NOTES - Populations.pdf

INVESTIGATION 1.2: 'A Sample Census - Wildlife on the Move'

- **population** - the total number of individuals of a single species that live in a designated region at a given time.
  - ex: human population is ~ 6 billion
- **population density** - the number of individuals of a single species that live in each unit area (km^2, mi^2, hectare, acre) of habitat at a given time.
  - ex: deer population is 6 deer per square mile
- **census** - a count of the population.
- **true census** - actual count of all of the individuals of a species in a given area.
- **sample census** - is an estimate of the population.

  (used when actual count is not possible)

ex density → 6 deer/mi^2
area → 10 mi^2

ESTIMATED POPULATION = Estimated Population Density x Area of Habitat

Pop => 6x10 = 60 deer

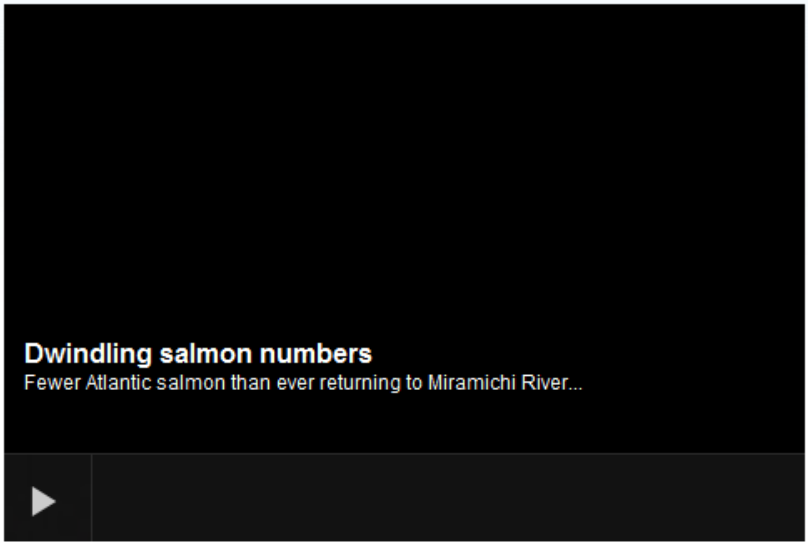
- The '**mark-return-recapture method**' is used to estimate population density.

ex: DFO at Millerton and Cassillis estimate salmon populations on Miramichi River.

$$P = \frac{T_F T_L}{M}$$

P - estimated population
T_F - total animals captured in first trapping
T_L - total animals captured in later trapping
M - recaptured animals that are marked

Miramichi Salmon Numbers Hit Record Low



CBC NEWS

Miramichi River salmon numbers hit record low in 2014

Bold Action Needed to Save Atlantic Salmon

TELEGRAPH JOURNAL

Bold action needed to stem Atlantic salmon crisis

Sept. 17, 2014

SHAWN BERRY LEGISLATURE BUREAU

http://asf.ca/bold-action-needed-to-save-atlantic-salmon.html

Calculating Exponential Growth

Formula for Exponential Growth

A quantity A that has exponential growth can be modeled by

$$A = P(1 + r)^n$$

$\wedge$ OR y^x

- A measures the quantity at any time.
- P is the initial value of A, when $n = 0$.
- r is the rate (%) of growth, *in decimal form.*
- n is the elapsed time.

http://www.math.andyou.com/pdf/152.pdf

http://www.math.andyou.com/152

EXAMPLE: The growth rate of a bacteria culture is 52% each hour. Initially, there are two bacteria. How many bacteria are there after 12 hours?

A = ? Population
P = 2
r = 52% → 0.52
n = 12

```
2(1+0.52)^12
        304.1956862
```

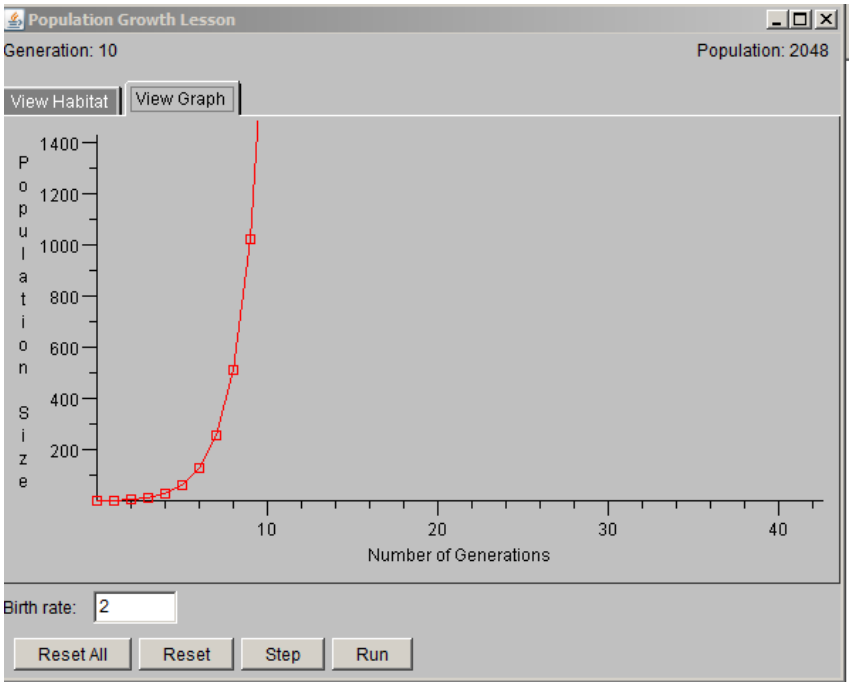
304 bacteria

Under ideal conditions:

NOTES - Exponential Growth.pdf

1. the **biotic potential** of a population is the maximum rate at which it can increase
2. **exponential growth** occurs - the population increases by the same percent from one time period to the next.

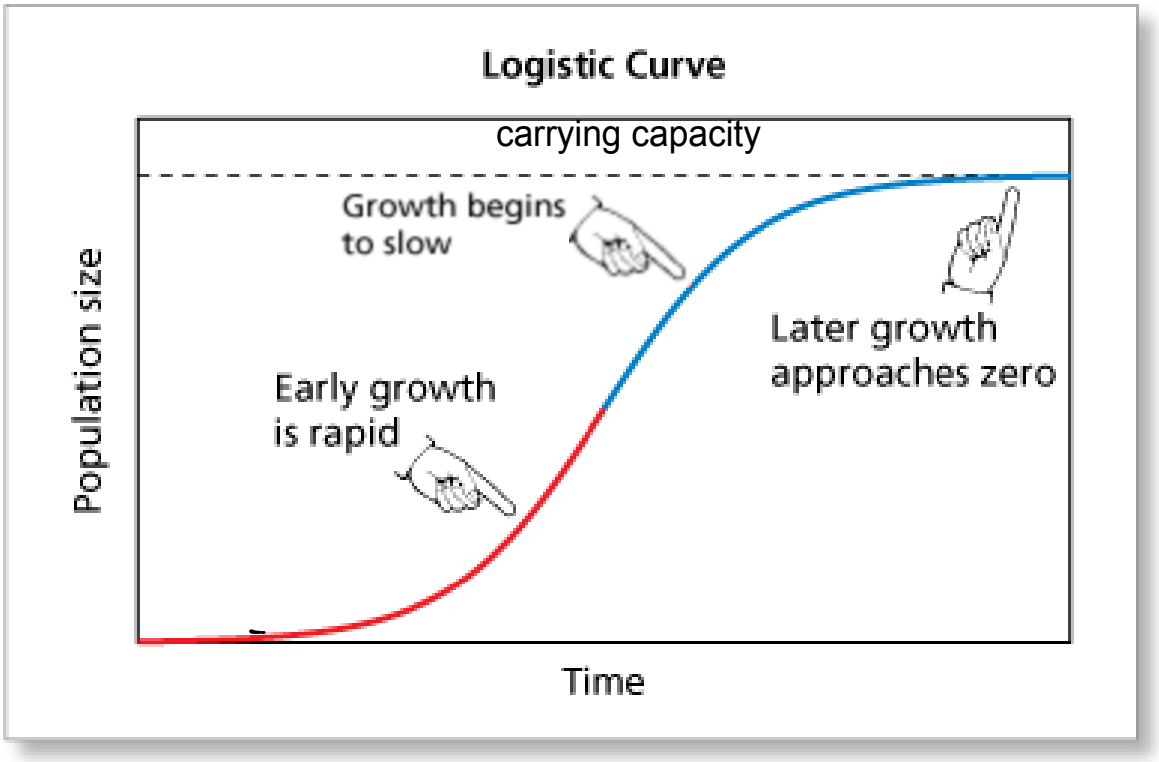
http://www.otherwise.com/population/exponent.html



- In nature, there are always limits to growth. A population will reach a size limit imposed by a shortage of one or more of the **limiting factors** of light, water, space and nutrients.
- **Carrying capacity** represents the highest population that can be maintained for an indefinite period of time by a particular environment.
- When a population grows exponentially at first, and then levels off to a stable number near the carrying capacity, it is called **logistic growth**. Logistic growth is much more common in nature than long-term exponential growth.
- **Natural Capital** - refers to all the natural resources on which people depend upon and includes resources we use to produce manufactured goods.

Exponential Growth -> "J"Curve

Logistic Growth -> "S" curve



Attachments

NOTES - Populations.pdf

NOTES - Exponential Growth.pdf