

**FINAL REPORT**  
**WESTERN CANADA COOPERATIVE BANDING PROGRAM**  
**WILLOW LAKE, NORTHWEST TERRITORIES**  
**SEPTEMBER 4, 2019**

**PERSONNEL**

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**ABSTRACT**

In 2019, the Sahtu Renewable Resources Board (SRRB), the Tulita Renewable Resources Council (TRRC), the Government of the Northwest Territories' Department of Environment and Natural Resources (ENR), and the United States Fish and Wildlife Service (USFWS) collaborated in the 23<sup>rd</sup> year of duck banding at Willow Lake, (65° 14' N; 125° 25' W) in the Mackenzie River Valley, Sahtu Settlement Area, NWT. The annual goal is to band 2,000 Mallards (*Anas platyrhynchos*), 1,500 Northern Pintail (*Anas acuta*), and any other incidental species of ducks (up to 1,000 per species) prior to the opening day of waterfowl hunting in the Northwest Territories (01 September). The USFWS, SRRB, and ENR provided logistical support for the project. A Waterfowl Biologist (USFWS) supervised two contract employees from the village of Tulita, NWT. Both were hired by SRRB. The USFWS employee arrived in camp and departed camp via North Wright's Twin Otter on 04 August and 29 August, respectively. The two technicians from Tulita arrived and departed on the same flights. A maximum of 9 swim-in style duck traps with restricted funnels and closed trap doors were run for 22 nights and 180 trap-nights. Trap success was 6.4 ducks per trap night. A combination of web address and 1-800 style leg bands were placed on a total of 1,156 ducks. Species totals and compositions are: Mallard (1,017, 88%), Northern Pintail (*Anas acuta*; 77, 7%), American Green-winged Teal (*Anas crecca*; 50, 4%), American Wigeon (*Mareca americana*; 6, 1%), Ring-necked Duck (*Aythya collaris*; 2, 0%), Blue-winged Teal (*Spatula discors*; 1, 0%), Lesser Scaup (*Aythya affinis*; 1, 0%), Common Goldeneye (*Bucephala clangula*; 1, 0%), and Mallard X American Black Duck Hybrid (1, 0%). The number of total ducks banded in 2019 was the 18<sup>th</sup> best (of 23) and 17% below the long-term average (1,398), but the number of Mallards banded in 2019 was 6<sup>th</sup> best (of 23) and 52% over long-term average (668) at the Willow Lake Banding Site. We experienced the lowest water levels in the last five years from beginning to end, so although the North end of Willow Lake was trappable, we had to trap far out into the lakebed. Approximately 11% of banded ducks (N = 124) were of the Hatch Year (HY) or Local (L) age classes. Of special note, 109 foreign bands (from previous years at Willow Lake or elsewhere) were recaptured, but no bands were worn enough to justify replacement.

## **INTRODUCTION AND BACKGROUND**

Willow Lake, residing along the Loche River in the Mackenzie River Valley and Sahtu Settlement area of the Northwest Territories has a long history of hunting, including waterfowl hunting. So much so, that some of the “Willow Lake People” had settled on the north end of Willow Lake hundreds of years ago because of the area’s abundance of game and fish. The navigable waters enabled them to reach other settlements such as Tulita and beyond. In those days, Tulita was the natural rendezvous location for the Willow Lake, Mackenzie River, and Mountain People. The settlement at the north end of Willow Lake is appropriately called “Willow Lake”, and cabins still exist. Most of the original cabins are gone, but newer, more up-to-date cabins with cellular internet, cell phone boosters, and satellite TV’s are increasingly common. A church Bern Will Brown built is also no longer standing. Currently, there are no year-round residents at Willow Lake, but many make trips from Tulita in the spring for waterfowl hunting and fish netting, and in the fall and early winter for trapping, fish netting, and hunting.

One of the original and now more increasing draws of the Willow Lake area is its abundance of migratory waterfowl in the spring and fall. In spring, the Loche River flows into Willow Lake and along with warming shorelines of a very shallow wetland basin, creates one of the first ideal stopover and staging locations for migratory waterfowl along their journey further north. In the fall, the water levels dictate migratory waterfowl usage, mainly because they don’t have the hindrance of frozen water further south. In good water years, Willow Lake can also be an important molting, breeding, stopover, and staging area for migratory waterfowl throughout the summer and fall during their journey south.

Since 1995, the United States Fish and Wildlife Service (USFWS) has collaborated with the Tulita Renewable Resources Council (TRRC), Sahtu Renewable Resources Board (SRRB), and the Government of the Northwest Territories’ Department of Environment and Natural Resources (ENR) to trap and band ducks in the vicinity of Willow Lake. The USFWS provides administrative logistics and expertise by running a camp with a Wildlife Biologist, specifically one that has been specially trained in trapping, banding, and identifying waterfowl, while the TRRC and SRRB have been instrumental in the hiring of local Tulita and Norman Wells banding technicians and providing local knowledge and logistical support. This partnership has been very beneficial to all entities. Both banding technicians and the crew leader Wildlife Biologists have much to teach each other, including the history, biology, traditions, and ways of all cultures.

The banding project was initially established at Loche Lake, the headwaters of the Loche River, but then moved to the area of Willow Lake in 1996, where it remains base camp for operations. The main initiative to band at this site was that no ducks had ever been banded in this reference area, and the USFWS (including the Pacific Flyway Study Committee) was very interested in the derivation of harvest for ducks using this area. In 2002, the base camp of operations for duck banding moved from the settlement of Willow Lake to the south end of Willow Lake (also the outlet of the Loche River). Motivation for moving the base camp of operations were two parts: 1) the substrate of the lake bed is mostly sand in the south and silt-clay in the north, making setting, maintaining, and gathering ducks and traps easier in the south, and 2) local concerns with the duck banding operations being in the traditional settlement location of Willow

Lake. Since 2015, we have made every effort to trap ducks wherever we found them, given local knowledge from technicians and support from the community. We found that in low water years, when natural food is available and accessible throughout the entire lake that migrant individuals who only spend a day or so on the lake are more likely to find our traps when they are spread out than by just trapping one location.

Willow Lake lies within the selected lands of the Sahtu Dene and Métis under the terms of the Sahtu and Métis Comprehensive Land Claim Agreement (Dept. of Indian and Northern Affairs Canada, 1993). The SRRB is the main instrument for wildlife management in the Sahtu Land Claim area and supports this project. The Tulita Lands Corporation is responsible for approving terms of access to private lands (Sahtu Dene and Métis) within the Tulita District, including the Willow Lake and Loche River watershed. The land claim gives the TRRC the responsibility for involvement in, and approval of, wildlife research and management projects in and near their community. Therefore, we obtained permission to enter these private lands, and to construct and occupy the project's base camp, from the Tulita Lands Corporation with the support of the TRRC. The Willow Lake "Duck Banding Operation" is considered an annual success by all entities and is welcomed every year.

Willow Lake duck banding base camp consists of two tent frames converted to sleeping cabins, a frame-style kitchen, an outhouse, and a storage silo. The silo provides storage for trap wire for the following year, miscellaneous trapping and living supplies and tools. In 2015, the crew also built a smoker out of birch, spruce, and mud. It makes fantastic smoked Coney and Whitefish with willow and alder wood.

The annual goal is to band 2,000 Mallards (*Anas platyrhynchos*), 1,500 Northern Pintail (*Anas acuta*), and any other incidental species of ducks (up to 1,000 per species) prior to the opening day of waterfowl hunting in the Northwest Territories (01 September).



## NARRATIVE

Wildlife Biologist Steve Olson arrived in Norman Wells on 02 August. After a day and a half gathering gear, discussing bear safety, shopping for food, and purchasing fuel, Olson departed Norman Wells on 04 August for Tulita via North Wright's Twin Otter on straight floats, to pick up banding technicians Philip Clement and Francis Ayah, and then onto Willow Lake. The first day at camp was spent unloading corn and gear, going through inventory in the storage silo, and pre-baiting the closest trap site. The first four of nine large traps were placed at Bidwell Point, Bay 1, and Y-Spot East sites on 06 August. As seen since 2015, the majority of ducks congregated along the northern bays and shorelines. A maximum of about 1000 ducks were present on the entire water body of Willow Lake upon arrival, including about 500 molting adult American Wigeon in a northern bay. Appreciable numbers (>1,000) of ducks were not seen or counted until about the 12<sup>th</sup> of August. Our efforts to get ducks feeding on corn did not take long this year. Our first ducks were captured on 07 August.

By 16 August we were running all 9 large traps per night among seven sites. Ducks were now much more common (about 4,000 in Willow Lake vicinity) and attracted to our baiting sites. Our three most productive days were 13, 14, and 18 of August when we banded 108, 98, and 95 ducks, respectively (Table 2).

Unlike every other year, we experienced zero predatory events in 2019. We surmise a pair of Sandhill Cranes (*Grus canadensis*) we assume are the same as seen August of 2017 and 2018 greatly enjoy our presence (corn) at the southern site (Bidwell Point) which is prone to mink predation, actually act as protective guardians of the site and deter predators. The pair exhibit the same protective behavior annually, by being "excited" for our daily arrival, only flushing less than 100 meters, waiting for their corn scraps when we leave, and not allowing other cranes within their "territory". They are always extremely vocal and always "dancing" and hopping.

We continued to explore and trap the north sites with variable but reliable success. Unlike other years where we had water access deep into the heart of bays, we had to improvise and trap far out into the lakebed on mud and sand bars, completely exposed to the elements. As the water level continued to recede throughout the month, we were very close to having to all sites on the northern end of the lake. We could not have continued with those traps another week. We have learned to start in the deepest water allowable to avoid moving traps late in August, and to make sure we can gather all traps and move them back to camp at the end of the month.

On 15 August, We received a re-supply via Pilatus Porter (North Wright Air) load of corn, food, and fuel. All three banders were picked up with a Pilatus Porter (North Wright Air) the morning of 29 August. Clement and Ayah were dropped off in Tulita, and Olson continued on to Norman Wells. Olson then flew out and home via commercial airline on 31 August.

## METHODS

Duck trapping was accomplished using six new (in 2018) bales of wire (galvanized and welded, 1" X 2" size, 14 gauge, and 100ft bales) cut into thirds. The nine new traps replace 15-20 year-old wire, originally used for Benning II style smaller box traps. The old traps had already been built and stored outside at the camp site from previous years. Upon arrival, we found that

Willow Lake had the lowest water in five years, and we did not have to cut emergent vegetation at banding sites to open feeding areas, as mud and sand shorelines were already exposed. We unloaded a few hundred pounds of corn at locations used in the past, and marked them with willow sticks. These sites were checked daily, and feeding area sizes were increased as needed to provide enough room for traps, loafing, and general sense of security. As in a lot of my experiences, especially in low duck density situations, we found that ducks visited our sites or were attracted at higher rates when we provided loafing and preening bars made from the cut and piled vegetation. It was also evident that loafing bars further increased catch rates in tucked-away bays when the entrance to the funnel was facing the loafing bar. The adverse was seen when a loafing bar was facing the backside of a trap and no entrance was visible. Also, the Bidwell Site (Figure 1 and Table 1) is almost a pure sand substrate, and we had to find the most solid sites we could in the north. These northern sites became worse for walking and wading with a reduction of water throughout the month and after being worked by feeding waterfowl and our own foot traffic. That being said, there exists incredible waterfowl habitat in the north, and substrate has not dictated our success.

Duck identification was achieved through years of professional experience and expertise of the USFWS Wildlife Biologist. Willow Lake's duck species composition is normally very predictable and so the chance of misidentification of odd species is highly unlikely. Aging and sexing ducks was accomplished using a variety of techniques such as feather colors, wing characters, bill and leg characters, and cloaca examinations. Further, the USFWS Wildlife Biologist has trapped all over North America, has personally banded very odd species, and constantly monitored the banding technicians for quality control. The USFWS Wildlife Biologist used every opportunity to teach the banding technicians not just how, but why a duck belonged to a certain species, age, and sex.

Data management was achieved by taking field notes on Write in Rain banding schedules. These data were then transferred to an Excel spreadsheet on a computer at the end of the month. These data were then worked for submission to the Bird Banding Laboratory upon returning to the office. Every effort was made to submit banding data as soon as possible upon returning because duck hunting seasons start September 1, and inevitably some of our banded ducks may be subjected to those early hunting seasons.

## RESULTS

Table 2. Daily bandings by trap location at Willow Lake, NT, 2019.

Banding Site Name	Day of August 2019																												Grand Total
	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28							
Bay 1						1	52	34	5		11	12	12	2	5														134
Bidwell	51	92	39	22	21	13	18	17	14	8	24	23	10	17	5	13	17	6	13	18	24	11							476
Island												33	16	6	3	6	9	6	2	3	2	2							88
River Bay East				9	21	8	4	1	5	7	4	3	4	2	3	1	3	5	8	3	3	3							97
River Bay West						18	9	12	9	10	6	5	9	5	3	1	4	6	4	9	1	1							112
Y-Spot East							14	25	8	9	5	7	6	6	5	3	1	3	4	9	2								107
Y-Spot West			5	7	9	13	11	9	9	11	7	12	6	9	10	10	3	1	3	4	3								142
Grand Total	51	92	44	38	51	53	108	98	50	45	57	95	63	47	34	34	37	27	34	46	33	19							1156

Figure 2. Ducks banded by day in August, 2015–2019 at Willow Lake, NT.

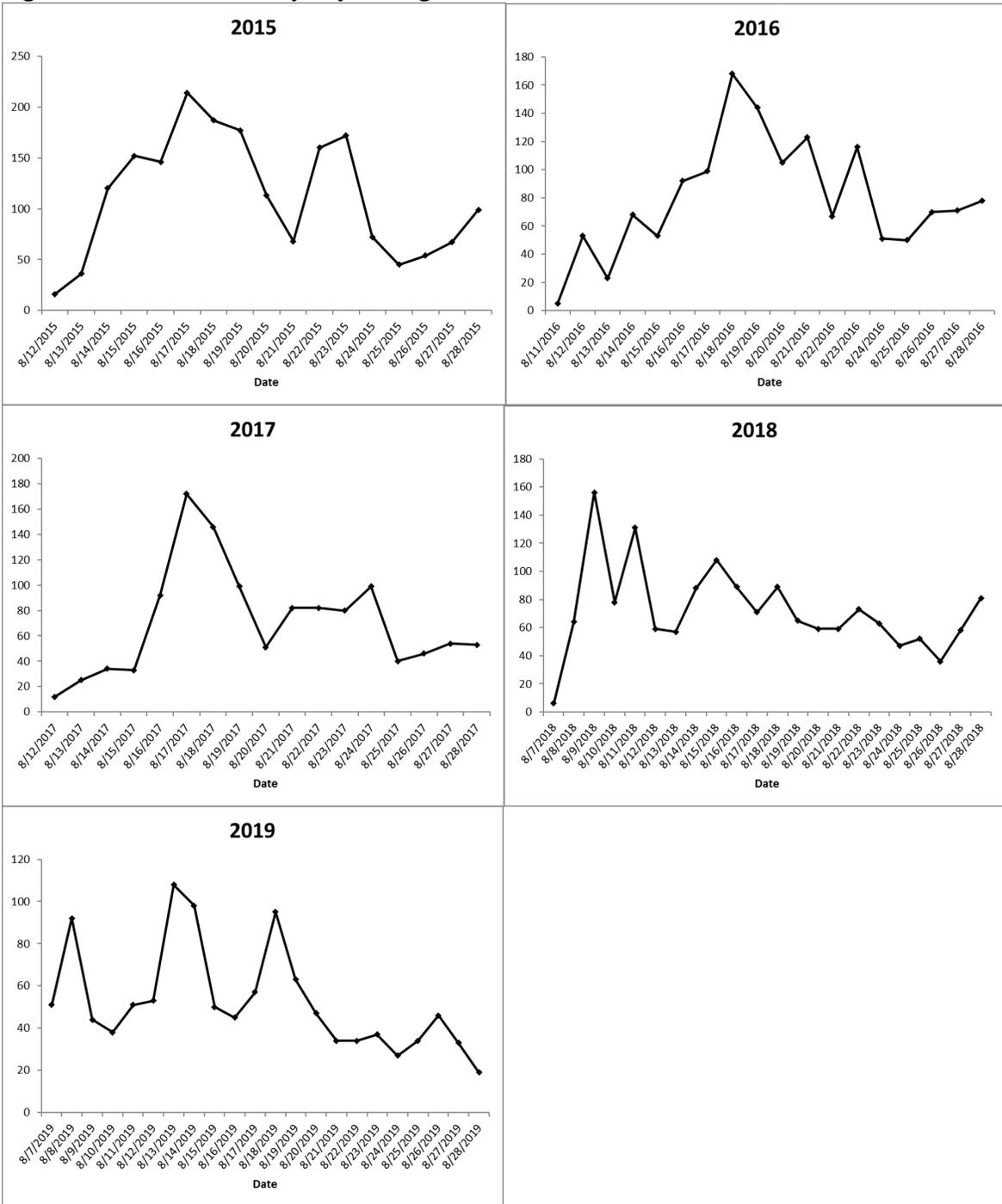


Table 3. Daily bandings by duck species at Willow Lake, NT, 2019.

Species	Day of August 2019																												Total	%
	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28								
MALL	9	60	38	26	45	50	101	97	48	38	56	93	58	46	32	34	36	25	30	46	33	16	1017	88%						
NOPI	15	27	5	5	6	2	6		1	3	1		2	1			1		1			1	77	7%						
AGWT	26	5		5		1	1		1	1		2	2					2	2			2	50	4%						
AMWI	1									3						1				1			6	1%						
RNDU								1								1							2	0%						
LESC					1																		1	0%						
COGO													1										1	0%						
BWTE					1																		1	0%						
MBDH				1																			1	0%						
Total	51	92	44	38	51	53	108	98	50	45	57	95	63	47	34	34	37	27	34	46	33	19	1156	100%						

Table 4. Duck species, age, and sex composition and summary at Willow Lake, NT, 2019.

Species	Sex		Grand Total	Species Composition	Percent Hatch Year (HY) and Local (L) by Species
	F	M			
MALL	265	752	1017	88.0%	
AHY	222	715	937		
HY	34	23	57		
L	9	14	23		7.9%
NOPI	46	31	77	6.7%	
AHY	29	21	50		
HY	17	10	27		35.1%
AGWT	13	37	50	4.3%	
AHY	7	28	35		
HY	6	9	15		30.0%
AMWI	5	1	6	0.5%	
AHY	3	1	4		
HY	2		2		33.3%
RNDU		2	2	0.1%	
AHY		2	2		0.0%
BWTE		1	1	0.1%	
AHY		1	1		0.0%
COGO	1		1	0.1%	
AHY	1		1		0.0%
LESC		1	1	0.1%	
AHY		1	1		0.0%
MBDH		1	1	0.1%	
AHY		1	1		0.0%
Grand Total	330	826	1156	100%	10.7%

Table 5. Trap mortality by location and cause of death during trapping at Willow Lake, NT, 2019.

Location	Cause of Death		
	Hypothermia	Tramplng	Total
Bidwell	1	1	2
Island	1		1
<b>Grand Total</b>	<b>2</b>	<b>1</b>	<b>3</b>

Table 6. Trap nights and summary statistics at Willow Lake, NT, 2019.

<b>Willow Lake trap nights and summary statistics</b>					
Date	Number of Traps Operating	Total Bands	Trapping Success (Total bands per Trap Night)	Bags of CORN used	Bags of BARLEY used
8/4/2019	-	-	-	2	0
8/5/2019	-	-	-	2	0
8/6/2019	4	-	-	2.5	0
8/7/2019	6	51	12.8	2	0
8/8/2019	7	92	15.3	1.5	0
8/9/2019	7	44	6.3	1.5	0
8/10/2019	8	38	5.4	2	0
8/11/2019	8	51	6.4	2	0
8/12/2019	8	53	6.6	2	0
8/13/2019	8	108	13.5	2.5	0
8/14/2019	8	98	12.3	3	0
8/15/2019	8	50	6.3	3	0
8/16/2019	9	45	5.6	3	0
8/17/2019	9	57	6.3	3	0
8/18/2019	9	95	10.6	3	0
8/19/2019	9	63	7.0	3	0
8/20/2019	9	47	5.2	3	0
8/21/2019	9	34	3.8	3	0
8/22/2019	9	34	3.8	3	0
8/23/2019	9	37	4.1	3	0
8/24/2019	9	27	3.0	3	0
8/25/2019	9	34	3.8	3	0
8/26/2019	9	46	5.1	3	0
8/27/2019	9	33	3.7	4	0
8/28/2019		19	2.1		0
<b>Totals</b>	<b>180</b>	<b>1156</b>	<b>6.4</b>	<b>63</b>	<b>0</b>

Table 7. Trapping success and banding at Willow Lake, NT, 1995–current.

Year	Grain Used (lbs)	Dates Trapped in August	Maximum Number of Traps	Trap Nights (TN)	Number of Ducks Banded	Trapping Success (Ducks / TN)	Crew Leader
1995	1,500	2 to 21	7	119	509	4.3	Popko
1996	4,500	9 to 30	17	195	1,892	9.7	Popko
1997	3,500	8 to 29	14	291	1,687	5.8	Popko
1998	4,000	13 to 30	16	262	1,700	6.5	Popko/Bidwell
1999	5,620	3 to 31	16	439	1,248	2.8	Bidwell
2000	4,463	3 to 30	18	490	1,600	3.3	Bidwell
2001	3,940	4 to 30	18	451	404	0.9	Bidwell
2002	6,100	5 to 29	18	416	2,168	5.2	Bidwell
2003	5,061	6 to 30	18	423	1,348	3.2	Bidwell
2004	4,022	9 to 30	20	470	1,298	2.8	Bidwell
2005	3,030	8 to 30	13	293	1,019	3.5	Bidwell
2006	3,856	8 to 30	19	408	2,083	5.1	Bidwell
2007	4,022	12 to 30	18	324	374	1.2	Zimpfer
2008	5,126	13 to 1	20	398	1,944	4.9	Zimpfer
2009	3,975	11 to 31	24	486	1,549	3.2	Zimpfer
2010			Station was not operated				
2011	3,550	10 to 31	25	511	1,674	3.2	Zimpfer
2012			Station was not operated				
2013	2,950	13 to 31	21	385	1,137	3	Zimpfer
2014	3,150	11 to 27	19	320	1,251	3.9	Zimpfer
2015	3,974	10 to 27	27	462	1,898	4.1	Olson
2016	4,637	9 to 27	18	268	1,436	5.4	Olson
2017	4,568	9 to 27	16	272	1,200	4.4	Olson
2018	4,807	6 to 28	9	162	1,589	9.8	Olson
2019	2,778	6 to 28	9	180	1,156	6.4	Olson
Mean	4,049	-	17	349	1,398	4.5	

## DISCUSSION

Water levels for the 2019 trapping season were the lowest experienced in the last five years, and we were able to utilize only the areas further into the lakebed of Willow Lake. In concert with historical reports, the water level continued to decrease throughout the season, and almost all traps needed to be moved either a few yards or to an entirely new site depending on the area surroundings and general slope of the substrate. Weather was very cold and rainy, and felt like fall weather all August. We had only a few days of sun. Most days were rainy and moderate to high winds, but we were able to safely accomplish crossing the lake and checking traps by following the lee side of the lake. Estimated daily high temperatures during banding operation were 3–19°C (38–65°F), and overnight lows were 1–7°C (33–45°F).

A maximum of 9 swim-in style duck traps with restricted funnels and closed trap doors were run for 22 nights and 180 trap-nights. Trap success was 6.4 ducks per trap night. A combination of web address and 1-800 style leg bands were placed on a total of 1,156 ducks. Species totals and compositions are: Mallard (1,017, 88%), Northern Pintail (*Anas acuta*; 77, 7%), American Green-winged Teal (*Anas crecca*; 50, 4%), American Wigeon (*Mareca americana*; 6, 1%), Ring-necked Duck (*Aythya collaris*; 2, 0%), Blue-winged Teal (*Spatula discors*; 1, 0%), Lesser Scaup (*Aythya affinis*; 1, 0%), Common Goldeneye (*Bucephala clangula*; 1, 0%), and Mallard X American Black Duck Hybrid (1, 0%) (Table 4). The number of total ducks banded in 2019 was the 18<sup>th</sup> best (of 23) and 17% below the long-term average (1,398), but the number of Mallards banded in 2019 was 6<sup>th</sup> best (of 23) and 52% over long-term average (668) at the Willow Lake Banding Site (Table 7). Approximately 11% of banded ducks (N = 124) were of the Hatch Year (HY) or Local (L) age classes (Table 4). Of special note, 109 foreign bands (from previous years at Willow Lake or elsewhere) were recaptured, but no bands were worn enough to justify replacement.

These numbers provide evidence of a low production year (for Mallards) if we assume young birds were available to be caught at similar rates as adults and that they were available at the time we were trapping. We caught the 6<sup>th</sup> most Mallards ever at this station (1,017) and broke the 1,000 mark for the 2<sup>nd</sup> year in a row. Arctic-nesting geese started to arrive later in the month, but we didn't witness great migrations until the last three days of banding. Thousands of southward migrating Greater White-fronted (*Anser albifrons*), Canada (*Branta canadensis*) Geese, and swans (both *Cygnus buccinator* and *Cygnus columbianus*) created a great spectacle for our last day in the marsh.

Odd species caught and banded: We caught and banded the first two Ring-necked Ducks and a Common Goldeneye on Willow Lake this year and also banded a Lesser Scaup. But possibly the oddest species captured this August was identified as a Mallard X American Black Duck Hybrid. Only one other had been caught and banded on Willow Lake, in August 2000. This bird was an adult male, which made identification easier. Lastly, the Willow Lake banding station has hit 32,075 ducks banded in total since 1995. These highlights certainly eased our depressive weather conditions during a cold and rainy month and are a testament to all the hard work and effort applied the last 25 years.

The north side of the lake should continue to be considered premier waterfowl habitat when water is available, and should be trapped as long as we have permission to. In previous years, locals with cabins on the north side of the lake have voiced concerns, but this is the best site on the entire lake, and every effort should be made to be granted permission to do so.

One-hundred and nine foreign bands (from previous years at Willow Lake or elsewhere) were recaptured, and one band was worn enough to justify replacement. The number and percentage of original banding locations are as follows: Willow Lake, NWT (from previous years; 104, 95%), Yukon Delta NWR, AK (1, 1%), Mills Lake, NT (1, 1%), and unknown at this time (3, 3%).

Since 1995, 32,075 ducks have been banded at the Willow Lake banding station. The species composition of the 4 most common species (equaling 99%) banded is Mallard (48%), Northern Pintail (32%), American Green-winged Teal (11%) and American Wigeon (8%).

General observations this year were similar to last three year's observations. We experienced very low densities of ducks early in the month, and estimate only 1,000 ducks were in the entire vicinity when we arrived. We estimated this by taking trips around the lake to scout for possible banding sites. We did notice a gradual increase in the total number of ducks using the Willow Lake area later in the month, but the greatest numbers were seen during two of our hardest weather events around mid-month (>5,000).

All garbage was flown out of camp and taken for disposal at the Norman Wells landfill. Multiple black bears (*Ursus americanus*) were seen this year (one was witnessed being shocked by our electric bear fence), and bald eagles (*Haliaeetus leucocephalus*) and osprey (*Pandion haliaetus*) were seen around camp and some of our trapping sites. The increase of aerial predators could pose a future impact if birds of prey become accustomed to attacking ducks upon release after banding. Unlike 2018, the wolf pack on the SE shoreline of Willow Lake was non-existent. Only one lone wolf howled for us, and only on one night of the month. Very few wolf tracks were seen as well. Overall, we had no major concerns this year. One last note is the increase in beaver, moose, caribou, grouse, and bear sightings.

The project's boat motors, banding carousel and banding board, floats, camping equipment, and supplies have been stored inside the grain silo at the camp for next year. Given the last two year's concerns over mice invading the storage shed for grain, we used all remaining corn this year and left none for next year. However, about 50 bags of corn remain in Norman Wells in a storage facility for 2020. Boats (12' Lund and 18' flat bottom Jon boat) were drug up the shoreline just downstream of camp, flipped upside down, and tied to trees for the off-season. We continue to lock the silo with two pad locks to prevent and discourage break-ins, which have occurred in previous years. This is not only disappointing, but a major hassle because we don't know what is stolen until we arrive. Further, replacing those stolen items is impossible for the current year. Upon arrival this year, we found no evidence of tampering with the silo, and all items were intact.

The old traps are located to the side of the silo, outside and fully exposed to the elements. Prior to this year, this has caused a few issues with some traps now rendered unusable because of the

threat they pose to the safety of the crew and the birds when used as traps. All nine of the newly built traps are now safely inside the storage shed and take up the space the grain used to take.

Finally, the banding camp buildings will need to be moved back away from the river sometime in the near future. Due to over-story clearing and warming temperatures, the camp continues to see river bank settling from the thawing of the permafrost, and the river bank has been eroding into the Loche River. In 2015, this created an immediate need to lift one of the sleeping cabins which was >14 inches below level. We were able to lift and re-set this cabin about 10 inches. This is only a temporary fix, and a more permanent solution will be needed soon. The crew also moved the outhouse, cleaned and reorganized the storage silo, and replaced the wood stove and piping in the kitchen building in 2017. All holes created by rodents in the floor of the storage silo were plugged and filled with expanding foam in 2017 and looked to be working well for the last two years.

**HIGH PRIORITY NEEDS FOR 2020:**

1. Purchase and deliver >2500 lbs. (or 50 bags) of corn for the 2020 season. This is normally delivered on the winter road to Norman Wells in January or February of 2020.
2. Personnel (i.e., banding technicians) need to be hired in advance to their departure, and they need to be available to be picked up on the day we fly out to camp. It was proven very hard to open and run a bush camp and band ducks with only two people in 2016. Earlier hiring also affords technicians an advance of payment so they can purchase gear and personal items prior to the month of banding.

**APPENDIX A.** Pictures and captions from Willow Lake, NT banding camp, 2019.

**PHOTO 1.** The final release of Mallards and all ducks by Willow Lake crew (left to right) Philip Clement, Steve Olson, and Francis Ayah. Photo By: Steve Olson



PHOTO 2. Due to low water conditions, traps were set great distances from shore. This likely helped in the complete elimination of predator-killed ducks in 2019. Photo By: Steve Olson

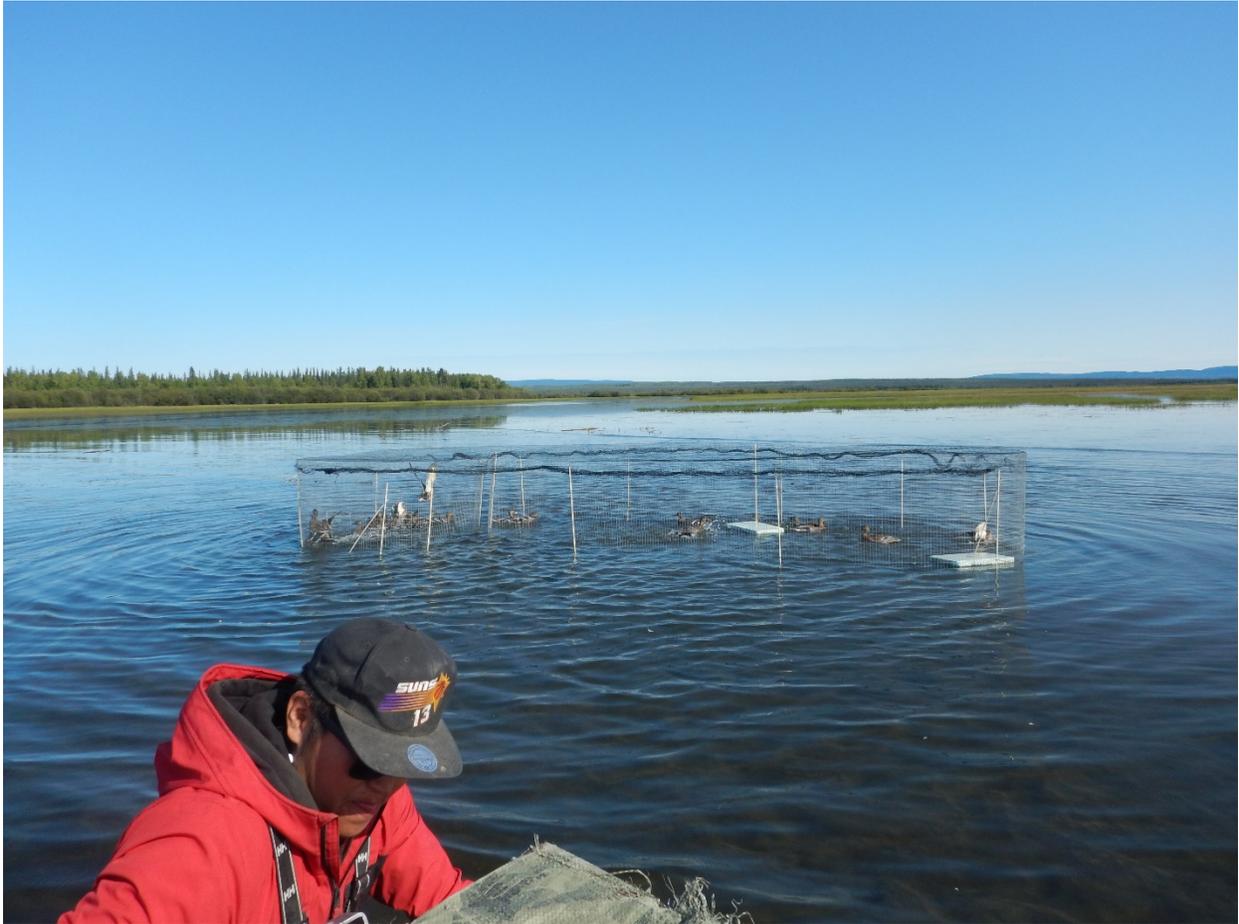


PHOTO 3. Francis Ayah, Philip Clement, and Steve Olson showing off the 1,000 duck banded at the Willow Lake banding station in 2019. It was fitting that it was an adult male Mallard. Photo By: Steve Olson



PHOTO 4. Steve Olson showing off an adult male Mallard X American Black Duck Hybrid, a rare bird, especially for Willow Lake. Photo By: Philip Clement



PHOTOS 5 & 6. Steve Olson showing off the Ring-necked and Common Goldeneye ducks caught and banded. These were both firsts for the Willow Lake banding station. Photo By: Francis Ayah and Steve Olson



PHOTO 7. Willow Lake duck banding camp. Note low water level and amount of exposed shoreline. Photo By: Steve Olson



PHOTO 8. 5:30 AM view out of the Willow Lake duck banding camp, with frost visible on the opposite shoreline this morning. Photo By: Steve Olson

