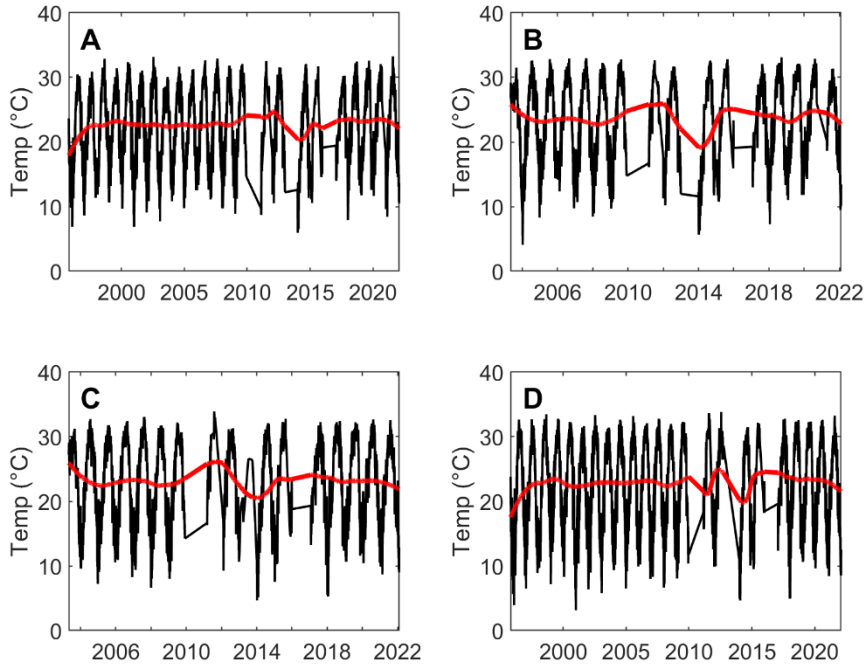
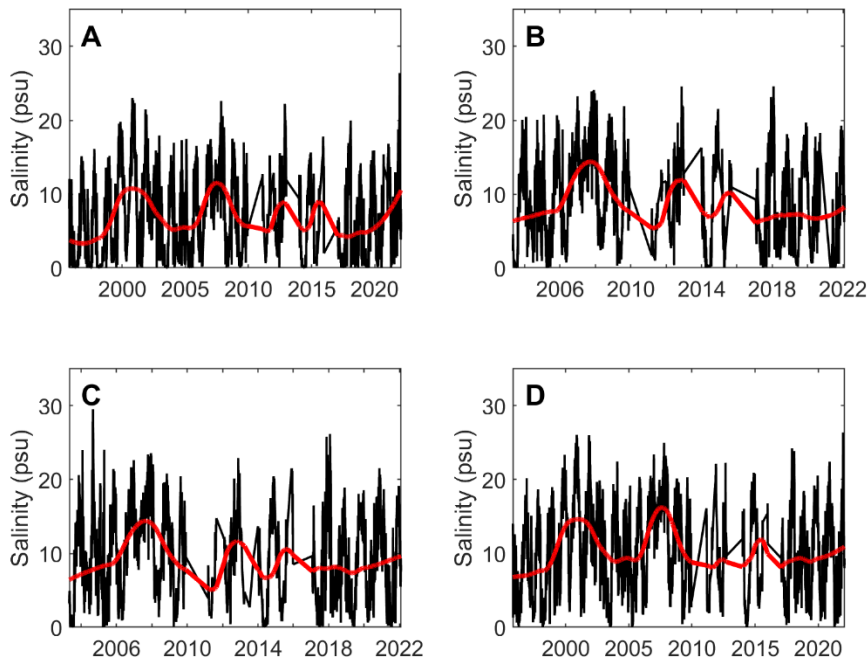


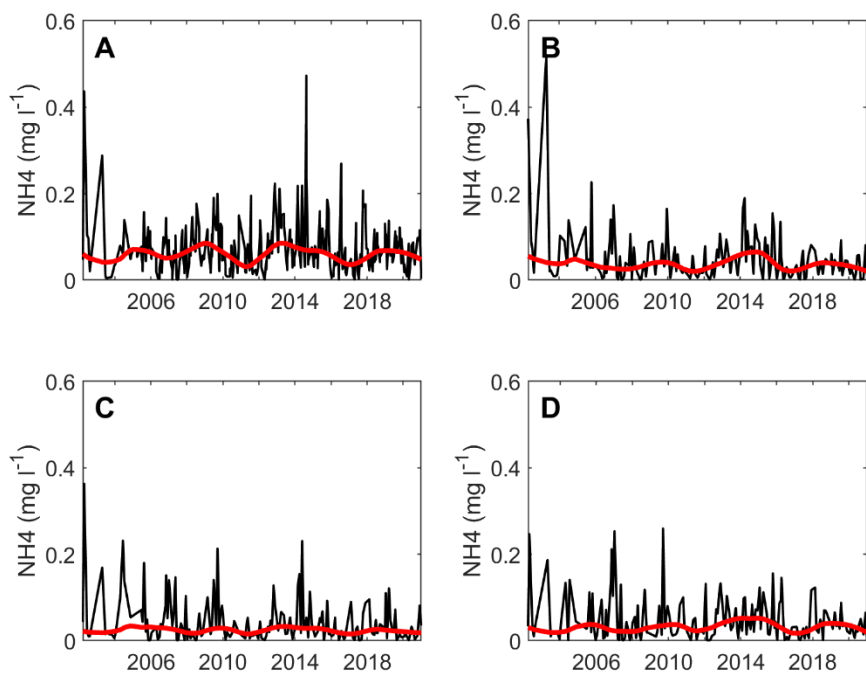
*Supplementary Material*



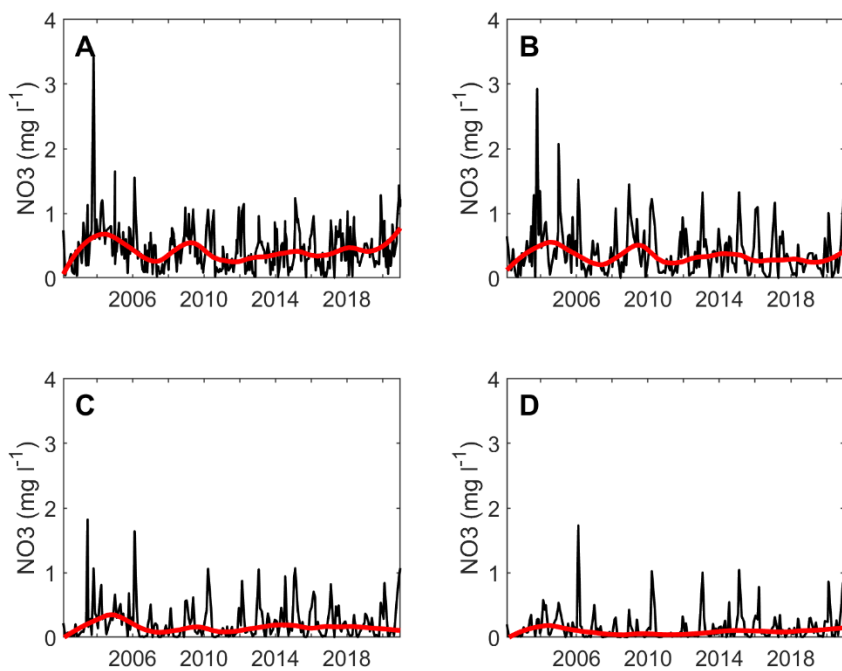
**Supplementary Figure 1.** Daily temperature values (black) and fitted loess curves (red) at the SWMP stations: (A) Fish River, (B) Magnolia River, (C) Middle Bay, and (D) Weeks Bay.



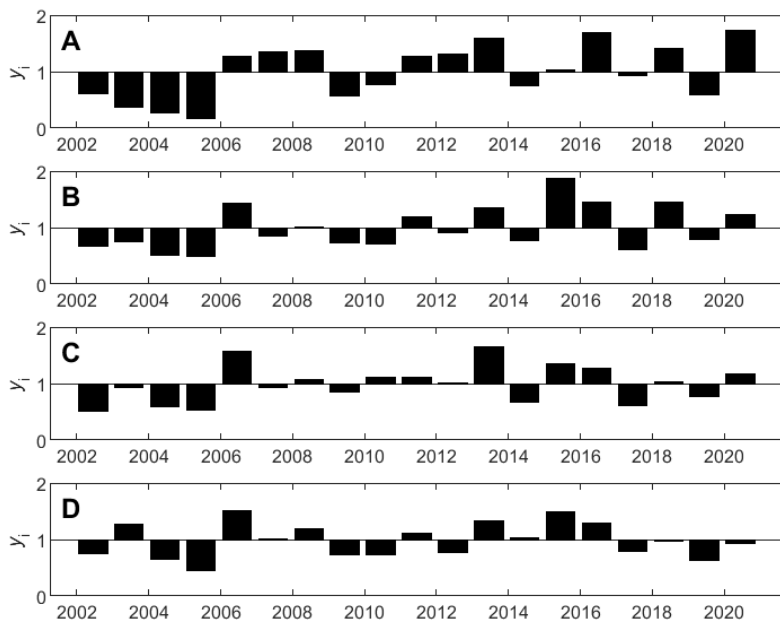
**Supplementary Figure 2.** Daily salinity values (black) and fitted loess curves (red) at the SWMP stations: (A) Fish River, (B) Magnolia River, (C) Middle Bay, and (D) Weeks Bay.



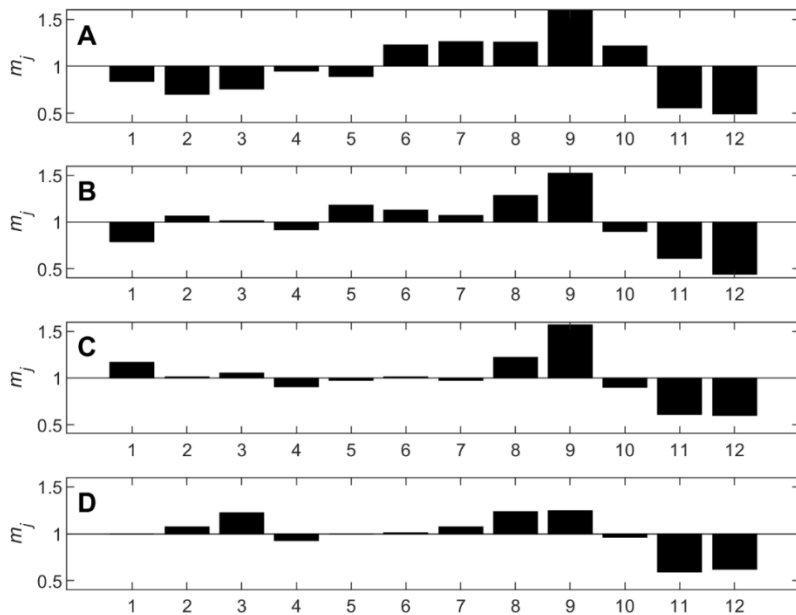
**Supplementary Figure 3.** Monthly  $\text{NH}_4^+$  values (black) and fitted roless curves (red) at the SWMP stations: (A) Fish River, (B) Magnolia River, (C) Middle Bay, and (D) Weeks Bay.



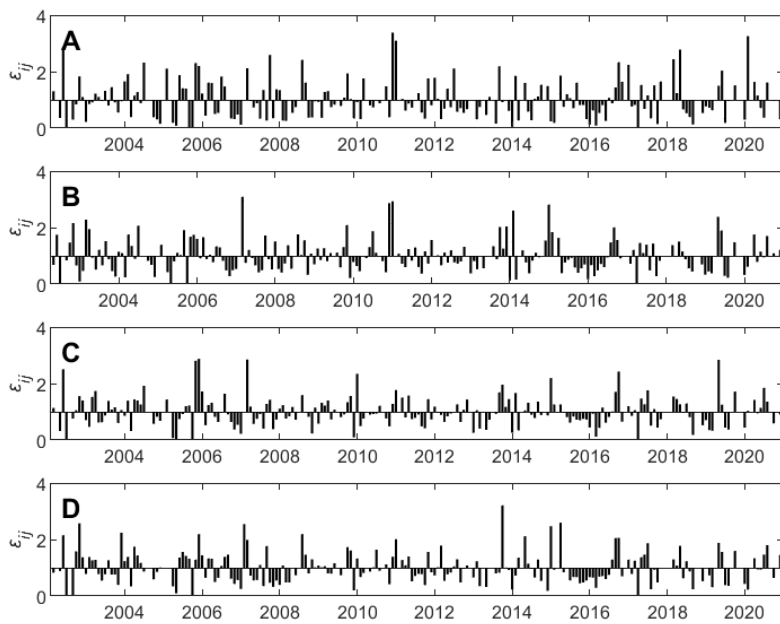
**Supplementary Figure 4.** Monthly  $\text{NO}_3^-$  values (black) and fitted roless curves (red) at the SWMP stations: (A) Fish River, (B) Magnolia River, (C) Middle Bay, and (D) Weeks Bay.



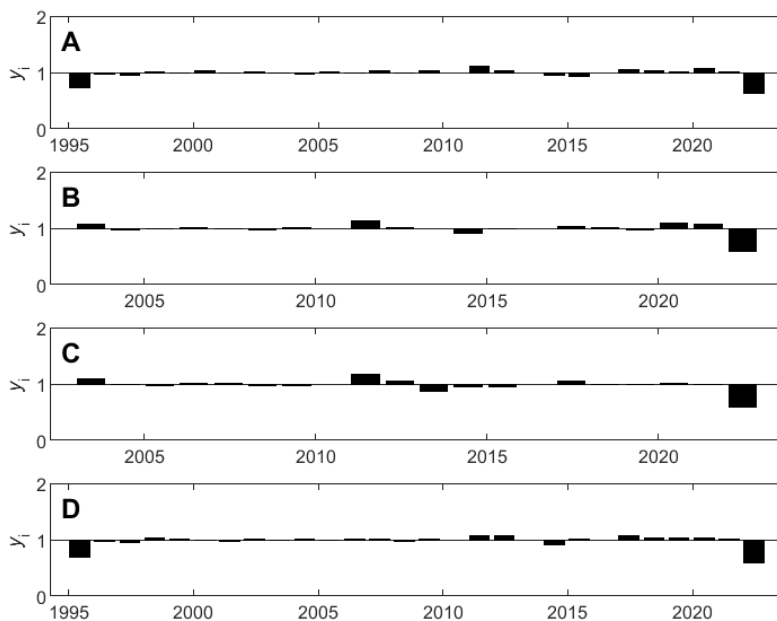
**Supplementary Figure 5.** Annual component ( $y_i$ , bars) for chl-*a* at the SWMP stations: (A) Fish River, (B) Magnolia River, (C) Middle Bay, and (D) Weeks Bay.



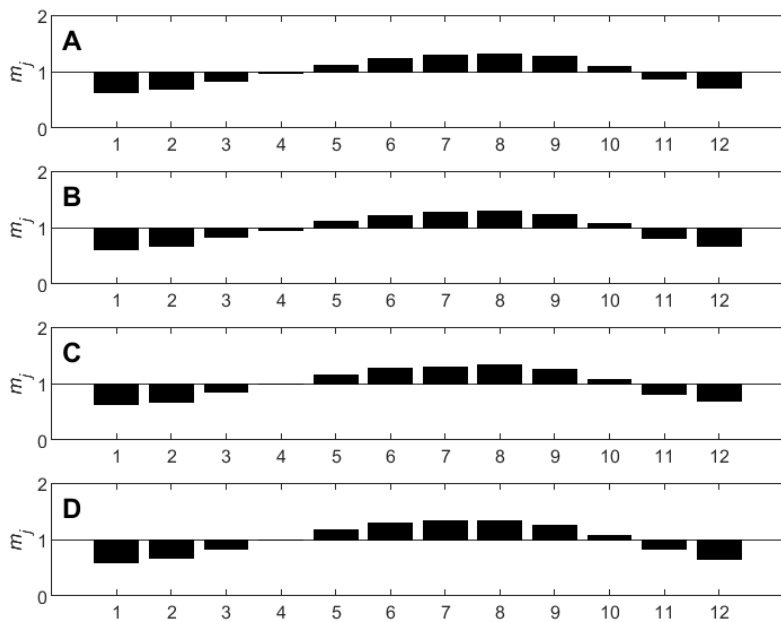
**Supplementary Figure 6.** Seasonal component ( $m_j$ , bars) for chl-*a* at the SWMP stations: (A) Fish River, (B) Magnolia River, (C) Middle Bay, and (D) Weeks Bay.



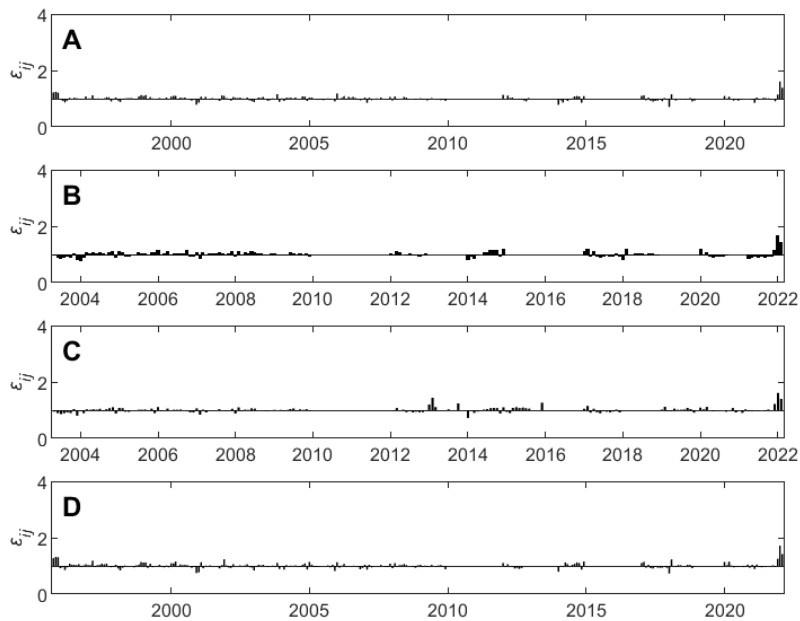
**Supplementary Figure 7.** Residual component ( $\varepsilon_{ij}$ , bars) for chl-*a* at the SWMP stations: (A) Fish River, (B) Magnolia River, (C) Middle Bay, and (D) Weeks Bay.



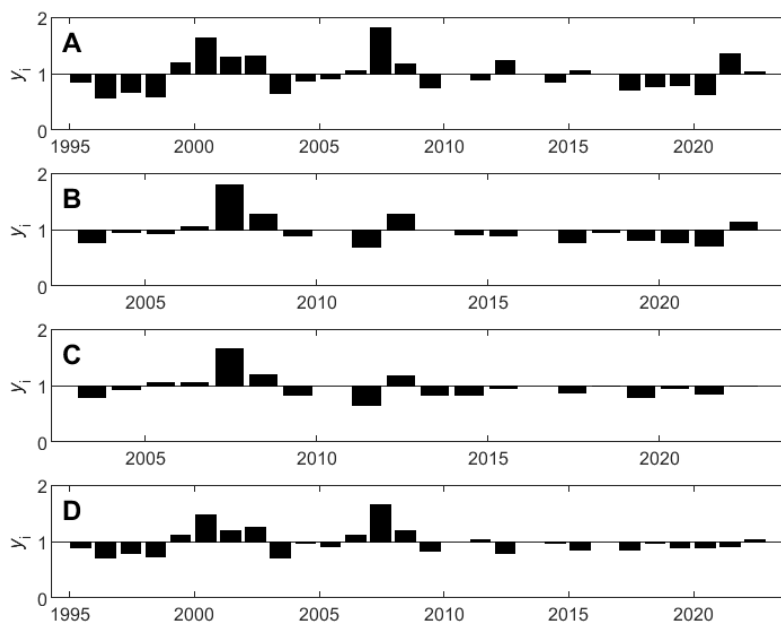
**Supplementary Figure 8.** Annual component ( $y_i$ , bars) for temperature at the SWMP stations: (A) Fish River, (B) Magnolia River, (C) Middle Bay, and (D) Weeks Bay.



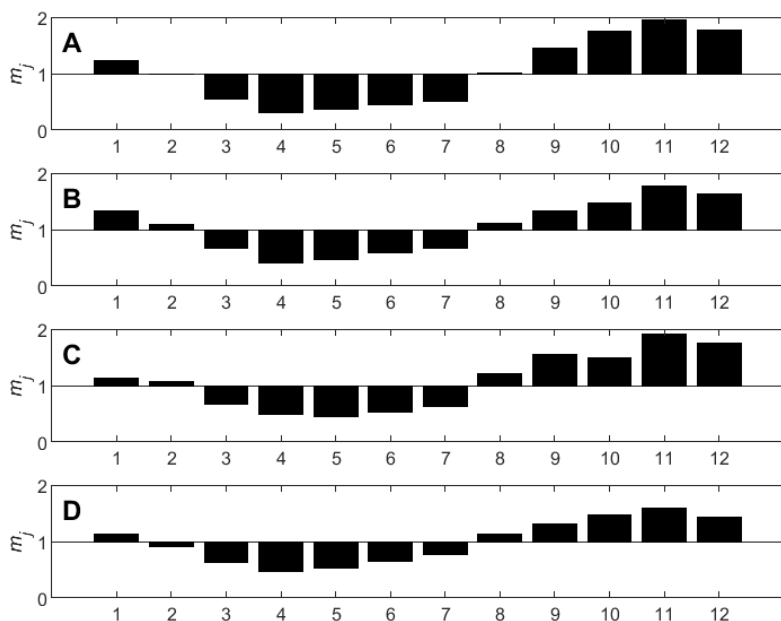
**Supplementary Figure 9.** Seasonal component ( $m_j$ , bars) for temperature at the SWMP stations: (A) Fish River, (B) Magnolia River, (C) Middle Bay, and (D) Weeks Bay.



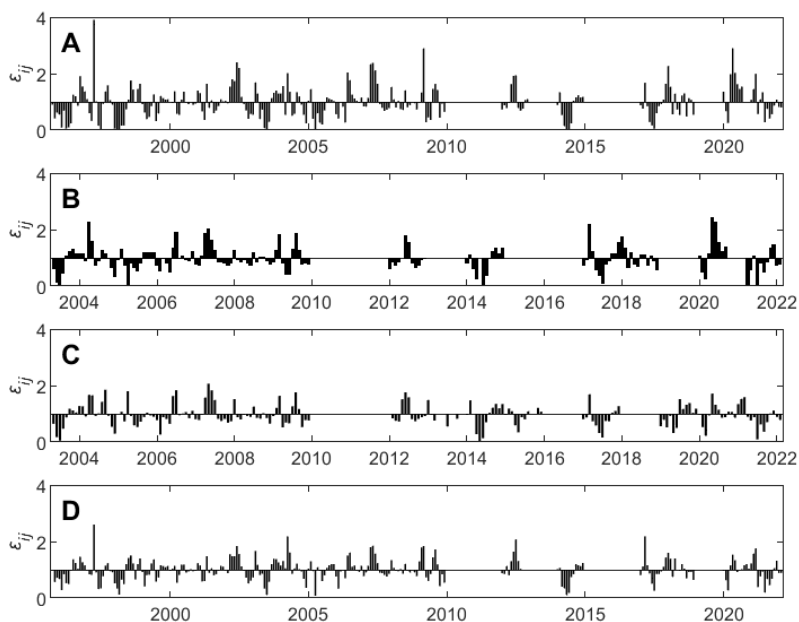
**Supplementary Figure 10.** Residual component ( $\varepsilon_{ij}$ , bars) for temperature at the SWMP stations: (A) Fish River, (B) Magnolia River, (C) Middle Bay, and (D) Weeks Bay.



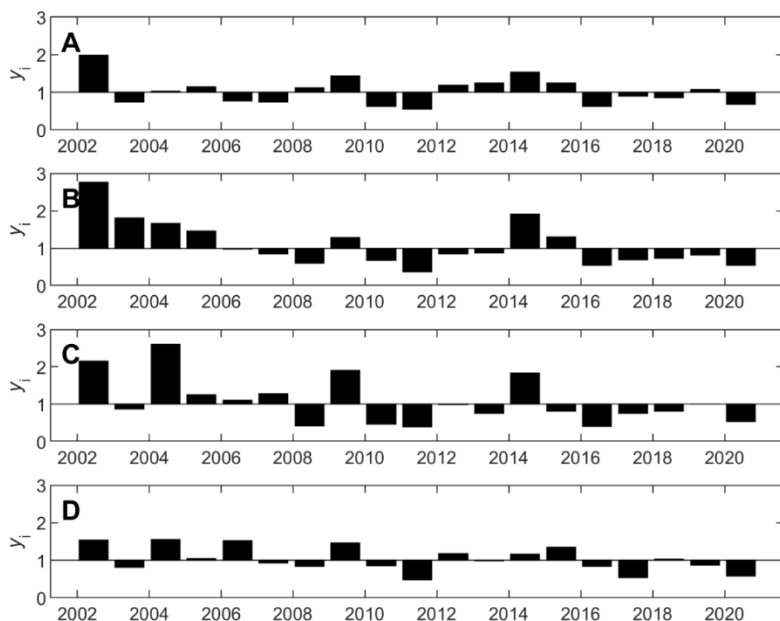
**Supplementary Figure 11.** Annual component ( $y_i$ , bars) for salinity at the SWMP stations: (A) Fish River, (B) Magnolia River, (C) Middle Bay, and (D) Weeks Bay.



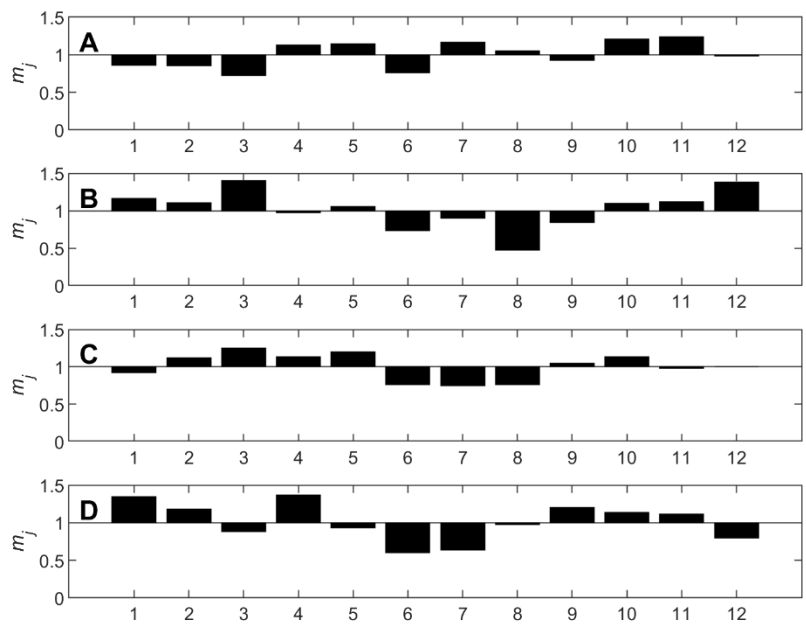
**Supplementary Figure 12.** Seasonal component ( $m_j$ , bars) for salinity at the SWMP stations: (A) Fish River, (B) Magnolia River, (C) Middle Bay, and (D) Weeks Bay.



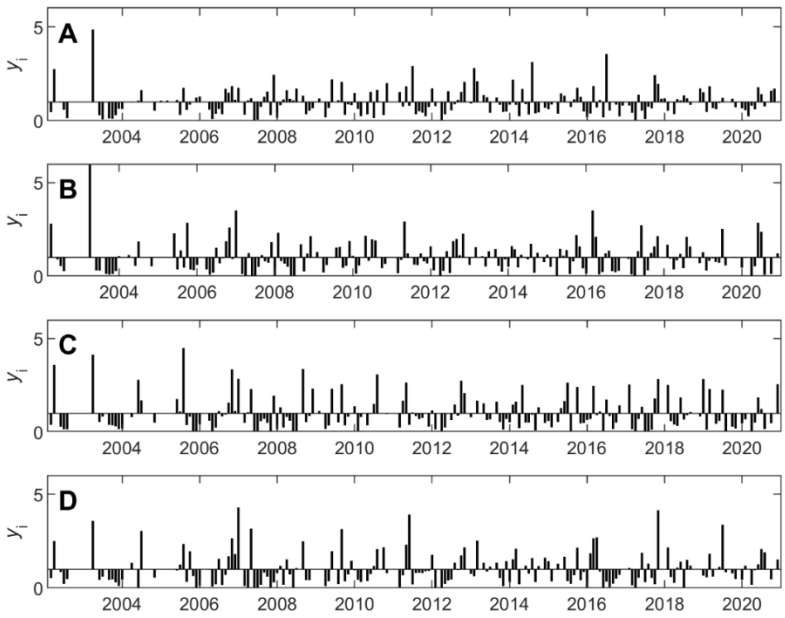
**Supplementary Figure 13.** Residual component ( $\varepsilon_{ij}$ , bars) for salinity at the SWMP stations: (A) Fish River, (B) Magnolia River, (C) Middle Bay, and (D) Weeks Bay.



**Supplementary Figure 14.** Annual component ( $y_i$ , bars) for  $\text{NH}_4^+$  at the SWMP stations: (A) Fish River, (B) Magnolia River, (C) Middle Bay, and (D) Weeks Bay.

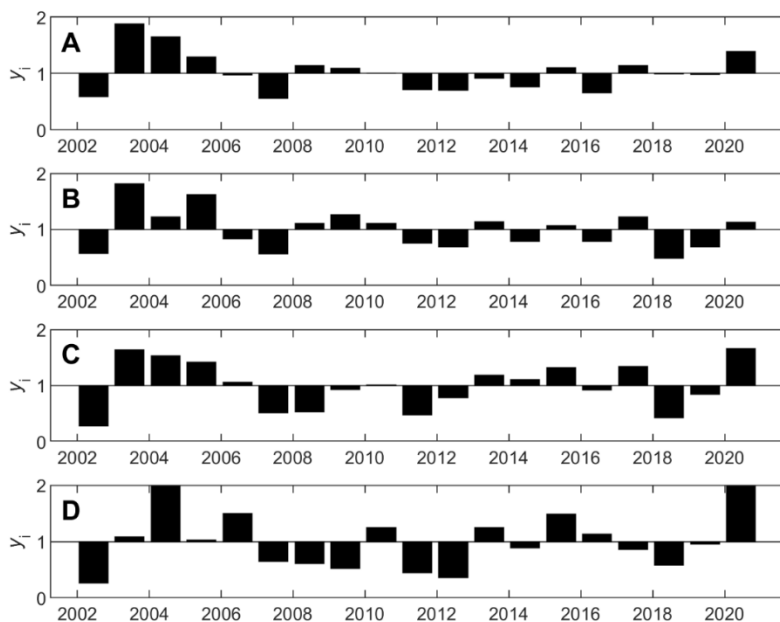


**Supplementary Figure 15.** Seasonal component ( $m_j$ , bars) for  $\text{NH}_4^+$  at the SWMP stations: (A) Fish River, (B) Magnolia River, (C) Middle Bay, and (D) Weeks Bay.

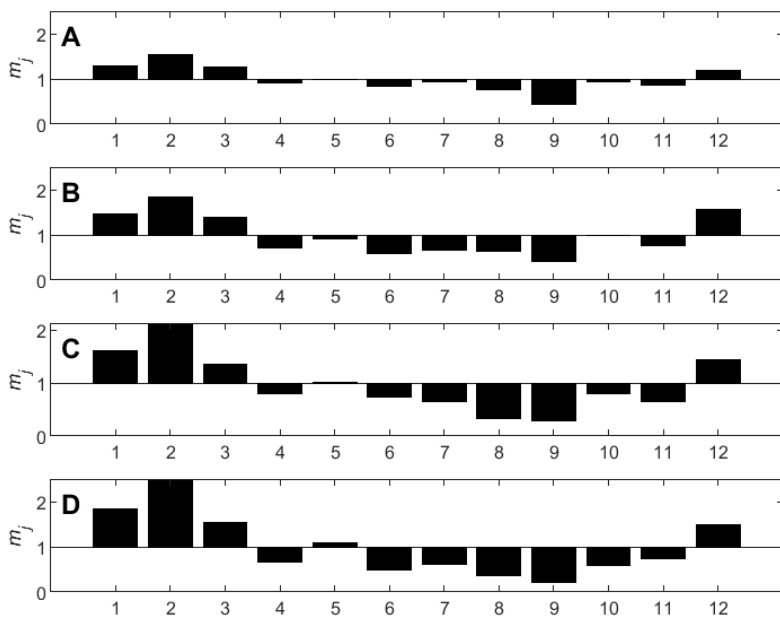


**Supplementary Figure 16.** Residual component ( $\epsilon_{ii}$ , bars) for  $\text{NH}_4^+$  at the SWMP stations: (A) Fish River, (B) Magnolia River, (C) Middle Bay, and (D) Weeks Bay.

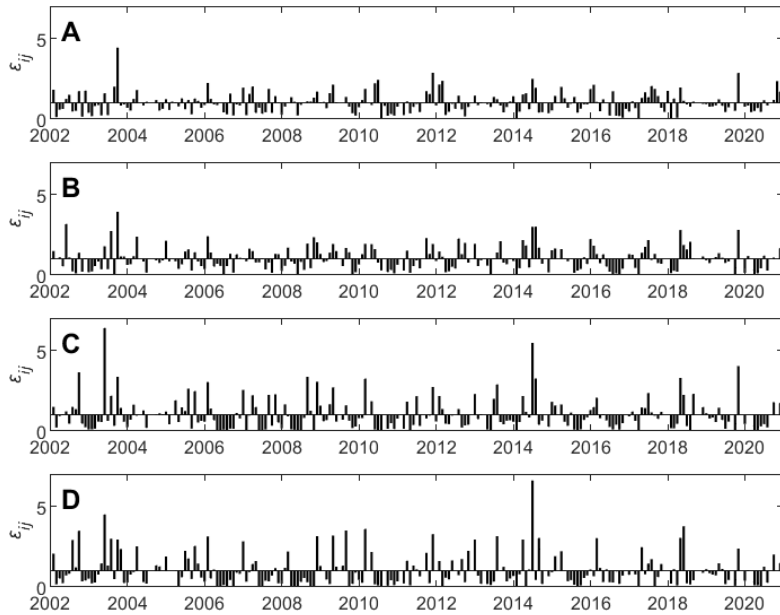




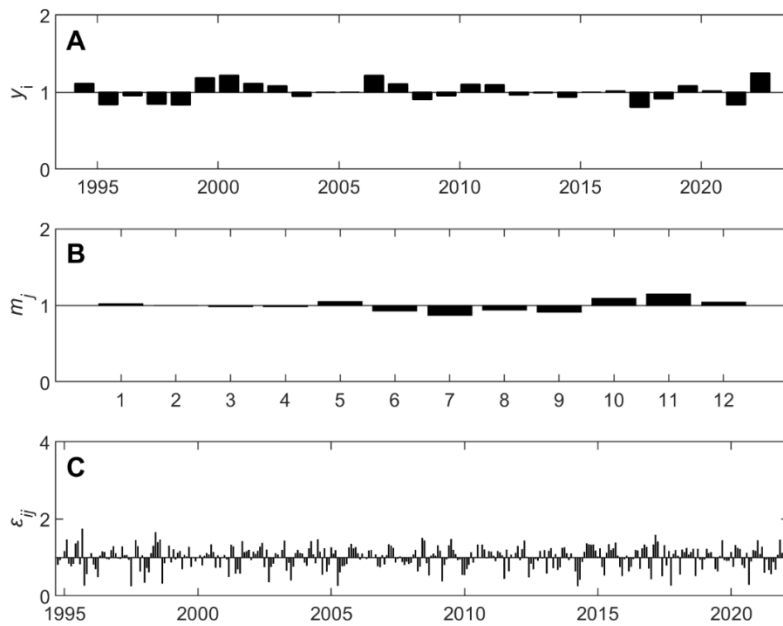
**Supplementary Figure 17.** Annual component ( $y_i$ , bars) for  $\text{NO}_3^-$  at the SWMP stations: (A) Fish River, (B) Magnolia River, (C) Middle Bay, and (D) Weeks Bay.



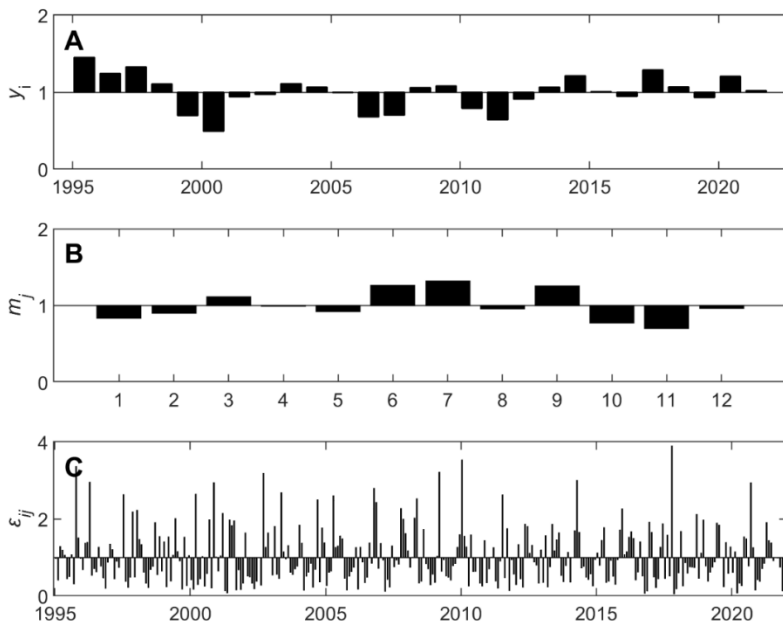
**Supplementary Figure 18.** Seasonal component ( $m_j$ , bars) for  $\text{NO}_3^-$  at the SWMP stations: (A) Fish River, (B) Magnolia River, (C) Middle Bay, and (D) Weeks Bay.



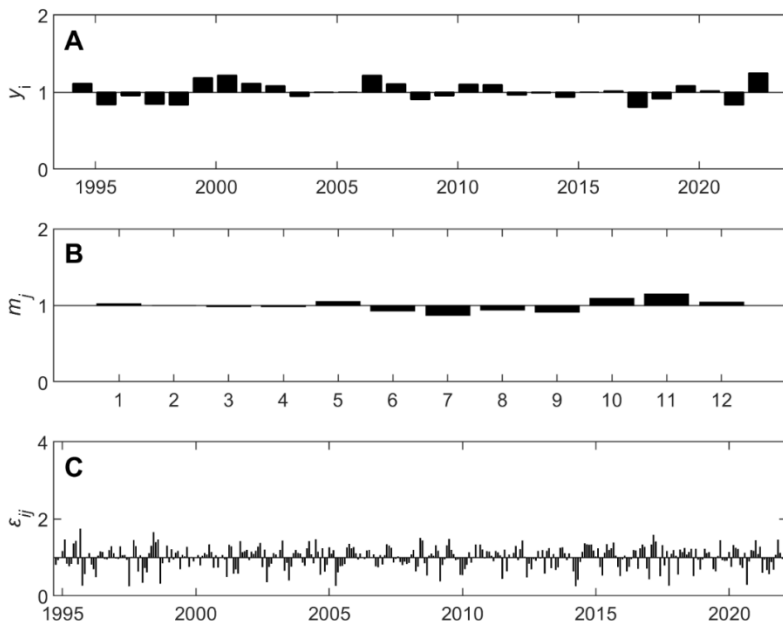
**Supplementary Figure 19.** Residual component ( $\varepsilon_{ij}$ , bars) for  $\text{NO}_3^-$  at the SWMP stations: (A) Fish River, (B) Magnolia River, (C) Middle Bay, and (D) Weeks Bay.



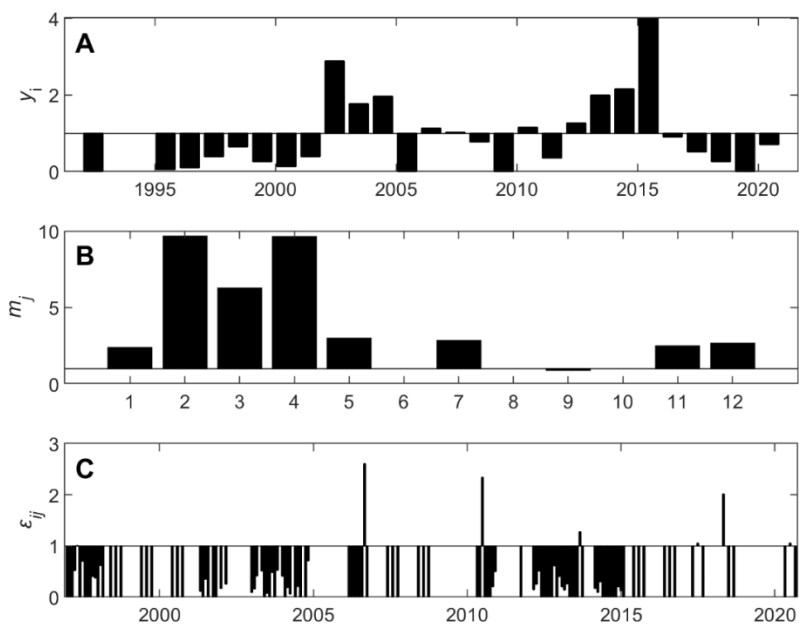
**Supplementary Figure 20.** Decomposition for discharge at the gauge with (A) annual component ( $y_i$ , bars), (B) seasonal component ( $m_j$ , bars), (C) residual component ( $\varepsilon_{ij}$ , bars).



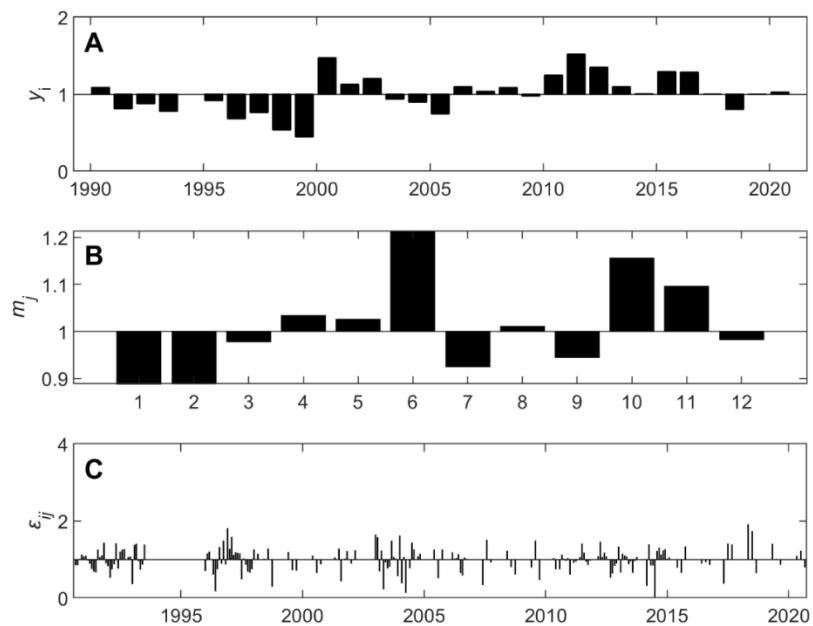
**Supplementary Figure 21.** Decomposition for RBI at the gauge with (A) annual component ( $y_i$ , bars), (B) seasonal component ( $m_j$ , bars), (C) residual component ( $\varepsilon_{ij}$ , bars).



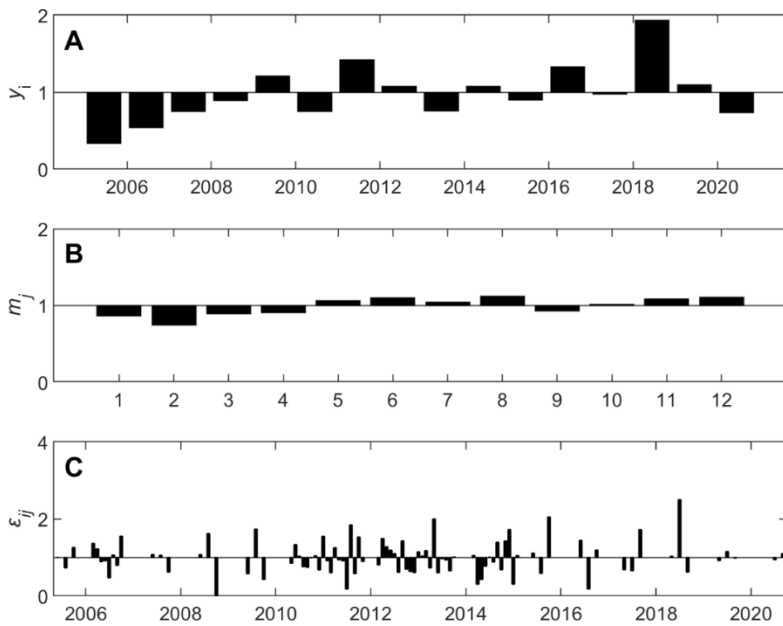
**Supplementary Figure 22.** Decomposition for BFI at the gauge with (A) annual component ( $y_i$ , bars), (B) seasonal component ( $m_j$ , bars), (C) residual component ( $\varepsilon_{ij}$ , bars).



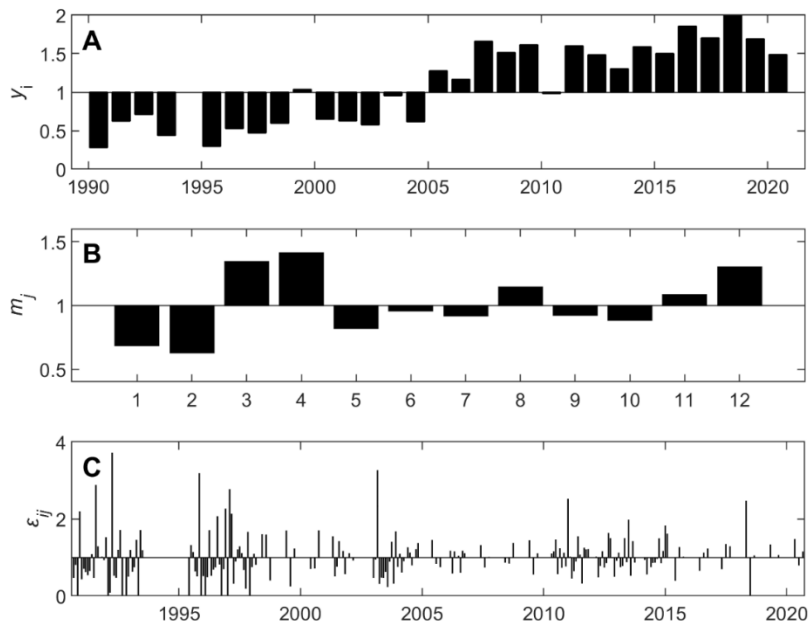
**Supplementary Figure 23.** Decomposition for  $\text{NH}_4^+$  at the gauge with (A) annual component ( $y_i$ , bars), (B) seasonal component ( $m_j$ , bars), (C) residual component ( $\epsilon_{ij}$ , bars). Seasonal and residual components were not instructive due to the number of  $0 \text{ mg l}^{-1}$  measures.



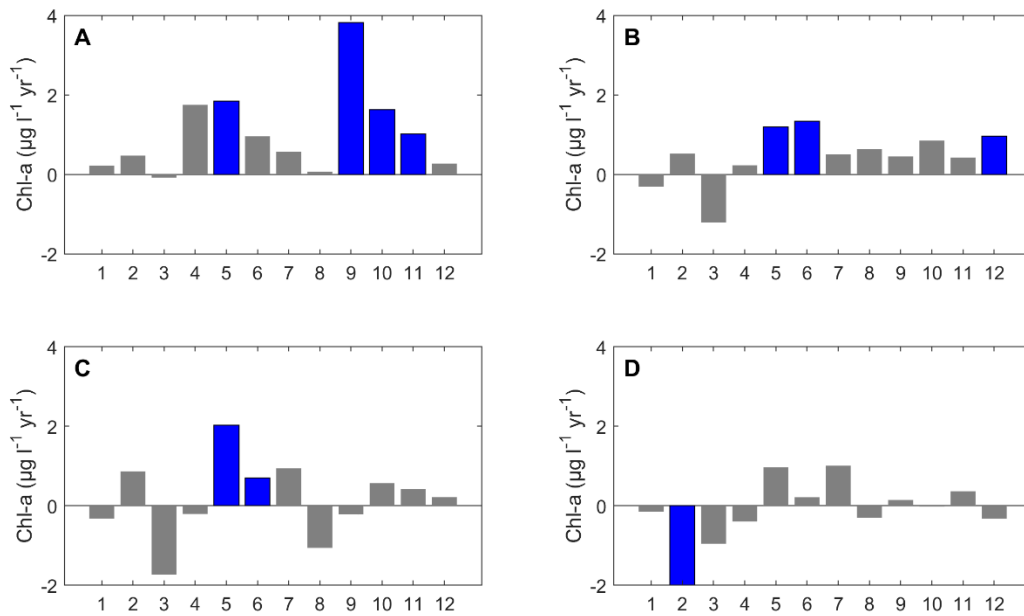
**Supplementary Figure 24.** Decomposition for  $\text{NO}_3^-$  at the gauge with (A) annual component ( $y_i$ , bars), (B) seasonal component ( $m_j$ , bars), (C) residual component ( $\epsilon_{ij}$ , bars).



**Supplementary Figure 25.** Decomposition for  $\text{PO}_4^{3-}$  at the gauge with (A) annual component ( $y_i$ , bars), (B) seasonal component ( $m_j$ , bars), (C) residual component ( $\varepsilon_{ij}$ , bars).



**Supplementary Figure 26.** Decomposition for TP at the gauge with (A) annual component ( $y_i$ , bars), (B) seasonal component ( $m_j$ , bars), (C) residual component ( $\varepsilon_{ij}$ , bars).



**Supplementary Figure S27.** Monthly trends for chl-*a* at the SWMP stations: (A) Fish River, (B) Magnolia River, (C) Middle Bay, and (D) Weeks Bay. Blue bars indicate significant trends.