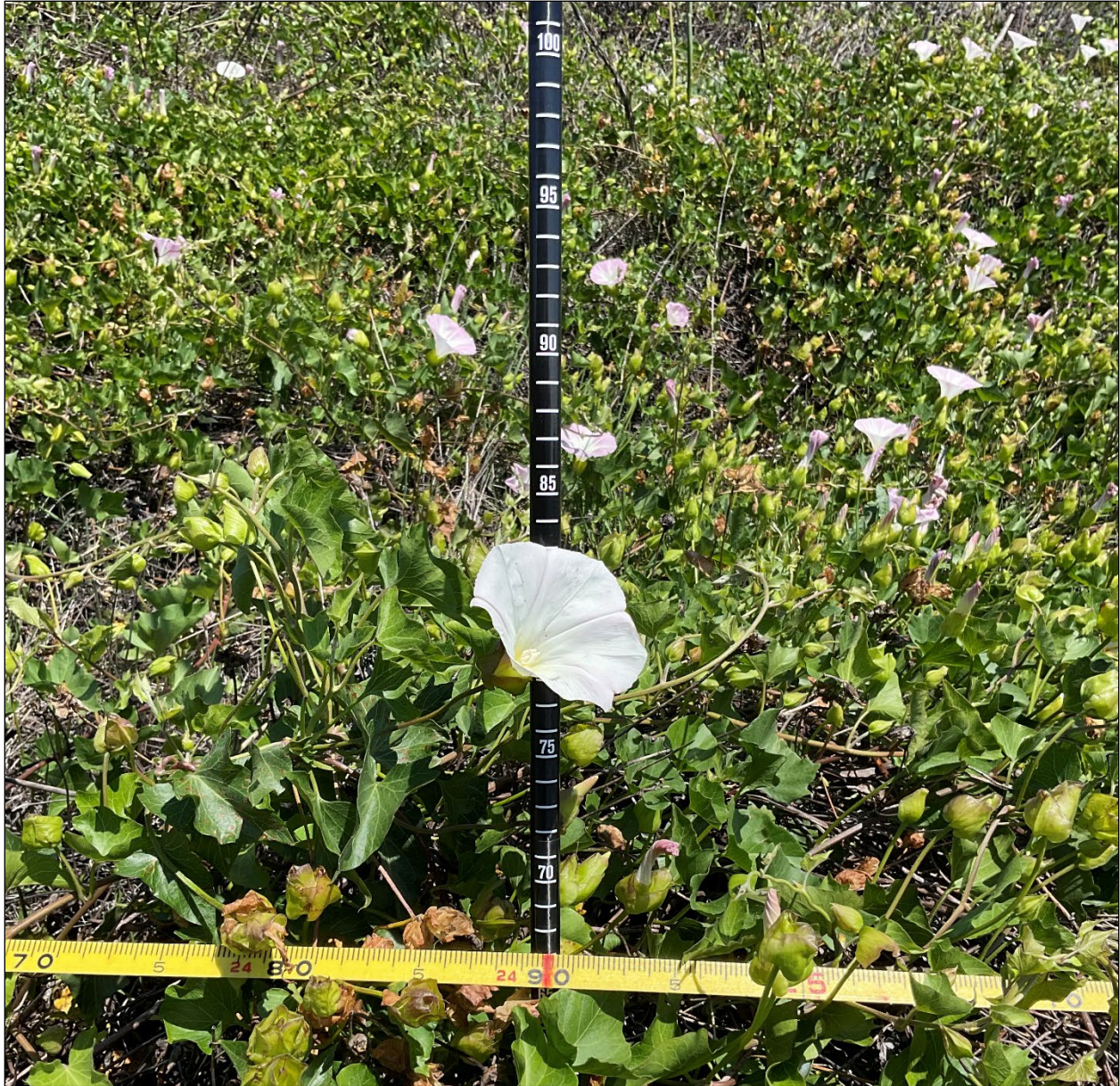

Supplemental Information

For the Science Report Publication “Analysis of Trends in Terrestrial Vegetation at Mediterranean Coast Network Parks: Channel Islands National Park”



Measuring height and cover of *Calystegia macrostegia* subsp. *macrostegia* on Santa Cruz Island.
NPS / Cameron B. Williams

Information

Authors and Affiliations

Leigh Ann Starcevich¹, Christopher Murray², Lena F.S. Lee³, Cameron B. Williams⁴, Kathryn McEachern⁵

¹ Western Ecosystems Technology, Inc., 2725 NW Walnut Blvd, Corvallis, OR 97330

² Western Ecosystems Technology, Inc., 2121 Midpoint Drive, Fort Collins, CO 80525

³ National Park Service – Mediterranean Coast Network, 401 West Hillcrest Drive, Thousand Oaks, CA 91360

⁴ Channel Islands National Park, 1901 Spinnaker Drive, Ventura, CA 93001

⁵ U.S. Geological Survey – WERC, Channel Islands Field Station, 1901 Spinnaker Drive, Ventura, CA 93001

Purpose

This file contains all supplemental information referenced in the NPS Science Report publication “Analysis of Trends in Terrestrial Vegetation at Mediterranean Coast Network Parks: Channel Islands National Park,” available on DataStore.

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Section A: rNPSVegCHIS Vignette

Data Availability

Contact the National Park Service Mediterranean Coast Network Inventory and Monitoring Program for information on data availability.

Installing the Package

Download the “rNPSVegCHIS_5.0.0.zip” file and store it in a directory of your choice. If using RStudio, select from the top menu Tools:Install Packages, and then, in the pop-up that appears, select “Package Archive File (.zip; .tar.gz)” from the drop-down. Next, select the “Browse...” button, and select the “rNPSVegCHIS_5.0.0.zip” file in the directory where it was stored. Finally, hit the “Install” button to complete its installation.

If using base R, select from the top menu Packages:Install package(s) from local files..., and then, in the pop-up that appears, select the “rNPSVegCHIS_5.0.0.zip” file in the directory where it was stored. Finally, hit the “Open” button to complete its installation.

When the *rNPSVegCHIS* package has been installed, the files in the package will be available for use. We recommend copying the *rNPSVegCHIS* package directory from the R package library and pasting a copy in another directory for use so that the package documents are not modified. If you are not sure where your R library is stored, enter the following command to find where the *rNPSVegCHIS* directory is stored: `.libPaths()`

The run code scripts for the analysis presented in this report are archived in the directory “rNPSVegCHIS/r_scripts.” Note that these scripts are provided as an archive of data formatting and analysis methods used rather than a tool for future analysis. Running this code may generate errors due to differing directory paths, changes to column names in data sets, and dependent R package updates. The Data.zip file (provided to MEDN separately from the R package due to the size of input data) contains the input files provided by MEDN for the analysis. The Data folder contained in the Data.zip file must be extracted and installed in a location that is then referenced in the run code scripts for the analysis functions to run.

Section B: Covariates Used to Model CHIS Vegetation Indicators

In Table 1, the covariates that were used to model CHIS vegetation indicators are listed and described.

Table 1. Notation, source, and description of covariates used for modeling CHIS vegetation indicators.

Covariate	Source	Description	Island(s)
AET_mm_currentYr	Tercek	Modeled actual evapotranspiration, current water year	SC, SM, SR
AET_mm_fog	Tercek	Modeled actual evapotranspiration, current year fog season	SC, SM, SR
AET_mm_prev2Yr	Tercek	Modeled actual evapotranspiration, previous two water years combined	SC, SM, SR
AET_mm_prevYr	Tercek	Modeled actual evapotranspiration, previous water year	SC, SM, SR
AET_Pen_an	Thoma	Modeled actual evapotranspiration, calendar year	All
AET_Pen_currYr	Thoma	Modeled actual evapotranspiration, current water year	All
AET_Pen_fogYr	Thoma	Modeled actual evapotranspiration, current year fog season	All
AET_Pen_mo	Thoma	Modeled actual evapotranspiration, by month	All
AET_Pen_prev2Yr	Thoma	Modeled actual evapotranspiration, previous two water years combined	All
AET_Pen_prevYr	Thoma	Modeled actual evapotranspiration, previous water year	All
Aspect_bearing	NPS	Aspect of site (degrees)	All
Cattle	NPS	Years since cattle removal	SC, SR
Cattle_Ind	NPS	Indicator of cattle removal (1 if post-removal, 0 if pre-removal)	SC, SR
Deer	NPS	Years since deer removal	SR
Deer_Ind	NPS	Indicator of deer removal (1 if post-removal, 0 if pre-removal)	SR
Def_Pen_an	Thoma	Accumulated water deficit, calendar year	All
Def_Pen_currYr	Thoma	Accumulated water deficit, current water year	All
Def_Pen_fogYr	Thoma	Accumulated water deficit, current year fog season	All
Def_Pen_mo	Thoma	Accumulated water deficit, by month	All
Def_Pen_prev2Yr	Thoma	Accumulated water deficit, previous two water years combined	All
Def_Pen_prevYr	Thoma	Accumulated water deficit, previous water year	All
Deficit_mm_currentYr	Tercek	Accumulated water deficit, current water year	SC, SM, SR

Covariate	Source	Description	Island(s)
Deficit_mm_fog	Tercek	Accumulated water deficit, current year fog season	SC, SM, SR
Deficit_mm_prev2Yr	Tercek	Accumulated water deficit, previous two water years combined	SC, SM, SR
Deficit_mm_prevYr	Tercek	Accumulated water deficit, previous water year	SC, SM, SR
Dew_Pen_currYr	Thoma	Number of days with dew, current water year	All
Dew_Pen_fogYr	Thoma	Number of days with dew, current year fog season	All
Dew_Pen_prev2Yr	Thoma	Number of days with dew, previous two water years combined	All
Dew_Pen_prevYr	Thoma	Dew presence (1 if dew present, 0 if not), previous water year	All
Elevation_m	NPS	Elevation of site (m)	All
Elk	NPS	Years since elk removal	SR
Elk_Ind	NPS	Indicator of elk removal (1 if post-removal, 0 if pre-removal)	SR
GDD_Pen_an	Thoma	Accumulated growing-degree days, calendar year	All
GDD_Pen_currYr	Thoma	Accumulated growing-degree days, current water year	All
GDD_Pen_fogYr	Thoma	Accumulated growing-degree days, current year fog season	All
GDD_Pen_mo	Thoma	Accumulated growing-degree days, by month	All
GDD_Pen_prev2Yr	Thoma	Accumulated growing-degree days, previous two water years combined	All
GDD_Pen_prevYr	Thoma	Accumulated growing-degree days, previous water year	All
Islet	NPS	Anacapa islet	AN
Month	NPS	Survey month	All
Northness	NPS	Northness of site (1 if due north, -1 if due south)	All
pet_allMonth	Flint	Cumulative potential evapotranspiration, mean of 30-year monthly means for all months	All
PET_mm_currentYr	Tercek	Cumulative potential evapotranspiration, current water year	SC, SM, SR
PET_mm_fog	Tercek	Cumulative potential evapotranspiration, current year fog season	SC, SM, SR
PET_mm_prev2Yr	Tercek	Cumulative potential evapotranspiration, previous two water years combined	SC, SM, SR
PET_mm_prevYr	Tercek	Cumulative potential evapotranspiration, previous water year	SC, SM, SR
pet_oct	Flint	Cumulative potential evapotranspiration, mean of 30-year monthly means for previous October to current survey month	All

Covariate	Source	Description	Island(s)
PET_Pen_an	Thoma	Cumulative potential evapotranspiration, Penman PET model	All
PET_Pen_currYr	Thoma	Cumulative potential evapotranspiration, Penman PET model, current water year	All
PET_Pen_fogYr	Thoma	Cumulative potential evapotranspiration, Penman PET model, current year fog season	All
PET_Pen_mo	Thoma	Cumulative potential evapotranspiration, Penman PET model, by month	All
PET_Pen_prev2Yr	Thoma	Cumulative potential evapotranspiration, Penman PET model, previous two water years combined	All
PET_Pen_prevYr	Thoma	Cumulative potential evapotranspiration, Penman PET model, previous water year	All
pet_singleMonth	Flint	Cumulative potential evapotranspiration, 30-year mean for month matching survey date	All
Pig	NPS	Years since pig removal	SC, SR
Pig_Ind	NPS	Indicator of pig removal (1 if post-removal, 0 if pre-removal)	SC, SR
rad_allMonth	Flint	Total clear sky solar radiation, mean of 30-year monthly means for all months	All
rad_oct	Flint	Total clear sky solar radiation, mean of 30-year monthly means for previous October to current survey month	All
rad_singleMonth	Flint	Total clear sky solar radiation, 30-year mean for month matching survey date	All
rh_Pen_currYr	Thoma	Relative humidity, current water year	All
rh_Pen_fogYr	Thoma	Relative humidity, current year fog season	All
rh_Pen_prev2Yr	Thoma	Relative humidity, previous two water years combined	All
rh_Pen_prevYr	Thoma	Relative humidity, previous water year	All
rn_allMonth	Flint	Clear sky net solar radiation, mean of 30-year monthly means for all months	All
rn_oct	Flint	Clear sky net solar radiation, mean of 30-year monthly means for previous October to current survey month	All
rn_singleMonth	Flint	Clear sky net solar radiation, 30-year mean for month matching survey date	All
Sheep	NPS	Years since sheep removal	SC
Sheep_Ind	NPS	Indicator of sheep removal (1 if post-removal, 0 if pre-removal)	SC
Slope_degrees	NPS	Slope of site (degrees)	All
SOIL_Pen_an	Thoma	Soil moisture, calendar year	All
SOIL_Pen_currYr	Thoma	Soil moisture, current water year	All

Covariate	Source	Description	Island(s)
SOIL_Pen_fogYr	Thoma	Soil moisture, current year fog season	All
SOIL_Pen_mo	Thoma	Soil moisture, by month	All
SOIL_Pen_prev2Yr	Thoma	Soil moisture, previous two water years combined	All
SOIL_Pen_prevYr	Thoma	Soil moisture, previous water year	All
Soil_water_mm_currentYr	Tercek	Soil moisture, current water year	SC, SM, SR
Soil_water_mm_fog	Tercek	Soil moisture, current year fog season	SC, SM, SR
Soil_water_mm_prev2Yr	Tercek	Soil moisture, previous two water years combined	SC, SM, SR
Soil_water_mm_prevYr	Tercek	Soil moisture, previous water year	SC, SM, SR
solRad_fog	Tercek	Total clear sky solar radiation, current year fog season	SC, SM, SR
solRad_prev2Yr	Tercek	Total clear sky solar radiation, previous two water years combined	SC, SM, SR
solRad_prevYr	Tercek	Total clear sky solar radiation, previous water year	SC, SM, SR
SRad_CurrentYear	Tercek	Total clear sky solar radiation, current water year	SC, SM, SR
svp_Pen_currYr	Thoma	Vapor pressure, current water year	All
svp_Pen_fogYr	Thoma	Vapor pressure, current year fog season	All
svp_Pen_prev2Yr	Thoma	Vapor pressure, previous two water years combined	All
svp_Pen_prevYr	Thoma	Vapor pressure, previous water year	All
Temp_Pen_an	Thoma	Temperature	All
Temp_Pen_currYr	Thoma	Temperature, current water year	All
Temp_Pen_fogYr	Thoma	Temperature, current year fog season	All
Temp_Pen_mo	Thoma	Temperature, by month	All
Temp_Pen_prev2Yr	Thoma	Temperature, previous two water years combined	All
Temp_Pen_prevYr	Thoma	Temperature, previous water year	All
vpd_Pen_currYr	Thoma	Vapor pressure deficit, current water year	All
vpd_Pen_fogYr	Thoma	Vapor pressure deficit, current year fog season	All
vpd_Pen_prev2Yr	Thoma	Vapor pressure deficit, previous two water years combined	All
vpd_Pen_prevYr	Thoma	Vapor pressure deficit, previous water year	All

Section C: Correlation Plots for Covariate Sets

Figures 1 through 12 show the correlation plots for sets of covariates that describe similar climate and environmental parameters. Please refer to Table 1 in Section B for full descriptions of each covariate.

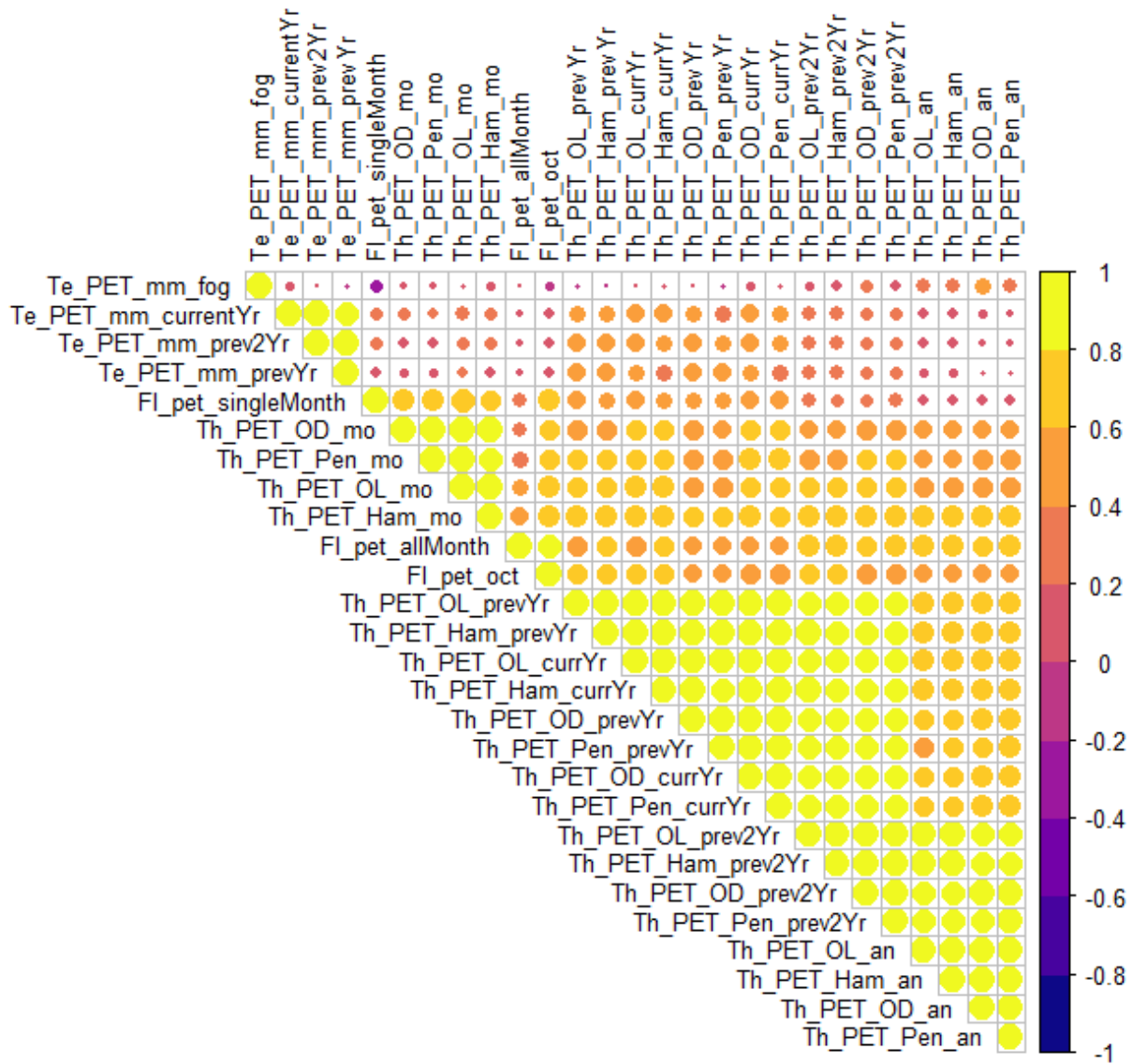


Figure 1. Correlation among potential evapotranspiration (PET) covariates.

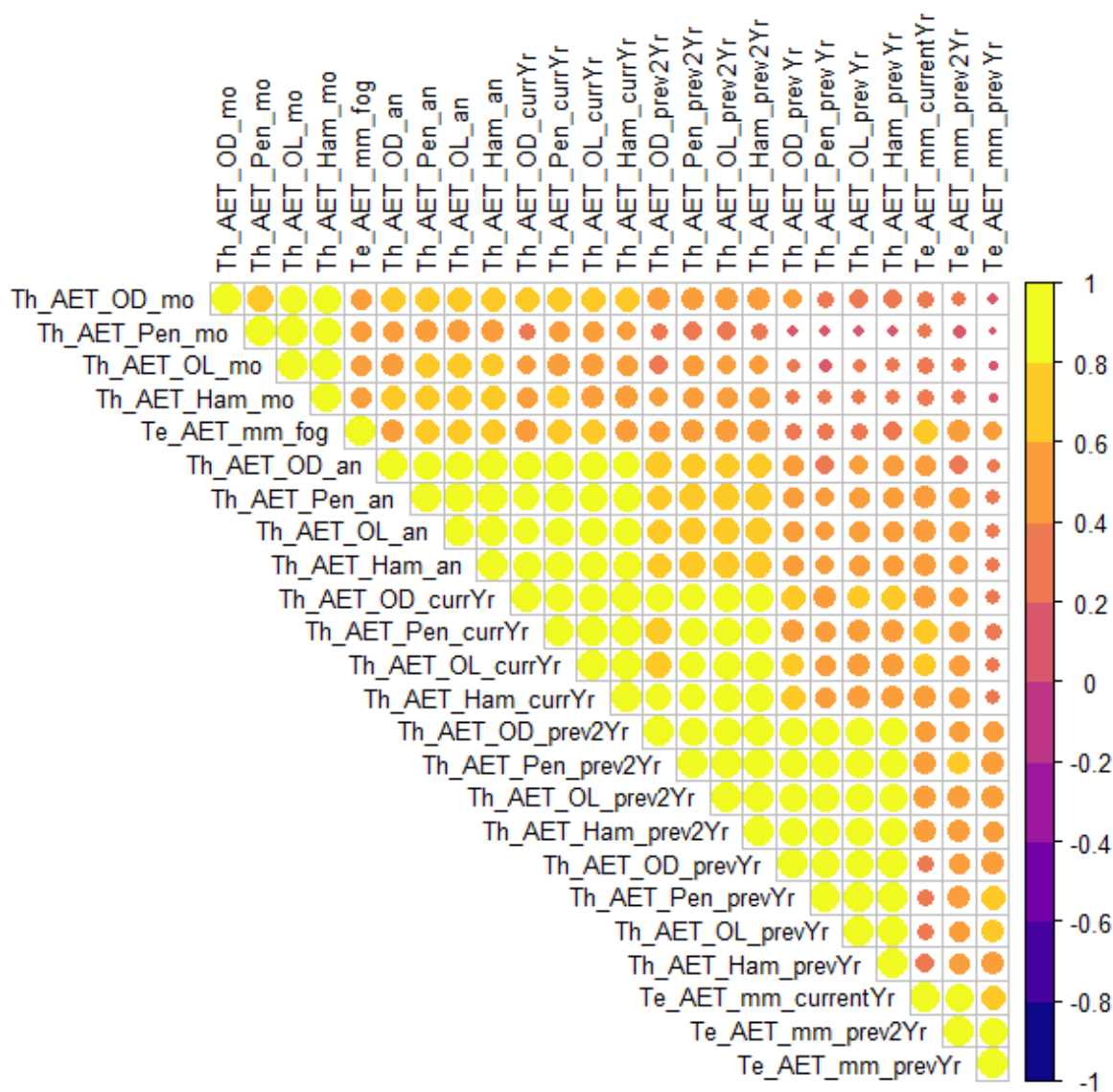


Figure 2. Correlation among actual evapotranspiration (AET) covariates.

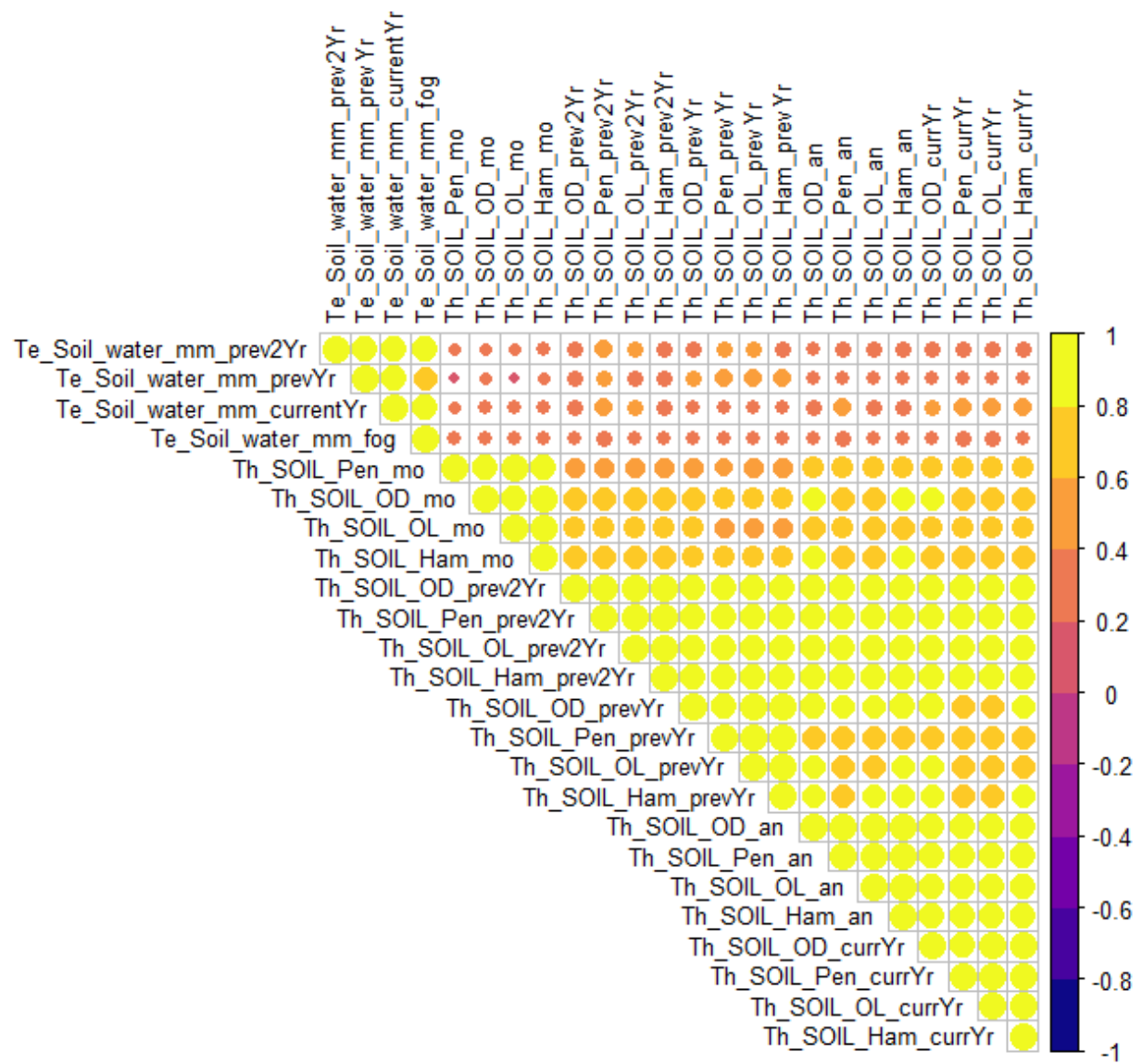


Figure 3. Correlation among soil moisture covariates.

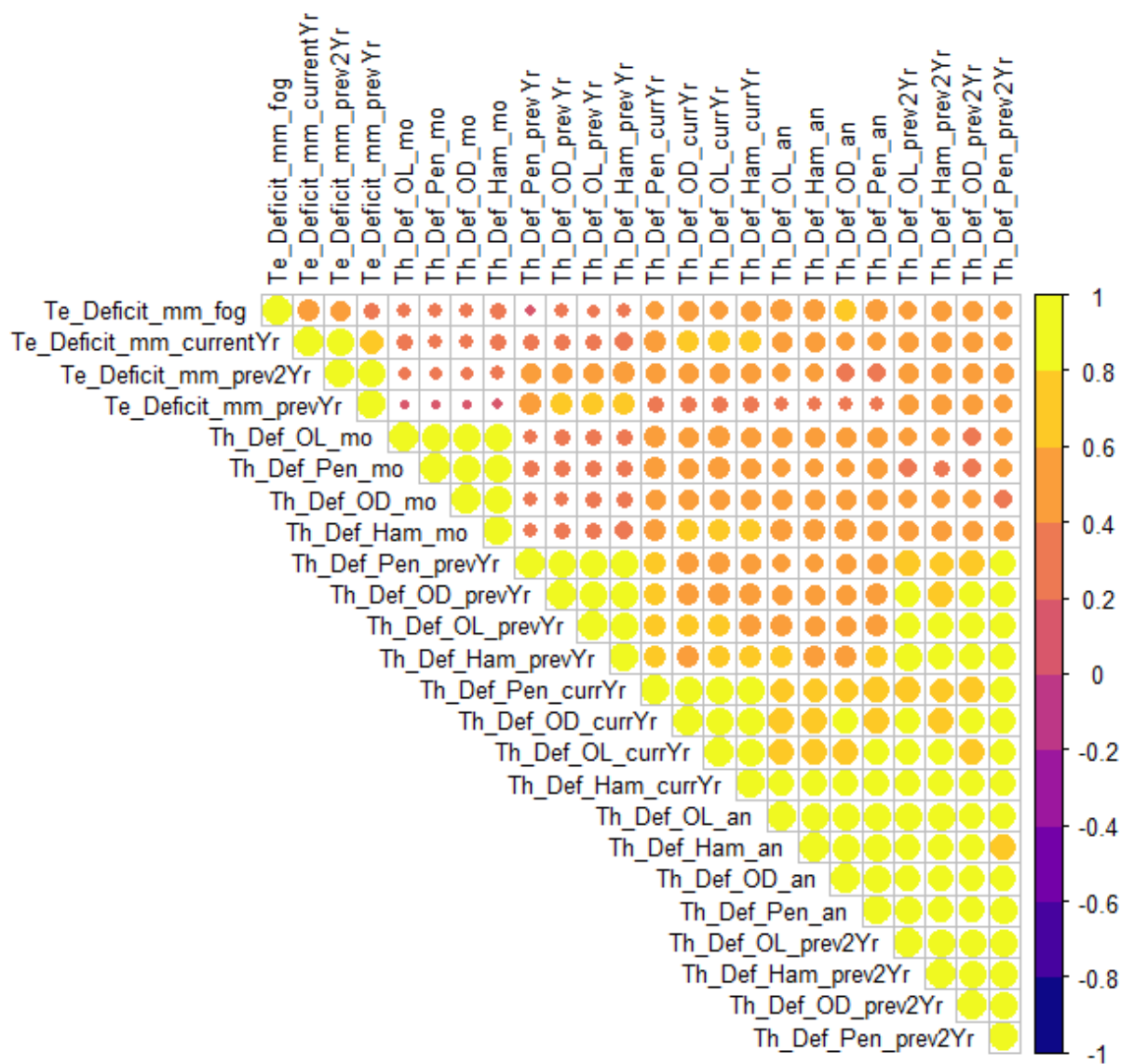


Figure 4. Correlation among water deficit covariates.

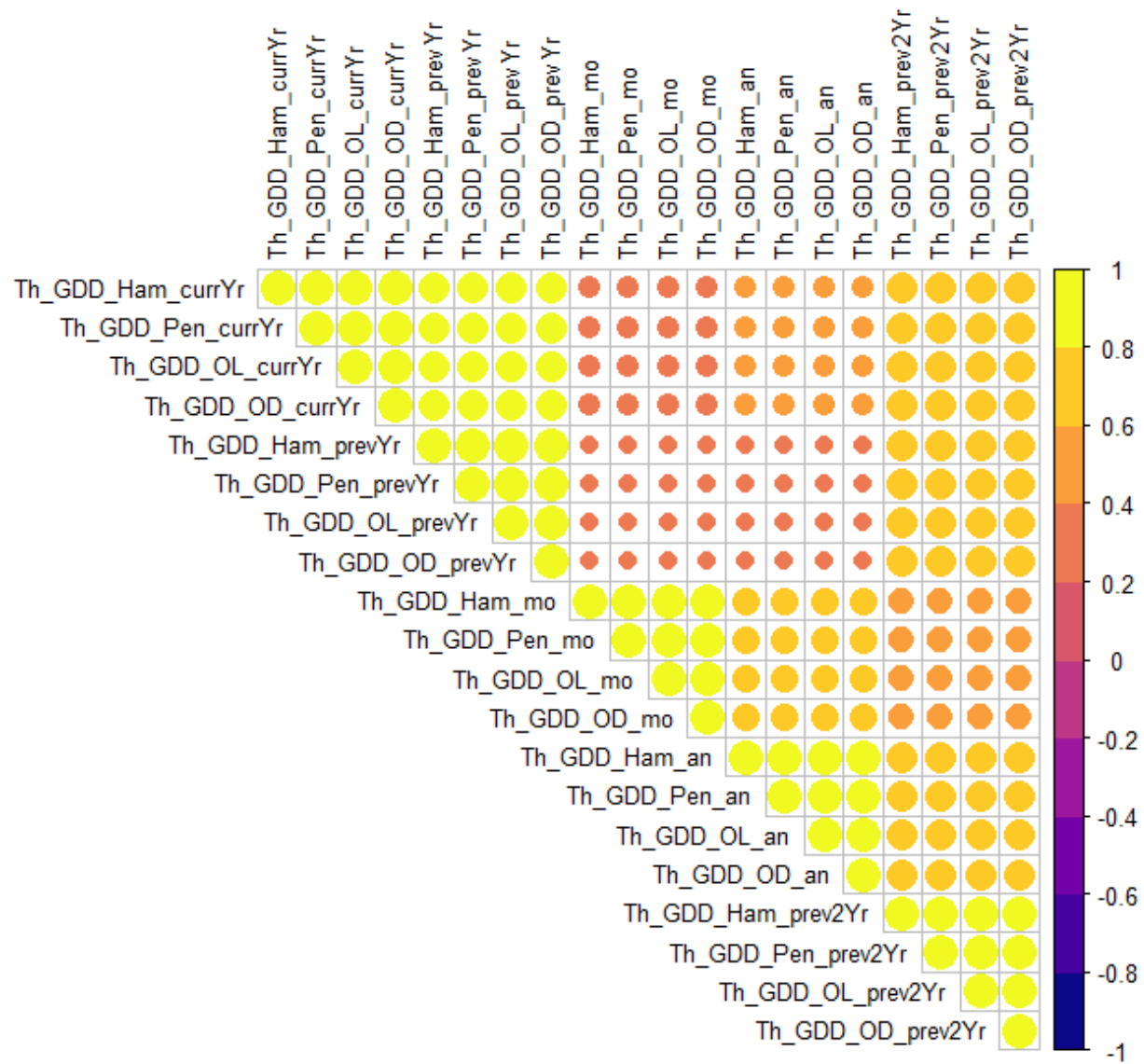


Figure 5. Correlation among growing-degree day covariates.

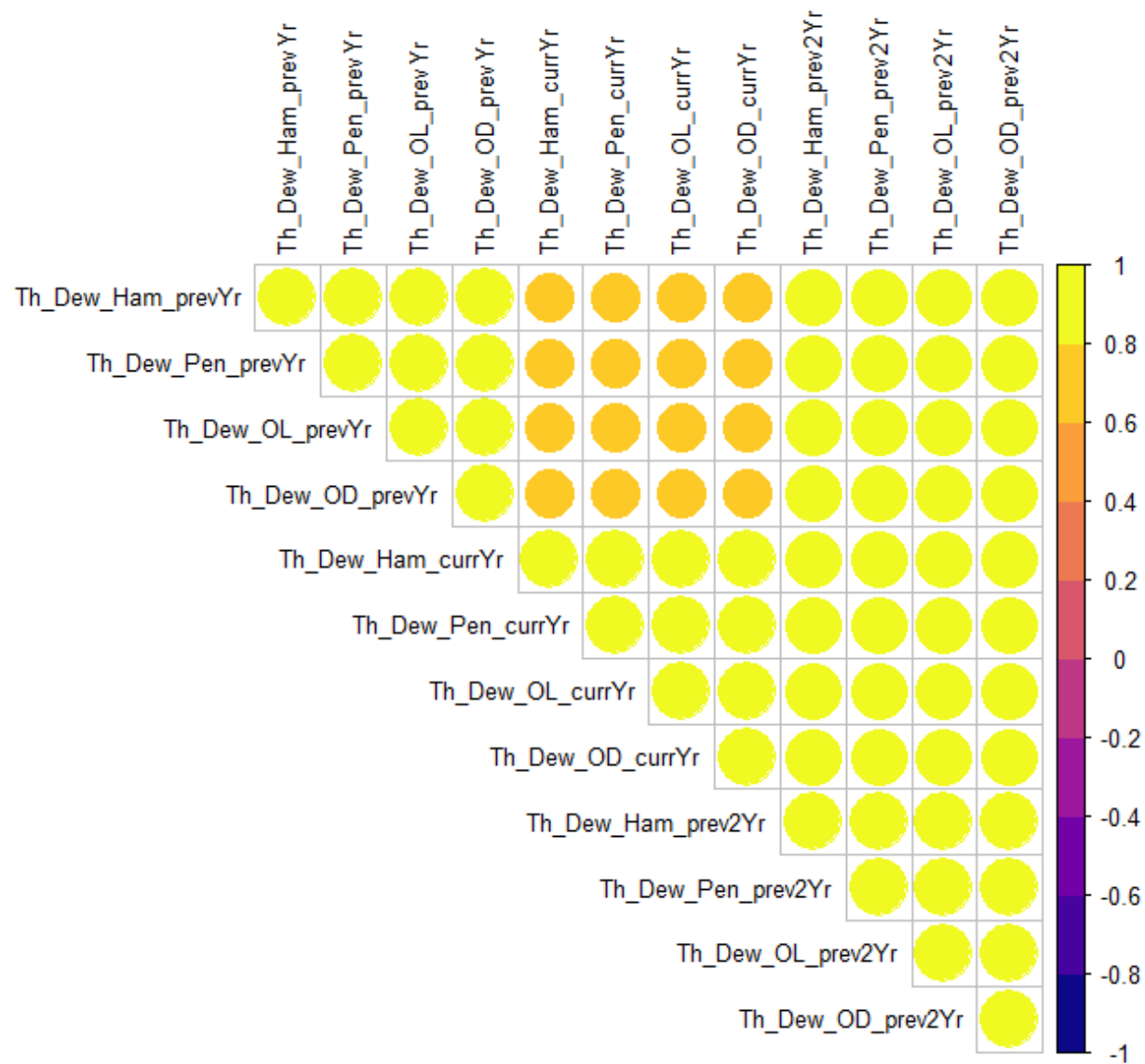


Figure 6. Correlation among dew covariates.

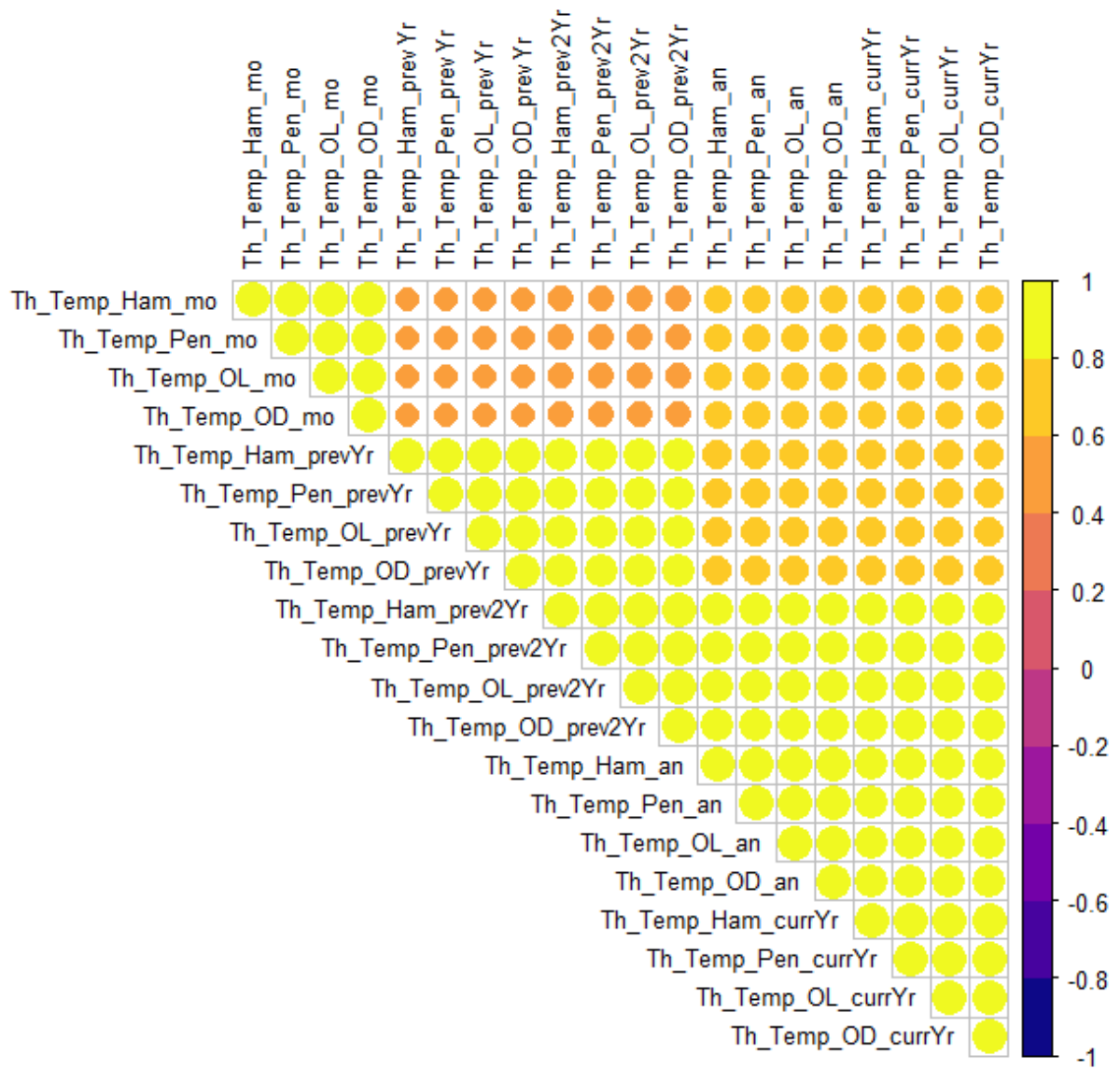


Figure 7. Correlation among temperature covariates.

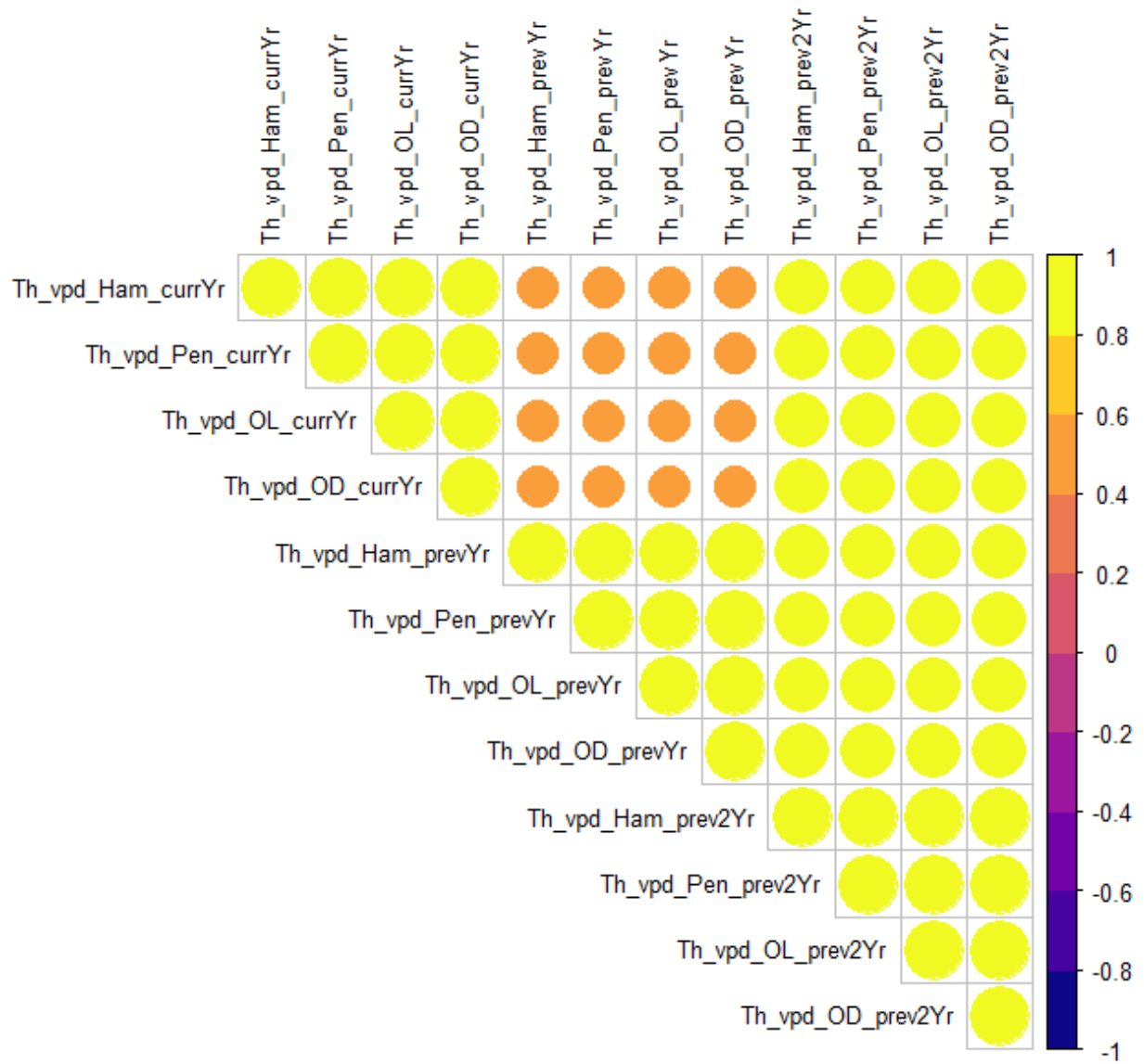


Figure 8. Correlation among vapor pressure deficit covariates.

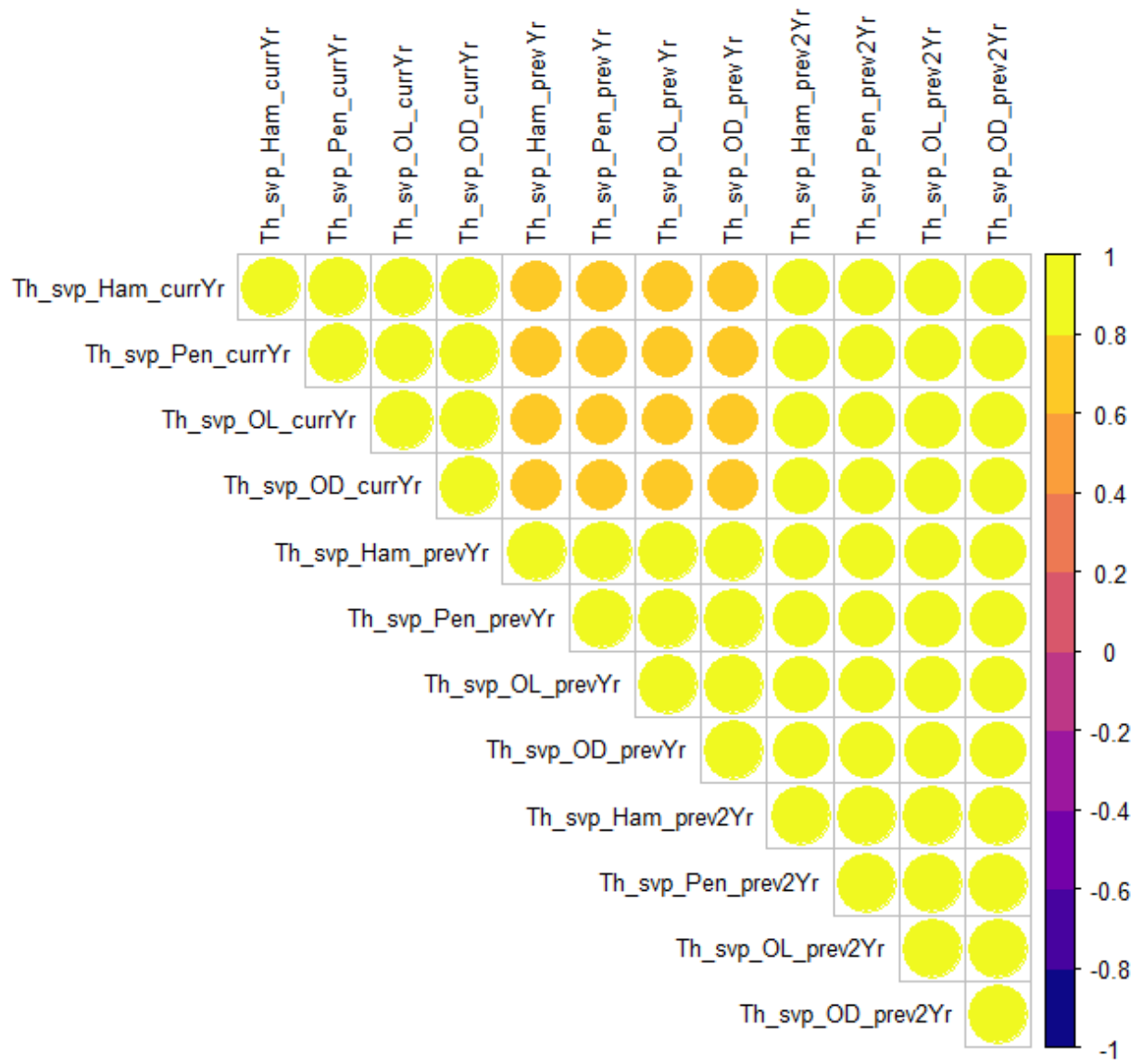


Figure 9. Correlation among vapor pressure covariates.

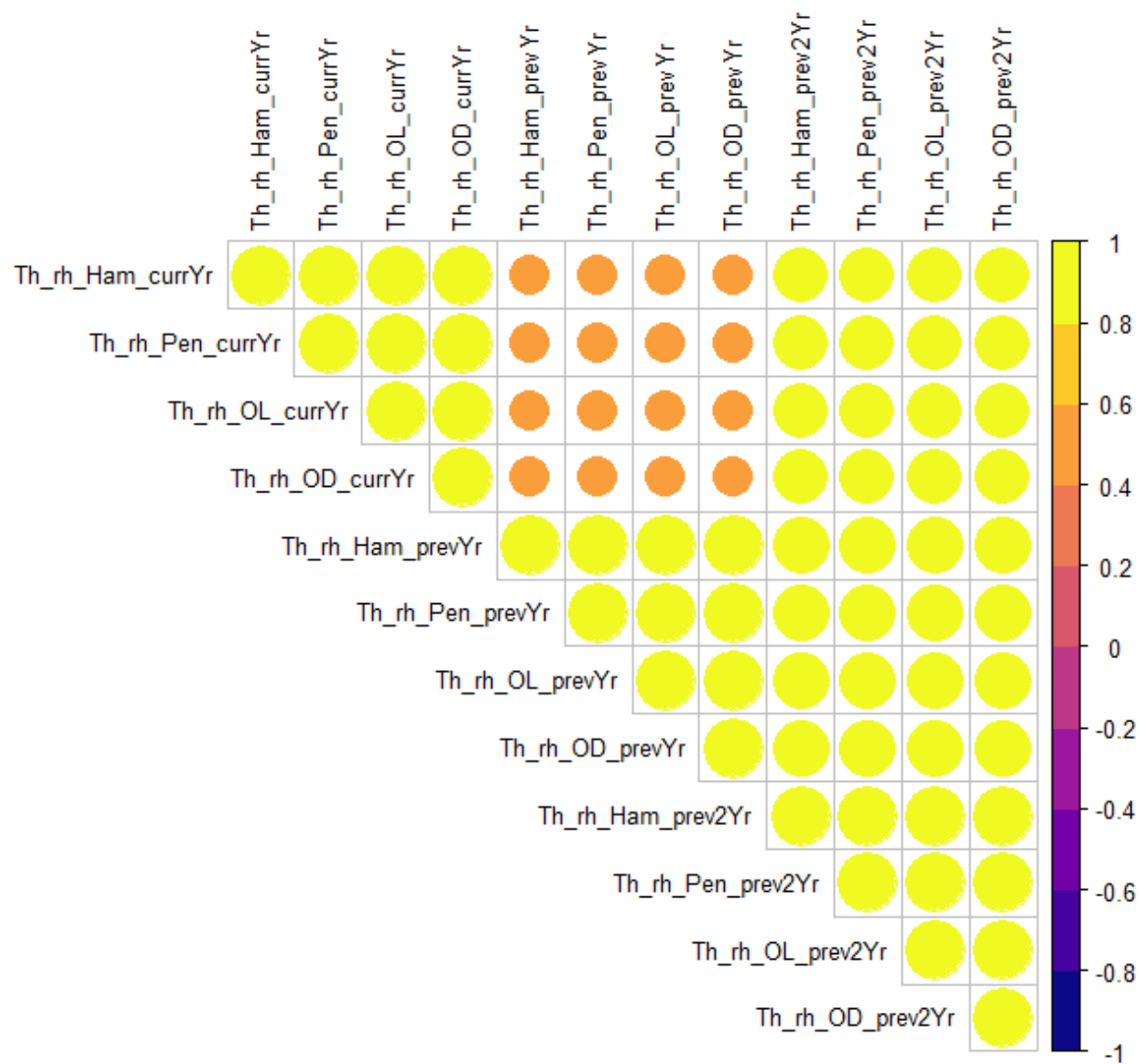


Figure 10. Correlation among relative humidity covariates.

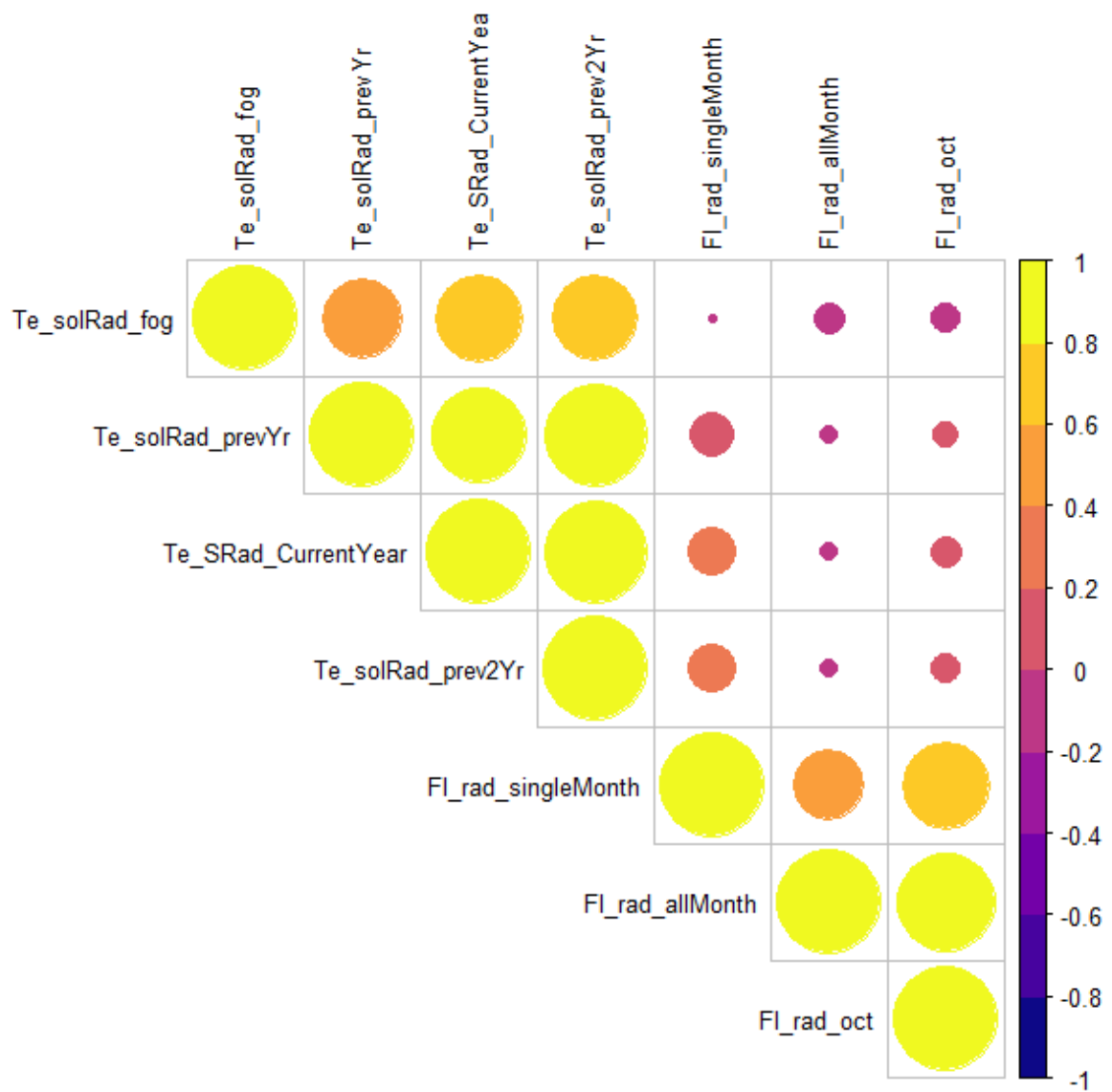


Figure 11. Correlation among solar radiation covariates.

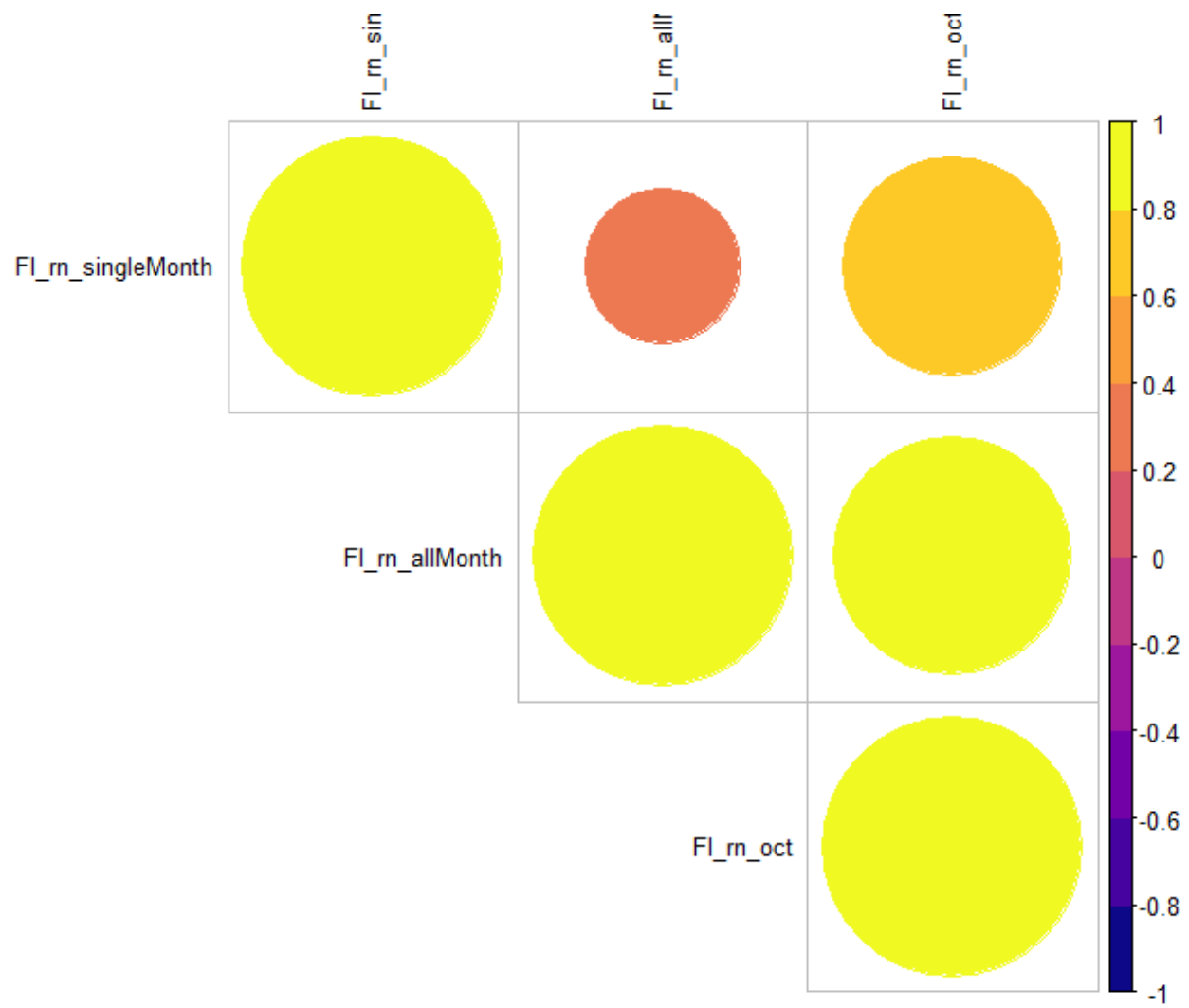


Figure 12. Correlation among net radiation covariates.

Section D: Trend Estimates Expressed as Percent Annual Trend

In Table 2, trend estimates are expressed as percent annual trends for each outcome, including upper and lower bounds for each 90% confidence interval.

Table 2. Trend estimates back-transformed into percent annual trend estimates with 90%-confidence intervals.

Outcome	Island	Site Type	Annual Percent Trend	90%-CI Lower Bound	90%-CI Upper Bound
Overall Shannon diversity	All	Index	-1.43	-1.91	-0.95
Native Shannon diversity	All	Index	-0.20	-0.62	0.23
Island chaparral Shannon diversity	SC,SR	Index	-3.98	-5.26	-2.67
Coastal sage scrub Shannon diversity	AN,SC,SM,SR	Index	-1.54	-2.53	-0.55
Grassland Shannon diversity	All	Index	-1.80	-2.44	-1.16
Riparian Shannon diversity	SC,SR	Index	-0.61	-2.11	0.91
Ironwood Shannon diversity	SC,SR	Index	-1.80	-2.81	-0.79
Mixed Woodland Shannon diversity	SC,SR	Index	-0.40	-1.09	0.30
Native tree density	SC,SR	Index	-2.87	-5.28	-0.41
Native tree recruitment density	SC,SR	Index	7.38	-3.43	19.41
Native shrub density	All	Index	3.50	1.20	5.85
Native shrub recruitment density	SC,SR	Index	-2.42	-6.75	2.12
Native tree cover	SC,SR	Index	-1.53	-2.45	-0.60
Native shrub cover	All	Index	3.09	1.11	5.11
Native forb cover	All	Index	-4.47	-6.23	-2.68
Nonnative forb cover	All	Index	-10.52	-12.76	-8.21
Native grass cover	All	Index	-3.83	-5.89	-1.73
Nonnative grass cover	All	Index	-7.54	-9.66	-5.36
Overall Shannon diversity	All	Prob	0.54	-3.94	5.22
Native Shannon diversity	All	Prob	-0.99	-4.06	2.18
Native shrub density	All	Prob	-5.08	-11.51	1.82
Native shrub cover	All	Prob	2.00	-0.85	4.94
Native forb cover	All	Prob	6.81	-9.05	25.43
Nonnative forb cover	All	Prob	0.47	-20.57	27.09
Native grass cover	All	Prob	-9.31	-23.15	7.01
Nonnative grass cover	All	Prob	-9.76	-30.39	16.99
Overall Shannon diversity	AN	Index	-2.49	-3.28	-1.69
Native Shannon diversity	AN	Index	-2.94	-3.93	-1.93
Coastal sage scrub Shannon diversity	AN	Index	-3.85	-5.37	-2.30
Grassland Shannon diversity	AN	Index	-2.23	-3.23	-1.23
Native shrub density	AN	Index	-0.31	-11.25	11.98

Outcome	Island	Site Type	Annual Percent Trend	90%-CI Lower Bound	90%-CI Upper Bound
Native shrub cover	AN	Index	-8.79	-11.78	-5.70
Native forb cover	AN	Index	-9.19	-12.61	-5.65
Nonnative forb cover	AN	Index	-0.66	-4.91	3.77
Native grass cover	AN	Index	-7.12	-11.60	-2.40
Nonnative grass cover	AN	Index	-5.21	-9.27	-0.97
Native Shannon diversity	AN	Prob	0.53	-11.01	13.57
Native shrub density	AN	Prob	-20.31	-41.13	7.88
Native shrub cover	AN	Prob	-1.76	-19.42	19.78
Native forb cover	AN	Prob	0.85	-18.98	25.54
Nonnative forb cover	AN	Prob	67.23	27.31	119.67
Native grass cover	AN	Prob	-3.56	-25.40	24.68
Nonnative grass cover	AN	Prob	26.97	-9.40	77.94
Overall Shannon diversity	SB	Index	-1.52	-2.24	-0.80
Native Shannon diversity	SB	Index	-0.93	-1.67	-0.19
Grassland Shannon diversity	SB	Index	-1.89	-3.19	-0.57
Native shrub density	SB	Index	-1.67	-6.74	3.69
Native shrub cover	SB	Index	-5.23	-7.59	-2.81
Native forb cover	SB	Index	-5.75	-9.11	-2.27
Nonnative forb cover	SB	Index	-1.46	-4.62	1.80
Native grass cover	SB	Index	2.61	-5.68	11.63
Nonnative grass cover	SB	Index	-9.30	-13.05	-5.38
<i>Deinandra clementina</i> cover	SB	Index	-1.74	-18.62	18.65
<i>Eriogonum giganteum</i> var. <i>compactum</i> cover	SB	Index	6.98	5.29	8.71
<i>Hordeum murinum</i> cover	SB	Index	-8.85	-12.35	-5.21
<i>Mesembryanthemum crystallinum</i> cover	SB	Index	2.79	-1.20	6.94
<i>Suaeda taxifolia</i> cover	SB	Index	-8.05	-9.54	-6.53
Overall Shannon diversity	SB	Prob	-9.38	-19.15	1.56
Native shrub density	SB	Prob	-17.75	-46.39	26.19
Native shrub cover	SB	Prob	2.20	-6.69	11.93
Native forb cover	SB	Prob	-12.46	-47.23	45.22
Nonnative forb cover	SB	Prob	-22.74	-59.41	47.05
Nonnative grass cover	SB	Prob	-61.50	-75.17	-40.32
<i>Hordeum murinum</i> cover	SB	Prob	-47.45	-61.65	-27.98
<i>Mesembryanthemum crystallinum</i> cover	SB	Prob	46.13	5.84	101.75
<i>Suaeda taxifolia</i> cover	SB	Prob	-28.62	-53.29	9.06
Overall Shannon diversity	SC	Index	-1.40	-2.32	-0.47
Native Shannon diversity	SC	Index	0.81	-0.05	1.68
Coastal sage scrub Shannon diversity	SC	Index	0.36	-1.60	2.35
Grassland Shannon diversity	SC	Index	-2.17	-4.21	-0.10
Riparian Shannon diversity	SC	Index	0.27	-1.31	1.88

Outcome	Island	Site Type	Annual Percent Trend	90%-CI Lower Bound	90%-CI Upper Bound
Oak woodland Shannon diversity	SC	Index	1.06	-1.54	3.72
Native tree density	SC	Index	-1.76	-3.71	0.24
Native tree recruitment density	SC	Index	3.39	-12.42	22.05
Native shrub density	SC	Index	22.96	12.42	34.48
Native shrub recruitment density	SC	Index	10.46	2.00	19.62
Native tree cover	SC	Index	-3.76	-5.08	-2.41
Native shrub cover	SC	Index	18.82	10.88	27.34
Native forb cover	SC	Index	-0.38	-3.93	3.30
Nonnative forb cover	SC	Index	-23.02	-28.92	-16.62
Native grass cover	SC	Index	-3.74	-13.70	7.38
Nonnative grass cover	SC	Index	-10.45	-15.21	-5.42
<i>Baccharis pilularis</i> cover	SC	Index	11.65	-18.92	53.75
<i>Eriogonum</i> Group cover	SC	Index	58.73	10.39	128.25
<i>Foeniculum vulgare</i> cover	SC	Index	-6.28	-13.30	1.30
<i>Pinus muricata</i> cover	SC	Index	6.11	-2.51	15.49
<i>Rhus integrifolia</i> cover	SC	Index	53.57	28.60	83.40
<i>Stipa</i> Group cover	SC	Index	21.99	-3.57	54.32
Overall Shannon diversity	SC	Prob	1.40	-3.50	6.54
Native Shannon diversity	SC	Prob	-0.56	-3.36	2.33
Native tree density	SC	Prob	-7.88	-26.35	15.21
Native tree recruitment density	SC	Prob	19.15	-38.05	129.14
Native shrub density	SC	Prob	-0.80	-7.49	6.37
Native shrub recruitment density	SC	Prob	73.95	17.70	157.09
Native tree cover	SC	Prob	0.21	-16.74	20.62
Native shrub cover	SC	Prob	2.93	-0.54	6.53
Native forb cover	SC	Prob	14.14	-6.35	39.13
Nonnative forb cover	SC	Prob	-7.37	-31.02	24.39
Native grass cover	SC	Prob	-30.48	-37.32	-22.89
Nonnative grass cover	SC	Prob	-9.61	-32.39	20.83
<i>Baccharis pilularis</i> cover	SC	Prob	5.68	-5.34	17.99
<i>Eriogonum</i> Group cover	SC	Prob	9.27	-12.02	35.72
<i>Foeniculum vulgare</i> cover	SC	Prob	-24.63	-39.78	-5.66
<i>Rhus integrifolia</i> cover	SC	Prob	2.52	-21.47	33.83
<i>Stipa</i> Group cover	SC	Prob	-32.02	-44.97	-16.03
Overall Shannon diversity	SM	Index	-1.41	-2.04	-0.79
Native Shannon diversity	SM	Index	-0.46	-1.02	0.11
Island chaparral Shannon diversity	SM	Index	-2.13	-2.83	-1.44
Coastal sage scrub Shannon diversity	SM	Index	-1.36	-2.28	-0.44
Grassland Shannon diversity	SM	Index	-1.16	-1.82	-0.50
Native shrub density	SM	Index	3.78	-1.27	9.10

Outcome	Island	Site Type	Annual Percent Trend	90%-CI Lower Bound	90%-CI Upper Bound
Native shrub cover	SM	Index	0.24	-4.20	4.89
Native forb cover	SM	Index	-5.76	-7.56	-3.93
Nonnative forb cover	SM	Index	-7.77	-10.31	-5.17
Native grass cover	SM	Index	-4.03	-7.63	-0.29
Nonnative grass cover	SM	Index	-8.27	-11.14	-5.30
<i>Acmispon dendroideus</i> var. <i>veatchii</i> cover	SM	Index	-7.21	-27.41	18.62
<i>Carpobrotus chilensis</i> cover	SM	Index	-18.43	-28.79	-6.56
<i>Isocoma menziesii</i> cover	SM	Index	9.30	2.80	16.21
Native Shannon diversity	SM	Prob	1.93	-1.94	5.97
Native shrub density	SM	Prob	-8.77	-39.01	36.45
Native shrub cover	SM	Prob	3.18	-16.10	26.88
Native forb cover	SM	Prob	17.24	1.40	35.56
Nonnative forb cover	SM	Prob	10.96	-0.52	23.76
Native grass cover	SM	Prob	-18.60	-36.87	4.97
Nonnative grass cover	SM	Prob	6.98	-9.46	26.41
<i>Acmispon dendroideus</i> var. <i>veatchii</i> cover	SM	Prob	18.13	-27.50	92.48
<i>Carpobrotus chilensis</i> cover	SM	Prob	0.50	-16.49	20.95
<i>Isocoma menziesii</i> cover	SM	Prob	-8.64	-14.84	-1.99
Overall Shannon diversity	SR	Index	-1.87	-2.49	-1.24
Native Shannon diversity	SR	Index	-0.41	-0.93	0.11
Coastal sage scrub Shannon diversity	SR	Index	-2.69	-3.91	-1.45
Baccharis scrub Shannon diversity	SR	Index	-2.23	-3.14	-1.31
Grassland Shannon diversity	SR	Index	-2.13	-3.01	-1.23
Riparian Shannon diversity	SR	Index	-1.40	-3.01	0.25
Mixed woodland Shannon diversity	SR	Index	-0.18	-1.02	0.66
Native tree density	SR	Index	-4.21	-11.33	3.48
Native tree recruitment density	SR	Index	8.63	-1.70	20.04
Native shrub density	SR	Index	4.17	1.74	6.66
Native shrub recruitment density	SR	Index	-3.78	-8.71	1.43
Native tree cover	SR	Index	40.57	13.11	74.69
Native shrub cover	SR	Index	3.98	1.52	6.50
Native forb cover	SR	Index	-5.30	-7.75	-2.78
Nonnative forb cover	SR	Index	-11.38	-14.13	-8.55
Native grass cover	SR	Index	-5.37	-7.84	-2.84
Nonnative grass cover	SR	Index	-9.16	-12.10	-6.12
<i>Arctostaphylos</i> Group cover	SR	Index	11.94	10.29	13.62
<i>Heteromeles arbutifolia</i> cover	SR	Index	-1.89	-2.89	-0.89
<i>Quercus pacifica</i> cover	SR	Index	-0.41	-1.04	0.22
<i>Salix lasiolepis</i> cover	SR	Index	21.63	17.88	25.50
<i>Stipa</i> Group cover	SR	Index	-4.05	-11.68	4.25

Section E: Detailed AICc Results of Covariate Modeling

Tables 3 to 144 contain lists of the top-ranked covariate models for each outcome, determined via AICc analysis. The results are organized by island (across/more than one island, Anacapa, Santa Barbara, Santa Cruz, San Miguel, and Santa Rosa) and site type (index or probability). Please refer to Table 1 in Section B for full descriptions of each covariate.

Covariate Modeling across Islands

Index Sites across All Islands

Table 3. Covariate models ranked by AIC_c for overall Shannon diversity at index sites across all islands.

Model	AIC _c	ΔAIC _c
rh_Pen_fogYr	13574.50	0.00
Def_Pen_mo	13575.87	1.36
AET_Pen_prev2Yr+Def_Pen_prevYr	13575.96	1.46
rh_Pen_fogYr+Northness	13576.27	1.77
rh_Pen_fogYr+Dew_Pen_fogYr	13576.46	1.96
SOIL_Pen_mo+Slope_degrees	13577.54	3.04
Def_Pen_prevYr	13577.73	3.23

Table 4. Covariate models ranked by AICc for native Shannon diversity at index sites across all islands.

Model	AICc	ΔAICc
SOIL_Pen_an+Def_Pen_mo	9574.38	0.00
Def_Pen_mo	9578.65	4.26
AET_Pen_an	9605.25	30.86
Def_Pen_an	9605.66	31.27
Temp_Pen_mo+Dew_Pen_prevYr	9612.43	38.05
Temp_Pen_mo+Slope_degrees	9613.08	38.70
Temp_Pen_mo	9614.15	39.77
GDD_Pen_mo	9617.28	42.90
rh_Pen_prevYr+Dew_Pen_fogYr+Northness	9623.01	48.63
rh_Pen_prevYr+Dew_Pen_fogYr	9623.14	48.76

Table 5. Covariate models ranked by AICc for island chaparral Shannon diversity at index sites across Santa Cruz and Santa Rosa Islands.

Model	AICc	Δ AICc
Slope_degrees+Cattle	722.27	0.00
Dew_Pen_fogYr+Northness+Cattle_Ind	726.22	3.96
Dew_Pen_fogYr+Northness+Elevation_m+Cattle_Ind	726.96	4.70
rh_Pen_fogYr+Northness	731.02	8.76
vpd_Pen_fogYr	732.75	10.49
svp_Pen_prev2Yr	733.49	11.22
rh_Pen_prev2Yr+Dew_Pen_fogYr+Northness	733.93	11.66
solRad_prevYr	734.62	12.36
GDD_Pen_an	735.30	13.04
Elevation_m	735.46	13.20

Table 6. Covariate models ranked by AICc for coastal sage scrub Shannon diversity at index sites across Anacapa, Santa Cruz, San Miguel, and Santa Rosa Islands.

Model	AICc	Δ AICc
pet_oct+AET_Pen_fogYr	1403.13	0.00
rad_oct	1404.11	0.98
pet_oct	1407.40	4.27
m_oct	1408.30	5.17
rh_Pen_prev2Yr+Northness	1411.87	8.74
Dew_Pen_fogYr+Northness	1412.11	8.98
rh_Pen_prev2Yr+Dew_Pen_fogYr+Northness	1412.32	9.19
Dew_Pen_fogYr+Northness+Elevation_m	1412.43	9.30
Northness	1412.48	9.35
Northness+Elevation_m	1412.77	9.64

Table 7. Covariate models ranked by AICc for grassland Shannon diversity at index sites across all islands.

Model	AICc	Δ AICc
Def_Pen_an	3963.26	0.00
Def_Pen_mo	3964.52	1.26
pet_allMonth+Def_Pen_mo	3965.99	2.72
SOIL_Pen_an+Def_Pen_mo	3966.49	3.23
GDD_Pen_mo	3967.45	4.18
Temp_Pen_mo	3967.52	4.26
solRad_prevYr	3967.65	4.39
Temp_Pen_mo+Dew_Pen_prevYr	3967.94	4.68

Table 8. Covariate models ranked by AICc for riparian Shannon diversity at index sites across Santa Cruz and Santa Rosa Islands.

Model	AICc	Δ AICc
Northness+Cattle_Ind	834.95	0.00
Northness+Pig_Ind+Cattle_Ind	835.97	1.02
Northness	836.29	1.34
Temp_Pen_currYr	836.52	1.57
GDD_Pen_an	836.61	1.66
Cattle_Ind	836.76	1.81
Northness+Pig_Ind	836.77	1.82
Dew_Pen_fogYr+Northness+Cattle_Ind	836.81	1.86
Dew_Pen_prev2Yr+Northness+Cattle_Ind	836.86	1.91
svp_Pen_currYr	836.90	1.95

Table 9. Covariate models ranked by AICc for ironwood Shannon diversity at index sites across Santa Cruz and Santa Rosa Islands.

Model	AICc	Δ AICc
SOIL_Pen_fogYr+Pig	230.56	0.00
SOIL_Pen_fogYr+Temp_Pen_fogYr	232.19	1.63
SOIL_Pen_fogYr+Temp_Pen_fogYr+Pig	232.53	1.97
Dew_Pen_prevYr+Elevation_m+Pig_Ind	238.62	8.06
Dew_Pen_prevYr+Dew_Pen_fogYr+Elevation_m+Pig_Ind	238.68	8.12
Elevation_m+Pig_Ind	239.60	9.04
Pig_Ind+Cattle_Ind	263.50	32.94
Dew_Pen_prevYr+Northness+Pig_Ind	270.11	39.56
Temp_Pen_mo	289.11	58.55
Dew_Pen_prevYr+Dew_Pen_fogYr	290.23	59.67

Table 10. Covariate models ranked by AICc for mixed woodland Shannon diversity at index sites across Santa Cruz and Santa Rosa Islands.

Model	AICc	Δ AICc
Northness+Elevation_m	705.12	0.00
Dew_Pen_currYr+Northness+Elevation_m	705.45	0.33
Dew_Pen_currYr+Northness+Elevation_m+Cattle_Ind	705.92	0.80
Northness+Elevation_m+Cattle_Ind	706.26	1.14
Northness+Elevation_m+Pig_Ind	706.49	1.37
Dew_Pen_currYr+Northness+Elevation_m+Pig_Ind	706.57	1.45
SOIL_Pen_fogYr+Slope_degrees	706.77	1.64
Dew_Pen_currYr+Dew_Pen_fogYr+Northness+Elevation_m	707.00	1.88
Dew_Pen_fogYr+Northness+Elevation_m	707.06	1.94
SOIL_Pen_fogYr+Slope_degrees+Cattle	707.82	2.70

Table 11. Covariate models ranked by AICc for native tree density at index sites across Santa Cruz and Santa Rosa Islands.

Model	AICc	Δ AICc
GDD_Pen_prev2Yr	1323.03	0.00
Temp_Pen_prev2Yr	1323.19	0.16
svp_Pen_prev2Yr	1323.91	0.88
Elevation_m	1324.06	1.03
Temp_Pen_prev2Yr+Cattle	1325.14	2.11
Temp_Pen_prev2Yr+Pig	1325.16	2.13
Dew_Pen_fogYr+Elevation_m	1325.51	2.48
Northness+Elevation_m	1325.60	2.57
Elevation_m+Pig_Ind	1325.77	2.73
Temp_Pen_prev2Yr+Pig+Cattle	1326.80	3.77

Table 12. Covariate models ranked by AICc for native tree recruitment density at index sites across Santa Cruz and Santa Rosa islands.

Model	AICc	Δ AICc
GDD_Pen_prevYr	1511.68	0.00
vpd_Pen_fogYr	1514.55	2.87
Pig	1514.55	2.87
Slope_degrees+Pig	1515.05	3.37
Temp_Pen_fogYr+Pig	1515.53	3.85
SRad_CurrentYear	1515.88	4.19
rh_Pen_fogYr	1516.03	4.35
Pig+Cattle	1516.37	4.69
Temp_Pen_mo+Pig	1516.46	4.78
rh_Pen_fogYr+Dew_Pen_prevYr	1516.61	4.92

Table 13. Covariate models ranked by AICc for native shrub density at index sites across all islands.

Model	AICc	Δ AICc
Slope_degrees	4941.49	0.00
Temp_Pen_fogYr+Slope_degrees	4942.59	1.10
SOIL_Pen_an+Slope_degrees	4943.04	1.55
Temp_Pen_mo+Slope_degrees	4943.49	2.00
Northness	4950.91	9.41
vpd_Pen_fogYr	4951.06	9.57
Temp_Pen_fogYr	4951.11	9.61
GDD_Pen_fogYr	4951.11	9.61
GDD_Pen_currYr	4951.14	9.64
svp_Pen_fogYr	4951.20	9.71

Table 14. Covariate models ranked by AICc for native shrub recruitment density at index sites across Santa Cruz and Santa Rosa Islands.

Model	AICc	Δ AICc
solRad_prev2Yr	2382.77	0.00
Dew_Pen_prev2Yr+Northness+Cattle_Ind	2389.88	7.11
Dew_Pen_prev2Yr+Northness+Elevation_m+Cattle_Ind	2391.67	8.90
Dew_Pen_prev2Yr+Dew_Pen_fogYr+Northness+Cattle_Ind	2391.86	9.09
Dew_Pen_prev2Yr+Cattle_Ind	2392.36	9.59
solRad_fog	2392.53	9.76
Northness+Cattle_Ind	2393.44	10.67
Dew_Pen_prev2Yr+Northness+Pig_Ind	2393.62	10.85

Table 15. Covariate models ranked by AICc for native tree cover at index sites across Santa Cruz and Santa Rosa Islands.

Model	AICc	Δ AICc
SOIL_Pen_fogYr+Slope_degrees+Pig	6429.71	0.00
SOIL_Pen_fogYr+Slope_degrees	6430.05	0.34
Cattle_Ind	6430.74	1.03
Slope_degrees+Pig	6431.71	2.00
SOIL_Pen_fogYr+Slope_degrees+Cattle	6432.02	2.31
Dew_Pen_prev2Yr+Cattle_Ind	6432.12	2.42
Slope_degrees	6432.19	2.49
Pig_Ind+Cattle_Ind	6432.58	2.87
Dew_Pen_fogYr+Cattle_Ind	6432.68	2.97
Elevation_m+Cattle_Ind	6432.77	3.06

Table 16. Covariate models ranked by AICc for native shrub cover at index sites across all islands.

Model	AICc	Δ AICc
rh_Pen_currYr+Dew_Pen_fogYr+Northness	18314.89	0.00
rh_Pen_currYr+Dew_Pen_fogYr	18315.70	0.81
pet_oct	18316.35	1.46
rn_oct	18316.89	2.00
rh_Pen_currYr+Northness	18317.71	2.83
pet_oct+AET_Pen_fogYr	18317.99	3.10
pet_oct+Def_Pen_mo	18318.12	3.24
rh_Pen_currYr	18318.48	3.59
rad_oct	18320.05	5.17
Temp_Pen_mo+Slope_degrees	18320.66	5.77

Table 17. Covariate models ranked by AICc for native forb cover at index sites across all islands.

Model	AICc	Δ AICc
SOIL_Pen_mo	23020.95	0.00
SOIL_Pen_mo+Slope_degrees	23021.24	0.29
PET_Pen_mo+SOIL_Pen_mo	23022.90	1.95
SOIL_Pen_mo+Def_Pen_mo	23022.92	1.98
PET_Pen_mo+AET_Pen_mo	23039.29	18.35
AET_Pen_mo+Def_Pen_mo	23039.29	18.35
AET_Pen_mo	23039.83	18.88
AET_Pen_mo+Slope_degrees	23040.73	19.78
Def_Pen_mo	23044.18	23.24
rn_oct	23048.07	27.12

Table 18. Covariate models ranked by AICc for nonnative forb cover at index sites across all islands.

Model	AICc	Δ AICc
AET_Pen_mo+Slope_degrees	20236.82	0.00
SOIL_Pen_mo+Slope_degrees	20239.60	2.78
Dew_Pen_currYr+Slope_degrees	20252.95	16.13
pet_allMonth+Def_Pen_mo	20253.00	16.18
pet_allMonth+SOIL_Pen_mo	20253.07	16.25
AET_Pen_mo	20264.53	27.70
AET_Pen_mo+Def_Pen_mo	20265.71	28.88
SOIL_Pen_mo+Def_Pen_mo	20269.13	32.31
SOIL_Pen_mo	20269.73	32.91
Def_Pen_mo	20270.80	33.98

Table 19. Covariate models ranked by AICc for native grass cover at index sites across all islands.

Model	AICc	ΔAICc
Dew_Pen_currYr+Elevation_m	19381.18	0.00
Dew_Pen_currYr+Dew_Pen_fogYr+Elevation_m	19383.03	1.85
Dew_Pen_currYr+Dew_Pen_fogYr+Northness+Elevation_m	19383.41	2.23
pet_singleMonth	19386.17	4.99
Elevation_m	19387.82	6.64
Northness+Elevation_m	19388.20	7.02
Dew_Pen_fogYr+Elevation_m	19389.47	8.29
Dew_Pen_fogYr+Northness+Elevation_m	19389.85	8.67
rn_oct	19391.79	10.61
rad_oct	19392.17	10.99

Table 20. Covariate models ranked by AICc for nonnative grass cover at index sites across all islands.

Model	AICc	ΔAICc
AET_Pen_mo+Slope_degrees	26155.47	0.00
AET_Pen_mo+SOIL_Pen_fogYr+Slope_degrees	26156.17	0.71
Temp_Pen_mo+Slope_degrees	26159.33	3.86
SOIL_Pen_fogYr+Temp_Pen_mo+Slope_degrees	26160.80	5.33
pet_allMonth+Def_Pen_mo	26163.23	7.77
rn_allMonth	26166.68	11.21
pet_allMonth	26167.11	11.64
rad_allMonth	26167.34	11.87
Dew_Pen_currYr+Slope_degrees	26171.29	15.83
Slope_degrees	26172.04	16.57

Probability Sites across All Islands

Table 21. Covariate models ranked by AICc for native Shannon diversity at probability sites across all islands.

Model	AICc	ΔAICc
Temp_Pen_mo+Slope_degrees	738.63	0.00
SOIL_Pen_currYr+Slope_degrees	740.13	1.50
rn_allMonth	742.30	3.67
GDD_Pen_mo	744.96	6.32
Temp_Pen_mo	745.29	6.65
SOIL_Pen_currYr+Temp_Pen_currYr	745.69	7.06
AET_Pen_prev2Yr+GDD_Pen_mo	746.69	8.06
GDD_Pen_prevYr	747.05	8.41
SOIL_Pen_currYr+Temp_Pen_mo	747.12	8.48
Dew_Pen_fogYr+Northness+Elevation_m	747.17	8.53

Table 22. Covariate models ranked by AICc for native shrub density at probability sites across all islands.

Model	AICc	ΔAICc
Temp_Pen_prev2Yr+Slope_degrees	1094.77	0.00
Temp_Pen_prev2Yr	1099.30	4.53
svp_Pen_prev2Yr	1099.59	4.82
SOIL_Pen_prev2Yr+Temp_Pen_prev2Yr	1100.28	5.51
Slope_degrees	1102.03	7.27
Temp_Pen_mo+Slope_degrees	1102.14	7.37
Elevation_m	1102.38	7.61
Northness+Elevation_m	1102.83	8.06
SRad_CurrentYear	1103.09	8.32

Table 23. Covariate models ranked by AICc for native shrub cover at probability sites across all islands.

Model	AICc	Δ AICc
Slope_degrees	1425.85	0.00
Temp_Pen_prevYr+Slope_degrees	1426.69	0.85
AET_Pen_mo+Slope_degrees	1427.44	1.60
Temp_Pen_mo+Slope_degrees	1427.73	1.88
SOIL_Pen_fogYr+Slope_degrees	1427.76	1.92
AET_Pen_mo+Temp_Pen_prevYr+Slope_degrees	1428.50	2.66
AET_Pen_mo+SOIL_Pen_fogYr+Slope_degrees	1429.19	3.35
AET_Pen_mo+Temp_Pen_mo+Slope_degrees	1429.44	3.59
Northness+Elevation_m	1430.85	5.00
Elevation_m	1431.00	5.15

Table 24. Covariate models ranked by AICc for native forb cover at probability sites across all islands.

Model	AICc	Δ AICc
rh_Pen_fogYr+Northness	1528.28	0.00
rh_Pen_fogYr+Dew_Pen_prevYr+Northness	1530.05	1.77
rh_Pen_fogYr+Dew_Pen_fogYr+Northness	1530.19	1.91
rh_Pen_fogYr+Dew_Pen_prevYr+Dew_Pen_fogYr+Northness	1532.02	3.73
Northness	1533.40	5.12
rh_Pen_prev2Yr+Northness	1534.85	6.57
Dew_Pen_prevYr+Northness	1535.12	6.84
Northness+Elevation_m	1535.15	6.87
Dew_Pen_fogYr+Northness	1535.27	6.99
rh_Pen_prev2Yr+Dew_Pen_fogYr+Northness	1536.65	8.36

Table 25. Covariate models ranked by AICc for nonnative forb cover at probability sites across all islands.

Model	AICc	Δ AICc
SOIL_Pen_mo+Def_Pen_mo	1348.71	0.00
SOIL_Pen_mo+Temp_Pen_prevYr	1355.80	7.09
SOIL_Pen_mo+Temp_Pen_prevYr+Slope_degrees	1357.71	9.00
SOIL_Pen_mo	1359.17	10.46
SOIL_Pen_mo+Slope_degrees	1360.87	12.16
SOIL_Pen_mo+Temp_Pen_mo	1360.95	12.24
AET_Pen_an	1361.30	12.58
AET_Pen_an+Def_Pen_mo	1362.42	13.71
SOIL_Pen_mo+Temp_Pen_mo+Slope_degrees	1362.58	13.87
rh_Pen_currYr	1368.91	20.20

Table 26. Covariate models ranked by AICc for native grass cover at probability sites across all islands.

Model	AICc	Δ AICc
Elevation_m	1045.66	0.00
Dew_Pen_prev2Yr+Elevation_m	1045.70	0.04
solRad_prevYr	1046.32	0.67
Northness+Elevation_m	1046.87	1.22
Dew_Pen_prev2Yr+Northness+Elevation_m	1047.15	1.50
Dew_Pen_fogYr+Elevation_m	1047.17	1.52
Dew_Pen_prev2Yr+Dew_Pen_fogYr+Elevation_m	1047.70	2.04
Slope_degrees	1048.16	2.51

Table 27. Covariate models ranked by AICc for nonnative grass cover at probability sites across all islands.

Model	AICc	Δ AICc
AET_Pen_currYr	2152.56	0.00
AET_Pen_prev2Yr+vpd_Pen_prevYr	2153.57	1.01
AET_Pen_currYr+Def_Pen_mo	2153.88	1.32
AET_Pen_prev2Yr	2155.99	3.43
solRad_fog	2156.12	3.56
rh_Pen_fogYr+Dew_Pen_prevYr+Dew_Pen_fogYr	2156.78	4.22
AET_Pen_prev2Yr+GDD_Pen_mo	2157.48	4.92
GDD_Pen_currYr	2157.69	5.13

Covariate Modeling for Anacapa Island

Anacapa Island Index Sites

Table 28. Covariate models ranked by AICc for overall Shannon diversity at index sites across Anacapa Island.

Model	AICc	Δ AICc
Temp_Pen_prev2Yr+Dew_Pen_prev2Yr	1239.36	0.00
svp_Pen_prev2Yr	1239.48	0.12
vpd_Pen_prev2Yr	1239.53	0.17
Temp_Pen_prev2Yr+Slope_degrees	1240.94	1.58
Temp_Pen_prev2Yr	1240.96	1.61
SOIL_Pen_mo+Temp_Pen_prev2Yr	1241.24	1.88
GDD_Pen_prev2Yr	1241.35	1.99
Def_Pen_an	1244.11	4.75
vpd_Pen_currYr	1244.55	5.19
rad_oct	1247.05	7.69

Table 29. Covariate models ranked by AICc for native Shannon diversity at index sites across Anacapa Island.

Model	AICc	Δ AICc
Temp_Pen_prev2Yr+Slope_degrees	856.60	0.00
svp_Pen_prev2Yr	860.19	3.58
Temp_Pen_prev2Yr	861.08	4.48
SOIL_Pen_mo+Temp_Pen_prev2Yr	861.20	4.60
GDD_Pen_prev2Yr	861.57	4.96
Temp_Pen_prev2Yr+Dew_Pen_prev2Yr	862.75	6.15
vpd_Pen_prev2Yr	866.27	9.67
vpd_Pen_currYr	867.05	10.45
Def_Pen_prev2Yr	867.58	10.98
Temp_Pen_mo+Slope_degrees	869.06	12.45

Table 30. Covariate models ranked by AICc for coastal sage scrub Shannon diversity at index sites across Anacapa Island.

Model	AICc	Δ AICc
Def_Pen_currYr	183.99	0.00
rh_Pen_currYr+Northness	185.60	1.60
svp_Pen_prev2Yr	186.57	2.58
pet_oct	186.89	2.90
rh_Pen_currYr+Dew_Pen_currYr+Northness	187.11	3.12
Temp_Pen_prev2Yr	187.17	3.18
GDD_Pen_prev2Yr	187.45	3.46
rn_oct	187.72	3.73
SOIL_Pen_an+Temp_Pen_mo	188.32	4.32
AET_Pen_fogYr+Temp_Pen_prev2Yr	188.96	4.96

Table 31. Covariate models ranked by AICc for grassland Shannon diversity at index sites across Anacapa Island.

Model	AICc	Δ AICc
vpd_Pen_prev2Yr	655.65	0.00
Temp_Pen_prev2Yr+Dew_Pen_prev2Yr	656.19	0.54
Def_Pen_prev2Yr	657.60	1.96
svp_Pen_prev2Yr	657.61	1.96
rn_oct	658.03	2.38
rad_oct	658.14	2.49
Temp_Pen_prev2Yr	658.15	2.50
Temp_Pen_prev2Yr+Slope_degrees	658.42	2.77
pet_oct	658.50	2.85
GDD_Pen_prev2Yr	658.56	2.91

Table 32. Covariate models ranked by AICc for native shrub cover at index sites across Anacapa Island.

Model	AICc	Δ AICc
vpd_Pen_prev2Yr	1872.23	0.00
Temp_Pen_prev2Yr+Slope_degrees	1875.38	3.15
rh_Pen_prev2Yr+Northness	1875.92	3.69
svp_Pen_prev2Yr	1878.83	6.60
AET_Pen_fogYr+Temp_Pen_prev2Yr	1880.58	8.35
Temp_Pen_prev2Yr	1880.74	8.51
GDD_Pen_prev2Yr	1881.05	8.82
rh_Pen_currYr+Northness	1881.39	9.16
Def_Pen_prev2Yr	1881.52	9.29
AET_Pen_fogYr+Slope_degrees	1882.03	9.80

Table 33. Covariate models ranked by AICc for native forb cover at index sites across Anacapa Island.

Model	AICc	Δ AICc
SOIL_Pen_mo+Temp_Pen_prev2Yr	2121.29	0.00
Temp_Pen_prev2Yr+Dew_Pen_prev2Yr	2121.79	0.50
Temp_Pen_prev2Yr	2122.97	1.68
GDD_Pen_prev2Yr	2123.09	1.80
svp_Pen_prev2Yr	2123.15	1.86
rh_Pen_currYr+Islet	2123.88	2.59
Temp_Pen_prev2Yr+Slope_degrees	2124.62	3.33
rh_Pen_prev2Yr+Islet	2127.30	6.00
vpd_Pen_prev2Yr	2128.60	7.31
Def_Pen_prev2Yr	2128.66	7.37

Table 34. Covariate models ranked by AICc for nonnative forb cover at index sites across Anacapa Island.

Model	AICc	Δ AICc
rh_Pen_currYr+Islet	1813.99	0.00
rh_Pen_currYr+Northness	1814.13	0.14
rh_Pen_currYr	1814.73	0.74
SOIL_Pen_an	1815.03	1.04
AET_Pen_an	1815.55	1.55
SOIL_Pen_an+Slope_degrees	1815.63	1.64
vpd_Pen_currYr	1815.92	1.93
AET_Pen_an+Def_Pen_mo	1815.95	1.96
rh_Pen_currYr+Dew_Pen_currYr+Islet	1815.99	2.00
rh_Pen_currYr+Dew_Pen_currYr+Northness	1816.13	2.14

Table 35. Covariate models ranked by AICc for native grass cover at index sites across Anacapa Island.

Model	AICc	Δ AICc
vpd_Pen_prev2Yr	1744.49	0.00
rh_Pen_prev2Yr+Islet	1746.82	2.33
rh_Pen_prev2Yr	1747.84	3.34
rh_Pen_prev2Yr+Northness	1749.33	4.84
SOIL_Pen_prev2Yr	1755.34	10.84
vpd_Pen_currYr	1755.54	11.05
AET_Pen_prev2Yr	1755.56	11.06
svp_Pen_prev2Yr	1755.67	11.17
Temp_Pen_prev2Yr	1756.28	11.78
Def_Pen_prevYr	1756.48	11.99

Table 36. Covariate models ranked by AICc for nonnative grass cover at index sites across Anacapa Island.

Model	AICc	Δ AICc
rh_Pen_currYr+Islet	2117.33	0.00
vpd_Pen_currYr	2117.38	0.04
AET_Pen_an	2119.01	1.68
AET_Pen_an+Def_Pen_mo	2120.37	3.03
rh_Pen_currYr	2120.60	3.27
SOIL_Pen_an+Temp_Pen_mo	2122.05	4.71
rh_Pen_currYr+Dew_Pen_fogYr	2122.08	4.75
SOIL_Pen_an	2122.29	4.95
rh_Pen_currYr+Northness	2122.55	5.22
SOIL_Pen_an+Temp_Pen_mo+Slope_degrees	2123.24	5.91

Anacapa Island Probability Sites

Table 37. Covariate models ranked by AICc for native Shannon diversity at probability sites across Anacapa Island.

Model	AICc	ΔAICc
SOIL_Pen_fogYr+Islet	77.21	0.00
vpd_Pen_prev2Yr	89.01	11.80
Def_Pen_currYr	89.28	12.06
rh_Pen_prev2Yr+Northness	90.21	12.99

Table 38. Covariate models ranked by AICc for native shrub density at probability sites across Anacapa Island.

Model	AICc	ΔAICc
Islet	71.97	0.00
Northness+Islet	72.65	0.68
rh_Pen_prevYr+Islet	73.87	1.90
Northness+Elevation_m	79.40	7.43
Elevation_m	79.40	7.43
Temp_Pen_fogYr	81.38	9.41
GDD_Pen_fogYr	81.38	9.41
PET_Pen_mo	81.61	9.64
Def_Pen_mo	81.79	9.83
svp_Pen_currYr	82.29	10.33

Table 39. Covariate models ranked by AICc for native shrub cover at probability sites across Anacapa Island.

Model	AICc	Δ AICc
Northness+Islet	108.36	0.00
Islet	109.37	1.01
rh_Pen_fogYr+Islet	110.50	2.15
SOIL_Pen_fogYr+Islet	110.81	2.46
rh_Pen_prevYr+Islet	111.37	3.01
Elevation_m	112.99	4.63
Northness+Elevation_m	114.58	6.22
SOIL_Pen_fogYr+Elevation_m	114.93	6.58
SOIL_Pen_fogYr+Northness+Elevation_m	116.74	8.38
Slope_degrees	123.52	15.17

Table 40. Covariate models ranked by AICc for native forb cover at probability sites across Anacapa Island.

Model	AICc	Δ AICc
Elevation_m	148.97	0.00
PET_Pen_mo	149.04	0.06
GDD_Pen_mo	149.24	0.27
Temp_Pen_mo	149.25	0.27
AET_Pen_prevYr+Def_Pen_mo	149.65	0.67
Def_Pen_mo	149.68	0.71
Def_Pen_prevYr	150.04	1.06
Temp_Pen_an	150.13	1.15
svp_Pen_fogYr	150.65	1.68
Northness+Elevation_m	150.70	1.73

Table 41. Covariate models ranked by AICc for nonnative forb cover at probability sites across Anacapa Island.

Model	AICc	Δ AICc
rh_Pen_prev2Yr	135.27	0.00
solRad_prev2Yr	135.42	0.15
rh_Pen_prev2Yr+Northness	136.11	0.84
AET_Pen_prev2Yr	137.78	2.52
SOIL_Pen_prev2Yr	137.87	2.60
Elevation_m	139.13	3.86
vpd_Pen_prev2Yr	139.42	4.16
SOIL_Pen_prev2Yr+Slope_degrees	139.71	4.44

Table 42. Covariate models ranked by AICc for native grass cover at probability sites across Anacapa Island.

Model	AICc	Δ AICc
vpd_Pen_prev2Yr	109.82	0.00
solRad_fog	110.99	1.17
AET_Pen_fogYr	111.28	1.46
Def_Pen_prevYr	111.61	1.79
Elevation_m	111.69	1.87
AET_Pen_prevYr	111.80	1.98
Islet	112.04	2.23
pet_singleMonth	112.28	2.46

Table 43. Covariate models ranked by AICc for nonnative grass cover at probability sites across Anacapa Island.

Model	AICc	Δ AICc
Northness	146.50	0.00
rh_Pen_currYr+Northness	146.55	0.04
Northness+Islet	146.73	0.23
rad_allMonth	147.89	1.39
pet_allMonth	148.04	1.54
Northness+Elevation_m	148.17	1.67
rn_allMonth	148.26	1.76
Def_Pen_an	150.68	4.18
rh_Pen_prevYr	151.57	5.07
GDD_Pen_mo	152.32	5.82

Covariate Modeling for Santa Barbara Island

Santa Barbara Island Index Sites

Table 44. Covariate models ranked by AICc for overall Shannon diversity at index sites across Santa Barbara Island.

Model	AICc	Δ AICc
SOIL_Pen_an+Slope_degrees	1679.22	0.00
SOIL_Pen_an+Dew_Pen_currYr+Slope_degrees	1680.95	1.73
AET_Pen_an	1681.18	1.96
AET_Pen_an+Def_Pen_currYr	1682.46	3.23
AET_Pen_an+Def_Pen_mo	1682.65	3.43
Temp_Pen_currYr+Slope_degrees	1683.32	4.09
Temp_Pen_currYr+Dew_Pen_currYr+Slope_degrees	1684.90	5.68
SOIL_Pen_an	1686.44	7.22
SOIL_Pen_an+Dew_Pen_currYr	1688.08	8.86
SOIL_Pen_an+Def_Pen_mo	1688.39	9.17

Table 45. Covariate models ranked by AICc for native Shannon diversity at index sites across Santa Barbara Island.

Model	AICc	Δ AICc
SOIL_Pen_an+Slope_degrees	1117.37	0.00
SOIL_Pen_an+Dew_Pen_currYr+Slope_degrees	1119.37	1.99
AET_Pen_an+AET_Pen_prevYr	1123.62	6.25
SOIL_Pen_an	1125.12	7.75
AET_Pen_an	1125.82	8.44
Temp_Pen_currYr+Dew_Pen_currYr+Slope_degrees	1126.91	9.54
Temp_Pen_currYr+Slope_degrees	1126.94	9.56
SOIL_Pen_an+Def_Pen_mo	1127.03	9.65
SOIL_Pen_an+Dew_Pen_currYr	1127.07	9.69
AET_Pen_an+Def_Pen_mo	1127.81	10.44

Table 46. Covariate models ranked by AICc for grassland Shannon diversity at index sites across Santa Barbara Island.

Model	AICc	Δ AICc
Dew_Pen_fogYr+Northness+Elevation_m	329.46	0.00
Dew_Pen_currYr+Slope_degrees	332.67	3.22
Northness+Elevation_m	335.63	6.17
solRad_prevYr	337.94	8.48
AET_Pen_an	338.62	9.16
rh_Pen_prevYr	339.10	9.64
SOIL_Pen_an	339.23	9.77
rh_Pen_prevYr+Dew_Pen_fogYr	339.30	9.84

Table 47. Covariate models ranked by AICc for native shrub density at index sites across Santa Barbara Island.

Model	AICc	Δ AICc
SOIL_Pen_prev2Yr+Slope_degrees	633.72	0.00
Slope_degrees	633.88	0.16
Temp_Pen_prevYr+Slope_degrees	634.25	0.53
SOIL_Pen_prev2Yr+Def_Pen_mo	634.41	0.70
AET_Pen_mo+Slope_degrees	635.26	1.54
Temp_Pen_mo+Slope_degrees	635.72	2.00
AET_Pen_prev2Yr	635.84	2.13
SOIL_Pen_prev2Yr	636.06	2.34
GDD_Pen_fogYr	636.18	2.46
Def_Pen_prevYr	636.27	2.55

Table 48. Covariate models ranked by AICc for native shrub cover at index sites across Santa Barbara Island.

Model	AICc	Δ AICc
Def_Pen_mo+Dew_Pen_prevYr+Slope_degrees	2719.91	0.00
Temp_Pen_mo+Dew_Pen_prevYr+Slope_degrees	2720.42	0.51
Temp_Pen_mo+Slope_degrees	2724.41	4.49
Temp_Pen_mo+Dew_Pen_prevYr	2724.73	4.81
Def_Pen_mo+Slope_degrees	2724.75	4.84
AET_Pen_currYr+Def_Pen_mo	2727.38	7.47
SOIL_Pen_prev2Yr+Def_Pen_mo	2727.90	7.99
GDD_Pen_mo	2728.08	8.16
Temp_Pen_mo	2728.65	8.74
Def_Pen_mo	2728.99	9.08

Table 49. Covariate models ranked by AICc for native forb cover at index sites across Santa Barbara Island.

Model	AICc	Δ AICc
AET_Pen_an+Def_Pen_currYr	3197.47	0.00
AET_Pen_an	3197.77	0.30
AET_Pen_an+Def_Pen_mo	3198.71	1.24
Def_Pen_currYr	3200.30	2.83
AET_Pen_prev2Yr+Def_Pen_currYr	3202.10	4.62
SOIL_Pen_an+Slope_degrees	3203.68	6.20
SOIL_Pen_an+Dew_Pen_currYr+Slope_degrees	3205.59	8.12
SOIL_Pen_an	3207.61	10.13
SOIL_Pen_an+Def_Pen_mo	3208.93	11.46
SOIL_Pen_an+Dew_Pen_currYr	3209.39	11.91

Table 50. Covariate models ranked by AICc for nonnative forb cover at index sites across Santa Barbara Island.

Model	AICc	Δ AICc
SOIL_Pen_prevYr+Slope_degrees	3461.99	0.00
AET_Pen_currYr	3462.78	0.79
Def_Pen_mo+Slope_degrees	3463.37	1.38
Def_Pen_prevYr	3463.62	1.63
AET_Pen_currYr+Def_Pen_mo	3463.81	1.82
Def_Pen_mo+Dew_Pen_prevYr+Slope_degrees	3464.95	2.96
Temp_Pen_prev2Yr+Slope_degrees	3465.07	3.08
Slope_degrees	3465.68	3.69
Temp_Pen_mo+Slope_degrees	3466.41	4.42
Temp_Pen_prev2Yr+Dew_Pen_prevYr+Slope_degrees	3466.99	5.00

Table 51. Covariate models ranked by AICc for native grass cover at index sites across Santa Barbara Island.

Model	AICc	Δ AICc
SOIL_Pen_fogYr+Slope_degrees	851.01	0.00
Dew_Pen_prevYr+Slope_degrees	851.64	0.63
Slope_degrees	852.02	1.01
SOIL_Pen_fogYr+Dew_Pen_prevYr+Slope_degrees	852.40	1.38
Def_Pen_mo+Dew_Pen_prevYr+Slope_degrees	852.73	1.72
SOIL_Pen_fogYr+Temp_Pen_mo+Slope_degrees	852.81	1.79
SOIL_Pen_fogYr+Temp_Pen_currYr+Slope_degrees	852.95	1.93
Temp_Pen_mo+Dew_Pen_prevYr+Slope_degrees	853.09	2.07
Temp_Pen_currYr+Slope_degrees	853.16	2.15
Temp_Pen_currYr+Dew_Pen_prevYr+Slope_degrees	853.23	2.21

Table 52. Covariate models ranked by AICc for nonnative grass cover at index sites across Santa Barbara Island.

Model	AICc	Δ AICc
AET_Pen_currYr+Def_Pen_mo	3502.08	0.00
SOIL_Pen_prev2Yr+Def_Pen_mo	3505.05	2.97
Temp_Pen_mo+Dew_Pen_currYr+Slope_degrees	3505.21	3.14
Temp_Pen_mo+Dew_Pen_currYr	3506.16	4.08
Temp_Pen_mo+Slope_degrees	3508.64	6.57
Def_Pen_mo+Dew_Pen_currYr	3509.52	7.44
Temp_Pen_mo	3509.60	7.52
AET_Pen_currYr	3510.71	8.63
Def_Pen_mo+Slope_degrees	3512.12	10.05
GDD_Pen_mo	3512.46	10.38

Table 53. Covariate models ranked by AICc for *Deinandra clementina* cover at index sites across Santa Barbara Island.

Model	AICc	Δ AICc
SOIL_Pen_prev2Yr+Slope_degrees	597.91	0.00
Def_Pen_currYr	601.93	4.02
Temp_Pen_currYr+Slope_degrees	602.09	4.18
Slope_degrees	604.53	6.61
rh_Pen_currYr+Dew_Pen_fogYr+Northness	604.56	6.65
Temp_Pen_mo+Dew_Pen_currYr+Slope_degrees	608.43	10.52
Dew_Pen_fogYr+Elevation_m	609.11	11.20
Dew_Pen_currYr+Slope_degrees	609.28	11.37
pet_allMonth+Def_Pen_mo	609.40	11.49
Def_Pen_mo+Slope_degrees	610.36	12.45

Table 54. Covariate models ranked by AICc for *Eriogonum giganteum* var. *compactum* cover at index sites across Santa Barbara Island.

Model	AICc	Δ AICc
solRad_prev2Yr	406.90	0.00
Northness+Elevation_m	416.44	9.53
AET_Pen_prev2Yr+Def_Pen_prevYr	416.71	9.81
solRad_fog	417.92	11.01
AET_Pen_prev2Yr	418.29	11.38
Dew_Pen_fogYr+Northness+Elevation_m	418.43	11.52
Elevation_m	419.39	12.49
Dew_Pen_fogYr+Elevation_m	421.38	14.48

Table 55. Covariate models ranked by AICc for *Hordeum murinum* cover at index sites across Santa Barbara Island.

Model	AICc	Δ AICc
AET_Pen_currYr+Def_Pen_mo	2219.14	0.00
SOIL_Pen_currYr+Def_Pen_mo	2224.67	5.53
SOIL_Pen_currYr+Def_Pen_mo+Dew_Pen_prev2Yr	2226.31	7.18
AET_Pen_currYr	2226.63	7.49
Temp_Pen_mo+Dew_Pen_prev2Yr	2229.67	10.53
Temp_Pen_mo	2229.86	10.72
Def_Pen_mo+Dew_Pen_prev2Yr	2230.26	11.12
GDD_Pen_mo	2230.97	11.83
Def_Pen_mo	2231.01	11.87
Temp_Pen_mo+Dew_Pen_prev2Yr+Slope_degrees	2231.30	12.16

Table 56. Covariate models ranked by AICc for *Mesembryanthemum crystallinum* cover at index sites across Santa Barbara Island.

Model	AICc	Δ AICc
Temp_Pen_mo+Dew_Pen_prev2Yr	2072.46	0.00
SOIL_Pen_fogYr+Temp_Pen_mo+Dew_Pen_prev2Yr+Slope_degrees	2072.83	0.36
Temp_Pen_prev2Yr+Dew_Pen_prev2Yr	2073.13	0.66
Temp_Pen_mo+Dew_Pen_prev2Yr+Slope_degrees	2074.32	1.86
SOIL_Pen_fogYr+Temp_Pen_mo	2074.47	2.01
Temp_Pen_prev2Yr+Dew_Pen_prev2Yr+Slope_degrees	2074.98	2.52
SOIL_Pen_fogYr+Temp_Pen_prev2Yr+Dew_Pen_prev2Yr+Slope_degrees	2075.40	2.94
SOIL_Pen_fogYr+Temp_Pen_mo+Slope_degrees	2076.45	3.99
SOIL_Pen_fogYr+Temp_Pen_prev2Yr	2076.97	4.51
SOIL_Pen_fogYr+Dew_Pen_prev2Yr	2077.65	5.19

Table 57. Covariate models ranked by AICc for *Suaeda taxifolia* cover at index sites across Santa Barbara Island.

Model	AICc	Δ AICc
SOIL_Pen_prevYr+Def_Pen_mo	1193.16	0.00
AET_Pen_currYr+Def_Pen_mo	1193.61	0.46
Def_Pen_mo	1198.24	5.08
rn_oct	1198.66	5.51
Def_Pen_mo+Dew_Pen_currYr	1198.78	5.62
rad_oct	1198.79	5.63
Temp_Pen_mo	1198.79	5.63
AET_Pen_prevYr	1199.43	6.27
GDD_Pen_mo	1199.53	6.37
Temp_Pen_mo+Dew_Pen_currYr	1200.11	6.95

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Table 58. Covariate models ranked by AICc for overall Shannon diversity at probability sites across Santa Barbara Island.

Model	AICc	Δ AICc
SOIL_Pen_prevYr	144.83	0.00
AET_Pen_fogYr+Temp_Pen_mo	151.81	6.98
GDD_Pen_mo	152.80	7.96
rh_Pen_prevYr+Dew_Pen_currYr	153.19	8.36
AET_Pen_fogYr+Temp_Pen_an	153.44	8.61
solRad_prevYr	153.44	8.61
AET_Pen_fogYr+Temp_Pen_mo+Slope_degrees	153.80	8.97
rh_Pen_prevYr+Dew_Pen_currYr+Northness	154.57	9.74

Table 59. Covariate models ranked by AICc for native shrub cover at probability sites across Santa Barbara Island.

Model	AICc	Δ AICc
pet_allMonth	183.08	0.00
rad_allMonth	183.70	0.62
rn_allMonth	183.70	0.62
pet_allMonth+AET_Pen_prevYr	184.79	1.71
Northness	186.14	3.07
solRad_fog	186.93	3.85
rh_Pen_currYr+Northness	187.09	4.01
Northness+Elevation_m	187.44	4.36

Table 60. Covariate models ranked by AICc for native forb cover at probability sites across Santa Barbara Island.

Model	AICc	Δ AICc
AET_Pen_fogYr+Temp_Pen_an+Slope_degrees	221.45	0.00
AET_Pen_fogYr+Temp_Pen_mo	221.59	0.14
AET_Pen_fogYr+Temp_Pen_mo+Slope_degrees	221.81	0.36
AET_Pen_fogYr+Temp_Pen_an	221.98	0.53
Def_Pen_fogYr	222.84	1.39
AET_Pen_prev2Yr+Def_Pen_mo	223.14	1.69
PET_Pen_fogYr	223.84	2.39
AET_Pen_fogYr+Slope_degrees	226.26	4.81
Def_Pen_mo	226.88	5.43
Temp_Pen_an+Slope_degrees	227.17	5.72

Table 61. Covariate models ranked by AICc for nonnative forb cover at probability sites across Santa Barbara Island.

Model	AICc	Δ AICc
AET_Pen_prevYr+SOIL_Pen_currYr+Def_Pen_mo	349.90	0.00
SOIL_Pen_currYr+Def_Pen_mo	350.45	0.56
Def_Pen_prevYr	353.10	3.21
pet_singleMonth	354.84	4.94
pet_singleMonth+AET_Pen_prevYr	354.89	4.99
rad_oct	356.08	6.19
rn_oct	356.09	6.19
SOIL_Pen_currYr+Temp_Pen_an	358.61	8.72
SOIL_Pen_currYr+Temp_Pen_mo	358.91	9.02
AET_Pen_fogYr+Temp_Pen_an+Slope_degrees	359.64	9.74

Table 62. Covariate models ranked by AICc for nonnative grass cover at probability sites across Santa Barbara Island.

Model	AICc	Δ AICc
Dew_Pen_currYr+Northness+Elevation_m	293.85	0.00
Northness+Elevation_m	295.18	1.33
Dew_Pen_currYr+Northness	305.93	12.08
Northness	307.07	13.23
rh_Pen_prevYr+Dew_Pen_currYr+Northness	307.18	13.33
rh_Pen_fogYr+Dew_Pen_currYr+Northness	307.68	13.83
rh_Pen_fogYr+Northness	307.90	14.05
rh_Pen_prevYr+Northness	309.05	15.20
rad_allMonth	309.24	15.39
rn_allMonth	309.34	15.49

Table 63. Covariate models ranked by AICc for *Hordeum murinum* cover at probability sites across Santa Barbara Island.

Model	AICc	Δ AICc
PET_Pen_mo	214.59	0.00
rh_Pen_fogYr+Northness	216.06	1.47
PET_Pen_mo+AET_Pen_prevYr	216.43	1.85
PET_Pen_mo+SOIL_Pen_prevYr	216.59	2.00
SOIL_Pen_prevYr+Temp_Pen_prevYr	217.16	2.58
rh_Pen_fogYr+Dew_Pen_currYr+Northness	218.08	3.49
Dew_Pen_currYr+Northness	219.11	4.52
rh_Pen_prevYr+Dew_Pen_currYr+Northness	219.52	4.93
Northness	219.77	5.18
Dew_Pen_currYr+Northness+Elevation_m	220.27	5.68

Table 64. Covariate models ranked by AICc for *Mesembryanthemum crystallinum* cover at probability sites across Santa Barbara Island.

Model	AICc	Δ AICc
PET_Pen_fogYr	277.59	0.00
Slope_degrees	279.54	1.95
SOIL_Pen_prev2Yr+Slope_degrees	280.40	2.81
AET_Pen_mo+Slope_degrees	280.72	3.14
Temp_Pen_mo+Slope_degrees	281.06	3.47
Temp_Pen_prevYr+Slope_degrees	281.14	3.55
AET_Pen_mo+SOIL_Pen_prev2Yr+Slope_degrees	282.25	4.67
SOIL_Pen_prev2Yr+Temp_Pen_mo+Slope_degrees	282.34	4.75
Dew_Pen_prevYr+Elevation_m	282.71	5.12
Elevation_m	283.49	5.90

Covariate Modeling for Santa Cruz Island

Santa Cruz Island Index Sites

Table 65. Covariate models ranked by AICc for overall Shannon diversity at index sites across Santa Cruz Island.

Model	AICc	Δ AICc
Temp_Pen_mo+Pig	1690.30	0.00
AET_Pen_mo+Soil_water_mm_fog+Temp_Pen_mo	1692.87	2.57
Def_Pen_mo	1693.11	2.82
AET_Pen_prevYr+Def_Pen_mo	1693.70	3.40
Temp_Pen_mo+Cattle	1693.71	3.41
Temp_Pen_mo+Sheep	1693.97	3.67
AET_Pen_mo+Def_Pen_mo	1694.26	3.96
SOIL_Pen_mo+Def_Pen_mo	1694.71	4.41
pet_singleMonth	1695.52	5.22
pet_singleMonth+SOIL_Pen_mo	1695.75	5.45

Table 66. Covariate models ranked by AICc for native Shannon diversity at index sites across Santa Cruz Island.

Model	AICc	Δ AICc
Dew_Pen_fogYr+Pig_Ind	1013.90	0.00
Dew_Pen_fogYr+Northness+Pig_Ind	1013.94	0.03
Dew_Pen_fogYr+Pig_Ind+Sheep_Ind	1014.02	0.12
Temp_Pen_mo	1014.03	0.12
Temp_Pen_mo+Sheep	1014.08	0.17
Dew_Pen_fogYr+Northness+Pig_Ind+Sheep_Ind	1014.08	0.18
Temp_Pen_mo+Cattle	1014.29	0.38
Temp_Pen_mo+Pig	1014.39	0.48
GDD_Pen_mo	1014.70	0.80
Def_Pen_mo	1015.41	1.50

Table 67. Covariate models ranked by AICc for grassland Shannon diversity at index sites across Santa Cruz Island.

Model	AICc	Δ AICc
Temp_Pen_mo+Pig	408.65	0.00
Pig	413.14	4.50
Temp_Pen_prev2Yr+Pig	413.16	4.51
Temp_Pen_mo+Sheep	414.00	5.35
Slope_degrees+Sheep	414.20	5.56
AET_Pen_fogYr+Temp_Pen_mo	414.53	5.89
Temp_Pen_mo+Cattle	414.55	5.91
Slope_degrees+Cattle	414.62	5.98
Elevation_m+Pig	414.71	6.06
AET_Pen_fogYr+Slope_degrees	414.86	6.22

Table 68. Covariate models ranked by AICc for riparian Shannon diversity at index sites across Santa Cruz Island.

Model	AICc	Δ AICc
rh_Pen_currYr+Dew_Pen_fogYr+Northness	214.46	0.00
rh_Pen_prev2Yr+Dew_Pen_fogYr+Northness	214.75	0.30
rh_Pen_prev2Yr+Northness	215.23	0.77
Northness+Sheep_Ind	215.38	0.92
Northness+Elevation_m	215.44	0.98
rh_Pen_currYr+Northness+Pig_Ind	215.47	1.02
Dew_Pen_fogYr+Northness+Pig_Ind	215.48	1.03
rh_Pen_currYr+Dew_Pen_fogYr+Northness+Pig_Ind	215.53	1.07
rh_Pen_prev2Yr+Dew_Pen_fogYr+Northness+Pig_Ind	215.63	1.17
Soil_water_mm_prev2Yr+Slope_degrees	216.90	2.45

Table 69. Covariate models ranked by AICc for oak Shannon diversity at index sites across Santa Cruz Island.

Model	AICc	Δ AICc
pet_allMonth+Def_Pen_mo	57.21	0.00
Slope_degrees+Cattle	60.59	3.38
solRad_fog	71.01	13.80
SOIL_Pen_fogYr+Temp_Pen_currYr	80.57	23.36
Temp_Pen_currYr+Pig	81.80	24.59
Temp_Pen_currYr+Sheep	82.31	25.10
AET_mm_currentYr	82.45	25.24
Temp_Pen_currYr+Cattle	82.77	25.56

Table 70. Covariate models ranked by AICc for native tree density at index sites across Santa Cruz Island.

Model	AICc	Δ AICc
Elevation_m	507.30	0.00
Elevation_m+Pig	507.91	0.61
AET_Pen_prev2Yr+Deficit_mm_prevYr	509.18	1.88
Northness+Elevation_m	509.28	1.97
rh_Pen_currYr+Pig_Ind	509.62	2.32
SOIL_Pen_an+Cattle	510.14	2.84
SOIL_Pen_an+Sheep	510.14	2.84
AET_Pen_prev2Yr	511.08	3.78
rh_Pen_currYr+Northness+Pig_Ind	511.45	4.15
rh_Pen_currYr+Dew_Pen_fogYr+Pig_Ind	511.52	4.22

Table 71. Covariate models ranked by AICc for native tree recruitment density at index sites across Santa Cruz Island.

Model	AICc	Δ AICc
Sheep_Ind	490.55	0.00
Pig_Ind+Sheep_Ind	491.75	1.19
Dew_Pen_fogYr+Sheep_Ind	492.52	1.97
Northness+Sheep_Ind	492.54	1.98
Northness+Pig_Ind+Sheep_Ind	493.73	3.18
Dew_Pen_fogYr+Pig_Ind+Sheep_Ind	493.75	3.19
Dew_Pen_fogYr+Northness+Sheep_Ind	494.50	3.95
solRad_fog	495.35	4.80

Table 72. Covariate models ranked by AICc for native shrub density at index sites across Santa Cruz Island.

Model	AICc	Δ AICc
Cattle	558.62	0.00
Sheep	558.62	0.00
AET_mm_fog+Cattle	560.06	1.44
AET_mm_fog+Sheep	560.06	1.44
Pig	561.38	2.76
rh_Pen_prevYr+Dew_Pen_prevYr	566.72	8.10
rh_Pen_prevYr	568.52	9.90
rh_Pen_prevYr+Dew_Pen_prevYr+Dew_Pen_fogYr	568.70	10.07
rh_Pen_prevYr+Dew_Pen_prevYr+Northness	568.70	10.08
PET_mm_fog	569.30	10.68

Table 73. Covariate models ranked by AICc for native shrub recruitment density at index sites across Santa Cruz Island.

Model	AICc	Δ AICc
Dew_Pen_fogYr+Northness+Pig_Ind	608.56	0.00
Northness+Pig_Ind	609.32	0.75
Dew_Pen_fogYr+Pig_Ind	609.47	0.90
Pig_Ind	609.94	1.37
AET_mm_fog+Temp_Pen_mo	610.06	1.50
GDD_Pen_mo	610.43	1.87
svp_Pen_prevYr	610.48	1.92
GDD_Pen_prevYr	610.49	1.93
AET_mm_fog+Temp_Pen_prevYr	610.56	2.00
Temp_Pen_mo	610.64	2.07

Table 74. Covariate models ranked by AICc for native tree cover at index sites across Santa Cruz Island.

Model	AICc	Δ AICc
Elevation_m+Pig	1783.76	0.00
Pig	1790.95	7.18
Temp_Pen_prev2Yr+Pig	1791.99	8.23
Temp_Pen_mo+Pig	1792.51	8.74
Slope_degrees+Sheep	1796.19	12.43
Slope_degrees+Cattle	1796.59	12.82
SOIL_Pen_an+Sheep	1797.81	14.05
SOIL_Pen_an+Cattle	1798.15	14.39
Sheep	1798.58	14.82
AET_Pen_fogYr+Cattle	1798.83	15.07

Table 75. Covariate models ranked by AICc for native shrub cover at index sites across Santa Cruz Island.

Model	AICc	Δ AICc
AET_Pen_fogYr+Cattle	1706.29	0.00
Cattle	1709.51	3.22
Slope_degrees+Cattle	1710.16	3.87
Temp_Pen_mo+Cattle	1710.71	4.42
Temp_Pen_prevYr+Cattle	1711.23	4.94
Sheep	1711.27	4.98
Slope_degrees+Sheep	1711.62	5.33
Temp_Pen_mo+Sheep	1712.47	6.18
Temp_Pen_prevYr+Sheep	1713.18	6.89
AET_Pen_fogYr+Soil_water_mm_prevYr+Slope_degrees	1716.20	9.91

Table 76. Covariate models ranked by AICc for native forb cover at index sites across Santa Cruz Island.

Model	AICc	Δ AICc
rh_Pen_currYr+Northness+Pig_Ind	2273.30	0.00
rh_Pen_currYr+Dew_Pen_fogYr+Northness+Pig_Ind	2273.99	0.69
Northness+Pig_Ind+Sheep_Ind	2275.42	2.12
pet_allMonth+Def_Pen_mo	2275.61	2.31
rh_Pen_currYr+Pig_Ind	2275.86	2.56
Dew_Pen_fogYr+Northness+Pig_Ind+Sheep_Ind	2276.27	2.97
rh_Pen_currYr+Dew_Pen_fogYr+Pig_Ind	2276.69	3.39
rh_Pen_prev2Yr+Northness+Pig_Ind	2276.99	3.69
Northness+Pig_Ind	2277.13	3.83
Dew_Pen_prevYr+Northness+Pig_Ind	2277.14	3.84

Table 77. Covariate models ranked by AICc for nonnative forb cover at index sites across Santa Cruz Island.

Model	AICc	Δ AICc
Temp_Pen_mo+Pig	2146.85	0.00
Temp_Pen_mo+Sheep	2150.30	3.45
Temp_Pen_mo+Cattle	2150.32	3.46
Pig	2157.39	10.54
Temp_Pen_currYr+Pig	2158.47	11.62
Elevation_m+Pig	2158.70	11.85
Cattle	2159.11	12.25
SOIL_Pen_fogYr+Pig	2159.20	12.34
Sheep	2159.41	12.56
Slope_degrees+Cattle	2159.46	12.60

Table 78. Covariate models ranked by AICc for native grass cover at index sites across Santa Cruz Island.

Model	AICc	Δ AICc
Elevation_m+Pig	1280.50	0.00
SOIL_Pen_fogYr+Elevation_m+Pig	1281.61	1.11
Temp_Pen_mo+Pig	1281.64	1.14
Temp_Pen_an+Pig	1281.78	1.27
Pig	1282.31	1.81
SOIL_Pen_fogYr+Pig	1283.51	3.01
Soil_water_mm_prev2Yr+Def_Pen_mo	1283.65	3.15
Northness+Pig_Ind+Sheep_Ind	1283.72	3.21
Dew_Pen_fogYr+Northness+Pig_Ind+Sheep_Ind	1283.84	3.34
Northness+Sheep_Ind	1284.34	3.84

Table 79. Covariate models ranked by AICc for nonnative grass cover at index sites across Santa Cruz Island.

Model	AICc	Δ AICc
Temp_Pen_mo+Pig	3579.41	0.00
AET_Pen_an+Def_Pen_mo	3582.73	3.32
Def_Pen_mo	3585.32	5.92
pet_allMonth+Def_Pen_mo	3586.17	6.76
AET_mm_currentYr+Def_Pen_mo	3586.36	6.95
Soil_water_mm_currentYr+Def_Pen_mo	3586.95	7.54
Temp_Pen_mo+Sheep	3587.01	7.60
SOIL_Pen_prevYr+Def_Pen_mo	3587.16	7.75
Temp_Pen_mo+Cattle	3587.54	8.13
Pig	3587.92	8.51

Table 80. Covariate models ranked by AICc for *Baccharis pilularis* cover at index sites across Santa Cruz Island.

Model	AICc	Δ AICc
Dew_Pen_currYr+Dew_Pen_prevYr	378.26	0.00
Dew_Pen_currYr+Pig_Ind	379.35	1.09
PET_mm_prev2Yr	379.35	1.09
Dew_Pen_currYr	379.42	1.16
rh_Pen_fogYr+Dew_Pen_currYr+Dew_Pen_prevYr	379.71	1.45
rh_Pen_prevYr+Dew_Pen_currYr+Dew_Pen_prevYr	379.95	1.69
rh_Pen_prevYr+Dew_Pen_currYr+Dew_Pen_fogYr	380.24	1.98
rh_Pen_fogYr+Dew_Pen_currYr	380.51	2.25
Dew_Pen_currYr+Dew_Pen_fogYr	380.61	2.35
Dew_Pen_prevYr+Pig_Ind	380.99	2.73

Table 81. Covariate models ranked by AICc for *Eriogonum* Group cover at index sites across Santa Cruz Island.

Model	AICc	ΔAICc
Slope_degrees+Cattle	681.18	0.00
Slope_degrees+Sheep	681.21	0.03
Temp_Pen_prev2Yr+Sheep	685.64	4.47
vpd_Pen_fogYr	686.83	5.66
Deficit_mm_fog	686.89	5.71
Cattle	687.07	5.89
Sheep	687.08	5.90
Def_Pen_fogYr	687.67	6.49
svp_Pen_prev2Yr	687.78	6.60
Temp_Pen_prev2Yr	688.02	6.85

Table 82. Covariate models ranked by AICc for *Foeniculum vulgare* cover at index sites across Santa Cruz Island.

Model	AICc	ΔAICc
rn_oct	463.23	0.00
pet_oct	463.27	0.04
rad_oct	463.48	0.25
pet_oct+SOIL_Pen_mo	464.88	1.64
pet_oct+Def_Pen_mo	465.21	1.98
AET_Pen_an+Def_Pen_mo	466.30	3.07
Soil_water_mm_prev2Yr+Def_Pen_mo	468.29	5.05
Def_Pen_mo	469.05	5.81
SOIL_Pen_mo+Def_Pen_mo	470.64	7.40
Soil_water_mm_prev2Yr+SOIL_Pen_mo	472.68	9.45

Table 83. Covariate models ranked by AICc for *Pinus muricata* cover at index sites across Santa Cruz Island.

Model	AICc	Δ AICc
AET_mm_fog+Slope_degrees	81.38	0.00
AET_mm_fog+Cattle	82.34	0.96
AET_mm_fog+SOIL_Pen_currYr+Slope_degrees	82.90	1.53
AET_mm_fog+Soil_water_mm_prevYr+Slope_degrees	83.07	1.70
AET_mm_fog+SOIL_Pen_currYr	83.27	1.89
AET_mm_fog+Soil_water_mm_prevYr+SOIL_Pen_currYr	83.72	2.35
Slope_degrees	86.52	5.14
Slope_degrees+Cattle	87.21	5.84
Slope_degrees+Sheep	87.22	5.84
rn_allMonth	87.64	6.27

Table 84. Covariate models ranked by AICc for *Rhus integrifolia* cover at index sites across Santa Cruz Island.

Model	AICc	Δ AICc
Temp_Pen_prev2Yr+Cattle	104.16	0.00
Temp_Pen_prev2Yr+Sheep	104.16	0.00
Temp_Pen_prev2Yr+Pig	104.71	0.56
Cattle	105.25	1.09
Sheep	105.25	1.10
Pig	105.84	1.68
Slope_degrees+Cattle	107.05	2.89
Slope_degrees+Sheep	107.06	2.90
Elevation_m+Pig	107.72	3.57
Deficit_mm_fog	113.37	9.21

Table 85. Covariate models ranked by AICc for *Stipa* Group cover at index sites across Santa Cruz Island.

Model	AICc	Δ AICc
Temp_Pen_prevYr+Pig	725.40	0.00
Pig_Ind+Sheep_Ind	731.23	5.84
Dew_Pen_fogYr+Pig_Ind+Sheep_Ind	731.50	6.10
Sheep_Ind	731.92	6.52
Dew_Pen_fogYr+Sheep_Ind	733.24	7.84
Northness+Pig_Ind+Sheep_Ind	733.25	7.86
Dew_Pen_fogYr+Northness+Pig_Ind+Sheep_Ind	733.52	8.12
Northness+Sheep_Ind	733.92	8.52
Temp_Pen_mo+Pig	735.15	9.75
Dew_Pen_fogYr+Northness+Sheep_Ind	735.25	9.85

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Table 86. Covariate models ranked by AICc for overall Shannon diversity at probability sites across Santa Cruz Island.

Model	AICc	Δ AICc
AET_Pen_prevYr+AET_Pen_currYr+Def_Pen_mo	352.01	0.00
pet_allMonth+Def_Pen_mo	353.09	1.07
AET_Pen_currYr+Def_Pen_mo	353.17	1.15
Def_Pen_mo	353.18	1.17
AET_Pen_prevYr+Def_Pen_mo	354.99	2.98
Deficit_mm_currentYr	356.43	4.42
GDD_Pen_mo	356.80	4.79
AET_Pen_currYr	357.04	5.03
Def_Pen_currYr	357.38	5.37
SOIL_Pen_prevYr	357.40	5.39

Table 87. Covariate models ranked by AICc for native Shannon diversity at probability sites across Santa Cruz Island.

Model	AICc	Δ AICc
Slope_degrees	248.40	0.00
AET_Pen_mo+Slope_degrees	248.83	0.43
Soil_water_mm_currentYr+Slope_degrees	249.51	1.10
Temp_Pen_mo+Slope_degrees	249.72	1.32
rn_allMonth	249.79	1.39
SOIL_Pen_prev2Yr+Slope_degrees	249.92	1.52
Temp_Pen_fogYr+Slope_degrees	250.25	1.84
Slope_degrees+Sheep	250.29	1.88
Slope_degrees+Cattle	250.29	1.88
AET_Pen_mo+Soil_water_mm_currentYr+Slope_degrees	250.39	1.98

Table 88. Covariate models ranked by AICc for native tree density at probability sites across Santa Cruz Island.

Model	AICc	Δ AICc
Northness	33.15	0.00
rh_Pen_fogYr+Northness	33.68	0.53
rh_Pen_prev2Yr+Northness	34.56	1.40
rad_allMonth	39.15	6.00
rn_allMonth	39.43	6.28
pet_allMonth	40.05	6.90
AET_mm_fog	40.82	7.66
AET_mm_fog+SOIL_Pen_prevYr	41.13	7.98
Soil_water_mm_currentYr+SOIL_Pen_prevYr+Slope_degrees	41.19	8.04
pet_allMonth+SOIL_Pen_prevYr	41.96	8.80

Table 89. Covariate models ranked by AICc for native shrub density at probability sites across Santa Cruz Island.

Model	AICc	Δ AICc
Soil_water_mm_fog+Elevation_m	320.39	0.00
Soil_water_mm_fog+SOIL_Pen_fogYr+Elevation_m	322.11	1.72
AET_Pen_fogYr+Slope_degrees	323.10	2.71
SOIL_Pen_fogYr+Northness+Elevation_m	323.17	2.78
SOIL_Pen_fogYr+Elevation_m	323.17	2.79
AET_Pen_fogYr+Temp_Pen_fogYr	323.44	3.05
Temp_Pen_fogYr	323.45	3.07
GDD_Pen_fogYr	323.45	3.07
Northness+Elevation_m	323.49	3.10
svp_Pen_fogYr	324.03	3.64

Table 90. Covariate models ranked by AICc for native shrub recruitment density at probability sites across Santa Cruz Island.

Model	AICc	Δ AICc
rh_Pen_prev2Yr	346.38	0.00
AET_mm_prevYr	346.61	0.22
GDD_Pen_mo	346.79	0.41
rh_Pen_prev2Yr+Northness	347.72	1.33
Temp_Pen_mo	347.74	1.35
vpd_Pen_prev2Yr	347.83	1.45
Deficit_mm_prev2Yr	348.09	1.71
Sheep	348.19	1.80
Pig	348.19	1.80
Cattle	348.19	1.80

Table 91. Covariate models ranked by AICc for native tree cover at probability sites across Santa Cruz Island.

Model	AICc	Δ AICc
Northness+Elevation_m	348.87	0.00
Elevation_m	348.93	0.06
Temp_Pen_currYr+Slope_degrees	358.93	10.06
Slope_degrees	359.75	10.88
Soil_water_mm_prevYr+Slope_degrees	360.50	11.63
Temp_Pen_mo+Slope_degrees	360.65	11.77
AET_Pen_mo+Slope_degrees	361.11	12.24
PET_mm_currentYr	361.17	12.30
SOIL_Pen_mo+Slope_degrees	361.51	12.64
Soil_water_mm_prevYr+Temp_Pen_mo	361.63	12.76

Table 92. Covariate models ranked by AICc for native shrub cover at probability sites across Santa Cruz Island.

Model	AICc	Δ AICc
rh_Pen_prev2Yr+Northness	559.58	0.00
Soil_water_mm_prev2Yr+Slope_degrees	560.06	0.48
rh_Pen_currYr+Northness	560.23	0.65
Northness	560.38	0.80
Slope_degrees	560.45	0.87
Slope_degrees+Cattle	560.55	0.97
Slope_degrees+Sheep	560.55	0.97
Northness+Elevation_m	561.54	1.96
Temp_Pen_fogYr+Slope_degrees	561.60	2.02
Temp_Pen_mo+Slope_degrees	561.62	2.04

Table 93. Covariate models ranked by AICc for nonnative forb cover at probability sites across Santa Cruz Island.

Model	AICc	Δ AICc
AET_Pen_mo+Soil_water_mm_prevYr	259.94	0.00
Soil_water_mm_prevYr	260.48	0.54
AET_Pen_mo+Soil_water_mm_prevYr+Slope_degrees	261.88	1.94
PET_mm_fog	262.31	2.37
Soil_water_mm_prevYr+Temp_Pen_mo	262.44	2.50
Soil_water_mm_prevYr+Slope_degrees	262.46	2.52
AET_Pen_mo+SOIL_Pen_prevYr	262.69	2.75
PET_Pen_fogYr	262.78	2.84
Def_Pen_fogYr	262.79	2.85
AET_mm_prevYr	263.11	3.16

Table 94. Covariate models ranked by AICc for native grass cover at probability sites across Santa Cruz Island.

Model	AICc	Δ AICc
Slope_degrees+Sheep	361.34	0.00
Slope_degrees+Cattle	361.34	0.00
SOIL_Pen_prevYr+Slope_degrees+Cattle	362.53	1.19
Soil_water_mm_prevYr+Slope_degrees	367.81	6.48
Elevation_m	368.24	6.90
Pig	368.38	7.04
Sheep	368.38	7.04
Cattle	368.38	7.04
Soil_water_mm_prevYr+SOIL_Pen_prevYr+Slope_degrees	368.72	7.39
SOIL_Pen_prevYr+Cattle	368.91	7.57

Table 95. Covariate models ranked by AICc for nonnative grass cover at probability sites across Santa Cruz Island.

Model	AICc	ΔAICc
SOIL_Pen_currYr+Slope_degrees	711.25	0.00
SOIL_Pen_currYr+Slope_degrees+Cattle	712.26	1.01
SOIL_Pen_currYr	714.08	2.84
SOIL_Pen_currYr+Temp_Pen_mo	714.63	3.38
SOIL_Pen_currYr+Temp_Pen_currYr	714.92	3.67
SOIL_Pen_currYr+Sheep	715.10	3.85
SOIL_Pen_currYr+Cattle	715.10	3.85
AET_Pen_currYr	716.83	5.58
Soil_water_mm_currentYr	717.56	6.31
Soil_water_mm_currentYr+Slope_degrees	717.59	6.35

Table 96. Covariate models ranked by AICc for *Baccharis pilularis* cover at probability sites across Santa Cruz Island.

Model	AICc	ΔAICc
Northness	144.65	0.00
Northness+Elevation_m	144.82	0.17
rh_Pen_currYr+Northness	146.39	1.74
rh_Pen_prev2Yr+Northness	146.65	2.00
rad_allMonth	150.09	5.44
pet_allMonth	150.33	5.67
rn_allMonth	150.34	5.69
Deficit_mm_fog	151.56	6.91
solRad_fog	151.94	7.28
AET_Pen_fogYr	152.25	7.59

Table 97. Covariate models ranked by AICc for *Eriogonum* Group cover at probability sites across Santa Cruz Island.

Model	AICc	ΔAICc
Northness	409.30	0.00
rh_Pen_fogYr+Northness	410.89	1.59
rh_Pen_prev2Yr+Northness	411.02	1.72
SOIL_Pen_fogYr+Northness	411.29	1.99
Northness+Elevation_m	416.54	7.24
SOIL_Pen_fogYr+Northness+Elevation_m	417.85	8.55
Def_Pen_fogYr	422.75	13.45
pet_allMonth	424.98	15.68
rad_allMonth	429.08	19.78
rn_allMonth	429.85	20.55

Table 98. Covariate models ranked by AICc for *Foeniculum vulgare* cover at probability sites across Santa Cruz Island.

Model	AICc	ΔAICc
Sheep	118.70	0.00
Pig	118.70	0.00
Cattle	118.70	0.00
Slope_degrees+Cattle	120.69	1.99
Slope_degrees+Sheep	120.69	1.99
SOIL_Pen_mo+Sheep	121.44	2.74
SOIL_Pen_mo+Cattle	121.44	2.74
Soil_water_mm_fog+Sheep	121.52	2.82
Soil_water_mm_fog+Pig	121.52	2.82
Soil_water_mm_fog	121.64	2.94

Table 99. Covariate models ranked by AICc for *Rhus integrifolia* cover at probability sites across Santa Cruz Island.

Model	AICc	Δ AICc
Slope_degrees	189.94	0.00
SRad_CurrentYear	189.97	0.03
Soil_water_mm_prevYr+SOIL_Pen_prevYr+Slope_degrees	190.15	0.21
Soil_water_mm_prevYr+Slope_degrees	190.19	0.25
Temp_Pen_currYr+Slope_degrees	191.32	1.38
AET_mm_fog+Slope_degrees	191.60	1.66
SOIL_Pen_prevYr+Slope_degrees	191.72	1.78
solRad_fog	191.73	1.79

Table 100. Covariate models ranked by AICc for *Stipa* Group cover at probability sites across Santa Cruz Island.

Model	AICc	Δ AICc
SOIL_Pen_prevYr+Slope_degrees+Cattle	267.70	0.00
SOIL_Pen_prevYr+Slope_degrees	270.46	2.76
Slope_degrees+Sheep	270.61	2.91
Slope_degrees+Cattle	270.61	2.91
Soil_water_mm_prevYr+Slope_degrees	272.01	4.31
AET_Pen_mo+SOIL_Pen_prevYr+Slope_degrees	272.40	4.70
Soil_water_mm_prevYr+SOIL_Pen_prevYr+Slope_degrees	272.44	4.73
SOIL_Pen_prevYr+Cattle	273.87	6.17
AET_Pen_mo+Soil_water_mm_prevYr+Slope_degrees	273.91	6.20
Slope_degrees	275.07	7.37

Covariate Modeling for San Miguel Island

San Miguel Island Index Sites

Table 101. Covariate models ranked by AICc for overall Shannon diversity of index sites across San Miguel Island.

Model	AICc	Δ AICc
pet_oct+AET_Pen_mo	1665.55	0.00
rn_oct	1666.34	0.78
pet_oct	1666.38	0.82
rad_oct	1667.05	1.50
pet_oct+AET_Pen_mo+Soil_water_mm_prevYr	1667.13	1.57
pet_oct+Soil_water_mm_prevYr	1667.70	2.15
pet_oct+SOIL_Pen_mo	1668.35	2.80
AET_Pen_mo	1669.23	3.67
Def_Pen_mo	1669.27	3.71
pet_oct+Soil_water_mm_prevYr+SOIL_Pen_mo	1669.70	4.15

Table 102. Covariate models ranked by AICc for native Shannon diversity of index sites across San Miguel Island.

Model	AICc	Δ AICc
pet_allMonth+Def_Pen_mo	1272.85	0.00
Def_Pen_mo	1275.27	2.41
GDD_Pen_mo	1276.18	3.33
vpd_Pen_currYr	1277.12	4.26
AET_mm_fog+Def_Pen_mo	1277.16	4.31
Soil_water_mm_prev2Yr+Def_Pen_mo	1277.18	4.32
Temp_Pen_mo	1277.82	4.96
rh_Pen_currYr	1278.34	5.48
rh_Pen_currYr+Northness	1279.27	6.42
rh_Pen_currYr+Dew_Pen_fogYr+Northness	1279.71	6.86

Table 103. Covariate models ranked by AICc for island chaparral Shannon diversity of Index sites across San Miguel Island.

Model	AICc	Δ AICc
rad_oct	340.82	0.00
pet_oct	341.12	0.29
rn_oct	341.51	0.69
pet_oct+SOIL_Pen_mo	343.07	2.24
pet_oct+Soil_water_mm_currentYr	343.44	2.62
pet_oct+Soil_water_mm_currentYr+SOIL_Pen_mo	345.17	4.35
pet_oct+AET_Pen_mo	346.30	5.48
AET_Pen_mo+Soil_water_mm_currentYr	349.59	8.77
Dew_Pen_fogYr+Northness	350.36	9.53
Dew_Pen_fogYr+Northness+Elevation_m	351.18	10.36

Table 104. Covariate models ranked by AICc for coastal sage scrub Shannon diversity at index sites across San Miguel Island.

Model	AICc	Δ AICc
Dew_Pen_currYr+Northness+Elevation_m	182.60	0.00
Northness+Elevation_m	182.96	0.36
rh_Pen_prev2Yr+Northness	183.95	1.35
Dew_Pen_currYr+Dew_Pen_fogYr+Northness+Elevation_m	183.97	1.37
rh_Pen_prev2Yr+Dew_Pen_currYr+Northness	184.14	1.54
Dew_Pen_fogYr+Northness+Elevation_m	184.89	2.29
pet_oct+Soil_water_mm_prev2Yr	185.25	2.65
rad_oct	185.82	3.22
Dew_Pen_currYr+Northness	186.64	4.04
AET_Pen_mo+SOIL_Pen_prev2Yr	186.74	4.14

Table 105. Covariate models ranked by AICc for grassland Shannon diversity at index sites across San Miguel Island.

Model	AICc	Δ AICc
rn_oct	321.79	0.00
rad_oct	323.17	1.38
Def_Pen_mo	323.45	1.67
AET_Pen_mo	323.55	1.76
AET_Pen_mo+Soil_water_mm_fog	324.46	2.67
AET_Pen_mo+Def_Pen_mo	324.51	2.72
AET_Pen_mo+Slope_degrees	325.11	3.32
SOIL_Pen_mo+Def_Pen_mo	325.43	3.65
Soil_water_mm_fog+SOIL_Pen_mo	325.85	4.06
SOIL_Pen_mo	326.34	4.56

Table 106. Covariate models ranked by AICc for native shrub density at index sites across San Miguel Island.

Model	AICc	Δ AICc
SOIL_Pen_currYr	760.87	0.00
AET_Pen_currYr	760.95	0.08
AET_Pen_currYr+Def_Pen_currYr	761.61	0.74
Soil_water_mm_fog+SOIL_Pen_currYr	762.02	1.16
Soil_water_mm_fog	762.37	1.50
Def_Pen_currYr	762.64	1.78
AET_Pen_currYr+Deficit_mm_currentYr	762.81	1.94
Deficit_mm_currentYr	762.89	2.03
AET_mm_currentYr	763.04	2.18
solRad_prevYr	763.15	2.29

Table 107. Covariate models ranked by AICc for native shrub cover at index sites across San Miguel Island.

Model	AICc	Δ AICc
PET_mm_prevYr	2835.20	0.00
vpd_Pen_prev2Yr	2836.24	1.04
GDD_Pen_prev2Yr	2836.58	1.38
PET_mm_fog	2837.24	2.04
Temp_Pen_fogYr	2837.40	2.20
GDD_Pen_fogYr	2837.40	2.20
vpd_Pen_fogYr	2837.69	2.50
svp_Pen_fogYr	2837.89	2.70
Soil_water_mm_fog+Temp_Pen_fogYr	2837.96	2.77
solRad_prev2Yr	2838.16	2.96

Table 108. Covariate models ranked by AICc for native forb cover at index sites across San Miguel Island.

Model	AICc	Δ AICc
pet_oct+AET_Pen_mo	3161.25	0.00
pet_oct	3162.67	1.42
Def_Pen_mo	3162.67	1.42
AET_Pen_mo	3162.73	1.47
pet_oct+AET_Pen_mo+Soil_water_mm_prev2Yr	3162.75	1.50
rn_oct	3162.79	1.53
Soil_water_mm_prev2Yr+Def_Pen_mo	3163.28	2.02
AET_Pen_mo+Def_Pen_mo	3163.82	2.57
AET_Pen_mo+Soil_water_mm_prev2Yr	3163.85	2.60
rad_oct	3164.06	2.80

Table 109. Covariate models ranked by AICc for nonnative forb cover at index sites across San Miguel Island.

Model	AICc	Δ AICc
AET_Pen_mo+Soil_water_mm_prevYr	2870.16	0.00
Soil_water_mm_prevYr+Def_Pen_mo	2872.80	2.64
AET_Pen_mo	2873.28	3.12
Soil_water_mm_prevYr+SOIL_Pen_mo	2874.00	3.85
rn_oct	2874.78	4.63
AET_Pen_mo+Def_Pen_mo	2875.19	5.03
AET_Pen_mo+Slope_degrees	2875.28	5.12
Def_Pen_mo	2875.83	5.67
SOIL_Pen_mo+Def_Pen_mo	2877.43	7.27
SOIL_Pen_mo	2877.89	7.74

Table 110. Covariate models ranked by AICc for native grass cover at index sites across San Miguel Island.

Model	AICc	Δ AICc
Dew_Pen_currYr	2356.32	0.00
vpd_Pen_fogYr	2357.08	0.76
GDD_Pen_currYr	2357.12	0.80
PET_mm_currentYr	2357.71	1.39
rh_Pen_prevYr+Dew_Pen_currYr	2358.06	1.74
GDD_Pen_mo	2358.29	1.97
Dew_Pen_currYr+Elevation_m	2358.32	1.99
Dew_Pen_currYr+Northness	2358.32	2.00
Dew_Pen_currYr+Dew_Pen_fogYr	2358.32	2.00
SRad_CurrentYear	2358.39	2.07

Table 111. Covariate models ranked by AICc for nonnative grass cover at index sites across San Miguel Island.

Model	AICc	Δ AICc
Soil_water_mm_prevYr+SOIL_Pen_prev2Yr	3093.58	0.00
AET_Pen_mo+Soil_water_mm_prevYr+SOIL_Pen_prev2Yr	3094.28	0.70
Soil_water_mm_prevYr+Def_Pen_mo	3094.53	0.95
Soil_water_mm_prevYr	3095.17	1.58
AET_Pen_mo+Soil_water_mm_prevYr	3095.60	2.01
SOIL_Pen_prev2Yr	3096.52	2.94
AET_Pen_mo+SOIL_Pen_prev2Yr	3096.85	3.26
solRad_fog	3100.55	6.96

Table 112. Covariate models ranked by AICc for *Acmispon dendroideus* var. *veatchii* cover at index sites across San Miguel Island.

Model	AICc	Δ AICc
Temp_Pen_prev2Yr+Dew_Pen_prev2Yr	533.52	0.00
PET_Pen_prevYr	536.58	3.06
svp_Pen_prev2Yr	537.91	4.39
Temp_Pen_prev2Yr	538.74	5.22
GDD_Pen_prev2Yr	538.98	5.46
PET_mm_prev2Yr	539.62	6.10
Dew_Pen_prev2Yr+Elevation_m	539.96	6.44
AET_mm_prevYr+Deficit_mm_prevYr	540.01	6.48
Temp_Pen_prev2Yr+Slope_degrees	540.58	7.06
Dew_Pen_prev2Yr+Northness+Elevation_m	541.07	7.55

Table 113. Covariate models ranked by AICc for *Carpobrotus chilensis* cover at index sites across San Miguel Island.

Model	AICc	Δ AICc
vpd_Pen_fogYr	1618.69	0.00
GDD_Pen_an	1620.17	1.49
Temp_Pen_an	1620.17	1.49
Soil_water_mm_fog+Temp_Pen_an	1620.43	1.75
svp_Pen_currYr	1621.14	2.45
SRad_CurrentYear	1621.16	2.47
SRad_CurrentYear	1621.16	2.47
SRad_CurrentYear+SRad_CurrentYear	1621.16	2.47
PET_mm_fog	1621.34	2.65
Soil_water_mm_fog+SOIL_Pen_mo	1621.45	2.77

Table 114. Covariate models ranked by AICc for *Isocoma menziesii* cover at index sites across San Miguel Island.

Model	AICc	Δ AICc
solRad_prev2Yr	1814.28	0.00
solRad_fog	1814.33	0.06
vpd_Pen_fogYr	1817.22	2.95
rh_Pen_currYr	1817.66	3.38
Deficit_mm_fog	1818.01	3.73
PET_mm_fog	1818.08	3.80
svp_Pen_fogYr	1818.24	3.96
GDD_Pen_fogYr	1818.27	4.00

San Miguel Island Probability Sites

Table 115. Covariate models ranked by AICc for native Shannon diversity of Probability Sites across San Miguel Island.

Model	AICc	ΔAICc
Northness	130.14	0.00
Elevation_m	130.26	0.12
rn_allMonth	130.26	0.12
pet_allMonth	130.38	0.24
Temp_Pen_fogYr	130.86	0.72
PET_mm_fog	131.40	1.26
AET_mm_prevYr	131.58	1.44
Temp_Pen_mo	131.61	1.47
vpd_Pen_prev2Yr	131.62	1.48
Def_Pen_mo	131.69	1.54

Table 116. Covariate models ranked by AICc for native shrub density at probability sites across San Miguel Island.

Model	AICc	ΔAICc
Deficit_mm_fog	238.34	0.00
PET_Pen_prevYr	242.74	4.40
vpd_Pen_prevYr	242.82	4.48
SOIL_Pen_an	243.22	4.89
Soil_water_mm_currentYr	243.30	4.97
rh_Pen_prevYr	243.79	5.45
PET_mm_fog	244.38	6.05
rh_Pen_prevYr+Dew_Pen_fogYr	245.00	6.66
rh_Pen_prevYr+Northness	245.16	6.83
SOIL_Pen_an+Slope_degrees	245.21	6.87

Table 117. Covariate models ranked by AICc for native shrub cover at probability sites across San Miguel Island.

Model	AICc	Δ AICc
Soil_water_mm_prevYr+SOIL_Pen_currYr	251.47	0.00
PET_Pen_currYr	252.04	0.58
Northness	253.62	2.16
SOIL_Pen_currYr	254.14	2.67
Dew_Pen_currYr+Northness	254.50	3.03
rh_Pen_prevYr+Northness	254.59	3.12
Northness+Elevation_m	254.77	3.30
rh_Pen_fogYr+Northness	254.82	3.35
Dew_Pen_fogYr+Northness+Elevation_m	254.96	3.49
Dew_Pen_fogYr+Northness	254.99	3.52

Table 118. Covariate models ranked by AICc for native forb cover at probability sites across San Miguel Island.

Model	AICc	Δ AICc
SRad_CurrentYear	261.12	0.00
AET_Pen_mo+Temp_Pen_fogYr+Slope_degrees	263.02	1.90
AET_Pen_mo+Temp_Pen_fogYr	263.35	2.23
AET_Pen_mo+Soil_water_mm_fog+Temp_Pen_fogYr	263.80	2.68
PET_mm_prevYr	263.82	2.71
Slope_degrees	264.06	2.94
svp_Pen_fogYr	264.19	3.07
GDD_Pen_prevYr	264.31	3.19
PET_Pen_currYr	264.39	3.27
rh_Pen_currYr	264.41	3.29

Table 119. Covariate models ranked by AICc for nonnative forb cover at probability sites across San Miguel Island.

Model	AICc	Δ AICc
rh_Pen_prev2Yr	199.30	0.00
rh_Pen_prev2Yr+Northness	200.93	1.62
rh_Pen_prev2Yr+Dew_Pen_fogYr	201.01	1.71
vpd_Pen_currYr	201.44	2.14
rh_Pen_currYr	202.34	3.04
rh_Pen_prev2Yr+Dew_Pen_fogYr+Northness	202.58	3.27
vpd_Pen_prev2Yr	202.64	3.34
GDD_Pen_mo	203.20	3.90
solRad_prevYr	203.25	3.95

Table 120. Covariate models ranked by AICc for nonnative grass cover at probability sites across San Miguel Island.

Model	AICc	Δ AICc
SOIL_Pen_prev2Yr	297.74	0.00
SOIL_Pen_prev2Yr+Slope_degrees	299.31	1.57
Soil_water_mm_currentYr	300.92	3.18
AET_Pen_fogYr	302.94	5.20
AET_Pen_fogYr+Slope_degrees	303.58	5.84
rh_Pen_prevYr	304.03	6.29
AET_mm_prev2Yr	304.28	6.54
Deficit_mm_currentYr	304.78	7.04
rh_Pen_prevYr+Northness	305.73	7.99
rh_Pen_prevYr+Dew_Pen_fogYr	305.77	8.03

Table 121. Covariate models ranked by AICc for *Acmispon dendroideus* var. *veatchii* cover at probability sites across San Miguel Island.

Model	AICc	Δ AICc
Elevation_m	48.69	0.00
Dew_Pen_fogYr+Elevation_m	50.08	1.39
Northness+Elevation_m	50.67	1.98
PET_mm_fog	51.93	3.24
Dew_Pen_fogYr+Northness+Elevation_m	52.08	3.39
Slope_degrees	52.58	3.89
Deficit_mm_fog	53.88	5.19
Soil_water_mm_currentYr	53.99	5.30
AET_Pen_currYr	54.06	5.37
PET_mm_prevYr	54.14	5.46

Table 122. Covariate models ranked by AICc for *Carpobrotus chilensis* cover at probability sites across San Miguel Island.

Model	AICc	Δ AICc
SOIL_Pen_currYr	215.25	0.00
Soil_water_mm_currentYr	215.33	0.08
AET_Pen_fogYr+Slope_degrees	216.38	1.13
AET_Pen_fogYr	216.53	1.28
Northness	217.76	2.52
Slope_degrees	217.84	2.59
Deficit_mm_fog	218.06	2.82
PET_Pen_prev2Yr	219.03	3.78
rh_Pen_fogYr+Northness	219.10	3.86
Dew_Pen_currYr+Northness	219.54	4.30

Table 123. Covariate models ranked by AICc for *Isocoma menziesii* cover at probability sites across San Miguel Island.

Model	AICc	Δ AICc
solRad_prev2Yr	207.19	0.00
rh_Pen_fogYr+Northness	207.62	0.44
rh_Pen_fogYr	207.69	0.50
Def_Pen_fogYr	207.92	0.73
Def_Pen_mo	207.94	0.75
rh_Pen_prev2Yr	208.37	1.19
rh_Pen_prev2Yr+Northness	208.41	1.22
SOIL_Pen_currYr	208.61	1.42
Soil_water_mm_fog	208.76	1.58
AET_mm_fog	208.90	1.71

Covariate Modeling for Santa Rosa Island

Santa Rosa Island Index Sites

Table 124. Covariate models ranked by AICc for overall Shannon diversity of index sites across Santa Rosa Island.

Model	AICc	Δ AICc
Elevation_m+Cattle_Ind+Elk_Ind	7130.93	0.00
Slope_degrees+Cattle	7132.70	1.77
Slope_degrees+Pig	7132.79	1.86
Elevation_m+Deer+Cattle_Ind+Elk_Ind	7132.87	1.94
Temp_Pen_mo+Cattle	7133.93	3.00
Temp_Pen_mo+Pig	7133.97	3.04
Elevation_m+Elk+Cattle_Ind	7136.33	5.40
Elevation_m+Cattle_Ind+Deer_Ind	7136.35	5.42
rh_Pen_fogYr+Dew_Pen_fogYr+Cattle_Ind+Elk_Ind	7137.25	6.32
Elevation_m+Elk_Ind	7137.48	6.55

Table 125. Covariate models ranked by AICc for native Shannon diversity at index sites across Santa Rosa Island.

Model	AICc	Δ AICc
Soil_water_mm_prevYr+Def_Pen_mo	5112.93	0.00
Soil_water_mm_prevYr+SOIL_Pen_mo+Def_Pen_mo	5114.92	1.99
rn_oct	5123.36	10.43
Def_Pen_mo	5126.11	13.18
Soil_water_mm_prevYr+SOIL_Pen_mo	5127.65	14.72
SOIL_Pen_mo+Def_Pen_mo	5127.95	15.02
rad_oct	5133.36	20.43
Temp_Pen_mo	5140.69	27.76
Temp_Pen_mo+Pig	5141.56	28.63
SOIL_Pen_mo	5142.01	29.08

Table 126. Covariate models ranked by AICc for coastal sage scrub Shannon diversity at index sites across Santa Rosa Island.

Model	AICc	Δ AICc
SOIL_Pen_fogYr+Slope_degrees+Cattle	949.70	0.00
rh_Pen_prev2Yr+Northness+Cattle_Ind+Elk_Ind	950.65	0.95
rh_Pen_prev2Yr+Dew_Pen_fogYr+Cattle_Ind+Elk_Ind	951.40	1.71
SOIL_Pen_fogYr+Slope_degrees+Pig	951.41	1.71
Temp_Pen_mo+Cattle	951.86	2.16
rh_Pen_fogYr+Northness+Cattle_Ind+Elk_Ind	952.14	2.44
SOIL_Pen_fogYr+Cattle	952.60	2.91
Northness+Pig_Ind+Cattle_Ind+Elk_Ind	952.63	2.93
Northness+Cattle_Ind+Elk_Ind	952.71	3.01
Slope_degrees+Cattle	952.95	3.26

Table 127. Covariate models ranked by AICc for Baccharis scrub Shannon diversity at index sites across Santa Rosa Island.

Model	AICc	Δ AICc
rh_Pen_fogYr+Northness+Cattle_Ind+Elk_Ind	837.37	0.00
Cattle_Ind+Elk_Ind	838.01	0.64
Northness+Cattle_Ind+Elk_Ind	838.26	0.89
Cattle_Ind+Elk_Ind+Deer_Ind	838.53	1.16
rh_Pen_fogYr+Dew_Pen_fogYr+Cattle_Ind+Elk_Ind	838.98	1.61
rh_Pen_prevYr+Northness+Cattle_Ind+Elk_Ind	839.13	1.76
Deer+Cattle_Ind+Elk_Ind	839.75	2.38
Elevation_m+Cattle_Ind+Elk_Ind	839.84	2.47
Pig_Ind+Cattle_Ind+Elk_Ind	839.94	2.57
Dew_Pen_fogYr+Cattle_Ind+Elk_Ind	840.00	2.64

Table 128. Covariate models ranked by AICc for grassland Shannon diversity at index sites across Santa Rosa Island.

Model	AICc	Δ AICc
Northness+Pig_Ind+Cattle_Ind+Elk_Ind	2182.00	0.00
Northness+Cattle_Ind+Elk_Ind	2183.53	1.53
rh_Pen_fogYr+Northness+Cattle_Ind+Elk_Ind	2184.89	2.89
Dew_Pen_fogYr+Northness+Cattle_Ind+Elk_Ind	2184.92	2.92
Northness+Deer+Cattle_Ind+Elk_Ind	2185.26	3.26
rh_Pen_prev2Yr+Northness+Cattle_Ind+Elk_Ind	2185.27	3.26
Slope_degrees+Cattle	2187.85	5.85
Pig_Ind+Cattle_Ind+Elk_Ind	2188.47	6.47
Northness+Elk+Cattle_Ind	2188.55	6.55
Slope_degrees+Pig	2188.70	6.70

Table 129. Covariate models ranked by AICc for riparian Shannon diversity at index sites across Santa Rosa Island.

Model	AICc	Δ AICc
Temp_Pen_prevYr+Slope_degrees	597.03	0.00
Temp_Pen_mo+Slope_degrees	598.48	1.44
Slope_degrees+Pig	598.96	1.93
Slope_degrees+Cattle	598.98	1.94
Slope_degrees	599.22	2.18
SOIL_Pen_prev2Yr+Slope_degrees	601.20	4.16
PET_mm_prev2Yr	601.68	4.65
GDD_Pen_prevYr	603.57	6.54
Elk	603.57	6.54
GDD_Pen_an	603.69	6.66

Table 130. Covariate models ranked by AICc for mixed woodland Shannon diversity at index sites across Santa Rosa Island.

Model	AICc	Δ AICc
Elevation_m+Elk	392.78	0.00
Dew_Pen_fogYr+Elevation_m+Deer	392.93	0.15
Dew_Pen_currYr+Elevation_m+Pig_Ind	394.22	1.44
Dew_Pen_currYr+Elevation_m+Deer	394.92	2.14
SOIL_Pen_an+Slope_degrees	546.44	153.66
Soil_water_mm_prev2Yr+SOIL_Pen_an	551.50	158.72
pet_oct+SOIL_Pen_an	577.06	184.28
SOIL_Pen_an+Def_Pen_mo	579.60	186.82
SOIL_Pen_an	585.73	192.95
Slope_degrees	587.08	194.30

Table 131. Covariate models ranked by AICc for native tree density at index sites across Santa Rosa Island.

Model	AICc	Δ AICc
AET_mm_fog+Def_Pen_mo	783.44	0.00
AET_mm_fog	783.61	0.17
AET_mm_fog+Soil_water_mm_fog+Def_Pen_mo	784.84	1.39
Deficit_mm_fog	784.85	1.41
AET_mm_fog+SOIL_Pen_prev2Yr+Def_Pen_mo	785.03	1.59
rh_Pen_currYr+Dew_Pen_prevYr+Dew_Pen_fogYr	785.82	2.38
rh_Pen_prev2Yr+Dew_Pen_prevYr+Dew_Pen_fogYr	786.03	2.59
rh_Pen_currYr+Dew_Pen_prevYr+Dew_Pen_fogYr+Elk_Ind	786.89	3.45
rh_Pen_currYr+Dew_Pen_prevYr+Dew_Pen_fogYr+Deer_Ind	786.89	3.45
rh_Pen_currYr+Dew_Pen_prevYr+Dew_Pen_fogYr+Deer	786.93	3.49

Table 132. Covariate models ranked by AICc for native tree recruitment density at index sites across Santa Rosa Island.

Model	AICc	Δ AICc
AET_mm_fog	1014.18	0.00
AET_mm_prev2Yr	1014.86	0.68
AET_mm_fog+SOIL_Pen_currYr	1014.98	0.79
AET_mm_fog+SOIL_Pen_currYr+Def_Pen_mo	1015.00	0.81
AET_mm_fog+Def_Pen_mo	1015.35	1.17
pet_singleMonth+AET_mm_fog	1015.48	1.29
GDD_Pen_prev2Yr	1015.90	1.72
pet_singleMonth+AET_mm_fog+SOIL_Pen_currYr	1016.25	2.07
Temp_Pen_fogYr	1016.52	2.33
GDD_Pen_fogYr	1016.52	2.33

Table 133. Covariate models ranked by AICc for native shrub density at index sites across Santa Rosa Island.

Model	AICc	Δ AICc
Slope_degrees+Pig	2762.72	0.00
Slope_degrees+Cattle	2762.72	0.00
Slope_degrees	2766.51	3.79
SOIL_Pen_currYr+Slope_degrees	2767.22	4.50
Temp_Pen_mo+Slope_degrees	2767.23	4.51
Cattle	2768.18	5.46
Pig	2768.18	5.46
Deficit_mm_currentYr	2768.20	5.48
Temp_Pen_currYr+Slope_degrees	2768.23	5.51
Temp_Pen_mo+Cattle	2769.79	7.07

Table 134. Covariate models ranked by AICc for native shrub recruitment density at index sites across Santa Rosa Island.

Model	AICc	Δ AICc
Def_Pen_fogYr	1771.79	0.00
Dew_Pen_prev2Yr+Northness+Elk+Cattle_Ind	1773.46	1.68
Dew_Pen_prev2Yr+Elk+Cattle_Ind	1774.34	2.56
Dew_Pen_prev2Yr+Northness+Cattle_Ind	1774.85	3.06
Dew_Pen_prev2Yr+Northness+Deer+Cattle_Ind	1774.93	3.14
Dew_Pen_prev2Yr+Elevation_m+Elk+Cattle_Ind	1775.84	4.06
Dew_Pen_prev2Yr+Deer+Cattle_Ind	1775.85	4.06
Dew_Pen_prev2Yr+Cattle_Ind	1775.91	4.12
solRad_prev2Yr	1775.98	4.19

Table 135. Covariate models ranked by AICc for native tree cover at index sites across Santa Rosa Island.

Model	AICc	Δ AICc
rn_allMonth	4701.33	0.00
rad_allMonth	4702.68	1.34
Northness+Elk	4709.67	8.33
Northness+Elevation_m+Elk	4711.08	9.74
Elk	4711.08	9.75
Northness+Elk+Cattle_Ind	4711.36	10.03
Dew_Pen_fogYr+Northness+Elk	4711.38	10.04
rh_Pen_currYr+Northness+Elk	4711.41	10.08
Northness+Elk+Pig_Ind	4711.59	10.26
Dew_Pen_prev2Yr+Northness+Elk	4711.66	10.33

Table 136. Covariate models ranked by AICc for native shrub cover at index sites across Santa Rosa Island.

Model	AICc	Δ AICc
Northness+Deer+Cattle_Ind+Elk_Ind	8752.10	0.00
Dew_Pen_fogYr+Deer+Cattle_Ind+Elk_Ind	8753.34	1.24
Deer+Cattle_Ind+Elk_Ind	8753.40	1.30
Dew_Pen_fogYr+Northness+Deer+Elk_Ind	8753.88	1.79
Cattle	8754.14	2.05
Pig	8754.29	2.20
Northness+Deer+Elk_Ind	8754.71	2.61
Elevation_m+Deer+Cattle_Ind+Elk_Ind	8754.71	2.61
rh_Pen_currYr+Dew_Pen_fogYr+Northness+Cattle_Ind	8755.02	2.93
Cattle_Ind+Elk_Ind+Deer_Ind	8755.10	3.01

Table 137. Covariate models ranked by AICc for native forb cover at index sites across Santa Rosa Island.

Model	AICc	Δ AICc
Temp_Pen_mo+Pig	11866.67	0.00
Temp_Pen_mo+Slope_degrees	11867.15	0.48
Temp_Pen_mo+Cattle	11869.25	2.58
AET_Pen_mo+Slope_degrees+Pig	11870.11	3.44
Soil_water_mm_fog+Def_Pen_mo	11873.39	6.71
Soil_water_mm_fog+SOIL_Pen_prevYr+Def_Pen_mo	11873.61	6.94
Temp_Pen_mo	11873.98	7.31
PET_Pen_mo+AET_Pen_mo+Soil_water_mm_fog	11875.38	8.71
SOIL_Pen_prevYr+Def_Pen_mo	11877.09	10.42
GDD_Pen_mo	11877.42	10.74

Table 138. Covariate models ranked by AICc for nonnative forb cover at index sites across Santa Rosa Island.

Model	AICc	Δ AICc
AET_Pen_mo+Slope_degrees+Pig	9532.04	0.00
Slope_degrees+Pig	9542.41	10.37
Slope_degrees+Cattle	9545.55	13.51
Cattle_Ind+Elk_Ind	9548.85	16.81
rh_Pen_prevYr+Northness+Cattle_Ind+Elk_Ind	9549.36	17.32
Dew_Pen_prevYr+Cattle_Ind+Elk_Ind	9549.43	17.39
Elevation_m+Cattle_Ind+Elk_Ind	9549.62	17.58
Deer+Cattle_Ind+Elk_Ind	9549.79	17.76
Northness+Cattle_Ind+Elk_Ind	9549.80	17.76
rh_Pen_prevYr+Dew_Pen_fogYr+Cattle_Ind+Elk_Ind	9550.28	18.24

Table 139. Covariate models ranked by AICc for native grass cover at index sites across Santa Rosa Island.

Model	AICc	Δ AICc
rn_oct	12954.97	0.00
rad_oct	12960.66	5.69
Elevation_m+Elk+Cattle_Ind	12962.65	7.68
Elevation_m+Deer+Cattle_Ind+Elk_Ind	12962.91	7.94
Elevation_m+Elk	12962.93	7.96
Northness+Elevation_m+Elk+Cattle_Ind	12963.35	8.38
Elevation_m+Elk+Pig_Ind	12963.39	8.42
Northness+Elevation_m+Elk	12963.68	8.71
Elevation_m+Deer+Pig_Ind+Elk_Ind	12964.07	9.10
Northness+Elevation_m+Elk+Pig_Ind	12964.11	9.14

Table 140. Covariate models ranked by AICc for nonnative grass cover at index sites across Santa Rosa Island.

Model	AICc	Δ AICc
rh_Pen_prev2Yr+Northness+Cattle_Ind+Elk_Ind	13406.90	0.00
rh_Pen_prev2Yr+Dew_Pen_fogYr+Cattle_Ind+Elk_Ind	13407.91	1.01
Temp_Pen_prev2Yr+Slope_degrees	13412.26	5.35
Slope_degrees+Cattle	13413.38	6.48
Slope_degrees+Pig	13414.81	7.91
rh_Pen_prev2Yr+Northness+Cattle_Ind+Deer_Ind	13415.31	8.41
rh_Pen_prev2Yr+Dew_Pen_fogYr+Cattle_Ind+Deer_Ind	13416.49	9.59
Soil_water_mm_fog+Slope_degrees	13423.13	16.23
Temp_Pen_prev2Yr+Pig	13424.27	17.37
rh_Pen_fogYr+Northness+Cattle_Ind+Elk_Ind	13424.51	17.61

Table 141. Covariate models ranked by AICc for *Arctostaphylos* Group cover at index sites across Santa Rosa Island.

Model	AICc	Δ AICc
Temp_Pen_an+Pig	835.23	0.00
Slope_degrees+Cattle	836.60	1.38
Cattle	838.32	3.10
Temp_Pen_mo+Cattle	840.07	4.85
rh_Pen_prevYr+Northness+Cattle_Ind+Elk_Ind	850.16	14.94
Northness+Cattle_Ind+Elk_Ind	850.99	15.76
Dew_Pen_fogYr+Northness+Cattle_Ind+Elk_Ind	852.21	16.98
Northness+Pig_Ind+Cattle_Ind+Elk_Ind	852.68	17.45
Northness+Deer+Cattle_Ind+Elk_Ind	852.80	17.57
Dew_Pen_currYr+Northness+Cattle_Ind+Elk_Ind	852.86	17.63

Table 142. Covariate models ranked by AICc for *Heteromeles arbutifolia* cover at index sites across Santa Rosa Island.

Model	AICc	Δ AICc
Cattle	1368.02	0.00
Slope_degrees+Cattle	1368.51	0.49
Temp_Pen_an+Cattle	1369.26	1.24
Pig	1369.59	1.57
Temp_Pen_mo+Cattle	1369.97	1.95
Slope_degrees+Pig	1370.08	2.06
Temp_Pen_an+Pig	1371.27	3.24
Temp_Pen_mo+Pig	1371.54	3.52
AET_Pen_mo+Slope_degrees+Pig	1371.94	3.92
Northness+Elk_Ind	1372.93	4.91

Table 143. Covariate models ranked by AICc for *Quercus pacifica* cover at index sites across Santa Rosa Island.

Model	AICc	Δ AICc
rh_Pen_prevYr+Elk	1646.70	0.00
rh_Pen_prevYr+Deer_Ind	1647.84	1.14
rh_Pen_prevYr+Deer	1647.99	1.29
rh_Pen_prevYr+Elk_Ind	1649.14	2.44
rh_Pen_prevYr+Deer+Elk_Ind	1649.44	2.75
rh_Pen_prevYr+Northness+Elk	1649.60	2.90
rh_Pen_prevYr+Elk_Ind+Deer_Ind	1649.68	2.98
rh_Pen_prevYr+Dew_Pen_fogYr+Deer_Ind	1649.84	3.14
rh_Pen_prevYr+Dew_Pen_fogYr+Deer	1649.99	3.29
Deer_Ind	1650.04	3.34

Table 144. Covariate models ranked by AICc for *Stipa* Group cover at index sites across Santa Rosa Island.

Model	AICc	Δ AICc
Dew_Pen_prev2Yr+Northness+Elk+Cattle_Ind	5013.61	0.00
pet_allMonth+Soil_water_mm_prevYr	5015.54	1.93
rh_Pen_prevYr+Northness+Elk	5016.12	2.51
Dew_Pen_prev2Yr+Northness+Elk+Pig_Ind	5016.30	2.69
rh_Pen_prevYr+Northness+Deer+Elk_Ind	5016.36	2.75
Northness+Elk+Cattle_Ind	5016.79	3.18
pet_allMonth+Soil_water_mm_prevYr+SOIL_Pen_an	5016.80	3.19
rh_Pen_prevYr+Northness+Cattle_Ind+Elk_Ind	5017.22	3.62
pet_allMonth+AET_mm_fog+Soil_water_mm_prevYr	5017.53	3.92
Northness+Pig_Ind+Cattle_Ind+Deer_Ind	5017.84	4.23

Santa Rosa Island Probability Sites

Because only two years of probability site data (2017 and 2018) were available in the SR data provided for analysis, covariate modeling was not conducted for probability sites from SR.

Section F: Detailed GLMM Results of Covariate Modeling

Tables 145 to 286 contain the results of the Generalized Linear Mixed Model analysis of the final covariate model for each outcome. The results are organized by island (across/more than one island, Anacapa, Santa Barbara, Santa Cruz, San Miguel, and Santa Rosa) and site type (index or probability). Descriptions of the covariates in the final model are provided in square brackets at the end of each table caption.

Covariate Modeling across Islands

Index Sites across All Islands

Table 145. GLMM estimates for the final covariate model of overall Shannon diversity at index sites across all islands [rh_Pen_fogYr = relative humidity for the current year fog season].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	1.4291	0.0625	22.87	<0.0001
rh_Pen_fogYr	0.3937	0.1018	3.87	0.0001
Year Variation	0.0327	—	—	—
Site Variation	0.2304	—	—	—
Site-Trend Variation	0.0354	—	—	—
Dispersion parameter	0.1095	—	—	—

Table 146. GLMM estimates for the final covariate model of native Shannon diversity at index sites across all islands [SOIL_Pen_an = soil moisture over the calendar year; Def_Pen_mo = accumulated water deficit by month].

Parameter	Estimate	Standard Error	z -value	p-value
(Intercept)	1.1016	0.0930	11.84	<0.0001
SOIL_Pen_an	0.0017	0.0007	2.51	0.0120
Def_Pen_mo	-0.0010	0.0001	-7.21	<0.0001
Year Variation	0.0087	—	—	—
Site Variation	0.2834	—	—	—
Site-Trend Variation	0.0374	—	—	—
Dispersion parameter	0.0901	—	—	—

Table 147. GLMM estimates for the final covariate model of island chaparral Shannon diversity at index sites across Santa Cruz and Santa Rosa Islands [Slope_degrees = slope of site in degrees; Cattle = number of years since cattle removal].

Parameter	Estimate	Standard Error	z -value	p-value
(Intercept)	1.3048	0.3768	3.46	0.0005
Slope_degrees	0.0195	0.0132	1.48	0.1380
Cattle	-0.0456	0.0093	-4.92	<0.0001
Year Variation	0.0312	–	–	–
Site Variation	0.2709	–	–	–
Site-Trend Variation	0.0517	–	–	–
Dispersion parameter	0.0385	–	–	–

Table 148. GLMM estimates for the final covariate model for coastal sage scrub Shannon diversity at index sites across Anacapa, Santa Cruz, San Miguel, and Santa Rosa Islands [rad_oct = total clear sky solar radiation as the mean of 30-year monthly means for the previous October to the current survey month].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	2.5685	0.2101	12.22	<0.0001
rad_oct	-0.0015	0.0003	-4.52	<0.0001
Year Variation	0.0632	–	–	–
Site Variation	0.1018	–	–	–
Site-Trend Variation	0.0324	–	–	–
Dispersion parameter	0.1118	–	–	–

Table 149. GLMM estimates for the final covariate model for grassland Shannon diversity at index sites across all islands [Def_Pen_an = accumulated water deficit for the calendar year].

Parameter	Estimate	Standard Error	z -value	p-value
(Intercept)	2.0520	0.1655	12.40	<0.0001
Def_Pen_an	-0.0005	0.0001	-3.47	0.0005
Year Variation	0.0257	–	–	–
Site Variation	0.0433	–	–	–
Site-Trend Variation	0.0400	–	–	–
Dispersion parameter	0.2664	–	–	–

Table 150. GLMM estimates for the final covariate model for riparian Shannon diversity at index sites across Santa Cruz and Santa Rosa Islands [Northness = northness of the site (1 if due north, -1 if due south)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	1.4372	0.0794	18.10	<0.0001
Northness	0.2980	0.1347	2.21	0.0269
Year Variation	0.0155	–	–	–
Site Variation	0.0645	–	–	–
Site-Trend Variation	0.0676	–	–	–
Dispersion parameter	0.3494	–	–	–

Table 151. GLMM estimates for the final covariate model for ironwood Shannon diversity at index sites across Santa Cruz and Santa Rosa Islands [SOIL_Pen_fogYr = soil moisture, current year fog season; Pig = years since pig removal].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	0.6375	0.0523	12.19	<0.0001
SOIL_Pen_fogYr	0.0087	0.0010	8.53	<0.0001
Pig	-0.0062	0.0048	-1.30	0.1946
Year RE Var	0.0000	–	–	–
Dispersion parameter	0.1035	–	–	–

Table 152. GLMM estimates for the final covariate model for mixed woodland Shannon diversity at index sites across Santa Cruz and Santa Rosa Islands [Northness = northness of the site (1 if due north, -1 if due south); Elevation_m = elevation of site (m)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	2.4608	0.2770	8.88	<0.0001
Northness	-0.3062	0.2629	-1.16	0.2441
Elevation_m	-0.3348	0.1036	-3.23	0.0012
Year RE Var	0.0000	–	–	–
Dispersion parameter	0.4421	–	–	–

Table 153. GLMM estimates for the final covariate model for native tree density at index sites across Santa Cruz and Santa Rosa Islands [GDD_Pen_prev2Yr = accumulated growing-degree days, previous two water years combined].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	0.3885	1.2598	0.31	0.7578
GDD_Pen_prev2Yr	-0.0004	0.0001	-2.81	0.0049
Year Variation	0.0679	–	–	–
Site Variation	0.7896	–	–	–
Site-Trend Variation	0.0909	–	–	–
Obs. Variation	0.0668	–	–	–

Table 154. GLMM estimates for the final covariate model for native tree recruitment density at index sites across Santa Cruz and Santa Rosa Islands [GDD_Pen_prevYr = accumulated growing-degree days, previous water year].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-10.5214	1.7674	-5.95	<0.0001
GDD_Pen_prevYr	0.0018	0.0005	3.77	0.0002
Year Variation	0.0000	–	–	–
Site Variation	2.7921	–	–	–
Site-Trend Variation	1.7825	–	–	–
Obs. Variation	1.4780	–	–	–

Table 155. GLMM estimates for the final covariate model for native shrub density at index sites across all islands [Slope_degrees = slope of site (degrees)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-1.8855	0.4449	-4.24	<0.0001
Slope_degrees	0.0392	0.0117	3.34	0.0008
Year Variation	0.0196	–	–	–
Site Variation	2.8841	–	–	–
Site-Trend Variation	0.9854	–	–	–
Obs. Variation	0.1611	–	–	–

Table 156. GLMM estimates for the final covariate model for native shrub recruitment density at index sites across Santa Cruz and Santa Rosa Islands [solRad_prev2Yr = total clear sky solar radiation, previous two water years combined].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	14.3166	4.1464	3.45	0.0006
solRad_prev2Yr	-0.0551	0.0130	-4.25	<0.0001
Year Variation	0.1033	–	–	–
Site Variation	3.6211	–	–	–
Site-Trend Variation	0.8645	–	–	–
Obs. Variation	1.9147	–	–	–

Table 157. GLMM estimates for the final covariate model for native tree cover at index sites across Santa Cruz and Santa Rosa Islands [Cattle_Ind = indicator of cattle removal (1 if post-removal, 0 if pre-removal)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-13.6223	0.7076	-19.25	<0.0001
Cattle_Ind	0.5205	0.1724	3.02	0.0025
Year Variation	0.0543	–	–	–
Site Variation	126.1563	–	–	–
Site-Trend Variation	2.7831	–	–	–
Dispersion parameter	52.3706	–	–	–

Table 158. GLMM estimates for the final covariate model for native shrub cover at index sites across all islands [pet_oct = cumulative potential evapotranspiration, mean of 30-year monthly means for previous October to current survey month].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-3.1334	0.2576	-12.16	<0.0001
pet_oct	-0.0051	0.0011	-4.44	<0.0001
Year Variation	0.0689	–	–	–
Site Variation	10.3525	–	–	–
Site-Trend Variation	1.0068	–	–	–
Obs. Variation	0.1378	–	–	–
Dispersion parameter	61.0728	–	–	–

Table 159. GLMM estimates for the final covariate model for native forb cover at index sites across all islands [SOIL_Pen_mo = soil moisture, by month].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-2.8144	0.3954	-7.12	<0.0001
SOIL_Pen_mo	0.0063	0.0007	8.73	<0.0001
Year Variation	0.2920	—	—	—
Site Variation	2.9411	—	—	—
Site-Trend Variation	0.6025	—	—	—
Obs. Variation	0.5853	—	—	—
Dispersion parameter	100.9991	—	—	—

Table 160. GLMM estimates for the final covariate model for nonnative forb cover at index sites across all islands [AET_Pen_mo = modeled actual evapotranspiration, by month; Slope_degrees = slope of site (degrees)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-2.7841	0.3043	-9.15	<0.0001
AET_Pen_mo	0.0083	0.0013	6.29	<0.0001
Slope_degrees	-0.0580	0.0103	-5.63	<0.0001
Year Variation	1.3161	—	—	—
Site Variation	2.6264	—	—	—
Site-Trend Variation	0.6940	—	—	—
Obs. Variation	1.1070	—	—	—
Dispersion parameter	102.7818	—	—	—

Table 161. GLMM estimates for the final covariate model for native grass cover at index sites across all islands [Dew_Pen_currYr = number of days with dew, current water year; Elevation_m = elevation of site (m)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-3.2413	0.8000	-4.05	<0.0001
Dew_Pen_currYr	0.0233	0.0075	3.10	0.0019
Elevation_m	-0.9124	0.1812	-5.04	<0.0001
Year Variation	0.3098	–	–	–
Site Variation	5.4762	–	–	–
Site-Trend Variation	0.8914	–	–	–
Obs. Variation	0.3263	–	–	–
Dispersion parameter	54.2142	–	–	–

Table 162. GLMM estimates for the final covariate model for nonnative grass cover at index sites across all islands [AET_Pen_mo = modeled actual evapotranspiration, by month; Slope_degrees = slope of site (degrees)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	0.2226	0.3141	0.71	0.4784
AET_Pen_mo	-0.0019	0.0009	-2.16	0.0310
Slope_degrees	-0.0615	0.0118	-5.19	<0.0001
Year Variation	1.1114	–	–	–
Site Variation	3.7680	–	–	–
Site-Trend Variation	0.3361	–	–	–
Dispersion parameter	7.5364	–	–	–

Probability Sites across All Islands

Table 163. GLMM estimates for the final covariate model of native Shannon diversity at probability sites across all islands [Temp_Pen_mo = temperature, by month; Slope_degrees = slope of site (degrees)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	1.0663	0.2752	3.87	0.0001
Temp_Pen_mo	-0.0250	0.0152	-1.65	0.0997
Slope_degrees	0.0127	0.0042	3.00	0.0027
Year RE Var	0.0086	–	–	–
Site Variation	0.2139	–	–	–
Island Variation	0.0401	–	–	–
Dispersion parameter	0.0652	–	–	–

Table 164. GLMM estimates for the final covariate model for native shrub density at probability sites across all islands [Temp_Pen_prev2Yr = temperature, previous two water years combined; Slope_degrees = slope of site (degrees)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	3.3817	1.7700	1.91	0.0561
Temp_Pen_prev2Yr	-0.3301	0.1110	-2.97	0.0029
Slope_degrees	0.0335	0.0129	2.60	0.0092
Year RE Var	0.0000	–	–	–
Site Variation	1.6118	–	–	–
Obs. Variation	0.3524	–	–	–

Table 165. GLMM estimates for the final covariate model for native shrub cover at probability sites across all islands [Slope_degrees = slope of site (degrees)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-4.8256	0.3823	-12.62	<0.0001
Slope_degrees	0.0561	0.0187	3.00	0.0027
Year RE Var	0.0000	–	–	–
Site Variation	5.5350	–	–	–
Dispersion parameter	213.3306	–	–	–

Table 166. GLMM estimates for the final covariate model for native forb cover at probability sites across all islands [rh_Pen_fogYr = relative humidity, current year fog season; Northness = northness of site (1 if due north, -1 if due south)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-5.8849	1.0484	-5.61	<0.0001
rh_Pen_fogYr	7.1402	2.7186	2.63	0.0086
Northness	0.6383	0.1559	4.09	<0.0001
Year RE Var	0.1786	–	–	–
Site Variation	0.8929	–	–	–
Island Variation	0.3266	–	–	–
Dispersion parameter	23.2821	–	–	–

Table 167. GLMM estimates for the final covariate model for nonnative forb cover at probability sites across all islands [SOIL_Pen_mo = soil moisture, by month; Def_Pen_mo = accumulated water deficit, by month].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-5.0874	0.7035	-7.23	<0.0001
SOIL_Pen_mo	0.0341	0.0055	6.23	<0.0001
Def_Pen_mo	0.0125	0.0034	3.67	0.0002
Year RE Var	0.2341	–	–	–
Site Variation	0.7965	–	–	–
Island Variation	1.0028	–	–	–
Dispersion parameter	10.2743	–	–	–

Table 168. GLMM estimates for the final covariate model for native grass cover at probability sites across all islands [Elevation_m = elevation of site (m)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-4.5236	0.9130	-4.95	<0.0001
Elevation_m	-0.5692	0.2058	-2.77	0.0057
Year Variation	0.0000	–	–	–
Site Variation	41.2823	–	–	–
Site-Trend Variation	10.1509	–	–	–
Obs. Variation	0.1844	–	–	–
Dispersion parameter	136.5059	–	–	–

Table 169. GLMM estimates for the final covariate model for nonnative grass cover at probability sites across all islands [AET_Pen_currYr = modeled actual evapotranspiration, current water year].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-3.3341	0.5161	-6.46	<0.0001
AET_Pen_currYr	0.0079	0.0019	4.08	<0.0001
Year Variation	0.3933	—	—	—
Site Variation	51.1557	—	—	—
Site-Trend Variation	21.1096	—	—	—
Dispersion parameter	13.4355	—	—	—

Covariate Modeling for Anacapa Island

Anacapa Island Index Sites

Table 170. GLMM estimates for the final covariate model for overall Shannon diversity at index sites across Anacapa Island [svp_Pen_prev2Yr = vapor pressure, previous two water years combined].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	6.3579	0.8670	7.33	<0.0001
svp_Pen_prev2Yr	-0.0025	0.0005	-5.17	<0.0001
Year RE Var	0.0355	—	—	—
Site Variation	0.1273	—	—	—
Dispersion parameter	0.5278	—	—	—

Table 171. GLMM estimates for the final covariate model for native Shannon diversity at index sites across Anacapa Island [Temp_Pen_prev2Yr = temperature, previous two water years combined; Slope_degrees = slope of site (degrees)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	4.6337	0.7229	6.41	<0.0001
Temp_Pen_prev2Yr	-0.2262	0.0450	-5.03	<0.0001
Slope_degrees	0.0230	0.0080	2.88	0.0039
Year Variation	0.0171	—	—	—
Site Variation	0.1500	—	—	—
Site-Trend Variation	0.0425	—	—	—
Dispersion parameter	0.1074	—	—	—

Table 172. GLMM estimates for the final covariate model for coastal sage scrub Shannon diversity at index sites across Anacapa Island [Def_Pen_currYr = accumulated water deficit, current water year].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	3.2005	0.1875	17.07	<0.0001
Def_Pen_currYr	-0.0026	0.0004	-6.11	<0.0001
Year RE Var	0.0459	–	–	–
Site Variation	0.0000	–	–	–
Dispersion parameter	0.9181	–	–	–

Table 173. GLMM estimates for the final covariate model for grassland Shannon diversity at index sites across Anacapa Island [vpd_Pen_prev2Yr = vapor pressure deficit, previous two water years combined].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	3.5411	0.4022	8.80	<0.0001
vpd_Pen_prev2Yr	-0.0018	0.0004	-4.30	<0.0001
Year RE Var	0.0404	–	–	–
Site Variation	0.0260	–	–	–
Dispersion parameter	0.3807	–	–	–

Table 174. GLMM estimates for the final covariate model for native shrub cover at index sites across Anacapa Island [vpd_Pen_prev2Yr = vapor pressure deficit, previous two water years combined].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	5.1098	1.1501	4.44	<0.0001
vpd_Pen_prev2Yr	-0.0056	0.0011	-5.11	<0.0001
Year Variation	0.1815	–	–	–
Site Variation	6.7978	–	–	–
Site-Trend Variation	0.6177	–	–	–
Dispersion parameter	11.1157	–	–	–

Table 175. GLMM estimates for the final covariate model for native forb cover at index sites across Anacapa Island [Temp_Pen_prev2Yr = temperature, previous two water years combined].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	8.7771	2.0966	4.19	<0.0001
Temp_Pen_prev2Yr	-0.6345	0.1356	-4.68	<0.0001
Year Variation	0.1349	—	—	—
Site Variation	0.4674	—	—	—
Site-Trend Variation	0.8816	—	—	—
Dispersion parameter	12.7268	—	—	—

Table 176. GLMM estimates for the final covariate model for nonnative forb cover at index sites across Anacapa Island [rh_Pen_currYr = relative humidity, current water year].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-5.5287	1.1156	-4.96	<0.0001
rh_Pen_currYr	6.1857	1.9593	3.16	0.0016
Year Variation	0.6933	—	—	—
Site Variation	1.5124	—	—	—
Site-Trend Variation	0.1898	—	—	—
Dispersion parameter	7.1769	—	—	—

Table 177. GLMM estimates for the final covariate model for native grass cover at index sites across Anacapa Island [vpd_Pen_prev2Yr = vapor pressure deficit, previous two water years combined].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	0.7635	1.0122	0.75	0.4507
vpd_Pen_prev2Yr	-0.0039	0.0009	-4.26	<0.0001
Year Variation	0.0856	—	—	—
Site Variation	2.1546	—	—	—
Site-Trend Variation	0.8658	—	—	—
Dispersion parameter	12.0659	—	—	—

Table 178. GLMM estimates for the final covariate model for nonnative grass cover at index sites across Anacapa Island [vpd_Pen_currYr = vapor pressure deficit, current water year].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	3.8488	0.7823	4.92	<0.0001
vpd_Pen_currYr	-0.0054	0.0008	-6.48	<0.0001
Year Variation	0.4323	—	—	—
Site Variation	2.0181	—	—	—
Site-Trend Variation	0.1383	—	—	—
Dispersion parameter	7.2633	—	—	—

Anacapa Island Probability Sites

Table 179. GLMM estimates for the final covariate model for native Shannon diversity at probability sites across Anacapa Island [SOIL_Pen_fogYr = soil moisture, current year fog season; IsletMiddle = middle islet sites; IsletWest = west islet sites].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	0.5744	0.3475	1.65	0.0984
SOIL_Pen_fogYr	-0.1375	0.1543	-0.89	0.3728
IsletMiddle	0.2920	0.2598	1.12	0.2611
IsletWest	0.9105	0.2326	3.91	<0.0001
Year RE Var	0.0000	—	—	—
Dispersion parameter	0.1934	—	—	—

Table 180. GLMM estimates for the final covariate model for native shrub density at probability sites across Anacapa Island [IsletMiddle = middle islet sites; IsletWest = west islet sites].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-4.6615	1.0581	-4.41	<0.0001
IsletMiddle	3.3693	1.1025	3.06	0.0022
IsletWest	3.4150	1.1122	3.07	0.0021
Year RE Var	0.0000	—	—	—
Obs. Variation	0.3533	—	—	—

Table 181. GLMM estimates for the final covariate model for native shrub cover at probability sites across Anacapa Island [IsletMiddle = middle islet sites; IsletWest = west islet sites].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-6.4896	1.0638	-6.10	<0.0001
IsletMiddle	2.9077	1.1545	2.52	0.0118
IsletWest	4.1648	1.1123	3.74	0.0002
Year RE Var	0.0000	—	—	—
Site Variation	0.2885	—	—	—
Dispersion parameter	40.7225	—	—	—

Table 182. GLMM estimates for the final covariate model for native forb cover at probability sites across Anacapa Island [Elevation_m = elevation of site (m)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-4.3834	0.6374	-6.88	<0.0001
Elevation_m	1.0077	0.4939	2.04	0.0413
Year RE Var	0.0000	—	—	—
Site Variation	0.9126	—	—	—
Dispersion parameter	17.4979	—	—	—

Table 183. GLMM estimates for the final covariate model for nonnative forb cover at probability sites across Anacapa Island [rh_Pen_prev2Yr = relative humidity, previous two water years combined].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-10.8124	2.0059	-5.39	<0.0001
rh_Pen_prev2Yr	16.5054	4.2625	3.87	0.0001
Year RE Var	0.0000	—	—	—
Site Variation	2.4574	—	—	—
Dispersion parameter	52.7995	—	—	—

Table 184. GLMM estimates for the final covariate model for native grass cover at probability sites across Anacapa Island [vpd_Pen_prev2Yr = vapor pressure deficit, previous two water years combined].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-12.5808	3.5196	-3.57	0.0004
vpd_Pen_prev2Yr	0.0065	0.0028	2.32	0.0204
Year RE Var	0.0000	—	—	—
Site Variation	6.5643	—	—	—
Dispersion parameter	69.8325	—	—	—

Table 185. GLMM estimates for the final covariate model for nonnative grass cover at probability sites across Anacapa Island [Northness = northness of site (1 if due north, -1 if due south)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-1.5886	0.5122	-3.10	0.0019
Northness	-2.1707	0.6071	-3.58	0.0003
Year RE Var	0.1974	—	—	—
Site Variation	0.8618	—	—	—
Dispersion parameter	3.5740	—	—	—

Covariate Modeling for Santa Barbara Island

Santa Barbara Island Index Sites

Table 186. GLMM estimates for the final covariate model for overall Shannon diversity at index sites across Santa Barbara Island [AET_Pen_an = modeled actual evapotranspiration, calendar year].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	1.1414	0.1287	8.87	<0.0001
AET_Pen_an	0.0020	0.0004	4.86	<0.0001
Year Variation	0.0276	—	—	—
Site Variation	0.1488	—	—	—
Site-Trend Variation	0.0107	—	—	—
Dispersion parameter	0.2442	—	—	—

Table 187. GLMM estimates for the final covariate model for native Shannon diversity at index sites across Santa Barbara Island [SOIL_Pen_an = soil moisture, calendar year; Slope_degrees = slope of site (degrees)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	0.2245	0.1399	1.61	0.1084
SOIL_Pen_an	0.0110	0.0024	4.57	<0.0001
Slope_degrees	0.0235	0.0067	3.51	0.0005
Year Variation	0.0220	–	–	–
Site Variation	0.1370	–	–	–
Site-Trend Variation	0.0110	–	–	–
Dispersion parameter	0.1024	–	–	–

Table 188. GLMM estimates for the final covariate model for grassland Shannon diversity at index sites across Santa Barbara Island [Dew_Pen_fogYr = number of days with dew, current year fog season; Northness = northness of site (1 if due north, -1 if due south); Elevation_m = elevation of site (m)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-0.0311	0.5484	-0.06	0.9548
Dew_Pen_fogYr	0.0183	0.0216	0.85	0.3973
Northness	0.7875	0.6451	1.22	0.2222
Elevation_m	1.4699	0.3249	4.52	<0.0001
Year Variation	0.0205	–	–	–
Site Variation	0.0155	–	–	–
Site-Trend Variation	0.0486	–	–	–
Dispersion parameter	0.2889	–	–	–

Table 189. GLMM estimates for the final covariate model for native shrub density at index sites across Santa Barbara Island [Slope_degrees = slope of site (degrees)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-1.9040	0.4786	-3.98	<0.0001
Slope_degrees	0.0565	0.0260	2.17	0.0298
Year Variation	0.0039	–	–	–
Site Variation	1.6427	–	–	–
Site-Trend Variation	1.0619	–	–	–
Obs. Variation	0.3380	–	–	–

Table 190. GLMM estimates for the final covariate model for native shrub cover at index sites across Santa Barbara Island [Def_Pen_mo = accumulated water deficit, by month; Dew_Pen_prevYr = dew presence (1 if dew present, 0 if not), previous water year; Slope_degrees = slope of site (degrees)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-4.5540	0.7742	-5.88	<0.0001
Def_Pen_mo	-0.0016	0.0012	-1.37	0.1698
Dew_Pen_prevYr	0.0118	0.0041	2.89	0.0039
Slope_degrees	0.0943	0.0357	2.64	0.0083
Year Variation	0.0193	—	—	—
Site Variation	4.7543	—	—	—
Site-Trend Variation	0.6121	—	—	—
Dispersion parameter	19.1528	—	—	—

Table 191. GLMM estimates for the final covariate model for native forb cover at index sites across Santa Barbara Island [AET_Pen_an = modeled actual evapotranspiration, calendar year].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-4.4414	0.4497	-9.88	<0.0001
AET_Pen_an	0.0110	0.0017	6.48	<0.0001
Year Variation	0.4543	—	—	—
Site Variation	1.6209	—	—	—
Site-Trend Variation	0.3386	—	—	—
Obs. Variation	0.3177	—	—	—
Dispersion parameter	22.4357	—	—	—

Table 192. GLMM estimates for the final covariate model for nonnative forb cover at index sites across Santa Barbara Island [AET_Pen_currYr = modeled actual evapotranspiration, current water year].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-3.3592	0.4810	-6.98	<0.0001
AET_Pen_currYr	0.0097	0.0024	4.04	<0.0001
Year Variation	0.8254	—	—	—
Site Variation	0.7151	—	—	—
Site-Trend Variation	0.0423	—	—	—
Dispersion parameter	5.2290	—	—	—

Table 193. GLMM estimates for the final covariate model for native grass cover at index sites across Santa Barbara Island [Slope_degrees = slope of site (degrees)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-8.8353	1.0187	-8.67	<0.0001
Slope_degrees	0.1476	0.0466	3.16	0.0016
Year Variation	0.6986	—	—	—
Site Variation	4.9820	—	—	—
Site-Trend Variation	0.8452	—	—	—
Dispersion parameter	11.8435	—	—	—

Table 194. GLMM estimates for the final covariate model for nonnative grass cover at index sites across Santa Barbara Island [AET_Pen_currYr = modeled actual evapotranspiration, current water year; Def_Pen_mo = accumulated water deficit, by month].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-2.5806	0.6978	-3.70	0.0002
AET_Pen_currYr	0.0120	0.0031	3.86	0.0001
Def_Pen_mo	-0.0012	0.0026	-0.46	0.6441
Year Variation	1.6529	—	—	—
Site Variation	2.8488	—	—	—
Site-Trend Variation	0.1291	—	—	—
Dispersion parameter	7.9551	—	—	—

Table 195. GLMM estimates for the final covariate model for *Deinandra clementina* cover at index sites across Santa Barbara Island [SOIL_Pen_prev2Yr = soil moisture, previous two water years combined; Slope_degrees = slope of site (degrees)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-13.1895	3.6379	-3.63	0.0003
SOIL_Pen_prev2Yr	0.0251	0.0085	2.94	0.0033
Slope_degrees	0.1762	0.1018	1.73	0.0834
Year Variation	0.0679	—	—	—
Site Variation	29.6340	—	—	—
Site-Trend Variation	0.3782	—	—	—
Dispersion parameter	96.4533	—	—	—

Table 196. GLMM estimates for the final covariate model for *Eriogonum giganteum* var. *compactum* cover at index sites across Santa Barbara Island [solRad_prev2Yr = total clear sky solar radiation, previous two water years combined].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-10.2661	2.0309	-5.06	<0.0001
solRad_prev2Yr	-0.0224	0.0043	-5.26	<0.0001
Year RE Var	0.1662	—	—	—
Site Variation	165.7756	—	—	—
Dispersion parameter	313.1273	—	—	—

Table 197. GLMM estimates for the final covariate model for *Hordeum murinum* cover at index sites across Santa Barbara Island [AET_Pen_currYr = modeled actual evapotranspiration, current water year; Def_Pen_mo = accumulated water deficit, by month].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-5.5345	0.9040	-6.12	<0.0001
AET_Pen_currYr	0.0125	0.0033	3.78	0.0002
Def_Pen_mo	-0.0025	0.0035	-0.69	0.4877
Year Variation	1.0954	—	—	—
Site Variation	7.0593	—	—	—
Site-Trend Variation	0.0465	—	—	—
Dispersion parameter	7.1291	—	—	—

Table 198. GLMM estimates for the final covariate model for *Mesembryanthemum crystallinum* cover at index sites across Santa Barbara Island [Temp_Pen_mo = temperature, by month; Dew_Pen_prev2Yr = number of days with dew, previous two water years combined].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-7.3824	1.4040	-5.26	<0.0001
Temp_Pen_mo	0.3029	0.0949	3.19	0.0014
Dew_Pen_prev2Yr	-0.0368	0.0094	-3.90	<0.0001
Year Variation	0.6819	—	—	—
Site Variation	3.7783	—	—	—
Site-Trend Variation	0.0897	—	—	—
Dispersion parameter	5.8787	—	—	—

Table 199. GLMM estimates for the final covariate model for *Suaeda taxifolia* cover at index sites across Santa Barbara Island [SOIL_Pen_prevYr = soil moisture, previous water year; Def_Pen_mo = accumulated water deficit, by month].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-14.4401	1.4263	-10.12	<0.0001
SOIL_Pen_prevYr	0.0210	0.0076	2.78	0.0055
Def_Pen_mo	0.0040	0.0030	1.35	0.1765
Year RE Var	0.5752	—	—	—
Site Variation	73.3690	—	—	—
Obs. Variation	0.1580	—	—	—
Dispersion parameter	23.7463	—	—	—

Santa Barbara Island Probability Sites

Table 200. GLMM estimates for the final covariate model for overall Shannon diversity at probability sites across Santa Barbara Island [SOIL_Pen_prevYr = soil moisture, previous water year].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	1.3398	0.0941	14.23	<0.0001
SOIL_Pen_prevYr	-0.0118	0.0017	-6.74	<0.0001
Year RE Var	0.0029	—	—	—
Site Variation	0.0995	—	—	—
Dispersion parameter	0.0593	—	—	—

Table 201. GLMM estimates for the final covariate model for native shrub cover at probability sites across Santa Barbara Island [cumulative potential evapotranspiration, mean of 30-year monthly means for all months].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-24.3538	8.6742	-2.81	0.0050
pet_allMonth	0.1276	0.0549	2.32	0.0201
Year RE Var	0.0000	—	—	—
Site Variation	1.9834	—	—	—
Dispersion parameter	173.1942	—	—	—

Table 202. GLMM estimates for the final covariate model for native forb cover at probability sites across Santa Barbara Island [Def_Pen_fogYr = accumulated water deficit, current year fog season].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	5.7176	3.1534	1.81	0.0698
Def_Pen_fogYr	-0.0137	0.0046	-2.99	0.0028
Year RE Var	1.0895	–	–	–
Site Variation	0.4719	–	–	–
Dispersion parameter	16.1052	–	–	–

Table 203. GLMM estimates for the final covariate model for nonnative forb cover at probability sites across Santa Barbara Island [SOIL_Pen_currYr = soil moisture, current water year; Def_Pen_mo = accumulated water deficit, by month].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-8.1170	2.0714	-3.92	<0.0001
SOIL_Pen_currYr	0.0851	0.0216	3.93	<0.0001
Def_Pen_mo	0.0531	0.0178	2.98	0.0029
Year RE Var	0.7700	–	–	–
Site Variation	0.7420	–	–	–
Dispersion parameter	7.7569	–	–	–

Table 204. GLMM estimates for the final covariate model for nonnative grass cover at probability sites across Santa Barbara Island [Northness = northness of site (1 if due north, -1 if due south); Elevation_m = elevation of site (m)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-5.0101	1.0804	-4.64	<0.0001
Northness	1.6256	0.2995	5.43	<0.0001
Elevation_m	2.7078	0.6227	4.35	<0.0001
Year RE Var	4.0507	–	–	–
Site Variation	0.0000	–	–	–
Dispersion parameter	7.3663	–	–	–

Table 205. GLMM estimates for the final covariate model for *Hordeum murinum* cover at probability sites across Santa Barbara Island [PET_Pen_mo = cumulative potential evapotranspiration, Penman PET model, by month].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-8.2538	1.6509	-5.00	<0.0001
PET_Pen_mo	0.0468	0.0126	3.70	0.0002
Year RE Var	0.0000	–	–	–
Site Variation	2.4098	–	–	–
Dispersion parameter	3.3199	–	–	–

Table 206. GLMM estimates for the final covariate model for *Mesembryanthemum crystallinum* cover at probability sites across Santa Barbara Island [PET_Pen_fogYr = cumulative potential evapotranspiration, Penman PET model, current year fog season].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-19.1843	5.3271	-3.60	0.0003
PET_Pen_fogYr	0.0234	0.0072	3.26	0.0011
Year RE Var	0.6921	–	–	–
Site Variation	0.4722	–	–	–
Dispersion parameter	2.8211	–	–	–

Covariate Modeling for Santa Cruz Island

Santa Cruz Island Index Sites

Table 207. GLMM estimates for the final covariate model for overall Shannon diversity at index sites across Santa Cruz Island [Temp_Pen_mo = temperature, by month; Pig = years since pig removal].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	1.0189	0.1174	8.68	<0.0001
Temp_Pen_mo	0.0313	0.0067	4.69	<0.0001
Pig	-0.0215	0.0061	-3.53	0.0004
Year Variation	0.0000	–	–	–
Site Variation	0.2766	–	–	–
Site-Trend Variation	0.0939	–	–	–
Dispersion parameter	0.0754	–	–	–

Table 208. GLMM estimates for the final covariate model for native Shannon diversity at index sites across Santa Cruz Island [Temp_Pen_mo = temperature, by month].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	0.6585	0.1395	4.72	<0.0001
Temp_Pen_mo	0.0170	0.0071	2.39	0.0167
Year Variation	0.0024	—	—	—
Site Variation	0.4456	—	—	—
Site-Trend Variation	0.0579	—	—	—
Dispersion parameter	0.0579	—	—	—

Table 209. GLMM estimates for the final covariate model for grassland Shannon diversity at index sites across Santa Cruz Island [Temp_Pen_mo = temperature, by month; Pig = years since pig removal].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	0.9241	0.2332	3.96	<0.0001
Temp_Pen_mo	0.0387	0.0150	2.58	0.0098
Pig	-0.0408	0.0139	-2.94	0.0033
Year Variation	0.0000	—	—	—
Site Variation	0.1874	—	—	—
Site-Trend Variation	0.2095	—	—	—
Dispersion parameter	0.0590	—	—	—

Table 210. GLMM estimates for the final covariate model for riparian Shannon diversity at index sites across Santa Cruz Island [rh_Pen_prev2Yr = relative humidity, previous two water years combined; Northness = northness of site (1 if due north, -1 if due south)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	1.7430	0.4241	4.11	<0.0001
rh_Pen_prev2Yr	-0.6405	0.8383	-0.76	0.4449
Northness	0.4045	0.0978	4.14	<0.0001
Year RE Var	0.0005	—	—	—
Site Variation	0.0000	—	—	—
Dispersion parameter	0.4966	—	—	—

Table 211. GLMM estimates for the final covariate model for oak Shannon diversity at index sites across Santa Cruz Island [pet_allMonth = cumulative potential evapotranspiration, mean of 30-year monthly means for all months; Def_Pen_mo = accumulated water deficit, by month].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-2.2692	0.4533	-5.01	<0.0001
pet_allMonth	0.0223	0.0029	7.76	<0.0001
Def_Pen_mo	0.0026	0.0012	2.25	0.0246
Year RE Var	0.0078	–	–	–
Dispersion parameter	0.0511	–	–	–

Table 212. GLMM estimates for the final covariate model for native tree density at index sites across Santa Cruz Island [Elevation_m = elevation of site (m)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-4.8152	0.5294	-9.10	<0.0001
Elevation_m	0.5603	0.1777	3.15	0.0016
Year RE Var	0.0142	–	–	–
Site Variation	0.6435	–	–	–
Obs. Variation	0.0584	–	–	–

Table 213. GLMM estimates for the final covariate model for native tree recruitment density at index sites across Santa Cruz Island [solRad_fog = total clear sky solar radiation, current year fog season].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-42.6216	17.2347	-2.47	0.0134
solRad_fog	0.0963	0.0380	2.53	0.0113
Year Variation	1.6286	–	–	–
Site Variation	9.0670	–	–	–
Site-Trend Variation	3.2380	–	–	–
Obs. Variation	1.0060	–	–	–

Table 214. GLMM estimates for the final covariate model for native shrub density at index sites across Santa Cruz Island [Cattle = years since cattle removal].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-5.0346	0.9196	-5.47	<0.0001
Cattle	0.2066	0.0505	4.10	<0.0001
Year Variation	0.0522	–	–	–
Site Variation	3.4001	–	–	–
Site-Trend Variation	1.8825	–	–	–

Table 215. GLMM estimates for the final covariate model for native shrub recruitment density at index sites across Santa Cruz Island [AET_mm_fog = modeled actual evapotranspiration, current year fog season; Temp_Pen_mo = temperature, by month].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-5.2592	1.6264	-3.23	0.0012
AET_mm_fog	-0.0228	0.0139	-1.64	0.1011
Temp_Pen_mo	0.1935	0.1006	1.92	0.0544
Year RE Var	0.0000	–	–	–
Site Variation	4.7252	–	–	–
Obs. Variation	1.7345	–	–	–

Table 216. GLMM estimates for the final covariate model for native tree cover at index sites across Santa Cruz Island [Elevation_m = elevation of site (m); Pig = years since pig removal].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-13.4415	2.0659	-6.51	<0.0001
Elevation_m	2.8109	0.7846	3.58	0.0003
Pig	-0.0567	0.0095	-5.95	<0.0001
Year RE Var	0.0000	–	–	–
Site Variation	43.1527	–	–	–
Dispersion parameter	36.6446	–	–	–

Table 217. GLMM estimates for the final covariate model for native shrub cover at index sites across Santa Cruz Island [AET_Pen_fogYr = Modeled actual evapotranspiration, current year fog season; Cattle = years since cattle removal].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-6.8960	0.8827	-7.81	<0.0001
AET_Pen_fogYr	0.0042	0.0016	2.56	0.0103
Cattle	0.1746	0.0379	4.60	<0.0001
Year Variation	0.0098	–	–	–
Site Variation	22.2925	–	–	–
Site-Trend Variation	2.5188	–	–	–
Dispersion parameter	216.9544	–	–	–

Table 218. GLMM estimates for the final covariate model for native forb cover at index sites across Santa Cruz Island [rh_Pen_currYr = relative humidity, current water year; Northness = northness of site (1 if due north, -1 if due south); Pig_Ind = indicator of pig removal (1 if post-removal, 0 if pre-removal)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-5.2615	0.5188	-10.14	<0.0001
rh_Pen_currYr	1.6223	0.6338	2.56	0.0105
Northness	0.8448	0.3802	2.22	0.0263
Pig_Ind	0.6381	0.1813	3.52	0.0004
Year Variation	0.0249	–	–	–
Site Variation	5.5120	–	–	–
Site-Trend Variation	0.7700	–	–	–
Dispersion parameter	42.5466	–	–	–

Table 219. GLMM estimates for the final covariate model for nonnative forb cover at index sites across Santa Cruz Island [Temp_Pen_mo = temperature, by month; Pig = years since pig removal].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-5.9626	0.7616	-7.83	<0.0001
Temp_Pen_mo	0.1688	0.0471	3.58	0.0003
Pig	-0.3699	0.0565	-6.54	<0.0001
Year Variation	0.1804	—	—	—
Site Variation	2.0434	—	—	—
Site-Trend Variation	3.0720	—	—	—
Obs. Variation	0.7679	—	—	—
Dispersion parameter	130.0235	—	—	—

Table 220. GLMM estimates for the final covariate model for native grass cover at index sites across Santa Cruz Island [Pig = years since pig removal].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-6.0786	0.5562	-10.93	<0.0001
Pig	-0.2583	0.0681	-3.79	0.0001
Year Variation	0.0826	—	—	—
Site Variation	10.0109	—	—	—
Site-Trend Variation	4.3174	—	—	—
Dispersion parameter	652.5393	—	—	—

Table 221. GLMM estimates for the final covariate model for nonnative grass cover at index sites across Santa Cruz Island [Temp_Pen_mo = temperature, by month; Pig = years since pig removal].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-1.9265	0.5270	-3.66	0.0003
Temp_Pen_mo	0.0833	0.0251	3.32	0.0009
Pig	-0.1915	0.0368	-5.20	<0.0001
Year Variation	0.2587	—	—	—
Site Variation	5.8442	—	—	—
Site-Trend Variation	0.6649	—	—	—
Dispersion parameter	20.6245	—	—	—

Table 222. GLMM estimates for the final covariate model for *Baccharis pilularis* cover at index sites across Santa Cruz Island [Dew_Pen_currYr = number of days with dew, current water year; Dew_Pen_prevYr = dew presence (1 if dew present, 0 if not), previous water year].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-12.8717	0.8512	-15.12	<0.0001
Dew_Pen_currYr	2.4575	1.0961	2.24	0.0250
Dew_Pen_prevYr	2.0868	1.0905	1.91	0.0557
Year Variation	0.0582	–	–	–
Site Variation	48.1901	–	–	–
Site-Trend Variation	9.9814	–	–	–
Dispersion parameter	350.3133	–	–	–

Table 223. GLMM estimates for the final covariate model for *Eriogonum* Group cover at index sites across Santa Cruz Island [Slope_degrees = slope of site (degrees); Cattle = years since cattle removal].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-19.2348	2.0307	-9.47	<0.0001
Slope_degrees	0.2129	0.0713	2.98	0.0028
Cattle	0.3471	0.0872	3.98	<0.0001
Year Variation	0.0432	–	–	–
Site Variation	59.2801	–	–	–
Site-Trend Variation	5.8783	–	–	–
Dispersion parameter	420.5270	–	–	–

Table 224. GLMM estimates for the final covariate model for *Foeniculum vulgare* cover at index sites across Santa Cruz Island [rn_oct = clear sky net solar radiation, mean of 30-year monthly means for previous October to current survey month].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-19.0470	1.5628	-12.19	<0.0001
rn_oct	0.0132	0.0033	3.97	<0.0001
Year RE Var	0.2320	–	–	–
Site Variation	127.7345	–	–	–
Dispersion parameter	142.8015	–	–	–

Table 225. GLMM estimates for the final covariate model for *Pinus muricata* cover at index sites across Santa Cruz Island [AET_mm_fog = modeled actual evapotranspiration, current year fog season; Slope_degrees = slope of site (degrees)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-12.5767	3.7042	-3.40	0.0007
AET_mm_fog	-0.2155	0.1190	-1.81	0.0703
Slope_degrees	-0.2492	0.2508	-0.99	0.3204
Year RE Var	0.0000	–	–	–
Site Variation	203.1753	–	–	–
Dispersion parameter	160.1553	–	–	–

Table 226. GLMM estimates for the final covariate model for *Rhus integrifolia* cover at index sites across Santa Cruz Island [Cattle = years since cattle removal].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-20.4412	1.9095	-10.70	<0.0001
Cattle	0.4262	0.0970	4.39	<0.0001
Year RE Var	0.6676	–	–	–
Site Variation	62.3959	–	–	–
Dispersion parameter	4182.0396	–	–	–

Table 227. GLMM estimates for the final covariate model for *Stipa* Group cover at index sites across Santa Cruz Island [Temp_Pen_prevYr = temperature, previous water year; Pig = years since pig removal].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-10.4951	1.4058	-7.47	<0.0001
Temp_Pen_prevYr	-0.0514	0.0841	-0.61	0.5411
Pig	-0.3038	0.0493	-6.16	<0.0001
Year Variation	0.0000	–	–	–
Site Variation	23.1563	–	–	–
Site-Trend Variation	4.2883	–	–	–
Obs. Variation	0.0719	–	–	–
Dispersion parameter	1094.6604	–	–	–

Santa Cruz Island Probability Sites

Table 228. GLMM estimates for the final covariate model for overall Shannon diversity at probability sites across Santa Cruz Island [Def_Pen_mo = accumulated water deficit, by month].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	1.1941	0.0993	12.02	<0.0001
Def_Pen_mo	0.0017	0.0009	1.92	0.0549
Year Variation	0.0014	—	—	—
Site Variation	1.5381	—	—	—
Site-Trend Variation	0.6262	—	—	—
Dispersion parameter	0.1659	—	—	—

Table 229. GLMM estimates for the final covariate model for native Shannon diversity at probability sites across Santa Cruz Island [Slope_degrees = slope of site (degrees)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	0.5697	0.1578	3.61	0.0003
Slope_degrees	0.0170	0.0065	2.61	0.0091
Year Variation	0.0000	—	—	—
Site Variation	1.1867	—	—	—
Site-Trend Variation	0.4498	—	—	—
Dispersion parameter	0.0477	—	—	—

Table 230. GLMM estimates for the final covariate model for native tree density at probability sites across Santa Cruz Island [Northness = northness of site (1 if due north, -1 if due south)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-2.2237	0.1043	-21.31	<0.0001
Northness	-2.3540	0.2877	-8.18	<0.0001
Year RE Var	0.0000	—	—	—
Site Variation	0.0000	—	—	—

Table 231. GLMM estimates for the final covariate model for native shrub density at probability sites across Santa Cruz Island [Soil_water_mm_fog = soil moisture, current year fog season; Elevation_m = elevation of site (m)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-2.0284	0.4987	-4.07	<0.0001
Soil_water_mm_fog	-0.0957	0.0397	-2.41	0.0158
Elevation_m	0.5437	0.1957	2.78	0.0055
Year RE Var	0.0000	–	–	–
Site Variation	1.2910	–	–	–
Obs. Variation	0.0515	–	–	–

Table 232. GLMM estimates for the final covariate model for native shrub recruitment density at probability sites across Santa Cruz Island [rh_Pen_prev2Yr = relative humidity, previous two water years combined].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-9.5836	2.7812	-3.45	0.0006
rh_Pen_prev2Yr	16.7350	6.1829	2.71	0.0068
Year RE Var	0.0000	–	–	–
Site Variation	2.0694	–	–	–
Obs. Variation	4.2170	–	–	–

Table 233. GLMM estimates for the final covariate model for native tree cover at probability sites across Santa Cruz Island [Elevation_m = elevation of site (m)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-4.2981	0.4539	-9.47	<0.0001
Elevation_m	0.5775	0.1373	4.21	<0.0001
Year RE Var	0.0000	–	–	–
Dispersion parameter	1.6656	–	–	–

Table 234. GLMM estimates for the final covariate model for native shrub cover at probability sites across Santa Cruz Island [Northness = northness of site (1 if due north, -1 if due south)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-2.9423	0.4314	-6.82	<0.0001
Northness	-1.4303	0.5953	-2.40	0.0163
Year RE Var	0.0000	—	—	—
Site Variation	6.3591	—	—	—
Dispersion parameter	267.3029	—	—	—

Table 235. GLMM estimates for the final covariate model for nonnative forb cover at probability sites across Santa Cruz Island [Soil_water_mm_prevYr = soil moisture, previous water year].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-4.0761	0.5842	-6.98	<0.0001
Soil_water_mm_prevYr	-0.0460	0.0205	-2.24	0.0249
Year RE Var	0.1810	—	—	—
Site Variation	1.4349	—	—	—
Dispersion parameter	281.9109	—	—	—

Table 236. GLMM estimates for the final covariate model for native grass cover at probability sites across Santa Cruz Island [Slope_degrees = slope of site (degrees); Sheep = years since sheep removal].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	2.2539	1.0514	2.14	0.0320
Slope_degrees	-0.0916	0.0284	-3.22	0.0013
Sheep	-0.3580	0.0624	-5.74	<0.0001
Year RE Var	0.0000	—	—	—
Site Variation	3.3919	—	—	—
Dispersion parameter	40.3087	—	—	—

Table 237. GLMM estimates for the final covariate model for nonnative grass cover at probability sites across Santa Cruz Island [SOIL_Pen_currYr = soil moisture, current water year; Slope_degrees = slope of site (degrees)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-2.0823	0.5658	-3.68	0.0002
SOIL_Pen_currYr	0.0566	0.0126	4.49	<0.0001
Slope_degrees	-0.0444	0.0198	-2.24	0.0249
Year RE Var	0.1599	–	–	–
Site Variation	2.2406	–	–	–
Dispersion parameter	42.6061	–	–	–

Table 238. GLMM estimates for the final covariate model for *Baccharis pilularis* cover at probability sites across Santa Cruz Island [Northness = northness of site (1 if due north, -1 if due south)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-17.2717	4.4341	-3.90	<0.0001
Northness	12.8793	5.1196	2.52	0.0119
Year RE Var	0.0000	–	–	–
Site Variation	9.5284	–	–	–
Dispersion parameter	321.9203	–	–	–

Table 239. GLMM estimates for the final covariate model for *Eriogonum* Group cover at probability sites across Santa Cruz Island [Northness = northness of site (1 if due north, -1 if due south)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-2.8666	0.2300	-12.46	<0.0001
Northness	-1.5077	0.2545	-5.92	<0.0001
Year RE Var	0.0363	–	–	–
Obs. Variation	0.0017	–	–	–
Dispersion parameter	2.9594	–	–	–

Table 240. GLMM estimates for the final covariate model for *Foeniculum vulgare* cover at probability sites across Santa Cruz Island [Sheep = years since sheep removal].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-7.6269	2.1520	-3.54	0.0004
Sheep	-0.2602	0.1450	-1.79	0.0728
Year RE Var	0.0000	–	–	–
Site Variation	35.9365	–	–	–
Dispersion parameter	600.3801	–	–	–

Table 241. GLMM estimates for the final covariate model for *Rhus integrifolia* cover at probability sites across Santa Cruz Island [Slope_degrees = slope of site (degrees)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-5.6940	0.8454	-6.74	<0.0001
Slope_degrees	0.0791	0.0267	2.96	0.0030
Year RE Var	0.0000	–	–	–
Dispersion parameter	1.6918	–	–	–

Table 242. GLMM estimates for the final covariate model for *Stipa* Group cover at probability sites across Santa Cruz Island [SOIL_Pen_prevYr = soil moisture, previous water year; Slope_degrees = slope of site (degrees); Cattle = years since cattle removal].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	0.6499	1.4106	0.46	0.6450
SOIL_Pen_prevYr	-0.0398	0.0158	-2.53	0.0115
Slope_degrees	-0.1339	0.0417	-3.21	0.0013
Cattle	-0.2105	0.0771	-2.73	0.0064
Year RE Var	0.0000	–	–	–
Site Variation	7.3556	–	–	–
Dispersion parameter	55.7412	–	–	–

Covariate Modeling for San Miguel Island

San Miguel Island Index Sites

Table 243. GLMM estimates for the final covariate model for overall Shannon diversity at index sites across San Miguel Island [rn_oct = clear sky net solar radiation, mean of 30-year monthly means for previous October to current survey month].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	2.8783	0.1932	14.90	<0.0001
rn_oct	-0.0028	0.0005	-5.71	<0.0001
Year Variation	0.0148	—	—	—
Site Variation	0.0361	—	—	—
Site-Trend Variation	0.0121	—	—	—
Dispersion parameter	0.2820	—	—	—

Table 244. GLMM estimates for the final covariate model for native Shannon diversity at index sites across San Miguel Island [pet_allMonth = cumulative potential evapotranspiration, mean of 30-year monthly means for all months; Def_Pen_mo = accumulated water deficit, by month].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	4.1575	1.1855	3.51	0.0005
pet_allMonth	-0.0176	0.0078	-2.25	0.0246
Def_Pen_mo	-0.0016	0.0004	-3.84	0.0001
Year Variation	0.0069	—	—	—
Site Variation	0.1235	—	—	—
Site-Trend Variation	0.0113	—	—	—
Dispersion parameter	0.2004	—	—	—

Table 245. GLMM estimates for the final covariate model for island chaparral Shannon diversity at index sites across San Miguel Island [rad_oct = total clear sky solar radiation, mean of 30-year monthly means for previous October to current survey month].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	4.1288	0.4272	9.66	<0.0001
rad_oct	-0.0037	0.0008	-4.89	<0.0001
Year RE Var	0.0379	—	—	—
Site Variation	0.0324	—	—	—
Dispersion parameter	0.2089	—	—	—

Table 246. GLMM estimates for the final covariate model for coastal sage scrub Shannon diversity at index sites across San Miguel Island [Northness = northness of site (1 if due north, -1 if due south); Elevation_m = elevation of site (m)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	2.6900	0.1666	16.14	<0.0001
Northness	0.8670	0.2144	4.04	<0.0001
Elevation_m	-0.2565	0.0667	-3.84	0.0001
Year RE Var	0.0451	–	–	–
Site Variation	0.0000	–	–	–
Dispersion parameter	0.0997	–	–	–

Table 247. GLMM estimates for the final covariate model for grassland Shannon diversity at index sites across San Miguel Island [rn_oct = clear sky net solar radiation, mean of 30-year monthly means for previous October to current survey month].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	3.2451	0.3065	10.59	<0.0001
rn_oct	-0.0042	0.0008	-5.46	<0.0001
Year RE Var	0.0007	–	–	–
Site Variation	0.0105	–	–	–
Dispersion parameter	0.0904	–	–	–

Table 248. GLMM estimates for the final covariate model for native shrub density at index sites across San Miguel Island [SOIL_Pen_currYr = soil moisture, current water year].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	0.7621	0.5309	1.44	0.1511
SOIL_Pen_currYr	-0.0172	0.0072	-2.38	0.0172
Year RE Var	0.1170	–	–	–
Site Variation	1.7561	–	–	–
Obs. Variation	0.2668	–	–	–

Table 249. GLMM estimates for the final covariate model for native shrub cover at index sites across San Miguel Island [PET_mm_prevYr = cumulative potential evapotranspiration, previous water year].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	3.4589	1.1263	3.07	0.0021
PET_mm_prevYr	-0.0088	0.0019	-4.58	<0.0001
Year Variation	0.1076	–	–	–
Site Variation	3.3063	–	–	–
Site-Trend Variation	1.1729	–	–	–
Obs. Variation	0.1054	–	–	–
Dispersion parameter	55.7673	–	–	–

Table 250. GLMM estimates for the final covariate model for native forb cover at index sites across San Miguel Island [pet_oct = cumulative potential evapotranspiration, mean of 30-year monthly means for previous October to current survey month].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	1.1697	0.6423	1.82	0.0686
pet_oct	-0.0233	0.0049	-4.78	<0.0001
Year Variation	0.1763	–	–	–
Site Variation	0.5011	–	–	–
Site-Trend Variation	0.1683	–	–	–
Dispersion parameter	19.9148	–	–	–

Table 251. GLMM estimates for the final covariate model for nonnative forb cover at index sites across San Miguel Island [AET_Pen_mo = modeled actual evapotranspiration, by month; Soil_water_mm_prevYr = soil moisture, previous water year].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-1.3447	0.5137	-2.62	0.0088
AET_Pen_mo	0.0159	0.0031	5.18	<0.0001
Soil_water_mm_prevYr	-0.0083	0.0036	-2.32	0.0205
Year Variation	0.2655	–	–	–
Site Variation	2.3240	–	–	–
Site-Trend Variation	0.3790	–	–	–
Dispersion parameter	12.4436	–	–	–

Table 252. GLMM estimates for the final covariate model for native grass cover at index sites across San Miguel Island [Dew_Pen_currYr = number of days with dew, current water year].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-3.2341	0.5746	-5.63	<0.0001
Dew_Pen_currYr	0.1442	0.0498	2.90	0.0038
Year Variation	0.1660	–	–	–
Site Variation	3.9178	–	–	–
Site-Trend Variation	0.6630	–	–	–
Dispersion parameter	15.9375	–	–	–

Table 253. GLMM estimates for the final covariate model for nonnative grass cover at index sites across San Miguel Island [Soil_water_mm_prevYr = soil moisture, previous water year].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-1.6863	0.6363	-2.65	0.0080
Soil_water_mm_prevYr	0.0125	0.0039	3.24	0.0012
Year Variation	0.7244	–	–	–
Site Variation	2.9371	–	–	–
Site-Trend Variation	0.5103	–	–	–
Dispersion parameter	9.2122	–	–	–

Table 254. GLMM estimates for the final covariate model for *Acmispon dendroideus* var. *veatchii* cover at index sites across San Miguel Island [Temp_Pen_prev2Yr = temperature, previous two water years combined; Dew_Pen_prev2Yr = number of days with dew, previous two water years combined].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-3.8030	2.3567	-1.61	0.1066
Temp_Pen_prev2Yr	-0.5299	0.1551	-3.42	0.0006
Dew_Pen_prev2Yr	0.1403	0.0480	2.92	0.0035
Year Variation	0.0643	–	–	–
Site Variation	22.2059	–	–	–
Site-Trend Variation	2.4371	–	–	–
Dispersion parameter	20.5938	–	–	–

Table 255. GLMM estimates for the final covariate model for *Carpobrotus chilensis* cover at index sites across San Miguel Island [vpd_Pen_fogYr = vapor pressure deficit, current year fog season].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-6.2836	1.5089	-4.16	<0.0001
vpd_Pen_fogYr	-0.0015	0.0005	-3.21	0.0013
Year Variation	0.2832	—	—	—
Site Variation	28.9617	—	—	—
Site-Trend Variation	2.2080	—	—	—
Obs. Variation	0.2281	—	—	—
Dispersion parameter	131.6756	—	—	—

Table 256. GLMM estimates for the final covariate model for *Isocoma menziesii* cover at index sites across San Miguel Island [solRad_prev2Yr = total clear sky solar radiation, previous two water years combined].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	1.5788	1.6385	0.96	0.3353
solRad_prev2Yr	-0.0153	0.0053	-2.86	0.0043
Year Variation	0.0409	—	—	—
Site Variation	10.6953	—	—	—
Site-Trend Variation	1.5710	—	—	—
Obs. Variation	0.1329	—	—	—
Dispersion parameter	177.8973	—	—	—

San Miguel Island Probability Sites

Table 257. GLMM estimates for the final covariate model for native Shannon diversity at probability sites across San Miguel Island [Northness = northness of site (1 if due north, -1 if due south)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	1.2584	0.1143	11.01	<0.0001
Northness	0.2952	0.1954	1.51	0.1310
Year RE Var	0.0000	—	—	—
Site Variation	0.1656	—	—	—
Dispersion parameter	0.2117	—	—	—

Table 258. GLMM estimates for the final covariate model for native shrub density at probability sites across San Miguel Island [Deficit_mm_fog = accumulated water deficit, current year fog season].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-10.2580	2.7193	-3.77	0.0002
Deficit_mm_fog	0.0214	0.0060	3.55	0.0004
Year RE Var	1.2388	–	–	–
Site Variation	1.4511	–	–	–
Obs. Variation	0.0000	–	–	–

Table 259. GLMM estimates for the final covariate model for native shrub cover at probability sites across San Miguel Island [PET_Pen_currYr = cumulative potential evapotranspiration, Penman PET model, current water year].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	7.0788	3.0563	2.32	0.0205
PET_Pen_currYr	-0.0118	0.0039	-3.01	0.0026
Year RE Var	0.0568	–	–	–
Dispersion parameter	7.3910	–	–	–

Table 260. GLMM estimates for the final covariate model for native forb cover at probability sites across San Miguel Island [SRad_CurrentYear = total clear sky solar radiation, current water year].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	6.7861	4.1174	1.65	0.0993
SRad_CurrentYear	-0.0297	0.0134	-2.22	0.0263
Year Variation	0.0000	–	–	–
Site Variation	7.0690	–	–	–
Site-Trend Variation	3.0399	–	–	–
Dispersion parameter	102.7237	–	–	–

Table 261. GLMM estimates for the final covariate model for nonnative forb cover at probability sites across San Miguel Island [rh_Pen_prev2Yr = relative humidity, previous two water years combined].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-9.1741	1.9001	-4.83	<0.0001
rh_Pen_prev2Yr	10.3722	3.2259	3.22	0.0013
Year RE Var	0.0000	–	–	–
Site Variation	0.7336	–	–	–
Dispersion parameter	127.2537	–	–	–

Table 262. GLMM estimates for the final covariate model for nonnative grass cover at probability sites across San Miguel Island [SOIL_Pen_prev2Yr = soil moisture, previous two water years combined].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-4.0603	0.8631	-4.70	<0.0001
SOIL_Pen_prev2Yr	0.0720	0.0204	3.54	0.0004
Year RE Var	0.2735	–	–	–
Site Variation	0.3692	–	–	–
Dispersion parameter	10.5334	–	–	–

Table 263. GLMM estimates for the final covariate model for *Acmispon dendroideus* var. *veatchii* cover at probability sites across San Miguel Island [Elevation_m = elevation of site (m)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-10.8884	3.4155	-3.19	0.0014
Elevation_m	3.9461	2.0522	1.92	0.0545
Year RE Var	0.0000	–	–	–
Dispersion parameter	13.2732	–	–	–

Table 264. GLMM estimates for the final covariate model for *Carpobrotus chilensis* cover at probability sites across San Miguel Island [SOIL_Pen_currYr = soil moisture, current water year].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-1.6882	0.4877	-3.46	0.0005
SOIL_Pen_currYr	-0.0291	0.0127	-2.29	0.0222
Year RE Var	0.0000	–	–	–
Dispersion parameter	10.7410	–	–	–

Table 265. GLMM estimates for the final covariate model for *Isocoma menziesii* cover at index sites across San Miguel Island [solRad_prev2Yr = total clear sky solar radiation, previous two water years combined].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-11.0465	3.2794	-3.37	0.0008
solRad_prev2Yr	0.0225	0.0104	2.16	0.0310
Year RE Var	0.0000	—	—	—
Site Variation	5.5316	—	—	—
Dispersion parameter	179.4329	—	—	—

Covariate Modeling for Santa Rosa Island

Santa Rosa Island Index Sites

Table 266. GLMM estimates for the final covariate model for overall Shannon diversity at index sites across Santa Rosa Island [Slope_degrees = slope of site (degrees); Cattle = years since cattle removal].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	1.9537	0.1012	19.30	<0.0001
Slope_degrees	-0.0111	0.0040	-2.74	0.0061
Cattle	-0.0230	0.0043	-5.36	<0.0001
Year Variation	0.0138	—	—	—
Site Variation	0.2544	—	—	—
Site-Trend Variation	0.0435	—	—	—
Dispersion parameter	0.0612	—	—	—

Table 267. GLMM estimates for the final covariate model for native Shannon diversity at index sites across Santa Rosa Island [Soil_water_mm_prevYr = soil moisture, previous water year; Def_Pen_mo = accumulated water deficit, by month].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	1.3278	0.0707	18.78	<0.0001
Soil_water_mm_prevYr	-0.0017	0.0004	-3.90	<0.0001
Def_Pen_mo	-0.0013	0.0002	-5.99	<0.0001
Year Variation	0.0074	–	–	–
Site Variation	0.2425	–	–	–
Site-Trend Variation	0.0407	–	–	–
Dispersion parameter	0.0769	–	–	–

Table 268. GLMM estimates for the final covariate model for coastal sage scrub Shannon diversity at index sites across Santa Rosa Island [SOIL_Pen_fogYr = soil moisture, current year fog season; Slope_degrees = slope of site (degrees); Cattle = years since cattle removal].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	1.3925	0.2294	6.07	<0.0001
SOIL_Pen_fogYr	0.0059	0.0025	2.32	0.0205
Slope_degrees	0.0174	0.0070	2.50	0.0124
Cattle	-0.0354	0.0083	-4.27	<0.0001
Year Variation	0.0286	–	–	–
Site Variation	0.0491	–	–	–
Site-Trend Variation	0.0341	–	–	–
Dispersion parameter	0.0985	–	–	–

Table 269. GLMM estimates for the final covariate model for Baccharis scrub Shannon diversity at index sites across Santa Rosa Island [Cattle_Ind = indicator of cattle removal (1 if post-removal, 0 if pre-removal); Elk_Ind = indicator of elk removal (1 if post-removal, 0 if pre-removal)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	2.2195	0.0862	25.74	<0.0001
Cattle_Ind	-0.1880	0.0702	-2.68	0.0074
Elk_Ind	-0.3314	0.0702	-4.72	<0.0001
Year Variation	0.0109	—	—	—
Site Variation	0.0614	—	—	—
Site-Trend Variation	0.0167	—	—	—
Dispersion parameter	0.1003	—	—	—

Table 270. GLMM estimates for the final covariate model for grassland Shannon diversity at index sites across Santa Rosa Island [Northness = northness of site (1 if due north, -1 if due south); Cattle_Ind = indicator of cattle removal (1 if post-removal, 0 if pre-removal); Elk_Ind = indicator of elk removal (1 if post-removal, 0 if pre-removal)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	1.9220	0.0714	26.91	<0.0001
Northness	0.2023	0.0632	3.20	0.0014
Cattle_Ind	-0.2224	0.0779	-2.86	0.0043
Elk_Ind	-0.2762	0.0793	-3.48	0.0005
Year Variation	0.0182	—	—	—
Site Variation	0.0254	—	—	—
Site-Trend Variation	0.0326	—	—	—
Dispersion parameter	0.2885	—	—	—

Table 271. GLMM estimates for the final covariate model for riparian Shannon diversity at index sites across Santa Rosa Island [Temp_Pen_prevYr = Temperature, previous water year; Slope_degrees = slope of site (degrees)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	3.6252	0.5246	6.91	<0.0001
Temp_Pen_prevYr	-0.0740	0.0347	-2.13	0.0331
Slope_degrees	-0.0373	0.0093	-4.01	<0.0001
Year Variation	0.0136	–	–	–
Site Variation	0.0473	–	–	–
Site-Trend Variation	0.0674	–	–	–
Dispersion parameter	0.1835	–	–	–

Table 272. GLMM estimates for the final covariate model for mixed woodland Shannon diversity at index sites across Santa Rosa Island [Elevation_m = elevation of site (m); Elk = years since elk removal].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	2.5176	0.0409	61.55	<0.0001
Elevation_m	-0.6788	0.0232	-29.32	<0.0001
Elk	-0.0073	0.0148	-0.49	0.6220
Year RE Var	0.0143	–	–	–
Dispersion parameter	0.0300	–	–	–

Table 273. GLMM estimates for the final covariate model for native tree density at index sites across Santa Rosa Island [AET_mm_fog = modeled actual evapotranspiration, current year fog season].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-2.2073	0.4328	-5.10	<0.0001
AET_mm_fog	-0.0102	0.0026	-3.92	<0.0001
Year Variation	0.9308	–	–	–
Site Variation	0.6572	–	–	–
Site-Trend Variation	0.1837	–	–	–
Obs. Variation	0.0330	–	–	–

Table 274. GLMM estimates for the final covariate model for native tree recruitment density at index sites across Santa Rosa Island [AET_mm_fog = modeled actual evapotranspiration, current year fog season].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-5.1331	0.9241	-5.55	<0.0001
AET_mm_fog	0.0158	0.0069	2.31	0.0209
Year Variation	1.0703	–	–	–
Site Variation	3.6973	–	–	–
Site-Trend Variation	1.5645	–	–	–
Obs. Variation	0.7958	–	–	–

Table 275. GLMM estimates for the final covariate model for native shrub density at index sites across Santa Rosa Island [Slope_degrees = slope of site (degrees); Pig = years since pig removal].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-2.6264	0.3703	-7.09	<0.0001
Slope_degrees	0.0427	0.0150	2.85	0.0044
Pig	0.0347	0.0137	2.53	0.0114
Year Variation	0.0043	–	–	–
Site Variation	2.4367	–	–	–
Site-Trend Variation	0.5320	–	–	–
Obs. Variation	0.1121	–	–	–

Table 276. GLMM estimates for the final covariate model for native shrub recruitment density at index sites across Santa Rosa Island [Def_Pen_fogYr = accumulated water deficit, current year fog season].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-0.6163	0.8710	-0.71	0.4792
Def_Pen_fogYr	-0.0047	0.0014	-3.41	0.0007
Year Variation	0.2176	–	–	–
Site Variation	2.4544	–	–	–
Site-Trend Variation	0.7315	–	–	–
Obs. Variation	1.9637	–	–	–

Table 277. GLMM estimates for the final covariate model for native tree cover at index sites across Santa Rosa Island [rn_allMonth = clear sky net solar radiation, mean of 30-year monthly means for all months].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	17.8429	3.3754	5.29	<0.0001
rn_allMonth	-0.0676	0.0086	-7.82	<0.0001
Year Variation	0.0753	—	—	—
Site Variation	39.9889	—	—	—
Site-Trend Variation	3.2741	—	—	—
Dispersion parameter	42.9508	—	—	—

Table 278. GLMM estimates for the final covariate model for native shrub cover at index sites across Santa Rosa Island [Deer = years since deer removal; Cattle_Ind = indicator of cattle removal (1 if post-removal, 0 if pre-removal); Elk_Ind = indicator of elk removal (1 if post-removal, 0 if pre-removal)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-4.0861	0.3783	-10.80	<0.0001
Deer	-0.0940	0.0373	-2.52	0.0117
Cattle_Ind	0.2630	0.1150	2.29	0.0222
Elk_Ind	0.2947	0.1220	2.42	0.0157
Year Variation	0.0213	—	—	—
Site Variation	11.5454	—	—	—
Site-Trend Variation	0.7373	—	—	—
Obs. Variation	0.0498	—	—	—
Dispersion parameter	70.1331	—	—	—

Table 279. GLMM estimates for the final covariate model for native forb cover at index sites across Santa Rosa Island [Temp_Pen_mo = temperature, by month; Pig = years since pig removal].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-1.1238	0.4020	-2.80	0.0052
Temp_Pen_mo	-0.1114	0.0229	-4.87	<0.0001
Pig	-0.0509	0.0161	-3.16	0.0016
Year Variation	0.2144	—	—	—
Site Variation	3.6935	—	—	—
Site-Trend Variation	0.8576	—	—	—
Obs. Variation	0.7340	—	—	—
Dispersion parameter	692.8664	—	—	—

Table 280. GLMM estimates for the final covariate model for nonnative forb cover at index sites across Santa Rosa Island [AET_Pen_mo = modeled actual evapotranspiration, by month; Slope_degrees = slope of site (degrees); Pig = years since pig removal].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-1.7378	0.3859	-4.50	<0.0001
AET_Pen_mo	0.0069	0.0019	3.66	0.0003
Slope_degrees	-0.0508	0.0132	-3.85	0.0001
Pig	-0.1256	0.0183	-6.85	<0.0001
Year Variation	0.3890	—	—	—
Site Variation	2.3966	—	—	—
Site-Trend Variation	0.4456	—	—	—
Obs. Variation	0.4656	—	—	—
Dispersion parameter	36.5310	—	—	—

Table 281. GLMM estimates for the final covariate model for native grass cover at index sites across Santa Rosa Island [rn_oct = clear sky net solar radiation, mean of 30-year monthly means for previous October to current survey month].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-4.4052	0.3603	-12.23	<0.0001
rn_oct	0.0055	0.0007	8.23	<0.0001
Year Variation	0.3288	–	–	–
Site Variation	6.1417	–	–	–
Site-Trend Variation	0.7792	–	–	–
Obs. Variation	0.3687	–	–	–
Dispersion parameter	140.9815	–	–	–

Table 282. GLMM estimates for the final covariate model for nonnative grass cover at index sites across Santa Rosa Island [rh_Pen_prev2Yr = relative humidity, previous two water years combined; Northness = northness of site (1 if due north, -1 if due south); Cattle_Ind = indicator of cattle removal (1 if post-removal, 0 if pre-removal); Elk_Ind = indicator of elk removal (1 if post-removal, 0 if pre-removal)].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-3.5712	0.7572	-4.72	<0.0001
rh_Pen_prev2Yr	6.5825	1.2453	5.29	<0.0001
Northness	-0.5141	0.4130	-1.24	0.2133
Cattle_Ind	-1.4580	0.2590	-5.63	<0.0001
Elk_Ind	-1.2905	0.2503	-5.16	<0.0001
Year Variation	0.2452	–	–	–
Site Variation	5.9026	–	–	–
Site-Trend Variation	0.3736	–	–	–
Dispersion parameter	9.0901	–	–	–

Table 283. GLMM estimates for the final covariate model for *Arctostaphylos* Group cover at Index sites across Santa Rosa Island [Temp_Pen_an = temperature; Pig = years since pig removal].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-22.8275	1.6369	-13.95	<0.0001
Temp_Pen_an	-0.1104	0.0845	-1.31	0.1917
Pig	0.1273	0.0136	9.37	<0.0001
Year RE Var	0.0000	—	—	—
Site Variation	1632.9489	—	—	—
Dispersion parameter	39.0825	—	—	—

Table 284. GLMM estimates for the final covariate model for *Heteromeles arbutifolia* cover at Index sites across Santa Rosa Island [Cattle = years since cattle removal].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-15.5077	0.8240	-18.82	<0.0001
Cattle	-0.0254	0.0074	-3.42	0.0006
Year RE Var	0.0000	—	—	—
Site Variation	131.6842	—	—	—
Dispersion parameter	28.6376	—	—	—

Table 285. GLMM estimates for the final covariate model for *Quercus pacifica* cover at Index sites across Santa Rosa Island [rh_Pen_prevYr = relative humidity, previous water year; Elk = years since elk removal].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-18.1827	1.0599	-17.15	<0.0001
rh_Pen_prevYr	0.7062	0.2920	2.42	0.0156
Elk	-0.0392	0.0140	-2.80	0.0050
Year RE Var	0.0006	—	—	—
Site Variation	270.1858	—	—	—
Dispersion parameter	83.8824	—	—	—

Table 286. GLMM estimates for the final covariate model for *Stipa* Group cover at index sites across Santa Rosa Island [pet_allMonth = cumulative potential evapotranspiration, mean of 30-year monthly means for all months; Soil_water_mm_prevYr = soil moisture, previous water year].

Parameter	Estimate	Standard Error	z-value	p-value
(Intercept)	-27.1673	4.1350	-6.57	<0.0001
pet_allMonth	0.1361	0.0286	4.75	<0.0001
Soil_water_mm_prevYr	0.0048	0.0019	2.48	0.0132
Year Variation	0.3515	–	–	–
Site Variation	19.8877	–	–	–
Site-Trend Variation	0.8436	–	–	–
Obs. Variation	0.0887	–	–	–
Dispersion parameter	59.7925	–	–	–

Santa Rosa Island Probability Sites

Because only two years of probability site data (2017 and 2018) were available in the SR data provided for analysis, covariate modeling was not conducted for probability sites from SR.