# Supplementary Materials

**Table S1.** Ancillary information for each of the 51 SET-MH sites included in this regional synthesis of surface elevation change data from coastal wetlands of the Greater Everglades. SET benchmark types are represented as D = deep and O = original. The first value in the column ‘SET/Marker horizon replicates’ represents the number of SET station replicates at a site, whereas the second number represents the number of marker horizon plot replicates at a site. Dominant vegetation communities are represented as BM = brackish marsh, FM = freshwater marsh, MF = mangrove forest, and MU = mudflat.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Site | Site abbreviation | Coordinates | SET benchmark type | SET/Marker horizon replicates | Years measured | Sampling events | Dominant vegetation | Original name | Owner\* | Associated publications‡ |
| Big Sable Creek-1 | BSC-1 | 25.2662,  -81.1623 | O | 3/9 | 1998 - 2021 | 56 | MF | BSC forest | 1 | 1, 2 |
| Big Sable Creek-mudflat | BSC-mudflat | 25.2662,  -81.1623 | D | 3/NA | 1998-2021 | 47 | MU | BSC mudflat | 1 | 1, 2 |
| Biscayne Bay-1 | BB-1 | 25.4840,  -80.3397 | D | 3/9 | 2011 - 2019 | 17 | MF | BISC1 | 2 |  |
| Biscayne Bay-2 | BB-2 | 25.5418,  -80.3127 | D | 3/9 | 2012 - 2019 | 15 | MF | BISC2 | 2 |  |
| Lostmans River-1 | LR-1 | 25.6122,  -81.0253 | O | 3/9 | 2000 - 2017 | 36 | FM | LO1 | 1 |  |
| Lostmans River-2 | LR-2 | 25.5932,  -81.0415 | O | 3/9 | 2000 - 2017 | 37 | BM | LO2 | 1 |  |
| Lostmans River-3 | LR-3 | 25.5392,  -81.1843 | O/D | 3/9 | 1999 - 2021 | 47 | MF | LO3 | 1 | 2, 3 |
| NE Florida Bay-1 | NEF-1 | 25.1953,  -80.6373 | O | 2/6 | 1997 - 2019 | 23 | MF | TF1 & TF2 | 3 | 4, 5 |
| NE Florida Bay-2 | NEF-2 | 25.1953,  -80.6371 | O | 2/6 | 1997 - 2019 | 23 | MF | TF3 & TF4 | 3 | 4, 5 |
| NE Florida Bay-3 | NEF-3 | 25.2000,  -80.6333 | O | 1/3 | 1997 - 2019 | 23 | MF | TF8 | 3 | 4, 5 |
| NE Florida Bay-4 | NEF-4 | 25.2178,  -80.6490 | O | 1/3 | 1997 - 2019 | 23 | MF | TF10 | 3 | 4, 5 |
| NE Florida Bay-5 | NEF-5 | 25.2179,  -80.6489 | O | 1/3 | 1997 - 2019 | 23 | MF | TF11 | 3 | 4, 5 |
| NE Florida Bay-6 | NEF-6 | 25.2543,  -80.4480 | O | 2/6 | 1997 - 2019 | 23 | MF | TF12 & TF13 | 3 | 4, 5 |
| NE Florida Bay-7 | NEF-7 | 25.1759,  -80.7427 | O | 1/3 | 1997 - 2019 | 23 | MF | TF14 | 3 | 4, 5 |
| NE Florida Bay-8 | NEF-8 | 25.1758,  -80.7355 | O | 1/3 | 1997 - 2019 | 23 | MF | TF15 | 3 | 4, 5 |
| NE Florida Bay-9 | NEF-9 | 25.2147,  -80.5332 | O | 2/6 | 1997 - 2019 | 23 | MF | TF16 & TF17 | 3 | 4, 5 |
| NE Florida  Bay-10 | NEF-10 | 25.1966,  -80.6422 | O | 1/3 | 1997 - 2019 | 20 | MF | TF18 | 3 | 4, 5 |
| NE Florida  Bay-11 | NEF-11 | 25.2162,  -80.6511 | O | 1/3 | 1997 - 2019 | 19 | MF | TF19 | 3 | 4, 5 |
| NE Florida  Bay-12 | NEF-12 | 25.2325,  -80.5244 | O | 2/6 | 1997 - 2019 | 20 | MF | TF20 & TF21 | 3 | 4, 5 |
| Rookery Bay-1 | RB-1 | 26.0224,  -81.7342 | O | 5/3 | 2001 - 2006 | 8 | MF | FL-Basin 3 | 1 | 6 |
| Rookery Bay-2 | RB-2 | 26.0272,  -81.7283 | O | 5/3 | 2001 - 2006 | 8 | MF | FL-Fringe 3 | 1 | 6 |
| Rookery Bay-3 | RB-3 | 26.0272,  -81.7283 | O | 3/3 | 1997 - 2006 | 8 | MF | HC restored/FL-Restored | 1 | 6, 7 |
| Rookery Bay-4 | RB-4 | 26.0224,  -81.7342 | O | 3/3 | 1997 - 2006 | 8 | MF | HC natural/FL-Basin 1 | 1 | 6, 7 |
| Rookery Bay-5 | RB-5 | 25.9324,  -81.6707 | D | 1/3 | 2015 - 2020 | 8 | MF | Site 1 dead | 1 | 8, 14 |
| Rookery Bay-6 | RB-6 | 25.9324,  -81.6707 | D | 1/3 | 2015 - 2020 | 8 | MF | Site 1 transition | 1 | 8, 14 |
| Rookery Bay-7 | RB-7 | 25.9324,  -81.6707 | D | 1/3 | 2015 - 2020 | 8 | MF | Site 1 closed canopy | 1 | 8, 14 |
| Rookery Bay-8 | RB-8 | 25.9329,  -81.6705 | D | 1/3 | 2015 - 2020 | 8 | MF | Site 2 dead | 1 | 8, 14 |
| Rookery Bay-9 | RB-9 | 25.9329,  -81.6705 | D | 1/3 | 2015 - 2020 | 8 | MF | Site 2 transition | 1 | 8, 14 |
| Rookery Bay-10 | RB-10 | 25.9329,  -81.6705 | D | 1/3 | 2015 - 2020 | 8 | MF | Site 2 closed canopy | 1 | 8, 14 |
| Rookery Bay-11 | RB-11 | 25.9307,  -81.6708 | D | 1/3 | 2015 - 2020 | 8 | MF | Site 3 dead | 1 | 8, 14 |
| Rookery Bay-12 | RB-12 | 25.9307,  -81.6708 | D | 1/3 | 2015 - 2020 | 8 | MF | Site 3 transition | 1 | 8, 14 |
| Rookery Bay-13 | RB-13 | 25.9307,  -81.6708 | D | 1/3 | 2015 - 2020 | 8 | MF | Site 3 closed canopy | 1 | 8, 14 |
| Rookery Bay-14 | RB-14 | 25.9310,  -81.6604 | D | 1/3 | 2015 - 2020 | 8 | MF | Site 4 dead | 1 | 8, 14 |
| Rookery Bay-15 | RB-15 | 25.9310,  -81.6604 | D | 1/3 | 2015 - 2020 | 8 | MF | Site 4 transition | 1 | 8, 14 |
| Rookery Bay-16 | RB-16 | 25.9310,  -81.6604 | D | 1/3 | 2015 - 2020 | 8 | MF | Site 4 closed canopy | 1 | 8, 14 |
| Rookery Bay-17 | RB-17 | 25.9073,  -81.6704 | D | 3/9 | 2015 - 2020 | 8 | MF | Horr’s Island | 1 | 8, 14 |
| Rookery Bay-18 | RB-18 | 26.0220,  -81.7345 | O | 3/7 | 1993 - 2017 | 17 | MF | Rookery Bay: Basin | 4 | 9 |
| Rookery Bay-19 | RB-19 | 26.0286,  -81.7427 | O | 2/4 | 1994 - 2007 | 12 | MF | Rookery Bay: Exposed | 4 | 9 |
| Rookery Bay-20 | RB-20 | 26.0220,  -81.7344 | O | 3/3 | 1993 - 2017 | 17 | MF | Rookery Bay: Fringe | 4 | 9 |
| Rookery Bay-21 | RB-21 | 26.0245,  -81.7468 | O | 2/2 | 1994 - 2017 | 13 | MF | Rookery Bay: Protected | 4 | 9 |
| Shark River-1 | SR-1 | 25.4724,  -80.8482 | O | 3/9 | 1999 - 2018 | 39 | FM | SH1 | 1 |  |
| Shark River-2 | SR-2 | 25.4101,  -80.9633 | O | 3/9 | 1998 - 2021 | 55 | MF | SH2 | 1 | 2, 10 |
| Shark River-3 | SR-3 | 25.3641,  -81.0785 | O/D | 3/9 | 1998 - 2021 | 66 | MF | SH3 | 1 | 2, 3, 11, 12 |
| Shark River-4 | SR-4 | 25.4235,  -81.0604 | D | 3/9 | 2006 - 2021 | 31 | MF | SH4 | 1 | 2, 10 |
| Shark River-5 | SR-5 | 25.4213,  -81.0597 | D | 3/9 | 2006 - 2021 | 31 | BM | SH5 | 1 | 10 |
| Ten Thousand Islands-1 | TTI-1 | 25.9319,  -81.5958 | O | 6/6 | 1997 - 2017 | 9 | MF | Blackwater | 4 |  |
| Ten Thousand Islands-2 | TTI-2 | 25.9021,  -81.5109 | O | 6/6 | 1997 - 2017 | 9 | MF | Faka Union | 4 |  |
| Ten Thousand Islands-3 | TTI-3 | 25.9614,  -81.5355 | D | 4/12 | 2012 - 2019 | 7 | BM | Brackish | 1 | 13 |
| Ten Thousand Islands-4 | TTI-4 | 25.9496,  -81.5363 | D | 4/12 | 2012 - 2019 | 7 | BM | Salt | 1 | 13 |
| Ten Thousand Islands-5 | TTI-5 | 25.9392,  -81.5335 | D | 4/12 | 2012 - 2019 | 7 | BM | Transition | 1 | 13 |
| Ten Thousand Islands-6 | TTI-6 | 25.9216,  -81.5385 | D | 4/12 | 2012 - 2019 | 7 | MF | Mangrove | 1 | 13 |
| Westlake-1 | WL-1 | 25.2205,  -80.8436 | D | 3/6 | 2018 - 2020 | 11 | BM | BW | 5 |  |

\*1. U.S. Geological Survey, Wetland and Aquatic Research Center; 2. National Park Service, South Florida Caribbean Inventory and Monitoring Network; 3. South Florida Water Management District; 4. U.S. Geological Survey, Patuxent Wildlife Research Center and National Park Service, Northeast Coastal and Barrier Inventory and Monitoring Network; 5. Florida International University, Wetland Ecosystems Research Lab.

‡1. Osland et al. (2020); 2. Smith et al. (2009); 3. Feher et al. (2020); 4. Coronado-Molina et al. (2012); 5. Sklar et al. (2021); 6. McKee (2011); 7. McKee and Faulkner (2000); 8. Krauss et al. (2018); 9. Cahoon and Lynch (1997); 10. Breithaupt et al. (2020); 11. Whelan et al. (2005); 12. Whelan et al. (2009); 13. Howard et al. (2020); 14. Cormier et al. (2022).

**Table S2.** Site-level surface elevation GAM model parameters. ‘*K*’represents the basis dimension used in the model, ‘EDF’ represents the effective degrees of freedom for the smooth term for time, and ‘REML’ represents the smoothing parameter selection score estimated by restricted maximum likelihood.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Site | *K* | *r*2 | EDF | REML |
| Big Sable Creek-1 | 10 | 0.85 | 6.70 | 184.56 |
| Biscayne Bay-1 | 10 | 0.59 | 2.80 | 52.25 |
| Biscayne Bay-2 | 10 | 0.53 | 2.20 | 52.23 |
| Lostmans River-1 | 5 | 0.72 | 2.60 | 136.43 |
| Lostmans River-2 | 5 | 0.20 | 1.60 | 139.94 |
| Lostmans River-3 | 10 | 0.97 | 6.70 | 172.91 |
| NE Florida Bay-1 | 3 | 0.74 | 1.90 | 74.60 |
| NE Florida Bay-2 | 4 | 0.98 | 2.90 | 65.82 |
| NE Florida Bay-3 | 3 | 0.96 | 2.00 | 65.11 |
| NE Florida Bay-4 | 4 | 0.98 | 2.60 | 74.07 |
| NE Florida Bay-5 | 5 | 0.87 | 2.70 | 73.76 |
| NE Florida Bay-6 | 3 | 0.79 | 1.00 | 76.97 |
| NE Florida Bay-7 | 3 | 0.93 | 1.00 | 80.31 |
| NE Florida Bay-8 | 4 | 0.96 | 2.00 | 67.53 |
| NE Florida Bay-9 | 6 | 0.87 | 2.80 | 63.65 |
| NE Florida Bay-10 | 3 | 0.92 | 2.00 | 58.78 |
| NE Florida Bay-11 | 3 | 0.73 | 1.60 | 58.35 |
| NE Florida Bay-12 | 6 | 0.88 | 3.30 | 61.32 |
| Rookery Bay-1 | 3 | 0.35 | 1.00 | 17.12 |
| Rookery Bay-2 | 4 | 0.39 | 1.50 | 15.13 |
| Rookery Bay-3 | 3 | 1.00 | 2.00 | 19.20 |
| Rookery Bay-4 | 3 | 0.99 | 2.00 | 24.98 |
| Rookery Bay-5 | 3 | 0.65 | 1.70 | 22.20 |
| Rookery Bay-6 | 3 | 0.71 | 1.30 | 20.29 |
| Rookery Bay-7 | 3 | 0.49 | 1.50 | 24.04 |
| Rookery Bay-8 | 3 | 0.94 | 1.00 | 24.47 |
| Rookery Bay-9 | 4 | 0.11 | 1.80 | 25.25 |
| Rookery Bay-10 | 3 | 0.38 | 1.00 | 22.41 |
| Rookery Bay-11 | 3 | 0.83 | 1.60 | 19.49 |
| Rookery Bay-12 | 4 | 0.70 | 1.00 | 24.43 |
| Rookery Bay-13 | 3 | 0.79 | 1.00 | 21.02 |
| Rookery Bay-14 | 3 | 0.63 | 1.00 | 21.30 |
| Rookery Bay-15 | 3 | 0.69 | 1.00 | 23.35 |
| Rookery Bay-16 | 3 | 0.67 | 1.00 | 21.82 |
| Rookery Bay-17 | 5 | 0.99 | 3.70 | 21.20 |
| Rookery Bay-18 | 5 | 0.96 | 1.60 | 48.57 |
| Rookery Bay-19 | 8 | 0.99 | 3.90 | 41.55 |
| Rookery Bay-20 | 8 | 0.80 | 3.60 | 33.73 |
| Rookery Bay-21 | 8 | 0.97 | 3.20 | 33.90 |
| Shark River-1 | 3 | 0.57 | 1.00 | 161.12 |
| Shark River-2 | 12 | 0.89 | 8.90 | 186.82 |
| Shark River-3 | 10 | 0.93 | 6.60 | 234.64 |
| Shark River-4 | 6 | 0.87 | 3.20 | 103.17 |
| Shark River-5 | 6 | 0.46 | 2.00 | 114.31 |
| Ten Thousand Islands-1 | 4 | 0.82 | 1.00 | 27.51 |
| Ten Thousand Islands-2 | 3 | 0.90 | 1.50 | 29.92 |
| Ten Thousand Islands-3 | 3 | 0.76 | 1.30 | 21.70 |
| Ten Thousand Islands-4 | 3 | 0.68 | 1.70 | 15.32 |
| Ten Thousand Islands-5 | 4 | 0.58 | 2.60 | 24.36 |
| Ten Thousand Islands-6 | 4 | 0.87 | 1.80 | 23.84 |
| Westlake-1 | 4 | 0.10 | 1.70 | 18.23 |

**Table S3.** Site-level vertical accretion GAM model parameters. ‘*K*’represents the basis dimension used in the model, ‘EDF’ represents the effective degrees of freedom for the smooth term for time, and ‘REML’ represents the smoothing parameter selection score estimated by restricted maximum likelihood.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Site | *K* | *r*2 | EDF | REML |
| Big Sable Creek-1 | 10 | 0.97 | 4.60 | 155.31 |
| Biscayne Bay-1 | 7 | 0.77 | 3.70 | 59.09 |
| Biscayne Bay-2 | 7 | 0.84 | 2.60 | 48.86 |
| Lostmans River-1 | 3 | 0.41 | 1.00 | 62.41 |
| Lostmans River-2 | 9 | 0.88 | 2.80 | 42.17 |
| Lostmans River-3 | 3 | 0.92 | 1.20 | 108.06 |
| NE Florida Bay-1 | 4 | 0.76 | 2.20 | 70.57 |
| NE Florida Bay-2 | 7 | 0.87 | 3.00 | 62.80 |
| NE Florida Bay-3 | 10 | 0.90 | 6.50 | 67.35 |
| NE Florida Bay-4 | 4 | 0.99 | 2.50 | 40.34 |
| NE Florida Bay-5 | 6 | 0.88 | 1.70 | 71.61 |
| NE Florida Bay-6 | 8 | 0.94 | 3.10 | 59.70 |
| NE Florida Bay-7 | 3 | 0.91 | 1.00 | 70.01 |
| NE Florida Bay-8 | 3 | 0.84 | 1.00 | 62.07 |
| NE Florida Bay-9 | 3 | 0.90 | 1.00 | 44.18 |
| NE Florida Bay-10 | 4 | 0.63 | 1.50 | 72.83 |
| NE Florida Bay-11 | 7 | 0.63 | 4.00 | 80.93 |
| NE Florida Bay-12 | 4 | 0.91 | 2.60 | 63.04 |
| Rookery Bay-1 | 3 | 0.96 | 1.60 | 16.14 |
| Rookery Bay-2 | 3 | 0.88 | 1.00 | 14.90 |
| Rookery Bay-3 | 6 | 0.99 | 3.30 | 24.82 |
| Rookery Bay-4 | 3 | 0.92 | 1.00 | 17.84 |
| Rookery Bay-5 | 3 | 0.15 | 1.00 | 20.32 |
| Rookery Bay-6 | 3 | 0.84 | 1.80 | 20.91 |
| Rookery Bay-7 | 3 | 0.59 | 1.20 | 20.81 |
| Rookery Bay-8 | 3 | 0.24 | 1.00 | 33.30 |
| Rookery Bay-9 | 3 | 0.87 | 1.90 | 14.54 |
| Rookery Bay-10 | 3 | 0.73 | 1.80 | 18.94 |
| Rookery Bay-11 | 3 | 0.94 | 1.80 | 24.59 |
| Rookery Bay-12 | 3 | 0.71 | 1.00 | 24.48 |
| Rookery Bay-13 | 3 | 0.71 | 1.00 | 21.99 |
| Rookery Bay-14 | 3 | 0.75 | 1.80 | 26.84 |
| Rookery Bay-15 | 3 | 0.77 | 1.00 | 25.69 |
| Rookery Bay-16 | 4 | 0.95 | 1.90 | 19.18 |
| Rookery Bay-17 | 4 | 0.96 | 1.90 | 24.75 |
| Rookery Bay-18 | 3 | 0.98 | 1.00 | 43.81 |
| Rookery Bay-19 | 3 | 0.09 | 1.50 | 24.36 |
| Rookery Bay-20 | 3 | 0.98 | 1.30 | 10.55 |
| Rookery Bay-21 | 3 | 0.76 | 1.00 | 25.21 |
| Shark River-1 | 3 | 1.00 | 1.90 | 9.63 |
| Shark River-2 | 3 | 0.96 | 1.00 | 112.43 |
| Shark River-3 | 10 | 0.98 | 7.80 | 207.00 |
| Shark River-4 | 10 | 0.95 | 5.30 | 57.78 |
| Shark River-5 | 10 | 1.00 | 7.70 | 41.39 |
| Ten Thousand Islands-1 | 6 | 1.00 | 2.40 | 12.71 |
| Ten Thousand Islands-2 | 7 | 1.00 | 3.90 | 16.36 |
| Ten Thousand Islands-3 | 3 | 0.89 | 1.00 | 16.39 |
| Ten Thousand Islands-4 | 4 | 0.97 | 2.00 | 16.74 |
| Ten Thousand Islands-5 | 4 | 0.79 | 1.70 | 23.84 |
| Ten Thousand Islands-6 | 3 | 0.80 | 1.00 | 18.51 |
| Westlake-1 | 4 | 0.65 | 1.50 | 10.98 |

**Table S4.** Recent tidal epoch-based (2001-2019) rates of sea-level rise calculated from water-level data collected at tide gauges located throughout the Greater Everglades region and the corresponding SET-MH sites (± 1 SE). SET-MH site abbreviations are defined in Tables 1 and S1. NPS = National Park Service; NOAA = National Oceanic and Atmospheric Agency.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tide gauge | Owner | Coordinates | Recent tidal epoch-based rate of sea-level rise (mm yr-1) | Corresponding SET-MH sites |
| BSC | NPS | 25.2661,  -81.1622 | 9.04 ± 1.04 | BSC-1 |
| HC | NPS | 25.2541,  -80.4442 | 7.63 ± 0.62 | NEF-6 |
| LM | NPS | 25.1758,  -80.6326 | 6.97 ± 0.57 | NEF-1, NEF-2 |
| LO | NPS | 25.5558,  -81.1689 | 7.48 ± 0.54 | LR-3 |
| LO2 | NPS | 25.5931,  -81.0415 | 5.72 ± 0.70 | LR-1, LR-2 |
| Naples | NOAA | 26.1191,  -81.8013 | 7.73 ± 0.48 | RB-1 through RB-21,  TTI-1 through TTI-6 |
| SH1 | NPS | 25.4723,  -80.8482 | 5.92 ± 1.43 | SR-1, SR-2 |
| SR | NPS | 25.3541,  -81.1000 | 7.30 ± 0.59 | SR-3, SR-4, SR-5 |
| TB | NPS | 25.1573,  -80.7247 | 6.51 ± 0.57 | NEF-7, NEF-8, WL-1 |
| TC | NPS | 25.2127,  -80.5333 | 5.31 ± 0.59 | NEF-9, NEF-12 |
| TR | NPS | 25.2171,  -80.6495 | 5.73 ± 0.76 | NEF-3, NEF-4, NEF-5, NEF-10, NEF-11 |
| Virginia Key | NOAA | 25.8216,  -80.1616 | 7.91 ± 0.63 | BB-1, BB-2 |

# Figure S1. The relationship between surface elevation change measured with the original SETs and deep RSETs at (a) Lostmans River-3 and (b) Shark River-3. Elevation change for both SET types was calculated relative to the elevation readings on the first measurement date of the deep RSETs (May 2007 for Lostmans River-3 and March 2002 for Shark River-3). The labeled values represent the regression coefficient (β) (± 1 SE) and coefficient of determination (*r*2) for the relationship between surface elevation change from the original SETs and deep RSETs at each site. \*\*\* indicates *p* < 0.001