

# Dene K'éh Kusān ARU Bird Surveys

2024 Summary Report

Prepared by National Audubon Society  
for the Dena Kayeh Institute





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**Appendix A: Detailed Survey Site Maps**

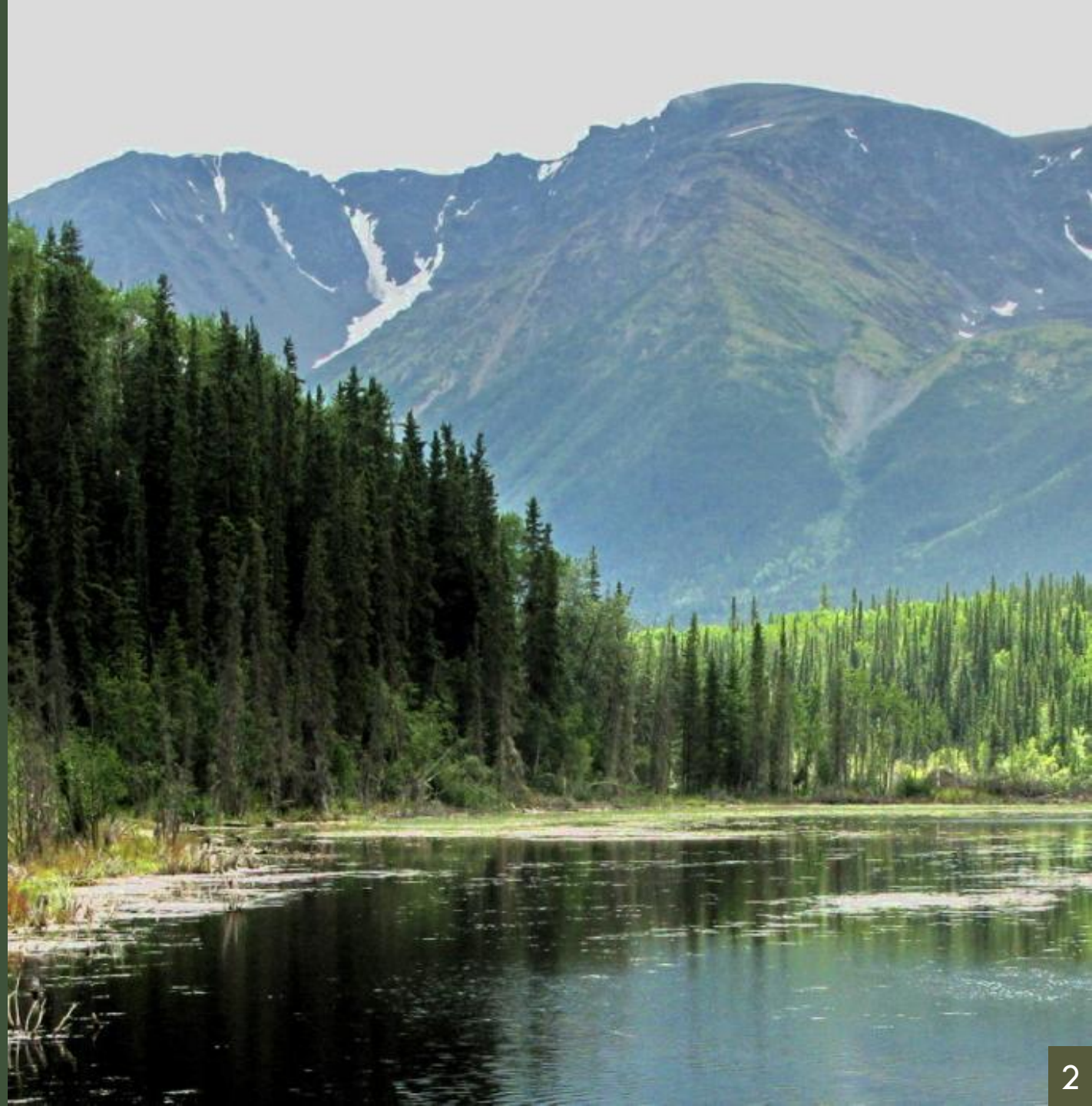




# BACKGROUND

During the summer of 2024, the Dena Kayeh Institute conducted bird surveys with Autonomous Recording Units (ARUs), in collaboration with the National Audubon Society's Boreal Conservation program. Surveys were conducted in the proposed Kaska Indigenous, Protected, and Conserved Area in northern British Columbia. The region is the Ancestral Territory of the Kaska Dena and the proposed area for protection encompasses approximately 40,000 km<sup>2</sup> within the Mackenzie River Basin.

ARUs allow for ongoing remote collection of audio data from the surrounding landscape, including bird songs and calls. ARUs record audio of the surrounding landscape at preprogrammed times and store the recordings until they can be retrieved at a later date. That data can later be analyzed to determine the presence of birds in the area and serve as an archive of the overall bioacoustics landscape that can be repeated and compared over time to help understand changes taking place within the ecological communities.





# ARU Survey Sites

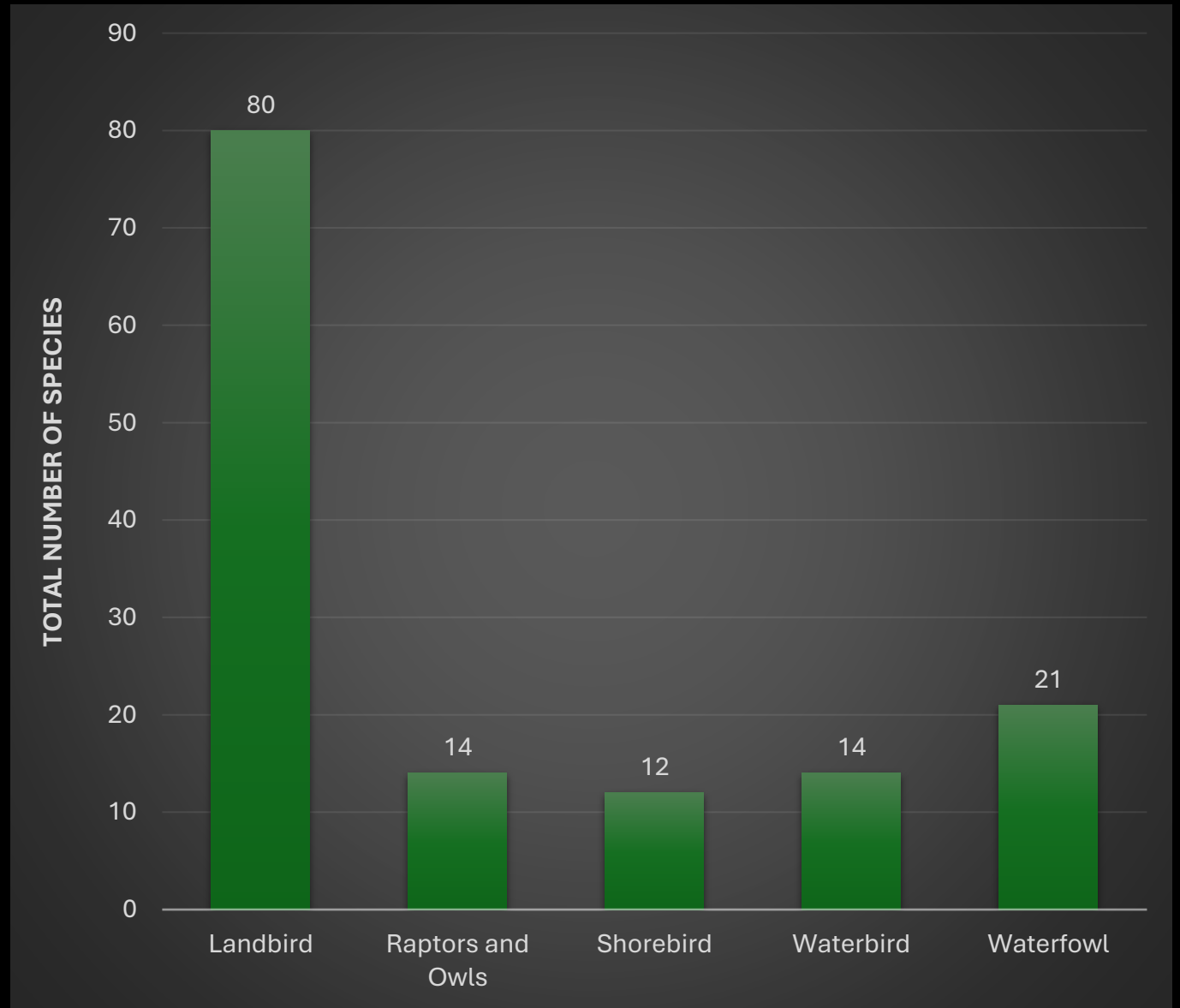
Table 1. ARU Survey Locations

Location	Latitude	Longitude
Site1	58.61838	-125.731
Site 2	59.72829	-128.117
Site 3	59.73737	-127.963
Site 4	58.66198	-125.751
Site 5	59.69759	-127.145
Site 6	59.30483	-126.676
Site 7	59.90997	-126.399
Site 8	59.36794	-127.468
Site 9	60.02935	-127.576
Site 10	59.79535	-127.905
Site 11	58.78356	-125.655
Site 12	58.84191	-125.213
Site 13	59.68731	-127.92
Site 14	58.7342	-125.718
Site 17	59.99312	-127.474
Site 18	59.79719	-129.133
Site 19	59.26589	-127.467
Site 21	58.84678	-125.051



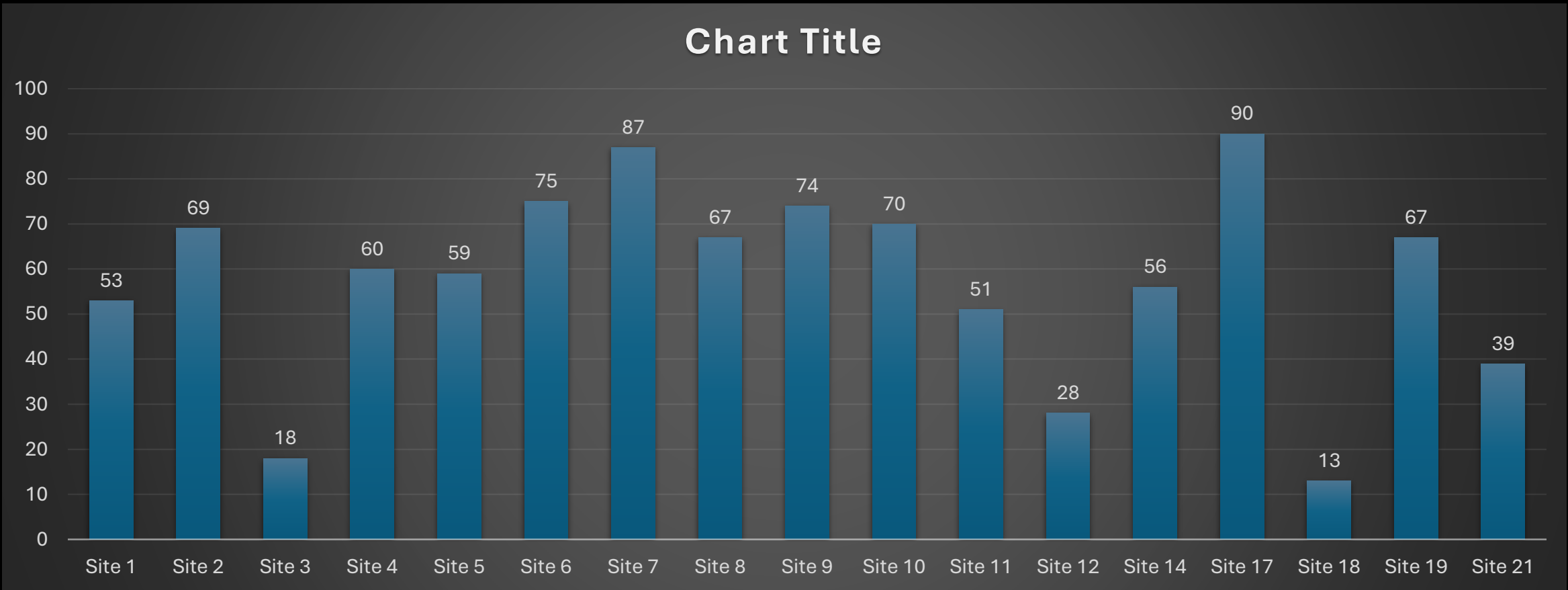
# ARU SURVEY RESULTS

- A total of 141 bird species were detected across the 18 survey sites, including: 80 landbird species, 14 raptor and owl species, 12 shorebird species, and 14 waterbird species, and 21 waterfowl.
- Six species detected are listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), including: Bank Swallow and Lesser Yellowlegs (Threatened), as well as Common Nighthawk, Olive-sided Flycatcher, Rusty Blackbird, and Yellow Rail (Special Concern)



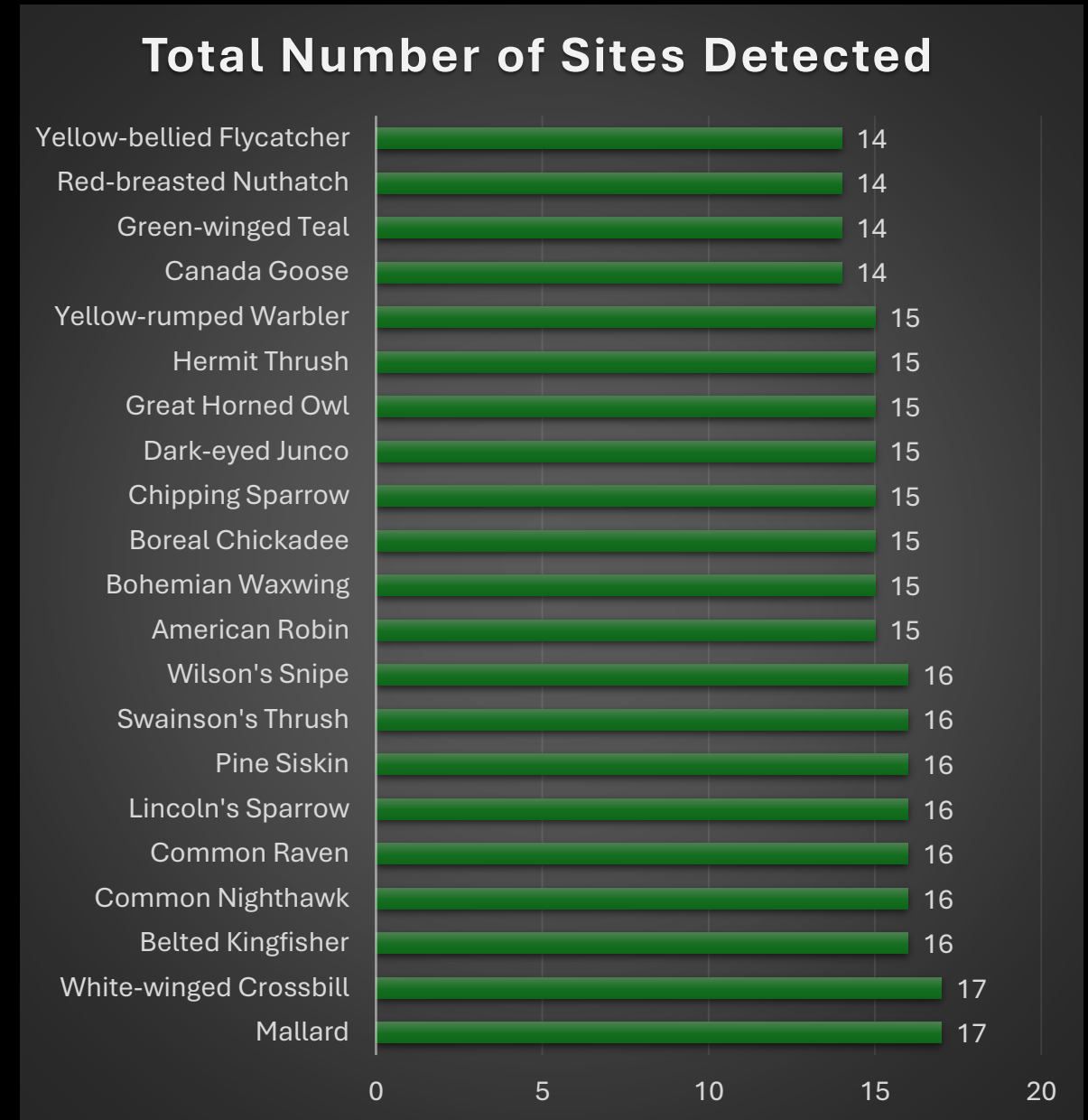
# Bird Diversity by Survey Site

The survey sites with greatest number of bird species detections were sites 17 (n = 90) and site 7 (N = 87)



# Most Frequently Detected Bird Species

21 species that occurred at  
more than 75% of the sites  
surveyed.





# LANDBIRD SPECIES DETECTIONS

- 80 landbird species were detected across the 18 survey sites
- Sites 9 and 17 had the greatest diversity of species (n = 48)

Breeding/Migration species column indicates if the species is known to breed in the survey area or if they only occur in the region during the migration period. Breeding/Migration species column indicates if the species is known to breed in the survey area or if they only occur in the region during the migration period.

Common Name	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12	Site 14	Site 17	Site 18	Site 19	Site 21	Total Sites Detected	Breeding/Migration Species
Alder Flycatcher	1	1	0	0	1	1	1	1	1	1	0	1	0	1	0	1	0	11	Breeding
American Pipit	1	1	1	1	0	1	1	1	1	1	0	0	1	1	0	1	0	12	Possible Breeder
American Redstart	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	Breeding
American Robin	1	1	0	1	1	1	1	1	1	1	1	0	1	1	0	1	1	14	Breeding
American Three-toed Woodpecker	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	3	Breeding
American Tree Sparrow	0	0	0	1	1	0	1	1	1	0	1	0	1	1	0	1	1	10	Breeding
Bank Swallow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	Breeding
Belted Kingfisher	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	15	Breeding
Black-and-white Warbler	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	2	Breeding
Black-backed Woodpecker	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	3	Breeding
Black-capped Chickadee	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	3	Breeding
Blackpoll Warbler	0	0	0	1	1	1	1	1	1	1	0	1	0	0	0	1	0	9	Breeding
Bohemian Waxwing	1	1	0	0	1	1	1	1	1	1	1	1	1	1	0	1	1	14	Breeding
Boreal Chickadee	1	1	1	0	1	1	1	1	1	1	1	1	1	1	0	0	1	14	Breeding
Brewer's Blackbird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	Possible Breeding
Canada Jay	1	1	1	0	0	1	0	1	0	1	1	0	1	1	1	0	1	11	Breeding
Cape May Warbler	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	Possible Breeder
Cedar Waxwing	1	0	0	0	0	1	0	0	0	1	1	1	1	1	0	1	0	8	Possible Breeder



# LANDBIRD SPECIES DETECTIONS continued

Table 2 continued. Landbird species detections by survey location; 1 indicates the species was detected and 0 indicates it was not detected. Breeding/Migration species column indicates if the species is known to breed in the survey area or if they only occur in the region during the migration period.

Common Name	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12	Site 14	Site 17	Site 18	Site 19	Site 21	Total Sites Detected	Breeding/Migration Species
Chipping Sparrow	1	1	0	1	1	1	1	1	1	1	1	1	1	0	0	1	1	14	Breeding
Clay-colored Sparrow	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	Possible
Common Nighthawk	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	1	15	Breeding
Common Raven	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	15	Breeding
Common Redpoll	0	1	0	1	1	1	1	0	1	0	1	0	0	0	1	1	0	9	Breeding
Common Yellowthroat	0	0	0	0	1	1	0	0	1	1	0	1	1	1	0	0	0	7	Breeding
Dark-eyed Junco	1	1	0	1	0	1	1	1	1	1	1	1	1	1	0	1	1	14	Breeding
Downy Woodpecker	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	Breeding
Dusky Flycatcher	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	2	Possible
Evening Grosbeak	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2	Breeding
Fox Sparrow	0	0	0	1	0	0	1	0	1	1	1	0	1	0	0	1	1	8	Breeding
Golden-crowned Kinglet	0	0	0	1	1	0	1	1	1	0	1	1	0	1	1	0	1	10	Breeding
Golden-crowned Sparrow	1	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	4	Breeding
Gray-cheeked Thrush	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	3	Breeding
Hairy Woodpecker	0	0	1	0	1	0	1	1	1	1	0	0	0	1	0	0	0	7	Breeding
Hammond's Flycatcher	1	0	0	1	0	1	0	0	1	0	1	0	1	1	0	1	0	8	Breeding
Hermit Thrush	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0	1	14	Breeding
Lapland Longspur	0	1	0	1	0	1	0	0	0	1	0	0	0	1	1	1	0	7	Migrant
Least Flycatcher	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	2	Breeding
Lincoln's Sparrow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	15	Breeding
Magnolia Warbler	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	3	Possible
Mountain Bluebird	0	1	0	0	0	0	0	0	0	1	0	0	1	1	0	1	0	5	Breeding
Mountain Chickadee	0	0	0	1	0	0	1	1	1	1	0	0	1	1	0	1	0	8	Breeding

# LANDBIRD SPECIES DETECTIONS continued

Table 2 continued. Landbird species detections by survey location; 1 indicates the species was detected and 0 indicates it was not detected. Breeding/Migration species column indicates if the species is known to breed in the survey area or if they only occur in the region during the migration period.

Common Name	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12	Site 14	Site 17	Site 18	Site 19	Site 21	Total Sites Detected	Breeder/ Migration Species
Northern Flicker	1	1	1	0	0	1	1	1	1	1	1	0	1	1	0	1	1	13	Breeding
Northern Waterthrush	1	1	0	0	1	1	1	0	1	0	0	1	0	1	0	1	0	9	Breeding
Olive-sided Flycatcher	0	1	0	0	1	1	0	0	1	1	1	0	0	0	0	1	0	7	Breeding
Orange-crowned Warbler	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0	3	Breeding
Ovenbird	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2	Breeding
Pacific-slope Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	Possible Breeding
Pileated Woodpecker	0	1	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	4	Breeding
Pine Grosbeak	0	0	0	0	1	0	1	0	1	0	1	0	0	1	0	0	1	6	Breeding
Pine Siskin	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	15	Breeding
Purple Finch	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	3	Breeding
Red-breasted Nuthatch	1	1	0	0	1	1	1	1	1	0	1	1	1	1	1	0	1	13	Breeding
Red-winged Blackbird	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	Breeding
Rose-breasted Grosbeak	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	Possible Breeding
Ruby-crowned Kinglet	1	1	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	13	Breeding
Rusty Blackbird	1	0	0	1	1	1	1	0	1	1	0	0	1	1	0	1	0	10	Breeding
Savannah Sparrow	0	1	0	1	0	1	0	1	1	1	0	0	1	0	0	0	0	7	Breeding
Say's Phoebe	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	Possible Breeding
Sharp-tailed Grouse	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	Possible Breeding
Snow Bunting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	Migrant
Spruce Grouse	0	1	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	4	Breeding
Swainson's Thrush	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	15	Breeding
Swamp Sparrow	1	1	0	1	1	1	0	1	0	1	1	1	1	1	0	0	0	11	Breeding
Tennessee Warbler	0	1	0	0	1	1	1	1	1	1	1	0	1	1	0	0	1	11	Possible Breeding



# LANDBIRD SPECIES DETECTIONS continued

Table 2 continued. Landbird species detections by survey location; 1 indicates the species was detected and 0 indicates it was not detected. Breeding/Migration species column indicates if the species is known to breed in the survey area or if they only occur in the region during the migration period.

Common Name	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12	Site 14	Site 17	Site 18	Site 19	Site 21	Total Sites Detected	Breeding/Migration Species
Townsend's Solitaire	1	0	0	0	0	1	0	1	1	1	1	0	0	1	0	1	0	8	Breeding
Townsend's Warbler	0	0	0	0	1	0	0	0	0	0	1	0	0	1	0	1	1	5	Possible Breeding
Tree Swallow	0	1	0	1	1	1	1	1	0	1	0	0	0	1	0	1	0	9	Breeding
Varied Thrush	1	1	0	0	1	1	1	1	1	0	1	1	1	1	0	0	1	12	Breeding
Violet-green Swallow	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	Breeding
Warbling Vireo	0	0	0	0	0	1	1	0	1	0	1	0	0	0	0	0	0	4	Breeding
Western Tanager	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	1	4	Breeding
Western Wood-Pewee	0	1	0	0	1	0	1	0	1	1	0	0	0	0	0	1	0	6	Breeding
White-crowned Sparrow	0	1	0	0	0	1	1	1	0	1	0	0	1	1	0	1	0	8	Breeding
White-throated Sparrow	0	1	0	0	1	1	1	0	1	0	1	1	0	1	0	1	0	9	Breeding
White-winged Crossbill	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	17	Breeding
Wilson's Warbler	0	0	0	0	1	0	0	1	1	0	1	0	1	1	0	1	0	7	Breeding
Winter Wren	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	3	Possible Breeding
Yellow-bellied Flycatcher	1	0	0	1	1	1	1	1	1	1	0	1	1	1	0	1	1	13	Breeding
Yellow-bellied Sapsucker	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	2	Breeding
Yellow-rumped Warbler	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	15	Breeding
<b>Total Species Detected</b>	<b>30</b>	<b>38</b>	<b>12</b>	<b>28</b>	<b>37</b>	<b>43</b>	<b>47</b>	<b>38</b>	<b>48</b>	<b>38</b>	<b>37</b>	<b>23</b>	<b>34</b>	<b>48</b>	<b>10</b>	<b>41</b>	<b>30</b>		

# RAPTOR AND OWL SPECIES DETECTIONS BY SURVEY SITE

- 14 raptor and owl species were detected across the 18 survey sites
- Sites 8 and 17 had the greatest raptor and owl species diversity (n = 8)

Table 3. Raptor and owl species detections by survey location; 1 indicates the species was detected and 0 indicates it was not detected. Breeding/Migration species column indicates if the species is known to breed in the survey area or if they only occur in the region during the migration period.

Common Name	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12	Site 14	Site 17	Site 18	Site 19	Site 21	Total Sites Detected	Breeding/Migration Species
Barred Owl	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	Breeding
Boreal Owl	0	1	0	1	1	0	1	1	0	0	1	0	0	1	0	1	0	8	Breeding
Great Gray Owl	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	Breeding
Great Horned Owl	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	0	1	14	Breeding
Short-eared Owl	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	3	Possible Breeding
American Kestrel	1	1	0	1	1	1	1	1	1	1	1	0	1	1	0	0	0	12	Breeding
Bald Eagle	1	0	0	1	1	1	1	1	1	0	1	0	0	1	0	0	0	9	Breeding
Merlin	1	1	0	1	0	1	1	1	1	1	1	0	0	0	0	0	1	10	Breeding
Northern Goshawk	1	1	0	1	0	0	0	1	0	1	1	0	1	1	0	0	1	9	Breeding
Northern Harrier	0	1	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	4	Breeding
Osprey	0	0	0	1	1	1	1	0	1	0	0	0	1	1	0	0	0	7	Breeding
Peregrine Falcon	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	2	Migration
Red-tailed Hawk	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	Breeding
Sharp-shinned Hawk	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	Breeding
<b>Total Species Detected</b>	<b>7</b>	<b>7</b>	<b>1</b>	<b>7</b>	<b>5</b>	<b>4</b>	<b>7</b>	<b>8</b>	<b>6</b>	<b>6</b>	<b>7</b>	<b>0</b>	<b>6</b>	<b>8</b>	<b>1</b>	<b>1</b>	<b>3</b>		



# SHOREBIRD SPECIES DETECTIONS BY SURVEY SITE

- 12 shorebird species were detected across the 18 survey sites
- Sites 4 and 17 had the greatest shorebird species diversity (n = 10)

Table 3. Shorebird species detections by survey location; 1 indicates the species was detected and 0 indicates it was not detected. Breeding/Migration species column indicates if the species is known to breed in the survey area or if they only occur in the region during the migration period.

Common Name	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12	Site 14	Site 17	Site 18	Site 19	Site 21	Total Sites Detected	Breeding/Migration Species
Dunlin	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	3	Migration
Greater Yellowlegs	1	1	0	1	1	1	1	0	1	1	0	0	1	1	0	1	1	12	Breeding
Killdeer	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	Breeding
Least Sandpiper	0	0	0	1	0	1	1	1	0	1	0	0	0	1	0	1	0	7	Migration
Lesser Yellowlegs	1	1	0	1	1	1	1	1	1	1	0	0	1	1	0	1	0	12	Breeding
Long-billed Dowitcher	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	2	Migration
Pectoral Sandpiper	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	Migration
Semipalmated Plover	0	1	0	1	0	1	1	0	0	0	0	0	0	1	0	0	0	5	Migration
Solitary Sandpiper	1	1	0	1	0	1	1	1	1	1	0	1	1	1	0	1	1	13	Breeding
Spotted Sandpiper	0	0	0	1	1	0	1	0	1	0	0	0	1	0	0	1	0	6	Breeding
Upland Sandpiper	0	1	1	1	0	0	0	1	1	1	0	0	0	0	0	1	0	7	Possible Breeding
Wilson's Snipe	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	15	Breeding
<b>Total Species Detected</b>	<b>4</b>	<b>6</b>	<b>1</b>	<b>10</b>	<b>4</b>	<b>7</b>	<b>7</b>	<b>5</b>	<b>6</b>	<b>6</b>	<b>1</b>	<b>2</b>	<b>6</b>	<b>10</b>	<b>0</b>	<b>8</b>	<b>3</b>		

# WATERBIRD SPECIES DETECTIONS BY SURVEY SITE

- 14 waterbird species were detected across the 18 survey sites
- Site 17 had the greatest diversity of waterbird species (n = 17)

Table 4. Waterbird species detections by survey location; 1 indicates the species was detected and 0 indicates it was not detected. Breeding/Migration species column indicates if the species is known to breed in the survey area or if they only occur in the region during the migration period.

Common Name	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12	Site 14	Site 17	Site 18	Site 19	Site 21	Total Sites Detected	Breeding/Migration Species
American Bittern	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	Breeding
Arctic Tern	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	Possible Breeding
Black Tern	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	Possible Breeding
Bonaparte's Gull	0	1	0	0	0	1	1	1	0	0	0	0	0	1	0	0	0	5	Breeding
Common Loon	0	1	1	0	1	1	1	1	1	1	0	0	0	1	0	1	0	10	Breeding
Herring Gull	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	3	Breeding
Horned Grebe	0	1	0	0	1	1	1	0	0	1	0	0	0	0	0	1	0	6	Breeding
Pacific Loon	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	4	Migration
Pied-billed Grebe	0	0	0	0	0	1	0	1	0	1	0	0	0	1	0	0	0	4	Possible Breeding
Red-necked Grebe	0	1	0	0	1	1	1	1	1	1	0	0	0	1	0	1	0	9	Breeding
Red-throated Loon	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	3	Migration
Sandhill Crane	0	1	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	4	Migration
Sora	1	0	0	1	1	1	1	1	0	1	0	0	1	1	0	0	0	9	Breeding
Yellow Rail	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	Possible Breeding
<b>Total Species Detected</b>	<b>1</b>	<b>8</b>	<b>2</b>	<b>2</b>	<b>4</b>	<b>7</b>	<b>7</b>	<b>7</b>	<b>4</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>9</b>	<b>0</b>	<b>3</b>	<b>0</b>		



# WATERFOWL SPECIES DETECTIONS BY SURVEY SITE

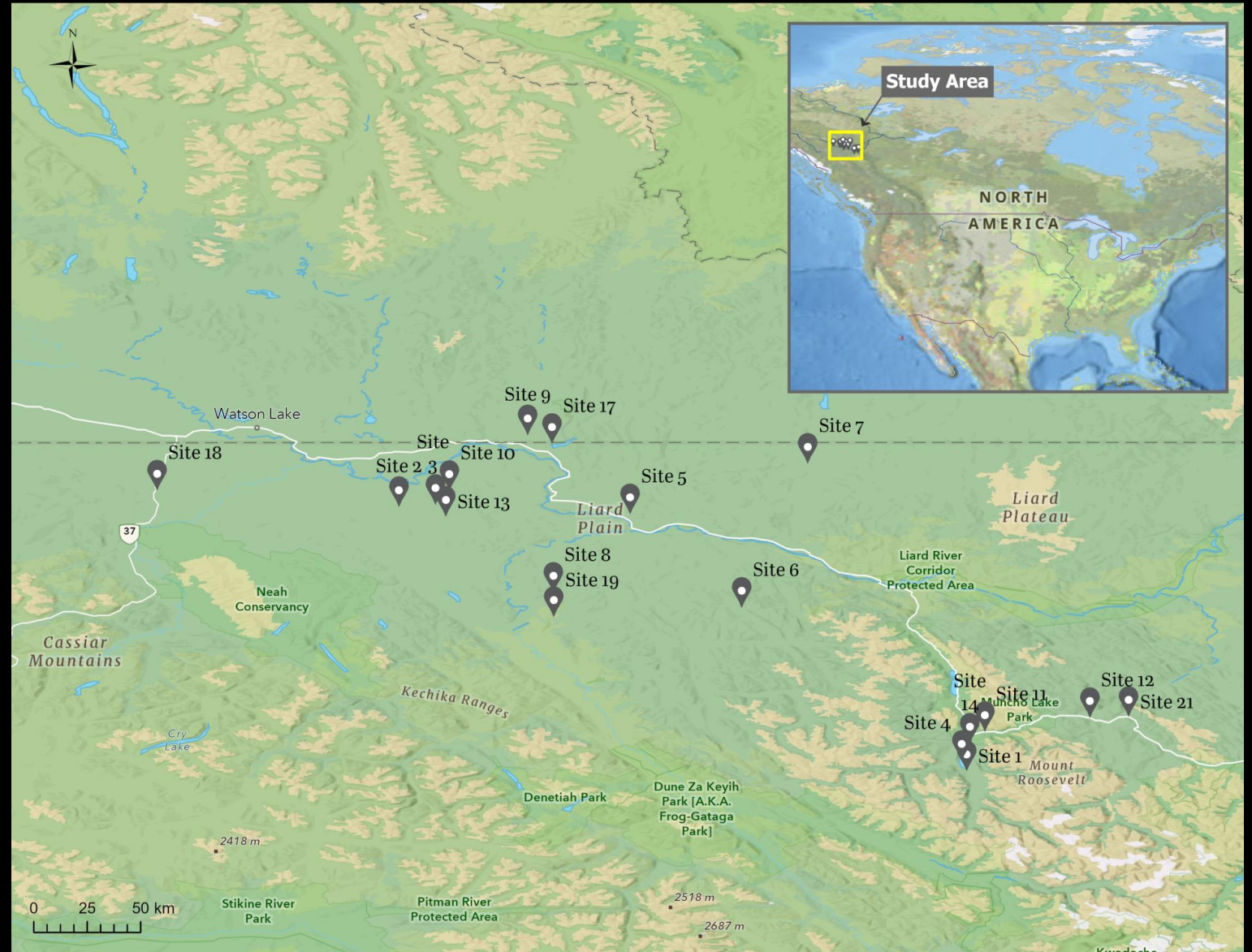
- 21 waterfowl species were detected across the 18 survey sites
- Site 7 had the greatest diversity of waterfowl species (n = 16)

Table 5. Waterfowl species detections by survey location; 1 indicates the species was detected and 0 indicates it was not detected.

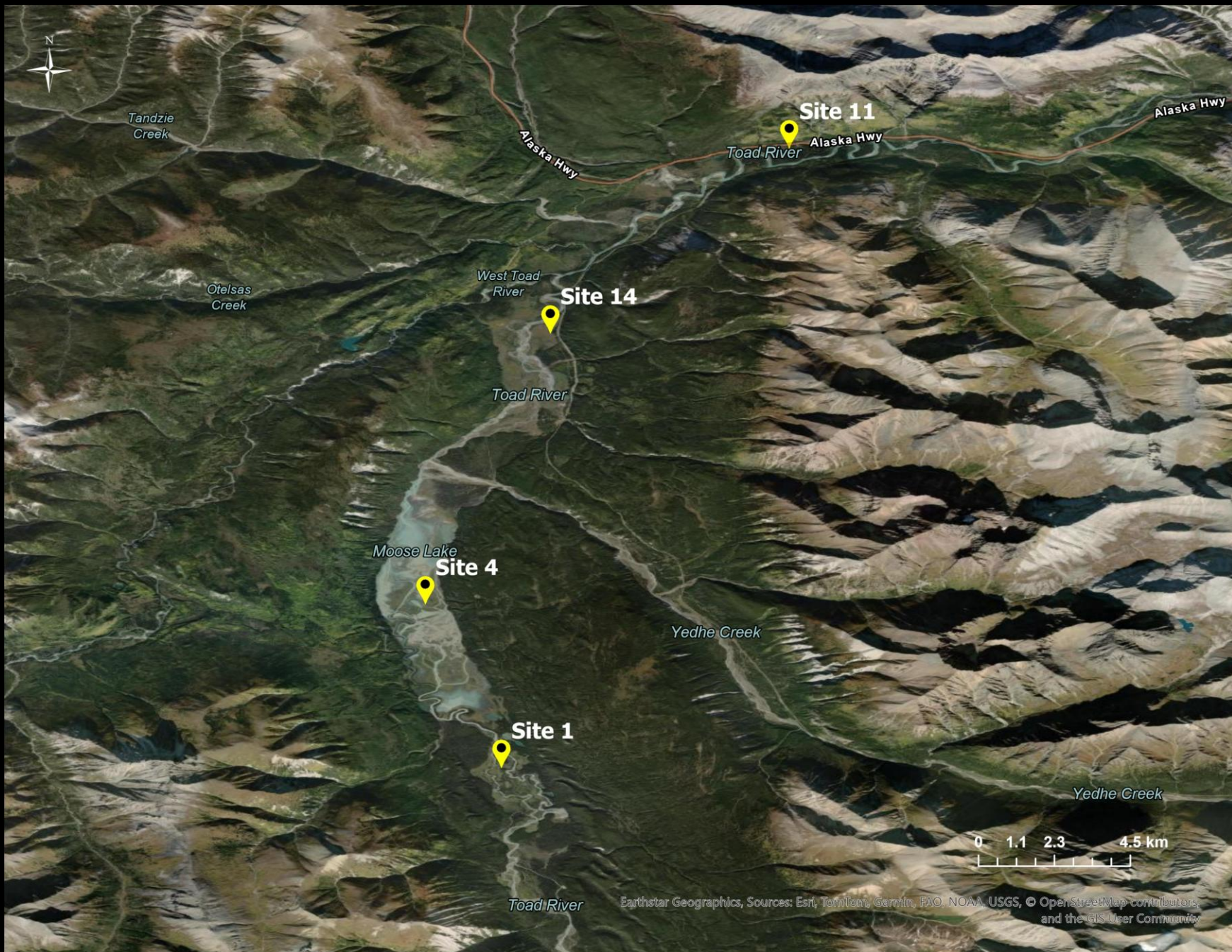
Breeding/Migration species column indicates if the species is known to breed in the survey area or if they only occur in the region during the migration period.

Common Name	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12	Site 14	Site 17	Site 18	Site 19	Site 21	Total Sites Detected	Breeding/ Migration Species
American Wigeon	1	1	0	1	1	1	1	1	1	1	0	0	1	1	1	0	1	13	Breeding
Barrow's Goldeneye	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	3	Breeding
Blue-winged Teal	1	0	0	1	0	1	0	0	0	1	0	0	0	1	0	0	0	5	Breeding
Cackling Goose	1	1	0	1	0	0	0	0	0	0	0	0	1	1	1	0	0	6	Migration
Canada Goose	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	0	14	Breeding
Common Goldeneye	1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	0	0	13	Breeding
Common Merganser	1	0	0	1	0	1	1	0	0	0	0	0	0	1	1	0	0	6	Breeding
Gadwall	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	2	Possible Breeding
Greater Scaup	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	Migration
Greater White-fronted Goose	1	1	0	1	0	1	1	1	1	1	0	0	0	1	0	0	0	9	Migration
Green-winged Teal	1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	0	1	14	Breeding
Long-tailed Duck	0	0	0	0	1	0	1	0	0	0	1	0	1	0	1	0	0	5	Migration
Mallard	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	16	Breeding
Northern Pintail	0	0	0	1	0	1	1	0	0	1	0	0	0	1	1	0	0	6	Breeding
Northern Shoveler	1	0	0	1	0	1	1	1	1	1	0	0	0	1	1	0	0	9	Breeding
Red-breasted Merganser	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	Migration
Ring-necked Duck	0	1	0	0	1	1	1	1	1	1	0	0	0	0	1	0	0	8	Breeding
Snow Goose	0	1	0	0	0	0	1	0	1	0	1	0	0	1	0	0	1	6	Migration
Surf Scoter	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	Migration
Trumpeter Swan	1	1	0	1	1	1	1	1	0	1	0	1	1	1	0	1	0	12	Possible Breeding
Tundra Swan	0	0	0	1	1	0	1	0	1	1	0	0	1	1	1	0	0	8	Migration
<b>Total Species Detected</b>	<b>11</b>	<b>10</b>	<b>2</b>	<b>13</b>	<b>9</b>	<b>14</b>	<b>16</b>	<b>9</b>	<b>10</b>	<b>13</b>	<b>6</b>	<b>3</b>	<b>9</b>	<b>15</b>	<b>14</b>	<b>2</b>	<b>3</b>		

# Appendix A. Detailed Survey Site Maps











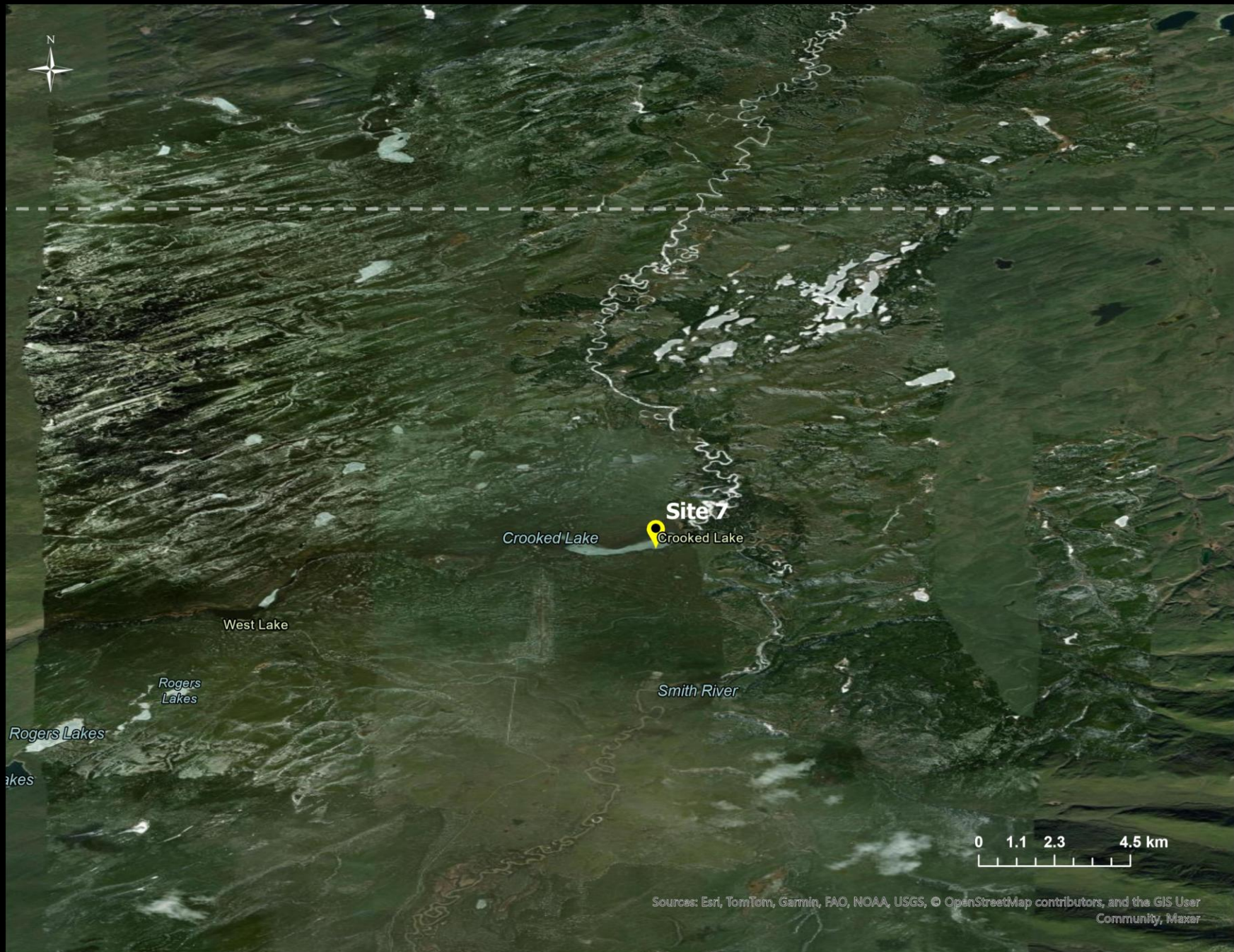




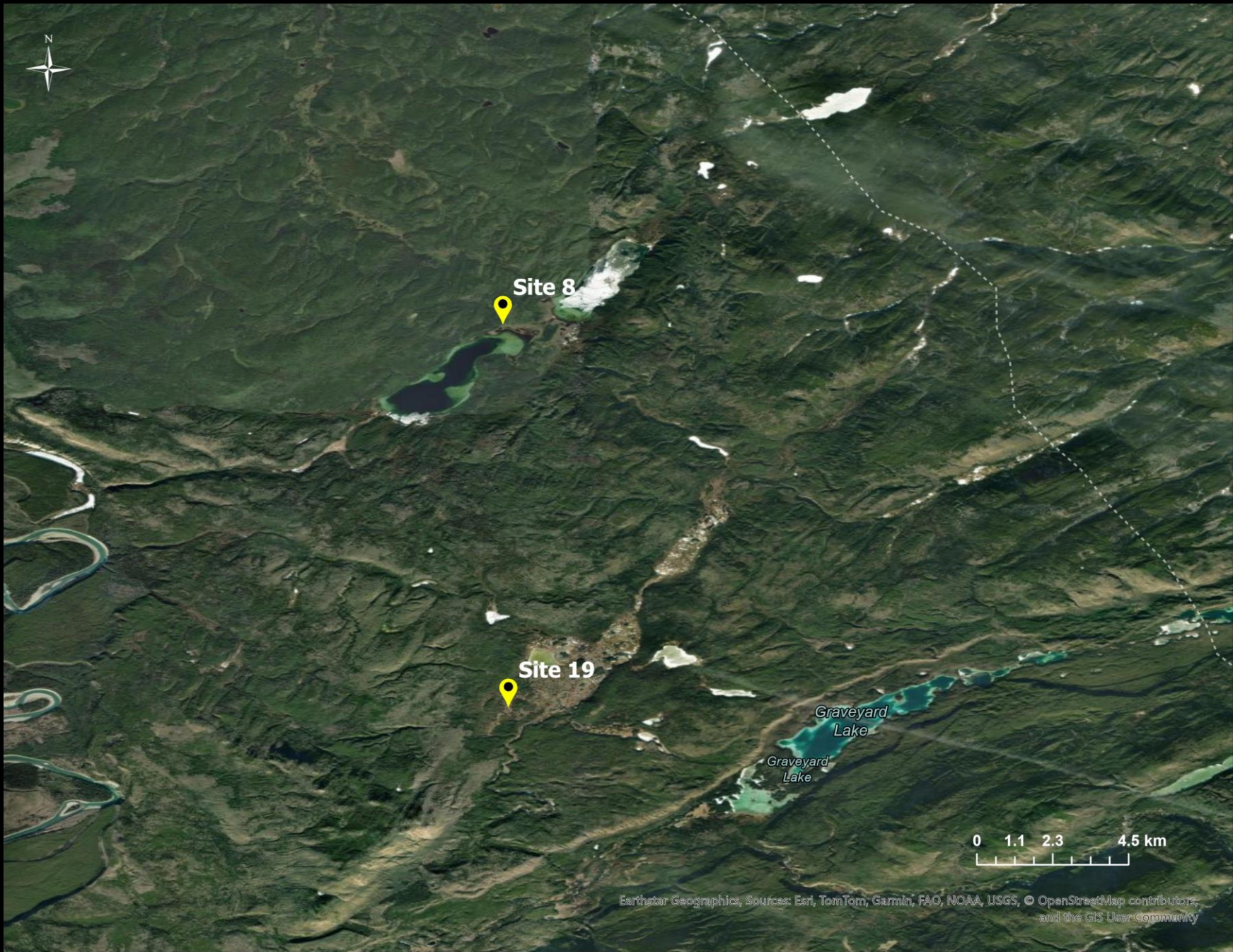












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