Samples and Populations

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Samples versus Populations

- **The *sample* is what we observe**
- **The *population* includes everything we wish we could**

Sample Statistics vs Population Parameters

- Average height of 100 adult giraffes observed
- Average height of all adult giraffes in Kenya

$$\overline{x} \text{ versus } \mu$$

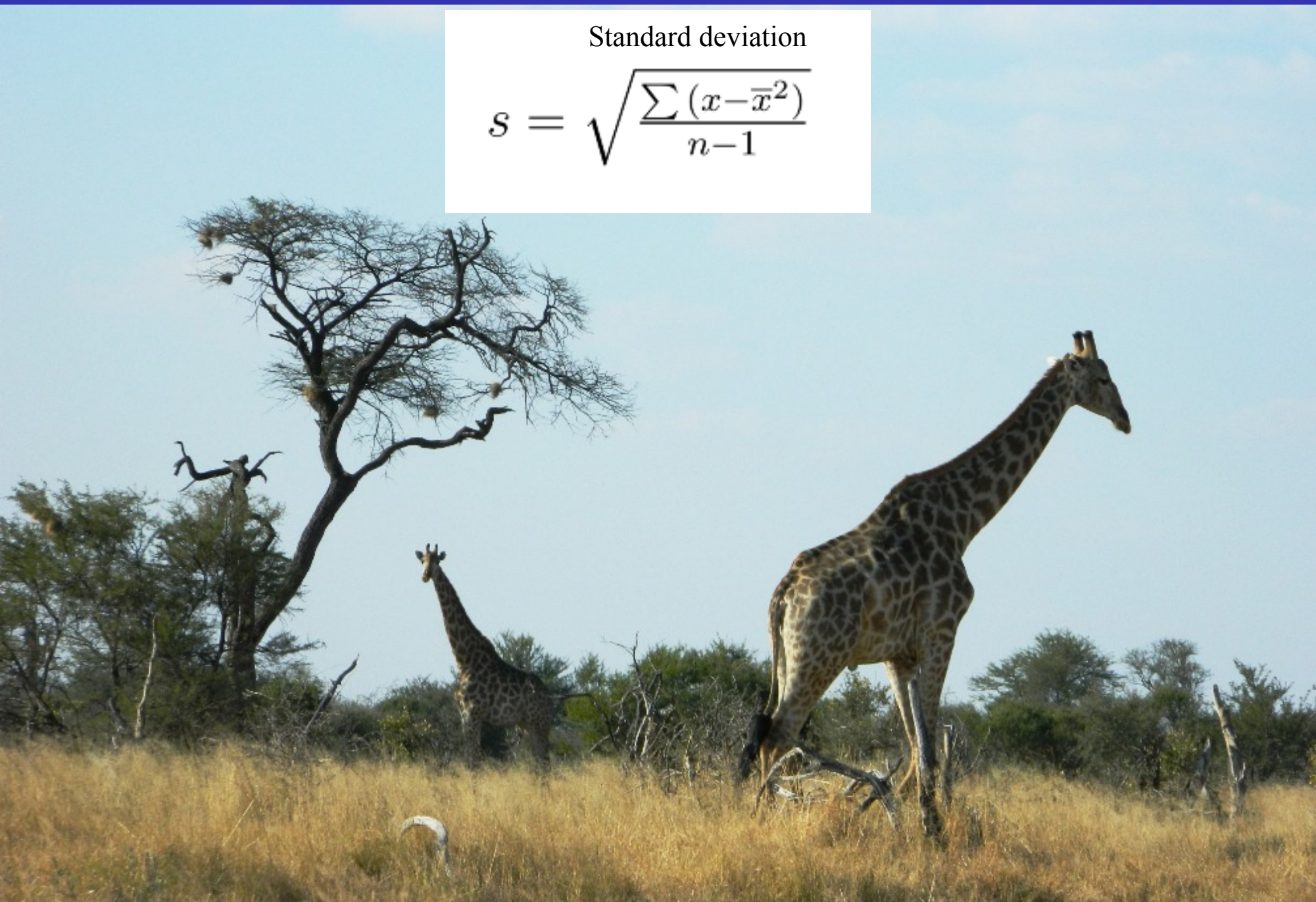
- Standard deviation of sample
- Standard deviaton of population

$$s \text{ versus } \sigma$$

How good is our estimate?

Standard deviation

$$s = \sqrt{\frac{\sum (x - \overline{x}^2)}{n-1}}$$



Estimating population mean by using sample mean

Standard error of the mean

$$SE = \frac{s}{\sqrt{n}}$$

There's a 68% chance that the population mean lies within one SE plus or minus of the sample mean.
(This is the Central Limit Theorem.)

Problem: If our 100 adult giraffes have an average height of 18 feet and the sample standard deviation is 2 feet, how do we estimate the population average?