

Agriculture Plan

Background Report

August 2017

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Cover photo: View of women and children fruit pickers working in a local orchard, circa 1915,
Kelowna Public Archives KPA#2225

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Executive Summary

Agriculture in the City of Kelowna has played an important role throughout its history. Agriculture is significant to the economy, growth and identity of the region. An Agriculture Plan Update has been undertaken as a collaborative process involving consultation with the agricultural industry, the public, local and senior levels of government and other local stakeholders.

The *Background Report* provides the context for the development of strategies, actions and policy directions to enhance, promote and sustain a resilient, prosperous and diverse agricultural sector.

This report provides an overview of the agricultural context including local farming history; a review of key federal and provincial regulations; a summary of the local policies and regulations affecting agriculture; and an assessment of key biophysical

characteristics such as water, soils, agricultural capability, and climate.

An agricultural profile of Kelowna is also presented, summarizing the types of crops and livestock being produced in the community. Indicators of financial health of farms and overall food self-sufficiency are also explored.

Finally, a set of updated maps are provided, including:

- ALR and A1 Zone boundaries;
- Changes in ALR over time;
- First Nation reserves and ALR;
- Roadways and farmland;
- Water providers;
- Water user groups; and
- Development Permit Areas (for hazards and natural areas) and their association with farmland.



Introduction

Over 12,000 ha (55%) of the City's land base is zoned agricultural, and of that over 8,600 ha (40%) are within the ALR.

Since the creation of Kelowna's first Agriculture Plan in 1998, the following new policies have been adopted:

- 2030 Official Community Plan;
- City of Kelowna Permanent Growth Boundary;
- Regional Growth Strategy; and
- Changes in provincial agricultural regulations.

Prior to the Agriculture Plan Update, mapping contained within the 1998 Plan had not been updated, and consequently did not accurately depict the changes that have occurred over the past 18 years. As such, the maps did not provide a robust mapping information layer for planners and decision-makers. Further, many of the policies listed in the 1998 Agriculture Plan were not clear or prescriptive and therefore the Plan was often challenged during the development process.

The Agriculture Plan Update allows the following goals to be integrated into a more current and responsive policy document:

1. Development of clear policies that serve to protect and promote agriculture while preserving the character of the City of Kelowna;
2. Identification of opportunities to strengthen farming and develop agriculture as an economic driver;



3. Development of policies that increase the amount of, and access to, locally grown and produced food; and
4. The building of resilience in communities against rising costs of food and risks from climate change.

This *Background Report* provides an overview of the biophysical features of the agricultural sector, including soils, water, and climate.

Agricultural Context

Location

Kelowna is the largest city in the Okanagan Valley, with a 2016 population of approximately 127,380. The City of Kelowna is one of four member municipalities within the Regional District of Central Okanagan (RDCO) and is situated on the eastern side of Okanagan Lake. The City of Kelowna is a gateway to the Okanagan and the BC Interior, with an international airport and several transportation routes connecting it to the North Okanagan, Similkameen, Thomson-Nicola, and Kootenay regions.



Figure 1: Map of City of Kelowna

Brief history of farming in Kelowna

The history of the Okanagan is strongly linked to agriculture. Agriculture remains an important sector of the regional economy, a fundamental part of the landscape, and an important way of life for many residents. Historical accounts of the importance of agriculture in the founding and development of the Okanagan are documented within the various local historical museums, community histories and personal accounts of our agriculturalists.

French Catholic missionaries, in particular Father Charles Pandosy, is credited with planting the first Okanagan apples trees in 1859. In the early 1900s, distribution was primarily by train as the Kettle Valley Railway, linked the BC coast to the Kootenays and was centered in Penticton. By 1900, more than 1 million fruit trees were growing and in 1913¹, there were four fruit tree co-ops in the Okanagan and extensive irrigation development projects underway.

Secondary support services and business, such as commodity groups, packinghouses, and distributors, grew accordingly within the Kelowna area. BC Fruit Processing Ltd. was formed in 1946 to produce and sell 100 per cent pure apple juice marketed under the brand, Sun-Rype. BC Tree Fruits was responsible for selling Okanagan apples across BC, Canada, and internationally through 36 cooperative societies, and 25 shippers. Today, BC Tree Fruits continues to have a main office in Kelowna.

Alongside a burgeoning apple industry, a thriving crop of tobacco was also produced in Kelowna in the early 1900s. Eventually competition from Ontario tobacco growers resulted in the demise of the industry and many Kelowna farmers switched to growing fruit. The first commercial plantings of grapes were made in the Kelowna area in 1926 and really started to expand in the 1960s. Grape production quickly began to expand into orchards that previously produced apples.

¹ Central Okanagan economic profile for agriculture, 2015. Regional District of Central Okanagan.

In nearby Summerland, the Agri-Food Research Station was established as the Dominion Experimental Farm in 1914, to support the development of the tree fruit industry. More recently, the research scope has grown to encompass plant pathology, entomology, grape production and food processing.

In 2015, the BC Fruit Growers Association reported an expansion of acreage devoted to apple growing after decades of decline in Kelowna. Reasons for this may be a levelling off in demand for Okanagan-grown wine grapes, and increased export opportunities for apples. Cherry production also is on the rise in Kelowna, due in part to new trade agreements signed with Asia-Pacific countries.



Workers harvesting onions in Kelowna, circa 1919, Kelowna Public Archives: KPA#5558

Agricultural Land Base

Approximately 8,686 ha (40 per cent) of land is located in the Agriculture Land Reserve (ALR) within the City of Kelowna's jurisdictional boundary². Unlike other communities, the City of Kelowna also has a significant amount of land that is zoned for agriculture but is outside the ALR (Figure 2).

Table 1 provides an overview of the ALR in Kelowna and Figure 3 indicates the changes in the ALR landbase between 1998 and 2015.

Table 1. ALR Statistics for the City of Kelowna^{3, 4}.

	Total Area (ha)
City of Kelowna Area	21,732
ALR in Kelowna in 1973	10,054
Land excluded from the ALR (1973 – 2015)	1,368
ALR in Kelowna in 2015	8,686
ALR in active farm use in Kelowna in 2015	3,915

Since the inception of the ALR in 1973, approximately 1,365 ha have been removed (excluded) from the ALR within the City of Kelowna. A report by the BC Ministry of Agriculture published in 2008 indicates that the majority of that land was excluded from the ALR prior to 1990⁵. In 1998, Kelowna's ALR land comprised 8,927 hectares. Over the past 18 years, ALR land has declined 3.4 per cent to 8,621 hectares (this figure is approximately equal to that quoted in Ministry of Agriculture's 2014 Agriculture Land Use Inventory for Kelowna, 8,686 hectares) (Figure 3).

A 2008 report, prepared by the Ministry of Agriculture and the Agriculture Land Commission, concluded that between 1973 and 2006, "if all lands with exclusion applications had been approved

during this time period, there would be a 37 per cent reduction in ALR land area which would have resulted in significant loss to the productive

agricultural land based economy." This demonstrates the importance of both the ALR and other agricultural policy, such as an Agriculture Plan, to preserve the agricultural land base in Kelowna.

First Nations Reserve Land and Agricultural Land

Although the City of Kelowna is located on unceded Okanagan Indian Band and Westbank First Nation territories, very little reserve land is located within Kelowna. The Agriculture Land Use Inventory, which was developed for the City of Kelowna in 2014 and published in 2015, indicates that 1 per cent of the ALR, or 138 ha, is located within First Nation reserves⁶. Figure 4 provides a map of the location of these reserve lands in relation to agricultural lands within Kelowna.

Road network and agricultural land

A functional road network is critical for the distribution of agricultural goods as well as for farm equipment access, delivery of inputs, and other key transportation needs. On the other hand, too many roads can fragment farmland and interfere with normal farming activities. Figure 5 indicates the location of existing and planned roadways (as per the City of Kelowna's OCP 20 year major road network) in relation to the Permanent Growth Boundary and agricultural areas.

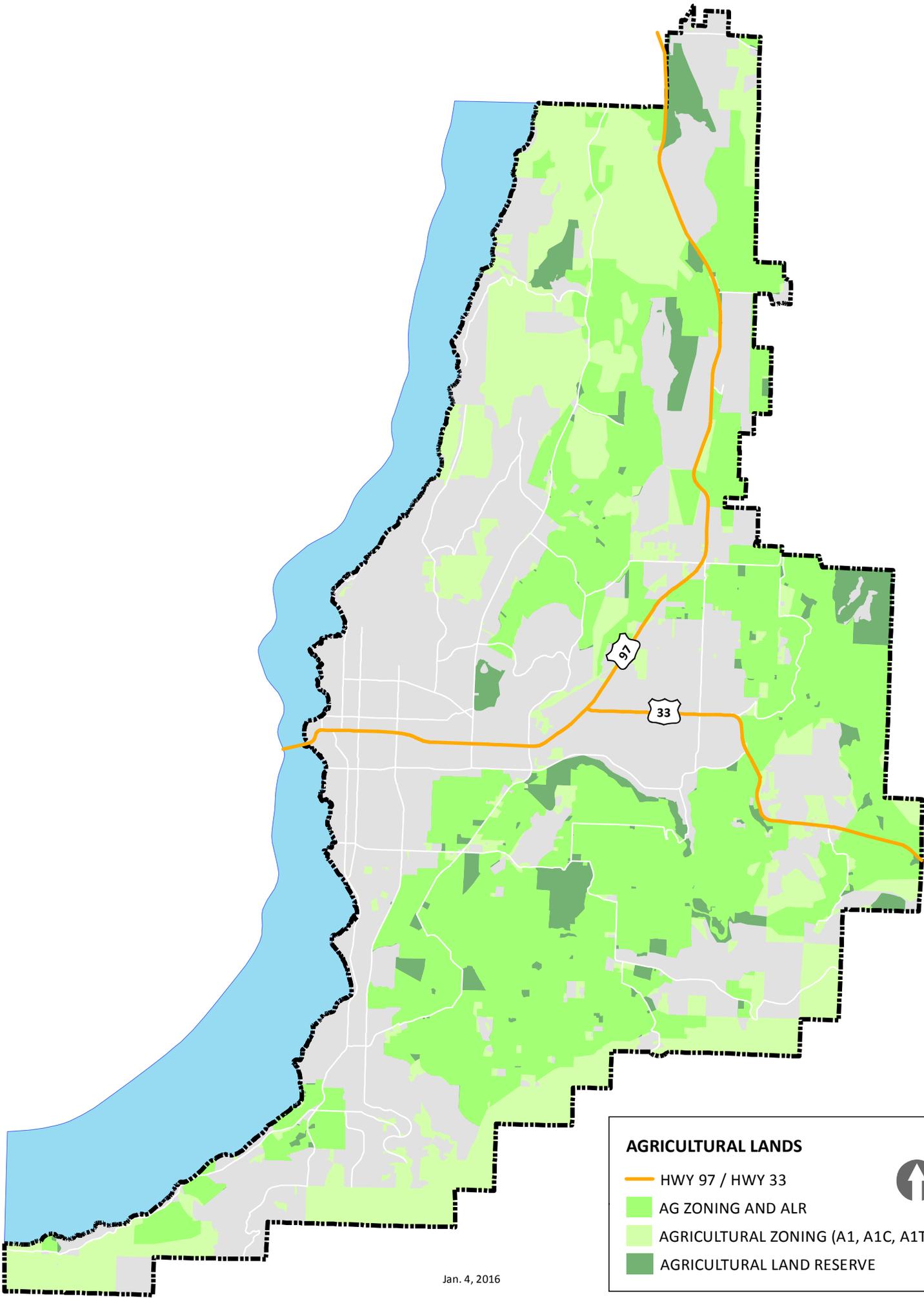
² City of Kelowna Agricultural Land Use Inventory (draft), 2016. BC Ministry of Agriculture.

³ Ibid.

⁴ City of Kelowna Agricultural Land Use Inventory (draft), 2016. BC Ministry of Agriculture.

⁵ The Agricultural Land Reserve and its Influence on Agriculture in the City of Kelowna. May, 2008. BC Ministry of Agriculture and Lands and Agricultural Land Commission. Growing Knowledge: File Number 800.100-3.

⁶ Agriculture Land Use Inventory, City of Kelowna, 2014. BC Ministry of Agriculture. Published in 2015.



AGRICULTURAL LANDS

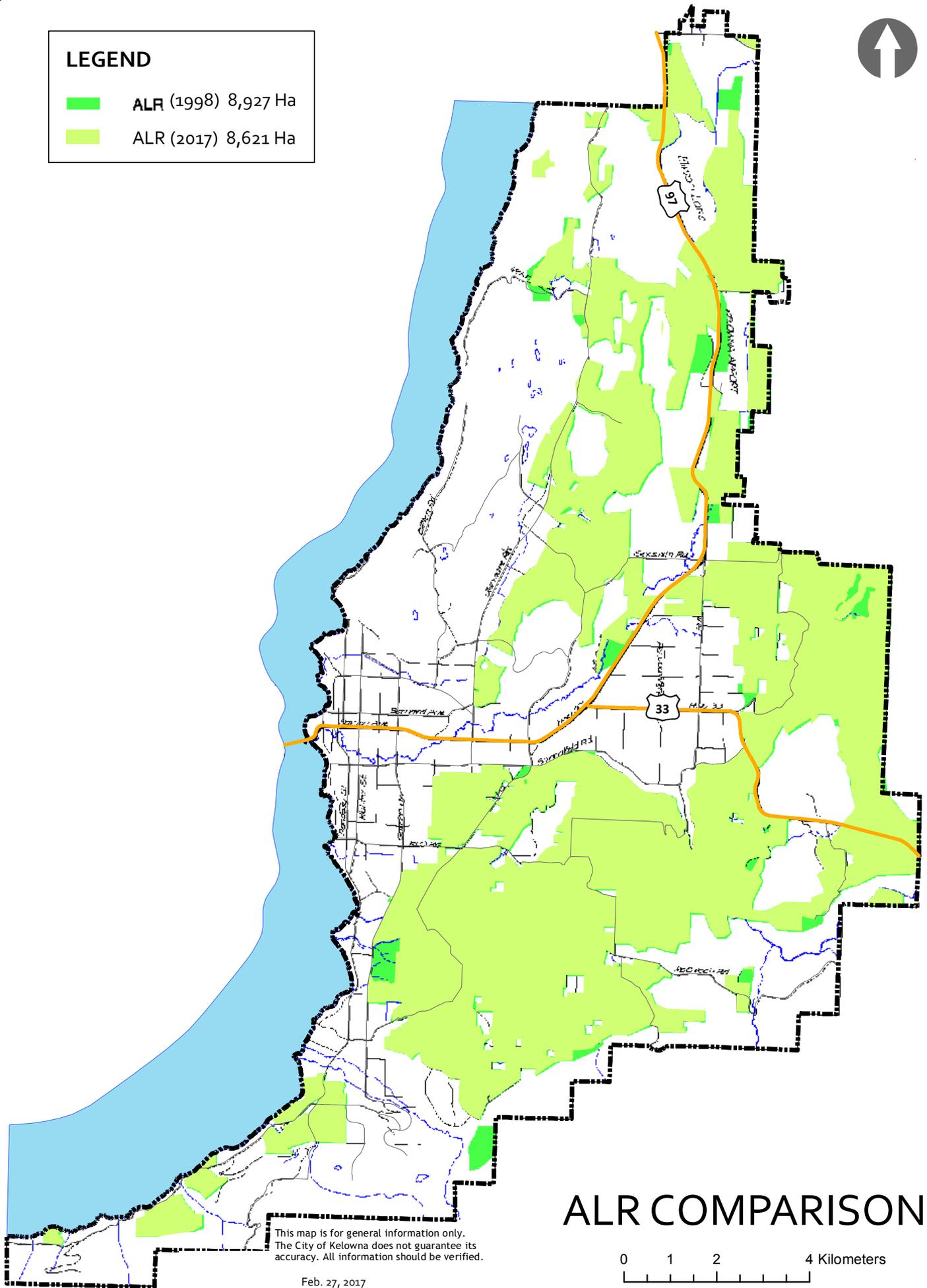
- HWY 97 / HWY 33
- AG ZONING AND ALR
- AGRICULTURAL ZONING (A1, A1C, A1T)
- AGRICULTURAL LAND RESERVE



Jan. 4, 2016

LEGEND

-  ALR (1998) 8,927 Ha
-  ALR (2017) 8,621 Ha

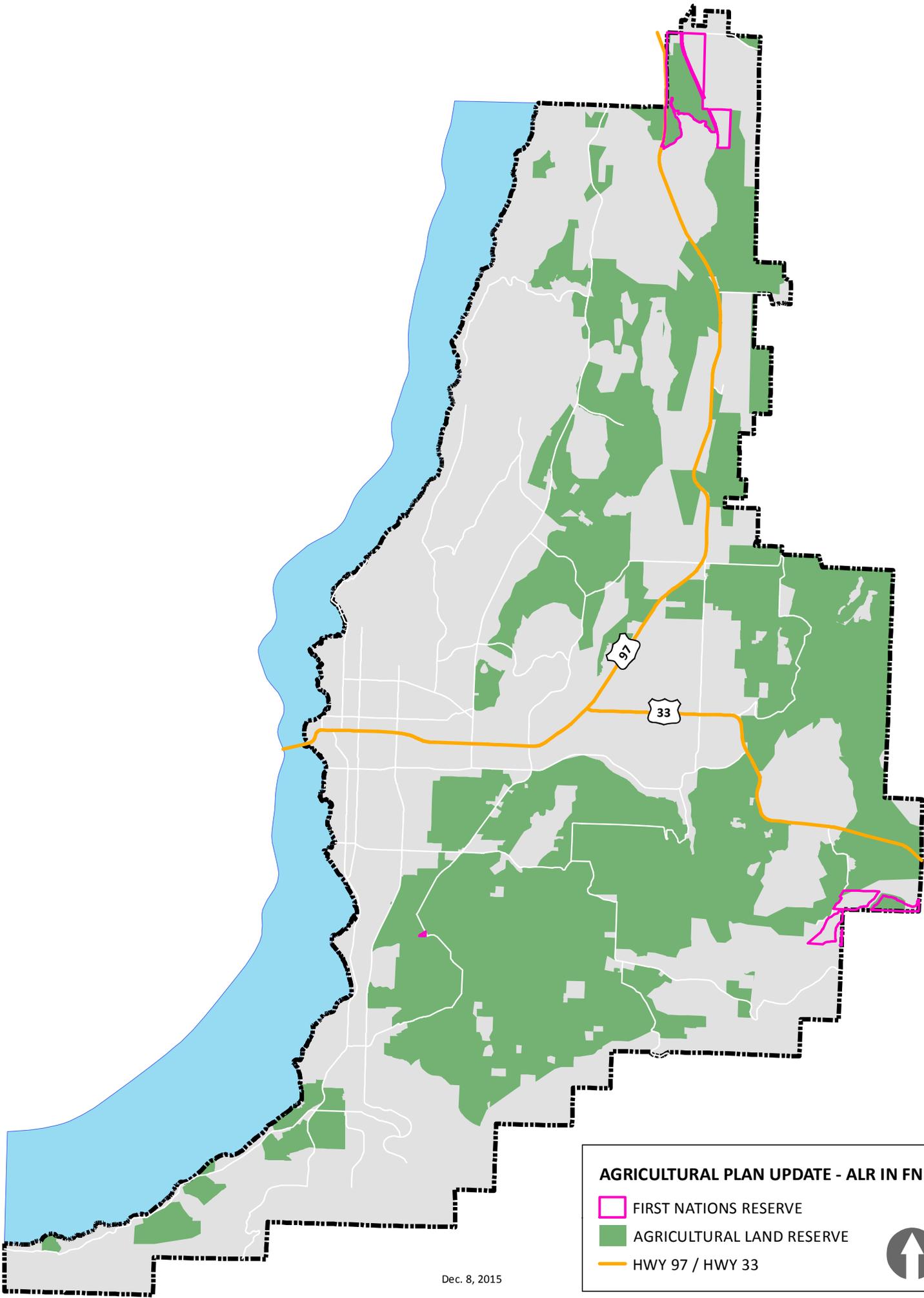


This map is for general information only.
The City of Kelowna does not guarantee its
accuracy. All information should be verified.

ALR COMPARISON



Feb. 27, 2017



AGRICULTURAL PLAN UPDATE - ALR IN FNR

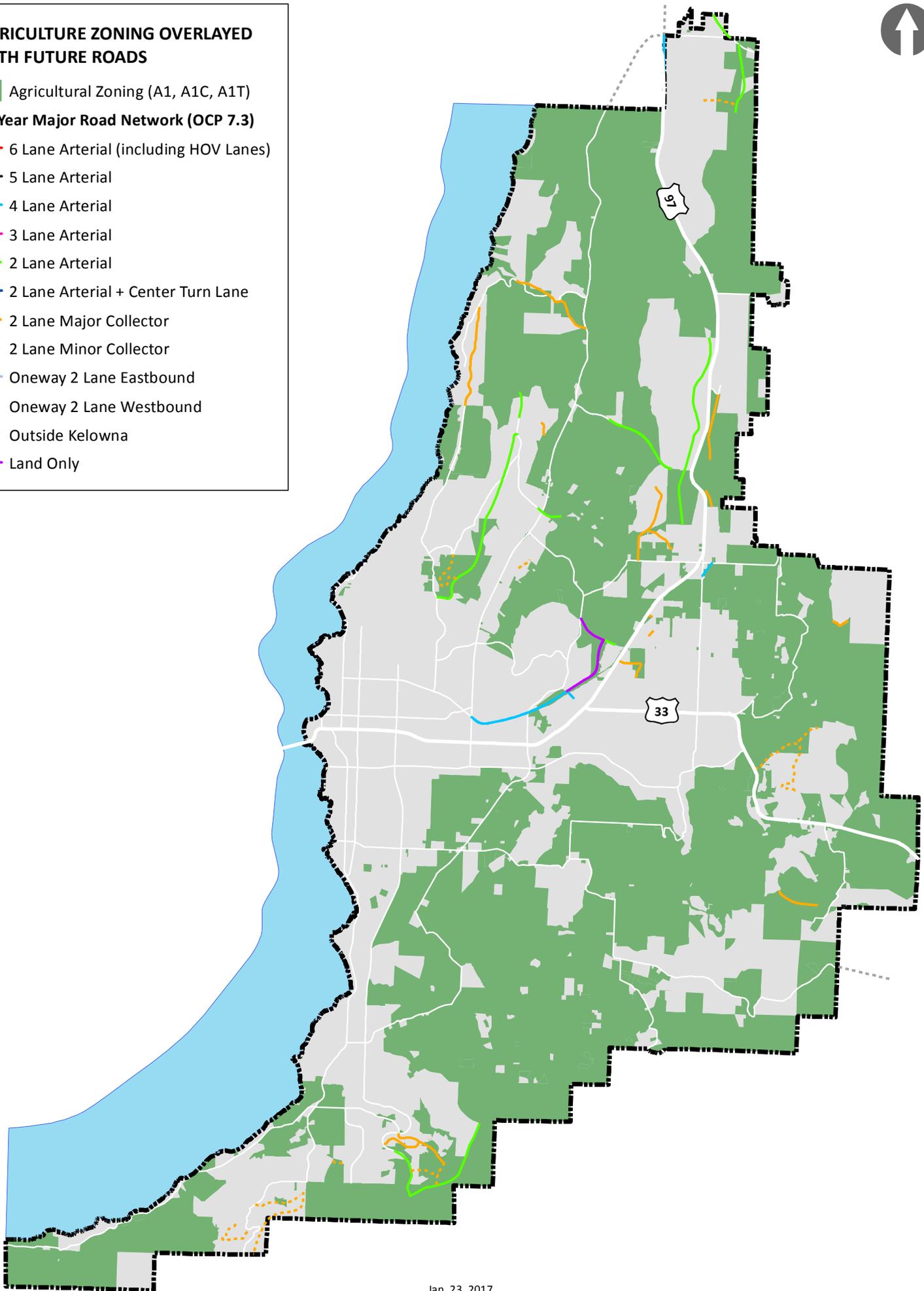
-  FIRST NATIONS RESERVE
-  AGRICULTURAL LAND RESERVE
-  HWY 97 / HWY 33



Dec. 8, 2015

AGRICULTURE ZONING OVERLAYED WITH FUTURE ROADS

-  Agricultural Zoning (A1, A1C, A1T)
- 20 Year Major Road Network (OCP 7.3)**
-  6 Lane Arterial (including HOV Lanes)
-  5 Lane Arterial
-  4 Lane Arterial
-  3 Lane Arterial
-  2 Lane Arterial
-  2 Lane Arterial + Center Turn Lane
-  2 Lane Major Collector
-  2 Lane Minor Collector
-  Oneway 2 Lane Eastbound
-  Oneway 2 Lane Westbound
-  Outside Kelowna
-  Land Only



Policy context

Agricultural land and associated uses are regulated and influenced by policy, legislation and regulation at the local, provincial and federal government levels. Some regulations are wide in scope and far-reaching, such as national and international trade agreements, while others are site-specific or issue-specific, such as zoning or meat processing regulations. As a result, no one piece of legislation has the capacity to address agricultural issues in an integrated and holistic manner.

Awareness of jurisdictional responsibilities and authority can be useful in defining policy, strategies, actions and pilot projects that can be taken by local government and those that require broader collaboration for specific issues.

This section summarizes some of the more influential policies and regulations⁷.

Federal

Federal government regulation addresses a number of areas including trade practices, public health and the protection of the natural environment. They also support agriculture through several funding programs.

GROWING FORWARD 2

Growing Forward 2 is designed to help the agricultural industry position itself to respond to future opportunities and to realize its full potential as a significant contributor to the economy. An estimated \$426.9 million is being invested in BC through Growing Forward 2 from 2013 to 2018.

CANADA AGRICULTURAL PRODUCTS ACT

The Canada Agricultural Products Act regulates the import, export and inter-provincial trade and marketing of agricultural products. The Canadian Food Inspection Agency (CFIA) administers many of the agricultural import and export activities. This Act standardizes agricultural grading and inspecting procedures across Canada.

ADDITIONAL FEDERAL LEGISLATION AFFECTING AGRICULTURE

Additional federal legislation that influences various aspects of the agriculture industry include:

- *Canada Grain Act*
- *Consumer Packaging and Labelling*
- *Excise and Import Permits Act*
- *Farm Income Protection Act*
- *Farm Products Agencies Act*
- *Feeds Act*
- *Fertilizers Act*
- *Fisheries Act*
- *Health of Animals Act*
- *Pest Control Products Act*
- *Plant Protection Act*
- *Seeds Act*
- *Transportation of Dangerous Goods Act*

Provincial

The Province of BC primarily regulates agriculture through the Agricultural Land Commission (ALC), who oversees the Agriculture Land Reserve (ALR); and the Ministry of Agriculture. A number of regulations and initiatives are in place to support agriculture and protect the natural environment.

⁷ Curran, D. 2009. Capital Regional District Agricultural Legal & Policy Scan. <https://www.crd.bc.ca/docs/default-source/crd-document-library/committeedocuments/planningtransportationandprot>

[activeservicescommittee/20090515/agenda-item-5---attachment-1-\(second-paper\)R.pdf?sfvrsn=0](https://www2.gov.bc.ca/gov2/active_services_committee/20090515/agenda-item-5---attachment-1-(second-paper)R.pdf?sfvrsn=0)

GROWING A HEALTHY FUTURE FOR BC FAMILIES

This plan outlined 23 strategies to sustain and facilitate the growth and diversification of the agriculture industry. The 2012 BC Jobs Plan Agrifoods Strategy builds on the initiatives undertaken through the BC Agriculture Plan by setting priorities and actions to guide the growth of the agricultural sector over a five-year period in three key areas:

- Focus on high-quality, high-value products;
- Expand domestic and international markets; and
- Enhance the agrifood sector's competitiveness.

BC BUY LOCAL PROGRAM

In 2012, the Province also provided a \$2 million investment in a Buy Local program to help agricultural industries and retail operations promote BC foods. In 2016/2017 the funding was directed through Investment Agriculture Foundation BC. The funding assists local businesses and organizations to launch or expand their marketing campaigns, including farmers' markets and several regional agricultural producer associations.

THE B.C. TREE FRUIT REPLANT PROGRAM

This program provides financial help for growers to replace fruit trees with varieties that will meet consumer demands for high-value, high-quality B.C. fruit. The BC government has committed \$8.4 million towards this seven-year replant project between 2015 and 2021. The BC tree fruit packing industry has just completed more than \$5 million in upgrades to its fruit packing equipment and to help packinghouses modernize.

BC AGRIFOOD AND SEA FOOD STRATEGIC GROWTH PLAN (2015)

This plan recognizes three key challenges and opportunities: achieving economic growth, adapting to climate change, and maintaining food supply security. The Plan provides direction for economic growth with a new, ambitious goal to



increase the sector's annual revenues to \$15 billion per year by 2020.

CANADA-BC ENVIRONMENTAL FARM PLAN (EFP) PROGRAM

The EFP is a voluntary program that assists farmers in developing an environmental action plan for their farm that enhances natural resources and reduces the possibility of accidental harm to soil, air, water and biodiversity values. Those who enroll in the program become eligible for cost-share funding for certain on-farm Best Management Practices projects through the Growing Forward ARDCorp program.

BC FARMERS' MARKET NUTRITION COUPON PROGRAM (FMNCP)

The FMNCP is a healthy eating initiative that supports farmers' markets and strengthens food security across BC. Community partner organizations hand out coupons to lower-income families and seniors participating in their food literacy programs. These coupons can be spent at all BC farmers' markets that participate in the FMNCP to purchase fruits, vegetables, cheese, eggs, nuts, fish and meat. The Farmers' Market Nutrition Coupon Program began in 2007 as a pilot project operating in each of the five health regions of BC and began receiving funding from the Ministry of Health in 2012. Since then, the program has continued to grow, serving 52 communities and reaching over 3,000 households. In 2016, the Province funded \$547,200 in farmers' market nutrition coupons through HealthyFamiliesBC.

AGRICULTURAL LAND COMMISSION ACT

In response to the continual loss of agriculture land, the ALC was created in 1973 with the following mandate:

- To preserve agricultural land;
- To encourage farming on agricultural land in collaboration with other communities of interest;
- To encourage local governments, first nations, the provincial government and its agents to enable and accommodate farm use of agricultural land and uses compatible with agriculture in their plans, bylaws, and policies.

The ALC administers the *ALC Act* and is responsible for the ALR, a provincial zone in which agriculture is recognized as the priority use. The purpose of the ALR is to ensure that the province's agricultural land base is preserved and available for farm uses both now and in the future. The *ALC Act* takes precedence over, but does not replace, other legislation and bylaws that may apply to the ALR. Local and regional governments, as well as other Provincial agencies, are expected to plan in accordance with the Provincial policy of preserving agricultural land. Bill 24 - Agricultural Land Commission Amendment Act (2014), created two ALR zones, six regional panels and incorporated ALC governance. The Okanagan is in Zone 1, and decision-making regarding exclusion, non-farm use, and subdivision applications, is conducted by a three-person regional panel.

AGRICULTURAL LAND RESERVE USE, SUBDIVISION AND PROCEDURE REGULATION

The Agricultural Land Reserve Use, Subdivision and Procedure Regulation (2002) specifies permitted land uses within the ALR. This regulation identifies farm activities and other, non-farm uses permitted in the ALR, notification requirements for soil removal and placement of fill, procedures for submitting applications and identifies filing requirements. Land use activities not included in the Regulation, such as subdividing land, building additional residences or excluding land from the ALR, require approval by the ALC through the application process. Amendments to the regulation

directed by Bill 24, were released in mid-2015. The majority of the changes are related to the ability to process farm items on ALR (a co-operative model is now permitted), the establishment of breweries and meaderies as a permitted use, the allowable production of marijuana, and clarifying the allowance of secondary suites and secondary dwellings in Zone 1 and Zone 2.

MINISTER OF AGRICULTURE BYLAW STANDARDS FOR MUNICIPALITIES WITH A FARM BYLAW

The City of Kelowna is one of four municipalities in BC (including the Corporation of Delta, Township of Langley, and City of Abbotsford), regulated under Section 918 of the Local Government Act. Under Section 918 the City is obligated to review their zoning bylaw to ensure consistency with the Minister of Agriculture's Bylaw Standards. While the bylaw standards can be quite specific, it is recognized that some accommodation is needed to meet specific characteristics present in some communities. The accommodations require approval from the Minister of Agriculture to be enforceable. The Minister's Bylaw Standards provide:

- Direction on some general issues such as minimum lot size and the nature of rural zones;
- Definitions of a farming operations and farm related activities;
- Direction on setbacks for farm buildings and farming activities;
- Direction on farm residential footprints; and
- Direction on planning for urban/agricultural edges.

Currently, Minister Bylaw Standards have been created for:

- Temporary farm worker housing in the ALR (2009)
- Regulating the siting and size of residential uses in the ALR (2011)
- Regulating medical marijuana production facilities in the ALR (2015)
- Regulating agri-tourism and farm retail sales in the ALR (2015)

FARM PRACTICES PROTECTION ACT

The intent of the *Farm Practices Protection (Right to Farm) Act (1996)* is to protect farms, using “normal farm practices”, from unwarranted nuisance complaints involving dust, odour, noise and other disturbances. The Farm Industry Review Board (FIRB) deals with complaints that arise from the Act and determines whether the issue results from normal farm practices. The FPPA protects farms both in and outside of the ALR, although those outside the ALR must obtain Class 9 (Farm) status from BC Assessment.

LOCAL GOVERNMENT ACT

Certain provisions of the *Local Government Act* address farming activities through community planning; zoning; nuisance regulations; removal and deposit of soil; weed and pest control; water use and drainage.

LAND TITLE ACT

The *Land Title Act* gives Approving Officers the power to assess potential impacts of proposed subdivisions on farmland. The Approving Officer is responsible for all subdivision applications within the municipal boundaries.

BC ASSESSMENT ACT

Section 23 of the *Assessment Act* and BC Reg 411/95, the *Classification of Land as a Farm Regulation* (the “Farm Class Regulation”), set out the requirements that must be met for land to be classified as “Farm” for assessment and tax purposes. Land classified as Farm must be used all or in part for primary agricultural production.

WATER SUSTAINABILITY ACT

The *Water Sustainability Act (WSA)* provides for the licensing of activities including use, diversion, and storage of water. The WSA provides local governments the ability to undertake Water Sustainability Plans, which may include a designation for “dedicated agricultural water”, also known as agricultural water reserves. This allows

the water sustainability planning process to prioritize or establish unique rules for agriculture, which will be particularly useful when considering how reductions in water use will be handled through drought planning and management.

PROVINCIAL AGRICULTURE ZONE WILDLIFE PROGRAM

The Provincial Agriculture Zone Wildlife Program (PAZWP) was developed in 2009 to accommodate special objectives in agricultural zones and provide special opportunities for hunters. PAZWP helps coordinate crop damage prevention, mitigation and compensation strategies for damage done by certain species of wildlife. PAZWP has helped increase hunting opportunities in agricultural areas and ungulate winter range zones.

AGRICULTURAL WASTE CONTROL REGULATION & ORGANIC MATTER RECYCLING REGULATION - ENVIRONMENTAL MANAGEMENT ACT

The *Agricultural Waste Control Regulation* and associated Code of Practice fall under the *Environmental Management Act*. These regulate practices for using, storing and managing agricultural waste material in order to prevent pollution. The Regulation and the Code deal with agricultural waste storage and on-farm composting. The *Organic Matter Recycling Regulation* specifies how composting is conducted in commercial facilities, including feedstock, size, technology, siting and procedures, and compost quality.

MEAT INSPECTION REGULATION

The *Meat Inspection Regulation (MIR)* (2004) establishes requirements for all provincially licensed slaughter facilities in BC. A graduated licensing approach includes several levels of slaughter operation for provincially licensed facilities.

Regional and Local

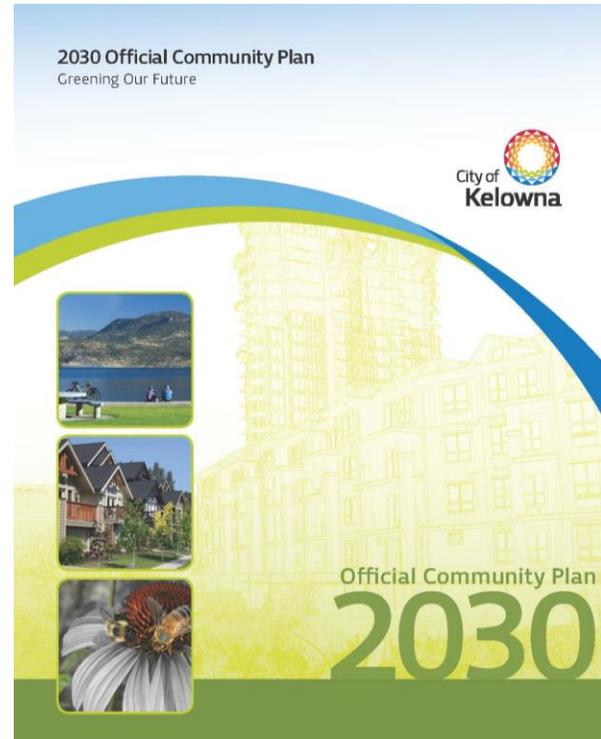
Locally, agriculture is considered through the Local Government Act (LGA), Regional Growth Strategy (RGS) of RDCO, Official Community Plan (OCP) and subsequently through regulations in the zoning bylaws. These documents are critical to the way in which local governments can support local food production and increase farm viability.

OKANAGAN-KOOTENAY STERILE INSECT RELEASE PROGRAM (OKSIR)

The Okanagan-Kootenay Sterile Insect Release Program (SIR) is an environmentally responsible, area-wide approach to control codling moth pest populations, one of the BC tree fruit industry's most damaging and costly pests. The program operates in the fruit-growing regions of the Okanagan, Similkameen, and Shuswap Valleys, where the tree fruit industry plays an important role in the lives of residents and commercial growers. The Sterile Insect Technique (SIT) is used to produce sterile codling moths, which are then released at regular intervals to breed with wild moths. The mating pair cannot produce viable offspring and the result is a steady reduction in wild codling moth populations. Funding for the Program is split between local property taxpayers (60 per cent) and commercial pome fruit growers (40 per cent). The program's state-of-the-art rearing facility has an annual production capacity of 780 million sterile codling moths, and the program is a major seasonal employer for the region. The success of SIR's area-wide approach has meant that farmers require few to no pesticides to prevent codling moth damage. This creates major benefits for our fruit industry, our environment, and the health of our communities.

KELOWNA'S 2030 OFFICIAL COMMUNITY PLAN

The City of Kelowna's 2030 Official Community Plan (OCP) recognizes agriculture as a significant contributor to the region's landscape, identity and economy. One of the ten main goals of the OCP is to "Enable Healthy and Productive Agriculture" by promoting "healthy and productive agriculture through diverse strategies that protect farmlands and food production."



The City of Kelowna's OCP includes two land use designations for agriculture:

- **Resource Protection Area:** rural lands preserved for agricultural, environmental, and recreational purposes, including the ALR, and other resource lands. Allowable uses would be agriculture / resource use. Generally, lands in this designation will not be supported for exclusion from the ALR.
- **Agri-Business:** rural land preserved for agriculture and agriculture-related businesses that support local farming and farmers (e.g. farmers market). Limited residential uses may be supported within this designation. Lands in Agri-Business designation will not be supported for exclusion from the ALR.

A variety of OCP objectives and policies connected to agriculture and food security can be found in Chapter 5 that are aimed at increasing local food production, protecting agriculture, and preserving agricultural land. Further, the OCP also provides Farm Protection Development Permit Guidelines (Chapter 15) outlining standards with respect to

subdivision design, site layout, landscaping, and buffering.

CITY OF KELOWNA ZONING BYLAW NO. 8000

Zoning bylaws can influence agricultural land in several ways, including through the setting of minimum parcel sizes and maximum building foot prints, setting parameters around secondary dwellings, setbacks, and establishing the potential for subdivision of agricultural lands, to name a few. The purpose of zoning is to restrict and regulate allowable uses within the zone, as well as setbacks, heights, site coverage, and subdivision regulations. Changes to the Zoning Bylaw and associated land use designation changes must be made through a zoning amendment through Council. In Kelowna, the A1 Zone includes 12,008 ha of land and covers the ALR as well as some additional lands outside the ALR, including vacant land outside the Permanent Growth Boundary. Small proportions of the ALR are also included in park zones and rural residential zones. The ALR is a provincial land use regulation while zoning is a local government land use regulation.

OTHER KELOWNA BYLAWS AFFECTING AGRICULTURE:

- Business Licence and Regulation Bylaw No. 7878: a business licence is required to operate a fruit stand to sell farm produce off-farm; landscaping, gardening and nursery supplies. It is not required for farm gate sales that are accessory to a farm operation.

- Animal and Poultry Regulation and Animal Pound Bylaw No. 5421-82: regulations for the keeping of farm animals within the City. It provides a detailed list of the number and types of animals permitted on lots in various zones based primarily on the size of the parcel. It also provides direction on size and siting of accessory buildings.
- Medical Marihuana Production Regulation Business Bylaw No. 10920: requires an owner or operator of a medical marihuana business within the City of Kelowna to hold a valid licence. This is of note because medical marihuana is a permitted agricultural activity on ALR land. Most permitted agricultural activities do not require a business licence.
- Soil Removal and Deposit Regulation Bylaw No. 9612: sets out the regulations for the deposit of soil on land where that soil did not previously exist including the requirement for a permit issued by the Subdivision Approving Officer. The bylaw provisions also include specific permit exemptions, permit conditions, security deposit requirements and details required for a permit application. There is no fee for a soil deposit permit. This is applicable to agriculture because much of the soil removal and deposit is occurring either from, or onto, ALR parcels.

Environmental Context

The Okanagan Basin (8,000 km²) is a narrow, north-south trending valley approximately 185 km in length bounded by upland plateaus and mountains that rise approximately 2000 m above the valley floor.⁸ The City of Kelowna is situated at a prominent bend at the mid-point of Okanagan Lake, where the northern segment of the Okanagan Basin contains a small valley that is parallel to Okanagan Lake. A mainstem river-lake system flows in a southerly direction in the valley bottom. Mountainous regions comprise the valley sides, and include precipitation catchment areas and watersheds⁹.

Water Resources

Due to the fact that the Okanagan Basin has an arid climate and is well-populated, the long-term sustainability of water resources is an issue of concern. The Okanagan Basin is characterized by a semi-arid continental climate, with an increase in atmospheric moisture from valley bottom to upland areas as well as south to north. Average annual precipitation for Kelowna is 381 mm and the average monthly air temperature varies from -3.8°C to 19.1°C¹⁰. Two-thirds (67 per cent) of the water used in the Okanagan Basin is derived from surface sources (lakes and streams), and 22 per cent is derived from groundwater, which is currently unlicensed. The remaining 11 per cent comes from recycling wastewater and by importing water across the basin boundary from adjacent areas. Since the aquifers in the Okanagan region are largely unconfined, a significant portion of the surface water in lakes and streams is derived from

groundwater. However, the state of knowledge of groundwater supply potential, aquifer health, and the actual amount of groundwater being used is poor. Groundwater is increasingly used as a water source as surface water becomes fully allocated in some areas.

The Okanagan Basin Water Board (OBWB) is a local water governance body with the objective to undertake strategic projects and programs at the Basin scale that meet the collective needs of Okanagan citizens for long-term sustainable water supplies while supporting the capacity of member jurisdictions to meet their own water management goals. In partnership with the BC Ministry of Agriculture, an Agricultural Water Demand Model (AWDM) was developed for the Okanagan Basin in 2010 to provide current and future agriculture water demand estimates for the Okanagan Basin. The model calculates water use on ALR properties and obtains a total for the entire basin or sub basins. Crop, irrigation system type, soils and climate data are used to calculate the water demand. Agricultural crop irrigation represents 64 per cent of the outdoor water use in the Okanagan Basin. An average of 660 mm per ha is used for agricultural irrigation, which is more efficient use of water than golf courses, parks, and residential landscaping who use an average of 900 mm per ha. Of the irrigated agricultural lands, 75 per cent is supplied by surface water sources which includes both private licences and water purveyors. Twenty per cent of the total area is currently irrigated by efficient irrigation systems; drip, microspray and microsprinkler systems for the horticulture sector.

⁸ Regional-Scale Groundwater Flow Model of the Kelowna Area and the Mission Creek Watershed, Central Okanagan, BC Final Report Submitted by: B.D. Smerdon and D.M. Allen 2009

⁹ Groundwater and hydrogeological conditions in the Okanagan Basin, BC. A state-of-the-basin report. Prepared by: Laurie Neilson-Welch, MSc. PhD candidate, Simon Fraser University and Diana Allen, PhD, P.Geo., Simon Fraser

University. Prepared for: Okanagan Basin Water Board For Objective 1 of the Phase 2 Groundwater Supply and Demand Project. December, 2007.

¹⁰ Regional-Scale Groundwater Flow Model of the Kelowna Area and the Mission Creek Watershed, Central Okanagan, BC Final Report Submitted by: B.D. Smerdon and D.M. Allen 2009

Groundwater is an important water supply and provides drinking water to communities as well as water for irrigation and industry¹¹. While surface water use is regulated through licencing, there is no current legislation governing the development and use of groundwater. The newly adopted Water Sustainability Act provides government with the authority to regulate future groundwater use through licencing, though it is unclear if existing wells will require the same level of administrative oversight.

The BC Ministry of Environment’s water atlas indicates three main aquifers underlying Kelowna¹². The 2013 Okanagan Groundwater Monitoring Project identified the need for observation wells to be established at these aquifers in order to properly monitor supply¹³. The largest, known as Aquifer #464, is over 69 km² in size¹⁴ and is made up of primarily sand and gravel and is confined by glaciolacustrine clay or till with an average thickness of 15 m. The prevalence of wells throughout the City of Kelowna, particularly east of Highway 97, indicates that some farms are using groundwater as a source of irrigation and livestock watering. Irrigation use was captured in the 2014 ALUI by crop type and irrigation system type. In total, 86 per cent of Kelowna’s cultivated crops utilize irrigation (3,319 ha). Sprinkler systems were the most common and were found across all main crop categories. Trickle systems were the second most commonly used system and were found primarily on tree fruit, vine, and nursery crops.

The Natural Environment Development Permit Area (DPA) includes vulnerable groundwater aquifers, water courses, sensitive drainage areas, and sensitive ecosystems (Figure 6).

¹¹ Jatel, N., Thomson, S., Graham, G., and D. Edwards. Okanagan Groundwater Monitoring Project Summary, 2013.

¹² | BC Ministry of Environment Water Resource Atlas. Interactive mapping tool. <http://maps.gov.bc.ca/ess/sv/wrbc/>

Water providers

Although agriculture uses a majority of the water in the Okanagan Basin, the agricultural industry is a relatively efficient user of water compared with other outdoor users. For instance, agriculture uses 120,000 million litres of water per year to irrigate 18,300 ha, an average of 660 millimeters per ha. On the other hand, the other three main outdoor uses (golf courses, parks, and residential landscaping) use a total of 68,000 million liters to irrigate 7,585 ha, an average of 900 millimeters per ha (Figure 7).

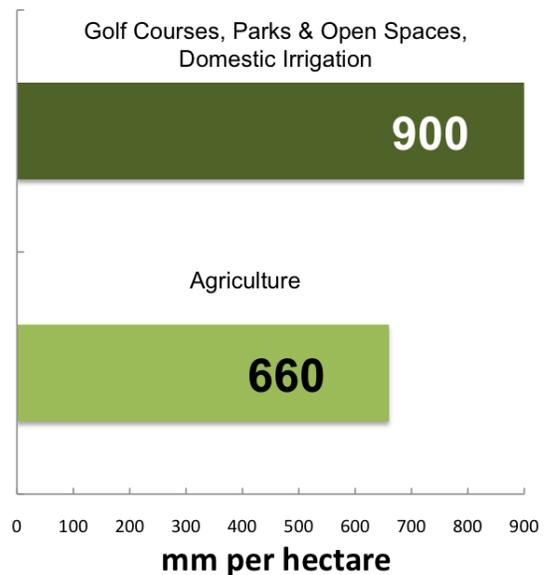


Figure 7: Efficiency of outdoor water use on a mm/ha basis

The City of Kelowna’s water utility is one of five water providers operating within municipal boundaries, including:

- City of Kelowna Water District
- South East Kelowna Irrigation District (SEKID)
- Rutland Waterworks (RWD)
- Glenmore-Ellison Improvement District (GEID)
- Black Mountain Irrigation District (BMID)

¹³ Jatel, N., Thomson, S., Graham, G., and D. Edwards. Okanagan Groundwater Monitoring Project Summary, 2013.

¹⁴ BC Ministry of Environment Water Resource Atlas. Interactive mapping tool. <http://maps.gov.bc.ca/ess/sv/wrbc/>



LEGEND

 Agriculture Zoning

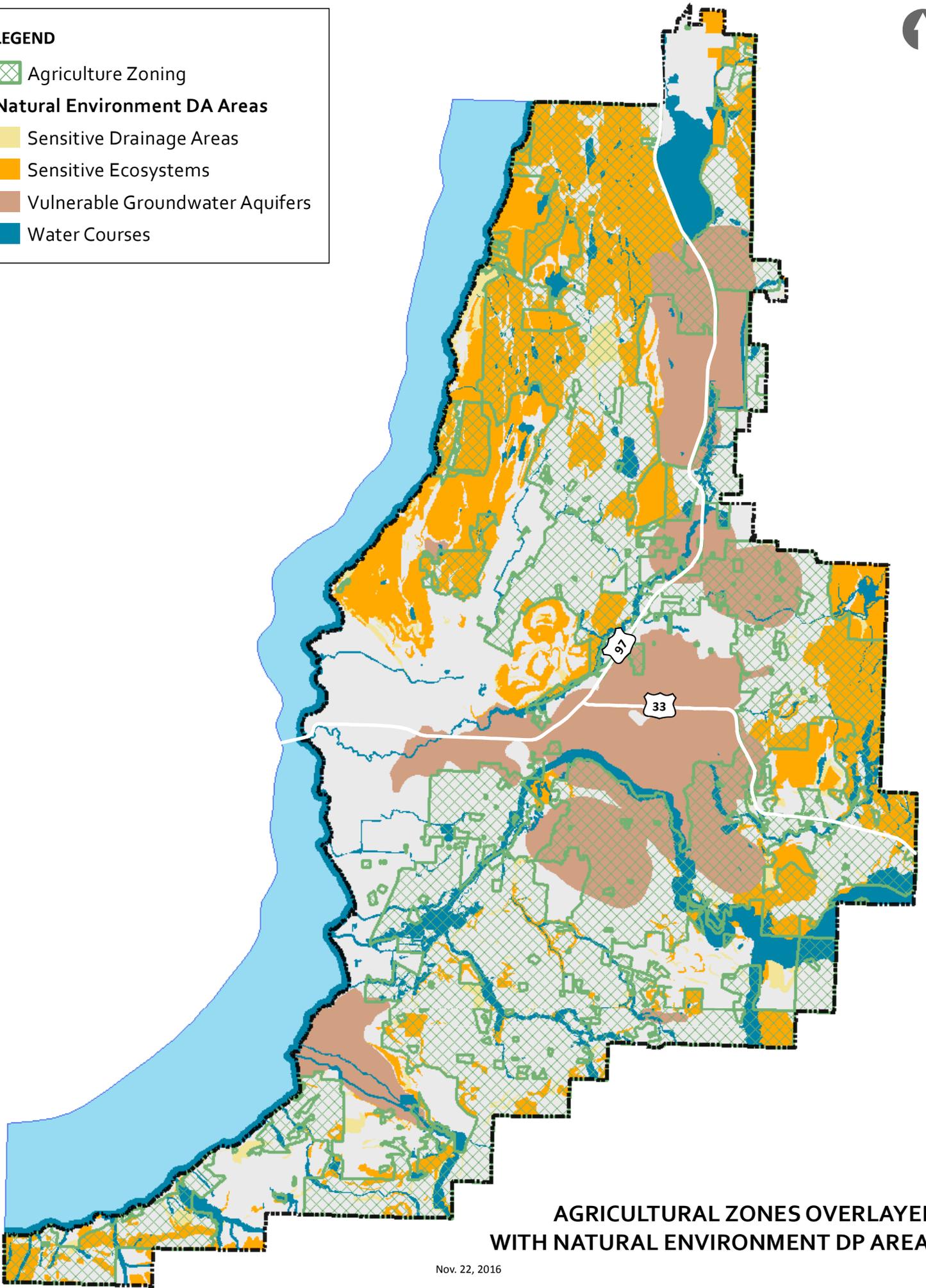
Natural Environment DA Areas

 Sensitive Drainage Areas

 Sensitive Ecosystems

 Vulnerable Groundwater Aquifers

 Water Courses



**AGRICULTURAL ZONES OVERLAYED
WITH NATURAL ENVIRONMENT DP AREAS**

The City serves approximately 60,000 customers from various systems, sourcing raw water source from Okanagan Lake. Most of the municipal water (95 per cent) is used for residential, commercial, industrial and institutional purposes; and only 5 per cent is used for agriculture¹⁵. Of the other irrigation districts, the SEKID has the largest number of agricultural users, with 500 agricultural (irrigation) connections and 2,200 domestic connections. As water quality standards have become more restrictive over time, some of the irrigations districts have encountered challenges in meeting the standards throughout the year, therefore boil water advisories persist in some of the more rural areas. Improvements to the water systems are planned for the short to medium term to address some of these water quality concerns. A map of water providers and agricultural areas is provided on the following page (Figure 8).

Kelowna Water Users' Communities

A water users' community is a group of six or more water licensees, each with their own licence(s), who create and maintain a system to store and deliver water to their respective place of use. Water users' community members may save money and time through sharing resources and works used to divert water¹⁶. There are three water users' communities in Kelowna: Benvoulin Water Users' Community, Mission Creek Water Users' Community and South Kelowna Water Users' Community (illustrated on the map on the following page, Figure 9). All three of these water users' communities source their water from Mission Creek for irrigation purposes for the properties of the members of the community. The oldest of three, the Mission Creek Water Users' Community, was first incorporated in 1921.

Currently, the incorporation agreement includes 41 water licenses in the area of KLO Road and Benvoulin Road¹⁷. To the north of the Mission Creek Water Users' Community, is the Benvoulin Water Users' Community, incorporated in 1930. Covering the area including Benvoulin Road, Byrns Road and Springfield Road, the community includes 23 water licenses¹⁸. The South Kelowna Water Users' Community is the furthest south of the three, and was incorporated in 1943. The agreement includes 17 water licenses in the area of Benvoulin and Casorso Roads¹⁹.

Steep slopes and hazards

The City of Kelowna's OCP contains a policy (5.15.12) that prohibits development on slopes greater than 30 per cent. The OCP also includes a Hazardous Conditions DPA. Although the DPA does not apply to activities that relate to normal farm practices, the Hazardous Conditions map indicates where some slopes may be too extreme for most farming activities to occur (Figure 10). In general, there is not very much overlap between steep slopes and agricultural zoning within the City. Some exceptions include areas adjacent to waterways, the Glenmore area, and the eastern slopes of Rutland, Black Mountain, and East Kelowna.

¹⁵ City of Kelowna Water webpage.

<http://www.kelowna.ca/CM/Page393.aspx>

¹⁶ Province of British Columbia, 2017. Water Users' Communities.

<http://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-licensing-rights/water-users-communities>

¹⁷ Province of British Columbia. Mission Creek WUC.

http://www.env.gov.bc.ca/wsd/water_rights/scanned_lic_dir/Water%20Users%20Community/Mission%20Creek%20WUC/

¹⁸ Province of British Columbia. Benvoulin WUC.

http://www.env.gov.bc.ca/wsd/water_rights/scanned_lic_dir/Water%20Users%20Community/Benvoulin%20WUC/

¹⁹ Province of British Columbia. South Kelowna WUC.

http://www.env.gov.bc.ca/wsd/water_rights/scanned_lic_dir/Water%20Users%20Community/South%20Kelowna%20WUC/

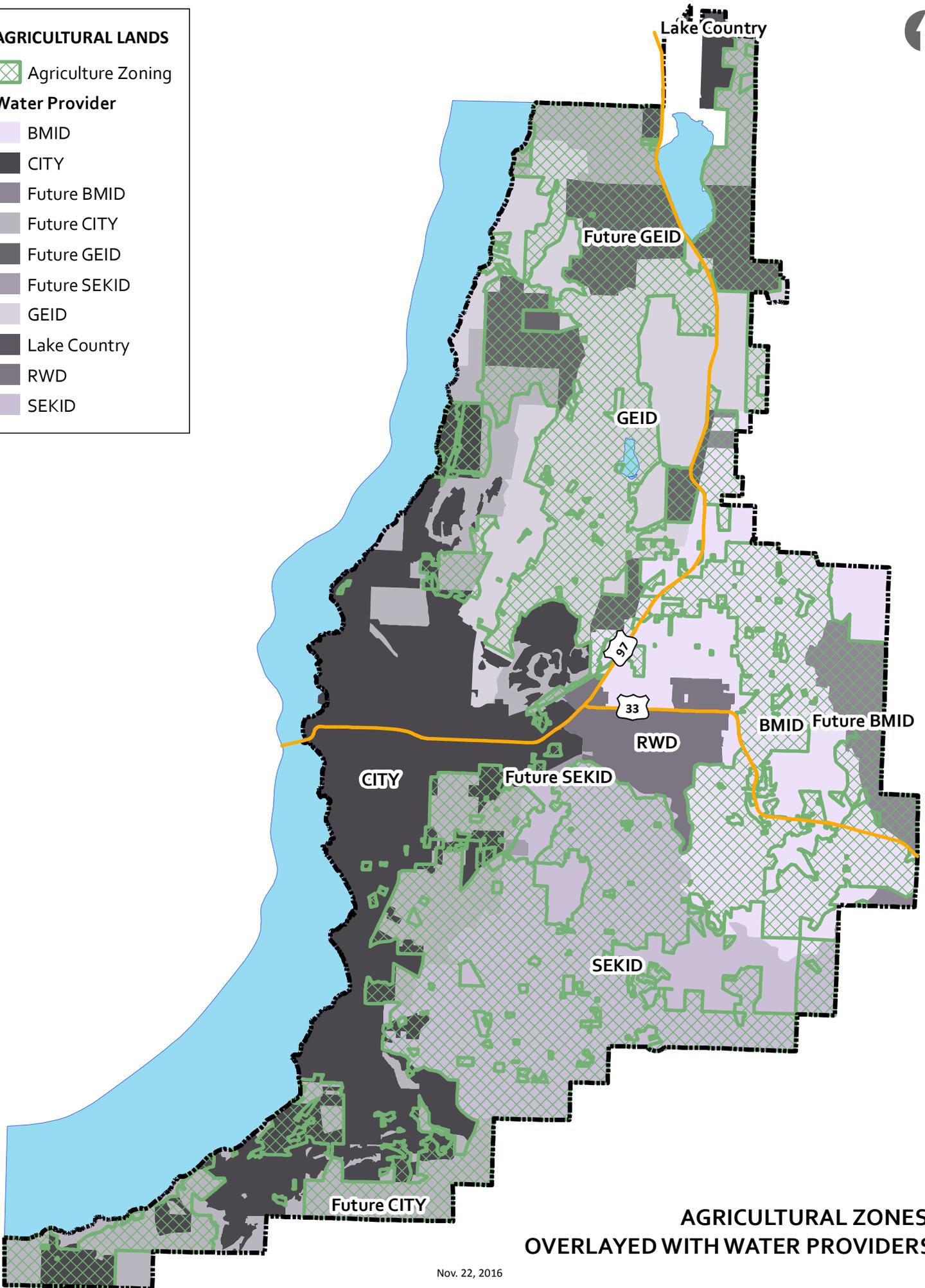


AGRICULTURAL LANDS

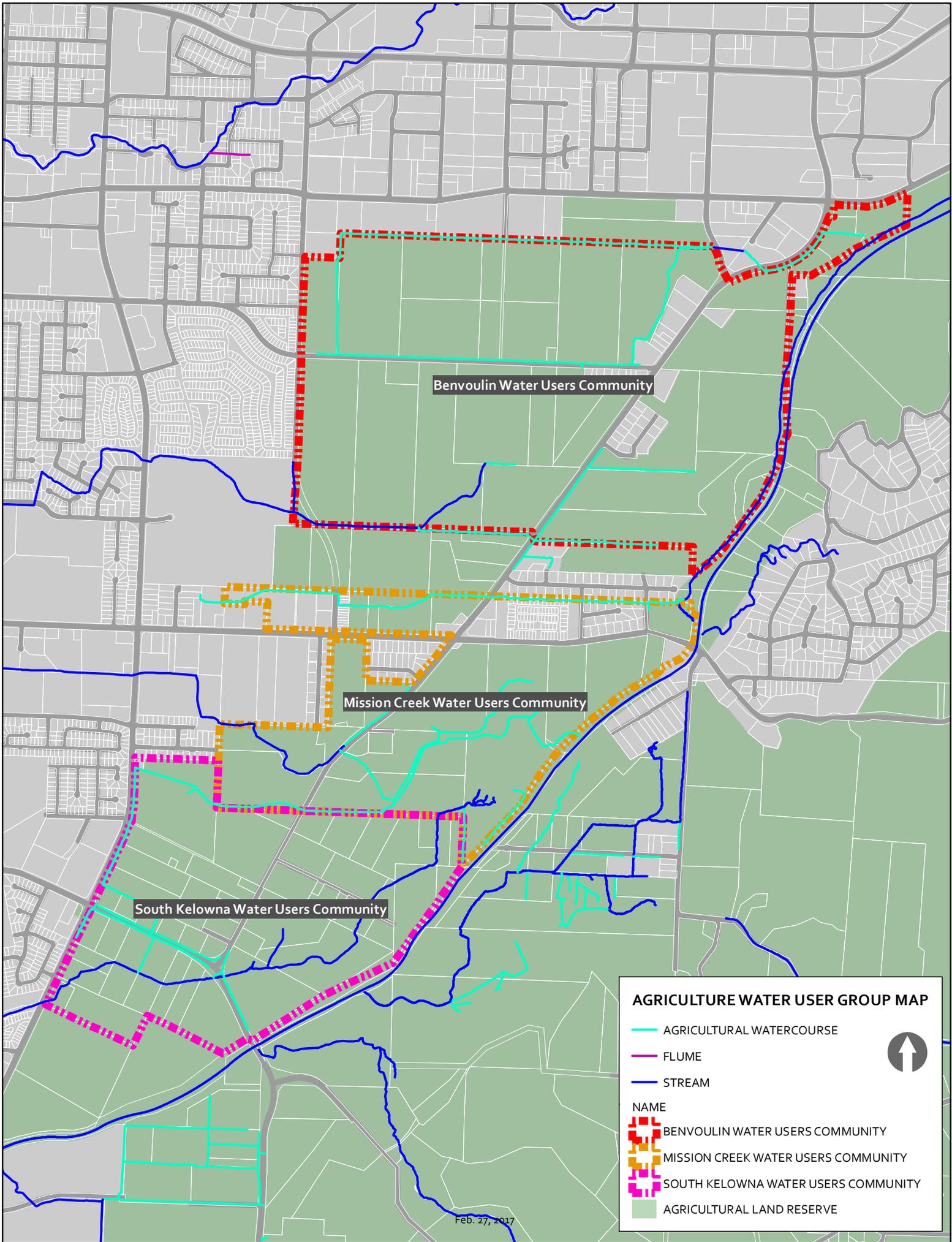
 Agriculture Zoning

Water Provider

-  BMID
-  CITY
-  Future BMID
-  Future CITY
-  Future GEID
-  Future SEKID
-  GEID
-  Lake Country
-  RWD
-  SEKID



**AGRICULTURAL ZONES
OVERLAYED WITH WATER PROVIDERS**



Benvoulin Water Users Community

Mission Creek Water Users Community

South Kelowna Water Users Community

AGRICULTURE WATER USER GROUP MAP

- AGRICULTURAL WATERCOURSE
- FLUME
- STREAM

NAME

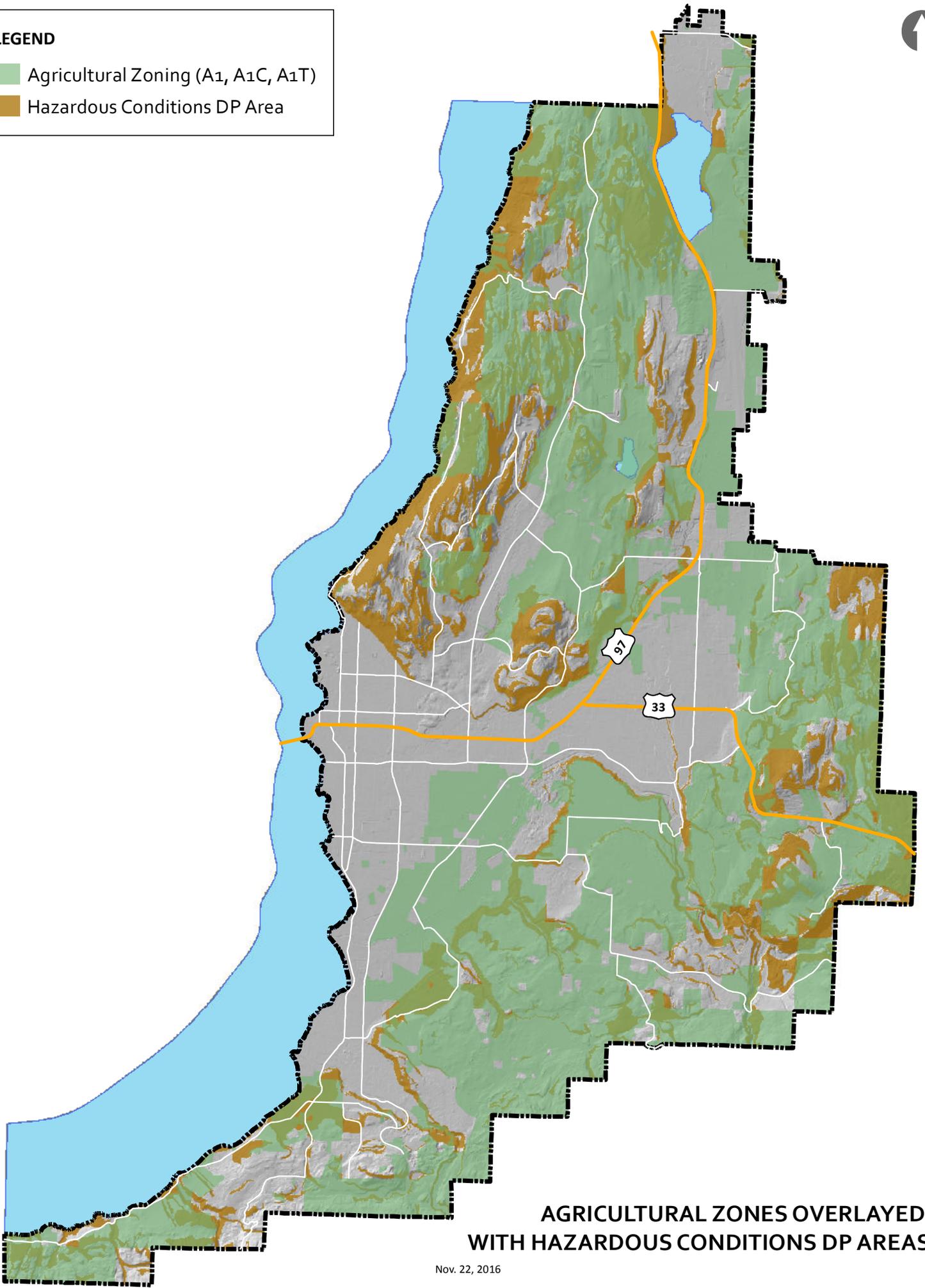
- BENVOULIN WATER USERS COMMUNITY
- MISSION CREEK WATER USERS COMMUNITY
- SOUTH KELOWNA WATER USERS COMMUNITY
- AGRICULTURAL LAND RESERVE





LEGEND

-  Agricultural Zoning (A1, A1C, A1T)
-  Hazardous Conditions DP Area



**AGRICULTURAL ZONES OVERLAYED
WITH HAZARDOUS CONDITIONS DP AREAS**

Nov. 22, 2016

Soils and agricultural capability

SOIL DEVELOPMENT

The Okanagan Valley bottom is infilled with a thick, complex arrangement of Tertiary intermountain basin sediments and more recent unconsolidated Quaternary (including recent Holocene) sediments from repeated glaciation, glaciolacustrine, and alluvial processes. Surficial geologic deposits are comprised of various depositional facies and landforms, including glaciofluvial deposits, kettled outwash, raised and present-day alluvial fans, and glaciolacustrine sediments²⁰.

During the Pleistocene, ice sheets extended over the Okanagan up to 7,000 feet in elevation. The weight and friction of the ice rounded the hills and caused pre-existing soils and loose materials to move into and mix with the ice.²¹ Large rock formations were crushed into a variety of soil textural sizes. As the glaciers retreated over time from the mountaintops, the valleys were partly blocked by remnants of the ice sheets. This debris accumulated to form till that was redistributed over the valley through glacier meltwater and filled the valley bottoms. Differences in chemical composition between soils in the area is generally the result of water sorting.

SOIL TYPES

The soils in the Kelowna area, indicated in Figure 11, are a combination of²²:

Glenmore (GLC): Glenmore soils are derived from lacustrine sediment deposits. The GLC variety are clay soils with undulating topography, generally located at elevations between 1,150 and 1,500 feet. The heavy clay causes drainage issues when irrigation water is used in excess. The surface is brownish grey, heavy clay with a brownish grey subsoil. These soils are suitable for a range of

agricultural crops including grains such as wheat. In order to successfully grow other crops subsurface drainage is recommended.

Nisconlith (N) with subclass groups of No, NI, Nsi, Ncl, and Nc): Nisconlith soils are part of a group of mineral soils that exist where the water table fluctuates at different levels within the soil complex. Drainage is therefore restricted. These soils occur in the colluvial fans and low floodplains of streams, where the water table is within a few inches of the surface for short periods during the spring freshet season. The topography is gently sloping or flat, and they are usually found at elevations between 903 and 1,700 feet above sea level. Damage to crops may occur if they are over-irrigated due to poor natural drainage. Installing drains is recommended. The subclasses are:

Rutland (R): Rutland soils are gravelly sandy loam soils derived from stony terraces at elevations between 1,200 and 2,700 feet. The soil surface is dark brown shading to brown in the lower part, with varying amounts of stones and gravel. The top layers are sandy loams that are underlain by coarser materials such as gravel. These soils require irrigation in order to become agriculturally productive. These soils are often more suited to orchards than for tilled crops. These soils are part of the Dark Brown Soils classification for the Okanagan Valley. These soils exist in arid areas at a higher elevation than the valley bottoms, usually occupying an elevation of 1,130 feet to 3,500 feet. These soils provide a short season for peaches and apricots, however apples, pears, cherries, and grapes can give excellent yields under the right drainage and irrigation conditions.

²⁰ Nasmith, H., 1962. Late glacial history and surficial deposits of the Okanagan Valley, British Columbia. Bulletin 46, BC Ministry of Energy, Mines and Petroleum Resources.

²¹ Kelley, C.C. and R.H. Spilsbury, 1949. Soil Survey of the Okanagan and Similkameen Valleys, BC. Report #3 of the

British Columbia Survey.

http://sis.agr.gc.ca/cansis/publications/surveys/bc/bc3/bc3_report.pdf

²² Ibid.

Oyama (OY): Oyama soils are derived from sandy terraces at elevations between 1,150 and 2,500 feet. Drainage is good to excessive and the soil surface is brown to dark brown, losing silt and clay content from the surface downward. The structure is finely granular and becomes structureless with depth.

Rough Mountainous Land (RM) and Rubble (Ru) indicate areas where topsoil is either thin or non-existent.

AGRICULTURAL CAPABILITY

The Canada Land Inventory (CLI), developed in the 1980s, used defensible criteria to apply agricultural

capability rating for soils in the ALR. There are seven classes, with Classes 1-3 considered the best for agriculture (or “prime”) and Classes 4-6 are considered marginal. Class 7 is generally applied to waterbodies, steep slopes, or other locations where agriculture is not viable. Agricultural capability in the Kelowna area is generally very high, with most soils either prime in their unimproved states or improvable to prime (Classes 1 – 3). Improvements may include irrigation, drainage, and removing stones. There are some areas where the soil class ratings dips to Classes 5-7, with the main limitation being rocky outcrops and steep slopes. These lower class soils are often ideal for fruit orchards and vineyards.

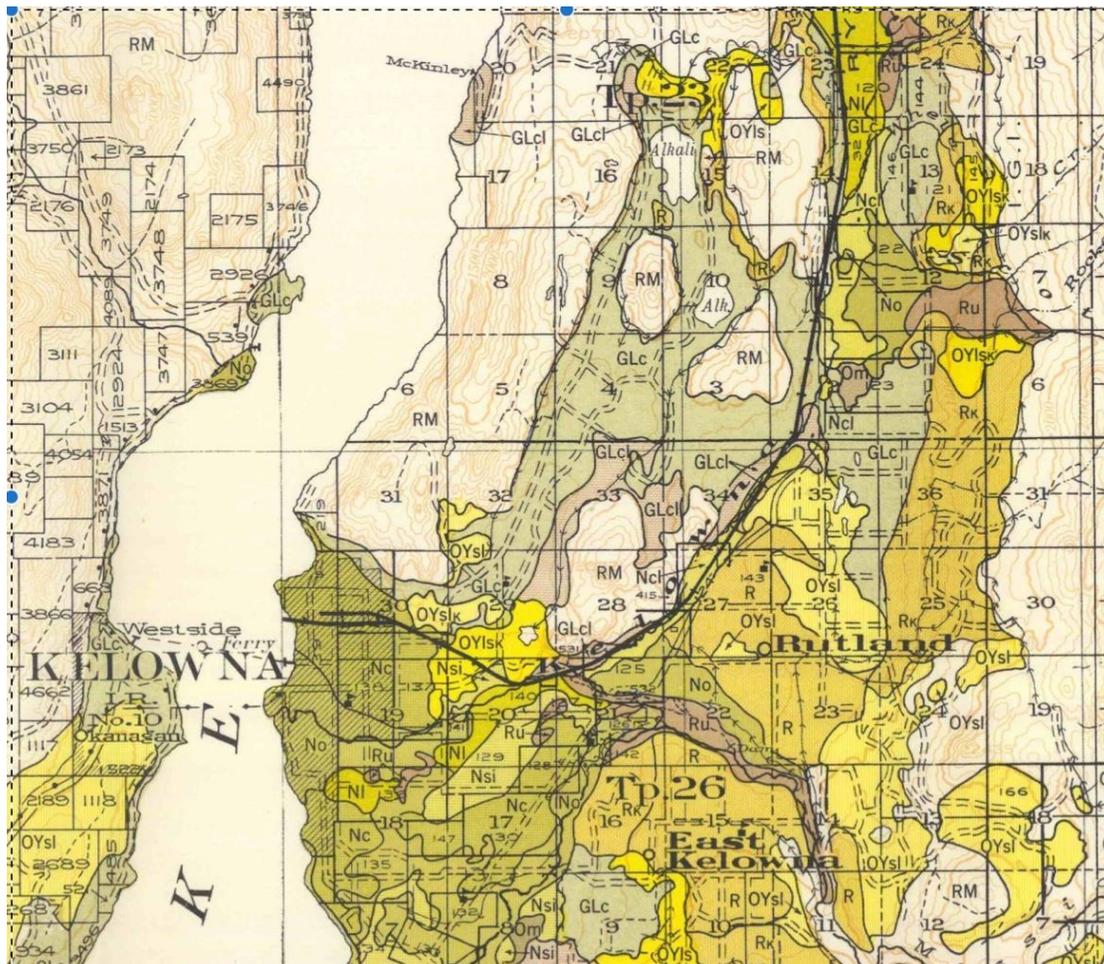


Figure 11: Map of Soil Series for Kelowna Area (Day et Al, 1959)

Invasive species and noxious weeds

Invasive species, primarily plants, have known impacts to the agriculture and livestock industry. Loss of native grasslands and forest plants to the spread of invasive plants has led to the loss of forage for both livestock and wildlife. Many invasive species also pose health threats to livestock and wildlife due to toxins or burrs causing physical injury. Regional District of Central Okanagan Bylaw No. 179²³ requires property owners to prevent the growth of noxious weeds and tall grasses and to provide for the cutting or destruction of noxious weeds and tall grasses. It applies to all Regional District of Central Okanagan electoral areas, the City of Kelowna, District of Lake Country and District of Peachland. It applies to farmland, although normal farm practices are exempt.

Some of the noxious and invasive plants affecting the Kelowna area include:

- Garlic mustard
- Knotweeds
- Puncturevine
- Longspine sandbur
- Common bugloss
- Rush skeletonweed
- Leafy spurge
- Hoary alyssum
- Common tansy
- Sulphur cinquefoil

- Knapweeds
- Hound's tongue
- Scotch thistle
- Hoary cress
- Purple loosestrife
- Yellow flag iris

Weather and growing degree days

Within the Okanagan, air masses move from west to east, with the amount of precipitation dependent upon both exposure and elevation. Lower parts of the valleys tend to be drier than hillslopes and mountainous areas. The spring and summer growing seasons are characterized by high-pressure systems that bring hot weather to the valleys, often with thunder storms. Climate normals (based on data collected from 1981 to 2010) for the Kelowna Environment Canada weather station point to a region with hot summers, cold winters, and fairly even precipitation amounts year-round. Some highlights are presented in Table 2.

Data from the Kelowna A weather station indicates average daily high temperatures of 27°C in summer, and average daily lows of -5°C in the winter. Precipitation averages 20 -30 mm per month of mixed rain and snow in the winter, and summer rains of 30 – 40 mm per month.

Table 2. Weather characteristics in Kelowna²⁴

	Kelowna A	Kelowna East	Kelowna PC Burnetts Nursery
Station Elevation (m)	429.5	491.0	349.9
Longitude	119°22'40.000" W	119°23'48.000" W	119°29'00.600" W
Latitude	49°57'22.000" N	49°51'34.200" N	49°52'27.000" N
Days per year with min temp < than 0°C	150.2	240.0	117.8
Days per year with max temp > than 20°C	123.5	118.1	123.8
Days per year with max temp > than 0°C	334.3	326.5	338.9
Days per year of rain	107.8	110.6	101.0
Days per year of snow	34.5	27.6	21.5
Average length of frost free period (days)	140	N/A	N/A
Average date of last spring frost	May 10th	N/A	N/A
Average date of first fall frost	September 28th	N/A	N/A

²³ [Regional District of Central Okanagan noxious weeds information webpage.](#)

²⁴ [Environment Canada Climate Normals data files, 2016.](#)

GROWING DEGREE DAYS

Growing degree days (GDD) are a weather-based indicator for assessing crop development. GDD units can be used to assess the suitability of a region for production of a particular crop; estimate the growth-stages of crops, weeds or the life stages of insects; predict maturity and cutting dates of forage crops; estimate the heat stress on crops; plan spacing of planting dates to produce separate harvest dates. Climate modeling suggests a substantial increase in GDDs in the coming decades, which will generally increase the diversity of crops that can be grown in the region.

The following GDDs (Table 3) are calculated using the Kelowna A weather station data and a base temperature of 10°C. The equation for each month is $\{(Max. Temp + Min. Temp)/2 - 10\} \times \#days/month^{25}$.

Table 3. Growing Degree Days (GDDs) for the Kelowna A weather station²⁶.

	Kelowna A weather station
January	0
February	0
March	0
April	0
May	86.8
June	199.5
July	294.5
August	282.1
September	114.0
October	0
November	0
December	0
TOTAL	976.9

This level of GDDs indicates a relatively long growing season with enough heat to grow field tomatoes and peppers. It is also a good level for

grapes and tree fruits. These GDDs could easily be increased by using polyhouse and other minimal greenhouse technologies, thereby increasing the growing season of crops produced in the area.

Climate change forecasting

Farmers are accustomed to the weather influencing their activities and weather-dependent decisions are a part of farming life. Adapting to climate change, however, involves a more systematic assessment and response. Agriculture is highly vulnerable to changes in climatic conditions and even small shifts could have significant consequences for farm viability and food production. Climate change scenarios developed by UBC and the Pacific Agri-Food Research Centre (PARC) in Summerland predict that winter snow packs will decrease as the climate warms and the snow level moves higher up the mountains. Further, agricultural water demands are expected to increase as climate change creates hotter summers and longer growing seasons. Climate change, population growth, and expansion of the agricultural land base are expected to result in significantly increased water withdrawals from surface and groundwater sources in the Okanagan Basin, especially during summer months.

Despite the challenges of applying broad climate models, some general projections are anticipated in BC between now and 2050. Additional secondary effects may include a range of conditions described in Table 4²⁷.

Regionally-specific climate modeling predictions are summarized in Table 5.

²⁵ Kelowna A weather station was chosen because it falls between the out ranges of Kelowna East weather station (which is at a higher elevation and is therefore colder and GDDs are lower) and Kelowna PC Burnetts Nursery weather station, which is at a lower elevation.

²⁶ Environment Canada Climate Normals data files, 2016. http://climate.weather.gc.ca/climate_normals/results_1981_2

010_e.html?searchType=stnProv&lstProvince=BC&txtCentralLatMin=0&txtCentralLatSec=0&txtCentralLongMin=0&txtCentralLongSec=0&stnID=1001&dispBack=0

²⁷ BC Agriculture and Food Climate Action Initiative. Regional forecasting.

<http://www.bcagclimateaction.ca/regional/vancouver-island/>

Table 4. Potential agricultural impacts of climate change.

Climate Change Condition	Potential Agricultural Impacts
Changing hydrological regime, decrease in summer precipitation	Decrease in productivity and quality of crops and livestock under water stress, increased costs, reduction in water supply (at times of high demand), increase in management complexity.
Increasing precipitation and variability of precipitation (especially in spring & fall)	Interruptions to planting, input applications and harvesting, increase in excessive moisture and site-specific flood risk, increase in pressure on drainage and water management, interruptions to pollination, decrease in light levels, increase in nutrient and input leaching, increase in management complexity.
Changing crop suitability ranges	Inconsistent productivity, quality & therefore prices; increase in suitability for new varieties of forage and field vegetable crops, increase in suitability of new crops.
Changes in pests and diseases	Increase in winter survival rates, increase in number of cycles in a year, introduction of new pests and diseases, increase in management costs, complexity, uncertainty, increase in delays or prevention of pollination.
Increase in extreme weather events (storms, wind, extreme heat)	Increase in building maintenance and damage costs, decrease in heating costs, increase in cooling and ventilation costs, interruptions to regional infrastructure and supply lines, decrease in productivity and quality.
Climate change impacts to other growing regions	Increase in feed or other input costs, increase in demand for food production/local food.

Table 5. Climate projections for the Central Okanagan in the 2020s, 2050s, and 2080s (PCICS, 2014)

Characteristic	Season	2020 change from 1961-1990 baseline		2050 change from 1961-1990 baseline		2080 change from 1961-1990 baseline	
		Range	Median	Range	Median	Range	Median
Mean Temperature	Annual	+0.6°C to +1.5°C	+1.0°C	+1.1°C to +2.7°C	+1.9°C	+1.7°C to +4.6°C	+2.9°C
Precipitation	Annual	-2% to +7%	+5%	-2% to +11%	+7%	+2% to +15%	+8%
	Summer	-11% to +10%	-5%	-24% to -1%	-11%	-34% to +4%	-12%
	Winter	-2% to +10%	+3%	-4% to +16%	+7%	+3% to +27%	+11%
Snowfall	Winter	-18% to +0%	-7%	-26% to -2%	-14%	-44% to -9%	-22%
	Spring	-58% to +1%	-33%	-76% to -13%	-57%	-89% to -17%	-77%
Growing Degree Days	Annual	+85 to +283 degree days	+178 degree days	+206 to +541 degree days	+359 degree days	+314 to +975 degree days	+560 degree days
Frost-free days	Annual	+7 to +21 days	+14 days	+13 to +36 days	+24 days	+20 to +60 days	+37 days

Agricultural Profile Methodology

This agricultural profile was compiled using existing reports and data sets. The main sources of data regarding agricultural activities were the 2014 Agricultural Land Use Inventory (ALUI), the Census of Agriculture (2001, 2006, 2011 and 2016), and BC Assessment. There are some clear differences in the way that these data sets are compiled, which can lead to discrepancies when some indicators are compared. Whenever possible, these differences are explained.

The report explores the following questions:

- How many and how big are farms in Kelowna?
- How much of Kelowna farmland is farmed?
- What crops are growing on Kelowna farms?
- How much farmland is used to grow grapes?
- What types of livestock are found on Kelowna farms?
- What soil and water practices are being used on Kelowna farms?
- How profitable are Kelowna farms?
- Who is farming in Kelowna?
- How is farmland tenure allocated in Kelowna?
- How much urban farming is occurring in Kelowna?
- What are some agricultural secondary support services located in Kelowna?
- How is agri-tourism characterized in Kelowna?
- How food self-sufficient is Kelowna?

Agricultural land use inventory

An Agricultural Land Use Inventory (ALUI) for the City of Kelowna was conducted by the Ministry of Agriculture in 2014. The inventory was part of a larger project in the Okanagan Basin and was funded in part by the Okanagan Basin Water Board. ALUIs provide a snapshot of agricultural activities occurring on the landbase, regardless whether or not the agricultural products are intended for sale. An ALUI is helpful in understanding the type and

extent of land-based agricultural activities within the ALR and parcels zoned for agriculture in a given area.

Data obtained through an ALUI include:

- How much land is currently used for agriculture;
- How much land is alienated from agriculture (due to topography, flooding, parcel size, existing land cover or land use, etc.);
- How much land may have potential for agricultural expansion; and
- An estimation of water demand with the use of an irrigation water demand model.

The following parcels were included in the ALUI study (Figure 12):

- Those completely or partially within the ALR;
- Any classified by BC Assessment as having "Farm" status for tax assessment;
- Those containing an active water licence for farming or irrigation purposes; and
- Any land zoned by the City of Kelowna to permit agriculture that is greater than 1 acre.

Highlights of a detailed ALUI report prepared by the Ministry of Agriculture ²⁸ are included in this analysis. It is important to note that the data collected during the ALUI includes information about activities on farmland that may or may not contribute to commercial farming operations. In other words, if five acres of apple trees are noted on the parcel then this contributes to the acreage listed as apple orchard production in the ALUI, even if the apples may not be sold and/or otherwise brought into the local food system. By contrast, the Census of Agriculture includes data on farms that are self-reported by individuals, specifically those from commercial operations. This is one example of how the data sets can lead to discrepancies in results.

²⁸ Ministry of Agriculture. 2016. City of Kelowna - Regional District of Central Okanagan. Agricultural Land Use Inventory

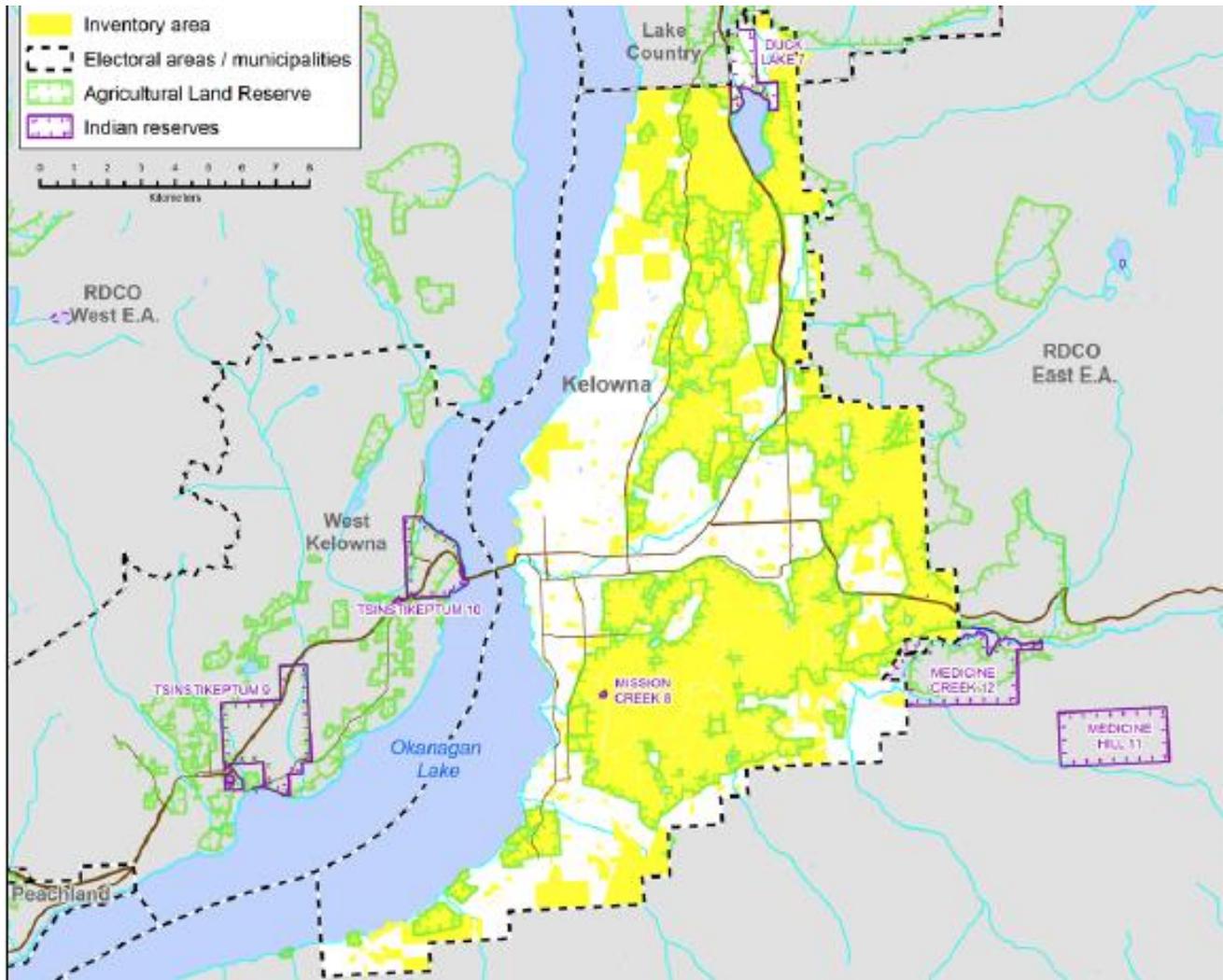


Figure 12: Agricultural Land Use Inventory assessment area

Census of Agriculture

The Census of Agriculture collects information from self-reporting individuals every five years as part of the larger Statistics Canada census collection and the completion is mandatory under the *Statistics Act*. The Census of Agriculture is a federal data collection initiative, and as such the geographic resolution is coarser than that of the ALUI (census subdivision rather than municipal boundary) but it is collected more frequently. This is another reason for some discrepancies found in the data sets.

The latest available Census of Agriculture uses 2016 data from Statistics Canada for Census Division (CD) 35 – Central Okanagan²⁹. The boundaries for Census Division 35 cover the whole Regional District of Central Okanagan (RDCO) and include

Census Consolidated Subdivision (CCS) 12 and CCS 20. CCS 12 is located on the east side of the lake and encompasses Kelowna (including East Kelowna and South Kelowna), Lake Country, and some rural areas east (Figures 12 and 13). Therefore, although CCS 12 was used to analyze the Census of

²⁹ Statistics Canada. 2016. 2016 Census of Agriculture. <http://www.statcan.gc.ca/eng/ca2016>

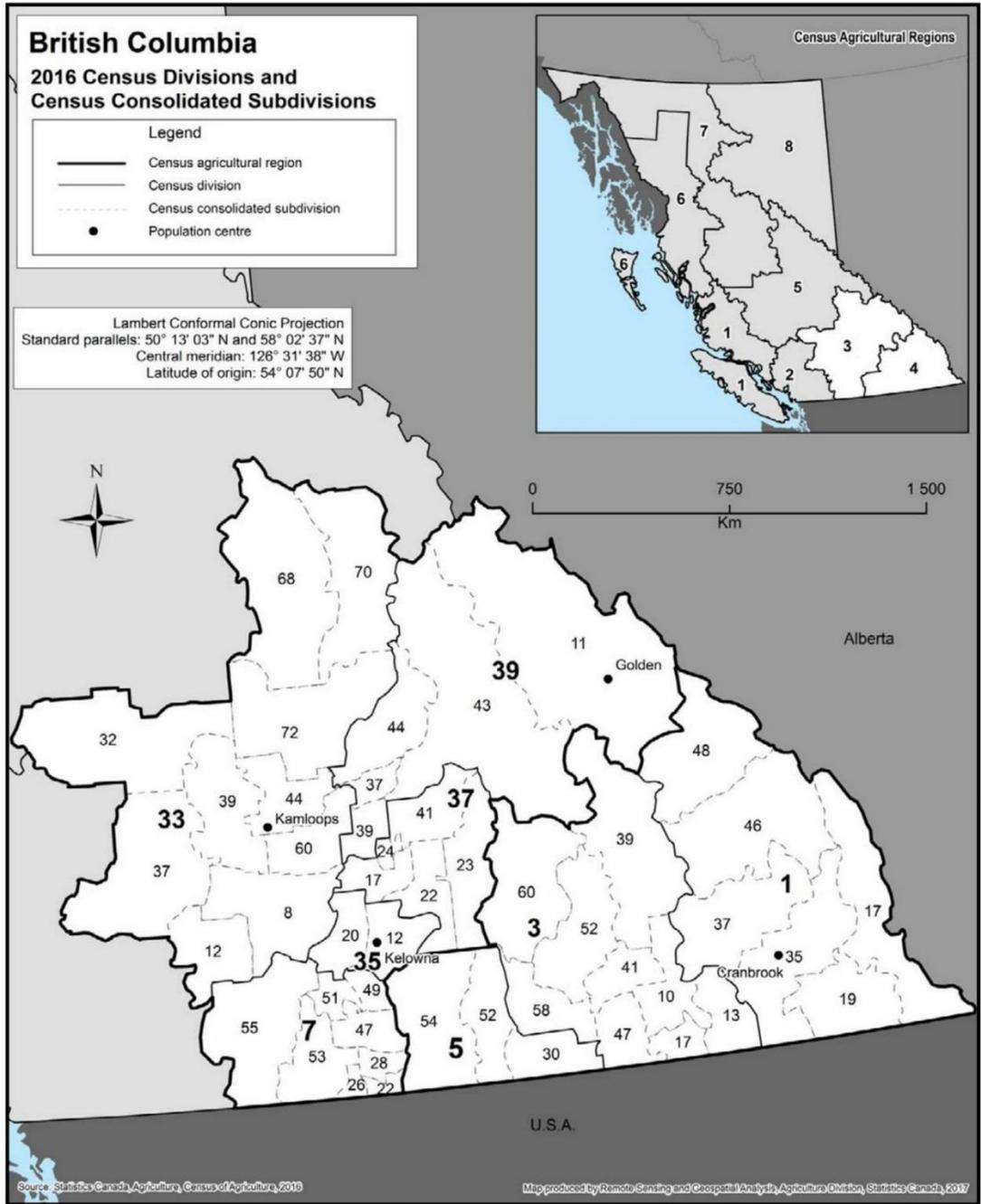


Figure 13: Census of Agriculture Census Consolidated Subdivision Map

Agriculture data for the City of Kelowna area also includes data for land outside the City's boundaries, so the resolution of the data is coarser than the ALUI data. The benefit of using the Census of Agriculture data is that it is recorded every five years and therefore allows for trends to be observed.

The Census of Agriculture defines the term "agricultural operator" as a person responsible for the management and/or financial decisions made in

the production of agricultural commodities³⁰. An “agricultural operation” is any farm, ranch or other operation that grows or produces agricultural products with the intent to sell these products. Farms with very low farm revenues are included as long as the agricultural products produced are intended for sale.

BC Assessment Farm Class Data

The Assessment Act is administered by BC Assessment, a provincial Crown Corporation responsible for the classification of properties for property assessment and tax purposes. Farm classification (Class 9) is a voluntary program providing the benefit of a lowered tax rate for assessed properties.

Even though property may be zoned as agricultural land, or located in the provincial ALR, farm classification will only be granted if the land (or at least a portion of it) is being actively used for agricultural production and it meets the other requirements of the Act. Only land can be classified as farmland - buildings (residences and outbuildings) are classified separately, typically as residential. Farm status properties may or may not be located within the ALR and are valuable for noting the distribution of farmed land in both the urban and rural areas.

Land qualifies for farm classification under the following conditions:

- The land is used for “primary agricultural production”;
- The land is the site of “a farmer’s dwelling”;
- The land is used for training and boarding horses in a horse rearing operation;
- The land otherwise contributes to primary agricultural production such as land used for drainage, irrigation, buffers and windbreaks.

Agricultural production for purely on-site consumption and the breeding and raising of pets.



A certain minimum amount of gross income must be produced from the primary agricultural production, and these requirements vary depending on the total land area. Minimum gross income requirements are calculated as follows:

- a) \$10,000 on land less than 0.8 ha (2 acres);
- b) \$2,500 on land between 0.8 ha (2 acres) and 4 ha (10 acres); and
- c) On land larger than 4 ha (10 acres), you must earn \$2,500 plus 5% of the actual value of any farm land in excess of 4 ha.

The higher income ratio threshold is applied to the smallest parcels of land in order to discourage the subdivision of farmland into small lots that would benefit primarily landowners wishing to experience a rural lifestyle while contributing in a very minimal way to agriculture.

³⁰ Statistics Canada. 2016. Frequently Asked Questions.

http://www23.statcan.gc.ca/imdb-bmdi/document/3438_D4_T9_V1-eng.htm

BC Food Self Reliance Study

In 2006, the BC Ministry of Agriculture produced BC's Food Self Reliance Study. The report included a model to measure food self-sufficiency within BC communities. The model estimates that 0.524 ha of land (irrigated and non-irrigated) is required to produce an adequate and healthy diet for one person to live for one year in BC. This model can be used in conjunction with population statistics and ALUI data to estimate the number of people that Kelowna's agricultural land base could feed if the system was completely localized (i.e. if all food produced in Kelowna was consumed in Kelowna). The model is a high level estimation but is useful in providing an indication of potential self-sufficiency.

UBC Okanagan Capstone Studies on Food Security in Kelowna

Two recent student-authored reports from UBC Okanagan examined questions around the resiliency of Kelowna's food system:

- Building a Business and Economic Case: Food Security in Kelowna, British Columbia. Proposed by: Kevin Khemapukpong, Leah Malcolm, Alex Naumov, Brendan Ogloff (2014).
- Building a Case for Kelowna's Food Security Strategy: Kelowna's Current Food Self-Sufficiency Situation. Proposed by: Jaclyn Kuzemski, Jordan Guglich, Mark Ronald, and Matt Percy (2015).

Findings from this work are referred to in this report.



Online Scan of Existing Agriculture and Food Related Businesses and Services

An inventory of existing businesses and services that support the local food and agriculture sector was developed and is included in this report. This inventory provides an indication of the level of sophistication of the local food system as well as support services and market opportunities for local producers.

Farm Characteristics

How many farms are in Kelowna?

According to the Census of Agriculture, the number of commercial farm operations has fluctuated in the Central Okanagan CCS 12 region since 2001, but overall the number has decreased over time (Figure 14).

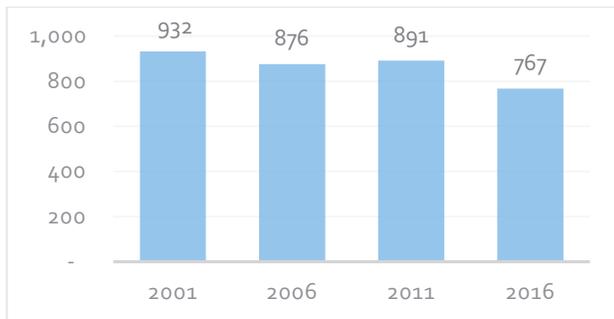


Figure 14. Number of farms in the Central Okanagan over time (Source: Census of Agriculture, 2001-2016)

The ALUI survey recognized 824 parcels of land in the ALR within Kelowna as undertaking some form of agricultural activity, and the BC Assessment roll includes 508 properties within Kelowna with Farm class status.

How big are farms in Kelowna?

The area of land being farmed has also fluctuated over the same time period according to the Census of Agriculture (Table 6).

Table 6. Farm size in the Central Okanagan (Source: Census of Agriculture, 2001 – 2016)

Central Okanagan	2001	2006	2011	2016
Total Area of Farms (ha)	20,544	23,407	29,354	21,568

Table 7 indicates commercial farm size in the Central Okanagan CCS 12 as reported in the Census of Agriculture. The vast majority of these farms were under 70 acres in size.

The average parcel size in Kelowna, determined by the ALUI, was 12.4 acres (5 ha) with 63 per cent of the parcels below 9.8 acres (4 ha). This indicates that farms within CCS 12 but outside the City of Kelowna’s boundary are likely larger than farms within the City.

Table 7. Farm size in the Central Okanagan (Source: Census of Agriculture, 2001-2016).

Central Okanagan	2001	% of Farms	2006	% of Farms	2011	% of Farms	2016	% of Farms
Total Number of Farms	932	100%	876	100%	891	100%	767	100%
Under 10 acres	336	36%	316	35%	380	43%	341	44%
10 - 69 acres	488	52%	479	55%	436	48%	356	46%
70 acres and over	108	12%	81	9%	147	16%	70	9%

Table 8 presents the size of ALR parcels from the ALUI data based on whether or not they are being used for farming. The average and median size of parcels that are not being used for farming are smaller than those that are being used for farming.

Table 8. Characteristics of farmed and unfarmed ALR in the City of Kelowna (Source: ALUI, 2016).

City of Kelowna	2014
Number of ALR parcels used for farming	824
Average parcel size (ha)	6.0 ha or 14.8 acres
Median parcel size (ha)	2.7 ha or 6.7 acres
Number of ALR parcels not used for farming	959
Average parcel size (ha)	4.0 ha or 9.8 acres
Median parcel size (ha)	1.1 ha or 2.7 acres

This is relevant, as it indicates that smaller parcels within the ALR are less likely to be farmed. There are more parcels of land in the ALR that are not being used for farming than there are parcels of ALR land that are being used for farming. Furthermore, the average parcel size of ALR parcels not being used for farming is 33 per cent smaller than those that are used for agriculture. This has implications regarding the viability of farmland after it becomes subdivided into small parcels.

This data is reinforced by BC Assessment Farm Income Summary data for the City of Kelowna, which denotes a total of 518 farms with Farm status (Class 9). The size class of these farms are as follows:

- Less than 1 ha (2 acres): 5 farms
- Between 1 and 4 ha (2 and 10 acres): 205 farms
- More than 4 ha (10 acres): 308 farms

Therefore, only five farms with Farm class status are under 2 acres in size, which represents approximately 1 per cent of the parcels with Farm class status in Kelowna. The majority (66 per cent) of operations with Farm class status are larger than 10 acres.

³¹ Ministry of Agriculture. 2016. City of Kelowna - Regional District of Central Okanagan. Agricultural Land Use Inventory

How much of Kelowna farmland is farmed?

Table 9 presents land cover as identified in the ALUI. Land cover refers to the physical features of the land (i.e. crops, buildings, forested areas, woodlots, streams, etc.) and four land cover categories encompass farming activities. A parcel is denoted as being “farmed” if it contains any of the following³¹:

1. Cultivated field crops – includes crops being grown in soil and any pasture land.
2. Farm infrastructure – includes barns, stables, corrals, riding rings, and their associated yards.
3. Greenhouses – includes glass or poly structures.
4. Crop barns – includes windowless buildings for growing crops, such as mushrooms or bean sprouts.

The farmed areas outside of the ALR tend to be on parcels in agricultural zones with Farm class status.

Table 9. Farmed area and ALR in the City of Kelowna (Source: ALUI, 2016).

Land Cover	Hectares
Jurisdictional area of Kelowna (excluding waterbodies)	21,732
Total area surveyed during ALUI (includes farmland inside the ALR and outside the ALR)	12,215
Total ALR in Kelowna	8,621
ALR included in the ALUI (amount being farmed)	8,146 (3,920)
Land outside the ALR included in the ALUI (amount being farmed)	4,069 (135)
Area within the ALR that is not being farmed	4,226

This indicates that a large amount of land that is zoned for agriculture and has the capability to support agriculture is not being farmed. This land availability represents an opportunity for the expansion of food production within the City of Kelowna.

Report. Reference Number: 800.510-14.2014. Summer 2014. Strengthening Farming Program.

What is growing on Kelowna farms?

According to the Census of Agriculture, the total area of land in crops within the Central Okanagan CCS 12 decreased in the years between 2001 and 2016. Land for pasture increased from 2001 to 2011, but decreased from 2011 to 2016 (Table 10). It is likely that the larger acreages of pasture are located outside of the City of Kelowna's boundaries, in the more rural parts of the Census Subdivision. The ALUI, which focused solely on farms within city

limits, noted tree fruits account for 41 per cent of all cultivated land in Kelowna.

The majority of cultivated land in Kelowna, as determined by the ALUI and the Census data, is made up of tree fruits, forage, and pasture. Production of vegetables and berries is relatively low in the city, indicating potential for growth in this sector. Crop types are shown in Table 11 below.

Table 10. Agricultural land use in the Central Okanagan from 2001 to 2016
(Source: Census of Agriculture 2001- 2016).

	2001 (ha)	%	2006 (ha)	%	2011 (ha)	%	2016 (ha)	%
Total area	20,544	100%	23,407	100%	29,354	100%	21,568	100%
Cropland	6,300	31%	5,350	23%	5,613	19%	4,873	23%
Pastureland (managed and unmanaged)	8,689	42%	9,662	41%	16,075	54%	8,502	39%
Total area all other land (including Xmas tree area)	x	x	7,789	33%	6,220	21%	8,124	38%

Table 11. Number of hectares crop types in the City of Kelowna
(Source: ALUI, 2014; Census of Agriculture, 2016).

	ALUI 2014			Census 2016		
	Hectares	% of cultivated land	% of ALR	Hectares	% of cultivated land	% of ALR
Tree fruits	1,578	41%	19%	2,533	60%	29%
Forage crops	1,748	45%	16%	1,153 ³²	27%	13%
Grapes	356	9%	4%	385	9%	4%
Nursery	97	2%	1%	x	x	x
Vegetables	69	2%	<1%	110	3%	1%
Turf	23	1%	<1%	x	x	x
Berries	23	1%	<1%	64	2%	1%
Total Field Crops	3,894	100%	46%	4,245	100%	48%

³² Includes alfalfa and alfalfa mixtures, tame hay and fodder crops (Census of Agriculture, 2011 & 2016)

The ALUI data was consistent with the Census data in that tree fruits had the highest amount of land cultivation. In particular, the ALUI found that apple production was the highest percentage of cultivated tree fruit area (27 per cent), with cherries and pears following further behind (Table 12). There has been a big jump in cherry production, even from the 2014 ALUI to the 2016 Agriculture Census.

According to the Census of Agriculture, production of nursery products and sod (turf) has remained quite consistent over time, but Christmas tree production decreased substantially from 2001 to 2011 (Figure 15). The hectares reported in the 2016 Census were suppressed for confidentiality, but the number of farms reporting specialty crops decreased for all crop types.

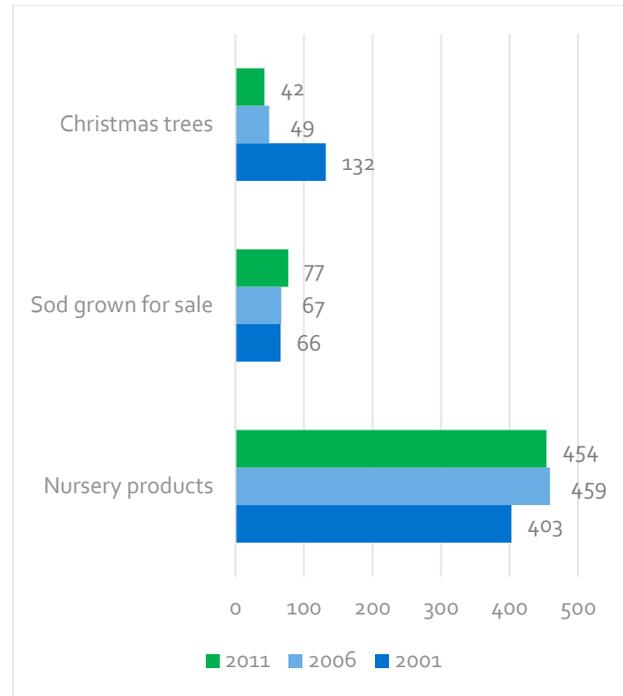


Figure 15: Amount of land in other crops within the Central Okanagan (ha).
(Source: Census of Agriculture 2001, 2006, & 2011)

Table 12. Amount of land in crops within the City of Kelowna
(Source: ALUI, 2014; Census of Agriculture, 2016).

	ALUI 2014			Census 2016		
	Ha	% of cultivated land	% of ALR	Ha	% of cultivated land	% of ALR
Apples	1,045	27%	13%	1,518	36%	18%
Cherries	395	10%	5%	852	20%	10%
Pears	95	2%	1%	91	2%	1%
Peaches	23	<1%	<1%	37	1%	<1%
Mixed fruits	16	<1%	<1%	n/a	n/a	n/a
Plums	3	<1%	<1%	15	<1%	<1%
Apricots	2	<1%	<1%	20	<1%	<1%

Total greenhouse production in the Central Okanagan CCS 12 has risen 55 per cent since 2001, with a slight dip in 2006 (Table 13). In 2011, the largest amount of greenhouse production was floriculture. Growing area for most production was suppressed in the 2016 data tables, but the number of farms reporting greenhouse vegetable production increased substantially from 5 in 2011 to 13 in 2016. There was one operation growing mushrooms in 2001, 2006 and 2016, but not in 2011.



According to the ALUI data, greenhouse production in 2014 was greater than the Central Okanagan CCS 12 in 2011 and 2016 (Table 14). This discrepancy may be due to actual sector growth, differences in the time of year that the data was obtained, or the fact that some of the greenhouses noted during the ALUI may not be growing products intended for sale, which is what the Census captures. The majority of greenhouse production in Kelowna is in nursery crops, which is consistent with the Census data for 2016 (Table 9). The majority of greenhouses in Kelowna are poly (88 per cent) and only 12 per cent are glass.

Table 13. Greenhouse production within the City of Kelowna
(Source: ALUI, 2014).

	m ²	%
Nursery	18,200	41%
Mixed use	14,200	32%
Vegetables	5,400	12%
Empty or Unknown	1,500	4%
Total greenhouse production	44,700	100%

Table 14. Greenhouse production in the Central Okanagan
(Source: Census of Agriculture, 2001 – 2016).

	2001 (# farms)	2001 (m ²)	2006 (# of farms)	2006 (m ²)	2011 (# of farms)	2011 (m ²)	2016 (# of farms)	2016 (m ²)
Greenhouse flowers	20	17,709	20	29,074	16	24,451	10	X
Greenhouse vegetables	5	x	8	4,241	5	1,127	13	X
Other greenhouse products	7	x	5	5,157	7	10,421	10	X
Total growing area for mushrooms	1	x	1	x	0	0	1	X
Total greenhouse area in use on census day	27	23,239	26	38,472	26	35,999	26	40,897

The following farms are known to be operating within the City of Kelowna. This list is representative of the fruit, vegetable, and greenhouse sector. However, it is not an exhaustive list.

Fruit and vegetable producers:

- Arndt Orchards
- BC Tree Fruits Market
- Caldwell Heritage Farm
- Curly Frog Farm
- Day's Century Growers
- Dendy Orchards
- De Simone Farms
- Don-O-Ray Farms
- Eastwood Organic Farm
- Firefly Farm
- Function Junctions Fruit Stand & Double Cross Cidery
- G.P. Sandher Holdings Ltd
- Graziano Orchards
- Green City Acres
- Harsh Bassi Orchards
- Hillcrest Farm Market
- Kelowna Veggies
- Kempf Orchard
- McMillan Farms – Corn Maze and Pumpkin Patch
- Morning Dove Gardens
- Old Meadows Organic Farm
- Roseridge Orchards
- Suncatcher Farm
- Sun City Cherries
- Sunshine Farm
- Wise Earth Farm

Nursery and floriculture:

- Bylands Garden Centre
- Elysium Garden Nursery
- K&J Pacific Peaches Christmas Tree Farm
- Blue Sage Farm
- Okanagan Lavender Herb Farm
- Volkmann Christmas Tree Farm



Breweries, cideries and distilleries:

- Bylands Garden Centre
- Elysium Garden Nursery
- K&J Pacific Peaches Christmas Tree Farm
- Blue Sage Farm
- Okanagan Lavender Herb Farm
- Volkmann Christmas Tree Farm

How much farmland is used to grow grapes in Kelowna?

According to the ALUI, approximately 9 per cent of cultivated land in Kelowna is comprised of grapes, representing 356 hectares in total (Table 15). By comparison, tree fruits cover more than four times this land area in the city. This corresponds to approximately 4 per cent of the ALR within Kelowna, and may be a smaller portion than many residents and visitors perceive. The profile of the local wine sector and the visibility of vineyards is especially high, giving more prominence to the grape and wine industry.

Table 15. Number of hectares of grapes in the City of Kelowna
(Source: ALUI, 2014).

	Hectares	% of cultivated land	% of ALR
Tree fruits	1,578	41%	19%
Grapes	356	9%	4%

It is also possible that many of the wineries based within the City of Kelowna are sourcing a portion of grapes for their products from vineyards outside city limits. The Agricultural Land Commission permits on-farm processing as long as at least 50 per cent of the product is grown on the farm. A 'farm' may include several disparate parcels owned and

operated by a single farmer. The following wineries and vineyards are located within Kelowna:

- Ancient Hill Estate Winery
- Calona Vineyards Winery
- Camelot Vineyards Ltd.
- Cedar Creek Estate Winery
- D&M Djordjevich Farm
- House of Rose Winery
- Indigenous World Winery
- Meadow Vista Honey Wines
- Nagging Doubt Winery
- Sandhill Winery
- Sperling Vineyards Wine Shop & Tasting Room
- SpierHead Winery
- St. Hubertus & Oak Bay Estate Winery
- Summerhill Pyramid Winery
- Tantalus Vineyards
- The Vibrant Vine
- The View Winery
- Wayne Gretzky Estates Okanagan (at Calona Vineyards Boutique)



What type of livestock is found on Kelowna farms?

Livestock production has remained relatively stable over time, with a few exceptions (Table 16). The most common form of animal husbandry in the Central Okanagan CCS 12 in 2016 was poultry production at 141 hen and chicken farms reporting. There was a dramatic decline in numbers of chickens, but bee colonies seem to have rebounded to close to 2006 numbers. The number of pig farms has declined over time, but has remained stable since 2011, which is consistent with the pork industry provincially. The number of cattle operations decreased from 2011 to 2016, but the number of animals per farm has increased. The trend of declining calf and cattle operations is likely due to the BSE crisis in the early 2000's combined with a tightening of the provincial meat inspection regulations. It is unclear whether or not the beef industry and number of farms will ever rebound from its earlier numbers. Many of these farms are



likely outside of Kelowna's city boundaries, but the trend is still interesting to note.

The livestock data captured during the ALUI is consistent with the Census data. The most common livestock activity in the City of Kelowna is horse (equine) with poultry the second most common (Table 17).

Table 16. Livestock trends in the Central Okanagan (Source: Census of Agriculture, 2001-2016).

	# of Farms	# of Animals	Avg per farm	# of Farms	# of Animals	Avg per farm	# of Farms	# of Animals	Avg per farm	# of Farms	# of Animals	Avg per farm
	2001			2006			2011			2016		
Hens and chickens	140	55,913	399	138	81,106	588	127	73,509	578	141	9,460	67
Horses and ponies	178	1,219	7	161	1,222	8	150	1,029	7	129	918	7
Total cattle and calves	117	6,806	58	81	4,281	52	86	4,045	47	67	6,575	98
Goats	26	236	9	24	225	9	33	315	9	27	214	8
Total sheep and lambs	35	834	24	23	714	31	26	946	36	37	705	19
Llamas and alpacas	24	291	12	13	253	19	23	172	7	14	87	6
Colonies of bees harvested for honey	17	1,026	60	20	1,172	59	21	489	23	44	956	22
Total pigs	17	201	12	16	x	x	10	79	8	10	x	x

Each occurrence of livestock on a farm parcel is counted as one activity, so the total number of livestock activities is almost equivalent to the number of farms in the region, unless a farm owns more than one parcel. In other words, if a farmer owns two parcels of land, but grazes beef cattle on both parcels, then it is possible that the cattle were counted twice if the ALUI was conducted on different days and the cows were moved overnight.

Table 17 Livestock within the City of Kelowna
(Source: ALUI, 2014).

	# or % of Parcels with that Livestock Noted	
Equine	230	64%
Poultry	56	16%
Beef	33	9%
Sheep/lamb/goat	22	6%
Llama/alpaca	12	3%
Swine	2	2%
Dairy	1	1%
Total	357	100%

The following livestock producers, equestrian operations, and honey producers are noted within Kelowna:

Livestock producers:

- Bite Me Organics
- Bottega alpacas
- Caldwell Heritage Farm
- Carmelis Goat Cheese Artisan Inc.
- Falcon Ridge Farms
- Firefly Farm
- Kelowna Free Graze Lamb
- Morning Dove Gardens
- Old Meadows Organic Farm
- Quality Farms



Equestrian operations:

- Arion Therapeutic Farm
- Briarwood Farm
- Cattail Creek Farms
- Flying Horse Farm
- Greenhawk Equestrian
- Mission Creek Ranch
- Myra Canyon Ranch
- Serendipity Farms
- Trapalands Farms

Honey producers:

- Arlo's Honey Farm
- Bill's Honey Farm
- Brainy Bee Honey
- Falcon Ridge Farms
- Meadow Vista Honey

What soil and water practices are being used on Kelowna farms?

Farms in the Central Okanagan region appear to be strengthening their efforts towards sustainability. From 2001 to 2011 the number of irrigated hectares in CCS 12 decreased substantially, as did chemical input usage as illustrated in Table 18. Chemical input usage continued to decline from 2011 to 2016 as well, but the number of irrigated hectares increased by 377 ha. The total number of farms reporting irrigation decreased from 752 in 2011 to 680 in 2016, indicating that fewer farms are likely managing more acreage. The number of hectares of irrigated land denoted during the ALUI was 3,326 ha, representing 82 per cent of all land being farmed in Kelowna. The main irrigation types being handline, wheeline, solid set and microsprinkler, and trickle irrigation was also used, mainly for grape production.

Table 18. Farm practices in the Central Okanagan in hectares

(Source: Census of Agriculture, 2001 – 2016).

Practice	2001	2006	2011	2016
Irrigated land	6,019	4,750	4,396	4,773
Commercial fertilizer	4,065	3,391	3,791	3,089
Herbicides	3,152	2,845	2,981	2,758
Insecticides	3,078	2,591	2,651	2,579
Fungicides	2,849	2,519	2,612	2,590
Lime	N/A	688	423	679



How profitable are Kelowna farms?

Kelowna producers experience high costs for land, labour, chemical and fertilizer inputs and fuel. Farmers in most of BC have difficulty producing sufficient financial resources to afford adequate farm labour, equipment, and other farm inputs (seeds, feed, soil amendments, etc.) to enhance production levels, and the situation in Kelowna is no different. Most farmers need financial assistance in order to scale up their production and often one family member must work off the farm.

Farm profitability is difficult to measure or to estimate. The following proxies can be used to determine profitability:

- Farm capital and assets
- Gross margin of farm operations
- Average farm receipts per farm
- Average farm receipts per hectare
- Net revenue margin
- Adjustments for inflation
- Farm income threshold values

Most of these indicators are measured through the Census of Agriculture, therefore the resolution of data can be obtained down to CCS 12, which is coarser than the City of Kelowna. However, the farm income threshold data is obtained from BC Assessment and represents information obtained for properties that have claimed Farm class status within the City of Kelowna.

FARM CAPITAL AND ASSETS

Total farm capital in Census of Agriculture CCS 12 has risen substantially from \$637 million in 2001 to over \$1.7 billion in 2016. Total farm capital includes land and buildings, livestock and poultry, farm machinery, and farm equipment regardless of whether these items are owned or leased.

Land and buildings represent 96 per cent of the total capital value, up from 89 per cent in 2001, indicating that land prices have increased substantially (Table 19). Nearly half of all farms (45 per cent) have farm capital value between \$500,000 and \$1,499,999 with only 15 per cent below \$500,000.

GROSS MARGIN OF FARM OPERATIONS

From 2001 to 2016 the gross margin of farm operations in the Central Okanagan CCS 12 dipped to less than 1 per cent in 2006 and then rose to 16 per cent in 2016, meaning that for every \$1.00 of sales, the farmer earned \$0.16 of profit (Table 20).

FARM RECEIPTS AND NET REVENUE

Sales (receipts) and net revenue can be calculated on a per farm and per hectare basis using Census of Agriculture data. The average revenue per hectare declined in 2011, but rebounded substantially in 2016 (Table 21).

Table 20. Gross margin of farm operations in the Central Okanagan

(Source: Census of Agriculture, 2001 – 2016).

Gross Margin of Farm Operations			
Year	Gross Farm Receipts (\$)	Total Operating Expenses (\$)	Gross Margin
2001	63,225,175	60,768,758	3.89%
2006	72,161,207	71,871,568	0.40%
2011	86,033,471	82,595,831	4.00%
2016	106,306,168	89,449,299	15.86%

Table 19. Farm Capital of Central Okanagan

(Source: Census of Agriculture 2001-2016).

	2001	%	2006	%	2011	%	2016	%
Total farm capital	637,026,748	100%	1,239,483,956	100%	1,673,766,221	100%	1,716,874,940	100%
Land and buildings	570,023,663	89%	1,167,113,122	94%	1,613,674,693	96%	1,645,622,859	96%
Farm machinery & equipment	55,965,153	8%	67,143,300	5%	54,791,465	3%	62,286,093	4%
Livestock and poultry	11,037,932	2%	5,227,534	<1%	5,300,063	<1%	8,965,988	1%

Table 21. Revenue per hectare of farmland in the Central Okanagan

(Source: Census of Agriculture, 2001 – 2016).

Year	# of Farms	Gross Farm Receipts (\$)	Average per Farm (\$)	Total Farm Area (Hectares)	Average per Hectare (\$)
2001	932	63,225,175	\$67,838	20,544	\$3,078
2006	876	72,161,207	\$82,376	23,407	\$3,083
2011	891	86,033,471	\$96,558	29,354	\$2,931
2016	767	106,306,168	\$138,600	21,568	\$4,929

The net revenue margin was an average of 15.3% for BC in 2016 and even higher in other regions of the Province, such as Abbotsford and Delta (Table 22). Net revenue margin was also up almost 5 percentage points from 10.7 per cent in 2011. The ratio of expenses to sales (receipts) appears to be lower in the Central Okanagan than in other regions, indicating that inputs and farm-related expenses are lower. This is contrary to the statistics from 2011 and additional investigation would be required to determine which expenses cost less, and why, in the Central Okanagan than in the rest of BC.

ADJUSTMENTS FOR INFLATION

When adjusted for inflation at 2.05 per cent (using the Bank of Canada consumer price index data inflation calculator³³, the revenue figures shift. In 2016, the average earnings per hectare of \$4,929 equates to just \$3,757.26 in 2001 dollars. This means that farmers have actually lost 23.8 per cent over the last 15 years on a per hectare basis. Perhaps not surprisingly then, 46 per cent of farms were earning less than \$10,000 in gross farm receipts in 2016 and only 28 per cent are making more than \$50,000 per year (Table 23). One reason for the substantial increase in gross margin from 2011 to 2016 could be the increase in farms making \$250,000 to \$499,999 and over \$1,000,000.

Table 22. Revenue per hectare of farmland in regions across BC
(Source: Census of Agriculture, 2016.)

Regional District or Municipality	Number of Farms	Total Farm Area (Ha)	Gross Farm Receipts (\$ million)	Expenses (\$ million)	% of Expenses vs. Income	Average Gross Revenue Per Farm (\$)	Average Gross Revenue Per Ha (\$)	Net Revenue Margin
Central Okanagan CCS 12	767	21,568	\$ 106.3	\$ 89.4	84%	\$138,600	\$4,929	+15.9
North Okanagan	1,039	81,336	\$ 151.7	\$ 129.4	85%	\$145,991	\$1,865	+14.7
Capital	1,003	13,265	\$ 64.6	\$ 58.1	90%	\$64,396	\$4,869	+10.1
Nanaimo	455	11,571	\$ 32.8	\$ 28.5	87%	\$72,177	\$2,838	+13.1
Comox Valley	416	9,653	\$ 33.7	\$ 29.5	87%	\$80,920	\$3,487	+12.5
Cowichan Valley	632	10,086	\$ 57.2	\$ 50.3	88%	\$90,542	\$5,673	+12.1
Abbotsford	1,307	22,714	\$ 853.1	\$ 721.3	85%	\$652,694	\$37,557	+15.4
Langley	1,103	10,807	\$ 340.1	\$ 292.5	86%	\$308,351	\$31,471	+14.0
Delta	185	9,090	\$ 223.5	\$ 198.5	89%	\$1,208,195	\$24,589	+11.2
Fraser Valley	2,576	60,853	\$ 1,468.5	\$ 1,222.1	83%	\$570,072	\$24,132	+16.8
Metro Vancouver	2,412	38,380	\$ 954.6	\$ 823.4	86%	\$395,761	\$24,872	+13.7
BC	17,528	2,590,210	\$ 3,729.4	\$ 3,159.7	85%	\$212,766	\$1,440	+15.3

³³ Bank of Canada consumer price index data inflation calculator: www.bankofcanada.ca/rates/related/inflation-calculator/

Table 23. Gross farm receipts by category in Central Okanagan CCS 12
(Source: Census of Agriculture, 2001 – 2016).

Total Gross Farm Receipts	2001 # of farms	2006 # of farms	2011 # of farms	2016 # of farms
Under \$10,000	472	425	474	353
\$10,000-\$24,999	165	134	116	123
\$25,000-\$49,999	98	108	91	76
\$50,000-\$99,999	76	77	74	70
\$100,000-\$249,999	77	76	74	63
\$250,000-\$499,999	24	37	35	46
\$500,000 - \$999,999	20	12	13	16
\$1,000,000 - \$1,999,999	N/A	3	9	13
\$2,000,000 and over	N/A	4	5	7

FARM INCOME THRESHOLD VALUES

The BC Assessment farm income threshold values for the City of Kelowna denotes a total of 518 farms with Farm status (Class 9). This is not the total number of farms in Kelowna since classification is voluntary and not all farm operators can meet the qualifications or choose to apply for farm status. Of these farms, the majority (70 per cent) are in the \$2,500 minimum income threshold category, indicating that most farms are between 0.8 ha and 4 ha (2 – 10 acres). Only a small number of farms under 0.8 ha (2 acres) have farm status.

Table 24 presents income ratio data for BC Assessment farms in the City of Kelowna. Income ratio is an indication of financial health of the farming operation. Any farm hovering around 1.0 is only just achieving the required minimum income levels to achieve Farm class status. For example, a small 2-acre farm with an income ratio of 5.0 would be reporting a gross farm income of \$50,000. A larger 8-acre farm with an income ratio of 2.0 would be reporting a gross farm income of \$5,000. In the City of Kelowna there are 101 farms (19 per cent of BC Assessment listed farms) reporting around the 1.0 income ratio level, but there are also 210 farms (41 per cent of BC Assessment listed farms) reporting at least a 5.0 income ratio level. This



indicates a split in financial success in Kelowna farms, and while some are struggling many others are doing well.

Table 24. Farm income threshold data for farm status properties within the City of Kelowna
(BC Assessment, 2015).

Income Ratio Group	Income Threshold Group			Grand Total
	\$10,000 (farms under 2 acres)	\$2,500 (farms 2 – 10 acres)	\$2,500+5% (farms over 10 acres)	
0.00 - 0.999	2	4	10	16
1.000 - 1.249	1	48	36	85
1.250 - 1.499	0	22	15	37
1.5 - 1.749	1	20	17	38
1.75 - 1.999	1	11	9	21
2.000 - 2.999	0	27	21	48
3.000 - 4.999	0	31	32	63
5.000 - 9.999	0	18	50	68
>=10.000	0	24	118	142
Total Farms	5	205	308	518

Who is Farming in Kelowna?

Only 1 per cent of the population in the Central Okanagan was employed by farming in 2016 and the number of farmers decreased from 2006 to 2016 (Table 25). The large number of farmers over 55 years of age and the increase in average age of farmers since 2006 indicate that few young people are pursuing farming as a career. Additionally, the number of farmers from 35 to 54 years of age declined from 2011 (40 per cent of total farmers) to 2016 (36 per cent of total farmers), while the number of farmers over 55 increased from 55 to 60 per cent of total farmers.

Table 25. Farmer demographics in the Central Okanagan

(Source: Census of Agriculture 2001-2016).

	2001	2006	2011	2016
Total Population	N/A	N/A	117,310	123,500
Total Number of operators	1,340	1,285	1,335	1,130
Male	875	820	855	730
Female	470	460	480	395
Under 35 years	65	50	55	45
35 to 54 years	670	590	540	410
55 years and over	610	640	740	675
Average Age (years)	53.3	55.3	56.8	57.7

Farmers spent less time working on the farm in 2016 than they did in 2011. The number of farmers working more than an average of 40 hours per week over the calendar year dropped from 315 to 235. This indicates the need for many operators to work outside the farm business in order to make a living.



How is Farmland Tenure Allocated in Kelowna?

Land tenure can be an indication of farm stability. Those owning land are more stable than those who lease their land. In the Central Okanagan CCS 12, approximately 72 per cent of the land was owned in 2016³⁴, while 13 per cent of the land was rented or leased through private arrangements (Table 26). This represents a moderately high level of farm stability in land tenure.

Farm ownership structure is predominantly sole proprietorship in the Central Okanagan CCS 12 (55 per cent) with a smaller proportion in a partnership with no written agreement (23 per cent). This has remained relatively consistent since 2001 (Table 27).

Table 26. Land tenure in the Central Okanagan (Source: Census of Agriculture 2001-2016).

	2001	%	2006	%	2011	%	2016	%
Area owned (ha)	15,678	76%	17,507	75%	18,125	62%	15,428	72%
Leased from governments (ha)	560	3%	4,061	17%	6,208	21%	x	x
Rented or leased from others (ha)	4,109	20%	2,595	11%	5,326	18%	2,905	13%
Total farm area (ha) ³⁵	20,544	100%	23,407	100%	29,354	100%	21,568	100%

Table 27. Farm business structure in the Central Okanagan (Source: Census of Agriculture 2001-2016).

	2001	%	2006	%	2011	%	2016	%
Total number of farms	932	100%	876	100%	891	100%	767	100%
Sole proprietorship	516	55%	499	57%	491	55%	420	55%
Partnership with written agreement	41	4%	33	4%	28	3%	41	5%
Partnership with no written agreement	244	26%	217	25%	226	25%	176	23%
Family corporation	120	13%	114	13%	128	14%	116	15%
Non-family corporation	10	1%	13	1%	18	2%	14	2%
Other (institution, community pasture, etc.)	1	<1%	0	0%	0	0%	0	0%

³⁴ These figures were not captured for the 2016 Census of Agriculture.

³⁵ Total farm area for 2006, 2011 and 2016 was calculated by Statistics Canada 14 as the difference between the sum of all land tenures minus

"Total area used by others." The "number of farms reporting" does not equal the sum of the parts because farms reporting more than one category (or activity) are only counted once.

Agricultural Support Services

Agricultural support services, such as farm equipment dealers, irrigation and drainage specialists, local processing, and value-added infrastructure can all assist in maximizing the ability for individual farming operations to succeed. The local food system is connected through storage, distribution, and retail channels as well.

Many transportation and distribution networks abound in the Central Okanagan, with Highway 97, Highway 97C, and Highway 33 travelling through and around Kelowna. Producers within the city have excellent access to local and regional communities and markets as well as a number of major cities such as Vernon, Kamloops, West Kelowna, Summerland, Penticton, Calgary and Vancouver by air and ground transportation. However, while the transportation routes exist, the cost of the fuel and freight out of the Central Okanagan region makes shipping and transportation prohibitive for many small and medium producers. The need to ship livestock to be finished and/or processed is a major transportation-related concern.

Support systems and infrastructure for collecting, storing, processing, and distributing food to major retail markets have long been established and operate efficiently at the provincial and national levels (Sysco, Gordon Food Services, and Overwaitea are examples). While some Kelowna suppliers have developed contracts with these distributors, other producers may have difficulty accessing this distribution system because they are too small to meet production requirements of larger scale retail outlets or there may be information gaps around labeling, quality control, traceability, and food safety.

The following lists identifies some of the support services that are based in the Kelowna area and serve local farms.



Processing and value-added resources:

- BC Tree Fruits Market
- Big Dave's Spices Ltd
- Bonanza Meat Packers Ltd.
- Foothills Creamery Ltd
- Fripp Warehousing
- Hawkeye Holdings Ltd
- Home for Dinner
- Little Creek Dressings
- Mission Meats
- Okanagan Poultry Processing
- Power Plant Whole Foods
- Springfield Meats
- T-Bone's Meat Processing
- Sunrype Products Ltd

Farm equipment:

- All Service Irrigation Ltd.
- Avenue Machinery
- Buckerfield’s Country Stores
- Evergreen Irrigation Ltd.
- Farmco Sales Ltd.
- Growers Supply Company Ltd.
- Irrigation Design Management
- Kelowna Irrigation Repair
- Liquid Underground Enterprises Ltd.
- Okanagan Bee Farm
- Okanagan Kootenay Sterile Insect Release Program
- OK Valley Irrigation
- PrairieCoast Equipment -
- Princess Auto
- Pro Source Irrigation Supply Ltd.
- Stewart Irrigation Ltd.
- Valley Irrigation
- Van-Kel Irrigation
- Westview Irrigation Ltd.

Industry and support extension:

- BC Agriculture Council
- BC Bee Keepers
- BC Cattlemans Association
- BC Cherry Growers Association
- BC Chicken Growers Association
- BC Direct Farm Marketing Association
- BC Fruit Growers Association
- BC Grape Growers Association
- BC Organic Growers
- Central Okanagan Community Farm Society
- Central Okanagan Fruit Tree Project
- RAMA: Radical Action with Migrants in Agriculture
- Tourism Kelowna



Agri-tourism

It is estimated that 1.5 million tourists visit Kelowna each year³⁶. This number is anticipated to increase annually. Many people come to the region for reasons directly related to the agricultural sector. These include, but are not limited to, the following:

- Educational farm tours;
- U-picks;
- Wineries, breweries, meaderies, and cideries;
- Equestrian facilities;
- Farmers markets and farm gate retail and;
- Bed and breakfasts.

Recent discussions at the ALC suggest that local governments and producers are requesting more clarification around the definition of “agri-tourism” specifically as it pertains to scale, permanence, and type of activity. Providing farm tours and serving prepared food on-site is one way that farmers have been able to continue farming in a profitable manner, and many Kelowna farms are examples of this. Tourism Kelowna has two webpages that have been developed to highlight local agri-tourism opportunities and a Farm to Table brochure, including a map, is available on their website.

Increasing consumer awareness of the benefits of eating locally is increasing the demand for fresh and processed local food products. Direct sales in the form of the number of farmers markets and BC’s high level of educated and health-conscious consumers has produced a 500 per cent increase in organic food purchases in BC since 2006³⁷. Other value-added sectors that are doing well include alcoholic beverages - craft beer retail sales have increased 20 per cent each year since 2006 and Okanagan wines have done very well in the past 10 years, winning national and international awards.



Experience-based products (such as corn sold at a corn maze, or apple pie sold at a u-pick apple orchard) are also popular with consumers. According to the community survey, consumers are willing to pay premium prices for products locally.

The Kelowna Farmers and Crafters Market operates twice a week (Saturdays and Wednesdays) and there may be interest (both from a supplier and consumer perspective) of having either an additional market or a series of pop-up markets for in-season goods to be added to the local market scene.

Agri-tourism can also manifest itself as components of cultural and historical education opportunities. In Kelowna, the Laurel Packinghouse pays tribute to the Central Okanagan’s rich agricultural heritage. The museum, located in an agri-industrial building over 100 years old, includes the BC Orchard Industry Museum and the BC Wine Museum. It also serves as an event location for meetings, conferences, and celebrations.

³⁶ Okanagan Valley Economic Profile 2015.
<http://www.investkelowna.com/sites/default/files/uploads/OV-EDS-Eco-Profile2015r1.pdf>

³⁷ BC Ministry of Agriculture Service Plan
http://www.bcbudget.gov.bc.ca/2013_June_Update/sp/pdf/ministry/agri.pdf

Urban Farming

Most urban farm production is occurring in residential backyards and in front yard plots and public community gardens. Community gardens improve access to food, increase the amount of permeable surfaces, provide space for bird habitat and bee pollination. They also serve as public spaces for recreation and beautify communities. Community gardens and urban farms have been shown to have multiple social, health, and economic benefits, including: creating safe spaces to recreate and improve the physical space of the neighbourhood; improving food access to food insecure areas and increasing fruit and vegetable consumption among participants; and, incubating new businesses in the form of Community Supported Agriculture (CSA). The City of Kelowna has drafted a target to encourage a community garden space within 400m or a 5-minute walk of all residents.

The City has partnered with the Central Okanagan Community Gardens Society to provide community gardens within Kelowna. The City of Kelowna provides the land, while the Central Okanagan Community Gardens society coordinates the gardeners and plots.

The gardens are located:

- Cawston Avenue (Downtown)
- St Paul Street (Downtown)
- Sutton Crescent (Glenmore)
- Hartman Road (Rutland)
- Barlee Road (Kelowna Central)
- Lindahl Street (Kelowna Central)
- Michaelbrook (Mission)
- Gibbs Road (Rutland)



The total area coverage of these community gardens is 0.45 ha (1 acre)³⁸. Additional estimates of the potential area of urban garden plots in residential areas of Kelowna was calculated at 81 ha (200 acres)³⁹. This assumes that all backyards and front yards could be used for cultivation, and therefore represents a potential area, rather than an actual amount of urban farmland.

While it is difficult to obtain estimates regarding the amount of land in urban areas currently being used for food production (much less how much food is being collectively produced on that land), the interest appears to be growing, with long waiting lists for community garden plots and the success of local urban farm businesses such as Green City Acres.

Urban agriculture support includes:

- Central Okanagan Community Gardens
- Central Okanagan Food Bank
- Central Okanagan Food Policy Council
- Farmers markets
- Kelowna Food Share
- Okanagan Fruit Tree Project
- Urban Harvest Organic Delivery

³⁸ As estimated in the UBC Captstone study: Building a Case for Kelowna's Food Security Strategy: Kelowna's Current Food

Self-Sufficiency Situation. Proposed by: Jaclyn Kuzemski, Jordan Guglich, Mark Ronald, and Matt Percy (2015)

³⁹ Ibid.

Food Self-Sufficiency

The BC Ministry of Agriculture estimates that 0.524 ha of land (irrigated and non-irrigated) is required to produce an adequate and healthy diet for one person to live for one year in BC. Kelowna's 2015 population was estimated at 123,500 for 2015⁴⁰. Using these figures, there would need to be 64,714 ha under production (with the potential to be irrigated) to be 100 per cent food self-sufficient. This is a land base greater than the entire area of the City of Kelowna (21,732 ha) and would assume that all food being produced would remain within the city for local consumption. Based on the ALUI data, there is currently 4,055 ha of land being farmed and 4,226 ha of land within the ALR that is not currently being farmed but has the potential to be farmed.

Therefore, Kelowna is estimated to be currently 6.2 per cent self-sufficient and if all ALR was being farmed to its fullest potential then that figure could rise to 12.8 per cent. Including the area of land used for community gardens (0.45 ha) and the potential to use residential gardens to their fullest capacity for food production (81 ha) would only shift the percentage of food self-sufficiency to 12.9 per cent (an overall increase of 0.1 per cent).



⁴⁰ Community Trends, 2015. City of Kelowna.
<http://apps.kelowna.ca/CityPage/Docs/PDFs//Policy%20and%20Planning/Community%20trends%202015.pdf?t=095301565>

Conclusion

Kelowna has a rich farming history and is characterized with high agricultural capability soils and climate. Water resources benefit from conservation practices and are mainly governed on a local basis, although some concerns about water quality persist. Climate change is predicted to increase water scarcity for all users but may open up the diversity of possible crop production in the region due to an increase in seasonal temperatures.

The Regional Growth Strategy and the OCP contain a multitude of goals, objectives, and policy directions that support farming and the agricultural land base. Clearly all the biophysical, policy, and local regulatory pieces are in place to create a healthy environment for viable agricultural operations and value-added food businesses, such as processing, canning, juicing, brewing, as well as retail and distribution, to flourish.

