frontiers

Population dynamics reveals a core community of the common bottlenose dolphin (*Tursiops truncatus*) in open waters of the south-western Gulf of Mexico

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Supplemental Material S1. Definition of terms

For the purpose of this study, we defined the following terms:

Apparent survival: The probability that an animal remains alive and available for recapture (i.e. it does not migrate permanently). In CMR framework, survival is termed "apparent" as the algorithm cannot discriminate between true mortality and emigration (White & Burnham, 1999; Cooch & White, 2019).

Capture-Mark-Recapture (CMR): A method for the determination of population parameters, based in a number K > 1 of discrete sampling occasions at which animals are caught, given unique marks and released back into the population for future sampling (Williams et al., 2002).

Cumulative frequency: In the discovery curve, the values in the y-axis that represent the cumulative number of observations of newly photo-identified dolphins corresponding to each of the consecutive sampling sessions (in this case seasons) (See Species accumulation curve).

Discovery curve: In CMR framework, a graph in which the x-axis represents the number of consecutive sampling sessions and the y-axis the cumulative frequency on newly identified individuals. See. If the graph presents linear trend, the population is open. If the graph reaches an asymptote, then all or most of the individuals in the study area were captured and so the population is closed (Colwell et al., 2004; see also Species accumulation curve).

Frequency table: A table that involves a listing of all the observed values of the variable being studied and how many times each value is observed (Zar, 2010).

Model assumptions: The Cormack-Jolly-Seber model assumptions for open populations are:

• Every marked animal present in the population at time (i) has the same probability of recapture (pi)

• Every marked animal in the population immediately after time (i) has the same probability of surviving to time (i+1)

• Marks are not lost or missed.

• All samples are instantaneous, relative to the interval between occasion (i) and (i+1), and each release is made immediately after the sample (Cooch & White, 2019).

Occurrence: the number of times the animal was recaptured (that is, eliminating the first sighting from the calculation) (Ballance, 1990; Morteo et al., 2012a).

Permanence: The time over which an individual was recorded, determined by the difference between its first and last sighting, according to the temporal stratification used (Ballance, 1990; Morteo et al., 2012a).

Periodicity: The recurrence of the individual, determined by the inverse of the average time (in days) between consecutive recaptures (Ballance, 1990; Morteo et al., 2012a). For the purpose of this study, Periodicity was calculated in both seasons and years, as necessary for constructing the IH4 matrix.

Philopatry: The tendency to stay in a familiar environment, mainly related to the natal habitat (Begon et al., 2006).

Probability of capture (p): The probability that an individual is captured for the first time given that it is alive and in the sample (White and Burnham, 1999; Cooch and White, 2019).

Probability of recapture (c): The probability that an individual is captured, given that it is alive, in the sample, and was previously captured at least once (White and Burnham, 1999; Cooch and White, 2017).

Recruitment probability (entrance probability, or pent, in POPAN modeling): The probability that an animal from the hypothetical superpopulation would enter the population between occasion i and i+1 (Schwarz & Arnason, 1996; Cooch & White, 2019).

Residency pattern: A classification scheme specific to a population in a study area based in a standardized site fidelity index, that reflects the relative proportion of time that individuals spend in the study area.

• **Occasional visitor**: An individual or group of individuals that spend a small proportion of time in a study are, as displayed by the lowest values of a standardized site fidelity index.

• **Occasional resident**: An individual or group of individuals that spend a medium proportion of time in a study are, as displayed by the lowest values of a standardized site fidelity index.

• **Regular resident**: An individual or group of individuals that spend the greatest proportion of time in a study area, as displayed by the greatest values of a standardized site fidelity index.

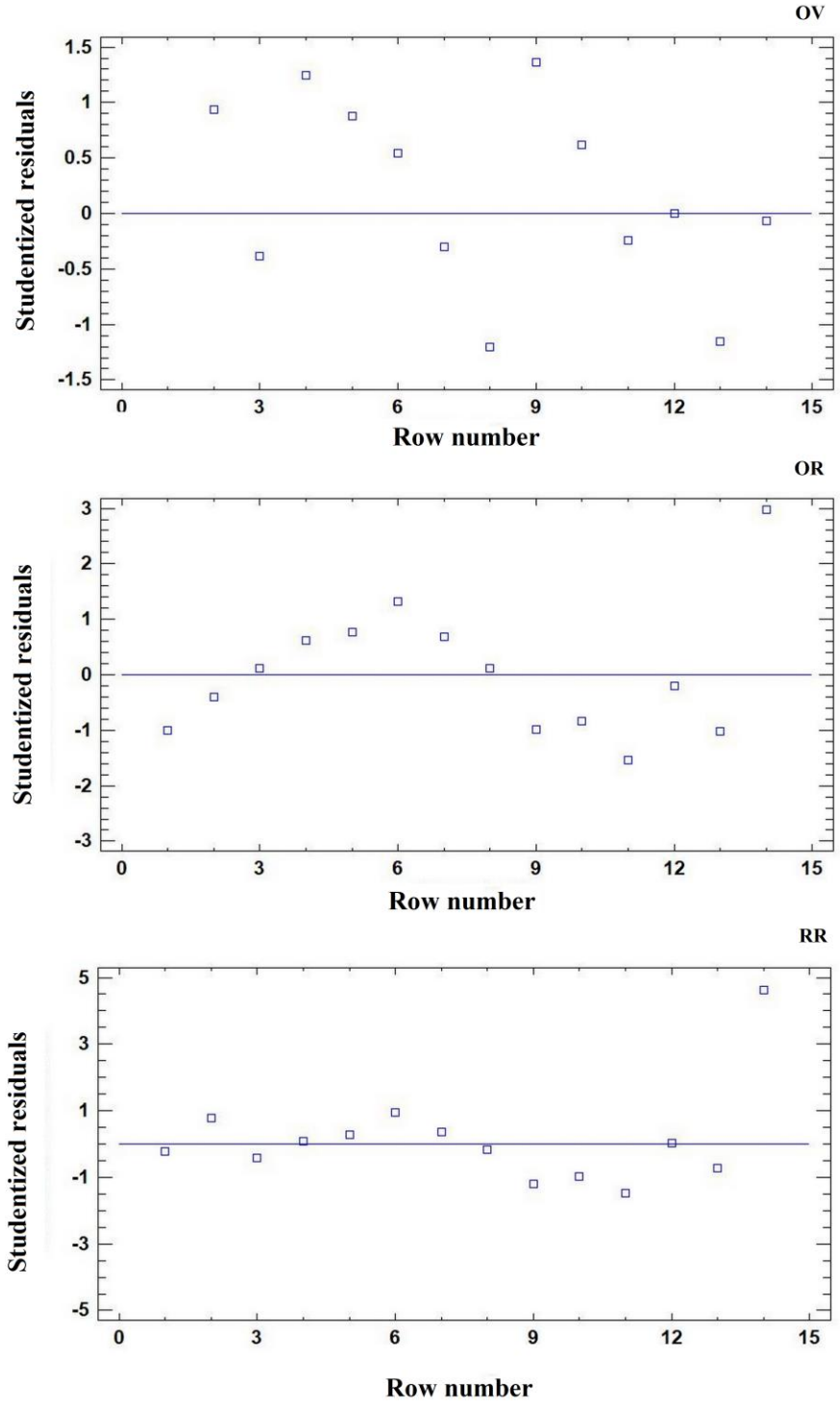
Site fidelity: The "tendency to return to a previously occupied location" (Greenwood, 1980; Switzer, 1993).

Species accumulation curve: A curve of rising biodiversity in which the x-axis is the number of sampling units (individuals or samples) from an assemblage and the y-axis is the observed species richness. The species accumulation curve rises monotonically to an asymptotic maximum number of species (Gotelli and Chao, 2013).

Superpopulation: A set of individuals consisting of all animals that would ever be born (entered) the population (Cooch and White, 2019) during the study.

Transient: Migratory individuals leaving the study area shortly after marking (Cooch and White, 2019). In this study, the term refers to all of the individuals that were present in the study area only during one season, independently of the number of recaptures during that season.

Supplemental Material S2. Graphs of the studentized residuals vs row number (consecutive sampling session) of abundances for the bottlenose dolphin off Alvarado Lagoon System, according to residency pattern. OV = occasional visitors, OR = occasional residents, RR = regular residents. Evident patterns are showed for all clusters.



Supplemental Material S3. Reduced m-array matrix that includes the summary of resighting histories of all sex groups.

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 * *  WARNING  * *   At least a pair of the capture histories are duplicates.

     Number of capture histories read was 125

                        Observed Recaptures for Group 1
                                        OV

  i   R(i)                              m(i,j)                              r(i)
              j=  2      3      4      5      6      7      8      9
  1     15        8      3      3      0      0      0      0      0       15
  2     15               7      3      1      0      0      0      0       15
  3     12                      5      1      0      0      0      0        7
  4     16                             6      0      2      1      0       10
  5     10                                    0      0      2      0        3
  6      0                                           0      0      0        0
  7      3                                                  0      1        1
  8      3                                                         0        0

 m(j)            8     10     11      8      0      2      3      1
 z(j)            7     12      8     10     13     11      9      8

  i   R(i)                  m(i,j)                  r(i)
              j= 10     11     12     13     14
  1     15        0      0      0      1      0       15
  2     15        3      0      0      1      0       15
  3     12        0      0      0      1      0        7
  4     16        1      0      0      0      0       10
  5     10        1      0      0      0      0        3
  6      0        0      0      0      0      0        0
  7      3        0      0      0      0      0        1
  8      3        0      0      0      0      0        0
  9      4        3      0      0      1      0        4
 10     17               6      1      3      0       10
 11      7                      2      1      0        3
 12      3                             1      0        1
 13     10                                    1        1

 m(j)            8      6      3      9      1
 z(j)            4      8      8      0      0
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 Program RELEASE - Survival Rate Estimation with Capture-Recapture Data
  Version 3.0(Win 95) Sep 1997         29-Sep-2021 07:49:09    Page  007
  n146 by residency pattern
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                     Observed Recaptures for Group 2
                                    OR

  i   R(i)                                m(i,j)                          r(i)
              j=  2      3      4      5      6      7      8      9
  1     16      11      0      3      0      0      0      1      0      16
  2     25              3     15      4      0      0      1      1      25
  3      8                     4      2      0      2      0      0       8
  4     26                            10      0      5      5      1      26
  5     18                                    2      1      6      4      18
  6      2                                           1      0      1       2
  7     11                                                  2      4      10
  8     15                                                         7      12

 m(j)           11      3     22     16      2      9     15     18
 z(j)            5     27     13     23     39     32     27     21

  i   R(i)                    m(i,j)                    r(i)
              j= 10     11     12     13     14
  1     16       1      0      0      0      0      16
  2     25       1      0      0      0      0      25
  3      8       0      0      0      0      0       8
  4     26       1      1      0      3      0      26
  5     18       5      0      0      0      0      18
  6      2       0      0      0      0      0       2
  7     11       4      0      0      0      0      10
  8     15       2      0      2      1      0      12
  9     20      13      3      0      3      0      19
 10     27              9      3      7      1      20
 11     13                     2      3      0       5
 12      7                            2      0       2
 13     19                                   2       2

 m(j)           27     13      7     19      3
 z(j)           13     20     18      1      0
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 Program RELEASE - Survival Rate Estimation with Capture-Recapture Data
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  n146 by residency pattern
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                      Observed Recaptures for Group 3
                                    RR

  i   R(i)                                m(i,j)                          r(i)
              j=  2      3      4      5      6      7      8      9
  1     39      35      1      3      0      0      0      0      0      39
  2     48             27     21      0      0      0      0      0      48
  3     30                    28      2      0      0      0      0      30
  4     52                           46      0      5      1      0      52
  5     49                                  19     15      6      9      49
  6     19                                         11      6      1      19
  7     31                                                19     11      31
  8     32                                                       29      32

 m(j)           35     28     52     48     19     31     32     50
 z(j)            4     24      2      6     36     24     23      5

  i   R(i)                    m(i,j)                  r(i)
              j= 10     11     12     13     14
  1     39       0      0      0      0      0      39
  2     48       0      0      0      0      0      48
  3     30       0      0      0      0      0      30
  4     52       0      0      0      0      0      52
  5     49       0      0      0      0      0      49
  6     19       0      1      0      0      0      19
  7     31       1      0      0      0      0      31
  8     32       3      0      0      0      0      32
  9     50      45      3      1      1      0      50
 10     49             35      4     10      0      49
 11     39                    15     18      0      33
 12     20                           15      0      15
 13     44                                  9       9

 m(j)           49     39     20     44      9
 z(j)            6     16     29      0      0

 Program RELEASE - Survival Rate Estimation with Capture-Recapture Data
  Version 3.0(Win 95) Sep 1997         29-Sep-2021 07:49:09    Page  009
  n146 by residency pattern
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                        Sums for the above Groups

 m.        0     54     41     85     72     21     42     50
 z.        0     16     63     23     39     88     67     59
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R.      70     88     50     94     77     21     45     50
r.      70     88     45     88     70     21     42     44

m.      69     84     58     30     72     13
z.      34     23     44     55      1      0
R.      74     93     59     30     73
r.      73     79     41     18     12

    Data type is Complete Capture Histories.
```