No evidence from long-term analysis of yellowfin tuna condition that Drifting Fish Aggregating Devices act as ecological traps

## Supplement 1

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16 Table S1: Number of sampled yellowfin tuna per school type per year.

| Year | FOB-associated | Free school | Unknown | Total |
| :---: | :---: | :---: | :---: | :---: |
| 1987 | 0 | 0 | 659 | 659 |
| 1988 | 0 | 0 | 664 | 664 |
| 1989 | 0 | 0 | 401 | 401 |
| 1990 | 279 | 119 | 407 | 805 |
| 2003 | 78 | 75 | 343 | 496 |
| 2004 | 0 | 82 | 691 | 773 |
| 2005 | 235 | 10 | 979 | 1,224 |
| 2006 | 105 | 337 | 3,339 | 3,781 |
| 2007 | 61 | 34 | 1,524 | 1,619 |
| 2008 | 9 | 27 | 926 | 962 |
| 2009 | 513 | 100 | 2,008 | 2,621 |
| 2010 | 433 | 123 | 944 | 1,500 |
| 2011 | 629 | 591 | 604 | 1,824 |
| 2012 | 233 | 510 | 2,688 | 3,431 |
| 2013 | 381 | 36 | 944 | 1,361 |
| 2014 | 523 | 178 | 402 | 1,103 |
| 2015 | 598 | 37 | 425 | 1,060 |
| 2016 | 0 | 0 | 294 | 294 |
| 2017 | 114 | 0 | 140 | 254 |
| 2018 | 165 | 0 | 251 | 416 |
| 2019 | 0 | 0 | 666 | 666 |
| Total | 4,356 | 2,259 | 19,299 | 25,914 |

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18 Table S2: Number of sampled yellowfin tuna per size class per year.

| Year | $<\mathbf{7 5} \mathbf{~ c m}$ | $\mathbf{7 5} \mathbf{- 1 2 0} \mathbf{c m}$ | $>\mathbf{1 2 0} \mathbf{c m}$ |
| :--- | :--- | :--- | :--- |
| 1987 | 13 | 423 | 223 |
| 1988 | 11 | 254 | 399 |
| 1989 | 19 | 189 | 193 |
| 1990 | 804 | 1 | 0 |
| 2003 | 0 | 166 | 330 |


| Year | $<\mathbf{7 5} \mathbf{~ c m}$ | $\mathbf{7 5} \mathbf{- 1 2 0} \mathbf{c m}$ | $>\mathbf{1 2 0} \mathbf{c m}$ |
| :--- | :--- | :--- | :--- |
| 2004 | 0 | 157 | 616 |
| 2005 | 0 | 1,089 | 135 |
| 2006 | 0 | 2,670 | 1,111 |
| 2007 | 0 | 960 | 659 |
| 2008 | 0 | 163 | 799 |
| 2009 | 158 | 1,244 | 1,219 |
| 2010 | 331 | 304 | 865 |
| 2011 | 31 | 752 | 1,041 |
| 2012 | 16 | 1,781 | 1,634 |
| 2013 | 189 | 462 | 710 |
| 2014 | 678 | 272 | 153 |
| 2015 | 751 | 229 | 80 |
| 2016 | 230 | 4 | 60 |
| 2017 | 197 | 24 | 33 |
| 2018 | 342 | 74 | 0 |
| 2019 | 640 | 26 | 0 |
| Total | $\mathbf{4 , 4 1 0}$ | $\mathbf{1 1 , 2 4 4}$ | $\mathbf{1 0 , 2 6 0}$ |



Figure S1: Coefficients of the Generalized Additive Models considering a subset of data. Only small fish ( $<75 \mathrm{~cm}$, red circles), only medium fish ( $75-120 \mathrm{~cm}$, blue triangles) or only large fish ( $>120 \mathrm{~cm}$, green squares). Coefficients of the fishing year (A) and of the quarter (B). Each coefficient represent the mean deviation of $T\left(\mathrm{~K}_{\mathrm{n}}\right)$ from the values at a given level of reference. The error bars represent the standard deviation. Considered categories of reference: Y: 2017; Q: Q1. The year 2017 was chosen as the reference year because it is the most recent year with all size classes measured.


26 Figure S2: Coefficients of the Generalized Additive Model with fishing mode as an explanatory variable. Coefficients of the fishing year (A), of the quarter (B), of the size class (C) and of the fishing
mode (D). Please note that each coefficient represents the mean deviation of $T\left(K_{n}\right)$ from the values for a given category of reference. The shape of the point represents the distribution of the obtained values. The numbers in grey in the upper part of the panels represent the percentage of the models generated in the bootstrap for which the given category was significantly different from the category of reference. Considered categories of reference, represented by a black dot: Y: 2015; Q: Q1; SC: <75 cm, FM: FOB. 2015 was chosen as the reference year because it is the most recent year with both FOB-associated and FSC tuna, as only FOB-associated tuna were sampled in 2016 and 2017. The $T\left(K_{n}\right)$ of FSC was significantly higher than that of FOB-associated tuna in all the models generated in the bootstrap (see panel D).


Figure S3: Coefficients of the Generalized Additive Models considering only fish caught in FOBassociated schools. Coefficients of the fishing year (A) of the quarter (B) and of the size class (C). Each coefficient represent the mean deviation of $\mathrm{T}\left(\mathrm{K}_{\mathrm{n}}\right)$ from the values for a given category of reference. The shape of the point represents the distribution of the obtained values. The numbers in grey in the upper part of the panels represent the percentage of the models generated in the bootstrap
for which the given category was significantly different from the category of reference. Considered categories of reference: Y: 2018; Q: Q1; SC: <75 cm.


Figure S4: Diagnostic plots of the residuals of 4 randomly picked Generalized Additive Models performed. (A-D) Quantile-quantile plots of the residuals. (E-H) Plot of the Moran's I in the data, in blue, and in the model residuals, in red. Distances on x axis is the distance used to define two


Figure S5: Coefficients of the Generalized Additive Model presented in the main manuscript. Coefficients of the fishing year (A) (same as panel B of Figure 2), of the quarter (B) and of the size class (C). Each coefficient represents the mean deviation of $T\left(K_{n}\right)$ from the
values for a category of reference. The shape of the points represents the distribution of the values obtained with the bootstrap process. Numbers in grey in the upper part of the panels represent the percentage of the models generated in the bootstrap for which a given category was significantly different from the category of reference. Considered category of reference, represented by a black dot: Y: 2019; Q: Q1; SC: <75 cm.


55 Figure S6: Spatial prediction of the Generalized Additive Models. (A) Mean predicted
56 value of $\mathrm{K}_{\mathrm{n}}$. (B) Mean number of samples in the data used as input in the model. Dark grey
cells represent cells in which no tuna was sampled. Considered categories of reference for the 58 prediction: Y: 2019; Q: Q1; size class: <75 cm.


Figure S7: Boxplot of the fork length of sampled tuna per year. The uneven distribution of the sampling is mainly due to the fact that data comes from different research projects, which do not always aim at studying the same size class.

