

## **Supplementary material**

### **Drivers of change in the relative abundance of dugongs in New Caledonia**

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**Table S1. Details of the survey design used for the dugong relative abundance and density analysis**

| Block    | Area covered (km <sup>2</sup> ) | Distance between transects (NM) |                     | Sampling Intensity (%) |                     | Number of transects surveyed |                     |
|----------|---------------------------------|---------------------------------|---------------------|------------------------|---------------------|------------------------------|---------------------|
|          |                                 | Jun 2003- Jan 2008              | Jun & Nov 2011-2012 | Jun 2003- Jan 2008     | Jun & Nov 2011-2012 | Jun 2003- Jan 2008           | Jun & Nov 2011-2012 |
|          |                                 | <b>1</b>                        | 1841                | 2.50                   | 2.50                | 16.04                        | 16.82               |
| <b>2</b> | 1300                            | 2.50                            | 1.25                | 16.92                  | 34.00               | 32                           | 63                  |
| <b>3</b> | 1948                            | 2.50                            | 2.50                | 15.92                  | 16.88               | 24                           | 24                  |
| <b>4</b> | 1749                            | 2.50                            | 2.50                | 15.23                  | 17.35               | 23                           | 23                  |
| Total    | 6838                            | -                               | -                   | -                      | -                   | 101                          | 132                 |

**Table S2. Availability probability estimates (SEs) for various strata of survey depths and turbidities calculated from data on artificial dugong models and the individual dive profiles of telemetered wild dugongs. (Extracted from Pollock et al. 2006)**

| Water quality      | Depth range | Visibility of sea floor | Maximum depth of visibility of models <sup>a</sup> (m) | Depth zone of visibility (m) <sup>b</sup> to calculate $p_a$ | $p_a$ (SE)                 |
|--------------------|-------------|-------------------------|--|--|----------------------------|
| Optimal sea state  |             |                         |  |  |                            |
| Clear              | Shallow     | Clearly visible         | Bottom   | All  | 1                          |
| Variable           | Variable    | Visible but unclear     | 2.44   | 2.5  | 0.65 (0.0452)              |
| Clear              | >5m         | Not visible             | 4.32   | 4.0  | 0.46 <sup>c</sup> (0.057)  |
| Turbid             | Variable    | Not visible             | 1.23   | 1.5 <sup>c</sup>   | 0.47 (0.0525)              |
| Marginal sea state |             |                         |  |  |                            |
| Clear              | Shallow     | Clearly visible         | Bottom   | Bottom   | 1                          |
| Variable           | Variable    | Visible but unclear     | 1.21   | 1.5 <sup>c</sup>   | 0.47 (0.0525)              |
| Clear              | >5m         | Not visible             | 0.69   | 1.5 <sup>c</sup>   | 0.30 <sup>d</sup> (0.0724) |
| Turbid             | Variable    | Not visible             | 1.43   | 1.5 <sup>c</sup>   | 0.47 (0.0525)              |

<sup>a</sup> Average for models 2.0 and 2.5 m long.

<sup>b</sup> Maximum depth used to calculate  $p_a$  from the telemetered animals.

<sup>c</sup> Based on minimum dive depth detectable on 15 telemetered wild dugongs. (See text for explanation.)

<sup>d</sup> Based on records from 4 dugongs with mean, median, and modal maximum dives of >6 m and a corresponding subset of the data from 1 dugong that spent considerable time in water >5 m deep. (See text for explanation.)

**Table S3. Details of the number and proportion of transects for which no dugongs have been sighted in any surveys in New Caledonia for the four blocks used in the dugong relative abundance and density analysis**

| Number of occasions a zero value was recorded | Number of transects | Percentage (%) |
|---|---------------------|----------------|
| 1   | 9                   | 6.8            |
| 2   | 11                  | 8.3            |
| 3   | 24                  | 18.2           |
| 4   | 36                  | 27.3           |
| 5   | 24                  | 18.2           |
| 6   | 28                  | 21.2           |
| Total   | 132                 | -              |

**Table S4. A comparison of Akaike Information Criteria (AIC) from various zero-inflated negative binomial models**

A model with asterisk is the best model

| Variables                                      | df | AIC      |
|--|----|----------|
| Year, Block, Interaction(Year, Block)          | 35 | 1629.430 |
| Year, Block, Season Interaction(Block, Season) | 23 | 1615.601 |
| Year, Block, Season                            | 17 | 1606.594 |
| Year, Season                                   | 11 | 1643.799 |
| Year, Block*                                   | 15 | 1603.702 |
| Block, Season                                  | 11 | 1613.429 |

**Table S5. Raw data used to conduct the dugong density analysis.**

| transect.code | block.code | area.km2   | year | season | adjcount    |
|---------------|------------|------------|------|--------|-------------|
| 1.09          | 1          | 23.8882256 | 2011 | cool   | 0           |
| 1.1           | 1          | 26.2964368 | 2011 | cool   | 0           |
| 1.11          | 1          | 22.343524  | 2011 | cool   | 3.019323671 |
| 1.12          | 1          | 20.4170536 | 2011 | cool   | 0           |
| 1.13          | 1          | 21.957428  | 2011 | cool   | 8.17539948  |
| 1.14          | 1          | 17.5738992 | 2011 | cool   | 0           |
| 1.15          | 1          | 15.6713288 | 2011 | cool   | 5.974406414 |
| 1.16          | 1          | 12.8153616 | 2011 | cool   | 2.136752137 |
| 1.17          | 1          | 11.325748  | 2011 | cool   | 0           |
| 1.18          | 1          | 11.2530032 | 2011 | cool   | 3.019323671 |
| 1.19          | 1          | 9.690088   | 2011 | cool   | 0           |
| 1.2           | 1          | 12.3116416 | 2011 | cool   | 0           |
| 1.21          | 1          | 13.9037728 | 2011 | cool   | 0           |
| 1.22          | 1          | 16.073064  | 2011 | cool   | 3.019323671 |
| 1.23          | 1          | 13.9814024 | 2011 | cool   | 0           |
| 1.24          | 1          | 10.4116008 | 2011 | cool   | 0           |
| 1.25          | 1          | 8.2935296  | 2011 | cool   | 3.019323671 |
| 1.26          | 1          | 8.1922088  | 2011 | cool   | 0           |
| 1.27          | 1          | 8.4961584  | 2011 | cool   | 0           |
| 1.28          | 1          | 8.0616712  | 2011 | cool   | 3.019323671 |
| 1.29          | 1          | 9.5210872  | 2011 | cool   | 2.136752137 |
| 1.3           | 1          | 8.9717808  | 2011 | cool   | 5.974406414 |
| 2.01          | 2          | 9.4038184  | 2011 | cool   | 0           |
| 2.03          | 2          | 10.6677168 | 2011 | cool   | 0           |
| 2.05          | 2          | 8.5404184  | 2011 | cool   | 17.23337049 |
| 2.07          | 2          | 6.5601096  | 2011 | cool   | 0           |
| 2.09          | 2          | 7.2623944  | 2011 | cool   | 0           |
| 2.11          | 2          | 4.8386408  | 2011 | cool   | 0           |
| 2.13          | 2          | 4.1934264  | 2011 | cool   | 0           |
| 2.15          | 2          | 3.9498648  | 2011 | cool   | 0           |
| 2.17          | 2          | 3.4775912  | 2011 | cool   | 0           |
| 2.19          | 2          | 3.242252   | 2011 | cool   | 0           |
| 2.21          | 2          | 3.3765976  | 2011 | cool   | 0           |
| 2.23          | 2          | 3.0881408  | 2011 | cool   | 0           |
| 2.25          | 2          | 3.3622344  | 2011 | cool   | 0           |
| 2.27          | 2          | 5.6611432  | 2011 | cool   | 3.019323671 |
| 2.29          | 2          | 5.3933304  | 2011 | cool   | 0           |
| 2.31          | 2          | 4.5796864  | 2011 | cool   | 0           |
| 2.33          | 2          | 10.7785928 | 2011 | cool   | 0           |
| 2.35          | 2          | 10.3362064 | 2011 | cool   | 8.046917621 |
| 2.37          | 2          | 8.5807952  | 2011 | cool   | 0           |
| 2.39          | 2          | 10.0633656 | 2011 | cool   | 0           |
| 2.41          | 2          | 7.2827856  | 2011 | cool   | 0           |
| 2.43          | 2          | 8.6565872  | 2011 | cool   | 0           |

|      |   |            |      |      |             |
|------|---|------------|------|------|-------------|
| 2.45 | 2 | 8.7780448  | 2011 | cool | 0           |
| 2.47 | 2 | 10.5900504 | 2011 | cool | 0           |
| 2.49 | 2 | 9.7688408  | 2011 | cool | 0           |
| 2.51 | 2 | 9.2595872  | 2011 | cool | 8.865248227 |
| 2.53 | 2 | 11.2819824 | 2011 | cool | 2.955082742 |
| 2.55 | 2 | 11.4687392 | 2011 | cool | 0           |
| 2.57 | 2 | 6.5624584  | 2011 | cool | 0           |
| 2.59 | 2 | 5.108188   | 2011 | cool | 0           |
| 2.61 | 2 | 6.831332   | 2011 | cool | 0           |
| 2.63 | 2 | 8.1612992  | 2011 | cool | 0           |
| 3.01 | 3 | 13.0719528 | 2011 | cool | 0           |
| 3.02 | 3 | 13.2442192 | 2011 | cool | 0           |
| 3.03 | 3 | 11.9755248 | 2011 | cool | 0           |
| 3.04 | 3 | 10.0410416 | 2011 | cool | 0           |
| 3.05 | 3 | 11.0032512 | 2011 | cool | 0           |
| 3.06 | 3 | 10.4803808 | 2011 | cool | 0           |
| 3.07 | 3 | 10.799868  | 2011 | cool | 0           |
| 3.08 | 3 | 12.493716  | 2011 | cool | 0           |
| 3.09 | 3 | 12.6943864 | 2011 | cool | 2.136752137 |
| 3.1  | 3 | 8.987408   | 2011 | cool | 4.273504274 |
| 3.11 | 3 | 10.4977456 | 2011 | cool | 8.547008547 |
| 3.12 | 3 | 11.5115656 | 2011 | cool | 0           |
| 3.13 | 3 | 11.0757104 | 2011 | cool | 0           |
| 3.14 | 3 | 12.0154592 | 2011 | cool | 6.038647343 |
| 3.15 | 3 | 11.4851024 | 2011 | cool | 0           |
| 3.16 | 3 | 14.4181312 | 2011 | cool | 0           |
| 3.17 | 3 | 14.228452  | 2011 | cool | 0           |
| 3.18 | 3 | 20.0752688 | 2011 | cool | 2.955082742 |
| 3.19 | 3 | 19.1478168 | 2011 | cool | 0           |
| 3.2  | 3 | 17.223944  | 2011 | cool | 0           |
| 3.21 | 3 | 12.5738344 | 2011 | cool | 0           |
| 3.22 | 3 | 17.5407776 | 2011 | cool | 11.82033097 |
| 3.23 | 3 | 19.1002448 | 2011 | cool | 0           |
| 3.24 | 3 | 19.2210136 | 2011 | cool | 0           |
| 4.02 | 4 | 20.9454368 | 2011 | cool | 0           |
| 4.03 | 4 | 23.2600936 | 2011 | cool | 2.136752137 |
| 4.04 | 4 | 24.0954504 | 2011 | cool | 0           |
| 4.05 | 4 | 24.1458808 | 2011 | cool | 2.136752137 |
| 4.06 | 4 | 20.9160672 | 2011 | cool | 7.292827945 |
| 4.07 | 4 | 20.621744  | 2011 | cool | 0           |
| 4.08 | 4 | 23.2061744 | 2011 | cool | 2.955082742 |
| 4.09 | 4 | 22.9777984 | 2011 | cool | 0           |
| 4.1  | 4 | 20.8705784 | 2011 | cool | 0           |
| 4.11 | 4 | 12.2086648 | 2011 | cool | 0           |
| 4.12 | 4 | 7.2861824  | 2011 | cool | 0           |
| 4.13 | 4 | 8.735468   | 2011 | cool | 0           |

|      |   |            |      |      |             |
|------|---|------------|------|------|-------------|
| 4.14 | 4 | 7.9404312  | 2011 | cool | 0           |
| 4.15 | 4 | 5.4343984  | 2011 | cool | 0           |
| 4.16 | 4 | 6.0444168  | 2011 | cool | 0           |
| 4.17 | 4 | 5.8689088  | 2011 | cool | 0           |
| 4.18 | 4 | 6.7024632  | 2011 | cool | 0           |
| 4.19 | 4 | 6.6162704  | 2011 | cool | 3.019323671 |
| 4.2  | 4 | 6.750936   | 2011 | cool | 0           |
| 4.21 | 4 | 5.3918528  | 2011 | cool | 0           |
| 4.22 | 4 | 5.272592   | 2011 | cool | 0           |
| 4.23 | 4 | 5.2881888  | 2011 | cool | 0           |
| 4.24 | 4 | 2.9916328  | 2011 | cool | 0           |
| 1.09 | 1 | 23.8882256 | 2011 | warm | 0           |
| 1.1  | 1 | 26.2964368 | 2011 | warm | 2.136752137 |
| 1.11 | 1 | 22.343524  | 2011 | warm | 0           |
| 1.12 | 1 | 20.4170536 | 2011 | warm | 0           |
| 1.13 | 1 | 21.957428  | 2011 | warm | 0           |
| 1.14 | 1 | 17.5738992 | 2011 | warm | 3.019323671 |
| 1.15 | 1 | 15.6713288 | 2011 | warm | 0           |
| 1.16 | 1 | 12.8153616 | 2011 | warm | 5.156075808 |
| 1.17 | 1 | 11.325748  | 2011 | warm | 0           |
| 1.18 | 1 | 11.2530032 | 2011 | warm | 3.019323671 |
| 1.19 | 1 | 9.690088   | 2011 | warm | 0           |
| 1.2  | 1 | 12.3116416 | 2011 | warm | 0           |
| 1.21 | 1 | 13.9037728 | 2011 | warm | 6.038647343 |
| 1.22 | 1 | 16.073064  | 2011 | warm | 2.955082742 |
| 1.23 | 1 | 13.9814024 | 2011 | warm | 0           |
| 1.24 | 1 | 10.4116008 | 2011 | warm | 5.156075808 |
| 1.25 | 1 | 8.2935296  | 2011 | warm | 2.136752137 |
| 1.26 | 1 | 8.1922088  | 2011 | warm | 0           |
| 1.27 | 1 | 8.4961584  | 2011 | warm | 0           |
| 1.28 | 1 | 8.0616712  | 2011 | warm | 6.038647343 |
| 1.29 | 1 | 9.5210872  | 2011 | warm | 1.388888889 |
| 1.3  | 1 | 8.9717808  | 2011 | warm | 0           |
| 2.01 | 2 | 9.4038184  | 2011 | warm | 0           |
| 2.03 | 2 | 10.6677168 | 2011 | warm | 0           |
| 2.05 | 2 | 8.5404184  | 2011 | warm | 0           |
| 2.07 | 2 | 6.5601096  | 2011 | warm | 0           |
| 2.09 | 2 | 7.2623944  | 2011 | warm | 0           |
| 2.11 | 2 | 4.8386408  | 2011 | warm | 0           |
| 2.13 | 2 | 4.1934264  | 2011 | warm | 0           |
| 2.15 | 2 | 3.9498648  | 2011 | warm | 0           |
| 2.17 | 2 | 3.4775912  | 2011 | warm | 0           |
| 2.19 | 2 | 3.242252   | 2011 | warm | 0           |
| 2.21 | 2 | 3.3765976  | 2011 | warm | 0           |
| 2.23 | 2 | 3.0881408  | 2011 | warm | 0           |
| 2.25 | 2 | 3.3622344  | 2011 | warm | 0           |

|      |   |            |      |      |             |
|------|---|------------|------|------|-------------|
| 2.27 | 2 | 5.6611432  | 2011 | warm | 0           |
| 2.29 | 2 | 5.3933304  | 2011 | warm | 0           |
| 2.31 | 2 | 4.5796864  | 2011 | warm | 0           |
| 2.33 | 2 | 10.7785928 | 2011 | warm | 1.388888889 |
| 2.35 | 2 | 10.3362064 | 2011 | warm | 0           |
| 2.37 | 2 | 8.5807952  | 2011 | warm | 0           |
| 2.39 | 2 | 10.0633656 | 2011 | warm | 0           |
| 2.41 | 2 | 7.2827856  | 2011 | warm | 0           |
| 2.43 | 2 | 8.6565872  | 2011 | warm | 0           |
| 2.45 | 2 | 8.7780448  | 2011 | warm | 0           |
| 2.47 | 2 | 10.5900504 | 2011 | warm | 0           |
| 2.49 | 2 | 9.7688408  | 2011 | warm | 0           |
| 2.51 | 2 | 9.2595872  | 2011 | warm | 0           |
| 2.53 | 2 | 11.2819824 | 2011 | warm | 0           |
| 2.55 | 2 | 11.4687392 | 2011 | warm | 0           |
| 2.57 | 2 | 6.5624584  | 2011 | warm | 0           |
| 2.59 | 2 | 5.108188   | 2011 | warm | 0           |
| 2.61 | 2 | 6.831332   | 2011 | warm | 0           |
| 2.63 | 2 | 8.1612992  | 2011 | warm | 0           |
| 3.01 | 3 | 13.0719528 | 2011 | warm | 0           |
| 3.02 | 3 | 13.2442192 | 2011 | warm | 5.910165485 |
| 3.03 | 3 | 11.9755248 | 2011 | warm | 3.019323671 |
| 3.04 | 3 | 10.0410416 | 2011 | warm | 5.910165485 |
| 3.05 | 3 | 11.0032512 | 2011 | warm | 0           |
| 3.06 | 3 | 10.4803808 | 2011 | warm | 2.955082742 |
| 3.07 | 3 | 10.799868  | 2011 | warm | 0           |
| 3.08 | 3 | 12.493716  | 2011 | warm | 3.019323671 |
| 3.09 | 3 | 12.6943864 | 2011 | warm | 6.038647343 |
| 3.1  | 3 | 8.987408   | 2011 | warm | 5.910165485 |
| 3.11 | 3 | 10.4977456 | 2011 | warm | 0           |
| 3.12 | 3 | 11.5115656 | 2011 | warm | 0           |
| 3.13 | 3 | 11.0757104 | 2011 | warm | 0           |
| 3.14 | 3 | 12.0154592 | 2011 | warm | 0           |
| 3.15 | 3 | 11.4851024 | 2011 | warm | 0           |
| 3.16 | 3 | 14.4181312 | 2011 | warm | 0           |
| 3.17 | 3 | 14.228452  | 2011 | warm | 0           |
| 3.18 | 3 | 20.0752688 | 2011 | warm | 0           |
| 3.19 | 3 | 19.1478168 | 2011 | warm | 0           |
| 3.2  | 3 | 17.223944  | 2011 | warm | 0           |
| 3.21 | 3 | 12.5738344 | 2011 | warm | 0           |
| 3.22 | 3 | 17.5407776 | 2011 | warm | 0           |
| 3.23 | 3 | 19.1002448 | 2011 | warm | 0           |
| 3.24 | 3 | 19.2210136 | 2011 | warm | 0           |
| 4.02 | 4 | 20.9454368 | 2011 | warm | 0           |
| 4.03 | 4 | 23.2600936 | 2011 | warm | 0           |
| 4.04 | 4 | 24.0954504 | 2011 | warm | 0           |

|      |   |            |      |      |             |
|------|---|------------|------|------|-------------|
| 4.05 | 4 | 24.1458808 | 2011 | warm | 0           |
| 4.06 | 4 | 20.9160672 | 2011 | warm | 0           |
| 4.07 | 4 | 20.621744  | 2011 | warm | 0           |
| 4.08 | 4 | 23.2061744 | 2011 | warm | 6.038647343 |
| 4.09 | 4 | 22.9777984 | 2011 | warm | 2.777777778 |
| 4.1  | 4 | 20.8705784 | 2011 | warm | 0           |
| 4.11 | 4 | 12.2086648 | 2011 | warm | 0           |
| 4.12 | 4 | 7.2861824  | 2011 | warm | 0           |
| 4.13 | 4 | 8.735468   | 2011 | warm | 1.388888889 |
| 4.14 | 4 | 7.9404312  | 2011 | warm | 0           |
| 4.15 | 4 | 5.4343984  | 2011 | warm | 0           |
| 4.16 | 4 | 6.0444168  | 2011 | warm | 0           |
| 4.17 | 4 | 5.8689088  | 2011 | warm | 6.038647343 |
| 4.18 | 4 | 6.7024632  | 2011 | warm | 0           |
| 4.19 | 4 | 6.6162704  | 2011 | warm | 3.019323671 |
| 4.2  | 4 | 6.750936   | 2011 | warm | 0           |
| 4.21 | 4 | 5.3918528  | 2011 | warm | 0           |
| 4.22 | 4 | 5.272592   | 2011 | warm | 0           |
| 4.23 | 4 | 5.2881888  | 2011 | warm | 0           |
| 4.24 | 4 | 2.9916328  | 2011 | warm | 0           |
| 1.09 | 1 | 23.8882256 | 2012 | cool | 0           |
| 1.1  | 1 | 26.2964368 | 2012 | cool | 0           |
| 1.11 | 1 | 22.343524  | 2012 | cool | 6.038647343 |
| 1.12 | 1 | 20.4170536 | 2012 | cool | 7.292827945 |
| 1.13 | 1 | 21.957428  | 2012 | cool | 18.11594203 |
| 1.14 | 1 | 17.5738992 | 2012 | cool | 5.974406414 |
| 1.15 | 1 | 15.6713288 | 2012 | cool | 6.038647343 |
| 1.16 | 1 | 12.8153616 | 2012 | cool | 3.019323671 |
| 1.17 | 1 | 11.325748  | 2012 | cool | 0           |
| 1.18 | 1 | 11.2530032 | 2012 | cool | 3.019323671 |
| 1.19 | 1 | 9.690088   | 2012 | cool | 0           |
| 1.2  | 1 | 12.3116416 | 2012 | cool | 0           |
| 1.21 | 1 | 13.9037728 | 2012 | cool | 0           |
| 1.22 | 1 | 16.073064  | 2012 | cool | 0           |
| 1.23 | 1 | 13.9814024 | 2012 | cool | 4.273504274 |
| 1.24 | 1 | 10.4116008 | 2012 | cool | 9.365339153 |
| 1.25 | 1 | 8.2935296  | 2012 | cool | 0           |
| 1.26 | 1 | 8.1922088  | 2012 | cool | 0           |
| 1.27 | 1 | 8.4961584  | 2012 | cool | 0           |
| 1.28 | 1 | 8.0616712  | 2012 | cool | 0           |
| 1.29 | 1 | 9.5210872  | 2012 | cool | 0           |
| 1.3  | 1 | 8.9717808  | 2012 | cool | 2.955082742 |
| 2.01 | 2 | 9.4038184  | 2012 | cool | 0           |
| 2.03 | 2 | 10.6677168 | 2012 | cool | 7.228587016 |
| 2.05 | 2 | 8.5404184  | 2012 | cool | 2.955082742 |
| 2.07 | 2 | 6.5601096  | 2012 | cool | 0           |



|      |   |            |      |      |             |
|------|---|------------|------|------|-------------|
| 2.09 | 2 | 7.2623944  | 2012 | cool | 0           |
| 2.11 | 2 | 4.8386408  | 2012 | cool | 0           |
| 2.13 | 2 | 4.1934264  | 2012 | cool | 0           |
| 2.15 | 2 | 3.9498648  | 2012 | cool | 0           |
| 2.17 | 2 | 3.4775912  | 2012 | cool | 0           |
| 2.19 | 2 | 3.242252   | 2012 | cool | 0           |
| 2.21 | 2 | 3.3765976  | 2012 | cool | 0           |
| 2.23 | 2 | 3.0881408  | 2012 | cool | 0           |
| 2.25 | 2 | 3.3622344  | 2012 | cool | 0           |
| 2.27 | 2 | 5.6611432  | 2012 | cool | 2.136752137 |
| 2.29 | 2 | 5.3933304  | 2012 | cool | 0           |
| 2.31 | 2 | 4.5796864  | 2012 | cool | 0           |
| 2.33 | 2 | 10.7785928 | 2012 | cool | 4.273504274 |
| 2.35 | 2 | 10.3362064 | 2012 | cool | 8.929489156 |
| 2.37 | 2 | 8.5807952  | 2012 | cool | 4.273504274 |
| 2.39 | 2 | 10.0633656 | 2012 | cool | 0           |
| 2.41 | 2 | 7.2827856  | 2012 | cool | 0           |
| 2.43 | 2 | 8.6565872  | 2012 | cool | 0           |
| 2.45 | 2 | 8.7780448  | 2012 | cool | 0           |
| 2.47 | 2 | 10.5900504 | 2012 | cool | 0           |
| 2.49 | 2 | 9.7688408  | 2012 | cool | 0           |
| 2.51 | 2 | 9.2595872  | 2012 | cool | 0           |
| 2.53 | 2 | 11.2819824 | 2012 | cool | 0           |
| 2.55 | 2 | 11.4687392 | 2012 | cool | 0           |
| 2.57 | 2 | 6.5624584  | 2012 | cool | 0           |
| 2.59 | 2 | 5.108188   | 2012 | cool | 0           |
| 2.61 | 2 | 6.831332   | 2012 | cool | 0           |
| 2.63 | 2 | 8.1612992  | 2012 | cool | 8.865248227 |
| 3.01 | 3 | 13.0719528 | 2012 | cool | 2.955082742 |
| 3.02 | 3 | 13.2442192 | 2012 | cool | 0           |
| 3.03 | 3 | 11.9755248 | 2012 | cool | 23.64066194 |
| 3.04 | 3 | 10.0410416 | 2012 | cool | 0           |
| 3.05 | 3 | 11.0032512 | 2012 | cool | 0           |
| 3.06 | 3 | 10.4803808 | 2012 | cool | 2.955082742 |
| 3.07 | 3 | 10.799868  | 2012 | cool | 0           |
| 3.08 | 3 | 12.493716  | 2012 | cool | 0           |
| 3.09 | 3 | 12.6943864 | 2012 | cool | 0           |
| 3.1  | 3 | 8.987408   | 2012 | cool | 2.955082742 |
| 3.11 | 3 | 10.4977456 | 2012 | cool | 11.82033097 |
| 3.12 | 3 | 11.5115656 | 2012 | cool | 2.955082742 |
| 3.13 | 3 | 11.0757104 | 2012 | cool | 0           |
| 3.14 | 3 | 12.0154592 | 2012 | cool | 0           |
| 3.15 | 3 | 11.4851024 | 2012 | cool | 0           |
| 3.16 | 3 | 14.4181312 | 2012 | cool | 0           |
| 3.17 | 3 | 14.228452  | 2012 | cool | 0           |
| 3.18 | 3 | 20.0752688 | 2012 | cool | 8.865248227 |

|      |   |            |      |      |             |
|------|---|------------|------|------|-------------|
| 3.19 | 3 | 19.1478168 | 2012 | cool | 0           |
| 3.2  | 3 | 17.223944  | 2012 | cool | 0           |
| 3.21 | 3 | 12.5738344 | 2012 | cool | 0           |
| 3.22 | 3 | 17.5407776 | 2012 | cool | 3.019323671 |
| 3.23 | 3 | 19.1002448 | 2012 | cool | 0           |
| 3.24 | 3 | 19.2210136 | 2012 | cool | 14.90389557 |
| 4.02 | 4 | 20.9454368 | 2012 | cool | 0           |
| 4.03 | 4 | 23.2600936 | 2012 | cool | 0           |
| 4.04 | 4 | 24.0954504 | 2012 | cool | 10.68376068 |
| 4.05 | 4 | 24.1458808 | 2012 | cool | 0           |
| 4.06 | 4 | 20.9160672 | 2012 | cool | 0           |
| 4.07 | 4 | 20.621744  | 2012 | cool | 0           |
| 4.08 | 4 | 23.2061744 | 2012 | cool | 2.136752137 |
| 4.09 | 4 | 22.9777984 | 2012 | cool | 0           |
| 4.1  | 4 | 20.8705784 | 2012 | cool | 0           |
| 4.11 | 4 | 12.2086648 | 2012 | cool | 0           |
| 4.12 | 4 | 7.2861824  | 2012 | cool | 0           |
| 4.13 | 4 | 8.735468   | 2012 | cool | 0           |
| 4.14 | 4 | 7.9404312  | 2012 | cool | 0           |
| 4.15 | 4 | 5.4343984  | 2012 | cool | 0           |
| 4.16 | 4 | 6.0444168  | 2012 | cool | 0           |
| 4.17 | 4 | 5.8689088  | 2012 | cool | 0           |
| 4.18 | 4 | 6.7024632  | 2012 | cool | 2.136752137 |
| 4.19 | 4 | 6.6162704  | 2012 | cool | 5.091834879 |
| 4.2  | 4 | 6.750936   | 2012 | cool | 0           |
| 4.21 | 4 | 5.3918528  | 2012 | cool | 0           |
| 4.22 | 4 | 5.272592   | 2012 | cool | 0           |
| 4.23 | 4 | 5.2881888  | 2012 | cool | 0           |
| 4.24 | 4 | 2.9916328  | 2012 | cool | 0           |
| 1.09 | 1 | 23.8882256 | 2012 | warm | 0           |
| 1.1  | 1 | 26.2964368 | 2012 | warm | 0           |
| 1.11 | 1 | 22.343524  | 2012 | warm | 3.019323671 |
| 1.12 | 1 | 20.4170536 | 2012 | warm | 0           |
| 1.13 | 1 | 21.957428  | 2012 | warm | 6.41025641  |
| 1.14 | 1 | 17.5738992 | 2012 | warm | 2.136752137 |
| 1.15 | 1 | 15.6713288 | 2012 | warm | 6.038647343 |
| 1.16 | 1 | 12.8153616 | 2012 | warm | 0           |
| 1.17 | 1 | 11.325748  | 2012 | warm | 0           |
| 1.18 | 1 | 11.2530032 | 2012 | warm | 0           |
| 1.19 | 1 | 9.690088   | 2012 | warm | 2.955082742 |
| 1.2  | 1 | 12.3116416 | 2012 | warm | 0           |
| 1.21 | 1 | 13.9037728 | 2012 | warm | 2.955082742 |
| 1.22 | 1 | 16.073064  | 2012 | warm | 5.974406414 |
| 1.23 | 1 | 13.9814024 | 2012 | warm | 0           |
| 1.24 | 1 | 10.4116008 | 2012 | warm | 7.292827945 |
| 1.25 | 1 | 8.2935296  | 2012 | warm | 0           |

|      |   |            |      |      |             |
|------|---|------------|------|------|-------------|
| 1.26 | 1 | 8.1922088  | 2012 | warm | 2.955082742 |
| 1.27 | 1 | 8.4961584  | 2012 | warm | 0           |
| 1.28 | 1 | 8.0616712  | 2012 | warm | 0           |
| 1.29 | 1 | 9.5210872  | 2012 | warm | 1.388888889 |
| 1.3  | 1 | 8.9717808  | 2012 | warm | 0           |
| 2.01 | 2 | 9.4038184  | 2012 | warm | 0           |
| 2.03 | 2 | 10.6677168 | 2012 | warm | 0           |
| 2.05 | 2 | 8.5404184  | 2012 | warm | 9.057971014 |
| 2.07 | 2 | 6.5601096  | 2012 | warm | 0           |
| 2.09 | 2 | 7.2623944  | 2012 | warm | 0           |
| 2.11 | 2 | 4.8386408  | 2012 | warm | 0           |
| 2.13 | 2 | 4.1934264  | 2012 | warm | 0           |
| 2.15 | 2 | 3.9498648  | 2012 | warm | 0           |
| 2.17 | 2 | 3.4775912  | 2012 | warm | 0           |
| 2.19 | 2 | 3.242252   | 2012 | warm | 0           |
| 2.21 | 2 | 3.3765976  | 2012 | warm | 0           |
| 2.23 | 2 | 3.0881408  | 2012 | warm | 0           |
| 2.25 | 2 | 3.3622344  | 2012 | warm | 0           |
| 2.27 | 2 | 5.6611432  | 2012 | warm | 3.019323671 |
| 2.29 | 2 | 5.3933304  | 2012 | warm | 0           |
| 2.31 | 2 | 4.5796864  | 2012 | warm | 0           |
| 2.33 | 2 | 10.7785928 | 2012 | warm | 0           |
| 2.35 | 2 | 10.3362064 | 2012 | warm | 5.910165485 |
| 2.37 | 2 | 8.5807952  | 2012 | warm | 0           |
| 2.39 | 2 | 10.0633656 | 2012 | warm | 0           |
| 2.41 | 2 | 7.2827856  | 2012 | warm | 0           |
| 2.43 | 2 | 8.6565872  | 2012 | warm | 0           |
| 2.45 | 2 | 8.7780448  | 2012 | warm | 0           |
| 2.47 | 2 | 10.5900504 | 2012 | warm | 2.955082742 |
| 2.49 | 2 | 9.7688408  | 2012 | warm | 0           |
| 2.51 | 2 | 9.2595872  | 2012 | warm | 13.53276353 |
| 2.53 | 2 | 11.2819824 | 2012 | warm | 0           |
| 2.55 | 2 | 11.4687392 | 2012 | warm | 0           |
| 2.57 | 2 | 6.5624584  | 2012 | warm | 0           |
| 2.59 | 2 | 5.108188   | 2012 | warm | 0           |
| 2.61 | 2 | 6.831332   | 2012 | warm | 0           |
| 2.63 | 2 | 8.1612992  | 2012 | warm | 5.974406414 |
| 3.01 | 3 | 13.0719528 | 2012 | warm | 0           |
| 3.02 | 3 | 13.2442192 | 2012 | warm | 5.974406414 |
| 3.03 | 3 | 11.9755248 | 2012 | warm | 3.019323671 |
| 3.04 | 3 | 10.0410416 | 2012 | warm | 5.910165485 |
| 3.05 | 3 | 11.0032512 | 2012 | warm | 3.019323671 |
| 3.06 | 3 | 10.4803808 | 2012 | warm | 0           |
| 3.07 | 3 | 10.799868  | 2012 | warm | 2.955082742 |
| 3.08 | 3 | 12.493716  | 2012 | warm | 0           |
| 3.09 | 3 | 12.6943864 | 2012 | warm | 2.955082742 |

|      |   |            |      |      |             |
|------|---|------------|------|------|-------------|
| 3.1  | 3 | 8.987408   | 2012 | warm | 10.18366976 |
| 3.11 | 3 | 10.4977456 | 2012 | warm | 0           |
| 3.12 | 3 | 11.5115656 | 2012 | warm | 2.955082742 |
| 3.13 | 3 | 11.0757104 | 2012 | warm | 0           |
| 3.14 | 3 | 12.0154592 | 2012 | warm | 0           |
| 3.15 | 3 | 11.4851024 | 2012 | warm | 0           |
| 3.16 | 3 | 14.4181312 | 2012 | warm | 0           |
| 3.17 | 3 | 14.228452  | 2012 | warm | 0           |
| 3.18 | 3 | 20.0752688 | 2012 | warm | 0           |
| 3.19 | 3 | 19.1478168 | 2012 | warm | 0           |
| 3.2  | 3 | 17.223944  | 2012 | warm | 0           |
| 3.21 | 3 | 12.5738344 | 2012 | warm | 3.019323671 |
| 3.22 | 3 | 17.5407776 | 2012 | warm | 0           |
| 3.23 | 3 | 19.1002448 | 2012 | warm | 8.865248227 |
| 3.24 | 3 | 19.2210136 | 2012 | warm | 3.019323671 |
| 4.02 | 4 | 20.9454368 | 2012 | warm | 0           |
| 4.03 | 4 | 23.2600936 | 2012 | warm | 0           |
| 4.04 | 4 | 24.0954504 | 2012 | warm | 0           |
| 4.05 | 4 | 24.1458808 | 2012 | warm | 0           |
| 4.06 | 4 | 20.9160672 | 2012 | warm | 0           |
| 4.07 | 4 | 20.621744  | 2012 | warm | 0           |
| 4.08 | 4 | 23.2061744 | 2012 | warm | 0           |
| 4.09 | 4 | 22.9777984 | 2012 | warm | 3.019323671 |
| 4.1  | 4 | 20.8705784 | 2012 | warm | 0           |
| 4.11 | 4 | 12.2086648 | 2012 | warm | 0           |
| 4.12 | 4 | 7.2861824  | 2012 | warm | 0           |
| 4.13 | 4 | 8.735468   | 2012 | warm | 0           |
| 4.14 | 4 | 7.9404312  | 2012 | warm | 0           |
| 4.15 | 4 | 5.4343984  | 2012 | warm | 3.019323671 |
| 4.16 | 4 | 6.0444168  | 2012 | warm | 0           |
| 4.17 | 4 | 5.8689088  | 2012 | warm | 0           |
| 4.18 | 4 | 6.7024632  | 2012 | warm | 0           |
| 4.19 | 4 | 6.6162704  | 2012 | warm | 3.019323671 |
| 4.2  | 4 | 6.750936   | 2012 | warm | 0           |
| 4.21 | 4 | 5.3918528  | 2012 | warm | 3.019323671 |
| 4.22 | 4 | 5.272592   | 2012 | warm | 0           |
| 4.23 | 4 | 5.2881888  | 2012 | warm | 0           |
| 4.24 | 4 | 2.9916328  | 2012 | warm | 0           |
| 1.09 | 1 | 23.8882256 | 2003 | cool | 0           |
| 1.1  | 1 | 26.2964368 | 2003 | cool | 9.057971014 |
| 1.11 | 1 | 22.343524  | 2003 | cool | 7.292827945 |
| 1.12 | 1 | 20.4170536 | 2003 | cool | 36.97510219 |
| 1.13 | 1 | 21.957428  | 2003 | cool | 15.09661836 |
| 1.14 | 1 | 17.5738992 | 2003 | cool | 0           |
| 1.15 | 1 | 15.6713288 | 2003 | cool | 2.136752137 |
| 1.16 | 1 | 12.8153616 | 2003 | cool | 2.136752137 |

|      |   |            |      |      |             |
|------|---|------------|------|------|-------------|
| 1.17 | 1 | 11.325748  | 2003 | cool | 45.28985507 |
| 1.18 | 1 | 11.2530032 | 2003 | cool | 2.136752137 |
| 1.19 | 1 | 9.690088   | 2003 | cool | 5.156075808 |
| 1.2  | 1 | 12.3116416 | 2003 | cool | 0           |
| 1.21 | 1 | 13.9037728 | 2003 | cool | 6.038647343 |
| 1.22 | 1 | 16.073064  | 2003 | cool | 2.136752137 |
| 1.23 | 1 | 13.9814024 | 2003 | cool | 8.547008547 |
| 1.24 | 1 | 10.4116008 | 2003 | cool | 0           |
| 1.25 | 1 | 8.2935296  | 2003 | cool | 0           |
| 1.26 | 1 | 8.1922088  | 2003 | cool | 0           |
| 1.27 | 1 | 8.4961584  | 2003 | cool | 0           |
| 1.28 | 1 | 8.0616712  | 2003 | cool | 0           |
| 1.29 | 1 | 9.5210872  | 2003 | cool | 0           |
| 1.3  | 1 | 8.9717808  | 2003 | cool | 0           |
| 2.01 | 2 | 9.4038184  | 2003 | cool | 2.955082742 |
| 2.03 | 2 | 10.6677168 | 2003 | cool | 0           |
| 2.05 | 2 | 8.5404184  | 2003 | cool | 18.48290598 |
| 2.07 | 2 | 6.5601096  | 2003 | cool | 0           |
| 2.09 | 2 | 7.2623944  | 2003 | cool | 0           |
| 2.11 | 2 | 4.8386408  | 2003 | cool | 1.388888889 |
| 2.13 | 2 | 4.1934264  | 2003 | cool | 0           |
| 2.15 | 2 | 3.9498648  | 2003 | cool | 0           |
| 2.17 | 2 | 3.4775912  | 2003 | cool | 0           |
| 2.19 | 2 | 3.242252   | 2003 | cool | 0           |
| 2.21 | 2 | 3.3765976  | 2003 | cool | 0           |
| 2.23 | 2 | 3.0881408  | 2003 | cool | 0           |
| 2.25 | 2 | 3.3622344  | 2003 | cool | 0           |
| 2.27 | 2 | 5.6611432  | 2003 | cool | 28.07971014 |
| 2.29 | 2 | 5.3933304  | 2003 | cool | 0           |
| 2.31 | 2 | 4.5796864  | 2003 | cool | 0           |
| 2.33 | 2 | 10.7785928 | 2003 | cool | 0           |
| 2.35 | 2 | 10.3362064 | 2003 | cool | 7.121749409 |
| 2.37 | 2 | 8.5807952  | 2003 | cool | 0           |
| 2.39 | 2 | 10.0633656 | 2003 | cool | 0           |
| 2.41 | 2 | 7.2827856  | 2003 | cool | 0           |
| 2.43 | 2 | 8.6565872  | 2003 | cool | 0           |
| 2.45 | 2 | 8.7780448  | 2003 | cool | 5.910165485 |
| 2.47 | 2 | 10.5900504 | 2003 | cool | 0           |
| 2.49 | 2 | 9.7688408  | 2003 | cool | 2.136752137 |
| 2.51 | 2 | 9.2595872  | 2003 | cool | 0           |
| 2.53 | 2 | 11.2819824 | 2003 | cool | 0           |
| 2.55 | 2 | 11.4687392 | 2003 | cool | 0           |
| 2.57 | 2 | 6.5624584  | 2003 | cool | 0           |
| 2.59 | 2 | 5.108188   | 2003 | cool | 0           |
| 2.61 | 2 | 6.831332   | 2003 | cool | 0           |
| 2.63 | 2 | 8.1612992  | 2003 | cool | 0           |

|      |   |            |      |      |             |
|------|---|------------|------|------|-------------|
| 3.01 | 3 | 13.0719528 | 2003 | cool | 0           |
| 3.02 | 3 | 13.2442192 | 2003 | cool | 0           |
| 3.03 | 3 | 11.9755248 | 2003 | cool | 3.019323671 |
| 3.04 | 3 | 10.0410416 | 2003 | cool | 0           |
| 3.05 | 3 | 11.0032512 | 2003 | cool | 0           |
| 3.06 | 3 | 10.4803808 | 2003 | cool | 0           |
| 3.07 | 3 | 10.799868  | 2003 | cool | 5.910165485 |
| 3.08 | 3 | 12.493716  | 2003 | cool | 0           |
| 3.09 | 3 | 12.6943864 | 2003 | cool | 8.929489156 |
| 3.1  | 3 | 8.987408   | 2003 | cool | 24.38684504 |
| 3.11 | 3 | 10.4977456 | 2003 | cool | 0           |
| 3.12 | 3 | 11.5115656 | 2003 | cool | 0           |
| 3.13 | 3 | 11.0757104 | 2003 | cool | 8.17539948  |
| 3.14 | 3 | 12.0154592 | 2003 | cool | 0           |
| 3.15 | 3 | 11.4851024 | 2003 | cool | 3.019323671 |
| 3.16 | 3 | 14.4181312 | 2003 | cool | 0           |
| 3.17 | 3 | 14.228452  | 2003 | cool | 0           |
| 3.18 | 3 | 20.0752688 | 2003 | cool | 3.019323671 |
| 3.19 | 3 | 19.1478168 | 2003 | cool | 0           |
| 3.2  | 3 | 17.223944  | 2003 | cool | 0           |
| 3.21 | 3 | 12.5738344 | 2003 | cool | 3.019323671 |
| 3.22 | 3 | 17.5407776 | 2003 | cool | 0           |
| 3.23 | 3 | 19.1002448 | 2003 | cool | 0           |
| 3.24 | 3 | 19.2210136 | 2003 | cool | 0           |
| 4.02 | 4 | 20.9454368 | 2003 | cool | 0           |
| 4.03 | 4 | 23.2600936 | 2003 | cool | 0           |
| 4.04 | 4 | 24.0954504 | 2003 | cool | 2.136752137 |
| 4.05 | 4 | 24.1458808 | 2003 | cool | 0           |
| 4.06 | 4 | 20.9160672 | 2003 | cool | 0           |
| 4.07 | 4 | 20.621744  | 2003 | cool | 3.019323671 |
| 4.08 | 4 | 23.2061744 | 2003 | cool | 5.910165485 |
| 4.09 | 4 | 22.9777984 | 2003 | cool | 0           |
| 4.1  | 4 | 20.8705784 | 2003 | cool | 0           |
| 4.11 | 4 | 12.2086648 | 2003 | cool | 0           |
| 4.12 | 4 | 7.2861824  | 2003 | cool | 3.019323671 |
| 4.13 | 4 | 8.735468   | 2003 | cool | 3.019323671 |
| 4.14 | 4 | 7.9404312  | 2003 | cool | 0           |
| 4.15 | 4 | 5.4343984  | 2003 | cool | 0           |
| 4.16 | 4 | 6.0444168  | 2003 | cool | 0           |
| 4.17 | 4 | 5.8689088  | 2003 | cool | 12.07729469 |
| 4.18 | 4 | 6.7024632  | 2003 | cool | 0           |
| 4.19 | 4 | 6.6162704  | 2003 | cool | 4.273504274 |
| 4.2  | 4 | 6.750936   | 2003 | cool | 10.31215162 |
| 4.21 | 4 | 5.3918528  | 2003 | cool | 0           |
| 4.22 | 4 | 5.272592   | 2003 | cool | 3.019323671 |
| 4.23 | 4 | 5.2881888  | 2003 | cool | 0           |

|      |   |            |      |      |             |
|------|---|------------|------|------|-------------|
| 4.24 | 4 | 2.9916328  | 2003 | cool | 0           |
| 1.09 | 1 | 23.8882256 | 2008 | warm | 0           |
| 1.1  | 1 | 26.2964368 | 2008 | warm | 0           |
| 1.11 | 1 | 22.343524  | 2008 | warm | 3.019323671 |
| 1.12 | 1 | 20.4170536 | 2008 | warm | 9.057971014 |
| 1.13 | 1 | 21.957428  | 2008 | warm | 13.33147529 |
| 1.14 | 1 | 17.5738992 | 2008 | warm | 0           |
| 1.15 | 1 | 15.6713288 | 2008 | warm | 8.17539948  |
| 1.16 | 1 | 12.8153616 | 2008 | warm | 0           |
| 1.17 | 1 | 11.325748  | 2008 | warm | 0           |
| 1.18 | 1 | 11.2530032 | 2008 | warm | 17.23337049 |
| 1.19 | 1 | 9.690088   | 2008 | warm | 2.136752137 |
| 1.2  | 1 | 12.3116416 | 2008 | warm | 2.136752137 |
| 1.21 | 1 | 13.9037728 | 2008 | warm | 3.019323671 |
| 1.22 | 1 | 16.073064  | 2008 | warm | 2.136752137 |
| 1.23 | 1 | 13.9814024 | 2008 | warm | 4.273504274 |
| 1.24 | 1 | 10.4116008 | 2008 | warm | 2.136752137 |
| 1.25 | 1 | 8.2935296  | 2008 | warm | 6.038647343 |
| 1.26 | 1 | 8.1922088  | 2008 | warm | 0           |
| 1.27 | 1 | 8.4961584  | 2008 | warm | 0           |
| 1.28 | 1 | 8.0616712  | 2008 | warm | 0           |
| 1.29 | 1 | 9.5210872  | 2008 | warm | 0           |
| 1.3  | 1 | 8.9717808  | 2008 | warm | 0           |
| 2.01 | 2 | 9.4038184  | 2008 | warm | 0           |
| 2.03 | 2 | 10.6677168 | 2008 | warm | 0           |
| 2.05 | 2 | 8.5404184  | 2008 | warm | 3.019323671 |
| 2.07 | 2 | 6.5601096  | 2008 | warm | 0           |
| 2.09 | 2 | 7.2623944  | 2008 | warm | 0           |
| 2.11 | 2 | 4.8386408  | 2008 | warm | 0           |
| 2.13 | 2 | 4.1934264  | 2008 | warm | 0           |
| 2.15 | 2 | 3.9498648  | 2008 | warm | 0           |
| 2.17 | 2 | 3.4775912  | 2008 | warm | 3.019323671 |
| 2.19 | 2 | 3.242252   | 2008 | warm | 0           |
| 2.21 | 2 | 3.3765976  | 2008 | warm | 0           |
| 2.23 | 2 | 3.0881408  | 2008 | warm | 0           |
| 2.25 | 2 | 3.3622344  | 2008 | warm | 0           |
| 2.27 | 2 | 5.6611432  | 2008 | warm | 0           |
| 2.29 | 2 | 5.3933304  | 2008 | warm | 0           |
| 2.31 | 2 | 4.5796864  | 2008 | warm | 0           |
| 2.33 | 2 | 10.7785928 | 2008 | warm | 0           |
| 2.35 | 2 | 10.3362064 | 2008 | warm | 0           |
| 2.37 | 2 | 8.5807952  | 2008 | warm | 0           |
| 2.39 | 2 | 10.0633656 | 2008 | warm | 0           |
| 2.41 | 2 | 7.2827856  | 2008 | warm | 0           |
| 2.43 | 2 | 8.6565872  | 2008 | warm | 0           |
| 2.45 | 2 | 8.7780448  | 2008 | warm | 4.273504274 |

|      |   |            |      |      |             |
|------|---|------------|------|------|-------------|
| 2.47 | 2 | 10.5900504 | 2008 | warm | 0           |
| 2.49 | 2 | 9.7688408  | 2008 | warm | 0           |
| 2.51 | 2 | 9.2595872  | 2008 | warm | 0           |
| 2.53 | 2 | 11.2819824 | 2008 | warm | 0           |
| 2.55 | 2 | 11.4687392 | 2008 | warm | 0           |
| 2.57 | 2 | 6.5624584  | 2008 | warm | 0           |
| 2.59 | 2 | 5.108188   | 2008 | warm | 0           |
| 2.61 | 2 | 6.831332   | 2008 | warm | 0           |
| 2.63 | 2 | 8.1612992  | 2008 | warm | 0           |
| 3.01 | 3 | 13.0719528 | 2008 | warm | 0           |
| 3.02 | 3 | 13.2442192 | 2008 | warm | 0           |
| 3.03 | 3 | 11.9755248 | 2008 | warm | 0           |
| 3.04 | 3 | 10.0410416 | 2008 | warm | 0           |
| 3.05 | 3 | 11.0032512 | 2008 | warm | 14.77541371 |
| 3.06 | 3 | 10.4803808 | 2008 | warm | 9.259259259 |
| 3.07 | 3 | 10.799868  | 2008 | warm | 0           |
| 3.08 | 3 | 12.493716  | 2008 | warm | 0           |
| 3.09 | 3 | 12.6943864 | 2008 | warm | 0           |
| 3.1  | 3 | 8.987408   | 2008 | warm | 0           |
| 3.11 | 3 | 10.4977456 | 2008 | warm | 0           |
| 3.12 | 3 | 11.5115656 | 2008 | warm | 2.136752137 |
| 3.13 | 3 | 11.0757104 | 2008 | warm | 3.019323671 |
| 3.14 | 3 | 12.0154592 | 2008 | warm | 0           |
| 3.15 | 3 | 11.4851024 | 2008 | warm | 0           |
| 3.16 | 3 | 14.4181312 | 2008 | warm | 0           |
| 3.17 | 3 | 14.228452  | 2008 | warm | 0           |
| 3.18 | 3 | 20.0752688 | 2008 | warm | 0           |
| 3.19 | 3 | 19.1478168 | 2008 | warm | 0           |
| 3.2  | 3 | 17.223944  | 2008 | warm | 0           |
| 3.21 | 3 | 12.5738344 | 2008 | warm | 0           |
| 3.22 | 3 | 17.5407776 | 2008 | warm | 0           |
| 3.23 | 3 | 19.1002448 | 2008 | warm | 0           |
| 3.24 | 3 | 19.2210136 | 2008 | warm | 0           |
| 4.02 | 4 | 20.9454368 | 2008 | warm | 0           |
| 4.03 | 4 | 23.2600936 | 2008 | warm | 6.038647343 |
| 4.04 | 4 | 24.0954504 | 2008 | warm | 0           |
| 4.05 | 4 | 24.1458808 | 2008 | warm | 0           |
| 4.06 | 4 | 20.9160672 | 2008 | warm | 3.019323671 |
| 4.07 | 4 | 20.621744  | 2008 | warm | 0           |
| 4.08 | 4 | 23.2061744 | 2008 | warm | 0           |
| 4.09 | 4 | 22.9777984 | 2008 | warm | 6.038647343 |
| 4.1  | 4 | 20.8705784 | 2008 | warm | 0           |
| 4.11 | 4 | 12.2086648 | 2008 | warm | 0           |
| 4.12 | 4 | 7.2861824  | 2008 | warm | 0           |
| 4.13 | 4 | 8.735468   | 2008 | warm | 0           |
| 4.14 | 4 | 7.9404312  | 2008 | warm | 0           |



|      |   |           |      |      |             |
|------|---|-----------|------|------|-------------|
| 4.15 | 4 | 5.4343984 | 2008 | warm | 0           |
| 4.16 | 4 | 6.0444168 | 2008 | warm | 0           |
| 4.17 | 4 | 5.8689088 | 2008 | warm | 0           |
| 4.18 | 4 | 6.7024632 | 2008 | warm | 0           |
| 4.19 | 4 | 6.6162704 | 2008 | warm | 4.273504274 |
| 4.2  | 4 | 6.750936  | 2008 | warm | 3.019323671 |
| 4.21 | 4 | 5.3918528 | 2008 | warm | 2.136752137 |
| 4.22 | 4 | 5.272592  | 2008 | warm | 3.019323671 |
| 4.23 | 4 | 5.2881888 | 2008 | warm | 0           |
| 4.24 | 4 | 2.9916328 | 2008 | warm | 0           |

---

**Table S6. Programming code used to conduct the dugong density analysis under the R programming system**

```
#####

#####

#The following code shows how to run a zero-inflated model

setwd("C:/Users/jc172521/DugongProject/2016/Papers/Chris")

Dug <- read.csv("AdjCountData_WildlifeResearch.csv",
               header = TRUE,
               dec = ".")

Dug$adjDug <- round(Dug$adjcount)

Dug$year <- as.factor(Dug$year)

Dug$block <- as.factor(Dug$block)

Dug$LogArea <- log(Dug$area.km2) #This is necessary for an offset in NB and ZI

#####

#Data exploration

table(Dug$adjDug)

sum(Dug$adjDug == 0) / nrow(Dug)

###Model comparison

library(MASS)

##Apply Poisson GLM

P <- glm(adjDug ~ year * block + season + offset(LogArea),
```

```

    family = poisson,

    data = Dug)

#Overdispersion

E1 <- resid(P, type = "pearson")

sum(E1^2) / (nrow(Dug) - length(coef(P)))

#[1] 7.827577

##Apply Negative Binomial

NB <- glm.nb(adjDug ~ year * block +season + offset(LogArea),

    data = Dug)

#Overdispersion

E2 <- resid(NB, type = "pearson")

sum(E2^2) / (N - (length(coef(NB))+1))

#[1] 0.8555324

##Apply Zero-inflated Poisson models

library(pscl)

ZP <- zeroinfl(adjDug ~ year * block + offset(LogArea) |

    year * block,

    dist = "poisson",

    link = "logit",

    data = Dug)

#Overdispersion

E3 <- resid(ZP, type = "pearson")

```

```

sum(E3^2) / (nrow(Dug) - length(coef(ZP)))

#[1] 1.924103

##Apply Zero-inflated NB
ZINB <- zeroinfl(adjDug ~ year * block +offset(LogArea) |
  year *block,
  dist = "negbin", link = "logit",
  data = Dug)

#Overdispersion
E4 <- resid(ZINB, type = "pearson")
sum(E4^2) / (nrow(Dug) - (length(coef(ZINB))+1))

#[1] 1.108459

#Comparing Poisson, NB, Zero-inflated Poisson and Zero-inflated NB
AIC(P, NB, ZP, ZINB)

#df  AIC
#P  16 3381.951
#NB  17 1691.293
#ZP  32 1917.088
#ZINB 33 1626.231

vuong(NB, ZINB)

#[1] -51.25504

#Raw AIC-corrected BIC-corrected
#-5.9043569 -5.9011447 0.3314667

```

```

#[1] 0.3338923

#[1] -48.530566 -48.504163  2.724474

#Vuong Non-Nested Hypothesis Test-Statistic:

# (test-statistic is asymptotically distributed N(0,1) under the
# null that the models are indistinguishable)

#-----

# Vuong z-statistic      H_A    p-value

#Raw                    -5.9043569 model2 > model1 1.7701e-09

#AIC-corrected         -5.9011447 model2 > model1 1.8049e-09

#BIC-corrected          0.3314667 model1 > model2  0.37015

###Model selection

#full model

ZINBF <- zeroinfl(adjDug ~ year* block + season + offset(LogArea) |
                year * block + season,
                dist = "negbin", link = "logit",
                data = Dug)

#reduced models below

ZINB2 <- zeroinfl(adjDug ~ year + block + season + offset(LogArea) |
                year + block + season,
                dist = "negbin", link = "logit",
                data = Dug)

ZINB3 <- zeroinfl(adjDug ~ year + season + offset(LogArea) |
                year + season,

```

```

      dist = "negbin", link = "logit",

      data = Dug)

ZINB4 <- zeroinfl(adjDug ~ year + block + offset(LogArea) |

      year + block,

      dist = "negbin", link = "logit",

      data = Dug)

ZINB5 <- zeroinfl(adjDug ~ block + season + offset(LogArea) |

      block + season,

      dist = "negbin", link = "logit",

      data = Dug)

AIC(ZINBF, ZINB2, ZINB3, ZINB4, ZINB5)

#df    AIC

#ZINBF 35 1629.430 <-- year * block + season for both counts and binomial models

#ZINB2 17 1606.594 <-- year + block + season for both counts and binomial models

#ZINB3 11 1643.799 <-- year + season for both counts and binomial models

#ZINB4 15 1603.702 <-- year + block for both counts and binomial models (this is the best
in terms of AIC)

#ZINB5 11 1613.429 <-- block + season for both counts and binomial models

summary(ZINB4)

#Call:

# zeroinfl(formula = adjDug ~ year + block + offset(LogArea) | year + block, data = Dug,
dist = "negbin", link = "logit")

```

```

#Pearson residuals:

# Min    1Q  Median    3Q    Max
#-0.77358 -0.45354 -0.35315 -0.08364 7.28194

#Count model coefficients (negbin with log link):

#      Estimate Std. Error z value Pr(>|z|)
#(Intercept) -0.4610   0.1720 -2.681 0.007347 **
#year2008    -0.5354   0.2346 -2.282 0.022496 *
#year2011    -0.8309   0.2006 -4.143 3.43e-05 ***
#year2012    -0.6905   0.1909 -3.616 0.000299 ***
#block2      0.6599   0.2043  3.229 0.001241 **
#block3      0.3301   0.1795  1.839 0.065862 .
#block4     -0.1826   0.2062 -0.885 0.375889
#Log(theta)  0.5201   0.1896  2.742 0.006098 **

# Zero-inflation model coefficients (binomial with logit link):

#      Estimate Std. Error z value Pr(>|z|)
#(Intercept) -0.4972   0.3001 -1.657 0.097546 .
#year2008     0.4574   0.3414  1.340 0.180242
#year2011     0.4637   0.2969  1.562 0.118257
#year2012     0.1257   0.2914  0.431 0.666163
#block2      1.7966   0.2972  6.045 1.49e-09 ***
#block3      0.9090   0.2819  3.225 0.001261 **
#block4      1.0246   0.3054  3.355 0.000794 ***

# ---

# Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

#Theta = 1.6821

#Number of iterations in BFGS optimization: 46

#Log-likelihood: -786.9 on 15 Df



**Table S7. Survey interruption and period taken to complete surveying Block 1**

| Date of survey   | Jun 2003<br>(cool<br>season) | Jan 2008<br>(warm<br>season) | Jun 2011<br>(cool<br>season) | Nov 2011<br>(warm<br>season) | Jun 2012<br>(cool<br>season) | Nov 2012<br>(warm<br>season) |
|--|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|
| Time on the ground<br>(days)   | 19                           | 58                           | 19                           | 25                           | 32                           | 27                           |
| Time to complete<br>Block 1 (days)   | 21                           | 2                            | 2                            | 1                            | 25                           | 21                           |
| Mean daily wind<br>speed (km/h) during<br>interruptions of the<br>survey of Block 1 <sup>a</sup> | 21                           | na <sup>b</sup>              | na <sup>b</sup>              | na <sup>b</sup>              | 21                           | 21                           |
| Max daily wind speed<br>(km/h) during<br>interruptions of the<br>survey of Block 1 <sup>a</sup>  | 45                           | na <sup>b</sup>              | na <sup>b</sup>              | na <sup>b</sup>              | 48                           | 43                           |

<sup>a</sup> Data obtained from (Météo-France 2014).

<sup>b</sup> Not applicable because there was no interruption of the survey.

**Table S8. Comparison of the standardized estimates of dugong relative abundance and standard errors ( $\pm$ SE) obtained using the Pollock et al. (2006) methodology for the dugong aerial surveys conducted in New Caledonia between 2003 and 2012**

Details of the counts of dugong groups, individual dugongs, dugong per transect, and calf sightings are also included

|  | Block | Survey year        |                     |                      |                     |                      |                    |
|--|-------|--------------------|---------------------|----------------------|---------------------|----------------------|--------------------|
|  |       | Jun 2003           | Jan 2008            | Jun 2011             | Nov 2011            | Jun 2012             | Nov 2012           |
| No. groups                             | 1     | 31                 | 20                  | 14                   | 14                  | 18                   | 16                 |
|  | 2     | 18                 | 3                   | 16                   | 9                   | 16                   | 18                 |
|  | 3     | 19                 | 4                   | 8                    | 8                   | 16                   | 15                 |
|  | 4     | 11                 | 7                   | 6                    | 5                   | 7                    | 4                  |
|  | Total | 79                 | 34                  | 44                   | 36                  | 57                   | 53                 |
| No. dugongs                            | 1     | 52                 | 27                  | 14                   | 14                  | 24                   | 16                 |
|  | 2     | 30                 | 4                   | 26 <sup>a</sup>      | 9                   | 21                   | 26                 |
|  | 3     | 23                 | 9                   | 14                   | 11                  | 25                   | 18                 |
|  | 4     | 17                 | 10                  | 7                    | 8                   | 10                   | 4                  |
|  | Total | 122                | 50                  | 61                   | 42                  | 80                   | 64                 |
| No. dugongs per transect               | 1     | 2.36               | 1.23                | 0.63                 | 0.63                | 1.10                 | 0.73               |
|  | 2     | 0.94               | 0.12                | 0.41 <sup>b</sup>    | 0.14                | 0.33                 | 0.41               |
|  | 3     | 0.96               | 0.37                | 0.58                 | 0.46                | 1.04                 | 0.75               |
|  | 4     | 0.74               | 0.43                | 0.30                 | 0.35                | 0.43                 | 0.17               |
|  | Total | 1.21               | 0.49                | 0.46                 | 0.32                | 0.6                  | 0.48               |
| No. calves (% , $\pm$ SE) <sup>b</sup> | 1     | 3 (5.8)            | 3 (11.1)            | 0                    | 0                   | 1 (4.2)              | 0                  |
|  | 2     | 1 (3.3)            | 0                   | 6 (23.1)             | 0                   | 3 (14.3)             | 2 (7.7)            |
|  | 3     | 1 (4.3)            | 2 (22.2)            | 4 (28.6)             | 3 (27.3)            | 4 (16.0)             | 1 (5.6)            |
|  | 4     | 4 (23.5)           | 2 (20.0)            | 1 (14.3)             | 3 (37.5)            | 2 (20.0)             | 0                  |
|  | Total | 9 (7.4, $\pm$ 4.8) | 7 (14.0, $\pm$ 5.0) | 11 (18.0, $\pm$ 6.2) | 6 (14.3, $\pm$ 9.6) | 10 (12.5, $\pm$ 3.4) | 3 (4.7, $\pm$ 1.9) |
|  | 1     | 919 (414)          | 435 (181)           | 250 (128)            | 243 (132)           | 417 (162)            | 261 (132)          |
|  | 2     | 401 (219)          | Tfs <sup>c</sup>    | 220 (82)             | 75 (56)             | 203 (74)             | 225 (83)           |

|                                 | Block | Survey year |                  |           |           |            |           |
|---------------------------------|-------|-------------|------------------|-----------|-----------|------------|-----------|
|                                 |       | Jun 2003    | Jan 2008         | Jun 2011  | Nov 2011  | Jun 2012   | Nov 2012  |
| Population estimate ( $\pm$ SE) | 3     | 380 (223)   | Tfs <sup>c</sup> | 233 (112) | 213 (113) | 484 (225)  | 338 (156) |
|                                 | 4     | 326 (192)   | 170 (85)         | 107 (68)  | 117 (70)  | 123 (75)   | 73 (71)   |
|                                 | Total | 2026 (553)  | 606 (200)        | 881 (201) | 649 (195) | 1227 (296) | 898 (231) |
| Coefficient of variation        |       | 0.27        | 0.33             | 0.24      | 0.30      | 0.25       | 0.22      |

<sup>a</sup> In addition, one herd of 69 dugongs (including 5 calves) was sighted and added to the final population estimate as explain in the main text.

<sup>b</sup> Excluding calves sighted in herds,

<sup>c</sup> too few sightings to estimate dugong abundance (< 5 dugong group sightings).

**Table S9. Details of group sizes of dugongs sighted during the aerial surveys conducted between 2003 and 2012 in New Caledonia and used for the dugong relative abundance and density analysis**

| Dugong group size | Block | Survey year |          |                  |          |          |          |
|-------------------|-------|-------------|----------|------------------|----------|----------|----------|
|                   |       | Jun 2003    | Jan 2008 | Jun 2011         | Nov 2011 | Jun 2012 | Nov 2012 |
| Mean              |       | 1.7         | 1.4      | 1                | 1        | 1.3      | 1        |
| Median            | 1     | 1           | 1        | 1                | 1        | 1        | 1        |
| Max               |       | 5           | 3        | 1                | 1        | 4        | 1        |
| Mean              |       | 1.7         | 1.3      | 1.6 <sup>a</sup> | 1        | 1.3      | 1.4      |
| Median            | 2     | 1           | 1        | 1                | 1        | 1        | 1        |
| Max               |       | 7           | 2        | 4                | 1        | 2        | 5        |
| Mean              |       | 1.2         | 2.3      | 1.8              | 1.4      | 1.6      | 1.2      |
| Median            | 3     | 1           | 1.5      | 1                | 1.5      | 1        | 1        |
| Max               |       | 3           | 5        | 4                | 2        | 3        | 3        |
| Mean              |       | 1.5         | 1.4      | 1.2              | 1.6      | 1.4      | 1        |
| Median            | 4     | 1           | 1        | 1                | 1        | 1        | 2        |
| Max               |       | 3           | 2        | 2                | 2        | 4        | 1        |

<sup>a</sup> Dugong herd of 69 individuals excluded from the table.

**Table S10. Pair-wise comparisons of dugong relative density across survey years in New Caledonia**

| Year | Count component <sup>a</sup> |                    |      |      |
|------|------------------------------|--------------------|------|------|
|      | 2003                         | 2008               | 2011 | 2012 |
| 2003 |                              | ↓* <sup>b, c</sup> | ↓**  | ↓*   |
| 2008 | ↑*                           |                    |      |      |
| 2011 | ↑**                          |                    |      |      |
| 2012 | ↑*                           |                    |      |      |

<sup>a</sup> Estimated from corrected counts with area of transect as an offset.

<sup>b</sup> Example to aid interpretation: the downward arrow shows that 2008 had significantly lower dugong counts than 2003

<sup>c</sup> Significance codes: < 0.001 = \*\*\*; 0.001 to < 0.01 = \*\*; 0.01 to ≤0.05 = \*

**Table S11. Pair-wise comparisons of dugong relative density among blocks in New Caledonia**

| Block | Count component <sup>a</sup> |         |     |     |
|-------|------------------------------|---------|-----|-----|
|       | 1                            | 2       | 3   | 4   |
| 1     |                              | ↑**b, c | ↑** |     |
| 2     | ↓**                          |         |     | ↓** |
| 3     | ↓**                          |         |     | ↓*  |
| 4     |                              | ↑**     | ↑*  |     |

| Block | Zero-inflation <sup>d</sup> |       |      |      |
|-------|-----------------------------|-------|------|------|
|       | 1                           | 2     | 3    | 4    |
| 1     |                             | ↑***b | ↑*** | ↑*** |
| 2     | ↓***                        |       | ↓*** | ↓*** |
| 3     | ↓***                        | ↑***  |      |      |
| 4     | ↓***                        | ↑***  |      |      |

<sup>a</sup> Estimated from corrected counts with area of transect as an offset

<sup>b</sup> Example to aid interpretation: for transects that have dugong counts > 0 there were more counts of dugongs in Block 2 than in Block 1; there were more transects with no dugong observations in Block 2 than in Block 1.

<sup>c</sup> Significance codes: < 0.001 = \*\*\*; 0.001 to < 0.01 = \*\*; 0.01 to ≤ 0.05 = \*

<sup>d</sup> Between block comparison of the number of transects where no dugongs were sighted

**Table S12. Count (A) and zero-inflation (B) model coefficients with Negative Binomial distribution of dugong relative density across survey years and blocks**

The reference level for year is 2003 and 1 for block

| (A) Count model coefficients         |           |            |         |          |                  |
|--------------------------------------|-----------|------------|---------|----------|------------------|
|                                      | Estimates | Std. Error | Z value | P(>  z ) | Sig.             |
| (Intercept)                          | -0.5009   | 0.1864     | -2.687  | 0.00721  | *** <sup>b</sup> |
| year2008                             | -0.5431   | 0.2496     | -2.176  | 0.02959  | *                |
| year2011                             | -0.8622   | 0.2132     | -4.043  | 5.27E-05 | ***              |
| year2012                             | -0.7409   | 0.204      | -3.633  | 0.00028  | ***              |
| block2                               | 0.6623    | 0.218      | 3.038   | 0.00238  | **               |
| block3                               | 0.3827    | 0.1921     | 1.992   | 0.04637  | *                |
| block4                               | -0.2597   | 0.2173     | -1.195  | 0.23207  |                  |
| (B) Zero-inflation model coefficient |           |            |         |          |                  |
|                                      | Estimates | Std. Error | Z value | P(>  z ) | Sig.             |
| (Intercept)                          | -3.23253  | 0.34439    | -9.386  | < 2e-16  | ***              |
| year2008                             | 0.47777   | 0.36533    | 1.308   | 0.190947 |                  |
| year2011                             | 0.44278   | 0.32027    | 1.383   | 0.166815 |                  |
| year2012                             | 0.05114   | 0.31755    | 0.161   | 0.872063 |                  |
| block2                               | 2.61628   | 0.32954    | 7.939   | 2.03E-15 | ***              |
| block3                               | 1.06889   | 0.3129     | 3.416   | 0.000635 | ***              |
| block4                               | 1.21574   | 0.35717    | 3.404   | 0.000664 | ***              |

<sup>a</sup> estimated from corrected counts with area of transect as an offset

<sup>b</sup> significance codes: < 0.001 = \*\*\*; 0.001 to < 0.01 = \*\* ;0.01 to  $\leq$ 0.05 = \*

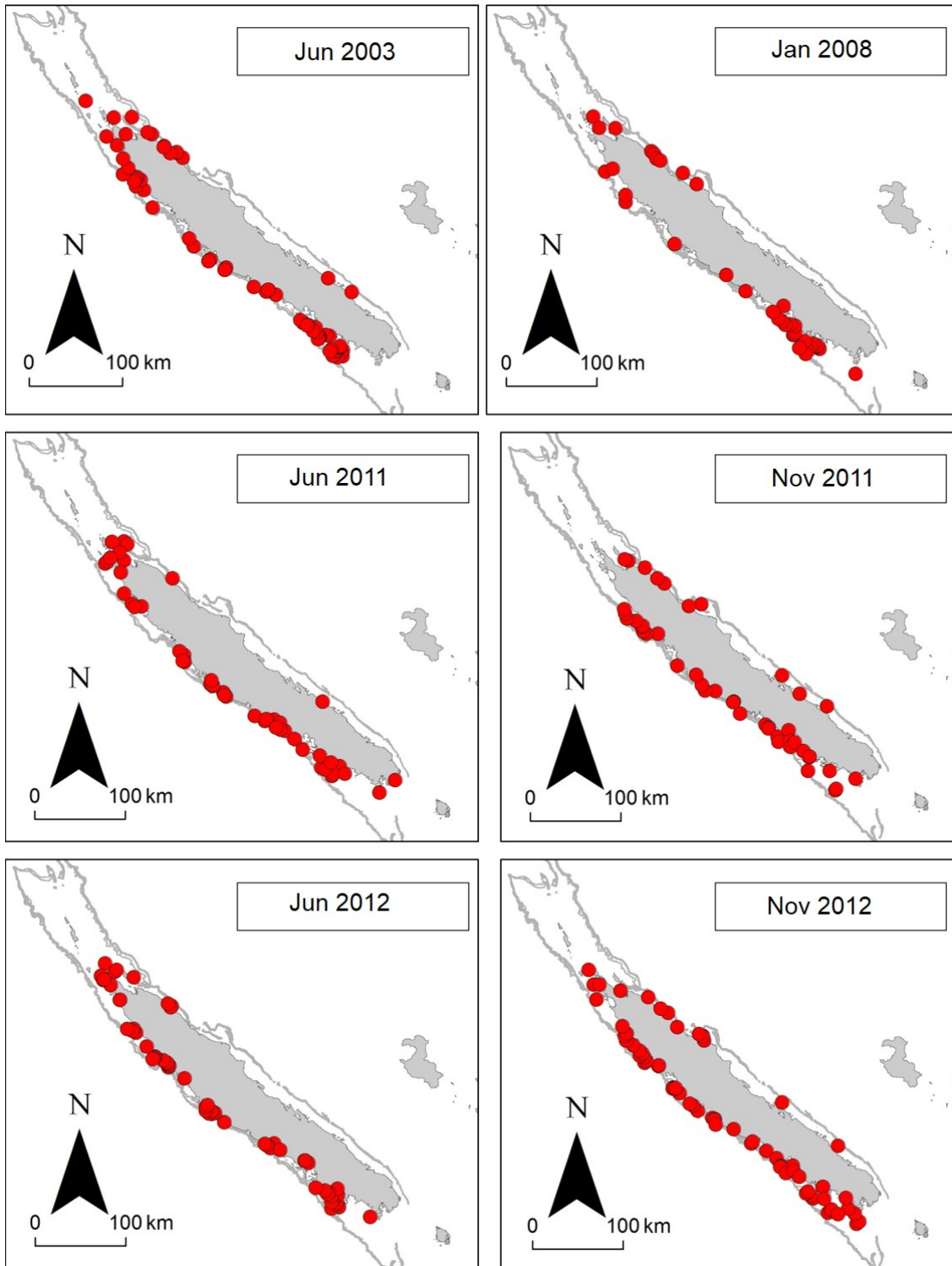
**Table S13. Results of (A) log-linear analysis and (B) general linear hypotheses and multiple comparisons to compare the interactions between blocks in the proportion of dugong calves**

| A  |          |            |         |          |
|--|----------|------------|---------|----------|
|  | Estimate | Std. Error | z value | P(>  z ) |
| (Intercept)  | -2.6295  | 0.5008     | -5.25   | < 0.0001 |
| block2   | 0.8749   | 0.4908     | 1.783   | 0.087461 |
| block3   | 1.2925   | 0.4684     | 2.76    | < 0.01   |
| block4   | 1.6645   | 0.4899     | 3.398   | < 0.001  |
| Jun-03   | -0.7586  | 0.5301     | -1.431  | 0.17295  |
| Jun-11   | 0.18     | 0.536      | 0.336   | 0.74164  |
| Jun-12   | -0.2803  | 0.5308     | -0.528  | 0.60516  |
| Nov-11   | -0.1247  | 0.5935     | -0.21   | 0.83643  |
| Nov-12   | -1.3192  | 0.7143     | -1.847  | 0.0846   |
| Null deviance: 40.433 on 23 degrees of freedom     |          |            |         |          |
| Residual deviance: 18.125 on 20 degrees of freedom |          |            |         |          |
| B  |          |            |         |          |
| 2 - 1 = 0  | 0.8412   | 0.4923     | 1.709   | 0.31729  |
| 3 - 1 = 0  | 1.2701   | 0.4772     | 2.662   | < 0.05   |
| 4 - 1 = 0  | 1.7104   | 0.505      | 3.387   | < 0.01   |
| 3 - 2 = 0  | 0.4288   | 0.4128     | 1.039   | 0.72519  |
| 4 - 2 = 0  | 0.8692   | 0.4446     | 1.955   | 0.20402  |
| 4 - 3 = 0  | 0.4403   | 0.4278     | 1.029   | 0.73096  |

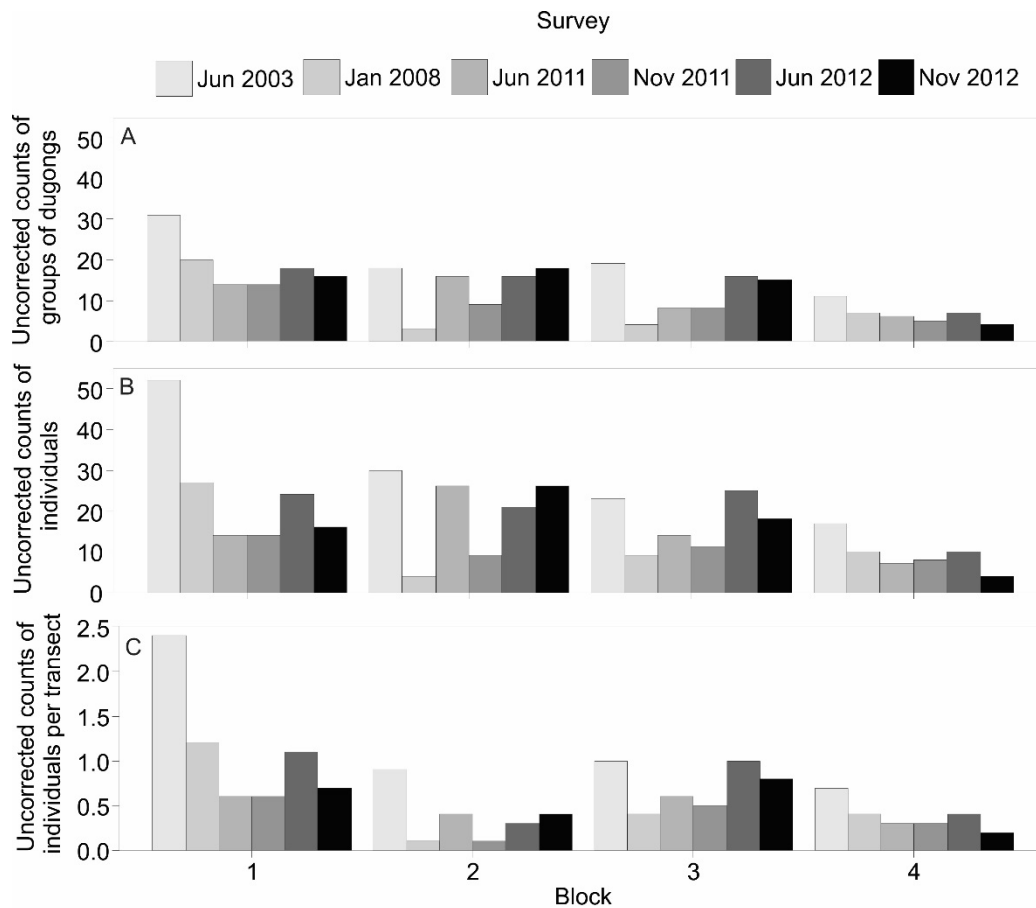
**Table S14. Results of log-linear model developed to analyze the relationship between the proportion of dugong sightings and water depth categories and survey year during the time series of dugong aerial surveys in New Caledonia**

| Analysis of deviance | Df | Deviance | Residual Df | Residual Deviance | P (> Chi) |
|----------------------|----|----------|-------------|-------------------|-----------|
| Null                 |    |          | 272         | 471.84            |           |
| Year                 | 5  | 15.702   | 267         | 456.14            | 0.06231   |
| Depth                | 4  | 154.074  | 263         | 302.07            | < 0.0001  |
| Year x Depth         | 20 | 21.044   | 243         | 281.02            | 0.82698   |

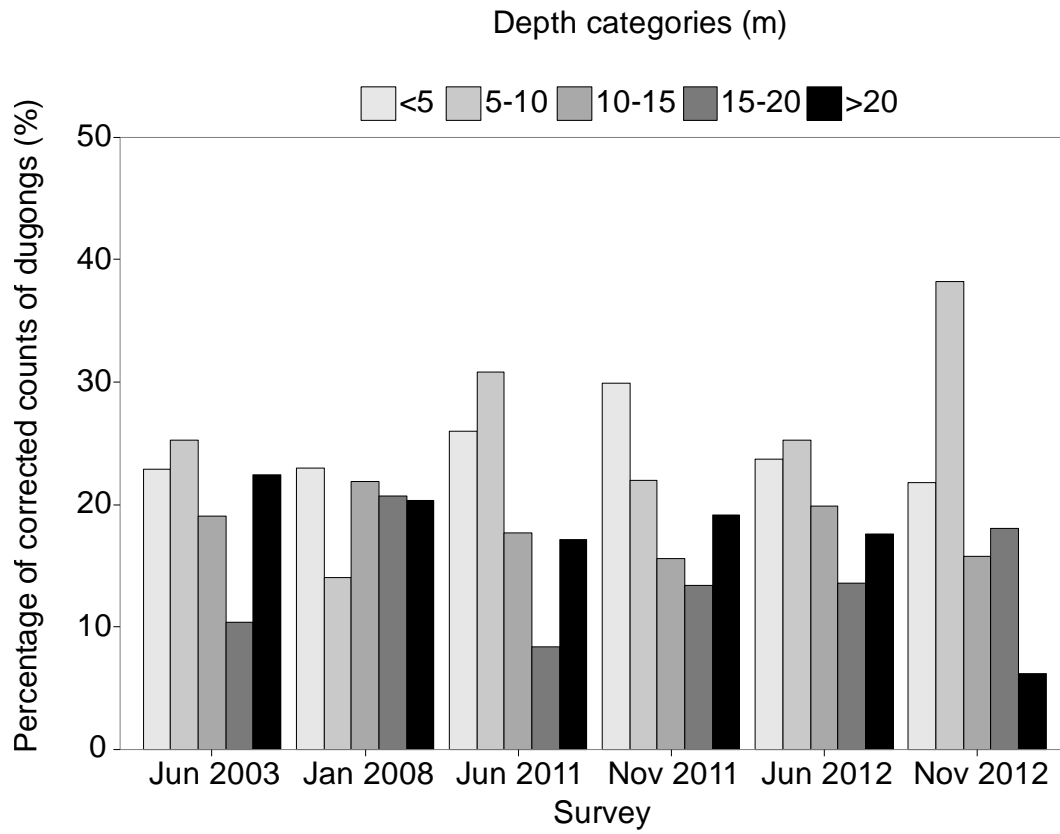




**Fig. S1.** Map of dugong sightings from all aerial surveys conducted between 2003 and 2012.



**Fig. S2.** Details of the counts of (A) groups of dugongs, (B) individuals, and (C) individuals per transect for individual blocks across the time series of systematic aerial surveys in New Caledonia. The column shading varies according to the survey. Note that this figure excludes a sighting of a herd of 69 dugongs (including 5 calves) in Block 2 in June 2011. The number of dugongs in this herd was added to the final population estimate.



**Fig. S3.** Frequency distribution of dugong sightings with respect to bathymetry during the dugong aerial surveys in New Caledonia.