Raw Water for Agricultural Irrigation Study - Phase 2

Detailed Land Use Report

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1.0 Introduction

1.1 BACKGROUND

The Regional Municipality of Niagara (Region), through their consultant, Stantec Consulting Limited, has commenced a study to identify options for providing raw water to fruit, grape and greenhouse growers in five municipalities: Niagara-on-the-Lake, St. Catharines, Lincoln, Grimsby and Pelham. The goal of the study is to determine an irrigation scheme that is able to meet the needs of the agricultural community in this area, while being financially feasible and environmentally sound.

In order to accurately assess the quantity and location of each grower type, a detailed land use map needed to be created. This map would also quantify areas of land that are not currently being used for fruit, grape, or greenhouse use, but are deemed as prime land for one or more of these uses.

2.0 Methodology

The technical activities of this task began with obtaining from the Region a property boundary map of the rural areas in the five target municipalities. The polygons created by the property lines formed parcels, of which each would be assigned a category. The parcel information was loaded onto a GPS unit, and a windshield survey (observation made of each property from roadside) was conducted to identify the type of crops grown during the 2006 growing season. The survey was conducted during August 2006. All rural areas of the 5 municipalities were surveyed, with the exception of Pelham, which was surveyed as far south as Sumbler Rd. Rural areas were identified as anything outside the "built-up" areas defined by the data obtained from the Region's GIS department.

2.1 CATEGORIES

The main interest groups in the overall study include growers of tender fruit and grapes, as well as land used for nurseries and greenhouses. Keeping this in mind, it was not deemed necessary to differentiate between types of growers within these categories (such as plum vs. peach vs. cherry). Instead, the categories were kept broad. Categories that did not fit into the interest groups were still separated for the purposes of evaluating the potential of converting into tender fruit or grape growing land. The categories along with assigned colours for the figures are listed below.

- Tender Fruit – orange
    - Includes all varieties of peaches, nectarines, plums, apricots, cherries,
- Grapes (wine) – light green
- Grapes (juice/table) – purple
- Nurseries – pink
    - Includes all outdoor and partially indoor/outdoor landscape plant growing operations. May overlap with greenhouse category. Sod farms were also included in this category.
- Greenhouses – blue
- Pome Fruit – red
    - Includes all varieties of apples, pears,
- Cash Crops – yellow
    - Includes all varieties of corn, wheat, beans,

- Idle Land – brown
    - Includes all land deemed to be fallow, as well as all visibly abandoned fields which could potentially be returned to producing farmland,
- Other Fruit – light orange
    - Includes strawberries, raspberries, and other small fruits. Covers very small area of region.
- Pasture – light yellow
    - Land for use in raising cattle, or for pig/poultry/dairy farms. Less potential for turning into producing farmland than cash crops or idle land.

Figures 1 through 3 show each district with the parcels coloured as indicated above. Woodlot data supplied by the Region is shown in dotted green. All other unlabelled areas are shown in white and may include but are not limited to: residential, industrial, commercial, institutional, parks, golf courses, landfills, and quarries.

If a parcel was definitively made up of one category (approximately more than 70% of the land), the whole parcel was labeled as such.

2.2 DATA GAPS

When the survey was complete, there were several data gaps that needed to be filled. Not all parcels were viewable from the roadside. In order to fill gaps, colour aerial photographs from the spring of 2002 were used as a resource. From the photographs, it was relatively simple to detect fruit trees and grape rows and greenhouses; however, it was difficult to assign different categories to these parcels (i.e. wine grapes vs. juice grapes). This, along with the fact that the data is 4 years old, will result in a small amount of discrepancy between the map produced and the actual 2006 land use. Since data gaps from the ground survey amounted to approximately 10% of the total area, this error will be minimal.

2.3 DATA MODIFICATION

A small portion of parcels ultimately had more than one category of land use (i.e. grower uses land to produce both grapes and peaches in relatively even amounts). The simplest way to account for this was to find a parcel nearby that had the same two primary uses, and assign each parcel only one category. In this way, a grower may look at a map and discover that their land has been categorized as grapes, when in fact half of it is used for tender fruit. However, the overall picture of land use will be captured for each district, and that was deemed most important.

While completing the windshield survey, any lot that was deemed to mostly (>70%) have wooded land on it was left blank. Woodlot information was provided by the Region, and was overlaid onto the parcel information (shown in dark green in the figures). Some parcels were

categorized during the survey, yet had large portions of wooded areas on them. When producing the numerical area numbers for the following section, the woodlot area that overlapped any existing categorized parcel was subtracted from that parcel to produce a more accurate quantity of land for that particular category.

There will be some numerical error in area when considering the fact that the whole parcel was labeled if it mostly (>70%) contained land use from one particular category. However, it was expected that this would be balanced by the fact that this rule was applied across the entire Region. For instance, if one parcel is 70% idle land, and the remaining 30% is tender fruit, another parcel with 70% tender fruit and 30% idle land will balance it out.

Each parcel was assigned a category, and the whole parcel area was included when calculating land use areas in Section 3. In general, area of crop cover is smaller than area of property; therefore there will be some overestimation if the whole parcel area is included in summations. This is mostly due to roadways in and around the property. This is less of a factor in cash crops and idle land, where actual area is approximately 95% of total area. Grapes and fruit tree areas will utilize somewhat less of the total property; approximately 85% of total land is actually occupied. Nurseries vary greatly in percentage of total property that they cover; some make use of the entire property, whereas others utilize only a fraction of the total property size; therefore actual land use is estimated at 85%. Most greenhouses cover only a small percentage of the total property area. This is due mainly to building permit restrictions imposed by local municipalities. Actual greenhouse area is approximately 20-30% of total property.

3.0 Land Use Summary by District

Three irrigation districts were defined in terms of municipal boundaries: East District (Niagara on the Lake), West District (Lincoln/Grimsby/St. Catharines), and South District (Pelham). The West District has been split into two zones: Zone A is below the Niagara Escarpment, while Zone B is above the Niagara Escarpment. In Figures 1 to 3, the boundary for each district is shown in dashed red. The data was split to show how much land use from each category fits inside each of these boundaries.

3.1 EAST DISTRICT (NIAGARA ON THE LAKE)

Table 1 – East District

Category	Total (ac.)
Grapes - Wine	8943
Tender Fruit	4994
Nurseries	502
Greenhouses	521
Grapes - Juice	468
Pome Fruit	199
Idle Land	3844
Cash Crops	1010
Pasture	206
Other Fruit	21
Total Categorized	20708

3.2 WEST DISTRICT (LINCOLN/GRIMSBY/ST. CATHARINES) – ZONE A

Table 2 – West District Zone A

Category	Total (ac.)
Grapes - Wine	4858
Tender Fruit	3873
Nurseries	805
Greenhouses	705
Grapes - Juice	1158
Pome Fruit	769
Idle Land	4549
Cash Crops	595
Pasture	244
Other Fruit	136
Total Categorized	17692

WEST DISTRICT (LINCOLN/GRIMSBY/ST. CATHARINES) – ZONE B

Table 3 – West District Zone B

Category	Total (ac.)
Grapes - Wine	1893
Tender Fruit	1
Nurseries	24
Greenhouses	75
Grapes - Juice	1561
Pome Fruit	423
Idle Land	7336
Cash Crops	8411
Pasture	678
Other Fruit	24
Total Categorized	20424

3.3 SOUTH DISTRICT (PELHAM)

Table 4 – South District

Category	Total (ac.)
Grapes - Wine	139
Tender Fruit	604
Nurseries	840
Greenhouses	144
Grapes - Juice	278
Pome Fruit	272
Idle Land	5060
Cash Crops	3119
Pasture	880
Other Fruit	103
Total Categorized	11439

4.0 Maps

The following pages show the maps for each district. The legend shows each category and the associated colour. Woodlot data supplied by the Region is shown in dotted green. All other unlabelled areas are shown in white and may include but are not limited to: residential, industrial, commercial, institutional, parks, golf courses, landfills, experimental farms, radio towers, and quarries.

5.0 Conclusion

This land use study has produced a valuable picture of existing and potential land use for each district. The entire data is compiled in Table 5, showing total areas of the different crop categories in the five target municipalities during the 2006 growing season. This data together with data from the consumption study will be used to determine the quantity and geographic distribution of demand for irrigation water in the five target municipalities.

Table 5 – All Irrigation Districts

Category	Total (ac.)
Grapes - Wine	15832
Tender Fruit	9472
Nurseries	2171
Greenhouses	1445
Grapes - Juice	3465
Pome Fruit	1664
Idle Land	20788
Cash Crops	13135
Pasture	2008
Other Fruit	283
Total Categorized	70263

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