

Supplementary Data 1—Abundance data matrix.

| Genera                               | Trench #-meters above the base of the outcrop |        |       |       |
|--------------------------------------|---|--------|-------|-------|
|                                      | 1-0.0   | 3-0.45 | 6-1.0 | 8-1.4 |
| <i>Phestia</i>                       | 4   | 1      | 20    | 2     |
| <i>Myalina</i>                       | 0   | 0      | 0     | 0     |
| <i>Aviculopectin</i>                 | 0   | 0      | 0     | 0     |
| <i>Astartella</i>                    | 8   | 13     | 39    | 18    |
| <i>Nuculopsis</i>                    | 1   | 4      | 4     | 0     |
| <i>Wilkingia</i>                     | 0   | 0      | 1     | 0     |
| <i>Palaeoneilo</i>                   | 1   | 0      | 2     | 0     |
| <i>Pteronites</i>                    | 0   | 0      | 0     | 1     |
| <i>Paleyoldia</i>                    | 2   | 0      | 1     | 2     |
| <i>Euphemites</i>                    | 2   | 10     | 5     | 14    |
| <i>Knightites</i>                    | 1   | 0      | 1     | 1     |
| <i>Retispira</i>                     | 0   | 0      | 0     | 0     |
| <i>Pharkidonotus</i>                 | 0   | 0      | 0     | 1     |
| <i>Staparollus</i>                   | 1   | 2      | 2     | 5     |
| <i>Treospira</i>                     | 5   | 3      | 2     | 3     |
| <i>Phymatopleura</i>                 | 1   | 1      | 1     | 1     |
| <i>AlphaGlabrocingulum</i>           | 0   | 5      | 3     | 2     |
| <i>BetaGlabrocingulum</i>            | 1   | 3      | 4     | 3     |
| <i>Worthenia</i>                     | 0   | 2      | 0     | 0     |
| <i>Platyceras</i>                    | 0   | 0      | 0     | 0     |
| <i>Strobeus</i>                      | 0   | 0      | 0     | 1     |
| <i>Meekospira</i>                    | 0   | 0      | 0     | 0     |
| <i>Streptacis?</i>                   | 0   | 0      | 0     | 0     |
| <i>Paleostylus</i>                   | 0   | 0      | 0     | 0     |
| <i>Turbinopsis</i>                   | 0   | 0      | 0     | 0     |
| <i>Crurithyris</i>                   | 138   | 182    | 246   | 240   |
| <i>Rhipidomella</i>                  | 1   | 1      | 0     | 0     |
| <i>Aneochonetes</i>                  | 17  | 38     | 95    | 23    |
| <i>Bneochonetes</i>                  | 0   | 0      | 0     | 0     |
| <i>Hustedia</i>                      | 2   | 1      | 11    | 2     |
| <i>Retaria</i>                       | 1   | 0      | 1     | 1     |
| <i>Reticulata</i>                    | 0   | 0      | 0     | 0     |
| <i>Cancrinella</i>                   | 0   | 2      | 2     | 1     |
| <i>Hystriculina</i>                  | 0   | 0      | 1     | 1     |
| <i>Phricidothyris</i>                | 0   | 0      | 1     | 0     |
| <i>Cleiothyridina</i>                | 0   | 0      | 1     | 0     |
| <i>Derbyia</i>                       | 0   | 1      | 0     | 0     |
| <i>Meekella</i>                      | 0   | 0      | 0     | 0     |
| <i>Composita</i>                     | 0   | 0      | 0     | 1     |
| <i>Dielasma</i>                      | 0   | 0      | 0     | 0     |
| <i>Wellerella</i>                    | 0   | 0      | 0     | 0     |
| <i>Pulchratia</i>                    | 0   | 0      | 0     | 0     |
| <i>Punctospirifer/Spiriferinella</i> | 0   | 0      | 0     | 0     |
| <i>Linoproductus</i>                 | 0   | 0      | 0     | 0     |
| <i>Petrocrania</i>                   | 0   | 0      | 0     | 0     |
| <i>Heterolosia</i>                   | 0   | 0      | 0     | 0     |

|                             |        |        |        |        |
|-----------------------------|--------|--------|--------|--------|
| <i>Eridmatus</i>            | 0      | 0      | 0      | 0      |
| <i>Prodentulum</i>          | 0      | 0      | 0      | 0      |
| A-Columnal                  | 0      | 1      | 1      | 1      |
| B-Columnal                  | 1      | 1      | 1      | 1      |
| C-Columnal                  | 0      | 1      | 1      | 0      |
| D-Columnal                  | 0      | 0      | 0      | 0      |
| E-Columnal                  | 0      | 0      | 0      | 0      |
| F-Columnal                  | 0      | 0      | 0      | 0      |
| G-Columnal                  | 0      | 0      | 0      | 0      |
| <i>Polypora</i>             | 0      | 0      | 0      | 0      |
| <i>Pinnatopora</i>          | 0      | 0      | 0      | 0      |
| <i>Acanthocladia</i>        | 0      | 0      | 0      | 0      |
| <i>Septopora</i>            | 0      | 1      | 1      | 0      |
| <i>A-Fistulipora</i>        | 0      | 0      | 0      | 0      |
| <i>B-Fistulipora</i>        | 0      | 1      | 1      | 0      |
| <i>A-Fenestella</i>         | 0      | 0      | 0      | 0      |
| <i>B-Fenestella</i>         | 0      | 0      | 0      | 0      |
| <i>F-Sheet-like</i>         | 0      | 0      | 0      | 0      |
| <i>A-Sheet-like</i>         | 0      | 0      | 0      | 0      |
| <i>A-Tabulipora</i>         | 0      | 0      | 0      | 0      |
| <i>B-Tabulipora</i>         | 0      | 0      | 0      | 0      |
| <i>Lioclema</i>             | 0      | 0      | 0      | 0      |
| <i>Cistodictya</i>          | 0      | 0      | 0      | 0      |
| <i>A-Rhombopora</i>         | 0      | 0      | 0      | 0      |
| <i>B-Rhombopora</i>         | 0      | 0      | 0      | 0      |
| <i>Rhabdomeson</i>          | 0      | 0      | 0      | 0      |
| <i>Eoasianites</i>          | 0      | 0      | 0      | 0      |
| <i>Archaeocidaris</i>       | 0      | 0      | 0      | 0      |
| Coral-Rugose                | 1      | 1      | 1      | 0      |
| Total abundance             | 188    | 275    | 449    | 325    |
| Richness                    | 18     | 22     | 27     | 22     |
| Evenness                    | 0.408  | 0.445  | 0.472  | 0.381  |
| Shannon's Information Index | 1.181  | 1.377  | 1.555  | 1.179  |
| Simpson's Diversity         | 0.4494 | 0.5383 | 0.6445 | 0.4441 |

| 9-1.65 | 10-1.9 | 10-2.1 | 12-2.4 | 12-2.55 | 13-2.75 |    |
|--------|--------|--------|--------|---------|---------|----|
| 11     |        | 6      | 1      | 2       | 4       | 4  |
| 0      |        | 0      | 0      | 0       | 2       | 0  |
| 0      |        | 0      | 0      | 1       | 1       | 0  |
| 16     |        | 9      | 2      | 3       | 2       | 2  |
| 3      |        | 1      | 0      | 0       | 6       | 1  |
| 0      |        | 0      | 0      | 0       | 0       | 0  |
| 0      |        | 0      | 0      | 0       | 0       | 0  |
| 0      |        | 0      | 0      | 0       | 0       | 0  |
| 2      |        | 1      | 0      | 0       | 0       | 0  |
| 19     |        | 8      | 6      | 4       | 4       | 1  |
| 1      |        | 1      | 1      | 0       | 1       | 1  |
| 0      |        | 0      | 0      | 0       | 0       | 0  |
| 2      |        | 0      | 0      | 2       | 1       | 1  |
| 4      |        | 2      | 4      | 2       | 2       | 1  |
| 1      |        | 1      | 1      | 4       | 4       | 1  |
| 2      |        | 3      | 0      | 2       | 1       | 4  |
| 3      |        | 5      | 1      | 3       | 4       | 2  |
| 1      |        | 7      | 3      | 8       | 15      | 5  |
| 0      |        | 0      | 0      | 0       | 0       | 0  |
| 0      |        | 0      | 0      | 0       | 0       | 1  |
| 0      |        | 1      | 0      | 1       | 0       | 0  |
| 1      |        | 1      | 0      | 0       | 0       | 0  |
| 0      |        | 0      | 0      | 0       | 0       | 0  |
| 0      |        | 1      | 0      | 1       | 2       | 0  |
| 0      |        | 0      | 0      | 0       | 0       | 0  |
| 143    | 189    |        | 74     | 26      | 69      | 52 |
| 1      | 1      |        | 1      | 94      | 29      | 80 |
| 59     | 88     |        | 16     | 48      | 75      | 69 |
| 1      | 3      |        | 2      | 3       | 9       | 15 |
| 10     | 46     |        | 9      | 23      | 74      | 59 |
| 0      | 3      |        | 0      | 3       | 4       | 1  |
| 0      | 0      |        | 0      | 0       | 0       | 1  |
| 2      | 6      |        | 1      | 2       | 8       | 2  |
| 4      | 10     |        | 2      | 10      | 63      | 13 |
| 0      | 0      |        | 0      | 2       | 2       | 0  |
| 1      | 1      |        | 1      | 1       | 5       | 3  |
| 1      | 0      |        | 1      | 2       | 6       | 1  |
| 0      | 1      |        | 0      | 0       | 0       | 0  |
| 5      | 3      |        | 1      | 6       | 28      | 6  |
| 2      | 1      |        | 1      | 2       | 2       | 2  |
| 0      | 2      |        | 0      | 2       | 19      | 21 |
| 2      | 1      |        | 2      | 1       | 3       | 2  |
| 0      | 2      |        | 0      | 1       | 5       | 6  |
| 1      | 1      |        | 1      | 0       | 2       | 0  |
| 0      | 0      |        | 1      | 0       | 0       | 1  |
| 1      | 0      |        | 0      | 0       | 0       | 0  |

|        |        |        |       |        |        |   |
|--------|--------|--------|-------|--------|--------|---|
| 0      | 0      | 0      | 0     | 0      | 0      | 0 |
| 0      | 0      | 0      | 0     | 0      | 0      | 1 |
| 1      | 1      | 1      | 1     | 1      | 1      | 1 |
| 1      | 1      | 0      | 0     | 0      | 1      | 1 |
| 0      | 0      | 0      | 0     | 0      | 1      | 1 |
| 0      | 0      | 0      | 0     | 1      | 0      | 0 |
| 0      | 0      | 0      | 0     | 1      | 0      | 0 |
| 0      | 0      | 0      | 0     | 0      | 0      | 0 |
| 0      | 0      | 0      | 0     | 0      | 0      | 0 |
| 0      | 1      | 0      | 0     | 1      | 1      | 1 |
| 0      | 0      | 0      | 0     | 0      | 0      | 0 |
| 0      | 0      | 0      | 0     | 0      | 0      | 0 |
| 0      | 0      | 0      | 0     | 0      | 1      | 0 |
| 0      | 0      | 0      | 0     | 0      | 1      | 1 |
| 0      | 0      | 1      | 0     | 0      | 0      | 0 |
| 0      | 1      | 0      | 0     | 0      | 1      | 1 |
| 0      | 1      | 0      | 0     | 0      | 1      | 1 |
| 0      | 0      | 0      | 0     | 0      | 0      | 0 |
| 0      | 0      | 0      | 0     | 0      | 1      | 1 |
| 0      | 0      | 0      | 0     | 0      | 0      | 1 |
| 0      | 0      | 0      | 0     | 0      | 1      | 1 |
| 0      | 0      | 0      | 0     | 0      | 1      | 1 |
| 1      | 0      | 0      | 0     | 0      | 1      | 1 |
| 0      | 0      | 0      | 0     | 0      | 0      | 0 |
| 0      | 0      | 0      | 0     | 0      | 0      | 0 |
| 0      | 1      | 0      | 0     | 0      | 0      | 0 |
| 0      | 0      | 1      | 0     | 0      | 0      | 0 |
| 0      | 0      | 0      | 0     | 0      | 0      | 0 |
| 2      | 0      | 1      | 3     | 4      | 9      |   |
| 304    | 411    | 136    | 266   | 468    | 380    |   |
| 31     | 36     | 26     | 33    | 44     | 43     |   |
| 0.577  | 0.538  | 0.588  | 0.672 | 0.719  | 0.672  |   |
| 1.982  | 1.929  | 1.914  | 2.35  | 2.723  | 2.526  |   |
| 0.7307 | 0.7275 | 0.6807 | 0.821 | 0.8975 | 0.8723 |   |

| 13-3.0 | 14-3.3 | 16-3.9 |    |
|--------|--------|--------|----|
|        | 5      | 2      | 0  |
|        | 0      | 0      | 0  |
|        | 0      | 0      | 0  |
|        | 5      | 3      | 3  |
|        | 3      | 2      | 0  |
|        | 0      | 0      | 0  |
|        | 0      | 0      | 0  |
|        | 0      | 0      | 0  |
|        | 9      | 1      | 0  |
|        | 1      | 1      | 0  |
|        | 1      | 0      | 0  |
|        | 1      | 2      | 0  |
|        | 3      | 2      | 1  |
|        | 0      | 0      | 0  |
|        | 10     | 8      | 2  |
|        | 0      | 0      | 0  |
|        | 14     | 15     | 1  |
|        | 0      | 0      | 0  |
|        | 1      | 2      | 1  |
|        | 2      | 1      | 0  |
|        | 0      | 0      | 0  |
|        | 0      | 1      | 0  |
|        | 0      | 1      | 1  |
|        | 1      | 0      | 0  |
|        | 69     | 168    | 10 |
|        | 457    | 437    | 11 |
|        | 33     | 83     | 16 |
|        | 14     | 19     | 1  |
|        | 61     | 52     | 10 |
|        | 1      | 1      | 1  |
|        | 1      | 0      | 1  |
|        | 10     | 6      | 0  |
|        | 28     | 11     | 1  |
|        | 0      | 0      | 1  |
|        | 1      | 1      | 1  |
|        | 1      | 6      | 2  |
|        | 0      | 0      | 0  |
|        | 4      | 1      | 7  |
|        | 1      | 1      | 0  |
|        | 16     | 13     | 1  |
|        | 1      | 2      | 1  |
|        | 4      | 26     | 14 |
|        | 1      | 1      | 0  |
|        | 1      | 0      | 0  |
|        | 0      | 0      | 0  |

|        |        |        |
|--------|--------|--------|
| 0      | 0      | 1      |
| 3      | 1      | 0      |
| 1      | 1      | 1      |
| 1      | 1      | 1      |
| 0      | 0      | 0      |
| 0      | 1      | 1      |
| 0      | 0      | 0      |
| 0      | 1      | 1      |
| 0      | 0      | 1      |
| 1      | 1      | 1      |
| 0      | 1      | 0      |
| 0      | 1      | 1      |
| 1      | 1      | 1      |
| 1      | 1      | 1      |
| 0      | 0      | 0      |
| 1      | 1      | 1      |
| 0      | 1      | 1      |
| 1      | 0      | 0      |
| 1      | 1      | 1      |
| 1      | 1      | 1      |
| 1      | 0      | 0      |
| 0      | 1      | 1      |
| 1      | 1      | 0      |
| 0      | 0      | 1      |
| 0      | 1      | 1      |
| 1      | 1      | 0      |
| 0      | 0      | 0      |
| 0      | 1      | 1      |
| 15     | 12     | 21     |
| 790    | 900    | 126    |
| 45     | 49     | 40     |
| 0.485  | 0.489  | 0.8    |
| 1.845  | 1.902  | 2.952  |
| 0.6467 | 0.7152 | 0.9175 |