WILDLIFE

Population Estimation

Suggested Time: 15-20 minutes

Recommended Grades: 6 - 12

Envirothon NB Learning Objectives

Science, Environmental Science, Math, Social Studies

Curriculum Outcomes

Concepts & Content

- Observation
- Data Gathering
- Estimation
- Analyze and Interpret
- Habitat
- Small Mammals

NB Global Competencies

- Critical Thinking & Problem Solving
- Communications
- Collaboration
- Sustainability & Global Citizenship
- Innovation & Creativity

Concepts

In a small population you are more likely to recapture marked individuals. In a large population you are less likely to recapture marked individuals.

UN Sustainable Development Goals

https://sdgs.un.org/goals

Acknowledgements

Presented by:

Kelly Honeyman and Joanne Jaillet, JD Irving Limited

Questions?
Connect with a natural resource expert.
Contact us:

Becky Geneau
Director, Environmental Programming & Science Competitions
becky.geneau@scienceeast.nb.ca
(506) 457-2340 ext. 129

WILDLIFE

Population Estimation

Suggested Time: 15-20 minutes

Recommended Grades : 6 - 12

Envirothon NB Learning Objectives

Science, Environmental Science, Math, Social Studies

Mark - Recapture Activity

The Mark and Recapture Technique

By far the most popular way to measure the size of a population is called the Mark and Recapture Technique. This technique is commonly used by fish and wildlife managers to estimate population sizes before fishing or hunting seasons. The mark and recapture method involves marking a number of individuals in a natural population, returning them to that population, and subsequently recapturing some of them as a basis for estimating the size of the population at the time of marking and release.

$$\frac{\text{R (marked recaptures)}}{\text{T (total in second sample)}} = \frac{\text{M (marked initially)}}{\text{N (total pop. size)}}$$

By rearranging the formula: where N is the total population

$$N = \frac{M*T}{R}$$

Example:

Suppose you took 200 mice out of a forest having an unknown number of mice, put leg bands on them, return them to the forest and let them mix thoroughly.

If you then take 250 mice from the forest and find 50 of them to be have leg bands, then **M = 200, T = 250, R = 50,** and the unknown total number of mice (N) could be estimated as:

N = M*T/R = (200)(250)/50 = 1000 mice

Question ?

A wildlife technician captures and applies an "X" to the belly 23 deer mice, which she then releases. A week later she traps 29 deer mice, 11 of which have an "X" on their belly.

What is the estimate of the total population of deer mice?

Going Further

What are some Issues/Concerns with using Mark-Recapture Methodology:

- Mark does not harm individual or affect its survival (ie big colourful ear tag makes it easier for prey to locate)
- Mark can't wash away
- No emigration or immigration during the survey period
- No mortality between time of mark and time of recapture
- Marking experience must not make an individual any more or less likely to be recaptured. (ie white deer in Maine clover traps was positive experience)

ENGAGE: Mark-Recapture Simulator
http://virtualbiologylab.org/NetWebHTML_FilesJan2016/MarkRecaptureModel.html

WATCH: Mark-Recapture
https://www.youtube.com/watch?v=240806aPHVg