

BIOLOGY 427 FIELD PROJECT 2012

General Rationale for Conducting a Biological Census

Understanding the distribution and abundance of species is one of the main goals of the ecological sciences. Biological censuses allow us to compare different areas in terms of species richness and composition. Conducting a biological census is an important step in examining any area being considered as a park or nature reserve (or, in many cases, when an area is about to be developed). Inventories conducted with standard methods on a regular basis become a monitoring program. Monitoring programs are useful for assessing the stability of natural systems, and for assessing the impacts of invading species, human disturbances, etc. For example, assessing the impact of the giant oil spill caused by the Exxon Valdez in 1989 was difficult, because there were almost no existing monitoring programs in Prince William Sound, Alaska. Many of the employment opportunities for field biologists consist of inventory work.

Specific Objective

Your objective is to survey the bird communities in two or more areas (preferably at least three) of your choosing, with the goal of comparing levels of species richness and community similarity. Before conducting the study, you should articulate a hypothesis that you wish to test (e.g. "I hypothesize that area A has more species diversity than area B.") as well as your reasoning for making that hypothesis. Note that surveying three or more areas will allow you to test more complex (and perhaps interesting) hypotheses (e.g. "I hypothesize that areas A and B are more similar to each other in species richness and composition than either are to area C.") You should design a census strategy and then conduct a series of standardized surveys in each area. Careful thought about the optimal census strategy can result in much more useful data that is more easily analyzed and interpreted.

Methods

We recommend that you join together with one to three other classmates (for a total group size of two to four) and work together on this project. Choose at least two areas that you want to compare in terms of their bird communities. These can be in Pacific Spirit Park or almost any other location of your choosing. Then, spend some time in each area, checking out the terrain and thinking about the best approach to surveying the area. Generate a basic map and habitat description of the area, and establish a regular schedule of visits to count birds. We suggest that you conduct at least one survey per week between late January and late March, alternating between sites (for example, three sites surveyed four times each would require 12 visits). In class we shall discuss possible survey methods as well as analytical methods for estimating species richness (e.g. Simpson's diversity index) and community similarity (e.g. Sorenson's similarity coefficient, or Renkonen similarity index).

Reports:

Class presentations: Groups should be prepared to give short presentations summarizing their findings starting on **March 29** (some presentations will be given on the subsequent days). You will be able to use a computer projector if you desire. This will be an opportunity to get feedback from other students, as well as the instructor and TA. The presentation should nicely summarize the written report.

Written report: A written report summarizing your findings is due on **Thursday, April 5**, at 5 PM. Each group will submit a single report, which should be carefully proofread, and of a maximum length of 8 pages of double-spaced text (plus title page, figures, citations, etc.).

*Note that most of the material you prepare for the presentation can be used in the written report. The intent of assigning both a presentation and written report is **not** to give you a lot of work, but rather to provide an opportunity for you to share your results with the class, and for feedback from other students and the instructors.*

The report should contain the following specific items:

Abstract: A short summary of the study, not more than one page in length.

Introduction: A section introducing the reader to the project, explaining why you did it, what main hypotheses you tested, what general approach you used, and interesting background information. Try to attract the reader to reading further.

Methods: A description of the methods you used in the study, in enough detail that a reader would be able to repeat the study. This must include a table detailing the number of visits, dates, times, number and identities of the observers, and the type of work done on each visit.

Results: A description of the results (the data) from your study, pointing out the key results. This section should contain such things as a list of all species observed, their relative abundances, etc. Much of this information can be presented in tables or figures (e.g. graphs or maps), although the main text should provide a narrative to walk the reader through the results. For any unusual species, you should comment on the evidence you used to identify them.

Discussion: A discussion of your results, pointing out why they are interesting, what we can conclude from them, and perhaps how they relate to information known from the literature. Say something about what research could be done to further answer your questions.

Acknowledgements: Thank those who helped with the study.

References: Bibliographic information for any literature cited in your report. You should use a standard scientific format for referring to references in the text and for listing references at the end of the report (see any major science journal, e.g. *Ecology*, or *Evolution*, for examples).

Appendices (optional): Additional information that doesn't fit well into the main part of the report.

Equipment

Rain gear, gloves, warm clothes, and waterproof footwear will maximize comfort. Each student can borrow a pair of binoculars for the duration of the project.

Advice

- The instructors will be happy to provide advice, especially during field trips or during class.
- **START EARLY!** This will give you more time to learn the common birds you will hear on your censuses, to get familiar with the area and its vegetation, be able to comment on seasonal changes, and generally have more to say about what happens in each area. Keep detailed field notes of your observations, including dates and times.
- The success of this project will depend a lot on good communication within your group. Make sure that you all sections of the report are written to the same high standard, and that each contribution is checked and integrated smoothly with the other sections before it is included in the final report. Get your writing and analysis, computing resources, etc., organized well ahead of time. (It is amazing how often computers and printers break down on the day that projects are due!)
- If you have other requests, please let us know and we shall try to help. We hope you will enjoy the project and find it rewarding as you build new skills. We recognize that most of you will begin without knowing a lot, but we also know that some of you have a lot to teach others in the class, and probably a few things to teach the instructors!