

**MUNICIPAL DISTRICT OF RANGLAND
DATA SCOPING PROJECT – SUMMARY OF FINDINGS**

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INTRODUCTION

The Municipal District of Ranchland No.66 (MD Ranchland) is a unique municipality in southwestern Alberta. In spite of its proximity to Calgary, and in the face of growing pressures from various development interests, it has retained much of its pristine natural endowment, and the majority of its constituents continue to earn their livelihoods through the traditional ranching economy and culture of the region.

In recent years, mounting development pressures and observation of rural residential and commercial recreational expansion in neighbouring jurisdictions has led to elevated concern about development in MD Ranchland. The municipal government has expressed a desire to protect the natural and cultural characteristics of MD Ranchland that make it special, and to be proactive and strategic in responding to potential developers.

To address this need, the Miistakis Institute was hired in 2007 to assist MD Ranchland in the creation of mapping products and other tools to facilitate the development and implementation of a conservation planning strategy. This report documents the first phase of this project, the goals of which are:

- to survey and catalogue existing GIS and other data on the region;
- to identify and prioritize where possible gaps in the data that is currently available; and
- to propose and provide cost estimates for next steps in the development of conservation planning tools for MD Ranchland.

DATA FINDINGS

The following section contains a summary of data discovered during the data-scoping exercise undertaken by the Miistakis Institute on behalf of MD Ranchland. Data is categorized by general theme, and then described, including (when known) source, availability, cost, and potential utility.

NATIVE RANGE INVENTORIES

ECOLOGICAL RANGE SITE DATA:

Source: Alberta Sustainable Resource Development

Contact: Barry Adams (phone 403.382.4299, email Barry.Adams@gov.ab.ca)

Description: This data set presents a broad overview of the major ecological range sites, the area of each type relative to the natural subregion and soil correlation area, a ranking of the relative abundance of each type and major gaps in reference to plant communities which would require more research. The data is vector-based polygons.

Access: This data is in-hand at Miistakis, and can be provided in hard-copy or digital image format to the Municipality. However, the actual GIS data is the property of ASRD, and permission to access this data would need to be obtained from Barry Adams.

Potential Use: This is the best readily available data on non-forested plant communities in Alberta, and would be useful in the identification of different types of grassland and shrubland ecosystems. This data set has also been used in the past to model soil moisture regimes and wildlife habitat.

AGRICULTURAL REGION OF ALBERTA SOIL INVENTORY DATABASE (AGRASID):

Source: Alberta Agriculture

Contact: David Spiess (phone 780.427.3739, email David.Spiess@gov.ab.ca)

Description: AGRASID is a digital database consisting of seamless GIS coverages and relational data files which describe the soil landscapes for the agricultural area (i.e. white zone) of Alberta. The data in AGRASID may be displayed in two formats - either as soil landscape polygons or as land system polygons. The soil landscape polygons and attribute data were compiled at a scale of 1:100,000. The soil landscape data was subsequently 'rolled up' to produce land systems polygons, which are intended to be presented at a scale of 1: 250 000. Data describing soils and landforms in greater detail are stored in separate, linkable tables.

Access: The complete AGRASID data set, including GIS polygons, additional data tables, and metadata, can be downloaded from the Alberta Agriculture web site ([http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/sag3249?opendocument](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/sag3249?opendocument)). Miistakis has a copy of the entire data set in-hand, and is able to share it with the Municipality.

Potential Use: AGRASID data has been used to predict everything from Agricultural carrying capacity and soil erosion potential to wildlife habitat. The major limitation to this type of use for the MD of Ranchland is the AGRASID covers only the white zone, and not the entire Municipality. However, the AGRASID data could potentially be harmonized with similar/comparable data for the green zone (forested region) of the MD, and then used for such modeling applications.

RIPARIAN HEALTH ASSESSMENTS

RIPARIAN HEALTH INVENTORY:

Source: Cows and Fish

Contact: Michael Gerrand (phone 403.382.0927, email mgerand@cowandfish.org)

Description: Cows and Fish maintains a Riparian Health Inventory for MD Ranchland, and data is recorded at two distinct levels of detail – the first level consists of individual studies that are conducted on 1km reaches of watercourses (study area width is determined by the extent of riparian vegetation), the goal of which is to record and evaluate the ecological function of the riparian habitat. These individual studies are conducted with landowners' permission, and with the promise of confidentiality. Individual Riparian Health Inventories are compiled in summary reports that describe the ecological functionality of watercourses. These reports have been presented to the Municipality in the past. Data has been collected over the past decade, but the collection has not been systematic.

In a May 2002 report by Cows and Fish entitled "Summary of Riparian Health Inventory and Assessments Completed within the Municipal District of Ranchland (1997 to 2001)",

various projects assessing Riparian Health in MD Ranchland are described, including an aerial survey conducted in 1997 and ground-verification of aerial surveys in 1998. These data are summarized by stream, reach, and health indicator, and data is available in tabular format.

Access: The summary watercourse reports are already in the possession of MD Ranchland, and are generally publicly available. Mr Gerrand suggested that, in order to release data specific to individual studies, permission would have to be obtained from every landowner for whom a study has been conducted. This would involve some time and effort on behalf of Cows and Fish, which would likely require compensation. A GIS layer exists showing the locations of individual studies – with landowners' permission, this layer could be made available to the MD.

Potential Use: Point locations of individual studies could be used in association with Satellite imagery or orthophotos to classify and map riparian areas in terms of health. This work could be done by Miistakis.

The information contained in the 2002 Cows and Fish report (see description above) could be converted from tabular format to GIS data. Alternatively, the method used in 1997 could be applied to orthoimagery collected in the summer of 2006 (see description of base data, below), in order to create a current and comparable riparian health data set for the entire Municipality. This work could also be done by Miistakis.

FOREST / VEGETATION DATA

LAND USE / LAND COVER DATA SET:

Source: Miistakis Institute

Contact: Greg Chernoff (phone 403.220.8968, email greg@rockies.ca)

Description: In the summer of 2006, Miistakis performed a classification of 1999-2001 Landsat ETM+ satellite imagery, developing 17 landcover classes that describe the landcover/land use for the Canadian portion of the Crown of the Continent Ecosystem. The raster resolution is 30m – accuracy has not been checked, but provincial vegetation data in Alberta and BC was used to inform the classification.

Access: This data is in-hand and Miistakis. It is our product, and we are agreeable to sharing the data openly, should it be useful

Potential Use: Thematically, the data is coarse, and would not be of use for detailed assessment of vegetation or land use, such as identification of individual species. The data set was created for a much larger spatial area. For general description of vegetation and land use, however, this data is suitable and available for free. It could be used to identify broad zones of interest, e.g. coniferous forest, grasslands, etc.

ALBERTA VEGETATION INVENTORY (AVI):

Source: Alberta Sustainable Resource Development

Contact: Kevin Tripp (phone 780.422.4106, email kevin.tripp@gov.ab.ca)

Description: The Alberta Vegetation Inventory (AVI) is a photo-based digital inventory developed to identify the type, extent and conditions of vegetation, where it exists and what

changes are occurring. AVI occurs on land managed by the Crown, land managed under a Forest Management Agreement (FMA) and others including Métis Settlements, First Nations and Federal Parks. The AVI provides detailed information to assist in the decision-making process for forest management planning, forest protection, wildlife habitat classification and integrated resource management activities. Focus is definitely on forest plant communities, with little description of grasslands or herbaceous layers.

Access: Miistakis has this data in-hand and can use it with the MD of Ranchland towards the provision of hard-copy maps. However, the GIS data is owned by the Government of Alberta, and can not be distributed. If the MD wishes to purchase this data, it can do so from ASRD at a cost of \$60.00 per township.

Potential Use: As stated above, the AVI data is most useful for describing forested landscapes. It could be used for mid-scale forest mapping, but is not practical for the identification of rare stands/species. AVI has also been modified in the past and used for wildlife habitat modeling.

WEED INFESTATIONS

WEED OCCURRENCE REPORT DATA

Source: Municipal District of Ranchland (No.66)

Contact: Carla Bick (phone 403.646.3131, email ag@ranchland66.com)

Description: MD Ranchland has a mechanism in place by which constituents can report the location, date, and species for all noxious weed and invasive plant occurrences within the Municipality. This data has been stored in hardcopy form, but is currently being converted into a GIS database by Carla Bick at the Municipal office.

Access: MD Ranchland owns and maintains this database.

Potential Use: This data is valuable in its current form for displaying the location and extent of infestation within the MD. Current data could be used to generate a density surface which would show areas of highest infestation or concern. More complex modeling could be employed to determine likely seed sources, or to predict the spread of weeds throughout the MD.

WATER QUALITY

VARIOUS WATER QUALITY INDICES

Source: Agricultural Land Resource Atlas of Alberta

Contact: Denis Belisle (phone 250.719.1411, email belisled@agr.gc.ca)

Description: There are various aspects of water quality represented by spatial indices in the 2005 Alberta Agriculture, Food, and Rural Development document entitled "Agricultural Land Resource Atlas of Alberta". Many of these indices cover only the white (agricultural) zone, but some cover all of Alberta with the exception of National Parks. The following is a list of potentially useful indices:

1. Township-generalized data showing average annual precipitation between 1971 and 2000. Data comes from Alberta Environment, Environment Canada, and the US National Climate Data Centre.
2. Areal extent of wetlands, calculated as a proportion of total area, based on Soil Landscapes of Canada database and Ducks Unlimited Wetland database.
3. Water Erosion Risk, divided into 5 categories (negligible to high), and based on the Soil Landscapes of Canada database.
4. Aquifer Vulnerability Index, an indication of how vulnerable an aquifer is to contamination – a consideration of depth to the aquifer, surficial geology, and groundwater recharge through precipitation.
5. Surface and Groundwater Quality Risk, which combines the Aquifer Vulnerability Index and mapped agricultural land uses.

Access: Hardcopy maps are already in-hand at Miistakis. Denis Belisle at Agriculture Canada has been contacted and is attempting to secure access for Miistakis and the Municipality to the GIS data layers.

Potential Use: Most of these indices are based on national-scale data sets. These may be too coarse for analytical work within MD Ranchland, but are valuable to display these phenomena in the agricultural area of the Municipality. If desired, it may also be possible to adapt the methods used to calculate these indices to finer-scale data sets, producing layers with more detail and potential utility.

DAM LOCATIONS

Source: Alberta Base Features (see details below)

Contact: see details below

Description: minor and major dam locations are included as part of the hydrography data in Alberta Base Features.

Access: see details below

Potential Use: Dam locations may be useful if other reliable water quality data is available, as dams effect the downstream transport of non-dissolved contaminants. Dams also have the potential to impact the upstream movements of aquatic species.

BASE DATA

NATIONAL TOPOGRAPHIC BASE DATA (NTDB)

Source: GeoGratis

Contact: website <http://geogratis.cgdi.gc.ca/geogratis/en/index.html>

Description: The National Topographic Data Base (NTDB) comprises digital vector data sets that cover the entire Canadian landmass. Geomatics Canada has digitized and structured thousands of topographic maps, creating a complete and uniform product that can be highly useful in a broad range of applications. The NTDB includes features such as watercourses, urban areas, railways, roads, vegetation, and relief. For a complete list and description of

themes included in the NTDB data layers, please consult the NTDB data dictionary, available online at http://ftp2.cits.rncan.gc.ca/pub/bndt/doc/dictntd3_en.pdf. The ground data is depicted through points, lines, and areas.

The organizational unit for the NTDB is the 1:50,000 National Topographic System (NTS) map sheet – in fact, this data is the same that would be used by Natural Resources Canada in the creation of commercially available NTS hard-copy maps. Each file (data set) contains data for one theme over one map sheet. MD Ranchland is covered by seven NTS map sheets: 82G9, 82G10, 82G15, 82G16, 82J1, 82J2, and 82J8.

Access: These data are available for free download from the above website.

Potential Uses: The NTDB provides a base of properly structured vector data designed and suited for spatial analysis in GIS applications. It can also be used purely for display purposes, in the preparation of thematic maps. These data could also serve as a baseline data set (e.g. for wetlands) that could subsequently be verified and/or augmented through a community-based mapping initiative.

ALBERTA BASE FEATURES

Source: AltaLIS Corporation

Contact: website www.altalis.com

Description: The 1:20,000 Base Features is a GIS spatial database product covering five major thematic areas: Access (roads), hydrography (streams, rivers, lakes, islands), geo-administrative boundaries (land areas that have explicitly defined boundaries, established by legislation or by an agency to manage or administer land use), elevation contours (10m for non-mountainous, 20m for mountainous areas), and the Alberta Township System (ATS) grid (to quarter section or legal subdivision (LSD) level). These are currently the most comprehensive hydrology data sets available for Alberta.

Access: The Miistakis Institute holds a complete data set of Alberta Base Features covering the MD of Ranchland. However, stringent laws are in place governing the sharing of this data – Miistakis is not able to provide this data to the MD of Ranchland, but would be able to use this data to provide hard-copy (paper or digital image) maps, as well as to use this data in a web-based mapping application developed for Municipal use.

The Base Feature coverage is sold by National Topographic System (NTS) grid map sheets, at a cost of \$100/sheet for all five themes (individual themes can be ordered separately). A 1:20,000 NTS map sheet covers the area of approximately 2.5 townships, and the MD of Ranchland is covered by approximately 16-20 NTS map sheets. Data can be ordered from the website listed above.

Potential Use: Aside from their obvious utility as reference data, some of these data themes could be of broader use in conservation planning and mapping in MD Ranchland. For example, the hydrography data could be used to map the potential distribution of contaminants, or could be used in conjunction with a citizen science project to plot locations of water quality monitoring stations, and to map water quality throughout the Municipality.

Some of these data are available through other sources (e.g. roads, administrative boundaries), and some may not be of particular use to the MD (e.g. elevation contours, which can be derived from free elevation data).

NATIONAL ROADS NETWORK (NRN):

Source: GeoBase

Contact: website www.geobase.ca

Description: (from GeoBase website) “The National Road Network, Canada, Level 1 (NRNC1) is the representation of a continuous accurate centerline for all non-restricted use roads in Canada (5 meters or more in width, drivable and no barriers denying access). The primary data source of NRNC1 was produced with field driven Differential Global Positioning System (DGPS) technology. Additional sources, such as existing accurate photogrammetric provincial and municipal data were also integrated and updated. During the initial acquisition of the NRN data, efforts were made to utilise and update as much existing authoritative 'closest to source' centerline road data as was possible.”

The NRN covers all publicly accessible roads, at a similar level of detail and accuracy to the Alberta Basefeatures data. Private roads (e.g. farm driveways) and decommissioned roads or OHV trails are omitted from this data set.

Access: This data is downloadable for free from the above website. Miistakis also has this data in-hand, and is able to share it with the Municipality.

Potential Use: Roads are valuable locational reference data, but can also be used in wildlife modeling and other conservation applications to indicate the level of human use/activity in a given area. Travel time along road networks can be calculated, and has been used in planning exercises to show assess the accessibility of different portions of a landscape.

LANDSAT MSS, TM & ETM+ SATELLITE IMAGERY:

Source: GeoBase, GLCF at University of Maryland

Contact: websites www.geobase.ca, glcf.umiacs.umd.edu

Description: Landsat Satellite Images of the MD of Ranchland are available for three separate dates: July 14th, 1974 (MSS – approx. 60m pixel resolution); July 26th, 1985 (TM – 30m pixel resolution), and August 28th, 2000 (ETM+ - 30m pixel resolution). These satellites were designed by NASA to capture reflectance off of the earth's surface in a broader range of wavelengths than the visible spectrum. Landsat imagery was originally developed for the military, but has come to be widely used in conservation.

Access: These images are freely available for download from the above website. Miistakis has all but the earliest image in-hand.

Potential Uses: Satellite imagery is a valuable resource in conservation science. It can be classified to map land use/land cover, including plant communities, wetlands and waterbodies, soils and surficial geology, and broad-scale land use practices. Imagery of the same areas acquired on different dates can be compared in order to assess land use/land cover change – for example, Miistakis compared the 1985 and 2000 images described above in order to assess the amount of deforestation (due to logging) that had occurred over a 15-year time span in the Livingstone and Upper Oldman drainages. The most basic use of satellite imagery is as a true-to-life reference, allowing one to locate themselves or areas of concern precisely on the landscape.

The analysis of satellite imagery requires specialized remote sensing software above and beyond the GIS software that is currently licensed to the MD of Ranchland.

DIGITAL COLOUR ORTHOPHOTOS:

Source: MD Ranchland, unknown contractor

Contact: Greg Brkich (phone 403.646.3131, email cao@ranchland66.com)

Description: Colour aerial photography was acquired during the summer of 2005, and is currently in the process of orthorectification. Once completed, imagery should be sub-metre resolution.

Access: The Municipality is involved in discussions to acquire the orthoimagery in digital form, and to house it in Municipal offices. Miistakis does not currently have access to this data.

Potential Use: As well as adding another snapshot to the time series of available imagery, enabling change analysis, high-resolution and up-to-date imagery can be used as a valuable reference layer for community mapping or citizen science exercises. This imagery will be a very valuable resource if the MD can secure it.

SPOT5 SATELLITE AND OTHER IMAGERY:

Source: SALTS/Pekisko

Contact: Alan Gardner (phone 403.646.2600, email salts_ed@shaw.ca)

Description: Southern Alberta Land Trust Society and the Pekisko Group are joint owners of SPOT5 satellite imagery and colour orthophotos covering a portion of the MD of Ranchland. SPOT5 imagery is panchromatic (i.e. not colour – grayscale) with 5m pixel resolution, and the orthoimagery is of sub-meter resolution. The dates of this imagery are not known.

Access: Use of this data requires the permission of SALTS and/or the Pekisko Group. Miistakis does not have this data in-hand.

Potential Use: This imagery could provide another snapshot of the MD at a particular time, and could thus be used for temporal analysis such as land use change. If the orthoimagery mentioned above is not obtained by the Municipality, perhaps this orthoimagery could be used instead.

CULTURALLY SIGNIFICANT AREAS

LISTING OF SIGNIFICANT HISTORICAL SITES AND AREAS:

Source: Alberta Community Development

Contact: Eric Damkjar (phone 780.431.2346, email Eric.Damkjar@gov.ab.ca)

Description: (taken from AB CD website) “This [GIS dataset] describes approximately 31,000 land sections that possess known historical resources or have high potential for their presence, including archaeological, palaeontological, historical, natural and cultural resources”. This data set contains a complete listing as of September 2006, with plans to update listing

every 6 months – sites/areas are delineated at a LSD/quarter section level, and are ranked according to historical resource value (HRV) between 1 (most significant) and 5 (least significant). Metadata exists in the form of web resources (http://www.cd.gov.ab.ca/preserving/heritage/pands/significant_sites/index.asp) and a downloadable document. This list may not be comprehensive, as it only includes sites that are currently known to the province.

Access: This data is available to the public for free download from the AB CD website. A more detailed version of the listing (e.g. more spatially refined locations, more description as to the nature of the site) is maintained by AB CD, but is not currently available for public distribution.

Potential Use: Data can be used as-is to identify areas of historical/cultural significance. It could also be augmented by community mapping or local experts.

RARE PLANTS

ELEMENT OCCURRENCE DATA:

Source: ANHIC (Alberta Natural Heritage Information Centre)

Contact: John Rintoul (phone 780.427.6639, email John.Rintoul@gov.ab.ca)

Description: This is a GIS polygon shapefile, containing location and attribute information for all Element Occurrences recorded through ANHIC within the MD of Ranchland. Thematic data includes species recorded, date of observation, provincial status of species, confidence in species identification, precision of location recorded (represented by circular polygons of varying radii), and other information.

Access: GIS data is in-hand at Miistakis. It was acquired for the purpose of this study and is transferable to the Municipality.

Potential Use: Data can be used as-is to identify areas of concentration of rare plants.

WATERSHEDS

NATIONAL SCALE FRAMEWORKS DRAINAGE AREAS:

Source: Natural Resources Canada, via GeoGratis

Contact: website www.GeoGratis.ca

Description: This nation-wide data set delineates first and second-order watersheds (e.g. Highwood River, Livingstone River, Upper Oldman River, etc.). It was compiled by the Government of Canada, along with other National Scale data (rivers, lakes, roads, etc.) at a 1:1,000,000 scale.

Access: Data is available for free from the above website – Miistakis already has this data in-hand, and is able to share it with the Municipality.

Potential Uses: Watershed boundaries are useful for delineating areas of focus, areas of downstream influence, and the general “lay of the land”. The National Scale Framework may

be too coarse for meaningful use, but a similar, finer scale data set could be readily created from a digital elevation model (DEM).

WILDLIFE ECOLOGY

UNGULATE WINTER RANGE DATA:

Source: Alberta SRD, Fish & Wildlife Division

Contact: Carita Bergman (phone 403.627.1155, email Carita.Bergman@gov.ab.ca)

Description: This data set consists of four GIS polygon shapefiles, showing the wintering ranges for mule deer, elk, moose, and bighorn sheep. Metadata is currently not available for this dataset, so the scale of analysis/display remains unclear. This data has been used for other conservation mapping applications in southwestern Alberta.

Access: GIS data is in-hand at Miistakis, and permission has been granted by Fish & Wildlife to pass this data on to the Municipality.

Potential Use: Data can be used as-is, or with a simple GIS overlay, to identify locations and intensity of ungulate winter use within the Municipal District.

GRIZZLY BEAR HABITAT SUITABILITY MODEL:

Source: Alberta SRD, Fish & Wildlife Division

Contact: Carita Bergman (phone 403.627.1155, email Carita.Bergman@gov.ab.ca)

Description: This GIS polygon shapefile is the result of a Habitat Suitability Index (HSI) modeling project undertaken by Carita Bergman, Area Biologist with Alberta Fish & Wildlife, as part of the Southern Headwaters at Risk Project (SHARP). The model has been rigorously validated against empirical data, and has also been shown to be representative of suitable habitat for other wide-ranging carnivore species. The shapefile consists of polygons representing habitat of distinct quality, ranging in value from 1 (poorest habitat) to 4 (best habitat).

Access: GIS data is in-hand at Miistakis, and permission has been granted by Fish & Wildlife to pass this data on to the Municipality.

Potential Use: Data can be used as-is to identify areas of high-quality carnivore habitat within the Municipal District.

SOUTHERN HEADWATERS AT RISK (SHARP) PATCH PRIORITY INDEX:

Source: Alberta SRD, Fish & Wildlife Division

Contact: Richard Quinlan (phone 403.381.5397, email Richard.Quinlan@gov.ab.ca)

Description: This index was calculated as part of the Southern Headwaters at Risk Project (SHARP) by Alberta SRD Fish & Wildlife Division. Using 17 wildlife species as indicators, researchers assigned a priority rank and rating to each of 15 landscaped-determined contiguous patches of habitat in Southwestern Alberta. Attribute data includes both rank (1-15) and priority rating (very high, high, medium, low, very low).

Access: GIS Data (including layer described above and several others) is in-hand at Miistakis, and permission has been granted by Fish & Wildlife to pass it on to the Municipality.

Potential Use: Data can be used as is to identify areas of higher and lower conservation priority from a multiple species perspective.

WOLF HOME RANGE DATA:

Source: Alberta SRD, Fish & Wildlife Division

Contact: Terry Mack (phone 403.625.1450, email Terry.Mack@gov.ab.ca)

Description: This data set consists of two polygons, showing the home ranges of the Bob Creek and Willow Creek wolf packs, respectively. Data has been collected over several years through a combination of radio telemetry and GPS collars. Despite changing population counts in individual packs, ranges and movement patterns have largely stayed the same over decades.

Access: Data is held by Fish & Wildlife. Terry Mack has agreed in principle to sharing the data, and will secure permission to release it to Miistakis and the Municipality.

Potential Use: Displays location of wolf populations within MD Ranchland. Other data related to current and historic predation levels, areas of highest wolf-livestock conflict, pack population dynamics, etc., may also be available.

LIVINGSTONE-UPPER OLDMAN WILDLIFE MONITORING DATA:

Source: Miistakis Institute

Contact: Michael Quinn (phone 403.220.7013, email quinn@ucalgary.ca)

Description: For the past several years, Miistakis has been involved in a wildlife and OHV monitoring project in the Livingstone and Upper Oldman drainages. Remote-triggered cameras have been set up at random locations on and adjacent to roads and trails, and have recorded humans and wildlife as they pass the camera's sensor. Over the years, a significant amount of data has been collected that indicates which species occur, where and when. Ultimately, this data will be used to model animal movements and the potential "pinch points" between humans and wildlife – but currently, this data is in a relatively raw state.

Access: Miistakis owns this data, but may be willing to share it with the MD for the purposes of this project.

Potential Use: As stated above, the data is still in a relatively raw state, and will be used to create more complex data sets that may be more useful to the MD. Current data sets can be used to show the occurrence and density of wildlife species within the Livingstone and Upper Oldman drainages.

MISCELLANEOUS

RURAL RESIDENTIAL EXPANSION DATA:

Source: Miistakis Institute

Contact: Greg Chernoff (phone 403.220.8968, email greg@rockies.ca)

Description: Miistakis has modeled the likelihood of rural residential expansion for six MD's in southwestern Alberta, including MD Ranchland. Using tax roll data from 1960-2001, the model shows the probable increase in number of residential structures by quarter section, based on topographic, scenic, and amenity-based variables.

Access: This data is property of the Miistakis Institute, but is shareable for the purpose of this project.

Potential Use: The information contained in this data set can be read as a spatial indication of demand for residential development – areas that are more attractive as potential residential developments will have higher numbers in the index. The MD could use this data to assess demand for development across the Municipality, and to determine areas where demand for development conflicts with priorities for conservation.

COALBED METHANE / TIGHT GAS LEASES

Source: Livingstone Landowners' Group

Contact: Andrew Nikiforuk (phone 403.270.2995, email andrew@andrewnikiforuk.com)

Description: The Miistakis Institute was hired in the spring of 2006 to create a series of maps for the Livingstone Landowners' Group (LLG). The maps were to show pending CBM / tight gas plays and leases held by three separate private concerns, and their overlap with traditional ranching areas in the Oldman River and Callum Creek drainages. Data that was created includes the location of the gas plant, lease applications before the Alberta Energy and Utilities Board (AEUB), the boundaries of the Waldron Grazing Cooperative, and the locations of lands held by members of the LLG. All data were digitized from hardcopy maps, and are stored as polygonal GIS files.

Access: Miistakis has this data in-hand, and has received permission from the LLG to share all files with MD Ranchland.

Potential Use: These data can be used to show the overlapping of land uses on the landscape, and in conjunction with other data to show the spatial interaction between land uses and other priorities.

ENVIRONMENTALLY SIGNIFICANT AREAS

Source: Alberta Sustainable Resource Development / Miistakis

Contact: Greg Chernoff (phone 403.220.8968, email greg@rockies.ca)

Description: There are two separate GIS polygon layers that identify Environmentally Significant Areas (ESA's) within MD Ranchland – a province-wide layer, and one which deals specifically with ESA's within the Rocky Mountain ecoregion. These are coarse spatial layers, with little additional information explaining what it is that makes an area "significant"

Access: This data is in-hand at Miistakis, and is freely available to the public.

Potential Use: The coarseness and lack of refined descriptions of “what significant means” limit the utility of this data set for detailed conservation planning. These layers are, however, useful for identifying general areas of concern within the Municipality.

ENVIRONMENTAL IMPACT ASSESSMENTS & OTHER STUDIES

Source: Various sources, documents held at MD Ranchland.

Contact: n/a

Description: The Municipality’s office houses an impressive collection of hardcopy documents – Environmental Impact Assessments (EIA’s), scientific studies, maps, airphotos, surveys, etc. – that describe various aspects of the Municipal landscape.

Access: n/a

Potential Use: When council is approached with a new proposal for development, it would be easy to overlook previous studies that have been done in the same area. It would be beneficial to the Municipality to index these documents spatially, by digitizing a rectangle showing the study area or region to which each document applies, and referencing each rectangle back to the original document. This would allow for the comparison of new proposals and documents to historic ones, and better enable Municipal staff and council to assess proposals for new studies or developments.

DATA GAPS

The assessment of data gaps is very subjective, and depends on the opinions and preferences of data users, the purpose for which the data is being collected, and other factors. However, the following offers some general insights on the deficits in the data sets that are described above.

Although there are high-quality GIS data that describe landforms, natural land cover, and use of the landscape by wildlife, there are fewer reliable sources within MD Ranchland for sub-surface characteristics of the region (namely groundwater and subsurface geology), or weather and climate/microclimate characteristics (variation in temperature, precipitation, or average wind speed throughout the region).

Another general theme of data that is largely absent from the collected datasets, and one that could be of immense importance in future conservation planning efforts, is present and future development and resource extraction data. Forestry, oil & gas, and mining industries have all been active in the region, and presumably have interests to continue development into the foreseeable future. These activities have a tangible impact on the future of the Municipality, and should be incorporated into future planning and mapping endeavours.

Lastly, it may be of use to MD Ranchland to have access to utility and service locational data; particularly the location of existing and planned power transmission and telecommunications infrastructure, as well as the present and planned service areas for high-speed internet.

NEXT STEPS

This report summarizes the findings from the first phase of an ongoing project, the end goal of which is to provide the MD of Ranchland with effective tools and resources to incorporate the conservation values of the Municipality and its constituents into the planning process. The first phase lays an essential foundation, and creates numerous varied opportunities for next steps moving forward.

Future phases of this project could include the development of the following applications in support of sustainable land use decision-making:

- graphically identifying data gaps which need to be filled in advance of land use changes being embraced by the MD
- development of conservation indices in the prescribed mapping tool, whereby certain key landscape features are layered together to represent areas of greater ecological importance
- use of weighted overlays where the planning / conservation / development / etc. priority of different data layers is weighted; for example, assigning a high conservation weighting for riparian areas, low conservation weighting for sub-divided parcels – and so on – could give an overall measure of prime conservation/development areas
- layering of development constraints to identify areas most able to accept new development
- use of community mapping exercises to draw from local expert knowledge to fill gaps, and translate that information into GIS layers

Some possible options for future work are included below.

1. Assembly of the data

Assembly of the data will include two tasks: acquiring identified data, and populating the Geographic Information System

Acquisition of data: Although much of the data identified in the scoping phase (Phase I) existed either in the Miistakis office or in easily-accessible locations (open-access web sites, etc.), much of it was not as readily accessible, so was identified but not acquired. This task will involve contacting data holders in these instances, negotiating for the acquisition of the data, and verifying its utility.

Population of the Geographic Information System: The MD of Ranchland has the basic software needed to receive, process and display the identified GIS data (ArcGIS Desktop). Import of that data requires ArcCatalog, which is also part of the ArcGIS software.

2. Development of a “Prescribed Mapping Application”

In smaller Municipalities, there is rarely the capacity or expertise for GIS mapping and analysis to be done in-house. In cases where these MDs have developed that capacity, the risk to sustainability is high in that usually only one person is trained. Though the MD of Ranchland has currently developed some internal capacity, planning for sustainability suggests it is prudent to develop a mapping application that is sufficiently intuitive that it can be run by the layperson, regardless of the complexity of the underlying Geographic Information System.

Similarly, the value of a data and mapping system to the municipality as a whole is greatly increased when more than one person feels comfortable using it.

The simplest way to set up such an application would be to build a “prescribed mapping application,” which is essentially a custom-built ArcGIS map document, built to complement the existing GIS software. Though an advanced GIS operator could still make use of all the cartographic and spatial analysis features of the GIS software, this application simplifies and to a degree automates the process of generating a map from the existing data.

The tool would allow all thematic data layers collected for the MD of Ranchland to be used, displaying the data according to pre-set map characteristics (colour, transparency, minimum and maximum scales, spatial extents, etc.). The user would then easily be able to choose which layers to include, then print off or display maps to suit their purposes. New data could be added as available/necessary.

3. Training of municipal staff

Though there is value in GIS training courses, those aimed at introductory to intermediate users can be generic and very costly. To maximize the ability of the MD of Ranchland to draw effectively from their Geographic Information System (and the prescribed mapping tool, as described above), Miistakis would provide one-on-one training for the responsible MD staff person.

Training would be directed to the project items described above, but would likely also incorporate some subjects of broader applicability. Topics could include:

- addition of new data layers to the system
- generation of maps and manipulation of data (to the extent allowed by the MD’s version of the GIS software)
- use of the prescribed mapping tool
- potential uses of the system to support land use decision-making

Three (3) full days of training would include on-site training (where the MD’s GIS operator learns using their specific set up and hardware/software environment) as well training at the Miistakis office on the University of Calgary campus (where the operator learns in an environment where greater data and technical resources are available).