

**-- FINAL REPORT --**

**Twentieth-Century Land Use and Occupancy Mapping Project  
for the Grand Lake Meadows, New Brunswick**

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For:

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## **ABSTRACT**

Maps and Canadian census data indicate that land use and occupancy patterns within the Grand Lake Meadows have changed over the last one hundred years. A major shift within the region in terms of the relationships between its residents and their local resources, such as value of forest products and agricultural acreage has also changed significantly. Finally, the urban population, as indicated by the Canada Census data suggest that the Grand Lake Meadows and surrounding region is significantly more urban in the later portion of the 20<sup>th</sup> Century. However, topographic maps for the Grand Lake Meadows, as defined for the purpose of this report, indicate that the region is actually more rural towards the end of the 20<sup>th</sup> Century.

## **INTRODUCTION**

The Department of Anthropology, University of New Brunswick, is required to produce a technical report summarising the work accomplished during a research project focusing on the Grand Lake Meadows region of New Brunswick. At the beginning of the 20<sup>th</sup> Century, Canada as a whole was predominantly a rural country; however, by the end of the 20<sup>th</sup> Century Canada had become economically much more urbanised. Traditionally, New Brunswick has been one of the most rural of the Canadian provinces, with the Grand Lake Meadows being a rural area in the centre of a predominantly rural economy. One of the primary questions addressed in this report, is whether the Grand Lake Meadows is as rural now as it was at the beginning of the 20<sup>th</sup> Century? This question will be addressed by focusing on evidence of shifts in terms of the relationship between residence and resources in the region, as well as evidence of changes in land use and occupancy over the last 100 years.

The report documents 20<sup>th</sup> Century patterns of land use and occupancy within the Grand Lake Meadows by highlighting habitation sites, communication and transportation routes, agriculture and forestry, waterways and floodplains, ceremonial sites, archaeological sites, and administrative boundaries. Any changes in patterns of land use and occupancy within the Grand Lake Meadows region was determined by focusing on road, topographic and land registry maps, aerial and archival photographs, as well as 20<sup>th</sup> Century census data. To illustrate any changes in land use and occupancy for the region, the technical report includes statistical data on changes in land use and occupancy, as well as the six maps of the Grand Lake Meadows region showing settlement patterns and land use at two decade intervals during the 20<sup>th</sup> Century.

## **GEOGRAPHIC BOUNDARIES**

The Grand Lake Meadows is defined for the purposes of this study in essentially the same manner that Washburn and Gillis Associates Ltd. utilized in their preliminary environmental impact assessment published in 1996 on the then proposed Trans-Canada Highway (Washburn & Gillis 1996:2-3). Washburn and Gillis defined the area as being bounded on the east by the Jemseg River, on the north by various bodies of water including Grand Lake, Back Lake, Maquapit Lake, French Lake and two extensive thoroughfares, the Blind Thoroughfare and the Lower Thoroughfare. The southern extent of the Grand Lake Meadows region is defined by the Saint John River, and the western limit is defined by a road that connects McGowans Corner to Lakeville Corner.

The total region encompasses approximately 500 hectares (Choate 1973), consisting primarily of a broad flat floodplain and wetland meadow, with elevations ranging from just above sea level to a height of 160 metres in the upland areas. It should be noted that for the purposes of this report we have also included Fulton Island and Thatch Island, as they are separated by only minute stretches of water, and in the case of Thatch Island, is shown as being connected to the mainland on the most recent topographic maps.

## **ADMINISTRATIVE BOUNDARIES**

The Grand Lake Meadows is divided into two county boundaries consisting of Queens and Sunbury counties. Further subdividing the Grand Lake Meadows are the parish boundaries of Cambridge and Canning, located in Queens county, and Sheffield located in Sunbury county. Each of the parishes administers a similar portion of the Grand Lake Meadows. Approximately  $\frac{1}{4}$  of the Grand Lake Meadows area is included in Sunbury county, with the remaining  $\frac{3}{4}$  administered by Queens county.

## **WATERWAYS AND FLOODPLAINS**

The land encompassed by the Grand Lake Meadows was classed by Washburn and Gillis (1996:2-1) as Floodplain Wetlands. This was because on any given year, approximately 85% of the area is inundated by seasonal floodwaters. The Flood Risk Map (Appendix 1 ) for Oromocto and Lower Jemseg shows that the 1973 Spring flood inundated the whole of the Grand Lake Meadows. The susceptibility of the Grand Lake Meadows to flooding is a function of the low topographic relief of the area coupled with the fact that the constricted nature of the gorge at Reversing Falls in Saint John, only allows for a maximum of 60 cm of outflow of water per week, regardless of the tides and season (SJRBB 1972). This constricted nature results in the periodic accumulation of large volumes of water during times of high river flow. This flooding happens annually after snowmelt in the spring. This flood deposits large volumes of sediment in the Grand Lake Meadows, and is one of the primary factors leading to the formation of the bottomlands of the lower Saint John River.

The main bodies of water that surround the Grand Lake Meadows region include: Grand Lake, Back Lake, Maquapit Lake, French Lake, the Saint John River, the Jemseg River and two extensive thoroughfares, the Blind Thoroughfare and the Lower Thoroughfare. The bodies of water included within the Grand Lake Meadows are Upper Timber Lake, Lower Timber Lake, Loders Creek, Otter Creek, and Trout Creek. The Saint John River is subject to tidal influences along the Grand Lake Meadows, and because of this, the River has an elevated salinity level compared to stretches of the river above Mactaquac, the current head of tide.

## **LAND USE**

### **Agricultural Use**

Compact clay loams and loams overlay much of the bedrock in the region. Some of the well-drained slopes in the region are moderately fertile; however, the overall lack of relief and the generally fine texture of the soils often impedes drainage, which decreases the growth rate of vegetation (DNRE 1993). The well-drained slopes in the Grand Lake Meadows region are in use for agriculture, predominantly horticultural crops such as vegetables and small fruits.

## **Forestry Use**

The Grand Lake Meadows is one of the richest wetlands in Eastern Canada. Much of the region consists of agricultural land bordering the old Trans-Canada Highway. The Grand Lake Meadows provides a complex setting for migrating waterfowl, aquatic and terrestrial plants and animals, and unique associations of hardwood swamp vegetation with southerly affinities (Choate 1973). Today the region has the warmest climate in the Province (Dzikowski et al. 1984). Due to the large water bodies in the region, primarily Grand Lake, which covers approximately 16,500 hectares, the region acts as a heat sink moderating the temperatures in the areas (DNRE 1993). Therefore, some of the vegetation species are almost exclusive to this region, in particular ironwood, basswood, butternut, white ash, green ash, and silver maple (DNRE). These tree species occur most commonly on the broad, fertile, alluvial floodplains. The study area is also composed of additional environmental features that influence growth and development of tree species. Coarse, alluvial deposits consisting mainly of riverbank soil support trees such as white pine. Fertile interval soils support tree species such as bur oak, green ash, butternut and silver maple. However, in areas that are flooded less frequently, sugar maple, red maple, basswood, ironwood, white ash and red oak stands are found. Sandy shorelines in the region are dominated by red oak and white ash. Finally, on the well-drained upland soils mixed wood stands of red spruce, hemlock, red maple, white birch and trembling aspen are common (DNRE). Disturbances associated with settlement, particularly agriculture and forestry, have altered the original forest considerably, resulting in numerous stands of red maple, gray birch, white birch and trembling aspen, with scattered spruce and fir (DNRE).

## **Transportation and Communication Routes**

From a review of available maps obtained for the area, it appears that the primary land transportation routes have always been situated along the well-drained levee to the south of Grand Lake Meadows. The earliest maps available, produced by the Geological Survey of Canada in 1880 and 1884 (Appendix 1), indicate that a portion of what is now the Trans-Canada Highway was present, extending to approximately the area currently known as *The Intervale*. At this time Highway 690, from McGowans Corner to Lakeville Corner, is also shown to have been in existence, crossing at Fulton Island as it does today. At low water, the remains of bridge pilings are still visible at the western tip of the island, immediately east of the current bridge.

Map information for the study area was difficult to find for the first two decades of the 20<sup>th</sup> Century. A single road map for the Province, dated 1907 is included in Appendix 1. This map shows that by the early part of the 20<sup>th</sup> Century, the road that ended at *The Intervale* was extended eastward to a point where it crossed the river at Jemseg. Highway 690 was also present at this time, located in essentially the same location as today.

By 1958, the main road through the Grand Lake Meadows had become part of the Trans-Canada Highway. In addition, a ferry connection was added linking *The Intervale* to Upper Gagetown, on the southern shore of the Saint John River. This ferry connection remained in service until the end of the 20<sup>th</sup> Century, when a bridge was constructed across the Saint John River approximately 3 km downstream from the ferry crossing.

Throughout the 20<sup>th</sup> Century, the primary land transportation routes remained unchanged; however, at the end of the 20<sup>th</sup> Century, a new route was proposed through the Grand Lake Meadows for the construction of the new Trans-Canada Highway. In addition to the previously mentioned bridge built

across the Saint John River, a new bridge was also built at Jemseg, just downstream from the existing crossing. A new, elevated 4-lane highway was also constructed at this time to the north of the existing Trans-Canada Highway, and joined with the existing highway at the new bridge crossing to the east of *The Intervale*.

## Human Habitation

### *Archaeological Sites:*

Based upon archaeological sites recorded in the surrounding area, the Grand Lake Meadows have been subject to periodic human occupation for at least the last 6000 years. Appendix ? includes a map of the distribution of all of the currently registered archaeological sites in the Grand Lake Meadows region. There are currently 12 recorded sites in the area. A summary of the known sites is included below;

Site Borden Number	Site Name	County	Age Attribution
BIDn3	N/A	Queens	N/A
BIDn5	Ferguson	Sunbury	2000+ BP to present
BIDn8	Ring Island	Queens	500+ years BP
BIDn12	Fulton Island	Sunbury	2000+ BP
BIDn17	Brush-lined Beach	Queens	500+ BP
BIDn18	Interlake	Queens	500+ BP to present
BIDn19	N/A	Queens	500+
BIDn21	N/A	Sunbury	N/A
BIDn23	N/A	Boundary Sunbury/Queens	N/A
BIDn25	Coy Cellar	Queens	Recent Historic Less than 500 BP
BIDn26	The Meadows	Queens	500-3000 BP
BIDn28	MacInnis	Queens	Colonial (1604-1867)
BIDn29	John Waterbury	Queens	Colonial (1604-1867)
BIDn30	The Interval	Queens	Colonial (1604-1867)

Table 1: Archaeological Sites within the Grand lake Meadows Area

*Ceremonial Sites:*

Despite evidence of major prehistoric ceremonial sites in the surrounding area, to date, no prehistoric ceremonial sites have been recorded within the Grand Lake Meadows. For the historic period, there are also no known ceremonial sites. Instead, the primary concentration of churches and cemeteries appear at Lakeville Corner and Sheffield.

*Other Built Heritage:*

A number of additional structures were identified during this study. The first of these structures is a lighthouse that was located at Bridges Point, east of McGowans Corner, until sometime after 1957. The lighthouse is present in 1938, based upon a map of that date, but does not appear on the 1980 topographic map (Appendix 1). The structure is therefore believed to have been removed or destroyed between 1957 and 1979.

There are also two docks that were built between 1938 and 1957 at *The Intervale*, which are still in existence at present. These two docks were utilized as part of a cable-ferry crossing that ferried cars from *The Intervale* to Upper Gagetown, sometime after 1938 until the end of the 20<sup>th</sup> Century.

*History of Occupation:*

The archaeological record is our only source of information about human occupation in the Grand Lake Meadows area prior to written historic accounts. From the surrounding area, there is evidence of human occupation prior to approximately 6000 years before present (BP). But for the Grand Lake Meadows area itself, there exists a much shorter occupation record, of approximately 2000 years BP. At the Meadows site (BIDn26), a full-scale archaeological excavation was conducted in 1999 to salvage archaeological material that was threatened by the construction of the new bridge across the Saint John River, 3 km below *The Intervale*. This site yielded thousands of artifacts and a number of radiocarbon dates, which suggest a Middle Maritime Woodland period (ca.2000 – 1500 BP) occupation. The rest of the recorded archaeological sites, with the exception of Fulton Island (BIDn12), consist of artifact assemblages recovered from the surface, which cannot be definitely attributed to a more precise date. The dates for Fulton Island are from an excavation during the 1970s, which are contemporaneous with the Meadows site (ca. 2000 BP).

It should be noted that artifacts recovered from the Ring Island site (BIDn8) appear to be similar to artifacts recovered elsewhere (primarily from Maine), which are dated to the Middle and Late Archaic periods (7000 – 2800 BP). However, without a definitive radiocarbon date, little can be said about possible human occupation during this time period. The historic period begins with the arrival of European explorers in the mid-17<sup>th</sup> Century, a period of low European population density.

The data gathered for the purposes of this study offer an opportunity to examine trends of settlement patterns in great detail. For the 1940s, 1960s and 1980s the distribution of structures on the available maps and depicted in archival photographs (Appendix 2), were assessed and the results are presented below;

### Number of Structures at 20 Year Intervals for the Grand lake Meadows

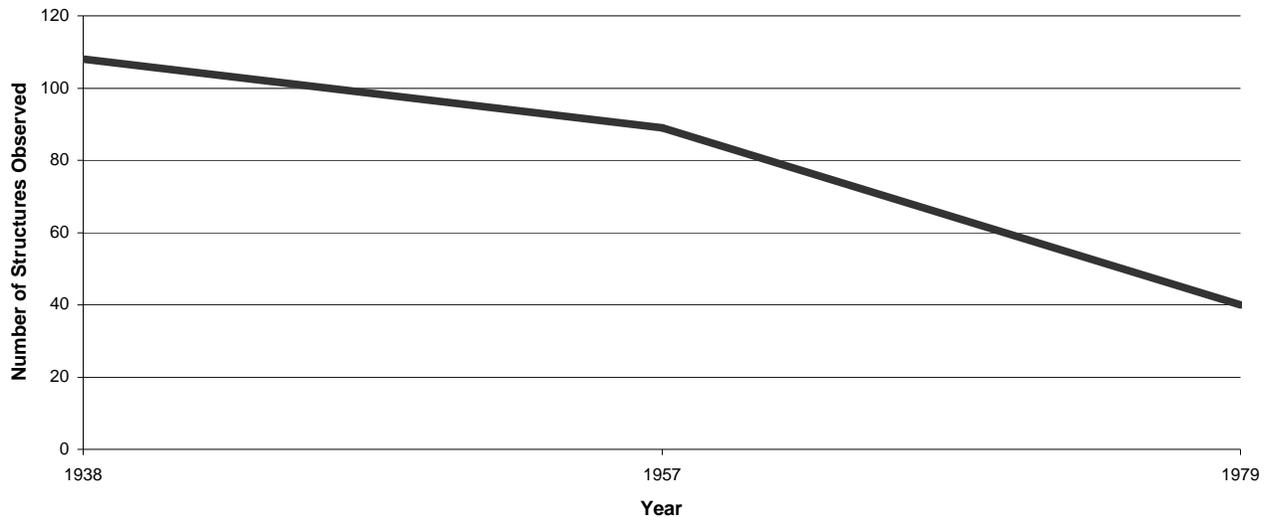


Figure 1

From Figure 1, it is clear that the predominant trend in the Grand Lake Meadows during this period of 60 years was the rapid and continuous drop in structures that were recorded on topographic maps for each of the years in question. In 1938, 108 structures are clearly visible on the topographic maps. In 1957, 89 structures are visible; the number of standing structures drops to 40 in 1980. Although air photos are included for 1993, this data is not incorporated because of difficulties in determining structures (Appendix 3 and 4). This decline in number of structures over this 40 year period may be due to lost soldiers during World War II.

The rate of decline in the number of structures is also noteworthy, from 1938 to 1957, the rate of numerical decline is exactly 1 structure removed/year. During the next 20 year interval, from 1957 to 1979, the rate of numerical decline more than doubles to 2.2 structures removed/year. It is possible that greater resolution in the period intervals may yield more data on whether these trends are gradual or major events such as the 1973 flood, in which the whole of the Grand Lake Meadows area was inundated, can explain the rapidity of the change in rate of numerical decline. Possibly, one reason for this numerical decline in structures is due to greater urbanization; whereas, people are leaving the rural setting to relocate to a more urban area.

#### *Demography:*

Grand Lake Meadows is within Queens and Sunbury counties. However, only two of the ten Queens county parishes, Cambridge and Canning, and one Sunbury parrish, Sheffield, are within the Grand Lake Meadows as defined for this study. Canadian Census data was obtained for eight census years consisting of: 1901,1911,1921,1931,1941,1961,1981 and 2001. However, only a portion of the data has been released for the 2001 census year. Census data for 1901 and 1911(Appendix 5 and 6) combine all data for York and Sunbury counties. Later census data utilized in this report for the years

1921, 1931, 1941, 1961, 1981 and 2001 often divide the data obtained from Queens and Sunbury counties. Further, much of the census data includes all the parishes found within each of these counties and only occasionally is individual parish information noted. The seven parishes found within Sunbury county includes: Blissville, Burton, Gladstone, Lincoln, Maugerville, Northfield and Sheffield. Within Queens county, information from ten parishes is included in the census data, including: Brunswick Cambridge and Canning, Chipman, Gagetown, Hampstead, Johnston, Petersville, Waterborough, and Wickham.

The demographic information addressed in the text of the report addresses total population, total immigration population, rural and urban economy, value of forest production, and agricultural acreage trends pertaining to major field crops such as hay, oats and buckwheat. The same questions were not always asked in each census year; therefore, it was not always possible to compare data from year to year. Some questions reflect trends pertaining to the census year. In the 1981 census, it was the first time that questions pertaining to spraying and dusting of crops on farms, fertilizer used on farms, and irrigation data on farms was collected. Additionally, only in the 1941 census were there questions pertaining to the area of crop failure, number of farms and cause of crop failure.

Total Population: The trend for the Grand Lake Meadows and surrounding region (Queens and Sunbury counties) remained fairly static from 1901 until 1941, with a total population between approximately 18,000 and 20,500 people. However, there was a significant rise in population noted in the 1961 census data at approximately 35,000 people, with another jump in population in 2001 to 50,000 people. Interestingly the first population jump happened at the beginning of World War II (Figure 2).

### Total Population in the Grand Lake Meadows and Surrounding Region

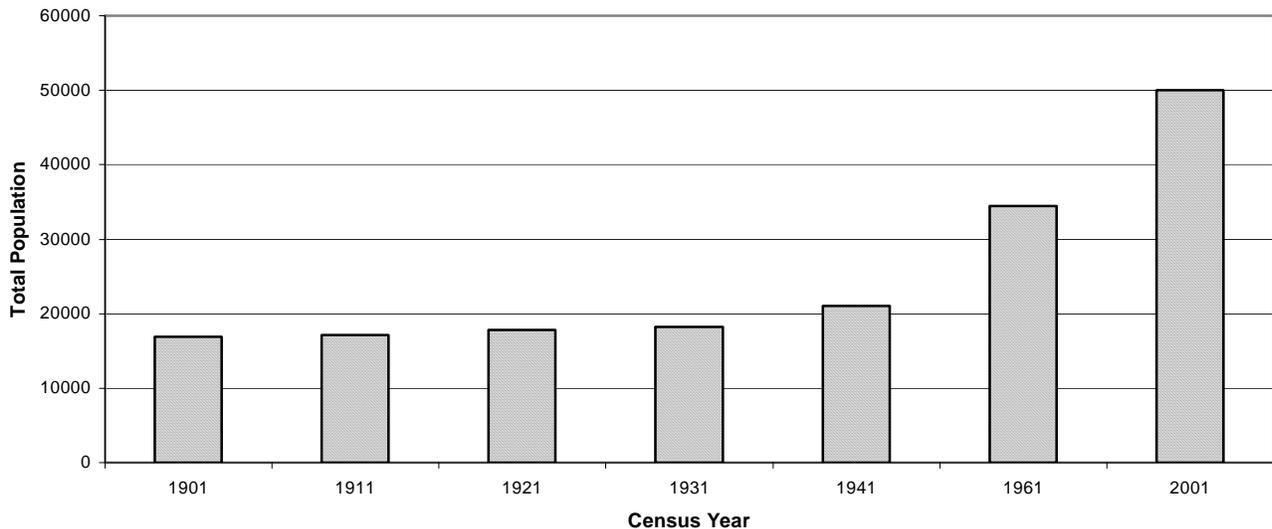


Figure 2

Total Immigrant Population: Only four census years noted the total immigrant population for the Grand Lake Meadows and surrounding region. Some of the countries that these individuals immigrated from include:

- |             |                 |                              |
|-------------|-----------------|------------------------------|
| 1. England  | 5. Newfoundland | 9. Turkey                    |
| 2. Ireland  | 6. Denmark      | 10. United States of America |
| 3. Scotland | 7. France       | 11. Norway and Sweden        |
| 4. Wales    | 8. Germany      | 12. Other countries          |

In 1901 census data revealed that there were 1250 immigrants in the region with an increase of approximately 1,200 people in 1921. There was a small decline in 1941 with a total immigrant population of approximately 2,000 people. The slight decline may again be related to the beginning of World War II, as the immigrant population increase again in 1961 back to approximately 2,400 people (Figure 3).

### Total Immigrant Population for the Grand Lake Meadows and Surrounding Region

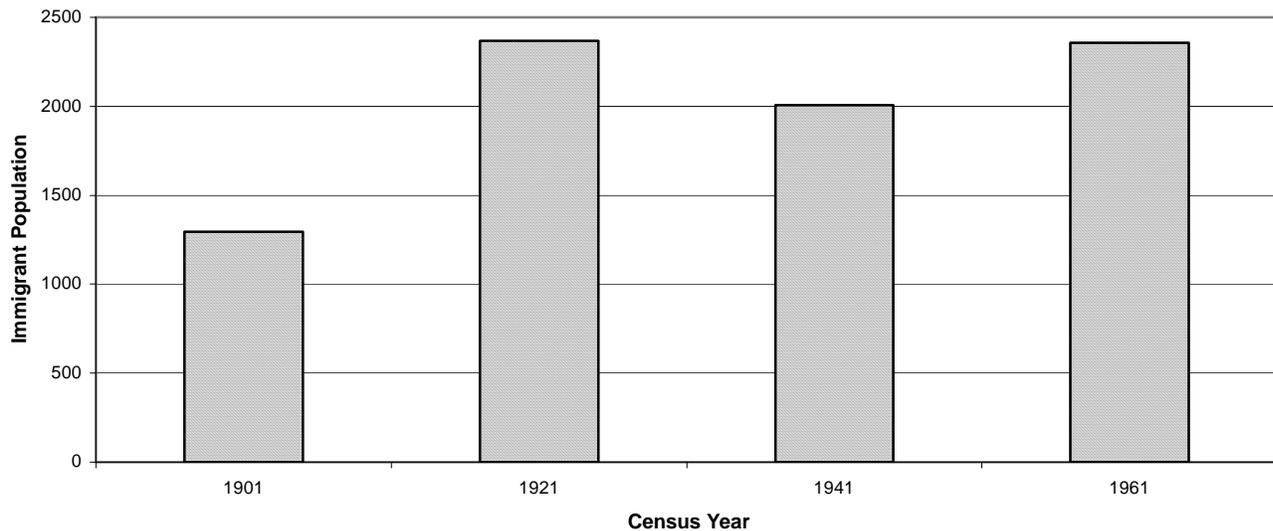


Figure 3

Total Rural and Urban Population: Considering that the rural and urban population totals consist of both Queens and Sunbury counties and all the parishes within, urban populations were noted in the 1911 (approximately 200 people), 1921 (approximately 300 people) and 1961 (approximately 14,500 people) census data. The total rural population for census years: 1901, 1911, 1921, 1931, 1941 and 1961 ranged between 16,000 and 21,000 people (Figure 4).

### Total Rural and Urban Population for the Grand Lake Meadows and Surrounding Region

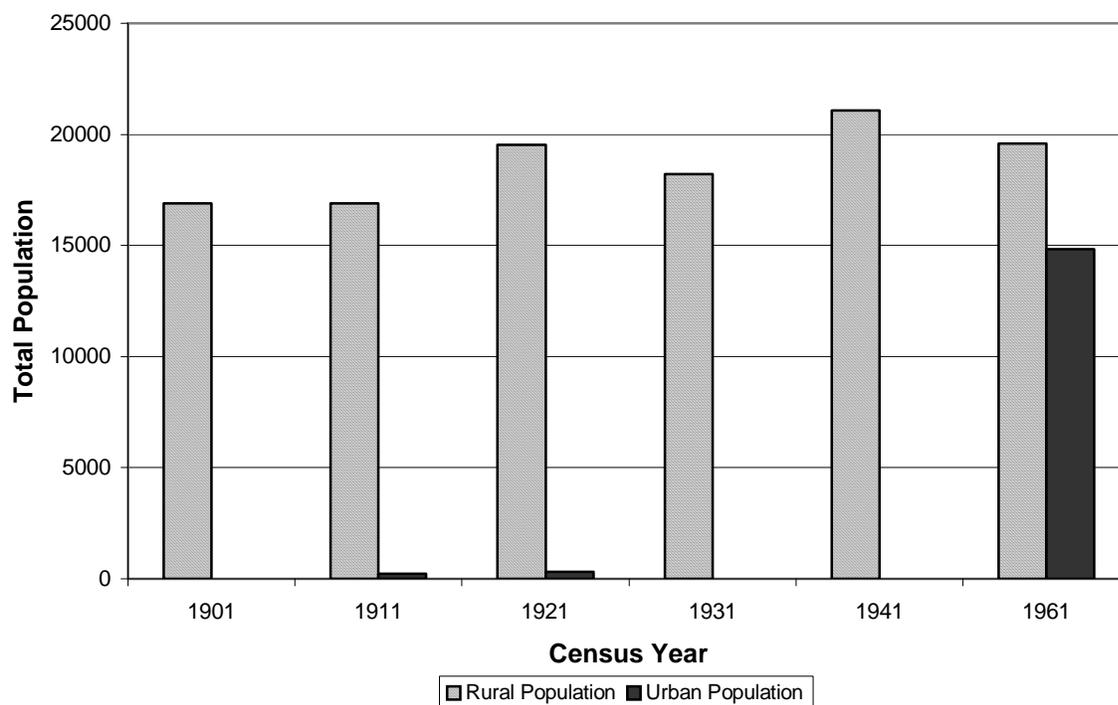


Figure 4

Field Crops: There were three field crops that covered the most acreage within the Grand Lake Meadows and surrounding region, which consisted of hay, buckwheat and oats. Other crops that were also planted by the acreage, that were not as predominant, included:

- |                       |                  |                      |
|-----------------------|------------------|----------------------|
| 1. corn for forage    | 8. hops          | 15. corn for husking |
| 2. other forage crops | 9. grass seed    | 16. peas             |
| 3. potatoes           | 10. clover seed  | 17. beans            |
| 4. turnips            | 11. fall wheat   | 18. mixed grains     |
| 5. other field roots  | 12. spring wheat | 19. mangolds         |
| 6. flax               | 13. barley       | 20. sugar beets      |
| 7. tobacco            | 14. rye          |                      |

The amount of hay planted by acreage remained stable, with approximately 45,000 to 55,000 acres, from 1911 until 1941. However, there was a marked decrease in acreage of hay in 1961 with approximately 18,000 acres planted and another slight decrease in 1981 with under 1,000 acres planted. The number of acres planted with buckwheat steadily declined in number with approximately 7,500 acres planted in 1911 and none by 1981. The amount of acres planted in oats also declined throughout the Century with approximately 9,000 acres planted in 1911 and 1921 and between 7,000 and 7,800 in 1931 and 1941. There was a significant decrease in 1961 with only 2,200 acres planted and again in 1981 with 142 planted acres of oats (figures 5, 6, 7).

The decrease in acres planted in hay, buckwheat and oats within the Grand Lake Meadows and surrounding region may be due to a number of individual reasons or the combination of many. First, the loss of acreage may be due to the construction of Canadian Forces Base (CFB) Gaagetown, located in the region. Additionally, the decrease in acreage may be the result of globalization. Improved transportation and infrastructure has made it easier and cheaper to transport field crops than to plant and grow locally. Finally, the impact of people moving away from the region may result in less farming, resulting in less planted acreage.

### Total Acres of Planted Hay in the Grand Lake Meadows and Surrounding Region

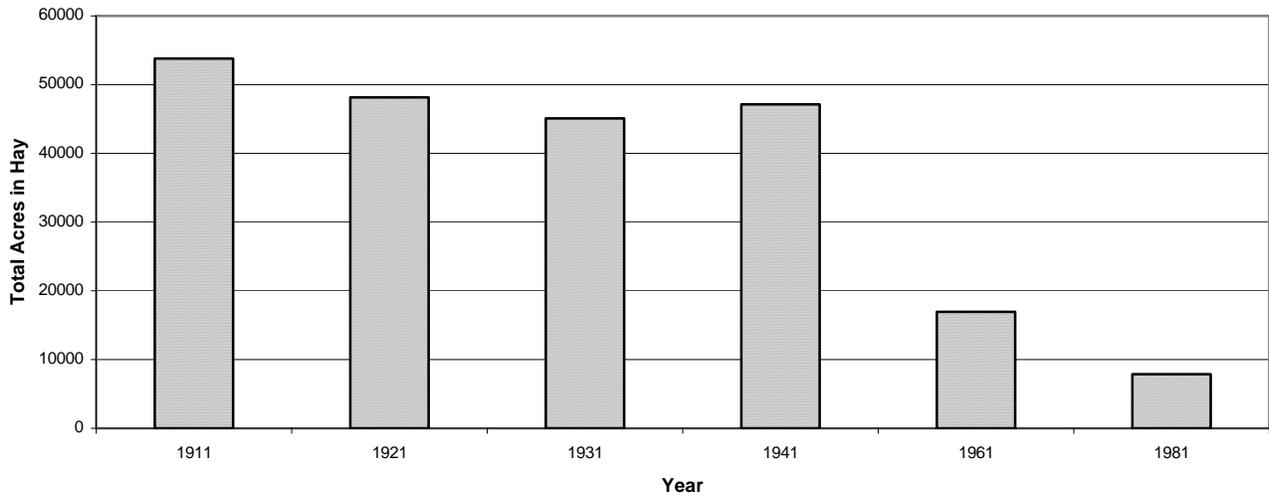


Figure 5

### Total Acres of Planted Buckwheat in the Grand Lake Meadows and Surrounding Region

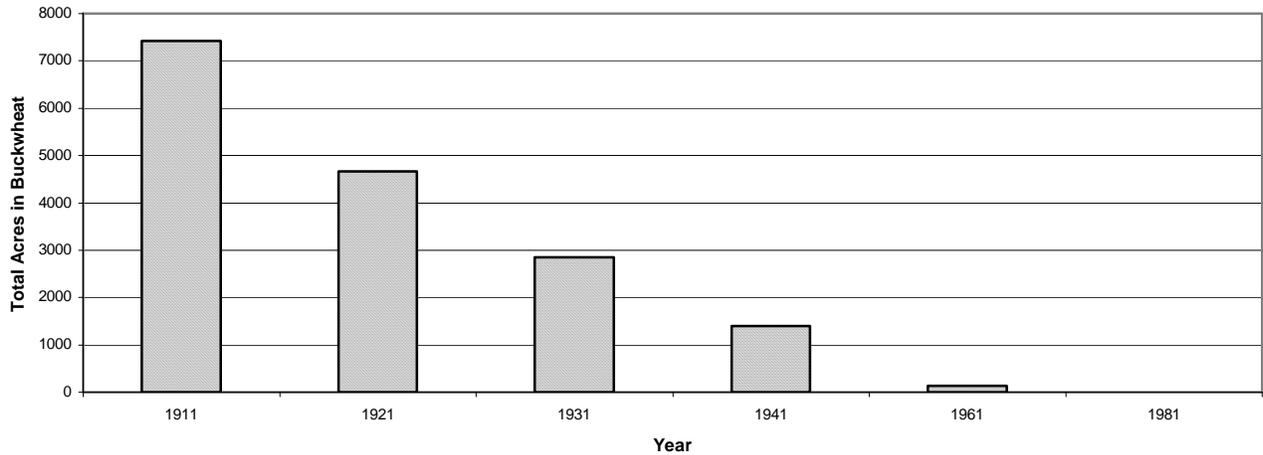


Figure 6

### Total Acres of Planted Oats in the Grand Lake Meadows and Surrounding Region

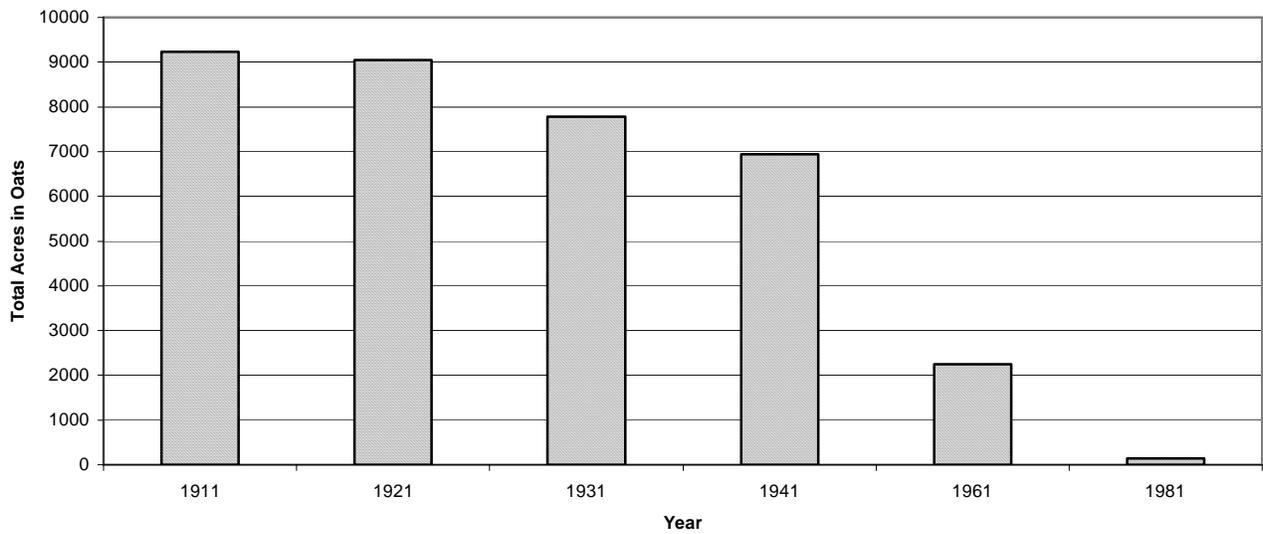


Figure 7

Total Value of Forest Products: The total value of forest products obtained from the forest including square, waney, flat timber and logs for lumber also decreases over the century with an approximate value of \$9000 in 1901 and 1911 and between \$7000 and \$8000 in 1931 and 1941. However, the value

of forest products decreased in 1961 to approximately \$2200 with another decrease in 1981 to \$150 (Figure 8).

### Total Value of Forest Products for the Grand Lake Meadows and Surrounding Region

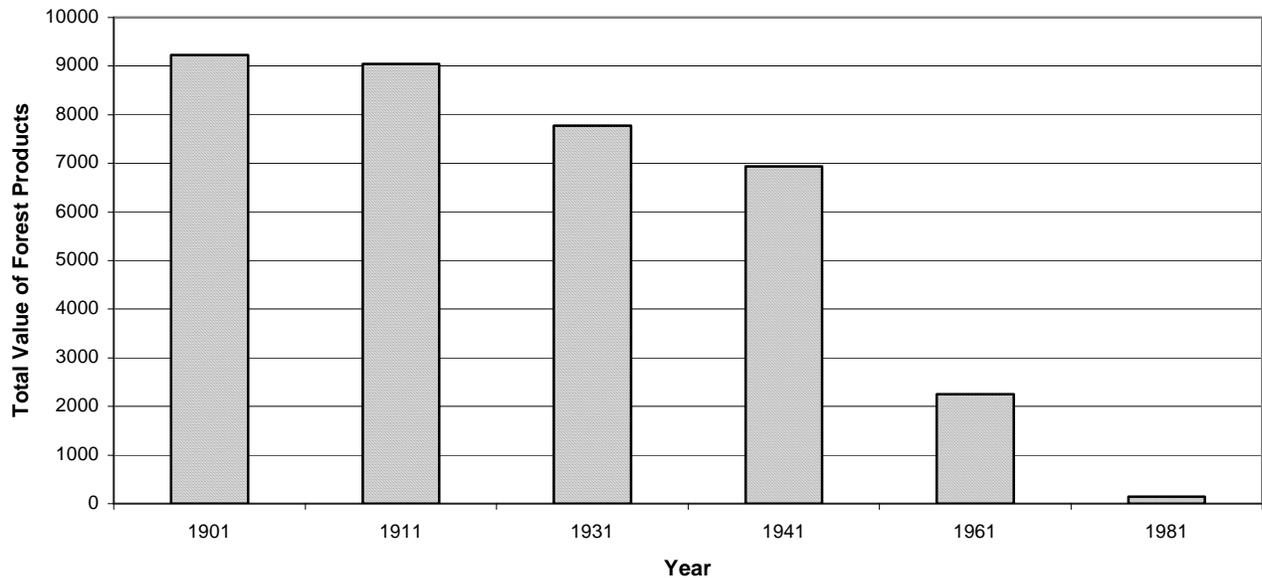


Figure 8

## DISCUSSION

The research completed for this report focused on shifts within the Grand Lake Meadows and its surrounding region in terms of the relationship between residence and resources in the area, as well as evidence of changes in land use and occupancy over the last century. These changes in patterns of land use and occupied area are highlighted by focusing on: habitation sites, communication and transportation routes, agriculture and forestry, waterways and floodplains, ceremonial sites, archaeological sites, and administrative boundaries. The key demographic issues and trends considered in this paper address:

- if land use and occupancy patterns within the grand Lake Meadows have changed over the last one hundred years,
- what some of the major shifts within the Grand Lake Meadows include in terms of the relationships between its residents and their local resources,
- how population changes in the region parallel overall trends taking place in other Canadian provinces, and
- is the Grand Lake Meadows as rural now as it was at the beginning of the 20<sup>th</sup> Century?

Numerous maps for the region, as well as, the Canadian Census data depicting the last one hundred years identify the shifts in demographic issues and trends.

Occupancy patterns as indicated by Canadian Census data for the Grand Lake Meadows and surrounding region have changed significantly over the last one hundred years. Total population trends from 1901 to 2001 increased steadily from approximately 18,000 to 50,000, with a significant jump in population after 1941. There was a bimodal distribution of total immigrant population for the region, with an increase in population in 1921 and 1961. Both of these total population trends for the region may be indicative of impacts due to World War II.

Land use patterns within the region have also changed significantly as noted by the acreage of Hay, Buckwheat and Oats. The amount of land planted with these crops decreased significantly from 1901 to 2001. Such trends in planted acreage of field crops may be due to the construction of CFB Gagetown, globalization, or people moving from a rural to an urban location.

One of the major shifts in terms of the relationship between the regions residents and their local resources is related to the total value of forest products. There was a slight decrease in the total value of forest products for the region from 1901 to 1941, with a more significant decrease between 1941 and 1961. Finally, by 1981 the total value of forest products was less than \$1,000 for the region.

The Grand Lake Meadows and surrounding region was almost completely rural until around 1957. As indicated by the Canadian Census data the total population living in a rural setting within the region was approximately 20,000 people. However, in that same year approximately 15,000 people were also living in an urban setting. A portion of this urban population increase may be because by 1961 CFB Gagetown was operational and a large number of people would have migrated to that region.

A number of generalizations were also noted by map data for the Grand Lake Meadows. Occupation for the region has been concentrated on the levee along the shore of the southern portion of the Grand Lake Meadows. Land use patterns, as indicated by a number of maps, changed significantly after 1973. These changing patterns may be related to the flood of 1973.

There also appears to be a stronger focus on the highway for settlement patterns, as indicated by topographic maps. Smaller structures located well away from the main road in the early part of the 20<sup>th</sup> Century disappears from later topographic maps with more structures located along the main highway. This may be due to a stronger settlement pattern focused along the main thoroughfare within the region. However, this pattern change may also be related to the decrease in field crop production in the later part of the century as indicated by census data. With a decrease in field crop production there would be less need for outbuilding that would be located closer to the agricultural fields.

The Grand Lake Meadows and surrounding region, as indicated by Canadian Census data, is less rural now than it was at the beginning of the 20<sup>th</sup> Century. The increase in population indicated for the region parallels other Canadian Provinces for the period between 1947 and 1966 (the “baby boom”). However, as indicated by the six Grand Lake Meadow maps generated for this project, the Grand Lake Meadows is more rural today than it was during the early to mid-portion of the 20<sup>th</sup> Century.

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