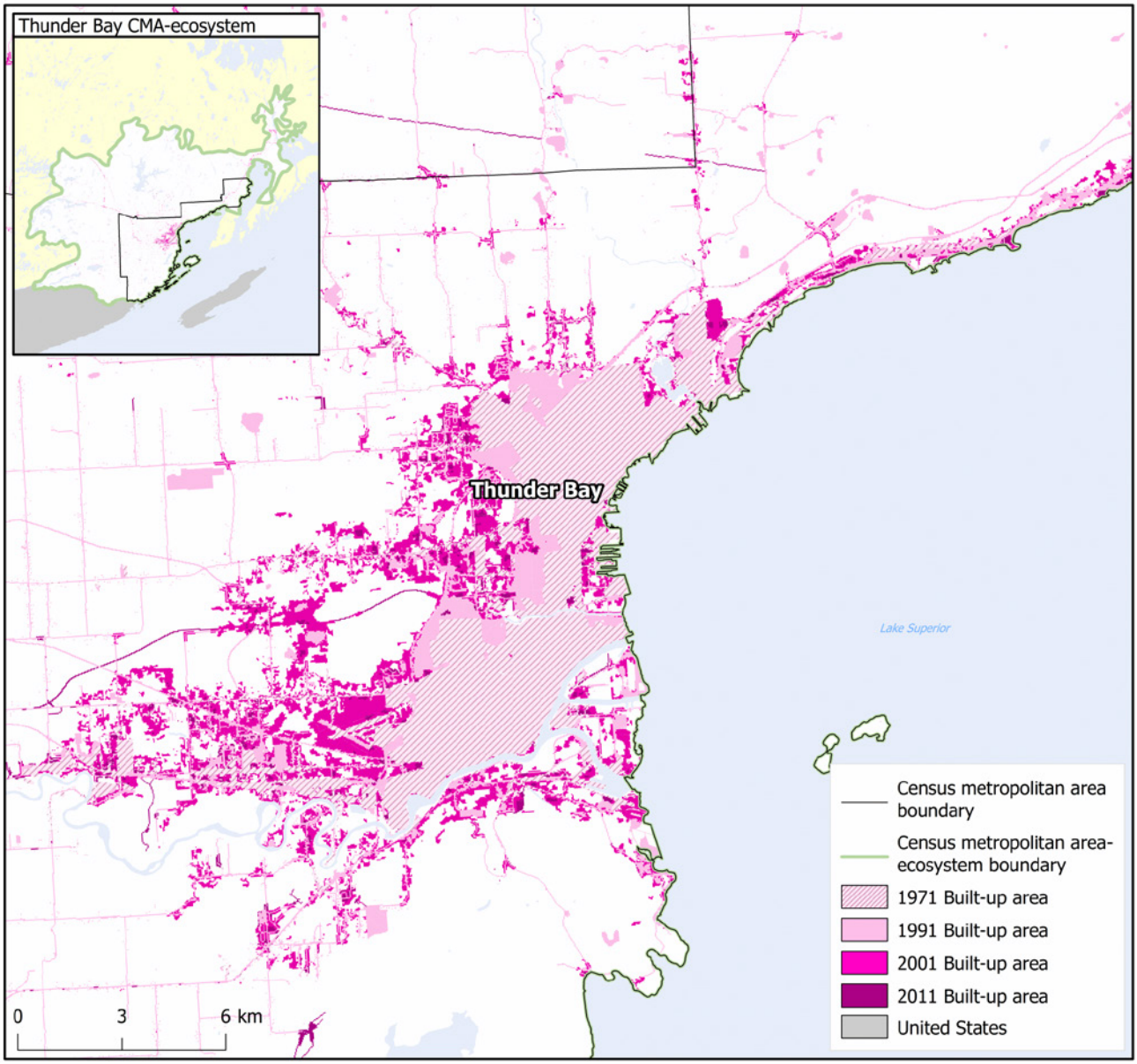
Thunder Bay, Ontario

Highlights

- At the CMA level, built-up area increased from 71 km^2 in 1971 to 193 km^2 in 2011, an increase of 170%.
- At the CMA-E level, built-up area increased from 79 km^2 in 1971 to 307 km^2 in 2011, an increase of 289%.
- In 2011, the natural and semi-natural land class was divided into forest (59%), water (8%) and other (33%).
- From 1971 to 2011, 20 km^2 of arable land and 130 km^2 of natural and semi-natural land were lost to settled area.
- Of the natural and semi-natural land converted to settled area from 1971 to 2011, 62.2% was forest, 5.3% was natural land for pasture and 32.4% was classed as other.
- Population in the CMA increased by 5% from 115,564 to 121,596 between 1971 and 2011.
- The number of dwellings in the CMA increased by 69% from 33,190 to 56,071 between 1971 and 2011.

Map 3.28
Built-up area, Thunder Bay census metropolitan area (CMA) and census metropolitan area-ecosystem (CMA-E), 1971, 1991, 2001 and 2011

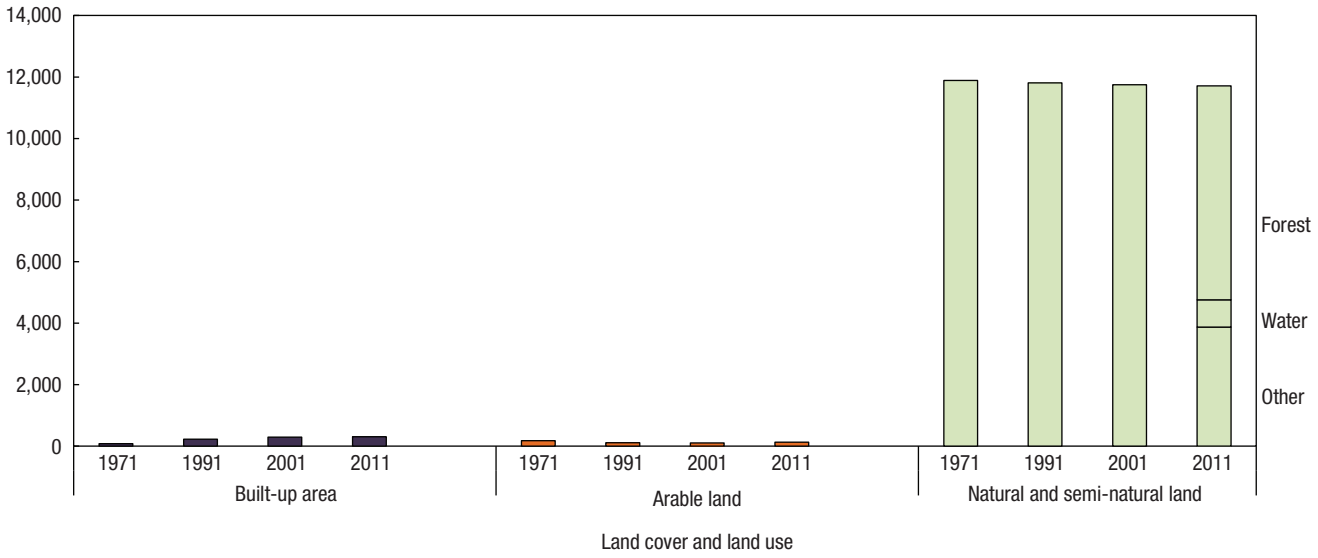


Note: Sources for 1971 built-up area do not contain the same level of detail as the more recent years.

Sources: Statistics Canada, Environment, Energy and Transportation Statistics Division, 2016, special tabulation of data from Natural Resources Canada (NRCan), Canada Centre for Remote Sensing (CCRS), 1999, *Canada Land Inventory: CLI Land Use (circa 1966),* ftp://ftp2.cits.rncan.gc.ca/pub/geott/cli_250k/landuse/ (accessed September 15, 2015); NRCan, CCRS, 1999, *Canada Land Use Monitoring Program (CLUMP): Land Use (1971),* ftp://ftp2.cits.rncan.gc.ca/pub/geott/clump/clump_1971/ (accessed September 15, 2015); Agriculture and Agri-Food Canada, 2015, *Land Use 1990, 2000 and 2010,* http://open.canada.ca/data/en/dataset/18e3ef1a-497c-40c6-8326-aac1a34a0dec (accessed September 16, 2015); NRCan, Canada Centre for Mapping and Earth Observation, 2014, *CanVec+* , ftp://ftp2.cits.rncan.gc.ca/pub/canvec+/shp/ (accessed August 10, 2015); United States Census Bureau, 2014, *Digital cartographic file in shapefile format – States*, file: cb_2014_us_state_500k.zip, http://www.census.gov/geo/maps-data/data/cbf/cbf_state.html (accessed October 29, 2015).

Chart 3.55
Land cover and land use, Thunder Bay census metropolitan area-ecosystem (CMA-E), 1971, 1991, 2001 and 2011

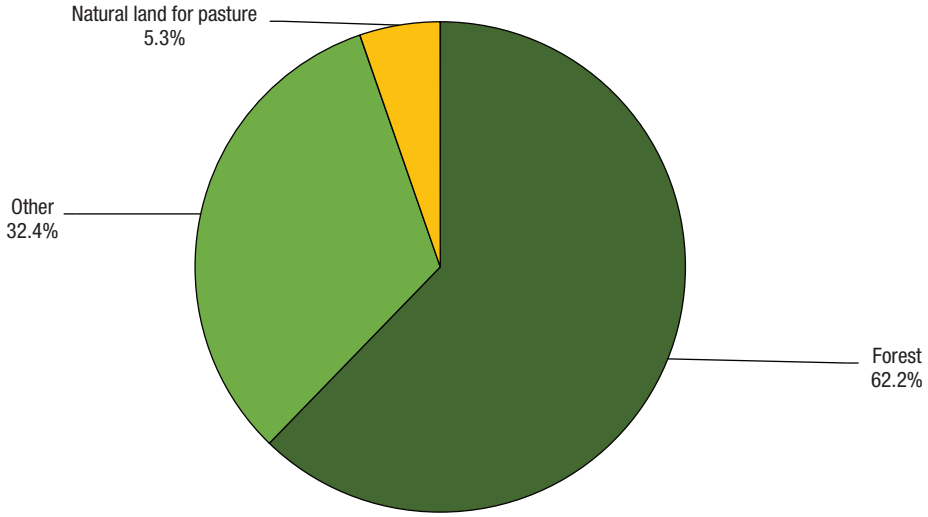
square kilometres



Notes: Built-up area for 1971 is based on *Canada Land Inventory: Land Use* (CLI: LU) and *Canada Land Use Monitoring Program* (CLUMP), with modeling of roads. CLI: LU and CLUMP built-up areas that were not built-up in the AAFC *Land Use, 1990* dataset were removed from the 1971 built-up data and reclassified according to their 1990 cover. Built-up areas for other years are taken from *Land Use, 1990, 2000 and 2010*. Arable land is composed of the cropland, tame or seeded pasture and summerfallow land from the Interpolated Census of Agriculture. Natural and semi-natural land is the residual area remaining after subtracting built-up and arable land from the total area. Because it was calculated residually, the class also includes some homes and other buildings, particularly those located on large lots and in rural areas, since these may not be captured by satellite imagery as built-up, due in part to the resolution of the data, but also overlying tree canopy. For 2011, forest and water are broken out separately based on data from *AAFC Crop Inventory, 2011* and *CanVec+* respectively. Other natural and semi-natural land is a residual class calculated by subtracting all other classes from the total area.
Sources: Statistics Canada, Environment, Energy and Transportation Statistics Division, 2016, special tabulation of data from Natural Resources Canada (NRCan), Canada Centre for Remote Sensing (CCRS), 1999, *Canada Land Inventory: CLI Land Use (circa 1966)*, ftp://ftp2.cits.rncan.gc.ca/pub/geott/cli_250k/landuse/ (accessed September 15, 2015); NRCan, CCRS, 1999, *Canada Land Use Monitoring Program (CLUMP): CLUMP Land Use (1971)*, ftp://ftp2.cits.rncan.gc.ca/pub/geott/clump/clump_1971/ (accessed September 15, 2015); Agriculture and Agri-Food Canada (AAFC), 2015, *Land Use 1990, 2000 and 2010*, http://open.canada.ca/data/en/dataset/18e3ef1a-497c-40c6-8326-aac1a34a0dec (accessed September 16, 2015); AAFC and Statistics Canada, special tabulation, *Census of Agriculture*, Census Geographic Component Base 2011 and Census of Agriculture Regular Base 1971; AAFC, 2013, *AAFC Crop Inventory, 2011*, http://open.canada.ca/data/en/dataset/58ca7629-4f6d-465a-88eb-ad7fd3a847e3 (accessed August 10, 2015); NRCan, Canada Centre for Mapping and Earth Observation, 2014, *CanVec+*, ftp://ftp2.cits.rncan.gc.ca/pub/canvec+/shp/ (accessed August 10, 2015).

Chart 3.56

Natural and semi-natural land lost to settled area, by selected land class, Thunder Bay census metropolitan area-ecosystem (CMA-E), 1971 to 2011



Notes: Natural and semi-natural land lost to settled area is calculated by overlaying the growth in settled area from 1971 to 2011 on natural and semi-natural land from the *Canada Land Inventory: Land Use (CLI: LU)* base layer and, for areas where the 1971 settled area was trimmed, on the area reclassified using AAFC's *Land Use, 1990*. Natural and semi-natural land lost to roads is not included. Other could include rock and unvegetated surfaces; wetland; mines, quarries, sand and gravel pits; outdoor recreation; other natural and semi-natural land and unmapped areas.

Sources: Statistics Canada, Environment, Energy and Transportation Statistics Division, 2016, special tabulation of data from Natural Resources Canada (NRCan), Canada Centre for Remote Sensing (CCRS), 1999, *Canada Land Inventory: CLI Land Use (circa 1966)*, ftp://ftp2.cits.rncan.gc.ca/pub/geott/cli_250k/landuse/ (accessed September 15, 2015); NRCan, CCRS, 1999, *Canada Land Use Monitoring Program (CLUMP): CLUMP Land Use (1971)*, ftp://ftp2.cits.rncan.gc.ca/pub/geott/clump/clump_1971/ (accessed September 15, 2015); Agriculture and Agri-Food Canada, 2015, *Land Use 1990, 2000 and 2010*, http://open.canada.ca/data/en/dataset/18e3ef1a-497c-40c6-8326-aac1a34a0dec (accessed September 16, 2015).

Table 3.82
Population and dwellings, total and settled area, Thunder Bay census metropolitan area (CMA) and census metropolitan area-ecosystem (CMA-E), 1971, 1991, 2001 and 2011

	CMA[1]		CMA-ecosystem[2]	
	Total area	Settled area[3]	Total area	Settled area[3]
	number			
1971				
Population	115,564	107,043	123,361	107,043
Dwellings	33,190	30,876	35,362	30,876
1991				
Population	123,838	120,818	132,951	127,293
Dwellings	46,372	45,466	49,541	47,741
2001				
Population	120,773	112,062	129,550	117,010
Dwellings	53,331	49,755	58,936	52,601
2011				
Population	121,596	110,457	129,800	115,002
Dwellings	56,071	51,483	62,185	54,849
	percent			
Population and dwelling change, 1971 to 2011				
Population	5	3	5	7
Dwellings	69	67	76	78

1. 2011 census metropolitan area (CMA) boundaries are used for all years.
2. The CMA-Ecosystem (CMA-E) combines any Soil Landscapes of Canada (SLC) polygon that is contained within or that intersects with the CMA boundary, as well as SLC polygons that are fully contained within this newly formed boundary of the CMA-E.
3. Settled area is defined as the built-up area excluding roads. Settled area population and dwelling counts include 1971 and 1991 enumeration area points and 2001 and 2011 dissemination block points located within 400 m of the settled area. Population and dwelling data for 2001 and 2011 is finer in scale than data for 1971 and 1991 and can therefore be better attributed to the settled areas, which may limit comparability of the data over time.

Sources: Statistics Canada, Environment, Energy and Transportation Statistics Division, 2016, special tabulation of data from the 1971, 1991, 2001 and 2011 Censuses of Population; Natural Resources Canada (NRCan), Canada Centre for Remote Sensing (CCRS), 1999, *Canada Land Inventory: CLI Land Use (circa 1966)*, ftp://ftp2.cits.rncan.gc.ca/pub/geott/cli_250k/landuse/ (accessed September 15, 2015); NRCan, CCRS, 1999, *Canada Land Use Monitoring Program (CLUMP): CLUMP Land Use (1971)*, ftp://ftp2.cits.rncan.gc.ca/pub/geott/clump/clump_1971/ (accessed September 15, 2015); Agriculture and Agri-Food Canada, 2015, Land Use 1990, 2000 and 2010, http://open.canada.ca/data/en/dataset/18e3ef1a-497c-40c6-8326-aac1a34a0dec (accessed September 16, 2015).

Table 3.83
Land cover and land use, Thunder Bay census metropolitan area (CMA) and census metropolitan area-ecosystem (CMA-E), 1971, 1991, 2001 and 2011

	CMA[1]	CMA-ecosystem[2]	CMA as a proportion of CMA-ecosystem
	square kilometres		percent
Total land area	2,556	12,148	21
1971			
Total built-up[3]	71	79	90
Settled	42	42	100
Roads	29	36	79
Arable[4]	..	179	..
Natural and semi-natural[5]	..	11,891	..
1991			
Total built-up[6]	144	228	63
Settled	85	123	70
Roads	58	106	55
Arable[4]	..	112	..
Natural and semi-natural[5]	..	11,808	..
2001			
Total built-up[6]	186	292	64
Settled	128	186	69
Roads	58	106	55
Arable[4]	..	108	..
Natural and semi-natural[5]	..	11,748	..
2011			
Total built-up[6]	193	307	63
Settled	132	193	68
Roads	61	114	53
Arable[4]	..	131	..
Natural and semi-natural[7]	..	11,710	..
Forest	..	6,951	..
Water	..	891	..
Other	..	3,869	..
		percent	
Land cover and land use change, 1971 to 2011			
Total built-up area[3,6]	170	289	...
Arable[4]	...	-27	...
Natural and semi-natural[5]	...	-2	...

1. 2011 census metropolitan area (CMA) boundaries are used for all years. Total area excludes water.
2. The CMA-Ecosystem (CMA-E) combines any Soil Landscapes of Canada (SLC) polygon that is contained within or that intersects with the CMA boundary, as well as SLC polygons that are fully contained within this newly formed boundary of the CMA-E. Includes all terrestrial and water surfaces.
3. Built-up area for 1971 is based on *Canada Land Inventory Land Use* (CLI: LU) and *Canada Land Use Monitoring Program* (CLUMP), code B – Urban Built-up. CLI: LU and CLUMP built-up areas that were not built-up in the AAFC *Land Use, 1990* dataset were removed from the 1971 built-up data and reclassified according to their 1990 cover. To improve comparability with the other years, roads included in the core built-up area were identified and removed to produce the 1971 settled area. The 1971 dataset did not include roads outside the core built-up area. Roads were modeled by applying the ratio of roads to settled area from 1990 to the 1971 settled area.
4. Arable land area is composed of the cropland, tame or seeded pasture and summerfallow land from the Interpolated Census of Agriculture.
5. Natural and semi-natural land is the residual area remaining after subtracting built-up and arable land from the total area. Because it was calculated residually, the class also includes some homes and other buildings, particularly those located on large lots and in rural areas, since these may not be captured by satellite imagery as built-up, due in part to the resolution of the data and overlying tree canopy.
6. Built-up area estimates for 1991, 2001 and 2011 are based on *Land Use, 1990, 2000 and 2010,* codes 21 (Settlement–Built-up and urban) and 25 (Roads–primary, secondary and tertiary).
7. For 2011, forest and water are broken out separately based on data from *AAFC Crop Inventory, 2011* and *CanVec+* respectively. Other natural and semi-natural land is a residual class calculated by subtracting all other classes from the total area. The change over time for these categories requires further validation.

Sources: Statistics Canada, Environment, Energy and Transportation Statistics Division, 2016, special tabulation of data from Natural Resources Canada (NRCan), Canada Centre for Remote Sensing (CCRS), 1999, *Canada Land Inventory: CLI Land Use (circa 1966)*, ftp://ftp2.cits.rncan.gc.ca/pub/geott/cli_250k/landuse/ (accessed September 15, 2015); NRCan, CCRS, 1999, *Canada Land Use Monitoring Program (CLUMP): CLUMP Land Use (1971),* ftp://ftp2.cits.rncan.gc.ca/pub/geott/clump/clump_1971/ (accessed September 15, 2015); Agriculture and Agri-Food Canada (AAFC), 2015, *Land Use 1990, 2000 and 2010,* http://open.canada.ca/data/en/dataset/18e3ef1a-497c-40c6-8326-aac1a34a0dec (accessed September 16, 2015); AAFC and Statistics Canada, special tabulation, *Census of Agriculture*, Census Geographic Component Base 2011 and 2001 and *Census of Agriculture*, Regular Base 1991 and 1971; AAFC, 2013, *AAFC Crop Inventory, 2011*, http://open.canada.ca/data/en/dataset/58ca7629-4f6d-465a-88eb-ad7fd3a847e3 (accessed August 10, 2015); NRCan, Canada Centre for Mapping and Earth Observation, 2014, *CanVec+,* ftp://ftp2.cits.rncan.gc.ca/pub/canvec+/shp/ (accessed August 10, 2015).

Table 3.84
Ecosystem asset account, Thunder Bay census metropolitan area-ecosystem (CMA-E), 1971 to 2011

	Total built-up area[1]			
	Settled	Roads	Arable[2]	Natural and semi-natural[3]
	square kilometres			
Opening stock 1971	42	36	179	11,891
Land lost to settled area	…	…	-20	-130
Balance of change[4]	151	77	-27	-50
Closing stock 2011	193	114	131	11,710

1. Built-up area data are taken from multiple sources. The 1971 built-up area is based on *Canada Land Inventory: Land Use* (CLI: LU) and *Canada Land Use Monitoring Program* (CLUMP). CLI: LU and CLUMP built-up areas that were not built-up in the AAFC *Land Use, 1990* dataset were removed from the 1971 built-up data and reclassified according to their 1990 cover. To improve comparability with the other years, roads included in the 1971 core built-up area were identified and removed to produce the 1971 settled area. As the 1971 dataset did not include roads outside the core built-up area, roads were modeled by applying the ratio of roads to settled area from 1990 to the 1971 settled area. Built-up area estimates for 2011 are based on *Land Use, 1990, 2000 and 2010,* codes 21 (Settlement–Built-up and urban) and 25 (Roads–primary, secondary and tertiary).
2. Arable land lost to settled area is calculated by overlaying the growth in settled areas from 1971 to 2011 on the CLI: LU base layer and, for areas where the 1971 settled area was trimmed, on the area reclassified using AAFC *Land Use, 1990*. The following CLI: LU classes were included: cropland, improved pasture and forage crops, orchards and vineyards and horticulture.
3. Natural and semi-natural land lost to settled area is calculated by overlaying the growth in settled area from 1971 to 2011 on the CLI: LU base layer and, for areas where the 1971 settled area was trimmed, on the area reclassified using AAFC *Land Use, 1990*. The following CLI: LU classes were included: forest, natural pasture and rangeland, outdoor recreation areas, rock and unvegetated surfaces, open wetland and unmapped areas.
4. The balance of change row reports the change, other than arable and natural and semi-natural land lost to settled area, that occurred from 1971 to 2011. These values are determined using an accounting procedure and represent the remaining difference between the opening and closing stock. Some rounding may occur.

Sources: Statistics Canada, Environment, Energy and Transportation Statistics Division, 2016, special tabulation of data from Natural Resources Canada (NRCan), Canada Centre for Remote Sensing (CCRS), 1999, *Canada Land Inventory: CLI Land Use (circa 1966)*, ftp://ftp2.cits.rncan.gc.ca/pub/geott/cli_250k/landuse/ (accessed September 15, 2015); NRCan, CCRS, 1999, *Canada Land Use Monitoring Program (CLUMP): CLUMP Land Use (1971),* ftp://ftp2.cits.rncan.gc.ca/pub/geott/clump/clump_1971/ (accessed September 15, 2015); Agriculture and Agri-Food Canada (AAFC), 2015, *Land Use 1990, 2000 and 2010*, http://open.canada.ca/data/en/dataset/18e3ef1a-497c-40c6-8326-aac1a34a0dec (accessed September 16, 2015); AAFC and Statistics Canada, special tabulation, *Census of Agriculture*, Census Geographic Component Base 2011 and 2001 and *Census of Agriculture*, Regular Base 1971 and 1991; NRCan, Canada Centre for Mapping and Earth Observation, 2014, *CanVec+,* ftp://ftp2.cits.rncan.gc.ca/pub/canvec+/shp/ (accessed August 10, 2015).

Links to more information

Tables by metropolitan area, Thunder Bay
www.StatCan.gc.ca/tables-tableaux/sum-som/l01/met01/met127-eng.htm

Thunder Bay CMA, population change, 2006 to 2011, by 2011 census tract
www12.StatCan.gc.ca/census-recensement/2011/geo/map-carte/pdf/thematic/2011-98310-001-595-013-01-00-eng.pdf

Metropolitan gross domestic product, experimental estimates, CANSIM TABLE 381-5000
www5.StatCan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=3815000&paSer=&pattern=&stByVal=1&p1=1&p2=31&tabMode=dataTable&csid

Thunder Bay CMA, Census Profile, 2011
www12.StatCan.gc.ca/census-recensement/2011/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CMA&Code1=595&Geo2=PR&Code2=35&Data=Count&SearchText=thunder&SearchType=Begins&SearchPR=01&B1=All&Custom=&TABID=1

Thunder Bay CMA, National Household Survey (NHS) Profile, 2011
www12.StatCan.gc.ca/nhs-enm/2011/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CMA&Code1=595&Data=Count&SearchText=thunder&SearchType=Begins&SearchPR=01&A1=All&B1=All&Custom=&TABID=1