Mark-Return-Recapture

This activity simulates a population census technique commonly used by wildlife biologists in the field. The first step is to trap a random sample of animals of the desired species. These animals are then ear-tagged or marked in some other manner and released. The next step is to trap once again. Some of the animals captured may have been marked from the first sample. Using a simple ratio, the biologist can come up with a quick population estimate. Here, you will use peas to represent the animal being studied and a beaker to represent the habitat.

$$\frac{N}{M} = \frac{n}{m}$$

N=Population estimate
M=Number of animals captured and marked in first sample
n=Number of animals captured in second (or subsequent)sample
m=Number of "n" that were already marked

1. Read all the directions before you begin.
2. Fill a 250 mL beaker ("habitat") to about the 100 mL mark with dried peas ("animals"). Do not count them, but make an estimate as to how many animals are in the population. This is a total guess and will be used later in the activity. Record your estimate.
3. Pick out a handful of animals (40-50) and count them. This is your first trapping sample, M. Record your data in Table 1.
4. To mark these animals put a mark on them using a marker. These marked individuals must be released back into the population (i.e., the beaker).
5. Shake the beaker and, without looking, grab another handful of animals. This is your second trapping sample, n. Try to make the number of animals removed each time about the same.
6. Record the number of marked (i.e., colored) animals trapped in your second trapping, m. Return the animals to the habitat.
7. Now use the equation above to calculate the estimated population, N. Remember this has nothing to do with the guess you made in step 2. Show all your work.
8. Repeat steps 5-7 to collect and record data for nine more trappings and then average your results.

Table 1 Number of animals trapped captured and marked in each sampling

	1	2	3	4	5	6	7	8	9	10
n										
m										
N										

M =

9. Count the actual number of animals in your population.
10. Was the result from the census closer than your initial estimate?
11. Was this technique a true or sample census?
12. Do you think the mark-return-recapture method is an accurate way to estimate the population? Justify your response.
13. What species of animal would this technique work well for? What species of animal would this technique not work for? Why?
14. For each of the following, indicate whether you would use a sample census or a true census and justify your choice.
a) Moose in Fundy National Park

b) Maple trees in Rockwood Park

c) Field mice on a farm

15. Give some reasons wildlife biologists might want to estimate the size of a population.