FINAL REPORT

WESTERN CANADA COOPERATIVE BANDING PROGRAM
WILLOW LAKE, NORTHWEST TERRITORIES
AUGUST 30, 2016

PERSONNEL

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ABSTRACT

In 2016, 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 20th 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 one other USFWS employee and two contract employees from the village of Tulita, NWT. Both were hired by SRRB. The two USFWS employees arrived and departed together via North Wright's Twin Otter on 06 August and 29 August, respectively. The two technicians from Tulita arrived on a resupply flight on 17 August and departed with USFWS employees on 29 August. A maximum of 18 swim-in style duck traps with restricted funnels and closed trap doors were run for 19 nights and 268 trap-nights. Trap success was 5.4 ducks per trap night. The combination web address and 1-800 style leg bands were placed on a total of 1,436 ducks. Species totals and compositions are: Northern Pintail (822, 57%), Mallard (547, 38%), American Green-winged Teal (*Anas crecca*; 57, 4%), and American Wigeon (*Anas Americana*; 10, 1%). The number of ducks caught in 2016 was the 11th best (of 20) and 2% above the long-term average (1,411) at the Willow Lake Banding Site. We experienced average to above-average water levels, so the North end of Willow Lake was trappable. Fifty-four percent (N = 772) of total ducks were caught away from the traditional southern point trap location. Approximately 32% of banded ducks (N = 465) were of the Hatch Year (HY) or Local (L) age classes. Of special note, 39 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, up-to-date cabins with internet, cell phone boosters, and satellite TV's are rumored to be 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 in the fall and early winter for trapping, fishing, 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 the spring, the Loche River flows into Willow Lake and along with warming shorelines, creates an ideal stopover and staging location 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) 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 the 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 Sahtu Renewable Resources Board (SRRB) have been instrumental in the hiring of local Tulita and Norman Wells banding technicians. This partnership has been very beneficial from all sides. 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). Reasons 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 made an effort to trap ducks wherever we found them, and we did not heed traditional trapping sites as our only option. We found that without trapping multiple locations

and limiting our traps to just the south end we would have only banded 664 ducks total. This would have been considered a bust year if we had only trapped the south end.

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).

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.

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 large quantities of grain for the following year, miscellaneous trapping and living supplies and tools, and some leftover nonperishable human foods. In 2015, the crew also built a smoker out of birch, spruce, and mud. It makes fantastic smoked Coney with willow and alder wood.

STUDY AREA

Figure 1. Study Area. Willow Lake, Northwest Territories, Canada.

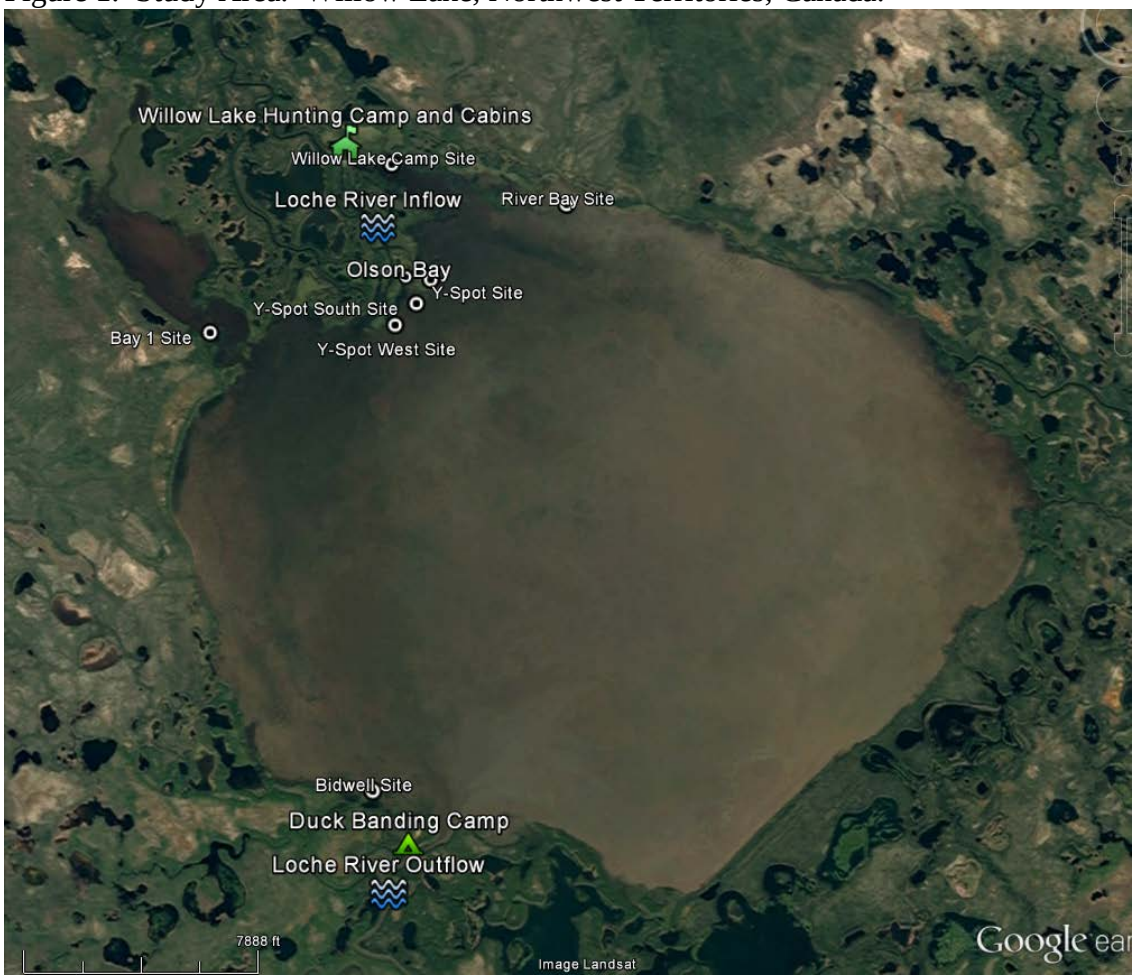

Table 1. Trap sites, GPS locations, dates, and number of traps running per night at location.

		Total Traps Set (closed) By Night (August, 2016)																			
Trapping Site Name	GPS Location	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Bay 1	65° 13' 47.64" N, 125° 26' 27.98" W	2	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
River Bay	65° 14' 32.83" N, 125° 21' 34.52" W		2	2	2	2	2	2	3	3	2	1	1	1	1	1	1	1		
Bidwell	65° 11' 12.09" N, 125° 24' 8.58" W	1	2	2	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Willow Lake Camp	65° 14' 47.23" N, 125° 24' 0.23" W		1	3	3	4	4	4	4	4	4	4	4	2	2	4	2	2		
Olson Bay	65° 14' 7.26" N, 125° 23' 47.59" W								1	1	1	1								
Y-Spot	65° 14' 6.31" N, 125° 23' 26.72" W											1	1	1	1	1	1	1	4	4
Y-Spot West	65° 13' 50.35" N, 125° 23' 55.68" W												1	1	1	1	1	1	1	1
Y-Spot South	65° 13' 57.89" N, 125° 23' 38.34" W																			
	Total Traps Running by Night	3	7	11	15	16	16	16	18	18	17	17	17	15	15	17	15	15	15	15

NARRATIVE

Wildlife Biologists Steve Olson and Jim Bredy arrived in Noman Wells on 04 August. After a day and half of gathering gear, discussing bear safety, shopping for food, and purchasing fuel, Olson and Bredy departed Norman Wells on 06 August for Willow Lake. Because we had a very heavy load (we maximized all other weight with bags of grain to be used in 2017), another flight was scheduled to fly from Willow Lake to Tulita to pick up Philip Clement, the other crew member. Unfortunately, Clement was not ready or available to be picked up and the Twin Otter (North Wright Air) returned to Willow Lake, dipped a wing as a signal, and returned to Norman Wells. The first day at camp was spent unloading gear, going through inventory in the storage silo. We were unable to get grain in the marsh on the first day because of the difficulties of opening a bush camp with only two people. The first three traps were placed at Bidwell Point and Bay 1 sites on 09 August. As seen in 2015, the majority of ducks congregated along the northern bays and shorelines. A maximum of about 300 ducks were present on the entire water body of Willow Lake upon arrival. Appreciable numbers (>1,000) of ducks were not seen or counted until about mid-month. Despite all our efforts to get ducks feeding on barley and corn, this took much longer than expected, and was heavily attributed to low area numbers. Our first ducks were captured on 11 August, and we were then running 11 traps per night among five locations (one traditional southern and four different bays in the north).

By 16 August we were running 18 total traps per night among six sites. Ducks were now much more common (about 2,000 in Willow Lake vicinity) and fully attracted to our baiting sites. Our two most productive days were 18 and 19 of August when we banded 168 and 144 ducks, respectively (Table 2).

Five independent predatory events occurred at four different sites this year. Four of the five were mink, and the other was a wolf. This is likely the most predator events ever encountered at Willow Lake. On 17 August, we discovered our first signs of mink predation at the River Bay site. Because of prior experience with mink at Willow Lake, we moved the problematic trap instantly upon evidence of predated ducks. The predator events were not only a disappointment, but they essentially shut down some of our most productive sites and forced us to relocate to a location not yet acclimated to by ducks.

Despite the mink issues, we continued to explore and trap the north sites with variable but reliable success. We were able to capitalize on the higher-than-average water conditions and trap many sites deep into the heart of bays. As the water level slowly receded throughout the month, we were finally forced to move a few northern sites because they had turned into literal mud wallows. These we moved to the delta (called Y-Spot) created by the Loche River inflow.

On 17 August, We received a re-supply via another Twin Otter (North Wright Air) load of food, grain, fuel, and two technicians, Clement and Horassi. Daily tasks and chores were made much easier following their arrival. All four of us were picked up with a Pilatus Porter (North Wright Air) the morning of 29 August. Clement and Horassi were dropped off in Tulita, and Olson and Bredy continued on to Norman Wells. Olson and Bredy then flew out and home via commercial airline on 31 August.

METHODS

Duck trapping was accomplished using newer and very old (most >16 years old) welded wire (1" X 2" size). Wire was cut into panels and constructed into foldable box-style funnel traps (see Benning II duck trap) using hog rings and zip ties. These traps had already been built and stored outside at the camp site from previous years. Upon arrival, we found that Willow Lake had ample water, and consequently had to cut emergent vegetation to open feeding areas we were creating. We used scythes to clear vegetation, and then unloaded a few hundred pounds of barley and corn, marking heavy baited sites with willow sticks or fiberglass poles. 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 higher water and 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 a pure sand substrate (bottom), 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 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 matched a certain species, age, and sex.

Data management was achieved by taking field notes on the start and end of strings of bands. In 2016, a "banding board", which is a modified band carousel used by many other crews, was constructed out of willow sticks and a piece of plywood. The banding board allowed for strings of bands to be allocated to the four age/sex categories for size 6 and 7 bands (our two most commonly used bands). This new addition greatly decreased our handling time of the birds and also made data collection more efficient. These data were then transferred to an Excel spreadsheet on a computer every night. These data were then worked for submission to the Bird Banding Laboratory upon returning from the bush. Every effort was made to submit banding data as soon as possible upon returning because duck hunting seasons start September 1, 2015, and inevitably some of our banded ducks may be subjected to those early hunting seasons.

2016 was also the first of a two year study where feed type (corn vs. traditional barley) and trap type (oval with a large lead (see Dieter et al.) vs. traditional Benning II traps). By strategically placing traps and providing both types of feed in the same banding sites, and replicating our

efforts in 2017, we hope to gain a better understanding and further increase our efficiency and effectiveness of trapping ducks in the north. This research will be analyzed and written up as a research article by winter 2017.

Lastly, we collected 60 primary feather samples from mallards (20 hatch year age class, 20 adult male, and 20 adult female). This initiative was part of a four duck banding station research project to try to identify where mallards banded at our stations molted their flight feathers. Stable isotope analysis will be used to better understand if we are indeed banding mallards from the reference areas we think we are representing by our banding stations. This initiative will likely continue for the next few years, given results of this year's effort.

RESULTS

Table 2. Daily bandings by trap location at Willow Lake, NT, 2016.

	Day of August 2016																		
Banding Site Name	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	Grand Total
Bay 1	5	6	3	5	8	17	4	5	6	28	31	14	31	25	2	10	5	12	217
Bidwell		47	19	60	38	58	30	52	81	38	36	19	34	7	7	33	45	60	664
Olson Bay							8	10	11	4									33
River Bay							42	75	27	1	18	26	41	15	8	14			267
Willow Lake Camp			1	3	7	17	15	26	19	34	38	8	10	3	2	1			184
Y-Spot															30	7	10	2	49
Y-Spot West														1	1	5	11	4	22
Grand Total	5	53	23	68	53	92	99	168	144	105	123	67	116	51	50	70	71	78	1436

*Major mink predation event at River Bay on 8/19
*Major mink predation event at Olson Bay on 8/20
*Major wolf predation event at Willow Lake Camp on 8/21
*Major mink predation event at Willow Lake Camp on 8/24
*Major mink predation event at Willow Lake Camp on 8/25

Figure 2. Ducks banded by day in August, 2016 at Willow Lake, NT.

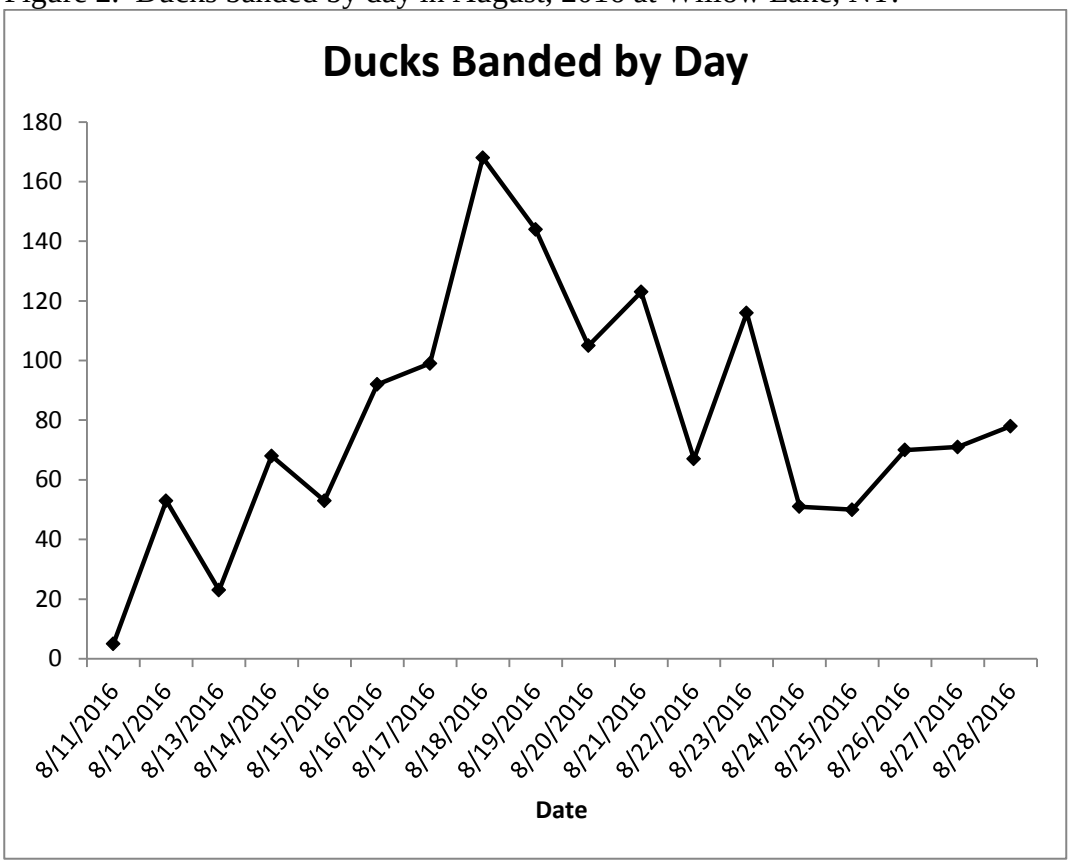

Table 3. Daily bandings by duck species at Willow Lake, NT, 2016.

	Day of August 2016																		
Species	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	Grand Total
AGWT	0	0	1	0	0	4	9	13	1	19	9	0	1	0	0	0	0	0	57
AMWI	0	0	1	0	0	0	0	0	0	1	0	6	0	0	0	0	0	2	10
MALL	1	11	4	23	26	42	32	43	54	31	34	17	45	30	36	34	38	46	547
NOPI	4	42	17	45	27	46	58	112	89	54	80	44	70	21	14	36	33	30	822
Grand Total	5	53	23	68	53	92	99	168	144	105	123	67	116	51	50	70	71	78	1436

Table 4. Duck species, age, and sex composition and summary at Willow Lake, NT, 2016.

	Sex			Grand	Species	Percent Hatch Year (HY)
Species	F	M	UNK	Total	Composition	and Local (L) by Species
AGWT	24	31	2	57	4.0%	
AHY	3	3		6		
HY	21	28	2	51		89.5%
AMWI	3	7		10	0.7%	
AHY	1	1		2		
HY		3		3		
L	2	3		5		80.0%
MALL	208	339		547	38.1%	
AHY	137	242		379		
HY	68	93		161		
L	3	4		7		30.7%
NOPI	508	314		822	57.2%	
AHY	375	209		584		
HY	133	105		238		29.0%
Grand Total	743	691	2	1436	100%	29.3%

Table 5. Trap mortality by location and cause of death during trapping at Willow Lake, NT, 2016.

	Cause of Death					
Location	Drowned/Trap-induced	Possible Botulism	Mink Killed	Possible wolf kill	Hypothermia	Total
Bidwell	1				1	2
Willow Lake Camp	3		26	2		31
Bay 1	1					1
Olson	1		2			3
River Bay		1	12			13
Grand Total	6	1	40	2	1	50

Table 6. Trap nights and summary statistics at Willow Lake, NT, 2016.

Willow Lake trap nights and summary statistics					
Date	Number of Traps Operating	Total Bands	Trapping Success (Total bands per Trap Night)	Bags of CORN used	Bags of BARLEY used
8/7/2016	-	-	-	3	3
8/8/2016	-	-	-	-	-
8/9/2016	3	0	0.0	2	2
8/10/2016	7	0	0.0	2	2
8/11/2016	11	5	0.7	2	2
8/12/2016	15	53	4.8	2	2
8/13/2016	16	23	1.5	2	2
8/14/2016	16	68	4.3	2	2
8/15/2016	16	53	3.3	2	2
8/16/2016	18	92	5.8	2	2
8/17/2016	18	99	5.5	3	3
8/18/2016	17	168	9.3	2	2
8/19/2016	17	144	8.5	2	2
8/20/2016	17	105	6.2	2	2
8/21/2016	15	123	7.2	2	2
8/22/2016	15	67	4.5	2	2
8/23/2016	17	116	7.7	2	2
8/24/2016	15	51	3.0	2	2
8/25/2016	15	50	3.3	2	2
8/26/2016	15	70	4.7	2	2
8/27/2016	15	71	4.7	2	2
8/28/2016	-	78	5.2	-	-
Totals	**268**	**1436**	**5.4**	**42**	**42**

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	1500	2 to 21	7	119	509	4.3	Popko
1996	4500	9 to 30	17	195	1892	9.7	Popko
1997	3500	8 to 29	14	291	1687	5.8	Popko
1998	4000	13 to 30	16	262	1700	6.5	Popko/Bidwell
1999	5620	3 to 31	16	439	1248	2.8	Bidwell
2000	4463	3 to 30	18	490	1600	3.3	Bidwell
2001	3940	4 to 30	18	451	404	0.9	Bidwell
2002	6100	5 to 29	18	416	2168	5.2	Bidwell
2003	5061	6 to 30	18	423	1348	3.2	Bidwell
2004	4022	9 to 30	20	470	1298	2.8	Bidwell
2005	3030	8 to 30	13	293	1019	3.5	Bidwell
2006	3856	8 to 30	19	408	2083	5.1	Bidwell
2007	4022	12 to 30	18	324	374	1.2	Zimpfer
2008	5126	13 to 1	20	398	1944	4.9	Zimpfer
2009	3975	11 to 31	24	486	1549	3.2	Zimpfer
2010	Station was not operated						
2011	3550	10 to 31	25	511	1674	3.2	Zimpfer
2012	Station was not operated						
2013	2950	13 to 31	21	385	1137	3	Zimpfer
2014	3150	11 to 27	19	320	1251	3.9	Zimpfer
2015	3974	10 to 27	27	462	1898	4.1	Olson
2016	4637	9 to 27	18	268	1436	5.4	Olson
Mean	4049	-	18	371	1411	4.1	

DISCUSSION

Water levels for the 2016 trapping season were average to above average, and we were able to utilize all areas of Willow Lake. As mentioned above, the crew had to create all of our banding sites because water was too deep beyond the emergent vegetation. In concert with historical reports, the water level decreased 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 mild to somewhat extreme this year. We had two large storms from the north that blew through, but were able to safely accomplish crossing the lake and checking traps by following the lee side of the lake. We received rain during the two larger storms, but in small rainfall amounts. In one instance, we returned to camp until a storm cell containing lightning had moved well past our location, and then ran the rest of our trap line. Daily high temperatures during banding operation were 7–30°C (45–85°F), and overnight lows were 4–15°C (39–60°F).

A maximum of 18 swim-in style duck traps with restricted funnels and closed trap doors were run for 19 nights and 268 trap-nights. Trap success was 5.4 ducks per trap night. A total of 1,436 ducks were banded in 2016. Species totals and compositions were: Northern Pintail (822, 57%), Mallard (547, 38%), American Green-winged Teal (*Anas crecca*; 57, 4%), and American Wigeon (*Anas Americana*; 10, 1%) (Tables 3 & 4). The number of ducks caught in 2016 was

the 11th best (of 20) and 2% above the long-term average (1,411) at the Willow Lake Banding Site. (Table 7). Approximately 32% of banded ducks (N = 465) were in the Hatch Year (HY) or Local (L) age classes (Table 4). These numbers provide evidence to a low production year 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. Anecdotally, we witnessed a dramatic increase in young birds in the last week of August. Arctic nesting geese also started to arrive later in the month, and we witnessed great migrations the last two weeks of August. Hundreds and thousands of southward migrating Greater White-fronted (*Anser albifrons*) and Canada (*Branta canadensis*) Geese created a great spectacle for the last week of August.

Fifty-four percent (N = 772) of total ducks were caught away from the traditional southern trap location (Bidwell site). Because we were able to, we trapped the north side of Willow Lake. Without this strategic motion to trap where the ducks wanted to be, we would have only banded 664 total ducks and we would have been explaining a bust year. The north side of the lake should 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 very best site to trap on the entire lake, and every effort should be made to be granted permission to do so.

Thirty-nine foreign bands (from previous years at Willow Lake or elsewhere) were recaptured, but no bands were worn enough to justify replacement. The number and percentage of original banding locations are as follows: Willow Lake, NWT (from previous years; 37, 95%), Fairview, AB (1, 3%), and Walsh, AB (1, 3%). The total foreign recaps remains a very large number for the total birds we handle, and despite the fact that 95% came from birds previously banded at Willow Lake, these data could indicate a northward movement of ducks during breeding season (referred to as an over-flight year) if we assume breeding ducks could not find suitable breeding habitat in the prairies further south.

Since 1995, 28,219 ducks have been banded at the Willow Lake banding station. The species composition of the 4 most common species banded is Mallard (44%) and Northern Pintail (36%), followed by American Green-winged Teal and American Wigeon at about 10% each, respectively.

General observations this year were similar to last two year's observations. We experienced very low densities of ducks early in the month, and estimate only 300 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, and the greatest numbers seen was during our last week on the lake (>5,000).

All garbage was flown out of camp and taken for disposal at the Norman Wells landfill. No black bears (*Ursus americanus*) were seen this year, and wolves (*Canis lupis*) and bald eagles (*Haliaeetus leucocephalus*) were seen around camp and some of our trapping sites, but only the wolf paid more than a casual interest in the traps.

The project's boat motors, banding carousel and banding board, floats, camping equipment, bait (approximately 6,624 lbs. of barley and corn), and supplies have been stored inside the grain silo at the camp for next year. Boats (12' Lund and 17' flat bottom Jon boat) were dragged up the shoreline just downstream of camp, flipped upside down, and tied to trees for the off-season. No regular fuel was left at camp. We continue to lock the silo with two pad locks to prevent and discourage break-ins, which have occurred in recent 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.

Traps are located to the side of the silo, outside and fully exposed to the elements. 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.

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.

HIGH PRIORITY NEEDS MET IN 2016:

1. Life jackets were purchased and now four are in the storage silo.
2. The first aid (medical) kit was replaced and now in the storage silo.
3. Fire extinguishers were purchased and now three are in the storage silo.
4. Bird netting for new oval traps were purchased and we now have ample supply in the storage shed. This has already decreased trap mortalities caused by old trap wires and hard (welded wire) tops.
5. Four new hip waders in sizes (mens 9, 10, 10, and 11) were purchased to accommodate banding technicians. This was much needed. All four pairs are still in near perfect condition and in the storage silo.

HIGH PRIORITY NEEDS FOR 2017:

1. Purchase and deliver >5000 lbs. (or 100 bags) of corn for the 2017 season. This is normally delivered on the winter road to Norman Wells in January or February of 2017.
2. Purchase and deliver 6 rolls (100 ft.) of heavy duty 1" X 2" welded wire to replace some trap wire that has seen over 19 years of weathering. This can be shipped via the winter road as well.
3. Personnel (i.e., banding technicians) need to be hired in greater advance than two days prior 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.

APPENDIX A. Pictures and captions from Willow Lake, NT banding camp, 2016.

PHOTO 1. A release of Northern Pintails by Jim Bredy and Antoine Horassi. Photo By: Steve Olson

PHOTO 2. Jim Bredy, Antoine Horassi, and Philip Clement banding Northern Pintails on a particularly cold, rainy, and windy final day. Photo By: Steve Olson

PHOTO 3. Steve Olson and Jim Bredy showing off some adult Northern Pintails from their mobile banding station. Photo By: Steve Olson

PHOTO 4. Jim Bredy showing the Northern Pintail and Mallard catching potential of experimental oval traps with 16 ft. leads, even during hot days and nights. Photo By: Steve Olson

PHOTO 5. The Northern Pintail and Mallard catching potential of experimental oval traps with 16 ft. leads (center) vs. old-style Benning II traps (left and extreme right). The center trap has about 120 Northern Pintails and Mallards in it. Photo By: Steve Olson

PHOTO 6. Jim Bredy with the last two ducks (adult female and male Mallards) banded in 2016, and likely his last two ducks banded in his ~40 year career. Photo By: Steve Olson

PHOTO 7. Willow Lake duck banding camp. The early spring flooding almost washed the picnic table away. Photo By: Steve Olson