$$\frac{dN_t}{dt} = r_0 \ln \frac{K}{N_t} N_t - qEN_t$$

where:

N_t = the population size at time t
r_0 = maximum growth rate [1/time step]
K = carrying capacity
E = catching effort
q = catchability coefficient

whose solution is:

$$\ln N_t = lnK - \frac{1}{r} qE(1 - e^{-rt}) + \ln Ke^{-rt}$$