

Bird Counts!

Point counts in Birdlasser: Distance sampling explained

Science and Innovation Programme

BirdLife South Africa

March 2023



Contents

Introduction	1
Distance Sampling theory	1
Point Count and Transect functionality in BirdLasser (Android Version)	2
Introduction	2
Point Count Data Collected.....	3
Getting Started with your First Count.....	3
In the field	3
Recording with BirdLasser.....	4
Downloading data and sharing with BirdLife South Africa	7
Frequently asked questions	8
Contacts	9

Introduction

A key question for birders, conservationists and ornithologists is: how many birds are there?

When birds do not live in a few, small colonies, this can be a difficult question to answer. When a species is distributed widely across the landscape we need to find out how many birds there are in a countable area and then extrapolate. We can use the density at which a bird occurs combined with the species range to determine a species population, or at least set bounds on a population range. Knowing that there are between 100 and 2000 birds is better than saying the bird is rare, and helps inform conservation actions such as Red Listing (deciding a conservation status).

To determine the number of species in an area, point counts and transects are usually conducted by ornithologists around the world. These methods are used to quantify the number of birds in a given area. Point counts are usually conducted at a single location for a set time interval (we will use 10 minutes), and then the observer moves to another spatially independent location and counts again (say >400m from the first point). On the other hand, transects allow the observer to be mobile across the landscape, usually following a set route for some predefined distance. Transects can be good for surveying rare birds or a target list of species, but can be difficult for community studies in species rich areas.

The aim of BirdLife South Africa is to determine densities, which are foundational for population estimations, for as many terrestrial species as possible. Not all birds are suitable to monitoring through this technique, but the majority are. But to achieve this, we need your help.

The aim of this document is to introduce and explain the point count recording trip card type in the BirdLasser mobile bird recording app in relation to Distance Sampling, a type of bird counting that takes into account detectability.

Distance Sampling theory

Birds vary in how easy they are to detect, and many variables influence how well we can record a species during a count. Birds in forest environments are difficult to find unless they sing. Even cryptic birds in open landscapes can be difficult to detect (a buttonquail vs a Secretarybird). The detection of a bird also depends on the observer's ability to identify the bird. Detection is influenced by the weather: how hot or how windy it is, as well as the time of day. Almost universally, observers detect fewer birds with increasing distance from the observer.

There are various methods available to account for these detection issues. For those most interested in finding out bird abundance, Distance Sampling is a solution. Distance Sampling is now used widely and has been the subject of many scientific papers. In essence, Distance Sampling attempts to correct for the fact that fewer birds are detected at increasing distances from the observer, and can do this for other confounding variables too.

In order to use Distance sampling techniques, a fundamental measurement that is required is the distance from the observer to an individual bird, or the centre of the group of birds. With enough encounters, **detection functions**, which describe to how far a species can be detected, are then created for each species (and selected covariates) using these distances.

Distance Sampling conforms to a snapshot paradigm. The aim of the observer is to try and capture the state of the birds at a location at a given point in time. In a perfect world, we'd just have taken a photo from space and counted all the birds. We can't do that (yet), so this is the next best thing.

For the background algorithms of Distance Sampling to work there are a few important assumptions that the observers need to be aware of:

1. Firstly, and perhaps most obviously, the species should **be correctly identified**.
2. The observer should attempt to **measure the distance** to where the birds were **before** they disturbed the birds around them. Sometimes a 'settling' period can be useful before the actual count begins.
3. Distances need to be measured as **accurately as possible to the closest meter**, especially for birds closest to the observation point. Tape measure or Laser rangefinders should ideally be used: lumping distances at 'round' numbers like 10, 20, can cause issues in detection functions by creating wobbly lines.
4. Importantly, **all birds** at the point origin (point counts), or along the transect line are detected. In other words, the software assumes perfect detection along the transect line (or perfect detection at distance 0, the point from which you conduct your count). This is generally a reasonable assumption, but might be violated in forests if you don't see a bird above you. In the grasslands or Karoo, you'd certainly notice if you were standing on a bird.
5. Points should be ideally and independently distributed (so we really don't want you heading to known birding hotspots). We will distribute preferred randomly generated points for you to choose from.

There are also several other factors that should be considered. The observer should attempt to **avoid double counting**. So, if you can see a family of Blue Cranes from two locations, only record them in one. Likewise, be aware that foraging species will be mobile during the 10-minute period, giving the appearance of independent groups. Observers should also be aware of species that might be attracted to the observer or observation points, for example Sentinel species (e.g. Karoo Scrub-Robin). Recording a distance AFTER the bird has been attracted to you will artificially increase the apparent density.

For any given location, given the species there are available in South Africa, you will likely only record a few species: so we need lots of independent counts (lots of 'mini photos' if you will).

Point Count and Transect functionality in BirdLasser (Android Version)

Introduction

BirdLasser is an app for mobile devices that provides various listing services. In order to use this app, the observer must register with BirdLasser and download it onto their smartphone from the Google Playstore or iStore.

We assume that users of this protocol have used BirdLasser before and know how to search, log and edit records. For more information on this, visit: <https://www.birdlasser.com/about/faq>

In order to obtain density estimates of birds across landscapes of South Africa, BirdLife South Africa commissioned BirdLasser to create the point counts and transects monitoring protocol. The protocol was

designed to be as generic as possible; the user needs to be aware of whether they are conducting points count or transects and enter the data accordingly.

The bird recording process (logging) is the same for line transect and point counts. In the case of a transect the observer will move along a predetermined route of known length, so each sighting's co-ordinates will be different. For a point count the observer will be at one location, so all the GPS co-ordinates will be the same.

This document will focus on the Point Count (stationary count) protocol.

Point Count Data Collected

The BirdLasser app will automatically collect the following information for each sighting:

- Date and time
- GPS Co-ordinates (Latitude and Longitude)

Data that will be collected by the observer includes:

- Species Name (as per the language settings on the app)
- Count of the number of birds seen or heard
- If the count is an estimate or not
- Distance from the observer in meters
- Distance bands (optional, depending on protocol)
- Compass bearing (optional)
- Activity (Perched, Flying)
- Notes (please do not use commas in your notes as it creates problem for the CSV download)

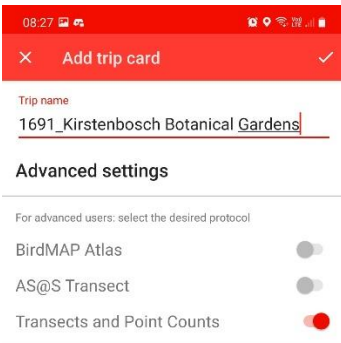
Getting Started with your First Count

In the field

It is a good idea to have a route planned, with an idea of where counts will be conducted along the way. As you approach where you want to do your count, become alert to any birds you may flush from where you want to conduct your count from: you need the distances to where they were before you arrived (otherwise skittish birds will become artificially scarce during analysis). Once you arrive at your point, you can decide if you need a settling down period or not. This may be required in areas of high bird abundance or wooded environments. Up to five minutes quiet observation time can be a good idea to what is going on at the point, what resources might be attracting birds, or where birds may be hiding. Once the bins are out, and the rangefinder is tested, the phone can come out to start recording.

Recording with BirdLasser

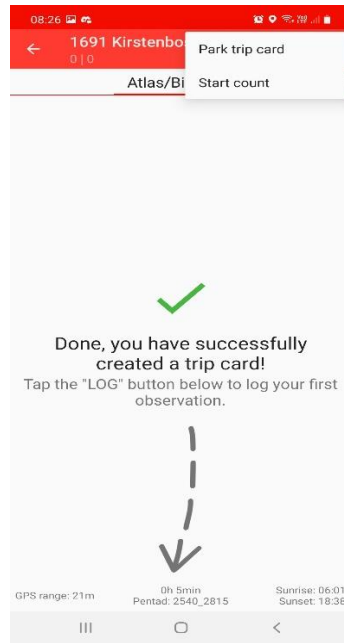
Android



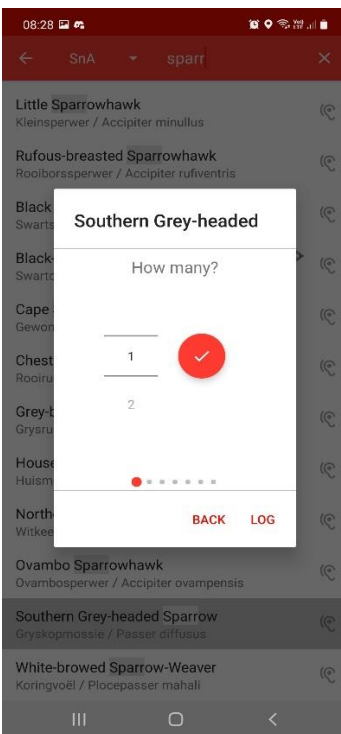
Click the + button on the entry screen to create a trip card.

For a Trip Name, enter your citizen science observer number (if you have one) and then the location, for example "1691 Kirstenbosch Botanical Gardens".

Make sure 'Transects and Point Counts' is activated and the other protocols deselected. Then 'tick' (top right) to move to next screen.



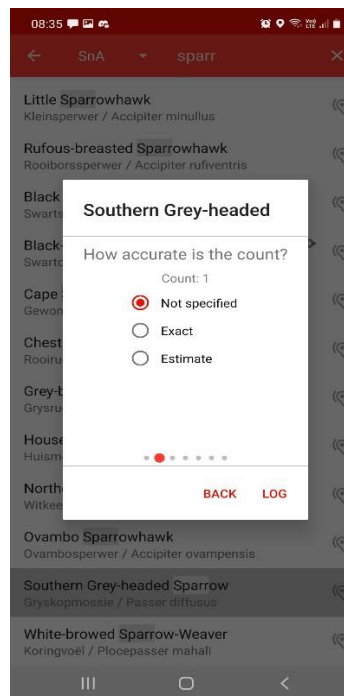
Click the menu (3 dots) top right, and choose 'Start count'. This records the date, time and your location in an 'Unidentified' record. Don't modify this record. Use the time on this record to see when your 10 minutes are up.



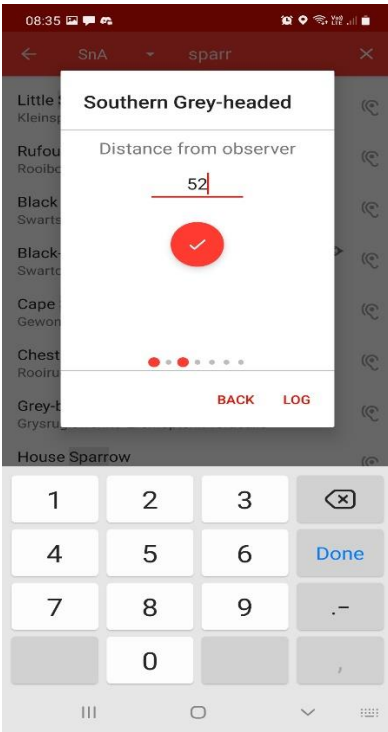
Use the LOG button at the bottom to choose a species, e.g. 'Southern Grey-headed Sparrow'.

BirdLasser will now guide you through the data that is required. Use the 'Red Tick' to move between fields.

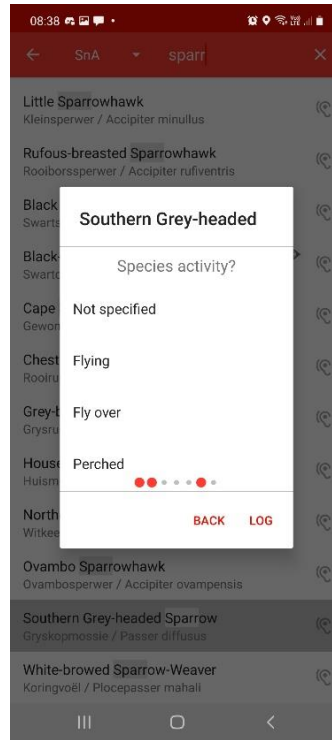
First enter the number of birds seen. Click the red right mark to move to the next screen.



Enter if the count is an exact count or estimate.



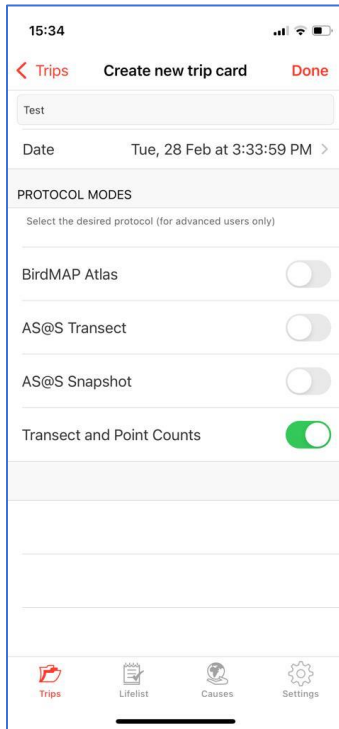
Enter the number of birds seen.



Enter the activity. You can press log here to save the record or add notes on the next screen and then press log.

For a 'rolling list', you can repeat the above process in a single trip card. Or you can choose to create a new Trip Card for each count (useful if you are doing repeat counts). Keeping a rolling list (lots of counts in 1 trip card) means fewer trip lists to export 😊

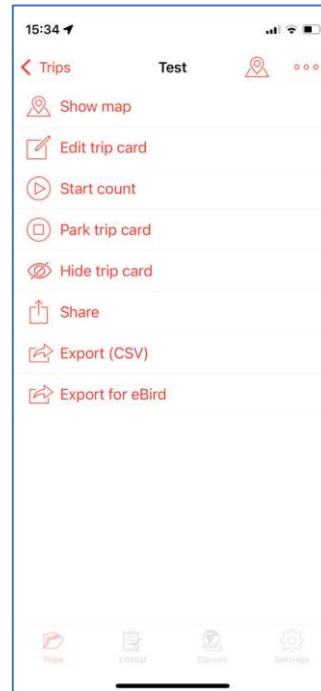
iPhone



Create a trip card and drag the “Transect and Point Counts” slider to the right. Make sure all the other protocols are off.

For a Trip Name, enter citizen science observer number (if you have one) and then the location, for example “1619_Kirstenbosch gardens”.

Swipe left to move to the next screen.

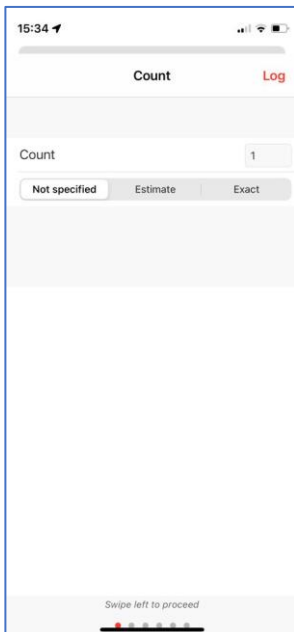


To start your count select “Start Count”

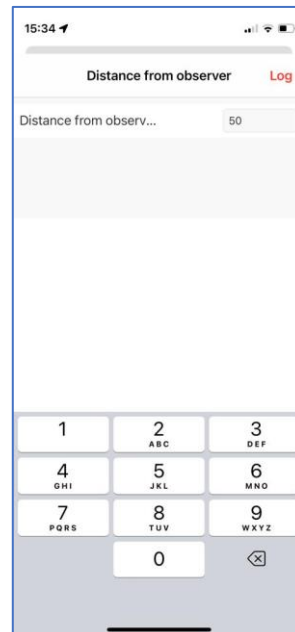
This records the date, time and your location in an ‘Unidentified’ record. Don’t modify this record.

Swipe left

On the next screen log the first species as you would normally do.

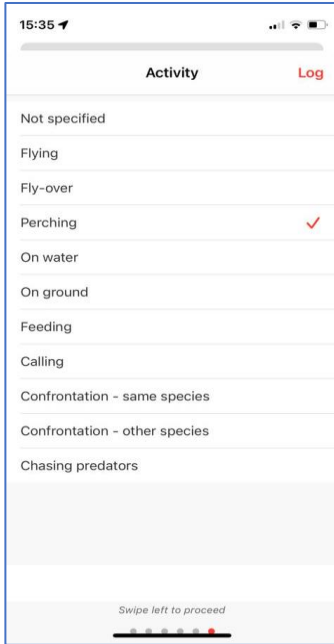


Enter your count and indicate if your count is an estimate or an exact count.

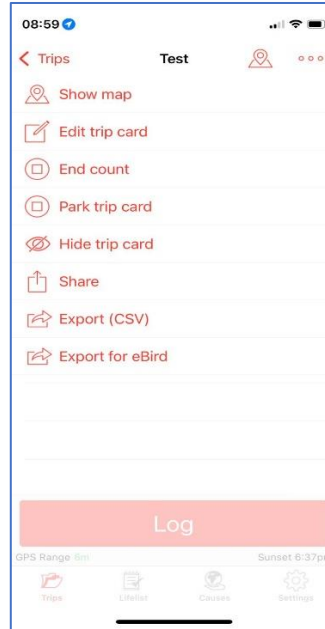


Take a reading of the distance to the bird using your range finder and enter the value.

Swipe left. You can skip the next screens and move to the activity screen.



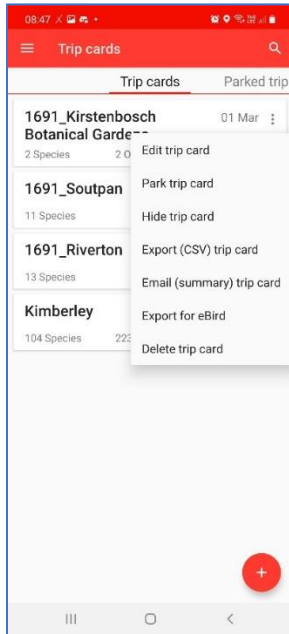
Select the activity and press Log. Your data will be saved and you can log the next bird.



At the end of ten minutes select “End count”. Another unspecified record will be added to the list.

Downloading data and sharing with BirdLife South Africa

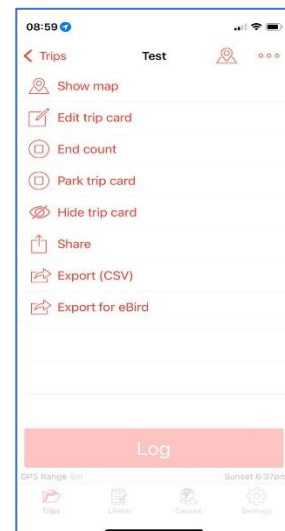
Android



To export the card in CSV format, click on the three dots to the right of the trip card name and select “Export (CSV) trip card”. Select the email software on your phone and email it to pointcounts@birdlife.org.za.

iPhone

You can now export the CSV file and using your email programme send it to pointcounts@birdlife.org.za



Frequently asked questions

How do I record distances to flying birds?

Generally, we don't need distances to flying birds in transit. If you think a bird is flying off from your count area, then you'll need to estimate where it took off from and measure to that object. We will need distances to aerial birds, such as swallows and swifts. Here, you will need to estimate the distance they were away from you when you identified them. Drop a line down from the sky to a terrestrial marker, and estimate the distance to that (not the distance from you to the birds in the sky).

I only heard the birds: what is the group count and distance?

First, you can add birds on call only. You may need to add a value that you think represents a group size e.g. a calling male likely represents a pair of birds in a territory. For flocking birds, you can estimate based on number of calls, volume and extent of area occupied. You indicate the uncertainty by ticking 'estimate' on the next screen. This also goes for distance: you will frequently have to guesstimate which bush the bird is in and measure the distance to that tree or vegetation zone. For very far off birds, it is also okay to guesstimate the distance.

Why are point counts only 10 minutes?

The idea of Distance Sampling is to get a 'snapshot' of what birds are there at the time the observer arrives. The 10 minutes allows you to record the birds you hear and see that 'belong' to that location. If you stay for longer, there is the danger of recording birds that weren't originally in the count location, which will inflate density estimates, especially for mobile and vocal species. Remember, the aim is NOT to gauge species richness for this exercise (where longer point counts would be required), but density estimates. I.e. total number of birds, not total number of species. If you are at a species rich location, it is okay to stay longer for data capture purposes: but be true to what was detected in the first 10 minutes (see below). 10 minutes may seem like no time at a busy location, but it will seem like a long time at an empty spot.

It's the dawn chorus! It will be very difficult to keep up and capture everything

Yes, it can be challenging. Start with the species closest to you first, and extend your count range accordingly. Prioritize perched birds over flying birds.

What is a Laser rangefinder and where can I get one?

Laser rangefinders are handheld devices to accurately measure distances to a target. It is a small device that basically shoots a laser and measures the time for it to 'bounce back' to the device, calculating distance from this time. There are many different brands, varying in price. The cheaper ones (used by golfers) may not record distances over sufficiently long distances for our purposes, it should at least cover 500m.

Where should I count?

This project needs as many counts from as many different locations as possible, from a variety of habitats, altitudes, land-use types, also 'sterile' environments with no birds. While it would be ideal to have this formalized, we are happy to consider point counts from any location (even if we thin some data out in the end). Preferential sampling (e.g. at dams) is discouraged (points need to be randomly selected) and birds at dams are better counted using other techniques (e.g. CWAC). Feel free to consult a member of BLSA should you require advice on where best to direct your efforts.

When should I count?

Counts should be conducted when conditions are good, i.e. early mornings or evenings, not too windy, not too rainy. Counting can also be done throughout the year.

I forgot to 'Stop' my Point Count!

If you forgot to end your point count by pushing 'End count', for data submitted to BirdLife SA we will assume a 10 minute point count, but it confounds data checking processes, so please do 'Stop'!

Will BirdLife South Africa really be able to determine population estimates for all species using this method?

The Science and Innovation programme has a proud history of determining densities and estimating population estimates for many of South Africa's bird species: notably the Fynbos and Karoo biomes. However, not all species are suitable to monitoring via point counts, this includes flocking waterbirds, very rare birds, skulking birds. The density estimations are complicated, and often come with wide confidence intervals. However, these estimates are a step in the right direction (and we would struggle to do this without your help).

Contacts

For more information please contact:

Dr Alan Lee – alan.lee@birdlife.org.za

Ernst Retief – ernst.retief@birdlife.org.za