



Wisconsin Critter Count: Student Handout

INTRODUCTION

The Wisconsin Department of Natural Resources uses a variety of tools and techniques to monitor wildlife, and to produce population estimates to better inform management decisions. Population estimates are used to look at long term trends, as well as setting harvest limits during hunting seasons for potentially vulnerable species. There are two count methods for generating population information: sample counts and total counts. In total counts, every individual of an intended geographic area is counted. For sample counts, a smaller fraction of individuals are counted and the data is used to interpolate population information for the entire geographic area. In this activity, you will create a model for these two different count methods and explore the advantages and disadvantages to both approaches.

PROCEDURES AND QUESTIONS

Follow the instructions and complete the questions as you work through the activity.

1. In the chart below, list all the advantages and disadvantages you can think of in using a sample count versus a total count for population estimates.

Survey method	Advantage (+)	Disadvantage (-)
Sample count		
Total count		

2. Read "Otter Fact Sheet."
3. You and a partner will work together to model the method used to generate otter population estimates using lentils (or beans) and a landscape sheet. Look at the landscape sheet and make sure you are familiar with the parts of the model (counting strips, transects and total landscape area).



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4. Obtain your measurements for the landscape:
 - a. Each transect has two counting strips (one on each side of the plane's flight path, represented by the dashed line).
 - b. Measure the length of a counting strip in transect A. Record the value in the **length** column below.
 - c. Measure the width of a counting strip in transect A. Record this value in the **width** column below.
 - d. Determine the area of transect A by multiplying the length x width x transect factor and record the value below (the transect factor takes into account that there are two transects for each flight path).
 - e. Repeat steps a-d above for transect B and record the values below.
 - f. Determine the total landscape area by measuring the length and width of the landscape sheet and then multiplying these two measurements.

Area Name	Length (cm)	Width (cm)	Transect Factor	Area (cm ²)
Transect A			x2	
Transect B			x2	
Total Landscape				

Data Table 1: Transect and Total Landscape Area

5. Your teacher will describe how to obtain your otters (lentils).
6. You will put the lentils on the landscape sheet using one of the methods below. Once you distribute your lentils, do not move them until you complete your total count.

No sheet protector method: one person cups the lentils into both hands about 10 cm above the landscape sheet and in one motion, pulls their hands apart to distribute the lentils. Runaway lentils should be returned to the landscape sheet randomly.

Sheet protector method: make sure the landscape sheet is in a sheet protector and hold vertically while another student pours in lentils. Then hold the protector horizontally on a table with one hand holding the opening closed and rapidly shake or wiggle the setup for a few seconds to distribute them

7. You will do a sample count first. Before you start counting, your class should agree on how to count the lentils within the counting strips so each group is doing it the same way. An important thing to keep in mind is not to count lentils in the flight paths (the area in between the counting strips) as this area is not taken into account for the transect areas. Other examples include: don't pick up lentils as you count, or a lentil has to be all the way in the counting strip to be counted.
8. Once you've counted the lentils for each transect, record the numbers in the data table below.
9. Calculate the density of lentils for each transect by dividing the number of lentils counted in the transect by the area of the transect and record in the data table below. *Don't forget to include your units of measurement throughout the activity.*



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Transect	Number of otters counted in transect	Otter density in transect (Number of otters / area of the transect cm ²)
A		
B		
Total Landscape		

Data Table 2: Otter Densities from Sample Count

10. Calculate the average density for the transects (add densities from above and divide by 2) and record. Average density of otters for transects: _____
11. Estimate the total number of otters in the landscape by multiplying the average density by the area of the landscape. Record data: _____
12. Now, do a total count for your landscape. Count all the lentils on your landscape (entire sheet). Record data: _____
13. How similar were the numbers between the sample and total counts on your landscape?

14. Now, examine the whole class data. Use each group's data from Data Table 2 to fill out Data Table 3: Class Data for Otter Counts below. Once you have data from all the groups, add the numbers together to complete a total for the class (this can also be done using a spreadsheet).



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	Group number	Total number of otters in sample count for landscape	Actual number of otters from total count for landscape
Totals			

Data Table 3: Class Data for Otter Counts

15. Calculate the total area for the class. Take the landscape area you calculated in Table 1 and multiply it by the number of groups in your class. _____
16. Calculate the estimated density of otters for the class using the class **sample count** data. Take the total number of otters from the sample count total calculated in Table 3 and divide it by the total area for the class. _____
17. Calculate the actual density of otters from the class using the **total count** data. Take the total number of otters from the total column in Table 3 and divide it by the total area for the class. _____
18. Look at the calculations above. How similar were the numbers between the sample and total counts for the whole class data?



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19. In the sample count method, did any issues arise? If so, what did your group do to address the issues?

20. What issues do you think researchers might encounter when conducting sample count and how would they address these issues?

21. Revisit the survey method chart you completed on page 1. Now that you have read the handout and completed the activity, add additional advantages or disadvantages for the different methods.



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Thinking about the bigger picture.

23. Think about other species of Wisconsin wildlife. Are there any other species that aerial surveys may work well for? What about some species that aerial surveys would not work well for?

24. A goal of Snapshot Wisconsin is to provide another tool for generating wildlife population estimates. What are some advantages and disadvantages of using trail cameras for population estimates?

22. Discuss any modifications you could make to this model to better represent an otter count in Wisconsin.