

**INVENTORY OF UPLAND SONGBIRDS ON MORTENSON LAKE,
HUTTON LAKE, AND BAMFORTH NATIONAL WILDLIFE REFUGES**

FINAL PROJECT REPORT

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Chestnut-collared Longspur, Bamforth National Wildlife Refuge

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BACKGROUND & OBJECTIVES

The greatest known value of the Laramie Plains National Wildlife Refuges is their importance to birds, which use the refuges during migration and breeding. Hutton Lake NWR is visited regularly by birders and has a well-supported checklist of waterfowl and, to a lesser extent, wetland-associated birds. However, the upland avifauna of the refuges is less well-defined, particularly for Mortenson Lake NWR and Bamforth NWR. Moreover, refuge managers have been hampered by a lack of information about the species of birds that nest in the uplands on the three refuges and by a lack of information about the species that use those habitats during migration. Consequently, managers have been unable to assess the compatibility of present and potential management practices with protection of refuge resources.

In order to fill this knowledge gap, systematic surveys for upland birds were conducted by the Wyoming Natural Diversity Database in 2009. The refuges were surveyed using the point-count method during migration and breeding seasons. Results from these surveys are presented here and serve as a baseline measure of the upland avifauna. If rolled into a long-term monitoring program, these methods could be repeated and compared with regional monitoring efforts to evaluate the roles of the refuges in supporting bird populations in the ecoregion.

Study Area

The study area consists of three refuges within 15 miles of each other on the mixed-grass prairie of the Laramie Plains. Generally speaking, the Laramie Plains form a high, intermontane basin (~7,200 ft elevation) dominated by windswept mixed-grass prairie and steppe vegetation. All three National Wildlife Refuges contain considerable wetland, lake, and playa habitat created by natural runoff or irrigation ditches from the Laramie River and major tributaries. The upland vegetation on Mortenson Lake NWR is primarily composed of mixed-grass prairie with some sagebrush (*Artemisia* sp.) and greasewood (*Sarcobatus vermiculatus*) cover. Hutton Lake NWR has some grassland but more big sagebrush (*Artemisia tridentata*) cover. Bamforth NWR contains patches of several vegetation types including mixed-grass prairie, greasewood, big sagebrush and saltbush (*Atriplex* sp.).

METHODS

Surveys were conducted using the point-count methods used by the Rocky Mountain Bird Observatory and the Monitoring Wyoming's Birds Program (Leukering et al. 1998). Surveyors used GPS to navigate to fixed points and recorded all birds seen or heard during a five-minute interval as well as the distance to each bird. The point-count technique is used widely in bird monitoring because it can produce density estimates that account for variation in 'detectability' between species. The method works especially well for territorial passerines that vocalize frequently, but less well for rare and/or cryptic species. To compensate somewhat for this shortfall, we also recorded the uncommon species detected while traveling between points ('88' species). Although these '88' detections are difficult to standardize across surveyors and seasons, they greatly improve species richness estimates.

Prior to the field season, ten points were stratified by habitat type and assigned to each refuge. The draft GAP Analysis Program's Ecological Systems map of Wyoming (USGS 2009) was used to identify the three most dominant upland vegetation types in each refuge. Table 2 displays the number of hectares occupied by each system and the number of corresponding points assigned. Other considerations in point placement included maximizing spatial coverage of each refuge, allowing at least 150 m between points (to avoid double-counting birds), and allowing at least 100 m from major dirt or paved roads. All survey point locations are displayed by refuge in Figures 1-3 below.

Surveyors were trained to identify bird species by sight and sound prior to the field season and were equipped with digital bird recordings and reference books in the field. Each survey consisted of visiting all 10 points at a refuge between dawn and 11am. Although windy conditions are normal on the Laramie Plains, surveys were not conducted in extreme wind or in the rain to avoid alterations in bird behavior and detectability. A total of five surveys were conducted on each refuge; three during the migratory season (May 10-29) and two during the breeding season (June 8-20). Table 2 shows the dates, times, and weather conditions recorded during each survey.

RESULTS

Sixty-three bird species were detected during surveys across all three refuges. Of those, approximately forty-two (66%) were true upland species that rarely use riparian or wetland habitats. Species richness was comparable between the refuges, with Bamforth yielding 36 species, Hutton Lake 40, and Mortenson Lake 42. Table 3 displays the 18 species of concern that were observed across the refuges. For our purposes, species that were either on WYNDD's Species of Concern list (Keinath 2003) or on the USFWS's Region 6 Species of Conservation Concern list (USFWS 2008) were considered for Table 3.

Not all the species of concern were true upland species, such as the American white pelican, bald eagle, Forster's tern, black tern, marbled godwit, and white-faced ibis. However many upland raptors such as the prairie falcon, ferruginous hawk, golden eagle, and burrowing owl were detected in addition to upland passerines such as the sage thrasher, McCown's longspur, chestnut-collared longspur, and grasshopper sparrow. Notably, seven of the ten species of concern detected at Bamforth were not detected on either Hutton Lake or Mortenson Lake. These were the American white pelican, burrowing owl, chestnut-collared longspur, ferruginous hawk, long-billed curlew, marbled godwit, and mountain plover. This may be because of the interwoven distribution of upland vegetation types at Bamforth, and suggests that the refuge may provide unique habitat not represented at the other two refuges.

In addition to the 18 species mentioned above, six species were detected that have 'sensitive' or 'potential concern' status with WYNDD, BLM and/or U.S. Forest Service Region 2. These species are the American avocet, black-crowned night heron, brewer's sparrow, California gull, red-necked phalarope, and sandhill crane (Table 4).

Each individual bird observation is provided electronically (Excel spreadsheet) and spatially (shapefile) along with this report for the USFWS's records. However, in order to better visualize and analyze the results here, Table 4 shows each species detected (in alphabetical order) along with the number of observations by refuge. The number of observations per species can be used

as a measure of relative abundance. For example, sage thrashers were present at all three refuges, but were most abundant on Hutton (17 individuals recorded during point counts) and least abundant on Mortenson (3 individuals recorded during point counts).

There was considerable crossover in avian species assemblages across refuges, however dominant vegetation clearly influenced the abundance of the more common upland species. For example, brewer's sparrows were present at all refuges, but were much more abundant on Hutton Lake and Bamforth, presumably because shrubland habitats are more abundant there (Table 1). Similarly, McCown's longspurs were present at all three refuges, but were much more abundant on Mortenson Lake, presumably because short-grass prairie is the dominant vegetation type.

In Table 4, the season when each species is thought to use the Laramie Plains Refuges (migration or breeding) was based on the dates of observation, staff experience, and Dunn and Alderfer (2008). Forty of the sixty-three species detected probably use the refuges for breeding and only nine for migration. In the case of fourteen species, however, limited observations made 'season of use' interpretation difficult, and were thus flagged as 'U' for unknown.

The last column displayed in Table 4 shows whether the species has been detected during other surveys in the Laramie Plains region. This information was drawn from the Biotics database at WYNDD, where most of the observations are from point-count surveys conducted in the last eight years for the Monitoring Wyoming's Birds Program. This field provides a very rough indication of whether these three refuges may provide important habitat for specific species which have not otherwise been recorded in the area. For example, records did not exist in Biotics for the burrowing owl or peregrine falcon in the Laramie Plains region prior to these surveys. Upon further examination, it may be determined that the refuges provide habitat for these species which is not commonly found elsewhere in the region.

Upland species which are suspected to occur with the Laramie Plains but were not detected during 2009 surveys are displayed in Table 5. This list was created from WYNDD's Biotics database and Dunn and Alderfer (2008). It is possible that these species use the three refuges

during migration, over-wintering, and/or breeding periods. This table is simply intended to provide supplemental material for USFWS management purposes.

CONCLUSIONS

Point-count surveys on Bamforth, Hutton Lake, and Mortenson Lake National Wildlife Refuges have resulted in a baseline measure of the upland avifauna on each refuge. Relative abundance estimates are now available for common species and presence/absence information for uncommon species. A total of 63 species were detected and 24 have special conservation designations under at least one federal or state agency. The majority of upland species detected are thought to breed on the refuges during the summer. Although each refuge had a unique bird community, Bamforth National Wildlife Refuge stood out from the others with a high number of species of concern that were not detected on either Mortenson Lake or Hutton Lake National Wildlife Refuges. Future surveys can use the same methods described herein to measure potential changes in species abundance and community composition as a result of management or other landscape changes. If rolled into a long-term monitoring program, results could also be compared with regional monitoring efforts to evaluate the roles of the refuges in supporting bird populations in the region.

ACKNOWLEDGEMENTS

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FIGURES & TABLES

Figure 1. Point count locations at Bamforth National Wildlife Refuge.

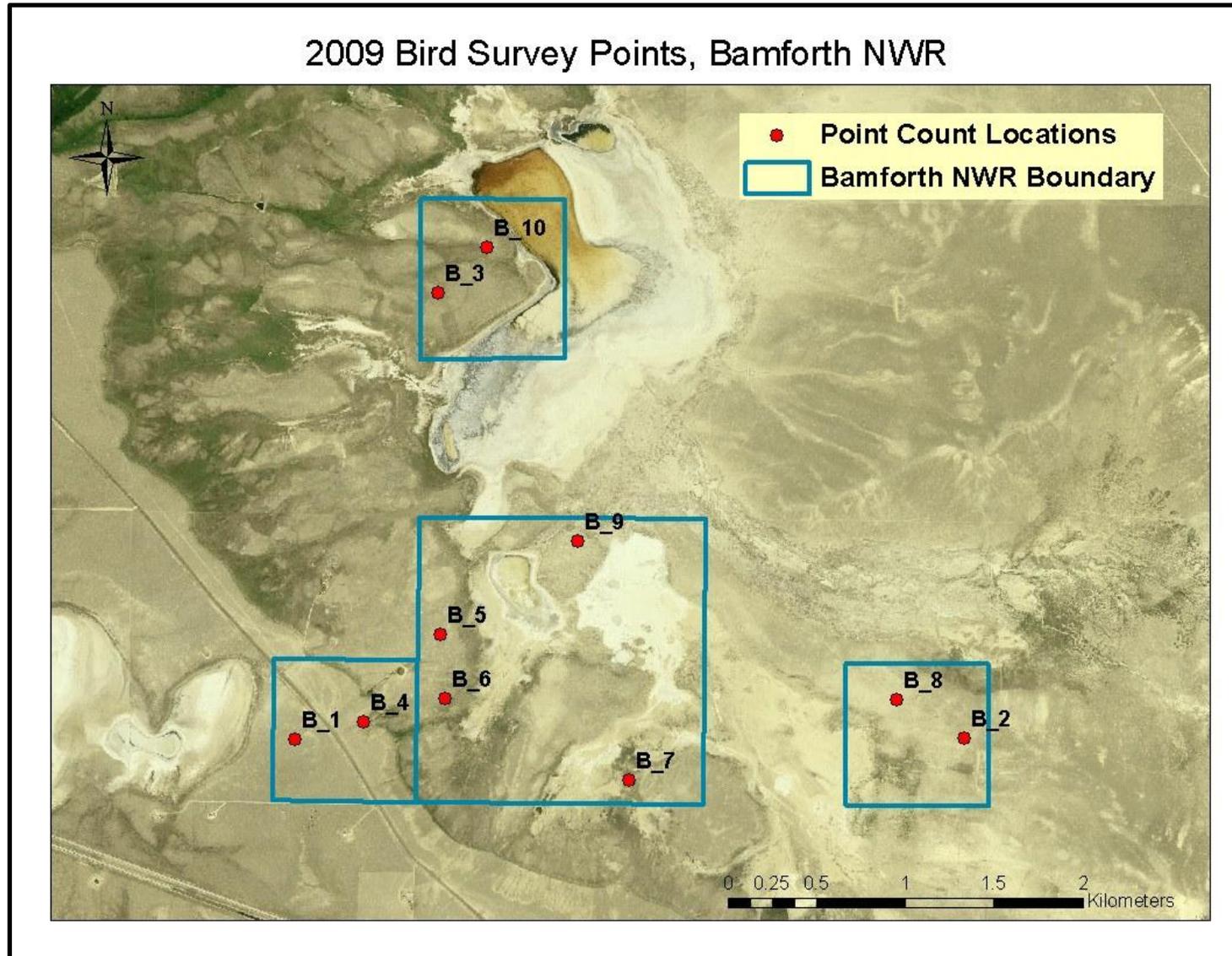


Figure 2. Point count locations at Hutton Lake National Wildlife Refuge.

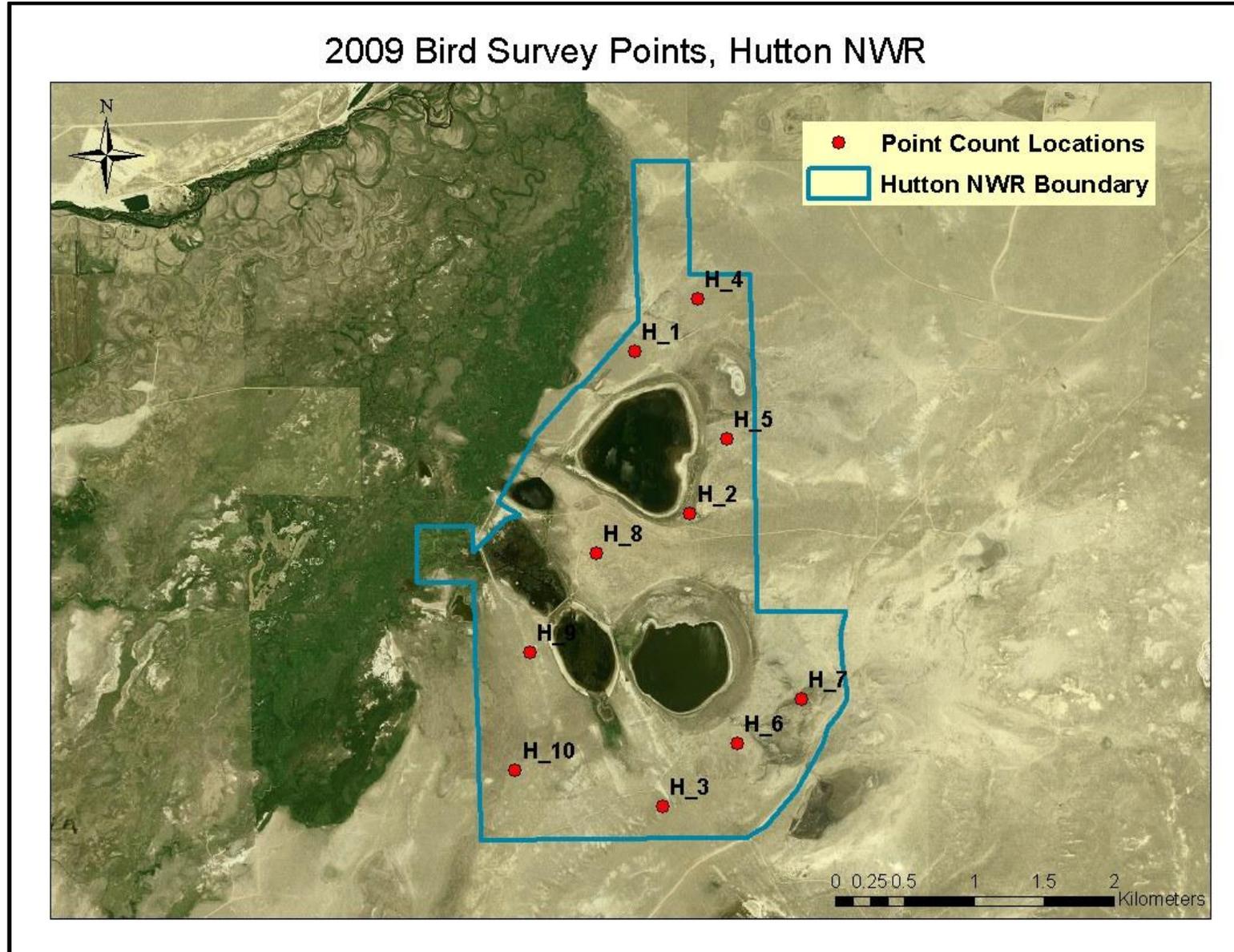


Figure 3. Point count locations at Mortenson Lake National Wildlife Refuge.

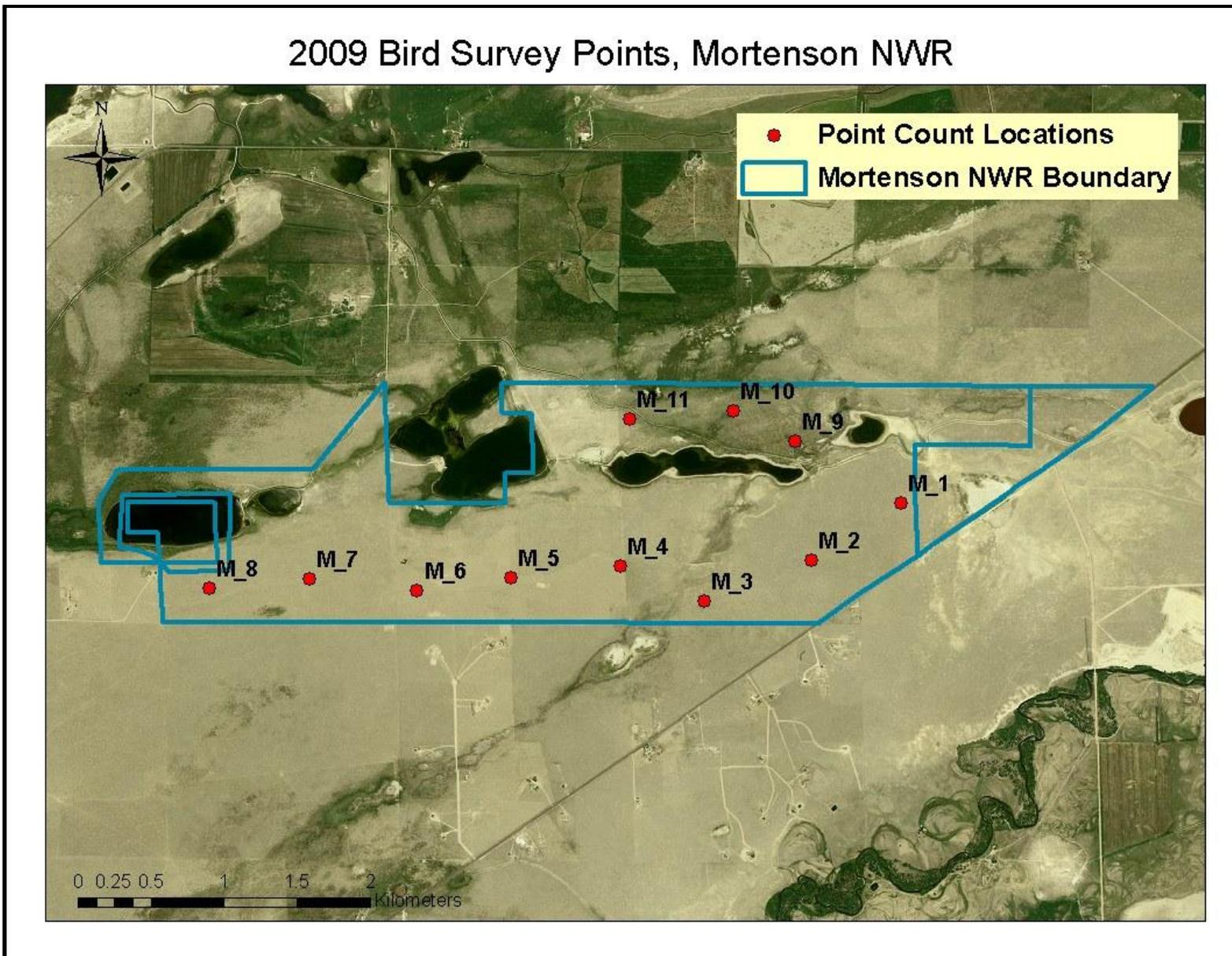


Table 1. Number of hectares occupied by the three most common Ecological Systems and the number of corresponding points assigned by refuge.

Refuge	Area (ha)	Proportion	# points	Habitat description
Bamforth	139	0.56	5	Wyoming Basins Low Sagebrush Shrubland
	91	0.37	4	Inter-Mountain Basins Big Sagebrush Steppe
	17	0.07	1	Inter-Mountain Basins Mixed Salt Desert Scrub
Hutton Lake	167	0.35	4	Wyoming Basins Low Sagebrush Shrubland
	159	0.33	3	Northwestern Great Plains Mixedgrass Prairie
	152	0.32	3	Inter-Mountain Basins Big Sagebrush Steppe
Mortenson Lake	446	0.77	8	Northwestern Great Plains Mixedgrass Prairie
	89	0.15	1	Wyoming Basins Low Sagebrush Shrubland
	44	0.08	1	Inter-Mountain Basins Greasewood Flat

Table 2. Individual survey dates, times, and weather conditions.

Refuge	Date	Start Time	End Time	Start Sky	End Sky	Start Wind	End Wind	Start Temp (°F)	End Temp (°F)
Mortenson L.	11-May-09	545	1100	1	-	0	-	38	-
Hutton L.	12-May-09	615	1100	3	1	4	4	50	-
Bamforth	14-May-09	545	1126	3	3	4	4	38	40
Mortenson L.	18-May-09	545	1030	0	0	3	3	45	60
Hutton L.	19-May-09	549	1016	0	0	2	4	50	65
Bamforth	20-May-09	539	1045	0	0	3	3	50	70
Mortenson L.	27-May-09	600	1000	0	0	0	1	34	50
Hutton L.	28-May-09	540	1021	0	0	0	0	45	65
Bamforth	29-May-09	540	1030	0	0	0	1	40	70
Mortenson L.	8-Jun-09	600	935	2	6	3	4	40	50
Hutton L.	9-Jun-09	543	1010	1	2	2	4	40	65
Bamforth	12-Jun-09	545	906	1	3	2	3	40	60
Mortenson L.	15-Jun-09	600	1000	0	1	0	4	44	60
Hutton L.	16-Jun-09	546	1020	0	1	1	4	41	65
Bamforth	17-Jun-09	539	1000	3	3	2	2	48	65

Weather Codes			
Sky Code	Cloud Cover	Wind Code	Wind Speed
0	0-15%	0	<1 mph
1	16-50%	1	1-3 mph
2	51-75%	2	4-7 mph
3	76-100%	3	8-12 mph
4	fog	4	13-18 mph
6	drizzle		

Table 3. Avian Species of Concern* observed on Laramie Plains National Wildlife Refuges during 2009 surveys.

Bamforth NWR	Hutton Lake NWR	Mortenson Lake NWR
American White Pelican	-	-
-	Bald Eagle	-
-	-	Black Tern
Burrowing Owl	-	-
Chestnut-collared Longspur	-	-
Ferruginous Hawk	-	-
-	Forster's Tern	Forster's Tern
Golden Eagle	Golden Eagle	Golden Eagle
-	-	Grasshopper Sparrow
-	Loggerhead Shrike	Loggerhead Shrike
Long-billed Curlew	-	-
Marbled Godwit	-	-
McCown's Longspur	McCown's Longspur	McCown's Longspur
Mountain Plover	-	-
-	-	Peregrine Falcon
-	Prairie Falcon	-
Sage Thrasher	Sage Thrasher	Sage Thrasher
-	White-faced Ibis	-

*Species of Concern are defined here as those which are on the Wyoming Natural Diversity Database's and/or USFWS Region 6 Species of Concern list.

Table 4. Upland bird survey results by species, status, season, and Refuge.

Season of Observation:	B = Breeding season (observed in May and June) M = Migratory season (observed primarily in May) U = Unknown (limited observations make interpretation difficult)
WYNDD status:	Concern = On WYNDD’s Species of Concern list and actively tracked. Species of highest conservation concern within Wyoming are ranked S1 or S2 (S1B means that only breeding sites of that species are considered rare, not necessarily the species itself). Potential Concern = On WYNDD’s Species of Potential Concern list or ‘watch list’.
USFWS Region 6 Status:	On list = Listed as a Species of Conservation Concern in Region 6 (USFWS 2008).
Other Fed. Agency Status:	USFS R2 = Listed as a Sensitive Species by the US Forest Service, Region 2. BLM = Listed as a Sensitive Species with the Bureau of Land Management in Wyoming.
(Observation info):	Pt. Obs = Number of individuals seen or heard during point-counts. Total Obs = Pt. Obs + Number of individuals detected while walking between points (‘88’ observations). Grand Total = Total number of observations recorded during surveys on all Refuges. Detected in LP = Species observations exist within WYNDD’s database for the Laramie Plains region (most data are from Monitoring Wyoming’s Birds surveys).

Common Name	Season	WYNDD Status*	USFWS Region 6 Status**	Other Fed. Agency Status	Bamforth		Hutton L.		Mortenson L.		Grand Total	Detected in LP
					Pt. Obs	Total Obs	Pt. Obs	Total Obs	Pt. Obs	Total Obs		
American Avocet	B	Potential Concern			1	7		29		14	50	X
American Kestrel	B									2	2	X
American White Pelican	U	Concern (high-S1B)				5					5	
Bald Eagle	U	Concern	On list (ESA delisted)				1	1			1	
Barn Swallow	M				1	1			3	3	4	X
Black Tern	U	Concern (high-S1B)		USFS R2						1	1	
Black-bellied Plover	M									1	1	
Black-billed Magpie	B						1				1	
Black-crowned Night Heron	B	Potential Concern				2		5			7	
Brewer's Blackbird	B				2	3		1	1	4	8	X
Brewer's Sparrow	B	Potential Concern		USFS R2, BLM	29	29	48	49	7	7	85	X
Broad-tailed Hummingbird	M							2			2	
Brown-headed Cowbird	B				11	13	12	14	7	9	36	X

Common Name	Season	WYNDD Status*	USFWS Region 6 Status**	Other Fed. Agency Status	Bamforth		Hutton L.		Mortenson L.		Grand Total	Detected in LP
					Pt. Obs	Total Obs	Pt. Obs	Total Obs	Pt. Obs	Total Obs		
Burrowing Owl	U	Concern	On list	USFS R2, BLM		3					3	
California Gull	B	Potential Concern			16	23	3	3	5	7	33	X
Canvasback	U					1					1	
Chestnut-collared Longspur	B	Concern (high-S1)	On list	USFS R2	1	11					11	X
Chipping Sparrow	U				1	2		1			3	X
Cliff Swallow	B							3	7	7	10	X
Common Merganser	B									1	1	
Common Nighthawk	B							2	1	2	4	X
Common Raven	B				1	2	3	6	4	6	14	X
Common Yellowthroat	B							8			8	
Double-crested Cormorant	B					5	1	1		1	7	
Eastern Kingbird	B								1	1	1	X
Ferruginous Hawk	B	Concern	On list	USFS R2, BLM		2					2	X
Forster's Tern	B	Concern (high-S1)					1	5		2	7	
Franklin's Gull	U					1		1	1	1	3	
Golden Eagle	B	Potential Concern	On list		4	4	1	6		5	15	X
Grasshopper Sparrow	U	Potential Concern	On list	USFS R2					1	1	1	X
Horned Lark	B				68	68	92	93	80	80	241	X
Killdeer	B				5	15	3	12	5	17	44	X
Lark Bunting	U					1					1	X
Loggerhead Shrike	U	Concern	On list	USFS R2, BLM				1		1	2	X
Long-billed Curlew	B	Concern	On list	USFS R2, BLM		2					2	X
Mallard	U									1	1	X
Marbled Godwit	M		On list			1					1	
Marsh Wren	B							4			4	
McCown's Longspur	B	Concern (high-S2)	On list	USFS R2	34	42	3	7	117	124	173	X
Mountain Bluebird	M									1	1	X
Mountain Plover	U	Concern (high-S2)	On list	USFS R2		2					2	X

Common Name	Season	WYNDD Status*	USFWS Region 6 Status**	Other Fed. Agency Status	Bamforth		Hutton L.		Mortenson L.		Grand Total	Detected in LP
					Pt. Obs	Total Obs	Pt. Obs	Total Obs	Pt. Obs	Total Obs		
Mourning Dove	M							3			3	X
Northern Harrier	U				1	1	5	6		2	9	X
Northern Mockingbird	B						1	1			1	X
Peregrine Falcon	M	Concern (high-S2)	On list (ESA delisted)	BLM						1	1	
Prairie Falcon	B		On list					2			2	
Red-necked Phalarope	M	Potential Concern						1		2	3	
Red-tailed Hawk	B						1	1	2	9	10	X
Red-winged Blackbird	B				3	3	8	8	21	21	32	X
Sage Thrasher	B	Potential Concern	On list	BLM	12	30	17	29	3	5	64	X
Sandhill Crane	B	Potential Concern				1					1	X
Savannah Sparrow	B				1	4	1	3		5	12	X
Spotted Sandpiper	B					1				1	2	
Swainson's Hawk	B				1	2			1	2	4	
Tree Swallow	B				1	1	1	2	8	8	11	X
Turkey Vulture	U								1	1	1	X
Vesper Sparrow	B				5	5	33	35	16	19	59	X
Western Meadowlark	B				66	66	48	48	59	59	173	X
White-faced Ibis	B	Concern (high-S1B)		BLM			1	2			2	
Willet	B				9	21	12	23	9	18	62	X
Wilson's Phalarope	B					5		1		3	9	X
Wilson's Snipe	M						1	2	1	1	3	X
Yellow-headed Blackbird	B						4	6	1	1	7	

Table 5. Additional avian upland species suspected to occur on Laramie Plains and potentially on Laramie Plains Refuges.

Season of Observation:	B = Breeding season (observed in May and June) M = Migratory season (observed primarily in May) U = Unknown (limited observations make interpretation difficult)
WYNDD status:	Concern = On WYNDD’s Species of Concern list and actively tracked. Species of highest conservation concern within Wyoming are ranked S1 or S2. Potential Concern = On WYNDD’s Species of Potential Concern list or ‘watch list’.
USFWS Region 6 Status:	On list = Listed as a Species of Conservation Concern in Region 6 (USFWS 2008).
Other Fed. Agency Status:	USFS R2 = Listed as a Sensitive Species by the US Forest Service, Region 2. BLM = Listed as a Sensitive Species with the Bureau of Land Management in Wyoming.
(Observation info):	Detected in LP = Species observations exist within WYNDD’s database for the Laramie Plains region (most data are from Monitoring Wyoming’s Birds surveys). Other species on this list are suspected to occur in the Laramie Plains based on distribution and range information alone.

Common Name	Season+	WYNDD Status*	USFWS Region 6 Status**	Other Fed. Agency Status	Detected in LP
American Crow	B				X
American Goldfinch	B				X
American Redstart	M				
American Robin	B				X
Bobolink	B	Concern (high-S2)			
Brown Thrasher	B				
Bullock's Oriole	B				X
Calliope Hummingbird	M	Concern			
Canada Goose	M/B				X
Cassin's Kingbird	B				
Cedar Waxwing	B				X
Common Grackle	B				X
Cooper's Hawk	B				X
Dark-eyed Junco	M				
Eastern Screech Owl	B	Potential Concern			
Eurasian Collared-Dove	B	Non-native species			
European Starling	B	Non-native species			X
Great Horned Owl	B				X
Greater Sage Grouse	B	Concern			X
Green-tailed Towhee	B				X
House Finch	B				X
House Sparrow	B	Non-native species			X
House Wren	B				

Common Name	Season+	WYNDD Status*	USFWS Region 6 Status**	Other Fed. Agency Status	Detected in LP
Lark Sparrow	B				X
Long-eared Owl	B				X
Merlin	M	Potential Concern			X
Mountain chickadee	M				
Northern Flicker	B				X
Northern Rough-winged Swallow	B				X
Pine Siskin	M				X
Rock Pigeon	B	Non-native species			X
Rock Wren	B				X
Rough-legged Hawk	M				X
Rufous Hummingbird	M				
Sage Sparrow	B	Concern	On list	USFS R2, BLM	X
Sharp-shinned Hawk	B				X
Sharp-tailed Grouse	B	Concern (high-S1)		USFS R2, BLM	
Short-eared Owl	B	Concern (high-S1)	On list	USFS R2	
Spotted Towhee	B				X
Townsend's Solitaire	M				X
Western Kingbird	B				X
Western Tanager	M				
White-crowned Sparrow	M				X
Yellow-breasted Chat	M				X
Yellow-rumped Warbler	M				X