$\boxed{Z = M + F}$

Shepherd

$$\frac{dP}{dt} = \frac{\alpha P}{1+\beta P^{\frac{1}{\gamma}}} - ZP$$

set $\frac{dP}{dt} = 0$

$$Z\cancel{\bar{P}} = \frac{\alpha \cancel{\bar{P}}}{1+\beta \bar{P}^{\frac{1}{\gamma}}}$$

$$1+\beta\bar{P}^{\frac{1}{\gamma}} = \frac{\alpha}{Z}$$

$-1 \quad /\beta$

$$\bar{P}^{\frac{1}{\gamma}} = \frac{\frac{\alpha}{Z}-1}{\beta}$$

$$\bar{P} = \frac{1}{\beta^{\gamma}}\left[\frac{\alpha}{Z}-1\right]^{\gamma}$$

Pella-Tomlinson

$$\frac{dP}{dt} = \alpha P\left(1+\beta\left(1-\left(\frac{P}{P_0}\right)^{\gamma}\right)\right) - ZP$$

set $\frac{dP}{dt} = 0$

$$Z\cancel{\bar{P}} = \alpha\cancel{\bar{P}}\left(1+\beta\left(1-\left(\frac{\bar{P}}{P_0}\right)^{\gamma}\right)\right)$$

$$\frac{Z}{\alpha} - 1 = \beta\left(1-\left(\frac{\bar{P}}{P_0}\right)^{\gamma}\right)$$

$$\left(\frac{\bar{P}}{P_0}\right)^{\gamma} = 1 - \frac{1}{\beta}\left[\frac{Z}{\alpha}-1\right]$$

$$\bar{P} = P_0\left(1-\frac{1}{\beta}\left[\frac{Z}{\alpha}-1\right]\right)^{\frac{1}{\gamma}}$$

$$= P_0\left(1+\frac{1}{\beta}\left[1-\frac{Z}{\alpha}\right]\right)^{\frac{1}{\gamma}}$$

Ricker-Power

$$\frac{dP}{dt} = \alpha P e^{-\beta\left(1-\frac{P}{P_0}\right)^{\gamma}} - ZP$$

set $\frac{dP}{dt} = 0$

$$Z\cancel{\bar{P}} = \alpha\cancel{\bar{P}} e^{-\beta\left(1-\frac{\bar{P}}{P_0}\right)^{\gamma}}$$

$$\log\left(\frac{Z}{\alpha}\right) = -\beta\left(1-\frac{\bar{P}}{P_0}\right)^{\gamma}$$

$$\left[\frac{1}{\beta}\log\left(\frac{Z}{\alpha}\right)\right]^{\frac{1}{\gamma}} = \left(\frac{\bar{P}}{P_0}-1\right)$$

$$\bar{P} = P_0\left(1+\frac{1}{\beta^{\frac{1}{\gamma}}}\log\left(\frac{Z}{\alpha}\right)^{\frac{1}{\gamma}}\right)$$

Deriso

$$\frac{dP}{dt} = \frac{\alpha P}{(1+\beta P)^{\gamma}} - ZP$$

set $\frac{dP}{dt} = 0$

$$Z\cancel{\bar{P}} = \frac{\alpha\cancel{\bar{P}}}{(1+\beta\bar{P})^{\gamma}} \qquad \bar{P} = \frac{1}{\beta}\left[\left(\frac{\alpha}{Z}\right)^{\frac{1}{\gamma}}-1\right]$$

$$1+\beta\bar{P} = \left(\frac{\alpha}{Z}\right)^{\frac{1}{\gamma}}$$

BH

$$\bar{P} = \frac{1}{\beta}\left[\frac{\alpha}{Z}-1\right]$$

Ricker

$$\bar{P} = \frac{1}{\beta}\log\left(\frac{\alpha}{Z}\right)$$