**Supplemental Material**

**Table S1.** Summary of salinity conditions in the Caloosahatchee River Estuary (CRE) from 5/1/2000 to 04/30/2017 at Cape Coral Bridge. For each water year, entries included the average salinity over all observations (Avg), total number of monitoring days (Total n), number (n) and percentage (%) of days where salinity was < 16 (wet years; blue), number and percentage of days where salinity was 16–28 (moderate years; white), and number and percentage of days where salinity was > 28 (dry years; orange). For 2001–2002 (\*), monthly Iona Cove (closest site to Cape Coral Bridge) salinity data were used to define year type, because Cape Coral Bridge data were unavailable.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Cape Coral/Iona Cove | | | <16 | | 16 – 28 | | >28 | |
| WY | Avg Salinity | Total n | n | % of total | n | % of total | n | % of total |
| 2001\* | 26.9 | 8 | 1 | 12.5 | 4 | 50 | 3 | 37.5 |
| 2002\* | 20.2 | 12 | 3 | 25 | 6 | 50 | 3 | 25 |
| 2003 | 3.8 | 101 | 101 | 100.0 | 0 | 0.0 | 0 | 0.0 |
| 2004 | 6.5 | 272 | 240 | 88.2 | 32 | 11.8 | 0 | 0.0 |
| 2005 | 10.7 | 364 | 242 | 66.5 | 122 | 33.5 | 0 | 0.0 |
| 2006 | 6.6 | 365 | 330 | 90.4 | 35 | 9.6 | 0 | 0.0 |
| 2007 | 17.6 | 323 | 117 | 36.2 | 195 | 60.4 | 11 | 3.4 |
| 2008 | 25.7 | 322 | 9 | 2.8 | 206 | 64.0 | 107 | 33.2 |
| 2009 | 17.6 | 365 | 121 | 33.2 | 185 | 50.7 | 59 | 16.2 |
| 2010 | 13.2 | 365 | 196 | 53.7 | 169 | 46.3 | 0 | 0.0 |
| 2011 | 13.4 | 315 | 150 | 47.6 | 163 | 51.7 | 2 | 0.6 |
| 2012 | 17.7 | 343 | 132 | 38.5 | 174 | 50.7 | 37 | 10.8 |
| 2013 | 13.9 | 345 | 198 | 57.4 | 146 | 42.3 | 1 | 0.3 |
| 2014 | 10.13 | 365 | 237 | 64.9 | 128 | 35 | 0 | 0 |
| 2015 | 11.82 | 365 | 285 | 78 | 80 | 21.9 | 0 | 0 |
| 2016 | 9.71 | 245 | 223 | 87.8 | 31 | 12.2 | 0 | 0 |
| **Total** | **14.1 ± 1.7** |  | **55.2 ± 7.3** | | **19.9 ± 5.0** | |  | **7.9 ± 3.2** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table S2:** Average oyster density (individuals m-2) and length (mm) for each site by water year. Site averages are represented in bold with standard error reported. | | | | | | | | | | |  |
|  |  | **Iona Cove** | | **Cattle Dock** | | **Bird Island** | | **Kitchel Key** | | **Tarpon Bay** | |
| **Water Year** | **Season** | **Density** | **Length** | **Density** | **Length** | **Density** | **Length** | **Density** | **Length** | **Density** | **Length** |
| **2003** | Dry | 733 |  |  |  | 1374 |  | 486 |  | 467 |  |
| **2004** | Dry | 696 |  |  |  | 2666 |  | 1474 |  | 6151 |  |
| **2005** | Wet | 332 |  |  |  | 1627 |  | 243 |  | 1171 |  |
| **2006** | Dry | 619 |  | 102 |  | 2345 |  | 2280 |  | 1133 |  |
| **2007** | Dry | 1375 |  | 237 |  | 667 |  | 659 |  | 1180 |  |
|  | Wet | 160 |  | 100 |  | 1490 |  | 1350 |  | 450 |  |
| **2008** | Dry | 1375 | 38.89 | 116 | 28.78 | 627 | 39.48 | 342 | 32.69 | 430 | 55.25 |
|  | Wet | 1172 | 34.67 | 224 | 28.85 | 1288 | 32.95 | 838 | 27.01 | 1624 | 28.14 |
| **2009** | Dry | 1849 | 31.38 | 680 | 28.83 | 2564 | 23.93 | 982 | 22.18 | 821 | 43.08 |
|  | Wet | 945 | 28.78 | 120 | 14.19 | 436 | 35.82 | 572 | 19.77 | 689 | 40.84 |
| **2010** | Dry | 1087 | 42.66 | 483 | 24.57 | 2955 | 24.34 | 485 | 23.52 | 398 | 52.23 |
|  | Wet | 1815 | 35.86 | 349 | 21.30 | 1205 | 20.65 | 700 | 15.61 | 947 | 43.49 |
| **2011** | Dry | 977 | 41.91 |  |  | 1771 | 26.46 | 829 | 19.17 | 835 | 44.75 |
|  | Wet | 1258 | 47.33 | 681 | 28.95 | 2910 | 28.66 | 1045 | 17.31 | 833 | 46.36 |
| **2012** | Dry | 1468 | 39.46 |  |  | 2676 | 30.88 | 716 | 20.08 |  |  |
|  | Wet | 1005 | 33.41 |  |  | 678 | 26.54 | 365 | 20.85 | 1046 | 40.40 |
| **2013** | Dry | 1013 | 38.02 |  |  | 3070 | 24.96 | 517 | 17.76 |  |  |
|  | Wet | 2449 | 29.23 |  |  | 1401 | 27.82 | 469 | 15.84 |  |  |
| **2014** | Dry | 218 | 35.78 |  |  | 2139 | 24.42 | 67 | 13.62 |  |  |
|  | Wet | 0 |  |  |  | 2606 | 20.74 | 1433 | 7.85 |  |  |
| **2015** | Dry | 690 | 60.42 |  |  | 1388 | 29.92 | 67 | 14.22 |  |  |
|  | Wet | 442 | 48.76 |  |  | 1428 | 26.33 | 91 | 9.25 |  |  |
| **2016** | Dry | 1552 | 40.31 |  |  | 1934 | 29.33 | 96 | 8.50 |  |  |
|  | Wet | 857 | 44.64 |  |  | 1643 | 27.52 | 165 | 7.70 |  |  |
| **2017** | Wet | 213 | 8.47 |  |  | 2107 | 20.67 | 247 | 13.70 |  |  |
| **Average** |  | **972**  **(± 73)** | **38.47**  **(± 0.5)** | **309**  **(± 46)** | **26.76**  **(± 0.8)** | **1800**  **(± 86)** | **26.55**  **(± 0.3)** | **661**  **(± 62)** | **16.65**  **(± 0.2)** | **1212**  **(± 181)** | **45.94**  **(± 0.9)** |
|  |  |  |  |  |  |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table S3:** Average shell length of oysters collected for monitoring of biological parameters across all sampling sites and years. Adult oysters were targeted for this analysis. | | | | | | | | | | | | | | | | |
| **Year** | **Iona Cove** | | | **Cattle Dock** | | | **Bird Island** | | | **Kitchel Key** | | | **Tarpon Bay** | | | |
|  | **Mean** | **N** | **SE** | **Mean** | **N** | **SE** | **Mean** | **N** | **SE** | **Mean** | **N** | **SE** | **Mean** | **N** | **SE** |
| 2001 | **89.0** | 78 | 1.9 | **69.6** | 77 | 1.3 | **57.2** | 78 | 0.9 | **45.3** | 76 | 0.8 | **72.8** | 78 | 1.5 |
| 2002 | **83.1** | 120 | 8.4 | **59.1** | 120 | 1.2 | **59.0** | 117 | 1.1 | **47.9** | 119 | 0.9 | **68.6** | 119 | 1.1 |
| 2003 | **84.4** | 119 | 6.6 | **60.1** | 119 | 1.2 | **58.4** | 120 | 0.8 | **53.4** | 120 | 0.8 | **73.7** | 116 | 5.3 |
| 2004 | **71.6** | 120 | 1.6 | **62.2** | 120 | 1.3 | **59.2** | 120 | 0.9 | **50.1** | 120 | 0.9 | **68.5** | 120 | 1.2 |
| 2005 | **71.9** | 113 | 1.5 | **59.2** | 120 | 1.3 | **55.4** | 120 | 0.9 | **47.0** | 120 | 0.8 | **68.2** | 120 | 1.4 |
| 2006 | **57.3** | 60 | 2.2 | **63.3** | 120 | 1.4 | **55.6** | 120 | 1.0 | **51.2** | 120 | 0.9 | **68.9** | 120 | 1.6 |
| 2007 | **68.6** | 120 | 1.3 | **66.4** | 120 | 1.3 | **58.6** | 120 | 1.0 | **53.8** | 120 | 0.8 | **71.5** | 124 | 1.6 |
| 2008 | **59.7** | 145 | 1.1 | **57.4** | 145 | 1.0 | **55.0** | 144 | 0.9 | **48.7** | 145 | 0.8 | **57.6** | 141 | 1.0 |
| 2009 | **62.6** | 171 | 1.3 | **52.7** | 179 | 0.8 | **49.6** | 180 | 0.7 | **48.1** | 180 | 0.6 | **64.4** | 179 | 1.1 |
| 2010 | **73.2** | 180 | 1.2 | **50.4** | 180 | 0.6 | **44.4** | 180 | 0.6 | **45.2** | 180 | 0.6 | **66.3** | 180 | 1.0 |
| 2011 | **74.8** | 180 | 1.6 | **57.6** | 120 | 0.9 | **43.1** | 180 | 1.0 | **43.8** | 180 | 1.0 | **67.5** | 180 | 1.5 |
| 2012 | **78.9** | 180 | 1.3 |  |  |  | **55.0** | 180 | 0.8 | **46.1** | 179 | 0.7 | **70.3** | 135 | 1.1 |
| 2013 | **74.7** | 180 | 1.2 |  |  |  | **54.6** | 180 | 0.8 | **45.3** | 180 | 0.6 |  |  |  |
| 2014 | **59.3** | 89 | 1.9 |  |  |  | **48.7** | 180 | 0.8 | **44.1** | 180 | 0.7 |  |  |  |
| 2015 | **64.8** | 180 | 1.0 |  |  |  | **48.3** | 180 | 0.6 | **46.5** | 180 | 0.7 |  |  |  |
| 2016 | **76.4** | 120 | 1.7 |  |  |  | **53.7** | 119 | 1.0 | **52.1** | 120 | 0.9 |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Average | **72.0** | 2,155 | 0.7 | **58.8** | 1,420 | 0.4 | **52.6** | 2,318 | 0.2 | **47.6** | 2,319 | 0.2 | **67.7** | 1,612 | 0.5 |
|  | | | | | |  |  |  |  |  |  |  |  |  |  |

**Figure S1**: Mean monthly flow rate from the S-79 lock and dam and seasonal oyster density for each site over the duration of the study period. Upper-estuary, low salinity sites (IC and CD) are marked in shades of light/dark blue and lower-estuary, high salinity sites (KK and TB) are marked in shades of red/orange to highlight the impact on different regions of the estuary. Mid-estuary moderate salinity site BI is marked in green.

**Figure S2**: Daily flow rate from the S-79 lock and dam and monthly oyster recruitment for each site over the duration of the study period. Blue trend line represents the mean recruitment across the entire estuary. Upper-estuary, low salinity sites (IC and CD) are marked in shades of light/dark blue and lower-estuary, high salinity sites (KK and TB) are marked in shades of red/orange to highlight the impact on different regions of the estuary. Mid-estuary moderate salinity site BI is marked in green.

**Figure S3**: Daily flow rate from the S-79 lock and dam and monthly oyster gonad index for each site over the duration of the study period. Blue trend line represents the mean gonad index across the entire estuary. Asterisks (\*) mark years with significant mortality events at IC in which no oysters could be collected for analysis. Upper-estuary, low salinity sites (IC and CD) are marked in shades of light/dark blue and lower-estuary, high salinity sites (KK and TB) are marked in shades of red/orange to highlight the impact on different regions of the estuary. Mid-estuary moderate salinity site BI is marked in green.

**Figure S4**: Daily flow rate from the S-79 lock and dam and monthly oyster condition index for each site over the duration of the study period. Blue trend line represents the mean condition index across the entire estuary. Asterisks (\*) mark years with significant mortality events at IC in which no oysters could be collected for analysis. Upper-estuary, low salinity sites (IC and CD) are marked in shades of light/dark blue and lower-estuary, high salinity sites (KK and TB) are marked in shades of red/orange to highlight the impact on different regions of the estuary. Mid-estuary moderate salinity site BI is marked in green.

**Figure S5**: Daily flow rate from the S-79 lock and dam and monthly *P. marinus* infection prevalence in oysters for each site over the duration of the study period. Blue trend line represents the mean *P. marinus* infection prevalence across the entire estuary. Asterisks (\*) mark years with significant mortality events at IC in which no oysters could be collected for analysis. Upper-estuary, low salinity sites (IC and CD) are marked in shades of light/dark blue and lower-estuary, high salinity sites (KK and TB) are marked in shades of red/orange to highlight the impact on different regions of the estuary. Mid-estuary moderate salinity site BI is marked in green.

**Figure S6**: Daily flow rate from the S-79 lock and dam and monthly *P. marinus* infection intensities in oysters for each site over the duration of the study period. Blue trend line represents the mean *P. marinus* infection intensities across the entire estuary. Asterisks (\*) mark years with significant mortality events at IC in which no oysters could be collected for analysis. Upper-estuary, low salinity sites (IC and CD) are marked in shades of light/dark blue and lower-estuary, high salinity sites (KK and TB) are marked in shades of red/orange to highlight the impact on different regions of the estuary. Mid-estuary moderate salinity site BI is marked in green.



**Figure S7:** Mean survival counts (left column), mean shell length (middle column), and salinity (right column) across time for each set of growth bags. Rows group each set by water year and the year type (wet, moderate, dry) is identified in the plot title.



**Figure S7 (continued)**



**Figure S7 (continued)**