

Agriculture and wildlife: A two-way relationship

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- . not available for any reference period
- .. not available for a specific reference period
- ... not applicable
- 0 true zero or a value rounded to zero
- 0^s value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded
- ^P preliminary
- ^r revised
- X suppressed to meet the confidentiality requirements of the *Statistics Act*
- ^E use with caution
- F too unreliable to be published
- * significantly different from reference category ($p < 0.05$)

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Highlights

Agricultural land provides important habitat to a variety of wildlife species, with natural land for pasture, woodlands and wetlands having the highest habitat value. Wildlife supplies many ecosystem services to the Canadian agricultural industry, and Canadian farmers can adopt several agricultural practices that enhance wildlife habitat.

- In 2011, nearly one-third (30.2%) of agricultural land in Canada was wildlife habitat, which represented 19.6 million hectares.
- Three-quarters of wildlife habitat reported by Canadian farmers was natural land for pasture (75.0%), and the remainder was woodlands and wetlands (25.0%).
- Two in five farms (40.3%) reported natural land for pasture while one in two farms (49.9%) reported woodlands and wetlands in 2011.

The relationship between agriculture and wildlife is a complex blend of co-operation and challenges. As agricultural land and wildlife habitat are converted for other uses, the co-existence of agriculture and wildlife could become increasingly important. This article examines the wildlife habitat available on agricultural land, the benefits that agriculture receives from wildlife, and mutually-beneficial farming practices.

What is wildlife habitat?

The Canadian agricultural landscape is a mosaic of different types of land cover, ranging from cropland to wetlands. The Census of Agriculture collects data on different types of land use, comprising the following six categories: cropland, summerfallow, tame or seeded pasture, natural land for pasture, woodlands and wetlands, and all other land.

Wildlife habitat is any land that can be used as a shelter, breeding ground or a food source for wildlife. While most agricultural land provides at least one of these requirements, woodlands and wetlands, and natural land

for pasture support more species and rank higher in terms of habitat value.¹ When combined, these two categories represent the second largest use of agricultural land in Canada after cropland (Chart 1).

The woodlands and wetlands category includes forests, woodlots, tree windbreaks, hedgerows, ponds, rivers, marshes, bogs, riparian areas and other wetlands. These habitats are used by a variety of wildlife including birds, small and large mammals, fish, amphibians, reptiles and insects. Wetlands remain one of the most important habitat types in the category. They support a large and diverse number of animals, and many species depend on wetlands for all of their shelter, breeding and feeding needs.²

The natural land for pasture category represents pasture land that has not been cultivated, drained, irrigated or fertilized. It includes grasslands and woodlands used for pasture. Grasslands provide habitat to a diversity of wildlife such as small and large mammals, grassland raptors, nesting birds, songbirds and pollinating insects.³

1. Javorek, S.K. and M.C. Grant, 2011, "Trends in wildlife habitat capacity on agricultural land in Canada, 1986-2006," *Canadian Biodiversity: Ecosystem Status and Trends 2010*, Technical Thematic Report No. 14, Canadian Councils of Resource Ministers, Ottawa, Catalogue no. EN14-43/14-2011E-PDF.

2. Federal, Provincial and Territorial Governments of Canada, 2010, *Canadian Biodiversity: Ecosystem Status and Trends 2010*, Canadian Councils of Resource Ministers, www.biodivcanada.ca/ecosystems (accessed October 10, 2014).

3. Federal, Provincial and Territorial Governments of Canada, 2010.

What you should know about this study

This study is based on data from the 2011 Census of Agriculture, which collected data from all agricultural operations that grow or raise livestock, poultry, crops or other agricultural products intended for sale. Respondents were asked to enumerate their commodities, land use and farming practices. This study does not include farms in the territories.

While this article focuses on agricultural land type, it should be noted that other factors such as landscape diversity and connectivity are also important to wildlife habitat availability on agricultural land.

Definitions

Agricultural land represents the total farm area reported in the 2011 Census of Agriculture and includes the following land use categories: cropland, summerfallow, tame or seeded pasture, natural land for pasture, woodlands and wetlands, and all other land.

Cropland represents the areas reported for field crops, hay, vegetables, sod, nursery products, fruits, berries and nuts.

Wildlife habitat refers to two agricultural land use categories: woodlands and wetlands, and natural land for pasture. The category woodlands and wetlands is a combined variable and it is not possible to determine the relative contributions of the two components.

For the purposes of this article, the term “wildlife habitat” will refer to these two agricultural land use categories: woodlands and wetlands, and natural land for pasture as reported in the Census of Agriculture.

Where is wildlife habitat found?

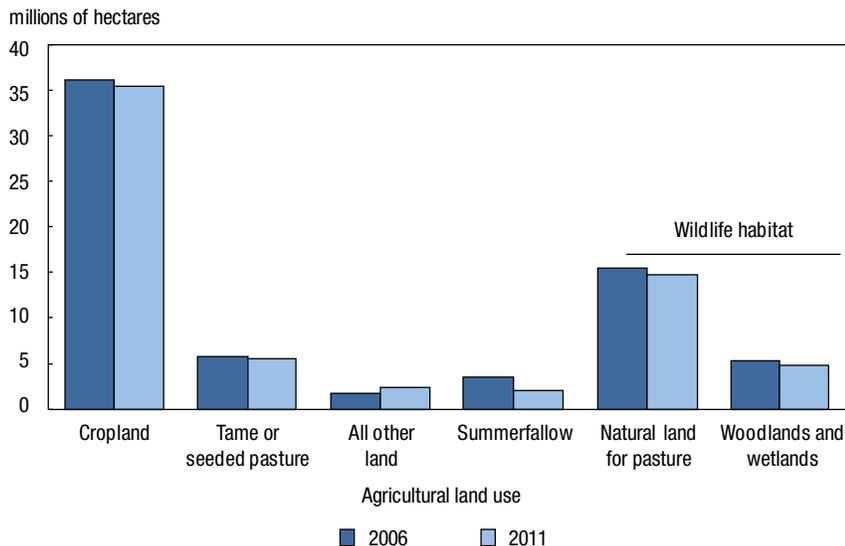
Using data from the Census of Agriculture, wildlife habitat represented 30.2% of all agricultural land in Canada, accounting for 19.6

million hectares in 2011. Looking at individual census divisions,⁴ wildlife habitat ranged from less than 10% to more than 90% of agricultural land (Map 1). Census divisions with more than 60% of agricultural land considered as wildlife habitat tended to be concentrated in the Atlantic provinces and British Columbia. However, Alberta and Saskatchewan, with 70.0% of agricultural land in Canada, reported the largest wildlife habitat areas at 7.3 million hectares and 5.8 million hectares, respectively.

The majority of wildlife habitat reported by Canadian farmers was natural land for pasture, which represented 22.7% of all agricultural land, and the remainder was woodlands and wetlands, which accounted for 7.6% of all agricultural land.

Natural land for pasture is largely found in western Canada (Table 1), with Alberta reporting the most amount of natural pasture area in 2011

Chart 1
Agricultural land use, Canada, 2006 and 2011

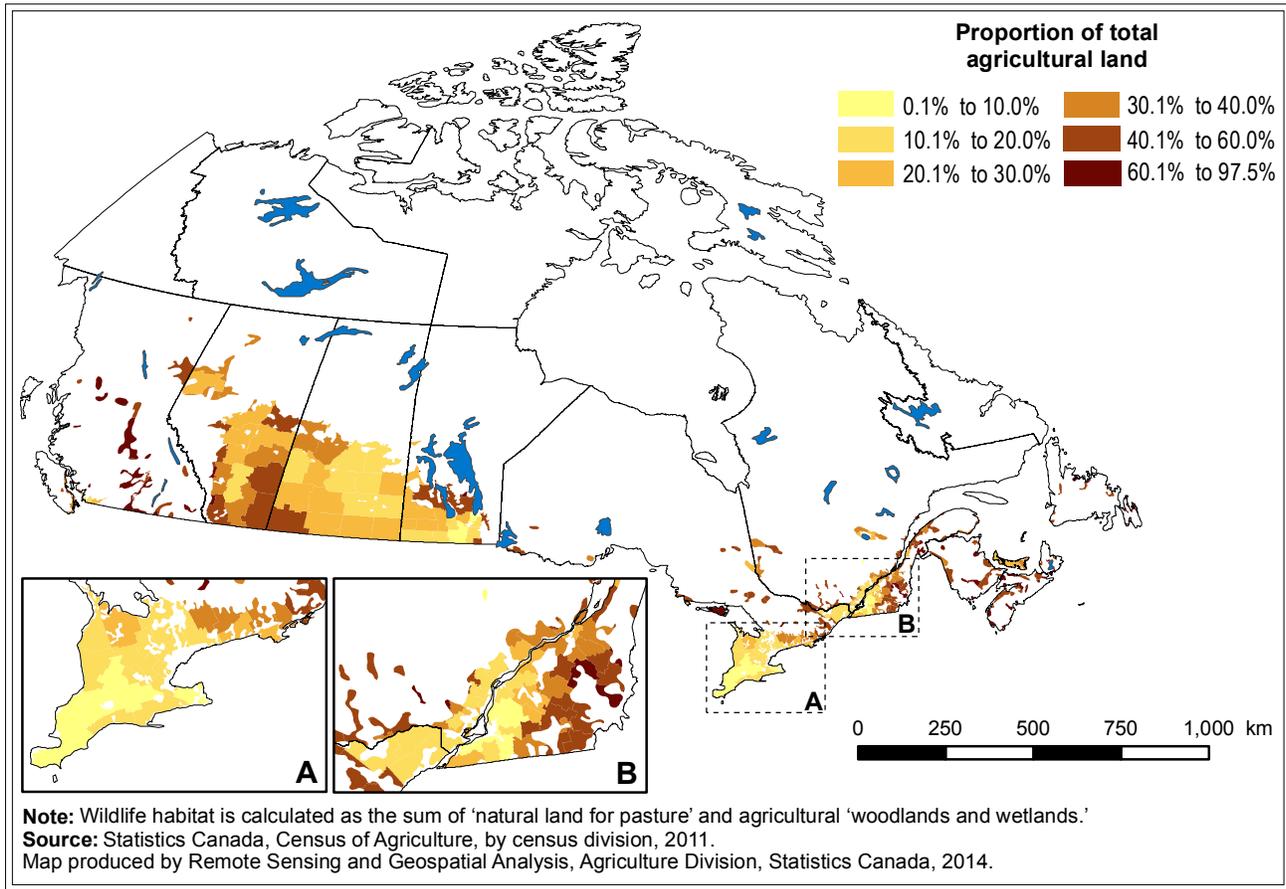


Source: Statistics Canada, Census of Agriculture, 2006 and 2011.

4. A census division (CD) is a geographic area established by provincial law. CDs often correspond to counties, regional districts and regional municipalities.

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Map 1
Wildlife habitat on agricultural land, Canada, 2011



(6.4 million hectares), followed by Saskatchewan (4.8 million hectares), Manitoba (1.5 million hectares) and British Columbia (1.4 million

hectares). British Columbia reported the largest area of natural land for pasture as a proportion of total agricultural land (53.1%).

Woodlands and wetlands represented a larger proportion of agricultural land in eastern Canada. More than 40% of agricultural land in

Table 1
Agricultural land use by province, 2011

	Area of agricultural land		Natural land for pasture		Woodlands and wetlands	
	hectares	percent	hectares	percent	hectares	percent
Canada	64,812,723	35,350,270	14,703,330	22.7	4,897,367	7.6
Atlantic provinces	1,063,343	430,363	65,711	6.2	450,031	42.3
Quebec	3,341,333	1,874,760	134,147	4.0	1,057,417	31.6
Ontario	5,126,653	3,613,821	398,538	7.8	646,578	12.6
Manitoba	7,293,839	4,348,869	1,466,968	20.1	549,444	7.5
Saskatchewan	24,940,023	14,728,934	4,816,782	19.3	1,009,381	4.0
Alberta	20,436,150	9,753,849	6,435,825	31.5	893,436	4.4
British Columbia	2,611,382	599,674	1,385,359	53.1	291,079	11.1

Source: Statistics Canada, Census of Agriculture, 2011.

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the Atlantic provinces was reported as woodlands and wetlands in 2011. The next largest proportions were in Quebec (31.6 %) and Ontario (12.6%). In terms of total area, however, woodlands and wetlands

were spread more evenly across the country (Table 1). Quebec reported the largest area of woodland and wetland in 2011 (1.1 million hectares), followed by Saskatchewan (1.0 million hectares) and Alberta (0.9 million hectares).

What types of farms⁵ have wildlife habitat?

The agriculture industry varies widely across Canada, with a diversity of products and farm sizes. This section summarizes the characteristics of farms reporting natural land

Table 2
Natural land for pasture by farm size, Canada, 2011

Farm size (hectares)	All farms		Natural land for pasture			
	number	Farms with natural land for pasture percent	Area hectares	Average area per farm	As a percentage of agricultural land area	
					percent	
All farms	205,730	82,865	40.3	14,703,330	177.4	22.7
Under 100	105,169	33,915	32.2	470,698	13.9	12.0
100 to 199	34,182	14,408	42.2	625,001	43.4	12.6
200 to 299	15,226	6,985	45.9	518,719	74.3	13.8
300 to 399	10,730	5,290	49.3	558,330	105.5	14.9
400 to 499	6,650	3,348	50.3	455,551	136.1	15.3
500 to 749	11,918	6,324	53.1	1,209,269	191.2	16.6
750 to 999	7,075	3,838	54.2	1,033,186	269.2	16.9
1,000 to 1,999	10,145	5,742	56.6	2,678,327	466.4	19.4
2,000 or more	4,635	3,015	65.0	7,154,249	2,372.9	39.2

Source: Statistics Canada, Census of Agriculture, 2011.

Table 3
Natural land for pasture by North American Industry Classification System (NAICS) farm type, Canada, 2011

Farm type (by NAICS)	All farms		Natural land for pasture			
	number	Farms with natural land for pasture percent	Area hectares	Average area per farm	As a percentage of agricultural land area	
					percent	
All farms	205,730	82,865	40.3	14,703,330	177.4	22.7
Dairy cattle and milk production	12,207	4,104	33.6	108,162	26.4	5.0
Beef cattle ranching and farming, including feedlots	37,406	26,426	70.6	10,072,656	381.2	52.8
Hog and pig farming	3,470	620	17.9	31,730	51.2	5.0
Poultry and egg production	4,484	976	21.8	12,774	13.1	5.5
Sheep and goat farming	3,924	1,913	48.8	35,468	18.5	17.1
Other animal production	24,124	13,814	57.3	920,898	66.7	29.7
Oilseed and grain farming	61,692	16,644	27.0	2,119,863	127.4	6.7
Vegetable and melon farming	4,822	843	17.5	19,711	23.4	2.9
Fruit and tree nut farming	8,253	1,123	13.6	11,360	10.1	3.3
Greenhouse, nursery and floriculture production	7,946	1,168	14.7	20,388	17.5	7.4
Other crop farming	37,402	15,234	40.7	1,350,319	88.6	20.9

Source: Statistics Canada, Census of Agriculture, 2011.

5. Farm type is established through a procedure that classifies each census farm according to the predominant type of production. The farm types presented in this document are derived based on the 2007 North American Industrial Classification System (NAICS).

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for pasture, and woodlands and wetlands in the 2011 Census of Agriculture.

Natural land for pasture

Natural land for pasture was reported on 40.3% of all farms in 2011. In general, natural land

for pasture was more commonly reported by larger operations and the average area increased with farm size (Table 2).

“Beef cattle” operations had the largest proportion of farms reporting natural land for pasture, followed by “other animal”⁶ farms, and “sheep

and goat” farms (Table 3). “Beef cattle” farms also reported the largest total natural land for pasture in 2011 (10.1 million hectares).

Table 4
Woodlands and wetlands by farm size, Canada, 2011

Farm size (hectares)	All farms		Woodlands and wetlands			
	Farms with woodlands and wetlands		Area hectares	Average area per farm	As a percentage of agricultural land area	
	number	percent			percent	percent
All farms	205,730	102,744	49.9	4,897,367	47.7	7.6
Under 100	105,169	50,058	47.6	722,610	14.4	18.4
100 to 199	34,182	19,864	58.1	765,816	38.6	15.5
200 to 299	15,226	8,552	56.2	509,738	59.6	13.5
300 to 399	10,730	5,684	53.0	393,563	69.2	10.5
400 to 499	6,650	3,305	49.7	272,839	82.6	9.2
500 to 749	11,918	5,797	48.6	517,592	89.3	7.1
750 to 999	7,075	3,262	46.1	369,410	113.2	6.1
1,000 to 1,999	10,145	4,547	44.8	692,727	152.3	5.0
2,000 or more	4,635	1,675	36.1	653,073	389.9	3.6

Source: Statistics Canada, Census of Agriculture, 2011.

Table 5
Woodlands and wetlands by North American Industry Classification System (NAICS) farm type, Canada, 2011

Farm type (by NAICS)	All farms		Woodlands and wetlands			
	Farms with woodlands and wetlands		Area hectares	Average area per farm	As a percentage of agricultural land area	
	number	percent			percent	percent
All farms	205,730	102,744	49.9	4,897,367	47.7	7.6
Dairy cattle and milk production	12,207	8,513	69.7	362,675	42.6	16.9
Beef cattle ranching and farming, including feedlots	37,406	17,133	45.8	1,133,451	66.2	5.9
Hog and pig farming	3,470	1,909	55.0	66,956	35.1	10.5
Poultry and egg production	4,484	1,789	39.9	36,634	20.5	15.8
Sheep and goat farming	3,924	2,002	51.0	48,670	24.3	23.5
Other animal production	24,124	10,940	45.3	310,442	28.4	10.0
Oilseed and grain farming	61,692	28,963	46.9	1,483,879	51.2	4.7
Vegetable and melon farming	4,822	2,410	50.0	96,694	40.1	14.4
Fruit and tree nut farming	8,253	3,587	43.5	165,263	46.1	47.5
Greenhouse, nursery and floriculture production	7,946	3,361	42.3	102,728	30.6	37.1
Other crop farming	37,402	22,137	59.2	1,089,974	49.2	16.9

Source: Statistics Canada, Census of Agriculture, 2011.

6. The category “other animal” includes establishments primarily engaged in raising animals, such as bees, horses, rabbits, llamas, deer, or combinations of animals.

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Woodlands and wetlands

Approximately half of all farms (49.9%) reported woodlands and wetlands in 2011. In contrast to natural land for pasture, woodlands and wetlands were more commonly reported on small to mid-sized operations (Table 4). However, the average woodlands and wetlands area for a farm in a particular size category increased with farm size.

Woodlands and wetlands were most commonly reported on “dairy cattle” farms, followed by “other

crop”⁷ farms and “hog and pig” farms (Table 5). “Oilseed and grain” farms, the most common farm type in 2011 representing 3 in 10 of all farm operations, also accounted for the largest area of woodlands and wetlands (1.5 million hectares).

How do farmers benefit from wildlife?

Wildlife provides many benefits to farmers that are not always obvious. These “ecosystem services” include crop pollination, breakdown of

organic matter to provide nutrients for crops, contaminant degradation and agricultural pest control. For example, a member of the little brown bat species can eat 600 mosquitoes in an hour,⁸ a breeding pair of ferruginous hawks can effectively control gophers,⁹ and lady beetles are important predators of numerous agricultural pests including soybean aphids.¹⁰

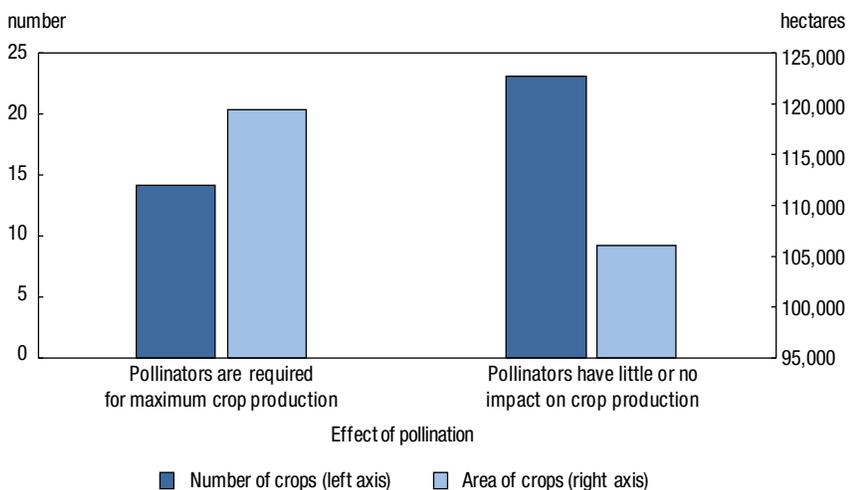
Agricultural dependence on pollinators

One of the valuable ecosystem services that wildlife provides to agriculture is pollination. While some food crops grown in Canada require insect pollinators to produce a crop or to achieve maximum yields, for other crops, pollinators have little effect on crop production.¹¹

The majority of the fruits, and certain vegetables and field crops reported in the Census of Agriculture, depend on pollinators for pollination. For fruits and vegetables alone, pollinators are required for maximum production of 14 food crops,¹² which totalled 119,418 hectares in 2011 (Chart 2).

Pollinators are also required for successful crops of buckwheat, sunflowers, mustard seed and caraway seed, and can increase the yields for some canola crops, as well as certain varieties of soybeans and dry beans.

Chart 2
The importance of pollinators on the production of fruit and vegetables, Canada, 2011



Note: Each category in the Census of Agriculture questionnaire was counted as a crop: “apples,” “pears,” “plums and prunes,” “cherries (sweet),” “cherries (sour),” “peaches,” “apricots,” “strawberries,” “raspberries,” “cranberries,” “blueberries,” “cucumbers,” “pumpkins,” and “squash and zucchinis.”

Source: Statistics Canada, Census of Agriculture, 2011.

7. The category “other crop” includes establishments primarily engaged in hay farming, maple syrup and maple products, or combinations of fruit and vegetable or other crops.

8. Newfoundland and Labrador Department of Environment and Conservation, 2014, *Animal Facts: Little Brown Bat*, www.env.gov.nl.ca/env/snp/programs/education/animal_facts/mammals/brown_bat.html (accessed July 24, 2014).

9. Alberta Agriculture and Rural Development, 2012, *Agri-Facts: Managing Richardson’s Ground Squirrels*, [http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/agdex3471](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex3471) (accessed July 24, 2014).

10. Ontario Ministry of Agriculture, Food and Rural Affairs, 2009, *Agronomy Guide for Field Crops*, Publication 811, www.omafra.gov.on.ca/english/crops/pub811/p811toc.html (accessed July 24, 2014).

11. Klein, A.M., B.E. Vaissière, J.H. Cane, I. Steffan-Dewenter, S.A. Cunningham, C. Kremen and T. Tscharntke, 2007, “Importance of pollinators in changing landscapes for world crops,” *Proceedings of the Royal Society of London B: Biological Sciences*, Vol. 274, pages 303 to 313.

12. Each category in the Census of Agriculture questionnaire was counted as a crop: “apples,” “pears,” “plums and prunes,” “cherries (sweet),” “cherries (sour),” “peaches,” “apricots,” “strawberries,” “raspberries,” “cranberries,” “blueberries,” “cucumbers,” “pumpkins,” and “squash and zucchinis.”

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In total, there were 9.8 million hectares of crops in Canada that benefited from pollinators, accounting for 27.8% of total cropland area and 35.9% of all farms in 2011. Of this, 0.3 million hectares were crops that depend on pollinators for pollination (Table 6).

The presence of wild pollinators and wildlife habitat has economic advantages for farmers. Some farms rely fully on wild pollinators, such as solitary bees, bumble bees, other wild bees, wasps and flies for

pollination, while other farms bring in additional pollinators to achieve adequate pollination.¹³

For many crops that benefit from pollinators, production is positively related to the availability of wild pollinator habitat. Wildlife habitat in the surrounding area can enhance pollination by wild pollinators and thereby increase yields.^{14,15} In Canada, wildlife habitat is present on 65% of the farms that benefit from pollinators.

What farm practices benefit wildlife?

There are several agricultural practices that enhance wildlife habitat. Examples include rotational grazing, windbreaks, winter cover crops, buffer zones around water bodies, and tillage practices that retain most of the crop residue on the surface. These practices are mutually beneficial to both the farm and wildlife.

Hedgerows and tree windbreaks

Hedgerows, fencerows and windbreaks can provide shelter, food and breeding sites to many wildlife species. They can also serve as valuable travel corridors that allow animals to move between habitats. For farmers, the advantages of these agricultural features and the wildlife they support include pollination, reduced soil erosion and natural agricultural pest control. In 2011, windbreaks or shelterbelts were reported on 29.7% of all farms, down from 36.9% in 2006.

Tillage

Crop residue are materials, such as straw, stalks and stubble, that are left on a field or orchard after a crop has been harvested. The amount of crop residue that remains on the surface after harvesting depends on the type of tillage used to prepare the soil for the next crop.

Conventional tillage incorporates most of the crop residue into the soil, whereas conservation tillage and no-till retain most of the crop residue on

Table 6
Area of crops that benefit from pollinators, Canada, 2011

Crop	Area hectares
Apples	18,243
Pears	944
Plums and prunes	684
Cherries (sweet)	1,951
Cherries (sour)	1,147
Peaches	3,154
Apricots	136
Strawberries	4,486
Raspberries	2,998
Cranberries	6,148
Blueberries	70,852
Cucumbers	2,339
Pumpkins	3,441
Squash and zucchini	2,895
Mustard seed	120,127
Sunflowers	31,480
Buckwheat	13,558
Caraway seed	5,209
Crops dependant on pollinators	289,792
Canola	7,838,354
Soybeans	1,601,653
Dry white beans	37,522
Other dry beans	60,174
Crops enhanced by pollinators	9,537,703
All crops that benefit from pollinators	9,827,495

Source: Statistics Canada, Census of Agriculture, 2011.

13. Klein, A.M., B.E. Vaissière, J.H. Cane, I. Steffan-Dewenter, S.A. Cunningham, C. Kremen and T. Tscharntke, 2007, "Importance of pollinators in changing landscapes for world crops," *Proceedings of the Royal Society of London B: Biological Sciences*, Vol. 274, pages 303 to 313.
14. Klein, A.M., B.E. Vaissière, J.H. Cane, I. Steffan-Dewenter, S.A. Cunningham, C. Kremen and T. Tscharntke, 2007.
15. Morandin, L.A. and M.L. Winston, 2006, "Pollinators provide economic incentive to preserve natural land in agroecosystems," *Agriculture, Ecosystems & Environment*, Vol. 116, pages 289 to 292.

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the surface. Several wildlife species find refuge, feed and nest in crop residue, therefore these species benefit from no-till and properly timed conservation tillage.¹⁶ From the perspective of the farmer, no-till and conservation tillage can reduce soil erosion, increase soil organic matter and help retain soil moisture. One of the negative aspects of no-till seeding is that farmers will typically rely more heavily on pesticides to control weeds and insects.

The total area of agricultural land prepared for seeding has remained relatively constant over the past two decades, rising slightly from 29.0 million hectares in 1991 to 29.6 million hectares in 2011. However,

the methods used to till the soil have shifted (Chart 3). Conventional tillage is no longer the most common method used by Canadian farmers and, in 2011, it represented under 20% of all land prepared for seeding. It has been surpassed by conservation tillage (24.6%) and no-till seeding (56.4%) as the most common methods of tillage.

Grazing

Farms use both natural and tame pasture land for livestock grazing. Both types of pasture are also used by wildlife, although natural pasture is considered more valuable as both feeding and breeding habitat. Grasslands, in particular, provide

habitat for a large diversity of wildlife, including many grassland birds that benefit from well-managed livestock grazing.¹⁷

For pasture land in general, wildlife habitat and the quality of livestock forage can be improved by implementing rotational grazing. Rotational grazing involves alternating use of two or more pastures at regular intervals, or temporary fences within pastures to prevent overgrazing. This allows pastures sufficient time to recover and improves soil and plant health. In 2011, 49.4% of all farms with cattle and pasture land reported practising rotational grazing, down from 54.4% in 2006.

Buffer zones

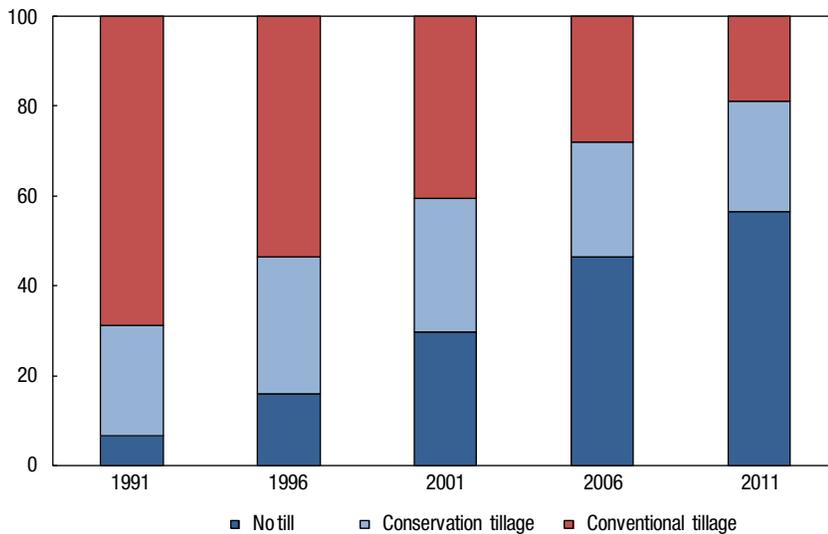
Buffer zones are strips of land around water bodies including streams, rivers and wetlands. They prevent sediments and contaminants from entering water bodies, provide wildlife habitat, and act as travel corridors between habitats. This, in turn, improves water quality for livestock use and protects fish stocks for recreational use. In 2011, buffer zones were reported on 20.7% of all Canadian farms, up from 19.6% in 2006.

Conserving natural pasture, woodlands and wetlands

Conserving natural pasture, woodlands and wetlands in the agricultural landscape is an important step to maintaining these valuable habitats. Recent challenges faced

Chart 3
Tillage practices, Canada, 1991 to 2011

percent of total land prepared for seeding



Source: Statistics Canada, Census of Agriculture, 1991 to 2011.

16. Eastern Canada Soil and Water Conservation Centre, n.d. (no date), *Enhancing Wildlife and Biodiversity*, prepared for Agriculture and Agri-Food Canada-Prairie Farm Rehabilitation Administration, www.gnb.ca/0173/30/EnhancingWildlifeBiodiversity.pdf (accessed July 24, 2014).
17. Federal, Provincial and Territorial Governments of Canada, 2010, *Canadian Biodiversity: Ecosystem Status and Trends 2010*, Canadian Councils of Resource Ministers, www.biodivcanada.ca/ecosystems (accessed October 20, 2014).

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by Canadian farmers coupled with increases in cash crop prices have made this a difficult task. Stewardship programs, such as community pastures, have played an important role in maintaining natural pasture land in Canada.^{18,19} For example, 468 community pastures reported over 2.4 million hectares of natural pasture on the 2011 Census of Agriculture. Overall, however, there was a 4.8% decrease in natural pasture land between 2006 and 2011.

Woodlands and wetlands reported in the Census of Agriculture also decreased between 2006 and 2011. Across Canada there was an 8.8% decline in woodlands and wetlands area on agricultural land, amounting to a decrease of approximately 0.5 million hectares.

With important wildlife habitat representing 30% of all agricultural land reported in the Census of Agriculture, and wildlife providing

invaluable ecosystem services, the relationship between agriculture and wildlife might be described as co-dependent.

Producers are increasingly being recognized as stewards of biodiversity. Through conservation and proper management of the agricultural landscape, this relationship can continue to be beneficial to both producers and wildlife.

18. Agriculture and Agri-Food Canada, 2013, *Community Pasture Program*, www.agr.gc.ca/eng/?id=1298388156452 (accessed July 24, 2014).

19. Federal, Provincial and Territorial Governments of Canada, 2010, *Canadian Biodiversity: Ecosystem Status and Trends 2010*, Canadian Councils of Resource Ministers, www.biodivcanada.ca/ecosystems (accessed October 10, 2014).