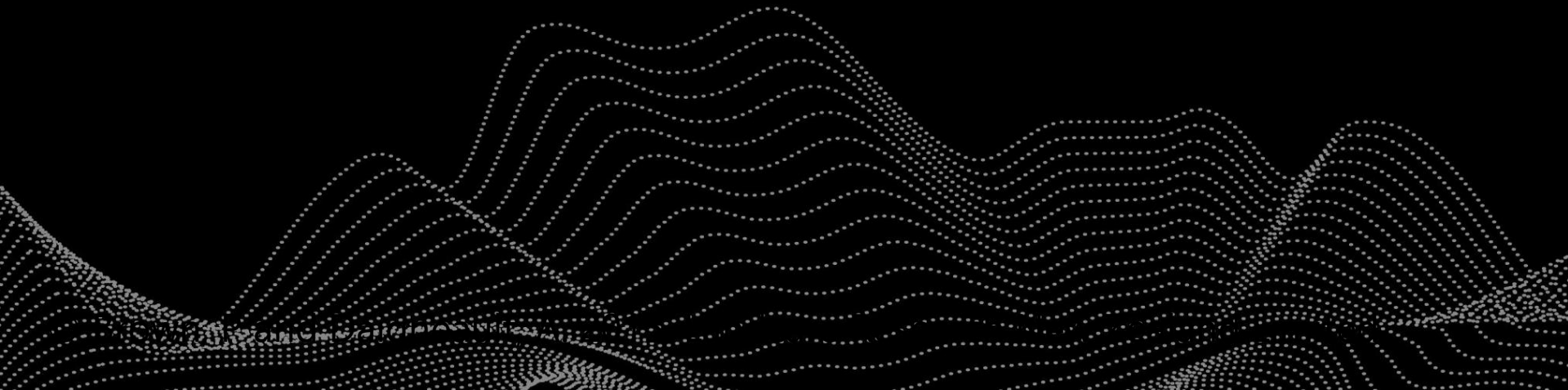




Manaaki Whenua
Landcare Research

Refining CBA

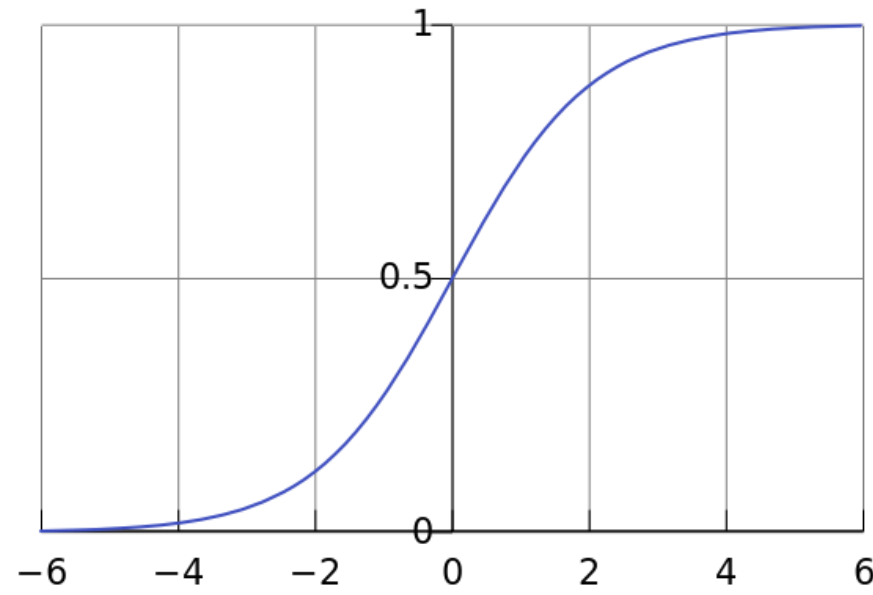
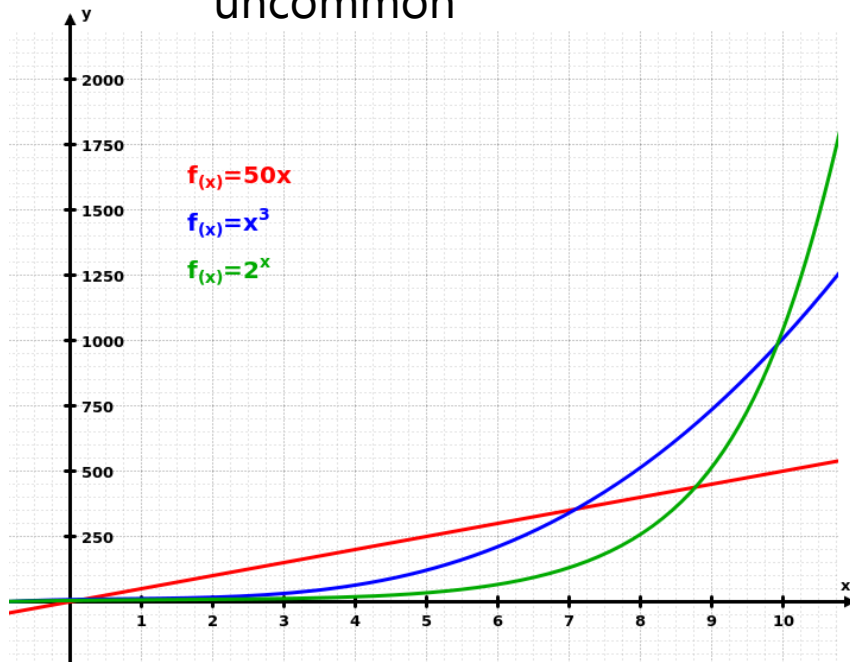
Population growth





Population growth

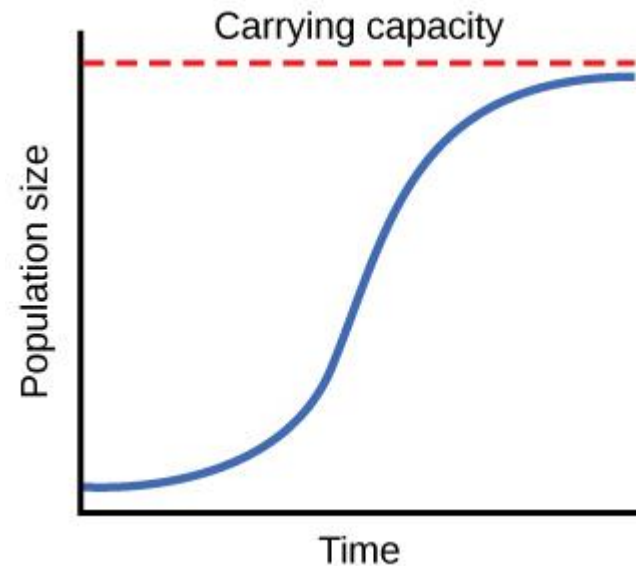
- The damages caused by invasive species are proportional to their population
 - The population of most living organisms follows a **logistic growth curve**
 - Some species follow **linear growth** curves, but **exponential growth** is uncommon





Population growth

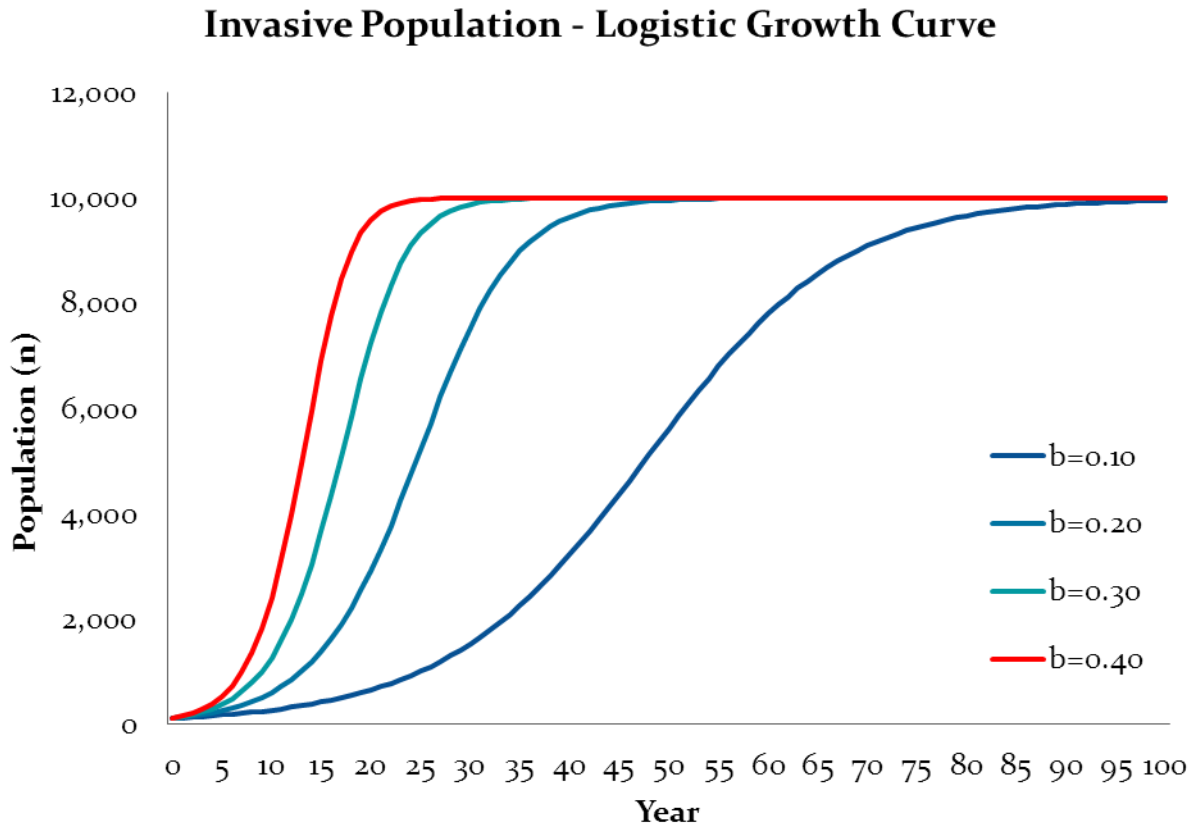
- Logistic growth:
$$\frac{dN}{dt} = bN_t \left(1 - \frac{N_t}{N_{max}}\right)$$
- where b = the proportional growth of the population, N_t , in one year
- N_t = population at time t
- N_{max} = **carrying capacity** of the population





Population growth

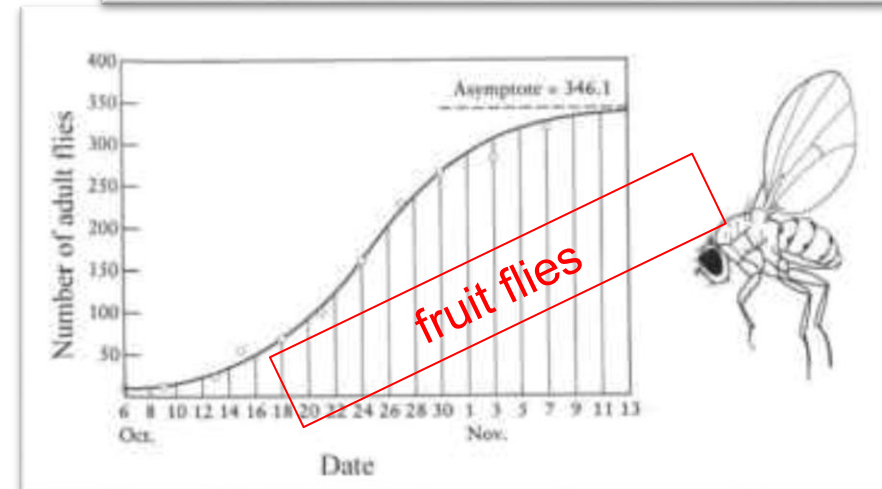
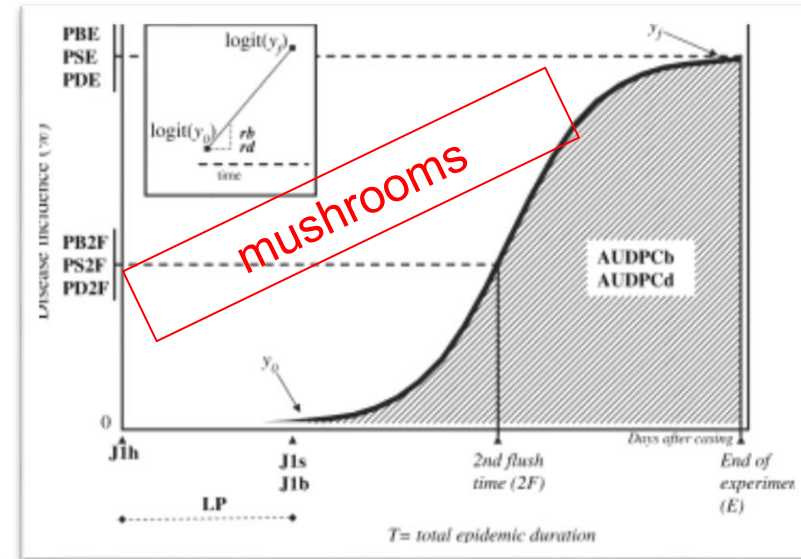
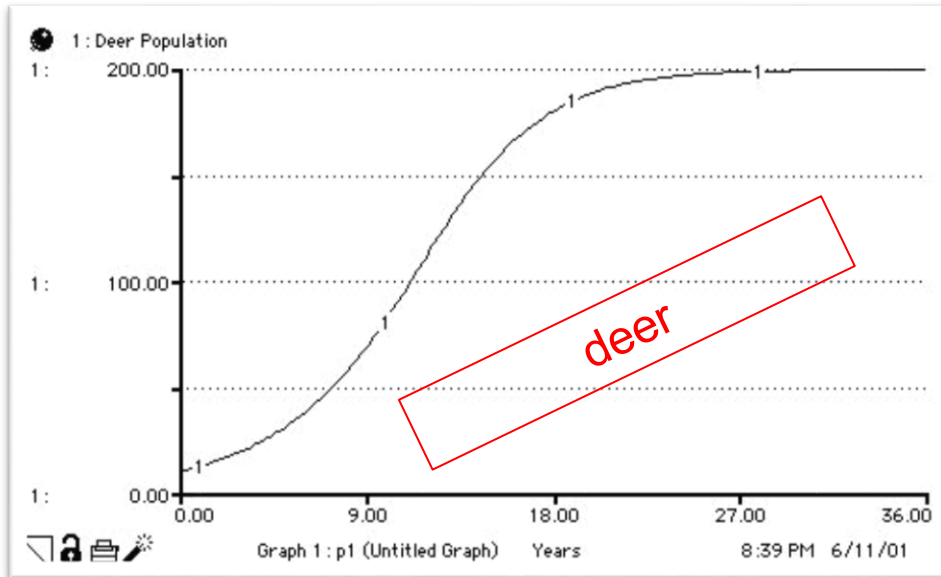
- With the same initial population, as b increases, the population reaches carrying capacity more quickly





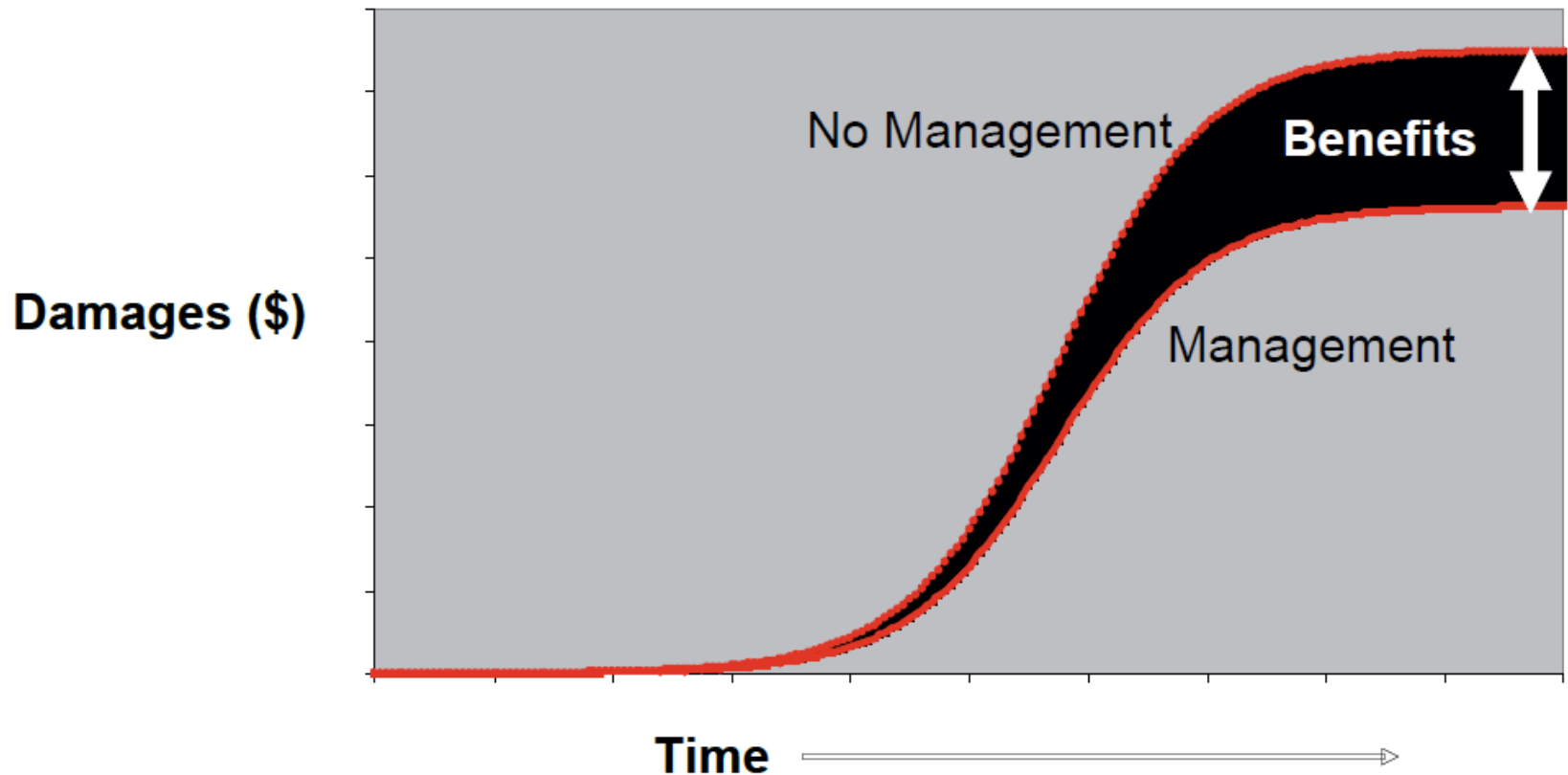
Population growth

- Most living things follow this pattern



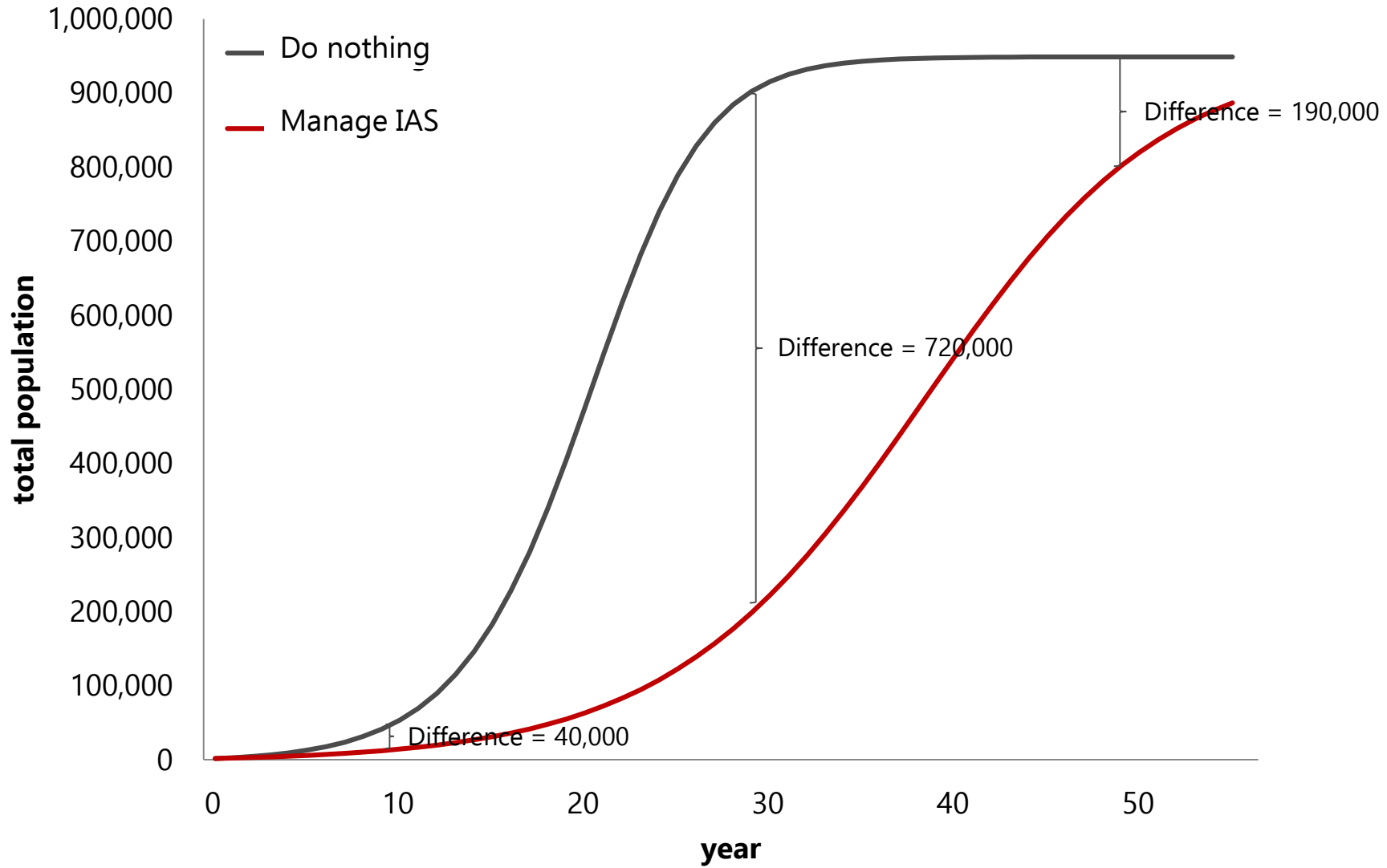


Estimating avoided damages from changes in the population



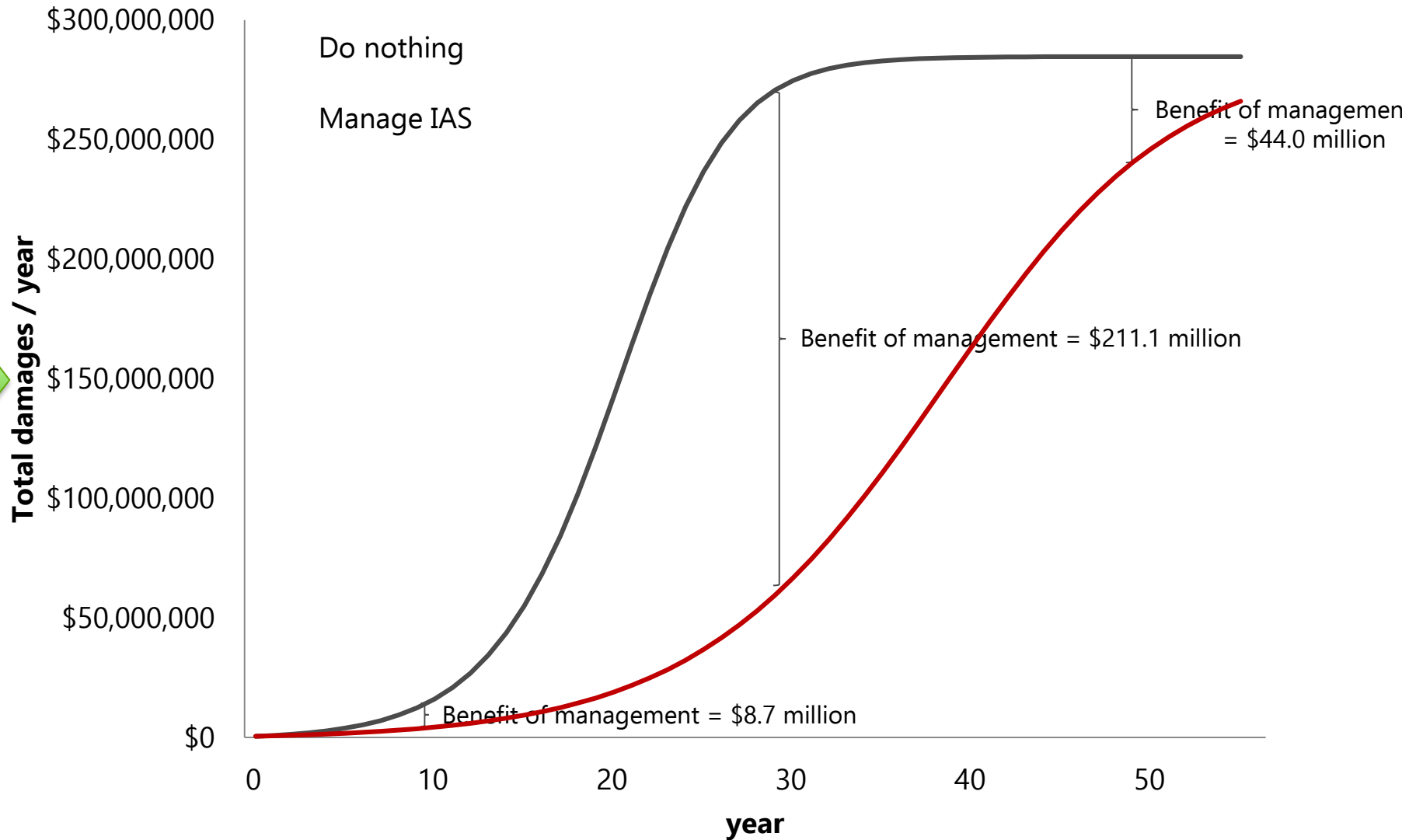


Total Population



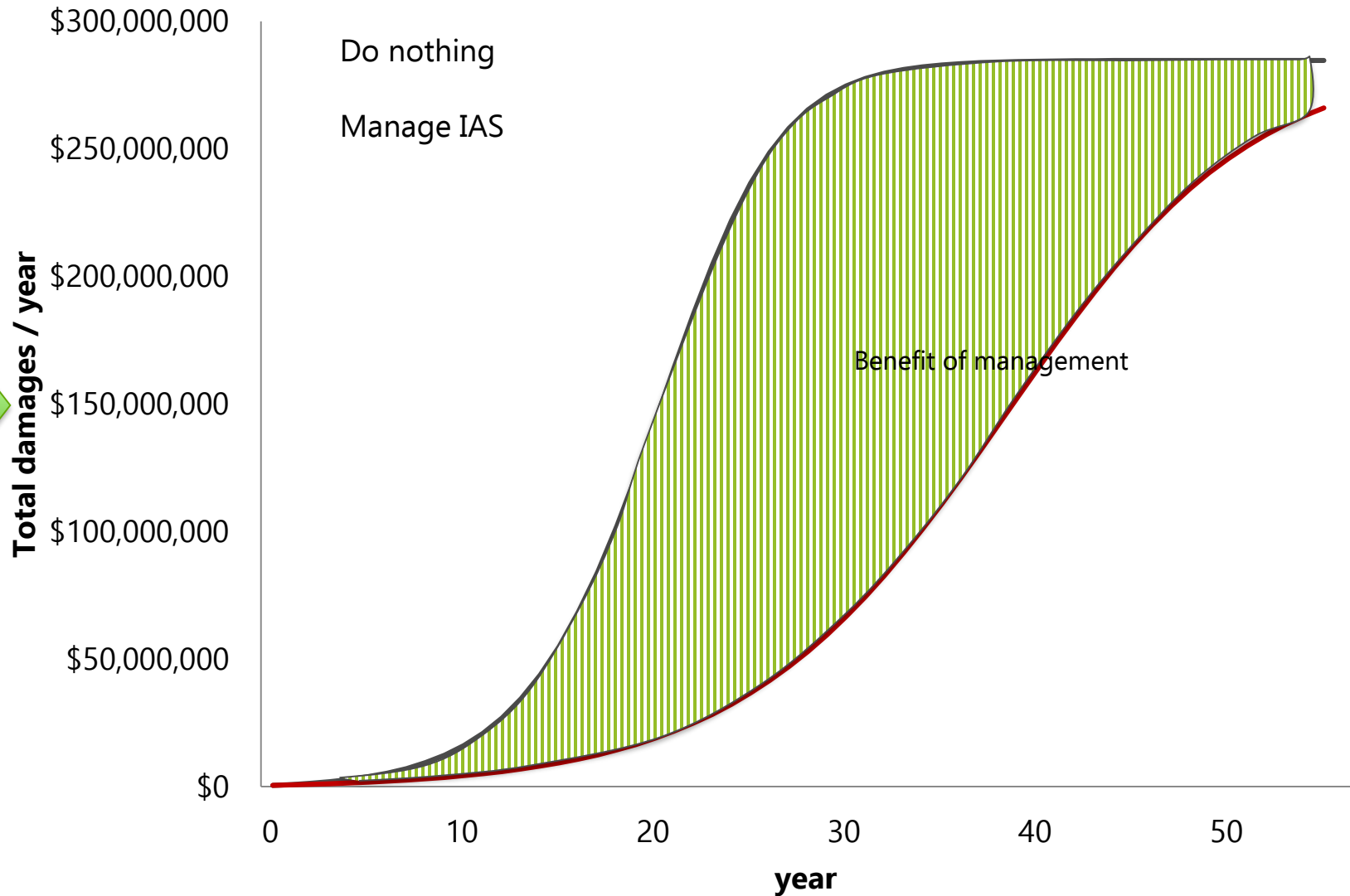


Total Monetary Damages





Total Monetary Damages



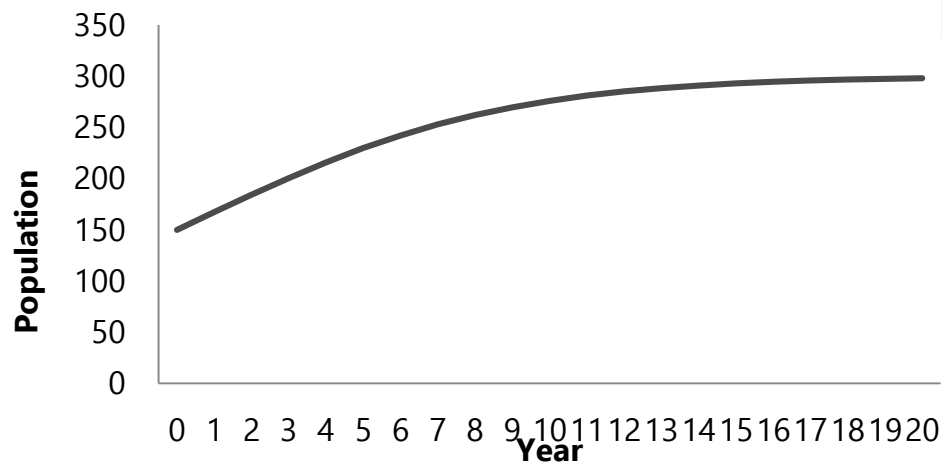


Population growth of jumbies

$$\frac{dN}{dt} = bN_t \left(1 - \frac{N_t}{N_{max}}\right)$$

- Current population (N_t) = 150
- Carrying capacity (N_{max}) = 300
- Proportional growth rate (b) = 0.23

Benefits of management
=
area between this curve
and curve under mgmt





EPEST

- **Economics of Pest Eradication Strategy Tool**
- Developed by Manaaki Whenua Landcare Research in partnership with Callum Lo
- Super useful, slightly fragile, very much in beta

