EMPLOYMENT LANDS

EXPLORING WEALTH GENERATING LANDS AND RELATED INFRASTRUCTURE ASSETS IN THE COLUMBIA BASIN BOUNDARY REGION OF BC

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COLUMBIA BASIN RDI
RURAL DEVELOPMENT INSTITUTE

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Project History

The Employment Lands Geospatial Inventory project is focused on better understanding available commercial, industrial, and agricultural lands and related infrastructure and economic assets and gaps that exist in the Basin-Boundary region. With an improved understanding of the type and availability of 'wealth generating' lands and related assets the region will be in a better position to make informed decisions and attract and retain businesses and investment. The objectives of the project include:

- to produce a regional baseline employment lands, infrastructure and related economic assets inventory database and web-based geospatial tool;
- to bring together key stakeholders to generate regional discussion and analysis of the employment lands landscape; and
- assess whether there is an adequate inventory (supply) of employment lands available for the development of new or expanding investment and job creation.

The project is led by Community Futures East Kootenay and funded by the Province of BC, the Southern Interior Beetle Action Coalition, and the Columbia Basin Trust. Selkirk College's Geospatial Research Centre (SGRC) and the Columbia Basin Rural Development Institute (RDI) are undertaking the research and development activities.

Interest in this project has been sustained and enthusiastic. Many potential partners are making themselves known. Existing stakeholders have been actively cooperative and enormously helpful. With attention to planning growing, as evidenced by the nearly universal development of Official Community Plans (OCPs) throughout the Columbia Basin Boundary region, stakeholders see the value in this product. This recognition of value has driven the high level of participation and cooperation.

The Regional Employment Lands Advisory Group, comprised of local government staff, elected officials and economic development officers, has advised on the general development of the project and its product development. This report constitutes the Final Report to the Advisory Committee for the Employment Lands Project. While this report represents the final official submission to the Advisory Committee and funding partners, the RDI plans to keep the Committee informed of future findings and development of the tool and its uses.

This report is intended to outline preliminary findings based on available data[1], demonstrate the employment lands GIS system capacity for analysis, to make some recommendations concerning the query function of the on-line tool, and to provide

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[1] Data acquisition and cleaning has taken considerable time and will be an ongoing pursuit for the lifetime of this project. However, there is currently sufficient data to test the functionality of the tool and to demonstrate its capabilities.

recommendations for the next phase of the project[2]. Because this is a unique GIS product, offering little guidance from best-practices, this report is also intended to stimulate discussion and input from stakeholders on the usefulness of the tool and its functionality. This report is not intended to offer any policy or planning recommendations.

This report provides a brief discussion of the specific regional context, a discussion of the relevant policy questions posed, a description of the Employment Lands team's approach to answer these questions, a technical description of the approach that was used, preliminary findings from the blended economic development-GIS analysis and treatment of required caveats, a discussion regarding the on-going development of the 'Digital Basin' platform, and some recommendations concerning a proposed Phase 2 of the project.

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[2] This plan is expected to include the incorporation of additional data sets, additional data query parameters, a plan for annual data updates and related data sharing MOUs, and at least one regional forum.

Regional Context[3]

The Columbia River begins its 2,000 kilometre journey at Columbia Lake near Canal Flats, B.C. and continues until it reaches the Pacific Ocean at Astoria, Oregon. As the sixth largest river basin in North America, the entire Columbia Basin covers 671,000 square kilometres within Canada and the United States. The borders of the Rural Development Institute's jurisdiction (hereafter referred to as "the region") extend from Valemount, in the north of the Basin, to the US border, to the south, and from the BC Rockies, in the east, to Big White ski area, in the west. This represents 212,219 square kilometers.

The Canadian portion of the basin includes four mountain ranges, deeply dissecting the region, creating an incredible range of ecosystems. These include: grasslands, wetlands, dry forests, riparian cottonwood forests, interior rainforests, alpine meadows and glaciers. The Basin is home to over 700 species of birds, mammals, fish and reptiles as well as many large and small human communities. The wetlands, streams, rivers and lakes are the lifeblood of the Columbia River system - providing habitat for a rich diversity of species and bringing water to its human inhabitants.

Humans have long been a part of Columbia Basin ecosystems. Archaeology tells us that First Nations have inhabited the Basin for more than 10,000 years. Significant settlement began in the mid and late 1800s with mining booms and construction of the Canadian Pacific and other railways. Today, the Canadian portion of the Basin Boundary region hosts almost 162,000 people or 3.3% of the BC population. Roughly 80% of the region's population lives in the West Kootenay, Creston-Cranbrook-Kimberley and Elk Valley Corridors.

The Kootenay Economic Region is the 5th most populated (of eight) regions in British Columbia. The region's population is growing at the 4th fastest rate according to Census data (2006-2011). In area, the region is the 7th largest geographic footprint. The Columbia Basin region has been the historic home to 4 First Nations' peoples (the Ktunaxa, the Secwepemc, the Sinixt, and the Syilx). The region falls into the political boundaries of: the Regional District of East Kootenays (RDEK), the Regional District of Central Kootenays (RDCK), the Regional District of Kootenay Boundary (RDKB), the Regional District of Columbia Shuswap[4] (CSRD), and the Regional District of Fraser Fort George[5] (RDFFG), includes 28 municipalities, and crosses 4 college catchment areas.

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[3] The Basin Boundary region includes the 'Kootenay Economic Region' with the additions of Revelstoke, Golden, CSRD Areas A & B, and Valemount. Reference to Basin Boundary region includes these Northern Columbia communities.

[4] Includes CSRD Areas A and B and the communities of Revelstoke and Golden only.

[5] Includes the community of Valemount.

A preliminary review of the region's OCPs[6] show the following generalized development goals:

- Support for local and regional economic development networks
  - Including research and other collaborative efforts
- Support for economic infrastructure
  - Including the development of planning tools for regional governments
- Support for human capital development (education and skills development)
  - Including entrepreneurial learning and peer-mentoring networks
- Support for business development capacity
  - Including the creation of an attractive investment climate and generalized facilitation of investment

Economy

Through time, natural resources have been the foundation for significant economic development in the region, through: forestry, hydroelectric power generation, mining, tourism and agriculture. This has been augmented, in the last two decades, by a burgeoning metallurgical sector and very active construction sector. The region is also developing an expanding professional services (business consulting, scientific services, financial services, etc.) sector and is seeing signs of the need to expand its healthcare and medical services (particularly those services that will support an aging population).

Environmental

Recognition of the importance of the unique natural biodiversity of the region is essential. Humans are a part of ecosystems, both dependent upon and influencing them. As the intensity and extent of human activity expands within the region, ecosystems and natural elements are impacted. Globally the condition of the environment is becoming more of a concern. Now and in the future, the region shares collective stewardship responsibility to conserve our natural environment.

Social/Cultural

The environment also supports quality of life by providing clean water, clean air, spectacular landscapes, a range of outdoor recreation opportunities and connections with nature and wilderness. The region is home to a unique culture that draws on the histories of the First Nations, the mining culture, the Doukhobor community, the influx of American conscientious objectors in the 60s and 70s, and the more current phenomenon of amenity migrants.

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[6] Included in the analysis were OCPs for: Lake Koocanusa, RDCK Areas A, B, C, E and F, and RDEK Area A, B, C, D and Big White and Mt Baldy Ski Areas

Governance & Vision

The Columbia Basin Boundary region comprises 28 municipalities bound by five regional districts. The regional districts have only a voluntary mandate to participate in regional planning. There is no single government that coordinates development for the region. As such, there is no unifying "Vision" that has been adopted.

In the winter of 2010, the CBT hosted the *2010 Scenario Planning Symposium*. The symposium sought public input on Basin planning priorities. This process was designed to bring together residents and deepen understanding of economic reality while gathering information on collective economic direction and priorities. The resulting report provides the following supported visions:

- Sustainable regional systems (Unanimously supported)
- Proactive response to changing global economic conditions (69% support)

While not a "Vision", as such, this does provide us with some general guidance regarding the elements that might support a collective regional vision.

A collective, regional vision of the future may want to incorporate the ideal of providing access to adequate employment lands for current and future economic activity to support the development of sustainable regional systems capable of proactive response to global economic conditions.

Principles

Land-use planning is typically guided by both vision and principles. For the same reason that the region does not have a shared "Vision", the region does not have any explicitly shared land-use planning principles. Listed below are a number of typical principles that could be incorporated into future land-use planning documents.

- Economic Diversification & Growth
- Environmental Stewardship
- Conservation of biodiversity
- Build active stewardship of resources
- Preservation of cultural richness
- Building on First Nations culture
- Protection of private land ownership / autonomy
- Development in manner consistent with shared vision

Policy Question Specification & Alternatives

The Employment Lands project was originally motivated to ask a simple question: is there adequate land available to support the existing business community and to accommodate expanding commercial interests? This has proven to be a more complicated question than originally envisioned.

Question 1
The research team started analyzing existing commercially zoned lands and their ability to meet the commercial needs of the region. This produced an examination of the region's zoning, building infrastructure, and sales turnover. Attempts to analyze the region's land-base through this lens uncovered a number of interesting results and lead the team, through the advisory committee, to a number of realizations concerning the data quality and demand issues.

Question 2
The research team was advised that analysis should be directed to prepare for discussions with the provincial government regarding the acquisition of Crown land for private commercial use. The research team re-specified the question as, "Can we identify currently non-commercially zoned lands that would be appropriate for commercial use?" The Results section of this report demonstrates the ability of the Employment Lands Tool to answer this question[7].

Considerations
Question 2, as posed, implicitly assumes that the existing commercially zoned lands are insufficient for the region's commercial needs. This assumption is based on anecdotal evidence. While anecdotal evidence may be strong, it tends to be discounted heavily by decision-makers in favour of quantifiable claims.

As readers will note in the Results section, the Question 2 results are highly specific to the assumptions regarding what constitutes "commercially viable land". The needs of an ore processing facility are likely to be considerably different from the needs of an accounting firm. It is recommended that analysis of Question 2 be posed with a specific sector or user groups in mind, as attributes of a viable parcel are specific to end-use.

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[7] It should be noted that the data sets feeding the system are still inadequate to complete this analysis. The results should be viewed in terms of the way they address the problem rather than as hard results.

This of course, begs the question of who is demanding additional land. The research team is committed to focusing the tool's development on answering Question 2 for the region as a whole, and for each sub-region and community. The tool, once complete, will be equally well-suited to analyzing the demand side of commercially viable lands in the region.

Most importantly, this entire line of questioning forces the question of "Why is our market not adjusting prices to allocate lands efficiently?"

Recommended Questions

The overall goal of this line of questioning is to ensure that adequate lands are available to meet the expansion needs of existing business and to provide room for new investment. Answering this completely requires the addressing of several more basic questions. The research team recommends the following process:

> *Q   Are existing "employment lands" meeting the needs of the business community?*
>
> While anecdotal evidence and early stage BR&E results indicate they do not, we should have a formal, quantified report stating as much.

If we assume an answer of "no", the following questions need to be addressed.

Relevant Supply Questions

Supply is the relationship between market prices and the number of units of a given product supplied to market. This relationship is generally determined by: input prices, technology, business taxes, expectations and the number of suppliers. In this context, price of inputs and technology are irrelevant[8]. We can consider the number of suppliers, in this context, to be the number of available properties. This leaves us with the following questions:

Supply and the Market
Is the market price of commercial land simply insufficient to convince landowners to offer their land for sale?

> *Q   Are prices too low to induce landowners to sell?*
>
> If this is the case, this is not a "supply" issue. This would be reflective of a soft market where the "demand" is not actually that strong. If this is the case, there is no real supply problem, but the revenues that could be generated by commercial activity are insufficient to justify putting the land to work.

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[8] Since the supply of land does not involve technological processing, nor productive resources (other than the land itself – which is being priced through this market).

This does not seem to be the case from the anecdotal evidence.
But, this should not be ruled out just yet!

Structural Issues with Supply
Is the regional tax structure, or legal structure preventing, in any way, the smooth offering of lands to the market?

> *Q   Can we remove any taxation or regulatory barriers to property market supply?*

> It is not clear that there are any significant differences from the BC norm that would distort the market, but we should not discount this without a survey of the various jurisdictions.

Are the expectations of land-owners influencing them to keep their lands off the market in the immediate term?

> *Q   Are the region's commercial landowners waiting for higher land prices?*
> *Q   Are these landowners expecting changes in regulations that will allow them to make more money on the sale of their properties?*
> *Q   Is there some other anticipation, of which we're not thinking, that would slow the offer of commercial lands for sale?*

Are there simply not enough properties available?

> *Q   Can we get more land released for commercial use?*

> This is the question that we are currently tasked to answer. It should become evident that this question, while relevant, requires a greater "market" context.

Being clear on market dynamics
If the answer to any one of these three questions were to lead us to the conclusion that supply is being constrained, **AND** if demand for land were there, we would expect a well functioning market to increase the price of land to the point where landowners were induced to offer their land. If they do not, the status quo is the highest value use of that land – there is no problem with current land assignments.

Relevant Demand Questions
Demand is the relationship between market prices and the number of units of a given product demanded in the market. This relationship is generally determined by: the consumers' income (or business revenues in the case of commercial property demand), consumer preferences, expectations, price of substitute/complementary products and the number of buyers. This leaves us with the following questions:

Demand and the Market
> *Q   Is the market price of commercial land simply too high for potential buyers?*

> If this is the case, then the regional economic landscape is not creating sufficient opportunities for economic interests to justify paying high land prices. This might create an argument for loosening the supply of land[9] - which would drive down prices.
> This does not seem to be the case from the anecdotal evidence.
> But, this should not be ruled out just yet!

Structural Issues with Demand
Consumer Incomes (in this instance Commercial Revenues), if insufficient, will not create an adequate demand to push up prices to a level that will induce greater land offerings.

> *Q   Are businesses not earning enough to justify land purchases?*
> *Q   What can we do to improve the profit generating prospects of our producers?*

> While this does not seem to be the issue, judging from the anecdotal evidence. We should rule out this possibility formally.

Are buyers preferences for lands with different attributes than those on offer?

> *Q   Are businesses seeing properties for sale, but none of them fit their needs?*

> This would indicate that we have incorrectly defined the market. This issue will be addressed in the following section on Markets and Market Dynamics.

Are buyer expectations somehow convincing them that they should not currently buy?

> *Q   Are buyers waiting for prices to fall or for market conditions to be more favourable?*

> Again, this does not seem to be the case. Unless, buyers are expecting better properties to be forthcoming as a result of political agitation. This does not seem likely.

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[9] Or, increasing the number of suppliers – in Determinants of Supply language

In the case of commercial properties, the relevant related products/services (substitutes and complements) would be:

Complements
- Utilities
- Road Access
- IT Infrastructure
- Proximity to Suppliers/Customers
- Transportation Infrastructure
- Appropriate Labour
- All other support infrastructure

Substitutes
- Rental Facilities
- Other Jurisdictions

> *Q   What can we do to lower the effective prices of these related products/services?*

> Prices of any of these related 'products' could influence the acceptability of properties on offer. Note that limits on access to the complementary products is identical to high prices.
> We should note, again, that these different attributes of properties can lead to incorrect definition of the 'market'.

If the number of buyers is too low, demand will be soft and will not drive prices high enough to induce suppliers to offer their lands.

> *Q   What else can be done to increase the size of this market?*

> Again, anecdotal evidence suggests this is not the case. But, if the prices in the market place are not pulling commercial lands into play, this should remain under question.

Being clear on market dynamics
If the answer to any one of these three questions were to lead us to the conclusion that demand is strong, **AND** if supply of land were there, we would expect a well functioning market to increase the price of land to the point where landowners were induced to offer their land. If they do not, the status quo is the highest value use of that land – there is no problem with current land assignments.

Markets and Market Dynamics
In a functioning market, the price mechanism will clear the market. That means the number of people willing to sell at the market price will be equaled by the number of buyers willing to pay the market price.

Efficient Market Scenario
If our property markets are working well, this would suggest that:
   a. The market price is simply too high for many potential buyers, or

b. There are many sub-markets qualified by:
        1. differing needs of different buyer classes
        2. differing attributes of properties
        3. there is misalignment of these buyers and sellers in the larger market

Price Choking
If the market price is choking out potential investors, increasing the number of land parcels available for commercial use will open up our ability to expand[10]. This could justify a policy change to increase the supply of private, commercial lands – provided a cost benefit analysis were performed measuring the value stream currently being provided by those lands in question. One would presume the provincial government would take this task on, but some preliminary research by the regional proponents would certainly strengthen the case.

We would want our political capital targeted to support sectors that can support the growth and well-being of the region. We would not want to spend our political capital supporting sectors that do not create growth and improve well-being[11]. In other words, we would want to match the attributes of the lands targeted for re-assignment with the needs of our targeted sectors. This would require demand analysis to ascertain which sectors are being limited by land supply, and determination of what their general land needs are.

Sub-Markets
If, in fact, the commercial property market is too broadly defined, we will have more work to do. As previously mentioned, the land needs of an ore-processing facility will be far different than the land needs of an accounting firm. We could say that they are not in the same property market at all.

If we accept that different buyers have different needs when evaluating property, and we accept that different properties have different attributes, then we must ask the question,

> *Q   Are there commonalities between those potential buyers who say they cannot find suitable land? And,*
> *Q   Can we identify the specific market issues in those sub-markets?*

The risk of not pursuing this line of questioning is that we go through an expensive (in the political capital sense) process of having lands released for commercial use only to find that those potential buyers are still not satisfied and the non-commercial values have been destroyed.

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[10] This will require justification of the economic benefits of expansion measured against the current non-commercial uses.

[11] Such as industries already receiving significant subsidies or creating other market distortions. The activities of these stakeholders generally lead to higher levels of inequality and impede growth.

We may very well have a land "supply" issue as it has been commonly been defined. But, if we are going to address that supply issue, we should do so efficiently rather than wastefully.

Inefficient Market Scenario
Common economic discussions usually assume that markets work well. This is not always the case. We need look no further than the Great Recession of 2009[12] to see dramatic evidence of markets failing to transmit the required information. We should not rule out the possibility that our regional property markets are failing to match willing buyers and willing sellers. To determine if this is the case, we should be asking:

> *Q   How many unfulfilled property demands exist?*
> *Q   How much under-utilized property exists?*
> *Q   Do the property attributes match those of the potential buyers' needs?*
> *Q   Why are landowners not bringing their properties to market? Or,*
> *Q   Why are potential buyers not finding these properties?*

There are many reasons why markets may not function properly. In this instance, the most plausible reasons to be explored would include:
- Information asymmetries (buyers and sellers having different information)
- Imperfect information (buyers and sellers not having adequate information)
- High transaction costs (high explicit and implicit costs of participating in the market)

Recommended Priority Questions
In light of this discussion, the research team recommends the following high priority questions to help direct the actions of all stakeholders (policy makers, researchers, and most-importantly – potential investors). These questions will help define whether or not we have a functioning market, first of all.

1. Are those potential buyers who indicate they cannot find suitable land really not finding suitable land *in their price range*?
2. Are those potential buyers not finding land with the right attributes?
3. How much under-utilized land exists in the region?

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[12] See Stiglitz, "Freefall", for a treatment of information asymmetries' devastating effects on market efficiency.

Analytical Approach

Two approaches were used to demonstrate the capacities of the Employment Lands Analysis Tool. The first was directed at answering *Question 1*, as described above, the second, at answering *Question 2*. The following describes the approaches taken in this *preliminary* round of analysis.

Part 1: Analysis of Existing Employment Lands

Existing data was used to perform a preliminary screening that identifies: the area currently under private ownership, the area available for commercial use[13], the proportion of commercially available land with existing buildings, and the number of commercial properties being bought and sold on an annual basis.

Identification of private ownership provides a baseline of the total land available for private activities, whether commercial or domestic. Crown land comprises the majority of land in British Columbia. The boundaries of crown/private land may be negotiated, but are subject to provincial level decision-making. While zoning offers additional restrictions on private land-use, negotiating changes to zoning is usually achieved within the region[14]. This filter gives us insight into medium term limits to the supply of employment lands.

Identification of land zoned for commercial use gives us a baseline of the total land available for private commercial activities. Commercial and industrial zoned lands have been inventoried and extracted from the data. This information tells us what proportion of private land is part of the supply of employment lands, and the proportion that is under residential use. This filter gives us another level of understanding of the medium term limits to the supply.

Identification of commercially available land with and without buildings tells us about the level of development already occurring on commercial land. Some commercial investors will prefer raw land so they can develop explicitly for their own uses. Others may have business needs that can readily fit into pre-existing structures/facilities. While additional attributes of **demand factors** are necessary to fully understand the pressures on the supply, this filter provides us with some insight into these two sub-markets.

Identification of property turnover lets us understand the level of activity occurring in the real-estate market. The results of this particular variable should be interpreted with some caution. High turnover rates will indicate that properties are

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[13] "Commercial Use", for the purposes of this paper, includes Retail, Industrial, and Mixed zoning unless specified.
[14] Some exceptions being "major projects", such as hydro-electric facility construction or Jumbo Pass Resort.

being offered for sale, and that there are buyers. Similarly, low turnover rates could indicate that there is little supply or conversely that there is little demand. We will need to acquire more detailed information on the price trends corrected for parcel attributed to understand whether demand is being met easily or whether demand is overwhelming supply. However, the turnover rates alone will give us an indication of how active the market is; this is a good first step to understanding the market dynamics.

Part 2: Analysis of Suitable Lands

Problem Definition

The research team set out to identify lands within the Columbia Basin Boundary region that are currently not available to commercial use, but would be suitable for commercial use.

Approach:

Use existing data to inventory those lands, currently under crown or public ownership, or under the ALR, that would be suitable to commercial or industrial expansion.

Answering this question requires us to define *"suitable for commercial or industrial expansion"*. The Research Team offers the following base-line assumptions.

01. **Land should be within 10km of a highway**. Transportation was the top information need cited in the User Needs Survey (August 2012). Ten kilometers is an arbitrary distance.
      **Data Available

02. **Land over 15% gradient is unsuitable for building or establishing commercial operations**. Land features and engineering costs can dictate where development occurs. 15% gradient is an arbitrary gradient.
      **Data Available

03. **Land should be within 1km of existing services.** Waterlines, powerlines, and service can be extended, but at considerable cost. 1km is an arbitrary distance.
      **Mixed Data Availability

04. **Land should fall under jurisdiction of an OCP.** Having established land-use principles and policies, through an OCP process, greatly reduces red-tape costs in managing land-use.
      o   OCPs also designate zoning
      **Data Available

05. **Land is not in a flood zone.**
      **Mixed Data Availability

06. ***Commercial or industrial use of land will not create social or environmental fragmentation.*** Development of new lands should not create new problems (i.e. new industrial land located immediately between two residential areas would not be appropriate, industrial activity may not be appropriate if it separates two prime grazing areas etc.). Proposed filters:
- ***Establish a 1km "Buffer Zone" around residential areas & community watersheds:***
  - ***Lands within Buffer Zone, but meeting all other Suitability Filters are suitable for Retail Zoning***
  - ***Lands outside Buffer Zone and meeting all other Suitability Filters are suitable for any commercial use***
    *Data Available for Residential zoning, mixed for community watersheds

This analysis will be performed in a GIS framework. The following maps (where data permits) will be produced, and be available in the live demo:
- Maps of Region
  - Showing all lands
  - Maps demonstrating successive removal of:
    - Private Lands
    - First Nations Reserves
    - Parklands
    - Forestry Tenures
    - Community Watersheds
    - Waterfront properties (reflecting Advisory Committee comments)
    - Flood Zones
- Maps of Demo Towns
  - Showing all lands within the reference area
  - Maps demonstrating the successive removal of all the above, and:
    - Each of the Suitability Filters

Sample Area:
The Research Team has identified the communities of Rossland and Creston as the best candidates for our focused analysis because the most complete data is available for these two communities.

To demonstrate some of the system's flexibility, we propose using ***Retail Trade Areas*** to set the physical area around the communities to be analyzed. A ***Retail Trade Area*** measures the radius within which people tend to focus most of their shopping in a given town (see Appendix X). This is calculated based on the proximity of the next sizeable community and the two populations.

The Retail Trade Areas are (from municipal boundaries outward):

Rossland   4.1km radius
Creston   36km radius

Assumptions:
- o Power available within town limits and on (non-forest service) roads
- o Community watershed defined as…. Private water supply that is land based (eg. Koch Creek Water Users Society)

Employment Lands Tool Technical Description

The GIS framework used to identify suitable areas for potential expansion of commercial lands inventory is based on the ESRI ArcGIS geodatabase, mapping and analysis platform. This technology is especially useful as much of the data collected and loaded into the database contains both spatial and attributed characteristics. The spatial properties consist of a geometry and its location on a map. For example, highways are typically represented by multipart vector line representing the highway centerline. Building locations are often represented by polygons of the building footprint, or by a point geometry representing the location only. Parcels and zoning are generally polygons. In addition, data is attached to these geometries through attributes that are stored with the feature, or in related database tables. An example would be the name of a highway or zoning designation of an area. Since the GIS tools have access to both the spatial and non-spatial information, very powerful analysis can be performed that relate things such as proximity (what is nearby), intersections (what things overlap) and that calculate statistics within the data itself (what is the average sale price of properties within the industrial zones). In addition to vector data, GIS tools can process raster data, such as imagery. Raster data often represents continuous geographical phenomenon. For example, digital elevation models are raster data that represent the elevation of land over an area. Based on this, GIS tools can then determine the slope and aspect properties of the same area and overlay the information with the vector data. Typical GIS tools used for economic development studies are:

- visualization of the data on a map,
- keeping track of quantitative data over time,
- analysis of spatial relationships involving the concepts of distance, proximity, areas of overlap, and areas of concentration or fragmentation.

The GIS datasets collected for this project are complex, and require extensive storage space. Because of this, the time to perform the analysis steps can be anywhere from minutes to hours. Because such a large area is covered, the datasets vary greatly in terms of how up-to-date they are, their granularity (scale or resolution), and type. This research project is not only collecting a vast inventory of cadastral and other data from the regional districts and municipalities over much of the Columbia Basin Boundary region, it is also collecting data from both provincial and national databases in order to fill in missing infrastructure, geophysical and economic information. See Appendix D for a list of datasets being collected. Even so, the gaps and variations of what is available somewhat limit the types of questions one can ask. However, the opportunities created by combining this data into one database are unique and powerful. Over time, it is expected much more data will be made available, and as a result, the tool's power and accuracy will increase.

To solve the question posed in this report that identifies suitable commercial lands, many detailed analysis steps are required. In addition, the datasets required vary, depending on the location. Because of this, the research team developed a GIS analysis model that automates the process and enables the analysis to be performed across the region in a consistent and repeatable manner. The following is a graphic representation of the entire model. The model's processes are described additionally.
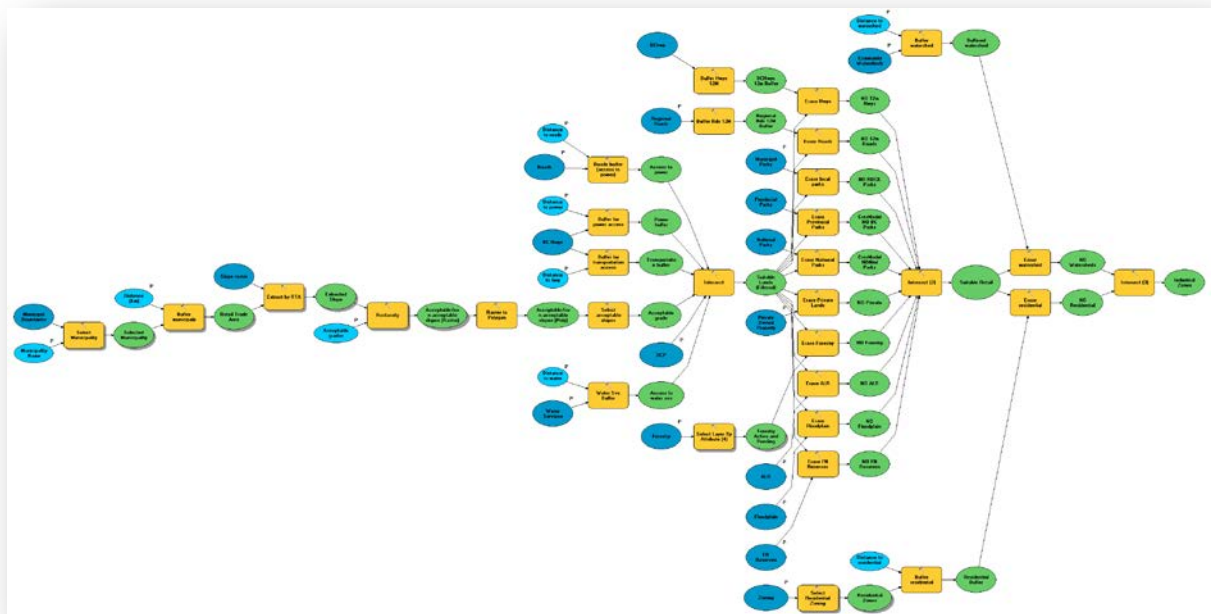

The question posed requires 20 different inputs, including what datasets are needed and the buffer distances used. These input parameters are presented to the user and can be filled out by dragging and dropping data from the project geodatabase into the tool and adding the buffer distances. This is useful in that this initial study uses buffer distances that are logical for the question, but can be refined as needed over multiple runs of the model. When looking at the model graphics, the P designation indicates a model parameter. These parameters correspond to the user inputs as shown below.
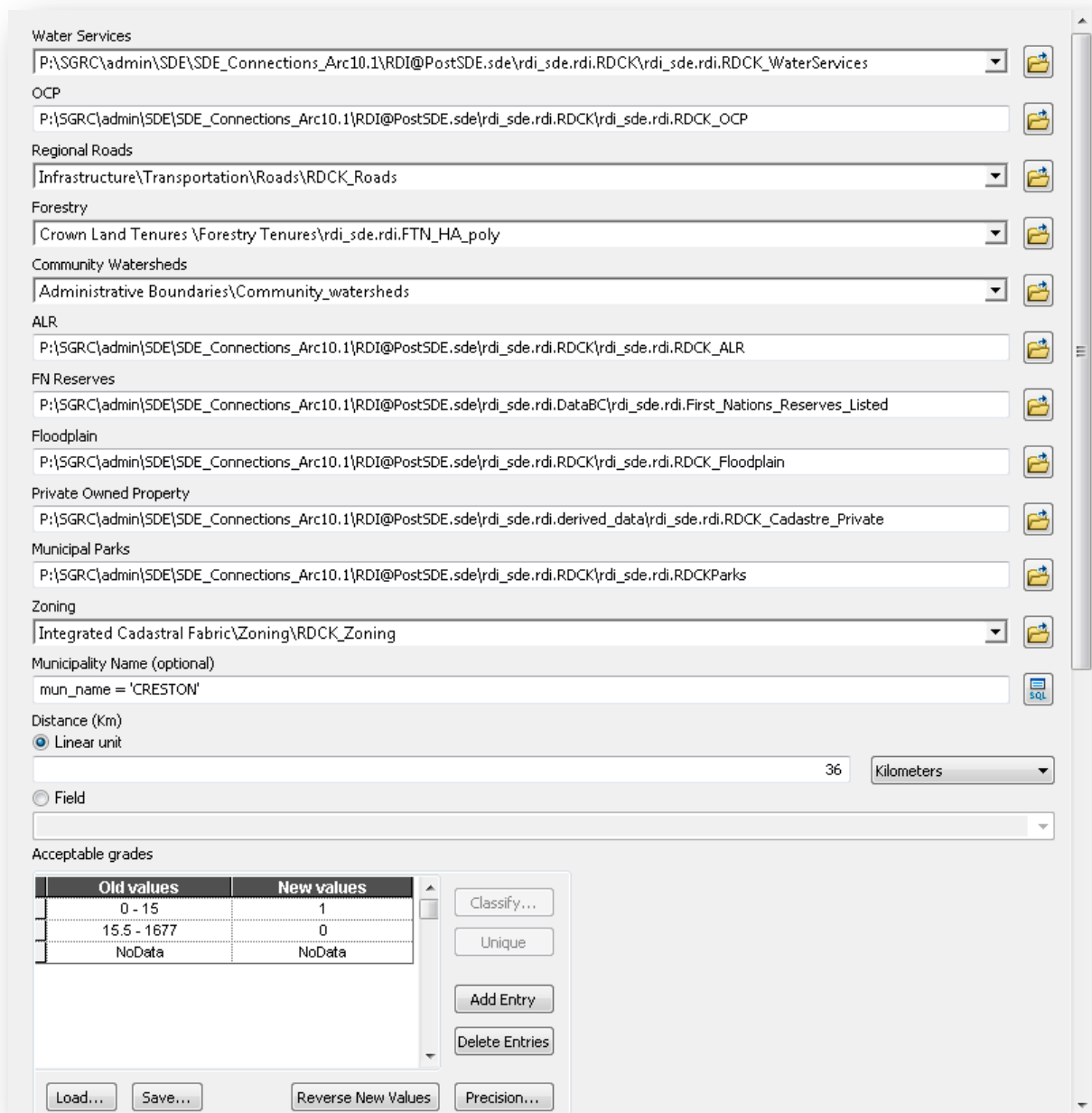
Screenshot of model inputs

Suitability Filters
1. Filter 1: Find Retail Trade Area lands with 15% grade or less.
   a. Select analysis location and buffer distance.
      i. User selects a municipality and a buffer distance. The buffer distance represents the Retail Trade Area (RTA) of the location.
      ii. The model then extracts slope information for the RTA.
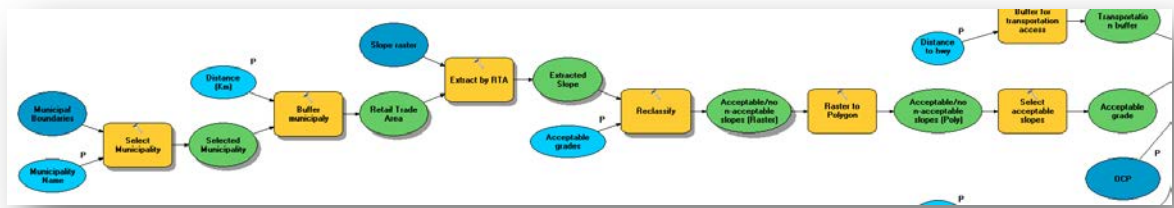
2. Filter 2: Distance to transportation.
   a. User selects the acceptable distance from a highway. The provincial dataset, BC_Hwys is used for this purpose. In the case of the study, the research team selected 10 Km.
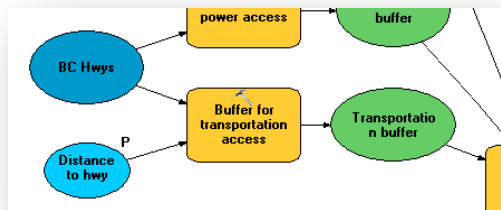

Locate lands within distance of highways.

3. Filter 3: Distance to existing services.
   a. Since data on location of existing power is spotty at best, the research team chose to assume that power runs along roads and highways and is available within a municipality. The user inputs an acceptable distance, which for the purposes of this study is 1 km.
   b. Water service locations are chosen by the user. For the Rossland study, the assumption was made that water services were located within the Rossland municipal boundary. In the case of Creston, the available water service areas polygons were used.
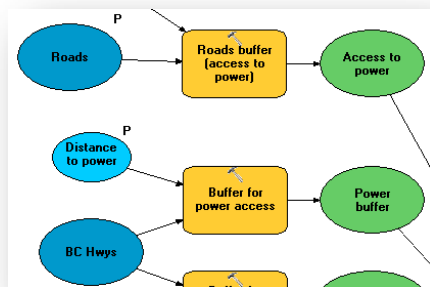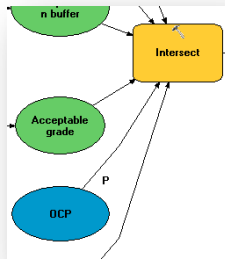

Locate lands near power services.
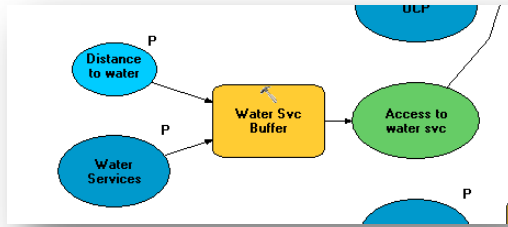
Select water service area and acceptable distance from.

4. Filter 4: Lands fall under jurisdiction of an OCP.
    a. Depending on the location of interest, the user selects an OCP dataset. This could be from the regional district or from the municipality dataset.

Locate lands under OCP

5. Filter 5: Lands should not fall within a flood zone.
    a. This criteria can only apply to areas where data is available. Currently data is available from RDKB and RDCK regional districts. User selects the floodzone dataset applicable to the location.
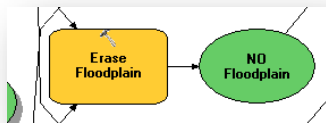

Locate lands not under flood zones

6. Filter 6: Lands within 1 km buffer zone of residential zoning meeting all other suitability filters are suitable for Retail Zoning. Lands outside of buffer zone and meeting all other suitability filters are suitable for commercial use.
    a. Regional district and municipality zoning datasets are used. The user can select the dataset depending on the location.

7. Filter 7: Retail lands can fall within a community watershed. Other commercial and industrial zones must be 1 km outside a community watershed.
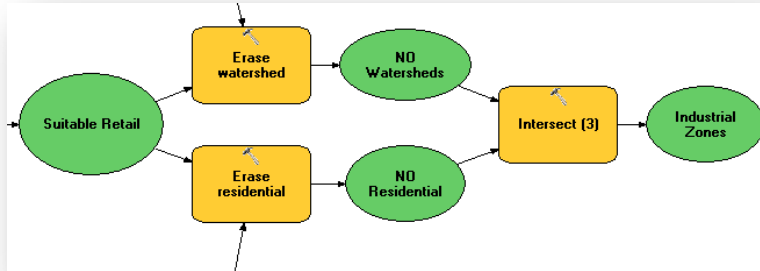
Locate retail vs commercial and industrial lands meeting suitability criteria

Once the filters have been processed there are areas that are not considered, thus are removed from the results:
1. Subtractors:
   a. First Nations reserves
   b. Parks
   c. Private lands
   d. Active and pending forestry tenures
   e. ALR
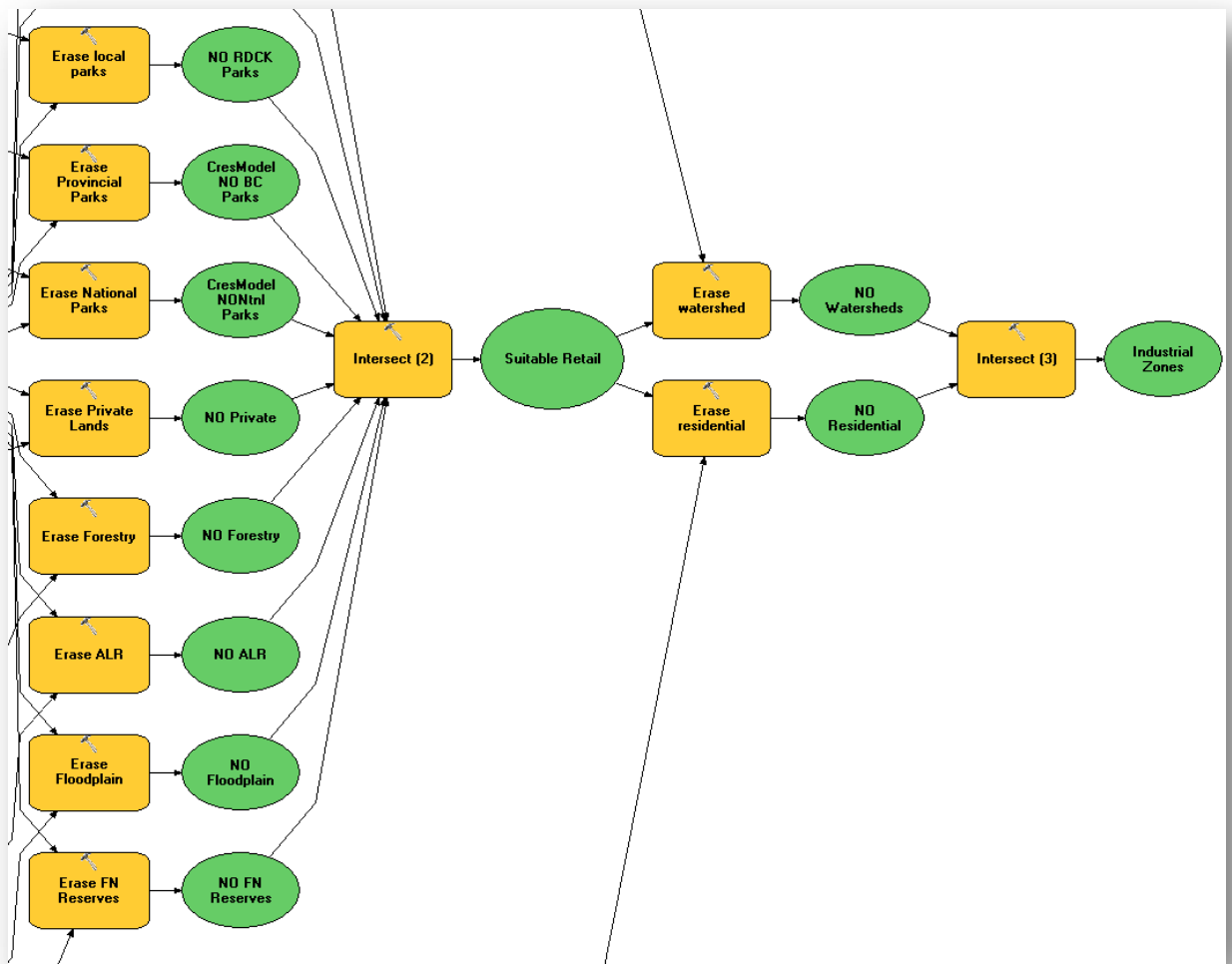
Lands removed from suitability analysis

Results

The objectives of the project include:

- to produce a regional baseline employment lands, infrastructure and related economic assets inventory database and web-based geospatial tool;
- to bring together key stakeholders to generate regional discussion and analysis of the employment lands landscape; and
- assess whether there is an adequate inventory (supply) of employment lands available for the development of new or expanding investment and job creation.

Regional Baseline

The structure of the data-base is complete. The inventory is being filled. The web-based tool has been built and is described in the next section.

Stakeholder Engagement

The Employment Lands Research Team has had success in engaging the wider community through the User Needs Assessment process, with the contributions of the Advisory Committee and has four major events planned for the next quarter, including demonstration and engagement sessions at the Association of Kootenay Boundary Local Governments Conference, the Basin Economic Development Practitioners Forum, the Regional Community Economic Development Forum and the Kootenay Rockies Planners Forum . Further, the on-line web portal is, by its very nature, interactive and engaging. As this product is made available to the general public, we will have even greater ability to reach out to stakeholders.

The results generated, thus far, in the Employment Lands project are preliminary and should not be used in policy analysis or policy writing. The results are a demonstration of what the analytical system will be capable of once full data sets have been cleaned, confirmed for accuracy, and integrated into the system. This section of the report offers a preliminary treatment of *Questions 1 & 2*.

Assessment Part 1: Sample Inventory Analysis

We have preliminary results for each of the three Kootenay Regional Districts: East, Central, and Boundary.

Regional District of East Kootenay

Figure 1 shows a map of the East Kootenay region. This map is coded to show the locations of crown land, private property, major populations and highways, and we've extracted the areas of private land, commercial-use and industrial-use zoned parcels.
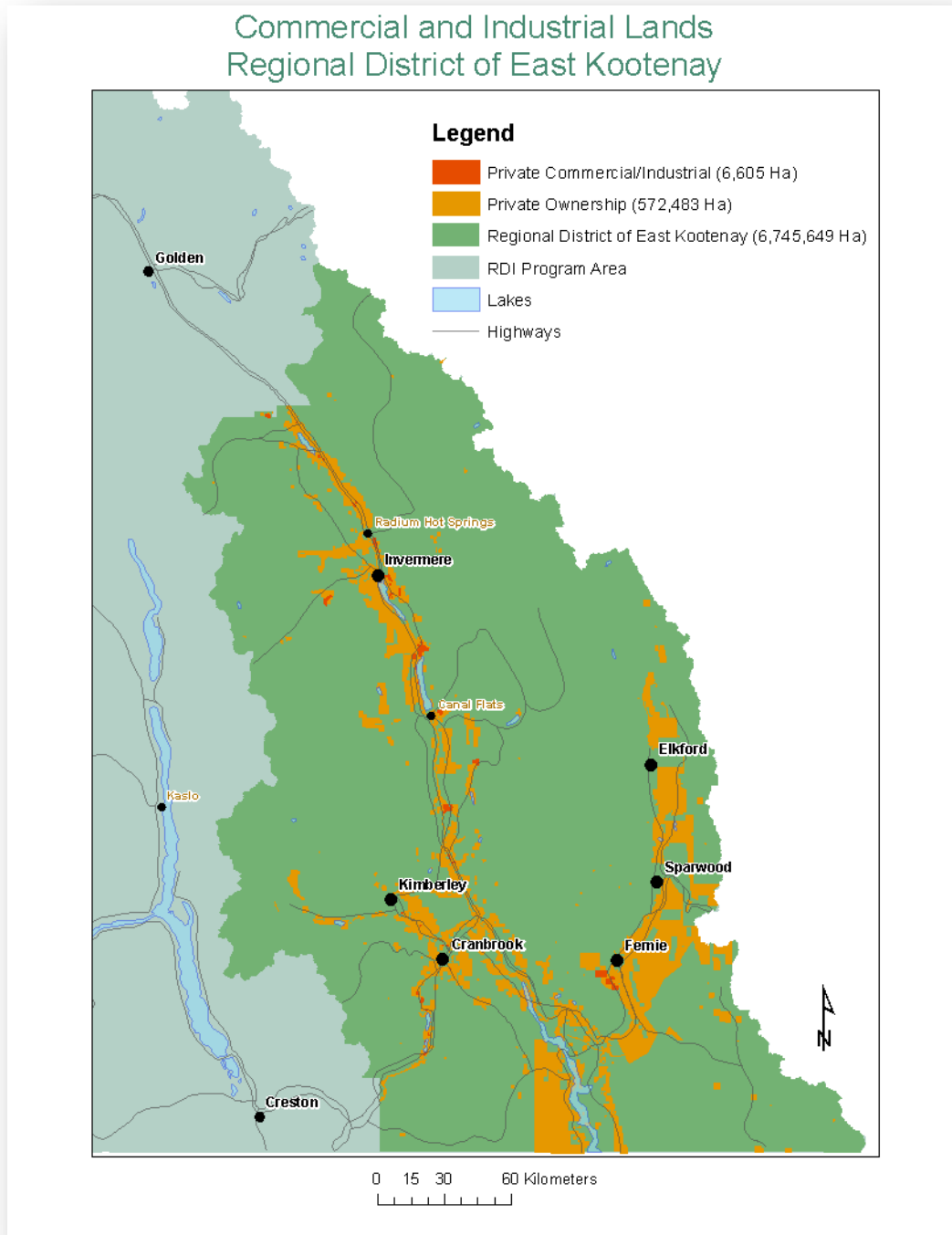

Figure 1

Summary of Preliminary Statistics[15]

Total Area
- 6,745,649 Hectares

Crown/Public Ownership
- 6,173,166 Hectares

Private Ownership
- 572,483 Hectares (8.5% of Total Area)

Commercially Available
- 6938 Hectares (1.2% of Private Land)
- 494 parcels in total
- 266 parcels with buildings
- 228 parcels without buildings

Commercial Zoned
- 5167 Hectares (75% of Com. Av. Land)

Industrial Zoned
- 1771 Hectares (25% of Com. Av. Land)

Despite the missing datasets, these figures are likely in the correct order of magnitude. We should see refinement of these numbers as datasets are incorporated into the model, but it would be unlikely to see large-scale change.

Unsurprisingly, most of the region falls under crown ownership. What may be surprising is the quantity of undeveloped commercial/industrial zoned land. Almost half of the land zoned for this use is undeveloped. There is more to this story, but we must wait for additional data.

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[15] Figures for East Kootenays reflect significant data gaps (Cranbrook, Sparwood, Fernie)

Regional District of Kootenay Boundary

Figure 2 shows a map of the Kootenay Boundary region. This map is coded to show the locations of crown land, private property, major populations and highways, and we've extracted the areas of private land, commercial-use and industrial-use zoned parcels. With Kootenay Boundary, we have also included parcel counts for Commercial and Industrially zoned lands and further disaggregated by parcels with and without buildings.
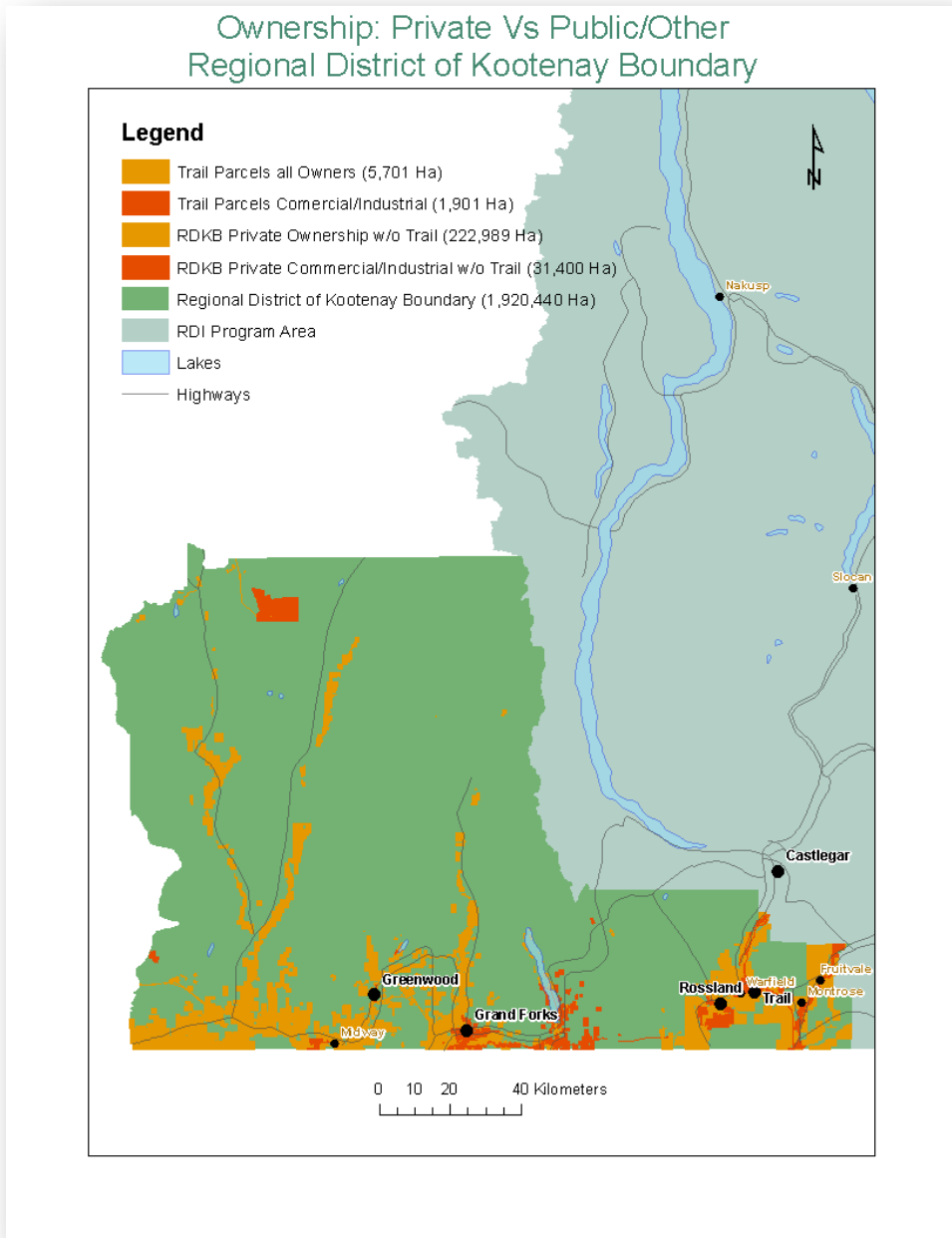

Figure 2

Summary of Preliminary Statistics

Total Area
- 1,920,440 Hectares

Crown/Public Ownership
- 1,691,750 Hectares

Private Ownership
- 228,690 Hectares (12% of Total Area)

Commercially Available
- 33,301 Hectares (15% of Private Land)
- 5,563 parcels in total
- 1,954 parcels with buildings
  - 627 sales since 2005
  - Mean price $298,502
- 3,609 parcels without buildings
  - 1315 sales since 2005
  - Mean price $167,897

Commercial Zoned
- N/A

Industrial Zoned
- N/A

Again, these figures are likely in the correct order of magnitude. We should see refinement of these numbers as datasets are incorporated into the model, but it would be unlikely to see large-scale change.

It is interesting that, as a proportion of total land, there is almost five times the land devoted to commercial purposes. Surprisingly, we see 65% of the land zoned for this use is undeveloped. We also see that there is far more turnover in undeveloped land than in developed land. This may be reflective of the supply or demand (again – we need more data).

Regional District of Central Kootenay

Figure 3 shows a map of the Central Kootenay region. This map is coded to show the locations of crown land, private property, major populations and highways, and we've extracted the areas of private land, commercial-use and industrial-use zoned parcels. With Kootenay Boundary, we have also included parcel counts for Commercial and Industrially zoned lands and further disaggregated by parcels with and without buildings.

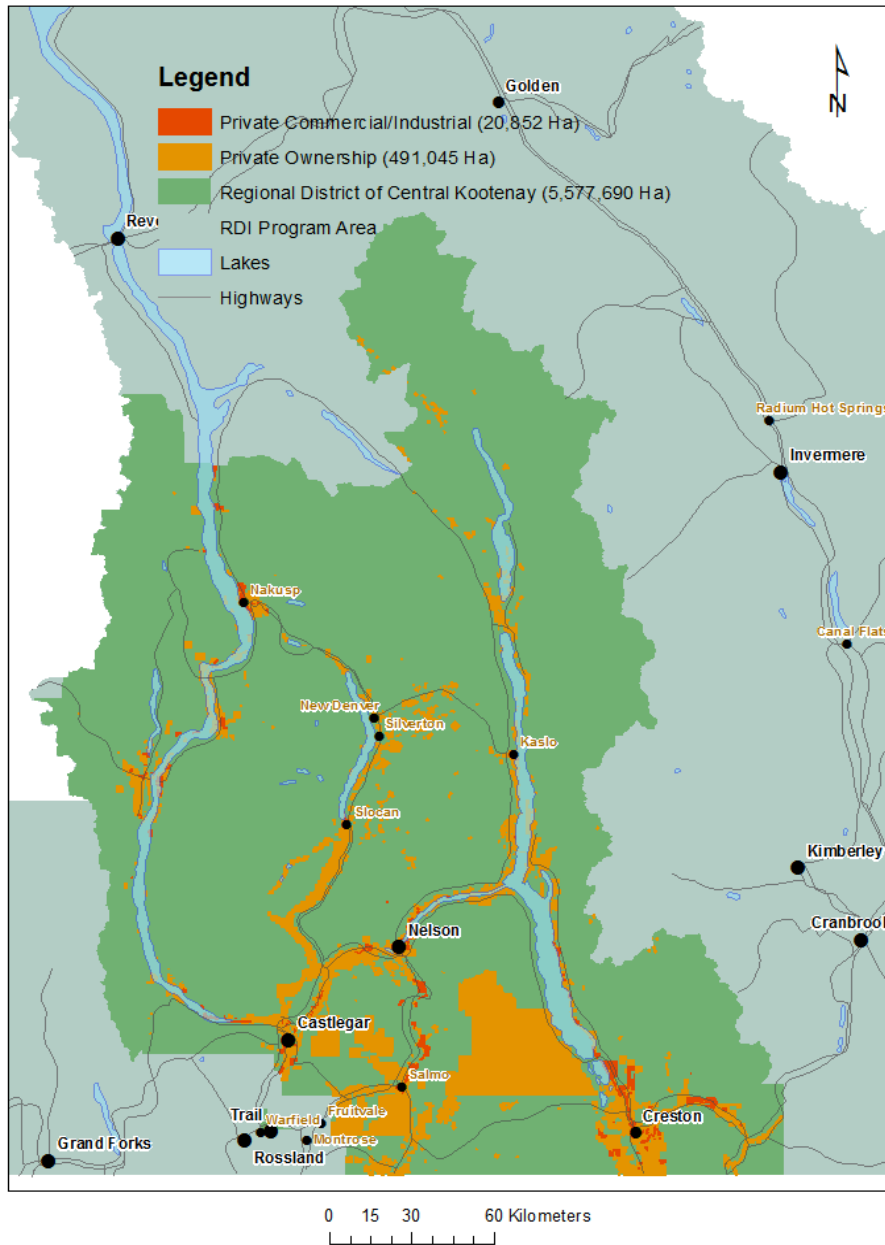Figure 3

Summary of Preliminary Statistics

Total Area
- 5,577,690 Hectares
- 54,787 parcels in total
  - 27,854 with buildings
  - 26,933 without

Crown/Public Ownership
- 5,086,645 Hectares

Private Ownership
- 491,045 Hectares (9% of Total Area)
- 42,134 parcels privately owned
  - 27,238 with buildings
  - 14,896 without

Commercially Available
- 20,852 Hectares (4% of Private Land)
- 3600 parcels in total
- 1996 parcels with buildings
  - 4 sales since 2005
  - Mean price $137,750
- 1604 parcels without buildings
  - 3 sales since 2005
  - Mean price $125,654

Again, these figures are likely in the correct order of magnitude. We should see refinement of these numbers as datasets are incorporated into the model, but it would be unlikely to see large-scale change.

As with the other RDs, we find that of the commercially available land, a large proportion (45%) is undeveloped. The most striking feature of the RDCK data is the low turnover on commercial zoned land. This may be reflective of the supply or demand (again – we need more data).

With only 7 private, commercial or industrially zoned properties indicated as selling since 2005, we must infer that the data sets are incomplete – at least for the RDCK.

Assessment Part 2: Commercially Suitable Lands

Our preliminary results of lands that would be commercially suitable around the towns of Rossland and Creston are presented below. The results for Creston have been derived using two sets of assumptions (regarding what constitutes "Commercially Suitable").

Rossland

The following suite of maps walks the reader through successive removals of land, as described in the Technical Description.

Creston

The following suite of maps walks the reader through successive removals of land, as described in the Technical Description. The first set of maps were produced using the same set of assumptions as were used for Rossland. The second set uses slightly relaxed assumptions. This demonstrates the importance of specifying the assumptions up front, and the capacity of the model to perform sensitivity analysis to the results.

- Considerations in lieu of results
- Remaining pieces that must be put in place to get full results

On-Line Functionality & Future Uses

The initial functionality of the on-line tool is to enable users to explore a map of employment lands assets for the region. Available data layers will continue to be made available through this viewer over time as the data is collected and loaded.
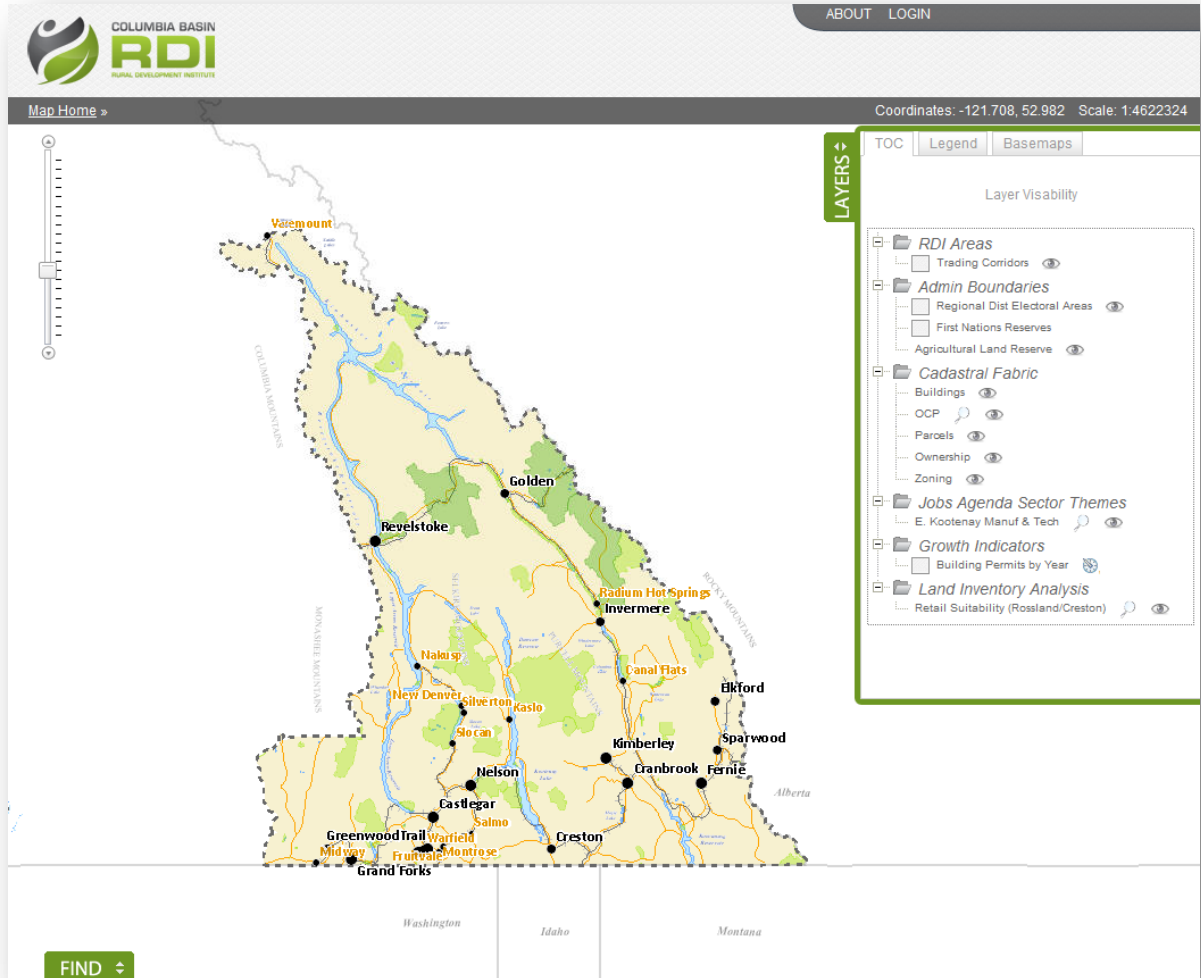
Employment Lands on-line viewer

Users can turn on and off the data layers that they wish to view by clicking in the layer checkboxes in the Table of Contents (TOC). When a layer such as zoning is displayed on the map, additional information may be viewed by clicking on a particular feature.
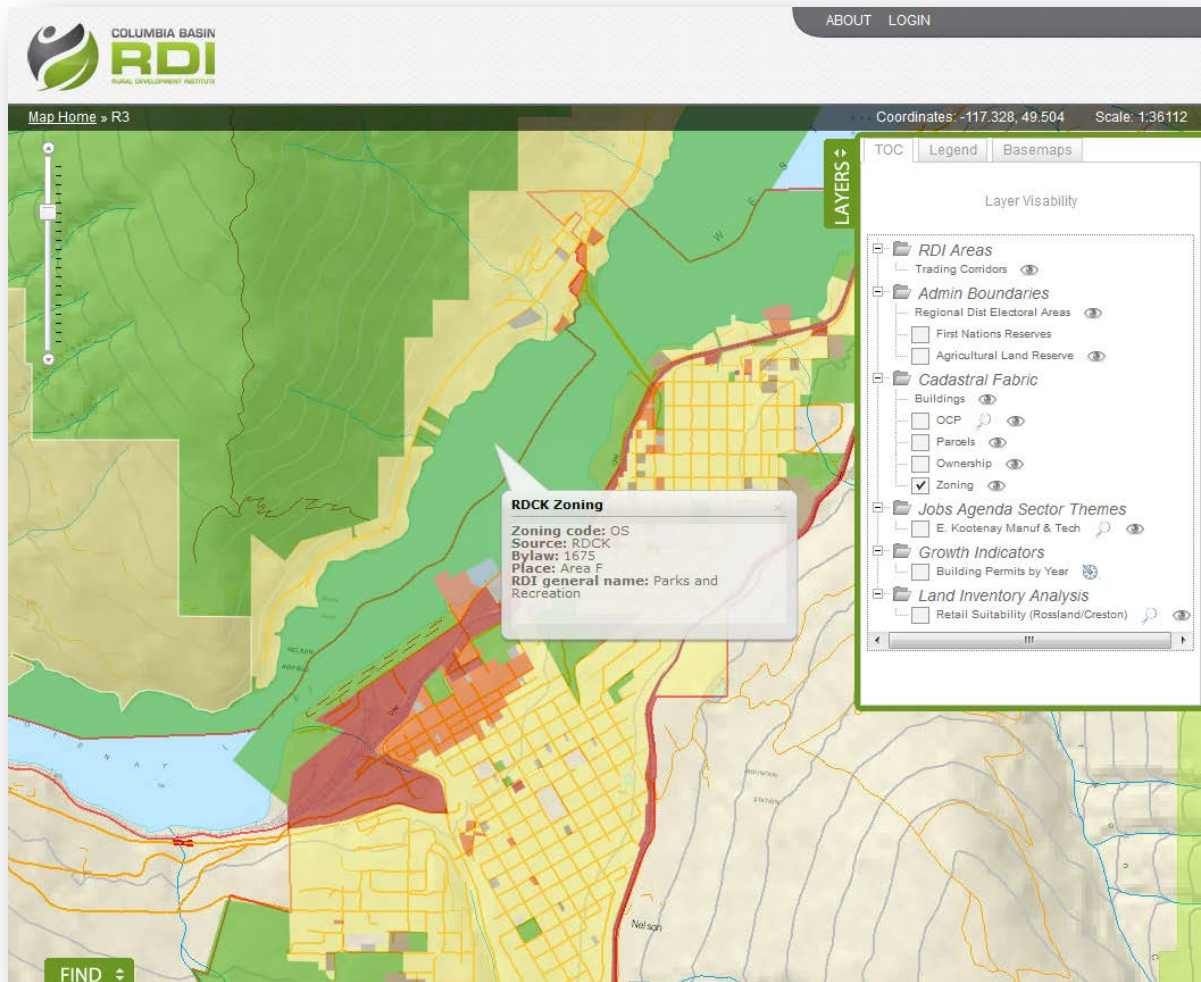
Map display of zoning information

A number of data layers are symbolized for easy visualization. A legend can be displayed by clicking on the Legend tab in the Layers dialog box.
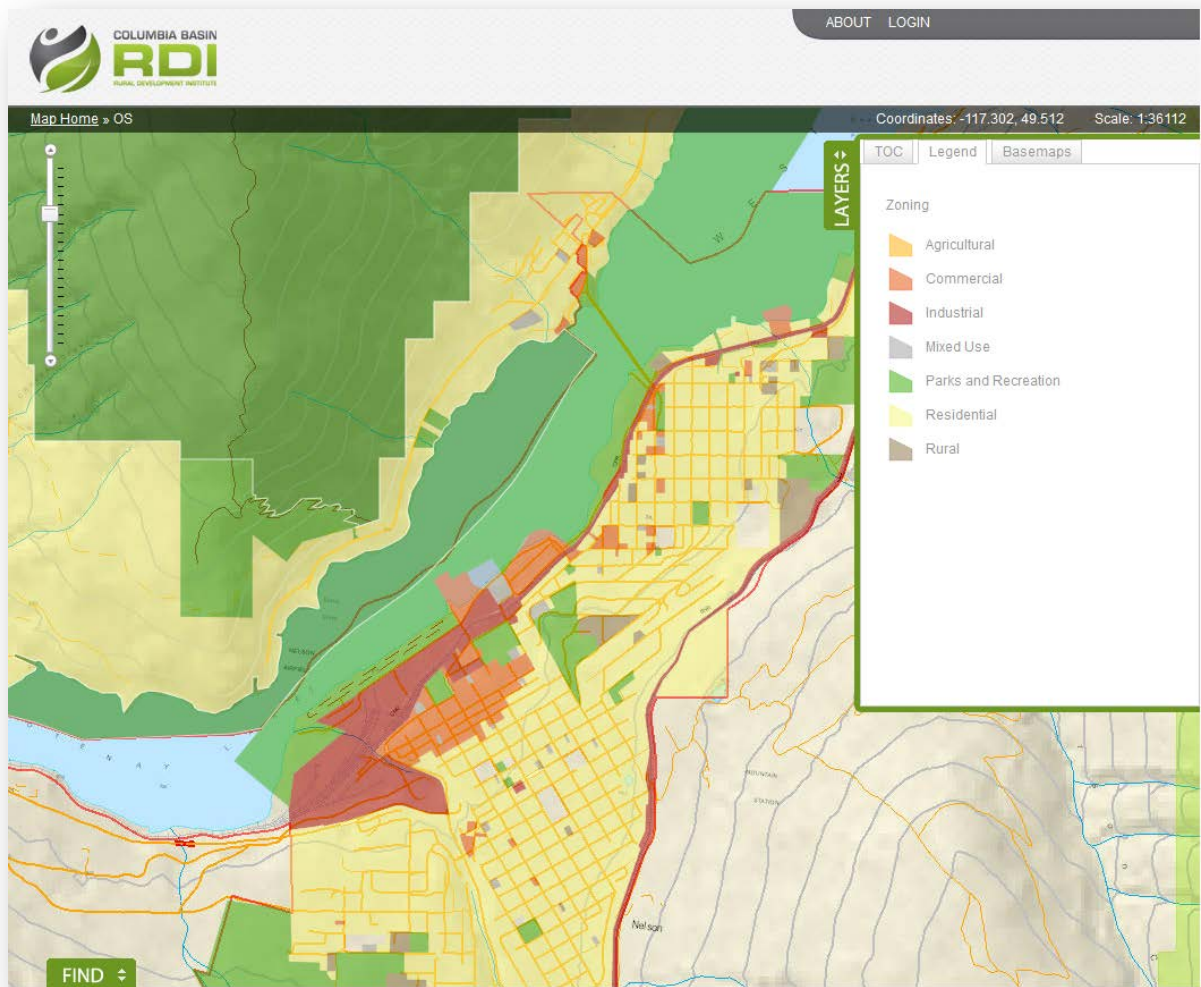
Map Legend displaying symbology for active layers

A number of map navigation tools are provided that enables the user to zoom in or out of an area by drawing a rectangle on the map. These map zooms (extents) are saved and can be re-visited using the map navigation tools.
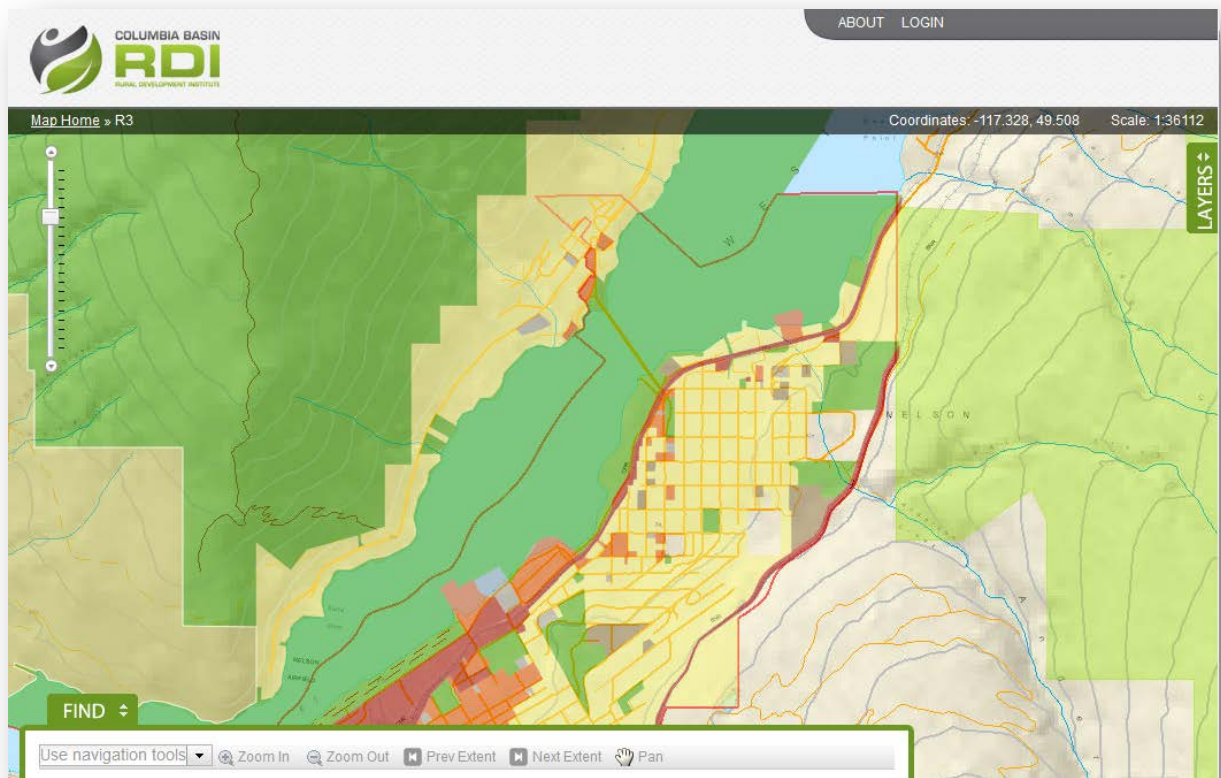
Map navigation tools

Users can choose to find communities, trading corridors, suitable parcels (demo only), and address locations by selecting from a dropdown box. A zoom-to icon (magnifying glass), if clicked, will cause the map to zoom and pan to the location.
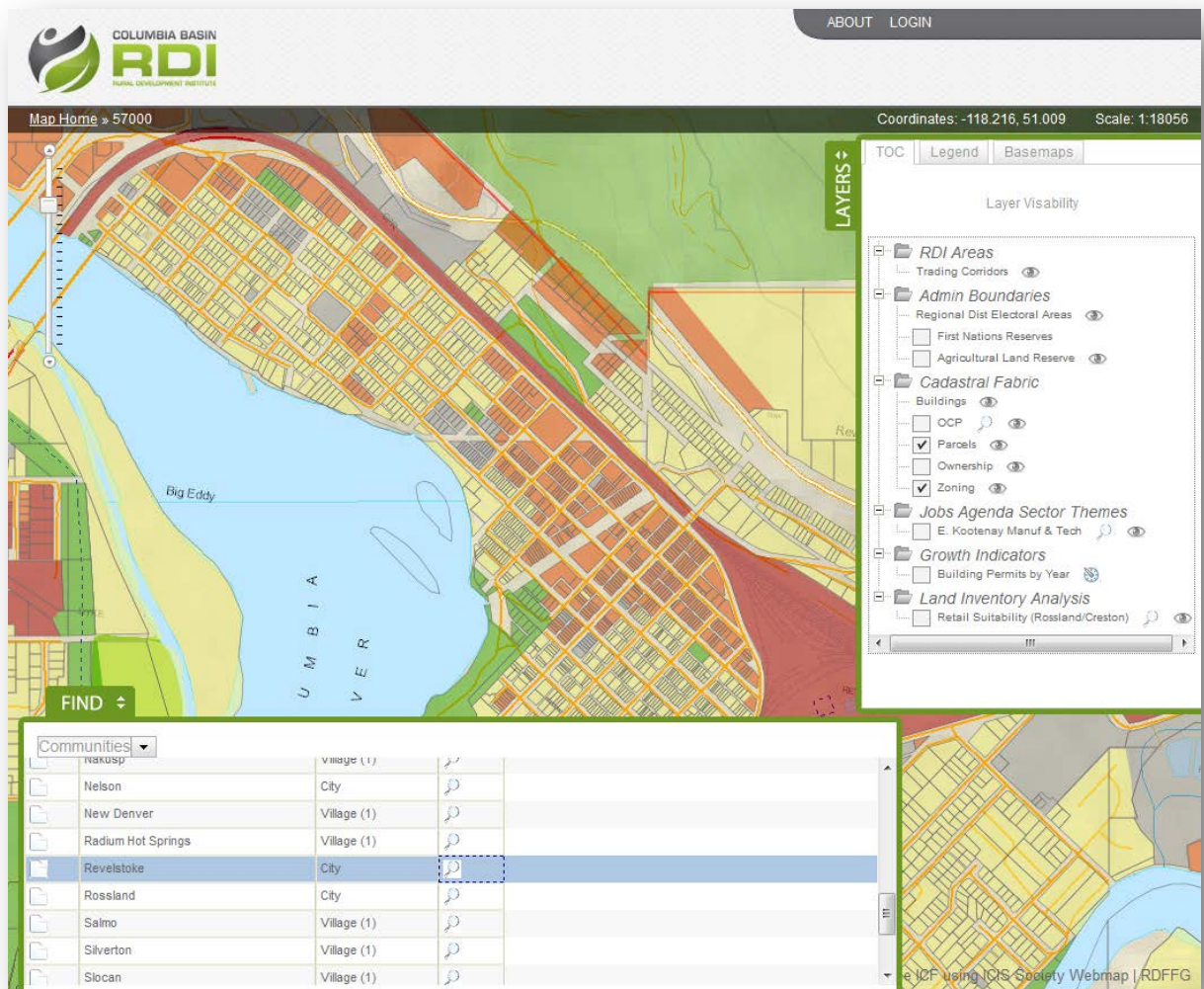
Find community feature

In the future, more data layers and details will be added along with the ability to do query and site selection based on the analysis models being built for this project.

Proposal for Phase 2

The Employment Lands Project is now ready to progress into Phase 2. This section presents a project plan to prepare work for the upcoming year (Fiscal Year 2013/2014). These recommendations take into consideration comments provided by the Employment Lands Advisory Committee and the findings of the Employment Lands Research Team.

Project Outline

The Employment Lands Project Phase 2 will be comprised of three principle efforts: Data Management, Employment Lands Analysis, and Improved Custom Analytical Capacity.

Data Management

Quality data is the heart of this project. This project represents an attempt to build a solid quantitative analytical basis for policy making in the Basin region. The quality of analysis is largely dependent on accurate and complete data[16].

Phase 1 of the Employment Lands project offered a number of emphatic reminders of this fact. For instance, the first tranche of analysis found only 7 commercial property sales (over 6 years) for the *entire RDCK region*. Stakeholders in Nelson listed between 10 and 20 that they were aware of in the last year. This serves to remind us that the analytical tool is only as good as the data that is uploaded to it.

Many positive outcomes resulted from Phase 1. The research team was inundated with data sets that had differing collection protocols and a myriad of naming conventions. Working through these data-sets has given the team a growing level of intimacy with the region's economic asset attributes and with the region's public data systems.

Phase 2 Data Management, then, will be focused on ensuring that all data-sets are as complete as possible, correctly interpreted, and integrated across all jurisdictions.

Custom Analyses of "Suitable Employment Lands"

The Results offered in this report represent a demonstration of analytical capacity, not of complete analytical results. The goal of this project has been to provide a complete analysis of the region's employment lands and the pressures on them. Providing useful analysis to regional policy makers will be the focus of the Phase 2 analytical component.

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[16] Strength of the model building and accuracy of assumptions also play significant roles.

Phase 1 Results should demonstrate to policy makers and regional stakeholders, the Employment Lands Tool's capacity for analysis. We have demonstrated a flexible platform that is capable of filtering complex, inter-connected data sets to provide answers to specific questions. We have been offered lessons on the importance of the underlying data and of accurately specifying the questions asked of the system.

Phase 2 will build on these lessons and focus on identifying lands that would be suitable to commercial use, but are currently legally unavailable to commercial development[17]. Once this question has been adequately addressed, Phase 2 will more thoroughly investigate the underpinning demand for and supply of commercial lands for the region. This will entail an examination of sectoral growth pressures, specific land attributes, utilization of existing lands and market efficiency.

On-Line Portal Development

The on-line functionality of the analytical tool has taken a back-seat to performing the basic analysis thus far. During Phase 2 of the Employment Lands Project, we plan to expand the development of the real-time customized analytical capacity in the web-portal.

Currently, users can use the on-line portal to examine different areas and to see where certain economic assets / infrastructure exist. Phase 2 will see the development of more advanced "query" function, where users can specify what attributes they are looking for, or how they would like the system to filter results, and see results specific to their needs.

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[17] Because they are designated as: working forest, agricultural land reserve, or parklands.

Expected Outcomes & Timeline

Data Management

Data Acquisition: Working with the various municipalities and regional districts to obtain all relevant data-sets for the region.

Data Cleaning: Ensuring that the data-sets are accurately represented in the meta-data files, and that they are accurate and complete.

Data Integration: Integrating data-sets into the Employment Lands model framework.

Custom Analysis

Question 2 Results: Applying the analytical framework designed to address Question 2 to the entire region – As per Advisory Committee instructions.

Utilization Analysis: Analyzing the utilization of existing commercially zoned lands throughout the region. Identifying underutilized parcels.

Sectoral Analysis: Analyzing economic growth patterns of major sectors represented in the region. Examining which sectors are growing the fastest, and looking at which sectors are driving demand for employment lands.

Sectoral Attributes: Study of desired land attributes that are common to stakeholders in fast-growing economic sectors.

Market Efficiency: Study of regional commercial real-estate markets and their level of efficiency (i.e. their ability to match buyers and sellers).

On-line Portal

Real-Time: Preliminary delivery of the web portal will offer users the ability to customize their visual map display with data layers (made available as they are cleaned and integrated). A final delivery date of December 2013 reflects our anticipated date of complete data acquisition. Of course, data sets will need to be updated on an on-going basis.

Query Function: The capacity to perform advanced queries will be added, at a limited level, to the web portal in the fall of 2013. This function will allow users to identify parcels of land with specific attributes, chosen by the user. We anticipate having higher-level query functionality developed for spring 2014 pending funding.

Research Line	Goal	Timeline
Data Management	• Complete acquisition from all jurisdictions	December 2013
	• Data cleaning (verification / validation)	Ongoing
	• Data integration	Ongoing
Custom Analysis[18]	• Question 2 results for region	Sept 2013
	• Utilization of existing lands analysis	Sept 2013
	• Demand / sectoral growth analysis	October 2013
	• Sectoral attributes	December 2013
	• Market efficiency study	March 2014
On-Line Portal	• Real-time usage	
	o Preliminary	October 2013
	o Final	December 2013
	• Query function delivery	
	o Preliminary	November 2013
	o Final	March 2014

Concluding Remarks

The Employment Lands Research Team would like to thank all contributing members of the public, the Advisory Committee and the generous support of Community Futures East Kootenay, the Province of BC, the Southern Interior Beetle Action Coalition, and the Columbia Basin Trust. We look forward to engaging in Phase 2 of this fascinating and important line of research.

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[18] Pending additional funding

Appendix A   Progress Checklist

Complete
- Data sharing agreements with:
  - RDKB
  - RDEK
  - RDCK
  - City of Kimberly (awaiting data)
  - City of Rossland
  - City of Sparwood
  - City of Revelstoke
  - City of Trail
  - City of Nelson

- Priority data layer identification

- Preliminary analysis / Interim reporting
- Structure and functionality of web-based geospatial employment lands, infrastructure and related assets mapping tool
- Key stakeholder involvement

In-Progress
- Data sharing agreements with:
  - CSRD
  - Remaining municipalities (Cranbrook, Golden, Valemount, Fernie, Castlegar)
  - Ktunaxa First Nation

- Migration of data to regional database (as they become available)
- Normalization of data to create seamless presentation of data
- Development of web-based geospatial employment lands, infrastructure and related assets mapping tool

Appendix B: Retail Trade Areas

$$\text{Retail Trade Radius} = \frac{\text{Distance between City A and City B}}{1 + \sqrt{\dfrac{\text{Population B}}{\text{Population A}}}}$$

Rossland: Distance to Trail   10km
                   Population Trail   7680
                   Population Rossland   3560

Creston: Distance to Cranbrook   105km
                   Population Cranbrook   19320
                   Population Creston   5310

Appendix C – Map of Region
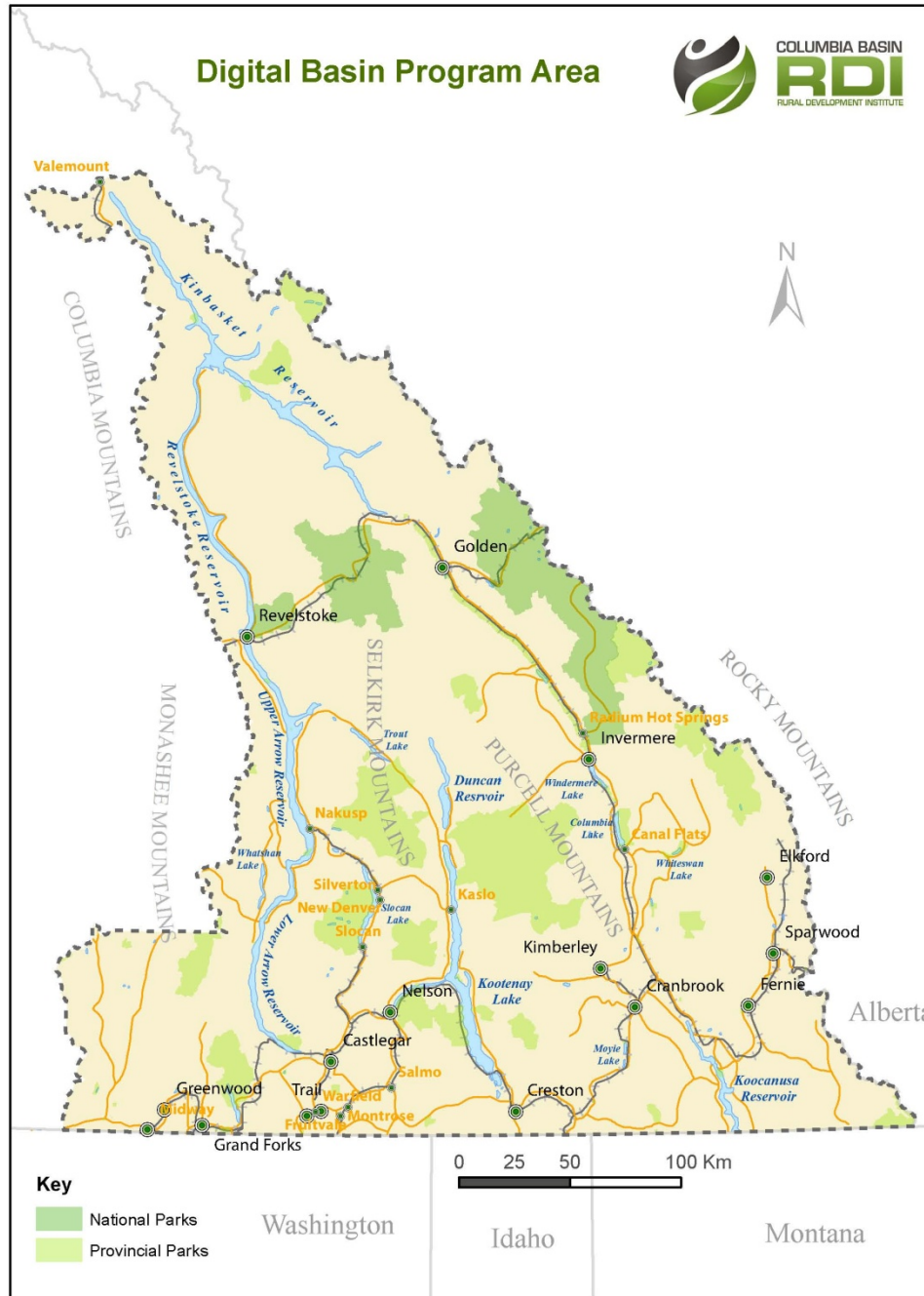
Map created by Selkirk Geospatial Research Centre

Appendix D – Priority Data Layers

Data Set	Comments	Source(s) Contact
<u>Urban</u>		
Cadastre (property fabric) with ownership	We have RDCK, RDKB, Rossland, RDEK, RDFFG (no folio)	Regional Districts: RDFFG, CSRD, RDCK, RDEK, RDKB. Cities:
Zoning	We have RDCK, RDKB, Rossland, Trail, RDEK (no data dictionary), RDFFG	Regional Districts: RDFFG, CSRD, RDCK, RDEK, RDKB. Cities:
OCP (official community plan)	We have RDCK, RDKB, RDEK (OCP SA)	Regional Districts: RDFFG, CSRD, RDCK, RDEK, RDKB. Cities:
Building points	We have RDCK, RDKB (polygons) & Rossland (polygons)	Regional Districts: RDFFG, CSRD, RDCK, RDEK, RDKB. Cities:
Square footage of different building types (commercial, recreation, other public etc)	We have RDCK, RDKB, Rossland	Regional Districts: RDFFG, CSRD, RDCK, RDEK, RDKB. Cities:
Transportation (road, rail, bus, air)	We have road, rail & air for RDCK (some bus), RDKB, RDFFG	Regional Districts: RDFFG, CSRD, RDCK, RDEK, RDKB. Cities:
Transportation Schedules and Volumes by Type	None	
Communications infrastructure (fibre, copper cables, radio towers, cell towers)	Some fibre optic from CBBC (little RDCK & RDKB)	CRTC, CBBC
Quality index for the telecommunications network	None	CRTC & Industry Canada http://www.ic.gc.ca/eic/site/719.nsf/eng/home
Airports	Not found at DataBC; they just had coastal airports	P:\SGRC\admin\SDE\SDE_Connections\RDI@PostSDE.sde\rdi_sde.rdi.BC_Airfields
Schools	Had to correct ~59 schools from DataBC's dataset (primary & secondary only)	DataBC; P:\SGRC\admin\SDE\SDE_Connections\RDI@PostSDE.sde\rdi_sde.rdi.Schools
Medical facilities	All Hospitals, Emergency Rooms, and Walk-in Clinics	DataBC; P:\SGRC\admin\SDE\SDE_Connections\RDI@PostSDE.sde\rdi_sde.rdi.HealthRelated

Real Estate Listings	We have Multiple Listing Statistics for 2011--Do a hedonic weighting model to establish far more appropriate and accurate weights. But, this would require a pretty decent sized data set of commercial property sales. *We have none*	BC Stats, BC Real Estate Board
Volumes and concentrations of tourist activities, by season	Some Parks data from 2010/11, and tourism revenue data for all	BC Stats
Quality or health index of the natural resources	None	BC MOF
Dispersion of skills by type	All at Kootenay level, not broken down further	BC Stats
Industrial activity density by NAICS code	All at Kootenay level, not broken down further & already classified by NAICS code (no #)--potential users punch in their NAICS code and get tailored data	BC Stats
First Nations GIS data	We assumingly have all + Akisqnuk First Nation specific data from BC Stats	O:\GIS_Data\admin\first_nations
Services (water, sewer, etc)	We have RDKB, Rossland, RDCK, RDEK (SAs)	Regional Districts, Municipalities
Manufacturing and Technology Companies	We have East Kootenay Data from 2007	
Sidewalks	None	RDs, Munis
Trails (bike, walking, etc)	Some in O:\GIS_Data\admin\recreation\commercial_backcountry_rec.gdb	RDs, Munis, Parks, Recreation groups
Where building bylaws apply/don't apply	We have some for RDCK & RDKB	RDs, Munis
Dynamic data (bldg permits, re-zoning applications, development plans)	We have RDCK & RDKB, and got amounts of specific permits for all areas	RDs, Munis, BC Stats, Stats Can
Elevation data (slope, aspect, elevation)	All	O:/gis_data/topo/dem
Land cover/vegetation	All	O:\GIS_Data\natural\land_cover\qbtm_r4

Soils/geology	Updated non-coverage datasets via DataBC on Aug.1/12 and are now in P:\SGRC\Projects\RDI\GIS_Data\Data BC	O:\GIS_Data\natural\soils & O:\GIS_Data\natural\geolog y
Flood zones	We have RDCK & RDKB	RDs, Munis
Front Country		
As for Urban	not all places will have OCP or zoning (Slocan Valley doesn't for instance)	
Golf courses	We have some within REC data from DataBC, but few	P:\SGRC\Projects\RDI\GIS_ Data\DataBC\REC_Related
Resorts	Some in West Kootenay--Including ski resorts; we have some within REC data from DataBC	P:\SGRC\Projects\RDI\GIS_ Data\DataBC\REC_Related
Other front country recreation & tourism	Kootenay Parks (O:\GIS_Data\admin\luco\aparks_r4)	BC assessment, data bc (O:\GIS_Data\admin\parks_ protected_areas)
Border crossing, highway scales	None--as measures of transportation & ins and outs of resources.	BC stats
Agricultural land (ALR), including ranches	Yes, but only broken down into areas within RD's (ie.Area A, B)--Out of Scope for analysis but could be used as a constraint or opportunity.	BC Stats, Stats Can, Agricultural Land Commission
Farming Database	Yes, but only broken down into areas within RD's (ie.Area A, B)--Out of Scope for analysis but could be used as a constraint or opportunity.	BC Stats, Stats Can, BC Assessment
Back Country		
As above		
Forestry tenures	Have some---could disaggregate to TFL, TSA, Community forests	DataBC
Backcountry tenures and lodges	Typically, there is a small area owned in fee simple by the company, like Baldface, around the lodge then a much larger tenure of Crown Land attached	data bc (O:\GIS_Data\admin\recreat ion\commercial_backcountr y_rec.gdb)

Trapping tenures	All	P:\SGRC\Projects\RDI\GIS_Data\DataBC\REC_Related\BC_Traplines
Mining tenures	All	P:\SGRC\Projects\RDI\GIS_Data\DataBC\Mining
Hydro-electric tenures including Independent Power Producers (IPPs).	We have some for RDCK & RDKB	data bc, google "IPPs", points of diversion extract
Infrastructure (information & communications like fibre backbones, hydro corridors, pipelines, radio towers, cell towers)	We have little for RDCK, RDKB, Rossland & Trail	data bc, utilities
Free Range Units	Yes, but only broken down into areas within RD's (ie.Area A, B)	BC Stats, Stats Can
Census Data as it becomes available		