



Delta Farmland & Wildlife Trust



2016 Annual Report

*"Conserving farmland and wildlife
through co-operative land stewardship."*

Cover Photo Credits

Left: Tractor, Drew Bondar

Top Right: Snow Geese, David Bradbeer

Bottom Right: Local Vegetables and Fruit, Markus Merkens

Thank you to everyone who has provided photographs to Delta Farmland & Wildlife Trust. If you are interested in contributing your own photos of wildlife and farming, please contact DF&WT at 604-940-3392 or dfwt@dccnet.com.

Our Supporters

The Delta Farmland & Wildlife Trust relies on additional funding to deliver the full extent of our stewardship programs. We would like to recognize the agencies that provided funding to our Stewardship Programs for 2016.

**Delta Agricultural Society
Vancouver Foundation
Environment and Climate Change Canada
Wildlife Habitat Canada
Ducks Unlimited Canada
BC Waterfowl Society
Habitat Conservation Trust Foundation
Corporation of Delta
City of Richmond**

and

Private Donations

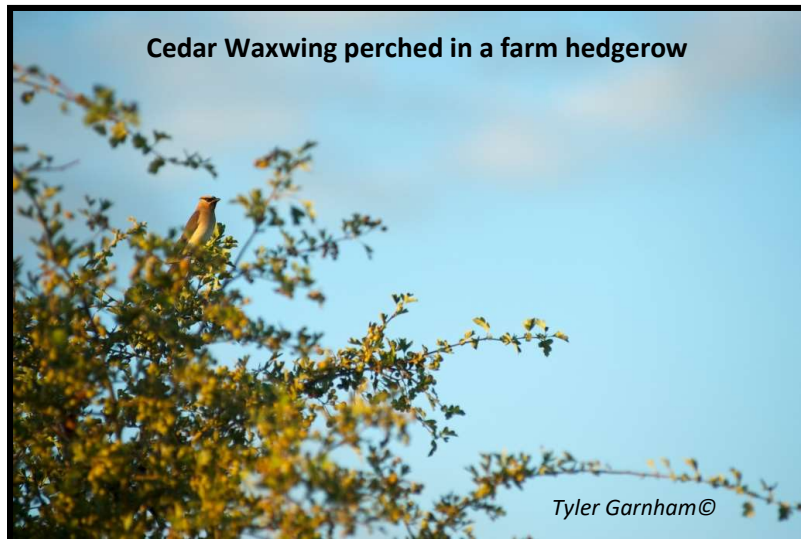
Delta Farmland & Wildlife Trust: Our Mission

DF&WT is a non-profit organization that promotes the preservation of farmland and wildlife habitat on the lower Fraser River delta (Municipality of Delta, City of 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 either 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.



Cedar Waxwing perched in a farm hedgerow

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.

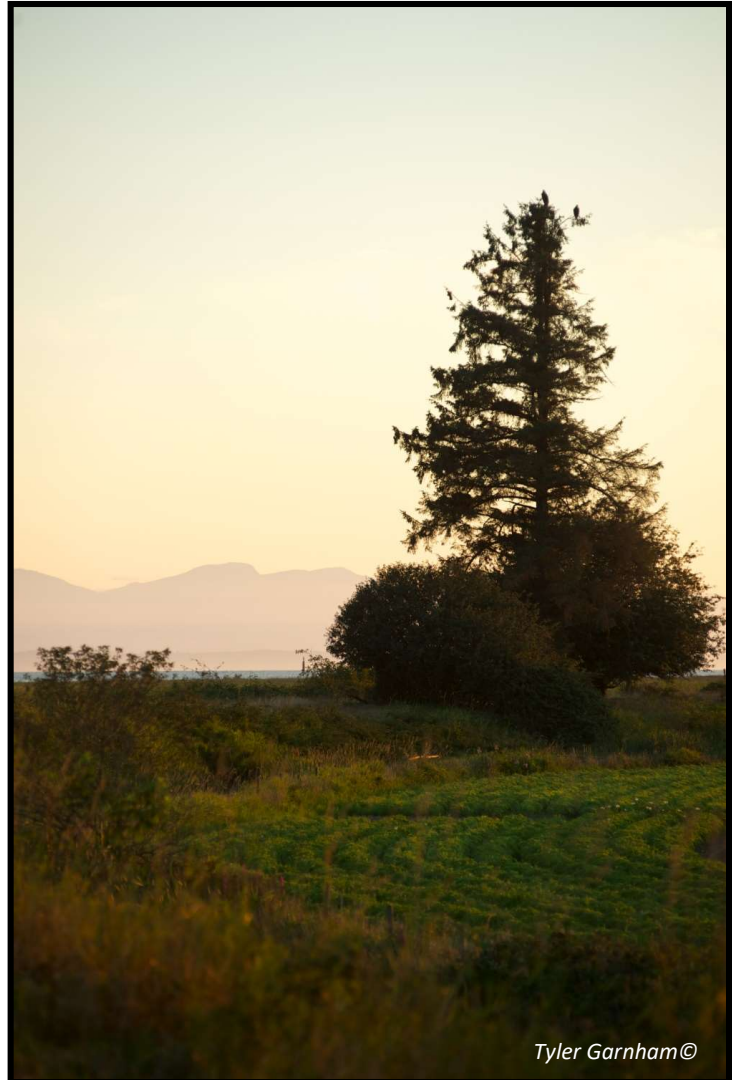
Farmland Stewardship in Action

DF&WT 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 pollinating 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 **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.

By providing solutions to farmers that are compatible with their crop rotations, the DF&WT Stewardship Programs are contributing to the availability of wildlife habitat and the long-term viability of local farming operations, which ensures that land will continue to be available for food production and wildlife conservation.



Summary of Stewardship Programs in 2016

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. During the 2016 fiscal year DF&WT provided cost-shares totaling **\$410,858**, excluding hedgerow maintenance, staff time and administration costs.

Stewardship Program	Acres	Rate	Total
Grassland Set-aside			
<i>1-year</i>	263	\$300.00	\$78,900.00
<i>2-year (*IAF Project)</i>	185	\$250-300*	\$53,550.00
<i>3-year</i>	44	\$250.00	\$11,000.00
<i>4-year</i>	57	\$300.00	\$17,100.00
<i>4+ year</i>	53	\$250.00	\$11,000.00
Total	602		\$171,550.00
Winter Cover Crops			
<i>Spring Cereals, Winter Cereals, Cover Crop Mixes and Clovers</i>	3,475	\$50-55	\$177,607.50
Laser Levelling	194	-	\$19,168.75
Field Liming (*tonnes of lime)	1,532*	\$30.00	\$38,748.30
Farmscape			
<i>Hedgerows</i>	3.39	\$300.00	\$1,017.00
<i>Grass Margins</i>	9.22	\$300.00	\$2,766.00
Total	8.21		\$3,783.00
Stewardship Programs Total			\$410,857.55

Grassland Set-aside Stewardship Program

Local farmers in Delta and Richmond are able to fallow land through the Grassland Set-aside Stewardship Program. 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). During that time, farmers receive cost-share payments to offset rent, seed, equipment, and labour costs (\$300/acre during the 1st year; \$250/acre in the 2nd and 3rd year; and \$300 in the 4th 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 \$150/acre). For more information on Grassland Set-asides, visit www.deltafarmland.ca.



Figure 1: Extent of 2016 Grassland Set-aside Program

Role in Local Crop Rotation

Grassland set-asides are short-term fallows that replenish soil organic matter. Soil organic matter is made up of the residue from dead plants, fungus, and soil organisms. Soil organic matter is crucial to maintaining agricultural production, as it influences soil structure (e.g., aggregate stability), water retention, drainage (by increasing soil macro-pores), soil microbial activity, macro invertebrates (e.g., earthworms), nutrient storage and nutrient uptake by crop plants. Additionally, the roots of grasses, and especially clover, can bore channels through compacted soil, thereby increasing drainage and aeration. Increased yields from grassland set-asides have not been formally documented but there are anecdotal reports of higher than average potato yields following a set-aside. Research is currently being conducted by DF&WT in partnership with the University of British Columbia to assess crop yields following set-aside

cessation. The program also allows farmers to transition to organically certified production by following 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 (LFRD) 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.

Other Benefits

The organic matter that accumulates in grassland set-asides and benefits soil quality also acts as a pool of carbon, temporarily locking it away into plant tissue and the soil. Although this stored carbon is released from a set-aside's soil when it is returned to crop production, the planting of new set-asides ensures that a dynamic, yet relatively consistent, pool of carbon is sequestered from the atmosphere.

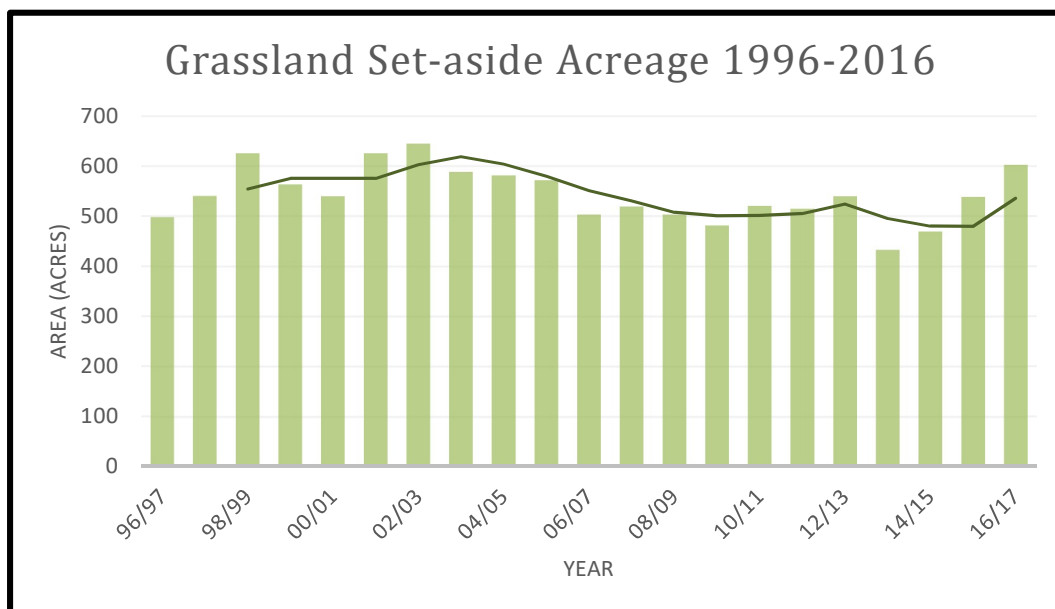


Figure 2: Historical acreage of Grassland Set-aside program enrollment from 1996 to 2016 (The dark green line is a 3-year running average).

Winter Cover Crop Stewardship Program

Farmers in Delta can plant cereal grasses, clover, or annual forage grasses as cover crop. Cover crops can be under-seed into growing crops (e.g., cereal grains and silage corn) or planted after cash crops (e.g., beans, peas, and potatoes) are harvested. In 2016, farmers received between \$50 and \$55/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.

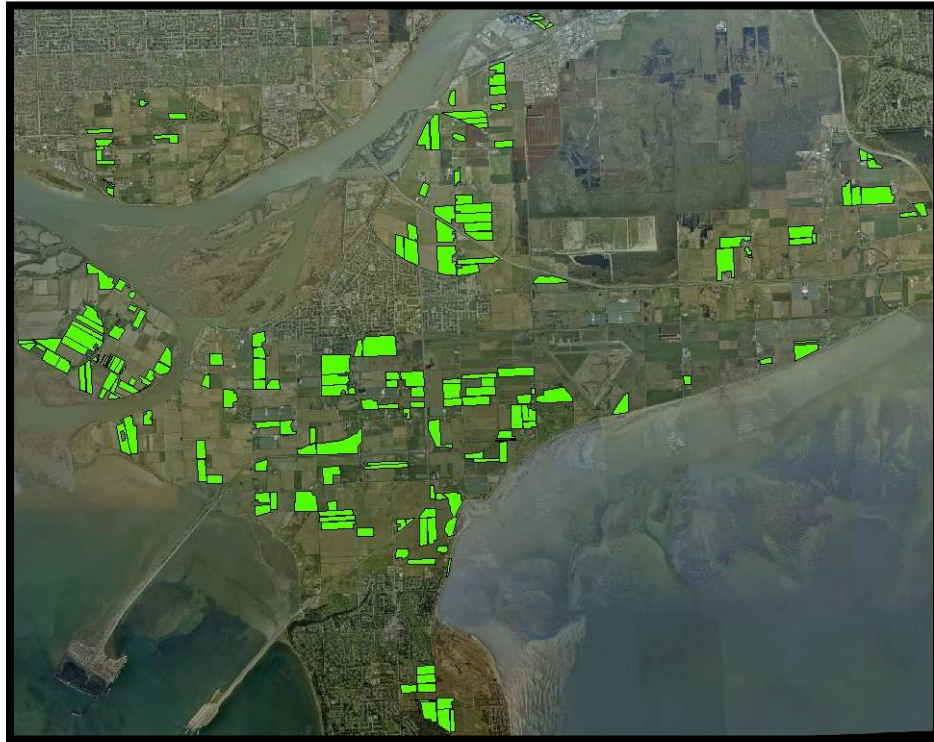


Figure 3: Extent of 2016 Winter Cover Crop Program

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.

Cereal Habitat Enhancement Pilot

Due to a recent decrease in operations of a local large-scale vegetable processor, the DF&WT initiated a three-year pilot project in 2016 to include spring-sown grain fields as a sub-component within our Winter Cover Crop Stewardship Program. As more acreage is being planted to grain because of the decrease in pea and bean contracts, this new DF&WT pilot program gives farmers an additional stewardship option. This program assists in supporting winter cover crops that have been established through the adequate re-distribution of residual seed from grain crops after harvest. If this spilt seed is adequately re-spread across the field, it has been observed that a cover crop can be established over the fall season that is equivalent to that planted following our management guidelines under our Winter Cover Crop Stewardship Program. This new three-year pilot program will assist farmers who are having to adjust their crop rotations as a result of the loss of pea and bean contracts, as well as ensure more acres are planted to a winter cover crop. In 2016, 503 acres were enrolled in the program costing \$25,150.

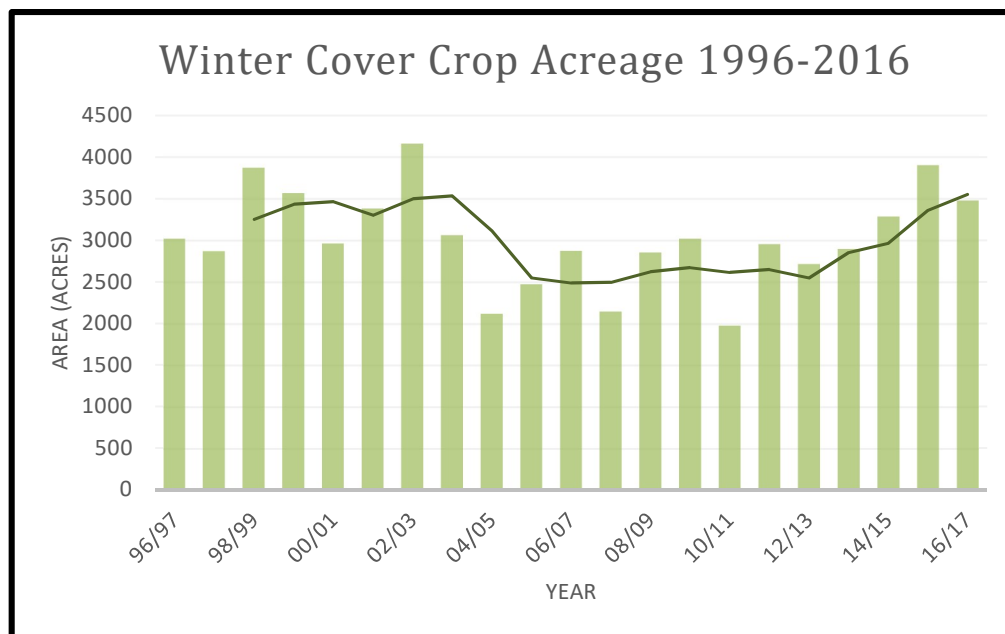


Figure 4: Historical acreage of Winter Cover Crop program enrollment from 1996 to 2016 (The dark green line is a 3-year running average).

Hedgerow Stewardship Program

Hedgerows in Delta are rows of native trees and shrubs planted along field edges. For more information on Hedgerows, visit www.deltafarmland.ca.

Role in Local Crop Rotation

The ecology of hedgerows is complex, and it is difficult to determine exactly how hedgerows contribute to crop production, but it is known that the presence of flowering shrubs and trees attracts pollinating insects. 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). A study in partnership with the University of British Columbia continued through 2016 to evaluate the quality of pollinator habitat and diversity of pollinator species (primarily bees) present in Delta hedgerows, which will be complete in the fall of 2017.

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 wider 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 \$300/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.

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 50 acres (20 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.

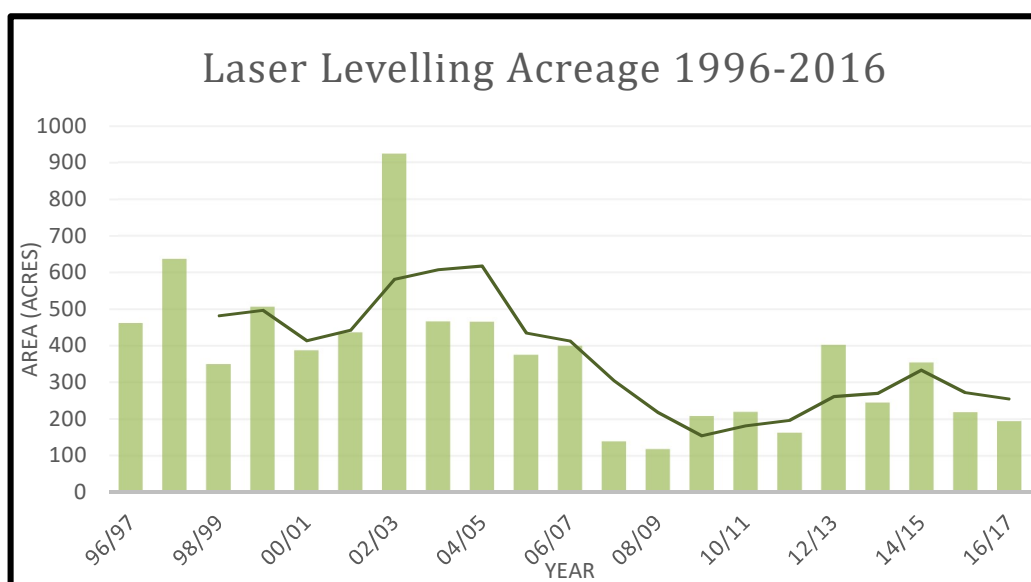


Figure 5: Historical acreage of Laser Leveling program enrollment from 1996 to 2016 (The dark green line is a 3-year running average).

Field Liming Stewardship Program

Farmers in Delta have had access to DF&WT's Field Liming cost-share since 2004. Through the program, farmers are eligible to receive \$30/tonne of lime applied, to a maximum of 2 tonnes/acre applied on a maximum of 100 acres. For more information on Field Liming, visit www.deltafarmland.ca.

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 \$79 per tonne (which includes transportation to the field and spreading), lime is an important investment in the stewardship of agricultural soils.



Figure 6: Historical tonnage of Field Liming program enrollment from 2003 to 2016 (The dark green line is a 3-year running average).

Impact of Stewardship Programs

In 2015, a British Columbia Institute of Technology (BCIT) Geographic Information Systems (GIS) student created cumulative enrollment maps for the Winter Cover Crop and Grassland Set-aside Programs. Figures 7 and 8 show the historical and present geographic locations of farmland habitat, in addition to highlighting over two decades of voluntary stewardship. Figure 8 reveals that virtually all soil-based fields in Delta have enrolled in the Winter Cover Crop Program at least once since the program's commencement.



Figure 7: Delta and Richmond fields impacted by the Grassland Set-aside Program from 1995 to 2016.



Figure 8: Delta and Richmond fields impacted by the Winter Cover Crop program from 1992 to 2016.

STATEMENT OF FINANCIAL POSITION
Unaudited, for the year ended December 31, 2016

ASSETS

	<u>2016 (\$)</u>	<u>2015 (\$)</u>
Current		
Cash	169,372	47,847
Term deposits	79,921	213,544
Contributions receivable	156,132	105,243
GST receivable	4,564	3,054
Prepaid Expenses	12,000	-
Total Current Assets	421,989	369,688
<hr/>		
Restricted cash	212,130	224,790
Long term investments- at cost	93,041	91,340
Capital assets	512	686
	727,672	686,504

LIABILITIES

	<u>2016 (\$)</u>	<u>2015 (\$)</u>
Current		
Accounts Payable	29,575	-
Payroll liabilities	3,026	4,663
Deferred revenue	212,130	224,790
Total Liabilities	244,731	229,453
<hr/>		
Net assets	482,941	457,051
<hr/>		
Total Liabilities and Net Assets	727,672	686,504

STATEMENT OF OPERATIONS AND CHANGES IN NET ASSETS
Unaudited, for the year ended December 31, 2016

	<u>2016 (\$)</u>	<u>2015 (\$)</u>
REVENUE		
Funding:		
Delta Agricultural Society	135,000	135,000
Vanc Fdn: YVR Wildlife Stewardship Fund	109,093	103,653
Gov't of Canada Cdn Wildlife Service	145,000	101,000
Ducks Unlimited Canada	25,000	25,000
Investment Agriculture Foundation (I.A.F)	48,518	48,518
AEWF Projects		-
HCTF	20,000	20,000
Vanc Fdn: Boundary Shores	18,635	17,706
Corporation of Delta	15,000	15,000
TG&CC Habitat Compensation Fund	13,750	13,750
Wildlife Habitat Canada	30,000	6,000
B.C. Waterfowl Society	25,000	39,903
City of Richmond	8,500	10,000
Other:		
Donations	24,640	26,223
Fundraising - BBQ	119,936	-
Fundraising - DATF	16,100	17,700
Interest and other income	7,661	4,967
Total revenue	761,833	584,420
EXPENSES		
Projects:		
Remittances to co-operators	410,858	388,509
Program coordinator	30,085	19,706
Travel and mileage	1,215	1,195
Program supplies	30,482	891
Monitoring and evaluation	8,752	8,848
Farmscape maintenance	6,384	14,021
Farmscape construction	-	6,991
I.A.F Project	54,000	37,503
Total project expenses	541,776	477,664
General:		
Administration, office, society costs	98,046	75,726
Fundraising - BBQ	75,764	1,732
Fundraising - DATF	17,165	15,052
Conservation education, communication - newsletter	3,192	4,328
Total general expenses	194,167	96,838
Total expenses	735,943	574,502
Excess of revenue over expenses	25,890	9,918
Net assets, beginning of year	457,051	447,133
Net assets, end of year	482,941	457,051