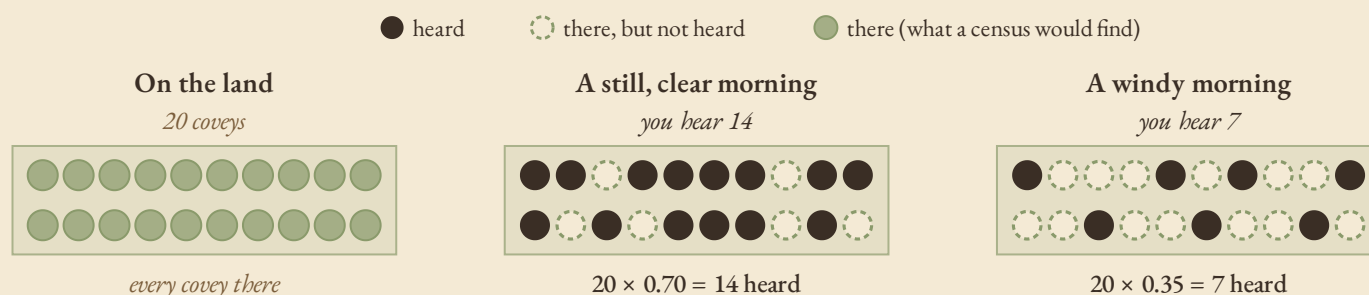


Census and Sensibility

How to Count the Wildlife on the Land You Know

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You will never count every animal on your land, and you do not need to. Count the same way, in the same places, at the same time of year, every year, and the differences between years can tell you what the land is doing. It goes deeper on the monitoring plan, part 13 of Guide 1, *Pride and Prescription*.



What you count = what is there × the chance of detecting each one

The same land, the same coveys, two mornings: the count halved and the birds did not. An illustration; the numbers are chosen for the example.

I Know what a count measures

START HERE

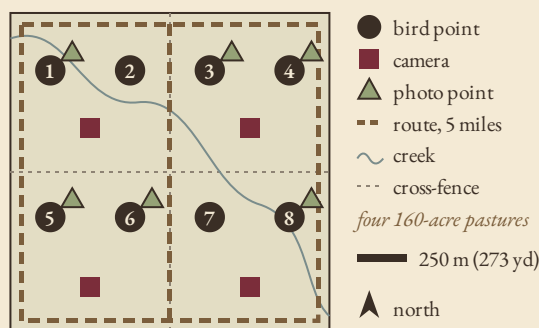
A census counts every animal, with no sampling and no error; on real land it does not happen. Every count is a sample, and on average it equals the animals present multiplied by the chance of detecting each one. That chance is almost always below one, often below half, and it moves with the wind, the heat, the cover, the hour, the season, the observer, and the animal itself.¹ Hold the method steady, and a change in the count more likely means a change in the animals; change the method, and the count changes whether the animals did or not. Most landowner counts are therefore indexes, and an index is only as good as its consistency. **Never compare raw counts between species or kinds of cover:** on one shortgrass refuge, Grasshopper Sparrows were counted a sixth as often as Cassin's Sparrows, yet they were the densest bird there, because they are the hardest to detect.²

II Design the count before you count

- 1 The question.** Tie the count to an objective in your plan (Guide 1, part 2), and name what you will measure: presence, an index, a density, or a number.
- 2 The places.** Spread stations at random or on a grid, not just where animals are. Results hold only where you sampled: counting the creek alone overstates the place,³ and some of what you count may live next door.⁴
- 3 The season and hour.** Count when detection is highest and steadiest: songbirds in the first hours after sunrise in the breeding season,⁵ coveys at dawn in autumn. Set rules for wind and rain, and keep them.
- 4 The effort.** Record minutes, miles, visits, or camera-nights every time, and zeros as zeros. A year with more effort looks better than it was unless the effort is on the sheet.⁴
- 5 The precision.** Let a first season show how many stations you need. Even a perfect count of a sample is uncertain: in

the worked example I give students, counting every covey on a tenth of the land left the total at 330, give or take 105.

- 6 The protocol.** Write the method on one page, with a map, so the next person counts as you did, and have a biologist check the design before the first count, not after the last.



An invented 640-acre place: eight bird points more than 250 m (273 yd) apart, four cameras at one per 160 acres, a five-mile route, six photo points.^{5,6}

III Match the method to the animal

● suits the job ○ can help Effort: ■■■ light ■■■ moderate ■■■ heavy

	Ungulates	Turkeys	Quail	Songbirds	Reptiles/ amphibians	Waterfowl	Effort	When
Trail cameras	●	●	○				■■■	Sep–Oct, deer
Point counts			○	●		○	■■■	late May–Jul
Call counts		●	●		●		■■■	by species
Routes and road counts	○	○	●	○	○		■■■	Aug, quail
Tracks, sign, and boards	●	○			●		■■■	any season
Nest boxes and checks				●		●	■■■	nesting season
Harvest records	●	●	●			●	■■■	hunting season
Logbook, citizen science	○	○	○	●	○	○	■■■	all year

Eight methods, six groups of animals; effort for one season at landowner scale; months for Texas and the southern Great Plains (page 3).

Trail cameras. Perfect for larger birds and mammals. Set them at random or on a grid, never over bait or feed: every animal needs an equal chance of being detected, and bait, by default, biases the count.¹ Run them the same weeks each year (for deer, September and October, one camera per 100 to 160 acres⁶), record camera-nights, and count animals, not photographs.

Point counts. For songbirds. At a marked point, let the birds settle 2 to 3 minutes, then record every bird seen or heard for a fixed 5 or 6 minutes, leaving out flyovers. Keep points at least 250 m (273 yd) apart, or 300 m (328 yd) in open grassland, and skip rain and strong wind.^{2,5} Measure each bird's distance with a rangefinder: without distances a point count is an index; with them it is a point transect, and detection can be estimated.⁷

Call counts. For animals more often heard than seen: bobwhite coveys calling at dawn in autumn,⁸ turkeys gobbling in spring, and frogs and toads on spring and summer nights. Listen at fixed stations in calm weather for a set time, and record each species; frog counts begin at least 30 minutes after sunset.⁹

Routes and road counts. Drive a fixed route at a fixed speed and hour, as Texas's August quail counts do.^{10,11} Spotlight counts of deer are common but shaky: the share of deer seen on a given night has run from none to 80 percent.¹² Run them as distance sampling, with the same routes, two observers, 10 miles an hour, dark-moon nights, and a distance to every group, and they become an estimate: on the Edwards Plateau, observers detected about one white-tailed deer group in three.³

Tracks, sign, and boards. Drag a stretch of ranch road smooth, or rake sand plots, and count the tracks that cross by

morning: cheap, and good for foxes, coyotes, raccoons, and hogs. Boards laid flat shelter snakes, lizards, and salamanders: lift and count.¹³ Record plots, boards, and nights.

Nest boxes and nest checks. Bluebirds, martins, and whistling-ducks take boxes. Check every 3 to 4 days, keep visits under a minute, and stay away when the young are close to leaving.¹⁴ Record each check's date, the nest's last active date, and its fate: the raw share of successful nests runs high, since a nest found late has already survived part of the risk; with the dates, daily survival can be estimated.¹⁵ Nests show young fledged, not whether a population grows: martins in managed housing succeed at more than 85 percent of nests, yet the species is declining.¹⁶

Harvest records. Every animal taken is a sample: date, place, sex, age, and weight. Young-of-the-year bobwhites have buff-tipped primary coverts, so a bag of wings gives the ratio of young to adults.¹⁷ A high ratio usually means a good nesting season, but it also rises when adults die, and hunters take ages unevenly. Survival takes marked birds: banded male turkeys on one Louisiana area survived twice as well once the bag limit fell from three to two and the season shortened.¹⁸

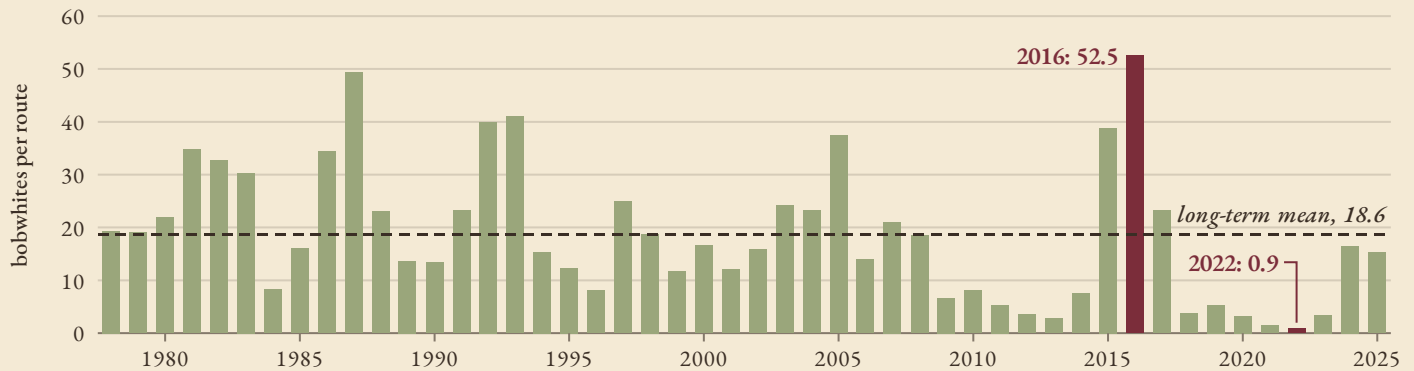
A logbook and citizen science. Write down what you see, where, when, and for how long. eBird records are public by default, though you can hide a checklist,¹⁹ and iNaturalist can obscure a location or keep a record private.²⁰

Photo points. Retake a photograph from each station's fixed point, the same week each year and on the same bearing, so habitat change sits beside animal change.²¹

IV Read the numbers, then use them

One year is a snapshot

Bobwhites seen per 20-mile roadside route each August, Rolling Plains of Texas, 1978 to 2025



Texas Parks and Wildlife Department roadside counts.¹⁰ From 52.5 in 2016 to 0.9 in 2022 on the same survey; a count in either year alone would have misread the land. A count shows that the birds changed, not why.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ungulates												
Turkeys												
Quail												
Songbirds												
Reptiles/amphibians												
Waterfowl												

camera survey

poult counts

covey call counts

point counts

frog call counts

harvest records

When to count what: one example for each group in the table on page 2, in typical windows for Texas and the southern Great Plains, each from its source on page 2; turkeys are counted in summer, when the poults can be counted.²² Shift the windows for your region and your species, and check your state's hunting seasons.

Plan on years, not seasons. Weather can swing a count manyfold from one year to the next, so give a count ten years or so before you call anything a trend. A short run can miss a slow decline that began before you started, and one property can look steady while its region falls:⁴ set your trend beside the regional survey.

Measure reproduction and survival where you can. A place can hold many animals and still raise few young.²³ At landowner scale: fawns per doe from the camera survey, poults per hen from summer sightings,²² young per adult from quail wings, young fledged per nest box, and survival from marked birds (page 2).

Keep the record. The datasheet on the back page, a spreadsheet, a backup, and the one-page protocol, filed together. Log effort and weather at every count, and what you and the weather did all year: stocking, burns, feed, harvest, and each rain, not just the total. On one ranch, a year with no herd count had to be dropped from the grazing analysis.²⁴



A smoke-phase (leucistic) Wild Turkey hen and her poults on a trail camera, from an undisclosed location in the Atchafalaya Basin, Louisiana, 2008.

Compare, then adjust. Each year, set the counts beside the objectives in your plan. When a count moves, list what could have moved it, and what else each cause would predict, before you change anything. That cycle is adaptive management (Guide 1, part 13).

The step up. Visit each station two or three times a season, or measure the distance to each animal, and detection can be estimated rather than assumed.^{7,25}

Field datasheet*Copy one sheet per station, per visit. A zero is a count.*

Property	Station or route		Method	
Observer	Date		Start	End
Effort (minutes, miles, or camera-nights)			Temperature	
Wind: calm · light · breezy · windy		Sky: clear · partly cloudy · overcast		Rain: none · drizzle · rain
SPECIES	NUMBER	DISTANCE (m)	SEEN OR HEARD	NOTES

*One line per bird or group, with its distance; leave flyovers off. Same place, season, hour, and effort every time.***Sources***Each source is shortened to its authors and year, where it was published, and its subject; the journal, volume, and pages, or the publisher or web address, find it.*

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- 3 **Buchholz and others 2023.** *Journal of Fish and Wildlife Management* 14:27–40. Density of axis deer, Texas.
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- 15 **Dinsmore and others 2002.** *Ecology* 83:3476–3488. Modeling nest survival.
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- 24 **Fritts and others 2018.** *Ecology and Evolution* 8:9550–9562. Drought and grazing, Lesser Prairie-Chicken.
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rules on spotlighting, entering land, and handling wildlife or active nests before you start, and follow the survey protocol for any listed species.

Credits. Figures by Grisham Field & Feather; the bobwhite trend uses Texas Parks and Wildlife Department data. The layout map's property and the detection diagram's numbers are invented. Photograph on page 3 courtesy of the author.

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