

Comparisons of avian populations at six localities in northern Nevada and Utah: 1867–1869 and 1994–2000

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INTRODUCTION

The Geological Exploration of the Fortieth Parallel under the leadership of Clarence King included a survey of the avifauna at several localities between Sacramento, California, and Salt Lake City, Utah, in the years 1867 to 1869. Robert Ridgway, who later achieved international acclaim for his long, distinguished career as a research ornithologist, was selected to record the avifauna along the way and obtain specimens for the Smithsonian collections (Ridgway, 1877). In some of the areas such as the Reno area and Salt Lake City, humans have changed the environment radically since his time but in others, very little.

Our goal was to determine if there had been important, long-term changes in the avian communities at six localities in the Great Basin where human intrusion has been minimal since Ridgway's time (fig. 1). In choosing these six localities, we hoped that any changes would reflect mainly natural causes rather than human intrusion. We visited these localities at the same time of year that Ridgway did, and we attempted to spend the same amount of time at each locality as he did, falling short in two places. The results of both surveys are recorded here in a series of tables. The tables include parallel columns for each locality, and they include data and observations that are summarized in this report.

FORT CHURCHILL, NEVADA

Ridgway visited the Fort Churchill area, east of present-day Carson City, for about two days in June, 1868; we spent a total of three days there in June, 1994, and early July, 1997. Carson River flows eastward from the Sierra Nevada Mountains in western Nevada. Fort Churchill is a state park on the north side of the river at the site of a U.S. Army cavalry base built in 1860. Modern restoration and improvements are modest and not obtrusive. Ridgway listed the avifauna near Fort Churchill and near Table Mountain, seven miles upstream.

A gravel road now parallels the river between Fort Churchill and Table Mountain. Our observations were made in the vicinity of the Fort and along the road between the Fort and Table Mountain.

The floodplain next to Carson River is covered by a thick stand of cottonwood trees and a few marshy pastures with scattered trees. Ridgway described the floodplain as heavily wooded by cottonwood trees. Next to the flood plain are sagebrush-covered hills. Humans apparently have not radically altered the environment where Ridgway made his observations since Ridgway's time.

Ridgway reported 32 species and we recorded 44 (Table 1). Although not reported in 1868, ducks, geese, herons, and egrets are now conspicuously present. Since every soldier at Fort Churchill had a gun, it is possible that most of the ducks and geese were shot for food, and the herons and egrets shot for their plumes, but none of this was mentioned by Ridgway. The ab-

sence, from the 1868 list, of magpies, Killdeer, gulls, crows, ravens, Great Horned Owls, and nighthawks is not easily explained. Magpies and Killdeer are especially abundant now and the other birds were observed repeatedly.

The absence from our list of Poorwills and Canyon Wrens is due more to the fact that their normal habitat in the hills was not visited than to any change in population. Shrikes are common in the region and their absence from our list probably is due to chance. Ridgway's report of Black Swifts near Fort Carson has been challenged, and he seems to have been mistaken (Knorr, 2000). It remains unclear what species Ridgway actually did see. Absence of warblers and vireos from our list represents an important population shift. In general, the avian community here appears to be more diverse than in 1868 despite an apparent decline in warblers and vireos.

UNIONVILLE, NEVADA

Ridgway stayed at Unionville for five weeks in September and October, 1867. We were there several days or parts of days in September, totaling about a week in the years between 1994 and 1997. This represents a large discrepancy in length of stays, five weeks versus one week, but our observations were bolstered by observations of others as indicated in a following section.

Unionville is a small settlement in Buena Vista Canyon on the east slope of the Humboldt Range, a major mountain range of northwestern Nevada. Buena Vista Creek is a strong, perennial stream that now is lined with giant Lombardy poplars and a wide variety of trees and shrubs introduced by the residents. In Ridgway's time, the place was an operating mining district. Ridgway reported that there was a thick growth of buffalo-berry, willows, wild rose, and choke-cherry along the stream, and a sparse growth of mountain mahogany, pinyon and juniper on the mountainside. His description could fit many a mountain range in northern Nevada. However, it is probable that most or all of the cottonwood trees that normally would have grown along the stream had been cut down for firewood, housing, charcoal, and mine timbers. Mark Twain, who lived in Unionville briefly in 1862, reported that there was no firewood for miles around. In any event, Ridgway must have ranged widely on horseback, and his observations were not confined to the immediate vicinity of the mining camp. Ridgway observed 34 species and we observed 49 (Table 2).

A century after Ridgway's visit, as part of the annual Audubon Society Christmas Bird Count, Robert E. Wallace, then a geologist with the U.S. Geological Survey, with his wife, Trudy, began recording all the birds seen in the Unionville area on one day per year for 15 of the 29 years from 1963 to 1991. Wallace is a skilled, life-long birder and is thoroughly familiar with the local avifauna, having spent several years mapping the geologic formations of the Humboldt Range.

Table 3 compares Ridgway's results with the Wallaces'. The list of birds seen on the Christmas counts differs from that for September-October, 1867. The Christmas counts represent a total of 15 days, all of which were after the fall migration. Ridgway was there for 37 days during fall migration. Despite the difference in season, significant comparisons can be made. Many more species were observed by the Christmas counters than by Ridgway. However, if introduced species and species observed on only a few years out of the 15, are subtracted from the Christmas list, the two lists become more alike. Furthermore, if the migratory birds, not to be expected on the Christmas list, are subtracted from Ridgway's list they become still more alike. However, the two lists modified thusly are not the same, and the residual differences are difficult to explain.

It is astonishing that Ridgway did not record any of the following in the five weeks of his residency there: Northern Harrier, Sharp-shinned Hawk, Red-tailed Hawk, Rough-legged Hawk, Golden Eagle, Prairie Falcon, Great Horned Owl, and Loggerhead Shrike. We observed these species during our short September visits, and they were recorded on most of the Christmas bird counts. The former scarcity of large trees around Unionville hardly could account for the apparent absence of these species in 1867 because they now thrive in parts of Nevada where trees are scarce and they range widely in their daily search for food. The avian community in the Unionville area appears to be more diverse now than it was in Ridgway's time.

AUSTIN, NEVADA

Ridgway visited Austin, a silver mining camp on the flank of the Toiyabe Range in central Nevada, in July, 1868, and we were there in July of 1997 and 1998. He was there about four days, and we were there about four days as well.

Today, Austin is a very small town of about 300, probably with fewer residents than in 1868. Ridgway described shrubby-lined brooks and extensive copses of aspens and choke-cherry bushes. On the lower slopes of the range, thin growths of juniper and pinyon prevailed whereas the ridges were partly covered by stunted growths of mountain mahogany. His description fits the present conditions quite closely; there seems to have been little change in the environment since the Fortieth Parallel Survey.

Ridgway reported 35 species and we saw 33, indicating no significant change in overall diversity at this location (Table 4).

RUBY MOUNTAINS, NEVADA

Ridgway camped at various points on the east side of the Ruby Mountains in northeastern Nevada for seven weeks in July, August, and September, 1868. We made several visits there totalling about two weeks between 1995 and 2000.

The Ruby Mountains actually are a single, long, high range. Alluvial fans slope away from the range and springs emerge at their margins. Ruby Marsh, fed by perennial springs, and Franklin Lake, fed by meltwater, border the range on the east side. Ruby Marsh now is the site of an extensive wildlife refuge accessible by roads along the dikes that separate the various ponds of more- or-less open water. Franklin Lake, just north of Ruby Marsh, is a large playa that normally is covered by shallow water in spring and, in wet years, is at least partially covered in summer and fall. Both Ridgway's and our observations were in canyons and on ridges, along the eastern slope of the range, and on alluvial fans between the range and the marsh. We included observations throughout Ruby Marsh, but, because he did not have access to open water in the interior of the marsh, Ridgway was hindered in observing waterfowl and waders.

Ridgway reported 94 species, and we recorded 105 (Table 5). For a fair comparison, most of the waterfowl and wading birds must be excluded from our list. Still, it seems strange that Ridgway did not report pelicans, gulls, terns, and Ospreys, which are easily visible in flight from the edge of the marsh. If waterfowl and waders are excluded from both lists, Ridgway's total count would be reduced to 81 and ours to 74. Had we spent five weeks in the area, as Ridgway did, our total probably would have equaled or exceeded his. The absence of warblers from our list is significant, and the absence of crossbills and Pine Siskins from our list may reflect the relatively short time we spent near timberline. It is notable that Ridgway reported no Steller's Jays on the mountainside, or magpies and crows, which now are common on the lower slopes.

EAST HUMBOLDT RANGE, NEVADA

Ridgway spent two weeks in and near the East Humboldt Range in late August and early September, 1868. We spent a total of about two weeks there in late August and September distributed between 1994 and 2000.

The East Humboldt Range is at the north end of the Ruby Mountains and separated from them only by a high pass. Ranches are located around the perimeter of the range where streams emerge from canyons, now as in Ridgway's time, but there are more of ranches now. Otherwise, the environment probably is similar to that in 1868.

Specifically, Ridgway's observations were at Secret Valley, "Dearing's Ranche," lower and upper Trout Creek, and the Clover Hills. Our observations were in Secret Valley, the Deering Creek area (probably the location of "Dearing's Ranche"), lower Trout Creek, and the Clover Hills. We substituted Angel Lake for upper Trout Creek; both are just below timberline at the north end of the range.

Ridgway observed 70 species and we saw 56 (Table 6). The chief difference between the two lists is the scarcity of warblers, vireos, and timberline species from ours. Other differences are also notable. Why did Ridgway not report any Killdeer, Scrub Jays, nutcrackers, Mountain Bluebirds or Red-winged Blackbirds? All of these are common now.

ANTELOPE ISLAND, UTAH

Ridgway spent five days on Antelope Island in June, 1869. We were there for a total of five days in June of 1994 and 1995.

Antelope Island is a fifteen-mile-long island in Great Salt Lake in northwestern Utah. Topographic relief is 2,400 feet. Sparse junipers are present at higher elevations, and sagebrush occurs in patches at all elevations, but the principal vegetation is grass. The island has a long history of sheep and cattle grazing and very sparse human settlement beginning in 1848. A ranch house and outbuildings dating from the earliest times still are present at a permanent spring on the east side of the island. The ranch house is the longest continuously occupied dwelling in Utah. The area around the ranch house includes outbuildings, deciduous shade trees, an orchard, and a cattail marsh. Ridgway made most of his observations near the ranch, as did we.

The entire island is now a State Park and is accessible by a causeway at the north end. Picnic facilities at the north end of the island are used by small numbers of people on weekends in summer, but the effects of human intrusion on the wildlife are minor. The sheep and cattle, present in Ridgway's time, are gone now, but about 600 bison in small herds roam freely over the island, taking the place of the sheep and cattle. The environment probably is much the same as it was when Ridgway visited the island in 1869.

Ridgway observed 21 species; we saw 41 (Table 7). Several species not observed by Ridgway in 1869 were very abundant in 1994-5. These include Eared Grebe, American Avocet, Willet, California Gull, Black-billed Magpie, Horned Lark, and Western Meadowlark. Others not reported by Ridgway are common. These include American White Pelican, Canada Geese, Great Blue Heron, Black-necked Stilt, Barn Swallow, Yellow-headed Blackbird, and Brewer's Blackbird.

In general, the avian community appears to be more diverse than it was in 1869. The reasons for this are not clear. Changes in the salinity of the lake affecting the food supply for waterfowl and waders can be factors. According to records that have been meticulously kept since the earli-

est days of settlement, the lake level was very high in 1869 and therefore salinity was relatively low. Also, when the level is high, the shoreline encroaches on low-lying vegetated areas, providing very good habitat for birds. The lake level and the salinity were about average in 1994-5, and a gravelly beach bordered the lake. The relatively high lake level in Ridgway's time should have favored a relatively high species count. Indiscriminate shooting and egg-collecting by early settlers may be contributing factors affecting population changes, but, in view of the sparsity of humans on the island, the apparently greater diversity now probably represents a significant increase in several species due to unknown natural causes.

CONCLUSIONS

A fair over-all comparison must compensate for random lucky or unlucky breaks and especially for the fact that Ridgway was not able to get to the open water along the east side of the Ruby Mountains, whereas we had ample opportunity to do so. Accordingly, we prepared two lists designed to eliminate the effects of luck and road-building in Ruby Marsh. Table 8 shows species we did not see at *any* of the six localities but that Ridgway saw at two or more localities. Table 9 shows species that Ridgway did not see at *any* locality but that we saw at two or more localities. We eliminated introduced species from this list. We conclude that, overall, we saw more water-loving birds than did Ridgway, and he saw more warblers and vireos than did we. An additional difference is that he saw more birds common at high altitudes in summer, such as juncos, Blue Grouse, and crossbills, possibly because he spent more time near timberline than we did; however, that is not certain. Of the residual differences, the lack of Great Horned Owls on Ridgway's list is most remarkable because we observed them at five of six localities, and the Wallaces saw them at Unionville on every one of their 15 Christmas counts. He saw no American Crows and we saw them at four localities. Lesser Goldfinches and Short-eared Owls appear to be more abundant now, and Spotted Sandpiper, Willow Flycatcher, Hammond's Flycatcher, Canyon Wren, Ruby-crowned Kinglet, and Swainson's Thrush appear to be less so.

Some of the differences between Ridgway's lists and ours could be due to the differing physical conditions of observation. Among Ridgway's advantages were the many hours he had available each day for observing; the use of a horse for stalking and access; and the opportunity for collecting specimens to be identified in his hand – a very great asset with respect to warblers and vireos half hidden among leaves in the cottonwood trees. Our advantages included a car for cover and mobility, good binoculars and a good spotting scope, but most of our days were relatively short – from mid-morning to late afternoon.

The human population in our six localities is not greatly different now compared with Ridgway's time, but its effect on the avian community may have changed over the years. There was probably more indiscriminate shooting of both game and non-game species in Ridgway's time, which could have reduced the numbers or visibility of some species significantly.

Our purpose was to detect any long-term changes in the avian community that could be ascribed to natural, as opposed to human, causes. It may be an impossible task: the human footprint, however light, is everywhere. The data of this report suggest that some species have declined and others have increased. Overall, whatever the causes, diversity of avian communities in areas of minimal human intrusion appears to be about equal to that of Ridgway's time.

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Figure 1. Index map showing localities cited in this report. 1, Fort Churchill; 2, Unionville; 3, Austin; 4, Ruby Mountains; 5, East Humboldt Range; 6, Antelope Island.

TABLE 1, FORT CHURCHILL, NEVADA

June 23-24, 1868

**June 18-19, 1994 (1.5 days)
July 3-5, 1997 (1.5 days)**

	083 Great Blue Heron
	084 Great Egret
	087 Snowy Egret
	099 White-faced Ibis
	118 Canada Goose
	126 Mallard
	165 Turkey Vulture
	167 Osprey
187 Swainson's Hawk-----	
191 Red-tailed Hawk-----	191 Red-tailed Hawk
197 American Kestrel-----	197 American Kestrel
	226 Wild Turkey
	231 California Quail
	267 Killdeer
	285 Willet
289 Spotted Sandpiper-----	
	354 Ring-billed Gull
	416 Rock Dove
	429 Mourning Dove
	456 Great-horned Owl
	472 Common Nighthawk
475 Common Poorwill-----	
480 Black Swift-----	
531 Hairy Woodpecker-----	530-531 Downy or Hairy Woodpecker
537 Northern Flicker-----	537 Northern Flicker
544 Western Wood-Pewee-----	544 Western Wood-Pewee
	557 Black Phoebe
	559 Say's Phoebe
562 Ash-throated Flycatcher-----	
574 Western Kingbird-----	574 Western Kingbird
593 Cliff Swallow-----	593 Cliff Swallow
	595 Barn Swallow
	606 Black-billed Magpie
	609 American Crow
	615 Common Raven
637 Rock Wren-----	637 Rock Wren
638 Canyon Wren-----	
641 House Wren-----	641 House Wren
673 Western Bluebird-----	673 Western Bluebird
692 American Robin-----	692 American Robin
726 Loggerhead Shrike-----	
	727 European Starling
	737 Solitary Vireo

740	Warbling Vireo-----		
758	Yellow Warbler-----		
794	Wilson's Warbler-----		
802	Yellow-breasted Chat-----		
819	Lazuli Bunting-----		
828	Rufous-sided Towhee-----	828	Rufous-sided (Spotted) Towhee
844	Brewer's Sparrow-----		
849	Lark Sparrow-----		
850	Black-throated Sparrow-----	850	Black-throated Sparrow
851	Sage Sparrow-----		
888	Western Meadowlark-----	884	Red-winged Blackbird
891	Brewer's Blackbird-----	888	Western Meadowlark
905	Northern Oriole-----	891	Brewer's Blackbird
916	House Finch-----	905	Northern (Bullock's) Oriole
		916	House Finch
		953	House Sparrow

TABLE 2, UNIONVILLE, NEVADA

September 17-October 23, 1867
(a=abundant; c=common; r=rare)

September 15, 1994; September 6-14, 1995 (short days)

September 17, 1996

September 8,9,11, 1997 (short days)

	083 Great Blue Heron
	092 Cattle Egret
	097 American Kestrel
	099 White-faced Ibis
	165 Turkey Vulture
	176 Northern Harrier
	177 Sharp-shinned Hawk
178 Cooper's Hawk r-----	
	191 Red-tailed Hawk
	194 Golden Eagle
	201 Prairie Falcon
	210 Chukar
222 Sage Grouse r-----	
	231 California Quail
	267 Killdeer
	416 Rock Dove
429 Mourning Dove r-----	429 Mourning Dove
	456 Great Horned Owl
	462 Burrowing Owl
	507 Broad-tailed Hummingbird
	514 Belted Kingfishers
	517 Lewis' Woodpecker
537 Northern Flicker (red) c-----	537 Northern Flicker
537 Northern Flicker (yellow) r-----	
553 Gray Flycatcher r-----	
	544 Western Wood-Pewee
	554 Western(?) Flycatcher
559 Say's Phoebe c-----	559 Say's Phoebe
582 Horned Lark c-----	582 Horned Lark
	595 Barn Swallow
602 Scrub Jay c-----	602 Scrub Jay
606 Black-billed Magpie a-----	606 Black-billed Magpie
	609 American Crow
615 Common Raven c-----	615 Common Raven
628 Bushtit a-----	628 Bushtit
637 Rock Wren a-----	637 Rock Wren
645 American Dipper c-----	
653 Golden-crowned Kinglet r-----	
654 Ruby-crowned Kinglet c-----	
674 Mountain Bluebird a-----	

692 American Robin a-----
719 American Pipit r-----
737 Solitary Vireo r-----
750 Orange-crowned Warbler a-----
763 Yellow-rumped Warbler a-----
794 Wilson's Warbler a-----
828 Rufous-sided Towhee r-----

854 Savannah Sparrow c-----
862 Song Sparrow va-----
866 Golden-crowned Sparrow r-----
867 White-crowned Sparrow va-----
869 Dark-eyed Junco (Oregon) va-----
884 Red-winged Blackbird c-----
888 Western Meadowlark c-----
891 Brewer's Blackbird va-----
905 Northern Oriole r-----
916 House Finch c-----

692 American Robin
702 Sage Thrasher

726 Loggerhead Shrike
727 European Starling

79x warbler

809 Western Tanager
828 Rufous-sided Towhee
844 Brewer's Sparrow
848 Vesper Sparrow
851 Sage Sparrow

862 Song Sparrow

867 White-crowned Sparrow

884 Red-winged Blackbird
888 Western Meadowlark

916 House Finch
922 Lesser Goldfinch
924 American Goldfinch

TABLE 3, UNIONVILLE, NEVADA

Sept. 17-Oct. 23, 1867

(a=abundant, c=common, r=rare).

178	Cooper's Hawk	r-----
222	Sage Grouse	r-----
429	Mourning Dove	r-----
537	Northern Flicker (red)	c-----
537	Northern Flicker (yellow)	r-----
553	Gray Flycatcher	r-----
559	Say's Phoebe	c-----
582	Horned Lark	c-----
602	Scrub Jay	c-----
606	Black-billed Magpie	a-----
615	Common Raven	c-----

Dec.-Jan. 1963-1991 (Figures to right are number of years the species were observed out of 15 annual counts).

083	Great Blue Heron	3
121	Green-winged Teal	1
131	Northern Pintail	1
126	Mallard	3
176	Northern Harrier	10
177	Sharp-shinned Hawk	8
178	Cooper's Hawk	3
187	Swainson's Hawk	1
191	Red-tailed Hawk	15
193	Rough-legged Hawk	11
194	Golden Eagle	10
197	American Kestrel	9
198	Merlin	1
201	Prairie Falcon	8
202	Peregrine Falcon	1
205	Gray Partridge	1
210	Chukar	6
214	Ring-necked Pheasant	4
231	California Quail	15
267	Killdeer	4
333	Common Snipe	7
416	Rock Dove	2
454	Western Screech owl	1
456	Great Horned Owl	15
514	Belted Kingfisher	2
517	Lewis' Woodpecker	1
523	Yellow-bellied Sapsucker	3
530	Downy Woodpecker	5
531	Hairy Woodpecker	4
537	Northern Flicker (red)	15
582	Horned Lark	15
602	Scrub Jay	14
606	Black-billed Magpie	15
615	Common Raven	15

628	Bushtit	a-----	619	Mountain Chickadee	6
637	Rock Wren	a-----	625	Plain Titmouse	2
			628	Bushtit	11
			637	Rock Wren	1
			638	Canyon Wren	7
645	American Dipper	c-----	640	Bewick's Wren	2
653	Golden-crowned Kinglet	r-----	642	Winter Wren	1
654	Ruby-crowned Kinglet	c-----	645	American Dipper	1
674	Mountain Bluebird	a-----	653	Golden-crowned Kinglet	2
			654	Ruby-crowned Kinglet	8
			675	Townsend's Solitaire	12
692	American Robin	a-----	683	Hermit Thrush	2
719	American Pipit	r-----	692	American Robin	11
			721	Bohemian Waxwing	1
			722	Cedar Waxwing	3
			725	Northern Shrike	3
			726	Loggerhead Shrike	13
			727	European Starling	14
737	Solitary Vireo	r-----			
750	Orange-crowned Warbler	a-----	762	Black-throated Blue Warbler	1
			763	Yellow-rumped Warbler	5
763	Yellow-rumped Warbler	a-----	828	Rufous-sided Towhee	10
794	Wilson's Warbler	a-----	841	American Tree Sparrow	1
828	Rufous-sided Towhee	r-----	851	Sage Sparrow	5
			862	Song Sparrow	14
854	Savannah Sparrow	c-----	866	Golden-crowned Sparrow	2
862	Song Sparrow	va-----	867	White-crowned Sparrow	13
866	Golden-crowned Sparrow	r-----	868	Harris' Sparrow	1
867	White-crowned Sparrow	va-----	869	Dark-eyed Junco (slate)	5
			869	Dark-eyed Junco (Oregon)	15
			888	Western Meadowlark	5
869	Dark-eyed Junco (Oregon)	va-----	891	Brewer's Blackbird	1
884	Red-winged Blackbird	c-----	897	Brown-headed Cowbird	1
888	Western Meadowlark	c-----			
891	Brewer's Blackbird	va-----	912	Pine Grosbeak	1
			914	Purple Finch	1
			916	House Finch	6
			921	Pine Siskin	1
905	Northern Oriole	r-----	922	Lesser Goldfinch	5
			924	American Goldfinch	4
			930	Evening Grosbeak	1
			953	House Sparrow	13
916	House Finch	c-----			

TABLE 4, AUSTIN, NEVADA

July 2-5, 1868

**July 5-8, 1997 (2.5 days total)
July 21-22, 1998 (1+ day total)**

165	Turkey Vulture-----
187	Swainson's Hawk-----
191	Red-tailed Hawk-----
192	Ferruginous Hawk-----
194	Golden Eagle-----
429	Mourning Dove-----
472	Common Nighthawk-----
475	Common Poorwill-----
553	Gray Flycatcher-----
562	Ash-throated Flycatcher-----
574	Western Kingbird-----
582	Horned Lark-----
589	Violet-green Swallow-----
593	Cliff Swallow-----
595	Barn Swallow-----
604	Pinyon Jay-----
615	Common Raven-----
637	Rock Wren-----
674	Mountain Bluebird-----
692	American Robin-----
702	Sage Thrasher-----
726	Loggerhead Shrike-----
740	Warbling Vireo-----
816	Black-headed Grosbeak-----
819	Lazuli Bunting-----
827	Green-tailed Towhee-----
828	Rufous-sided Towhee-----
842	Chipping Sparrow-----
844	Brewer's Sparrow-----
848	Vesper Sparrow-----
849	Lark Sparrow-----
851	Sage Sparrow-----
888	Western Meadowlark-----
891	Brewer's Blackbird-----
905	Northern Oriole-----

165	Turkey Vulture
176	Northern Harrier
177	Sharp-shinned Hawk
187	Swainson's Hawk
191	Red-tailed Hawk
194	Golden Eagle
197	American Kestrel
201	Prairie Falcon
429	Mourning Dove
472	Common Night Hawk
537	Red-shafted Flicker
507	Broad-tailed Hummingbird
574	Western Kingbird
589	Violet-green Swallow
593	Cliff Swallow
595	Barn Swallow
606	Black-billed Magpie
615	Common Raven
619	Mountain Chickadee
637	Rock Wren
641	House Wren
674	Mountain Bluebird
692	American Robin
702	Sage Thrasher
809	Western Tanager
819	Lazuli Bunting
827	Green-tailed Towhee
828	Rufous-sided (Spotted) Towhee
844	Brewer's Sparrow
848	Vesper Sparrow
891	Brewer's Blackbird
921	Pine Siskin
953	House Sparrow

TABLE 5, RUBY MOUNTAINS, NEVADA

July 12--September 5, 1868

August 30--September 1 1995
 August 25-28, 1996
 September 4-6, 1997
 July 09-12, 1998, August 24, 2000

009	Red-necked Grebe-----	007	Pied-billed Grebe
		010	Eared Grebe
		011	Western Grebe
		068	American White Pelican
080	American Bittern-----	71	Double-crested Cormorant
		80	American Bittern
		083	Great Blue Heron
		084	Great Egret
		087	Snowy Egret
		092	Cattle Egret
		094	Black-crowned Night-Heron
099	White-faced Ibis-----	099	White-faced Ibis
		108	Trumpeter Swan
118	Canada Goose-----	118	Canada Goose
126	Mallard-----	126	Mallard
		135	Northern Shoveler
		140	Canvasback
		141	Redhead
		145	Lesser Scaup
		162	Ruddy Duck
165	Turkey Vulture-----	165	Turkey Vulture
		167	Osprey
176	Northern Harrier-----	176	Northern Harrier
178	Cooper's Hawk-----	178	Cooper's Hawk
187	Swainson's Hawk-----	187	Swainson's Hawk
191	Red-tailed Hawk-----	191	Red-tailed Hawk
193	Rough-legged Hawk-----		
		192	Ferruginous Hawk
194	Golden Eagle-----	194	Golden Eagle
197	American Kestrel-----	197	American Kestrel
		198	Merlin
201	Prairie Falcon-----	201	Prairie Falcon
202	Peregrine Falcon-----		
217	Blue Grouse-----	222	Sage Grouse
235	Black Rail-----	240	Sora
		248	American Coot
248	American Coot-----	251	Sandhill Crane
251	Sandhill Crane-----	267	Killdeer
267	Killdeer-----	273	Black-necked Stilt
289	Spotted Sandpiper-----		

333 Common Snipe-----
 381 Forster's Tern-----
 389 Black Tern-----
 429 Mourning Dove-----
 472 Common Nighthawk-----
 475 Common Poorwill-----
 487 White-throated Swift-----
 502 Black-chinned Hummingbird----
 505 Calliope Hummingbird-----
 507 Broad-tailed Hummingbird-----
 514 Belted Kingfisher-----
 531 Hairy Woodpecker-----
 537 Northern Flicker-----
 542 Olive-sided Flycatcher-----
 544 Western Wood Pewee-----
 549 Willow Flycatcher-----
 551 Hammond's Flycatcher-----
 553 Gray Flycatcher-----
 559 Say's Phoebe-----
 562 Ash-throated Flycatcher-----
 574 Western Kingbird-----
 589 Violet-green Swallow-----
 593 Cliff Swallow-----
 595 Barn Swallow-----
 602 Scrub Jay-----
 604 Pinyon Jay-----
 605 Clark's Nutcracker-----
 615 Common Raven-----
 619 Mountain Chickadee-----
 628 Bushtit-----
 637 Rock Wren-----
 638 Canyon Wren-----
 641 House Wren-----
 644 Marsh Wren-----
 674 Mountain Bluebird-----
 682 Swainson's Thrush-----
 692 American Robin-----
 702 Sage Thrasher-----

333 Common Snipe
 337 Wilson's Phalarope
 355 California Gull
 373 Caspian Tern
 381 Forster's Tern
 389 Black Tern
 429 Mourning Dove
 456 Great Horned Owl
 468 Short-eared Owl
 472 Common Nighthawk
 475 Common Poorwill
 502 Black-chinned Hummingbird
 505 Calliope Hummingbird
 530 Downy Woodpecker
 517 Lewis' Woodpecker
 531 Hairy Woodpecker
 537 Northern Flicker
 544 Western Wood-Pewee
 553 Gray Flycatcher
 559 Say's Phoebe
 562 Ash-throated Flycatcher
 574 Western Kingbird
 582 Horned Lark
 588 Tree Swallow
 589 Violet-green Swallow
 593 Cliff Swallow
 595 Barn Swallow
 598 Steller's Jay
 602 Scrub Jay
 604 Pinyon Jay
 605 Clark's Nutcracker
 606 Black-billed Magpie
 609 American Crow
 615 Common Raven
 619 Mountain Chickadee
 625 Plain Titmouse
 628 Bushtit
 637 Rock Wren
 641 House Wren
 644 Marsh Wren
 655 Blue-gray Gnatcatcher
 674 Mountain Bluebird
 692 American Robin
 702 Sage Thrasher
 722 Cedar Waxwing

726	Loggerhead Shrike-----	726	Loggerhead Shrike
		727	European Starling
736	Gray Vireo-----	736	Gray Vireo
740	Warbling Vireo-----		
752	Virginia's Warbler-----		
758	Yellow Warbler-----	758	Yellow Warbler
		763	Yellow-rumped Warbler
764	Black-throated Gray Warbler---		
765	Townsend's Warbler-----		
766	Hermit Warbler-----		
790	MacGillivray's Warbler-----		
791	Common Yellowthroat-----	791	Common Yellowthroat
794	Wilson's Warbler-----		
802	Yellow-breasted Chat-----	802	Yellow-breasted Chat
809	Western Tanager-----		
816	Black-headed Grosbeak-----	816	Black-headed Grosbeak
819	Lazuli Bunting-----	819	Lazuli Bunting
827	Green-tailed Towhee-----		
828	Rufous-sided Towhee-----	828	Rufous-sided Towhee
842	Chipping Sparrow-----	842	Chipping Sparrow
844	Brewer's Sparrow-----	844	Brewer's Sparrow
848	Vesper Sparrow-----	848	Vesper Sparrow
849	Lark Sparrow-----	849	Lark Sparrow
851	Sage Sparrow-----		
854	Savannah Sparrow-----	854	Savannah Sparrow
856	Grasshopper Sparrow-----		
862	Song Sparrow-----	862	Song Sparrow
		863	Lincoln's Sparrow
883	Bobolink-----	883	Bobolink
884	Red-winged Blackbird-----	884	Red-winged Blackbird
888	Western Meadowlark-----	888	Western Meadowlark
889	Yellow-headed Blackbird-----	889	Yellow-headed Blackbird
891	Brewer's Blackbird-----	891	Brewer's Blackbird
		894	Common Grackle
905	Northern Oriole-----		
915	Cassin's Finch-----		
917	Red Crossbill-----		
918	White-winged Crossbill-----		
921	Pine Siskin-----		

TABLE 6, EAST HUMBOLDT RANGE, NEVADA

September 6-20, 1868

September 6 to 8, 1994
 September 15 to 17, 1995
 August 24 and 29, 1996
 September 7, 1997, August 23, 25 to 28, 2000

165	Turkey Vulture-----	126	Mallard
176	Northern Harrier-----	165	Turkey Vulture
177	Sharp-shinned Hawk-----	176	Northern Harrier
178	Cooper's Hawk-----	177	Sharp-shinned Hawk
187	Swainson's Hawk-----	178	Cooper's Hawk
191	Red-tailed Hawk-----	187	Swainson's Hawk
		191	Red-tailed Hawk
194	Golden Eagle-----	192	Ferruginous Hawk
197	American Kestrel-----	194	Golden Eagle
198	Merlin-----	197	American Kestrel
201	Prairie Falcon-----	201	Prairie Falcon
217	Blue Grouse-----		
222	Sage Grouse-----		
225	Sharp-tailed Grouse-----		
		251	Sandhill Crane
429	Mourning Dove-----	267	Killdeer
		333	Common Snipe
467	Long-eared Owl-----	416	Rock Dove
		429	Mourning Dove
475	Common Poorwill-----	456	Great Horned Owl
507	Broad-tailed Hummingbird-----		
508	Rufous Hummingbird-----	472	Common Nighthawk
514	Belted Kingfisher-----	475	Common Poorwill
517	Lewis' Woodpecker-----		
524	Red-naped Sapsucker	514	Belted Kingfisher
530	Downy Woodpecker-----	517	Lewis' Woodpecker
531	Hairy Woodpecker-----	524	Red-naped Sapsucker
537	Northern Flicker-----		
544	Western Wood-Pewee-----	537	Northern Flicker
551	Hammond's Flycatcher-----	544	Western Wood-Pewee
553	Gray Flycatcher-----		
		559	Say's Phoebe
582	Horned Lark-----	574	Western Kingbird
		589	Violet-green Swallow
		595	Barn Swallow
		602	Scrub Jay
		604	Pinyon Jay

606	Black-billed Magpie-----	605	Clark's Nutcracker
		606	Black-billed Magpie
615	Common Raven-----	609	American Crow
616	Black-capped Chickadee-----	615	Common Raven
619	Mountain Chickadee-----	616	Black-capped Chickadee
629	Red-breasted Nuthatch-----	619	Mountain Chickadee
637	Rock Wren-----		
641	House Wren-----	637	Rock Wren
654	Ruby-crowned Kinglet-----		
		674	Mountain Bluebird
682	Swainson's Thrush-----		
683	Hermit Thrush-----	692	American Robin
692	American Robin-----	702	Sage Thrasher
702	Sage Thrasher-----		
722	Cedar Waxwing-----	726	Loggerhead Shrike
726	Loggerhead Shrike-----	727	European Starling
737	Solitary Vireo-----		
740	Warbling Vireo-----		
750	Orange-crowned Warbler-----		
751	Nashville Warbler-----	758	Yellow Warbler
758	Yellow Warbler-----		
763	Yellow-rumped Warbler-----		
765	Townsend's Warbler-----		
790	MacGillivray's Warbler-----		
791	Common Yellowthroat-----		
794	Wilson's Warbler-----		
809	Western Tanager-----		
819	Lazuli Bunting-----		
827	Green-tailed Towhee-----		
844	Brewer's Sparrow-----		
848	Vesper Sparrow-----	848	Vesper Sparrow
849	Lark Sparrow-----	849	Lark Sparrow
854	Savannah Sparrow-----	854	Savannah Sparrow
861	Fox Sparrow-----		
862	Song Sparrow-----	862	Song Sparrow
863	Lincoln's Sparrow-----	863	Lincoln's Sparrow
867	White-crowned Sparrow-----	867	White-crowned Sparrow
869	Dark-eyed Junco-----		
		883	Bobolink
		884	Red-winged Blackbird
888	Western Meadowlark-----	888	Western Meadowlark
		889	Yellow-headed Blackbird
891	Brewer's Blackbird-----	891	Brewer's Blackbird
		916	House Finch
917	Red Crossbill-----		
918	White-winged Crossbill-----		
921	Pine Siskin-----		
		922	Lesser Goldfinch (black-back)
924	American Goldfinch-----		

TABLE 7, ANTELOPE ISLAND, UTAH

June 4-8, 1869

June 12-14, 1994; June 2-3, 1995

June 4-8, 1869		June 12-14, 1994; June 2-3, 1995	
		010	Eared Grebe
		068	American White Pelican
		071	Double-crested Cormorant
		083	Great Blue Heron
		118	Canada Goose
		126	Mallard
		136	Gadwall
		176	Northern Harrier
		197	American Kestrel
		202	Peregrine Falcon
		210	Chukar
267	Killdeer-----	267	Killdeer
		273	Black-necked Stilt
		274	American Avocet
		285	Willet
299	Long-billed Curlew-----	299	Long-billed Curlew
		355	California Gull
429	Mourning Dove-----	429	Mourning Dove
549	Willow Flycatcher-----		
		456	Great Horned Owl
		468	Short-eared Owl
		537	Northern Flicker
		559	Say's Phoebe
		574	Western Kingbird
582	Horned Lark-----	582	Horned Lark
		595	Barn Swallow
		606	Black-billed Magpie
615	Common Raven-----	615	Common Raven
		637	Rock Wren
674	Mountain Bluebird-----		
		692	American Robin
699	Gray Catbird-----		
		700	Northern Mockingbird
702	Sage Thrasher-----	702	Sage Thrasher
		719	American Pipit
726	Loggerhead Shrike-----	726	Loggerhead Shrike
		727	European Starling
740	Warbling Vireo-----		
780	American Redstart-----		
819	Lazuli Bunting-----		
828	Rufous-sided Towhee-----		
844	Brewer's Sparrow-----		

849 Lark Sparrow-----
850 Black-throated Sparrow-----

854 Savannah Sparrow-----

884 Red-winged Blackbird-----

905 Northern Oriole-----
916 House Finch-----

849 Lark Sparrow

851 Sage Sparrow

862 Song Sparrow
884 Red-winged Blackbird
888 Western Meadowlark
889 Yellow-headed Blackbird
891 Brewer's Blackbird

TABLE 8
**Species not observed by us at any locality
but reported by Ridgway at two or more localities**
(single digits=number of localities)

2	217--Blue Grouse
2	289--Spotted Sandpiper
2	549--Willow Flycatcher
2	551--Hammond's Flycatcher
2	638--Canyon Wren
2	654--Ruby-crowned Kinglet
2	682--Swainson's Thrush
5	740--Warbling Vireo
2	750--Orange-crowned Warbler
2	765--Townsend's Warbler
2	790--MacGillivray's Warbler
4	794--Wilson's Warbler
2	869--Dark-eyed Junco
2	917--Red Crossbill
2	918--White-winged Crossbill

TABLE 9
**Species not reported by Ridgway at any locality
but observed by us at two or more localities**
(single digits=number of localities)

2	010--Eared Grebe
2	068--American White Pelican
2	071--Double-crested Cormorant
4	083--Great Blue Heron
2	084--Great Egret
2	087--Snowy Egret
2	167--Osprey
2	273--Black-necked Stilt
2	285--Willet
2	355--California Gull
5	456--Great Horned Owl
2	468--Short-eared Owl
4	609--American Crow
2	922--Lesser Goldfinch