Field Protocol for Spatially Balanced Sampling of Landbird Populations

Integrated Monitoring in Bird Conservation Regions (IMBCR)

Updated April 2024

Bird Conservancy of the Rockies
Connecting People, Birds and Land

IMBCR

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Connecting people, birds and land

Mission: Conserving birds and their habitats through science, education and land stewardship

Vision: Native bird populations are sustained in healthy ecosystems

Bird Conservancy of the Rockies conserves birds and their habitats through an integrated approach of science, education, and land stewardship. Our work radiates from the Rockies to the Great Plains, Mexico and beyond. Our mission is advanced through sound science, achieved through empowering people, realized through stewardship, and sustained through partnerships. Together, we are improving native bird populations, the land, and the lives of people.

Core Values:

1. **Science** provides the foundation for effective bird conservation.
2. **Education** is critical to the success of bird conservation.
3. **Stewardship** of birds and their habitats is a shared responsibility.

Goals:

1. Guide conservation action where it is needed most by conducting scientifically rigorous monitoring and research on birds and their habitats within the context of their full annual cycle.
2. Inspire conservation action in people by developing relationships through community outreach and science-based, experiential education programs.
3. Contribute to bird population viability and help sustain working lands by partnering with landowners and managers to enhance wildlife habitat.
4. Promote conservation and inform land management decisions by disseminating scientific knowledge and developing tools and recommendations.

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Western Meadowlark by Deanna Beutler.

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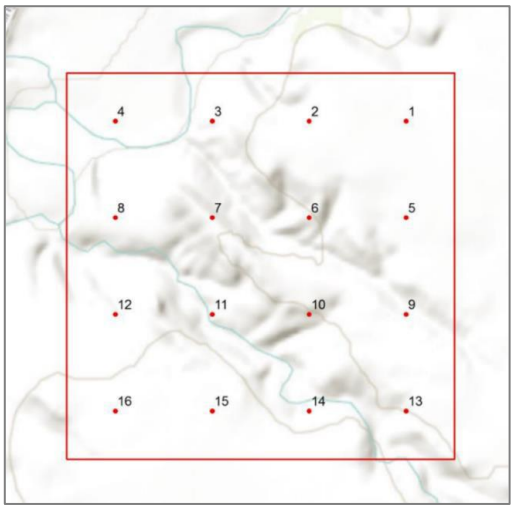
Project Overview

Bird Conservancy of the Rockies, in cooperation with the U.S. Forest Service, U.S. Bureau of Land Management, U.S. National Park Service, Colorado Parks and Wildlife, and other agencies, developed a program to monitor bird populations using point counts as the primary sampling technique in 2008. We designed the program to be statistically rigorous, biologically accurate, and to produce data for analyses of population trends for most breeding, diurnal landbird species.

This document provides details on the design and field implementation of the Integrated Monitoring in Bird Conservation Regions (IMBCR) monitoring program. This protocol is intended to instruct field technicians on how to conduct point counts and to help partners establish monitoring projects of their own, so that the methods can be comparable.



Survey points are arranged in a 4 x 4 grid of 16 points, with 250 m spacing between points (Figure 1).

Grids are selected using a spatially balanced sampling algorithm (Stevens and Olsen 2004). Grids are generally selected without regard to habitat type, except for some grids selected within riparian corridors. In most instances, grids are stratified by land ownership (National Forests, National Grasslands, National Parks, BLM Field Offices, private property, etc.).

Figure 1. Diagram of a grid (red outline) and points (red dots). *Grids* may also be referred to as "*transects*" or "*surveys*". Individual points should always be referred to as "*points*".

Each survey grid can contribute data to population estimates at multiple spatial scales. An individual stratum can be combined into one or more superstrata, as shown in Figure 2.

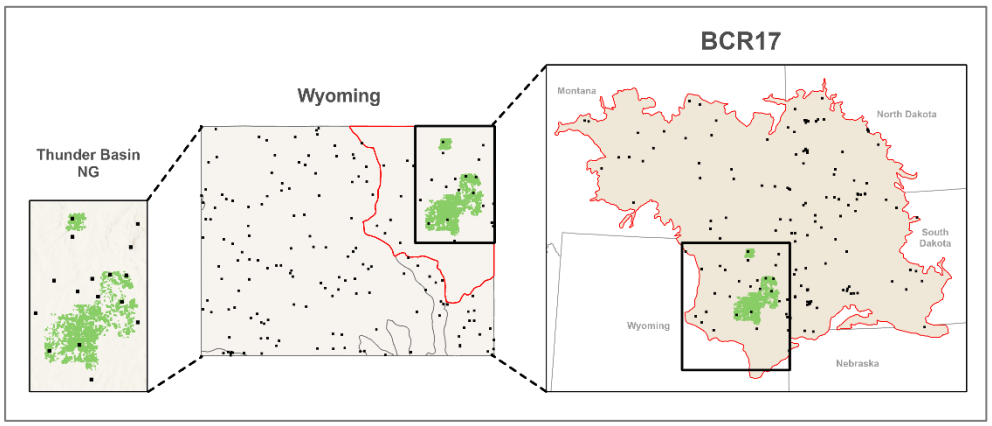


Figure 2. IMBCR results are estimated at multiple spatial scales. For example, data collected in Thunder Basin National Grassland stratum contribute to estimates for both the Wyoming and Bird Conservation Region (BCR) 17 superstrata.

Transect, grid, or survey – used interchangeably to refer to the group of sixteen point count stations
Point – One of the sixteen point count stations within the grid

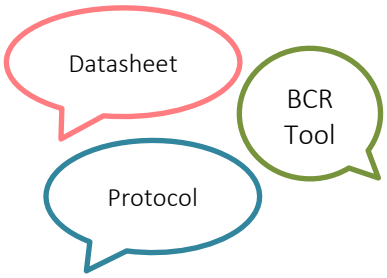
Protocol Overview

Each field technician will complete these tasks during the field season.

A. Before the Survey
- Prepare for the survey (have equipment and data sheets organized, review weather and safety considerations).
- Review land ownership & permission for each survey location. For surveys on private land, inform landowner of the survey date.
- Determine access point, scout the best way to access the transect, determine efficient order to conduct the points.

B. During the Survey
- Navigate to each point, arriving at the first point prior to sunrise.
- Record survey information
- Collect vegetation data at each point (habitat type, overstory, understory and groundcover percent cover and species composition, etc.)
- Collect bird data at each point (species, detection type, distance, sex, etc.)
- Record reasons why any points were unable to be surveyed
- Review data

C. After the Survey
- Enter data
- Complete office day tasks (proofing and uploading datasheets, logging time and travel, updating Landowner Database, etc.)



Throughout this protocol, we reference datasheets, other protocols or manuals, and online tools developed by Bird Conservancy with these symbols. Please contact Matthew McLaren if you need a copy of any datasheets or protocols.

Part 1: General Information

I. **Materials**

Before heading out into the field, each technician should be sure to have the following equipment (your employer will supply all materials except binoculars):

A. Timepiece with a countdown timer and a chime
B. Binoculars (you must provide these)
C. Declination-adjustable compass with sighting capability (e.g., a mirror)
D. Clipboard
E. Pencils (carry at least two with you in the field)
F. GPS unit with point count locations loaded onto it
G. Rangefinder
H. Extra batteries
I. Satellite communication device (e.g. Spot or InReach)
J. Data forms sufficient for all the points planned that morning
K. Plant ID guide
L. Maps and transect locations
M. Protocol with master list of four-letter bird codes
N. Master list of weather, habitat, and plant codes attached to the clipboard

II. Strategies for Success

A. Stay organized

The night before each survey, organize equipment and materials for the following morning's survey. Prepare food and personal gear to facilitate a timely departure from camp or the trailhead. Bring appropriate gear, including extra water, a first aid kit, and all required survey gear.

B. Familiarize yourself with the survey site

The day before conducting a point count survey, familiarize yourself with the survey area and habitat, and plan an access route to navigate to the first point (this will make it easier to navigate if you have to hike in in the dark the next morning). If you are provided with access route instructions, verify they are accurate and update as needed. Determine the point to point route you will take during the survey. If the survey is in a remote area, plan to camp the previous night nearby.

C. Check weather reports

Unless there are extreme conditions predicted for the morning (e.g., strong winds and/or heavy rain), observers should attempt to conduct a survey. Do not conduct counts if wind strength on the Beaufort scale is a sustained 5 or greater, or if it is raining more than a drizzle. If you encounter these conditions, wait until the weather improves, or cancel sampling for that day and try again another day. If you wait for the weather to improve, you must start the survey within the 5-hour post-sunrise window, and complete the minimum number of points (4 points for a grid on private land and 6 points for a grid on public land). If you cancel a survey due to weather, you will complete other work that day, such as data entry.

D. Daily timing

Sampling occurs in the morning, beginning approximately ½ hour before sunrise (once there is enough light to identify birds by sight) and ending no later than 5 hours after official sunrise. Sunrise times vary depending on location and date - always check the local sunrise time using your GPS. Arrive at the first point while it is still dark so that the count can begin as soon as it is light enough to see. Singing rates for most species are highest near sunrise and then decline slowly over the next few hours.

E. Safety

During training, your crew leader will review safety considerations and provide a safety protocol. It's your responsibility to know: 1) the dangers you may encounter in the field, 2) how to minimize the likelihood of encountering those dangers, and 3) what to do if you encounter a dangerous situation.

You may be provided with a personal locator beacon (such as SPOT or inReach), which allows you to regularly check in with their crew leader in the absence of cell phone service. Additionally, it allows you to send a "help" message in the event of an emergency. Most IMBCR partner organizations require you to send your crew leader an "ok" message prior to, and following, the completion of each survey. If so, you are required to consistently use the units; otherwise, the crew leader is left wondering if you forgot to check in, or, if you are in need of assistance. We will cover how to use inReach units during training, and more information is available in the Safety Protocol.

III. **Seasonal Timing**

Point counts should be performed after all migratory species have returned to their breeding areas and as early in the season as possible without counting transient birds that are still migrating through. Counts performed in grasslands in late May are not comparable to counts performed in the same habitat in early July. Most local breeding birds complete nesting before the middle of July and are much less vocal at that time compared to earlier in the breeding season.

Below is a list of the optimal survey dates for each study area.

Arizona:
<3,500ft (<1,000m) – April 20th – May 10th
3,500ft – 5,000ft (1,000m – 1,500m) – May 1st – May 20th
5,100ft – 6,500ft (1,500m – 2,000m) – May 10th – June 10th
6,600ft – 7,500ft (2,000m –2,300m) – May 20th – June 20th
>7,500ft (>2,300m) – June 10th – July 5th

California (entire state):
May 20 – June 20

Colorado:
<6,500ft (<1,981m) – May 10th – June 10th
6,500ft – 8,000ft (1,981m – 2,438m) – June 1st – June 25th
8,000ft – 9,300ft (2,438m – 2,834m) – June 10th – July 10th
>9,300ft (>2,835m) – July 1st – July 15th

Idaho/Montana:
<7,500ft (<2,300m) – 25 May – 15 June
7,500ft – 9,300ft (2,286m – 2,835m) – 5 June – 30 June
>9,300ft (>2,835m) – 1 July – 15 July

Kansas (entire state):
May 1 – June 15

Nebraska and South Dakota:
<3,000ft (<900m) - 20 May - 15 June
3,000ft - 5,000ft (900m - 1,500m) - 1 June - 26 June
>5,000ft (>1,500m) - 27 June - 10 July

Nevada:
<6,500ft (<1,981m) – May 10th – June 10th
6,500ft – 8,000ft (1,981m – 2,438m) – June 1st – June 25th
8,000ft – 9,300ft (2,438m – 2,834m) – June 10th – July 10th
>9,300ft (>2,835m) – July 1st – July 15th

New Mexico (entire state):
April 15 – May 31

North Dakota (entire state):
June 1 - June 26

Oklahoma (entire state):
April 20 – June 15

Oregon (entire state):
May 20 – June 20

Texas (entire state):
April 20 – June 15

Utah
<6,500ft (<1,981m) – May 10th – June 10th
6,500ft – 8,000ft (1,981m – 2,438m) – June 1st – June 25th
8,000ft – 9,300ft (2,438m – 2,834m) – June 10th – July 10th
>9,300ft (>2,835m) – July 1st – July 15th

Wyoming/Caribou-Targhee National Forest:
<6,500ft (< 2000m) – 20 May – 20 June
6,500ft – 7,500ft (2,000m – 2,300m) – June 5th – July 1st
7,500ft – 8,500 (2,300m – 2,600m) – June 15th – July 10th
8,500ft (>2,600m) – July 1st – July 20th

Part 2: Preparation and Planning

I. Land Ownership, Access, & Permission

A. Ownership Categories

These are most common types of ownership we encounter while conducting surveys:

Type of ownership	Description	Permission/permit
Public Right of Way (PRW)	Government-owned passageway (such as a road) through any other type of land. **Not all roads are public!** Interstates, state highways, county, USFS and BLM roads are public right of ways – if a road has one of these labels, you can travel on it without trespassing. Legally, landowners cannot gate public right of ways even if they own adjacent property; however, this still occurs. If you come to a gate or other indicator (e.g. No Trespassing sign), assume you have reached the end of the public right of way.	None
Federal Lands	Bureau of Land Management	Usually none, but check for local restrictions
	U.S. Forest Service	
	U.S. Fish and Wildlife Service	Typically required
	National Park Service	
	Department of Defense	
	Bureau of Indian Affairs	Always required
State Lands	State trust lands (e.g., State Land Board, school trust)	Varies by state
	State resource lands (e.g., wildlife, parks, or forest)	Typically required
Local Government Lands	County and city lands	Varies
Private Lands	Owned by individuals or businesses, who have the right to prevent access to their land. Further, they have the right to prevent access to adjacent public land if no public right of way exists. Trespassing laws vary state to state; for simplicity's sake, if you are on private land without landowner consent – you are trespassing.	Always required

Passes and permits: If required, your crew leader will obtain permits for you. Your employer will also reimburse you for any fees (e.g. state park entry fee) incurred while conducting surveys. In National Parks, your research permit will also serve as a free entrance pass.

Checkerboard ownership: In some areas, a mixture of public and private parcels forms a configuration resembling a checkerboard. This is most commonly found in areas with BLM lands, but may occur in other areas.

It is not legal to "jump corners" from one public parcel to the next (that is, pass from 1 to 4 in Figure 3), unless you have permission from the landowner of parcel 2 or 3.

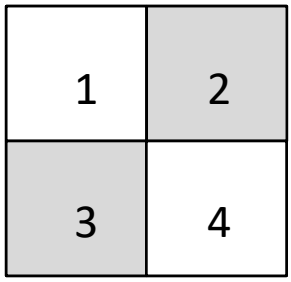
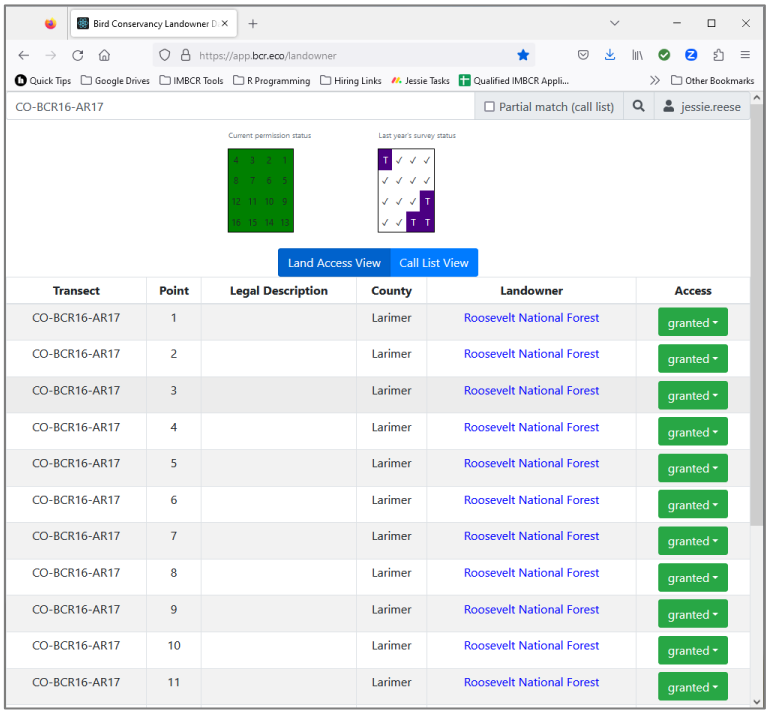


Figure 3. Checkboard landscape. Shaded squares represent private parcels and unshaded squares represent public parcels.

B. Landowner Database – Access Permission

IMBCR technicians are responsible for checking Bird Conservancy's Landowner Database to determine the ownership and access permission status of each survey they plan to complete. **Do not attempt to cross or survey property if you have any question regarding ownership.** Trespassing is a serious offense and may be cause for immediate termination.

Prior to the field season, your supervisor will work to obtain permission to access private or restricted property. Usually, they'll have secured permission for ≥ 4 out of the 16 points before assigning you the transect (which is the minimum required number of points to consider a survey complete due to private land issues). Occasionally, you may be asked to contact assessor offices, resource managers, and/or private landowners to obtain additional contact information and permission.



BCR Tool

Checking access permission

Visit Bird Conservancy's Landowner Database at https://app.bcr.eco/landowner to check access permission.

Log in with your Observer ID and password (provided at training).

Type the transect number into the empty search box at the top and navigate to the appropriate transect.

Note the access status for each point on the survey on your Landowner Information Sheet and Transect Map.

Figure 4. The Landowner Database.

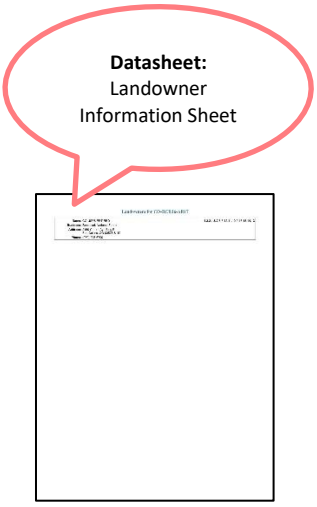
Recording access permission

On your Landowner Information Sheet (Figure 5) and Transect Map (Figure 6), circle each point where access has been "granted" or is "conditional" and cross out any points where access has been "denied" or is "no attempt". Points where the access status is "pending" should not be marked.

This will help you remember which points are ready to survey, which points should be avoided, and which points you can ask about permission if you encounter a landowner near the transect or see a nearby house.

Name:	Jennifer Blakesley	5, 9, 13,
Address:	1230 Mountain Vista St., Green River, WY 82935	
Phone:	(307) 332-0835	
Name:	Jeff Birek (owner)	1,
Business:	Birek Cattle Co. LLC	
Address	PO Box 247	
	Green River, WY 82935	
Phone:	(307) 331-4251	
Alternate Phone:	(307) 328-4455	
Name:	Green Grass Country Club (Owner), Nick Van Lanen (Contact)	10, 11, 14
Business:	Green Grass Country Club	
Address	PO Box 21	
	Green River, WY 82935	
Phone:	Phone: (307) 882-1459	
Notes:	2/2011: Contact Nick before entering.	
Name:	Chris White (owner)	2, 4
Address	PO Box 844	
	Green River, WY 82935	
Physical Address:	2716 Tulane Dr.	
Phone:	(307) 452-9845	
Name:	Jora Rehm-Lorber (owner)	6, 7, 8
Address	589 Comanche Cir	
	Green River, WY 82935	
Phone:	(307) 362-3854	
Name:	Matthew & Cassidy McLaren (owner)	12, 15, 16
Address	1100 Mountain Vista St.	
	Green River, WY 82935	
Phone:	(307) 462-8985	
Name:	David Hanni (owner)	3,
Address	PO Box 1441	
	Green River, WY 82935	
Phone:	(307) 433-9957	

Figure 5. Example landowner information sheet. Circle points with permission granted; cross out points without permission.



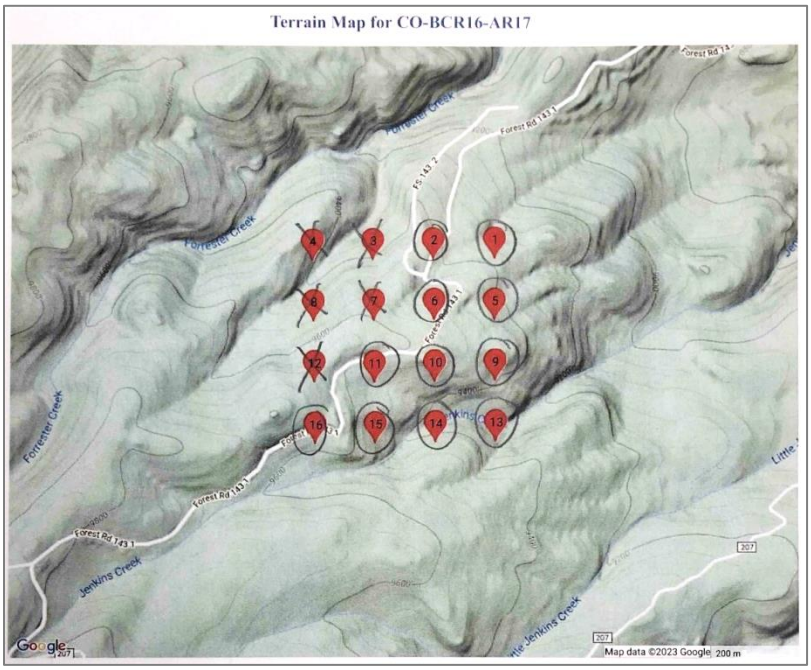
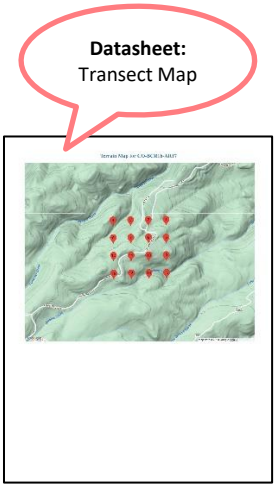


Figure 6. Example survey map. Circle points with permission granted; cross out points without permission.



Checking for special access instructions

Review the notes and contact log for each landowner whose land you intend to survey. There may be special instructions regarding driving on roads, disturbing cattle, etc. Record these notes on your landowner information sheet as a reminder to yourself.

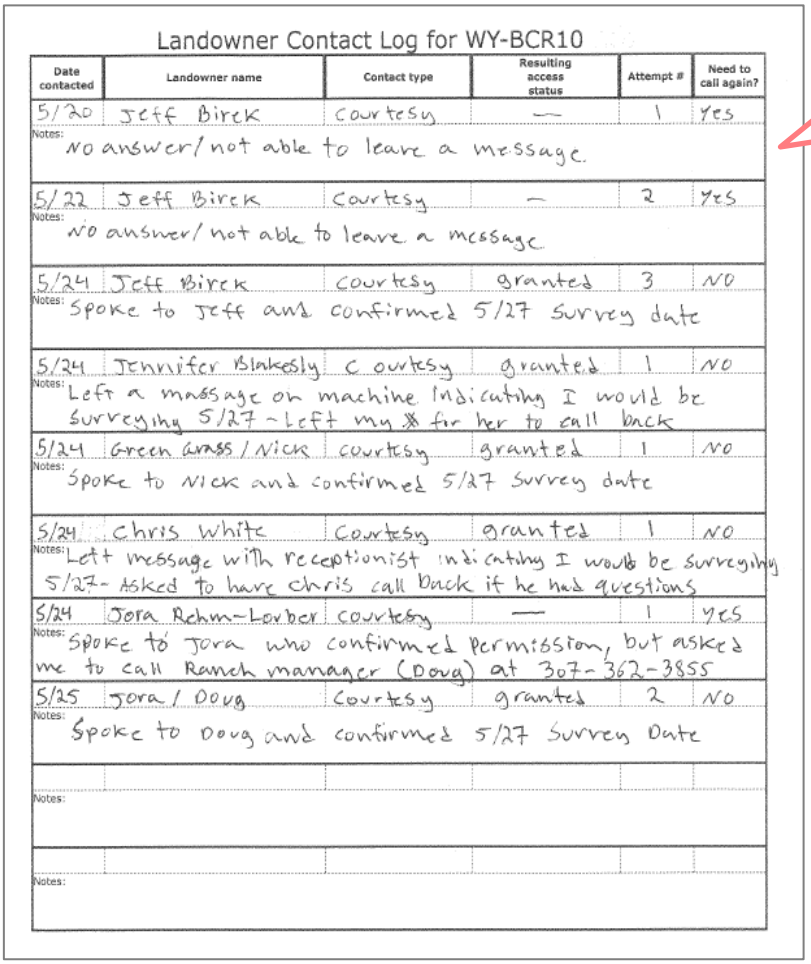
Giving landowners a courtesy call

For each landowner who has granted access to their property, you must call two or three days prior to surveying the property.

It is extremely important that you do this because your employer has promised each landowner that they will receive notification prior to the survey, as a courtesy to them.

When calling please tell the landowner your name, the organization you are working for, provide an expected date that you will be on their property, and describe the vehicle that you will be driving. In the event that a landowner who has already granted permission doesn't answer the phone, a voicemail message will suffice.

If the landowner doesn't answer and you are unable to leave a message you should not survey the property until you establish some contact with the landowner. If you are unable to establish contact after four attempts please contact your crew leader. If your employer obtained permission via mail, but there is no associated contact phone number, it is okay to survey those points without talking to the landowner, as long as you have the return card granting permission with you at the time of the survey.



Landowner Contact Log for WY-BCR10

Date contacted	Landowner name	Contact type	Resulting access status	Attempt #	Need to call again?
5/20	Jeff Birck	courtesy	—	1	yes
Notes: no answer/not able to leave a message.					
5/22	Jeff Birck	courtesy	—	2	yes
Notes: no answer/not able to leave a message					
5/24	Jeff Birck	courtesy	granted	3	NO
Notes: spoke to Jeff and confirmed 5/27 survey date					
5/24	Jennifer Blakesly	courtesy	granted	1	NO
Notes: Left a massage on machine indicating I would be surveying 5/27 - Left my # for her to call back					
5/24	Green Grass / Nick	courtesy	granted	1	NO
Notes: spoke to Nick and confirmed 5/27 survey date					
5/24	Chris White	Courtesy	granted	1	NO
Notes: Left message with receptionist indicating I would be surveying 5/27- Asked to have Chris call back if he had questions					
5/24	Jora Rehm-Lovber	courtesy	—	1	yes
Notes: spoke to Jora who confirmed permission, but asked me to call Ranch manager (Doug) at 307-362-3855					
5/25	Jora / Doug	Courtesy	granted	2	NO
Notes: Spoke to Doug and confirmed 5/27 survey Date					
Notes:					
Notes:					

Datasheet: Landowner Contact Log

Record all attempts to contact landowners and the result of those attempts on the Landowner Contact Log datasheet (Figure 7).

If you obtain any new landowner information while in the field (such as landowner names, phone numbers, addresses, etc.), record it here.

Updating the Landowner Database

All landowner contacts and any new landowner information must be entered into the Landowner Database following the **Data Entry Protocol**.

Protocol

Figure 7. Example landowner contact log.

II. Transect Descriptions, Maps, & Navigation

A. Transect Description Sheets

For each survey assigned to you, you'll receive a printed Transect Description Sheet (TDS, Figure 8). Most TDS will already have information recorded; however, new surveys which haven't been done before will be mostly blank. Record, verify, or update all information on the TDS. This is the best opportunity for information obtained "on the ground" to be passed on to crew leaders and future technicians.

Transect CO-BCR16-AR17

Transect Name: Observer ID: Date Conducted:

Please verify all transect information. If the access point, county, map, or other information is inaccurate, note the correct data!

DeLorme Page: 18 B2 | Access Point UTM: 13 408578 4526762 | Difficulty: 2, 2

Accessible to: ☐ All Vehicles ☐ High Clearance ☑ 4WD Only

State: CO | County: Larimer | Backpacker: ☐

Elevation: 9613.68 | Management Unit: Arapaho and Roosevelt National Forests

Access Point Directions:

From Poudre Canyon/HWY 14 go 27.5 mi and turn left onto Hohnholz Lakes Rd. Drive past Hohnholz lakes and stay on FR200 for 8.8 miles. At Fork stay left on FR143. Take this road for ~3.5 miles until it dead ends at a parking area (AP coordinates here). At the parking area there will be a small FS road leading off the the left. Take this road as far as possible (4wd and high clearance required). In 2013, was able to get within about 1km of transect before fallen trees blocked rd. In 2022, huge puddles completely blocked this road (couldn't navigate in a Subaru Forester), so I hiked in ~4 miles.

Camping/Notes:

I camped at the large parking area at the AP. Very buggy here.

Transect Description:

Insect Infested. Hiking between points is steep in some places.

Point Info:

Point:	Zone:	Easting:	Northing:	TRS:
1	13	413526	4526728	
2	13	413276	4526728	
3	13	413026	4526728	
4	13	412776	4526728	
5	13	413526	4526478	
6	13	413276	4526478	
7	13	413026	4526478	
8	13	412776	4526478	
9	13	413526	4526228	
10	13	413276	4526228	
11	13	413026	4526228	
12	13	412776	4526228	
13	13	413526	4525978	
14	13	413276	4525978	
15	13	413026	4525978	
16	13	412776	4525978	

Datasheet: Transect Description Sheet

BCR Tool

TDS Website

You can access TDS and other datasheets on the TDS Website at https://tds.app.bcr.eco.

Login with your Observer ID and password, and enter the transect number.

Here you can print out the TDS, Transect Map, Landowner Information Sheet & Landowner Contact Log.

You can also **interactively explore the Transect Map** to zoom in and view terrain, topography & satellite basemaps.

Figure 8. Example Transect Description Sheet (TDS).

Filling out the Transect Description Sheet

Datasheet: Transect Description Sheet

Access Point
The closest safe spot to the survey where you can park your vehicle. If possible, should be a recognizable feature such as a cattle guard or sign post.

Observer ID – Your Observer ID

Date Conducted – YYYY/MM/DD

DeLorme Page – Page number and section from DeLorme Atlas

Access Point UTM – UTM coordinates and projection zone for the *Access Point*

Difficulty – Record the access and transect difficulty using the rubric (Table 1). This information allows you to know if you will be pressed for time to complete all 16 points, so you can plan accordingly.

Table 1. Transect difficulty rubric.

Access Difficulty Hiking difficulty from access point to transect	**Transect Difficulty** Difficulty traveling between points on a transect
1: ≤ 3 km and easy topography. Hike to transect requires < 45 minutes.	1: Relatively flat. 16 points easily surveyed in ~ 4 hours.
2: 3 km - 6 km with relatively easy topography. Hike to transect requires < 75 minutes.	2: Hilly terrain, areas with dense vegetation, and/or a few stream crossings. Able to complete 12-16 points.
3: ≥ 6 km and/or difficult terrain. Transect likely requires backpacking into transect the day before.	3: Steep slopes, dense vegetation, or difficult stream crossings throughout the transect. Able to complete 6-12 points.
4: Inaccessible due to river, cliffs, or other dangerous terrain.	4: Unable to complete more than 5 points due to cliffs, rivers, or other dangerous terrain.

A survey of access difficulty 1 and transect difficulty 2 is written as 1, 2.

Accessible to – Type of vehicle needed to drive to the access point

Backpacker - Check this box if a full day is required to backpack in the day prior to surveying

Access Point Directions – Driving directions to the *Access Point* (the most logical, safe, and efficient location to park a vehicle to access the survey). Give explicit directions from a major intersection within a nearby town readily found on a map. Give mileages from intersections or landmarks using your odometer. If roads are unmarked, provide UTM coordinates of intersections or landmarks.

If existing directions are incorrect, delete the old directions and update. If you find an alternate route, and both sets of directions are useful, keep both and label one "Alternate Directions".

Record directions, distance, and hiking time from the Access Point to the transect. Record UTM coordinates of landmarks or locations that allow efficient access to the survey (e.g. where to leave a hiking trail and start bushwhacking).

Camping/Notes – Campsite description and directions including UTM coordinates. If camping is unavailable near the survey (e.g., no public land nearby) then record where you stayed.

Also include: the nearest library or free internet location, problems encountered during the survey, cool scenery, or other tidbits that future surveyors might find interesting.

Do not list bird species you found on the survey - this can bias future detection data.

Transect Description – Record the primary habitat types encountered, information about the terrain, fence or stream crossings, and any other helpful information. For difficult surveys, provide directions between points or an exact order to conduct the points to avoid/limit difficult navigation.

B. Interactive Maps – Phone and Computer Apps

Each technician will receive a KML file containing the point locations for your surveys. These files can be opened in a variety of mapping applications (Table 2).

Table 2. Mapping applications useful for IMBCR surveys.

Application	Phone or Computer	Available Offline	Shows Current Location	Additional Info
Google Earth Pro for Desktop	Computer	Yes	No	Great to use on your computer when you're in the field away from internet access!
OnX Hunt	Both	Upload points online, then save maps offline	Yes (phone)	Contains landowner parcels boundaries and names; paid; may need to convert .kml file to .gpx
Avenza	Phone	Yes	Yes	Download free maps from their store; great for Motor Vehicle Use Maps; upload your own georeferenced PDF maps
CalTopo	Both	Yes, if you zoom in while online (saves to your phone's cache)	Yes (phone)	Can create your own georeferenced PDFs for Avenza on the computer version; offline use on phone is finicky

After uploading your survey points to one of the mapping apps, plan the order you'll conduct your assigned surveys to minimize travel time and distance traveled between survey locations. You can also color code the locations of transects by seasonal period to aid in planning the order surveys should be completed.

Use satellite and topographic basemaps to review terrain at each survey location, and determine which roads and/or trails you can use to access the survey. Look carefully at steep surveys via satellite - steep slopes lacking vegetation are not as safe for travel.

Several apps listed in Table 2 are handy to use on your phone to navigate while traveling to and conducting the survey. Additionally, you'll receive a handheld GPS unit with survey points for navigation. Always use your GPS (rather than an app) to make the final approach to the point, because it is more precise and allows you to record your GPS accuracy.

C. DeLorme, BLM, and USFS Maps

In addition to interactive maps, DeLorme Atlases are useful for driving directions in your study area and locating towns, public lands, or other areas of interest in the general area. Surveys on BLM lands or National Forests may be greatly aided by maps produced by those agencies. In particular, we recommend having USFS or BLM maps that display trail systems, 4WD roads, and parking areas for backcountry surveys as these can greatly simplify navigation to the survey. In most cases, your employer will provide you with these maps. If you do not have a map that you feel is necessary, contact your supervisor to see if you can be reimbursed for the expense of a purchased map.

Part 3: Conducting the Survey

I. Conducting Point Count Surveys

A. Navigate to the Point

You will receive a GPS unit with point locations for your surveys loaded onto it. Otherwise, your crew leader will instruct you on how to load your surveys. Follow the GPS unit to each point count station. See Appendix A for a description of how points are labeled within the GPS unit.

Points may be visited in any order

If you can't conduct the survey from the exact point location, you may count from anywhere within 25m of the point. Acceptable reasons to do so include:

1) permission was not granted from a private landowner; however, the observer can count from a public right-of-way that is within 25m of the point,
2) the point count station does not afford good visibility (a boulder, rock or other obstruction is blocking your view, or it is down in a wash)
3) it is difficult to hear (often times running water can make hearing birds difficult but moving a few steps away greatly improves your aural detection ability).

Make every effort to count from the exact point location. If you can't get within 25m of the exact point location, do not survey the point.

B. Collecting Habitat Data

When you reach the first point, fill out the start time, sky & wind codes, and temperature.

When you reach each point, fill out the GPS accuracy and habitat data on the field forms first. However, do identify and make a note on your datasheet of the locations of any birds flushed from around the count station upon your approach. Filling out the habitat data first is important for two reasons: 1) it will ensure that you do not forget to write it down, and 2) it will allow the local birds to "settle down" after the disturbance you created while approaching the point.

Do not start the point count until after you've collected the habitat data

This information will have real applications for managing habitats for birds, so please be as accurate as possible with these data. However, because it is very important to finish as many point counts as possible in a morning, we ask that you do not spend more than a couple minutes filling in habitat data at each point.

Collect samples of unknown plant species (place in a numbered zip lock bag), or take photos so you can identify them after completing the survey. Below is a description of the fields found on the vegetation datasheet and brief instructions on recording these data. Refer to Figure 9 at the end of this section for an example of a completed vegetation datasheet.

Datasheet: Habitat Data

i. Site Data

Observer ID	Date (YYYY/MM/DD)	Transect ID		Start	End
			Time		
			Sky		
			Wind		
			Temp		

Observer ID: Your Observer ID
Date: YYYY-MM-DD
Transect ID: Full code identifying the state, stratum and survey number (e.g., CO-BCR16-AR8)
Time: (start and end) Use **local time** in the **military format**. Record the start time when you arrive at the first point and begin recording site data. Record the stop time after you complete the final point count.
Sky: (start and end) Enter one-digit codes at beginning and end of the survey (not for each point)

0=0-15% cloud cover
1=16-50% cloud cover
2=51-75% cloud cover
3=76-100% cloud cover
5=fog
6=drizzle
8=Light snow

Do not survey in any other conditions

Wind: (start and end)**:** Enter one-digit codes at beginning and end of the survey:

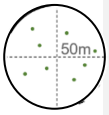
0=Less than 1 mph; smoke rises vertically
1=1-3 mph; smoke drift shows wind direction
2=4-7 mph; leaves rustle, wind is felt on face
3=8-12 mph; leaves, small twigs in constant motion; light flag extended
4=13-18 mph; raises dust, leaves, loose paper; small branches in motion

Do not survey in any other conditions

Temperature: (start and end)**:** Use °F (if no thermometer, estimate to the nearest 5° or use a weather app or car thermometer)

	Point Info (Y/N)					
Point	GPS Accuracy	Private property?	Midstory Present	Cliff/rock?	P-dog town?	P-dogs present?	Cheatgrass?
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							

ii. Point Info (Y/N)



Complete as appropriate for conditions within **50m** of the count station.

GPS Accuracy: Record to nearest meter
Private Property?: Record Y if private; otherwise N
Midstory Present: Record Y to indicate the presence of several distinct layers of overstory vegetation; otherwise N
Cliff/rock?: Record Y to indicate the presence of cliffs or large rocky outcrops (**the size of a refrigerator or larger**); otherwise N
P-dog town?: Record Y to indicate the presence of a prairie dog town (even if abandoned); otherwise N
P-dogs present?: Record Y to indicate the presence of prairie dogs. If you have reason to believe a colony is active (fresh scat or diggings), but they are all inside (excessive heat or cold), mark Y. Otherwise, N.
Cheatgrass?: Record Y to indicate the presence of cheatgrass (either current or past season growth); otherwise N

Deep dive – midstory
We define the midstory as a layer of trees or shrubs ≥ 3m tall, all of similar heights, that is lower and distinct from the top canopy.

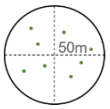
Datasheet: Habitat Data

Primary Habitat – Two-letter code corresponding to the primary habitat type that best describes the 50m radius surrounding the point. Please use the descriptions on page xx.

If riparian habitat is present anywhere within the 50m radius, the primary habitat type should be Riparian.

Point	Primary Habitat	% Overstory	Overstory Mean Height (m)	# Snags	Overstory - all spp. total to 100%									
					Species #1	Sp 1 % cover	Species #2	Sp 2 % cover	Species #3	Sp 3 % cover	Species #4	Sp 4 % cover	Species #5	Sp 5 % cover
1														
2														

iii. Overstory Data – Any vegetation **3.0 m or taller** within **50m** of the point count station



% Overstory: Estimate the *total* percent cover of all overstory trees. Use 1%, 5%, or multiples of 10%. If no overstory cover is present, record "0". Refer to Figure 10 at the end of this section for examples of what various cover percentages look like.

Overstory Mean Height: Estimate the average height to the top of the overstory trees to the nearest 1m. Use a rangefinder to help gauge estimates. If no overstory cover is present, record "0".

# of Snags: Count the number of snags (trees that are completely dead) that are ≥3m high and ≥6 inches dbh). If there are so many snags that counting each is logistically difficult (100+), and they are fairly evenly distributed, count the snags within a quarter of the 50m radius circle and multiply by 4 to get an estimate of the total (if you count 78 snags in a quarter of the 50m radius you would record 312 snags; 78 x 4). Take the time to count all snags whenever possible and never record 100+, 200+, etc.

Species Composition: Identify the dominant tree species (up to 5) and record them using two-letter vegetation codes (Appendix B). Record the relative abundance of the total overstory occupied by each species using 1%, 5%, or multiples of 10%. The largest value may be an integer other than 1%, 5%, or a multiple 10% in order for the total to sum to 100%. If only one tree species is present in the overstory the relative percent should be 100%, regardless of the % overstory cover.

Note that Snags (SN), dead trees (DA, DC, DD, DJ, DY), and burned trees (BC or BU) should be considered part of the overstory species composition if they are ≥3m tall, and they are among the top 5 most abundant tree species.

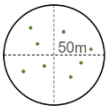
For species which are…
- **Identified** but **not included** in the list of codes
  - Record **XX** as the code
  - Specify the species XX equals in the notes box
  - If multiple XX species, record XX_1, XX_2…
- **Unidentified**, even after consulting a field guide
  - Record an unknown code
  - **UC** (unknown conifer), **UD** (unknown deciduous), **OT** (other)

Notes

For **cropland**, record whether **bare** (plowed), **fallow**, or **active** (and indicate crop species if known) in the Notes box, next to the applicable row for the point in the Understory Layer section

Datasheet: Habitat Data

iv. Understory Data –



Woody vegetation taller than 0.25m & shorter than 3m (including seedling trees) within **50m** of the point count station.

Point	% Shrub Cover	Shrub Mean height (m)	Understory layer - all spp. total to 100%									
			Species #1	Sp 1 % cover	Species #2	Sp 2 % cover	Species #3	Sp 3 % cover	Species #4	Sp 4 % cover	Species #5	Sp 5 % cover
1												
2												

Understory Cover: Estimate the total percent cover of all woody shrub species AND seedling trees. Use 1%, 5%, or a multiple of 10% to estimate the % understory cover. If no understory cover is present, record "0". Refer to Figure 10 for % covers examples.

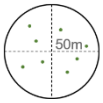
Grasses, rushes, reeds, sedges, and herbaceous species are not woody – even if > 0.25m tall, record these in the ground cover section.

Mean height: Estimate the average height to the nearest 0.25m. If no understory cover is present, record "0".

Species composition: Identify and record the dominant understory species (including seedling trees) using two-letter vegetation codes (Appendix B). Record the relative abundance of the total understory layer occupied by each species using 1%, 5%, or multiples of 10%. The largest value may be an integer other than 1%, 5%, or a multiple 10% in order for the total to sum to 100%. If only one tree species is present in the overstory the relative percent should be 100%, regardless of the % overstory cover.

Note: Dead trees (DA, DC, or DD, DJ, DY), and burned trees (BC or BU) should be considered part of the understory species composition if they are ≥ 0.25m and < 3m tall.

v. Ground Cover Data



Estimate the total percent of ground cover for each of the following categories within **50m** of the count station. Use 1%, 5%, or multiples of 10% when estimating % ground cover. The largest value may be an integer other than 1%, 5%, or a multiple 10% in order for the total to sum to 100%.

Point	Ground Cover - totals to 100%										
	% Snow	% Water	% Woody	% Dead and Down	% Herbaceous	% Dead Standing Grass	% Live Grass	% Litter	% Bare	Dead Standing Grass Height (cm)	Live Grass & Herb. Height (cm)
1											
2											

For ground cover & heights record 0 instead of leaving blank.

Snow
Water
Woody: vegetation < 0.25m tall (~ 10") including cacti
Dead and down: trees (≥ 6" diameter) not more than 0.25m tall at their highest point
Herbaceous: broad-leaved herbaceous plants and forbs (any height, live plants only)
Dead standing grass: grass, rushes, reeds, and sedges from last year's growing season (any height)
Live grass: grasses, rushes, reeds, and sedges that are still green or are clearly from this year's growing season (any height). Note: wheat is a grass and should be included in this category
Litter: leaves, needles, bark, dead grass, and all woody debris with a diameter <6"
Bare: inorganic materials such as dirt, rocks, pavement and sand

Dead grass leaning over more than 45° is litter.

Dead standing grass height: estimate the average height (to nearest 1cm) of all dead grasses (including rushes, reeds, and sedges) that are no longer alive and are from the previous year's growing season. Note: include wheat stubble
Grass and herbaceous height: estimate the average height (to nearest 1 cm) of the living grass species **AND** all herbaceous plants

Your datasheet (21.5cm x 28cm) or pencil (15cm) can help you estimate height.

vi. Habitat Codes

Agricultural /Rural (AR): vegetation has been planted by humans for food production or ornamental purposes in sparsely developed areas. Examples include a farmed field with wheat, corn, millet, etc., a fallow field, a rural home site with planted non-native species, or a park planted with non-native species. Please make note of crop spp., if fallow, etc.

Aspen (AS): overstory dominated by aspen although scattered ponderosa pine or Douglas-fir may be present. The overstory cover should be ≥10% and consist of ≥50% aspen. Aspen stands often have an abundant and diverse shrub layer. Typical shrub species in aspen habitats include snowberry, willow, sagebrush, mountain mahogany, and oak. On occasion there may be no shrub layer. Typically, the ground under aspen stands is covered by grasses and forbs.

Alpine Tundra (AT): high-elevation, open landscapes that occur above tree line. These areas should have ≤5% overstory and often lack a significant shrub component. Ground cover consists of short grasses (generally ≤10cm in height), wild flowers, mosses, lichens, and succulents.

Barren (BA): area with little vegetation or rock present. These areas are typically characterized by large amounts of gravel, sand, silt, clay, or other earthen material and tend to be eroded. May include sand dunes, buttes, badlands formations, gravel pits, and desert pavement. The sum of live and dead grass must account for <10% of ground cover and shrub cover should be <10%. Exposed rock and boulders must make up <20% of ground cover (see Cliff/Rock). Barren habitat should not experience significant seasonal flooding (see Playa).

Burned Area (BU): forest habitat where ≥50% of canopy is dead and shows evidence of severe fire scars or where ≥50% of trees have burned and fallen.

Cliff/Rock (CR): area is dominated by rock and/or generally lacking vegetative cover (e.g., talus slopes, boulder fields, and rocky outcroppings). Areas described as Cliff/Rock should have ≤10% shrub cover and <10% canopy cover. Bare rock should make up ≥20% of the exposed ground cover.

Desert/Semi desert Shrubland (DS): dry landscape containing shrubs, but lacking a co-dominant grass component. % shrub cover should be ≥10. Shrubs often include sagebrush, greasewood, Fremont mahonia and saltbush. Sagebrush must comprise ≤30% of the shrub composition (see Sage Shrubland). Ground cover layer is typically dominated by bare ground and rock with limited forbs and grasses present. Grass and forbs make up ≤20% of ground cover (see Shrubland).

Deciduous Woodland (DW): habitat consisting of ≥10% canopy cover that is dominated by deciduous species other than Aspen or Oak species. Native deciduous species should comprise ≥50% of the canopy cover and Aspen or Oak spp. must comprise ≤50% of the canopy cover. The 50m radius should not include a permanent or seasonal water source (see Riparian).

Grassland (GR): landscape lacking an overstory and significant shrub component. Ground cover is dominated by grasses and perhaps some forbs. Shrub component must be <10% (see Shrubland). The sum of live and dead standing grass must be ≥10%.

Hemlock (HE): habitat consisting of ≥ 10% canopy cover where hemlock species ≥50% of the overstory cover. Hemlock species include western hemlock and mountain hemlock.

Herbaceous Meadow (HM): Area with little to no overstory dominated by forbs, often surrounded by or interspersed within grassland habitat. Canopy cover should be ≤10%. Shrub layer should be ≤10%. Sum of live and dead standing grass should be <10%, and herbaceous should be ≥10%.

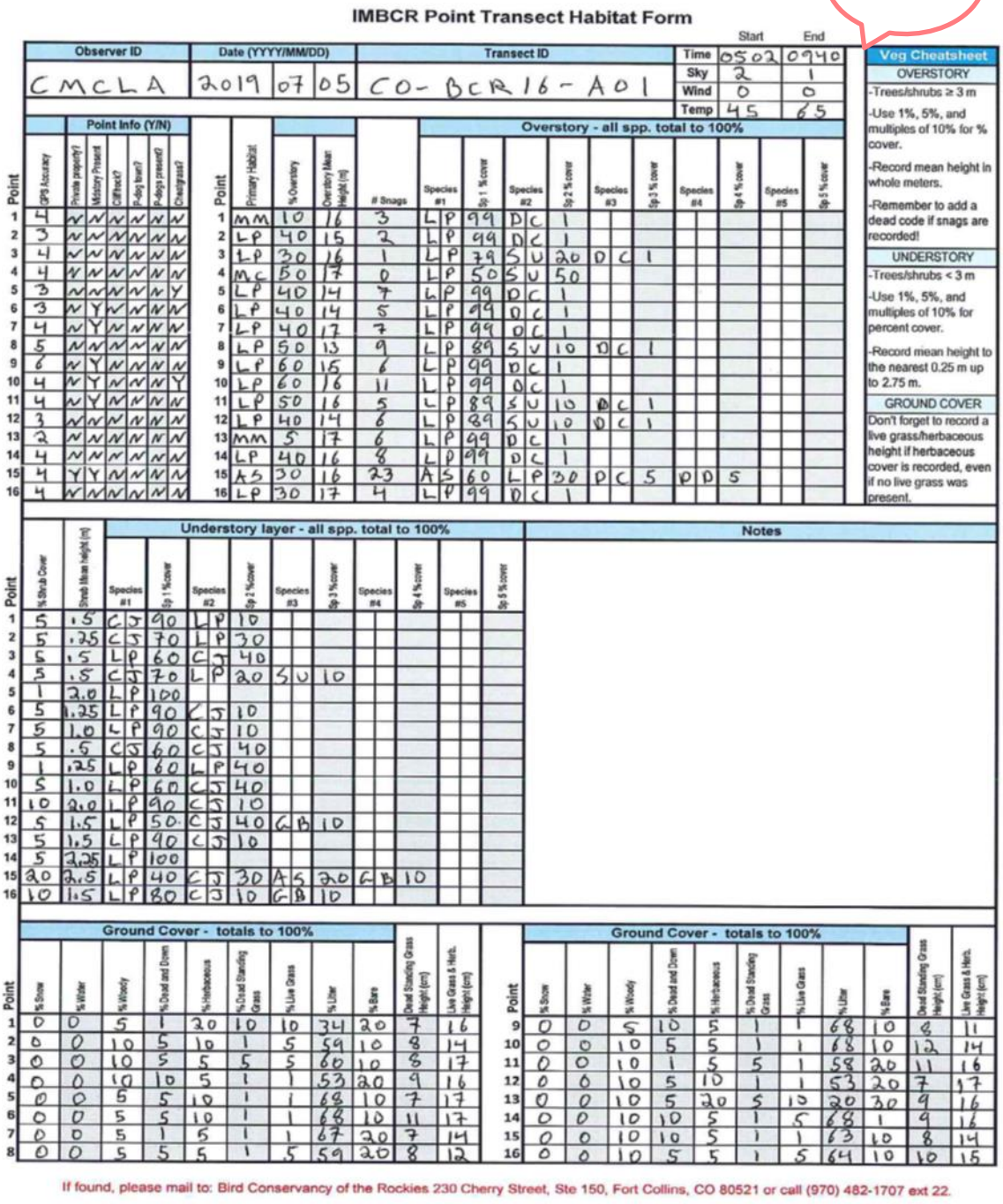
Historic Wetland (HW): land that was historically considered to be a wetland, but has since dried up. Wetland vegetation still dominates the landscape, although it is probably dried up and dead.

Insect Infested (II): forested habitat with ≥10% of the overstory composition dead or sickly - typically referring to pine and spruce bark beetles affecting several species of pine and spruce trees. Canopy cover must be ≥10%.

Jeffrey Pine (JP): areas with ≥5% overstory cover that is made up primarily of Jeffrey pine. This habitat often includes other tree types such as fir and Ponderosa pine, but Jeffrey pine should comprise ≥50% of the overstory layer. Shrub cover can vary from sparsely to heavily vegetated. Ground cover typically dominated by grass species.
Larch (LA): overstory dominated by larch although other coniferous and deciduous species may be present. The overstory cover should be ≥10% and consist of ≥50% larch.
Logged (LO): area within a forested habitat that has been recently logged. Overstory cover should be ≤10% (see a variety of forest primary habitats). Shrub cover should be ≤10% (see Shrubland). There should be little to no regrowth of shrub and/or overstory species. Ground cover typically consists primarily of grasses, stumps and dead and down timber.
Lodgepole Pine (LP): habitat consisting of ≥10% canopy cover that is dominated by lodgepole pine. Canopy may have other conifer species or some aspen, but lodgepole pine must comprise ≥50% of the overstory cover. Shrub layer can be conspicuous or nearly absent.
Mesquite Bosque (MB): forested habitat surrounding riparian corridors that consists of ≥50% mesquite species. Canopy cover should be ≥10%. Ground cover typically consists primarily of grasses.
Mixed Conifer (MC): forested habitat consisting of several species of conifers, such as ponderosa pine, lodgepole pine, Douglas-fir, or spruce/fir spp. If the area is dominated by Douglas-fir, use Mixed Conifer as the primary habitat type. Canopy cover should be ≥10%. Overstory may range from very dense to relatively open. Undergrowth is complex and typically contains deciduous shrubs and/or conifer saplings. Stands with dense overstory may have little or no shrub and ground cover.
Montane Meadow (MM): areas with little to no overstory that are surrounded by forests. Elevations should be ≥7,000'. Soils should be moist to wet with forbs or grass as the dominant ground cover. Canopy cover should be ≤10%. Shrub layer should be ≤10%.
Oak Woodland (OA): Habitat dominated by oaks (*Quercus* spp.), often accompanied by juniper, ponderosa pine, pinyon pine, or Chihuahuan Pine. The overstory and shrub cover must sum to ≥10% cover, with oak species making up ≥50% of that cover. In some instances, there may be little or no overstory because the Oak species that are present are <3m high. In southern Arizona this habitat code should be used for Madrean woodlands.
Open Water (OW): habitat consisting of ≥50% open water, bank, and shoreline. Any other habitat type may be present, but must be <50%.
Pinyon-Juniper/Juniper (PJ): vegetative communities largely influenced by pinyon pine, juniper, or a combination of the two species. The overstory and shrub cover must sum to ≥10%. Semi-arid conditions often produce a relatively short overstory. Juniper tends to dominate at lower elevations while pinyon dominates at higher elevations. Typically, shrub layer includes sagebrush, rabbit brush, oak, or mahogany. Ground cover is usually dominated by grasses with fewer forbs. In some instances, there may be little or no overstory because the PJ that is present is <3m high.
Playa (PL): Shallow, ephemeral wetland that experiences significant seasonal changes in semi-arid to arid climates, including the Great Plains. They are primarily filled by rainfall, although playas found in agricultural settings may also receive water from irrigation runoff. They often have high salinity or may be completely dry. Some wetland-loving plants like sedges or rushes may be present even when surface water is not present.
Ponderosa Pine (PP): areas with ≥5% overstory cover that is made up primarily of ponderosa pine. This habitat often includes other tree types such as fir, pine, and aspen, but ponderosa pine should comprise ≥50% of the overstory layer. Shrub layer relatively open and often includes common juniper, oak, cliffrose, and currants. Ground cover typically dominated by grass species. This code should be used even if there is a significant oak understory.

Riparian (RI): stands or strips of trees or shrubs near a permanent or seasonal water source. Typical tree and shrub species include cottonwood, box elder, maple, aspen, alder, and willows. Riparian areas are typically discrete habitats, often surrounded by coniferous forest, grassland, shrubland or sagebrush habitat. If riparian vegetation is present within the 50m radius, this should be the primary habitat type.
Sage Shrubland (SA): habitat where grasses and shrubs are co-dominant and the shrub cover is ≥10%. Shrub species must consist of ≥30% sagebrush. Typical ground cover is dominated by grasses with limited forbs and bare ground.
Spruce-Fir (SF): coniferous forest that is dominated by spruce and fir species (typically occurring at elevations ≥7000'). Note that Douglas-fir is not a true fir species (see Mixed Conifer). Overstory cover should be ≥10% with spruce and fir species comprising ≥50% of the overstory cover. Variable understory typically includes shrubs and forbs with few grasses.
Shrubland (SH): landscape co-dominated by grass and shrub species. Shrub cover must be ≥10%. Sagebrush must be <30% of shrub layer (see Sage Shrubland). Typical shrub species include ceonothus, manzanita, sage, rabbitbrush, currant, skunkbrush, serviceberry, and plum. Grass and forbs should make up ≥20% of ground cover (see Desert/Semi desert Shrubland).
Urban/Residential (UR): areas highly impacted by human development in which ≥20% of the ground is covered by impermeable surfaces. Typically describing relatively dense development including houses, lawns, sidewalks, parking areas, and streets.
Wetland (WE): habitat influenced by permanent or seasonal flooding resulting in tall reeds, grasses, and/or cattails with little to no overstory. This habitat is defined by the presence of some emergent vegetation that is adapted to wet soils or inundation. Typical species include cattails, sedges, rushes, and sphagnum mosses. Overstories are limited to drier areas around the wetland and overstory cover should be ≤10%.
Whitebark Pine (WP): mid to high elevation habitat (>6,000') dominated by whitebark pine. The overstory cover should be >5% and consist of >50% whitebark pine.
Western Red Cedar (WR): habitat consisting of ≥10% canopy cover that is dominated by Western cedar species including Western red cedar, incense cedar, and Alaska cedar. Canopy may have other conifer or deciduous species, but cedar species must comprise ≥50% of the overstory cover.
Not Listed (XX): primary habitat type does not fall into any of the above categories. This code is generally used when working in a new study area that has habitat types not encountered previously on IMBCR surveys. Make sure you write notes in the margin on the right of the datasheet explaining what you think the primary habitat should be described as for this point.

Datasheet:
Habitat Data



IMBCR Point Transect Habitat Form

Observer ID	Date (YYYY/MM/DD)	Transect ID		Start	End
CMCLA	2019 / 07 / 05	CO-BCR16-A01	Time	0502	0940
			Sky	2	1
			Wind	0	0
			Temp	45	65

Veg Cheatsheet

OVERSTORY
-Trees/shrubs ≥ 3 m
-Use 1%, 5%, and multiples of 10% for % cover.
-Record mean height in whole meters.
-Remember to add a dead code if snags are recorded!

UNDERSTORY
-Trees/shrubs < 3 m
-Use 1%, 5%, and multiples of 10% for percent cover.
-Record mean height to the nearest 0.25 m up to 2.75 m.

GROUND COVER
Don't forget to record a live grass/herbaceous height if herbaceous cover is recorded, even if no live grass was present.

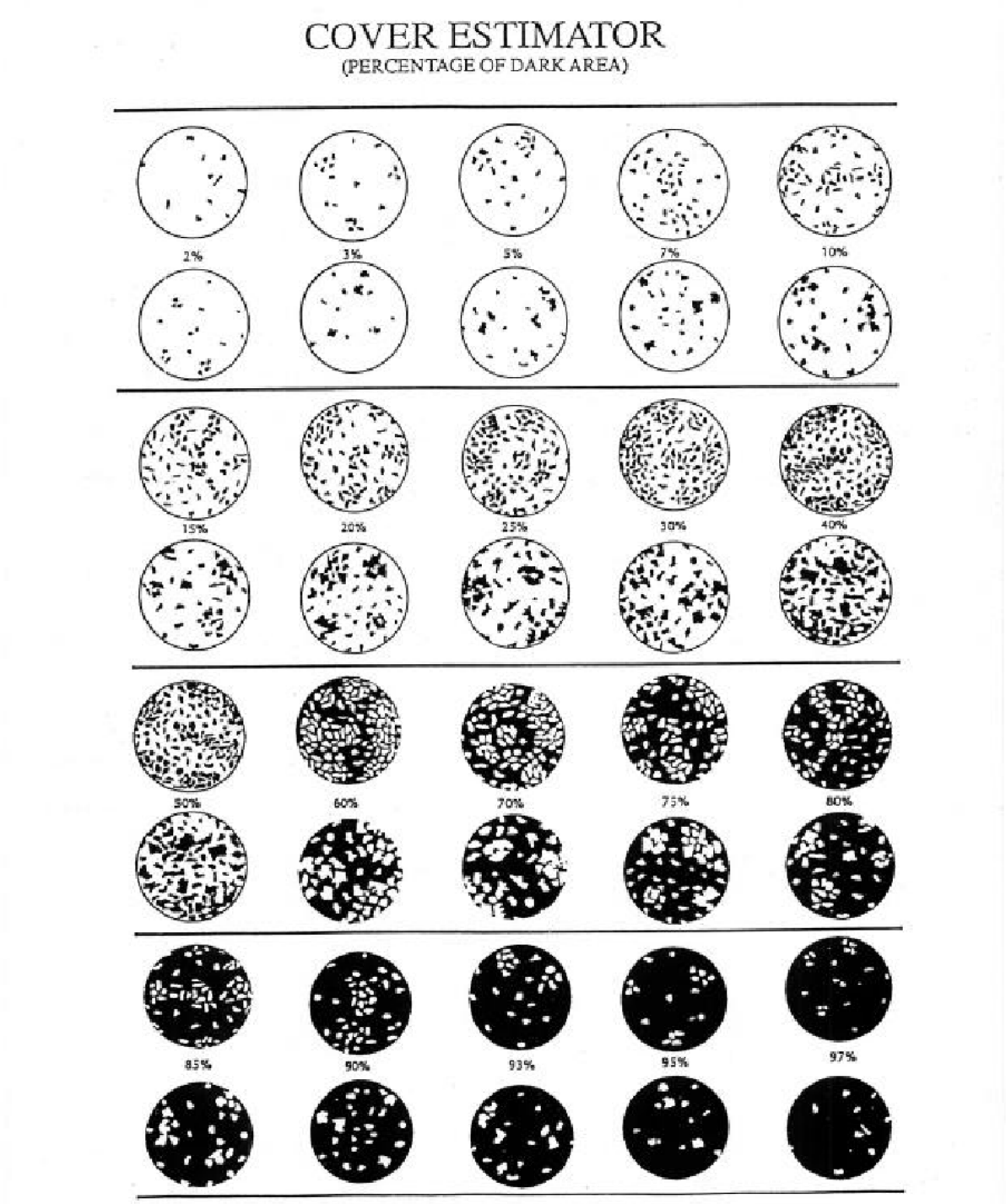
Point	Point Info (Y/N): GPS Accuracy	Private property?	Military Present	Cliff/rock?	P-dog town?	P-dogs present?	Cheatgrass?	Point	Primary Habitat	% Overstory	Overstory Mean Height (m)	# Snags	Overstory - all spp. total to 100%: Species #1	Sp 1 % cover	Species #2	Sp 2 % cover	Species #3	Sp 3 % cover	Species #4	Sp 4 % cover	Species #5	Sp 5 % cover
1	4	N	N	N	N	N	N	1	MM	10	16	3	LP	99	DC	1						
2	3	N	N	N	N	N	N	2	LP	40	15	2	LP	99	DC	1						
3	4	N	N	N	N	N	N	3	LP	30	16	1	LP	79	SU	20	DC	1				
4	4	N	N	N	N	N	N	4	MC	50	17	0	LP	50	SU	50						
5	3	N	N	N	N	N	Y	5	LP	40	14	7	LP	99	DC	1						
6	3	N	Y	N	N	N	N	6	LP	40	14	5	LP	99	DC	1						
7	4	N	Y	N	N	N	N	7	LP	40	17	7	LP	99	DC	1						
8	5	N	N	N	N	N	N	8	LP	50	13	9	LP	89	SV	10	DC	1				
9	6	N	Y	N	N	N	N	9	LP	60	15	6	LP	99	DC	1						
10	4	N	Y	N	N	N	Y	10	LP	60	16	11	LP	99	DC	1						
11	4	N	Y	N	N	N	N	11	LP	50	16	5	LP	89	SU	10	DC	1				
12	3	N	N	N	N	N	N	12	LP	40	14	6	LP	89	SU	10	DC	1				
13	2	N	N	N	N	N	N	13	MM	5	17	6	LP	99	DC	1						
14	4	N	N	N	N	N	N	14	LP	40	16	8	LP	99	DC	1						
15	4	Y	Y	N	N	N	N	15	AS	30	16	23	AS	60	LP	30	DC	5	PP	5		
16	4	N	N	N	N	N	N	16	LP	30	17	4	LP	99	DC	1						

Point	% Shrub Cover	Shrub Mean Height (m)	Understory layer - all spp. total to 100%: Species #1	Sp 1 % cover	Species #2	Sp 2 % cover	Species #3	Sp 3 % cover	Species #4	Sp 4 % cover	Species #5	Sp 5 % cover	Notes
1	5	.5	CJ	90	LP	10							
2	5	.25	CJ	70	LP	30							
3	5	.5	LP	60	CJ	40							
4	5	.5	CJ	70	LP	20	SU	10					
5	1	2.0	LP	100									
6	5	1.25	LP	90	CJ	10							
7	5	1.0	LP	90	CJ	10							
8	5	.5	CJ	60	CJ	40							
9	1	.25	LP	60	LP	40							
10	5	1.0	LP	60	CJ	40							
11	10	2.0	LP	90	CJ	10							
12	5	1.5	LP	50	CJ	40	GB	10					
13	5	1.5	LP	90	CJ	10							
14	5	2.25	LP	100									
15	20	2.5	LP	40	CJ	30	AS	20	GB	10			
16	10	1.5	LP	80	CJ	10	GB	10					

Point	Ground Cover - totals to 100%: % Snow	% Water	% Woody	% Dead and Down	% Herbaceous	% Dead Standing Grass	% Live Grass	% Litter	% Bare	Dead Standing Grass Height (cm)	Live Grass & Herb. Height (cm)	Point	Ground Cover - totals to 100%: % Snow	% Water	% Woody	% Dead and Down	% Herbaceous	% Dead Standing Grass	% Live Grass	% Litter	% Bare	Dead Standing Grass Height (cm)	Live Grass & Herb. Height (cm)
1	0	0	5	1	20	10	10	34	20	7	16	9	0	0	5	10	5	1	1	68	10	8	11
2	0	0	10	5	10	1	5	59	10	8	14	10	0	0	10	5	5	1	1	68	10	12	14
3	0	0	10	5	5	5	5	60	10	8	17	11	0	0	10	1	5	5	1	58	20	11	16
4	0	0	10	10	5	1	1	53	20	9	16	12	0	0	10	5	10	1	1	53	20	7	17
5	0	0	5	5	10	1	1	68	10	7	17	13	0	0	10	5	20	5	10	20	30	9	16
6	0	0	5	5	10	1	1	68	10	11	17	14	0	0	10	10	5	1	5	68	1	9	16
7	0	0	5	1	5	1	1	67	20	7	14	15	0	0	10	10	5	1	1	63	10	8	14
8	0	0	5	5	5	1	5	59	20	8	12	16	0	0	10	5	5	1	5	64	10	10	15

If found, please mail to: Bird Conservancy of the Rockies 230 Cherry Street, Ste 150, Fort Collins, CO 80521 or call (970) 482-1707 ext 22.

Figure 9. Example of a completed Vegetation Datasheet.



Barry, Sheila. 1994. Monitoring Vegetation Cover. Alameda County Resource Conservation District, 1996 Holmes St., Livermore, CA 94550

Figure 10. Examples of percent cover classes.

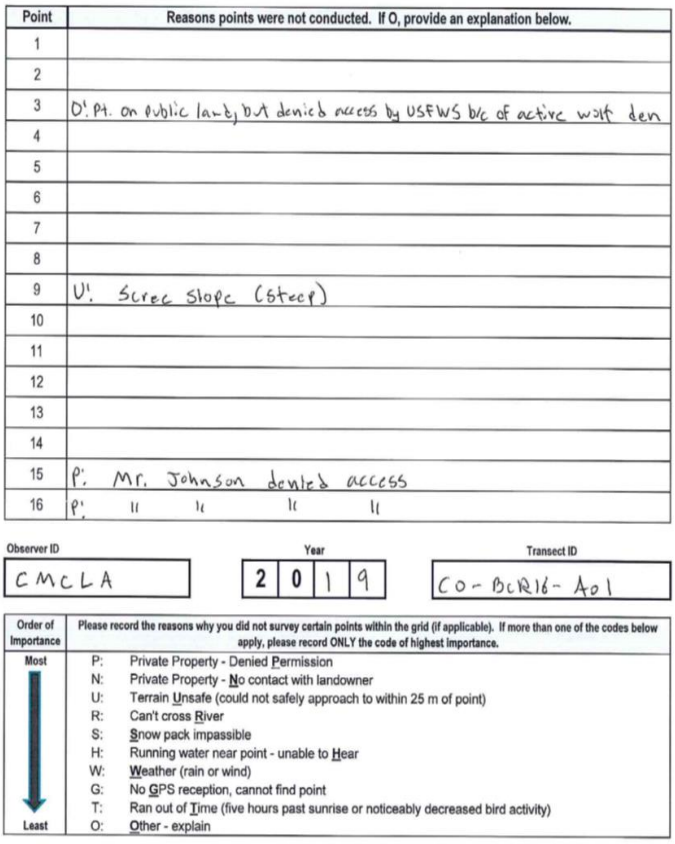
Datasheet:
Point Information

vii. Point Information Datasheet

For each point you were unable to complete on a survey, record the reason why (Figure 11). Possible reasons are listed below from highest importance to lowest importance. If more than one code applies, record only the code of highest importance (e.g., if you were denied permission, but also ran out of time, record only P: Private Property – Denied Permission).

Table 3. Possible reasons why points not completed, listed in order of importance.

Code	Description
P	Private Property - Denied Permission
N	Private Property - No contact with landowner
U	Terrain Unsafe (could not safely approach to within 25 m of point)
R	Can't cross River
S	Snow pack impassible
H	Running water near point - unable to Hear
W	Weather (rain or wind)
G	No GPS reception, cannot find point
T	Ran out of Time (5 hours past sunrise or noticeably decreased bird activity)
O	Other - explain



Point	Reasons points were not conducted. If O, provide an explanation below.
1	
2	
3	O: Pt. on public land, but denied access by USFWS b/c of active wolf den
4	
5	
6	
7	
8	
9	U: Scree slope (steep)
10	
11	
12	
13	
14	
15	P: Mr. Johnson denied access
16	P: " " " "

Observer ID: CMCLA | Year: 2019 | Transect ID: CO-BCR18-A01

Order of Importance	Please record the reasons why you did not survey certain points within the grid (if applicable). If more than one of the codes below apply, please record ONLY the code of highest importance.
Most	P: Private Property - Denied Permission
	N: Private Property - No contact with landowner
	U: Terrain Unsafe (could not safely approach to within 25 m of point)
	R: Can't cross River
	S: Snow pack impassible
	H: Running water near point - unable to Hear
	W: Weather (rain or wind)
	G: No GPS reception, cannot find point
	T: Ran out of Time (five hours past sunrise or noticeably decreased bird activity)
Least	O: Other - explain

If you run into an issue not listed, record "O" for "Other". Include detailed notes on why the point was not conducted. We report this information to our funders after the field season, so the more information you provide, the less your crew leader will contact you with questions after the field season.

Figure 11. Example of a completed Point Information Datasheet.

C. Collecting Bird Data

Important notes for conducting IMBCR point counts:

Document the minute of the count that an individual bird was **first** detected. To do this, be diligent with recording number of the minute under the "minutes" column **each time the beeper goes off**.

Do not record any birds after the six minutes are over, even if it is an interesting bird (See "88" Birds)

If, during your point count, you detect a bird that was flushed from the point upon your arrival (before you began the count), **record the bird's original distance from the survey point**. We assume that these birds would have remained at their original locations, if they hadn't been disturbed by the observer.

While conducting counts, **focus primarily on birds that are close to the point**. Although we do ask you to record all birds detected, distant birds have little effect on density estimates. However, missing close birds can have a significant effect on density estimates.

Do not use a scope. It is more important to focus on and accurately record birds that are close to you rather than those that are far away. Binoculars are sufficient for visual bird identification.

Look and listen in all directions, including up. Slowly rotate in place while you are counting; making three complete turns in the six minutes is probably adequate.

Stay in one place while counting. You may take a step or two away from the point in order to identify a bird that you detected from the point, but ALWAYS return to the point as soon as possible. Do not chase birds before or during the count. **After the six minutes are up, you may chase down a bird to identify it**, but do not leave the point during the six minutes and do not record birds for the count that were only detected while chasing another bird after the count. Remember: Consistency of methods and coverage is the key to useful data!

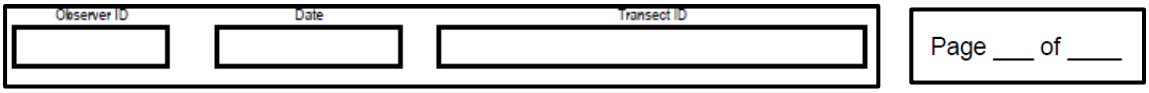
You may hear or see the same individual birds on multiple points. **It is okay to record the same bird on multiple points, so long as the bird is not moving in response to your presence**. For example, if you see a Western Meadowlark on a power line, and that same Western Meadowlark is visible at the same location from the next two points, you would record it on all three point counts. Additionally, if you see a Red-tailed Hawk soaring above you, and still see the hawk soaring on another point, you would record it on both points. However, if you survey three points along a fence and as you move between points a Loggerhead Shrike keeps moving away from you and re-perching on the fence, you should record that bird on the first point only. Additionally, you should **mentally track birds that may move around you during a point so as not to double count** them during a single six-minute count.

Your crew leader will provide a stopwatch that beeps every minute. Ensure you understand how to use it, and that it is functioning correctly – it's impossible to pay attention to the birds and note how much time (by looking down at the stopwatch) has passed simultaneously.

Review your datasheets before leaving each point. This is the best chance to catch and correct errors. Do not fill in any missing information after you've left the point

Datasheet: Bird Data

i. General Info



Fill in the blanks at the bottom of **both** sides of **every** bird datasheet prior to starting your first point. Without this information, if a bird datasheet were to be separated from its habitat datasheet, the transect ID would be unknown, rendering the data useless. We scan all of our data, so the general info needs to be on both sides of the datasheet.

Observer: Your Observer ID
Date: YYYY/MM/DD
Transect ID: Full code identifying the state, stratum and survey number (e.g., CO-BCR16-AR8)
Page number: Count each side of a datasheet as one page

ii. Point Data

At each point count station, first record the habitat data. Then, record the point number and start time, activate your stopwatch, and begin recording the birds you see and hear.

Start Time	Point #	Minute	Species	Radial Distance	HOW	SEX	Visual?	Migrating?	Cluster	
									Size	Code

Start Time – Use local time in military format
Point Number – Leave a blank line above each new point. If observations from one point span multiple pages, include ("cont.") next to the point number at the top of the next page. For birds detected between points that have not been recorded on previous points, record "88" for the point number
Minute – Record each minute (1-6) as soon as the stopwatch beeps. Minute 1 is from 0 to 60 seconds

For each independently detected bird, you will record:

Species – Record using 4-letter codes. If you are unsure of the 4-letter code, make a note with the full species name in the notes section, then correct the code prior to scanning your datasheet. See Appendix C. Four-Letter Bird Codes for a complete list of bird species codes. Commit to memory codes that do not follow the general code convention (Table 4).

Subspecies – You may record an individual as a subspecies if you **visually** identify it. Do not record subspecies based on calls or songs, even if you feel that you are able to identify them by call or song. Use the 4-letter codes provided in Table 5.

Unknown birds - If you detect a bird that you are unable to identify, use the appropriate unknown bird code (Table 6). **Never guess on the identity of a bird**. This is falsifying data. It's better to record "UNBI" than to incorrectly identify a bird. However, recording a lot of unidentified birds is an indication that you need to study and practice before performing more point counts.

No birds – If you don't detect any birds during a one-minute period, enter the code "NOBI" (No Birds). If no birds are detected during a six minute count, you should have six time periods recorded, each with "NOBI" written next to it. Recording "NOBI" will help you keep track of your minute intervals, and the data will reflect that you did conduct a full six minute count.

Table 4. Commonly confused 4-letter codes.

Species Name	Correct Code	Incorrect Code
Cackling Goose	CACG	CAGO
Canada Goose	CANG	CAGO
Northern Shoveler	NSHO	NOSH
Ring-necked Pheasant*	**RNEP**	RNPH, RINP
Barn Owl*	**BANO**	BAOW, BNOW
Barred Owl*	**BADO**	BAOW, BDOW
Western Wood-Pewee	WEWP	WWPE
Tree Swallow	TRES	TRSW
Bank Swallow	BANS	BASW
Barn Swallow	BARS	BASW
Cactus Wren	CACW	CAWR
Canyon Wren	CANW	CAWR
Cedar Waxwing	CEDW	CEWA
Black-throated Gray Warbler	BTYW	BTGW
MacGillivray's Warbler	MGWA	MAWA
Canyon Towhee	CANT	CATO
Lark Bunting	LARB	LABO
Sage Sparrow	SABS	SASP
Savannah Sparrow	SAVS	SASP
Lazuli Bunting	LAZB	LABU
Red-winged Blackbird	RWBL	RWBB
American Goldfinch	AGOL	AMGO

*Codes were updated in 2023 to match the standardized list maintained by The Institute for Bird Populations. See Appendix C for all updates.

Table 5. Subspecies 4-letter codes.

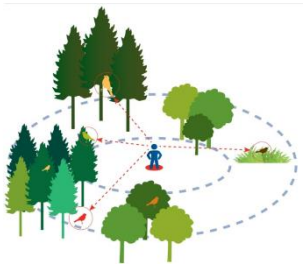
Subspecies	Code
Dark-eyed Junco (Gray-headed)	GHJU
Dark-eyed Junco (Oregon)	ORJU
Dark-eyed Junco (Pink-sided)	PSJU
Dark-eyed Junco (Red-backed)	RBJU
Dark-eyed Junco (Slate-colored)	SCJU
Dark-eyed Junco (White-winged)	WWJU
Mallard (Mexican Duck)	MEDU
Northern Flicker (Yellow-shafted)	YSFL
Northern Flicker (Intergrade)	FLIN
Northern Flicker (Red-shafted)	RSFL
White-crowned Sparrow (Gambel's)	GWCS
White-crowned Sparrow (Mountain)	MWCS
Yellow-rumped Warbler (Audubon's)	AUWA
Yellow-rumped Warbler (Myrtle's)	MYWA

Table 6. Unknown 4-letter codes.

Unknown Bird	Code
Unknown Accipiter	UNAC
Unknown Bird	UNBI
Unknown Blackbird	UNBL
Unknown Buteo	UNBU
Unknown Cardinal	UNCA
Unknown Cowbird	UNCB
Unknown Chickadee	UNCH
Unknown Corvid	UNCO
Unknown Cormorant	UNCT
Unknown Dove	UNDO
Unknown Duck	UNDU
Unknown Empidonax	UNEM
Unknown Falcon	UNFA
Unknown Finch	UNFI
Unknown Flycatcher	UNFL
Unknown Flicker	UNFR
Unknown Grosbeak	UNGB
Unknown Gnatcatcher	UNGN
Unknown Grouse	UNGR
Unknown Gull	UNGU
Unknown Hawk	UNHA
Unknown Hummingbird	UNHU
Unknown Jay	UNJA
Unknown Kingbird	UNKI
Unknown Longspur	UNLO
Unknown Meadowlark	UNME
Unknown Myiarchus	UNMY
Unknown Nuthatch	UNNU
Unknown Oriole	UNOR
Unknown Owl	UNOW
Unknown Pipit	UNPI
Unknown Quail	UNQU
Unknown Raptor	UNRA
Unknown Raven	UNRV
Unknown Sandpiper	UNSA
Unknown Swift	UNSI
Unknown Sparrow	UNSP
Unknown Sapsucker	UNSS
Unknown Swallow	UNSW
Unknown Tanager	UNTA
Unknown Tern	UNTE
Unknown Thrush	UNTH
Unknown Titmouse	UNTI
Unknown Towhee	UNTO
Unknown Thrasher	UNTR
Unknown Vireo	UNVI
Unknown Warbler	UNWA
Unknown Woodpecker	UNWO
Unknown Wren	UNWR

Datasheet: Bird Data

Start Time	Point #	Minute	Species	Radial Distance	HOW	SEX	Visual?	Migrating?	Cluster Size	Cluster Code



Radial Distance – Using your rangefinder, measure the distance from the point count station to every individual bird detected and record it in meters. Every bird must have distance recorded in order to be used in our analysis.

Distance sampling relies upon the assumption that you measure all distances accurately, so use your rangefinder for EVERY bird.

Record **radial (horizontal) distance**, not straight-line distance. For example, if you detect a bird singing in a tree directly above you, the distance would be 0, not how far the bird is above you.

Measure distances to **where you first detected the bird**, not to where you first identified it.

For birds that are vocalizing but not seen, try to pinpoint their locations to a specific tree/bush, then measure the distance to that object

If you detect a bird at one kilometer (1,000 m) or beyond, enter the distance as "999".

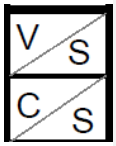
If you cannot get a direct line of sight to the location of a bird, estimate the distance that bird is from a visible point and use the rangefinder to measure to that point. Then add or subtract the additional estimated distance between that point and the bird to obtain the best possible distance estimate from the point to the bird. Estimate the distance from the visible point to the bird BEFORE using the rangefinder to get the distance from you to that point.

If you see or hear a bird that is beyond the range of the rangefinder, estimate the distance the bird is past a point that is within-range of your rangefinder and add that distance to what the rangefinder displays.

HOW – Record how each bird was first detected in the **upper left portion of the box** using the following codes. Remember – how you detect a bird may be different from how you identify it.

V = visual, **C** = calling, **S** = singing, **D** = drumming, **F** = Flyover, or **O** = other aural (e.g. wing beats).

If the detection type you first record is visual, calling, or other, and that same individual later sings, write an 'S' in the lower right portion of the 'How' box. Singing birds are more likely to be holding a breeding territory, providing evidence that the species breeds within the study area.
Note: "S" is the only code allowed in the lower right portion of the box.



Just because a bird is flying does not make it a flyover.

Flyovers – A bird observed flying over a point **without showing any signs of using the surrounding habitat**. However, individuals of species that habitually hunt on the wing (e.g., raptors, swallows, swifts or appear to be foraging (e.g., crossbills, goldfinches, waxwings) in the vicinity of the point, or are flying from perch to perch should NOT be treated as flyovers. Just because a bird is flying overhead does not make it a flyover.

Datasheet: Bird Data

Start Time	Point #	Minute	Species	Radial Distance	HOW	SEX	Visual?	Migrating?	Cluster Size	Cluster Code

Sex – Record the sex of the bird if you visually identify the sex of a sexually dimorphic species. If you don't see the bird, or if species is not sexually dimorphic, record the sex as "U" for unknown. For birds that you visually identify as juvenile, record "J" in the Sex column.

M = male, **F** = female, **U** = unknown, **J** = juvenile

Females of many bird species sing occasionally – do not assume that singing birds are males.

Recording birds as juveniles allows us to remove them from analyses, while retaining proof of breeding behavior for the location.

Visual? – Enter a checkmark if you were able to visually *identify* the individual at any time during the survey. Check this box even if you recorded "V" for the *detection* type.

The Visual column is for visual *identification*, not visual *detection*

This column is meant to further assure crew leaders of proper identification. Check this box if you visually identify the individual before, during or after the point count.

Note: If a bird was *detected* visually but *identified* by another means AND you were never able to positively identify the individual by sight then do NOT check the visual checkbox.

Migrating? – Enter a checkmark if you have reason to believe the detected individual is not on its breeding territory.

Clues that a bird may be migrating through are: 1) the bird is in a large flock, 2) the bird is in unusual habitat that differs substantially from where it is typically found during the breeding season (e.g., a Brewer's Sparrow that is detected in a desert environment with no sagebrush), or 3) the bird is outside of its typical breeding range.

Cluster Size – Record the number of individuals present in each cluster (defined below); record "1" for solo birds.

In our analysis, clusters are actually our unit of observation, with most cluster sizes = 1. There are generally two cases in which cluster sizes are > 1; single species flocks and paired birds. In order for multiple birds to be considered a cluster, they must:

1. Be of the same species
2. Be detected in the same minute interval
3. Be within 20m of one another
4. Not be two countersinging males

"A cluster is a relatively tight aggregation of objects of interest…" (Buckland et al. 2001).

Flocks: Record the distance to the center of each flock.
Pairs: Record the distance to each individual.

Datasheet: Bird Data

Start Time	Point #	Minute	Species	Radial Distance	HOW	SEX	Visual?	Migrating?	Cluster	
									Size	Code

Clusters spanning only one line on the datasheet do not need a cluster code (e.g., a flock where all individuals were detected the same way and they cannot be sexed).

Cluster Code – Clusters with the following criteria will span multiple datasheet lines – record a unique letter (A, B, C…) for each cluster to "link" these observations:

Individuals within a flock or pair **can be sexed**. Record the number of males and number of females on separate lines & include a cluster code.

Individuals within a flock or pair were **detected by different methods**. Record the number of individuals detected by each detection type on separate lines & include a cluster code.

For example, you may hear a bird singing or calling, look up, and see that it is a male bird with a female perched or foraging nearby. In this case, enter the male and female on separate lines of your datasheet. Record "HOW" = S(inging) for the male and "HOW" = V(isual) the female, with the same cluster code for both.

Putting it all together – an example scenario

During the first minute of a point count the observer hears a Western Tanager (WETA) and an American Robin (AMRO) singing, after the timer beeps the observer hears a Black-headed Grosbeak (BHGR) give its distinctive squeaky call note. The observer turns to see the bird and notes that the calling bird is a male BHGR 27m away AND also notes that there is a female BHGR in the same tree, but about 29m away. The observer then sees an Audubon's Warbler 47m away and later hears it sing. In minute three, the observer hears 5 Pine Siskins (PISI), looks up, and measures that they are 36-38m away. The observer does not record any new birds in minute 4. During the fifth minute the observer hears a Mountain Chickadee (MOCH) calling, looks up and sees that MOCH as well as a second MOCH in the same tree; both at 17m away (the method of detection differs so they should be recorded on separate lines with a common cluster code). The observer sees a brown-plumaged CAFI in a tree 36m away in minute 6 (male CAFI require two years to achieve adult plumage, thus a brown-plumaged bird cannot be sexed in the field). The observer's data look like this:

Time	Point #	Minute	Species	Radial Distance	How	Sex	Visual	Migrant?	Cluster	
									Size	Code
0552	03	1	WETA	46	S	M	X		1	
			AMRO	103	S	U			1	
		2	BHGR	27	C	M	X		1	A
			BHGR	29	V	F	X		1	A
			AUWA	47	V/S	U	X		1	
		3	PISI	37	C	U	X		5	
		4	NOBI							
		5	MOCH	17	C	U	X		1	B
			MOCH	17	V	U	X		1	B
		6	CAFI	36	V	U	X		1	

Datasheet:
Bird Data

Start Time	Point #	Minute	Species	Radial Distance	HOW	SEX	Visual?	Migrating?	Cluster	
									Size	Code

iii. Mammals

Yes, mammals! We are also collecting data on red squirrels (RESQ), Abert's squirrels (ABSQ), and Pika (PIKA) during point counts. Treat these three mammal species as you would a bird on point counts (fill in the radial distance, how, sex, and visual boxes).

Do not forget to record these mammals **and** their associated data at all point counts, as the utility of these data depend on everyone collecting them throughout the study area.

iv. "88" Birds

If you encounter a species while walking between points that you haven't yet recorded on a point count during the survey, record it as follow:

			6	R	W	B	L	0	3	7	V	F	x		
	8	8		N	O	G	O				V	U	x		
0702	0	3	1	M	O	C	H	0	7	1	S	U			

Leave a single blank row after your last point count detection. Record 88 for the minute, and leave the point blank. Record the Species Code, How, Visual, Migrant? and Custer Size (distance not needed). If you record an "88" bird and then subsequently detect that individual on a point count, cross out the "88" detection.

In order to ensure that the detection occurred on the survey grid, only record "88" birds **after completing the first point count and before beginning the last point count of the morning**. Do not record "88" birds that you detect while approaching the survey in the morning or after finishing your last point count.

If you encounter a rare or unusual species before or after you've started surveying, record it in the notes section at the bottom of the bird datasheet, including the Species Code, UTM coordinates, and distance to the nearest point count station.

v. Survey notes

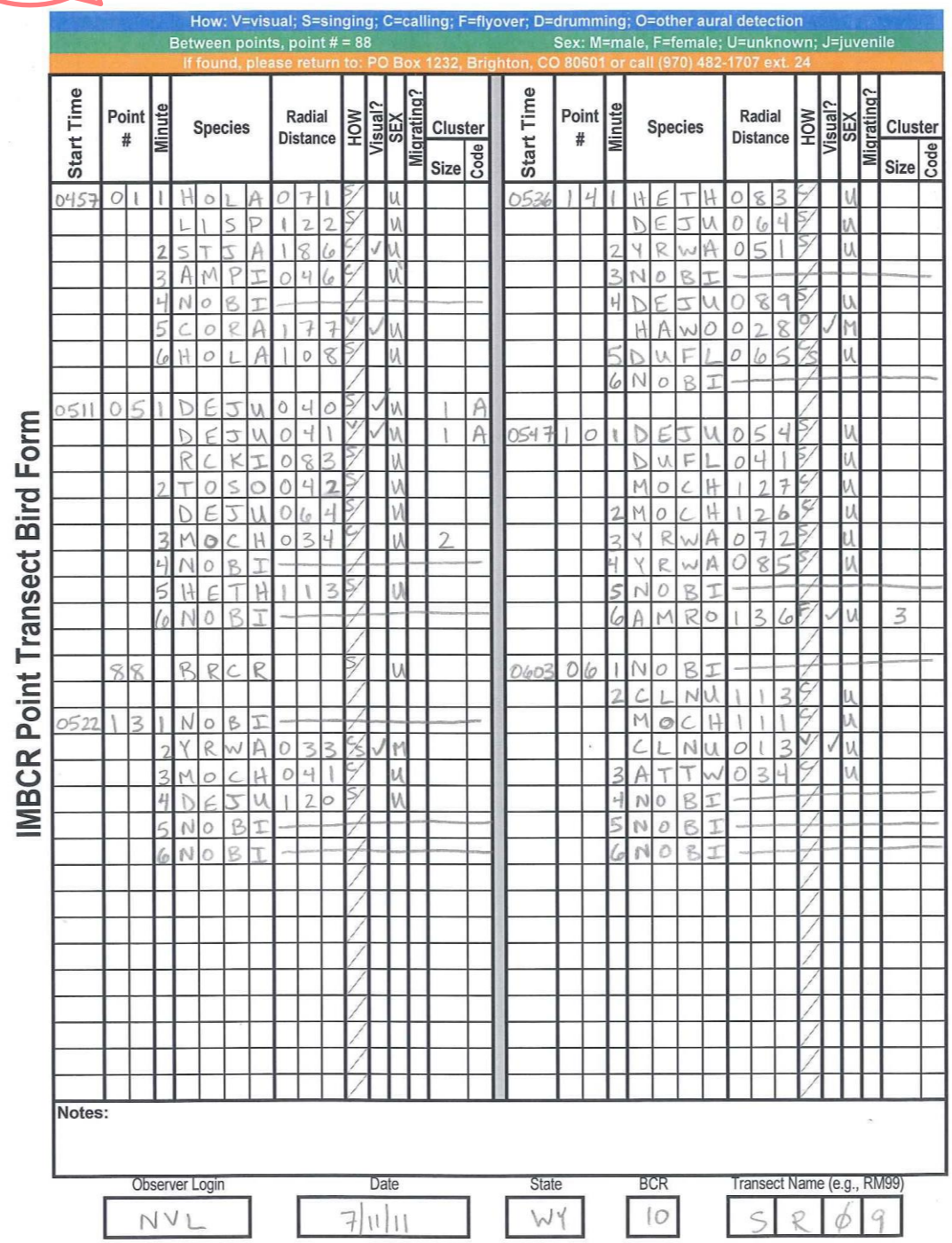
Notes:

Enter information relevant to the site or individual points, e.g., problems encountered, anything that may have affected your point counts (loud noises, cows, etc.), and identification notes for rare or unusual birds.

If you positively identify a species that you believe may be questioned later (it seems odd or out of place), it is helpful to write notes to confirm your detection, including key field marks (both visual and/or auditory), age and sex of the bird, how you differentiated the rare species from other similar species and any relevant information regarding behavior and/or weather conditions. Please share any photos or audio recordings with your supervisor.

When entering data into the database, don't forget to look through the notes sections on your datasheets. Notes that are useful to someone surveying next year should be entered on the transect description page.

Datasheet:
Bird Data



Page 1 of 3

IMBCR Point Transect Bird Form

How: V=visual; S=singing; C=calling; F=flyover; D=drumming; O=other aural detection
Between points, point # = 88 Sex: M=male, F=female; U=unknown; J=juvenile
If found, please return to: PO Box 1232, Brighton, CO 80601 or call (970) 482-1707 ext. 24

Start Time	Point #	Minute	Species	Radial Distance	HOW	Visual?	SEX	Migrating?	Cluster Size	Cluster Code
0457	01	1	HOLA	071	S		U			
			LISP	122	S		U			
		2	STJA	186	S	✓	U			
		3	AMPI	046	S		U			
		4	NOBI	—	—	—	—	—		
		5	CORA	177	S	✓	U			
		6	HOLA	108	S		U			
0511	05	1	DEJU	040	S	✓	U		1	A
			DEJU	041	S	✓	U		1	A
			RCKI	083	S		U			
		2	TOSO	042	S		U			
			DEJU	064	S		U			
		3	MOCH	034	S		U		2	
		4	NOBI	—	—	—	—	—		
		5	HETH	113	S		U			
		6	NOBI	—	—	—	—	—		
	88		BRCR		S		U			
0522	13	1	NOBI	—	—	—	—	—		
		2	YRWA	033	S	✓	M			
		3	MOCH	041	S		U			
		4	DEJU	120	S		U			
		5	NOBI	—	—	—	—	—		
		6	NOBI	—	—	—	—	—		

Start Time	Point #	Minute	Species	Radial Distance	HOW	Visual?	SEX	Migrating?	Cluster Size	Cluster Code
0536	14	1	HETH	083	S		U			
			DEJU	064	S		U			
		2	YRWA	051	S		U			
		3	NOBI	—	—	—	—	—		
		4	DEJU	089	S		U			
			HAWO	028	O	✓	M			
		5	DUFL	065	S		U			
		6	NOBI	—	—	—	—	—		
0547	10	1	DEJU	054	S		U			
			DUFL	041	S		U			
			MOCH	127	S		U			
		2	MOCH	126	S		U			
		3	YRWA	072	S		U			
		4	YRWA	085	S		U			
		5	NOBI	—	—	—	—	—		
		6	AMRO	136	F	✓	U		3	
0603	06	1	NOBI	—	—	—	—	—		
		2	CLNU	113	S		U			
			MOCH	111	S		U			
			CLNU	013	S	✓	U			
		3	ATTW	034	S		U			
		4	NOBI	—	—	—	—	—		
		5	NOBI	—	—	—	—	—		
		6	NOBI	—	—	—	—	—		

Notes:

Observer Login	Date	State	BCR	Transect Name (e.g., RM99)
NVL	7/11/11	WY	10	SR09

Figure 12. Example of completed Bird Datasheet.

VII. Before Leaving Survey Site

Once you finish the survey, and before leaving the site, don't forget to:

A. Check to make sure you entered your observer initials, transect ID, and page numbers on EACH page.
B. Record the end data for the survey (time, temp, sky, wind, transect notes) immediately upon completing the survey.
C. Go through your datasheets carefully to make sure you have not forgotten to record ANY data. Your work is not done until you've reviewed your data from the morning.
D. Provide clear and explicit directions to the survey location, including driving and hiking directions if necessary.
E. Send an OK message to your supervisor using your Spot or inReach unit.

VIII. Potential Issues When Conducting Point Counts

A. Window species

This is "listening through" (not detecting) a particular common species because you are habituated to it (Mourning Dove is a common window species).

B. Look and Listen everywhere

Be sure to look up regularly, particularly in taller forest types and/or if you are wearing a hat. Avoid wearing sunglasses or hats that can affect your hearing or field of view while counting birds. This includes caps that pull down over your ears as well as full-brimmed hats that can deflect sound away from your ears. Be sure to look and listen in all directions (equally). Avoid wearing bright colors that may attract species to you (hummingbirds, etc.) or frighten birds away from you.

C. Stand at Points

Do not sit or kneel as this can reduce the number of individuals recorded, by decreasing visibility, audibility and dexterity. If you are tired, take a short break after the point count.

D. No Pishing

Do not attract birds to you during the counts by pishing or playing bird calls. Pishing is permissible after the count in an attempt to identify an individual that was not identifiable on the count, but do not add other individuals after the count that were not first detected during the count period. **Never pish or otherwise attract birds toward you when you are near a point that has not been completed!**

E. Vehicle (and other) Noise

Occasionally aircraft or other mechanical noise can be loud and reduce your ability to hear birds. In these instances, pause your stopwatch and wait for the noise to subside. Once the noise is gone, start your stopwatch again and resume the count where you left off. If excessive noise interrupts the count for more than one minute, start the survey again after the disturbance has passed. Include notes about disturbance in the notes on the datasheet.

F. Guessing

Never guess on the identity of a bird. Instead, use an unknown code (e.g., unidentified sparrow = UNSP) for those individuals about which you're not sure. However, recording a lot of unidentified birds is an indication that you need to learn/practice more before performing point counts. If you are unsure of the correct unknown code, make a note in the comments section so you can write the correct code in later.

G. Know the Area

Check out your survey area and familiarize yourself with the habitats found within the grid the day before you survey so you know what to expect. Plan out an access route the day before. You will be able to find your way in the dark more easily if you have already done the hike during daylight hours.

H. Practice

Practice identifying birds in a habitat or elevation range before counting in that area. Be familiar with the songs and calls of all species found in an area before conducting point counts there. Birding on-site the evening before is often helpful when camping at or near the survey. Study the list of bird species you are likely to come across in your study area (provided by your crew leader) along with audio recordings to practice before (and during) the field season.

I. Weather

Weather can always be a factor when conducting point counts. Never conduct a point count when it is raining, as birds will not be very active and visibility may be poor (light mist or drizzle is fine as long as it is not impacting the bird activity). Also, do not conduct a point count if the wind is strong enough to hinder your ability to hear bird calls and songs, as this will affect the number of birds you are able to detect. If you are unsure if the weather is impacting your ability to detect birds or resulting in decreased bird activity, conduct the count and review the data afterwards. If you detected very few birds or almost all of your detections were visual it is likely that your ability to hear and/or bird activity is impacted by the weather. In these instances make a note that the data should not be used for analyses.

IV. Literature Cited

Buckland, S. T., D. R. Anderson, K. P. Burnham, J. L. Laake, D. L. Borchers, and L. Thomas. 2001. Introduction to distance sampling: estimating abundance of biological populations. Oxford University Press, Oxford, UK.

Leukering, T., M. Carter, A. Panjabi, D. Faulkner, and R. Levad. Revised 2005. Point Transect Protocol. Unpubl. document. Rocky Mountain Bird Observatory Brighton, Colorado, USA.

Stevens Jr., D. L., & Olsen, A. R. (2004). Spatially balanced sampling of natural resources. Journal of the American Statistical Association, 99(465), 262–278.

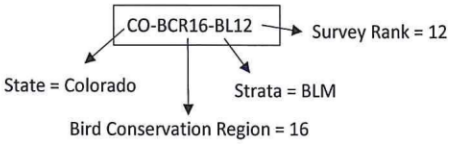
Appendix A. GPS Naming System

At the beginning of the field season, you will receive a GPS unit containing waypoints for each point on each transect assigned to you. The following is an example of how transects and points will be labeled in your GPS unit.

Integrated Monitoring in Bird Conservation Regions Grid and GPS Point Label Explanation

The survey labels are based on the State, Bird Conservation Region (BCR), Strata Code (i.e. BLM = BL) and the Rank (The number of the sample).

Example IMBCR Survey Label



Point 1 GPS label = CO16-BL12-1

- CO = State
- 16 = Bird Conservation Region
- BL = Strata Code
- 12 = Survey Rank
- 1 = Point 1

Point Number	GPS Label
1	CO16-BL12-1
2	CO16-BL12-2
3	CO16-BL12-3
4	CO16-BL12-4
5	CO16-BL12-5
6	CO16-BL12-6
7	CO16-BL12-7
8	CO16-BL12-8
9	CO16-BL12-9
10	CO16-BL12-10
11	CO16-BL12-11
12	CO16-BL12-12
13	CO16-BL12-13
14	CO16-BL12-14
15	CO16-BL12-15
16	CO16-BL12-16

16 point grid with points and GPS labels

④ CO16-BL12-4	③ CO16-BL12-3	② CO16-BL12-2	① CO16-BL12-1
⑧ CO16-BL12-8	⑦ CO16-BL12-7	⑥ CO16-BL12-6	⑤ CO16-BL12-5
⑫ CO16-BL12-12	⑪ CO16-BL12-11	⑩ CO16-BL12-10	⑨ CO16-BL12-9
⑯ CO16-BL12-16	⑮ CO16-BL12-15	⑭ CO16-BL12-14	⑬ CO16-BL12-13

Appendix B. Key of Two-Letter Codes for Shrubs and Trees

Code	CommonName	ScientificName	States
AA	Acacia	Acacia sp.	AZ, CA, KS, NM, NV, OK, TX, UT
AG	Agave	Agave sp.	AZ, CA, NM, NV, TX, UT
AL	Alder	Alnus sp.	AZ, CA, CO, ID, KS, MT, NM, ND, NV, OK, TX, UT, WA, WY
AE	American Elm	Ulmus americana	CO, KS, MT, ND, NE, OK, SD, TX, WY
HH	American Hophornbeam	Ostrya virginiana	KS, ND, NE, OK, SD, TX, WY
LI	American Linden / Basswood	Tilia americana	KS, ND, NE, OK, SD
AP	American Plum	Prunus americana	All
AM	Apache Plume	Fallugia paradoxa	AZ, CA, CO, NM, NV, OK, TX, UT
AW	Arizona Black Walnut	Juglans major	AZ, NM, OK, TX, UT
AC	Arizona Cypress	Cupressus arizonica	AZ, CA, NM, NV, TX, UT
AH	Ash	Fraxinus sp.	All
AK	Ashy Silktassel	Garrya flavescens	AZ, CA, NM, NV, UT
BA	Baccharis / Mule Fat	Baccharis sp.	AZ, CA, CO, KS, NM, NV, OK, OR, TX, UT
BP	Balsam Poplar	Populus balsamifera	CA, CO, ID, MT, ND, NV, OR, SD, UT, WA, WY
BT	Barrel Cactus	Ferocactus sp.	AZ, CA, NM, NV, TX, UT
BE	Beaked Hazelnut	Corylus cornuta	CA, CO, ID, MT, ND, OR, SD, WA, WY
BG	Beargrass	Nolina sp.	AZ, CA, CO, NM, NV, OK, TX, UT
BM	Bigtooth Maple	Acer grandidentatum	AZ, CO, ID, MT, NM, NV, TX, UT, WA, WY
BI	Birch	Betula sp.	All
BY	Bitter Cherry	Prunus emarginata	AZ, CA, ID, MT, NM, NV, OR, UT, WA, WY
PT	Black Cottonwood	Populus trichocarpa	CA, ID, MT, ND, NV, OR, WA, WY, UT
BN	Black Walnut	Juglans nigra	CO, KS, ND, NE, NM, OK, SD, TX, UT
BB	Blackberry / Raspberry / Thimbleberry	Rubus sp.	All
BL	Blackbrush	Coleogyne ramosissima	AZ, CA, CO, NV, UT
BK	Bladder Sage	Salazaria mexicana	AZ, CA, NV, TX, UT
BS	Blue Spruce	Picea pungens	AZ, CO, ID, NM, UT, WY
BX	Box Elder	Acer negundo	All
BR	Bristlecone Pine	Pinus aristata	AZ, CO, NM
EN	Brittlebush	Encelia sp.	AZ, CA, NV, UT
AB	Buckthorn	Rhamnus sp.	All
BF	Buffaloberry	Shepherdia canadensis	AZ, CA, CO, ID, MT, ND, NM, NV, OR, SD, UT, WA, WY
BO	Bur Oak	Quercus macrocarpa	CO, KS, MT, ND, NE, NM, OK, SD, TX, WY
BC	burnt conifer	NULL	All
BD	burnt deciduous	NULL	All
BW	Burroweed	Isocoma tenuisecta	AZ, NM, TX

Code	CommonName	ScientificName	States
LU	Bush Lupine	Lupinus sp.	All
BH	Buttonbush	Cephalanthus occidentalis	AZ, CA, KS, NE, OK, TX
CL	Catalpa	Catalpa sp.	CA, KS, NE, OK, OR, SD, TX
CM	Catclaw mimosa	Mimosa aculeaticarpa	AZ, NM, TX
CA	Ceanothus	Ceanothus sp.	All
CB	Chaffbush	Amphipappus sp.	AZ, CA, NV, UT
CK	Chickasaw Plum	Prunus angustifolia	CA, CO, KS, NE, NM, OK, TX
CP	Chihuahuan Pine	Pinus leiophylla	AZ, NM
CC	Choke Cherry	Prunus virginiana	All
CH	Cholla / Pencil Cactus	Cylindropuntia sp.	AZ, CA, CO, KS, NM, NV, OK, TX, UT
CR	Cliffrose / Bitterbrush	Purshia sp.	AZ, CA, CO, ID, MT, NE, NM, NV, OR, TX, UT, WA, WY
CJ	Common Juniper	Juniperus communis	AZ, CA, CO, ID, MT, ND, NE, NM, NV, OR, SD, UT, WA, WY
CO	Condalia	Condalia sp.	AZ, CA, NM, TX
CW	Crack Willow	Salix fragilis	CO, ID, KS, MT, ND, NE, NM, OR, SD, UT, WY
CE	Creosote	Larrea tridentata	AZ, CA, NM, NV, TX, UT
CT	Crucifiction Thorn	Canotia holacantha	AZ
DL	Dalea / Prairie Clover / Featherplume	Dalea sp.	All
DA	dead Aspen	NULL	All
DC	dead conifer	NULL	All
DD	dead deciduous	NULL	All
DJ	dead Juniper	NULL	All
DY	dead Pinyon Pine	NULL	All
DM	Desert Almond	Prunus fasciculata	AZ, CA, NV, UT
DH	Desert Honeysuckle	Anisacanthus thurberi	AZ, NM
LV	Desert Lavender	Hyptis emoryi	AZ, CA, NV
DO	Desert Olive	Forestiera neomexicana	AZ, CA, CO, NM, NV, OK, TX, UT
DP	Desert Polygala	Polygala acanthoclada	AZ, CA, UT
DR	Desert Rue	Thamnosma montana	AZ, CA, NV, UT
DS	Desert spoon / Sotol	Dasylirion wheeleri	AZ, NM, TX
DE	Desert Willow / Desert Catalpa	Chilopsis linearis	AZ, CA, KS, NM, NV, OK, TX, UT
DW	Dogwood	Cornus sp.	All
DF	Douglas Fir	Pseudotsuga menziesii	AZ, CA, CO, ID, MT, NM, NV, OR, TX, UT, WA, WY
EB	Elderberry	Sambucus sp.	All

Code	CommonName	ScientificName	States
EM	Elm	Ulmus sp.	All
ES	Engelmann Spruce	Picea engelmannii	AZ, CA, CO, ID, MT, NM, NV, OR, UT, WY
FD	Fairy Duster	Calliandra eriophylla	AZ, CA, NM, TX
FB	Fendlerbush	Fendlera rupicola	AZ, CO, NM, NV, TX, UT
FE	Fernbush	Chamaebatiaria millefolium	AZ, CA, CO, ID, NM, NV, OR, TX, UT
FH	Fool's Huckleberry	Menziesia ferruginea	CA, ID, MT, OR, WA, WY
FC	Fremont Cottonwood	Populus fremontii	AZ, CA, CO, NM, NV, TX, UT
FM	Fremont Mahonia / Barberry / Desert Holly	Berberis sp.	AZ, CA, CO, ID, KS, MT, ND, NE, NM, NV, OR, SD UT, WA, WY
FR	Fremont's Buckwheat / Crispleaf Buckwheat	Eriogonum corymbosum	AZ, CO, NM, NV, UT, WY
GO	Gambel Oak	Quercus gambelii	AZ, CO, NM, NV, OK, SD, TX, UT, WY
TT	Glandulare Labrador Tea/Trappers Tea	Ledum Glandulosum	CA, ID, MT, NV, OR, UT, WA, WY
GL	Globemallow	Sphaeralcea sp.	AZ, CA, CO, KS, NE, NM, NV, OK, TX
GB	Gooseberry / Currant	Ribes sp.	All
GF	Grand Fir	Abies grandis	CA, ID, MT, OR, WA
LB	Graythorn/Lotebush	Ziziphus obtusifolia	AZ, CA, NM, NV, OK, TX, UT
GW	Greasewood	Sarcobatus sp.	AZ, CA, CO, ID, MT, ND, NE, NM, NV, OR, SD, TX, UT, WA, WY
GA	Green Ash	Fraxinus pennsylvanica	CO, KS, MT, ND, NE, NM, OK, SD, TX, UT, WY
GM	Greenmolly	Bassia americana	AZ, CA, CO, ID, MT, NM, NV, OR, TX, UT, WY
GY	Gum Bully / Woolly Buckthorn	Sideroxylon lanuginosum	AZ, KS, NM, OK, TX
HK	Hackberry	Celtis sp.	All
HA	Hawthorn	Crataegus sp.	All
EC	Hedgehog Cactus	Echinocereus sp.	AZ, CA, CO, KS, NE, NM, NV, OK, SD, TX, UT, WY
HC	Hickory	Carya sp.	KS, ND, NE, OK, TX
HL	Honey Locust	Gleditsia triacanthos	All
HT	Hoptree	Ptelea sp.	AZ, CO, KS, NE, NM, TX, UT
HO	Horsebrush	Tetradymia sp.	AZ, CA, CO, ID, MT, NM, NV, OR, UT, WA, WY
HB	Huckleberry	Vaccinium sp.	AZ, CO, ID, KS, MT, ND, NM, OR, SD, TX, UT, WA, WY
XX	Identified But Not Listed	NULL	All
IC	Incense Cedar	Calocedrus decurrens	CA, NV, OR
IB	Indigo bush / Leadplant	Amorpha sp.	All
IO	Iodinebush	Allenrolfea occidentalis	AZ, CA, ID, NM, NV, OR, TX,UT
JP	Jeffrey Pine	Pinus jeffreyi	CA, NV, OR
JO	Jojoba	Simmondsia	AZ, CA, UT

Code	CommonName	ScientificName	States
		chinensis	
JT	Joshua Tree	Yucca brevifolia	AZ, CA, NV, UT
JU	Juniper	Juniperus sp.	All
KC	Kentucky Coffee Tree	Gymnocladus dioicus	KS, ND, NE, OK, SD, TX
KO	Kochia / Molly /Burningbush / Smotherweed	Bassia sp.	All
LM	Limber Pine	Pinus flexilis	AZ, CA, CO, ID, MT, ND, NE, NM, NV, OR, SD, UT, WY
LW	Little Walnut	Juglans microcarpa	KS, NM, OK, TX
LL	Loblolly Pine	Pinus taeda	OK, TX
LT	Locust sp.	Robinia sp.	All
LP	Lodgepole Pine	Pinus contorta	CA, CO, ID, MT, NV, OR, SD, UT, WA, WY
MD	Madrone	Arbutus arizonica	AZ, NM
MZ	Manzanita	Arctostaphylos sp.	AZ, CO, MT, NM, TX, UT, WY
ML	Maple	Acer sp.	All
MR	Mariola	Parthenium incanum	AZ, NM, NV, TX, UT
ME	Mesquite	Prosopis sp.	AZ, CA, CO, KS, NM, NV, OK, TX, UT
MK	Mock Orange	Philadelphus sp.	AZ, CA, CO, ID, MT, NM, NV, OK, OR, TX, UT, WA, WY
MB	Mojave sea-blite	Suaeda moquinii	AZ, CA, CO, ID, MT, ND, NE, NM, NV, OR, SD, TX, UT, WA, WY
MT	Mormon Tea	Ephedra sp.	AZ, CA, CO, NM, NV, OK, OR, TX, UT, WY
MO	Mountain Ash	Sorbus scopulina	AZ, CA, CO, MT, ND, NM, NV, OR, SD, UT, WA, WY
MH	Mountain Hemlock	Tsuga mertensiana	CA, ID, MT, NV, OR, WA
MM	Mountain Mahogany	Cercocarpus sp.	AZ, CA, CO, ID, KS, MT, NE, NM, NV, OK, OR, SD, TX, UT, WA, WY
MS	Mountain Spray / Oceanspray	Holodiscus sp.	AZ, CA, CO, ID, MT, NM, NV, OR, TX, UT, WA, WY
MU	Mulberry	Morus sp.	All
NC	Narrow-leaf Cottonwood	Populus angustifolia	AZ, CA, CO, ID, MT, NE, NM, NV, SD, TX, UT, WA, WY
LC	New Mexico Locust	Robinia neomexicana	AZ, CA, CO, NM, NV, TX, UT, WY
NB	Ninebark	Physocarpus sp.	All
OB	Oak	Quercus sp.	All
OL	Ocotillo	Fouquieria splendens	AZ, CA, NM, NV, TX
OR	Oreganillo	Aloysia wrightii	AZ, CA, NM, NV, TX, UT
OX	Oregon Boxwood	Paxistima myrsinites	All
OG	Oregon-grape	Mahonia aquifolium	AZ, CA, CO, ID, MT, ND, NE, NM, OR, SD, TX, UT, WA, WY
OE	Osage Orange	Maclura pomifera	CA, CO, KS, NE, NM, OK, OR, SD, TX, UT, WA
YE	Pacific Yew	Taxus brevifolia	CA, ID, MT, NV, OR, WA

Code	CommonName	ScientificName	States
PV	Palo Verde	Cercidium floridum	AZ, CA, NV
PB	Paper Birch	Betula papyrifera	CO, ID, MT, ND, NE, OR, SD, WA, WY
PW	Peachleaf Willow	Salix amigdaloides	All
PM	Persimmon	Diospyros sp.	CA, KS, NE, OK, TX, UT
PY	Pinyon Pine	Pinus edulis	AZ, CA, CO, NM, NV, OK, TX, UT, WY
PC	Plains Cottonwood	Populus deltoides	AZ, CO, KS, MT, ND, NE, NM, OK, SD, TX, UT, WY
PI	Poison Ivy	Toxicodendron radicans	AZ, KS, NE, OK, SD, TX
PP	Ponderosa Pine	Pinus ponderosa	AZ, CA, CO, ID, MT, ND, NE, NM, NV, OK, OR, SD, TX, UT, WA, WY
PO	Poplar	Populus sp.	All
PA	Prickly Ash	Zanthoxylum americanum	KS, ND, NE, OK, SD, TX
OP	Prickly Pear	Opuntia sp.	All
AS	Quaking Aspen	Populus tremuloides	AZ, CA, CO, ID, MT, ND, NE, NM, NV, OR, SD, TX, UT, WA, WY
RA	Rabbitbrush	Chrysothamnus sp.	AZ, CA, CO, ID, KS, MT, NE, NM, NV, OK, OR, TX, UT, WA, WY
BU	Ragweed / Bursage	Ambrosia sp.	All
RR	Range Ratany	Krameria parvifolia	AZ, CA, NM, NV, TX, UT
RS	Ratany sp.	Krameria sp.	AZ, CO, KS, NM, OK, TX, UT
RG	Rayless Goldenhead	Acamptopappus sphaerocephalus	AZ, CA, NV, UT
RB	Redbud	Cercis sp.	AZ, CA, KS, NM, NE, NV, OK, TX, UT
RD	Red-osier Dogwood	Cornus sericea	AZ, CA, CO, ID, KS, MT, ND, NE, NM, NV, OR, SD, UT, WA, WY
RH	Rhododendron	Rhododendron sp.	CA, CO, ID, MT, OK, OR, TX, WA
MA	Rocky Mountain Maple	Acer glabrum	All
RO	Russian Olive	Elaegnus angustifolia	All
SA	Sagebrush	Artemisia sp.	All
CG	Saguaro	Carnegiea gigantea	AZ, CA
SL	Saltbush	Atriplex sp.	All
SD	Sand Cherry	Prunus pumila	CO, KS, MT, ND, NE, OR, SD, UT, WY
SB	Serviceberry	Amelanchier sp.	All
SR	Shinnnery Oak / Havard Oak	Quercus havardii	AZ, CO, KS, NM, OK, TX, UT
LO	Shrub Live Oak	Quercus turbinella	AZ, CA, CO, NM, NV, TX, UT
SC	Shrubby Cinquefoil	Pentaphylloides floribunda	AZ, CA, CO, ID, MT, ND, NM, OR, SD, UT, WA, WY
EL	Siberian Elm	Ulmus pumila	All
SI	Siberian Peashrub / Caragana	Caragana arborescens	CA, CO, ID, MT, ND, NE, NM, OR, SD, UT, WA, WY
SM	Silver Maple	Acer saccharinum	CA, WA, ND, SD, NE, KS, OK, TX, NM

Code	CommonName	ScientificName	States
SE	Single-leaf Ash	Fraxinus anomala	AZ, CA, CO, NM, NV, UT, WY
SK	Skunkbrush	Rhus trilobata	All
SS	Smooth Sumac	Rhus glabra	All
SN	Snag	NULL	All
SW	Snakeweed	Gutierrezia sarothrae	All
SY	Snowberry	Symphoricarpos sp.	All
YS	Soaptree Yucca	Yucca elata	AZ, NM, NV, TX, UT
PS	Southwestern White Pine	Pinus strobiformis	AZ, CO, NM, TX
ST	Spindletree / Wahoo	Euonymus sp.	CO, KS, MT, ND, NE, OK, SD, TX
SH	Spiny Hopsage	Grayia spinosa	AZ, CA, CO, ID, MT, NM, NV, OR, UT, WA WY
SP	Spiraea	Spiraea betulifolia	ID, MT, ND, OR, SD, WA, WY
SU	Subapline Fir	Abies lasiocarpa	AZ, CA, CO, ID, MT, NM, NV, UT, WA, WY
SZ	Sugar Sumac	Rhus ovata	AZ, CA
US	Sumac	Rhus sp.	All
PL	Sycamore	Platanus sp.	AZ, CA, KS, NE, NM, OK, TX, WA
TA	Tamarisk / Saltcedar	Tamarix pentandra	All
TR	Tarbush	Flourensia cernua	AZ, NM, TX
TH	Tree of Heaven	Ailanthus altissima	AZ, CA, CO, ID, KS, NE, NM, NV, OK, OR, TX, UT, WA
TW	Twinberry / Bush Honeysuckle	Lonicera sp.	All
UC	Unknown coniferous species	NULL	All
UD	Unknown deciduous species	NULL	All
OT	Unknown Plant	NULL	All
VI	Viburnum	Viburnum sp.	CA, CO, ID, KS, MT, ND, NE, NM, OK, OR, SD, TX, WA, WY
WB	Water Birch	Betula occidentalis	AZ, CA, CO, ID, MT, ND, NE, NM, NV, OR, SD, UT, WA, WY
WX	Waxflower	Jamesia americana	AZ, CA, CO, NM, NV, UT, WY
HE	Western Hemlock	Tsuga heterophylla	CA, ID, MT, OR, WA
LA	Western Larch	Larix occidentalis	ID, MT, OR, UT, WA, WY
WC	Western Red Cedar	Thuja plicata	CA, ID, MT, OR, WA
WW	Western White Pine	Pinus monticola	CA, ID, MT, NV, OR, UT, WA
WF	White Fir	Abies concolor	AZ, CO, ID, NM, NV, OR, UT, WY
WS	White Spruce	Picea glauca	ID, MT, SD, WY
WP	Whitebark Pine	Pinus albicaulis	CA, ID, MT, NV, OR, WA, WY
PF	White-stem Paper-flower	Psilostrophe cooperi	AZ, CA, NM, NV, UT
WT	Whitetop / Pepperweed / Cress Shrub	Cardaria / Lepidium sp.	All
WG	Wild Grape	Vitis sp.	All

Code	CommonName	ScientificName	States
WR	Wild Rose	Rosa sp.	All
WI	Willow	Salix sp.	All
WY	Wingleaf Soapberry	Sapindus saponaria	AZ, CO, NM, KS, OK, TX
WN	Winterfat	Krascheninnikovia lanata	All
WO	Wolfberry	Lycium pallidum	AZ, CA, CO, NM, NV, OK, TX, UT
WU	Wright's Buckwheat	Eriogonum wrightii	AZ, CA, NM, NV, TX, UT
YU	Yucca	Yucca sp.	AZ, CA, CO, KS, MT, ND, NE, NM, NV, OK, SD, TX, UT, WY

Appendix C. Four-letter Bird Codes.

Codes highlighted in yellow were updated in 2023. Codes highlighted in green were updated in 2024.

Common Name	Code
Abert's Towhee	ABTO
Acorn Woodpecker	ACWO
Alder Flycatcher	ALFL
American Avocet	AMAV
American Bittern	AMBI
American Coot	AMCO
American Crow	AMCR
American Dipper	AMDI
American Goldfinch	AGOL*
American Goshawk	AGOS*
American Kestrel	AMKE
American Pipit	AMPI
American Redstart	AMRE
American Robin	AMRO
American Three-toed Woodpecker	ATTW
American Tree Sparrow	ATSP
American White Pelican	AWPE
American Wigeon	AMWI
American Woodcock	AMWO
Anna's Hummingbird	ANHU
Aplomado Falcon	APFA
Arizona Woodpecker	ARWO*
Ash-throated Flycatcher	ATFL
Baird's Sandpiper	BASA
Baird's Sparrow	BAIS
Bald Eagle	BAEA
Baltimore Oriole	BAOR
Baltimore X Bullock's Oriole Hybrid	BBOH
Band-tailed Pigeon	BTPI
Bank Swallow	BANS
Barn Owl	BANO*
Barn Swallow	BARS
Barred Owl	BADO*
Barrow's Goldeneye	BAGO
Bell's Vireo	BEVI
Belted Kingfisher	BEKI
Bendire's Thrasher	BETH
Bewick's Wren	BEWR
Black Phoebe	BLPH
Black Rail	BLRA
Black Rosy-Finch	BLRF
Black Swift	BLSW
Black Tern	BLTE
Black Vulture	BLVU
Black-and-white Warbler	BAWW
Black-backed Woodpecker	BBWO
Black-bellied Whistling Duck	BBWD
Black-billed Cuckoo	BBCU
Black-billed Magpie	BBMA
Black-capped Chickadee	BCCH
Black-capped Gnatcatcher	BCGN
Black-capped Vireo	BCVI
Black-chinned Hummingbird	BCHU
Black-chinned Sparrow	BCSP
Black-crested Titmouse	BCTI
Black-crowned Night-Heron	BCNH
Black-headed Grosbeak	BHGR
Black-necked Stilt	BNST
Blackpoll Warbler	BLPW
Black-tailed Gnatcatcher	BTGN
Black-throated Blue Warbler	BTBW
Black-throated Gray Warbler	BTYW
Black-throated Green Warbler	BTNW
Black-throated Sparrow	BTSP
Blue Grosbeak	BLGR
Blue Jay	BLJA
Blue-gray Gnatcatcher	BGGN
Blue-throated Hummingbird	BLUH
Blue-winged Teal	BWTE
Bobolink	BOBO
Bohemian Waxwing	BOWA
Boreal Chickadee	BOCH

Common Name	Code
Boreal Owl	BOOW
Botteri's Sparrow	BOSP
Brewer's Blackbird	BRBL
Brewer's Sparrow	BRSP
Bridled Titmouse	BRTI
Broad-billed Hummingbird	BBIH*
Broad-tailed Hummingbird	BTHU
Broad-winged Hawk	BWHA
Bronzed Cowbird	BROC
Brown Creeper	BRCR
Brown Pelican	BRPE
Brown Thrasher	BRTH
Brown-capped Rosy-Finch	BCRF
Brown-crested Flycatcher	BCFL
Brown-headed Cowbird	BHCO
Bufflehead	BUFF
Bullock's Oriole	BUOR
Burrowing Owl	BUOW
Bushtit	BUSH
Cackling Goose	CACG
Cactus Wren	CACW
California Gull	CAGU
California Scrub Jay	CASJ
California Quail	CAQU
Calliope Hummingbird	CAHU
Canada Goose	CANG
Canada Jay	CAJA
Canvasback	CANV

Common Name	Code
Canyon Towhee	CANT
Canyon Wren	CANW
Carolina Chickadee	CACH
Carolina Wren	CARW
Caspian Tern	CATE
Cassin's Finch	CAFI
Cassin's Kingbird	CAKI
Cassin's Sparrow	CASP
Cassin's Vireo	CAVI
Cattle Egret	CAEG
Cave Swallow	CASW
Cedar Waxwing	CEDW
Chestnut-backed Chickadee	CBCH
Chestnut-collared Longspur	CCLO
Chestnut-sided Warbler	CSWA
Chihuahuan Raven	CHRA
Chimney Swift	CHSW
Chipping Sparrow	CHSP
Chuck-will's-widow	CWWI
Chukar	CHUK
Cinnamon Teal	CITE
Clapper Rail	CLRA
Clark's Grebe	CLGR
Clark's Nutcracker	CLNU
Clay-colored Sparrow	CCSP
Cliff Swallow	CLSW
Common Black-Hawk	CBHA
Common Gallinule	COGA

Common Name	Code
Common Goldeneye	COGO
Common Grackle	COGR
Common Ground-Dove	COGD
Common Loon	COLO
Common Merganser	COME
Common Nighthawk	CONI
Common Poorwill	COPO
Common Raven	CORA
Common Tern	COTE
Common Yellowthroat	COYE
Connecticut Warbler	CONW
Cooper's Hawk	COHA
~~Cordilleran Flycatcher~~	~~COFL~~
Costa's Hummingbird	COHU
Crested Caracara	CRCA
Crissal Thrasher	CRTH
Curve-billed Thrasher	CBTH
Dark-eyed Junco	DEJU
Dark-eyed Junco (Gray-headed)	GHJU
Dark-eyed Junco (Oregon)	ORJU
Dark-eyed Junco (Pink-sided)	PSJU
Dark-eyed Junco (Red-backed)	RBJU
Dark-eyed Junco (Slate-colored)	SCJU
Dark-eyed Junco (White-winged)	WWJU
Dickcissel	DICK

Common Name	Code
Double-crested Cormorant	DCCO
Downy Woodpecker	DOWO
Dusky Flycatcher	DUFL
Dusky Grouse	DUGR
Dusky-capped Flycatcher	DCFL
Eared Grebe	EAGR
Eastern Bluebird	EABL
Eastern Kingbird	EAKI
Eastern Meadowlark	EAME
Eastern Phoebe	EAPH
Eastern Screech-Owl	EASO
Eastern Towhee	EATO
Eastern Whip-poor-will	EWPW
Eastern Wood-Pewee	EAWP
Elegant Trogon	ELTR
Elf Owl	ELOW
Eurasian Collared-Dove	EUCD
European Starling	EUST
Evening Grosbeak	EVGR
Ferruginous Hawk	FEHA
Ferruginous Pygmy-Owl	FEPO
Field Sparrow	FISP
Fish Crow	FICR
Five-striped Sparrow	FSSP
Flame-colored Tanager	FCTA
Flammulated Owl	FLOW
Forster's Tern	FOTE
Fox Sparrow	FOSP

Common Name	Code
Franklin's Gull	FRGU
Gadwall	GADW
Gambel's Quail	GAQU
Gila Woodpecker	GIWO
Gilded Flicker	GIFL
Glossy Ibis	GLIB
Golden Eagle	GOEA
Golden-crowned Kinglet	GCKI
Golden-fronted Woodpecker	GFWO
Golden-winged Warbler	GWWA
Grace's Warbler	GRWA
Grasshopper Sparrow	GRSP
Gray Catbird	GRCA
Gray Flycatcher	GRFL
Gray Hawk	GRHA
Gray Partridge	GRAP*
Gray Vireo	GRVI
Gray-crowned Rosy-Finch	GCRF
Great Blue Heron	GBHE
Great Crested Flycatcher	GCFL
Great Egret	GREG
Great Gray Owl	GGOW
Great Horned Owl	GHOW
Great Kiskadee	GKIS
Greater Pewee	GRPE
Greater Prairie-Chicken	GRPC
Greater Roadrunner	GRRO
Greater Sage-Grouse	GRSG

Common Name	Code
Greater Scaup	GRSC
Greater Yellowlegs	GRYE
Great-tailed Grackle	GTGR
Green Heron	GRHE
Green Kingfisher	GKIN
Green-tailed Towhee	GTTO
Green-winged Teal	GWTE
Groove-billed Ani	GBAN
Gunnison Sage-Grouse	GUSG
Hairy Woodpecker	HAWO
Hammond's Flycatcher	HAFL
Harlequin Duck	HADU*
Harris's Hawk	HAHA*
Harris's Sparrow	HASP
Hepatic Tanager	HETA
Hermit Thrush	HETH
Hermit Warbler	HEWA
Herring Gull	HERG
Hooded Merganser	HOME
Hooded Oriole	HOOR
Hooded Warbler	HOWA
Horned Grebe	HOGR
Horned Lark	HOLA
House Finch	HOFI
House Sparrow	HOSP
House Wren	HOWR
Hutton's Vireo	HUVI
Inca Dove	INDO

Common Name	Code
Indigo Bunting	INBU
Indigo x Lazuli Bunting Hybrid	ILBH
Juniper Titmouse	JUTI
Killdeer	KILL
Ladder-backed Woodpecker	LBWO
Lark Bunting	LARB
Lark Sparrow	LASP
Lazuli Bunting	LAZB
Le Conte's Sparrow	LCSP
Le Conte's Thrasher	LCTH
Least Bittern	LEBI
Least Flycatcher	LEFL
Least Sandpiper	LESA
Least Tern	LETE
Lesser Goldfinch	LEGO
Lesser Nighthawk	LENI
Lesser Prairie-Chicken	LEPC
Lesser Scaup	LESC
Lesser Yellowlegs	LEYE
Lewis's Woodpecker	LEWO
Lincoln's Sparrow	LISP
Little Blue Heron	LBHE
Loggerhead Shrike	LOSH
Long-billed Curlew	LBCU
Long-billed Dowitcher	LBDO
Long-eared Owl	LEOW
Louisiana Waterthrush	LOWA
Lucy's Warbler	LUWA

Common Name	Code
MacGillivray's Warbler	MGWA
Magnificent Hummingbird	MAHU
Magnolia Warbler	MAWA
Mallard	MALL
Marbled Godwit	MAGO
Marsh Wren	MAWR
Merlin	MERL
Mexican Chickadee	MECH
Mexican Jay	MEJA
Mexican Whip-poor-will	MWPW
Mississippi Kite	MIKI
Montezuma Quail	MONQ
Mountain Bluebird	MOBL
Mountain Chickadee	MOCH
Mountain Plover	MOPL
Mountain Quail	MOUQ
Mourning Dove	MODO
Mourning Warbler	MOWA
Nashville Warbler	NAWA
Nelson's Sparrow	NESP
No Birds	NOBI
Northern Beardless-Tyrannulet	NOBT*
Northern Bobwhite	NOBO
Northern Cardinal	NOCA
Northern Flicker	NOFL
Northern Flicker (Intergrade)	FLIN
Northern Flicker (Red-shafted)	RSFL

Common Name	Code
Northern Flicker (Yellow-shafted)	YSFL
Northern Goshawk	NOGO
Northern Harrier	NOHA
Northern Hawk Owl	NHOW*
Northern Mockingbird	NOMO
Northern Parula	NOPA
Northern Pintail	NOPI
Northern Pygmy-Owl	NOPO
Northern Rough-winged Swallow	NRWS
Northern Saw-whet Owl	NSWO
Northern Shoveler	NSHO
Northern Waterthrush	NOWA
Olive Warbler	OLWA
Olive-sided Flycatcher	OSFL
Orange-crowned Warbler	OCWA
Orchard Oriole	OROR
Osprey	OSPR
Ovenbird	OVEN
Pacific Wren	PAWR
~~Pacific-slope Flycatcher~~	~~PSFL~~
Painted Bunting	PABU
Painted Redstart	PARE
Pectoral Sandpiper	PESA
Peregrine Falcon	PEFA
Phainopepla	PHAI
Pied-billed Grebe	PBGR
Pika	PIKA

Common Name	Code
Pileated Woodpecker	PIWO
Pine Grosbeak	PIGR
Pine Siskin	PISI
Pinyon Jay	PIJA
Piping Plover	PIPL
Plumbeous Vireo	PLVI
Prairie Falcon	PRFA
Prothonotary Warbler	PROW
Purple Martin	PUMA
Pygmy Nuthatch	PYNU
Pyrrhuloxia	PYRR
Red Crossbill	RECR
Red-bellied Woodpecker	RBWO
Red-breasted Merganser	RBME
Red-breasted Nuthatch	RBNU
Red-breasted Sapsucker	RBSA
Red-eyed Vireo	REVI
Red-faced Warbler	RFWA
Redhead	REDH
Red-headed Woodpecker	RHWO
Red-naped Sapsucker	RNSA
Red-necked Grebe	RNGR
Red-necked Phalarope	RNPH
Red-tailed Hawk	RTHA
Red-winged Blackbird	RWBL
Ring-billed Gull	RBGU
Ring-necked Duck	RNDU
Ring-necked Pheasant	RNEP*

Common Name	Code
Rock Pigeon	ROPI
Rock Wren	ROWR
Rose-breasted Grosbeak	RBGR
Ruby-crowned Kinglet	RCKI
Ruby-throated Hummingbird	RTHU
Ruddy Duck	RUDU
Ruffed Grouse	RUGR
Rufous Hummingbird	RUHU
Rufous-crowned Sparrow	RCSP
Rufous-winged Sparrow	RWSP
Sage Thrasher	SATH
Sagebrush Sparrow	SABS
Sandhill Crane	SACR
Savannah Sparrow	SAVS
Say's Phoebe	SAPH
Scaled Quail	SCQU
Scarlet Tanager	SCTA
Scissor-tailed Flycatcher	STFL
Scott's Oriole	SCOR
Sedge Wren	SEWR
Semipalmated Plover	SEPL
Sharp-shinned Hawk	SSHA
Sharp-tailed Grouse	STGR
Short-eared Owl	SEOW
Snow Goose	SNGO
Snowy Egret	SNEG
Snowy Plover	SNPL
Solitary Sandpiper	SOSA

Common Name	Code
Song Sparrow	SOSP
Sooty Grouse	SOGR
Sora	SORA
Spotted Owl	SPOW
Spotted Sandpiper	SPSA
Spotted Towhee	SPTO
Sprague's Pipit	SPPI
Spruce Grouse	SPGR
Squirrel, Abert's	ABSQ
Squirrel, Red	RESQ
Steller's Jay	STJA
Stilt Sandpiper	STSA
Sulphur-bellied Flycatcher	SBFL
Summer Tanager	SUTA
Swainson's Hawk	SWHA
Swainson's Thrush	SWTH
Swamp Sparrow	SWSP
Tennessee Warbler	TEWA
Thick-billed Kingbird	TBKI
Thick-billed Longspur	TBLO
Townsend's Solitaire	TOSO
Townsend's Warbler	TOWA
Tree Swallow	TRES
Tropical Kingbird	TRKI
Trumpeter Swan	TRUS
Tufted Titmouse	TUTI
Turkey Vulture	TUVU
Unknown Accipiter	UNAC

Common Name	Code
Unknown Bird	UNBI
Unknown Blackbird	UNBL
Unknown Buteo	UNBU
Unknown Cardinal	UNCA
Unknown Chickadee	UNCH
Unknown Cormorant	UNCT
Unknown Corvid	UNCO
Unknown Cowbird	UNCB
Unknown Dove	UNDO
Unknown Duck	UNDU
Unknown Empidonax	UNEM
Unknown Falcon	UNFA
Unknown Finch	UNFI
Unknown Flicker	UNFR
Unknown Flycatcher	UNFL
Unknown Gnatcatcher	UNGN
Unknown Grosbeak	UNGB
Unknown Grouse	UNGR
Unknown Gull	UNGU
Unknown Hawk	UNHA
Unknown Hummingbird	UNHU
Unknown Jay	UNJA
Unknown Kingbird	UNKI
Unknown Longspur	UNLO
Unknown Meadowlark	UNME
Unknown Myiarchus	UNMY
Unknown Nuthatch	UNNU
Unknown Oriole	UNOR

Common Name	Code
Unknown Owl	UNOW
Unknown Pipit	UNPI
Unknown Quail	UNQU
Unknown Raptor	UNRA
Unknown Raven	UNRV
Unknown Sandpiper	UNSA
Unknown Sapsucker	UNSS
Unknown Sparrow	UNSP
Unknown Swallow	UNSW
Unknown Swift	UNSI
Unknown Tanager	UNTA
Unknown Tern	UNTE
Unknown Thrasher	UNTR
Unknown Thrush	UNTH
Unknown Towhee	UNTO
Unknown Vireo	UNVI
Unknown Warbler	UNWA
Unknown Woodpecker	UNWO
Unknown Wren	UNWR
Upland Sandpiper	UPSA
Varied Bunting	VABU
Varied Thrush	VATH
Vaux's Swift	VASW
Veery	VEER
Verdin	VERD
Vermilion Flycatcher	VEFL
Vesper Sparrow	VESP
Violet-green Swallow	VGSW

Common Name	Code
Virginia Rail	VIRA
Virginia's Warbler	VIWA
Warbling Vireo	WAVI
Western Bluebird	WEBL
Western Flycatcher	WEFL
Western Grebe	WEGR
Western Kingbird	WEKI
Western Meadowlark	WEME
Western Sandpiper	WESA
Western Screech-Owl	WESO
Western Tanager	WETA
Western Wood-Pewee	WEWP
White-breasted Nuthatch	WBNU
White-crowned Sparrow	WCSP
White-crowned Sparrow (Gambel's)	GWCS
White-crowned Sparrow (Mountain)	MWCS
White-eared Hummingbird	WEHU
White-eyed Vireo	WEVI
White-faced Ibis	WFIB
White-headed Woodpecker	WHWO
White-tailed Kite	WTKI
White-tailed Ptarmigan	WTPT
White-throated Sparrow	WTSP
White-throated Swift	WTSW
White-winged Crossbill	WWCR
White-winged Dove	WWDO
Whooping Crane	WHCR

Common Name	Code
Wild Turkey	WITU
Willet	WILL
Williamson's Sapsucker	WISA
Willow Flycatcher	WIFL
Wilson's Phalarope	WIPH
Wilson's Snipe	WISN
Wilson's Warbler	WIWA
Winter Wren	WIWR
Wood Duck	WODU
Woodhouse's Scrub-Jay	WOSJ
Wood Thrush	WOTH
Yellow Warbler	YEWA
Yellow-bellied Sapsucker	YBSA
Yellow-billed Cuckoo	YBCU
Yellow-breasted Chat	YBCH
Yellow-eyed Junco	YEJU
Yellow-headed Blackbird	YHBL
Yellow-rumped Warbler	YRWA
Yellow-rumped Warbler (Audubon's)	AUWA
Yellow-rumped Warbler (Myrtle)	MYWA
Yellow-throated Vireo	YTVI
Yellow-throated Warbler	YTWA
Zone-tailed Hawk	ZTHA

Appendix D. Single-point and Variable Point Surveys

Certain projects within the IMBCR design use a point schematic other than the 16-point grid.

One common schematic is to "saturate" points spaced at regular intervals across a given polygon. These surveys are called single-point surveys, because we treat each point as a transect unto itself in our database.

Example of a single-point survey. The point number will always be 1.

Other projects may have a unique point layout, or may sample only a subset of a 16-point grid.

The sampling protocol is mostly identical, but note that **you should not record 88 birds for these surveys**.

Ask your Crew Leader for a special single-point datasheet if you weren't given one.

These surveys should be entered using the **IMBCR (Variable Points)** option in the Data Entry App. See the Data Entry Protocol for details.