

## WF4133-Fisheries Science

Class 12: Population and Harvest  
Dynamics Continued

### Housekeeping

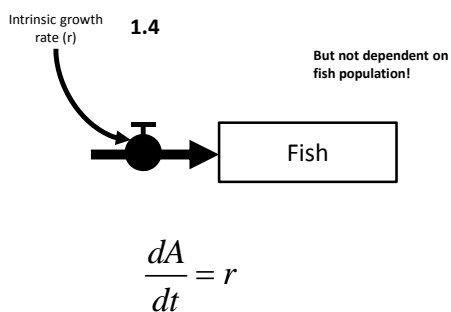
1. Exams graded
  1. Last 2 questions?
  2. +7 pnts
2. Lab Next Monday.



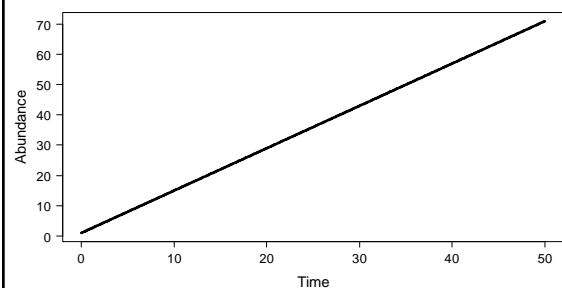
### Fish population dynamics

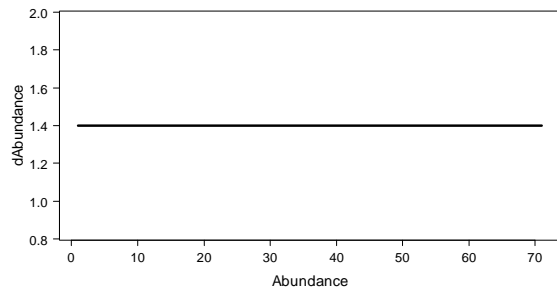
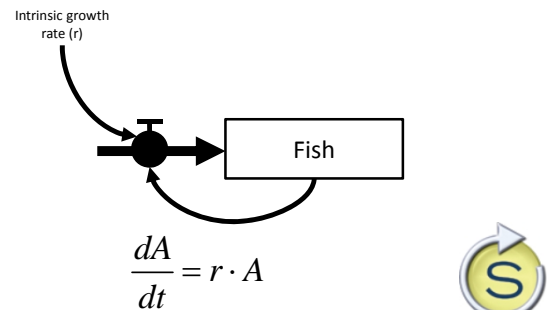
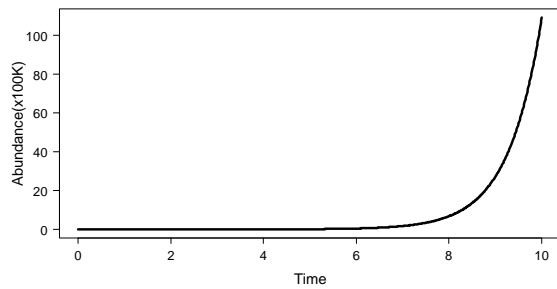
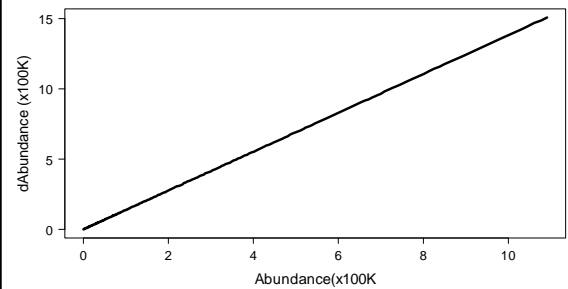
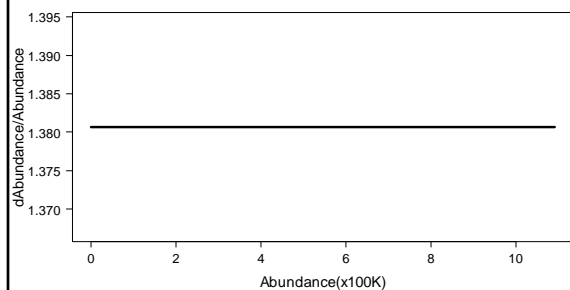
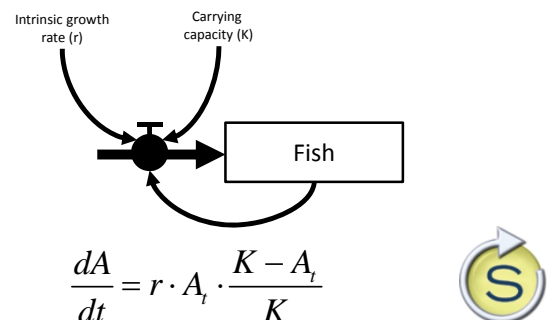


### Linear population model

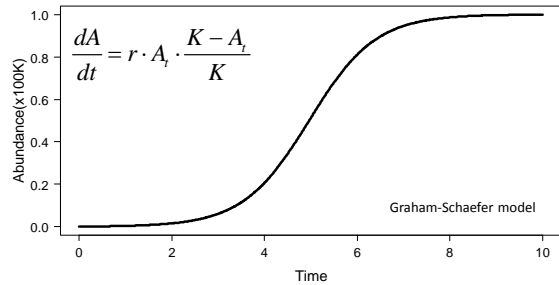


### Linear population dynamics

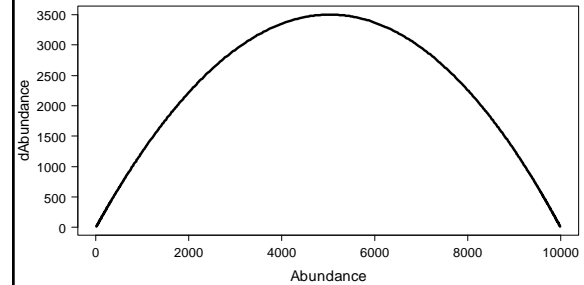


**dA versus A****Exponential population model****Exponential population model****dA versus A****Per capita rate of change****Graham-Schaefer model**

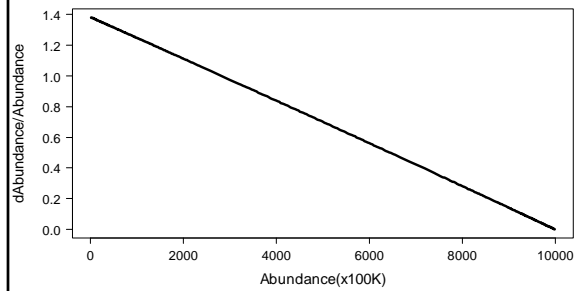
### Population dynamics



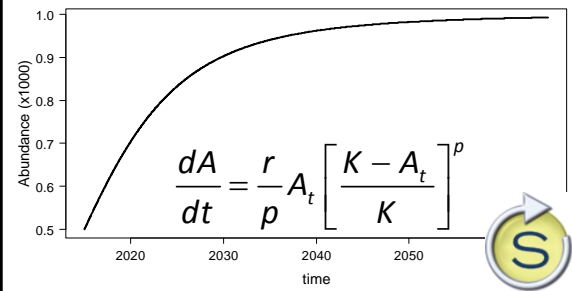
### dA versus A



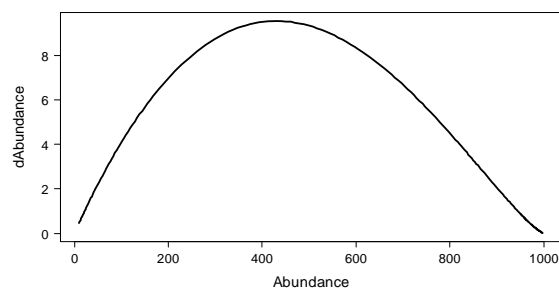
### Per capita rate of change



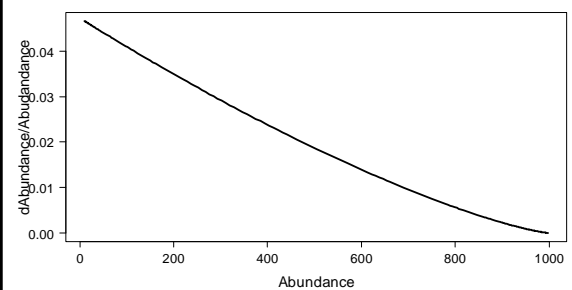
### Pella-Tomlinson

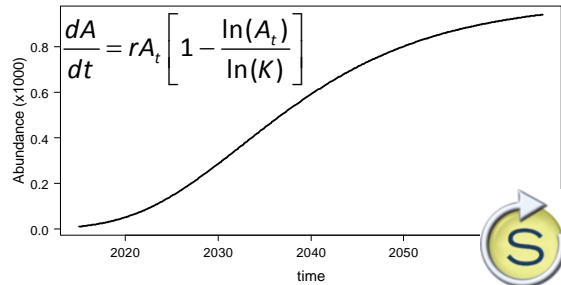
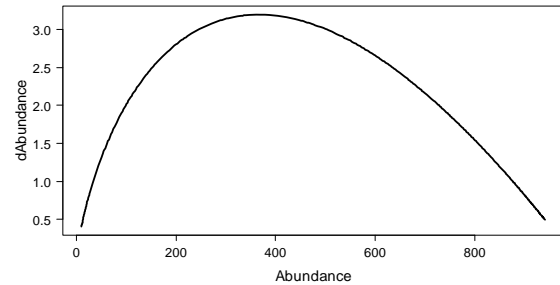
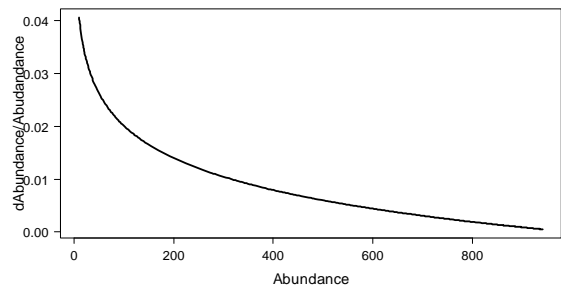
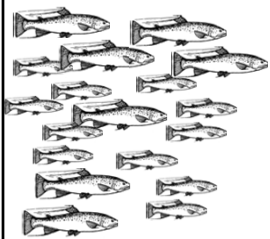
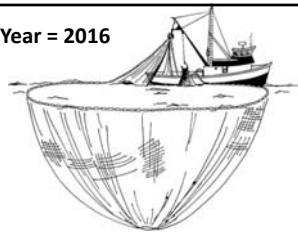
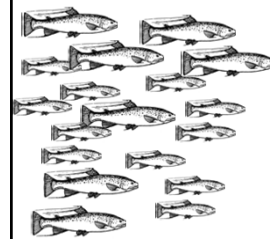
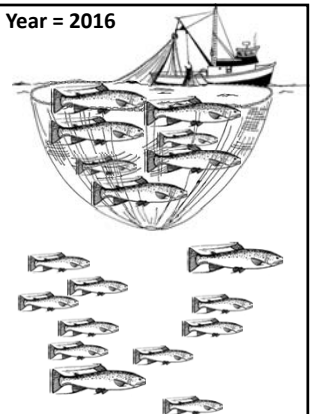


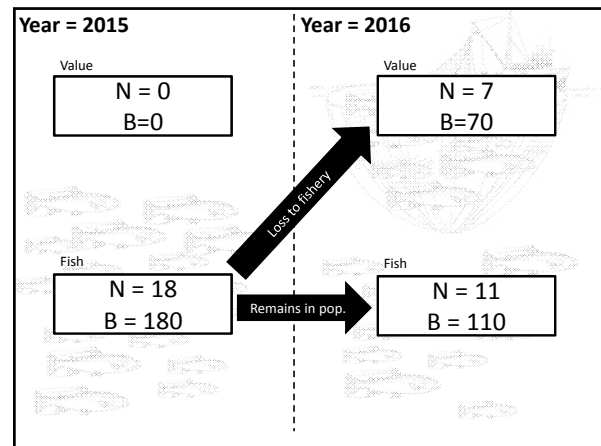
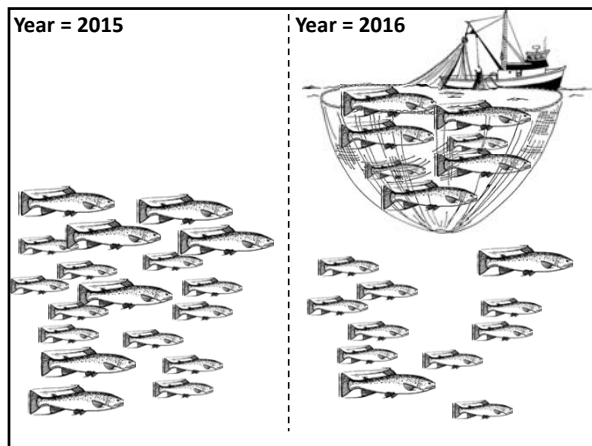
### dA versus A



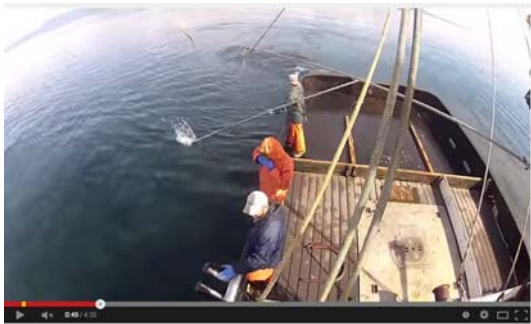
### Per capita rate of change



**Fox model****dN/dt versus N****Per capita rate of change****Year = 2015****Year = 2016****Year = 2015****Year = 2016**

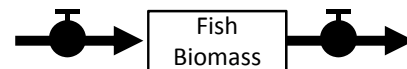


### The real fisheries world



SE Alaska Salmon Purse Seine Set

### Piecing it together



Fish are measured as  
biomass (B)

### Piecing it together



Value is quantified as some relation of fish

- Harvest Yield (abundance, biomass)
- Economic value
- Others...?

### Piecing it together



2 state variables that can  
accumulate or lose material

$$\frac{dBiomass}{dt} = ??$$

$$\frac{dYield}{dt} = ??$$

