**Validating trends in olive ridley sea turtle nesting track counts in Guatemala in light of a national hatchery protection strategy**

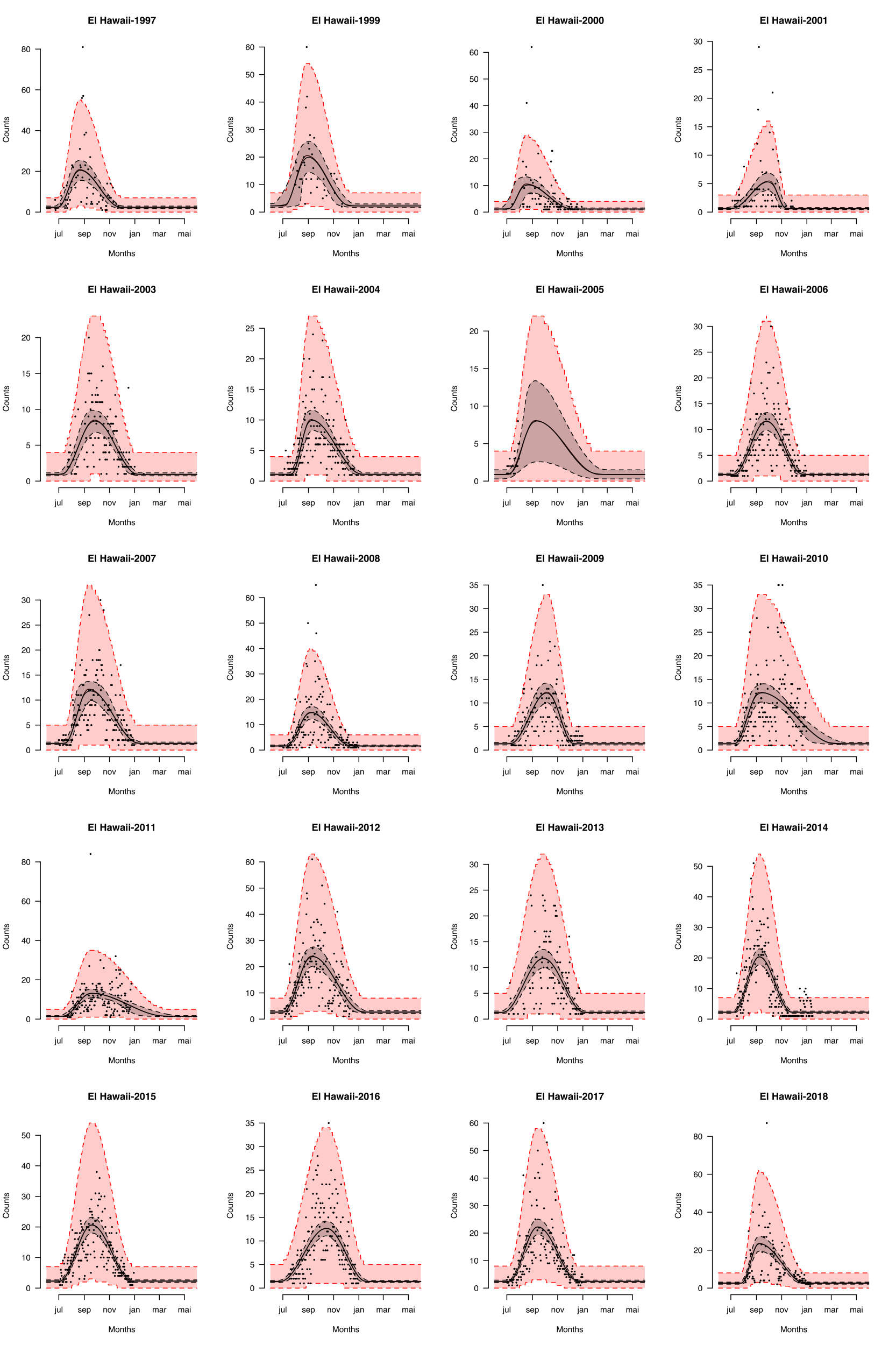
B. Alejandra Morales-Mérida, Colum Muccio and Marc Girondot

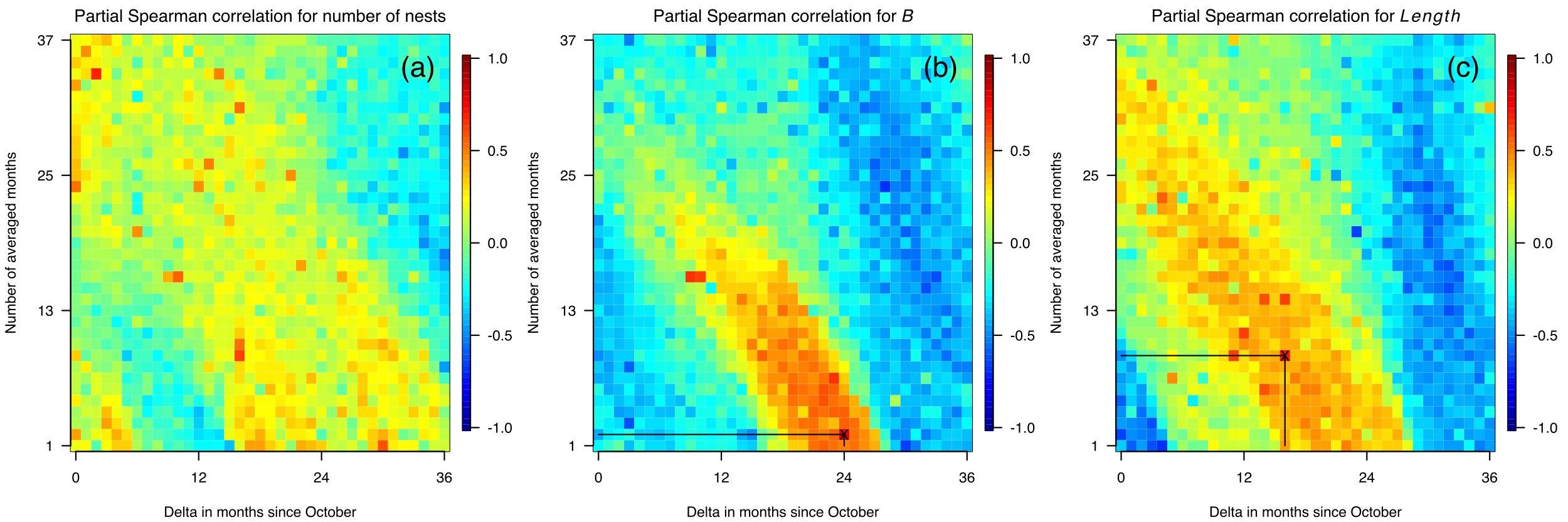
Supplementary Table 1 Number of monitored nights for olive ridley sea turtles *Lepidochelys olivacea* on the Pacific coast of Guatemala. A nesting season is defined as the period from 1 June to 31 May in the following year. Non-available data are shown as blank cells and horizontal lines indicate missing data for the complete nesting season.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Candelaria | Churirin | Conacaste | El Chico | El Gariton | El Paredon | El Rosario | El Triunfo | El Hawaii | La Barrona | Monterrico |
| 1997–1998 |  |  |  |  |  |  |  |  | 65 |  |  |
| 1999–2000 |  |  |  |  |  |  |  |  | 34 |  |  |
| 2000–2001 |  |  |  |  |  |  |  |  | 86 |  |  |
| 2001–2002 |  |  |  |  |  |  |  |  | 71 |  |  |
| 2003–2004 |  |  |  |  |  |  |  |  | 138 |  |  |
| 2004–2005 |  |  |  |  |  |  |  |  | 166 |  |  |
| 2005–2006 |  |  |  |  | 107 |  | 70 |  | 21 | 114 |  |
| 2006–2007 |  |  |  |  | 120 |  | 127 |  | 170 |  |  |
| 2007–2008 |  |  |  |  |  |  |  |  | 176 |  |  |
| 2008–2009 |  |  |  |  |  |  |  |  | 163 |  |  |
| 2009–2010 |  |  |  |  |  |  |  |  | 141 |  |  |
| 2010–2011 |  |  |  |  |  |  | 80 |  | 173 |  |  |
| 2011–2012 |  |  |  |  |  |  | 78 |  | 153 |  |  |
| 2012–2013 |  |  |  |  |  |  |  |  | 150 |  |  |
| 2013–2014 | 112 | 12 | 140 | 22 |  | 50 |  | 40 | 115 | 161 | 55 |
| 2014–2015 | 105 | 16 | 180 | 40 |  | 111 | 182 |  | 184 | 160 | 173 |
| 2015–2016 | 133 | 31 | 159 | 25 |  | 69 |  |  | 181 | 178 | 153 |
| 2016–2017 |  | 25 | 150 | 17 |  |  |  |  | 166 | 168 | 119 |
| 2017–2018 |  |  | 153 | 17 |  | 126 |  |  | 154 | 122 | 130 |
| 2018–2019 |  | 43 | 118 |  |  | 97 |  |  | 108 | 116 | 95 |

Supplementary Table 2 Number of olive ridley sea turtle eggs incubated in each hatchery located on the Pacific coast of Guatemala during 2001–2018. Non-available data are shown as blank cells. Source: National council of Protected Areas of Guatemala official database.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Hatchery | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
| La Barrona | 3,100 | 3,700 |  | 1,609 | 7,016 | 11,027 | 13,247 | 12,342 | 16,956 | 15,171 | 8,455 | 15,387 | 15,434 |
| El Hawaii | 12,578 | 13,385 | 13,385 | 22,693 | 22,969 | 28,220 | 30,603 | 48,406 | 51,897 | 41,194 | 37,166 | 50,186 | 34,077 |
| El Rosario | 1,651 | 3,909 | 3,933 | 3,900 | 5,370 | 10,411 | 3,969 | 6,463 | 13,618 | 14,175 | 10,998 | 8,803 | 2,442 |
| El Conacaste | 954 | 2,983 | 1,332 | 994 |  | 768 |  | 2,515 | 2,560 | 3,996 |  | 5,762 | 1,698 |
| Monterrico | 3,538 | 4,260 | 3,682 | 3,798 | 4,262 | 13,917 | 42,471 | 41,031 | 47,181 | 61,965 | 45,462 | 72,259 | 73,552 |
| Barra del Jiote | 4,840 | 1,638 | 1,452 |  |  |  | 3,500 | 1,830 | 12,201 | 3,189 | 4,619 | 6,984 | 18,133 |
| El Garitón | 3,136 | 5,000 | 2,189 | 2,865 | 5,079 | 6,195 | 3,225 | 9,079 | 10,184 | 11,402 | 5,549 | 18,832 | 3,784 |
| El Banco | 658 |  | 840 | 935 | 13,382 | 9,041 | 41,233 | 42,097 | 52,359 | 79,165 | 128,820 | 197,093 | 220,990 |
| Candelaria | 512 | 1,360 | 860 | 800 | 1,454 | 1,940 |  | 1,739 |  |  |  |  | 3,880 |
| Las Lisas | 9,357 | 9,033 | 8,106 | 8,472 | 9,914 | 8,835 | 10,435 | 10,418 | 16,039 | 17,000 | 21,251 | 31,567 | 27,281 |
| El Chapetón | 5,352 | 4,219 | 4,224 | 5,617 | 6,298 | 7,086 | 14,104 | 14,364 | 20,213 | 14,994 | 12,154 | 30,086 | 16,639 |
| La Mañanitas |  |  |  |  |  |  |  | 4,289 | 7,970 | 8,729 | 336 | 1,798 | 1,572 |
| Tilapa |  |  |  |  |  |  |  | 938 | 1,563 | 1,981 |  | 1,948 | 3,154 |
| El Chico |  |  |  |  |  |  |  | 198 | 880 | 1,171 |  | 300 | 380 |
| Sipacate |  |  |  |  |  |  |  | 10,111 | 7,654 | 13,284 |  | 15,650 | 10,308 |
| El Naranjo |  |  |  |  |  |  |  | 21,209 | 38,720 | 1,049 |  | 6,848 | 10,644 |
| El Paredon |  |  |  |  |  |  |  | 12,058 | 10,088 |  |  | 10,293 | 19,382 |
| Tres Cruces |  |  |  |  |  |  |  |  |  | 1,712 |  | 527 | 378 |
| Madre Vieja |  |  |  |  |  |  |  |  |  |  |  | 10,510 | 12,467 |
| Ocos |  |  |  |  |  |  |  | 742 |  | 696 |  |  | 771 |
| AAK |  |  |  |  |  |  |  |  |  |  |  |  | 2,449 |
| La Barona |  |  |  |  |  |  |  | 3,065 | 352 | 829 |  |  | 1,672 |
| Tulate |  |  |  |  |  |  |  | 2,998 | 3,136 | 1,280 |  |  | 1,032 |
| Churirin |  |  |  |  |  |  |  |  |  |  |  |  | 1,032 |
| El Parlamar |  |  |  |  |  |  |  | 4,328 |  |  |  |  |  |
| Tahuexco |  |  |  |  |  |  |  |  |  |  |  |  | 584 |
| Bahía Tortuga |  |  |  |  |  |  |  | 16,444 |  |  |  |  |  |
| El Manchon |  |  |  |  |  |  |  |  |  | 820 |  |  |  |
| La Barrona |  |  |  |  |  |  |  | 12,342 | 20,249 | 15,351 |  |  |  |
| Champerico |  |  |  |  |  |  |  |  |  | 1,944 |  |  |  |

Supplementary Fig. 1 Seasonality of olive ridley sea turtle *Lepidochelys olivacea* nesting activity measured on El Hawaii beach in Guatemala in during 1997-2018. The selected model for assessing the seasonality of nesting activity is that of the year effect on the *P*, *LengthB* and *LengthE* parameters (Table 1). Dots are the nightly counted nests, central plain line is the fitted Bayesian model and central dashed lines represent the 95% credible interval of the seasonality of nesting. Exterior dashed lines represent the 95% credible interval of the nightly nest counts based on negative binomial distribution.

 Supplementary Fig. 2 Relationships between cumulative El Niño–Southern Oscillation event effects and (a) number of olive ridley sea turtle nests, (b) beginning of the olive ridley sea turtle nesting season and (c) length of the olive ridley sea turtle nesting season on Hawaii beach in Guatemala. The x- and y-axes represent the lag in months and the number of months of the El Niño–Southern Oscillation event effect, respectively.