

## Contents

|   |    |
|---|----|
| SI 1 Number of occurrences for each species and species sampling.....           | 2  |
| SI 2 Fossil calibration.....  | 7  |
| SI 3 Annuals and perennials.....  | 8  |
| SI 4 AUC and CI for niche models.....   | 9  |
| SI 5 Relative input of variables into niche models.....                         | 11 |
| SI 6 Test for normality of PC variances.....                                    | 14 |
| SI 7 Niche position and niche breadth values.....                               | 16 |
| SI 8 Kurtosis for PC scores distributions.....                                  | 19 |
| SI 9 Geographical range for each species.....                                   | 20 |
| SI 10 Mean latitude and centroid-based latitude estimates for each species..... | 22 |
| SI 11 Annual perennial niche position and breadth.....                          | 24 |
| SI 12 Latitude and niche breadth.....   | 25 |
| SI 13 Evolutionary models comparison for niche position and breadth.....        | 26 |

**SI 1 Number of occurrences for each species and species samping**

a) Locality data (number of observation per species used for niche modeling)

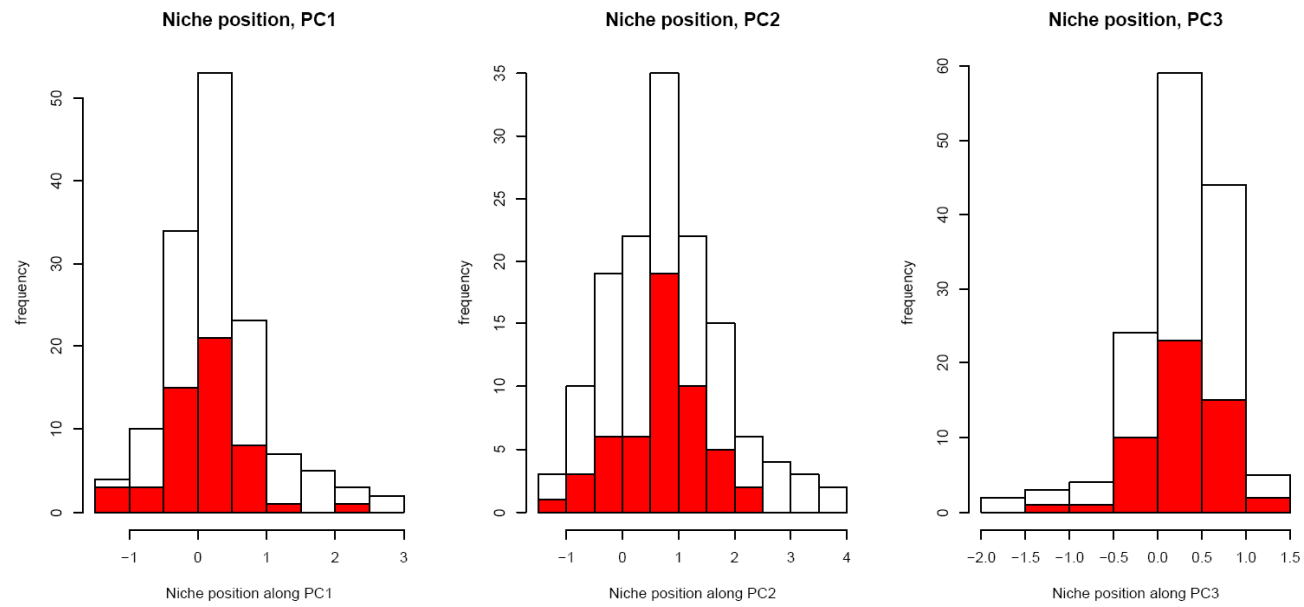
| <b>Species</b>           | <b>Count</b> |
|--------------------------|--------------|
| Chorizanthe angustifolia | 45           |
| Chorizanthe brevicornu   | 886          |
| Chorizanthe clevelandii  | 65           |
| Chorizanthe cuspidata    | 61           |
| Chorizanthe diffusa      | 100          |
| Chorizanthe douglasii    | 39           |
| Chorizanthe fimbriata    | 510          |
| Chorizanthe howellii     | 21           |
| Chorizanthe leptotheca   | 106          |
| Chorizanthe palmeri      | 39           |
| Chorizanthe parryi       | 238          |
| Chorizanthe polygonoides | 322          |
| Chorizanthe procumbens   | 182          |
| Chorizanthe pungens      | 67           |
| Chorizanthe rigida       | 533          |
| Chorizanthe robusta      | 26           |
| Chorizanthe spinosa      | 87           |
| Chorizanthe staticoides  | 601          |
| Chorizanthe stellulata   | 107          |
| Chorizanthe uniaristata  | 100          |
| Chorizanthe valida       | 25           |
| Chorizanthe watsonii     | 287          |
| Chorizanthe xanti        | 301          |
| Dodecahema leptoceras    | 33           |
| Eriogonum alatum         | 424          |
| Eriogonum arborescens    | 39           |
| Eriogonum batemanii      | 31           |
| Eriogonum bicolor        | 44           |
| Eriogonum brachyanthum   | 144          |
| Eriogonum brachypodium   | 67           |
| Eriogonum breedlovei     | 23           |
| Eriogonum cernuum        | 395          |
| Eriogonum cithariforme   | 160          |
| Eriogonum clavellatum    | 32           |
| Eriogonum contiguum      | 38           |
| Eriogonum contortum      | 18           |
| Eriogonum corymbosum     | 361          |
| Eriogonum davidsonii     | 548          |
| Eriogonum deflexum       | 846          |
| Eriogonum elegans        | 32           |
| Eriogonum elongatum      | 364          |

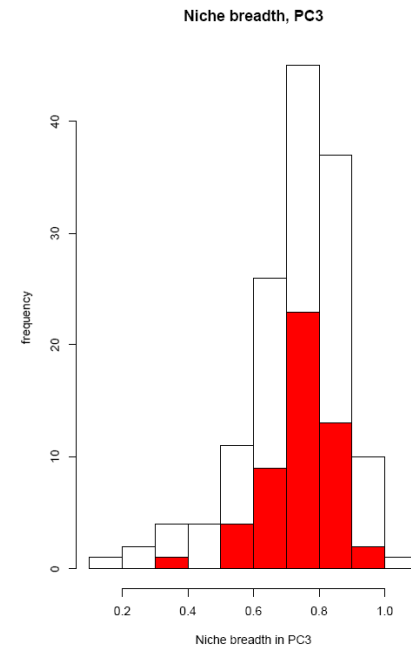
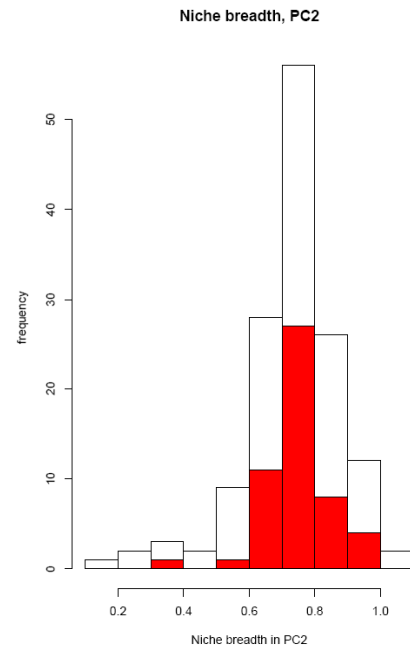
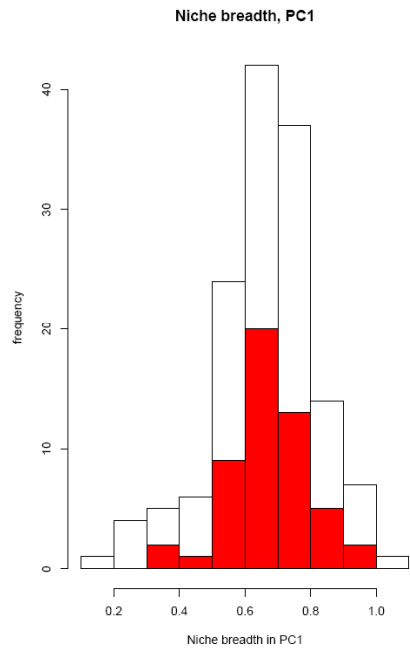
|                          |      |
|--------------------------|------|
| Eriogonum esmeraldense   | 57   |
| Eriogonum fasciculatum   | 2911 |
| Eriogonum flavum         | 324  |
| Eriogonum fusiforme      | 23   |
| Eriogonum giganteum      | 99   |
| Eriogonum gracile        | 719  |
| Eriogonum gracilipes     | 25   |
| Eriogonum grande         | 130  |
| Eriogonum heermannii     | 251  |
| Eriogonum incanum        | 278  |
| Eriogonum inerme         | 62   |
| Eriogonum inflatum       | 1283 |
| Eriogonum jamesii        | 495  |
| Eriogonum kennedyi       | 107  |
| Eriogonum latifolium     | 244  |
| Eriogonum lemmonii       | 24   |
| Eriogonum maculatum      | 411  |
| Eriogonum marifolium     | 328  |
| Eriogonum microthecum    | 748  |
| Eriogonum nidularium     | 219  |
| Eriogonum nudum          | 1810 |
| Eriogonum nutans         | 71   |
| Eriogonum ochrocephalum  | 85   |
| Eriogonum ovalifolium    | 919  |
| Eriogonum panamintense   | 55   |
| Eriogonum parishii       | 94   |
| Eriogonum parvifolium    | 197  |
| Eriogonum pusillum       | 370  |
| Eriogonum saxatile       | 252  |
| Eriogonum shockleyi      | 154  |
| Eriogonum spergulinum    | 471  |
| Eriogonum tomentosum     | 96   |
| Eriogonum trichopes      | 543  |
| Eriogonum umbellatum     | 2383 |
| Eriogonum wrightii       | 1376 |
| Hollisteria lanata       | 140  |
| Lastarriaea coriacea     | 215  |
| Oxytheca parishii        | 204  |
| Pterostegia drymarioides | 844  |

- b) Welch Two Sample t-test. Shows that there is no statistically significant difference between the sample of 68 species used in the analysis and the distribution of values for the Eriogonodeae-wide dataset (180 species).

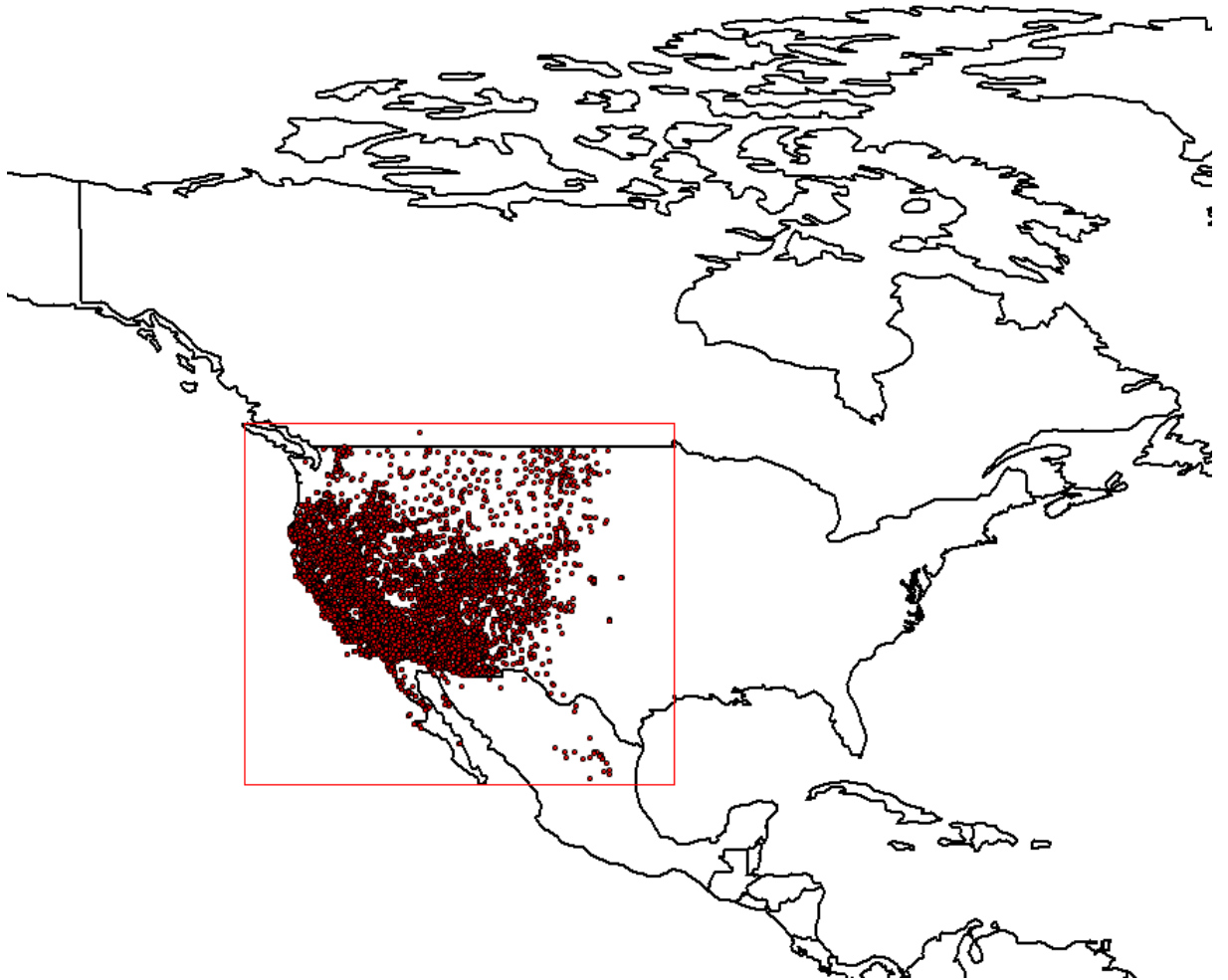
| <b>Variable</b> | <b>t-test</b> | <b>df</b> | <b>p-value</b> |
|-----------------|---------------|-----------|----------------|
| PC1m            | 0.7081        | 113.876   | 0.39034        |
| PC2m            | 0.5844        | 116.467   | 0.56           |
| PC3m            | -0.1809       | 109.916   | 0.8568         |
| PC1b            | -0.4735       | 116.416   | 0.6367         |
| PC2b            | -0.9525       | 132.518   | 0.3426         |
| PC3b            | -0.7704       | 125.732   | 0.4425         |

- c) Distribution of niche position and niche breadth values for species used in the analysis (red histogram 68 species) versus the distribution of niche position and niche breadth values for the Eriogonoideae-wide sample (in white, 180 species for which there are data). These two distributions are not different statistically, therefore the subset used in the analysis is representative.





- d) Species distribution and extent of occurrences for 68 species based on data from GBIF, CalFlora, and the Consortia of California Herbaria databases. Only 4 species (*E. cernuum*, *E. flavum*, *E. ovalifolium*, *E. umbellatum*) in our analysis have distributions expanding into Canada. The absence of occurrences in Canada for these and other species was compensated by the use of species distribution modeling.



## SI 2 Fossil calibration

Tree calibration.

| <b>Fossil name</b> | <b>Estimated dates (m.y.)</b> |
|--------------------|-------------------------------|
| Chorizanthé        | 2.5 - +/- 1.75                |
| Root               | 23.5 - +/-4.5                 |

Chorizanthé fossil obtained from:

R. Hoffmann, C. Stock, L. Miller, R. W. Chaney, and H. L. Mason. 1927. The Finding of Pleistocene Material in an Asphalt Pit at Carpinteria, California . Science 66:155-157

Root estimate obtained from:

Kostikova et al. Scale-dependent adaptive evolution and morphological convergence to climatic niche in Californian eriogonoids (Polygonaceae) Journal of Biogeography (in review)

**SI 3 Annuals and perennials**

Species classified by type of life-history trait

|  |           |
|--|-----------|
| <i>Chorizanthe angustifolia</i>                      | annual    |
| <i>Chorizanthe brevicornu</i>                        | annual    |
| <i>Chorizanthe clevelandii</i>                       | annual    |
| <i>Chorizanthe cuspidata</i> var. <i>cuspidata</i>   | annual    |
| <i>Chorizanthe diffusa</i>                           | annual    |
| <i>Chorizanthe douglasii</i>                         | annual    |
| <i>Chorizanthe fimbriata</i>                         | annual    |
| <i>Chorizanthe howellii</i>                          | annual    |
| <i>Chorizanthe leptotheca</i>                        | annual    |
| <i>Chorizanthe palmeri</i>                           | annual    |
| <i>Chorizanthe parryi</i> var. <i>fernandina</i>     | annual    |
| <i>Chorizanthe polygonoides</i>                      | annual    |
| <i>Chorizanthe procumbens</i>                        | annual    |
| <i>Chorizanthe pungens</i> var. <i>pungens</i>       | annual    |
| <i>Chorizanthe robusta</i> var. <i>robusta</i>       | annual    |
| <i>Chorizanthe staticoides</i>                       | annual    |
| <i>Chorizanthe stellulata</i>                        | annual    |
| <i>Chorizanthe uniaristata</i>                       | annual    |
| <i>Chorizanthe valida</i>                            | annual    |
| <i>Chorizanthe xanti</i>                             | annual    |
| <i>Eriogonum alatum</i> var. <i>alatum</i>           | perennial |
| <i>Eriogonum bicolor</i>                             | perennial |
| <i>Eriogonum brachyanthum</i>                        | annual    |
| <i>Eriogonum brachypodum</i>                         | annual    |
| <i>Eriogonum breedlovei</i>                          | perennial |
| <i>Eriogonum cernuum</i>                             | annual    |
| <i>Eriogonum cithariforme</i>                        | annual    |
| <i>Eriogonum clavellatum</i>                         | perennial |
| <i>Eriogonum contiguum</i>                           | annual    |
| <i>Eriogonum contortum</i>                           | annual    |
| <i>Eriogonum corymbosum</i> var. <i>corymbosum</i>   | perennial |
| <i>Eriogonum davidsonii</i>                          | annual    |
| <i>Eriogonum elegans</i>                             | annual    |
| <i>Eriogonum elongatum</i>                           | perennial |
| <i>Eriogonum esmeraldense</i> var. <i>toiyabense</i> | annual    |

|   |           |
|---|-----------|
| <i>Eriogonum fasciculatum</i> var. <i>foliolosum</i>  | perennial |
| <i>Eriogonum flavum</i>                               | perennial |
| <i>Eriogonum fusiforme</i>                            | annual    |
| <i>Eriogonum gracile</i>                              | annual    |
| <i>Eriogonum gracilipes</i>                           | perennial |
| <i>Eriogonum heermannii</i>                           | perennial |
| <i>Eriogonum hoffmannii</i> var. <i>robustius</i>     | annual    |
| <i>Eriogonum inerme</i>                               | annual    |
| <i>Eriogonum inflatum</i>                             | annual    |
| <i>Eriogonum jamesii</i>                              | perennial |
| <i>Eriogonum kennedyi</i>                             | perennial |
| <i>Eriogonum latifolium</i>                           | perennial |
| <i>Eriogonum lemmonii</i>                             | annual    |
| <i>Eriogonum maculatum</i>                            | annual    |
| <i>Eriogonum marifolium</i>                           | perennial |
| <i>Eriogonum microthecum</i>                          | perennial |
| <i>Eriogonum nidularium</i>                           | annual    |
| <i>Eriogonum nudum</i>                                | perennial |
| <i>Eriogonum nutans</i>                               | annual    |
| <i>Eriogonum ochrocephalum</i>                        | perennial |
| <i>Eriogonum ovalifolium</i> var. <i>baileym</i>      | perennial |
| <i>Eriogonum panamintense</i>                         | perennial |
| <i>Eriogonum parishii</i>                             | annual    |
| <i>Eriogonum parvifolium</i>                          | perennial |
| <i>Eriogonum pusillum</i>                             | annual    |
| <i>Eriogonum saxatile</i>                             | perennial |
| <i>Eriogonum shockleyi</i> var. <i>longilobum</i>     | perennial |
| <i>Eriogonum spergulinum</i> var. <i>reddingianum</i> | annual    |
| <i>Eriogonum tomentosum</i>                           | perennial |
| <i>Eriogonum trichopes</i> var. <i>trichopes</i>      | annual    |
| <i>Eriogonum umbellatum</i>                           | perennial |
| <i>Eriogonum wrightii</i> var. <i>subscaposum</i>     | perennial |
| <i>Pterostegia drymarioides</i>                       | annual    |



**SI 4 AUC and CI for niche models**

The accuracy and confidence intervals of niche modeling for each species. Accuracy is calculated based on hold-out dataset and 95% CI are obtained by bootstrapping.

| <b>Species</b>                        | <b>Accuracy</b> | <b>95% CI [min, max]</b> |
|---------------------------------------|-----------------|--------------------------|
| Chorizanthe brevicornu                | 0.9485          | 0.9272, 0.965            |
| Chorizanthe clevelandii               | 0.996           | 0.9857, 0.9995           |
| Chorizanthe diffusa                   | 0.9958          | 0.985, 0.9995            |
| Chorizanthe fimbriata                 | 0.9945          | 0.984, 0.9989            |
| Chorizanthe leptotheca                | 0.9938          | 0.9819, 0.9987           |
| Chorizanthe palmeri                   | 0.9918          | 0.9792, 0.9978           |
| Chorizanthe parryi var fernandina     |                 |                          |
| Chorizanthe polygonoides              | 0.9795          | 0.9626, 0.9901           |
| Chorizanthe procumbens                | 0.9886          | 0.9754, 0.9958           |
| Chorizanthe pungens var pungens       | 0.992           | 0.9795, 0.9978           |
| Chorizanthe rigida                    | 0.9459          | 0.9232, 0.9635           |
| Chorizanthe spinosa                   | 0.9981          |                          |
| Chorizanthe staticoides               | 0.9766          | 0.9595, 0.9879           |
| Chorizanthe stellulata                | 0.9886          | 0.9753, 0.9958           |
| Chorizanthe uniaristata               | 0.9877          | 0.9734, 0.9955           |
| Chorizanthe watsonii                  | 0.976           | 0.9593, 0.9872           |
| Chorizanthe xanti                     | 0.976           | 0.9585, 0.9876           |
| dleptocer                             | 0.9939          | 0.9822, 0.9987           |
| Eriogonum brachyanthum                | 0.98            | 0.9635, 0.9904           |
| Eriogonum brachypodum                 | 0.9896          | 0.976, 0.9966            |
| Eriogonum breedlovei                  | 0.9962          | 0.9862, 0.9995           |
| Eriogonum cithariforme                | 0.99            | 0.9768, 0.9967           |
| Eriogonum davidsonii                  | 0.9593          | 0.9385, 0.9746           |
| Eriogonum deflexum                    | 0.9495          | 0.9279, 0.9662           |
| Eriogonum elegans                     | 0.9961          | 0.9859, 0.9995           |
| Eriogonum elongatum                   | 0.9771          | 0.9604, 0.9881           |
| Eriogonum esmeraldense var toiyabense | 0.9872          | 0.9722, 0.9953           |
| Eriogonum fasciculatum var foliolosum | 0.947           | 0.926, 0.9635            |
| Eriogonum giganteum                   | 0.9939          | 0.9821, 0.9987           |
| Eriogonum gracile                     | 0.9616          | 0.9413, 0.9764           |
| Eriogonum gracilipes                  |                 |                          |
| Eriogonum grande                      | 0.996           | 0.9855, 0.9995           |
| Eriogonum incanum                     | 0.9866          | 0.9727, 0.9946           |
| Eriogonum inerme                      | 0.9901          | 0.977, 0.9968            |
| Eriogonum inflatum                    | 0.9257          | 0.9021, 0.9451           |
| Eriogonum kennedyi                    | 0.9923          | 0.9804, 0.9979           |
| Eriogonum latifolium                  | 0.9936          | 0.9813, 0.9987           |
| Eriogonum maculatum                   | 0.9329          | 0.9066, 0.9537           |
| Eriogonum marifolium                  | 0.985           | 0.9706, 0.9935           |
| Eriogonum microthecum                 | 0.8716          | 0.8405, 0.8985           |
| Eriogonum nidularium                  | 0.9545          | 0.9331, 0.9707           |
| Eriogonum nudum                       | 0.9373          | 0.9156, 0.9548           |
| Eriogonum ovalifolium var baileym     | 0.8937          | 0.8657, 0.9175           |
| Eriogonum panamintense                | 0.9894          | 0.9755, 0.9966           |
| Eriogonum parishii                    | 0.99            | 0.9767, 0.9967           |
| Eriogonum parvifolium                 | 0.9981          |                          |
| Eriogonum pusillum                    | 0.9643          | 0.9441, 0.9787           |
| Eriogonum saxatile                    | 0.9738          | 0.9556, 0.986            |

|  |        |                |
|--|--------|----------------|
| Eriogonum spergulinum var reddingianum | 0.9735 | 0.9567, 0.9851 |
| Eriogonum trichopes var trichopes      | 0.9309 | 0.9064, 0.9506 |
| Eriogonum umbellatum                   | 0.8243 | 0.794, 0.8518  |
| Eriogonum wrightii var subscaposum     | 0.9353 | 0.9115, 0.9542 |
| hlanatas                               | 0.992  | 0.9796, 0.9978 |
| lcoriaceas                             | 0.9664 | 0.948, 0.9796  |
| oparishiis                             | 0.9958 | 0.9848, 0.9995 |
| Pterostegia drymarioides               | 0.9665 | 0.9482, 0.9797 |

**SI 5 Relative input of variables into niche models**

The relative weight of each climatic variable in species-specific niche model

| Species  | bio1  | bio2  | bio3  | bio4  | bio5  | bio6  | bio7  | bio8  | bio9  | bio10 | bio11 | bio12 | bio13 | bio14 | bio15 | bio16 | bio17 | bio18 | bio19 |
|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| <i>Chorizanthe brevicornu</i>                      | 20.58 | 14.66 | 20.48 | 27.12 | 77.08 | 15.37 | 20.96 | 17.06 | 58.61 | 44.26 | 16.7  | 27.95 | 20.7  | 16.87 | 26.56 | 25.24 | 17.8  | 34    | 15.82 |
| <i>Chorizanthe clevelandii</i>                     | 4.13  | 1.14  | 1.53  | 1.41  | 1.68  | 2.42  | 1.19  | 3.43  | 1.68  | 2.9   | 2.36  | 2.5   | 1.85  | 2.57  | 2.6   | 2.24  | 3.73  | 6.46  | 3.7   |
| <i>Chorizanthe diffusa</i>                         | 1.32  | 1.42  | 1.26  | 3.64  | 2.79  | 0.98  | 3.81  | 1.52  | 1.21  | 2.98  | 0.83  | 1.03  | 0.86  | 0.62  | 0.74  | 0.91  | 2.19  | 3.74  | 1.08  |
| <i>Chorizanthe fimbriata</i>                       | 5.84  | 2.68  | 9.49  | 10.88 | 3.86  | 5.31  | 5.93  | 13.56 | 5.77  | 9.38  | 5.59  | 4.46  | 7.26  | 14.07 | 7.37  | 5.27  | 6.2   | 19.68 | 16.18 |
| <i>Chorizanthe leptotheca</i>                      | 2.91  | 1.07  | 2.91  | 2.48  | 2.27  | 1.73  | 1.51  | 4.04  | 2.61  | 3.85  | 2.52  | 2.22  | 2.7   | 4.25  | 2.36  | 2.47  | 3.39  | 4.77  | 5.21  |
| <i>Chorizanthe palmeri</i>                         | 1.76  | 0.42  | 1.31  | 1.91  | 1.39  | 0.43  | 0.72  | 1.41  | 1.2   | 2.3   | 0.71  | 1.04  | 0.9   | 0.76  | 0.84  | 1.06  | 2.08  | 3.06  | 2.46  |
| <i>Chorizanthe parryi</i> var<br><i>fernandina</i> | 4.43  | 1.16  | 5.59  | 3.76  | 2.86  | 3.27  | 2.07  | 6.24  | 7.79  | 5.92  | 4.18  | 2.31  | 2.01  | 3.67  | 2.28  | 2.04  | 2.52  | 8.01  | 7.33  |
| <i>Chorizanthe polygonoides</i>                    | 6.8   | 5.27  | 7.22  | 7.75  | 6.86  | 4.59  | 6.77  | 9.31  | 10.02 | 8.65  | 5     | 6.41  | 6.15  | 13.58 | 7     | 6.72  | 6.68  | 24.22 | 18.23 |
| <i>Chorizanthe procumbens</i>                      | 2.94  | 2.32  | 3.41  | 3.66  | 4.08  | 3.75  | 3.71  | 5.3   | 3.82  | 3.2   | 3.47  | 2.41  | 2.51  | 3.48  | 2.33  | 2.26  | 2.14  | 7.26  | 6.14  |
| <i>Chorizanthe pungens</i> var<br><i>pungens</i>   | 1.24  | 0.51  | 0.57  | 1.87  | 1.21  | 0.35  | 1.48  | 1.54  | 0.59  | 1.5   | 0.64  | 0.41  | 0.51  | 0.25  | 0.15  | 0.47  | 0.71  | 1.08  | 0.87  |
| <i>Chorizanthe rigida</i>                          | 12.62 | 8.69  | 10.24 | 17.55 | 63.06 | 9.36  | 12.19 | 14.32 | 31.43 | 43.77 | 10.41 | 32.14 | 24.7  | 8.97  | 17.32 | 31.14 | 11.33 | 16.95 | 9.09  |
| <i>Chorizanthe spinosa</i>                         | 1.99  | 1.02  | 1.66  | 3.51  | 1.47  | 3.8   | 3     | 2.16  | 2.45  | 2.27  | 2.43  | 2.39  | 1.27  | 1.22  | 1.1   | 1.64  | 2.07  | 6.77  | 1.09  |
| <i>Chorizanthe staticoides</i>                     | 7.93  | 5.67  | 3.67  | 7.71  | 13.3  | 7.71  | 11.27 | 12.01 | 6.36  | 6.54  | 7.8   | 8.08  | 6.91  | 17.81 | 15.34 | 9.2   | 24.18 | 47.89 | 23.11 |
| <i>Chorizanthe stellulata</i>                      | 2.65  | 1.64  | 2.96  | 4.76  | 2.91  | 1.94  | 2.9   | 3.64  | 6.42  | 3.66  | 2.79  | 2.73  | 2.32  | 1.21  | 2.79  | 2.47  | 1.26  | 7.48  | 6.24  |
| <i>Chorizanthe uniaristata</i>                     | 4.97  | 2.16  | 1.89  | 2.94  | 2.92  | 3.91  | 2.59  | 5.53  | 3.59  | 3.98  | 4.19  | 2.13  | 1.65  | 4.52  | 3.52  | 2.1   | 7.58  | 9.82  | 3.82  |
| <i>Chorizanthe watsonii</i>                        | 9.48  | 10.86 | 10.4  | 13.69 | 9.18  | 14.57 | 9.24  | 19.02 | 15.3  | 8.42  | 12.51 | 13.2  | 11.25 | 8.54  | 10.34 | 11.19 | 11.95 | 32.52 | 15.51 |
| <i>Chorizanthe xanti</i>                           | 8.7   | 4.27  | 4.96  | 5.3   | 6     | 7.68  | 4.44  | 9.4   | 8.22  | 4.72  | 7.96  | 7.02  | 6.26  | 11.06 | 6.76  | 6.6   | 13.27 | 26.2  | 14.5  |
| <i>dleptocer</i>                                   | 1.46  | 0.51  | 0.87  | 0.7   | 1.05  | 0.88  | 0.68  | 1.49  | 1.49  | 1.36  | 1.04  | 1.24  | 1.03  | 0.4   | 0.95  | 1.05  | 0.91  | 2.3   | 2.27  |
| <i>Eriogonum brachyanthum</i>                      | 3.83  | 3.28  | 4.13  | 4.75  | 3.85  | 5.67  | 3.44  | 6.45  | 4.81  | 3.86  | 4.05  | 5.58  | 4.2   | 3.21  | 4.2   | 5.1   | 3.39  | 10.99 | 4.41  |
| <i>Eriogonum brachypodium</i>                      | 3.52  | 3.13  | 2.39  | 3.43  | 4.51  | 3.51  | 3.39  | 4.08  | 3.73  | 3.75  | 3.6   | 4.82  | 3.52  | 1.49  | 3.25  | 4.05  | 2.63  | 4.34  | 4.02  |
| <i>Eriogonum breedlovei</i>                        | 0.82  | 0.45  | 1.02  | 0.73  | 0.48  | 1.02  | 0.78  | 1.42  | 0.65  | 0.52  | 1.11  | 0.79  | 0.91  | 0.45  | 1.15  | 0.69  | 1.09  | 1.15  | 0.8   |
| <i>Eriogonum cithariforme</i>                      | 4.97  | 1.5   | 1.56  | 2.3   | 3.44  | 2.19  | 1.71  | 2.6   | 2.4   | 3.7   | 2.11  | 3.17  | 1.82  | 4.26  | 3.28  | 2.68  | 6.09  | 7.75  | 5.08  |
| <i>Eriogonum davidsonii</i>                        | 13.81 | 9.38  | 9.93  | 9.93  | 10.24 | 12.61 | 9.3   | 14.71 | 11.88 | 10.91 | 16.42 | 12.99 | 12.77 | 15.25 | 10.95 | 11.31 | 12.36 | 18.71 | 23.69 |

|   |       |       |       |       |       |       |       |       |        |       |       |       |       |       |       |       |       |        |       |
|---|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| Eriogonum deflexum                        | 19.77 | 14.21 | 18.4  | 29.84 | 62.09 | 16.54 | 18.41 | 25.67 | 44.62  | 37.54 | 23.05 | 22.49 | 21.96 | 11.97 | 29.24 | 29.97 | 13.7  | 22.64  | 22.09 |
| Eriogonum elegans                         | 1.66  | 1.37  | 0.98  | 1.08  | 1.34  | 1.55  | 0.91  | 1.71  | 1.54   | 2.45  | 1.31  | 0.89  | 0.81  | 0.88  | 1.42  | 0.82  | 2.1   | 3.82   | 1.34  |
| Eriogonum elongatum                       | 7.22  | 3.51  | 7.77  | 9.28  | 6.86  | 5.13  | 5.23  | 11.9  | 6.92   | 8.15  | 6.97  | 7.42  | 5.58  | 12.56 | 8.95  | 7.03  | 13.81 | 36.72  | 21.21 |
| Eriogonum esmeraldense var<br>toiyabense  | 2.69  | 2.26  | 2.94  | 3.42  | 3.27  | 2.56  | 2.2   | 3.3   | 2.4    | 3.02  | 2.67  | 3.8   | 3.39  | 2.19  | 4.99  | 3.33  | 3.37  | 6.59   | 2.57  |
| Eriogonum fasciculatum var<br>foliolosum  | 53.04 | 18.13 | 26.62 | 27.3  | 29.37 | 61.73 | 22.99 | 60.46 | 108.99 | 29.37 | 68.2  | 30.15 | 34.31 | 90.06 | 42.23 | 31.62 | 39.03 | 130.29 | 55.23 |
| egiganteu                                 | 0.89  | 2.12  | 0.71  | 1.72  | 1.82  | 1.78  | 2.73  | 2.45  | 0.7    | 0.9   | 1.44  | 0.84  | 0.72  | 0.5   | 0.71  | 0.59  | 1.33  | 2.85   | 1.35  |
| Eriogonum gracile                         | 13.13 | 4.53  | 5.61  | 10.24 | 6.13  | 8.02  | 6.25  | 15.9  | 11.19  | 12.06 | 8.69  | 13.48 | 9.94  | 28.45 | 17.23 | 11.64 | 25.01 | 53.05  | 37.41 |
| Eriogonum gracilipes                      | 0.81  | 0.36  | 0.52  | 0.8   | 1     | 0.58  | 0.56  | 0.52  | 0.73   | 0.99  | 0.79  | 0.96  | 0.66  | 0.52  | 0.57  | 0.95  | 0.74  | 1.23   | 0.62  |
| Eriogonum grande                          | 0.67  | 1.28  | 0.3   | 2.12  | 1.23  | 0.72  | 3.31  | 0.78  | 0.64   | 0.66  | 0.82  | 0.38  | 0.33  | 0.79  | 0.67  | 0.35  | 1.06  | 1.6    | 0.6   |
| Eriogonum incanum                         | 5.14  | 3.67  | 5.99  | 6.71  | 6.34  | 6.4   | 5.53  | 8.48  | 3.86   | 7.76  | 5.53  | 5.56  | 4.61  | 7.7   | 8.51  | 4.54  | 9.46  | 13.31  | 8.99  |
| Eriogonum inerme                          | 2.98  | 1.65  | 1.25  | 1.63  | 1.95  | 1.77  | 1.24  | 2.96  | 2.4    | 2.47  | 2.57  | 2.09  | 1.31  | 1.61  | 1.85  | 1.91  | 3.31  | 5.41   | 3.05  |
| Eriogonum inflatum                        | 24.99 | 13.77 | 22.78 | 27.5  | 78.05 | 25.3  | 19.9  | 22.41 | 41.11  | 41.79 | 34.22 | 67.37 | 45.15 | 15.93 | 44.67 | 61.08 | 18.95 | 38.23  | 20.55 |
| Eriogonum kennedyi                        | 2.95  | 2.25  | 2.2   | 2.19  | 2.88  | 2.08  | 1.91  | 3.28  | 2.64   | 2.53  | 2.47  | 2.75  | 2.19  | 2.95  | 2.46  | 2.18  | 3.17  | 4.59   | 2.49  |
| Eriogonum latifolium                      | 3.49  | 4.74  | 3.32  | 8.25  | 4.88  | 4.52  | 12.62 | 5.48  | 2.56   | 4.5   | 4.51  | 3.84  | 3.65  | 2.89  | 3.34  | 4.06  | 3.18  | 8.34   | 7.46  |
| Eriogonum maculatum                       | 12.71 | 12.39 | 11.68 | 18.17 | 12.86 | 18.23 | 12.43 | 14.58 | 16.54  | 11.32 | 16.05 | 17.1  | 16.95 | 9.9   | 16.62 | 19.45 | 12.73 | 33.67  | 14.22 |
| Eriogonum marifolium                      | 7.48  | 8.55  | 9.45  | 15.14 | 5.24  | 12.59 | 8.29  | 13.67 | 3.7    | 5.77  | 11.2  | 12.58 | 9.33  | 7.13  | 11.82 | 11.11 | 6.03  | 10.42  | 21.05 |
| Eriogonum microthecum                     | 24.95 | 29.83 | 28.55 | 35.24 | 23.85 | 34.27 | 27.56 | 34.49 | 27.93  | 21.8  | 29.17 | 30.07 | 35.85 | 22.62 | 38.93 | 39.18 | 31.48 | 59.79  | 33.2  |
| Eriogonum nidularium                      | 7.55  | 8.59  | 6.39  | 13.11 | 8.5   | 8.19  | 9.31  | 9.59  | 8.68   | 8.23  | 8.27  | 12.82 | 12.69 | 4.49  | 9.86  | 12.71 | 7.69  | 19.26  | 9.1   |
| Eriogonum nudum                           | 23.71 | 21.28 | 33.1  | 72.44 | 15.39 | 18.26 | 29.26 | 59.26 | 17.15  | 17.3  | 20.84 | 36.55 | 49.51 | 29.99 | 44.82 | 67.78 | 29.61 | 116.97 | 143   |
| Eriogonum ovalifolium var<br>baileym      | 34.39 | 35.41 | 23.84 | 32.45 | 30.51 | 36.64 | 29.07 | 47.9  | 29.18  | 32.66 | 35.51 | 33.28 | 47.42 | 29.28 | 45.26 | 45.17 | 39.49 | 87.02  | 31.67 |
| Eriogonum panamintense                    | 1.8   | 2.61  | 2.28  | 2.81  | 2.95  | 1.65  | 2.93  | 2.27  | 2.47   | 2.12  | 1.87  | 2.38  | 1.87  | 1.48  | 2.7   | 2.23  | 1.71  | 2.13   | 2.82  |
| Eriogonum parishii                        | 2.35  | 1.41  | 1.18  | 2.08  | 2.45  | 2.47  | 2.07  | 2.64  | 2.85   | 2.41  | 2.41  | 2.41  | 2.3   | 1.94  | 2.05  | 2.16  | 2.19  | 2.94   | 2.55  |
| Eriogonum parvifolium                     | 2.17  | 4.76  | 3.03  | 6.67  | 6.85  | 2.5   | 10.75 | 3.17  | 1.94   | 3.71  | 2.47  | 2.36  | 2.15  | 3.88  | 2.47  | 2.66  | 8.75  | 11.57  | 5.19  |
| Eriogonum pusillum                        | 8.24  | 7.54  | 7.37  | 11.75 | 6.82  | 11.07 | 8.42  | 10.74 | 9.33   | 7.32  | 10.94 | 14.31 | 11.24 | 6.41  | 8.58  | 13.63 | 8.5   | 23.86  | 8.66  |
| Eriogonum saxatile                        | 9.71  | 4.01  | 3.19  | 4.08  | 6.47  | 5.1   | 3.94  | 8.4   | 5.44   | 6.55  | 4.38  | 7.65  | 6.36  | 6.91  | 6.23  | 6.67  | 7.31  | 17.09  | 12.97 |
| Eriogonum spergulinum var<br>reddingianum | 10.97 | 7.84  | 16.53 | 19.51 | 13.25 | 12.91 | 8.2   | 19.65 | 6.17   | 11.71 | 10.86 | 11.1  | 10.92 | 11.13 | 13.98 | 10.74 | 16.71 | 32.18  | 27.37 |

|                                    |       |       |       |       |       |       |       |        |       |       |       |       |       |       |       |       |       |        |        |
|------------------------------------|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|
| Eriogonum trichopes var trichopes  | 17.37 | 10.99 | 9.78  | 19.94 | 41.8  | 14.3  | 13.2  | 14.77  | 36.41 | 25.77 | 15.67 | 16.14 | 13.39 | 12.29 | 18.25 | 17.61 | 11.81 | 16.27  | 18.4   |
| Eriogonum umbellatum               | 45.66 | 50.19 | 67.79 | 62.04 | 42.29 | 46.48 | 48.69 | 127.38 | 47.05 | 62.86 | 43.9  | 47.59 | 39.08 | 37.22 | 62.99 | 40.72 | 54.31 | 97.25  | 114.98 |
| Eriogonum wrightii var subscaposum | 24.1  | 18.99 | 48.15 | 63.51 | 20.04 | 30.74 | 39.33 | 25.71  | 34.61 | 19.52 | 31.72 | 27.78 | 27.65 | 28.11 | 39.93 | 23.94 | 31.27 | 33.38  | 81.74  |
| hlanata                            | 3.81  | 2.5   | 1.39  | 2.86  | 2.01  | 5.04  | 2.24  | 4.79   | 4.47  | 2.65  | 4.11  | 2.22  | 2.11  | 3.61  | 2.88  | 2.08  | 9.81  | 14.43  | 3.28   |
| lcoriacea                          | 5.63  | 4.33  | 3.11  | 4.82  | 5.77  | 5.45  | 4.37  | 7.99   | 6.51  | 6.14  | 4.54  | 5.94  | 6.09  | 6.57  | 5.45  | 5.88  | 11.57 | 21.05  | 10.99  |
| oparishii                          | 1.58  | 1.7   | 2.61  | 2.84  | 1.19  | 3.53  | 1.51  | 2.65   | 1.59  | 1.3   | 2.56  | 3.71  | 3.48  | 4.36  | 2.05  | 2.63  | 2.17  | 3.46   | 3.9    |
| Pterostegia drymarioides           | 19.78 | 10.32 | 9     | 15.02 | 9.62  | 25.63 | 13.23 | 33.18  | 21.13 | 13.82 | 23    | 15.17 | 12.57 | 72.65 | 29.28 | 13.39 | 47.61 | 112.62 | 51.88  |

**SI 6 Test for normality of PC variances**

Test for normality of each PC score. The non-significant p-values confirm that the PC score follows normal distribution.

| Species                               | PC1    | PC1 p-value | PC2    | PC2 p-value | PC3    | PC3 p-value |
|---------------------------------------|--------|-------------|--------|-------------|--------|-------------|
| Chorizanthe_angustifolia              | 40.99  | 0.4710      | 31.078 | 0.8690      | 31.078 | 0.8690      |
| Chorizanthe_brevicornu                | 38.386 | 0.5870      | 71.02  | 0.0025      | 71.02  | 0.0025      |
| Chorizanthe_clevelandii               | 43.51  | 0.3650      | 38.092 | 0.6010      | 38.092 | 0.6010      |
| Chorizanthe_cuspidata_var_cuspidata   | 48.97  | 0.1840      | 47.458 | 0.2260      | 47.458 | 0.2260      |
| Chorizanthe_diffusa                   | 31.75  | 0.8500      | 26.878 | 0.9560      | 26.878 | 0.9560      |
| Chorizanthe_douglasii                 | 36.454 | 0.6730      | 34.69  | 0.7460      | 34.69  | 0.7460      |
| Chorizanthe_fimbriata                 | 57.832 | 0.0424      | 48.34  | 0.2010      | 48.34  | 0.2010      |
| Chorizanthe_howellii                  | 62.872 | 0.0156      | 25.87  | 0.9690      | 25.87  | 0.9690      |
| Chorizanthe_leptotheca                | 56.068 | 0.0586      | 42.04  | 0.4260      | 42.04  | 0.4260      |
| Chorizanthe_palmeri                   | 41.956 | 0.4290      | 44.266 | 0.3360      | 44.266 | 0.3360      |
| Chorizanthe_parryi_var_fernandina     | 39.394 | 0.5420      | 33.64  | 0.7860      | 33.64  | 0.7860      |
| Chorizanthe_polygonoides              | 55.69  | 0.0627      | 40.822 | 0.4780      | 40.822 | 0.4780      |
| Chorizanthe_procumbens                | 40.99  | 0.4710      | 29.062 | 0.9190      | 29.062 | 0.9190      |
| Chorizanthe_pungens_var_pungens       | 54.388 | 0.0786      | 50.02  | 0.1580      | 50.02  | 0.1580      |
| Chorizanthe_rigida                    | 51.7   | 0.1220      | 94.624 | 0.0000      | 94.624 | 0.0000      |
| Chorizanthe_robusta_var_robusta       | 55.396 | 0.0660      | 44.392 | 0.3310      | 44.392 | 0.3310      |
| Chorizanthe_spinosa                   | 66.526 | 0.0071      | 46.954 | 0.2420      | 46.954 | 0.2420      |
| Chorizanthe_staticoides               | 33.766 | 0.7810      | 40.402 | 0.4970      | 40.402 | 0.4970      |
| Chorizanthe_stellulata                | 39.184 | 0.5520      | 95.38  | 0.0000      | 95.38  | 0.0000      |
| Chorizanthe_uniaristata               | 47.038 | 0.2390      | 49.642 | 0.1670      | 49.642 | 0.1670      |
| Chorizanthe_valida                    | 32.8   | 0.8160      | 46.492 | 0.2560      | 46.492 | 0.2560      |
| Chorizanthe_watsonii                  | 54.892 | 0.0721      | 37.126 | 0.6430      | 37.126 | 0.6430      |
| Chorizanthe_xanti                     | 35.866 | 0.6980      | 26.416 | 0.9620      | 26.416 | 0.9620      |
| dleptocer                             | 37.63  | 0.6210      | 53.674 | 0.0887      | 53.674 | 0.0887      |
| Eriogonum_alatum_var_alatum           | 31.288 | 0.8630      | 26.038 | 0.9670      | 26.038 | 0.9670      |
| Eriogonum_batemani                    | 29.482 | 0.9100      | 108.86 | 0.0000      | 108.8  | 0.0000      |
| Eriogonum_bicolor                     | 51.406 | 0.1280      | 52.036 | 0.1160      | 52.036 | 0.1160      |
| Eriogonum_brachyanthum                | 29.566 | 0.9080      | 39.646 | 0.5310      | 39.646 | 0.5310      |
| Eriogonum_brachypodium                | 45.442 | 0.2920      | 75.346 | 0.0009      | 75.346 | 0.0009      |
| Eriogonum_breedlovei                  | 52.75  | 0.1030      | 143.1  | 0.0000      | 143.13 | 0.0000      |
| Eriogonum_cernuum                     | 51.742 | 0.1210      | 44.35  | 0.3320      | 44.35  | 0.3320      |
| Eriogonum_cithariforme                | 44.812 | 0.3150      | 48.046 | 0.2090      | 48.046 | 0.2090      |
| Eriogonum_clavellatum                 | 65.938 | 0.0081      | 38.218 | 0.5950      | 38.218 | 0.5950      |
| Eriogonum_contiguum                   | 32.338 | 0.8310      | 131.08 | 0.0000      | 131.08 | 0.0000      |
| Eriogonum_contortum                   | 52.414 | 0.1090      | 46.114 | 0.2690      | 46.114 | 0.2690      |
| Eriogonum_corymbosum_var_corymbosum   | 59.932 | 0.0283      | 64.594 | 0.0108      | 64.594 | 0.0108      |
| Eriogonum_davidsonii                  | 40.444 | 0.4950      | 56.026 | 0.0590      | 56.026 | 0.0590      |
| Eriogonum_deflexum                    | 49.096 | 0.1800      | 89.248 | 0.0000      | 89.248 | 0.0000      |
| Eriogonum_elegans                     | 29.356 | 0.9130      | 54.052 | 0.0832      | 54.052 | 0.0832      |
| Eriogonum_elongatum                   | 56.572 | 0.0535      | 26.374 | 0.9630      | 26.374 | 0.9630      |
| Eriogonum_esmeraldense_var_toiyabense | 44.392 | 0.3310      | 46.324 | 0.2620      | 46.324 | 0.2620      |
| Eriogonum_fasciculatum_var_foliolosum | 39.52  | 0.5360      | 55.858 | 0.0608      | 55.858 | 0.0608      |
| Eriogonum_flavum                      | 62.788 | 0.0159      | 46.912 | 0.2430      | 46.912 | 0.2430      |
| Eriogonum_fusiforme                   | 84.796 | 0.0001      | 46.912 | 0.2430      | 46.912 | 0.2430      |
| Eriogonum_giganteum                   | 39.352 | 0.5440      | 48.844 | 0.1870      | 48.844 | 0.1870      |
| Eriogonum_gracile                     | 34.606 | 0.7490      | 48.844 | 0.1870      | 48.844 | 0.1870      |
| Eriogonum_gracilipes                  | 35.11  | 0.7290      | 81.646 | 0.0002      | 81.646 | 0.0002      |
| Eriogonum_grande                      | 98.362 | 0.0000      | 37.798 | 0.6140      | 37.798 | 0.6140      |
| Eriogonum_heermannii                  | 44.14  | 0.3400      | 39.898 | 0.5200      | 39.898 | 0.5200      |

|  |        |        |        |        |        |        |
|--|--------|--------|--------|--------|--------|--------|
| Eriogonum_hoffmannii_var_robustus      | 50.104 | 0.1560 | 125.07 | 0.0000 | 125.07 | 0.0000 |
| Eriogonum_incanum                      | 45.862 | 0.2780 | 50.902 | 0.1380 | 50.902 | 0.1380 |
| Eriogonum_inerme                       | 44.224 | 0.3370 | 56.866 | 0.0507 | 56.866 | 0.0507 |
| Eriogonum_inflatum                     | 45.106 | 0.3040 | 53.002 | 0.0991 | 53.002 | 0.0991 |
| Eriogonum_jamesii                      | 32.8   | 0.8160 | 35.404 | 0.7170 | 35.404 | 0.7170 |
| Eriogonum_kennedyi                     | 46.702 | 0.2500 | 28.012 | 0.9390 | 28.012 | 0.9390 |
| Eriogonum_latifolium                   | 32.926 | 0.8110 | 66.862 | 0.0066 | 66.862 | 0.0066 |
| Eriogonum_lemmonii                     | 29.986 | 0.8980 | 46.072 | 0.2700 | 46.072 | 0.2700 |
| Eriogonum_maculatum                    | 41.62  | 0.4440 | 59.638 | 0.0300 | 59.638 | 0.0300 |
| Eriogonum_marifolium                   | 58.63  | 0.0365 | 34.144 | 0.7670 | 34.144 | 0.7670 |
| Eriogonum_microthecum                  | 39.226 | 0.5500 | 45.526 | 0.2890 | 45.526 | 0.2890 |
| Eriogonum_nidularium                   | 53.674 | 0.0887 | 66.148 | 0.0077 | 66.148 | 0.0077 |
| Eriogonum_nudum                        | 37.462 | 0.6290 | 42.208 | 0.4190 | 42.208 | 0.4190 |
| Eriogonum_nutans                       | 106.80 | 0.0000 | 62.284 | 0.0176 | 62.284 | 0.0176 |
| Eriogonum_ochrocephalum                | 92.482 | 0.0000 | 54.22  | 0.0809 | 54.22  | 0.0809 |
| Eriogonum_ovalifolium_var_baileym      | 45.106 | 0.3040 | 28.6   | 0.9280 | 28.6   | 0.9280 |
| Eriogonum_panamintense                 | 37.504 | 0.6270 | 59.512 | 0.0307 | 59.512 | 0.0307 |
| Eriogonum_parishii                     | 38.344 | 0.5890 | 62.326 | 0.0175 | 62.326 | 0.0175 |
| Eriogonum_parvifolium                  | 46.786 | 0.2470 | 25.576 | 0.9720 | 25.576 | 0.9720 |
| Eriogonum_pusillum                     | 44.056 | 0.3440 | 49.558 | 0.1690 | 49.558 | 0.1690 |
| Eriogonum_saxatile                     | 45.022 | 0.3070 | 71.734 | 0.0021 | 71.734 | 0.0021 |
| Eriogonum_shockleyi_var_longilobum     | 103.73 | 0.0000 | 35.152 | 0.7270 | 35.152 | 0.7270 |
| Eriogonum_spergulinum_var_reddingianum | 67.66  | 0.0055 | 31.498 | 0.8570 | 31.498 | 0.8570 |
| Eriogonum_tomentosum                   | 50.692 | 0.1430 | 49.264 | 0.1760 | 49.264 | 0.1760 |
| Eriogonum_trichopes_var_trichopes      | 60.268 | 0.0265 | 66.022 | 0.0079 | 66.022 | 0.0079 |
| Eriogonum_umbellatum                   | 40.318 | 0.5010 | 46.912 | 0.2430 | 46.912 | 0.2430 |
| Eriogonum_wrightii_var_subscaposum     | 44.812 | 0.3150 | 60.562 | 0.0250 | 60.562 | 0.0250 |
| Hollisteria lanata                     | 60.646 | 0.0246 | 52.666 | 0.1050 | 52.666 | 0.1050 |
| Icariacea                              | 46.114 | 0.2690 | 39.226 | 0.5500 | 39.226 | 0.5500 |
| oparishii                              | 90.088 | 0.0000 | 53.884 | 0.0856 | 53.884 | 0.0856 |
| Pterostegia_drymarioides               | 39.94  | 0.5180 | 61.108 | 0.0224 | 61.108 | 0.0224 |

**SI 7 Niche position and niche breadth values**

The niche position (PC1mean, PC2mean and PC3mean) and niche breadth (PC1breadth, PC2breadth, PC3breadth) estimates used for the evolutionary analyses.

| Species  | PC1mean | PC2mean  | PC3mean  | PC1breadth | PC2breadth | PC3breadth |
|--|---------|----------|----------|------------|------------|------------|
| <i>Chorizanthe angustifolia</i>                      | 2.28915 | 0.352971 | 0.843941 | 0.396603   | 0.235608   | 0.127922   |
| <i>Chorizanthe brevicornu</i>                        | 0.93718 | 1.615302 | -0.66383 | 0.804695   | 0.545486   | 0.391861   |
| <i>Chorizanthe clevelandii</i>                       | 0.51093 | 0.741421 | 0.531891 | 0.433319   | 0.384453   | 0.234823   |
| <i>Chorizanthe cuspidata</i> var<br><i>cuspidata</i> | 4.14322 | -0.08782 | 0.05225  | 0.348176   | 0.345455   | 0.321923   |
| <i>Chorizanthe diffusa</i>                           | 1.55432 | 0.282316 | 0.767792 | 0.467459   | 0.483058   | 0.256908   |
| <i>Chorizanthe douglasii</i>                         | 1.23502 | 0.524633 | 0.686265 | 0.463446   | 0.504661   | 0.259162   |
| <i>Chorizanthe fimbriata</i>                         | 1.7684  | 0.656186 | 0.090324 | 0.5472     | 0.514308   | 0.378769   |
| <i>Chorizanthe howellii</i>                          | 4.20592 | -2.25363 | -0.75577 | 0.416595   | 0.518491   | 0.705762   |
| <i>Chorizanthe leptotheca</i>                        | 0.85381 | 0.94364  | 0.264928 | 0.421684   | 0.440277   | 0.252851   |
| <i>Chorizanthe palmeri</i>                           | 0.13078 | 0.776482 | 1.027257 | 0.138963   | 0.118411   | 0.054518   |
| <i>Chorizanthe parryi</i> var<br><i>fernandina</i>   | 1.40881 | 0.358387 | 0.367437 | 0.581129   | 0.519923   | 0.356764   |
| <i>Chorizanthe polygonoides</i>                      | 0.94049 | 0.448119 | 0.357369 | 0.608151   | 0.514064   | 0.369976   |
| <i>Chorizanthe procumbens</i>                        | 1.44538 | 0.375605 | 0.560304 | 0.454684   | 0.466003   | 0.25165    |
| <i>Chorizanthe pungens</i> var<br><i>pungens</i>     | 1.60713 | -0.3885  | 0.954924 | 0.490445   | 0.398346   | 0.240671   |
| <i>Chorizanthe rigida</i>                            | 0.91091 | 1.887739 | -0.75691 | 0.838989   | 0.49616    | 0.320843   |
| <i>Chorizanthe robusta</i> var<br><i>robusta</i>     | 2.11537 | -0.57072 | 0.909095 | 0.506433   | 0.40454    | 0.272389   |
| <i>Chorizanthe spinosa</i>                           | 0.60589 | 1.5685   | -0.31366 | 0.635819   | 0.460061   | 0.297261   |
| <i>Chorizanthe staticoides</i>                       | 1.9017  | 0.487447 | 0.156776 | 0.598591   | 0.581833   | 0.383656   |
| <i>Chorizanthe stellulata</i>                        | 0.37372 | 0.113101 | -0.27879 | 0.558825   | 0.747234   | 1.226798   |
| <i>Chorizanthe uniaristata</i>                       | 0.61057 | 1.200346 | 0.204412 | 0.521507   | 0.458771   | 0.266463   |
| <i>Chorizanthe valida</i>                            | 0.87931 | 0.42151  | 1.00946  | 0.235341   | 0.274905   | 0.091662   |
| <i>Chorizanthe watsonii</i>                          | -0.4869 | 0.365867 | 0.249243 | 0.970093   | 0.638135   | 0.396519   |
| <i>Chorizanthe xanti</i>                             | 1.21103 | 0.152579 | 0.458666 | 0.59581    | 0.511758   | 0.359869   |
| <i>Eriogonum alatum</i> var<br><i>alatum</i>         | -1.4832 | -1.56257 | -0.37893 | 1.046144   | 1.241306   | 1.555803   |
| <i>Eriogonum bicolor</i>                             | -2.0329 | 0.064279 | -0.23347 | 1.102613   | 0.679304   | 0.41367    |
| <i>Eriogonum brachyanthum</i>                        | -0.6742 | 1.318197 | 0.070158 | 0.571526   | 0.486084   | 0.308067   |
| <i>Eriogonum brachypodium</i>                        | -1.7266 | 2.070634 | -0.16649 | 0.390816   | 0.249106   | 0.16038    |
| <i>Eriogonum breedlovei</i>                          | -0.5239 | 1.21192  | 0.415084 | 0.345522   | 0.381001   | 0.188214   |
| <i>Eriogonum cernuum</i>                             | -2.0703 | -1.95316 | -0.31908 | 1.17593    | 1.383422   | 1.780569   |
| <i>Eriogonum cithariforme</i>                        | 0.27281 | 0.872958 | 0.411916 | 0.369667   | 0.434825   | 0.257591   |
| <i>Eriogonum clavellatum</i>                         | -2.4366 | -0.06844 | -0.1512  | 1.209144   | 0.847506   | 0.550663   |
| <i>Eriogonum contiguum</i>                           | -0.7276 | 2.979635 | -0.5809  | 0.45032    | 0.157945   | 0.147562   |
| <i>Eriogonum contortum</i>                           | -3.2448 | 1.22603  | -0.01282 | 0.597203   | 0.408632   | 0.232441   |
| <i>Eriogonum corymbosum</i><br>var <i>corymbosum</i> | -1.8044 | -0.12559 | -0.18954 | 1.288703   | 0.970818   | 0.627701   |
| <i>Eriogonum davidsonii</i>                          | 0.30369 | -0.01085 | -0.61888 | 0.652294   | 0.90338    | 1.549389   |
| <i>Eriogonum deflexum</i>                            | 0.37883 | 1.443529 | -0.65735 | 0.839413   | 0.616972   | 0.47506    |



|   |         |          |          |          |          |          |
|---|---------|----------|----------|----------|----------|----------|
| <i>Eriogonum elegans</i>                                | -0.1293 | 1.062614 | 0.650878 | 0.21982  | 0.304495 | 0.128315 |
| <i>Eriogonum elongatum</i>                              | 0.83895 | 0.513133 | 0.438334 | 0.484562 | 0.48632  | 0.344207 |
| <i>Eriogonum esmeraldense</i><br>var <i>toiyabense</i>  | -1.5726 | -2.62479 | -2.33078 | 0.867621 | 0.931825 | 0.707428 |
| <i>Eriogonum fasciculatum</i><br>var <i>foliolosum</i>  | 1.26998 | 0.851263 | -0.44502 | 0.750122 | 0.653301 | 0.632409 |
| <i>Eriogonum flavum</i>                                 | -2.0066 | -3.01064 | 0.38049  | 1.395999 | 1.011099 | 1.105693 |
| <i>Eriogonum fusiforme</i>                              | -4.1883 | 0.869621 | 0.020816 | 0.21634  | 0.40745  | 0.144905 |
| <i>Eriogonum gracile</i>                                | 0.93658 | -0.81876 | -0.75845 | 0.484011 | 0.952673 | 1.935044 |
| <i>Eriogonum gracilipes</i>                             | -1.9089 | -3.68094 | 1.318437 | 0.463104 | 0.536315 | 0.441774 |
| <i>Eriogonum grande</i>                                 | 4.25369 | -1.64498 | -1.36032 | 0.325666 | 0.680894 | 0.960061 |
| <i>Eriogonum heermannii</i>                             | -0.8391 | -0.58894 | -1.93329 | 0.778159 | 1.059388 | 1.83153  |
| <i>Eriogonum hoffmannii</i><br>var <i>robustius</i>     | -1.77   | 2.742408 | -0.76225 | 0.358764 | 0.189758 | 0.144393 |
| <i>Eriogonum incanum</i>                                | 0.34216 | -3.18215 | 0.984931 | 0.815691 | 0.886006 | 0.908152 |
| <i>Eriogonum inerme</i>                                 | -0.1273 | 0.391201 | 0.919877 | 0.248049 | 0.380633 | 0.179361 |
| <i>Eriogonum inflatum</i>                               | 0.33821 | 1.314836 | -0.60239 | 0.91409  | 0.644491 | 0.482319 |
| <i>Eriogonum jamesii</i>                                | 0.19658 | -2.54071 | -0.30764 | 1.179738 | 1.3664   | 1.904724 |
| <i>Eriogonum kennedyi</i>                               | 0.22183 | -1.25476 | 0.852055 | 0.658823 | 0.991066 | 0.60337  |
| <i>Eriogonum latifolium</i>                             | 1.77105 | -1.22202 | 0.474803 | 0.441641 | 0.634222 | 0.873073 |
| <i>Eriogonum lemmonii</i>                               | -2.4102 | 1.809175 | -0.10397 | 0.49257  | 0.402821 | 0.246011 |
| <i>Eriogonum maculatum</i>                              | -0.4926 | 1.194966 | -0.19694 | 0.654574 | 0.543603 | 0.363365 |
| <i>Eriogonum marifolium</i>                             | 0.108   | -3.35154 | -0.11489 | 0.765274 | 1.012197 | 1.851601 |
| <i>Eriogonum microthecum</i>                            | -1.4829 | -1.51012 | -0.72037 | 1.056558 | 1.334445 | 1.84252  |
| <i>Eriogonum nidularium</i>                             | -0.9758 | 1.152401 | -0.28922 | 0.812484 | 0.57488  | 0.386975 |
| <i>Eriogonum nudum</i>                                  | 0.81576 | -1.30979 | 0.122886 | 0.643435 | 0.940569 | 1.249796 |
| <i>Eriogonum nutans</i>                                 | -2.7219 | -0.0931  | 0.284551 | 0.830419 | 0.653282 | 0.368573 |
| <i>Eriogonum ochrocephalum</i>                          | -2.7299 | -0.61912 | 0.627305 | 0.78464  | 0.620038 | 0.345661 |
| <i>Eriogonum ovalifolium</i><br>var <i>baileym</i>      | -1.3925 | -1.77522 | 0.562653 | 1.259233 | 1.170827 | 0.791899 |
| <i>Eriogonum panamintense</i>                           | -1.0936 | -0.13331 | -1.52575 | 0.630573 | 1.15713  | 1.720083 |
| <i>Eriogonum parishii</i>                               | -0.6633 | -1.82363 | 1.112525 | 0.439485 | 0.992207 | 0.841636 |
| <i>Eriogonum parvifolium</i>                            | 2.60795 | -0.15984 | 0.370374 | 0.535909 | 0.576224 | 0.450915 |
| <i>Eriogonum pusillum</i>                               | -0.71   | 1.522397 | -0.34164 | 0.604781 | 0.460493 | 0.315553 |
| <i>Eriogonum saxatile</i>                               | 0.38254 | -0.1574  | 0.714633 | 0.469327 | 0.577604 | 0.385169 |
| <i>Eriogonum shockleyi</i> var<br><i>longilobum</i>     | -2.7062 | -0.17142 | 0.006287 | 0.961743 | 0.735949 | 0.484726 |
| <i>Eriogonum spergulinum</i><br>var <i>reddingianum</i> | -0.0091 | -2.53749 | -1.21934 | 0.79028  | 1.418696 | 1.927035 |
| <i>Eriogonum tomentosum</i>                             | 1.9069  | -1.07244 | -2.78813 | 0.472814 | 0.313377 | 0.468881 |
| <i>Eriogonum trichopes</i> var<br><i>trichopes</i>      | 0.5679  | 1.721512 | -0.78013 | 0.64046  | 0.49295  | 0.627701 |
| <i>Eriogonum umbellatum</i>                             | -0.7349 | -2.28486 | 0.367689 | 1.191084 | 1.271876 | 1.325879 |
| <i>Eriogonum wrightii</i> var<br><i>subscaposum</i>     | 0.93548 | -0.04521 | 0.023575 | 0.742754 | 0.94915  | 0.721768 |
| <i>Pterostegia drymarioides</i>                         | 1.18112 | 0.636149 | -0.19129 | 0.619175 | 0.64826  | 0.571769 |



**SI 8 Kurtosis for PC scores distributions**

The kurtosis values for each PC score for the species which distribution was significantly different from normal expectations. To test if the kurtosis is different from normal expectations or not, we simulated 1000 normal distribution where number of observations was equal to number of observations for each species, calculated for each normal distribution kurtosis and tested the observed kurtosis was outside the 95% confidence intervals. None of the kurtosis was outside 95% CI.

| <b>Species</b>                         | <b>PC1</b> | <b>PC2</b> | <b>PC3</b> |
|--|------------|------------|------------|
| Chorizanthe_fimbriata                  | -0.1400    | -0.1384    | 0.7751     |
| Chorizanthe_howellii                   | 0.0688     | 0.0627     | -0.0754    |
| Chorizanthe_spinosa                    | -0.0288    | 0.1668     | 1.4471     |
| Eriogonum_clavellatum                  | 0.0101     | -0.1314    | 0.4469     |
| Eriogonum_corymbosum_var_corymbosum    | -0.0968    | -0.2003    | 0.0818     |
| Eriogonum_flavum                       | 0.0930     | 0.2090     | 0.1114     |
| Eriogonum_fusifforme                   | 0.2275     | -0.3658    | -0.1987    |
| Eriogonum_grande                       | 0.0341     | -0.1771    | -0.3269    |
| Eriogonum_marifolium                   | 0.0346     | -0.3716    | -0.5303    |
| Eriogonum_nutans                       | 0.0809     | 0.1421     | 0.8316     |
| Eriogonum_ochrocephalum                | 0.2481     | -0.1350    | 1.2096     |
| Eriogonum_shockleyi_var_longilobum     | 0.3481     | -0.0127    | 0.5346     |
| Eriogonum_spergulinum_var_reddingianum | -0.0518    | -0.0856    | -0.4024    |
| Eriogonum_trichopes_var_trichopes      | -0.1630    | 0.0886     | 1.6873     |

**SI 9 Geographical range for each species**

The estimated area of occupancy for each species

| species   | area of occupancy | extent of occurrences |
|---|-------------------|-----------------------|
| <i>Chorizanthe brevicornu</i>                       | 36.56052918       | 35.56052918           |
| <i>Chorizanthe clevelandii</i>                      | 5.835567612       | 2.835567612           |
| <i>Chorizanthe cuspidata</i> var <i>cuspidata</i>   | 0.382962021       | 2.617037979           |
| <i>Chorizanthe diffusa</i>                          | 3.010632482       | 1.989367518           |
| <i>Chorizanthe douglasii</i>                        | 2.387994032       | 2.387994032           |
| <i>Chorizanthe fimbriata</i>                        | 6.515743357       | 4.515743357           |
| <i>Chorizanthe leptotheca</i>                       | 3.405550599       | 1.594449401           |
| <i>Chorizanthe palmeri</i>                          | 2.01200552        | 0.98799448            |
| <i>Chorizanthe parryi</i> var <i>fernandina</i>     | 1.610844459       | 3.389155541           |
| <i>Chorizanthe polygonoides</i>                     | 12.18047586       | 9.18047586            |
| <i>Chorizanthe procumbens</i>                       | 3.015675917       | 2.015675917           |
| <i>Chorizanthe pungens</i> var <i>pungens</i>       | 0.902133322       | 1.097866678           |
| <i>Chorizanthe rigida</i>                           | 18.26074859       | 15.26074859           |
| <i>Chorizanthe robusta</i> var <i>robusta</i>       | 0.271313192       | 0.271313192           |
| <i>Chorizanthe spinosa</i>                          | 2.058394614       | 2.941605386           |
| <i>Chorizanthe staticoides</i>                      | 3.669675648       | 3.669675648           |
| <i>Chorizanthe stellulata</i>                       | 5.98227204        | 0.98227204            |
| <i>Chorizanthe uniaristata</i>                      | 1.938628247       | 1.938628247           |
| <i>Chorizanthe watsonii</i>                         | 28.31478897       | 25.31478897           |
| <i>Chorizanthe xanti</i>                            | 7.083371276       | 3.083371276           |
| <i>Eriogonum alatum</i> var <i>alatum</i>           | 81.17398524       | 81.17398524           |
| <i>Eriogonum bicolor</i>                            | 5.311299264       | 3.311299264           |
| <i>Eriogonum brachyanthum</i>                       | 9.811343317       | 5.811343317           |
| <i>Eriogonum brachypodium</i>                       | 21.2238239        | 21.2238239            |
| <i>Eriogonum breedlovei</i>                         | 0.876163448       | 2.123836552           |
| <i>Eriogonum cernuum</i>                            | 142.1396293       | 141.1396293           |
| <i>Eriogonum cithariforme</i>                       | 2.147853249       | 2.852146751           |
| <i>Eriogonum clavellatum</i>                        | 3.893140599       | 0.893140599           |
| <i>Eriogonum contiguum</i>                          | 2.366945939       | 1.366945939           |
| <i>Eriogonum corymbosum</i> var <i>corymbosum</i>   | 37.95033484       | 36.95033484           |
| <i>Eriogonum davidsonii</i>                         | 18.65225631       | 18.65225631           |
| <i>Eriogonum deflexum</i>                           | 39.51134184       | 37.51134184           |
| <i>Eriogonum elegans</i>                            | 3.279891604       | 2.279891604           |
| <i>Eriogonum elongatum</i>                          | 6.49283393        | 1.49283393            |
| <i>Eriogonum esmeraldense</i> var <i>toyabense</i>  | 2.879478197       | 2.879478197           |
| <i>Eriogonum fasciculatum</i> var <i>foliolosum</i> | 35.00416242       | 33.00416242           |
| <i>Eriogonum flavum</i>                             | 129.4831529       | 124.4831529           |
| <i>Eriogonum fusiforme</i>                          | 6.712888498       | 3.712888498           |
| <i>Eriogonum gracile</i>                            | 9.879818889       | 7.879818889           |
| <i>Eriogonum gracilipes</i>                         | 0.357480201       | 0.357480201           |
| <i>Eriogonum grande</i>                             | 0.204641371       | 4.795358629           |
| <i>Eriogonum heermannii</i>                         | 50.28763688       | 48.28763688           |
| <i>Eriogonum incanum</i>                            | 2.288675532       | 2.288675532           |
| <i>Eriogonum inerme</i>                             | 8.387573616       | 8.387573616           |
| <i>Eriogonum inflatum</i>                           | 45.51326263       | 40.51326263           |

|   |             |             |
|---|-------------|-------------|
| <i>Eriogonum jamesii</i>                                | 88.9588247  | 85.9588247  |
| <i>Eriogonum kennedyi</i>                               | 5.259520552 | 5.259520552 |
| <i>Eriogonum latifolium</i>                             | 2.19231629  | 0.19231629  |
| <i>Eriogonum lemmonii</i>                               | 0.982267618 | 1.017732382 |
| <i>Eriogonum maculatum</i>                              | 38.93265423 | 36.93265423 |
| <i>Eriogonum marifolium</i>                             | 13.30527659 | 9.30527659  |
| <i>Eriogonum microthecum</i>                            | 110.0652475 | 107.0652475 |
| <i>Eriogonum nidularium</i>                             | 32.50255057 | 29.50255057 |
| <i>Eriogonum nudum</i>                                  | 46.77237612 | 43.77237612 |
| <i>Eriogonum nutans</i>                                 | 24.63341412 | 23.63341412 |
| <i>Eriogonum ochrocephalum</i>                          | 12.69279233 | 12.69279233 |
| <i>Eriogonum ovalifolium</i> var<br><i>baileym</i>      | 99.24265196 | 95.24265196 |
| <i>Eriogonum panamintense</i>                           | 4.477597367 | 0.522402633 |
| <i>Eriogonum parishii</i>                               | 5.378597789 | 3.378597789 |
| <i>Eriogonum parvifolium</i>                            | 4.706533634 | 4.706533634 |
| <i>Eriogonum pusillum</i>                               | 28.39560623 | 28.39560623 |
| <i>Eriogonum saxatile</i>                               | 3.663679516 | 3.663679516 |
| <i>Eriogonum shockleyi</i> var<br><i>longilobum</i>     | 43.49352723 | 43.49352723 |
| <i>Eriogonum spergulinum</i> var<br><i>reddingianum</i> | 6.59201006  | 1.59201006  |
| <i>Eriogonum tomentosum</i>                             | 21.84986029 | 19.84986029 |
| <i>Eriogonum trichopes</i> var<br><i>trichopes</i>      | 39.1500419  | 36.1500419  |
| <i>Eriogonum umbellatum</i>                             | 137.1818469 | 137.1818469 |
| <i>Eriogonum wrightii</i> var<br><i>subscaposum</i>     | 45.64217824 | 44.64217824 |
| <i>Pterostegia drymarioides</i>                         | 25.70492476 | 23.70492476 |
| <i>Chorizanthe angustifolia</i>                         | 1.11806107  | 1.88193893  |
| <i>Chorizanthe howellii</i>                             | 0.332051924 | 1.667948076 |
| <i>Chorizanthe valida</i>                               | 0.109910561 | 4.890089439 |
| <i>Eriogonum contortum</i>                              | 0.988796033 | 4.011203967 |
| <i>Eriogonum hoffmannii</i> var<br><i>robustius</i>     | 0.935984943 | 0.064015057 |

**SI 10 Mean latitude and centroid-based latitude estimates for each species**

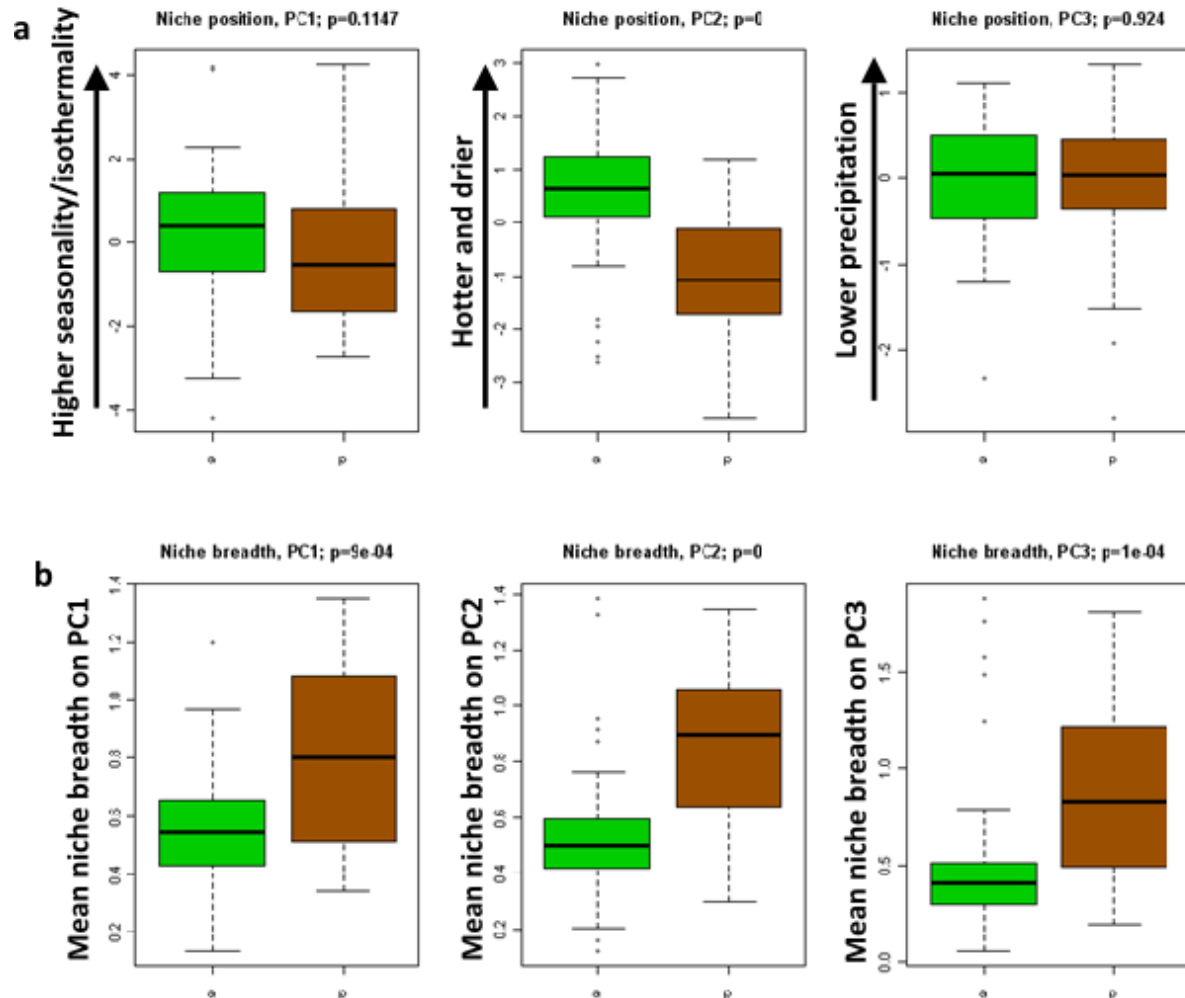
Latitude of centroid obtained from maps of area of occupancy and average latitude for each species calculated as simple average across occurrence points

| <b>species</b>                        | <b>latitude of centroid</b> | <b>averaged latitude</b> |
|---------------------------------------|-----------------------------|--------------------------|
| Chorizanthe brevicornu                | 34                          | 34.3325                  |
| Chorizanthe clevelandii               | 39                          | 37.5669                  |
| Chorizanthe cuspidata var cuspidata   | 37.71928271                 | 37.9087                  |
| Chorizanthe diffusa                   | 37                          | 36.0566                  |
| Chorizanthe douglasii                 | 35.89099522                 | 35.9092                  |
| Chorizanthe fimbriata                 | 33                          | 33.0022                  |
| Chorizanthe leptotheca                | 33                          | 33.2564                  |
| Chorizanthe palmeri                   | 36                          | 35.4877                  |
| Chorizanthe parryi var fernandina     | 34                          | 34.0381                  |
| Chorizanthe polygonoides              | 33                          | 35.7329                  |
| Chorizanthe procumbens                | 33                          | 33.0357                  |
| Chorizanthe pungens var pungens       | 37                          | 36.9108                  |
| Chorizanthe rigida                    | 34                          | 34.3694                  |
| Chorizanthe robusta var robusta       | 37.11516131                 | 37.0913                  |
| Chorizanthe spinosa                   | 39.2356                     | 35.0654                  |
| Chorizanthe staticoides               | 33.675                      | 34.3257                  |
| Chorizanthe stellulata                | 41                          | 38.8748                  |
| Chorizanthe uniaristata               | 40                          | 35.9086                  |
| Chorizanthe watsonii                  | 34                          | 36.9751                  |
| Chorizanthe xanti                     | 33                          | 34.917                   |
| Eriogonum alatum var alatum           | 37.22848782                 | 36.2203                  |
| Eriogonum bicolor                     | 38.60821257                 | 38.5976                  |
| Eriogonum brachyanthum                | 45.2                        | 36.3092                  |
| Eriogonum brachypodium                | 40                          | 36.5619                  |
| Eriogonum breedlovei                  | 35                          | 35.77                    |
| Eriogonum cernuum                     | 39.82191698                 | 38.714                   |
| Eriogonum cithariforme                | 35                          | 34.7476                  |
| Eriogonum clavellatum                 | 37.49253569                 | 37.918                   |
| Eriogonum contiguum                   | 35.97185005                 | 36.2896                  |
| Eriogonum corymbosum var corymbosum   | 37.75556183                 | 37.445                   |
| Eriogonum davidsonii                  | 33                          | 34.2581                  |
| Eriogonum deflexum                    | 35                          | 34.5303                  |
| Eriogonum elegans                     | 37                          | 35.5912                  |
| Eriogonum elongatum                   | 33                          | 34.1724                  |
| Eriogonum esmeraldense var toyabense  | 41.6                        | 38.4126                  |
| Eriogonum fasciculatum var foliolosum | 34                          | 34.2097                  |
| Eriogonum flavum                      | 45.25567558                 | 45.1434                  |
| Eriogonum fusiforme                   | 38.84603173                 | 38.8523                  |
| Eriogonum gracile                     | 35                          | 34.9663                  |
| Eriogonum gracilipes                  | 38                          | 37.7177                  |
| Eriogonum grande                      | 33                          | 33.7052                  |
| Eriogonum heermannii                  | 36.87600276                 | 36.4149                  |
| Eriogonum incanum                     | 40                          | 37.799                   |
| Eriogonum inerme                      | 38                          | 36.2607                  |

|   |             |         |
|---|-------------|---------|
| <i>Eriogonum inflatum</i>                               | 34          | 35.0396 |
| <i>Eriogonum jamesii</i>                                | 24.81771521 | 34.712  |
| <i>Eriogonum kennedyi</i>                               | 37.1333     | 34.802  |
| <i>Eriogonum latifolium</i>                             | 42          | 38.293  |
| <i>Eriogonum lemmonii</i>                               | 39.60351825 | 39.5337 |
| <i>Eriogonum maculatum</i>                              | 41          | 36.2873 |
| <i>Eriogonum marifolium</i>                             | 43.5283     | 40.8068 |
| <i>Eriogonum microthecum</i>                            | 37          | 38.3026 |
| <i>Eriogonum nidularium</i>                             | 35          | 37.1739 |
| <i>Eriogonum nudum</i>                                  | 33          | 38.5252 |
| <i>Eriogonum nutans</i>                                 | 39.7523479  | 39.5055 |
| <i>Eriogonum ochrocephalum</i>                          | 43.37096162 | 42.0669 |
| <i>Eriogonum ovalifolium</i> var<br><i>baileym</i>      | 50.2022     | 40.0049 |
| <i>Eriogonum panamintense</i>                           | 37          | 36.3587 |
| <i>Eriogonum parishii</i>                               | 33          | 34.3628 |
| <i>Eriogonum parvifolium</i>                            | 33          | 34.6644 |
| <i>Eriogonum pusillum</i>                               | 35          | 35.6786 |
| <i>Eriogonum saxatile</i>                               | 34          | 34.9982 |
| <i>Eriogonum shockleyi</i> var<br><i>longilobum</i>     | 38.81883419 | 38.8516 |
| <i>Eriogonum spergulinum</i> var<br><i>reddingianum</i> | 40          | 38.4093 |
| <i>Eriogonum tomentosum</i>                             | 31.07221516 | 31.0632 |
| <i>Eriogonum trichopes</i> var<br><i>trichopes</i>      | 34          | 33.8825 |
| <i>Eriogonum umbellatum</i>                             | 42.5627     | 39.7005 |
| <i>Eriogonum wrightii</i> var<br><i>subscaposum</i>     | 34          | 34.741  |
| <i>Pterostegia drymarioides</i>                         | 36.522949   | 34.6883 |
| <i>Chorizanthe angustifolia</i>                         | 34.84696854 | 34.977  |
| <i>Chorizanthe howellii</i>                             | 39.6188355  | 39.2494 |
| <i>Chorizanthe valida</i>                               | 38.22645699 | 38.1637 |
| <i>Eriogonum contortum</i>                              | 39.04652514 | 39.1032 |
| <i>Eriogonum hoffmannii</i> var<br><i>robustius</i>     | 36.35553762 | 36.2265 |

### SI 11 Annual perennial niche position and breadth

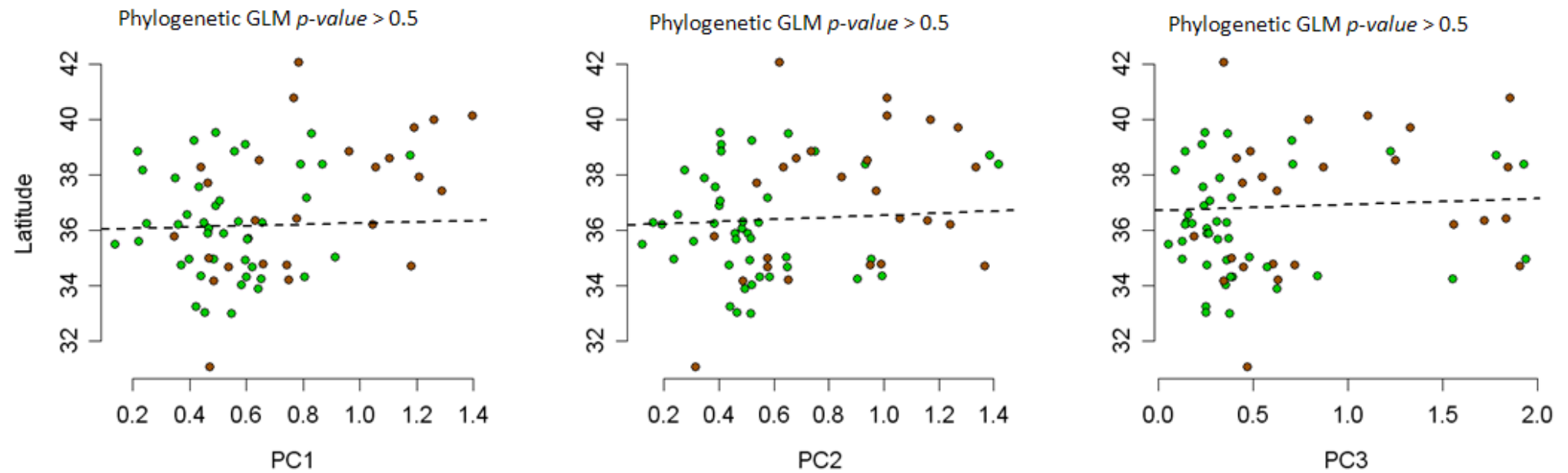
Along Y axes are the values of PC scores, along X axes are the categories of life-traits: a – annuals (green), p – perennial (brown). The boxplot calculated from niche positions of species and niche breadth of species (SI 9), where life-history trait served as categorical variable. In (a) X represent the mean niche position along PC axes, while in (b) X represent a mean niche breadth for each species





### SI 12 Latitude and niche breadth

Relationship between mean latitude and niche breadth values: none of the PC scores found to be significantly associated with mean latitudinal position. In green are annual species, in brown – perennial.



**SI 13 Evolutionary models comparison for niche position and breadth**

Average AIC weights for each evolutionary model. The values are averages across estimations done on 100 trees with 10 stochastic maps where appropriate (i.e. models BMS, OUM, OUMV, OUMA, OUMVA). Quantiles (reported in brackets below each average AIC weight) are calculated as 2.5% and 97.5% from the distribution of AIC weights based on 100 trees, with 10 stochastic maps each where appropriate

|                       | <b>BM1</b>              | <b>BMS</b>                      | <b>OU1</b>              | <b>OUM</b>                | <b>OUMA</b>            | <b>OUMV</b>                     | <b>OUMVA</b>            |
|-----------------------|-------------------------|---------------------------------|-------------------------|---------------------------|------------------------|---------------------------------|-------------------------|
| <b>Niche breadth</b>  |                         |                                 |                         |                           |                        |                                 |                         |
| PC1                   | <0.001<br>(0.000-0.000) | <0.001<br>(0.000-0.000)         | <0.001<br>(0.000-0.000) | 0.024<br>(0.009-0.046)    | 0.131<br>(0.053-0.260) | <b>0.796**</b><br>(0.554-0.871) | 0.049<br>(0.018-0.111)  |
| PC2                   | <0.001<br>(0.000-0.000) | <0.001<br>(0.000-0.000)         | <0.001<br>(0.000-0.003) | 0.172<br>(0.103-0.233)    | 0.108<br>(0.069-0.138) | <b>0.714**</b><br>(0.576-0.778) | 0.004<br>(0.001-0.024)  |
| PC3                   | <0.001<br>(0.000-0.000) | <0.001<br>(0.000-0.000)         | 0.023<br>(0.003-0.060)  | 0.129<br>(0.018-0.312)    | 0.209<br>(0.056-0.254) | <b>0.575**</b><br>(0.202-0.762) | 0.062<br>(0.017-0.077)  |
| <b>Niche position</b> |                         |                                 |                         |                           |                        |                                 |                         |
| PC1                   | <0.001<br>(0.000-0.000) | <b>0.717**</b><br>(0.396-0.825) | <0.001<br>(0.000-0.001) | 0.104<br>(0.025-0.202)    | 0.091<br>(0.022-0.188) | 0.088<br>(0.020-0.206)          | <0.001<br>(0.000-0.000) |
| PC2                   | <0.001<br>(0.000-0.000) | <0.001<br>(0.000-0.001)         | <0.001<br>(0.000-0.000) | 0.106237<br>(0.067-0.153) | 0.152<br>(0.083-0.251) | <b>0.684**</b><br>(0.540-0.762) | 0.058<br>(0.039-0.073)  |
| PC3                   | <0.001                  | <0.001                          | <b>0.516**</b>          | 0.122                     | 0.144                  | 0.139                           | 0.078                   |

(0.000-0.000)

(0.000-0.000)

(0.360-0.844)

(0.010-0.188)

(0.015-0.234)

(0.014-0.249)

(0.007-0.115)

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