

Alberta Waterfowl Crop Damage Prevention Program, 2007

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Alberta Waterfowl Crop Damage Prevention Program, 2007

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Conservation Report Series Type

Data

ISBN printed: 978-0-7785-7082-0

ISBN online: 978-0-7785-7083-7

Publication No.: T/188

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Suggested Citation:

Hudson, V. 2008. Alberta waterfowl crop damage prevention program, 2007. Data report, D-2008-003, produced by the Alberta Conservation Association, St. Paul, Alberta, Canada. 14 pp + App.

Cover photo credit: David Fairless

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EXECUTIVE SUMMARY

The Waterfowl Crop Damage Prevention Program (WCDPP) provides assistance to Alberta grain producers in reducing or preventing damage to cereal crops caused by waterfowl during the fall migration period. Damage prevention is accomplished through provision of alternate food for waterfowl at feeding stations and lure crops, provision of waterfowl scaring equipment for producers to borrow free of charge and waterfowl scaring advice available through print media, internet and WCDPP coordinators.

In 2007, ten feeding stations and one lure crop operated for an average of 65 d providing a total of 11,936 bushels of barley for an estimated 1,338,183 duck-days of use.

Scaring equipment was available for producers to borrow at 46 locations throughout the province. Scare cannon distribution centres operated for an average of 83 d, and 192 cannons were loaned to 84 landowners for use on at least 157 quarter sections of land. Of landowners who borrowed scare cannons, 38% agreed to allow their contact information to be provided to waterfowl hunters. Scare cannon request information was provided to waterfowl enthusiasts through weekly updates on an Alberta Conservation Association waterfowl web page. Three waterfowl hunters contacted WCDPP coordinators for landowner contact information.

The majority of cereal crops reached 70% harvest completion by mid September in southern Alberta and by the second week of October in northern Alberta. The 2007 WCDPP was delivered in accordance with the program plan and within budget.

Key words: waterfowl, crop damage prevention, Alberta, cereal grain, ducks, geese, cranes.

ACKNOWLEDGEMENTS

I thank Deanna Dixon (Environment Canada) and Ken Lungle (Alberta Sustainable Resource Development) for providing valuable assistance in the development of the annual program plan. The delivery and direction of this program benefited greatly from the efforts of regional program coordinators Mike Grue, Dave Jackson, Jim Potter and Amanda Rezansoff. I also thank Doug Manzer for assisting with administrative issues. Finally, I thank Doug Manzer and Amanda Rezansoff for reviewing this report and providing valuable editorial suggestions.

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1.0 INTRODUCTION

1.1 General introduction

Alberta is a major nesting and staging area for many species of waterfowl, including ducks, geese and cranes (Salt and Salt 1976; Poston et al. 1990; Federation of Alberta Naturalists 1992). Waterfowl are opportunistic feeders and their fall migration period tends to coincide with the harvest season for cereal grains in Alberta (Federation of Alberta Naturalists 1992), creating the potential for significant waterfowl damage to unharvested grain crops across the province. Most grain producers tolerate a certain amount of waterfowl damage to crops; however, when that damage becomes severe or recurrent, producers become intolerant of waterfowl and the damage they cause (Renewable Resources Consulting Services 1969). Consequently, producers may become less receptive to programs aimed at enhancing or protecting waterfowl and their habitat. To address producer concerns of crop damage caused by waterfowl, provincial crop damage compensation and prevention programs have been functioning since 1961.

1.2 Waterfowl crop damage compensation

In 1961, the Government of Alberta established the Wildlife Damage Fund, funded by sportsmen license fees, to compensate Alberta grain producers for crop damage caused by waterfowl without payment of crop insurance premiums. Initially, the compensation payable was the lesser of \$15/acre or 50% of the value of the lost crop. In 1973, the rate was increased to the lesser of \$25/acre or 75% of the value of the lost crop. The rate was adjusted once more in 1978 to the lesser of \$50/acre or 75% of the value of the lost crop. From 1983 to 1990, the compensation rate was adjusted annually with a maximum payment of 75% of the value of the lost crop. The signing of the North American Waterfowl Management Plan (NAWMP) in the late 1980s increased the need for an improved compensation program. Discussions among various governments, producers and crop insurance agencies culminated in the development of a compensation program that paid a flat 80% of the value of the crops lost to waterfowl damage from 1991 to 1999. In 2000, waterfowl damage compensation was changed to the present rate of 100% of the commercial value of the crop damaged (Ken Lungle Alberta Sustainable Resource Development (ASRD), pers. comm.).

1.3 Waterfowl crop damage prevention

In 1970, an experimental waterfowl damage prevention program was initiated by the Alberta Government in the Grande Prairie area (Burgess 1973). The purpose of this program was to determine if a waterfowl scaring program, in combination with the provision of feeding sites, would prevent or minimize crop damage. Ultimately, the goal of the program was to establish if the prevention program would be economically efficient, by preventing crop damage instead of making compensation payments after the damage was done. With the success of the experimental program, a waterfowl damage prevention program was expanded into areas of the province where depredation losses had been both severe and recurrent. Today the Waterfowl Crop Damage Prevention Program (WCDPP) delivers damage prevention assistance in all grain producing areas of the province. Mallards (*Anas platyrhynchos*), northern pintails (*Anas acuta*), Canada geese (*Branta canadensis*), white-fronted geese (*Anser albifrons*), snow geese (*Chen caerulescens*) and sandhill cranes (*Grus canadensis*) are the primary waterfowl species targeted by the WCDPP.

The Alberta Conservation Association (ACA) has delivered the WCDPP since 1997 and shared costs (50:50) with Environment Canada. This report summarizes the WCDPP activities for 2007.

2.0 STUDY AREA

2.1 Description

The WCDPP is delivered throughout the white (settled) area of Alberta. Damage prevention activities are delivered through provision of alternate food (feeding stations and lure crops) and loaning of equipment through scare cannon distribution centres (Figure 1).

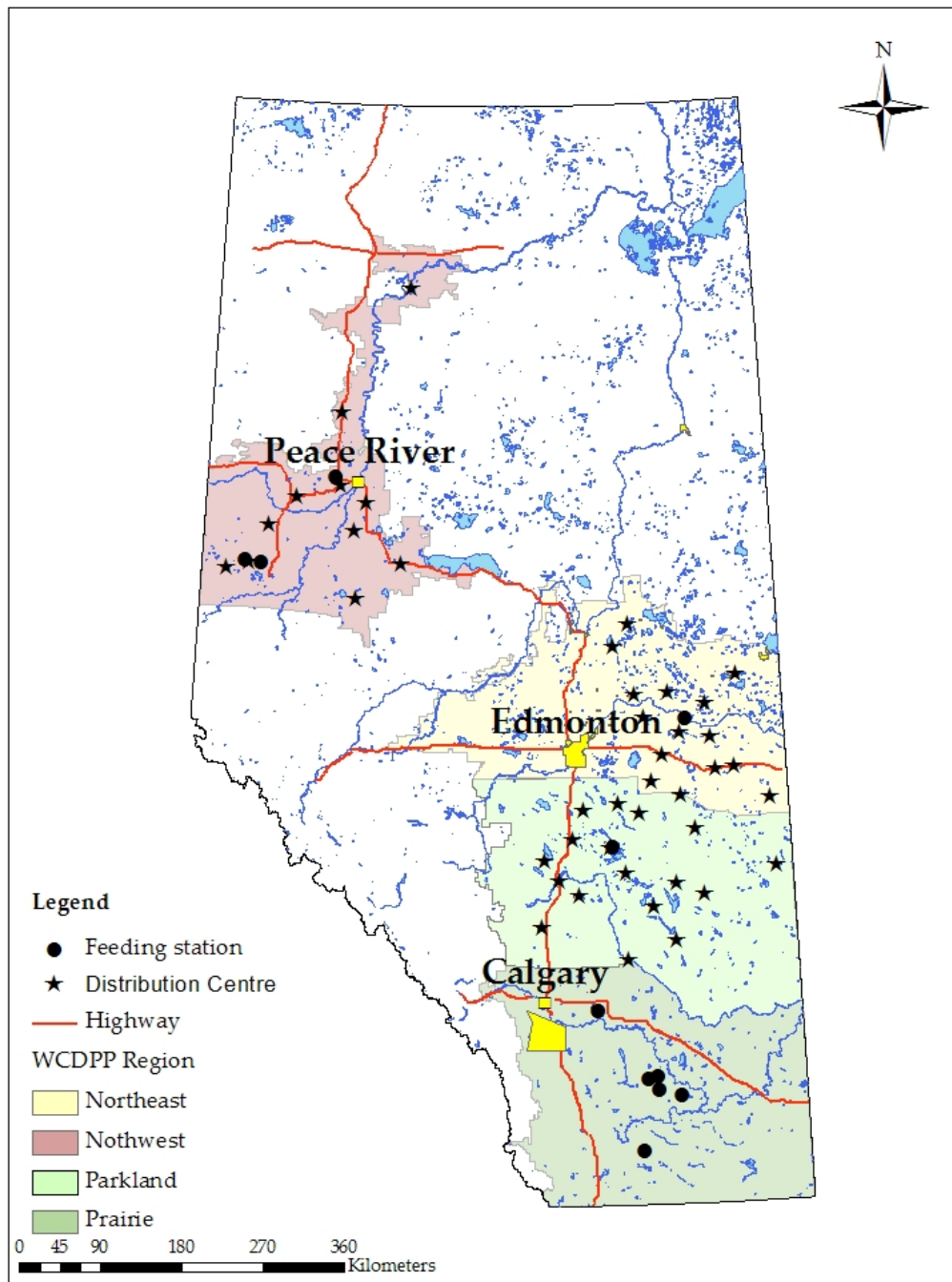


Figure 1. Map of the Alberta Waterfowl Crop Damage Prevention Program 2007 operational areas showing administrative regions, feeding stations and distribution centres.

3.0 MATERIALS AND METHODS

3.1 Regional organization

Four regional coordinators (Northwest, Northeast, Parkland, and Prairie regions; see Figure 1) deliver the WCDPP under the direction of a provincial coordinator. In the Prairie region, damage prevention activities include the provision of alternate feed for waterfowl. In the Northwest, Northeast, and Parkland regions, WCDPP activities include operation of feeding stations and scare cannon distribution centers (Figure 1).

3.2 Provision of alternate feed

Provision of alternate feed for waterfowl consists of either a feeding station, where shelled barley is spread along a portion of lakeshore, or a lure crop where a mature barley crop is swathed and left in the field for waterfowl to feed on. Feeding stations are used primarily by ducks, whereas both ducks and geese use lure crops. Hunting within 400 m of feeding areas is prohibited in order to avoid disturbing birds that have adjusted to the area.

3.2.1 Feeding station

The WCDPP currently has 13 waterfowl feeding stations established throughout Alberta (Table 1). Except for Flat, Bittern and Badger lakes, feeding operations took place at ten of these stations in 2007. The ability to use feeding stations is somewhat reliant on water levels. Ducks are reluctant to feed at sites where they cannot swim within a short distance of the feed. Excessive vegetation growth between the open water and the feeding station, usually associated with low water levels, appears to act as a barrier to ducks. Consequently, Flat Lake and Bittern feeding stations were not operated in 2007 due to low water levels. Uncertainty of cost-shared funding from Environment Canada and the inability to initiate contracts prior to 15 July prevented the securement of a contractor to operate the feeding station at Badger Lake in 2007.

Feeding stations are operated by a local producer contracted to spread barley daily on a defined area of the shoreline parallel to the water's edge. The contractor records the amount of barley placed on the site each day. The target is for all barley placed out one

day to be consumed before the next feeding in order to avoid wasting barley through spoilage, sprouting, or trampling. Throughout the feeding period, the contractor maintains contact with ACA staff and reports observations of any sick ducks, unauthorized entry on the feeding station, and the status of barley on hand for feeding.

Table 1. Waterfowl Crop Damage Prevention Program feeding station and lure crop locations.

Feeding station	Land location
San Diego Lake	SW 29-15-17 W4
Badger Lake ¹	NE 29-16-18 W4
Lost Lake	E 6-14-17 W4
Grantham Lake	SE 14-13-15 W4
Stirling Lake	NE 6-7-19 W4
Namaka Lake	NE 12-23-24 W4
Bashaw	SE 2-42-21 W4
Bittern Lake ²	SE 8-47-21 W4
Lac Brosseau	NE 13-56-12 W4
Flat Lake ¹	NE 22-65-20 W4
La Glace	NW 7-74-8 W6
Buffalo Lake	NE 2-74-7 W6
Lac Cardinal	SW 15-84-24 W5
Prouty Lake (lure crop)	SE 18-15-18 W4

¹No feeding operations conducted in 2007.

²Feeding station decommissioned in 2007.

Feeding activities commence in early to mid August to coincide with the start of local harvest activities. Termination of the feeding program begins when approximately 70% of the barley, wheat and pea fields in the local area have been harvested. The amount of barley spread at feeding stations is tapered off for the final days of feeding to allow ducks attending the stations to disperse in small numbers.

The proportion of crop harvested is monitored by surveys along transects in each feeding station area. ACA staff identify a road transect route of approximately 50 to 75

km, which provides a good representation of crop types within approximately 16 km of the feeding station. ACA staff drive along this route and record the harvest status (standing, swathed, or harvested) of each field of wheat, barley and peas adjacent to the road. Harvest progression is represented by the proportion of these crops that are standing, swathed or harvested. Typically, transects are conducted every two weeks beginning in mid August and weekly once the proportion of crops harvested reaches 50%.

ACA staff visit the feeding stations at least twice a week during peak feeding periods to visually estimate the number and species of ducks using the sites, and to monitor for disease outbreaks. At most feeding stations, small blinds are erected to facilitate counting of ducks. Observation begins approximately 0.5 h before sunrise and continues until either new birds cease to arrive at the feeding station or the number of birds arriving is considered insignificant in relation to the peak abundance, typically 1.5 – 2 h after sunrise. Evening observations begin approximately 1.5 h before sunset and continue until 0.5 h after sunset, or until it is too dark for observation. For each observational visit, an estimate of the number of ducks is made in a cumulative manner. Upon arrival, the number of ducks feeding on the station and the number of dabbling ducks, (particularly mallard, pintail, and widgeon) swimming in the water within approximately 100 m of the feeding station are estimated. Estimates of additional flocks landing or swimming into the feeding station area are added to the original estimate. There was variation in the estimated number of ducks among field staff; therefore, estimates of bird numbers are used in conjunction with barley consumption information recorded by the station feeders to calculate the ducks feeding on any one day. The WCDPP has used a consumption estimate of 0.5 lb of barley per duck per day for grain consumption by ducks at a feeding station (Ken Lungle, ASRD, pers. comm.). Duck days were calculated by multiplying the number of bushels of barley fed by 48 lb (the average weight of a bushel of barley) and dividing by the lb/duck/day reported for each feeding station.

3.2.2 *Lure crop*

Lure crop operation consists of a local producer contracted to plant and swath the crop of barley used for luring waterfowl. When the feeding period at the lure crop is completed, the contractor harvests the remaining swaths and transports the barley to nearby WCDPP granaries. Due to unpredictable use by birds, lure crops have been discontinued in all areas except Prouty Lake in the Bow River Irrigation District (Table 1).

3.3 Scare cannon distribution centres

Scare cannon distribution centres are located in contracted local businesses, ACA offices and ASRD district offices. Cannons may be borrowed, free of charge, by producers with waterfowl damage problems. For each borrowed cannon, the distribution centre operator collects a damage deposit (which is returned to the borrower if the cannon is returned in good condition), location of crop damaged land, crop type, species causing damage and whether or not the borrower will permit their contact information to be provided to interested waterfowl hunters. Regional WCDPP coordinators collect weekly summaries from distribution centres. In 2007, distribution centre contracts were typically paid \$300 for storing cannons for the season plus \$10 for each cannon distributed. ASRD offices that served as distribution centres provided this service free of charge.

3.4 Waterfowl web page

Crop producers often wish to contact waterfowl hunters but do not know where to access them, while waterfowl hunters desire access to land with waterfowl concentrations. Waterfowl hunters can provide waterfowl scaring assistance to crop producers with damage problems as hunting typically frightens waterfowl from the field. If hunting takes place in fields where scarecrows and/or scare cannons are being used, it enhances the effectiveness of that equipment in deterring waterfowl from returning.

The WCDPP used a website to assist waterfowl hunters in locating potential areas of waterfowl concentrations and to assist producers with waterfowl crop damage prevention. The web page contained information on the WCDPP, a downloadable fact sheet on waterfowl crop damage prevention strategies and a link to a provincial map that visually displayed the number of requests for waterfowl crop damage prevention assistance received weekly from scare cannon distribution centres. The number of requests for assistance can indicate areas where waterfowl are concentrated. Each distribution centre was colour-coded on the map according to the number of requests for waterfowl crop damage prevention assistance received. The viewer was able to click on a region of interest and view more detailed information on the number of requests for assistance received in the past week, plus the total number of requests based on individual reporting areas. Contact information for regional coordinators was listed, and viewers (i.e., waterfowl hunters) were encouraged to contact the appropriate coordinator for contact information of receptive producers in areas of crop damage. In 2007, information on the web page was updated weekly from 15 August to 31 October.

Web page use was measured by the number of visits made to the page. Visits were classed into two categories. Bookmarked or direct visits represent visits that come from a direct entry into the browser or bookmark. These visits are more likely to be repetitive and viewers may not necessarily be accessing the site for new information (e.g., the site could be set as someone's home page). Referred visits represent visits that come from another site location (i.e., a search engine or another site). These visits have a higher likelihood of being unique and viewers are more likely accessing the site for information.

3.5 Evaluation of feeding program

An evaluation of the effectiveness of feeding stations as a method of waterfowl crop damage prevention began in 2006. The primary objectives of this evaluation were to:

1. Estimate the environmental variables that explain the greatest proportion of variation in duck-related crop damage, and
2. Evaluate the effectiveness of feeding stations with regard to mitigating crop damage caused by ducks.

Further analysis and completion of the evaluation was proposed for 2007 with results contained in a separate report.

3.6 Cost of damage control

Two significant factors have always been taken into account when describing yearly program costs. First, costs for large equipment (i.e., scare cannons, granaries) purchased for the program and initial development or major upgrading of feeding stations were amortized over 10 years as these items are used beyond the year in which they are purchased. When annual program costs were determined, the amortized amount rather than the purchase price of the equipment was used. For example, 100 cannons purchased for \$23,600 in 1998 were reported as a \$2,360 annual expense for years 1998 – 2007 inclusive. Second, barley for feeding stations was purchased throughout the feeding period, as required. A final purchase of barley for each feeding station for use in the following year was usually made after feeding activities have ceased. This final purchase was not accounted for in the year it was made, since it was for the next year's operation. All costs for barley purchases were accounted for in the year the barley was fed, regardless of when the actual purchase was made. To allow for yearly comparisons, costs in this report were accounted for in this manner to be consistent with reporting in previous years.

4.0 RESULTS

4.1 Waterfowl use of alternate feeding sites

Hot, dry weather conditions in July accelerated crop development throughout the province. Harvesting began two weeks earlier in 2007 than in most other years and was well underway by 16 August (Alberta Agriculture, Food and Rural Development 2007). Cooler than normal temperatures and sporadic precipitation throughout the last half of August and most of September slowed harvest activities. Harvest progression in the areas surrounding WCDPP feeding sites is summarized in Appendix 1.

The Prouty Lake lure crop in the Prairie region was swathed on 8 August and combined on 17 September. It received limited use, reporting an estimated 200 bushels

of grain consumed and providing 24,000 duck-days of use over a 41 day period. Feeding commenced on 7 August at the Lost and Stirling feeding stations, and on 8, 9 and 11 August at Grantham, San Diego and Namaka feeding stations, respectively. Feeding operations terminated on 5 September at Grantham, Lost and Stirling, 15 September at San Diego, and 20 September at Namaka. No complaints were received from the Badger area regarding that feeding station not operating in 2007. The six Prairie feeding areas fed approximately 3,433 bushels of barley and provided an estimated 411,960 duck-days of use.

The Bashaw feeding station in the Parkland region operated for 60 d, commencing 6 August and terminating on 4 October. Approximately 1,626 bushels of barley were fed providing an estimated 266,000 duck-days of use. Low water levels at Bittern lake have prevented effective feeding for the past six years. Complaints of waterfowl crop damage have not been received in the area during that time. The feeding station was decommissioned in 2007 with the remaining grain in the bin sold to a feed mill and the bin sold to a local farmer.

In the Northeast region, the Lac Brosseau feeding station provided an estimated 96,127 duck-days of use and fed approximately 1,001 bushels of barley over 57 d from 13 August until 8 October.

In the Northwest region, feeding operations commenced on 13 August at Buffalo, 15 August at Lac Cardinal and 22 August at La Glace and terminated on 21 October at all three sites. The three feeding stations provided an estimated 564,096 duck-days of use and total barley consumed was estimated at 5,876 bushels.

Throughout the province, feeding stations operated for an average of 65 d and provided a total of 11,936 bushels of barley and an estimated 1,338,183 duck-days of use (Appendix 2).

4.2 Scare cannon distribution centre use

Scare cannons were available at 46 locations, including 35 contracted businesses, nine ASRD district offices, and two ACA offices. Detailed information on distribution centre use is contained in Appendix 3. The distribution centres operated for an average of 83

d, beginning in late July and finishing in mid October through November depending on the area. In total, 192 cannons were loaned out to 84 landowners for use on at least 157 different quarter sections of land. Thirty-eight percent of the landowners indicated they would allow their contact information to be provided to waterfowl hunters, 56% indicated they would not, and 6% of landowners did not indicate a preference.

4.3 Waterfowl web page

From 12 August to 31 October 2007 the web page received a total of 420 visits. Table 2 summarizes web page use and shows the highest number of visits occurred in August, September, and October.

One waterfowl hunter contacted WCDPP coordinators through the web page with a request for additional information. Two additional requests for information were received from waterfowl hunters, but were not associated with use of the web page.

Table 2. Use of the Waterfowl Crop Damage Prevention Program waterfowl web page in 2007.

Month	Total	Bookmarked or direct	Referred	Visits that proceeded to map	
				#	%
August ¹	96	65	31	62	65
September	155	85	70	74	48
October	169	93	76	86	51
November	85	57	28	42	49
December	58	48	10	32	55

¹Total visits recorded from 12 August to 31 August 2007.

4.4 Feeding station evaluation

The feeding station evaluation was suspended in 2007 because of uncertainty over the future of the WCDPP and, in particular, due to the lack of a signed funding agreement between Environment Canada and ACA. Evaluation of feeding stations is deemed to be a component of the program that will be deferred until secure multi-year funding is in place.

4.5 Program expenditures

The total cost of field operations for the 2007 crop damage prevention program was \$96,062, with \$65,294 for feeding station operation (Appendix 2) and \$30,768 for scare cannon distribution centre operation (Appendix 4).

The 2007 program expenditure represented the total amount of funds spent on the WCDPP between 1 April 2006 and 31 March 2007. This amount differs from program costs as described in Section 3.5. Supervisory activities (i.e., regional and provincial coordinator expenditures) are an important component of the WCDPP but are difficult to attribute to the cost of any specific program area; therefore, these costs were not included in program costs.

Data provided by field personnel indicated that the total WCDPP program expenditure during 2007-08 amounted to \$227,923 (Table 3). This amount is well within the original budget of \$350,000 and within a budget restriction of \$240,000 imposed by Environment Canada in September 2007. ACA delivered the 2007-08 field component of the program, although an agreement to cost-share the program with Environment Canada was not signed until well after program delivery (19 December 2007).

Table 3. Alberta Waterfowl Crop Damage Prevention Program expenditures for 2007.

	Expenditures (\$)	Sub-total (\$)
Feeding Operations		
Feeding station monitoring contract	2,500	
Feed station site rental	0	
Feed station feeding contracts	23,647	
Feed station grain	44,826	
Lure crop	0	
Field supplies/equipment	3,150	
Feed station evaluation	0	
		74,123
Scare Cannon Distribution		
Advertising	222	
Distribution centre contracts	12,495	
Cannon shipping	1,395	
Equipment purchase	0	
Field supplies/equipment repair	1,833	
		15,945
Administration		
<i>Regional Programming</i>		
Coordinator salaries/benefits	87,343	
Advertising	921	
Vehicle operation	20,573	
Phone (cell and long distance)	823	
Office/field supplies	554	
Travel expenses	669	
		110,884
<i>Provincial Coordination</i>		
Salaries/benefit	22,361	
Vehicle operation	3,371	
Phone (cell and long distance)	156	
Web-site development	0	
Office/field supplies	664	
Travel expenses	418	
		26,971
Total budget		\$227,923

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6.0 APPENDICES

Appendix 1. 2007 Waterfowl Crop Damage Prevention Program weekly harvest progression expressed as a proportion of field peas, barley and wheat crops standing, swathed and harvested by feeding station.

Region	Feeding station and harvest category	Weekly harvest progression (%)									
		05- Aug	12- Aug	19- Aug	26- Aug	02- Sep	09- Sep	16- Sep	23- Sep	30- Sep	07- Oct
Prairie	San Diego, Badger, Prouty Lakes										
	Standing	86	71	53	42	31	17				
	Swathed	11	20	17	20	12	19				
	Harvested	3	9	30	38	57	74				
	Lost Lake										
	Standing	80	71	54	34	13					
	Swathed	10	13	12	15	8					
	Harvested	10	16	34	51	79					
	Grantham Lake										
	Standing	80	70	34	25	10					
	Swathed	11	14	22	17	11					
	Harvested	9	16	45	58	79					
	Stirling										
	Standing	81	56	35	18						
	Swathed	7	15	12	6						
	Harvested	13	29	53	76						
	Namaka										
	Standing	87	82	77	57	34	37	13			
	Swathed	0	3	6	18	16	8	11			
	Harvested	13	15	18	25	40	55	76			

Appendix 1. Continued.

Region	Feeding station and harvest category	Weekly harvest progression (%)									
		05- Aug	12- Aug	19- Aug	26- Aug	02- Sep	09- Sep	16- Sep	23- Sep	30- Sep	07- Oct
Parkland	Bashaw				93	84	79	31	15	10	
					6	13	12	31	37	19	
					1	3	9	38	48	71	
Northeast	Brosseau										
			95		89		51		9		
			4		8		27		17		
			1		4		22		74		
Northwest	Buffalo / LaGlace										
			99		95		57		25	19	5
			1		2		21		13	18	9
	Cardinal		0		3		22		62	63	86
			100		92		77		52	33	11
			0		7		14		12	12	4
			0		2		9		36	55	85

Appendix 2. Summary of waterfowl use of bait stations and lure crop during the 2007 Waterfowl Crop Damage Prevention Program.

Feeding site	Days of feeding	Start date	End date	Total duck days	Grain consumed (bu)	Grain consumed/duck/d (lb)	Feeding costs (\$)	Cost/duck/d (cents)
Prouty	41	08-Aug	17-Sep	24,000	200	0.40	3,668	15.28
San Diego	38	09-Aug	15-Sep	167,280	1,394	0.40	6,627	3.96
Badger ¹								
Lost Lake	30	07-Aug	05-Sep	49,800	415	0.40	2,503	5.03
Grantham	32	08-Aug	08-Sep	43,560	363	4.00	2,861	6.57
Stirling	30	07-Aug	05-Sep	97,800	815	4.00	3,425	3.50
Namaka	41	11-Aug	20-Sep	29,520	246	0.40	2,101	7.12
Bashaw	60	06-Aug	04-Oct	266,000	1,626	0.29	6,735	2.53
Lac Brosseau	57	13-Aug	08-Oct	96,127	1,001	0.50	6,961	7.24
Buffalo (G.P.)	70	13-Aug	21-Oct	143,616	1,496	0.50	8,120	5.65
La Glace	61	22-Aug	21-Oct	283,680	2,955	0.50	13,418	4.73
Lac Cardinal	68	15-Aug	21-Oct	136,800	1,425	0.50	8,875	6.49
Total				1,338,183	11,936		65,294	

¹Unable to secure contractor for feeding operation in 2007.

Appendix 3. 2007 Waterfowl Crop Damage Prevention Program scare cannon distribution centre use. Distributing agents: C = contracted business, ACA = ACA office, ASRD = Fish and Wildlife district office.

Distribution centre	Agent	Start date	End date	Duration (d)	Cannons used	Different quarters	Landowners	Landowners allowed contact information to go to hunters
Andrew	C	15-Aug	8-Nov	83	0	0	0	0
Atmore	C	14-Aug	7-Nov	83	1	1	1	0
Bonnyville	C	13-Aug	6-Nov	83	5	5	4	3
Boyle	C	14-Aug	26-Oct	72	1	1	1	0
Holden	C	17-Aug	14-Nov	87	0	0	0	0
Mannville	C	16-Aug	8-Nov	82	0	0	0	0
Myrnam	C	16-Aug	8-Nov	82	16	8	7	1
Paradise Valley	C	17-Aug	6-Nov	79	6	2	2	2
St. Paul	ACA	year round			11	11	6	2
Smoky Lake	C	15-Aug	7-Nov	82	2	2	2	1
Two Hills	C	15-Aug	7-Nov	82	0	0	0	0
Vegreville	C	15-Aug	14-Nov	89	2	2	1	1
Vermilion	C	16-Aug	6-Nov	80	2	1	1	1
Viking	C	17-Aug	14-Nov	87	2	2	2	0
Vilna	C	15-Aug	7-Nov	82	0	0	0	0
La Crete	C	15-Aug	31-Oct	76	3	4	1	Unknown
Manning	C	15-Aug	31-Oct	76	5	4	1	0

Appendix 3. Continued.

Distribution centre	Agent	Start date	End date	Duration (d)	Cannons used	Different quarters	Landowners	Landowners allowed contact information to go to hunters
Grimshaw	C	15-Aug	31-Oct	76	8	7	4	2
Nampa	C	15-Aug	31-Oct	76	6	2	2	0
Fairview	C	15-Aug	31-Oct	76	34	31	11	3
Girouxville	C	15-Aug	31-Oct	76	5	3	2	0
High Prairie	C	15-Aug	31-Oct	76	13	9	4	2
Spirit River	C	15-Aug	31-Oct	76	0	0	0	0
Valleyview	C	15-Aug	31-Oct	76	4	3	2	1
Hythe	C	15-Aug	31-Oct	76	5	3	2	2
La Glace	C	15-Aug	31-Oct	76	12	11	4	0
Bashaw	C	26-Jul	16-Nov	110	11	9	5	1
Bawlf	C	1-Aug	24-Oct	83	2	1	1	0
Bentley	C	3-Aug	25-Oct	82	2	1	1	1
Byemore	C	30-Jul	31-Oct	90	5	5	2	0
Camrose	C	1-Aug	24-Oct	83	2	2	2	1
Castor	C	19-Jul	26-Sep	67				
Lougheed	C	1-Aug	26-Oct	85	2	2	1	0
Pine Lake	C	1-Aug	21-Oct	80	3	3	2	2
Provost	C	3-Aug	18-Oct	75	5	4	3	3
Stettler	C	30-Jul	29-Oct	89	6	8	3	3
Camrose	ASRD	1-Aug	1-Nov	90				
Cornation	ASRD	1-Aug	1-Nov	90				

Appendix 3. Continued.

Distribution centre	Agent	Start date	End date	Duration (d)	Cannons used	Different quarters	Landowners	Landowners allowed contact information to go to hunters
Drumheller	ASRD	1-Aug	1-Nov	90				
Hanna	ASRD	1-Aug	1-Nov	90	11	10	4	Unknown
Olds	ASRD	1-Aug	1-Nov	90				
Ponoka	ASRD	1-Aug	1-Nov	90				
Provost	ASRD	1-Aug	1-Nov	90				
Red Deer	ACA	1-Aug	1-Nov	90				
Stettler	ASRD	1-Aug	1-Nov	90				
Wetaskiwin	ASRD	1-Aug	1-Nov	90				
Total					192	157	84	32

Appendix 4. 2007 Waterfowl Crop Damage Prevention Program distribution centre operation costs.

Distribution centre	Total cost (\$)
NE amortized costs ¹	6,711
NE distribution centre operation	234
Andrew	309
Atmore	320
Bonnyville	361
Boyle	316
Holden	309
Mannville	309
Myrnam	460
Paradise Valley	371
St. Paul	0
Smoky Lake	330
Two Hills	309
Vegreville	330
Vermilion	330
Viking	330
Vilna	309
NW amortized cost 2007 ¹	5,682
NW distribution centre operation	2,304
La Crete	330
Manning	361
Grimshaw	391
Nampa	371
Fairview	659
Girouxville	361
High Prairie	430
Spirit River	309
Valleyview	350
Hythe	350
La Glace	433
Parkland amortized costs ¹	2,430
Parkland distribution centre operation	912
Bashaw	422

Appendix 4. Continued.

Distribution centre	Total cost (\$)
Bawlf	330
Bentley	330
Byemore	361
Camrose	330
Castor	309
Lougheed	330
Pine Lake	340
Provost	361
Stettler	350
Total	\$30,768

¹Amortized cost = regional scaring equipment purchase price amortized over 10 year period (1998-2007 inclusive).

**The Alberta Conservation Association acknowledges
the following partner for their generous support of
this project**



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