



Restoration of Great Lakes Marshes, Activity—Writing Hypotheses Data Sheet

- Data Set: *Phragmites* Vegetation Sampling & Bird Use Monitoring (found in the activity, greatlakeslessons.com)

Background:

Ducks Unlimited is conducting a study to investigate bird use of Great Lakes marshes—before, during and after restoration efforts. They will sample marsh habitats that have experienced some level of invasion by *Phragmites australis*, common reed. Sampling will occur one year prior to treatment, after an herbicide treatment, after a burn treatment, and one year after treatment. The data set for this lesson contains one pre-treatment survey, collected in August 2011.

Methods:

150 sampling plot locations were randomly generated, and 30 were chosen to be the center point of the sampling plots based on accessibility and timing efficiency. From the center point of each of the 30 locations, 4 samples are taken 5 m from the center point in each cardinal direction to the North, South, East, and West measuring 1 m² (1 m x 1 m). This yielded a total of 120 sampling plots.

Within each sampling plot the following response variables were measured: 1) percent cover of living *Phragmites* foliage, and 2) percent cover of living non-*Phragmites* vegetation. The percent cover of *Phragmites* and non-*Phragmites* is expressed as an individual cover class, described in the table below:

Cover Class	Range of Coverage	Range Midpoint
1	<5%	2.5%
2	5%–25%	15.0%
3	25%–50%	37.5%
4	50%–75%	62.5%
5	75%–95%	85.0%
6	95%–100%	97.5%

In addition to the vegetation sampling, a 5-minute bird use survey was conducted noting any bird species that are within the sampling areas utilizing the vegetative habitat, citing both species type (if known) and the number of species. Each bird seen utilizing the sampling area is counted only once. Individuals seen flying from or into the sampling area, as well as vocalizations heard within the treatment area, were recorded.

1. Looking at the data, in how many plots were birds noted? How many different species were observed?

2. Do you see a relationship between vegetation cover class and bird use? If so, describe this relationship, both with words and in a graph.

3. Define a hypothesis. When are hypotheses used?

4. Consider the data set you've just reviewed and write hypotheses that describe what you expect to see during and after restoration of the marsh in this data set. Remember that a testable hypothesis contains two variables: "independent" (the variable you control) and "dependent" (the variable you observe and measure the results).

5. Using your hypotheses as a guide, sketch graphs of your predictions. Remember that the x-axis is always your independent variable, and the y-axis is always your dependent variable.