



Delta Farmland & Wildlife Trust

Partners in Stewardship

ANNUAL REPORT 2019







**Delta Farmland
& Wildlife Trust**

Partners in Stewardship

Our Mission

Delta Farmland & Wildlife Trust (DF&WT) is a non-profit organization that promotes the preservation of farmland and wildlife habitat on the Fraser River delta (Cities of Delta and Richmond) through co-operative land stewardship.

Challenges to Farming and Wildlife Conservation

Farmland on the lower Fraser River delta is ideal for food production because the soils are fertile and the region has a relatively long growing season. The area is also important for a diversity of migratory birds that use the delta as a stopover before they continue their journey or spend the entire winter. Despite the suitability of the area for farming and wildlife, there are challenges facing both.

The heavy silt/clay soils of local farms are prone to degradation when overworked by machinery. Tractors and other farm equipment can compact the soil and intensive tillage speeds the breakdown of soil organic matter, a crucial component of soil fertility.

Farmers can fallow (rest) land by planting grasses and clovers and leaving the field alone for a period of time, however many farms simply cannot afford to take crop fields out of production.

Wildlife, especially migratory birds, are also challenged to survive in the increasingly developed landscape of the lower Fraser River delta. Almost 80% of the marsh present a century ago has been drained and only 600 hectares of grassland are present in the Municipality of Delta, compared to an estimated 6,000 hectares before 1890. Native shrubs and tree communities have dwindled as well.

Farmland Stewardship in Action

Delta Farmland & Wildlife Trust has developed stewardship programs to address the challenges facing agriculture and wildlife conservation.

Through the stewardship programs, local farmers are eligible for cost-share payments when they plant crops that are beneficial to wildlife and/or agricultural production. The management guidelines that farmers follow to be eligible for the programs are guided by extensive research. Each program addresses a specific example of wildlife conservation and/or agricultural production.

The **Grassland Set-aside Stewardship Program** pays farmers to fallow land, which improves soil fertility, while providing habitat for a diversity of grassland raptors, wading birds, songbirds, small mammals, and pollinating insects.

The **Winter Cover Crop Stewardship Program** helps cover the cost of establishing vegetative cover on fields before winter, which protects the soil from erosion, improves soil fertility, and provides feeding habitat for herbivorous waterfowl and shorebirds.

Through the **Hedgerow Stewardship Program**, linear corridors of native shrubs and trees are planted along farm fields to provide habitat for songbirds, raptors, and beneficial insects.

Similar corridors of grasses are planted along field edges through the **Grass Margin Stewardship Program**. Farmers can also apply to cover some of the costs of soil amendments and management through the **Soil Amendment (previously named Field Liming) and Laser Leveling Stewardship Programs**. Lime maintains soil pH at optimum levels so that plants can grow effectively and laser leveling improves drainage on fields that are prone to flooding.

The **Forage Enhancement Pilot Program**, which was established in 2017, assists grass forage producers with the costs to over- and re-seed their forage fields as a result of waterfowl grazing. This pilot provides support for the enhancement and continued provision of high-valued grass forage fields for dairy cattle feed and as vital waterfowl foraging habitat.

Summary of Stewardship Programs in 2019

Delta Farmland & Wildlife Trust stewardship programs are designed to contribute to agricultural soil fertility and wildlife habitat availability, while mitigating conflict between wildlife and farming operations.

In 2019, DF&WT was able to increase the cost-share rates for both the Grassland Set-aside and Winter Cover Crop Stewardship Programs. The cost-share rate for the Set-aside Program had not increased since the program was established over 25 years ago. The rate was increased from \$300/acre to \$400/acre. The Winter Cover Crop program cost-share rates were increased by \$10/acre bringing the new rates to \$60-65/acre. Rates were increased due to a decrease in participation in both programs over the past couple years and to ensure that rates offered remained proportional to rising costs associated with each

program. Due to an increase in these rates, total cost-share payments for 2019 was one of the highest since the organization was established. During the 2019 fiscal year DF&WT provided cost-shares totaling \$424,862 excluding staff time and administration costs. Included in that total were two hedgerows that were planted in October and December totaling 408m in length and costing \$21,362 to install.

STEWARDSHIP PROGRAM	ACRES	RATE (\$)	TOTAL (\$)
Grassland Set-aside			
1-year	175	400	62,800
2-year	143	400	57,200
3-year	72	400	25,600
4-year	25	400	10,000
4+ year	31	400	10,800
Total	446	–	166,400
Winter Cover Crops	2,516	60-65	147,251
<i>Spring Cereals, Winter Cereals, Cover Crop Mixes and Clovers</i>			
Forage Enhancement Pilot	489	75	36,675
Laser Levelling	180	–	21,100
Soil Amendment	1,145	30	26,124
<i>(*tonnes of lime/ gypsum)</i>			
Farmscape			
Hedgerows	8.70	400	1,262
Grass Margins	11.72	400	4,688
Hedgerow Construction	0.38	–	21,362
Total			27,312
Stewardship Programs Total			424,862

Grassland Set-aside Stewardship Program

Local farmers in Delta and Richmond are able to fallow land through the **Grassland Set-aside (GLSA) Stewardship Program**. Farmers commonly enter fields into the GLSA program to restore degraded land, transition fields into organic production and diversify options for crop rotations. Individual fields are planted with forage grasses and clovers and can be enrolled in the Set-aside Program for up to 4 years (extensions to 5 or 6 years on a case-by-case basis). Over the past couple years some farmers have also been experimenting with pollinator-friendly set-aside mixes. While enrolled in the program, farmers receive cost-share payments to offset rent, seed, equipment, and labour costs. DF&WT was fortunate to secure additional funding in 2019, which allowed for an increase to the cost-share rate from \$300 to \$400/acre each year. Farmers who choose to plant a grassland set-aside with grain may harvest the nurse crop in the first year (harvest reduces a farmer's cost-share to \$200/acre).

■ For more information on Grassland Set-asides, visit www.deltafarmland.ca.



Figure 1: Extent of 2019 Grassland Set-aside Program

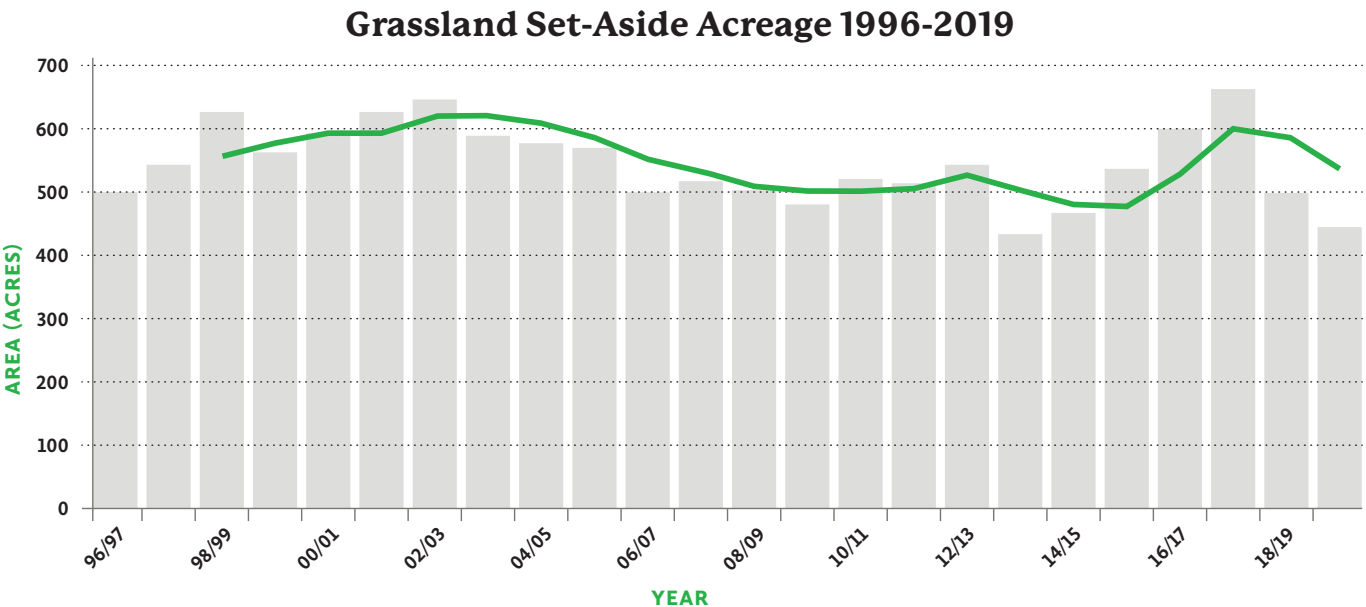


Figure 2: Historical acreage of Grassland Set-aside program enrollment from 1996 to 2019 (The line is a 3-year running average).



ROLE IN LOCAL CROP ROTATION

Grassland set-asides (GLSA) are short-term fallows that improve soil quality. Short-term set-asides have been

shown to reduce soil compaction and improve soil structure. Aggregates are clumps of individual soil particles that form the basis of soil structure. Aggregate stability is a measure of the resistance of aggregates to physical disturbances. Short-term GLSA increase aggregate stability which can improve water infiltration, water retention, soil aeration, space for root growth and habitat for soil organisms. Set-asides with forbs also provide habitat for beneficial insects which may improve yields of adjacent fields that are planted with pollinator-dependent crops. The program also allows farmers to transition to organically certified production by fallowing their field during the 3-year chemical free period.



ROLE IN WILDLIFE CONSERVATION

Grassland set-asides mimic the grasslands that were abundant on

the lower Fraser River delta prior to 1890 (when land clearing and draining for agriculture began) and are therefore ideal surrogate habitat for wildlife. Populations of small mammals, especially Townsend's vole, establish under the thick canopy of grass and provide prey for predatory birds. These include raptors (Northern Harrier, Short-eared Owl, Barn Owl, Rough-legged Hawk, Red-tailed Hawk, and American Kestrel) and wading birds (Great Blue Heron and American Bittern).

Grassland set-asides provide habitat for a diversity of arthropods, including pollinating insects like bumblebees. Arthropods can also serve as a food source for shrews and insectivorous birds, including Barn Swallows and Western Meadowlarks.

Set-asides also provide nesting habitat for grassland birds. Savannah Sparrows and Common Yellowthroat nests can be found in set-asides and occasionally reports of Northern Harrier nests. Short-eared Owls and Western Meadowlarks may nest in set-asides but this has not been confirmed. It is thought that breeding populations of Western Meadowlarks have been extirpated from the lower Fraser River delta.



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Winter Cover Crop Stewardship Program

Farmers in Delta can plant cereal grasses, clover, or annual forage grasses as a cover crop. Cover crops can be under-seeded into growing crops (e.g. cereal grains and silage corn) or planted after cash crops (e.g. beans, peas, and potatoes) are harvested. Farmers receive between \$60 and \$65/acre to seed winter cover crops. The majority of cover crops are seeded in late summer and early fall.

■ For more information on winter cover crops, visit www.deltafarmland.ca.



Figure 3: Extent of 2019 Winter Cover Crop Program

Winter Cover Crop Acreage 1996-2019

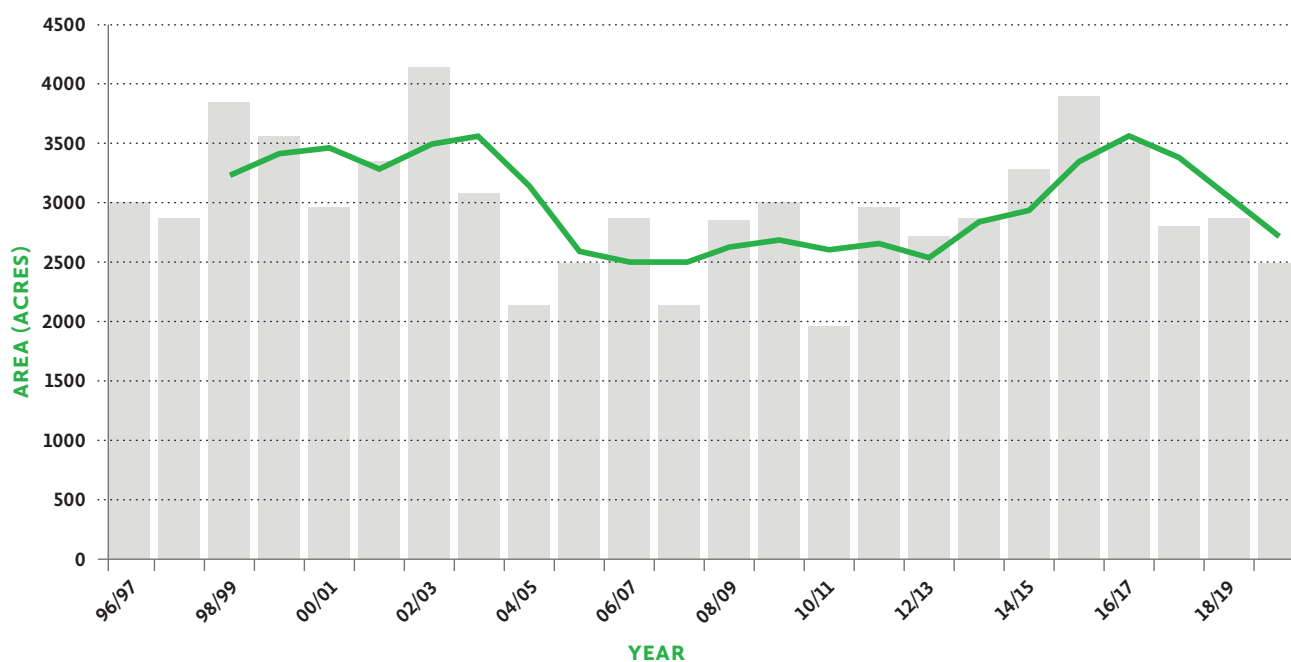


Figure 4: Historical acreage of Winter Cover Crop program enrollment from 1996 to 2019 (The line is a 3-year running average).



ROLE IN LOCAL CROP ROTATION

The foliage of cover crops provides ground cover, preventing rain-induced soil erosion, while the roots increase soil porosity and break up compaction. Cereal cover crops scavenge nutrients that would otherwise leach from the soil during heavy winter rains. The cover crop can be incorporated in spring as a green manure to increase soil organic matter. Soil organic matter improves soil structure, increases the water holding capacity of soil, and increases the infiltration of water. Clover cover crops can fix nitrogen and offset the need to use synthetic fertilizers. While directly improving soil health, cover crops can also provide many other agricultural benefits. Cover crops can shade weeds and some release allelopathic compounds that inhibit weed growth, reducing the farmer's usage of chemical controls.



ROLE IN WILDLIFE CONSERVATION

Cover crops mainly benefit herbivorous waterfowl, providing them with a protein-rich food source during staging and wintering periods. Lesser Snow Geese, American Wigeon, Northern Pintail, Mallard, and Trumpeter Swans are all species that frequently feed on winter cover crops. To a lesser extent, Canada Geese, Cackling Geese, Greater White-fronted Geese, Tundra Swans, and Green-winged Teal feed on cover crops. Several species of shorebird have been identified using cover crop fields as well. Wilson's Snipe use the dense vegetation of early planted cover crops as shelter, and Dunlin and Black-bellied Plover have been observed feeding on invertebrates on grazed cover crop fields. In one instance, a group of 18 Northern Harriers was observed roosting in an oat cover crop that had grown higher than 50 cm.



OTHER BENEFITS

Grasses grown for hay and pasture (perennial forage) can be grazed by waterfowl, reducing harvest yields and potentially requiring fields to be reseeded. Winter cover crops can act as lures, drawing waterfowl away from hay and pasture, and provide them with an alternative source of feed. While cover crops have not resulted in a complete abatement of grazing on hay and pasture, they offset some of the loss that growers would have otherwise experienced.



Hedgerow Stewardship Program

The Hedgerow Stewardship Program covers the costs to establish linear rows of native trees and shrubs along field edges. Over 25 hedgerows totaling 10 km in length have been planted through the Hedgerow Stewardship Program. Hedgerows provide year-round habitat for wildlife. Over half of the bird species found on farmland can be attributed to hedgerows.

■ For more information on Hedgerows, visit www.deltafarmland.ca.



ROLE IN LOCAL CROP ROTATION

The ecology of hedgerows is complex, and although it is difficult to determine exactly how hedgerows contribute to crop production, current research supports their role in providing habitat for predatory, parasitoids and pollinating insects. Beneficial insects are known to support biological pest management and increase crop yields. Pollinating insects are required for fruit set in a number of local agricultural crops, including tomatoes, berry crops (blueberry, strawberry, raspberry, and cranberry) and cucurbits (squash, zucchini, pumpkins, and cucumbers).



ROLE IN WILDLIFE CONSERVATION

Hedgerows provide feeding habitat for songbirds and raptors. Many hedgerow songbirds feed upon the berries from fruiting shrubs or the insects living in the hedge. Accipiter hawks like Cooper's and Sharp-shinned Hawk will hunt smaller songbirds within the hedge. Raptors, like the Red-tailed Hawk, Rough-legged Hawk, Short-eared Owl, and Northern Harrier will use hedges as perch sites. Surveys conducted of hedgerows in Delta, including those established through DF&WT's stewardship program, indicate that older, more structurally developed hedgerows provide habitat for a wide variety of bird species.



Grass Margin Stewardship Program

Like hedgerows, grass margins are linear strips of habitat running along the edge of agricultural fields. DF&WT encourages farmers to use the same mixture of forage grass and clover used in grassland set-asides when planting margins. Farmers are eligible to receive \$400/acre for grass margins enrolled in the program.

■ For more information on Grass Margins, visit www.deltafarmland.ca.



ROLE IN LOCAL CROP ROTATION

Grass margins can provide physical breaks between fields, especially fields that require buffer zones for organic certification. When margins are planted along ditch edges, the grass can trap soil that would erode off the field during heavy rains, preventing the ditch from filling with sediments. When grass margins contain clover, they can provide feeding habitat for pollinating insects.



ROLE IN WILDLIFE CONSERVATION

Similar to grassland set-asides, grass margins can provide habitat for small mammals which are prey for raptors and wading birds. Raptors may also roost in grass margins during winter; Short-eared Owls have been flushed from grass margins during field surveys. Grassland songbirds nest and feed in the grass margins.



Forage Enhancement Pilot Program

In 2017, the Forage Enhancement Program was initiated to assist grass forage producers with the increasing intensity of grazing that their forage fields are experiencing over the winter season. Through the Forage Enhancement Pilot Program, DF&WT is sharing the costs associated with over- and re-seeding forage fields in the spring due to waterfowl grazing. The goal of the program is to support the enhancement and continued provision of these high-valued fields both for dairy cattle feed and as vital waterfowl foraging habitat.

■ For more information on the Forage Enhancement Program, visit www.deltafarmland.ca.



ROLE IN LOCAL CROP ROTATION

Perennial grass forage fields provide the bulk of feed for dairy cattle herds in Delta. Waterfowl grazing of perennial grass forage fields creates a considerable cost to many Delta forage producers including lower forage yields, reduced harvest quality (protein), a reduction in cuts (i.e. 4-5/year to 3/year), and at times destroyed plantings that require re-seeding. Impacts from waterfowl may also result in soil problems such as compaction and ponding. In some cases, grass forage fields must be re-seeded annually (as opposed to every 5+ years) at a cost upwards of \$400-650/acre.

The costs to maintain perennial forage fields in some cases are reaching a level where it is no longer economically viable. This is causing some producers to plant annual forage fields and other forage crops (i.e. corn). The concern with regards to waterfowl is that annual forage fields may be tilled in the fall and left bare over the winter season. Bare fields tend to dry out quicker in the spring, permitting earlier access and planting, which is critical for nutrient management. However, the consequence of this practice is fields that once provided significant foraging habitat for waterfowl will no longer be available over the winter and migratory season. This decrease in perennial fields will exacerbate the issue elsewhere by increasing pressures on remaining grass forage and winter cover cropped fields.



ROLE IN WILDLIFE CONSERVATION

Grass forage fields mainly benefit herbivorous waterfowl, providing them with a protein-rich food source during staging and wintering periods. Lesser Snow Geese, American Wigeon, Northern Pintail, Mallard, and Trumpeter Swans are all species that frequently feed on grass forage fields. Past research conducted by DF&WT has identified perennial forage fields as providing some of the highest quality foraging habitat for migratory waterfowl.



Laser Leveling Stewardship Program

DF&WT has been offering its Laser Leveling cost-share program to farmers since 1996. Through the program, co-operators are eligible to receive up to 50% of the cost of leveling, up to a maximum cost-share of \$125/acre (\$309/ha) and a maximum of 100 acres (40 ha) leveled.

■ For more information on Laser Leveling, visit www.deltafarmland.ca.



ROLE IN LOCAL CROP ROTATION

Drainage is an essential component of productive agriculture, especially in areas that experience periods of heavy rainfall. On the Fraser delta, heavy rains occur during the winter months and poor field drainage can lead to soil erosion, soil compaction, and salt accumulation. Field topography plays an important role in how water is drained from a field. Steeply sloped fields can lose significant amounts of topsoil as fine particles are washed away by water runoff. Water pools in low areas and is unable to drain, and the weight of water in these areas is significant enough to cause compaction. Furthermore, these areas take longer to dry in spring, delaying farmers' access to portions of their fields. When the puddles do dry, the osmotic pressure can pull significant amounts of salt from deeper in the soil profile to the surface, thereby impacting crop production.

Delta farmers have access to laser leveling services which can recontour their fields to maximize drainage, and minimize water ponding and soil erosion. Using GPS, stationary laser towers, and computer software, a laser leveling plough is pulled by a powerful tractor and can accurately recontour a field. The plough fills in low areas and removes soil from high points, and fields can be contoured to either be completely level, sloped, or crowned, depending on the field's characteristics.

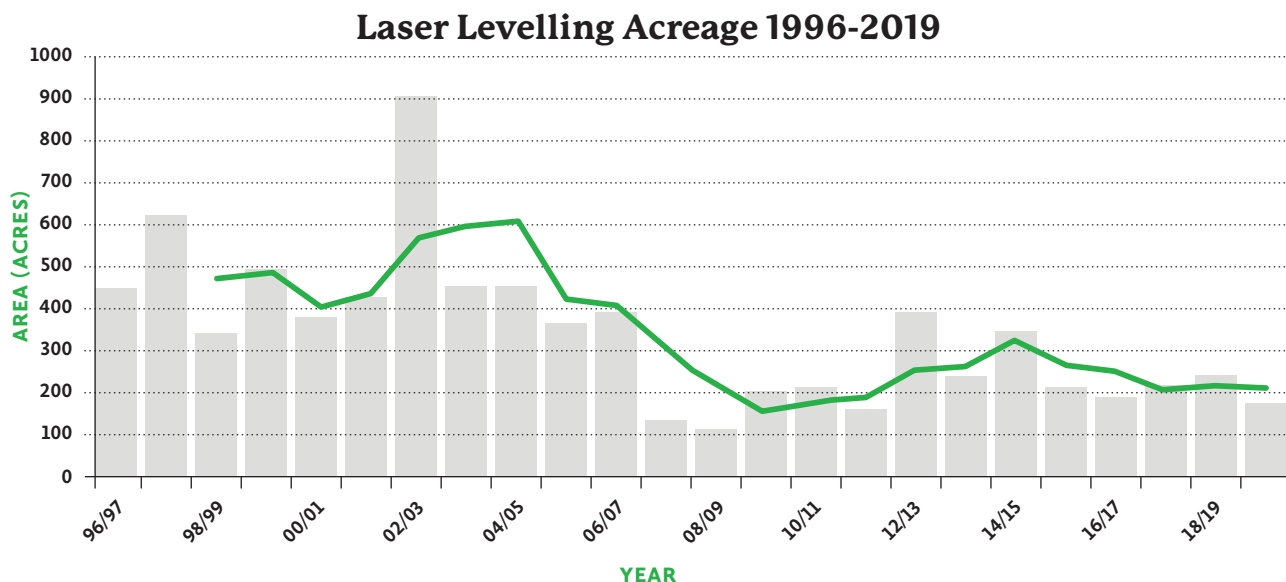


Figure 5: Historical acreage of Laser Leveling program enrollment from 1996 to 2019 (The line is a 3-year running average).

Soil Amendment (Formerly known as Field Liming) Stewardship Program

Farmers in Delta have had access to DF&WT's Soil Amendment cost-share since 2004. Through the program, farmers have been eligible to receive \$30/tonne of lime applied, to a maximum of 2 tonnes/acre applied on a maximum of 100 acres. In 2019, gypsum was added to the program as a pilot for two years.

■ For more information on the Soil Amendment Stewardship Program, visit www.deltafarmland.ca.



Tonnes of Lime and Gypsum 2003-2019

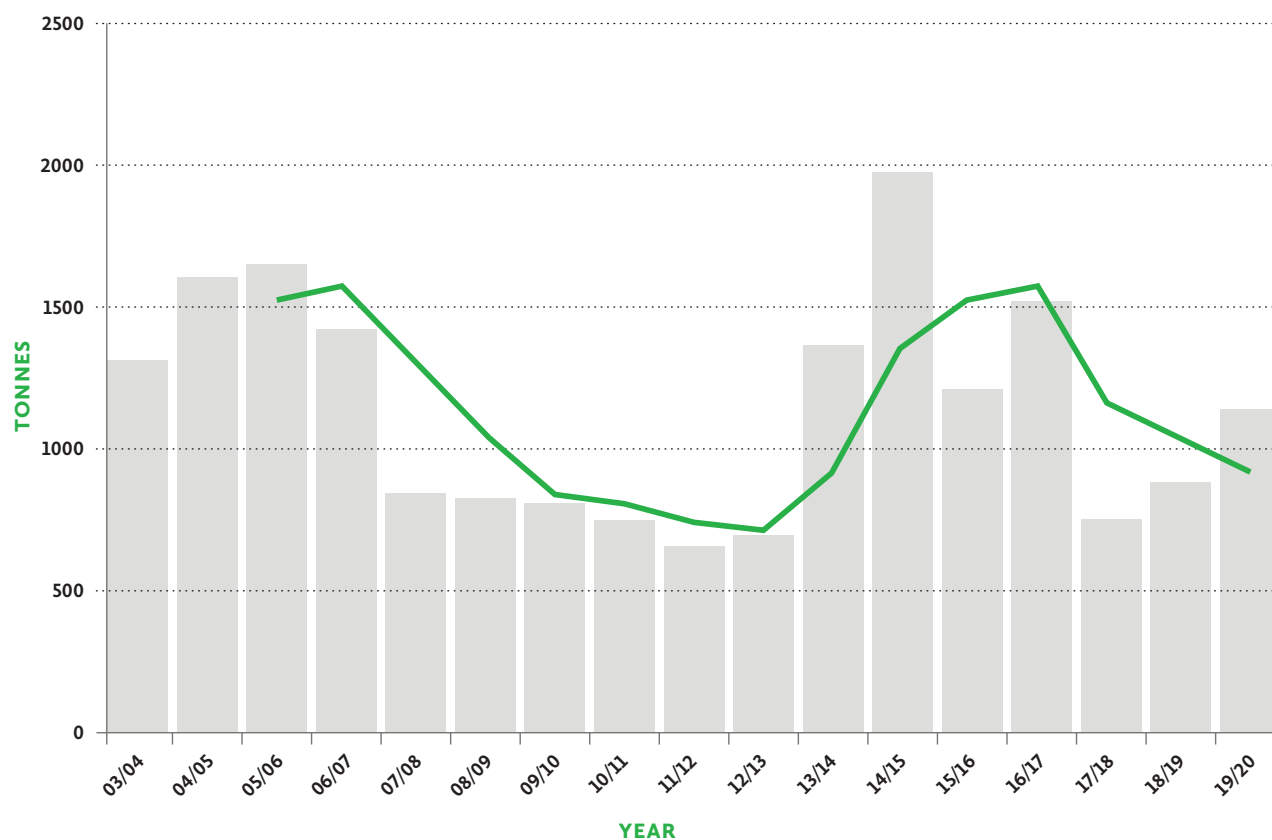


Figure 6: Historical tonnage of Soil Amendment program enrollment from 2003 to 2019 (The line is a 3-year running average).



ROLE IN LOCAL CROP ROTATION

Soils become acidic when there is an accumulation of positively charged hydrogen ions (called cations). There are several ways soils become acidic. Heavy rains can leach away positively charged ions like calcium, magnesium, potassium, and sodium. Excess nitrogen fertilizer that is not taken up by crop plants can be oxidized to acids by soil microbes. When soils become too acidic, plants are unable to take up nutrients efficiently.

The application of lime to fields allows farmers to adjust soil pH to approach a level that maximizes yield potential, particularly for vegetable crops. While many factors, such as the kind of crop, soil type, and climate, influence the effect of liming a field, it can be generally stated that the application of lime on all moderate to strong acid soils will improve and maintain productivity. At a cost of over \$120 per tonne (which includes transportation to the field and spreading), lime is an important investment in the stewardship of agricultural soils.

Gypsum is a soil amendment that has been applied to agricultural soils for hundreds of years as a source of plant nutrients (calcium and sulfur) and as a means to improve soil structure (increases soil aggregation).¹ In sodic and heavy clay soils, gypsum reduces the dispersion of soil particles and soil surface crusting, which can increase water infiltration and plant seedling emergence. Delta's heavy silt/clay soils and vicinity to the ocean make them prone to compaction and salinity issues. With climate change projected to increase soil salinity and spring/fall precipitation, incorporating additional methods to mitigate soil salinity and structural degradation is important for maintaining the long-term productivity of Delta soils.



1 – Chen, L. & W. A. Dick. 2011.

Gypsum as an agricultural amendment: General use guidelines. Retrieved from <https://fabe.osu.edu/sites/fabe/files/imce/files/Soybean/Gypsum%20Bulletin.pdf>

Summary of Outreach Completed in 2019

Delta Farmland & Wildlife Trust communicates the results of its work to the general public in a variety of formats including: field tours, reports, news articles, social media (Instagram and Facebook), community events, lectures, presentations, website features and in the publication of our bi-annual newsletter, "Farmland & Wildlife." In 2019, we held our 14th annual "Day at the Farm" agricultural awareness event, which attracted over 4,400 visitors from communities across the Lower Mainland. The event is an excellent outreach activity for communicating the non-market benefits of agriculture in the Fraser River delta, including wildlife conservation.

The Trust was also recognized in the media on numerous occasions including (but not limited to):

DELTA OPTIMIST

- "New UBC findings can improve soil on Delta farms" (April 16, 2019)
- "Delta farmers doing their part to mitigate climate change" (August 8, 2019)
- "Farming has never been this much fun" (September 3, 2019)
- "Delta's 14th annual Day at the Farm on this Saturday" (September 7, 2019)
- "10 kilometers' worth of natural habitats planted in Delta" (November 9, 2019)

THE WESTERN PRODUCER

- "Farmers urged to show good soil practices" (March 14, 2019)
- "Wildlife habitat program conserves land in B.C. delta" (September 5, 2019)

COUNTRY LIFE

- "Vegetation fundamental to farms, landscape" (March 2019 issue)

GLOBAL TIMES & XINHUA NEWS AGENCY

- "Annual Day at the Farm agricultural fair kicks off in Delta, Canada" (September 8, 2019)



Highlights of the range of outreach activities, in addition to Day at the Farm, given during the 2019 year:

OUTREACH TYPE	AUDIENCE	ATTENDEES
Presentations	Pacific Agriculture Show Horticultural Growers' Course – Farmers, industry representatives	55
	British Columbia Institute of Technology Fish, Wildlife and Recreation – (BCIT FWR) class	30
	Tsawwassen Rotary – Tsawwassen business members, managers and professionals	30
	BC Fuchsia and Begonia Society – Gardeners	25
	Dunbar Garden Club – Gardeners	60
	Metro Vancouver Agriculture Advisory Committee – Members include municipal staff and councilors, agriculture commodity groups, educational institutions and food-related organizations	20
Field Tours	Quest University – Class	20
	University of British Columbia (UBC) and Simon Fraser University – Faculty	3
	Western Producer and BC Blueberry Council – Journalist and staff	2
	Delta Chamber of Commerce – Bus tour with Chamber members	45
	Canadian Farm Writers Federation – Farm writers and journalists from across Canada	20
	UBC Applied Biology class	20
	BCIT FWR class	30
Program Updates	Delta Farmers' Institute meeting – Delta Farmers (Two meetings)	30
	City of Delta Agriculture Advisory Committee meeting – City staff, councillors and farmers (Two meetings)	14
	City of Surrey Agriculture and Food Policy Advisory Committee meeting – City staff, Surrey farmers	15
Newsletter	DF&WT Farmland & Wildlife Newsletter (Summer and Winter Issues)	900+
Display Booth	Pacific Northwest Farm Direct Marketing Tour – Washington, Oregon, Idaho and BC farmers	50
	Orphaned Wildlife Rehabilitation Society Open House (Two days) – Residents of Metro Vancouver	2800
Publications	Canadian Journal of Soil Science – “Short-term effects of grassland set-asides on soil properties in the Fraser River delta of British Columbia” (article)	
	Experience Delta Spring 2019 Issue – “A perfect partnership on the farm” (article)	
	BC Outdoors Magazine Sept/Oct 2019 issue – “Hunters' Contribution to Farmland Stewardship” (article)	

Day at the Farm

“Day at the Farm” is an integral initiative to Delta Farmland & Wildlife Trust’s annual outreach. 2019 marked the 14th anniversary of this free, community-building event, which educates people of all ages about the importance of agriculture and the non-market environmental services that farmland provides. The event is hosted at Westham Island Herb Farm and provides residents of the Lower Mainland with the opportunity to directly interact and engage with local farmers and a working farm. The event provides a hub for cooperative collaboration between farmers and community members to ensure long-term sustainability and widespread awareness of our local agricultural landscape. Over 4,400 people attended the event from across Metro Vancouver with over 1,300 people taking the farmer-led hay wagon tours.

Event attendees included:

- 4H Calf Club
- BC Ag. in the Classroom
- BC Cranberry Growers Association
- BC Dairy Association
- BC Egg Board
- BC Fresh
- BC Chicken Growers Association
- Bird Studies Canada
- Canadian Wildlife Service (Environment & Climate Change Canada)
- Delta Farm Roots
- Delta Naturalists
- E.S. Cropconsult
- Farm Credit Canada
- Fraser Valley Conservancy
- Orphaned Wildlife Rehabilitation Society
- Society Promoting Environmental Conservation
- Stewardship Centre for BC
- University of British Columbia
- Vancity
- West Coast Seeds

We'd like to thank event sponsors which included:

BC Fresh, BC Youth in Agriculture, BC Ministry of Agriculture, BC Waterfowl Society, City of Delta, Delta Agricultural Society, Delta Foundation, Envision Financial, Farm Credit Canada, Lehigh Hanson, Metro Vancouver, Royal Bank of Canada, Terralink Horticulture, Thrifty Foods, Vancity and White Spot.



Summer Solstice BBQ Fundraiser

Every two to three years, DF&WT hosts our Summer Solstice BBQ fundraiser. The event is an opportunity to raise funds for the organization as well as recognize members of the agricultural and conservation community. In past years the event has been hosted at the Roddick's Barn. For the event in 2019, it was held for the first time at the historic Harris Barn and raised approximately \$24,000. Members recognized at this year's BBQ included the Delta Agricultural Society for their significant financial contributions to DF&WT since the organization's establishment; Edward van Veenendaal for his service as a DF&WT director for many years; and Ian Paton for his long-term support of the Trust. As in previous years, the BC Culinary Olympic Team catered the event once again providing an outstanding meal.



We'd like to extend our thanks and appreciation to everyone who supported the event including:

Shato Holdings Ltd., Century Group, Ducks Unlimited Canada, Vancity, Global Container Terminals Canada LP, BC Fresh, the City of Delta, Alpha Aviation, Westshore Terminals, Four Winds Brewery and Emma Lea Farms.

Thank you to the businesses that provided goods and services including:

AgSafe BC, Apex Glass, Arlene Smith, Atomic Hair Studio, Barnside Brewing, Bass Pro Shop, Beach Grove Golf Club, Blair Ledingham, Brent Kelly Farm Inc., Buttercups Children's Boutique, Camille's, Carlene Lewall, Coast Tsawwassen Inn, Coastal Olive Oils Co., Country Lane Gallery, Delta Optimist, Double R Rentals, Ducks Unlimited, Equine Essentials, ES Crop Consult, Extreme Clothing Boutique, Farm Credit Canada, Gary Nay, Gateway Casinos & Entertainment Limited, Home Hardware Tsawwassen, Hygge, Kathy Dance, Kirsten Laufer Photography, L'Aromas Bakehouse, Ladner Village Market, Linda Jones, Lordco Auto Parts, Mario's Kitchen, Maureen Malenstyn/True Outdoors, Men in Kilts, Meridian Farm Market, Niagara Falls Restaurant, Petra's by L'Aromas, Prairie Coast Equipment, Richlea Bakery, Robert Bateman, Royal Bank of Canada, RunInn Tsawwassen, School House Farm, Silvercore Advanced Training Systems, South Coast Casuals, Southern Irrigation, South Delta Heels, Spa Blue, Speeds Liquor Store, Speeds Pub, Stillwater Sports, Sunny Tsawwassen (Tsawwassen Business Association), Sunnyside Nursery, TNT Hay Sales, Tsawwassen Springs Golf Course, Tyler Garnham Photography, Urban Impact, Vancouver Aquarium, Vancouver Canadian Baseball, Vinca's Kitchen, West Coast Fence Art, and West Coast Seeds.

Summary of Research Completed in 2019

Demonstrating Long-Term Improvements in Soil Productivity on Delta Farmland

In 2015, DF&WT in partnership with the University of British Columbia's Faculty of Land and Food Systems began a five-year research project with federal funding delivered by Investment Agriculture Foundation of BC. The project is evaluating the effects of short (2 year) to medium (4 year) term recurrent grassland set-asides on enhancing soil quality. Results will assist farmers in optimizing the management of their set-asides and will ultimately contribute to sustaining agriculture as a viable industry in Delta for the foreseeable future.

The effects of 2- and 3-Year grassland set-asides on plant available nitrogen and greenhouse gas emissions in Delta, British Columbia (Lewis Fausak) is the third theses to be produced through this five-year research project entitled: Demonstrating Long-term Improvements in Soil Productivity on Delta Farmland.

The objectives of this project are to evaluate:

- 1) The effects of Grassland Set-asides (GLSA) on soil quality;
- 2) How the effects of GLSA on soil quality vary with the duration of set-aside;
- 3) How the incorporation of GLSA into a crop rotation affects soil nutrient cycling and subsequent crop yield; and
- 4) How differences in soil nutrient cycling and yield vary with the duration of the set-aside.

The effects of 2- and 3-Year grassland set-asides on plant available nitrogen and greenhouse gas emissions in Delta, British Columbia addressed objective three and four of the project, which entailed assessing the effect of two- and three-year set-asides on soil quality, nitrogen availability, crop yields, and greenhouse gas emissions.

■ Complete results can be accessed at
<https://open.library.ubc.ca/cIRcle/collections/ubctheses/24/items/1.0380750>

Invertebrate Community Surveys of Grass Margins and Crop Fields 2019 – Dave Charbula (BCIT Ecological Restoration Program Summer Internship)

This study assessed the effects of DF&WT supported grass margins on invertebrate communities. Study results found a general trend towards higher total abundance of all invertebrate taxa combined in grass margins versus in crop fields. Taxa known to be beneficial to agriculture had higher abundance in grass margins, while pest taxa had similar levels of abundance in grass margins and crop fields.

■ The final report is available on our website at www.deltafarmland.ca/library

Assessing Waterfowl Use of Agricultural Lands in Delta & Richmond, BC – Brooklyn Hillman (DF&WT Field Technician)

In 2016, DF&WT in partnership with Canadian Wildlife Service and Ducks Unlimited Canada began a multi-year project assessing waterfowl use of agricultural land throughout Delta and south Richmond. The project intends to collect up-to-date information by surveying a selected sub-set of fields throughout the migration and winter periods. Surveys are quantifying and assessing patterns in waterfowl use between crop types and over time. Surveys are also being used to quantify the benefit of cover crops to waterfowl.

This updated information will enable accurate assessments of the degree to which current waterfowl populations are supported by agricultural land, and will support efforts to conserve and maintain farmland and 'waterfowl-compatible' agricultural practices. The project will also assist in quantifying the value of the DF&WT's Winter Cover Crop (WCC) Program for waterfowl, to garner continued and additional support for the program.

Over the course of 30 survey days conducted between October 2019 and March 2020, a total of 37,429 waterfowl were observed, comprising ten different species. The waterfowl species observed from greatest to least abundant were Mallard (*Anas platyrhynchos*), American Wigeon (*Mareca americana*), Snow Goose (*Anser caerulescens*), Trumpeter Swan (*Cygnus buccinator*), Northern Pintail (*Anas acuta*), Canada Goose (*Branta canadensis*), Cackling Goose (*Branta hutchinsii*), Green-winged Teal (*Anas crecca*), Northern Shoveler (*Spatula clypeata*), and Gadwall (*Mareca strepera*). In addition to the 10 target waterfowl species, eight Eurasian Wigeon (*Mareca penelope*) and one Common Merganser (*Mergus merganser*) were seen on surveyed fields. Other notable avifauna included 22,889 gulls (Family Laridae), 492 Bald Eagles (*Haliaeetus leucocephalus*), 447 Northwestern Crows (*Corvus caurinus*), 164 Great Blue Herons (*Ardea Herodias*), and 154 Killdeer (*Charadrius vociferus*).

Waterfowl were observed foraging in crop fields and DF&WT's cover cropped fields. Of the 202 surveyed fields, 32 fields were enrolled in DF&WT's WCC stewardship program and 17 fields were enrolled in the Cereal Habitat Enhancement Program (CHEP). Fields enrolled in the WCC program supported a greater density of waterfowl than the overall average at 1.36 birds/ha while CHEP fields supported a lower density at 0.39 birds/ha. Additional surveys over the next couple seasons will be required in order to provide an accurate assessment of waterfowl use of traditional and novel cover crops.



Statement of Financial Position

UNAUDITED, FOR THE YEAR ENDED DECEMBER 31, 2019

Assets	CURRENT	2019 (\$)	2018 (\$)
	Cash	242,298	57,939
	Term deposits	73,958	155,448
	Contributions receivable	139,855	180,628
	GST receivable	8,007	2,223
	Prepaid expenses	88,200	6,000
	Total current assets	558,318	402,238
	Restricted cash	262,522	192,428
	Long term investments – at cost	102,838	96,429
	Capital assets	295	295
		923,973	691,390
Liabilities	CURRENT	2019 (\$)	2018 (\$)
	Accounts payable	141,539	5,275
	Payroll liabilities	–	–
	Deferred revenue	262,522	192,428
	Total liabilities	404,061	197,703
	Net assets	519,912	493,687
	Total liabilities and net assets	923,973	691,390

Statement of Operations and Changes in Net Assets

UNAUDITED, FOR THE YEAR ENDED DECEMBER 31, 2019

Revenue		2019 (\$)	2018 (\$)
FUNDING			
	Delta Agricultural Society	135,000	135,000
	Gov't of Canada Cdn Wildlife Service	120,000	140,000
	Vanc Fdn: YVR Wildlife Stewardship Fund	124,202	119,669
	Investment Agriculture Foundation (I.A.F)	48,518	24,259
	B.C. Waterfowl Society	31,000	36,600
	Wildlife Habitat Canada	35,000	-
	Ducks Unlimited Canada	30,000	40,000
	Habitat Conservation Trust Foundation	20,000	20,000
	Vanc Fdn: Boundary Shores	21,216	20,442
	City of Delta	50,000	15,000
	Tsawwassen Golf Course Compensation Fund	13,750	13,750
	City of Richmond	10,000	10,000
	Total revenue	777,290	624,489
OTHER			
	Donations	29,398	24,240
	Fundraising - BBQ	63,797	-
	Fundraising - DATF	34,418	24,290
	Interest and other income	10,991	1,239
	Total revenue	777,290	624,489
Expenses		2019 (\$)	2018 (\$)
PROJECTS			
	Remittances to co-operators	402,770	380,456
	Program coordinator	43,763	36,583
	Travel and mileage	4,204	2,075
	I.A.F Project	45,688	53,127
	Monitoring and evaluation	47,768	24,062
	Farmscape maintenance	9,885	5,100
	Farmscape construction	21,362	17,170
	Total project expenses	575,440	518,573
GENERAL			
	Administration, office, society costs	81,955	70,122
	Fundraising - BBQ	40,406	637
	Fundraising - DATF	32,105	30,394
	Conservation education, communication	21,159	2,965
	Total general expenses	175,625	104,118
	Total expenses	751,065	622,691
	Excess of revenue over expenses	26,225	1,798
	Net assets, beginning of year	493,687	493,889
	Prior period adjustment	-	(2,000)
	Net assets, end of year	519,912	493,687

YVR Wildlife Stewardship Fund

As a result of the construction of a parallel runway and associated developments at the Vancouver International Airport between 1992 and 1996, approximately 350 ha of wildlife habitat were drastically altered. The affected area consisted primarily of farmland providing a wide range of habitats typically associated with agricultural landscapes. Based on a series of habitat assessments and wildlife surveys conducted in the affected area, it was determined that a wide range of wildlife species would be impacted by the airport expansion.

Approval of the airport expansion was contingent on a mitigation/compensation program that addressed the loss of wildlife habitat and resulting displacement of wildlife. At the time, the Federal Government committed itself to protecting or replacing wildlife habitat so that no net loss of habitat capability resulted from the parallel runway

project. A total of 318 ha of land had been secured for the purposes of wildlife habitat and agriculture in the vicinity of the lower Fraser River delta. Although securing these lands and conducting habitat enhancement on them contributed to the goal of no net loss of habitat capability, it did not compensate for all loss. Additional habitat capability on privately held lands was identified through land stewardship activities that promote wildlife use.

To meet additional requirements, a Wildlife Compensation fund (YVR Wildlife Stewardship Fund) was established to finance land stewardship activities on private lands in perpetuity. This fund (\$2.25 million) was granted to the DF&WT who transferred it to the Vancouver Foundation as an endowment fund. Yearly returns from the fund are utilized to pay for core programs administered by the DF&WT.

ALLOCATION OF FUNDS FOR THE 2019 PROGRAM YEAR

PROGRAM/EXPENSE	AMOUNT (\$)	PERCENTAGE (%)
Hedgerow and Grass Margin Stewardship Programs	\$36,895.00	30%
Grassland Set-aside Stewardship Program (Inc. research)	\$13,725.00	11%
Communications	\$21,270.00	17%
Monitoring & Evaluation	\$15,050.00	12%
Administration, Coordination (staff wages)	\$37,260.00	30%
Total	\$124,200.00	100%

Boundary Shores Compensation Fund

(Vanc Fdn: Boundary Shores)

The development of the Boundary Shores Golf Course just southwest of the Boundary Bay Airport contributed to a loss of farmland and wildlife habitat. Covering 62 hectares of previously farmed land, the course removed approximately 16 hectares of old-field and 36 hectares of waterfowl winter grazing habitats. It had been estimated that the loss of the balance of 10 hectares, which represented old-field habitat, may be mitigated through landscape management within the footprint of the golf course.

In 1990, the developers of the Boundary Shores Golf Course agreed to pay \$531,720 to the City of Delta as part of a mitigation and compensation package for 52 ha of altered habitat in the vicinity of the proposed golf course. These funds were to be used as a conservation fund (hereafter referred to as the Boundary Shores Compensation Agreement Fund or BSCA Fund) to purchase, lease, or manage land for wildlife habitat. Both the Canadian Wildlife

Service and British Columbia Ministry of Environment suggested that the funds be used for the replacement of lost old-field and waterfowl grazing habitat. The comments of both government agencies were the basis of the Habitat Compensation Trust Agreement between the City of Delta and the developers of the Boundary Shores Golf Course. Under the Habitat Compensation Trust Agreement, the developer and the City of Delta agreed that the Municipality would transfer the funds to an existing or yet to be established entity whose objectives shall relate generally to the conservation of the Lower Fraser delta ecosystem.

Under an agreement between DF&WT and the City of Delta, the funds were to be managed as outlined in the Boundary Shores Compensation Fund Management Plan. The compensation funds as well as \$33,866 in interest earned by the City of Delta during their possession of the funds were transferred to the DF&WT in November 2000.

ALLOCATION OF FUNDS FOR THE 2019 PROGRAM YEAR

PROGRAM/EXPENSE	AMOUNT (\$)	PERCENTAGE (%)
Grassland Set-aside Stewardship Program	\$8,486.00	40%
Winter Cover Crop Stewardship Program	\$8,486.00	40%
Administration, Coordination (staff wages)	\$4,243.00	20%
Total	\$21,215.00	100%

Tsawwassen Golf & Country Club Habitat Compensation Fund (TG&CC Habitat Compensation Fund)

The redevelopment of the Tsawwassen Golf and Country Club at Highway 17 and 52nd Street resulted in a 22-hectare loss of farmland and wildlife habitat. The parcel developed had not been farmed for a number of years and, as a result, transitioned into old-field habitat which supports many birds of prey, owls, herons and grassland songbird and wildlife species. There was no opportunity to mitigate loss of old-field habitat and compensation of lost habitat capacity needed to take place at other locations on the delta.

In 2008, the developer agreed to pay \$300,000 to the City of Delta as part of a mitigation and compensation package for 22 hectares of lost farmland and old-field habitat. These funds were to be used to facilitate the long-term financing of surrogate habitat elsewhere within the lowlands of the Fraser River delta. Under the Development Agreement the funds were earmarked to fund ongoing grassland set-aside agreements with local farmers.

ALLOCATION OF FUNDS FOR THE 2019 PROGRAM YEAR

PROGRAM/EXPENSE	AMOUNT (\$)	PERCENTAGE (%)
Grassland Set-aside Stewardship Program	\$13,750	100%

Our Supporters

Delta Farmland & Wildlife Trust would like to recognize the agencies that provided funding to deliver the full extent of our stewardship programs and research for the 2019 fiscal year.

Delta Agricultural Society

Vancouver Foundation

Environment and Climate Change Canada

Ducks Unlimited Canada

BC Waterfowl Society

Habitat Conservation Trust Foundation

Habitat Stewardship Program

City of Delta

City of Richmond

Investment Agriculture Foundation of BC

Greygates Foundation

and

Private Donations



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