Rates and Constants Table - SPS17_base5 (scratch)

	Parameter	Description	Value	Unit	Min	Max	Reference
1	**Genera Variables**						
2	Ke_a	Background non-algal light extinction	0.336	0 : 1/m	0	4	Cerco and Cole (1992)
3	Ke_b	Coefficient for chlorophyll for light extinction	0.0365	0 : 1/m/(ugA/L)^Ke_c	0	0.054	Riley 1956
4	Ke_c	Exponent for chlorophyll for light extinction	0.64	0 : No Units	0	1	Riley 1956
5	**NH3**	**Ammonia**					
6	anc	Nitrogen to carbon ratio	0.176	0 : g N/g C	0	0.25	WASP5; pp. 105
7	k71	Organic nitrogen mineralization rate	0.1	0 : 1/day	0.01	0.15	WDOE (1984)
8	th71	Temperature coefficient	1.07	No Units	0	1.08	WASP5; pp. 105
9	k12	Nitrification rate	0.07	0 : 1/day	0.09	0.13	WDOE (1984)
10	th12	Temperature coefficient	1.08	No Units	0	1.08	WASP5; pp. 105
11	knit	Half saturation constant for oxygen limitation	1	0 : g O2/m^3	0	2	WASP5; pp 105
12	kmnc	Half saturation constant for nitrogen	0.9	0 : g C/m^3	0	1	Boatman (1977)
13	**NO3**	**Nitrate**					
14	k2d	Denitrification rate @ 20 °C	0.15	0 : 1/day	0.09	0.16	WASP5; pp. 105
15	th2d	Temperature coefficient	1.05	No Units	0	2	WASP5; pp. 102
16	kno3	Michaelis constant for denitrification	0.5	0 : g O2/m^3	0.1	0.1	WASP5; pp. 105
17	**PO4**	**Inorganic Phosphorous**					
18	apc	Phosphorus to carbon ratio	0.001	0 : g P/g C	0.025	0.025	WASP5; pp. 98
19	k83	Dissolved organic phosphorus mineralization	0.2	0 : 1/day	0.1	0.3	WASP5; pp. 98
20	th83	Temperature coefficient	1.07	No Units	0	1.08	WASP5; pp. 98
21	kmpc	Half saturation constant for phosphorus	0.5	0 : g C/m^3	1	10	Boatman (1997)
22	plc	Phosphorus limiting switch	0	No Units			
23	**DAP**	**Diatoms - Phytoplankton**	☐				
24	c2chla_d	Ratio of carbon to chlorophyll a	40	No Units	10	100	EPA (1985)
25	rins_d	Saturating light intensity	100	1 : W/m^2	110	200	WDOE (1984)
26	kmn_d	Half saturation constant for nitrogen	0.001	0 : g N/m^3	0.001	0.025	WDOE (1984)
27	ZPGMode_d	Zooplankton grazing mode	1 : LinearGr	No Units	0	2	Boatman (1997)
28	kgmicro_d	Grazing rate due to microzooplankton	0.081	0 : 1/day	0	0.08	Boatman (1997)
29	kgmacro_d	Grazing rate due to macrozooplankton	0.101	0 : 1/day	0	0.101	Boatman (1997)
30	thkt_d	Temperature coefficient	1.045	No Units	1.045	1.045	WASP5; pp. 94
31	k1d_d	Death rate	0.003	0 : 1/day	0.015	0.2	WDOE (1984)
32	k1c_d	Maximum growth rate	0	0 : 1/day	0.01	4	WASP5; pp. 94
33	th1c_d	Temperature coefficient	1.068	No Units	0	1.08	WASP5; pp. 94
34	kmp_d	Half saturation constant for phosphorus	0.005	0 : g P/m^3	0.001	0.002	WASP5; pp. 94
35	k1r_d	Endogenous respiration rate @ 20 °C	0.1	0 : 1/day	0.05	0.2	WDOE (1984)
36	th1r_d	Temperature coefficient	1.045	No Units	1.045	1.045	WASP5; pp. 52
37	vs4_d	Settling velocity	0.05	5 : m/day	0.05	0.5	WDOE (1984)
38	fe_d	Excretion fraction of phytoplankton	0.1	No Units	0.1	0.8	EPA (1985)
39	as_d	Assimilation efficiency of zooplankton grazing	0.5	No Units	0.5	0.8	EPA (1985)
40	**DFP**	**Dynoflagellates - Phytoplankton**	☐				

Rates and Constants Table - SPS17_base5 (scratch)

	Parameter	Description	Value	Unit	Min	Max	Reference
41	c2chla_f	Ratio of carbon to chlorophyll a	70	No Units	10	100	EPA (1985)
42	rins_f	Saturating light intensity	100	1 : W/m^2	110	200	WDOE (1984)
43	kmn_f	Half saturation constant for nitrogen	0.007	0 : g N/m^3	0.001	0.025	WDOE (1984)
44	ZPGMode_f	Zooplankton grazing mode	1 : LinearGr	No Units	0	2	Boatman (1997)
45	kgmicro_f	Grazing rate due to microzooplankton	0.11	0 : 1/day	0	0.08	Boatman (1997)
46	kgmacro_f	Grazing rate due to macrozooplankton	0.01	0 : 1/day	0	0.101	Boatman (1997)
47	thkt_f	Temperature coefficient	1.04	No Units	1.045	1.045	WASP5; pp. 94
48	k1d_f	Death rate	1	0 : 1/day	0.015	0.2	WDOE (1984)
49	k1c_f	Maximum growth rate	0	0 : 1/day	0.01	4	WASP5; pp. 94
50	th1c_f	Temperature coefficient	1.057	No Units	0	1.08	WASP5; pp. 94
51	kmp_f	Half saturation constant for phosphorus	0.00001	0 : g P/m^3	0.001	0.002	WASP5; pp. 94
52	k1r_f	Endogenous respiration rate @ 20 °C	0.025	0 : 1/day	0.05	0.2	WDOE (1984)
53	th1r_f	Temperature coefficient	1.05	No Units	1.045	1.045	WASP5; pp. 52
54	vs4_f	Settling velocity	0.1	5 : m/day	0.05	0.5	WDOE (1984)
55	fe_f	Excretion fraction of phytoplankton	0	No Units	0.1	0.8	EPA (1985)
56	as_f	Assimilation efficiency of zooplankton grazing	0.5	No Units	0.5	0.8	EPA (1985)
57	UseVtemp	Use temperature dependent velocity	☑	View Equation			
58	Vtmax	Maximum temperature dependent velocity	0.000145	0 : m/sec	0	0.0002	Kamykowski et al. (1988)
59	b	Empirical Constant	0.632	No Units	0	2	Kamykowski et al. (1988)
60	c	Empirical Constant	2	No Units	0	5	Kamykowski et al. (1988)
61	tL	Lower temperature constant °C	11.68	0 : C	0	20	Kamykowski et al. (1988)
62	tH	Higher tempeature constant °C	33	0 : C	10	50	Kamykowski et al. (1988)
63	Voff	Swimming speed enhancement due to light	3.5e-005	No Units	0	0.0002	Kamykowski et al. (1988)
64	UseVlight	Use light dependent velocity	☑	View Equation			
65	Vlmax	Maximum light dependent velocity	3.5e-005	0 : m/sec	0	0.0002	Kamykowski et al. (1988)
66	Alpha	Empirical Constant	10	0 : um m^2/uEinst	0	20	Kamykowski et al. (1988)
67	**DO**	**Dissolved Oxygen**					
68	SDOEMethod	Surface DO reaeration formulation	1 : Wannink	View Equation			
69	kdf	deoxygenation rate @ 20°C for fast CBOD	0.1	0 : 1/day	0.16	0.21	WDOE (1984)
70	kds	deoxygenation rate @ 20°C for slow CBOD	0.02	0 : 1/day	0.16	0.21	WDOE (1984)
71	ReaerationFactor	Factor to increase the reaeration rate	1	No Units	1	10	
72	Thtk2	Temperature correction for reaeration	1.024	No Units	1.0	1.07	WUAL2Kw
73	**CBOD_F**	**Fast Reacting Dissolved**					
74	aoc	Oxygen to carbon ratio	2.67	0 : g O2/g C	2.67	2.67	WASP5; pp. 52
75	thd	Temperature coefficient	1.047	No Units	1.047	1.047	WASP5; pp. 52
76	kbod	Half saturation constant for oxygen limitation	0.5	0 : g O2/m^3	0.5	0.5	WASP5; pp. 52
77	foc	Oxygen from dead algae	0.5	No Units	0.5	0.5	WASP5; pp. 98
78	r_CBODP	Stoichiometric equivalent between CBOD and	0.004	No Units	0.004	0.004	CE-QUAL-W2 Version 3.2
79	r_CBODN	Stoichiometric equivalent between CBOD and	0.006	No Units	0.006	0.006	CE-QUAL-W2 Version 3.2
80	r_CBODC	Stoichiometric equivalent between CBOD and	0.32	No Units	0.32	0.32	CE-QUAL-W2 Version 3.2

Rates and Constants Table - SPS17_base5 (scratch)

	Parameter	Description	Value	Unit	Min	Max	Reference
81	**CBOD_S**	**Slow Reacting Dissolved**					
82	fd5	Fraction of dead phytoplankton recycled to	0.5	No Units	0.5		
83	**ON_D and ON_P**	**Dissolved and Particulate Organic**					
84	kh7p	Hydrolysis rate for particulate organic nitrogen	0.086	0 : 1/day	0.075	0.1	Cerco and Cole (1994)
85	thh7p	Temperature coefficient	1.047	No Units			
86	fon	Organic nitrogen from dead algae	0.5	No Units	0	0.5	WASP5; pp. 105
87	vs7	Organic matter settling velocity	0.1	5 : m/day	0.05	0.5	EPA (1985)
88	ancp	Particulate organic nitrogen to carbon ratio	0.25	No Units	0.25	0.8	WASP5; pp. 105
89	**OP_D and OP_P**	**Dissolved and Particulate Organic**					
90	kh8p	Hydrolysis rate for particulate organic	0.086	0 : 1/day	0.075	0.1	Cerco and Cole (1994)
91	thh8p	Temperature coefficient	1.047	No Units	0	1.08	
92	fop	Organic phosphorus from dead algae;	0.5	No Units	0.5	0.5	WASP5; pp. 98
93	vs8	Organic matter settling velocity	0.1	5 : m/day	0.05	0.2	EPA (1985)
94	apcp	Particulate organic phosphorus to carbon ratio	0.75	No Units	0.7	0.8	WASP5; pp. 98
95	**OC_P_F**	**Fast Reacting Particulate Organic**					
96	fd9f	Fraction of dead phytoplankton to recycled to	0.4	No Units	0	1	
97	fg9f	Fraction of micro-Grazing to fast reacting	0.4	No Units	0	1	
98	kpd9f	Hydrolysis rate for fast reacting particulate	0.075	0 : 1/day	0.075	0.08	Cerco and Cole (1994)
99	thpd9p	Temperature coefficient for the hydrolysis	1.07	No Units	0	1.08	Cerco and Cole (1994)
100	vs9	Settling velocity of particulate organic carbon	0.1	5 : m/day	0.05	0.2	EPA (1985)
101	**OC_P_S**	**Slow Reacting Particulate Organic**					
102	fd9s	fraction of dead phytoplankton to recycled to	0.4	No Units	0	1	
103	fg9s	fraction of micro-grazing to slow reacting	0.4	No Units	0	1	
104	kpd9s	Hydrolysis rate for slow reacting particulate	0.02	0 : 1/day	0.005	0.02	Pett (1989)
105	thpd9s	Temperature coefficient for the hydrolysis rate	1.07	No Units	0	1.07	Cerco and Cole (1994)
106	**OC_P_R**	**Refractory Particulate Organic**					
107	fd9r	fraction of dead phytoplankton to recycled to	0.2	No Units	0	1	
108	fg9r	fraction of micro-grazing to refractory	0.2	No Units	0	1	
109	**TVRC File Settings**						
110	UseTVRCData	Use time varying rates and constants data	0				
111	TVRCFileName	Time varying rates and constants file name	No_Data_F	Browse	View		