

Bird List of San Bernardino Ranch in Agua Prieta, Sonora, Mexico

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Abstract—Interest and investigation of birds has been increasing over the last decades due to the loss of their habitats, and declination and fragmentation of their populations. San Bernardino Ranch is located in the desert grassland region of northeastern Sonora, México. Over the last decade, restoration efforts have tried to address the effects of long deteriorating economic activities, like agriculture and livestock, that used to take place there. The generation of annual lists of the wildlife (flora and fauna) will be important information as we monitor the progress of restoration of this area. As part of our professional training, during the summer and winter (2011-2012) a taxonomic list of bird species of the ranch was made. During this season, a total of 85 species and 65 genera, distributed over 30 families were found. We found that five species are on a risk category in NOM-059-ECOL-2010 and 76 species are included in the Red List of the International Union for Conservation of Nature (IUCN). It will be important to continue this type of study in places that are attempting restoration and conservation techniques. We have observed a huge change, because of restoration activities, in the lands in the San Bernardino Ranch.

Introduction

Birds represent one of the most remarkable elements of our environment, because they're easy to observe and it's possible to find them practically anywhere. Approximately 12% of all bird species in the planet are found in Mexico, this corresponds to 1060 species of a total of 8500 (INECOL 1996). This enormous diversity is due, among other reasons, to a bird species with Nearctic (North America) and Neotropical (Middle and South America) affinities; Mexico is the contact zone between these two biogeographic regions (INECOL, 1996).

Sonora varies seasonally from moist and cool to dry and hot. Here the northern fringe of the tropics meets the southern end of the temperature region, bringing plants and animals from both sources into a single state (Russell and Monson 1998). Due to this, Sonora has varied habitats like the deserts, grassy plains, and rugged mountains that may be arid and barren, or forest clad and split by great canyons. River valleys are bordered by gallery woodlands or by irrigated fields (Russell and Monson 1998). These characteristics produce a rich, diversified, and interesting biota, which still awaits full study.

According to the book *Diversidad Biológica de Sonora* (Molina-Freaner and Van Devender 2009), the birds of Sonora include 556 species in 73 families and 20 orders, with 227 resident species, 46 summer residents, 223 long distance migratory and 50 partially

migratory (Villaseñor-Gómez et al., 2010). Twenty-eight of those species are considered at risk on a global scale, and are included in the Red List of the International Union for Conservation of Nature (IUCN). Two-hundred-ninety are in the Neotropical Migratory Bird Conservation Act (NMBCA) of the United States and 66 species in the Mexican Official Norm NOM-059-ECOL-2001 (SEMARNAT 2010).

The length of the migration period may vary considerably among different species. Most of the Sonoran birds (41%) are year-round residents. Only 8.3% are summer residents that nest after returning from a winter stay to the South. Another group is composed of birds that breed in the United States and Canada, and then migrate south for varying distances to spend the colder months in Sonora or passing through to continue as far as southern South America (Russell and Monson 1998).

The study area is considered as the continuation of Arizona's Southeast birds and the extreme Southeast New Mexico's birds, bringing a mix of species with tropical and nearctic distributions, becoming an ecotone between the Chihuahuan and Sonoran Desert, and the Sierra Madre Occidental that divides both deserts (Molina-Freaner and VanDevender, 2009). This region is part of the Madrean Archipelago that constitutes mountain formations isolated by "oceans" of grass and deserted shrubs, acting like barrels or bridges that limit or make a possible genetic inter, (2011).

The area of San Bernardino has a history of agriculture and livestock exploitation beyond the recovery capacity of the land. In the last 20 years, restoration processes have been implemented with good results, making it necessary to intensify politics and economical resources to maintain and continue the ecological improvement (CEDES 2011).

Birds are very sensitive to environmental changes and, therefore, they can be used as indicators of environmental transformations, through changes in their distribution and temporal differences in their abundance (Hutto 1998). Research has increased in the last decades,

In: Gottfried, Gerald J.; Ffolliott, Peter F.; Gebow, Brooke S.; Eskew, Lane G.; Collins, Loa C., comps. 2013. Merging science and management in a rapidly changing world: Biodiversity and management of the Madrean Archipelago III; 2012 May 1-5; Tucson, AZ. Proceedings. RMRS-P-67. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

due to the decline of many populations and fragmentation or loss of their habitats (Vickery et al., 1999). In recent years, vast areas have been cleared of all existing plant life and planted with African buffel grass (Poaceae: *Pennisetum ciliare*), creating a monoculture of little value to wildlife. Even more of Sonora is destined to be altered this way (Bowden 1993).

The objective of this work is to know the composition of bird species present in the San Bernardino Ranch, and contribute to the listing update of the wildlife of the area.

Area Description and Methods

The San Bernardino Ranch is located 31 kilometers from Agua Prieta-Janos road 31° 19' 0.20" N & 109° 15' 59.91" inside the State of Sonora. The observations occur on five different sites, locality one (L1) main house, locality two (L2) Silver Creek River, locality three (L3) San Bernardino River, locality four (L4) dam, locality five (L5) Cienega. The total area of observation was 3.9 km².

Three periods of observations were performed two times in daylight around 5 am to 11 am and from 5 pm to 7 pm. The first period was on July 4 to 10, 2011, called summer observation, and the other two periods were December 13 to 18, 2011, and March 14 to 18, 2012, being the winter observations. These dates were decided due to being part of our professional practices in our career as an obligatory process for our graduation.

Bird species were registered using direct observation by binoculars (10x42ALPEN and 12x42BUSHNELL) and the identification by field guides of birds such as Kaufman (2005), and Sibley (2000). There was no singing identification. A list of recorded species is presented as a main result of the study.

Results and Discussions

The total of species for all periods was of 85 species distributed in 30 families and 65 genus (table 1). On the summer observation (June) we observed a total of 46 species in 23 families and 42 genus. The winter observation's (December and March) results were of 63

Table 1—SBR total species of birds.

Order	Family <i>Scientific name</i>	Common name	Summer	Winter	NOM-059 -ECOL-2010 ^a	IUCN ^a
Accipitriformes	Accipitridae					
	<i>Accipiter cooperi</i>	Cooper's Hawk		x	Protección especial (PR)	
	<i>Buteo albonotatus</i>	Zone-tailed Hawk	x		Protección especial (PR)	
	<i>Buteo jamaicensis</i>	Red-tailed Hawk	x	x		Least Concern
	<i>Buteo regalis</i>	Ferruginous Hawk		x	Protección especial (PR)	Least Concern
	<i>Circus cyaneus</i>	Northern Harrier		x		Least Concern
	<i>Parabuteo unicinctus</i>	Harris's Hawk		x	Protección especial (PR)	Least Concern
	Cathartidae					
	<i>Cathartes aura</i>	Turkey Vulture	x	x		Least Concern
Anseriformes	Anatidae					
	<i>Anas strepera</i>	Gadwall		x		Least Concern
	<i>Aythya collaris</i>	Ring-necked Duck		x		Least Concern
	<i>Oxyura jamaicensis</i>	Ruddy Duck		x		Least Concern
Apodiformes	Apodidae					
	<i>Aeronautes saxatalis</i>	White-throated Swift		x		Least Concern
	Trochilidae					
	<i>Archilochus alexandri</i>	Black-chinned Hummingbird	x			Least Concern
	<i>Cynanthus latirostris</i>	Broad-billed Hummingbird	x	x		Least Concern
	<i>Selasphorus platycerus</i>	Broad-tailed Hummingbird	x			
Caprimulgiformes	Caprimulgidae					
	<i>Chordeiles acutipennis</i>	Lesser Nighthawk		x		Least Concern
	<i>Chordeiles minor</i>	Common Nighthawk	x	x		Least Concern
Charadriiformes	Charadriidae					
	<i>Charadrius vociferus</i>	Killdeer	x	x		Least Concern
	Scolopacidae					
	<i>Actitis macularius</i>	Spotted Sandpiper		x		Least Concern
Columbiformes	Columbidae					
	<i>Columbina inca</i>	Inca Dove	x	x		Least Concern
	<i>Streptopelia decaocto</i>	Eurasian Collared-Dove		x		Least Concern
	<i>Zenaida asiatica</i>	White-winged Dove	x	x		Least Concern
	<i>Zenaida macroura</i>	Mourning Dove	x	x		Least Concern
Cuculiformes	Cuculidae					
	<i>Geococcyx californianus</i>	Greater Roadrunner	x	x		Least Concern
Falconiformes	Falconidae					
	<i>Falco columbarius</i>	Merlin		x		Least Concern

Table 1—Continued.

Order	Family Scientific name	Common name	Summer	Winter	NOM-059 -ECOL-2010 ^a	IUCN ^a
Galliformes	Odontophoridae <i>Callipepla gambelii</i>	Gambel's Quail	x	x		Least Concern
Gruiformes	Rallidae <i>Fulica americana</i>	American Coot	x	x		Least Concern
Passeriformes	Bombycillidae <i>Bombycilla cedrorum</i>	Cedar waxwing		x		Least Concern
	Cardinalidae <i>Cardinalis cardinalis</i>	Northern Cardinal	x	x		Least Concern
	<i>Cardinalis sinuatus</i>	Pyrrhuloxia	x	x		Least Concern
	<i>Passerina caerulea</i>	Blue Grosbeak	x			Least Concern
	<i>Piranga rubra</i>	Summer Tanager		x		Least Concern
	Corvidae <i>Corvus corax</i>	Common Raven		x		Least Concern
	<i>Corvus cryptoleucus</i>	Chihuahuan Raven	x	x		Least Concern
	Emberizidae <i>Aimophila carpalis</i>	Rufous-winged Sparrow		x		
	<i>Aimophila ruficeps</i>	Rufous-crowned Sparrow		x		Least Concern
	<i>Amphispiza belli</i>	Sage Sparrow		x		Least Concern
	<i>Amphispiza bilineata</i>	Black-throated Sparrow	x	x		
	<i>Amphispiza quinquestriata</i>	Five-striped Sparrow		x		Least Concern
	<i>Chondestes grammacus</i>	Lark Sparrow		x		Least Concern
	<i>Melospiza melodia</i>	Song Sparrow		x		Least Concern
	<i>Passerculus sandwichensis</i>	Savannah Sparrow		x	Amenazada (A)	Least Concern
	<i>Pipilo chlorurus</i>	Green-tailed Towhee		x		Least Concern
	<i>Pipilo fuscus</i>	Canyon Towhee	x	x		Least Concern
	<i>Poecetes gramineus</i>	Vesper Sparrow	x	x		Least Concern
	<i>Spizella atrogularis</i>	Black-chinned Sparrow	x	x		Least Concern
	<i>Spizella passerina</i>	Chipping Sparrow		x		Least Concern
	<i>Zonotrichia leucophrys</i>	White-crowned Sparrow		x		Least Concern
	Fringillidae <i>Carduelis psaltria</i>	Lesser Goldfinch		x		Least Concern
	<i>Carpodacus mexicanus</i>	House Finch	x	x		Least Concern
	<i>Spinus tristis</i>	American Goldfinch	x			
	Hirundinidae <i>Hirundo rustica</i>	Barn Swallow	x			Least Concern
	<i>Tachycineta bicolor</i>	Tree Swallow		x		Least Concern
	Icteridae <i>Agelaius phoeniceus</i>	Red-winged Blackbird	x			Least Concern
	<i>Euphagus cyanocephalus</i>	Brewer's Blackbird		x		Least Concern
	<i>Molothrus ater</i>	Brown-headed Cowbird	x			
	<i>Molothrus aeneus</i>	Bronzed Cowbird	x			Least Concern
	<i>Quiscalus mexicanus</i>	Great-tailed Grackle	x			Least Concern
	Mimidae <i>Oreoscoptes montanus</i>	Sage Trasher		x		Least Concern
	Parulidae <i>Dendroica petechia</i>	Yellow Warbler	x			Least Concern
	<i>Geothlypis trichas</i>	Common Yellowthroat	x			Least Concern
	<i>Vermivora luciae</i>	Lucy's Warbler	x			
	<i>Vermivora ruficapilla</i>	Nashville Warbler	x			Least Concern
	Troglodytidae <i>Cistothorus palustris</i>	Marsh Wren		x		Least Concern
	<i>Thryomanes bewickii</i>	Bewick's Wren	x			Least Concern
	Turdidae <i>Turdus migratorius</i>	American Robin		x		Least Concern
	Tyrannidae <i>Contopus cooperi</i>	Olive-sided Flycatcher		x		Near Table

Table 1—Continued.

Order	Family Scientific name	Common name	Summer	Winter	NOM-059 -ECOL-2010 ^a	IUCN ^a	
Threatened	<i>Empidonax hammondii</i>	Hammond's Flycatcher		x		Least Concern	
	<i>Empidonax wrightii</i>	Gray Flycatcher		x		Least Concern	
	<i>Pyrocephalus rubinus</i>	Vermilion Flycatcher	x	x		Least Concern	
	<i>Sayornis nigricans</i>	Black Phoebe	x	x		Least Concern	
	<i>Sayornis phoebe</i>	Eastern Phoebe		x		Least Concern	
	<i>Sayornis saya</i>	Say's Phoebe	x	x		Least Concern	
	<i>Myiarchus cinerascens</i>	Ash-throated Flycatcher	x			Least Concern	
	<i>Tyrannus melancholicus</i>	Tropical Kingbird	x			Least Concern	
	Vireonidae						
		<i>Vireo gilvus</i>	Warbling Vireo	x			Least Concern
		<i>Vireo huttoni</i>	Hutton's Vireo		x		Least Concern
	Pelecaniformes	Ardeidae					
		<i>Ardea herodias</i>	Great Blue Heron	x			
		<i>Egretta caerulea</i>	Little Blue Heron	x	x		Least Concern
Piciformes	Picidae						
	<i>Melanerpes formicivorus</i>	Acorn Woodpecker	x			Least Concern	
	<i>Melanerpes uropygialis</i>	Gila Woodpecker	x	x		Least Concern	
	<i>Picoides arizonae</i>	Arizona Woodpecker		x		Least Concern	
	<i>Picoides villosus</i>	Hairy Woodpecker		x		Least Concern	
	<i>Sphyrapicus nuchalis</i>	Red-naped Sapsucker		x		Least Concern	
Strigiformes	Strigidae						
	<i>Bubo virginianus</i>	Great Horned Owl	x	x		Least Concern	
	Tytonidae						
	<i>Tyto alba</i>	Barn Owl	x			Least Concern	
Total	30		46	63	5	76	
	85						

^aSpecies found in the NOM-059-ECOL-2010 and the International Union for Conservation of Nature are marked with the risk category under where they are established.

species in 28 families and 51 genus. In December we identified 35 species and in March 43 species were identified.

The 24 species that were in all observations were Black-throated sparrow (*Amphispiza bilineata*), Great Horned Owl (*Bubo virginianus*), Red-tailed Hawk (*Buteo jamaicensis*), Gambel's Quail (*Callipepla gambelii*), House Finch (*Capodarcus mexicanus*), Northern Cardinal (*Cardinalis cardinalis*), Pyrrhuloxia (*Cardinalis sinuatus*), Turkey Vulture (*Cathartes aura*), Killdeer (*Charadrius vociferus*), Common Nighthawk (*Chordeiles minor*), Inca Dove (*Columbina inca*), Chihuahuan Raven (*Corvus cryptoleucus*), Broad-billed Hummingbird (*Cyanthus latirostris*), Little Blue Heron (*Egretta caerulea*), American Coot (*Fulica americana*), Greater Roadrunner (*Geococcyx californianus*), Acorn Woodpecker (*Melanerpes uropygialis*), Canyon Towhee (*Pipilo fuscus*), Vesper Sparrow (*Pooecetes gramineus*), Vermilion Flycatcher (*Pyrocephalus rubinus*), Black Phoebe (*Sayornis nigricans*), Black-chinned Sparrow (*Spizella atrogularis*), White-winged Dove (*Zenaida asiatica*), Mourning Dove (*Zenaida macroura*).

We found that five species are on a risk category in NOM-059-ECOL-2010, four are in Special Protection (Pr): Cooper's Hawk (*Accipiter cooperi*), Zone-tailed Hawk (*Buteo albonotatus*), Red-tailed Hawk (*Buteo jamaicensis*), Ferruginous Hawk (*Buteo regalis*), Harris's Hawk (*Parabuteo unicinctus*); one is threatened (A): Savannah Sparrow (*Passerculus sandwichensis*); and none is endemic of Mexico; 76 species are included in the Red List of the International Union for Conservation of Nature (IUCN) as least concern "LC" and one species is near threatened "NT" (Olive-sided Flycatcher). This is important

because the risk species help to declare protected areas, ensuring the preservation of the rich flora, fauna, and environmental services.

In August and October of 2005, Rob Hunt made a report of bird observations in the San Bernardino Ranch, and found 61 species of birds. We found 31 of those observed; we didn't know exactly the area where the observations took place, so we can't compare the total or both results (Cuenca Los Ojos 2012).

The San Bernardino National Wildlife Refuge (SBNWR) located in the border east of Douglas Arizona, next to the San Bernardino Ranch, has 30 years of protecting water resources and habitats. They have registered over 270 species of birds; if we consider those data as 100% of the bird species present in SBNWR, we can say that we have observed 31.48% of species. Also, the SBNWR has an area of 9.34 km² and our area of observations was made on 3.9 km² (U.S. Fish & Wildlife Service 2011).

Conclusions

It is important to keep having this type of study in places that are actively implementing restoration and conservation techniques. We have seen a huge change in the lands in the San Bernardino Ranch; there is more retained soil and water, which attracts many diverse species. Also, we didn't find considerable threatened species in the Red List of IUCN and NOM-059-ECOL-2010, but we are aware that actions of conservation and restoration in the future will bring a healthy habitat that would help in the improvement and development of the ecological interactions.

Acknowledgments

We would like to thank to Valer Austin for all the support and time he shared with us by getting to know the Ranch and working in it. Also, to Cindy Tolle who helped in the making of this work, and to all the people of the Ranch, Don Pancho, Lázaro, Lili, Juana, Bernardino and Samuel. Special thanks to our professor M.Sc. Gilberto Solís who introduced us to the Ranch; to Dra. Reyna A. Castillo Gámez for letting us use her field material and helpful comments; and to Dr. Alejandro Varela Romero for his help in the professional practices, and some comments on the manuscript. Thanks to our friends Erandi, Valeria, Cali, Carlos, Gert, David and JR for their support.

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