

Table 5. Summary of mixed-effect models estimating effect sizes at the community level and testing for differences between consumers (C) and primary producers (P) for the entire dataset ('All') or only for experimental studies. Effect sizes ("Median" and "95% CI") and differences between them ( $P_B$ ) were estimated based on 10000 bootstrap samples generated by resampling with replacement (N number of studies included) or based on raw data (n number of data rows included). In the case of community abundance and diversity, analyses were also re-run on publication bias-corrected datasets. \*  $P < 0.05$ , \*\*\*  $P < 0.001$

| Analysis                    |   | Resampled thoroughly |        |             |              | Resampled thoroughly bias corrected |        |             |              | Raw data model |       |             | Raw data model bias corrected |     |       |             |       |
|-----------------------------|---|----------------------|--------|-------------|--------------|-------------------------------------|--------|-------------|--------------|----------------|-------|-------------|-------------------------------|-----|-------|-------------|-------|
|                             |   | N                    | Median | 95% CI      | $P_B$        | N                                   | Median | 95% CI      | $P_B$        | n              | Mean  | 95% CI      | $P_B$                         | n   | Mean  | 95% CI      | $P_B$ |
| <u>All</u>                  |   |                      |        |             |              |                                     |        |             |              |                |       |             |                               |     |       |             |       |
| Community abundance         | C | 53                   | -0.003 | -0.34/0.34  |              | 53                                  | 0.07   | -0.34/0.35  |              | 606            | -0.06 | -0.19/0.07  |                               | 585 | -0.03 | -0.16/0.10  |       |
|                             | P |                      | -1.18  | -1.76/-0.62 | <b>0.014</b> |                                     | -1.06  | -1.59/-0.56 | <b>0.019</b> |                | -0.83 | -1.06/-0.61 | ***                           |     | -0.70 | -0.92/-0.47 | ***   |
| Community biomass           | C | 21                   | -0.64  | -1.47/-0.02 |              |                                     |        |             |              | 167            | 0.17  | -0.11/0.45  |                               |     |       |             |       |
|                             | P |                      | -0.4   | -0.63/-0.18 | 0.573        |                                     |        |             |              |                | -0.24 | -0.6/0.12   | *                             |     |       |             |       |
| Community diversity         | C | 44                   | -0.39  | -0.78/0.01  |              | 42                                  | -0.37  | -0.74/0.02  |              | 241            | -0.19 | -0.44/0.06  |                               | 207 | -0.15 | -0.38/0.08  |       |
|                             | P |                      | -1.7   | -2.28/-1.24 | <b>0.023</b> |                                     | -1.11  | -1.45/-0.8  |              |                | -1.28 | -1.7/-0.87  | ***                           |     | -0.33 | -0.74/0.08  |       |
| Community evenness          | C | 6                    | -0.29  | -0.91/1.75  |              |                                     |        |             |              | 20             | 0.39  | -0.43/1.2   |                               |     |       |             |       |
|                             | P |                      | -1.26  | -2.18/-0.63 | 0.505        |                                     |        |             |              |                | 0.06  | -1.6/1.73   |                               |     |       |             |       |
| <u>Experimental studies</u> |   |                      |        |             |              |                                     |        |             |              |                |       |             |                               |     |       |             |       |
| Community abundance         | C | 22                   | -0.02  | -0.5/0.51   |              | 22                                  | -0.02  | -0.5/0.52   |              | 159            | 0.12  | -0.15/0.4   |                               | 158 | 0.12  | -0.15/0.4   |       |
|                             | P |                      | -1.04  | -1.61/-0.42 | 0.121        |                                     | -0.94  | -1.49/-0.37 | 0.155        |                | -0.64 | -1.01/-0.26 | ***                           |     | -0.60 | -0.98/-0.23 | 0.000 |
| Community diversity         | C | 16                   | -0.12  | -0.42/0.18  |              |                                     |        |             |              | 42             | -0.28 | -0.69/0.14  |                               |     |       |             |       |
|                             | P |                      | -1.45  | -1.71/-1.2  | 0.056        |                                     |        |             |              |                | -0.98 | -1.63/-0.34 | *                             |     |       |             |       |

Table 6. Summary of mixed-effect models estimating effect sizes at the species level and testing for differences between consumers (C) and primary producers (P) for the entire dataset ('All') or only for experimental studies. Effect sizes ("Median" and "95% CI") and differences between them ( $P_B$ ) were estimated based on 10000 bootstrap samples generated by resampling with replacement (N number of studies included) or based on raw data (n number of data rows included). \*\*\*  $P < 0.001$

| Analysis                    | Resampled thoroughly |        |        |              | Raw data model |      |        |                |
|-----------------------------|----------------------|--------|--------|--------------|----------------|------|--------|----------------|
|                             | N                    | Median | 95% CI | $P_B$        | n              | Mean | 95% CI | $P_B$          |
| <u>All</u>                  |                      |        |        |              |                |      |        |                |
| Species abundance           | C                    | 46     | -0.19  | -0.55/0.13   |                | 558  | -0.17  | -0.26/-0.08*** |
|                             | P                    |        | -0.69  | -1.22/-0.14  | 0.296          |      | -0.47  | -0.66/-0.28    |
| Species biomass             | C                    | 17     | -0.66  | -2.67/3.27   |                | 198  | -0.08  | -0.37/0.22     |
|                             | P                    |        | -0.4   | -0.97/-0.09  | 0.274          |      | -0.29  | -0.68/0.09     |
| Species growth              | C                    | 18     | -0.07  | -1.31/1.46   |                | 101  | -0.01  | -0.46/0.47     |
|                             | P                    |        | -0.6   | -0.81/-0.43  | 0.626          |      | -0.43  | -1.1/0.23      |
| Species survival            | C                    | 13     | -0.82  | -1.32/-0.37  |                | 59   | -0.58  | -0.89/-0.28    |
|                             | P                    |        | -1.31  | -2.1/-1.06   | 0.488          |      | -1.04  | -1.7/-0.38     |
| <u>Experimental studies</u> |                      |        |        |              |                |      |        |                |
| Species abundance           | C                    | 22     | -0.31  | -0.74/0.15   |                | 140  | -0.22  | -0.43/-0.01    |
|                             | P                    |        | -0.51  | -1.05/0.04   | 0.517          |      | -0.53  | -0.9/-0.16     |
| Species biomass             | C                    | 10     | 2.81   | -2.99/3.64   |                | 110  | -0.53  | -1.01/-0.05    |
|                             | P                    |        | -0.32  | -1.17/0.09   | 0.26           |      | -0.54  | -1.17/0.09     |
| Species growth              | C                    | 14     | -0.51  | -1.64/1.89   |                | 76   | 0.06   | -0.63/0.76     |
|                             | P                    |        | -0.23  | -0.49/0.03   | 0.582          |      | -0.32  | -1.27/0.62     |
| Species survival            | C                    | 11     | -0.66  | -1.09/ -0.25 |                |      |        |                |
|                             | P                    |        | -0.03  | -1.25/0.51   | 0.617          |      |        |                |

Table 7. Summary of mixed-effect models estimating effect sizes at the community level and testing for differences between consumers (C) and primary producers (P) by invasive species. Effect sizes (“Median” and “95% CI”) and differences between them ( $P_B$ ) were estimated based on 10000 bootstrap samples generated by resampling with replacement (N number of studies included) or based on raw data (n number of data rows included). In the case of community abundance and diversity, analyses were also re-run on bias-corrected datasets. \*  $P < 0.05$ , \*\*  $P < 0.01$ , \*\*\*  $P < 0.001$

| Analysis                   | Resampled thoroughly |        |        |             | Resampled thoroughly bias corrected |        |        |             | Raw data model |      |        |             | Raw data model bias corrected |      |        |             |     |
|----------------------------|----------------------|--------|--------|-------------|-------------------------------------|--------|--------|-------------|----------------|------|--------|-------------|-------------------------------|------|--------|-------------|-----|
|                            | N                    | Median | 95% CI | $P_B$       | N                                   | Median | 95% CI | $P_B$       | n              | Mean | 95% CI | $P_B$       | n                             | Mean | 95% CI | $P_B$       |     |
| <i>Caulerpa racemosa</i>   |                      |        |        |             |                                     |        |        |             |                |      |        |             |                               |      |        |             |     |
| Community abundance        | C                    | 17     | 0.05   | -0.57/0.56  |                                     | 17     | 0.04   | -0.57/0.57  |                | 149  | 0.36   | -0.02/0.73  |                               | 135  | 0.36   | 0.02/0.69   |     |
|                            | P                    |        | -2.12  | -3.45/-1.09 | <b>0.043</b>                        |        | -1.73  | -2.61/0.92  |                |      | -1.47  | -1.95/-1.0  | ***                           |      | -1.21  | -1.65/-0.78 | *** |
| Community diversity        | C                    | 14     | 1.2    | -0.75/2.56  |                                     | 12     | 1.18   | -0.82/2.29  |                | 57   | 1.07   | 0.3/1.84    |                               | 35   | 1.02   | 0.46/1.59   |     |
|                            | P                    |        | -3.51  | -4.68/-2.55 | <b>0.012</b>                        |        | -1.2   | -2.3/-1.66  | *              |      | -3.64  | -4.63/-2.56 | ***                           |      | -1.8   | -2.56/-0.94 | *** |
| <i>Caulerpa taxifolia</i>  |                      |        |        |             |                                     |        |        |             |                |      |        |             |                               |      |        |             |     |
| Community abundance        | C                    | 11     | -0.67  | -1.44/0.2   |                                     | 11     | -0.62  | -1.38/0.21  |                | 129  | -0.55  | -0.79/-0.31 |                               | 124  | -0.47  | -0.7/-0.23  |     |
|                            | P                    |        | -1.13  | -3.03/0.02  | 0.534                               |        | -1.13  | -3.03/-0.01 |                |      | -0.87  | -1.63/-0.11 |                               |      | -0.87  | -1.62/-0.12 |     |
| Community diversity        | C                    | 9      | -1.07  | -1.95/-0.26 |                                     | 9      | -0.98  | -1.82/-0.19 |                | 52   | -1.01  | -1.43/-0.58 |                               | 46   | -0.88  | -1.31/-0.46 |     |
|                            | P                    |        | -0.47  | -1.66/0.52  | 0.563                               |        | -0.28  | -1.29/0.41  |                |      | -0.1   | -1.04/0.85  |                               |      | 0.7    | -0.27/1.68  | **  |
| <i>Codium fragile</i> spp. |                      |        |        |             |                                     |        |        |             |                |      |        |             |                               |      |        |             |     |
| Community abundance        | C                    | 7      | 0.48   | -0.66/1.76  |                                     |        |        |             |                | 71   | 0.56   | 0.17/0.95   |                               |      |        |             |     |
|                            | P                    |        | -0.48  | -2.24/0.68  | 0.412                               |        |        |             |                |      | -0.01  | -0.62/0.59  |                               |      |        |             |     |
| Community diversity        | C                    | 6      | 0.73   | -0.48/4.47  |                                     | 6      | 0.66   | -0.49/2.47  |                | 43   | 1.02   | 0.44/1.59   |                               | 42   | 0.85   | 0.33/1.36   |     |
|                            | P                    |        | 0.4    | -1.01/1.11  | 0.594                               |        | 0.4    | -1.0/1.1    |                |      | 0.28   | -0.64/1.19  |                               |      | 0.28   | -0.55/1.1   |     |
| <i>Sargassum muticum</i>   |                      |        |        |             |                                     |        |        |             |                |      |        |             |                               |      |        |             |     |
| Community abundance        | C                    | 15     | 0.63   | -0.07/1.32  |                                     |        |        |             |                | 184  | 0.11   | -0.1/0.31   |                               |      |        |             |     |
|                            | P                    |        | -0.67  | -1.26/-0.12 | 0.221                               |        |        |             |                |      | -0.25  | -0.64/0.14  |                               |      |        |             |     |
| Community biomass          | C                    | 7      | 0.65   | -2.03/2.89  |                                     |        |        |             |                | 80   | 0.66   | 0.26/1.05   |                               |      |        |             |     |
|                            | P                    |        | -0.32  | -0.67/0.11  | 0.234                               |        |        |             |                |      | 0.41   | -0.44/1.26  |                               |      |        |             |     |
| Community diversity        | C                    | 11     | -0.52  | -1.02/-0.05 |                                     | 11     | -0.49  | -0.99/-0.02 |                | 50   | -0.5   | -0.8/-0.19  |                               | 49   | -0.45  | -0.75/-0.15 |     |
|                            | P                    |        | -0.22  | -0.73/0.16  | 0.615                               |        | -0.24  | -0.79/0.07  |                |      | -0.08  | -0.91/0.74  |                               |      | -0.1   | -0.9/0.7    |     |

Table 7. continued

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|                            |   |   |       |             |       |    |       |            |  |
|----------------------------|---|---|-------|-------------|-------|----|-------|------------|--|
| <i>Undaria pinnatifida</i> |   |   |       |             |       |    |       |            |  |
| Community                  | C | 3 | 0.01  | -0.73/0.56  |       | 12 | -0.23 | -0.72/0.26 |  |
| diversity                  | P |   | -0.98 | -1.65/-0.43 | 0.544 |    | -0.41 | -1.08/0.27 |  |

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Table 8. Summary of mixed-effect models estimating effect sizes at the species level and testing for differences between consumers (C) and primary producers (P) by invasive species. Effect sizes (“Median” and “95% CI”) and differences between them ( $P_B$ ) were estimated based on 10000 bootstrap samples generated by resampling with replacement (N number of studies included) or based on raw data (n number of data rows included). \*\*\*  $P < 0.001$

| Analysis                          | Resampled thoroughly |        |             |       | Raw data model |       |             |       |
|-----------------------------------|----------------------|--------|-------------|-------|----------------|-------|-------------|-------|
|                                   | N                    | Median | 95% CI      | $P_B$ | n              | Mean  | 95% CI      | $P_B$ |
| <u><i>Caulerpa racemosa</i></u>   |                      |        |             |       |                |       |             |       |
| Species abundance                 | C 8                  | 0.12   | -0.72/1.06  |       | 116            | 0.11  | -0.14/0.36  |       |
|                                   | P                    | -1.18  | -2.7/0.58   | 0.51  |                | -0.88 | -1.34/-0.41 | ***   |
| <u><i>Caulerpa taxifolia</i></u>  |                      |        |             |       |                |       |             |       |
| Species abundance                 | C 10                 | 0.38   | -0.26/1.05  |       | 84             | -0.26 | -0.53/0.01  |       |
|                                   | P                    | -0.91  | -1.18/0.01  | 0.318 |                | -0.52 | -1.49/0.45  |       |
| Species biomass                   | C 5                  | -0.62  | -1.73/0.18  |       | 37             | -0.42 | -0.71/-0.14 |       |
|                                   | P                    | 0.1    | -0.46/0.7   | 0.647 |                | 0.17  | -0.44/0.78  |       |
| <u><i>Codium fragile spp.</i></u> |                      |        |             |       |                |       |             |       |
| Species abundance                 | C 10                 | -0.14  | -1.11/0.55  |       | 84             | -0.15 | -0.42/0.12  |       |
|                                   | P                    | -0.44  | -1.43/0.64  | 0.528 |                | 0.15  | -0.39/0.7   |       |
| Species biomass                   | C 4                  | 7.49   | -4.31/7.49  |       | 15             | 1.66  | -2.03/5.34  |       |
|                                   | P                    | -0.49  | -1.27/-0.01 | 0.316 |                | -0.53 | -4.65/3.59  |       |
| Species growth                    | C 7                  | 0.53   | -1.78/3.77  |       | 33             | 0.54  | -0.39/1.47  |       |
|                                   | P                    | -0.1   | -0.38/-0.01 | 0.713 |                | 0.04  | -2.31/2.39  |       |
| <u><i>Sargassum muticum</i></u>   |                      |        |             |       |                |       |             |       |
| Species abundance                 | C 12                 | -0.06  | -0.79/0.86  |       | 176            | -0.04 | -0.22/0.15  |       |
|                                   | P                    | -0.28  | -0.75/0.33  | 0.6   |                | -0.19 | -0.54/0.17  |       |

Table 9. Summary of mixed-effect models estimating effect sizes at the community level and testing for differences between consumers (C) and primary producers (P) by habitat type. Effect sizes (“Median” and “95% CI”) and differences between them ( $P_B$ ) were estimated based on 10000 bootstrap samples generated by resampling with replacement (N number of studies included) or based on raw data (n number of data rows included). In the case of community abundance and diversity, analyses were re-run on bias-corrected datasets, when this was possible after data elimination. \*\*  $P < 0.01$ , \*\*\*  $P < 0.001$

| Analysis                       | Resampled thoroughly |        |        |             | Resampled thoroughly bias corrected |              |        |             | Raw data model |      |        |              | Raw data model bias corrected |      |        |             |  |
|--------------------------------|----------------------|--------|--------|-------------|-------------------------------------|--------------|--------|-------------|----------------|------|--------|--------------|-------------------------------|------|--------|-------------|--|
|                                | N                    | Median | 95% CI | $P_B$       | N                                   | Median       | 95% CI | $P_B$       | n              | Mean | 95% CI | $P_B$        | n                             | Mean | 95% CI | $P_B$       |  |
| <u>Intertidal rocky bottom</u> |                      |        |        |             |                                     |              |        |             |                |      |        |              |                               |      |        |             |  |
| Community abundance            | C                    | 11     | -0.24  | -0.94/0.66  |                                     |              |        |             |                | 164  | -0.31  | -0.49/-0.12  |                               |      |        |             |  |
|                                | P                    |        | -0.68  | -1.62/0.01  |                                     | 0.582        |        |             |                |      | -0.34  | -0.67/-0.003 |                               |      |        |             |  |
| Community diversity            | C                    | 9      | -1.56  | -2.45/-1.02 |                                     | 9            | -1.52  | -2.23/-1.02 |                | 59   | -0.92  | -1.42/0.42   |                               | 58   | -0.84  | -1.33/-0.34 |  |
|                                | P                    |        | -0.06  | -0.69/0.55  |                                     | 0.089        | -0.09  | -0.72/0.51  |                |      | 0.14   | -0.5/0.79    |                               | **   | 0.14   | -0.49/0.77  |  |
| <u>Subtidal rocky bottom</u>   |                      |        |        |             |                                     |              |        |             |                |      |        |              |                               |      |        |             |  |
| Community abundance            | C                    | 23     | 0.12   | -0.34/0.65  |                                     | 23           | 0.1    | -0.36/0.64  |                | 199  | 0.19   | -0.18/0.56   |                               | 184  | 0.17   | -0.16/0.51  |  |
|                                | P                    |        | -1.5   | -2.43/-0.71 |                                     | 0.071        | -1.29  | -2.01/-0.64 |                |      | -1.04  | -1.49/-0.59  |                               | ***  | -0.81  | -1.23/-0.40 |  |
| Community diversity            | C                    | 20     | 0.04   | -0.61/0.7   |                                     | 19           | 0.04   | -0.61/0.7   |                | 76   | -0.07  | -0.59/0.46   |                               | 55   | -0.06  | -0.48/0.36  |  |
|                                | P                    |        | -2.77  | -3.75/-2.07 |                                     | <b>0.003</b> | -1.69  | -2.13/-1.33 |                | **   | -2.58  | -3.29/-1.85  |                               | ***  | -1.19  | -1.84/-0.54 |  |
| Community evenness             | C                    | 4      | -1.0   | -1.56/-0.08 |                                     |              |        |             |                | 12   | -0.64  | -1.66/0.37   |                               |      |        |             |  |
|                                | P                    |        | 0.23   | -0.71/0.32  |                                     | 0.779        |        |             |                |      | 0.06   | -1.54/1.66   |                               |      |        |             |  |

Table 10. Summary of mixed-effect models estimating effect sizes at the species level and testing for differences between consumers (C) and primary producers (P) by habitat type. Effect sizes (“Median” and “95% CI”) and differences between them ( $P_B$ ) were estimated based on 10000 bootstrap samples generated by resampling with replacement (N number of studies included) or based on raw data (n number of data rows included). \*\*  $P < 0.01$

| Analysis                       | Resampled thoroughly |        |             |       | Raw data model |       |             |       |
|--------------------------------|----------------------|--------|-------------|-------|----------------|-------|-------------|-------|
|                                | N                    | Median | 95% CI      | $P_B$ | n              | Mean  | 95% CI      | $P_B$ |
| <u>Intertidal rocky bottom</u> |                      |        |             |       |                |       |             |       |
| Species abundance              | C 11                 | -0.14  | -0.68/0.37  |       | 169            | -0.17 | -0.27/-0.07 |       |
|                                | P                    | -0.2   | -0.97/0.68  | 0.6   |                | 0.01  | -0.21/0.22  |       |
| <u>Subtidal rocky bottom</u>   |                      |        |             |       |                |       |             |       |
| Species abundance              | C 18                 | -0.15  | -0.57/0.28  |       | 200            | -0.06 | -0.25/0.13  |       |
|                                | P                    | -0.58  | -1.3/0.15   | 0.427 |                | -0.34 | -0.68/0.001 |       |
| Species growth                 | C 5                  | 0.17   | -0.2/1.39   |       | 32             | 0.19  | -0.13/0.52  |       |
|                                | P                    | -1.04  | -1.33/-0.83 | 0.215 |                | -0.56 | -1.07/-0.04 | **    |
| <u>Seagrass</u>                |                      |        |             |       |                |       |             |       |
| Species abundance              | C 8                  | -2.46  | -5.81/-0.92 |       | 21             | -2.23 | -3.52/-0.93 |       |
|                                | P                    | -1.44  | -2.35/-0.37 | 0.582 |                | -0.79 | -2.38/0.8   |       |

Table 11. Summary of mixed-effect models estimating effect sizes at the community level and testing for differences between consumers (C) and primary producers (P) by European marine region. Effect sizes (“Median” and “95% CI”) and differences between them ( $P_B$ ) were estimated based on 10000 bootstrap samples generated by resampling with replacement (N number of studies included) or based on raw data (n number of data rows included). In the case of community abundance and diversity, analyses were re-run on bias-corrected datasets, when this was possible after data elimination. \*\*  $P < 0.01$ , \*\*\*  $P < 0.001$

| Analysis                            | Resampled thoroughly |        |        |             | Resampled thoroughly bias corrected |        |        |             | Raw data model |       |             |       | Raw data model bias corrected |             |            |       |
|-------------------------------------|----------------------|--------|--------|-------------|-------------------------------------|--------|--------|-------------|----------------|-------|-------------|-------|-------------------------------|-------------|------------|-------|
|                                     | N                    | Median | 95% CI | $P_B$       | N                                   | Median | 95% CI | $P_B$       | n              | Mean  | 95% CI      | $P_B$ | n                             | Mean        | 95% CI     | $P_B$ |
| <u>Bay of Biscay</u>                |                      |        |        |             |                                     |        |        |             |                |       |             |       |                               |             |            |       |
| Community abundance                 | C                    | 7      | 0.21   | -0.48/1.5   |                                     |        |        |             | 124            | -0.07 | -0.25/0.1   |       |                               |             |            |       |
|                                     | P                    |        | -0.43  | -1.26/0.12  | 0.497                               |        |        |             |                | -0.58 | -0.94/-0.21 | **    |                               |             |            |       |
| <u>Greater North Sea/Celtic Sea</u> |                      |        |        |             |                                     |        |        |             |                |       |             |       |                               |             |            |       |
| Community abundance                 | C                    | 9      | 0.59   | -0.17/1.1   |                                     |        |        |             | 84             | 0.25  | -0.08/0.57  |       |                               |             |            |       |
|                                     | P                    |        | 0.29   | -1.08/1.52  | 0.725                               |        |        |             |                | 0.44  | -0.21/1.09  |       |                               |             |            |       |
| <u>Western Mediterranean</u>        |                      |        |        |             |                                     |        |        |             |                |       |             |       |                               |             |            |       |
| Community abundance                 | C                    | 19     | -0.06  | -0.64/0.45  |                                     | 19     | -0.06  | -0.63/0.44  | 207            | 0.02  | -0.23/0.28  |       | 191                           | 0.02        | -0.22/0.26 |       |
|                                     | P                    |        | -1.8   | -2.93/-0.89 | <b>0.036</b>                        |        | -1.55  | -2.43/-0.78 | *              | -1.39 | -1.75/-1.04 | ***   | -1.17                         | -1.51/-0.83 | ***        |       |
| Community biomass                   | C                    | 6      | -1.17  | -1.66/-0.69 |                                     |        |        |             | 27             | -1.03 | -1.38/-0.69 |       |                               |             |            |       |
|                                     | P                    |        | -0.94  | -2.06/-0.33 | 0.744                               |        |        |             |                | -0.22 | -0.71/0.28  | **    |                               |             |            |       |
| Community diversity                 | C                    | 17     | -0.14  | -1.3/0.78   |                                     | 15     | -0.2   | -1.27/0.66  | 81             | 0.04  | -0.52/0.6   |       | 52                            | 0.01        | -0.51/0.53 |       |
|                                     | P                    |        | -2.96  | -3.99/-2.19 | 0.068                               |        | -1.69  | -2.1/-1.31  |                | -3.47 | -4.24/-2.69 | ***   | -1.58                         | -2.42/-0.74 | ***        |       |



Table 12. Summary of mixed-effect models estimating effect sizes at the species level and testing for differences between consumers (C) and primary producers (P) by European marine region. Effect sizes (“Median” and “95% CI”) and differences between them ( $P_B$ ) were estimated based on 10000 bootstrap samples generated by resampling with replacement (N number of studies included) or based on raw data (n number of data rows included). \*\*  $P < 0.01$ , \*\*\*  $P < 0.001$

| Analysis                     | Resampled thoroughly |        |        |             | Raw data model |        |             |       |
|------------------------------|----------------------|--------|--------|-------------|----------------|--------|-------------|-------|
|                              | N                    | Median | 95% CI | $P_B$       | n              | Mean   | 95% CI      | $P_B$ |
| <u>Bay of Biscay</u>         |                      |        |        |             |                |        |             |       |
| Species abundance            | C                    | 7      | -0.28  | -1.17/1.21  |                |        |             |       |
|                              | P                    |        | -0.02  | -0.62/1.09  | 0.54           |        |             |       |
|                              |                      |        |        |             | 131            | -0.09  | -0.24/0.05  |       |
|                              |                      |        |        |             |                | 0.04   | -0.29/0.38  |       |
| <u>Greater North Sea</u>     |                      |        |        |             |                |        |             |       |
| Species abundance            | C                    | 5      | -1.0   | -1.76/-0.02 |                |        |             |       |
|                              | P                    |        | -0.05  | -0.96/1.75  | 0.409          |        |             |       |
|                              |                      |        |        |             | 66             | -0.77  | -1.03/-0.51 |       |
|                              |                      |        |        |             |                | -0.11  | -0.57/0.35  | **    |
| <u>Western Mediterranean</u> |                      |        |        |             |                |        |             |       |
| Species abundance            | C                    | 13     | -0.16  | -1.55/0.43  |                |        |             |       |
|                              | P                    |        | -1.39  | -2.52/-0.27 | 0.511          |        |             |       |
|                              |                      |        |        |             | 142            | -0.005 | -0.31/0.3   |       |
|                              |                      |        |        |             |                | -1.16  | -1.65/-0.68 | ***   |
| Species growth               | C                    | 5      | -0.48  | -0.48/-0.4  |                |        |             |       |
|                              | P                    |        | -0.47  | -0.58/-0.32 | 0.933          |        |             |       |
|                              |                      |        |        |             | 13             | -0.22  | -1.12/0.67  |       |
|                              |                      |        |        |             |                | -0.66  | -1.65/0.34  |       |

Table 13. Summary of the regressions of effect size on community variables (including both primary producers and consumers) against Halpern's index for the entire dataset ('All') or only for experimental studies. Effect sizes ("Median" and "95% CI") were estimated based on 10000 bootstrap samples generated by resampling with replacement (N number of studies included). In the case of community abundance and diversity, analyses were re-run on bias-corrected datasets.

| Analysis                    | Resampled thoroughly |        |        |             | Resampled thoroughly<br>bias corrected |        |         |             |      |
|-----------------------------|----------------------|--------|--------|-------------|--|--------|---------|-------------|------|
|                             | N                    | Median | 95% CI | <i>P</i>    | N                                      | Median | 95% CI  | <i>P</i>    |      |
| <u>All</u>                  |                      |        |        |             |  |        |         |             |      |
| Community abundance         | Intercept            | 52     | -1.25  | -2.07/-0.5  |  | 52     | -1.21   | -2.00/-0.47 |      |
|                             | Slope                |        | 0.04   | 0.01/0.08   | 0.17                                   |        | 0.01    | -0.08/0.03  | 0.16 |
| Community biomass           | Intercept            | 20     | -1.17  | -1.6/-0.68  |  | 20     | -1.13   | -1.54/-0.66 |      |
|                             | Slope                |        | 0.03   | 0.006/0.06  | 0.14                                   |        | 0.03    | 0.004/0.05  | 0.14 |
| Community diversity         | Intercept            | 43     | -1.02  | -1.67/-0.41 |  | 43     | -0.84   | -1.43/-0.26 |      |
|                             | Slope                |        | 0.004  | -0.02/0.03  | 0.75                                   |        | -0.0003 | -0.03/0.03  | 0.73 |
| Community evenness          | Intercept            | 6      | 0.99   | -0.14/3.02  |  |        |         |             |      |
|                             | Slope                |        | -0.08  | -0.16/-0.02 | 0.43                                   |        |         |             |      |
| <u>Experimental studies</u> |                      |        |        |             |  |        |         |             |      |
| Community abundance         | Intercept            | 22     | -0.92  | -1.8/-0.17  |  | 22     | -0.93   | -1.78/-0.14 |      |
|                             | Slope                |        | 0.02   | -0.01/0.07  | 0.56                                   |        | 0.02    | -0.01/0.07  | 0.55 |
| Community biomass           | Intercept            | 7      | -1.13  | -1.55/-0.74 |  | 7      | -1.13   | -1.55/-0.75 |      |
|                             | Slope                |        | 0.05   | 0.01/0.08   | 0.31                                   |        | 0.05    | 0.01/0.08   | 0.31 |
| Community diversity         | Intercept            | 16     | -0.66  | -1.04/-0.28 |  | 16     | -0.67   | -1.04/-0.28 |      |
|                             | Slope                |        | -0.01  | -0.03/0.01  | 0.79                                   |        | -0.01   | -0.03/0.01  | 0.79 |

Table 14. Summary of the regressions of effect size on community variables against Halpern’s index for primary producers or consumers. Effect sizes (“Median” and “95% CI”) were estimated based on 10000 bootstrap samples generated by resampling with replacement (N number of studies included). In the case community abundance and diversity, analyses were re-run on bias-corrected datasets.

| Analysis                 | Resampled thoroughly |        |        |              | Resampled thoroughly<br>bias corrected |        |              |       |
|--------------------------|----------------------|--------|--------|--------------|--|--------|--------------|-------|
|                          | N                    | Median | 95% CI | P            | N                                      | Median | 95% CI       | P     |
| <u>Primary producers</u> |                      |        |        |              |  |        |              |       |
| Community abundance      | Intercept            | 23     | -2.04  | -3.5/-0.67   | 23                                     | -1.90  | -3.30/-0.56  |       |
|                          | Slope                |        | 0.06   | -0.03/0.13   | 0.47                                   | 0.05   | -0.03/0.13   | 0.46  |
| Community biomass        | Intercept            | 17     | -1.06  | -1.46/-0.61  | 17                                     | -1.01  | -1.35/-0.58  |       |
|                          | Slope                |        | 0.03   | 0.01/0.06    | 0.09                                   | 0.03   | 0.01/0.05    | 0.053 |
| Community diversity      | Intercept            | 21     | -2.26  | -3.26/-1.45  | 21                                     | -1.78  | -2.59/-1.15  |       |
|                          | Slope                |        | 0.03   | -0.006/0.08  | 0.63                                   | 0.02   | -0.01/0.07   | 0.63  |
| <u>Consumers</u>         |                      |        |        |              |  |        |              |       |
| Community abundance      | Intercept            | 32     | 0.02   | -0.91/0.98   | 32                                     | -0.01  | -0.95/0.95   |       |
|                          | Slope                |        | -0.002 | -0.04/0.04   | 0.64                                   | -0.01  | -0.04/0.04   | 0.65  |
| Community biomass        | Intercept            | 5      | -1.49  | -3.51/0.52   | 5                                      | -1.54  | -3.41/0.40   |       |
|                          | Slope                |        | 0.03   | -0.05/0.11   | 0.60                                   | 0.03   | -0.04/0.11   | 0.60  |
| Community diversity      | Intercept            | 25     | 0.39   | -0.52/1.45   | 25                                     | -0.36  | -0.56/1.39   |       |
|                          | Slope                |        | -0.04  | -0.08/-0.003 | 0.22                                   | -0.04  | -0.08/-0.001 | 0.23  |

Table 15. Summary of the regressions of effect size on species variables (including both primary producers and consumers) against Halpern's index for the entire dataset ('All') or only for experimental studies. Effect sizes ("Median" and "95% CI") were estimated based on 10000 bootstrap samples generated by resampling with replacement (N number of studies included).

|                             |           | Resampled thoroughly |        |             |          |
|-----------------------------|-----------|----------------------|--------|-------------|----------|
| Analysis                    |           | N                    | Median | 95% CI      | <i>P</i> |
| <u>All</u>                  |           |                      |        |             |          |
| Species abundance           | Intercept | 44                   | -1.04  | -1.84/-0.31 | 0.22     |
|                             | Slope     |                      | 0.03   | 0.001/0.06  |          |
| Species biomass             | Intercept | 11                   | -0.92  | -1.71/-0.23 | 0.47     |
|                             | Slope     |                      | 0.03   | -0.01/0.01  |          |
| <u>Experimental studies</u> |           |                      |        |             |          |
| Species abundance           | Intercept | 22                   | -0.08  | -0.89/0.78  | 0.46     |
|                             | Slope     |                      | -0.02  | -0.05/0.02  |          |
| Species biomass             | Intercept | 6                    | -0.97  | -2.02/0.01  | 0.60     |
|                             | Slope     |                      | 0.04   | -0.03/0.10  |          |

Table 16. Summary of the regressions of effect size on species variables against Halpern’s index for primary producers or consumers. Effect sizes (“Median” and “95% CI”) were estimated based on 10000 bootstrap samples generated by resampling with replacement (N number of studies included).

|                          |           | Resampled thoroughly |        |             |      |
|--------------------------|-----------|----------------------|--------|-------------|------|
| Analysis                 |           | N                    | Median | 95% CI      | P    |
| <u>Primary producers</u> |           |                      |        |             |      |
| Species abundance        | Intercept | 21                   | 0.23   | -1.75/1.66  |      |
|                          | Slope     |                      | -0.06  | -0.14/0.07  | 0.41 |
| Species biomass          | Intercept | 8                    | -0.87  | -1.62/-0.2  |      |
|                          | Slope     |                      | 0.04   | -0.01/0.09  | 0.51 |
| <u>Consumers</u>         |           |                      |        |             |      |
| Species abundance        | Intercept | 29                   | -0.78  | -1.7/-0.07  |      |
|                          | Slope     |                      | 0.02   | -0.003/0.06 | 0.32 |
| Species biomass          | Intercept | 3                    | -2.41  | -16.23/1.01 |      |
|                          | Slope     |                      | 0.08   | -0.08/0.09  | 0.41 |