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To: Files

From: Biological Technician Payne
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Subject: Cottonwood Forest Rare Landbird Inventory 2012

Background

The boreal forest (AKA taiga), consisting mainly of coniferous trees (in this region spruce) and some deciduous trees (in this region birch and cottonwood), comprises North American's northern most forest. White spruce (*Picea glauca*) tree line is correlated to the 10˚ C isotherm for mean July temperature (Nienstaedt & Zasada, USFS web page). King Salmon's mean July temperature of 13˚ C (NWS web page) meets this minimum, but likely this mean declines as one moves south on the Peninsula (the 29 year mean at Port Heiden is 11 ˚ C, and the 60 year mean at Cold Bay is 10˚ C). This explains why spruce thin as one moves south; there are no spruce past the northern boundary of the Alaska Peninsula/Becharof NWR. However, cottonwood (*Populus balsamifera*) trees grow south of this boundary through the Becharof and Ugashik Units of the Alaska Peninsula/Becharof NWR to approximately the northern boundary of Aniakchak National Monument. These cottonwood forests generally thrive below 140 m in elevation, and in well-drained areas close to water. Dog Salmon and the southern King Salmon river drainages, especially around Mother Goose Lake and Painter Creek, support the largest stands. However, small copses (0.5 hectares) may be found scattered throughout the lower elevations of the Alaska Peninsula.

Although the Refuge dedicated eight years to intensive landbird capture and banding (Egan and Adler, 2001; Gregory & Savage, In Prep) in three small cottonwood copses at Mother Goose Lake, other than the Alaska Landbird Monitoring Survey block visited in 2011 (Savage 2011), biologists have conducted no work in the King Salmon River drainage in the past 11 years. The Boreal Partners in Flight working group has named cottonwood forests as a habitat of special interest in the draft version 2 of the Landbird Conservation Plan for Alaska (Boreal Partners in Flight, In Prep.).

Cottonwood forests provide woody structure those other vegetation communities on the Alaska Peninsula lack. They support bird species that depend on woody structure, including some raptors that need trees for nest platforms; woodpeckers, chickadees, and tree swallows (see Appendix I for scientific names of birds) that require cavities for nesting; and other species that depend on higher canopies, or specific insect communities for feeding. Thus cottonwood forests provide habitats for several landbird species that are not commonly found in other habitats of the Alaska Peninsula. There are several species with a limited distribution in southwestern Alaska; some of these birds (song sparrow and Pacific wren) are widely distributed with patchy abundance on the Pacific side of the Aleutian Range, a distance of less than 30 km from this year's study site, and may utilize this cottonwood forest for nesting. Prior to the field season we developed our species of interest list (Table 1) using various resources. We used the Refuge's incidental databases of previous staff observations first to describe the known distribution across the Northern Alaska Peninsula (NAKP). We also summarized information into this column from the Refuge's bird list (USFWS 2010) which previously compiled information from published historic data with some incidental information. We then queried the incidental data for observations of these species within the Refuge cottonwood forests. The survey aims to determine cottonwood forest usage, with an emphasis on breeding, by uncommon or rare birds. Because playback surveys increase detection probability (Saracco et al. 2011) playback surveying is an efficient and common way to survey for the presence of rare birds.

We anticipate the inventory phase of this project to last one to three summers depending on staffing availability, funding and access to unique locations. The objective is to test for presence or absence of the avian species of interest by using digital playbacks and targeted listening to test for detection. If some detections are made, a more extensive survey could be outlined to examine connectivity from the "mainland" cottonwood forest and the outlying "islands."

Methods

Prior to selecting study areas, the second author explored the Refuge's land cover map with regard to cottonwood distribution, patch size and accessibility (Figure 1). While primarily distributed around Mother Goose Lake, small patches occur throughout the northeastern portion of the Refuge. Because many of these patches are small and the remotely acquired digital information (i.e., Landsat data) for tall deciduous shrub is difficult to delineate from deciduous trees, the land cover map (30 m resolution) does not display all patches of cottonwood.

Due to limited staff, and other projects scheduled during the prime time for this survey, our work this year was limited to one visit to Mother Goose Lake, the most accessible and concentrated area of cottonwood forest on the Alaska Peninsula. Several transects were planned utilizing the Refuge's digital land cover map (USFWS and Ducks Unlimited, 2010). The transects varied from 660 – 1700 m; we selected them to lie within cottonwood dominated forests starting approximately 50 – 200 m from the lakeshore (Figure 2). We placed transect points every 250 m. To avoid traveling through the forest after dark, several owl survey points were established adjacent to cottonwood forests along the shore of Mother Goose Lake (Figure 1). Other preparation before going to the field included: preparing the recordings (Peyton 1990) with Nero10© and downloading them to the portable caller (FoxPro NX3), constructing a random

Table 1. Species of interest and history of occurance on the Northern Alaska Peninsula (NAKP), Cottonwood Forest Rare Landbird Inventory, July 2012.

Species	Known Peninsular Distribution	Presence in AKP NWR Cottonwood Forest
Sharp-shinned Hawk	Sporadic sightings (spring and fall), usually forest habitats.	Five sightings at Mother Goose and one sighting at the King Salmon River South ALMS plot.
Northern Goshawk	Rare breeder on the NAKP, forested habitats.	Sightings (spring through fall) in the Mother Goose Lake area, nest at Ugashik South airstrip (non Refuge
Great-horned Owl	Uncommon breeder on the NAKP.	More than 25 sightings (primarily August - September) from Mother
Boreal Owl	Uncommon breeder on the NAKP, spruce forest.	One sighting near Puale Bay (not in cottonwood forest).
Northern Saw-whet Owl	Rare breeder on the NAKP, forested habitats.	Ten sightings and one capture including juveniles from Mother Goose Lake in the late 1990's.
Downy Woodpecker	Rare to uncommon breeder on the NAKP.	Regularly observed and probable breeder.
Hairy Woodpecker	Accidental on the peninsula.	A single sighting at Mother Goose
Alder Flycatcher	Uncommon breeder in suitable	Regularly observed and probable
Brown Creeper	Rare breeder on the NAKP, spruce forest.	One fall sighting at Mother Goose Lake.
Pacific Wren	Rare breeder on the Pacific side of the Aleutian Range.	One sighting at Yantarni Bay; one sighting near Seal Islands in 1991 (neather in cottonwood forest, Seal
Varied Thrush	Uncommon breeder on the NAKP, spruce forest.	Two sightings at Mother Goose Lake.
Nothern Waterthrush	Rare to uncommon breeder on the NAKP, riparian habitats, usually alder.	Uncommon wherever suitable habitat exists (Upper Kejulik River and Mother Goose Lake).
Blackpoll Warbler	Common breeder on the NAKP, spruce and mixed forest.	One sighting at Mother Goose Lake.
Lincoln's Sparrow	Rare to uncommon breeder on the NAKP, usually near late successional beaver ponds.	One record along the Upper Kejulik River.
Song Sparrow	Uncommon to common breeder on the Pacific side of the Aleutian Range.	No definate records.
Lincoln's Sparrow	Rare to uncommon breeder on the NAKP, usually near late successional beaver ponds.	One record along the Upper Kejulik River.
Dark-eyed Junco	Uncommon breeder on the NAKP, spruce forest.	Nine fall sightings at Mother Goose Lake.
Rusty Blackbird	Rare to uncommon breeder on the NAKP, wet boreal forest.	Six fall sightings at Mother Goose Lake.

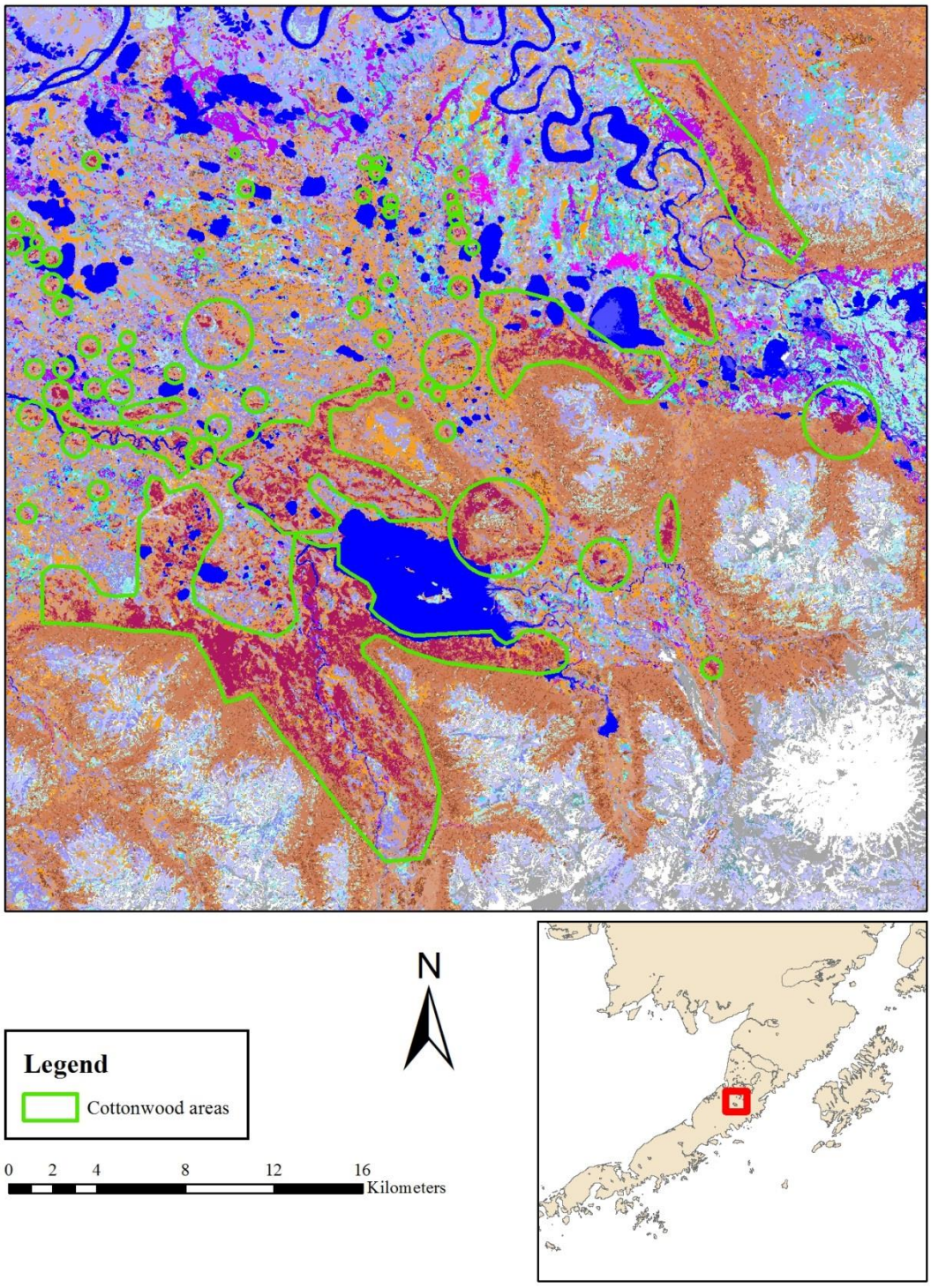

Figure 1. Location of cottonwood forests near Mother Goose Lake and the Dog Salmon River South, Cottonwood Forest Rare Landbird Inventory, July 2012.

number table (each species assigned a number code; followed a different random number series at each survey point), constructing and printing data sheets, and downloading survey points to the GPS units.

We began our transect surveys generally within 30 min. of actual sunrise. Surveys were always started at the lake and proceeded into the cottonwood forest. Upon reaching each point we recorded the time and played the call/songs of diurnal, non-predatory species of interest in random order using the caller. Each call/song recording, consisting of 13-28 seconds of call/song followed by 32-47 seconds of silence, was played twice. To gauge the effectiveness of the FoxPro NX3 at eliciting a response, we included the calls/songs of three control species (species already known to be common in the area): American robin, hermit thrush, and orange-crowned warbler. On our data sheet, we recorded the species played and the species, number, sex, distance, and response type of all birds responding. We proceeded along the transect playing all of the diurnal non-predatory species and then on the return, we played raptor calls at each point, following the same protocol. All observation data were keyed into an Excel file formatted similarly to the data sheet.[1] We planned to conduct owl surveys along the shore of Mother Goose Lake beginning at sunset following a similar protocol as the diurnal bird census; but because of weather and boat motor issues, we were unable to complete them.

Vegetation data, using the ALMS Habitat protocol (Handel and Cady 2004), was collected on the return route. The ALMS data file requires multiple relational tables to store vegetation data, so to simplify data entry, an abbreviated format was used to key some of the vegetation data on another worksheet of the Excel data file.

Results & Discussion

After an aborted flight with Katmai Air on 1 July due to weather, we arrived at the Refuge cabin at Mother Goose Lake around 1345 on 2 July. Both flights used a Cessna 207 on floats because that was the only Office of Aircraft Safety rated aircraft available. We began transects on 3 July and completed fourteen sampling points on three transects over the four day visit. Two of the transects were located on the south side of Mother Goose Lake while one was on the north side of the lake (Figure 2).

Most survey points occurred on topographic slopes falling toward the lake or on ravines draining into the lake. Elevation ranged from 31 – 108 m (mean of 70 m) as measure with the GPS. All survey points occurred within cottonwood forest. The cottonwood forest varied from open to closed canopy (30 – 75 % canopy cover) and consisted of 3-12 m tall trees (5 – 9 m was most common) with DBH measurements from ~ 10 – 25 cm. The understory usually consisted of a mix of grass (usually including *Calamagrostis canadensis)*, various herbaceous plants, and occasional ferns.

The number of conspecific responses to a played song/call varied considerably (Table 2) and was probably influenced by several factors: presence of the target, abundance (density), and response likelihood (a factor of bird behavior and suitability of playback). The responses to our three

[1] Data stored on Savage's computer:
Documents\Biology\BirdsLand\CottowoodSurveys\Cottonwood_Data_2012.xlsx

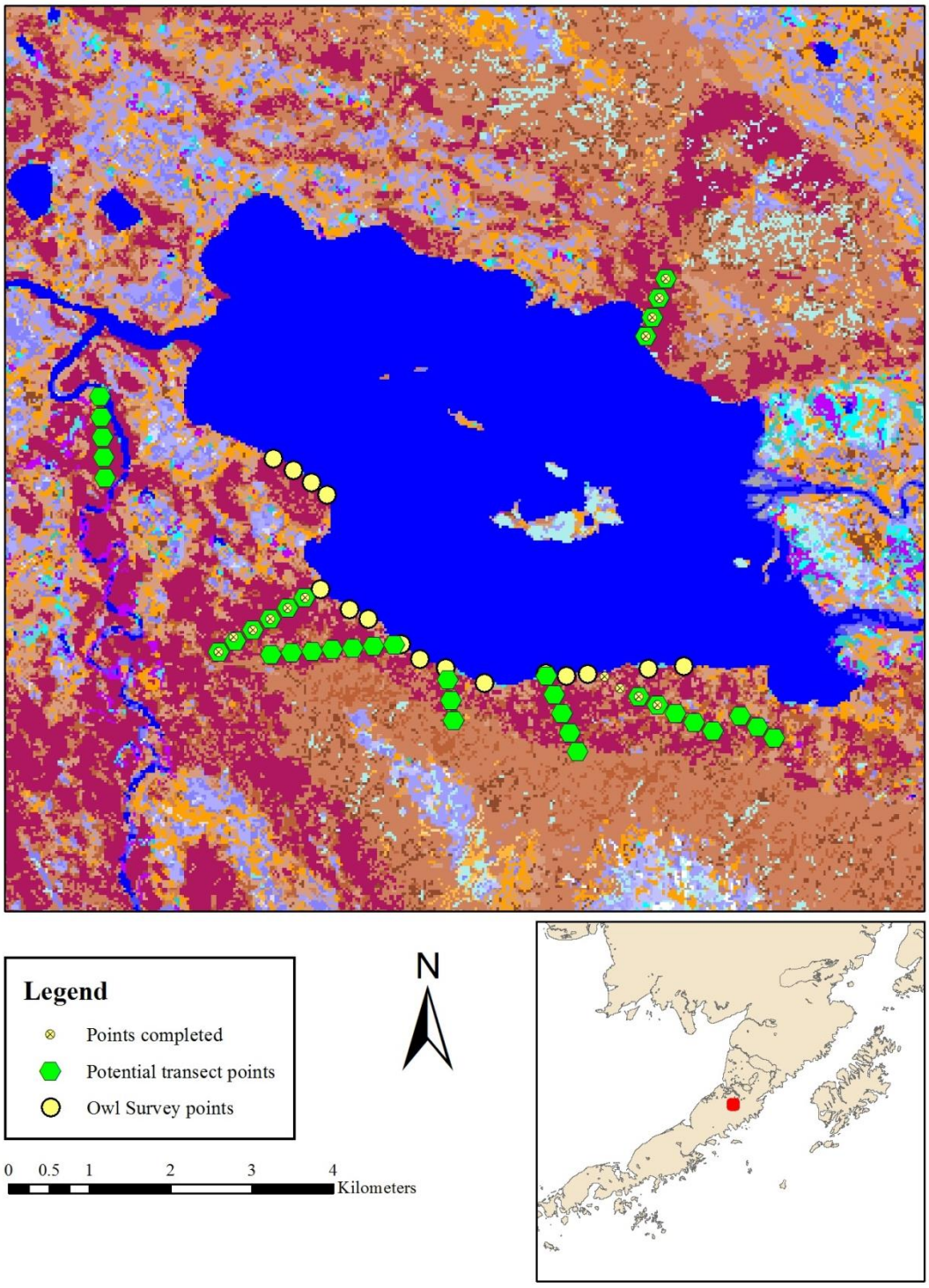

Figure 2. Location of playback transects and points, Cottonwood Forest Rare Landbird Inventory, July 2012.

control species (hermit thrush, American robin, orange-crowned warbler) indicate that the FoxPro caller is loud enough and maintains enough sound fidelity to elicit a response when calls/songs are played.

Table 2. Species played (vertical) and the number of individuals of each species (horizontal) that responded, Cottonwood Forest Rare Landbird Inventory, July 2012. Shaded cells indicate conspecific responses. Species in ***bold italics*** (horizontal) were not delivered as playbacks.

	Downy woodpecker	Black-billed magpie	***Black-capped chickadee***	***Gray-cheeked thrush***	Hermit thrush	American robin	Orange-crowned warbler	***Wilson's warbler***	***Fox sparrow***	***Golden-crowned sparrow***	***Pine grosbeak***	***Common redpoll***	Total
Sharp-shinned hawk			4		2		1			3		1	11
Northern goshawk			4	2	3		4			1	1		15
Downy woodpecker	2				1			2					5
Hary woodpecker													0
Alder flycatcher			2					1		1			4
Brown creeper					1		2	1					4
Pacific wren				1			2						3
Hermit thrush					10					1			11
American robin					1	2				1			4
Varied thrush					3								3
Northern waterthrush					1		1	2					4
Orange-crowned warbler							5						5
Blackpoll warbler							1	2					3
Song sparrow	1				1				1				3
Lincoln's sparrow		1			1			1		1			4
Dark-eyed junco								1		1			2
Rusty blackbird													0
Total	3	1	10	3	24	2	16	10	1	9	1	1	81

The call/songs most likely to elicit a response from any bird were northern goshawk, sharp-shinned hawk, and hermit thrush with 15, 11, and 11 responses each (Table 2). Hermit thrush (control) was the species most likely to respond to its own call. Hermit thrush was also the most likely to respond to any playback, responding to 10 of the 14 broadcast species with a total of 24 responses. American robin and orange-crowned warbler (controls) displayed conspecific responses, but at a lower level than hermit thrush. All three species are relatively common in the area; we have no data to account for the differences in response rates. Possible reasons for different responses include: the quality of the species specific recording used, possible geographic variation leading to decreased conspecific recognition of response, breeding stage of individual species or bird, use of the cottonwood habitat, and individual male territory size. Only one species of interest, downy woodpecker, was encountered during playback surveys. An additional species of interest, alder flycatcher, was encountered at Mother Goose Lake while transiting to a survey site. Both these species had been encountered previously at Mother Goose Lake (Gregory & Savage, In Prep).

Our analysis did not detail intensity of response. Responses varied from approaching to 50 m (considered weakest), calling, and approaching to some distance with counter singing (considered strongest). If an individual bird was already singing in the area prior to playback and its behavior didn't change, we didn't count it as a response. Any of these responses received the same tally in Table 2. From our observations we cannot distinguish if the response was to the playback, to our presence, to another conspecific in the area, or possibly to some stimulus that we did not detect. Many of the "responses" we recorded were not conspecific and could have been routine singing. When there was no response, it is impossible to distinguish between there being no bird in the area to respond, or lack of response. Most landbird work relying on vocalizations is completed in June due to the evolving breeding cycle of the birds. By early July songbirds are raising broods and/or in the case of thrushes and sparrows, beginning second broods and may respond less to playbacks. The time for territory establishment and mate attraction are past and birds may not respond as strongly to broadcast vocalizations. In short, we did not hit the ideal window for this work and this may have affected our results.

Three other tree dependent species (black-capped chickadee, pine grosbeak, and tree swallow) that were not included on the initial species of interest list were encountered. These species had all been commonly captured and documented during the previous work at Mother Goose Lake (Egan and Adler, 2001).

Incidental bird sighting data, including relative abundance and breeding codes, were recorded for the duration of our stay (Table 3). Twenty-nine species were recorded; we did not observe any species that had not been observed in previous years (1994-2001) at the bird station at Mother Goose. During this visit, red-breasted merganser, downy woodpecker, black-capped chickadee, American robin, orange-crowned warbler, and Wilson's warbler were confirmed as breeders based on the presence of recently fledged young or food carrying behavior. We observed a female common goldeneye that circled us multiple times in the forest near the lake edge; the behavior reminded us of a bird attempting to return to a nest she was flushed from. We did not observe any trees in the immediate vicinity that appeared large enough to contain a nest cavity for goldeneye. Fourteen records exist for this species at Mother Goose (1995-2001) with six being lone females (including one showing agitated behavior), and two being pairs. This species has not been confirmed to breed in the area and is thought only to winter on the Alaska Peninsula (Eadie et al. 1995).

The 2012 inventory work involved low effort (one week) and low cost (Table 4). Future survey costs could be significantly reduced if Refuge planes were available for all air transportation, or for a similar expense, more sites could be visited. Additional work at the site included trail and cabin maintenance; and setting out the surface temperature logger and buoy for the Mother Goose Lake temperature array.

Table 3. Incidental bird sightings, relative abundance, and breeding status, Cottonwood Forest Rare Landbird Inventory, July 2012.

	Mother Goose Cabin & SE Corner Lake		Mother Goose Lake, N & SW shores	
	14160		14399	
	Relative Abundance[1]	Breeding Status[2]	Relative Abundance[1]	Breeding Status[2]
Mallard			U	X
White-winged Scoter	U	H	U	X
Common Goldeneye	U	H		
Red-breasted Merganser			U	Y
Red-throated Loon			U	H
Common Loon			U	S
Semipalmated Plover	U	H		
Greater Yellowlegs	U	H	U	H
Wilson's Snipe	U	C	C	C
Mew Gull	U	H	C	X
Glaucous-winged Gull			U	X
Arctic Tern	U	H	C	X
Downy Woodpecker			U	F
Alder Flycatcher			U	S
Black-billed Magpie			U	X
Common Raven	U	H		
Tree Swallow			U	H
Black-capped Chickadee	U	H	U	F
Gray-cheeked Thrush	U	S	C	S
Hermit Thrush	C	S	C	S
American Robin	U	Y	C	S
Orange-crowned Warbler	C	S	C	F
Yellow Warbler	U	S	U	S
Wilson's Warbler	C	S	C	F
Savannah Sparrow			U	S
Fox Sparrow	U	S	C	S
Gambel'sWhite-crowned Sparrow	U	S		
Golden-crowned Sparrow	C	S	C	S
Pine Grosbeak	U	S	U	S
Common Redpoll	U	S	C	S

[1] C - Common, U - Uncommon

[2] X - Detected (no evidence of breeding), H - Observed in nesting habitat, S - Singing male, C - Courtship Display, F - Adult with fecal sac or food for young, Y - Recently fledged young

Table 4. Costs of cottonwood forest surveys, Cottonwood Forest Rare Landbird Inventory, July 2012.

	Cost	Totals
Field Gear (Refuge inventory)	Not Included	
Misc. Personal Gear (waders, raingear)	Not Included	
FoxPro Wildlife callers	445	445
Refuge Aircraft	938	
Charter Aircraft	2190	
Boat fuel (estimated)	20	
Field Per diem & Travel Fees	80	
Field Food (estimated)	168	
Total Transportation and Travel		3,396
Refuge Biologist, hourly	Not Included	
Refuge Biologist (8 hours holiday worked)	312	
Refuge Seasonal employee, 7 days + 9.5 hours overtime	1,426	
Total Salary & Overtime		1,738
GRAND TOTAL		5,579

Recommendations

Many of the species of interest were not detected during our surveys. This could indicate absence, but may also be a factor of survey timing, the limited number of surveys, and/or poor quality recordings or broadcast equipment. We recommend the following:

1. Additional surveys should be conducted during the prime window (1-21 June).
2. Increase the time and effort invested in conducting the surveys. This would include increasing the number of points and may involve increasing the number of surveyors.
3. Obtain higher quality recordings and/or recordings of local birds.
4. Test species recordings prior to field work to determine their effectiveness.
5. Finish testing the species of interest list by incorporating owl surveys along cottonwood forest edge.
6. Fully explore the species of interest habitat requirements to determine if Refuge cottonwood forest is suitable.
7. Investigate methods for extracting existing cottonwood copse data from current GIS-based information and utilizing this to look at occupancy requirements (e.g., minimum patch size, minimum dbh) for the species of interest.

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Appendix I. Scientific names[1] of bird species mentioned in report, Cottonwood Forest Rare Landbird Inventory, July 2012.

Common Name	Scientific Name	Common Name	Scientific Name
Mallard	*Anas platyrhynchos*	Black-capped Chickadee	*Poecile atricapillus*
White-winged Scoter	*Melanitta fusca*	Brown Creeper	*Certhia americana*
Common Goldeneye	*Bucephala clangula*	Pacific Wren	*Troglodytes pacificus*
Red-breasted Merganser	*Mergus serrator*	Gray-cheeked Thrush	*Catharus minimus*
Red-throated Loon	*Gavia stellata*	Hermit Thrush	*Catharus guttatus*
Common Loon	*Gavia immer*	American Robin	*Turdus migratorius*
Sharp-shinned Hawk	*Accipiter striatus*	Varied Thrush	*Ixoreus naevius*
Northern Goshawk	*Accipiter gentilis*	Northern Waterthrush	*Parkesia noveboracensis*
Semipalmated Plover	*Charadrius semipalmatus*	Orange-crowned Warbler	*Oreothlypis celata*
Greater Yellowlegs	*Tringa melanoleuca*	Yellow Warbler	*Setophaga petechia*
Wilson's Snipe	*Gallinago delicata*	Blackpoll Warbler	*Setophaga striata*
Mew Gull	*Larus canus*	Wilson's Warbler	*Cardellina pusilla*
Glaucous-winged Gull	*Larus glaucescens*	Savannah Sparrow	*Passerculus sandwichensis*
Arctic Tern	*Sterna paradisaea*	Fox Sparrow	*Passerella iliaca*
Great Horned Owl	*Bubo virginianus*	Song Sparrow	*Melospiza melodia*
Boreal Owl	*Aegolius funereus*	Lincoln's Sparrow	*Melospiza lincolnii*
Northern Saw-whet Owl	*Aegolius acadicus*	Gambel'sWhite-crowned Sparrow	*Zonotrichia leucophrys*
Downy Woodpecker	*Picoides pubescens*	Golden-crowned Sparrow	*Zonotrichia atricapilla*
Alder Flycatcher	*Empidonax alnorum*	Dark-eyed Junco	*Junco hyemalis*
Black-billed Magpie	*Pica hudsonia*	Rusty Blackbird	*Euphagus carolinus*
Common Raven	*Corvus corax*	Pine Grosbeak	*Pinicola enucleator*
Tree Swallow	*Tachycineta bicolor*	Common Redpoll	*Acanthis flammea*

[1] Birds ordered according to the AOU 52nd supplement (Chesser et al. 2011).