Table 10. Spearman rank correlation matrix for environmental variables and select groups of algae and zooplankton for the lower Tualatin River with Wapato-affected samples removed.

[See table 9 for variable definitions. Rho values in ***red*** are significant at the P<0.001 level; Rho values in **blue** are significant at the P<0.01 level; Rho values in **bold** are significant at the P<0.05 level; Includes 65 samples collected during the 2006–08 growing season from river mile 11.5 to 3.4. **Abbreviation:** <, less than]

Variable	Total algal biovolume	Chl-*a*	Pheo-*a*	Pheo-*a*:Chl-*a*	DIN	NH_3	NO_2+NO_3	TKN	TN	SRP	TP	DIN:SRP	SRP:TP	TSS	Turbidity	Temp	SC	DO	DO%	pH	Cl	Total_Flow_cfs	Natural_Flow_cfs	Flow_augmentation_cfs	WWTF_cfs	%Flow_augmentation	%Natural_Flow	%WWTF	PARmax	Total zooplankton density	Cladocerans	Copepods	Rotifers	Blue-green Algae	Chrysophyte algae	Cryptophyte algae	Diatoms	Centric diatoms	Filamentous diatoms	Dinoflagellates	Euglenoids	Green algae
Chl-*a*	***0.70***																																									
Pheo-*a*	***0.37***	0.33																																								
Pheo-*a*:Chl-*a*	-0.12	-0.36	***0.76***																																							
DIN	-0.18	-0.11	0.02	0.10																																						
NH_3	***-0.51***	***-0.65***	-0.04	***0.41***	0.05																																					
NO_2+NO_3	-0.16	-0.09	0.03	0.09	***1.00***	0.02																																				
TKN	0.17	0.34	0.36	0.12	0.32	0.11	0.31																																		
TN	-0.11	-0.02	0.10	0.11	***0.98***	0.03	***0.98***	***0.48***																																	
SRP	***-0.66***	***-0.81***	***-0.41***	0.15	0.07	***0.45***	0.06	-0.37	-0.02																																
TP	-0.00	-0.02	0.17	0.18	0.13	0.14	0.13	0.34	0.19	**0.22**																														
DIN:SRP	***0.56***	***0.72***	***0.40***	-0.10	0.32	***-0.41***	0.33	***0.47***	***0.40***	***-0.92***	-0.16																													
SRP:TP	***-0.69***	***-0.84***	***-0.47***	0.12	0.05	***0.44***	0.04	***-0.47***	-0.06	***0.96***	-0.04	***-0.89***																												
TSS	0.18	0.29	0.14	-0.07	0.05	-0.14	0.05	**0.25**	0.10	-0.18	0.35	0.19	**-0.28**																											
Turbidity	0.19	0.09	0.05	-0.02	0.29	-0.11	0.30	**0.22**	0.32	0.03	0.34	0.08	-0.07	***0.47***																										
Temp	**0.29**	0.32	**0.29**	0.06	**0.29**	***-0.38***	0.30	0.21	0.32	-0.33	-0.01	***0.42***	-0.32	-0.08	0.08																										
SC	-0.18	-0.08	0.17	0.22	***0.76***	-0.07	***0.77***	0.32	***0.77***	0.02	0.03	**0.27**	0.03	0.00	0.11	***0.53***																									
DO	***0.64***	***0.54***	0.18	-0.20	**-0.28**	-0.51	**-0.26**	0.13	-0.21	***-0.56***	0.02	***0.42***	***-0.58***	0.20	0.02	0.08	-0.21																									
DO%	***0.67***	***0.59***	**0.22**	-0.18	**-0.23**	-0.56	-0.21	0.16	-0.16	***-0.60***	0.02	***0.48***	***-0.63***	0.18	0.03	**0.23**	-0.13	***0.99***																							
pH	-0.07	0.11	-0.14	-0.22	**-0.27**	0.04	**-0.27**	0.01	**-0.25**	-0.20	-0.16	0.08	-0.16	0.06	**-0.28**	***-0.37***	**-0.25**	0.18	0.12																						
Cl	0.02	0.10	0.18	0.10	***0.77***	-0.21	***0.78***	**0.28**	***0.78***	-0.08	-0.02	***0.37***	-0.07	0.03	0.10	***0.48***	***0.87***	-0.04	0.03	**-0.28**																					
Total_Flow_cfs	-0.04	**-0.26**	**-0.27**	-0.09	***-0.50***	0.19	***-0.50***	-0.15	***-0.50***	0.18	-0.01	-0.36	0.18	-0.16	-0.36	***-0.53***	***-0.43***	0.18	0.09	0.17	***-0.45***																				
Natural_Flow_cfs	0.22	0.04	-0.29	-0.32	***-0.52***	0.06	***-0.52***	-0.15	***-0.52***	-0.08	-0.11	-0.13	-0.07	0.04	-0.30	***-0.47***	***-0.49***	0.30	0.22	***0.43***	***-0.44***	***0.76***																			
Flow_augmentation_cfs	**-0.23**	-0.02	0.17	0.18	***0.50***	-0.08	***0.50***	0.22	***0.51***	0.00	0.08	0.20	-0.02	-0.21	0.01	***0.49***	***0.55***	-0.32	**-0.23**	**-0.28**	***0.52***	***-0.45***	***-0.61***																		
WWTF_cfs	0.04	-0.02	0.19	0.20	**0.23**	0.01	**0.23**	**0.23**	**0.25**	-0.03	-0.04	0.12	-0.02	0.05	-0.03	0.08	***0.49***	0.13	0.13	-0.19	***0.53***	**0.24**	-0.01	0.04																	
%Flow_augmentation	-0.31	-0.11	**0.23**	0.31	***0.61***	0.01	***0.61***	**0.24**	***0.61***	0.09	0.12	0.15	0.08	-0.13	**0.22**	***0.52***	***0.60***	***-0.40***	-0.31	-0.36	***0.51***	***-0.67***	***-0.85***	***0.87***	-0.05																
%Natural_Flow	0.31	0.14	**-0.28**	***-0.37***	***-0.52***	-0.01	***-0.52***	-0.17	***-0.52***	-0.15	-0.12	-0.06	-0.14	0.12	**-0.25**	***-0.43***	***-0.51***	0.34	**0.26**	***0.45***	***-0.43***	***0.63***	***0.98***	***-0.65***	-0.10	***-0.87***															
%WWTF	0.05	0.19	***0.39***	**0.25**	***0.57***	-0.15	***0.58***	**0.29**	***0.59***	-0.19	-0.03	***0.40***	-0.17	0.14	**0.22**	***0.49***	***0.73***	-0.04	0.04	-0.30	***0.78***	***-0.61***	***-0.65***	0.41	***0.62***	***0.50***	***-0.61***														
PARmax	***0.45***	0.36	0.13	-0.12	0.02	***-0.52***	0.05	-0.05	0.04	**-0.24**	-0.02	**0.24**	**-0.27**	0.07	0.13	0.30	0.00	0.36	***0.40***	-0.17	**0.23**	-0.16	-0.11	0.05	0.04	0.01	-0.07	0.17													
Total zooplankton density	0.35	***0.39***	0.32	0.05	0.15	**-0.22**	0.16	0.33	0.21	***-0.38***	0.13	***0.42***	***-0.45***	-0.04	0.07	***0.41***	0.19	0.03	0.09	-0.15	**0.26**	-0.18	-0.08	***0.45***	0.00	**0.28**	-0.07	0.15	0.21												
Cladocerans	***0.38***	0.35	***0.38***	0.13	0.06	-0.20	0.07	0.29	0.11	-0.33	0.09	0.34	***-0.39***	-0.03	0.07	***0.41***	0.15	0.01	0.08	**-0.24**	**0.23**	-0.07	-0.05	***0.39***	0.14	0.22	-0.05	0.16	0.15	***0.93***										
Copepods	**0.22**	0.35	**0.22**	-0.02	0.21	-0.14	0.21	***0.41***	**0.27**	-0.35	0.15	***0.42***	***-0.42***	-0.03	0.03	0.31	0.21	-0.01	0.05	-0.10	**0.26**	-0.19	-0.10	***0.47***	-0.01	0.32	-0.09	0.15	0.15	***0.93***	***0.79***									
Rotifers	***0.56***	***0.60***	**0.29**	-0.13	0.13	***-0.46***	0.15	0.19	0.18	***-0.58***	0.02	***0.60***	***-0.62***	-0.03	0.09	***0.43***	0.07	**0.25**	0.31	-0.02	0.18	**-0.23**	-0.02	**0.26**	-0.15	0.13	0.04	0.07	***0.43***	***0.81***	***0.68***	***0.72***								
Blue-green algae	0.21	0.07	-0.08	-0.12	-0.16	-0.13	-0.16	-0.10	-0.17	0.02	-0.07	-0.08	0.03	0.13	-0.07	**-0.26**	-0.16	0.15	0.11	0.03	-0.10	***0.37***	***0.38***	***-0.39***	**0.27**	***-0.47***	0.37	-0.11	0.04	-0.21	-0.09	-0.29	-0.18							
Chrysophyte algae	**-0.26**	**-0.26**	-0.02	0.16	**0.29**	**0.26**	**0.28**	0.05	**0.26**	0.21	-0.03	-0.09	**0.22**	-0.20	-0.17	0.21	***0.43***	**-0.27**	**-0.24**	-0.20	0.35	-0.02	-0.12	0.17	**0.26**	0.19	-0.16	**0.25**	-0.07	0.08	0.07	0.08	-0.02	-0.18						
Cryptophyte algae	***0.75***	***0.52***	0.33	-0.03	0.12	***-0.48***	0.14	0.19	0.17	***-0.39***	0.06	***0.41***	***-0.44***	0.14	**0.26**	***0.52***	0.19	0.33	***0.40***	**-0.28**	0.35	-0.33	-0.12	0.02	0.16	0.05	-0.03	***0.38***	***0.41***	***0.40***	***0.40***	0.29	***0.48***	0.12	-0.07					
Diatoms	***0.82***	***0.60***	0.19	**-0.23**	-0.29	***-0.41***	**-0.28**	0.01	**-0.25**	***-0.60***	-0.00	***0.46***	***-0.62***	**0.26**	0.07	0.07	-0.32	***0.64***	***0.64***	0.13	-0.15	0.15	***0.43***	***-0.39***	-0.06	***-0.51***	***0.51***	-0.18	***0.40***	0.16	0.18	0.03	***0.42***	**0.27**	-0.35	0.36				
Centric diatoms	***0.80***	***0.61***	0.18	**-0.25**	-0.29	***-0.44***	**-0.27**	0.01	**-0.25**	***-0.60***	-0.02	***0.46***	***-0.62***	**0.23**	0.06	0.05	-0.32	***0.67***	***0.66***	0.16	-0.13	0.16	***0.44***	***-0.39***	-0.07	***-0.51***	***0.51***	-0.20	***0.42***	0.17	0.16	0.05	***0.46***	**0.26**	-0.36	0.36	***0.97***			
Filamentous diatoms	***0.74***	***0.54***	0.14	**-0.23**	-0.35	***-0.41***	**-0.33**	-0.04	-0.32	***-0.57***	-0.08	***0.41***	***-0.56***	0.15	0.01	0.08	-0.32	***0.62***	***0.62***	0.14	-0.16	**0.22**	***0.43***	-0.36	-0.05	***-0.48***	***0.48***	**-0.23**	0.35	0.14	0.19	0.00	***0.40***	**0.24**	-0.35	0.30	***0.93***	***0.96***		
Dinoflagellates	**0.25**	0.18	0.29	0.16	-0.06	-0.19	-0.06	0.20	-0.02	-0.16	-0.07	0.13	-0.16	-0.19	0.10	0.32	0.07	0.06	0.11	**-0.24**	0.05	-0.12	-0.20	0.21	-0.04	**0.25**	-0.21	0.07	0.10	0.30	0.32	0.20	0.30	**-0.27**	0.06	0.34	-0.01	0.01	0.05		
Euglenoids	-0.02	0.06	-0.03	-0.07	-0.08	0.01	-0.08	0.01	-0.08	-0.06	-0.04	0.02	-0.06	-0.06	-0.03	0.15	-0.06	-0.05	-0.02	0.13	-0.17	-0.15	-0.06	0.08	-0.29	0.13	-0.04	-0.12	-0.21	0.01	-0.02	-0.01	0.02	-0.06	-0.06	-0.03	-0.01	-0.02	0.01	0.07		
Green algae	***0.70***	***0.55***	*0.37*	-0.01	-0.06	-0.29	-0.06	***0.38***	0.03	***-0.46***	0.09	***0.41***	***-0.53***	0.10	0.36	**0.25**	-0.11	***0.43***	***0.46***	-0.18	-0.02	-0.18	-0.03	-0.11	-0.05	-0.06	0.03	0.09	0.17	0.32	0.30	**0.28**	***0.43***	0.07	**-0.22**	***0.60***	***0.41***	***0.40***	0.33	**0.22**	0.08	
Unidentified algae	0.19	0.00	**0.27**	**0.27**	0.01	0.01	0.01	0.04	0.03	0.00	0.12	0.00	-0.05	-0.03	0.01	0.06	0.02	-0.03	-0.02	-0.14	0.11	-0.01	0.02	0.18	0.10	0.04	0.02	0.08	0.20	0.18	**0.24**	0.10	0.12	0.14	-0.11	0.17	0.19	0.15	0.16	0.03	0.10	-0.01