

# Alberta Waterfowl Crop Damage Prevention Program, 2006

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# Alberta Waterfowl Crop Damage Prevention Program, 2006

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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, 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 2006, 11 feeding stations operated for an average of 34 d and provided a total of 7,526 bushels of barley and estimated 846,798 duck-days of use. The total estimated duck-use of feeding stations measured by duck-days was 59% lower in 2006 than that reported in 2005.

Scaring equipment was available for producers to borrow at 56 locations throughout the province. Scare cannon distribution centres operated for an average of 80 d, and 114 cannons were loaned out to 64 landowners for use on at least 90 different quarter sections of land. Just under half ( $n = 23$ ) of the 50 landowners who were asked said they would allow WCDPP coordinators to provide their contact information to interested waterfowl hunters. Scare cannon request information was provided to waterfowl enthusiasts through weekly updates on an Alberta Conservation Association waterfowl web page. Five waterfowl hunters contacted WCDPP coordinators for information as a result of the web page.

Dry weather in the fall allowed producers to harvest most cereal crops by mid September. As a result, program activities were terminated before the target date of 6-October. Program expenditures were lower than expected because of this early termination, with an estimated total expenditure of \$203,668.

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

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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 et al. 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). This creates the potential for significant waterfowl damage to unharvested grain crops across the province. Most grain producers will 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 that they cause (Renewable Resources Consulting Services 1969). This, in turn, causes producers to be less receptive to programs aimed at enhancing or protecting waterfowl and their habitat. To address concerns of crop damage caused by waterfowl, the Alberta Government has established provincial crop damage compensation and prevention programs.

### **1.2 Waterfowl crop damage compensation**

In 1961, the Government of Alberta established the Wildlife Damage Fund, funded by sportsman's license fees, to make compensation for crop damage caused by waterfowl available to Alberta grain producers without the 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 between 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 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. Additionally, the goal 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 been responsible for delivering the WCDPP since 1997. Cost of the 2006 program was shared equally between ACA and Environment Canada. This report summarizes the WCDPP activities for 2006.

## **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 loaning of equipment through scare cannon distribution centres (Figure 1).

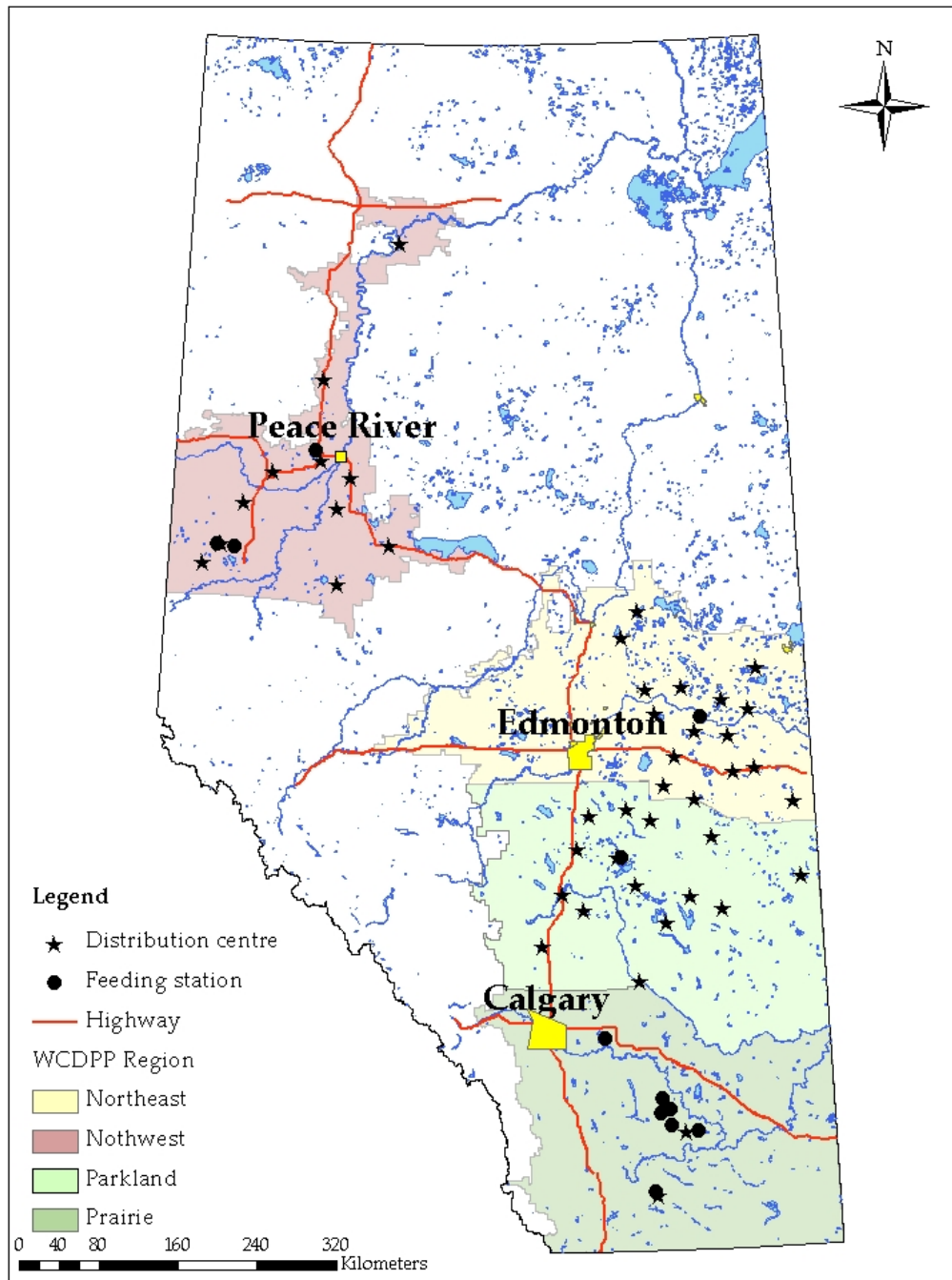


Figure 1. Map of Alberta Waterfowl Crop Damage Prevention Program 2006 operational areas showing regions, feeding stations, and distribution centres.

## **3.0 MATERIALS AND METHODS**

### **3.1 Regional organization**

Four regional coordinators (Northwest, Northeast, Parkland, and Prairie regions; Figure 1) deliver the WCDPP under the direction of a provincial coordinator. In the Northwest, Northeast, and Parkland regions, WCDPP activities include operation of feeding stations (alternate feed) and contracted scare cannon distribution centres. In the Prairie region waterfowl damage prevention activities consist of provision of alternate food for waterfowl through both feeding stations and one lure crop, and the operation of scare cannon distribution centres.

### **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, while 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 feeding stations established for waterfowl feeding throughout Alberta (Table 1). Except for Flat and Bittern lakes, feeding operations in 2006 took place at 11 of these stations. The effectiveness of 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 actual feed. Excessive vegetation growth between the open water and the feeding station that is usually associated with low water levels appears to be a barrier to ducks. Consequently, feeding was not carried out at the Bittern Lake and Flat Lake feeding stations due to low water levels.

Feeding stations are operated by a local producer who is contracted to spread barley daily on the feeding station. The contractor records the amount of barley placed on the site each day. The amount of feed is a calculated function of the number of ducks

feeding. 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. During the entire feeding period, the contractor maintains contact with ACA staff and reports any sick ducks observed, 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	Feeding station land location
San Diego Lake	SW 29-15-17 W4
Badger Lake	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 <sup>1</sup>	SE 8-47-21 W4
Lac Brosseau	NE 13-56-12 W4
Flat Lake <sup>1</sup>	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

<sup>1</sup>No feeding operations conducted in 2006.

Termination of the feeding program begins when 70% of 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 few days of feeding to allow ducks attending the stations to disperse in small numbers. The proportion of crop harvested (harvest progression) is monitored by surveys along transects in each feeding station area. ACA staff identify a transect route (road) of approximately 50 to 75 km, which gives 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 percentage of these crops that are standing, swathed, or harvested. Typically, transects are conducted every two weeks beginning in mid August. Once the proportion of crops that are harvested reaches 50%, transects are conducted weekly until harvest completion reaches 70%.

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. Estimated number of ducks can vary considerably among field staff, therefore, field staff estimates of bird numbers are used in conjunction with barley consumption information recorded by the station feeders to develop an estimate of ducks feeding on any one day. The WCDPP uses 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.).

### **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 one operated at Prouty Lake in the Bow River Irrigation District (Table 1).

### **3.3 Scare cannon distribution centres**

Historically, the WCDPP had Crop Damage Control (CDC) areas in locations of the province that experienced severe and recurrent waterfowl crop damage. These areas were serviced by field staff that delivered, set up, and maintained scare cannons for farmers. Farmers outside of CDC areas had little or no access to scaring equipment. In 1992, a NAWMP initiative purchased scare cannons for use in the WCDPP and a network of cannon distribution centres was set up throughout agricultural areas of Alberta where no other damage prevention activity existed. From 1992 to 2005, the WCDPP used both field staff in CDC areas and scare cannon distribution centres to provide waterfowl scaring equipment.

Over the past several years, the cost of providing direct assistance to producers through field staff has increased because of increasing costs associated with vehicle operation, propane, and wages, while the number of requests for direct assistance with waterfowl crop damage has decreased. In spite of the increasing operational cost, the budget available for the WCDPP has remained static or decreased over the past 10 y. Taking these factors into consideration all CDC areas formerly operated with ACA field staff were replaced by distribution centres in 2006. The change in program delivery method was advertised in local papers for two weeks in late July and early August. Local ASRD district offices which typically receive producer's reports of waterfowl crop damage were advised of this program delivery change and provided with a list of the distribution centres serving former CDC areas. The district offices were instructed to provide farmers with the contact information for the nearest distribution centre. District offices were asked to report any comment received, whether positive or adverse, regarding this change, to regional WCDPP coordinators.

Scare cannon distribution centres are located in contracted local businesses, ASRD district offices, and in the Bow River and Raymond Irrigation District offices. Cannons may be borrowed, free of charge, by producers with waterfowl damage problems from these centres. For each cannon lent out, the distribution centre operator must collect a damage deposit (which is returned to the borrower if the cannon is returned in good

condition) and information on crop damage land location, crop type, wildlife species causing the damage, and whether or not the borrower will allow his contact information to be provided to interested waterfowl hunters. Regional WCDPP coordinators collect information summaries weekly from distribution centres. In 2006, distribution centre contracts typically paid \$300 for storing cannons for the season plus \$10 for each cannon distributed. ASRD offices that served as distribution centres provide this service to ACA free. In the Prairie region, Irrigation District offices also distributed scare cannons. In 2006, scare cannons were made available to agricultural producers through 56 distribution centres.

### **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. Hunting in a field that is sustaining crop damage 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 to the fields.

In 2005, we began a pilot project using an internet-based reporting tool to identify areas where the WCDPP was receiving requests for assistance with waterfowl crop damage. The number of requests for assistance can indicate areas of waterfowl concentration. In 2006, we continued testing and modifying the web page contained on the ACA internet site (<http://www.ab-conservation.com/CDC/index.asp>). The web page was also advertised in the 2006 Alberta hunting regulations and in the Alberta Outdoorsman. The web page contains information on the WCDPP, a downloadable fact sheet on waterfowl crop damage prevention strategies, and a link to a provincial map which visually displays the number of requests for waterfowl crop damage prevention assistance received weekly at reporting scare cannon distribution centres. Each distribution centre was colour-coded according to the total 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 total number of requests based on individual

reporting areas. Contact information for Regional WCDPP coordinators was listed and viewers were encouraged to contact the appropriate WCDPP coordinator for additional information. By viewing the web page, waterfowl enthusiasts could identify areas of waterfowl concentrations both regionally and locally. Hunters wishing to contact receptive farmers in areas of crop damage could do so through regional WCDPP coordinators. Information on the web page was updated weekly from 15 August to 31 October in 2006.

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

### **3.4 Evaluation of feeding program**

An evaluation of the effectiveness of feeding stations as a method of waterfowl crop damage prevention was proposed for 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;
2. Evaluate the effectiveness of feeding stations with regard to mitigating crop damage caused by ducks.

Information on waterfowl crop damage prevention and compensation collected through WCDPP and Agriculture Financial Services Corporation was used to attempt to answer the questions;

- i. Is severity of crop damage at lakes with bait stations different from severity of crop damage at lakes without bait stations?
- ii. What are the major environmental factors that contribute to duck-related crop damage in southern Alberta?

For the purposes of our evaluation, duck damage was defined as producer claims of duck damage that resulted in a compensation payment. Geodatabases containing compensation claim information from 1964 to 2005, WCDPP complaint locations from 1984 to 2005, feeding station information from 1973 to 2005, and significant duck staging waterbodies were updated and developed.

To answer the first question, lakes significant to ducks during the fall were identified and the effect those lakes had on the presence or absence of crop damage by ducks was determined, regardless of the presence of a feeding station. Poston et al. (1990) classified waterbodies of the Prairie Provinces as important for duck staging by flock size. Waterbodies with flock sizes of > 20,000 ducks were classified as nationally important, those with flocks of 5000 - 20,000 were classified as regionally important and those with of 2000 - 5000 ducks were classified as locally important staging sites. We are using Poston's classification system to address objectives one and two above and anticipate the first phase of this evaluation to be completed by March 2008.

### **3.5 Cost of damage control**

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

## 4.0 RESULTS

### 4.1 Waterfowl use of alternate feeding sites

Warm, dry weather conditions allowed harvesting to progress rapidly in Alberta in 2006. Provincially, an estimated 83% of crops were harvested by 15 September in 2006 compared to an average of 50% harvested by that time in most years (Alberta Agriculture Food and Rural Development 2006). Feeding operations are usually terminated when  $\geq 70\%$  barley, wheat, and field pea crops in the area are harvested. However, in 2006, feeding operations continued at the Stirling and Lac Brosseau feeding stations for an additional 8 and 13 d, respectively to allow landowners to harvest crops in the immediate area of the feeding stations. These crops were lying in swath when transects reached the feeding termination percentage and had the potential of sustaining considerable damage if feeding operations were terminated before they were harvested. Harvest progression in the areas surrounding WCDPP feeding sites is summarized in Appendix 1.

The Prouty Lake (Prairie region) lure crop was damaged by an early summer hail storm in July 2006. Some of the crop grew again but matured too late to be used as a lure crop for damage prevention. The crop that did mature was harvested and the barley hauled to nearby WCDPP granaries. Feeding commenced on 8 August at the Lost, San Diego, Badger, Grantham, Stirling, and Namaka feeding stations. Feeding operations terminated on 30 August at Grantham, 5 September at Lost, San Diego and Badger sites, and 12 September at Stirling and Namaka. These six feeding stations fed approximately 3,970 bushels of barley and provided an estimated 476,400 duck-days.

The Bashaw feeding station in the Parkland region operated for 45 d, commencing 2 August and terminating on 15 September. Approximately 967 bushels of barley were fed providing an estimated 121,900 duck-days.

In the Northeast region, the Lac Brosseau feeding station provided an estimated 63,794 duck-days and fed approximately 665 bushels of barley over 41 d from 14 August until 23 September.

In the Northwest region, the Buffalo (Grande Prairie) feeding station operated from 1 August to 13 September. Feeding operations commenced on 12 August at La Glace and 15 August at Lac Cardinal and terminated on 12 September and 17 September, respectively. The three feeding stations provided an estimated 184,704 duck-days. Total barley consumed was estimated at 1,924 bushels.

Throughout the province, feeding stations operated for an average of 34 d and provided a total of 7,526 bushels of barley and estimated 846,798 duck-days (Appendix 2).

#### **4.2 Scare cannon distribution centre use**

Scare cannons were available at 36 contracted businesses, 16 ASRD district offices, 2 ACA offices and the Bow River and Raymond Irrigation district offices. Detailed information on distribution centre use is contained in Appendix 3. The distribution centres operated for an average of 80 d, beginning in late July and finishing in mid October through November depending on area. One-hundred-and-fourteen cannons were loaned out to 64 landowners for use on at least 90 different quarter sections of land. Just under half (n = 23) of the 50 landowners who were asked said they would allow WCDPP coordinators to provide their contact information to interested waterfowl hunters.

The change in scare cannon delivery method from field staff to distribution centres received limited reported comment from producers. Regional coordinators reported acceptance from producers when the change was explained to them. No ASRD district office reported feedback from producers regarding the change in delivery method. One new distribution centre, established to replace a CDC area, reported two producers refused to pick up scaring equipment when informed of the change.

#### **4.3 Waterfowl web page**

From 13 August to 31 October the web page received a total of 316 visits. Table 2 summarizes the web page use and shows a high percentage of visits that proceeded to the map and therefore were more likely to be accessing the web page for waterfowl

concentration information from August to November. The increase in visits to the map which occurred in January may be in part attributed to web page maintenance.

Five waterfowl hunters contacted WCDPP coordinators with requests for additional information directly through the web page. Two additional requests for information were received from waterfowl hunters but not as a result of the web page.

Table 2. Use of Waterfowl Crop Damage Prevention Program waterfowl web page in 2006.

Month	Total Visits	Bookmarked or Direct	Referred	Visits that proceeded to map	
				No.	Percentage (%)
August	68	32	36	61	90
September	113	41	72	84	74
October	135	71	64	57	42
November	112	74	38	28	25
December	116	102	14	2	2
January	116	83	33	14	12
February	76	66	10	2	3

#### 4.4 Feeding station evaluation

Preliminary results using a subset of compensation claims and lake data from southern Alberta indicated that duck compensation claims, standardized to claims/km<sup>2</sup>, surrounding lakes classified as regionally significant were highest within 25 km of the lakes. Further analysis and completion of the first phase of this evaluation is proposed for 2007 - 2008 with results contained in a separate report.

#### **4.5 Program Expenditures**

The total cost of field operations for the 2006 damage prevention program was \$73,094, made up of \$40,163 for feeding operations (Appendix 2) and \$32,931 for scare cannon distribution centre operation (Appendix 4).

Data provided by field personnel indicate that the total WCDPP program expenditure during 2006 - 2007 amounted to \$203,668 (Table 3). This amount is well within the approved budget of \$393,600. One of the contributing factors accounting for the difference in budgeted versus actual expenditures in 2006 was a rapid harvest season throughout the province. This resulted in reduced feeding station expenses as well as low cannon use, and therefore, low contract amounts for scare canon distribution centres.

The 2006 program expenditure represents 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 3.4. Supervisory activities (i.e., regional and provincial coordinator expenditures) are important components in the operation of the WCDPP but are difficult to attribute to the cost of any specific program area and are, therefore, not included in program costs.



Table 3. Alberta Waterfowl Crop Damage Prevention Program expenditures for 2006.

	Expenditure (\$)	Sub total (\$)
<b>Feeding Operations</b>		
Field technician contract	3,000	
Vehicle operation	4,929	
Meal allowance	104	
Bait station site rental	1,214	
Bait station feeding contracts	14,618	
Bait station grain	13,058	
Lure crop	3,468	
Field supplies/equipment	128	
Bait station evaluation	3,617	
		44,135
<b>Scare Cannon Distribution</b>		
Advertising	1,932	
Distribution centre contracts	12,150	
Cannon shipping	1,009	
Vehicle operation	2,380	
Equipment purchase		
Field supplies/equipment repair	1,202	
		18,673
<b>Administration</b>		
<i>Regional Programming</i>		
Coordinator salaries/benefits	88,297	
Vehicle operation	15,673	
Phone (cell and long distance)	940	
Office/field supplies	856	
Staff training	67	
Travel expenses	64	
		105,897
<i>Provincial Coordination</i>		
Salaries/benefit	28,933	
Vehicle operation	3,833	
Phone (cell and long distance)	129	
Web-site development	212	
Program fact sheet	1,567	
Office/field supplies		
Travel expenses	291	
		34,964
<b>Total budget</b>		<b>203,668</b>

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## 6.0 APPENDICES

Appendix 1. 2006 Waterfowl Crop Damage Prevention Program weekly harvest progression expressed as a percentage of field peas, barley and wheat crops standing, swathed and harvested by feeding station.

Region	Feeding station and Harvest category	Weekly harvest progression (%)					
		6-Aug	13-Aug	20-Aug	27-Aug	3-Sep	10-Sep
<b>Prairie</b>	<b>San Diego, Badger, Prouty Lakes</b>						
	Standing	97	82	66	34	34	19
	Swathed	2	10	16	15	15	9
	Harvested	1	8	18	52	52	72
	<b>Lost Lake</b>						
	Standing	91	85	47	26	20	
	Swathed	5	8	20	10	10	
	Harvested	4	7	34	65	71	
	<b>Grantham Lake</b>						
	Standing	89	86	63	17		
	Swathed	6	7	4	5		
	Harvested	5	7	33	78		
	<b>Stirling</b>						
	Standing	83	76	66	32	19	
	Swathed	6	8	14	14	9	
	Harvested	11	17	20	55	72	
	<b>Namaka</b>						
	Standing	100	86	76	75	67	21
Swathed	0	3	8	8	9	3	
Harvested	0	11	16	17	24	76	
<b>Parkland</b>	<b>Bashaw</b>						
	Standing			79	64	26	6
	Swathed			10	8	25	3
	Harvested			11	30	51	93
<b>Northeast</b>	<b>Brosseau</b>						
	Standing				89	32	13
	Swathed				4	22	11
	Harvested				7	46	76
<b>Northwest</b>	<b>Buffalo / LaGlace</b>						
	Standing		91		20	5	
	Swathed		3		4	1	
	Harvested		6		76	94	
	<b>Cardinal</b>						
	Standing			93	38	18	
	Swathed			6	16	9	
	Harvested			1	46	73	

Appendix 2. Summary of waterfowl use of bait stations and lure crop during the 2006 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 cost (\$)	Cost/duck/d (c)
Prouty							3,468	
San Diego	29	8-Aug	5-Sep	162840	1357	0.40	4,882	3.00
Badger	29	8-Aug	5-Sep	37800	315	0.40	1,960	5.19
Lost Lake	29	8-Aug	5-Sep	50400	420	0.40	2,275	4.51
Grantham	24	8-Aug	30-Aug	36360	303	4.00	1,762	4.85
Stirling	36	8-Aug	12-Sep	157800	1315	4.00	5,385	3.41
Namaka	36	8-Aug	12-Sep	31200	260	0.40	2,220	7.12
Bashaw	45	2-Aug	15-Sep	121900	967	0.38	3,789	3.11
Lac Brosseau	41	14-Aug	23-Sep	63794	665	0.50	3,902	6.12
Buffalo (G.P.)	44	1-Aug	13-Sep	43584	454	0.50	2,945	6.76
La Glace	32	12-Aug	12-Sep	99840	1040	0.50	4,390	4.40
Lac Cardinal	34	15-Aug	17-Sep	41280	430	0.50	3,185	7.72
Total				846798	7526	0.43	40,163	4.74

Appendix 3. 2006 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)	Number of cannons used	Number of quarter sections	Number of landowners	Landowners willing to allow hunters
Andrew	C	10-Aug	9-Nov	89	2	1	1	
Atmore	C	17-Aug	28-Sep	41	0	0	0	
Bonnyville	C	11-Aug	13-Oct	62	2	4	2	1
Boyle	C	15-Aug	27-Nov	102	0	0	0	
Elk Point	C	11-Aug	27-Sep	46	0	0	0	
Holden	C	8-Aug	9-Nov	91	2	2	2	1
Mannville	C	9-Aug	16-Oct	67	0	0	0	0
Myrnam	C	11-Aug	17-Nov	96	8	6	5	0
Paradise Valley	C	9-Aug	17-Nov	98	8	7	4	3
St. Paul	ACA	year round			12	19	6	5
Smoky Lake	C	10-Aug	18-Oct	68	0	0	0	0
Two Hills	C	11-Aug	27-Sep	46	0	0	0	0
Vegreville	C	8-Aug	22-Nov	104	12	9	6	8
Vermilion	C	9-Aug	17-Nov	98	12	7	6	0
Viking	C	8-Aug	20-Nov	102	7	4	4	0
Vilna	C	10-Aug	28-Sep	48	0	0	0	0
La Crete	C	15-Aug	31-Oct	76	3	1	1	1
Manning	C	15-Aug	31-Oct	76	0	0	0	0
Grimshaw	C	15-Aug	31-Oct	76	0	0	0	0
Nampa	C	15-Aug	31-Oct	76	0	0	0	0
Fairview	C	15-Aug	31-Oct	76	4	1	1	0
Girouxville	C	15-Aug	31-Oct	76	2	2	2	2
High Prairie	C	15-Aug	31-Oct	76	0	0	0	0
Spirit River	C	15-Aug	31-Oct	76	3	3	2	1
Valleyview	C	15-Aug	31-Oct	76	0	0	0	0
Beaverlodge	C	15-Aug	31-Oct	76	0	0	0	0
La Glace	C	15-Aug	31-Oct	76	0	0	0	0
Bashaw	C	1-Aug	17-Nov	106	7	4	4	
Bawlf	C	1-Aug	18-Oct	77	0	0	0	
Bentley	C	3-Aug	2-Oct	59	0	0	0	
Byemore	C	19-Jul	26-Sep	67	1	2	1	

Appendix 3. Continued.

Distribution centre	Agent	Start date	End date	Duration (d)	Number of cannons used	Number of quarter sections	Number of landowners	Landowners willing to allow hunters
Camrose	C	3-Aug	18-Oct	75	10	6	6	
Castor	C	19-Jul	26-Sep	67	0	0	0	
Lougheed	C	27-Jul	5-Oct	68	7	3	3	
Pine Lake	C	28-Jul	28-Sep	60	0	0	0	
Provost	C	27-Jul	31-Oct	94	2	1	1	
Stettler	C	20-Jul	5-Oct	75	1	1	1	1
Camrose	ASRD	1-Aug	1-Nov	90	1	1	1	
Coronation	ASRD	1-Aug	1-Nov	90	2	2	2	
Drumheller	ASRD	1-Aug	1-Nov	90				
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	1	1	1	
Brooks	ASRD	year round			0			
Strathmore	ASRD	year round			2	2		
Drumheller	ASRD	year round			0			
Hanna	ASRD	year round			0			
Oyen	ASRD	year round			0			
Vulcan	ASRD	year round			0			
Foremost	ASRD	year round			0			
Lethbridge	ASRD	year round			1	1		
Bow River Irrigation District		year round			2		2	
Raymond Irrigation District		year round			0		0	
<b>Total</b>					<b>114</b>	<b>90</b>	<b>64</b>	<b>23</b>

Appendix 4. 2006 Waterfowl Crop Damage Prevention Program distribution centre operation costs.

Distribution centre	Total cost \$
NE amortized costs	6711
NE distribution centre operation	2560
NE distribution centre advertisement	1120
Andrew	330
Atmore	309
Bonnyville	330
Boyle	438
Elk Point	309
Holden	330
Mannville	309
Myrnam	391
Paradise Valley	391
St. Paul	0
Smoky Lake	300
Two Hills	309
Vegreville	420
Vermilion	433
Viking	381
Vilna	309
NW Amortized Cost 2006	5682
NE distribution centre operation	284
NW distribution centre advertisement	812
La Crete	419
Manning	388
Grimshaw	343
Nampa	343
Fairview	595
Girouxville	398
High Prairie	539
Spirit River	409
Valleyview	353
Beaverlodge	353
La Glace	353
Parkland Amortized Costs	1865
Parkland distribution centre operation	757
Bashaw	381
Bawlf	309
Bentley	300
Byemore	319
Camrose	391

Appendix 4. Continued.

Distribution centre	Total cost \$
Castor	309
Lougheed	381
Pine Lake	309
Provost	330
Stettler	330
Total	32,931





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