

## Questions on Populations

- A. For each of the underlined species, identify the following changes as density-dependent OR density-independent factors on the population.
1. A few animals infected with tuberculosis are accidentally introduced into the Canadian wood bison herd in northern Alberta.
  2. Arsenic leaks from a mine and enters a river where crayfish live.
  3. A pack of 15 **wolves** move across the border from Canada into a very large Montana park where they find adequate food, but frequently do not find mates for several years.
  4. Zebra mussels enter the Great lakes and grow on any surface, filtering food from the water and being eaten by a wide variety of ducks, including scoters.
  4. The whooping cranes in Florida are doing well with numbers over 200, but they still do not know how to do the proper mating dance to stimulate ovulation.
  6. Brown snakes arrive on Guam where they eat birds, lizards, nest under rocks and have no island predators and the snakes have become a serious pest with a bounty placed on them.
- B. Make survivorship curves of the three species below indicating which is most 'r' and which most 'K' -like.
- Species X – 1000 seeds released at a time; mature at 6 months;  
lives average of 7 months
- Species Y – 10000 seeds released at a time; mature in 3 months;  
lives average of 5 months
- Species Z – 100 seeds released at a time; mature at 18 months;  
lives average of 48 months

C. Identify which of the plant species [X,Y or Z above] will do best in the scenarios below:

Scenarios

7. A forest fire has just burned through an area.
  
8. An area has been left as parkland since 1925.
  
9. A beetle from Asia that strips all the leaves off plants has arrived in a Canadian forest.
  
10. An area near a river is prone to flooding, on average, once every 7 years.
  
11. Migratory bison come through the area every second year to feed on plants.

D. Select the type of symbiosis seen in each of the examples below

12. An acacia tree produces sugary globules that are eaten by insect-killing ants that live inside the hollow stems of the acacia.
  
13. A remora sticks to the underside of a shark where it picks up scraps of food dropped by the shark.
  
14. A photosynthetic alga lives inside the rigid chitin skeleton of a fungus.
  
15. A wasp disguises itself as an ant and enters the ant burrow where it is fed and looked after by workers that normally feed young ants.

## D. SURVIVORSHIP and SELECTION TYPE

1. Survivorship curves – tell us how long individuals \_\_\_\_\_ in a population

type I – species with a \_\_\_\_\_ survival rate of their young

- most of the individuals are expected to die only when \_\_\_\_\_

- eg \_\_\_\_\_

type II - species in which individuals die at a \_\_\_\_\_ rate from predation, disease, etc.

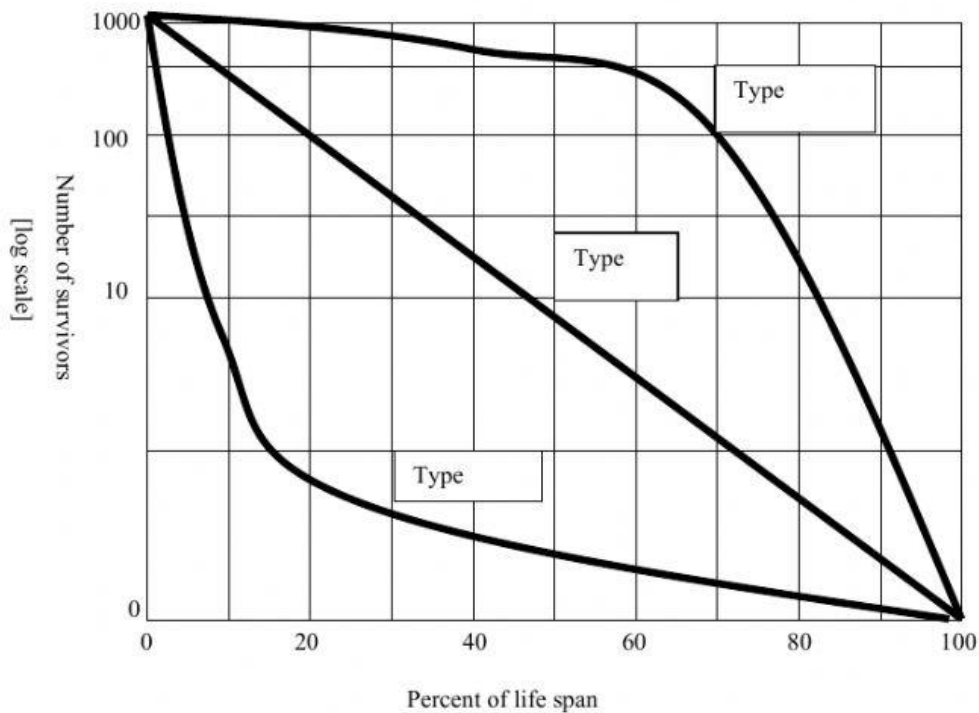
- eg squirrels, bees, most reptiles

type III-species with most individuals die when \_\_\_\_\_

- \_\_\_\_\_ babies are born, but \_\_\_\_\_ survive very long

- eg tobacco, salmon, oysters

Survivorship curves



2. 'r' and 'K' selection

- a. 'r' refers to species whose population is well \_\_\_\_\_ the carrying capacity and so can still grow \_\_\_\_\_ with a rate 'r'
- b. 'K' refers to populations that are \_\_\_\_\_ the carrying capacity [K]
- c. 'r' and 'K' refer to different \_\_\_\_\_ that will ensure the \_\_\_\_\_ of the species
- d. the environment, \_\_\_\_\_ of the organism, \_\_\_\_\_ & \_\_\_\_\_ of offspring, maturity, \_\_\_\_\_ expectancy and frequency of \_\_\_\_\_ all influence this

r	K
Unstable environment, density independent	Stable environment, density dependent interactions
_____ size of organism	_____ size of organism
energy used to make each individual is _____	energy used to make each individual is _____
_____ offspring are produced	_____ offspring are produced
_____ maturity	_____ maturity, often after a prolonged period of _____
_____ life expectancy	_____ life expectancy
each individual reproduces _____	individuals can reproduce _____
type _____ survivorship pattern	type ___ or ___ survivorship pattern
in which most of the individuals die within a short time but a few live much longer	in which most individuals live to near the maximum life span

## E. INTERACTIONS WITHIN COMMUNITIES

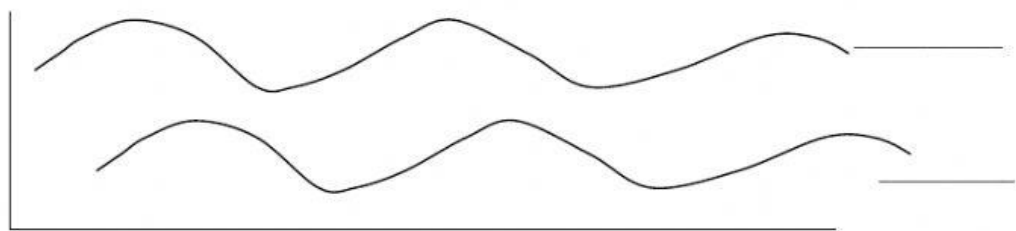
### 1. Interspecific competition

- 2 or more species struggling for the \_\_\_\_\_ resource
- both species will \_\_\_\_\_
- eg. two plants growing in the same shallow depression compete for water & neither gets enough

### 2. Predation

- one species \_\_\_\_\_ and \_\_\_\_\_ another
- the predator \_\_\_\_\_ but the prey \_\_\_\_\_
- but if the predator eats too \_\_\_\_\_ prey,

then the prey \_\_\_\_\_ & predator also \_\_\_\_\_



- note: there is always more of the \_\_\_\_\_  
the two cycles are out of \_\_\_\_\_ as there is a delay in the effect  
as predator #'s increase, prey #'s \_\_\_\_\_; as prey #'s fall, predator #'s \_\_\_\_\_

### 3. Defense mechanisms

- \_\_\_\_\_ – don't get seen by predator OR prey eg. \_\_\_\_\_
- \_\_\_\_\_ – produce or accumulated eg. \_\_\_\_\_ butterfly
- \_\_\_\_\_ - pretend to be toxic eg. \_\_\_\_\_ butterfly

### 4. Symbiosis

- \_\_\_\_\_ - both gain eg. \_\_\_\_\_ & giraffe
- \_\_\_\_\_ - one gains, one unaffected eg. \_\_\_\_\_ on back of turtle
- \_\_\_\_\_ - one gains, one loses eg. \_\_\_\_\_ and you

## F. Endangered species.

### Meaning of status

1. \_\_\_\_\_ is beyond help.
2. \_\_\_\_\_ can only be saved by imports.
3. \_\_\_\_\_ is in serious trouble & we must act fast to save these species.
4. \_\_\_\_\_ means we have more time before they become endangered.
5. \_\_\_\_\_ means we need to be concerned in the future.

### Causes of endangerment

1. \_\_\_\_\_ Once the trees are gone, everything that lived in them is gone as well.
2. \_\_\_\_\_ We are running out of many species of fish.
3. \_\_\_\_\_ The introduced starling has taken nest sites from many local birds.
4. \_\_\_\_\_ The pond still exists, but now few things can live in it.

### Factors influencing Endangerment

- a) SIZE \_\_\_\_\_ animals need more food and more space.  
Both animal may eat a similar \_\_\_\_\_ BUT one eats much more &  
so needs to \_\_\_\_\_ more to find more food
- b) RANGE An animal that is found in \_\_\_\_\_ place is at risk if anything happens to that place.  
The species with a \_\_\_\_\_ range is at greater risk  
than one that is found everywhere in Canada
- c) DIET A \_\_\_\_\_ is at greater risk because its food may become rare  
more readily than a \_\_\_\_\_ food
- d) BIOTIC POTENTIAL \_\_\_\_\_ rate, survival to reproductive age, births per \_\_\_\_\_ and  
births per \_\_\_\_\_ are all part of this. eg. \_\_\_\_\_ breed much faster than buffalo.
- e) HUMAN INTERACTIONS Some animals do well around people and some do not  
Some are killed from \_\_\_\_\_ Some are killed by \_\_\_\_\_

Some reduce their range by \_\_\_\_\_ humans.

Some are poisoned by \_\_\_\_\_ or purposely to kill predators.

### Putting all the factors together

Species A: small, large range, omnivore, moderate biotic potential, many human interactions

Four \_\_\_\_\_ & one negative factor. Is Species A at risk?

Species A: \_\_\_\_\_

Species B: medium size, large range, omnivore, very high biotic potential, many human interactions

Four \_\_\_\_\_ & one negative factor. Is Species B at risk?

Species B: \_\_\_\_\_

Predictions are not always easy

The \_\_\_\_\_ / human interactions involve feeding.

The \_\_\_\_\_ / human interactions involve killing.

BUT, in general, the more \_\_\_\_\_ factors,

the more \_\_\_\_\_ the species is to be in trouble.

### **work on endangered species questions**

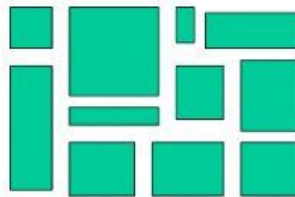
#### HUMAN THREATS TO OTHER SPECIES

##### 1. HUMAN POPULATION GROWTH

-humans directly compete with other species for \_\_\_\_\_ and \_\_\_\_\_

-more humans means more \_\_\_\_\_

##### 2. HABITAT FRAGMENTATION



a single large area of \_\_\_\_\_

the same area broken up into \_\_\_\_\_

## EFFECTS OF HABITAT FRAGMENTATION

- this creates barriers for \_\_\_\_\_
- the \_\_\_\_\_ [ vegetation is different for the outside 10 – 30m due to available light]  
different \_\_\_\_\_ means different food and nests
- fragmented habitat gives introduced \_\_\_\_\_ more access to the habitat

### 3. HABITAT LOSS

- not all habitat is \_\_\_\_\_
- some habitats are more \_\_\_\_\_ than others
- these are classified as \_\_\_\_\_ areas or Biodiversity \_\_\_\_\_

#### A. WHAT ARE WILDERNESS AREAS?

- only areas greater than \_\_\_\_\_ km<sup>2</sup>
- at least \_\_\_\_\_ percent of original vegetation
- less than \_\_\_\_\_ people / km<sup>2</sup>

#### WHERE ARE THE WILDERNESS AREAS ON EARTH?

- there are \_\_\_\_\_ Wilderness Areas
- they include habitats on every \_\_\_\_\_, ranging from the Amazon rainforest to the Sahara desert
- unfortunately, most of the Wilderness areas are in the \_\_\_\_\_  
where there is \_\_\_\_\_ biodiversity

#### B. WHAT ARE HOTSPOTS?

- these are the areas on Earth with the \_\_\_\_\_ biodiversity per square kilometer
- there are \_\_\_\_\_ biodiversity hotspots
- they contain \_\_\_\_\_ percent of all plant species

and \_\_\_\_\_ percent of all terrestrial vertebrate species

-they only occupy \_\_\_\_\_ percent of the planet's land area.

#### WHERE ARE THE HOTSPOTS?

most biodiversity hotspots are in the \_\_\_\_\_

The Wilderness area do not \_\_\_\_\_ very much with the Hotspots.

#### C. What are endemic species?

Any species \_\_\_\_\_ found in one area is said to be ENDEMIC to that area.

These ENDEMIC species may be found only on a single \_\_\_\_\_

or \_\_\_\_\_, in a single river or \_\_\_\_\_.

#### Why are there endemic species?

-they are not capable of \_\_\_\_\_ great distances to other suitable habitats

-their \_\_\_\_\_ requirements are only met over a small area

#### Why do hotspots have so many endemic species?

-they have \_\_\_\_\_ environment

-they have lots of \_\_\_\_\_

-they have been \_\_\_\_\_ for long times and the result is lots of endemic species