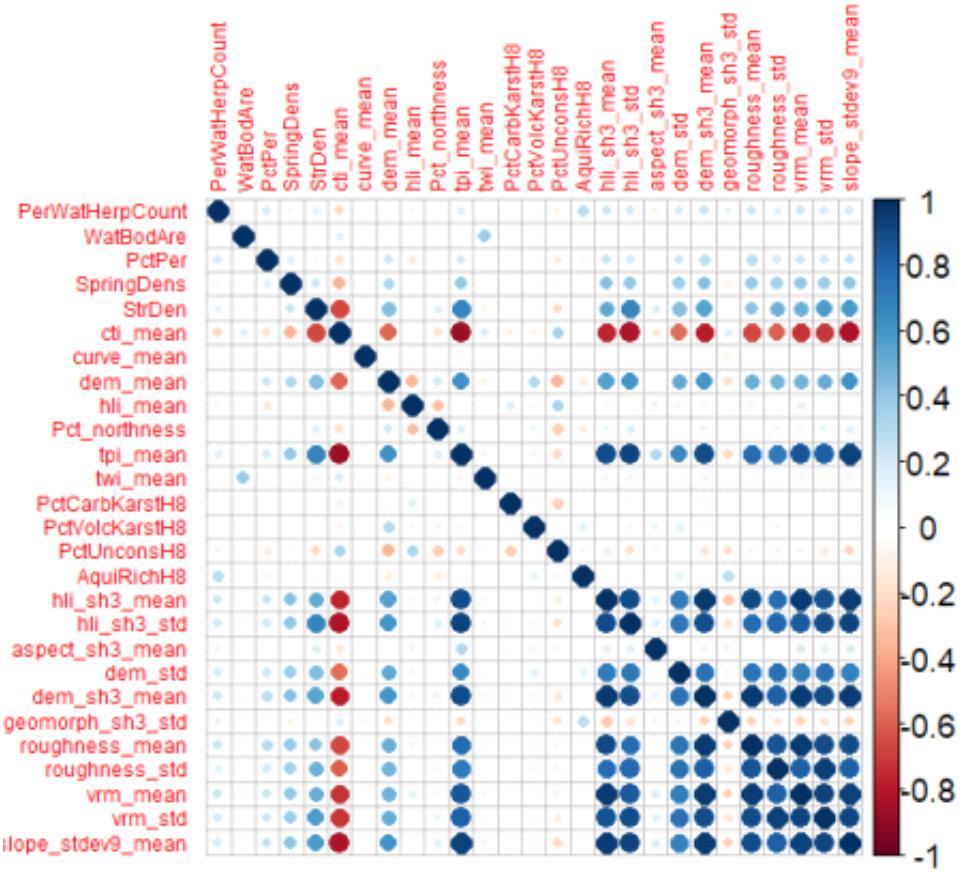
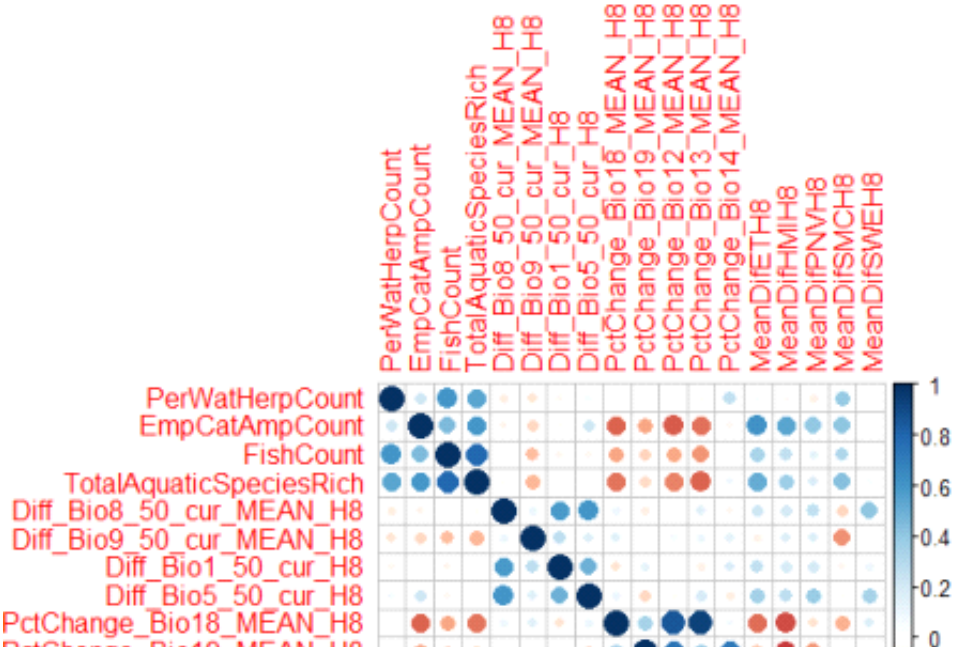
Correlations

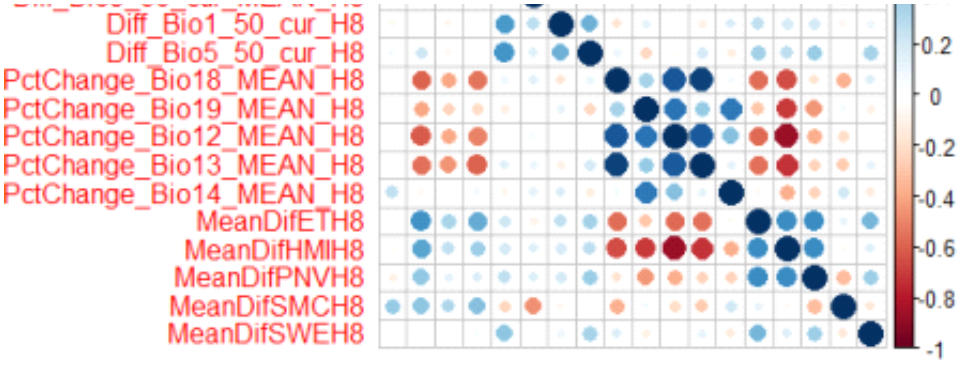
Monday, November 24, 2025 12:27 PM

Pearson correlations between variables considered for assessment of perennial water-dependent amphibian and reptile habitat

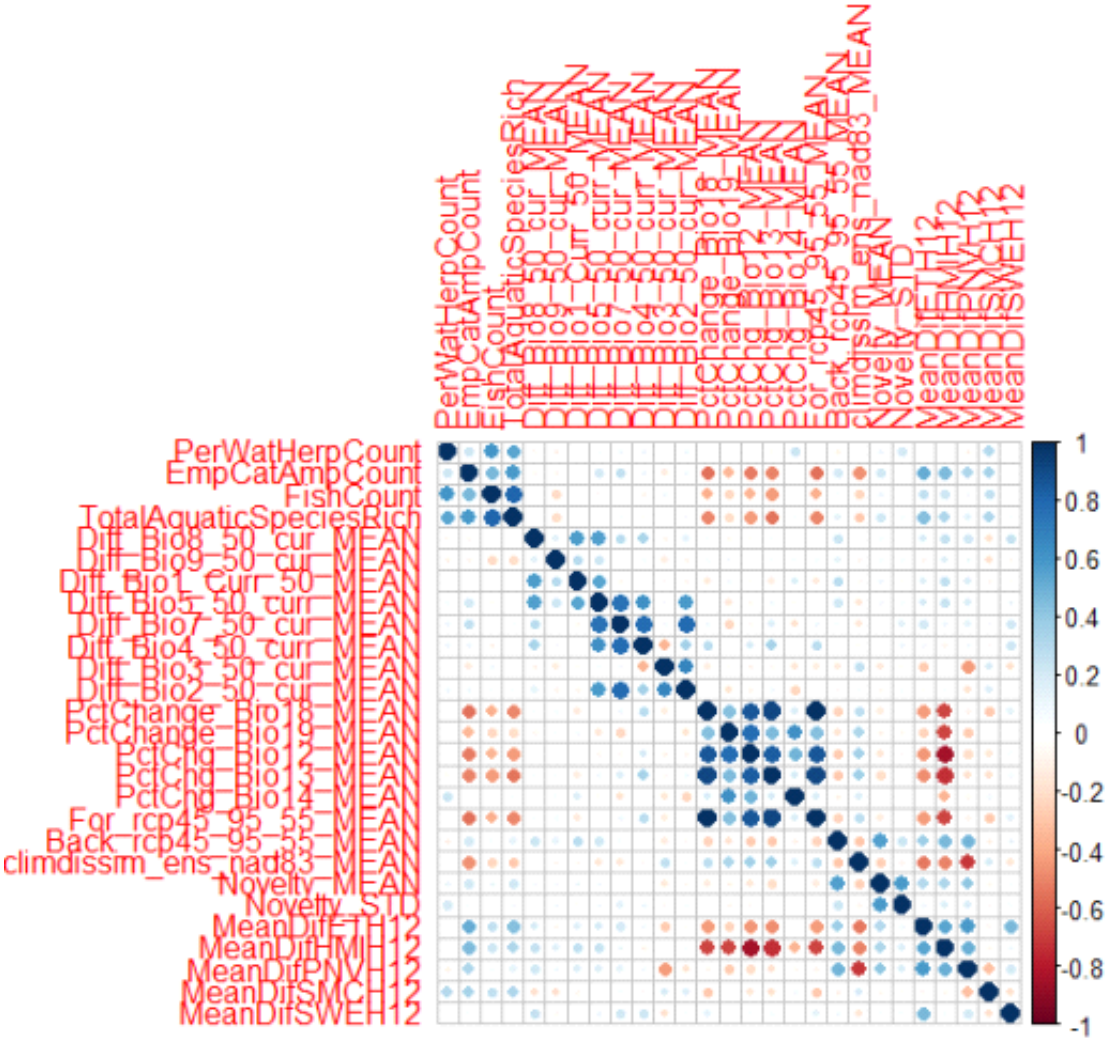


Among indicators, CTI has many negative correlations.
DEM diversity, roughness, slope diversity, TPI, and VRM have many positive correlations.

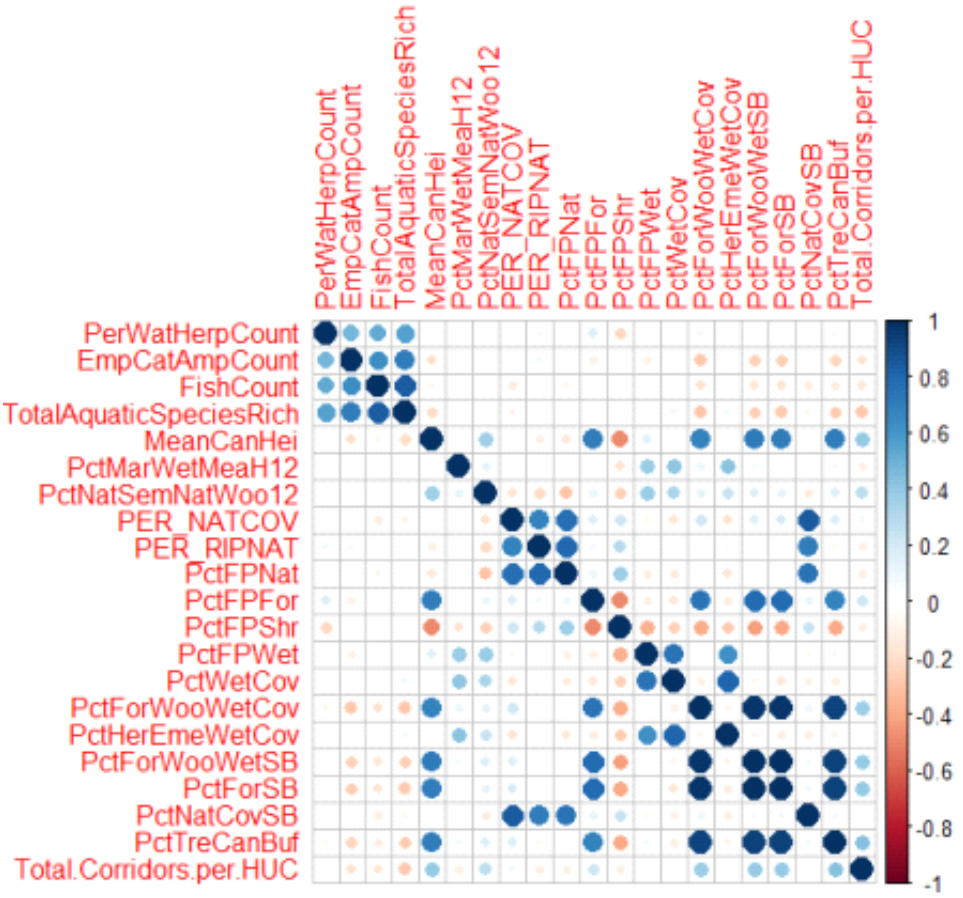




For climate, the greatest correlations (>0.7) are among precipitation change and HMI.



Climate indicator results are similar at the HUC12 scale.



For vegetation indicators, there are many correlations among measures of canopy height, forest cover, and natural cover.

FBBC

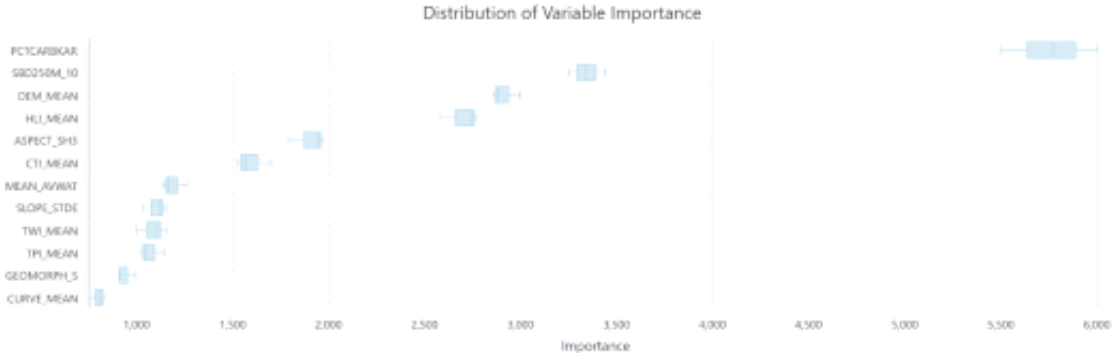
Thursday, April 3, 2025 5:25 PM

Forest-Based and Boosted Classification results for perennial water-dependent amphibian and reptile habitat. Lithology, soil, and topography variables were assessed for their ability to predict species richness and total waterbody area for amphibians and reptiles.

Predicting perennial water-dependent amphibian and reptile species richness:

Top Variable Importance

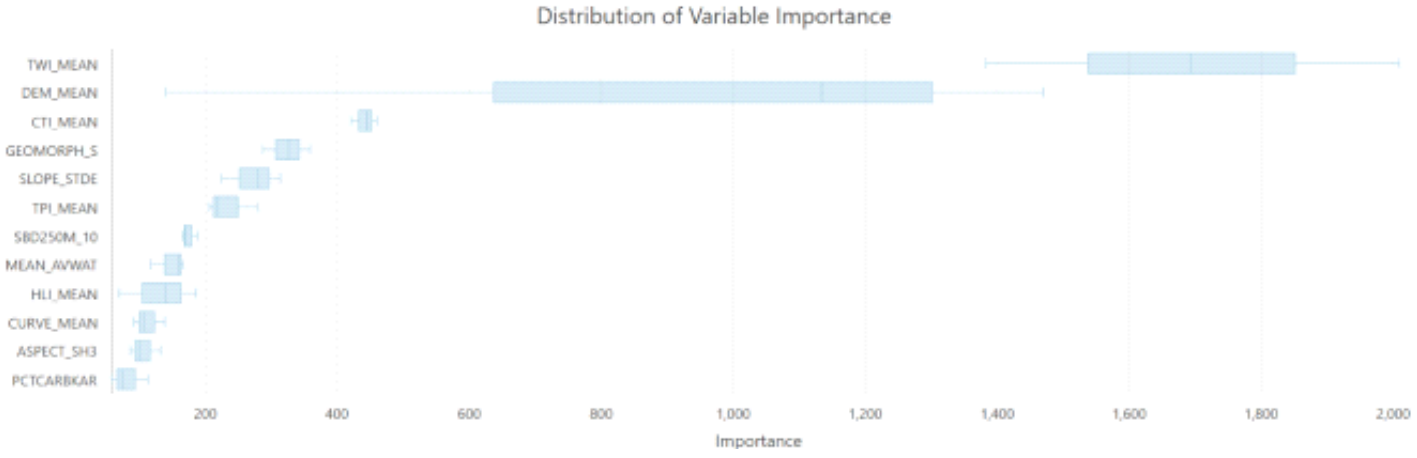
Variable	Importance	%
PctCarbKarstH8	6003.87	24
sbd250m_100bd_mean	3443.78	14
dem_mean	2879.51	12
hli_mean	2767.04	11
aspect_sh3_mean	1970.43	8
cti_mean	1566.11	6
mean_avwatstr	1163.14	5
slope_stdev9_mean	1151.93	5
tpi_mean	1023.89	4
twi_mean	1002.04	4
geomorph_sh3_std	908.23	4
curve_mean	751.30	3



Predicting water body area:

Top Variable Importance

Variable	Importance	%
twi_mean	1693.40	33
dem_mean	1470.09	29
cti_mean	420.49	8
geomorph_sh3_std	358.75	7
slope_stdev9_mean	224.25	4
tpi_mean	218.55	4
sbd250m_100bd_mean	170.22	3
hli_mean	139.57	3
curve_mean	138.41	3
aspect_sh3_mean	132.06	3
mean_avwatstr	117.47	2
PctCarbKarstH8	74.69	1



Exploratory Regression

Monday, November 24, 2025 12:12 PM

Assessment of climate variables
Response variable: perennial water-dependent amphibian and reptile species richness

Choose 3 of 15 Summary

Highest Adjusted R-Squared Results

AdjR2	AICc	JB	K(BP)	VIF	SA	Model
0.28	13583.91	0.00	0.00	2.15	0.00	-PCTCHANGE_BIO19_MEAN_H8*** +PCTCHANGE_BIO14_MEAN_H8*** +MEANDIFSMCH8***
0.27	13625.77	0.00	0.00	2.08	0.00	-DIFF_BIO9_50_CUR_MEAN_H8*** -PCTCHANGE_BIO19_MEAN_H8*** +PCTCHANGE_BIO14_MEAN_H8***
0.25	13708.13	0.01	0.00	1.48	0.00	-DIFF_BIO9_50_CUR_MEAN_H8*** +PCTCHANGE_BIO14_MEAN_H8*** +MEANDIFSMCH8***

Passing Models

AdjR2	AICc	JB	K(BP)	VIF	SA	Model

Choose 4 of 15 Summary

Highest Adjusted R-Squared Results

AdjR2	AICc	JB	K(BP)	VIF	SA	Model
0.31	13459.52	0.00	0.00	4.02	0.00	-PCTCHANGE_BIO19_MEAN_H8*** +PCTCHANGE_BIO12_MEAN_H8*** +PCTCHANGE_BIO14_MEAN_H8*** +MEANDIFSMCH8***
0.31	13474.91	0.00	0.00	2.40	0.00	-DIFF_BIO9_50_CUR_MEAN_H8*** -PCTCHANGE_BIO19_MEAN_H8*** +PCTCHANGE_BIO14_MEAN_H8*** +MEANDIFSMCH8***
0.31	13492.25	0.00	0.00	3.80	0.00	-PCTCHANGE_BIO19_MEAN_H8*** +PCTCHANGE_BIO14_MEAN_H8*** -MEANDIFHMIH8*** +MEANDIFSMCH8***

Passing Models

AdjR2	AICc	JB	K(BP)	VIF	SA	Model

Choose 5 of 15 Summary

Highest Adjusted R-Squared Results

AdjR2	AICc	JB	K(BP)	VIF	SA	Model
0.33	13383.81	0.00	0.00	4.02	0.00	-DIFF_BIO9_50_CUR_MEAN_H8*** -PCTCHANGE_BIO19_MEAN_H8*** +PCTCHANGE_BIO12_MEAN_H8*** +PCTCHANGE_BIO14_MEAN_H8*** +MEANDIFSMCH8***
0.33	13411.52	0.00	0.00	2.49	0.00	-DIFF_BIO9_50_CUR_MEAN_H8*** -PCTCHANGE_BIO19_MEAN_H8*** +PCTCHANGE_BIO13_MEAN_H8*** +PCTCHANGE_BIO14_MEAN_H8*** +MEANDIFSMCH8***
0.32	13424.04	0.00	0.00	3.81	0.00	-DIFF_BIO9_50_CUR_MEAN_H8*** -PCTCHANGE_BIO19_MEAN_H8*** +PCTCHANGE_BIO14_MEAN_H8*** -MEANDIFHMIH8*** +MEANDIFSMCH8***

Passing Models

AdjR2	AICc	JB	K(BP)	VIF	SA	Model

Writing Results to Output Table....

Exploratory Regression Global Summary (PERWATHERPCOUNT)

Percentage of Search Criteria Passed

Search Criterion	Cutoff	Trials	# Passed	% Passed
Min Adjusted R-Squared	> 0.50	4943	0	0.00
Max Coefficient p-value	< 0.05	4943	2533	51.24
Max VIF Value	< 7.50	4943	4762	96.34
Min Jarque-Bera p-value	> 0.10	4943	73	1.48
Min Spatial Autocorrelation p-value	> 0.10	18	0	0.00

Summary of Variable Significance

Variable	% Significant	% Negative	% Positive
PCTCHANGE_BIO14_MEAN_H8	100.00	0.00	100.00
MEANDIFSMCH8	100.00	0.00	100.00
MEANJUNFLOPCTCH2040	100.00	100.00	0.00
DIFF_BIO9_50_CUR_MEAN_H8	99.32	100.00	0.00
DIFF_BIO5_50_CUR_H8	98.30	0.00	100.00
BACK_RCP45_95_55_MEAN	97.28	100.00	0.00
DIFF_BIO8_50_CUR_MEAN_H8	87.42	97.55	2.45
MEANDIFSWEH8	80.63	13.60	86.40
MEANDIFETH8	80.35	14.55	85.45
DIFF_BIO1_50_CUR_H8	77.97	92.86	7.14
MEANDIFPNVH8	76.07	62.07	37.93
PCTCHANGE_BIO12_MEAN_H8	73.49	49.15	50.85
MEANDIFHMIH8	72.47	74.17	25.83
PCTCHANGE_BIO19_MEAN_H8	71.58	53.30	46.70
PCTCHANGE_BIO13_MEAN_H8	71.38	61.86	38.14

Summary of Multicollinearity

Variable	VIF	Violations	Covariates
DIFF_BIO8_50_CUR_MEAN_H8	2.34	0	--------
DIFF_BIO9_50_CUR_MEAN_H8	1.73	0	--------
DIFF_BIO5_50_CUR_H8	2.93	0	--------
DIFF_BIO1_50_CUR_H8	2.35	0	--------
PCTCHANGE_BIO19_MEAN_H8	6.41	0	--------
PCTCHANGE_BIO12_MEAN_H8	17.85	108	PCTCHANGE_BIO13_MEAN_H8 (3.96), MEANDIFHMIH8 (2.64)
PCTCHANGE_BIO13_MEAN_H8	9.15	15	PCTCHANGE_BIO12_MEAN_H8 (3.96)
PCTCHANGE_BIO14_MEAN_H8	2.51	0	--------
BACK_RCP45_95_55_MEAN	1.29	0	--------
MEANDIFETH8	4.57	0	--------
MEANDIFHMIH8	10.36	83	PCTCHANGE_BIO12_MEAN_H8 (2.64)
MEANDIFPNVH8	3.94	0	--------
MEANDIFSWEH8	2.08	0	--------
MEANDIFSMCH8	2.12	0	--------
MEANJUNFLOPCTCH2040	1.34	0	--------

Summary of Residual Normality (JB)

JB	AdjR2	AICc	K(BP)	VIF	SA	Model
0.991110	0.203902	13867.595803	0.000000	1.537134	0.000000	-DIFF_BIO8_50_CUR_MEAN_H8*** -DIFF_BIO9_50_CUR_MEAN_H8*** +PCTCHANGE_BIO14_MEAN_H8*** +MEANDIFETH8*** +MEANDIFSWEH8***
0.939455	0.206059	13860.135047	0.000000	1.262542	0.000000	-DIFF_BIO8_50_CUR_MEAN_H8*** -DIFF_BIO9_50_CUR_MEAN_H8*** -PCTCHANGE_BIO13_MEAN_H8*** +PCTCHANGE_BIO14_MEAN_H8*** +MEANDIFSWEH8***
0.912818	0.231390	13770.964700	0.000000	1.285858	0.000000	-DIFF_BIO8_50_CUR_MEAN_H8*** -DIFF_BIO9_50_CUR_MEAN_H8*** +PCTCHANGE_BIO14_MEAN_H8*** +MEANDIFSWEH8*** -MEANJUNFLOPCTCH2040***

Summary of Residual Spatial Autocorrelation (SA)

SA	AdjR2	AICc	JB	K(BP)	VIF	Model
0.000000	0.332325	13383.813066	0.000000	0.000000	4.022174	-DIFF_BIO9_50_CUR_MEAN_H8*** -PCTCHANGE_BIO19_MEAN_H8*** +PCTCHANGE_BIO12_MEAN_H8*** +PCTCHANGE_BIO14_MEAN_H8*** +MEANDIFSMCH8***
0.000000	0.325564	13411.521360	0.000000	0.000000	2.494350	-DIFF_BIO9_50_CUR_MEAN_H8*** -PCTCHANGE_BIO19_MEAN_H8*** +PCTCHANGE_BIO13_MEAN_H8*** +PCTCHANGE_BIO14_MEAN_H8*** +MEANDIFSMCH8***
0.000000	0.322487	13424.040464	0.000000	0.000000	3.814195	-DIFF_BIO9_50_CUR_MEAN_H8*** -PCTCHANGE_BIO19_MEAN_H8*** +PCTCHANGE_BIO14_MEAN_H8*** -MEANDIFHMIH8*** +MEANDIFSMCH8***

Table Abbreviations

AdjR2	Adjusted R-Squared
AICc	Akaike's Information Criterion
JB	Jarque-Bera p-value
K(BP)	Koenker (BP) Statistic p-value
VIF	Max Variance Inflation Factor

Assessment of lithology/soil/topography variables
Response variable: perennial water-dependent amphibian and reptile species richness

Choose 1 of 11 Summary

Highest Adjusted R-Squared Results

AdjR2	AICc	JB	K(BP)	VIF	SA	Model
0.07	14291.63	0.00	0.00	1.00	0.00	-SBD250M_100BD_MEAN***
0.02	14422.74	0.00	0.37	1.00	0.00	-CTI_MEAN***
0.02	14423.06	0.00	0.51	1.00	0.00	+SLOPE_STDEV9_MEAN***

Passing Models

AdjR2	AICc	JB	K(BP)	VIF	SA	Model

Choose 2 of 11 Summary

Highest Adjusted R-Squared Results

AdjR2	AICc	JB	K(BP)	VIF	SA	Model
0.09	14240.95	0.00	0.00	1.07	0.00	-SBD250M_100BD_MEAN*** -DEM_MEAN***
0.09	14241.53	0.00	0.00	1.14	0.00	-SBD250M_100BD_MEAN*** -PCTCARBKARSTH8***
0.08	14262.73	0.00	0.00	1.00	0.00	-SBD250M_100BD_MEAN*** -ASPECT_SH3_MEAN***

Passing Models

AdjR2	AICc	JB	K(BP)	VIF	SA	Model

Choose 3 of 11 Summary

Highest Adjusted R-Squared Results

AdjR2	AICc	JB	K(BP)	VIF	SA	Model
0.12	14147.67	0.00	0.00	1.59	0.00	-SBD250M_100BD_MEAN*** -CTI_MEAN*** -DEM_MEAN***
0.11	14163.25	0.00	0.00	1.26	0.00	-SBD250M_100BD_MEAN*** -DEM_MEAN*** -PCTCARBKARSTH8***
0.11	14172.49	0.00	0.00	1.67	0.00	-SBD250M_100BD_MEAN*** -DEM_MEAN*** +SLOPE_STDEV9_MEAN***

Passing Models

AdjR2	AICc	JB	K(BP)	VIF	SA	Model

Choose 4 of 11 Summary

Highest Adjusted R-Squared Results

AdjR2	AICc	JB	K(BP)	VIF	SA	Model
0.15	14047.55	0.00	0.00	1.60	0.00	-SBD250M_100BD_MEAN*** -CTI_MEAN*** -DEM_MEAN*** -PCTCARBKARSTH8***
0.14	14067.42	0.00	0.00	1.77	0.00	-SBD250M_100BD_MEAN*** -CTI_MEAN*** -DEM_MEAN*** -ASPECT_SH3_MEAN***
0.13	14098.99	0.00	0.00	1.67	0.00	-SBD250M_100BD_MEAN*** -DEM_MEAN*** +SLOPE_STDEV9_MEAN*** -PCTCARBKARSTH8***

Passing Models

AdjR2	AICc	JB	K(BP)	VIF	SA	Model

Choose 5 of 11 Summary

Highest Adjusted R-Squared Results

AdjR2	AICc	JB	K(BP)	VIF	SA	Model
0.18	13938.98	0.00	0.00	1.80	0.00	-SBD250M_100BD_MEAN*** -CTI_MEAN*** -DEM_MEAN*** -ASPECT_SH3_MEAN*** -PCTCARBKARSTH8***
0.16	14014.22	0.00	0.00	5.46	0.00	-SBD250M_100BD_MEAN*** -CTI_MEAN*** -DEM_MEAN*** -TPI_MEAN*** -PCTCARBKARSTH8***
0.16	14019.39	0.00	0.00	2.30	0.00	-SBD250M_100BD_MEAN*** -DEM_MEAN*** +TPI_MEAN*** -ASPECT_SH3_MEAN*** -PCTCARBKARSTH8***

Passing Models

AdjR2	AICc	JB	K(BP)	VIF	SA	Model

Writing Results to Output Table....

Exploratory Regression Global Summary (PERWATHERPCOUNT)

Percentage of Search Criteria Passed

Search Criterion	Cutoff	Trials	# Passed	% Passed
Min Adjusted R-Squared	> 0.50	1023	0	0.00
Max Coefficient p-value	< 0.05	1023	303	29.62
Max VIF Value	< 7.50	1023	893	87.29
Min Jarque-Bera p-value	> 0.10	1023	0	0.00
Min Spatial Autocorrelation p-value	> 0.10	16	0	0.00

Summary of Variable Significance

Variable	% Significant	% Negative	% Positive
SBD250M_100BD_MEAN	100.00	100.00	0.00
CTI_MEAN	100.00	100.00	0.00
ASPECT_SH3_MEAN	100.00	100.00	0.00
PCTCARBKARSTH8	96.89	100.00	0.00
DEM_MEAN	94.82	100.00	0.00
HLI_MEAN	90.41	5.96	94.04
SLOPE_STDEV9_MEAN	89.90	5.70	94.30
TPI_MEAN	79.02	52.33	47.67
GEOMORPH_SH3_STD	50.00	21.50	78.50
TWI_MEAN	28.24	0.00	100.00
CURVE_MEAN	4.66	100.00	0.00

Summary of Multicollinearity

Variable	VIF	Violations	Covariates
SBD250M_100BD_MEAN	1.50	0	--------
CTI_MEAN	5.54	0	--------
CURVE_MEAN	1.06	0	--------
DEM_MEAN	2.08	0	--------
TPI_MEAN	16.08	130	SLOPE_STDEV9_MEAN (99.24)
TWI_MEAN	1.06	0	--------
HLI_MEAN	1.35	0	--------
ASPECT_SH3_MEAN	1.78	0	--------
GEOMORPH_SH3_STD	1.46	0	--------
SLOPE_STDEV9_MEAN	9.94	130	TPI_MEAN (99.24)
PCTCARBKARSTH8	1.25	0	--------

Summary of Residual Normality (JB)

JB	AdjR2	AICc	K(BP)	VIF	SA	Model
0.000000	0.083286	14481.608741	0.004133	1.000000	0.000000	-CURVE_MEAN
0.000000	0.024396	14422.741313	0.368259	1.000000	0.000000	-CTI_MEAN***
0.000000	0.069817	14291.631106	0.000001	1.000000	0.000000	-SBD250M_100BD_MEAN***

Summary of Residual Spatial Autocorrelation (SA)

SA	AdjR2	AICc	JB	K(BP)	VIF	Model
0.000000	0.182968	13938.975633	0.000000	0.000000	1.800541	-SBD250M_100BD_MEAN*** -CTI_MEAN*** -DEM_MEAN*** -ASPECT_SH3_MEAN*** -PCTCARBKARSTH8***
0.000000	0.160303	14014.222616	0.000000	0.000000	5.457811	-SBD250M_100BD_MEAN*** -CTI_MEAN*** -DEM_MEAN*** -TPI_MEAN*** -PCTCARBKARSTH8***
0.000000	0.158725	14019.387635	0.000000	0.000000	2.298876	-SBD250M_100BD_MEAN*** -DEM_MEAN*** +TPI_MEAN*** -ASPECT_SH3_MEAN*** -PCTCARBKARSTH8***

Table Abbreviations

AdjR2	Adjusted R-Squared
AICc	Akaike's Information Criterion
JB	Jarque-Bera p-value
K(BP)	Koenker (BP) Statistic p-value
VIF	Max Variance Inflation Factor
SA	Global Moran's I p-value
Model	Variable sign (+/-)

Vegetation variables
Response variable: perennial water-dependent amphibian and reptile species richness

Choose 1 of 8 Summary

Highest Adjusted R-Squared Results

AdjR2	AICc	JB	K(BP)	VIF	SA	Model
0.06	14329.82	0.00	0.12	1.00	0.00	-PCTFPSHR***
0.05	14340.46	0.00	0.79	1.00	0.00	+PCTNATSEMNATWOO12***
0.05	14360.04	0.00	0.06	1.00	0.00	+MEANCANHEI***

Passing Models

AdjR2	AICc	JB	K(BP)	VIF	SA	Model

Choose 2 of 8 Summary

Highest Adjusted R-Squared Results

AdjR2	AICc	JB	K(BP)	VIF	SA	Model
0.09	14243.80	0.00	0.56	1.08	0.00	+PCTNATSEMNATWOO12*** -PCTFPSHR***
0.07	14277.61	0.00	0.07	1.17	0.00	+MEANCANHEI*** -PCTFPSHR***
0.07	14280.63	0.00	0.13	1.03	0.00	+PCTNATCOVSB*** -PCTFPSHR***

Passing Models

AdjR2	AICc	JB	K(BP)	VIF	SA	Model

Choose 3 of 8 Summary

Highest Adjusted R-Squared Results

AdjR2	AICc	JB	K(BP)	VIF	SA	Model
0.10	14190.75	0.00	0.55	1.11	0.00	+PCTNATSEMNATWOO12*** +PCTNATCOVSB*** -PCTFPSHR***
0.09	14232.72	0.00	0.43	1.46	0.00	+MEANCANHEI*** +PCTNATSEMNATWOO12*** -PCTFPSHR***
0.09	14233.10	0.00	0.11	1.21	0.00	+MEANCANHEI*** +PCTNATCOVSB*** -PCTFPSHR***

Passing Models

AdjR2	AICc	JB	K(BP)	VIF	SA	Model

Choose 4 of 8 Summary

Highest Adjusted R-Squared Results

AdjR2	AICc	JB	K(BP)	VIF	SA	Model
0.11	14181.42	0.00	0.25	1.39	0.00	+PCTNATSEMNATWOO12*** +PCTNATCOVSB*** -PCTFPSHR*** -PCTFPWET***
0.11	14182.90	0.00	0.47	1.46	0.00	+MEANCANHEI*** +PCTNATSEMNATWOO12*** +PCTNATCOVSB*** -PCTFPSHR***
0.10	14188.83	0.00	0.00	1.16	0.00	+PCTNATSEMNATWOO12*** +PCTNATCOVSB*** +PCTTRECANBUF** -PCTFPSHR***

Choose 5 of 8 Summary

Highest Adjusted R-Squared Results

AdjR2	AICc	JB	K(BP)	VIF	SA	Model
0.11	14173.62	0.00	0.20	1.61	0.00	+MEANCANHEI*** +PCTNATSEMNATWOO12*** +PCTNATCOVSB*** -PCTFPSHR*** -PCTFPWET***
0.11	14179.23	0.00	0.00	1.41	0.00	+PCTNATSEMNATWOO12*** +PCTNATCOVSB*** +PCTTRECANBUF** -PCTFPSHR*** -PCTFPWET***
0.11	14180.65	0.00	0.14	1.59	0.00	+PCTMARWETMEAH12* +PCTNATSEMNATWOO12*** +PCTNATCOVSB*** -PCTFPSHR*** -PCTFPWET***

Passing Models

AdjR2	AICc	JB	K(BP)	VIF	SA	Model

Writing Results to Output Table....

Exploratory Regression Global Summary (PERWATHERPCOUNT)

Percentage of Search Criteria Passed

Search Criterion	Cutoff	Trials	# Passed	% Passed
Min Adjusted R-Squared	> 0.50	218	0	0.00
Max Coefficient p-value	< 0.05	218	81	37.16
Max VIF Value	< 7.50	218	218	100.00
Min Jarque-Bera p-value	> 0.10	218	0	0.00
Min Spatial Autocorrelation p-value	> 0.10	16	0	0.00

Summary of Variable Significance

Variable	% Significant	% Negative	% Positive
MEANCANHEI	100.00	0.00	100.00
PCTNATSEMNATWOO12	100.00	0.00	100.00
PCTNATCOVSB	100.00	0.00	100.00
PCTFPSHR	100.00	100.00	0.00
HUC	57.58	0.00	100.00
PCTTRECANBUF	56.57	4.04	95.96
PCTMARWETMEAH12	54.55	0.00	100.00
PCTFPWET	37.37	58.59	41.41

Summary of Multicollinearity

Variable	VIF	Violations	Covariates
MEANCANHEI	2.11	0	--------
PCTMARWETMEAH12	1.30	0	--------
PCTNATSEMNATWOO12	1.67	0	--------
PCTNATCOVSB	1.05	0	--------
PCTTRECANBUF	1.80	0	--------
PCTFPSHR	1.28	0	--------
PCTFPWET	1.59	0	--------
HUC	1.29	0	--------

Summary of Residual Normality (JB)

JB	AdjR2	AICc	K(BP)	VIF	SA	Model
0.000000	0.053154	14340.459935	0.791301	1.000000	0.000000	+PCTNATSEMNATWOO12***
0.000000	0.009527	14464.336665	0.445754	1.000000	0.000000	+PCTMARWETMEAH12***
0.000000	0.046389	14360.037063	0.063034	1.000000	0.000000	+MEANCANMEI***

Summary of Residual Spatial Autocorrelation (SA)

SA	AdjR2	AICc	JB	K(BP)	VIF	Model
0.000000	0.110195	14173.617918	0.000000	0.198085	1.613409	+MEANCANMEI*** +PCTNATSEMNATWOO12*** +PCTNATCOVSB*** -PCTFPSHR*** -PCTFPWET***
0.000000	0.108376	14179.232162	0.000000	0.000002	1.411760	+PCTNATSEMNATWOO12*** +PCTNATCOVSB*** +PCTTRECANBUF** -PCTFPSHR*** -PCTFPWET***
0.000000	0.107916	14180.650240	0.000000	0.143485	1.590528	+PCTMARWETMEAH12* +PCTNATSEMNATWOO12*** +PCTNATCOVSB*** -PCTFPSHR*** -PCTFPWET***

Table Abbreviations

AdjR2	Adjusted R-Squared
AICc	Akaike's Information Criterion
JB	Jarque-Bera p-value
K(BP)	Koenker (BP) Statistic p-value
VIF	Max Variance Inflation Factor
SA	Global Moran's I p-value
Model	Variable sign (+/-)
Model	Variable significance (* = 0.10; ** = 0.05; *** = 0.01)

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Generalized Linear Regression assessment of soil and topography variables
Response variable: perennial water-dependent amphibian and reptile species richness

Summary of GLR Results [Model Type: Continuous (Gaussian/OLS)]

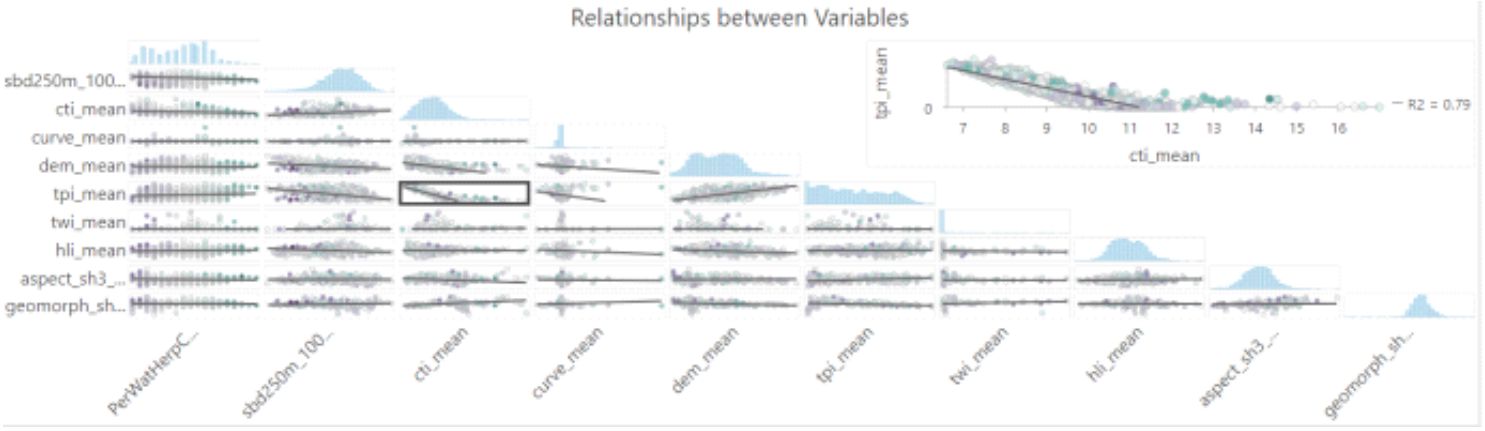
Variable	Coefficient[a]	StdError	t-Statistic	Probability[b]	Robust_SE	Robust_t	Robust_Pr[b]	VIF[c]
Intercept	51.975076	3.963510	13.113397	0.000000*	3.789406	13.715890	0.000000*	----------
SBD250M_1000D_MEAN	-16.992332	1.476422	-11.509129	0.000000*	1.501868	-11.314134	0.000000*	1.350797
CTI_MEAN	-0.834331	0.118287	-7.053471	0.000000*	0.129507	-6.442366	0.000000*	5.513267
CURVE_MEAN	-4358.146133	8165.484293	-0.533728	0.593583	9778.278107	-0.445697	0.655867	1.071358
DEM_MEAN	-0.002240	0.000200	-11.193664	0.000000*	0.000192	-11.678004	0.000000*	2.114788
TPI_MEAN	-2.591554	2.215564	-1.169704	0.242221	2.273129	-1.140082	0.254348	17.917019
TWI_MEAN	0.000071	0.000027	2.631886	0.008533*	0.000031	2.285023	0.022371*	1.066062
HLI_MEAN	-1.702585	2.582654	-0.659238	0.509796	2.535687	-0.671449	0.501988	1.365424
ASPECT_SH3_MEAN	-5.278217	0.751122	-7.027112	0.000000*	0.795998	-6.630945	0.000000*	1.911345
GEOMORPH_SH3_STD	6.412540	2.095812	3.059692	0.002250*	2.191533	2.926052	0.003470*	1.476997
SLOPE_STDEV9_MEAN	0.136936	0.054606	2.507726	0.012197*	0.057138	2.396571	0.016601*	9.998630

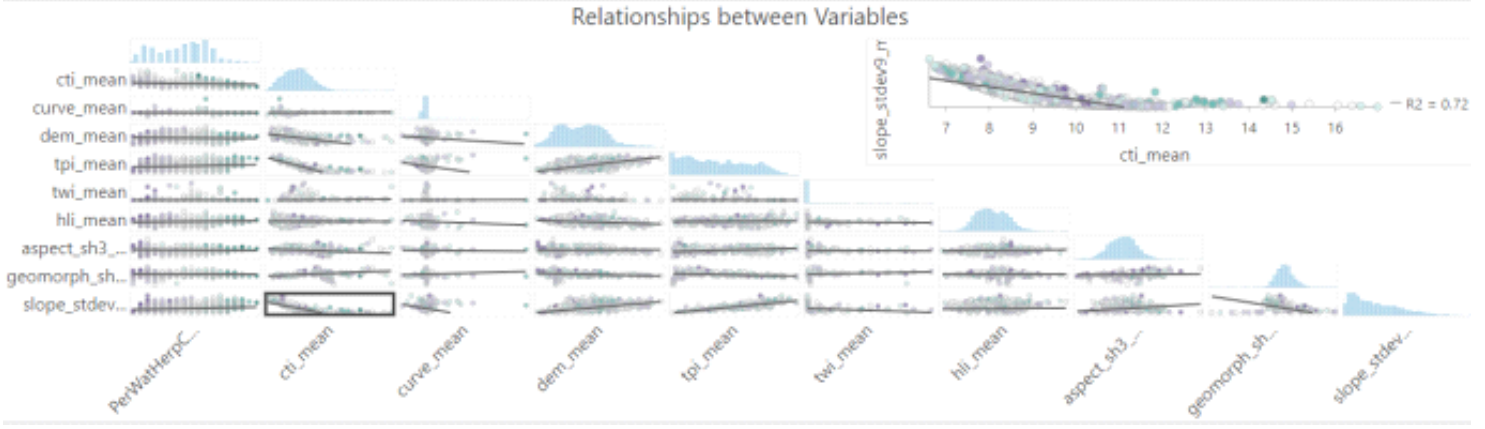
GLR Diagnostics

Input Features	HUC12sAmphsRepts20241218	Dependent Variable	PERWATHERPCOUNT
Number of Observations	2750	Akaike's Information Criterion (AICc)[d]	14052.535742
Multiple R-Squared[d]	0.153179	Adjusted R-Squared[d]	0.150087
Joint F-Statistic[e]	49.544929	Prob(>F), (10,2739) degrees of freedom	0.000000*
Joint Wald Statistic[e]	457.132964	Prob(>chi-squared), (10) degrees of freedom	0.000000*
Koenker (BP) Statistic[f]	136.559204	Prob(>chi-squared), (10) degrees of freedom	0.000000*
Jarque-Bera Statistic[g]	57.213388	Prob(>chi-squared), (2) degrees of freedom	0.000000*

Notes on Interpretation

*	An asterisk next to a number indicates a statistically significant p-value (p < 0.01).
a	Coefficient: Represents the strength and type of relationship between each explanatory variable and the dependent variable.
b	Probability and Robust Probability (Robust_Pr): Asterisk (*) indicates a coefficient is statistically significant (p < 0.01); if the Koenker (BP) Statistic [f] is statistically significant, use the Robust Probability column (Robust_Pr) to determine coefficient significance.
c	Variance Inflation Factor (VIF): Large Variance Inflation Factor (VIF) values (> 7.5) indicate redundancy among explanatory variables.
d	R-Squared and Akaike's Information Criterion (AICc): Measures of model fit/performance.
e	Joint F and Wald Statistics: Asterisk (*) indicates overall model significance (p < 0.01); if the Koenker (BP) Statistic [f] is statistically significant, use the Wald Statistic to determine overall model significance.
f	Koenker (BP) Statistic: When this test is statistically significant (p < 0.01), the relationships modeled are not consistent (either due to non-stationarity or heteroskedasticity). You should rely on the Robust Probabilities (Robust_Pr) to determine coefficient significance and on the Wald Statistic to determine overall model significance.
g	Jarque-Bera Statistic: When this test is statistically significant (p < 0.01) model predictions are biased (the residuals are not normally distributed).

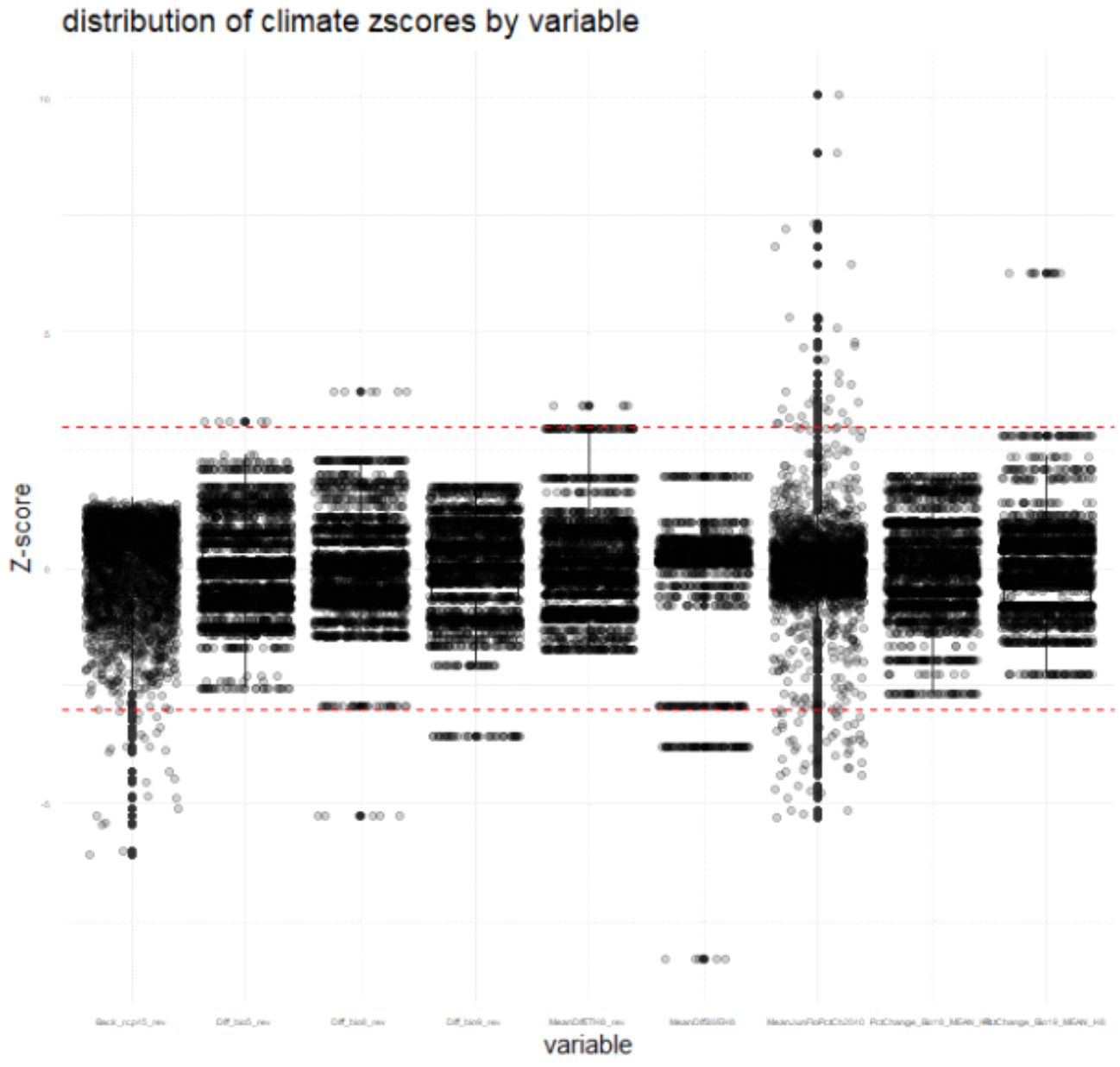




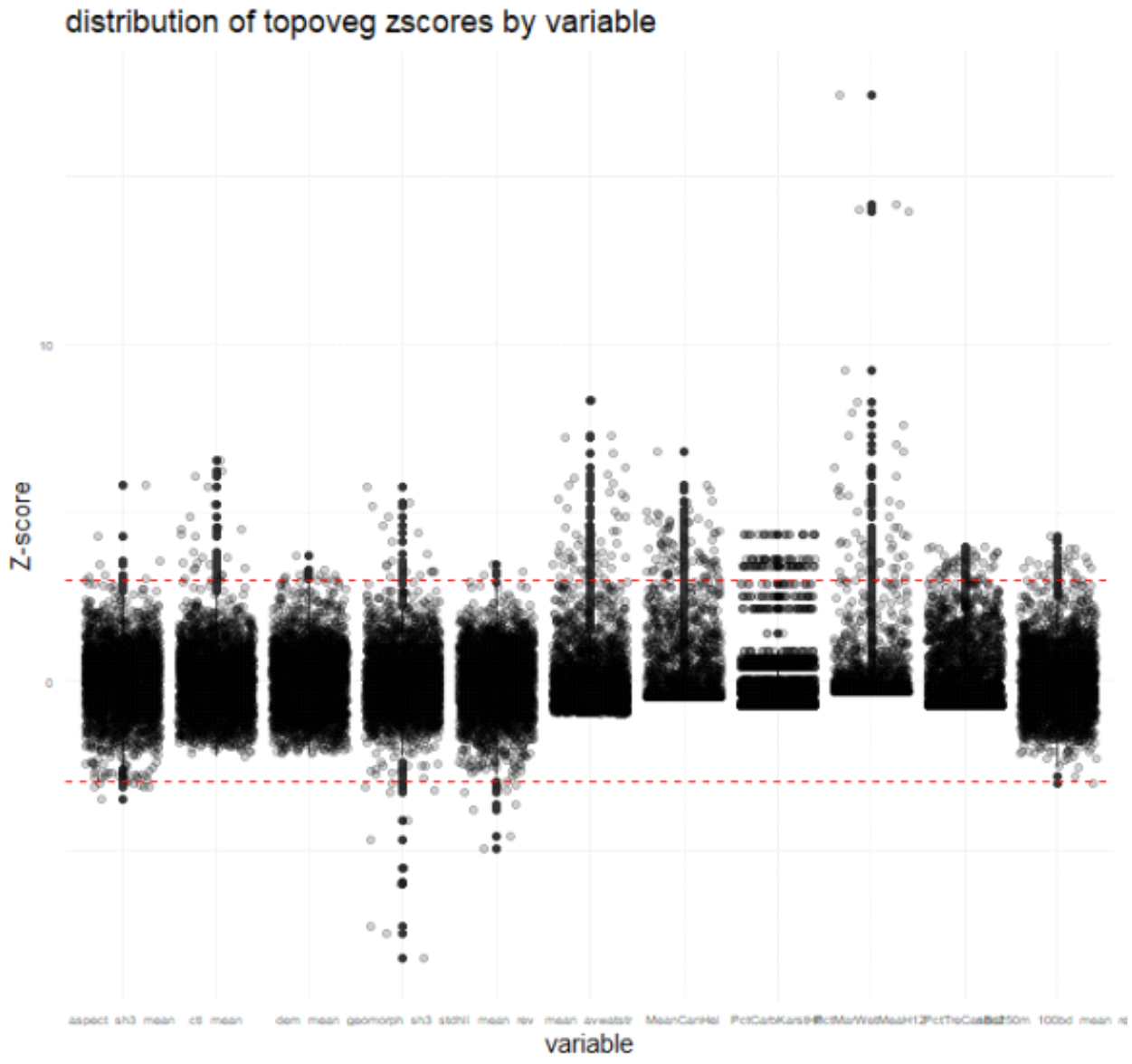
Z Scores

Thursday, January 23, 2025 2:26 PM

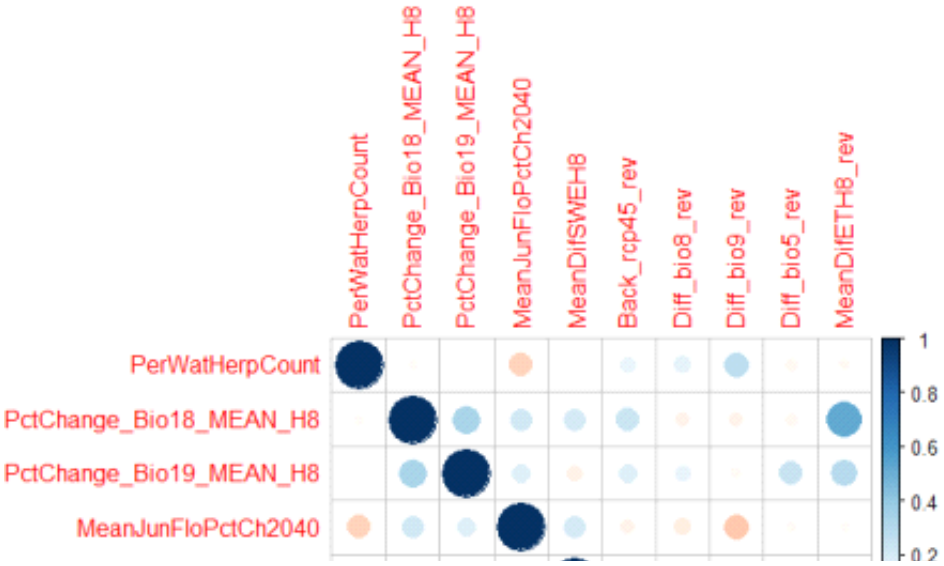
Distribution of Z scores calculated for climate indicators of refugia for perennial water-dependent amphibian and reptile habitat

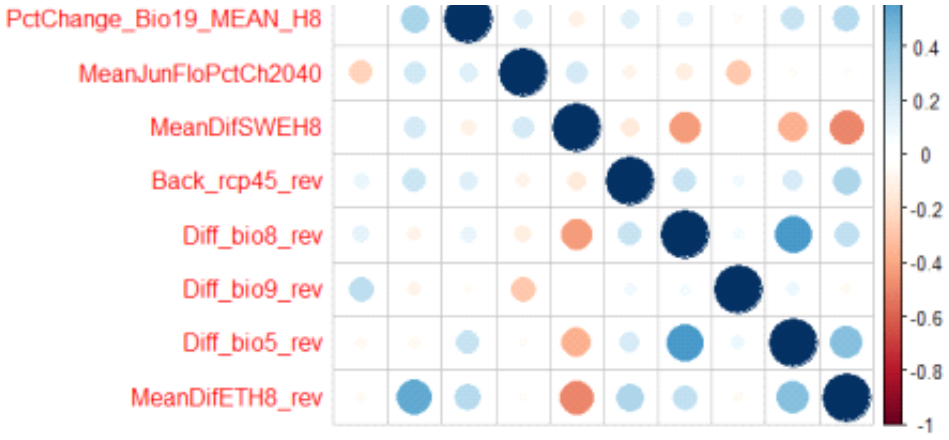


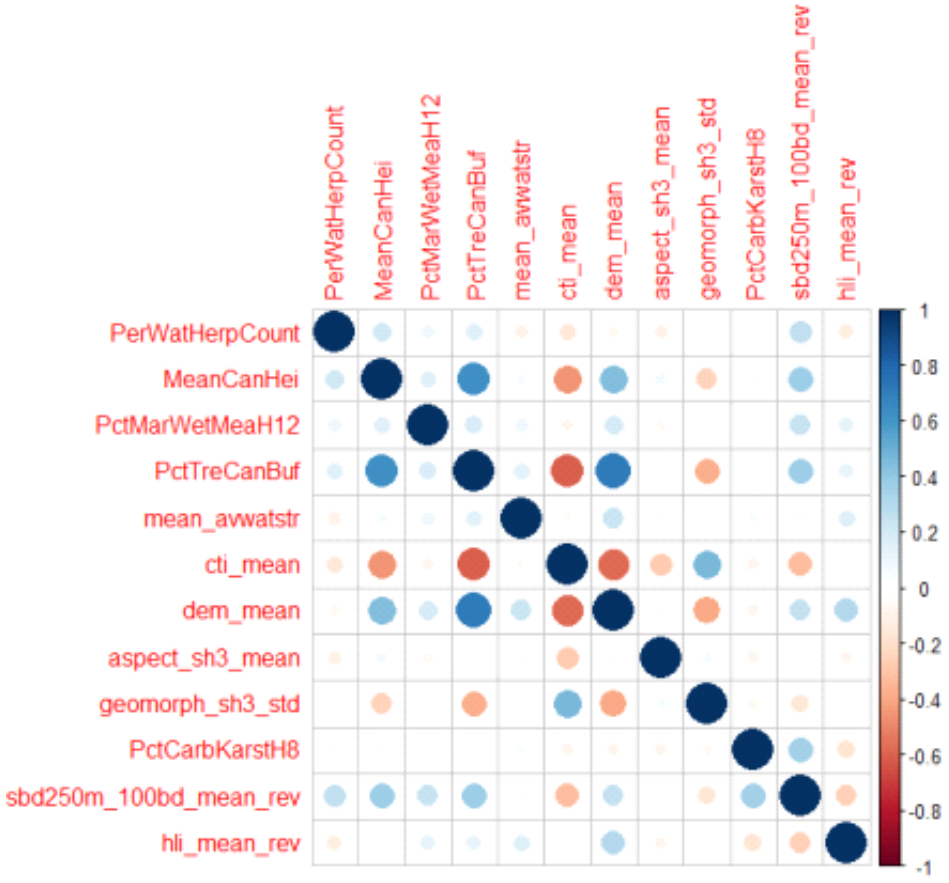
Distribution of Z scores calculated for lithology, soil, and topography indicators of refugia for perennial water-dependent amphibian and reptile habitat



Pearson correlations among indicator Z scores




PctChange_Bio19_MEAN_H8
MeanJunFloPctCh2040
MeanDifSWEH8
Back_rcp45_rev
Diff_bio8_rev
Diff_bio9_rev
Diff_bio5_rev
MeanDifETH8_rev
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


PerWatHerpCount
MeanCanHei
PctMarWetMeaH12
PctTreCanBuf
mean_avwatstr
cti_mean
dem_mean
aspect_sh3_mean
geomorph_sh3_std
PctCarbKarstH8
sbd250m_100bd_mean_rev
hli_mean_rev
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1

Indicator weights

Thursday, January 23, 2025 2:47 PM

```
Weights calculated for lithology, soil, topography, and vegetation indicators
Weights and Z scores were multiplied and then summed to calculate a composite index for each HUC12 watershed.

Optimization Parameters:
Number of variables: 11
Minimum weight: 0.05
Maximum weight: 0.3
Initial weights check:
Min weight: 0.03472454
Max weight: 0.1023852
Sum of weights: 1
Optimization error: at least one element in x0 < lb
Trying alternative optimization...
Optimized Weights and Variable Characteristics:
                                    variable     weight variance mean_correlation         cv
MeanCanHei                       MeanCanHei 0.07878277     0.50       0.70532086 0.26853367
PctMarWetMeaH12               PctMarWetMeaH12 0.28239397     1.00       0.19214028 1.00000000
PctTreCanBuf                     PctTreCanBuf 0.05000000     0.25       0.97090348 0.05914967
mean_avwatstr                   mean_avwatstr 0.05000000     0.50       0.06918519 0.25267263
cti_mean                             cti_mean 0.06454868     0.50       0.87870336 0.07220816
dem_mean                             dem_mean 0.05000000     0.00       1.00000000 0.00000000
aspect_sh3_mean               aspect_sh3_mean 0.05000000     0.25       0.00000000 0.05524040
geomorph_sh3_std             geomorph_sh3_std 0.13528565     1.00       0.43921342 0.14648794
PctCarbKarstH8                 PctCarbKarstH8 0.05000000     0.50       0.10481015 0.26912595
sbd250m_100bd_mean_rev sbd250m_100bd_mean_rev 0.13898893     1.00       0.65966673 0.06047951
hli_mean_rev                     hli_mean_rev 0.05000000     0.25       0.22036955 0.01893197
Weight Statistics:
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
0.05000 0.05000 0.05000 0.09091 0.10703 0.28239



Weights calculated for climate indicators
Weights and Z scores were multiplied and then summed to calculate a composite index for each HUC12 watershed.
Climate Indicators

Optimization Parameters:
Number of variables: 9
Minimum weight: 0.05
Maximum weight: 0.3
Initial weights check:
Min weight: 0.06783752
Max weight: 0.1165203
Sum of weights: 1
Optimized Weights and Variable Characteristics:
                                      variable    weight variance mean_correlation          cv
PctChange_Bio18_MEAN_H8 PctChange_Bio18_MEAN_H8 0.1326070      1.0        0.6013848 0.003862137
PctChange_Bio19_MEAN_H8 PctChange_Bio19_MEAN_H8 0.0500000      0.5        0.4203463 0.140719308
MeanJunFloPctCh2040         MeanJunFloPctCh2040 0.1387758      0.5        0.2339651 0.728306972
MeanDifSWEH8                       MeanDifSWEH8 0.1457073      0.0        0.7177795 1.000000000
Back_rcp45_rev                   Back_rcp45_rev 0.0500000      0.5        0.4260990 0.022824749
Diff_bio8_rev                     Diff_bio8_rev 0.0500000      0.5        0.7031170 0.101019601
Diff_bio9_rev                     Diff_bio9_rev 0.0500000      0.5        0.0000000 0.023975314
Diff_bio5_rev                     Diff_bio5_rev 0.1680566      1.0        0.7602284 0.000000000
MeanDifETH8_rev                 MeanDifETH8_rev 0.2148532      1.0        1.0000000 0.043299804
Weight Statistics:
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.0500  0.0500  0.1326  0.1111  0.1457  0.2149
```