

| Process/plankton type     | Symbol         | Meaning                                 | Parameter value (mmol m <sup>-3</sup> )   |   |  |  |
|---------------------------|----------------|---|---|---|--|--|
| Nutrient Uptake ( $U$ )   |                |   | Monod*<br>( $U_h$ )<br>$\frac{n}{n+k}$<br>0.5   | Sigmoidal<br>( $U_s$ )<br>$\frac{n^2}{n^2+k^2}$<br>0.74 | Exponential<br>( $U_e$ )<br>$1 - \exp(-\frac{n}{k})$<br>1.12   | Trigonometric<br>( $U_t$ )<br>$\frac{2}{\pi} \arctan(\frac{n}{k})$<br>0.60 |
| Non-diatom                | $kN_{nd}$      | shape-defining constant for nitrogen    | 0.33  | 0.49  | 0.74   | 0.40   |
|                           | $kFe_{nd}$     | shape-defining constant for iron        | $\times 10^{-3}$  | $\times 10^{-3}$  | $\times 10^{-3}$   | $\times 10^{-3}$   |
| Diatom                    | $kN_d$         | shape-defining constant for nitrogen    | 0.75  | 1.12  | 1.68   | 0.91   |
|                           | $kSi_d$        | shape-defining constant for silicon     | 0.75  | 1.12  | 1.68   | 0.91   |
|                           | $kFe_d$        | shape-defining constant for iron        | 0.67<br>$\times 10^{-3}$  | 0.99<br>$\times 10^{-3}$                                | 1.50<br>$\times 10^{-3}$   | 0.81<br>$\times 10^{-3}$   |
| Grazing ( $G$ )           |                |   | Holling type III*<br>( $G_1$ )<br>$g_m \frac{P_a P_a^2}{k_g^2 + P_a P_a^2 + P_b P_b^2}$<br>0.80 |   | Holling type II<br>( $G_2$ )<br>$g_m \frac{P_a P_a^2}{k_g(P_a P_a + P_b P_b) + P_a P_a^2 + P_b P_b^2}$<br>0.46 |  |
| Microzooplankton          | $k_{mi}$       | half-saturation constant                | 0.75  |   | 0.75   |  |
|                           | $p_{mi_{nd}}$  | grazing preference for non-diatom       | 0.25  |   | 0.25   |  |
|                           | $p_{mi_{det}}$ | grazing preference for detritus         |   |   |  |  |
| Mesozooplankton           | $k_{me}$       | half-saturation constant                | 0.30  |   | 0.17   |  |
|                           | $p_{me_{nd}}$  | grazing preference for non-diatom       | 0.15  |   | 0.15   |  |
|                           | $p_{me_{det}}$ | grazing preference for detritus         | 0.15  |   | 0.15   |  |
|                           | $p_{me_d}$     | grazing preference for diatoms          | 0.35  |   | 0.35   |  |
|                           | $p_{me_{mi}}$  | grazing preference for microzooplankton | 0.35  |   | 0.35   |  |
| Mortality ( $\rho, \xi$ ) |                |   | Hyperbolic*<br>( $\rho_h, \xi_h$ )<br>$\mu \frac{P}{P+k_M} P$<br>0.10                           | Linear<br>( $\rho_l, \xi_l$ )<br>$\mu P$<br>0.10        | Quadratic<br>( $\rho_q, \xi_q$ )<br>$\mu P^2$<br>0.05  | Sigmoidal<br>( $\rho_s, \xi_s$ )<br>$\mu \frac{P^2}{P^2+k_M^2} P$<br>0.10  |
| Non-diatom                | $\mu_{nd}$     | maximum rate (day <sup>-1</sup> )       | 0.50  | –   | –  | 0.74   |
|                           | $k_{Mnd}$      | half-saturation constant                | 0.10  | 0.10  | 0.05   | 0.10   |
| Diatom                    | $\mu_d$        | maximum rate (day <sup>-1</sup> )       | 0.50  | –   | –  | 0.74   |
|                           | $k_{Md}$       | half-saturation constant                | 0.10  | 0.10  | 0.05   | 0.10   |
| Microzooplankton          | $\mu_{mi}$     | maximum rate (day <sup>-1</sup> )       | 0.50  | –   | –  | 0.74   |
|                           | $k_{Mmi}$      | half-saturation constant                | 0.20  | 0.19  | 0.07   | 0.20   |
| Mesozooplankton           | $\mu_{me}$     | maximum rate (day <sup>-1</sup> )       | 0.75  | –   | –  | 1.12   |
|                           | $k_{Mme}$      | half-saturation constant                |   |   |  |  |