

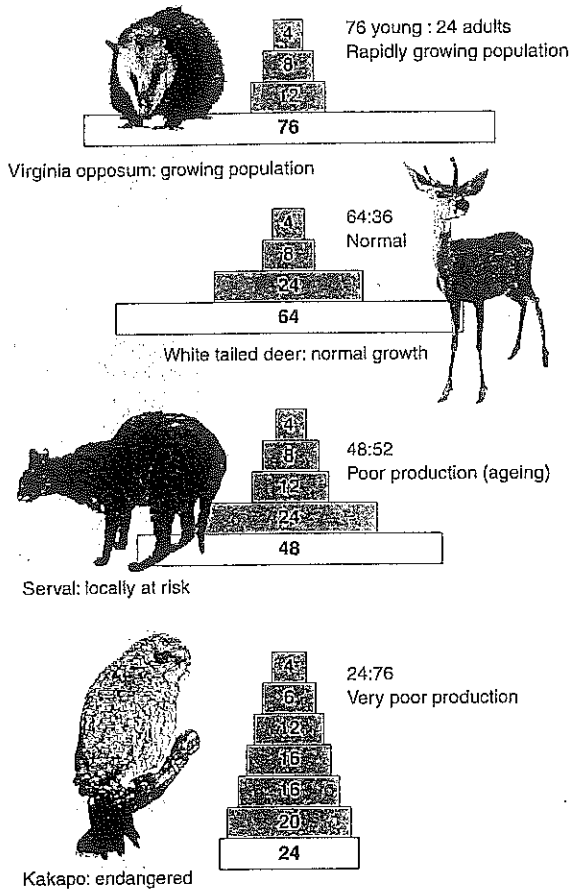
# Population Age Structure

The age structure of a population refers to the relative proportion of individuals in each age group in the population. The age structure of populations can be categorised according to specific age categories (such as years or months), but also by other measures such as life stage (egg, larvae, pupae, instars), or size class (height or diameter in plants). Population growth is strongly influenced by age structure; a population with a high proportion of reproductive and prereproductive aged individuals has a much greater potential for population growth than one that is dominated by older individuals. The ratio of young to adults in a relatively stable population of most mammals and birds is

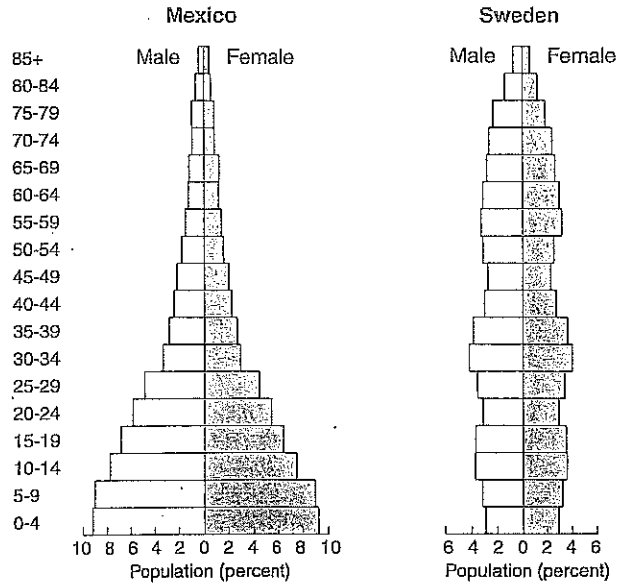
approximately 2:1 (below, left). Growing populations in general are characterised by a large and increasing number of young, whereas a population in decline typically has a decreasing number of young. Population age structures are commonly represented as pyramids, in which the proportions of individuals in each age/size class are plotted with the youngest individuals at the pyramid's base. The number of individuals moving from one age class to the next influences the age structure of the population from year to year. The loss of an age class (e.g. through overharvesting) can profoundly influence a population's viability and can even lead to population collapse.

## Age Structures in Animal Populations

These theoretical age pyramids, which are especially applicable to birds and mammals, show how growing populations are characterised by a high ratio of young (white bar) to adult age classes (grey bars). Ageing populations with poor production are typically dominated by older individuals.



## Age Structures in Human Populations



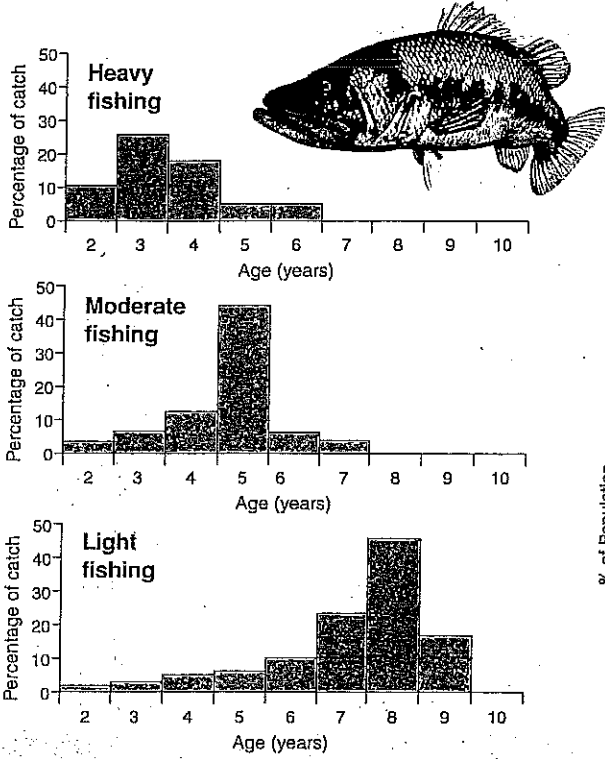
Most of the growth in human populations in recent years has occurred in the developing countries in Africa, Asia, and Central and South America. This is reflected in their age structure; a large proportion of the population comprises individuals younger than 15 years (age pyramid above, left). Even if each has fewer children, the population will continue to increase for many years. The stable age structure of Sweden is shown for comparison.

Analysis of the age structure of a population can assist in its management because it can indicate where most of the mortality occurs and whether or not reproductive individuals are being

replaced. The age structure of both plant and animal populations can be examined; a common method is through an analysis of size which is often related to age in a predictable way.

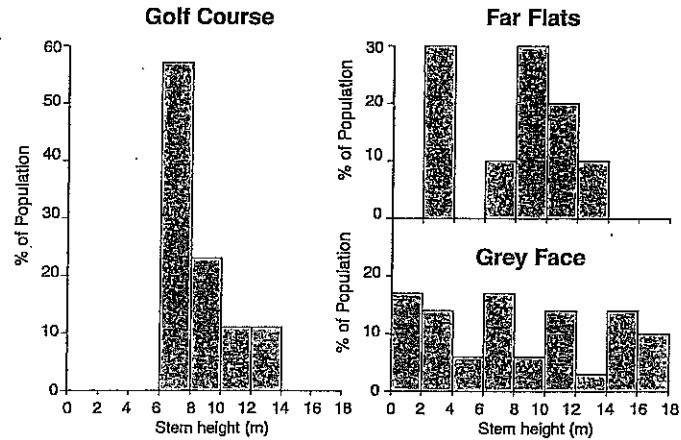
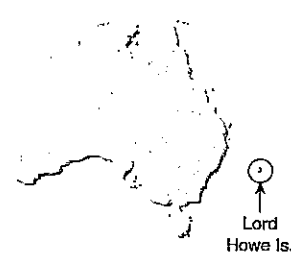
**Managed Fisheries**

The graphs below illustrate the age structure of a hypothetical fish population under different fishing pressures. The age structure of the population is determined by analysing the fish catch to determine the frequency of fish in each size (age) class.



**Thatch Palm Populations on Lord Howe Island**

Lord Howe Island is a narrow sliver of land approximately 770 km northeast of Sydney. The age structure of populations of the thatch palm *Howea forsteriana* was determined at three locations on the island: the golf course, Grey Face and Far Flats. The height of the stem was used as an indication of age. The differences in age structure between the three sites are mainly due to the extent of grazing at each site.



# Population Age Structure

Page 71 & 72

Name: \_\_\_\_\_

1. What is meant by the term age structure? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
  
2. What factor strongly influences population growth? \_\_\_\_\_  
\_\_\_\_\_
  
3. A population with a great potential for population growth would be different from that which has a low potential for population growth. What accounts for the difference? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
  
4. What would be the ratio (take the first number → young and divide it by the second number → adult) between adults and young in a:
  - a. Stable normal growth population? \_\_\_\_\_ young : 1 adult
  - b. Growing population? \_\_\_\_\_ young : 1 adult
  - c. Endangered population? \_\_\_\_\_ young : 1 adult
  - d. At risk population? \_\_\_\_\_ young : 1 adult
  
5. How is the shape of the Histogram for Mexico different from Sweden? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
  
6. Based on the Histogram Mexico is a \_\_\_\_\_ population while Sweden is a \_\_\_\_\_ population.
  
7. What might happen if a population loses an entire age class of individuals? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
  
8. What are 2 reasons why a conservation ecologist might want to do an analysis of age structure for a population? \_\_\_\_\_  
\_\_\_\_\_

9. For the managed fisheries what age of individual is most common under the following fishing pressures:
- a. Light fishing \_\_\_\_\_
  - b. Heavy fishing \_\_\_\_\_
  - c. Moderate fishing \_\_\_\_\_

10. Look at the age structure for the Thatch Palm trees. Which of the three sites best reflects the age structure of: (thinking)
- a. Ungrazed population? \_\_\_\_\_

Reason for your answer: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

- b. Heavily grazed population? \_\_\_\_\_

Reason for your answer: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

11. You are asked to manage a park. There are 177 deer in it. You do an age survey and discover the following results:

25 – 1 year old males	8 – 4 year old females
24 – 1 year old females	6 – 5 year old males
27 – 2 year old males	7 – 5 year old females
28 – 2 year old females	4 – 6 year old males
19 – 3 year old male	3 – 6 year old female
15 – 3 year old females	1 – 7 year old males
10 – 4 year old males	0 – 7 year old females

- a. Draw a histogram for this population below (hint look at human one page 71)

