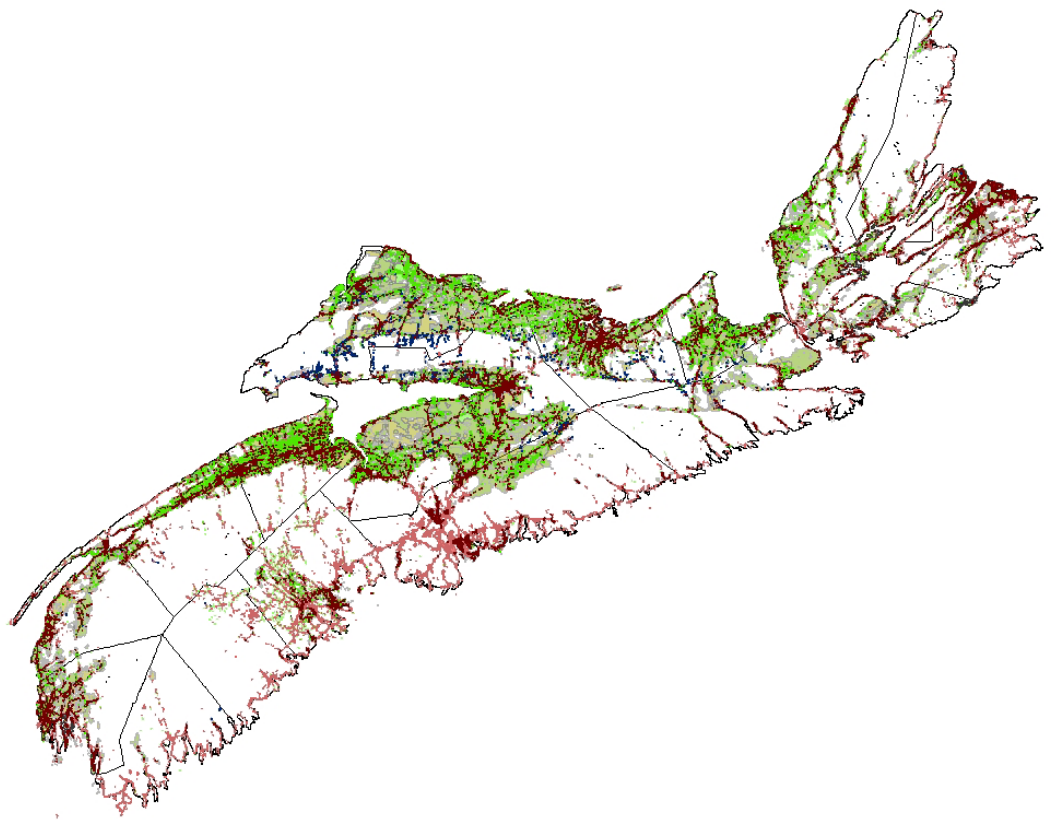


Profile of Agricultural Land Resources in Nova Scotia



Prepared by:
Michael Devanney, Economist
Nova Scotia Department of Agriculture
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devannm@gov.ns.ca

NOVA SCOTIA



PROFILE of AGRICULTURAL LAND RESOURCES

Introduction

This report presents an overview of agricultural land resources in Nova Scotia. The following sections describe how much arable land assets the province and its counties have, where the land is located and how it is being used. The report also provides an estimate of how much arable land has been lost to urban development as well as farmland that is threatened by property fragmentation and encroachment.

Key terms

CLI- Canada Land Inventory. A land classification system, the agricultural portion of which designates land capability for agriculture.

CLI2- The best arable land in Nova Scotia (not necessarily used for agriculture). These soils have moderate limitations for crops or require moderate conservation practices.

CLI3- Soils have moderately severe limitations that restrict use for crops or require special conservation practices.

CLI4- Soils have severe limitations that restrict use for crops or require special conservation practices or both.

CLI5 and poorer- Soils have very severe limitations for crops.

ALIP- Farmland (including wild blueberries) as designated by the 1998 Agricultural Land Identification Project by the NS Department of Agriculture.

Agricultural and blueberry land (DNR)- Farmland and wild blueberry agriculture as identified by the NS Department of Natural Resources.

Data and limitations

This report relies on three primary data sets:

The Canadian Land Inventory (CLI), produced in 1960s to early 1980s provides land capability classifications for agriculture among other rural land uses. While this information is old and at a large geographic scale 1:250,000, the information is useful in providing guidance regarding the province's agricultural land resources. The main limitation to these data are distortions in certain areas of the province (mainly in southwestern Nova Scotia and Cape Breton). Where these distortions result in the CLI data not fitting with the other data sources used in this report, errors will occur. For most of the main agricultural regions of the province, the CLI data seem to fit with the other data sources well.

The Forestry Inventory Geographic Information System of the Nova Scotia Department of Natural Resources (DNR) maintains a spatial dataset which displays and categorizes the land cover of Nova Scotia. These maps were used to determine the location and size of urban areas, agriculture and wild blueberry land. The land classifications were interpreted from air photos and satellite imagery acquired between 1997 and 2006. Data are not collected on a county basis and so counties contain data based on images from multiple years. For this reason, exact comparisons between counties cannot be made.

In 1998, the Nova Scotia Department of Agriculture completed the Agricultural Land Identification Project (ALIP). This project used a combination of the DNR forest coverage files mentioned above and ground confirmation (truthing) to determine active and inactive agricultural lands in the province. While very useful, this information is now dated. An updated version of this report with new ALIP data would be significantly more accurate for 2010.

Property and civic address data for the province of Nova Scotia were also used in this analysis.

Methodology

The datasets described above were imported into ESRI's ArcMap GIS software to arrive at the calculations in this report. The main analysis tools used were the spatial area calculator to determine hectares, and the clip function to determine how much of one land type (e.g. agriculture) occurred on a second land type (e.g. CLI 2).

The CLI data were reprojected from coordinate system NAD 1927 UTM Zone 20N to NAD 1983 UTM Zone 20N. This is the closest coordinate system available to shift the data to more accurately fit with the other sources of geographic data used in this report.

The ALIP data were manually shifted in ArcMap as it was determined that the original projection was not accurate. This small shift helped to fit the ALIP data with the other data used in this report.

Overview of land resources

Lands most suitable for agricultural production (Canadian Land Inventory (CLI) classes 2,3 and 4¹) cover slightly less than 30 percent of Nova Scotia's land area (see Table 1). The province's best arable land (CLI2) accounts for 3 percent of the land area, while CLI3 and CLI4 cover 18 and 8 percent, respectively. This land is not necessarily used for agriculture and may instead be used for urban development, for other economic uses, or exist in a forested/natural state.

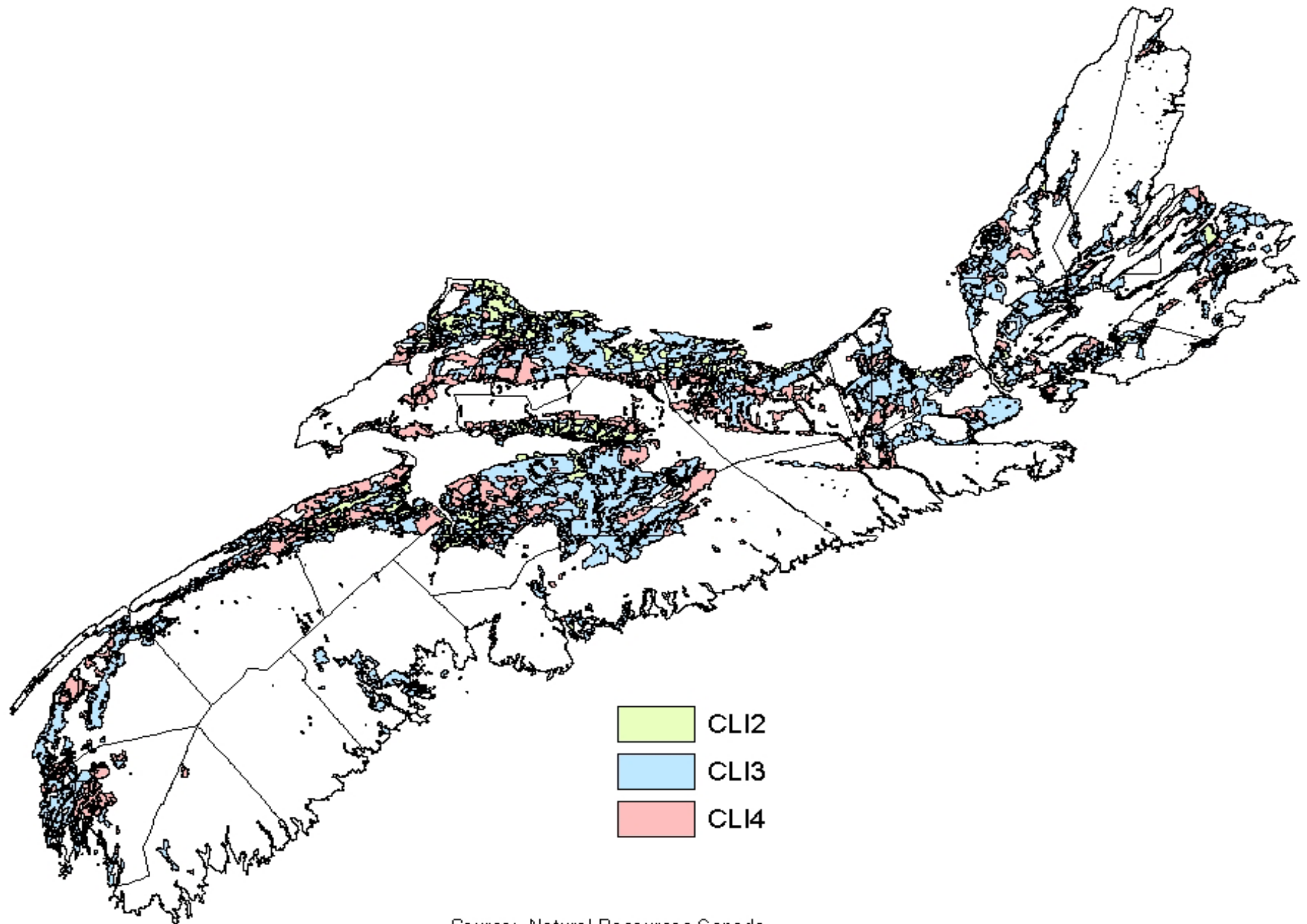
Table 1. Agricultural land resources- Nova Scotia		
	Hectares	Percent of provincial land area
CLI 2,3,4 TOTAL	1,573,160	28.7
CLI 2	164,933	3.1
CLI 3	990,062	18.1
CLI 4	418,166	7.6
Agricultural land (ALIP)*	235,965	4.3
Agricultural land (DNR)**	229,004	4.2
Blueberry land (DNR)**	16,508	0.3
<p>* As indicated by the NSDA Agricultural Land Identification Project. ** Based on forest coverage files from NS Natural Resources (blueberry land is low-bush/ wild) Source: Nova Scotia Department of Agriculture, NS Natural Resources, Natural Resources Canada</p>		

Approximately 235,000 hectares are used for agriculture (including blueberry production) as indicated by the ALIP project in 1998, amounting to 4.3 percent of the province's area (Figure 1b). Agricultural land as identified by DNR forest inventory data amounts to approximately 229,000 hectares with a further 16,500 hectares estimated to be in wild blueberry production.

Land with suitability for agricultural production is concentrated in the Annapolis Valley, throughout most of Hants County, and along the Northumberland Strait. There are also significant concentrations in Digby and Yarmouth counties, in southern Inverness and around the Cape Breton Regional Municipality.

¹ Nova Scotia does not have any CLI class 1 soil. Class 2 to 4 soils have moderate to severe limitations that restrict the range of crops or require special conservation practices or both. Class 5 soils and below have very severe limitations for agriculture.

Figure 1a. Agricultural land resources in Nova Scotia



Source: Natural Resources Canada

Cumberland County has the most CLI 2,3,4 soils in Nova Scotia with 232,379 hectares (14.8 percent of provincial total), followed by Hants (188,497 ha, 12 percent) and Colchester (181,843 ha, 11.6 percent). Shelburne and Queens counties have the least amount of arable land, each with less than 1 percent of the provincial total. Kings, while being the most important county in terms of agricultural output, is actually the sixth county in terms of arable land area at 107,850 hectares (6.9 percent).

Cumberland is also endowed with the largest area of highest rated soils for agriculture (CLI2) in the province with 50,235 hectares (30.5 percent of the provincial CLI2 total). Colchester has the second largest area of these lands with 33,684 hectares (20.4 percent) followed by Kings (20,438 ha, 12.4 percent). Yarmouth, Lunenburg, Shelburne and Queens have no CLI2 land.

Hants has the most CLI3 land with 125,362 hectares (12.7 percent of provincial CLI3 total). Cumberland also has the largest area of CLI4 land (74,931 ha, 17.9 percent).

Hants County has the most arable land as a percentage of county area with CLI2,3,4 lands accounting for 61.9 percent of the county's land. Antigonish is essentially the same at 61.7 percent. Cumberland (54.2 percent), Pictou (50.8 percent), Kings (50.6 percent) and Colchester (50.3 percent) all have over half of their land as CLI 2, 3 or 4. Lunenburg (9.4 percent), Shelburne (1.9 percent) and Queens (0.2 percent) all have less than 10 percent arable lands. For full county level information see appendix table A1.

Figure 1b. Agriculture and urban land development in Nova Scotia

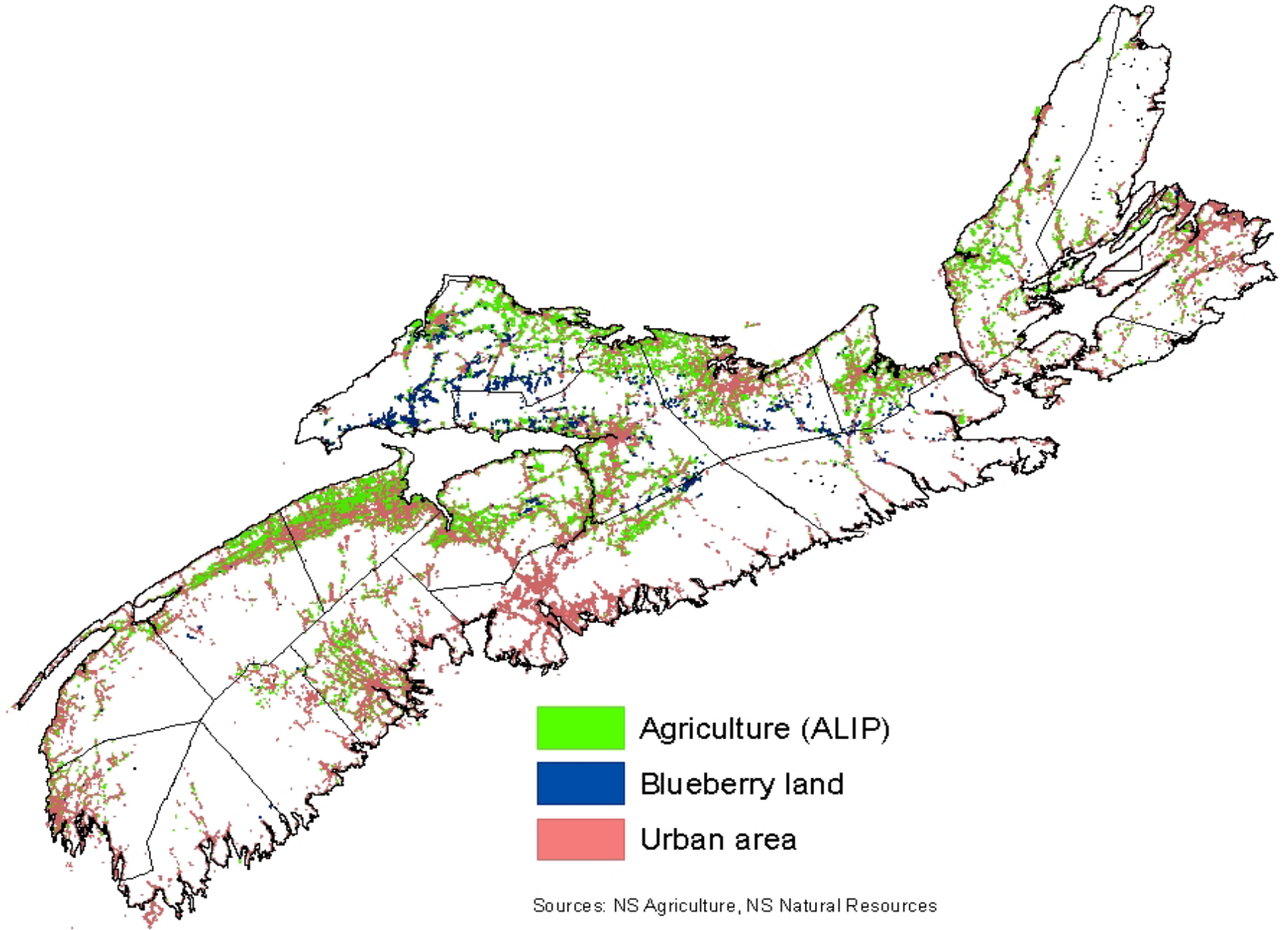
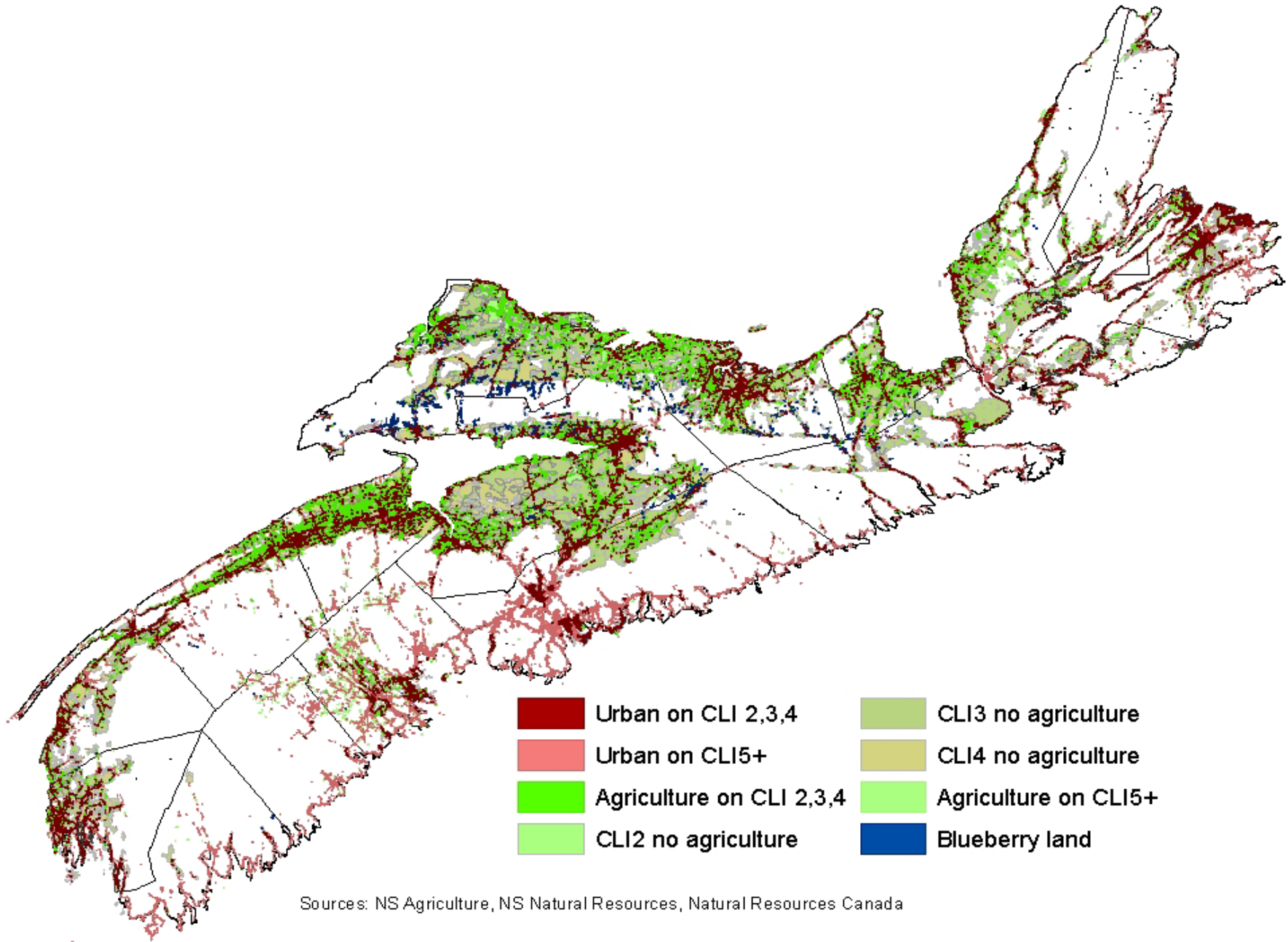


Figure 1c. Agricultural land resources and development (overlay)



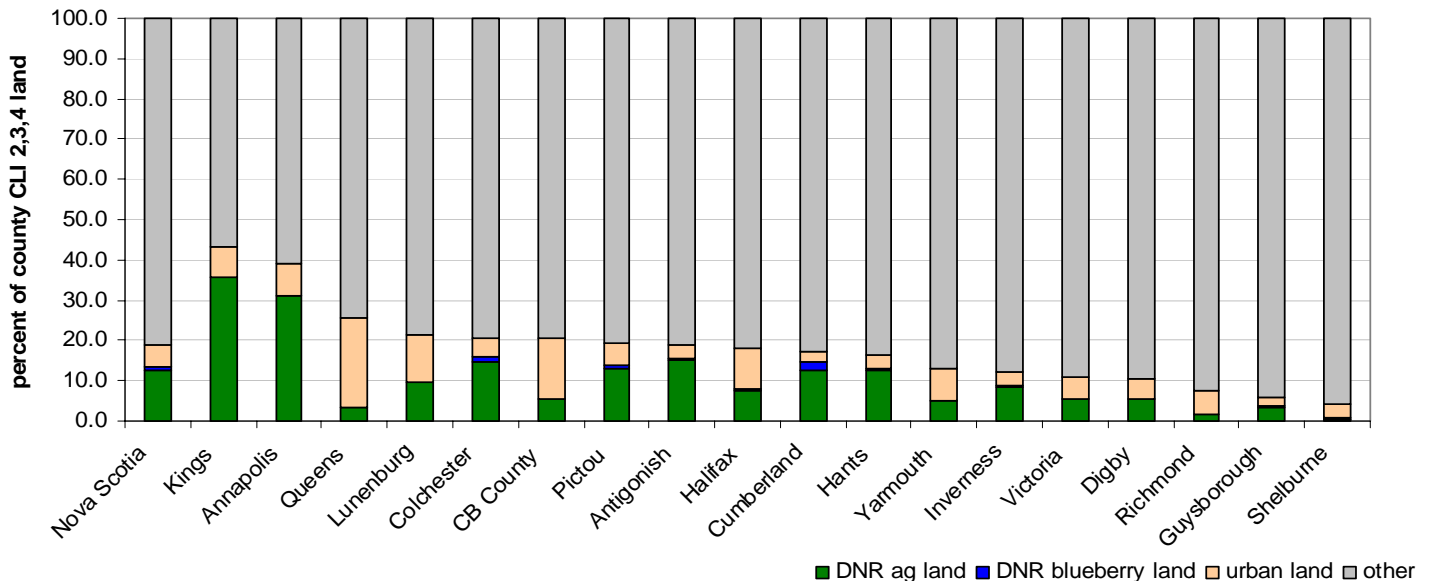
Sources: NS Agriculture, NS Natural Resources, Natural Resources Canada

Usage of arable land and composition of farmed land

Approximately 13 percent of land most suitable for agricultural production (CLI classes 2, 3 and 4) is used for agriculture in Nova Scotia. Slightly less than 1 percent of this land is also used for wild blueberry production. Urban development takes up 5.4 percent of CLI 2,3,4 and the remaining 81 percent is in some other use (natural forest or other natural state, cultivated forest, etc).

Kings County makes the most use of its arable land for agricultural production (Figure 2). Over one-third (36 percent) of CLI 2,3,4 land in Kings is in farming. Annapolis County also utilizes a significant portion of its arable land for farming (31 percent). Beyond Kings and Annapolis, utilization rates for arable lands drop off significantly (Antigonish is third highest at 15 percent). This is a result of (1) other counties having relatively large endowments of arable land and/or (2) low utilization of CLI 2,3,4 land for agriculture.

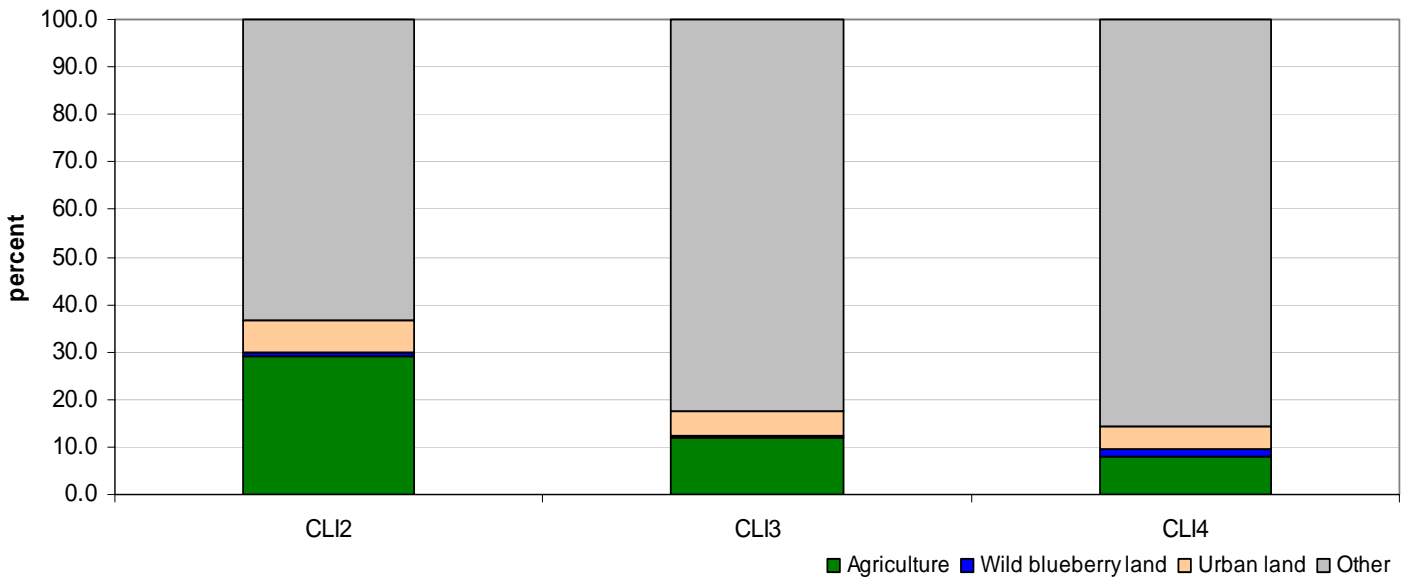
Figure 2. Utilization of soils suitable for agriculture



Cumberland County uses 2.4 percent of arable land for wild blueberry production, the highest in the province. Most blueberry production takes place on soils not suitable for agriculture.

Utilization of arable land for farming is highest on the best arable land (see Figure 2b). Provincially, 29 percent of the best land for agriculture, CLI2, is used for farming. Approximately 12 percent of CLI3 and 8 percent of CLI4 land is used in farming. Urban development takes up 6.9 percent of CLI2 land, 5.4 percent of CLI3 and 4.6 percent of CLI4.

Figure 2b- Utilization of soils suitable for agriculture- Nova Scotia (breakdown)



Kings County utilizes 62 percent of its CLI2 land, the highest in Nova Scotia. Kings is somewhat different than the provincial average in terms of urban use of arable land. While urban utilization of arable land is highest on the best land and decreases as land quality decreases provincially, in Kings urban land takes up 7.6 percent of CLI2, 6.5 percent of CLI3, and 8.7 percent of CLI4. Urban land, relatively speaking, is using up relatively less prime arable land in Kings in favour of the lower classes of soil. This alludes to the importance of agriculture to the economy of Kings and the land use bylaws in place there.

Composition of agricultural land

Looking at the land base from a slightly different perspective (the composition of lands used for agriculture², Figure/Table 3) it is apparent that agriculture in Nova Scotia is generally taking place on good agricultural soils. Half of agricultural land is on class 3 soils, while 21 percent is on class 2 soils and 14 percent are on class 4. Only 13 percent of agriculture in Nova Scotia takes place on poorer than CLI 4 land.

Wild blueberry production is highly concentrated in CLI 4 land and poorer. Provincially, 45 percent of wild blueberry production takes place on CLI4 land and 34 percent on CLI5 or poorer. Less than 5 percent of wild blueberry production takes place on CLI2 and 16 percent is located on CLI3 land.

² Rather than arable land with *potential* for agriculture, but not necessarily farmed.

Figure 3. Composition of agricultural land

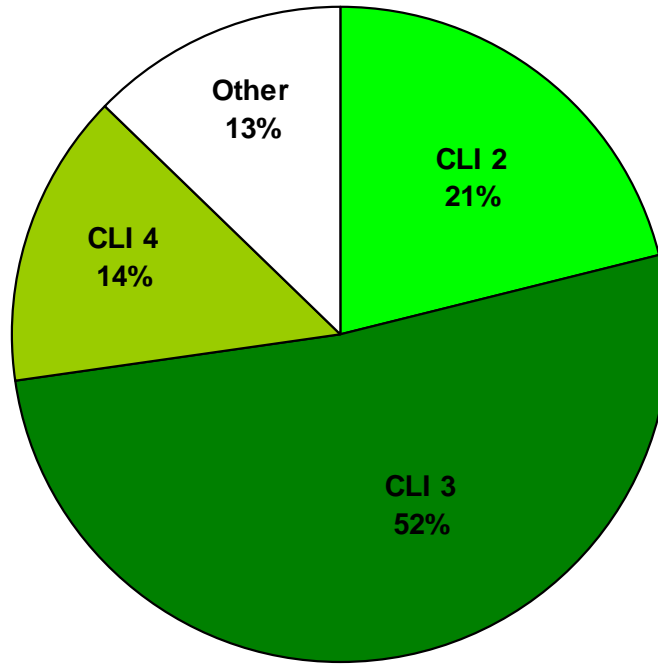


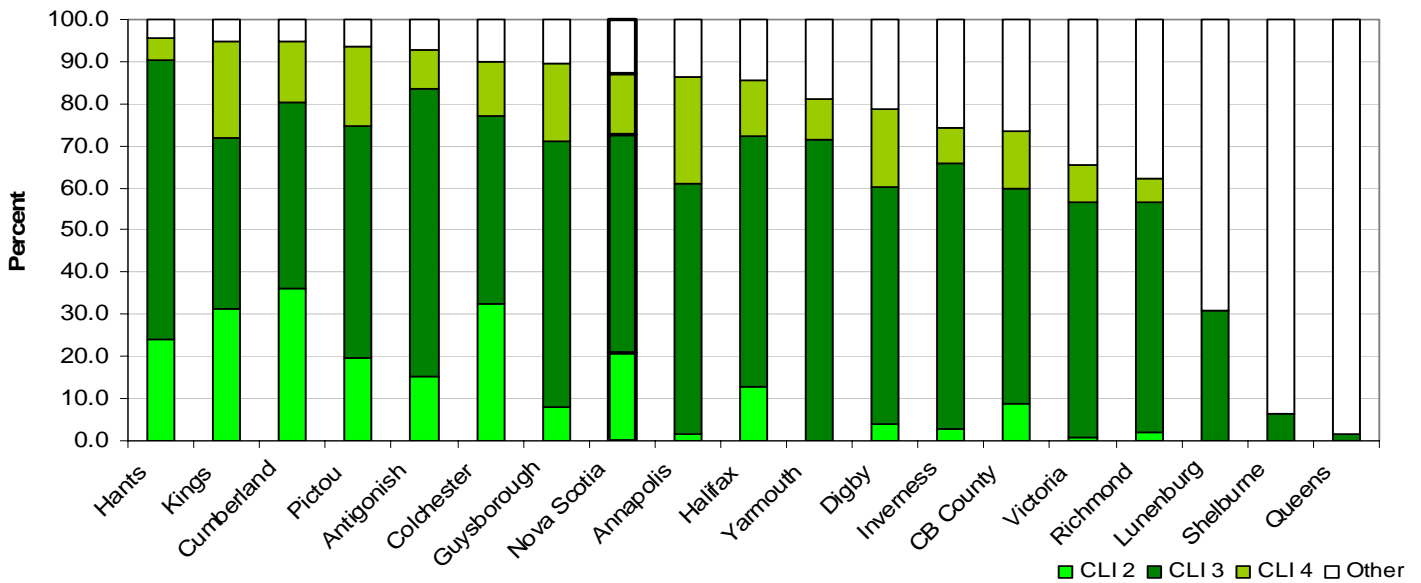
Table 3. Composition of agricultural land- Nova Scotia			
	Agricultural land (ALIP) *	Agricultural land (DNR)**	Blueberry land (DNR)**
	Percent		
CLI 2	20.5	21.1	4.7
CLI 3	49.4	51.8	16.4
CLI 4	16.3	14.5	44.5
Other	13.8	12.7	34.4

* As indicated by the NSDA Agricultural Land Identification Project.
 ** Based on forest coverage files from NS Natural Resources (blueberry land is low-bush/ wild)
 Source: Nova Scotia Department of Agriculture, Natural Resources Canada,
 Nova Scotia Department of Natural Resources.

Hants, Kings, Cumberland, Pictou, Antigonish, Colchester and Guysborough all have 90 percent or more of agriculture occurring on CLI 2,3 or 4 land (Figure 4). Seven counties have less than 75 percent of agriculture on the best arable land.

Cumberland has the highest percentage of agriculture taking place on CLI2 soil (36 percent). Colchester (33 percent), Kings (31 percent), Hants (24 percent) and Pictou (20 percent) all have 20 percent or more of agriculture located on the best agricultural land.

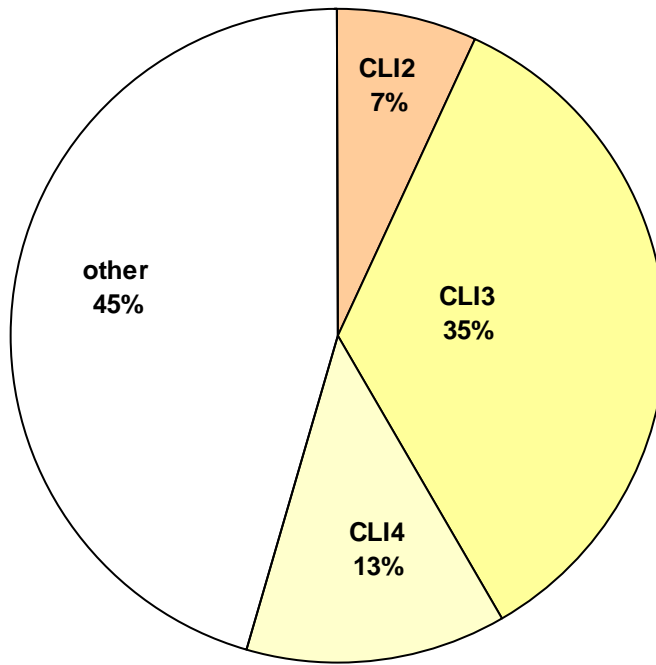
Figure 4. Percentage of agriculture occurring on CLI 2,3,4 land by county



Urban use and property fragmentation of the agricultural land base

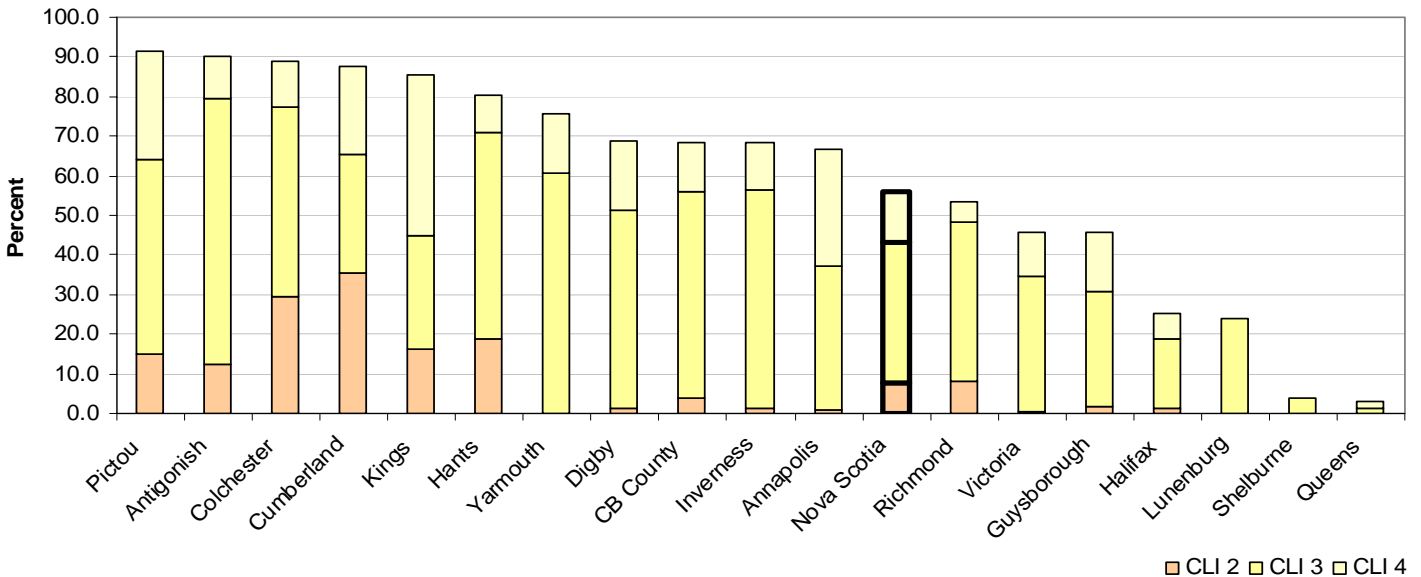
As shown in Figure 5a, a significant portion of urban areas in Nova Scotia are located on land that originally had good potential for agriculture, although 45 percent of urban areas are also located on land with poor agricultural potential. Approximately 7 percent of urban development is located on Nova Scotia's best arable land, 35 percent is on CLI 3 land and 13 percent on CLI4.

**Figure 5a. Composition of urban land-
Nova Scotia**



As shown in Figure 5b, Pictou County has over 91 percent of its urban development on CLI 4 soil or better. The Nova Scotia average is brought down substantially due to Halifax, Nova Scotia's largest urban area, being largely located on poorer than CLI 4 land.

Figure 5b. Composition of urban areas by county



Some lands currently in agriculture may be relatively easily removed for other forms of development. A contributing factor is lot size. Nova Scotia has approximately 19,000 properties of less than two hectares in size that are centered in ALIP lands. This amounts to just under 11,500 hectares of ALIP land.

Kings County has 3,020 properties and 1,883 hectares of properties less than 2 hectares in area on ALIP land, the most of any county. This amounts to just under 5 percent of Kings ALIP lands. Percentage wise, Digby has by far the most fragmented farmland with 20 percent (837 ha) of ALIP lands being on properties of less than 2 hectares. Neighboring Yarmouth County is second at 9 percent (325 ha).

In total, Nova Scotia has a total of 46,000 small (< 2 ha) properties either on, or adjacent to, ALIP farmland. These properties total approximately 30,000 hectares. Once again, Kings has the largest number of these properties with 7,206, but Digby has the highest ratio between small properties and ALIP land, followed again by Yarmouth. Shelburne and Lunenburg also have a large number of small size properties adjacent to ALIP lands relative to the size of land being farmed. Cumberland agriculture is the least threatened, relatively speaking, but does have the third largest number of these properties bordering on ALIP land.

An attempt was made to estimate the amount of farm land lost to urban development. A land cover file based on satellite and fly-over images from the NS Department of Natural Resources was compared to the original ALIP file from 1998 to determine which farm lands had become designated as urban as of the date of the DNR images.

Approximately 3,500 hectares (1.5 percent) of ALIP lands in Nova Scotia have been lost to urban development since 1998 based on this methodology. Colchester has lost the most land to urban development (819 ha) followed by Cumberland (597 ha) and Kings (400 ha). Shelburne, Queens and Victoria counties have all lost less than 25 hectares of farmland. In relative terms, Digby has lost the highest percentage of farmland (6.1 percent), followed by Shelburne (3.7 percent) and Colchester (2.5 percent).

While physical occupancy of land by non farm development or land with the potential for non-farm development can be used to estimate potential loss of land to the sector, the effect of development on adjacent agricultural lands is probably of greater significance in terms of area affected. In order to estimate the area of farmland that is at risk due to the proximity of development, a 300 ft (91.44m) buffer was drawn around the property line of each small (<2ha) property and the amount of ALIP farmland falling under this zone was calculated (Figure 6).

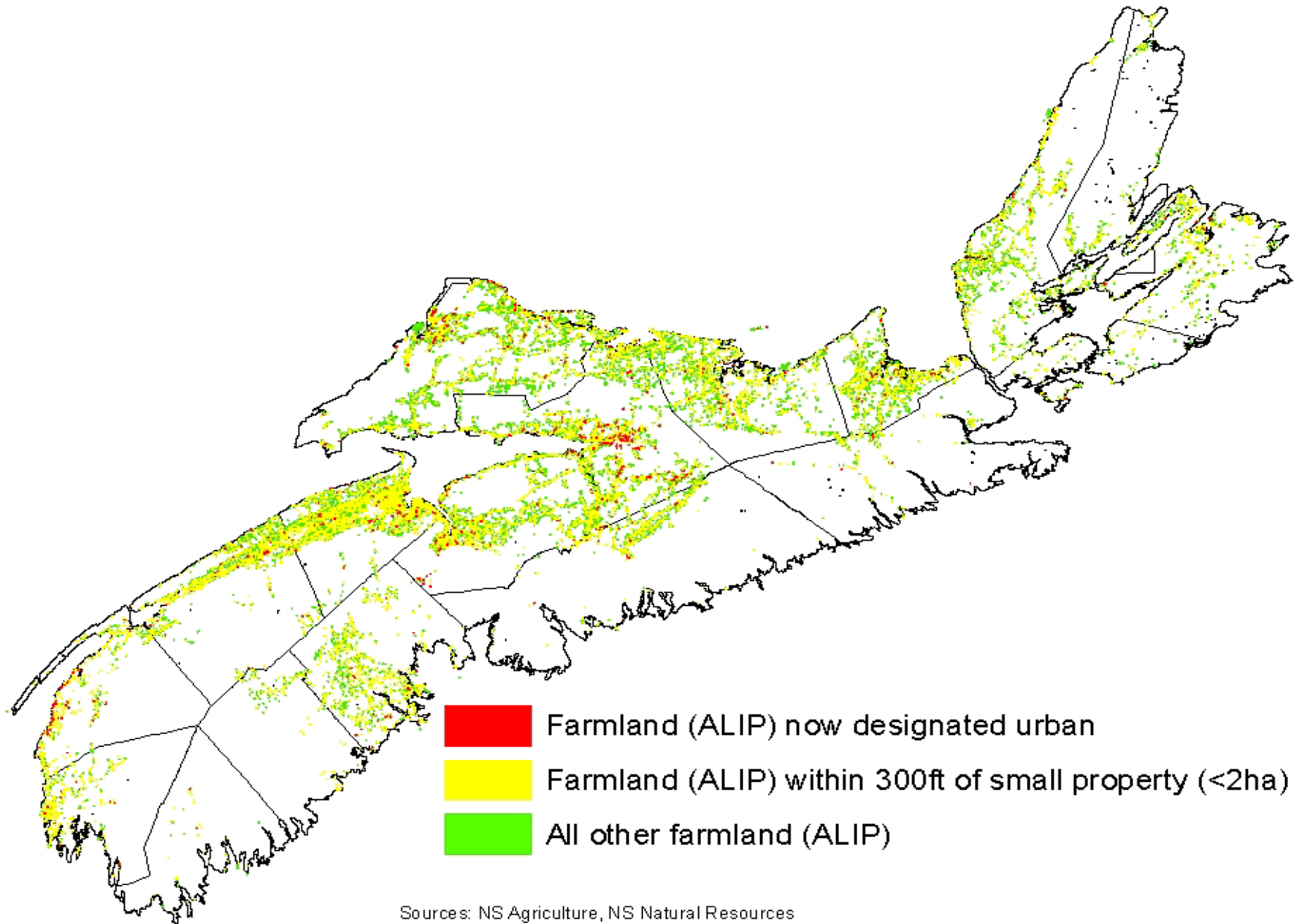
The 300 foot buffer was chosen in order to give an estimate of how much agricultural land is close enough to other forms of development that nuisance or

development conflicts could occur. There are a number of recommended setback distances, from various jurisdictions, and for a wide number of agricultural uses. The 300 foot setback was used by Kings County as a setback distance between livestock barns and residential dwellings, and was recommended by the county's Agricultural Working Group to increase to 600ft (in the case of siting new non-farm dwellings) in 2007 (Municipality of Kings, 2007).

Nova Scotia has about 30 percent of its farmland (as designated by ALIP) within 300 feet of the boundary of properties that are small enough to either currently be developed, or to be relatively easily developed. Of the roughly 70,000 hectares of agriculture in this class, approximately 70 percent are within 300 feet of a small property with a civic address. This indicates that a significant portion of agriculture in Nova Scotia faces the issues that are associated with urban encroachment on farmland.

Again, Digby County has the highest percentage of its farmland at risk at 60 percent, followed by Yarmouth (46 percent). Kings has the largest area of farmland at risk (11,920 hectares, 30 percent). Cumberland agriculture is the least threatened in percentage terms (22 percent), while Shelburne has the smallest area of farmland falling into this category (123 hectares).

Figure 6. Lost or threatened farmland



Sources: NS Agriculture, NS Natural Resources

Next steps

This overview of agricultural land resources can be used to gain a better understanding of the geography and use of arable land and farming in the province. The data used in this report are not perfect, and the accuracy and usefulness of this information could be greatly improved with updated and more precise information. Nonetheless, the findings reported here should be useful in guiding future work regarding agricultural land use in Nova Scotia.

Sources

Municipality of the County of Kings. 2007. Agricultural Working Group- Final Report.

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Nova Scotia Department of Agriculture. Agricultural Land Identification Project (ALIP).

Nova Scotia Department of Natural Resources. Forest Inventory- Geographic Information Systems. Available from: www.gov.ns.ca/natr/forestr/gis/forest-inventory.asp. Accessed [25 January 2010].

SNSMR (Service Nova Scotia and Municipal Relations). 2009. NS Civic Address File and property polygons.

APPENDIX

Table A1. Arable land resources- Nova Scotia and counties				
	Arable land (CLI 2,3,4)	CLI 2	CLI 3	CLI 4
Nova Scotia	1,573,160	164,933	990,062	418,166
Cumberland	232,379	50,233	107,213	74,931
Hants	188,497	19,630	125,362	43,506
Colchester	181,843	33,684	99,242	48,917
Pictou	144,383	19,061	75,330	49,992
Inverness	113,907	2,469	95,857	15,581
Kings	107,850	20,438	42,898	44,515
Antigonish	89,499	6,875	65,597	17,027
Halifax	83,941	3,093	63,149	17,699
Cape Breton	78,220	3,589	59,983	14,647
Digby	68,756	1,282	47,899	19,574
Guysborough	64,945	1,217	49,000	14,729
Yarmouth	61,532	0	38,933	22,599
Annapolis	47,082	629	28,560	17,893
Richmond	43,220	2,408	32,733	8,080
Victoria	34,869	325	27,466	7,078
Lunenburg	27,138	0	27,138	0
Shelburne	4,631	0	3,437	1,194
Queens	470	0	265	205
Source: Natural Resources Canada				

Table A2. Land in Farming- Nova Scotia and counties			
	Agricultural land (ALIP)*	Agricultural land (DNR)**	Blueberry land (DNR)**
Nova Scotia	235,964	229,004	16,508
Kings	40,188	40,461	0
Cumberland	38,775	30,528	8,933
Colchester	33,025	30,108	3,128
Hants	24,795	25,144	420
Pictou	20,994	20,302	1,931
Annapolis	16,134	16,978	61
Antigonish	13,924	14,542	534
Inverness	12,488	13,092	170
Lunenburg	7,716	8,392	33
Halifax	7,676	7,488	538
Cape Breton	5,584	5,635	108
Digby	4,205	4,807	45
Yarmouth	3,514	3,791	21
Victoria	2,725	2,897	0
Guysborough	1,779	2,331	454
Richmond	1,132	1,259	0
Queens	989	1,018	33
Shelburne	322	232	101
<p>* As indicated by the NSDA Agricultural Land Identification Project. ** Based on forest coverage files from NS Natural Resources (blueberry land is low-bush/wild) Source: NS Agriculture, NS Natural Resources</p>			

