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A Texas Landowner's Guide to Conducting a Bird Survey

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Introduction

Wildlife management, while often focused on game species, includes all wildlife from mammals and reptiles to birds. Bird surveys for gamebirds and songbirds assimilate observational data that allows a landowner or manager to gather information on what species frequent their land at different times of the year. These surveys are important as a component of an overall effort to monitor wildlife communities on rangelands, and birds are important indicators of rangeland health. They will also give perspective on the bird diversity of the ecosystem, which can aid in wildlife management decision-making and achieving management goals. A manager or landowner might have the goal of obtaining a wildlife management tax valuation, which includes all native bird species. After reading this guide, a landowner should be able to conduct a general bird survey to inform appropriate land management. In this guide, there are descriptions of the tools and techniques that can be used to conduct bird surveys for measuring bird diversity on a property and an introduction to more technical approaches for population estimation. Ralph et al. (1993) produced a popular manual for bird surveys that is often cited by scientists and can be useful for understanding the basics of bird monitoring. Lists of birding communities across the state of Texas, applicable field guides, and an example observation sheet are included.

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Property Information

Before beginning a bird survey, it is important to be familiar with the bird species that frequent the region and their identifying characteristics, at least to a certain degree. While it is true that most surveys rely on song for identification, there are many other characteristics that can be used, like behavior, shape, or color. Becoming familiar with the identifying features and behaviors of the birds in a given area will make identification quicker and easier in the field. This can be achieved by studying a regional field guide to birds and spending time casually observing birds.

Another bit of information that is important to get the best representation of bird diversity on a property is to be familiar with the different habitat types present. For example, a grassland can easily be distinguished from a shrubland because of tree density. The reason it is important to conduct surveys in different habitat types is simply that different birds reside in different habitats. Some bird species desire habitat with heavier brush, such as Ladder-backed Woodpecker or Bewick's Wren; some prefer savannah with native grasses and scattered trees or clumps of brush, such as Black-capped Vireo, Vermillion Flycatcher, and Northern Bobwhite (Fig. 1); and other birds desire grassland habitat, such as meadowlarks and many sparrows. Most bird field guides give a general description of the kinds of habitat each species prefers. In general, if an area of habitat looks different from other areas, it can be considered a separate habitat. Ideally, the landowner would have maps indicating where different habitat types are located on the property; however, this is not always the case. If physical habitat maps are desired, they can often be obtained by speaking with Texas Parks and Wildlife County Biologists, or a landowner can make their own by using Google Earth or similar applications.

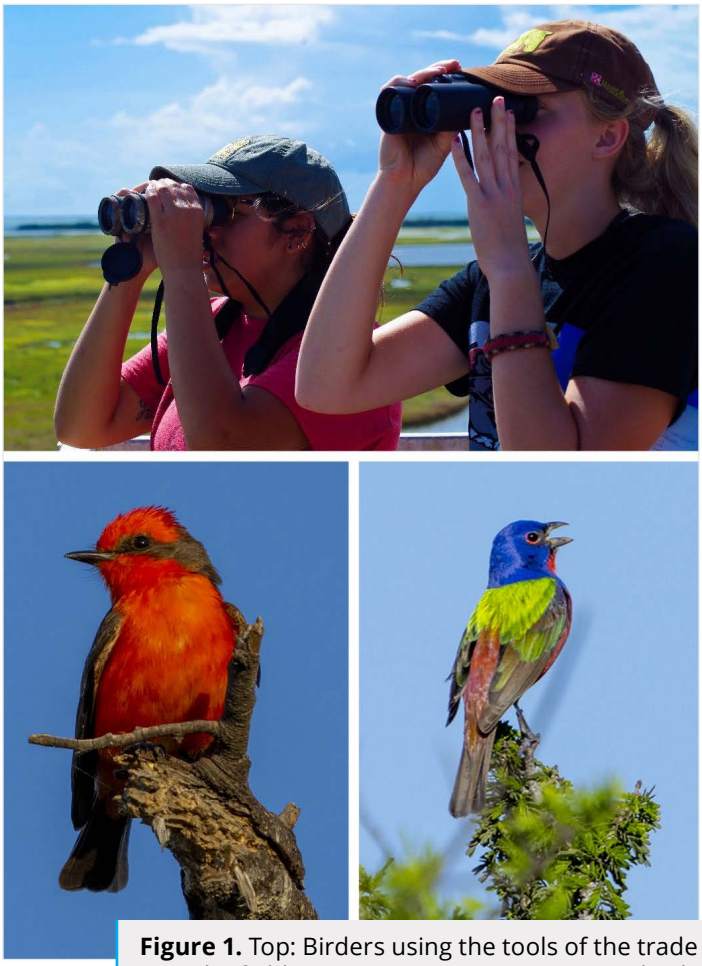

Figure 1. Top: Birders using the tools of the trade in the field. *Photo by A. Kasner.* Bottom: Two birds regularly found on Texas rangelands: Vermillion Flycatcher (left) and Painted Bunting (right).

Equipment

Fortunately, very little equipment is required to conduct bird surveys. The only materials that are needed are a piece of paper, a pencil/erasable pen (because everyone makes mistakes), a clipboard, and a field guide. Field guides are a great way to help with identification on the fly during surveys. Fortunately, with advances in technology, there are now two options for field guides: physical books or phone/tablet apps. There are a multitude of field guides on the market, each with pros and cons—at the end of the day, it comes down to personal preference. Examples are listed in the "Field Guides" section below. For surveys with a lot of places to visit or if there are new volunteers to help, a handheld global positioning system (GPS) is a great way to make sure the surveys are done at the appropriate location, and a rangefinder can be handy for measuring distances.

Binoculars or a spotting scope can be very helpful to identify birds from a long distance, and most would consider them a necessity. In today's market, there is a wide variety of different options at a range of price points. However, with all the options, it can be overwhelming when trying to narrow the focus to just a few. Below are a few things to consider when looking at binoculars:

- Magnification – On all binoculars, there are two numbers separated by a small "x." The first number is the magnification—the higher the number, the closer the bird appears. For optimal viewing of birds, 8x or 10x magnification is recommended.
- Objective lens diameter – The second number behind the "x" is the objective lens diameter and tells the size of the larger front lenses. Larger lens diameters allow more light to reach the user's eye, making the bird appear brighter, and are better in low light. However, a larger lens diameter means heavier binoculars. A lens diameter of 32 millimeters (mm) to 42 mm is recommended for optimal viewing. Anti-fog coating is recommended, and most binoculars come standard with this.
- Comfort and price – Everyone is going to have different preferences when it comes to the weight and feel of binoculars. Always try out a pair of binoculars for as long as possible before purchasing, and try different brands. Some are heavier than others, and higher magnification is more sensitive to trembling hands. While it is still true that one "gets what they pay for," most optics today are far superior to those from a decade ago, even at low price points. High-quality optics can cost a thousand dollars or more, but many very good options are available in the $100 to $350 range.
- Tips and tricks for use – A major trade-off with higher magnification is that objects can be challenging to find because the user is more zoomed into an area. Do not try to find a bird in the binoculars—instead, the viewer should keep their eyes fixed on the bird while raising the binoculars to their eyes. There is usually a rubber guard attached to each eyepiece, and some have eyepieces that twist in or out. Eyeglass wearers should twist these in (or fold over the rubber guard if eyepieces are not adjustable), while those without glasses should twist them out (or leave the rubber guards extended).

Survey Conditions

When conducting surveys, the goal is to see and hear as many birds as possible and collect data that is as uniform as possible across a property. To achieve this goal, it is recommended to put restrictions on when surveys are conducted. Time of day is critically important to consider. In general, birds are most vocal and active during the morning and evening hours. If the focus is to document diurnal (day) bird species, morning surveys are recommended. Evening surveys are useful for species such as nighthawks that become active just before dark, and nocturnal (night) bird species (such as owls and poorwills) that can be heard after sunset. Morning surveys should begin 30 minutes before official sunrise and conclude no later than 11 a.m. Temperature will greatly affect when morning surveys end, and on hotter days, surveys may need to wrap up closer to 10 a.m. Evening surveys are suggested to begin at least half an hour before official sunset and continue at a minimum of 1 hour after sunset.

The second condition to keep in mind for surveys is weather. Ideally, there would be zero wind or rain, and visibility would be 100 percent, but this is not realistic. If no wind was required, there would be many areas in Texas that could never have bird surveys conducted. For areas with consistent wind speeds of 8 to 12 miles per hour (mph; 13 to 19 kilometers per hour [km/h]), the general rule of thumb is that if the surveyor can walk faster than the speed the wind is blowing, the survey can be conducted. Areas with higher average wind speeds should aim to avoid conducting bird surveys when sustained wind speeds consistently exceed 7 mph (12 km/h). Infrequent gusts of wind exceeding 7 mph are okay and should not affect the birds observed. Obtaining accurate wind speed information has become much easier and more affordable in recent years. Landowners can access information via free phone apps or purchase an anemometer for less than $20. The observer should use their judgement—if the wind makes it difficult to easily hear the surrounding birds, then the survey should be stopped. Rainfall can make it a little trickier to decide if a survey should be conducted. It is acceptable to conduct bird surveys on days when it is raining, but consistent or prolonged, torrential rainfall is a reason to postpone a survey. Acceptable rainfall conditions include light drizzles, misty rain, and brief showers. If visibility becomes affected at any point due to rainfall or fog, it is recommended to end the survey.

How to Conduct the Survey

Transects

Conducting a bird survey on a property can be as simple or complex as the individual wants to attempt and are recommended to be implemented at intervals that are realistic enough to keep the surveys enjoyable (e.g., once per year or once per season). If the goal is to determine a list of species on the property, then simply walking a ranch road or trail that traverses the property (scientists call this a transect) and recording the species detected is sufficient. Ideally, the transect would be in a straight line, but as long as the transect does not double back on itself, it should be fine. Having a transect that loops back on itself could result in birds being counted twice, which would inflate count numbers. As previously mentioned, the transects should occur in different habitat types, and a minimum of one transect survey should be done per habitat type. This can be accomplished by walking a single ranch road or trail that passes through all of the habitat types present on the ranch. If the lay of the land requires separate transects in each habitat, then transects are recommended to be 100 to 250 meters in length. Of course, the larger the property and the more diverse the habitats within the property, the more effort is needed. More transects can be conducted to get an accurate representation of the bird species present within a given habitat type. If multiple transects are done, it is recommended to change the order in which transects are completed and the direction travelled each time a survey is done to keep the chances of bird detections equal across the transects. For example, consistently starting with transect 8 and ending with transect 3 is more likely to result in lower detection on transect 3 because birds wind down in the morning and when temperatures rise.

Point Counts

Sitting at water sources or feeders or in a deer blind for a period of time is another way to get an idea of what birds are present, and this option can stand alone or be used alongside the transect method. This method is called a “point count” by scientists. Put simply, a point count involves remaining stationary at a point and recording each bird detected in the surrounding area while attempting to avoid recording the same individual more than once. If a management goal is to improve habitat and measure bird responses to it, established points repeated each season or year are best. As with the “transect” approach, conduct

these point counts at all the major habitat types on the property. There may be one or multiple points in each habitat, but make sure that points are sufficiently spaced apart so that the same birds are not counted in a neighboring point (perhaps 250 to 500 meters apart), and count at each point for the same length of time (5 to 10 minutes is typical). If the landowner wants to know the density of birds on the property, they can limit the diameter of the point-count circle (or the distance they record birds from a transect), which allows them to determine the size of the area surveyed and estimate birds per acre. For example, a circle with a 100-meter diameter is approximately 2 acres. Repeated monitoring at these sites will allow for an understanding of overall bird populations, population shifts, and responses to management activities.

Tips and Tricks

Use preprinted data sheets (see Appendix A for an example) to prevent omission of important information and allow quick recording of bird detections. When doing surveys at points, a circle drawn on the data sheet can help prevent double-counting by recording the approximate location of the bird in the circle, and use the extra space to note birds seen on the way or outside the circle so that new species are not missed. Surveys are easier to do with paired observers, and the camaraderie is great if conversation does not scare the birds away. Have one person identify the birds and the other record what is seen and heard. Switch between points unless one is not skilled at bird identification. Use an audio identification app such as Merlin (Cornell Lab of Ornithology, a free app for Apple and Android users) to help identify bird sounds (see below for details in "Technology") or take a handheld recorder or the voice memo phone app to record sounds for playback later. While many apps now have recordings that can be played to elicit bird responses, this can be problematic for territorial species, and it is not recommended to use them in this way. Finally, landowners unfamiliar with songbirds may consider allowing bird watchers ("birders") on their property to help conduct surveys for more reliable results or until they feel sufficiently trained to do it on their own.

Technology and Resources

Technology

There are several types of technology and equipment (Fig. 2) that can be used to help in conducting bird surveys. This section will focus on the technology commonly used by birders since they are automated and user-friendly, while also discussing more advanced technology available and providing cautions about the pros and cons of identifying birds using recording technology. From artificial intelligence (AI) that is programmed to identify potential species in the area to recording technologies for targeted times of the day, a multitude of digital resources are available to help a landowner identify bird species and population numbers across their property.

Artificial intelligence is progressively integrated into the world of bird monitoring. With this progress, several bird AI platforms have been created, with Merlin Bird ID being the most common and feasible option for birders, landowners, and managers. Merlin is a free bird identification application developed by the Cornell Lab of Ornithology for digital mobile phones. Merlin uses machine learning and AI to suggest the identification of birds from photos and audio recordings based on the user's location (failure to confirm accurate location can lead to errors). While it is a convenient method to identify species, there are a couple of precautions to keep in mind. The app can quickly use up phone memory, so memory should be monitored and recordings should be deleted regularly. More importantly, the app is not 100 percent accurate because the software cannot always distinguish between very similar species or fails to correctly identify a species when it is detected outside of its expected range. In order to reduce this error when conducting bird surveys, the user should verify that the identified species can reasonably be expected to occur in the region and more carefully evaluate any identifications that do not fit this criterion. Consulting field guides, regional experts, or experienced birders will allow for more accurate identifications. At any rate, the next step is to gather a list of all identified species and sit down with a field guide to ensure the time and range match with each bird observed.

Autonomous Recording Units (ARUs) are one of the most useful technologies that allow for a greater picture of what species might be in a location that a manager or landowner might miss while conducting their surveys and can even be used in lieu of in-person surveys. However, ARUs require much more technological savvy, or a birder who is really good at identifying birds by song/call only. Thus, they are mostly used for scientific studies. While AI is useful, people can listen to the playback themselves to identify birds. There are several different types of ARUs (Fig. 2) with differing price ranges and qualities, and most are beyond the cost and skill level of the average landowner or birder. However, the less-expensive ARUs

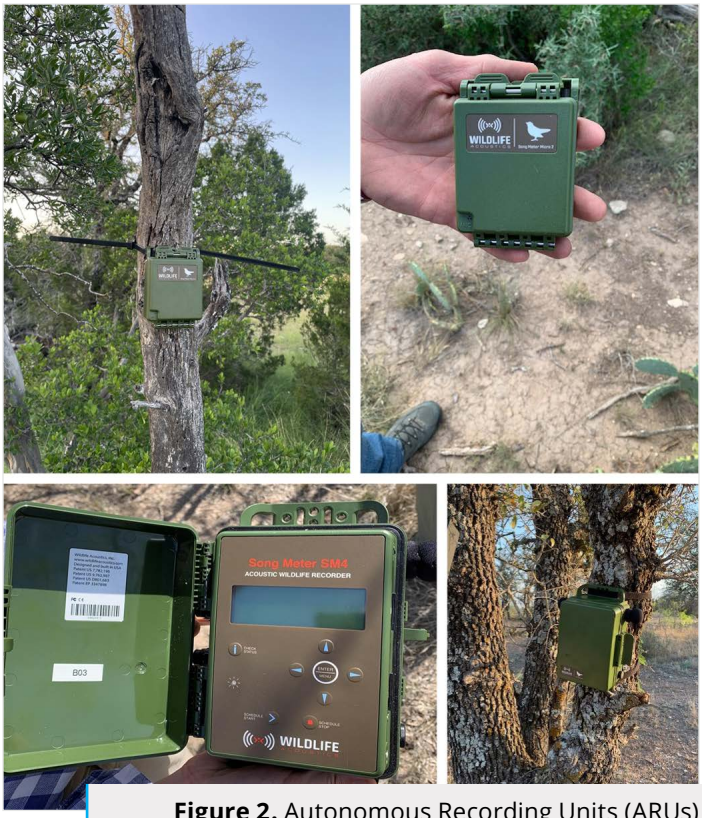

Figure 2. Autonomous Recording Units (ARUs) deployed for recording soundscapes to monitor bird populations. Top: Song Meter Micro 2 (~$150 by Wildlife Acoustics, Inc.). Bottom: Song Meter SM4 (~$700 by Wildlife Acoustics, Inc.). *Photos by C. Gomez.*

can be a powerful way to monitor bird populations remotely and accurately. They can be programmed to record at specific times of day, and users can learn to use programs such as BirdNET to identify birds from the recordings. BirdNET is a free bird audio identification software produced by the Cornell Lab of Ornithology that can identify birds from large audio datasets, but the outputs require interpretation and caution using manual verification and high confidence thresholds. While it is more complicated and comes with some expense, this technology is not outside the realm of possibility for ambitious birders and land managers.

Other Resources

The field guides and organizations listed below can help aid in the identification and observation of birds and provide a community for bird enthusiasts.

Audubon Texas

- *Audubon Dallas*
- *Bastrop County Audubon Society*
- *Bexar Audubon Society*
- *Big Country Audubon Society*
- *Central Texas Audubon Society*
- *Coastal Bend Audubon Society*
- *El Paso/Trans-Pecos Audubon Society*
- *Fort Worth Audubon Society*
- *Golden Triangle Audubon Society*
- *Houston Audubon Society*
- *Huntsville Audubon Society*
- *Llano Estacado Audubon Society – Facebook Group*
- *Monte Mucho Audubon Society*
- *Prairie and Timbers Audubon Society*
- *Rio Brazos Audubon Society*
- *Tex-Ark Audubon Society – Facebook Group*
- *Texas Panhandle Audubon Society*
- *Texoma Audubon Society*
- *Travis Audubon Society*
- *Twin Lakes Audubon Society*
- *Tyler Audubon Society*

Texas Ornithological Society

Texas Ornithological Society is region-specific; please explore regional information.

Texas Master Naturalists

Texas Master Naturalists has chapters located across the state that offer opportunities to engage in monitoring efforts, learn field skills, and meet other wildlife enthusiasts.

Field Guides

- Dunn, J. L. & Alderfer, J. *National Geographic Field Guide to the Birds of North America* (7th edition). ISBN 978-1426218354
- Kavanagh, J. *Texas Birds: A Folding Pocket Guide to Familiar Species* (Nature Observation North America). ISBN 978-1583551189.
- Lockwood, M. W. *American Birding Association Field Guide to Birds of Texas* (American Birding Association State Field). ISBN 978-1935622666.
- Sibley, D. A. *The Sibley Guide to Birds* (2nd edition). ISBN 978-0307957900
  - Also available in separate Eastern and Western editions.
- Birds of Texas Field Guides – A quick search will produce several good options.

- Bird identification apps – Examples below include illustrations, photos, recordings of songs and calls, range maps, and descriptions of each species.
    - Merlin (By Cornell Lab of Ornithology, freely available on iPhone or Android devices)
    - iBird (Free and premium versions available for iPhone users)
    - *Audubon Bird Guide*

Conclusion

This guide provides a brief introduction to the purpose, use, application, and resources for landowners and managers to better understand how to conduct bird surveys in an efficient manner to inform management plans on their land. Having a general understanding of the birds present can significantly impact management options and decisions in a way that provides the best direction to achieve the landowner's goals. There is more to the land than the earth and sky, and it is crucial to see all that lives in between and manage them effectively.

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Appendix A: Observation Sheet

Date: _____ Pasture/Site: _____ Time: _____

Observations: _____

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