



United States Department of the Interior

NATIONAL PARK SERVICE
JEWEL CAVE NATIONAL MONUMENT
CUSTER, SOUTH DAKOTA 57730

IN REPLY REFER TO:

N 1419

September 9, 1996

Memorandum

To: Files

From: Superintendent

Subject: Jewel Cave Bird Monitoring Survey

Noted

JECA

*b. b. key
549308*

Author unknown

In the spring of 1996, a breeding bird census was conducted within the Monument. A point-count method that is currently in use on the surrounding Black Hill National Forest, was used. That method is described in the "Handbook of Field Methods for Monitoring Landbirds", USDA General Technical Report PSW-GTR-144 (portions attached). An extensive (as opposed to an intensive) point count method was used.

The census was set up and performed by Black Hills National Forest biological technician Duane Weber under agreement with the Black Hills National Forest.

The route established has 20 points, 17 along a circular route, and 3 special interest points, as shown on the map attached. Each point is marked with a stake of green steel fence post, driven into the ground to extend only about 12". Each stake is marked with a numbered aluminum tag, numbers are from 1-20. The map attached shows the route and all 20 locations. Verbal descriptions of the sites (attached) were written by JECA employee Marie Curtin after visiting the sites with JECA employee Gretchen Schenk, who had accompanied Duane Weber on one of the survey days.

Duane Weber ran the census route once in inclement weather, 3 times in reasonable weather. His notes and raw data are part of this file, as is a list of the acronyms he used to identify birds. The acronyms are simply 4-letter identifiers consisting of the first two letters of the bird's first and second common names, i.e. an American Robin is AMRO.

It is our intention to run the survey again in the springs of 1997 and 1998, and to have, therefore, 3 consecutive years of data to form a baseline. If Duane Weber is not available to do the survey again himself, he recommends that either Mike Laycock or Doug Buttery, both WICA employees, do it.

After the initial 3 years of data are collected, we may choose to re-run the census periodically, or we may choose not to re-run it

unless we have some particular management need.

Duane Weber recommended that, on running the census again, the census taker run the 17 points in one day, leaving the 3 special interest points for another day, in order to keep the continuity of the regular survey points.

In the original proposal for this project, the cost was estimated at \$1830; actual cost was \$1094, and was paid by JECA to the USFS. It covered the initial planning and setup of the points, and the first data collection (3 census runs). The proposal and billing record are attached.

A handwritten signature in cursive script, reading "Kate Cannon". The signature is written in dark ink and is positioned above the "Attachments:" section.

Attachments:

1. Excerpt from General Technical Report PSW-GTR-144
2. Map of census route
3. Verbal descriptions of site locations
4. Data sheets from 4 census runs
5. Acronym list for bird species seen
6. Original proposal/cost estimate
7. Billing record "Request to Bill"

Breeding Bird Survey Stations

- #1 West of Hell Canyon trail/road, at north side of drainage.
- #2 West side of Canyons Trail, just south of junction where trail turns east towards the historic cave entrance.
- #3 West side of Canyons Trail, where trail curves to southeast just before CCC dynamite cache. If you reach the cache, you've gone too far.
- #4 West side of Canyons Trail, in front of the small "grotto."
- #5 Southeast of "Upper Prairie Dog Spring," at the base of a large ponderosa pine.
- #6 South side of Canyons Trail.
- #7 West side of Canyons Trail, further from USFS/NPS boundary than map indicates. Look for the marker as you come into the turn.
- #8 South side of Canyons Trail, on USFS land, before you reach the NPS boundary sign.
- #9 Marker is several yards west/northwest of spring.
- #10 South side of Lithograph Canyon road.
- #11 South side of Lithograph Canyon road, by a large ponderosa pine.
- #12 North side of Lithograph Canyon Road, further east than map indicates. At marker, you can look back towards west and see the Visitor Center Area buildings above the road.
- #13 South side of Lithograph Canyon Road, further east than map indicates. Close to drainage.
- #14 South side of Lithograph Canyon Road.
- #15 Near stump located between 4th and 5th (?) power line poles (counting from Lithograph Canyon Road).
- #16 On the power line, several yards east of the pole from which power lines run to Maintenance Shop.
- #17 From #16, walk power line until it angles slightly to southwest twice. #17 is at 3rd (?) pole after it changes direction.
- #18 North of trail, on west-facing slope.
- #19 North of trail, before you reach the Service Road at Historic Area.
- #20 North of lagoons, across the path/road, up the hill near the large ponderosa.



Activity Codes
 1 Feed / 1 Rock
 2 Sing / 2 Shrub
 3 Perch / 3 Ground
 4 Preen / 4 Trees
 5 Flying/ 5 Air
 6 mating/ 6 Water
 7 swimming/ -

[illegible]

Activity Codes
1 Feed / 1 Rock
2 Sing / 2 Shrub
3 Perch / 3 Ground
4 Preen / 4 Trees
5 Flying / 5
6 mating /
7 swimmin.

[illegible]

Acronyms

AMRO	American Robin	<i>Turdus migratorius</i>
BCCH	Black-capped Chickadee	<i>Parus atricapillus</i>
BHCO	Brown-headed Cowbird	
CAFI	Cassin's Finch	
COYE	Common Yellow-throat	?
CHSP	Chipping Sparrow	
DUFL	Dusky Flycatcher	
GRAJ	Gray Jay	
HAWO	Hairy Woodpecker	
MODO	Mourning Dove	
MALL	Mallard	
MOBL	Mountain Bluebird	
MCWA	MacGillivray's Warbler	
NOFL	Northern Flicker	
OVEN	Ovenbird	
RBNU	Red-breasted Nuthatch	
RECR	Red Crossbill	
SOVI	Solitary Vireo	
SPSA	Spotted Sandpiper	
SWTH	Swainson's Thrush	?
TOSO	Townsend's Solitaire	
VGSW	Violet Green Swallow	?
WAVI	Warbling Vireo	
WETA	Western Tanager	
WBNU	White-breasted Nuthatch	
WITU	Wild Turkey	
WTSW	White-throated Swift	?
WWPE	Western Wood Pewee	?
YRWA	Yellow-rumped Warbler	?

Detection Code

- 1 Song/Call
- 2 Seen
- 3 Flyby

Activity Code

- | | | |
|----------|---|----------|
| 1 Feed | / | 1 Rock |
| 2 Sing | / | 2 Shrub |
| 3 Perch | / | 3 Ground |
| 4 Preen | / | 4 Trees |
| 5 Flying | / | 5 Air |

Acronyms

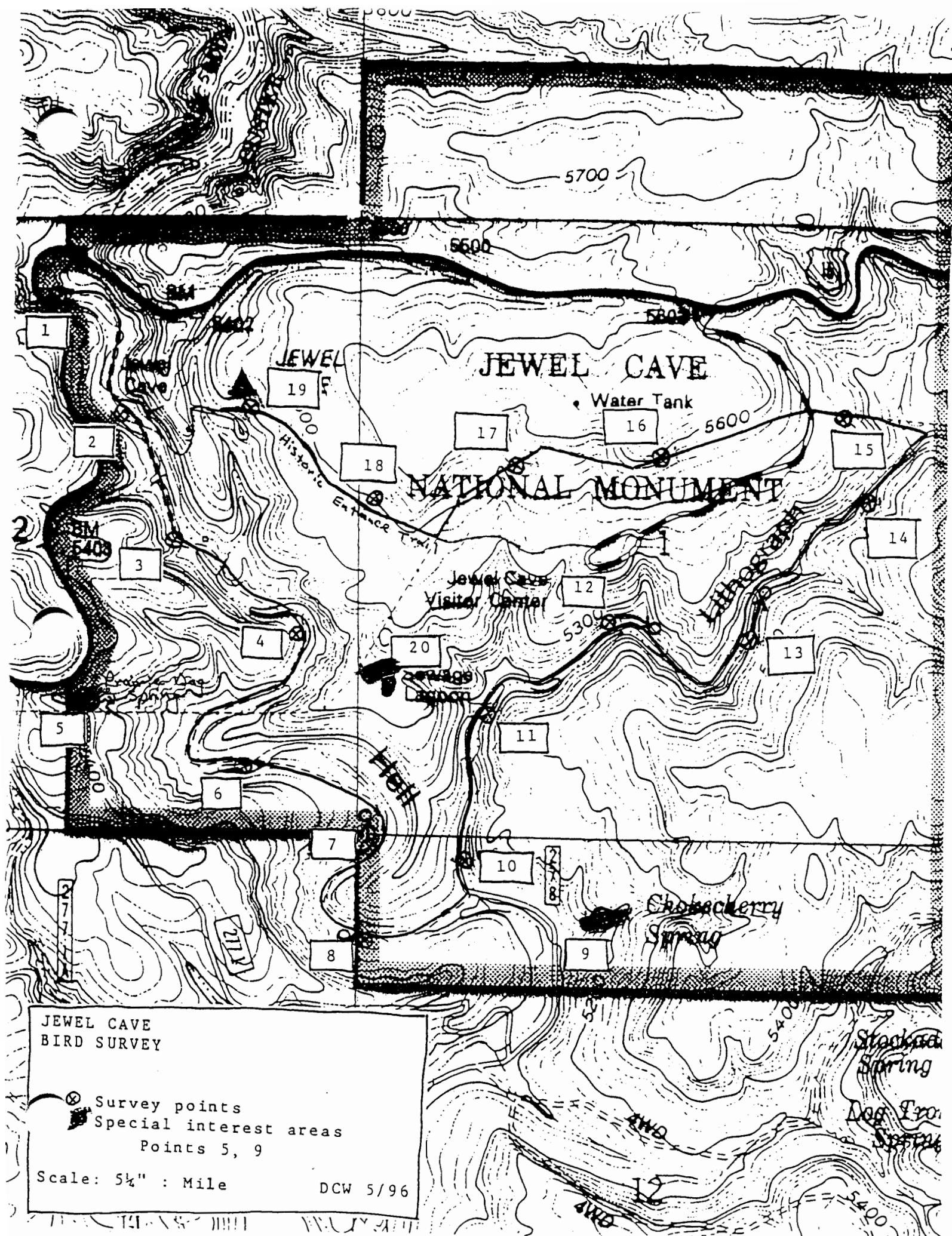
AMRO	American Robin
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JEWEL CAVE
BIRD SURVEY

- ⊗ Survey points
- Special interest areas
- Points 5, 9

Scale: 5 1/4" : Mile

DCW 5/96





United States
Department
of Agriculture

Forest Service

Pacific Southwest
Research Station

General Technical
Report PSW-GTR-144



Handbook of Field Methods for Monitoring Landbirds

C. John Ralph Geoffrey R. Geupel Peter Pyle Thomas E. Martin David F. DeSante



We suggest the following measurements (fig. 12), of the plant containing the nest. All measurements should be in centimeters.

- Plant species common name.
- Plant species genus.
- Plant height.
- Nest height.
- Plant "dbh" (diameter at breast height), stem diameter of the nest substrate, usually measured at 0.25 m above the ground, because many nests are in substrates less than "breast height."
- Nest distance from edge—Distance from edge of plant, inward to the nest.
- Canopy cover—The canopy cover at chest height should be measured using a densiometer. This is a measure of the tree canopy, and should be measured as close to the nest as possible, but not under the canopy of the nest plant if it is a shrub.
- Nest distance from center/stem—Distance of the nest laterally from the main stem.
- Number of support branches—The number of branches actually supporting the nest.
- Diameter support branches—Average diameter of stems supporting the nest.
- Nest concealment—Measured by estimating percent of the nest concealed by foliage cover in a 25-cm circle centered on the nest from a distance of 1 m from above (overhead cover), from below, and from the side (side cover) in each of the four cardinal directions.
- Compass direction—Direction from the nest to the main stem of the substrate.
- Total percent cover nest substrate—The percent cover of the plant containing the nest, using the outer margin of the plant as the boundary. This is most useful in shrubs.

The Nest Site and Random Points

Vegetation in the patch surrounding the nest can provide information on differences in microhabitat choice among species.

We recommend using vegetation sampling methods based on a series of points, as outlined in the section "Methods of habitat assessment," below, or those described in Martin and Roper (1988) with some modifications (obtainable from Martin). The point method involves measuring habitat features in the nest patch in circular releves of 11.2-m radius centered on the nest, smaller than the 25- to 50-m releves for general habitat assessment, detailed below. In addition, non-use sites should be sampled with the same protocol at 35 m from the nest in a direction parallel to the contour of the plot (to stay within the same microhabitat type when possible). The sampling plot should be centered on the plant stem nearest to the 35-m point that is of the same species and size as that used for the nest. Random plots can also be established in a grid to obtain a stratified random sample of the vegetation. Comparisons of random versus nest plots can indicate choice of microhabitat types. Comparisons of nest versus non-use plots then provide information on choice of habitat patches within a microhabitat type. These sampling protocols keep the methods relatively compatible with other sampling schemes (e.g., James and Shugart

1970), but also allow tests of hypotheses about the interactions between choice of nest site and predation risk or habitats chosen for nesting.

Censusing

The assessment of population size should be an integral part of any monitoring program. Various methods have been employed and thoroughly tested (see Ralph and Scott 1981). Abundance of birds has long been used to measure habitat suitability but is often retrospective, giving trends without any possibility of determining causation, and can even be misleading (van Horne 1983).

It is desirable to use a method that allows the biologist to census as many points as possible in the time available, thus gaining as many independent data points as possible. That is, it is much better statistically to census five points in a 10-day interval, than to count at one point five times. The farther apart each of the five points, the more likely the data can be extrapolated to a larger region.

Below we outline four major methods. Two of these, the point counts and the spot mapping methods, are the most common ones used (for definitions see Ralph 1981b). The point count is probably the best for most surveys and has been adopted as the standard method for monitoring (Ralph and others, in press). The methods for both are taken in part from the excellent book by Koskimies and Vaisanen (1966). In addition, a strip transect count and an area search method are also presented. The latter is especially popular with volunteers.

General Considerations

Time of Day

The best time for censusing at most temperate latitudes during the breeding season is usually between 5 and 9 a.m. Under most circumstances, no counts should be done after 10 a.m. Exceptions could be in the non-breeding period. It is best to start within 15 minutes of local sunrise. Examining pilot data is the best way to determine when detection rates are the most stable. In general, the period between official sunrise and the ensuing 3-4 hours is usually relatively stable. For most species, during the period between dawn (first light) and sunrise, the number and rate of birds singing is somewhat higher than the rest of the morning. For maximum comparability in detection probabilities for species among points, it will be best to start at sunrise rather than at first light.

Census Period

Breeding season point counts should be run during the time of year when the detection rates of the species being studied are most stable. Within the breeding season, the months of May, June, and the first week in July are best for counting passerines in North America. However, stable counting is

when the rate of singing of the various species has stabilized, are as early as April in the Southeast and Southwest and may extend later in the boreal zones. In Latin America the breeding season will be longer, and censuses can profitably be conducted throughout the year.

Weather

Birds should not be surveyed when rain or wind interfere with the intensity or audibility of bird sounds, when fog or rain interfere with visibility, or when cold weather shuts down bird song activity.

Point Counts

We suggest two levels of point counts. **Extensive point counts** are intended for a series of points, placed at a minimum of 250 m apart, largely on roads or trails over an entire region. **Intensive point counts** are placed within a mist net or nest search plot.

The account below is based on Hilden and others (1991), and the standards are taken from Ralph and others (in press), as adopted by the Point Count Workshop of the Monitoring Group of the Neotropical Migratory Bird Conservation Program, held in Beltsville, Maryland, November 1991.

Background and Aims

In many countries point counts are the main method in monitoring the population changes of breeding landbirds. With the point count method it is possible to study the yearly changes of bird populations at fixed points, differences in species composition between habitats, and abundance patterns of species. The point count method is probably the most efficient and data-rich method of counting birds. It is the preferred method in forested habitats or difficult terrain. Point counts involve an observer standing in one spot and recording all the birds seen or heard at either a fixed distance, or unlimited distance. This method can be conducted one or many times at a given point. The North American Breeding Bird Survey of the U.S.D.I. Fish and Wildlife Service is such a method.

The point count method applied to landbirds does not provide reliable data on waterfowl; however, rails and waders are counted well. Some landbirds also pose problems as they are particularly quiet, loud, nocturnal, or flocking. If these species are of particular interest, the method may be modified to accommodate them.

Equipment and Time Needed

One should not start point counts without good identification skills, including a knowledge of the songs and calls of birds. Details on training for distance estimates are given in Kepler and Scott (1981). In the tropics, learning all the songs and calls of all species at all times of the year is difficult in practice. In many areas it takes an experienced observer 4-8 weeks to identify 80-90 percent of the species. In temperate zones, this can often be done in less than 2 weeks.

For the census one needs a map, a pencil, notebook, a watch that shows seconds, and binoculars. The route and the points are marked on a survey map and, if necessary, in the field with plastic tape or streamers to ensure that the same points are found in the following years. The observer may move from one point to another by foot or with a vehicle.

The time needed for censusing one point count route is usually no more than four morning hours, depending on the distance between the points and the method of travel.

Choosing a Counting Route for Extensive Point Counts

An extensive point count route should encompass all the habitats of a region, if possible. In addition, it should include any mist net or nest searching plots in the region. In choosing a route and laying out the points for census, use a systematic rather than random sampling design, either on roads or off roads. Systematic gridding of points is preferable to the random placement of points in most cases. Systematic placement can include placing points at designated distances along roads. Do not stratify by habitat, unless separate estimates for a habitat are required. If the goal is to estimate population trends for an entire management unit, then point counts should be spaced evenly throughout that unit, or along the road system in an area, without regard to current habitat configurations.

Observers should attempt to carry out censuses primarily on tertiary roads, then secondary roads, and should avoid wide, primary roads. Off-road censuses should be carried out on trails, if possible, in major habitats not covered by road systems. Using roads, travel time can be reduced to as little as 1-2 minutes between sampling points. Under optimal road conditions, up to 25 5-minute point counts can be conducted in one morning. In an off-road situation, the number of point counts one observer can conduct during a morning varies between 6 and 12. Roadside habitats usually do not sample all of the available habitats. In this situation, a collection of both on- and off-road surveys can be created that best fits local conditions. Although a road modifies the surrounding habitats, we feel that tertiary road systems (i.e., narrow dirt roads) allow for birds to be counted in approximately the same proportions as off-road surveys.

The minimum distance between point counts in wooded habitats is 250 m. Birds previously recorded at another sampling point should not be recorded again. In virtually all habitats, more than 99 percent of individuals are detected within 125 m of the observer. In open environments, this minimum distance should be increased because of the greater detectability of birds. Along roads, where travel by vehicle is possible, distances of 500 m or more should be used.

Choosing Points for Intensive Point Counts

The intensive point counts are conducted within a study plot for mist nets or nest searches. We suggest between 9 and 16 points in a grid of 3 by 3, 3 by 4, or 4 by 4 points. For most analyses, the birds counted from these points will be combined into a single mean. Therefore, the distance between points is

This method used at J.C.

less critical than for extensive point counts where each point is intended to be statistically independent. The points on an intensive census grid should be adjusted to fit within the netting array or nest search plot so as to fully census the area. It is very important not to include areas much beyond the array or plot boundaries. These are covered by the extensive point count censuses. For example, a census grid of nine points, 100 m apart, would cover 4 ha. Allowing for an effective radius of censusing of perhaps 50 m outside this grid, the area covered expands to about 9 ha. A grid of 12 points 150 m apart would have an effective area of about 22 ha. Thus a census grid should have points that are between 75 and 150 m apart, depending upon the area to be covered and the number of points to be included. Under most circumstances 9-12 points should be more than adequate.

Field Work

The censuser should approach the point with as little disturbance to the birds as possible. Counts should begin immediately when the observer reaches the census point. Time spent at each count point should be 5 minutes if travel time between counting points is less than 15 minutes (for greater efficiency) and 10 minutes if travel time is greater than 15 minutes. If a survey is primarily for inventory and few points will be surveyed, then 10 minutes is appropriate. Data should be separated into those individuals seen or heard during the first 3 minutes (for comparison with Breeding Bird Surveys) and those additional individuals heard in the remaining 2 and 8 minutes.

The details of each point are recorded: the reference number, name of the point, date, and the time. The species are written down in the order they are observed. For each species, the number of individuals is recorded separately for those within a circle of 50 m around the censuser and for all those outside the circle, out to an unlimited distance. In noisy environments, dense foliage, or in tropical forests, observers have found that 25 m was preferred. The distance is that at which the individual was first observed. For birds near the 50-m border, the category may be confirmed by measuring paces to the border when the counting is over. If a bird flees when the censuser arrives at the point, the bird should be included according to its take-off place. Birds that were detected flying over the point, rather than detected from within the vegetation, should be recorded separately.

Estimating distances requires experience, so a new censuser should measure the length of steps in different terrain, and then check the distance to several singing birds in order to make the estimating of distances routine. Estimating may be eased by either natural or artificial landmarks.

If there are several males of the same species around a point, one may sketch in the margin the directions and distances of each singing male with an arrow to ensure that they are not confused. Juvenile birds or birds that fledged during the current breeding season should be recorded separately.

A bird flushed within 50 m of a point's center as an observer approaches or leaves a point should be counted as being at the

point if no other individual is seen during the count period. It is advisable that this be recorded separately.

If a flock is encountered during a census period, it may be followed after the end of the period to determine its composition and size. An observer should follow such a flock for more than 10 minutes. This is especially useful during the winter. A bird giving an unknown song or call may be tracked down after the count period for confirmation of its identity.

No attracting devices or records should be used, except in counts for specialized groups of birds.

Filling in the Forms

The data taken at point counts are of two types, the location information and the census data. The location data are contained in the first three lines of the "Location and Vegetation Form" (fig. 15, described below) and contain information about each census point. We also suggest that the vegetation data be taken (see Habitat Assessment, below). We suggest two types of census data forms. One involves mapping and the other direct recording.

Mapping Point Counts—This method of taking data involves the recorder placing on a map (fig. 13) the location of each bird detected (D. Welsh, pers. comm.). We suggest that species codes be used on the map, with a single letter for the most common species, and the full 4-letter code for other species. The birds' activities can be recorded by the various mapping symbols given in figure 13. The circle on the map can be the 50-m radius, enabling the observer to keep track of individuals easily. The orientation of the observer ("Direction") should be entered on each form by placing the compass position in the box at the top. Separate time periods are easily entered by using different colored pencils, e.g., birds seen in the first 3 minutes in black, and those seen within 3-5 minutes in red.

The data are then transcribed onto the Point Count Data Form (fig. 14), described below.

Direct Recording Point Counts—This method involves a single-step process of the observer recording the observations directly on the Point Count Data Form (fig. 14). Many observers do not think that it is necessary to map the location of birds in order to keep track of individuals. Using this method, an observer tallies in pencil each individual detected by placing a "tick" mark (a single line), or another code, in the appropriate column. Codes, for example, can be used to separate out singing vs. visual-only birds (S and V) and age categories. When field work is over, the actual number in each distance and time category can be written in ink for data entry.

The specific data suggested are as follows:

- State or province—The 2-column code for each.
- Region—An 8-column code, designated by the investigator. Often, the name of the USGS quad, a prominent landmark, or a nearby town will provide the best code name.
- Station—For intensive point counts, we suggest a 4-letter code, the same as that used for the mist net array or nest search plot. For extensive point counts, we suggest a code relating to the general area or road. In general, we expect that a station will have no more than 50 points.

Per Duane 9/96

On running the bird survey route, if its too unlikely to get all 20 sites done in the allotted time, drop the 3 "special interest areas", & do them on a separate morning. To keep the continuity of the regular survey prints

Should not always start at same point - see data sheets



Jewel Cave Bird Survey - W.C.W.

Date 5/28/96 Run # 1

Weather - cloud ceiling 500-500 ft. above ground (Almost continuous rain for past 7 days) No rain during surveys - Misty at times - 100% overcast
Temp. 38° - 45°F

Site	Time	Species	#	Dist.	Sex	Det.	Act
1	0533	Bechthale	1	50+	u	1	24
		YR warbler	1	50+	♂	1	24
		Sol. Vireo	1	50+	♂	1	24
		RB Nuthatch	2	50+	u	1	24
		3 MIN ~~Chipping Sparrow~~	1	50+	u	1	24
		D. Flycatcher	1	40	u	1	24
		Overbird	1	50+	♂	1	24
0538 S.M. ~~~~~							
2	0544	BC. Chickadee	1	45+	u	1	24
		S. Thrush	2	5	u	2	34
		RB Nuthatch	1	50+	u	1	24
		McGillivray's Warb.	1	50+	♂	1	24
		Overbird	1	50+	♂	1	24
		3 MIN WB Nuthatch	1	50+	♂	1	24
		BA Cowbird	1	50+	♂	1	24
3	0604	YR. Warbler	1	50+	u	1	24
		0544 S.M. ~~~~~					
		RB Nuthatch	1	50+	u	1	24
		Overbird	1	50+	♂	1	24
		YR Warbler	1	50+	♂	1	24
		3 MIN BA Cowbird	1	50+	u	1	24
		Overbird	1	50+	u	1	24
4	0614	YR Cowbird	1	40	u	1	24
		3 MIN Red X-bill	2	50+	u	3	55
		RB Nuthatch	1	50+	u	1	24
		0609 S.M. ~~~~~					
		RB Nuth.	2	50+	u	1	24
		WB Nuth.	2	50+	u	1	24
		Red. Bl. Warb.	2	50+	♂	3	55
3 MIN	0614	YR. Warbler	1	30	♂	2	24

Site	Time	Species	#	Dist.	Sex	Det.	Act
4 (cont'd)	0614	Sm. w.					
5	0627	WB. Warbler	1	50+	u	1	24
	3 MIN	Am. Robin	1	50+	♂	1	24
		RB. Nuthatch	1	50+	u	1	24
		YR. Warbler	1	50+	♂	1	24
	0632	Sm. w.					
6	0639	Ovenbird	1	50+	♂	1	24
		YR. Warbler	1	50+	♂	1	24
		RB. Nuthatch	3	45	u	1	24
		RB. Cowbird	1	45	u	1	24
	3 MIN	Am. Robin	1	50+	u	1	24
	0644	Sm. w.					
7	0649	DE. Junc.	1	50+	♂	1	24
		YR. Warbler	1	50+	u	1	24
		RB. Nuthatch		50+	u	1	24
	3 MIN	Am. Robin		50+	♂	1	24
		RB. Chickadee	2	50+	u	1	24
	0652	Sm. w.					
8	0700	WB. Nuthatch	1	50+	u	1	24
		Ovenbird	1	40	♂	1	24
		RB. Nuthatch	1	50+	u	1	24
		R. X. Warbler	1	50+	u	3	55
	3 MIN	DE. Junc.	1	50+	♂	1	24
		DE. Junc.	1	45	♂	1	24
	0705	Sm. w.					
9	0716	Ch. Wren	4	45	u	2	53
		R. X. Warbler	2	50+	♂	1	24
		DE. Junc.	1	50+	♂	1	24
	3 MIN	N. F. Warbler	1	50+	u	1	24
		RB. Nuthatch		50+	u		24
	0721	Sm. w.					

Site	Time	Species	#	Dist	Sex	Net.	Act
10	0731	D.E. Junco	1	50+	♂	1	24
	3 min	R.B. Nod	2	50+	u	1	24
	0736	Swain					
11	0741	DE Junco	2	35	♂	1	24
		R X-bill	3	50+	u	3	55
	3 min	R.B. Nod	1	50+	u	1	24
		YR warbler	1	50+	u	1	24
		R.B. Nod	1	30	u	2	55
	0746	Swain					
12	0753	WR Nod	1	50+	u	1	24
		OWB	2	50+	♂	1	24
		R.B. Nod	1	50+	u	1	24
		OWB	1	50+	♂	1	24
	3 min	N. Flicker	1	50+	u	1	24
		B. C. Nod	2	50+	u	1	24
	0758	Swain					
13	0806	owb-b-d	1	50+	♂	1	24
	3 min	OWB	1	50+	u	1	24
		R.B. Nod	1	50+	u	1	24
	0811	Swain					
14	0816	owb-b-d	1	50+	♂	1	24
	3 min						
	0821	Swain					
15	0827	clay sparrow	2	30	u	2	24
	3 min	YR Warbler	1	50+	u	3	55
		R.B. Nod	1	35	♂	3	55
		owb-b-d	1	50+	♂	1	24
	0832	Swain					

Slide	Time	Species	#	Dist	Sex	bet.	Acc
18	0737	RECR	1	50+	u	3	55
		WBNu	1	50+	u	1	24
		BCCH	2	50+	u	1	24
	3 MIN	YRWA	1	50+	♂	1	24
		DEJu	1	50+	u	1	24
		CHSP	1	50+	♂	1	24
		To So	1	50+	♂	1	24

5 MIN

19	0748	AMAO	1	25+	♀	2	13
		RBNu	1	50+	u	1	24
		MODO	1	50+	u	1	24
		RECR	3	50+	1 ♂ 2 Juv.	2	14
		DEJu	1	45	u	2	13
		SOVI	1	50+	♂	1	24
	3 MIN	BCCH	1	50+	u	1	24
		CHSP	1	50+	u	2	34
		WWPE	1	50+	♂	1	24

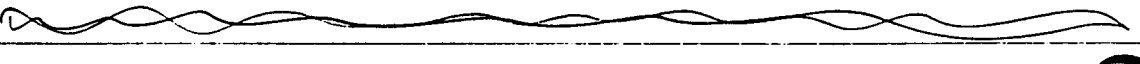
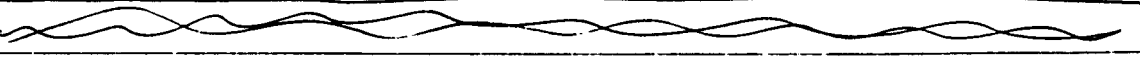
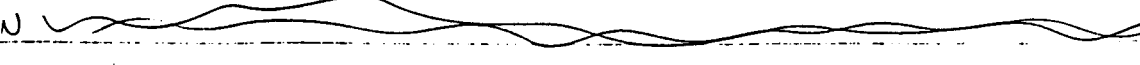
5 MIN

1	0803	RECR	1	50+	u	3	55
		WETA	1	50+	♂	1	24
		AMAO	1	50+	u	1	24
		DuFL	2	15	u	2	24
		YRWA	1	50+	♂	1	24
		WAVI	1	50+	♂	1	24
	3 MIN	MODO	1	50+	u	1	24
		WTSW	1	50+	u	3	55
		CAFI	1	50+	♂	1	24

5 MIN

June 10, 1996 2nd Run Juncos Cove 13th Survey Dec. 11
 47°F @ 0510 calm winds 90% clear skies

Site	Time	Species	#	Dist.	Sex	Net.	Act.
8	0528	CHSP	1	50+	♂	1	24
		WBNH	1	50+	♂	1	23
		WBNH	1	50+	♂	1	24
		RECR	2	35	u	1	24
	3 MIN	OVEN	2	50+	♂	1	24
		RECR	2	50+	u	3	55
		DUFL	1	50+	u	1	24
	5 MIN						
9	0544	COYE	1	30	♂	1	23
		WBNH	1	50+	u	1	24
		RECR	4	50+	u	3	55
		DESH	1	50+	u	1	24
		DUFL	1	30	u	1	24
		DUFL	1	50+	u	1	24
	3 MIN	ANNO	1	50+	♂	1	24
		ANNO	1	50+	♂	1	24
	5 MIN						
10	0558	OVEN	1	50+	♂	1	24
		DUFL	1	45	♂	1	24
		WBNH	1	50+	♂	1	24
		RECR	1	50+	u	1	24
		WETA	1	50+	♂	1	24
		RECR	1	50+	♀	3	55
	3 MIN	MODO	1	50+	♂	1	24
	5 MIN						
11	0606	WUPE	2	50+	u	1	24
		SONI	1	50+	♂	1	24
		MODO	1	50+	♂	1	24
		YRWA	1	50+	♂	1	24
		GHCO	1	50+	u	1	24
		WBNH	1	50+	u	1	24
		NO FL.	1	50+	u	1	24

Site	Time	Species	#	Dist.	Sex	Act	Act
11 (cont'd)	3 Min						
		RECR	1	50+	u	3	55
	5 MIN						
12	0615	OVEN	2	50+	♂	1	24
		WBNH	1	50+	u	1	24
		YRWA	1	50+	♂	1	24
		NOFL	1	50+	u	1	24
		GRJA	1	50+	u	1	24
		AMRO	1	50+	♂	1	24
		MOOD	1	50+	u	3	55
	3 MIN	RECR	2	50+	u	3	55
		RBNH	1	50+	u	1	24
	5 MIN						
13	0624	NOFL	1	35	u	1	24
		AMRO	1	50+	♂	1	24
		OVEN	1	50+	♂	1	24
		RECR	1	50+	u	3	55
		RBNH	1	50+	u	1	24
	3 MIN	BLCH	1	50+	u	1	24
	5 MIN						
14	0632	SOVI	1	50+	u	1	24
		RECR	3	50+	u	3	55
		NOFL	1	50+	u	1	24
		RBNH	1	50+	u	1	24
		YRWA	1	50+	♂	1	24
		AMRO	2	50+	u	1	24
	3 MIN	MOOD	1	50+	♂	1	24
		OVEN	1	50+	♂	1	24
		SOVI	1	50+	u	1	24
	5 MIN						

Site	Time	Species	#	Dist.	Sex	Net.	Act.
15	0649	YRWA	1	50+	♂	2	24
		MONO	1	50+	♂	1	24
		BHCO	1	50+	u	1	24
		AMRO	2	50+	u	1	24
		DELU	1	15	u	2	34
		OVEN	1	50+	♂	1	24
	3MIN	SOVI	1	50+	♂	1	24
		BCCH	1	50+	u	1	24
	5MIN						
16	0710	AMRO	1	50+	u	1	24
		YRWA	1	50+	♂	1	24
		WWPE	1	50+	♂	1	24
		BHCO	1	50+	u	1	24
		ABAM	1	50+	u	1	24
	3MIN	AMRO	1	40	u	1	24
		YRWA	1	50+	♂	1	24
	5MIN						
17	0712	AMRO	2	50+	u	1	24
		YRWA	2	50+	♂	1	24
		BCCH	1	50+	u	1	24
		TOSO	1	50+	u	1	24
		CHSP	1	50+	u	1	24
	3MIN	HAWO	1	50+	u	1	24
		BECK	1	50+	♂	3	55
		BHCO	1	50+	♂	1	24
	5MIN						
20	0724	MALL	1	50+	♀	1	24
		RECA	6	50+	u	3	55
		SOVI	1	50+	♂	1	24
		UGSW	1	50+	♂	3	55
	3MIN	YRWA	1	50+	♂	1	24
		MOBL	1	50+	u	1	24
		AMRO	1	50+	u	1	24
	5MIN						

Site	Time	Species	#	Dist.	Sex	Det.	Act.
16	0839	C. Finch	1	50+	♂	1	24
		Am. Robin	1	50+	u	1	24
	3 MIN	RB Nut	1	40	u	1	24
17	0850	DF Junco	1	40	u	1	24
		RB Nut	2	30	u	2	14
	3 MIN	YR Warbler	1	30	♂	1	24
18	0902	RB Nut	1	50+	u	1	20
	3 MIN	YR Warbler	1	25	♂	1	20
19	0913	Am. Robin	1	50	u	1	24
		Chipping Sparrow	1	20	u	1	24
		Chipping Sparrow	6	45	u	2	13
		RB Nut	1	45	u	2	13
	3 MIN	Red Y. Warbler	3	50+	u	3	55
		DF Junco	2	30	u	2	13
20	0935	Mallard	3	50+	♂ 1 u	2	13
		Chipping Sparrow	1	20	u	2	13
		YR Warbler	1	50+	♂	2	13
		RB Nut	1	40	♂	1	24
	3 MIN	Sp. 446 Sp. 447	1	50+	u	2	13
21	0940	5 MIN					

Site	Time	Species	#	Dist	Sex	Act.	Act.
2	0816	MONO	2	50+	♂	1	24
		DUFL	1	50+	u	1	24
		DEJU	1	30	u	1	24
		OVEN	1	50+	♂	1	24
		DUFL	2	30	u	1	24
		RBNU	1	50+	u	1	24
		AMRO	1	50+	u	1	24
	3 MIN	YRWA	1	50+	u	1	24
		MECA	3	50+	u	3	55
		BHCO	1	50+	u	1	24
5 MIN							
3	0827	RECR	2	50+	u	3	55
		OVEN	1	50+	♂	1	24
		WAVI	1	50+	♂	1	24
		SOVI	1	50	♂	1	24
		WBNU	1	50+	u	1	24
	3 MIN	YRWA	1	30	♀	2	24
5 MIN							
4	0837	YRWA	1	50+	♂	1	24
	3 MIN	RBNU	1	50+	u	1	24
		AMRO	1	50+	u	1	24
		MOBL	1	50+	♂	3	55
5 MIN							
5	0852	WAVI	1	50+	♂	1	24
		RECR	3	50+	u	3	55
	3 MIN	RBNU	1	50+	u	2	14
		YRWA	1	50+	♂	1	24
5 MIN							
6	0903	DEJU	2	50+	♂	1	24
		CHSP	2	30		1	24
		OVEN	1	50+	♂	1	24
	3 MIN	RBNU	2	40	u	1	24

65°F @ 0930 Sunny 80% c/w sks light S. breeze 1-2 mph

Site	Time	Species	#	Dist	Sex	Det.	Act
6 (cont'd)		YRWA	1	50+	♂	1	24
	5 MIN						
7	0913	YRWA	1	50+	♂	1	24
		CHSP	1	50+	♂	1	24
		BLCH	1	25	u	1	24
		DESH	1	40	u	1	24
	3 MIN	CHSP	1	25	u	3	55
		OVEN	1	50+	♂	1	24
	5 MIN						

Site	Time	Species	#	Dist	Sex	Act.	Act
17 cont'd	3 MIN						
		WWPE	1	50+	u	1	24
		WBNH	1	50+	u	1	24
		YRWA	1	30	u	2	24
20	0013	MALL	2	50+	Ju.	2	33
		WETA	1	50+	♂	1	24
		COYE	1	50+	♂	1	24
		AMRO	1	50+	u	1	24
		RWBL	1	50+	♀	5	55
		SOVI	1	50+	u	1	24
	3 MIN	WAVI	2	50+	♂	1	24
		OUIN	1	50+	♂	1	24
		RWDL	1	50+	♂	5	55
		WBNH	1	50+	u	1	24
		RISNH	1	50+	u	1	24
		BCCN	2	50+	u	1	24
18	0024	RECR	4	Fly	u	5	55
		AMRO	2	50+	u	1	24
		YRWA	2	50+	♂	1	24
	3 MIN	YRWA	1	40	♂	2	55
19	0035	RECR	2	Fly	u	3	55
		RECR	2	50+	u	1	24
		WWPE	2	50+	♂	1	24
		RISNH	1	50+	u	1	24
	3 MIN	AMRO	1	40	u	1	24
		YRWA	1	50+	♂	1	24
		WBNH	1	50+	u	1	24
		TOSO	1	Fly	u	3	55

Jewel Cave Bird Survey

3rd Run

(3)

Site	Time	Species	#	Dist.	Sex	Det.	Act
1	0653	YRWA	1	30	u	2	24
		HAWO	1	50+	u	1	24
		AMRO	1	50+	u	1	24
		NOFL	1	50+	u	1	24
	3 MIN	WETA	1	50+	♂	1	24
		MGWA	1	50+	♂	1	24
2	0702	YRWA	1	50+	♂	1	24
		DUFL	1	50+	♂	1	24
		RECR	3	Fly	u	3	55
		TOSO	1	50+	♂	1	24
		UGSW	2	Fly	u	3	55
		AMRO	2	50+	u	1	24
	3 MIN	BLCH	2	50+	u	1	24
		MGWA	1	50+	♂	1	24
		SDVI	1	50+	♂	1	24
3	0713	WWPE	1	50+	u	1	24
		DUFL	1	50+	u	1	24
		OVEN	1	50+	♂	1	24
		RBWH	1	50+	u	1	24
		WAVI	1	50+	♂	1	24
	3 MIN	MGWA	1	40	♂	1	24
		WETA	1	50+	♂	1	24
4	0723	DUFL	1	10	♂	2	24
	3 MIN	RBWH	1	30	u	1	24
		YRWA	1	50+	♂	1	24
		AMRO	1	50+	u	1	24
		RECR	3	Fly	u	3	55
		RTHA	1	50+	u	3	55

Jewel Cave Bird Survey

3rd run

(4)

06/19/96

D. Weber

Site	Time	Species	#	Dist	Sex	Det.	Act.
5	0737	AMRO	2	40	♂	2	24
		YRWA	3	35	♂	2	32
	3min	AMRO	1	50+	♂	3	55
		DUFL	1	50+	u	1	24
		CHCO	1	40	♂	1	24
		NOFL	1	50+	u	1	24
6	0747	RBNH	2	50+	u	1	24
		OVEN	1	50+	♂	1	24
		DUFL	1	50+	u	1	24
	3min	YRWA	1	50+	♂	1	24
		RECR	1	50+	u	3	55
		DEJU	1	50+	♂	1	24
7	0758	BCCIT	1	50+	u	1	24
		SOVI	1	50+	♂	1	24
		DUFL	1	50+	u	1	24
	3min	AMRO	1	50+	u	1	24
		YRWA	1	50+	♂	1	24
		AMRO	1	50+	u	1	24
8	0808	OVEN	1	45	♂	1	24
		DEJU	1	50+	♂	1	24
		OUFID	1	50+	♂	1	24
		RECR	1	fly	u	3	55
		SOVI	1	50+	♂	1	24
	3min	YRWA	1	50+	♂	1	24
		RBNH	2	50+	u	1	24

Jewel Cave Bird Survey

3rd run

(5)

06/19/96 D. Weber

Site	Time	Species	#	Dist.	Sex	Det.	Act
9	0823	RECR	3	50+	u	3	55
	3MIN	DUFL	1	50+	u	1	24
		BCCH	1	50+	u	1	24

10	0835	BCCH	1	50+	u	1	24
		WAUI	1	50+	♂	1	24
		YRWA	1	50+	♂	1	24
		MODO	1	50+	♂	1	24
	3MIN	DUFL	1	50+	u	1	24
		RECR	3	50+	u	3	55

11	0845	WAUI	1	50+	♂	1	24
		BCCH	1	50+	u	1	24
		WWPE	1	50+	u	1	24
		OVEN	1	50+	♂	1	24
	3MIN	RBNU	1	50+	u	1	24

12	0855	OVEN	2	50+	♂	1	24
		RBNU	1	50+	u	1	24
		RECR	2	50+	u	3	55
		WWPE	1	50+	♂	1	24
	3MIN	CONI	1	50+	u	3	55
		AMRO	1	50+	u	1	24

13	0906	TOSO	1	50+	u	1	24
	3MIN	SOUL	1	50+	♂	1	24

50°F mostly cloudy calm winds
clearing to mostly sunny by 0800

Duane Weber

Site	Time	Species	#	Dist	Sex	Det.	Act
14	0524	DUFL	1	40	♂	1	24
		MGWA	1	50+	♂	1	22
		AMRO	1	50+	u	1	24
		RECR	10	50+	u	5	55
		WETA	2	50+	♂		24
		BECO	1	50+	♂	2	55
	3 MIN	MORO	1	50+	u	1	24
		OVEN	1	50+	♂	1	24
		BECH	1	50+	u	1	24
	5 MIN	GRAS	1	50+	u	1	24
15	0530	MORO	1	50+	♂	1	24
		OVEN	1	50+	♂	1	24
		RECH	2	50+	u	5	55
		AMRO	1	40	♂	2	13
		WBNH	1	50+	u	1	24
	3 MIN	AMRO	1	30	Imm.	1	24
	5 MIN	YRWA	1	50+	♂	1	24
16	0548	BBWO	1	50+	u	2	14
		YRWA	2	50+	♂	1	24
		HAWO	1	50+	u	1	24
		AMRO	1	50+	u	1	24
		RECR	6	50+	u	5	55
		BECO	1	50+	♂		24
		MORO	1	50+	♂		24
	3 MIN	WETA	2	50+	♂	1	24
		MALL	1	50+	♀	1	23
		WWDF	1	50+	u	1	24
17	0559	ABNH	3	50+	u	1	24
		RECR	17	Fly	u	5	55
		DEJH	2	50+	♂	1	24
		MORO	1	50+	♂	1	24



06/26/96

Site	Time	Species	#	Dist	Sex	Net.	Act
20	0545	MALL	1	40	♀	2	13
		MALL	2	40	Juv	2	13
		MORO	1	50+	u	1	24
		RECR	12	50+	u	3	55
		WETA	1	50+	♂	1	24
		AMRO	1	50+	u	1	23
	3 MIN	ROBU	1	50+	u	1	24
		DEJU	1	50+	♂	1	24
		VGSW	2	50	u	2	15
18	0558	WBUH	1	50+	u	1	24
		RECR	4	—	u	3	55
		SOLVI	1	50+	♂	1	24
		YRWA	1	50+	♂	1	24
		PISI	2	—	u	3	55
		GRAJ	2	50+	u	1	24
	3 MIN	DEJU	1	40	u	1	23
19	0605	DEJU	1	40	♂	1	24
		RECR	8	—	u	3	55
		YRWA	1	50+	♂	1	24
	3 MIN	WWPE	1	45	u	2	24
		AMRO	1	50+	u	1	24
		ROBU	1	50+	u	1	24
1	0624	AMRO	1	25	♂	2	13
		AMRO	1	25	♀	2	13
		SOLVI	1	50+	u	1	24
		WTSW	1	50+	u	1	25
		DUFL	1	50+	u	1	24
		YRWA	1	50+	♂	1	24

06/26/96

Site	Time	Species	#	Dist	Sex	Det	Act
1 (cont'd)		WBSN	1	50+	u	1	24
	3MIN	WETA	1	50+	♂	1	24
		CHSP	2	50+	u	1	24
		BECH	1	50+	u	1	24
		RECR	5	50+	u	3	55
		AMRO	1	30	Juv	1	24
2	0635	KBNU	1	50+	u	1	24
		AMRO	3	50+	u	1	24
		TOSO	1	50+	u	1	24
		YRWA	1	50+	♂	1	24
		OVEN	1	50+	♂	1	24
		RECR	3	—	u	3	55
		HAWO	1	40	u	1	24
	3MIN	DUFL	1	35	u	1	24
		AMRO	2	50+	u	1	24
3	0645	WETA	1	50+	♂	1	24
		NOFL	1	50+	u	1	24
		MGWA	1	40	♂	1	22
		AMRO	2	45	u	2	24
		WBSN	1	50+	u	1	24
		RECR	6	—	u	3	55
		COFL	1	45	u	1	24
	3MIN	OVEN	1	50+	♂	1	24
		RBSN	2	50+	u	1	24
4	0655	RECR	2	—	u	3	55
	3MIN	RBSN	1	50+	u	1	24
		AMRO	1	50+	u	1	24

4th Run

③

06/24/96 Jcw

Site	Time	Species	#	Dist	Sex	Det.	Act.
5	0709	BHCO	2	40	1 ♂ 1 ♀	2	24
		RSNU	1	50+	u	1	24
		OVEN	1	50+	♂	1	24
	3 MIN	DESH	1	50+	♂	1	24
		BCCH	1	50+	u	1	24

6	0719	BCCH	1	40	u	1	24
		SOVI	1	50+	♂	1	24
		RSNU	3	50+	u	1	24
		DESH	1	50+	♂	1	24
		NOFL	1	50+	u	1	24
		OVEN	1	50+	♂	1	24
		AMRO	1	30	♂	2	34
	3 MIN	AMRO	1	30	Juv.	1	24
		DESH	1	50+	♂	1	24
		YRWA	1	40	♀	2	14

7	0730	SOVI	1	50+	♂	1	24
		AMRO	3	50+	u	1	24
		NOFL	1	50+	♂	1	24
	3 MIN	DESH	1	50+	♂	1	24
		OVEN	1	50+	♂	1	24

8	0743	YRWA	1	50+	♂	1	24
		AMRO	1	50+	u	1	24
		OVEN	1	50+	♂	1	24
		RSNU	1	50+	u	1	24
	3 MIN	SOVI	1	50+	♂	1	24
		BCCH	1	50+	u	1	24
		UETA	1	50+	♂	1	24

06/26/96 Jcw (4)

Site	Time	Species	#	Dist.	Sex	Net.	Act
9	0757	COYE	1	20	♂	1	22
		RECH	2	30	u	1	24
		AMRO	2	50+	u	1	24
		DUFL	1	30	u	2	44
		OVEN	1	50+	♂	1	24
	3 MIN	WWPE	1	45	u	1	24
		MOBO	1	50+	u	1	24
		CHSP	3	50+	♂	1	24

10	0810	WETA	1	50+	♂	1	24
		WAVI	1	50+	♂	1	24
		RBNU	1	50+	u	1	24
		OVEN	1	50+	♂	1	24
	3 MIN	WWPE	1	40	u	1	24
		RECR	1	—	u	3	55

11	0821	RECR	8	—	u	3	55
		AMRO	1	50+	u	1	24
		DEJU	1	50+	♂	1	24
		MGWA	1	50+	♂	1	22
	3 MIN	DUFL	1	50+	u	1	24

12	0830	MGWA	1	50+	♂	1	24
		DUFL	1	50+	u	1	24
		OVEN	1	50+	♂	1	24
		COFL	1	45	u	1	24
		WRNU	1	40	u	1	24
	3 MIN	WETA	1	50+	♂	1	24

06/26/96

Site	Time	Species	n	Dist	Sex	Det	Act
13	0841	WETA	1	50+	♂	1	24
		RSNU	1	50+	u	1	24
	3 MIN	DEJU	1	50+	u	1	24
		HAWO	1	50+	u	1	24
		BCCH	1	50+	u	1	24

14	0852	CHSP	1	50+	u	1	24
		BCCH	2	50+	u	1	24
	3 MIN	DHFL	1	50+	u	1	24
		SOVI	1	50+	♂	1	24

15	0902	CONI	1	50+	u	3	55
		YRWA	1	50+	♂	1	24
		WWPE	1	50+	u	1	24
		AMRO	2	50+	u	1	24
	3 MIN	BHCO	1	50+	u	1	24
		RSNU	1	50+	u	1	24

16	0914	SOVI	1	50+	♂	1	24
		RSNU	1	50+	u	1	24
		AMRO	1	50+	u	1	24
		YRWA	1	50+	♂	1	24
	3 MIN	RECR	1	—	♂	3	55
		NOFL	1	50+	u	1	24

17	0924	SOVI	1	50+	♂	1	24
		DEJU	3	50+	♂	1	24
		YRWA	2	50+	♂	1	24
		AMRO	1	35	♂	2	34
	3 MIN	AMRO	1	40+	juv.	1	24
		AMRO	1	50+	u	1	24
		CONI	1	—	u	3	55
		NOFL	1	—	u	3	55

JEWEL CAVE BIRD MONITORING PLAN PROPOSAL

Goal: Design, set-up, and run the first year of a bird survey on Jewel Cave National Monument.

1. Select a point count survey route to cover the habitat components of Jewel Cave.
2. Map the route and stopping points on 1:24,000 scale (or larger) maps.
3. "Permanently" mark the stop points on the ground so the survey can be repeated.
4. Five photographs of each survey point. One of the survey point center itself, and one photo each of due North, South, East, West while standing at the survey point center.
5. Read each survey point three times during the peak breeding season of May 15 - June 30. Starting at sunrise, about 5:30 am, and ending no later than 10:00 am. (Provision may be made for a night survey for owls.)

Estimated Costs:

10 working days GS-7 step 4	138.00/day	1380.00
Stub "T" steel fence posts	25 X 3.00 <i>Free!</i>	~~75.00~~
Bird monitoring station signs	35 X 5.50 <i>Not ordered or needed</i>	~~192.50~~
Film and processing	3 ~~5~~ , 36 exp. rolls	~~95.00~~ ^{50.00}
Travel mileage	300 X .30/mile	90.00

		1832.50

Identify birds

~~AMRO~~			
AMRO	American Robin	WUPE	Western Wood Pewee
BCCH	Black Capped Chickadee	YRWA	Yellow Rumped Warbler
BHCO	Brown Headed Cowbird		
CAFI	Cassin's Finch		
COYE	Common Yellowthroat		
CHSP	Chipping Sparrow		
DUFL	Dusky Flycatcher		
GRAY	Gray Jay		
~~GRJA~~			
HAWO	hairy Woodpecker		
MODO	Mourning Dove		
MALL	MALLARD		
MOBL	Mountain Bluebird		
MCWA	McGillivray's Warbler		
NOFL	Northern Flicker		
OVEN	Ovenbird		
RBNH	Red Breasted Nuthatch		
RECR	Red Crossbill		
SOVI	Solitary Vireo		
SPSA	Spotted Sandpiper		
SWTIT	Swainson's Thrush		
TOSO	Towhee's Solitaire		
UGSW	Violet Green Swallow		
WAVI	Warbling Vireo		
WETA	Western Tanager		
WBNU	White-breasted Nuthatch		
WITU	Wild Turkey		
~~WT~~ WTSW	White-throated Swift		

Detection

1 Song/call

2 Seen

3 Fly by

Feed

2 Sing

3. Perch

4. Areen

5. Flying

1 Rock

2 Shrub

3 Ground

4 TURNS

5. Air

ALT CODE

Seed	1	Rock
Sing	2	Shrub
Perch	3	Ground
Green	4	Trees
Flying	5	Air

NET CODE

LIET CODE

1 - SONO/CAL.
2 - GREEN
3 - FLITTY

AL. 6. 61A. 61

1-TP 2	1-TP 3
2-TP 2	2-TP 3
3-TP 2	3-TP 3
4-TP 2	4-TP 3
5-TP 2	5-TP 3



BCCH Black-capped Chickadee
BHCO Brown-headed cowbird
CAFI Cassin's Finch
COYE Common Yellowthroat
CHSP Chipping Sparrow
DUFL Dusky Flycatcher
GRAY Gray Jay

MODO Mourning Dove
MALL Mallard
MOBL Mountain Bluebird
MCWA McGillivray's Warbler
NOFL Northern Flicker
OVEN Ovenbird
RBNU Red-breasted Nuthatch

SOVI Solitary Vireo
SPDA Spotted Sandpiper
SWTH Swainson's Thrush
TOSO Townsend's Solitaire
VGSW Violet Green Swallow
WAVI Warbling Vireo
WETA Western Tanager

WITU Wild Turkey
WTSW White-throated swift
WWPE Western Wood peewee
YRWA Yellow-rumped Warbler

1 Song/Call
2 Seen
3 Flyby

Activity Codes
1 Feed / 1 Rock
2 Sing / 2 Shrub
3 Perch / 3 Ground
4 Preen / 4 Trees
5 Flying/ 5 Air

1st run
6/5/97

PAGE
#1

Time	#	Species	# Detected	Distance	Sex	How detected	Activity
5:10	1	AMRO	1111	30, 50+		1	24
		CHSP	11	50+		1	24
		SOVI		50+		1	24
		BCCH	11	50+		1	24
		WWPE	1	50+		1	24
		YRWA	1	50+		1	24
3 min		PTSI	1	50+		1	24
		WW-Wood PE				1	24
5:21	(2)	WBNH		50+		1	24
		SOVI		50+		1	24
		DUFL	1,1	30+, 30+		1	24
		UNKNOWN #2				1	24
3 min		NOFL		50+		1	24
		MODO		50+		1	24
		DEJU	1,1	50+		1	24
		BHCO		50+		1	55
5:26		WETA					
5:33		WETA					
(3)		DUFL	1	30+		1	24
		YRWA	1	20		1	24
		OVEN	1	40		1	23
3 min		AMRO	1	50+		1	24
		MODO	1	50+		1	24
		DEJU	1	50+		1	24
5:38		WETA		40		1	22
(4) 5:40		CHSP	1	25		1	24
		YRWA	2	50+		1	24
		AMRO	11	50+		1	24
5:51		DUFL	1	50+		1	24
6:02		OVEN	1,1	50+, 50+		1	22
		CHSP	1,1	40+		1	24
		BHCO	1	40		1	24
		DEJU	3	30		2	55
6:07							

wind 5 mph 1st run 6/5/97

Site #	Time	Species	# Detected	Distance	Sex	How detected	Activity
#6	6:15 ¹⁴	DURC	1,1	50+		1	24
		OVEN	1,1	50+		1	23
		CH SP	1	50+		1	24
		TOSO	1			1	24
		RBNU	1			1	24
	6:20	~~unknown~~ DETH	1	50+		1	24
#7	6:27	MODO	1,1	50+		1	24
		AMRO	1,1	50+		1	24
		DURC	1			1	24
		OVEN	1,1	50+		1	24
		CH SP	1,1	50+		1	24
		WITU	1	50+		1	23
		WRNU	1	50+		1	24
	6:32	unknown	rich deep throaty single song	!			
#8	6:38 ³⁰	CH SP		50+		1	24
		DURC	1	40		1	24
		~~SOVI~~ unknown		40		1	24
		OVEN	1,1,1	30, 50+		1	23
		MODO	1	50+		1	24
		DURC	1			1	24
		AMRO	1	50+		1	24
	6:43	BNCO	2	50+	pair	2	24
#9	7:01 ³⁰	CH SP	1	50+		1	24
		DURC	1	50+		1	24
		DETH	1	50+		1	24
		YRWA	1	50+		1	24
		BECH	1	50+		1	24
		unknown					
	7:06 ³⁰	wrenlike whee-whee-whee-whee					
#10	7:16	CH SP	1	30		1	24
		YRWA	1,1	40, 50+		1	24
		DURC	1,1			1	24
		MODO	1			1	24
		AMGO	1	50+		2	55
		RBNU	1	50+		1	24

BOCH Black-capped Chickadee MODO Mourning Dove SOVI Solitary Vireo WITU Wild Turkey 1 Song/Call 1 Feed / 1 Rock
 BHCO Brown-headed cowbird MALL Mallard SPDA Spotted Sandpiper WTSW White-throated swift 2 Seen 2 Sing / 2 Shrub
 CAFE Cassin's Finch MOBL Mountain Bluebird SWTH Swainson's Thrush WWPE Western Wood peewee 3 Flyby 3 Perch / 3 Ground
 COYE Common Yellowthroat MCWA McGillivray's Warbler TOSO Townsend's Solitaire YRWA Yellow-rumped Warbler 4 Preen / 4 Trees
 CHSP Chipping Sparrow NOFL Northern Flicker VGSW Violet Green Swallow 5 Flying/ 5 Air
 DUFL Dusky Flycatcher OVEN Ovenbird WAVI Warbling Vireo 6/5/97
 GRAJ Gray Jay RBNU Red-breasted Nuthatch WETA Western Tanager

#	Time	Species	# Detected	Distance	Sex	How detected	Activity
#11	7:27	OVEN	1			1	23
		MODO	1			1	24
		unknown	1			1	24
		WBNU	1	40		2	24
3 min		WWPE	1	50+		1	24
		unknown	1	40		1	24
		unknown	1	40		1	24
#12	7:40	OVEN	1,1			1	23
		YRWA	1			1	24
		BCCH	1	50		1	24
		unknown	1	50		1	23
		~~WETA~~	~~1~~	~~40~~		~~1~~	~~24~~
		DUFC	1	35		1	24
		unknown	1	40		1	24
		RBNU	1	50		1	24
	7:45	WAVE	1	20		2	24
13	7:54	NOFL	1	50+		1	24
		OVEN	1,1	40, 50+		1	23
		DUFC	1	30		1	24
		SOVI	1	40		1	24
3 min		RBNU	1,1	50+		1	24
		unknown	1				
#14	8:08	CHSP	1	40			
		WAVE	1,1	50+			
		OVEN	1,1	40, 50+			
		WBNU	1	40			
		DUFC	1				
3 min		BCCH	1,1,1	50, 30			
		GRJA	1,1	30		2	55
		AMRO	1	30			
	8:13	BHCO		50+			

AMRO American Robin	HAWO Hairy Woodpecker	RECR Red Crossbill	WBNU White-breasted Nuthatch
BOCH Black-capped Chickadee	MODO Mourning Dove	SOVI Solitary Vireo	WITU Wild Turkey
BHCO Brown-headed Cowbird	MAIL Mallard	SPDA Spotted Sandpiper	WTSW White-throated Swift
CAFI Cassin's Finch	MOBL Mountain Bluebird	SWTH Swainson's Thrush	WWPE Western Wood peewee
COYE Common Yellowthroat	MCWAM McGillivray's Warbler	TOSO Townsend's Solitaire	YRWA Yellow-rumped Warbler
CHSP Chipping Sparrow	NOFL Northern Flicker	VGSW Violet Green Swallow	
DUFL Dusky Flycatcher	OVEN Ovenbird	WAVI Warbling Vireo	
GRAJ Gray Jay	RBNU Red-breasted Nuthatch	WETA Western Tanager	

Detection Codes: 1 Song/Call, 2 Seen, 3 Flyby
 Activity Codes: 1 Feed / 1 Rock, 2 Sing / 2 Shrub, 3 Perch / 3 Ground, 4 Preen / 4 Trees, 5 Flying / 5 Air

1st run 6/5/97
 wind 16 mph / PAGE #1

Site #	Time	Species	# Detected	Distance	Sex	How detected	Activity
#15	8:22 ³⁰	TOSO	1	40		1	24
		RECR	1	40		1	55
		YRWA	1	25		2	55
		OVEN	1,1,1	40, 50		1	23
		RBNU	1	50		1	24
	3 min	DUFL	1	40		1	24
		CHSP	1	45		1	24
#16	8:35	YRWA	1,1	40		1	24
		MODA	1	50		1	24
		WWPE	1,1	50		1	24
		AMRO	1,1	50		1	24
		BHCO	1	40		1	24
		unknown vireo like	1			1	24
#17	8:47	YRWA	1,1,1	30, 40, 50		1	24
		BHCO	1	40		1	24
		AMRO	1,1,1	50+		1	24
		RBNU	1,1	50+		1	24
		WBNU	1	50+		1	24
#20	9:00 ³⁰	MAIL	2	35+	09	2	on pond
		RTHA	1	50+		2	55
		YRWA	2	50+		1	24
#18	9:14 ¹⁵	RBNU	1	50+		1	24
		YRWA	1,1,1	50		1	24
		RETH	1	40		1	24
#19	9:25 ⁴⁴	AMRO		50+		1	24
		TOSO		45		1	24
		unknown				1	24
	9:30 ⁴⁴	BHCO		45		1	24

1 SWAINSON'S THRUSH HEARD IN BETWEEN COAST DRINKS #2 AND #3

AMRO American Robin	HAWO Hairy Woodpecker	RECR Red Crossbill	WBNU White-breasted Nuthatch	Detection Codes	Activity Codes
BCCH Black-capped Chickadee	MODO Mourning Dove	SOVI Solitary Vireo	WITU Wild Turkey	1 Song/Call	1 Feed / 1 Rock
BHCO Brown-headed cowbird	MALL Mallard	SPDA Spotted Sandpiper	WTSW White-throated swift	2 Seen	2 Sing / 2 Shrub
CAFI Cassin's Finch	MOBL Mountain Bluebird	SWTH Swainson's Thrush	WWPE Western Wood peewee	3 Flyby	3 Perch / 3 Ground
COYE Common Yellowthroat	MCWA McGillivray's Warbler	TOSO Townsend's Solitaire	YRWA Yellow-rumped Warbler		4 Preen / 4 Trees
CHSP Chipping Sparrow	NOFL Northern Flicker	VGSW Violet Green Swallow			5 Flying/ 5 Air
DUFL Dusky Flycatcher	OVEN Ovenbird	WAVI Warbling Vireo			
GRJ Gray Jay	RBNU Red-breasted Nuthatch	WETA Western Tanager			

PCI #1 6/26/97

Site #	Time	Species	# Detected	Distance	Sex	How detected	Activity
# 20	5:10 am	AMROB	11	50+		24 1 2	24 13
		MODO	11	30		55 24 2	55 24
		DEJU	11	30		2	13
		OVEN	1	50+		1	24
	3 min	WZUA	11	40		1	24
		WZUA		50			
	2 min	CHSP	1	50			24
# 12	5:22	WZUA	1	40		1	24
		AMROB	1	50+		1	24
	3 min	MODO	1	50+		1	24
	2 min	RENU	1	50		1	24
# 19	5:33	AMROB	11	20		2	24
		MODO	1	50+		1	24
		RENU	1	30		2	24
		CHSP	1	30		1	24
	2 min	WZUA	1	30		2	24
	5:52	SOVI	11	30 150+		1	24
		BCCH	1	30		1	24
		WZUA	11	40 200		1	24
	3 min	AMROB	1	40		1	55
		WZUA	2	30		3	55
		WZUA	1	40		1	24
		CHSP	1	30		1	24
	2 min	COYE	2	50+		1	24
# 2	6:04	DUFL	1	30		1	24
		SOVI	1	40		1	24
	3 min	DEJU	1	30		1	24
		VGSW	1	40		2	55
	2 min	OVEN	1	50+		1	24
# 3	6:16	OVEN	1	40		1	24
		CHSP	1	30 40		1	24
		RENU	11	50		1	24
	3 min	WAVI	1	20		1	24
		MOBL	1	40		1	24
		AMROB	1	40		1	24
	2 min	BCCH	1	30		3	55

AMRO American Robin	HAWO Hairy Woodpecker	RECR Red Crossbill	WBNU White-breasted Nuthatch	Detection Codes	Activity Codes
BCCH Black-capped Chickadee	MODO Mourning Dove	SOVI Solitary Vireo	WITU Wild Turkey	1 Song/Call	1 Feed / 1 Rock
BHCO Brown-headed cowbird	MALL Mallard	SPDA Spotted Sandpiper	WTSW White-throated swift	2 Seen	2 Sing / 2 Shrub
CAFI Cassin's Finch	MOBL Mountain Bluebird	SWTH Swainson's Thrush	WWPE Western Wood peewee	3 Flyby	3 Perch / 3 Ground
COYE Common Yellowthroat	MCWA McGillivray's Warbler	TOSO Townsend's Solitaire	YRWA Yellow-rumped Warbler		4 Preen / 4 Trees
CHSP Chipping Sparrow	NOFL Northern Flicker	VGSW Violet Green Swallow			5 Flying/ 5 Air
DUFL Dusky Flycatcher	OVEN Ovenbird	WAVI Warbling Vireo			
GRAJ Gray Jay	RBNU Red-breasted Nuthatch	WETA Western Tanager			

page 2 of 24

Site #	Time	Species	# Detected	Distance	Sex	How detected	Activity
#4	4:12	CHSP	1	30		1	24
	3 min	WARBLER?	1	40		1	24
	3 min	NOFL	1	30		1	24
#5	7:15	COUE	11	20		1, 2	24
		AMRO	1	50+		1	24
	3 min	DOFL	11	30			24
	3 min	CHSP	1	30			24
#6	6:52	TOSO	1	40			24
		COUE	1	40		1	24
		RBNU	11	40-50		1, 2	14:50
		OVEN	1	40			24
		RECR	1	30		1	24
	3 min	DOFL	1	30			24
		TOSO	1	30		1	24
#7	7:10	DOFL	1	30		1	24
		OVEN	11	50		1	24
		COUE	1	30		1	24
	3 min	AMRO	1	50+		1	24
		YRWA	1	30		1	24
	2 min	CHSP	1	40		1	24
#8	7:23	SOVI	1	40		1	24
		OVEN	11	20-30		1	24
		WETA	1	50		1	24
		YRWA	1	30		1	24
	3 min	AMRO	11	50+		1	24
	2 min	DOFL	1	30		1	24
#9	7:43	YRWA	11	10		1	24
		RBNU	1	50		1	24
		CHSP	1	30		1	24
		DOFL	11	30		1	24
	3 min	TOSO	1	40		1	24
		YRWA	1	30		1	24

AMRO American Robin	HAWO Hairy Woodpecker	RECR Red Crossbill	WBNU White-breasted Nuthatch	Detection Codes	Activity Codes
BCHC Black-capped Chickadee	MODO Mourning Dove	SOVI Solitary Vireo	WITU Wild Turkey	1 Song/Call	1 Feed / 1 Rock
BHCO Brown-headed cowbird	MALL Mallard	SPDA Spotted Sandpiper	WTSW White-throated swift	2 Seen	2 Sing / 2 Shrub
CAFI Cassin's Finch	MOBL Mountain Bluebird	SWTH Swainson's Thrush	WWPE Western Wood peewee	3 Flyby	3 Perch / 3 Ground
COYE Common Yellowthroat	MCWA McGillivray's Warbler	TOSO Townsend's Solitaire	YRWA Yellow-rumped Warbler		4 Preen / 4 Trees
CHSP Chipping Sparrow	NOFL Northern Flicker	VGSW Violet Green Swallow			5 Flying/ 5 Air
DUSK Dusky Flycatcher	OVEN Ovenbird	WAVI Warbling Vireo			
IRAY Iray Jay	RBNU Red-breasted Nuthatch	WETA Western Tanager			

Site #	Time	Species	# Detected	Distance	Sex	How detected	Activity
#10	8:58	PCNA	1	30		1	24
	3min	AMRO	1	50+		1	24
	3min	DUF	1	40		1	24
#11	8:09	CHSP	1	20		1	24
		TOSO	1	40		1	24
		WAVI	1	30		1	24
		COUB	1	20		1	24
	3min	PCNA	1	40		1	24
		PCNA	1	40-50+		1	24
		MCWA	1	30		1	24
	2min	DUF	1	20		1	24
#12	8:22	WAVI	1	30		1	24
		AMRO	11	50-50+		1 + 3	24
		PCNA	1	50		1	24
		WETA	1	50		1	24
		RECR	1	40		3	55
	3min	COUB	1	50+		1	24
	2min	COUB	1	50+		1	24
#13	8:37	OVEN	1	40		1	24
		DUF	1	30		1	24
		NOFL	1	30		2	34
		PCNA	1	40		1	24
	3min	CHSP	1	50+		1	24
		OVEN	1	40		1	24
	2min	PCNA	1	50		1	24
#14	8:42	YRWA	1	30		1	24
		WETA	1	30		1	24
		WAVI	1	30		1	24
		PCNA	1	50	♂	3	55
		CHSP	1	40		1	24
	3min	OVEN	1	40		1	24
	2min	AMRO	1	50+		3	55

AMRO American Robin
 BCCH Black-capped Chickadee
 BHCO Brown-headed cowbird
 CAFE Cassin's Finch
 COYE Common Yellowthroat
 CHSP Chipping Sparrow
 DUFL Dusky Flycatcher
 GRAJ Gray Jay

HAWO Hairy Woodpecker
 MODO Mourning Dove
 MALL Mallard
 MOBL Mountain Bluebird
 MCWA McGillivray's Warbler
 NOFL Northern Flicker
 OVEN Ovenbird
 RBNU Red-breasted Nuthatch

RECR Red Crossbill
 SOVI Solitary Vireo
 SPDA Spotted Sandpiper
 SWTH Swainson's Thrush
 TOSO Townsend's Solitaire
 VGSW Violet Green Swallow
 WAVI Warbling Vireo
 WETA Western Tanager

WBNU White-breasted Nuthatch
 WITU Wild Turkey
 WTSW White-throated swift
 WWPE Western Wood peewee
 YRWA Yellow-rumped Warbler

Detection Codes
 1 Song/Call
 2 Seen
 3 Flyby

Activity Codes
 1 Feed / 1 Rock
 2 Sing / 2 Shrub
 3 Perch / 3 Ground
 4 Preen / 4 Trees
 5 Flying / 5 Air

Site #	Time	Species	# Detected	Distance	Sex	How detected	Activity
#15	9:13	OVEN	11	40		1	24
		TOSO	1	50		1	24
		AMRO	1	30		3	55
	3 min	~~SOVI~~	~~1~~	50		1	24
		TUNU	1	50+		3	55
	2 min	YRWA	1	50+		1	24
#16	9:17	AMRO	1	30		1	24
		TOSO	1	30		1	24
		WAVI	1	50		1	24
		CHSP	1	40		1	24
		WWPE	11	50		1	24
	3 min	COYE	1	30		1	24
		NOFL	1	50+		1	24
	2 min	YRWA	1	50		1	24
#17	9:28	NOFL	1	50		1	24
		WWPE	11	50		1	24
		TOSO	1	50		1	24
	3 min	RECR	1	30		3	55
		COWB	1	50		1	24
		AMRO	1	50		1	24

AMRO American Robin	GRAJ Gray Jay	PISI Pine Siskin	VGSW Violet Green Swallow	Detection Codes	Activity Codes
BCCH Black-capped Chickadee	HAWO Hairy Woodpecker	RBNU Red-breasted Nuthatch	WAVI Warbling Vireo	1 Song/Call	1 Feed / 1 Rock
BHCO Brown-headed cowbird	MODO Mourning Dove	RECR Red Crossbill	WETA Western Tanager	2 Seen	2 Sing / 2 Shrub
CAFI Cassin's Finch	MALL Mallard	SOVI Solitary Vireo	WBNU White-breasted Nuthatch	3 Flyby	3 Perch / 3 Ground
COY Common Yellowthroat	MOBL Mountain Bluebird	SPDA Spotted Sandpiper	WITU Wild Turkey		4 Preen / 4 Trees
CHSP Chipping Sparrow	MCWA McGillivray's Warbler	SWTH Swainson's Thrush	WTSW White-throated swift		5 Flying/ 5 Air
DUF American Goldfinch	NOFL Northern Flicker	TOSO Townsend's Solitaire	WWPE Western Wood peewee		6 mating/ 6 Water
	OVEN Ovenbird		YRWA Yellow-rumped Warbler		7 swimming/ -

Site #	Time	Species	# Detected	Distance	Sex	How detected	Activity
1	5:20	WITU	1	50+	U	1	23
		YRWA	1	<50	U	1	24
		MCGLWA	1	<50	U	1	24
3 min		CHSP	1	50+	U	1	24
3 min		RODO	1	50+	U	1	21
		HANO	1	<50	U	1	24
5 min		AMRO	1	50+	U	1	24
#2	5:35	AMRO	11	<50	U	1	24
		OVEN	1	<50	U	1	23
		YRWA	1	<50	U	1	24
		CHSP	1	<50	U	1	24
		NOFL	#1	50+ ~~40~~	U	1 #2	24
3 min		MCDO	1	50+	U	1	24
5 min		NOFL	1	<50	U	1	24
#3	5:47	~~WBNU~~ ~~YRWA~~ OVEN	11	50+	U	1	24
			11	50+ ~~30~~	U	1	24
					U	1	24
3 min		DUF	1	<50	U	1	24
5 min							
#4	5:59	YRWA	1	<50	U	1	24
		BHCO	1	<50	U	1	24
3 min		MCGLWA	1	<50	U	1	24
5 min							
#5	6:13	AMRO	1	50+	U	1	24
		WETA	1	<50	U	1	24
3 min		CHSP	1	<50	U	1	24
5 min		YRWA	1	<50	U	1	24
#6	6:30	~~OVEN~~ ~~YRWA~~ WBNU		50+	U	1	23
				50+	U	1	24
3 min		YRWA		50+	U	1	24
		CHSP		<50	U	1	24
5 min		DUF		50+	U	1	24
#7	6:40	WBNU		50+	U	1	24
3 min		OVEN		50+	U	1	23

AMRO American Robin
 BCCH Black-capped Chickadee
 BHCO Brown-headed cowbird
 CAFI Cassin's Finch
 COYE Common Yellowthroat
 CHSP Chipping Sparrow
 DUFL Dusky Flycatcher
 AMGO American Goldfinch

GRAJ Gray Jay
 HAWO Hairy Woodpecker
 MODO Mourning Dove
 MALL Mallard
 MOBL Mountain Bluebird
 MCWA McGillivray's Warbler
 NOFL Northern Flicker
 OVEN Ovenbird

PISI Pine Siskin
 RBNU Red-breasted Nuthatch
 RECR Red Crossbill
 SOVI Solitary Vireo
 SPDA Spotted Sandpiper
 SWTH Swainson's Thrush
 TOSO Townsend's Solitaire

VGSW Violet Green Swallow
 WAVI Warbling Vireo
 WETA Western Tanager
 WBNU White-breasted Nuthatch
 WITU Wild Turkey
 WTSW White-throated swift
 WWPE Western Wood peewee
 YRWA Yellow-rumped Warbler

Detection Codes
 1 Song/Call
 2 Seen
 3 Flyby

Activity Codes
 1 Feed / 1 Rock
 2 Sing / 2 Shrub
 3 Perch / 3 Ground
 4 Preen / 4 Trees
 5 Flying/
 6 mating/
 7 swimming

6/5/98

Site #	Time	Species	# Detected	Distance	Sex	How detected	Activity
#8	6:02	OVEN	11	450			23
		WETA	1	50			20
		CHSP	1	50			20
		SOVI	11	450			20
		NOFL	1	500			20
		WETA	1	50			20
	3:00	OVEN		500			20
	5:00	OVEN	1	500			20
#9	7:00	OVEN	11	450			
		OVEN		50			20
		OVEN		50			20
	3:00	OVEN	1	50			20
	5:00						
#10	7:25	OVEN	11	450			20
		OVEN	5	50	2	2	20
	3:00	OVEN		450	1	2	20
	5:00	OVEN		500			
#11	7:37	OVEN	1	450			
		OVEN		500			
		OVEN		500			
		OVEN	1				
		OVEN	1	500			20
	2:00	OVEN					
	5:00	OVEN					
#12	7:50	OVEN	1	500			
		OVEN	11	450			
		CHSP	1	450			
		OVEN	11	450	2	1	23
	3:00	OVEN	1	50	2	1	20
	5:00						

6/5/92

AMRO American Robin
 BCCH Black-capped Chickadee
 BHCO Brown-headed cowbird
 GAFL Cassin's Finch
 COYE Common Yellowthroat
 CHSP Chipping Sparrow
 DUSKY Dusky Flycatcher
 A American Goldfinch

GRAJ Gray Jay
 HAWO Hairy Woodpecker
 MODO Mourning Dove
 MALL Mallard
 MOBL Mountain Bluebird
 MCWA McGillivray's Warbler
 NOFL Northern Flicker
 OVEN Ovenbird

PISI Pine Siskin
 RBNU Red-breasted Nuthatch
 RECR Red Crossbill
 SOVI Solitary Vireo
 SPDA Spotted Sandpiper
 SWTH Swainson's Thrush
 TOSO Townsend's Solitaire

VGSW Violet Green Swallow
 WAVI Warbling Vireo
 WETA Western Tanager
 WBNU White-breasted Nuthatch
 WITU Wild Turkey
 WTSW White-throated swift
 WWPE Western Wood peewee
 YRWA Yellow-rumped Warbler

Detection Codes
 1 Song/Call
 2 Seen
 3 Flyby

Activity Codes
 1 Feed / 1 Rock
 2 Sing / 2 Shrub
 3 Perch / 3 Ground
 4 Preen / 4 Trees
 5 Flying/ 5 Air
 6 mating/ 6 Water
 7 swimming/ -

Site #	Time	Species	# Detected	Distance	Sex	How detected	Activity
# 3	5:10	OVEN	11	50+			23
		CHSP	1	50+			24
		MALL	1	50+			24
		SOVI		50+			24
	2 min	OVEN	1	50+			24
	5						
# 4	5:10	CHSP	1	50+			24
		CHSP				2	24
		SOVI					24
		OVEN					24
		OVEN					24
		OVEN	4	50+		2	24
		OVEN	1	50+		2	24
	5:10						
~~5:10 - 5:15~~							
# 5	5:10	OVEN	1	50+			24
		SOVI	1	50+			24
		CHSP		50+			24
	5:10	YRWA	1	50+			24
# 6	5:15	AMRO	1	50+			24
		YRWA	1	50+			24
	3 min	CAFI	1	50+			24
→ 10:00	5:10	RECR	11	50+	3	2	24
		AMRO	1	50+	2	1	24
# 17	9:58	WETA	1	50+	2	1	24
		SOVI	1	50+	11	1	24
		CAFI	1	50+	2	1	24
	3 min	YRWA	1	50+	11	1	24
# 20	9:10	YRWA	1	50+	2	2	24
		MALL	1	50+	3	2	24
		CHSP	3	50+	2	1	24
	3 min	YRWA	1	50+	2	1	24
	9:10						

AMRO American Robin
BCCH Black-capped Chickadee
BHCO Brown-headed cowbird
CAFI Cassin's Finch
COYE Common Yellowthroat
CHSP Chipping Sparrow
DUFL Dusky Flycatcher
AMGO American Goldfinch

GRAJ Gray Jay
HAWO Hairy Woodpecker
MODO Mourning Dove
MALL Mallard
MOBL Mountain Bluebird
MCWA McGillivray's Warbler
NOFL Northern Flicker
OVEN Ovenbird

PISI	Pine Siskin
RBNU	Red-breasted
Nuthatch	
RECR	Red Crossbill
SOVI	Solitary Vireo
SPDA	Spotted Sandpiper
SWTH	Swainson's Thrush
TOSO	Townsend's Solitaire

VGSW Violet Green Swallow
WAVI Warbling Vireo
WETA Western Tanager
WBNU White-breasted Nuthatch
WITU Wild Turkey
WTSW White-throated swift
WWPE Western Wood peewee
YRWA Yellow-rumped Warbler

Detection Codes
1 Song/Call
2 Seen
3 Flyby

Activity Codes

1 Feed	1 Rock
2 Sing	2 Shrub
3 Perch	3 Ground
4 Preen	4 Trees
5 Flying	
6 mating	
7 swimmin.	

[illegible]

AMRO American Robin	GRAJ Gray Jay	PISI Pine Siskin	VGSW Violet Green Swallow	Detection Codes	Activity Codes
BCCH Black-capped Chickadee	HAWO Hairy Woodpecker	RBNU Red-breasted	WAVI Warbling Vireo	1 Song/Call	1 Feed / 1 Rock
BHCO Brown-headed cowbird	MODO Mourning Dove	Nuthatch	WETA Western Tanager	2 Seen	2 Sing / 2 Shrub
CAFI Cassin's Finch	MALL Mallard	RECR Red Crossbill	WBNU White-breasted Nuthatch	3 Flyby	3 Perch / 3 Ground
COYE Common Yellowthroat	MOBL Mountain Bluebird	SOVI Solitary Vireo	WITU Wild Turkey		4 Preen / 4 Trees
CHSP Chipping Sparrow	MCWA McGillivray's Warbler	SPDA Spotted Sandpiper	WTSW White-throated swift		5 Flying/ 5 Air
DUFL Dusky Flycatcher	NOFL Northern Flicker	SWTH Swainson's Thrush	WWPE Western Wood peewee		6 mating/ 6 Water
American Goldfinch	OVEN Ovenbird	TOSO Townsend's Solitaire	YRWA Yellow-rumped Warbler		7 swimming/ -

Site #	Time	Species	# Detected	Distance	Sex	How detected	Activity
8	5:20	SOVI	11	<50 50+	unk	1	~~24~~ 24
		OVEN	11	<50 50+	unk	1	~~23~~ 23
		JUNCO	1	<50	unk	1	24
	3min	WBNU	1	50+	unk	1	24
	3min	VGSW	1	<50	unk	2	55
		GOFI	1	50+	unk	1	24
		CHSP	1	50+	unk	1	24
		~~BCCH~~	1	50+	unk	1	24
		DUFL	1	50+	unk	1	24
	5min	RBNU	1	50+	unk	1	24
9	5:40	OVEN	1	<50	unk	1	23
		DUFL	1	50+	unk	1	24
		YRWA	1	50+	unk	1	24
		AMRO	1	50+	unk	1	24
	3min	RECR	1	<50		2	55
		SOVI	1	<50	unk	1	24
	5min	NOFL	1	50+	unk	1	24
10	5:53	WBNU	1	50+	unk	1	24
		MOBL	1	<50	unk	1	24
		SOVI	1	50+	unk	1	24
		DUFL	1	50+	unk	1	24
	3min	MODO	1	50+	unk	1	24
		RECR	1	<50	unk	1	24
		AMRO	1	50+	unk	1	24
	5min	JUNCO	1	<50	unk	1	24
11	6:07	VGSW	1	<50	unk	2	34
		AMRO	2	<50	♂ ♂	2	34/55
		MODO	11	<50, 50+	unk	1	24
		RECR	11	<50	unk	1	24
		NOFL	1	50+	unk	1	24
		CHSP	2	<50	unk	2	34
	3min	OVEN	1	50+	unk	1	24
	5min	DUFL	1	<50	unk	1	34

AMRO American Robin	GRAJ Gray Jay	PISI Pine Siskin	VGSW Violet Green Swallow	Detection Codes	Activity Codes
BCCH Black-capped Chickadee	HAWO Hairy Woodpecker	RBNU Red-breasted Nuthatch	WAVI Warbling Vireo	1 Song/Call	1 Feed / 1 Rock
BHCO Brown-headed cowbird	MODO Mourning Dove	RECR Red Crossbill	WETA Western Tanager	2 Seen	2 Sing / 2 Shrub
CAFI Cassin's Finch	MALL Mallard	SOVI Solitary Vireo	WBNU White-breasted Nuthatch	3 Flyby	3 Perch / 3 Ground
COYE Common Yellowthroat	MOBL Mountain Bluebird	SPDA Spotted Sandpiper	WITU Wild Turkey		4 Preen / 4 Trees
CHSP Chipping Sparrow	MCWA McGillivray's Warbler	SWTH Swainson's Thrush	WTSW White-throated swift		5 Flying / 5
DUFL Dusky Flycatcher	NOFL Northern Flicker	TOSO Townsend's Solitaire	YWPE Western Wood peewee		6 mating /
AMGO American Goldfinch	OVEN Ovenbird		YRWA Yellow-rumped Warbler		7 swimming

Site #	Time	Species	# Detected	Distance	Sex	How detected	Activity
12	6:20	AMRO	1	<50	unk	1	24
		~~RBNU~~	1	50+	unk	1	24
		DUFL	1	<50	unk	1	24
		OVEN	1	<50	unk	1	23
	3min	WBNU	1	50+	unk	1	24
		CHSP	1	<50	unk	1	24
	5min	DEJL	1	<50	unk	1	24
13	6:33	OVEN	1	<50	unk	1	24
		BCCH	1	<50	unk	1	24
		YRWA	1	<50	unk	1	24
		CHSP	1	<50	unk	1	24
	3min	EMPFL	1	<50	unk	2	34
		NOFL	1	50+	unk	1	24
	5min	WBNU	1	50+	unk	1	24
14	6:44	SOVI	1	<50	unk	1	24
		OVEN	11	<50, 50+	unk	2	23
		~~RBNU~~	11	50+	unk	1	24
		BCCH	11	<50	unk	1	24
		DUFL	1	<50	unk	1	24
	3min	MODO	1	50+	unk	1	24
		~~AMRO~~	1	50+	unk	1	24
		BHCO	1	<50	unk	1	24
	5min	RECR	11	50+	unk	1	24
15	6:58	DUFL	1	<50	unk	1	24
		RBNU	~~11~~ 11	50+	unk	1	24
		OVEN	~~5~~ 1	<50	unk	1	~~23~~ 23
		BCCH	11	<50	unk	1	24
		YRWA	11	<50	unk	1	24/34
		CHSP	1	<50	unk	2	34
	3min	WBNU	1	<50	unk	2	55/34
		SOVI	1	50+	unk	1	24
	5min	WBNU	1	<50	unk	1	24

AMRO American Robin
 BCCH Black-capped Chickadee
 BHCO Brown-headed cowbird
 CAFE Cassin's Finch
 COVE Common Yellowthroat
 CHSP Chipping Sparrow
 DUSK Dusky Flycatcher
 AMGL American Goldfinch

GRAJ Gray Jay
 HAWO Hairy Woodpecker
 MODO Mourning Dove
 MALL Mallard
 MOBL Mountain Bluebird
 MCWA McGillivray's Warbler
 NOFL Northern Flicker
 OVEN Ovenbird

PISI Pine Siskin
 RBNU Red-breasted Nuthatch
 RECR Red Crossbill
 SOVI Solitary Vireo
 SPDA Spotted Sandpiper
 SWTH Swainson's Thrush
 TOSO Townsend's Solitaire

VGSW Violet Green Swallow
 WAVI Warbling Vireo
 WETA Western Tanager
 WBNU White-breasted Nuthatch
 WITU Wild Turkey
 WTSW White-throated swift
 WWPE Western Wood peewee
 YRWA Yellow-rumped Warbler

Detection Codes
 1 Song/Call
 2 Seen
 3 Flyby

Activity Codes
 1 Feed / 1 Rock
 2 Sing / 2 Shrub
 3 Perch / 3 Ground
 4 Preen / 4 Trees
 5 Flying/ 5 Air
 6 mating/ 6 Water
 7 swimming/ -

6/22/15

Site #	Time	Species	# Detected	Distance	Sex	How detected	Activity
16	7:11	BHCO	1	<50	unk	1	24
		RBNU	1	50+	unk	1	24
		YRWA	1	50+	unk	1	24
		AMRO	1	50+	unk	1	24
		WBNU	1	50+	unk	1	24
	3min	MOBL	1	50+	unk	1	24
		RECR	11	<50	unk	1	24
		YRWA	1	<50	unk	1	24
17	7:23	YRWA	1	50+	unk	1	24
		RBNU	1	50+	unk	1	24
		WHA? WOOD	1	<50	unk	1	24
		GRJA	11	<50	unk	2	34
	3min	~~RECR~~					
	5min	RECR	1	<50	unk	1	24/55
	7:38	YRWA	1	50+	unk	1	24
		MOBL	1	50+	unk	1	24
		MALL	1111 (DUCK LINGS)	<50	unk	2	33
	min. 3:22	RECR	1	50+	unk	1	25
	5min	RECR	2	<50	unk	2	55
#18	~~7:52~~	DEJL	1	<50	unk	1	24
	7:52	RECR	1	<50	unk	1	24
		BCCH	1	50+	unk	1	24
	3min	YRWA	1	<50	unk	1	24
	5min	~~NOFL~~	1	~~50+~~	~~unk~~	~~1~~	~~24~~
#19	8:03	YRWA	1		unk	1	24
		NOFL	1	<50	unk	1	24
		CHSP	11	<50, 50+	unk	2/1	34/24
		BCCH	1	50+	unk	1	24
	3min	AMRO	1	50+	unk	1	24
	5min	CAFI	1	<50	♂	2	34

AMRO American Robin
 BCCH Black-capped Chickadee
 BHCO Brown-headed cowbird
 CAFE Cassin's Finch
 COYE Common Yellowthroat
 CHSP Chipping Sparrow
 DUFL Dusky Flycatcher
 AMGO American Goldfinch

GRAJ Gray Jay
 HAWO Hairy Woodpecker
 MODO Mourning Dove
 MALL Mallard
 MOBL Mountain Bluebird
 MCWA McGillivray's Warbler
 NOFL Northern Flicker
 OVEN Ovenbird

PISI Pine Siskin
 RBNU Red-breasted
 Nuthatch
 RECR Red Crossbill
 SOVI Solitary Vireo
 SPDA Spotted Sandpiper
 SWTH Swainson's Thrush
 TOSO Townsend's Solitaire

VGSW Violet Green Swallow
 WAVI Warbling Vireo
 WETA Western Tanager
 WBNU White-breasted Nuthatch
 WITU Wild Turkey
 WTSW White-throated swift
 WWPE Western Wood peewee
 YRWA Yellow-rumped Warbler

Detection Codes
 1 Song/Call
 2 Seen
 3 Flyby

Activity Codes
 1 Feed ? 1 Rock
 2 Sing / 2 Shrub
 3 Perch / 3 Ground
 4 Preen / 4 Trees
 5 Flying/ 5
 6 mating/
 7 swimming

Site #	Time	Species	# Detected	Distance	Sex	How detected	Activity
#1	8:22	YRWA	1	<50	unk	1	24
		CHSP	1	<50	unk	2	24
		PISI	1	<50	unk	1	24
		TUVU	11	50+	unk	2	55
	3min	EMP. FLY	1	<50	unk	2	24
	5min						
#2	8:33	PISI	1	<50	unk	1	24
		WBNU	1	50+	unk	1	24
		SOVI	1	<50	unk	1	24
		VISW	1	50+	unk	1	55
		AMRO	1	50+	unk	1	24
		DETUNCO	1	<50	unk	1	24
	3min	DUFL	1	<50	unk	1	24
		YRWA	1	<50	unk	1	24
	5min	RBNU	1	<50	unk	1	24
		SAC HAWY WOODPECKER	1	<50	unk	2	34
		BEFORE #3 (OUTSIDE POINT COUNT TIME)					
#3	8:45	OVEN	1	<50	unk	1	23
		YRWA	1	<50	unk	1	24
		CHSP	11	<50	unk	1/2	24/34
		WAVI	1	50+	unk	1	24
	3min	RECR	11	<50	unk	1	24
	5min	BCCH	1	50+	unk	1	24
#4	8:58	OVEN	1	<50	unk	1	23
		SOVI	1	<50	unk	1	24
		YRWA	1	<50	unk	1	24
	3min	DUFL	1	<50	unk	1	24
	5min						
#5	9:13	BCCH	1	<50	unk	2	34
		CHSP	11	<50	unk	1/2	24/34
		DUFL	1	<50	unk	1	24
		YRWA	1	<50	unk	2	34
		AMRO	11	<50	♂ x	2	55
		NOFL	1	<50	unk	2	55
	3min	DUFL	1	<50	unk	2	24
		OVEN	1	<50	unk	1	24



AMRO American Robin	GRAJ Gray Jay	PISI Pine Siskin	VGSW Violet Green Swallow	Detection Codes	Activity Codes
BCCH Black-capped Chickadee	HAWO Hairy Woodpecker	RBNU Red-breasted Nuthatch	WAVI Warbling Vireo	1 Song/Call	1 Feed / 1 Rock
BHCO Brown-headed cowbird	MODO Mourning Dove	RECR Red Crossbill	WETA Western Tanager	2 Seen	2 Sing / 2 Shrub
CAFI Cassin's Finch	MALL Mallard	SOVI Solitary Vireo	WBNU White-breasted Nuthatch	3 Flyby	3 Perch / 3 Ground
COYE Common Yellowthroat	MOBL Mountain Bluebird	SPDA Spotted Sandpiper	WITU Wild Turkey		4 Preen / 4 Trees
CHSP Chipping Sparrow	MCWA McGillivray's Warbler	SWTH Swainson's Thrush	WTSW White-throated swift		5 Flying/ 5 Air
Dusky Flycatcher	NOFL Northern Flicker	TOSO Townsend's Solitaire	WWPE Western Wood peewee		6 mating/ 6 Water
American Goldfinch	OVEN Ovenbird		YRWA Yellow-rumped Warbler		7 swimming/ -

Site #	Time	Species	# Detected	Distance	Sex	How detected	Activity
14	9:02am	OVEN	1	<50	unk	1	23
		RECR	11	50+	unk	1	24
		AMRO	1	50+	unk	1	24
		DEJU	1	50+	unk	1	24
		YRWA	1	50+	unk	1	24
	3min	WAVI	1	50+	unk	1	24
		WETA	1	50+	unk	1	24
	5min	DEJU	1	<50	unk	1	24
#15	9:16am	YRWA	1	50+	unk	1	24
		AMRO	111	<50	unk	1/2	24/34
		DEJU	1	50+	unk	1	24
		PISI	1	<50	unk	1	24
		OVEN	1	50+	unk	1	24
		CHSP	1	<50	unk	1	24
	3min	RECR	1	<50	unk	1	24
		RBNU	1	50+	unk	1	24
	5min	YRWA	1	<50	unk	1	24
#16	9:23am	waited for a large truck to leave maintenance yard					
	9:35am	SOVI	1	<50	unk	1	24
		AMRO	11	50+	unk	1/2	24/34
		YRWA	1	50+	unk	1	24
		RBNU	1	50+	unk	1	24
		RECR	1	<50	unk	1	24
	3min	WWPE	1	50+	unk	1	24
		VGSW	1	<50	unk	2	24
		~~XXXX~~					
	5min	MOBL	1	50+	unk	1	24
#17	9:50	RBNU	1	50+	unk	1	24
		WWPE	1	50+	unk	1	24
		RECR	11	<50	unk	1/2	24/55
		AMRO	1	50+	unk	1	24
	3min	YRWA	1	50+	unk	1	24
	5min	—					

Activity Codes
1 Feed 1 Rock
2 Sing 2 Shrub
3 Perch 3 Ground
4 Preen 4 Trees
5 Flying/ 5 Air
6 mating/ 
7 swimmin

Site #	Time	Species	# Detected	Distance	Sex	How detected	Activity
#10	8:06	DULFL	11 <50 →		unk	1	24
		AMRO	1 50+ →		unk	1	24
		MODD	1 50+ →		unk	1	24
	3min	RECR	1 <50 →		unk	1	24
		BECH	1 50+ →		unk	1	24
	5min	CAFI (?)	1 <50 →		unk	1	24
#11	8:18	CHSP	1 <50 →		unk	1	24
		DULFL	1 <50 →		unk	1	24
		BECH	1 50+ →		unk	1	24
		AMRO	11	# 50+	unk	1	24
		WAVI	11 ~~24~~	<50	unk	1/2	24/34
		RBNH	1	50+	unk	1	24
		RECR	1	<50	unk	1	24
		DEJUL	1	<50	unk	1	24
		BHCO	11	<50	unk	1	24
	3min	MCWA	1	<50	unk	2	24
	5min	WBNH	1	50+	unk	1	24
#12	8:31	OVEN	1	<50	unk	1	24
		DULFL	1	<50	unk	1	24
		WAVI	1	<50	unk	1	24
		BECH	1	50+	unk	1	24
		AMRO	11	<50	unk	1/2	24/55
		PISI	11	<50	unk	2	24
		YRWA	1	<50	unk	1	24
	3min	RECR	1	<50	unk	1	24
	5min	MCWA	1	<50	♂	2	34
#13	8:50am	DEJUL	11	<50	unk	1	24
		OVEN	1	50+	unk	1	24
		DULFL	11	<50, 50+	unk	1	24
	3min	AMRO	1	<50	unk	2	34
	5min						

AMRO American Robin
 BCCH Black-capped Chickadee
 BHCO Brown-headed cowbird
 CAFE Cassin's Finch
 COYE Common Yellowthroat
 CHSP Chipping Sparrow
 Dusky Flycatcher
 American Goldfinch

GRAJ Gray Jay
 HAWO Hairy Woodpecker
 MODO Mourning Dove
 MALL Mallard
 MOBL Mountain Bluebird
 MCWA McGillivray's Warbler
 NOFL Northern Flicker
 OVEN Ovenbird

PISI Pine Siskin
 RBNU Red-breasted Nuthatch
 RECR Red Crossbill
 SOVI Solitary Vireo
 SPDA Spotted Sandpiper
 SWTH Swainson's Thrush
 TOSO Townsend's Solitaire

VGSW Violet Green Swallow
 WAVI Warbling Vireo
 WETA Western Tanager
 WBNU White-breasted Nuthatch
 WITU Wild Turkey
 WTSW White-throated swift
 WWPE Western Wood peewee
 YRWA Yellow-rumped Warbler

Detection Codes
 1 Song/Call
 2 Seen
 3 Flyby

6/29/96
 Activity Codes
 1 Feed / 1 Rock
 2 Sing / 2 Shrub
 3 Perch / 3 Ground
 4 Preen / 4 Trees
 5 Flying/ 5 Air
 6 mating/ 6 Water
 7 swimming/ -
 8 DRUMMING

Site #	Time	Species	# Detected	Distance	Sex	How detected	Activity
20	5:04	MALL	6 DUCKLINGS	<50	unk	2	76
		BCCH	11	<50	unk	1	24
		CHSP	1	<50	unk	1	24
		RBNU	1	50+	unk	1	24
	3 min	NIGHTHAWK (NIHA)	1	<50	-V	2	55
	5 min	MODO	1	50+	unk	1	24
18	5:17	RECR	1	<50	unk	1	24
		DEJU	1	50+	unk	1	24
		YRWA	1	<50	unk	1	24
	3 min	(BHCO) COBI 2	1	<50	unk	1	24
		RECR	1	<50	unk	1	24
	5 min	TOSO	1	50+	unk	1	24
19	5:30	NOFL	1	50+	unk	1	84
		AMRO	1	<50	unk	1	24
		RECR	1111	<50	unk	1/2	24/
		MODO	1	50+	unk	1	24
		CHSP	1	50+	unk	1	24
	3 min	YRWA	1	<50	unk	1	24
	5 min	CHSP	1	<50	unk	1	24
PASQUE FLOWER BLOOMING! AT #19							
#1	5:50	-----					
		OVEN	1	<50	unk	1	24
		WBNU	1	50+	unk	1	24
		MODO	1	50+	unk	1	24
		RBNU	1	50+	unk	1	24
	3 min	WTSW	11	<50	unk	1	24

		AMRO	1	<50	unk	1	24
		DU FL	1	<50	unk	1	24



AMRO American Robin
 BCCH Black-capped Chickadee
 BHCO Brown-headed cowbird
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Detection Codes
 1 Song/Call
 2 Seen
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Activity Codes
 1 Feed / 1 Rock
 2 Sing / 2 Shrub
 3 Perch / 3 Ground
 4 Preen / 4 Trees
 5 Flying/ 5 Air
 6 mating/ 6 Water
 7 swimming/ -

Site #	Time	Species	# Detected	Distance	Sex	How detected	Activity
6	6:57	OVEN	1	<50	unk	1	24
		CHSP	11	50+	unk	1	24
		DEJU	1	<50	unk	1	24
		AMRO	1	50+	unk	1	24
		YRWA	1	<50	unk	1	24
		WAVI	1	<50	unk	1	24
	3min	RECR	1	50+	unk	1	24
	5min						
#7	7:08	CHSP	1	<50	unk	1	24
		DEJU	1	<50	unk	1	24
		AMRO	1	<50	unk	1	24
		YRWA	1	50+	unk	1	24
		RECR	11	50+	unk	1	24
	3min	RBNU	1	50+	unk	1	24
	5min						
8	7:18am	OVEN	1	<50	unk	1	24
		SOVI	1	<50	unk	1	24
		CHSP	1	<50	unk	1	24
		BCCH	1	<50	unk	1	24
		DEJU	1	<50	unk	1	24
		TOSO	1	50+	unk	1	24
	3min	NOGO (GOSHAWK)	1	<50	♂	2/55/34	34/55/34
	5min						
#9	7:50	CHSP	1	<50	unk	1	24
		OVEN	1	<50	unk	1	24
		DLFL	1	<50	unk	1	24
		DEJU	1	<50	unk	2	55
		YRWA	1	50+	unk	1	24
		RECR	111	50+	unk	1	24
		DOWO	1	50+	unk	1	24
	3min						
	5min						

