Retrospective Analysis

Stewardship Projects in the Lake Simcoe Watershed

2005-2006 to 2017-2018

January 2018

Prepared for:
Ontario Ministry of Agriculture and Rural Affairs (OMAFRA)

Prepared by:
Jen Hoesen, Environmental Programs Analyst
Ontario Soil and Crop Improvement Association (OSCIA)

OSCIA
Grassroots Innovation
Since 1939

This page is intentionally left blank

1. Executive Summary

To inform program design in the Lake Simcoe watershed, OSCIA has conducted a retrospective analysis of stewardship projects completed in the watershed since 2004. This report was designed to allow for the comparison of select project activities completed in the watershed to other regions, with the objective of better understanding factors that may be contributing to participation in the Lake Simcoe watershed.

The Ontario Soil and Crop Improvement Association (OSCIA) has played a key role in the delivery of agricultural stewardship programming in Ontario since the late 1980s. OSCIA's province-wide connection to farmers has enabled the association to effectively administer a variety of cost-share opportunities. Currently, OSCIA delivers multiple environmental cost-share programs for various federal departments, provincial ministries, and not-for-profit agencies across the province.

The data analyzed in this report captures the last 13 years of program delivery in the Lake Simcoe watershed, and spans 12 OSCIA administered cost-share programs. These program opportunities have evolved over the last three Agricultural Policy Frameworks, as there have been many changes in the type of Best Management Practices (BMPs) supported and completed in the Lake Simcoe watershed. These activities help to improve soil health and water quality in a region that has experienced significant environmental stress.

The report aims to answer two questions. The first is understanding what has been accomplished in the Lake Simcoe watershed in terms of stewardship projects. This includes a comprehensive review of projects completed in the watershed, as well as an understanding of the types of farms that have participated and how those factors have changed over time. The second question considers how future opportunities can be better tailored to the specific needs of farmers in the watershed in consideration of these changes.

This report is an inventory of the stewardship activities that have been completed in the watershed, as supported through OSCIA cost-share. The data has many applications, some of which are beyond the scope of this report. Overall, there has been significant effort on the part of participating Lake Simcoe farmers in addressing environmental concerns in the watershed, but there is a need to continue the work. The information contained within this report will help program designers in the design and implementation of future programs for this unique watershed.

This report should be a living document that is added to as new programs are delivered.

Table of Contents

Acknowledgements

The author would like to acknowledge support provided by staff at the Ontario Soil and Crop Improvement Association (OSCIA) in reviewing initial drafts of this report: Laura Van Vliet, Amy Tenbult, Andrea Dube Goss, and Andrew Graham. Program partners at the Ontario Ministry of Agriculture and Rural Affairs (OMAFRA) also provided support to the project, including Cindy Bradley MacMillan and Deborah Brooker. A special thanks to Darryl Finnigan for getting this project started, and for recognizing the value of using cost-share data as a tool to better understand stewardship accomplishments on the farm landscape.

List of Tables

List of Figures

2. Introduction

Excessive nutrients are a key water quality concern in the Lake Simcoe watershed (LSW), and efforts to restore Lake Simcoe have been on-going since the 1980s. Farmers are key stakeholders in the protection of the environment, and their participation in stewardship programs is essential to the long-term health of the watershed. To maintain and increase the adoption of stewardship programs by Lake Simcoe farmers, program designers need to understand changes that are occurring within the watershed. This report aims to provide a better understanding of the performance of Best Management Practices (BMPs) in LSW that have been supported through cost-share programs delivered by the Ontario Soil and Crop Improvement Association (OSCIA).

Lake Simcoe Watershed

Outside of the Great Lakes, Lake Simcoe is the largest lake in southern Ontario. The watershed contains significant natural, urban and agricultural systems and includes parts of the Oak Ridges Moraine (ORM) and the Greenbelt. It has a total land and water surface area of 3,342 km^2, of which the lake occupies 20 percent or 772 km^2. The ORM is the southern watershed divide – lands drain north off the moraine to Lake Simcoe and south to Lake Ontario, while the Oro Moraine is the northern watershed divide (LSRCA, 2017).

The land portion of the watershed is approximately 2,600 km^2 and is drained by 35 tributary rivers, with five major tributaries accounting for more than 60 percent of the total drainage area.

Within the watershed, there are 22 municipal governments: four counties, (Durham Region, Simcoe County, York, and Kawartha Lakes) and 18 local municipalities. In the last ten years, the population has increased by 9 percent, and is home to more than 450,000 people. As of 2011, there are approximately 1,700 farms operating in the Lake Simcoe watershed.

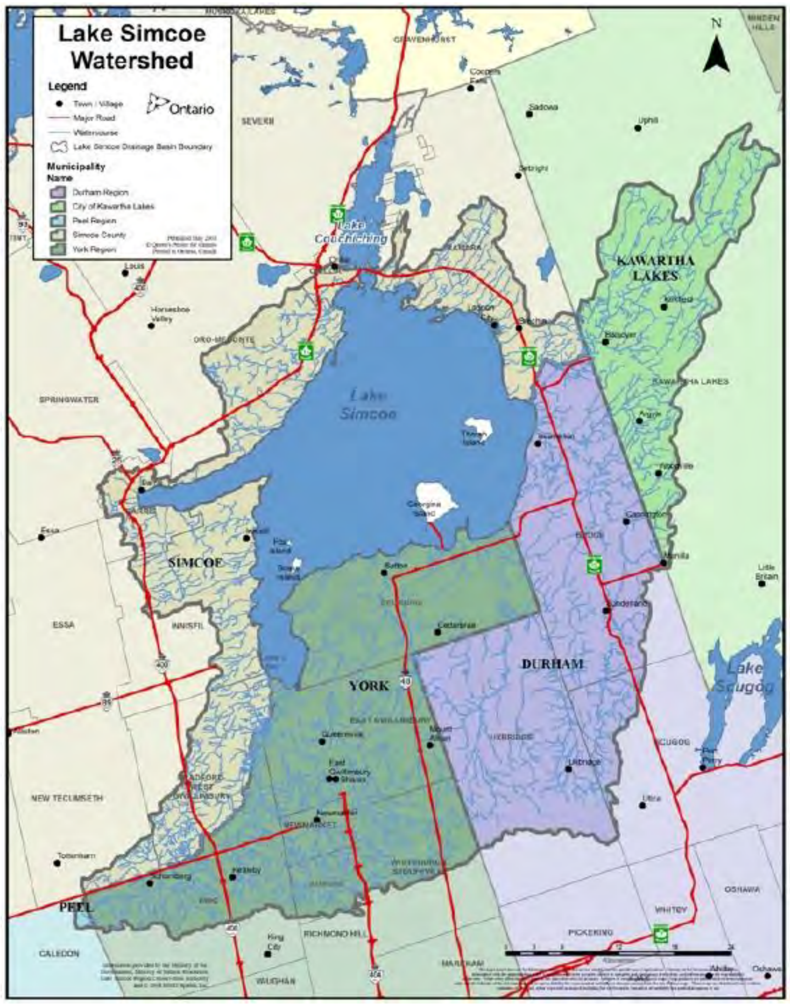

Figure 1: The Lake Simcoe Watershed (LSW) with the four regional counties including Simcoe, York, Durham, and Kawartha Lakes. Simcoe county has seen the most projects completed (42 percent), followed by York (32 percent), Durham (20 percent), and Kawartha Lakes (5 percent).

Environmental Impacts

Human activities have significantly affected the watershed, and excessive nutrients like phosphorus are negatively impacting water quality. This not only impacts drinking water but threatens aquatic habitat for species such as cold-water fish. In response to these environmental challenges, the first watershed-specific legislation in Canada, the Lake Simcoe Protection Act, was enacted in 2008. The Lake Simcoe Protection Plan outlines actions and targets for environmental improvements; and was designed to reduce phosphorus pollution and improve water quality and fish habitat. Approximately 36 percent of the land area is classified as agriculture and activities through hay, pasture and cropland continue to contribute 25% of the total phosphorus load.

Over the last 20 years, there have been many changes in the agricultural profile of the watershed. To understand the scale of cost-share participation, a selection of agricultural characteristics as reported by the Census of Agriculture has been summarized.

3. Statistical Profile of Agriculture in Lake Simcoe Watershed

Number of Farms

More than 50 percent of the watershed's agricultural land area is intensively farmed, with the remaining area devoted to non-intensive agricultural activities (LSRCA, 2017). The watershed supports a conventional farm economy with 1,707 farms involved in cash crops, livestock, and mixed operations. This is a decrease of 328 farms, or 17 percent, from the 2,035 farms that were reported in 1991 (Table 1).

The highest concentration of agriculture occurs south of Lake Simcoe itself. The sub-watersheds of West Holland, East Holland, Black River, Uxbridge Brook and Pefferlaw Brook, and Beaver River together represent 73 percent of total farms in the entire watershed.

Table 1: Number of Farms in LSW, 1991-2011.

Subwatershed	Number of Farms in 1991	Number of Farms (2001)	Number of Farms (2006)	Number of Farms (2011)
West Holland	404	331	338	300
East Holland	145	135	131	124
Black River	310	271	248	244
Uxbridge Brook, Pefferlaw Brook	389	342	355	288
Beaver River	305	268	280	290
Maskinonge River, Georgina Creeks	57	66	63	64
Innisfil Creeks	34	30	30	28
Lovers, Barrie, South Hewitts Creek	63	58	49	49
Oro Creeks, North Hawkestone Creek	105	96	83	90
Whites Creek	53	53	65	69
Talbot River	120	98	116	88
Ramara Creeks	49	55	64	74
Total	**2,035**	**1,803**	**1,822**	**1,707**

Source: Statistics Canada, Census of Agriculture, 1991-2011

Average Farm Size

More than one third of total farms in the watershed are less than 28 hectares (70 acres) in size. As well, very small farms of less than 4 hectares (9.8 acres) represent 6 percent of total farms in the watershed (Figure 2). There was a slight increase in the number of 600+ acre farms between the 1991 and 2011 census.

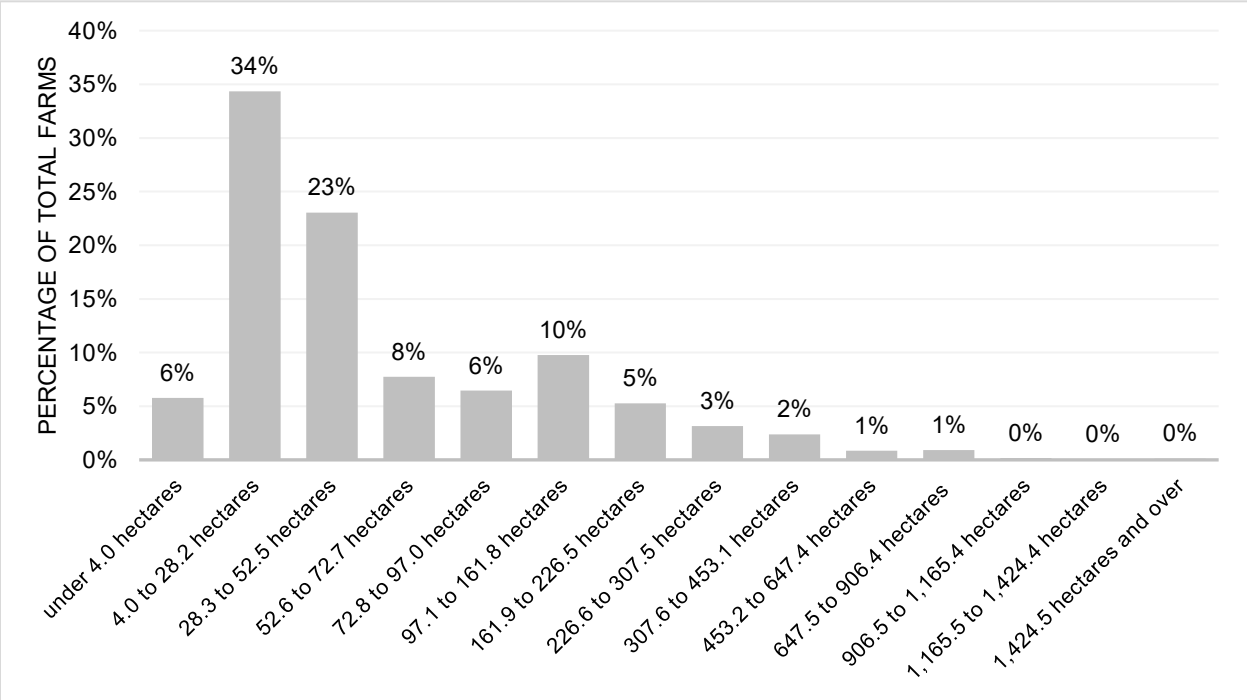

Figure 2: Percentage of Farm Area Distribution in Lake Simcoe Watershed, 2011.

The average farm size increased 4 percent, from 189 acres in 2006 to 196 acres in 2011 (Table 2). In comparison, the average farm size in Ontario increased 18 percent, from 206 acres in 1996 to 244 acres in 2011. Although average farm size within the watershed increased, there is considerable variation within sub-watersheds.

Table 2: Average Farm Size in Lake Simcoe Watershed, 2001 to 2011.

Average Farm Size (Acres)			Percent Change		
2001	2006	2011	2001-2006	2006-2011	2001-2011
189	185	196	-2.1%	5.9%	3.8%

Source: Statistics Canada, Census of Agriculture, 2001-2011

Crop Production

Approximately 1,800 km^2 of farmland is cultivated with hay, forage and fodder crops, corn, grains, soybeans, vegetables (like cabbage, onions, carrots, celery and lettuce), and other speciality crops (LSRCA, 2014). In addition to upland agriculture, the Holland River sub-watershed supports the largest cultivated marsh or 'polder' area in Ontario. Polders are former wetlands that were drained so the rich soils could be used for agriculture. The watershed is also home to several speciality farms including orchards, vineyards, wildflower and tree nurseries, and turf grass operations. Figure 3 illustrates the percentage of farmland area in field crops and pasture lands in the watershed in 2011.

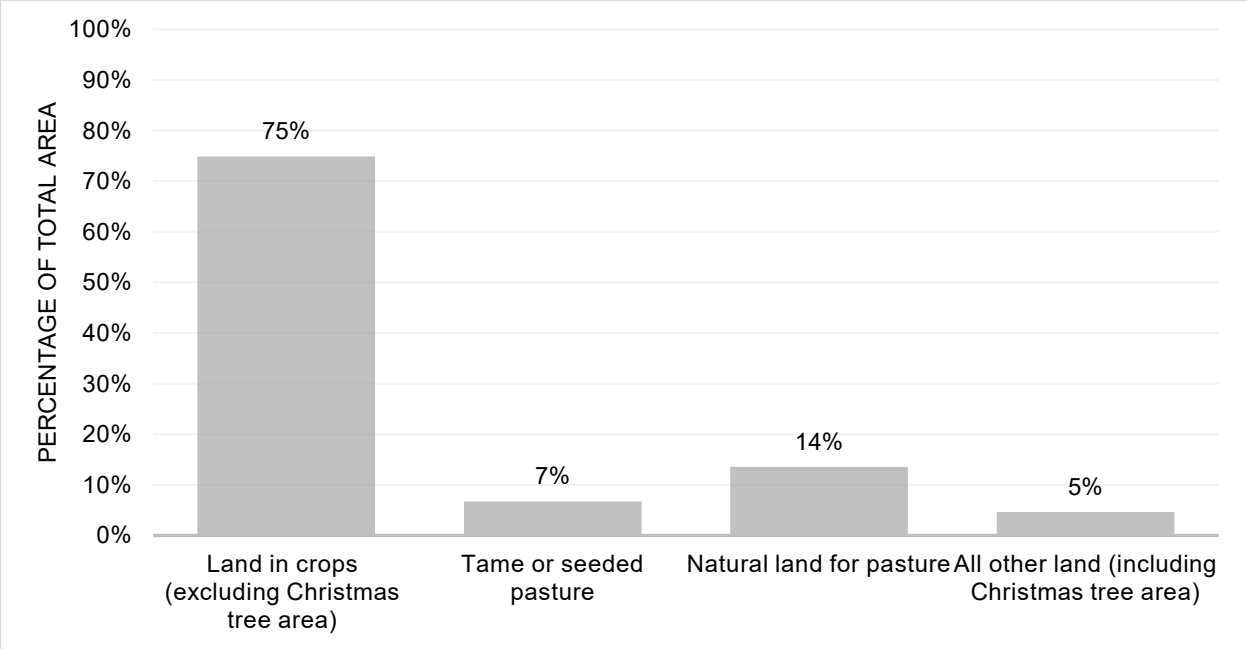

Figure 3: Land Area in Crops and Pasture Lands in Lake Simcoe Watershed, 2011.[1]

Livestock Production

Agriculture within the watershed is diverse, and livestock production has been a significant industry within the region. Table 3 illustrates the livestock profile for 2011. The predominant types of livestock production are cattle farms (dairy and beef), reported by 622 farms, followed by an aggregate of sheep, goat and horse farms, reported by 563 farms.

Table 3: Livestock Production in Lake Simcoe Watershed, Number of Farms and Livestock, 2011.

Number of Farms				Number of Livestock			
Poultry Farms	Cattle Farms	Pig Farms	Sheep, goat and horse Farms	Total Poultry	Total Cattle	Total Pigs	Total Sheep, goats and horses
253	622	43	563	917,880	40,651	728	24,335

Source: Statistics Canada, Census of Agriculture, 2011

4. Project Objective

Conduct an analysis of stewardship projects carried out by the Ontario Soil and Crop Improvement Association (OSCIA). Assess project data from current and previous stewardship projects administered by OSCIA in the Lake Simcoe watershed from 2004-present and compare them to stewardship projects administered by OSCIA in other parts of the Province from 2004-present. Create and publish a summary of the analysis on OSCIA's website.

[1] Statistics Canada, Census of Agriculture, 2011. Land in crops includes corn, grains, soybeans, vegetables.

Methods

A list of programming opportunities available in the Lake Simcoe watershed was developed after interviews with OSCIA staff and OMAFRA specialists.

Table 4: List of Cost-share Programs Reviewed in this Report.

Program Name	Acronym	Timeframe	Report Status
Canada-Ontario Farm Stewardship Program	COFSP	2004-2013	Included in report
Canada-Ontario Water Supply Expansion Program	COWSEP	2005-2013	Included in report
Greencover Canada	GC	2004-2013	Included in report
Greenbelt Green Energy Program for Agriculture	GGEPA	2004-2008	Included in report
Oak Ridges Moraine Environmental Enhancement Program	ORMEEP	2004-2008	Included in report
Greenbelt Farm Stewardship Program	GFSP	2005-2008	Included in report
Species at Risk Farm Incentive Program	SARFIP	2008-Present	Included in report
Ontario Drinking Water Stewardship Program	ODWSP	2008-2013	Included in report
Lake Simcoe Farm Stewardship Initiative	LSFSI	2008-2009	Included in report
Lake Simcoe Farm Stewardship Program	LSFSP	2009-2012	Included in report
Nutrient Management Assistance Program	NMAP	N/A	*Not included*
Grassland Habitat Farm Incentive Program	GHFIP	2012-2014	Included in report
Growing Forward 2	GF2	2013-present	Included in report
Water's Edge Transformation Program	WET	2014-2015	Included in report
Species at Risk Partnerships on Agricultural Lands	SARPAL	2016-Present	Included in report
Soil Health Improvement Program	SHIP	2016-2017	*No uptake in LSW*
Lake Simcoe Soil Health Improvement Project	LS-SHIP	2017-2018	Included in report

Although the Soil Health Improvement Program (SHIP) was available to the Lake Simcoe watershed in 2016-2017, there was no uptake from the Lake Simcoe watershed. The Nutrient Management Assistance Program (NMAP) was not included due to time constraints in acquiring the data before completion of this report. It is not known how many projects were completed in the Lake Simcoe watershed under this program.

Data Sources

Internal

There are two different databases that store separate years of project data at OSCIA. Data was readily obtained from programs administered after 2013 (GF2, SARFIP, LS-SHIP, and SARPAL). However, the data collected for programs administered prior to 2013 is stored in a different database. To generate reports, the data fields must be queried, but it was not initially known what data fields were collected, or how they were named. A technical specifications document provided by OMAFRA staff contained the name of data fields used in these past programs, and the report was able to be generated at a later date. Copies of program brochures and select application forms were also collected and reviewed.

External

It was decided that agricultural census data in Lake Simcoe watershed would be relevant to the analysis for comparison. Although a request was made for the 2016 census, the timeframe to complete custom reports can be lengthy. It was not provided before the completion of this report, and as of February 12, 2018, it is still not available. Select data from the 1991 to 2011 census was obtained.

Data Verification

Watershed

The datasets were filtered to isolate projects located in the Lake Simcoe watershed. It was discovered that 19 projects outside the watershed's boundary were supported under the LSFSP and LSFSI. After discussions with ministry specialists, it was determined that parcels of farmland along the boundary of the watershed were considered eligible under these programs. As well, there were a few cases where projects (completed in Nottawasaga, Kawartha Lakes, Toronto) were supported under these programs because the projects were deemed to be within an "airshed" of influence for the Lake Simcoe watershed. It is also possible that some of these projects were completed within the boundary of the Lake Simcoe watershed, but that the farm business location may have been assigned to the project location on the paper application form. Therefore, the dataset was filtered to first isolate projects in the Lake Simcoe watershed, and the remaining dataset was filtered to isolate projects that were funded in LSFSP/LSFSI.

Datasets for all Lake Simcoe projects were collated into one spreadsheet.

Project Status

There are 22 unique project statuses. The data was filtered to exclude statuses that were not required or applicable to the analysis (declined, withdrawn, etc.). Where possible[2], only complete milestones were used (Table 5).

Table 5: List of Project Statuses.

Project Milestone	Complete
1000 - Initialized in DIRT	No
1100 - Application Deemed Incomplete	No
1200 - Application Deemed Complete	No
1300 - Declined - Incomplete	No
1325 – Withdrawn / Withdrawn – After Approval	No
1350 - Declined - Not Eligible	No
1375 - Declined - Low Score	No
1400 - Partial Approval	Yes
1450 - Conditional Approval	Yes
1550 - Application Approved	Yes
2000 - Claim Entered	Yes
2100 - Claim Deemed Incomplete	Yes
2200 - Claim Deemed Complete	Yes
2350 - Claim Declined	No
2550 - Claim Approved for Payment	Yes
2700 - Cheque Printed	Yes
2800 - Cheque Mailed	Yes
2900 - Cheque Reconciled	Yes

[2] Approved project statuses for the 2017-2018 program year were included in the analysis

2400 - Claim Ready for Project Adjustment	Yes
2600 - Claim Ready for Cheque Reissue	Yes

Duplication

Each project is assigned an application number. Duplicate records were identified by conditionally formatting the dataset to identify duplicate application numbers. Duplication of records occurred in two cases: projects that received funding from more than one source, or projects that funded more than one BMP category on a single project application. These records were merged to prevent duplication of project numbers and project measures in grouped analyses (e.g. acres).

Example: Duplication caused by multiple funding source.

Fund	FundName	ApplicationID	BMP Category	Project Cost	Cost Share	Acres
COFSP	Canada-Ontario Farm Stewardship Program	PY1-34511	Cover crops	$1,500.00	$800.00	35
GFSP	Greenbelt Farm Stewardship Program	PY1-34511	Cover crops	$1,500.00	$575.00	35

Solution: Merging single project to one record.

Fund	FundName	ApplicationID	BMP Category	Project Cost	Cost Share	Acres
COFSP GFSP	Canada-Ontario Farm Stewardship Program Greenbelt Farm Stewardship Program	PY1-34511	Cover crops	$1,500.00	$1,375.00	35

Number of Projects

Final reports for the Lake Simcoe Agricultural Stewardship Program (LSASP) and the Lake Simcoe Farm Stewardship Program (LSFSP) were reviewed to verify that the number of projects in the dataset matched what had been reported by OSCIA. These numbers were consistent. However, annual reports for the other programs administered through partnership with the OFA (COFSP, etc.) were not available as OSCIA did not fulfil final reporting obligations for these programs. Although the number of projects could not be verified with those annual reports, the integrity of the database provides excellent confidence in the data to move forwards.

Subwatersheds

Subwatersheds (tertiary) were not collected or entered with the project application form, these were manually added to the spreadsheet using ArcGIS. The provided lot, concession and/or GPS coordinates were used to identify the tertiary subwatershed information. For projects that did not provide lot, concession, or GPS coordinates, the tertiary subwatershed was identified by searching for the project address in AgMaps.

Reclassification

Adjustments were made to the naming of soil types. For example, 'muck' or 'org muck' was renamed to 'organic (muck)'.

BMP Categories

With each new year, and each new program, over 100 individual environmental and non-environmental BMP categories have been funded. Over time, these activities have been amalgamated into a smaller number of general project categories. Reclassification of BMP names was done to ensure consistency in the analysis phase. In situations where category names differed between frameworks, the name used in the GF2 framework was assumed. Note that some of the eligibility requirements between BMPs changed over time, and this was not factored into the analysis.

Table 6: Reclassified BMP Categories.

Original BMP Category	Reclassified BMP Category
Actions for biodiversity	Habitat Protection
Alternate Livestock Watering Systems	Habitat Protection
Animal health/plant pest monitoring and treatment equipment	Animal and plant health
Biodiversity Enhancement Planning	Planning
Business and Strategic Plans	Planning
Cleaning and disinfection	Animal and plant health
Cleaning and disinfection to prevent introduction and spread of diseases and pests	Animal and plant health
Construction of handling and storage facilities for mortality management	Animal and plant health
Cost of Production Assessment	Business and leadership development
Courses (in-class)	Skills development and training
Courses (on-line)	Skills development and training
Cover Crops	Cover crops
Cross-Fencing for Rotational Grazing	Habitat Protection
Develop market strategies	Market development
Develop value-added agri-food and agricultural products	Market development
Energy Conservation Measures for Agricultural Purposes	Energy Conservation
Enhancing Wildlife Habitat and Biodiversity	Habitat Protection
Enterprise Resource Planning	Planning
Equipment Customization	Improved Cropping Systems
Erosion Control Structures	Erosion Control
Establishing quarantine/isolation or segregation facilities	Animal and plant health
Farm business planning	Planning
Farm Energy Audits	Energy Conservation

Original BMP Category	Reclassified BMP Category
Farm Financial Assessment	Planning
Farm financial assessment or cost of production assessment	Planning
Farm Water Treatment Equipment for Agricultural Use	Water treatment
Farmyard and Horticultural Facilities Runoff Control	Runoff control
Fencing to Exclude Livestock from Sensitive Areas	Habitat Protection
Food safety skills development and training	Assurance systems
Fuel storage improvements	Storage of agricultural products
Habitat Development	Habitat Protection
Habitat Protection in Livestock Systems	Habitat Protection
Implement soil amendment (compost, compost tea, manure) practices and procedures	Animal and plant health
Implementation of a traceability system, including recall capabilities	Assurance systems
Improved Cropping Systems	Improved Cropping Systems
Improved Manure Storage and Handling	Manure Storage
Improved Pest Management (IPM)	Integrated Pest Management
Improvements to animal handling procedures and practices	Animal and plant health
Improvements to animal housing and handling facilities	Animal and plant health
In Barn Improvements for Water Efficiency	In-barn water efficiency
Incorporating delayed grazing into rotational grazing systems	Habitat Protection
Install technology and/or equipment to increase automation	Labour enhancement
Invasive Alien Plant Species Control	Habitat Protection
Irrigation Management	Irrigation water efficiency
Irrigation water efficiency improvements	Irrigation water efficiency
Land application of manure	Land application of manure
Land Management for Soils at Risk	Habitat Protection
Livestock facilities runoff control	Runoff control
Livestock Mortality Management	Animal and plant health
Manage food safety risks	Assurance systems
Manure Land Application	Land application of manure
Manure storage improvements	Manure storage
Manure Treatment	Manure treatment
Manure Treatment (composting)	Manure composting

Original BMP Category	Reclassified BMP Category
Mentoring/Coaching Services	Skills development and training
Native Tree Planting	Habitat Protection
New Water Wells for Agricultural Purposes	Water well management
Nutrient recovery from wastewater	Nutrient recovery from wastewater
Nutrient Testing	Planning
On-site Training	Skills development and training
Other Training	Skills development and training
Planning	Planning
Ponds for Agricultural Water Supply Management	Water storage for agricultural use
Precision Agriculture	Global Positioning System
Global Positioning Systems	Global Positioning System
Preventing access from wildlife, pests and rodents	Preventing wildlife damage
Preventing Wildlife Damage	Preventing wildlife damage
Product and Waste Management	Composting agricultural waste
Reducing greenhouse gas emissions from indoor agriculture facilities	Reducing GHG from indoor agriculture facilities
Reducing greenhouse gas emissions through on-farm energy efficiency and energy conservation measures	Energy Conservation
Relocation of Livestock Confinement and Horticultural Facilities from Riparian Areas	Habitat Protection
Renewable Energy Production for Agricultural Purposes	Energy Conservation
Resource Planning	Planning
Septic Systems	Septic systems
Shelterbelt and Native Vegetation Establishment	Habitat Protection
Skills development and training	Skills development and training
Spring and Sand Point Development for Agricultural Purposes	Water storage for agricultural use
Succession Plan	Planning
Traffic flow management	Animal and plant health
Upland and Riparian Area Habitat Management	Habitat Protection
Water Supply Expansion Planning	Planning
Water Supply to Farm for Agricultural Use	Water storage for agricultural use
Water Well Management	Water well management
Weather risk mitigation	Weather risk mitigation
Wintering Site Pasture Management	Habitat Protection
Workshops/Seminars	Skills development and training

Data Fields

The depth of which the analysis could be completed was limited by the available dataset. This is more apparent for projects completed prior to 2013, when the information collected on application forms was less detailed. As well, each program, and in some cases, different years within the same program, collected information differently. This increased the amount of work needed to reclassify and prepare the dataset. Another point to mention is data confidence. Applicants were able to receive assistance in completing applications prior to 2013. Since then, applicants must fill out the paperwork themselves.

The following example shows how two similar BMP projects can provide varied levels of detail due to different program rules, data entry procedures and the applicant's willingness to be thorough. As shown, the project funded under COFSP does not provide the type of tillage implement and/or components funded. This limitation prevented an analysis of the type of costs. In addition, the COFSP did not collect project impact information, so the impact of these BMPs in terms of acres cannot be accurately measured.

Program	**COFSP**	**LS-SHIP**
Project Type	Improved Cropping System	Equipment Customization
Description	Address tillage through equipment upgrade	1350 No-till drill planter
Cost	$ 8,000.00	$ 15,450.00
Acres impacted	*Null* (not mandatory)	205

While *GF2* required that the applicant submit a Final Report Survey, this information was forwarded on to OMAFRA for analysis. Therefore, it was not available to OSCIA to link the impact information directly with the farm business information for further analysis. More recently, OSCIA programs have started to collect more extensive data alongside standard project information, including survey results, project impact information, and detailed cost descriptions.

A list of the data fields available to this analysis project is shown in Table 7. Note that several of these data fields were not considered mandatory (e.g. supplemental project data, etc.), and therefore not all of them have been included in the analysis due to low sample sizes. As well, information regarding the number and type of livestock, or the number and type of acreage (e.g. rented, owned, irrigated, etc.) was collected on the enrolment form. This information is collected as the first stage of participation in cost-share programming and is not typically updated, even if an applicant completes subsequent projects in later years.

Proposed project start and end dates were collected on the application form. But the actual start and completion dates were not collected on the claim form for projects completed prior to 2012. Therefore, it was decided to rely on the registered fiscal year date to determine the year the project was actually completed in order to be consistent across all years.

Between 2004-2012, limited EFP data was submitted with the project application form for cost-share programs that were associated with the EFP. Therefore, not all the projects in the database have this information attached.

Producer investment is identified as ProjectCosts. Funding contributions for each program are listed separately (e.g. GFF-COFSP and GFF-GGEPA because a single project could receive multiple sources of cost-share) but are combined in the PaidCostShare field.

Table 7: Data fields available to the analysis.

FileNumber	APF-GFSP	PrimaryCommodityGroup
ApplicationID	GFF-GGEPA	SecondaryCommodityGroup
FrameworkAcronym	GFF-ODWSP	LivestockQuantity_Beef
FrameworkName	APF-ODWSP	LivestockQuantity_Dairy
FundAcronym	APF-ORMEEP	LivestockQuantity_Hogs
FundName	SARFIP	LivestockQuantity_Poultry
EFP Number	GF2	LivestockQuantity_Sheep
BMPCode	LS-SHIP	LivestockQuantity_Other
BMPDescription	PaidCostShare	OtherLivestockDescription
ProjectType	Watershed	IrrigatedAcreage
DateRegisteredByHeadOffice	TertiaryWatershedName	LegalAcreage Owned CropPasture
Fiscal Year	QuaternaryWatershedID	LegalAcreage Owned NonCropNonPasture
Status	QuaternaryName	LegalAcreage RentedLeased CropPastureOther
Farm Name	County	Township
Mailing Address	Municipality	Concession
City	EFPAreaOfConcern	Lot
Province	EFPAction	DistanceToSurfaceWater
Postal Code	ImplementationDetails	HasSitePlan
Phone	EFPWorksheetNumber	IsBuildingPermitRequired
ProjectCosts	Worksheet	HasDimensions
GFF-COFSP	EFPQuestionNumber	DimensionLength
APF-GC	SoilType	DimensionWidth
APF-COFSP	SoilDescription	DimensionHeight
GFF-LSFSP	IsWithin30MOfWater	HasTechnicalAdvisor
GFF-LSFSP-F	GPSNorth	ODWSPTitle
GFF-LSFSP-S	GPSWest	BMPSupplementalDataOption
GFF-LSFSP-P	PremisesId	BMPSupplementalDataAmount
APF-LSASP	ScopeStartDate	EFPRiskRating
APF-COWSEP	ScopeCompleteDate	Worksheet Number

Number of Farms

Since 2013, each enrolled farm business is assigned a unique OperationID. Prior to this, a different numbering system was exercised. This introduced challenges in comparing the total number of unique farm businesses across both systems. Other metrics were examined including LegalBusinessName, and FBRN (where available) to determine uniqueness.

Thoughts on Comparative Analysis

In determining what regions to compare Lake Simcoe projects to, the decision was ultimately centered around participation trends. This decision was influenced primarily by the low uptake seen

in the Lake Simcoe Soil Health Improvement Project (LS-SHIP). While most of the BMP activities covered in the report include a comparison to other watersheds, there was interest in completing a more in-depth assessment between Lake Simcoe and other region(s).

However, there are many factors beyond the scope of this report that have influenced the number and type of projects completed. Other stewardship programming completed by local Conservation Authorities (CAs) is not factored into this analysis, but it has certainly played a strong role in BMP adoption on the farm landscape. Other factors include regulatory demands, market pressures, efficiency, and interest expressed by individual agricultural sectors. In terms of cost-share participation, more projects have been completed in the Grand River watershed (southern Ontario's largest watershed) than in any other watershed. This makes sense based on the size and scale of agriculture in the Grand River watershed. Grand River watershed was selected due to the availability of data for this report.

There was also interest in comparing participation trends in the Lake Simcoe watershed to that of the Nottawasaga watershed. Although the Soil Health Improvement Program (SHIP) was available to farmers in Nottawasaga and Lake Simcoe alike, all of the projects were completed in Nottawasaga. There was no participation from farmers in the Lake Simcoe watershed in this program. However, due to a small sample size in SHIP (less than 15 projects), the analysis was not included in this report.

A final note on comparative analysis using cost-share data. Every region, whether it is a watershed, or a county, or a township, is unique and is influenced by its own set of socioeconomic and farm business characteristics. As well, there have been a plethora of changes in programming over the years, including eligibility criteria that may or may not have impacted different geographies (i.e. priority areas). Comparisons can be helpful, but one needs to keep in mind the many variables impacting and driving cost-share participation spatially.

5. Cost-Share Programs

Cost-share opportunities are designed to encourage the adoption of BMPs to reduce environmental risks. Programs come in many shapes and sizes, and for many years, OSCIA's program delivery approach has followed the conventional first-come, first-served approach. Additionally, some programs were designed as "top-up" initiatives, where participants could access up to 75 percent cost-share utilizing a single project application form. As a result, a single project could receive funding from multiple funding sources (e.g. a provincial and a federal contribution).

With an increasing demand for cost-share programs and a need to measure the impact of funded stewardship activities, a targeted, merit-based approach has evolved in recent years, which prioritizes projects that demonstrate the greatest environmental impact. Due to the competitive nature of these programs, the administrative support offered in the past to help farmers complete paperwork is no longer provided in the same manner. Applicants must complete application forms themselves. Additionally, funding has been re-directed away from activities that are deemed standard practice (i.e. GPS). It is important to consider how changes in program structure may have impacted participation levels.

Table 8: Cost-share Programs Summary.

Program Name	Acronym	Availability
Canada-Ontario Farm Stewardship Program	COFSP	2004-2013
Canada-Ontario Water Supply Expansion Program	COWSEP	2004-2013
Greencover Canada	GC	2004-2013
Greenbelt Green Energy Program for Agriculture	GGEPA	2004-2008
Oak Ridges Moraine Environmental Enhancement Program	ORMEEP	2004-2008
Greenbelt Farm Stewardship Program	GFSP	2005-2008
Species at Risk Farm Incentive Program	SARFIP	2008-Present
Ontario Drinking Water Stewardship Program	ODWSP	2008-2013
Lake Simcoe Agricultural Stewardship Program	LSAP	2008-2009
Lake Simcoe Farm Stewardship Program	LSFSP	2009-2012
Growing Forward 2	*GF2*	2013-present
Water's Edge Transformation Program	WET	2014-2015
Species at Risk Partnerships on Agricultural Lands	SARPAL	2016-Present
Lake Simcoe Soil Health Improvement Project	LS-SHIP	2017-2018

Canada-Ontario Farm Stewardship Program (COFSP)

COFSP was a voluntary cost-share program that encouraged producers to improve management of agricultural land through the adoption of BMPs to reduce the risk of water and air quality, improve soil productivity and enhance wildlife habitat. Cost-share for specific COFSP categories was set at either 30 percent or 50 percent, up to the category caps. All cost-share funds were available on a first-come, first served basis up to the available annual funds for each year of the program. COFSP started under the Agricultural Policy Framework and extended through Growing Forward.

Canada-Ontario Water Supply Expansion Program (COWSEP)

COWSEP was a voluntary cost-share program to improve the capacity of agricultural producers to deal with low water situations through expanded water supplies. The Tier 1 component was delivered by OSCIA and included on-farm infrastructure improvements to address water supply issues. Cost-share categories were set at 33 percent of eligible costs, up to the category caps.

Greencover Canada (GC)

GC was an initiative to help producers improve land management practices, promote sustainable land use, protect water quality, reduce greenhouse gas emissions, enhance biodiversity and wildlife habitat, and expand the land base covered with perennial forage and trees. Elements of GC included: critical area management (i.e. enhancing riparian areas); shelterbelts; and technical assistance. The cost-share for GC BMP categories was set at 50 percent, up to the category caps.

Oak Ridges Moraine Environmental Enhancement Program (ORMEEP)

Through an innovative partnership between Oak Ridges Moraine Foundation, conservation groups, federal and provincial governments and farm organizations; up to 90 percent combined top-up cost-share was available to farmers on the Oak Ridge Moraine to implement BMPs that preserve, protect and restore the environmental integrity of the Oak Ridge Moraine.

EFP

OSCIA has a long history of success in delivering both education and cost-share programming for all agricultural producers across Ontario. OSCIA has been the delivery agent for the renowned Canada-Ontario Environmental Farm Plan (EFP) since its inception in 1992.

The EFP is a voluntary two-day educational workshop that guides producers through a risk assessment and Action Plan preparation process specific to their operation, addressing 23 different areas on farm – from fertilizer storage to woodland and wildlife management. The EFP was a grassroots response to the increasing environmental pressures of the day.

Its successes have been a critical contribution towards addressing acceptable 'normal farm practices' as they related to environmental issues and continues to shape the Ontario farm landscape today.
Having a completed EFP is a requirement for farmers across Ontario to access cost-share through programs delivered by OSCIA. EFP data is not collected by OSCIA; however, limited data was submitted with the project application form for cost-share programs associated with the EFP. More information on the EFP risks can be found on page 30.

Greenbelt Farm Stewardship Program (GFSP)
Through a partnership with the Friends of the Greenbelt Foundation; up to 75 percent combined top-up cost-share was available to farmers living in the Greenbelt to implement 22 of the 36 BMP categories that were funded under the APF.

Species at Risk Farm Incentive Program (SARFIP)
SARFIP is an annual cost-share program supported through funding provided by the Ministry of Natural Resources and Forestry and Environment and Climate Change Canada, that assists with the recovery of species at risk (SAR). SARFIP provides funding to agricultural landowners interested in competing habitat creation, enhancement and protection BMPs that support species at risk. Cost-share funding is available for beneficial practices that directly or indirectly benefit SAR. In the current fiscal year, farm businesses can access up to $20,000 in cumulative SARFIP cost-share.

Ontario Drinking Water Stewardship Program (ODWSP)
ODWSP cost-share was available to farmers for selected environmental projects that were implemented on a parcel of agricultural land that was within, or extended into a wellhead protection area or intake protection zone. Up to 100 percent combined cost-share was available to support three components: early actions within intake and wellhead protection areas, education and outreach, and complementing special projects.

Lake Simcoe Farm Stewardship Program (LSFSP)
LSFSP provided environmental cost-share funding for farmers in LSW to implement best management practices. The program operated from 2008 through 2012, funded in part by both the federal and provincial governments.

Growing Forward 2 (*GF2*)
GF2 is a five-year commitment by Canada's federal, provincial and territorial governments to encourage innovation, competitiveness and market development, adaptability and industry sustainability in Canada's agriculture, agri-food and agri-based bio-products sector. *GF2* built on the successes of Growing Forward and the Agricultural Policy Framework. It is a merit-based program and is intended to drive positive change, supporting only the most impactful projects with funding.

Water's Edge Transformation Program (WET)
WET launched in 2013 and aimed to engage farm businesses in activities aimed at bettering riparian health and water quality across three geographic regions, including Lake Simcoe watershed. The program ran for two years and supported six categories of BMPs: upstream clean water diversion, downslope

management of contaminated runoff, livestock removal from watercourses, riparian naturalization, improved stream crossing for livestock equipment, and structural erosion control projects contributing to riparian condition. WET used the conservation tender model, which identified projects based on the ratio of costs requested to societal benefits gained.

Species at Risk Partnerships on Agricultural Lands (SARPAL)

SARPAL is an Environment and Climate Change Canada initiative that is focused on working with farmers to support the recovery of species at risk on agricultural land. SARPAL funds priority conservation actions currently focused on supporting the Bobolink and the American Badger. The Grassland Stewardship Program is one component of the SARPAL Initiative in Ontario providing funding for the implementation of five BMPs that play a key role in maintaining healthy bobolink and other grassland bird habitat, and can help sustain production and profitability on the farm.

Lake Simcoe Soil Health Improvement Project (LS-SHIP)

Modelled after the Farmland Health Incentive Program (FHIP), LS-SHIP supported Best Management Practices (BMPs) recommended through the Soil Health Check-Up. Farmers had the opportunity to work with a Certified Crop Advisor (CCA) to assess environmental risks of their farms and develop recommendations for improvement.

6. Program Participation

Since the 2004-2005 program year, 1,248 projects have been implemented in the Lake Simcoe watershed[3]. In total, approximately 350 individual farm businesses (20 percent of total farms in the watershed) have participated in OSCIA delivered cost-share programs. The highest participation occurred between 2006-2007 and 2011-2012, where 942 projects were completed, representing 75 percent of total projects completed to-date. This period also saw the most participation from Lake Simcoe farmers with 285 farms participating.

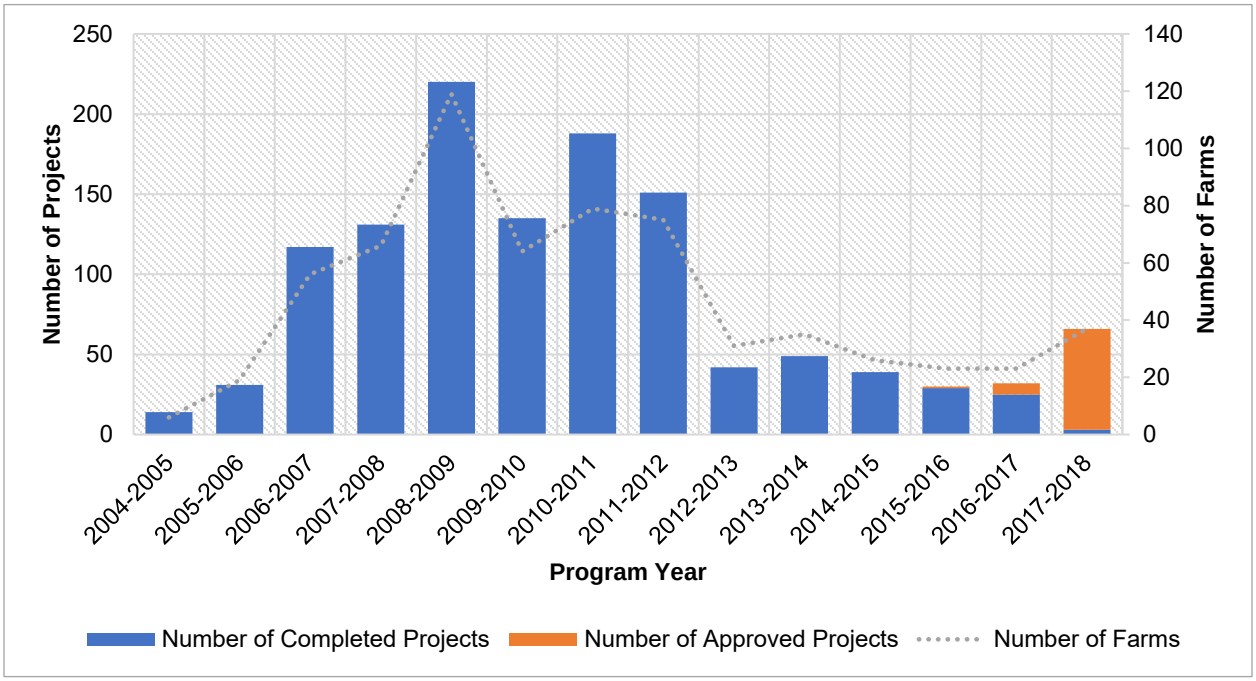

Figure 4: Cost-share participation in the Lake Simcoe Watershed, 2004-2005 to 2017-2018.[4]

Participation has varied over time, but the trends often correlate with changes in programming. For example, the greatest number of projects were completed in the 2008-2009 fiscal year, corresponding to the availability of the Lake Simcoe Agricultural Stewardship Program (LSASP) and the Lake Simcoe Farm Stewardship Program (LSFSP). These programs were specifically targeted to the watershed and offered significantly enhanced cost-share levels compared to what COFSP offered alone. The application procedure was very straight forward and OSCIA program representatives were readily available to assist.

With the introduction of *Growing Forward 2* (*GF2*) in 2013, participation declined, and it did not increase until the final year of *GF2* when many participants once again had grown comfortable with the application procedures[5]. The targeted Lake Simcoe Soil Health Improvement Project (LS-SHIP) that was delivered in 2017, had negligible participation from farmers in the watershed. This report will provide information that will inform an analysis of why this occurred.

[3] As of December 1, 2017, approximately 1,177 of the 1,248 approved projects (94.3 percent of total LSW cost-share projects administered through OSCIA) have been completed, with the remaining 71 projects still yet to claim.
[4] 2017-2018 data included approved, but not yet completed (claimed) projects
[5] There was strong interest from Lake Simcoe farmers in the *Reducing greenhouse gas emissions through on-farm energy efficiency and energy conservation measures BMP* introduced in the final year of *GF2.*

Primary Commodity

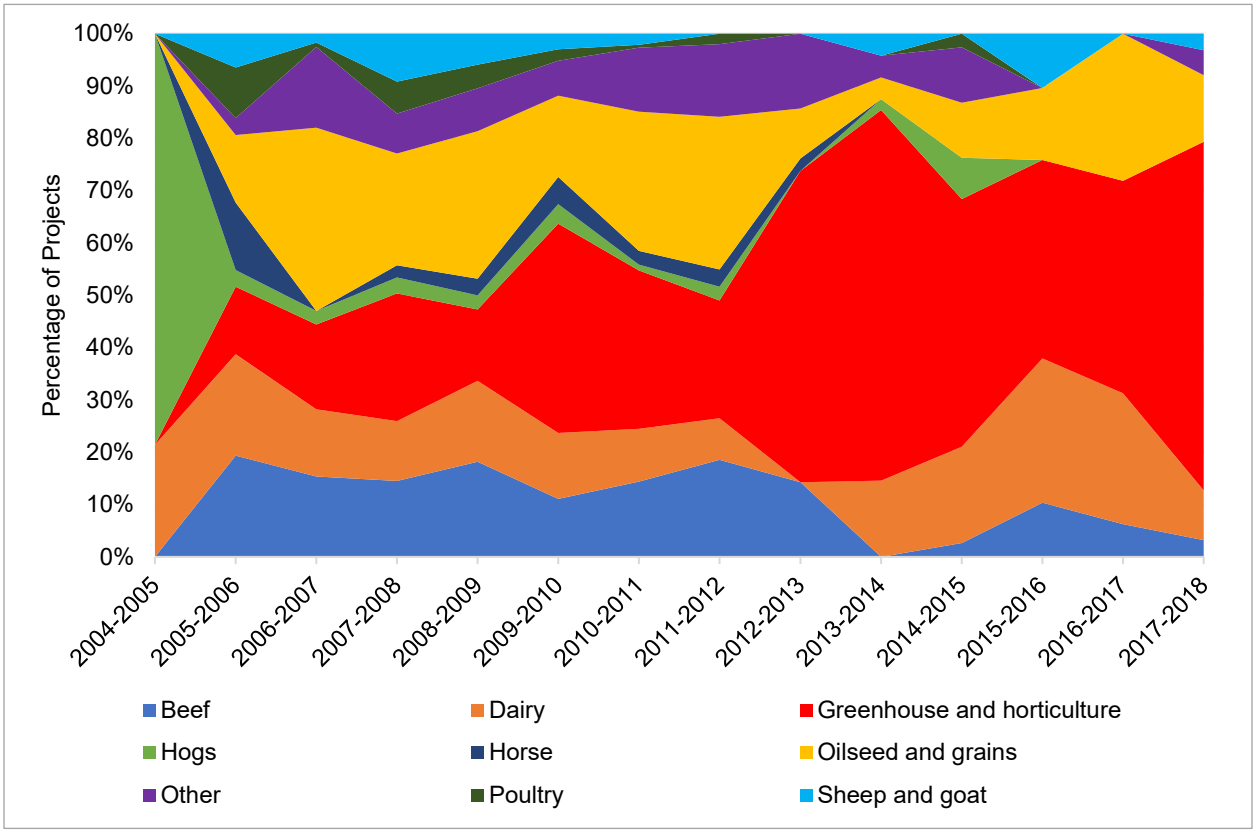

Figure 5: Program Participation by Primary Commodity in the Lake Simcoe Watershed.[6]

Note the higher participation from livestock groups in earlier years, while in the last five years, horticulture and greenhouse operations have completed more projects (Figure 5). From 2013-2018, the majority of farms classified as greenhouse and horticulture included vegetable and melon producers. While participation from livestock groups declined, particularly beef farms, there was an increase in projects completed by dairy farms after 2015. Oilseed and grain participation has also fluctuated. Overall, the greatest participation has been driven by horticulture and greenhouses, specifically vegetable and melon producers. Although it is clear there have been changes with regards to commodity participation, it is unclear what factors may be driving this change. Decisions may have been influenced by farm profitability, consumer demands, regulatory requirements, or even a growing awareness amongst some sectors on environmental issues combined with a willingness to engage in environmental education and cost share programs.

[6] The following commodity groups are not included in Figure 5: fruit and tree nut (2 projects), and fruit and vegetable preserving/processing (3 projects). The *GF2* commodity categories vegetable and melon, and greenhouse, nursery, and floriculture are shown under 'greenhouse and horticulture' to correspond with categories from previous policy frameworks. 2017-2018 data includes approved but not yet completed projects.

Acres

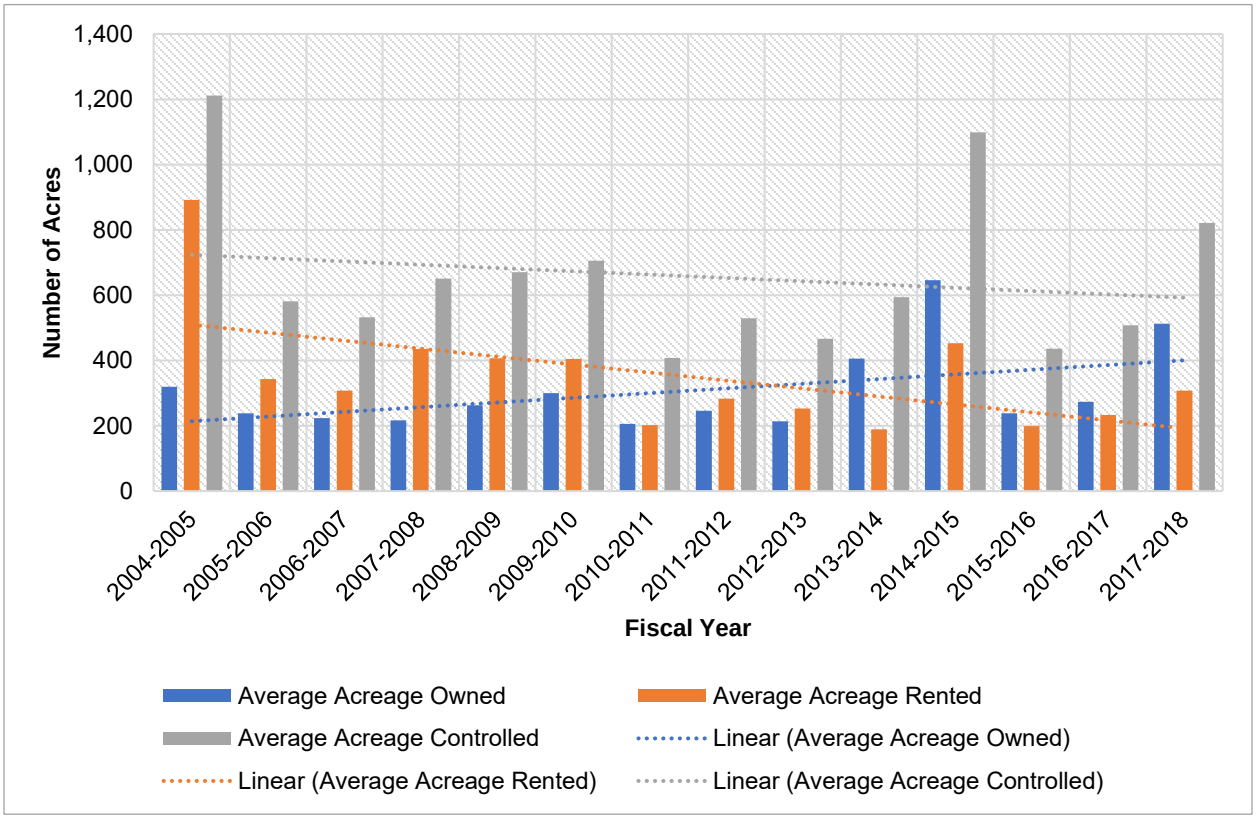

Figure 6: Average Acreage Owned, Rented, and Controlled by Participating LSW Farms.[7]

Over all years, the average total acreage owned by participating producers was 307 acres. While the average acreage controlled (all land owned and rented) was 658 acres. We can also compare the average acreage owned with average acreage rented. As shown in Figure 6, the average acreage owned increased whereas the average rented acreage decreased. As rented land represents a larger proportion of land controlled, average acreage controlled (or total farm size) also decreased. Cost-share participation has been driven by farms over 200 acres in size. As shown in Figure 7, farms between 226 to 397 acres (91.1 and 161.8 hectares) in size have demonstrated higher participation in cost-share programs. Note the low participation amongst farms with less than 179 acres (72.8 hectares) in size.

There has also been a significant increase in irrigated acreage as shown in Figure 8. This is attributed to the higher participation from vegetable and melon producers. Over this time, the average number of irrigated acres per LSW participating farm has increased 13 times, from 25 acres of irrigated land per farm, to 320 acres of irrigated land per farm.

[7] Average farm size of LSW participants, as measured by average: acreage owned (both crop pasture and non-crop pasture), rented acreage, and controlled acreage (rented and owned), 2004-2005 to 2017-2018. 2017-2018 data includes approved but not yet completed projects.

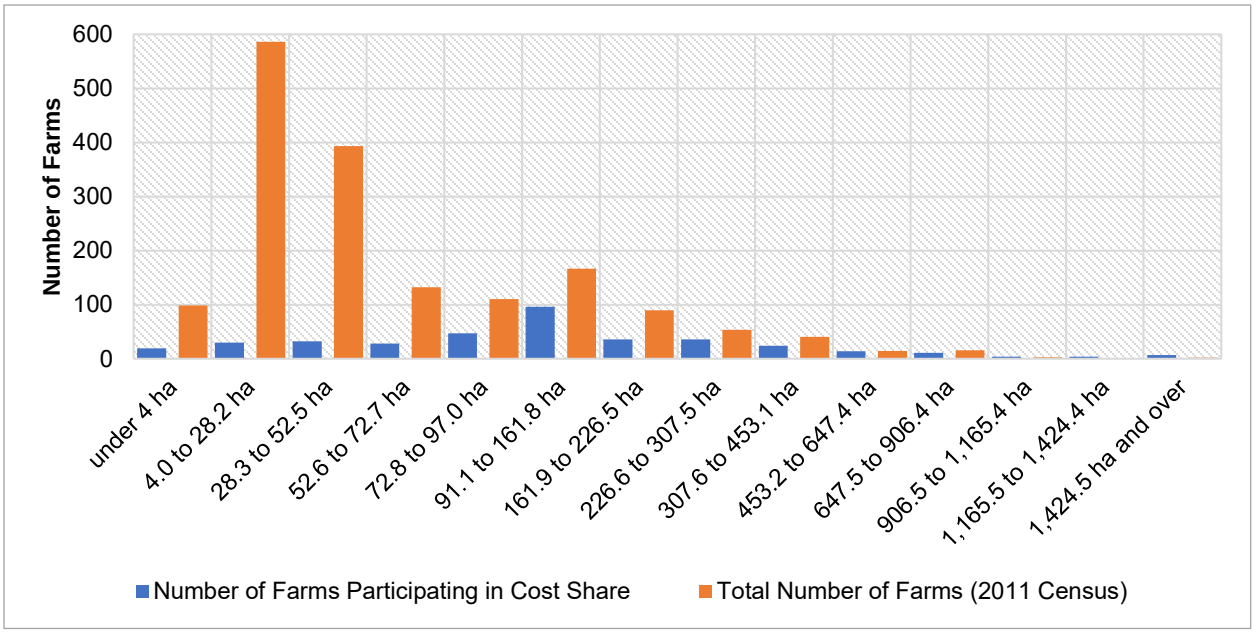

Figure 7: Total Farm Area Distribution in Lake Simcoe Watershed.[8]

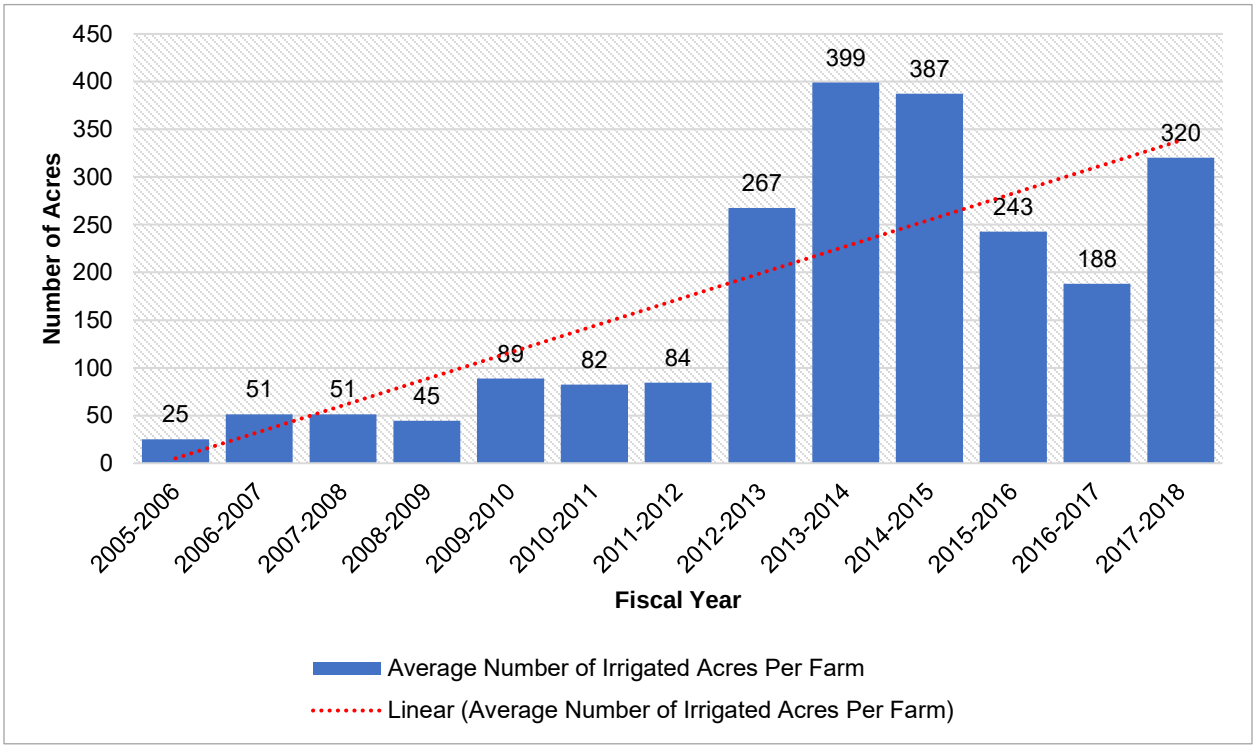

Figure 8: Average Number of Irrigated Acres reported by participating LSW farms.[9]

[8] Source: Statistics Canada, Census of Agriculture, 2011. 2017-2018 cost-share data includes approved but not yet completed projects. Note the higher participation from farms between 91 – 161 hectares, while participation from farms less than 72 hectares is lower.

[9] 2017-2018 data includes approved but not yet completed projects. The average number of participating irrigated acreage in cost-share programming has more than quadrupled over the last 10 years in LSW.

Livestock Nutrient Units

Livestock nutrient units (NU) were calculated for all livestock reported by participating operations using the process presented in the Environmental Farm Plan Workbook, 4th Edition, Worksheet 17[10]. Total NU varied dramatically year to year, with a maximum of 22,980 in 2010-2011 and a minimum of 484 in 2003-2004 (Figure 9). Note that total NU remains low in later years of GF2 despite increases in participation, reflecting shifting commodity participation. Average NU per functional acreage (that is, cropping acreage as reflected in participating farms) also varied considerably, ranging from 0.05 in 2017-2018 to 1.21 in 2005-2006 (Figure 9).

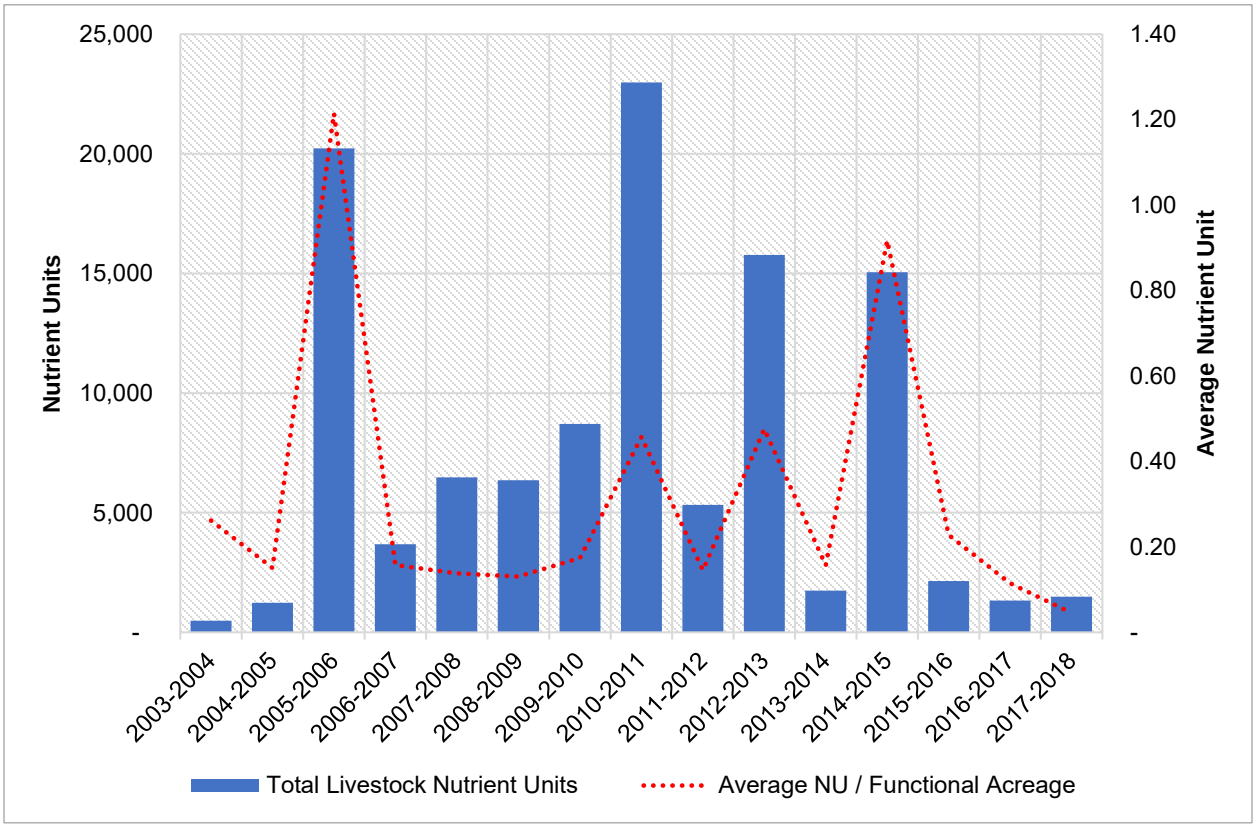

Figure 9: LSW Participants: Livestock Nutrient Units of Participating Farms.

[10] Livestock Nutrient Units were calculated using the process presented in the Environmental Farm Plan Workbook, 4th Edition, 2013 - Worksheet 17. The following assumptions and calculations were used: Beef cattle were assumed to be 50% beef cows (including unweaned calf and replacements; divide number of livestock by 1.0) and 50% beef feeders (575-1250 lbs.; divide number of livestock by 3). Dairy cattle were assumed to be medium-frame dairy cows (100-1200 lbs., milking or dry, such as Guernseys; divide number of livestock by 0.85). Hogs were assumed to be farrow-wean sows (lactating-aged sows, includes weaners to 60 lbs; divide number of livestock by 2.25). Poultry was assumed to be laying hens (after 2.9 lbs. pullet stage, until end of laying period at about 3.75 lbs.; divide number of livestock by 150). Sheep were assumed to be milking-aged ewes (for milk production, includes lambs, replacements, and rams; divide number of livestock by 6).

Geography

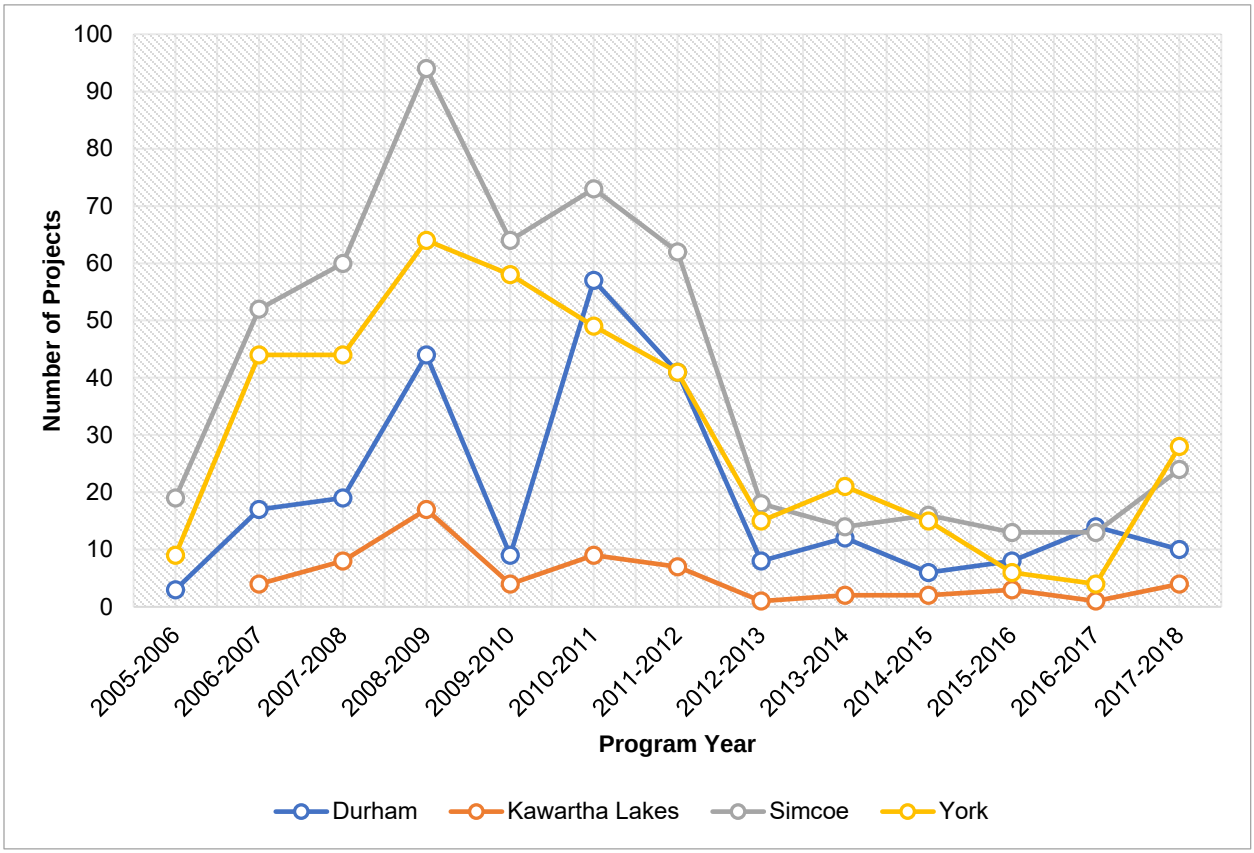

Figure 10: Number of Projects by County, 2005-2006 to 2017-2018.[11]

Over this time, Simcoe county has seen the most projects completed (42 percent), followed by York (32 percent), Durham (20 percent), and Kawartha Lakes (5 percent). The relative areas represented by each county can be seen in Figure 1. In 2017, there was an increase in participation from farms in York (Figure 10). The municipalities and counties that have demonstrated the highest participation, also have the greatest density by number of farms (Figure 11).

[11] 2017-2018 data includes approved but not yet completed projects. Note the increase in York in 2017-2018.

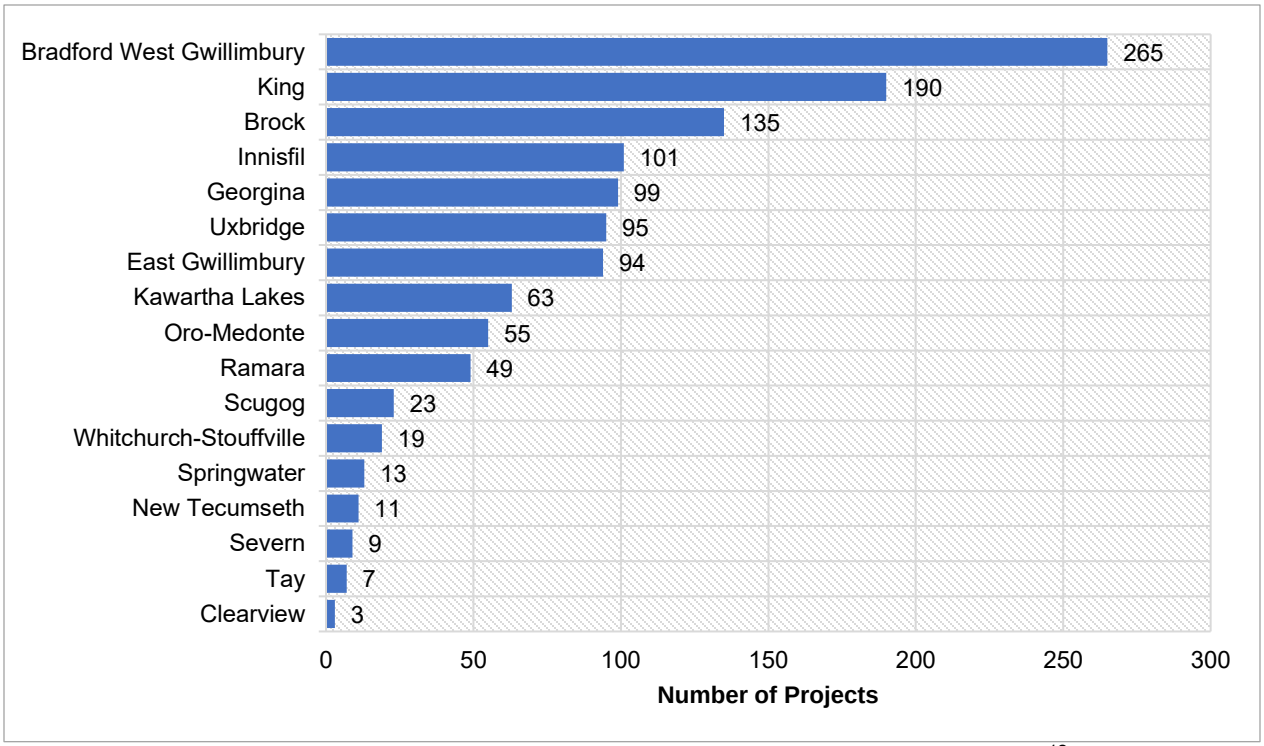

Figure 11: Number of Projects Completed by Municipality, 2004-2005 to 2017-2018.[12]

[12] Newmarket (1 project), Orillia (1 project), Adjala-Tosorontio (1 project), Barrie (2 projects), Clarington (2 projects), Essa (2 projects), and Tiny (2 projects) are not shown in Figure 11.

7. Environmental Farm Plan

One of the first voluntary approaches initiated to help agricultural producers reduce the impact of production was the Environmental Farm Plan (EFP). The EFP workbook consists of 23 risk assessment modules relating to farm activities in three general areas: the farmstead, farming practices and natural areas. OSCIA does not collect EFP data, but between 2004 and 2012, limited EFP data was submitted with the project application form for cost-share programs associated with the EFP. These worksheets can reveal what risk areas prompted action. Figure 12 compares the EFP risk areas for projects implemented in LSW with that of Ontario.

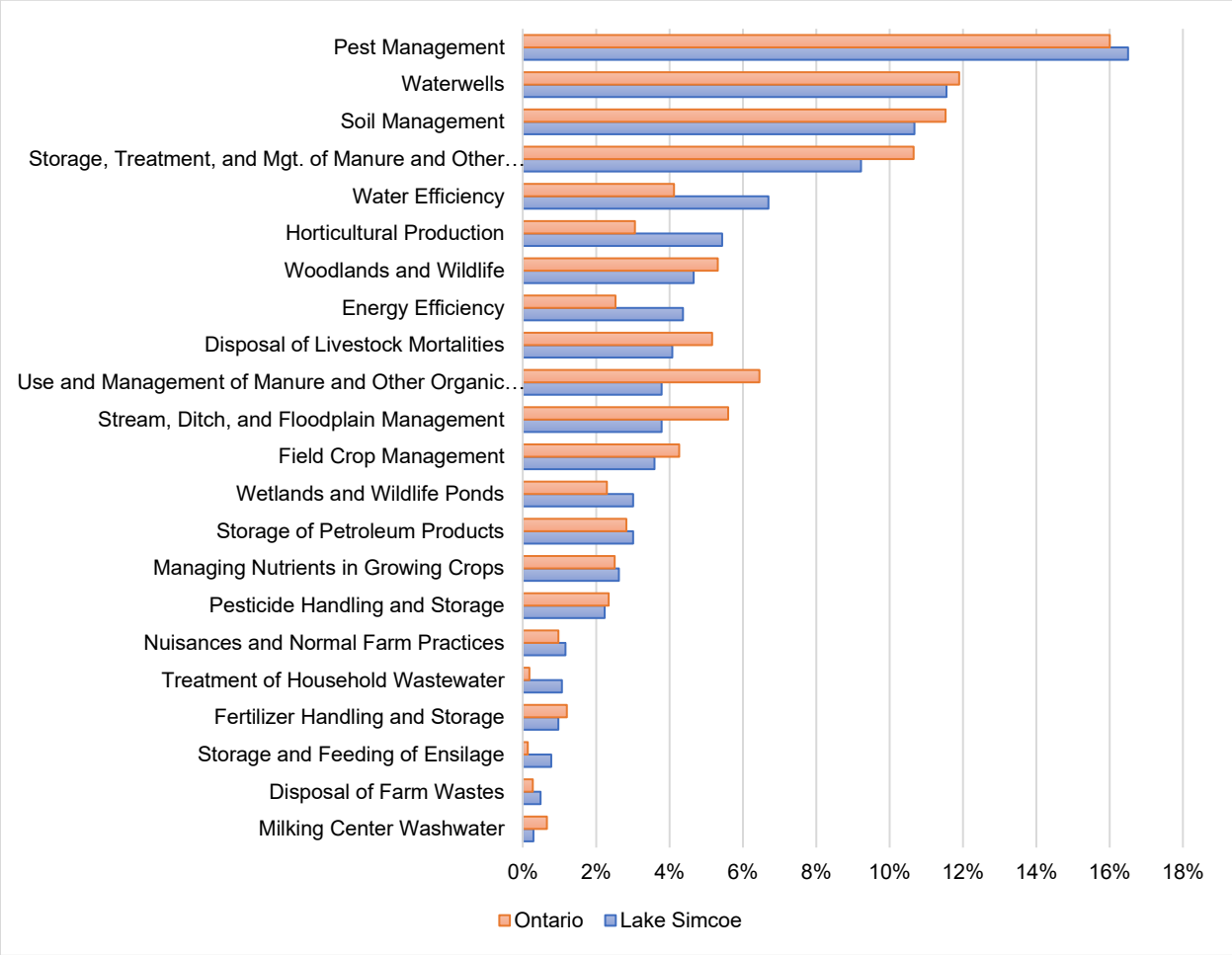

Figure 12: Environmental Farm Plan (EFP) Worksheets, 2004-2005 to 2011-2012[13]

When compared to Ontario, the EFP risk areas in LSW were mostly similar, but with some noticeable differences. There was a greater percentage of projects completed in LSW that addressed Pest Management (Worksheet #20), Water Efficiency (#13), Horticultural Production (#18), and Energy Efficiency (#14) concerns. These risks areas influenced the number and type of projects completed as shown in Table 9.

[13] Approximately 80 percent of total projects completed in LSW between 2004-2012 provided EFP worksheet data. Over this same period, approximately 22,000 projects in Ontario also provided EFP worksheet data. The fourth heading reads, “On-Farm Storage, Treatment, and Management of Manure and Other Prescribed Materials

8. Best Management Practices (BMPs)

Table 9: Total LSW Projects ranked by Number of Projects, 2004-2005 to 2017-2018[14]

Project Type	Total Number of Projects	Total Project Costs	Total Cost Share
Habitat protection and enhancement	125	$ 978,709	$ 520,062
Planning	118	$ 644,339	$ 313,758
Water well management	106	$ 667,139	$ 275,216
Integrated pest management	94	$ 662,102	$ 424,748
Global positioning system (GPS)	93	$ 2,103,931	$ 1,219,931
Improved cropping systems (i.e. No-till)	90	$ 2,415,555	$ 1,152,330
Runoff control	77	$ 1,256,708	$ 756,531
Storage of agricultural products	61	$ 1,096,292	$ 404,450
Energy conservation	57	$ 1,551,593	$ 390,624
Irrigation water efficiency	55	$ 1,618,987	$ 819,832
Cover crops	47	$ 207,326	$ 91,916
Manure storage improvements	47	$ 3,763,830	$ 1,793,916
Animal and plant health	38	$ 1,706,239	$ 588,114
Nutrient recovery from wastewater	32	$ 2,114,800	$ 701,866
Composting agriculture waste	24	$ 1,287,084	$ 719,290
Preventing wildlife damage	20	$ 150,189	$ 96,484
Storage of agricultural waste	20	$ 779,219	$ 469,195
Land application of manure	19	$ 342,891	$ 132,452
Erosion control structures	17	$ 272,531	$ 175,918
Water storage for agricultural use	17	$ 263,963	$ 116,865
Water treatment	14	$ 71,442	$ 44,905
Assurance systems - animal welfare	12	$ 800,924	$ 231,991
Skills development and training	12	$ 10,541	$ 5,024
Manure composting	11	$ 393,232	$ 148,186
In-barn water efficiency	10	$ 31,538	$ 13,298
Assurance systems - food safety	7	$ 354,101	$ 124,667
Labour enhancement	5	$ 351,203	$ 118,935
Assurance systems - traceability	4	$ 1,039,739	$ 226,401
Market development	4	$ 165,105	$ 51,239
Business and leadership development	3	$ 8,658	$ 7,154
Septic systems	3	$ 82,143	$ 24,947
Manure treatment	2	$ 37,008	$ 25,376
Reducing greenhouse gas emissions from indoor agriculture facilities	2	$ 749,261	$ 175,000
Weather risk mitigation	2	$ 56,057	$ 22,989
Total	1,248	$ 28,034,377	$ 12,383,610

[14] Costs for each year have been normalized using inflation rates based on the consumer price index (CPI), as provided by the Bank of Canada's Inflation Calculator. 2017-2018 data includes approved but not yet completed projects. In some cases, project type names have been reclassified to align with the current naming structure used in GF2 (as outlined in the Methodology section).

Table 10: Total LSW Projects ranked by Average Project Cost, 2004-2005 to 2017-2018.[15]

Project Type	Total Number of Projects	Average Project Cost Per Project
Reducing greenhouse gas emissions from indoor agriculture facilities	2	$ 374,631
Assurance systems - traceability	4	$ 259,935
Manure storage improvements	47	$ 80,081
Labour enhancement	5	$ 70,241
Assurance systems - animal welfare	12	$ 66,744
Nutrient recovery from wastewater	32	$ 66,087
Composting agriculture waste	24	$ 53,628
Assurance systems - food safety	7	$ 50,586
Animal and plant health	38	$ 44,901
Market development	4	$ 41,276
Storage of agricultural waste	20	$ 38,961
Manure composting	11	$ 35,748
Irrigation water efficiency	55	$ 29,436
Weather risk mitigation	2	$ 28,028
Septic systems	3	$ 27,381
Energy conservation	57	$ 27,221
Improved cropping systems (i.e. No-till)	90	$ 26,840
Global positioning system (GPS)	93	$ 22,623
Manure treatment	2	$ 18,504
Land application of manure	19	$ 18,047
Storage of agricultural products	61	$ 17,972
Runoff control	77	$ 16,321
Erosion control structures	17	$ 16,031
Water storage for agricultural use	17	$ 15,527
Habitat protection and enhancement	125	$ 7,830
Preventing wildlife damage	20	$ 7,509
Integrated pest management	94	$ 7,044
Water well management	106	$ 6,294
Planning	118	$ 5,461
Water treatment	14	$ 5,103
Cover crops	47	$ 4,411
In-barn water efficiency	10	$ 3,154
Business and leadership development	3	$ 2,886
Skills development and training	12	$ 878

[15] Costs for each year have been normalized using inflation rates based on the consumer price index (CPI), as provided by the Bank of Canada's Inflation Calculator. 2017-2018 data includes approved but not yet completed projects. In some cases, project type names have been reclassified to align with the current naming structure used in GF2 (as outlined in the Methodology section).

Table 11: Total LSW Projects ranked by Average Cost Share, 2004-2005 to 2017-2018[16]

Project Type	Total Number of Projects	Average Cost Share Per Project
Reducing greenhouse gas emissions from indoor agriculture facilities	2	$ 87,500
Assurance systems - traceability	4	$ 56,600
Manure storage improvements	47	$ 38,168
Composting agriculture waste	24	$ 29,970
Labour enhancement	5	$ 23,787
Storage of agricultural waste	20	$ 23,460
Nutrient recovery from wastewater	32	$ 21,933
Assurance systems - animal welfare	12	$ 19,333
Assurance systems - food safety	7	$ 17,810
Animal and plant health	38	$ 15,477
Irrigation water efficiency	55	$ 14,906
Manure composting	11	$ 13,471
Global positioning system (GPS)	93	$ 13,118
Market development	4	$ 12,810
Improved cropping systems (i.e. No-till)	90	$ 12,804
Manure treatment	2	$ 12,688
Weather risk mitigation	2	$ 11,494
Erosion control structures	17	$ 10,348
Runoff control	77	$ 9,825
Septic systems	3	$ 8,316
Land application of manure	19	$ 6,971
Water storage for agricultural use	17	$ 6,874
Energy conservation	57	$ 6,853
Storage of agricultural products	61	$ 6,630
Preventing wildlife damage	20	$ 4,824
Integrated pest management	94	$ 4,519
Habitat protection and enhancement	125	$ 4,161
Water treatment	14	$ 3,207
Planning	118	$ 2,659
Water well management	106	$ 2,596
Business and leadership development	3	$ 2,385
Cover crops	47	$ 1,956
In-barn water efficiency	10	$ 1,330
Skills development and training	12	$ 419

[16] Costs for each year have been normalized using inflation rates based on the consumer price index (CPI), as provided by the Bank of Canada's Inflation Calculator. 2017-2018 data includes approved but not yet completed projects. In some cases, project type names have been reclassified to align with the current naming structure used in GF2 (as outlined in the Methodology section).

As shown in Table 9, the greatest number of projects completed were habitat protection activities. This reflects higher participation in earlier programs where supported BMPs were exclusively environmental (i.e. in GF2, environmental BMPs were only one of six focus areas offering cost-share opportunities). The second most completed project type was planning, with the majority addressing nutrient management (planning is further explored on page 49). However, the picture looks quite different when projects are ranked according to investment. Table 10 lists the projects by highest average project cost, while Table 11 lists the projects by highest average cost-share.

In terms of the most expensive projects to complete, the best management practices relating to traceability (Assurance Systems) and reducing GHG from indoor agricultural facilities (Environment and Climate Change Adaptation) had the greatest cost to the producer. Understandably, there were very few of these projects completed as a result. Given that the sample size is so low for those projects, there should be caution in using the averages for these activities, particularly within this geography. Note, that many of the project types funded under *GF2*, had higher project costs. This includes activities relating to the development of an assurance system (including animal welfare and food safety), as well as labour enhancement, animal and plant health and market development (*GF2* participation is explored further on page 58). These activities have contributed to an increase in the average project cost as shown in Figure 13. Note the increasing project average, as costs have risen from around $10,000 per project in 2005-2006 to $40,000 per project in 2017-2018.

Regarding the environmental BMPs, the most expensive project type completed in LSW was not surprisingly, manure storage improvements at $80,000 per project. Other manure activities, including manure composting averaged $36,000 per project, while manure treatment averaged $18,000 per project. Irrigation water efficiency had an average project cost of $55,000 while run-off control (for both livestock and horticultural run-off) averaged $16,000 per project. In terms of the activities with the greatest number of projects completed, habitat protection and planning both had project averages less than $7,000 per project. The higher number of projects completed for each of these activities, has also impacted the project average, but in general these BMPs are far less expensive to implement on the farm landscape. Cover crop investments by LSW producers averaged $4,000 per project. While some BMPs result in localized improvements at the farmstead, other actions are field-based, where the impact and investment is spread across a larger area. Cover crops are one such BMP.

As ranked by total number of projects, habitat protection, planning, water well management, integrated pest management, and GPS represent 50 percent of total projects completed in LSW. However, when ranked as a percentage of total project costs, the top five project types by cost include manure storage improvements (13 percent), improved cropping systems (9 percent), nutrient recovery from wastewater (8 percent), global positioning systems (8 percent), and animal and plant health (6 percent). Together, these BMPs represent approximately 44 percent of total project costs invested since 2004. The type of projects ranked by average cost-share closely aligns with that of the average project costs, because cost-share is a percentage of total project costs. Note that funding level percentages have changed over time, as program rules have adjusted to reflect the increasing demand for and expectation of higher cost-share funding levels.

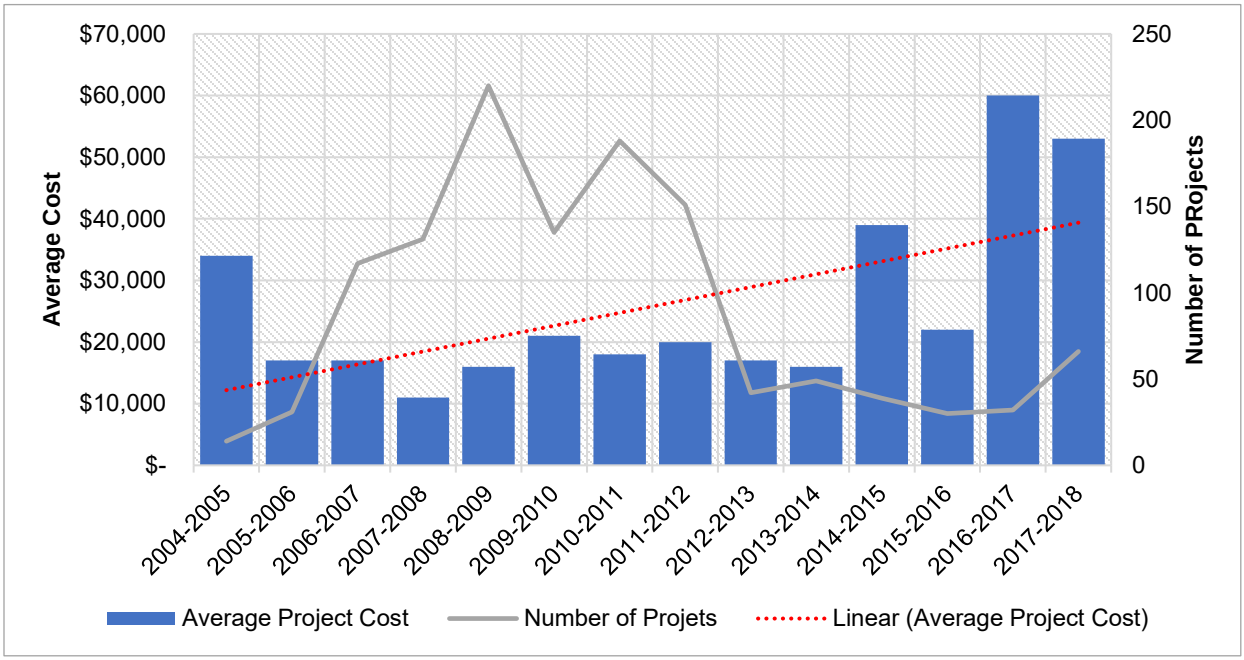

Figure 13: Average Project Costs in the Lake Simcoe Watershed, 2004-2005 to 2017-2018[17]

Appendix I shows how the number of projects completed for a select number of Best Management Practices (BMPs) implemented in the Lake Simcoe watershed has changed through time. Note these timeseries graphs do not consider changes to programming, which have certainly influenced participation in these activities. These graphs also provide context on the number of farms implementing these best management practices over this timeframe.

There are likely many reasons why the number and type of projects completed in LSW has changed over time. Discomfort with the merit-based program design, combined with significantly fewer government dollars to support environmental projects provincially, led to a drop in the number of farms securing allocations. Other factors that may have influenced cost-share participation include regulatory demands, market pressures, a need to become more efficient, and interest expressed by individual agricultural sectors.

Additionally, the Lake Simcoe Region Conservation Authority (LSRCA) was quite active through this period, and they also delivered environmental BMPs to farmers. Although beyond the scope of this report, data from LSRCA could shed further light on understanding trends, particularly regarding the adoption of environmental BMPs in this watershed.

[17] 2017-2018 data includes approved but not yet completed projects. Costs have been rounded to the nearest 1000. Note that all projects listed in Table 5 are included in Figure 13, and that the offering of BMPs changed considerably with *GF2*.

6. Comparative Analysis

So far, this report has focused on the participation of farmers in the Lake Simcoe watershed. But it was designed to allow for comparisons of projects in LSW to other regions, with the objective of better understanding what factors may be unique to LSW.

The Grand River watershed (GRW) is the largest watershed in southern Ontario (Figure 27). At 6,800 square kilometers, GRW has nearly three times the land area of LSW. With approximately 6,200 farms operating in the watershed, GRW has seen the largest number of stewardship projects completed in comparison to all other Ontario watersheds participating in OSCIA delivered cost-share programming. There are 6,200 farms in GRW compared to Lake Simcoe's 1,700 farms.

While approximately 350 farms in LSW have participated in cost-share (20 percent of total farms in LSW), there have been approximately 1,200 farms in GRW that have participated in cost-hare (19 percent of total farms in GRW). It would seem the overall participation rate in cost-share between the watersheds has been about the same. However, while participating LSW farms completed 1,248 projects, participating GRW farms completed 2,955 projects. This means, that Lake Simcoe farms completed more projects on average, in comparison to farms located in GRW (Figure 28). Over this time, participating LSW farms completed 1.8 projects per year on average, while participating GRW farms completed 1.5 projects per year. In both watersheds, there are concentrations of projects that are not reflected this rate.

As shown in Figures 28 and 29, both watersheds saw a decline in participation during 2012-2013, which can be attributed in part to availability and complexity of programming. However, there has been more participation from GRW farms 2013-present in comparison to LSW farms.

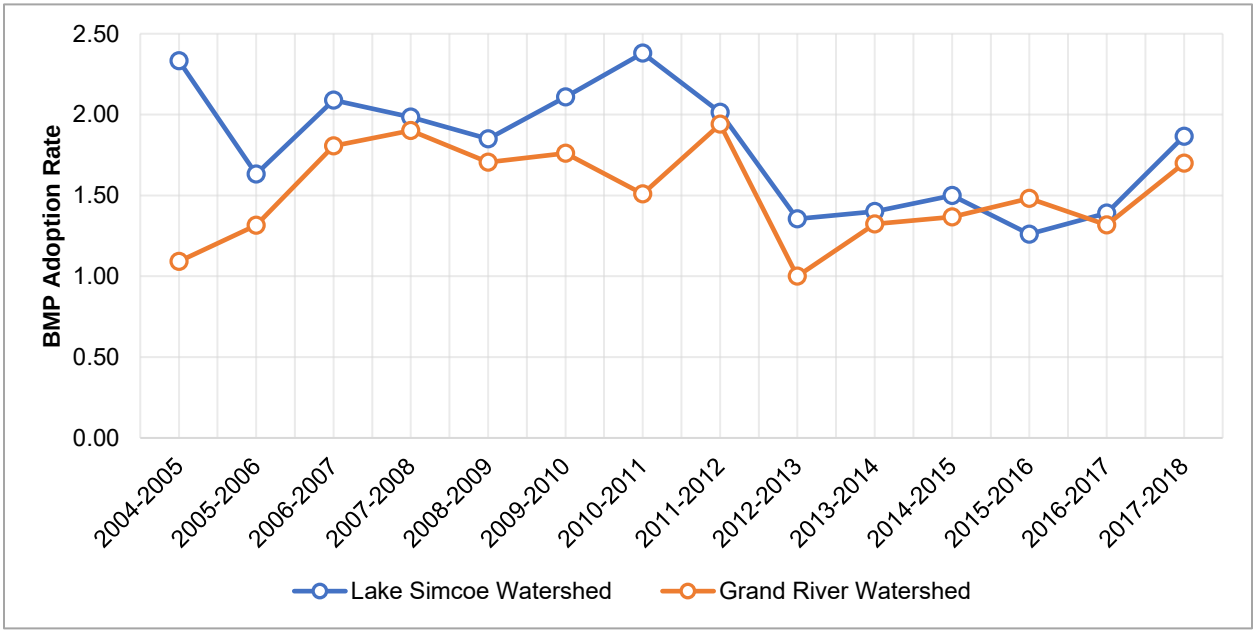

Figure 28: BMP Adoption Rate in LSW and GRW, 2004-2005 to 2017-2018[18].

[18] The BMP Adoption Rate is calculated by dividing the number of projects by the number of farms in each year. Note that each watershed had opportunities for targeted programming. For example, in LSW, the Lake Simcoe Farm Stewardship Program (LSFSP) was available in 2008-2012, and in GRW, the Farmland Health Incentive Program

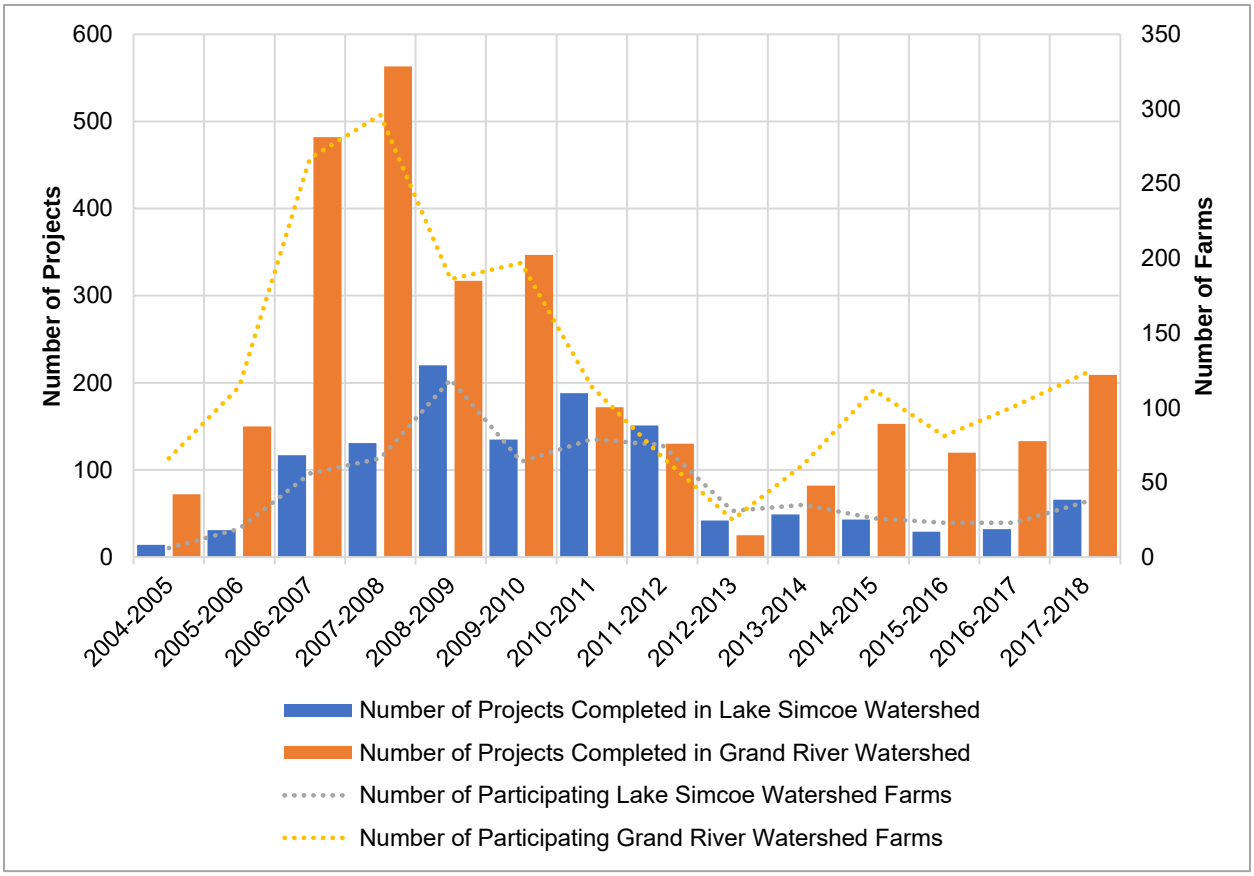

Figure 29: Number of Projects Completed in LSW and GRW, 2004-2005 to 2017-2018[19].

A select number of BMP activities for both watersheds have been reviewed in-depth. These activities were chosen based on available data, and include the project types of Habitat Protection, Planning, Conservation Tillage, Cover Crops, Runoff Control and Manure Storage Improvements. Although these activities are only a selection of the total projects completed, a comparison of these projects to other major watersheds (Conservation Authorities) and programs can reveal factors associated with project completion. As mentioned, caution must be exercised in using comparisons because each region has its own unique socioeconomic and farm business characteristics, and those criteria are not factored into this analysis.

Habitat Protection

Cost-share funding to support on-farm habitat has been available since 2004-2005 through OSCIA delivered cost-share programs. This activity is also supported by local Conservation Authorities and other environmental government agencies. While the focus of protecting on-farm habitat is often linked to species at risk (SAR), these projects also improve water quality and soil health. In terms of participation, project data from OSCIA delivered programs reveals that GRW has completed the most projects under this category, while LSW ranked 7th out of 32 participating watersheds.

[19] 2017-2018 data includes approved but not yet completed projects. Both watersheds saw a decline in participation as the program structure changed from the conventional first-come, first-serve approach to a merit-based structure.

The highest participation for this project category in LSW occurred in 2010-2011, and there has been a decline in the number of projects completed since this time (Figure 30). The trend in GRW was similar. While the number of projects completed in GRW is three times higher than in LSW (400 projects in LSW versus 125 projects in GRW), total farm participation20 in each watershed was the same (4 percent). Therefore, the percentage of farms in each watershed that completed a habitat project with support from cost-share programs was nearly the same. However, the individual BMP activities implemented was different between the watersheds.

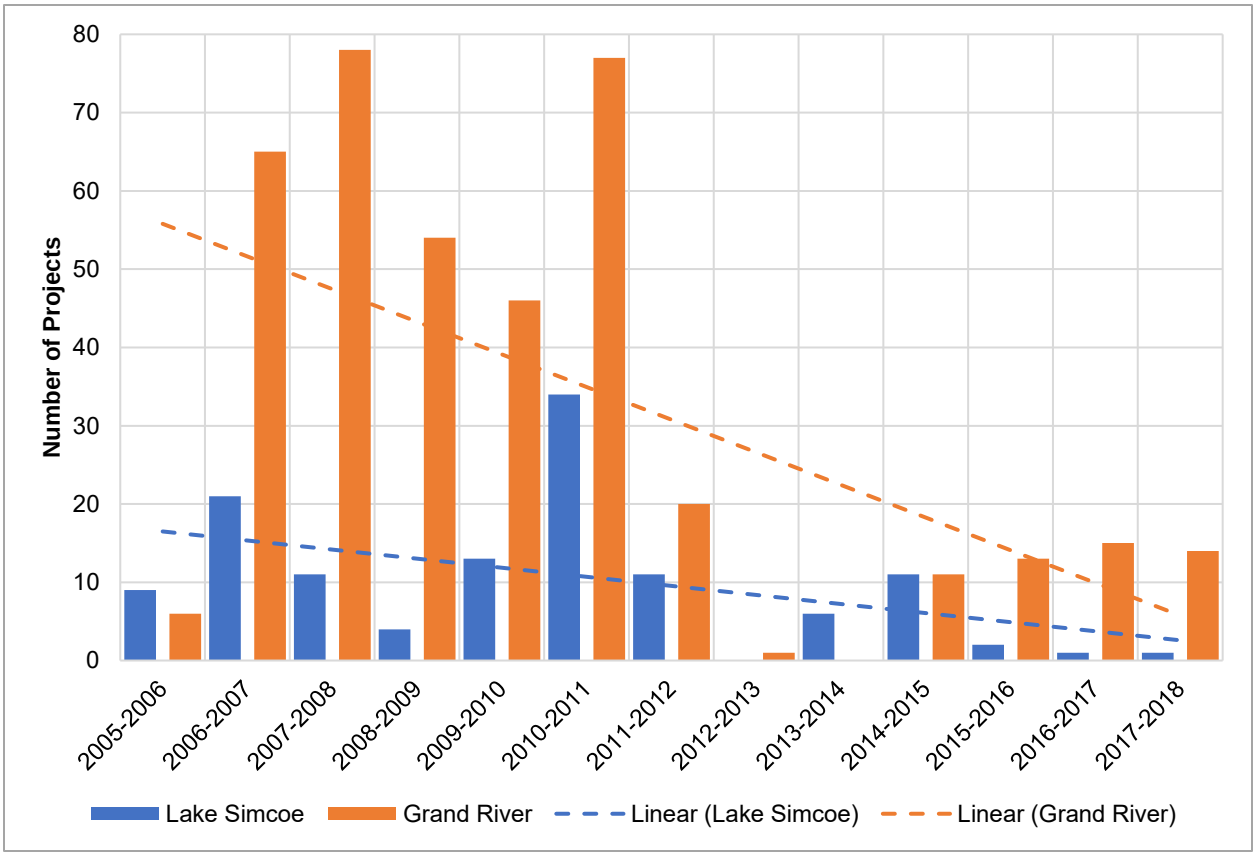

Figure 30: Habitat Protection Projects, 2005-2006 to 2017-2018

[20] Based on 68 participating farms, and 1,707 farms as reported by the 2011 census in Lake Simcoe Watershed; and 248 participating farms/6,400 farms in as reported by 2006 census for Grand River Watershed

Table 12: Habitat Protection Project Numbers and Costs in Lake Simcoe Watershed[21]

Project Type	Number of Projects	Project Costs	Cost Share
Cross-Fencing for Rotational Grazing	42	$ 263,000	$ 164,000
Tree planting (shelterbelts/windbreaks)	31	$ 137,000	$ 81,000
Livestock watering system	16	$ 113,000	$ 64,000
Buffer establishment	12	$ 66,000	$ 24,000
Improved stream crossing	7	$ 113,000	$ 65,000
Invasive species control	5	$ 39,000	$ 15,000
Fencing to Exclude Livestock from Sensitive Areas	3	$ 23,000	$ 11,000
Wetland Restoration	2	$ 18,000	$ 7,000
Incorporating delayed grazing into rotational grazing systems	1	$ 1,000	$ 1,000
Total	119	$ 773,000	$ 431,000

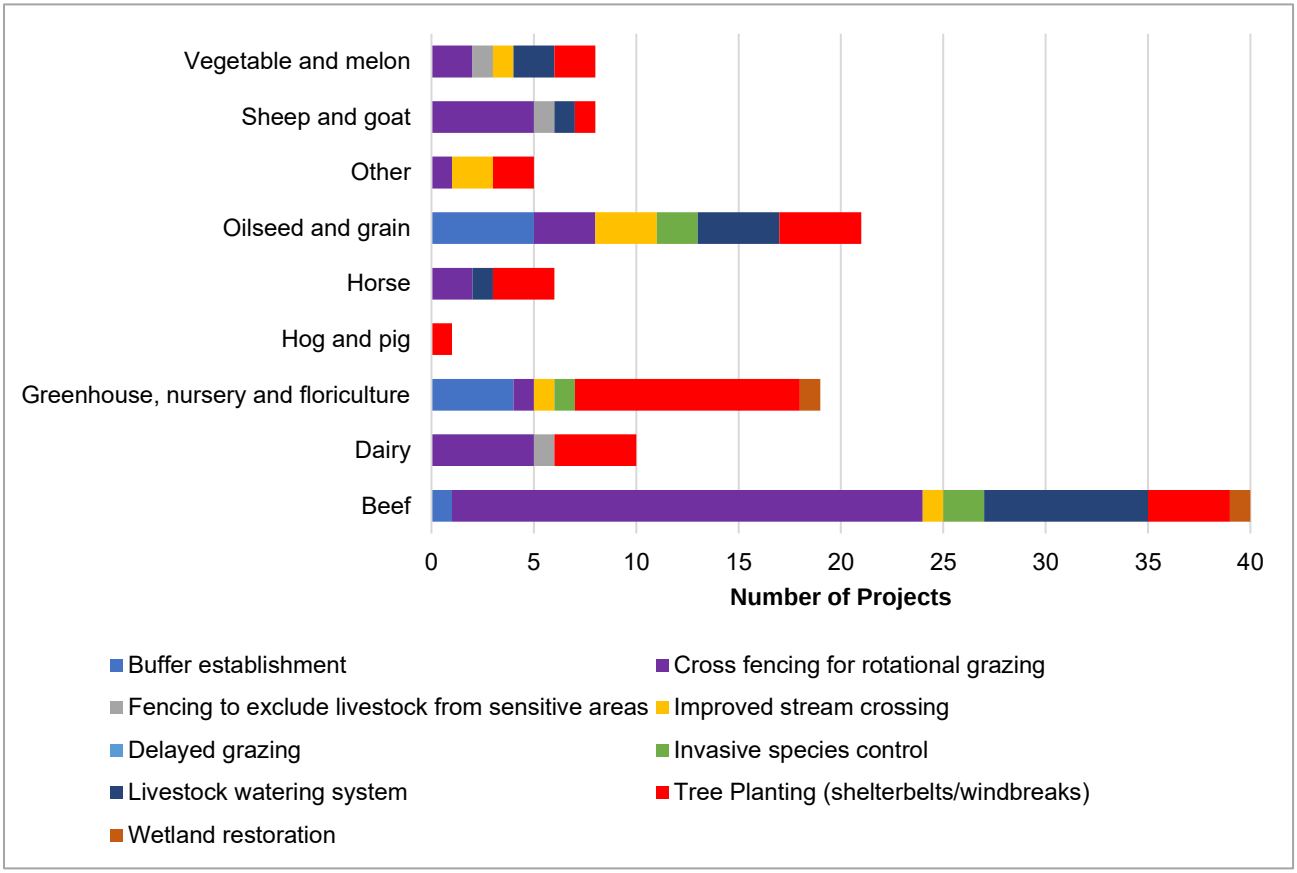

Figure 31: Habitat Projection Projects in the Lake Simcoe Watershed, by Primary Commodity

[21] Projects not shown in Table 12 include relocation of livestock containment (2 projects), winter site pasture field access (1 project), and 3 (WET) projects which supported multiple BMPs per project. Costs have been rounded to the nearest 1,000.

Table 13: Project Numbers and Costs in Grand River Watershed[22]

Best Management Practice (BMP)	Projects	Project Costs	Cost Share
Tree planting (shelterbelt/windbreak)	167	$ 769,000	$ 371,000
Cross fencing for rotational grazing	101	$ 551,000	$ 268,000
Buffer establishment	51	$ 193,000	$ 93,000
Livestock watering system	30	$ 114,000	$ 55,000
Improved stream crossing	19	$ 238,000	$ 91,000
Fencing to exclude livestock from sensitive areas	11	$ 86,000	$ 35,000
Tree planting (block planting)	11	$ 82,000	$ 35,000
Wetland restoration	3	$ 25,000	$ 13,000
Habitat structures	2	$ 7,000	$ 3,000
Invasive species control	1	$ 5,000	$ 2,000
Total	396	$ 2,071,000	$ 966,000

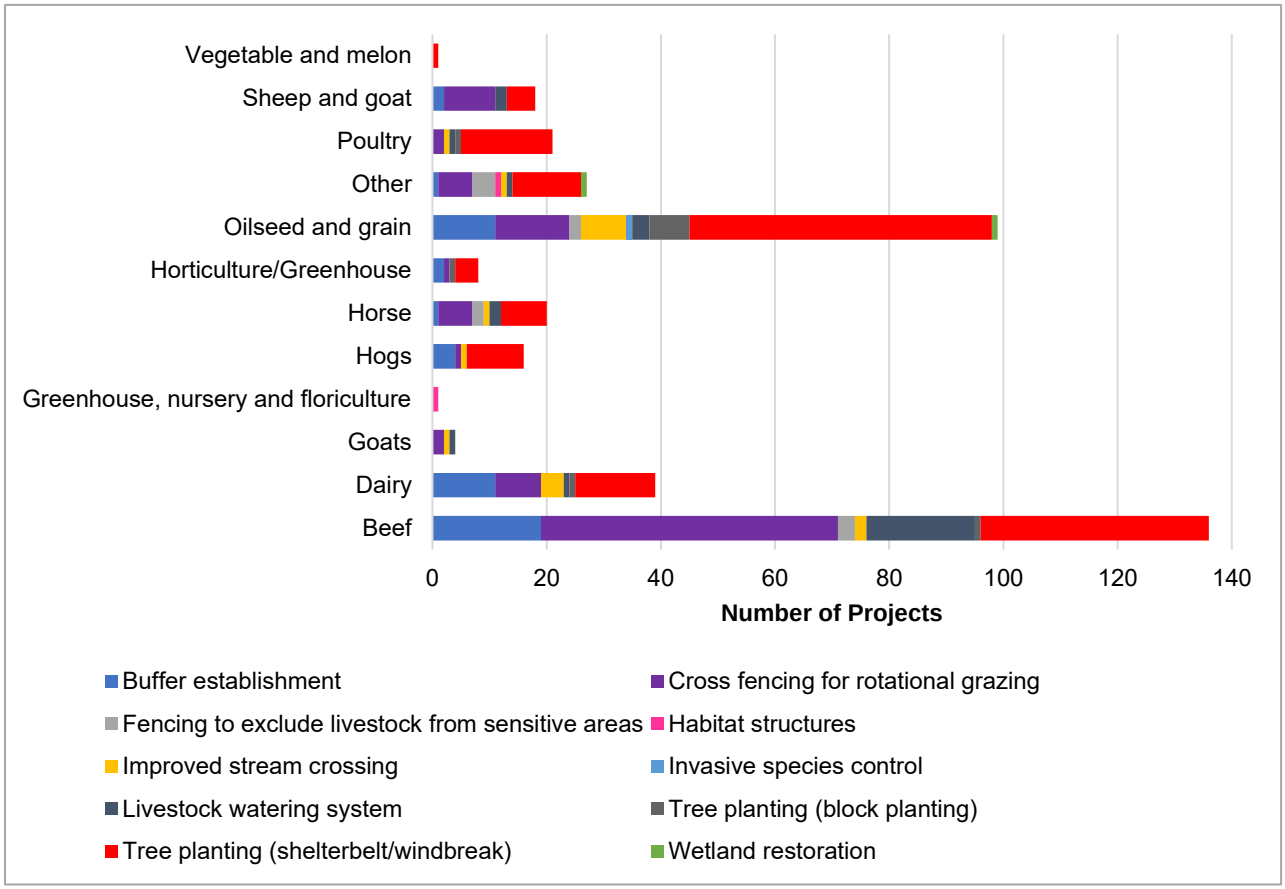

Figure 32: Habitat Protection Projects in Grand River Watershed, by Primary Commodity

[22] Costs have been rounded to the nearest 1000.

While planting projects were most frequent in GRW, the activity with the most projects completed in LSW was grazing management through cross-fencing. Since tree planting projects are typically less expensive than fencing projects, this has reflected into the lower average project cost for Habitat Projects in GRW, of which more than 50 percent of projects were tree planting (Figure 33). While the average project cost in LSW was $6,400, in GRW it was around $5,100 per project.

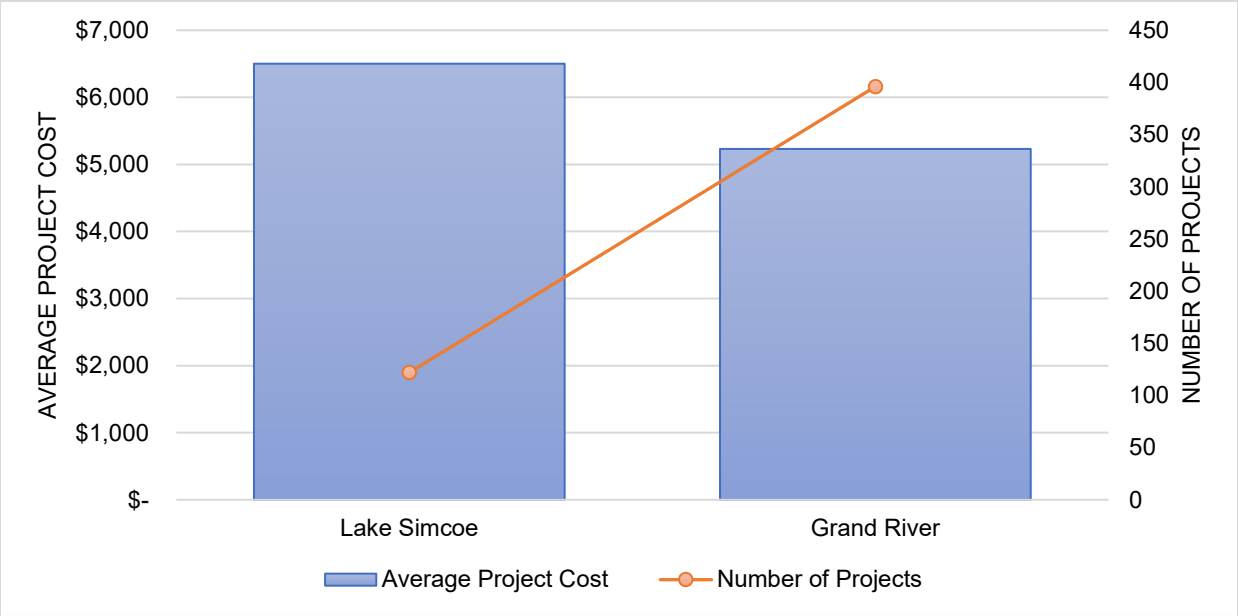

Figure 33: Average Project Costs for Habitat Protection Projects.

Recall, that Habitat Protection projects were the most frequent project type in LSW. The majority of planting projects were completed by greenhouses in LSW, while in GRW, the majority of planting projects were completed by oilseed and grain farms (Figure 31 and Figure 32).

Number of Trees

It is estimated that 16,254 trees were planted in the Lake Simcoe watershed based on 42 total planting projects. By comparison, it is estimated that 100,775 trees were planted in the Grand River watershed based on 205 total planting projects. On average, planting projects completed in the Grand River watershed were three times as large as the average number of trees planted per project in the Grand River watershed;1,244, versus 387 per project in the Lake Simcoe Watershed.

Meters of Fencing

It is estimated that 22,971 meters of fencing was installed in the Lake Simcoe watershed based on 45 fencing projects. By comparison, it is estimated that 29,604 meters of fencing was installed in the Grand River watershed based on 29 fencing projects. On average, the size of fencing projects completed in both watersheds was about the same, as the average number of meters of fencing installed per project was 919 meters in the Lake Simcoe Watershed, versus 1,021 meters in the Grand River Watershed.

Planning Activities

The second most popular category of projects completed in LSW was planning. This category includes a variety of planning activities such as agri-environmental resource planning and farm business planning. Since 2004, more than 3,000 planning projects in Ontario have been supported through cost-share. While GRW has completed the most planning projects, LSW ranked 8th out of 25 participating watersheds that completed a planning project (Figure 34).

Some of the programming opportunities available for planning had targeted geographies.

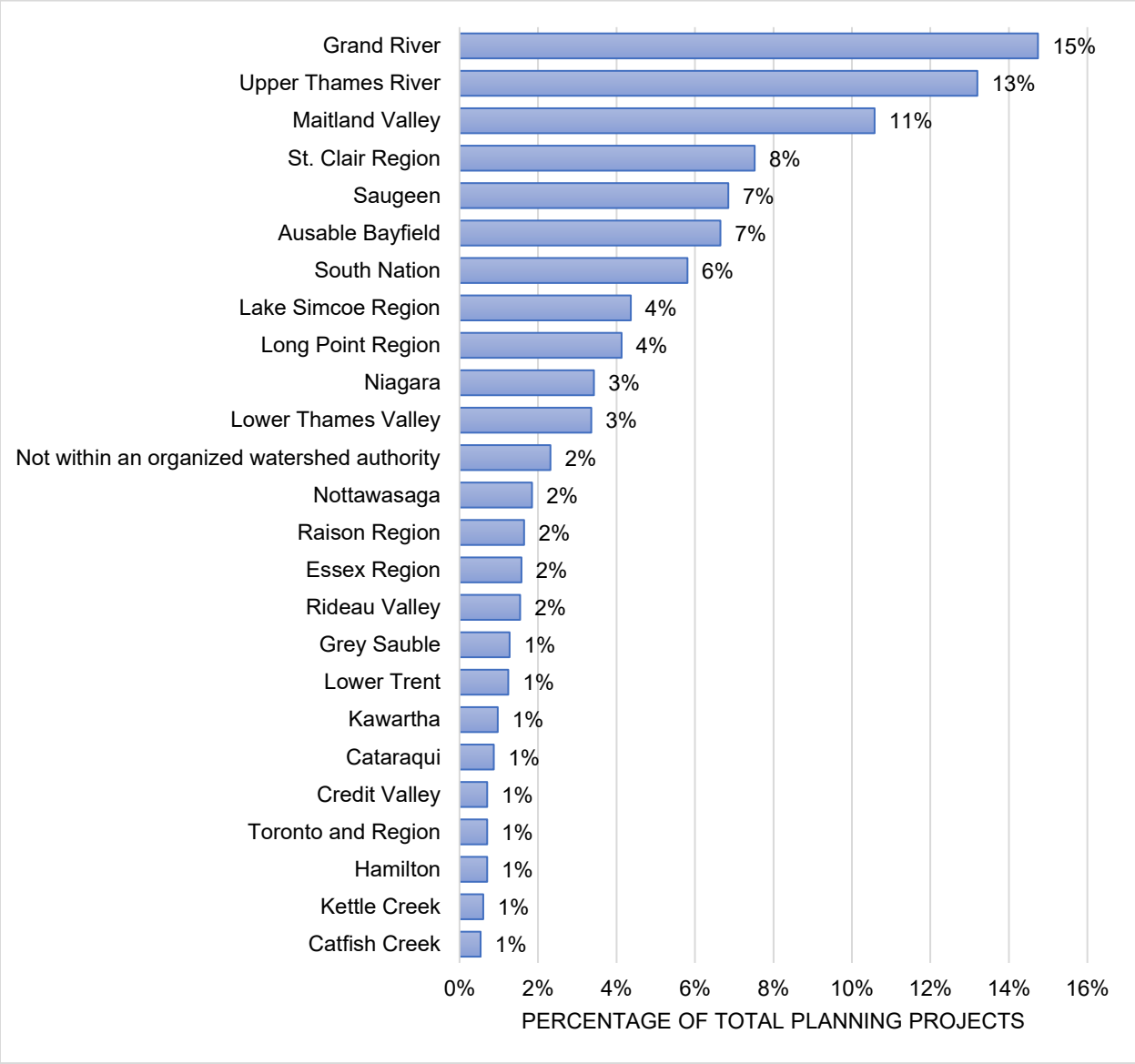

Figure 34: Percentage of Total Planning Projects by Watershed (CA), 2004-2005 to 2017-2018.[23]

[23] Figure 34 includes planning projects supported in COFSP, GC, LSASP (LSW), LSFSP (LSW), FHIP (GLASI Target Area), and *GF2*. The following watersheds (CAs) are not shown in Figure 34 because they were less than 1

In LSW, while more than half of all planning projects were nutrient management related, approximately 24 percent were farm business related (Table 14). Note that funding for financial and business type planning did not become available until 2008-2009 (Growing Forward), so many of the plans completed prior were nutrient and water management related. Although we don't know how many acres were impacted[24] by these plans, we can get a sense of the land area by looking at the farm acreage (Table 15).

Table 14: Type of Planning Activity completed in LSW, 2004-2005 to 2017-2018.[25]

Activity	Number of Projects	Percentage of Planning Projects
Nutrient management planning	63	53%
Farm business planning	28	24%
Water management planning	16	14%
Enterprise resource planning	4	3%
Crop nutrient planning	2	2%
Hydrological survey, reports or investigations planning	1	1%
Integrated pest management planning	1	1%
Irrigation, water and nutrient planning	1	1%
Soil erosion control planning	1	1%
Biodiversity enhancement planning	1	1%
Total	**118**	**100%**

Table 15: Land Area influenced by Planning in LSW, 2004-2005 to 2017-2018.[26]

Plans	Total Projects	Crop Acres Owned	Non-Crop Acres Owned	Rented Acres	Irrigated Acres
Biodiversity enhancement planning	1	85	45	0	0
Crop nutrient planning	2	2,410	8	120	950
Hydrological survey, reports or investigations planning	1	95	0	400	225
Integrated pest management planning	1	25	0	1,500	0
Irrigation, water and nutrient planning	1	0	0	250	250
Nutrient management planning	63	15,402	1,646	22,772	2,408
Soil erosion control planning	1	455	1,045	1,600	0
Water management planning	16	6,461	280	2,457	7,286
Total	**86**	**24,933**	**3,024**	**29,099**	**11,119**

percent; and include Mattagami, Ganaraska, Moira, Halton, Napanee, Prince Edward Region, Mississippi Valley, Otonabee, and Catfish Creek.

[24] Project impact data, such as the number of acres was not collected with the project application form

[25] Planning projects supported in COFSP, GFSP, COWSEP, LSASP, LSFSP, and *GF2*

[26] Farm business planning, strategic planning and enterprise resource planning projects are not shown in Table 10

Based on the plans summarized in Table 15, it is estimated that these plans may have impacted up-to 24,933 acres of cropland in LSW (owned acres). The majority of planning projects were completed by dairy farms and greenhouse facilities.
Between 2004-2005 and 2012-2013, 73 percent of planning projects completed in LSW were nutrient management plans while 19 percent were water management plans. In comparison, nearly 98 percent of planning projects completed in GRW during this same period were nutrient management related.

Conservation Tillage

Cost-share funding to support improvements in tillage, have been periodically available to farmers in LSW and in terms of soil health, no-till (or zero-till) has been the most popular improvement in the watershed. Approximately 76 farms in LSW have addressed soil management by investing in new or existing equipment to improve tillage, fertility, planting, and manage crop residues. Over 90 projects have been completed to-date, with 70 percent of projects categorized as no-till (or zero-till) systems.

Table 16: Conservation Tillage Equipment Projects in LSW, 2005-2006 to 2017-2018[27]

Type of Equipment	Projects	Project Costs	Cost Share
Crop residue management	10	$ 102,000	$ 43,000
Fertility (i.e. banding, variable rate)	6	$ 71,000	$ 35,000
Planting (plant cover crops)	6	$ 38,000	$ 22,000
Tillage (i.e. no till, strip till, etc.)	68	$ 1,979,000	$ 940,000
Total	**90**	**$ 2,189,000**	**$ 1,041,000**

We can look to the EFP to understand how environmental risks may have motivated these equipment projects. LSW farms identified concerns with the amount of organic matter in the soil, and the amount of tillage being used (Figure 35). This trend was similar to Ontario; however, Ontario projects identified more risks relating to the amount of tillage and type of planting equipment, as well as risks relating to rill and gully erosion on marginal lands.

We can also look at the proportion of owned and rented acres for farms that completed a Conservation Tillage Equipment project. Figure 36 shows the proportion of owned/rented acres by watershed (CA) and includes projects completed between 2005-2006 and 2011-2012. Note the sizeable proportion of rented land reported by LSW farms that completed a Conservation Tillage Equipment project. In fact, LSW was second, only behind Essex Region in terms of the number of rented acres reported by participating farms. The number of reported acres owned by program participants in these two watersheds is surprisingly much lower than typical seen across other major watersheds.

[27] Costs have been rounded to the nearest 1,000 and have not been normalized.

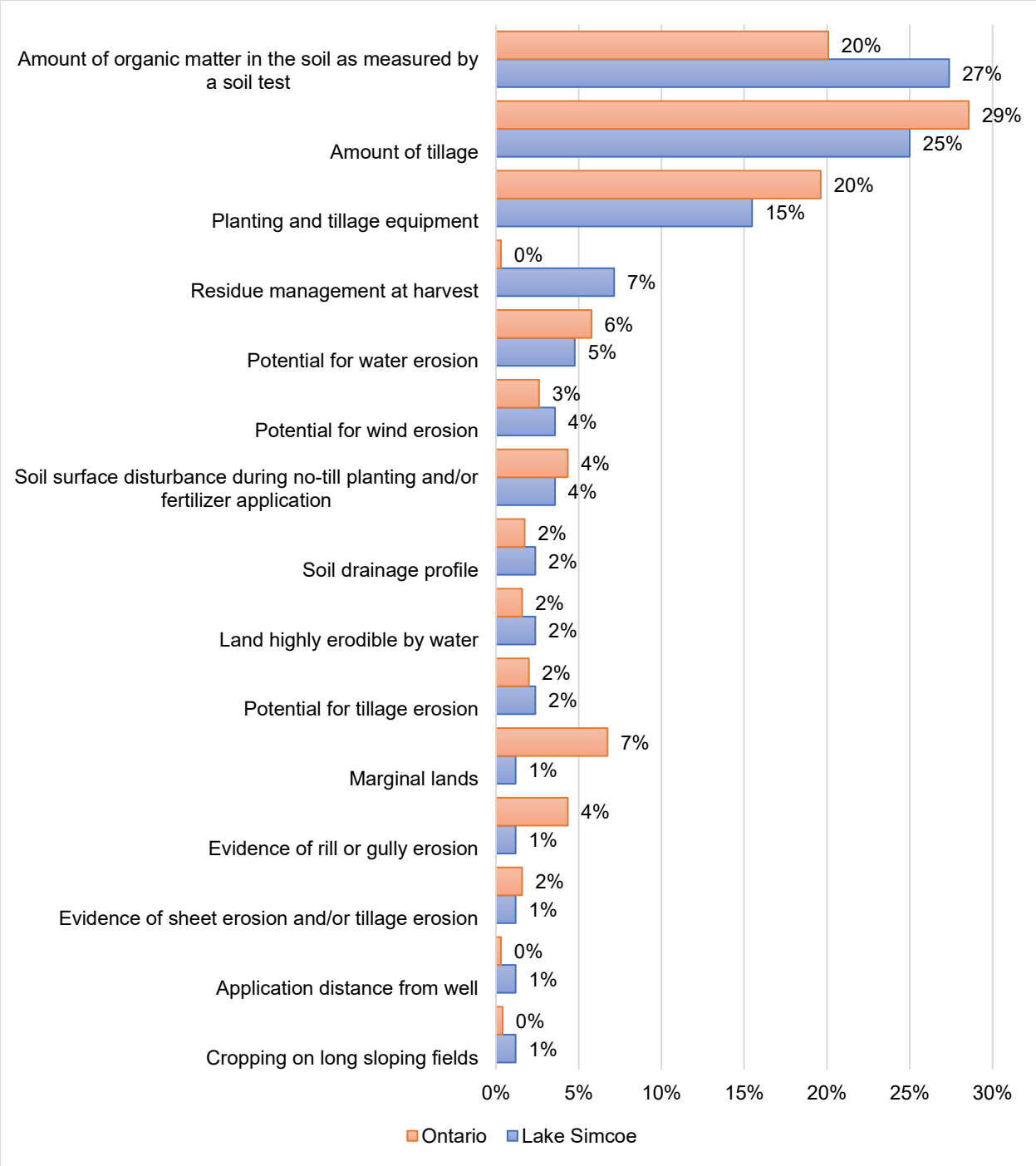

Figure 35: EFP Risks from Conservation Tillage Equipment Projects, 2005-2006 to 2011-2012[28].

[28] Figure 35 includes Conservation Tillage Equipment projects (crop residue management, fertility (i.e. banding), planting, and no-till, etc.) that were completed between 2005-2006 fiscal year and 2011-2012..

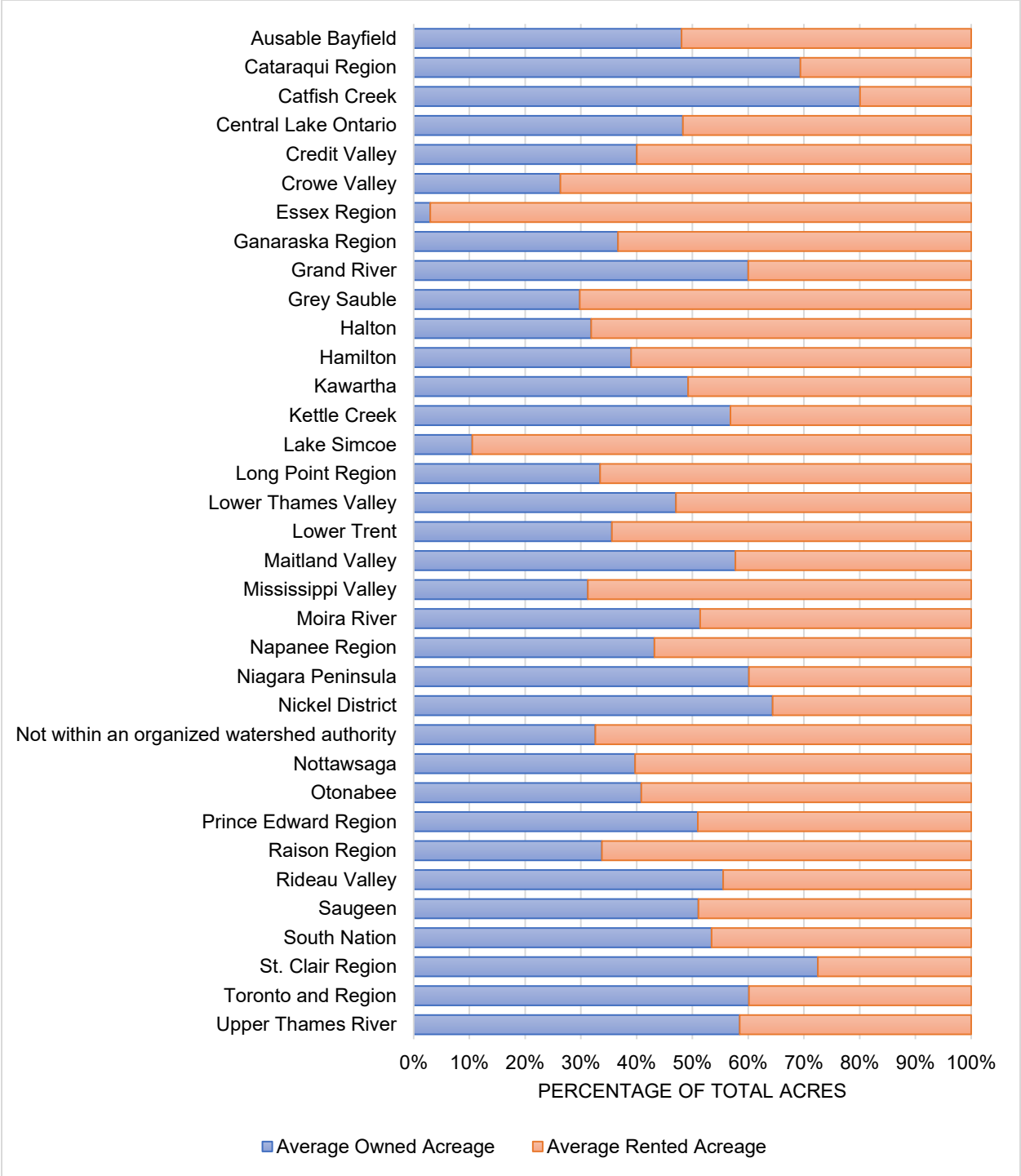

Figure 36: Proportion of Owned/Rented Land for Conservation Tillage Equipment Projects[29]

[29] Figure 36 includes Conservation Tillage Equipment projects (crop residue management, fertility (i.e. banding), planting, and no-till, etc.) that were completed between 2005-2006 fiscal year and 2011-2012. Total acreage does not include non-crop, non-pasture acreage. Note that ratios may have been impacted by the willingness of applicants to report total acres on the enrolment form. Some applicants are more thorough than others.

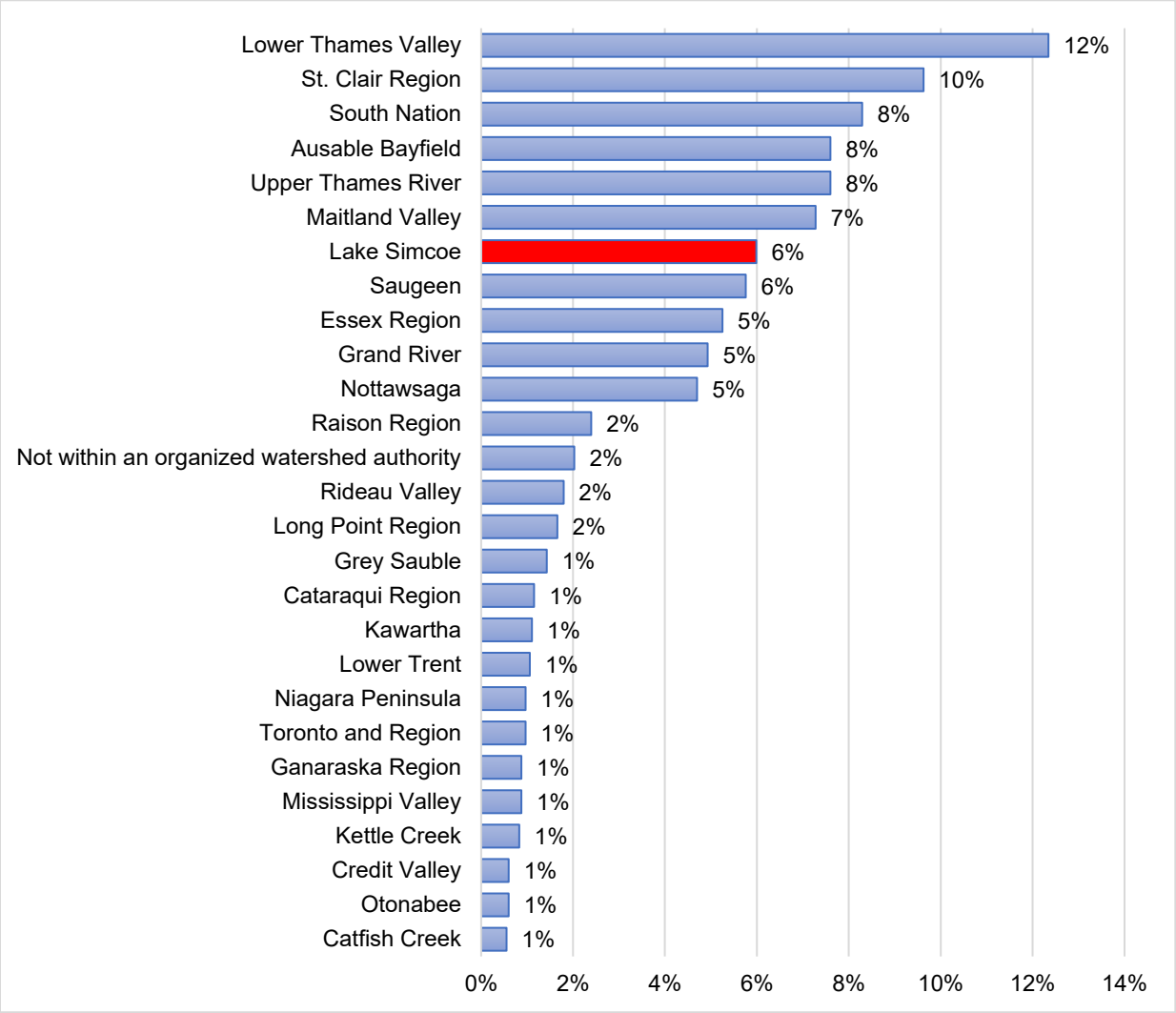

Figure 37: Percentage of Equipment Projects (2005-2006 to 2011-2012) by Watershed (CA).[30]

LSW ranked 7th out of 35 participating watersheds with a total of 6 percent of completed conservation tillage equipment projects from the period of 2005-2006 and 2011-2012 (Figure 37).

Funding to support this activity returned in 2015, but it was only available to portions of southern Ontario at the time. The Farmland Health Incentive Program (FHIP) was launched in 2015, part of the Great Lakes Agricultural Stewardship Initiative (GLASI). FHIP was not available to LSW, but it was a very popular program for conservation tillage equipment in the GLASI Target Area. The Soil Health Improvement Program and the Lake Simcoe Soil Health Improvement Project were modelled after FHIP and these opportunities became available to famers in Lake Simcoe in 2016. Although there was little interest from the watershed in this program structure.

[30] Not shown in Figure 37 because the number of projects was less than 1 percent include Nickel District, Crowe Valley, Napanee Region, Moira River, Prince Edward Region, Hamilton, Halton, Central Lake Ontario

Table 17: Number of FHIP Equipment Projects by Watershed (CA), 2015-2018.

Watershed	2015-2016	2016-2017	2017-2018	Total
Ausable Bayfield	6	12	14	32
Catfish Creek	3	2	-	5
Essex Region	8	8	4	20
Grand River	6	5	13	24
Grey Sauble	2	-	1	3
Kettle Creek	3	4	3	10
Long Point Region	2	2	7	11
Lower Thames Valley	9	17	29	55
Maitland Valley	21	10	10	41
Saugeen	8	4	10	22
St. Clair Region	20	7	15	42
Upper Thames River	6	19	21	46
Total	**94**	**90**	**127**	**311**

There have been approximately 300 equipment projects supported through FHIP (Table 17). As shown in Figure 37, Lower Thames Valley has completed the most equipment projects from 2005-2006 and 2011-2012. Note that the top-ranking watersheds in Figure 37, were within the GLASI Target Area and were supported in FHIP. While SHIP and LS-SHIP offered funding to support conservation tillage equipment, there was little interest in this BMP from LSW compared to past years. Previously it seems that LSW farms that completed an equipment project had a higher proportion of rented land compared to most other watersheds, with the primary motivator for the project being concerns with organic matter in the soil. With LS-SHIP there was a reluctance by farmers to engage with Certified Crop Advisors (CCAs) to prepare a Soil Health Check-Up.

Cover Crops

Funding to support the establishment of non-harvested, non-grazed cover crops has been available within LSW, and across Ontario since 2004. Through OSCIA delivered cost-share programs, over 500 farms across Ontario have competed approximately 890 cover crop projects (Figure 38). In LSW, the majority of cover crop projects were completed to address wind erosion (Table 18).

Table 18: Environmental Farm Plan, Cover Crop Projects in LSW (2005-2011).

Worksheet	Question #	EFP Rating	Number of Projects	Percentage of Projects
19	4	Adjustment to amount of fertilizer needed when using legumes or cover crops	1	3%
16	10	Application distance from well	4	11%
15	2	Potential for wind erosion	25	69%
15	5	Evidence of rill or gully erosion	3	8%
15	6	Land highly erodible by water	1	3%
15	13	Soil drainage profile	2	6%

The average number of acres planted per cover crop project in LSW was 169 acres, which is slightly lower than the Ontario average of 180 acres (based on OSCIA-delivered cost-share programs that

funded cover crops). Nearly 70 percent of LSW cover crops projects were completed on farms that identified organic (muck) soil as the dominant surface texture. LSW ranked 10th out of 31 participating watersheds that completed cover crop projects supported through cost-share.

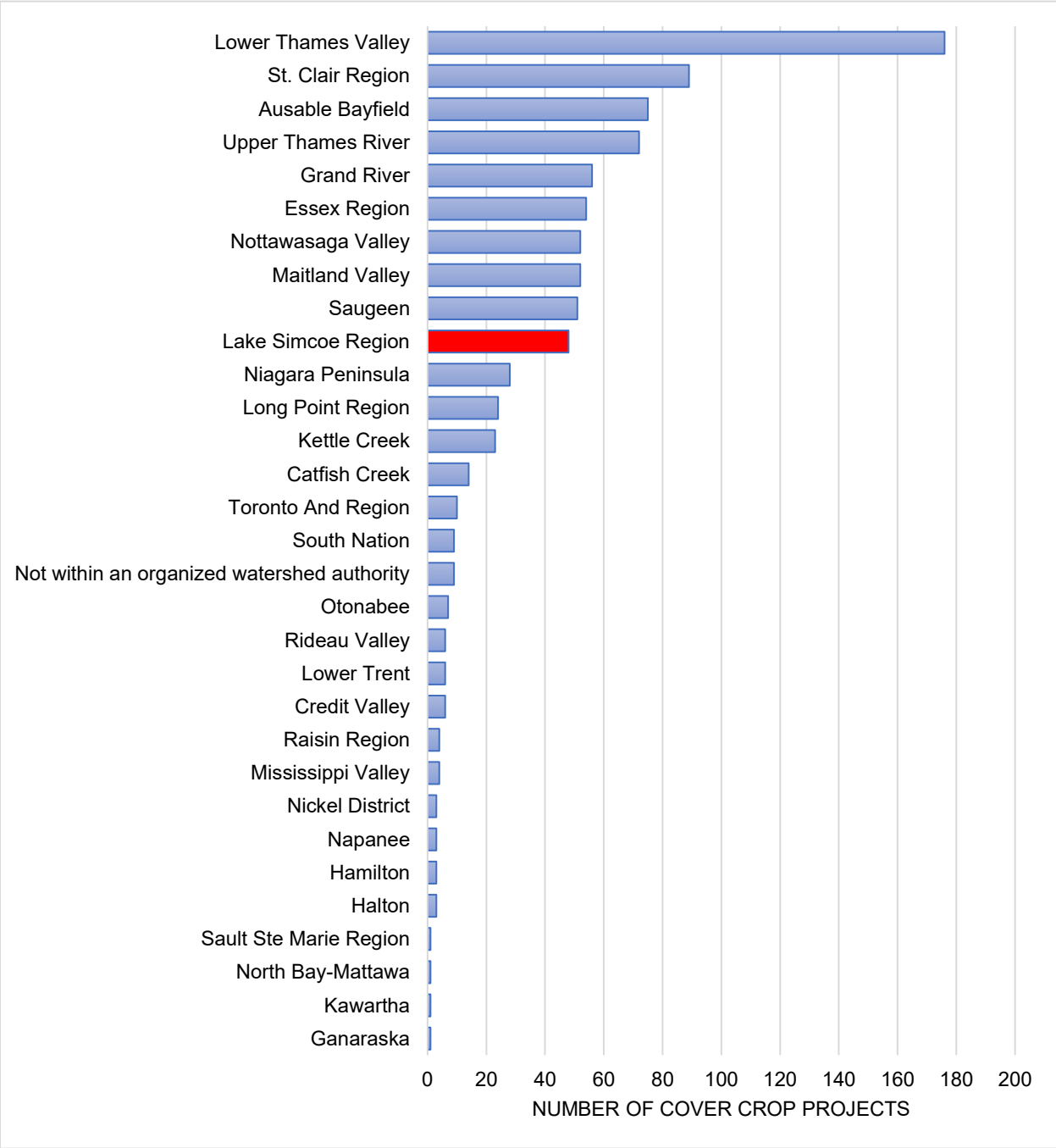

Figure 38: Cover Crop Projects by Watershed (CA), 2004-2005 to 2017-2018.[31]

[31] Programs considered include Growing Forward 2 *GF2*, Priority Sub-watershed Project, Soil Health Improvement Program, Lake Simcoe Soil Health Improvement Project, Farmland Health Incentive Program, Canada-Ontario Farm Stewardship Program, Greencover Canada, Lake Simcoe Agricultural Stewardship Program, Lake Simcoe Farm Stewardship Program.

Runoff Control

Approximately 77 projects have been completed in LSW to support improvements to reduce or control runoff from existing livestock yards and horticultural facilities[32]. This BMP was the 7th most popular in LSW, with nearly 70 percent of projects completed by livestock farms (50 percent of total projects were completed by dairy farms). These projects have addressed runoff from approximately 4,790 beef cattle, 2,982 dairy cattle, and 4,990 sheep and goats.

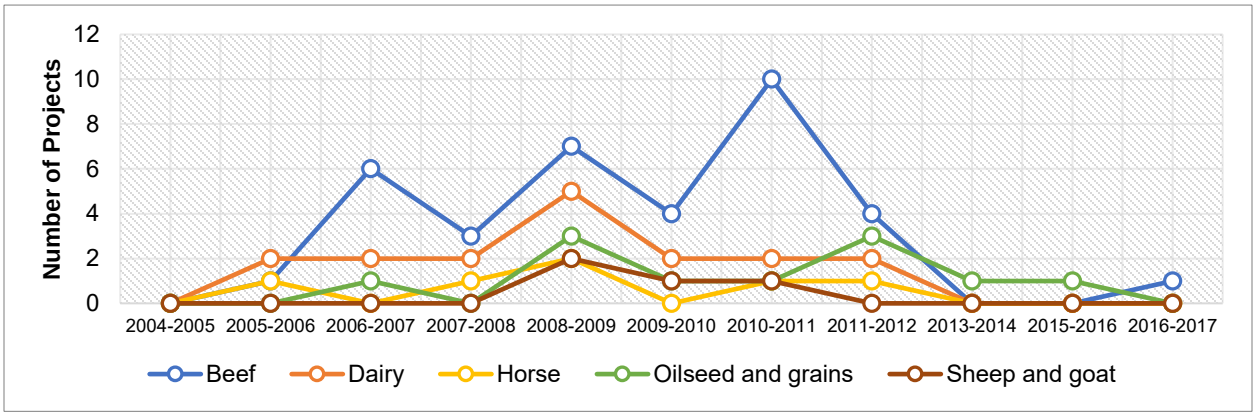

Figure 39: Runoff Control Projects by Primary Commodity, 2004-2005 to 2016-2017[33]

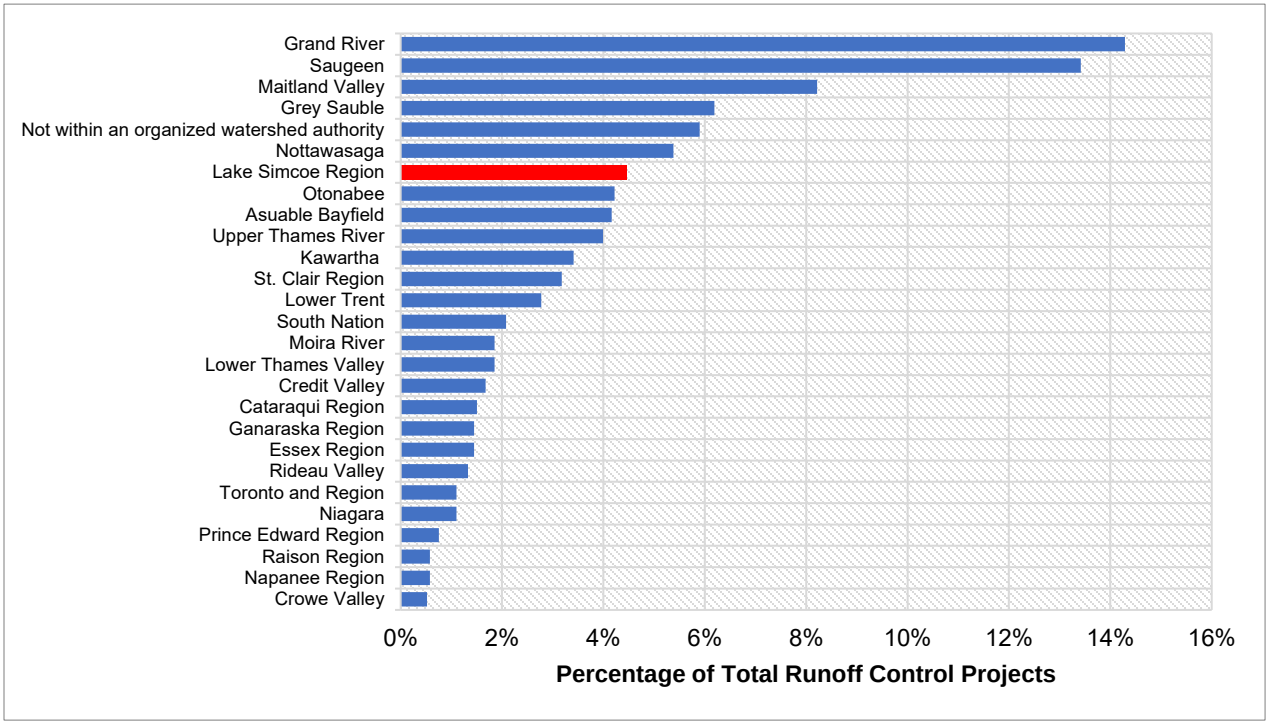

Figure 40: Runoff Control Projects by Conservation Authority, 2004-2005 to present[34]

[32] Funded activities include upstream diversion around existing farmyards and greenhouses, and downstream protection via catch basins, retention ponds or constructed wetlands (72% or projects); as well, impermeable bases and/or roofs to minimize runoff from livestock areas were also included (28% of projects).

[33] Note: Hog, poultry and greenhouse each completed 1 runoff control project, but they are not included in Figure 39

[34] Catfish Creek, Halton, Kettle Creek, Central Lake Ontario, Mississippi Valley, Hamilton, and Long Point Region are not included in Figure 42 as all were below 1 percent.

Manure Storage and Composting

Approximately 56 farms in LSW have addressed manure risks through increased and improved manure storage, and composting structures. More than 70 percent of projects have addressed storage and containment needs, while 18 percent were compost related. The projects were completed on farms that reported 2,791 beef cattle, 4,926 dairy cattle, 17,400 hogs, 3,745,090 poultry, and 1,460 sheep and goats.

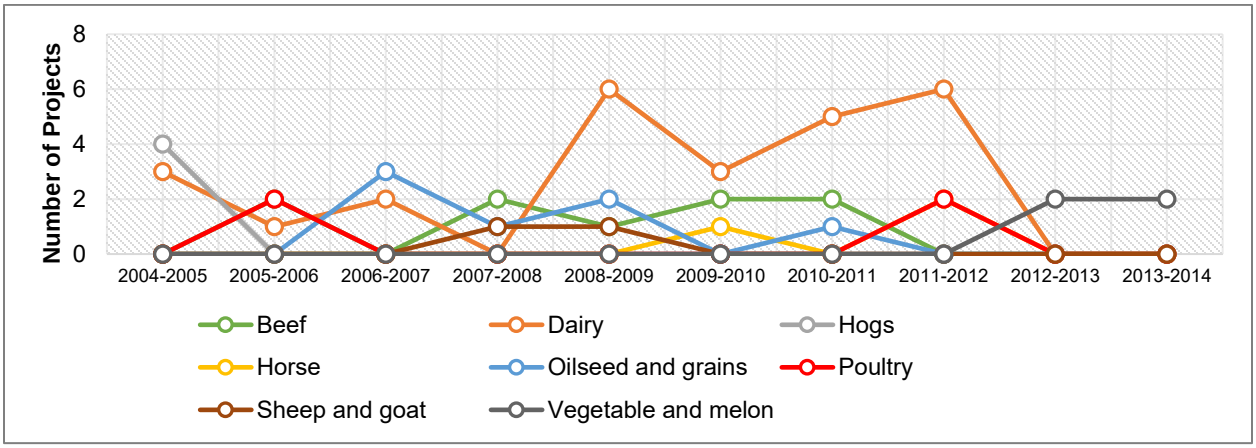

Figure 41: Manure Storage and Composting Projects by Primary Commodity[35]

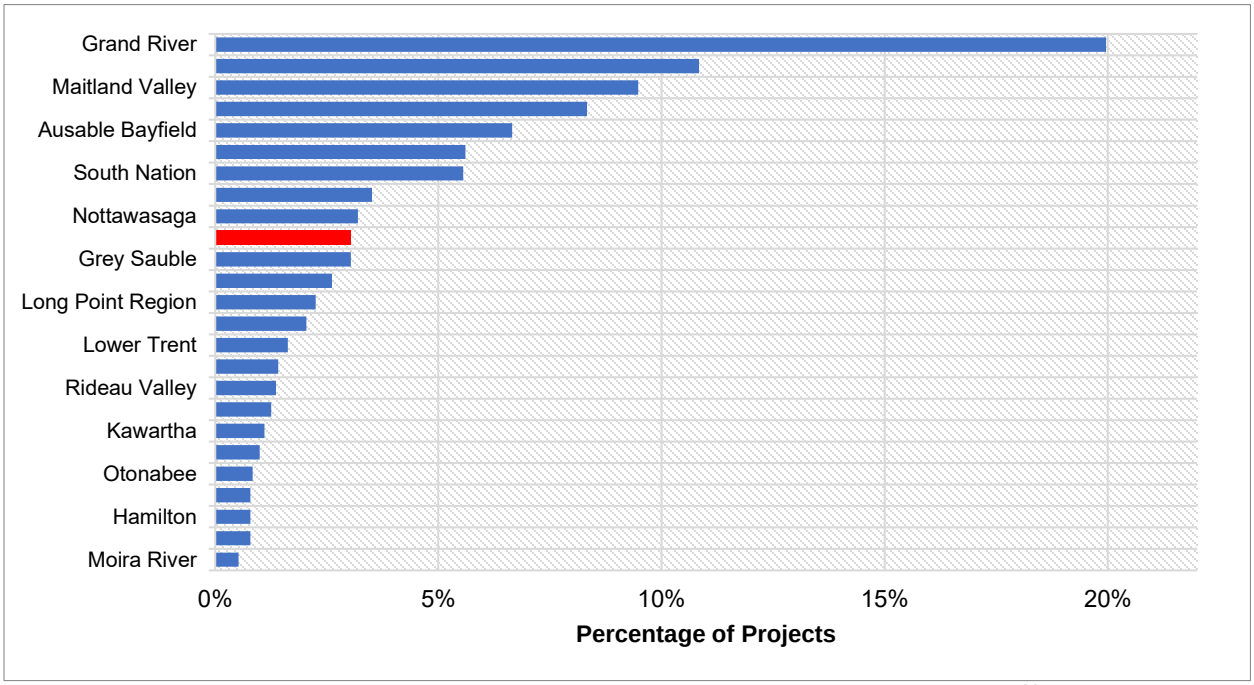

Figure 42: Manure Storage and Composting Projects by Conservation Authority.[36]

[35] Note: Other completed 1 manure storage project, but it is not included in Figure 41

[36] Central Lake Ontario, North Bay-Mattawa, Crowe Valley, Halton, Mississippi Valley, Napanee Region, Ganaraska Region, Prince Edward Region, Essex Region, and Kettle Creek are not included in Figure 42 as all were below 1 percent.

7. Growing Forward 2 (GF2)

While it has been helpful to review some of the longer-term trends throughout the timeframe covered by this report, the most recent programming offered through *GF2* is an indicator of current patterns in the Lake Simcoe watershed. *GF2* was competitive, and prioritized funding towards projects with the greatest overall benefit. This program structure will continue into the next framework, and so an understanding of participation trends from Lake Simcoe watershed will help inform programming expectations from this geography. Project categories were organized into distinct Focus Areas including: Environment and Climate Change Adaptation, Animal and Plant health, Assurance Systems, Market Development, Business and Leadership Development and Labour Productivity and Enhancement. Overall, approximately 164 projects, or 4 percent of total *GF2* projects were completed in the Lake Simcoe watershed.

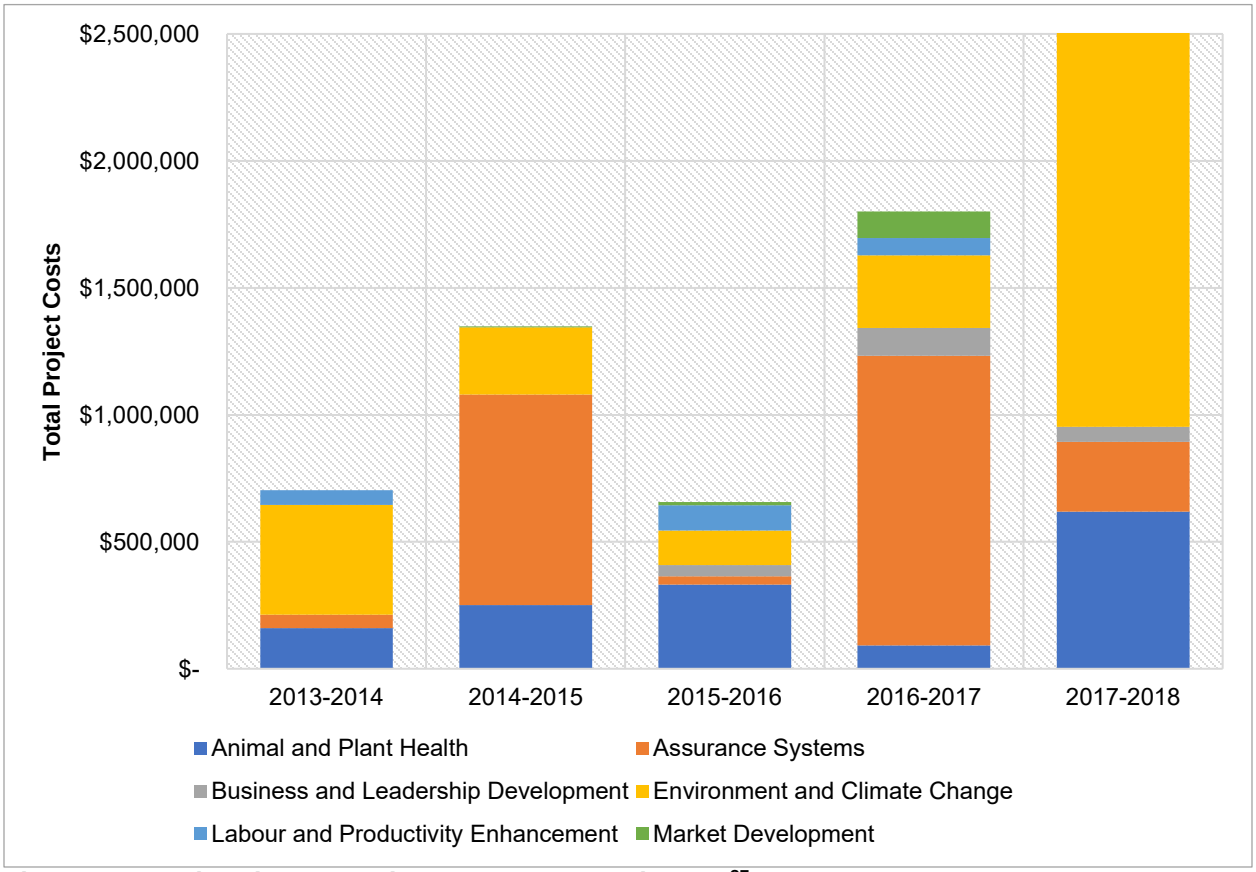

Figure 43: Total Project Costs by *GF2* Focus Area in LSW[37]

As shown in Figure 43, the Focus Areas of Environment and Climate Change Adaptation and Assurance systems have seen the highest project costs across all *GF2* years in LSW. The higher environmental costs shown in 2017-2018 are attributed to the newly added BMP *Reducing greenhouse gas emissions through on-farm energy efficiency and energy conservation measures* which was added in the final intake of the final year of GF2, and of which, LSW demonstrated strong interest from greenhouses. In terms of commodity, the highest participation by number of projects and total project costs has been from vegetable and melon producers (Figure 44 and Figure 45).

[37] 2017-2018 data includes approved but not yet claimed projects.

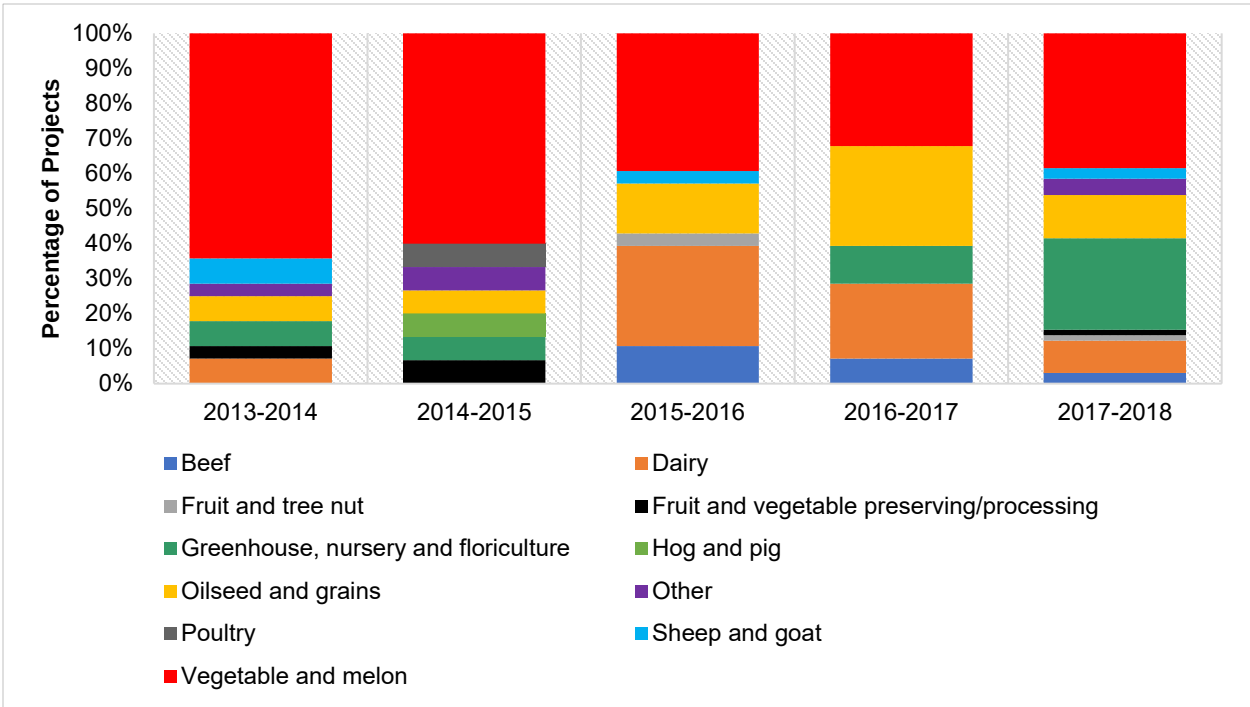

Figure 44: Percentage of GF2 Projects in LSW by Primary Commodity[38].

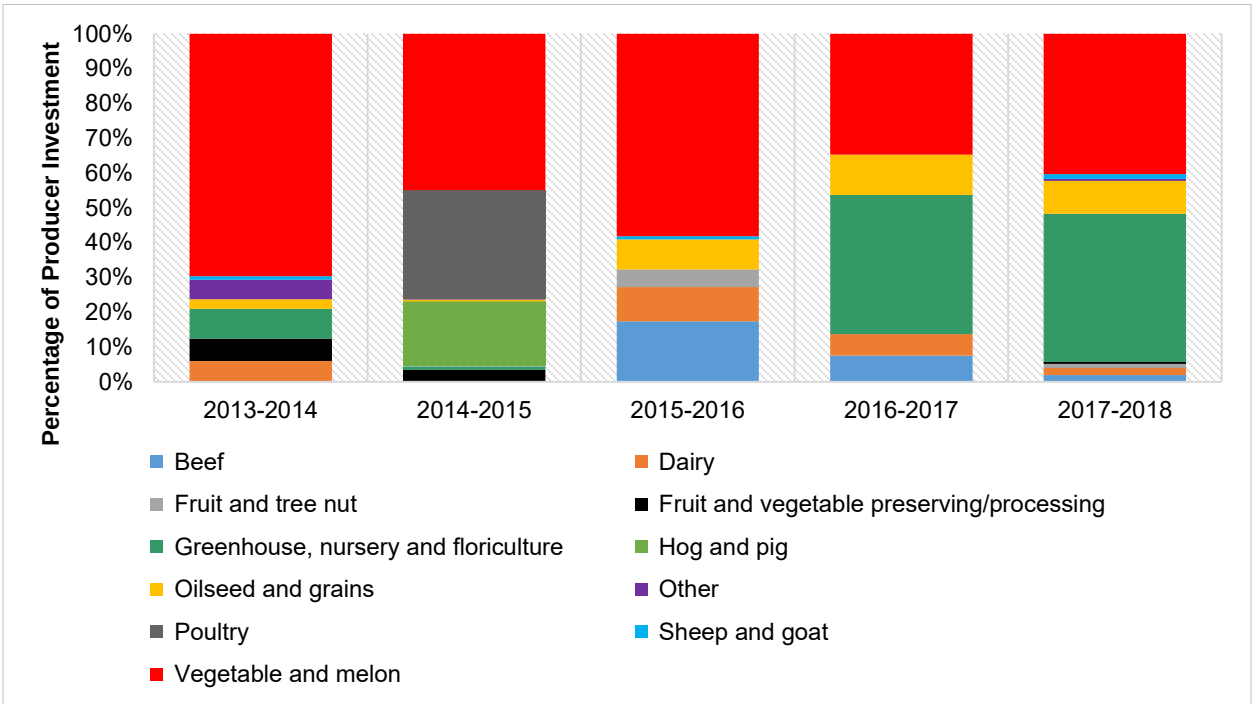

Figure 45: Percentage of *GF2* Project Costs in LSW by Primary Commodity.

[38] 2017-2018 data includes approved but not yet completed projects.

Table 19: GF2 BMP Adoption Rate by Primary Commodity in LSW.

Primary Commodity	Number of Projects	Number of Farms	BMP Adoption Rate
Fruit and vegetable preserving/processing	3	1	3.00
Vegetable and melon	72	27	2.67
Greenhouse, nursery and floriculture	23	9	2.56
Sheep and goat	5	2	2.50
Beef	7	4	1.75
Oilseed and grains	23	15	1.53
Other	5	4	1.25
Dairy	22	18	1.22
Fruit and tree nut	2	2	1.00
Hog and pig	1	1	1.00
Poultry	1	1	1.00

2017-2018 data includes approved but not yet completed projects.

As shown in Table 19, vegetable and melon producers and greenhouse and nursery farms were more likely to complete a greater number of projects in the Lake Simcoe watershed in comparison to other commodity groups. Fruit and vegetable preserving/processing operations were not considered because only one farm participated. This pattern was similar to that of Ontario, where greenhouse and nursery farms, and vegetable and melon producers had higher BMP Adoption rates than livestock groups and oilseed and grain producers.

In addition, vegetable and melon producers were more likely, in GF2, to complete more than one type of BMP project. Oilseed and grain farms were also more likely to complete a greater diversity of BMP projects, although the number of total projects completed by this group was lower than vegetable and melon producers.

Table 20: *GF2* BMP Adoption Rate by Primary Commodity in LSW.

Primary Commodity	Number of Projects	Number of BMPs Addressed
Vegetable and melon	72	15
Oilseed and grains	23	12
Greenhouse, nursery and floriculture	23	9
Dairy	22	6
Beef	7	5
Other	5	5
Sheep and goat	5	4
Fruit and vegetable preserving/processing	3	3
Fruit and tree nut	2	2
Hog and pig	1	1
Poultry	1	1

2017-2018 data includes approved but not yet completed projects.

9. Conclusion

This report has aimed to provide additional context on the many stewardship accomplishments that have been completed in the Lake Simcoe watershed since 2004. Cost-share data has revealed a variety of interesting trends, specific to participating farms. Although we don't know how many farms in LSW have implemented BMPs without the assistance of cost-share, we know that participating farms have made considerable progress in addressing soil health and water quality improvements. To-date, over $28 million has been invested by 350 farms and various levels of government to implement over 1,200 projects in the watershed since 2005. This is quite an accomplishment in terms of BMP adoption for the watershed.

Throughout this analysis, it was also determined that participation in cost-share programs has experienced somewhat of a slowdown beginning in 2011-2012. Although there may be a slight reverse in this trend as shown in the 2017-2018 fiscal year (Figure 4). This reiterates that the work needs to continue. The following summary should be helpful in directing further research, outreach, evaluation and analytical efforts to better serve the needs of agriculture in this unique region.

This report should be a living document that is added to as new programs are delivered.

Summary of Findings

Number of Participating Farms	• Approximately 350 individual farm businesses in LSW have participated in OSCIA delivered cost-share since 2004. • This represents about 20 percent of total farms in the watershed (based on 1,707 farms in 2011 census). How does this compare to other regions, or to farms in LSW with an FBRN?
Investments	• $15.7 million in eligible project costs have been invested by participating LSW farms, with an additional $12.3 million in cost-share funding from government partners. • On average, this equates to a $12,500 investment per project by LSW farmers, and a government investment of $9,800 per project over this timeframe.
Average Cost-Share Funding Level	• On average, stewardship projects have been supported at a cost share funding level rate of between 40-45 percent. • Between 2006 and 2012, participants could access up to 75 percent cost-share through combined cost-share programming.
Average Project Cost	• Average project costs have increased from $10,000 in 2004-2005 to $40,000 in 2017-2018, though the offering of BMPs has changed considerably with GF2.
Environmental Farm Plan (EFP) Risks	• LSW farms identified more EFP risks associated with pest management, water efficiency, horticultural production and energy efficiency in comparison to farms in Ontario (2004-2012). • Although this information is somewhat dated, it indicates a need for funded BMPs to be more tailored within these risk areas.
Irrigated Acres	• Participating irrigated acreage has quadrupled in the last 10 years, this is an area of growth. • Between 2006 and 2017, the average number of irrigated acres per farm increased from 25 acres to 320 acres.
Proportion of Owned/Rented Acres	• Participating rented acreage has declined, while owned acreage has increased. Between 2006 and 2012, the majority of farms that invested in conservation tillage equipment, reported a sizable proportion of rented land in comparison to all other watersheds.
Larger Farms	• There has been higher participation from larger farms in the watershed, the greatest participation has been farms between 90 hectares (220 acres) to 160 hectares (395 acres) in size.

Summary of Findings

Smaller Farms	• Participation from smaller farms, 78 hectares or less in size (less than 190 acres), has been much lower. • How can future programming opportunities be more tailored to smaller farms? How many of them have an FBRN?
Popular Project Types by Number	• The most popular project type in terms of the total number of projects was habitat protection (10 percent), while planning came in second with 9 percent of projects. These are relatively lower cost projects and received considerably more cost-share in past years.
BMP Investments	• In terms of total project costs, the greatest investments in the watershed in terms of soil health and water quality have been the result of manure storage improvements (13 percent of total investments), conservation tillage equipment (8 percent), and nutrient recovery from wastewater projects (7 percent).
Participation Trends	• Approximately 75 percent of projects were completed between 2006 and 2012 through the conventional program design and with considerably more cost-share available for environmental BMPs.
Vegetable and Melon Production	• Recent participation (2013-present) has been primarily driven by vegetable and melon producers, and these farms have very specific needs, particularly in the Holland Marsh (muck soils)
Livestock Farms	• There has been a decline in participation from livestock commodity groups, particularly beef. However, this could be related to changing market prices. • During GF2 (2015-present) there was an increase in participation from dairy farms.
Greenhouses	• There was strong interest from greenhouses in LSW for energy conservation and energy efficiency BMPs that were introduced to GF2 in 2017-2018.
Number of Trees	• It is estimated that 16,000 trees were planted while 23 kilometers of exclusion fencing was installed to protect streams and enhance on-farm habitat.
Impacted Acres through Planning Activities	• It is estimated that 25,000 acres of cropland may have benefited from planning activities (water and nutrient management plans, etc.).

10. References

Environment and Climate Change Canada (2016). *Canadian Environmental Sustainability Indicators: Reducing Phosphorus Loads to Lake Simcoe and South-eastern Georgian Bay.* Retrieved from: www.ec.gc.ca/indicateurs-indicators/default.asp?lang=en&n=90435A23-1.

Grand River Conservation Authority (GRCA). (2008). Executive Summary: *Grand River Watershed Characterization Report*. Retrieved from: https://www.sourcewater.ca/en/source-protection-areas/resources/Documents/Grand/Grand_Reports_Characterization_ES.pdf

Government of Ontario (2016). *Lake Simcoe phosphorus reduction strategy*. Retrieved from: https://www.ontario.ca/page/lake-simcoe-phosphorus-reduction-strategy

Government of Ontario. (2017). *Minister's Five-Year Report on Lake Simcoe: To protect and restore the ecological health of the Lake Simcoe watershed*. Retrieved from: https://www.ontario.ca/page/ministers-five-year-report-lake-simcoe-protect-and-restore-ecological-health-lake-simcoe-watershed

Lake Simcoe Region Conservation Authority (LSRCA) (n.d.). Lake Simcoe Region Conservation Authority: Our Watershed. Retrieved from: https://www.lsrca.on.ca/Pages/watershed.aspx

Government of Ontario. (2016.) *Lake Simcoe Watershed Map*. Retrieved from: https://www.ontario.ca/page/lake-simcoe-phosphorus-reduction-strategy

Grand River Conservation Authority (2008). *Printable watershed map*. Retrieved from: https://www.grandriver.ca/en/our-watershed/Maps-and-data.aspx

Mabel, Joe (2013). *Aerial – Cook's Bay, Lake Simcoe from SW*. Retrieved from: https://commons.wikimedia.org/wiki/File:Aerial_-_Cooks_Bay,_Lake_Simcoe,_Ontario_from_SW_01_-_white_balanced_(9659705784).jpg