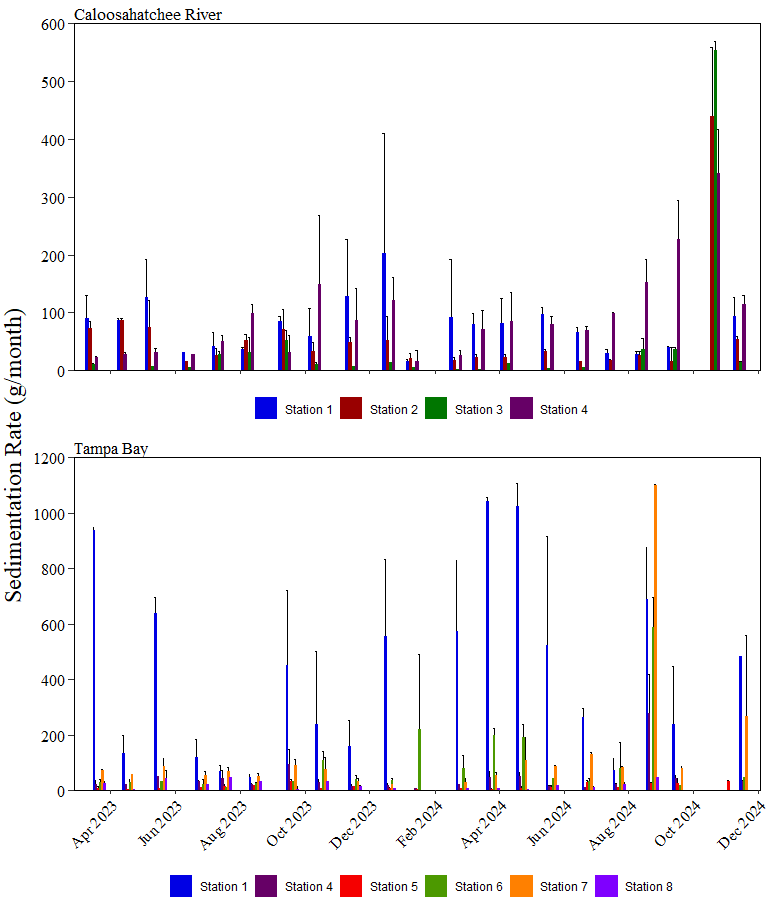
Sediment Trap Summary

2024-12-16

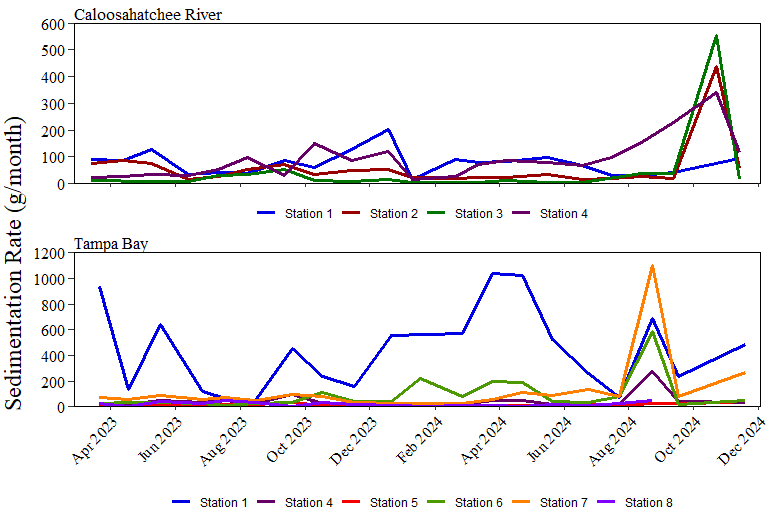
This report provides summary tables and figures for the sediment trap data collected from Caloosahatchee River estuary and Tampa Bay estuary stations from December 2022 through November 2024. Monthly data is standardized to a 28-day month unless otherwise noted. When possible, data is extrapolated to the entire sample collected based on crucible sub-sample information.  
  
From March 2023 through April 2024 for Tampa Bay samples and March 2023 through May 2024 for Caloosahatchee samples, the portion of samples used for ash weight processing was estimated. Beginning in May (Tampa Bay) and June (Caloosahatchee) 2024, the portion of samples used for ash weight processing were calculated by dividing the crucible sample dry weight (g) by the total sample dry weight (g). Due to this difference, analyses for percent organic content and organic weight were performed separately on the “estimated” data and on the “calculated” data.

## Sedimentation rate

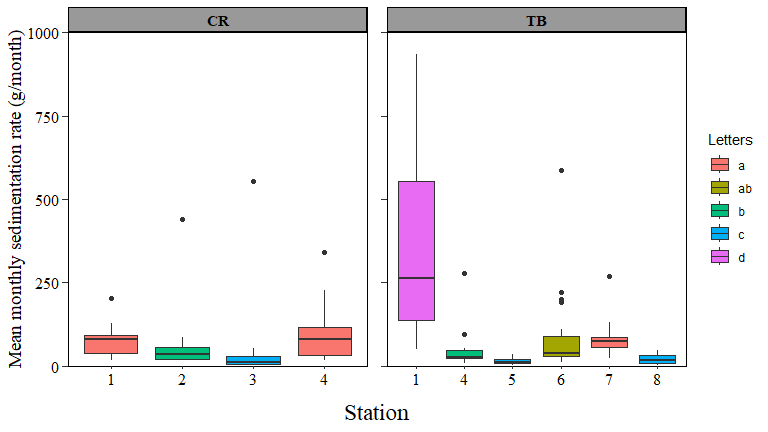
Oyster reefs in the Caloosahatchee River estuary averaged sedimentation rates of 68.9 g/month (Table 1, Figure 1-2). The lowest average sedimentation rate occurred at station 3 (mean: 45.5 g/month) and the highest occurred at station 4 (mean: 93.7 g/month). Overall, the lowest single month sedimentation rate (2.8 g/month) occurred in March 2024 at station 3 while the highest (553.5 g/month) occurred in October 2024 at station 3 (Table 2).  
  
Oyster reefs in the Tampa Bay estuary had an average sedimentation rate of 126 g/month (Table 1, Figure 1-2). The lowest average sedimentation rate occurred at station 5 (mean: 15.5 g/month) and the highest occurred at station 1 (mean: 433.7 g/month). The lowest single station sedimentation rate (2.4 g/month) occurred in January 2024 at station 8 while the highest (1099.7 g/month) occurred in August 2024 at station 7 (Table 2).  
  
Sedimentation rates were significantly different between estuaries (F(1,187) = 11.72, p = 0.001) and among stations (F(8,187) = 27.55, p = 0) (Figure 3, Table 3).  
  
{Include text about between estuaries and among stations. Tables 4 & 5 and Tables 6 & 7.}



**Figure 1.** Mean monthly sedimentation rate (± S.D.) at stations in Caloosahatchee River and Tampa Bay. Please note differences in magnitude between the y-axes.



**Figure 2.** Mean monthly sedimentation rate at stations in Caloosahatchee River and Tampa Bay. Please note differences in magnitude between the y-axes.



**Figure 3.** Mean monthly sedimentation rates at stations in Caloosahatchee River and Tampa Bay. Colors indicate significant groupings (alpha = 0.05).

Table 1. Sedimentation rates (g/month) by station and overall during the project.

| **Estuary** | **Station** | **MeanRate** | **sdRate** | **MinRate** | **MaxRate** |
| --- | --- | --- | --- | --- | --- |
| CR |  |  |  |  |  |
|  | 1 | 75.9 | 61.8 | 12.4 | 348.7 |
|  | 2 | 58.5 | 91.7 | 0.7 | 522.7 |
|  | 3 | 45.5 | 124.1 | 2.8 | 563.5 |
|  | 4 | 93.7 | 83.0 | 3.4 | 393.9 |
|  |  | 68.9 | 93.0 | 0.7 | 563.5 |
| TB |  |  |  |  |  |
|  | 1 | 433.7 | 347.6 | 40.4 | 1,081.5 |
|  | 4 | 44.7 | 63.7 | 7.8 | 377.0 |
|  | 5 | 15.5 | 10.8 | 2.9 | 40.4 |
|  | 6 | 98.9 | 144.5 | 9.6 | 665.2 |
|  | 7 | 137.3 | 244.6 | 19.4 | 1,100.9 |
|  | 8 | 18.9 | 15.8 | 0.3 | 64.0 |
|  |  | 126.0 | 234.5 | 0.3 | 1,100.9 |

Table 2. Minimum and maximum sedimentation rates per station and the Month and Year in which the minimum or maximum occurred.

| **Measure** | **Estuary** | **Station** | **Type** | **Year** | **Month** | **Value** |
| --- | --- | --- | --- | --- | --- | --- |
| Sedimentation | CR | 1 | Min Rate | 2024 | 01 | 15.5 |
| Max Rate | 2023 | 12 | 202.1 |
| 2 | Min Rate | 2024 | 06 | 15.9 |
| Max Rate | 2024 | 10 | 438.9 |
| 3 | Min Rate | 2024 | 03 | 2.8 |
| Max Rate | 2024 | 10 | 553.5 |
| 4 | Min Rate | 2024 | 01 | 16.6 |
| Max Rate | 2024 | 10 | 341.2 |
| TB | 1 | Min Rate | 2023 | 08 | 49.5 |
| Max Rate | 2024 | 03 | 1,042.0 |
| 4 | Min Rate | 2024 | 01 | 8.1 |
| Max Rate | 2024 | 08 | 279.0 |
| 5 | Min Rate | 2024 | 01 | 3.1 |
| Max Rate | 2023 | 09 | 35.3 |
| 6 | Min Rate | 2023 | 07 | 11.1 |
| Max Rate | 2024 | 08 | 586.8 |
| 7 | Min Rate | 2023 | 12 | 23.1 |
| Max Rate | 2024 | 08 | 1,099.7 |
| 8 | Min Rate | 2024 | 01 | 2.4 |
| Max Rate | 2023 | 07 | 47.0 |

Table 3. Analysis of sedimentation rates (g/month) by estuary and station. Permutation ANOVA using 10,000 permutations. Red text indicates signifcance alpha < 0.05.

| **Factors** | **df** | **SS** | **MS** | **F** | **Pr** |
| --- | --- | --- | --- | --- | --- |
| Estuary | 1 | 1.57 | 1.57 | 11.72 | 0.001 |
| Station\_code | 8 | 29.56 | 3.70 | 27.55 | 0.000 |
| Residuals | 187 | 25.08 | 0.13 |  |  |

Table 4. Mean sedimentation rates (g/month) per estuary. Letters are determined based on pairwise permutation two-sample independence analysis.

| **Estuary** | **n** | **mean** | **sd** | **lower** | **upper** | **Letters** |
| --- | --- | --- | --- | --- | --- | --- |
| CR | 81 | 68.22 | 88.31 | -20.09 | 156.52 | a |
| TB | 116 | 123.06 | 223.64 | -100.57 | 346.70 | a |

Table 5. Pairwise two-sample permutation post-hoc comparisons of sedimentation rates (g/month) per estuary.

| **Comparison** | **Stat** | **p.value** | **p.adjust** |
| --- | --- | --- | --- |
| CR - TB = 0 | -0.6052 | 0.545 | 0.545 |

Table 6. Mean sedimentation rates (g/month) per station. Letters are determined based on pairwise permutation two-sample independence analysis.

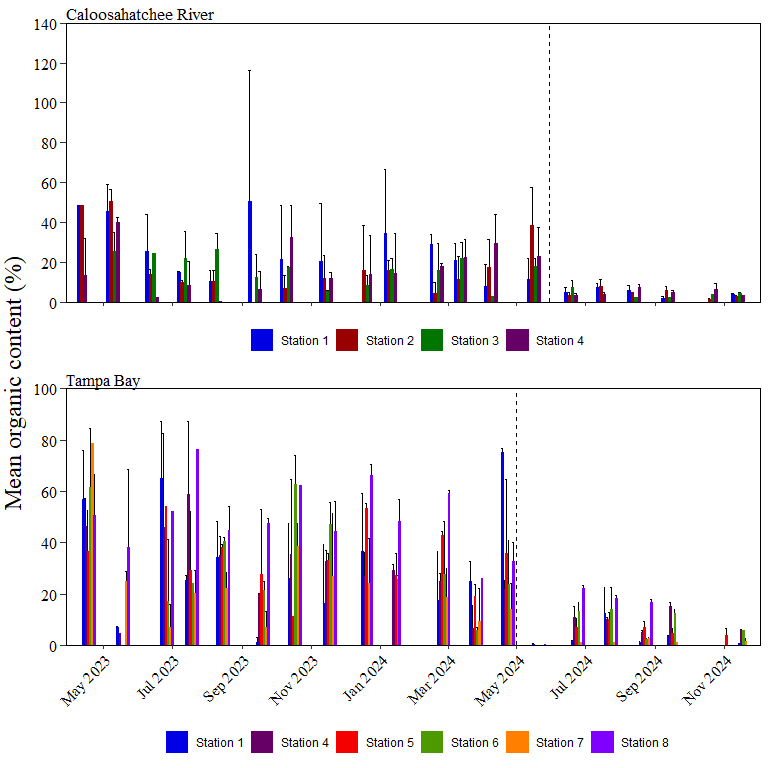
| **Station\_code** | **n** | **mean** | **sd** | **lower** | **upper** | **Letters** |
| --- | --- | --- | --- | --- | --- | --- |
| CR1 | 20 | 75.85 | 44.15 | 31.70 | 120.01 | a |
| CR2 | 21 | 58.46 | 90.02 | -31.56 | 148.47 | b |
| CR3 | 19 | 44.49 | 124.06 | -79.57 | 168.55 | c |
| CR4 | 21 | 92.17 | 78.03 | 14.14 | 170.21 | a |
| TB1 | 19 | 435.04 | 325.10 | 109.94 | 760.14 | d |
| TB4 | 20 | 44.89 | 58.51 | -13.62 | 103.39 | b |
| TB5 | 20 | 15.06 | 9.77 | 5.29 | 24.83 | c |
| TB6 | 20 | 93.80 | 132.20 | -38.40 | 226.00 | ab |
| TB7 | 19 | 135.25 | 239.38 | -104.13 | 374.62 | a |
| TB8 | 18 | 20.27 | 15.32 | 4.95 | 35.60 | c |

Table 7. Pairwise two-sample permutation post-hoc comparisons of sedimentation rates (g/month) per station. Red text indicates signifcance alpha < 0.05.

| **Comparison** | **Stat** | **p.value** | **p.adjust** |
| --- | --- | --- | --- |
| CR1 - CR2 = 0 | 2.192 | 0.03 | 0.04 |
| CR1 - CR3 = 0 | 3.845 | 0.00 | 0.00 |
| CR1 - CR4 = 0 | -0.2791 | 0.78 | 0.80 |
| CR1 - TB4 = 0 | 2.901 | 0.00 | 0.01 |
| CR1 - TB1 = 0 | -4.347 | 0.00 | 0.00 |
| CR1 - TB5 = 0 | 4.987 | 0.00 | 0.00 |
| CR1 - TB6 = 0 | 0.6286 | 0.53 | 0.57 |
| CR1 - TB7 = 0 | -0.9909 | 0.32 | 0.39 |
| CR1 - TB8 = 0 | 4.282 | 0.00 | 0.00 |
| CR2 - CR3 = 0 | 2.733 | 0.01 | 0.01 |
| CR2 - CR4 = 0 | -2.223 | 0.03 | 0.04 |
| CR2 - TB4 = 0 | 0.8161 | 0.41 | 0.49 |
| CR2 - TB1 = 0 | -4.821 | 0.00 | 0.00 |
| CR2 - TB5 = 0 | 3.887 | 0.00 | 0.00 |
| CR2 - TB6 = 0 | -1.268 | 0.20 | 0.26 |
| CR2 - TB7 = 0 | -2.662 | 0.01 | 0.01 |
| CR2 - TB8 = 0 | 3.068 | 0.00 | 0.00 |
| CR3 - CR4 = 0 | -3.833 | 0.00 | 0.00 |
| CR3 - TB4 = 0 | -2.233 | 0.03 | 0.04 |
| CR3 - TB1 = 0 | -4.994 | 0.00 | 0.00 |
| CR3 - TB5 = 0 | 0.4221 | 0.67 | 0.70 |
| CR3 - TB6 = 0 | -3.235 | 0.00 | 0.00 |
| CR3 - TB7 = 0 | -3.935 | 0.00 | 0.00 |
| CR3 - TB8 = 0 | -0.07882 | 0.94 | 0.94 |
| CR4 - TB4 = 0 | 2.852 | 0.00 | 0.01 |
| CR4 - TB1 = 0 | -4.099 | 0.00 | 0.00 |
| CR4 - TB5 = 0 | 4.828 | 0.00 | 0.00 |
| CR4 - TB6 = 0 | 0.8056 | 0.42 | 0.49 |
| CR4 - TB7 = 0 | -0.6625 | 0.51 | 0.57 |
| CR4 - TB8 = 0 | 4.182 | 0.00 | 0.00 |
| TB4 - TB1 = 0 | -4.952 | 0.00 | 0.00 |
| TB4 - TB5 = 0 | 3.416 | 0.00 | 0.00 |
| TB4 - TB6 = 0 | -1.918 | 0.06 | 0.07 |
| TB4 - TB7 = 0 | -3.197 | 0.00 | 0.00 |
| TB4 - TB8 = 0 | 2.54 | 0.01 | 0.02 |
| TB1 - TB5 = 0 | 5.526 | 0.00 | 0.00 |
| TB1 - TB6 = 0 | 4.158 | 0.00 | 0.00 |
| TB1 - TB7 = 0 | 3.672 | 0.00 | 0.00 |
| TB1 - TB8 = 0 | 5.161 | 0.00 | 0.00 |
| TB5 - TB6 = 0 | -4.183 | 0.00 | 0.00 |
| TB5 - TB7 = 0 | -4.864 | 0.00 | 0.00 |
| TB5 - TB8 = 0 | -0.6397 | 0.52 | 0.57 |
| TB6 - TB7 = 0 | -1.339 | 0.18 | 0.23 |
| TB6 - TB8 = 0 | 3.521 | 0.00 | 0.00 |
| TB7 - TB8 = 0 | 4.268 | 0.00 | 0.00 |

## Percent organic content

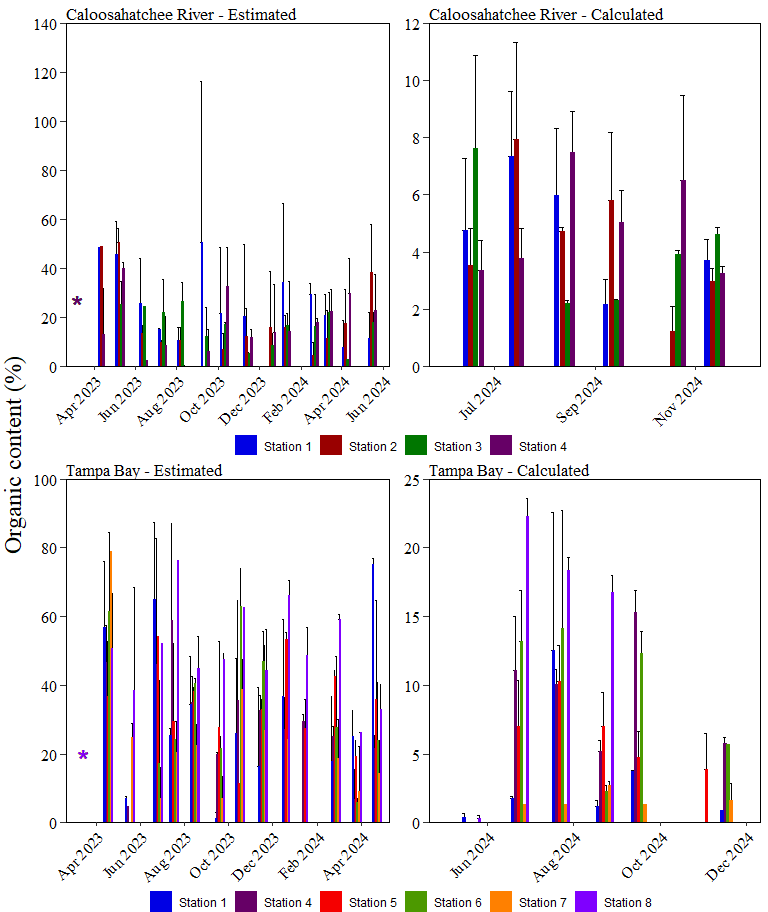
Percent organic content of samples was assessed by determining the relative amounts of organic and inorganic material in a sub-sample. Sub-sample portion was determined by estimation or by calculated sample proportion (Figure 4).



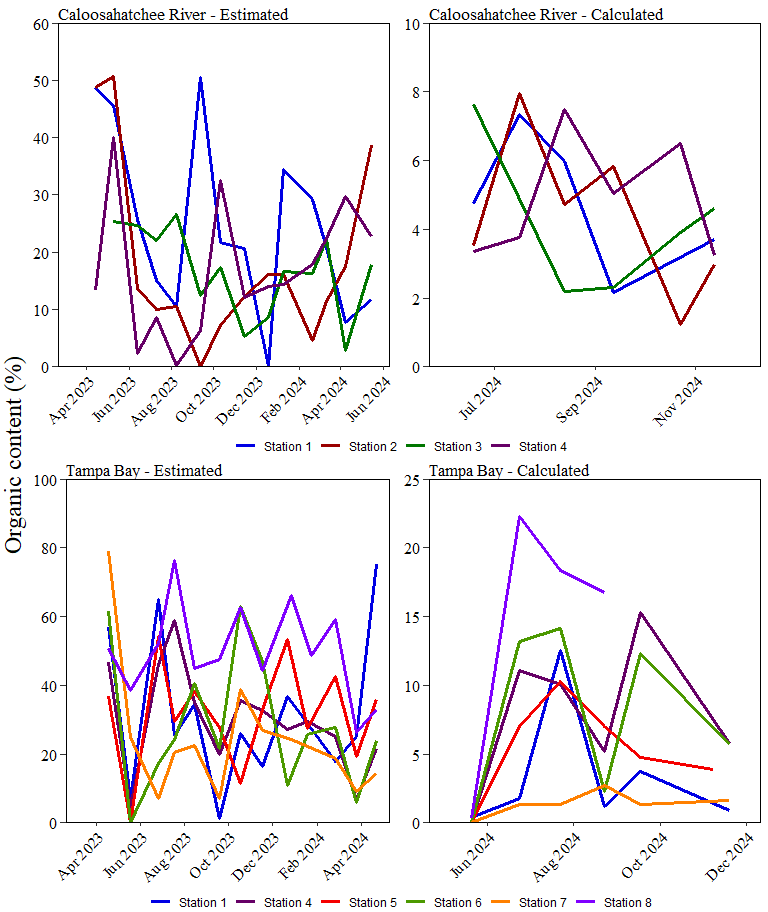
**Figure 4.** Mean monthly percent organic content of sediment samples (± S.D.) at stations in Caloosahatchee River and Tampa Bay. The dashed vertical lines note when sample proportions change from ‘estimated’ to ‘calculated’. Please note differences in magnitude between the y-axes.

### Estimated percent organic content

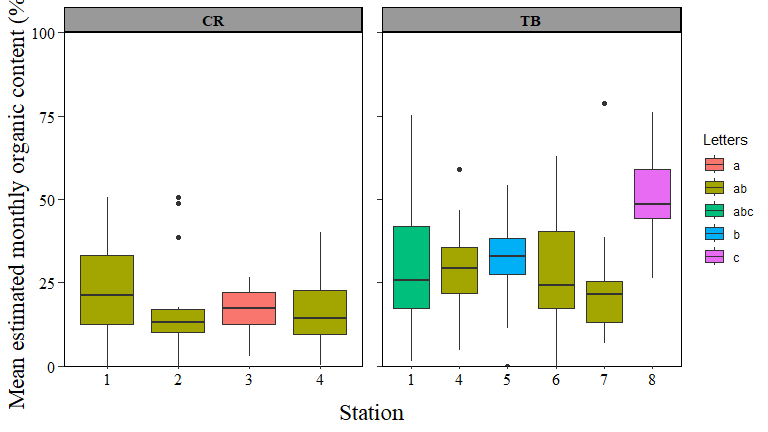
Sediment on oyster reefs in the Caloosahatchee River estuary averaged 19.3% estimated organic content (Table 8, Figures 5-6). The lowest average estimated percent organic content occurred at station 3 (mean: 16.5%) and the highest estimated occurred at station 1 (mean: 24.5%). Overall, the lowest single month estimated percent organic content (0, 0%) occurred in September 2023, December 2023 at station 2, 1 while the highest (50.6%) occurred in May 2023 at station 2 (Table 9).  
  
Sediment on oyster reefs in the Tampa Bay estuary averaged 32.6% estimated organic content (Table 8, Figures 5-6). The lowest average estimated percent organic content occurred at station 7 (mean: 22%) and the highest estimated occurred at station 8 (mean: 48.2%). Overall, the lowest single month estimated percent organic content (0, 0%) occurred in May 2023, May 2023 at station 5, 6 while the highest (78.8%) occurred in April 2023 at station 7 (Table 9).  
  
The percent of organic content in samples were significantly different among stations (F(8,121) = 2.72, p = 0.009) but not between estuaries (F(1,121) = 0.45, p = 0.506) (Figure 7, Table 10).  
  
{Include text about among stations. Tables 11 & 12.}



**Figure 5.** Mean monthly estimated (left) and calculated (right) organic content (%) of sediment at stations in Caloosahatchee River (top) and Tampa Bay (bottom).



**Figure 6.** Mean monthly estimated (left) and calculated (right) organic content (%) of sediment at stations in Caloosahatchee River (top) and Tampa Bay (bottom).



**Figure 7.** Mean estimated monthly percent organic content from stations in Caloosahatchee River and Tampa Bay. Colors indicate significant groupings (alpha = 0.05). Rates are standarized to a 28-day month.

Table 8. Estimated and calculated percent organic content (%) by station and overall during the study

| **Type** | **Estuary** | **Station** | **MeanPct** | **sdPct** | **MinPct** | **MaxPct** |
| --- | --- | --- | --- | --- | --- | --- |
| Estimated |  |  |  |  |  |  |
|  | CR | 1 | 24.5 | 23.0 | 0.0 | 97.1 |
|  | 2 | 18.4 | 17.3 | 0.0 | 54.8 |
|  | 3 | 16.5 | 9.4 | 2.7 | 32.1 |
|  | 4 | 17.4 | 14.4 | 0.0 | 44.0 |
|  |  | 19.3 | 17.0 | 0.0 | 97.1 |
|  | TB | 1 | 32.2 | 25.1 | 0.0 | 80.8 |
|  | 4 | 30.9 | 18.7 | 0.6 | 78.9 |
|  | 5 | 32.7 | 16.5 | 0.0 | 56.2 |
|  | 6 | 29.7 | 21.3 | 0.0 | 77.8 |
|  | 7 | 22.0 | 17.7 | 0.0 | 78.8 |
|  | 8 | 48.2 | 15.3 | 17.1 | 76.2 |
|  |  | 32.6 | 20.6 | 0.0 | 80.8 |
| Calculated |  |  |  |  |  |  |
|  | CR | 1 | 4.8 | 2.4 | 1.5 | 9.0 |
|  | 2 | 4.4 | 2.6 | 0.6 | 10.3 |
|  | 3 | 4.1 | 2.4 | 2.1 | 9.9 |
|  | 4 | 4.9 | 2.0 | 2.6 | 8.6 |
|  |  | 4.6 | 2.3 | 0.6 | 10.3 |
|  | TB | 1 | 3.7 | 5.5 | 0.2 | 19.7 |
|  | 4 | 7.9 | 5.3 | 0.0 | 16.4 |
|  | 5 | 5.5 | 3.8 | 0.0 | 12.1 |
|  | 6 | 8.1 | 6.7 | 0.0 | 20.2 |
|  | 7 | 1.4 | 0.9 | 0.0 | 2.9 |
|  | 8 | 14.4 | 9.0 | 0.1 | 23.2 |
|  |  | 6.4 | 6.5 | 0.0 | 23.2 |

Table 9. Minimum and maximum estimated and calculated percent organic content per station and the Month and Year in which the minimum or maximum occurred.

| **Measure** | **Type** | **Estuary** | **Station** | **Extreme** | **Year** | **Month** | **Value** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Organic Weight | Estimated | CR | 1 | Min Daily Org Wt | 2023 | 12 | 0.0 |
| Max Daily Org Wt | 2023 | 09 | 50.6 |
| 2 | Min Daily Org Wt | 2023 | 09 | 0.0 |
| Max Daily Org Wt | 2023 | 05 | 50.6 |
| 3 | Min Daily Org Wt | 2024 | 04 | 2.8 |
| Max Daily Org Wt | 2023 | 08 | 26.6 |
| 4 | Min Daily Org Wt | 2023 | 08 | 0.2 |
| Max Daily Org Wt | 2023 | 05 | 40.0 |
| TB | 1 | Min Daily Org Wt | 2023 | 09 | 1.2 |
| Max Daily Org Wt | 2024 | 04 | 75.1 |
| 4 | Min Daily Org Wt | 2023 | 05 | 4.7 |
| Max Daily Org Wt | 2023 | 07 | 58.9 |
| 5 | Min Daily Org Wt | 2023 | 05 | 0.0 |
| Max Daily Org Wt | 2023 | 06 | 54.1 |
| 6 | Min Daily Org Wt | 2023 | 05 | 0.0 |
| Max Daily Org Wt | 2023 | 10 | 62.9 |
| 7 | Min Daily Org Wt | 2023 | 09 | 6.9 |
| Max Daily Org Wt | 2023 | 04 | 78.8 |
| 8 | Min Daily Org Wt | 2024 | 03 | 26.2 |
| Max Daily Org Wt | 2023 | 07 | 76.2 |
| Calculated | CR | 1 | Min Daily Org Wt | 2024 | 09 | 2.2 |
| Max Daily Org Wt | 2024 | 07 | 7.3 |
| 2 | Min Daily Org Wt | 2024 | 10 | 1.2 |
| Max Daily Org Wt | 2024 | 07 | 7.9 |
| 3 | Min Daily Org Wt | 2024 | 08 | 2.2 |
| Max Daily Org Wt | 2024 | 06 | 7.6 |
| 4 | Min Daily Org Wt | 2024 | 11 | 3.2 |
| Max Daily Org Wt | 2024 | 08 | 7.5 |
| TB | 1 | Min Daily Org Wt | 2024 | 05 | 0.4 |
| Max Daily Org Wt | 2024 | 07 | 12.6 |
| 4 | Min Daily Org Wt | 2024 | 05 | 0.0 |
| Max Daily Org Wt | 2024 | 09 | 15.3 |
| 5 | Min Daily Org Wt | 2024 | 05 | 0.0 |
| Max Daily Org Wt | 2024 | 07 | 10.3 |
| 6 | Min Daily Org Wt | 2024 | 05 | 0.0 |
| Max Daily Org Wt | 2024 | 07 | 14.1 |
| 7 | Min Daily Org Wt | 2024 | 05 | 0.0 |
| Max Daily Org Wt | 2024 | 08 | 2.7 |
| 8 | Min Daily Org Wt | 2024 | 05 | 0.3 |
| Max Daily Org Wt | 2024 | 06 | 22.3 |

Table 10. Analysis of estimated organic content (%) by estuary and station. Permutation ANOVA using 10,000 permutations. Red text indicates signifcance alpha < 0.05.

| **Factors** | **df** | **SS** | **MS** | **F** | **Pr** |
| --- | --- | --- | --- | --- | --- |
| Estuary | 1 | 115.25 | 115.25 | 0.45 | 0.506 |
| Station\_code | 8 | 5,638.66 | 704.83 | 2.72 | 0.009 |
| Residuals | 121 | 31,310.53 | 258.76 |  |  |

Table 11. Mean estimated organic content (%) per station. Letters are determined based on pairwise permutation two-sample independence analysis.

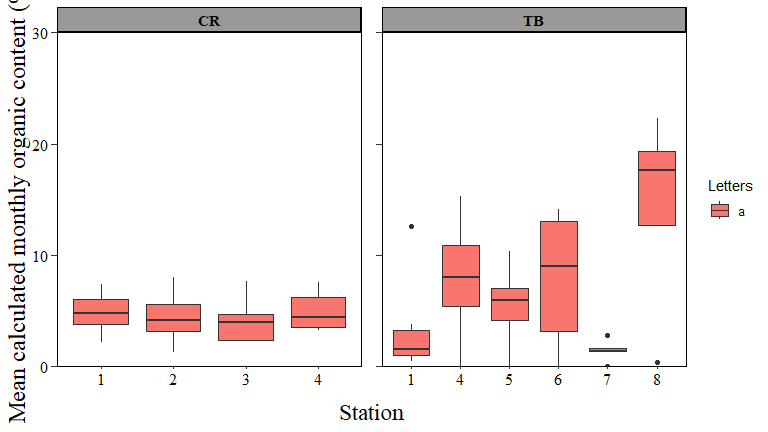
| **Station\_code** | **n** | **mean** | **sd** | **lower** | **upper** | **Letters** |
| --- | --- | --- | --- | --- | --- | --- |
| CR1 | 14 | 24.46 | 15.69 | 8.77 | 40.15 | ab |
| CR2 | 14 | 18.38 | 15.88 | 2.50 | 34.26 | ab |
| CR3 | 13 | 16.78 | 7.65 | 9.13 | 24.43 | a |
| CR4 | 14 | 16.90 | 11.54 | 5.36 | 28.43 | ab |
| TB1 | 12 | 32.23 | 22.83 | 9.40 | 55.07 | abc |
| TB4 | 13 | 29.94 | 15.31 | 14.62 | 45.25 | ab |
| TB5 | 13 | 31.48 | 15.27 | 16.21 | 46.76 | b |
| TB6 | 13 | 28.34 | 19.64 | 8.70 | 47.98 | ab |
| TB7 | 12 | 24.36 | 19.46 | 4.90 | 43.82 | ab |
| TB8 | 13 | 50.00 | 13.71 | 36.29 | 63.71 | c |

Table 12. Pairwise two-sample permutation post-hoc comparisons of estimated organic content (%) per station. Red text indicates signifcance alpha < 0.05.

| **Comparison** | **Stat** | **p.value** | **p.adjust** |
| --- | --- | --- | --- |
| CR1 - CR2 = 0 | 1.018 | 0.31 | 0.48 |
| CR1 - CR3 = 0 | 1.55 | 0.12 | 0.26 |
| CR1 - CR4 = 0 | 1.424 | 0.15 | 0.30 |
| CR1 - TB4 = 0 | -0.9197 | 0.36 | 0.52 |
| CR1 - TB1 = 0 | -1.023 | 0.31 | 0.48 |
| CR1 - TB5 = 0 | -1.169 | 0.24 | 0.42 |
| CR1 - TB6 = 0 | -0.5771 | 0.56 | 0.75 |
| CR1 - TB7 = 0 | 0.01468 | 0.99 | 0.99 |
| CR1 - TB8 = 0 | -3.406 | 0.00 | 0.01 |
| CR2 - CR3 = 0 | 0.3345 | 0.74 | 0.87 |
| CR2 - CR4 = 0 | 0.2878 | 0.77 | 0.87 |
| CR2 - TB4 = 0 | -1.83 | 0.07 | 0.17 |
| CR2 - TB1 = 0 | -1.739 | 0.08 | 0.18 |
| CR2 - TB5 = 0 | -2.04 | 0.04 | 0.12 |
| CR2 - TB6 = 0 | -1.424 | 0.15 | 0.30 |
| CR2 - TB7 = 0 | -0.8678 | 0.39 | 0.54 |
| CR2 - TB8 = 0 | -3.779 | 0.00 | 0.00 |
| CR3 - CR4 = 0 | -0.03056 | 0.98 | 0.99 |
| CR3 - TB4 = 0 | -2.461 | 0.01 | 0.06 |
| CR3 - TB1 = 0 | -2.124 | 0.03 | 0.11 |
| CR3 - TB5 = 0 | -2.676 | 0.01 | 0.04 |
| CR3 - TB6 = 0 | -1.871 | 0.06 | 0.16 |
| CR3 - TB7 = 0 | -1.283 | 0.20 | 0.37 |
| CR3 - TB8 = 0 | -4.207 | 0.00 | 0.00 |
| CR4 - TB4 = 0 | -2.289 | 0.02 | 0.08 |
| CR4 - TB1 = 0 | -2.057 | 0.04 | 0.12 |
| CR4 - TB5 = 0 | -2.501 | 0.01 | 0.06 |
| CR4 - TB6 = 0 | -1.781 | 0.07 | 0.18 |
| CR4 - TB7 = 0 | -1.2 | 0.23 | 0.41 |
| CR4 - TB8 = 0 | -4.109 | 0.00 | 0.00 |
| TB4 - TB1 = 0 | -0.3032 | 0.76 | 0.87 |
| TB4 - TB5 = 0 | -0.2628 | 0.79 | 0.87 |
| TB4 - TB6 = 0 | 0.2355 | 0.81 | 0.87 |
| TB4 - TB7 = 0 | 0.8058 | 0.42 | 0.57 |
| TB4 - TB8 = 0 | -2.917 | 0.00 | 0.03 |
| TB1 - TB5 = 0 | 0.09916 | 0.92 | 0.96 |
| TB1 - TB6 = 0 | 0.4656 | 0.64 | 0.78 |
| TB1 - TB7 = 0 | 0.9124 | 0.36 | 0.52 |
| TB1 - TB8 = 0 | -2.179 | 0.03 | 0.10 |
| TB5 - TB6 = 0 | 0.4627 | 0.64 | 0.78 |
| TB5 - TB7 = 0 | 1.022 | 0.31 | 0.48 |
| TB5 - TB8 = 0 | -2.766 | 0.01 | 0.03 |
| TB6 - TB7 = 0 | 0.5167 | 0.61 | 0.78 |
| TB6 - TB8 = 0 | -2.77 | 0.01 | 0.03 |
| TB7 - TB8 = 0 | -3.058 | 0.00 | 0.02 |

### Calculated percent organic content

Sediment on oyster reefs in the Caloosahatchee River estuary averaged 4.6% calculated organic content (Table 8, Figures 6-7). The lowest average calculated percent organic content occurred at station 3 (mean: 4.1%) and the highest occurred at station 4 (mean: 4.9%). Overall, the lowest single month calculated percent organic content (1.2%) occurred in October 2024 at station 2 while the highest (7.9%) occurred in July 2024 at station 2 (Table 9).  
  
Sediment on oyster reefs in the Tampa Bay estuary averaged 6.4% calculated organic content (Table 8, Figures 6-7). The lowest average calculated percent organic content occurred at station 7 (mean: 1.4%) and the highest estimated occurred at station 8 (mean: 14.4%). Overall, the lowest single month calculated percent organic content (0, 0, 0%) occurred in May 2024, May 2024, May 2024 at station 4, 5, 7 while the highest (22.3%) occurred in June 2024 at station 8 (Table 9).  
  
The percent of organic content in samples were significantly different between estuaries (F(1,46) = 7.14, p = 0.01) and among stations (F(8,46) = 3.32, p = 0.004) (Figure 8, Table 13).  
  
{Include text about among stations. Tables 14-15 and 16-17.}



**Figure 8.** Mean calculated monthly percent organic content from stations in Caloosahatchee River and Tampa Bay. Colors indicate significant groupings (alpha = 0.05).

Table 13. Analysis of calculated organic content (%) by estuary and station. Permutation ANOVA using 10,000 permutations. Red text indicates signifcance alpha < 0.05.

| **Factors** | **df** | **SS** | **MS** | **F** | **Pr** |
| --- | --- | --- | --- | --- | --- |
| Estuary | 1 | 133.78 | 133.78 | 7.14 | 0.010 |
| Station\_code | 8 | 497.00 | 62.13 | 3.32 | 0.004 |
| Residuals | 46 | 861.27 | 18.72 |  |  |

Table 14. Mean calculated organic content (%) per estuary Letters are determined based on pairwise permutation two-sample independence analysis.

| **Estuary** | **n** | **mean** | **sd** | **lower** | **upper** | **Letters** |
| --- | --- | --- | --- | --- | --- | --- |
| CR | 22 | 4.56 | 1.96 | 2.59 | 6.52 | a |
| TB | 34 | 6.31 | 6.22 | 0.09 | 12.53 | a |

Table 15. Pairwise two-sample permutation post-hoc comparisons of calculated organic content (%) per estuary Red text indicates signifcance alpha < 0.05.

| **Comparison** | **Stat** | **p.value** | **p.adjust** |
| --- | --- | --- | --- |
| CR - TB = 0 | -1.27 | 0.2 | 0.2 |

Table 16. Mean calculated organic content (%) per station. Letters are determined based on pairwise permutation two-sample independence analysis.

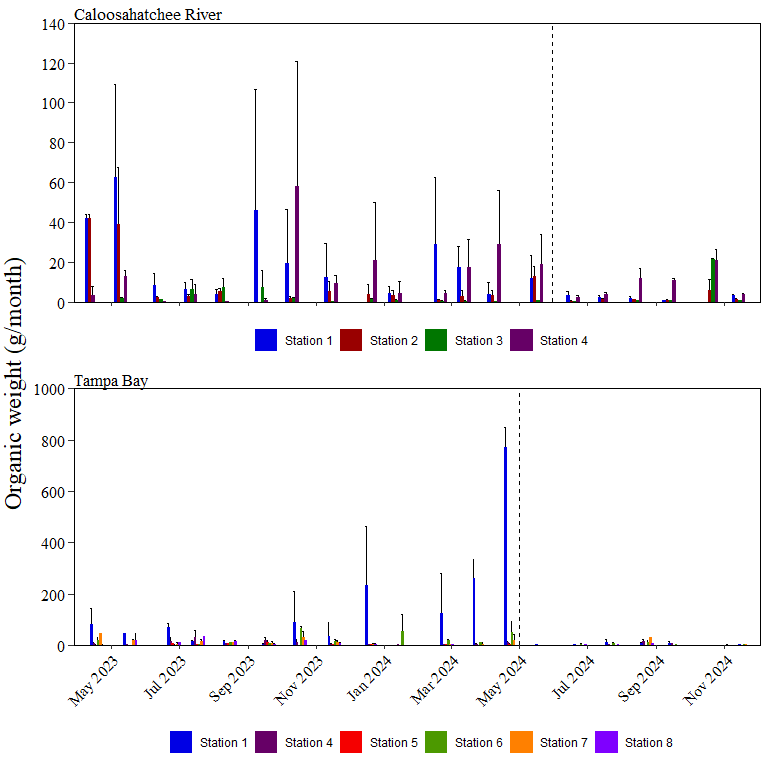
| **Station\_code** | **n** | **mean** | **sd** | **lower** | **upper** | **Letters** |
| --- | --- | --- | --- | --- | --- | --- |
| CR1 | 5 | 4.79 | 2.00 | 2.79 | 6.78 | a |
| CR2 | 6 | 4.37 | 2.35 | 2.02 | 6.72 | a |
| CR3 | 5 | 4.13 | 2.22 | 1.91 | 6.35 | a |
| CR4 | 6 | 4.90 | 1.77 | 3.13 | 6.68 | a |
| TB1 | 6 | 3.42 | 4.62 | -1.20 | 8.04 | a |
| TB4 | 6 | 7.90 | 5.36 | 2.54 | 13.26 | a |
| TB5 | 6 | 5.49 | 3.49 | 2.00 | 8.98 | a |
| TB6 | 6 | 7.94 | 6.08 | 1.86 | 14.02 | a |
| TB7 | 6 | 1.37 | 0.86 | 0.51 | 2.24 | a |
| TB8 | 4 | 14.43 | 9.70 | 4.73 | 24.13 | a |

Table 17. Pairwise two-sample permutation post-hoc comparisons of calculated organic content (%) per station. Red text indicates signifcance alpha < 0.05.

| **Comparison** | **Stat** | **p.value** | **p.adjust** |
| --- | --- | --- | --- |
| CR1 - CR2 = 0 | 0.3309 | 0.74 | 0.80 |
| CR1 - CR3 = 0 | 0.5142 | 0.61 | 0.76 |
| CR1 - CR4 = 0 | -0.1062 | 0.92 | 0.94 |
| CR1 - TB4 = 0 | -1.191 | 0.23 | 0.44 |
| CR1 - TB1 = 0 | 0.6304 | 0.53 | 0.68 |
| CR1 - TB5 = 0 | -0.4156 | 0.68 | 0.78 |
| CR1 - TB6 = 0 | -1.09 | 0.28 | 0.48 |
| CR1 - TB7 = 0 | 2.486 | 0.01 | 0.19 |
| CR1 - TB8 = 0 | -1.809 | 0.07 | 0.23 |
| CR2 - CR3 = 0 | 0.1796 | 0.86 | 0.90 |
| CR2 - CR4 = 0 | -0.4625 | 0.64 | 0.76 |
| CR2 - TB4 = 0 | -1.404 | 0.16 | 0.41 |
| CR2 - TB1 = 0 | 0.4636 | 0.64 | 0.76 |
| CR2 - TB5 = 0 | -0.6721 | 0.50 | 0.67 |
| CR2 - TB6 = 0 | -1.296 | 0.20 | 0.41 |
| CR2 - TB7 = 0 | 2.256 | 0.02 | 0.19 |
| CR2 - TB8 = 0 | -1.989 | 0.05 | 0.21 |
| CR3 - CR4 = 0 | -0.6621 | 0.51 | 0.67 |
| CR3 - TB4 = 0 | -1.384 | 0.17 | 0.41 |
| CR3 - TB1 = 0 | 0.327 | 0.74 | 0.80 |
| CR3 - TB5 = 0 | -0.7676 | 0.44 | 0.64 |
| CR3 - TB6 = 0 | -1.273 | 0.20 | 0.41 |
| CR3 - TB7 = 0 | 2.168 | 0.03 | 0.19 |
| CR3 - TB8 = 0 | -1.872 | 0.06 | 0.23 |
| CR4 - TB4 = 0 | -1.261 | 0.21 | 0.41 |
| CR4 - TB1 = 0 | 0.748 | 0.45 | 0.64 |
| CR4 - TB5 = 0 | -0.3842 | 0.70 | 0.79 |
| CR4 - TB6 = 0 | -1.155 | 0.25 | 0.45 |
| CR4 - TB7 = 0 | 2.69 | 0.01 | 0.19 |
| CR4 - TB8 = 0 | -1.949 | 0.05 | 0.21 |
| TB4 - TB1 = 0 | 1.459 | 0.14 | 0.41 |
| TB4 - TB5 = 0 | 0.9281 | 0.35 | 0.57 |
| TB4 - TB6 = 0 | -0.01287 | 0.99 | 0.99 |
| TB4 - TB7 = 0 | 2.26 | 0.02 | 0.19 |
| TB4 - TB8 = 0 | -1.32 | 0.19 | 0.41 |
| TB1 - TB5 = 0 | -0.8843 | 0.38 | 0.58 |
| TB1 - TB6 = 0 | -1.381 | 0.17 | 0.41 |
| TB1 - TB7 = 0 | 1.062 | 0.29 | 0.48 |
| TB1 - TB8 = 0 | -1.962 | 0.05 | 0.21 |
| TB5 - TB6 = 0 | -0.8657 | 0.39 | 0.58 |
| TB5 - TB7 = 0 | 2.201 | 0.03 | 0.19 |
| TB5 - TB8 = 0 | -1.795 | 0.07 | 0.23 |
| TB6 - TB7 = 0 | 2.115 | 0.03 | 0.19 |
| TB6 - TB8 = 0 | -1.265 | 0.21 | 0.41 |
| TB7 - TB8 = 0 | -2.301 | 0.02 | 0.19 |

## Organic weight

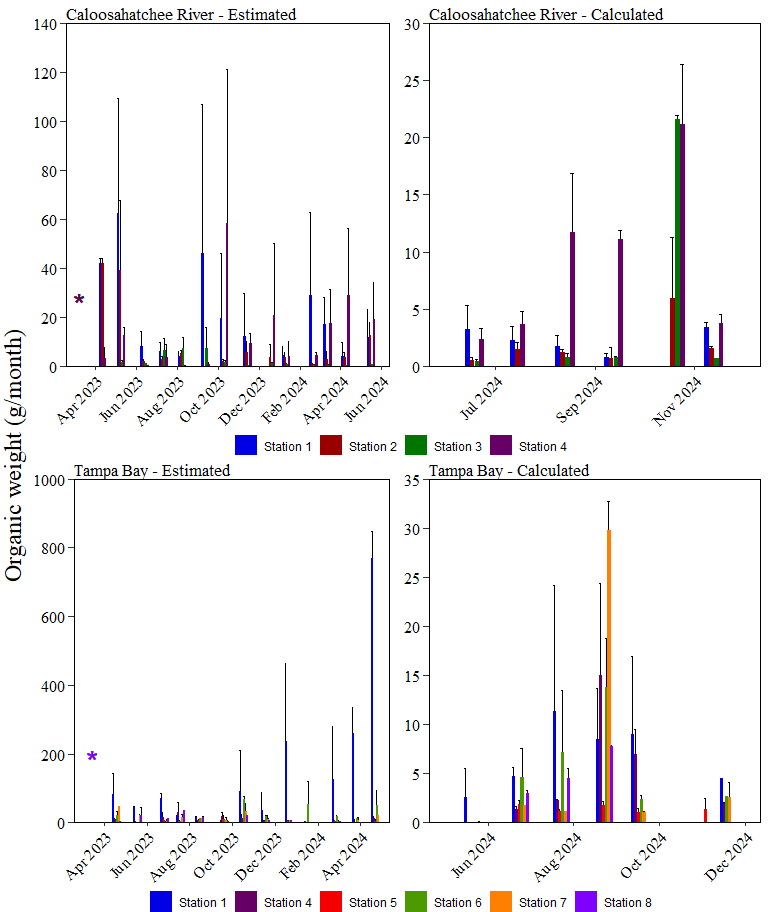
Organic weights were assessed by determining the relative amounts od organic and inorganic material in a sub-sample. Sub-sample portion was determined by estimation of sample proportion or calculated sample proportion (Figure 9).



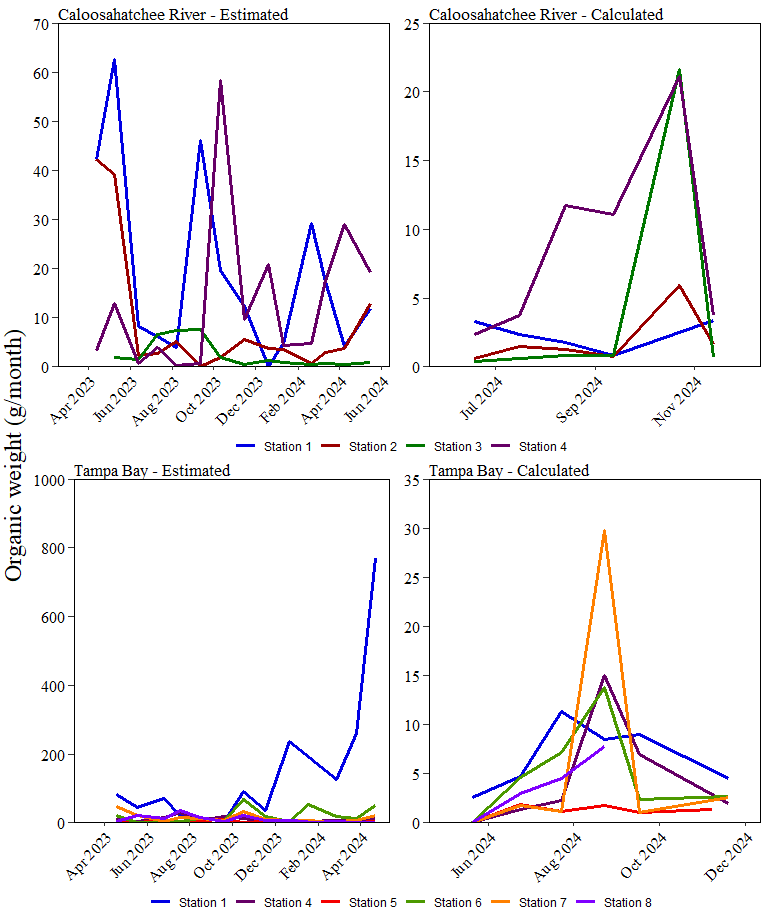
**Figure 9.** Mean monthly organic weight of sediment (± S.D.) at stations in Caloosahatchee River and Tampa Bay. The dashed vertical lines note when sample proportions change from ‘estimated’ to ‘calculated’. Please note differences in magnitude between the y-axes.

### Estimated organic weights

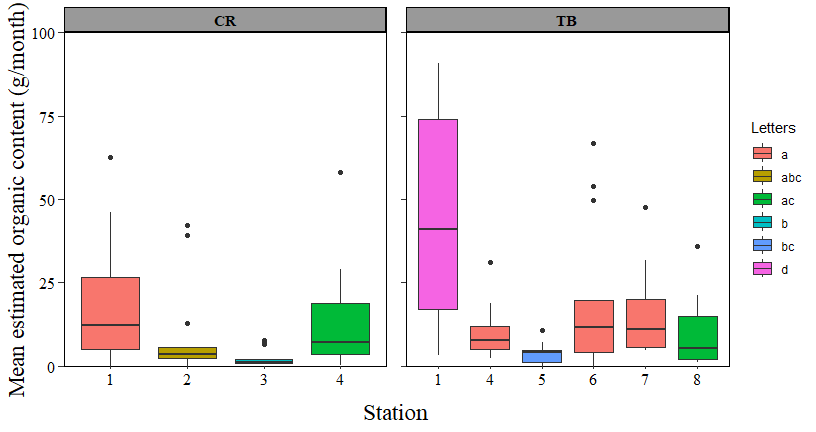
Sediment on oyster reefs in the Caloosahatchee River estuary averaged estimated organic weights of 11.3 g/month (Table 18, Figure 10-11). The lowest estimated organic weight occurred at station 3 (mean: 2.5 g/month) and the highest occurred at station 1 (mean: 19.2 g/month). Overall, the lowest single month organic weight (0, 0 g/month) occurred in September 2023, December 2023 at station 2, 1 while the highest (62.5 g/month) occurred in May 2023 at station 1 (Table 19).  
  
Sediment on oyster reefs in the Tampa Bay estuary averaged estimated organic weights of 34.5 g/month (Table 18, Figure 10-11). The lowest estimated sedimentation rate occurred at station 5 (mean: 4.1 g/month) and the highest occurred at station 1 (mean: 146.2 g/month). The lowest single station sedimentation rate (0, 0 g/month) occurred in May 2023, May 2023 at station 5, 6 while the highest (769.8 g/month) occurred in April 2024 at station 1 (Table 19).  
  
Estimated organic weights were significantly different among stations (F(8,121) = 8.91, p = 0) but not between estuaries (F(1,121) = 1.44, p = 0.233) (Figure 12, Table 20).  
  
{Include text about among stations. Tables 21 & 22.}



**Figure 10.** Mean monthly estimated (left) and calculated (right) organic weight of sediment at stations in Caloosahatchee River (top) and Tampa Bay (bottom). Please note differences in magnitude between the y-axes.



**Figure 11.** Mean monthly estimated (left) and calculated (right) organic weight of sediment at stations in Caloosahatchee River (top) and Tampa Bay (bottom). Please note differences in magnitude between the y-axes.



**Figure 12.** Mean estimated monthly organic content (g/month) of samples from stations in Caloosahatchee River and Tampa Bay. Colors indicate significant groupings (alpha = 0.05).

Table 18. Estimated and calculated organic weight (g/month) of sediment by station and overall during the project.

| **Type** | **Estuary** | **Station** | **MeanWt** | **sdWt** | **MinWt** | **MaxWt** | **MeanSample** | **sdSample** | **MinSample** | **MaxSample** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Estimated |  |  |  |  |  |  |  |  |  |  |
|  | CR | 1 | 19.2 | 25.6 | 0.0 | 95.7 | 5.5 | 6.0 | 0.0 | 22.3 |
|  | 2 | 9.0 | 14.7 | 0.0 | 59.3 | 4.5 | 6.5 | 0.0 | 29.6 |
|  | 3 | 2.5 | 3.5 | 0.2 | 13.4 | 1.7 | 1.9 | 0.2 | 6.7 |
|  | 4 | 13.7 | 21.8 | 0.0 | 102.6 | 5.1 | 6.3 | 0.0 | 29.0 |
|  |  | 11.3 | 19.4 | 0.0 | 102.6 | 4.3 | 5.7 | 0.0 | 29.6 |
|  | TB | 1 | 146.2 | 219.3 | 0.0 | 825.9 | 15.7 | 21.2 | 0.0 | 82.6 |
|  | 4 | 10.5 | 11.0 | 0.2 | 51.6 | 4.9 | 4.8 | 0.1 | 25.8 |
|  | 5 | 4.1 | 3.9 | 0.0 | 18.4 | 3.0 | 2.4 | 0.0 | 9.9 |
|  | 6 | 21.9 | 27.5 | 0.0 | 100.2 | 6.6 | 7.2 | 0.0 | 30.3 |
|  | 7 | 13.9 | 13.7 | 0.0 | 48.1 | 5.7 | 6.4 | 0.0 | 24.0 |
|  | 8 | 8.4 | 10.6 | 0.2 | 38.2 | 4.1 | 4.0 | 0.1 | 17.9 |
|  |  | 34.5 | 103.1 | 0.0 | 825.9 | 6.7 | 10.7 | 0.0 | 82.6 |
| Calculated |  |  |  |  |  |  |  |  |  |  |
|  | CR | 1 | 2.3 | 1.3 | 0.6 | 4.7 | 1.1 | 0.5 | 0.4 | 1.9 |
|  | 2 | 1.9 | 2.5 | 0.0 | 9.7 | 0.8 | 0.5 | 0.0 | 1.8 |
|  | 3 | 4.9 | 8.8 | 0.2 | 21.8 | 0.6 | 0.2 | 0.2 | 1.0 |
|  | 4 | 9.0 | 7.2 | 1.7 | 24.8 | 1.1 | 0.4 | 0.5 | 1.7 |
|  |  | 4.6 | 6.3 | 0.0 | 24.8 | 0.9 | 0.5 | 0.0 | 1.9 |
|  | TB | 1 | 7.0 | 6.1 | 0.5 | 20.4 | 0.7 | 0.7 | 0.1 | 2.1 |
|  | 4 | 4.6 | 6.1 | 0.0 | 21.6 | 1.4 | 1.2 | 0.0 | 4.1 |
|  | 5 | 1.2 | 0.7 | 0.0 | 2.1 | 0.8 | 0.5 | 0.0 | 1.5 |
|  | 6 | 5.3 | 5.5 | 0.0 | 17.3 | 1.2 | 0.9 | 0.0 | 2.5 |
|  | 7 | 6.0 | 11.2 | 0.0 | 31.9 | 0.4 | 0.3 | 0.0 | 1.0 |
|  | 8 | 3.8 | 3.0 | 0.0 | 7.8 | 1.8 | 1.2 | 0.0 | 3.1 |
|  |  | 4.7 | 6.5 | 0.0 | 31.9 | 1.0 | 0.9 | 0.0 | 4.1 |

Table 19. Minimum and maximum estaimted and calculated organic weights (g/month) of samples per station and the Month and Year in which the minimum or maximum occurred.

| **Measure** | **Type** | **Estuary** | **Station** | **Extreme** | **Year** | **Month** | **Value** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Organic Weight | Estimated | CR | 1 | Min Daily Org Wt | 2023 | 12 | 0.0 |
| Max Daily Org Wt | 2023 | 05 | 62.5 |
| 2 | Min Daily Org Wt | 2023 | 09 | 0.0 |
| Max Daily Org Wt | 2023 | 04 | 42.2 |
| 3 | Min Daily Org Wt | 2024 | 04 | 0.4 |
| Max Daily Org Wt | 2023 | 09 | 7.5 |
| 4 | Min Daily Org Wt | 2023 | 08 | 0.2 |
| Max Daily Org Wt | 2023 | 10 | 58.2 |
| TB | 1 | Min Daily Org Wt | 2023 | 09 | 3.2 |
| Max Daily Org Wt | 2024 | 04 | 769.8 |
| 4 | Min Daily Org Wt | 2024 | 01 | 2.4 |
| Max Daily Org Wt | 2023 | 07 | 31.0 |
| 5 | Min Daily Org Wt | 2023 | 05 | 0.0 |
| Max Daily Org Wt | 2023 | 09 | 10.7 |
| 6 | Min Daily Org Wt | 2023 | 05 | 0.0 |
| Max Daily Org Wt | 2023 | 10 | 66.8 |
| 7 | Min Daily Org Wt | 2023 | 06 | 4.6 |
| Max Daily Org Wt | 2023 | 04 | 47.7 |
| 8 | Min Daily Org Wt | 2024 | 01 | 1.2 |
| Max Daily Org Wt | 2023 | 07 | 35.8 |
| Calculated | CR | 1 | Min Daily Org Wt | 2024 | 09 | 0.8 |
| Max Daily Org Wt | 2024 | 11 | 3.4 |
| 2 | Min Daily Org Wt | 2024 | 06 | 0.6 |
| Max Daily Org Wt | 2024 | 10 | 5.9 |
| 3 | Min Daily Org Wt | 2024 | 06 | 0.4 |
| Max Daily Org Wt | 2024 | 10 | 21.6 |
| 4 | Min Daily Org Wt | 2024 | 06 | 2.4 |
| Max Daily Org Wt | 2024 | 10 | 21.1 |
| TB | 1 | Min Daily Org Wt | 2024 | 05 | 2.6 |
| Max Daily Org Wt | 2024 | 07 | 11.3 |
| 4 | Min Daily Org Wt | 2024 | 05 | 0.0 |
| Max Daily Org Wt | 2024 | 08 | 15.0 |
| 5 | Min Daily Org Wt | 2024 | 05 | 0.0 |
| Max Daily Org Wt | 2024 | 06 | 1.9 |
| 6 | Min Daily Org Wt | 2024 | 05 | 0.0 |
| Max Daily Org Wt | 2024 | 08 | 13.8 |
| 7 | Min Daily Org Wt | 2024 | 05 | 0.0 |
| Max Daily Org Wt | 2024 | 08 | 29.8 |
| 8 | Min Daily Org Wt | 2024 | 05 | 0.1 |
| Max Daily Org Wt | 2024 | 08 | 7.7 |

Table 20. Analysis of estimated organic content (g/month) by estuary and station. Permutation ANOVA using 10,000 permutations. Red text indicates signifcance alpha < 0.05.

| **Factors** | **df** | **SS** | **MS** | **F** | **Pr** |
| --- | --- | --- | --- | --- | --- |
| Estuary | 1 | 0.27 | 0.27 | 1.44 | 0.233 |
| Station\_code | 8 | 13.62 | 1.70 | 8.91 | 0.000 |
| Residuals | 121 | 23.10 | 0.19 |  |  |

Table 21. Mean estimated organic content (g/month) per station. Letters are determined based on pairwise permutation two-sample independence analysis.

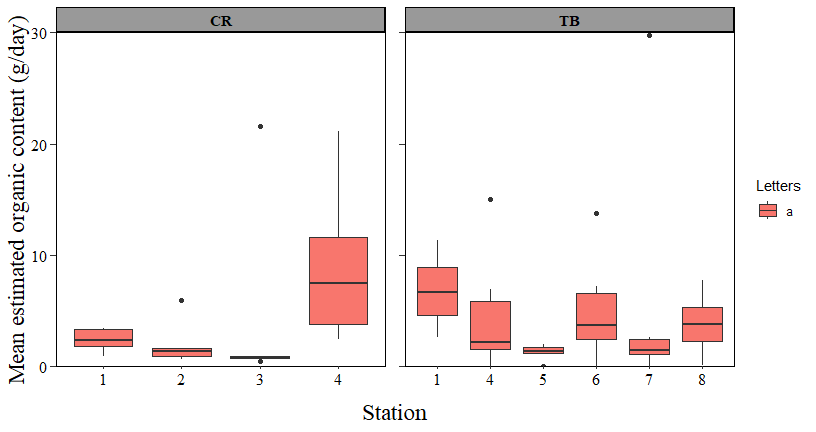
| **Station\_code** | **n** | **mean** | **sd** | **lower** | **upper** | **Letters** |
| --- | --- | --- | --- | --- | --- | --- |
| CR1 | 14 | 19.16 | 18.93 | 0.22 | 38.09 | a |
| CR2 | 14 | 9.04 | 13.77 | -4.73 | 22.81 | abc |
| CR3 | 13 | 2.44 | 2.76 | -0.32 | 5.20 | b |
| CR4 | 14 | 13.23 | 15.75 | -2.52 | 28.97 | ac |
| TB1 | 12 | 146.23 | 213.00 | -66.78 | 359.23 | d |
| TB4 | 13 | 10.14 | 8.10 | 2.04 | 18.24 | a |
| TB5 | 13 | 3.90 | 3.02 | 0.88 | 6.92 | bc |
| TB6 | 13 | 20.29 | 22.05 | -1.76 | 42.34 | a |
| TB7 | 12 | 15.33 | 13.17 | 2.16 | 28.50 | a |
| TB8 | 13 | 10.07 | 10.57 | -0.50 | 20.65 | ac |

Table 22. Pairwise two-sample permutation post-hoc comparisons of estimated organic content (g/month) per station. Red text indicates signifcance alpha < 0.05.

| **Comparison** | **Stat** | **p.value** | **p.adjust** |
| --- | --- | --- | --- |
| CR1 - CR2 = 0 | 1.906 | 0.06 | 0.12 |
| CR1 - CR3 = 0 | 3.315 | 0.00 | 0.01 |
| CR1 - CR4 = 0 | 1.025 | 0.31 | 0.42 |
| CR1 - TB4 = 0 | 0.9356 | 0.35 | 0.46 |
| CR1 - TB1 = 0 | -2.844 | 0.00 | 0.02 |
| CR1 - TB5 = 0 | 2.721 | 0.01 | 0.02 |
| CR1 - TB6 = 0 | 0.1421 | 0.89 | 0.91 |
| CR1 - TB7 = 0 | -0.02443 | 0.98 | 0.98 |
| CR1 - TB8 = 0 | 1.32 | 0.19 | 0.29 |
| CR2 - CR3 = 0 | 1.949 | 0.05 | 0.11 |
| CR2 - CR4 = 0 | -0.9043 | 0.37 | 0.46 |
| CR2 - TB4 = 0 | -1.395 | 0.16 | 0.26 |
| CR2 - TB1 = 0 | -3.633 | 0.00 | 0.00 |
| CR2 - TB5 = 0 | 0.9211 | 0.36 | 0.46 |
| CR2 - TB6 = 0 | -1.652 | 0.10 | 0.18 |
| CR2 - TB7 = 0 | -2.131 | 0.03 | 0.07 |
| CR2 - TB8 = 0 | -0.7527 | 0.45 | 0.53 |
| CR3 - CR4 = 0 | -2.574 | 0.01 | 0.03 |
| CR3 - TB4 = 0 | -3.387 | 0.00 | 0.00 |
| CR3 - TB1 = 0 | -4.108 | 0.00 | 0.00 |
| CR3 - TB5 = 0 | -1.414 | 0.16 | 0.26 |
| CR3 - TB6 = 0 | -3.026 | 0.00 | 0.01 |
| CR3 - TB7 = 0 | -3.693 | 0.00 | 0.00 |
| CR3 - TB8 = 0 | -2.671 | 0.01 | 0.02 |
| CR4 - TB4 = 0 | -0.2977 | 0.77 | 0.84 |
| CR4 - TB1 = 0 | -3.25 | 0.00 | 0.01 |
| CR4 - TB5 = 0 | 1.775 | 0.08 | 0.14 |
| CR4 - TB6 = 0 | -0.8198 | 0.41 | 0.50 |
| CR4 - TB7 = 0 | -1.15 | 0.25 | 0.36 |
| CR4 - TB8 = 0 | 0.2264 | 0.82 | 0.88 |
| TB4 - TB1 = 0 | -3.398 | 0.00 | 0.00 |
| TB4 - TB5 = 0 | 2.598 | 0.01 | 0.02 |
| TB4 - TB6 = 0 | -0.6942 | 0.49 | 0.56 |
| TB4 - TB7 = 0 | -1.213 | 0.23 | 0.34 |
| TB4 - TB8 = 0 | 0.6297 | 0.53 | 0.60 |
| TB1 - TB5 = 0 | 3.926 | 0.00 | 0.00 |
| TB1 - TB6 = 0 | 2.76 | 0.01 | 0.02 |
| TB1 - TB7 = 0 | 2.946 | 0.00 | 0.01 |
| TB1 - TB8 = 0 | 3.411 | 0.00 | 0.00 |
| TB5 - TB6 = 0 | -2.419 | 0.02 | 0.04 |
| TB5 - TB7 = 0 | -3.151 | 0.00 | 0.01 |
| TB5 - TB8 = 0 | -1.772 | 0.08 | 0.14 |
| TB6 - TB7 = 0 | -0.1789 | 0.86 | 0.90 |
| TB6 - TB8 = 0 | 1.081 | 0.28 | 0.39 |
| TB7 - TB8 = 0 | 1.555 | 0.12 | 0.21 |

### Calculated organic weights

Sediment on oyster reefs in the Caloosahatchee River estuary averaged calculated organic weights of 4.6 g/month (Table 18, Figure 10-11). The lowest average calculated organic weight occurred at station 2 (mean: 1.9 g/month) and the highest occurred at station 4 (mean: 9 g/month). Overall, the lowest single month calculated organic weight (0.4 g/month) occurred in June 2024 at station 3 while the highest (21.6 g/month) occurred in October 2024 at station 3 (Table 19).  
  
Sediment on oyster reefs in the Tampa Bay estuary averaged calculated organic weights of 4.7 g/month (Table 18, Figure 10-11). The lowest average calculated organic weight occurred at station 5 (mean: 1.2 g/month) and the highest occurred at station 1 (mean: 7 g/month). The lowest single station organic weight (0, 0, 0 g/month) occurred in May 2024, May 2024, May 2024 at station 4, 5, 7 while the highest (29.8 g/month) occurred in August 2024 at station 7 (Table 19).  
  
Neither factor was significant (Figure 13, Table 23).  
  
{Include text about among stations. Table 24 & 25}



**Figure 13.** Mean calculated monthly organic content (g/month) of samples from stations in Caloosahatchee River and Tampa Bay. Colors indicate significant groupings (alpha = 0.05).

Table 23. Analysis of calculated organic content (g/month) by estuary and station. Permutation ANOVA using 10,000 permutations. Red text indicates signifcance alpha < 0.05.

| **Factors** | **df** | **SS** | **MS** | **F** | **Pr** |
| --- | --- | --- | --- | --- | --- |
| Estuary | 1 | 0.02 | 0.02 | 0.18 | 0.676 |
| Station\_code | 8 | 1.82 | 0.23 | 1.83 | 0.095 |
| Residuals | 46 | 5.70 | 0.12 |  |  |

Table 24. Mean calculated organic content (g/month) per station. Letters are determined based on pairwise permutation two-sample independence analysis.

| **Station\_code** | **n** | **mean** | **sd** | **lower** | **upper** | **Letters** |
| --- | --- | --- | --- | --- | --- | --- |
| CR1 | 5 | 2.32 | 1.06 | 1.26 | 3.38 | a |
| CR2 | 6 | 1.92 | 2.01 | -0.09 | 3.93 | a |
| CR3 | 5 | 4.87 | 9.36 | -4.49 | 14.24 | a |
| CR4 | 6 | 8.96 | 7.18 | 1.78 | 16.15 | a |
| TB1 | 6 | 6.75 | 3.33 | 3.42 | 10.09 | a |
| TB4 | 6 | 4.58 | 5.61 | -1.02 | 10.19 | a |
| TB5 | 6 | 1.22 | 0.68 | 0.54 | 1.89 | a |
| TB6 | 6 | 5.09 | 4.88 | 0.21 | 9.97 | a |
| TB7 | 6 | 6.04 | 11.66 | -5.63 | 17.70 | a |
| TB8 | 4 | 3.82 | 3.20 | 0.62 | 7.01 | a |

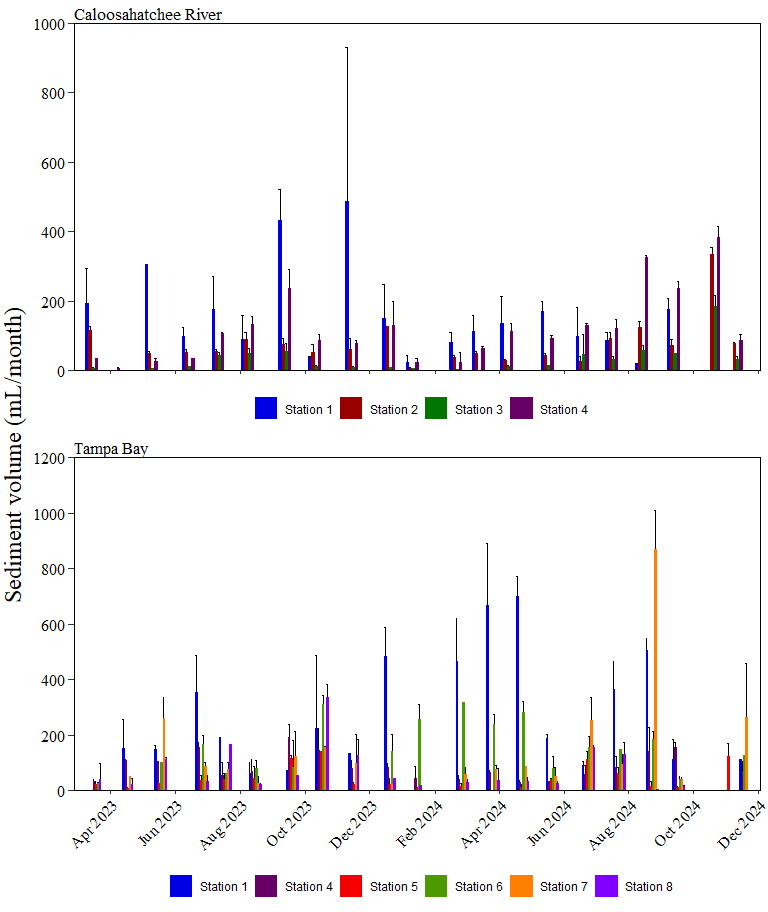
Table 25. Pairwise two-sample permutation post-hoc comparisons of calculated organic content (g/month) per station. Red text indicates signifcance alpha < 0.05.

| **Comparison** | **Stat** | **p.value** | **p.adjust** |
| --- | --- | --- | --- |
| CR1 - CR2 = 0 | 0.805 | 0.42 | 0.73 |
| CR1 - CR3 = 0 | 0.223 | 0.82 | 0.88 |
| CR1 - CR4 = 0 | -2.048 | 0.04 | 0.30 |
| CR1 - TB4 = 0 | -0.3999 | 0.69 | 0.88 |
| CR1 - TB1 = 0 | -2.298 | 0.02 | 0.19 |
| CR1 - TB5 = 0 | 1.637 | 0.10 | 0.46 |
| CR1 - TB6 = 0 | -0.8159 | 0.41 | 0.73 |
| CR1 - TB7 = 0 | -0.07669 | 0.94 | 0.96 |
| CR1 - TB8 = 0 | -0.4206 | 0.67 | 0.88 |
| CR2 - CR3 = 0 | -0.2108 | 0.83 | 0.88 |
| CR2 - CR4 = 0 | -2.316 | 0.02 | 0.19 |
| CR2 - TB4 = 0 | -0.8889 | 0.37 | 0.70 |
| CR2 - TB1 = 0 | -2.481 | 0.01 | 0.19 |
| CR2 - TB5 = 0 | 0.72 | 0.47 | 0.76 |
| CR2 - TB6 = 0 | -1.279 | 0.20 | 0.48 |
| CR2 - TB7 = 0 | -0.5142 | 0.61 | 0.88 |
| CR2 - TB8 = 0 | -0.8895 | 0.37 | 0.70 |
| CR3 - CR4 = 0 | -1.627 | 0.10 | 0.46 |
| CR3 - TB4 = 0 | -0.4719 | 0.64 | 0.88 |
| CR3 - TB1 = 0 | -1.62 | 0.11 | 0.46 |
| CR3 - TB5 = 0 | 0.6072 | 0.54 | 0.84 |
| CR3 - TB6 = 0 | -0.7602 | 0.45 | 0.75 |
| CR3 - TB7 = 0 | -0.2299 | 0.82 | 0.88 |
| CR3 - TB8 = 0 | -0.428 | 0.67 | 0.88 |
| CR4 - TB4 = 0 | 1.424 | 0.15 | 0.46 |
| CR4 - TB1 = 0 | 0.3353 | 0.74 | 0.88 |
| CR4 - TB5 = 0 | 2.583 | 0.01 | 0.19 |
| CR4 - TB6 = 0 | 1.17 | 0.24 | 0.54 |
| CR4 - TB7 = 0 | 1.469 | 0.14 | 0.46 |
| CR4 - TB8 = 0 | 1.363 | 0.17 | 0.46 |
| TB4 - TB1 = 0 | -1.376 | 0.17 | 0.46 |
| TB4 - TB5 = 0 | 1.323 | 0.19 | 0.46 |
| TB4 - TB6 = 0 | -0.335 | 0.74 | 0.88 |
| TB4 - TB7 = 0 | 0.2293 | 0.82 | 0.88 |
| TB4 - TB8 = 0 | 0.003718 | 1.00 | 1.00 |
| TB1 - TB5 = 0 | 2.792 | 0.01 | 0.19 |
| TB1 - TB6 = 0 | 1.082 | 0.28 | 0.60 |
| TB1 - TB7 = 0 | 1.415 | 0.16 | 0.46 |
| TB1 - TB8 = 0 | 1.388 | 0.17 | 0.46 |
| TB5 - TB6 = 0 | -1.691 | 0.09 | 0.46 |
| TB5 - TB7 = 0 | -0.9008 | 0.37 | 0.70 |
| TB5 - TB8 = 0 | -1.352 | 0.18 | 0.46 |
| TB6 - TB7 = 0 | 0.5297 | 0.60 | 0.88 |
| TB6 - TB8 = 0 | 0.3167 | 0.75 | 0.88 |
| TB7 - TB8 = 0 | -0.2032 | 0.84 | 0.88 |

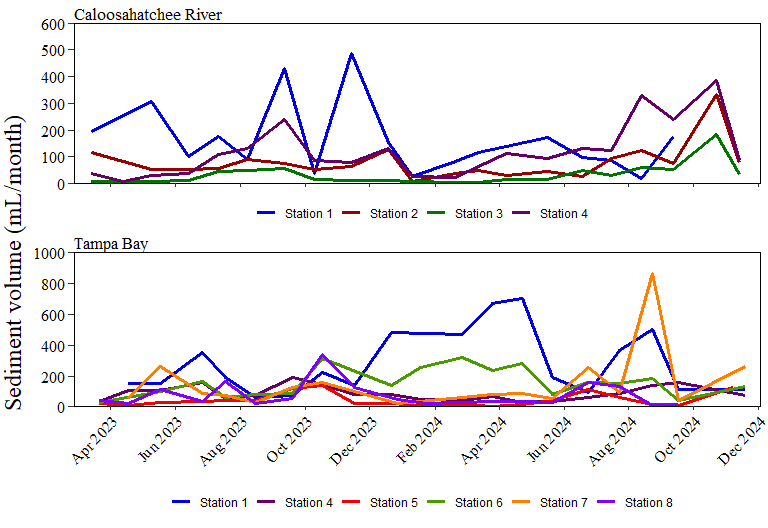
## Volumetrics

As an additional way to assess the sedimentation rates occurring on oyster reefs, sediment samples were processed using volumetrics to compare the amount of sediment accumulating on Caloosahatchee and Tampa Bay oyster reefs.

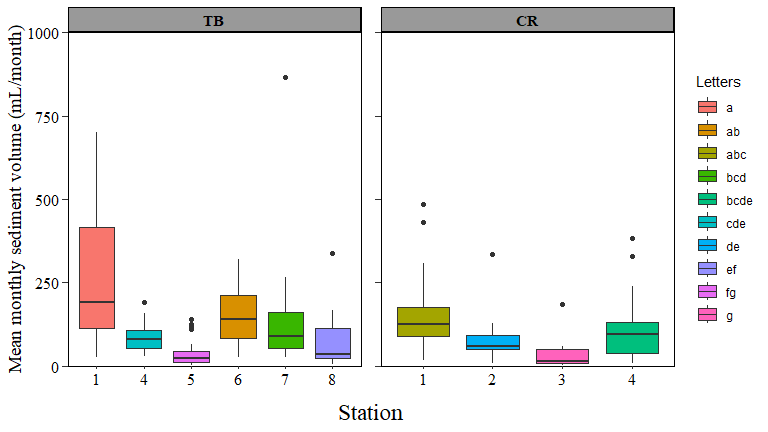
Oyster reefs in the Caloosahatchee River estuary averaged sediment volumes of 97.8 mL/month (Table 26, Figures 14-15). The lowest average sediment volume occurred at station 3 (mean: 34.3 mL/month) and the highest occurred at station 1 (mean: 156.2 mL/month). Overall, the lowest single month sediment volume (2.1 mL/month) occurred in March 2024 at station 3 while the highest (486 mL/month) occurred in November 2023 at station 1 (Table 27).  
  
Oyster reefs in the Tampa Bay estuary had an average sediment volume of 126.1 mL/month (Table 26, Figures 14-15). The lowest average sediment volume occurred at station 5 (mean: 41.4 mL/month) and the highest occurred at station 1 (mean: 285.9 mL/month). The lowest single station sediment volume (2.9 mL/month) occurred in March 2024 at station 5 while the highest (867.1 mL/month) occurred in August 2024 at station 7 (Table 27).  
  
Sediment volumes were significantly different between estuaries (F(1,190) = 46.25, p = 0) and among stations (F(8,190) = 14.15, p = 0) (Figure 16, Table 28).  
  
{Include text about between estuaries and among stations. Tables 29-30 & 31-32.}



**Figure 6.** Mean monthly sedimentat volume (± S.D.) at stations in Caloosahatchee River and Tampa Bay. Please note differences in magnitude between the y-axes.



**Figure 7.** Mean monthly sediment volume at stations in Caloosahatchee River and Tampa Bay. Please note differences in magnitude between the y-axes.



**Figure 8.** Mean monthly sediment volume at stations in Caloosahatchee River and Tampa Bay. Colors indicate significant groupings (alpha = 0.05).

Table 26. Sediment volume (mL/month) by station and overall during the project.

| **Estuary** | **Station** | **Mean\_mL** | **sd\_mL** | **Min\_mL** | **Max\_mL** |
| --- | --- | --- | --- | --- | --- |
| CR |  |  |  |  |  |
|  | 1 | 156.2 | 153.6 | 12.7 | 800.0 |
|  | 2 | 77.9 | 68.6 | 6.4 | 348.3 |
|  | 3 | 34.3 | 43.7 | 2.0 | 208.3 |
|  | 4 | 123.1 | 101.5 | 4.1 | 406.3 |
|  |  | 97.8 | 108.5 | 2.0 | 800.0 |
| TB |  |  |  |  |  |
|  | 1 | 285.9 | 222.3 | 25.2 | 825.5 |
|  | 4 | 88.0 | 53.7 | 14.0 | 224.0 |
|  | 5 | 41.4 | 43.1 | 1.8 | 156.2 |
|  | 6 | 152.9 | 95.4 | 16.0 | 335.0 |
|  | 7 | 147.4 | 192.7 | 10.0 | 966.5 |
|  | 8 | 67.9 | 80.6 | 1.7 | 370.0 |
|  |  | 126.1 | 151.7 | 1.7 | 966.5 |

Table 27. Minimum and maximum sediment volume (mL/month) per station and the Month and Year in which the minimum or maximum occurred.

| **Estuary** | **Station** | **Type** | **Year** | **Month** | **Value** |
| --- | --- | --- | --- | --- | --- |
| CR | 1 | Min Volume | 2024 | 08 | 17.5 |
| Max Volume | 2023 | 11 | 486.0 |
| 2 | Min Volume | 2024 | 01 | 8.3 |
| Max Volume | 2024 | 10 | 334.6 |
| 3 | Min Volume | 2024 | 03 | 2.1 |
| Max Volume | 2024 | 10 | 184.4 |
| 4 | Min Volume | 2023 | 04 | 7.9 |
| Max Volume | 2024 | 10 | 384.1 |
| TB | 1 | Min Volume | 2023 | 01 | 25.2 |
| Max Volume | 2024 | 04 | 700.0 |
| 4 | Min Volume | 2024 | 04 | 29.0 |
| Max Volume | 2023 | 09 | 192.0 |
| 5 | Min Volume | 2024 | 03 | 2.9 |
| Max Volume | 2023 | 10 | 140.0 |
| 6 | Min Volume | 2023 | 03 | 26.7 |
| Max Volume | 2024 | 02 | 319.5 |
| 7 | Min Volume | 2023 | 12 | 24.5 |
| Max Volume | 2024 | 08 | 867.1 |
| 8 | Min Volume | 2024 | 08 | 5.9 |
| Max Volume | 2023 | 10 | 337.5 |

Table 28. Analysis of sediment volumes (mL/month) by estuary and station. Permutation ANOVA using 10,000 permutations. Red text indicates signifcance alpha < 0.05.

| **Factors** | **df** | **SS** | **MS** | **F** | **Pr** |
| --- | --- | --- | --- | --- | --- |
| Estuary | 1 | 6.55 | 6.55 | 46.25 | 0 |
| Station\_code | 8 | 16.04 | 2.00 | 14.15 | 0 |
| Residuals | 190 | 26.91 | 0.14 |  |  |

Table 29. Mean sediment volumes (mL/month) per estuary. Letters are determined based on pairwise permutation two-sample independence analysis.

| **Estuary** | **n** | **mean** | **sd** | **lower** | **upper** | **Letters** |
| --- | --- | --- | --- | --- | --- | --- |
| CR | 79 | 96.51 | 99.78 | -3.27 | 196.30 | a |
| TB | 121 | 124.57 | 142.36 | -17.80 | 266.94 | a |

Table 30. Pairwise two-sample permutation post-hoc comparisons of sediment volumes (mL/month) per estuary.

| **Comparison** | **Stat** | **p.value** | **p.adjust** |
| --- | --- | --- | --- |
| TB - CR = 0 | 1.659 | 0.097 | 0.097 |

Table 31. Mean sediment volumes (mL/month) per station. Letters are determined based on pairwise permutation two-sample independence analysis.

| **Station\_code** | **n** | **mean** | **sd** | **lower** | **upper** | **Letters** |
| --- | --- | --- | --- | --- | --- | --- |
| CR1 | 18 | 160.35 | 129.10 | 31.25 | 289.44 | abc |
| CR2 | 20 | 79.20 | 68.28 | 10.92 | 147.48 | de |
| CR3 | 20 | 32.77 | 40.84 | -8.06 | 73.61 | g |
| CR4 | 21 | 118.99 | 100.46 | 18.53 | 219.45 | bcde |
| TB1 | 19 | 266.32 | 208.56 | 57.77 | 474.88 | a |
| TB4 | 21 | 87.04 | 46.82 | 40.22 | 133.87 | cde |
| TB5 | 21 | 42.56 | 43.14 | -0.59 | 85.70 | fg |
| TB6 | 19 | 152.81 | 90.64 | 62.17 | 243.44 | ab |
| TB7 | 20 | 145.95 | 185.85 | -39.90 | 331.80 | bcd |
| TB8 | 21 | 69.94 | 78.88 | -8.94 | 148.83 | ef |

Table 32. Pairwise two-sample permutation post-hoc comparisons of sediment volumes (mL/month) per station. Red text indicates signifcance alpha < 0.05.

| **Comparison** | **Stat** | **p.value** | **p.adjust** |
| --- | --- | --- | --- |
| TB1 - TB6 = 0 | 1.595 | 0.11 | 0.16 |
| TB1 - TB7 = 0 | 2.31 | 0.02 | 0.04 |
| TB1 - TB8 = 0 | 3.915 | 0.00 | 0.00 |
| TB1 - TB4 = 0 | 3.399 | 0.00 | 0.00 |
| TB1 - TB5 = 0 | 4.521 | 0.00 | 0.00 |
| TB1 - CR1 = 0 | 1.647 | 0.10 | 0.14 |
| TB1 - CR2 = 0 | 3.581 | 0.00 | 0.00 |
| TB1 - CR3 = 0 | 4.72 | 0.00 | 0.00 |
| TB1 - CR4 = 0 | 2.641 | 0.01 | 0.02 |
| TB6 - TB7 = 0 | 1.088 | 0.28 | 0.33 |
| TB6 - TB8 = 0 | 3.35 | 0.00 | 0.00 |
| TB6 - TB4 = 0 | 2.438 | 0.01 | 0.03 |
| TB6 - TB5 = 0 | 4.196 | 0.00 | 0.00 |
| TB6 - CR1 = 0 | 0.2789 | 0.78 | 0.78 |
| TB6 - CR2 = 0 | 2.832 | 0.00 | 0.01 |
| TB6 - CR3 = 0 | 4.495 | 0.00 | 0.00 |
| TB6 - CR4 = 0 | 1.564 | 0.12 | 0.16 |
| TB7 - TB8 = 0 | 2.511 | 0.01 | 0.02 |
| TB7 - TB4 = 0 | 1.048 | 0.29 | 0.34 |
| TB7 - TB5 = 0 | 3.587 | 0.00 | 0.00 |
| TB7 - CR1 = 0 | -0.7227 | 0.47 | 0.50 |
| TB7 - CR2 = 0 | 1.686 | 0.09 | 0.14 |
| TB7 - CR3 = 0 | 4.019 | 0.00 | 0.00 |
| TB7 - CR4 = 0 | 0.52 | 0.60 | 0.63 |
| TB8 - TB4 = 0 | -2.118 | 0.03 | 0.06 |
| TB8 - TB5 = 0 | 1.563 | 0.12 | 0.16 |
| TB8 - CR1 = 0 | -2.934 | 0.00 | 0.01 |
| TB8 - CR2 = 0 | -1.26 | 0.21 | 0.27 |
| TB8 - CR3 = 0 | 2.382 | 0.02 | 0.03 |
| TB8 - CR4 = 0 | -2.051 | 0.04 | 0.06 |
| TB4 - TB5 = 0 | 3.481 | 0.00 | 0.00 |
| TB4 - CR1 = 0 | -1.846 | 0.06 | 0.10 |
| TB4 - CR2 = 0 | 0.9942 | 0.32 | 0.36 |
| TB4 - CR3 = 0 | 4.021 | 0.00 | 0.00 |
| TB4 - CR4 = 0 | -0.3846 | 0.70 | 0.72 |
| TB5 - CR1 = 0 | -3.83 | 0.00 | 0.00 |
| TB5 - CR2 = 0 | -2.743 | 0.01 | 0.01 |
| TB5 - CR3 = 0 | 0.9874 | 0.32 | 0.36 |
| TB5 - CR4 = 0 | -3.242 | 0.00 | 0.00 |
| CR1 - CR2 = 0 | 2.313 | 0.02 | 0.04 |
| CR1 - CR3 = 0 | 4.169 | 0.00 | 0.00 |
| CR1 - CR4 = 0 | 1.184 | 0.24 | 0.30 |
| CR2 - CR3 = 0 | 3.398 | 0.00 | 0.00 |
| CR2 - CR4 = 0 | -1.098 | 0.27 | 0.33 |
| CR3 - CR4 = 0 | -3.75 | 0.00 | 0.00 |