Mark-Return-Recapture

It is often impractical or impossible to accurately determine the size of an animal population. The mark-return-recapture method is a technique commonly used 3to estimate the size of a population. 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 marked might be captured in the second trapping. The proportion of recaptures to new captures on this second round can be used to estimate the actual size of the population. Using a simple ratio, the biologist can come up with a quick population estimate. Here, you will use popcorn kernels to represent the animal being studied and a beaker to represent the habitat. The kernels will be marked with a marker.

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

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. Fill a 250 mL beaker ("habitat") to about the 100 mL mark with kernels (your "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.
2. "Trap" a few animals by removing them from the beaker. You should trap about 20 individuals. Count the animals and record the number in your data table as M, the number trapped in your first trapping.
3. To mark these animals put a mark on them using a marker. Release the animals into the population (*i.e.,* the beaker).
4. Shake the beaker and, without looking, make perform trapping. Count them and record this as n = 1, your second trapping sample. Try to make the number of animals trapped each time about the same.
5. Record the number of marked (*i.e.,* colored) animals trapped in your second trapping as m = 1. Return the animals to the habitat.
6. 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.
7. Repeat the procedure to complete n = 10. Average your results.

Table 1 M =

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

Questions

a) Count the actual number of animals in your population.
b) Was the result from the census closer than your initial estimate?
c) Which part of this activity represents a true census? Which part represents a sample census?
d) How could the accuracy of the census be improved?
e) Why would this type of census work well for some animal species but not others?
f) Give some reasons wildlife biologists might want to estimate the size of a population.