Pemberton Valley Agricultural Area Plan

APPENDICES

Appendix A: Land Use Inventory Report – Pemberton Valley 2009 (including maps)

Appendix B: SWOT Analysis

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Growing Knowledge

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Ministry of Agriculture

Land Use Inventory Report

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Pemberton Valley

Fall 2009

Ministry of Agriculture
Strengthening Farming Program
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For further information on the content and development of this report please contact:

Ministry of Agriculture
Sustainable Agriculture Management Branch
Abbotsford, British Columbia, Canada
(604) 556-3110

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John Bek, local farmer (Pemberton Elite Seed Potatoes)

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Abbreviations and Acronyms

AGRI	British Columbia Ministry of Agriculture
ALC	Agricultural Land Commission
ALR	Agricultural Land Reserve
BC	British Columbia
GIS	Geographic Information Systems
ALUI	Agricultural Land Use Inventory
SLRD	Squamish-Lillooet Regional District
ha	Hectares

Executive Summary

Agricultural Land Use Inventories (ALUIs) are done to support BC local governments, the BC Agricultural Land Commission, the BC Ministry of Agriculture, the BC agriculture industry and other readers interested in understanding what agriculture activities are taking place in the surveyed area. ALUIs can also assist with analysis on the health of an agriculture zone by looking at the capacity for agricultural expansion, the land that is not available for agriculture, and pressures on agricultural land use within the surveyed area. They can also be used to develop a water demand model for the surveyed area.

The ALUI of Pemberton Valley is a drive-by inventory that records land use on a per-parcel basis on land that is within and next to the Agriculture Land Reserve (ALR). It shows the agricultural land use on each parcel at the time the survey is done, as a snapshot in time, and it does not assess who owns the land.

The area studied in this report includes a total of 6,484 hectares (ha) of land on 528 parcels within the SLRD Electoral Area C and within the Village of Pemberton, of which 5,119 ha are within the ALR. This covers 68% of the total ALR within these two jurisdictions. The remaining 32% of the ALR was not surveyed as it is in Indian Reserve, outside legal land parcels, or inaccessible.

Land was classified into three distinct categories for this report:

- Farmed land – Land commercially farmed or non-commercially farmed,
- Not farmed land:
    - Available land – Land available for agriculture expansion but not currently farmed, and
    - Unavailable land – Land not currently used for agriculture and not available for agriculture use.

Figure 1. Percent of Agricultural Land Reserve area in land use categories for all surveyed parcels

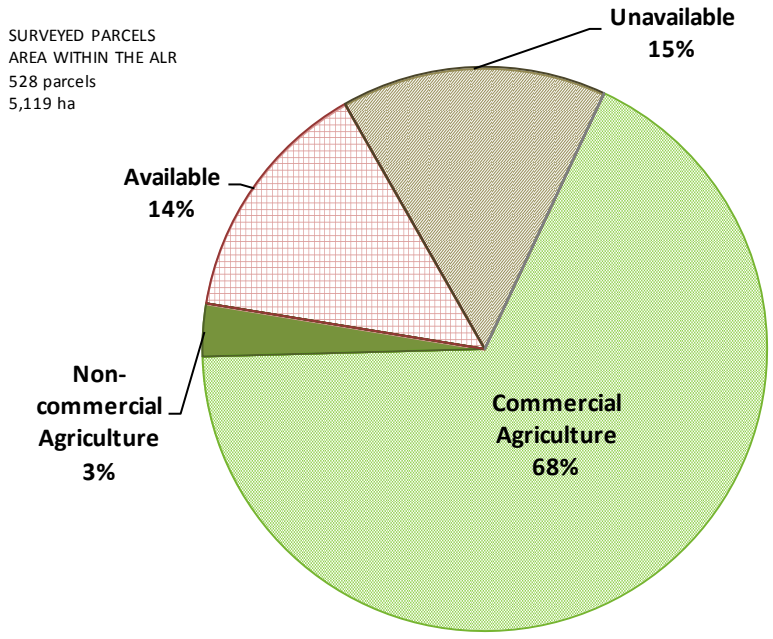


Figure 1 illustrates that when only land within the ALR is considered (5,119 ha), 71% is farmed (68% commercially farmed and 3% non-commercially farmed), 14% is available for agriculture expansion and 15% is unavailable for agriculture expansion.

These categories are very important determinants of the sustainability of agriculture in the region. Ideally, the land in commercial agriculture production is maximized and the amount of land that is unavailable for agriculture is minimized. Within the 5,119 ha in the ALR, 3616 ha or 71% is farmed, with only 3% of that in non-commercial agriculture, 725 ha or 14% is available for agriculture expansion, and 778 ha or 15% is unavailable for farming.

Land available for farm expansion includes 80 parcels with no development, making up 444 ha in the ALR. Some of these parcels are a significant size, with a mean size of 10 ha. An additional 91 parcels, making up 246 ha in the ALR are occupied by a residence, but are otherwise unused. Most of the unused land is covered with natural vegetation with no visible limitation, accounting for 399 ha, or 55% of unused farmland. There are 162 ha of unused farmland that appear to have drainage limitations, 5 ha with slope limitations and 35 ha that are wetlands, totalling 202 ha of land with some kind of natural limitation, or accounting for 28% of the unused farmland. Developing more drainage infrastructure could potentially bring about 200 ha into production.

In total, 778 ha of land, or 14% of all the land in the ALR surveyed, is not available for agriculture use. About 9% is due to natural constraints and 5% is due to non-farm use. By comparison, about 5% of the land base within the ALR in Abbotsford and 6% of the land base within the ALR in Chilliwack are not available for agriculture due to natural constraints and non-farm use. This is much less than in Pemberton. It may be important to not add to the amount of land that is permanently tied up in non-farm use, as this valley is a small and isolated agriculture zone. Lack of access to land and conflict caused by non-farm use could have a deleterious effect on the viability of all farms in the area.

The general land use by parcel shows that out of the 528 parcels surveyed, 258 or 49% have some agriculture use. Residential use without agriculture use is present on 128 parcels or 24% of the parcels within the surveyed area. A total of 94 parcels or 18% are unused. The remaining 48 parcels have some form of temporary or permanent non-farm use. Of the 258 parcels with agriculture use, 77% of them are in commercial agriculture production.

In terms of area or number of parcels, the main agricultural commodities in Pemberton are (1) forage production, (2) potato production, (3) beef production, (4) pasture, (5) horses, and (6) cereals. There are 80 parcels in forage production, about 40% of the parcels in active commercial agriculture production in the surveyed area. The next most common primary agriculture use for parcels is potato production. Potatoes are present on 13% of the parcels in agriculture production in the surveyed area. The primary use of 21 parcels is beef production, a total of about 11% of all the parcels in commercial agriculture production. Fourteen parcels or 7% of the parcels have horses as a primary land use. Ten parcels have grain production as a primary activity.

Seed potatoes are grown in fairly long rotations of a minimum of four years and often longer to reduce the risk of soil-borne disease. The most common companion activity to seed potato production has been beef production, as this requires cereal grains and forage production, which fit well into seed potato rotations.

There may be several different types of agriculture uses on a given parcel. In this study, the primary agricultural activity for each parcel is assigned to the activity judged to be more profitable than the other agricultural activities on the parcel..

Diversification of agriculture production is apparent by this per-parcel ranking of the primary agriculture activities. There is also llama, sheep, and apiculture present in Pemberton on single parcels. In addition, there are berries, vegetables, nurseries, and nut trees present as well as agriculture storage facilities and agri-tourism ventures.

Pemberton has appropriate agriculture infrastructure, which is an important strength in an agriculture zone, with 36 parcels with hay storage and 22 parcels with vegetable crop houses. There are 26 value-added ventures in Pemberton, including 16 farms that engage in direct market activities such as selling their products in farmers markets or to restaurants. Currently there is only one farm that is regularly open for agri-tourism. With the growing popularity of the region, there are likely to be wider opportunities for seasonal direct marketing and agri-tourism.

Pemberton has exceptional water resources, with most of the water used for irrigation coming from gravity-feed systems. In the past, irrigation has been restricted to the potato crops, but more recently, more forage crops are being irrigated to increase their carrying capacity and ensure against losses during increasingly sporadic weather patterns in the summer. Currently, 1,496 ha or 41% of the ALR used for agriculture production has irrigation systems installed or access to irrigation.

The data shows that parcel sizes over 8 ha are more likely to be farmed than smaller parcel sizes. Of the parcels over 16 ha in size, 72% are farmed and 28% are not farmed. In contrast, of the parcels that are less than 2 ha exactly the reverse is true, with 28% being farmed and 72% not being farmed. This shows that the likelihood of farming is generally increased with parcels over 8 ha. The larger parcels are suitable for extensive agriculture production systems, focussed on commercial seed potato production and cattle farming, with associated land in managed pasture, hay and cereal crop production. Smaller parcels become inefficient for this type of production and are more suitable for intensive poultry, direct market vegetable production, nursery and other more intensive uses.

The minimum amount of land needed to maintain the current potato planting is 1920 ha in parcels over 7 ha in size. About 320 ha would be in potatoes and the remaining 1,600 ha would be in cereals, forage and/or pasture and available for crop rotation into potatoes. Currently, analysis of the crop cover data shows that the total available area is 1,935 ha within the ALR. This includes land that is not available to seed potato growers for lease, some land that would not be suitable for seed potatoes and land that has not traditionally been used for seed potato production. This means that there may be a critical shortage of land needed to sustainably maintain the current acreage of seed potatoes. As seed potato production forms the basis of the agriculture production system in Pemberton and is very important economically for the region, it may be important to look at how the land base for seed potato production can be expanded. It is also critical not to lose land currently in forage production through actions such as subdivision and non-farm use, exclusion from the ALR, etc.

Given that residential use without agriculture use is present on 128 parcels or 24% of the parcels within the surveyed area, there may be some justification for concern about the residential use of parcels on the ALR. In particular, concern regarding the placement of large and very large houses in the middle of parcels, including in larger parcels. Further investigation of this question could be undertaken in partnership with the Regional District.

1. Introduction

This report attempts to examine the health and vitality of the agriculture zone in Pemberton through analyzing agricultural land use, land availability, and constraints to agriculture production. This report gives a snapshot of the agriculture production system including the main cropping system and trends of agriculture development in the region.

The data is collected by parcel. Therefore land use by parcel and the amount of cover of various uses such as residential, commercial, and agricultural can be analyzed. The cover data is also amalgamated, so it is possible to see how much land has been altered for cropping, infrastructure for roads, and how much is treed and not altered, etc.

The main focus of the report is on the current agricultural land use, land not available for agriculture production, and land that could become available for agriculture production. The report looks in some detail at constraints on land that is not farmed, including drainage requirements. In addition, a parcel size analysis on farmed and not farmed land is carried out to further show impacts of parcel size and availability of farmland in the various size classes.

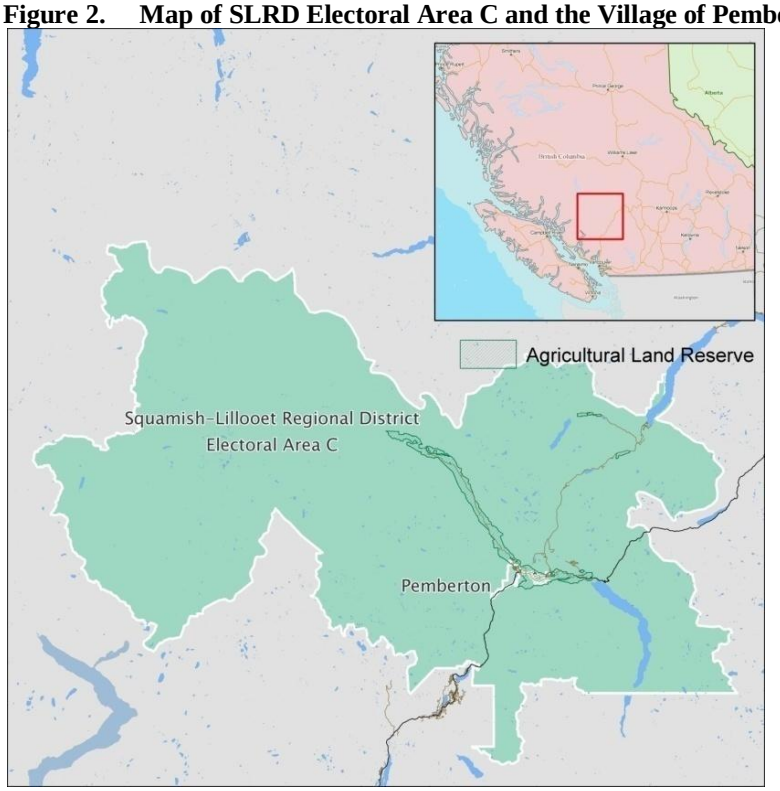
The agriculture production system in Pemberton is analyzed in some detail, including analysis of the main crops and animals, agriculture practices such as the type and amount of irrigation that is being carried out, and organic agriculture. Agriculture infrastructure such as hay storage and root vegetable storage buildings is also inventoried.

The report attempts to tease out land constraints that may threaten the sustainability of seed potato production in Pemberton. In addition, it contains a preliminary analysis of the effect that residential land use and placement of large houses may be having on the vitality of the associated agriculture land.

PEMBERTON VALLEY

The Pemberton Valley is located north of Vancouver on the mainland of British Columbia. The valley is part of Electoral Area C and the Village of Pemberton within the Squamish-Lillooet Regional District (SLRD).

Figure 2. Map of SLRD Electoral Area C and the Village of Pemberton



AGRICULTURAL LAND RESERVE

The Agricultural Land Reserve (ALR) is a provincial land use zone that was designated in 1973 in which agriculture is recognized as the priority use. It was established through cooperative efforts with local governments with input through public hearing processes. Within the ALR, farming is encouraged and non-agricultural uses are controlled.

The ALR within the SLRD Electoral Area C and the Village of Pemberton includes: a total of 7,578 hectares, which is just over 1% of the land area (561,773 hectares) of SLRD Electoral Area C and the Village of Pemberton[1] Included in the ALR are:

- 4,676 hectares in privately held parcels
- 55 hectares in privately held parcels used for the Pemberton Airport
- 601 hectares in provincial crown administered parcels
- 91 hectares of designated rights of way
- 743 hectares of Indian Reserve land
- 1,412 hectares of unsurveyed crown land.

[1] Agricultural Land Commission, ALR mapping, Land and Resource Data Warehouse, September, 2006.

INVENTORY AREA

The inventory area includes 610 parcels, which is all parcels completely or partially within the Agriculture Land Reserve (ALR) but outside Indian Reserves in SLRD Electoral Area C or the Village of Pemberton. These 610 parcels total 7,065 hectares - 6,868 hectares within SLRD Electoral Area C and 188 hectares within the Village of Pemberton.

Of these 610 parcels, 82 parcels were inaccessible by road resulting in only 528 parcels on 6,484 hectares being surveyed, of which 5,119 hectares are within the ALR. This is 68% of the ALR within the SLRD Electoral Area C and the Village of Pemberton. The remaining 32% of the ALR was not surveyed as it is in Indian Reserve, outside legal land parcels or inaccessible. See Table 1 for a detailed accounting of the surveyed area. Figure 3 below maps the surveyed area.

Table 1. Description of surveyed area

Land Descriptions	Electoral Area C and Village of Pemberton Total ALR area (ha)	Inventory Area			
		Area of Parcels		Total Area of Parcels (ha)	Number of parcels
		ALR (ha)	Non-ALR (ha) [2]		
Privately held parcels	4676	4676	816	5492	523
Pemberton Airport	55	55	0	55	3
Provincial crown administered parcels	601	601	586	1187	58
Designated rights of way	91	91	231	322	26
Indian Reserve land	743				
Unsurveyed crown land	1412				
Subtotal	**7,578**	**5,423**	**1,633**	**7,056**	**610**
Inaccessible areas		-304	-268	-572	-82
TOTAL SURVEYED		**5,119**	**1,365**	**6,484**	**528**

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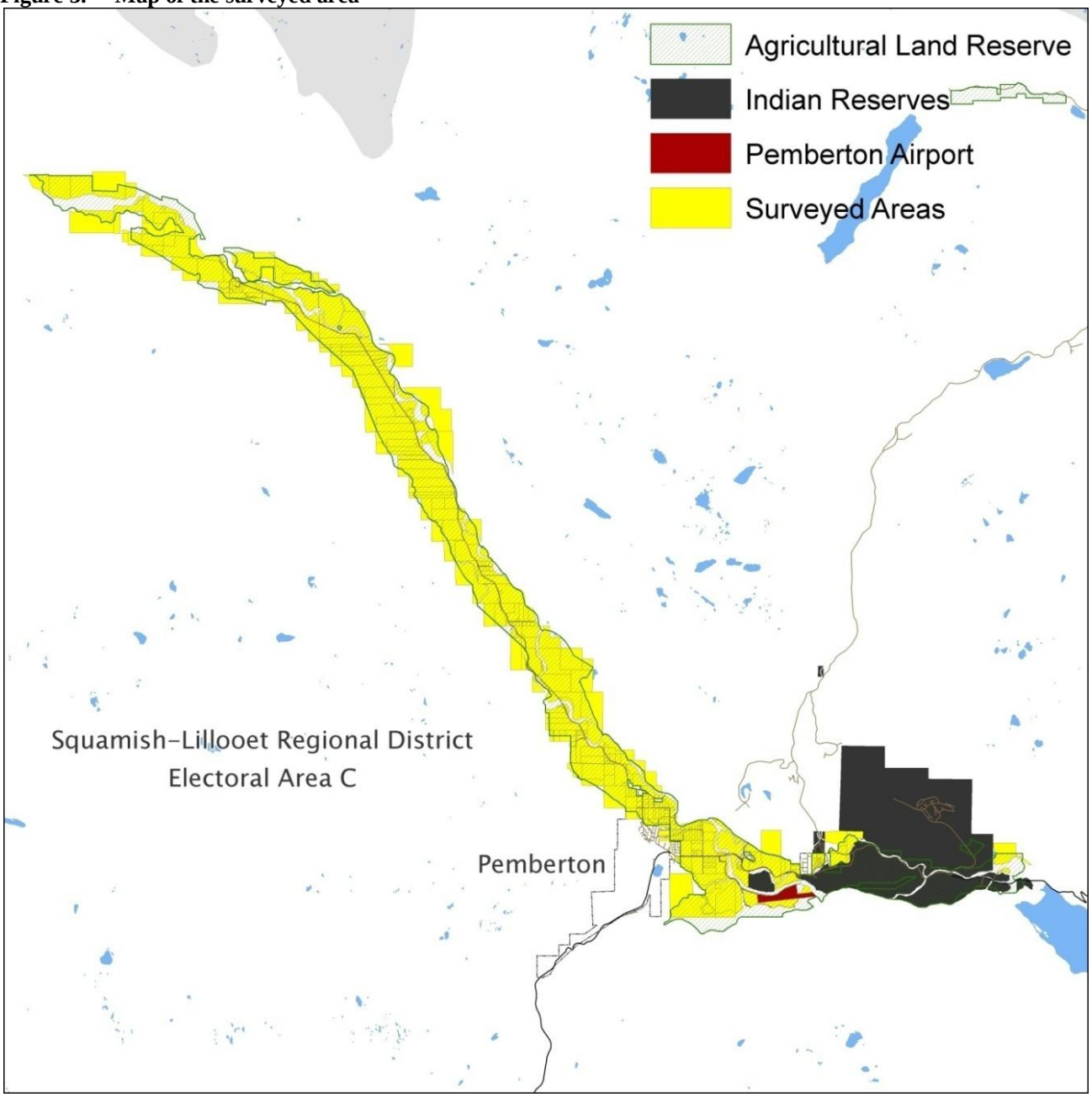
[2] Because parcel boundaries are not always coincident with ALR boundaries, it is common for a parcel selected for survey to have a portion of its area outside the ALR.

Figure 3. Map of the surveyed area[3]



[3] Surveyed area refers to parcels that were visited and surveyed.

2. Land Use

THE CONDITION OF THE ALR WITH RESPECT TO AGRICULTURE

There are general three categories of land use examined in this report:

- farmed land- divided into commercially farmed land and non-commercially farmed land,
- not farmed land:
    - available land- land not currently used for agriculture but available for agriculture expansion, and
    - unavailable land- land not currently used for agriculture and not available for agriculture use.

These categories are chosen because the relative amount of each has a bearing on the health and sustainability of agriculture in the region. Ideally, the amount of land in commercial agriculture production is maximized and the amount of land unavailable for agriculture is minimized. Having land available for agriculture expansion allows farm businesses to grow. It is exceedingly detrimental to an agriculture area if there is an increase in land unavailable for agriculture through proliferation of non-farm uses in the ALR.

Table 2, Figure 4, Figure 5, and Figure 6 show the distribution of land and parcels in each of the agricultural use categories for the surveyed parcels.

Table 2. Land use for all surveyed parcels

Agricultural Land Use	Number of parcels	Area of parcels (ha)	ALR (ha)	Non-ALR (ha)
Commercial Agriculture	198	3,903.4	3,461.8	441.6
Non-commercial Agriculture	60	212.0	154.2	57.8
Available	179	1,128.8	725.2	403.7
Unavailable	91	1,239.7	777.6	462.1
TOTAL SURVEYED	528	6,484	5,119	1,365

Table 2 shows there are 3,462 ha of ALR land on commercially farmed parcels and 154 ha of ALR land on non-commercially farmed parcels, for a total of 3,616 ha.

In addition, there are 442 ha outside the ALR on commercially farmed parcels and 58 ha outside the ALR on non-commercially farmed parcels, for a total of 500 ha.

Refer to Appendix B Map 1. for more information .

Most of the land base in the surveyed area is farmed, as Figure 4 shows. Figure 4 also shows that most of the agricultural land use is within the ALR. Unused and unavailable lands have relatively more hectares outside the ALR. This shows that most of the agriculture production is taking place within the ALR boundary, irrespective of parcel boundaries. Figure 5 only considers land area inside the ALR, which is the emphasis in this report. It shows that 71% of land inside the ALR is being farmed, with 14% of the land base available for agriculture expansion and 15% unavailable for farming.

Figure 4. Percent of the surveyed area in agricultural land use categories for all surveyed parcels

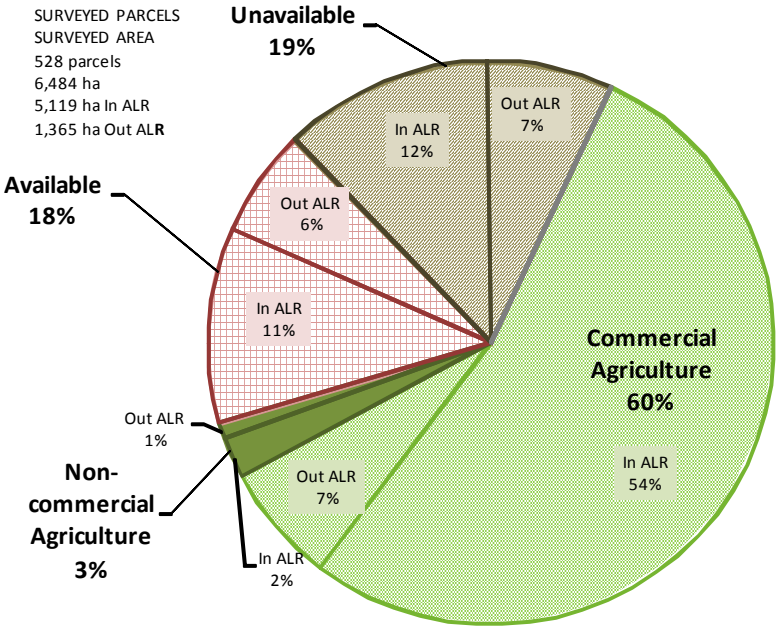


*Figure **4** illustrates that of the entire surveyed area of 6,484 ha, (including area both inside and outside of the ALR), 63% is farmed.*

Figure 5. Percent of the ALR area in agricultural land use categories for all surveyed parcels

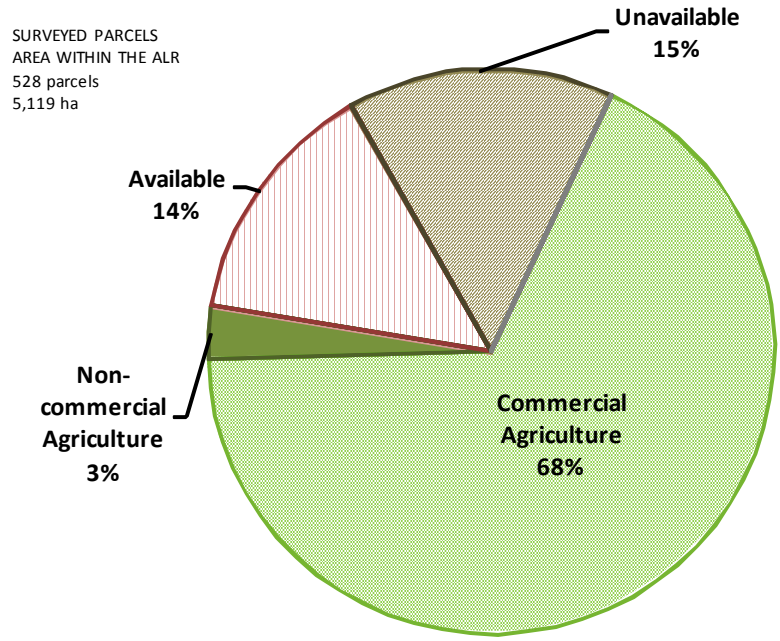


Figure 5 illustrates that when only land within the ALR is considered (5,119 ha), 71% is farmed, 14% is available for agriculture expansion and 15% is unavailable for agriculture expansion.

The number of parcels is important to consider and Figure 6 shows that there are more parcels in the non-commercial agriculture and available land categories than in commercial agriculture. This reflects the fact that many of the parcels in these categories are smaller in size. Most parcels in commercial agriculture are larger than 2 hectares and therefore, there are fewer of them.

Figure 6. Percent of the surveyed parcels in agricultural land use categories

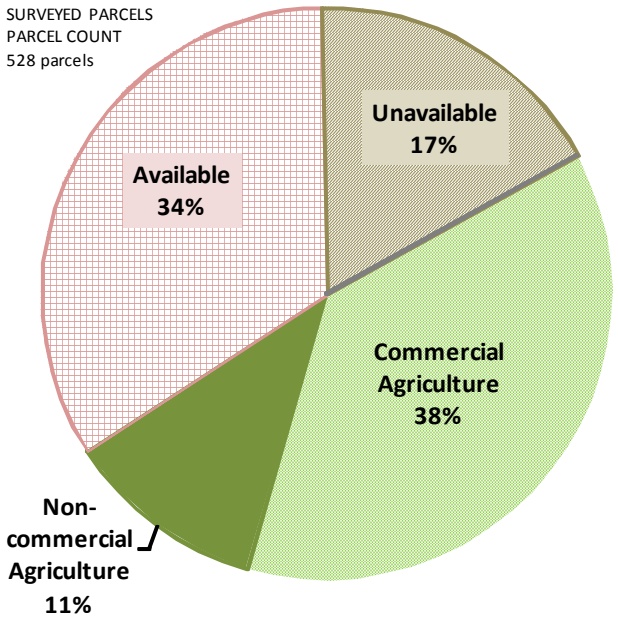
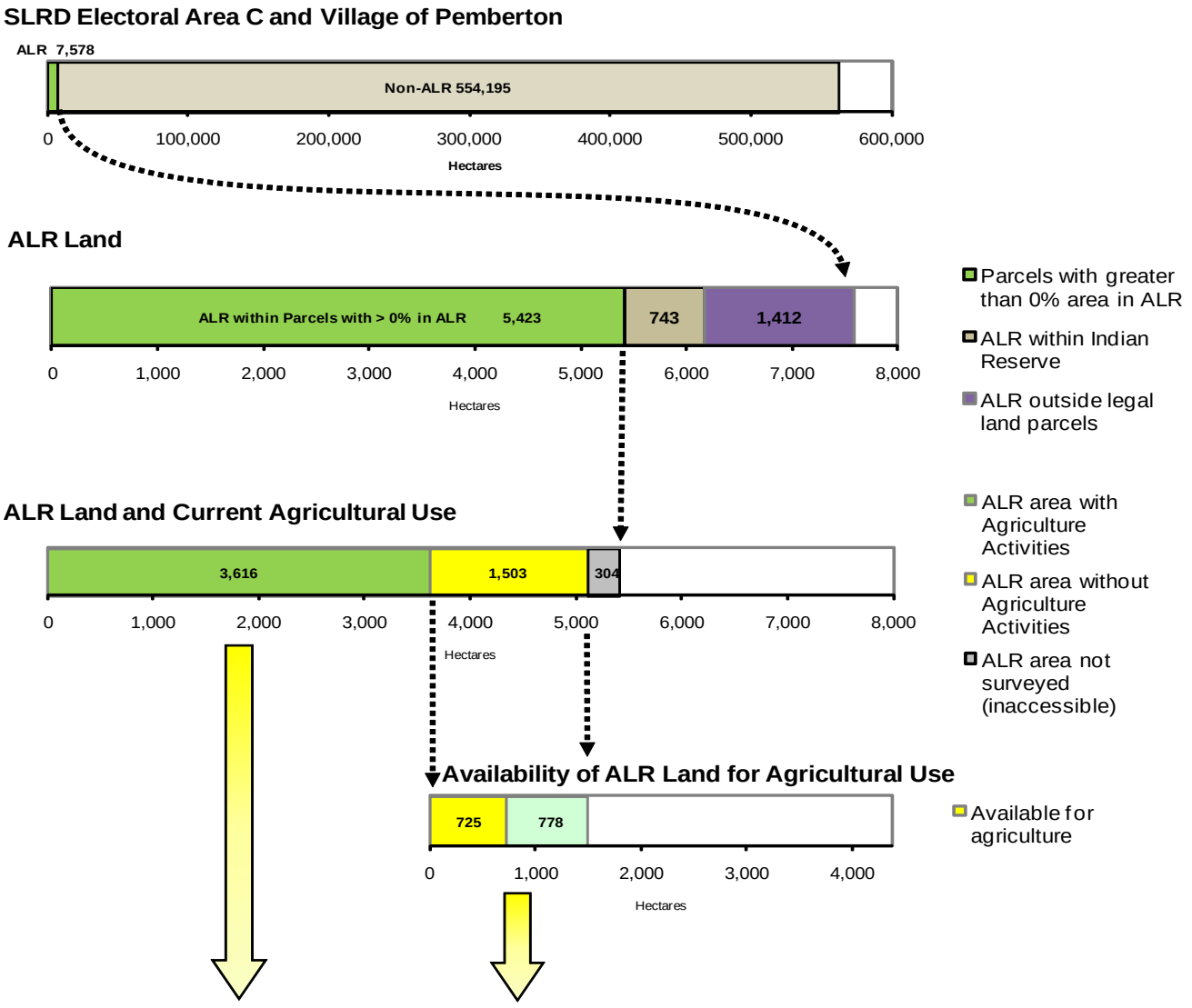


Figure 7 shows in another way, the general health of the ALR by identifying whether land in the ALR is in use or available for agriculture expansion. This analysis is by cover and reflects all land within the ALR, regardless of the size of area. There are 5,119 ha within the ALR within the survey area. Of the 5119 ha inside the ALR, 3,616 ha are currently used for agriculture and an additional 725 ha are available for agriculture. There are an additional 778 ha not available for agriculture.

Figure 7. Availability of ALR land for agriculture



See report section:
3. Agriculture Activities

See report section:
4. Land that is Not Farmed

GENERAL LAND USE

General land use by parcel is summarized in

Table 3 for all parcels within the surveyed area. Figure 8 illustrates that 258 parcels or 49%, have some agriculture use. Residential use without agriculture use is present on 128 parcels, or 24% of parcels surveyed. The next largest group is unused parcels or parcels with temporary non-farm use, which is a total of 99 parcels, or 19%. The remaining 43 parcels have some form of permanent non-farm use.

Figure 8. General land use by number of parcels

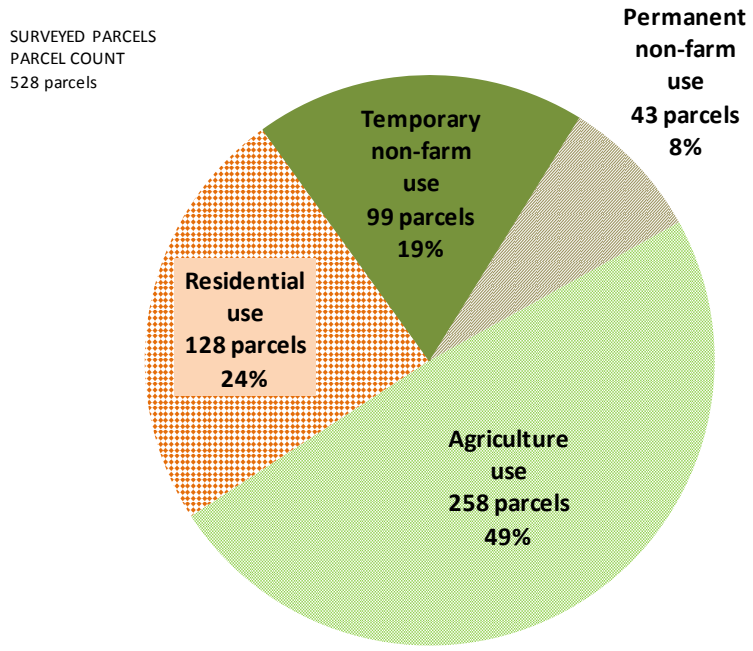


Figure 9 illustrates that agricultural land use is present on 4,115 ha of land within the 6,484 ha of the study area, or 63% of the surveyed area, and is by far the most dominant use. Of the 4,115 ha, 88% or 3,616 ha are inside the ALR and 12% or 499 ha are outside the ALR.

Although residential use without agriculture use is present on 128 parcels, or 24% of parcels surveyed, the area with residential use only is quite small, 311 ha or 5% of all the land surveyed. The mean parcel size for these parcels is 3 ha and lower, reflecting that solely residential use of parcels is more predominant in smaller size parcels.

There are also 94 unused parcels, along with 5 parcels with temporary non-farm use. Unused land is more prevalent outside the ALR boundary than inside the ALR boundary, with 580 ha, or 46%, of all land in this category. There are 43 parcels that have some type of permanent non-farm use, such as commercial service, recreational use, etc. The dominant permanent non-farm use is water management, meaning foreshore, dykes and ditches along with roads, railways and recreational use.

Figure 9. General land use by parcel area

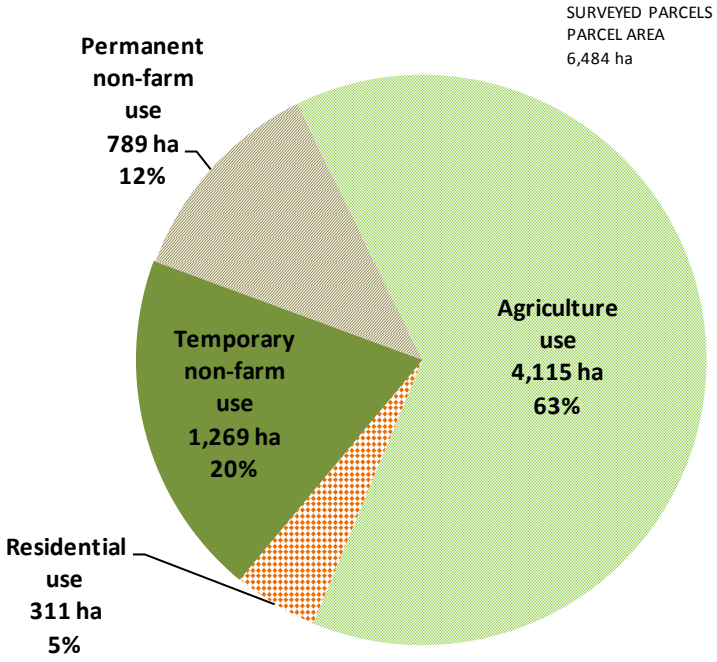


Table 3. General land use by parcel

General Land Use		Inventory Area					
		Number of parcels	Area of parcels (ha)	Mean parcel size (ha)	Median parcel size (ha)	ALR (ha)	Non-ALR (ha)
Agriculture use	Agriculture	48	939	20	14	764	175
	Agriculture and Other	46	942	20	8	723	219
	Agriculture and Residential	134	1,670	12	5	1,607	63
	Agriculture, Residential, and Other	30	564	19	15	522	42
	SUBTOTAL	258	4,115			3,616	499
Residential use	Residential	47	41	< 1	< 1	36	4
	Residential and Other	81	270	3	2	240	30
	SUBTOTAL	128	311			276	35
Temporary non-farm use	Recreation & leisure	2	6	3	3	6	-
	Dumps & deposits	2	13	6	6	13	< 1
	Forestry	1	10	10	10	10	-
	Unused	94	1,240	41	21	661	580
	SUBTOTAL	99	1,269			689	580
Permanent non-farm use	Airport	3	55	18	16	55	-
	Golf course	4	140	35	26	140	-
	Roadway, Railway	11	43	8	1	38	4
	Utilities	2	59	30	30	27	33
	Water management	23	492	35	26	278	214
	SUBTOTAL	43	789			538	251
SURVEYED PARCELS TOTAL		**528**	**6,484**			**5,119**	**1,365**

Refer to Appendix B Map 2. for more information .

3. Agriculture Activities

COMMERCIAL AND NON-COMMERCIAL AGRICULTURE ACTIVITIES

Table 4 shows the breakdown between commercial and non-commercial agriculture activities on a per parcel basis over the surveyed area. Of the parcels in agriculture use, 198 have strong evidence of revenue-generating agriculture activity and/or farm class status based on 2009 BC Assessment. The remaining 60 of parcels are in use, but they do not appear to support significant revenue-generating agriculture activity and/or do not have farm class status.

Table 4. Commercial and non-commercial agriculture activities

Agricultural activity	Number of parcels	Area of parcels (ha)	Mean parcel size (ha)	ALR (ha)	Non-ALR (ha)
Commercial Agriculture	198	3,903.4	19.7	3,461.8	441.6
Non-commercial Agriculture	60	212.0	3.5	154.2	57.8
TOTAL	258	4,115		3,616	499

AGRICULTURE PRODUCTION SYSTEM ANALYSIS

Every agriculture region in BC has very different characteristics in terms of crops grown, climate and proximity to dense urban areas. For the zones where agriculture as a land use seeks to maximize output and economic performance and where there may be pressures from non-farm use, it is important to determine the basic agricultural production system. This is done by finding the predominant commodities in the area and from there determining if the land base is sufficient to support them. It is also vital to determine if there is an available land base for farm businesses to expand onto, if the intensity of agriculture use is increasing and responding to market demand or decreasing, and what barriers exist to increased farm development.

There may be several different types of agriculture uses on a given parcel. In this study, we determine the primary agricultural activity for each parcel by using a system that ranks the most profitable type of production above all other agriculture activities on a parcel. The assumptions made regarding which types of production are most profitable are somewhat arbitrary and would vary from region to region. In the case of Pemberton, seed potato production is the most important cash crop and so potatoes (which may include organic potatoes) outrank all other agriculture activities on a parcel. Medium to large size animal production, which in this case is primarily beef cattle, is the main supporting commodity to seed potato production. Therefore, it outranks hay production.

A strong agricultural area will have enough land base that the basic agriculture production system can remain viable and changes in the most prevalent commodities are not because of lack of land base or access to water resources, but rather are a response to market forces. For example, early in the past century, Pemberton farmers supplied Vancouver with many dairy products as well as vegetables and meat, which were shipped by train. As other regions became more efficient than Pemberton in

production of many of these foodstuffs (often because processing capability was located in the Lower Mainland close to population centers), Pemberton farmers found their niche in British Columbia and global markets in seed potato production and established an international reputation for the only virus-free seed potato production area in the world.

Primary agriculture production can change over time in response to market forces in a region. Positive development would show more economic return per acre. This can be achieved through using more intensive practices or by growing higher value crops. More intensive practices increase the productivity of current crops or insure against crop losses and make more efficient use of the available land base. A common example of an intensive production practice is the use of irrigation.

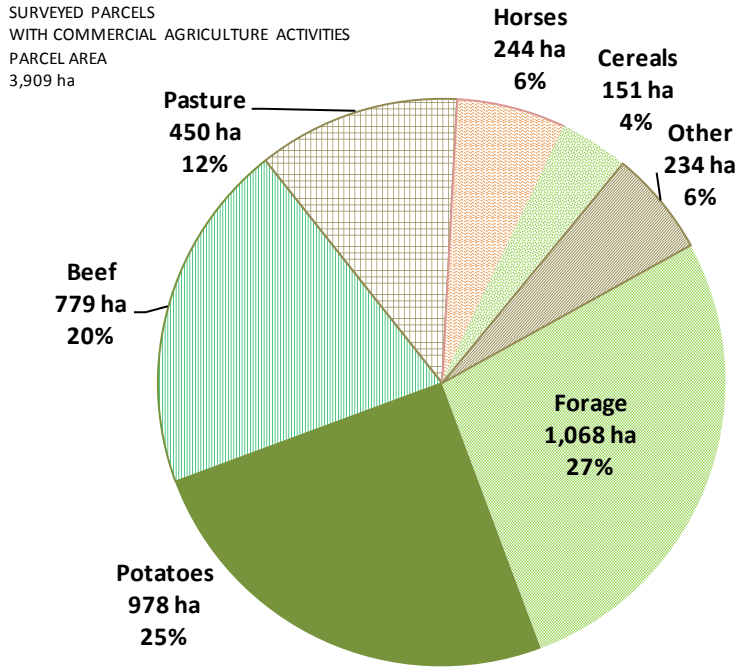
Further agriculture development can also mean that diversification occurs with higher value crops being grown, such as direct market organic vegetable production or berry production. More intensive or higher value crops can require higher capital costs and more elaborate infrastructure, such as crop housing, irrigation, drainage, or labour. More intensive crops can sometimes make good use of smaller parcels. Diversification into more intensive animal production can also occur, which may mean moving from only cow-calf production into also having finishing operations within a region or increasing housed animal production such as swine, poultry or dairy. Intensive agriculture development can strengthen all agriculture activities as it can support needed infrastructure, including businesses that support agriculture and agriculture knowledge services.

An agriculture area can also de-intensify where the main commodities that form the backbone of the agriculture production system are phased out in favour of production that has less value per acre and makes less efficient use of the available land base. This may occur in some regions with negative impacts of climate change causing increasing drought or severe storms. An agriculture region can also lose its main commodities to less profitable products due to loss of agricultural land to urbanization pressures such as non-farm use and subdivision, loss of access to water resources, inhibition of farming due to conflicting non-farm use within or adjacent to the ALR, or loss of farmer's access to land within the ALR. If a zone is lagging behind the basic production system, it is worthwhile to study it more closely to determine why this is the case.

AGRICULTURE PRODUCTION SYSTEM

The main commercially produced agricultural commodities in Pemberton by area are (1) forage production, (2) potato production, (3) beef production, (4) pasture, (5) horses, and (6) cereals (see Figure 10 below). The agricultural production system is based on seed potato production.

Figure 10. Primary commercial agriculture activities by parcel area



Refer to Appendix B Map 3. for more information .

Seed potatoes are grown in fairly long rotations of a minimum of four years and often longer, to reduce the risk of soil-borne disease. This long rotation is critical to maintain, as Pemberton is the world's only virus-free seed potato production area. Seed potatoes are a high value crop. However, in the years between seed potato crops, farmers need to grow other crops that also have value, a complementary weed control regime, etc. The most common companion activity to seed potato production has been beef production, as this requires cereal grains and forage production, which fit well into seed potato rotations.

The rotation often goes: potatoes in year 1, cereal crop (usually oats) with grass-legume mix as an understory in year 2, grass-legume mix for pasture and hay in years 3, 4, and possibly 5, then back to potatoes. Cattle are grazed on land that has been harvested for potatoes (as they will eat the waste potatoes lying on the ground), grazed on land that has been harvested for cereals, and grazed on the grass-legume mix. The production value of the land lies primarily in the seed potato production and secondarily in the beef production.

Intensification of agriculture production in Pemberton is also occurring. In the case of Pemberton, more irrigation is occurring. Whereas irrigation on seed potatoes has been a common practice in the past, recently there has been more irrigation of pasture, to ensure good productivity to support and expand the viable beef industry.

There is increased organic vegetable production and production of many diverse crops, such as nursery crops, vines and berries. Some of the more intensive crop production is suitable for smaller parcels of land. Most of this change is not in conflict with the seed potato production, but some of it can inhibit access to land for seed potato producers due to new crops being perennial crops or new areas requiring organic certification.

The agriculture zone in Pemberton should not de-intensify, as it has excellent soil, water and climatic conditions and good access to markets. If a zone within the Pemberton area does not have seed potato production or intense crop production, it may indicate that there are conflicts preventing optimal agricultural land use. The area along the Highway 99 corridor does not have seed potato production and appears to have less intensive agricultural land use. This area could be studied more closely to determine if there are particular issues that may be causing this area to have less agriculture development in general than the area up Pemberton Valley.

COMMERCIAL AGRICULTURE PRODUCTION

Table 5 shows that there are 198 parcels in commercial agriculture production, meaning they show strong evidence of revenue-generating agriculture activity and/or farm class status based on 2009 BC Assessment. This section discusses the primary agriculture use on these parcels. It does not include parcels not used for commercial production. Almost all of the area in commercial crop production is inside the ALR boundary.

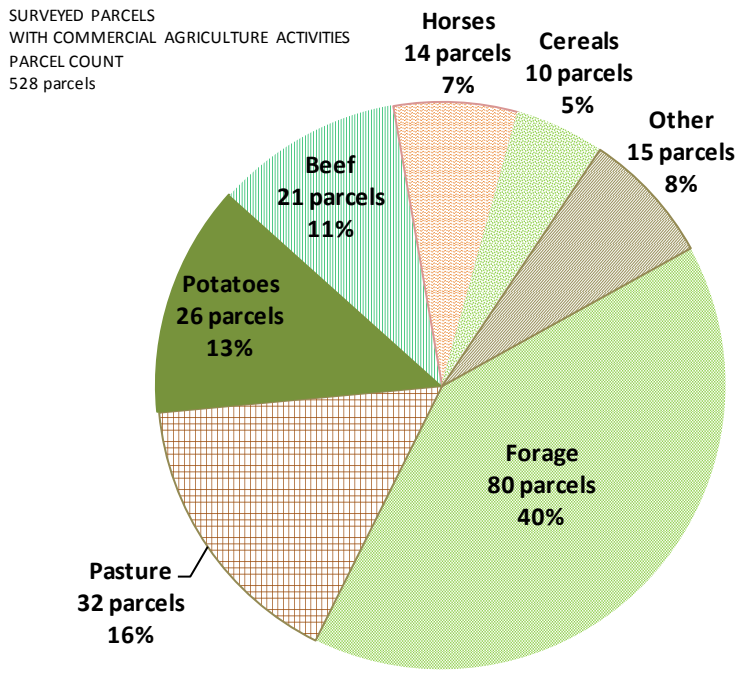
The survey determined that some fields were considered "forage" production and others were simply "pasture." This division is arbitrary as forage production is usually land that is grazed and also cut for hay, and "pasture" is land that is not cut for hay. However, the data are not 100% accurate. Table 5 shows that there are 80 parcels in forage production, about 40% of the parcels in active commercial agriculture production in the surveyed area (see Figure 11). The forage is primarily for feeding beef cattle, which is the most dominant livestock group in Pemberton. It is also used for feeding horses. Most of the feed produced is used locally. Feed is not a major export crop. The median parcel size for forage production is 8.3 ha, showing that both large and small parcels can be used for forage production, but predominantly larger parcels are used.

Figure 11 shows that sixteen percent of the parcels are used for pasture. Pastures can occur on both larger and smaller parcels and the median parcel size used is 7.4 ha.

Table 5. Primary commercial agriculture activities by parcel[4]

Primary agriculture activity	Parcels with Commercial Agriculture Activities					
	Number of parcels	Parcel area (ha)	Mean parcel size (ha)	Median parcel size (ha)	ALR (ha)	Non-ALR (ha)
Forage	80	1,068	13.3	8.3	932	136
Potatoes	26	978	37.6	31.9	869	109
Beef	21	779	37.1	32.0	711	68
Pasture	32	450	14.1	7.4	364	86
Horses	14	244	17.4	9.5	237	7
Cereals	10	151	15.1	11.5	120	31
Cranberries	2	72	36.2	36.2	70	2
Llama	1	42	42.1	42.1	42	< 1
Equipment/material Storage	3	40	13.5	0.4	40	< 1
Sheep	1	33	33.0	33.0	33	-
Vegetables	1	19	19.1	19.1	19	-
Nursery	1	10	9.6	9.6	8	2
Agri-tourism	2	7	3.4	3.4	7	< 1
Specialty	2	5	2.3	2.3	5	-
Apiculture	1	4	3.8	3.8	4	-
Crops under cover	1	2	2.0	2.0	2	-
TOTAL	**198**	**3,903**			**3,462**	**442**

Figure 11. Percent of parcels in primary commercial agriculture categories[3]



Refer to Appendix B Map 3. for more information .

[4] Primary commercial agricultural activities were determined by identifying whether there was medium or large scale livestock being produced on the parcel and then by identifying the largest agricultural land cover.

The next most common primary agriculture use for parcels is potato production, as potatoes are present on 13% of the parcels in agriculture production in the surveyed area. Potatoes may not be the only crop on the parcel but if present, they are counted as the dominant use. In general, there is more than one crop on the parcels with potato production, showing that there may be some efficiency gained when the parcels are of sufficient size to accommodate more than one type of crop. Parcels with potatoes have a median parcel size of 31.9 ha.

At the time of the survey, in July, the primary use of 21 parcels was beef production, a total of about 11% of all the parcels in commercial agriculture production. All these animals represent both cow-calf operations and finishing beef operations. Larger parcels, with a median size of 32 ha, are used for beef cattle production. This does not include all the parcels where beef cattle were sighted, only the parcels where they would have been the dominant use based on the cropping of the parcel and herd size (approximately greater than 50 animals or the largest land cover).

Fourteen parcels, or 7%, have more than 25 horses sighted on them. Horses are present on many parcels in Pemberton, but are not considered a primary agriculture activity except when there is no other apparent agriculture activity or if the horses are a primary agriculture use, such as a breeding farm.

Ten parcels have grain production as a primary agriculture activity, meaning that there is not also potato production or medium or large scale animal production on the same parcel. The median parcel size for grain production is 11.5 ha.

Diversification of agriculture production is apparent from this per-parcel analysis of the primary agriculture activities. There is also llama, sheep and apiculture present in Pemberton on single parcels. In addition, there are berries, vegetables, nurseries and nut trees present as well as agriculture storage facilities and agri-tourism ventures.

For a couple of large parcels, approximately 33 ha in size, totalling 70 ha, are being converted into cranberry production. However, production of most of the other types of diversified crops take place on smaller parcels.

Only two parcels have other types of animals as their primary production, sheep and llama. Both these parcels are large in size, 33 and 42 ha respectively.

Table 6 and Figure 12 below shows the commercial agriculture activities by land cover, including fields planted in various crops as well as natural cover such as treed areas on pastures with beef cattle. There are 3,903 ha in parcels used for commercial agriculture production, including land outside of the ALR. This includes over 1,000 ha treed or in wetlands. Most of the treed cover is in very small patches, with a median size of 2 ha. In some cases, it may be possible for farmers to clear this land to increase their land base. It should be kept in mind that although the treed area represents a large land area, it is generally a small portion of any given parcel.

The main land cover is forage crops. The forage crops are primarily grass with grass/alfalfa or clover mixes and some alfalfa. Table 6 explains the data on a detailed land cover basis and shows that there are

approximately 1,680 ha of grass, 270 ha of mixed grass and legume, 70 ha of alfalfa and 34 ha of clover, making up about 53% of the area in commercial agriculture production, including land not in the ALR.

Forage production covers 56% of the land cover in commercial agriculture production within the ALR. The land cover data shows that there are 222 fields of grass with a median size of 4 ha. This includes most of the fields that were used strictly as pasture and is by far the most dominant type of field in this area. There are also 24 fields of mixed grass/legume with a median size of 13 ha, 11 fields of alfalfa with a median size of 5 ha and 4 fields with clover of approximately 9 ha.

Table 5 above shows there are 26 parcels in potatoes, and Table 6 below shows there are approximately 35 potato fields with a median size of 7 ha and an average size of 9 ha, with a total land cover of approximately 320 ha. It is interesting to note that the median parcel size with potato production is 32 ha, showing that there are likely efficiencies gained when a larger parcel is used for potato production.

There are 10 parcels where grain production is the primary agriculture activity. The most accurate measure of grain crop production is by land cover, in Table 6 where it is shown that there are approximately 29 fields in oat production and 2 fields in barley production, covering 177 and 16 ha respectively, for a total cover of 193 ha. Cereal crops are predominantly grown after potatoes and are sometimes under-cropped with forages. Therefore, it makes sense that almost the same amount of land in potatoes is also in cereal crop production. Organic potatoes are not likely rotated with cereals but rather with legume/forage green manures.

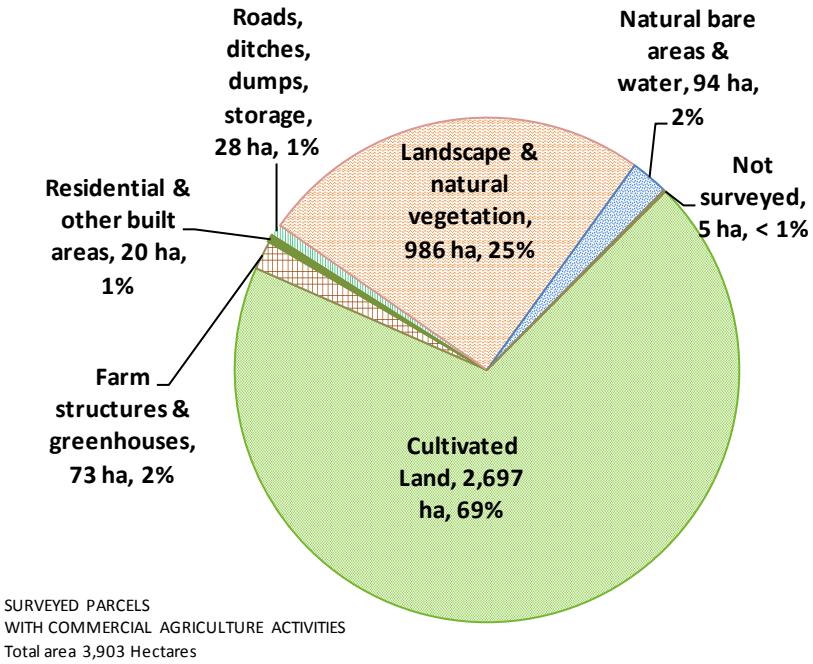
There is a close correlation between the amount of land in cereal grain and potato production with field size. The average size of a field in oat production is 6 ha and in barley production is 8 ha. Grain is useful in the rotation when shifting from potatoes to forage partly because it starts quickly, can shade an establishing forage crop during the summer, and because it is useful as feed for livestock and horses. Barley is also used as feed for horses, is a good feed for cattle, and can have higher protein and high digestible energy than oats.

The remaining crops in Table 6 represent diversity in crop production in Pemberton. The largest area not yet discussed is being developed for cranberry production, with a total land cover of 65 ha. At the time of data collection, this land was being prepared for the planting and growing of cranberries, with dykes and irrigation systems being put into place. Cranberries are a new crop in Pemberton.

Table 6. Land cover type on parcels with commercial agriculture activities

Land Cover	Parcels with Commercial Agriculture Activities					
	Number of areas	Area (ha)	Mean area size (ha)	Median area size (ha)	ALR (ha)	Non-ALR (ha)
Forage & pasture - Grass	222	1,684	7.6	4.3	1,653	31
Potatoes	35	322	9.2	7.0	319	3
Forage & pasture - Mixed grass / legume	24	271	11.3	13.1	268	3
Oats	29	177	6.1	5.4	174	3
Forage & pasture - Alfalfa	11	70	6.4	5.1	69	1
Cranberries	2	65	32.6	32.6	65	< 1
Forage & pasture - Clover	4	34	8.6	9.3	34	< 1
Vegetables	8	23	2.8	0.4	23	< 1
Barley	2	16	8.1	8.1	16	-
Other cultivated land	2	10	5.2	5.2	10	< 1
Fallow land	3	10	3.3	2.3	9	< 1
Ornamentals and shrubs	1	4	3.9	3.9	4	-
Hazelnut / filbert	2	4	1.8	1.8	4	-
Grapes	2	3	1.7	1.7	3	-
Strawberries	2	2	0.8	0.8	2	< 1
Cedar hedging	1	1	1.0	1.0	1	-
Apples	1	< 1	0.6	0.6	< 1	-
Other / unknown	1	< 1	0.2	0.2	< 1	-
Cultivated Land SUBTOTAL	352	2,697			2,655	42
Farm structures	107	70	0.7	0.4	70	< 1
Greenhouse / crop barn	3	3	0.9	1.1	3	< 1
Farm structures & greenhouses SUBTOTAL	110	73			73	< 1
Residential footprint	73	20	0.3	0.2	19	< 1
Other built areas	1	< 1	0.3	0.3	< 1	< 1
Residential & other built areas SUBTOTAL	74	20			19	< 1
Ditch / bank	9	13	1.4	1.1	13	< 1
Roadways / railways	13	9	0.7	0.5	9	< 1
Dump / Deposit	2	4	2.0	2.0	4	< 1
Storage / parking	4	2	0.5	0.2	2	< 1
Roads, ditches, dumps, storage SUBTOTAL	28	28	4.7	3.8	28	< 1
Natural vegetation	167	982	5.9	2.1	633	348
Landscape vegetation	6	4	0.7	0.7	4	< 1
Landscape & natural vegetation SUBTOTAL	173	986			637	348
Wetlands / water	47	90	1.9	1.1	44	46
Natural bare areas	2	4	2.0	2.0	-	4
Natural bare areas & water SUBTOTAL	49	94			44	50
Not surveyed	2	5	2.4	2.4	5	-
TOTAL	**788**	**3,903**			**3,462**	**442**

Figure 12. Percent of each general land cover type on parcels with commercial agriculture activities



COMMERCIAL LIVESTOCK ACTIVITIES

Table 7 shows the dominant livestock activities in the Pemberton Valley. Most of the livestock activities center around the raising of beef cattle, followed by horses, with llamas on one parcel and sheep on one parcel.

What is interesting about this data is that there is no intensive livestock production in Pemberton and no supply-managed commodity production, i.e. dairy or poultry. All animal production is extensive and most animals are pastured most of the time.

Table 7. Parcels with commercial livestock activities as their primary agriculture activity

Primary agricutlture activity	Number of parcels	Area of parcels (ha)	Mean parcel size (ha)	Median parcel size (ha)	ALR (ha)	Non-ALR (ha)
Beef	21	779	37.1	32.0	711	68
Horses	14	244	17.4	9.5	237	7
Llamas	1	42	42.1	42.1	42	< 1
Sheep	1	33	33.0	33.0	33	-
TOTAL	37	1,098	29.7	22.8	1,022	76

Refer to Appendix B Map 4. for more information .

BEEF PRODUCTION

Beef production is the most dominant animal agriculture activity in Pemberton. Table 8 shows there are 21 parcels where commercial beef production is the primary agriculture activity. There are 18 additional parcels where beef is not the primary activity, making a total of 39 parcels in Pemberton that have some type of beef cattle activity. Large parcels are generally used for beef production, with the mean parcel size for this type of activity being over 30 ha.

The dominant type of beef production in Pemberton is cow-calf production. In the past, all the calves were auctioned in the Lower Mainland, to be sold into commercial feeding operations usually out of province. There is now a shift in this practice, as most of the calves produced in the Pemberton Valley are now sold into Pemberton Meadows Natural Beef, to be finished in Pemberton. In spite of current struggles with beef prices, direct marketing this well-recognized product has proven successful.

Beef production requires significant land resources for forage production.

Table 8. Parcels with commercial beef production activities

Type of Beef Activity	Parcels with beef activities			Area of parcels (ha)	Mean parcel size (ha)	Median parcel size (ha)	ALR (ha)	Non-ALR (ha)
	Primary activity	Ancillary activity	Total Parcels					
Backgrounding / finishing	5	-	5	222	44.4	8.5	187	35
Cow / calf	15	6	21	675	32.2	37.3	639	
Mixed	-	2	2	79	39.6	11.1	72	7
Other (includes personal use)	1	10	11	212	19.3	19.3	211	2
TOTAL	21	18	39	1,189	30.5	32.0	1,109	43

HORSE PRODUCTION

Horse farms are the second most dominant type of livestock operation in Pemberton after beef production. Table 9 shows there are 14 parcels with horse operations as a primary activity, about 7% of all parcels with commercial agriculture activity. The majority of parcels with more than ten horses are boarding operations and in addition, there are a few trail riding horse businesses and two parcels that are primarily horse breeding operations. Table 9 shows that beef, forage and sheep production accompany some horse operations.

Horse boarding operations are generally placed on smaller parcels, with the median size being 8.5 ha. In contrast, horse operations involving breeding are placed on larger parcels. There were two trail riding/outfitter operations noted, both of which are placed on larger parcels, of a median size of 37 ha.

Horses are a popular ancillary activity in Pemberton, with 41 parcels containing horses. Most of the parcels with horses contain one or two for personal use, usually on smaller parcels with a median size of 3 ha. In total, 55 parcels contain horses.

Table 9. Parcels with horse activities

Type of horse activity	Parcels with horse activities			Area of parcels (ha)	Mean parcel size (ha)	Median parcel size (ha)	ALR (ha)	Non-ALR (ha)
	Primary activity	Ancillary activity	Total Parcels					
Boarding	7	6	13	159	12.2	8.5	152	7
Breeding	2	-	2	75	37.3	37.3	75	
Boarding / breeding	2	-	2	22	11.1	11.1	22	< 1
Trail riding	1	1	2	85	42.7	42.7	30	55
Other (includes personal use)	2	34	36	299	8.3	3.4	279	20
TOTAL	14	41	55	640	11.6	4.0	558	62

Table 10 shows that most parcels with horse activities have only pasture or hay production as an associated agriculture activity. In addition, two large parcels had horses and beef together.

Table 10. Other agriculture activities on parcels with horse as the primary agriculture activity

Additional agricutlture activity	Number of parcels	Area of parcels (ha)	Mean parcel size (ha)	Median parcel size (ha)	ALR (ha)	Non-ALR (ha)
Forage/Pasture	2	87	43.5	43.5	87	-
Beef	2	76	38.1	38.1	69	7
Sheep / lamb	1	9	8.8	8.8	9	< 1
TOTAL	5	172			165	7

NON-COMMERCIAL PRODUCTION

Table 11 shows there are 60 parcels, covering 212 ha that do not have discernable commercial agriculture activity. Several of these parcels may have been cut for hay or used for pasture, but only would have had small numbers of livestock, such as one or two horses. In general, these are parcels of 4 ha or less in size. The average median parcel size for all of these parcels is 2 ha as opposed to the average median parcel size of 8 ha for all parcels in commercial agriculture use, reflecting that larger parcels are generally in commercial agriculture use.

Table 11. Primary non-commercial agriculture activities

Primary agriculture activity	Number of parcels	Area of parcels (ha)	Mean parcel size (ha)	Median parcel size (ha)	ALR (ha)	Non-ALR (ha)
Forage	36	147	4.1	1.7	92	55
Pasture	22	61	2.8	2.1	58	3
Other	1	3	2.9	2.9	3	-
Agri-tourism	1	< 1	< 1	< 1	< 1	-
TOTAL	60	212	3.5	1.9	154	58

Refer to Appendix B Map 5. for more information .

Table 12 confirms that most of the land cover in parcels with no commercial agriculture is natural vegetation (43%) or in grass for hay and/or pasture (42%). About 8% of the land cover is built, composed of mainly residential buildings, including driveways and garages.

Table 12. Land cover on parcels with non-commercial agriculture activities

Land Cover	Parcels with Non-commercial Agriculture Activities					
	Number of areas	Area (ha)	Mean area size (ha)	Median area size (ha)	ALR (ha)	Non-ALR (ha)
Forage & pasture - Grass	62	91	1.5	1.3	91	< 1
Vegetables	1	< 1	0.3	0.3	< 1	-
Fallow land	1	1	1.1	1.1	1	< 1
SUBTOTAL	64	92			92	< 1
Greenhouse / crop barn	1	< 1	0.1	0.1	< 1	-
Farm structures	16	5	0.3	0.3	5	< 1
SUBTOTAL	17	5			5	< 1
Residential footprint	30	9	0.3	0.2	9	< 1
Other built areas	2	< 1	< 0.1	< 0.1	< 1	-
SUBTOTAL	32	10			10	< 1
Storage / parking	3	2	0.6	0.6	2	< 1
Ditch / bank	2	1	0.7	0.7	1	-
SUBTOTAL	5	3	1.4	1.3	3	< 1
Landscape vegetation	1	< 1	0.7	0.7	< 1	-
Natural vegetation	16	92	5.8	1.4	43	49
SUBTOTAL	17	93			44	49
Wetlands / water	2	9	4.3	4.3	< 1	9
SUBTOTAL	2	9			< 1	9
TOTAL	**137**	**212**			**154**	**58**

4. Land that is Not Farmed

Table 13 gives a breakdown of land that is not farmed by parcel. Some of this land is unused and available for agriculture expansion and some is not available for agriculture due to a constraint, either a natural barrier, infrastructure, or non-farm use. Table 13 shows there are 179 parcels with unused land and 91 parcels that have land that is unavailable for agriculture use, comprising 725 and 778 ha of ALR land, respectively.

Table 13. Parcels that are not farmed

Availability for agriculture	Number of parcels	Area of parcels (ha)	Mean parcel size (ha)	ALR (ha)	Non-ALR (ha)
Available for agriculture	179	1,129	6.3	725	404
Not available for agriculture	91	1,240	13.6	778	462
TOTAL	270	2,368	8.8	1,503	866

LAND NOT AVAILABLE FOR AGRICULTURE

Table 14 is a description of parcels that are not available for agriculture use and the reason they cannot be used. This is land that is considered to be permanently not available for agricultural use. Table 15 breaks down the parcels by cover, showing primarily what has been developed and not developed.

Table 14 shows that 20 of the parcels are not available for agriculture because they are used for water management. A closer examination of these parcels in Table 15 shows that most of them are covered in natural vegetation and wetland (257 ha) and serve a riparian and bank stabilization function. In addition, dykes are on two parcels in the ALR, comprising 20 ha and ditches are on one parcel, comprising 1 ha. Together, these water management constraints use 278 ha, or 36% of the total area not available for agriculture. However, they serve a necessary function for agricultural production.

Table 14 shows that an additional 216 ha, or 27%, in 14 parcels, are limited by topographic constraints and Table 15 shows that they are covered by natural vegetation.

The remaining land not available for farming is due to non-farm use. Table 14 shows that golf course use takes up 4 large parcels with a mean size of 35 ha, using 140 ha altogether. The next largest non-farm use is the airport, using 3 parcels with a mean size of 18 ha, totalling 55 ha. The golf course and airport are proximate and together make up 195 ha, or 25% of all the land not available for agriculture use.

There are a number of roads in the ALR in Pemberton, which utilize 36 ha. Utilities, including power lines, utilize 27 ha. Roads, utilities and railway use up 8.4% of all the land not available for agriculture.

Residential uses occupy 25 parcels that are less than 0.4 ha in size. It is deemed that the land around the houses is too small to be of agricultural use. Service use is on 9 parcels, also small in size. Together these uses comprise 24 ha, or 3% of all the land that is not available for agriculture use.

In total, 778 ha of land, or 14% of all the land in the ALR surveyed, are not available for agriculture use. About 9% is due to natural constraints and 5% is due to non-farm use.

Whereas some utilization of land for infrastructure development is essential, other permanent non-farm uses are not essential for agricultural productivity and take land away from agricultural use. A high percentage of land tied up in non-farm use can restrict farmer's access to land and agriculture business expansion potential. This is a small and isolated agriculture zone and lack of access to land and conflict caused by non-farm use could have a deleterious effect on the viability of all farms in the area.

Some types of non-farm uses can have the unintended impact of making it more difficult to run a farm business, particularly if there are nuisances associated with the farm businesses such as noise, dust or odour. Therefore, recreation and leisure development can effectively cause the surrounding farm uses to be of lower intensity and possibly also of lower economic value to accommodate a perceived or real threat of nuisance complaints. Even though normal farm practices that may cause nuisance are protected under BC's *Farm Practices Protection Act*, the Farm Industry Review Board has determined that farmers should show reasonable consideration for their neighbours. Encouraging more recreation and leisure uses of farmland may not be in the best long-term economic interest of agriculture in the region.

If an area within the ALR is heavily developed with respect to a given non-farm use such as residential, institutional or recreational, the accompanying infrastructure used to support that development and the additional amenities that such development attracts, may lead to speculation on ALR land. This can lead farm owners to decide against investing in capital-intensive agriculture activities, which becomes a limitation on agriculture potential.

Table 14. Land use on parcels not available for agriculture

Land Uses	Number of parcels	Area of parcels (ha)	Mean parcel size (ha)	ALR (ha)	Non-ALR (ha)
Water management	20	471	23.5	257	213
Physical limitation - Slope	14	425	30.3	216	209
Golf course	4	140	35.0	140	-
Transportation - Airport	3	55	18.2	55	-
Transportation - Roadway	5	39	7.9	36	4
Utilities	2	59	29.7	27	33
Commercial & service	9	22	2.5	21	1
Water management - Dyke	2	20	10.1	20	< 1
Residential (<=0.4ha)	25	4	0.1	3	1
Transportation - Railway	6	3	0.5	2	< 1
Water management - Ditch	1	1	1.4	1	-
TOTAL	91	1,240	13.6	778	462

Refer to Appendix B Map 6. for more information .

Table 15. Land cover by land use on parcels not available for agriculture

Land Uses	Land Cover (ALR)										Total Area ALR (ha)
	Bank, ditch	Forage, pasture - Grass	Golf fairway / green	Managed vegetation	Natural Vegetation	Natural waterbody / wetland	Other buildings	Residential buildings	Roadways, railways	Storage, parking	
Water management	-	1.8	-	-	208.0	47.5	-	-	-	-	257
Physical limitation - Slope	-	-	-	-	211.3	5.1	-	-	-	-	216
Golf course	-	-	116.1	9.3	12.1	-	1.8	-	-	0.8	140
Transportation - Airport	-	-	-	36.9	4.8	-	2.0	-	9.7	1.2	55
Transportation - Roadway	-	-	-	-	29.6	< 0.1	-	-	6.2	-	36
Utilities	-	-	-	1.9	24.7	-	-	-	-	-	27
Commercial & service	0.3	-	-	5.2	10.5	-	1.5	3.2	-	0.4	21
Water management - Dyke	4.4	2.4	-	-	12.9	-	-	-	-	-	20
Residential (<=0.4ha)	-	-	-	0.3	-	-	1.3	0.9	-	-	3
Transportation - Railway	-	-	-	-	-	-	-	-	2.3	-	2
Water management - Ditch	1.4	-	-	-	-	-	-	-	-	-	1
TOTAL	6	4	116	54	514	53	7	4	18	2	**778**
PERCENT OF TOTAL AREA	< 1%	< 1%	15%	7%	66%	7%	< 1%	< 1%	2%	< 1%	**100%**

LAND AVAILABLE FOR AGRICULTURE THAT IS NOT BEING USED

There are 179 parcels, with 725 ha within the ALR that are either in temporary non-farm use or not currently being used and are available for agriculture expansion. This about 14% of the ALR within the surveyed area.

Table 16 below gives a break-down of these parcels. It shows that 80 parcels, making up 444 ha in the ALR, are not being used at all. Some of these parcels are a significant size, with a mean size of 10 ha. An additional 91 parcels, making up 246 ha in the ALR, are occupied by a residence but are otherwise unused.

The remaining parcels have some type of non-farm use, but could be brought back into agricultural production. These non-farm uses include activities such as minor fill dumping, truck parking and outdoor storage of cars or non-farm equipment. These uses occupy 8 parcels and 36 ha in total. Non-farm use can be a significant problem in some agriculture areas, but it does not seem to be a big issue in Pemberton.

Table 16. Land use on parcels available for agriculture

Land Uses	Number of parcels	Area of parcels (ha)	Mean parcel size (ha)	ALR (ha)	Non-ALR (ha)
Household	91	278	3.1	246	32
Unused	80	815	10.2	444	371
Dumps & deposits - temporary non farm use	3	14	4.5	14	< 1
Recreation & leisure - temporary non farm use	2	6	3.1	6	-
Tourist accommodations	1	4	3.7	4	< 1
Industrial - temporary non farm use	1	2	2.0	2	-
Forestry	1	10	9.7	10	-
TOTAL	179	1,129	6.3	725	404

Refer to Appendix B Map 7. for more information .

Table 17 below shows a detailed breakdown of the land cover on the available agriculture land. Whereas some of the available farmland is cleared and managed in some way, most of it is covered with natural vegetation with no visible limitation, accounting for 399 ha, or 55% of available farmland. This appears to be land that requires clearing and could be brought into production relatively easily. There are 162 ha of available farmland that have drainage limitations, 5 ha with slope limitations and 35 ha that are wetlands, totalling 202 ha of land with some kind of natural limitation or 28% of the available farmland. Developing more drainage infrastructure could bring about 200 ha into production.

Table 17. Land cover by land use on parcels available for agriculture

Land Uses	Land Cover (ALR)												Total Area ALR (ha)
	Unused farmland	Natural vegetation	Natural vegetation - Drainage limitation	Natural vegetation - Slope limitation	Natural wetlands / water	Managed vegetation	Dump / Deposit	Bank, ditch	Residential buildings	Other buildings	Roadways, railways	Storage / parking	
Household	18.8	153.7	2.1	0.9	1.2	31.4	-	1.0	28.0	5.1	2.7	1.0	246
Unused	3.6	221.8	159.7	4.4	33.8	17.4	-	-	-	1.7	1.8	-	444
Dumps & deposits	0.3	6.9	-	-	-	-	4.3	-	0.3	1.8	-	-	14
Recreation & leisure	-	6.1	-	-	-	-	-	-	-	-	-	-	6
Tourist accommodations	2.5	0.8	-	-	-	-	-	-	-	0.3	-	-	4
Industrial	1.6	-	-	-	-	-	-	-	0.2	-	-	0.2	2
Forestry	-	9.7	-	-	-	-	-	-	-	-	-	-	10
TOTAL	27	399	162	5	35	49	4	< 1	28	9	5	1	**725**
PERCENT OF TOTAL AREA	4%	55%	22%	< 1%	5%	7%	< 1%	< 1%	4%	1%	< 1%	< 1%	**100%**

PARCEL SIZE ANALYSIS

Out of the 528 parcels with more than 50% of their area within the ALR, 270 of them are farmed and 258 of them are not farmed. Table 18 below shows that most parcels are less than 4 ha (287) or larger than 16 ha (126). In Pemberton, fewer parcels are in the 4-8 ha size category (58 parcels) and the 8-16 ha size category (57 parcels).

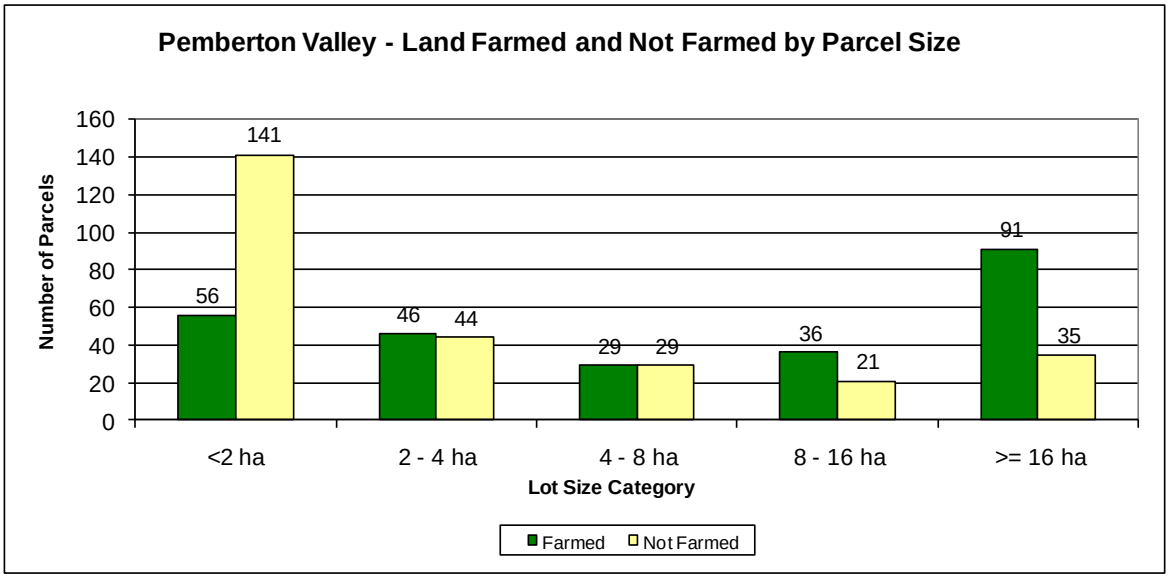
The data shows that parcel sizes over 8 ha are more likely to be farmed than smaller parcel sizes. Of the parcels over 16 ha in size, 72% are farmed and 28% are not farmed. In contrast, of the parcels that are less than 2 ha exactly the reverse is true, with 28% being farmed, and 72% not being farmed. Therefore, the opportunity for farming is generally increased with parcels over 8 ha. This matches the current extensive agricultural production system, which is focussed on commercial seed potato production and cattle farming with associated land in managed pasture, hay and cereal crop production, all of which require larger parcels. Smaller parcels become inefficient for this type of production and are more suitable for intensive poultry, direct market vegetable production, nursery and other more intensive uses.

Figure 13 below gives a graphic description of farmed and not farmed parcels. There are comparatively few parcels over 8 ha in size that are not being farmed and that could be brought into production, only 21 parcels in the 8-16 ha size category and 35 parcels in the greater than 16 ha size category are not being farmed. In comparison, there are 44 parcels not being farmed that are between 2 and 4 ha and 141 parcels not being farmed that are less than 2 ha in size. This means that there is an ample supply of small lots and that smaller lots are underutilized for farming.

Table 18. Lot size categories of land with agriculture activity and without agriculture activity

		Farmed	Not Farmed
Parcel Size	**Number of parcels**	**Percent of parcels farmed**	**Percent of parcels not-farmed**
<2 ha	197	28.43%	71.57%
2 - 4 ha	90	51.11%	48.89%
4 - 8 ha	58	50.00%	50.00%
8 - 16 ha	57	63.16%	36.84%
> 16 ha	126	72.22%	27.78%
Total	528	48.86%	51.14%

Figure 13. Parcel size distribution of farmed and not farmed land



5. Agriculture Infrastructure

Infrastructure for storing crops, equipment and machinery is very expensive to build and maintain. These types of structures are a valuable asset for a farming area.

HAY STORAGE

Table 19 shows there are 36 parcels with hay storage. The hay sheds appear to be relatively permanent with very few hay sheds that look neglected or abandoned. Most of the large and medium size hay sheds were on parcels of about 25 ha or larger, whereas the smaller sheds were on smaller parcels of about 4 ha.

Table 19. Parcels with commercial feed storage infrastructure[5]

Scale of storage infrastructure	Number of parcels	Area of parcels (ha)	Mean parcel size (ha)	Median parcel size (ha)	ALR (ha)	Non-ALR (ha)
large hayshed	20	697	34.9	31.1	641	56
medium hayshed	10	287	28.7	24.9	272	15
small hayshed	6	38	6.3	4.1	37	< 1
TOTAL	36	1,022	28.4	22.2	950	72

Refer to Appendix B Map 8. for more information .

VEGETABLE CROP HOUSE INFRASTRUCTURE

Potato production requires relatively sophisticated storage units. In this report, these structures are referred to as vegetable crop houses. There are 22 parcels with vegetable crop house infrastructure. About 20% of these structures appear to include cooling systems, which can keep potatoes at the same temperature and humidity from fall harvest to spring planting. The average parcel size for buildings that appear to have refrigeration is 42 ha and those that appear to have non-refrigerated buildings is 34 ha.

Table 20. Parcels with vegetable crop storage infrastructure[6]

Crop storage type	Scale	Number of parcels	Area of parcels (ha)	Mean parcel size (ha)	Median parcel size (ha)	ALR (ha)	Non-ALR (ha)
Refrigerated	medium	1	3	3.2	3.2	3	-
Refrigerated	large	3	149	49.7	64.9	130	84
	Subtotal	4	152	38.0	42.0	133	84
Non-refrigerated	small	2	107	53.3	53.3	98	53
Non-refrigerated	medium	4	148	36.9	29.6	138	118
Non-refrigerated	large	12	441	36.8	29.5	441	412
	Subtotal	18	695	38.6	34.2	678	583
	TOTAL	22	848	38.5	34.2	811	667

Refer to Appendix B Map 9. for more information .

[5] There is double counting within this table due to parcels having more than one scale of storage infrastructure.
[6] There is double counting within this table due to parcels having more than one scale of storage infrastructure.

6. Agriculture Practices

IRRIGATION

The value of an agricultural zone is determined not only by the quality of its soils and climate but also by access to water for watering livestock and for irrigation of crops. Pemberton not only has exceptional soils and climate for an agriculture region, it also has excellent and high quality water resources. The water for irrigation comes mainly from surface water runoff on the mountain sides that supply gravity-feed systems.

In the past, irrigation has been restricted to seed potato fields. However, in recent years, irrigation has expanded to other crops, notably high-value crops but also grass for pasture and hay for beef cattle, as some farmers seek to expand their beef cattle production on the same land base. Generally, moderate rainfall occurs throughout the summer in Pemberton, but recent years have brought less certain weather patterns, with a trend towards longer periods of warmer and drier summer weather. Irrigation can be used to ensure optimal production and to protect farmers against crop losses during extended hot and dry periods.

Table 21 below shows that 1,496 ha, or 52% of the area used for agriculture in Pemberton, have irrigation systems installed. Sixty-four percent of the irrigated crops, 960 ha, are in forages and mainly irrigated by travelling gun systems. The data shows that 43% of all the land planted to forage crops has irrigation available. Forage crops may not be irrigated as intensively as other crops.

Vegetable crops, including all of the potato crop and other types of vegetables, are 100% irrigated, with over 50% of the systems being wheel line sprinklers. All intensive crops such as vines, berries, nurseries and nut trees are 100% irrigated and generally use permanent irrigation structures. Cereal crops are 55% irrigated.

The presence of abundant, good quality water is one of the key attributes of Pemberton as an agriculture zone and allows for more intensive agricultural development in high-value crops. As detailed data on irrigation was collected, it is possible to run the Water Demand Model for Pemberton if climate and soils data is available.

Table 21. Crop category and irrigation system type by area

Crop Type	Irrigation System present (ha)			Total Area with Irrigation System (ha)	% of Crop Area with Irrigation System
	Sprinkler	Giant gun	Other		
Forage, pasture	17	890	53	960	43%
Vegetables	183	95	68	346	100%
Grains, cereals and oilseeds	-	108	-	108	55%
Vines & berries	2	-	69	71	100%
Nursery & Tree plantations	5	-	-	5	100%
Other	-	4	-	4	16%
Specialty, Turf, Nut trees	-	-	4	4	100%
Tree fruits	-	-	-	-	-
TOTAL	**206**	**1,096**	**193**	**1,496**	**52%**

Refer to Appendix B Map 10. for more information .

ORGANIC FARMING

There are some well-established organic farmers in Pemberton. Most of the organic farms grow potatoes or other root crops and engage in direct marketing their crops

Table 22 shows there are at least six parcels with predominantly organic vegetable production, totalling 142 ha. Generally the parcels are large in size, with a median size of 18 ha. However, some types of organic production can make use of smaller parcels.

Table 22. Parcels classified as organic

Scale of storage infrastructure	Number of parcels	Area of parcels (ha)	Mean parcel size (ha)	Median parcel size (ha)	ALR (ha)	Non-ALR (ha)
Organic	6	142	23.7	17.7	138	4
TOTAL	6	142	23.7	17.7	138	4

Refer to Appendix B Map 11. for more information .

7. Value-Added Agriculture

There are 26 value-added agriculture ventures in Pemberton. There are 16 farms that engage in direct market activities such as selling their product in farmers' markets or to restaurants. A total of 9 farms have farm gate sales and there are 5 parcels with agri-tourism or tourism activities. Currently, there is only one farm that is regularly open for agri-tourism and direct sales.

Table 23. Parcels with value added activities

Value added type	Number of parcels	Area of parcels (ha)	Mean parcel size (ha)	Median parcel size (ha)	ALR (ha)	Non-ALR (ha)
Agritourism - Guest house	4	10	2.4	2.4	10	< 1
Agritourism - Seasonal events	1	84	83.7	83.7	84	< 1
Direct marketing - Farm gate sales	9	190	21.2	15.9	167	24
Direct marketing - Other/unknown	2	95	47.3	47.3	38	57
Direct marketing - Permanent retail store	1	3	2.8	2.8	3	-
Direct marketing - Seasonal store (stand)	2	103	51.4	51.4	103	< 1
Direct marketing - U-pick	2	40	20.2	20.2	40	< 1
Prep/processing - Winery/cidery	1	3	2.8	2.8	3	-
Prep/processing - Crop processing	4	155	38.6	44.2	134	21
TOTAL	26	682	26.2	17.5	581	101

Refer to Appendix B Map 12. for more information .

8. Land Availability Analysis for Seed Potato Production

The BC seed potato industry has been a Canadian leader in the development of the virus-free seed potato program. Pemberton is a seed control area, capitalizing on its isolation. One very important method of preventing diseases in root crops like potatoes is to ensure that land that has been planted with potatoes has a chance to rest for a number of years before the next potato crop. A minimum rest period is four years, but five years is optimal. To ensure the long-term health of the industry, it is critical that sufficient land is available for potato production to allow for a five year rotation. Potatoes require 7 ha fields and larger and Table 24 below shows that there currently are 26 parcels with potatoes on them with a median parcel size of 32 ha. Table 25 below shows that there are currently 319 ha planted with potatoes with a median field size of 7 ha.

Having access to land for potato production is critical to keep this industry viable. Potato farmers own a significant portion of the land they need and in addition, rely on leasing a portion of the land they need. In the past, they were able to access land relatively easily, partly due to the amount of beef production. With new, permanent crops coming into the area and an expansion of certified organic land, potato farmers are finding it more difficult to lease sufficient land in the traditional potato-growing area.

With a five year rest period, the minimum amount of land needed to maintain the current potato planting is 1920 ha in parcels over 7 ha in size. This land would be planted with potatoes in the first year, likely a cereal crop in the second year with an understory of mixed grass and legume, then hay and pasture for the third, fourth and fifth years, and then back to potatoes. About 320 ha would be in potatoes and the rest, 1,600 ha, would be in cereals, forage production and/or pasture.

When analysis of the crop cover data is carried out, constraining the data to fields that are 7 ha or larger or that have the potential to be 7 ha or larger, the results from Table 26 below shows that the total available area is 1,935 ha within the ALR. This data includes land that may no longer be available to potato farmers for lease and land along the Highway 99 corridor that has not traditionally been used for seed potato production. As a minimum of 1,600 ha are needed in forage and cereal crop production and 1,935 ha are available, including land that is not available for potato farmers to lease, there may be a critical shortage of land to sustainably maintain the seed potato crop. As seed potato production forms the basis of the agriculture production system in Pemberton and is very important economically for the region, it may be important to look closely at how the land base for seed potato production can be expanded.

Table 24. Parcels with potato production as the primary agriculture activity

Primary agriculture activity	Parcels with Commercial Agriculture Activities					
	Number of parcels	Parcel area (ha)	Mean parcel size (ha)	Median parcel size (ha)	ALR (ha)	Non-ALR (ha)
Potatoes	26	978	37.6	31.9	869	109
TOTAL	**26**	**978**	**37.6**	**31.9**	**869**	**109**

Refer to Appendix B Map 13. for more information .

Table 25. Area in potato crops on parcels with potato production as the primary agriculture activity

Land Cover	Parcels with Commercial Agriculture Activities					
	Number of areas	Area (ha)	Mean area size (ha)	Median area size (ha)	ALR (ha)	Non-ALR (ha)
Potatoes	35	322	9.2	7.0	319	3
TOTAL	**35**	**322**	**9.2**	**7.0**	**319**	**3**

Table 26. Areas 7 ha or larger in forage or cereal production

Forage, pasture, cereal, grain or oilseed type	Number of areas	Land area (ha)	Mean area size (ha)	Median area size (ha)	ALR (ha)	Non ALR (ha)
Alfalfa	5	57	11.4	8.1	57	< 1
Barley	2	16	8.1	8.1	16	-
Clover	3	31	10.2	10.2	31	-
Grass	128	1,447	11.3	8.4	1,430	17
Mixed grass / legume	17	247	14.5	14.5	244	3
Oats	24	161	6.7	6.5	158	3
TOTAL	**179**	**1959**			**1935**	**24**

9. Residential Use of Farmland

Land use that restricts access to farmland by farmers threatens the sustainability of agriculture in a region, as it may limit the ability of agriculture to grow, intensify and respond to market demands. Residential use of farmland can be a barrier to farmers' access if the primary motivation for ownership is residential use instead of farm-related income potential and the landowner does not want to farm or lease the land to farmers.

Normally, farmers place houses carefully to ensure that the use of land is maximized. In Pemberton, where there have been historical and ongoing issues with flooding, housing and farm structures are often placed on the land with the highest elevation on the parcel. This means houses may not be adjacent to parcel boundaries, in the corners and adjacent to the road, but are still placed in a way that does not interfere with the cropping of the parcel. However, there is a perception that some large homes have recently been built in the middle of parcels, where farming is not a primary consideration.

Table 27 below looks at all residential structures in the study area. There are many parcels, 238 of the 528 parcels studied, that have no residential use. There are 290 parcels that have some form of residential use. Of these, there appears to be one motel, one hotel and one set of row houses, all with no commercial agricultural land use on the parcel. The rest have residences suitable to support an agricultural land use.

The size of residence may be one of several factors that can lead to a parcel being farmed or not. Figure 14 illustrates that for all parcels with commercial agriculture, 38% were found to have no residence, 16% had small size houses, 33% had medium size houses, and 10% had large or very large houses.

Figure 14. Parcels with commercial agriculture and residential structures

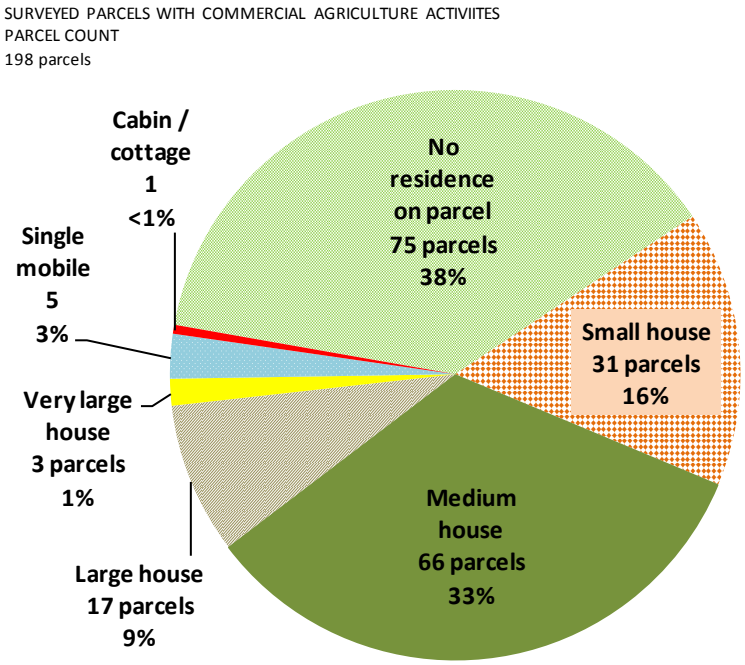


Table 27. Parcel status and the presence of a residence[7]

Most significant type of residential structure on the parcel	Parcel agricultural status (number of parcels)				Parcels				
	Commercial Agriculture	Non-commercial Agriculture	Available	Unavailable	Number of parcels	Area of parcels (ha)	Mean parcel size (ha)	ALR (ha)	Non-ALR (ha)
No residence on parcel	75	20	85	58	238	3,941	16.6	2,716	1,226
Small house (<1500 sq.ft.)	31	7	25	18	81	626	7.7	591	35
Medium house (1500 - 3500 sq. ft.)	66	21	50	12	149	1,366	9.2	1,297	68
Large house (3500 - 5000 sq. ft.)	17	10	12	2	41	347	8.5	336	11
Very large house (>5000 sq. ft.)	3	1	1	-	5	82	16.3	75	7
Single mobile home	5	1	3	-	9	95	10.6	88	7
Cabin / cottage	1	-	-	-	1	18	18.0	8	10
Row house / townhouse	-	-	1	-	1	2	1.7	< 1	2
Mobile home park	-	-	1	-	1	2	2.0	2	< 1
Motel style	-	-	1	-	1	4	3.7	4	< 1
Hotel style	-	-	-	1	1	1	1.4	1	-
TOTAL	**198**	**60**	**179**	**91**	**528**	**6,484**		**5,119**	**1,365**

There is a further question regarding whether the placement of houses can have an impact on the ability of the parcel to be used for agriculture. Table 28 examines the agricultural status of parcels with large or very large houses not adjacent to parcel boundaries within the surveyed area. Six of the parcels had commercial agriculture activity and eight of the parcels had either non-commercial agriculture activities or no agriculture activities at all.

Table 28 shows that the commercial agriculture activities are forage, pasture and horse farms. At least 12 of the 14 parcels are not apparently being farmed at the baseline economic intensity seen in the region, with a seed potato rotation of potatoes, cereals and forage grass and pasture (see discussion in section 6.4).

Table 28. Large or extra large residences not adjacent to the parcel boundary

Agricultural activity	Parcel agricultural status (number of parcels)				Total number of residential structures	Total number of parcels
	Commercial Agriculture	Non-commercial Agriculture	Available	Unavailable		
Horse Farm	2	-	-	-	2	2
Forage	2	-	-	-	2	2
Pasture	2	-	-	-	2	2
Other	-	2	-	-	2	2
----------	-	-	6	-	6	6
TOTAL	**6**	**2**	**6**	**-**	**14**	**14**

[7] There could be more than one residence on a parcel. This table quantifies the number or parcels with residences and not the number of residences.

10. Comments from the Ministry of Agriculture Agrologist

The Pemberton Valley is a very rich agriculture region with excellent soil, water resources and climate. It is also particularly fortunate to have farmers who are both well-versed in complex crop production as well as animal production.

Pemberton has the benefit and challenge of being an isolated agriculture valley. There is no other significant tract of available agriculture land close to Pemberton. The isolation of such a rich tract of agriculture land has enabled Pemberton to achieve outstanding success in seed potato production and to maintain a virus-free status.

The Agricultural Land Use Inventory shows that the baseline agriculture production system is seed potato production, with rotational crops of grass and cereal crops. It also shows that there are more intense operations developing in the area, such as organic vegetable production, direct market production, berry production and other diversified crops that tend to be grown on smaller parcels. There is also increasing intensity in animal production with the success of Pemberton Natural Beef, so that beef cattle are now being finished within the valley and then marketed, capturing most of the value of their production. However, there are no large-scale intensive livestock operations in the valley and it would be informative to understand why. The land base exists for intensive livestock, so barriers may be lack of supportive infrastructure such as feed suppliers and slaughtering facilities.

The Agricultural Land Use Inventory showed that there are several potential threats to maintaining and increasing the viability of agriculture.

(1) The currently available agriculture land that could potentially rotate with seed potatoes is insufficient for seed potato farmers to continue adequate rotations to maintain their virus-free status.

Some of the land previously used for seed potato production is shifting to organic agriculture and berry production and can no longer accommodate the production of seed potatoes. As increasing intensification and diversity are healthy for the region, it is important to explore options to access new land for crop rotations and maximize the use of existing agriculture land.

(2) Of all the land surveyed in the ALR, 14% is not available for agriculture use. About 5% of the available agriculture land base is for non-farm use. Increasing the amount of land that farmers cannot access will impact the viability of agriculture in the region.

(3) The Regional District should consider implementing restrictions on the size and siting of residential use.

(4) Most of the small lots (less than two hectares) are not being farmed, whereas most of the larger parcels (16 ha and larger) are being farmed.

It is possible that agriculture in Pemberton can become even more vibrant and contribute even greater benefits to the region's economy and way of life. The Agricultural Land Use Inventory shows that 16 parcels in the valley utilize direct marketing. The Pemberton Natural Beef venture is successful and uses more intensive forage production to increase the carrying capacity of the forage lands. Beef

production may increase in the valley to supply this market which may lead to irrigation of pastures or hayfields and more barley production if suitable varieties of barley are available. Also, the trend toward developing more value-added agriculture is noted.

There is one direct market farm that is open to the public, growing a wide variety of produce and animal products on a smaller scale. There are many seasonal stands in the area and numerous parcels in organic vegetable production for the direct market. With the growing popularity of the region, there are likely to be wider opportunities for seasonal direct marketing and agri-tourism. The stellar reputation of the seed potato industry and the success of current direct market businesses, provide an excellent platform for branding the region so that even more farmers can use marketing models that will enable them to be price setters rather than price takers.

The Agricultural Land Use Inventory showed that Pemberton has 22 parcels with root vegetable crop storage infrastructure. This is expensive infrastructure to build and is a real benefit for the region, both for ongoing seed potato production and the production of new, diversified vegetable crops.

The abundance of good quality water for irrigation is one of Pemberton's the greatest assets. The Agricultural Land Use Inventory showed that a surprisingly high amount of land in Pemberton is irrigated at least part of the time. With increasingly uncertain weather patterns and increased crop needs, it is likely that irrigation will increase in Pemberton. The irrigation in Pemberton currently uses gravity-feed systems from surface water streams coursing down the mountain sides. This supplies a pure low-cost water source. However, with increased irrigation needs groundwater sources may be required. It would be prudent for the Regional District to undertake a groundwater resource study, to ensure that this valuable resource is developed wisely.

The completion of this Agricultural Land Use Inventory provides a baseline database through which changes in agricultural land use can be tracked over time. It is recommended that the study be repeated in intervals of less than ten years.

Appendix A

AGRICULTURAL LAND USE INVENTORY METHODOLOGY

AgFocus is an Agricultural Land Use Inventory System developed by BC Ministry of Agriculture's Strengthening Farming Program. AgFocus provides the tools to efficiently capture detailed information about land cover and land use on agricultural lands. For more information on AgFocus, please refer to these documents available from the Strengthening Farming Program:

- AgFocus – A Surveyors Guide to Conduction an Agricultural Land Use Inventory,
- AgFocus – Field Guide to Conducting an Agricultural Land Use Inventory, and
- AgFocus – A GIS Analyst's Guide to Agricultural Land Use Inventory Data.

CONDUCTING THE SURVEY

The Pemberton Valley agricultural land use inventory was conducted in the early fall of 2009 by a BC Ministry of Agriculture Regional Agrologist assisted by a BC Ministry of Agriculture Spatial Data Analyst.

The inventory area focused on land within the Agricultural Land Reserve but parcels with farm class based on 2009 BC Assessment were also considered for survey.

Cadastre mapping (2007) was provided by the Squamish-Lillooet Regional District through the Integrated Cadastral Information Society. Field survey maps showing property boundaries, aerial photography (1999) and other reference information provided the basis for the survey. Aerial photographs provided confirmation of uses and basic estimated information where the activities on a parcel were not visible from the road.

The survey crew drove to each property and observed the land use, agriculture activity and land cover from the road. Aerial photographs were used to check site characteristics where parcels were not fully visible. The Spatial Data Analyst entered the appropriate codes into the database on a laptop computer.

Once acquired through the survey, the data was brought into a Geographic Information System (GIS) to facilitate analysis and mapping. Digital data, in the form of a database and GIS spatial layers (for maps), is available upon request through a data sharing agreement.

Description of the Data

For each property in the study area, data was collected on the general land use, agriculture activities (where present), land covers (including crops and buildings), agricultural practices (including irrigation), and livestock.

1. *General land use*: There are finite levels of general land use (e.g. agriculture, residential, and other) which were recorded for each property, based on an assessment of their overall economic importance, the property's tax status, and/or the extent of the land use.

2. *Agriculture activity*: Up to two types of agriculture activities were recorded on parcels where an agriculture crop was recorded as a land cover.

3. *Land covers*: Land covers including crops, buildings, forested areas (woodlots), streams, etc. were recorded for each parcel surveyed. Where a property was not visible from the roadway, orthophotos were used to identify land covers. Orthophotos were also used to confirm areas of observed covers.

4. *Agricultural practices*: Surveyors recorded agricultural practices associated with each crop cover. For example, if a forage crop was being harvested for hay, it was recorded. Irrigation was also recorded, including the type of system used.

5. *Livestock*: The types of all livestock operations were recorded and scales were estimated. A record was also made of properties where livestock were not seen at the time of survey, but inferred based on grazed pastures, manure storage, and other evidence.

Explanation of Land Cover Methodology

The primary purpose of a land cover survey is to separate the parcel into homogeneous components or land cover polygons and assign each a description based on predefined classifications. Prior to the field survey, land cover polygons were delineated in the office using 1999 orthophotography and assigned a preliminary classification. Further delineation occurred during the field survey until one of the following was achieved:

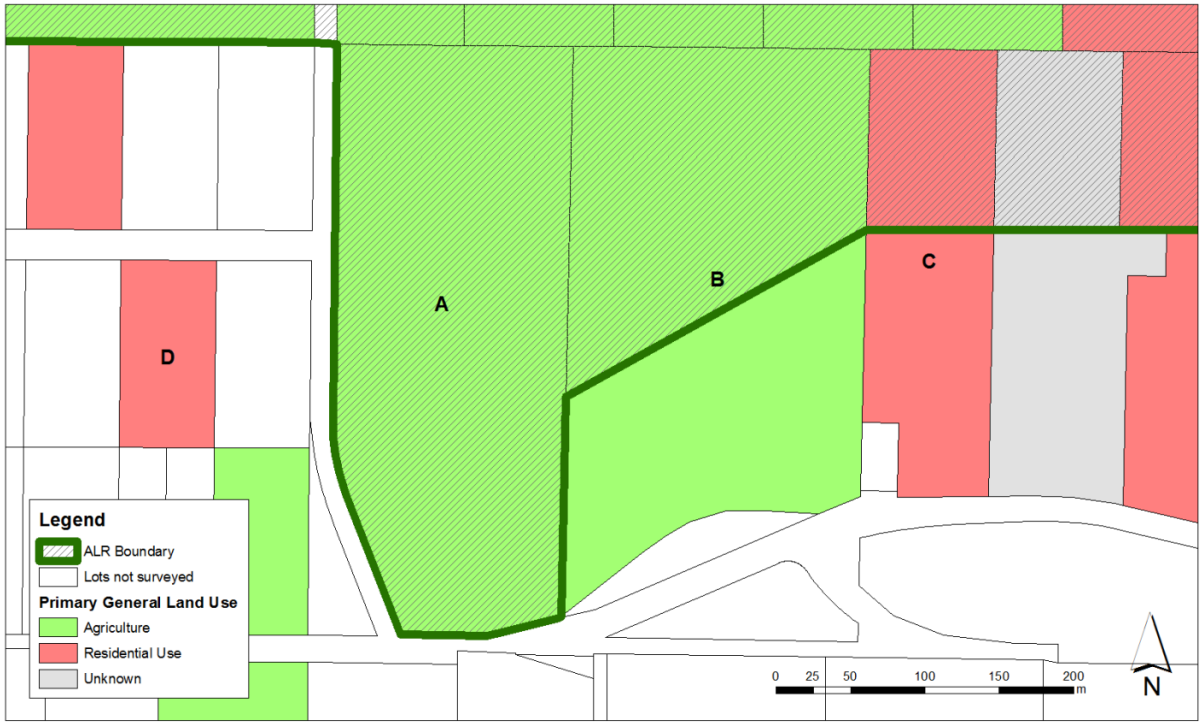
- Minimum polygon size (500 sq M, ~5400 sq ft) or minimum polygon width (10 M, ~33 ft),
- Polygon is homogeneous in physical cover and homogeneous in irrigation method, or
- Maximum level of detail required was reached.

Determination of parcels which were included in the survey

Since much of the following analysis is parcel based, it is important to note that the ALR boundaries are not always coincident with parcel boundaries.

Figure 15 illustrates the frequent differences between parcel boundaries and the ALR boundary. Given that the dark green line represents the ALR boundary, Lot A is completely in the ALR and Lots B and C have a portion of their area in the ALR. Many of the results presented in this report include the parcel portions both in and out of the ALR as well as the entire parcel area.

Figure 15. Survey parcel inclusion in the ALR



DEFINITIONS

Commercial agriculture – Parcels judged to support significant revenue-generating agriculture activity and/or have farm class status based on 2009 BC Assessment.

Commercial agriculture activity – The main commercial agriculture activity occurring on a parcel that has been determined based on the following conditions: parcel is classified as a commercial use for agriculture; livestock has either a medium or large scale; largest agricultural land cover.

Commercial and service use – The use of a parcel which includes the following: retail, services; wholesale; tourism; cultural and entertainment; and commercial and service – agriculture related (off farm) e.g. auction services, implement dealer/repair, veterinary services, fertilizer sales, pesticide sales, equipment sales.

Crops under cover – Crops that are grown within a glass greenhouse or a poly greenhouse

Farm class – Parcels that are classified as farm class by BC Assessment[8].

Land cover – Land covers are the homogeneous components or biophysical entity within a parcel. Land covers including crops (by irrigation system), buildings, forested areas (woodlots), streams, etc. were recorded for each parcel surveyed. Where a property was not visible from the roadway, orthophotos were used to identify land covers. Orthophotos were also used to confirm areas of observed covers.

Non-commercial agriculture activity – The main non-commercial agriculture activity occurring on a parcel that has been determined based on the following conditions: parcel is classified as a hobby use for agriculture; livestock has either a medium or large scale; largest agricultural land cover.

Parcel – An area of land that is uniquely defined for ownership or land use purposes.

Permanent non-farm use – These are parcels that are permanently not available for agriculture due to the following reasons: topographic constraints; permanent structures which will more than likely remain fixed; residential parcels that are less than 0.4 ha (lots considered not farmable).

Primary agriculture activity – The agriculture activity occurring on a parcel that is most likely the greatest source of income.

Temporary non-farm use – These are parcels that are temporarily not available for agriculture but can be converted back to farmland. For example, these include parcels that are unused, and are residential parcels greater than 0.4 ha.

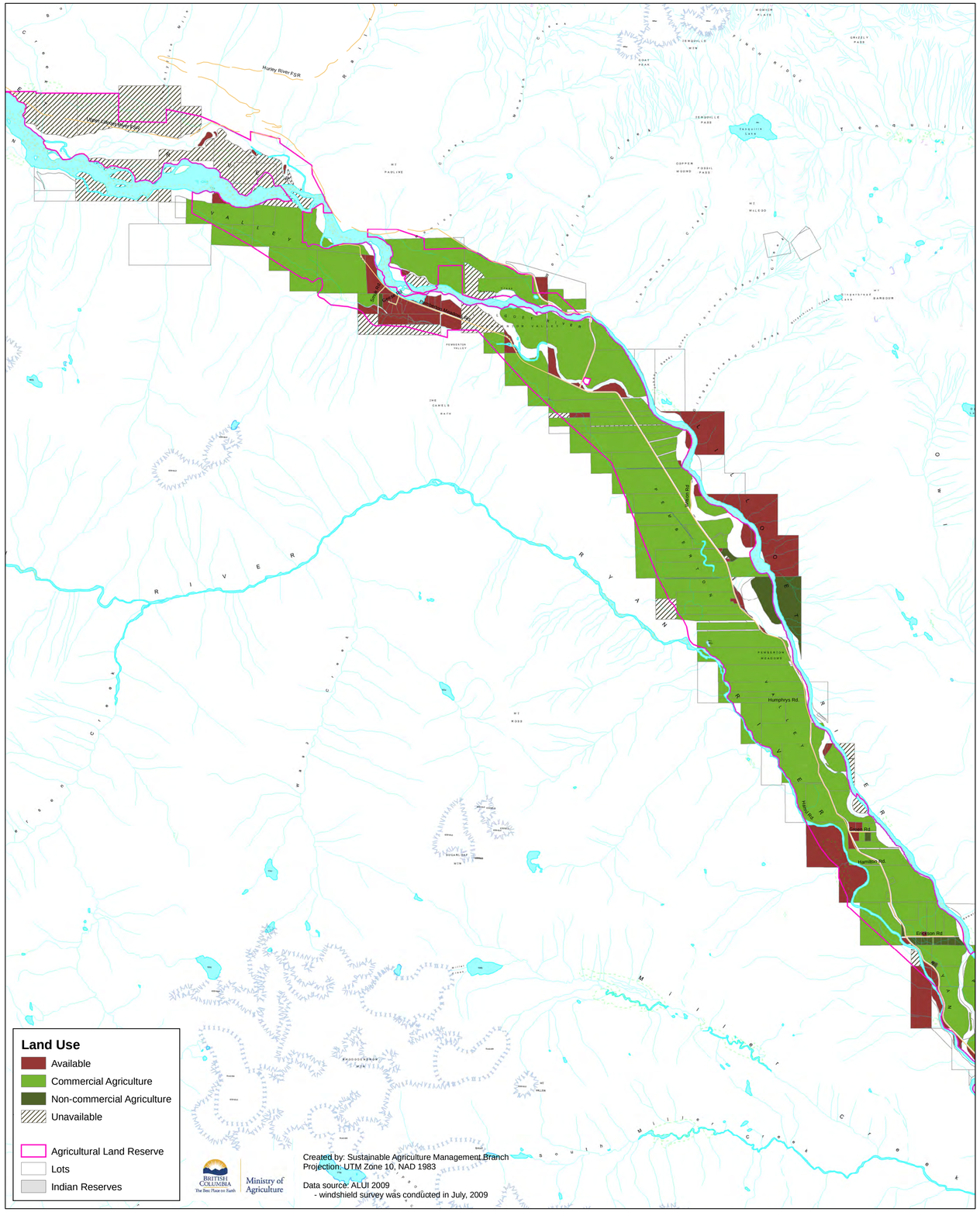
Travelling gun irrigation – These systems consist of a wheeled cart with a large sprinkler, the main traveler machine with a hose reel, and an irrigation hose. The wheeled cart is pulled either by a cable or

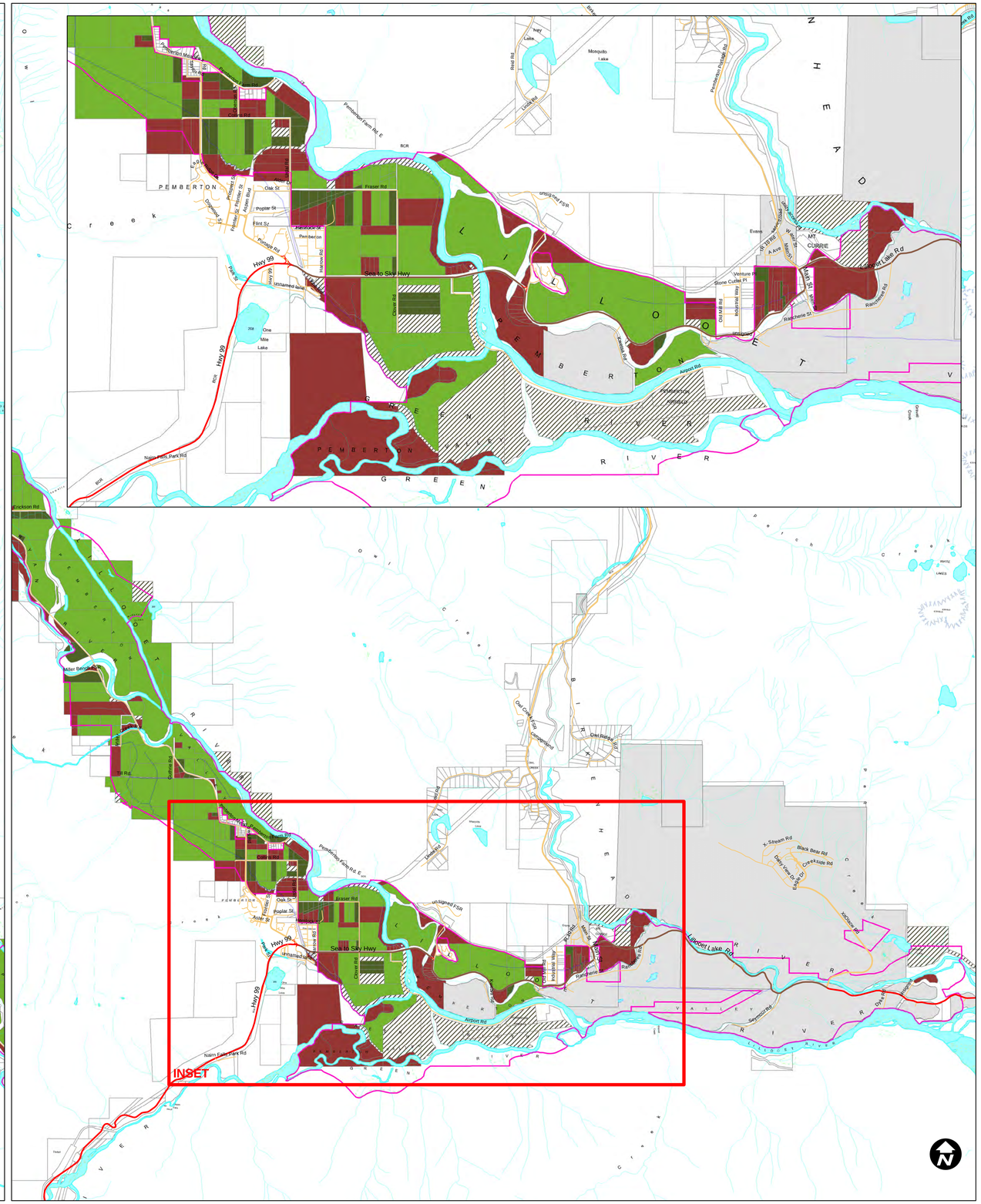
[8] BC Reg. 411/95: Standards for the Classification of Land as a Farm ("the Standards"). http://www.bcassessment.bc.ca/public/Documents/10-055%20BCA%20Farm%20Classification%20Brochure.pdf

a hand irrigation hose during operation. Set time for these systems should be very short to avoid deep percolation or runoff. This makes these systems very difficult to manage properly.

Undertree irrigation – These systems can have a variety of sprinkler spacings, as the sprinkler layout must match the crop spacings. Lateral lines are usually buried PVC or polyethylene pipe.

Wheel-move irrigation – A series of pipes, each with a wheel of about 1.5 m diameter permanently affixed to its midpoint and sprinklers along its length, are coupled together at one edge of a field. Water is supplied at one end using a large hose. After sufficient water has been applied, the hose is removed and the remaining assembly rotated either by hand or with a purpose-built mechanism, so that the sprinklers move 10m across the field. The hose is reconnected. The process is repeated until the opposite edge of the field is reached. These systems generally have standard sprinkler spacings, as aluminum pipes of standard lengths are usually used.





Map 1. Land use for all surveyed parcels

Created by: Sustainable Agriculture Management Branch
Projection: UTM Zone 10, NAD 1983

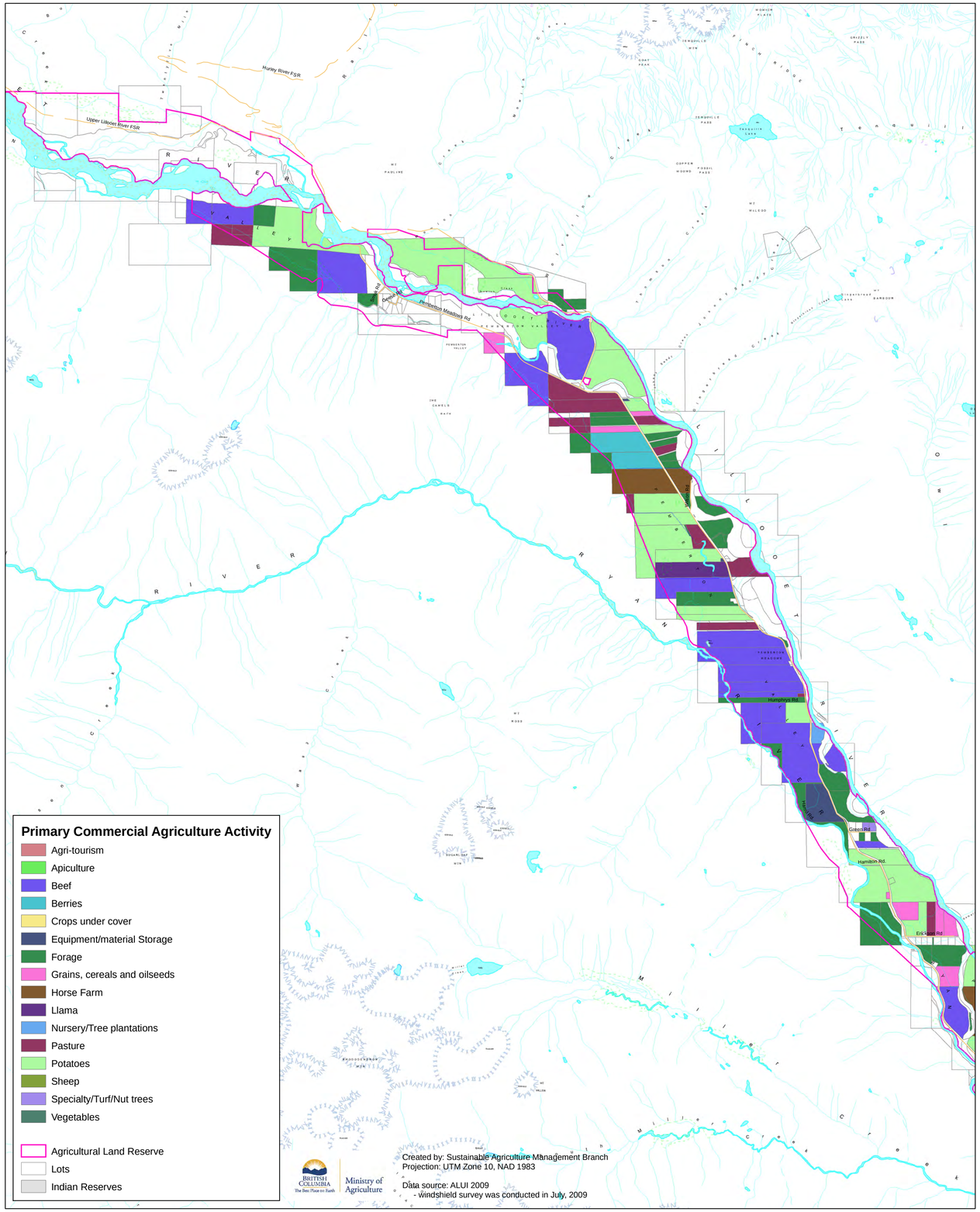
Data source: ALUI 2009
- windshield survey was conducted in July, 2009

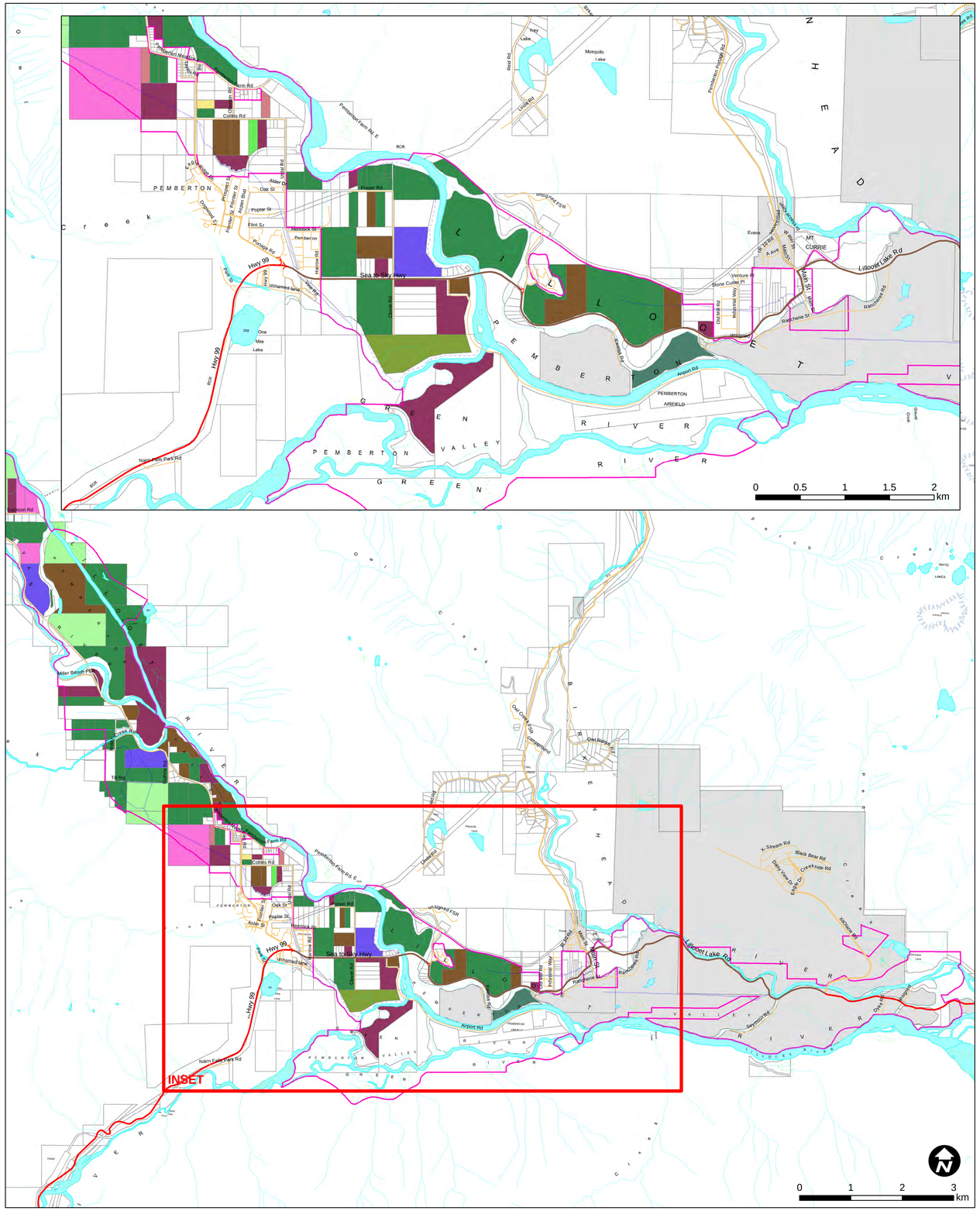
Map 2. General land use by parcel for all surveyed parcels

Created by: Sustainable Agriculture Management Branch
Projection: UTM Zone 10, NAD 1983

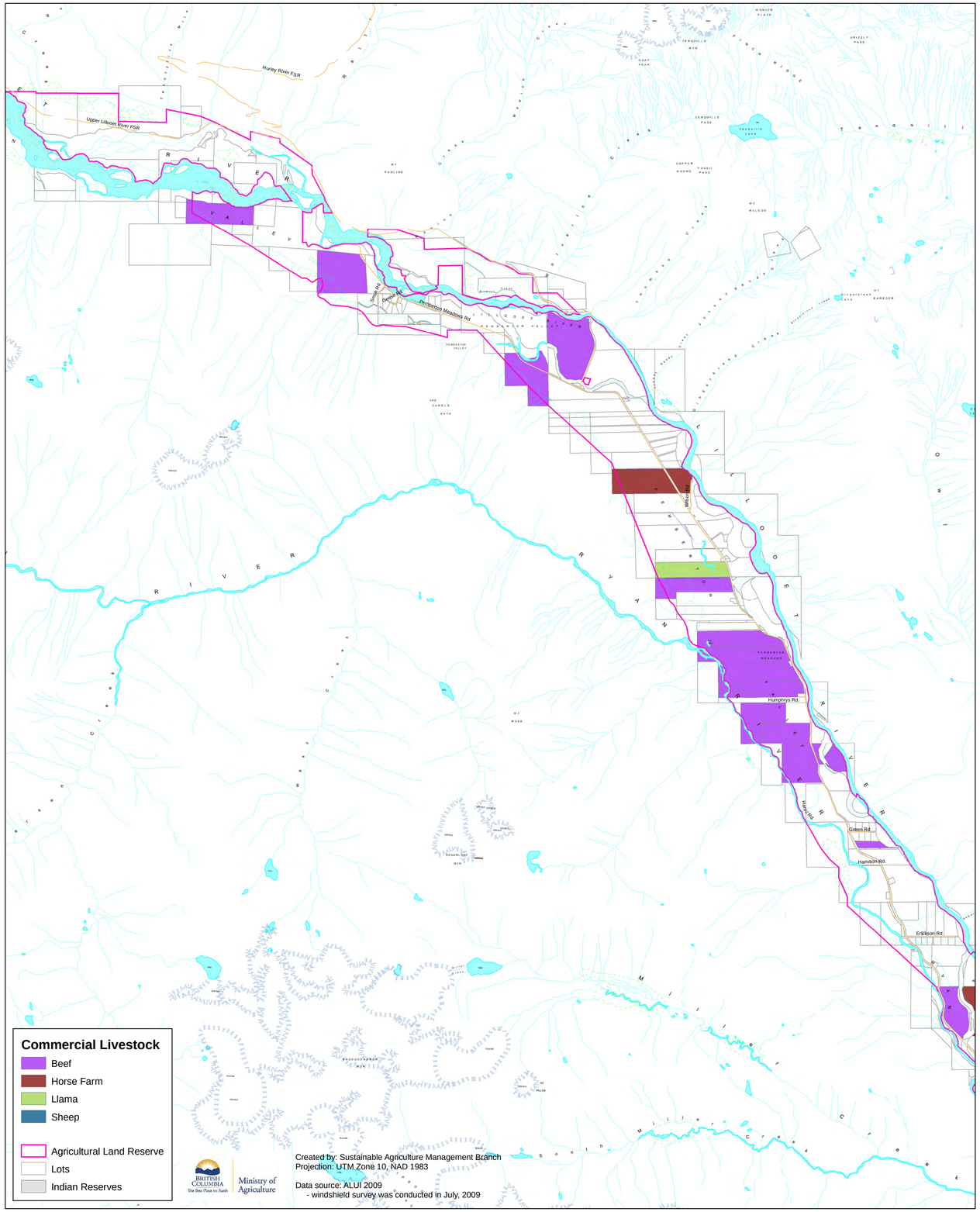
Data source: ALUI 2009
- windshield survey was conducted in July, 2009

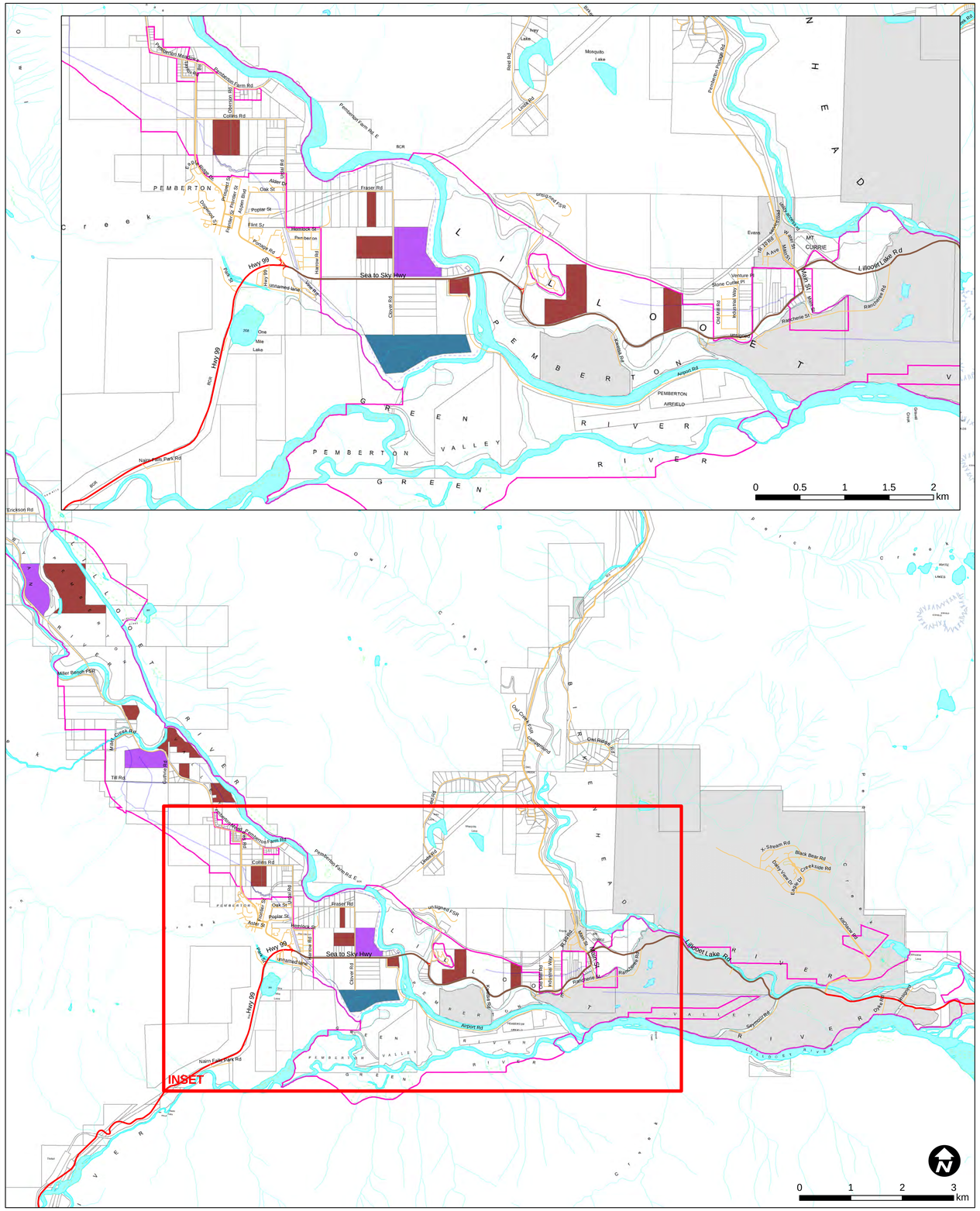
Map 3. Primary commercial agriculture activities by parcel



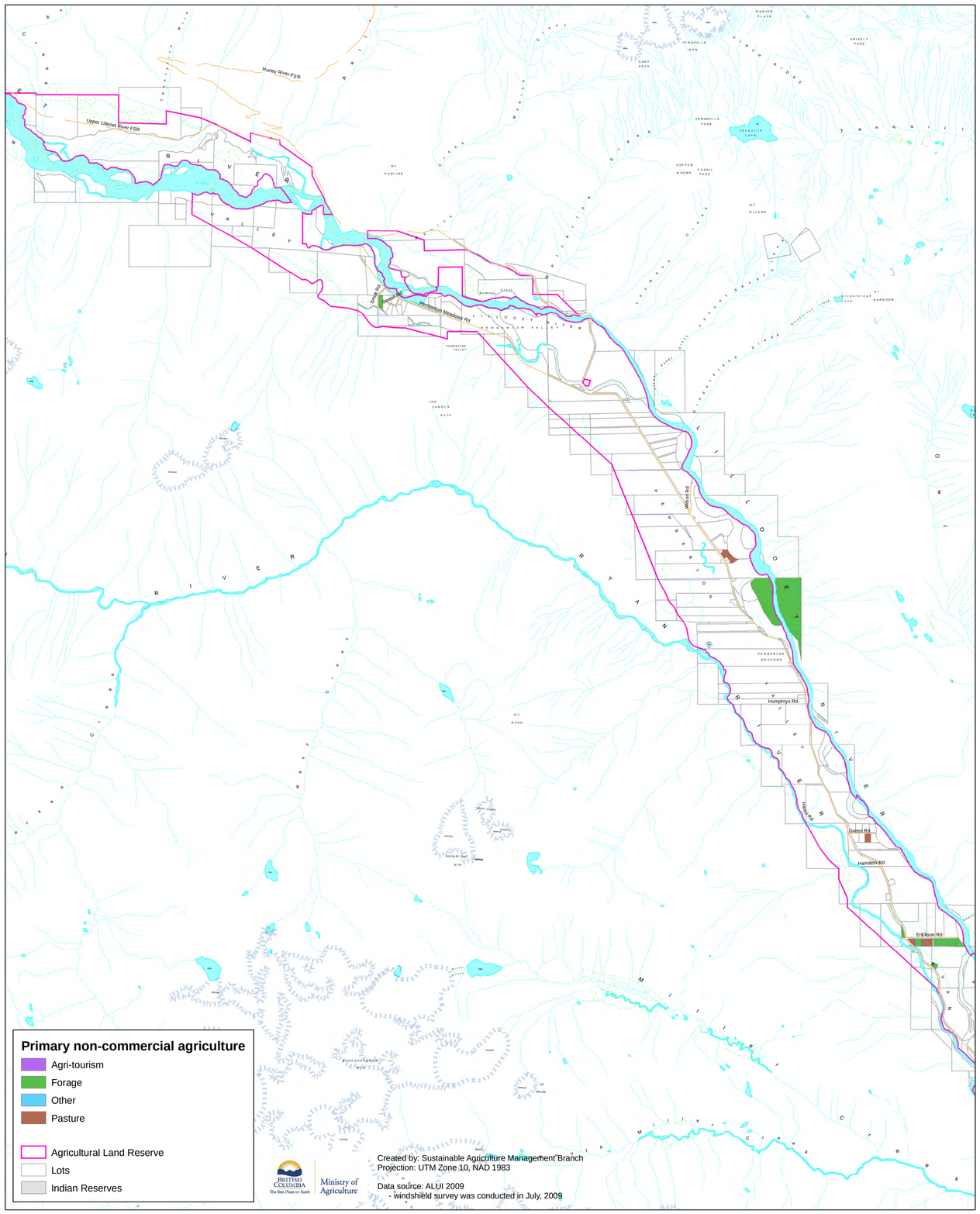


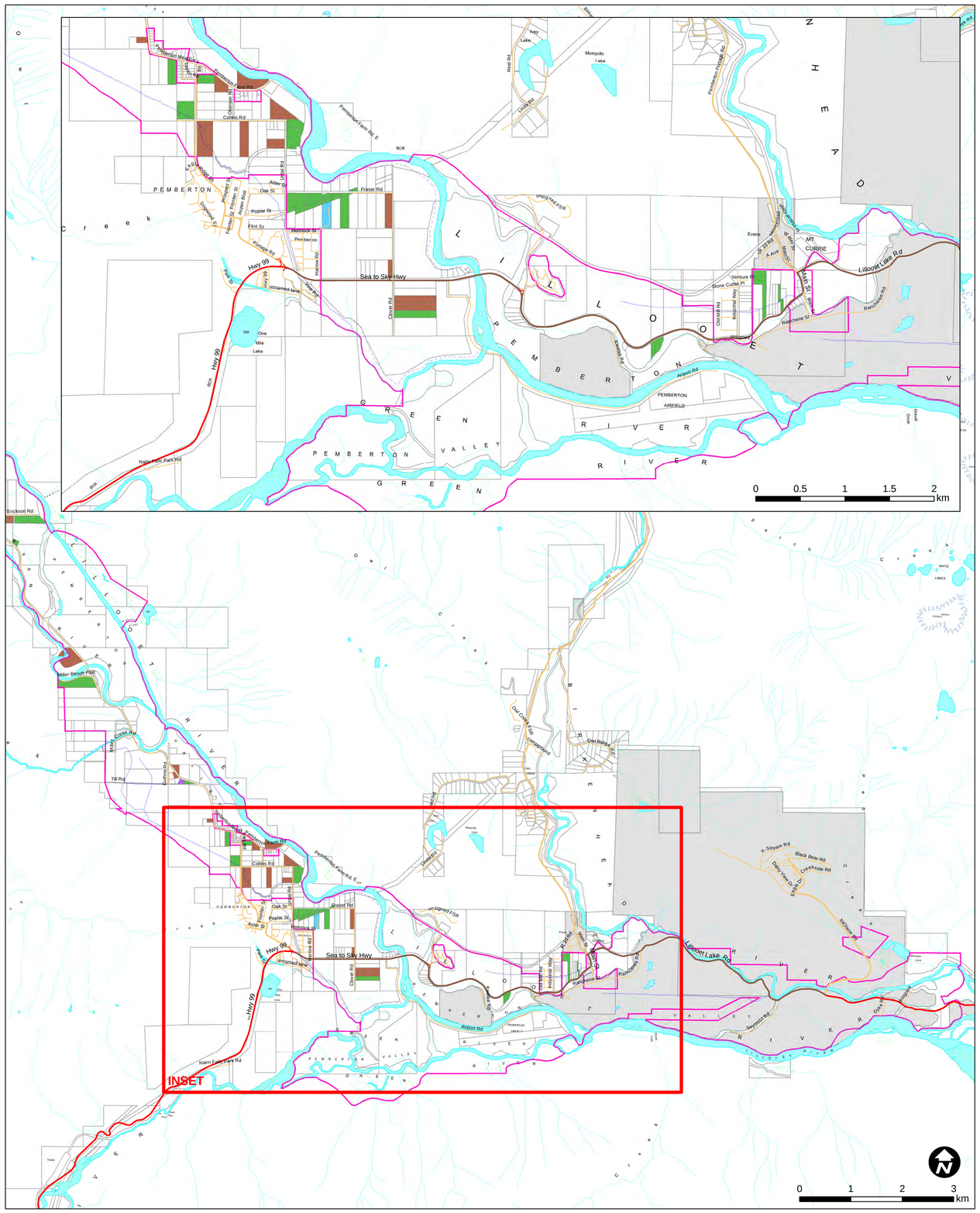
Map 4. Parcels with commercial livestock activities as their primary agricultural activity





Map 5. Primary non-commercial agriculture activities by parcel





Map 6. Land use on parcels not available for agriculture

Land Use on Parcels Not Available for Agriculture

- 🟩 Commercial & service
- ■ Golf course
- ■ Physical limitation - Slope
- ■ Residential (<=0.4ha)
- ■ Transportation - Airport
- ■ Transportation - Railway
- ■ Transportation - Roadway
- ■ Utilities
- ■ Water management
- 🟥 Water management - Ditch
- ■ Water management - Dyke

- ☐ Agricultural Land Reserve
- ☐ Lots
- ■ Indian Reserves

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Created by: Sustainable Agriculture Management Branch
Projection: UTM Zone 10, NAD 1983

Data source: ALUI 2009
- windshield survey was conducted in July, 2009

Map 7. Land use on parcels available for agriculture

Land Use on Parcels Available for Agriculture

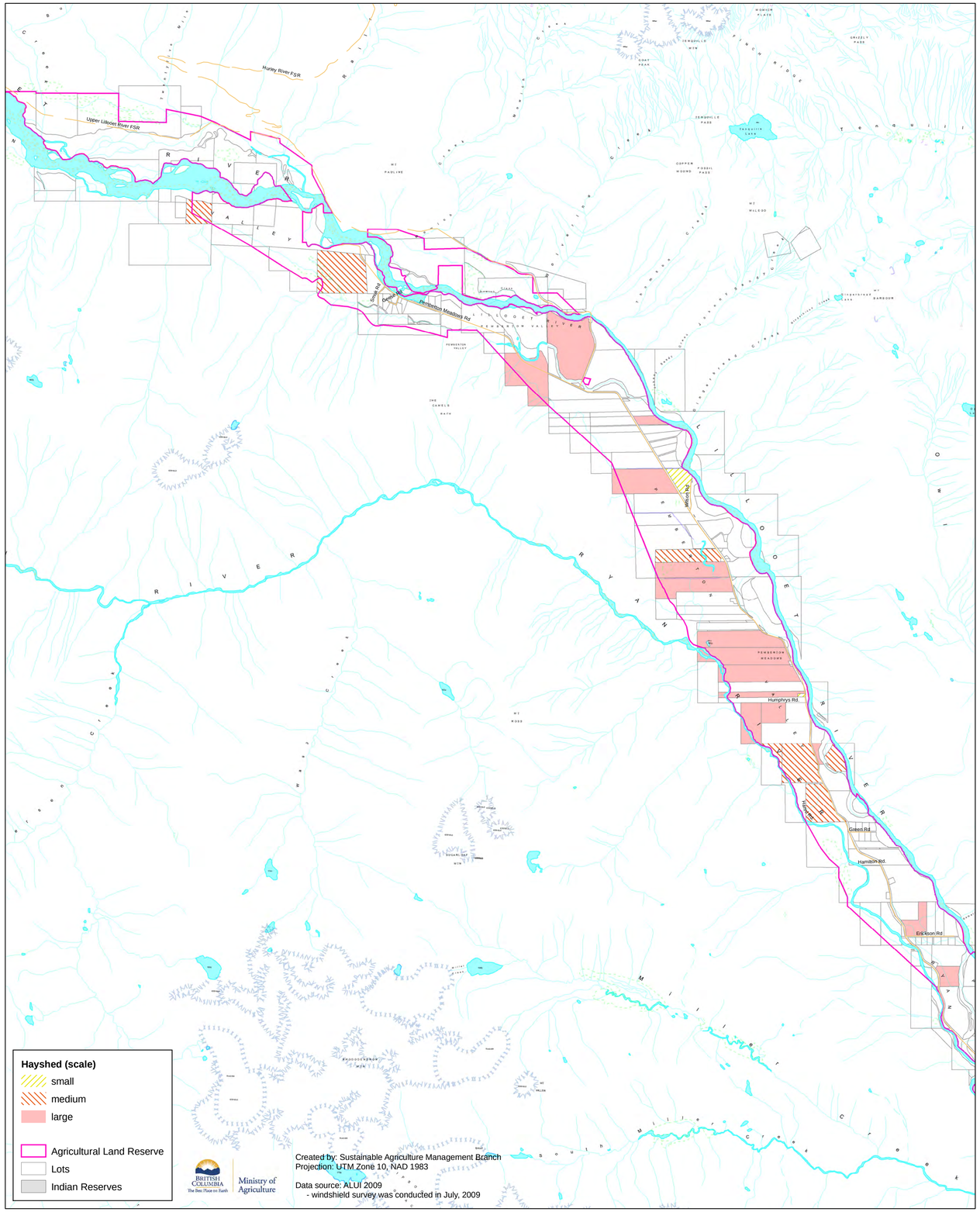
- 🟨 Dumps & deposits - temporary non farm use
- 🟩 Forestry
- 🟫 Household
- ▨ Industrial - temporary non farm use
- 🟪 Recreation & leisure - temporary non farm use
- 🟥 Tourist accommodations
- 🟦 Unused

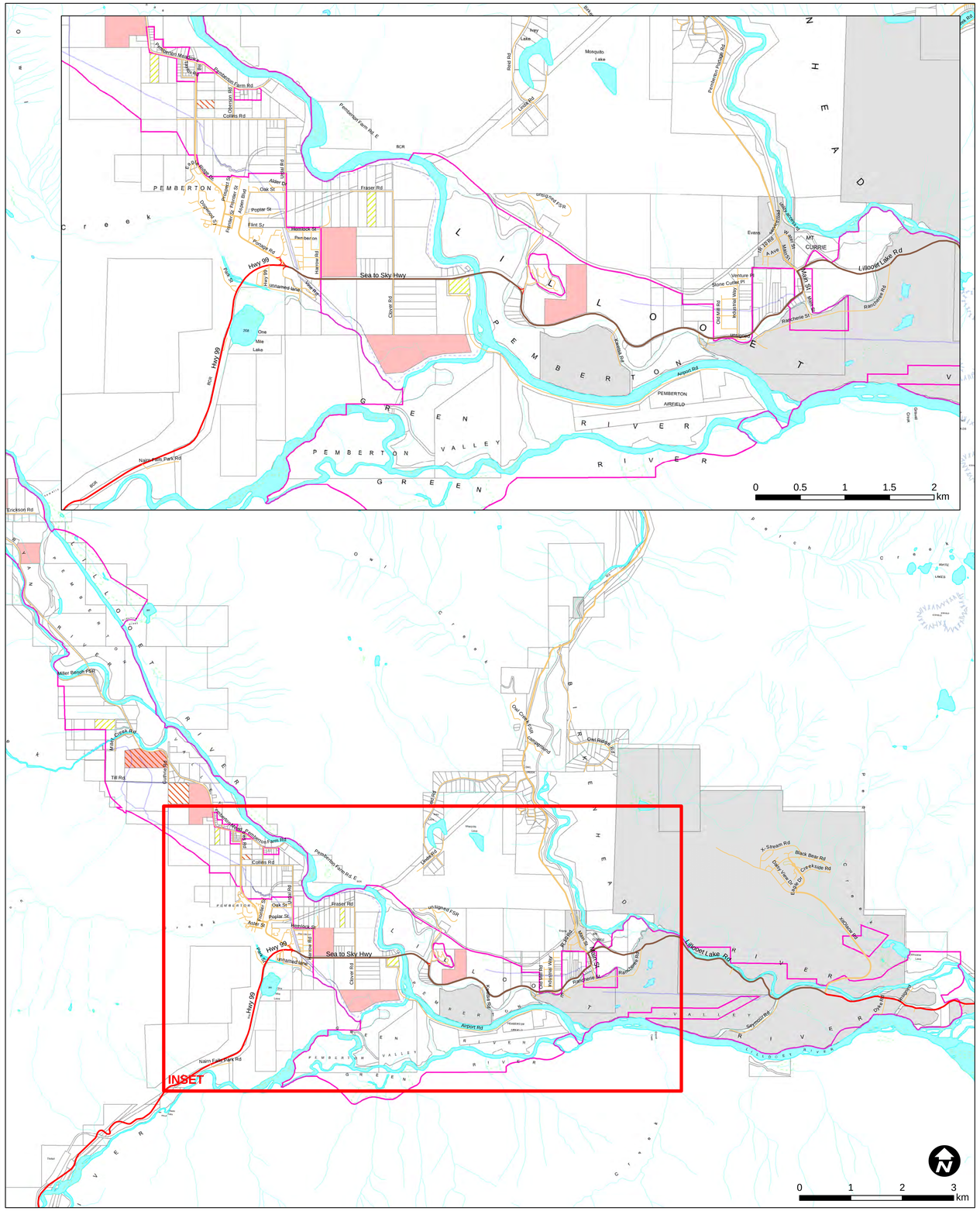
- ☐ Agricultural Land Reserve
- ☐ Lots
- ▨ Indian Reserves

Created by: Sustainable Agriculture Management Branch
Projection: UTM Zone 10, NAD 1983

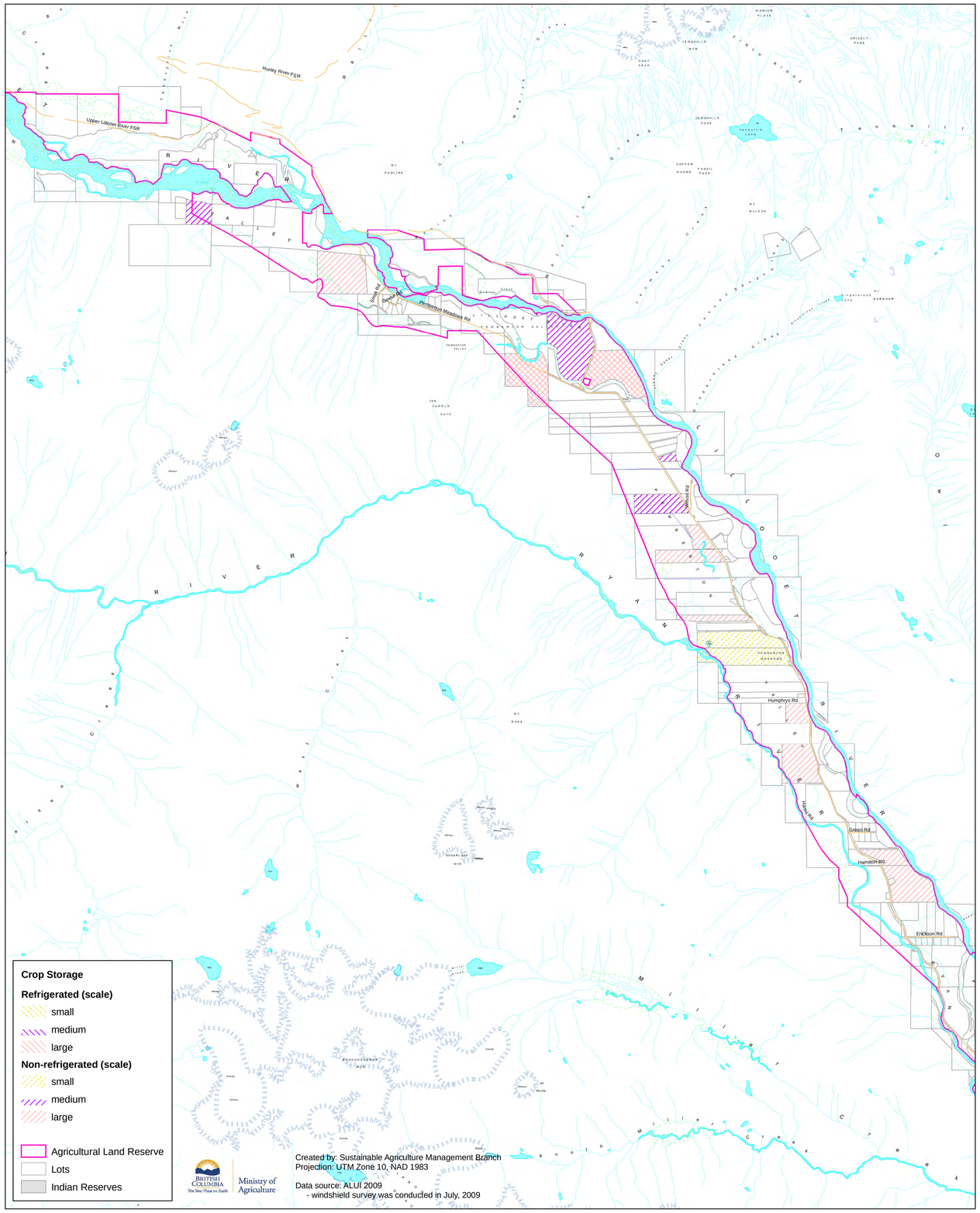
Data source: ALUI 2009
- windshield survey was conducted in July, 2009

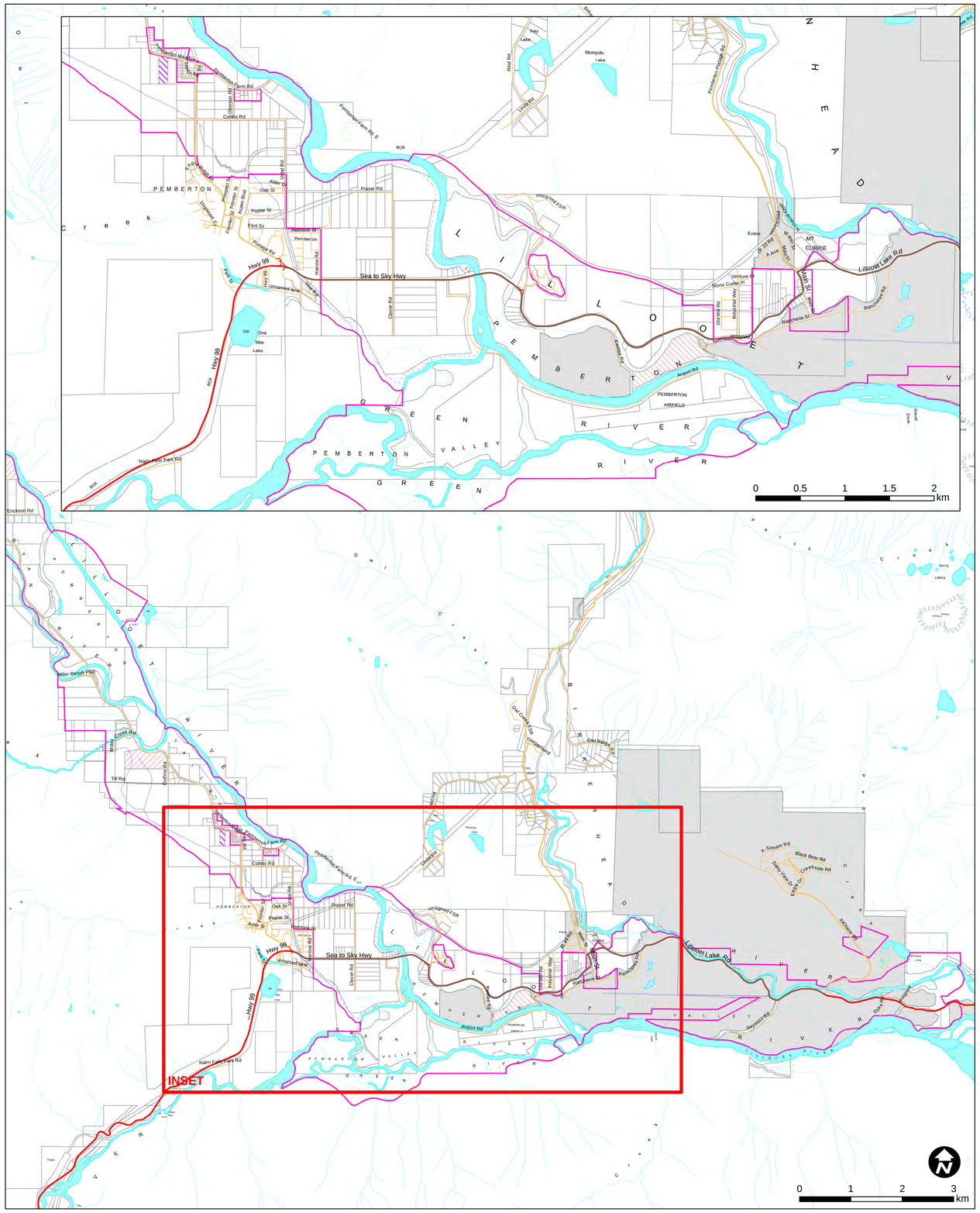
Map 8 Parcels with commercial feed storage infrastructure



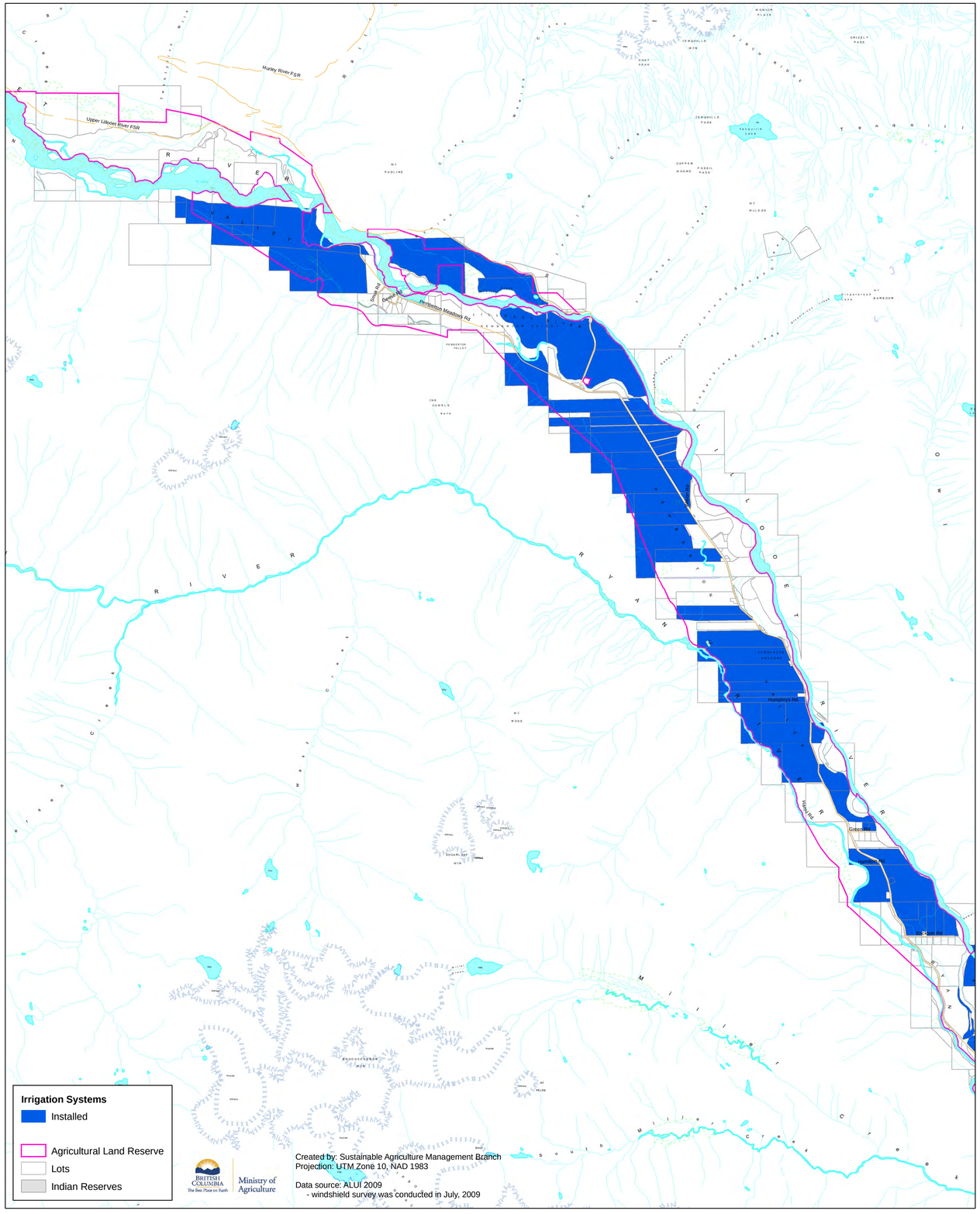


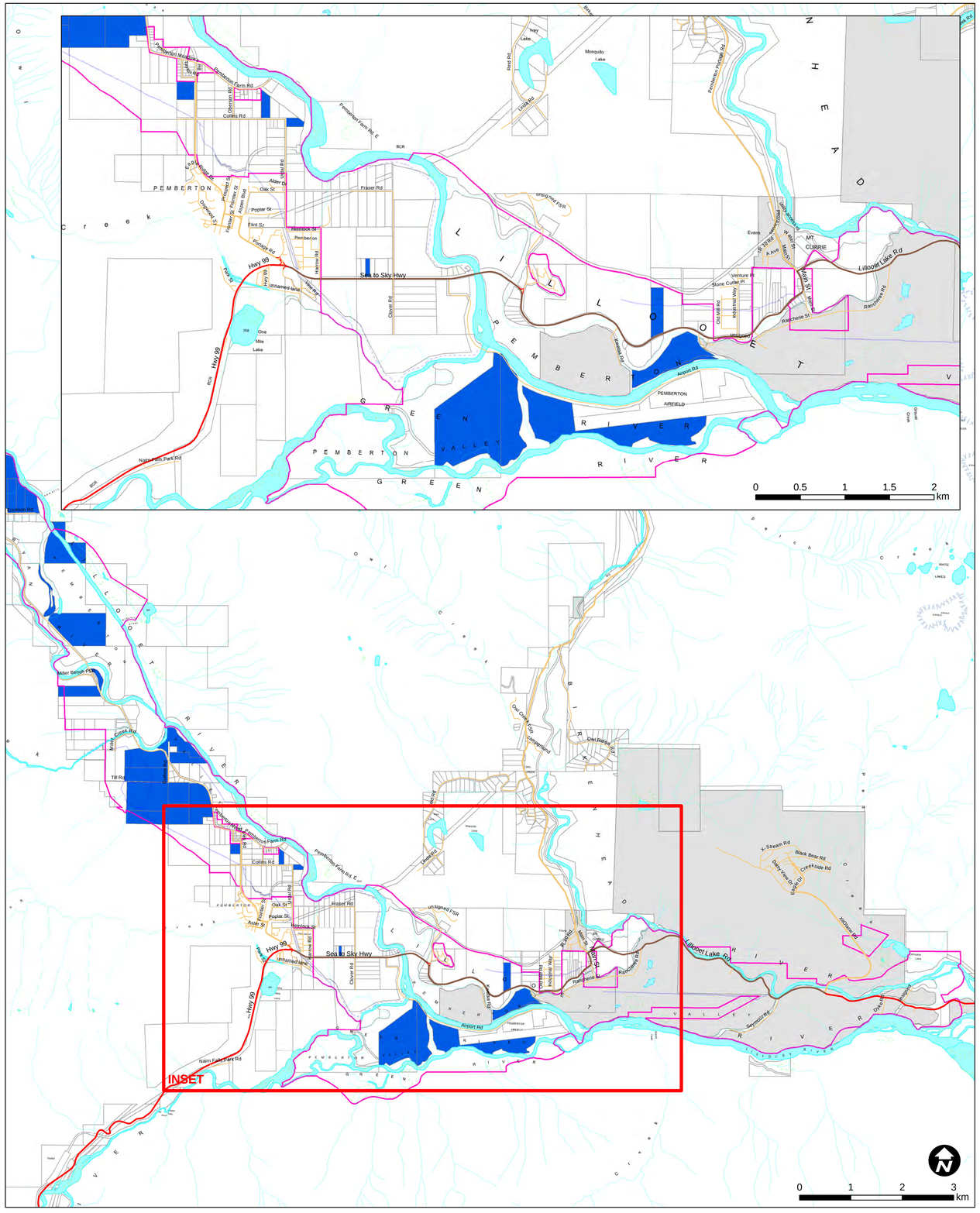
Map 9. Parcels with vegetable crop storage infrastructure



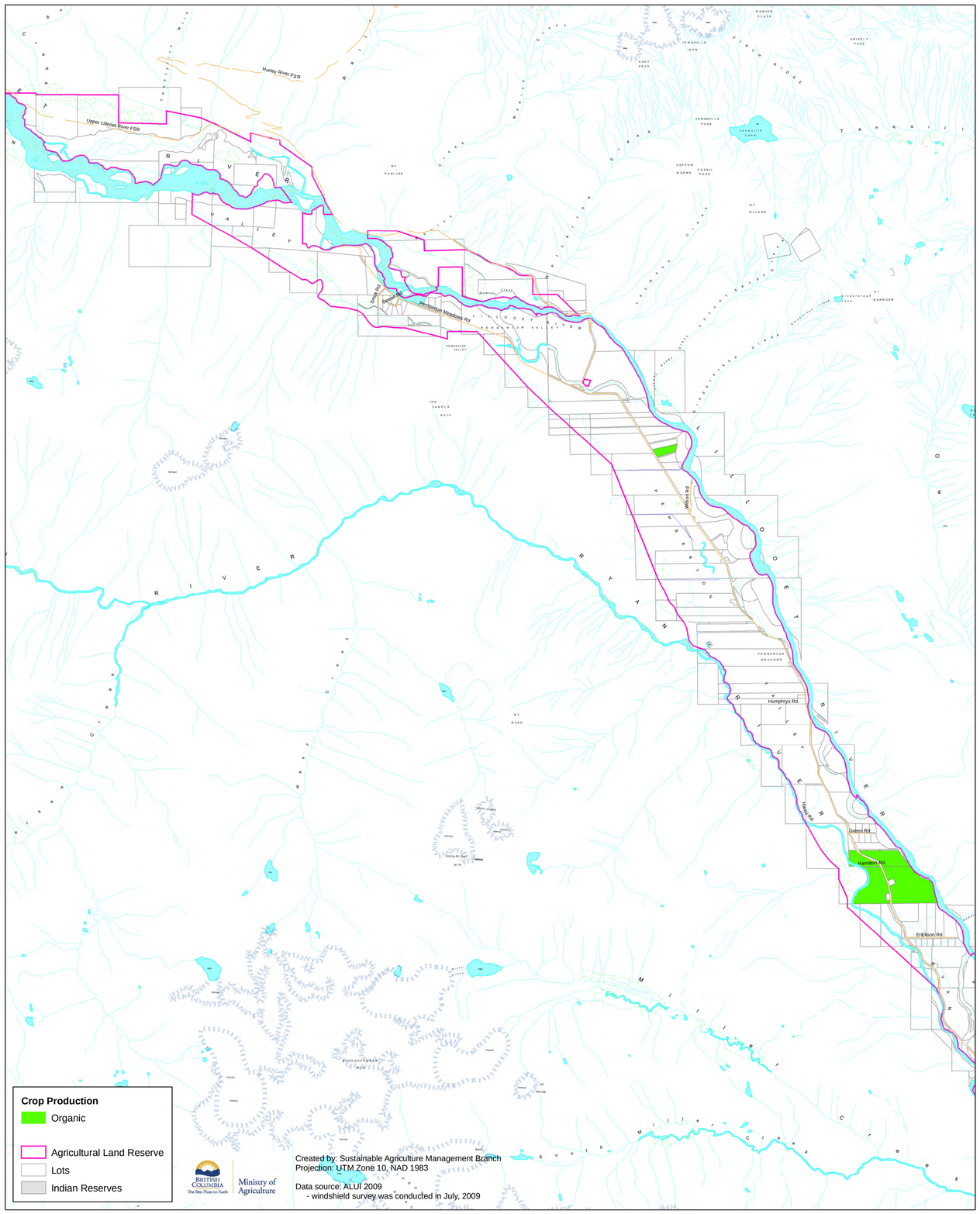

Pemberton Meadows Rd
Pemberton Farm Rd
Collins Rd
Pemberton Farm Rd E
Fraser Rd
Alder Dr
Oak St
Poplar St
Birch St
Hemlock St
Pemberton
Portage Rd
Prospect St
Church St
Frontier St
Dogwood St
Aspen Blvd
Cedar Rd
Flint St
Park Dr
Hwy 99
Unnamed lane
Cloverley Rd
Clover Rd
Nairn Falls Park Rd
Erickson Rd
Miller Bench FSR
Black Creek Rd
Till Rd
Lillooet River FSR
Rimrock Rd
Tenquille Lake FSR
Mosquito Lake
Reid Rd
Tenas Rd
Pemberton Portage Rd
Evans
MT. CURRIE
Lillooet Lake Rd
Venture Pl
Stone Cuillin Pl
Ostler Rd
Andrinal Way
Watchene St
Mt Currie
Airport Rd
PEMBERTON AIRFIELD
Sea to Sky Hwy
Ryan Rd
Ranchero Rd
Ranchero Pl
Indianola Way
Ostler Rd
Owl Creek Forest Service Road
Deer Ridge Rd
Creekside Rd
Black Bear Rd
Deer View Dr
Eagle Dr
Stream Rd
Soo Creek Rd
Soo Creek Forest Service Road
Soo Creek Rd
Soo Creek Forest Service Road
Soo Creek Rd
Soo Creek Forest Service Road

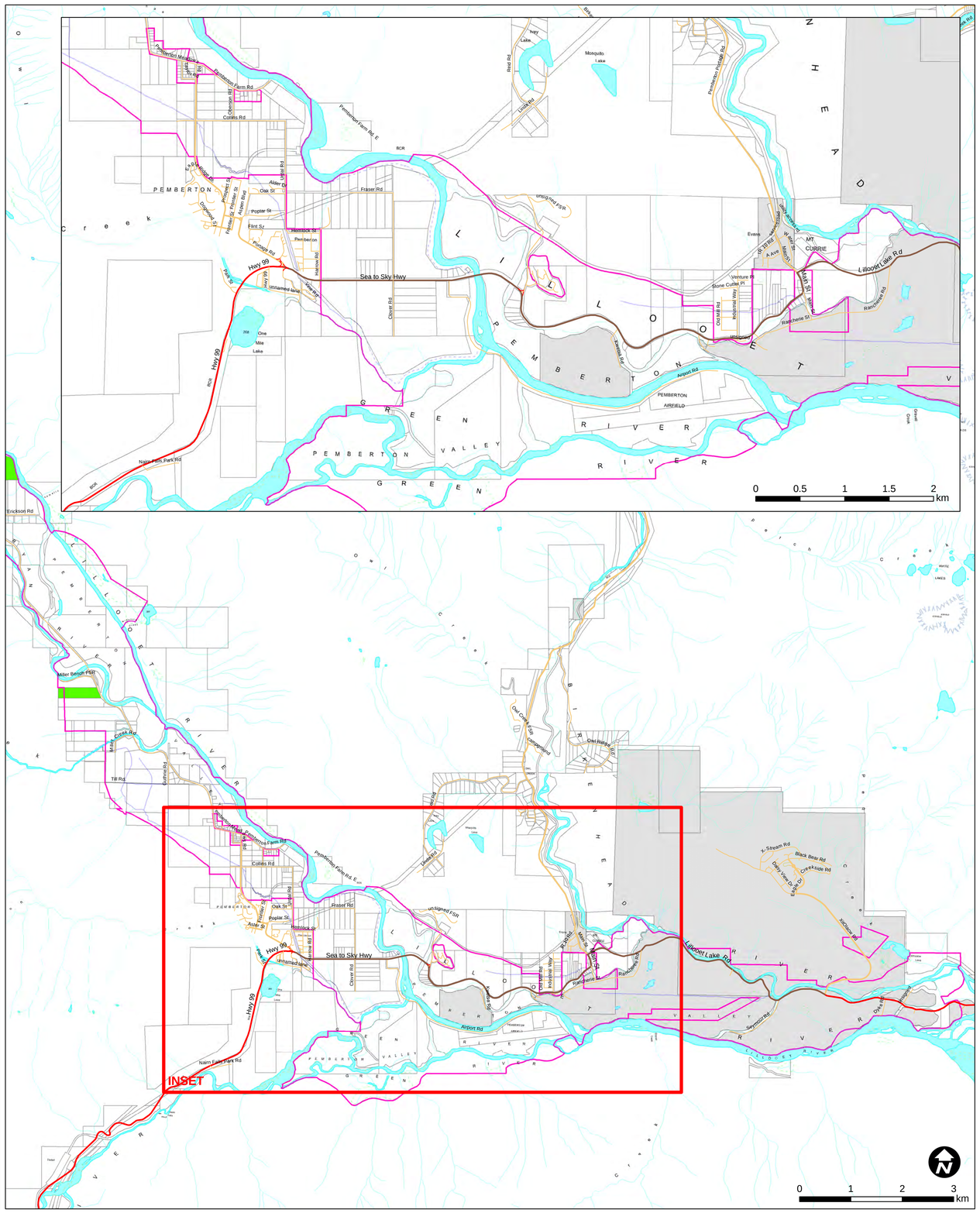
Map 10. Parcels with irrigation systems



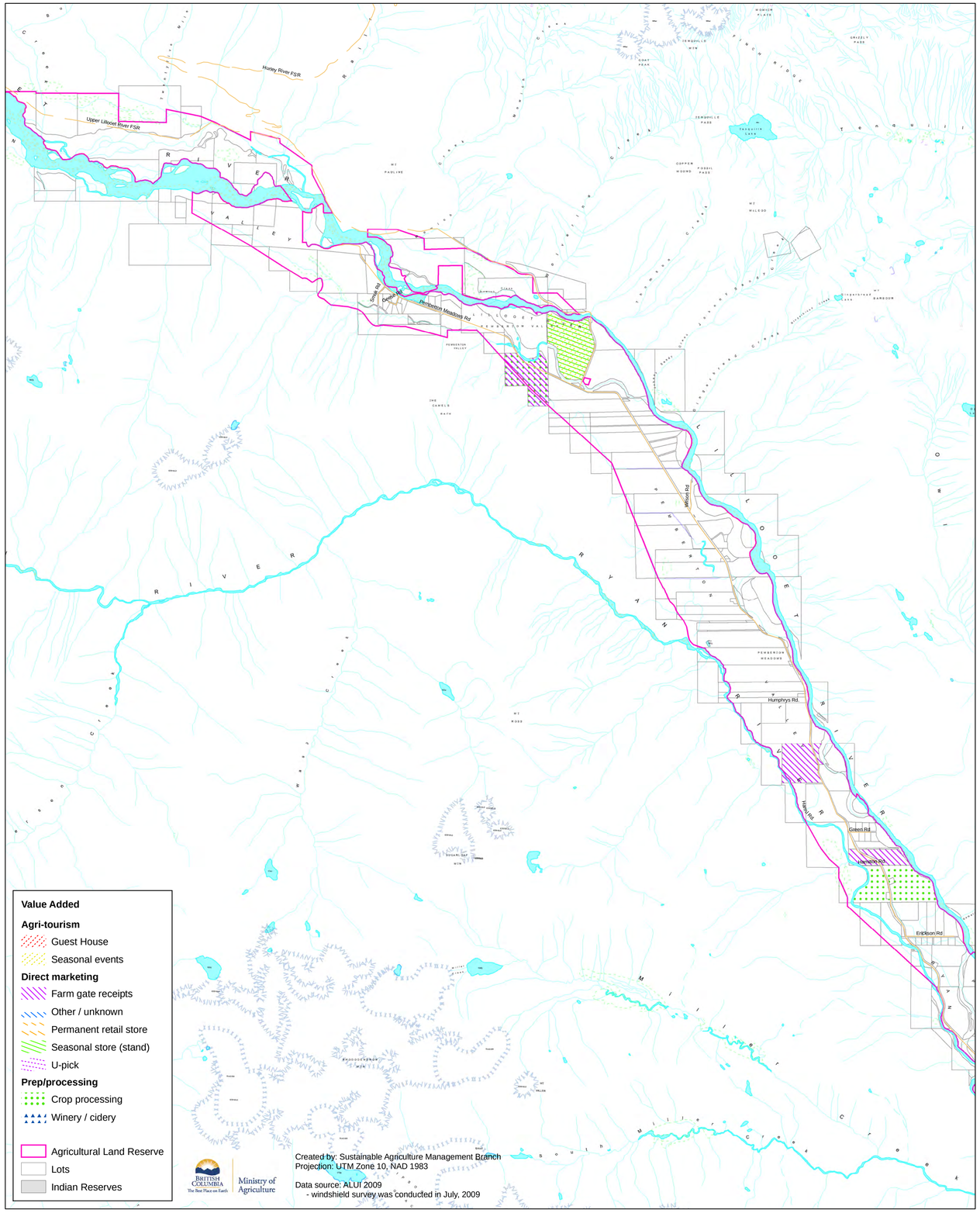


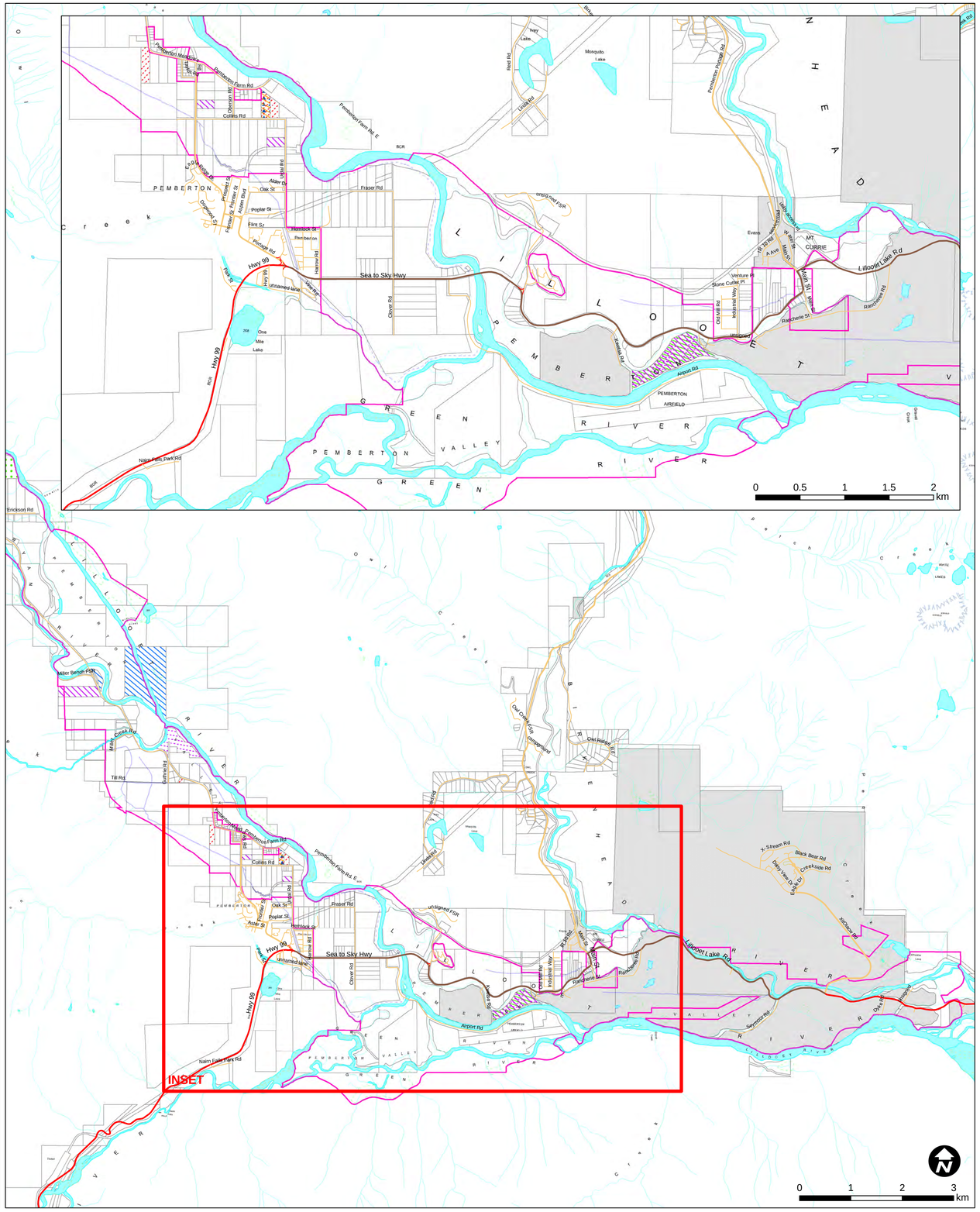
Map 11. Parcels classified as organic

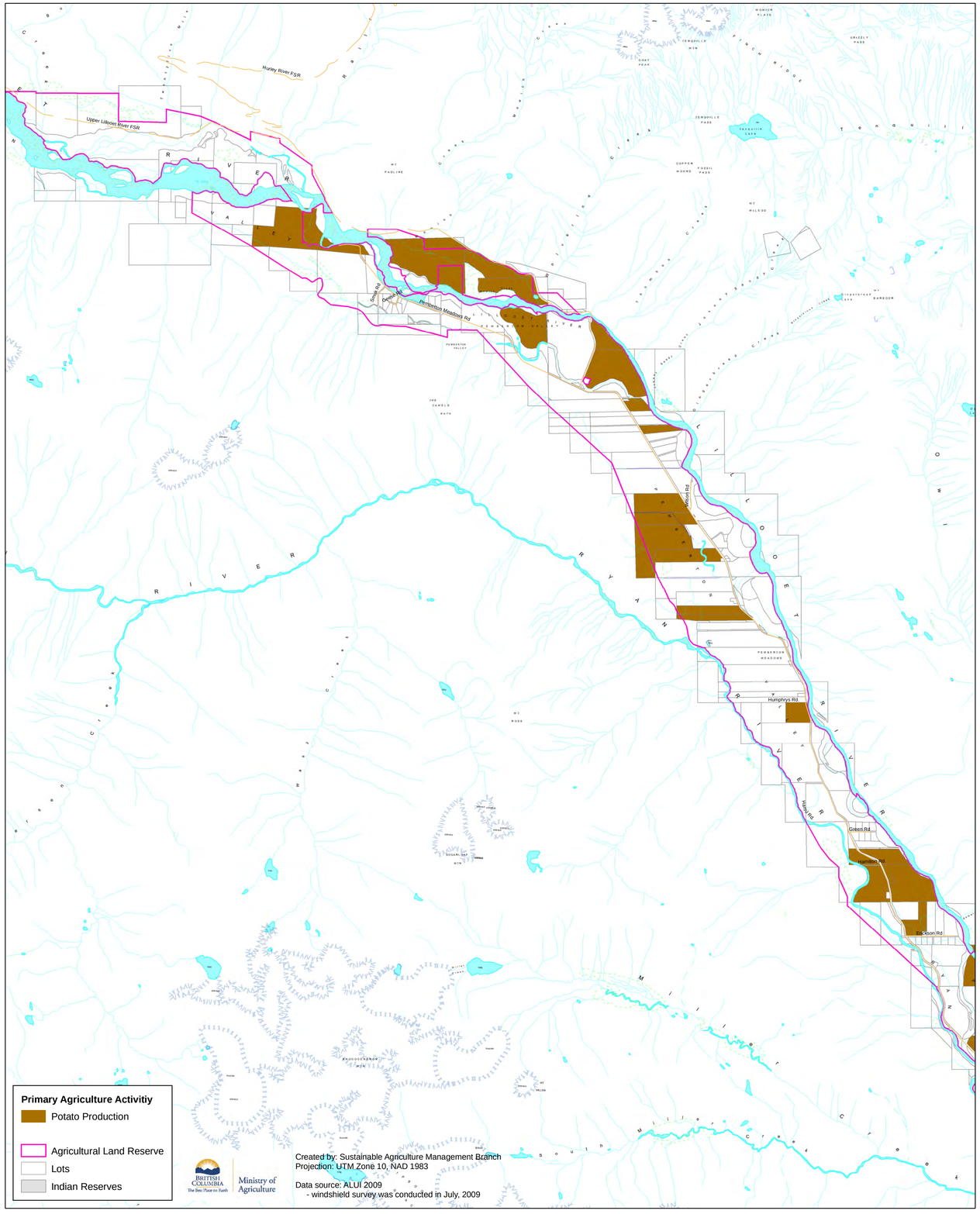


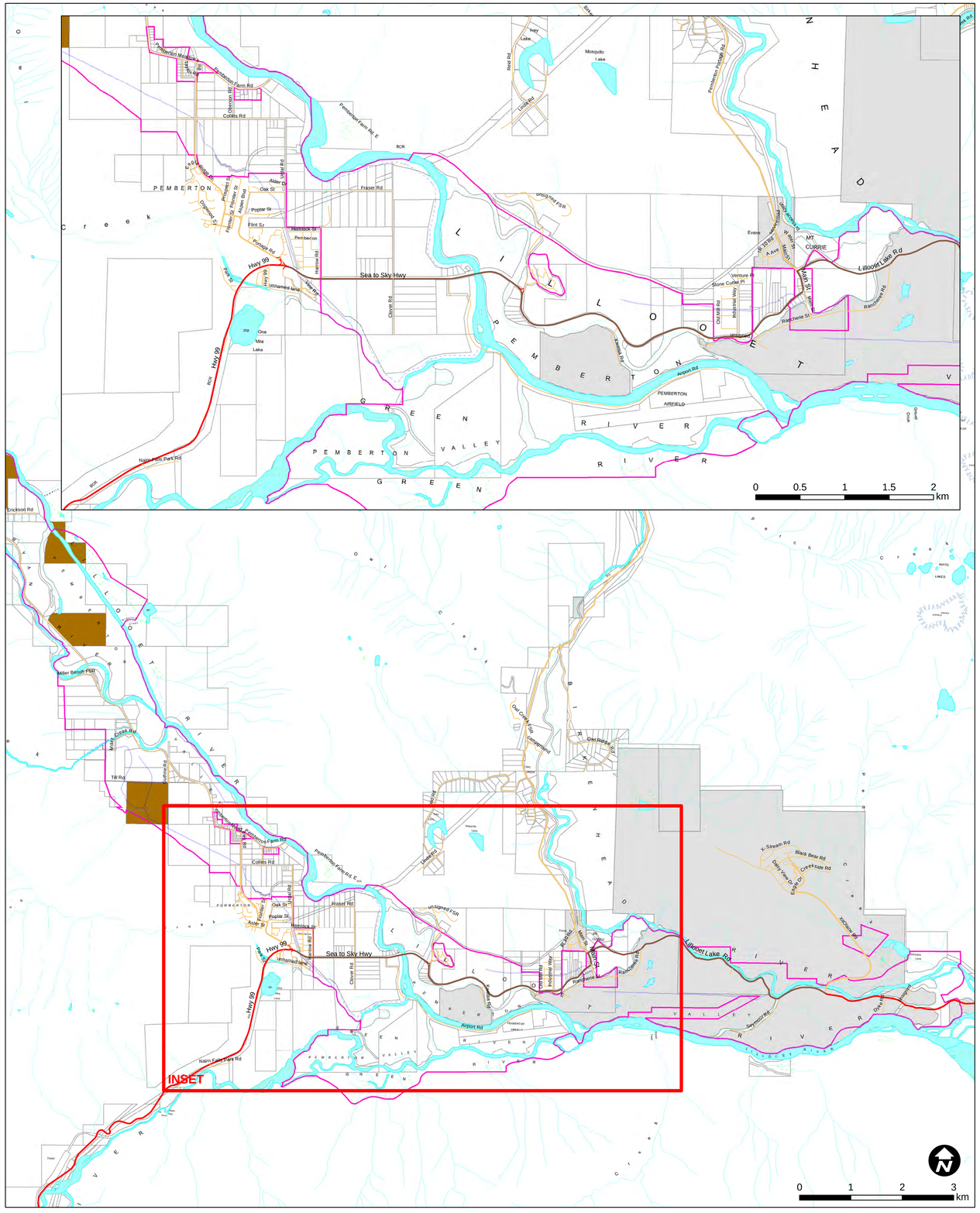


Map 12. Parcels with value added activities









Map 13. Parcels with potato production as the primary agriculture activity

Created by: Sustainable Agriculture Management Branch
Projection: UTM Zone 10, NAD 1983

Data source: ALUI 2009
- windshield survey was conducted in July, 2009

Appendix ": 3 7 / 4 Analysis

Strengths, Weaknesses, Opportunities and Threats of Pemberton Valley Agriculture

Strengths

- Fertile soils
- Excellent growing conditions
- Pristine water and food growing environment
- Local secure supply of fresh food
- Natural biosecurity afforded by the isolation of the Valley
- Close proximity to Whistler and Vancouver area markets
- Growing local economy and associated economic opportunity
- Knowledgeable farmers with significant assets on the ground

Weaknesses

- ALR being increasingly used for non-food agricultural purposes
- Perceived negative environmental impact of agriculture
- Lack of respect for farmers and agriculture
- Lack of public understanding of impacts on agriculture
- Perceived absence of tolerance/compatibility between organic and conventional production practices
- Complex governance related to agricultural planning and implementation
- Absence of local plant or animal processing
- Limited local agricultural diversity
- Inadequate agricultural infrastructure, such as drainage, flood control, and irrigation

Opportunities

- Contribute to local and regional food security
- Develop local markets
- Protect and market biosecurity
- Open up more ALR for agriculture
- Plan agro-tourism to generate broad benefits to the agricultural sector
- Attract and develop value-added enterprise

Threats/Challenges

- Developing a sustainable balance between Village of Pemberton growth, erosion and encumbrance of ALR land by government, and the protection of ALR for working agriculture
- Developing a sustainable balance between recreational users and agricultural land use
- Developing a sustainable balance between agro-tourism and other agricultural sectors
- Developing a sustainable balance between new resident pressure, rural-residential expansion, and farming access to the agricultural land base
- Introduction of noxious weed and invasive species
- High land costs undermining the economic sustainability and future viability of farming
- Poor recruitment of new farmers

Appendix #: Preliminary Market Opportunities Analysis

Market Opportunities Analysis – January, 2010

1.0 Production – Relative Strengths

- Clean growing environment image
- Safe, healthy products
- Superior natural inputs, e.g., water, soil, air
- Local origin

2.0 Production – Relative Weaknesses

- Later growing season
- Shorter growing season
- Smaller scale – higher unit cost

3.0 Market Area Parameters

The food market opportunities for agricultural production from the Pemberton value are a function of:

- Size of local markets (Pemberton and Whistler)
- Size of regional markets (Squamish and Lillooet)
- Immediate "export" markets (Vancouver, Lower Mainland, Vancouver Island)

4.0 Potential Target Markets

4.1 Farm-Based Food Markets

- Local fresh food sales (wholesale, Farmers Market, farm-direct)
- Regional fresh food sales (wholesale, Farmers Markets)
- Agri-tourism fresh food sales (Farmers Markets, direct farm marketing)

4.1.1 Fresh Horticultural Food Markets

- Vegetable production
- Baby vegetable production
- Intensive horticulture (greenhouse vegetable, herbs, mushrooms)
- Honey

4.1.2 Primary Processing Food Markets

- Vegetable and fruit primary processing (grading, washing, packaging)
- Meat slaughter (chickens, turkeys, , beef, sheep, hog, specialty, other)
- Dairy (milk)
- Eggs

4.1.3 Value-Added Secondary Processing Food Markets

- Vegetable and fruit value-added (frozen, dried, preserves)
- Meat further processing (smoked, cured, sausages)
- Baking, prepared foods

4.2 Farm-Based Non-Food Markets

4.2.1 Inputs Supply

- Vegetable seed production (heirloom varieties, organic seeds stock, non-GMO seeds, GMO - enhanced seeds, indigenous seed stock, specialty mushrooms, rare/unusual seeds, wildflower seeds, early maturity seed stock, cold weather adapted seed stock, drought tolerant seed stock)
- Propagation (bedding plants)

4.2.2 Non-food products

- Local and regional non-food products (flowers, ornamental nursery, native plants, bulbs)
- Intensive horticulture (floriculture)
- Oilseed and biomass biofuels
- Fibre (hemp, agro-forestry)
- Agri-tourism value-added (crafts)

4.2.3 Services

- Agri-tourism services (bed & breakfast)
- Trails use
- Equestrian riding, stables
- Petting stables
- U-pick

4.2.4 Animal Feeds

- Alfalfa
- Hay
- Cereal grains

5.0 Regional Food Consumption

The current regional population has been estimated in Table 1. Whistler tourism has been represented as a daily population “equivalent”. Based on a possible market of approximately 66,000 persons, estimated annual regional food demand is presented in Table 2.

Table 1: Regional Population in the Vicinity of the Pemberton Valley

Location	Population	
Squamish Lillooet Regional District (2008)(1)	37,385	
Whistler (tourism daily equivalent) (2)	28,304	
Total		**66,124**

Sources:

(1) 2009 estimate. www.whistler.ca

(2) BC Stats
http://www.bcstats.gov.bc.ca/DATA/pop/pop/dynamic/PopulationStatistics/SelectRegionType.asp?category=Census

Table 2: Estimated Annual Regional Consumption of Food Products (based on total population in Table 1)

Category	Item	Litres	Tonnes	Dozen
Dairy	Fluid milk	5,255,000		
	Cheese		901	
	Cream	612,000		
	Butter		114	
	Other dairy		1,208	
Eggs				640,400
Red Meat	Beef		2,024	
	Pork		1,632	
	Mutton/lamb		82	
	Veal		71	
Poultry	Chicken		2,093	
	Turkey		297	
Fresh Vegetables			7,364	
	Beans		66	
	Broccoli		205	
	Cabbage		315	
	Carrots		486	
	Corn		138	
	Garlic		30	
	Lettuce		667	
	Onions		574	
	Peppers		245	
	Potatoes		4,303	
	Rutabaga		82	
	Tomatoes		540	
Total Fresh Fruit			1,405	
	Blueberries		63	
	Melons		700	
	Raspberries		n/a	
	Strawberries		202	

Sources: Statistics Canada. 2007. Canadian Foods Statistics. Catalogue no. 21-020-X. Volumes are based on Canadian per capita consumption.
Notes: n/a = Not available

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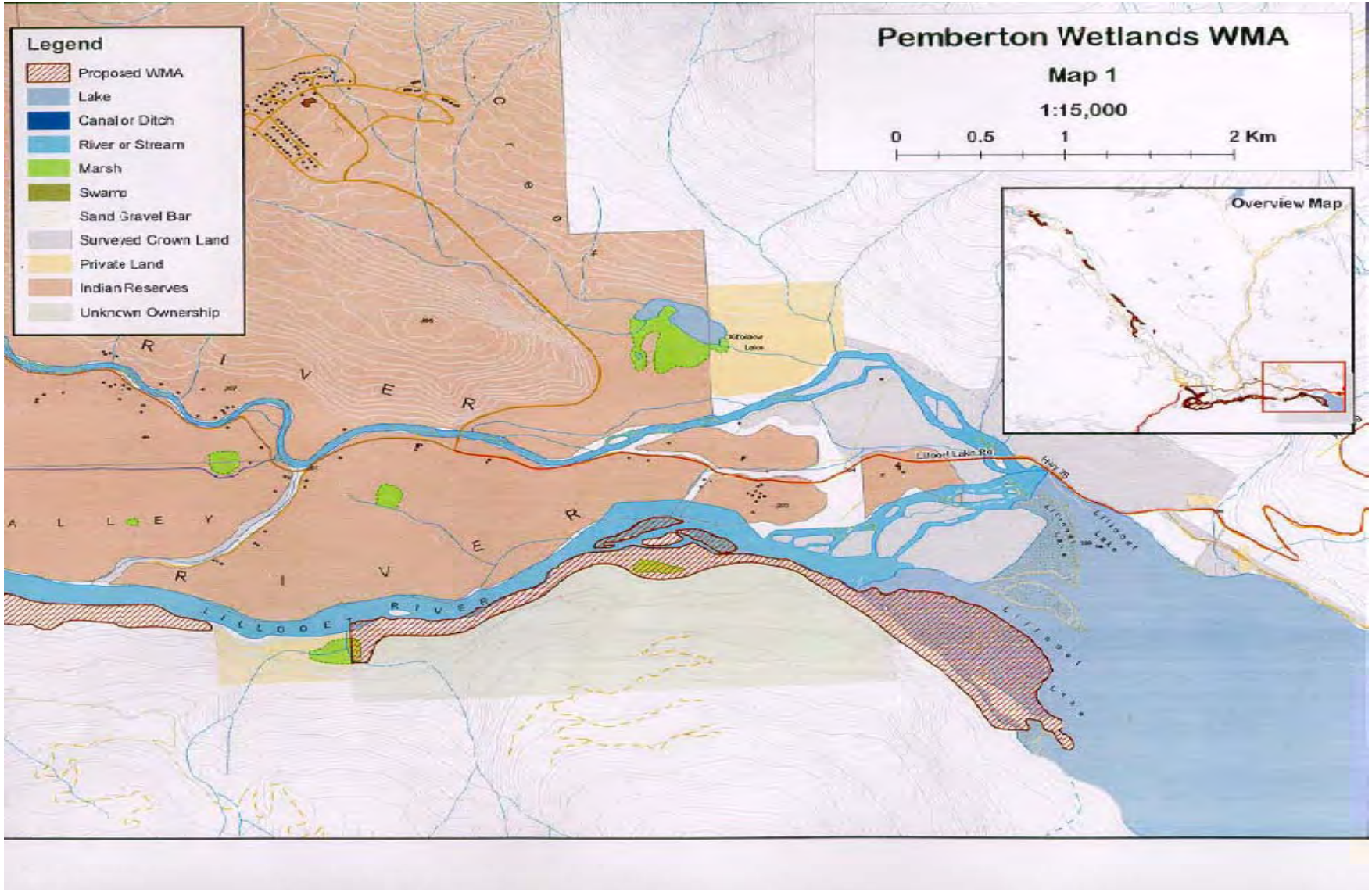

Figure 2-2a: Proposed Wildlife Management Areas in the Pemberton Valley.
(Source: Ministry of Environment. 2009. Environmental Stewardship and Protected Areas Division. Proposed Pemberton Wetlands Wildlife Management Area)

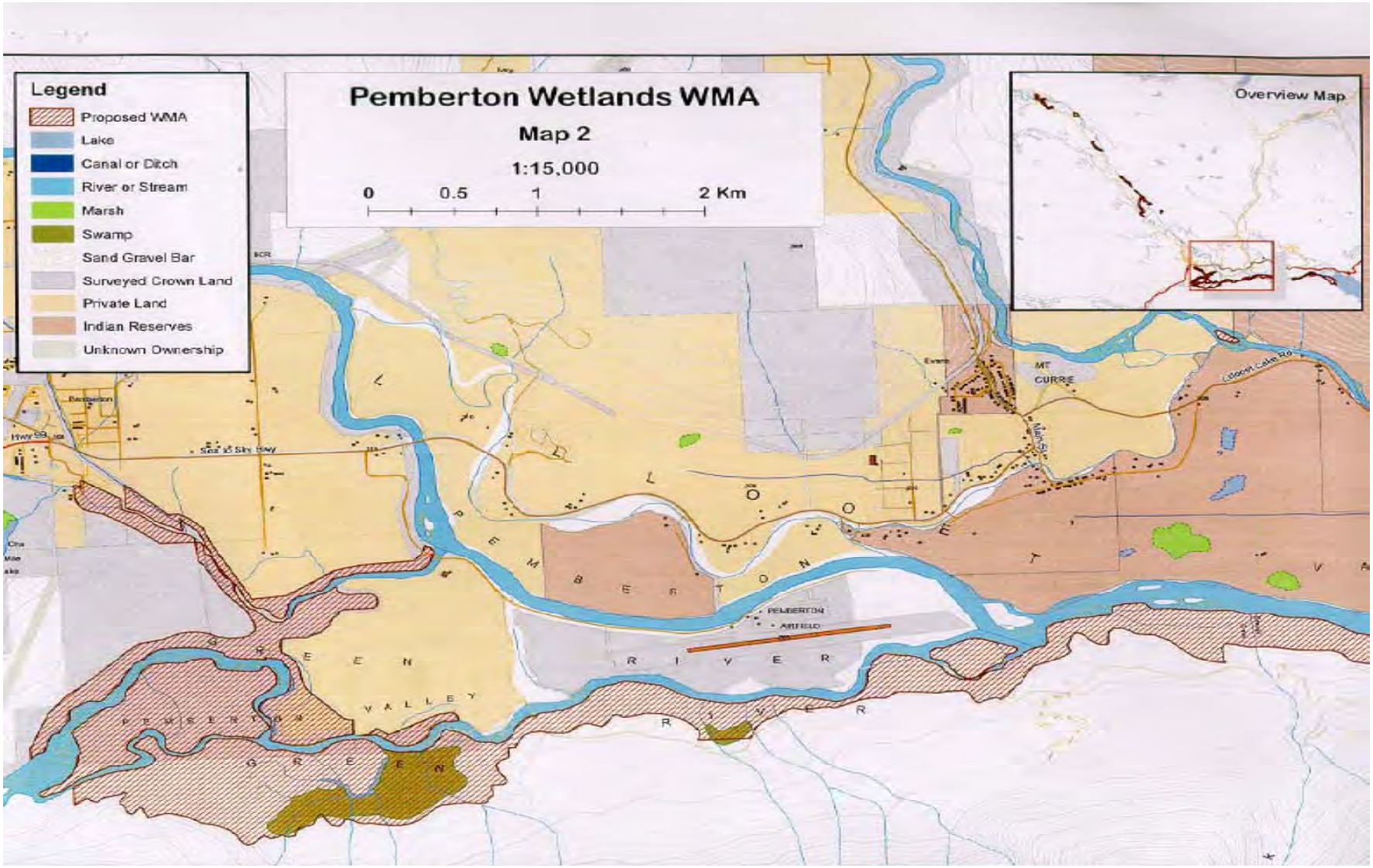

Figure 2-2b: Proposed Wildlife Management Areas in the Pemberton Valley
(Source: Ministry of Environment. 2009. Environmental Stewardship and Protected Areas Division. Proposed Pemberton Wetlands Wildlife Management Area)

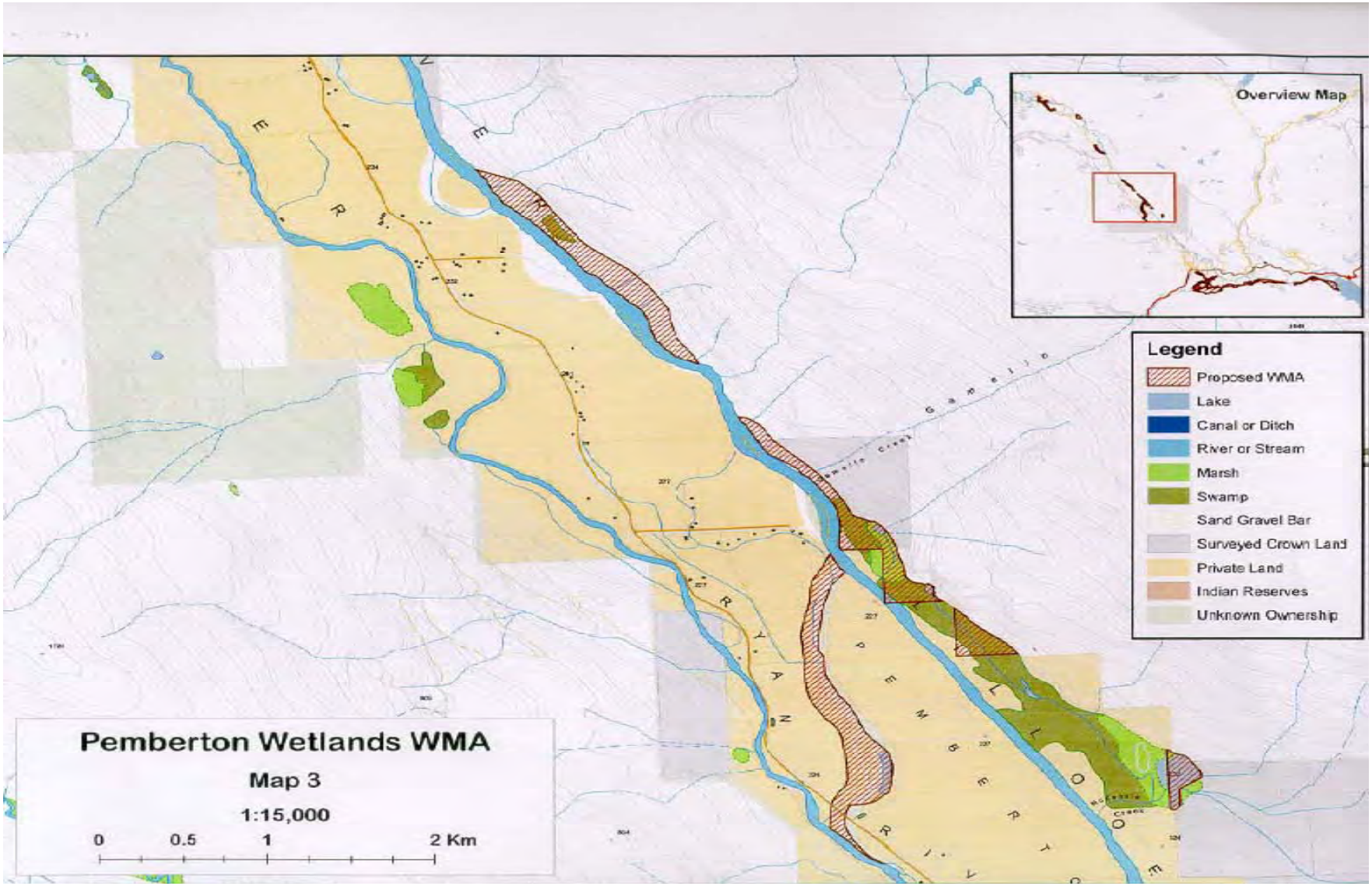

Figure 2-2c: Proposed Wildlife Management Areas in the Pemberton Valley
(Source: Ministry of Environment. 2009. Environmental Stewardship and Protected Areas Division. Proposed Pemberton Wetlands Wildlife Management Area)

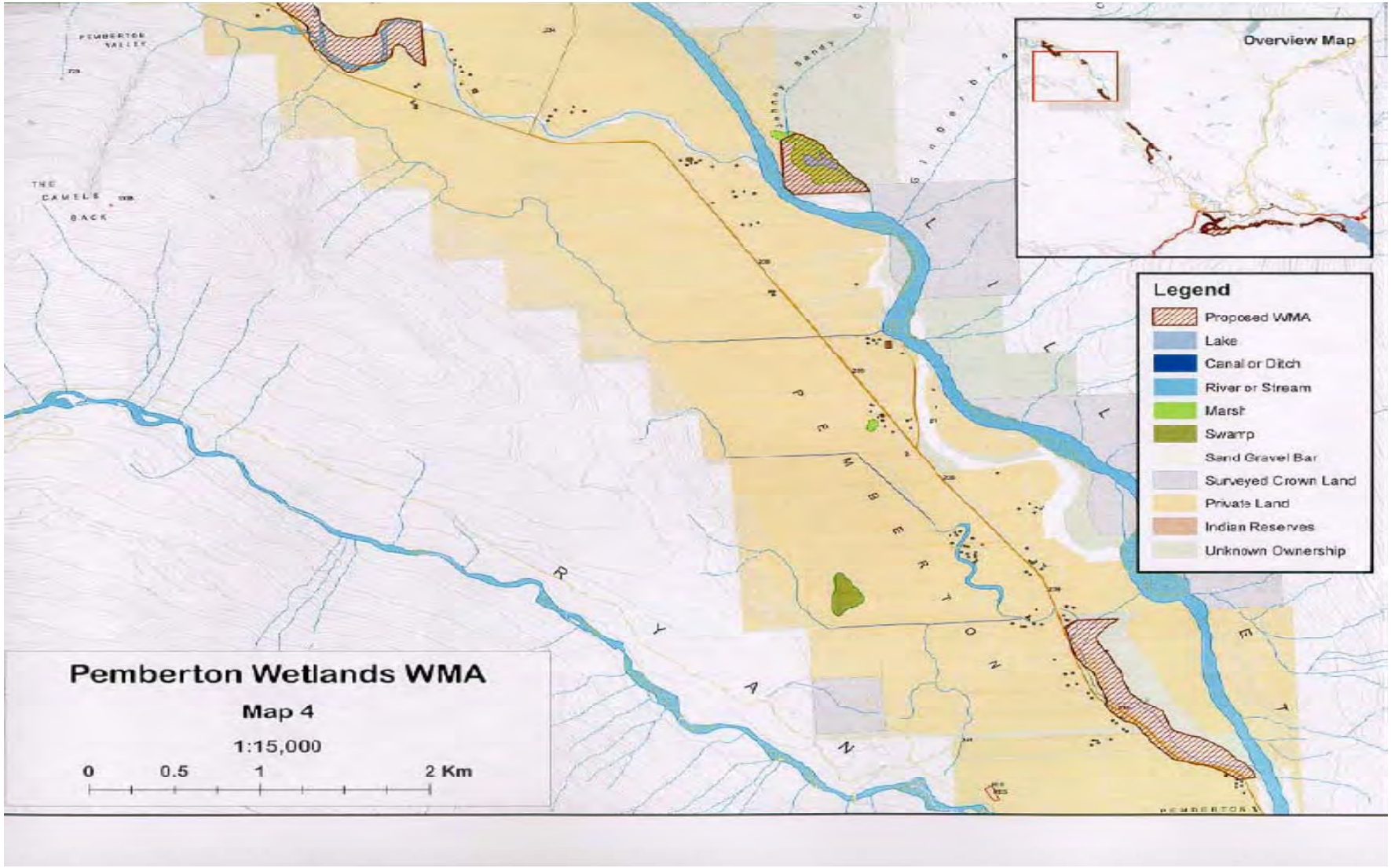

Figure 2-2d: Proposed Wildlife Management Areas in the Pemberton Valley
(Source: Ministry of Environment. 2009. Environmental Stewardship and Protected Areas Division. Proposed Pemberton Wetlands Wildlife Management Area)

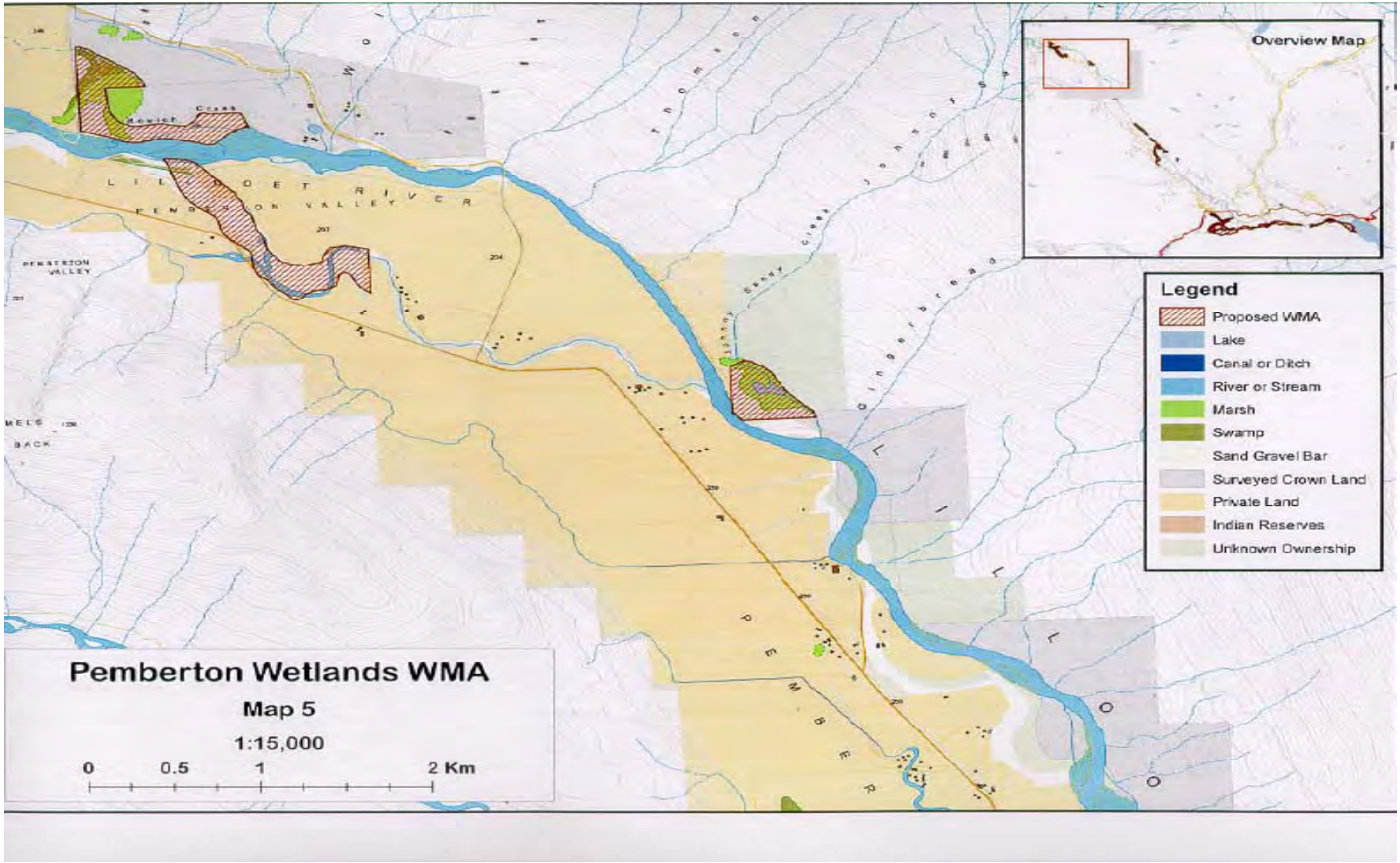

Figure 2-2e: Proposed Wildlife Management Areas in the Pemberton Valley
(Source: Ministry of Environment. 2009. Environmental Stewardship and Protected Areas Division. Proposed Pemberton Wetlands Wildlife Management Area)

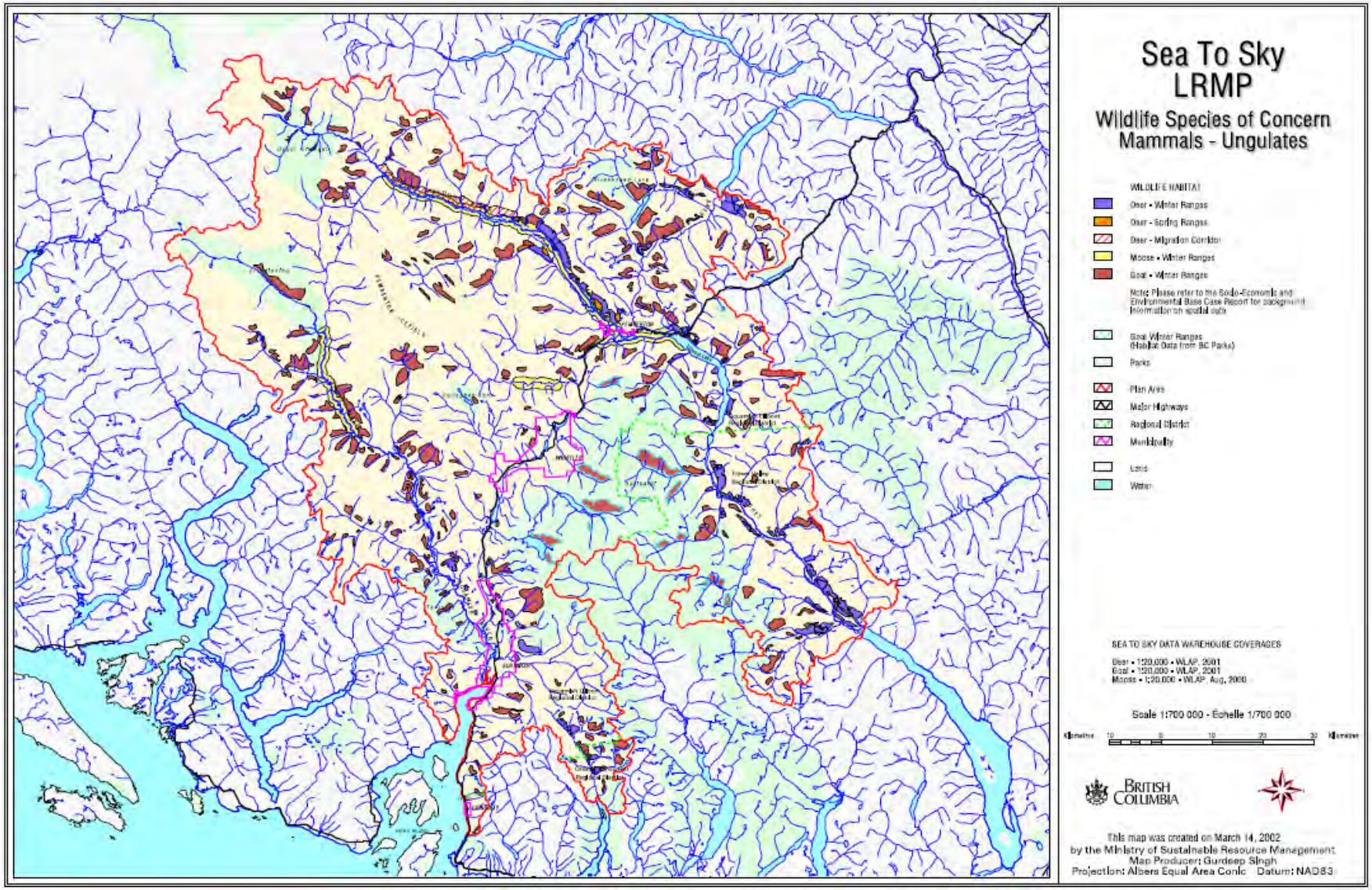

Figure 2-3: Sea To Sky: Ungulate Wildlife Species of Concern.
(Source: Sea to Sky LRMP. http://www.shim.bc.ca/atlases/sea2sky/webAtlas/contextmaps/Wildlife.pdf)

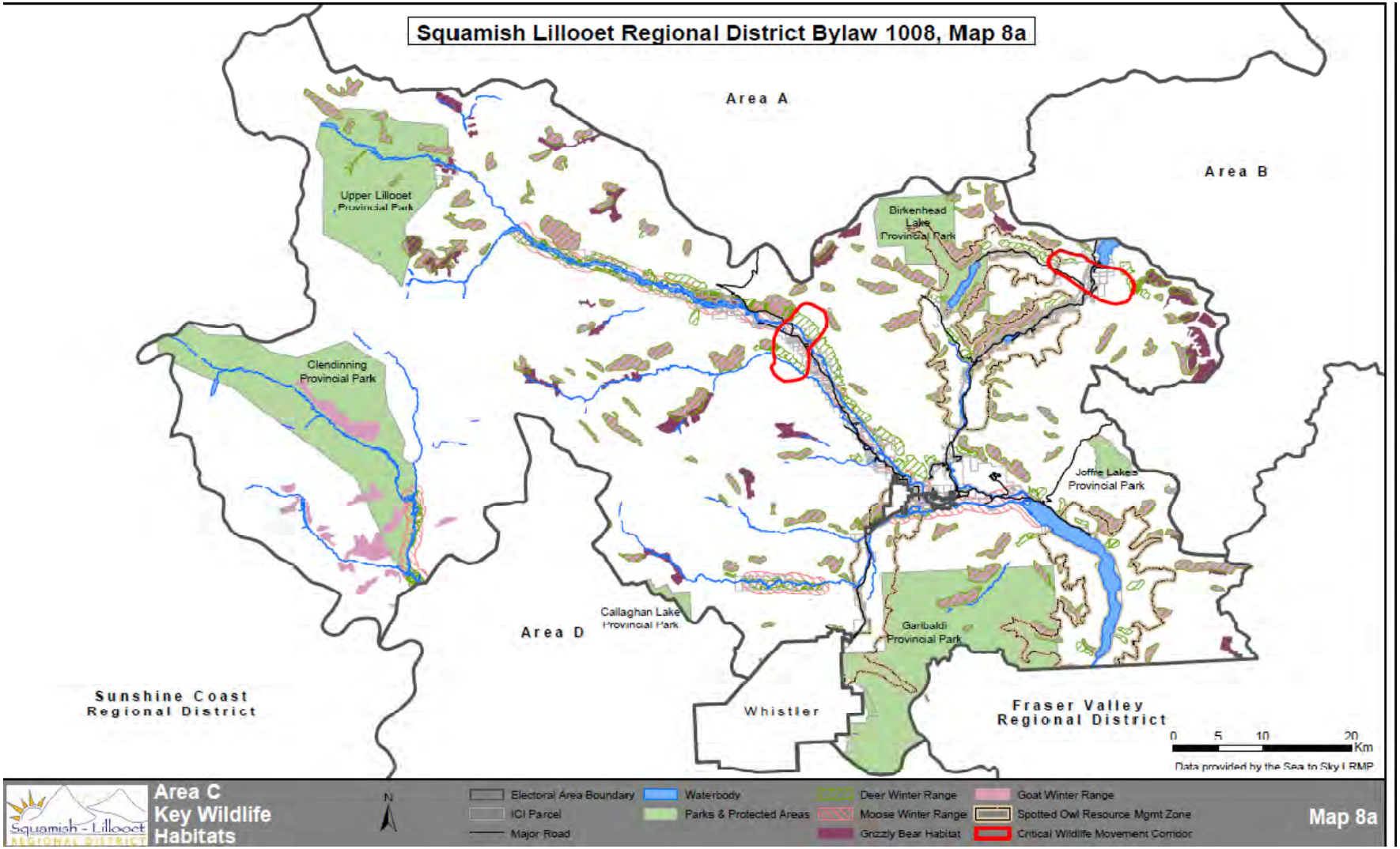

Figure 2-4: Critical Wildlife Movement Corridor in the Pemberton Valley
(Source: Squamish Lillooet Regional District Bylaw 1008. Area C Key Wildlife Habitats, Map 8a.
http://www.slrd.bc.ca/files/%7B2416466F-9EA0-44D0-810B-29D77D067029%7DAreaC_8aWildlife_080625.pdf

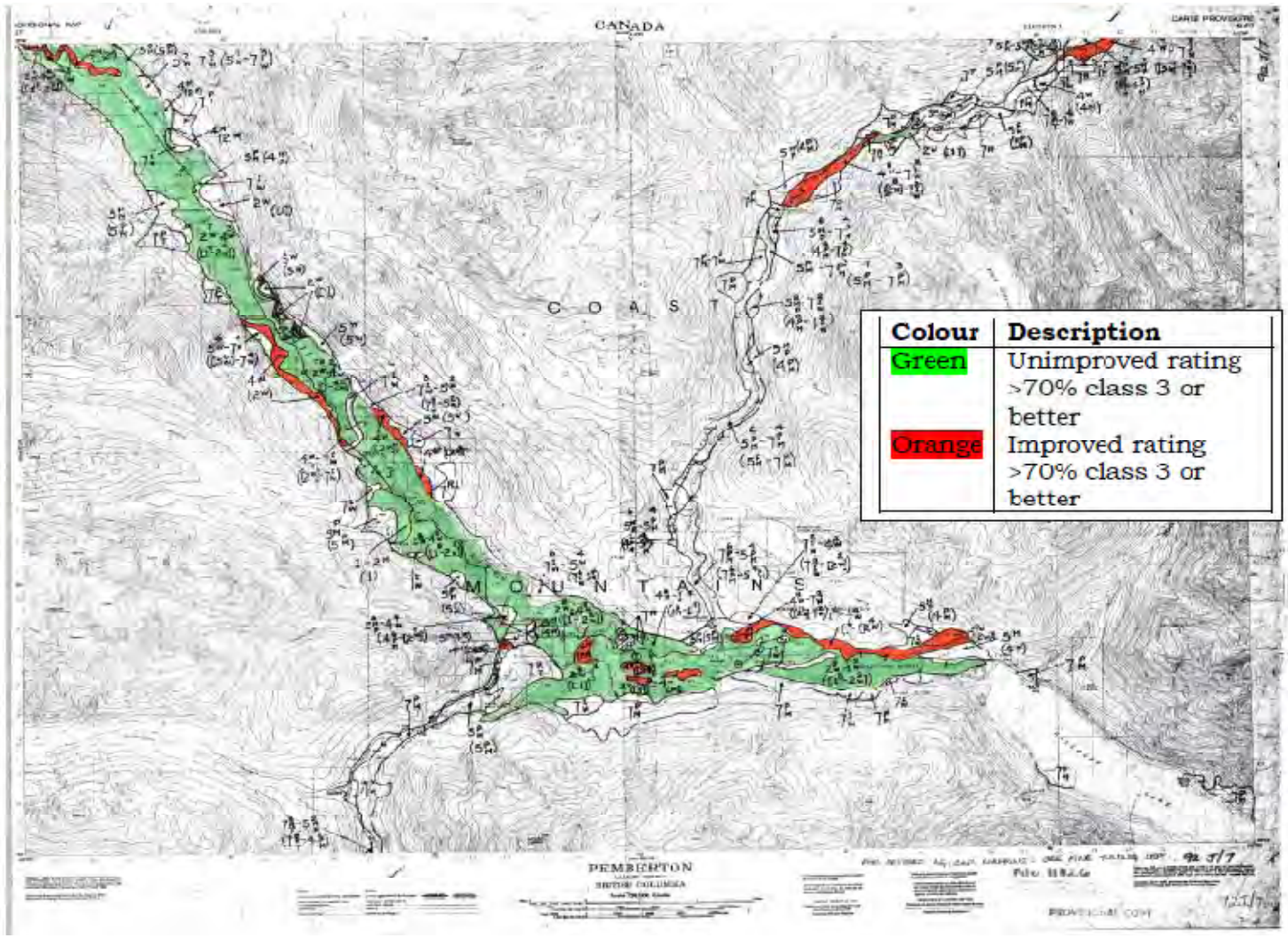

Figure 3-2: Improved and Improved Soil Capability Rating, Lower Pemberton Valley

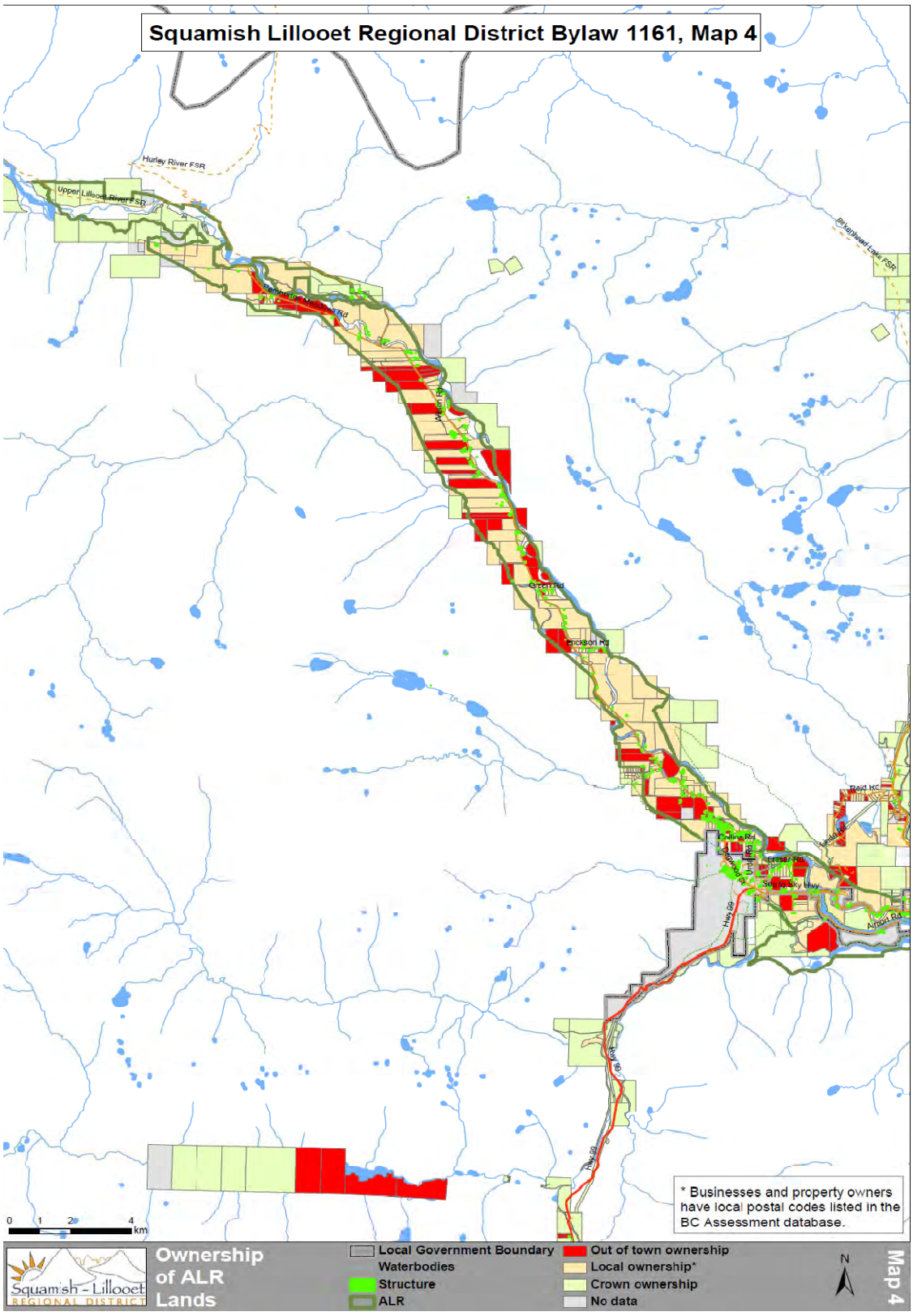

Figure 3-1: Farmland Property Ownership in the Pemberton Valley, 2009
(Source: BC Assessment)

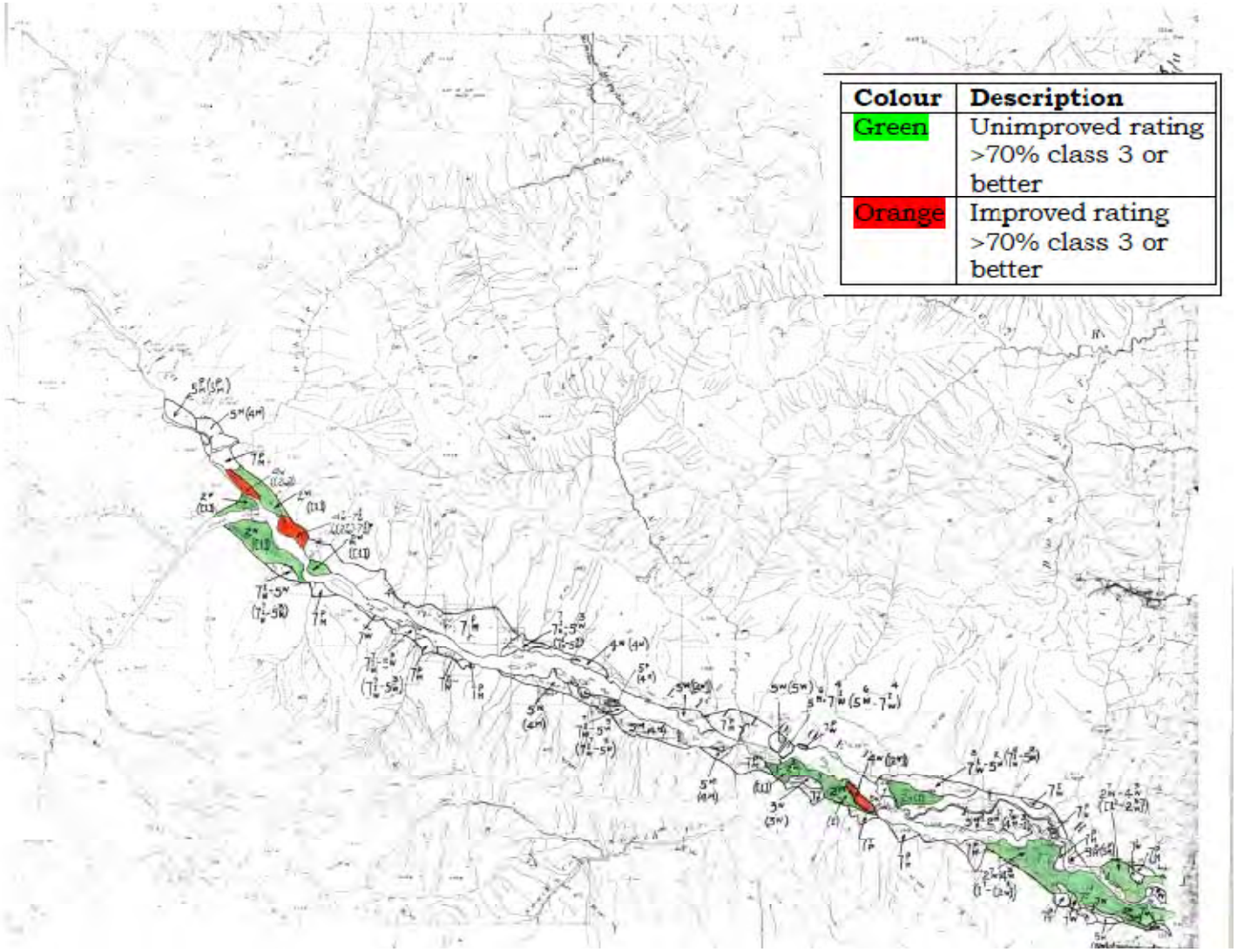

Figure 3-3: Improved and Unimproved Soil Capability Rating, Upper Pemberton Valley

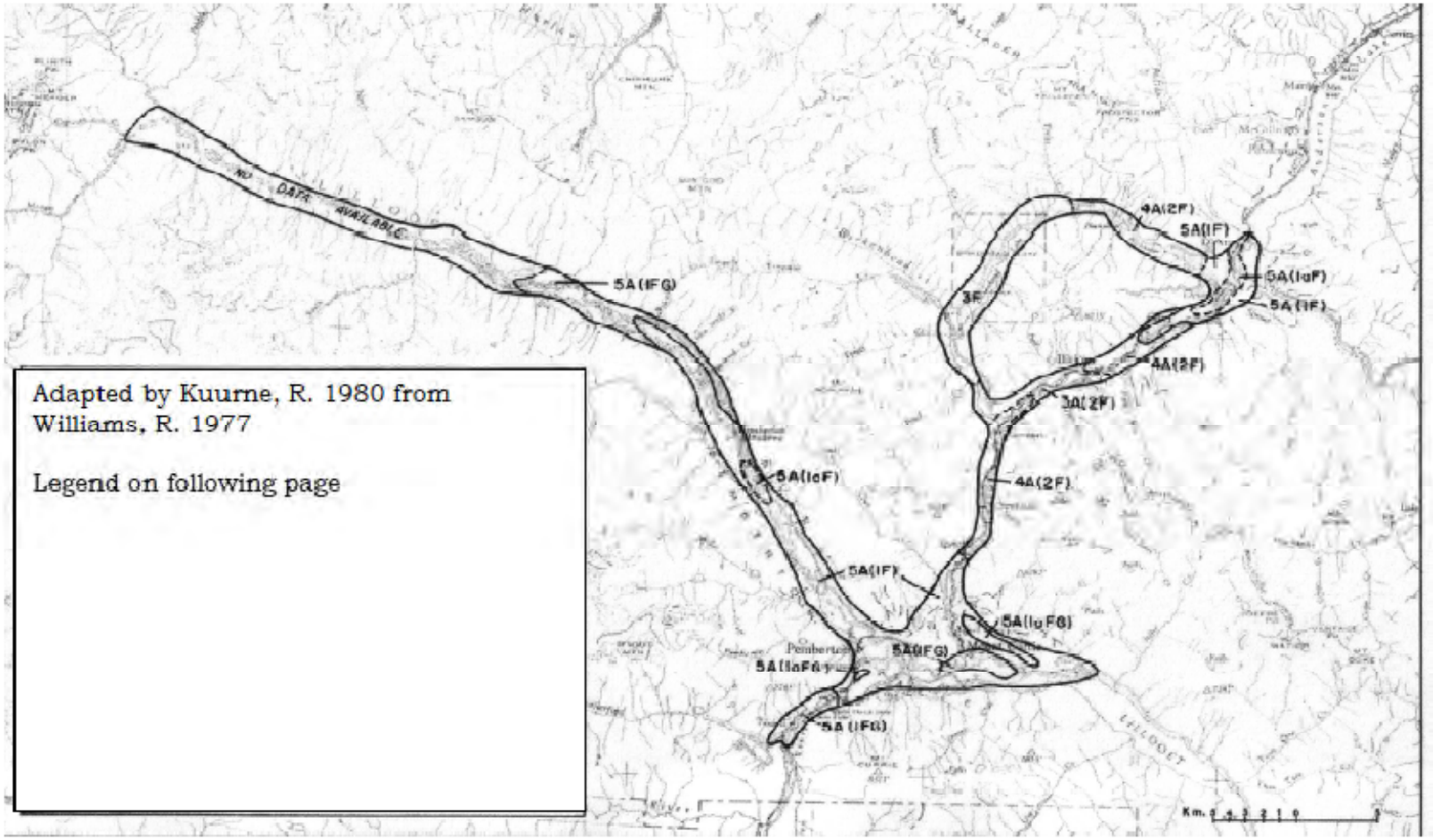

Figure 3-6: Provisional Climate Capability for Agriculture of the Pemberton Valley (from Kuurne, 1980)

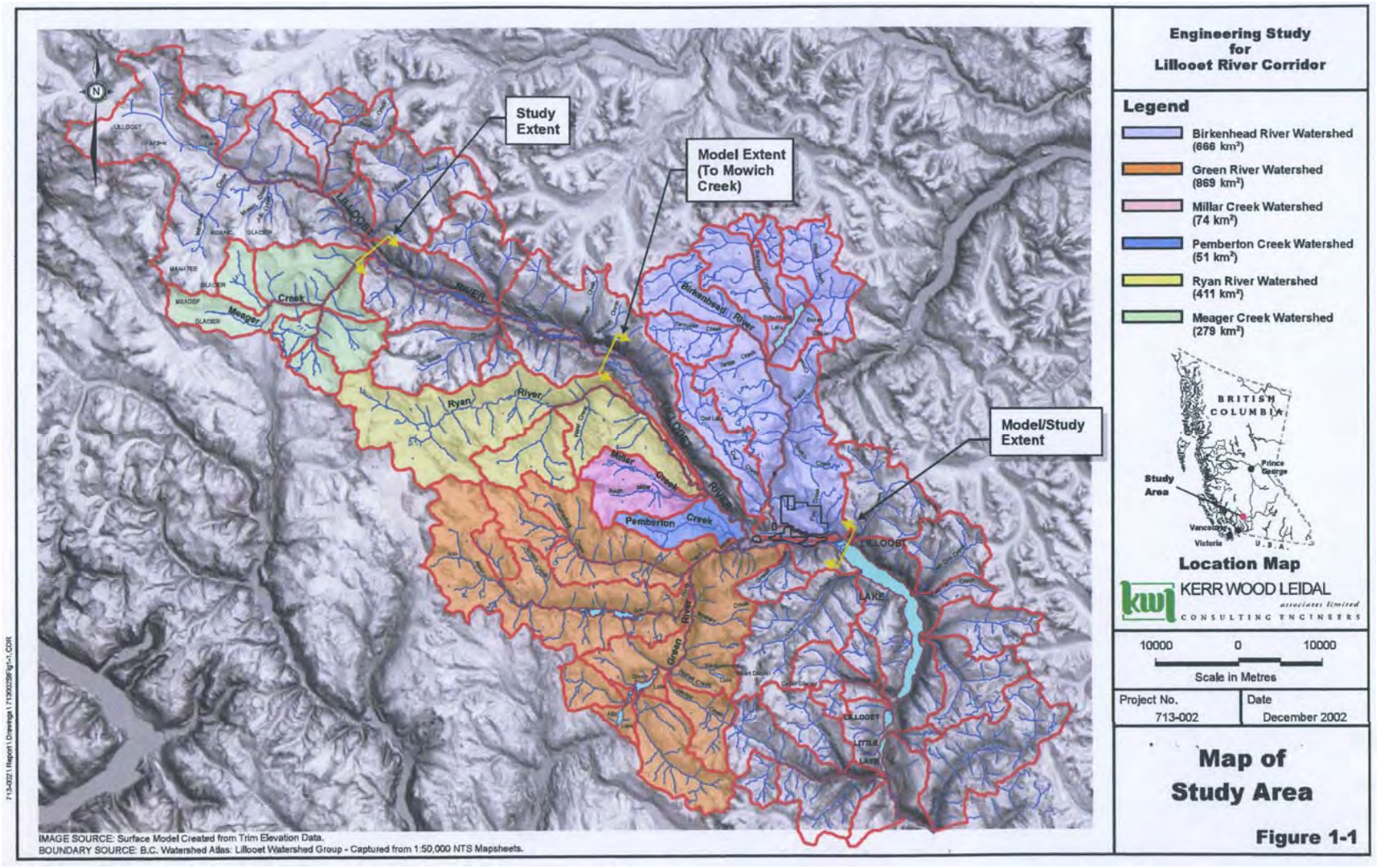

Figure 3-8: Watersheds discharging into the Lillooet River, Pemberton Valley.
Source: Kerr Wood Leidal Associates Ltd. 2005. Engineering Study for Lillooet River Corridor. http://www.pvdd.ca/files/Final-Report.pdf