

Draft Version
Conducting the Censuses

This document includes a list of field equipment and information about identifying shorebirds, counting multi-species flocks, counting techniques, keeping track of where you are, and handling field difficulties. At this point, we assume that you have designed a project that will collect standardized monitoring data or answer your research questions, and that you've selected an appropriate study site (or sites). **You should have developed a site-specific protocol for covering your study area.** You may have conducted a small pilot study, and you are aware of constraints that might interfere with count accuracy or precision. You know which conditions (or variables) you want to keep constant over all surveys and which you want to vary. If you are still designing a project, *Project Goals, Study Site Selection, and Study Design Considerations*

http://www.prbo.org/tools/shorebird/docs/SDP_projgoals.pdf may be helpful.

Essential and/or useful equipment for the field includes:

- binoculars (8X or greater is best)
- telescope (zoom eyepieces are often essential)
- several pencils or pens
- wristwatch
- maps and/or instructions
- field recording forms
- clipboard with rubber bands to hold down forms
- field notebook
- hand counter
- field guide
- hat, sunscreen, other sun protection
- cell phone or radio
- water
- lunch or snacks

Because most non-breeding shorebirds occupy unvegetated or sparsely-vegetated habitat in which they can be easily observed, the accepted method of estimating their abundance in an area is to count them directly through visual observation. This requires that a person conducting an area survey (a censuser) possess two basic, but key, skills: the ability to **readily** identify all species likely to occur in the area and the ability to count the number of each species present. In addition to these general skills, a censuser needs to know the protocol for the specific site or wetland that is being surveyed.

Identifying Shorebirds: Attending field trips led by experienced observers is a good way to learn shorebird identification; these are often offered by local Audubon and natural history societies,

colleges, or adult education programs. Practicing on your own with one of the many good field guides available is essential to honing your skills. If you are a beginner, ultimately, you will need to go out with an experienced observer to validate your identification skills.

Censusers must develop a slightly different set of skills than casual bird watchers because they are counting all the birds in an area, not just those that are conveniently near or well lit for viewing. You may need to identify shorebirds that are in silhouette, shorebirds that are tightly packed in a roosting flock, or very large numbers of shorebirds in mixed flocks. You need to be able to identify them fairly rapidly, before they have a chance to move or fly; this is particularly an issue where raptors are active. Familiarity with the subtle differences in the shape, posture, behavior, and coloring between species is invaluable during a census.

Counting shorebirds in multi-species flocks: When you start to count shorebirds at a site you are faced with quickly deciding whether to count all the birds together or scan the flock successively for each species present. With experience you will learn which method is most efficient for you, given the abundance, species composition, and dispersion of the shorebirds, and whether you have an assistant recording the count for you. Mixed species assemblages may be present as two or more species in relatively equal abundance, as predominantly one species with a few uncommon species, or some combination.

- Equally abundant species can be counted first together, with all but the most abundant species then counted separately (the number of the most abundant species obtained by subtraction). The benefit of this method is that if the flock flies before you can count each species separately, you at least may have obtained an overall count of mixed species, with a general impression of percent species composition.
- Equally abundant species may be counted separately. This may be particularly efficient if you are going out as part of a census team, and different people count different species.
- If you find predominantly one species mixed with a few uncommon species, it is useful to have a recording assistant to whom you can enumerate the uncommon species as you maintain a running count of the most common species while you scan the flock.
- With much experience, you may learn to count more than one species simultaneous as you are scanning or you may develop your own technique for handling multiple species counts.

Counting techniques involve direct counting, which is useful for low numbers of birds, and estimation, which is essential for large flocks. Some techniques involve a combination of counting and estimation. It is not unusual in the middle of a census to have shorebird flocks fly up, circle in

the air, and land again; they may land where they previously arose, may land to join a nearby flock, or may leave the immediate area. Rising or falling tide levels, human disturbance, and raptors in the areas may cause this to happen multiple times during a census. In order to obtain counts before flock movement causes you to have to start counting over again, you need to balance the need for highly refined counts with the need to complete the count quickly.

For fewer than 40, or widely scattered, shorebirds you probably will count individual birds. This may not be the most accurate count method for large flocks because of flock movement. With larger flocks, you should start at one side of the flock and count 5, 10, 20, or 50 shorebirds at a time. Once you have a good idea of what, say, 20 birds look like in that flock, you can count the remainder of the flock in groups of 20 birds. For very large flocks, it may be necessary to count in much larger multiples. After you have conducted many censuses you will hone your ability to quickly estimate group sizes of birds. However, it always is useful to count out bird groups in the beginning of each census, as a defense against developing estimating biases.

Keeping track of where you are is essential when you are conducting a census. Few areas can be covered from a single vantage point and you will have to move between points to count all birds. It often is difficult to relocate where you left off counting from a new vantage point, so think about all possible clues you will be able to use from your next location. Geographically distinct points in the wetland or background habitat (think about what it will look like from your next vantage point), a break in the flocks, or an individual of an uncommon species can be used to mark where you have left off counting. Move quickly to the next vantage point, locate where you left off, and begin counting.

Recording shorebird counts in the field involves counting multiple species, keeping track of where you are in the flock, and writing it all down. The way you keep your written field records will determine how difficult it is to tally a final count afterwards. On a separate handout, www.prbo.org/tools/shorebird/SDP_RecTips.pdf, are some tips on recording your data in the field.

Some other techniques you may find useful:

- Obtaining an initial impression of the numbers of shorebirds you will be counting can be very useful if a census is interrupted because the birds have flown out of easy viewing range. When you first arrive at a viewing location, you might make on-the-spot order of magnitude estimates of the numbers of at least the most abundant species.
- Order of magnitude estimates (OMEs) can be based on powers of ten, using arithmetic divisions of low, mid, or high ranges. With this method, if there were more than 9 but fewer

than 100 shorebirds, you would estimate either low tens (10-39), mid-tens (40-69), or high tens (70-99); estimates are similar for low, mid, or high hundreds (100-399, 400-699, 700-999), thousands, and so on.

- If you are training or refreshing yourself in counting methods, you might make OMEs first, then count the birds you've spot estimated, to check and refine your estimating accuracy.

Factors that may complicate a survey and suggestions for addressing them:

- rapidly rising or falling tides that force or allow the birds to constantly reposition themselves with respect to the water line
 - *it is often easier to conduct a survey under neap, rather than spring, tide conditions*
- excessive human disturbance
 - *when possible, avoid scheduling weekend or holiday surveys*
 - *early morning surveys may work better, there are often fewer people about then*
- pressure from raptor attacks
 - *there's no easy fix for this problem but methods we've described above for making a count more quickly can salvage something from an otherwise destroyed census*
- poor lighting conditions
 - *avoid midday censuses, when possible*
 - *lighting constraints may dictate whether feeding or roosting conditions are the best times for censuses*
- many of the shorebirds are too distant to accurately identify or count when they are feeding
 - *determine where these shorebirds roost and count them there*
- the roosting flocks are so tightly packed that it is hard to identify and count the shorebirds
 - *count them when they are feeding*
- inclement weather may interfere with accurate results
 - *always have backup census dates for each scheduled census*
 - *cancel censuses if rain or wind are likely to seriously imperil the count accuracy*

Tall your census total for each species, preferably on the day you conduct the census. If there are any uncertainties or errors in what you wrote in the field, you will best be able to decipher or catch them when the census is fresh in your mind. Next steps, verifying your summary totals, entering online and proof-reading your data are at http://www.prbo.org/tools/shorebird/SDP_HowToEnter.pdf.