

**INVENTORY AND MONITORING of  
AVIAN MANAGEMENT INDICATOR SPECIES for the  
MEDICINE BOW NATIONAL FOREST, WYOMING**

***YEAR TWO PROGRESS REPORT***

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## INTRODUCTION

This report provides second-year results (i.e., data collected during summer 2006) of a five-year songbird inventory and monitoring effort. The Wyoming Natural Diversity Database (WYNDD) conducted a stratified random sample of two target habitats and a control group on portions of the Medicine Bow National Forest (MBNF) in the Sierra Madre Mountains, Medicine Bow Mountains, and Laramie Mountains. Target habitats were 1) medium to high elevation conifer forests dominated by spruce and fir; and 2) riparian zones with a high percentage of Willow (*Salix* spp.). Control sites were randomly selected from across the forest. The goal of the five-year study is to provide distribution and density estimates of four avian management indicator species (MIS); Golden-crowned Kinglet (*Regulus satrapa*), Wilson’s Warbler (*Wilsonia pusilla*), Lincoln’s Sparrow (*Melospiza lincolnii*), and American Three-toed Woodpecker (*Picoides dorsalis*). For regional consistency the design and methods of this study are based on the Rocky Mountain Bird Observatory (RMBO) Point Transect Protocol (Leukering et al. 2005).

## ***METHODS***

Methods were addressed in detail in the first season's progress report (Keinath et al. 2006) and are summarized herein. For the second year efforts, avian surveys were conducted in June and early July of 2006 on the Medicine Bow National Forest of southeastern Wyoming (Figure 1). The majority of the study took place on the Brush Creek-Hayden and Laramie ranger districts. One control transect was located on the Laramie Peak unit of the Douglas ranger district.

An initial list of transect starting points was provided to WYNDD by the Forest Service at the outset of the study. Transects fell into three categories based on predominant habitat: spruce-fir, riparian-willow and randomly placed control transects. A total of 25 transects were selected and surveyed in 2005 (10 spruce-fir, 10 riparian, 5 random). Surveys were repeated on these transects in 2006, although slight modifications were made for logistical reasons. Riparian transect 6 (R06) was surveyed in 2005, but road noise from a nearby highway compromised point counts on this transect, so it was replaced in 2006 by riparian transect 8 (R08). Locations of selected individual points some other transects were moved in 2006 to increase observer safety on those transects (i.e., to avoid dangerously steep slopes or river crossings). We expect the resulting slate of transects and points to remain unchanged for the duration of this study.

Point count methods generally followed those described in the RMBO Point Transect Protocol, which was last revised in March, 2005 (Leukering et al. 2005). Each transect was composed of 15 listening points spaced approximately 250 meters apart. At each point, observers recorded GPS coordinates and documented general habitat and weather conditions. Each point count was five minutes in duration, during which time all avian species detected within 100 meters were recorded. Methods were modified in 2006 to record in which half of the 5-minute survey period woodpecker detections occurred. In addition to point count surveys, MIS detections were documented while walking between points on each transect, as per the low density target species protocol noted by Leukering et al. (2005). During this study all counts were conducted between roughly 5:30 am and 11:00 am. Rain, wind and traffic noise can hinder bird detection, and often result in subdued avian behavior. Point counts were not conducted if wind exceeded 18 mph, or a

4 on the Beaufort wind scale (wind raises dust, leaves, loose paper; small branches in motion). Point counts were suspended if precipitation exceeded a drizzle, if snowfall noticeably subdued bird behavior, or if traffic noise obscured bird detections.

## ***RESULTS AND DISCUSSION***

As stated in the introduction, the primary goal of this five-year study is to develop density estimates for four management indicator species. As demonstrated below, inter-year variability in bird abundance can be large, so this analysis requires the full dataset and therefore will not be performed until the final year. Thus, this progress report presents a simple accounting of the data collected to date.

### **Summary of Data**

Maps of MIS detections during point count transects are shown in Figures 2 – 5 with associated detection numbers reported in Table 1. All MIS were detected more frequently in 2006 than in 2005. In fact, detections of American Three-toed Woodpecker, Golden-crowned Kinglet, and Lincoln's Sparrow approximately doubled, while those for Wilson's Warbler increased by about 30%. However, the ranked relative abundance of these species remained the same. Lincoln's Sparrow was most frequently detected (266 observations), followed by Wilson's Warbler (179 observations), then Golden-crowned Kinglet (74 observations) and American Three-toed Woodpecker (41 observations). As before, each species showed clear preference at the scale of transects; Golden-Crowned Kinglets and American Three-toed Woodpeckers being found predominantly on spruce-fir transects, while Wilson's Warblers and Lincoln's Sparrows were found mostly on riparian transects.

Inter-year differences in observations seem fairly high, making sample size very important in determining trends. As in 2005, we suspect that this study will generate sufficient information to estimate densities for Lincoln's Sparrow and Wilson's Warbler, but that sample size will be marginal for Golden-crowned Kinglet and Three-toed Woodpecker.

A summary of all 2006 observations are presented in Table 2. 4,030 observations were made during formal point-counts transects in 2006, which is nearly double the number of observations in 2005. As in 2005, the two most commonly encountered species were Ruby-crowned Kinglet (471 observations covering all transects), followed by Yellow-rumped Warbler (324 observations). Pine Siskin was the third most observed bird in 2006 (298 observations – up from 84 in 2005) followed by Lincoln's Sparrow (266 observations), Dark-eyed Junco (239 observations) and American Robin (214 observations). Wilson's Warbler dropped out of the top 5 in 2006, being the 8<sup>th</sup> most seen bird (179 observations). On the opposite end of the spectrum, 12 species were represented by only one observation in 2006 (see Table 2).

During point counts, 18 new species were seen in 2006: American Redstart, Brown-capped Rosy-Finch, Blue Grouse, Band-tailed Pigeon, Canada Goose, California Gull, Cooper's Hawk, Common Merganser, Hammond's Flycatcher, Killdeer, Lazuli Bunting, Least Flycatcher, Osprey, Ovenbird, Ring-necked Duck, Tree Swallow, Willow Flycatcher, and Wild Turkey. On the other hand, 9 species observed during point counts in 2005 were not observed in 2006: American Crow, Belted Kingfisher, Black-headed Grosbeak, Great Horned Owl, Lark Sparrow, Sandhill Crane, Say's Phoebe, Sharp-shinned Hawk, and Virginia's Warbler.

## **A Note on Surveys and Personnel**

The management indicator species selected for this project make the selection of field personnel critical, as they are not easy to audibly distinguish by in-experienced birders. Since MIS were not selected for their ease of identification and detection, it is critical that personnel be thoroughly screened for their abilities to detect and distinguish each of these four species. Further, to minimize variability in detection, continuity of training should be maintained throughout the course of the 5 year study. For instance:

1. The distinctive, high-pitched song of the Golden-crowned Kinglet cannot be detected by people who have difficulty hearing high-frequency sounds. Conversely, portions of the song of the very common Ruby-crowned Kinglet are similar to the Golden-crowned Kinglet and can be confused by someone without experience. Given the apparently low abundance of Golden-crowned

Kinglets on the selected transects, potentially significant biases could occur unless field personnel have a) appropriate auditory capabilities and b) a precise ability to filter out calls of similar species.

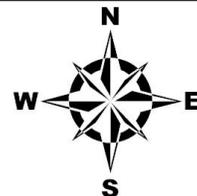
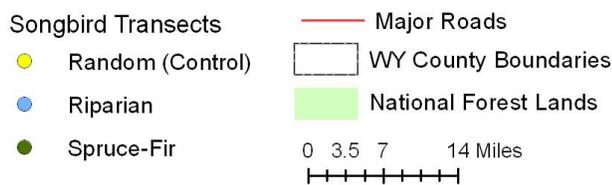
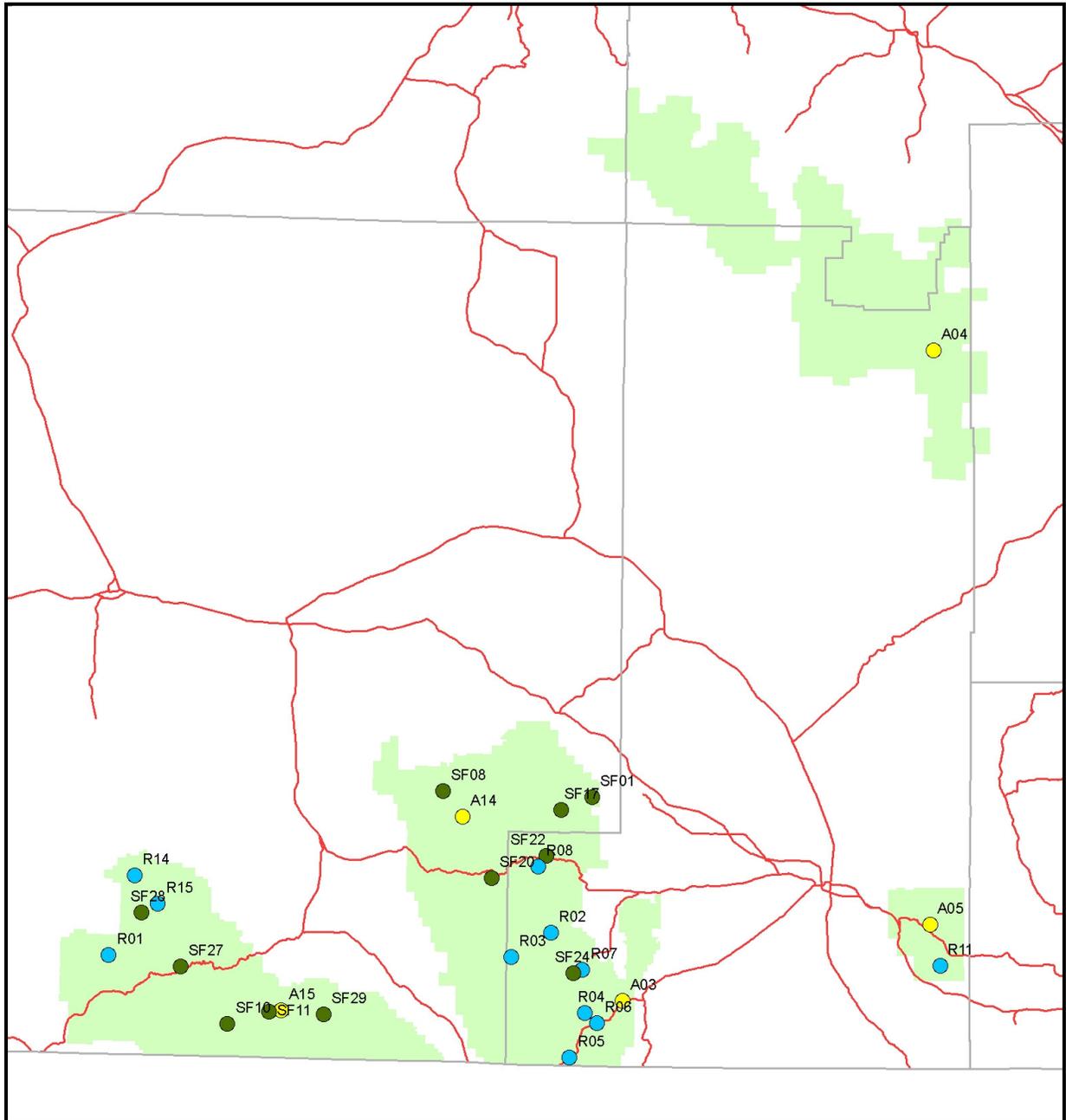
2. The majority of Three-toed Woodpeckers in this study were identified by their drumming, which is distinctive, but which many biologist cannot distinguish from that of the Hairy Woodpecker. Hairy Woodpeckers are more common on the forest, so making this mistake could severely bias estimates of Three-toed Woodpecker occurrence.
3. In dense riparian habitat, visibility is limited and the person conducting point counts must rely largely on audible cues (i.e., songs and calls). However, these areas generally contain abundant and dense avifauna, resulting in many, intermixed vocalizations that can be difficult to distinguish even by good birders. Wilson's Warbler falls squarely in the middle of this fray and has a song similar to several other warblers occurring in the area. Thus, it is important that technicians be thoroughly aware of the subtleties that distinguish Wilson's Warbler songs and calls from others in Table 2.

## ***REFERENCES***

- Leukering, T., M.F. Carter, A. Panjabi, D. Faulkner, and R. Levad. 2005. Rocky Mountain Bird Observatory Point Transect Protocol: Revised March 2005. Rocky Mountain Bird Observatory, Brighton, Colorado.
- Keinath, D., B.H. Smith, and G. Beauvias. 2006. Inventory and monitoring of avian management indicator speices for the Medicine Bow National Forest, Wyoming: Year one progress report. Wyoming Natural Diversity Database, University of Wyoming, Laramie, Wyoming. January 2007.

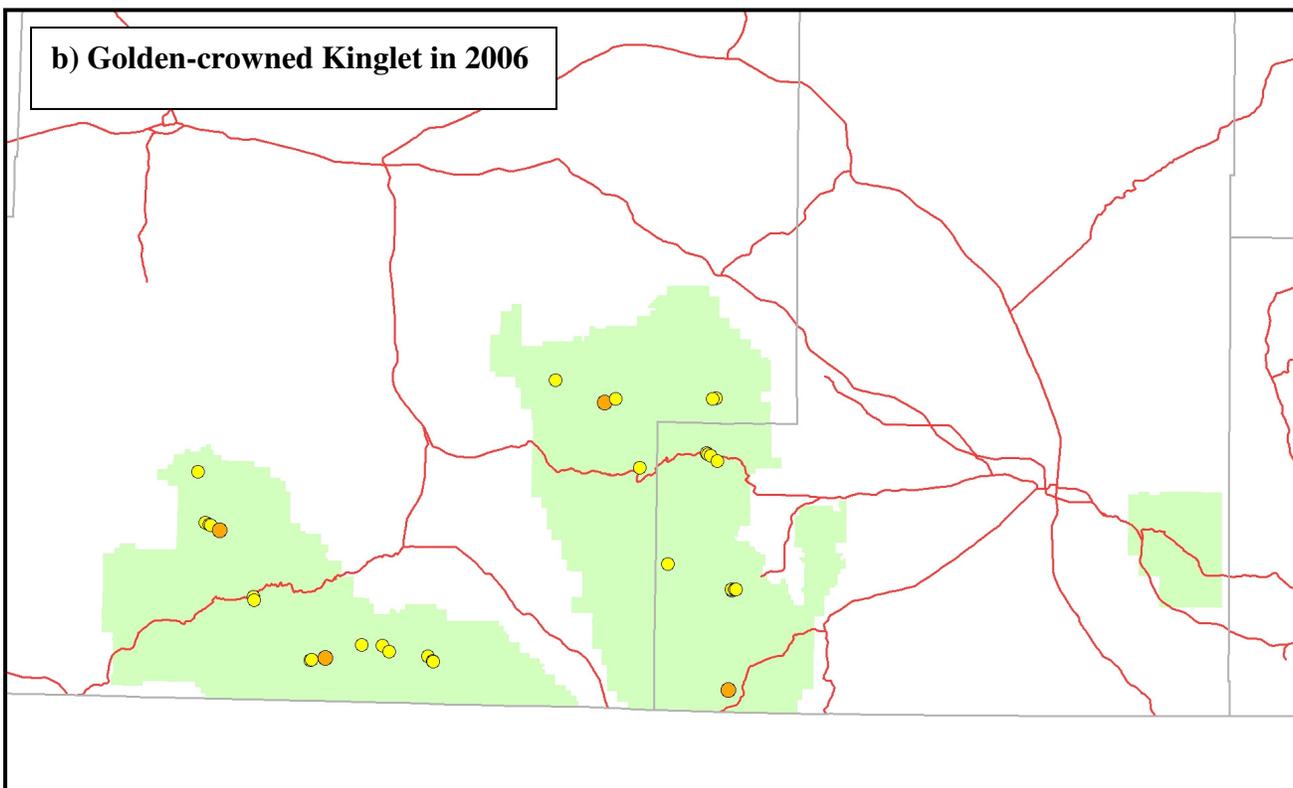
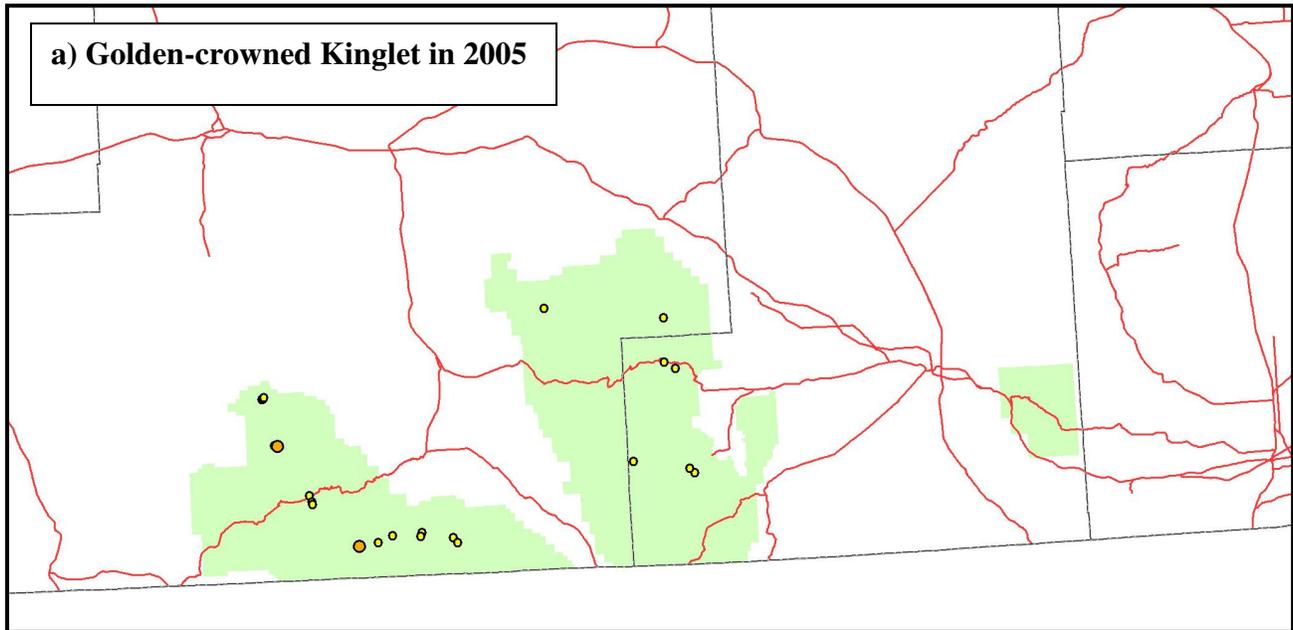
## *FIGURES AND TABLES*

**Figure 1:** Approximate location of songbird transects to monitor avian management indicator species within the Medicine Bow National Forest of southern Wyoming.



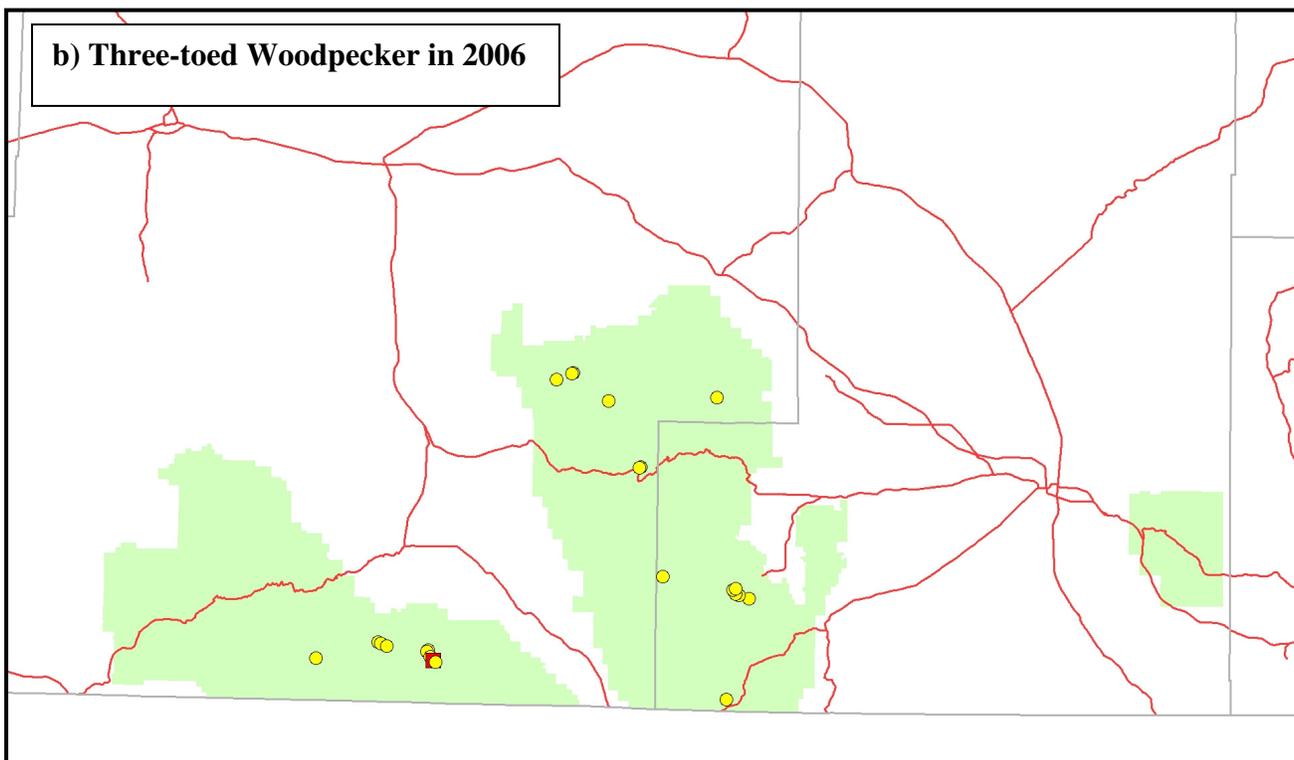
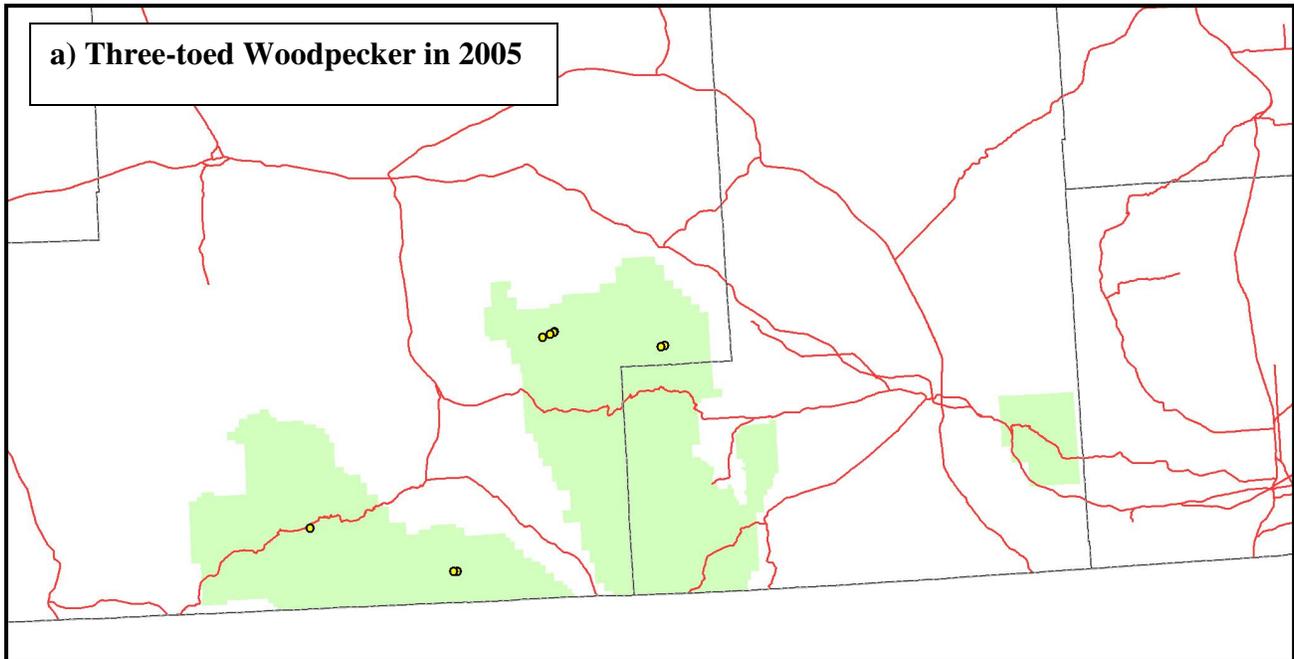
**Figure 2:** Observation maps of Golden-crowned Kinglet in the Medicine Bow National Forest for a) spring 2005 and b) spring 2006. Symbols represent the number of individuals observed during point count transects and are coded as follows:

● = 1 or 2 individuals, ● = 3 or 4 individuals, ■ = 5 or 6 individuals.



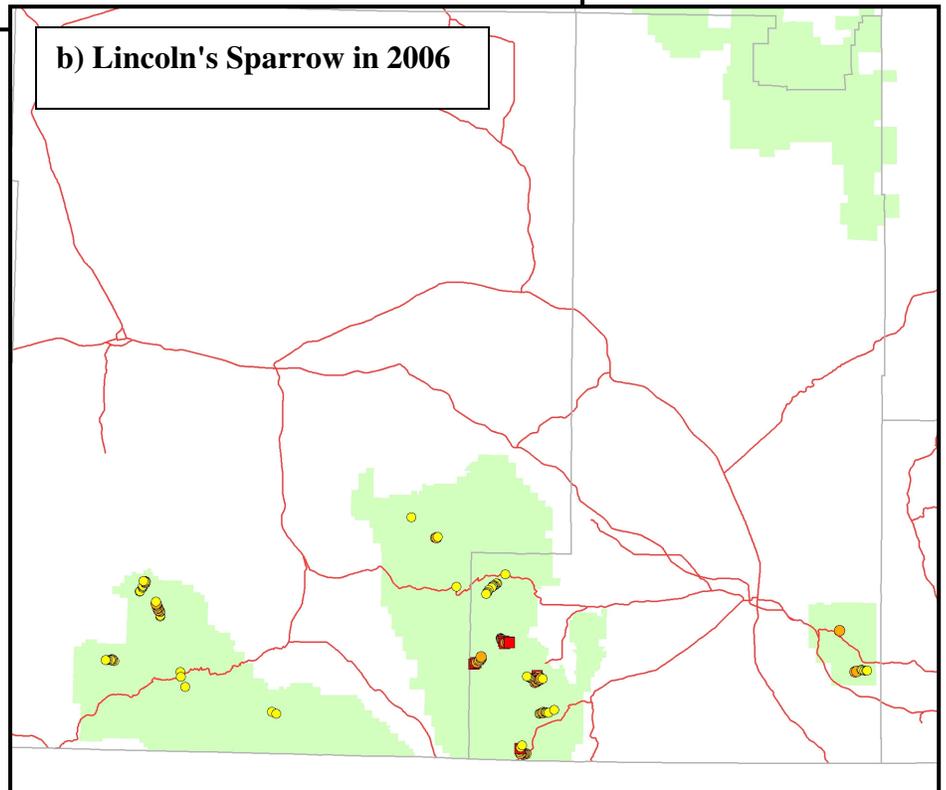
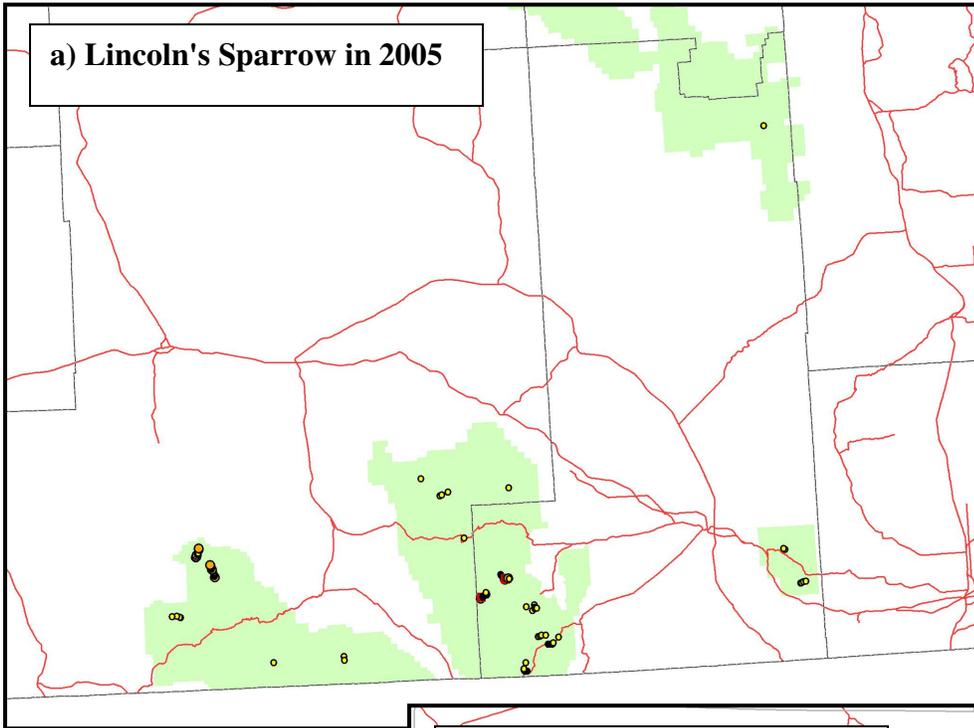
**Figure 3:** Observation maps of American Three-toed Woodpecker in the Medicine Bow National Forest for a) spring 2005 and b) spring 2006. Symbols represent the number of individuals observed during point count transects and are coded as follows:

● = 1 or 2 individuals, ● = 3 or 4 individuals, ■ = 5 or 6 individuals.



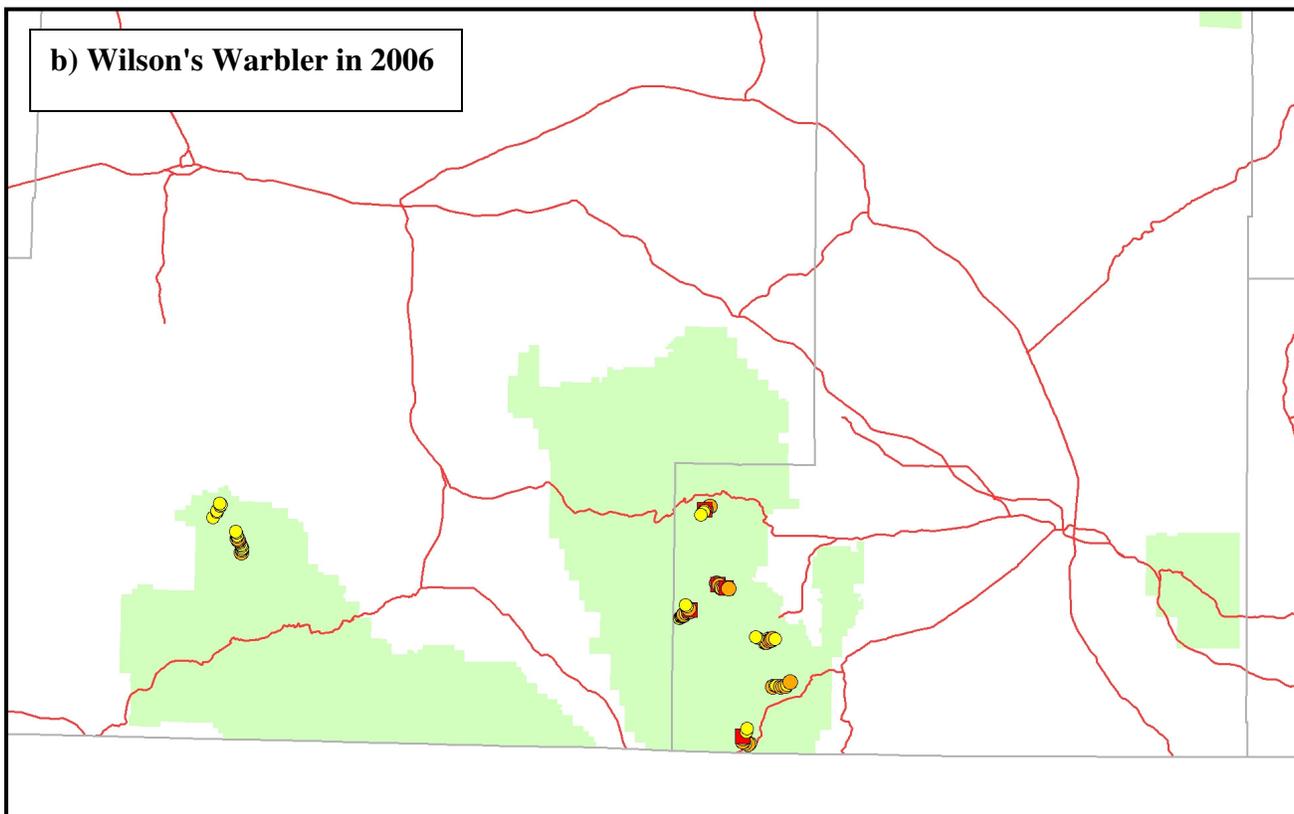
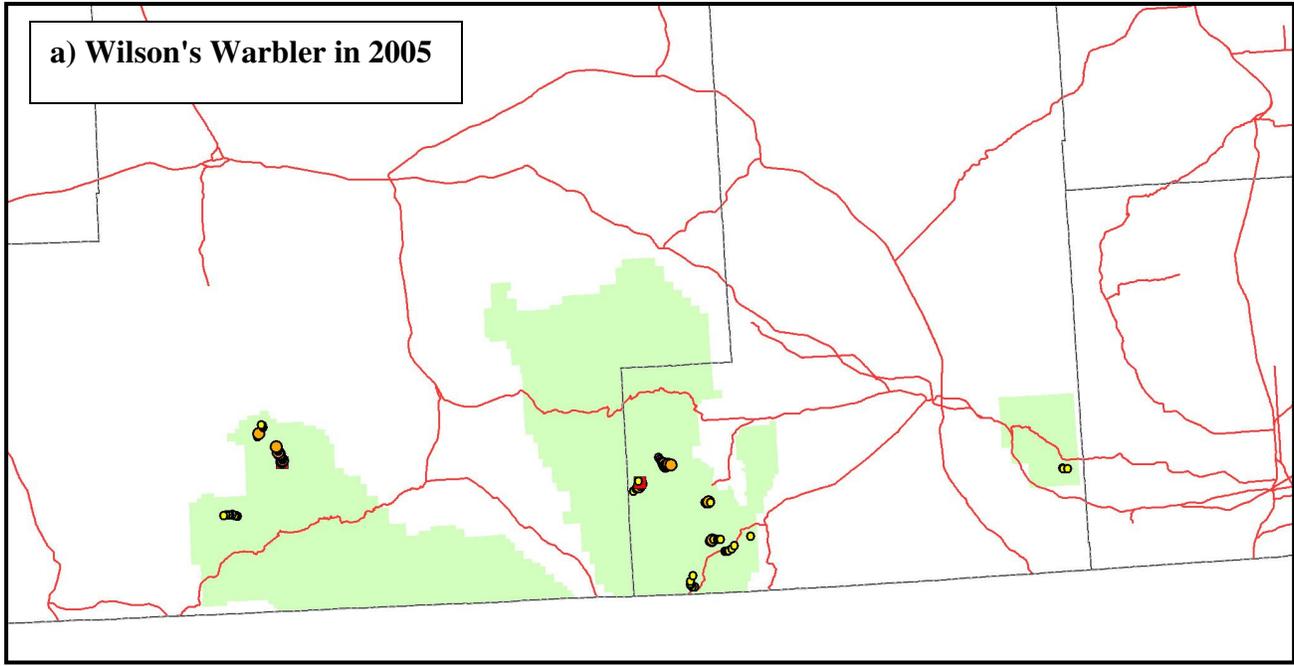
**Figure 4:** Observation maps of Lincoln's Sparrow in the Medicine Bow National Forest for a) spring 2005 and b) spring 2006. Symbols represent the number of individuals observed during point count transects and are coded as follows:

● = 1 or 2 individuals, ● = 3 or 4 individuals, ■ = 5 or 6 individuals.



**Figure 5:** Observation maps of Wilson’s Warbler in the Medicine Bow National Forest for a) spring 2005 and b) spring 2006. Symbols represent the number of individuals observed during point count transects and are coded as follows:

● = 1 or 2 individuals, ● = 3 or 4 individuals, ■ = 5 or 6 individuals.



**Table 1:** Summary of management indicator species observed by transect in 2005 and 2006. GCKI = Golden-crowned Kinglet, LISP = Lincoln's Sparrow, ATTW = American Three-toed Woodpecker, and WIWA = Wilson's Warbler.

Transect	ATTW		GCKI		LISP		WIWA	
	2005	2006	2005	2006	2005	2006	2005	2006
A03 - Medicine Bow (Porter and Woods Creeks)							1	
A04 - Laramie Range (Clark Draw off Murphy Canyon)		1			1			
A05 - Pole Mountain (Bisbee Hill and Lodgepole Creek)					2	3		
A14 - Medicine Bow (Brush Creek and Turpin Reservoir)		1		5	4	9		
A15 - Sierra Madre (Soldier Creek and Encampment River)		4	2	4		2		
R01 - Sierra Madre (Big Sandstone Creek)					5	9	9	
R02 - Medicine Bow (Douglas Creek and Cinnibar Park)					30	43	30	31
R03 - Medicine Bow (Horse Creek)		2	2	1	22	32	18	30
R04 - Medicine Bow (Fox Creek and Tributary)					5	14	14	20
R05 - Medicine Bow (Pelton Creek at WyColo)		1		3	8	28	6	24
R06 - Medicine Bow (Woods Creek at Chimney Park)		-		-	9	-	6	-
R07 - Medicine Bow (Lake Creek at Dry Park Road)		1		2	8	46	9	24
R08 - Medicine Bow (Bear Lake)		-		-	-	15	-	14
R11 - Pole Mountain (Middle Crow Creek west of Granit Springs Res.)					5	13	3	
R14 - Sierra Madre (Savery Creek)		1	3	4	28	16	9	7
R15 - Sierra Madre (Jack Creek)					30	25	29	27
SF08 - Medicine Bow (East Kenneday Peak and Purse Creek)	5	5	1	8	1	2		
SF10 - Sierra Madre (Hog Park Northwest, Little Snake River)		1	4	7	1			
SF11 - Sierra Madre (Hog Park Northeast, Robinson Creek)			1	3				
SF17 - Medicine Bow (Trail Creek)	5	1	1	3	1			
SF20 - Medicine Bow (Silver Lake and Sucker Lake)	1	2		1	1	1		
SF22 - Medicine Bow (Snowy Range Natural Area)			2	4		1		
SF24 - Medicine Bow (Muddy Mountain)		6	3	11	1	4		2
SF27 - Sierra Madre (Haskin's Creek Campground)	1	1	4	5		3		
SF28 - Sierra Madre (East Fork Savery Creek and Contintental Divide)		1	5	9				
SF29 - Sierra Madre (Billie Creek and Blackhall Mountain)	3	13	2	4	2			
Species Total (all transects)	15	41	30	74	164	266	134	179

\* Transect codes designate habitat types: SF = spruce fir, R = riparian-willow and A = random. These designations represent the primary habitat type in each transect, but not all points within a given transect fall within the noted habitat. Control transects were randomly placed throughout the Medicine Bow National Forest and generally contained a mixture of habitat types (most often lodgepole pine dominated conifer) and intersected at least one riparian area.



**Table 2 continued:** Summary of all species observed by transect for both 2005 and 2006. The first number in each pair is the 2005 count, while the second is the 2006 count. Species names followed by asterisks were new in 2006.

Species	R01	R02	R03	R04	R05	R06	R07	R11	R14	R15	SF01	SF08	SF10	SF11	SF17	SF20	SF22	SF24	SF27	SF28	SF29	A03	A04	A05	A14	A15	Total 2005	Total 2006
Pine Grosbeak		0/1	0/2				0/2				1/1	0/5	4/0	0/7	2/1	1/3	0/2	0/4	1/3	0/7	1/2		0/1		0/5	2/0	12	46
Pine Siskin	5/17	0/5	3/9	2/2	1/4			1/7	5/14	5/15	4/9	7/30	9/13	7/39	1/2	1/10	0/9	4/4	3/39	7/7	1/13	7/6	7/11	1/5	0/11	3/7	84	298
Plumbeous Vireo								1/0							0/1								2/6				3	7
Pygmy Nuthatch																							6/21	1/0			7	21
Red-breasted Nuthatch	1/0		1/0	1/0	0/1		0/1	1/2	1/3	0/1		6/7	1/1	1/2	2/3	1/1	1/1	1/3	6/5	1/3	2/1	1/4	4/5	2/0		1/3	35	47
Ruby-crowned Kinglet	4/5	3/21	7/28	8/20	12/16	14/0	13/20	1/5	12/26	5/17	14/26	13/21	7/4	23/17	13/21	15/25	8/16	13/34	12/18	9/19	17/23	6/16	2/5	3/8	14/34	6/17	254	471
Red Crossbill		0/2	0/5	0/2			0/5		1/1	0/1	4/2	0/20	2/13	0/14	3/1		0/2	0/5	0/16	5/7	1/6	1/0	6/61	1/0	0/16	3/4	27	183
Ring-necked Duck **							0/2																					2
Red-naped Sapsucker	1/2	2/0		4/2	2/1	4/0			1/2	2/3		5/0						1/0				0/3	1/1	1/0			24	14
Rock Wren	1/0																					1/1					2	1
Red-tailed Hawk	2/1				2/0		0/1	0/1	0/1																		4	5
Red-winged Blackbird					1/3	1/0		1/3																			3	6
Sandhill Crane	1/0																										1	
Say's Phoebe														1/0													1	
Savannah Sparrow	1/0		0/1		0/2			0/3																	0/1		1	7
Sora																									1/0		1	
Song Sparrow	9/14	0/1	0/1		1/8		0/7	27/15	1/1	1/10															0/2		39	62
Spotted Sandpiper	4/3	9/6				1/0		4/2	0/1	0/1						0/2									3/0		21	17
Spotted Towhee	1/2							0/1																			1	3
Sharp-shinned Hawk																											1	
Steller's Jay			0/1	2/0															0/1		1/0	0/7	0/1	1/1			3	11
Swainson's Thrush	1/0		0/1										1/1		1/0					0/1		0/1	0/1			1/1	4	6
Tennessee Warbler			0/3																								3	
Townsend's Solitaire	1/0				0/1			0/1			1/0		6/0	0/1		0/3						1/2	4/1	1/3		3/0	17	12
Tree Swallow **	0/8	0/2	0/1		0/1		0/1			0/4														0/1	0/2		24	
Turkey Vulture	1/0							0/2														0/2	0/13				1	17
Unknown (unidentified)	7/8	0/2			3/1	1/0	2/1	0/1			0/1	0/1		0/1	0/1		0/3	0/2	2/0	0/1		0/2	0/1	0/6	0/1	0/1	15	35
Veery						1/0																					2	
Vesper Sparrow	2/0																										4	
Violet-green Swallow	1/1						1/0	1/0	3/3	4/9													2/0				12	13
Virginia's Warbler																							1/0				1	
Warbling Vireo	6/7			4/3		2/0			1/1	8/0		5/1		6/0		1/0	1/0	1/0	3/8		1/0	4/0	5/1	6/0		3/0	57	21
White-breasted Nuthatch											1/0		1/0							1/0	1/0	1/0	0/2				5	2
White-crowned Sparrow	2/0	14/22	8/10		3/12		4/9	0/2		7/13	1/0				0/2	2/5									0/3	0/4	41	112
Western Bluebird		3/0																									3	
Western Kingbird	1/0																										1	
Western Tanager	0/1						0/1		2/1			2/0	3/9	15/1		1/1	0/1		6/2	2/1	1/0	2/1	10/6	1/0		7/2	52	28
Western Wood-Pewee	1/0	0/3		1/0	1/1	1/0			5/3	0/1	0/1		0/1							1/2		1/0	1/0		1/0	3/4	16	16
Willow Flycatcher **								0/1															0/1				2	
Williamson's Sapsucker																		0/1	0/1				1/0			1/0	2	2
Wilson's Snipe	1/0	5/3	4/1		3/3	6/0	6/5		1/0	4/0																0/4	30	16
Wild Turkey **								0/1																			1	
Wilson's Warbler	9/0	30/31	18/30	14/20	6/24	6/0	9/24	3/0	9/7	29/27									0/2			1/0					134	179
Yellow-rumped Warbler	2/13	4/7	8/6	6/7	0/1	5/0	1/3	4/4	4/13	1/8	20/13	10/26	11/17	8/23	20/9	7/10	11/10	0/17	4/19	6/18	6/15	5/20	18/16	12/14	10/21	10/11	193	324
Yellow Warbler	3/10							23/31		1/0												1/1	0/1	1/2			29	45
<b>Total 2005</b>	<b>143</b>	<b>118</b>	<b>90</b>	<b>68</b>	<b>77</b>	<b>85</b>	<b>70</b>	<b>123</b>	<b>122</b>	<b>148</b>	<b>85</b>	<b>82</b>	<b>93</b>	<b>98</b>	<b>85</b>	<b>66</b>	<b>40</b>	<b>50</b>	<b>75</b>	<b>59</b>	<b>71</b>	<b>88</b>	<b>118</b>	<b>94</b>	<b>58</b>	<b>74</b>	<b>2280</b>	
<b>Total 2006</b>	<b>180</b>	<b>193</b>	<b>164</b>	<b>104</b>	<b>164</b>	<b>0</b>	<b>189</b>	<b>199</b>	<b>161</b>	<b>214</b>	<b>80</b>	<b>188</b>	<b>148</b>	<b>176</b>	<b>74</b>	<b>102</b>	<b>92</b>	<b>145</b>	<b>196</b>	<b>132</b>	<b>135</b>	<b>148</b>	<b>282</b>	<b>130</b>	<b>167</b>	<b>118</b>		<b>4030</b>

## ***APPENDIX: DIGITAL FILES***

The CD-ROM on the inside, back cover of this report stores a shapefile (OBS\_05&06) containing the point observation data collected for this project. Each record in this shapefile (6,319 in total) represents an observation of one bird. The fields are defined as follows:

1. YEAR: The year in which the observation was made (either 2005 or 2006).
2. TANSECT: The transect on which the observation was made. “R” transects are riparian, “SF” transects are spruce-fir, and “A” transects are the random controls.
3. POINT: The point on the transect in which the observation was made. There are 15 points on each transect. Points with a decimal extension mean the observation was made between two points. For example, “10.5” means the observation was made between point 10 and point 11. There are no UTM coordinates for between-point observations.
4. TRANSPT: A concatenation of the Transect and Point fields, see above.
5. SPECIES\_FI: The 4-letter species code for the observed bird. See Leukering et al. (2005) for a definition of these codes.
6. HOW\_MOD: The method used to make the observation, as described in Leukering et al. 2005. In general, F = flyover, S = song, C = call, V = visual, D = drumming, O = other.
7. CLUSTER\_CO: If the observed bird was part of a cluster (see Leukering et al. 2005 for definition of cluster), then there will be a letter designation in this field. Adjacent observations with the same letter were part of the same cluster.
8. UTME: The X-coordinate, or UTM Easting, of the point in question (Zone 13, NAD 1983)
9. UTMN: The Y-coordinate, or UTM Northing, of the point in question (Zone 13, NAD 1983)