Supporting Information for "Linkages Between Phytoplankton and Bottom Oxygen in the Chesapeake Bay"

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Introduction

In this appendix we show more details about the relationship between bottom [DO] and pre-DO surface [Chl-a] in the Chesapeake Bay. Figures S1−S4 show essentially the same data shown in Fig. 3A,E in the main text but only for pattern 1 and categorized by station or by year to show the interannual and spatial variability. Figure S5 shows the seasonality of surface phytoplankton biomass along the Chesapeake Bay mainstem transect.

Text S1. Figure S1 shows the sation by station relationship between bottom [DO] and pre-DO surface [Chl-a] in April. For most upper and middle bay stations, the two variables

exhibit a strong correlation; bottom [DO] tends to be lower for years with higher pre-DO [Chl-a]. The correlation decreases towards the lower bay particularly for stations near the open Atlantic, largely owing to smaller range of [DO].

Text S2. Figure S2 shows the spatial relationship between bottom [DO] and pre-DO surface [Chl-a] for each year.The degree of correlation exhibits significant variability from highly (2017) to poorly (2012) correlated. In 2013, 2014, and 2016, the correlation is strong for a subset of the stations. The large variability is likely associated with the changes in mixing intensity because water column in April is not yet stratified.

Text S3. Figure S3 is similar to Fig. S1 except for August. The correlation is generally low owing mainly to the small dynamic range of [DO] for a given station. The August [DO] at a given station changes little from year to year.

Text S4. Figure S4 is similar to Fig. S2 except for August. The degree of correlation across different stations is consistently strong for each individual year.

Text S5. Figure S5 shows monthly changes in surface [Chl-a] along the mainstem transect (see Fig. 1 in main text). Two main blooms in March and July are visible in this region.

Figure S1. Station-specific interannual relationship between bottom [DO] and 4-weekly mean pre-DO surface [Chl-a] in the Chesapeake Bay in April. Panels are ordered by station location from the upper to the lower bay.

Figure S2. Spatial relationship between bottom [DO] and 4-weekly mean pre-DO surface [Chl-a] in the Chesapeake Bay in April. Each panel shows data from a specific year.

Figure S3. Same as Fig. S1 except for August.

Figure S4. Same as Fig. S2 except for August.

Figure S5.