# Rates and Constants Table - base17a_XPC01

| | 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 | 0.045 | 0 : 1/m/(ugA/L)^Ke_c | 0 | 0.054 | Riley 1956 |
| 4 | Ke_c | Exponent for chlorophyll for light extinction | 0.7 | 0 : No Units | 0 | 1 | Riley 1956 |
| 5 | **NH3** | **Ammonia** | | | | | |
| 6 | anc | Nitrogen to carbon ratio | 0.1 | 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** | ☐ | | | | |

**Scenario: base17a_XPC01.txt**

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| | 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 | 0.2 | 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 | 1.06 | 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 |

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| | Parameter | Description | Value | Unit | Min | Max | Reference |
|---|---|---|---|---|---|---|---|
| 81 | **CBOD_S** | **Slow Reacting Dissolved** | | | | | |
| 82 | fd5 | Fraction of dead phytoplankton recycled to | 0.75 | 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 | 0.2 | 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 | 0.2 | 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 | 0.08 | 0 : 1/day | 0.075 | 0.08 | Cerco and Cole (1994) |
| 99 | thpd9p | Temperature coefficient for the hydrolysis | 1.04 | No Units | 0 | 1.08 | Cerco and Cole (1994) |
| 100 | vs9 | Settling velocity of particulate organic carbon | 0.2 | 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 | 1.04 | 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_Fi | Browse | View | | |