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Supporting Information for

Evaluating the pH-dependence of DOM absorbance, fluorescence, and photochemically produced singlet oxygen

Anya Allen,[1,2] Kai Cheng[2], Garrett McKay[2,]*

1. Department of Biochemistry and Biophysics, Texas A&M University, College Station, TX 77843
2. Zachry Department of Civil & Environmental Engineering, Texas A&M University, College Station, TX 77843

*Corresponding author

gmckay@tamu.edu; (979) 458-6540

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Tables S1. List of chemicals used in this study.

Chemical	Supplier	Purity
Hydrochloric acid, 2N	VWR	ACS grade
Sodium hydroxide	VWR	>95%
Acetovanillone	Sigma-Aldrich	>98%
4-Hydroxybenzoic acid	Sigma-Aldrich	99%
Hydroquinone	Sigma-Aldrich	99%
Potassium hydrogen phosphate	VWR	98%
Potassium dihydrogen phosphate	VWR	>99%

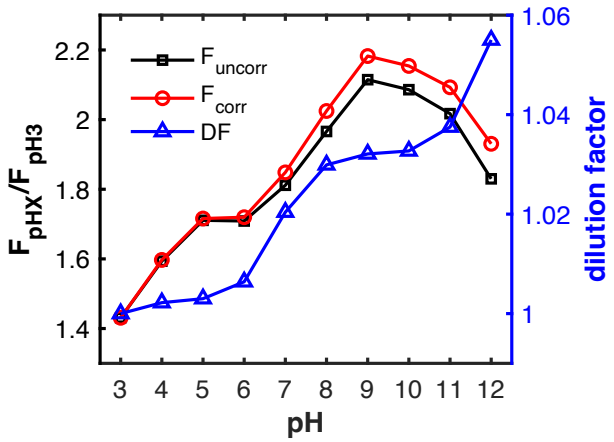

Figure S1. Impact of dilution on the fractional fluorescence intensity for Suwannee River fulvic acid. F_{pHX}/F_{pH3} here refers to the excitation/emission pair of 365/450 nm and F_{uncorr} (black squares) and F_{corr} (red circles) represents the uncorrected and corrected results, respectively. DF (blue triangles) stands for dilution factor and was calculated using the cumulative distribution of volumes added during titration of 10 mL of 10 mM phosphate buffer from pH 3 to 12 in one-pH unit increments.

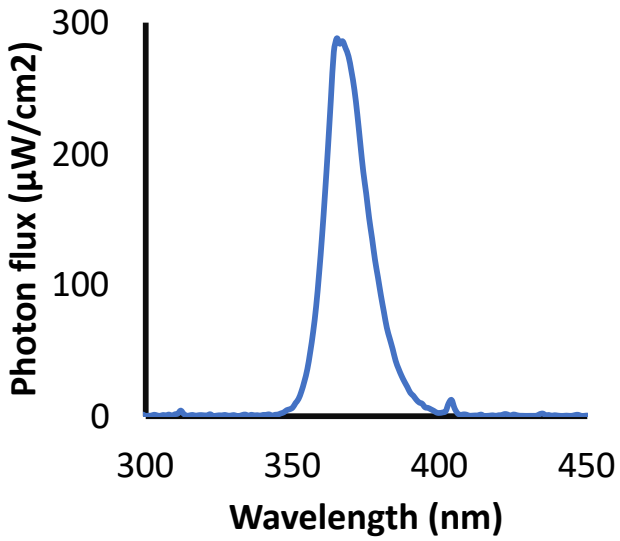

Figure S2. Absolute spectral irradiance of UV-365 lamps. Measured with an Ocean Optics Flame spectroradiometer.

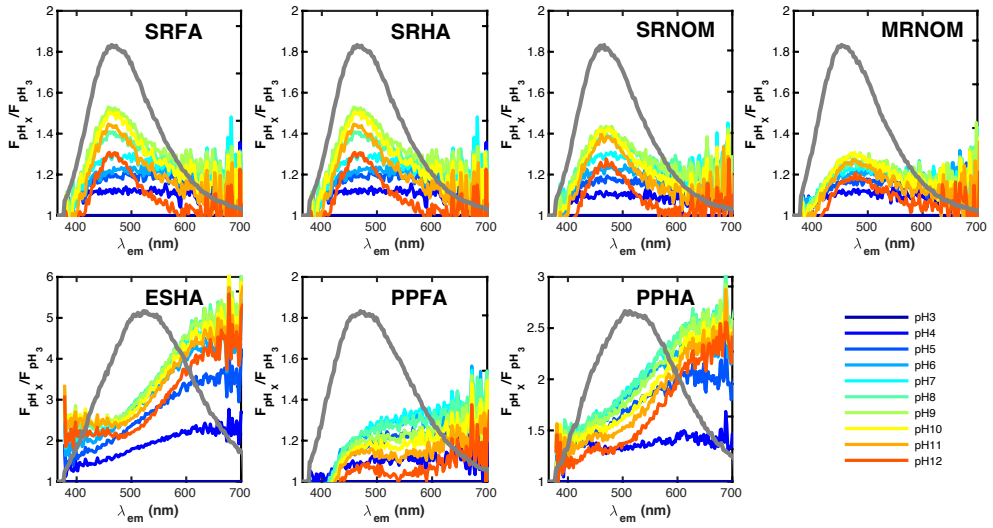

Figure S3. pH-Dependent fluorescence emission of whole water samples at 365 nm excitation. Note that *F* here represents $F(\lambda_{ex} = 365nm, \lambda_{em})$, not the integrated emission as shown in the main manuscript. The gray lines represent the normalized emission spectrum at pH 3.

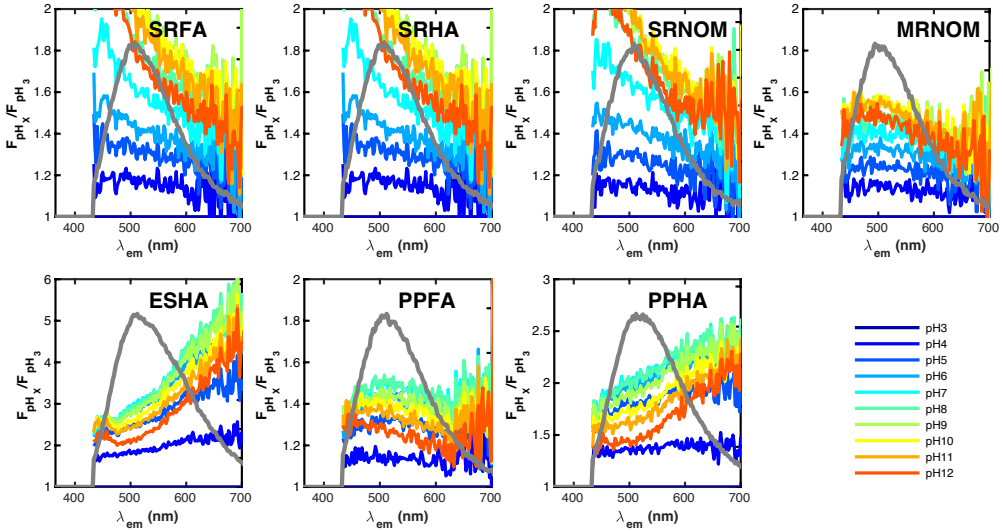

Figure S4. pH-Dependent fluorescence emission of whole water samples at 420 nm excitation. Note that *F* here represents $F(\lambda_{ex} = 420\ nm, \lambda_{em})$, not the integrated emission as shown in the main manuscript. The gray lines represent the normalized emission spectrum at pH 3.

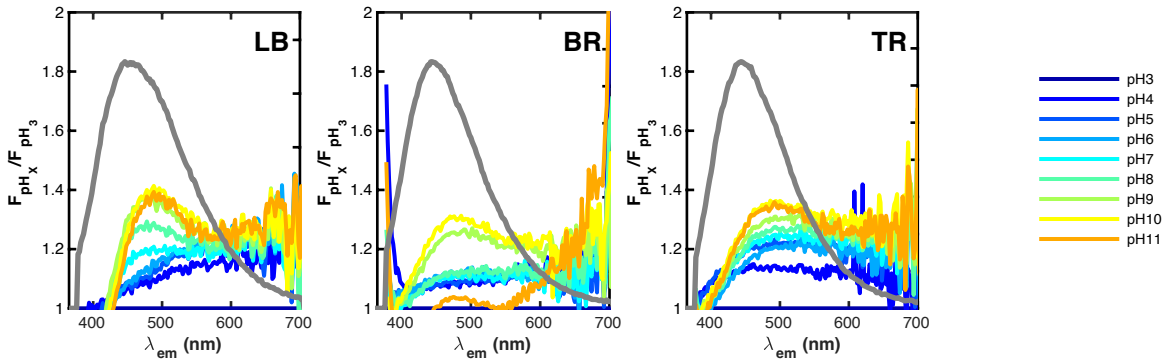

Figure S5. pH-Dependent fluorescence emission of whole water samples at 365 nm excitation. Note that *F* here represents $F(\lambda_{ex} = 365\ nm, \lambda_{em})$, not the integrated emission as shown in the main manuscript. The gray lines represent the normalized emission spectrum at pH 3.

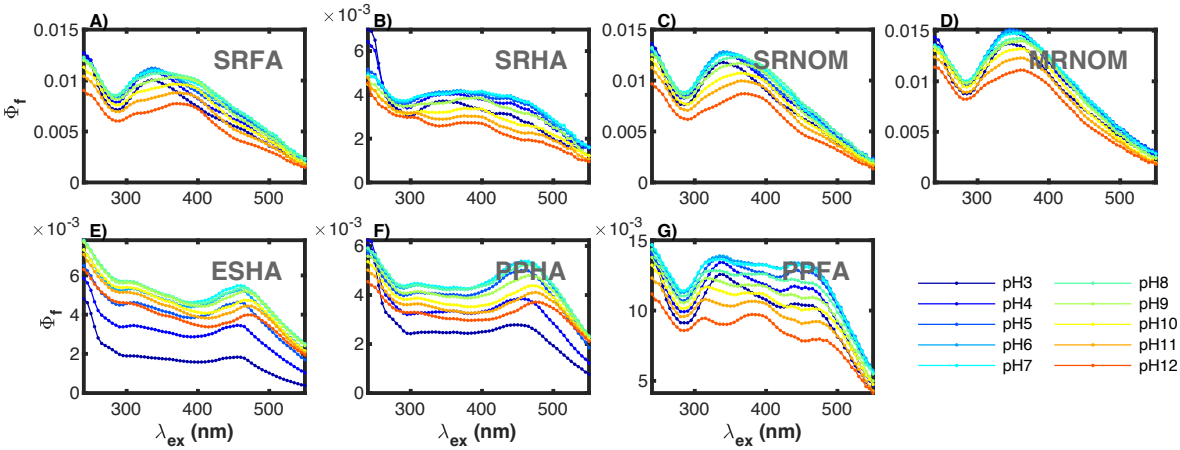

Figure S6. pH-Dependent fluorescence quantum yields of DOM isolates of whole water samples at 365 nm excitation. Note that *F* here represents $F(\lambda_{ex} = 365\ nm, \lambda_{em})$, not the integrated emission as shown in the main manuscript.

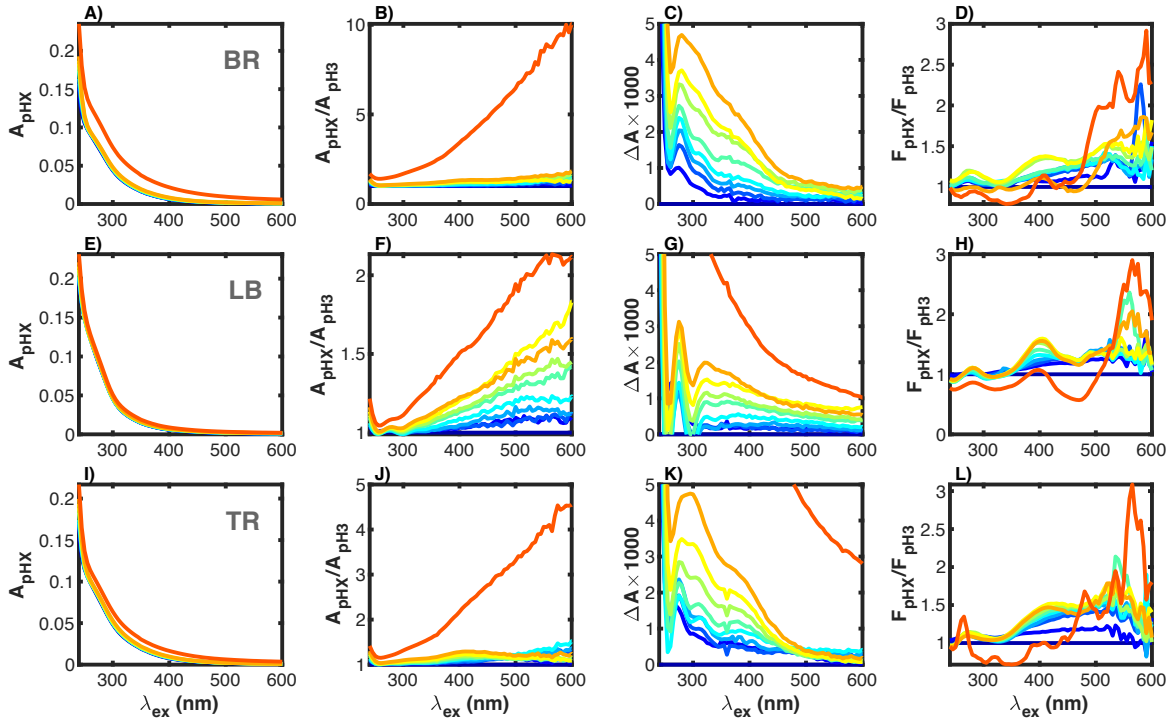

Figure S7: pH-Dependent optical properties of whole water samples from Central Texas, including A)-D) Brazos River (BR), E)-H) Lake Bryan (LB), and I)-L)Trinity River (TR). Spectra were collected during titrations initiated by acidifying solutions to pH 3 with 0.25 M HCl and then adding small a mounts of 0.125 or 0.25 M NaOH to achieve one-unit pH increments. Spectra at pH 12 were excluded in the main manuscript (Figure 4) due to particle formation [note large baseline increase at pH 12, red line in A) and I)]. Absorbance spectra were collected in a 10 cm path length cuvette and normalized to a 1 cm path length. Line colors correspond to legend in Figure 1 of the main text.

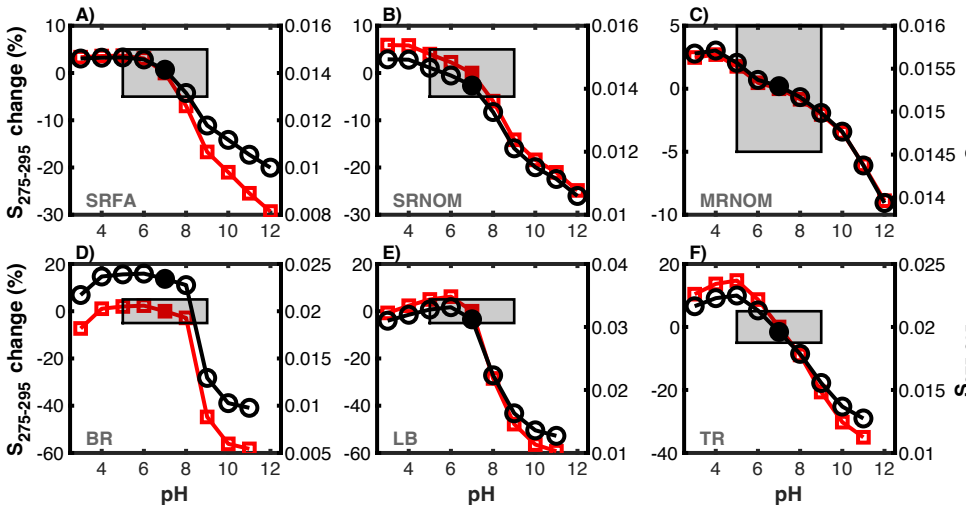

Figure S8: Variation in $S_{275\text{-}295}$ between pH 3 and 12 for DOM isolates and whole water samples. Gray box borders $\pm$ 5% relative change (red markers, left axis) and pH 5 to 9. The absolute change in $S_{275\text{-}295}$is indicated by the black circles and right axis). pH 7 is indicated by the closed marker.

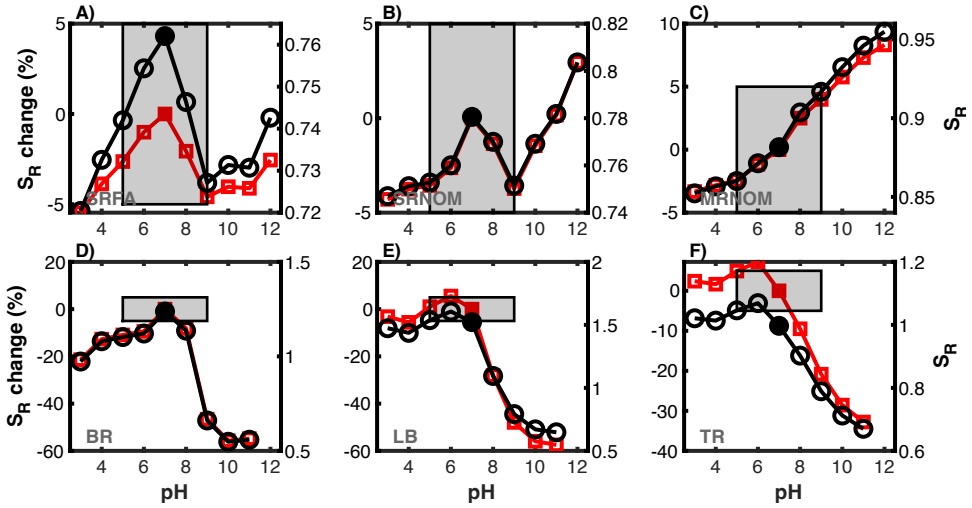

Figure S9: Variation in S_R between pH 3 and 12 for DOM isolates and whole water samples. Gray box borders $\pm$ 5% relative change (red markers, left axis) and pH 5 to 9. The absolute change in S_R is indicated by the black circles and right axis). pH 7 is indicated by the closed marker.

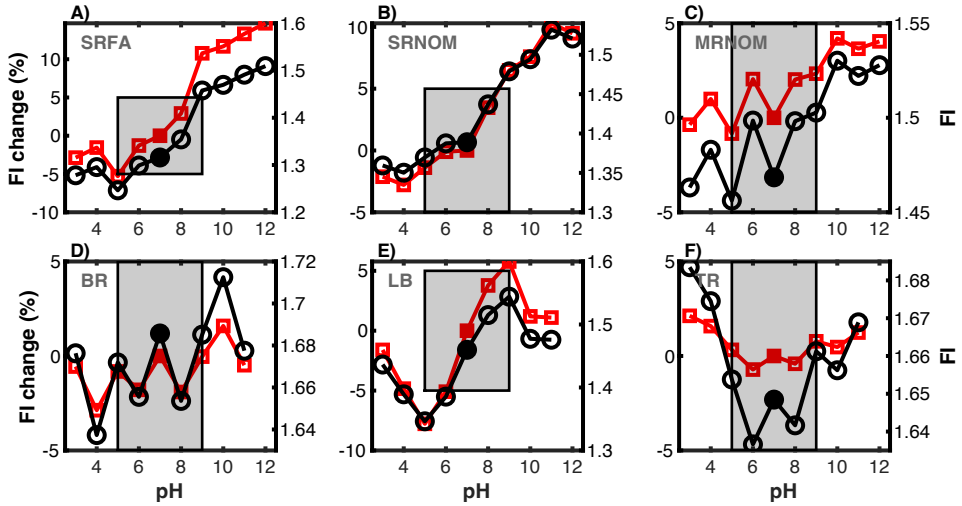

Figure S10: Variation in FI between pH 3 and 12 for DOM isolates and whole water samples. Gray box borders ± 5% relative change (red markers, left axis) and pH 5 to 9. The absolute change in FI is indicated by the black circles and right axis). pH 7 is indicated by the closed marker.

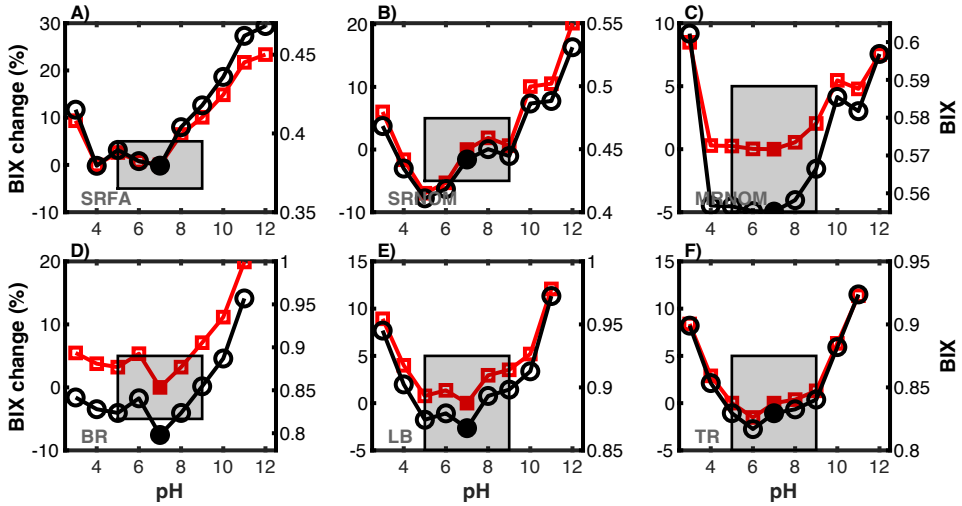

Figure S11: Variation in BIX between pH 3 and 12 for DOM isolates and whole water samples. Gray box borders ± 5% relative change (red markers, left axis) and pH 5 to 9. The absolute change in BIX is indicated by the black circles and right axis). pH 7 is indicated by the closed marker.

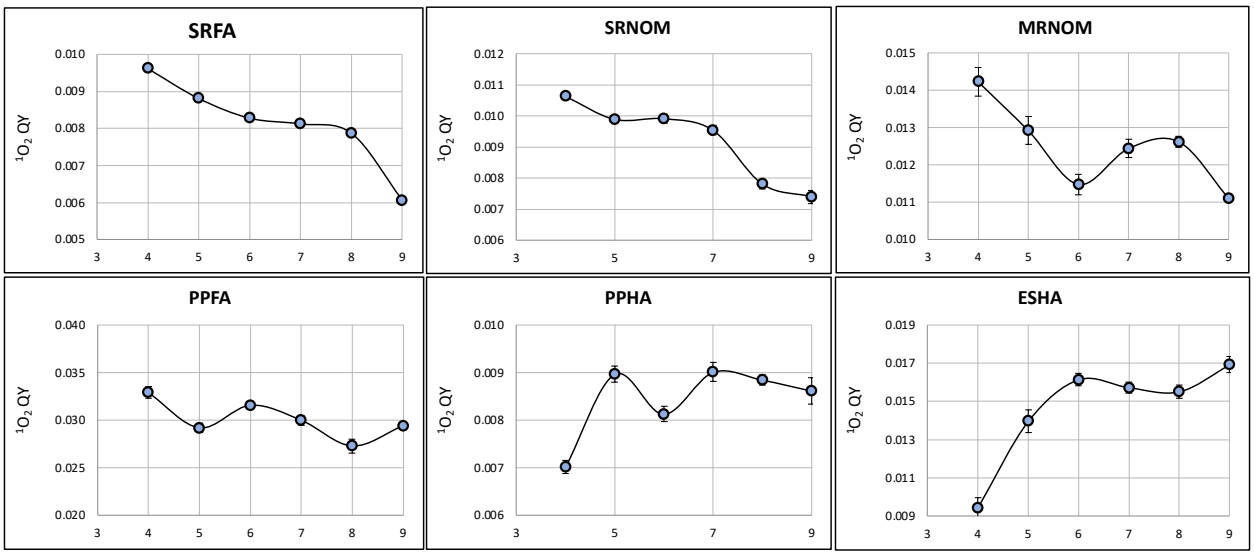

Figure S12. Singlet oxygen quantum yields for DOM isolates as determined using furfuryl alcohol (100 µM) between pH 4 and 9.

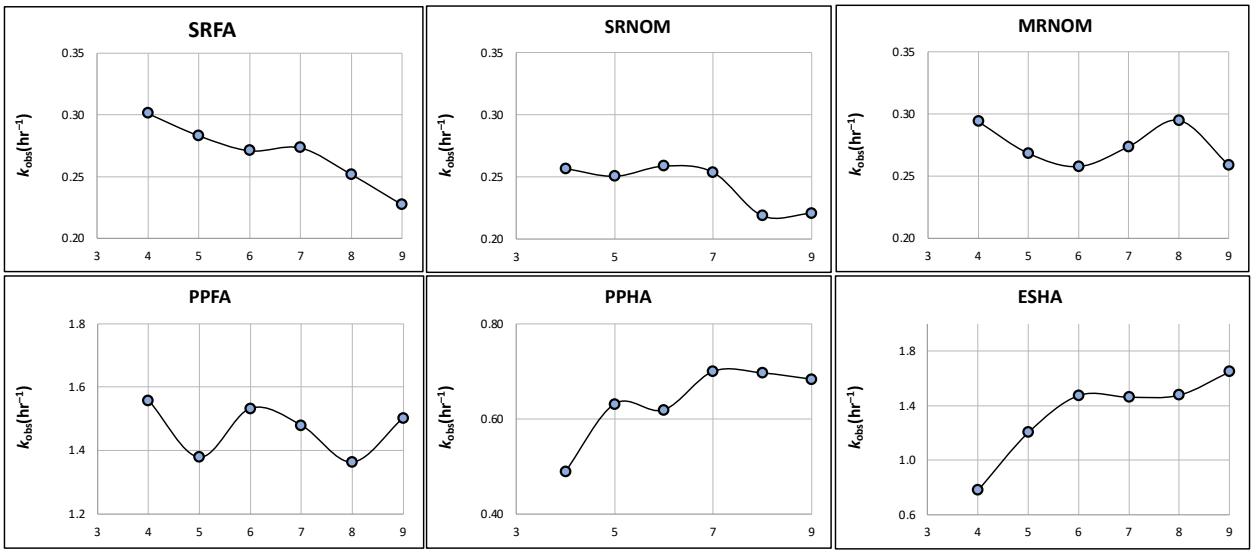

Figure S13. First order photodegradation rate constants of furfuryl alcohol (100 µM) between pH 4 and 9 for DOM isolates