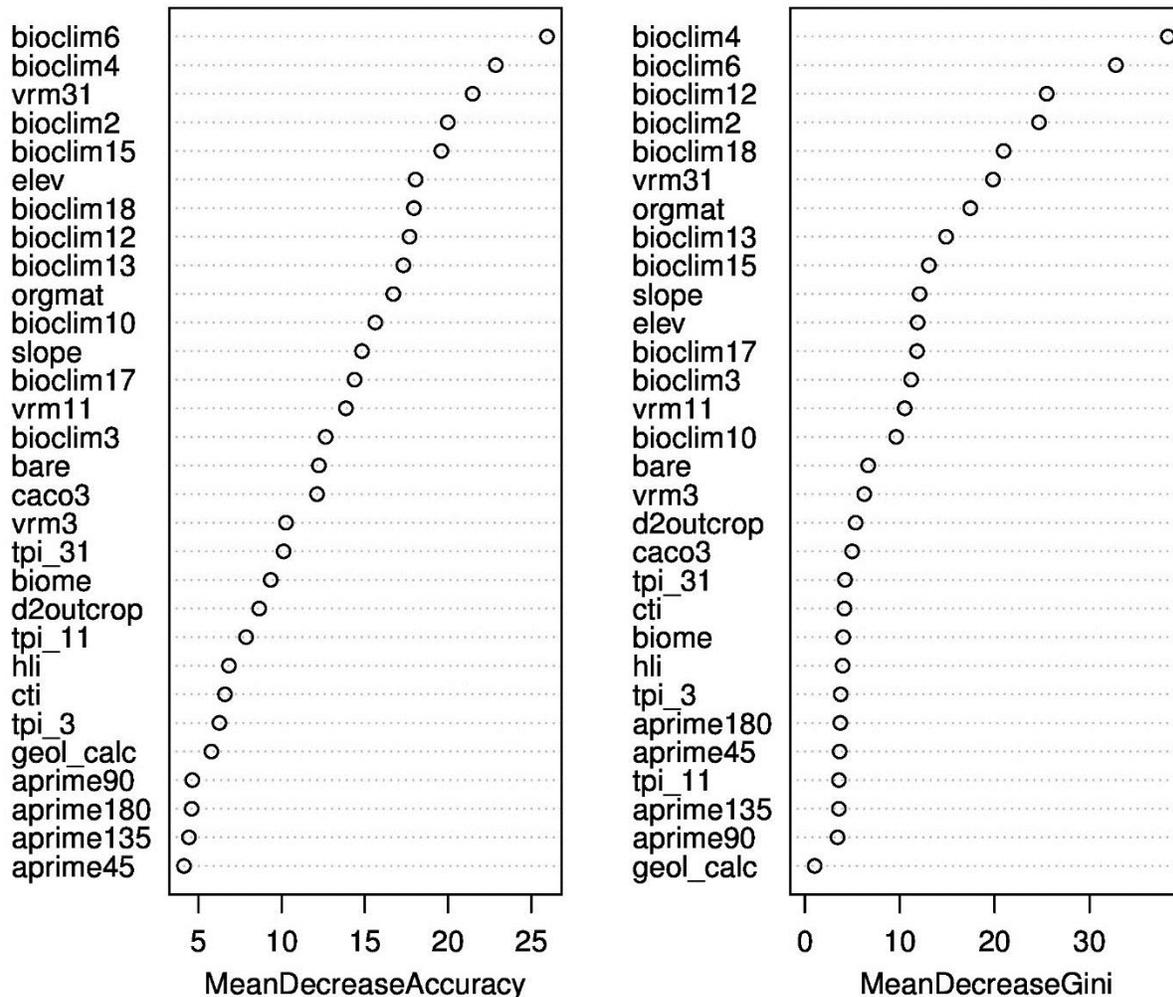
- **Number of Locations:** 225
- **Out-of-Bag Error:** 5.1%
- **TSS:** 88.8%
- **Kappa:** 86.8%
- **Sensitivity:** 93.4%
- **Specificity:** 95.4%

## Model Comments:

Endemic plant species that are restricted to specific soil conditions are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. In addition, for calciphilic species such as Beaver Rim phlox, a surrogate layer was developed from bedrock geology layers to reflect calcium carbonate content. There is taxonomic work evaluating whether Green River and Wind River area populations may represent two separate varieties but it was modeled in one set.

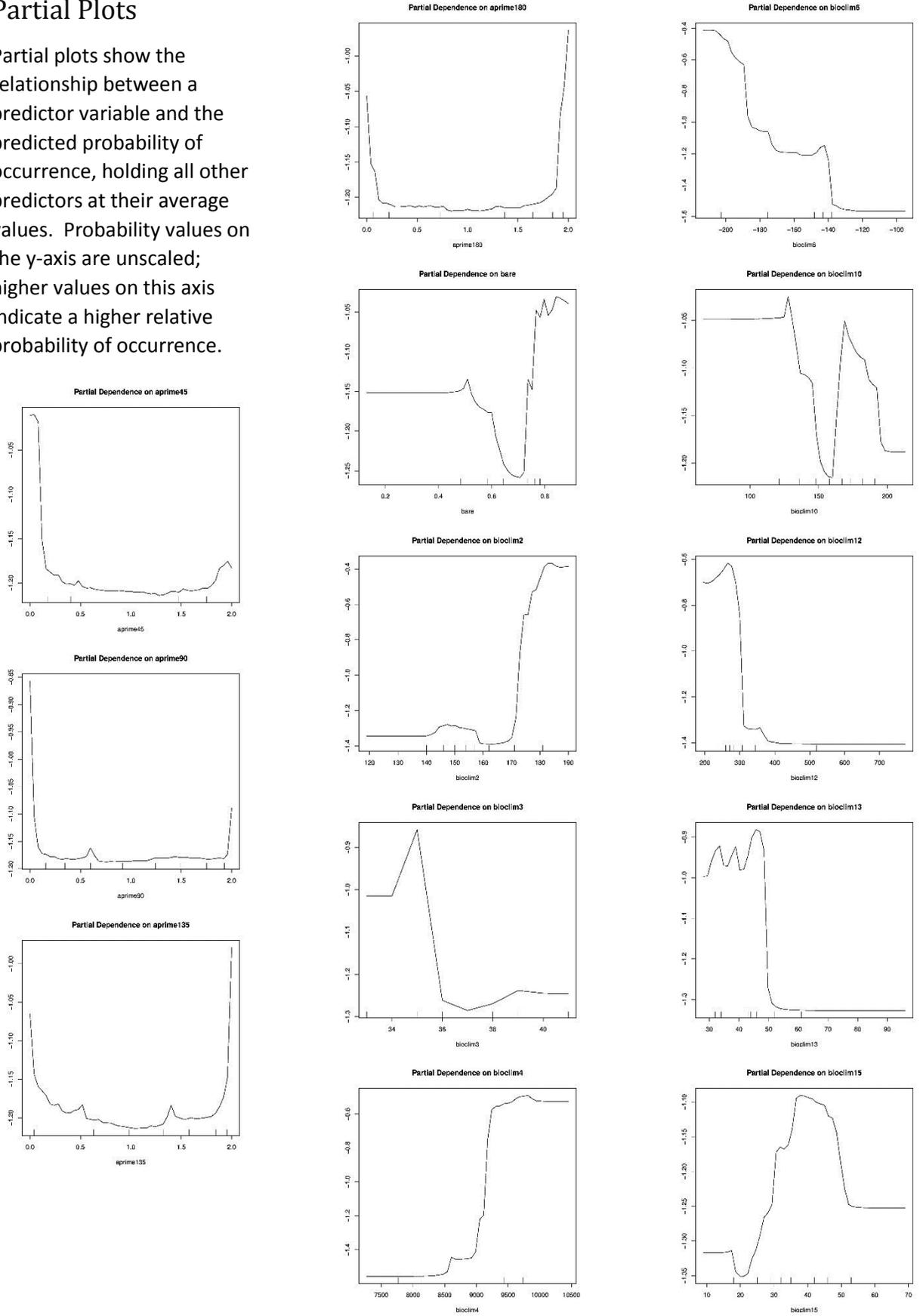
## Predictor Variable Importance:

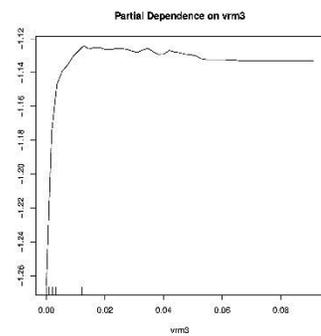
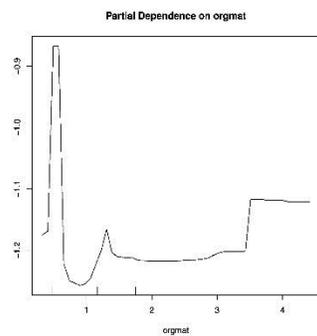
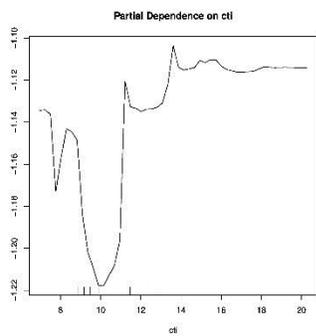
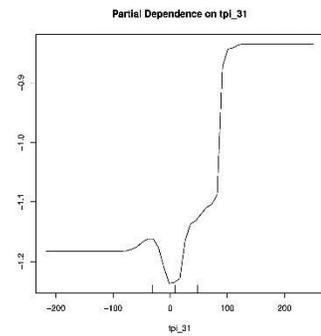
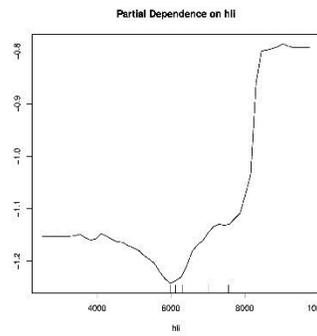
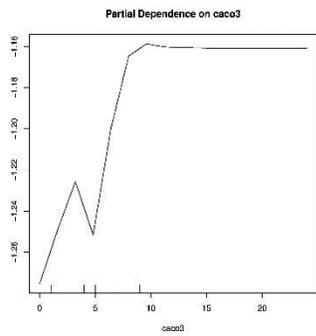
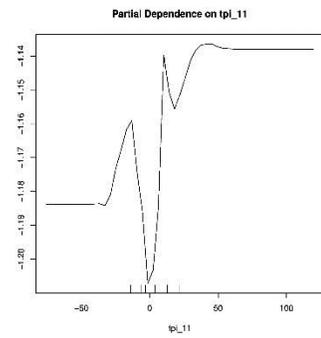
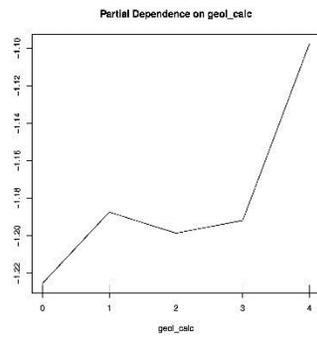
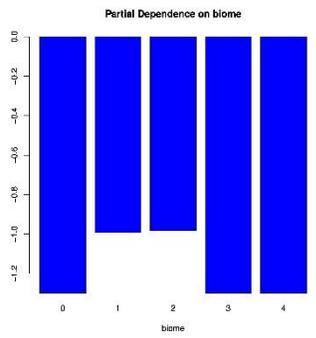
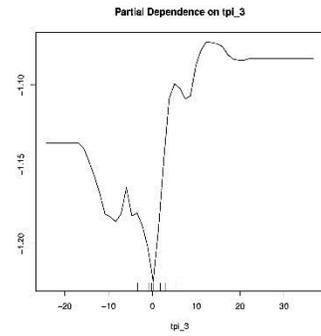
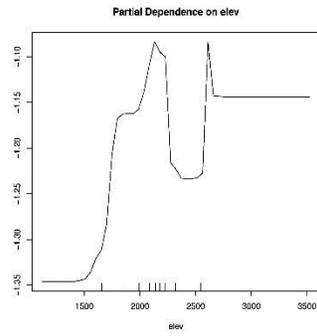
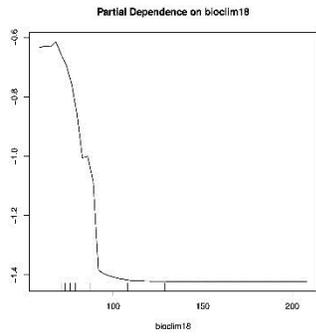
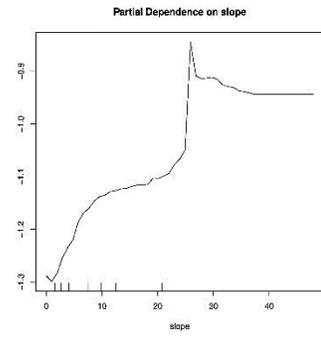
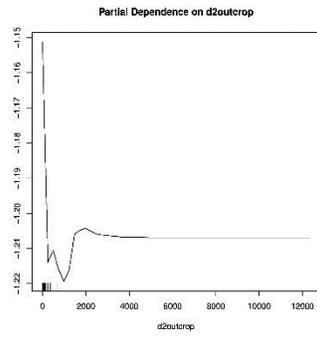
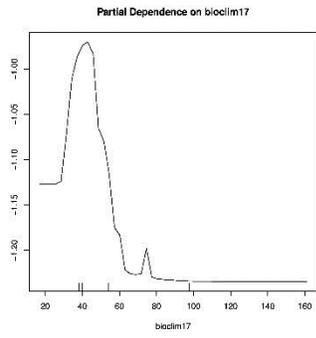
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.

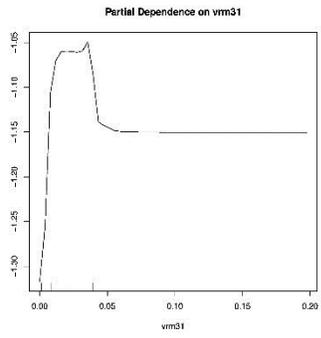
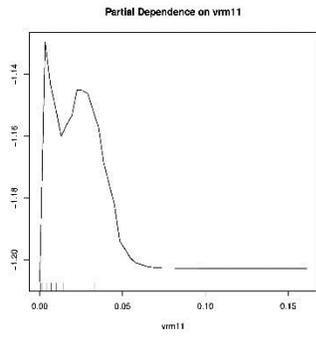


# Partial Plots

Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.

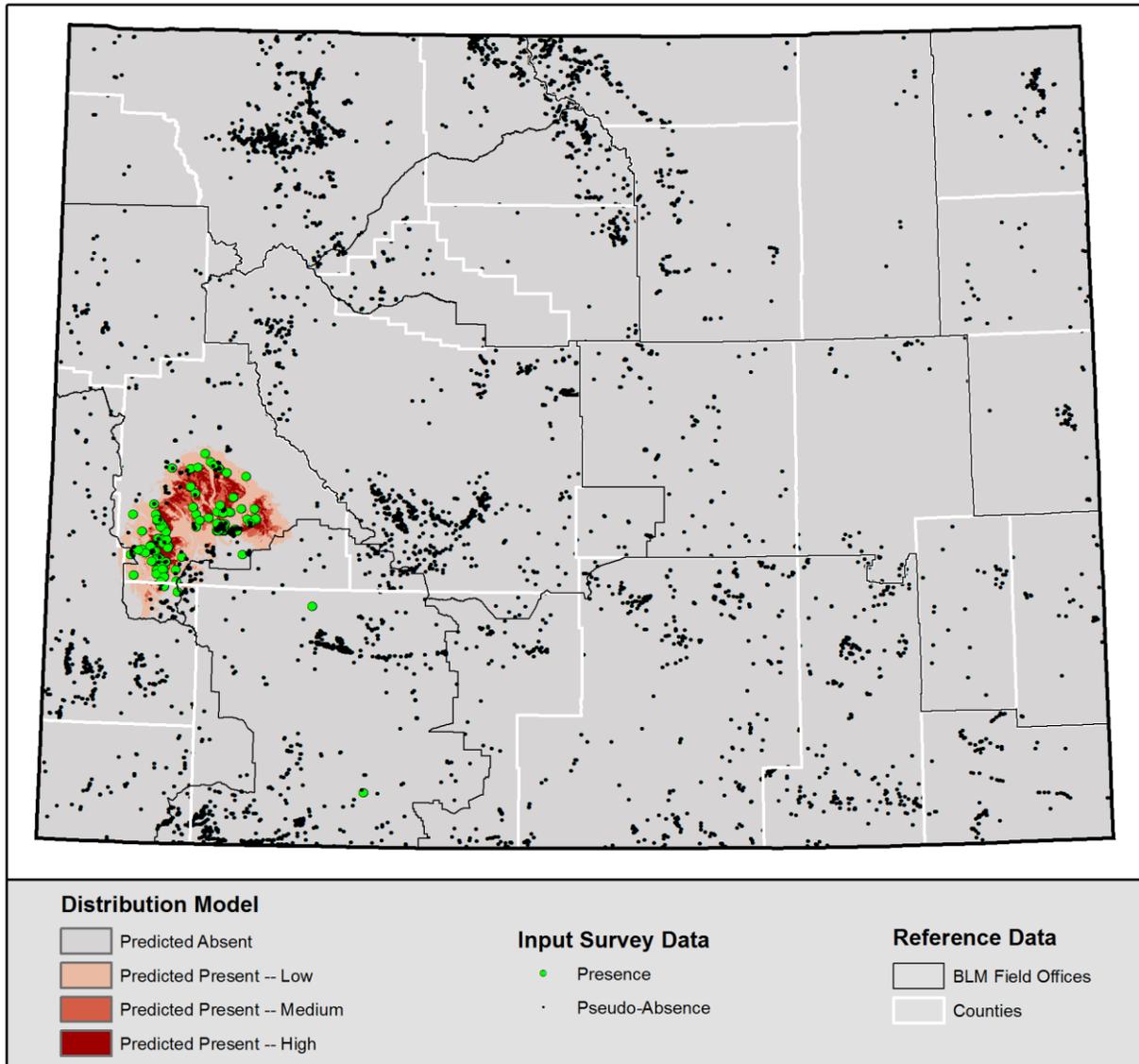






# Big piney milkvetch (*Astragalus drabelliformis*)

Model version: 2015-08-27



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.667
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.676	Predicted Absent (0)
0.676	0.920	Low (1)
0.920	0.996	Medium (2)
0.996	1	High (3)

## Model Details

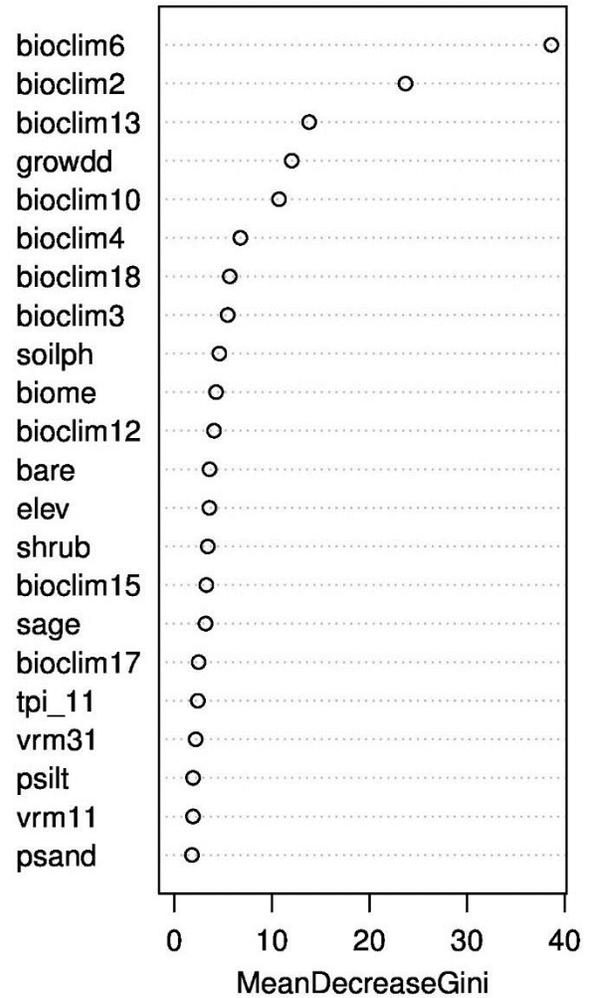
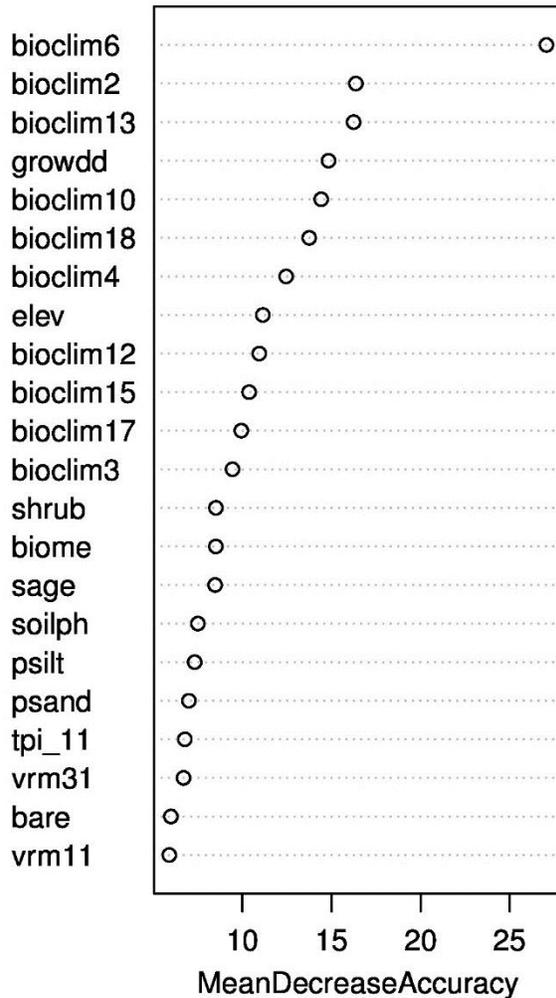
- **Number of Locations:** 107
- **Out-of-Bag Error:** 4.6%
- **TSS:** 89.5%
- **Kappa:** 88.0%
- **Sensitivity:** 93.4%
- **Specificity:** 96.1%

## Model Comments:

Endemic plant species that are restricted to specific soil conditions are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. Big Piney milkvetch is limited to coarse substrates and exposed settings. A high proportion of Big Piney milkvetch presence points may have large buffers, affecting model performance.

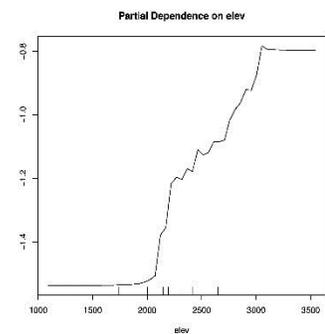
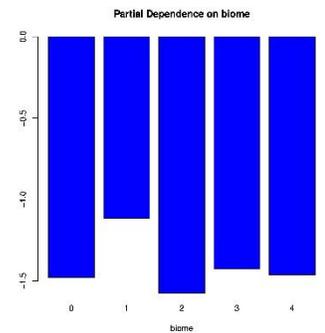
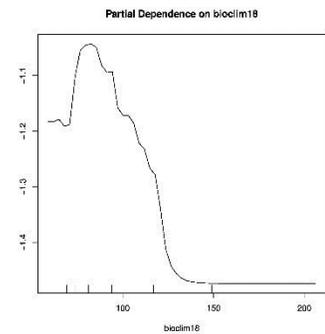
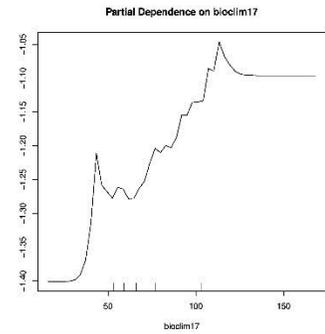
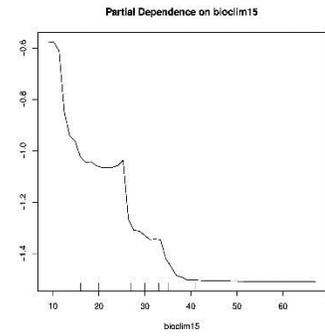
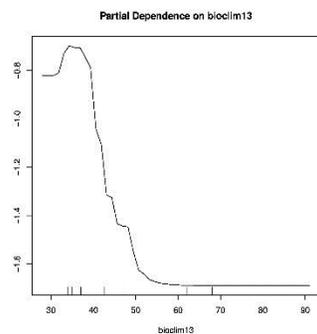
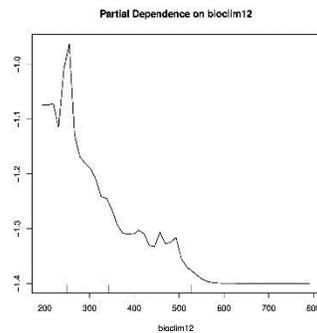
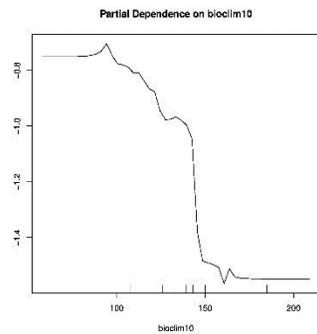
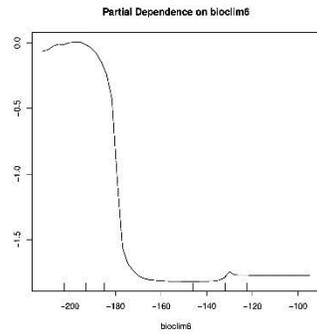
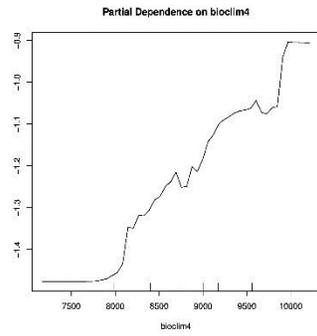
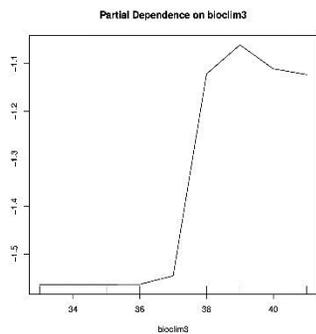
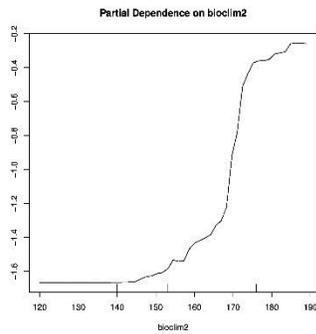
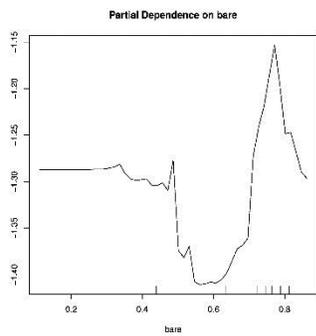
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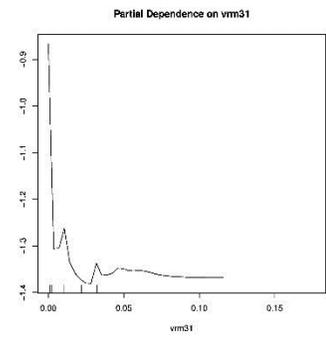
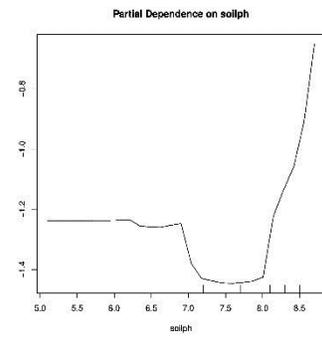
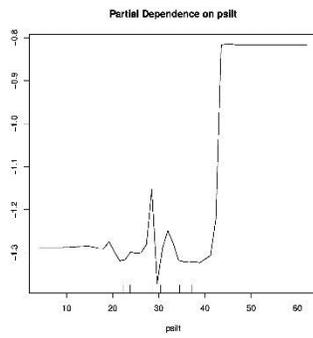
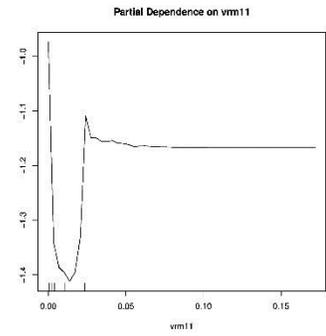
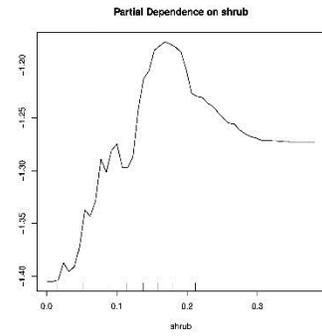
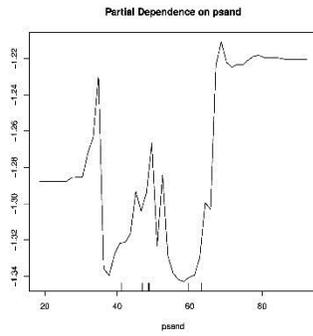
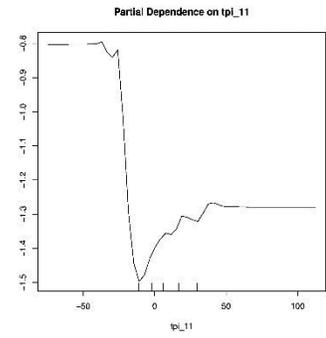
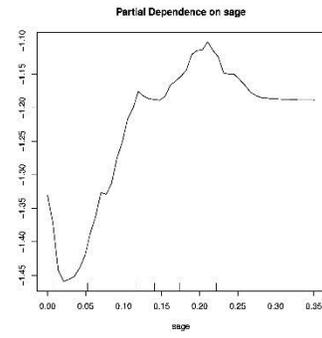
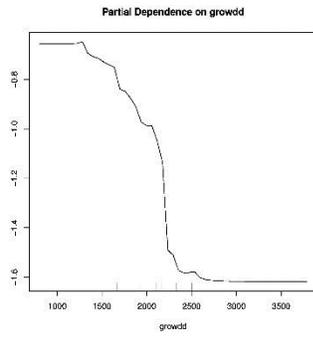
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

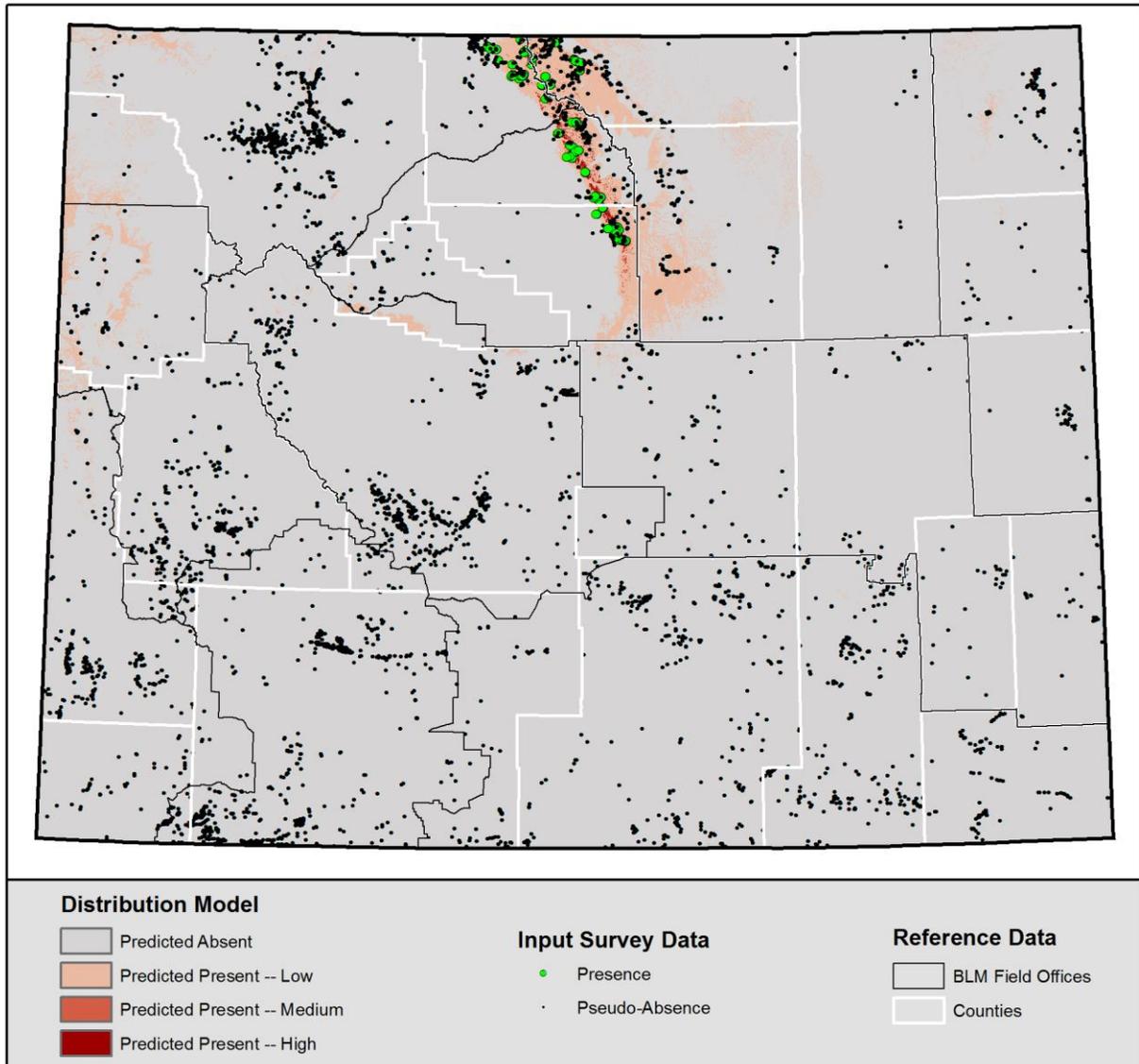
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Cary's beardtongue (*Penstemon caryi*)

Model version: 2014-07-26



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.568
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.238	Predicted Absent (0)
0.238	0.808	Low (1)
0.808	0.952	Medium (2)
0.952	1	High (3)

## Model Details

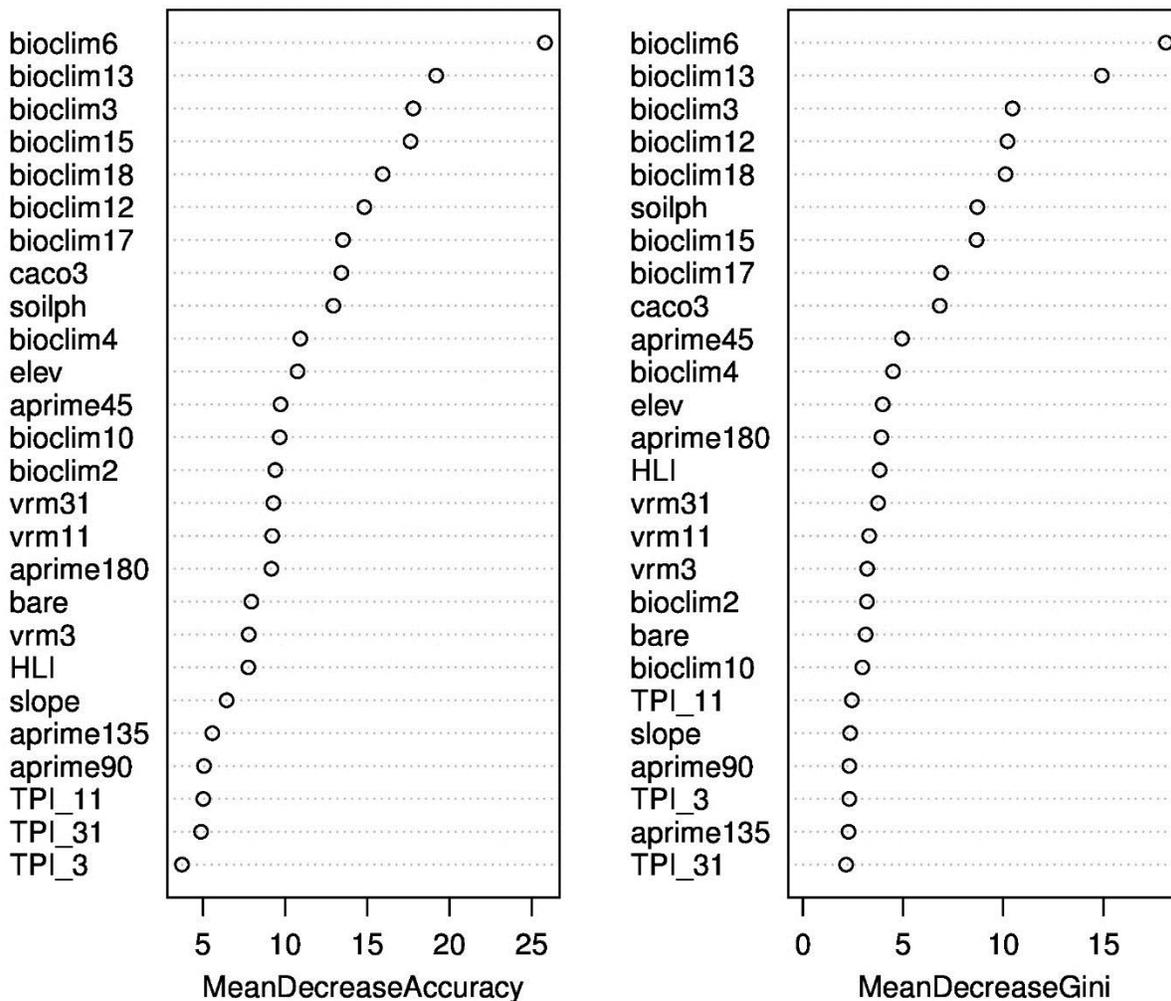
- **Number of Locations:** 100
- **Out-of-Bag Error:** 5.5%
- **TSS:** 86.3%
- **Kappa:** 85.4%
- **Sensitivity:** 90.5%
- **Specificity:** 95.8%

## Model Comments:

Regionally endemic plant species that are restricted to specific soil conditions are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. In addition, for calciphilic species such as Cary's beardtongue, a surrogate layer was developed from bedrock geology layers to reflect calcium carbonate content.

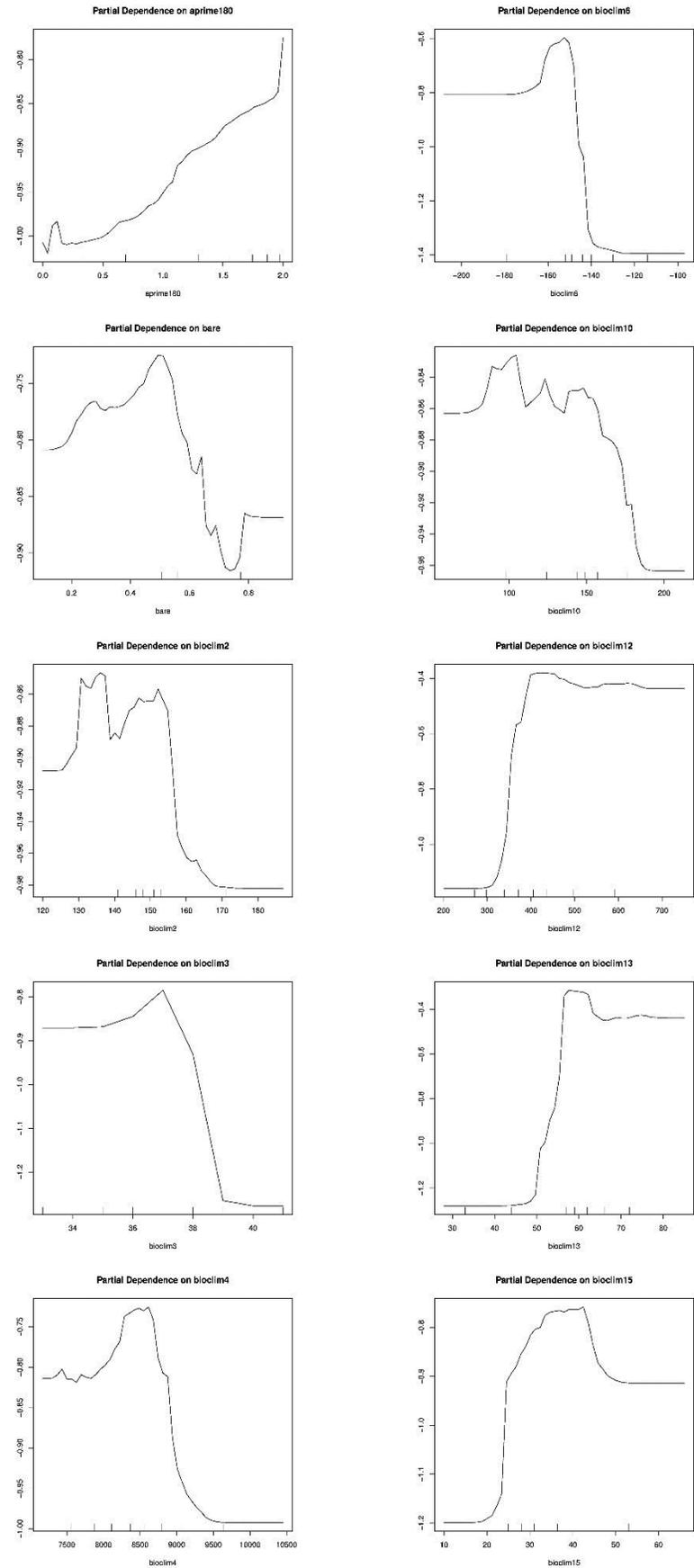
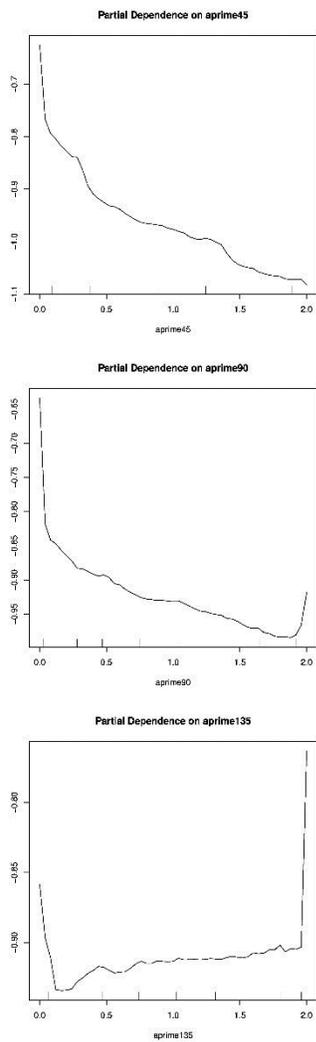
## Predictor Variable Importance:

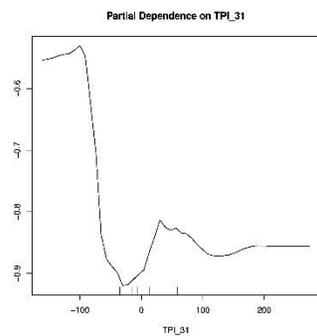
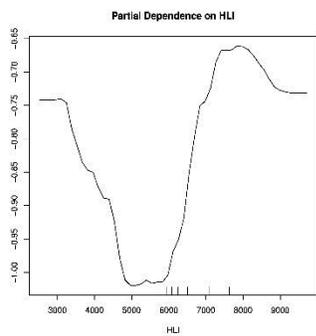
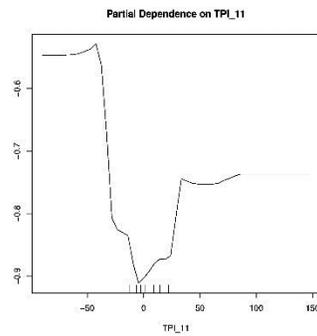
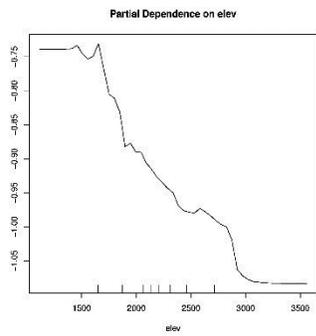
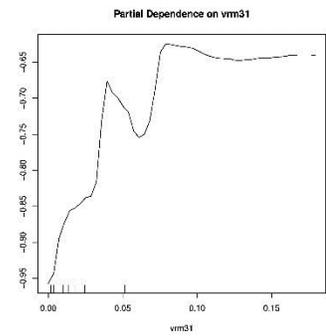
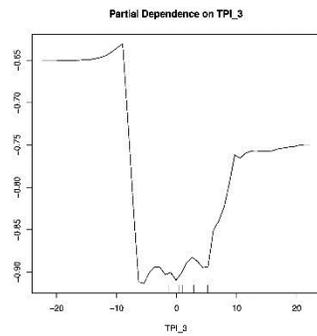
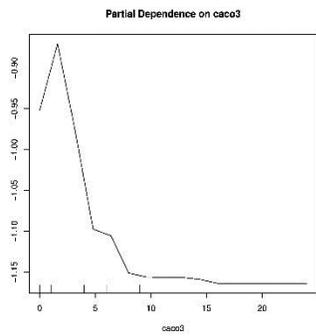
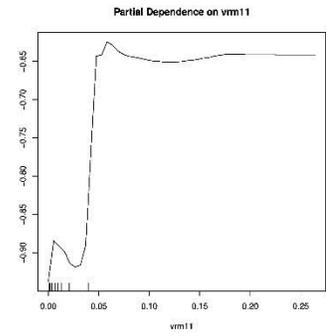
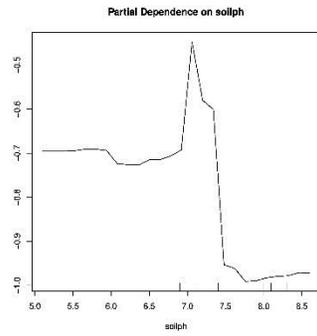
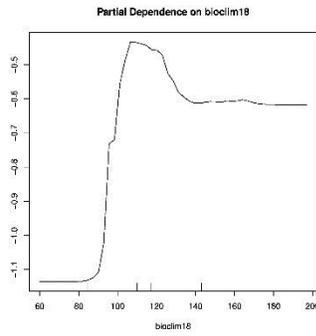
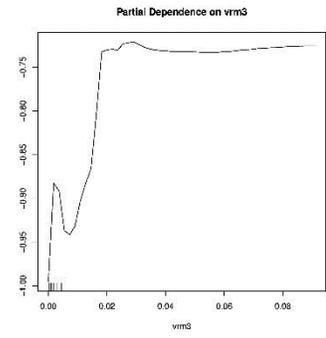
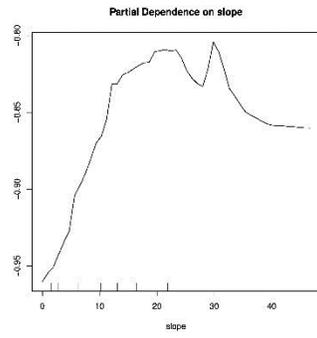
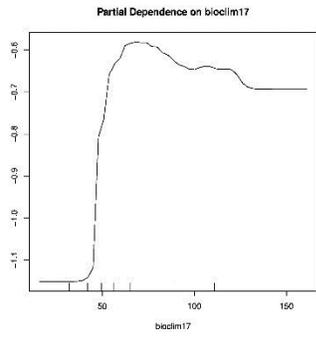
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

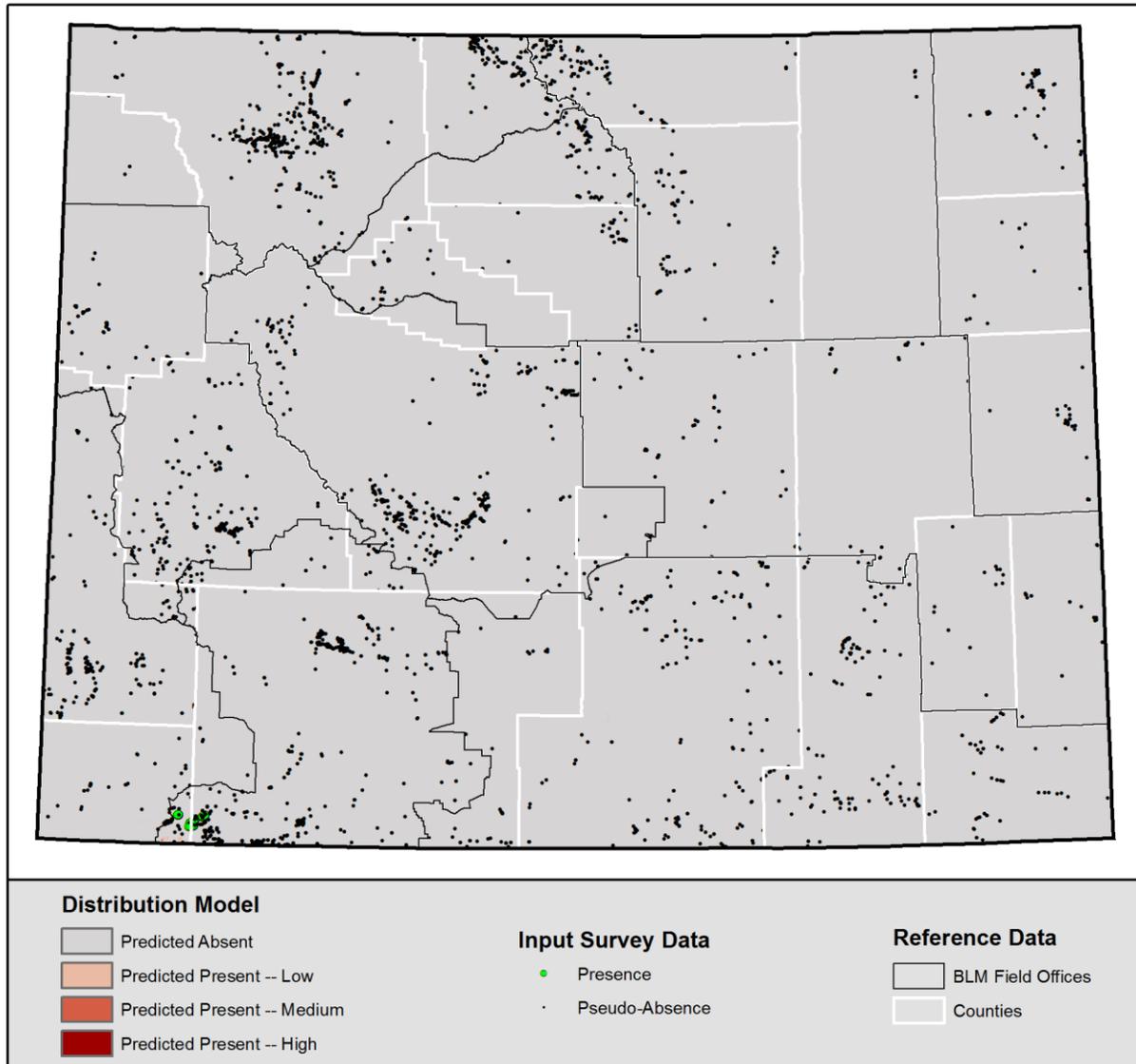
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Cedar Mountain Easter daisy (*Townsendia microcephala*)

Model version: 2014-07-23



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.590
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.610	Predicted Absent (0)
0.610	0.868	Low (1)
0.868	0.968	Medium (2)
0.968	1	High (3)

## Model Details

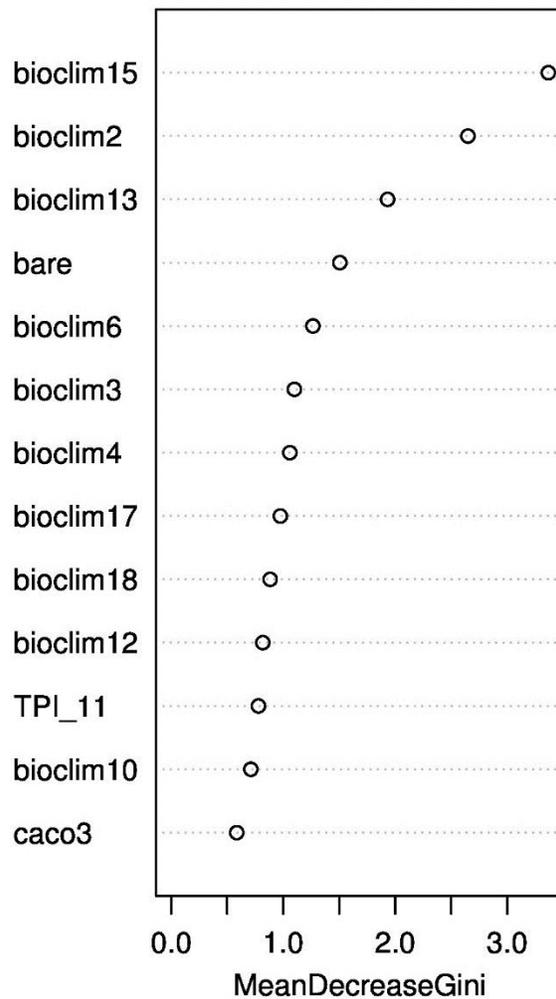
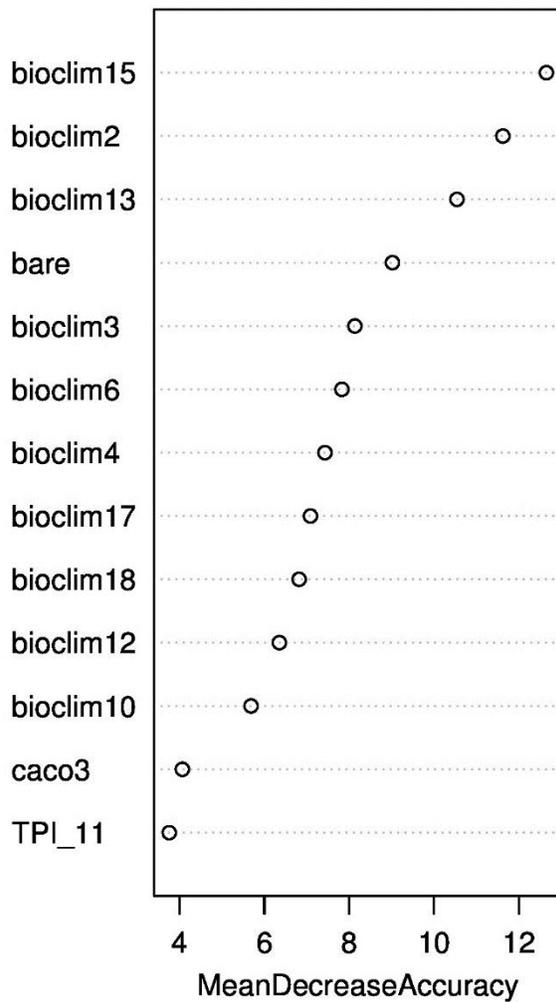
- **Number of Locations:** 12
- **Out-of-Bag Error:** 2.8%
- **TSS:** 92.9%
- **Kappa:** 92.7%
- **Sensitivity:** 94.9%
- **Specificity:** 98.0%

## Model Comments:

Endemic plant species that are restricted to specific soil conditions are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. Cedar Mountain Easter-daisy is limited to the Bridger Formation, but bedrock geology was not included among environmental layers.

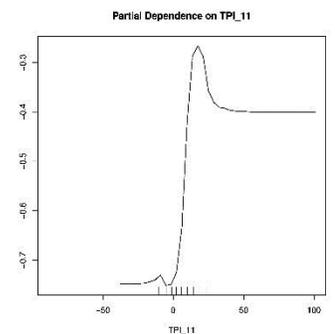
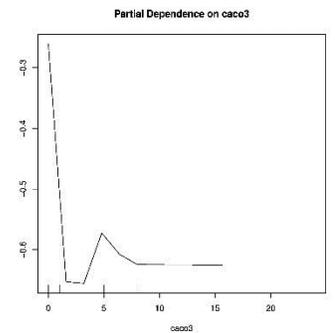
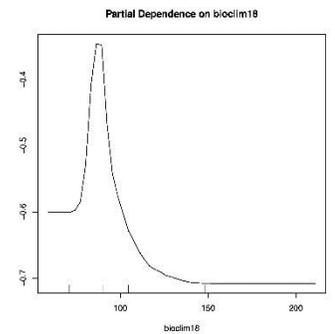
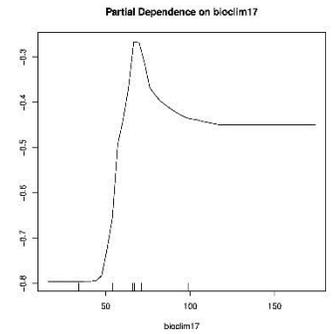
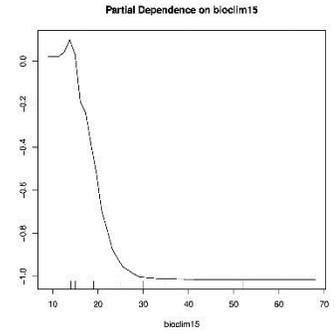
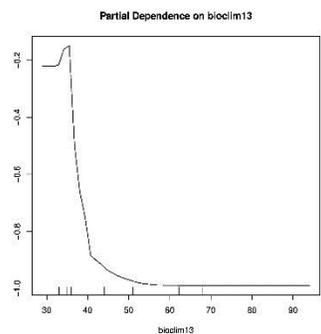
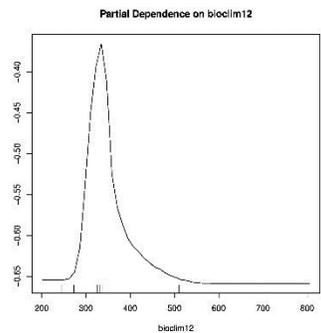
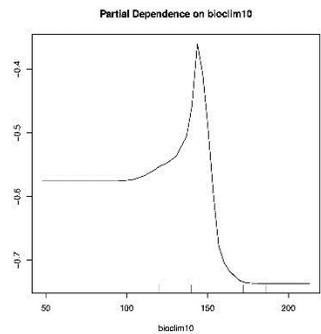
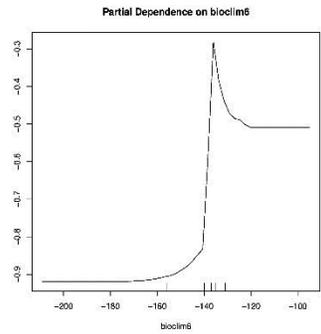
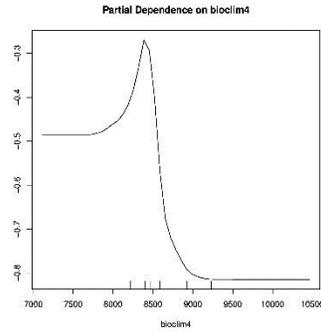
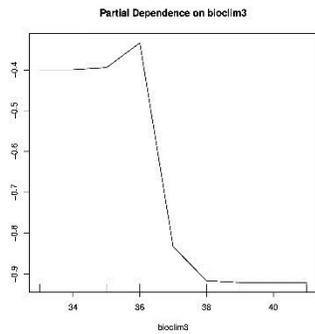
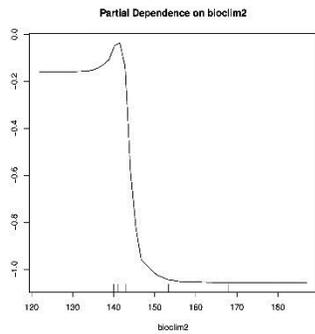
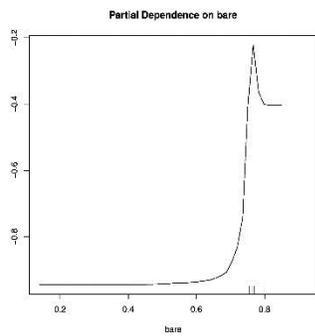
## Predictor Variable Importance:

The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



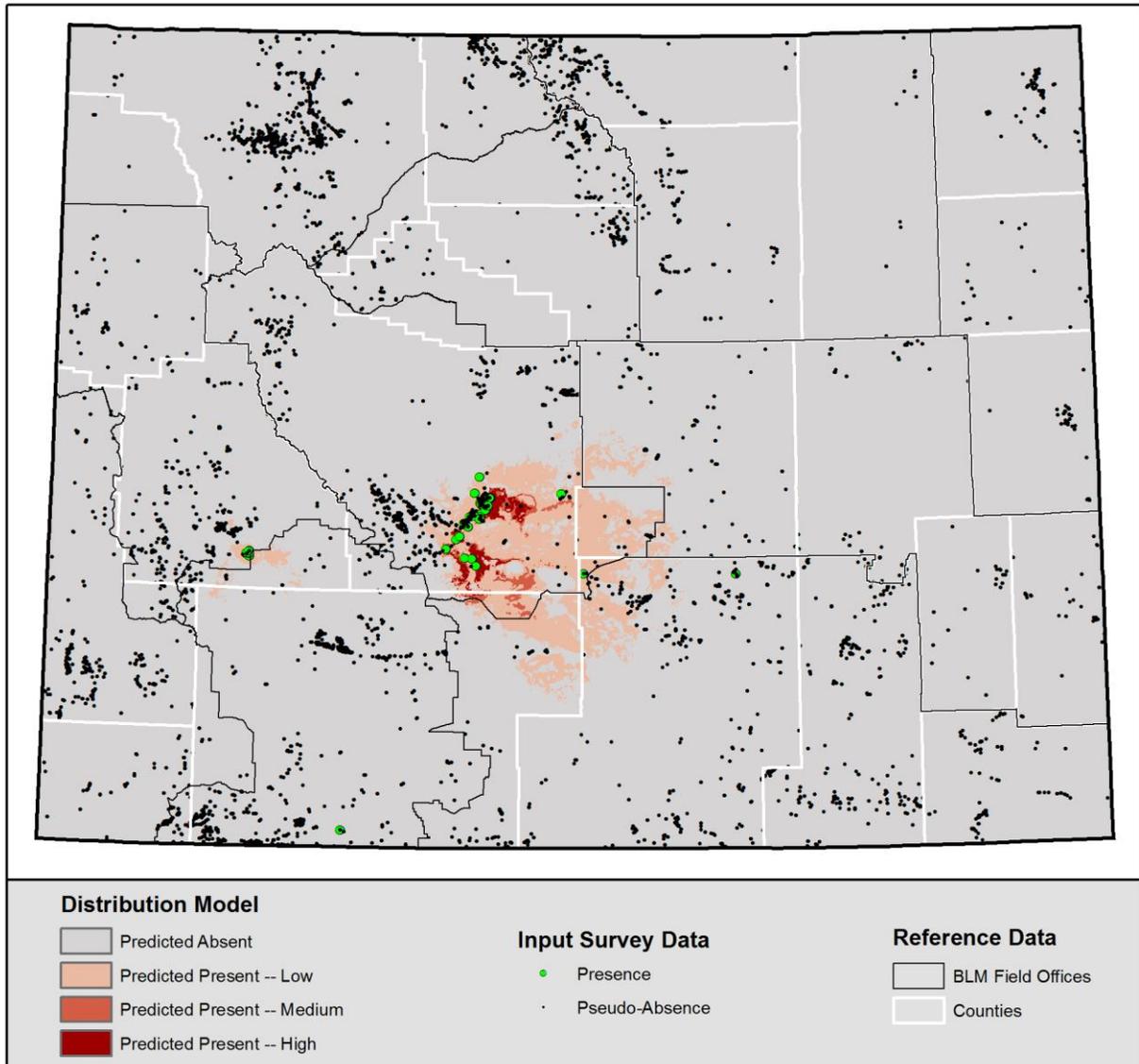
# Partial Plots

Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.



# Cedar rim thistle (*Cirsium aridum*)

Model version: 2014-07-23



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.542
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.494	Predicted Absent (0)
0.494	0.844	Low (1)
0.844	0.974	Medium (2)
0.974	1	High (3)

## Model Details

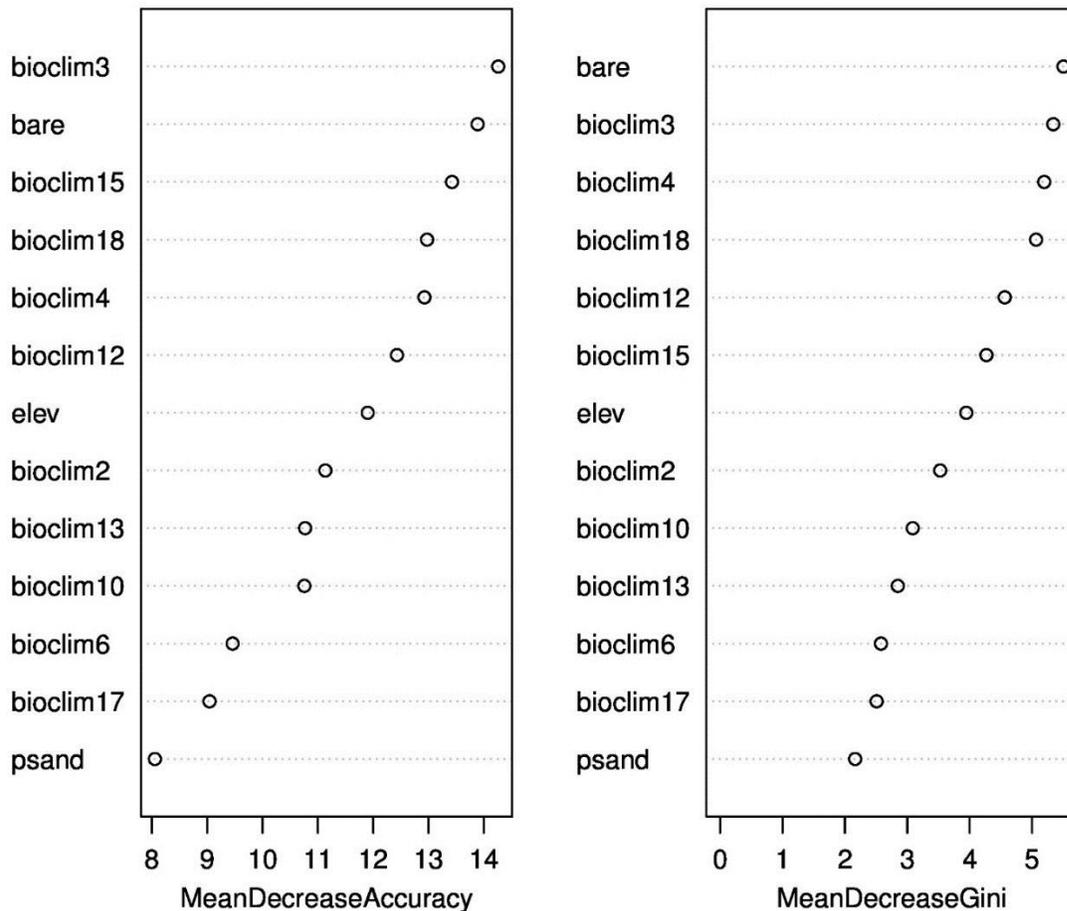
- **Number of Locations:** 29
- **Out-of-Bag Error:** 7.7%
- **TSS:** 77.8%
- **Kappa:** 79.2%
- **Sensitivity:** 82.0%
- **Specificity:** 95.8%

## Model Comments:

Endemic plant species that are restricted to specific soil conditions are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. Cedar Rim thistle is found mainly on the White River and Split Rock Formations, but bedrock geology was not included among the environmental layers.

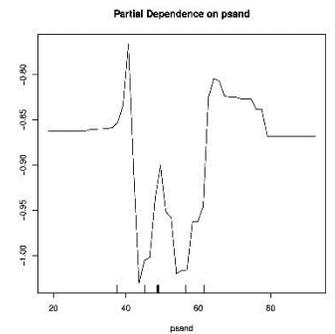
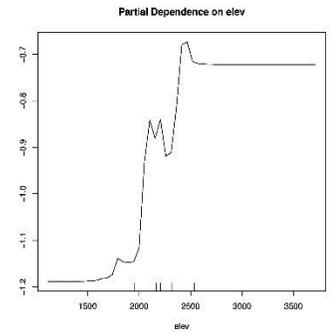
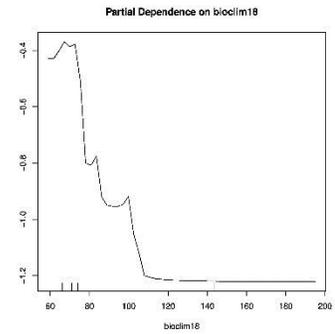
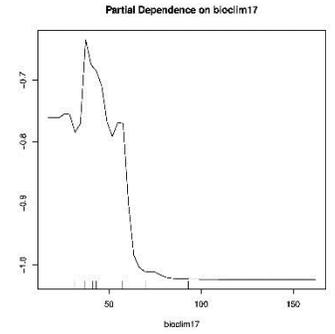
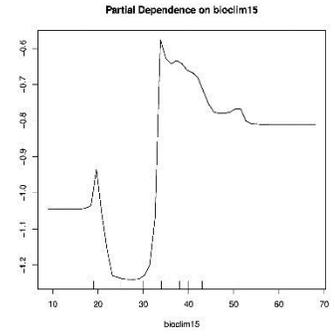
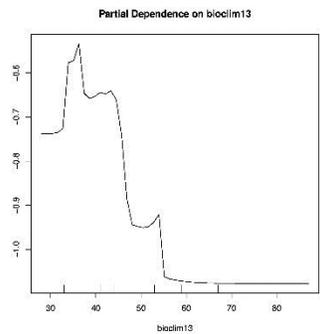
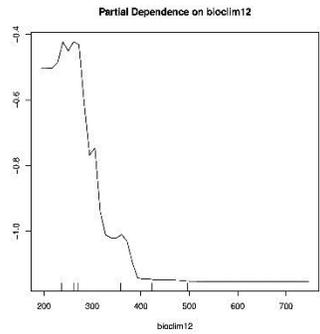
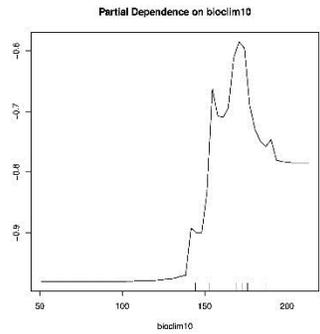
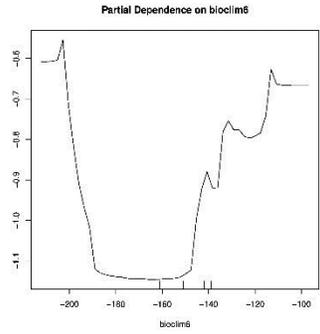
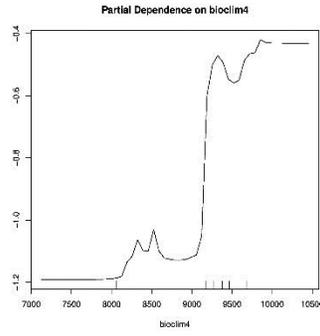
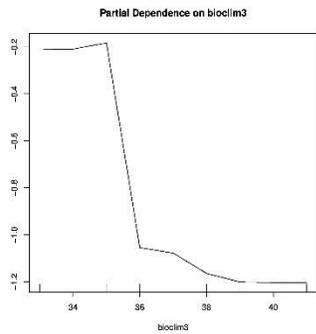
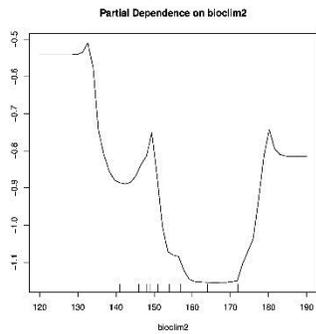
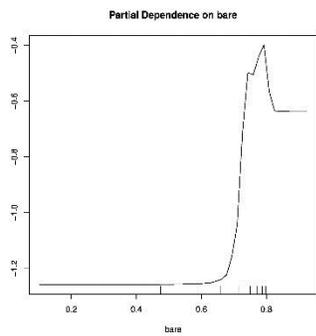
## Predictor Variable Importance:

The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



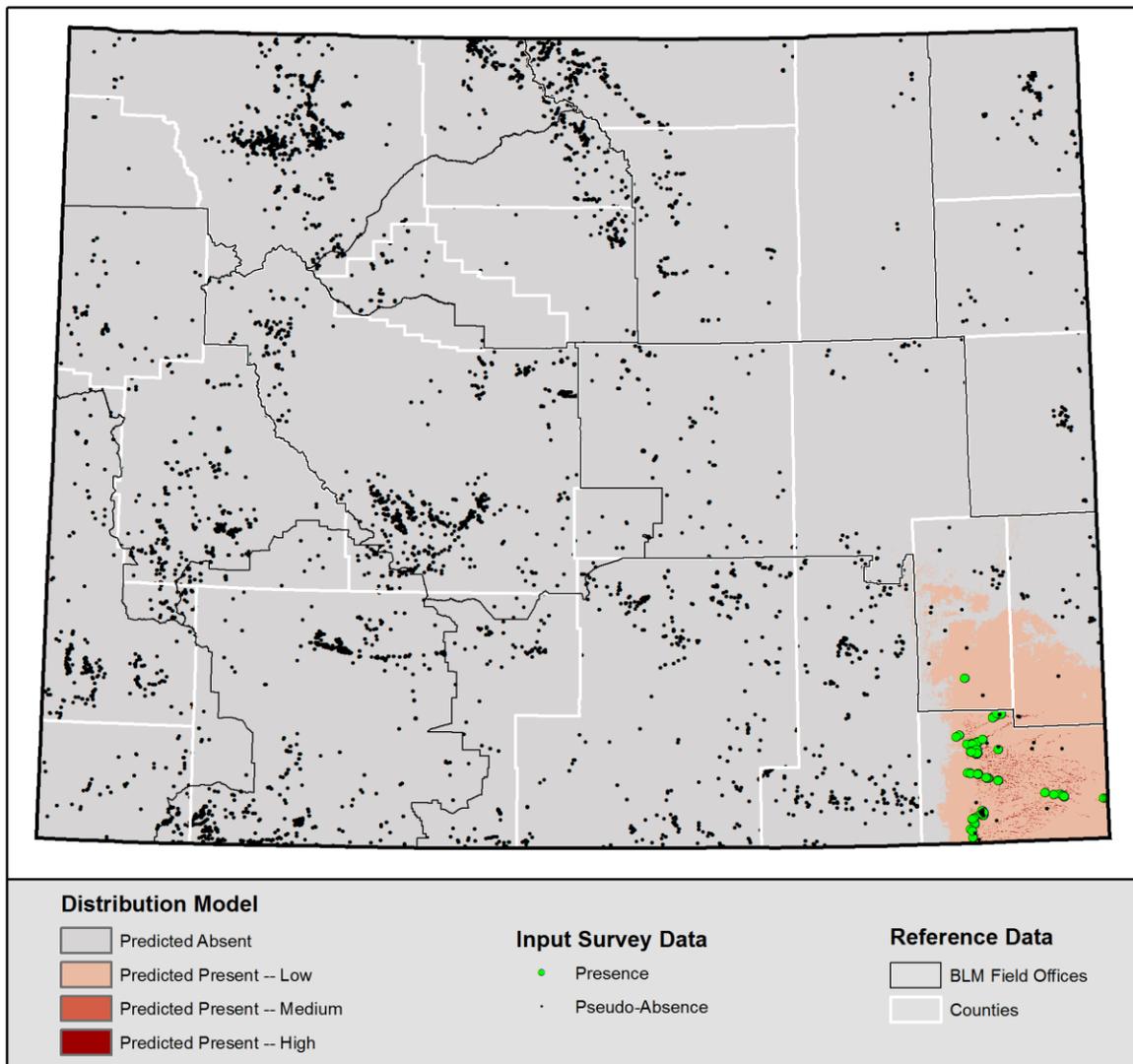
# Partial Plots

Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.



# Colorado butterfly plant (*Gaura neomexicana* var. *coloradensis*)

Model version: 2015-08-27



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.450
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.462	Predicted Absent (0)
0.462	0.950	Low (1)
0.950	0.992	Medium (2)
0.992	1	High (3)

## Model Details

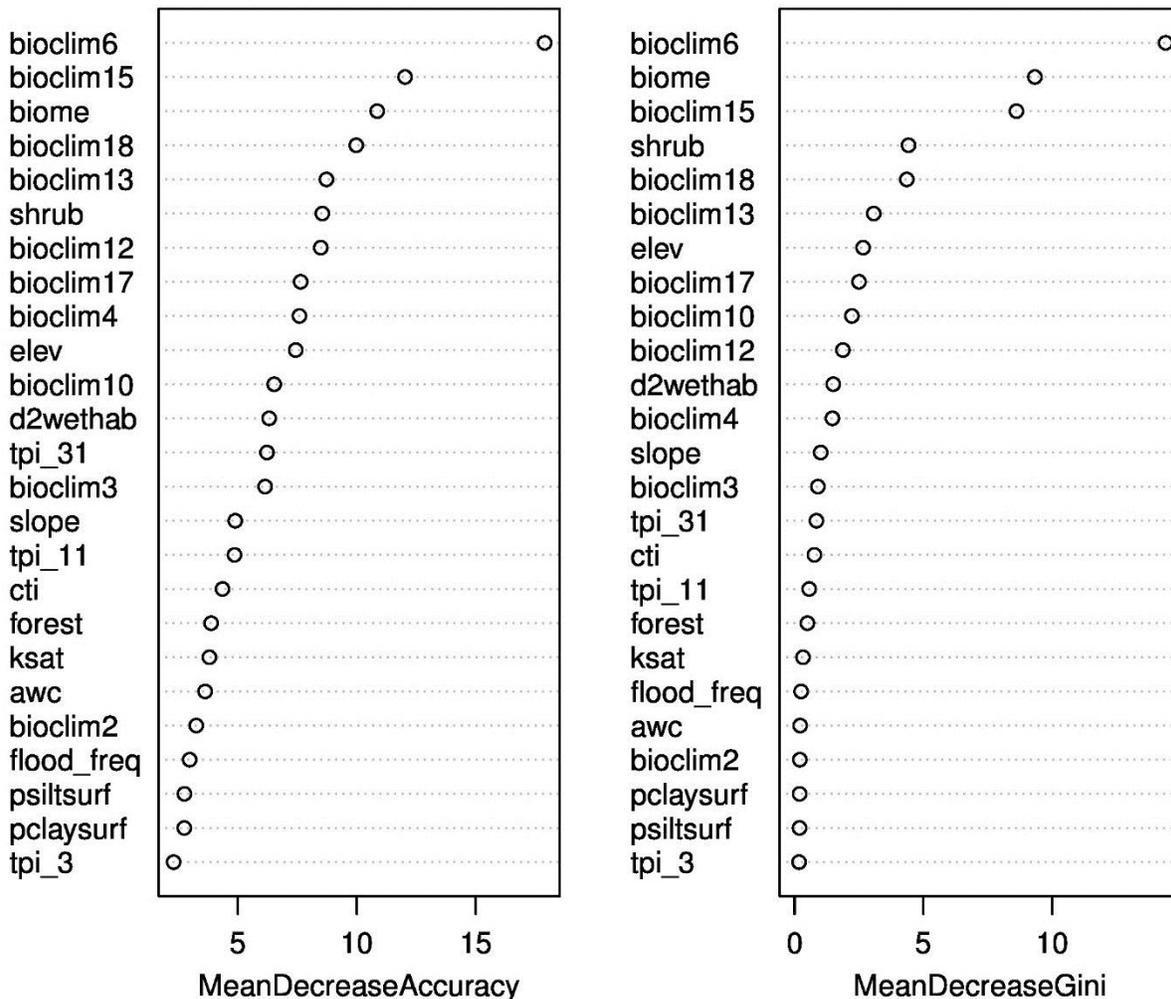
- **Number of Locations:** 42
- **Out-of-Bag Error:** 0.9%
- **TSS:** 98.0%
- **Kappa:** 97.7%
- **Sensitivity:** 98.7%
- **Specificity:** 99.3%

## Model Comments:

Threatened wetland plant species that occupy a narrow vegetation zone (wet meadows) in a subtle drainage settings are difficult to model. A layer was developed that combines layers representing riverine and palustrine settings along a distance gradient for Colorado butterfly plant and other wetland species of wet meadows. As a result of the imprecision or incompleteness in this layer, large areas of southeastern Wyoming were mapped as low probability potential habitat.

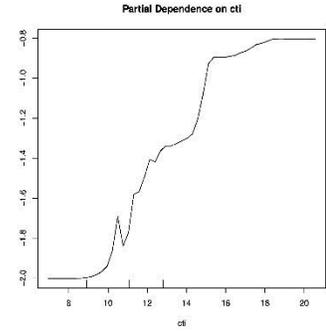
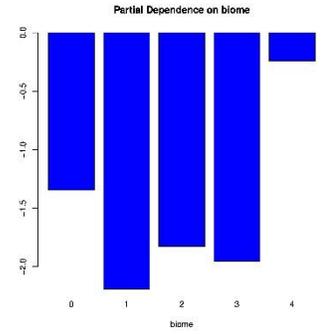
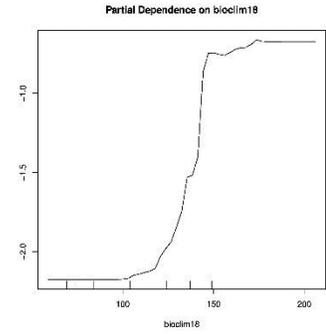
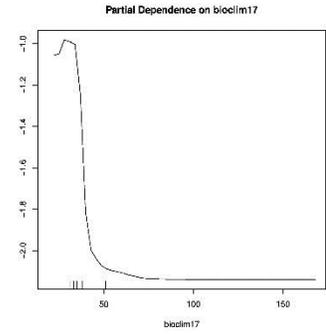
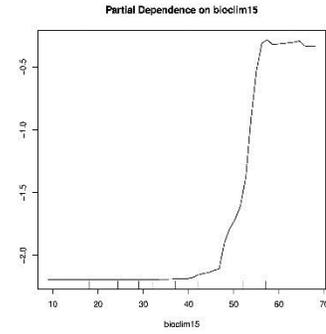
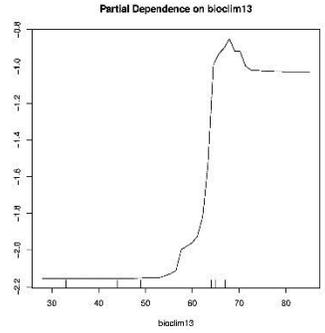
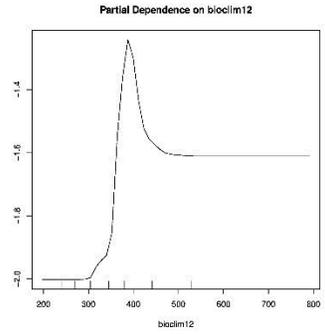
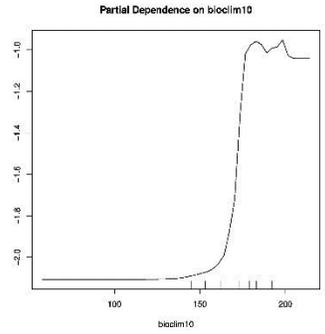
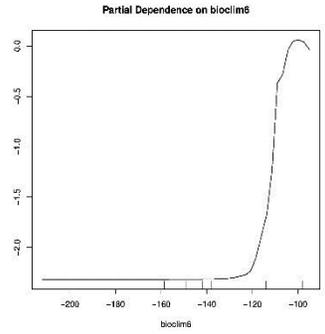
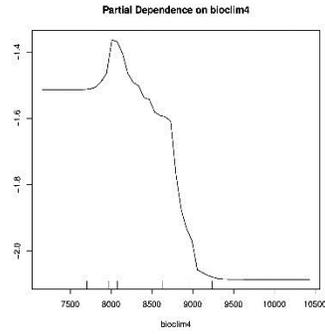
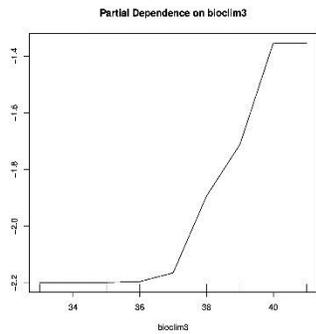
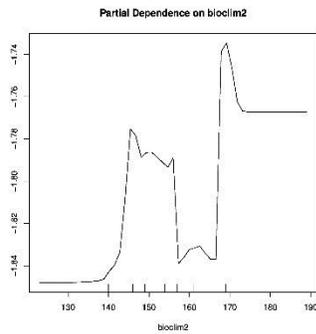
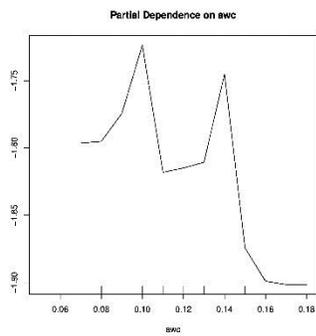
## Predictor Variable Importance:

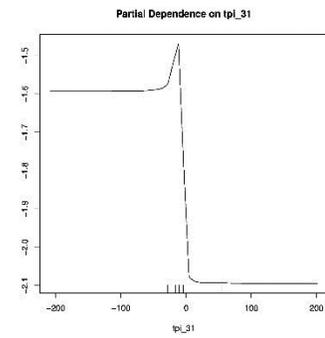
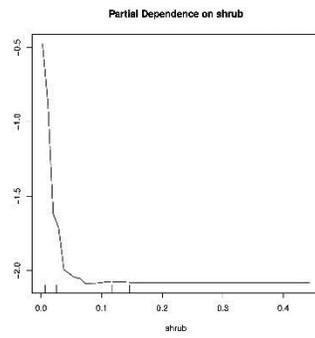
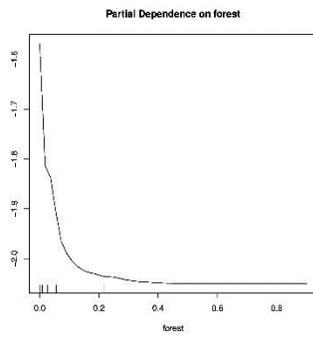
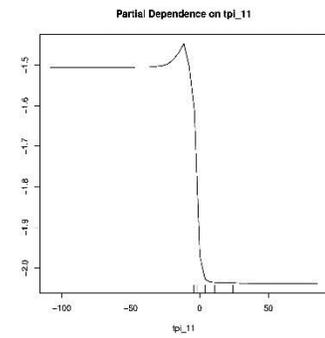
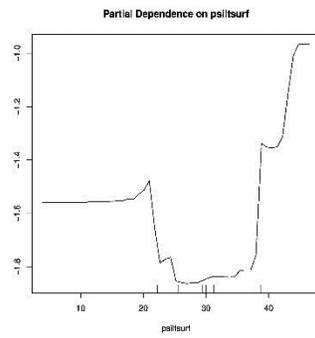
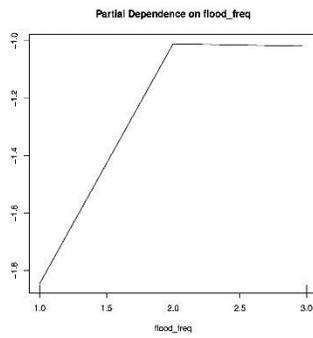
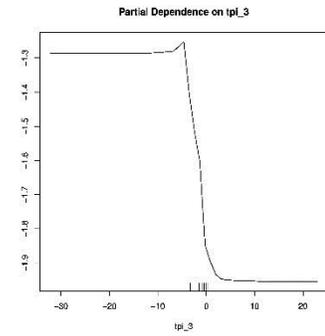
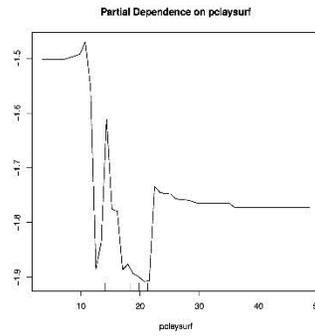
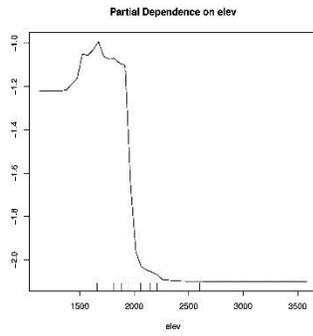
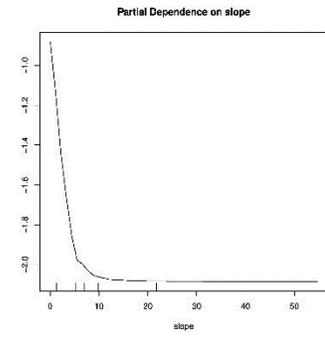
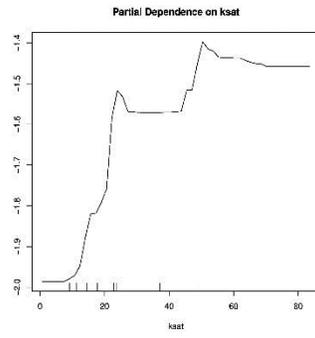
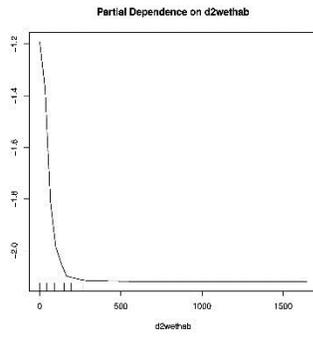
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

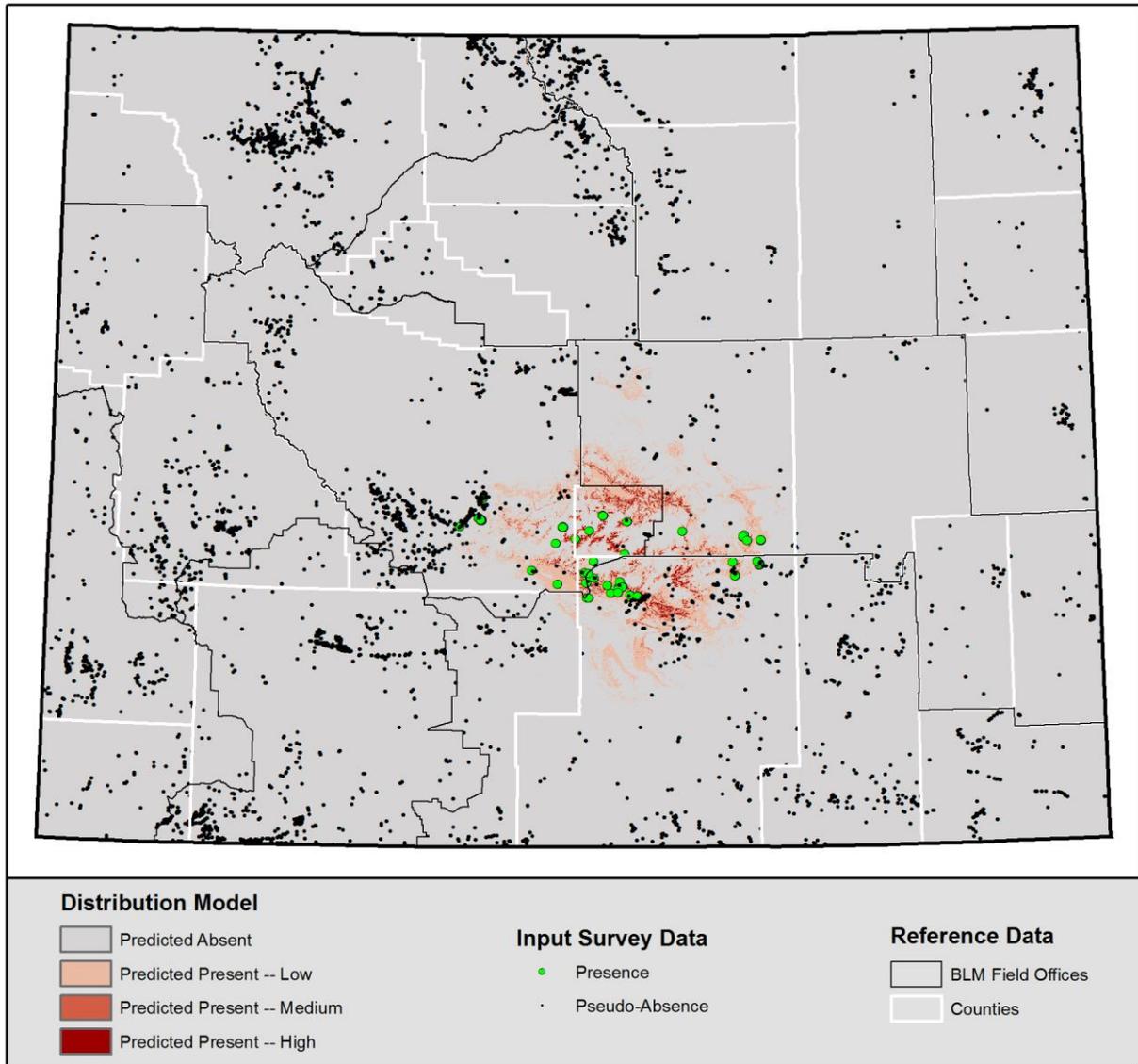
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Devil's gate twinpod (*Physaria eburniflora*)

Model version: 2015-08-26



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); random Forest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.511
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.494	Predicted Absent (0)
0.494	0.830	Low (1)
0.830	0.960	Medium (2)
0.960	1	High (3)

## Model Details

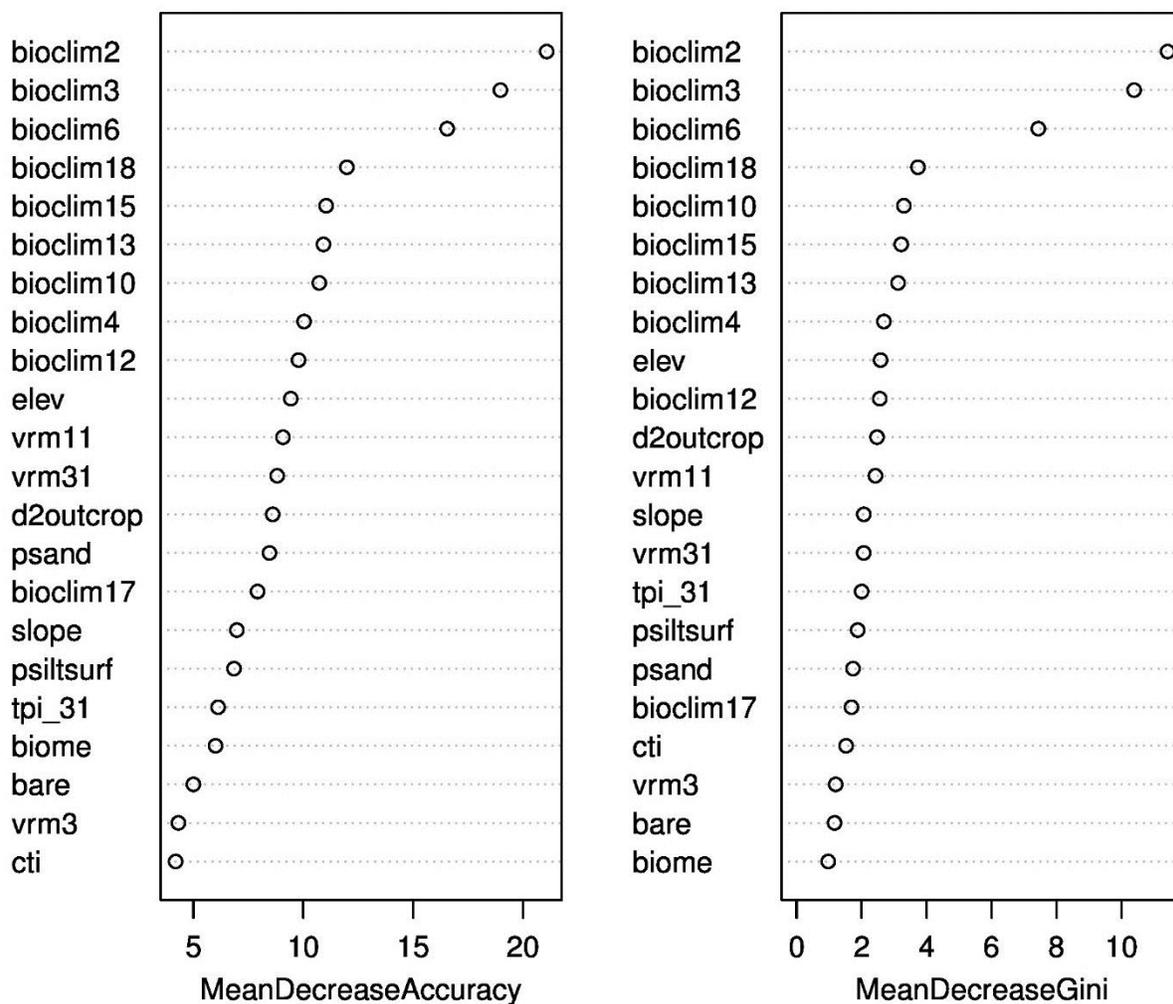
- **Number of Locations:** 48
- **Out-of-Bag Error:** 4.8%
- **TSS:** 87.6%
- **Kappa:** 87.4%
- **Sensitivity:** 90.9%
- **Specificity:** 96.7%

## Model Comments:

Endemic plant species that are restricted to specific soil conditions are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties.

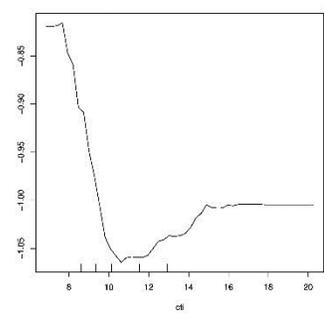
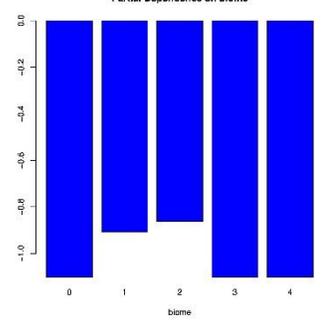
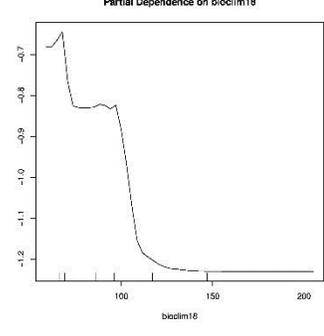
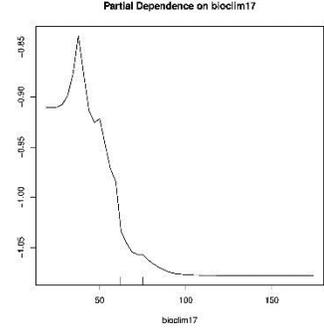
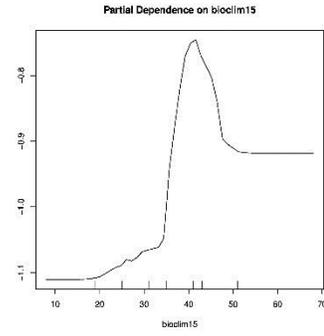
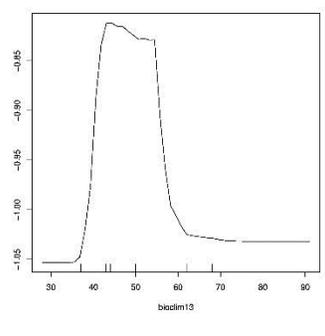
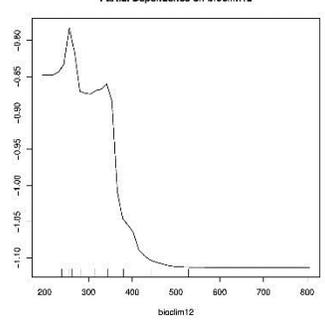
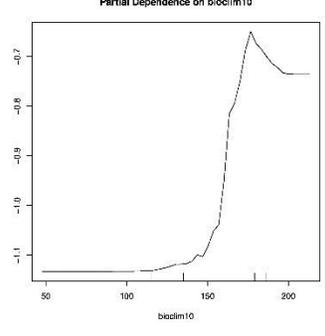
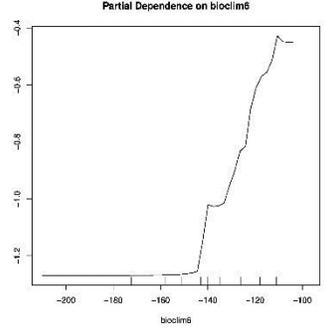
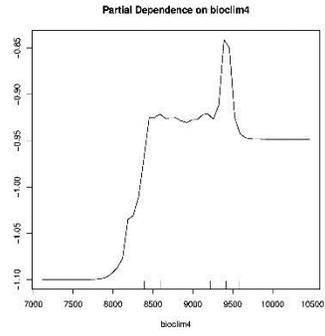
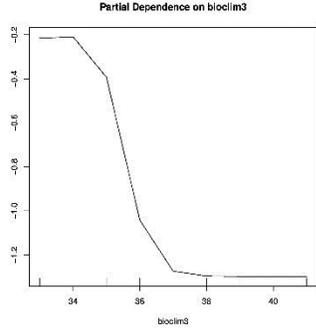
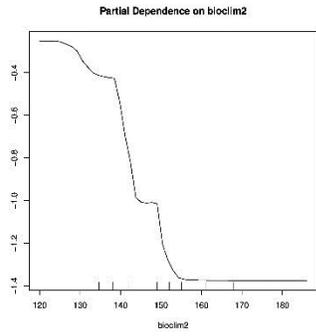
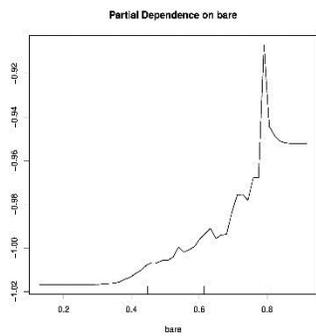
## Predictor Variable Importance:

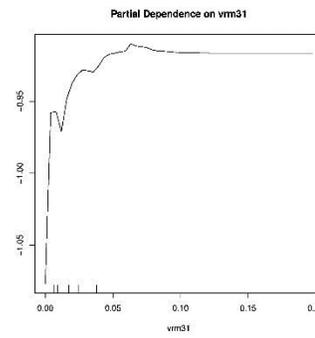
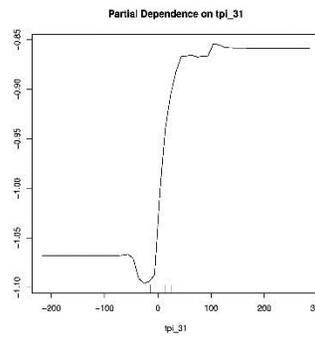
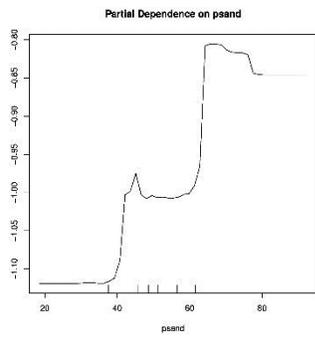
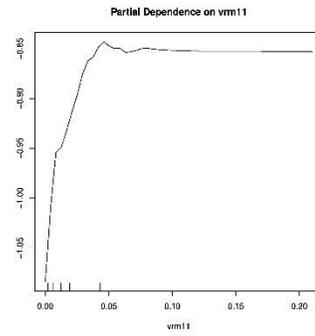
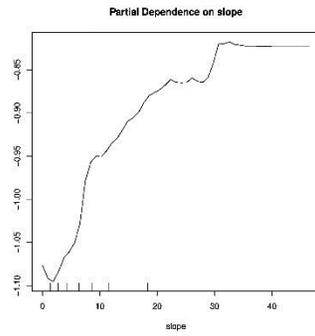
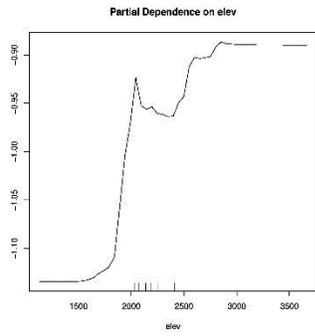
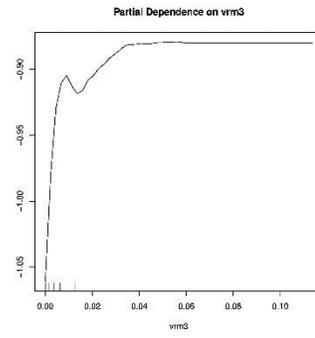
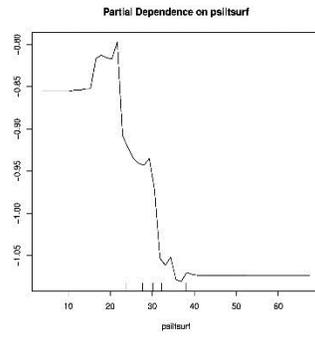
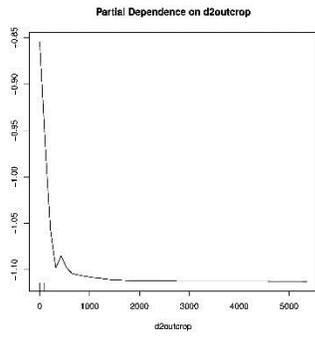
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

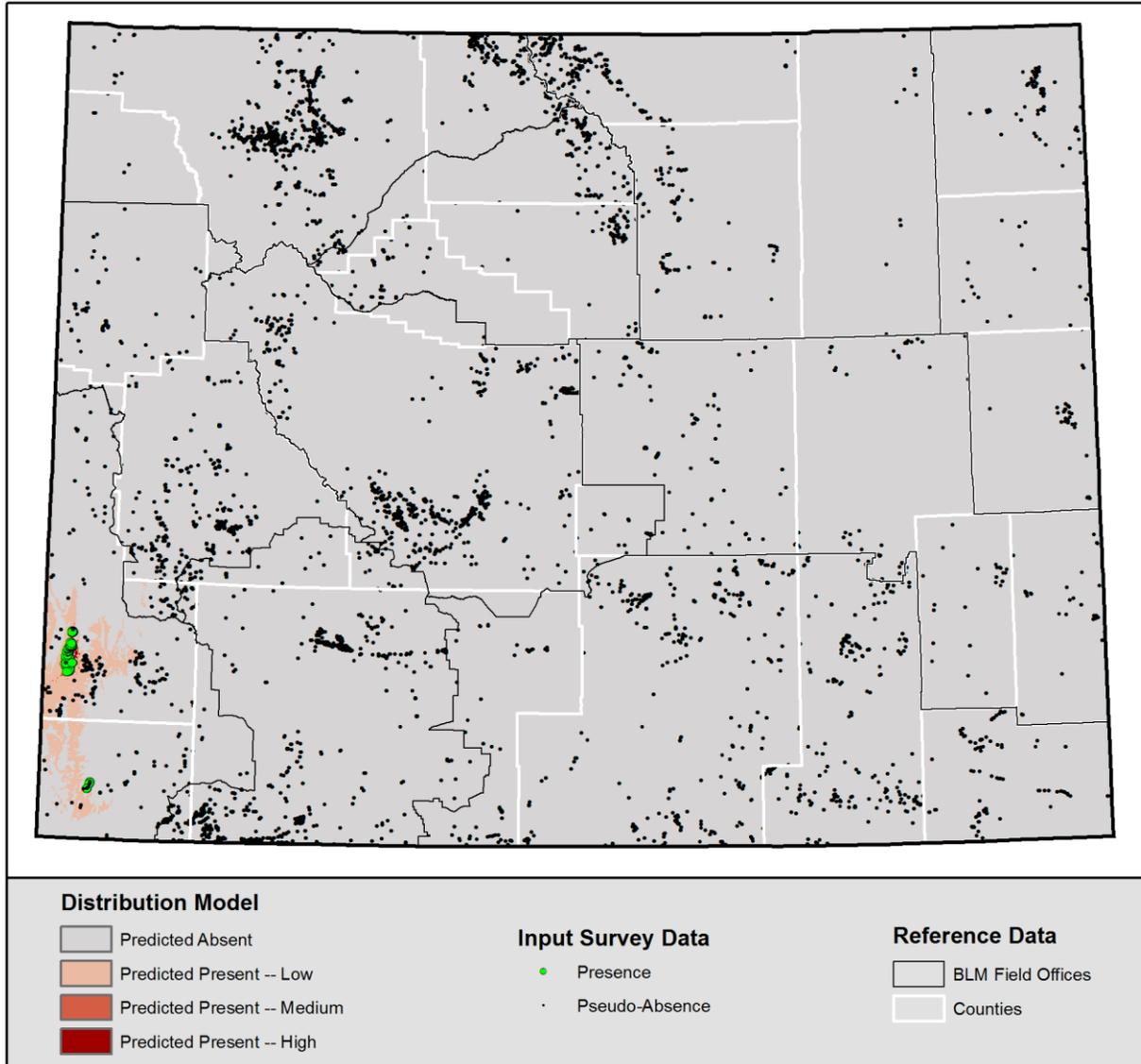
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Dorn's twinpod (*Physaria dornii*)

Model version: 2014-07-24



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.552
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.554	Predicted Absent (0)
0.554	0.974	Low (1)
0.974	0.998	Medium (2)
0.998	1	High (3)

## Model Details

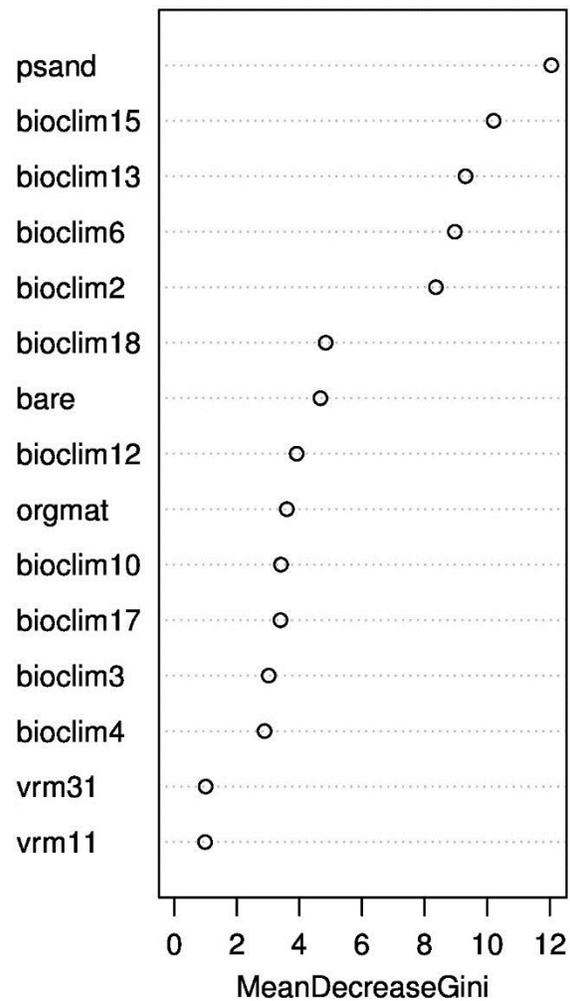
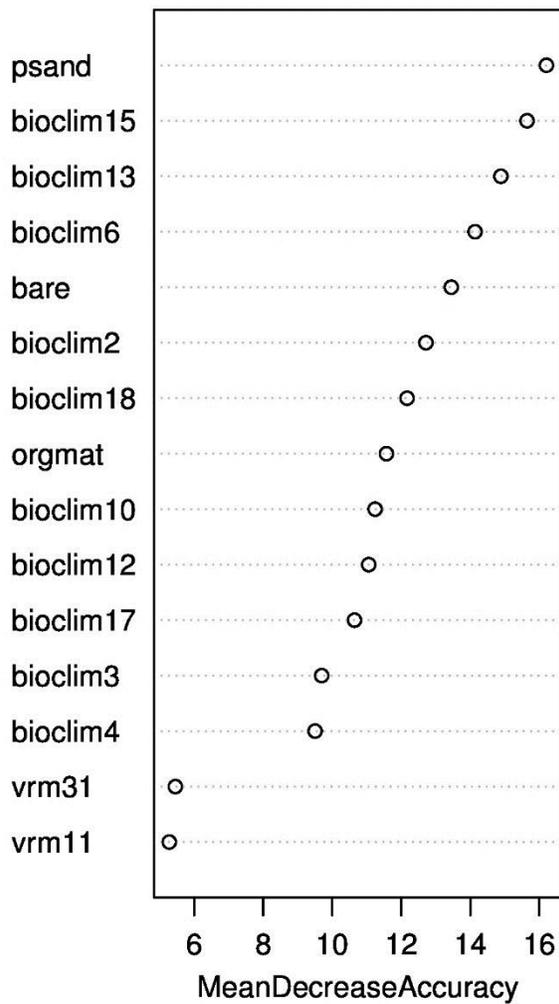
- **Number of Locations:** 54
- **Out-of-Bag Error:** 2.0%
- **TSS:** 95.2%
- **Kappa:** 94.8%
- **Sensitivity:** 96.7%
- **Specificity:** 98.5%

## Model Comments:

Endemic plant species that are restricted to specific soil conditions are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. In addition, for calciphilic species such as Dorn's twinpod, a surrogate layer was developed from bedrock geology layers to reflect calcium carbonate content.

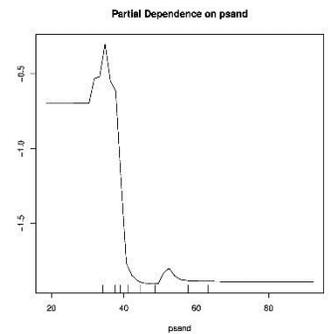
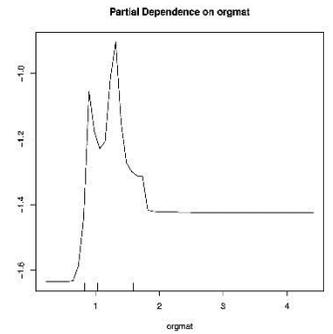
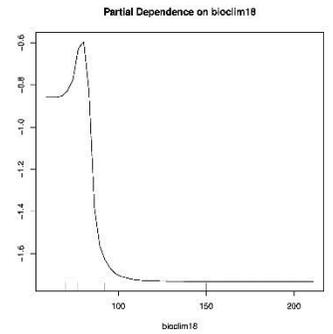
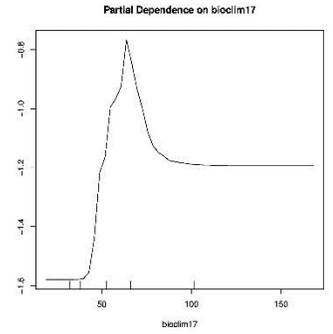
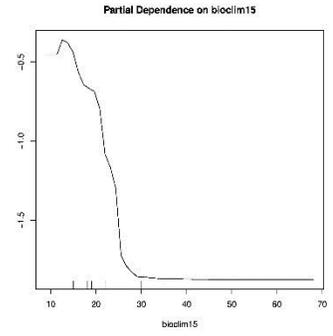
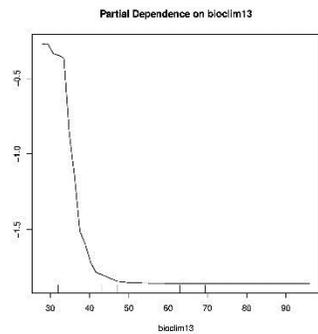
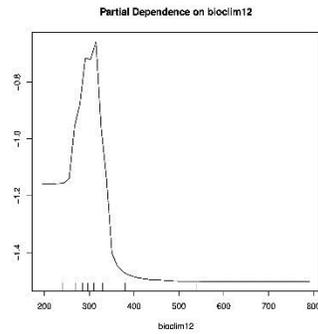
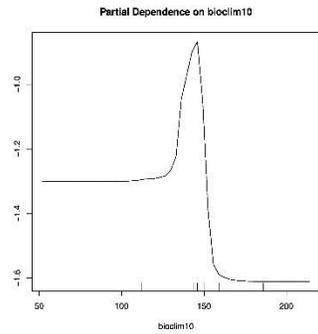
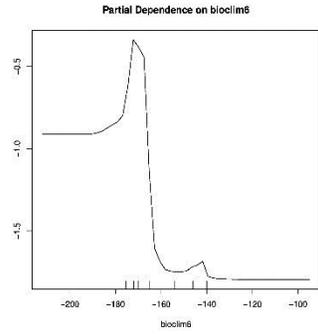
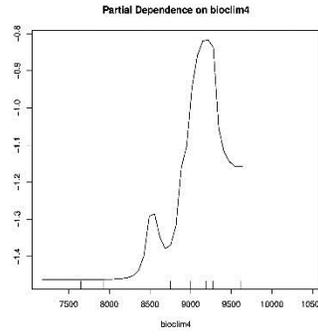
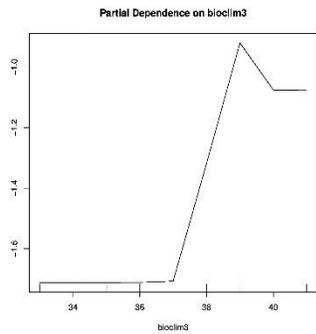
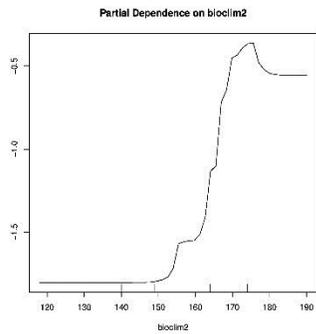
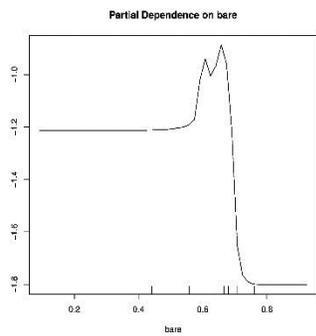
## Predictor Variable Importance:

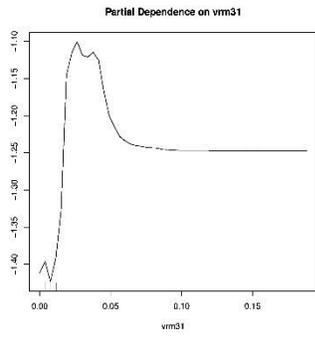
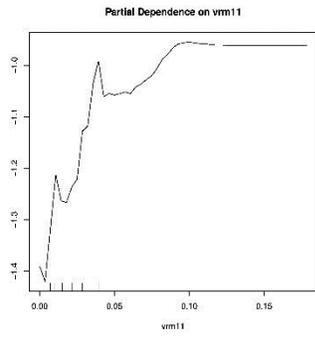
The graph below indicates the relative importance of predictors in modeling distribution for this species. "MeanDecreaseAccuracy" calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than "MeanDecreaseGini," which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

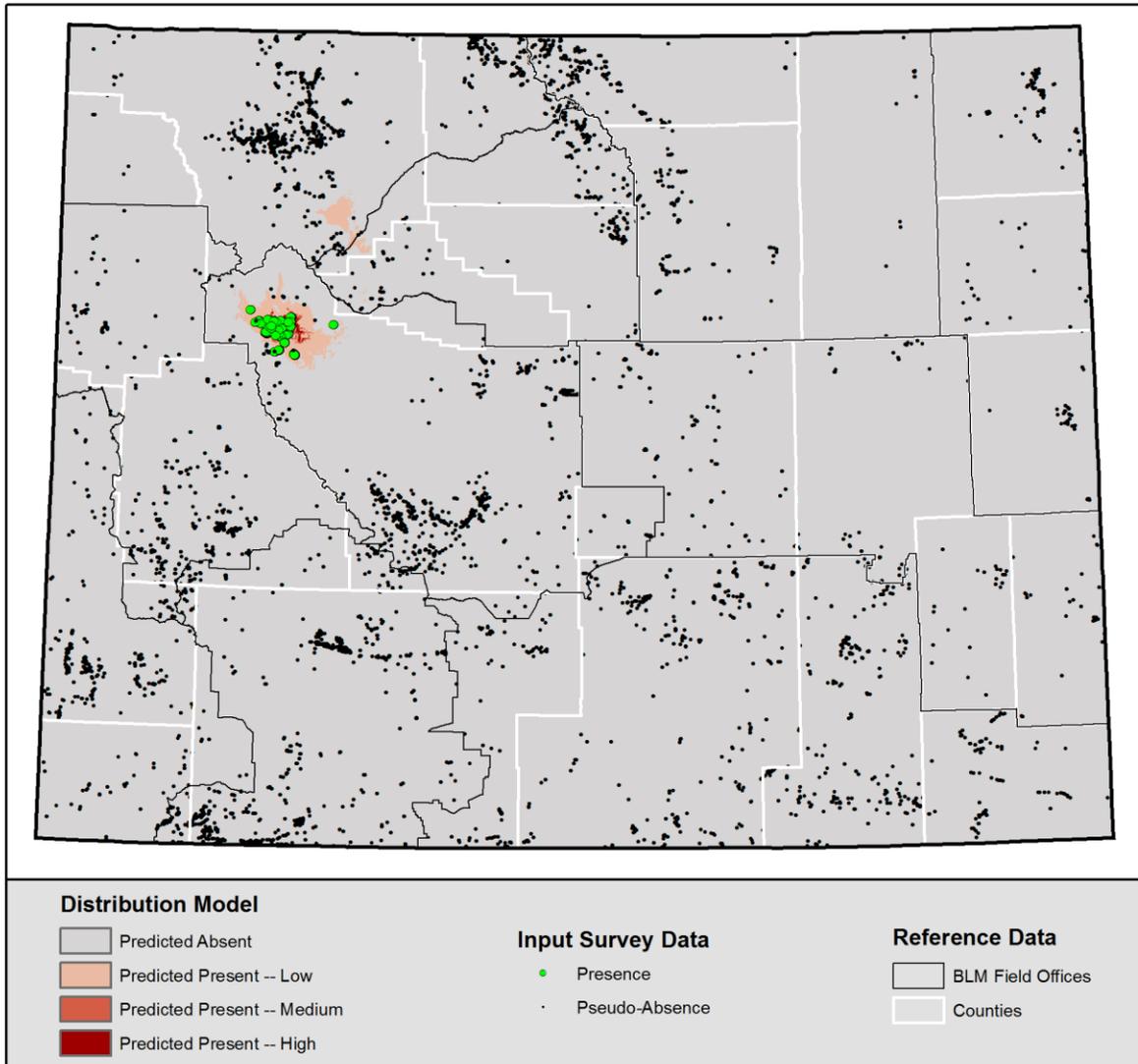
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Dubois milkvetch (*Astragalus gilviflorus* var. *purpureus*)

Model version: 2015-08-27



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.640
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.658	Predicted Absent (0)
0.658	0.982	Low (1)
0.982	0.998	Medium (2)
0.998	1	High (3)

## Model Details

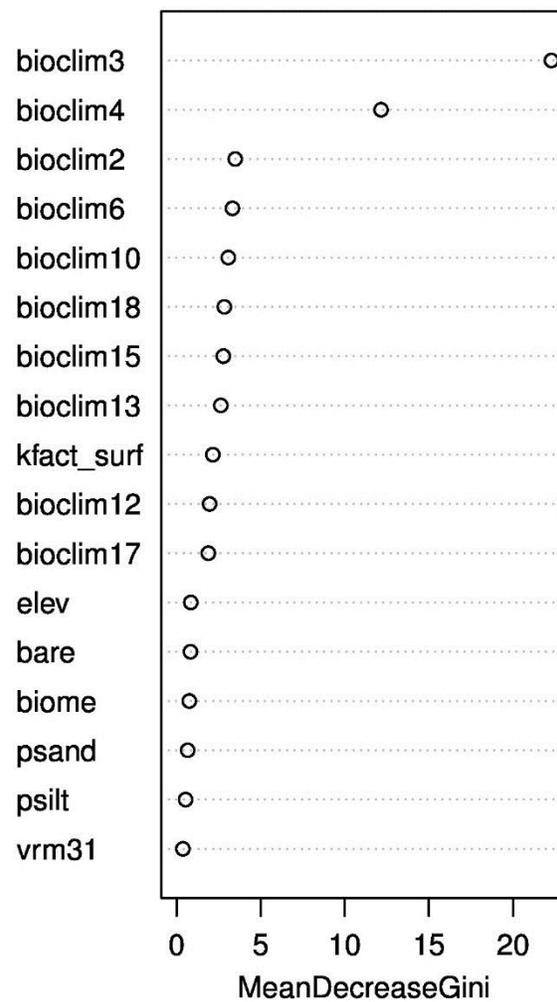
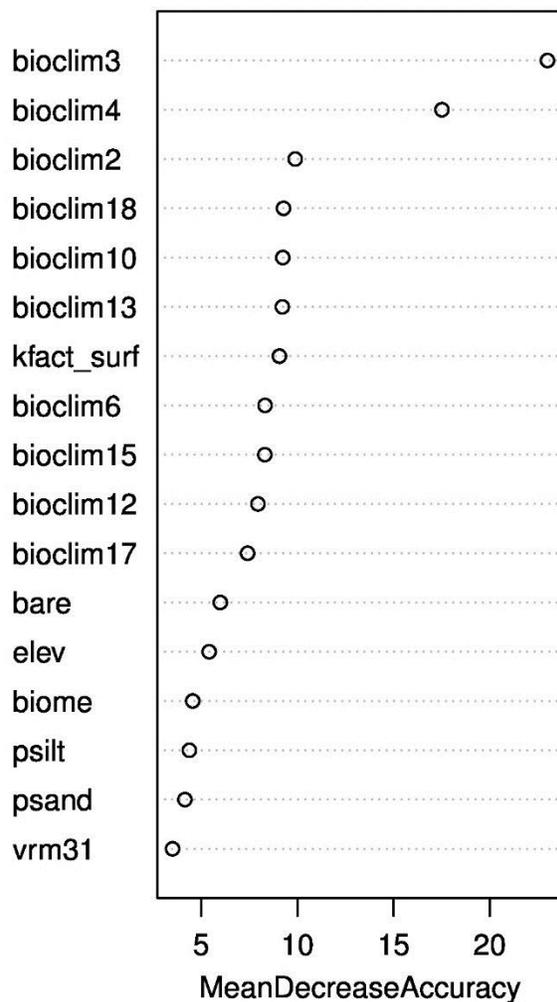
- **Number of Locations:** 42
- **Out-of-Bag Error:** 0.9%
- **TSS:** 97.1%
- **Kappa:** 97.6%
- **Sensitivity:** 97.4%
- **Specificity:** 99.7%

## Model Comments:

Endemic plant species that are restricted to specific soil conditions are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties.

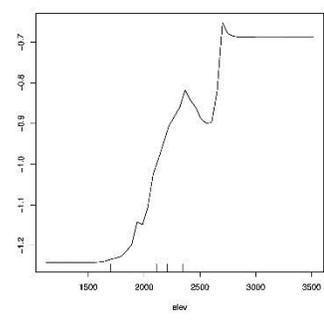
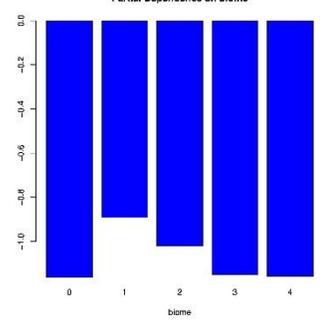
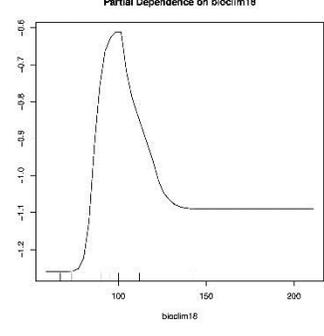
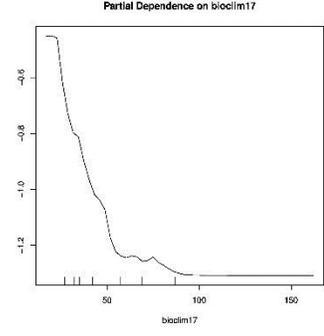
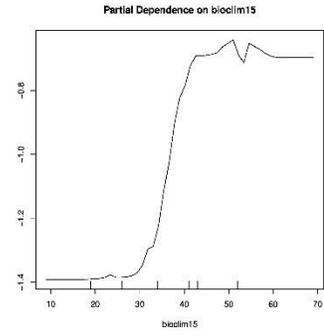
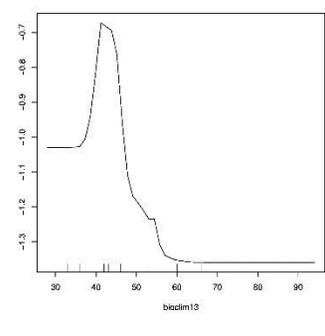
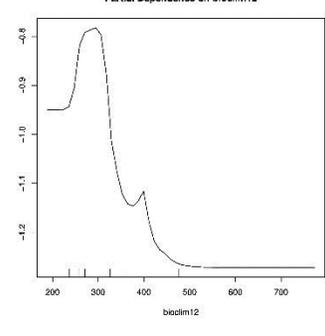
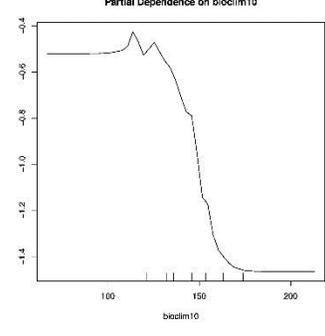
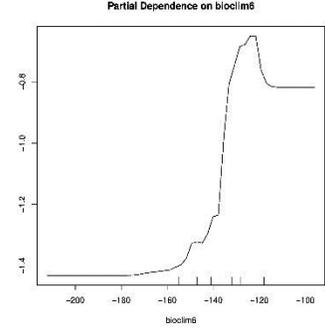
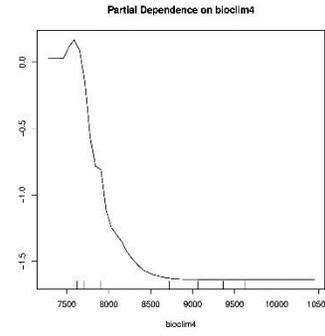
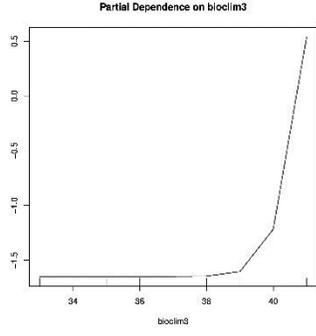
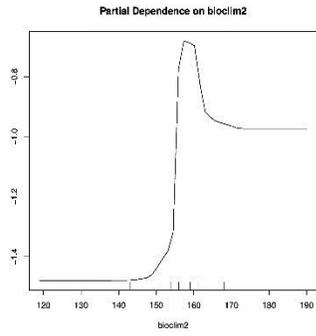
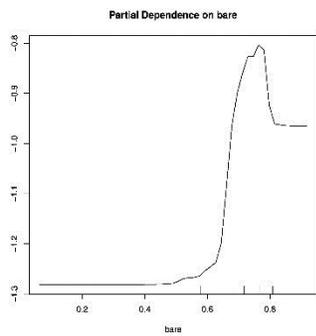
## Predictor Variable Importance:

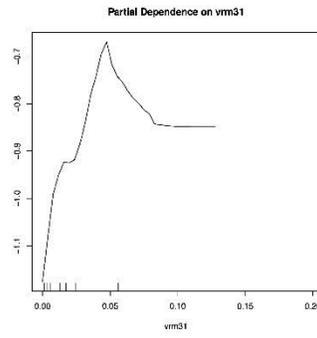
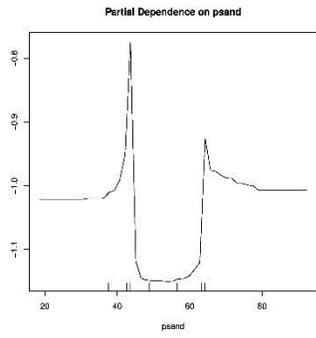
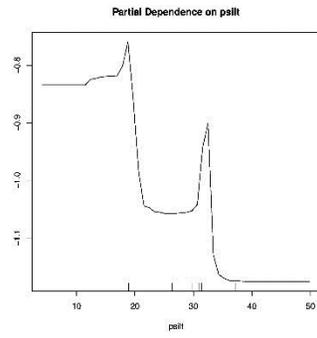
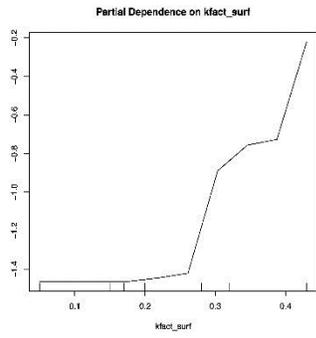
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

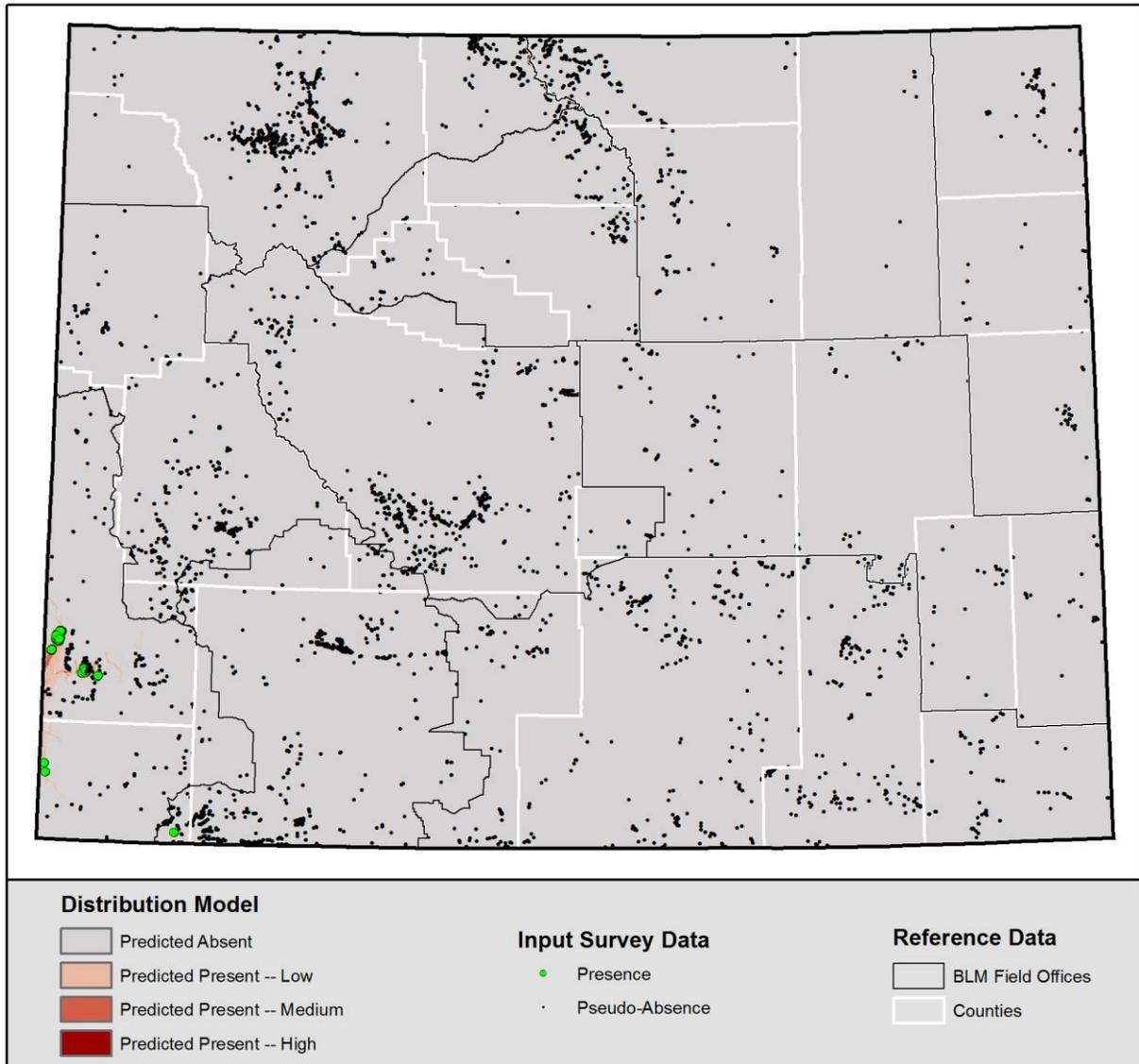
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Entire-leaved peppergrass (*Lepidium integrifolium*)

Model version: 2015-08-26



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.694
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.698	Predicted Absent (0)
0.698	0.956	Low (1)
0.956	0.998	Medium (2)
0.998	1	High (3)

## Model Details

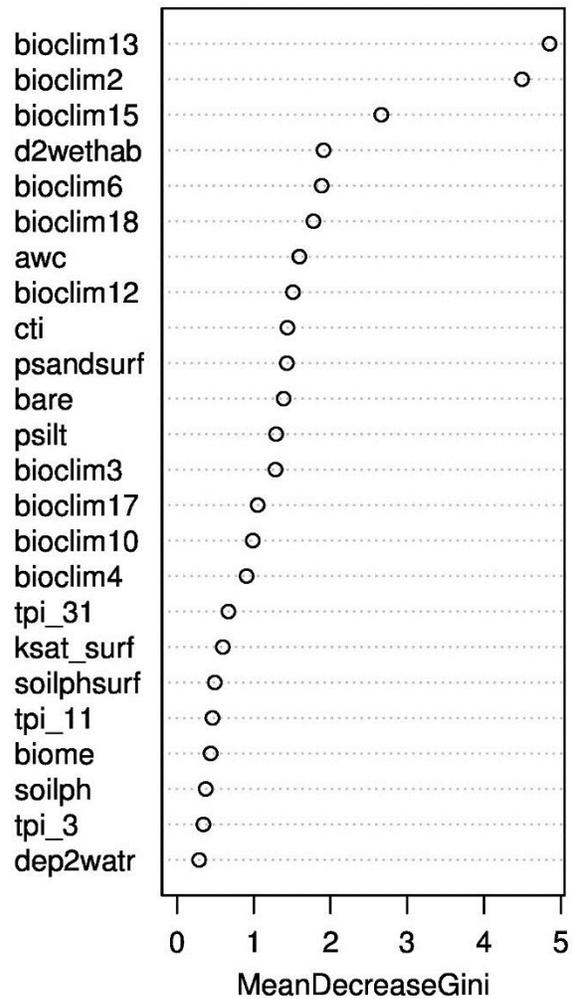
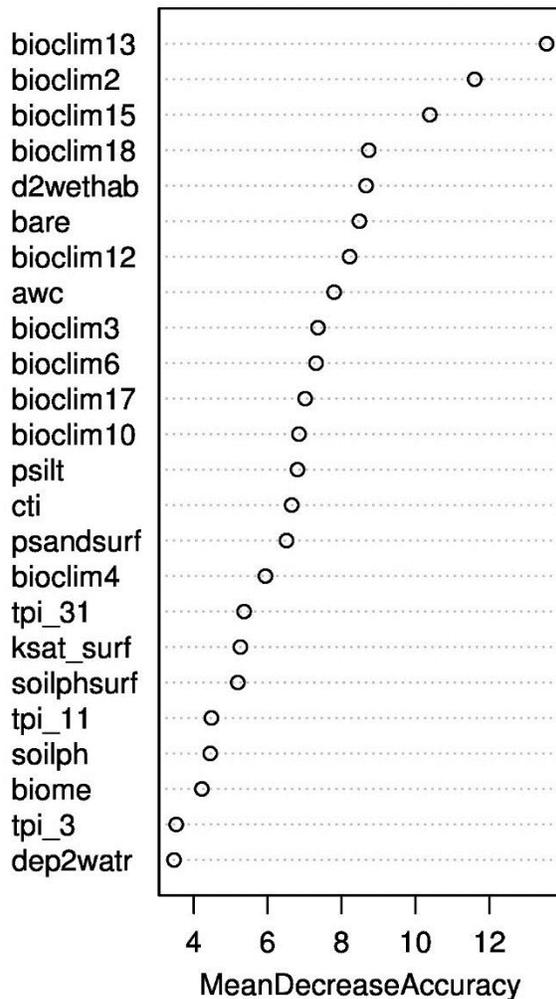
- **Number of Locations:** 23
- **Out-of-Bag Error:** 1.8%
- **TSS:** 94.0%
- **Kappa:** 95.0%
- **Sensitivity:** 94.7%
- **Specificity:** 99.3%

## Model Comments:

Regionally endemic wetland plant species that occupy what is often a narrow vegetation zone (wet meadow) and limited range of hydrological conditions are difficult to model. A layer was developed that combines layers representing riverine and palustrine settings along a distance gradient for Entire-leaved peppergrass and other wetland species of wet meadows. As a result of the imprecision or incompleteness in this layer, areas were mapped as low probability potential habitat across upland areas.

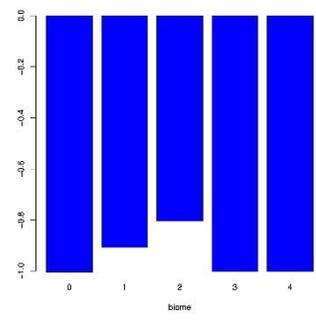
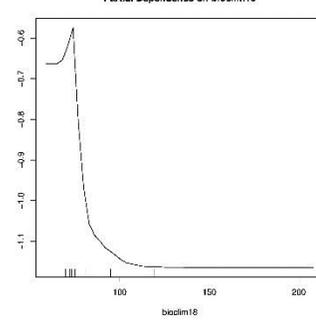
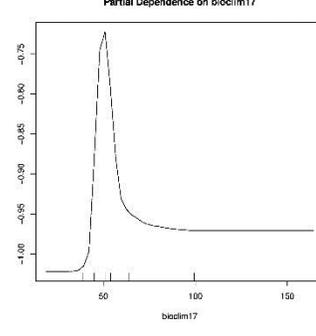
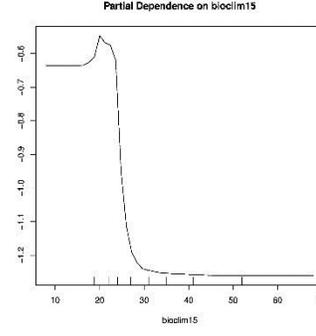
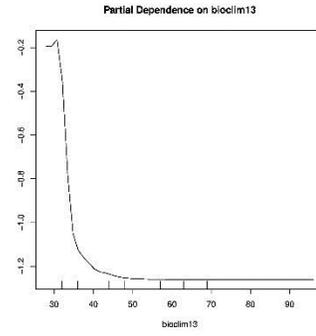
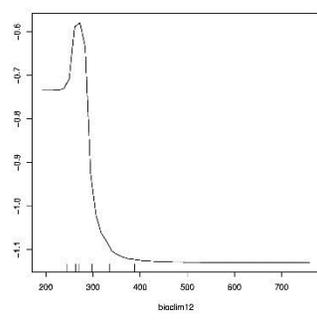
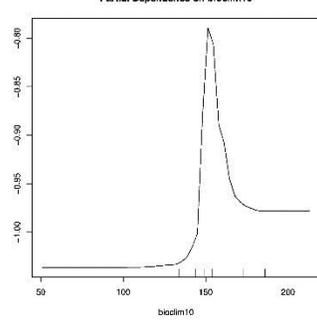
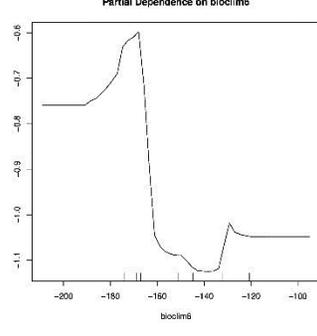
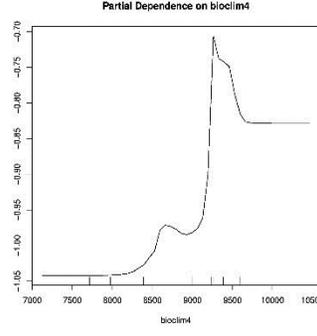
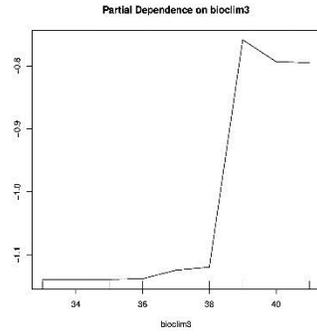
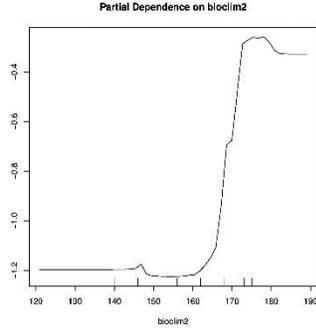
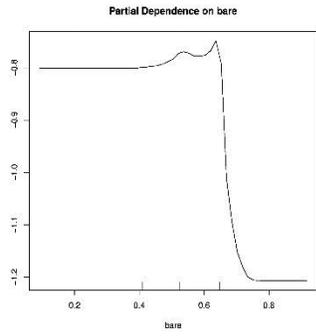
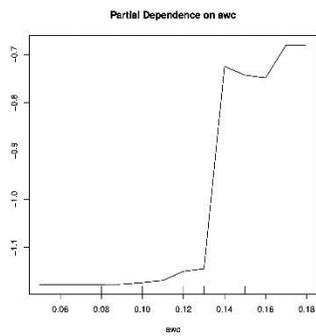
## Predictor Variable Importance:

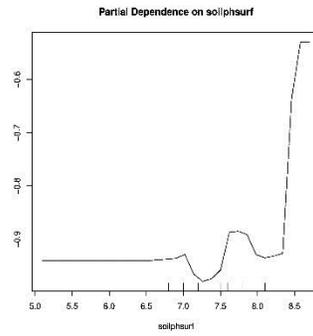
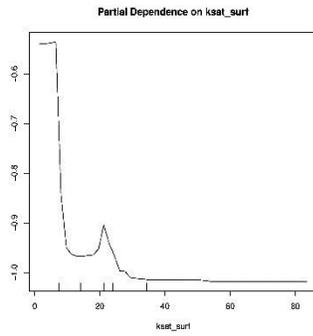
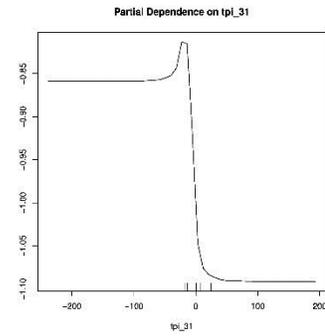
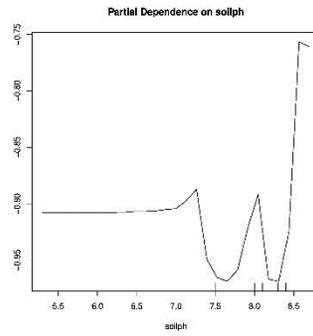
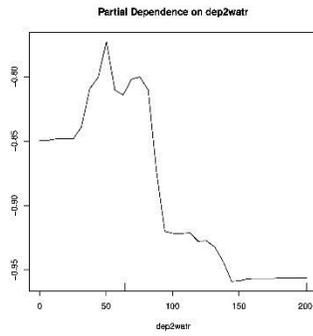
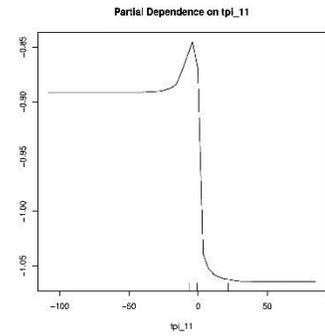
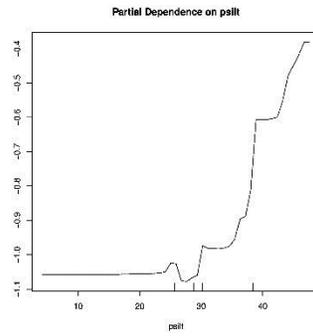
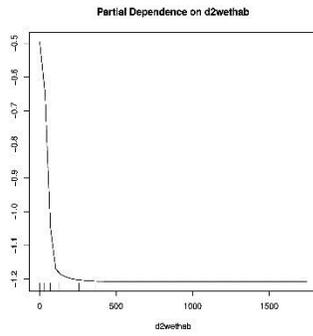
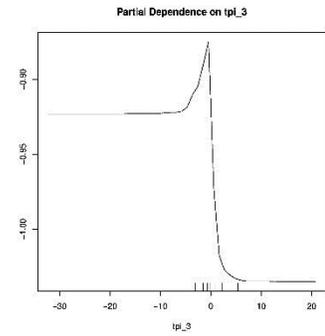
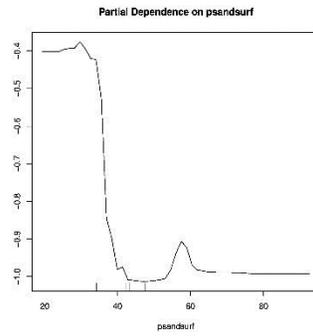
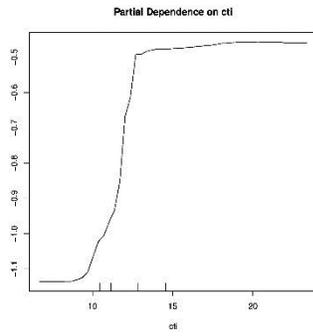
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

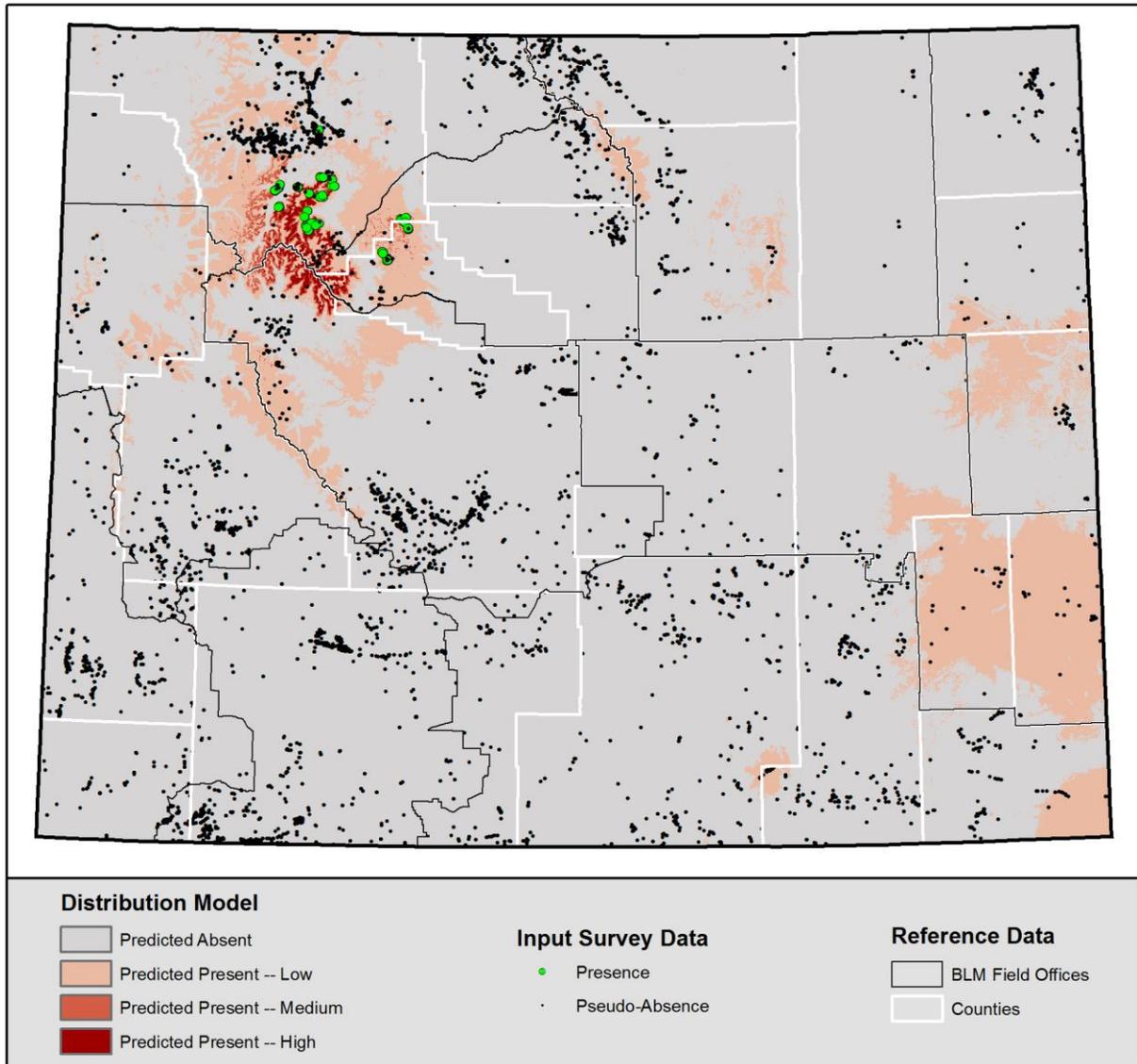
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Evert's waferparsnip (*Cymopterus evertii*)

Model version: 2015-08-24



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.422
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	.0320	Predicted Absent (0)
.0320	0.830	Low (1)
0.830	0.976	Medium (2)
0.976	1	High (3)

## Model Details

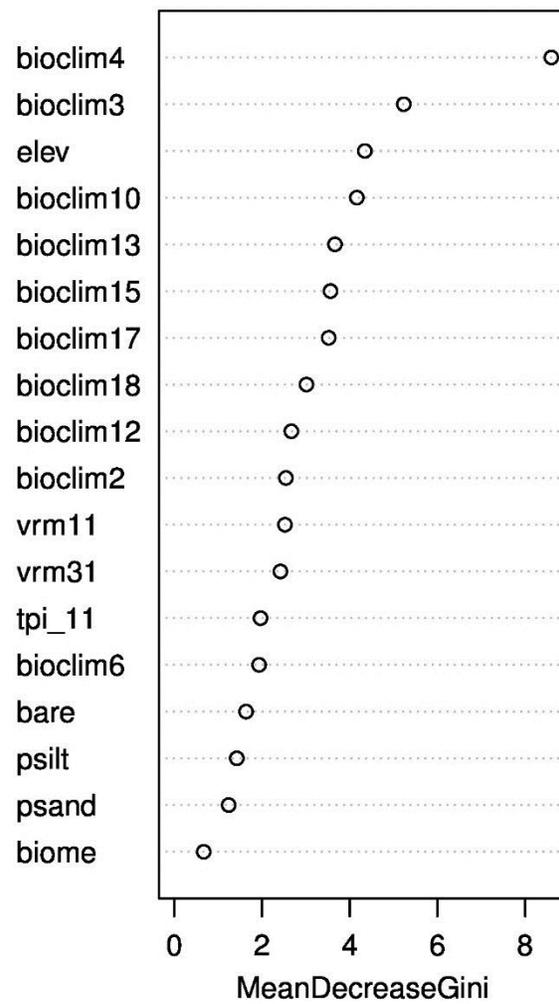
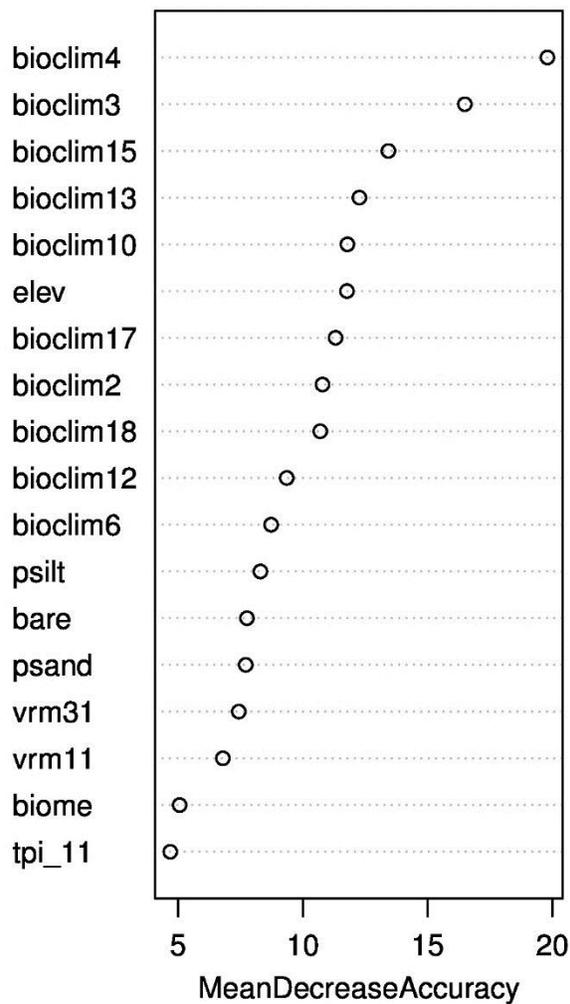
- **Number of Locations:** 37
- **Out-of-Bag Error:** 6.0%
- **TSS:** 83.3%
- **Kappa:** 83.9%
- **Sensitivity:** 86.8%
- **Specificity:** 96.4%

## Model Comments:

Regionally endemic plant species that are restricted to specific soil conditions are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. This species is primarily on volcanic soils and it is possible that addition of bedrock geology layers would constrain the mapping of large areas as low probability potential habitat.

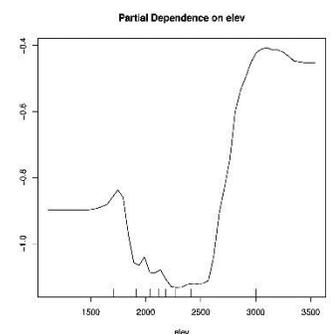
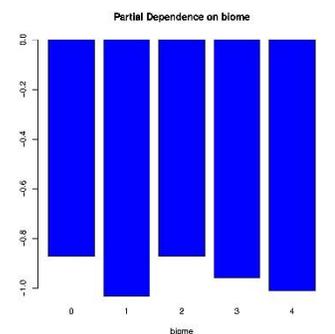
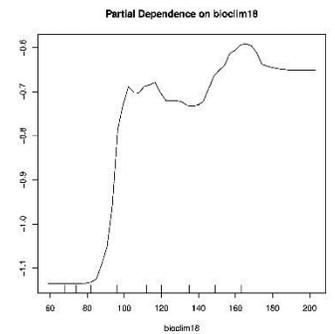
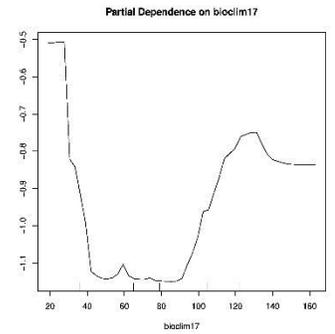
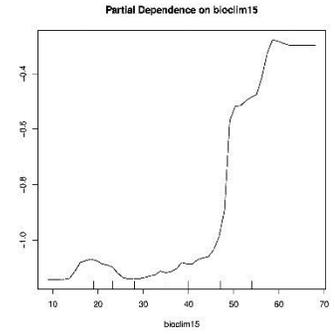
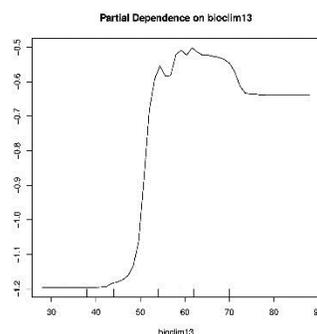
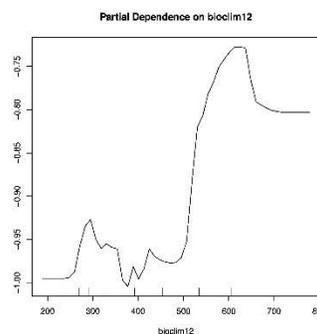
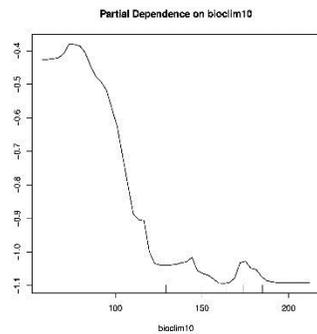
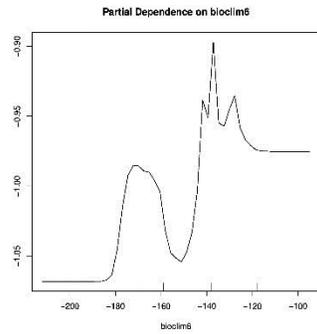
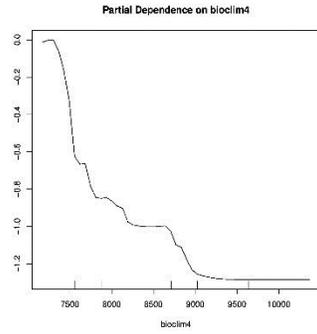
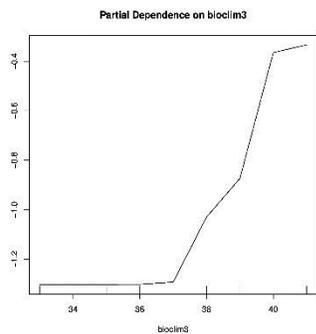
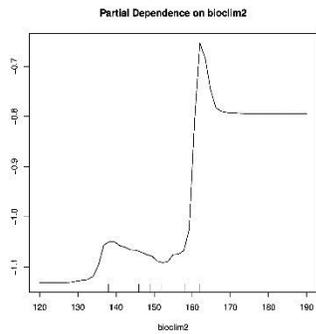
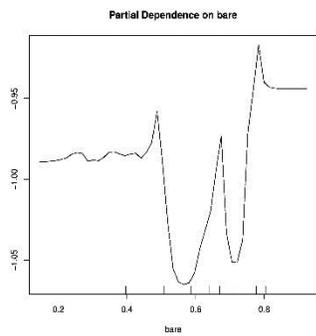
## Predictor Variable Importance:

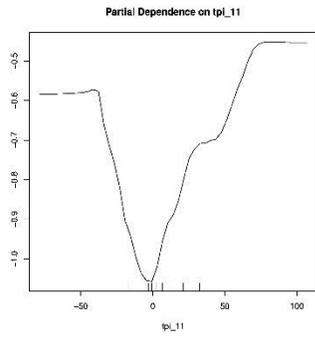
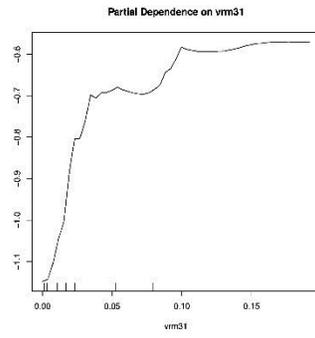
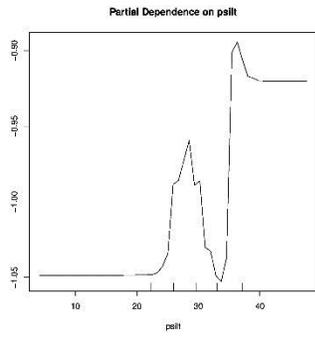
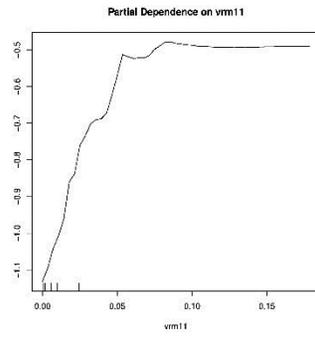
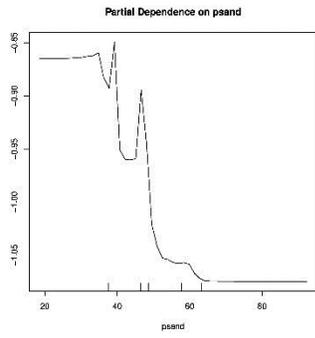
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

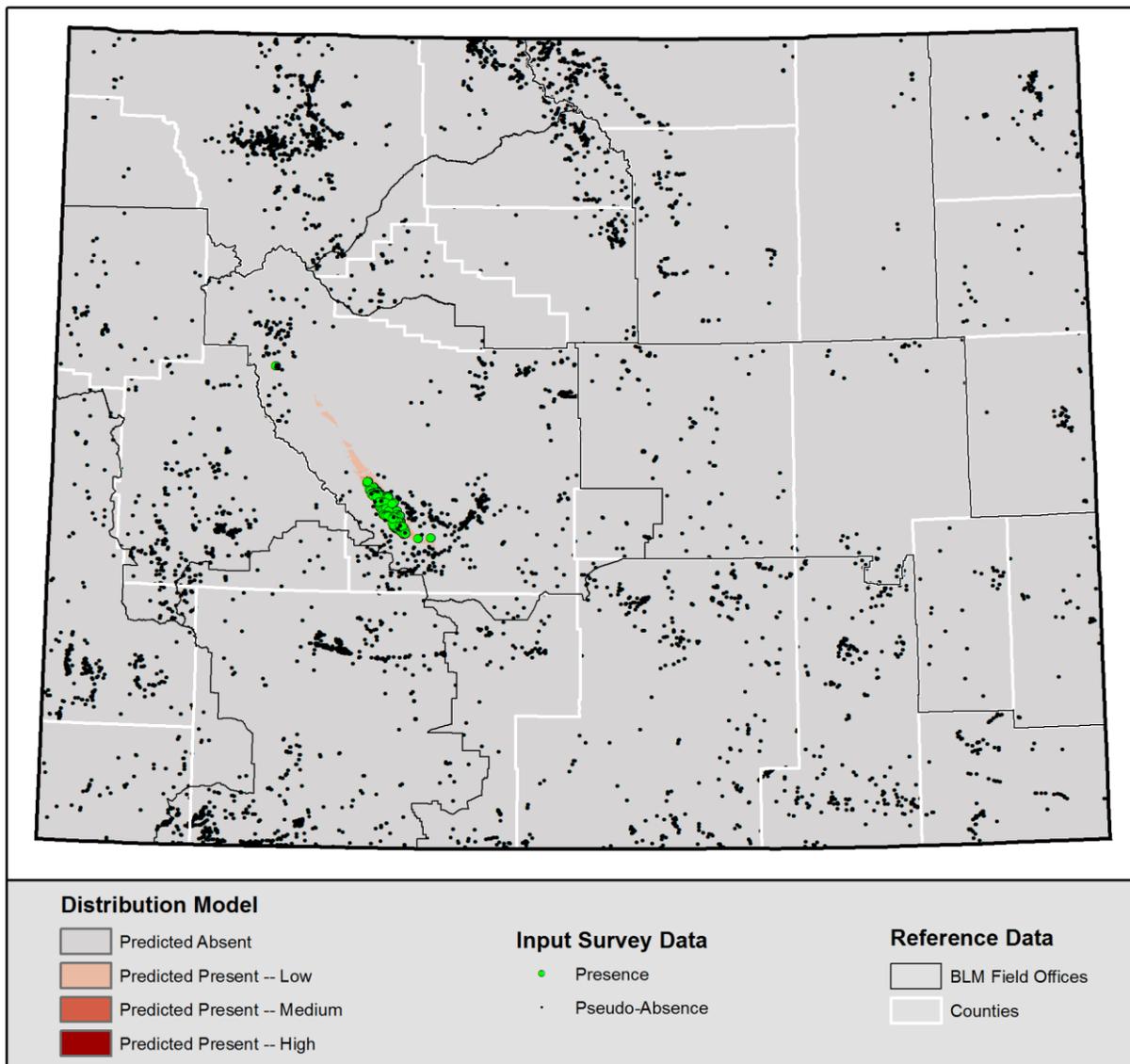
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Freemont bladderpod (*Lesquerella fremontii*)

Model version: 2015-08-26



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); random Forest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.596
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.602	Predicted Absent (0)
0.602	0.986	Low (1)
0.986	1	Medium (2)
1	1	High (3)

## Model Details

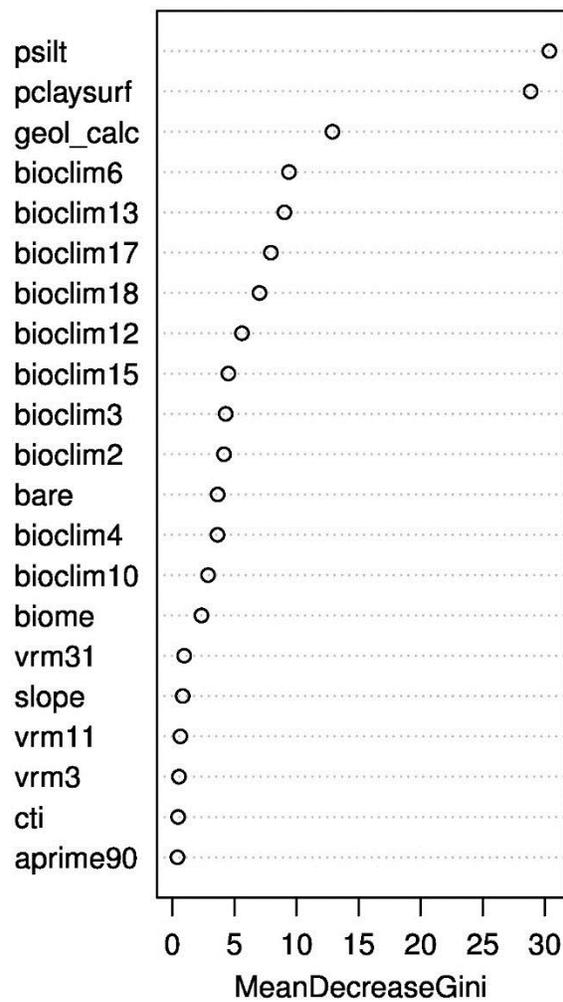
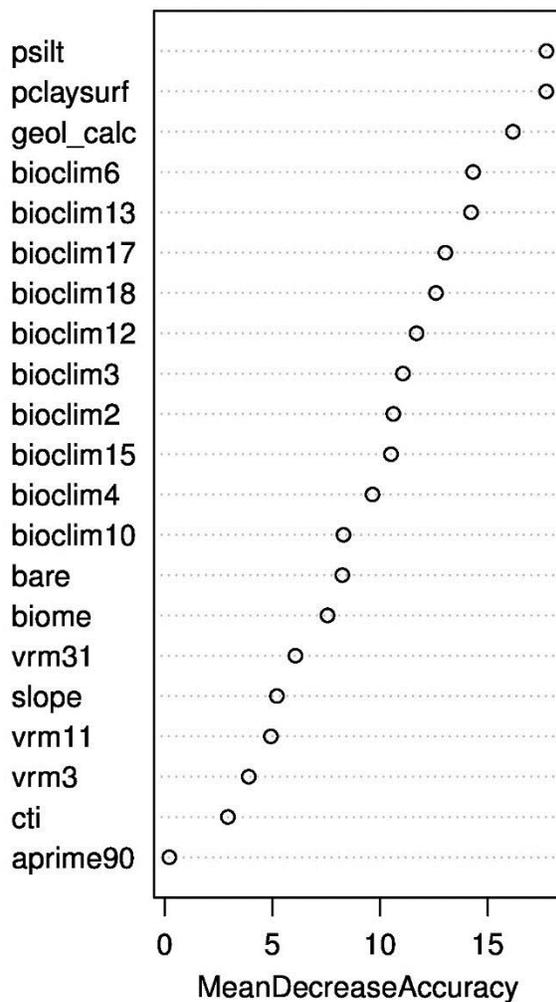
- **Number of Locations:** 94
- **Out-of-Bag Error:** 1.2%
- **TSS:** 95.6%
- **Kappa:** 96.8%
- **Sensitivity:** 95.7%
- **Specificity:** 99.8%

## Model Comments:

Endemic plant species that are restricted to specific soil conditions are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. In addition, for calciphilic species such as Fremont bladderpod, a surrogate layer was developed from bedrock geology layers to reflect calcium carbonate content.

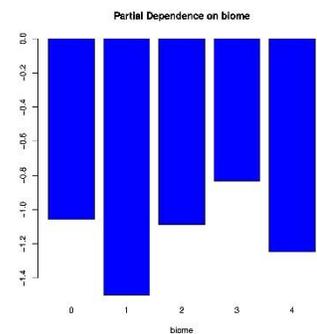
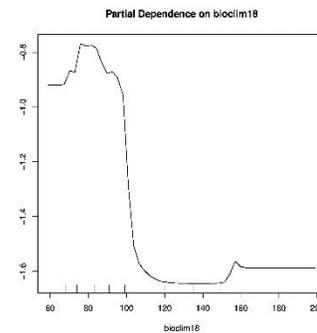
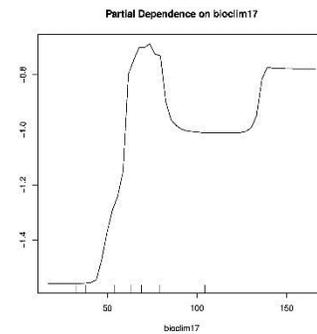
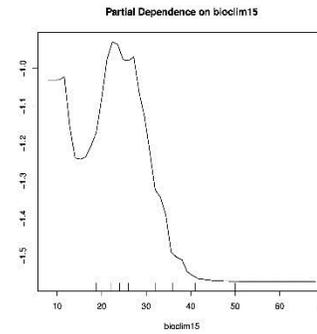
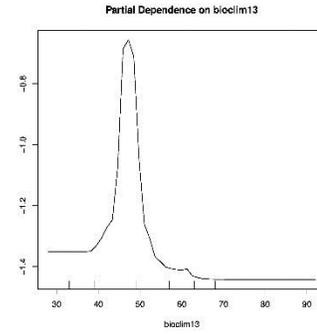
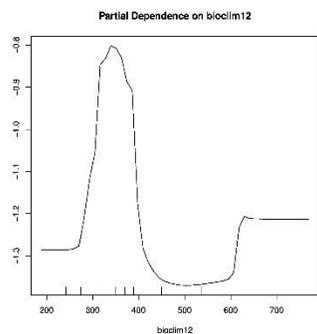
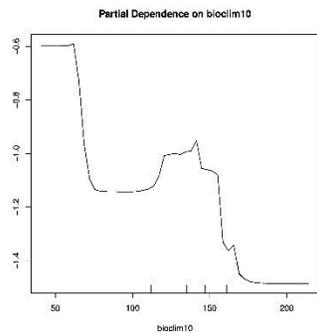
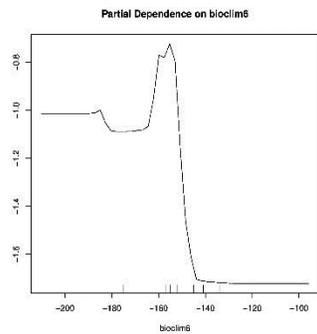
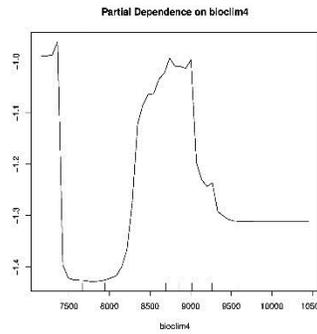
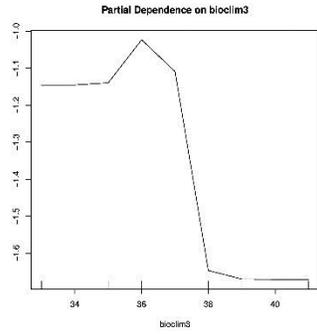
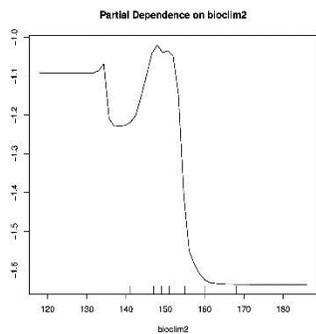
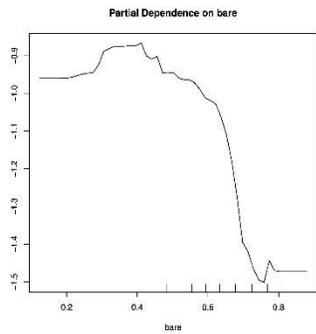
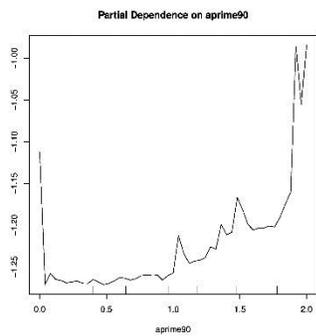
## Predictor Variable Importance:

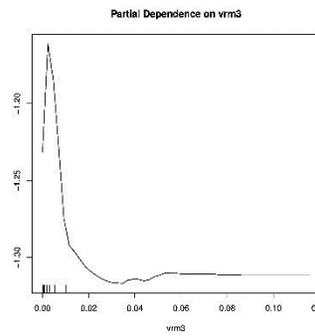
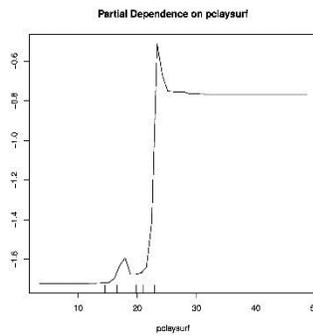
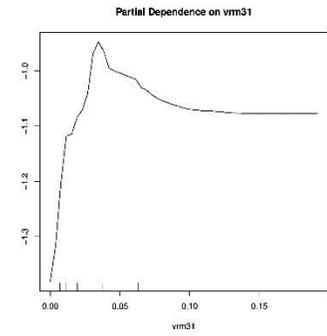
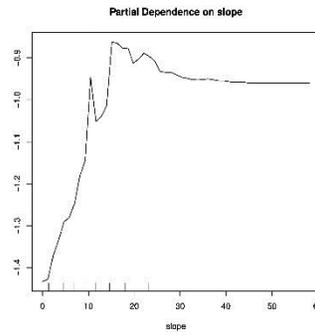
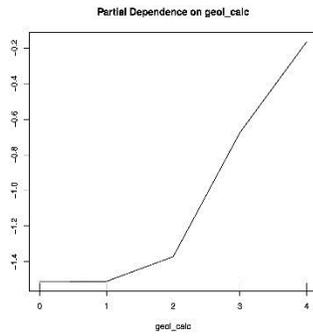
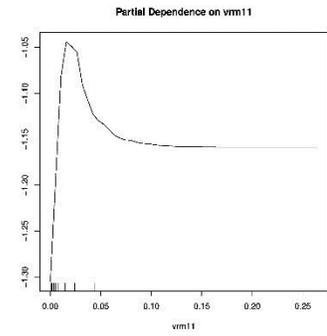
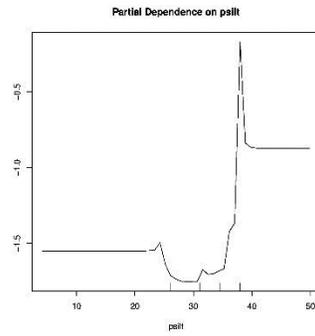
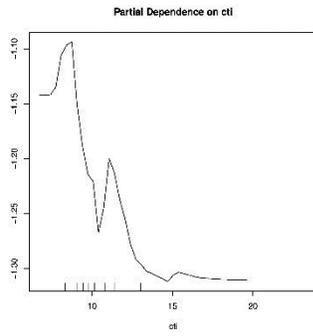
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

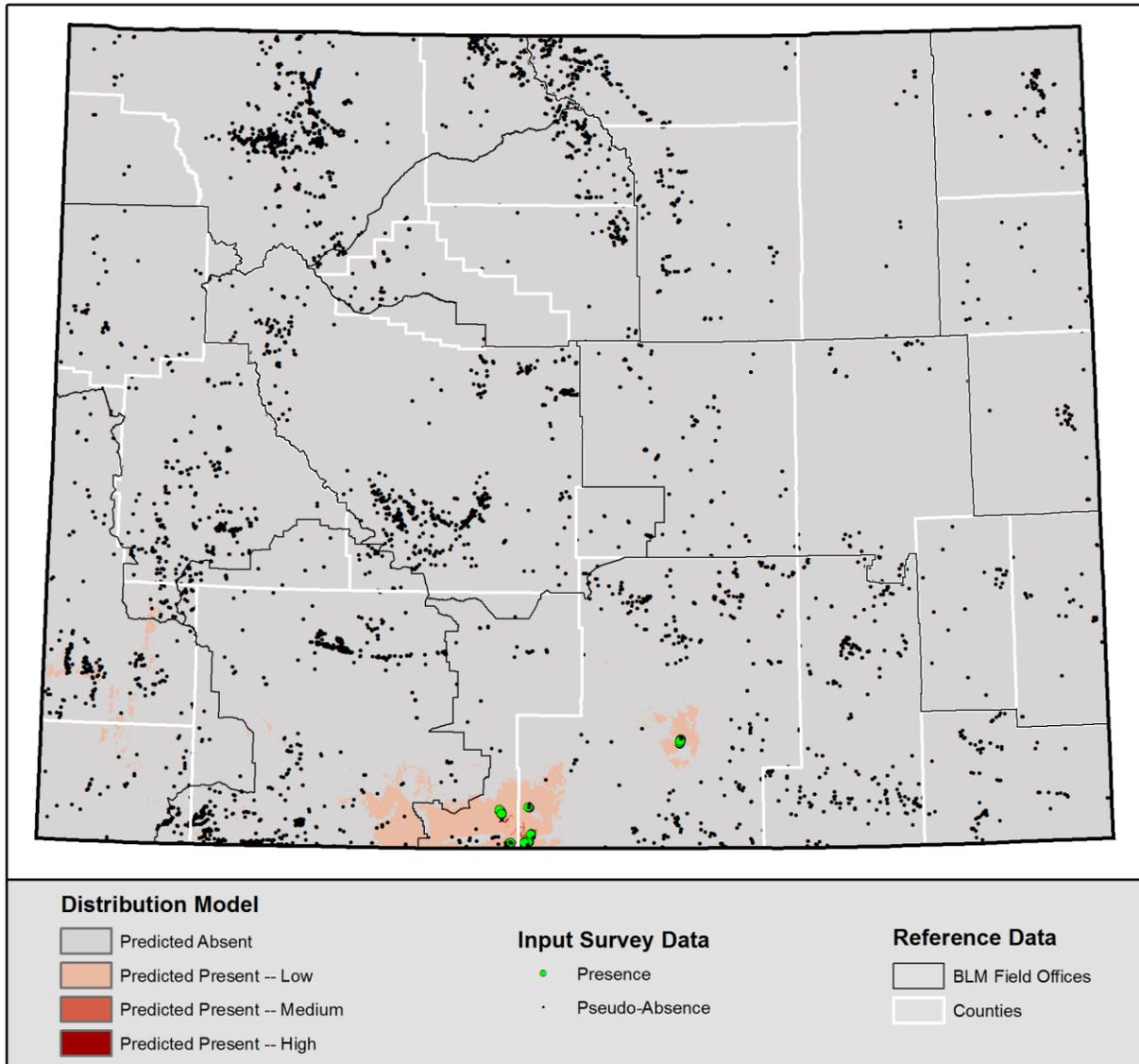
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Gibben's beardtongue (*Penstemon gibbensii*)

Model version: 2014-07-26



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); random Forest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.357
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.358	Predicted Absent (0)
0.358	0.970	Low (1)
0.970	1	Medium (2)
1	1	High (3)

## Model Details

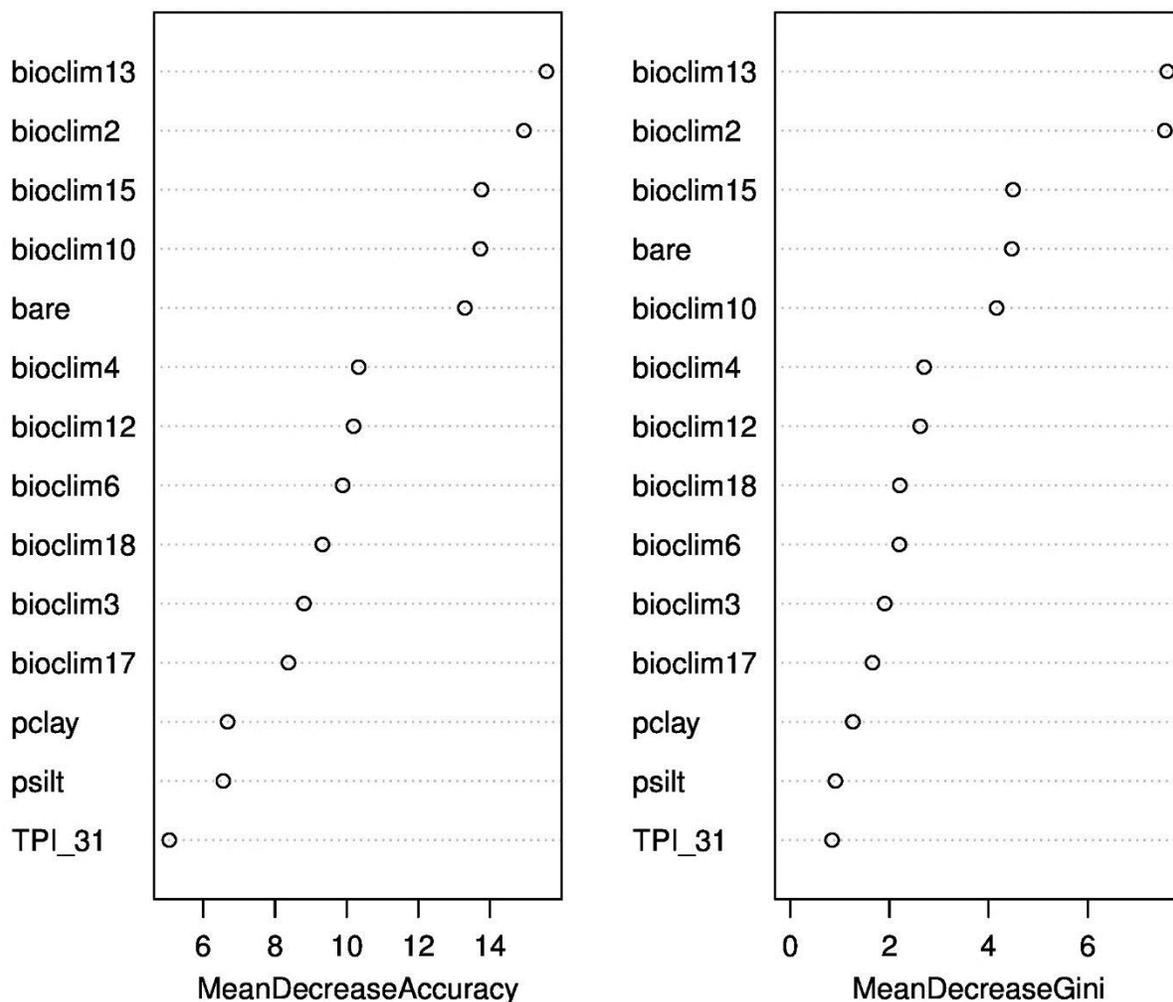
- **Number of Locations:** 30
- **Out-of-Bag Error:** 2.7%
- **TSS:** 90.3%
- **Kappa:** 92.7%
- **Sensitivity:** 90.8%
- **Specificity:** 99.5%

## Model Comments:

Regionally endemic plant species that are restricted to specific soil conditions are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. Gibbens' beardtongue is restricted to a combination of substrate and setting characteristics that may relate to subtle unmapped attributes such as volcanic ash content. As such, large areas of south-central Wyoming are shown as low probability potential habitat, some of which include occupied habitat, and others that may not be suitable.

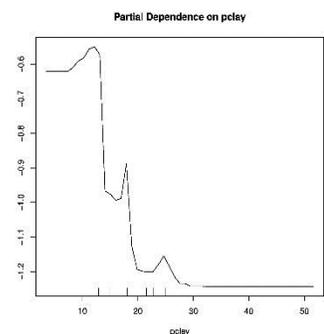
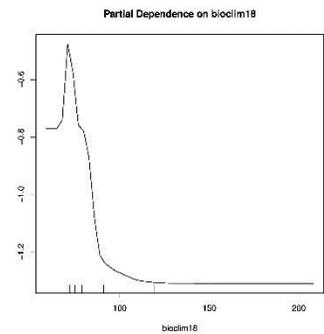
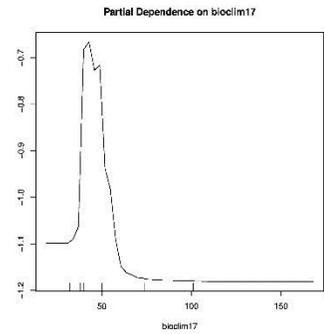
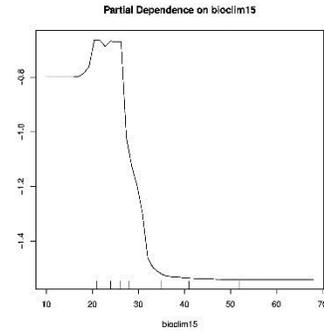
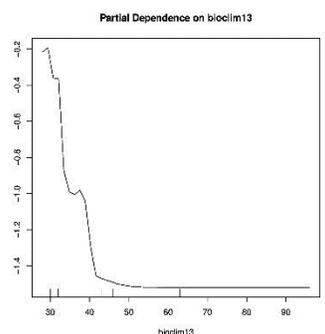
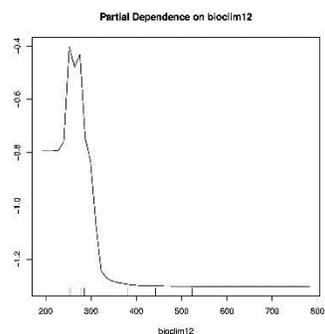
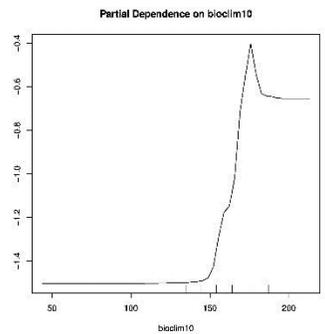
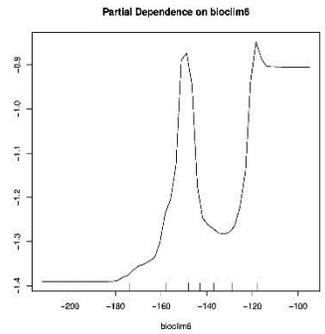
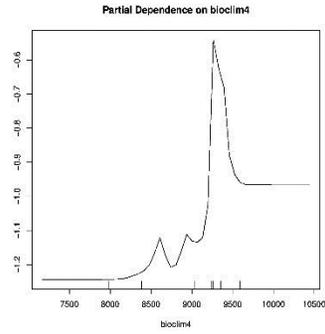
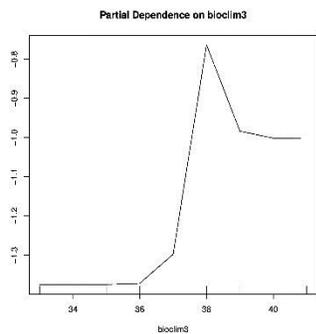
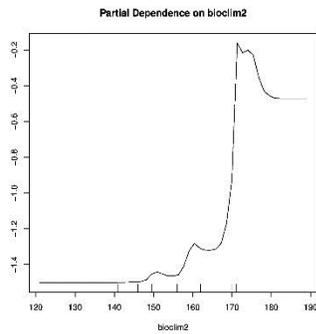
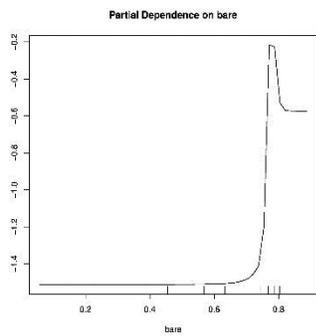
## Predictor Variable Importance:

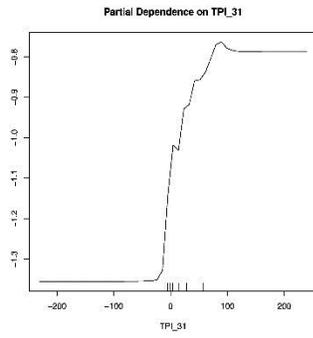
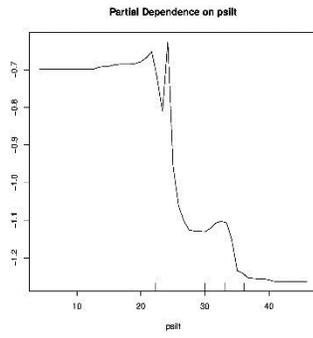
The graph below indicates the relative importance of predictors in modeling distribution for this species. "MeanDecreaseAccuracy" calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than "MeanDecreaseGini," which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

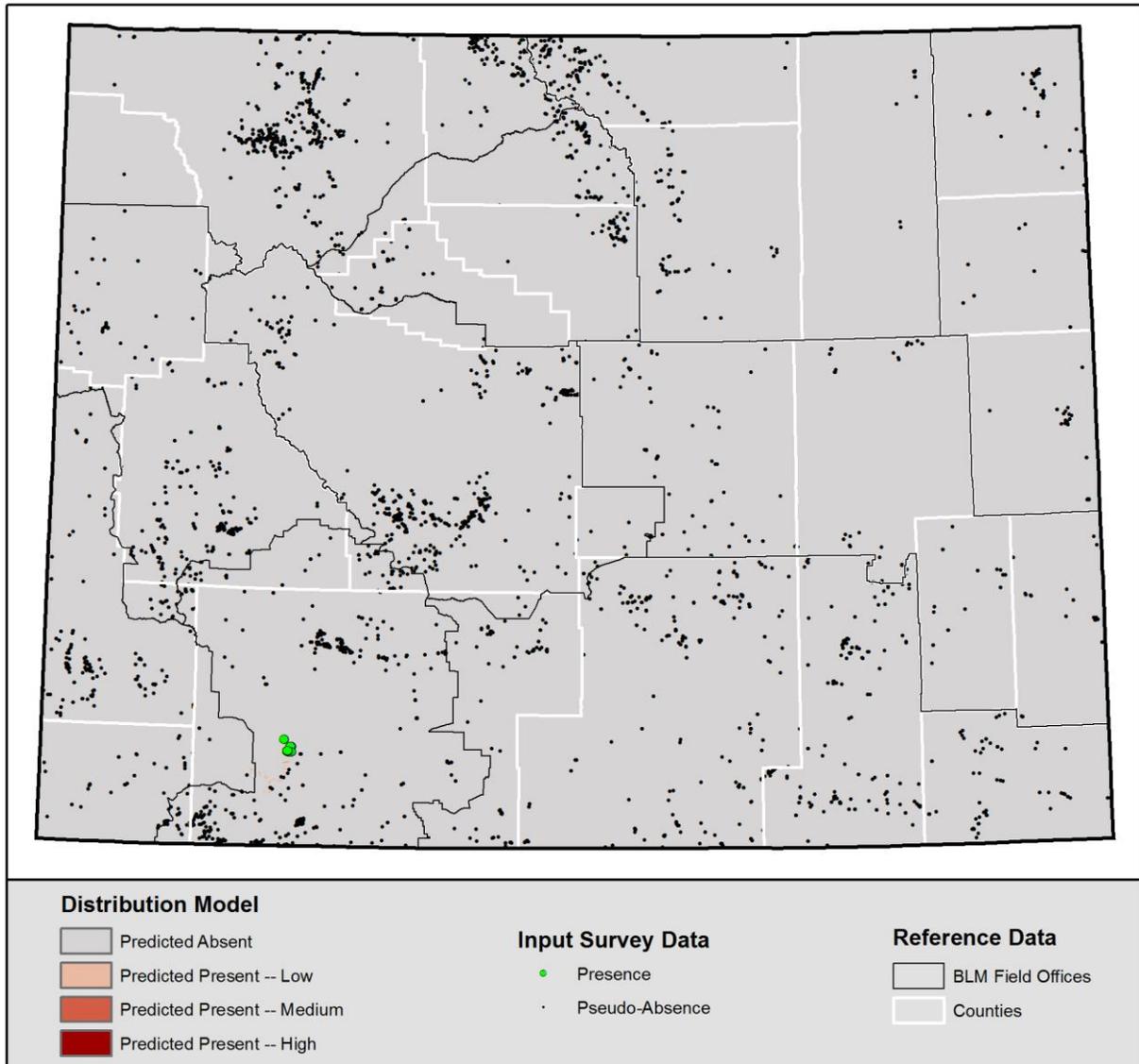
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Green river greenthread (*Thelesperma caespitosum*)

Model version: 2015-08-25



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.887
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.888	Predicted Absent (0)
0.888	0.984	Low (1)
0.984	0.998	Medium (2)
0.998	1	High (3)

## Model Details

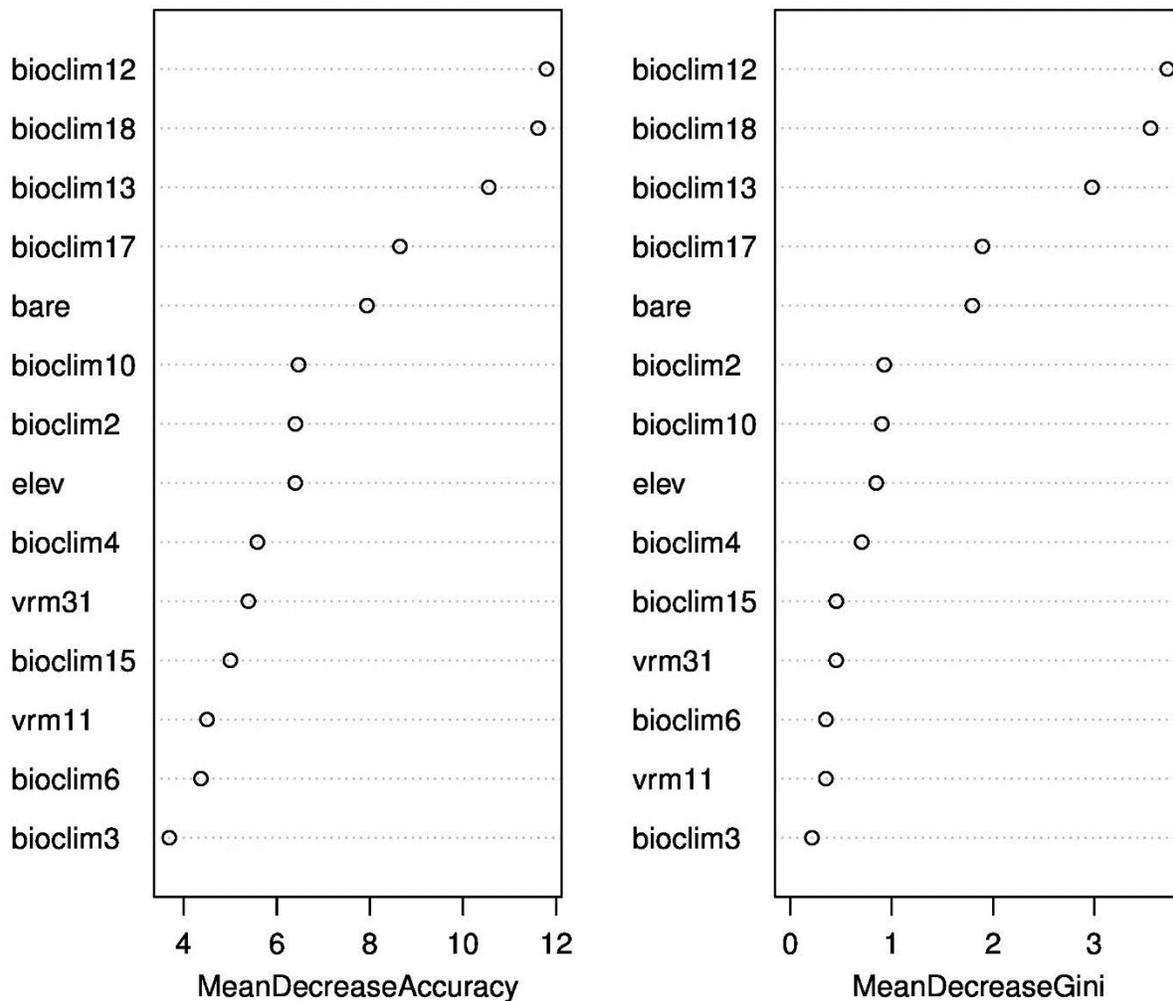
- **Number of Locations:** 13
- **Out-of-Bag Error:** 1.3%
- **TSS:** 98.2%
- **Kappa:** 96.6%
- **Sensitivity:** 99.8%
- **Specificity:** 98.3%

## Model Comments:

Regionally endemic plant species that are restricted to specific soil conditions are difficult to model because statewide data are coarsely mapped and categorical. Taxonomists' opinions vary whether Green River greenthread and Uinta greenthread are different species, different varieties, or the same species. They were modeled separately.

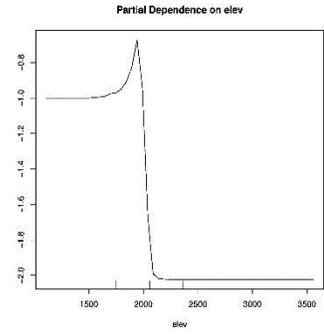
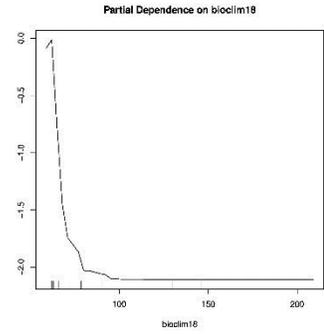
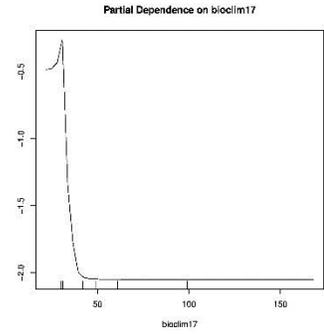
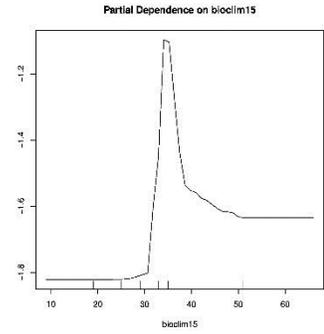
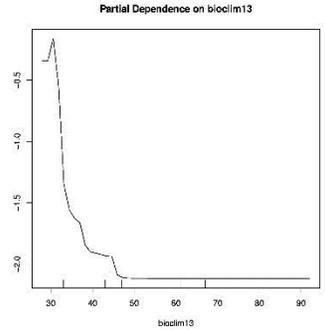
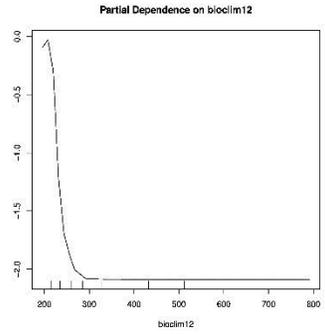
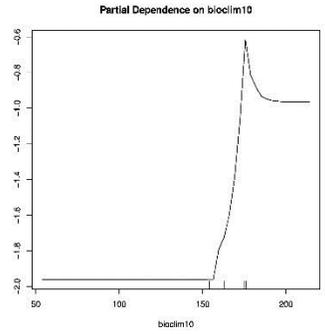
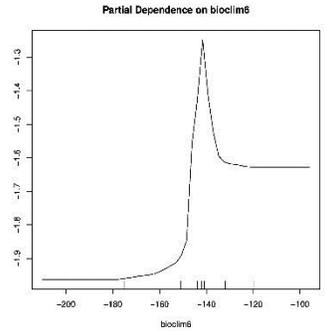
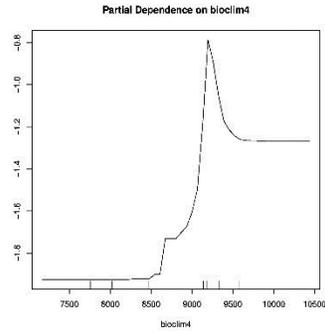
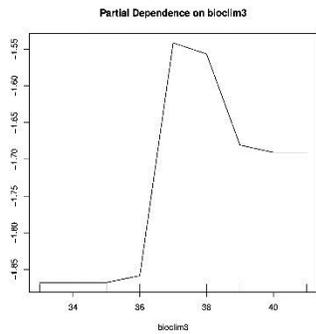
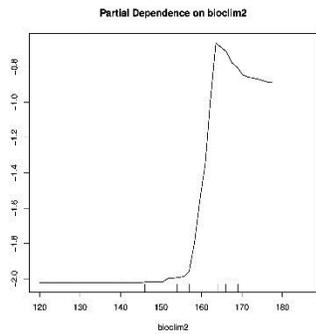
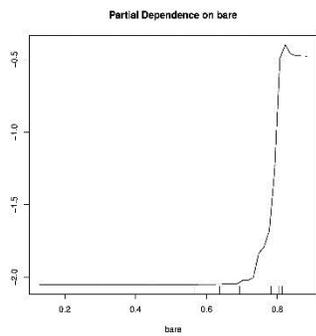
## Predictor Variable Importance:

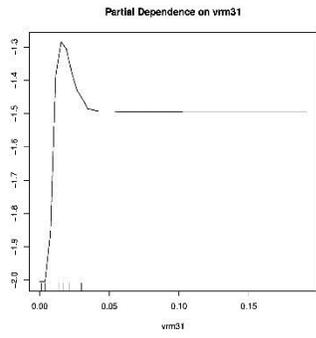
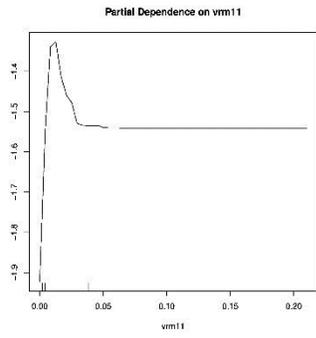
The graph below indicates the relative importance of predictors in modeling distribution for this species. "MeanDecreaseAccuracy" calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than "MeanDecreaseGini," which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

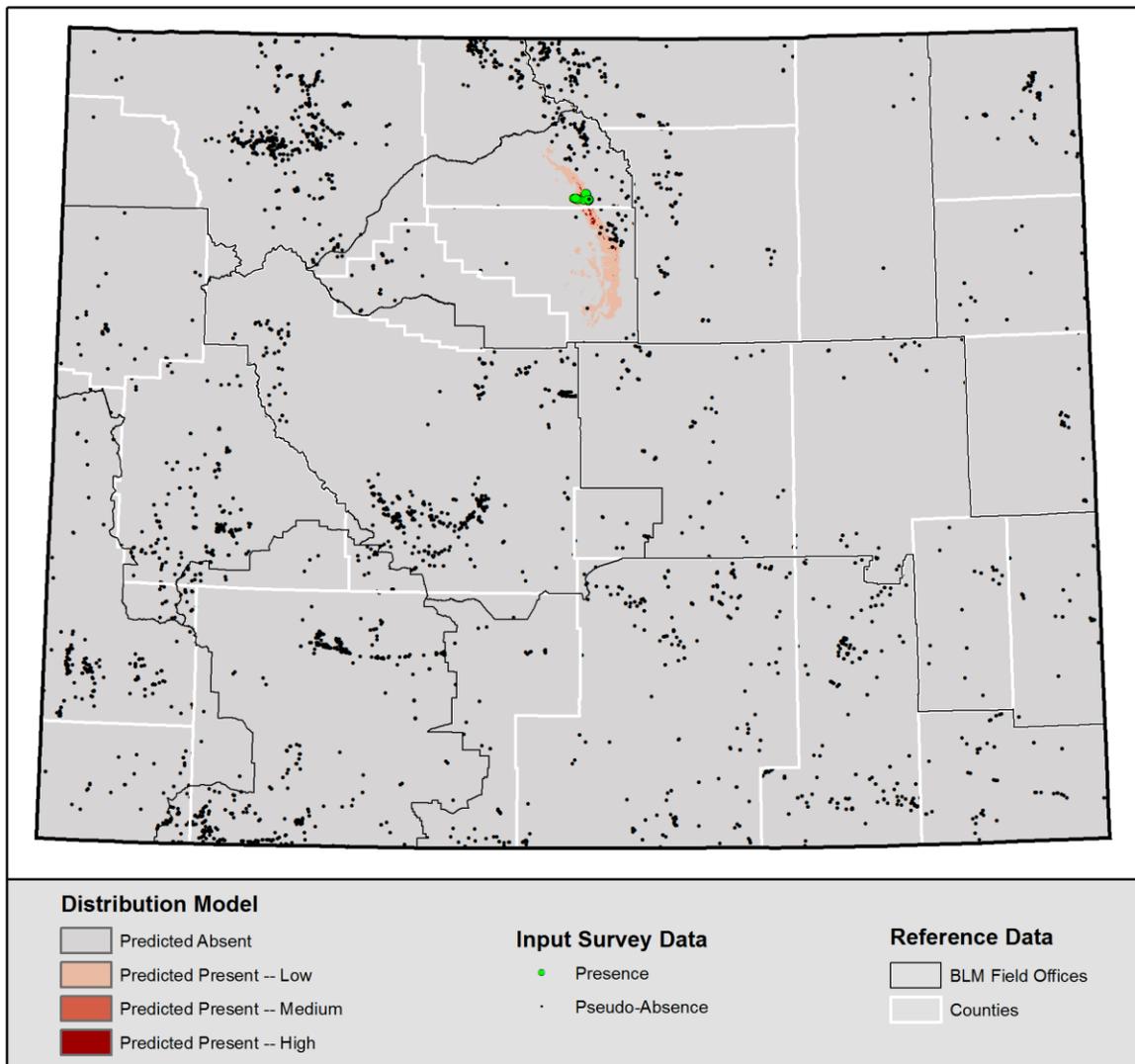
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Hyattville milkvetch (*Astragalus jejunus* var. *articulatus*)

Model version: 2014-07-25



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.726
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.732	Predicted Absent (0)
0.732	0.990	Low (1)
0.990	0.996	Medium (2)
0.996	1	High (3)

## Model Details

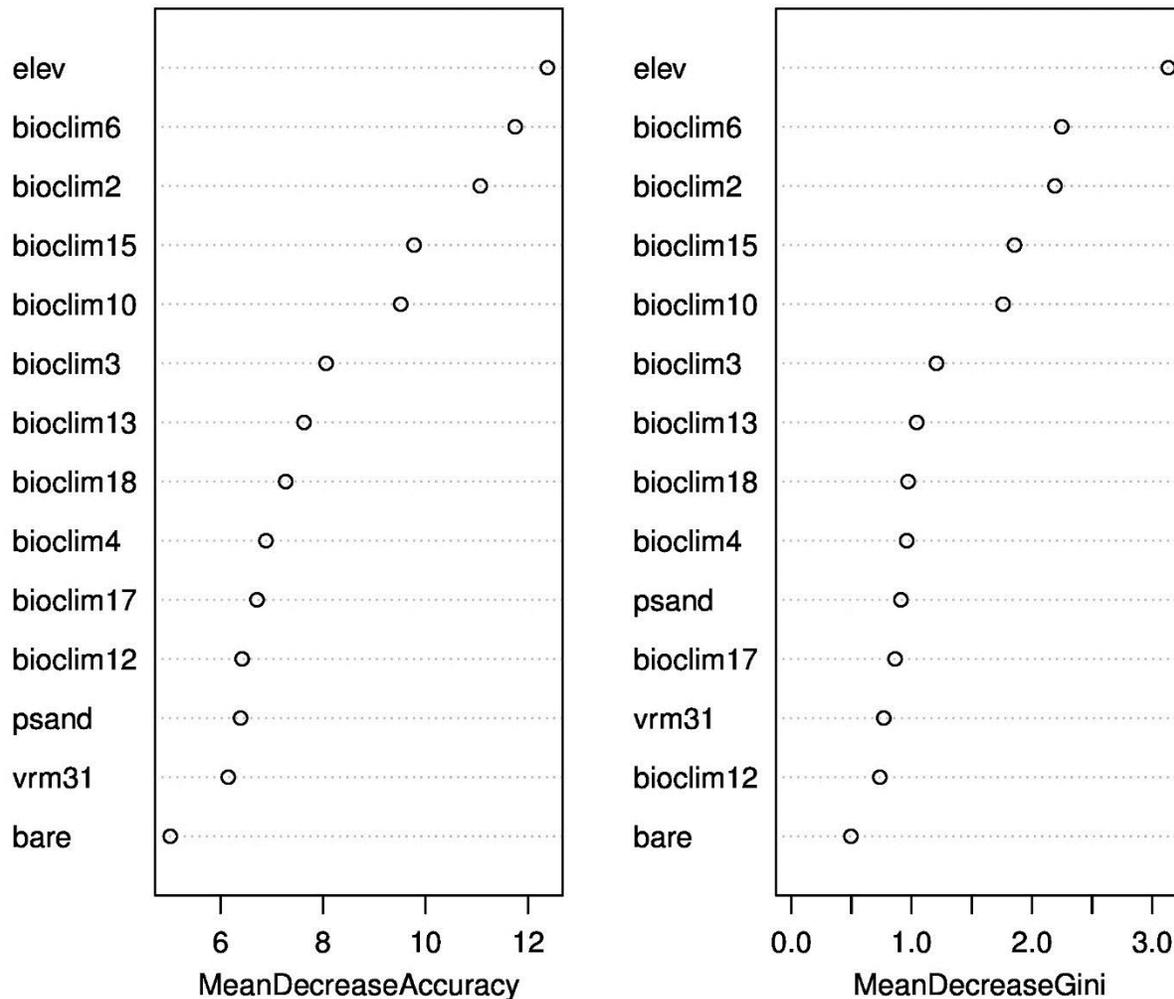
- **Number of Locations:** 13
- **Out-of-Bag Error:** 0.6%
- **TSS:** 99.2%
- **Kappa:** 98.5%
- **Sensitivity:** 99.9%
- **Specificity:** 99.3%

## Model Comments:

Endemic plant species that are restricted to specific soil conditions are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. Hyattville milkvetch is associated mainly with Goose Egg and Chugwater Formations, and to a lesser extent with the Tensleep Formation. It is unlikely that addition of bedrock geology layers would constrain the mapping of large areas as low probability potential habitat.

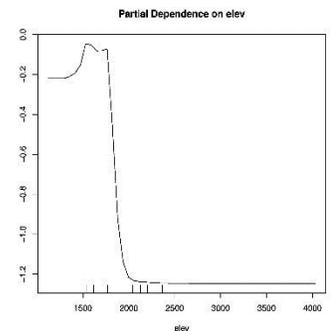
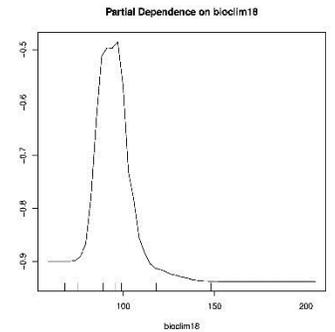
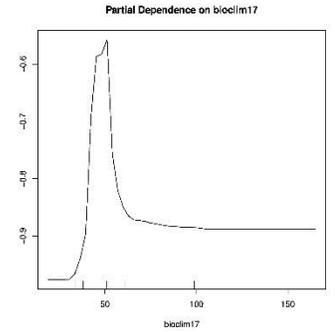
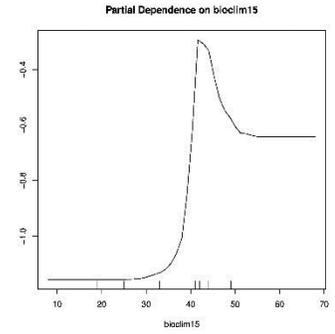
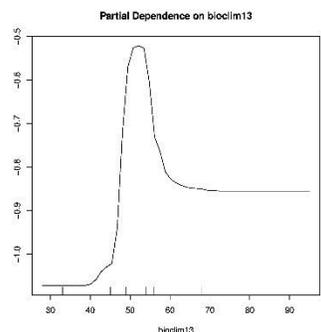
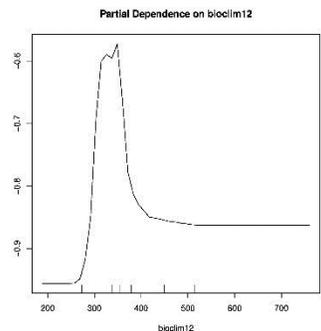
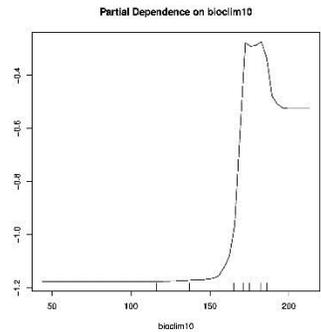
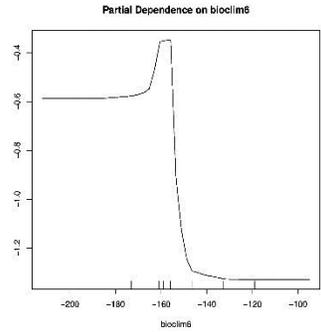
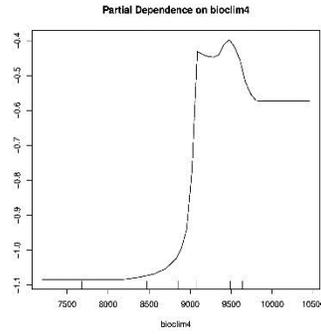
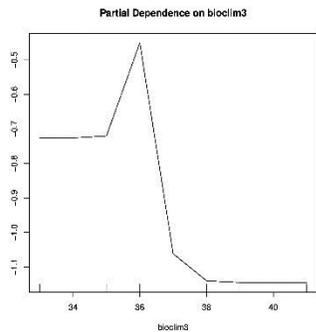
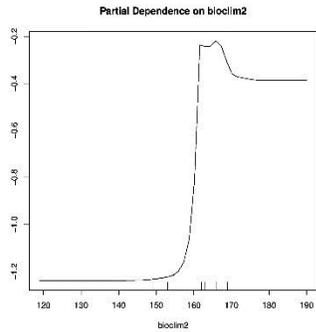
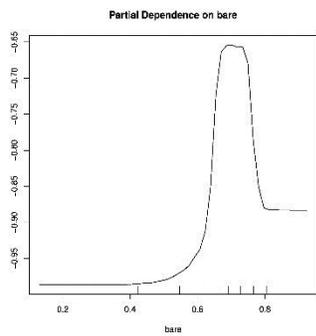
## Predictor Variable Importance:

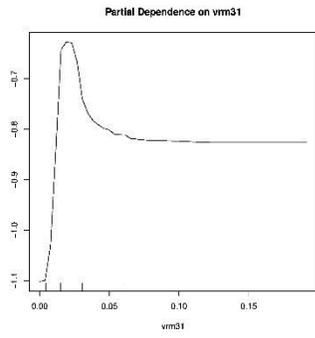
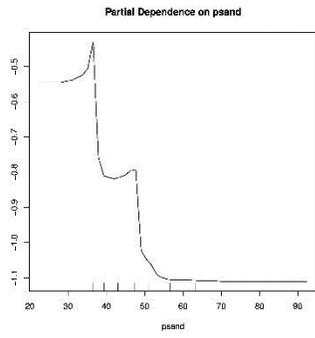
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

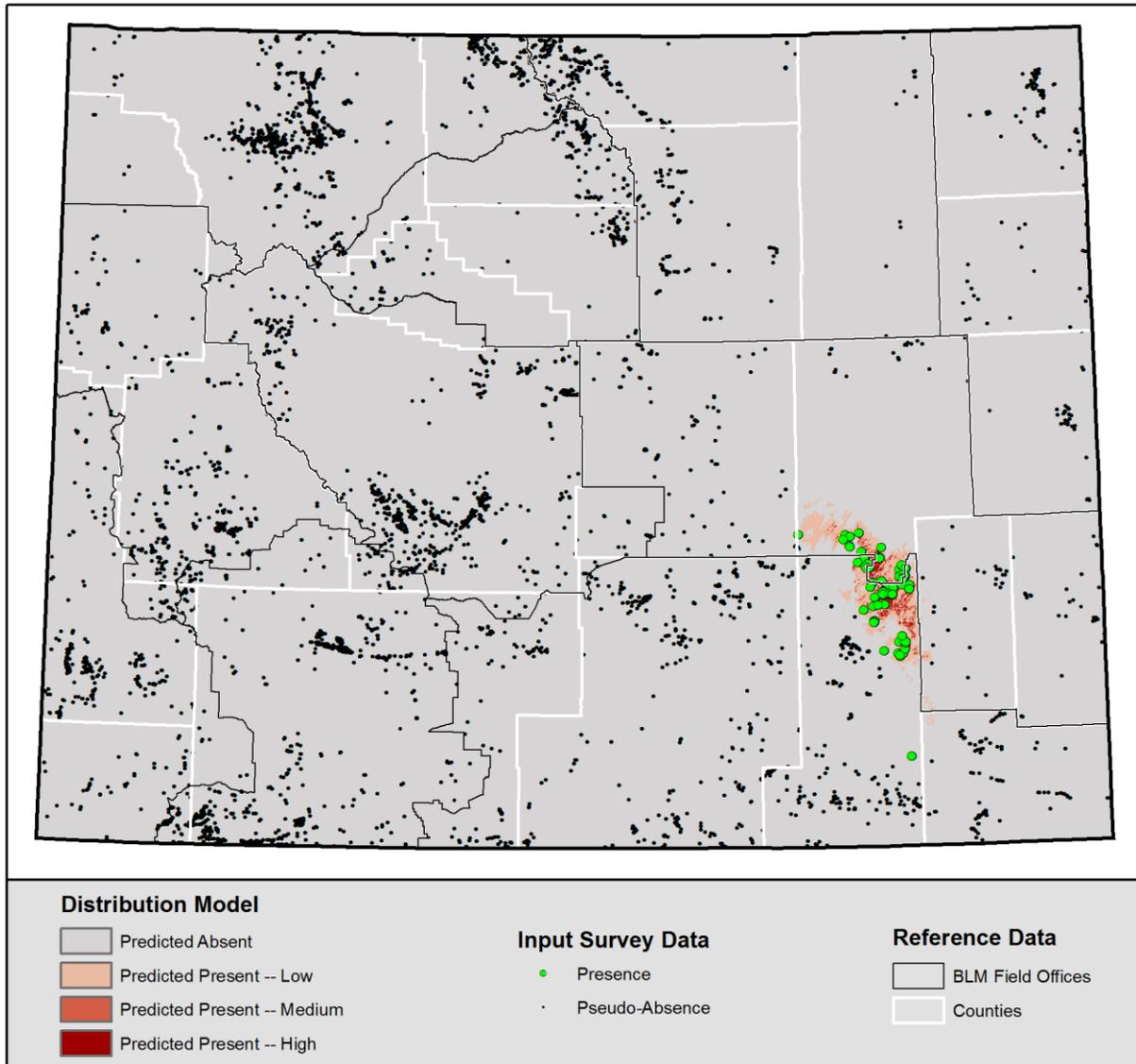
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Laramie columbine (*Aquilegia laramiensis*)

Model version: 2015-08-28



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); random Forest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.679
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.702	Predicted Absent (0)
0.702	0.976	Low (1)
0.976	0.998	Medium (2)
0.998	1	High (3)

## Model Details

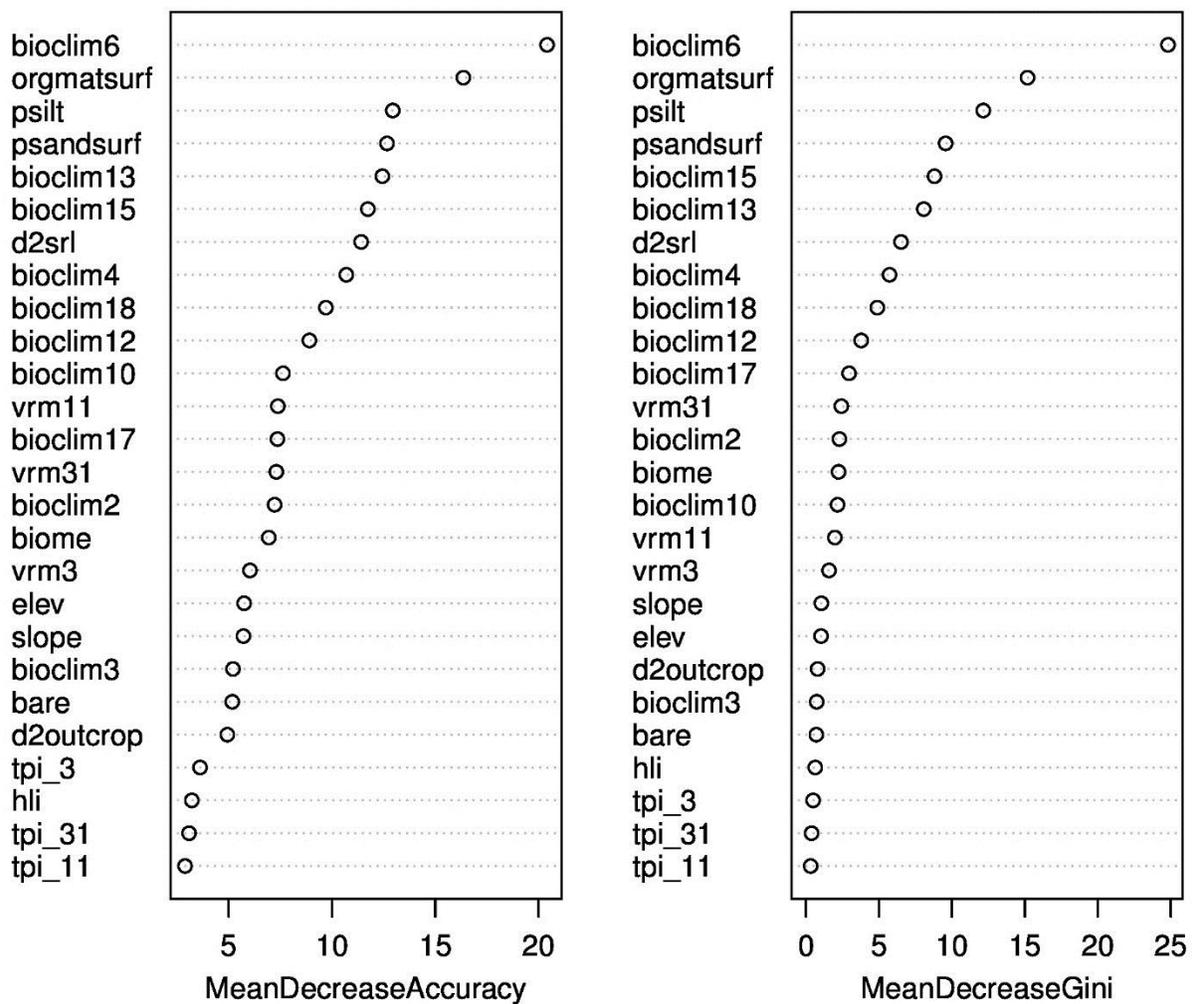
- **Number of Locations:** 81
- **Out-of-Bag Error:** 1.4%
- **TSS:** 94.5%
- **Kappa:** 96.1%
- **Sensitivity:** 94.7%
- **Specificity:** 99.8%

## Model Comments:

Endemic plant species that are restricted to specific soil conditions are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. Laramie columbine is almost restricted to a distinct part of Sherman Granite bedrock not separated out by geological mapping.

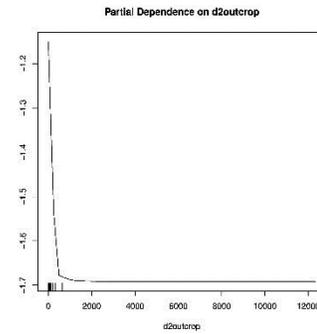
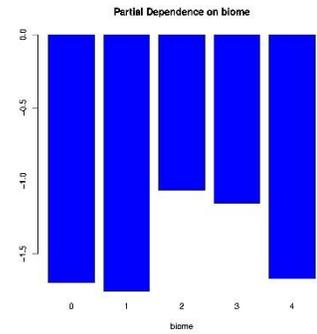
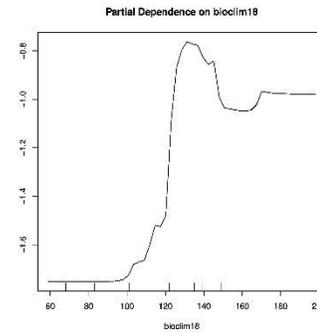
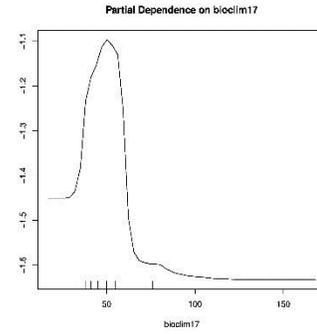
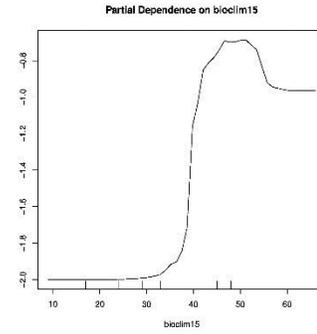
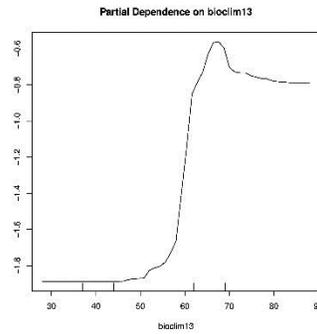
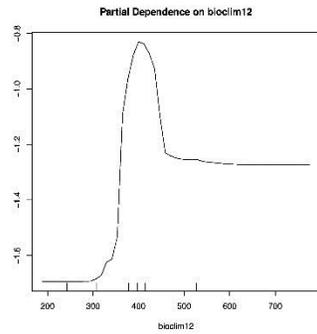
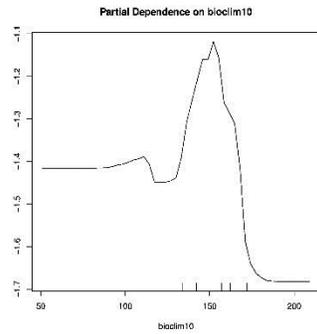
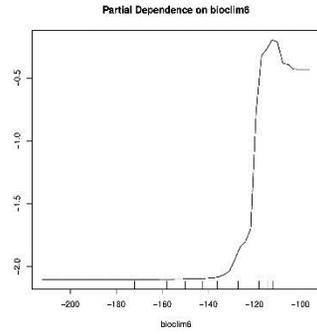
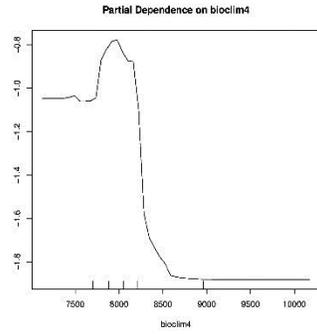
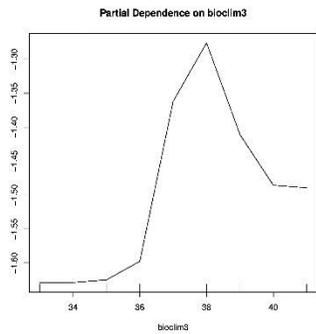
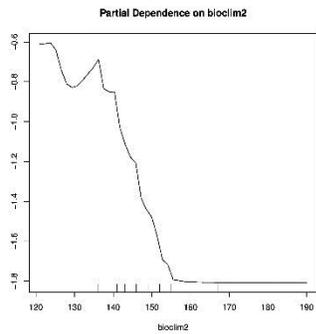
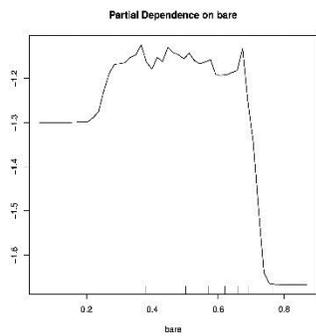
## Predictor Variable Importance:

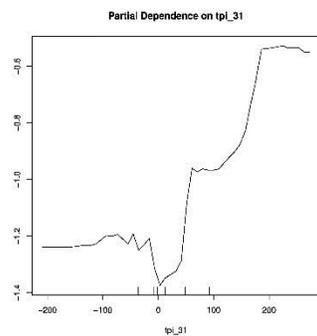
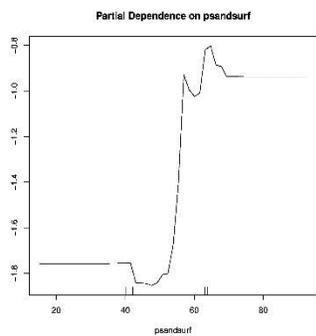
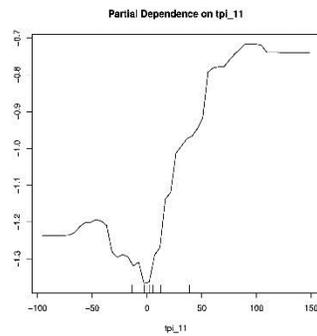
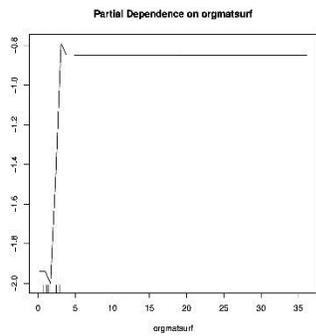
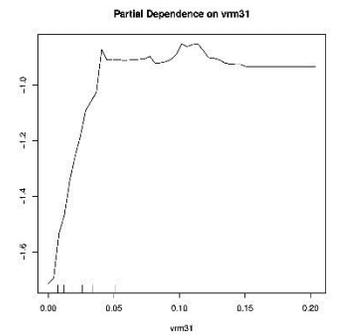
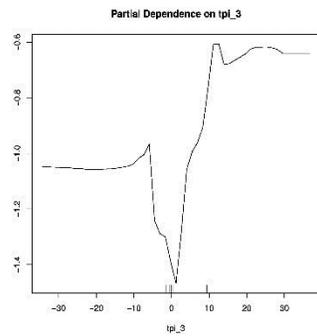
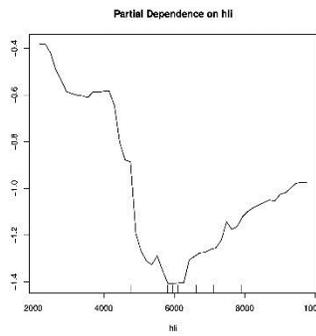
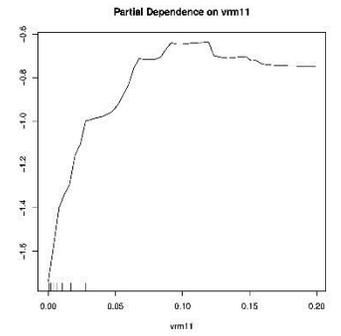
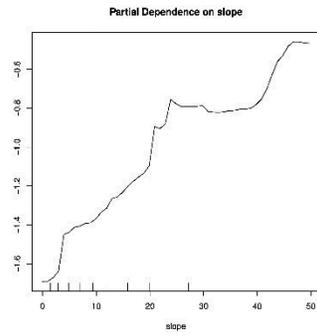
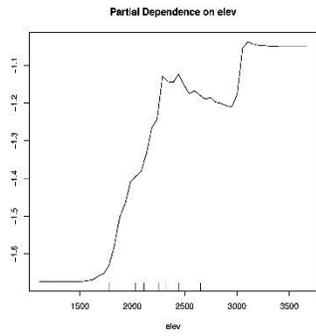
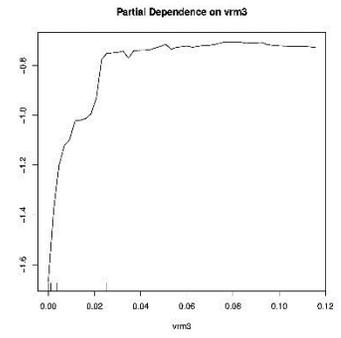
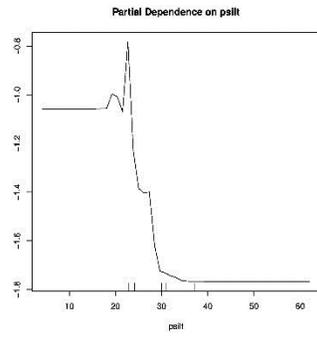
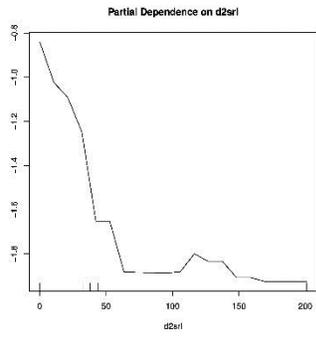
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

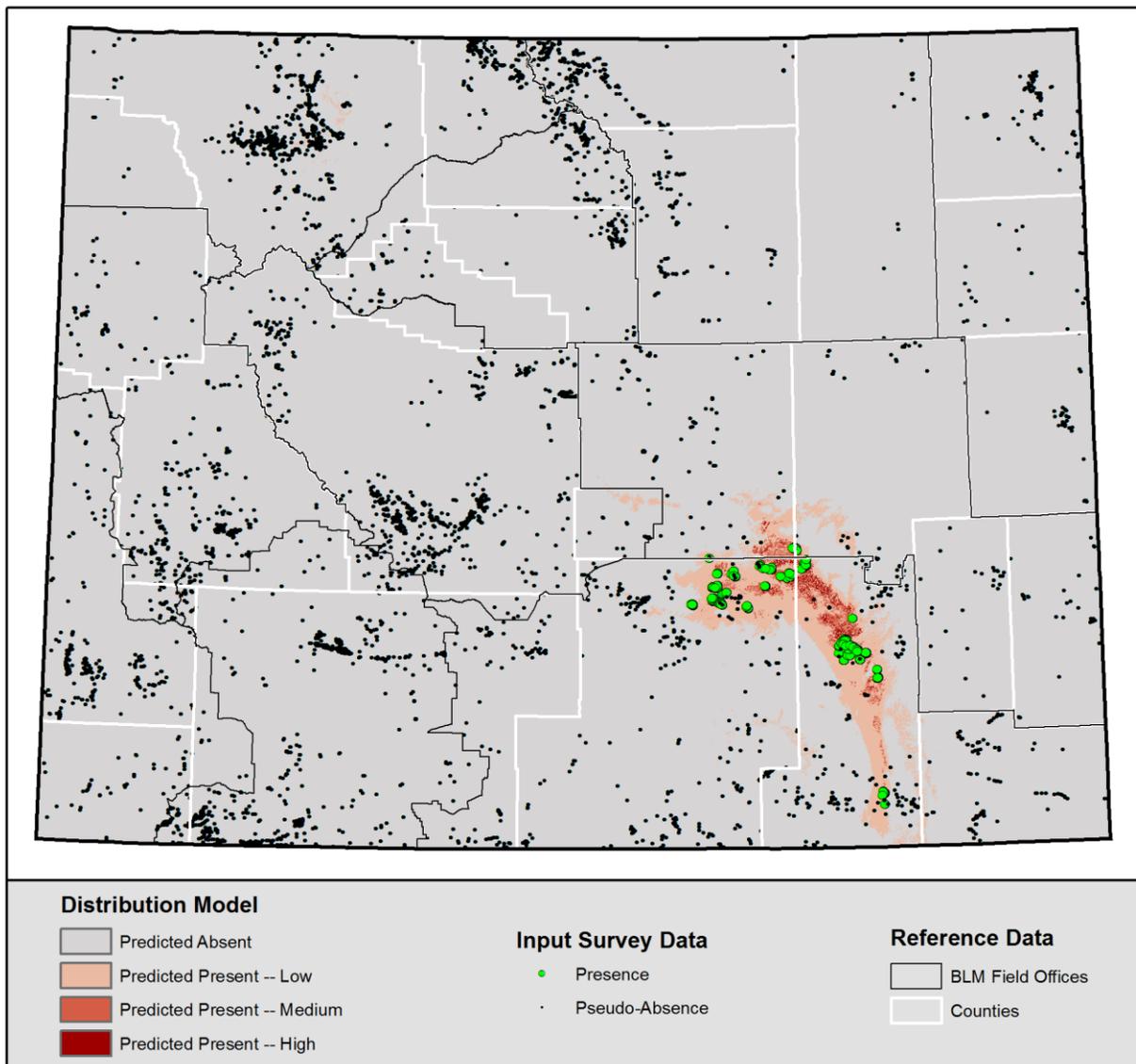
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Laramie false sagebrush (*Sphaeromeria simplex*)

Model version: 2015-08-25



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.557
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.408	Predicted Absent (0)
0.408	0.932	Low (1)
0.932	0.996	Medium (2)
0.996	1	High (3)

## Model Details

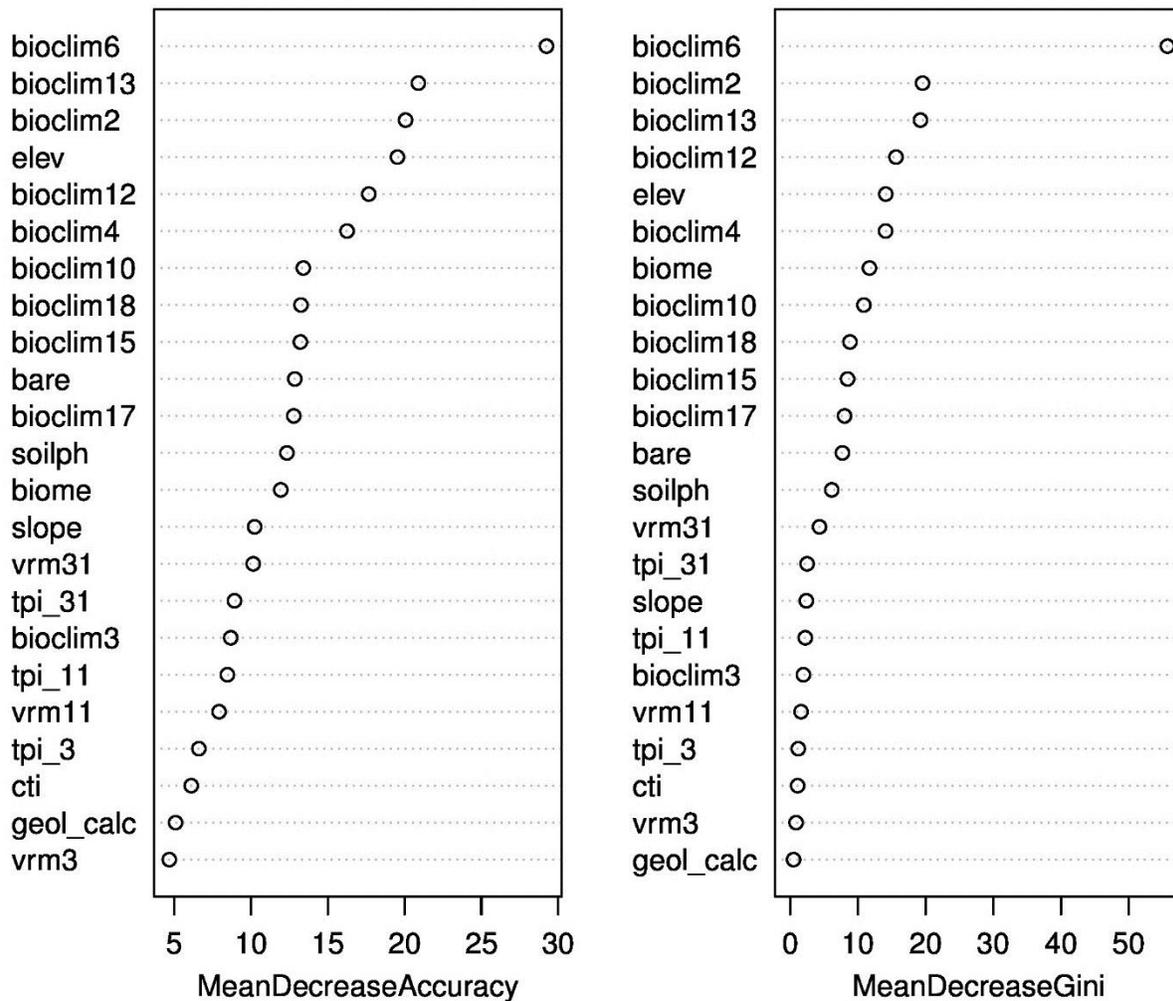
- **Number of Locations:** 146
- **Out-of-Bag Error:** 0.9%
- **TSS:** 98.1%
- **Kappa:** 97.7%
- **Sensitivity:** 98.8%
- **Specificity:** 99.2%

## Model Comments:

Endemic plant species that are restricted to specific soil conditions are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. In addition, for calciphilic species such as Laramie false sagebrush, a surrogate layer was developed from bedrock geology layers to reflect calcium carbonate content.

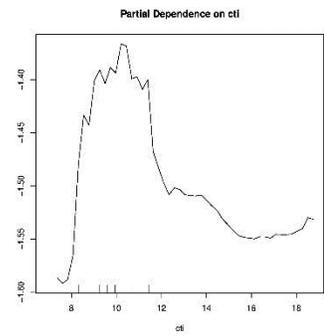
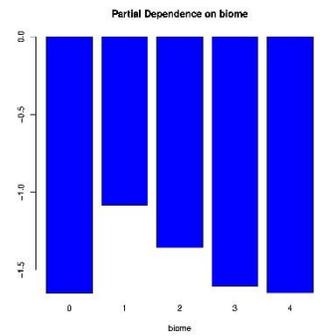
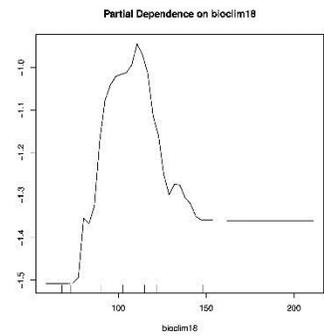
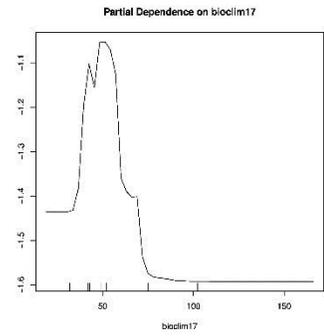
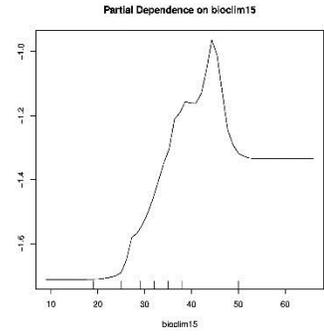
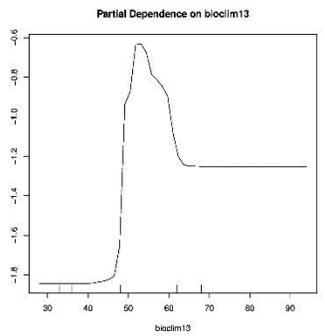
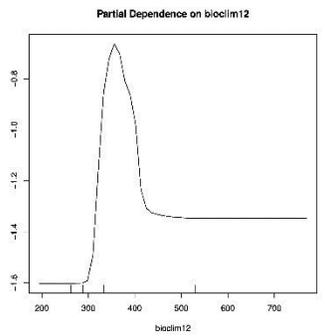
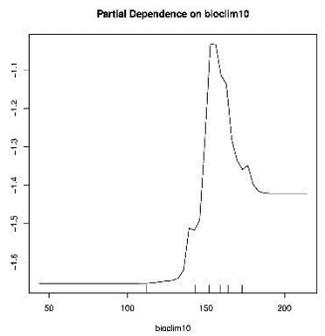
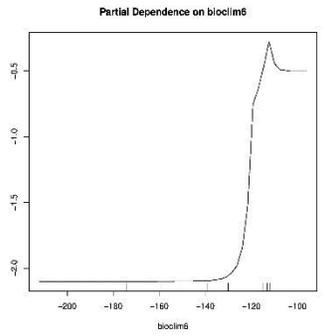
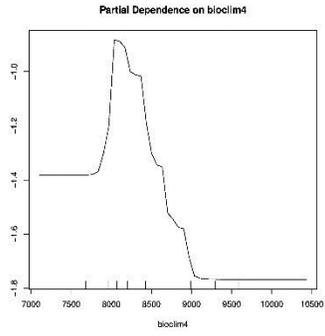
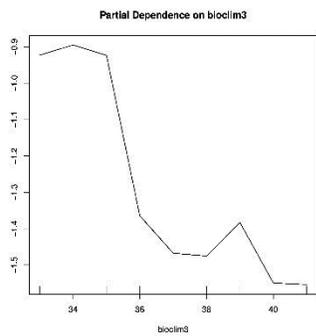
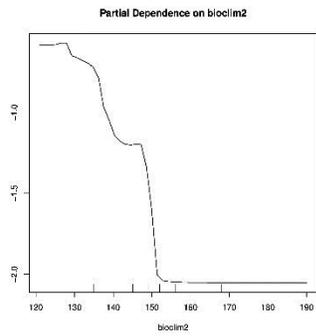
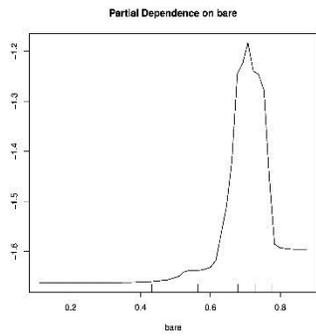
## Predictor Variable Importance:

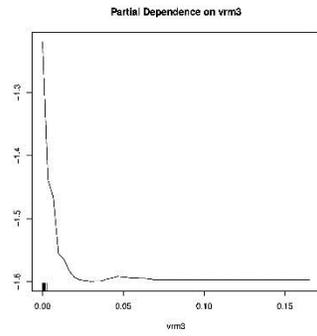
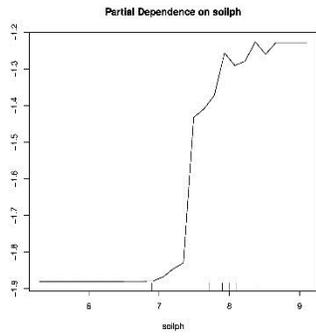
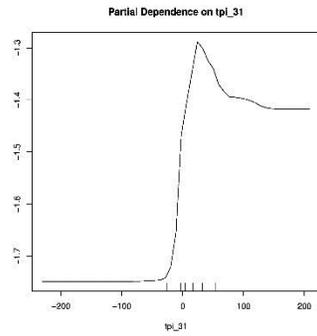
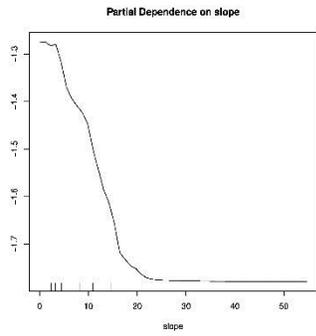
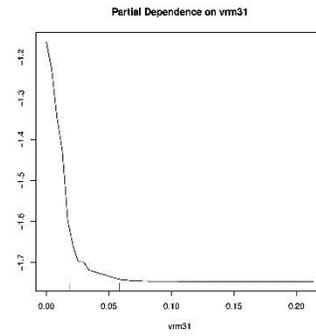
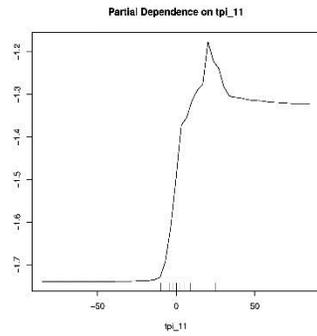
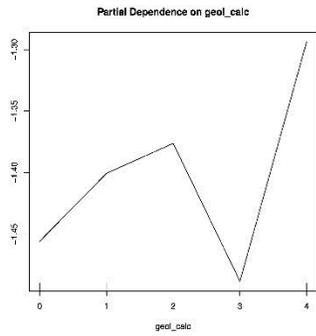
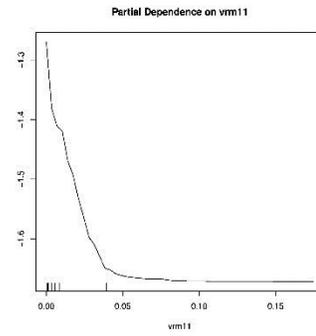
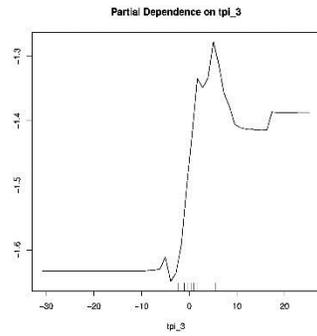
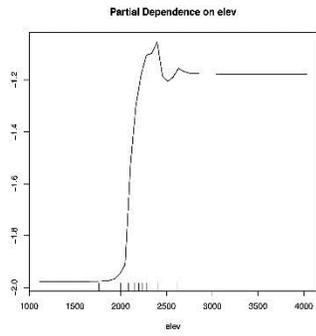
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

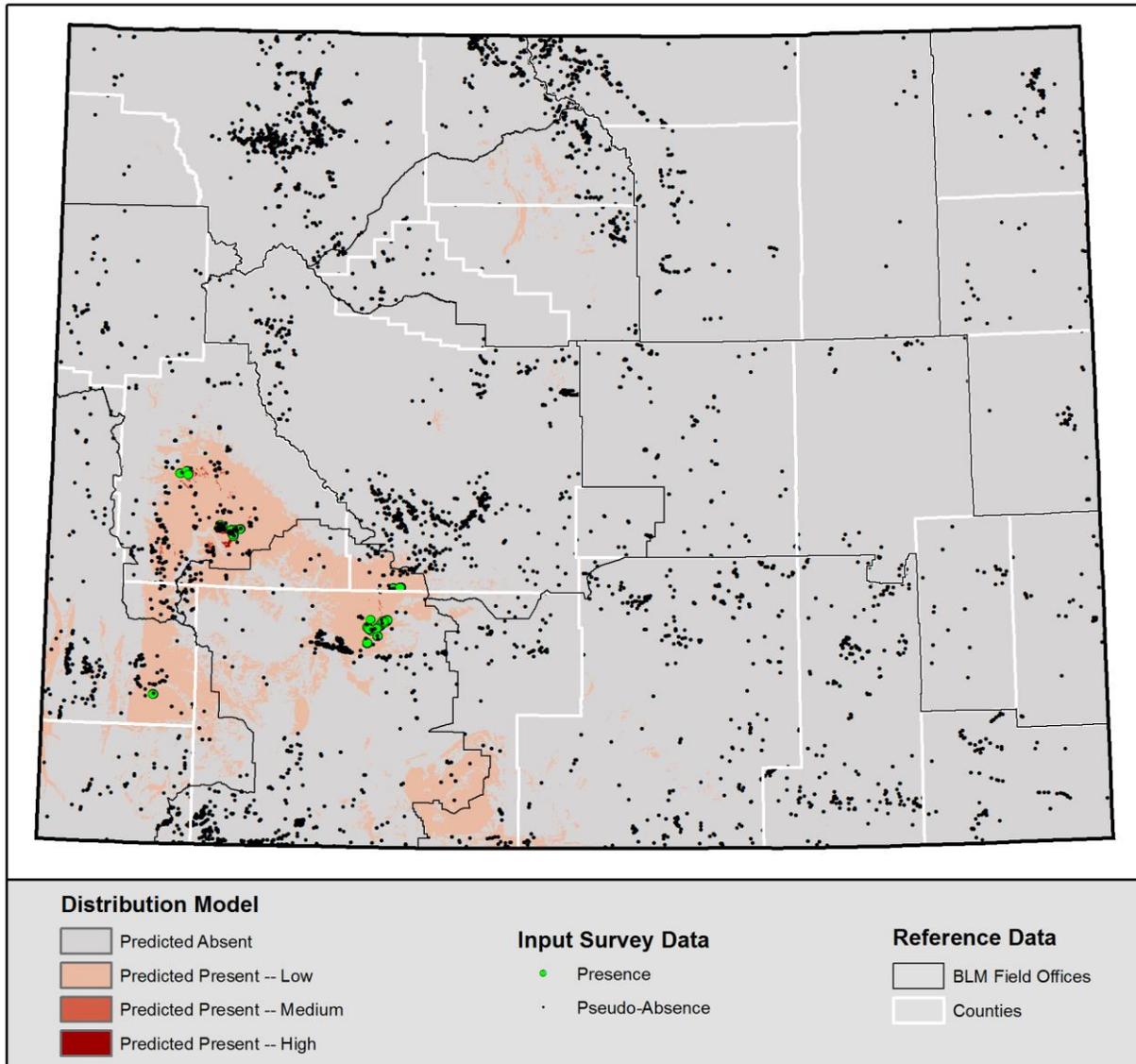
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Large-fruited bladderpod (*Lesquerella macrocarpa*)

Model version: 2015-08-26



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.403
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.242	Predicted Absent (0)
0.242	0.908	Low (1)
0.908	0.968	Medium (2)
0.968	1	High (3)

## Model Details

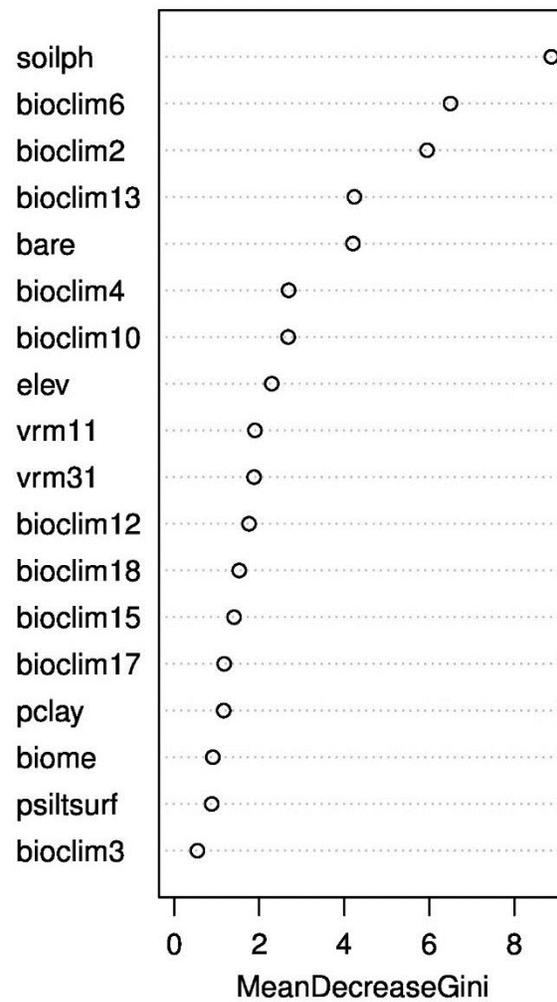
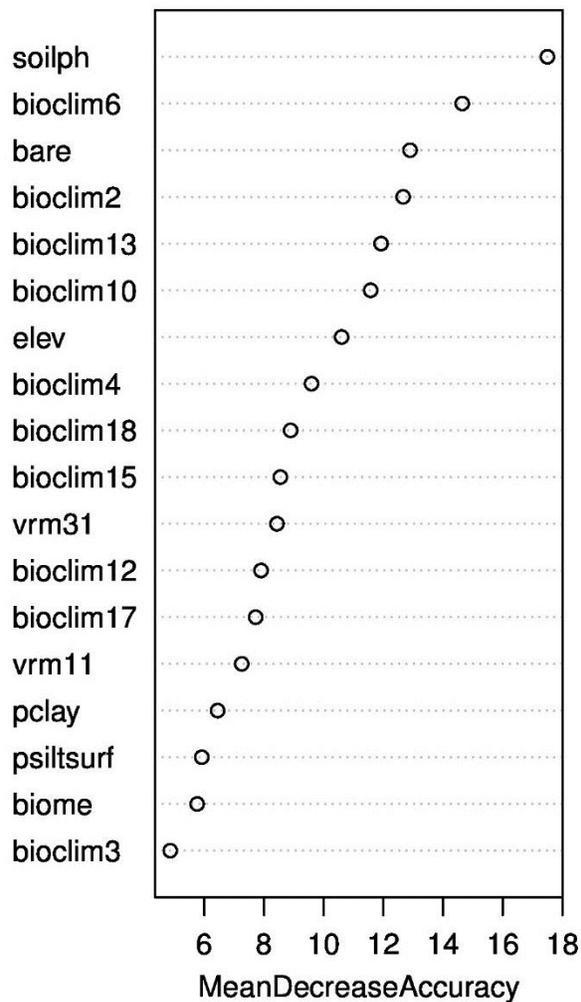
- **Number of Locations:** 34
- **Out-of-Bag Error:** 6.0%
- **TSS:** 86.0%
- **Kappa:** 84.3%
- **Sensitivity:** 91.1%
- **Specificity:** 94.9%

## Model Comments:

Endemic plant species that are restricted to specific soil conditions are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. Large-fruited bladderpod is restricted to different settings (upland barrens, rims, outwashes) in different parts of its distribution, further complicating modeling. As such, large areas of southwestern Wyoming are shown as low probability potential habitat, some of which include occupied habitat, and others that may not be suitable.

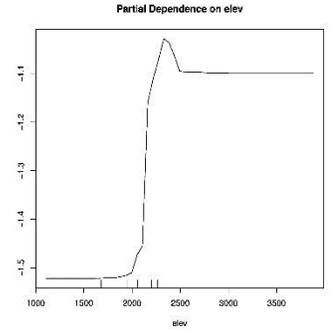
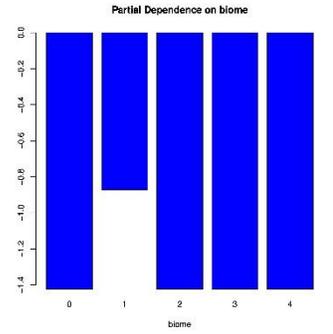
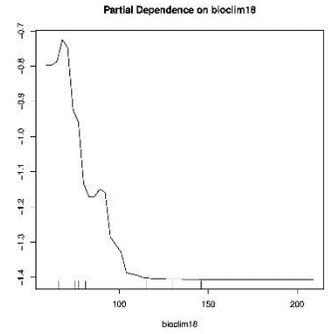
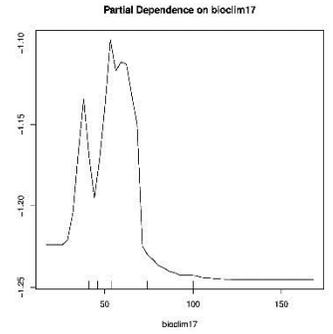
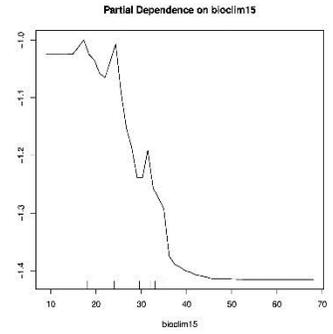
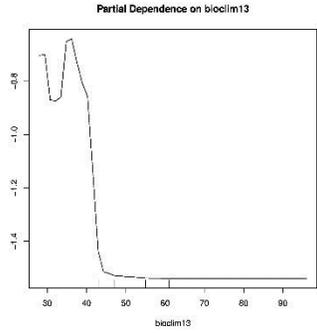
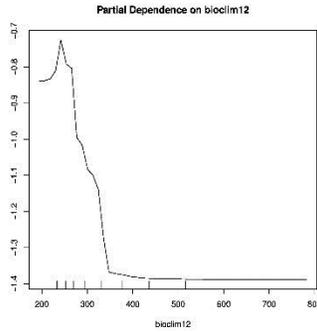
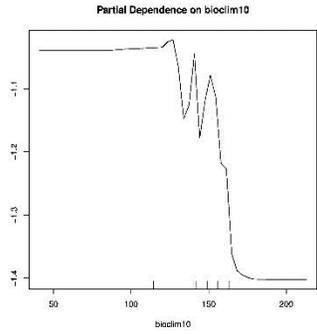
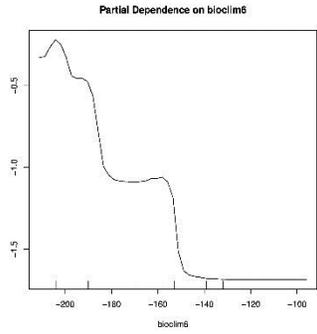
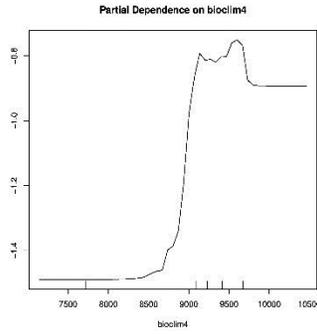
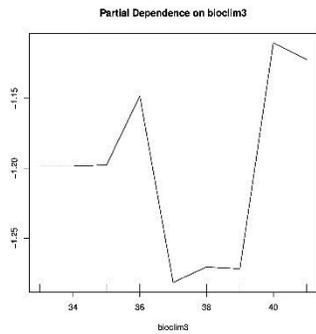
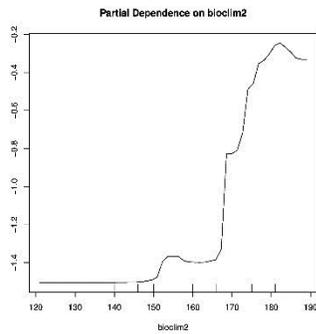
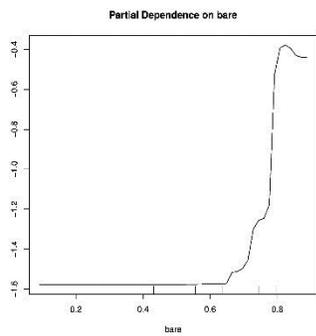
## Predictor Variable Importance:

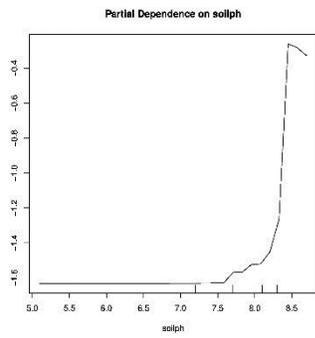
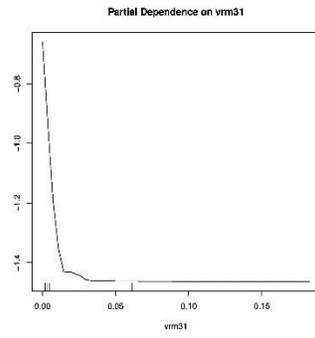
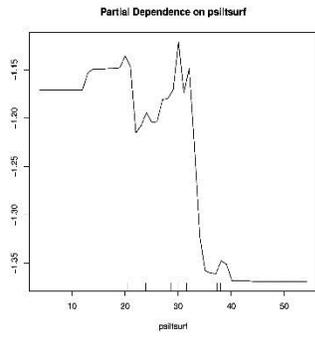
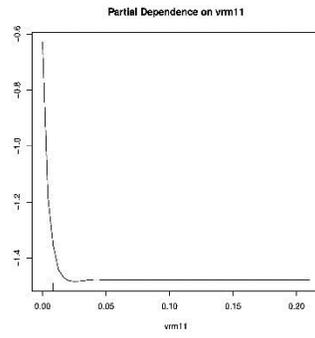
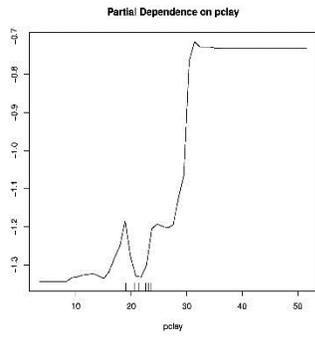
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

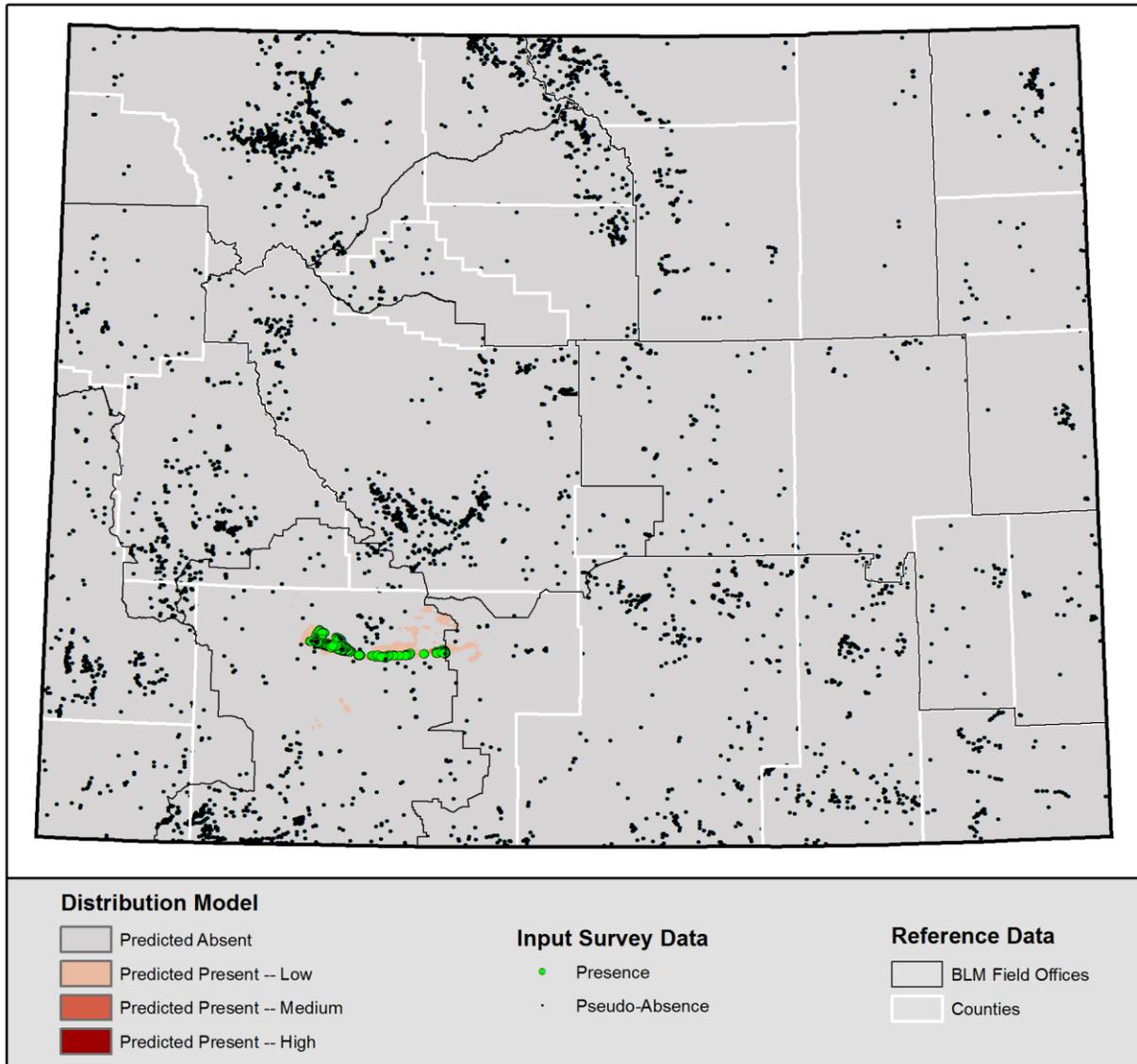
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Long-awned alkali wild-rye (*Elymus simplex* var. *luxurians*)

Model version: 2014-07-26



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.682
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.688	Predicted Absent (0)
0.688	0.996	Low (1)
0.996	1	Medium (2)
1	1	High (3)

## Model Details

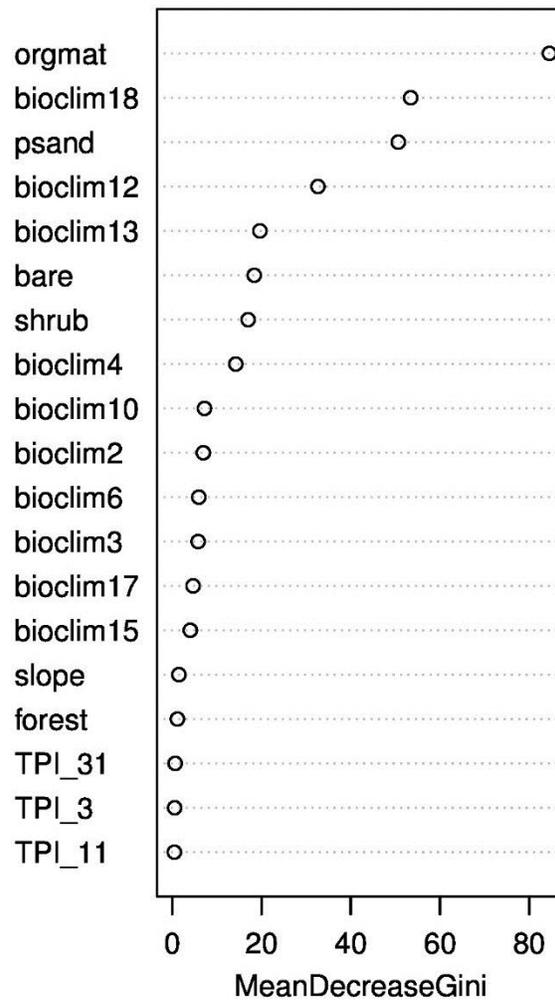
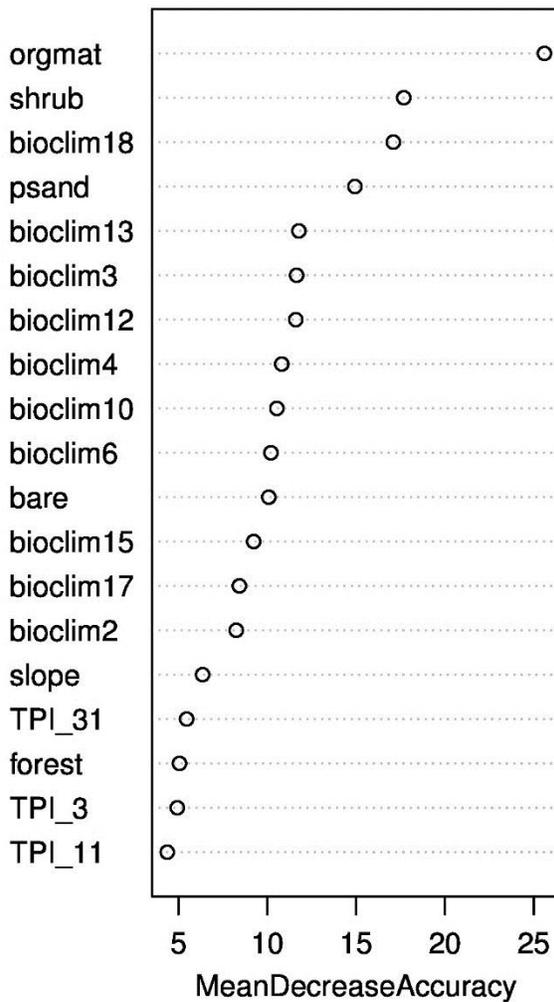
- **Number of Locations:** 220
- **Out-of-Bag Error:** 0.3%
- **TSS:** 99.3%
- **Kappa:** 99.2%
- **Sensitivity:** 99.6%
- **Specificity:** 99.8%

## Model Comments:

Endemic plant species that are restricted to specific soil conditions are often difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. In the case of Long-awned alkali wild-rye, the continuity of the Killpecker dunes and the large body of field-generated presence points supported high model performance.

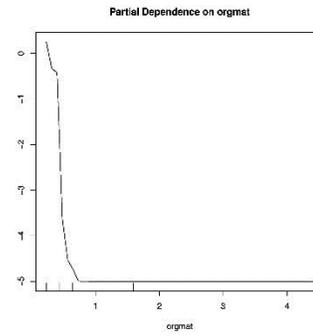
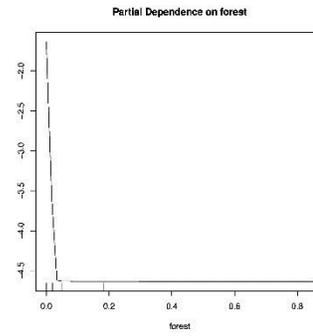
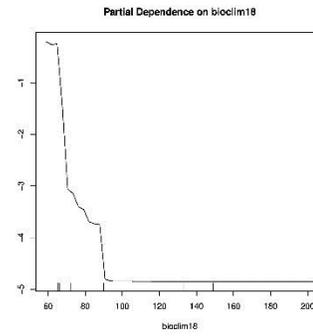
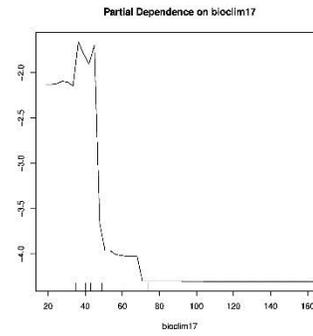
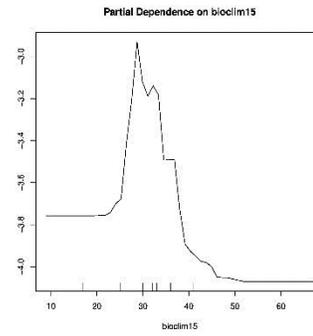
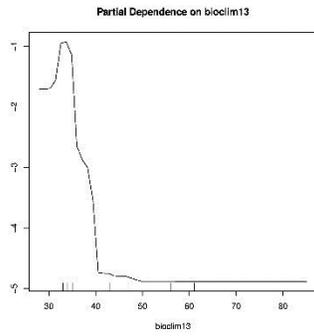
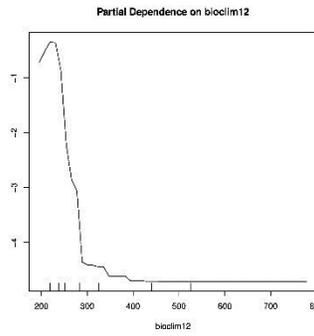
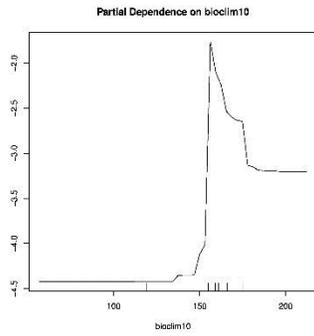
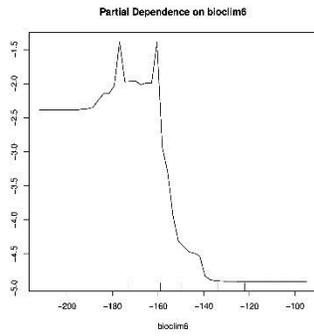
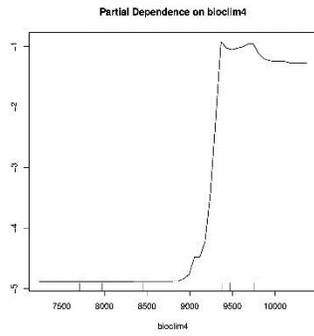
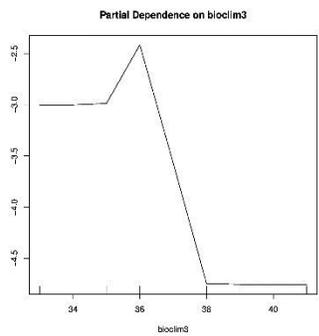
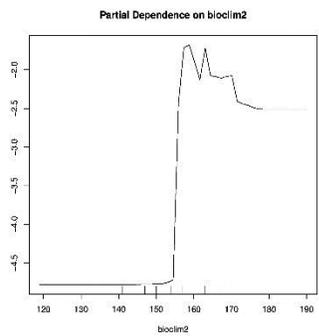
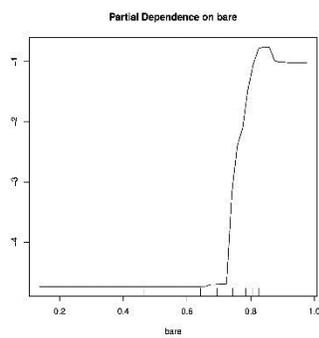
## Predictor Variable Importance:

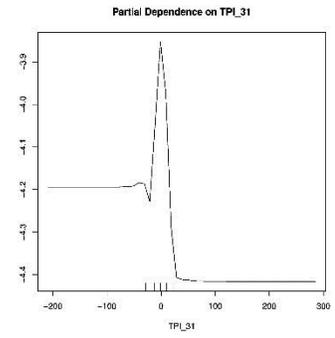
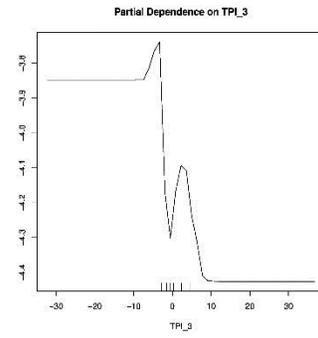
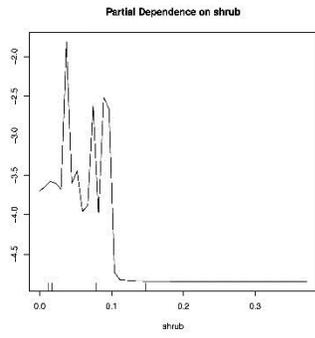
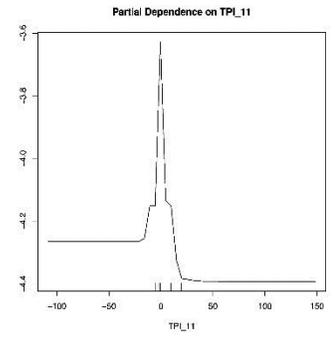
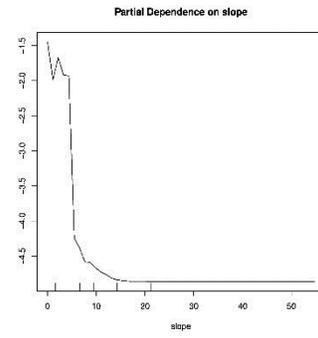
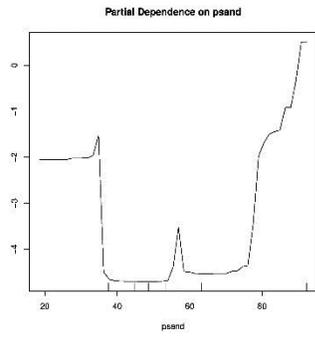
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

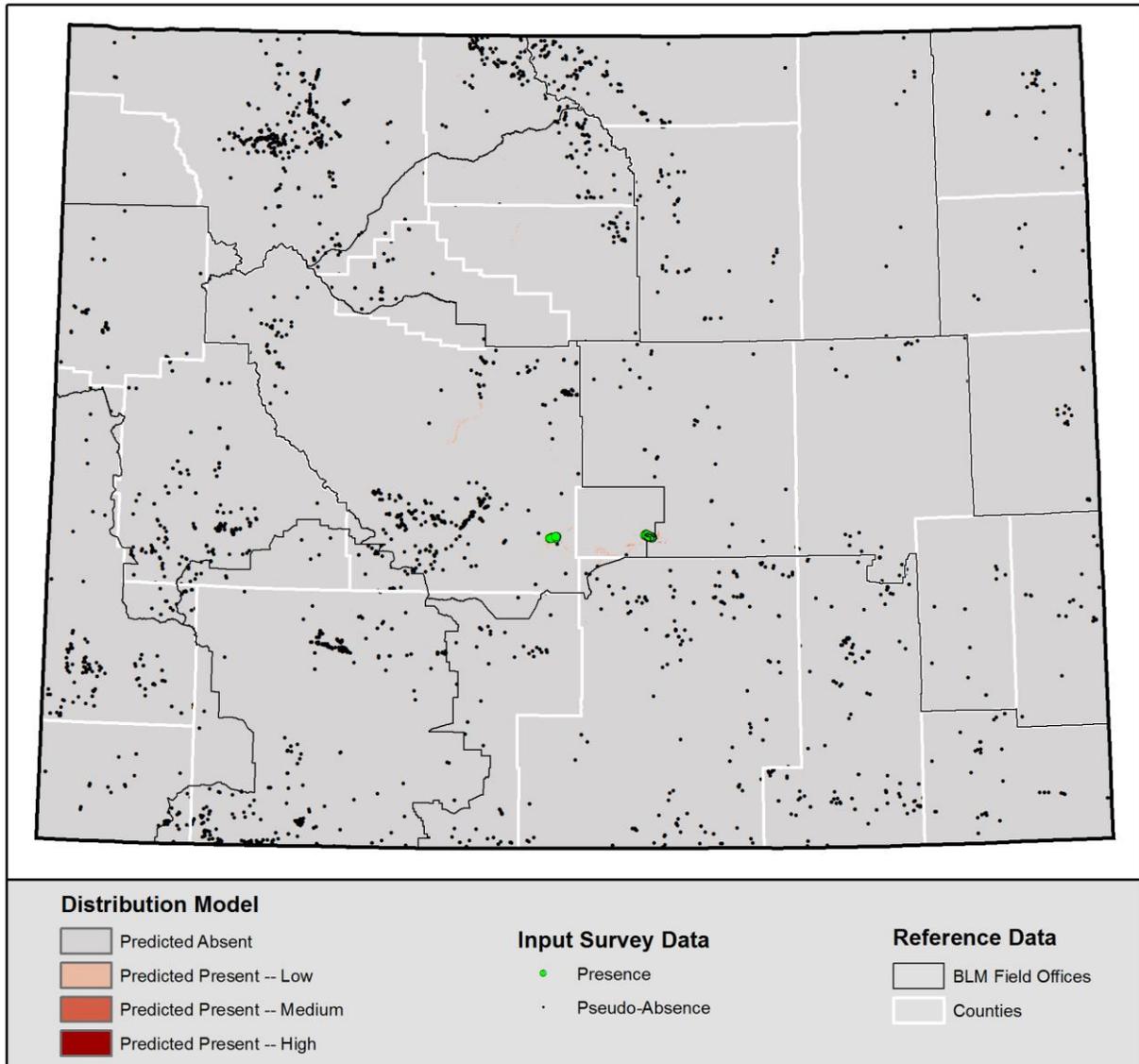
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Many-stemmed spider flower (*Cleome multicaulis*)

Model version: 2015-08-27



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.718
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.720	Predicted Absent (0)
0.720	0.918	Low (1)
0.918	0.992	Medium (2)
0.992	1	High (3)

## Model Details

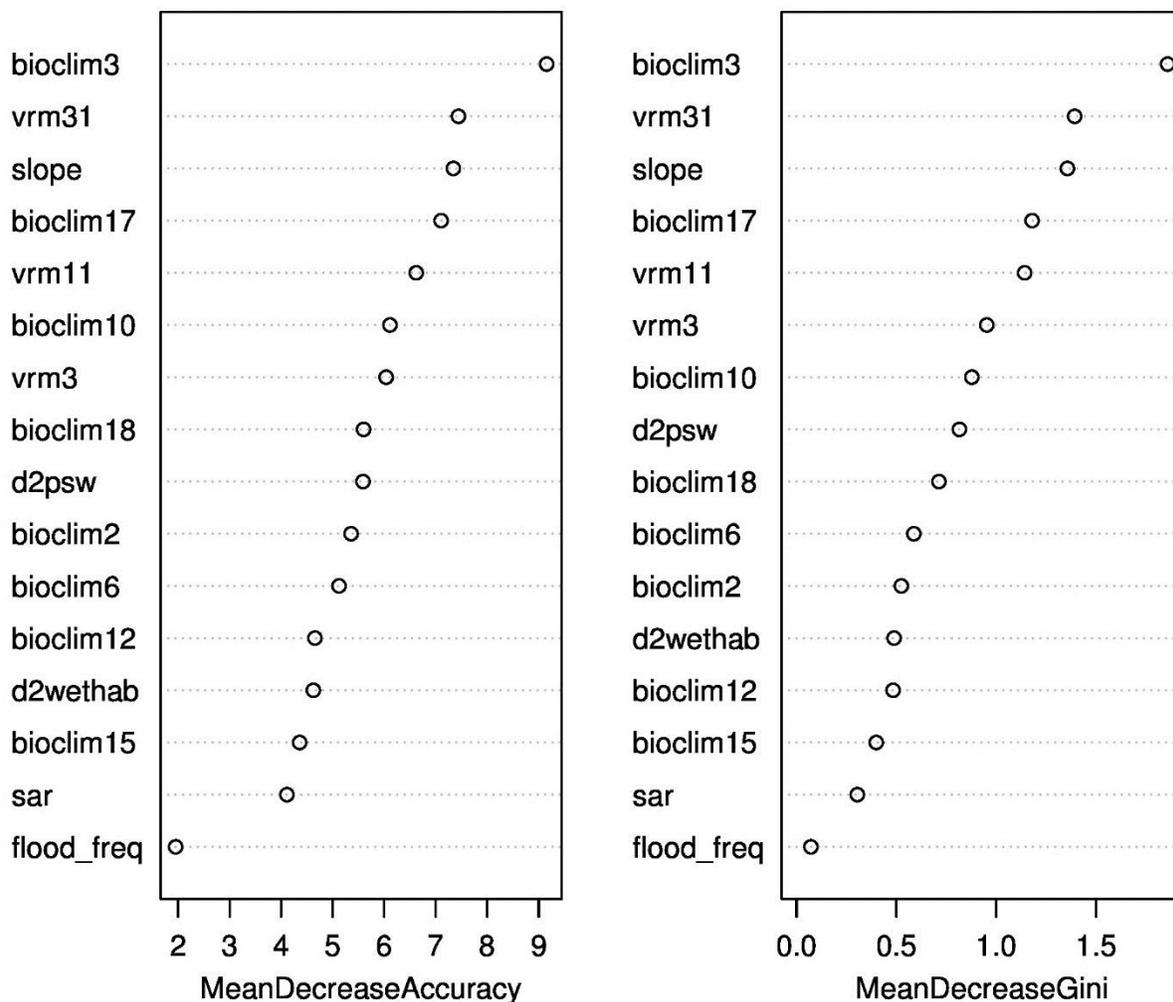
- **Number of Locations:** 9
- **Out-of-Bag Error:** 1.8%
- **TSS:** 97.4%
- **Kappa:** 95.3%
- **Sensitivity:** 99.7%
- **Specificity:** 97.7%

## Model Comments:

Rare wetland plant species that occupy microhabitats and limited ranges of hydrological conditions are difficult to model. A layer was developed that combines layers representing riverine and palustrine settings along a distance gradient. Many-stemmed spider-flower is restricted to playa lakes.

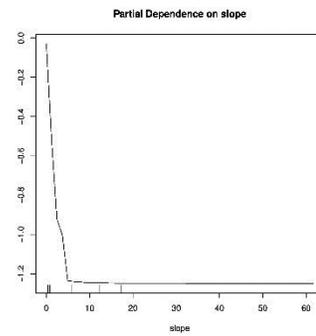
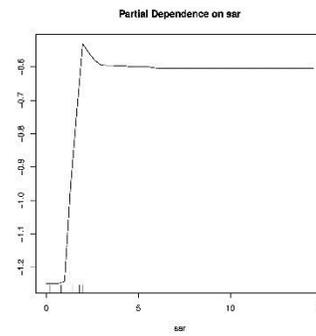
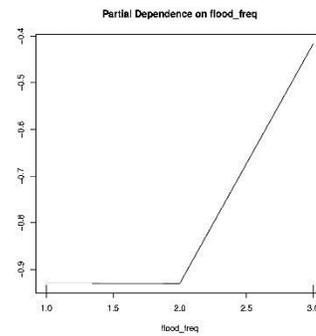
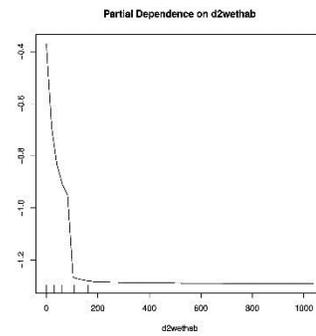
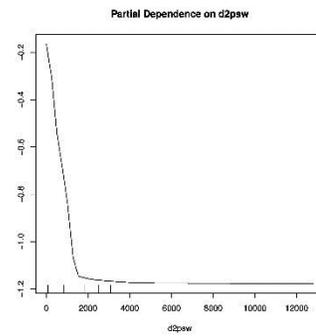
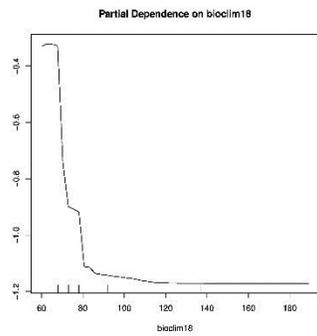
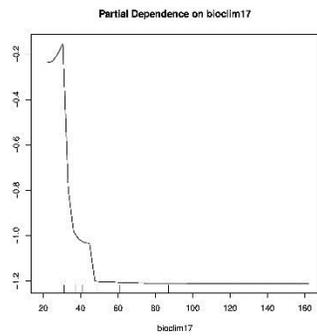
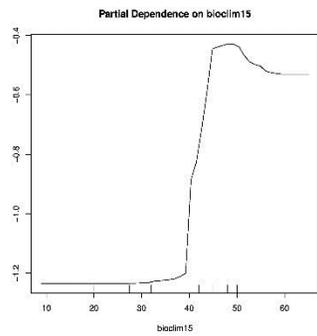
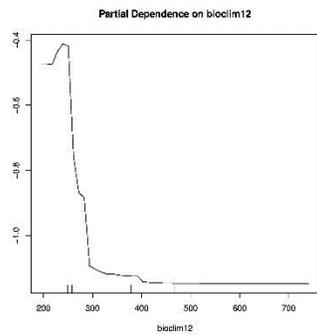
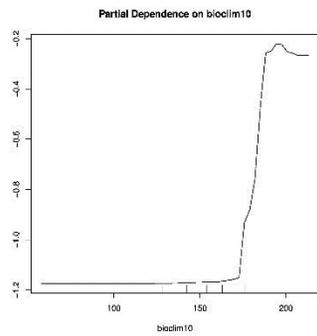
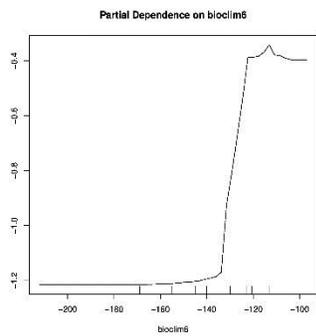
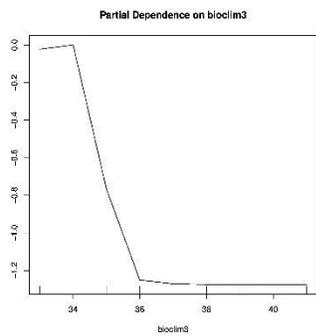
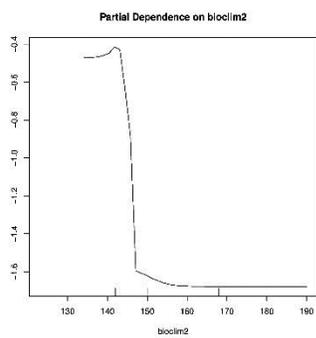
## Predictor Variable Importance:

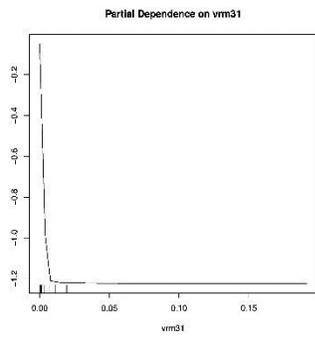
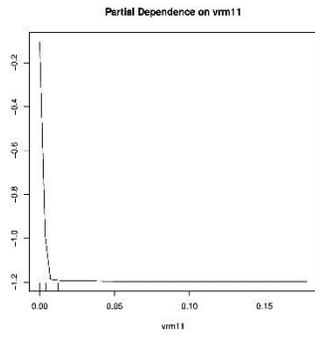
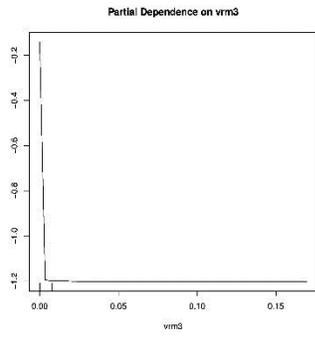
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

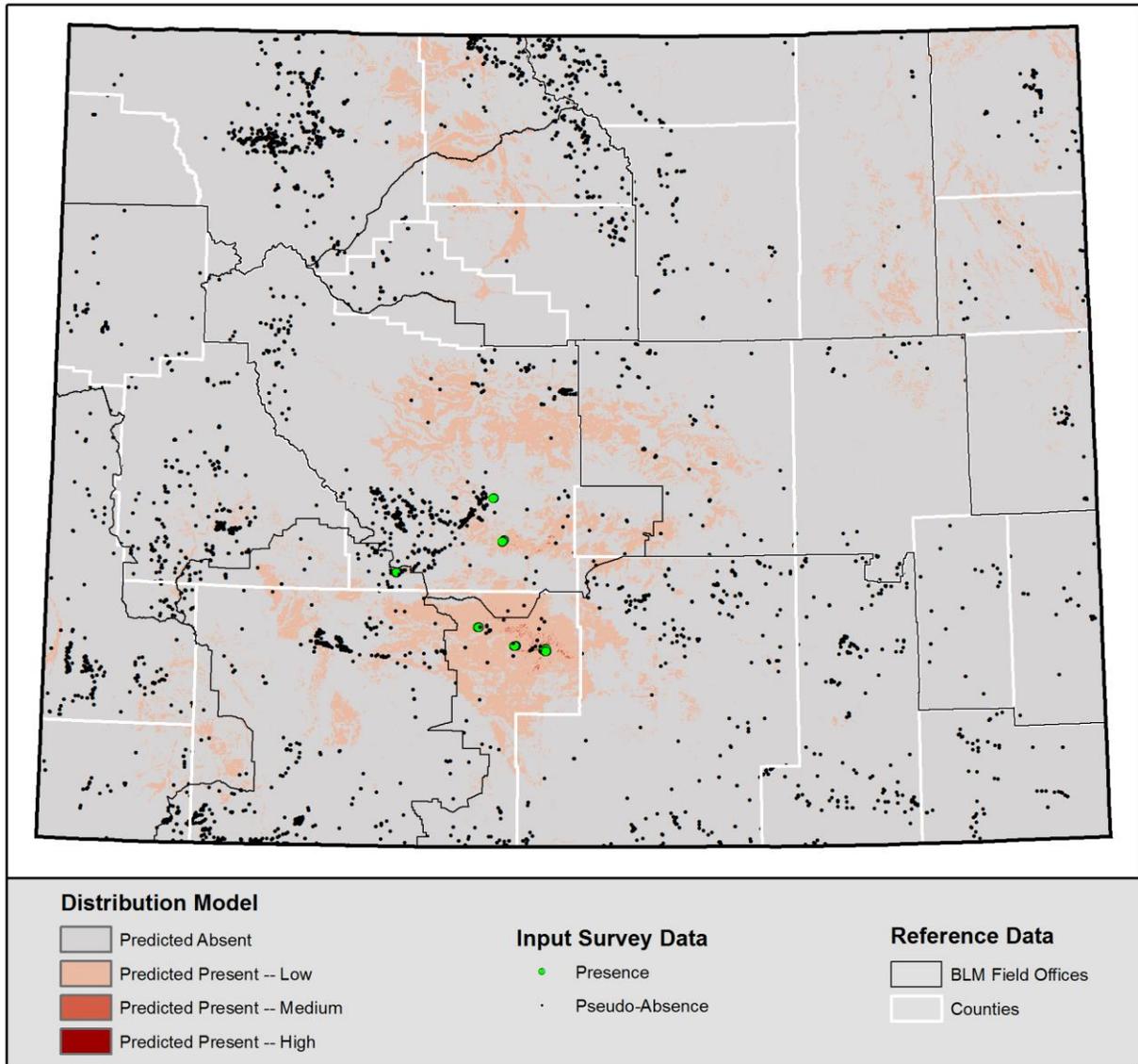
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Meadow milkvetch (*Astragalus diversifolius*)

Model version: 2015-08-27



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.457
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.414	Predicted Absent (0)
0.414	0.890	Low (1)
0.890	0.992	Medium (2)
0.992	1	High (3)

## Model Details

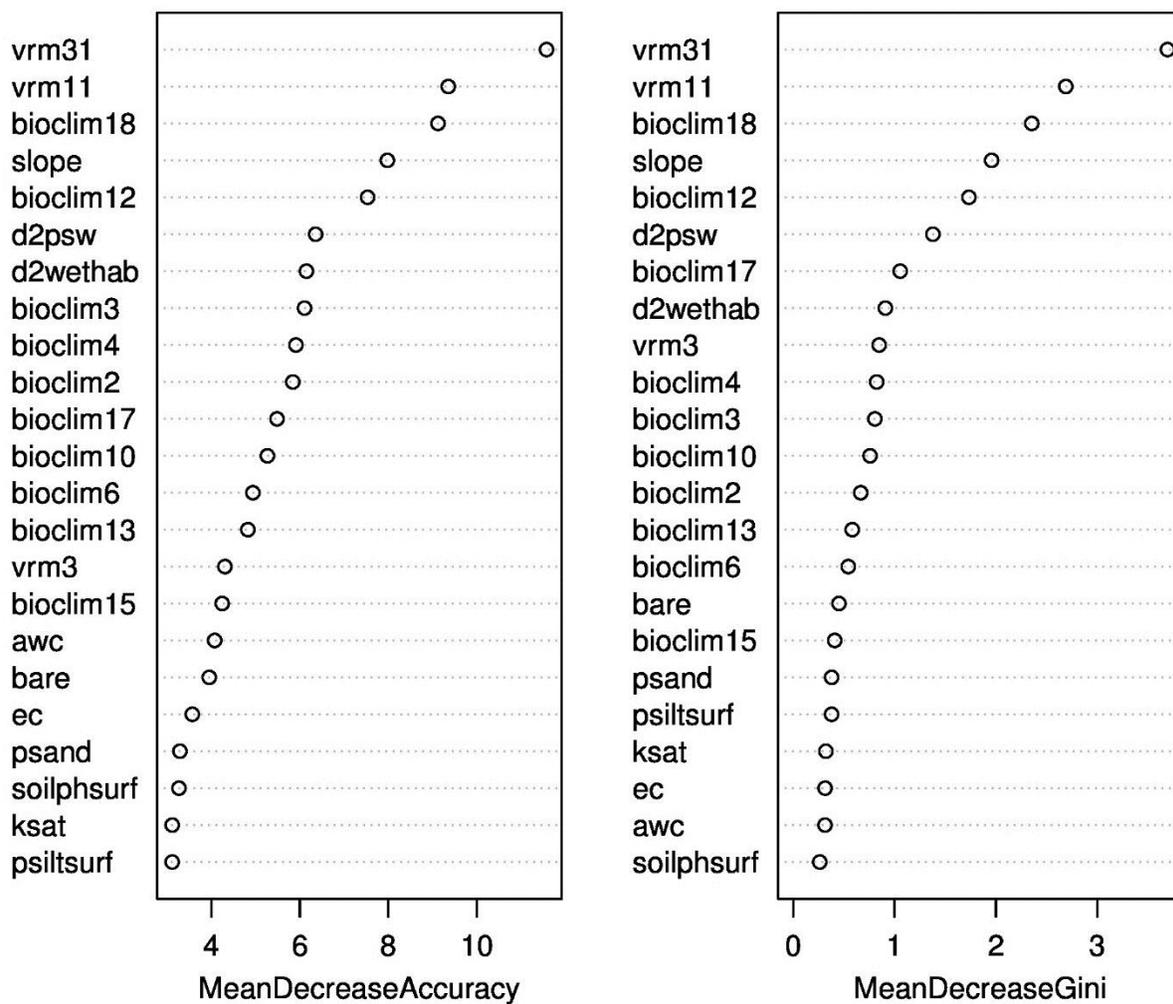
- **Number of Locations:** 16
- **Out-of-Bag Error:** 5.8%
- **TSS:** 83.7%
- **Kappa:** 84.3%
- **Sensitivity:** 87.3%
- **Specificity:** 96.5%

## Model Comments:

Rare wetland plant species that limited ranges of hydrological conditions and different hydrological settings in different parts of distribution are difficult to model. A layer was developed that combines layers representing riverine and palustrine settings along a distance gradient. Meadow milkvetch is restricted to playa lakes of closed basin settings as well as salt-accumulating riparian zones.

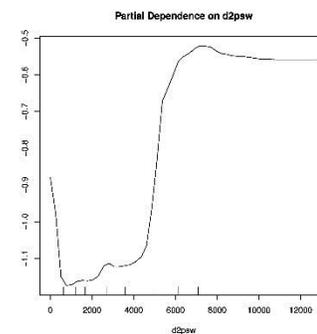
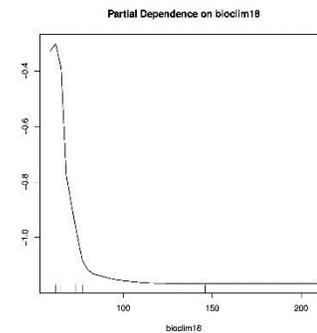
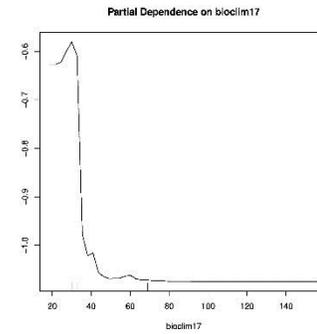
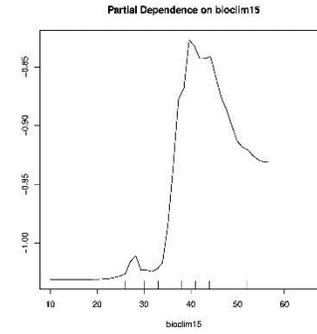
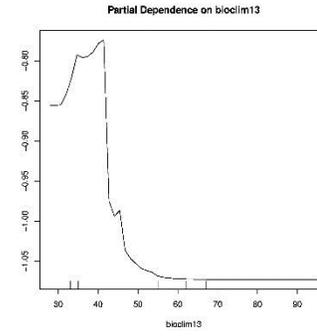
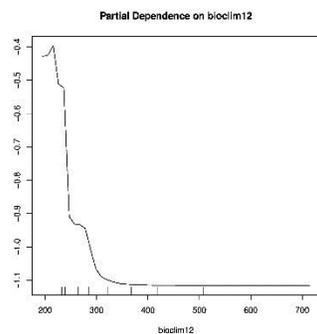
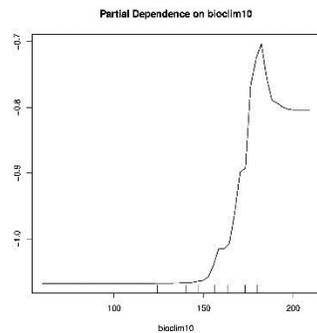
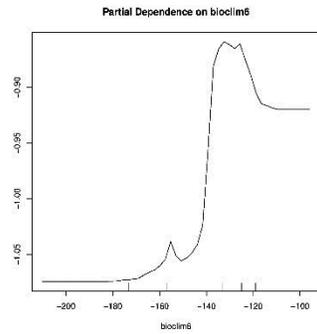
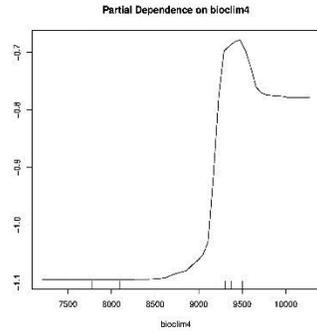
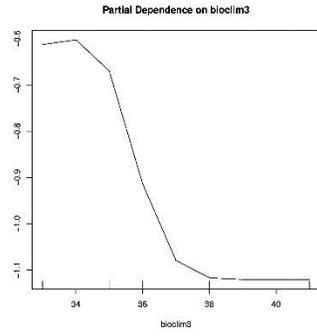
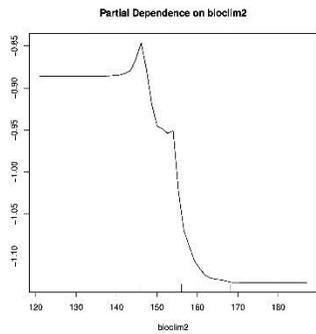
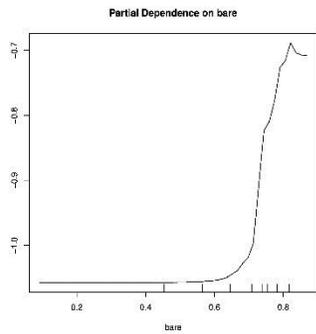
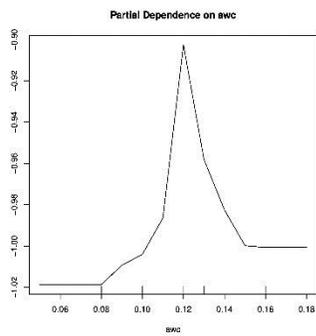
## Predictor Variable Importance:

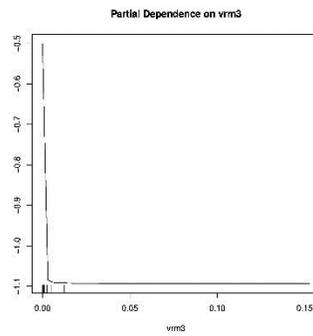
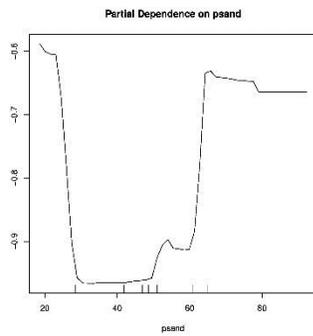
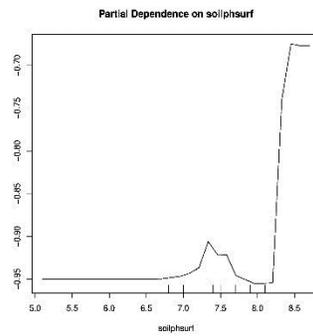
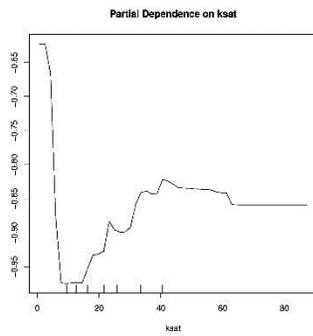
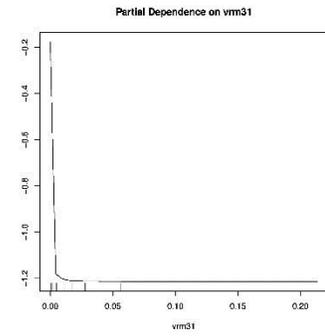
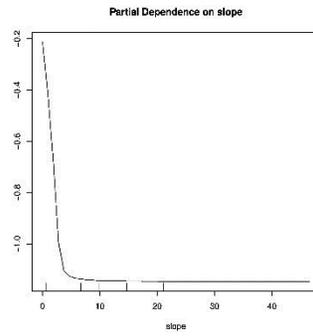
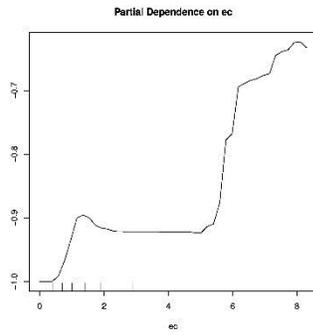
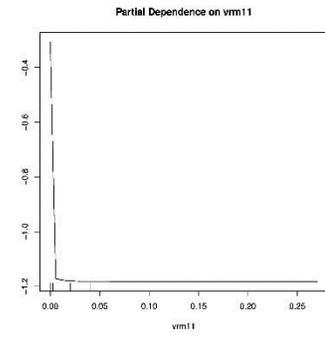
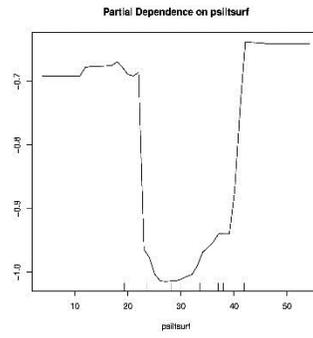
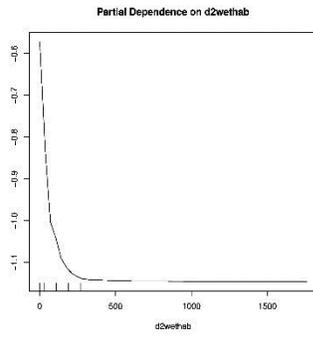
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

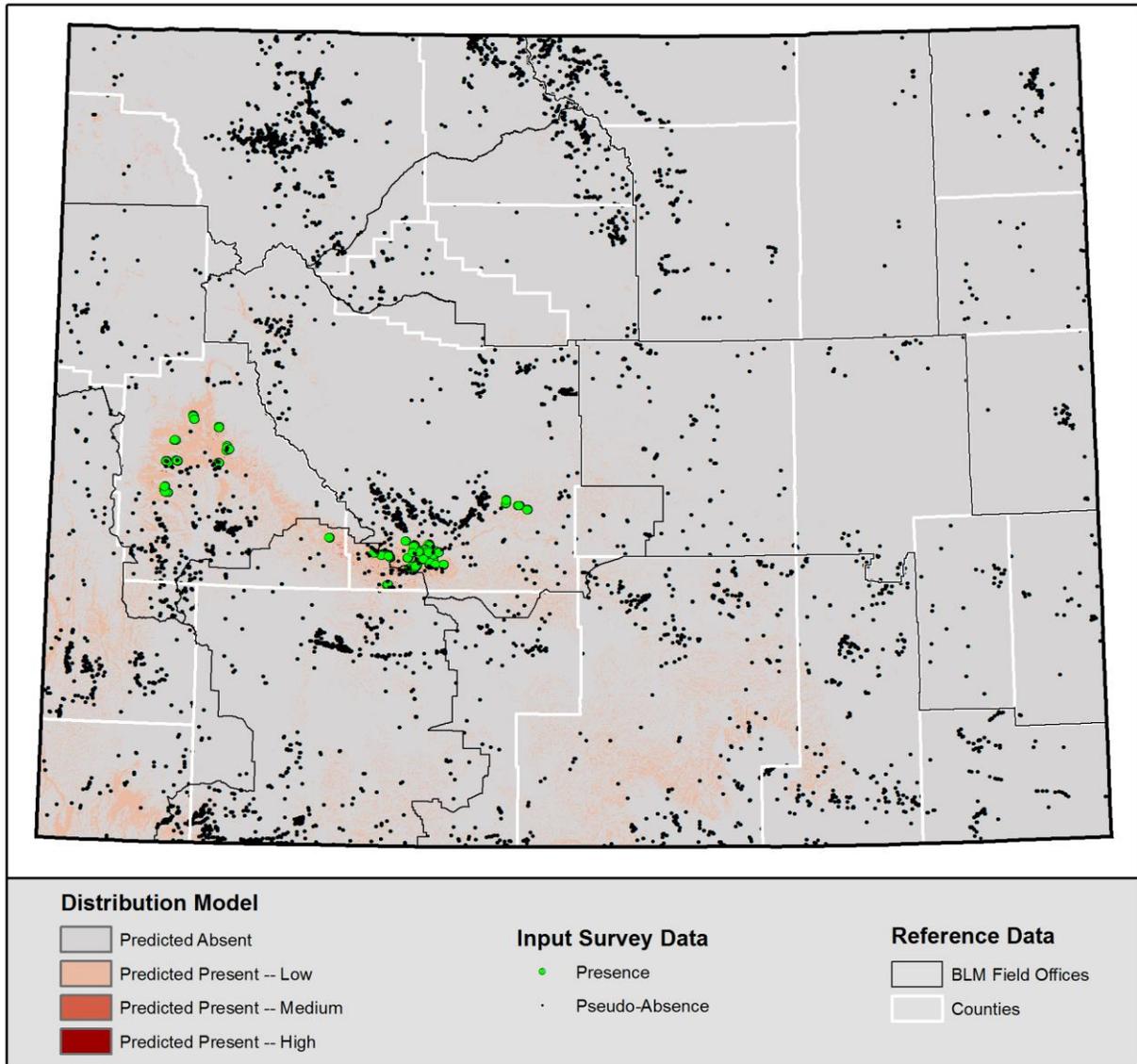
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Meadow pussytoes (*Antennaria arcuata*)

Model version: 2015-08-24



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.476
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.242	Predicted Absent (0)
0.242	0.924	Low (1)
0.924	0.998	Medium (2)
0.998	1	High (3)

## Model Details

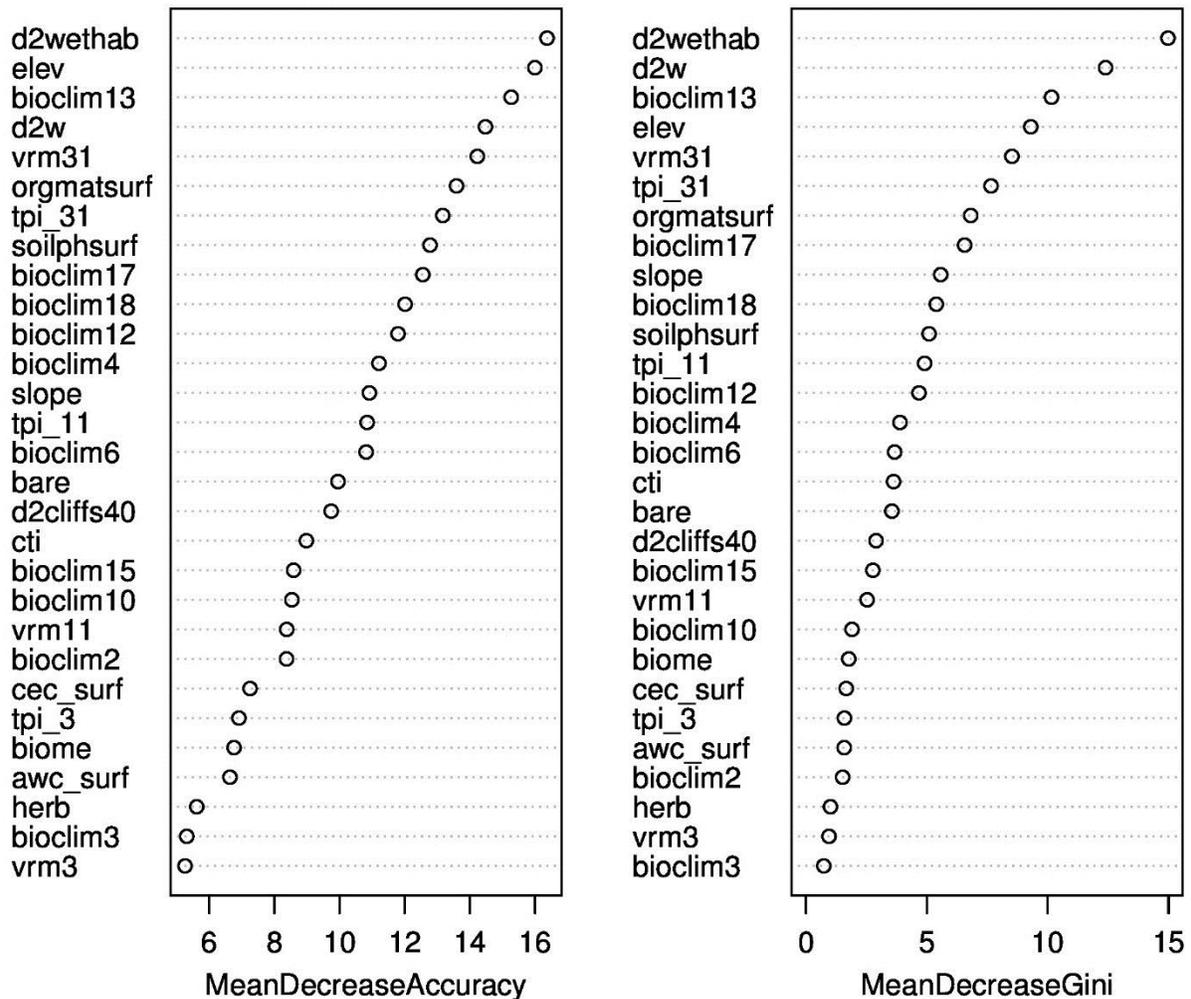
- **Number of Locations:** 92
- **Out-of-Bag Error:** 1.6%
- **TSS:** 95.6%
- **Kappa:** 95.7%
- **Sensitivity:** 96.6%
- **Specificity:** 99.0%

## Model Comments:

Rare wetland plant species that occupy microhabitat are difficult to model. A layer was developed that combines layers representing riverine and palustrine settings along a distance gradient. Meadow pussytoes distribution may also reflect relict habitat (organic soil accumulation) in the geological past, beyond the scope of modeling. As a result, large areas of Green River and Sweetwater river uplands were mapped as low probability potential habitat, as were all major drainages in the Sweetwater River watershed.

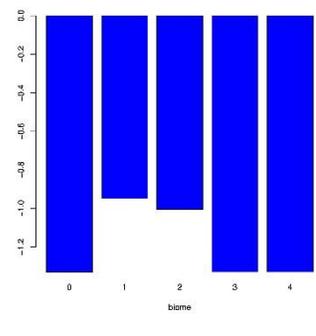
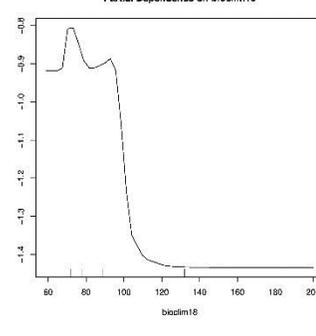
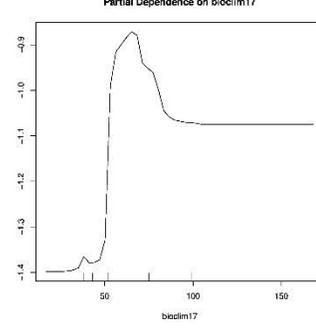
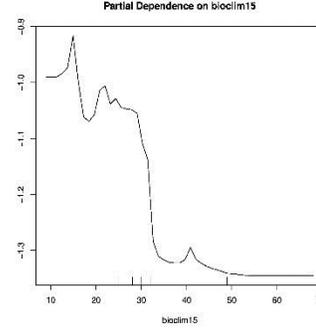
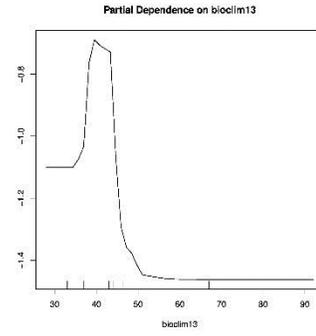
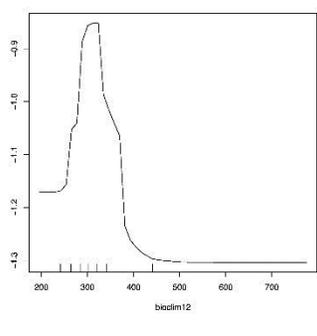
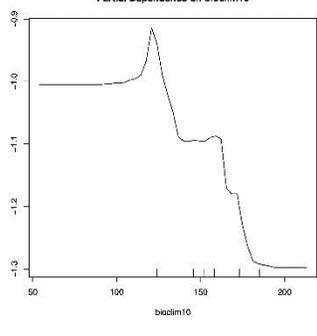
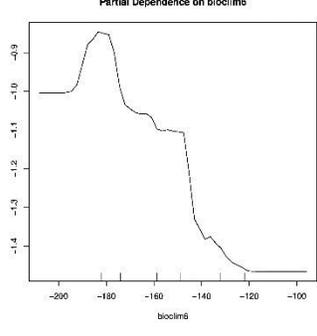
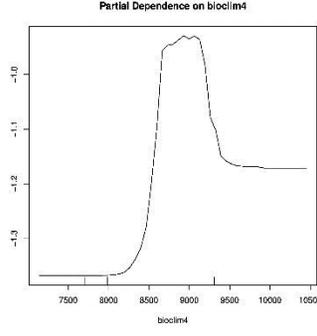
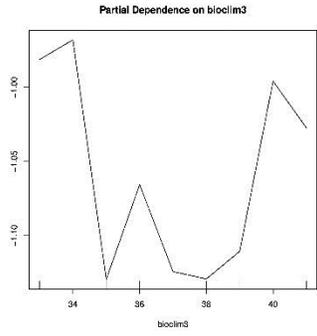
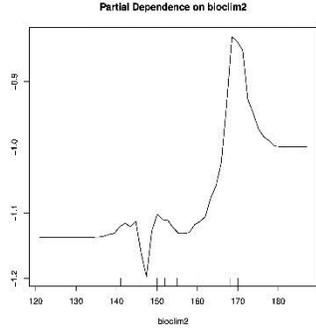
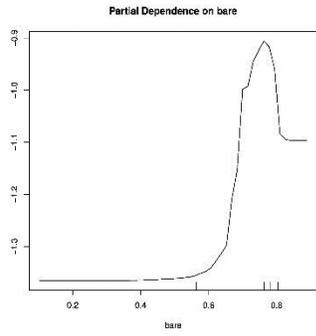
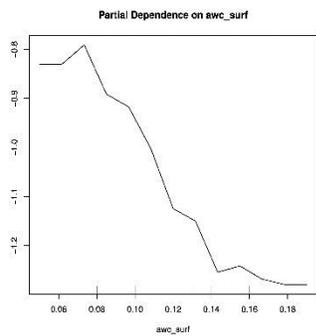
## Predictor Variable Importance:

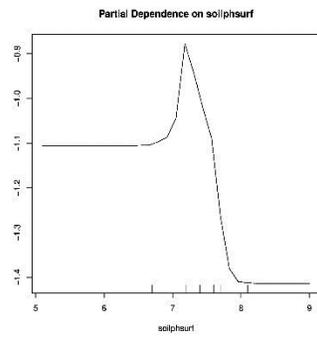
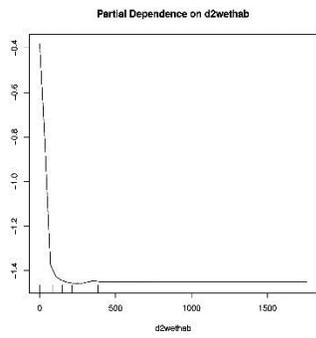
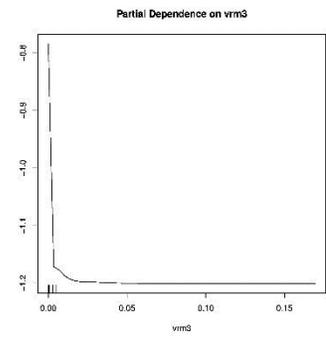
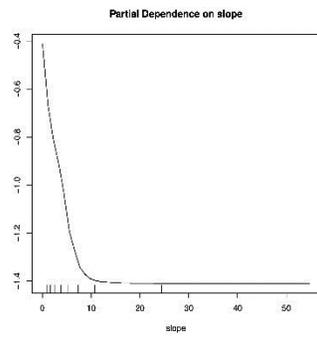
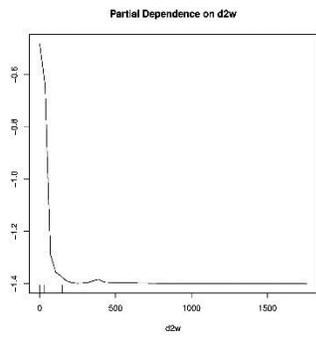
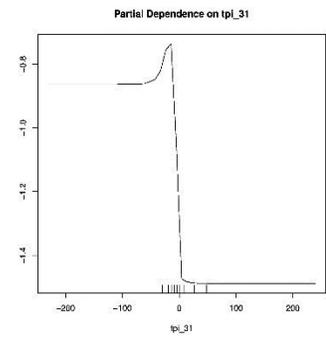
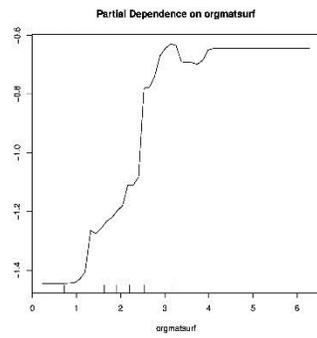
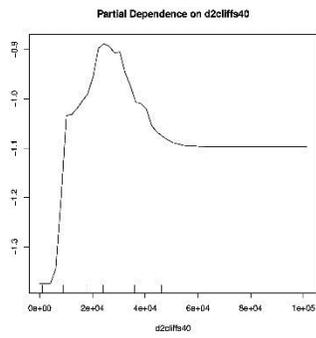
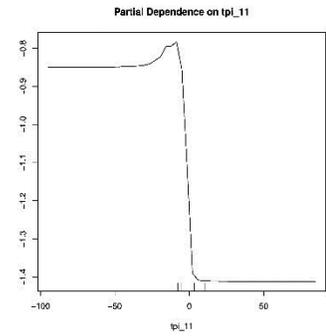
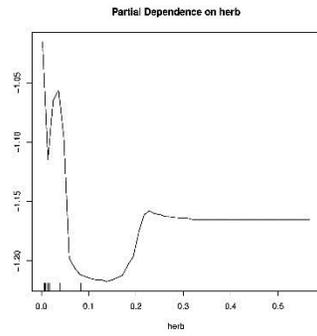
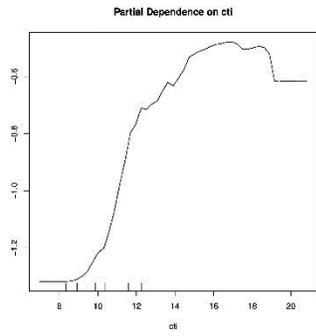
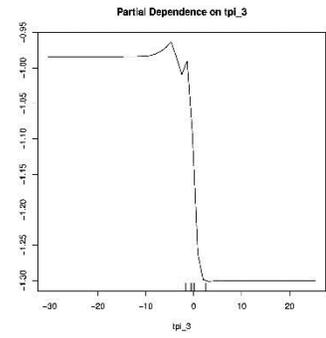
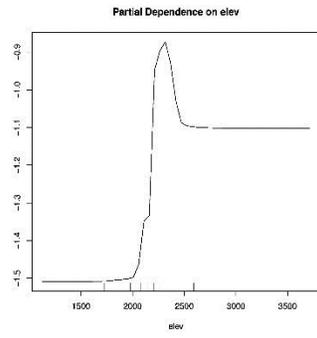
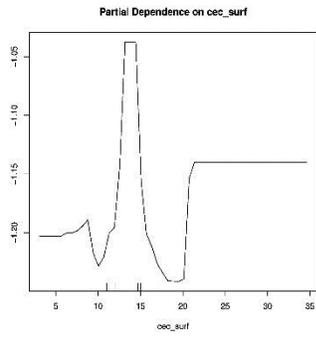
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.

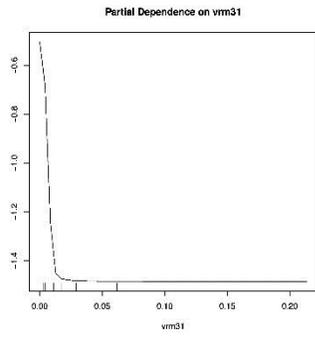
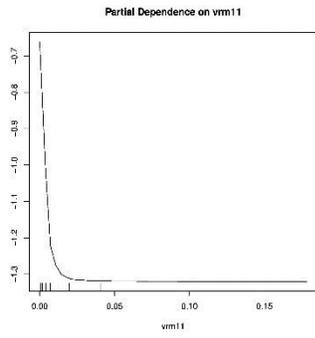


# Partial Plots

Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.

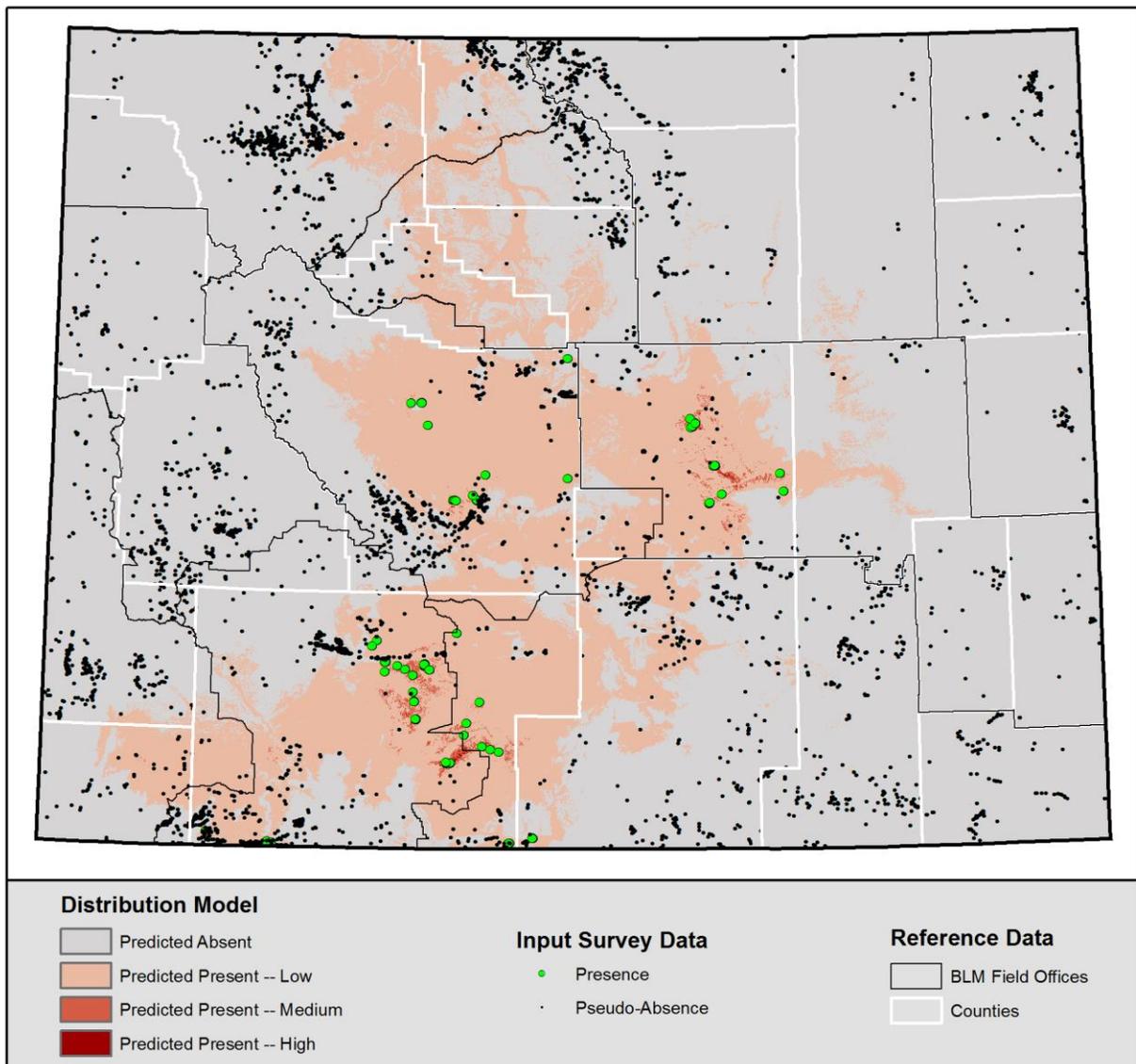






# Nelson's milkvetch (*Astragalus nelsonianus*)

Model version: 2014-07-25



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.512
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.234	Predicted Absent (0)
0.234	0.812	Low (1)
0.812	0.980	Medium (2)
0.980	1	High (3)

## Model Details

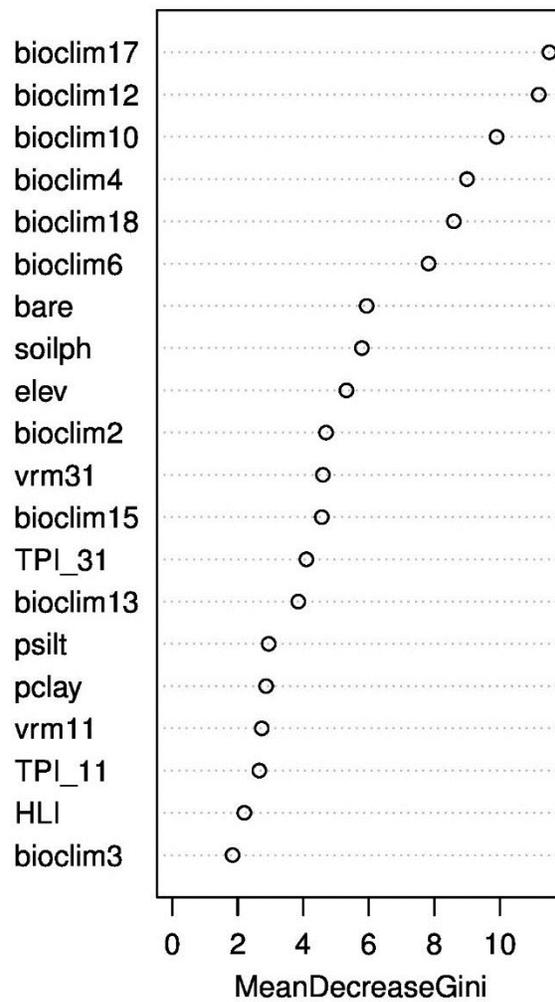
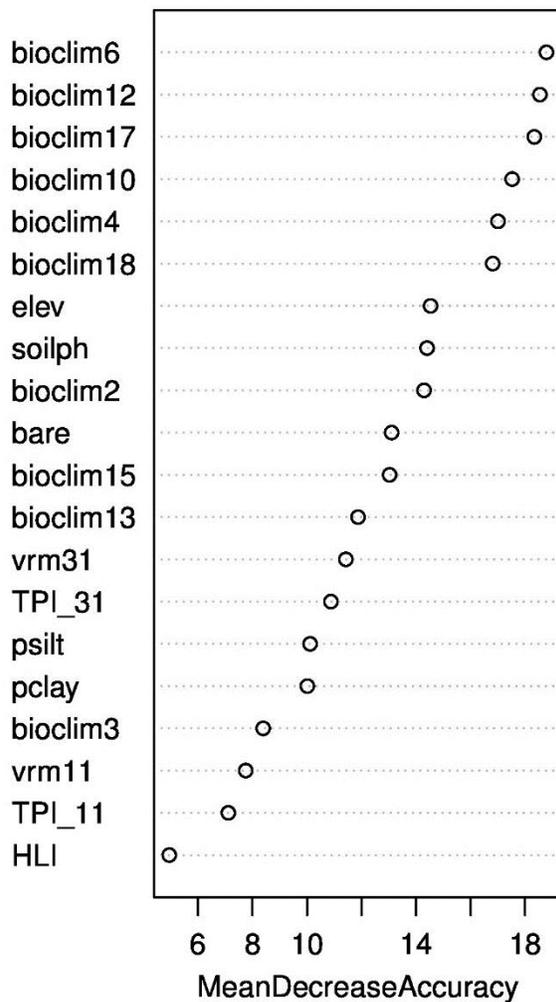
- **Number of Locations:** 75
- **Out-of-Bag Error:** 6.7%
- **TSS:** 79.8%
- **Kappa:** 81.6%
- **Sensitivity:** 83.3%
- **Specificity:** 96.6%

## Model Comments:

Regionally endemic plant species that are restricted to specific soil conditions are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. Nelson's milkvetch is restricted to a combination of substrate and setting characteristics that may relate to trace minerals such as selenium. As a result, large areas of the Wyoming Basins Ecoregion were mapped as low probability potential habitat.

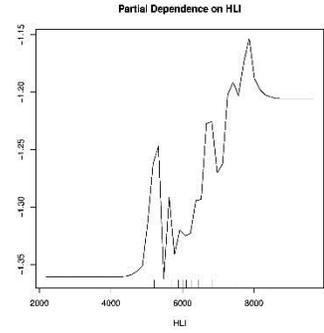
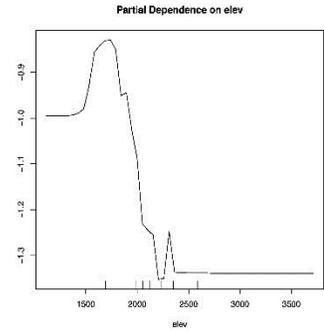
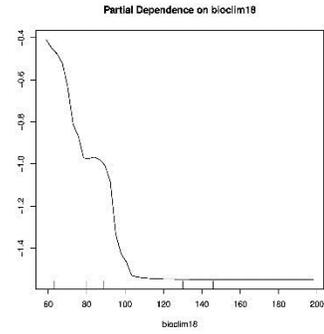
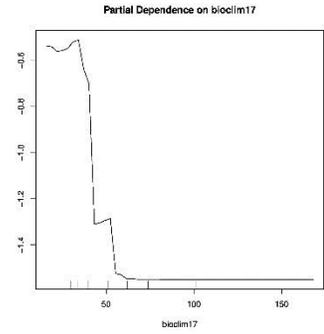
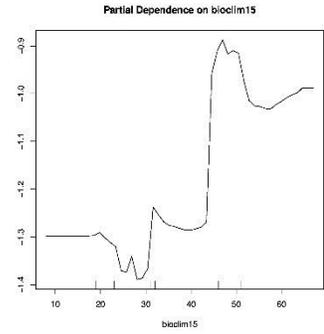
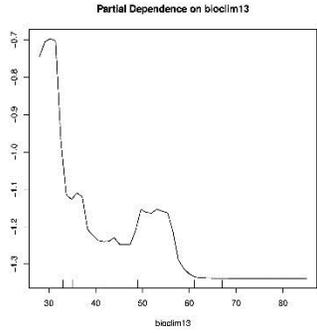
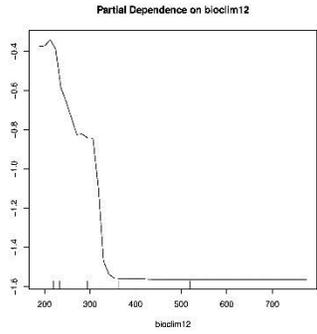
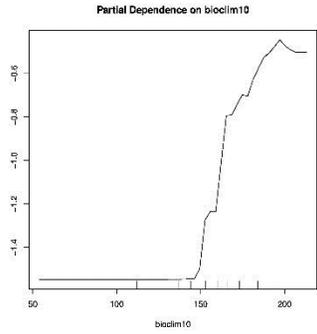
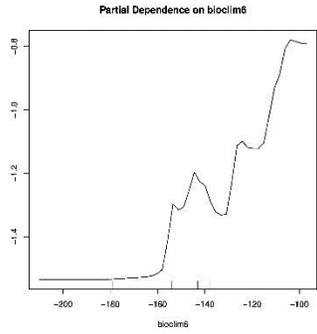
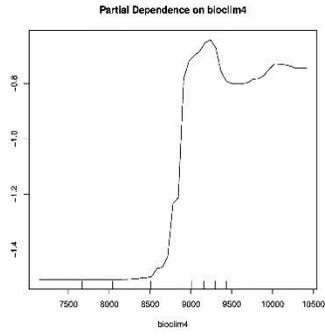
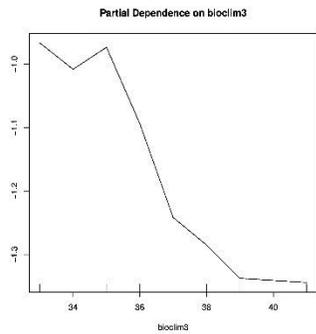
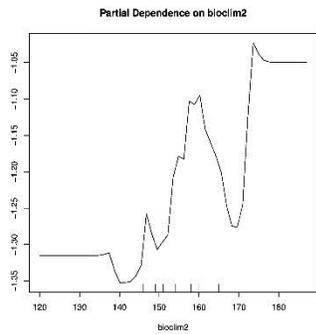
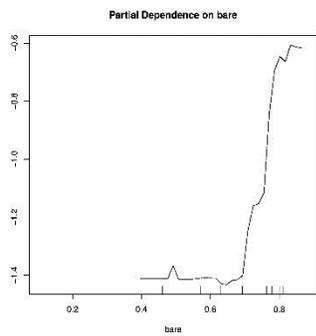
## Predictor Variable Importance:

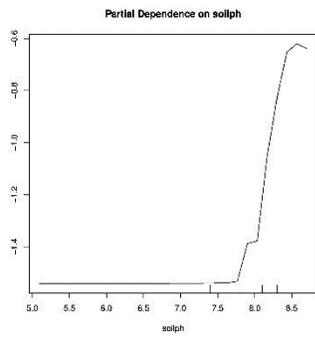
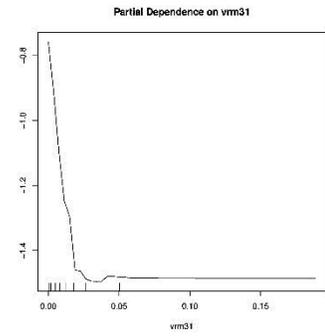
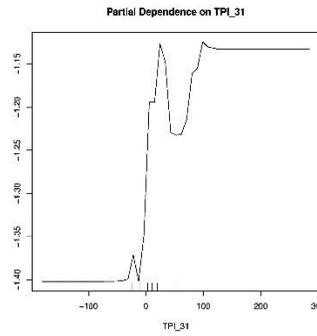
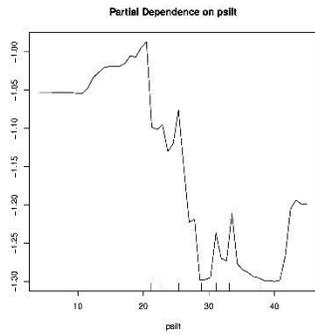
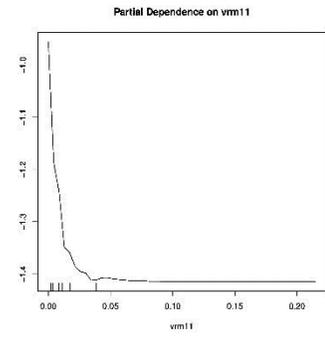
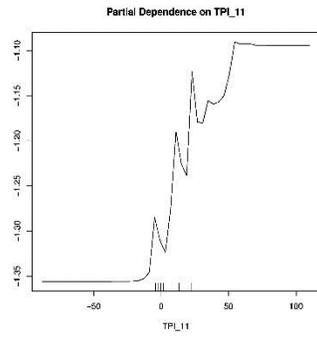
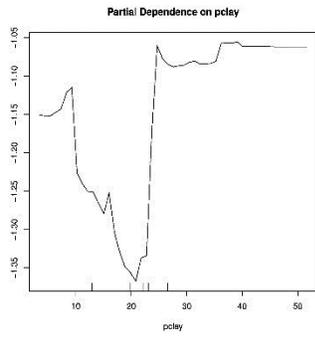
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

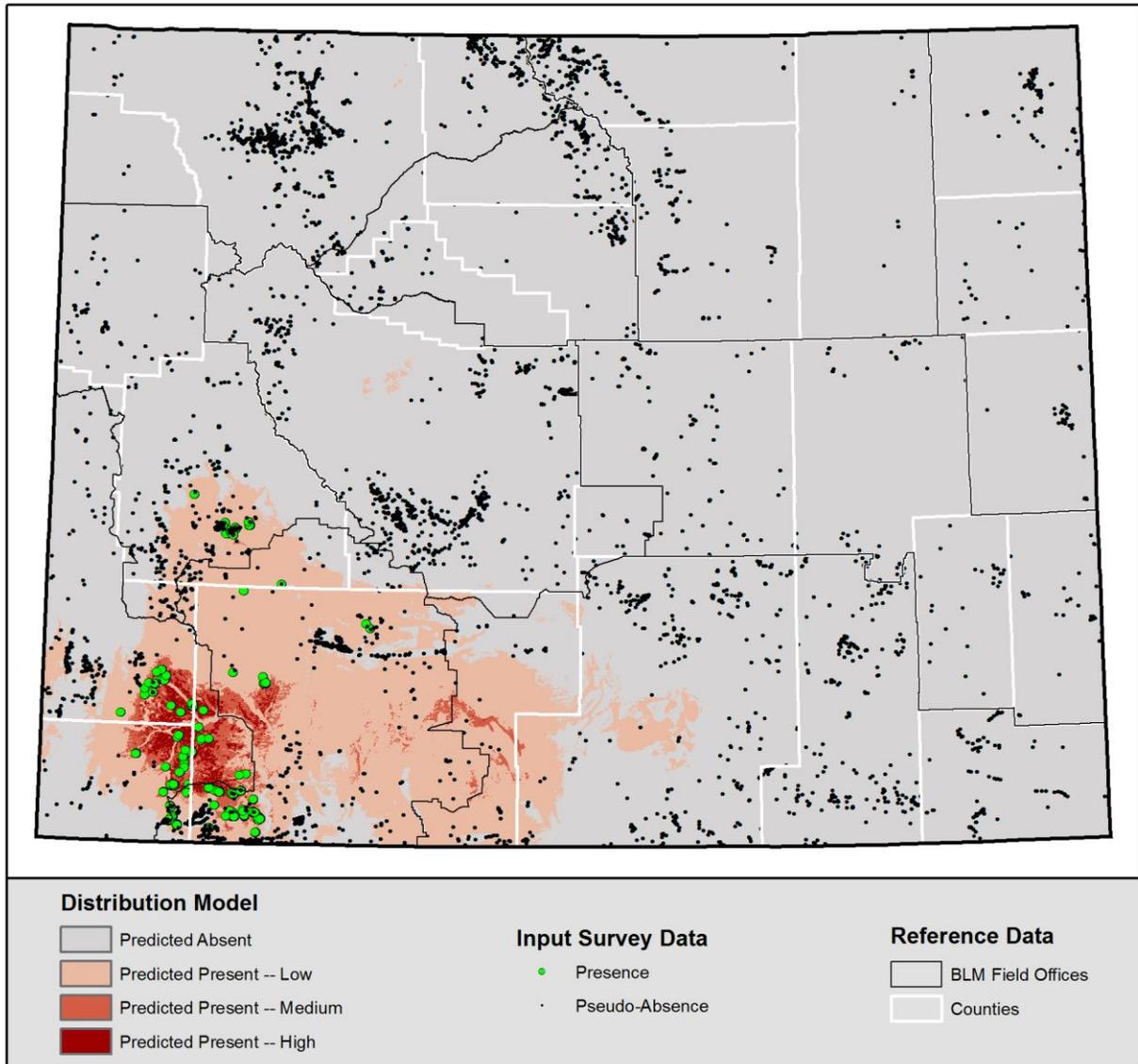
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Opal phlox (*Phlox opalensis*)

Model version: 2014-07-25



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.576
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.214	Predicted Absent (0)
0.214	0.856	Low (1)
0.856	0.988	Medium (2)
0.988	1	High (3)

## Model Details

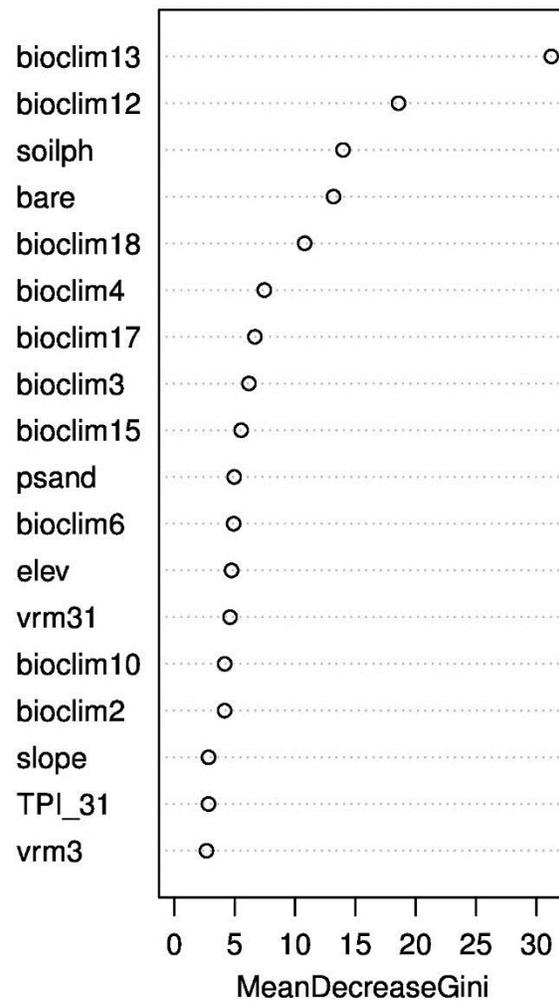
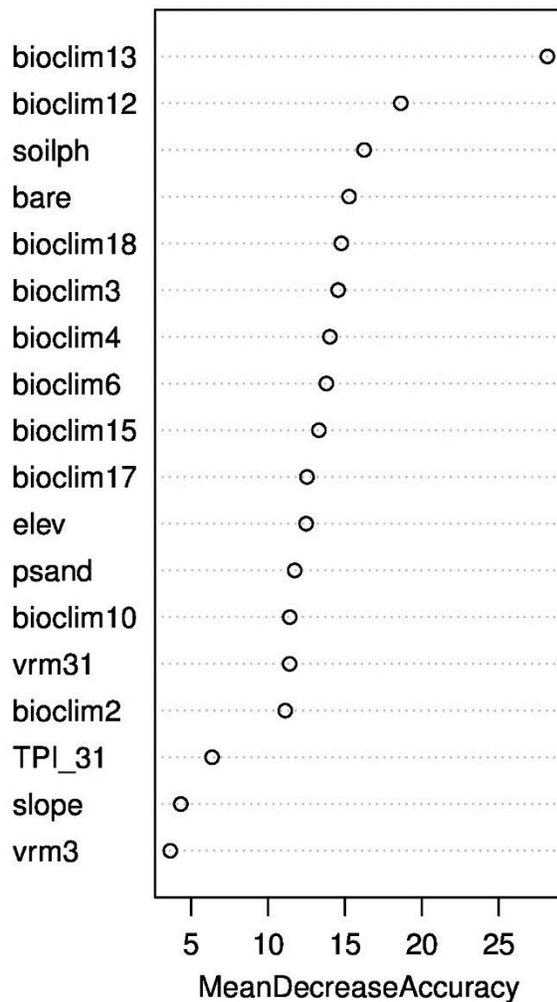
- **Number of Locations:** 100
- **Out-of-Bag Error:** 6.5%
- **TSS:** 82.6%
- **Kappa:** 82.7%
- **Sensitivity:** 86.9%
- **Specificity:** 95.8%

## Model Comments:

Regionally endemic plant species that are restricted to a combination of setting and specific soil conditions are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. As a result, large areas of southwestern Wyoming were mapped as low probability potential habitat.

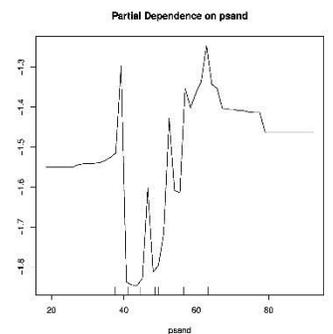
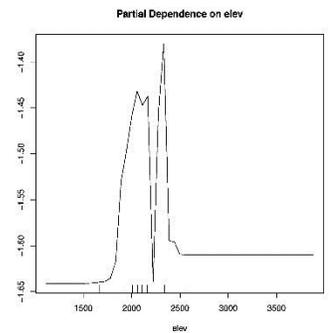
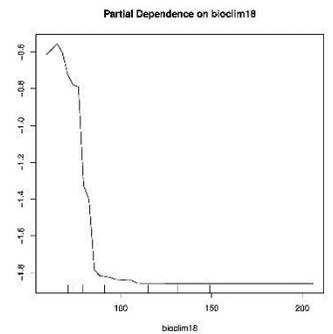
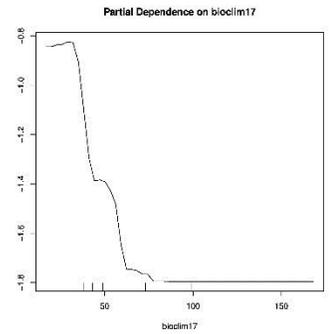
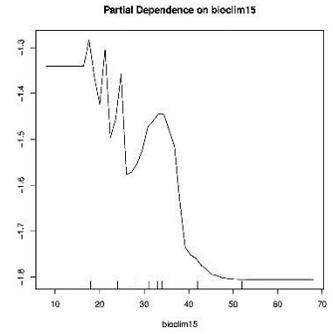
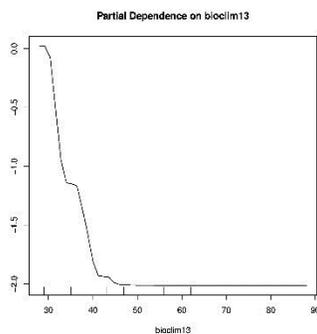
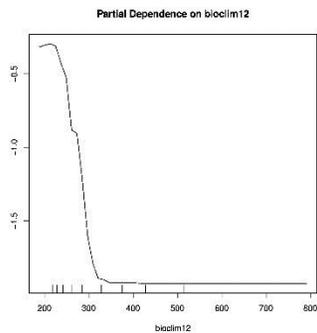
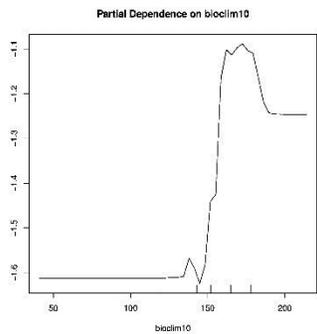
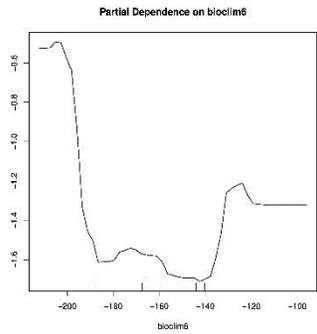
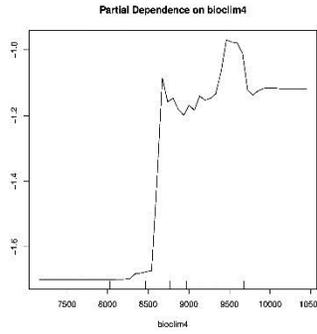
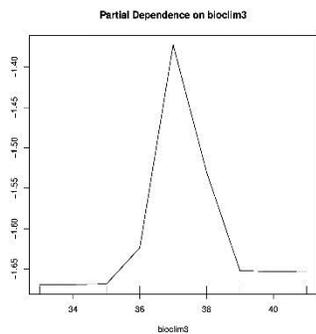
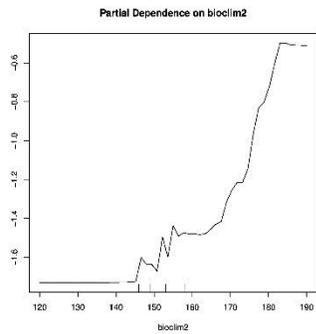
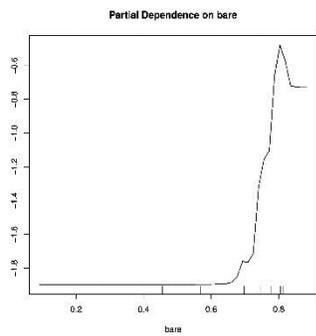
## Predictor Variable Importance:

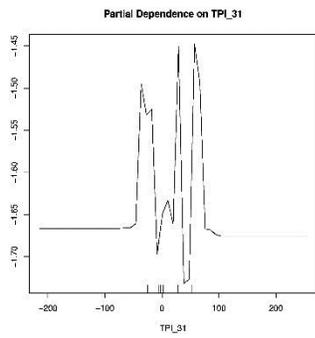
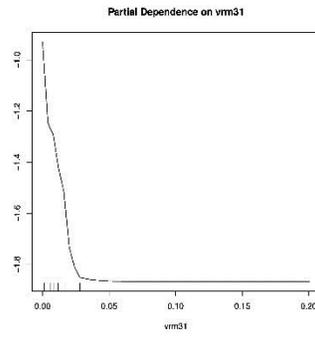
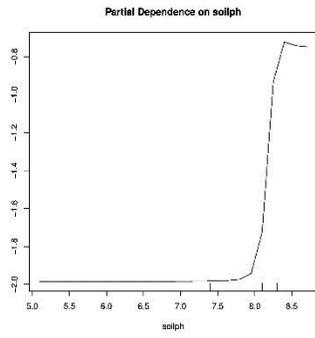
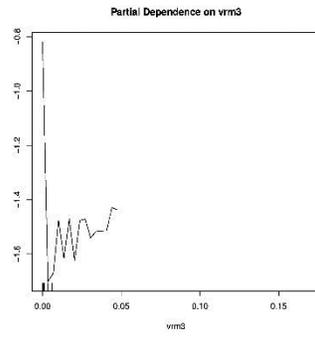
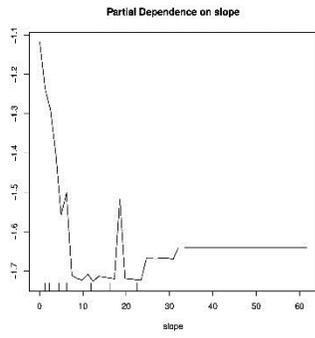
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

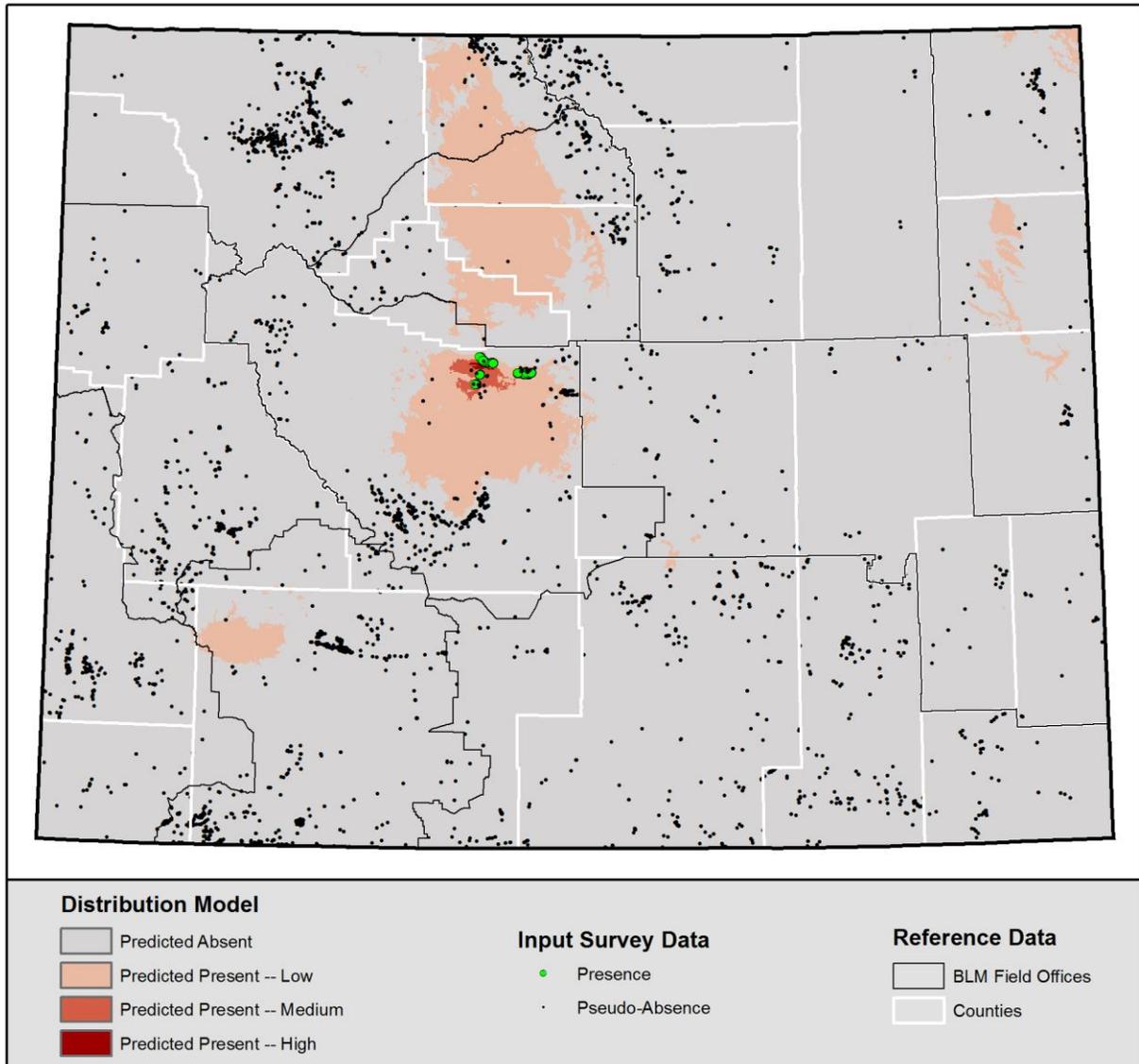
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Owl creek miner's candle (*Cryptantha subcapitata*)

Model version: 2014-07-23



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.286
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.272	Predicted Absent (0)
0.272	0.960	Low (1)
0.960	1	Medium (2)
1	1	High (3)

## Model Details

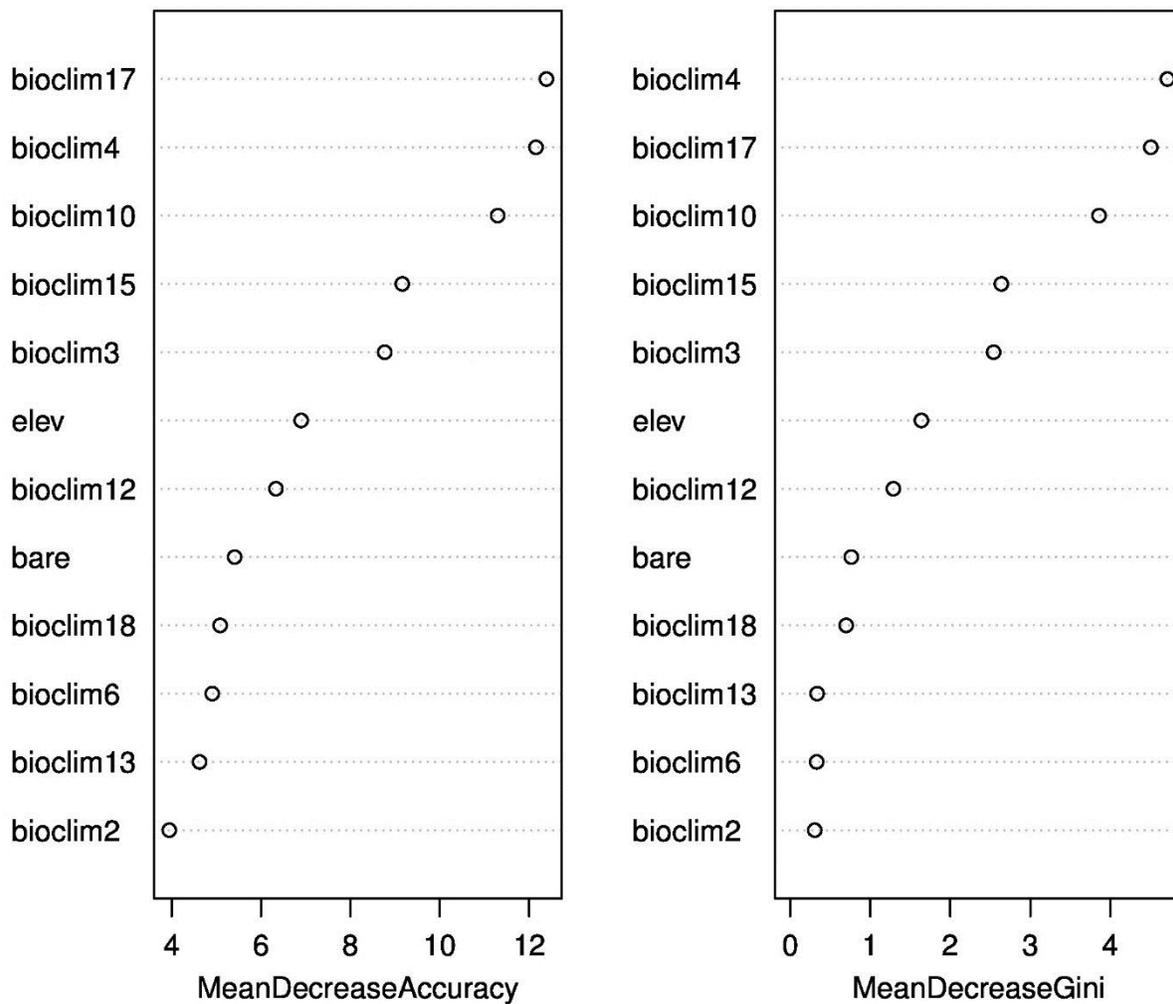
- **Number of Locations:** 16
- **Out-of-Bag Error:** 3.6%
- **TSS:** 90.7%
- **Kappa:** 90.4%
- **Sensitivity:** 93.3%
- **Specificity:** 97.4%

## Model Comments:

Endemic plant species that are restricted to specific soil conditions are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. Owl Creek miner's candle might be limited to the Wind River Formation, but bedrock geology was not included in the environmental layers and this might reduce the extent of low probability potential habitat across the Wind River Basin.

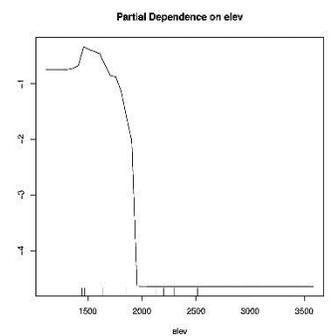
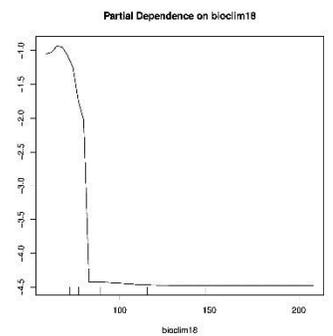
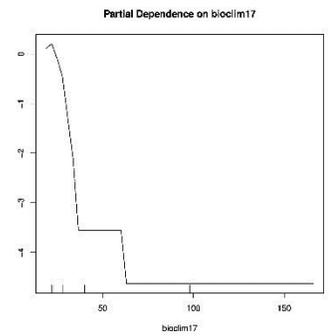
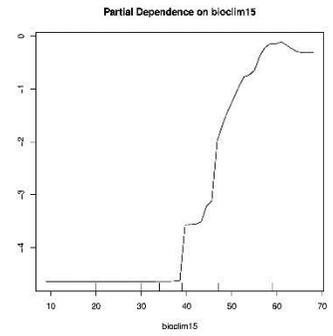
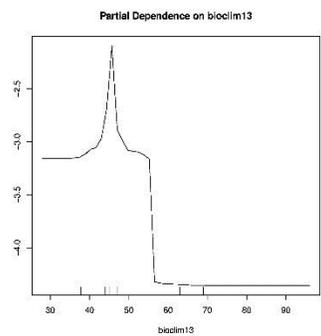
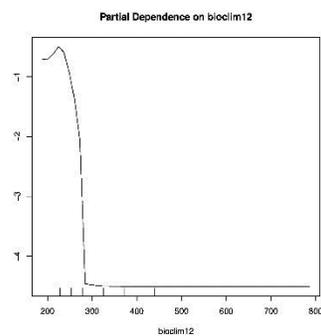
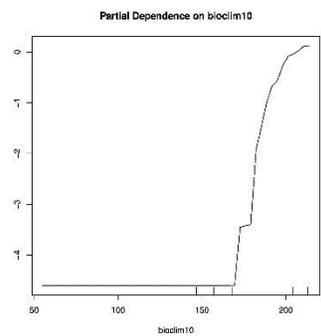
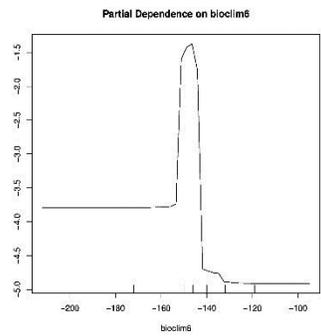
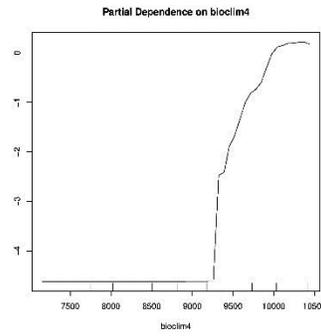
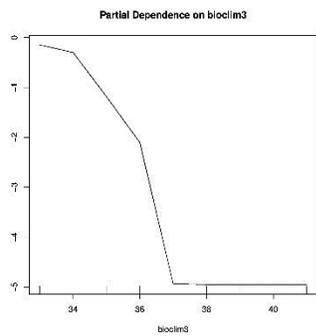
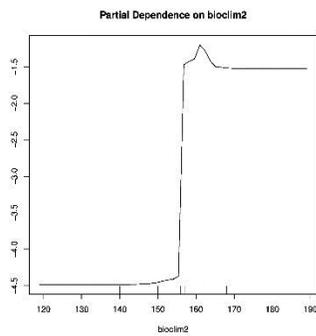
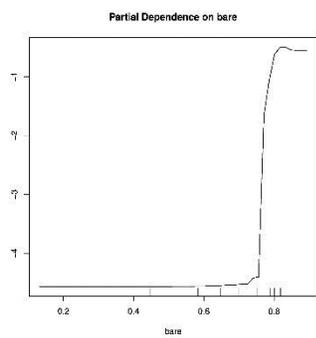
## Predictor Variable Importance:

The graph below indicates the relative importance of predictors in modeling distribution for this species. "MeanDecreaseAccuracy" calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than "MeanDecreaseGini," which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



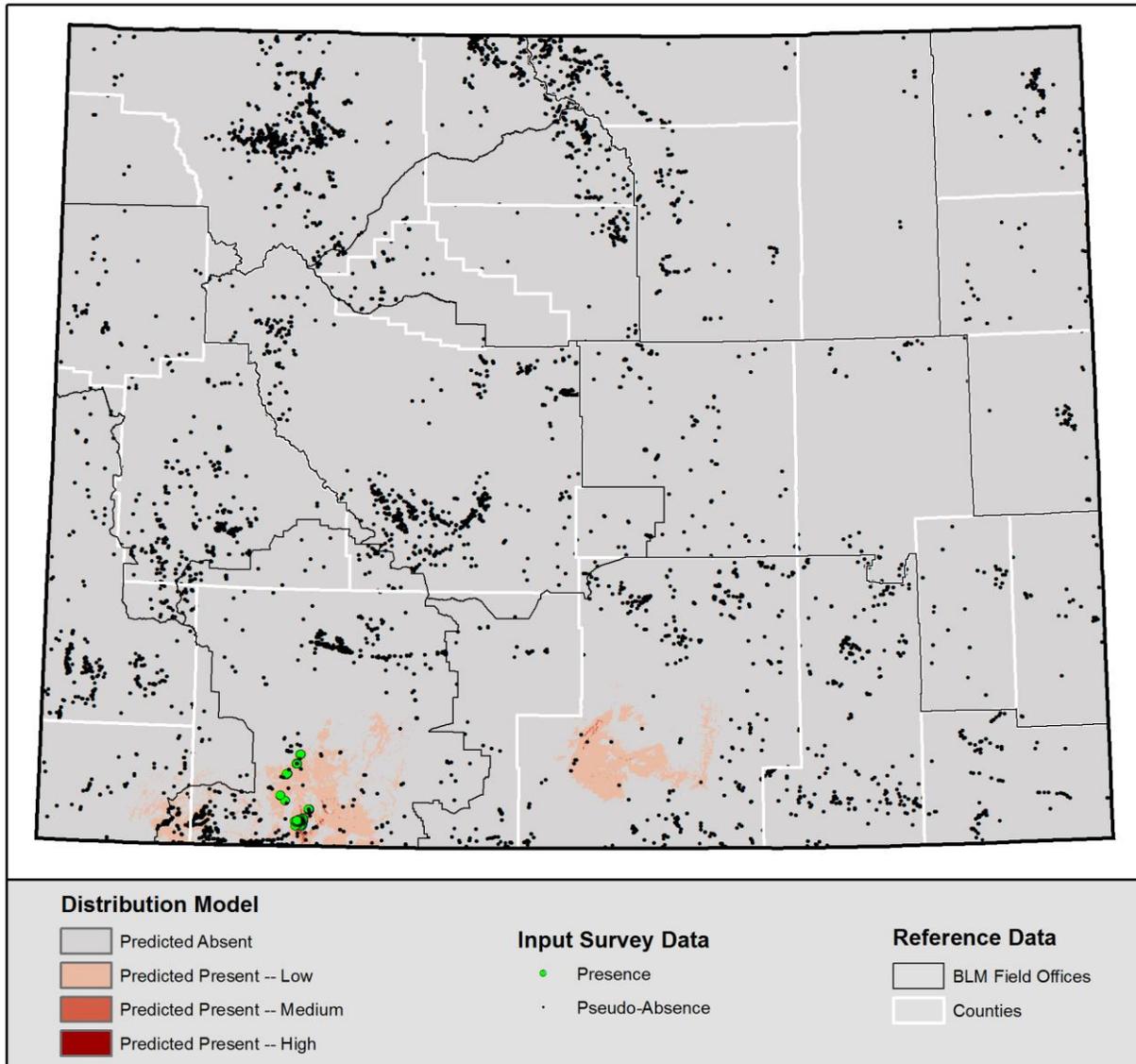
## Partial Plots

Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.



# Ownbey's thistle (*Cirsium ownbeyi*)

Model version: 2014-10-23



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.529
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.372	Predicted Absent (0)
0.372	0.862	Low (1)
0.862	0.994	Medium (2)
0.994	1	High (3)

## Model Details

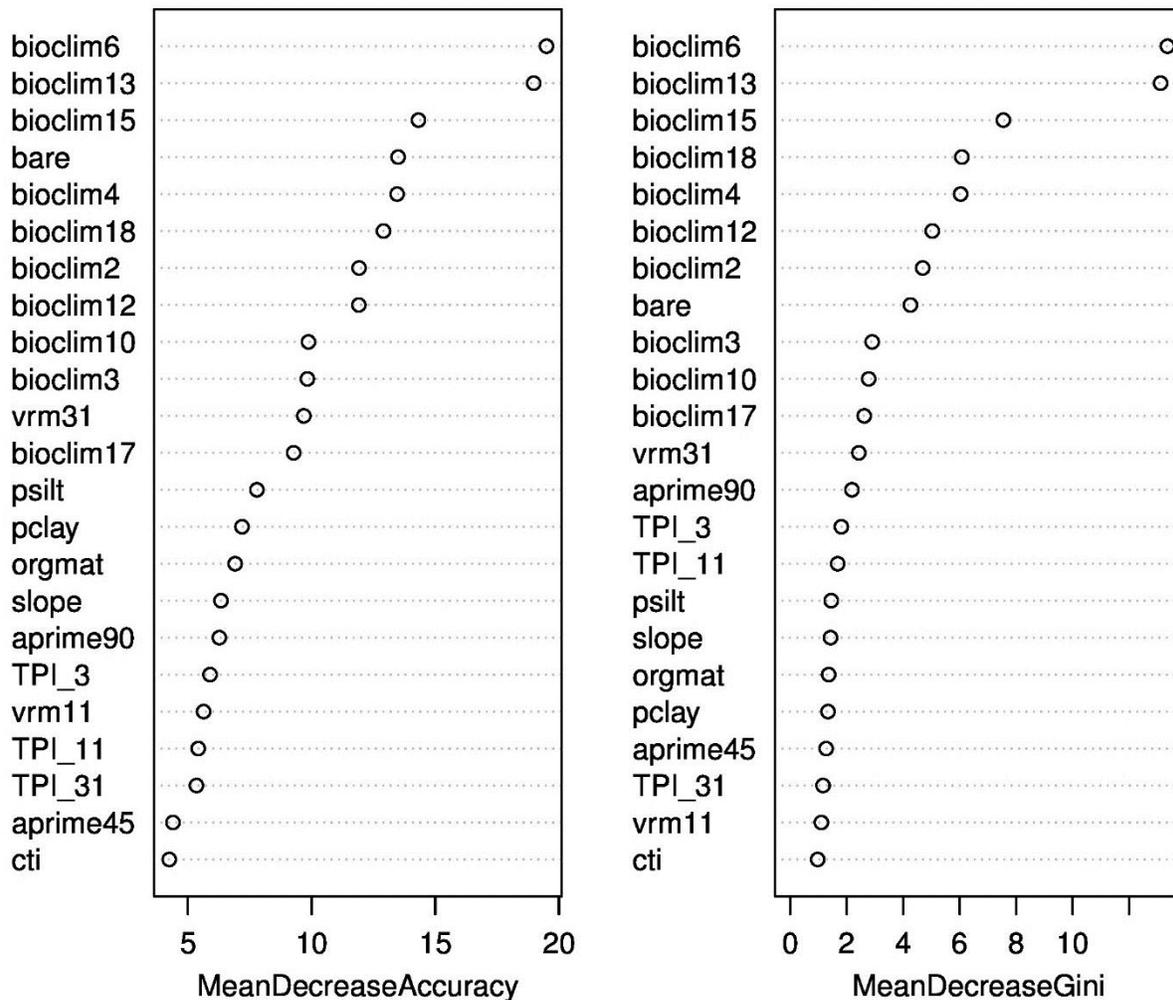
- **Number of Locations:** 58
- **Out-of-Bag Error:** 3.1%
- **TSS:** 91.5%
- **Kappa:** 91.6%
- **Sensitivity:** 93.6%
- **Specificity:** 98.0%

## Model Comments:

Endemic plant species that are restricted to specific soil conditions are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. Ownbey's thistle is mainly found on a segment of the Green River Formation, but bedrock geology was not included in the environmental layers. As a result, large areas of southcentral Wyoming were mapped as low probability potential habitat.

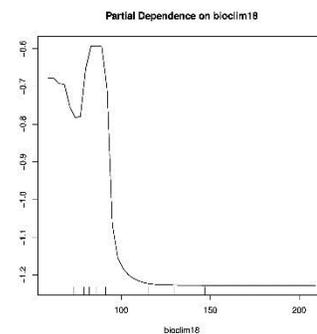
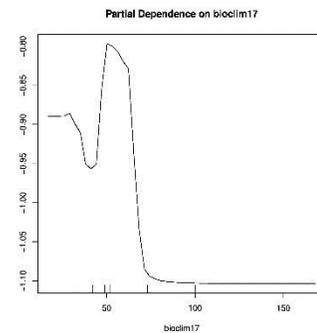
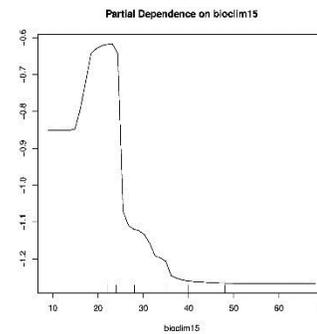
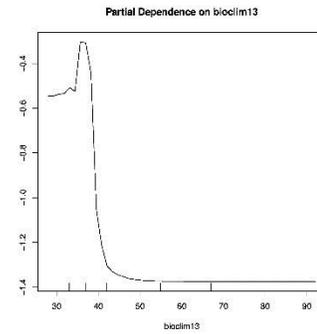
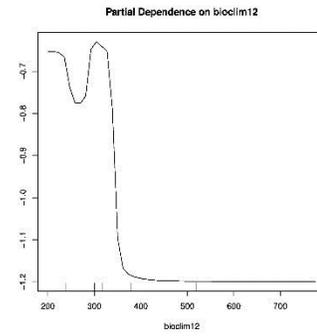
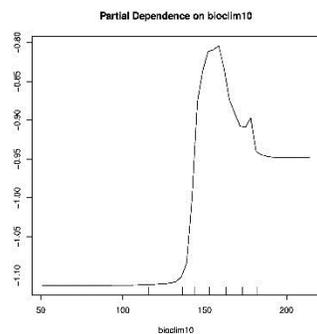
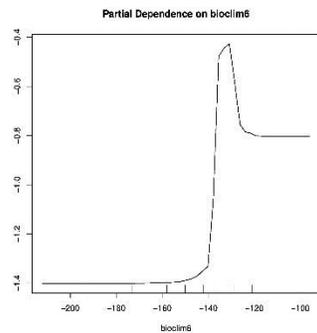
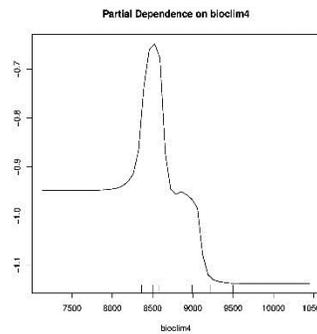
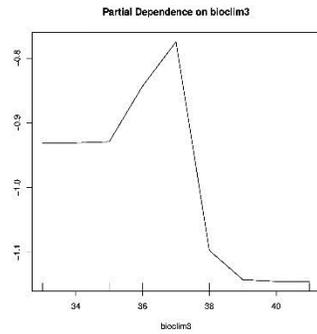
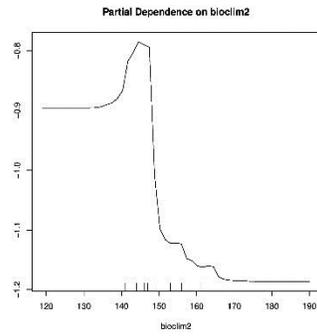
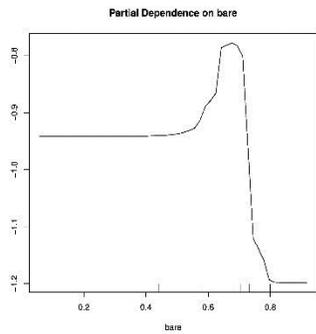
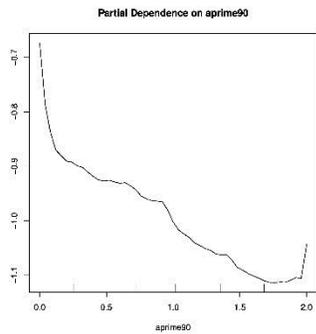
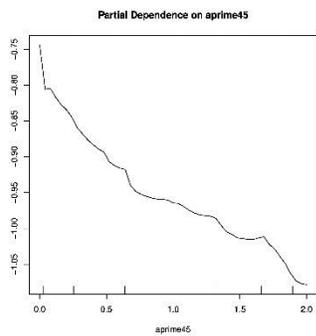
## Predictor Variable Importance:

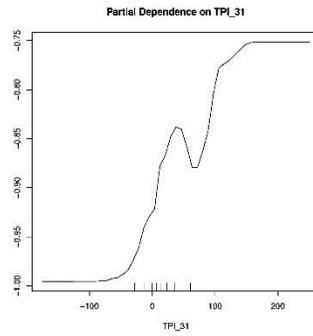
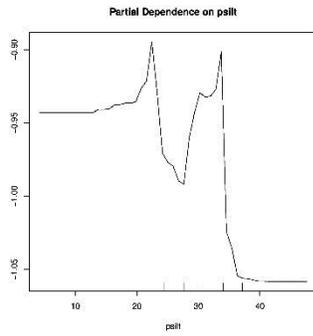
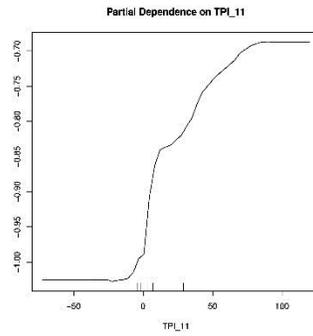
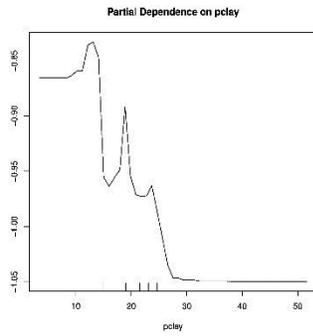
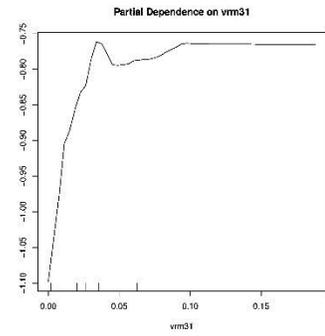
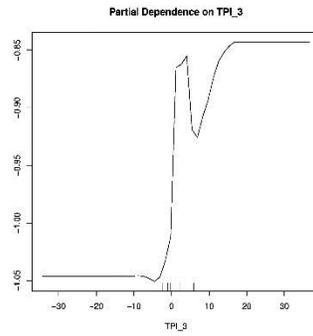
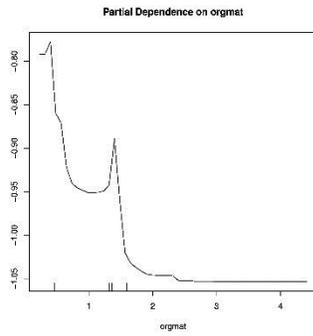
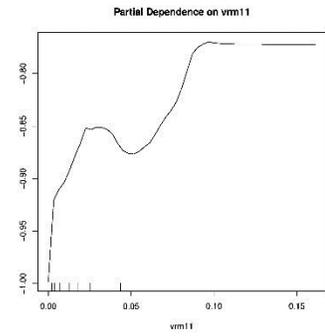
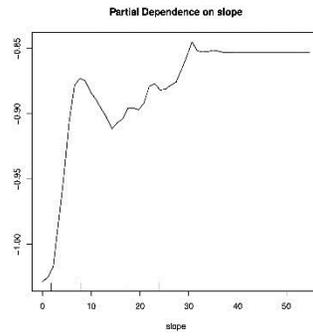
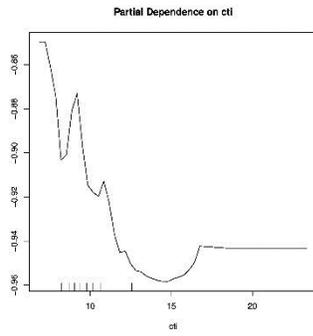
The graph below indicates the relative importance of predictors in modeling distribution for this species. "MeanDecreaseAccuracy" calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than "MeanDecreaseGini," which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

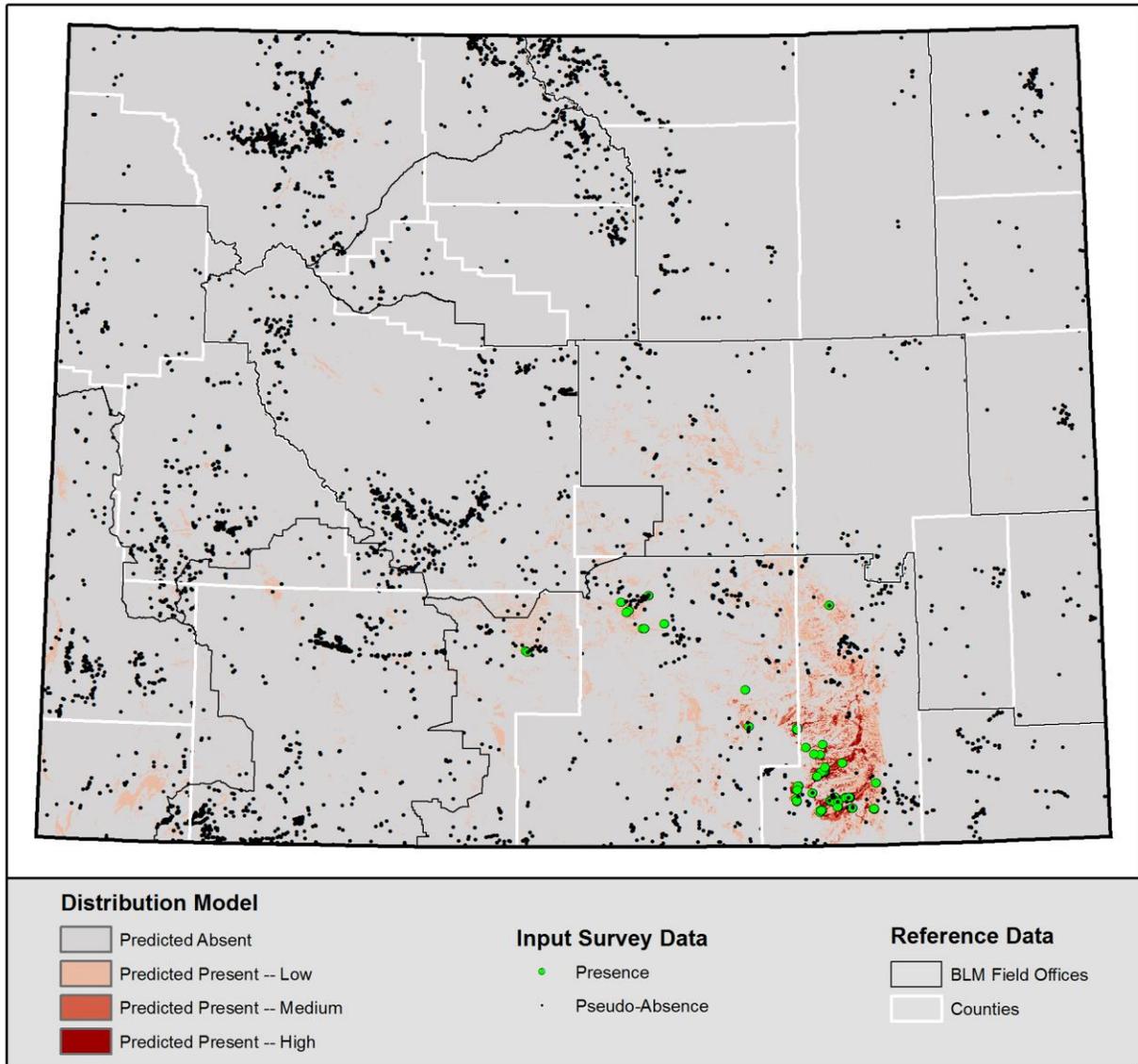
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Pale blue-eyed grass (*Sisyrinchium pallidum*)

Model version: 2015-08-28



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.611
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.550	Predicted Absent (0)
0.550	0.824	Low (1)
0.824	0.970	Medium (2)
0.970	1	High (3)

## Model Details

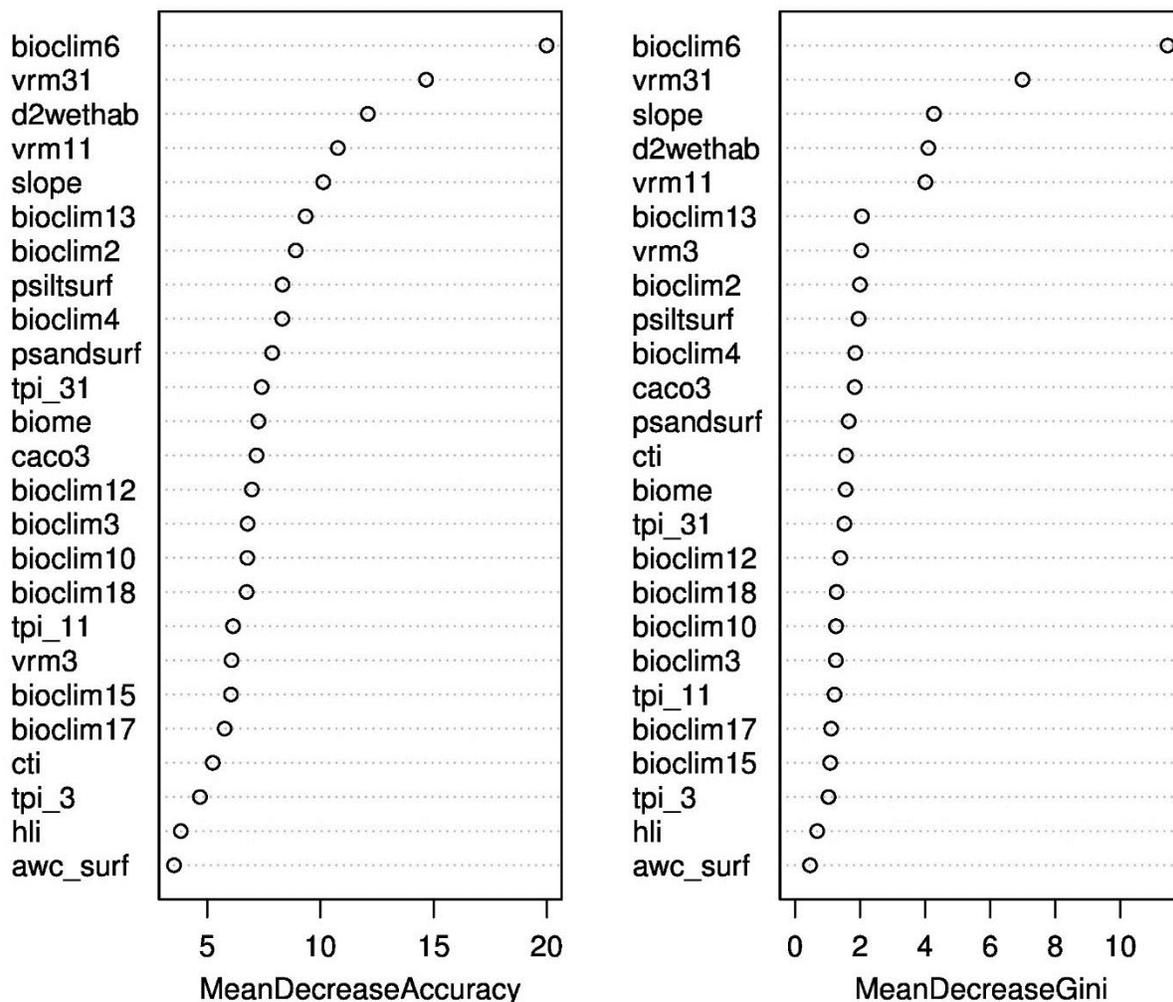
- **Number of Locations:** 40
- **Out-of-Bag Error:** 4.9%
- **TSS:** 85.7%
- **Kappa:** 86.7%
- **Sensitivity:** 88.5%
- **Specificity:** 97.3%

## Model Comments:

Regionally endemic wetland plant species that occupy a narrow vegetation zone (wet meadow) and limited range of hydrological conditions are difficult to model. A layer was developed that combines layers representing riverine and palustrine settings along a distance gradient for Pale blue-eyed grass and other wetland species of wet meadows. It is mainly on colluvial deposits in the Laramie Basin, but is found on other deposits with shallow groundwater elsewhere.

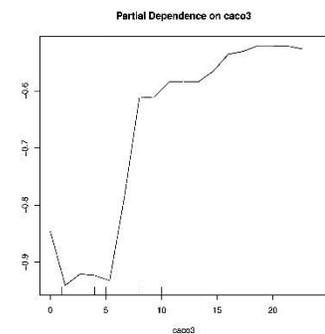
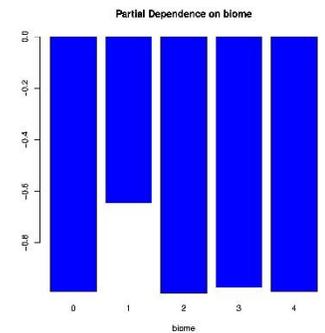
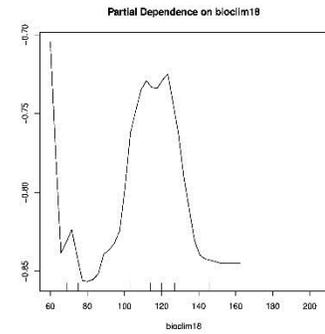
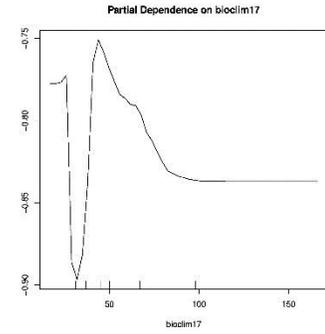
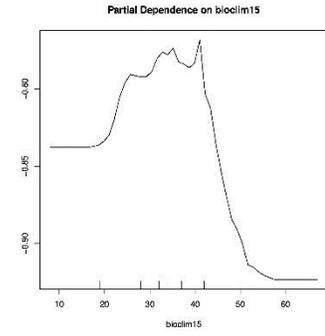
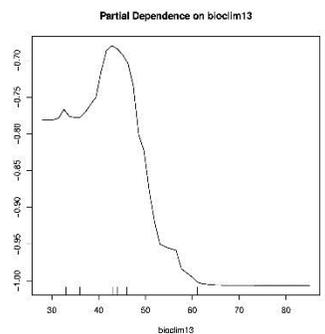
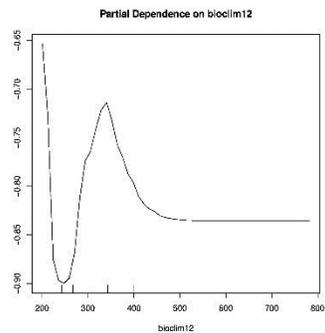
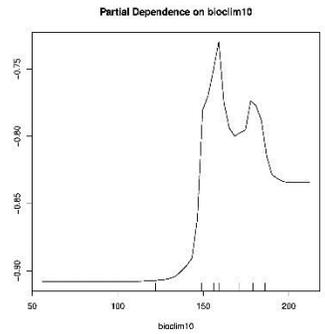
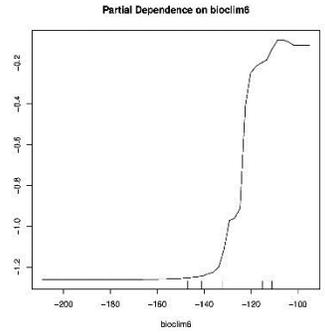
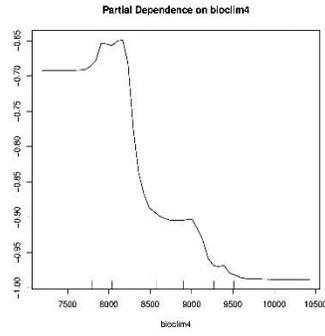
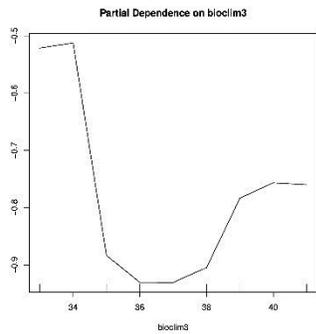
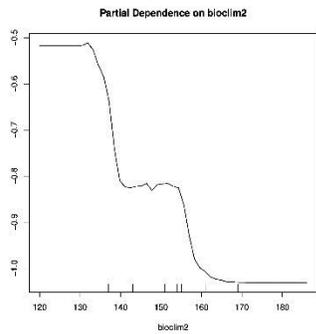
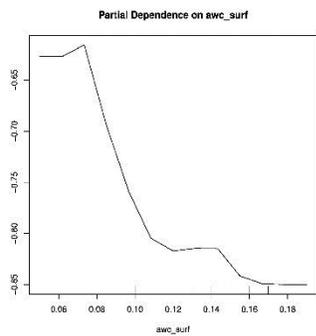
## Predictor Variable Importance:

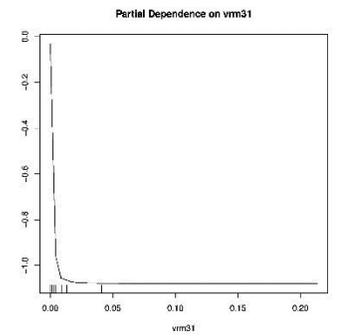
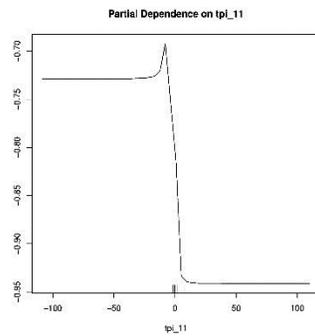
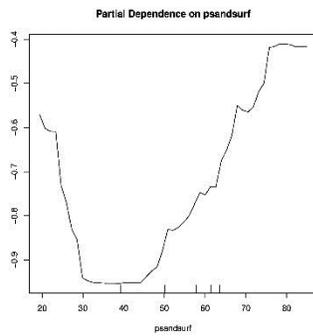
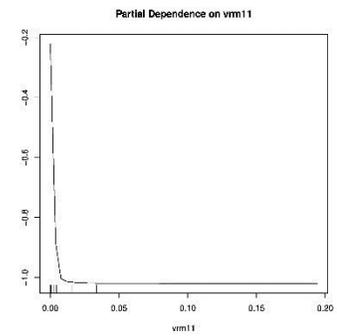
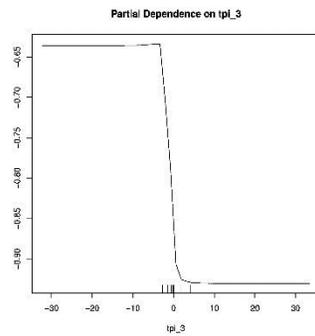
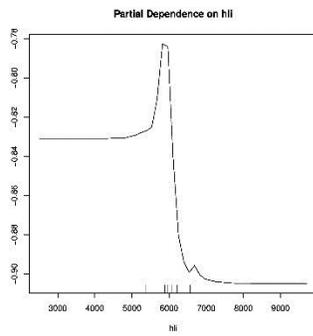
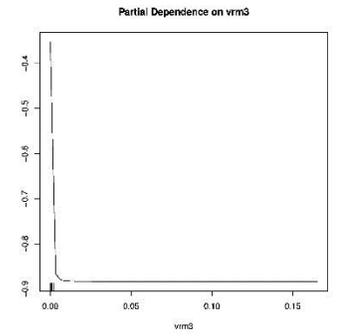
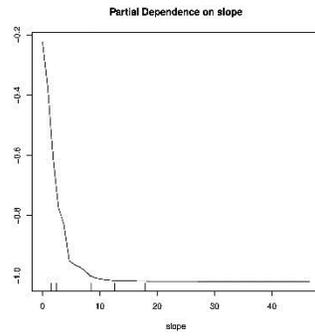
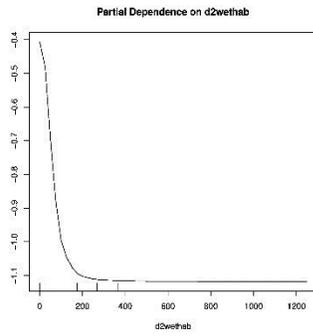
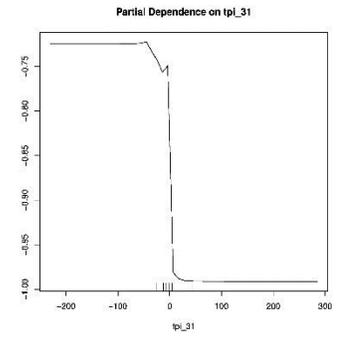
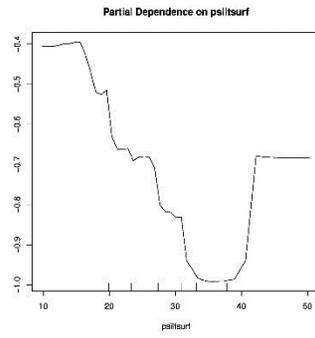
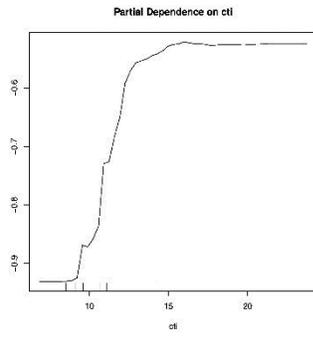
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

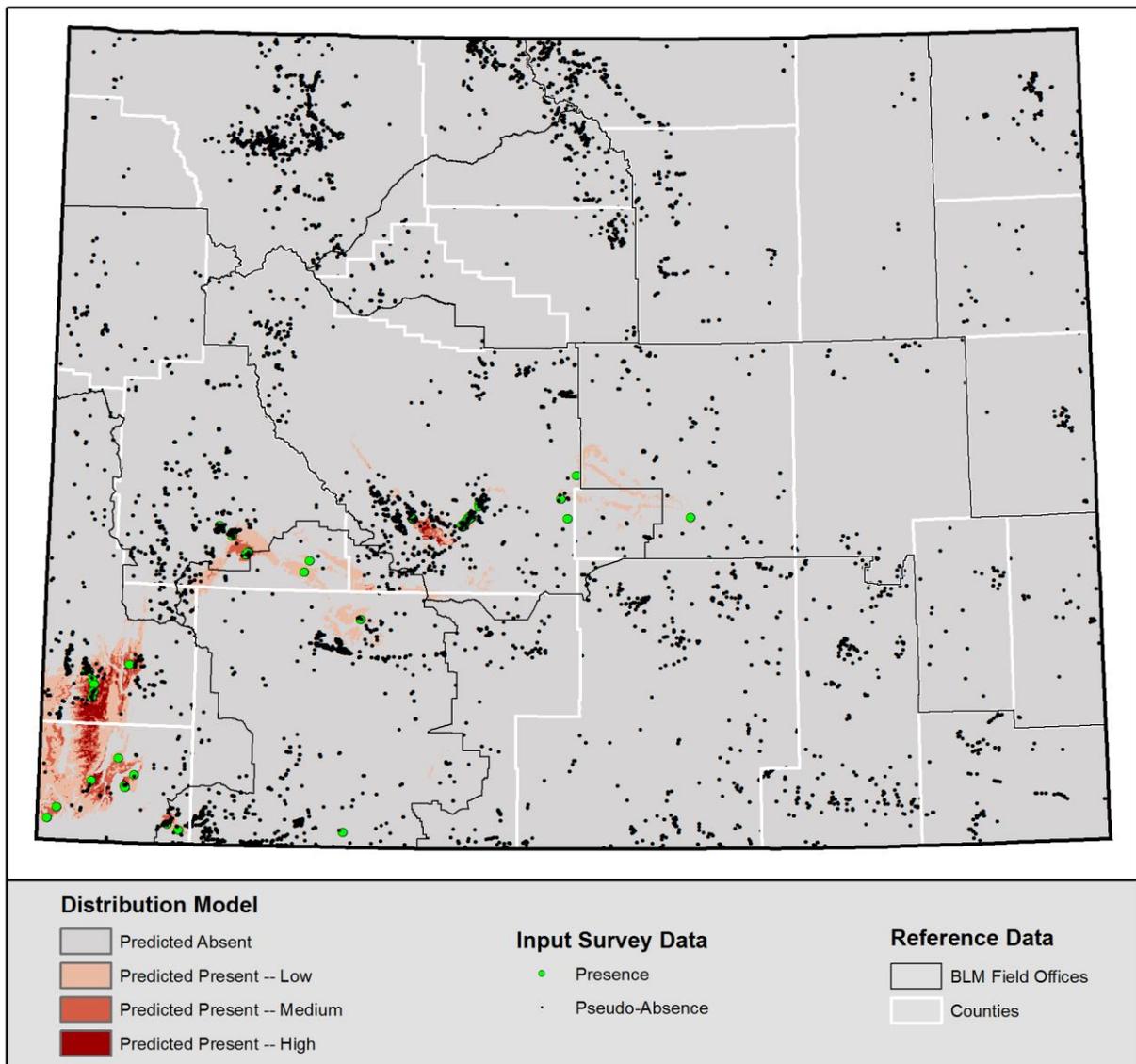
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Payson beardtongue (*Penstemon paysoniorum*)

Model version: 2015-08-28



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.592
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.544	Predicted Absent (0)
0.544	0.758	Low (1)
0.758	0.940	Medium (2)
0.940	1	High (3)

## Model Details

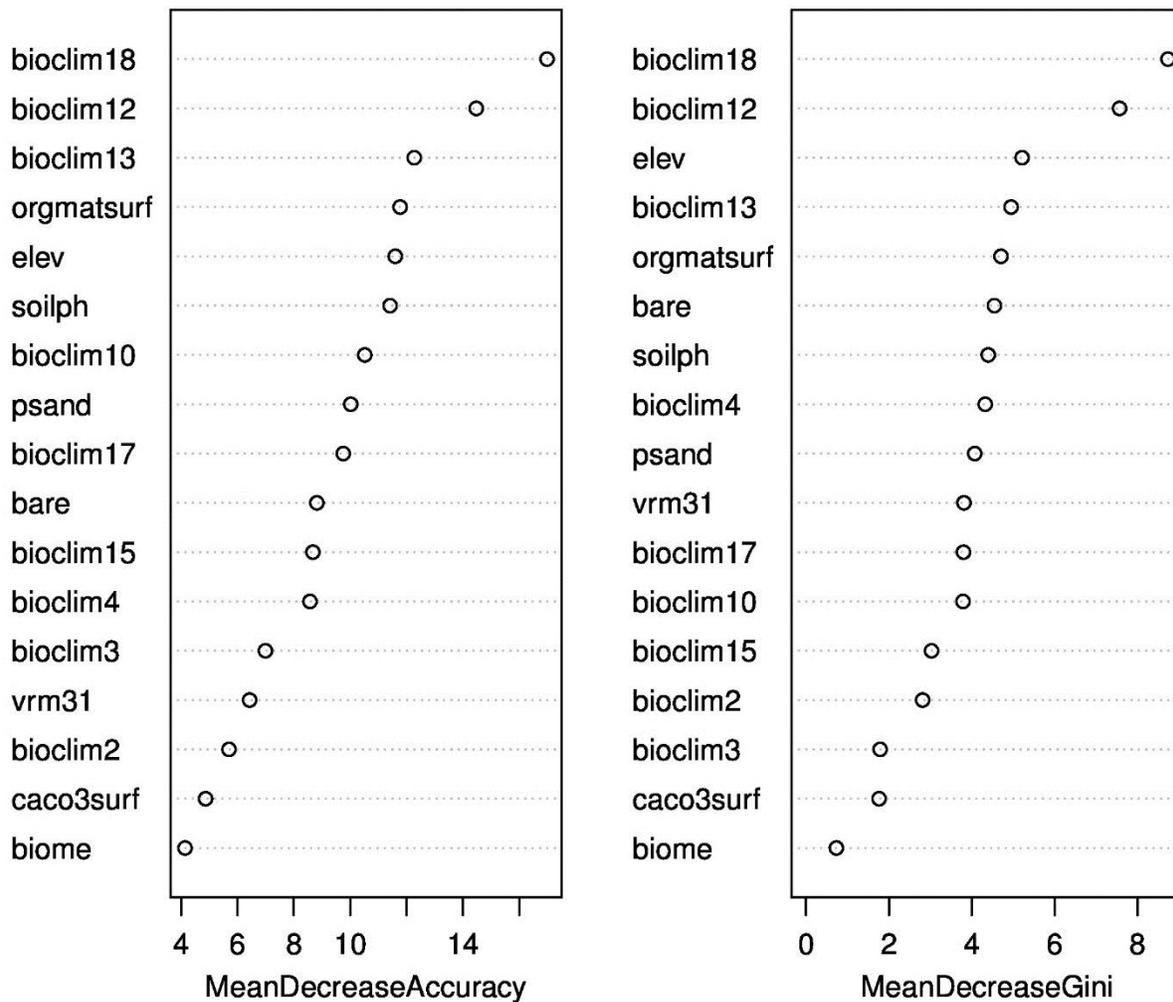
- **Number of Locations:** 47
- **Out-of-Bag Error:** 14.6%
- **TSS:** 57.8%
- **Kappa:** 59.8%
- **Sensitivity:** 65.8%
- **Specificity:** 92.0%

## Model Comments:

Endemic plant species that are restricted to specific soil conditions are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. Payson's beardtongue may occupy different combinations of setting and soil conditions in different parts of its distribution, further complicating modeling. This species has presence points that are comprised almost entirely of collection records and it is possible that this affected model performance.

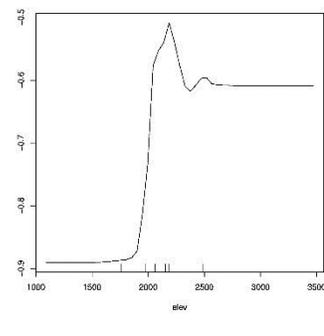
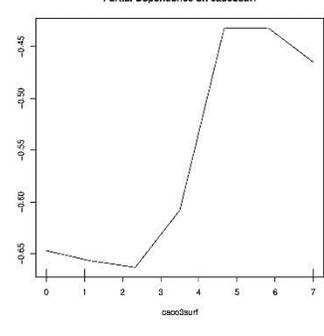
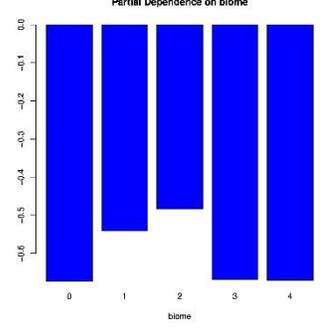
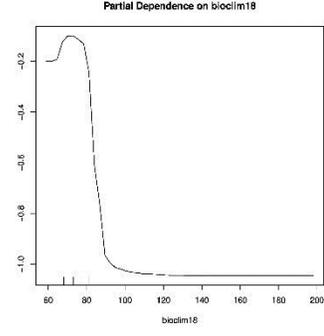
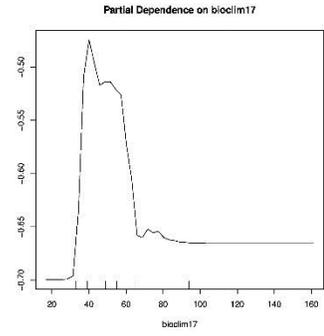
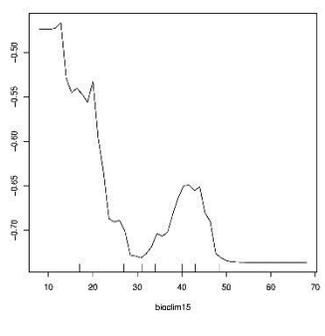
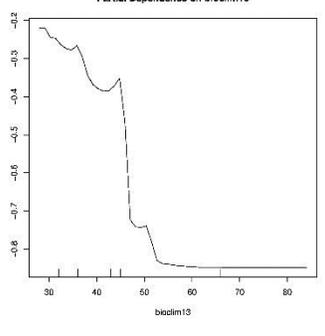
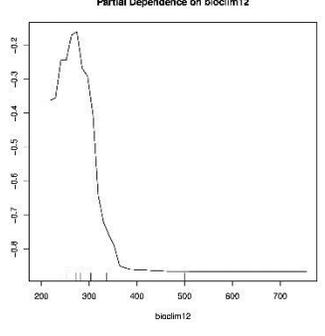
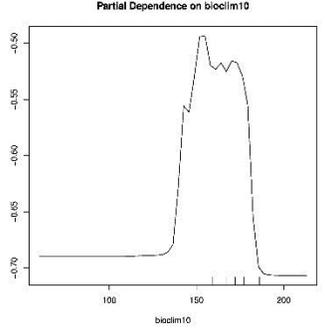
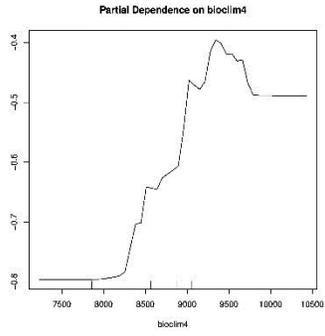
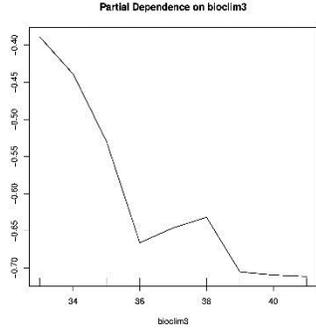
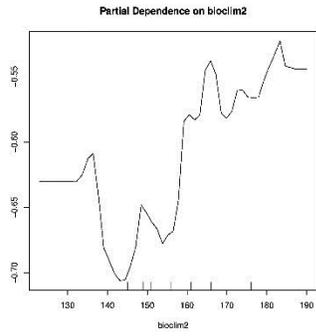
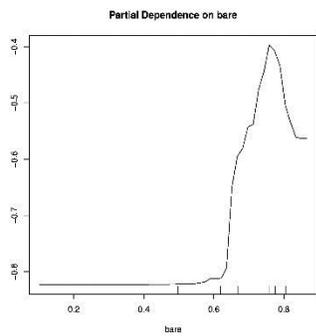
## Predictor Variable Importance:

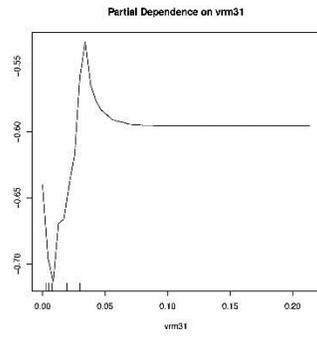
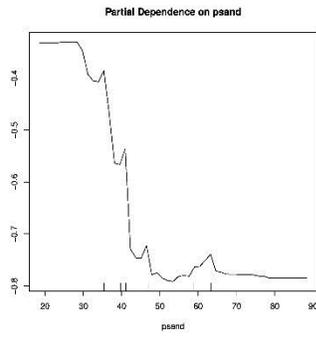
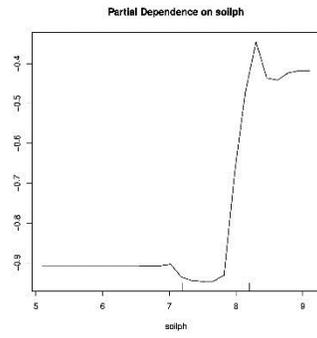
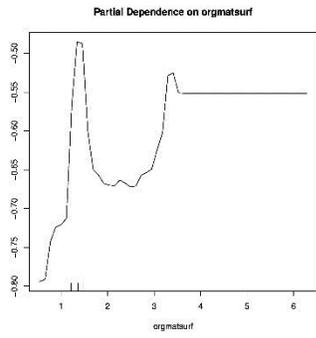
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

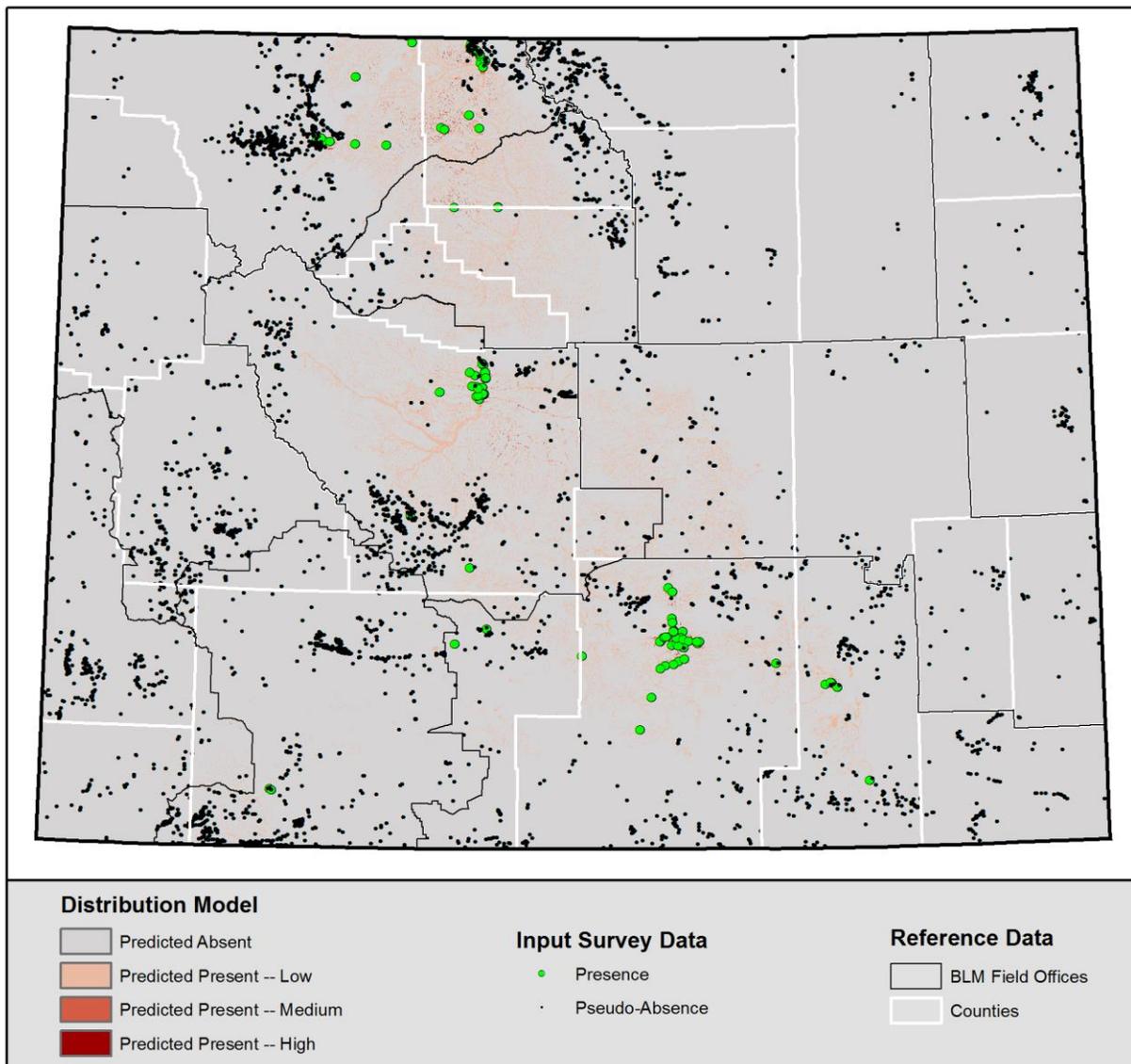
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Persistent sepal yellowcress (*Rorippa calycina*)

Model version: 2015-08-27



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.726
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.490	Predicted Absent (0)
0.490	0.934	Low (1)
0.934	0.994	Medium (2)
0.994	1	High (3)

## Model Details

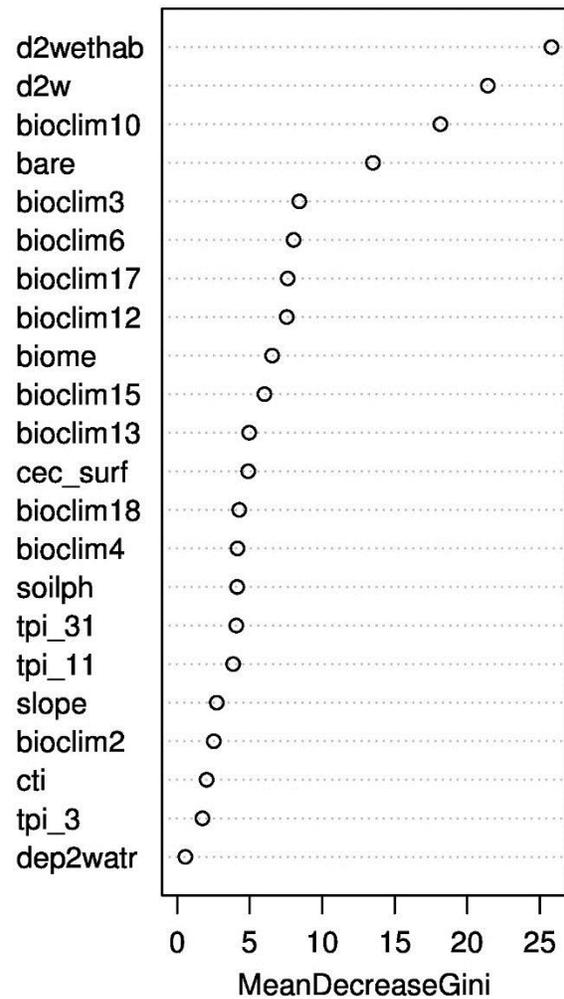
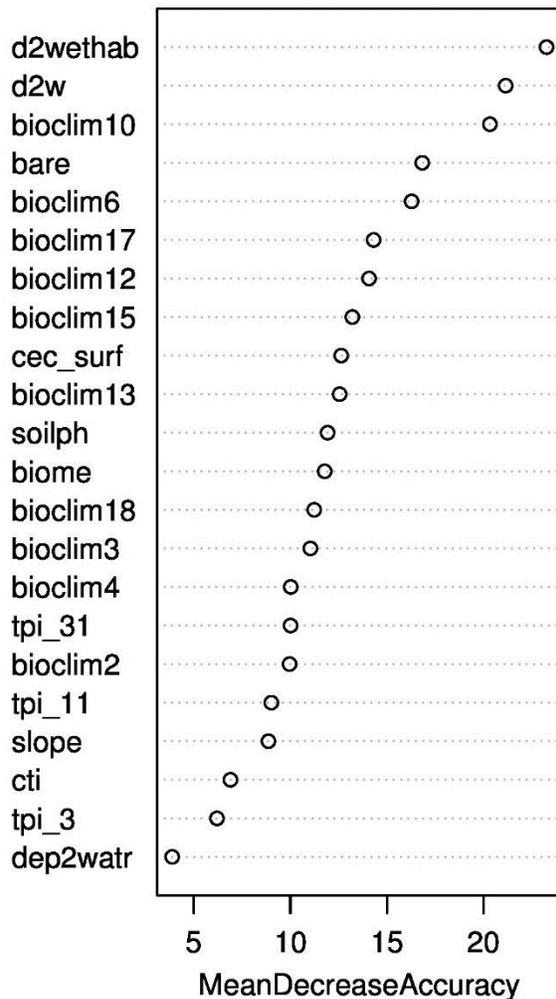
- **Number of Locations:** 109
- **Out-of-Bag Error:** 3.1%
- **TSS:** 90.9%
- **Kappa:** 91.8%
- **Sensitivity:** 92.4%
- **Specificity:** 98.5%

## Model Comments:

Regionally endemic wetland plants such as Persistent sepal yellowcress that sometimes occupy fluctuating environments and manmade features (exposed flats of reservoirs) as well as natural features are difficult to model. A layer was developed that combines layers representing riverine and palustrine settings along a distance gradient to represent at least the latter. All records were used for presence data regardless of origin, resulting in a model that predicts most major riparian settings from north-central to south-central Wyoming as low probability potential habitat.

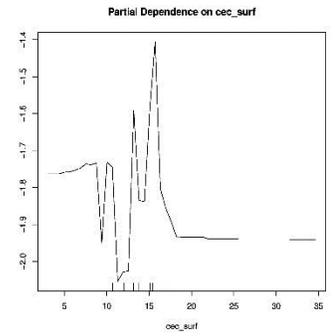
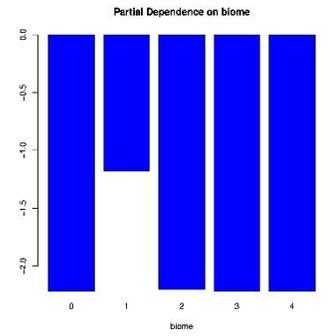
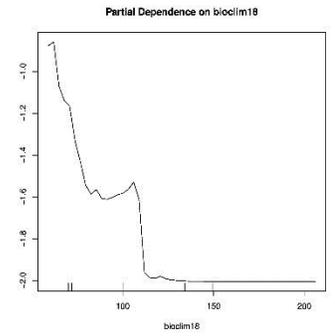
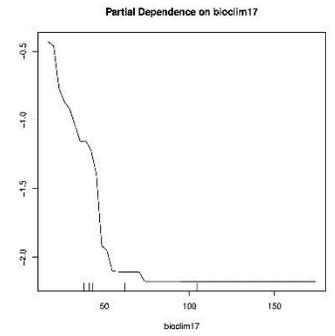
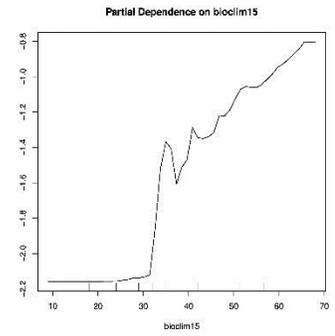
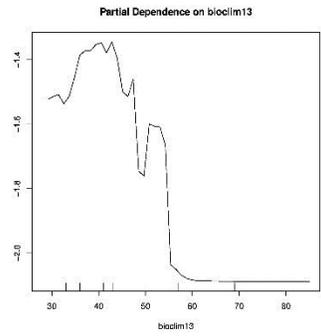
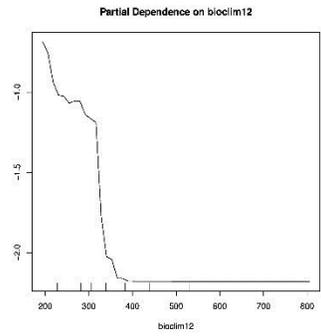
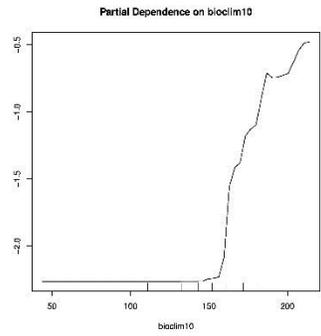
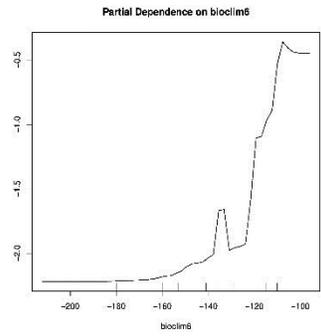
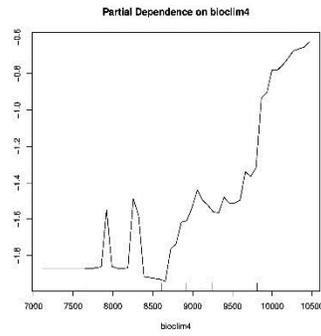
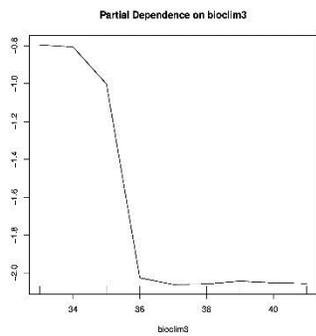
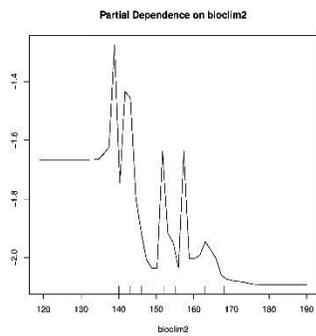
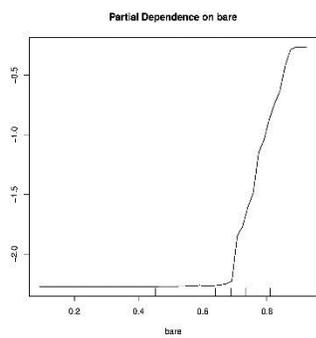
## Predictor Variable Importance:

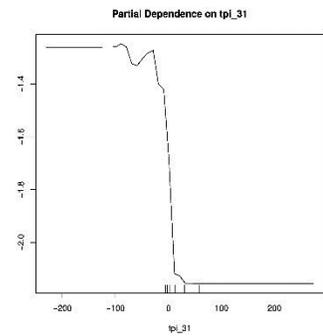
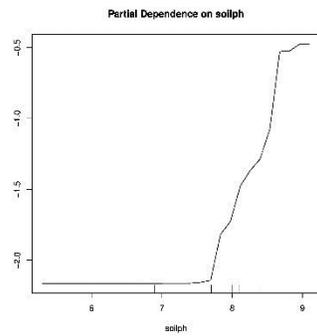
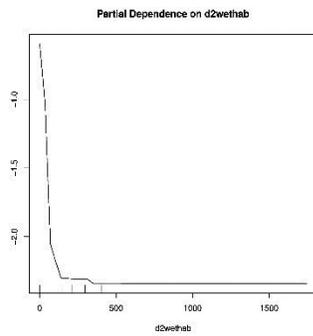
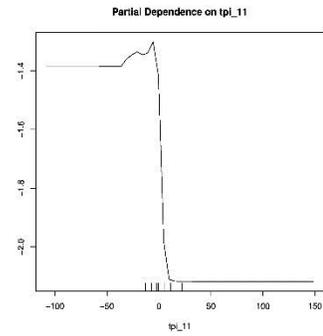
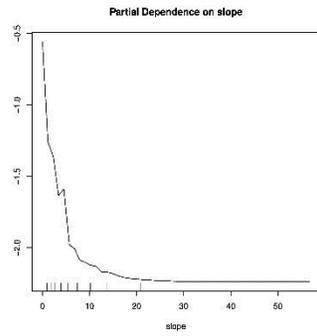
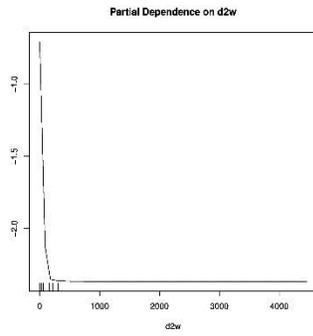
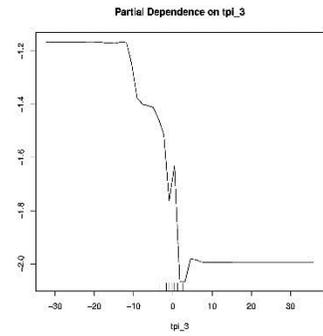
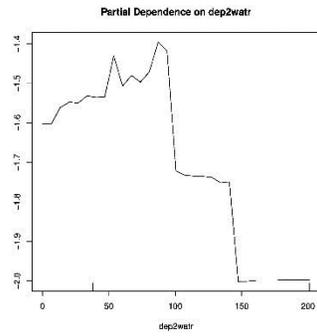
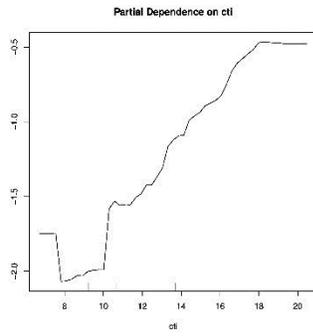
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

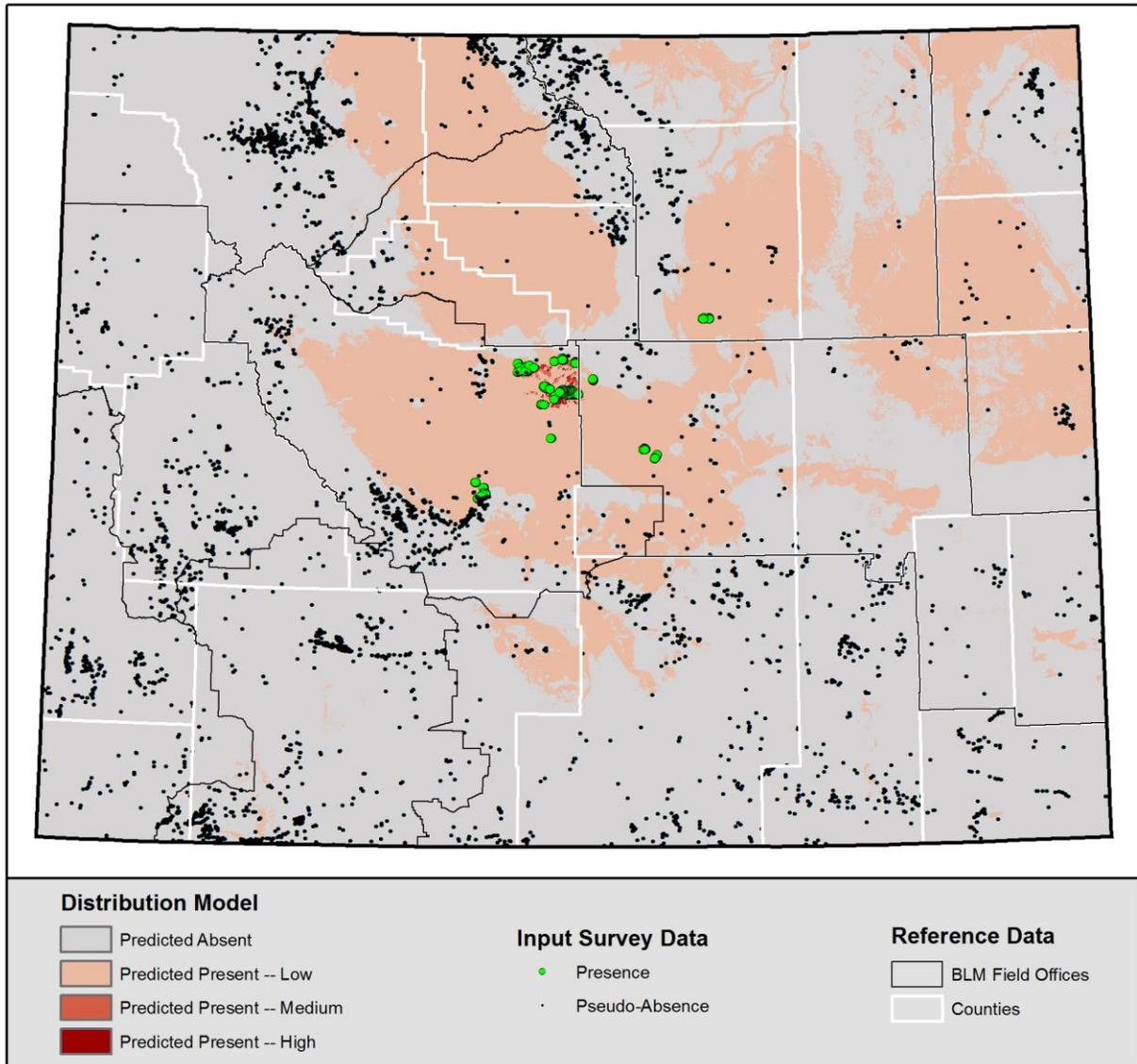
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Porter's sagebrush (*Artemisia porteri*)

Model version: 2014-07-22



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.522
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.084	Predicted Absent (0)
0.084	0.978	Low (1)
0.978	1	Medium (2)
1	1	High (3)

## Model Details

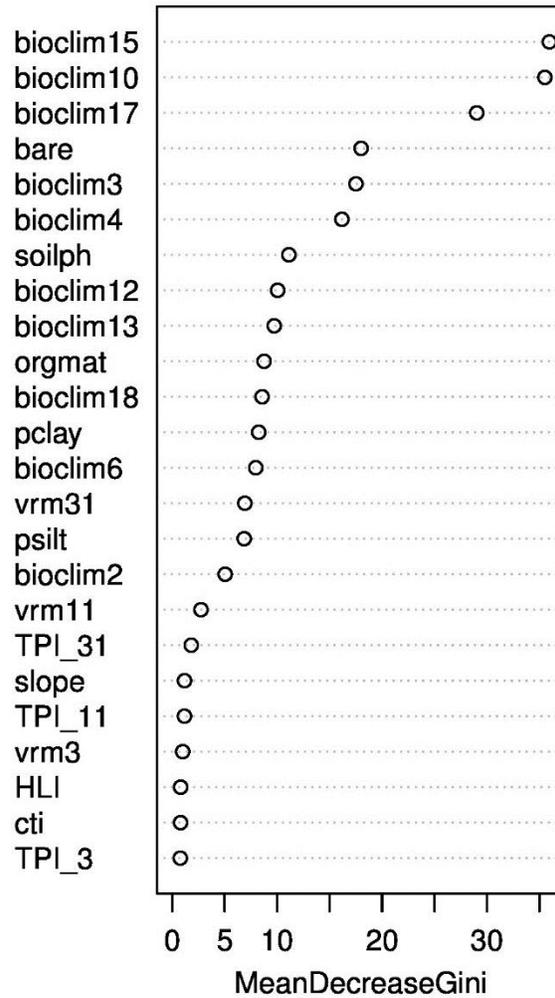
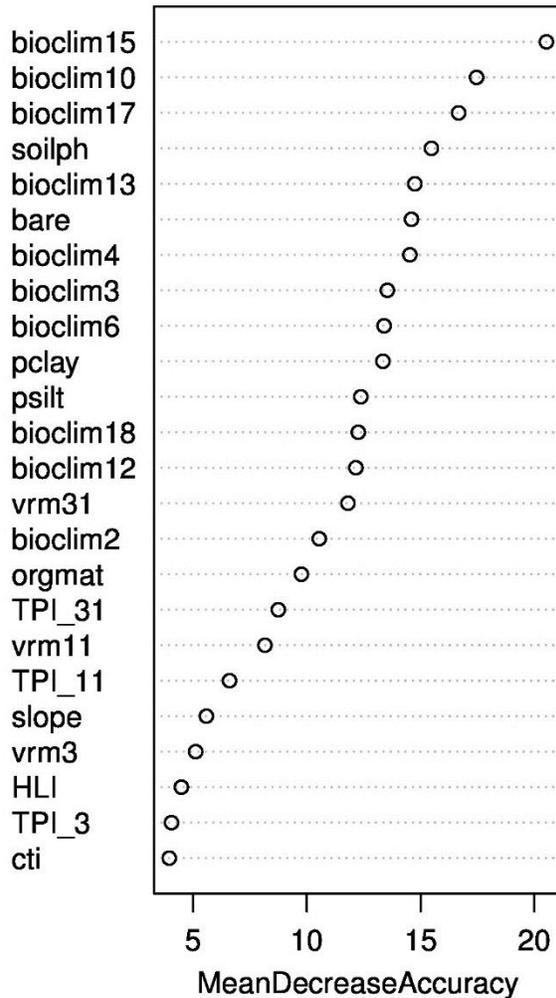
- **Number of Locations:** 164
- **Out-of-Bag Error:** 0.9%
- **TSS:** 97.7%
- **Kappa:** 97.7%
- **Sensitivity:** 98.3%
- **Specificity:** 99.4%

## Model Comments:

Endemic plant species that are restricted to specific soil conditions are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. As such, large areas of central Wyoming are shown as low probability potential habitat, some of which include occupied habitat, and others that may not be suitable.

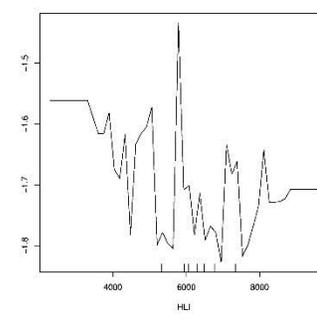
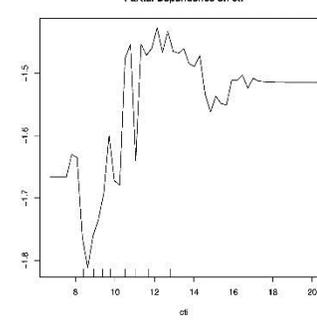
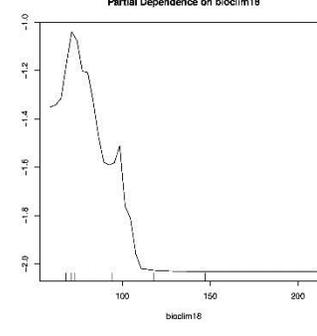
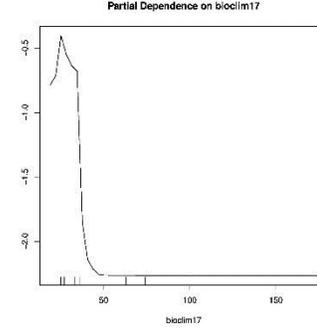
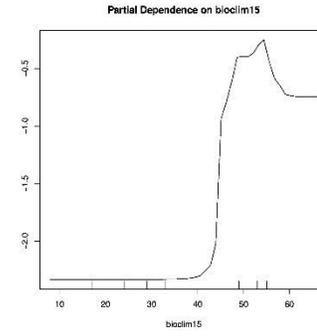
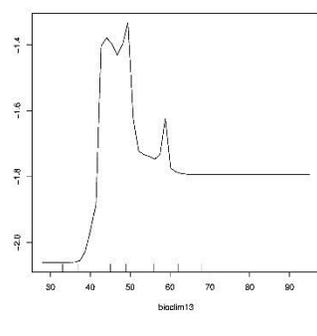
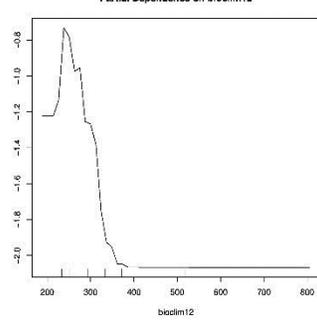
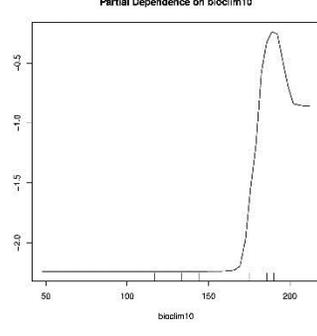
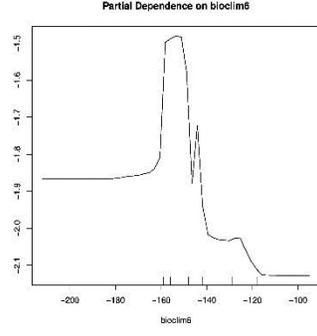
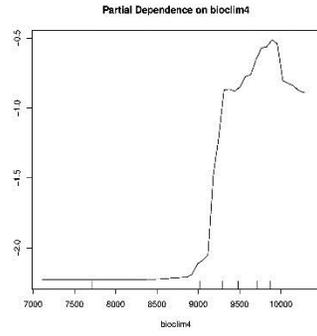
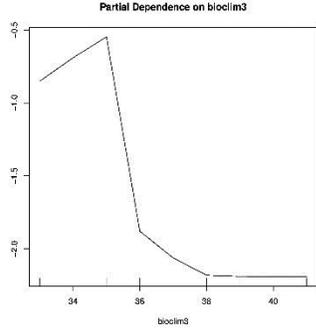
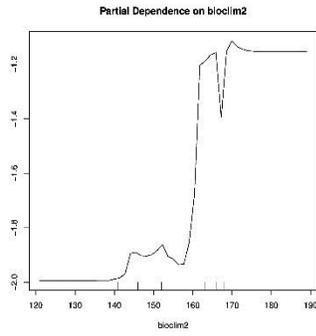
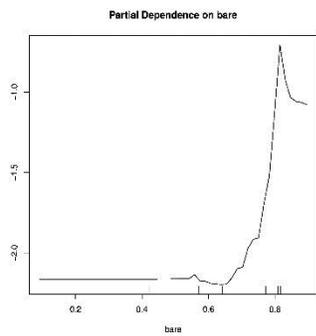
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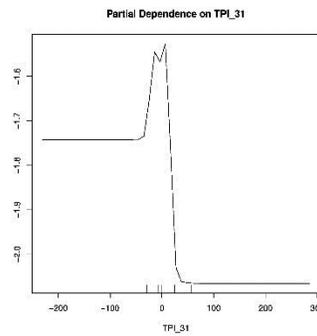
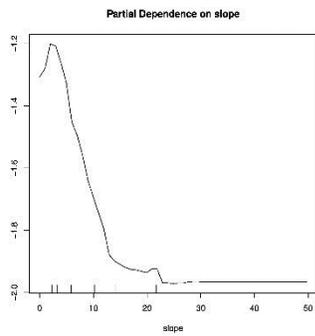
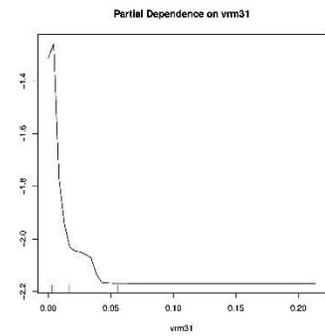
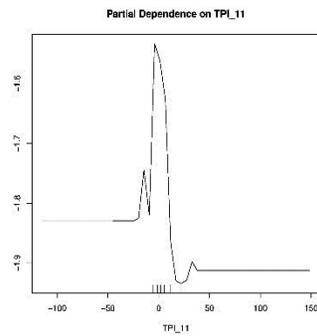
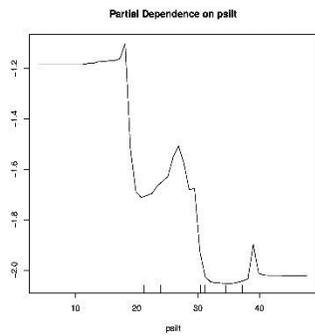
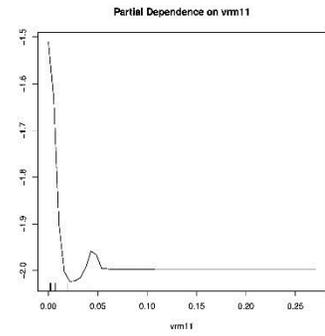
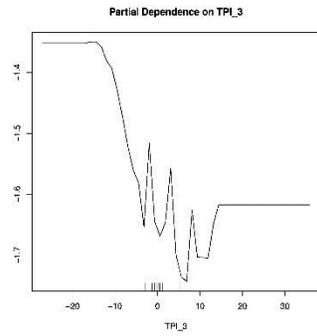
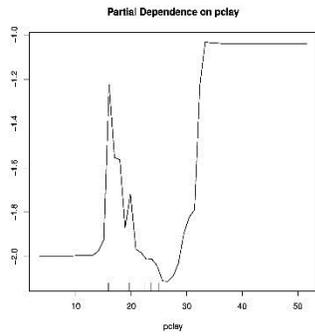
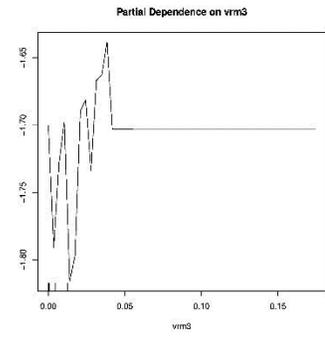
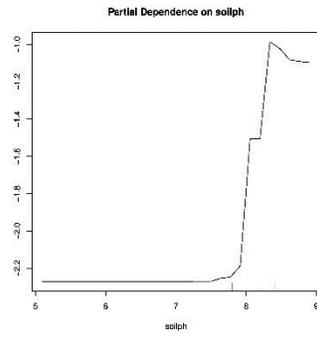
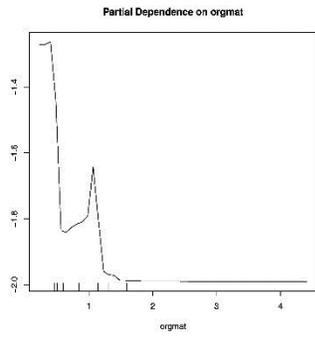
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

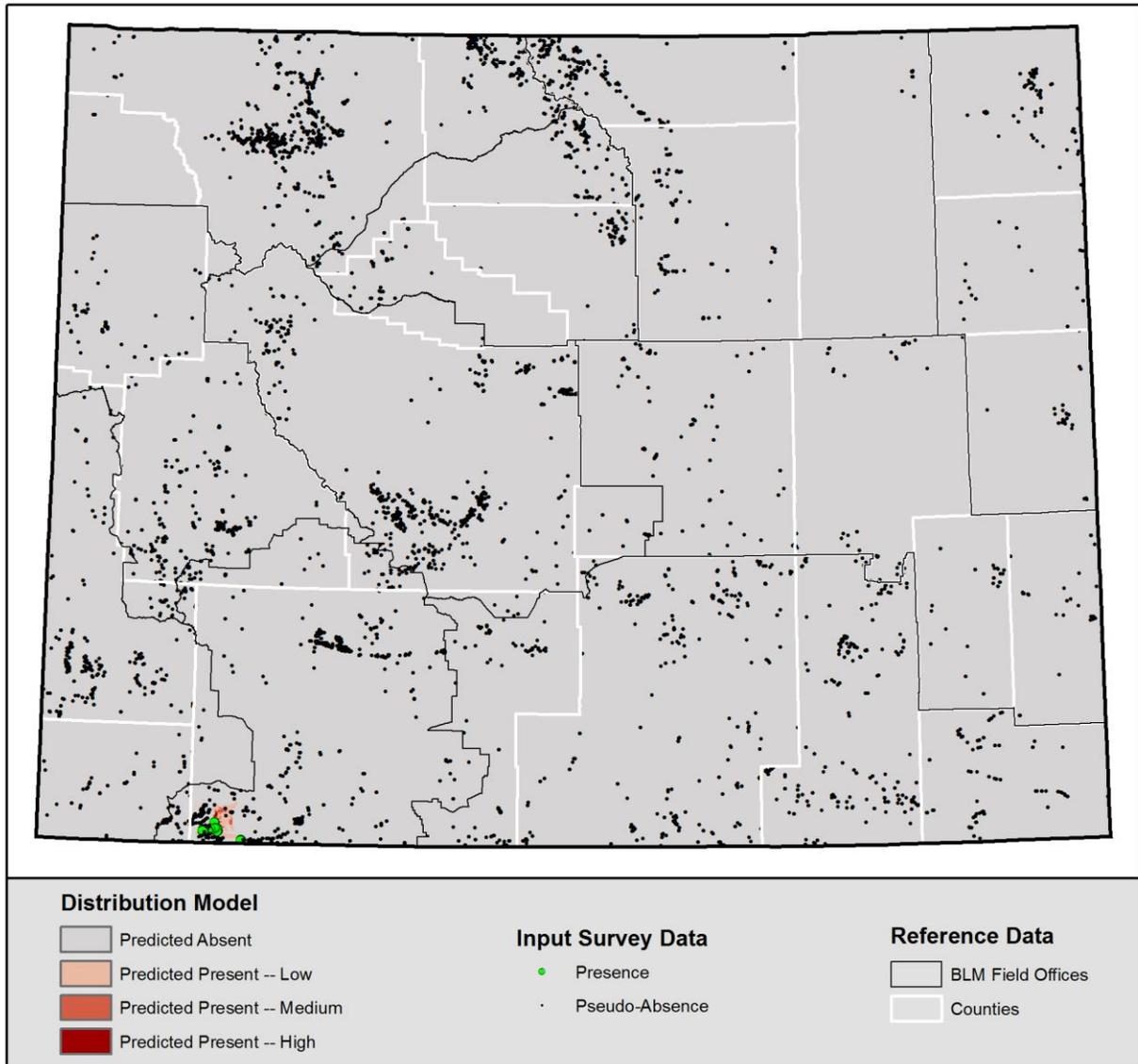
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Precocious milkvetch (*Astragalus proimanthus*)

Model version: 2015-08-27



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.837
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.844	Predicted Absent (0)
0.844	0.976	Low (1)
0.976	0.998	Medium (2)
0.998	1	High (3)

## Model Details

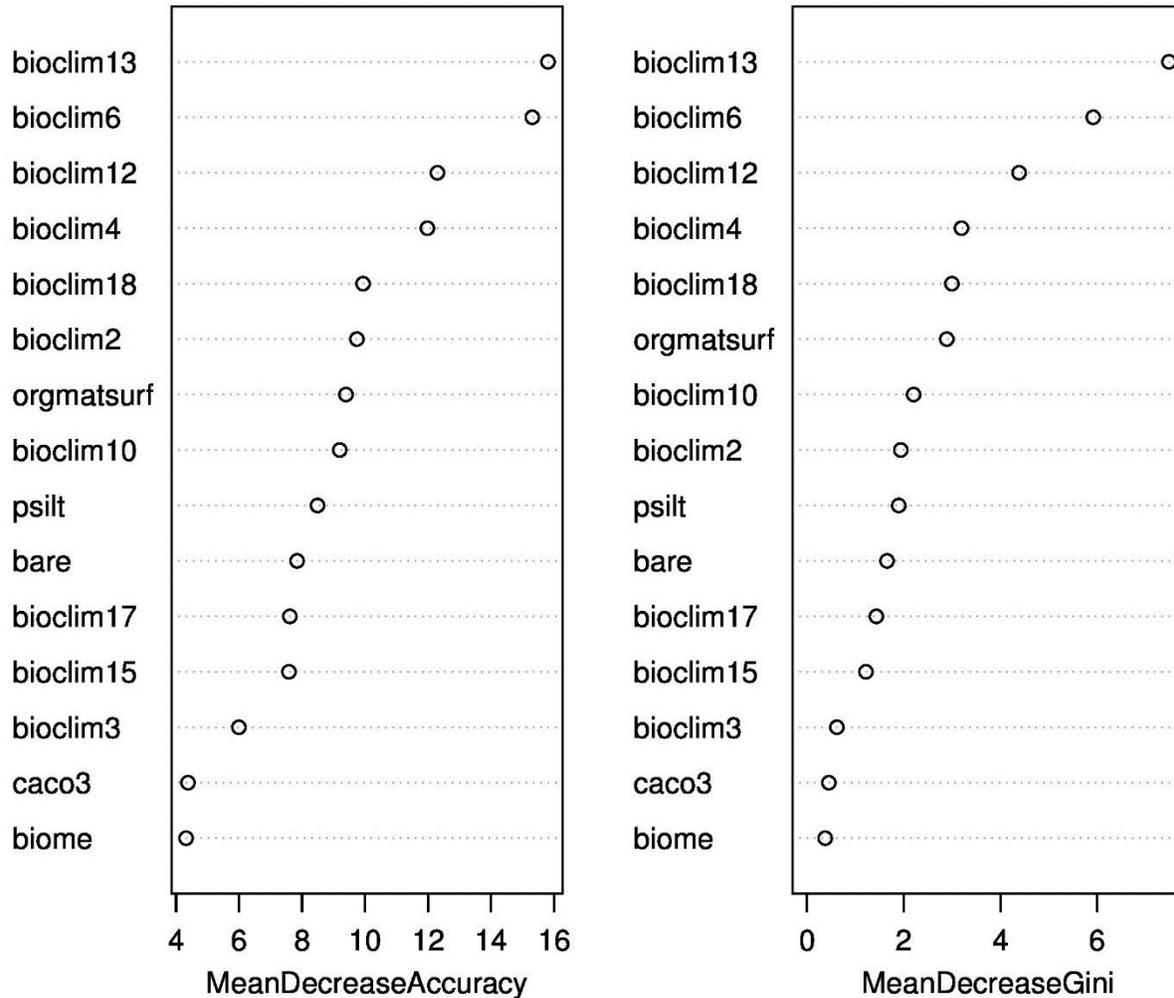
- **Number of Locations:** 26
- **Out-of-Bag Error:** 1.0%
- **TSS:** 98.6%
- **Kappa:** 97.4%
- **Sensitivity:** 99.9%
- **Specificity:** 98.7%

## Model Comments:

Regionally endemic plant species that are restricted to specific soil conditions are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. In addition, for calciphilic species such as Precocious milkvetch, a surrogate layer was developed from bedrock geology layers to reflect calcium carbonate content.

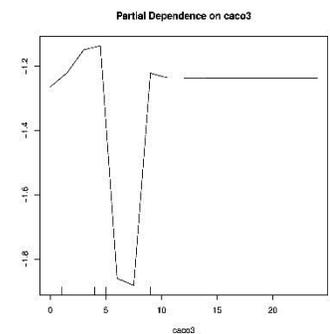
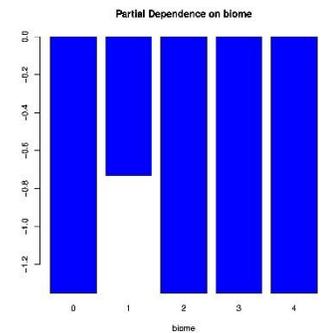
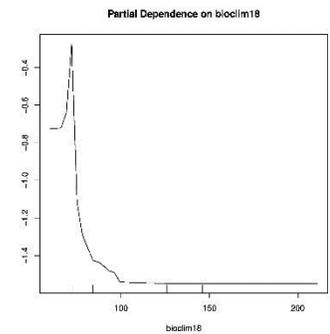
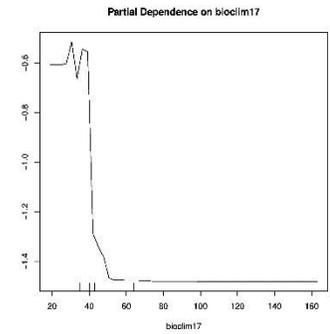
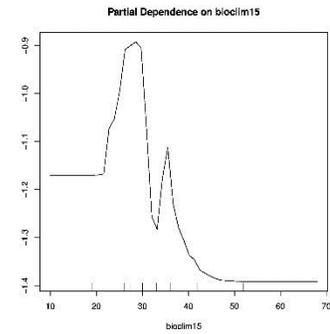
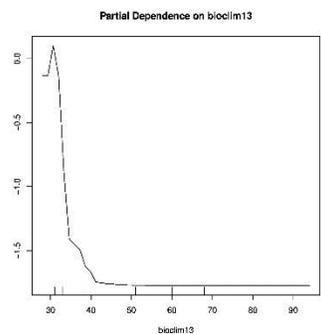
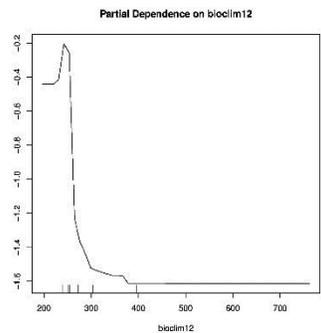
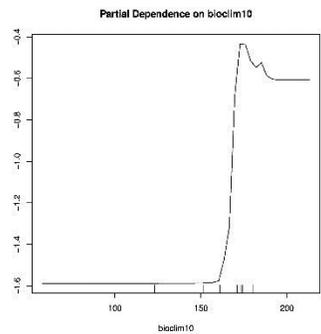
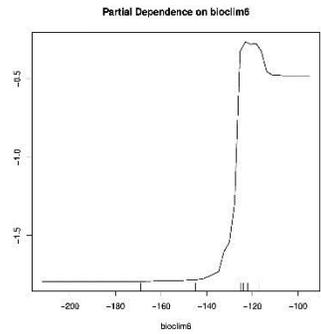
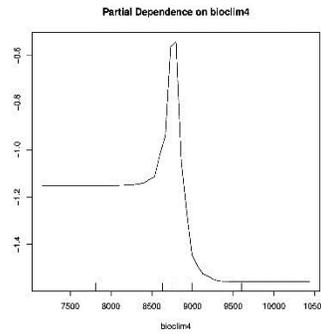
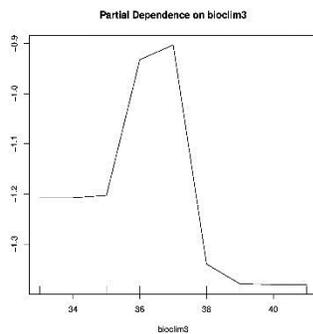
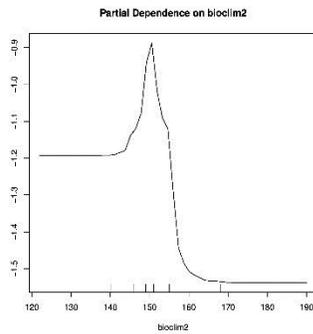
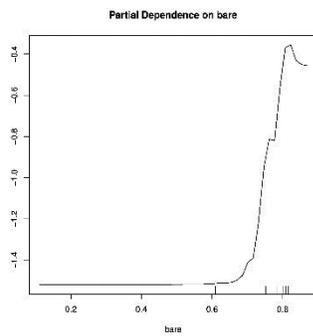
## Predictor Variable Importance:

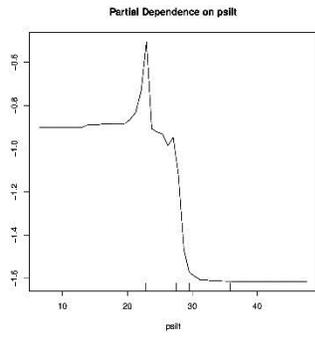
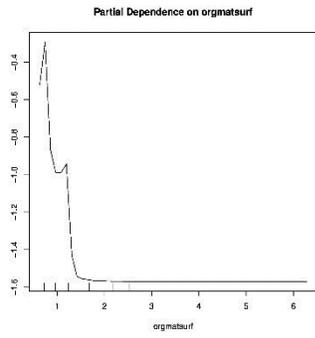
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

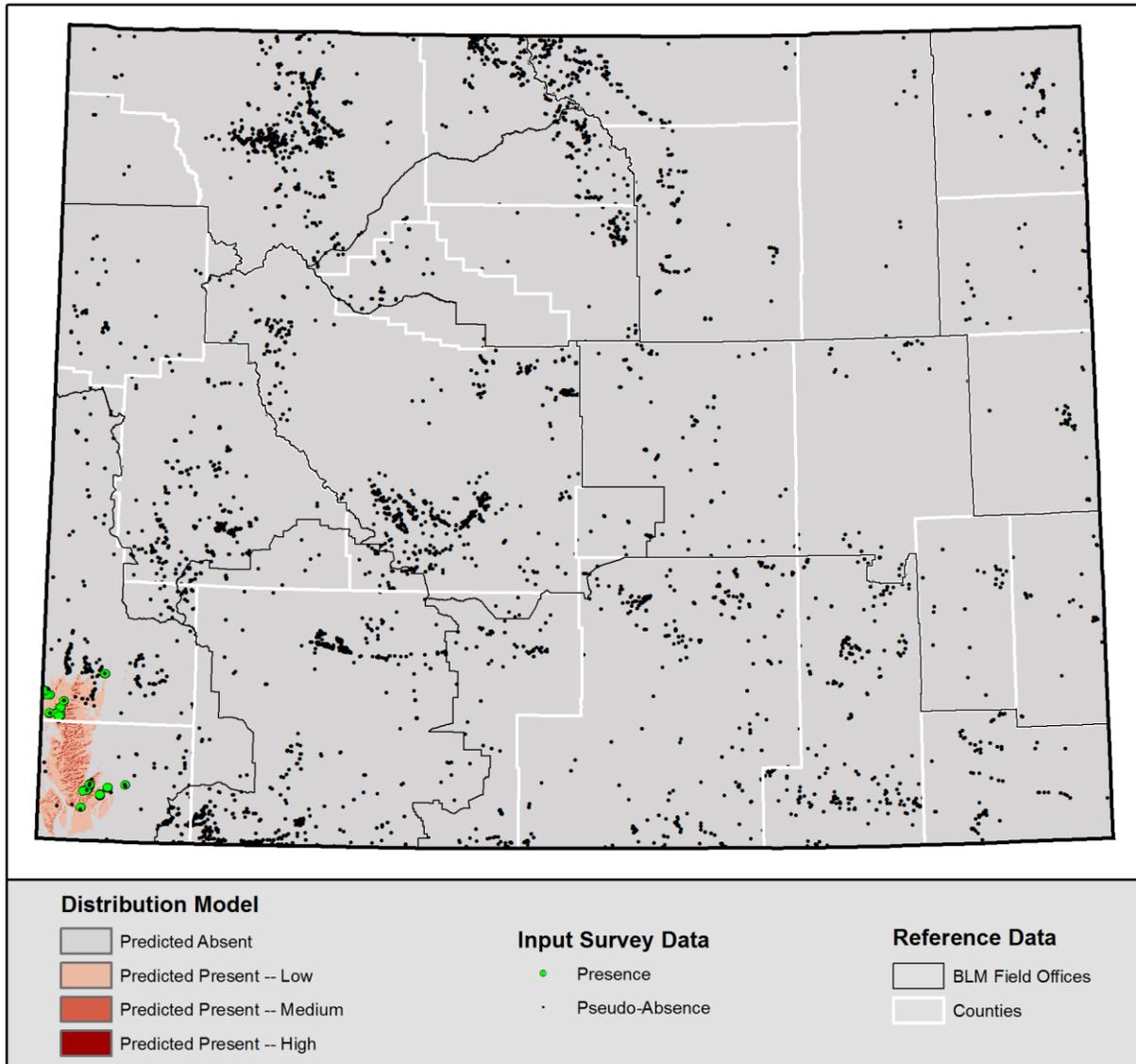
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Prostrate bladderpod (*Lesquerella prostrata*)

Model version: 2015-08-26



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.711
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.716	Predicted Absent (0)
0.716	0.938	Low (1)
0.938	1	Medium (2)
1	1	High (3)

## Model Details

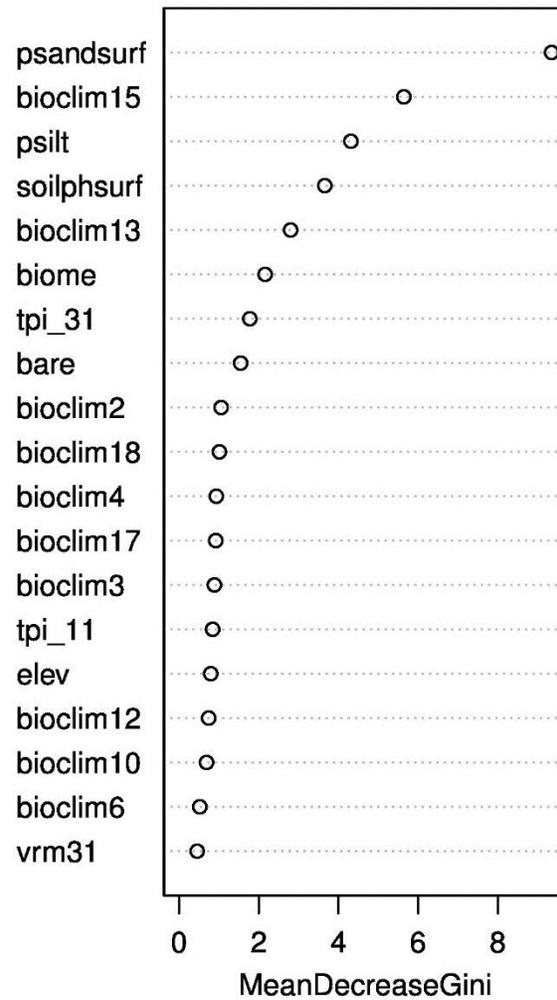
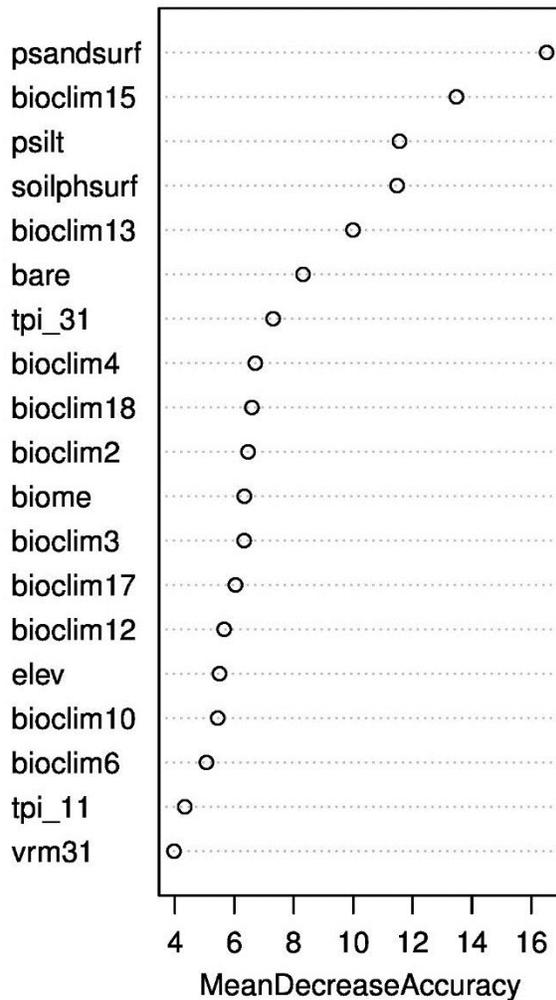
- **Number of Locations:** 27
- **Out-of-Bag Error:** 2.7%
- **TSS:** 92.9%
- **Kappa:** 92.7%
- **Sensitivity:** 94.9%
- **Specificity:** 98.0%

## Model Comments:

Regionally endemic plant species that are restricted to specific soil conditions are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. In addition, for calciphilic species such as Prostrate bladderpod, a surrogate layer was developed from bedrock geology layers to reflect calcium carbonate content.

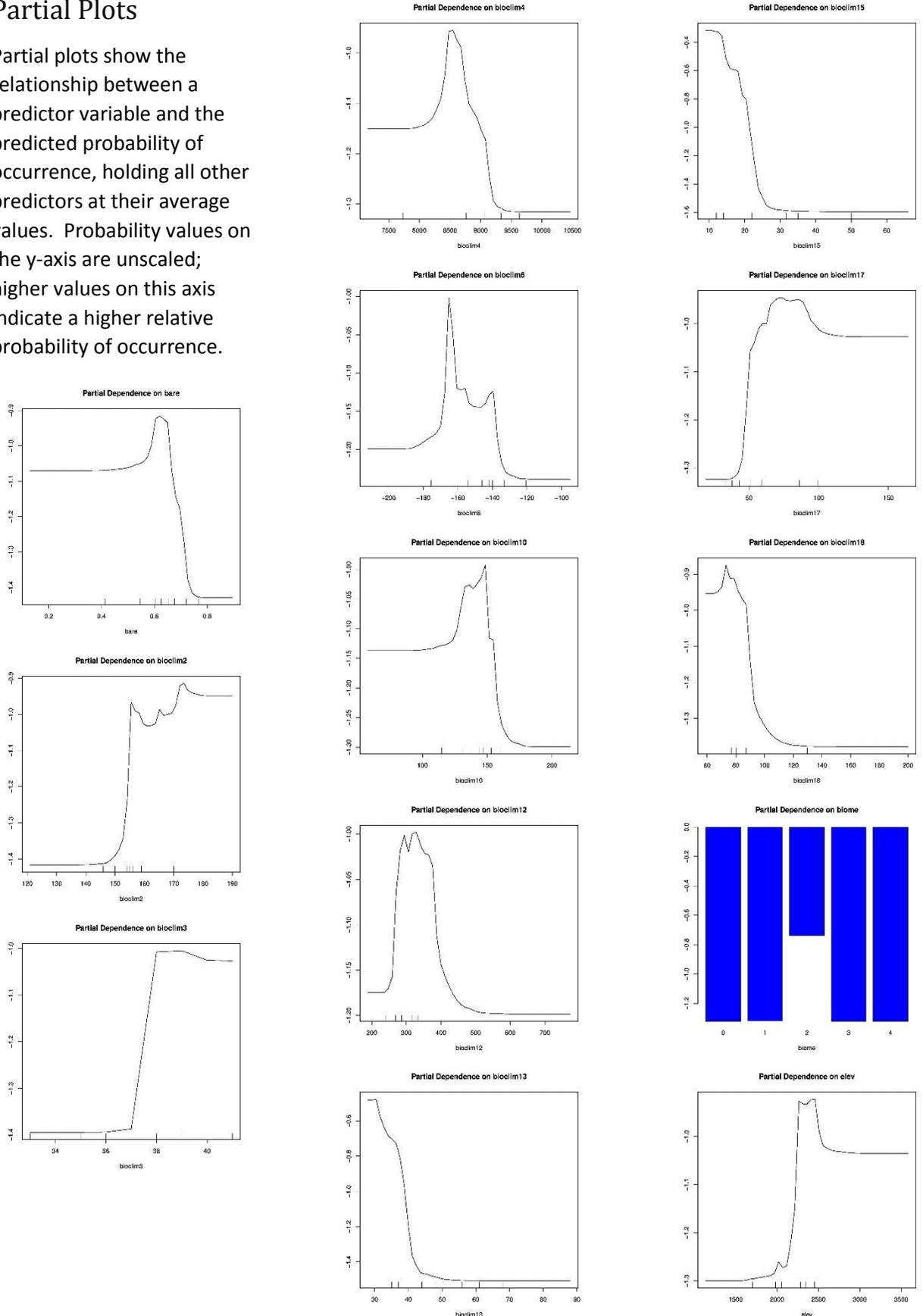
## Predictor Variable Importance:

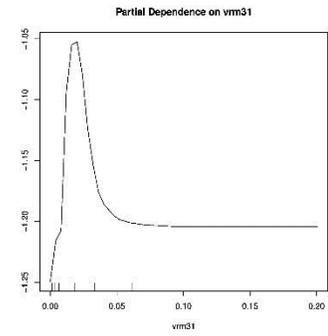
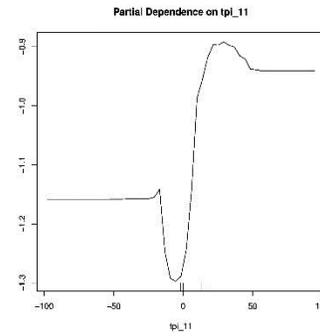
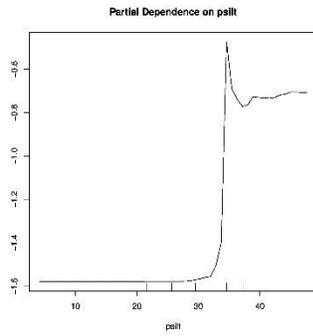
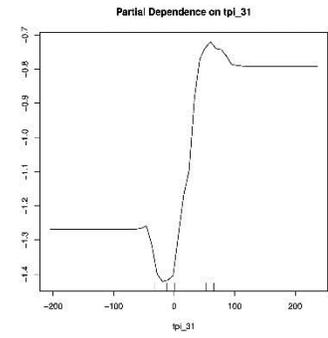
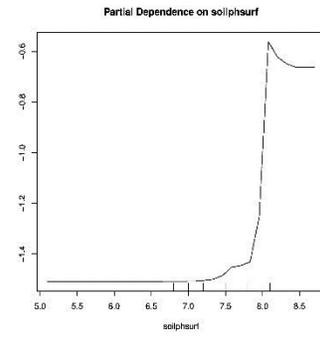
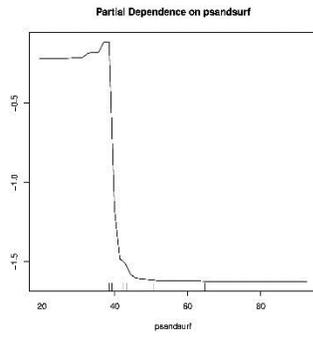
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

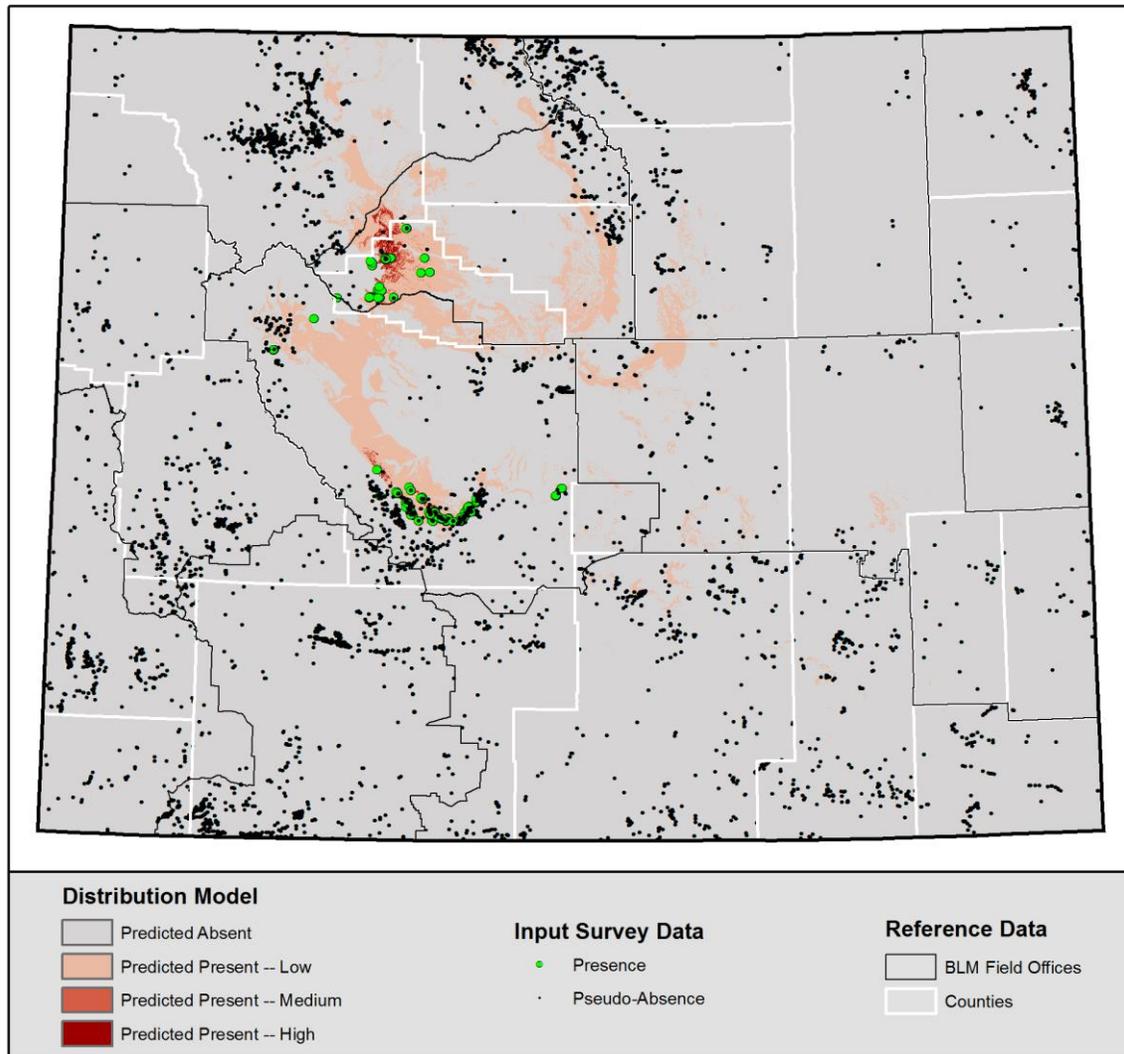
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Rocky Mountain twinpod (*Physaria saximontana* var. *saximontana*)

Model version: 2015-08-26



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.424
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.298	Predicted Absent (0)
0.298	0.818	Low (1)
0.818	0.970	Medium (2)
0.970	1	High (3)

## Model Details

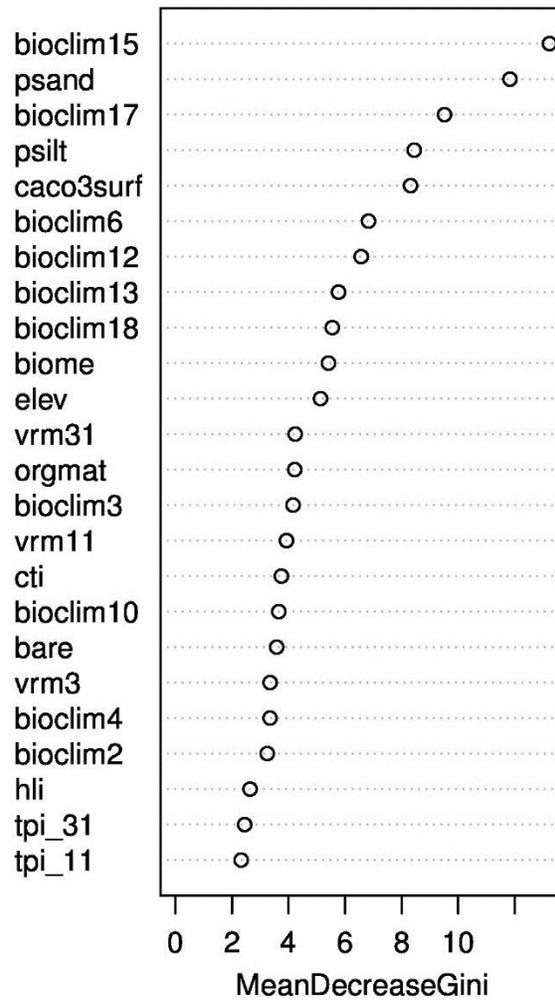
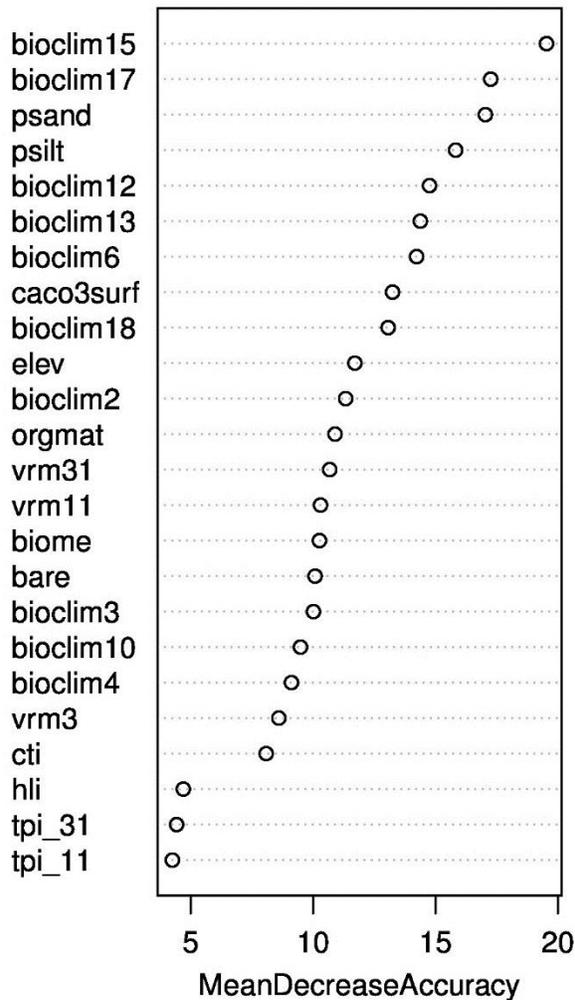
- **Number of Locations:** 88
- **Out-of-Bag Error:** 6.1%
- **TSS:** 82.3%
- **Kappa:** 83.5%
- **Sensitivity:** 85.7%
- **Specificity:** 96.6%

## Model Comments:

Endemic plant species that are restricted to specific soil conditions are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. As such, large areas of north-central Wyoming are shown as low probability potential habitat, and a number of presence points from occupied habitat are mapped as unsuitable.

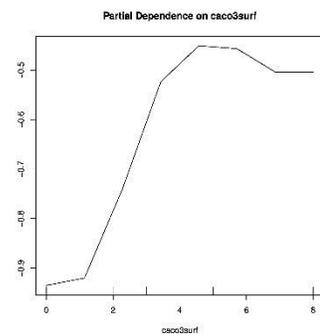
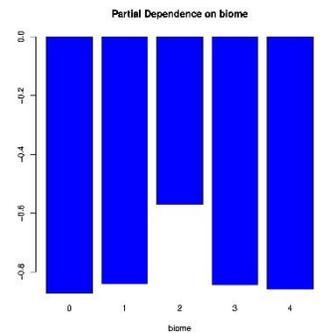
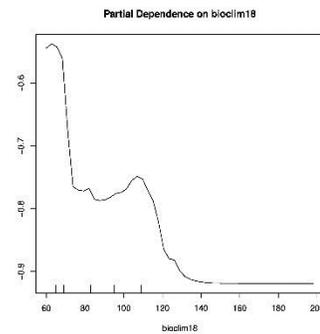
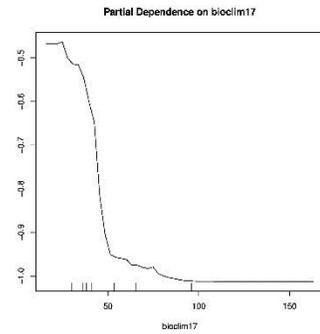
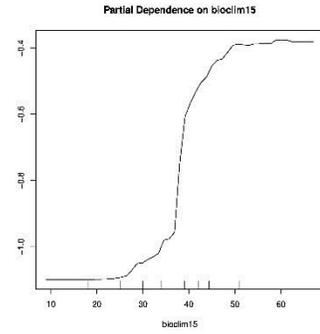
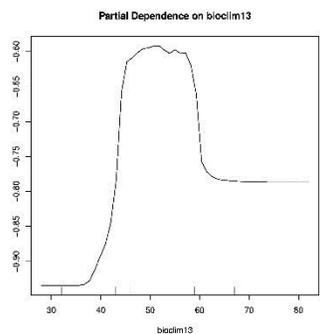
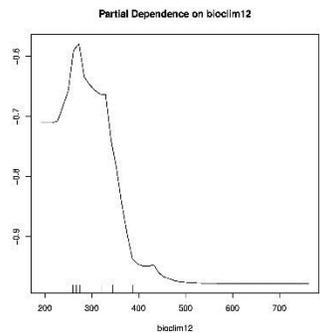
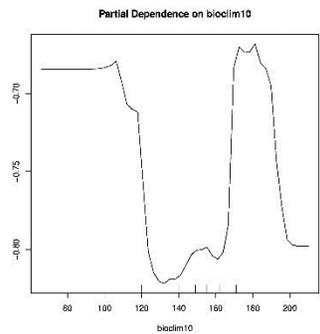
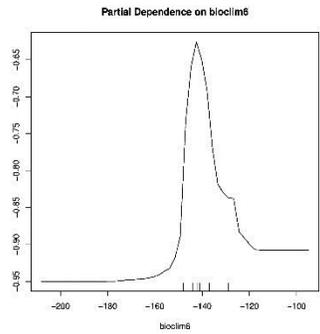
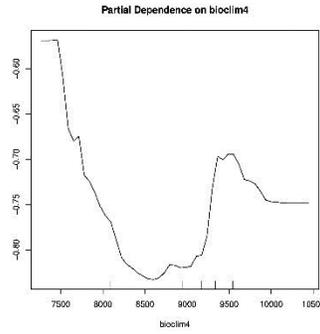
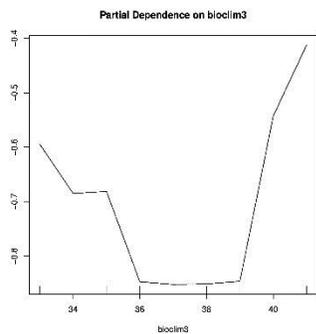
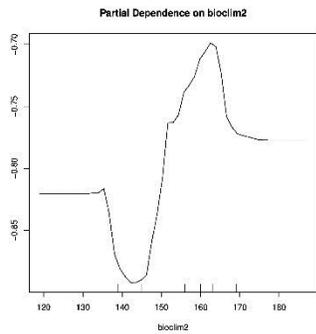
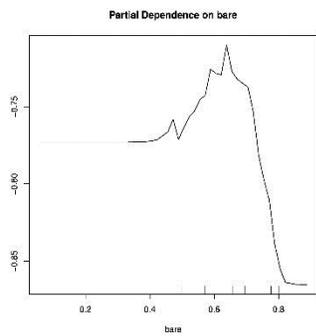
## Predictor Variable Importance:

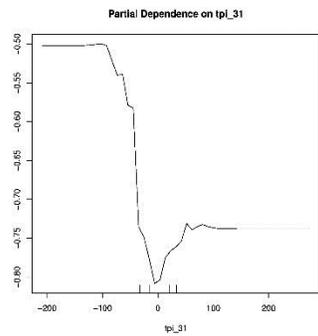
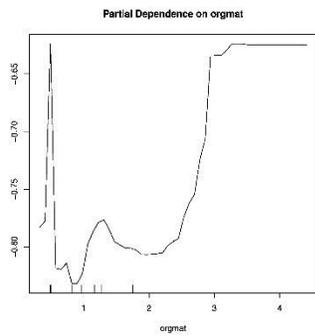
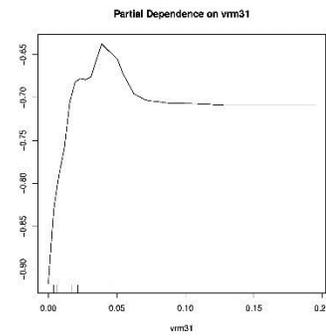
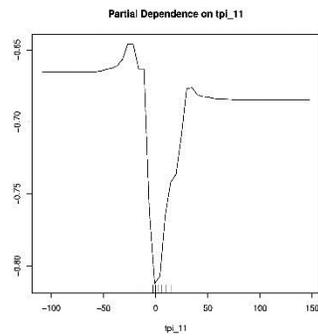
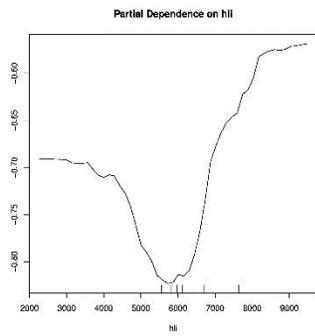
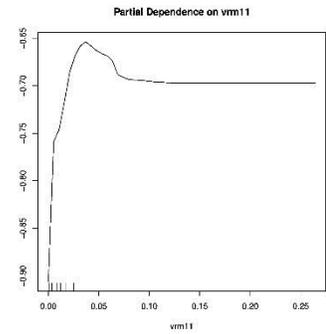
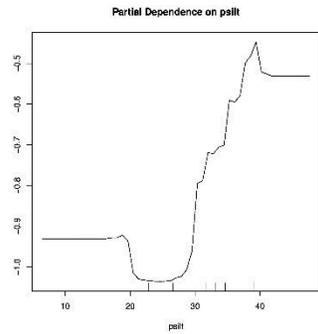
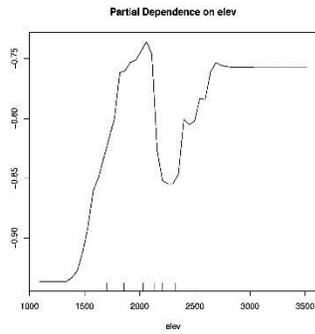
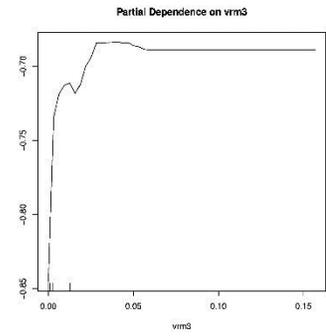
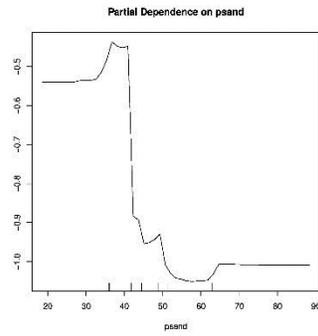
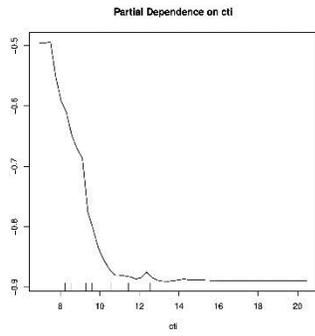
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

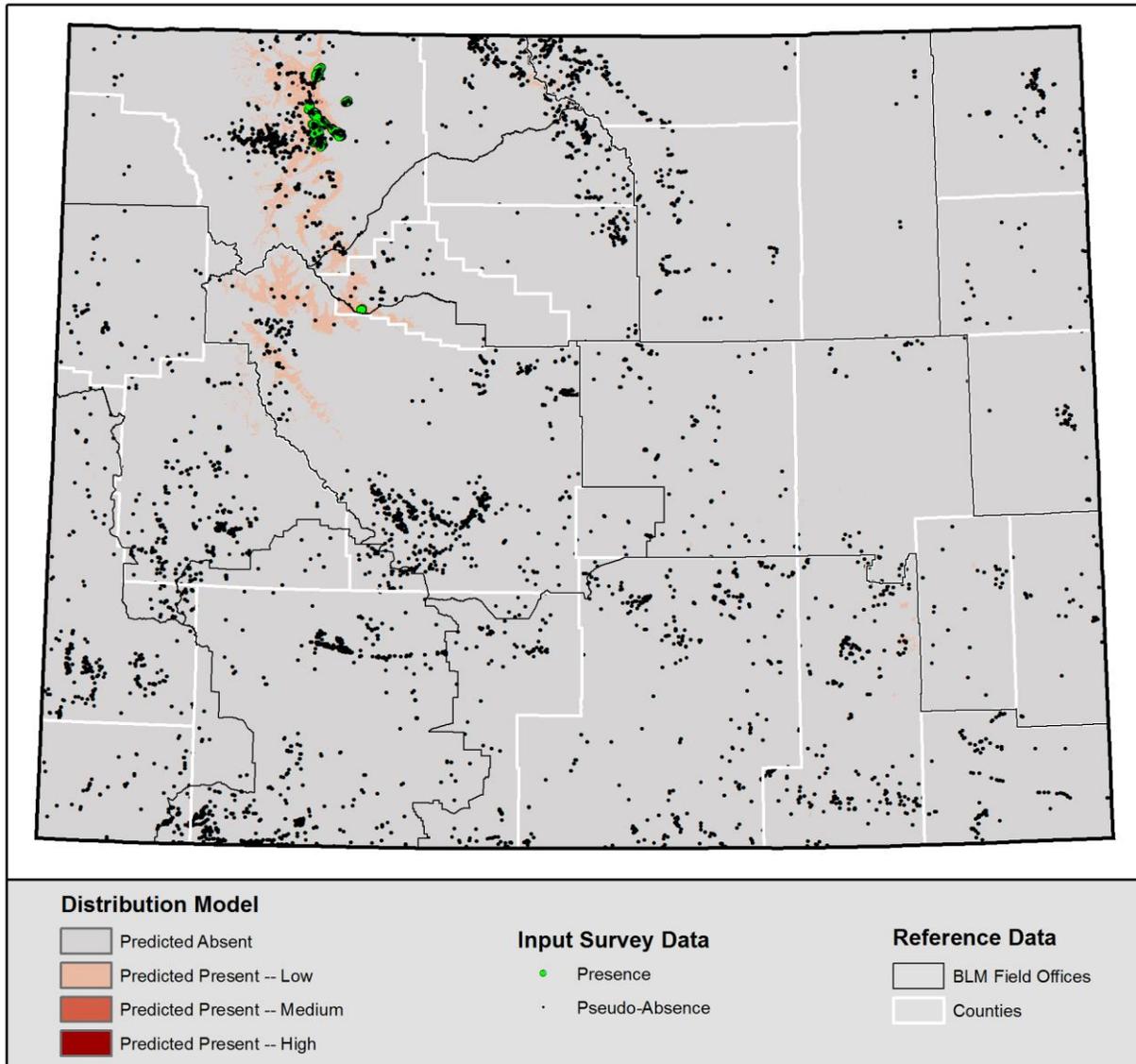
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Shoshonea (*Shoshonea pulvinata*)

Model version: 2015-08-24



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.421
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.242	Predicted Absent (0)
0.242	0.808	Low (1)
0.808	0.948	Medium (2)
0.948	1	High (3)

## Model Details

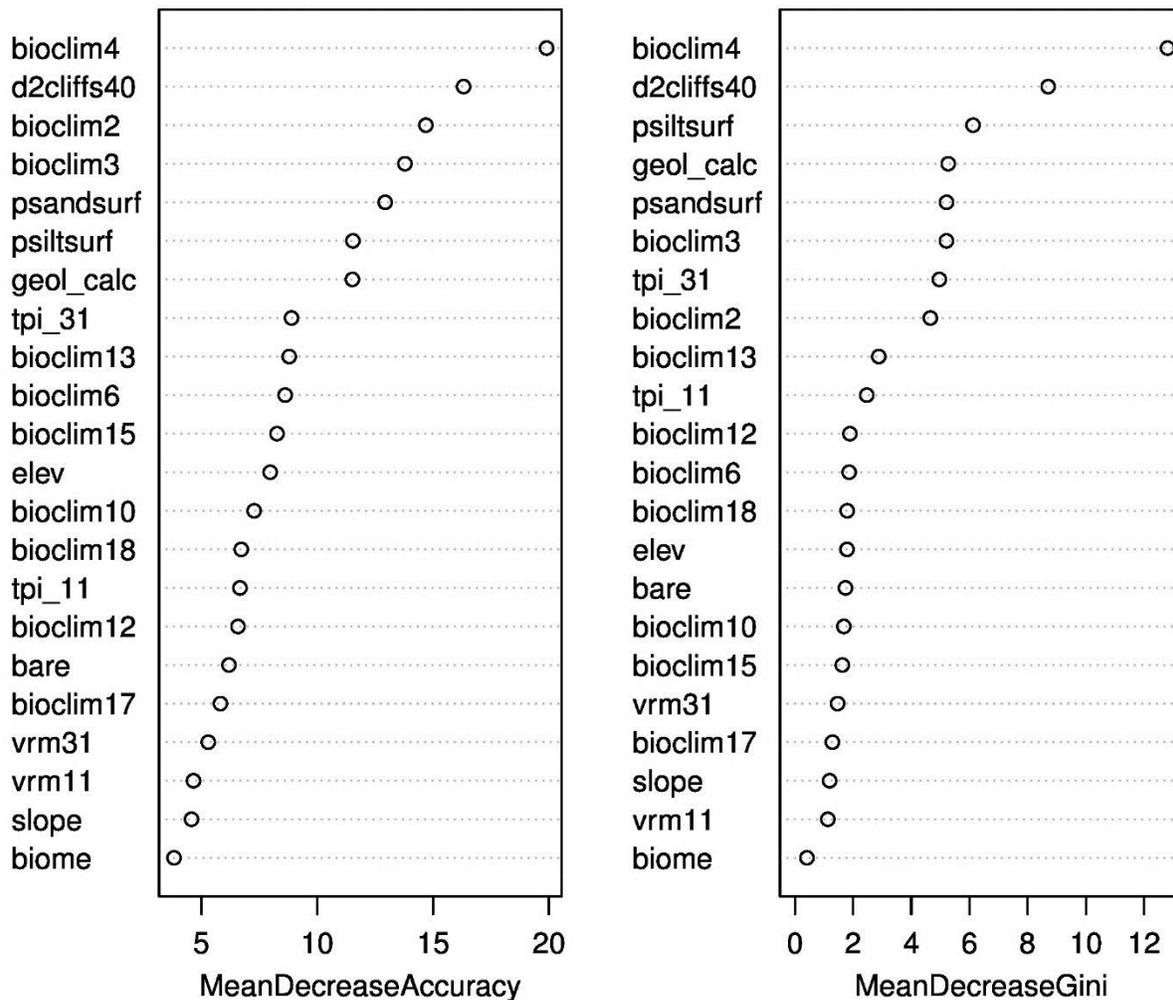
- **Number of Locations:** 51
- **Out-of-Bag Error:** 4.9%
- **TSS:** 87.2%
- **Kappa:** 87.0%
- **Sensitivity:** 90.5%
- **Specificity:** 96.7%

## Model Comments:

Regionally endemic plant species that are restricted to specific soil conditions are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. In addition, for calciphilic species such as *Shoshonea*, a surrogate layer was developed from bedrock geology layers to reflect calcium carbonate content. The geological complexity and crudeness of the surrogate layer might account for the breadth of low probability potential habitat.

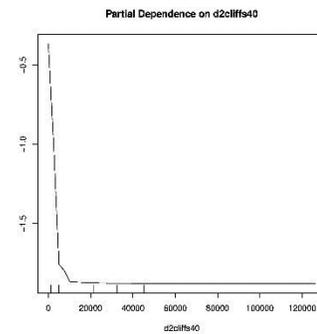
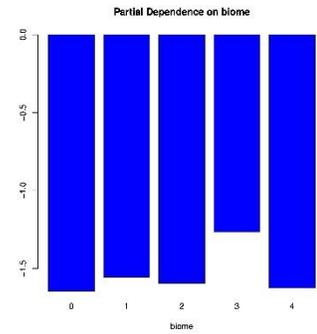
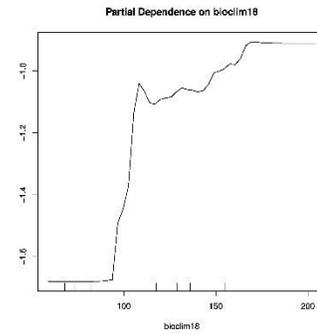
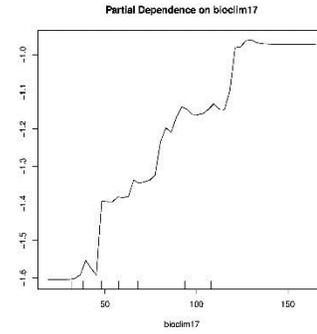
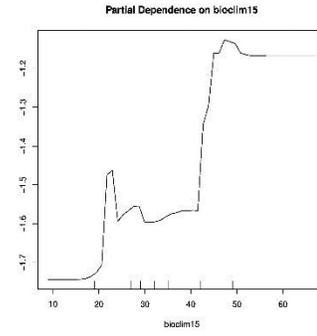
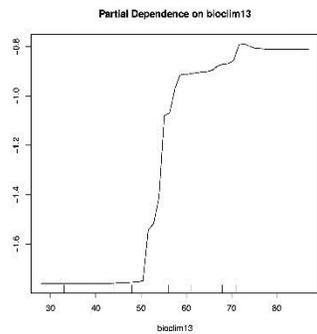
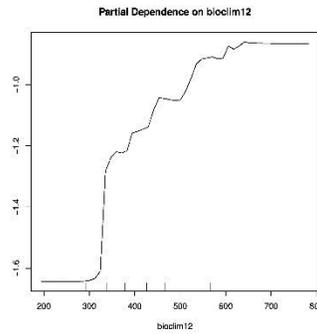
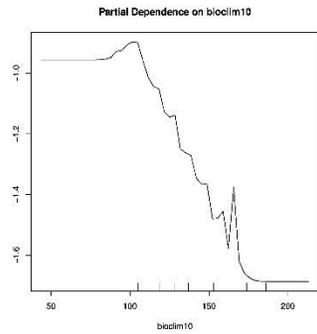
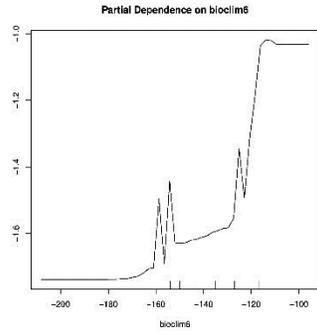
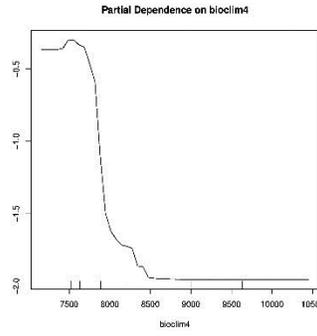
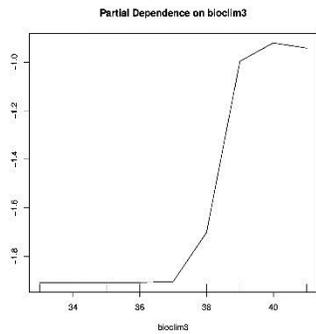
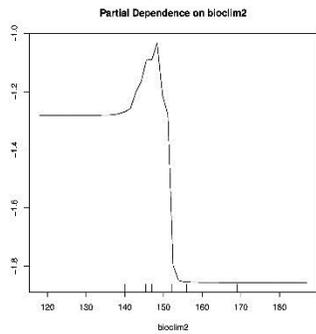
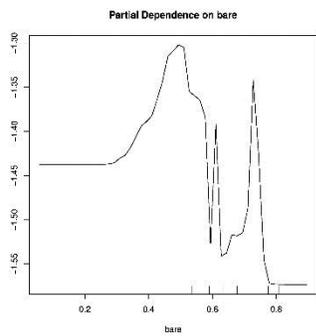
## Predictor Variable Importance:

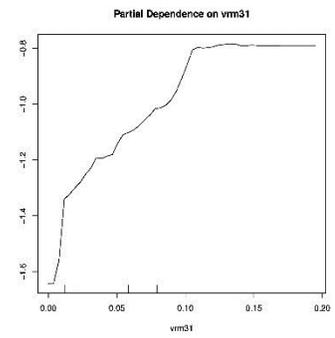
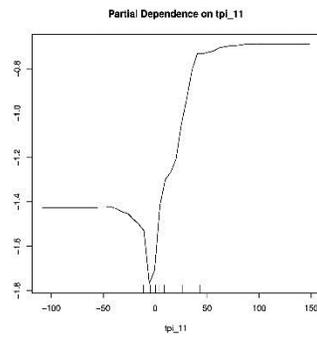
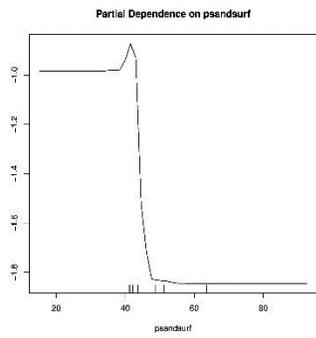
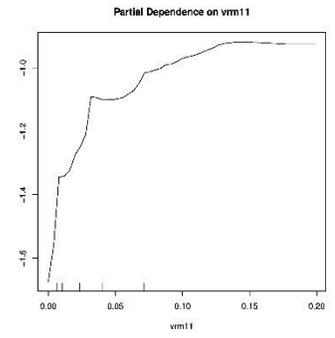
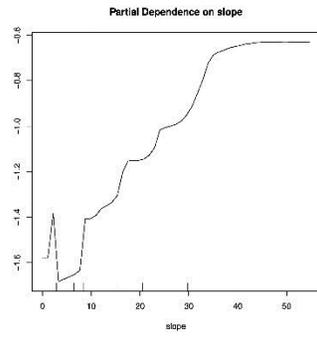
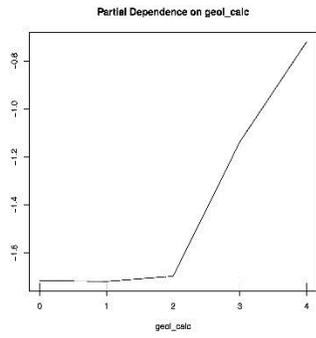
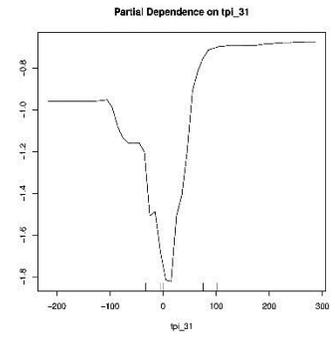
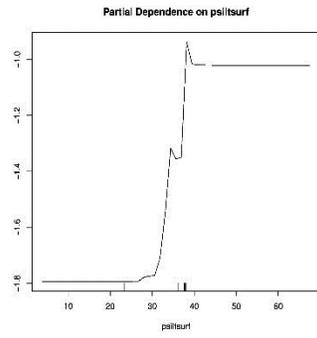
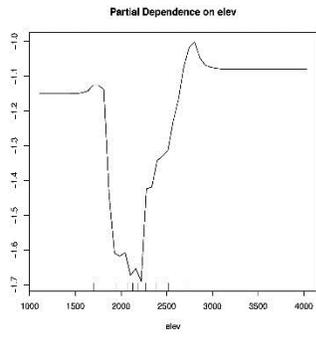
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

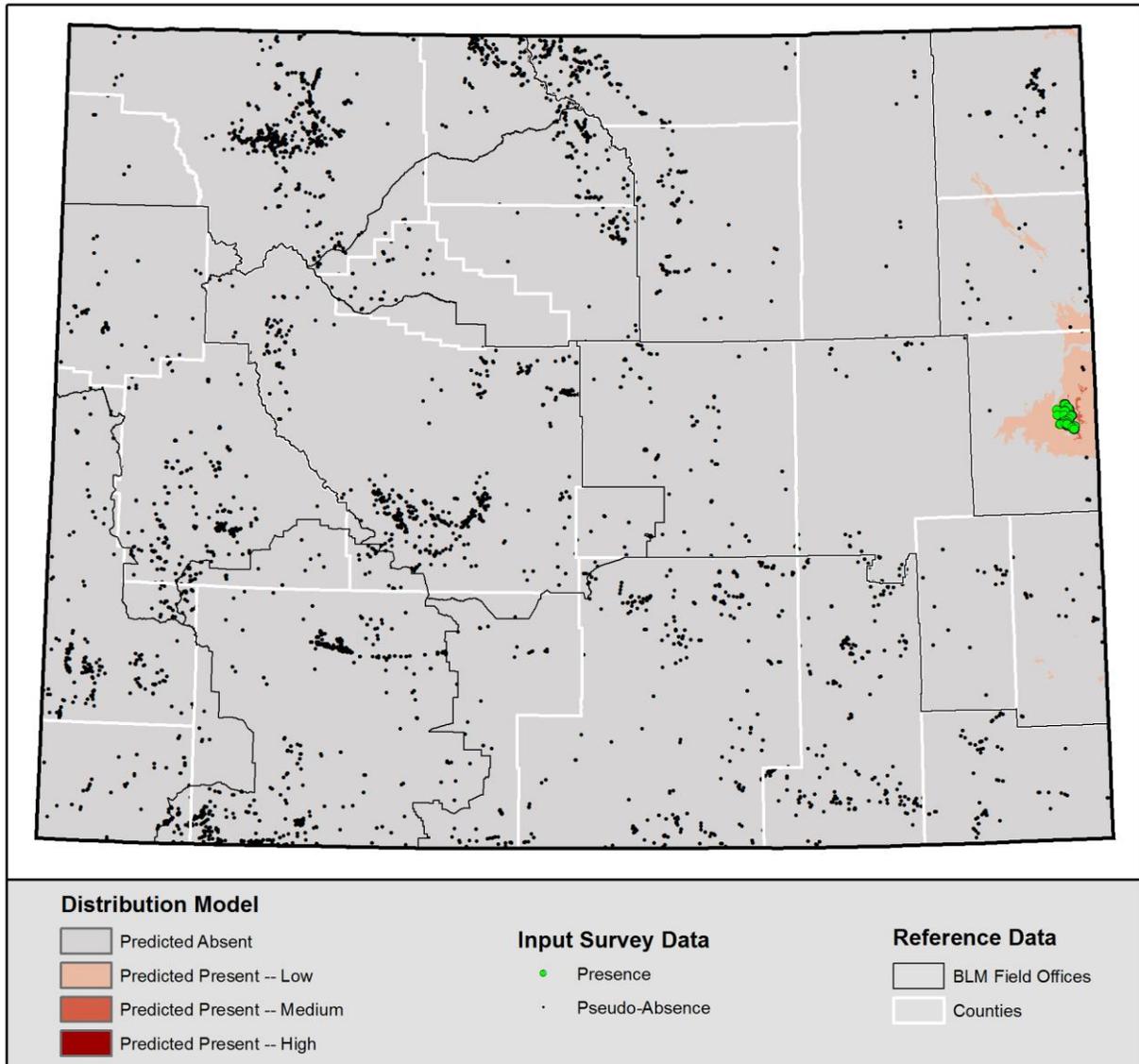
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Sidesaddle bladderpod (*Lesquerella arenosa* var. *argillosa*)

Model version: 2014-07-24



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.511
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.542	Predicted Absent (0)
0.542	0.990	Low (1)
0.990	1	Medium (2)
1	1	High (3)

## Model Details

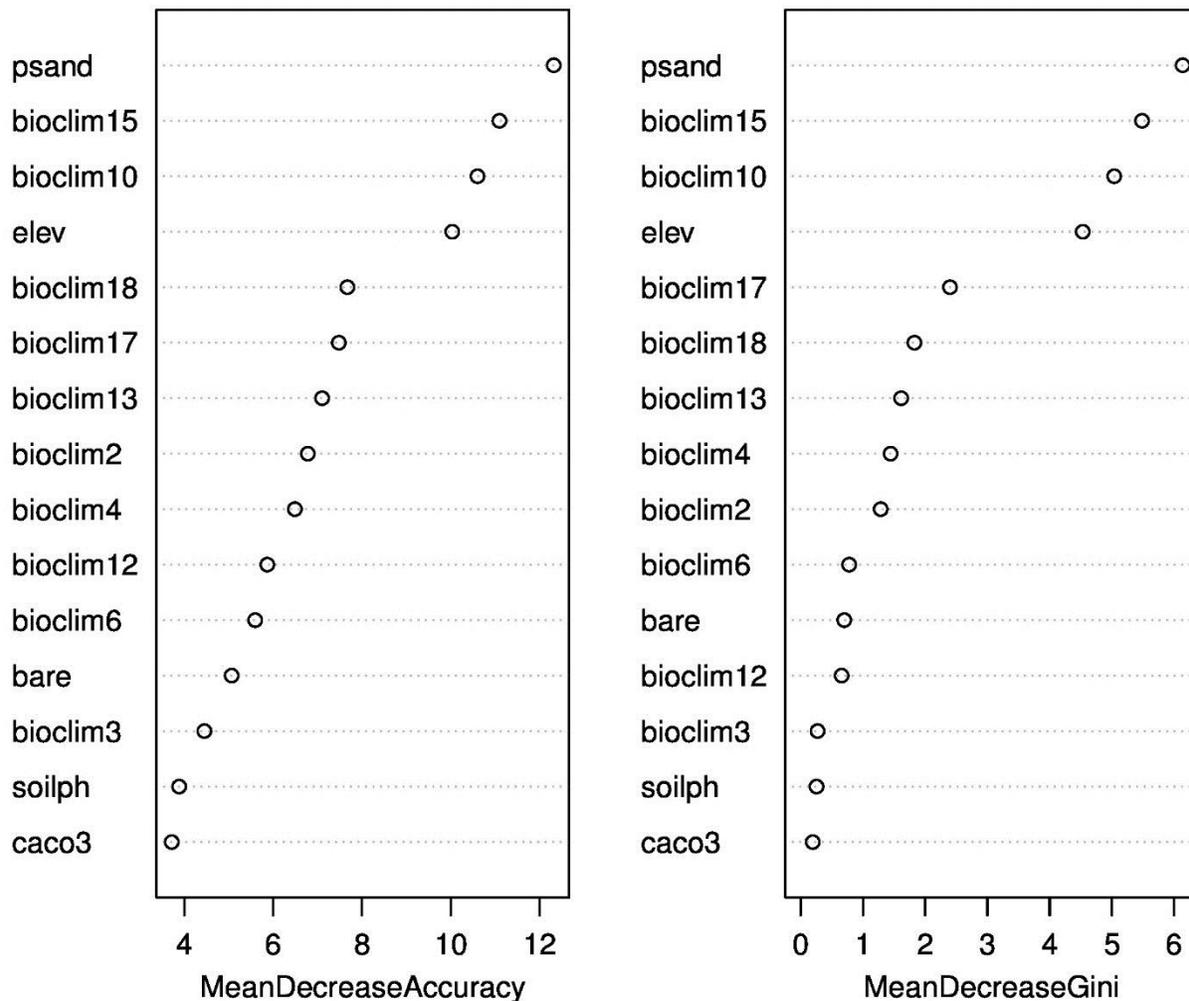
- **Number of Locations:** 21
- **Out-of-Bag Error:** 0.5%
- **TSS:** 99.3%
- **Kappa:** 98.7%
- **Sensitivity:** 100.0%
- **Specificity:** 99.4%

## Model Comments:

Regionally endemic plant species that are restricted to specific soil conditions are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. In addition, for calciphilic species such as Sidesaddle bladderpod, a surrogate layer was developed from bedrock geology layers to reflect calcium carbonate content.

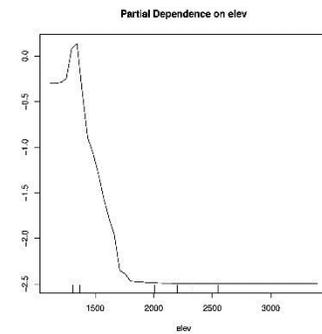
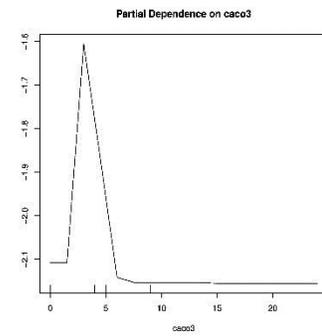
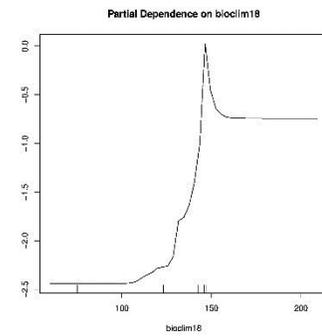
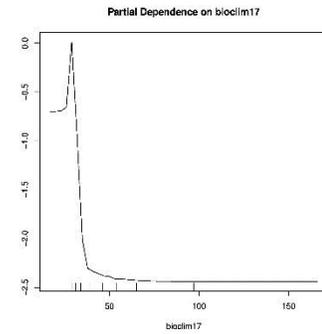
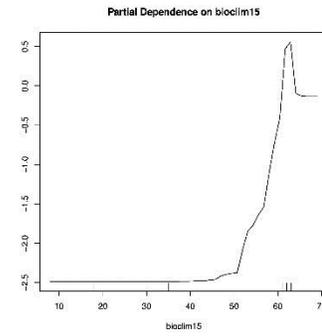
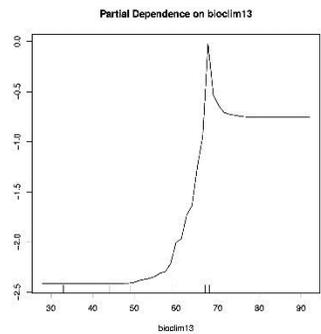
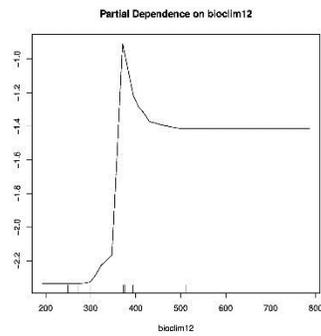
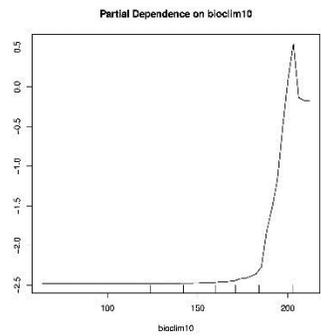
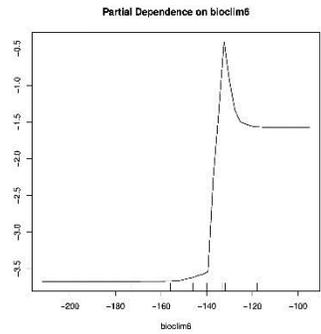
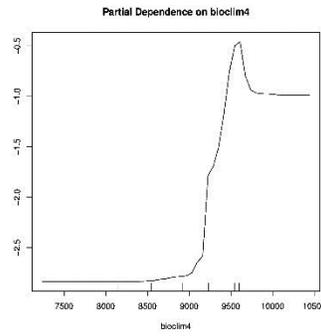
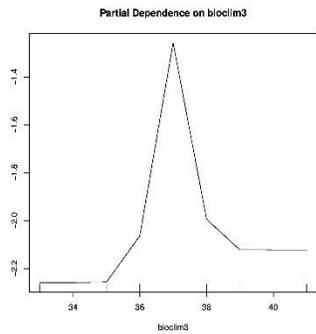
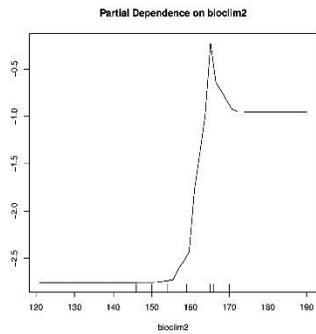
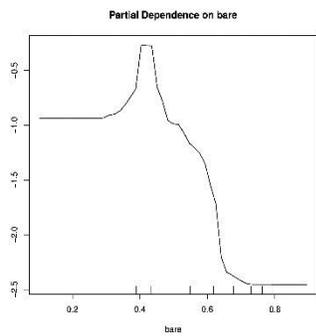
## Predictor Variable Importance:

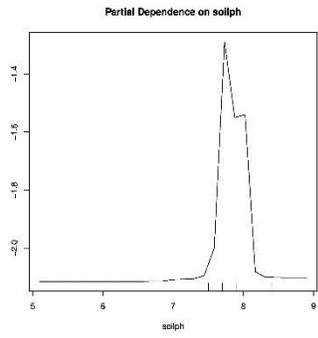
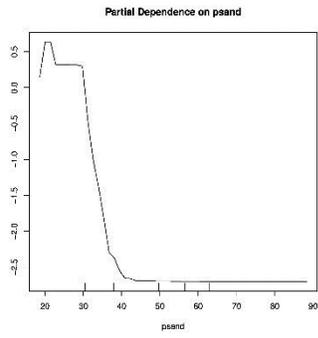
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

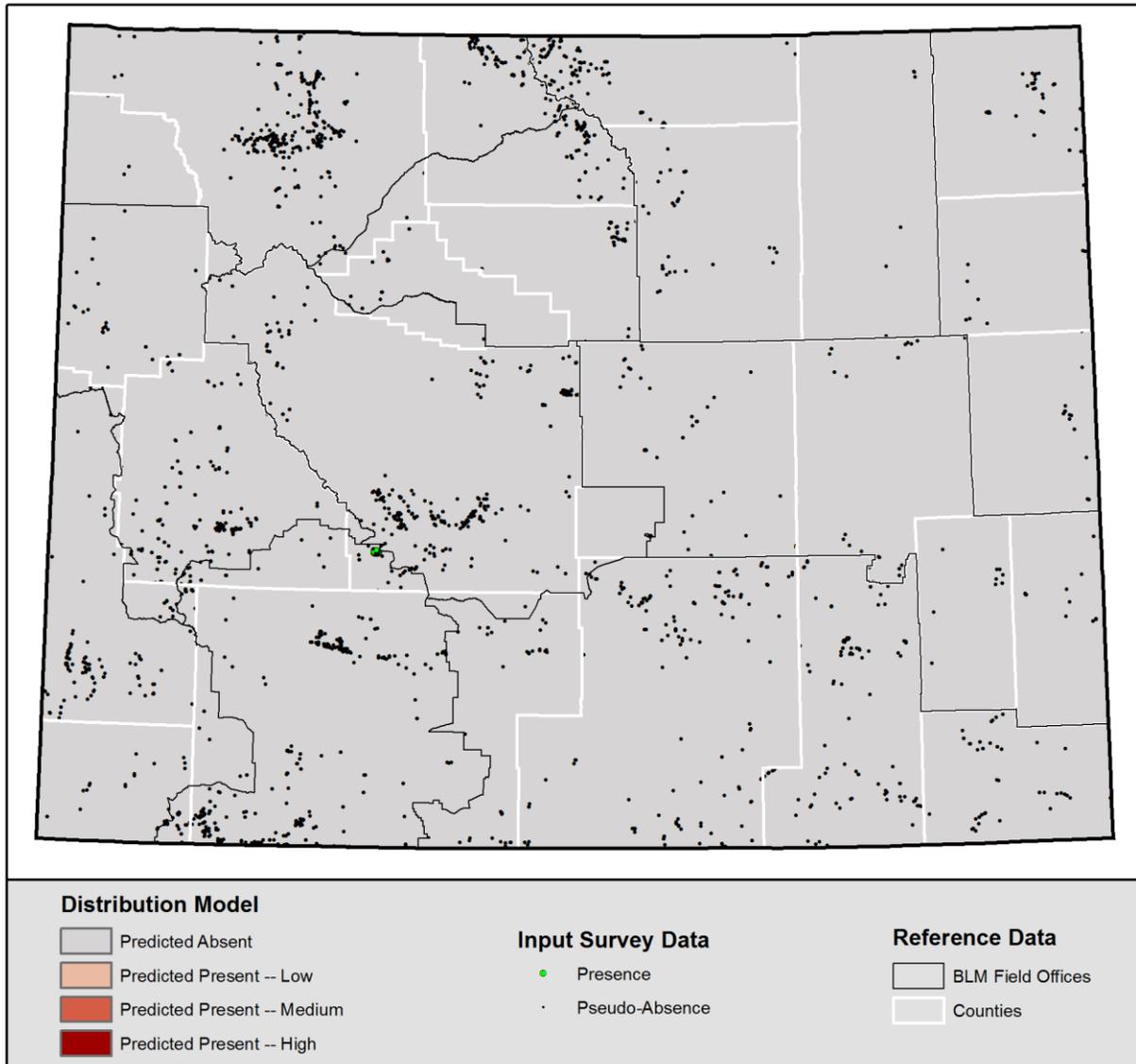
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Small rockcress (*Boechera pusilla*)

Model version: 2015-08-25



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.857
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.876	Predicted Absent (0)
0.876	0.964	Low (1)
0.964	0.995	Medium (2)
0.995	1	High (3)

## Model Details

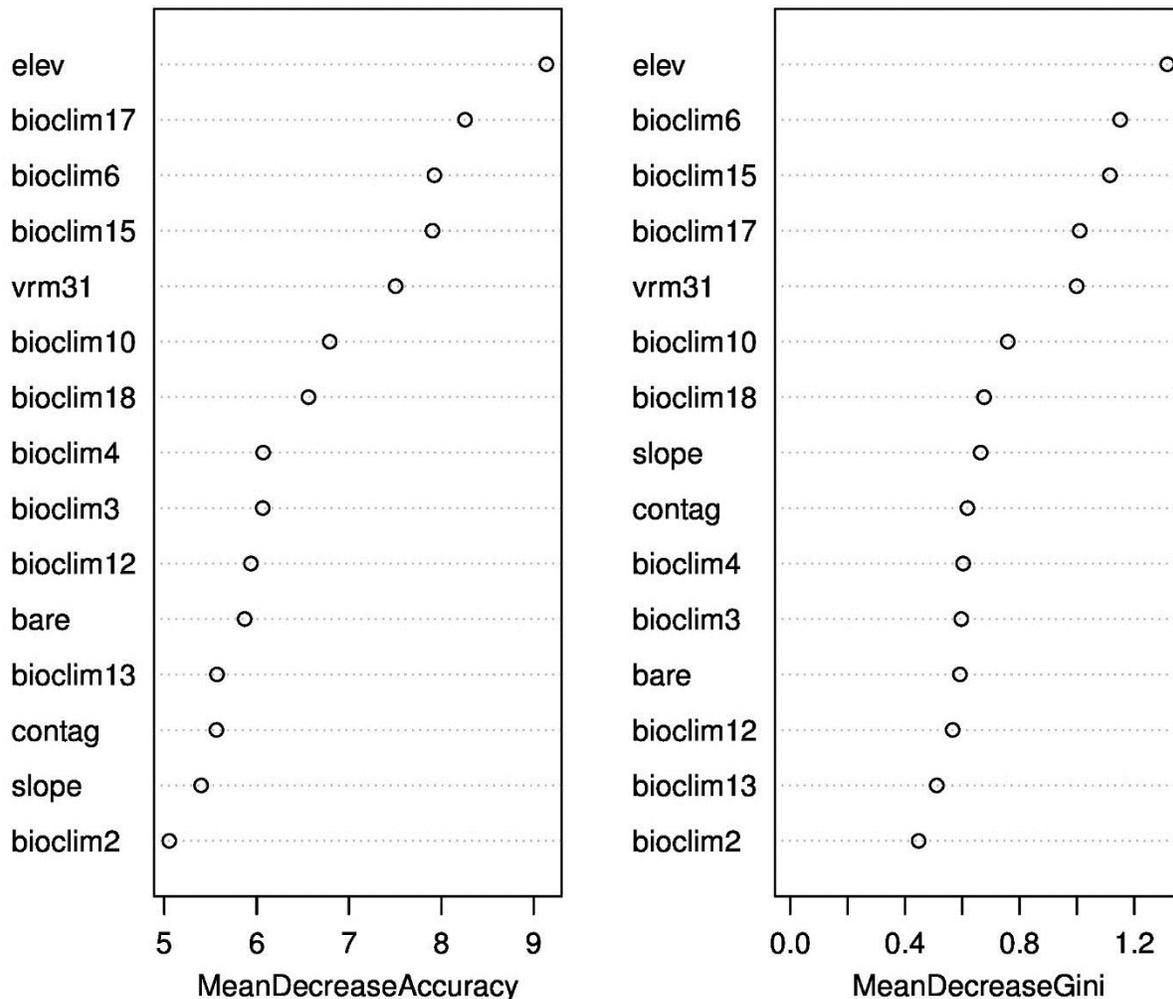
- **Number of Locations:** 8
- **Out-of-Bag Error:** 0.5%
- **TSS:** 99.3%
- **Kappa:** 98.6%
- **Sensitivity:** 100.0%
- **Specificity:** 99.3%

## Model Comments:

Endemic plant species that are restricted to specific soil conditions and microhabitats are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. The performance of the Small rockcress model was also constrained by the paucity of presence points for this narrow endemic, further complicated by the fact that some of the smallest areas of occupied habitat have highest numbers, indicating relative suitability.

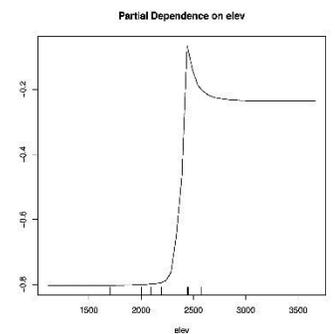
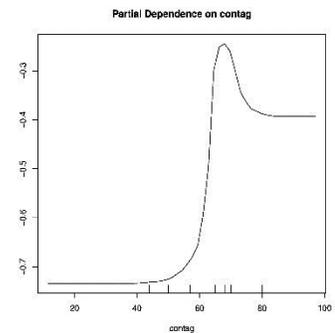
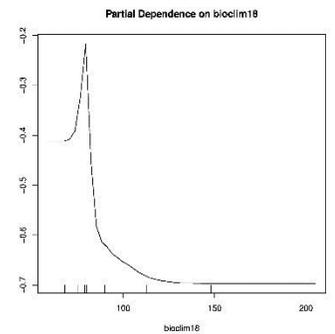
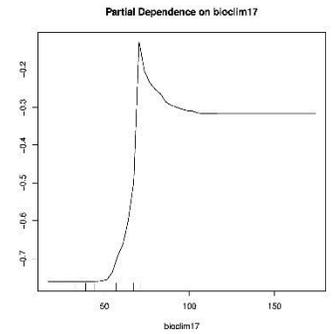
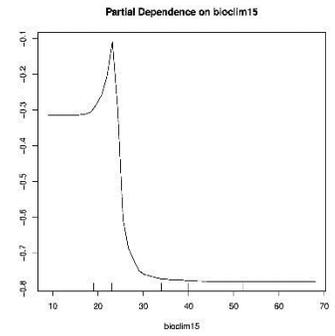
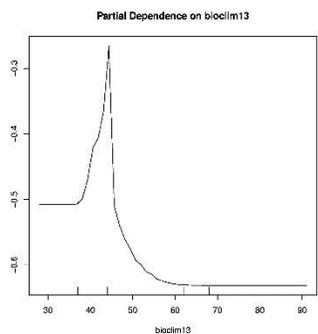
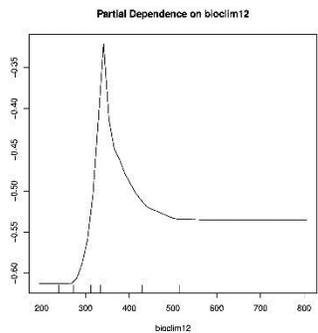
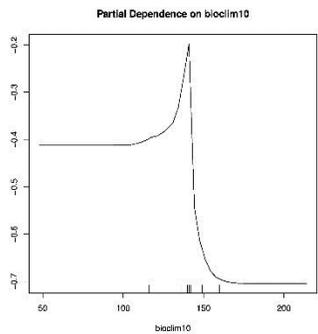
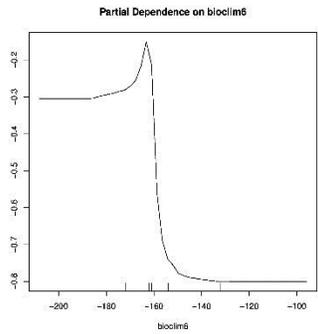
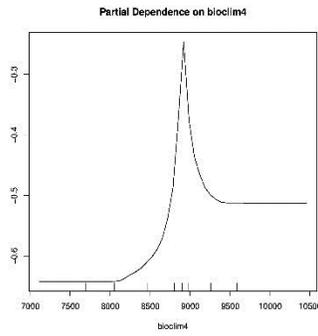
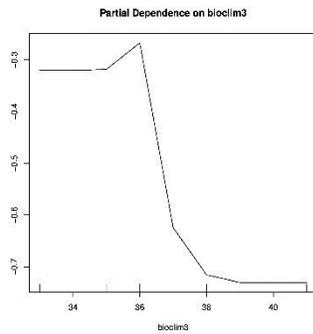
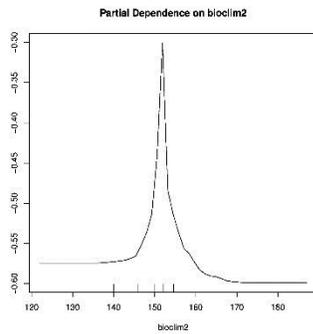
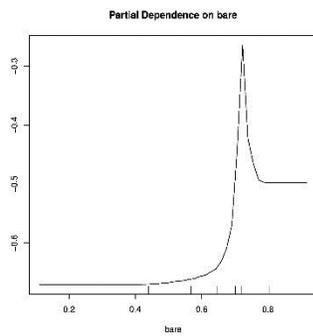
## Predictor Variable Importance:

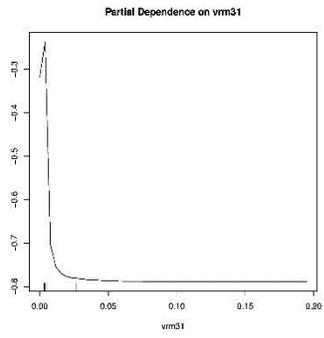
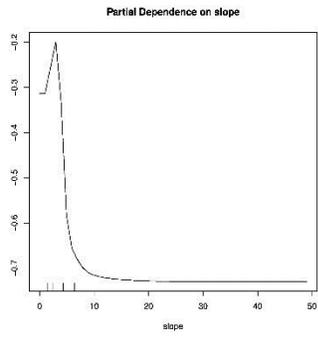
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

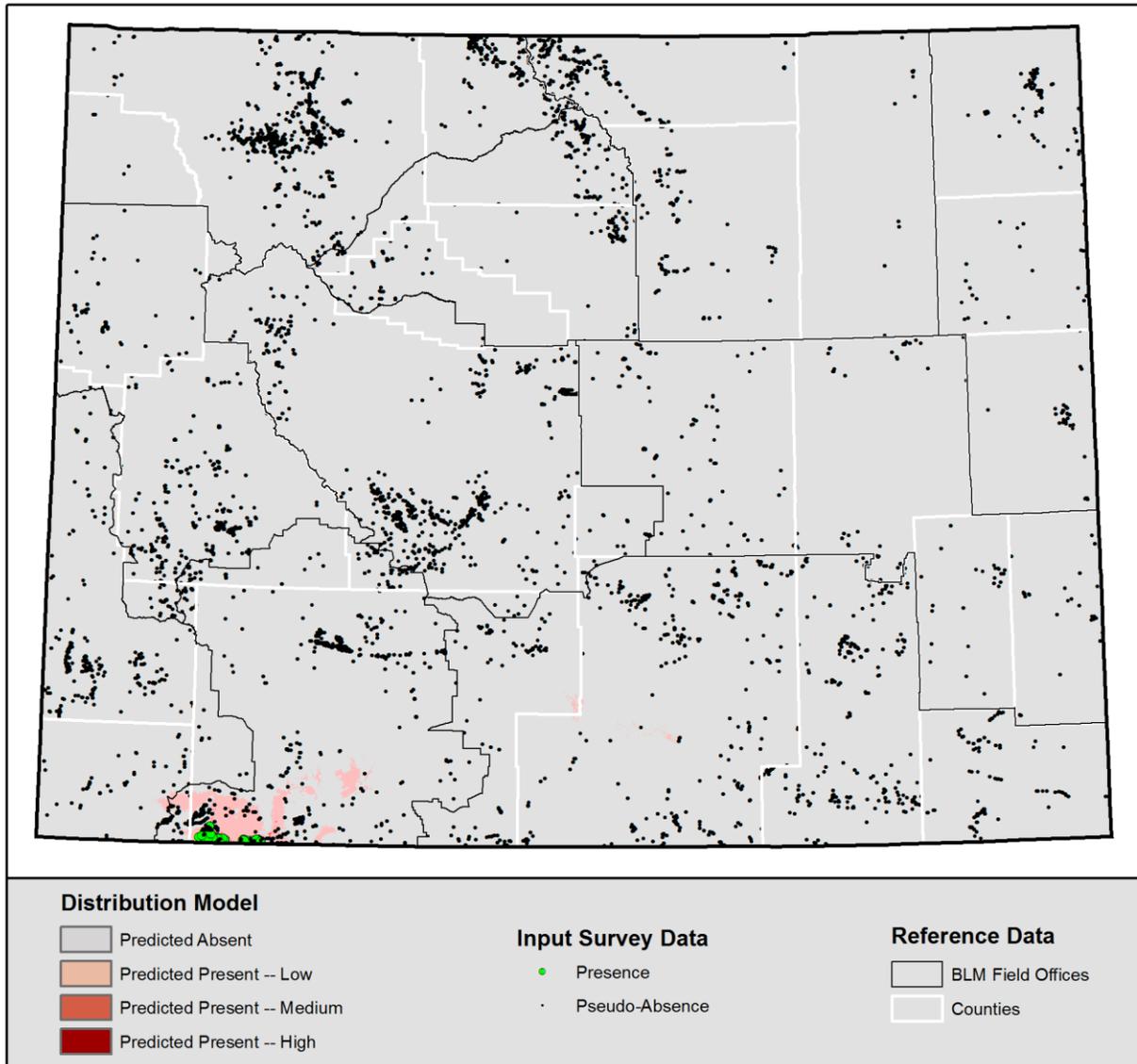
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Stemless beardtongue (*Penstemon acaulis*)

Model version: 2015-08-28



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.582
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.474	Predicted Absent (0)
0.474	0.968	Low (1)
0.968	0.996	Medium (2)
0.966	1	High (3)

## Model Details

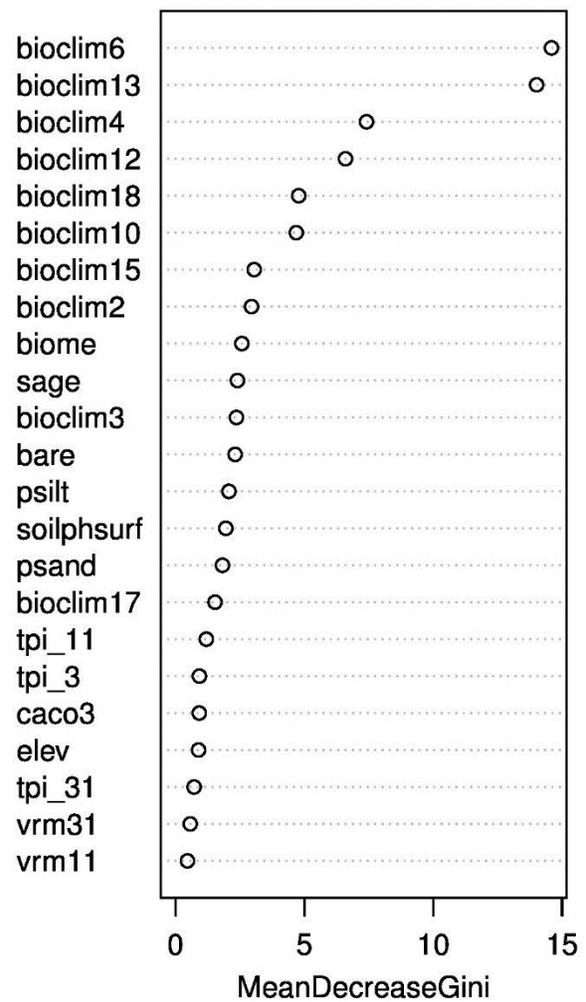
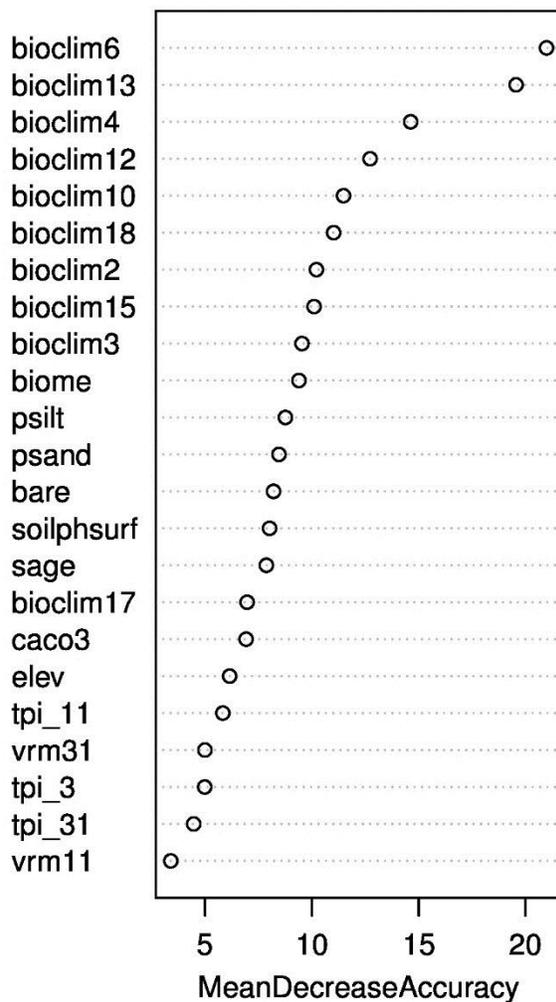
- **Number of Locations:** 54
- **Out-of-Bag Error:** 1.9%
- **TSS:** 95.6%
- **Kappa:** 95.1%
- **Sensitivity:** 97.1%
- **Specificity:** 98.5%

## Model Comments:

Regionally endemic plant species that are restricted to specific soil conditions and microhabitats are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. Stemless beardtongue is restricted to soils derived from the Bridger Formation, including colluvium.

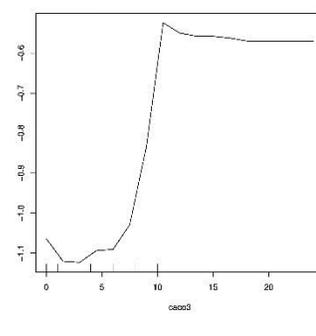
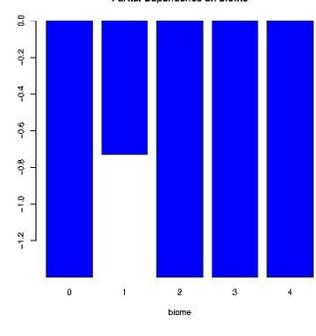
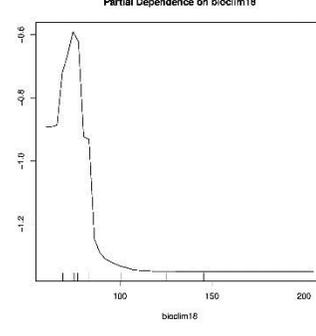
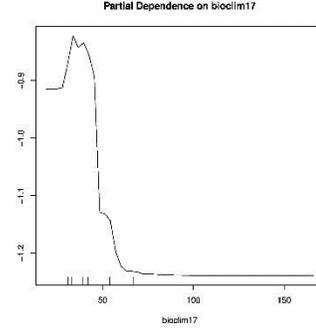
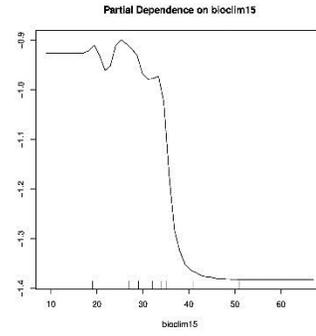
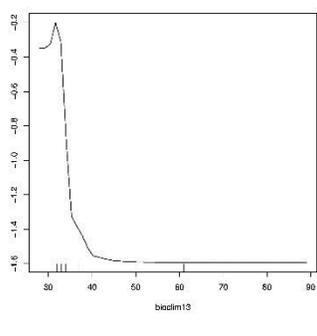
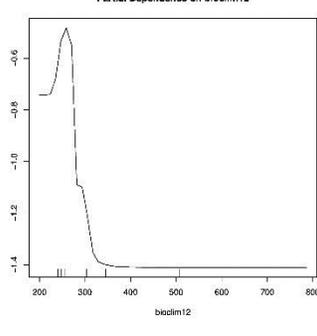
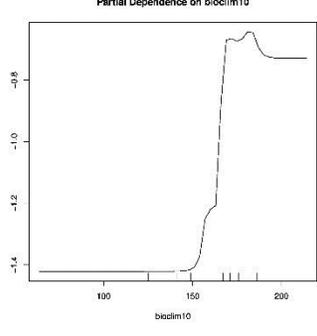
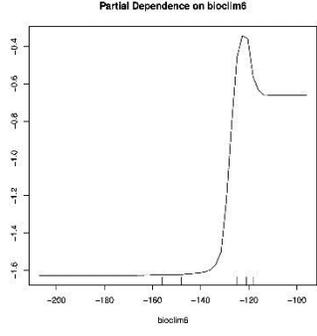
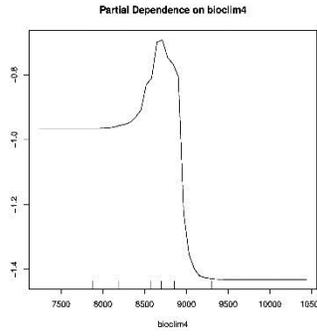
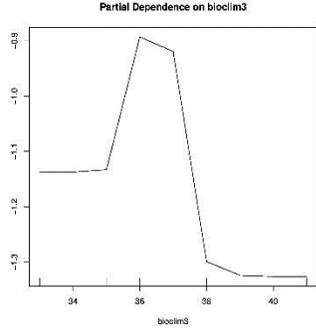
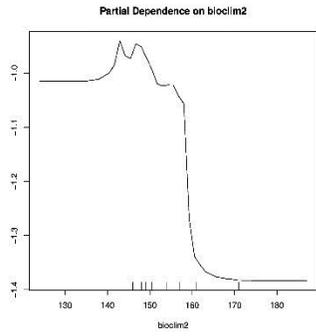
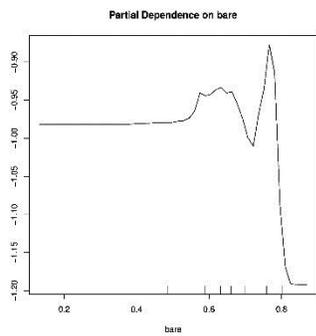
## Predictor Variable Importance:

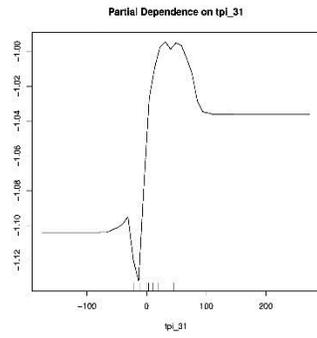
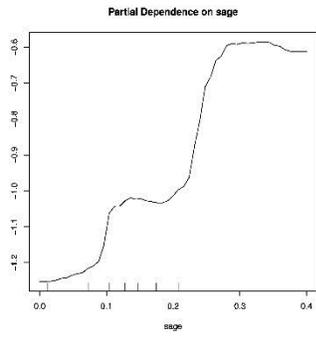
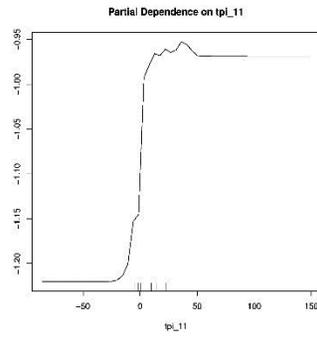
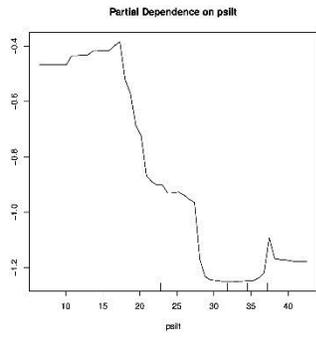
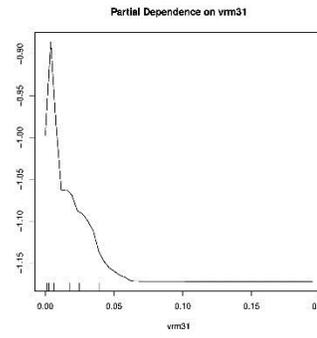
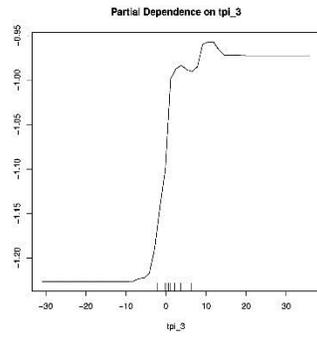
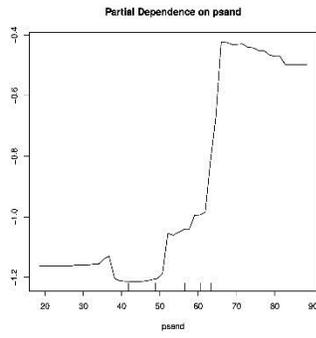
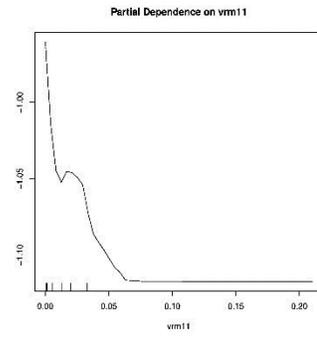
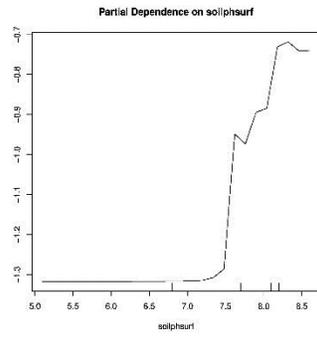
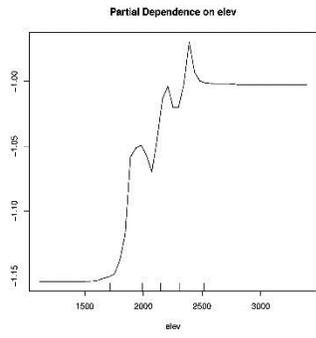
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

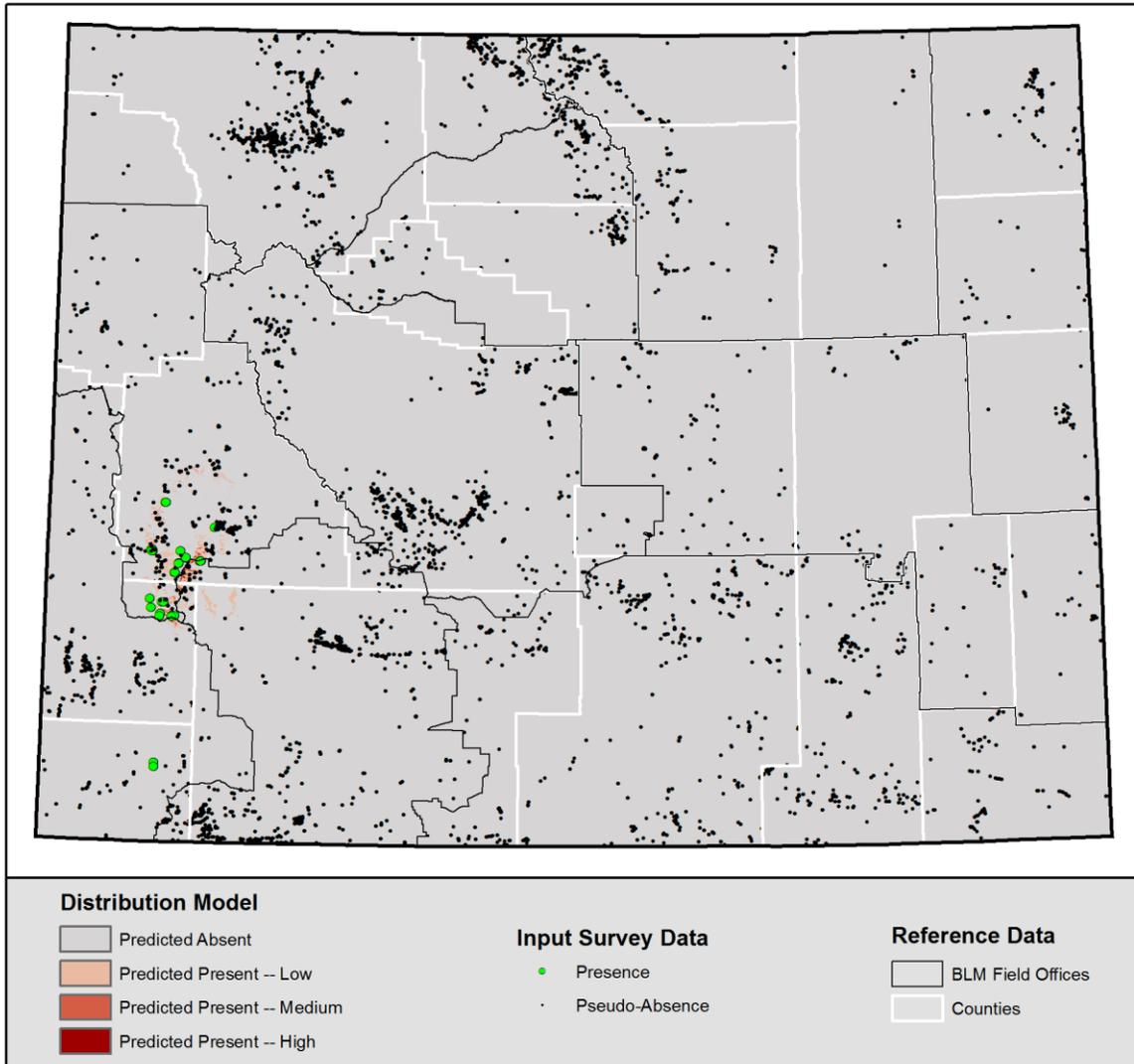
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Trelease's racemose milkvetch (*Astragalus racemosus* var. *treleasei*)

Model version: 2015-08-27



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.757
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.758	Predicted Absent (0)
0.758	0.942	Low (1)
0.942	0.994	Medium (2)
0.994	1	High (3)

## Model Details

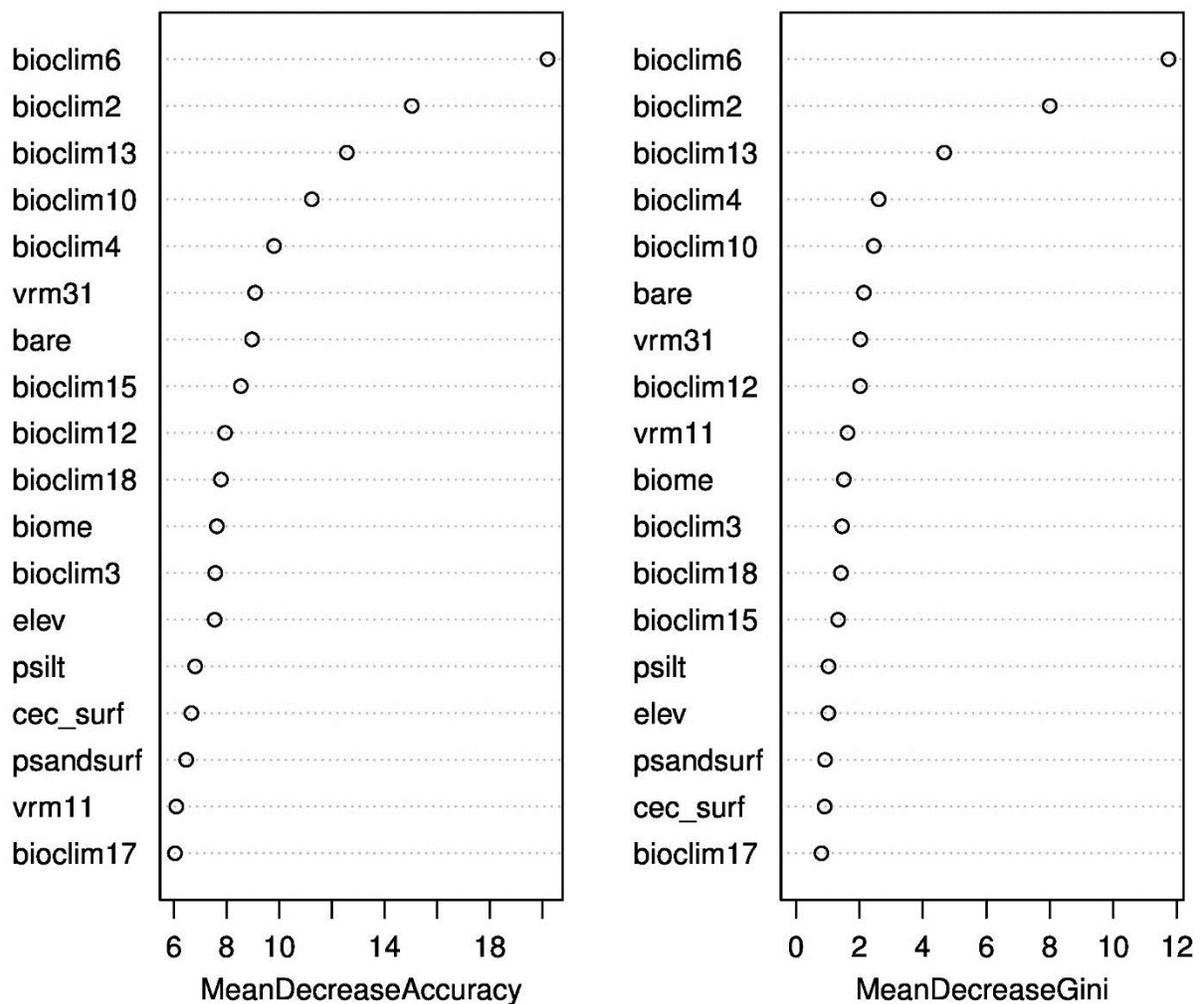
- **Number of Locations:** 32
- **Out-of-Bag Error:** 4.9%
- **TSS:** 88.9%
- **Kappa:** 87.2%
- **Sensitivity:** 93.2%
- **Specificity:** 95.8%

## Model Comments:

Regionally endemic plant species that are restricted to specific soil conditions and microhabitats are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties.

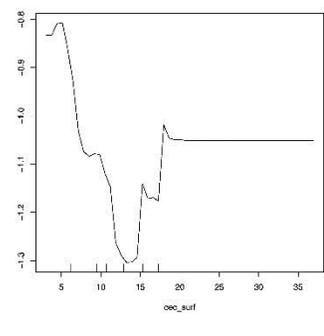
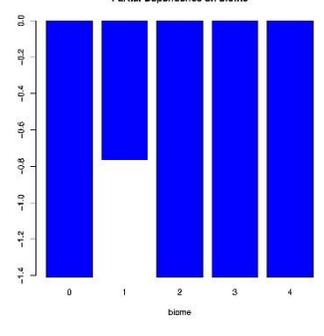
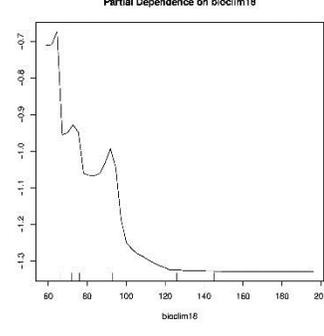
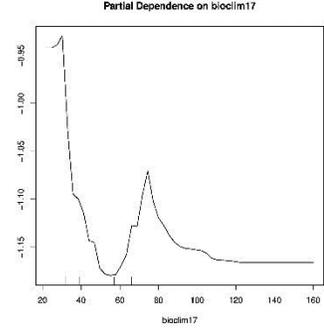
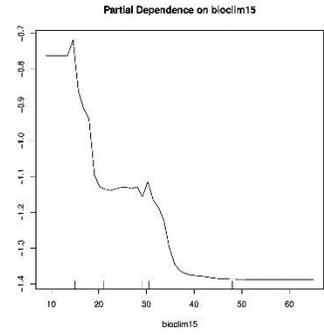
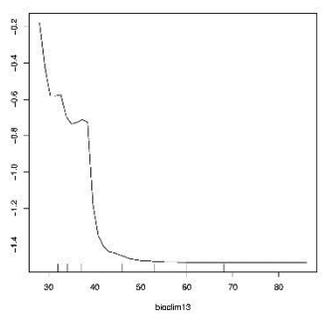
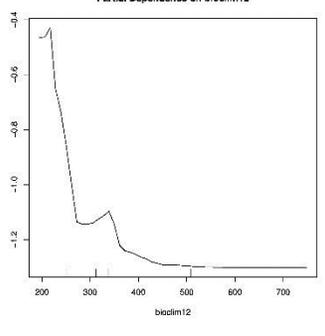
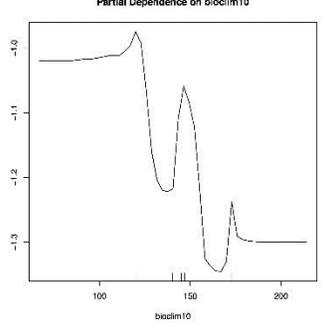
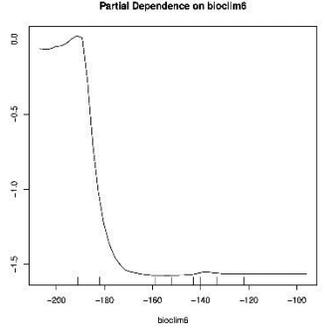
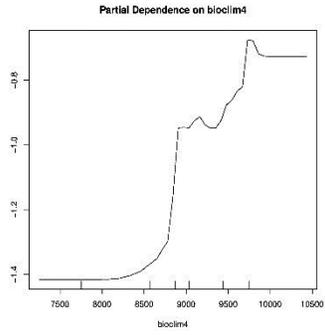
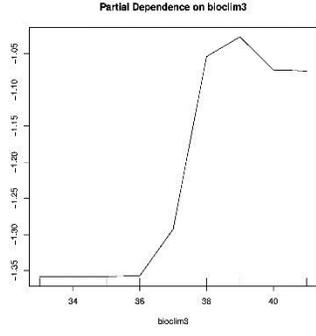
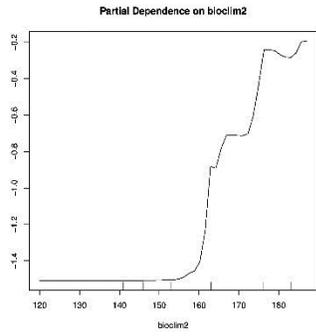
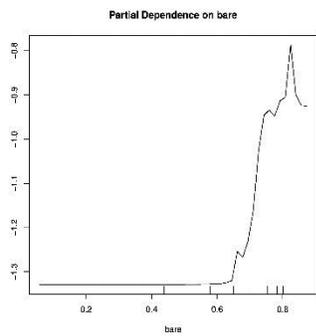
## Predictor Variable Importance:

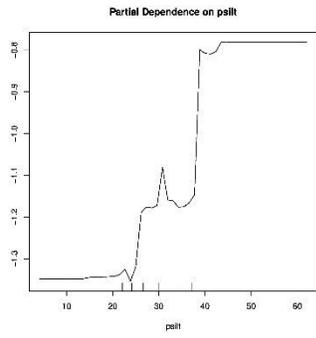
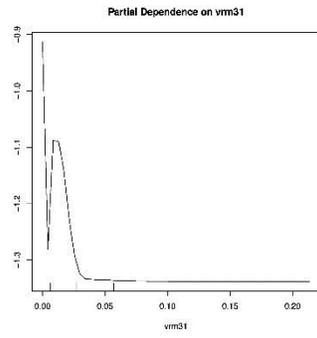
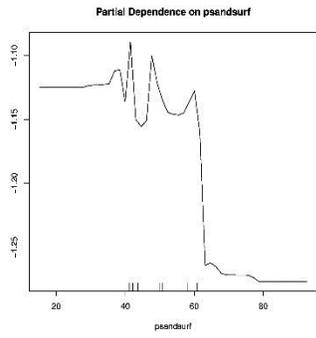
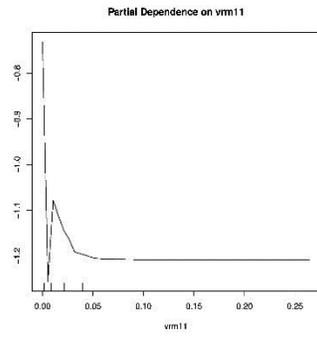
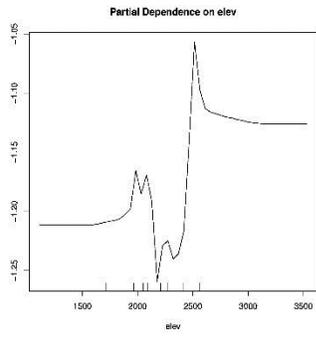
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

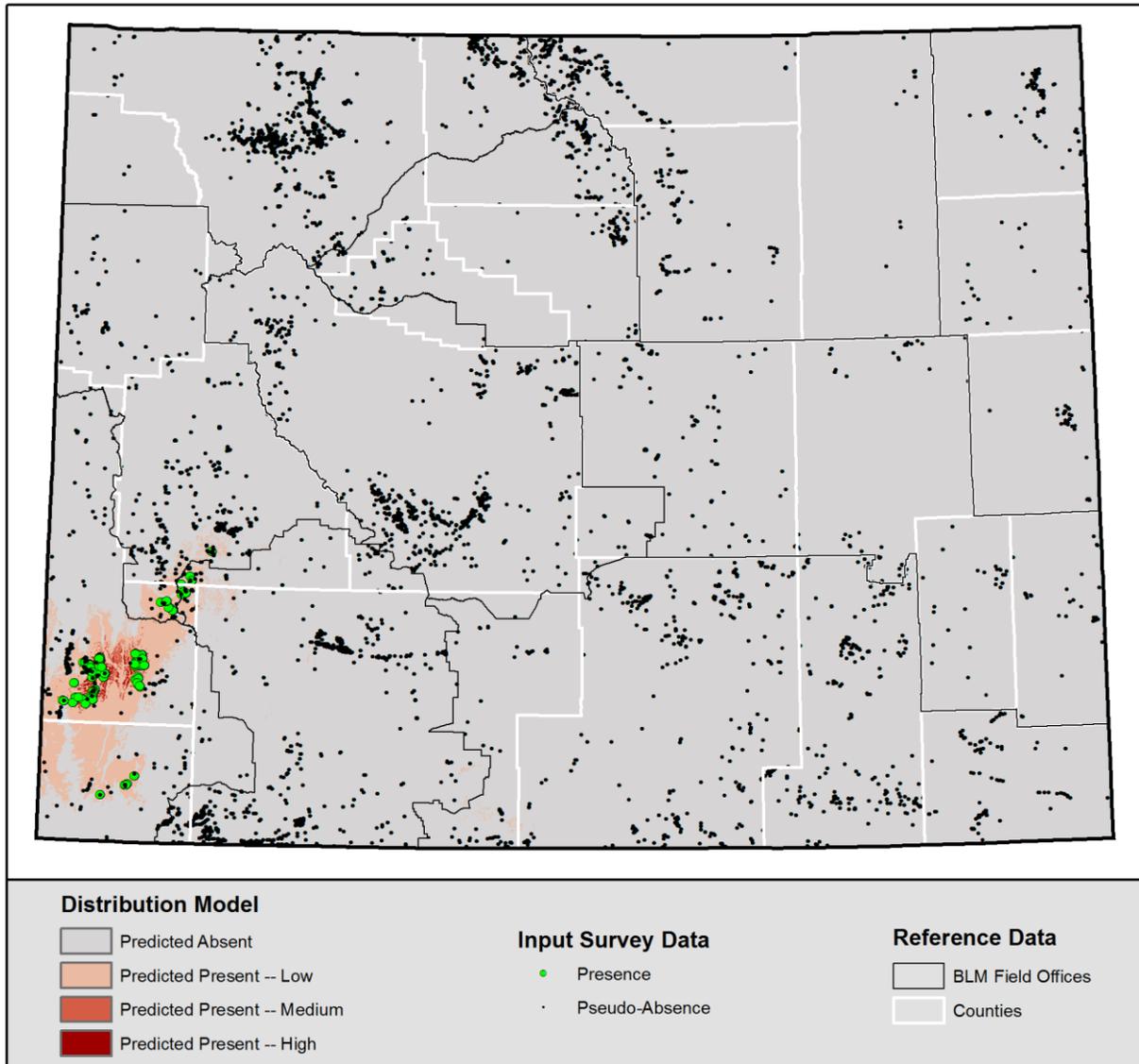
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Tufted twinpod (*Physaria condensata*)

Model version: 2014-07-24



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.634
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.340	Predicted Absent (0)
0.340	0.928	Low (1)
0.928	0.994	Medium (2)
0.994	1	High (3)

## Model Details

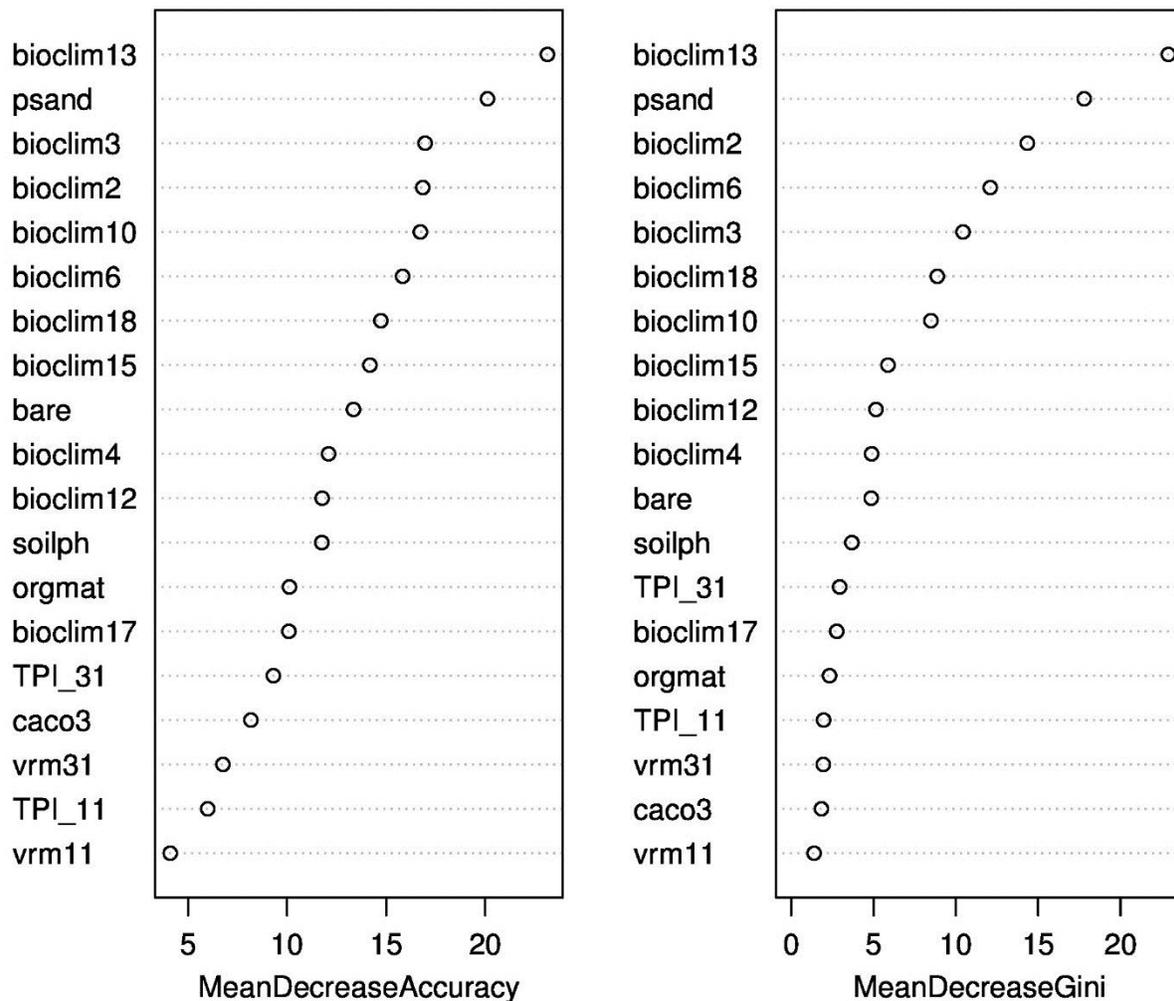
- **Number of Locations:** 90
- **Out-of-Bag Error:** 3.5%
- **TSS:** 91.3%
- **Kappa:** 90.6%
- **Sensitivity:** 94.0%
- **Specificity:** 97.3%

## Model Comments:

Endemic plant species that are restricted to specific soil conditions and microhabitats are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. In addition, for calciphilic species such as Tufted twinpod, a surrogate layer was developed from bedrock geology layers to reflect calcium carbonate content.

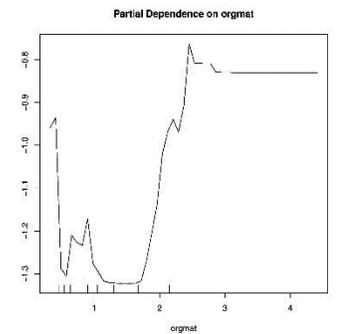
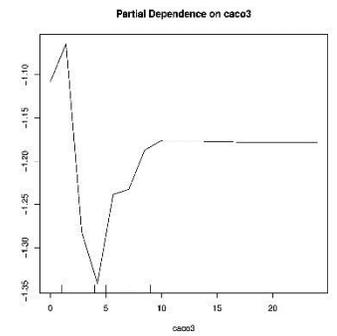
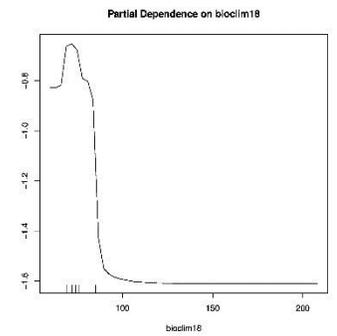
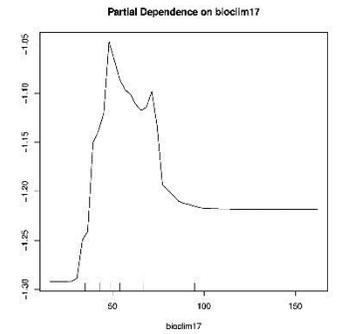
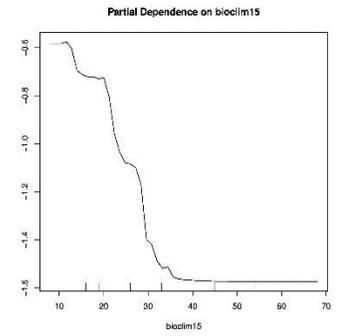
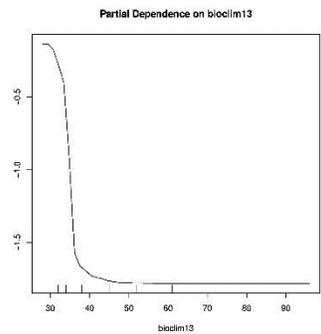
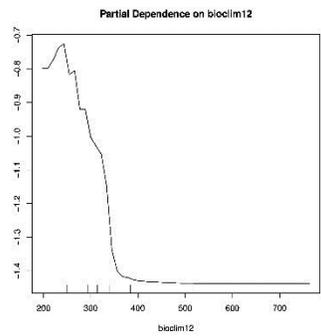
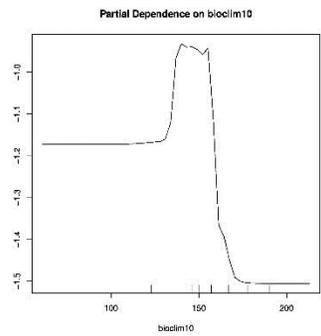
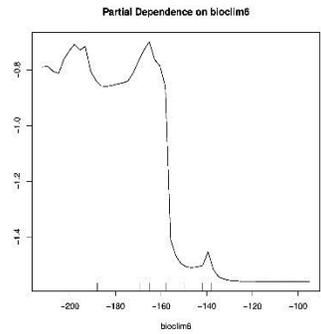
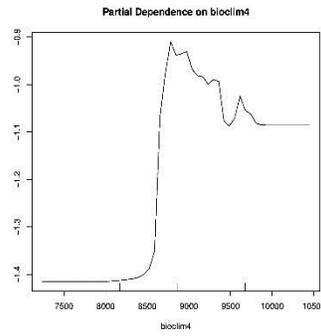
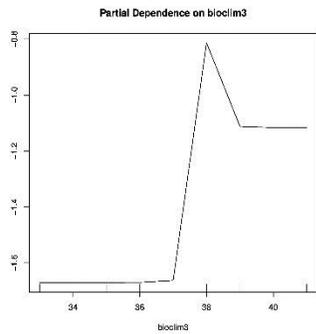
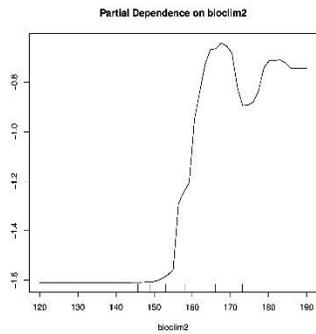
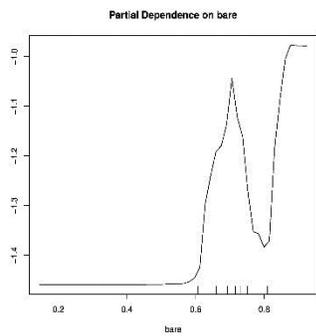
## Predictor Variable Importance:

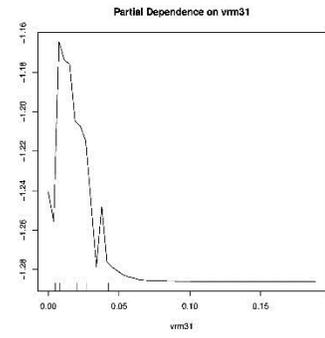
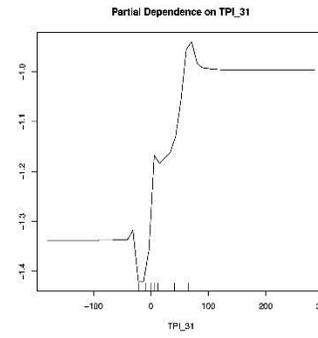
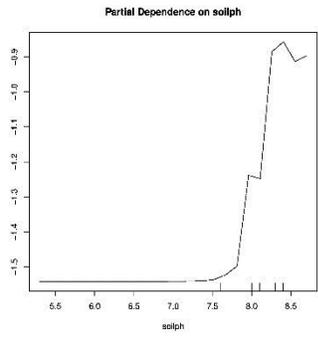
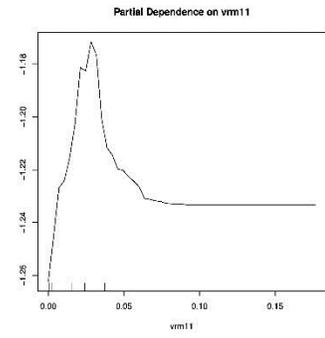
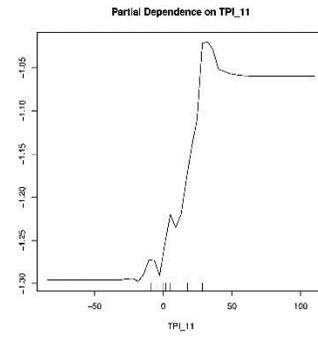
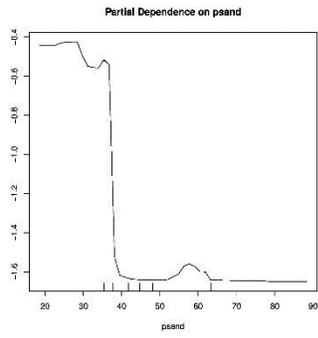
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

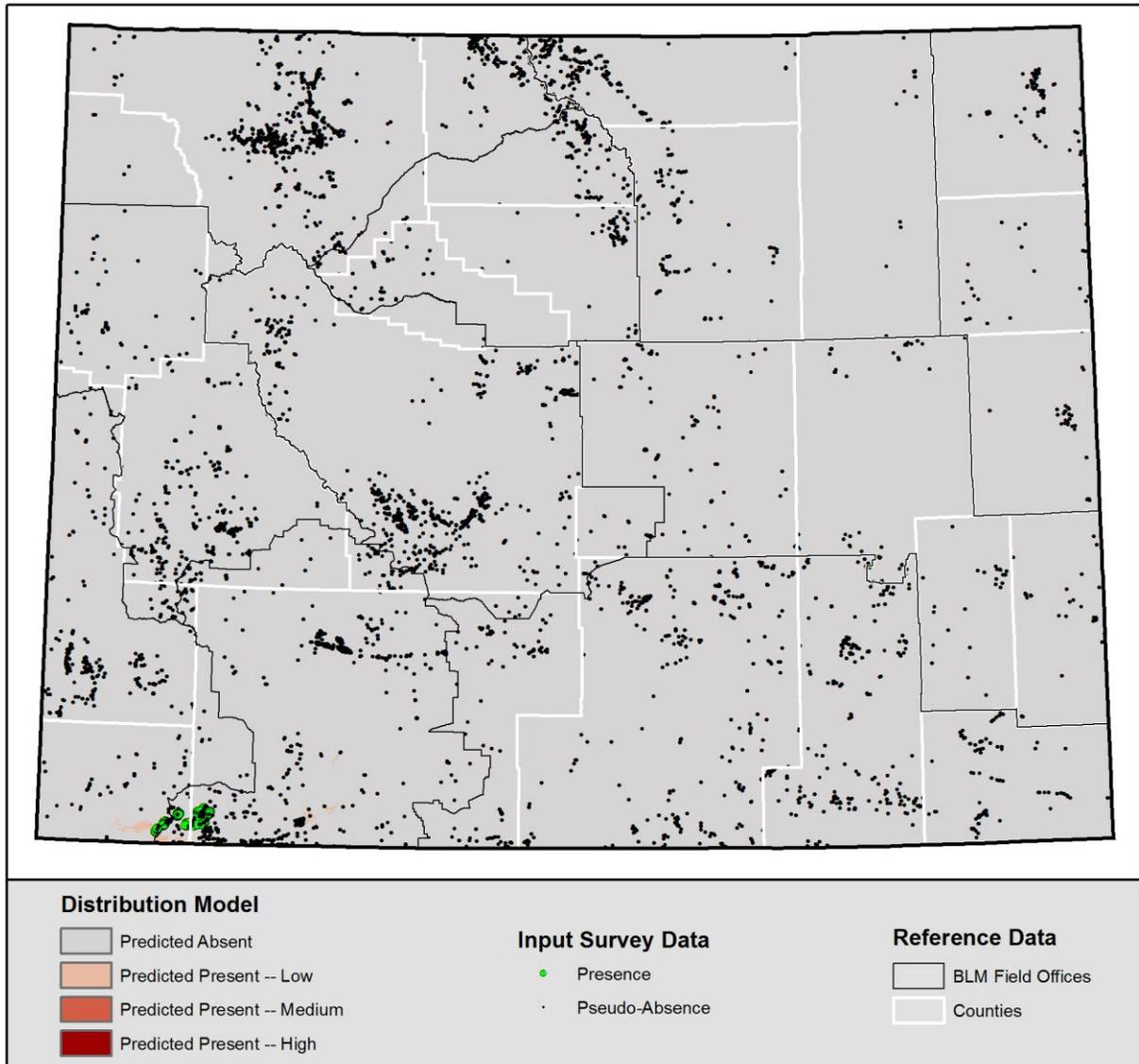
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Uinta greenthread (*Thelesperma pubescens*)

Model version: 2015-08-25



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.592
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.592	Predicted Absent (0)
0.592	0.924	Low (1)
0.924	0.994	Medium (2)
0.994	1	High (3)

## Model Details

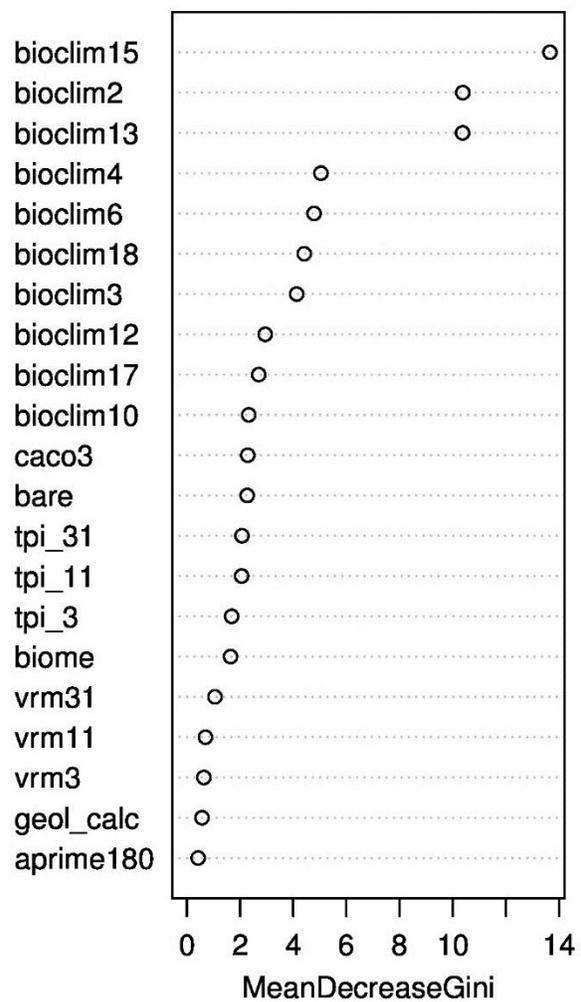
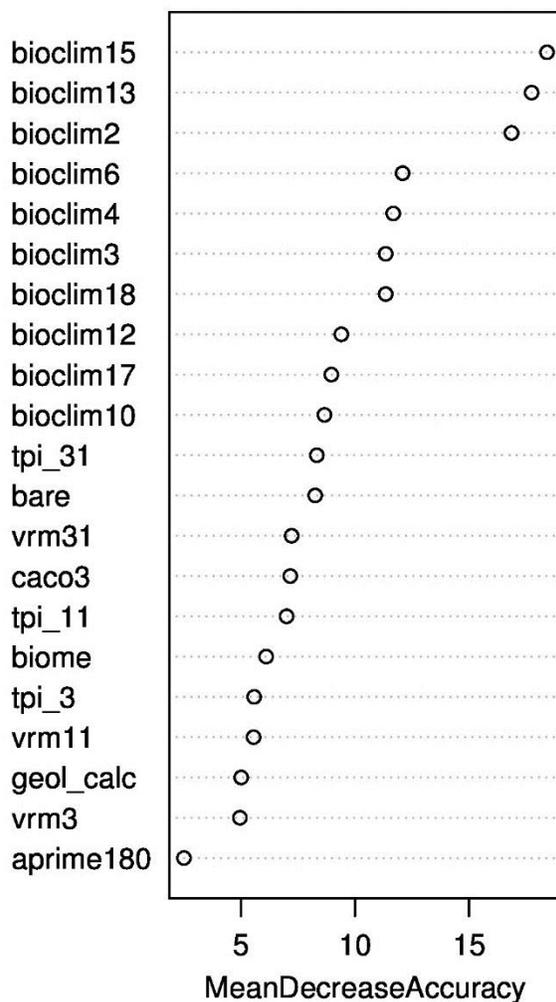
- **Number of Locations:** 51
- **Out-of-Bag Error:** 1.4%
- **TSS:** 97.5%
- **Kappa:** 96.4%
- **Sensitivity:** 99.0%
- **Specificity:** 98.5%

## Model Comments:

Regionally endemic plant species that are restricted to specific soil conditions and microhabitats are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. Uinta greenthread is limited to the Bridger Formation, but bedrock geology was not included in the environmental layers. Taxonomists' opinions vary whether Uinta greenthread and Green River greenthread are different species, different varieties or the same species. They were modeled separately.

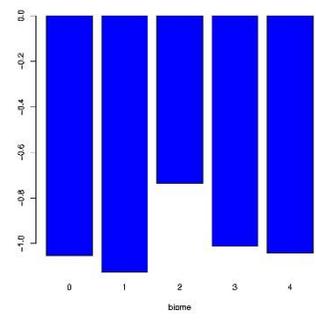
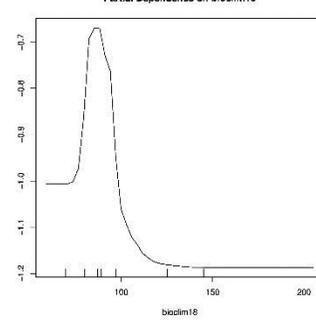
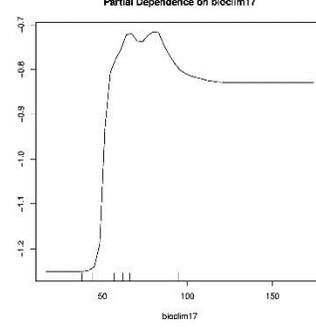
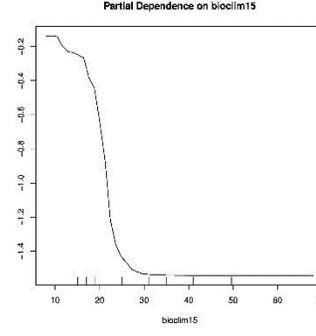
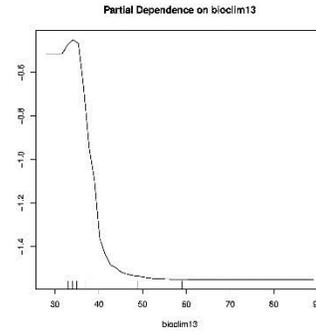
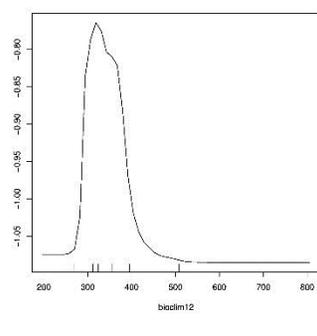
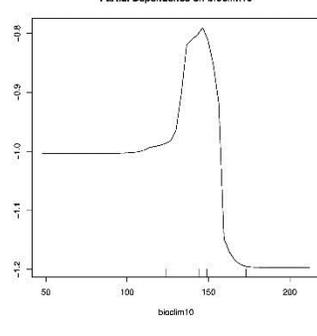
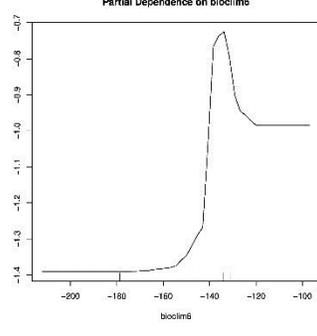
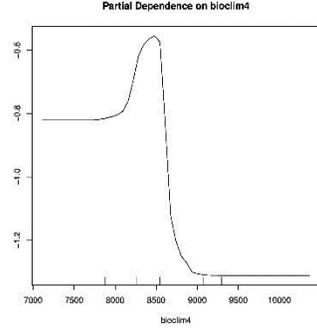
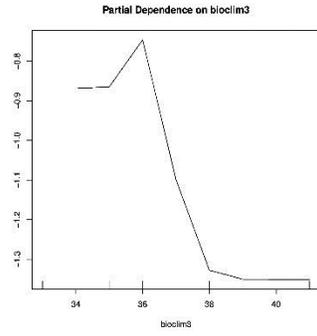
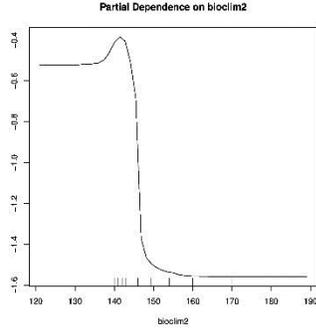
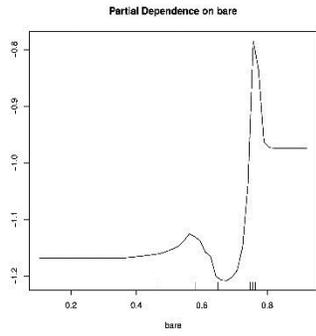
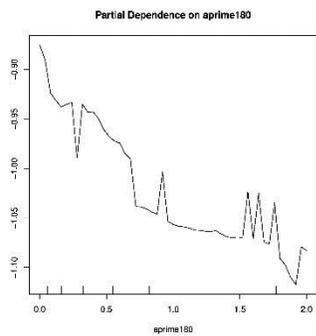
## Predictor Variable Importance:

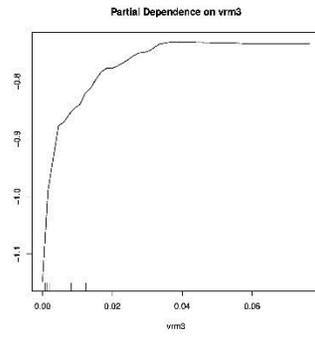
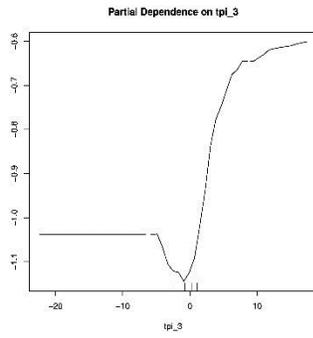
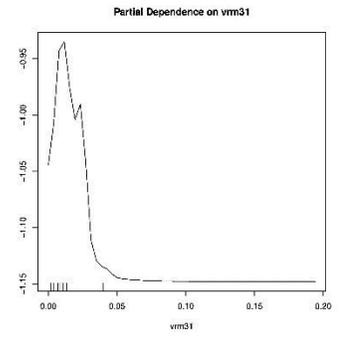
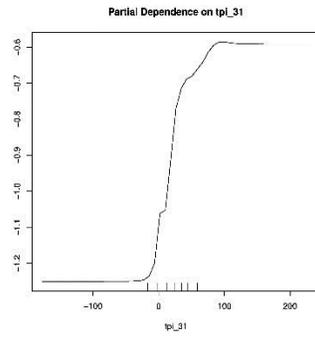
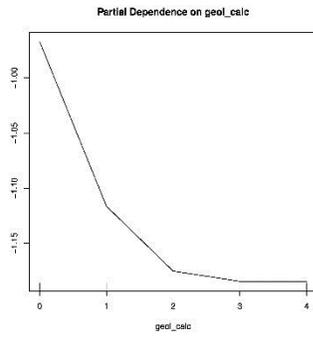
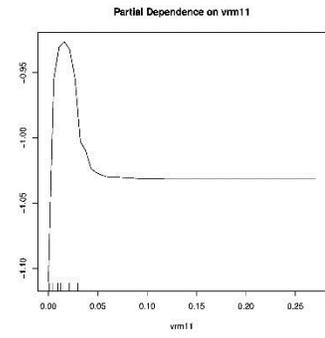
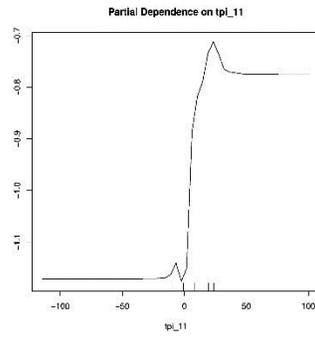
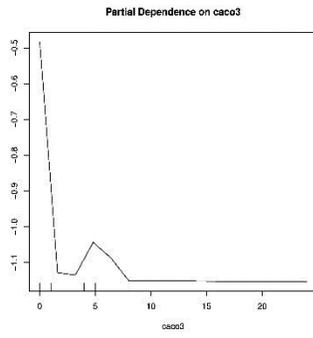
The graph below indicates the relative importance of predictors in modeling distribution for this species. "MeanDecreaseAccuracy" calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than "MeanDecreaseGini," which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

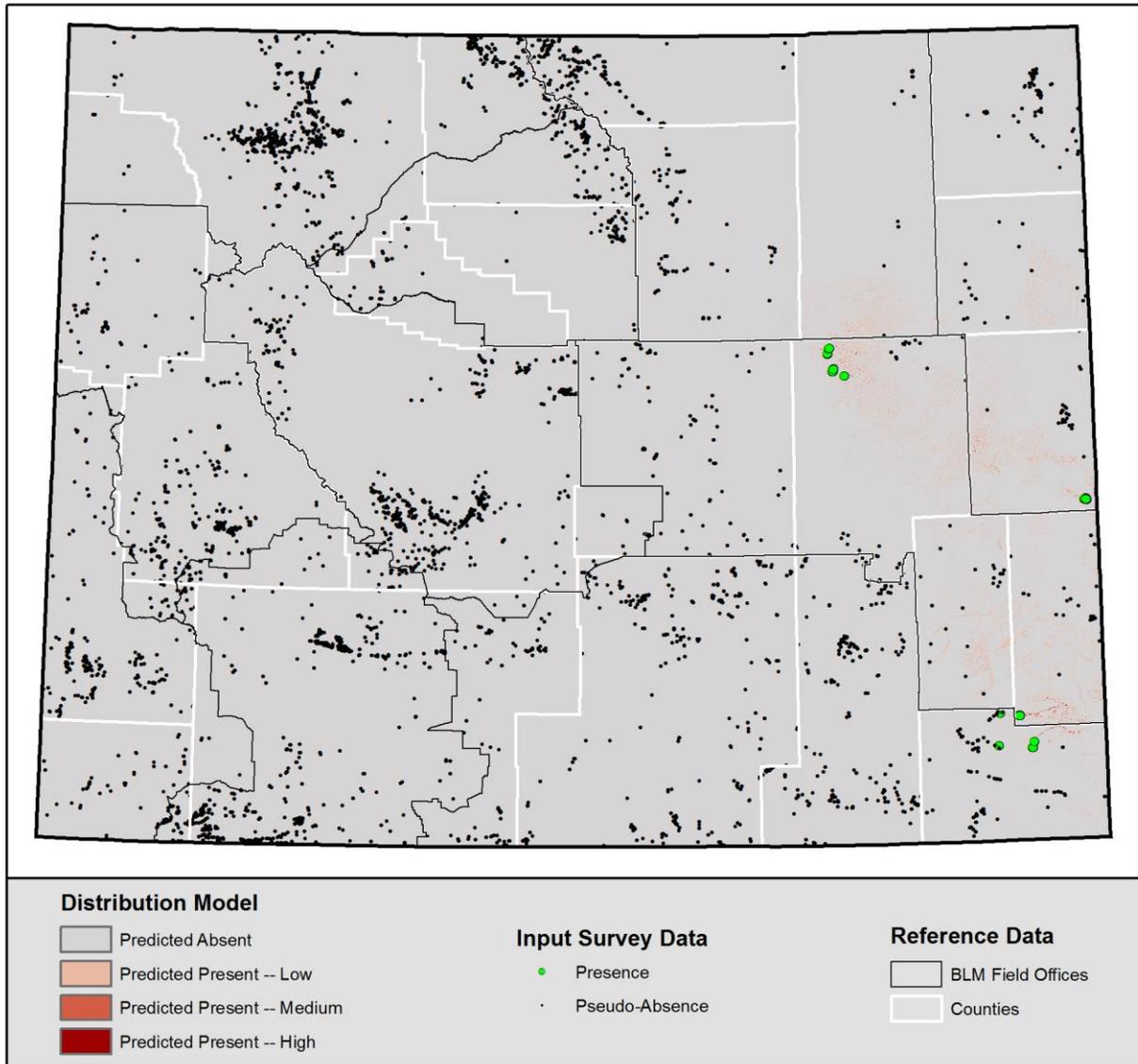
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Ute ladies' tresses (*Spiranthes diluvialis*)

Model version: 2015-08-29



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.862
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.828	Predicted Absent (0)
0.828	0.986	Low (1)
0.986	1	Medium (2)
1	1	High (3)

## Model Details

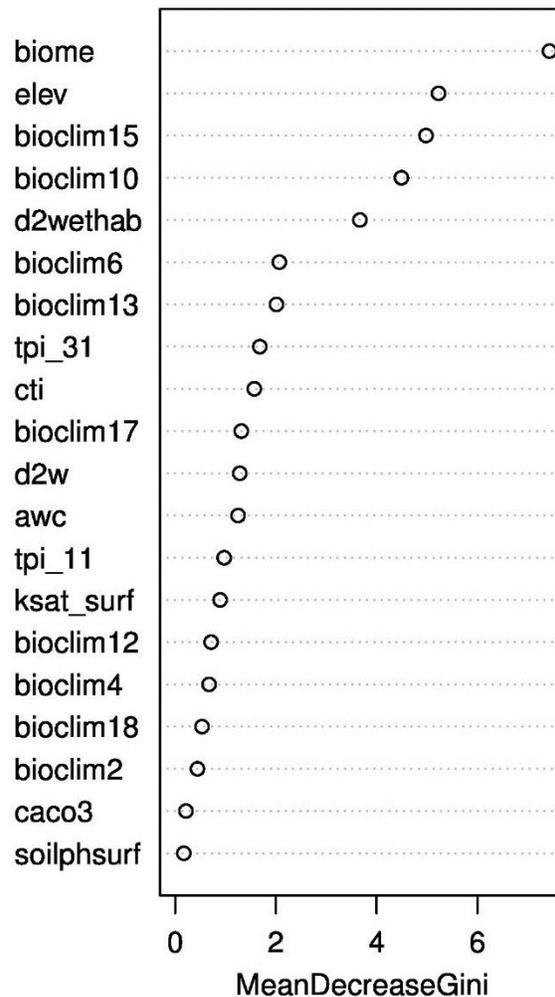
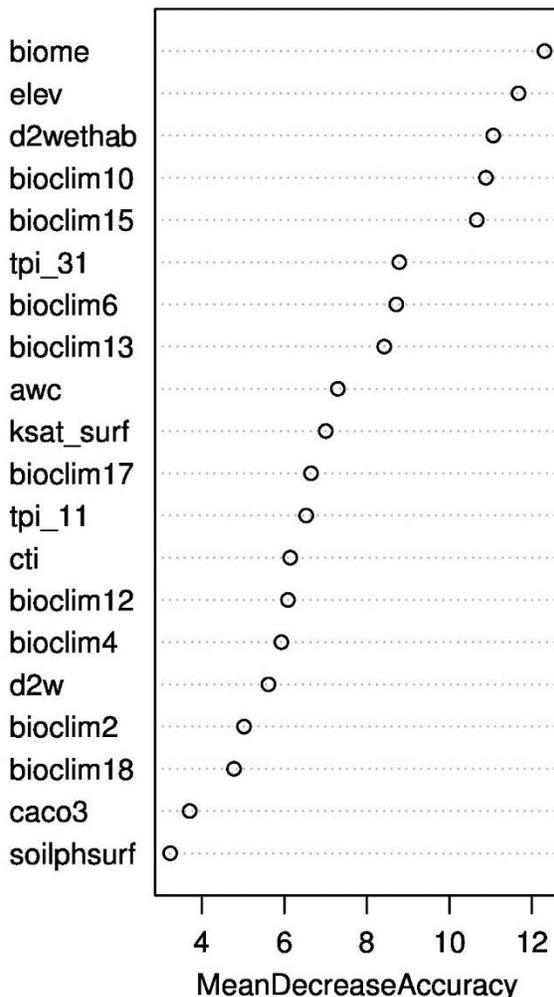
- **Number of Locations:** 28
- **Out-of-Bag Error:** 1.3%
- **TSS:** 97.9%
- **Kappa:** 96.6%
- **Sensitivity:** 99.4%
- **Specificity:** 98.5%

## Model Comments:

Threatened wetland plant species that occupy a narrow vegetation zone (wet meadow) and limited range of hydrological conditions and associated aquifer water chemistry that vary in different parts of its distribution are difficult to model. A layer was developed that combines layers representing riverine and palustrine settings along a distance gradient for species of wet meadows. No potential habitat for Ute ladies' tresses was identified by the model in the western 2/3 of the state though the species is present to different degrees in nearby locations of Idaho, Montana and Utah.

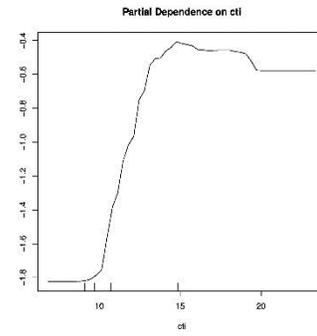
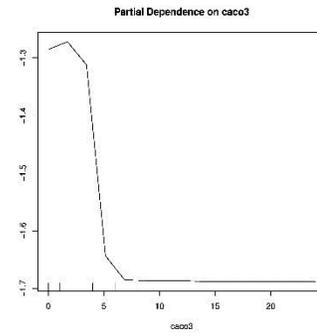
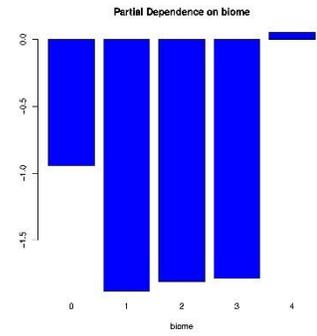
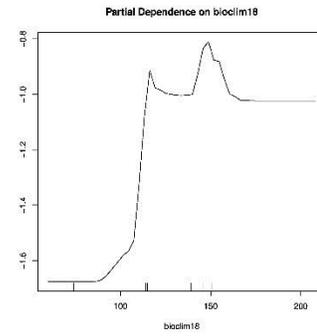
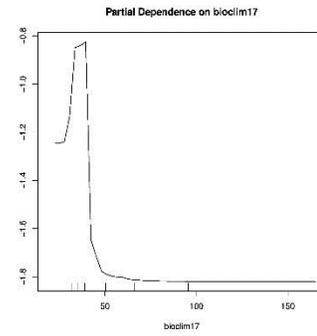
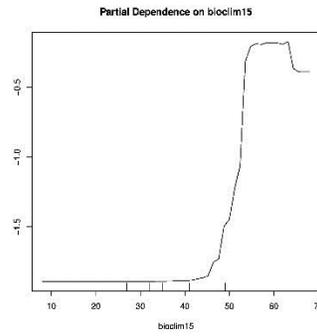
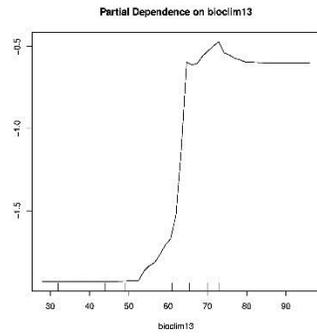
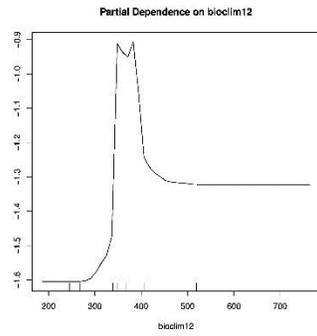
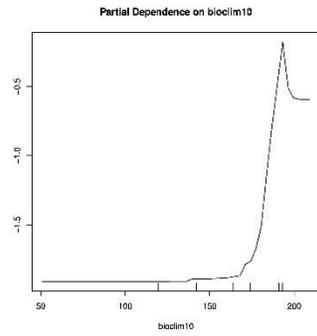
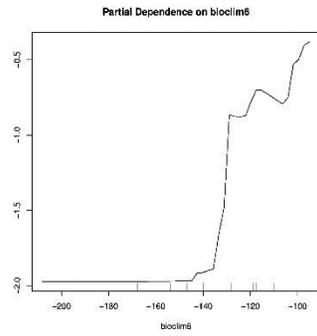
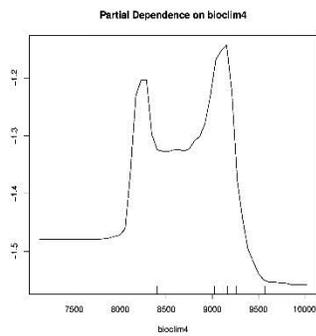
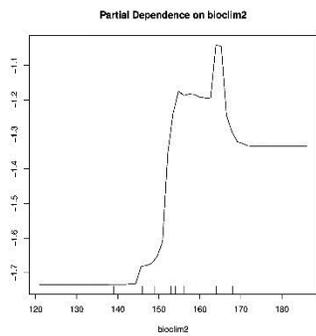
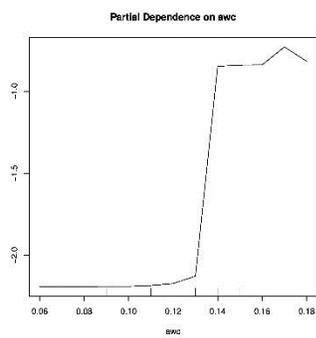
## Predictor Variable Importance:

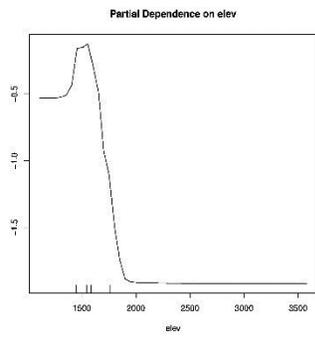
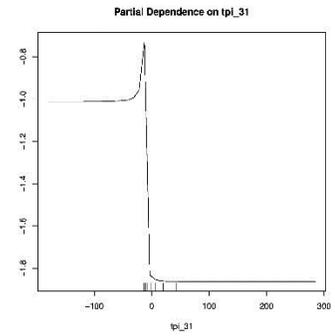
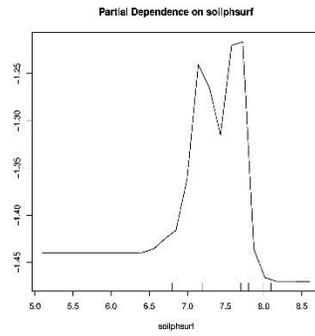
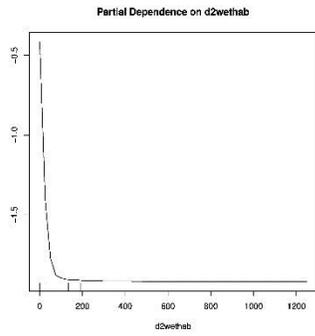
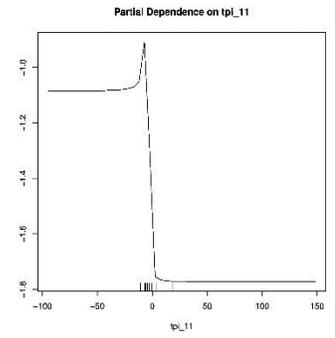
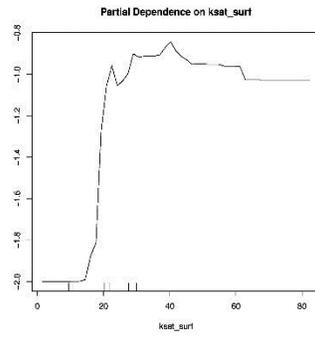
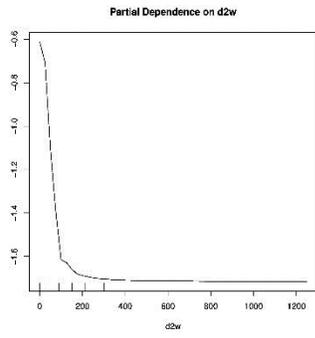
The graph below indicates the relative importance of predictors in modeling distribution for this species. "MeanDecreaseAccuracy" calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than "MeanDecreaseGini," which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

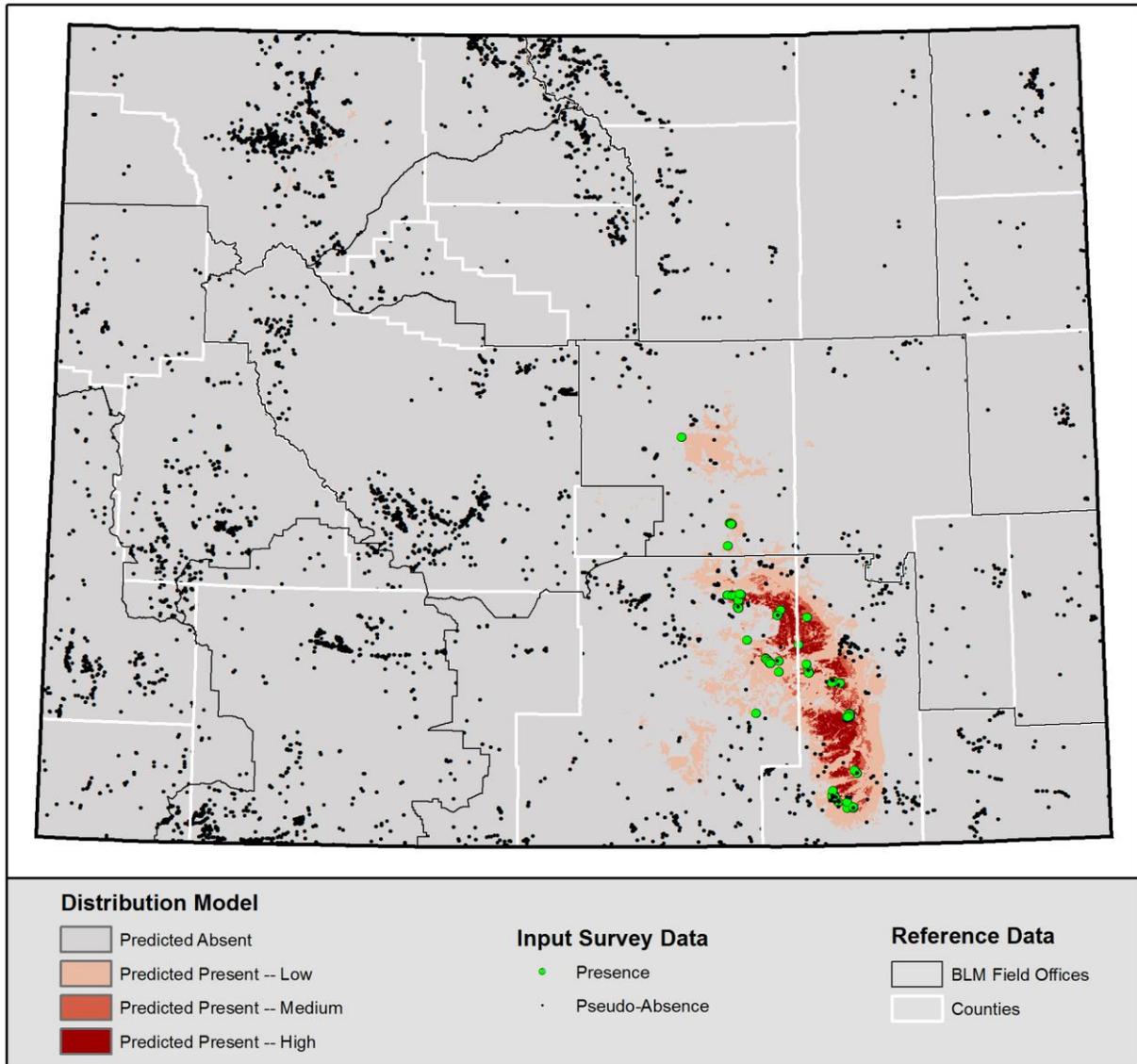
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Ward's goldenweed (*Oonopsis wardii*)

Model version: 2014-07-23



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.578
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.592	Predicted Absent (0)
0.592	0.956	Low (1)
0.956	0.998	Medium (2)
0.998	1	High (3)

## Model Details

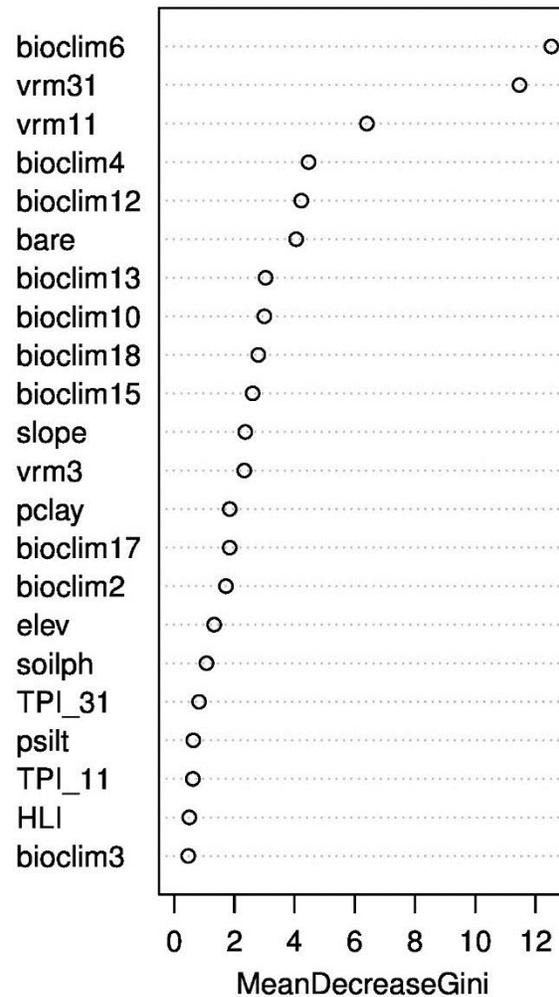
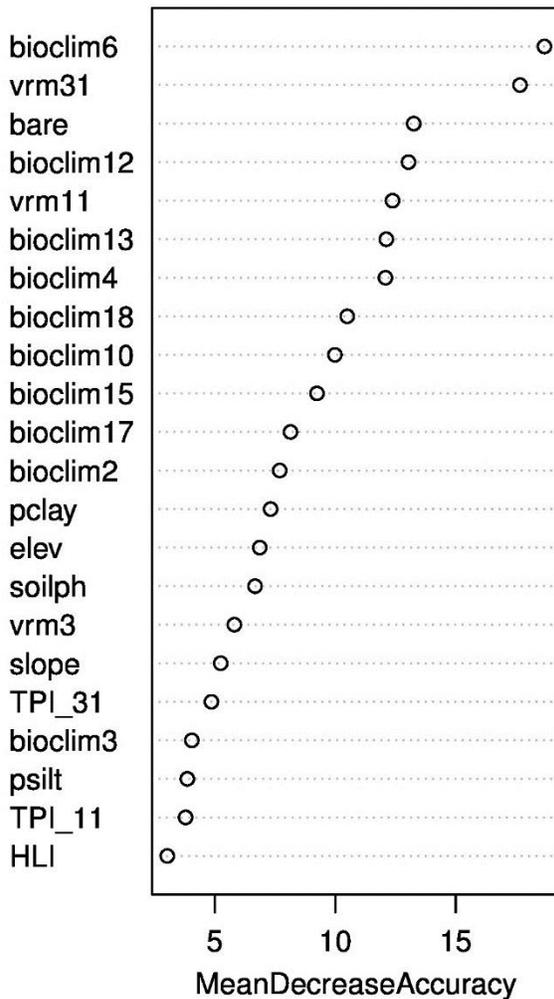
- **Number of Locations:** 47
- **Out-of-Bag Error:** 3.5%
- **TSS:** 89.2%
- **Kappa:** 90.5%
- **Sensitivity:** 90.9%
- **Specificity:** 98.4%

## Model Comments:

Regionally endemic plant species that are restricted to specific soil conditions and microhabitats are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. Ward's goldenweed is restricted to a combination of substrate and setting characteristics that may relate to trace minerals such as selenium. However, large areas of the Laramie Basin and surroundings were mapped as high and medium probability potential habitat.

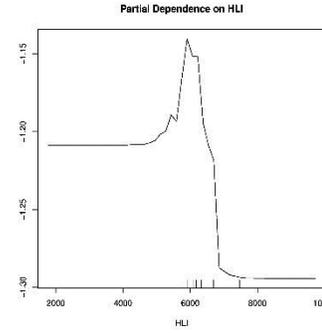
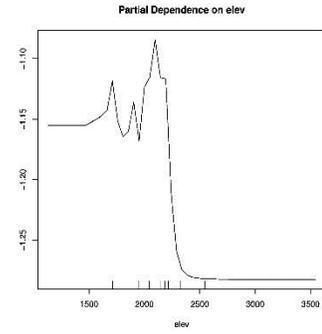
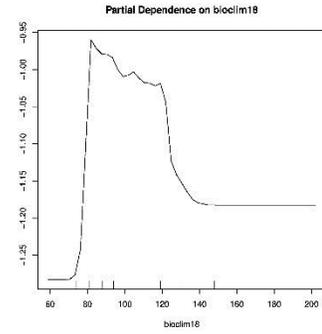
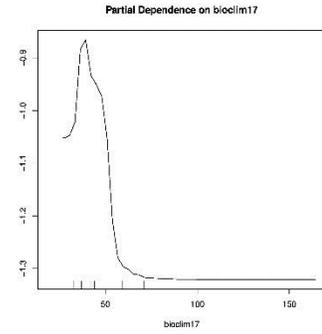
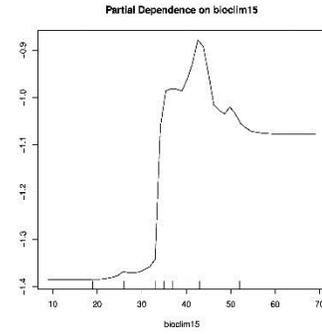
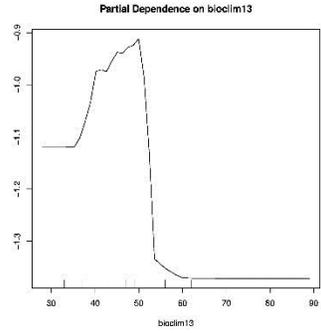
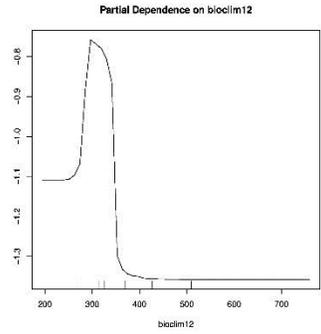
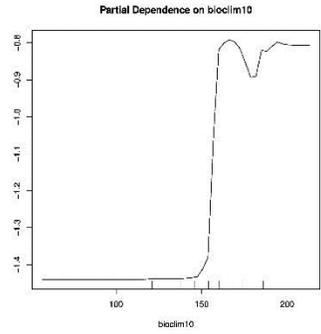
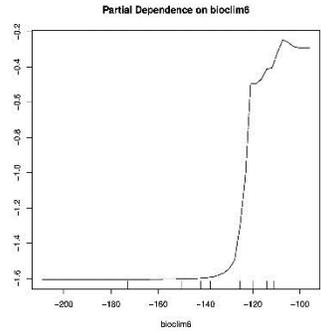
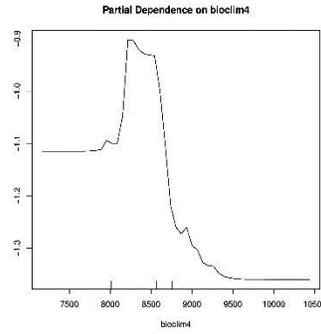
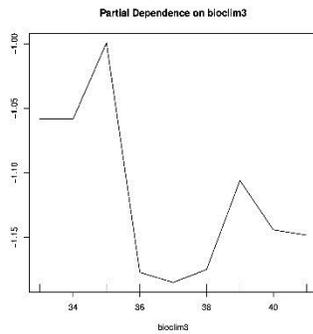
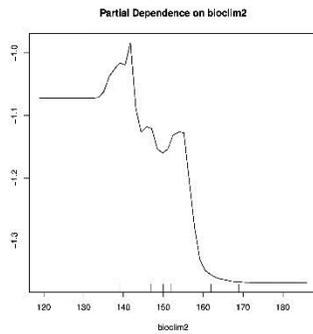
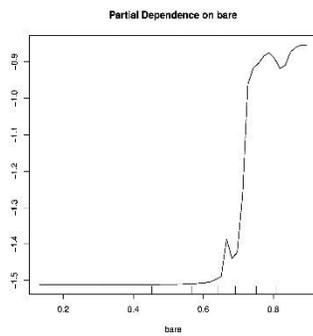
## Predictor Variable Importance:

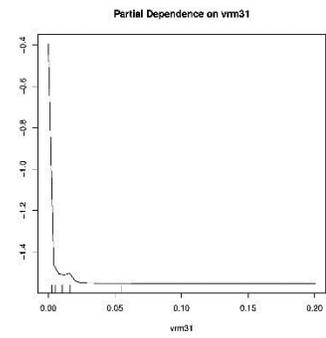
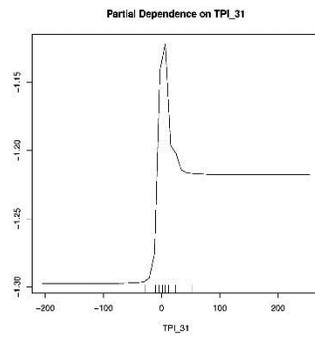
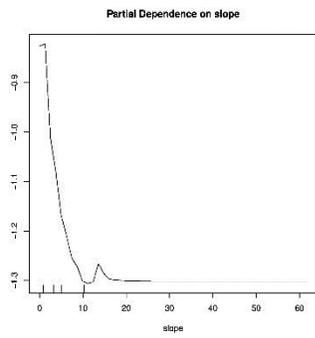
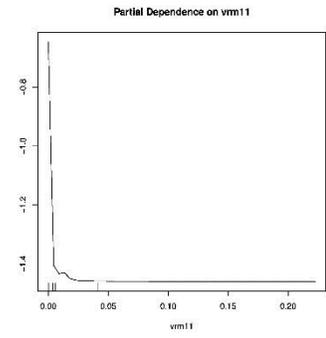
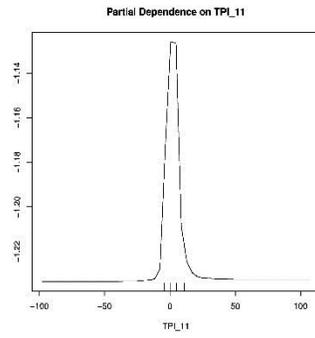
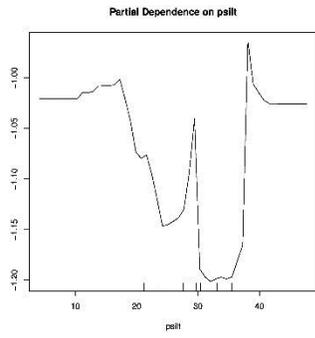
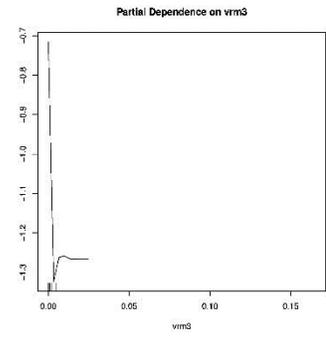
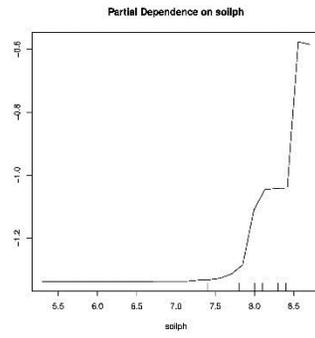
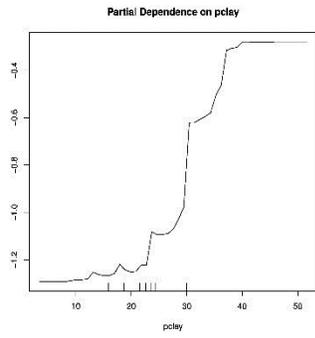
The graph below indicates the relative importance of predictors in modeling distribution for this species. "MeanDecreaseAccuracy" calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than "MeanDecreaseGini," which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

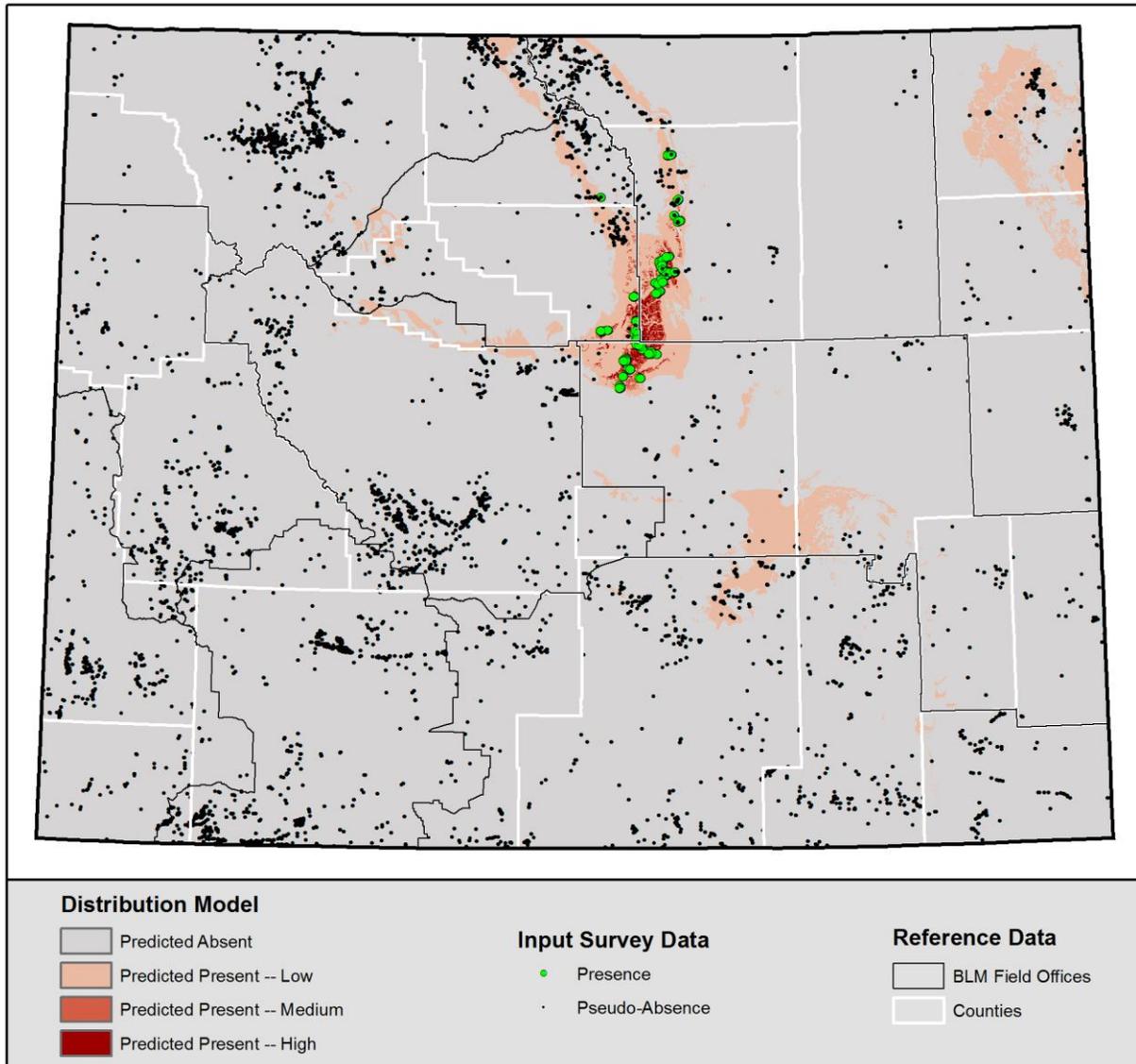
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Williams' waferparsnip (*Cymopterus williamsii*)

Model version: 2015-08-24



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.513
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.318	Predicted Absent (0)
0.318	0.932	Low (1)
0.932	0.992	Medium (2)
0.992	1	High (3)

## Model Details

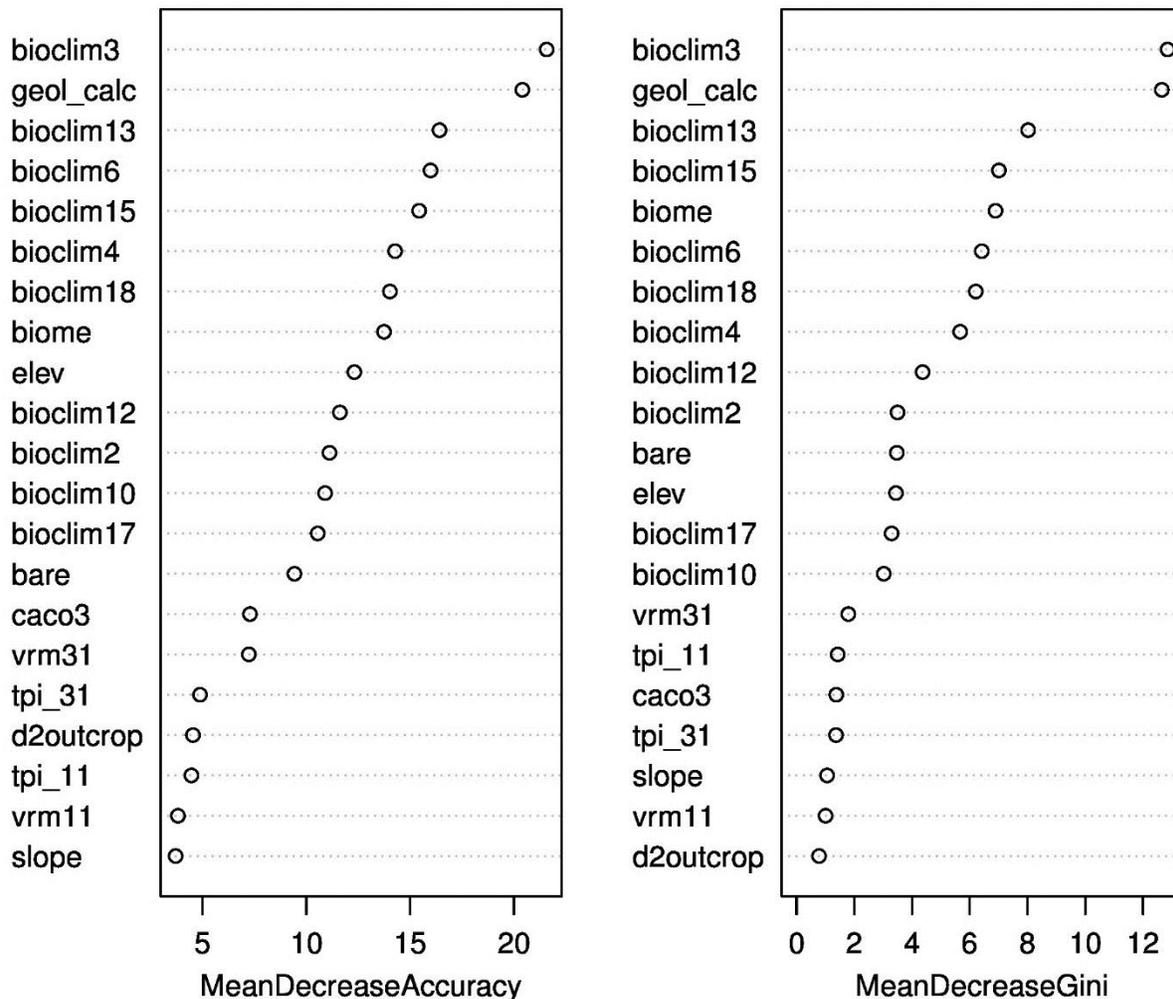
- **Number of Locations:** 64
- **Out-of-Bag Error:** 2.5%
- **TSS:** 93.0%
- **Kappa:** 93.2%
- **Sensitivity:** 94.6%
- **Specificity:** 98.4%

## Model Comments:

Regionally endemic plant species that are restricted to specific soil conditions are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. In addition, for calciphilic species such as Williams' waferparsnip, a surrogate layer was developed from bedrock geology layers to reflect calcium carbonate content. Despite this refinement, large areas in eastern Wyoming are mapped as low probability potential habitat.

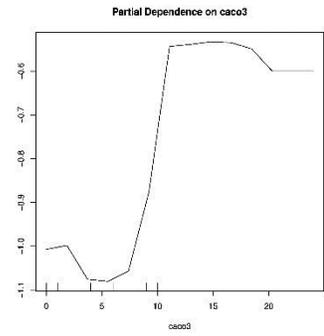
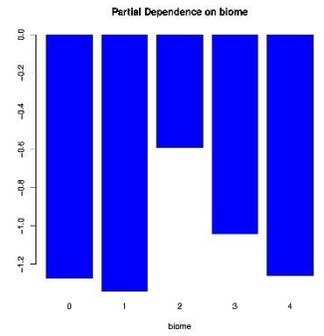
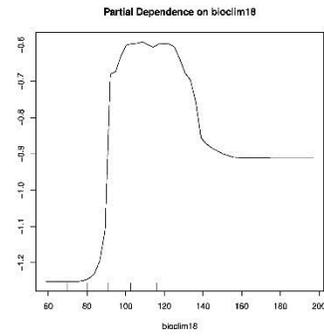
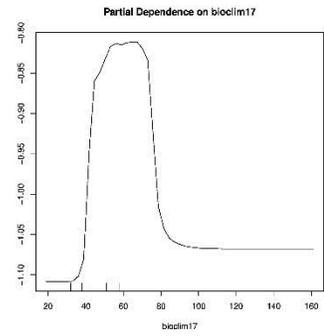
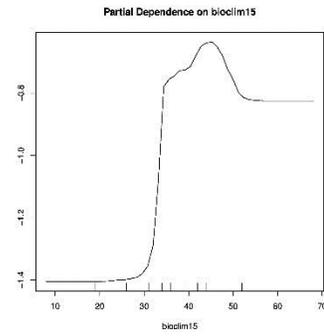
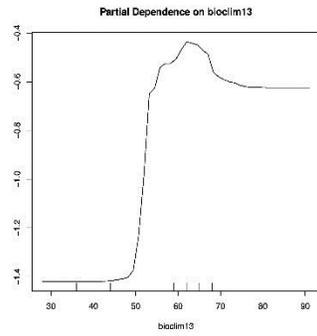
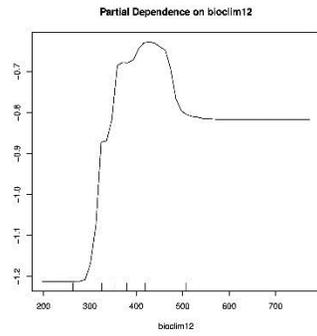
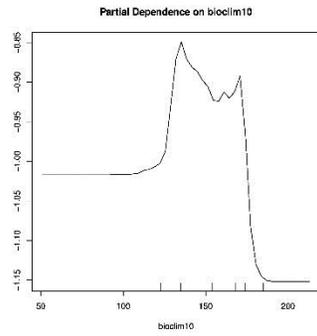
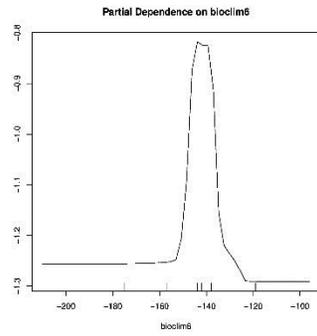
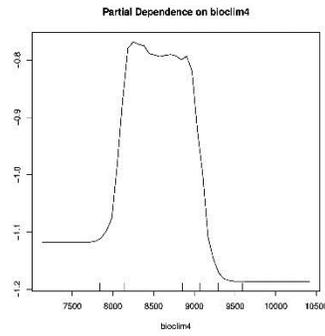
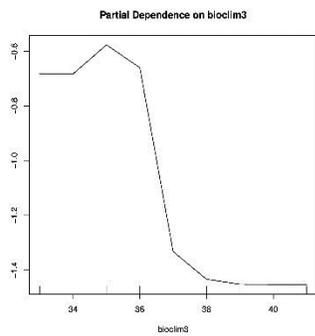
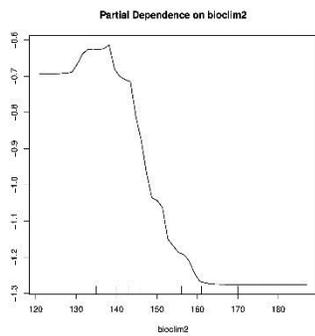
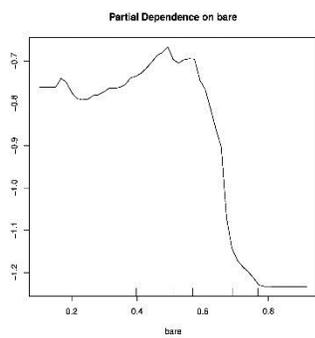
## Predictor Variable Importance:

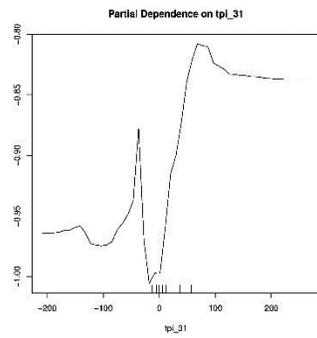
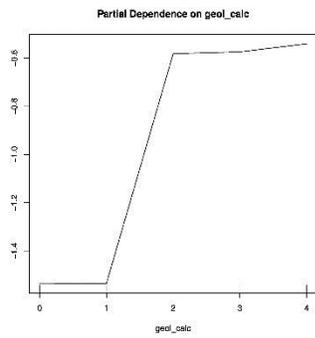
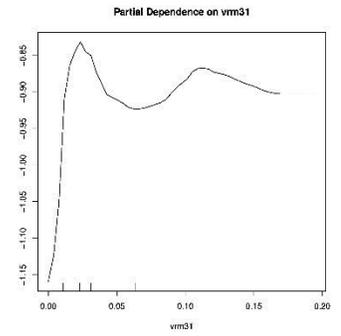
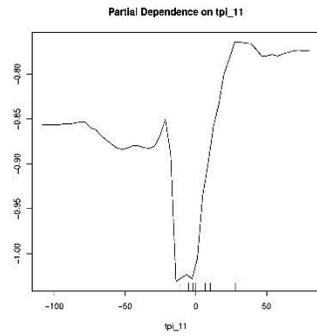
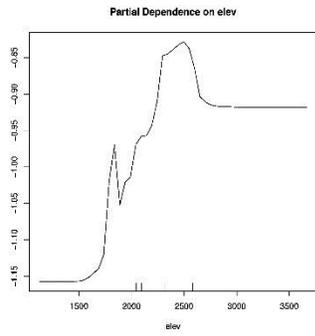
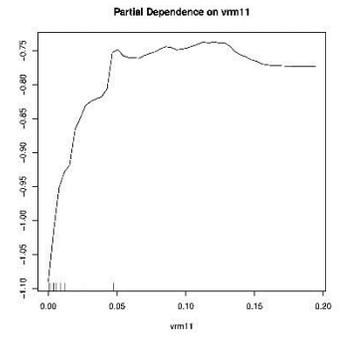
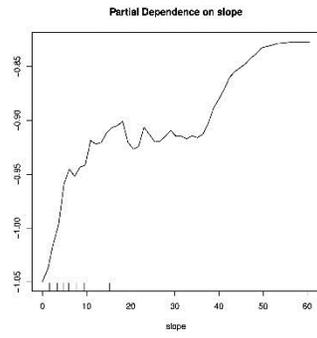
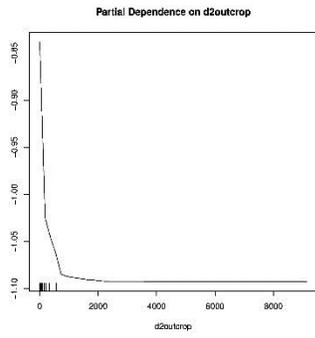
The graph below indicates the relative importance of predictors in modeling distribution for this species. "MeanDecreaseAccuracy" calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than "MeanDecreaseGini," which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

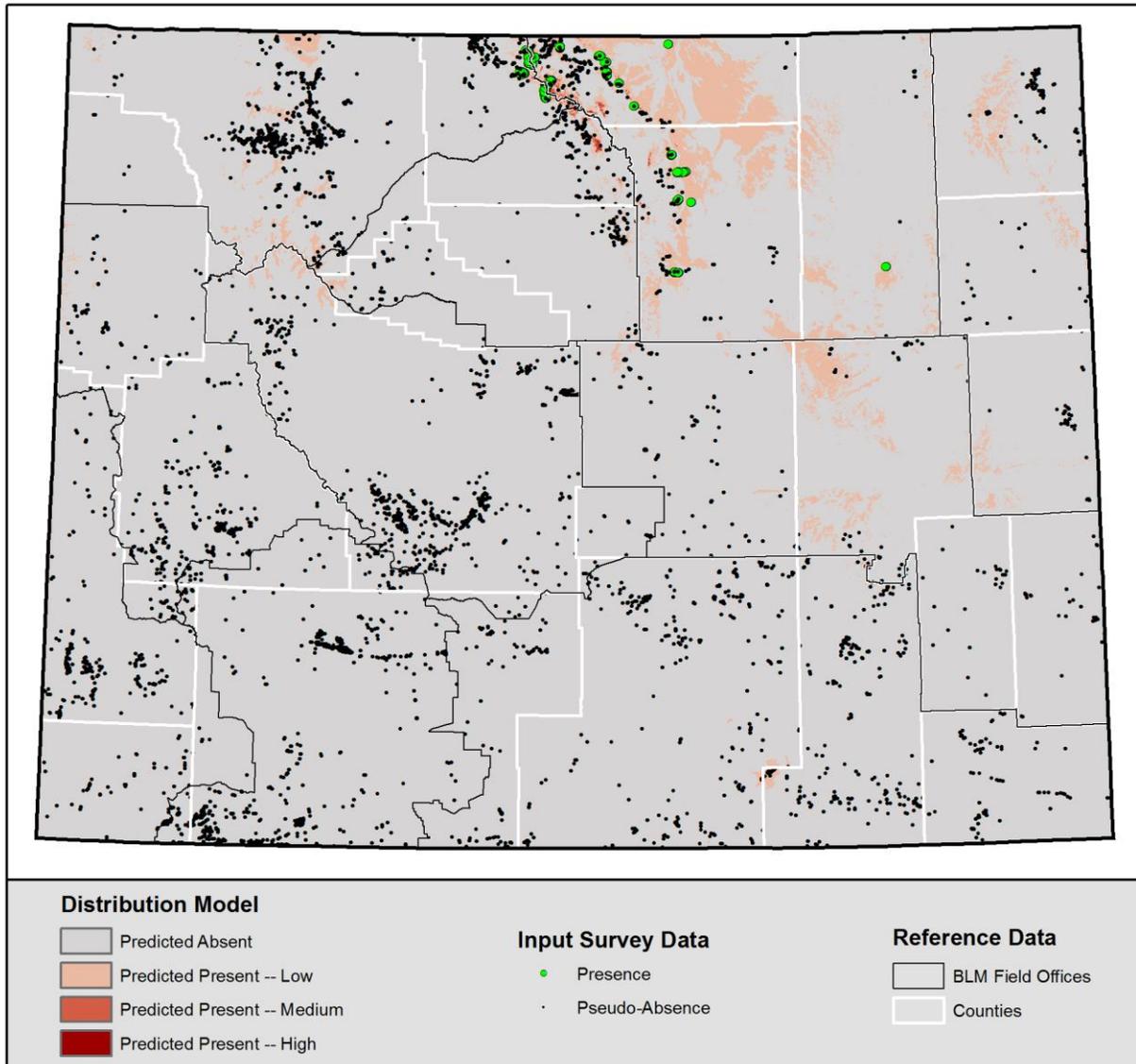
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Woolly twinpod (*Physaria lanata*)

Model version: 2015-08-26



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.503
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.422	Predicted Absent (0)
0.422	0.830	Low (1)
0.830	0.968	Medium (2)
0.968	1	High (3)

## Model Details

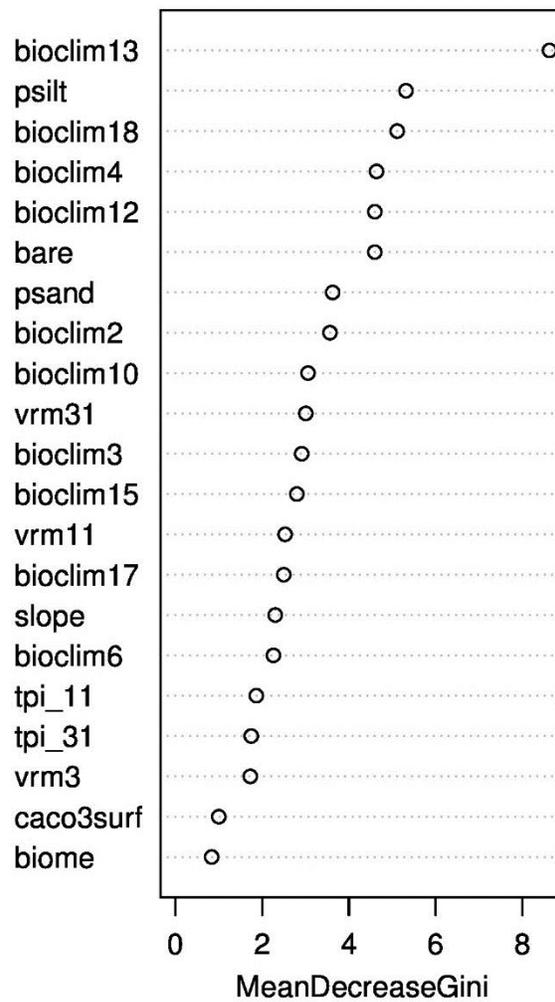
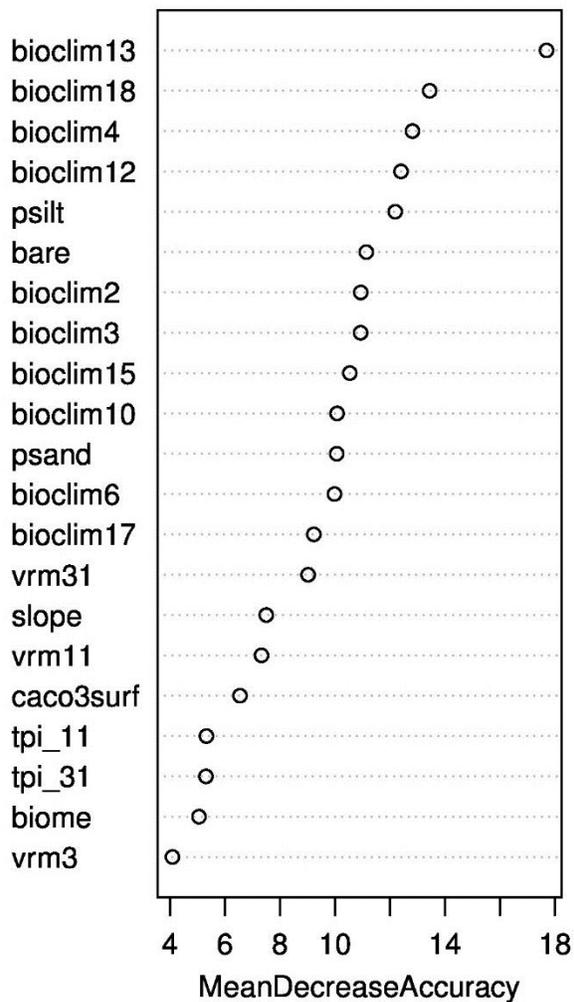
- **Number of Locations:** 46
- **Out-of-Bag Error:** 7.7%
- **TSS:** 77.3%
- **Kappa:** 79.1%
- **Sensitivity:** 81.2%
- **Specificity:** 96.1%

## Model Comments:

Regionally endemic plant species that are restricted to specific soil conditions are difficult to model because statewide data are coarsely mapped and categorical. The statewide soils layer was parameterized to produce layers with gradients reflecting different soil properties. In addition, for calciphilic species such as Woolly twinpod, a surrogate layer was developed from bedrock geology layers to reflect calcium carbonate content. There has been little survey for it outside of the Big Horn Mountains in Wyoming, though it has been surveyed in Montana outside of the Big Horn Mountains.

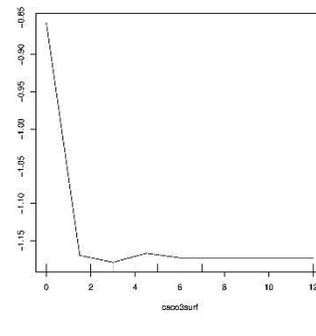
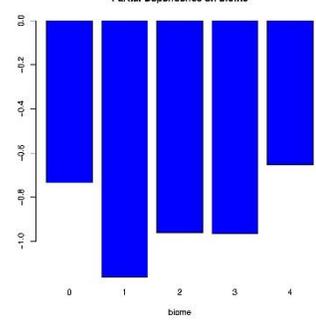
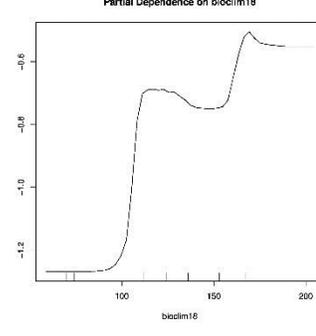
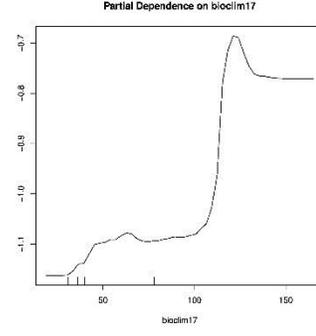
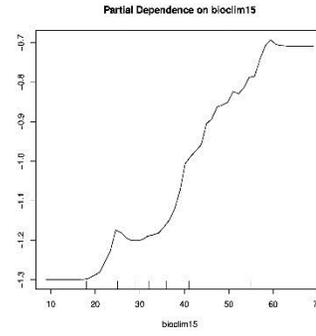
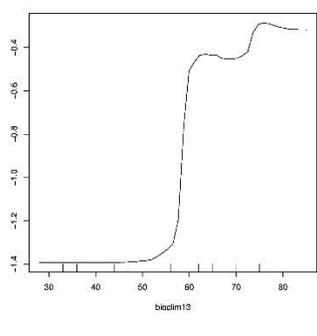
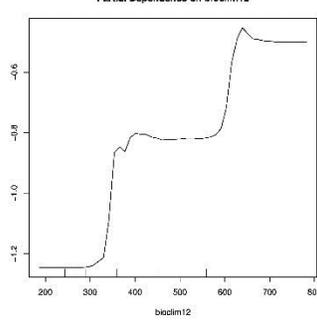
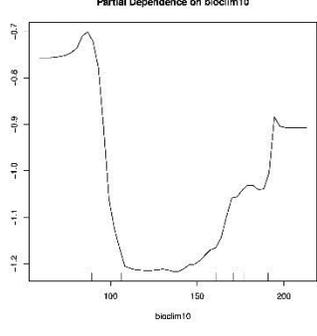
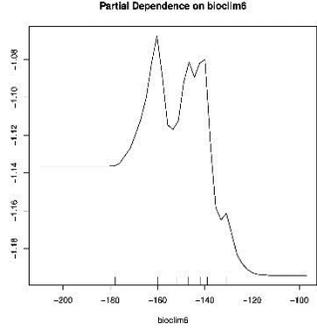
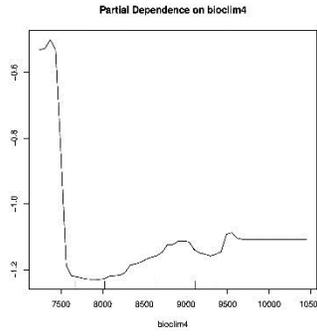
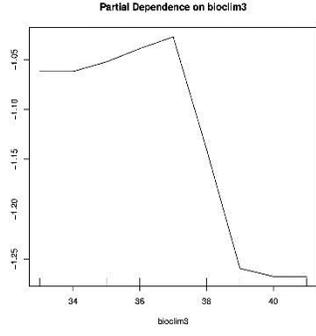
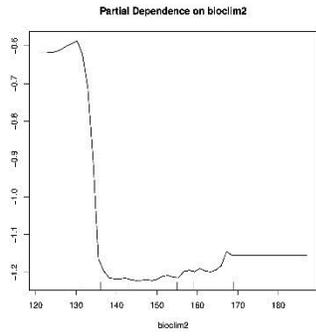
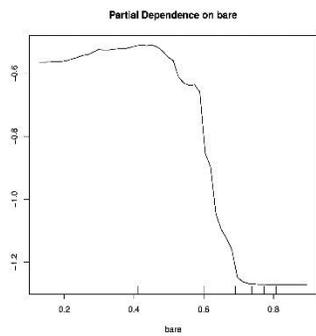
## Predictor Variable Importance:

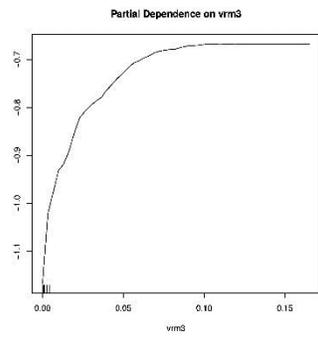
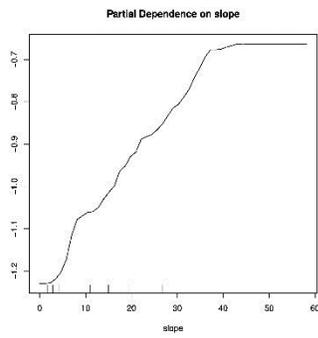
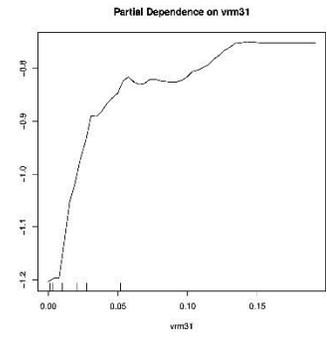
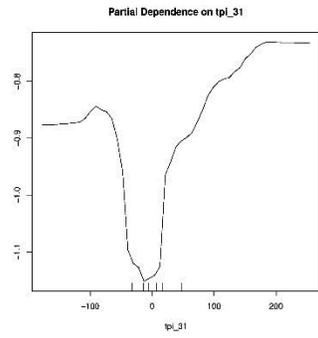
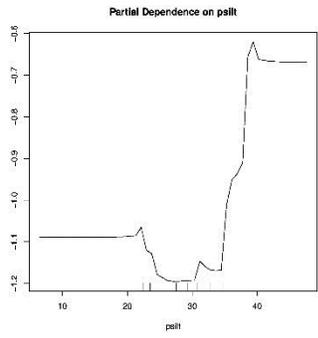
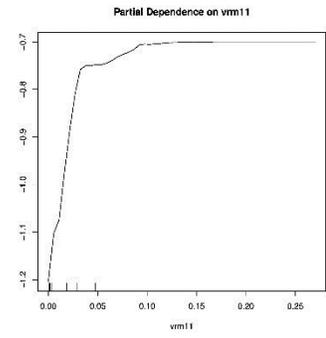
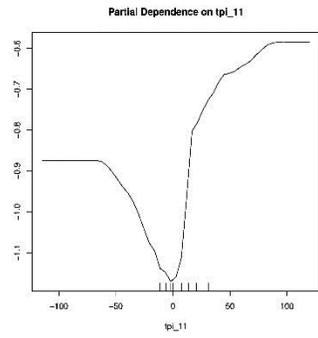
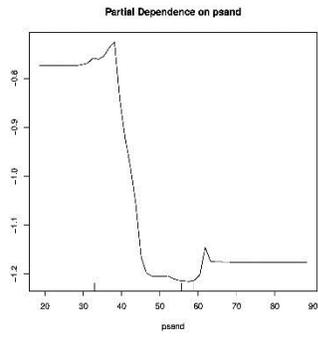
The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

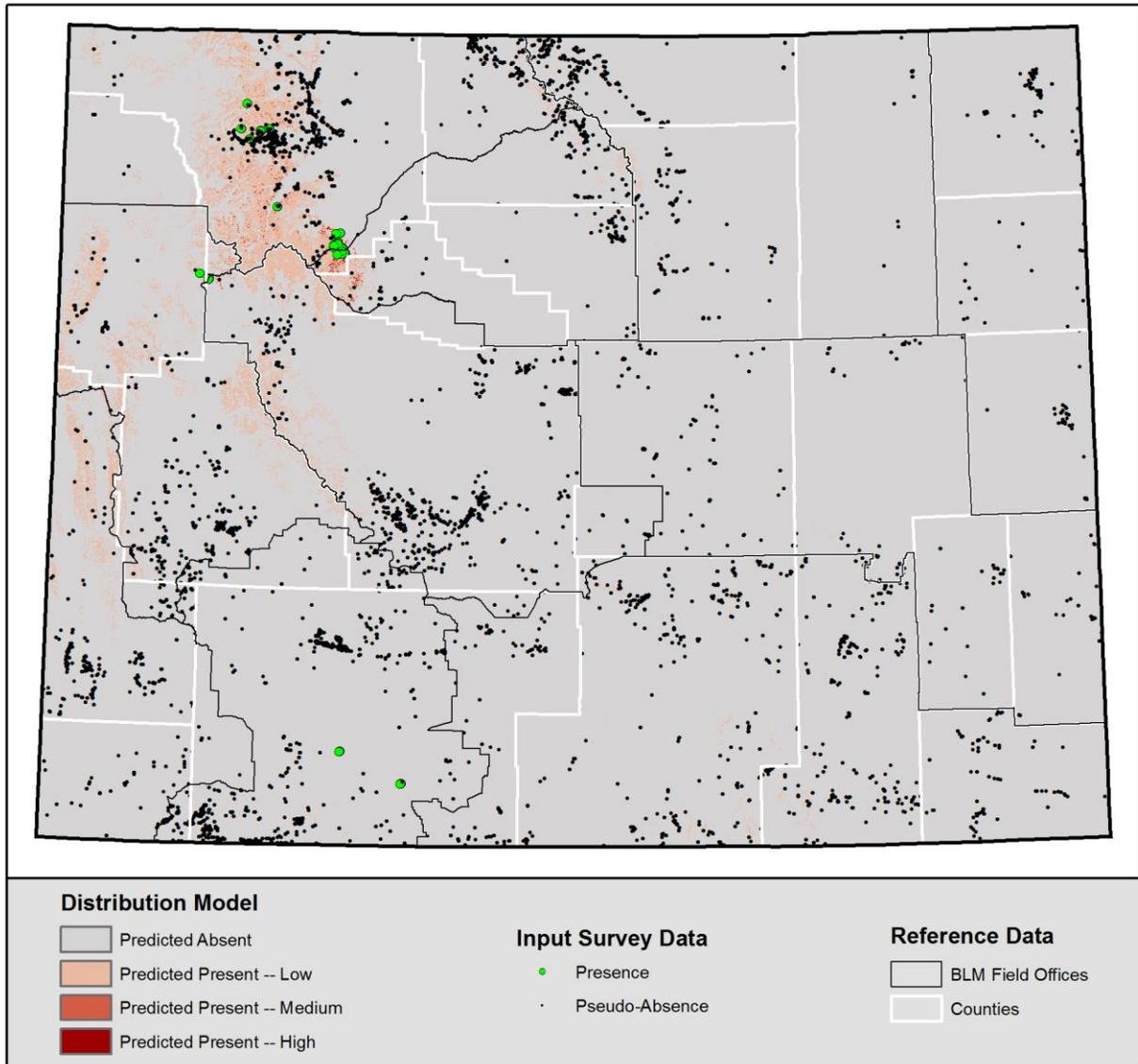
Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.





# Wyoming tansymustard (*Descurainia torulosa*)

Model version: 2015-08-26



## Model Information

- **Algorithm:** Random Forest
- **Software:** R, version R v. 3.0.2 (2013-09-25); randomForest package v. 4.6.7
- **Binary Threshold (MaxTSS):** 0.494
- **Reclassification Table for Four-Category Version:**

From	To	Becomes
0	0.424	Predicted Absent (0)
0.424	0.836	Low (1)
0.836	0.946	Medium (2)
0.946	1	High (3)

## Model Details

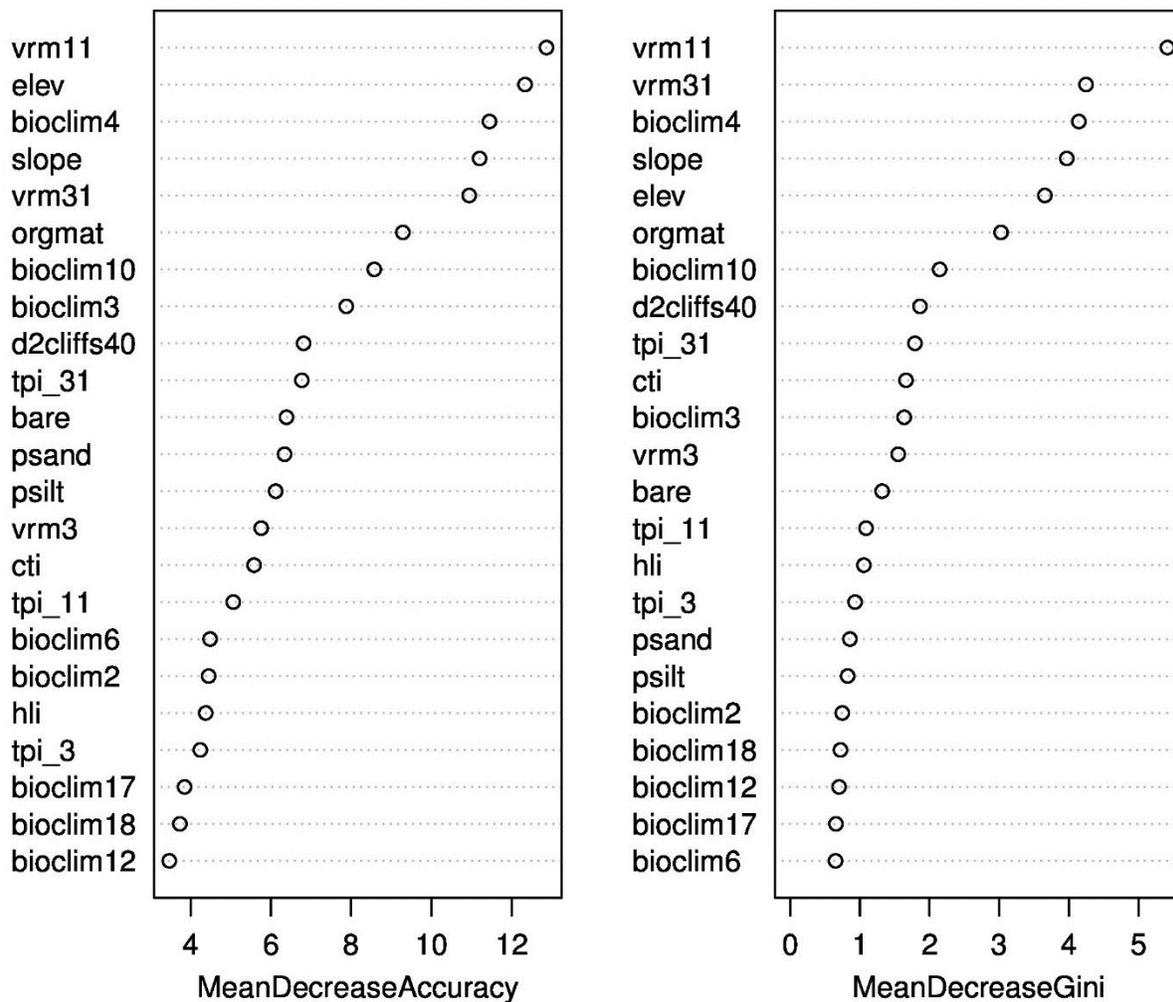
- **Number of Locations:** 30
- **Out-of-Bag Error:** 6.5%
- **TSS:** 83.3%
- **Kappa:** 82.7%
- **Sensitivity:** 88.0%
- **Specificity:** 95.3%

## Model Comments:

Endemic plant species that are adapted to microhabitat conditions are difficult to model because statewide data do not exist. This is especially true for Wyoming tansymustard because it is in cliff microhabitats of both mountains and basins. The model is based on presence points followings RM treatment, possibly subject to further taxonomic work.

## Predictor Variable Importance:

The graph below indicates the relative importance of predictors in modeling distribution for this species. “MeanDecreaseAccuracy” calculates importance by permuting (i.e., randomizing) values for the predictor and measuring the resulting decrease in model accuracy. This measure is typically a more reliable indicator of importance than “MeanDecreaseGini,” which measures improvement in a model due to splits based on the predictor. In both graphs, the further to the right the point falls on the graph, the higher the relative importance of the corresponding predictor. See Appendix 1 of this report for a detailed description of each predictor.



# Partial Plots

Partial plots show the relationship between a predictor variable and the predicted probability of occurrence, holding all other predictors at their average values. Probability values on the y-axis are unscaled; higher values on this axis indicate a higher relative probability of occurrence.

