

# Alberta Northwest Species at Risk: Acoustic Monitoring Summary 2019-2020 Autonomous Recording Unit (ARU) Pilot

## *Background and Methods*

Birds are an ecologically and culturally important part of biological communities. Birds are often used as indicators of ecosystem health as many are sensitive to environmental changes. For instance, almost one-third of songbirds that breed in Alberta's boreal forest meet their nesting and foraging requirements in old-forest habitats, and are sensitive to changes in old-forest habitats. Monitoring these species helps us understand both the state of bird populations and the ecosystems they inhabit. Additionally, there are many bird species that are declining due to a combination of anthropogenic and natural causes that are important to consider in land management.

Autonomous recording units (ARUs) are used to remotely survey a variety of vocalizing species such as birds and bats. The units are installed to a tree or other vertical structure and programmed to passively record ambient sounds at set times of day over long periods of time. The recordings are listened to and species identified by their vocalizations. There are many advantages to monitoring bird communities using ARUs over traditional methods such as point counts or using playbacks. The results have a greater level of quality control as the recordings can be reviewed and species re-identified or confirmed. Species of interest may call at different times of day or during different seasons; ARUs can be programmed to record at multiple points in time over long periods of time, increasing the detection period and thus potential suite of species monitored. Multiple rare or at-risk species can be targeted for monitoring using a single ARU set-up. Lastly, ARUs can be installed during daylight hours by any trained personnel, reducing the risk and expertise required to conduct monitoring.

ARUs were deployed as part of an existing study design to document mammal communities using remote cameras in northwestern Alberta. Twenty ARUs (or "stations") were deployed across three grids in two caribou ranges—Chinchaga and Caribou Mountains—to monitor the acoustic community of birds. Sites were positioned across a range of latitudes and habitat conditions. Birds were identified from the recordings on memory cards collected from the ARUs; the recordings span April 4 to July 18, 2020.

## *Results*

During the first year of monitoring, the ARUs detected 68 species of birds (Table 1). Thirty-two of the species, or almost half of all species, were only detected at a single station. One station did not detect any birds during the deployment time.

**Table 1.** Bird species detected during the first year of acoustic monitoring in northwestern Alberta caribou ranges. “Number of Detections” indicates the number of stations (out of a total of 19) where each species was detected at least once. “Old Forest Birds” is a guild of bird species that meet their foraging and nesting requirements in old-forest habitat. “Status” indicates the current (as of 2015) status of each species within Alberta as ranked by Alberta Environment & Parks.

<b>Common Name</b>	<b>Number of Detections</b>	<b>Old Forest Birds</b>	<b>Status</b>
American Coot	1		
Black-and-white Warbler	1		
Blackpoll Warbler	1	Y	
Black Tern	1		Sensitive
Boreal Chickadee	1		
Bonaparte's Gull	1		
Canada Goose	1		
Clay-colored Sparrow	1		
Evening Grosbeak	1	Y	
Golden-crowned Kinglet	1	Y	
Great Horned Owl	1	Y	
Hairy Woodpecker	1	Y	
Lesser Yellowlegs	1		
Mallard	1		
Marsh Wren	1		
Nelson's Sparrow	1		
Northern Flicker	1		
Northern Goshawk	1	Y	Sensitive
Pied-billed Grebe	1		Sensitive
Red-breasted Nuthatch	1	Y	
Red-eyed Vireo	1		
Rose-breasted Grosbeak	1	Y	
Savannah Sparrow	1		
Sharp-tailed Grouse	1		Sensitive
Solitary Sandpiper	1		
Spotted Sandpiper	1		
Tundra Swan	1		
Warbling Vireo	1	Y	
Western Tanager	1	Y	Sensitive
White-crowned Sparrow	1		
Wilson's Warbler	1		
Yellow-bellied Flycatcher	1		Undetermined
American Bittern	2		Sensitive
Black-backed Woodpecker	2		Sensitive
Common Loon	2		

<b>Common Name</b>	<b>Number of Detections</b>	<b>Old Forest Birds</b>	<b>Status</b>
Greater White-fronted Goose	2		
Greater Yellowlegs	2		
Magnolia Warbler	2	Y	
Northern Waterthrush	2	Y	
Palm Warbler	2		
Red-winged Blackbird	2		
Ring-necked Duck	2		
Ruffed Grouse	2		
Sora	2		Sensitive
American Wigeon	3		
Green-winged Teal	3		
Le Conte's Sparrow	3		
Orange-crowned Warbler	3		
Pileated Woodpecker	3	Y	Sensitive
White-winged Crossbill	3	Y	
Yellow-bellied Sapsucker	3	Y	
American Robin	4		
Common Yellowthroat	4		Sensitive
Swamp Sparrow	4		
Pine Siskin	5	Y	
Ovenbird	6		
Ruby-crowned Kinglet	6	Y	
Canada Jay	7		
Tennessee Warbler	7		
Wilson's Snipe	7		
Alder Flycatcher	8		Sensitive
Chipping Sparrow	8		
Dark-eyed Junco	8		
Hermit Thrush	9		
White-throated Sparrow	9		
Lincoln's Sparrow	10		
Yellow-rumped Warbler	11	Y	
Swainson's Thrush	12	Y	

The most commonly detected species was the Swainson's Thrush, which commonly occurs in mature/old coniferous, mixedwood, and deciduous stands. It is found across Alberta and most common in the Boreal Forest, Foothills, Rocky Mountain, and Canadian Shield Natural Regions. Swainson's Thrush is found in forest types throughout Alberta, but is considered an Old Forest Bird and prefers closed-canopy forests of mid- to late-aged

stands. Its relative abundance is highest in mid-aged white spruce and mixedwood stands, though it is also abundant in treed swamps. The next most-detected species, Yellow-rumped Warbler, is also an old-forest associate. Overall, nineteen species in the Old Forest Birds guild were detected, indicating the presence of old-forest habitat across the area.

Eleven species considered Sensitive by Alberta Environment & Parks were detected during the first year of acoustic monitoring. Only three of the Sensitive species are old-forest associates; several are associated with wetlands (e.g., Black Tern, Sora, American Bittern, Pied-billed Grebe). These pilot results demonstrate the ability of ARUs to concurrently monitor multiple species of interest while providing additional ecological information on the forest habitats in the area.