

Sampling Local Shorebird Populations

Activity originally created by Rich Kleinleder and the Shorebird Sister Schools Committee, Alaska 1994-1995.

Grade Level: upper middle school / high school

Duration: regular counts over a 2 to 4-week period

Skills: application, observation, comparison, collecting and interpreting data, communication and presentation, forming hypotheses, discussion, evaluation, and using technology
Subjects: science, math, and technology

Concepts

- Bridge the classroom and the local environment
- Gain first hand knowledge through an outdoor experience.
- Discover the ecosystem through multi-sensory experiences.
- View shorebirds, their habitats, and what they eat.
- Utilize the scientific method as a process for inquiry and discovery.

Vocabulary

- transect sample plot
- sampling
- scientific method
- stopover site
- breeding habitat
- non-breeding habitat

Overview

Students work individually to design a shorebird observation study that determines how many shorebirds use a local stopover, breeding, or non-breeding site and then compare their results.

Objectives

After this activity, students will be able to:

- Explain the steps involved in the scientific method.
- Develop a procedure or protocol for collecting observation data.
- Correctly set-up a transect area.

- Use at least three mathematical calculations to analyze the data collected.

Materials

- one copy of the student readings *The Scientific Method of Inquiry* and *Sampling Populations* for each student
- field notebook
- graph paper or computer graphing program
- pencil
- watch

Optional

- stakes and flagging tape for marking the area

Introduction

This activity requires students to go to the shorebird viewing site on a regular basis, with or without teacher supervision, to count the number of birds in a small plot several times during the season. Parental involvement is encouraged, especially for younger students.

Sampling is the scientific method of measuring one or more variables on a small plot (a transect) and using those results to make assumptions about a larger area. Scientists are usually interested in making statistical comparisons that require they follow a series of specific procedures under standardized conditions. For more information about the scientific method see the student reading *The Scientific Method of Inquiry*.

While this activity was designed for use at a migration stopover site, students can make similar investigations at shorebird non-breeding or breeding habitats. This activity also gives them the opportunity to make hands-on, critical thinking discoveries about the scientific process. They will discover how important it is to collect sufficient data and attempt

to make more than the minimum number of counts. They will also discover the importance of choosing a truly representative sample plot.

Activity Preparation

1. Choose a sample plot or transect area.
It should be set up in typical shorebird habitat used on a regular basis by shorebirds during the time of this activity. Contact your local shorebird researcher, birdwatching club, or naturalist to find out the best time and place to begin this activity. Keep in mind that the sample plot does not need to be very large (25 meters is a suggested start). However, the observer should be able to see and count all of the birds in the plot within 30-60 seconds.
2. Mark the study boundaries.
You may or may not need to use artificial markers to define the boundaries of your plot. Natural topographic features like rocks, gravel bars, and well-defined clumps of vegetation may serve just as well. The shape of the plot does not need to be regularly geometric. The idea is to define the boundaries well enough so that you can return to and make counts in that exact same area repeatedly.
3. Mark the spot where the observer will stand every time he/she observes the shorebirds. This is important to ensure a consistent view of the sample plot (and eliminate the variable of any bias based on a changing view.)
4. Set up a counting protocol.
After setting up your sample plot, determine what the counting protocol will be. In order to compare activity on the plot from one day to another,



decide when, relative to the tide, counts will be made and for how long. This is important to standardize because most of the shorebirds will concentrate on the beach or mud flats as they are being exposed by the receding tide. Because the time of tide is different each day, counts can not be taken at the same time each day.

Sample Protocol

- Counts will be taken every sample day one hour following the time that the tide recedes enough to completely expose the plot.
 - During each visit, all birds present will be counted within one hour.
 - The plot will be counted at least three times for each sample, with a 3 minute break between counts.
5. Design a data log or chart. This log should include all elements of the predetermined protocol. A log for the sample protocol above would include a place for the date, time of the count, and number of birds counted each time. Also include the time of the tide and the name of the researcher (if a team is involved) doing the counts.

Procedure

1. Carry out the counts.
2. Present the results in a table.
Create a table of results from the log notes to determine the average number of birds in the plot for each day birds were counted. Remember to include complete labels explaining the units (e.g. dates and the number of birds counted) See the table below showing the relationship between the number of shorebirds and date at one particular location.

Note: The actual log used in the field would probably contain space for more data than is shown in the final table of results. For instance, on each count day, record the times of the counts. Such data is important to have in the logs to look for other patterns relating behavior to the environment and to allow another researcher to exactly replicate, and therefore test, the work.

3. Present the results pictorially using the table of results to plot a data graph to show any patterns.

4. Use the data to ask questions about the shorebirds observed! Compare these results to other students who collected data.

- How do the graphs compare with other student “researchers”?
- Why do they look the same or different?
- When is the peak of the migration in your area?
- Was enough data collected to determine this?
- Does this exercise bring up more questions than you can answer with this set of data?
- What sort of things would you have to observe or measure to answer those questions?

5. Report your results on the SSSP Web site <http://sssp.fws.gov>.

Data Table Example

Number of Shorebirds Counted (All Species) at Alfred's Beach

Date	April 22	April 25	April 30	May 1	May 4
Count 1					
Count 2					
Count 3					
Count 4		(no count)		-----	
Average:					

