

SASKATCHEWAN ASSOCIATION OF RURAL MUNICIPALITIES



Got Gravel?

Aggregate Management Strategies for Rural Municipalities in Saskatchewan

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Executive Summary

The Saskatchewan Association of Rural Municipalities (SARM) initiated this project in August, 2015 to study the current state of aggregate resources in Saskatchewan and develop strategies for Rural Municipality (RM) sustainable gravel resource management. The elements of this report consist of a historical review of aggregate management and use, determining the current state of gravel in Saskatchewan, identifying legislation and policy which may limit an RMs ability to access affordable gravel resources, identifying best management practices which could be adopted into current gravel management programs to ensure efficient use of the resource and development of recommendations to steer towards long term gravel reserves for RMs.

Gravel is an important non-renewable resource necessary for infrastructure construction and maintenance. Saskatchewan's Rural Municipalities (RMs) are responsible for the construction and maintenance of approximately 174,000 kilometers of road, representing 92 percent of the province's rural road network. Average annual gravel requirements of RMs are 20,356 cubic yards. Approximately 90 percent of the gravel use in Saskatchewan is for the purpose of road construction and maintenance. Costs associated with maintaining, upgrading and building new roads comprise the largest part of an RMs budget. This road network is important infrastructure contributing to the economy and providing benefits to all of Saskatchewan's residents.

As Saskatchewan's economy grows, competition for gravel will increase because of industrial, municipal and other demands for aggregate. It is inevitable that local supplies of gravel in some areas of the province will be exhausted. Since the late 1980's, gravel values in Saskatchewan have increased by approximately 300 percent. This upward cost trend is expected to continue. Based on the current 5-year average use by RMs and a 30-year outlook, overall approximately 181,600,000 cubic yards of gravel will be needed by RMs over the next three decades.

Ten recommendations are made in this report:

Table 1: Summary of Recommendations

No.	Recommendation
1	A gravel exploration unit be developed under SARM to lead the exploration and establishment of gravel reserves on a Planning Division basis on behalf on RMs
2	SARM collaborates with the Ministry of Highways, the Saskatchewan Shortline Rail Association and the Transportation Planning Committees to fully understand near and longer-term needs and economics of transporting gravel by rail to those RMs in short supply
3	SARM includes the need for additional funding, to accommodate exploration and acquisition of gravel reserves and reflect the actual cost of road maintenance, within the current review of grants being conducted by the Saskatchewan government
4	RMs having extensive gravel deposits and development should issue Development Permits as a means to properly manage the development and assure ratepayer interests are balanced with the need to conserve and utilize gravel resources responsibly

No.	Recommendation
5	SARM develop a common set of conditions specific to gravel pit development and operations that all RMs can use as a basis for permitting gravel operations subject to local needs
6	SARM develops basic road construction and maintenance guidelines specific to road Classes 4 through 7 for use by Rural Municipalities
7	SARM designate 'entities' as the lead for providing training to RMs for road construction and maintenance standards, best management practices, gravel acquisition and gravel pit management
8	RMs should purchase private land having good gravel reserves as part of their portfolio of a strategic supply
9	Where Crown Land is within or nearby RMs, investment should be made in exploring for gravel sources and reserving known sources for future use, where gravel development is an appropriate use of the land
10	SARM should consider advocating for the following 5 policy changes within government: <ul style="list-style-type: none"> 1. Priority Rights to Gravel 2. Agriculture Leaseholder Compensation 3. Fees, Charges, Security Requirements 4. Permit and Lease Approval Requirements 5. Other Opportunities

The recommendations are designed to cover several key needs. First and foremost, they steer towards taking actions that secure gravel reserves for use into the future. Secondly, they support development of additional tools and education opportunities with intent to conserve and use gravel in a responsible manner. Lastly, policy changes are identified that benefit both RMs and private gravel operators, related to the use of crown gravel sources for public works projects.

Acknowledgements

Saskatchewan Rural Municipalities

SARM Infrastructure Committee

SARM IC Sub-committee

Saskatchewan Heavy Construction Association

Saskatchewan Shortline Rail Association

Ministry of Agriculture

Ministry of Highways and Infrastructure

Ministry of Environment

Ministry of Economy

Ministry of Government Relations

Disclaimer

The Got Gravel? - Aggregate Management Strategies for Rural Municipalities in Saskatchewan is an independent report commissioned by the Saskatchewan Association of Rural Municipalities (SARM). The report includes recommended strategies for acquiring future reserves of gravel for use in public works projects and best practices to better use and conserve gravel.

This report has been completed in accordance with the terms of reference issued by SARM (SARM-002 August 14, 2015). SARM has closed this project and considers this report final.

The SARM Board of Directors may not fully endorse all of the contents of this report. The report may not necessarily represent the views or opinions of SARM or the Rural Municipalities. The conclusions and recommendations contained within this report are those of the Authors. Until such time as the SARM Board of Directors makes decisions confirming acceptance, rejection, or non-consensus regarding the conclusions and recommendations contained in this report, they should be regarded as information only.

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Chapter 1: Report Overview

The Saskatchewan Association of Rural Municipalities (SARM) initiated a project in August, 2015 to study the current state of aggregate resources in Saskatchewan and develop strategies for Rural Municipality (RM) sustainable aggregate resource management. The elements of this project consisted of a historical review of aggregate management and use, determining the current state of gravel in Saskatchewan, identifying legislation and policy which may limit an RMs ability to access affordable gravel resources, identifying best management practices which could be adopted into current gravel management programs to ensure efficient use of the resource and develop recommendations to steer towards long term gravel reserves for RMs.

Organization of Project

This project was completed through three milestones: current state analysis, gap and issue identification, and final report development.

Milestone 1, current state analysis, included tasks associated with information and data gathering. The project team conducted interviews with representatives from industry, all levels of government, and private land owners. Interviews were initiated to fully comprehend aggregate operations in Saskatchewan, from understanding perspectives of governing policy to learning about on-the-ground operations of aggregate exploration, acquisition, and management. In addition to interviews, the project team attended the SARM Mid-Term Convention and gathered further information through a workshop presentation and impromptu interviews with various convention delegates.

Information gathering also included an online survey, which was developed and sent out to each RM for completion, a review of current Saskatchewan policy and legislation relating to aggregate operations, and an analysis of geographic data (GIS) availability and needs.

Milestone 2, gap and issue identification, occurred concurrently with Milestone 1, as preliminary gaps and issues were acknowledged using the research and information gathered in Milestone 1. Potential gravel sources (e.g. surface geological features, Crown Land, First Nation Reserves etc.) were identified using available mapping and literature, and areas of future potential opportunity or stockpiling were noted using various sources of information. A general review of applicable aggregate best management practices was conducted, as well as research into alternatives to gravel use or conservation methods was completed.

Milestone 3, final report development, was initiated upon completion of Milestones 1 and 2. This milestone included addressing the gaps and issues found in the analysis through the development of policy recommendations and potential gravel management strategies applicable to Saskatchewan Rural Municipalities. All data, information, recommendations, and strategies were then compiled into a final report. The SARM Infrastructure Committee and key stakeholders had input throughout the process.

Literature Reviews

Upon project commencement, literature relating to gravel exploration, acquisition, operations, and management practices was sought and reviewed. The focus of the literature review was specific for Saskatchewan; however other applicable aggregate resource management information was reviewed based on potential applicability for use in Saskatchewan. This background research included reviewing alternatives to aggregate and best aggregate management practices, provincial population changes, gravel road engineering methods, investigations of the history of gravel operations in Saskatchewan and historical provincial exploration, and identifying past or current programs which relate to RM aggregate operations.

Legislation, Policy and Planning Reviews

The policy assessment was conducted through a review of the respective roles of responsible Saskatchewan Ministries, the relevant provincial and federal legislation and associated regulations and the Ministry policies related to the exploration, allocation, operation and reclamation of gravel pits. Results were summarized in a table format for quick reference. Through a synthesis process, gaps were identified in respect to management and/or allocation of gravel to rural municipalities. Information was shared with multiple stakeholders including the project Infrastructure Committee, and the Sub-group including representatives from the Ministry of Agriculture, the Ministry of Environment, and the Ministry of Highways and Infrastructure. Stakeholder feedback was considered in the development of the recommendations.

Online Survey

A web based survey, sent out to 296 Rural Municipalities, was conducted to understand the current state of gravel within each RM, the sources of gravel used by RMs, and issues associated with acquiring and securing gravel reserves, whether on public or private land. The survey was open for a two-month period, with a follow-up reminder email and an announcement at the SARM Mid-Term Convention. The survey results were used in issues analysis, geographic analysis, gap analysis, and in conjunction with the policy analysis to develop recommendations and strategies.

Interviews and Workshops

To fully understand aggregate operations, policy, and management in Saskatchewan, one-on-one interviews were conducted with representatives from industry, private operators, and all levels of government. Questions were tailored to the interviewee, however focus areas included current supply (exploration) and future demand (competition), aggregate related policies and standards, potential opportunities, and perceived gaps/issues which hinder sustainable aggregate management for Municipalities. Questions were designed to promote discussions, to learn of the perspectives of all those involved in aggregate operations and management. Interviews were conducted from October 2015 through the end of November 2015, with additional engagement of the Saskatchewan Shortline Rail Association (SSRA) and the Saskatchewan Heavy Construction Association (SHCA) in March 2016 and April 2016 respectively.

An informative workshop was conducted during the SARM Mid-Term Convention in November 2015. The workshop was used to inform RMs of the aggregate management strategy project, to remind the delegates to complete the online survey, and to gather further information through a worksheet which was completed during the presentation and handed-in upon workshop conclusion. Approximately 200 worksheets were collected for analysis.

Geographic Analysis

The geographical analysis was conducted using various data sets, such as the on-line survey information, population datasets from the Saskatchewan Bureau of Statistics, Ministry of Highways and Infrastructure Road Network Data, Saskatchewan Surficial Geology, and the Saskatchewan Research Council Aggregate Resource Potential maps. The data was analyzed using Microsoft Excel and ArcView, a geospatial tool that enables visualization, management and mapping of data. Various provincial maps, tables and graphs were developed to represent current state of aggregate, potential opportunities, as well assist in predicting future demand areas. Locating of gravel supplies and specific sources could not be conducted, due to the limitations of data associated with present-day aggregate pits and confirmed map source locations.

Work with Infrastructure Committee and Sub-group

As was outlined in the project proposal, the project team worked closely with the Infrastructure Committee (IC) and the Sub-group, updating on project progress and meeting as necessary to ensure tasks were in-line with the expectations of the scope of work. Bi-weekly updates were sent to the SARM project manager, and meetings with the IC took place upon project kick-off and at the end of each milestone. Sub-group meetings were conducted at project kick-off and at the conclusion of each Milestone, to obtain feedback from each group of stakeholders involved in RM aggregate management.

Chapter 2: History of Aggregate in Saskatchewan

General Geology

The last glaciation which enveloped Saskatchewan occurred during the Wisconsin glacial period, about two million years ago; at which time the Laurentide ice sheet covered most of the province, with believed exception of the Cypress Hills area and the Grasslands National Park area (Dale, 2006). The ice sheet retreated northeastward, and much of the Saskatchewan landscape was created through glacial deposition and erosion. Ice-contact glaciofluvial deposits, such as kames, kame deltas, kame terraces, and eskers are landforms which generally contain smaller sand and gravel occurrences, while larger potential granular deposits may be found in kettled/non-kettled outwash plains, valley plains, and delta areas (Mollard & Mollard, 1987) (Figure 1). Though Saskatchewan's landforms contain many of these aggregate related glaciofluvial landforms, much of the material left behind contains higher volumes of sand compared to gravel. As such, not all landforms in Figure 1 will contain high volumes of good quality gravel. Areas which are thought to contain coarser deposits in larger volumes include that of the Cypress Hills region, the Wood Mountain region (Sask. Industry & Resources, 2003) and the Swift Current region (Rogers, 2011).

Overview of Aggregate Related Initiatives

Records indicate that since approximately 1940, aggregate has been on the radar of various groups as an important natural resource. This is apparent through the development of Acts, policies, initiatives and programs tracked over time (Figure 2). The following sub-sections of this Chapter and following Chapters will refer to many of these initiatives; these are used to gain an understanding of efforts put forth in gravel exploration, acquisition, and management by aggregate stakeholders in the province.

Exploration:

Gravel was first administered through the provincial government in 1957, under the Mineral Resources Act - Quarrying Regulations (Government of Saskatchewan, 1957). It was categorized with all other quarriable substances, such as marble, limestone, granite, etc. These regulations only applied to gravel on crown owned land.

Shortly after this in 1966, the provincial government produced a document outlining Saskatchewan's mineral resources. This document however, did not explicitly detail exploration activities for aggregate, it focused on the geology associated with the resources and provincial production for that time.

As the provincial economy grew and competition increased, there became a larger demand for gravel. As such, there was a need by provincial, municipal and private operators to investigate larger commercial sources and explore for future gravel resources. The first record found of exploration was that in 1968, by the provincial government. Subsequent records from the Saskatchewan Mineral Assessment Database (SMAD) (Ministry of the Economy, Accessed 2015), indicate RMs, the government, and private industry all took part in sand and gravel exploration activities.

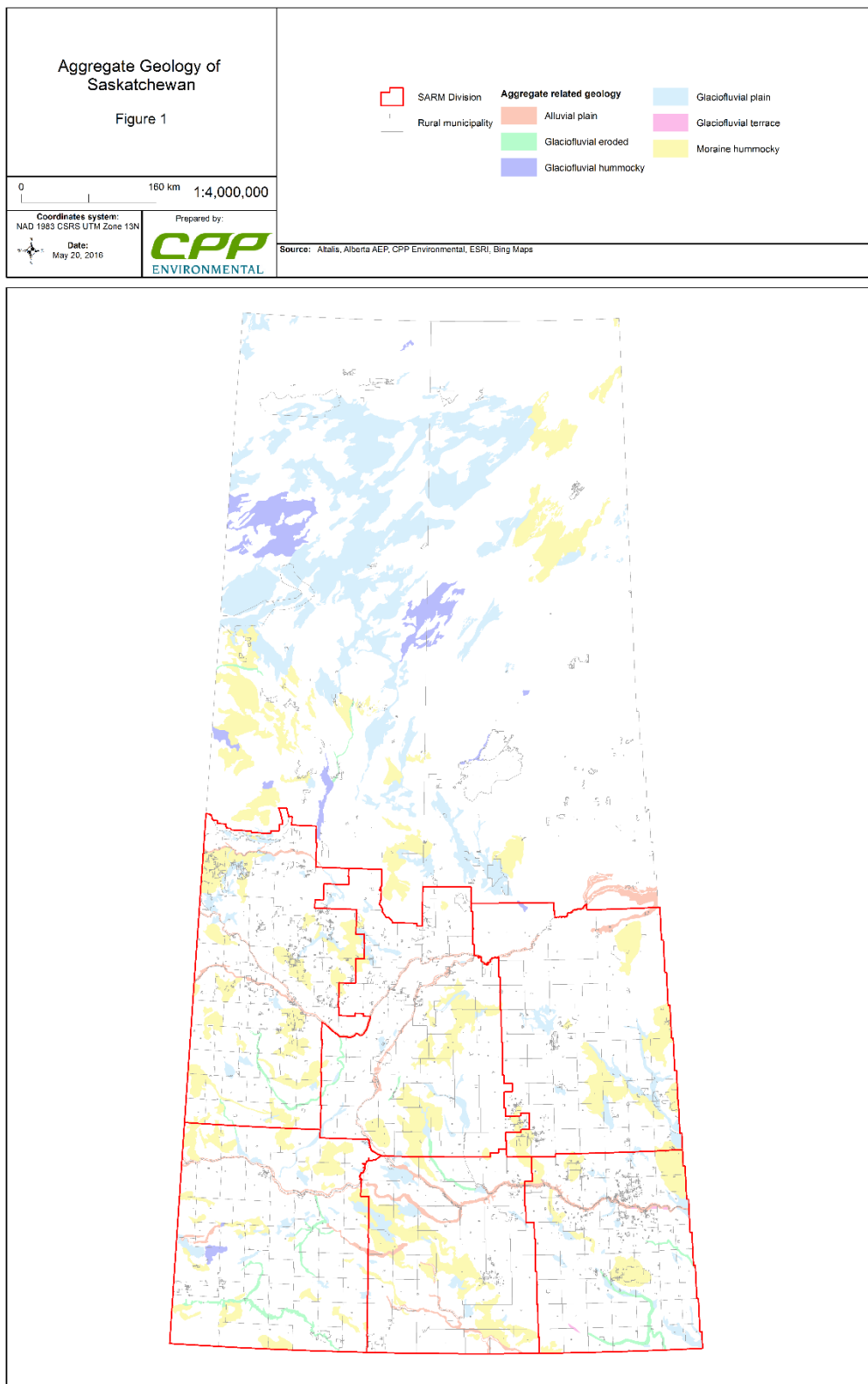


Figure 1: Surficial geology related to potential aggregate (sand & gravel) containing landforms

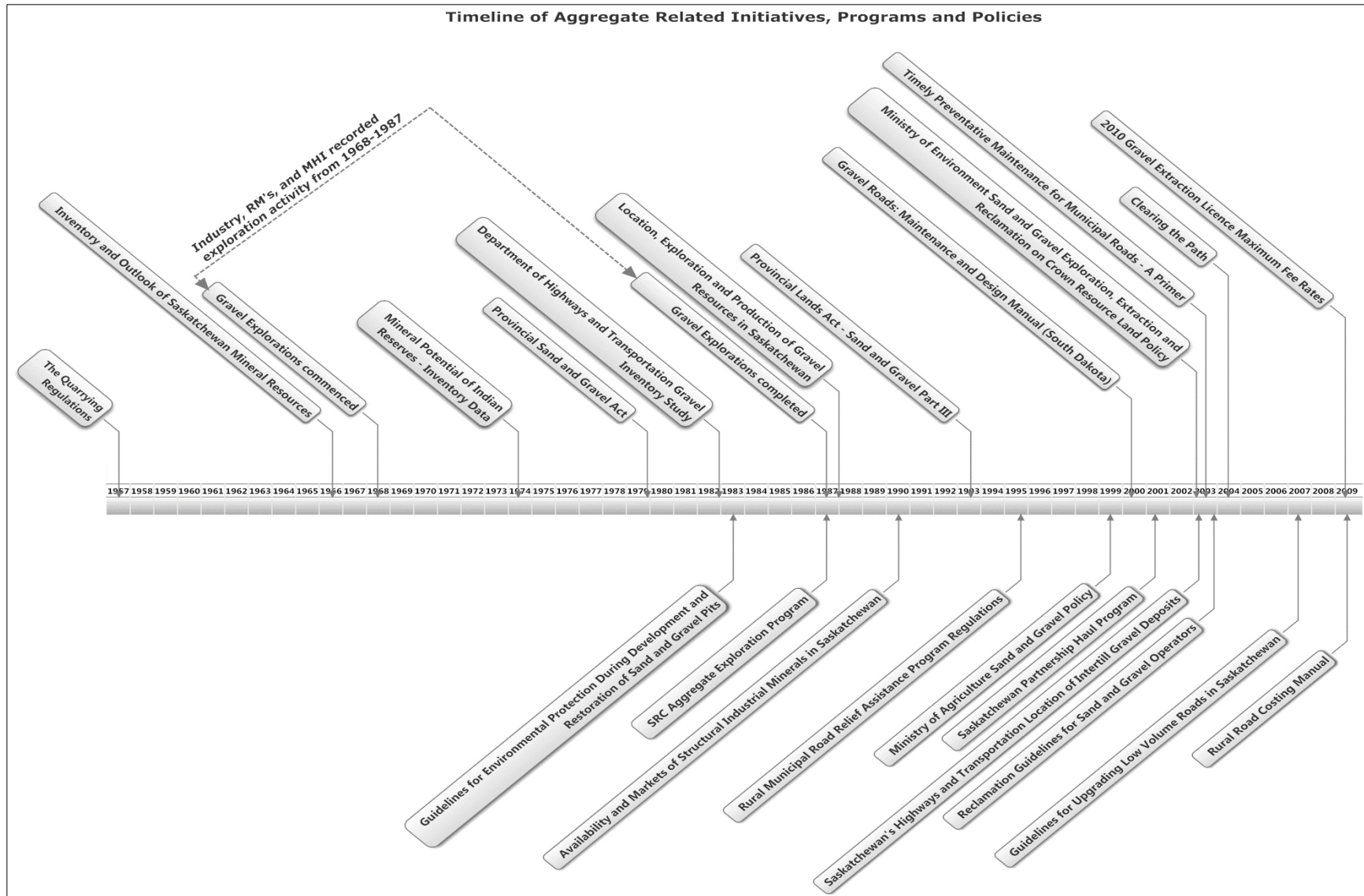


Figure 2: Historical overview of aggregate initiatives applicable to Saskatchewan

According to records, from 1968-1987, there were ten recorded instances of exploration by RMs but most were from private industry. In total, there were 39 exploration results listed in the SMAD data. For these, test holes/pits were drilled but no record of viability was reported.

Further to the Government SMAD data, there are 37 records of aggregate related activity in the Saskatchewan Mineral Deposit Index (SMDI) (Government of Saskatchewan, 2015). Few dates are associated with the records, however those that had dates reflect 2002 and 2003. Compiled results can be seen below (Table 2), and a cross-reference of location within aerial imagery can be seen in Figure 3. References for this exploration cited the study done by Mollard & Mollard, 1987 within the dataset.

Table 2: SMDI Aggregate Related Records

Sand & Gravel Activity	Records
Developed Prospect without Resources	1
Developed Prospect with Resources	4
Producing Mine	2
Prospect	23
Low-Purity Limestone Activity	
Occurrence	4
Developed Prospect with Resources	3

Aboriginal Affairs and Northern Development Canada also began to investigate aggregate potential on various First Nations reserves through the province around 1975 (Government of Canada, 1979). Approximately 40 reserves were investigated between 1974 and 1989 (Table 3). Few of these areas were estimated to have commercial quality aggregate; many were sandy or poor quality, to be used at only a local level.

Table 3: First Nations Involved in Early Exploration

Ahtahkakoop	Lac La Ronge	Ochapowace	Standing Buffalo
Joseph Bighead	Mosquito-Grizzly	Pasqua	Star Blanket
Cowessess	Little Black Bear	Buffalo River	Sturgeon Lake
Cumberland	Little Red River	Piapot	Sweet Grass
Grizzly Bear's Head	Makao	Poundmaker	Turnor Lake
James Smith	Mistawasis	Red Pheasant	White Bear
Kahkewistahaw	Montreal Lake	Sakimay	White Cap
Keeseekoose	Muscowpetung	Saulteaux	
Key	Muskeg Lake	Seekaskootch	
La Plonge	Moosomin	Shesheep	

Note: Names in chart as they appear in the referenced documents.



Figure 3: Aerial image example of one SMDI site showing gravel development resulting from the exploration

As this interest in the location of potential aggregate resources increased, a project by the Saskatchewan Research Council (SRC), referred to the Aggregate Exploration Program, was initiated, circa 1987, in response to an increased need for aggregate by many of the Rural Municipalities (Simpson, 1987). Eleven RMs were investigated, through field testing and aerial photo analysis. The first four RMs were investigated from 1987-1988. Out of a total area of 4,776 km², 165 prospects were found and 251 test-holes drilled. The following year, seven RMs were investigated for a total area of 6,713 km². There were 248 prospects identified and 384 test-holes drilled. Final reports were to be presented to the Municipalities in 1989, though no known public record of this has been found.

Mapping products from these exploration programs were developed however, but only covered a portion of the province, mainly the southern regions. These Aggregate Resource Potential Maps were based on exploration as well as surficial geology (Saskatchewan Research Council, 1987) (Appendix 1: Example of an SRC Aggregate Potential Map). These maps were created to assist in the provincial search for aggregate, as assumed by the text listed on the maps:

“...Aggregate deposits contained in these units should provide suitable material for traffic gravel, sub-base, and base for paved roads and possibly concrete.” (Saskatchewan Research Council, 1987). Though this initiative provided a means to search for aggregate at that time, nothing of a public nature has been developed since.

Concurrent to the SRC program, and perhaps supporting the exploration initiatives, J.D. and D.G. Mollard (Mollard & Mollard, 1987) also investigated gravel potential throughout the province. This investigation yielded various test hole sites, and reports associated with methods interpretations, and recommendations. Estimates from this investigation reported approximately 10,000 small gravel prospects at a density of about one for every 25 km² and one large prospect approximately every 2,600 km² (Rogers, 2011).

Production and Values:

The earliest records found regarding Saskatchewan sand and gravel production and value are from the 1951 November Economic Review (Government of Saskatchewan, 1951). This report refers to sand and gravel as industrial minerals, and depicts a tracking graph of net value of production from 1940-1950 (Figure 4). Of interest in this particular report is the importance of aggregate stressed in the text as such: “*Large deposits of construction materials, i.e., sand and gravel, do not frequently occur in quantities of major commercial proportions, but small deposits...are of local significance, and are found throughout the entire settled region. They are minerals whose importance is too easily overlooked, for they are an essential ingredient of the province’s rapidly growing building and highway program.*” (Government of Saskatchewan, 1951). That said, these Economic Reviews were written consecutively from 1951, however did not specifically include sand and gravel in all early editions.

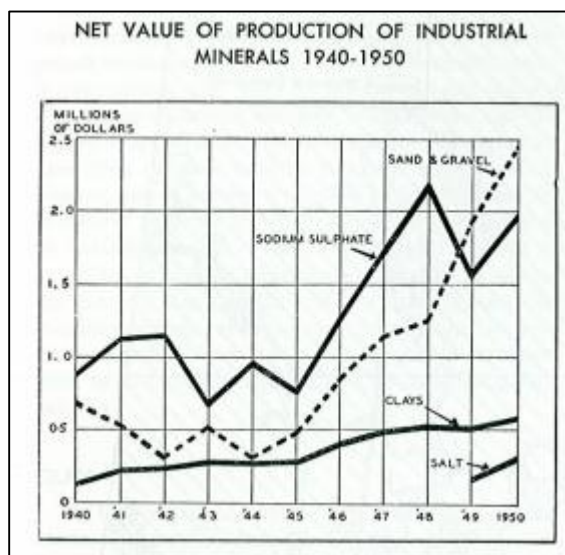


Figure 4: Sand & gravel value production graph as seen in November 1951 Economic Review

In 1966, the Department of Mineral Resources produced a document, *Inventory and Outlook of Saskatchewan Mineral Resources* (Government of Saskatchewan, 1966), which briefly outlined Saskatchewan sand and gravel production rates and resource economic worth. A reproduction of the sand and gravel information presented in this report can be seen in Figure 5.

In 2003, a further version of this was developed, extending the timeline from 1970 through 2001 (Sask. Industry & Resources, 2003) (Figure 6). This version however contains estimates which include clay, nonetheless, an apparent upwards value trend is still visible. Using data from the Economic Review reports, the same upward trends are visible, in both production volume (Figure 7) and value (Figure 8).

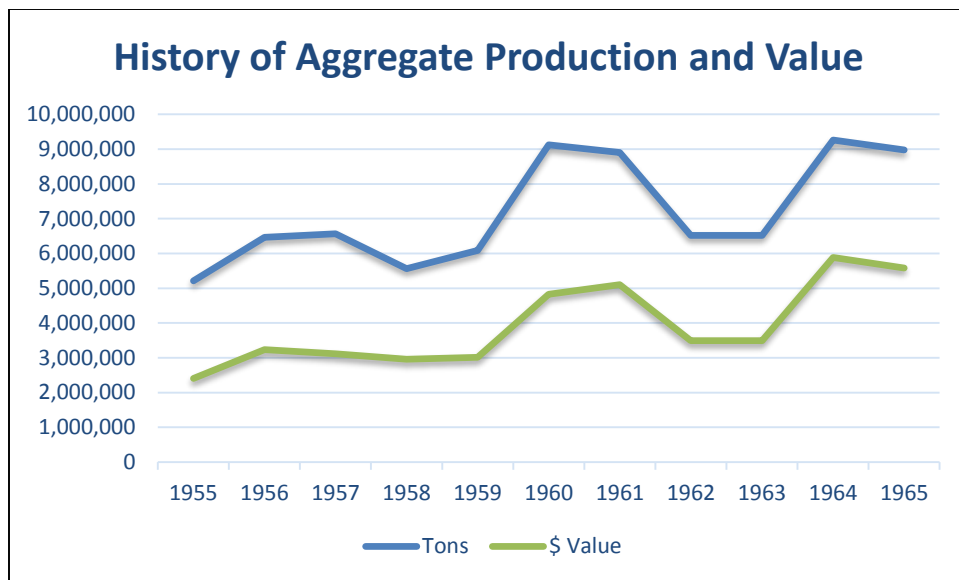


Figure 5: Historic production and value of sand and gravel

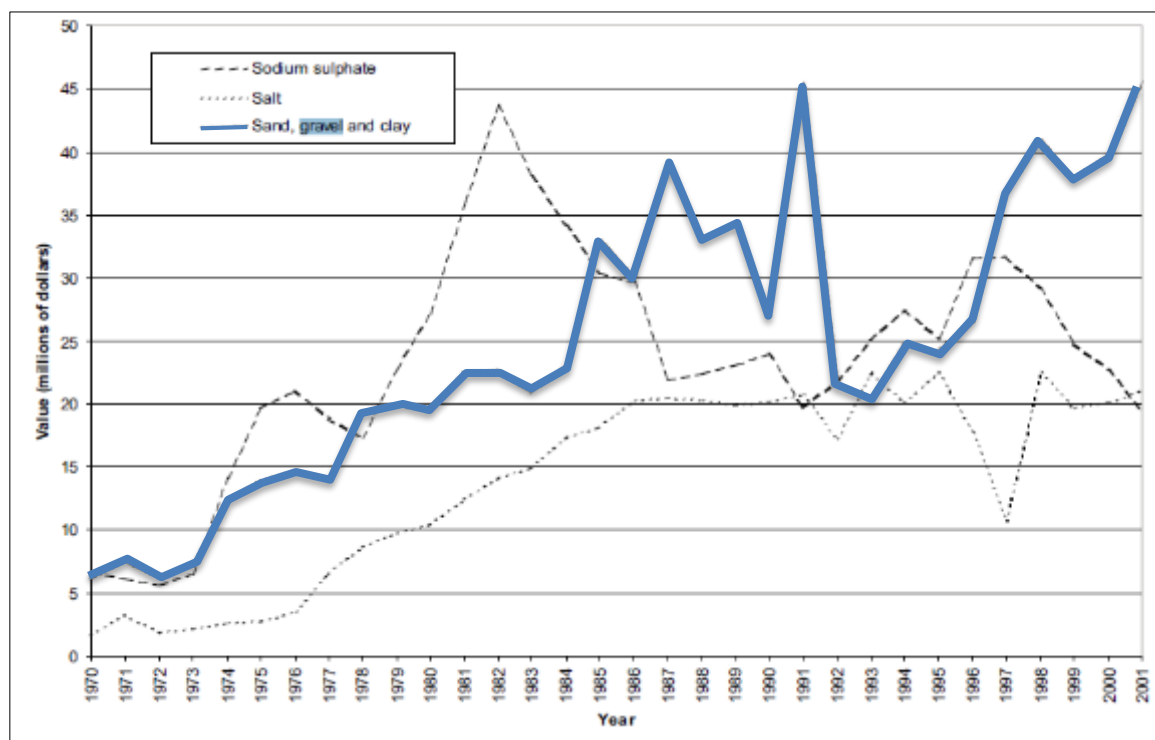


Figure 6: Value of sand & gravel production 1970-2011. (Sask. Industry & Resources, 2003).

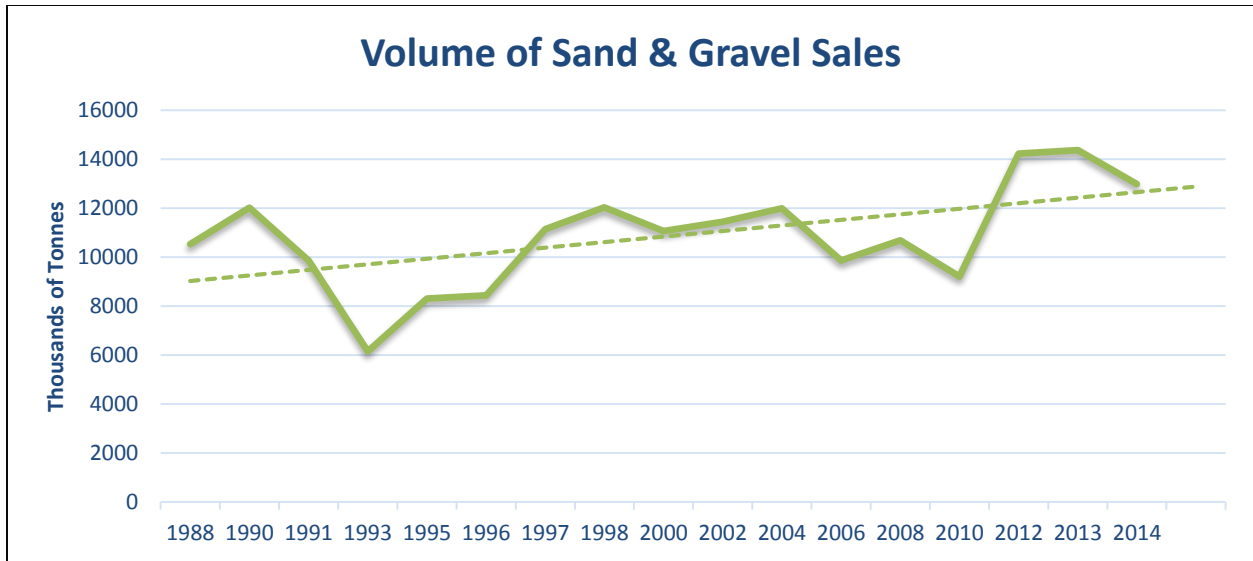


Figure 7: Compilation of volume data from Saskatchewan Economic Review

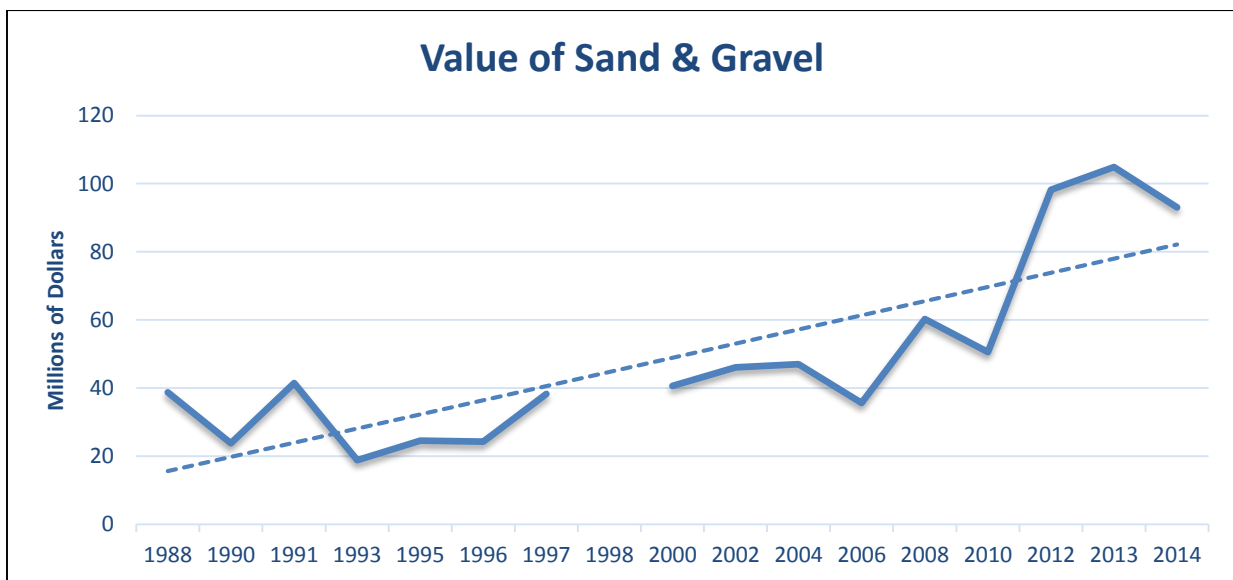


Figure 8: Compilation of value data from Saskatchewan Economic Review

Note: No data was listed for 1998 in these particular reports

In 1982, the provincial government, through Ministry of Highways, inventoried department managed gravel in ministry pits, and developed equations to predict future department volume and requirement for projects. This formally unnamed report (Government of Saskatchewan, 1982) summarized its findings by six districts (not synonymous with the current SARM Division's), and provided an insight to past quantities of gravel in an area, and future demands (Figure 9). It also provided prospective on haul distances overtime to move gravel from ministry pits to the required project location (Figure 10).

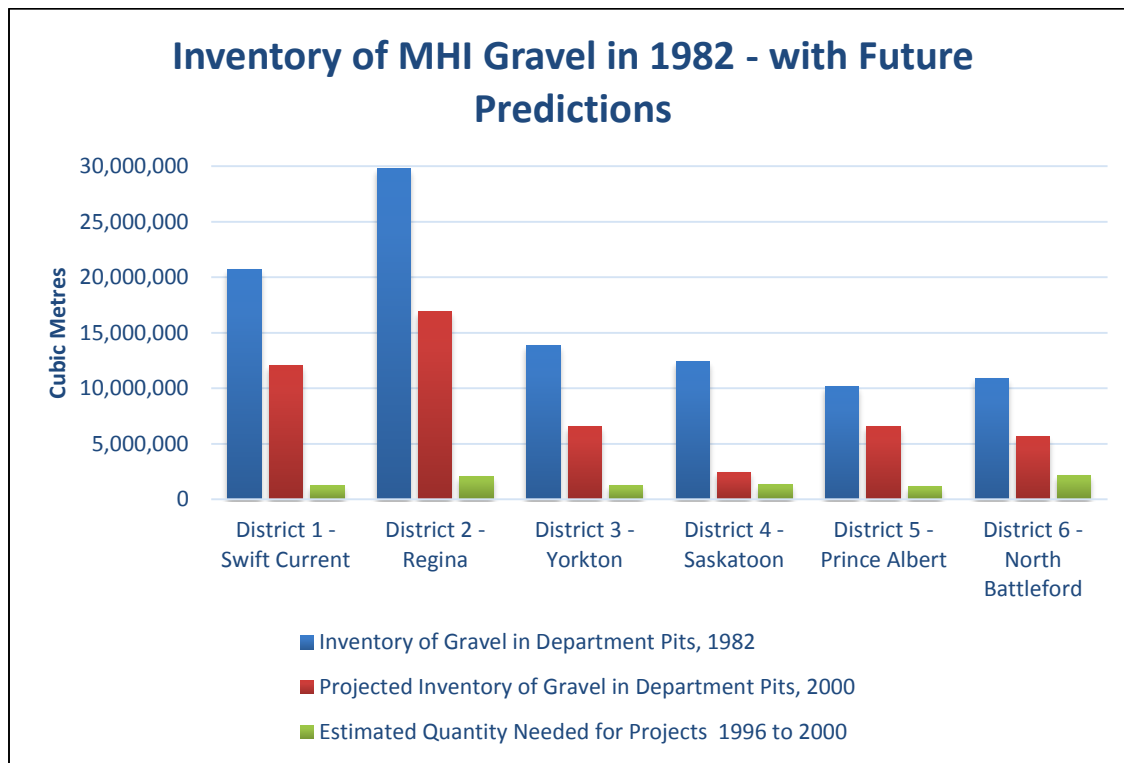


Figure 9: 1982 Inventory of government managed gravel

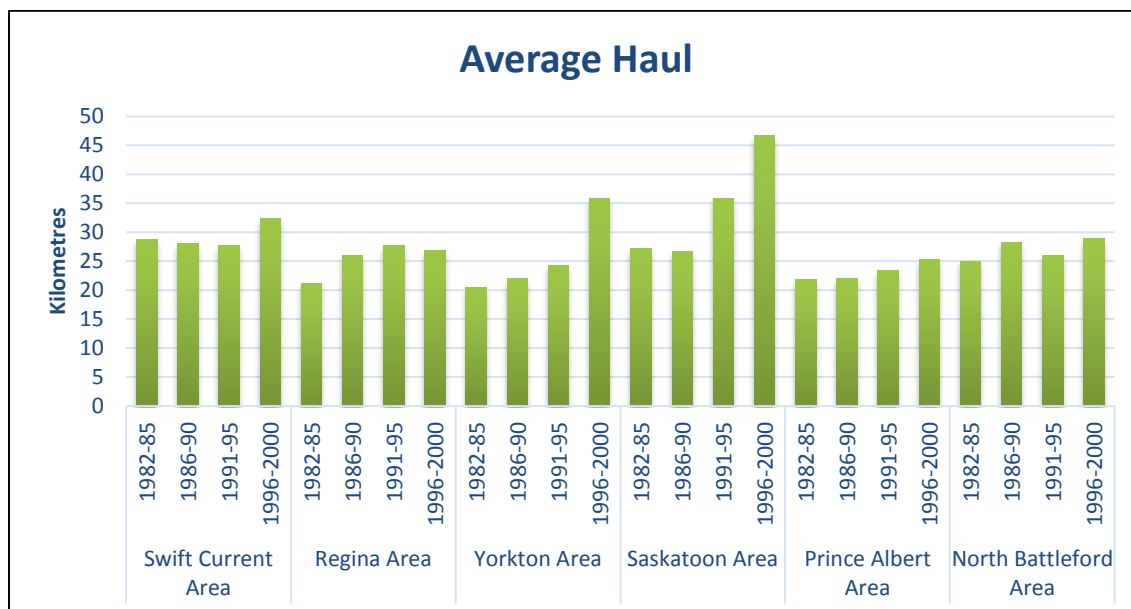


Figure 10: Average calculated haul distance to move Ministry gravel

Conclusions from History:

Over fifty years ago, the provincial government along with various other jurisdictions and groups, found it important and necessary to begin to understand provincial gravel resources; where they may be found, volumes associated with prospects, and gravel needs into the future. This led to the beginning of the development of sand and gravel regulation, source maps, and source documentation.

What can be said about this history is that when well-resourced initiatives were put forth to explore for aggregate, gravel, in any quantity and quality, was usually found.

History also provides a comparable for average gravel haul distances, volumes of production, and average product value. Historically, value and production in the province have had an increasing trend. Most notably, using this data, value of aggregate since the late 1980's has increased about 300%, a substantial increase over about 30 years. This trend firmly shows gravel value will increase over time, and this will be reflected in not only sales value but will most likely impact consumer purchasing.

The earlier gravel reserves are found and secured, the less of a cost burden acquisition will be for the RM and ratepayers over the long term.

Haul distance in the past appears to be within expected values, with the averages ranging from between 23km to 34km; this indicates Saskatchewan gravel is just not “at your back door”. Figure 10 also depicts a predicted increase in haul distance in certain areas of the province, however because it is just a prediction from 1982 and the depicted Divisions do not coincide with the SARM Districts, no direct comparative analysis can be made using this data.

Saskatchewan Population Changes

Saskatchewan population has trended around 1,000,000 people since the mid-1980's, with a slight increase beginning around 2006 (Figure 11). Though provincial numbers appear to be increasing, this does not mean that all population centers are also increasing. In fact, cities in Saskatchewan are increasing in population, but RM populations on average are decreasing (Saskatchewan Bureau of Statistics, 2015). This trend is further apparent when populations are segregated by populated area (Figure 12). Comparatively, cities and First Nations areas have been increasing over time, towns and villages remaining stagnant, and RMs noticeably decreasing.

Looking at individual population changes, there is a vast difference between those RMs who are losing residents, and those who are gaining residents. Analysis conducted on all RM population data from 1986 through to 2011 indicate a range of population change between -71% to +114% (Figure 13). Of all 296 RMs, 271 have a decreasing population through this timeframe.

In addition to population changes, general population numbers also must be noted. As of 2011, 75 RMs had populations less than 300 people, with the smallest recorded at 73. In comparison,

there are only 32 RMs whose populations are greater than 1,000 people, the largest being 8,354 residents of Corman Park. The average size of an RM as of 2011 was 509 residents (Saskatchewan Bureau of Statistics, 2015).

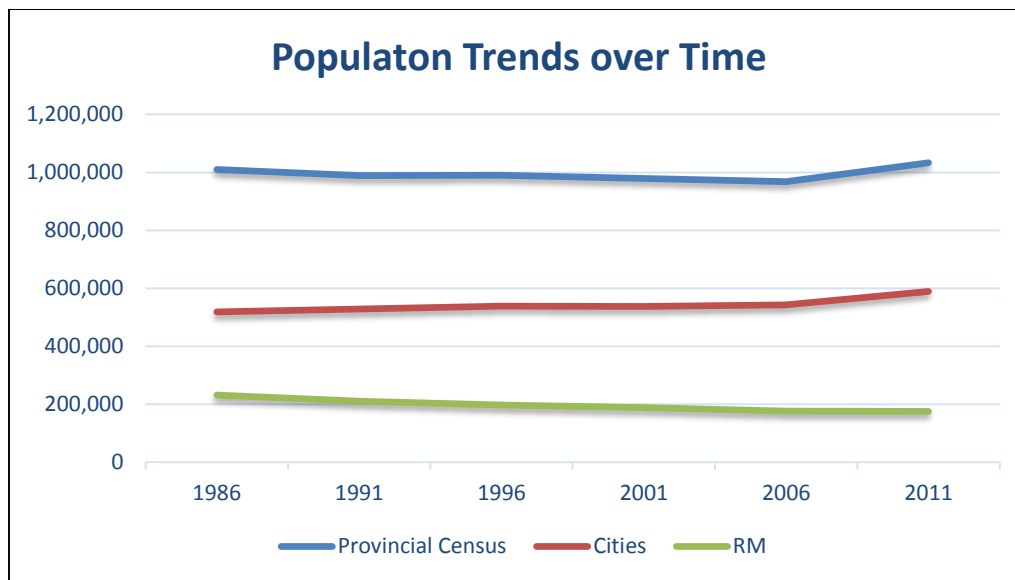


Figure 11: Trends in Saskatchewan population over time

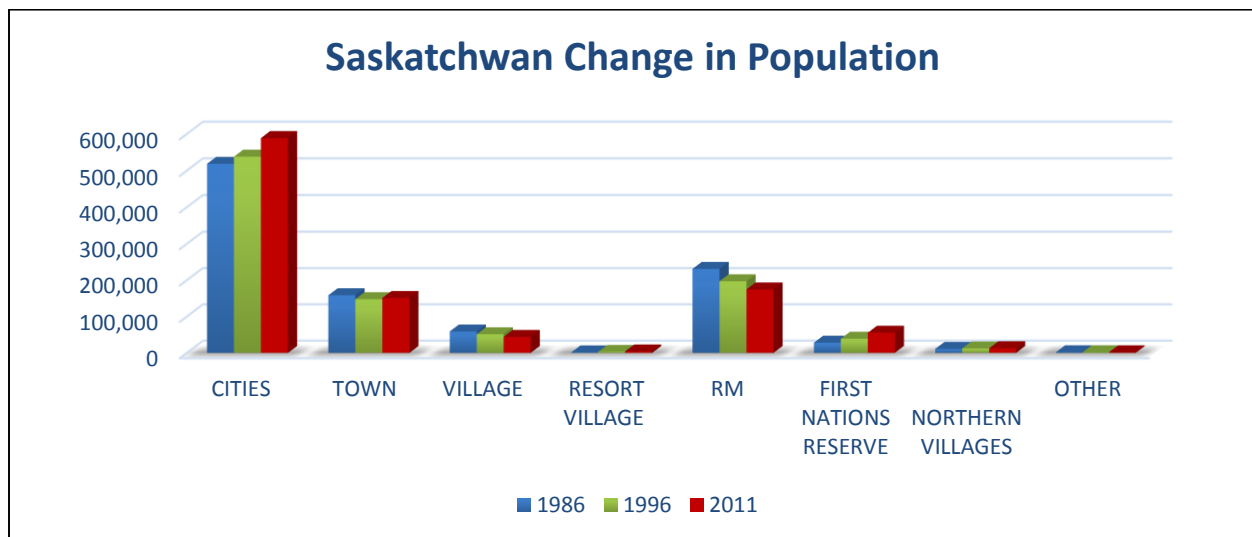


Figure 12: Population trends by populated area

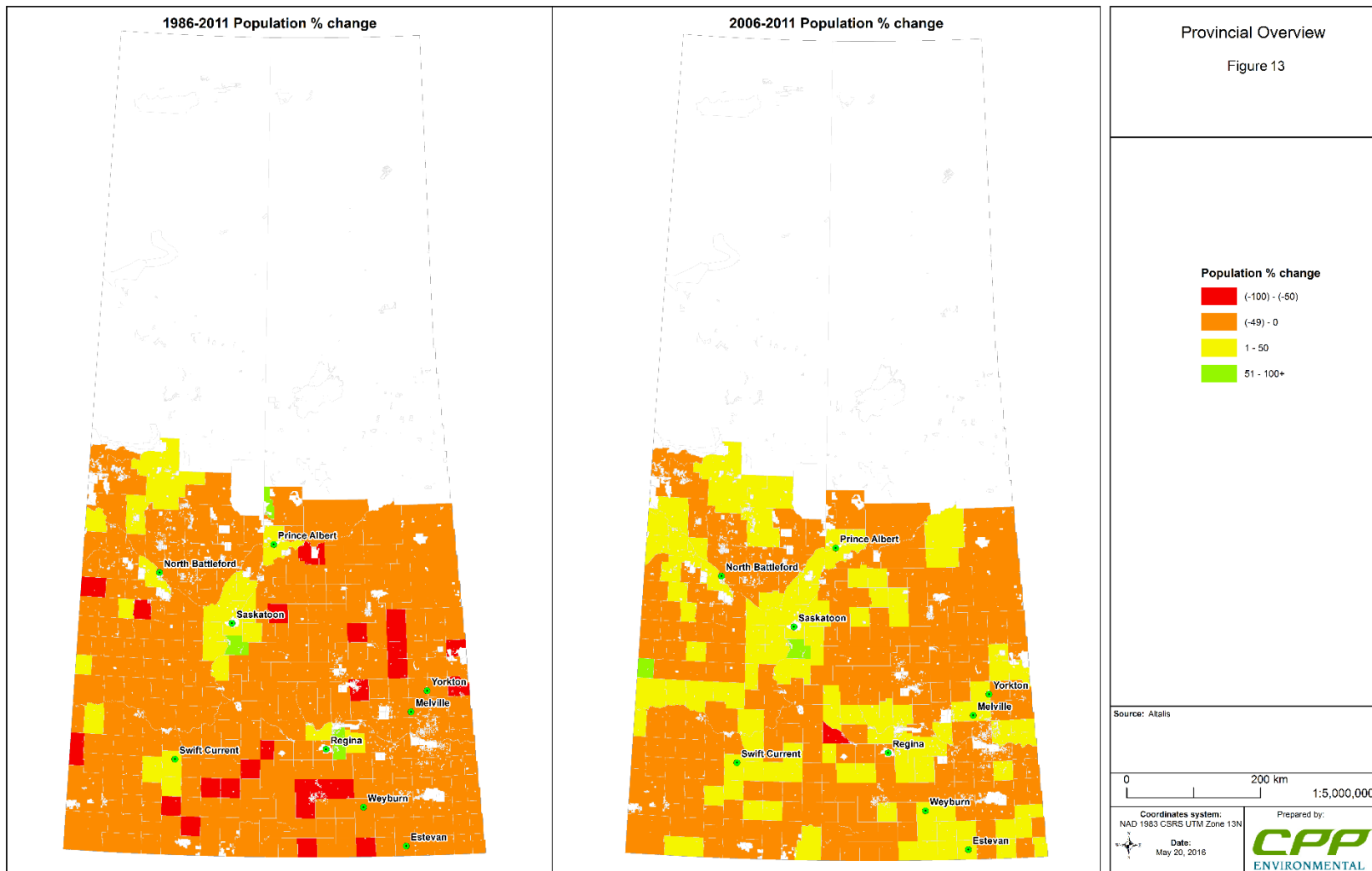


Figure 13: Saskatchewan RM population change comparison

Not only is it important to understand population changes of RMs, it is also necessary to understand where the population is moving. It is apparent that people are trending towards urban living, however great increases in population of the urban-rural interface areas can also be seen; RMs who surround cities are increasing in population as well (Figure 13). This becomes a complex issue, as those RMs decreasing in population still in need to fund aggregate for their roads, and those who are increasing may need larger volumes of aggregate to accommodate the demand increase.

Aggregate management strategies need to account for the change in ratepayer populations and address how RMs with decreasing populations will afford to maintain their roads

Chapter 3: Rural Municipality Online Survey Summary

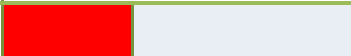

Two hundred and nineteen of the 296 RMs of Saskatchewan completed the online survey sent out in October 2015. Nineteen questions were developed to get an understanding of the current state of gravel needs, as well as methods and concerns regarding acquiring, securing, and effectively managing gravel resources within a RM.

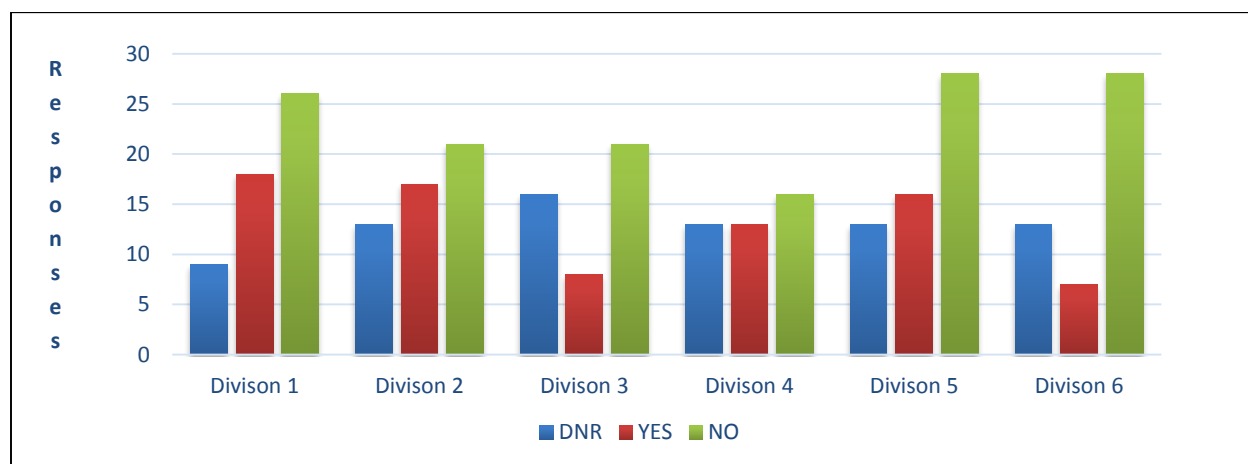
Not all RMs participated in the survey; completed responses were received from 74%. As such, responses cannot be conclusively used to determine state of aggregate according to all RMs, however, responses are relevant to be used to provide a general understanding of situation; the need, the demand, and the processes involved in RM aggregate management and operations. Full survey results may be seen in Appendix 2: Online Survey Results.

Current State

Of the responses, approximately 64% of RMs do not have problems securing reliable gravel (Figure 14) and over half of the RMs indicated they have a strategic reserve (Figure 15). Using only these two questions of the survey as the indicators, it initially appears that gravel shortage concerns are not overwhelming through the province. Below is an example of the survey outcomes and the overall summary by Division.

1. Does your RM have any problems securing reliable gravel supplies for road construction and maintenance?

Response	Chart	Percentage	Count
Yes		36.1%	79
No		63.9%	140
Total Responses			219



**DNR denotes Did Not Respond

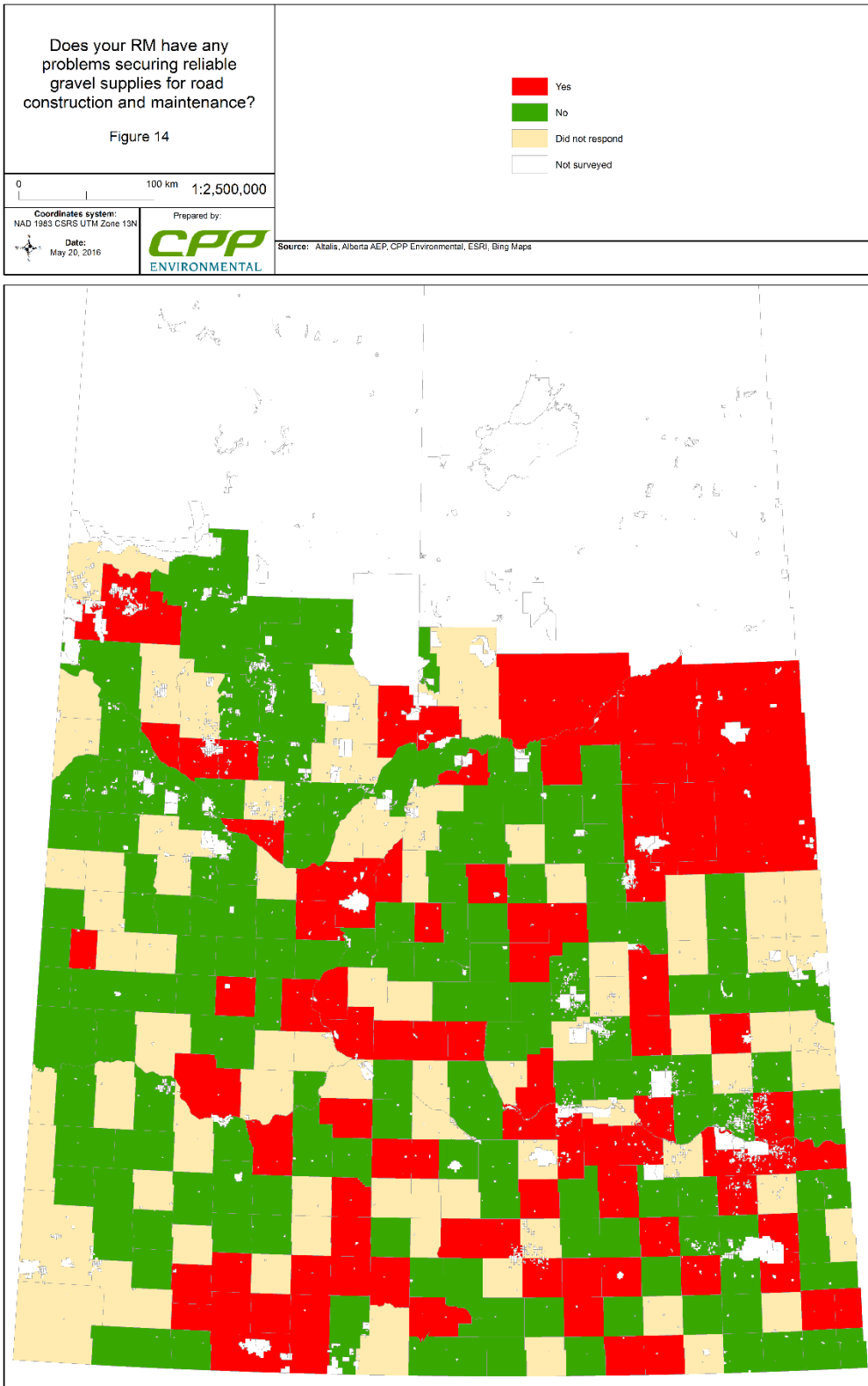


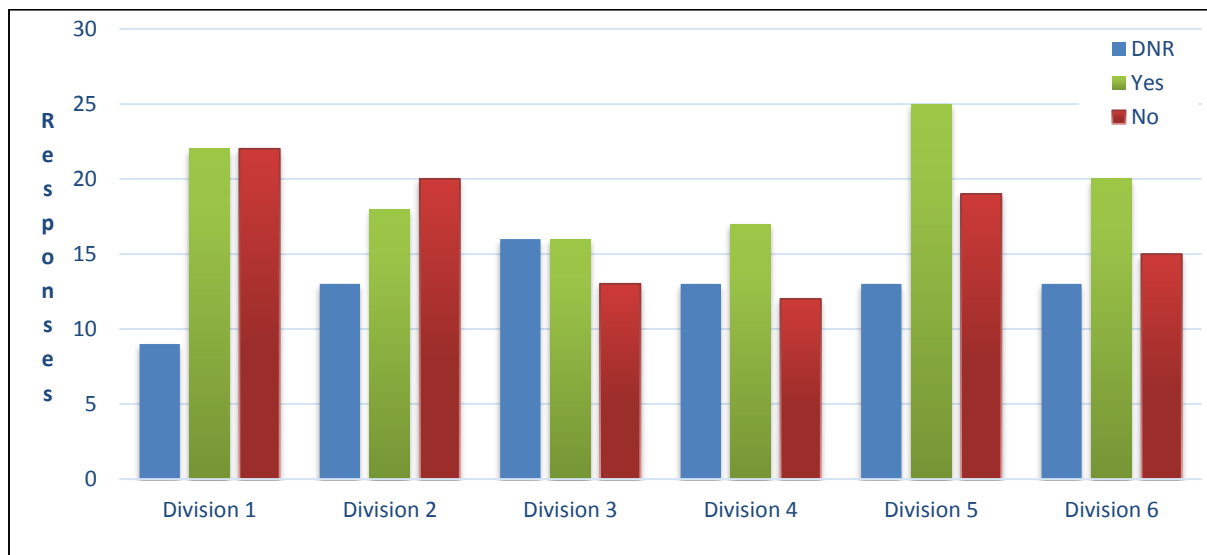


Figure 14: Survey Question 1: Does your RM have any problems securing reliable gravel supplies for road construction and maintenance?

2. Does your RM have a strategic gravel reserve to fulfill future road construction and maintenance needs?

Response	Chart	Percentage	Count
Yes		53.9%	118
No		46.1%	101
Total Responses			219



Those who responded 'yes' to Question 2, were then asked to answer Question 2 (a) "Approximately how many years of gravel reserves does your RM have available?". Results of these answers are mapped in Figure 15.

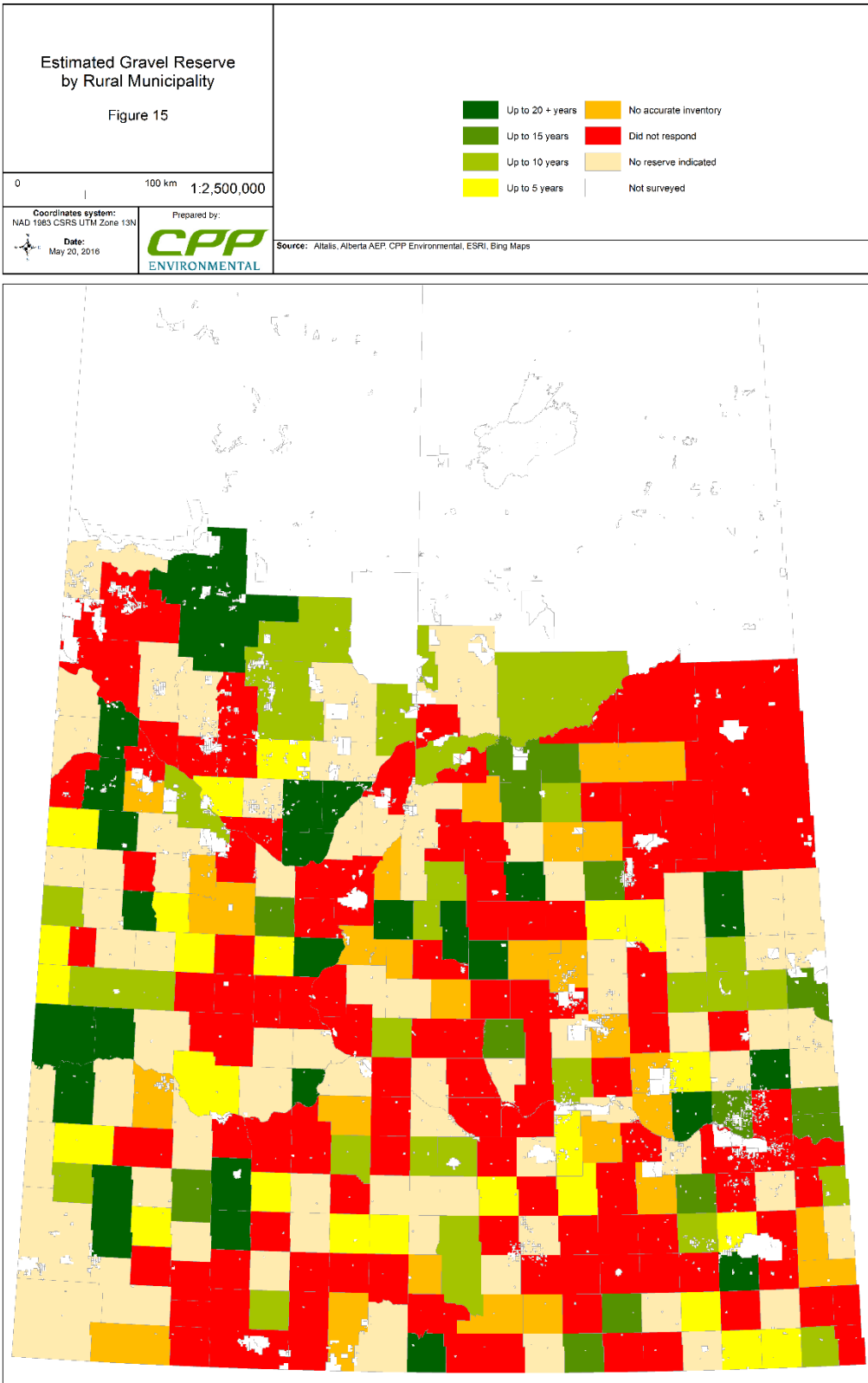


Figure 15: Survey Question 2 and 2a: Does your RM have a strategic gravel supply reserve to fulfill future road construction and maintenance needs? If so, how many years of reserve?

Questions 3 through Question 15 relate to qualitative information on gravel sources, gravel volume uses, availability, gravel management and accessibility on crown and private lands.

Question 3 asked the abundance of gravel with the boundary of the RM. Generally, 59% of Rural Municipalities indicated that gravel was moderately to very abundant. Subsequently 38% of RMs indicated low abundance of gravel supplies which does not meet local demand. Mapping this information, Figure 16 depicts apparent “deficit” areas of the province, most notably that in the north-east and that of the south-east.

To gain an understanding of how much gravel is used given the answers in Question 3, Question 5 asked: “On average, what volume of gravel does your RM use on an annual basis?”. Answers ranged from approximately 4,000cubic yards to 120,000cubic yards (Figure 17). The range of answers for the Divisions were between 24,524 and 15,076 cubic yards. The highest reported consumer was Division 6 and the lowest consumer Division 2.

Only 17% of RMs use Best Management Practices, 8% use alternatives to gravel (to a degree) and 11% partner with adjacent RMs to share gravel resources. Hauling distances per RM averages between 25.8 to 33.0 kilometres however some RMs indicated that they have hauling distances as far as 125 kilometres.

On average, 58% of RMs source the majority of gravel from pits managed on private land. Commercial operators are the next main source of gravel, with approximately 27% of RMs using this as a source, either exclusively or to some extent. There are currently only 12% of RMs who manage pits on crown land, and 3% who use supply agreements with either MHI or other RMs.

Question 16 asked what works well within the existing allocation process. A few themes emerged.

- Lease processes are efficient and government staff are aware of assets and allocation.
- The department Lands Branch seems to be streamlined and accommodating with regards to acquiring gravel lease agreements.
- Having the opportunity to test on Crown land and reserve crown land for sale.
- RMs being specifically mentioned in section D5 of the sand and gravel policy as to road hauling issues.
- The Ministry of Agriculture has been very cooperative and informative, partnering with other municipalities.
- Working with the Ministry of Highways would help promote regional, best practices for resources.

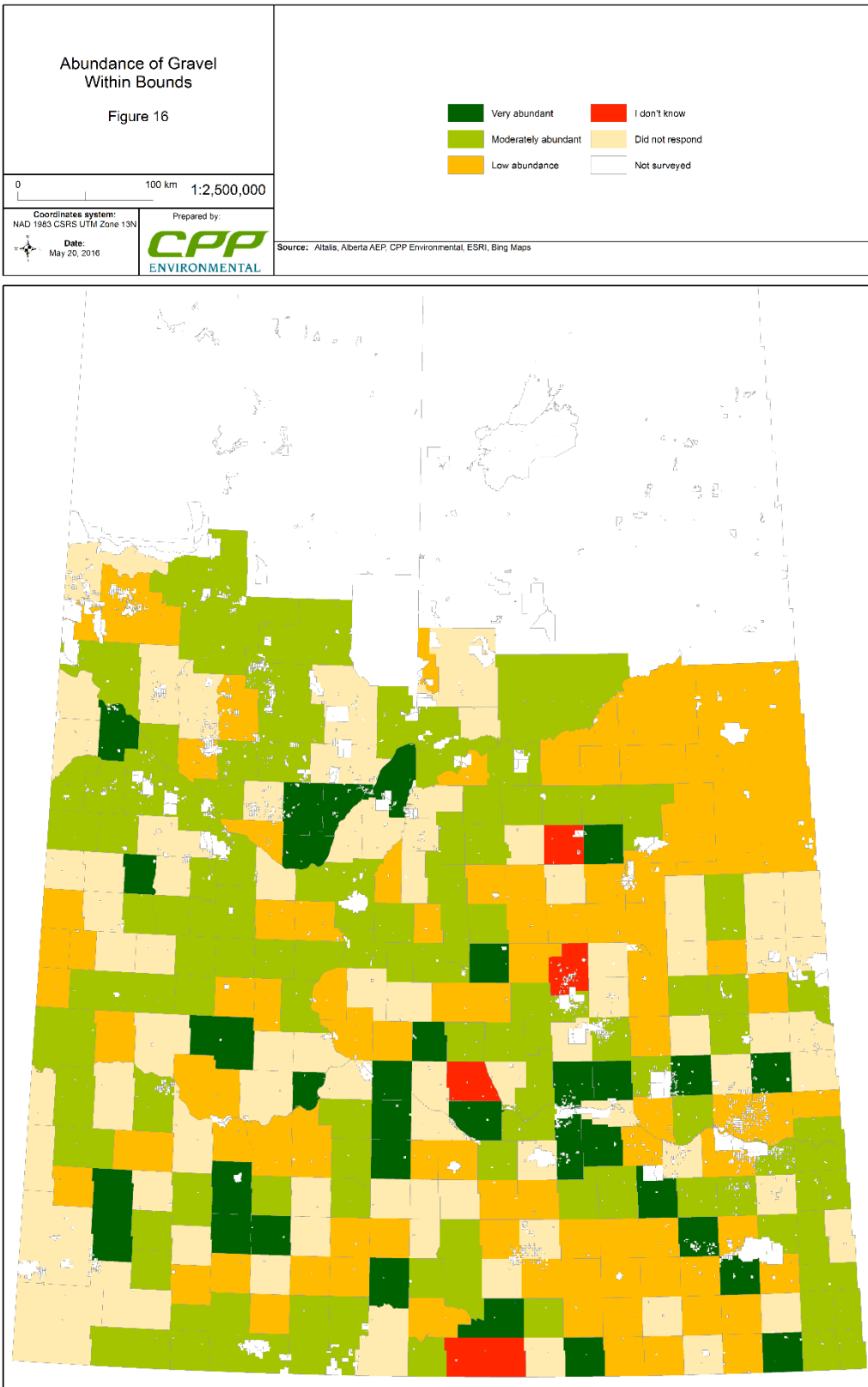


Figure 16: Survey Question 3: How abundant is gravel within the boundary of your RM?

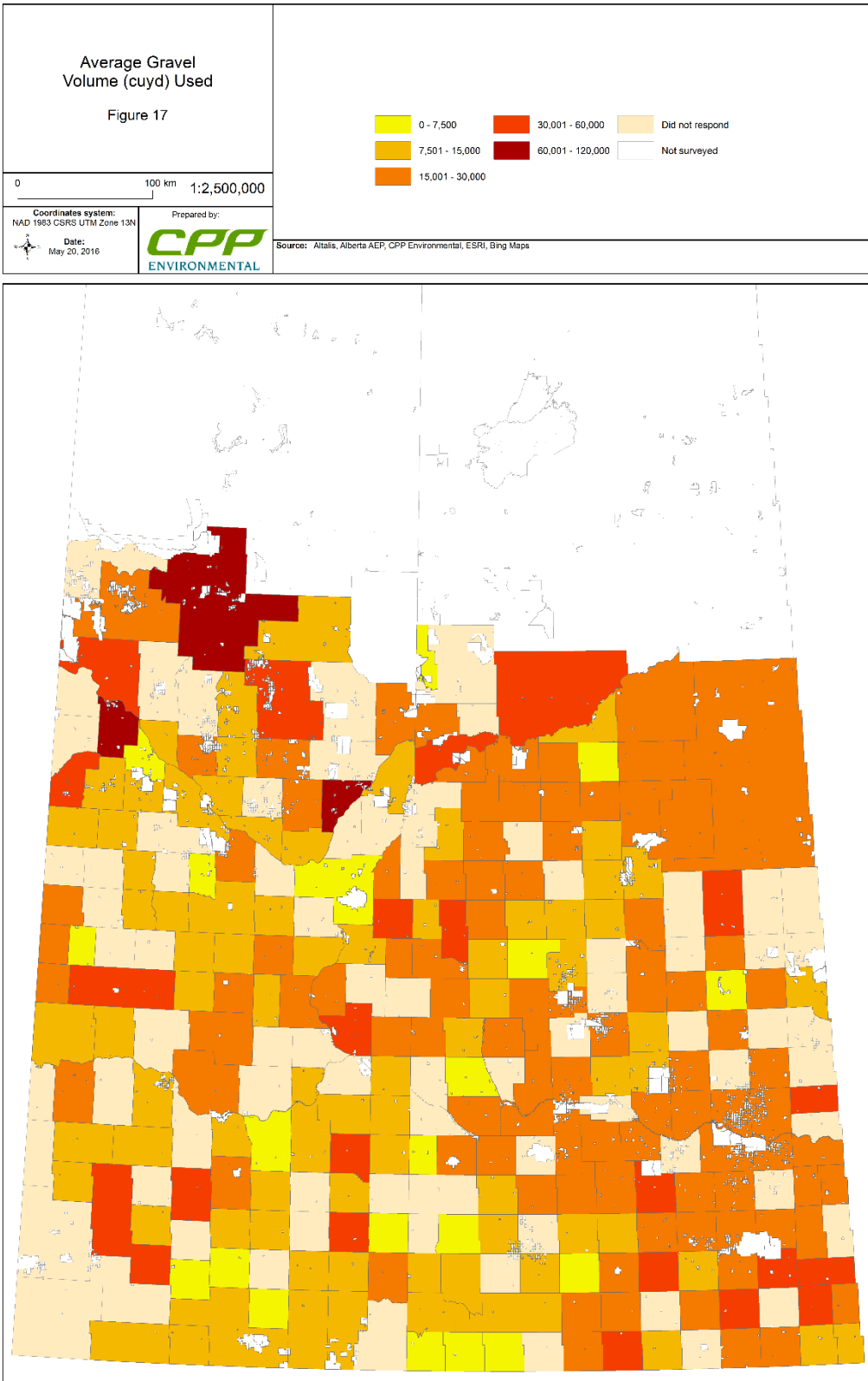
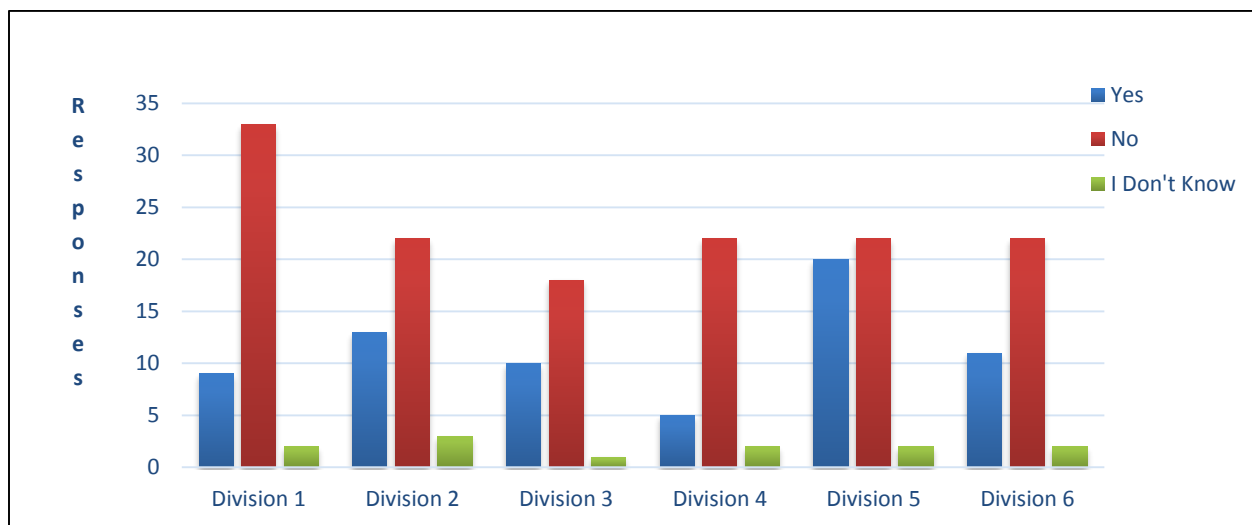


Figure 17: Survey Question 5: On average, what volume of gravel does your RM use on an annual basis?

Question 17 asked what could be improved in the existing allocation process. A few themes emerged; they include:

- Policy outdated, last updated May 2013.
- Ensure all sources of gravel are reserved for the municipality before crown lands are sold or leased.
- Being able to explore the land prior so that gravel is assured before sale or lease of lands. This could be extended to adjacent RMs that have problems securing gravel so that gravel on Crown lands are not sold to private sectors.
- Permitting process could be easier. The present system is very cumbersome and time consuming.
- Mandatory prices and better long term lease agreements.
- Collaboration between RMs with abundant Crown land within their boundaries and with adjacent RMs that have no crown land.

Question 18 asked “Does your Rural Municipality issue development permits or other approvals for gravel leases on private lands?”



Question 19 asked “Are there any other information or comments you would like to provide?” The following is an overview of what was said.

- A system of fair distribution developed between areas that have gravel and areas where there is not.
- Information on how to deal with private landowners who have gravel and steps to take.
- Sharing of best practices regarding the use of alternatives and their reliability.
- Prior to selling of crown land, ensure that all gravel supplies are retained for the use of the RMs and not sold to private sector.
- Distinction made as far as road maintenance fee legislation. RMs should not be charged a road maintenance fee the same as a commercial resource company. RMs are using the gravel on municipal roads for the benefit of the public and not to make a profit.

- Guideline for standard quality of gravel for road use on municipal roads. Material specifications should be stated so as to ensure that the best quality of gravel is being used for each specific requirement.

General Survey Analysis

Survey responses should not be considered representative of every RM, as 26% of RMs did not respond to the survey. However, results can be used to see general trends or patterns in how gravel is managed at a municipal level and what issues are plaguing acquisition and development. Summarized below, and in Figure 18 and Figure 19, is what may be classified (only using survey responses) as the RMs with the most stress on aggregate management and the RMs who believe they are having the least aggregate management stress; the question being: “Which RMs initially appear to be under the highest aggregate acquisition stress, and which ones appear to have little stress in aggregate acquisition?” Using various filtering, the following was observed:

A quick overview reveals there are 79 Rural Municipalities who indicated they had problems securing reliable gravel. Of these, 62 indicated that they have no strategic gravel reserve to fulfill future road construction and maintenance needs, and of these, 40 RMs indicated that gravel within their boundaries is in low abundance (potential high stress situation). In comparison, 140 Rural Municipalities indicated they did not have any problems securing a reliable gravel supply, 101 of these specified they have a strategic gravel supply, and 19 indicated gravel in within their boundary was “very abundant” (potential lower stress situation) Figure 18 depicts those RMs who believe they have “potential high stress and those who believe they are under “potential lower aggregate stress”.

Looking at a strategic, long-term perspective however, from all 219 responses, there were 99 RMs who indicated they **do not** have a strategic reserve. In addition to this, of the 120 RMs who indicated they **do** have a strategic reserve, 95 of them have a reserve less than 20 years or do not have an accurate inventory. As the term “strategic reserve” generally indicates long-term (20 years+) supply, these 95, in addition to the 99 who do not have a strategic reserve, may be viewed, in a strategic sense, as a future high stress RM (Figure 19).

To effectively manage aggregate, it is important for RMs to understand gravel inventory within their boundaries and be willing to work with others to share resources as a means to save costs.

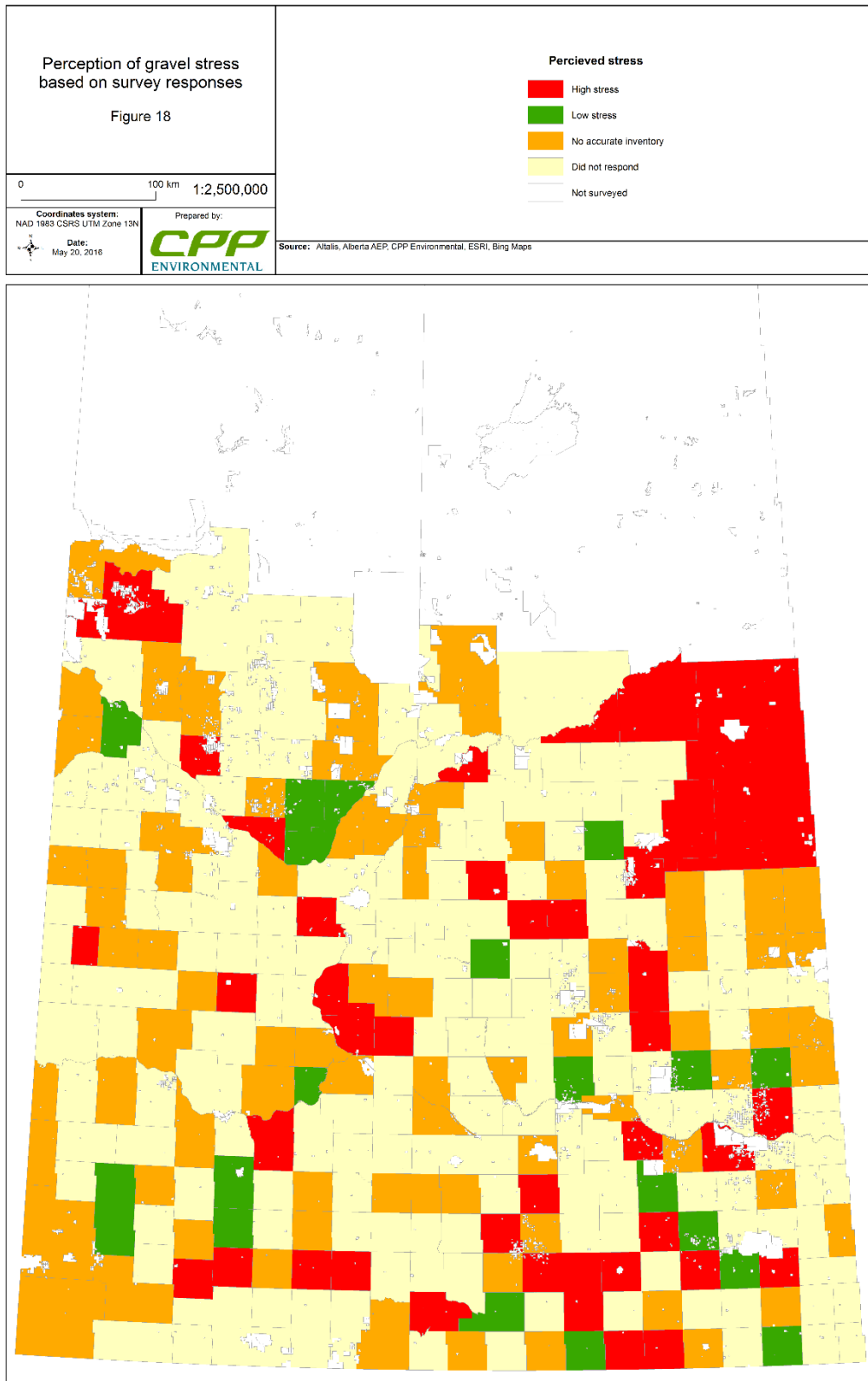
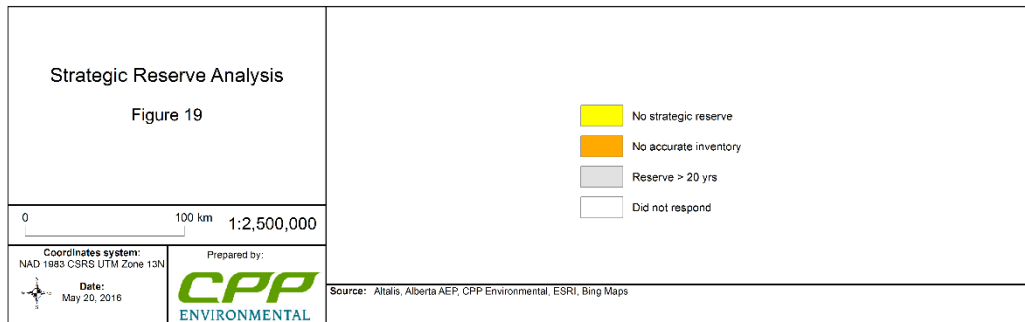


Figure 18: Responses which indicated a perception of high and low aggregate stress based on existing gravel reserves



Chapter 4: Current State of Saskatchewan Aggregate

Organizations and Agencies

Gravel resources in the province are managed and regulated by a number of different organizations, each playing a unique, but key role in the overall industry. The following briefly outlines roles and responsibilities of each organization as they pertain to gravel and gravel operations.

Provincial Government:

There are four government ministries which play a role in gravel operations in the province; Agriculture, Environment, Government Affairs, and Highways and Infrastructure (MHI).

The Ministry of Agriculture is one of the ministries responsible for managing crown land and crown land leases. The mandate for the use of crown lands is to “*To promote the sustainable and integrated use of Crown land while providing opportunities for diversification and economic growth*” (Government of Saskatchewan, 2015). Through this mandate, they are responsible for the Sand and Gravel Policy as well as the Agricultural Crown Land Sale to Lessee Policy. Currently, there are approximately 1575 crown land gravel leases administered by the ministry, (Saskatchewan Ministry of Agriculture, 2016).

The Ministry of Environment is the other ministry responsible for managing crown land and leases. Leases administered by Environment are generally found in central and northern Saskatchewan. As of January 2016, there were approximately 903 crown land gravel leases and permits administered by Environment (Saskatchewan Ministry of Environment, 2016). As much of the land in northern Saskatchewan, the Northern Administration District (NAD), is considered crown, Environment plays a key role in gravel operations in this part of the province, in coordination with the Ministry of Highways.

Government Affairs provides support to rural municipalities through overall municipal administration. This ministry supports RMs by providing information, tools, and guidance documents for matters such as planning and development, applicable acts and regulations, asset management, merging municipalities, and the municipal revenue sharing program. This ministry may be seen as a key information source when RMs have questions about land management and regulations in their area.

Ministry of Highways and Infrastructure (MHI) is important in the exploration, acquisition, development, and operation of gravel resources throughout the province. The ministry has developed standards for provincially built roads and manages pits in a variety of locations. The MHI is responsible for the construction and maintenance of provincial highways and associated infrastructure. Within the NAD, public gravel roadways are considered the responsibility of the government, as there are no RM's, and therefore Highways and Infrastructure are fully responsible to the residents for construction, maintenance, operations, and associated gravel acquisition.

Together, in the southern region of the province, MHI and the RMs play necessary and key roles in building and maintain Saskatchewan's road network; value can be achieved for taxpayers through their cooperating on gravel supply

Area Transportation Planning Committees

There are twelve Area Transportation Planning Committees (ATPCs) which span the province. These are a collective of representatives from Rural Municipalities, Urban Municipalities, and the Ministry of Highways and Infrastructure. These groups work together with the MHI to develop long-term planning approaches to investments in the transportation system (Government of Saskatchewan, 2013). Objectives of the ATPC's include actively engaging stakeholders in open planning processes, developing and maintaining transportation plans that address the economic and social needs, and developing partnerships between local leaders, communities, government and industries to maximize social and economic opportunities through safe, efficient transportation networks. This group serves as an advisory role on transportation planning issues to Ministry of Highways as well as to Rural Municipalities. They are a communication link between the two parties and understand transportation issues of each of these two groups. Some committees are more active than others, however if all have similar expectations and roles, they can act as a key resource for municipalities.

Saskatchewan Association of Rural Municipalities (SARM)

SARM is the voice of rural Saskatchewan; it is an independent association who represents rural municipal government and is the principal advocate in RM representation before senior governments. SARM provides many services and programs to its members, of which include planning services and municipal roads programs.

Rural Municipalities

There are 296 Rural Municipalities (RM) within Saskatchewan, all of whom are governed by the Municipalities Act-Statutes of Saskatchewan 2005. One main responsibility of RMs is to manage and maintain road classes 4 – 7, for its residents. This includes gravel acquisition, grading, surfacing, and road construction as necessary. This is possible through the ratepayer base and municipal programs and grants.

Provincial Gravel Overview

Gravel Competition and Consumption

Saskatchewan consumes most of the gravel it produces. As of 2015, the province produced about 10,980 M tonnes valued at almost \$107,314,000 (Natural Resources Canada, 2015).

Competition for gravel and aggregate resources has increased steadily over the past 10 years, and RMs now compete with each other, as well as groups such as mining, oil & gas, agricultural productions, and public infrastructure developments to secure gravel resources for their own road building projects.

According to Natural Resources Canada, Saskatchewan uses a large percentage of its aggregate resources for road maintenance and construction (Figure 20), and this would include

RM gravel use for road maintenance. This consumption includes shipments by producers as well as aggregate used in cement plants (Natural Resources Canada, 2016).

As Saskatchewan uses most of its gravel for road building, the need to have gravel easily accessible for such purposes is imperative.

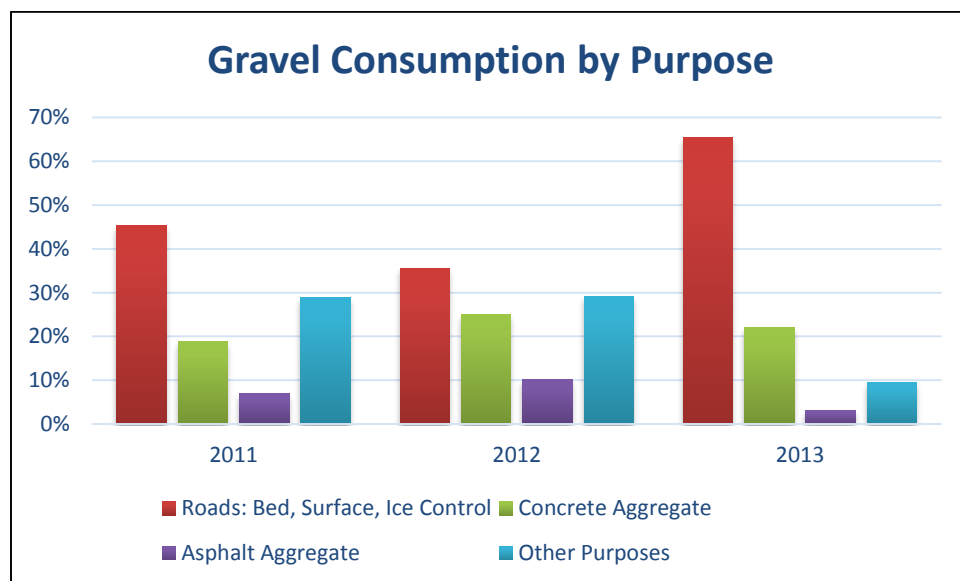


Figure 20: Saskatchewan gravel consumption by purpose

Within the Northern Administration District (NAD), the main consumers of gravel are the mines (Fidler, 2015). There is far less competition for gravel here however, as the population is smaller, there are fewer roadways, and there is a greater supply of gravel. The biggest reason perhaps for a less competitive market in the NAD is that the public roadways are managed by the Government of Saskatchewan (Fidler, 2015).

South of the NAD is quite the opposite. Rural Municipalities are in competition for road gravel, as provincial populations are growing, road quality expectations are increasing, and various economic sectors are thriving. This competition has led some RMs to have difficulties negotiating gravel contracts with private land owners, as the demand drives up prices and land holders hold out on the best price offered. Private land owners are less likely than in the past to sign long term gravel supply agreements, because of the price escalation driven by demand.

At a Division and RM level, there are vast differences between the average amount of gravel used for road maintenance operations. Division average 5-year volumes range between 15,000 cubic yards and 24,500 cubic yards, with a total average of approximately 20,000 cubic yards (Figure 21). Volumes used on average by each RM range is between 4,000 cubic yards to 120,000 cubic yards (Figure 17).

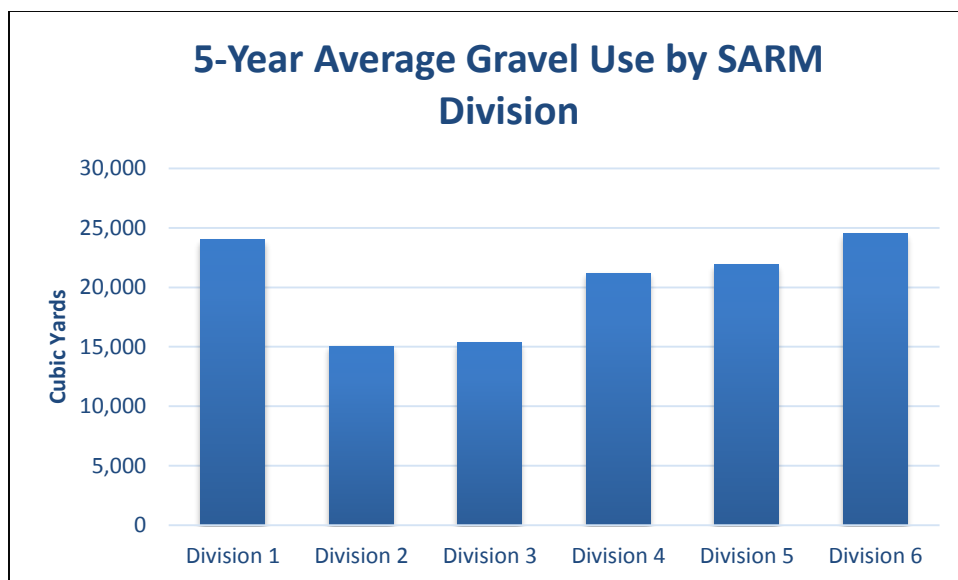


Figure 21: Average gravel use by Division

Gravel Availability

Locating Gravel: According to the Mollard & Mollard study in 1987, there is one small aggregate prospect every 26 km² and the larger deposit prospects, generally containing more granular material, are fewer in number (approximately one in every 2,600 km² located) and are vastly scattered throughout the province. This makes locating gravel extremely difficult.

The SRC Aggregate Exploration Program of the 1980's (Chapter 2: History of Aggregate in Saskatchewan) is the most current provincial sourcing map available, not including the use of surficial geology maps of Saskatchewan. Given the lack of current publicly available resources for locating prospects, those RMs who are interested in finding gravel seek out professional contractors and/or search on their own using landform features, reliance on private landholder knowledge, and "hunt-and-peck" based on locations of existing pits in the area.

Though finding reliable gravel resources is difficult in the province, 63% of RMs surveyed indicated that they did not have any problems securing a reliable gravel supply. Of these, 46% have a strategic gravel supply reserve, though most were 15-year supply and below, indicating an operational reserve rather than long-term strategic reserve.

Crown Lands: Gravel on crown land is administered by the Ministry of Environment and Ministry of Agriculture. According to data from the Ministry of Agriculture (Kirychuk, 2016), there are 8,087 agricultural land leases, and about 357,184 acres of vacant agricultural Crown land within Saskatchewan. Of this, there are currently only 357 active sand and gravel leases or leases awaiting signature, for an approximate extraction acreage total of 5,015.04 acres and total sand and gravel lease disposition area of 22,130.54 acres (Table 4, Table 5).

Table 4: Sand and Gravel Agricultural Leases - Active or Awaiting Signature

Leasee	Active Leases	Allowable Area for Gravel Removal (acres)
Ministry of Highways	134	2,305.63
Private Operators	43	795.66
Rural Municipalities	177	1,903.75
Other	3	10.00
Total	357	5,015.04

Table 5: Sand and Gravel Crown Land Agricultural Leases Overview by SARM Division

	Ministry of Highways	Allowable acres of gravel removal	Private Operators	Allowable acres of gravel removal	Rural Municipalities	Allowable acres of gravel removal	Other	Allowable acres of gravel removal
Division 1	9	223.63	2	170.00	21	213.30		
Division 2	23	685.63	14	263.69	28	293.14	1	5.00
Division 3	23	413.20	7	56.57	22	201.00	1	0.00
Division 4	21	164.05	3	169.00	46	465.67		
Division 5	31	407.21	6	39.20	26	393.42		
Division 6	25	265.53	11	97.20	34	337.22	1	5.00

Note: Agricultural Dispositions could not be mapped due to the data limitations

A sand and gravel reservation on agricultural crown land denotes land that has been requested to be reserved from sale due to likely sand and gravel reserves, though reserves are often not confirmed and gravel on this land is speculative. There are currently 3,283 sand and gravel parcel reservations within the Ministry records, for a total approximately area of 344,536.90 acres (Kirychuk, 2016).

Crown agricultural land can provide an important and economical long term source of gravel for RMs subject to exploration and reserving land for future gravel extraction

Data from the Ministry of Environment suggests that there are approximately 779 active Sand & Gravel leases under their administration, and 124 leases which are expired or on hold. Of the active leases, there are 575 which are listed as Government held and 204 listed as Non-Government held. Most of these dispositions are located in northern Saskatchewan, in the NAD boundaries (Figure 22).

Process: Rural Municipalities are able to obtain their gravel from a variety of sources, though many obtain their primary source of gravel from their own pits managed on private land. On average, approximately 58% of the RMs surveyed indicated their primary source of gravel was on private land; 70 RMs exclusively used private pits.

The second most important source of gravel for RMs is through purchase from commercial gravel operators. Of those surveyed, an average of 27% indicated their primary source was from commercial operators; 36 indicated they exclusively purchased from commercial operations. Only 12% of RMs obtain their primary gravel from crown land, and 3% of RMs obtain gravel from supply agreements.

Though few RMs obtain gravel from crown managed pits, the process for obtaining permits and leases for gravel exploration and extraction on these lands is relatively efficient, with few delays or complaints about service by those RMs who manage pits on crown lands. Most routinely obtain approvals within reasonable time-lines. Once a gravel lease is locked in, it is available to the lessee for a term of about 21 years.

The same cannot be said for gravel accessibility on private land, according to responses from various RMs. A lack of proven gravel sources, in combination with increased resource competition and costs, are major concerns for RMs who manage aggregate on the private land base. Municipalities acquiring gravel on private land negotiate with the landowner, and in some cases, the landowner will allow the user with the highest bid to obtain gravel from said land; often an RM cannot afford the bid and lose out. Unless an RM purchases the land or enters into a long term agreement with a landholder, they have difficulties securing long term access to gravel on this type of land base.

Alternative Sources: Gravel acquisition on crown or private land can be further expanded into specific sources or locations. Evidence from the 1975 Aboriginal Affairs and Northern Development exploration program indicate gravel can be sourced from First Nations lands. Those who were involved in the exploration can be seen in Figure 23 and Table 3.

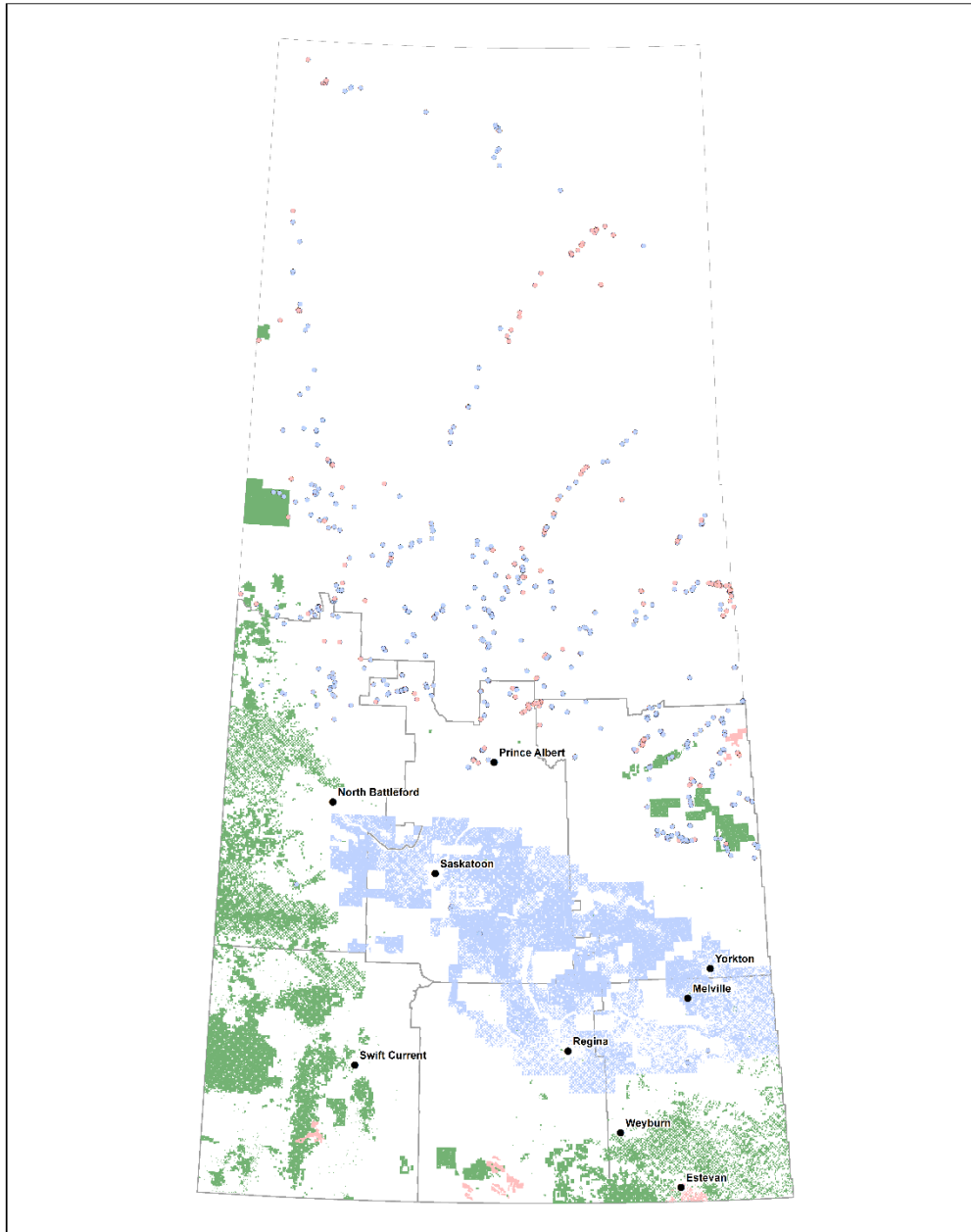
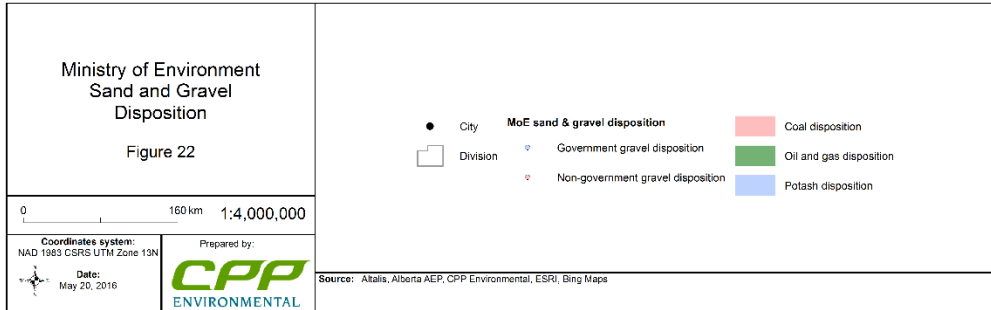


Figure 22: Ministry of Environment aggregate dispositions in relation to Saskatchewan major industry

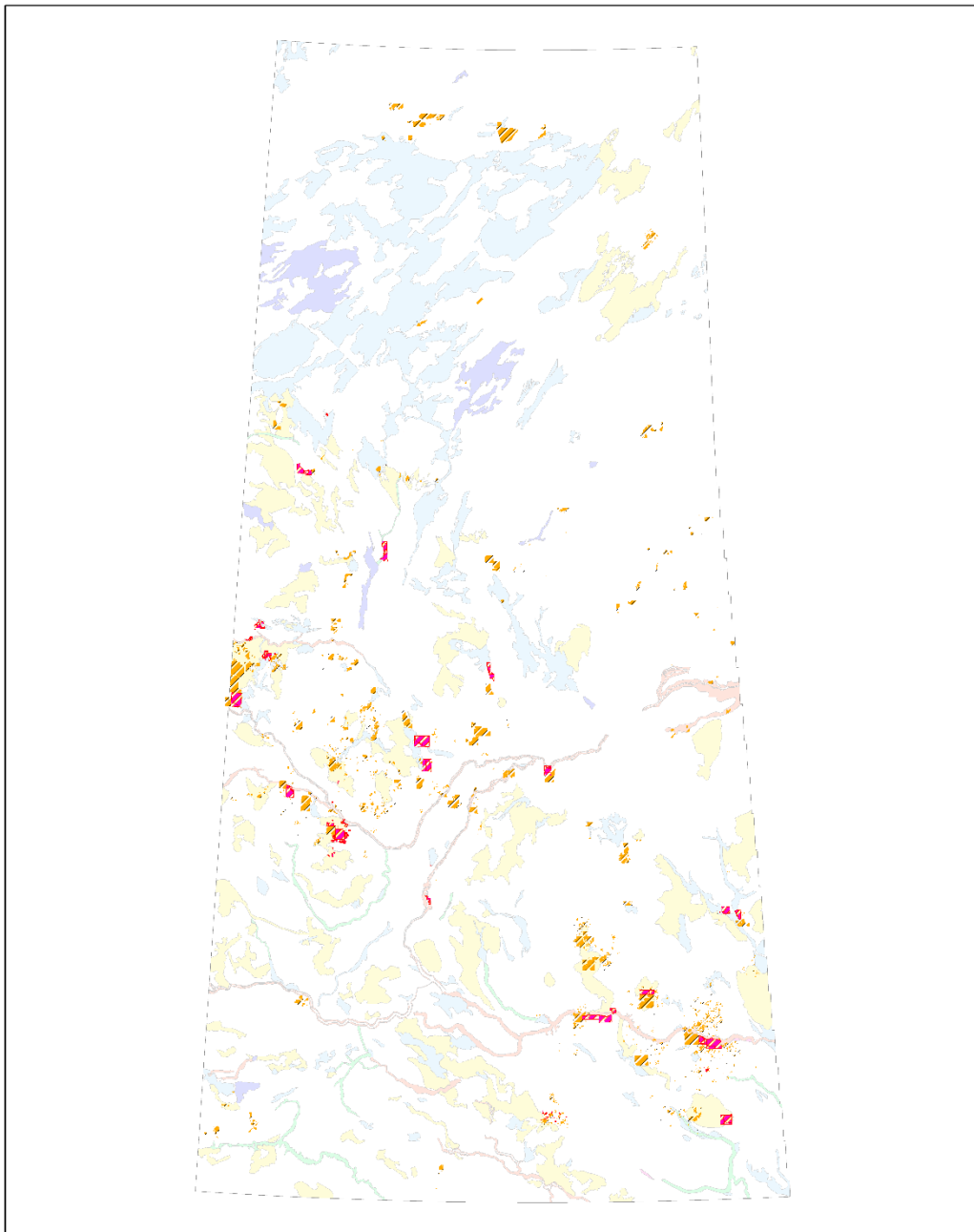
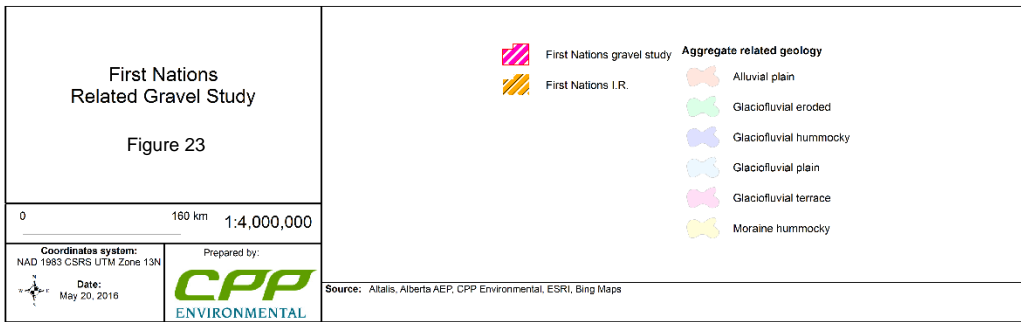


Figure 23: First Nations lands in proximity to aggregate related surficial geology

From the survey, there was at least one RM who indicated they sourced their gravel from local First Nations land, and at least one commercial operator who was interviewed who also had an aggregate agreement with the First Nations. The Government of Canada, having jurisdiction over these lands, has produced a document titled *Guidelines for Unconsolidated Non-Metallic Substances on Reserve Land* (Government of Canada, 2014) which outlines the process of extracting gravel from First Nation land.

The Northern Administration District (NAD) is known for its rocky, forested terrain. As such, this area of the province, though generally remote from the more settled region, has a greater availability of gravel and a greater availability of rock that can be crushed and used as road gravel. Currently, mines in Northern Saskatchewan are the main consumers of gravel, and most roadways have been constructed due to mine development and resource acquisition (Figure 22). There is limited access to gravel resources here, as the road network is sparse and the rail network is non-existent; however, gravel and crushed rock alternatives are available and are currently mined in this area.

Major Industry: In addition to RMs needing gravel resources for maintenance of their road networks, Saskatchewan has other industries which require gravel for operations and rely on the road networks for transportation and movement of goods. Three of these major industries include oil & gas, potash, and coal. According to the Geological Atlas of Saskatchewan (Government of Saskatchewan, 2016), there are approximately 680 active coal dispositions, 20,260 active oil & gas related dispositions, and 150 active potash dispositions throughout the province (Figure 22).

Transportation Network in Saskatchewan:

The Saskatchewan road network is comprised of six classes of roadways, based on function, weight, and use (Ministry of Highways and Infrastructure, 2001) (**Error! Not a valid bookmark self-reference.**). Those roads listed as Class 4 – 7 are under the responsibility of the RMs, and calculates approximately 174,000km; 77% of are Class 6 and 7, 12% are Class 5, and only 11% are Class 4.

Of the total Saskatchewan road network, RMs are responsible for maintaining 92% of the roadways in the province.

Table 6: Saskatchewan Road Network Classes

Road Class	Function
Class 1	Roads serve as the major international and inter-provincial travel routes. These roads are generally the highest traffic volumes routes and have a large mix of vehicle types. These roads total 5,637 kilometers representing 3% of the system.
Class 2	Roads serve as the major links between large communities and regional service centres and connect to primary highways in neighbouring provinces and states. These roads serve large urban centres and industries and large amounts of commercial traffic. These roads total 4,322 kilometers representing 2% of the system.
Class 3	Roads serve medium sized communities and service centres. These roads have a significant amount of commercial traffic and provide access to large tourist areas. These roads total 5,930 kilometers representing 3% of the system.
Class 4	Roads serve as an inter-provincial road network, which links small communities with the higher-class roads. These roads can serve as the major haul roads or access for large industries and resources, which include: forestry, oil, grain and agricultural products, coal, potash, uranium, and gravel. These roads total 19,320 kilometers representing 10% of the system.
Class 5	Roads will serve small communities, medium-sized industrial and agricultural sites, tourist facilities, and inter-municipal collector roads. These roads total 21,388 kilometers representing 11% of the system.
Class 6	Are local, all-weather roads and serve as the primary access to individual rural residents and school bus routes. Provides access to small industrial and agricultural sites and seasonal park facilities. These roads total 64,565 kilometers representing 34% of the system.
Class 7	Roads serve access to land and other properties. These roads total 69,225 kilometers representing 37% of the system.

Figure 24 outlines the approximate length of roads each Division is responsible for maintaining. Divisions on average are responsible for 30,000km of roads; total road length by RM can be seen in Figure 25, while Class 4 through Class 7 road can be viewed in Figure 26. Currently, Division 5 has the longest RM maintained road network, next to Division 6.

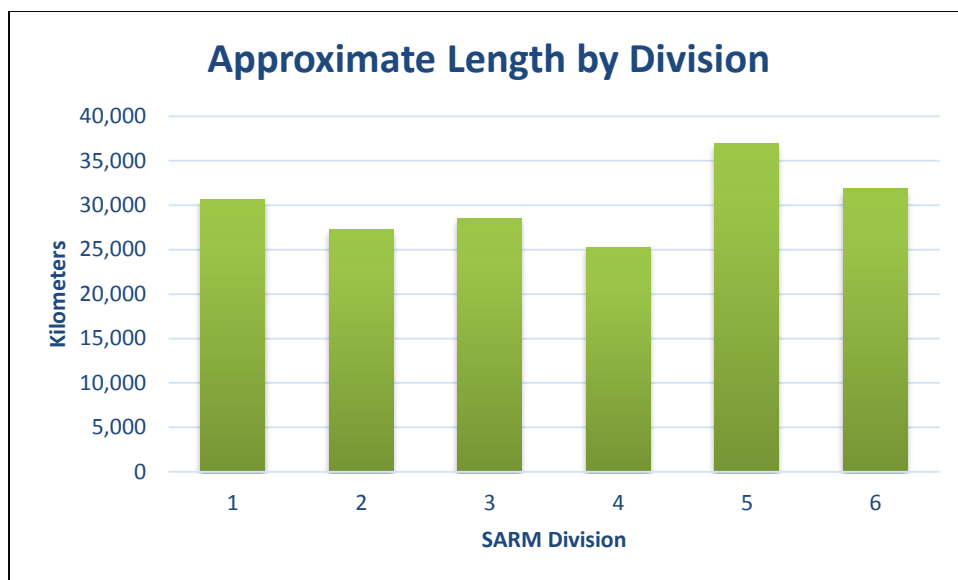


Figure 24: Approximate RM maintained road length by division

Rural Municipalities use road maintenance information from various resources. They may choose to maintain their roads according to their own past methods or according to what they can afford. The Ministry of Highways through their website (<http://www.highways.gov.sk.ca/business>) has road building standards and manuals associated with construction and maintenance. Only a few of these documents reference gravel roads; many are designed for paved surfaces. Some RMs use MHI references along with advice from professional engineering firms when building and maintaining. The Area Transportation Planning Committees also provide information and guidance for gravel road operations, and the User's Manual for Rural Road Costing Model through the Asset Management Program (VEMAX Management Inc., 2009) provides a means to assess road building costs by Division. Though many of these resources are available, there are no specific Saskatchewan rural road building guidance documents, leading to various maintenance techniques, engineering methods, and aggregate volume requirements within a region.

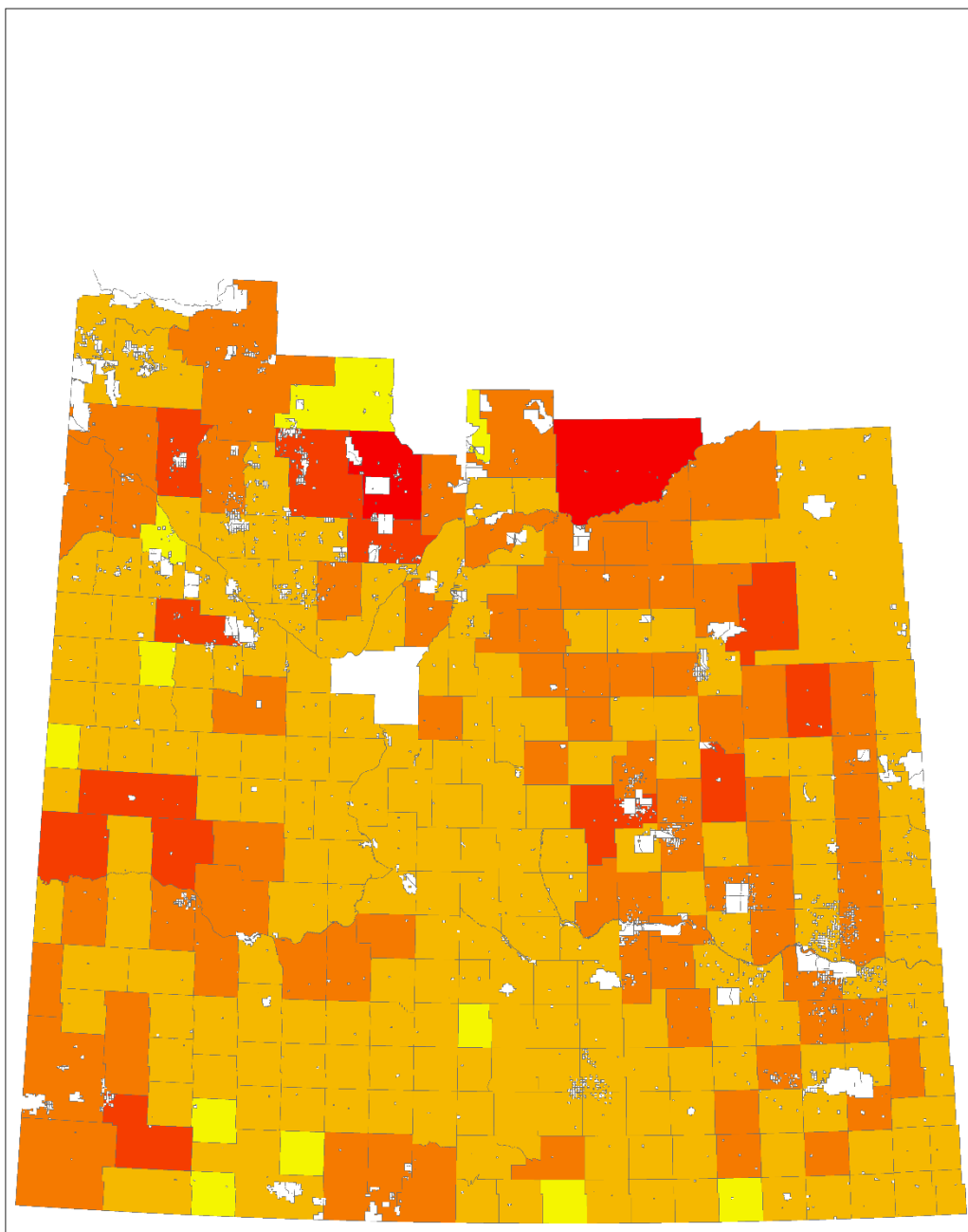
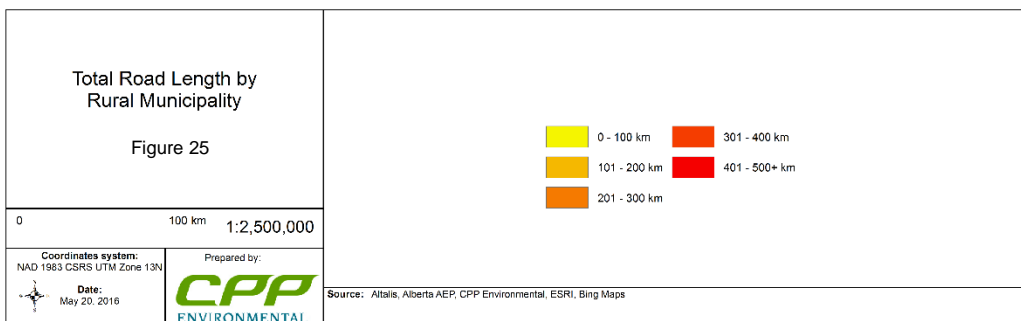


Figure 25: Total Length of Roads by Rural Municipality



Figure 26: Saskatchewan RM maintained roads (Class 4 - 7)

Clearing the Path Roadways (CTP):

The Clearing the Path program was designed as part of the Saskatchewan road network as means to increase economic traffic to smaller areas of the province while still maintaining a high quality of road network for such traffic. “The CTP network is designed to complement the existing system of primary roads, as well as provide primary weight access to communities currently without, to help attract economic development” (SARM, 2009). There are approximately 6,401km of primary weight roads which are designated under Clearing the Path (SARM, 2016) (Figure 27). CTP roads are eligible for maintenance funding up to \$1,100/km per year; however, RMs must submit a declaration each year and meet the requirements to be considered.

At first glance, it appears Division 1 and Division 4 have the most CTP roads, while Division 2 and Division 6 have the least (Figure 27). If this is true, then it may be assumed, if all RMs applied for maintenance funding, Division 1 and 4 would receive greater financial assistance in total and perhaps have more flexibility in gravel acquisition options for their roads.

Note: Data was not available to analyse CTP roads by division formally, therefore Figure 27 conclusions are from observation of the picture only. Picture provided through Government of Saskatchewan, Ministries of Highways and Infrastructure.

The Saskatchewan Rail Network

Saskatchewan has an extensive network of railways comprising:

- Shortline railways (privately owned)
- CN Mainline and Branch lines
- CP Mainline and Branch lines

There is potential to utilize the rail system to transport gravel from areas of high supply to areas of low supply to meet demands of RMs who do not benefit from having suitable quantity or quality of gravel reserves within their borders. Figure 28 portrays the rail network in relation to landforms potentially having aggregate deposits (sand and gravel). There are many potential sources of gravel in proximity to the rail network. Figure 29 portrays the rail network in relation to the RMs, depicted by the extent of their gravel reserves. Again, there is opportunity to transport gravel to many RMs requiring reliable and long-term gravel supplies.

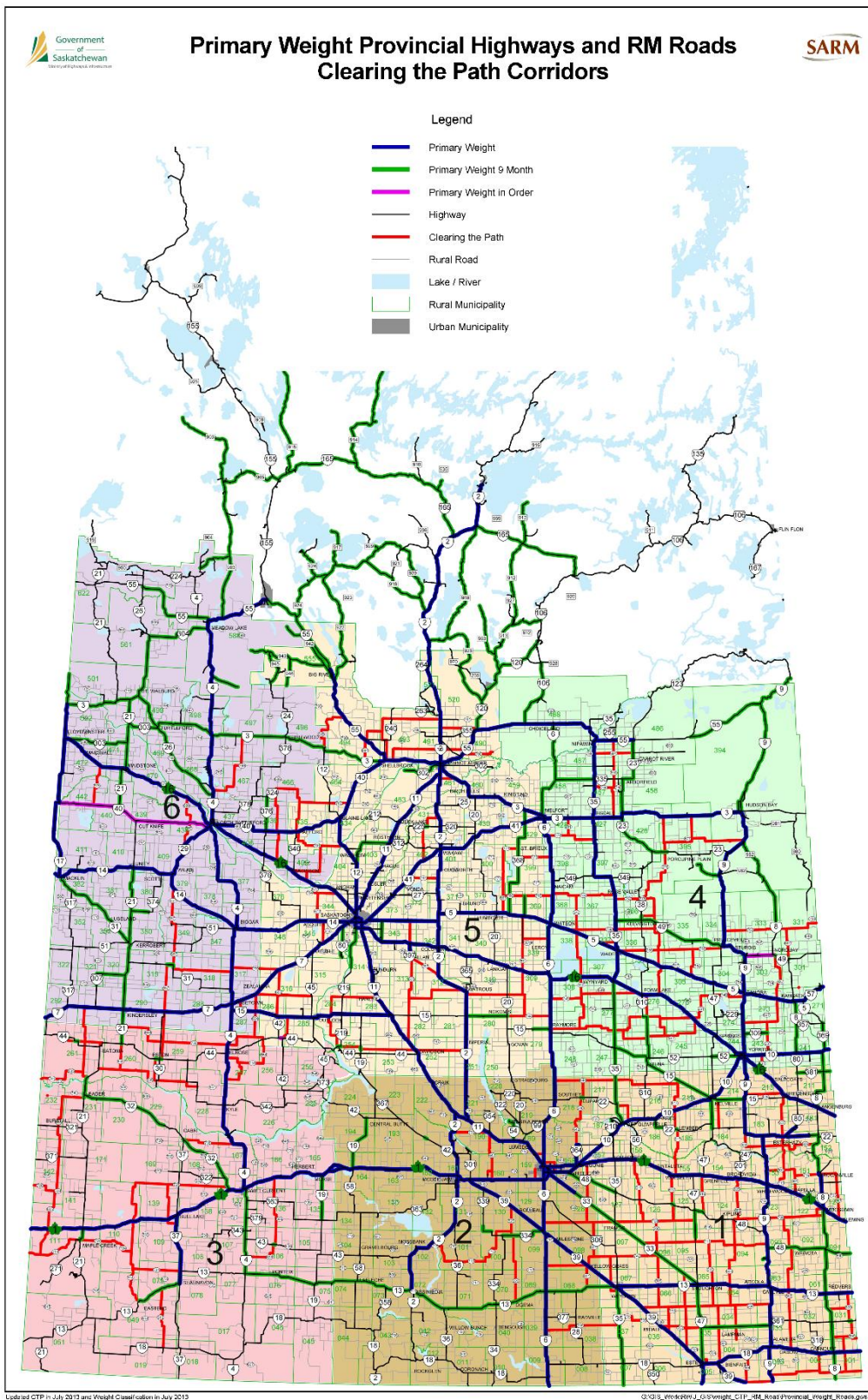


Figure 27: Primary weight and clearing the path roads by planning division

Gravel has been transported by rail within Saskatchewan, primarily to meet the needs of the Ministry of Transportation and Infrastructure on a project specific basis. The Ministry conducted a preliminary study of the movement of gravel by rail to determine areas of need and feasibility. General discussions with Ministry officials indicated that it is feasible to utilize rail to transport gravel, and the ministry is presently looking at options to stockpile railed gravel in areas of need.

Discussions with the Saskatchewan Shortline Railway Association (SSRA) indicated an interest by the shortline operators, some of whom already have experience in moving gravel by rail on a project basis. The SSRA sees an opportunity to expand upon this service, however some key challenges exist:

Rail Cars

Rail cars suitable for hauling gravel must be leased or purchased, with costs incurred by the shipper.

Coordination with Class 1 Operators

Shortline railway operators struggle to make hauling gravel economical for their clients, with one factor being the fees and tariffs charged by the Class one operators (CN Railway and CP Rail) to run on their lines. With increased volumes and frequency of gravel transport, shortline operators will be in a better position to negotiate better rates. Difficulties increase if transport needs to switch from CN to CP or vice versa.

Infrastructure

There is a need to have the proper infrastructure in place for loading, unloading and stockpiling gravel transported by rail. It is preferable to plan shipments from a shortline railway to a shortline railway, because the lower line traffic means that the loading and unloading can occur directly from the line, without need of a spur. However, for transport of large volumes a spur line into a stockpile site is ideal.

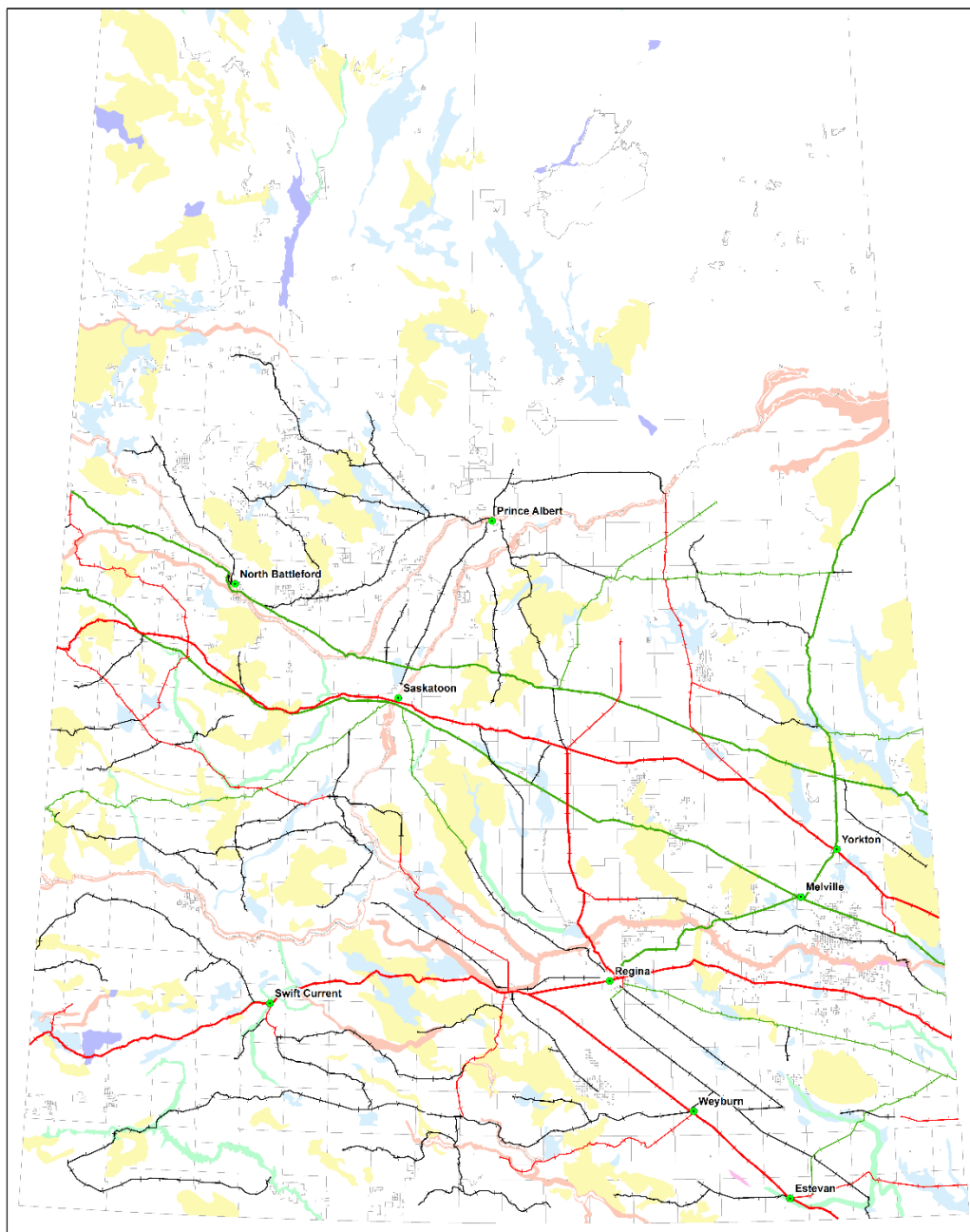
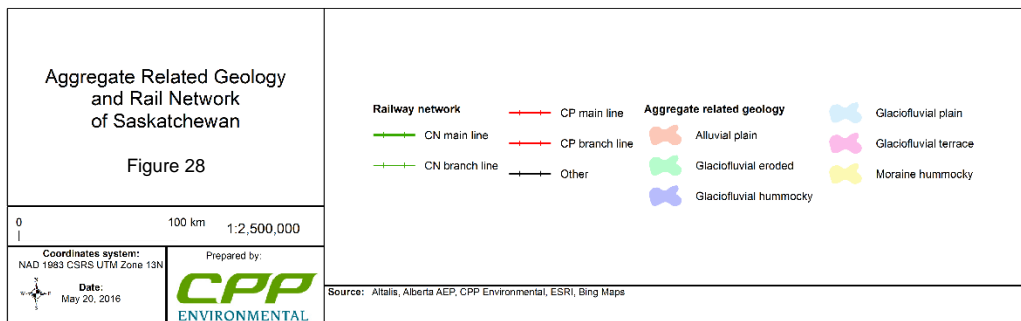


Figure 28: Saskatchewan's rail network in relation to aggregate related geology

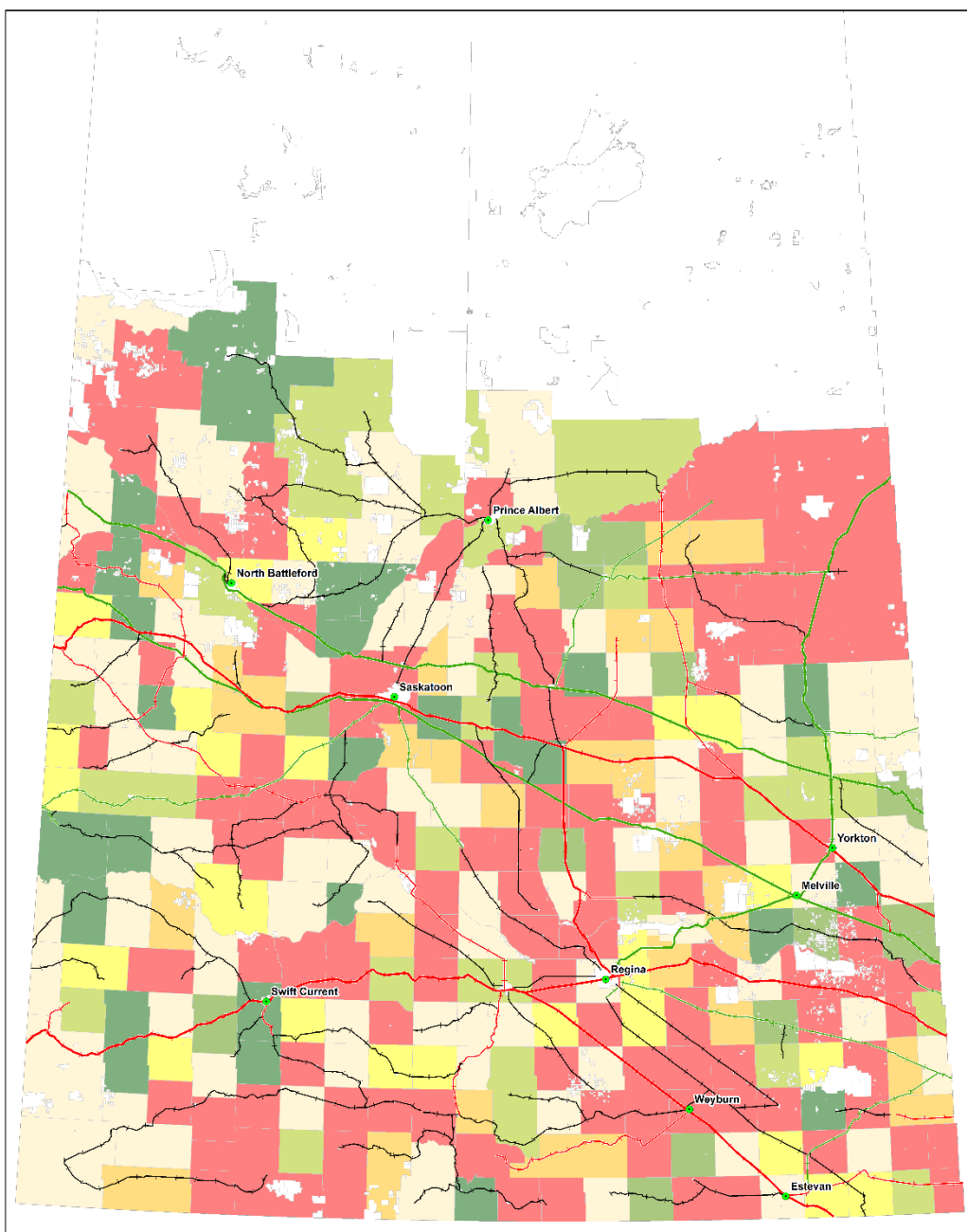
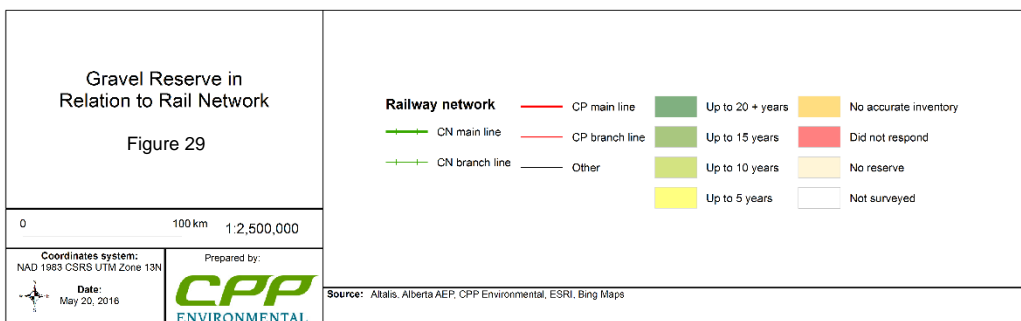


Figure 29: Saskatchewan's rail network in relation to RMs and their respective gravel reserves.

Transport of gravel within Saskatchewan is a viable option that will become more economical over time. Increasing volumes being hauled and competition between gravel suppliers and railways should result in cost savings. RMs will be able to order the right quality and specifications to meet their needs. Options also exist, for example to screen the aggregate and only haul the crushed rock component, which can be blended at the receiving stockpile site.

Another important consideration in the use of rail to transport gravel is the carbon footprint. Railways are far more efficient in reducing the carbon footprint of transporting large volumes of material. It can be expected that as carbon pricing becomes a common component of Canada's economy, transport of bulk materials by rail over long distances will become more efficient than trucking because of carbon taxes. Rail transport also reduces the wear and tear on roads resulting from large volume gravel hauls.

20 to 25 rail cars can displace 100 trucks, reducing the carbon footprint of transport and the wear and tear on rural roads and highways (personal communication SSRA)

Gravel Costing and Gravel Haul

Without a focused study on gravel costs to RMs, it is extremely difficult to gain an accurate idea of finances contributed to gravel acquisition and operations. Survey results yielded a brief overview of what RMs were paying to haul gravel, however, responses were in many different units, perhaps due to misunderstanding of the survey question. Thus, this information was difficult to analyze, and some answers given were not used in the breakdown seen in Table 7.

Table 7: Analyzed Results of Cost to Haul and Average Haul Distance

Division	\$yard/km	Avg. Haul Distance (km)	Range of Haul (km)
Division 1	0.56	26.9	10-60
Division 2	0.30	25.8	8-70
Division 3	0.36	27.4	10-75
Division 4	0.51	32.0	3-100
Division 5	0.28	27.5	9-100
Division 6	0.32	29.5	10-125

Hauling distances based on survey information varied between 3.2 km and 125 km, with the median value of 21.6 km. Average RM hauls by Division can be seen in Table 7. Again, the usability of the cost data was poor and was screened to only include the usable units. In some circumstances, the answer did not suit the question and was not used. However, from the averages obtained from the usable data, these current distances are only slightly greater than the distances listed by MHI in the 1982 gravel inventory (as seen in Chapter 2: History of Aggregate in Saskatchewan).

Programs and Initiatives:

There are a variety of resources which RMs may use to assist with gravel management (see Figure 2). A few noteworthy include:

Municipal Roads for the Economy Program (MREP): provides conditional funding with annual funding provided by the Ministry of Highways and Infrastructure. Three components include:

- Clearing the Path (CTP) Corridor Incremental Maintenance,
- Heavy Haul-High Volume Road and CTP Construction Projects, and
- Municipal Bridge Services

The Provincial Revenue Sharing Program and Gas Tax Funding Program: provides unconditional annual funding to RMs.

It is important that Provincial funding provided to RMs such as the Municipal Roads for the Economy Program, Revenue Sharing Program and Gas Tax Program are reviewed and updated regularly to maintain and/or enhance the capacity of RMs for conducting road maintenance, gravel exploration and acquisition.

Ministry of Highways and Infrastructure: online access to road building design and specifications manuals (focussed on paved roads).

Government of Saskatchewan Asset Management: within this program, there are a number of frameworks to help value your road maintenance and assist with understanding costs.

Municipal Administration Tools, Guides, and Resources for Municipalities: Government of Saskatchewan online host of tools, guides, and legislation to assist RMs with understanding their responsibilities and to assist in developing road haul agreements, rates, etc.

Gravel Roads Maintenance and Design Manual: November 2000 publication by the U.S. Department of Transportation is used as a reference guide for many Saskatchewan road engineers.

Survey responses indicate that some RMs are aware of some or all of these types of resources, while others are not. Some RMs do not believe they have the funding to hire professional road engineers to assist with road construction and maintenance, thus, they “keep doing what they are doing”. For these RMs, in many cases gravel is being lost due to these inadequately engineered roads and/or lack of engineering practices. Currently, there is no formal guide for best management practices in road engineering and maintenance in which RMs can consistently consult. Thus they must rely on assistance from groups such as the ATPC’s, the contractors they hire, or simply “how it has been done in the past” methods.

A list of further references (beyond those used for this report) regarding aggregate management and opportunity suggestions can be seen in Appendix 3: References for Gravel Road Maintenance and Management.

A lack of a formal guide for best management practices in gravel road engineering for RMs to consult may be leading to inconsistent, inefficient road maintenance methods.

Collaboration

The Government of Saskatchewan works closely with SARM, as well as the ATPC's to provide support to the Rural Municipalities of Saskatchewan. There are many RMs who believe the crown land leasing system and communications between the Agriculture and Environment Ministries and the RMs is open and efficient, or "seems to work fine". According to some RMs however, the relationship and collaboration between municipalities and the Ministry of Highways is not as open or the ministry is not willing to collaborate or share resources.

Perception aside, it is very surprising then to see that RMs themselves don't often partner or share resources between other RMs; only 11.4% indicated upon survey that they collaborate with others. Those that do collaborate do so through sharing gravel pits, sharing operational costs, or share hauling. Those 88.6% who do not partner, either believe they do not have enough gravel to share or they have enough and do not need to partner. As many RMs use commercial operators to obtain gravel, they don't see partnering as an option or have never considered partnering as part of their aggregate management plan.

The Central Area Transportation Planning Committee has delivered valuable training to RMs in the past regarding road construction, road maintenance and gravel exploration.

Alternatives

Only 17% of RMs use aggregate best management practices (BMPs), and even less at 7.8% use alternatives to gravel to maintain their roads. The most common types of BMPs used by RMs according to the survey are that of dust control, surface binders, and pulling gravel from the road shoulders. From the survey and various interviews, it is believed that most RMs do practice best aggregate management, but many either do not consider those operations best management or are unfamiliar with the term best management practice and therefore responded accordingly.

Realizing that the use of gravel alternatives to maintain a road is a relatively new idea, not fully proven, and in some cases more expensive, it is not surprising that RMs do not frequently use alternatives when maintaining their roads. Those who do use alternatives, do so at a small scale through the use of recycled concrete or asphalt, gravel binding agents and chemical applications, potash tailings, and shredded tires. Availability of alternate materials is a limiting factor of their use.

Summary of Current State

Gravel resources in Saskatchewan exist, however due to the geology of the province, large commercial deposits are hard to find, and extensive exploration is needed to determine viable sources. Those sources which are known are explored and utilized by various groups, of most interest in this study are the Rural Municipalities, the Saskatchewan Government, and Commercial Operators.

From responses listed in the SARM – *Understanding Rural Municipality Gravel Resources and Gravel Management* survey, it is abundantly clear that most RMs are having some issues regarding gravel exploration and acquisition, and strategic management for current and future road maintenance operations. To understand the circumstances under which this is occurring, it was necessary to investigate population dynamics in the province, the current road and rail systems, and gravel production and consumption. An overview of findings can be seen in Table 8. From the investigation, the following key points are of major interest to strategy development for sustainable aggregate management:

- Most Rural Municipality populations are decreasing. Many that are increasing are close to urban areas and/or have natural resource development potential.
- RMs maintain over 90% of roadways in the province and receives approximately 28% of provincial revenue sharing plus extra dollars from MREP, but only if an RM meets the criteria
- Most RMs get their gravel from their own private land pits or commercial operators. Fewer RMs use crown land as of late.
- 64% of RMs currently do not have any problems securing aggregate; however most do not have a long term strategic supply.
- Many RMs do not use best management practices or alternatives to gravel.
- Only about 31% of RMs issue development permits for gravel extraction operations in their area. Some do not know these options are available to them.
- For RMs who do use crown land, the process to obtain leases seems efficient, however many believe gravel on crown should be reserved for the municipality before lands are sold or leased.
- RMs generally feel a lack of support or collaboration from MHI when it comes to gravel operation and acquisition processes.
- Crown land is being sold without gravel exploration or RM rights to gravel; although referrals are conducted to the RM in which the land sale occurs, few have resources to investigate and respond meaningfully.
- Hauling distances are an issue for RMs, however are not a great deviation from distances tracked in the past.
- Most RMs do not collaborate with each other on gravel operations.
- Without proper inventories of RM gravel pits and common road maintenance specifications, it becomes difficult to plan for future aggregate needs.

Road Network and Population Summary:

Interestingly, the average total length of roads in any given RM is approximately 580km (Figure 25) and average population of an RM is approximately 590 residents; currently near a 1:1 ratio. As populations in certain areas of the province decline however, this ratio changes, and the same amount of roads need to be maintained but with funding from a smaller ratepayer base.

One may argue that smaller populated areas have less traffic, and therefore perhaps less road maintenance. This is not necessarily true, as roads through an RM may have the same volume of traffic regardless, due to non-resident traffic, such as agricultural, commercial, or industrial movement (Figure 22), especially if an RM is in-between two major development areas.

The reciprocal may be true for the RMs with growth. RMs with increased growth have a greater ratepayer base and generally an increased traffic volume. Growth may lead to an increase in road building and demand for pavement. Maintaining paved roads increases front end capital cost, but reduces gravel needs over time. A population influx, especially around urban municipalities, often results in increased rural housing developments. Without appropriate development controls or planning, there is potential for in-ground aggregate to be sterilized for future use due to development.

Gravel Availability and Consumption Summary:

Table 8 demonstrates the annual gravel demand of an RM by Division. Knowing this information can allow estimates of future aggregate consumption, by Division or at an RM scale.

For example, by using the average gravel consumption of an RM in Division 1 (24,010cuyd), multiplying that by the total number of RMs in Division 1 (53) and then multiplying that by a 30-year outlook, one can gain a reasonable estimate of how many cubic yards Division 1 may need to strategically acquire (38,175,900cuyd), presuming the road network classes and maintenance schedules do not dramatically change over that time.

**Average Annual Gravel Consumption x Number of Years for Future Planning +
planned new road construction = Strategic Gravel Inventory**

Using such a formula, individual RMs can quickly and easily apply their annual average gravel consumption to this and develop numbers for their strategic aggregate plans. The 30-year outlook was chosen as a reasonable long-term planning period consistent with other provincial strategic planning periods; over time, the intent would be to regularly recalibrate the estimates based on gravel reserve status and updated demand estimates for a rolling 30-year outlook.

Table 8: Summary of Current State of Gravel in Saskatchewan

	Percent Survey Completion	Avg. Gravel Use by RM on Annual Basis (cu yd)	Census Population (2011)	% Change in Population (2006- 2011)	Total Length of Road Maintained (km)	Avg. Hauling Distance by RM (km)	Road km/person	30-Year Gravel Reserves Outlook (cu yd)
Division 1	81%	24,010	25,109.00	0.67	30,654	26.9	1.2	38,175,900
Division 2	75%	15,076	23,104.00	-1.24	27,290	25.8	1.2	23,066,280
Division 3	64%	15,386	18,792.00	0.19	28,502	27.4	1.5	20,771,100
Division 4	69%	21,209	26,637.00	-6.46	25,279	32.0	0.9	26,723,340
Division 5	77%	21,933	51,657.00	2.31	36,965	27.5	0.7	37,505,430
Division 6	73%	24,524	29,286.00	-1.05	31,851	29.5	1.1	35,314,560

Municipalities under Potential High Aggregate Stress

The survey responses clearly indicate that some RMs are uninformed when it comes to effectively managing aggregate for future consumption. Considering the factors of the current state and future need, one can make preliminary suggestions about where there may be future (if not current) stress on an RMs ability to acquire and secure local gravel.

Aggregate stresses come in variety of forms. Using the surficial geology of Saskatchewan and focussing on only those landforms with aggregate potential, many RMs appear to be near such features. However, these landforms do not necessarily contain viable sand and gravel, and using this map as a tool will not allow an RM to know the presence, quality or quantity of gravel without ground-work. Those who are not located over such potential features may have an increased likelihood of not having any gravel resources within their bounds.

Current aggregate related dispositions on crown land yield a better understanding of where there may be potential for gravel. Established sites or those listed to have potential are a better indicator of certainty of occurrence (Figure 22, Table 4, Table 5). RMs without current aggregate related dispositions may be less likely to find gravel within their bounds.

Population growth, especially surrounding urban centres, is also a stress to gravel availability. This type of growth often results in housing developments where potential gravel resources could be sterilized, if not extracted before development. RMs with growing populations and/or near urban centres may experience these types of issues, resulting in a potential loss of gravel resources if not planned for accordingly.

Transportation corridors are also important in aggregate planning. RMs will all have roadways though their bounds, however, the use of rail to potentially carry mass volumes of aggregate may become the most cost effective means of transit. Those RMs who do not have rail access may have a disadvantage, and have to alternatively plan for higher gravel road haul costs.

Major industry within Saskatchewan is also an important factor when assessing gravel availability and determining potential areas of stress. Industries such as mining, oil & gas, and potash will also compete with RMs for land and gravel resources for their own development and operations; whether it be operating their own pits or purchasing from contractors.

To broadly understand how aggregate stresses (such as those listed above) may affect RMs, a query was conducted to find possible stress associations. The query included those indicators which may most affect an RMs ability to acquire and secure gravel:

- Population growth >5% according to the 2011 Census – 5-year average
- Population growth >5% according to the 2011 Census – 25-year average
- No presence of a rail network
- No currently reported RM strategic gravel reserves according to the online survey results
- Major industry disposition within bounds (potash, oil & gas, and mining)

The outcome of this query can be seen in Figure 30. Four categories resulted based on an RM meeting the above indicators:

- Those RMs who met four indicators
- Those RMs who met three indicators
- Those RMs who met two indicators
- Those RMs who met one indicator
- All other RMs

Each category was then assigned a priority, based on the number of indicators met; no RM met all five indicators. If an RM met four indicators, for example had no strategic gravel reserves, had an increasing population over a 5-year period, had no rail system in its bounds, and had an industry disposition inbounds, it would be ranked Priority 1. Priority 1 designated RMs may experience the highest amount of gravel stress in the future, as they have many variables affecting gravel availability and accessibility.

Priority 2 RMs are those who met three indicators; there are 41 RMs who have been categorized as Priority 2. These RMs are also considered to have a high stress on current and future gravel availability and accessibility, solely based on the data given.

Priority 3 RMs met two indicators and Priority 4 RMs met one indicator in this exercise. These RMs may be under less immediate stress as from this initial analysis, it appears there may be fewer pressures on the gravel resource in these areas. This is not to say these areas do not need assistance with planning or management, they just may not need to be immediately addressed.

There were only a handful of RMs who did not meet any of the above five indicators. These have not been categorized under the Priorities, and for the purposes of this exercise, can be considered areas without stress on their gravel resources for the interim. They have been labelled as “Uncategorized” on Figure 30.

These priority areas were then mapped with the major cities of the province for reference (Figure 30).

Those RMs listed as Priority 1 and Priority 2 will need to focus initiatives on acquiring strategic reserves locally if gravel is present or establishing long term gravel supply contracts with suppliers. It will be necessary for these RMs to focus on ensuring population/economic growth is accounted for in development planning and develop systems to efficiently move gravel into their bounds by railway. Those listed as Priority 3 and Priority 4 will need utilize the rail system to efficiently to move gravel into their bounds and acquire sufficient strategic gravel reserves in a quantity sufficient to meet future public works needs.

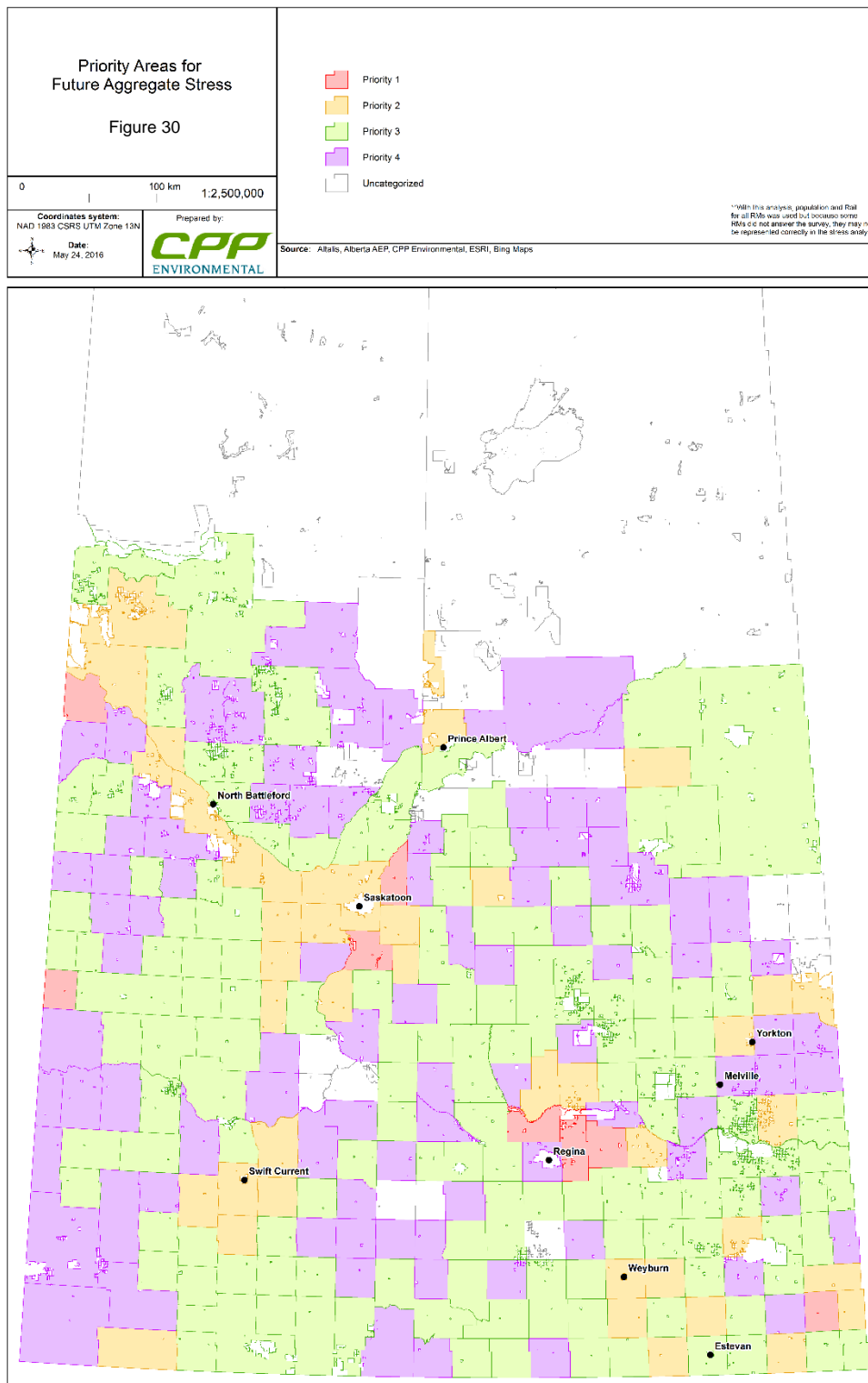


Figure 30: Prioritization of RMs due to predicted future stress.

Chapter 5: Aggregate Best Management Practices

Aggregate Alternatives

The search for alternatives to traditional aggregate is ongoing wherever there are concerns over current and future supplies of aggregate. Saskatchewan is already part of the search. One such example was presented to the Canadian Technical Asphalt Association in 2000 entitled “Cold In-Place Recycling Using Asphalt Emulsion for Strengthening for Saskatchewan Low Volume Roads” (Baker, Wourms, Berthelot, & Gerbrandt, 2000).

Saskatchewan is likely to continue its involvement in the search for alternatives as concerns over aggregate supplies continues and overall public support for principles of natural resource and environmental sustainability increases.

RMs have reported using alternatives, albeit at a lower level (about 8%), including recycled concrete and asphalt, shredded tires, crusher dust, and potash tailings. It is noted that roughly 25% of RMs responses indicated the lack of knowledge of what alternatives to use and their effectiveness were barriers to use of alternatives to traditional gravel.

There are abundant gravel binding products on the market designed to improve gravelled road surfaces. Many products claim to reduce resistance to surface abrasion and dusting and reduce water penetration, thereby reducing the damaging effects caused by traffic and wetting and drying cycles. A caution is many products are designed to be used with specific particle size distribution in the gravel surface (e.g. between 12% to 15% clay). Application rates need to be adjusted for the road surface material used, for example, surfaces consisting of high sand or silt content may need higher doses to achieve the proper binding qualities. Certain products also require windowing of surface material for product application followed by grading and compaction using a vibrating roller or multi-tire roller. Other products are simply sprayed on a properly crowned and graded road surface. It will be important for RMs to coordinate trials and share results prior to committing to large scale treatment types or products.

Trials of various gravel road binding products should be conducted on rural gravel roads to determine the most effective and efficient treatments based on local road surface material specifications and durability.

However, it seems clear that the greatest majority of RMs will continue to rely on traditional sand and gravel as the preferred material for road construction and maintenance, at least into the foreseeable future, as alternatives are not uniformly or readily available to all RMs and may be cost prohibitive for large scale use.

Education and awareness on the availability and function of aggregate alternatives should continue to be delivered to RMs through SARM or through other appropriate training organizations.

Some aggregate alternatives may include:

- Rubberized asphalt concrete (Johnson, Sproule, & Juristovski, 1995)
- Limestone (Government of Saskatchewan, 2015)
- Reused and Recycled Road Construction and Maintenance Material (Federation of Canadian Municipalities, 2005)
- Lightweight Concrete Aggregates from Saskatchewan Clay (Sacuta, 1956)
- Use of Steel Slags (Wojciech, Gluchowski, & Radziemska, 2015)
- Various surfacing alternatives for unsealed roads (Henning, Kadar, & Bennett, 2006)
- Crushed concrete (Cross, 2013)

Best Management Practices

Best Management Practices (BMPs) are acceptable practices that can be implemented to protect or conserve a natural resource. These can be processes to follow or on-the-ground tools to use. Using BMPs, in gravel pit management and for road construction and maintenance, may help aggregate managers support local economies, respect neighbourhood values, conserve the resource, and operate with environmental responsibility (Government of British Columbia, 2002).

As discussed in the previous section on alternatives, it is highly likely that traditional aggregate will continue to be the preferred material for road construction and maintenance.

RMs need get the most out the sand and gravel material that is available to them, while taking advantage of alternatives and while continuing to explore and develop new sources of sand and gravel.

According to the Got Gravel survey, about 17% of respondents' report having used aggregate BMPs (Figure 31). It is reasonable to assume that there are RMs using day-to-day operations (in their pits and on the road) that could be considered BMPs but have not been identified as such.

Those RMS reporting using BMPs do so through the use of the following practices, all of which can contribute to conserving supplies of traditional aggregate:

- Chemical surface binders
- Shoulders are pulled in the fall and reclaimed in the spring to retrieve gravel in the ditch
- Blading techniques, change blades and operator training
- Haul the majority of gravel to stockpile in the winter when the roads are frozen so there is little to no road damage or gravel loss
- Blend sand at a rate of 25%
- Speed limit control

- Graveling such that primary roads get gravel every year, secondary roads get gravel every second year and farm access roads get graveled only when the Councillor and the foreman decide they require gravel (“as-needed basis”).

A wealth of information on aggregate best management practices to guide operations already exists, including in Saskatchewan and other Western Provinces. Rural Municipalities can certainly refer to existing aggregate best management practices for guidance when managing sand and gravel resources within their respective municipal boundaries.

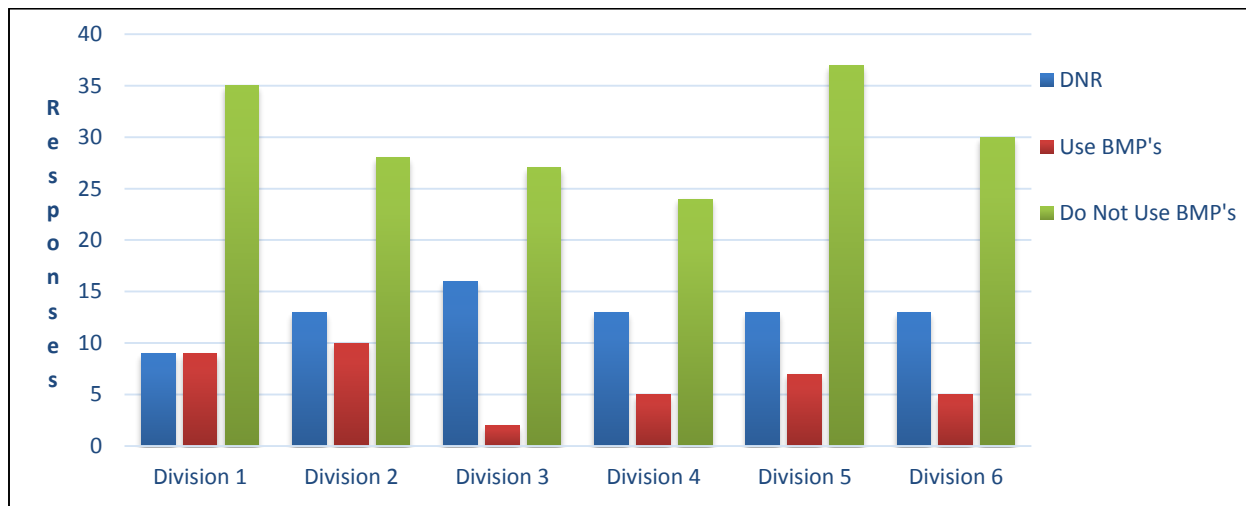


Figure 31: Overview of best management practice use by SARM Division

An opportunity exists to capitalize on currently available practices by reviewing them in the context of the Saskatchewan situation (local and provincial) and developing a new “made-in Saskatchewan” suite of aggregate best management practices.

Information on aggregate best management practices (pits and roads) in Alberta and Saskatchewan is further provided in Appendix 3: References for Gravel Road Maintenance and Management.

The Saskatchewan Ministry of Highways and Infrastructure has compiled an extensive library of information for contractors, consultants, truckers, and shippers who do business with them, including information on “Environmental Stewardship”. The information provides best practices to reduce impacts of activities such as operating sand and gravel pits, building roads and maintaining roads. The information is available at <http://www.highways.gov.sk.ca/business>.

Strategic Recommendations – SARM Midterm Workshop

At the November 15, 2015 SARM Midterm Workshop, RMs described some common concerns and issues associated gravel resources and road building and maintenance, including:

- Locating aggregate supplies
- High volume, increasing weights of traffic
- Poor quality soil (for road construction)
- Poor quality gravel for road surfacing
- Perennial wet weather and flooding conditions
- Environmental and Heritage restrictions
- Public concerns (“not-in-my-backyard”)

An analysis of concerns and issues impacting wise use and conservation of aggregate resulted in several strategic practices below:

Pit Inventory – Strategic use of aggregate resources requires knowing its current status including quantity and quality. Further, the true nature of potential shortages cannot be fully understood nor accommodated without inventory information.

An inventory of RMs respective aggregate resources provides them with the ability to best use and conserve the resource, both within their respective boundaries and in partnership with each other.

Inventory aggregate in existing pits to properly plan for their best use (quality) and longer term availability (quantity).

Pit Planning – Maximizing use of aggregate in pits requires a planned approach to wise use and conservation of the resource.

Pit development planning will ensure infrastructure is placed in the most practical location for maximum extraction. Pit operation and management planning will reduce potential environmental (erosion, contamination) and safety concerns. Planning for reclamation will decrease costs by ensuring reclamation materials are conserved and placed properly for future use.

Developing, operating, managing and reclaiming pits to get the most aggregate out at the least possible cost while reducing potential ongoing public concerns and minimizing environmental restrictions is required.

Surface Water Management - Wet weather conditions and flooding during the past 4 to 5 years has caused increasing road building and maintenance concerns. The impacts of known cyclical changes to prairie weather patterns as well as the long term effects of climate change are bound to continue.

Managing for future impacts of changing weather is required through the use of suitable road construction materials, proper crowning of road surfaces, increased culvert sizing, additional culvert placement (for cross drainage) and improved ditch drainage to handle greater water volumes.

Quality of Materials (soil and gravel) – The use of materials appropriate to intended RM road use and vehicle weights is critical to wise use and conservation of aggregate supplies.

A rationalized approach to prioritizing road developments is required. The current general “do as best we can” is not sustainable.

Municipal Planning – An aggressive approach to municipal planning and enacting development by-laws to conserve aggregate resources is required, including extracting the resource prior to development.

Chapter 6: Policy, Planning, and Guiding Principles

Sand and gravel is increasing in importance as Saskatchewan's population grows and infrastructure demands increase. Demand for sand and gravel has increased significantly in recent years, creating greater competition between users of the resource and higher prices to acquire it. Legislation and policy provide frameworks for making consistent and fair decisions for conservation, management and allocation of the resource.

RMs have an obligation to their ratepayers to construct and maintain a significant network of roads within their respective boundaries. It is important that legislation and policy frameworks do not create unreasonable barriers to RMs to access affordable sand and gravel for their infrastructure needs.

Identification and review of legislation and policy associated with gravel exploration, acquisition, operation and reclamation of pits was conducted in the context of a RMs ability to access gravel resources. The review and analysis was completed in three phases:

- A. Regulatory Framework – Current provincial and federal legislation (Acts and Regulations)
- B. Provincial Sand and Gravel Policy (Crown Land) – Current provincial policy governing the allocation and use of sand and gravel
- C. Strategic Management and Planning – management and planning issues indirectly related to conservation, management and use of sand and gravel that may have resulted in unintended, detrimental impacts.

A. Regulatory Framework (Provincial and Federal Legislation)

Introduction

Sand and gravel operators are subject to requirements of federal and provincial legislation (Acts and Regulations), as well as municipal by-laws. Awareness of the legislation is important to sand and gravel operators so that they can ensure their operations are in compliance with requirements. In several cases, non-compliance with regulatory requirements includes severe monetary penalty (e.g. *Heritage Property Act*).

A summary of the more common Acts and regulations and the responsible Ministry/Agency is provided below.

Nineteen provincial and federal Acts and eleven provincial and federal regulations were reviewed in the context of their requirements for conservation, management and use of sand and gravel. The analysis was completed in consideration of the following topics or subject matters:

- Description – actual regulatory requirements of respective Acts or regulations
- Comments – observations on the impacts of the regulatory requirements on sand and gravel management

- Significance to RMs – an analysis of the importance of the regulatory requirement, specific to RMs, including the consequences of non-compliance (penalties)
- Cost – an analysis of the cost to RMs to meet the regulatory requirements (financial, effort)

A summary of the federal and provincial legislation included in the review and analysis is summarized in Table 9 and Table 10.

Addendum 2: Aggregate Related Provincial and Federal Acts and Associated Regulations provides a summary of requirements related to the development, operation and reclamation of gravel pits, including special considerations for Saskatchewan RMs.

Table 9: Provincial Regulatory Framework

Act or Regulation	Responsible Ministry/Agency
<i>Sand and Gravel Act (1979)</i>	Highways and Infrastructure
<i>Crown Minerals Act</i>	Economy
<i>Provincial Lands Act</i> <ul style="list-style-type: none"> • <i>Provincial Land Regulations</i> 	Agriculture
<i>Forest Resources Management Act</i> <ul style="list-style-type: none"> • <i>Crown Resource Land Regulations</i> 	Environment
<i>Parks Act</i> <ul style="list-style-type: none"> • <i>Parks Regulations</i> 	Parks, Culture and Sport
<i>Heritage Property Act</i>	Parks, Culture and Sport
<i>Wildlife Habitat Protection Act</i> <ul style="list-style-type: none"> • <i>Wildlife Habitat Disposition and Alteration Regulations</i> • <i>Wildlife Habitat and Ecological Lands Designation Regulations</i> 	Environment
<i>Wildlife Act</i> <ul style="list-style-type: none"> • <i>Wild Species at Risk Regulations</i> 	Environment
<i>Water Security Agency Act</i>	Water Security Agency (Crown Corporation)
<i>Weed Control Act</i> <ul style="list-style-type: none"> • <i>Weed Control Regulations</i> 	Agriculture
<i>Environmental Management and Protection Act</i> <ul style="list-style-type: none"> • <i>Environmental Management and Protection (General) Regulations</i> 	Environment
<i>Municipalities Act</i> <ul style="list-style-type: none"> • <i>Municipalities Regulations</i> 	Government Relations
<i>Planning and Development Act</i> <ul style="list-style-type: none"> • <i>Statements of Provincial Interest Regulations</i> 	Government Relations

Table 10: Federal Regulatory Framework

Act or Regulation	Responsible Ministry/Agency
<i>Indian Act</i> (for operations on Indian Reserves)	Indian Affairs and Northern Development
<i>Canada Wildlife Act</i> <ul style="list-style-type: none"> • <i>Wildlife Area Regulations</i> 	Environment Canada
<i>Migratory Birds Convention Act</i>	Environment Canada
<i>Species at Risk Act</i>	Environment Canada
<i>Fisheries Act</i>	Fisheries and Oceans Canada
<i>Navigable Waters Protection Act</i>	Transport Canada

B. Provincial Sand and Gravel Policy (Crown Land)

Introduction

Two primary provincial policies governing the administration of the majority of provincial crown sand and gravel resources in Saskatchewan are:

- Ministry of Agriculture “*Sand and Gravel Policy, November 1999*”
- Ministry of Environment “*Sand and Gravel Exploration, Extraction and Reclamation on Crown Resource Land, November 2003*”

RMs may also access sand and gravel on provincial crown land administered by Ministries other than Agriculture and Environment, such as the Ministry of Parks, Culture and Sport. However, access is typically more restrictive on these lands and they are generally considered to be less available sources of gravel.

1. Ministry of Agriculture “*Sand and Gravel Policy, November 1999*”.

The Ministry of Agriculture administers sand and gravel on agriculture crown land in accordance with its 1999 policy, last reviewed in 2013. The policy is subject to the *Provincial Lands Act* and associated Regulations, in particular the *Provincial Land Regulations*. Agriculture crown land is generally located in the southern agriculture area of Saskatchewan.

<http://www.agriculture.gov.sk.ca/Default.aspx?DN=ede0d389-bc47-4948-8a79-d27a5b00ebb6>

2. Ministry of Environment “*Sand and Gravel Exploration, Extraction and Reclamation on Crown Resource Land, November 2003*”.

The Ministry of Environment administers sand and gravel on Crown resource land in accordance with its 2003 policy. No recent review or revision of the policy is apparent. The policy is subject to the *Forest Resources Management Act* and associated

Regulations, in particular the *Crown Resource Land Regulations*. The majority of Crown resource land is located in the northern forested area of Saskatchewan with some land located in the southern agriculture area of Saskatchewan.

<http://www.environment.gov.sk.ca/adx/asp/adxGetMedia.aspx?DocID=632,620,247>

Both Policies include aspects that are based on Regulation. Any amendments to regulatory aspects of the Policies will include a requirement to follow legally prescribed legislative amendment processes.

Policy Analysis

An analysis of the two primary policies governing provincial crown sand and gravel resources in Saskatchewan included a “side-by-side” comparison between similar aspects of the respective policies. Results of the analysis is summarized in *Appendix 4*.

The analysis includes identification of gaps and opportunities as described below:

- Gaps: Brief synopses of observable inconsistencies between the two Policies and underlying issues resulting from the inconsistencies
- Opportunities and Benefits: Possible remedies/resolutions to inconsistencies and underlying issues as well as the anticipated benefits to RMs if amendments are made

As much as practical, the policy analysis considerations are directed primarily to identify and provide amendment opportunities to those aspects of the two Policies that limit RMs’ access to Crown-owned gravel resources. However, because the Policies are Provincial in nature and govern not only RMs but also two other major client groups (Ministry of Highways and Infrastructure and Commercial/Private Contractors), amendment opportunities are provided in consideration of all three major client groups with a view to striking a reasonable balance between the respective client group needs.

Because of the Provincial nature of the Policies, it is highly recommended that a more inclusive and comprehensive review between the three major client groups be completed in order to determine whether the suggested opportunities for amendment are viable and/or workable.

Some amendment opportunities may have potential to satisfy objectives of Saskatchewan’s “*Red Tape Reduction Action Plan*” and the “*Regulatory Modernization*” initiative, particularly those opportunities that have the potential to reduce regulatory overlap, duplication, and redundancy. SARM may choose to highlight these provincial-level initiatives to the Ministries of Agriculture and Environment as added support to SARM recommendations for Policy review.

C. Strategic Management and Planning

Introduction

The review and analysis of legislation and policy directly related to conservation, management and use of sand and gravel is completed.

There are other management and planning issues indirectly related to conservation, management and use of sand and gravel that may have resulted in unintended, detrimental impacts. The issues were revealed through:

- analysis of the responses received from the Survey
- review and analysis of other unrelated provincial programs (e.g. PFRA Community Pastures Program)
- review of statistics and trends (e.g. Statistics Canada population trends)
- analysis of current practices (e.g. levels of cooperation and collaboration)

The following issues were reviewed and recommendations are provided to resolve them.

C.1 Issue: Sale of Crown Land - Potential sources of Crown gravel are lost if a reasonable investigation of the presence of gravel is not conducted prior to the sale of Crown land.

Many RMs have expressed concern regarding the sale of Crown land prior to a thorough assessment of its potential for sand and gravel, including;

- Loss of access to potential sand and gravel areas through programs such as the Agricultural Crown Land Sale Program and the sale of former Federal (PFRA) Community Pastures
- Inadequate time and resources to adequately respond to referrals that RMs receive prior to completion of sale of Crown land
- No referrals prior to sale of Crown land located outside respective RMs' boundaries and within their respective areas of interest

Agricultural Crown Land Sale Program – The Program was introduced in November, 2008 with the latest extension effective November 4, 2015 to December 31, 2017. The latest extension includes a three-phase incentive to sell eligible agriculture crown land to lessees. It offers decreasing price discounts of 15%, 10% and 5% during its respective three phases. It is estimated that about 600,000 acres of Crown land will be sold under the program.

The current version of the Agricultural Crown Land Sale Program implements the “Southern Conservation Land Management Strategy” (SCLMS), announced on May 12, 2015. The SCLMS was developed to balance economic growth with responsible land management; where the particular ecological value of the land will determine what restrictions are put in place and what incentives are available (Kiryuchuk, 2016), such as:

HIGH ecological value land – is not available for purchase.

MODERATE ecological value land – may be available for purchase with a Crown Conservation Easement. Sales incentives do not apply to moderate rated parcels.

LOW ecological value land – may be available for purchase with no restrictions. Sales incentives apply to low rated parcels

The SCLMS classified approximately 3.5 M acres of Crown land previously designated under the Wildlife Habitat Protection Act (WHPA). Acreage categories were:

- 1.7 M acres with HIGH ecological value to be retained under Crown ownership
- 1.3 M acres with MODERATE ecological value that may be eligible for sale
- 525,000 acres with LOWER ecological value may be eligible for sale with no restrictions

The Ministry of Agriculture advises that the majority of the land is likely to be sold during the first phase of the Agricultural Land Sale Program (November 4, 2015 to March 31, 2016) because of the 15% price discount offered to lessees.

According to the classifications above, as much as 1.8 M+ acres of Crown land may be eligible for sale.

Transition of (PFRA) Community Pastures - In spring 2012, the Federal government ended their PFRA Community Pasture Program and transferred lands back to the provinces. PFRA Community Pastures in Saskatchewan include 62 pastures on about 1.77 M acres. So far, 33 former PFRA Community Pastures have been transferred to Saskatchewan. The pastures will be taken over by patrons of the former PFRA community pastures. Patrons will have the option to lease the pastures or, preferably, to purchase them. Prior to the sale of pastures, a review is completed in accordance with eligibility requirements under the “Agricultural Crown Land Sales Program”, including whether they contain sand and gravel. Not all pasture lands will be eligible for sale.

About 9,000 acres of former PFRA Community Pasture lands are designated under “The Wildlife Habitat Protection Act” but may be still be eligible for sale.

IMPACT: Potential gravel sources located on to 3.5M acres of Crown land, either former PFRA Community Pasture lands or classified as eligible for sale under the Agricultural Crown Land Sale may be lost.

The appropriate Ministry should complete comprehensive assessments for potential sand and gravel prior to sale of Crown land and, when justified, reserve lands for future sand and gravel use as well as future sand and gravel lease revenue and royalty earnings.

Alternatively, a clear, consistent process should be developed to ensure that referrals are made to RMs prior to the proposed sale of Crown land located within their respective boundaries, as well as to adjacent RMs. When Provincial programs are selling larger tracts of Crown land in a relatively short time period, RMs will require temporary re-allocation of funds to effectively complete sand and gravel assessments to meet the Provincial program demands.

C.2 Issue: Land Use Planning - Potential future sources of gravel are not adequately protected when provincial and municipal land use and development plans do not include gravel conservation as a primary land use objective.

Land Use Planning is a primary tool for ensuring that sand and gravel resources are protected for future use by RMs. As scarcity of the sand and gravel resource increases, the need for more strategic, long term planning to manage and conserve sand and gravel resource also increases.

Some deficiencies were identified for both Provincial and Municipal land use planning.

Provincial Land Use Planning – Generally speaking, provincial Ministries are responsible for land use planning on Crown land. A brief review of 10 Ministry of Environment Crown land use plans reveals them be in various stages of completion from the earliest 1998 to more recent 2012. Sand and gravel resource conservation objectives have low priority in older plans and may lead to loss of potential gravel sources in favour of other land use objectives.

No reviews of other provincial land use plans were completed (e.g. Park Management Planning, Forest Land Use Planning). However, it is likely that sand and gravel conservation objectives have a lower priority.

Municipal Land Use Planning - Generally speaking, RMs are responsible for land use planning on land in their respective municipalities, provided the plans are not in conflict with provincial policies and interests. Through authorities derived from the “*Planning and Development Act, 2007*” and the “*Municipalities Act*”, RMs have the authority to set policies governing the development of their communities by developing official community plans (OCP) and district plans to guide land use and community development and by setting zoning bylaws to establish land use and development standards.

Currently, RMs are exercising their respective planning authorities inconsistently and the future availability of sand and gravel resources may be lost in favour of other land use objectives. Some RMs are making extensive use of their planning authorities while other RMs have not used any of them.

Table 11 provides a summary of the different planning authorities available to RMs and their overall use percentage as of August 2011.

Table 11: Planning Authorities Available to RMs

Rural Municipality Planning Status, August 2011	
Planning Instruments/Components	Approximate % use by RMs
Planning Districts/OCP and Zoning Bylaws	10%
OCP and Zoning Bylaws	40%
Zoning Bylaws	22%
No Planning Bylaws	28%

For further detail, refer to “Community Planning Maps” available at website:

<https://www.saskatchewan.ca/government/municipal-administration/maps-for-municipalities#community-planning-maps>

Of particular interest to both Crown and Municipal land use planning is the “*Statement of Public Interest Regulations*” (under the “*Planning and Development Act, 2007*”). It is noted that while the statements are intended to guide municipal planning, it is reasonable to expect that

provincial planning will also be guided by them. The regulation provides 14 statements including that the province, "...has a clear interest in ensuring that sand and gravel resources are accessible for development..." (Table 12).

Table 12: Statement of Public Interest Regulations - Sand and Gravel

<p align="center">"Statement of Public Interest Regulations" STATEMENT 6.11</p>
<p>6.11 Sand and Gravel STATEMENT OF INTEREST</p> <p>The province has an interest in ensuring that sand and gravel resources are accessible for development.</p> <p><i>Planning Documents and Decisions</i></p> <p>To assist in meeting the province's sand and gravel interests, planning documents and decisions shall, insofar as is practical:</p> <ol style="list-style-type: none"> 1. Ensure that sand and gravel development is compatible with existing and planned land uses; 2. Ensure that sand and gravel development is operated with minimal disturbance to the environment and aquifers; 3. Require that future reclamation of the sand and gravel development be addressed during the development permit approval stage; and 4. Include sand and gravel development as a permitted or discretionary land use in each rural municipality.

IMPACT: The future availability of sand and gravel is threatened by land use planning deficiencies and inconsistent levels of protection of potential gravel sources at the same time that rapid and ongoing land use changes are occurring (e.g. oil and gas exploration and development, country residential development, farm size increases, and so on).

Future development and/or review of all provincial Crown land use plans should include well-defined sand and gravel resource management objectives that ensure optimal use of the sand and gravel resource.

RMs should work collaboratively to strengthen their collective ability to more effectively plan for long term access to sand and gravel by:

- Utilizing the ATPCs to establish common regional approaches to aggregate planning and/or partnering with adjacent RMs
- Completing or amending Official Community Plans and enacting land use zoning by-laws to compliment the Provincial Statement of Interest 6.11 "*Statement of Public Interest Regulations*" for sand and gravel. Plans should include consistent objectives for conservation, management and use of sand and gravel across respective RMs,
- Jointly lobbying provincial agencies, such as the Ministry of Parks, to include objectives for use of sand and gravel in Park Management Plans where appropriate.

C.3 Issue: Joint Gravel Projects – Gravel costs can be decreased when RMs negotiate jointly with contractors for completion of common gravel projects such as hauling/stockpiling, washing, crushing, asphalt production, and so on.

Some RMs have raised concerns that Road Maintenance Agreements have created road use conflicts and gravel use restrictions between neighbouring RMs. Conflicts between RMs can potentially result in extra effort and cost to deliver services to ratepayers.

Any RM can enter into an agreement with one or more other municipalities. Some RMs report working together to better realize “economies of scale” to decrease the overall cost of projects such as gravel exploration and gravel crushing.

At the same time, many RMs are subject to population decreases as the migration from rural to urban municipalities continues, causing decreases in their tax base.

IMPACT: A double whammy of increasing gravel costs and decreasing tax bases may erode some RMs’ ability to deliver road building and maintenance services to ratepayers at an acceptable level. In addition, gravel conflicts between RMs may increase and may negatively impact the willingness of RMs to work together on other common service delivery issues.

RMs should work more collaboratively to increase cost advantages through “economy of scale” and to stabilize service delivery across respective RMs

Some ideas of collaborative work include:

- Jointly establish and maintain major haul routes through and between respective RMs through collaborative “Road Maintenance Agreements”
- Cooperate on efforts to collect and jointly use gravel extraction fees through use of cooperative “Gravel Extraction Licensing” to maintain roads or complete other joint projects
- Pool resources to complete joint gravel exploration programs
- Pool resources to share development and use of gravel pits
- Pool resources to share and maintain gravel equipment (trucks, loaders)
- Collaborate on opportunities to purchase private land gravel sources today to secure sources for future supply needs.
- Develop more “RM pit sharing agreements” to jointly use current and future sand and gravel pits located in respective RMs

C.4 Issue: Gravel Partnerships - Competition and prices for gravel will continue to increase when partnerships between RMs and commercial and private contractors are not negotiated.

RMs have identified that the costs of gravel obtained from private land pits is continually increasing. RMs also report that their primary source of sand and gravel comes from pits they manage on private land.

As competition for gravel on private land increases between commercial and private contractors and RMs, so too will costs for gravel on private land increase. Over time, it is likely that commercial and private operators will typically outbid RMs for gravel rights on private land.

While high demand for gravel on private land will continue to affect its price, there is opportunity for RMs to moderate price increases by negotiating partnerships with commercial and private operators, including for both gravel supply and gravel pit management.

IMPACT: RMs ability to manage pits on private land is being eroded as commercial and private operators outbid them. Over time, this option may become far too costly to even consider, particularly for longer term, strategic supplies when future costs are unknown.

RMs need to review opportunities for partnerships with commercial and private contractors to meet longer term needs for sand and gravel

Ways for RMs to partner may include:

- Negotiating “pit management agreements” with commercial and private contractors to explore, develop, operate and supply gravel from:
 - Crown lands reserved to RMs through their exercise of “priority rights”
 - Rural Municipality managed pits on private land
- Negotiating “long term supply agreements” with commercial/private contractors

Chapter 7: Key Findings and Recommendations

This chapter summarizes the key findings of the analysis conducted and provides recommendations. The key findings have been organized by category. Recommendations are made to address opportunities to improve the ability of RMs to acquire strategic gravel reserves and conserve the use of gravel.

Value of Gravel

- The value of gravel is increasing.
- Gravel is a non-renewable resource.
- Securing strategic gravel supplies can significantly hedge future costs of gravel acquisition, leading to affordable future gravel supplies.

Competition

- Competitors to RMs for gravel are the Ministry of Highways, Urban Municipalities, Private Operators and Industry.
 - Both the Ministry of Highways and Private Operators invest heavily in gravel exploration and development
 - Private Operators also supply large volumes of gravel to provincial, urban and rural public works projects on a competitive basis
- Population trends in most RMs are declining while road maintenance needs/expectations are remaining stable or increasing

Future Needs

- In total, based solely on current average annual gravel usage reported by RMs, 181,556,610 cubic yards of gravel is required to meet future needs (Table 8) for a 30-year strategic reserve target
 - Assuming the private operators continue to supply 27% of the annual gravel need, the RMs will need to acquire 142,957,960 cubic yards of gravel for a 30-year reserve
- The strategic reserve needs may increase as provincial development occurs
- Overall gravel demand in the future, across all sectors, will increase as Saskatchewan's economy and population increases.

Exploration

- Historically, well-funded and focused initiatives to explore for gravel have realized positive results
- Gravel in areas of need is annually diminishing with ongoing use of the scarce resource
- Generally, on an individual basis, most RMs do not have adequate skill sets or resources to explore for gravel at the scale needed to establish strategic reserves
- It is increasingly difficult to justify spending public funds on items that will not produce an immediate benefit to taxpayers; gravel reserves contribute to future value

Recommendation 1	A gravel exploration unit be developed under SARM to lead the exploration and establishment of gravel reserves on a Planning Division basis on behalf on RMs.
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Recommendation 1 considerations:

- *The unit can comprise of approximately 4 highly qualified and skilled staff, with advanced knowledge of gravel exploration and acquisition.*
- *Focus will be on both private and crown land.*
- *The unit can investigate and respond to Crown agricultural land sale referrals on behalf of RMs.*
- *The unit is short term, approximately a 5-year term to achieve reserve targets.*
- *The unit can be funded through a pro-rated portion of the RM road maintenance grants.*
 - *Funding would include human resources and exploration budgets.*
- *The role of the unit is exploration and establishment of gravel reserves; it will not be involved in pit development and operations, which remains a responsibility of individual RMs.*
- *The intent is to establish strategic reserves that will be shared by multiple RMs, not to establish reserves on an individual RM basis.*
- *Economy of scale will result in significant cost savings over individual RM exploration efforts.*

Rail Transportation of Gravel

- The average distance of gravel hauling has increased slightly since the 1980s, indicating that many RMs are still relatively dependent on local supplies.
- RMs local supplies are being diminished and will not fulfil long term needs.
- For many RMs future transportation costs will escalate.
- Carbon pricing and climate change initiatives will increase future transport costs.
- Bulk transport of gravel by rail will become more affordable in the future as compared to long distance truck haul.
- Rail transport minimizes the impact to RM roads.
- The ministry of Highways has conducted studies for the movement of gravel by rail and is studying opportunities to establish stockpiles delivered by rail for specific projects and in areas of low supply.
- Small volumes of gravel have been successfully transported throughout Saskatchewan by the shortline rail system and economies of transport by rail will improve with increased volumes, additional experience and technologies.
- Railways provide an opportunity to bring in gravel meeting the project specifications and standards where it is not available locally, or within reasonable truck haul distances.

Recommendation 2 SARM collaborates with the Ministry of Highways, the Saskatchewan Shortline Rail Association and the Transportation Planning Committee to fully understand near and longer-term needs and economics of transporting gravel by rail to those RMs in short supply.

Recommendation 2 considerations:

- *There has been considerable work completed to date by the Ministry of Highways and some Shortline Rail operators to investigate opportunities to transport gravel.*
- *The Ministry of Highways is looking at options to develop stockpile gravel sites, delivered by rail, in areas of low supply.*
 - *SARM and the RMs would benefit to jointly develop stockpile sites so they can be of a common use between the Ministry of Highways and local RMs.*
 - *Economies of scale improve through partnering with the Ministry of Highways over what can be achieved individually.*
 - *The Transportation Planning Committees can play a key role in determining the respective Division needs for specific stockpile sites.*
- *Recommendation 2 would be a long-term initiative/partnership that evolves over time as gravel supply dynamics change on regional and provincial scales.*

Roads

- Roads are important for the economy of the Province and economic development in rural areas.
- Road use agreements and provincial government funding is critical to maintain the existing road infrastructure.
- Road maintenance concerns on heavy haul roads and/or from gravel sources is a concern.
- RMs are responsible for providing access to properties and maintaining the access, but are not legally bound to build more roads or upgrade roads.
- It is unrealistic to expect any significant divestiture or reduction in roads.
- Expectations are as Saskatchewan's economy and population grows, RM roads will increase in length and/or road standard.

Economic (Funding)

- Truck transport is the most common method of transporting gravel.
- Transportation costs are often the highest component of overall gravel costs for a project because of bulk and weight.
- It can be expected that truck transport costs will increase due to higher future fuel, labour, and capital costs, combined with anticipated longer haul distances as local supplies diminish.
- Truck transport of gravel can cause deterioration of roads because of weights and volume of traffic, especially during wet conditions.
- Hauling agreements benefit the RM in which the gravel pit resides; RMs through which gravel is transported often do not benefit from hauling fees, even though their portion of roads are used and impacted.

- This inequity of hauling agreement fees is contentious among RMs.
- All industries and commercial traffic are not equally subject to hauling agreement fees such as is the gravel transport industry.
- RMs are signing road hauling agreements with other RMs, when the purpose is for public works that benefit all Saskatchewan residents.

Recommendation 3 SARM includes the need for additional funding, to accommodate exploration and acquisition of gravel reserves and reflect the actual cost of road maintenance, within the current review of grants being conducted by the Saskatchewan government.

Recommendation 3 considerations:

- *This recommendation relates to the Ministry of Economy – Review of Industry Financial Contributions to Rural Municipalities resulting from the 2015 SARM resolution number 18-15A.*
- *The review currently includes discussion of Road Maintenance Agreements specific to rates, application of annual consumer price index increases and a formal review every four years.*
 - *The current fee schedule is insufficient to cover actual costs.*
- *Road maintenance agreement fees can include an amount dedicated to support exploration and acquisition of gravel reserves, as periodic reserve replacement is critical for managing future gravel costs.*
- *Additional short term funding is required to provide the capacity to initiate programs to establish gravel reserves (relationship to Recommendation 1).*
- *Governments generally avoid expenditures that do not have an immediate benefit to taxpayers; arguments must be put forward in support of the future savings realized by investing in aggregate reserves today (e.g. historic gravel value trend Chapter 2).*
- *Without adequate resources and investment to explore for and secure gravel reserves, it likely will not happen.*

Environmental and Social

- Environmental concerns and regulation, especially for Crown Land pits will increase over time.
- Reclamation of gravel pits to an acceptable end land use will become more prominent.
- In RMs where development is occurring, especially in RMs adjacent to or nearby urban centres where subdivisions and bedroom communities occur, social and environmental concerns related to gravel pits will be voiced by rate payers including but not limited to:
 - Impact on water wells and ground water.
 - Dust and noise.
 - Road maintenance.
 - Aesthetics.
 - Impacts on surface drainage.
 - Impacts to locally significant landscape/wildlife/fishery values.

- RMs will be faced with increased public pressure to deal with gravel development issues.
- In areas of RMs where extensive gravel development occurs, RMs will need to respond to land use planning issues to balance use and conservation of gravel resources with rate payer concerns.
 - If not dealt with, local gravel reserves may be sterilized from use, thereby increasing haul distances and costs as gravel is brought in from afar.
 - RMs could designate areas as “priority gravel extraction” to permit development of aggregates where they are extensive.

Recommendation 4 RMs having extensive gravel deposits and development should issue Development Permits as a means to properly manage the development and assure ratepayer interests are balanced with the need to conserve and utilize gravel resources responsibly.

Recommendation 5 SARM develops a common set of conditions specific to gravel pit development and operations that all RMs can use as a basis for permitting gravel operations subject to local needs.

Recommendation 4 and 5 considerations:

- *As rural land use activity increases, RMs will have a responsibility to manage the associated issues; this is best accomplished through the issuance of Development Permits to properly condition activities and manage problems before they occur.*
- *Since gravel development on private land is essentially unregulated, the Development Permit is a logical means of regulating the development and operations of a gravel pit.*
- *Development permits and associated conditions would be aligned to RM Bylaws.*

Road Construction and Maintenance

- There are road construction and maintenance standards available through the MHI, however they are dominantly for paved roads.
- There are road constructions and maintenance standards for gravel roads available for reference from other jurisdictions, however they are not developed for the Saskatchewan road class system.
- RMs reported that they often have to compromise road construction or maintenance because of the lack of funding; do the best with the resources they have.
- RMs often do not have the resources or in many cases the skill sets to effectively explore for gravel.
- Often the local gravel supplies are not the right quality or specifications, but are used anyway, because of the cost of hauling in gravel from elsewhere.
- In some RMs clay materials are in short supply, therefore inferior materials for road bed construction are used; this causes gravel to be ‘punched’ into the road surface and imposes a requirement for more frequent resurfacing.

- Recent wet weather and flooding conditions experienced in Saskatchewan caused road deterioration and washouts.
- The Saskatchewan Government provided emergency funding to compensate for RMs higher gravel usage during flood events.
- The Transportation Planning Committee provided valuable training sessions to RMs in the past on road construction, maintenance and gravel exploration.

Recommendation 6	SARM develops basic road construction and maintenance guidelines specific to road Classes 4 through 7 for use by Rural Municipalities.
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Recommendation 6 considerations:

- *A common guidelines document will support greater consistency between RMs in regard to road standards and maintenance needs.*
- *Guidelines may support realization of efficiencies.*
- *Guidelines for road construction and maintenance will make planning and management of gravel inventory and gravel reserve requirements easier on a divisional scale through having common requirements.*
- *There are many reference documents available in Saskatchewan, other provinces and the United States that can be used to develop a “made in Saskatchewan” reference guide; one is not starting from scratch.*
- *The Municipal Road Program Manual adopted by SARM is available to all RMs and could be used as a venue to house these guidelines.*
- *Such a reference guide would be an excellent resource for use in Recommendation 7.*

Recommendation 7	SARM designate ‘entities’ as the lead for providing training to RMs for road construction and maintenance standards, best management practices, gravel acquisition and gravel pit management.
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Recommendation 7 considerations:

- *SARM can identify the right ‘entities’ capable of delivering the described training and collaborate with the identified organizations or individuals on the delivery of training sessions.*
 - *The Central Area Transportation Planning Committee is an example of an ‘entity’ that has already demonstrated competence and credibility in delivering these types of training sessions.*
 - *Entities could include, but not limited to, existing groups and committees, other organizations and associations, or contracts to training providers or specialists.*
- *Training the form of Technical Sessions can be offered in conjunction with the annual and mid-term SARM meetings to mitigate costs and maximize participation.*

- *Conducting regular training sessions provided over time will accommodate RM employee and Councillor turnover so incoming employees and Councillors can be trained.*
- *The sessions will provide a forum for the sharing of knowledge and innovation.*

Private Land

- Private land gravel sources are the most important gravel sources for RMs today.
- Sourcing gravel from private land through agreements or purchase of the land is the most competitive avenue to acquire strategic reserves.
- Private contractors play an important role, and will continue so, in supplying RMs with gravel from private land sources; there are opportunities for long-term supply agreements to be negotiated.
- Long term, RM purchase of private land with gravel reserves is most economical, considering resale value and appreciation.

Recommendation 8 RMs should purchase private land having good gravel reserves as part of their portfolio of a strategic supply.

Recommendation 8 considerations:

- *Strategic gravel supplies for RMs should include a variety of private land, supply agreement and crown land sources.*
- *Good gravel reserves means having high quality (suitable specifications for road surfacing) and large volumes (potentially multi-decade supplies).*
- *RMs could collaborate on land purchases where the gravel reserve is within reasonable haul distances and could supply two or more RMs.*
- *While purchasing private land has a large up front capital cost, with escalation of land prices, appropriate reclamation to an acceptable end land use and consideration of resale value, it may prove to be a wise economic investment over the long term (Chapter 2, historical upward value trend of gravel).*
- *SARM could support RMs by developing an information sheet for RMs use to provide a consistent message to ratepayers on the benefits to acquiring private land gravel reserves as a means to manage future costs of acquiring gravel.*

Crown Land

- Crown land gravel sources are economic in terms of acquisition and long term supply.
- Exploration costs to confirm gravel presence are largest expense prior to development.
- Determining gravel presence on crown agricultural lands prior to government land sales is important.

Recommendation 9 Where Crown Land is within or nearby RMs, investment should be made in exploring for gravel sources and reserving known sources for future use, where gravel development is an appropriate use of the land.

Recommendation 9 considerations:

- *Recommendation 9 represents all Crown Land sources, not just vacant agricultural Crown Land.*
- *Crown Land gravel reserves will increase in importance for RMs supply over time as private land sources are depleted.*
- *Once reserves are determined, RM costs associated with reserving use of the land or leasing are very economical over the long term.*

Gravel Policy

- Gravel policy between the Ministry of Environment and the Ministry of Agriculture is not consistent.
- Fee structures and reclamation security requirements for RM Crown Land gravel leases between Agriculture and Environment agency management are different.
- Access to Crown Land with agriculture leases on them occasionally causes problems for RMs and while dispute processes exist they are informal.
- Priority rights to gravel for public works use should be clarified (i.e. Provincial or RM priority)

Recommendation 10	SARM should consider advocating for the following 5 policy changes within government: <ol style="list-style-type: none">1. Priority Rights to Gravel2. Agriculture Leaseholder Compensation3. Fees, Charges, Security Requirements4. Permit and Lease Approval Requirements5. Other Opportunities
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Recommendation 10 considerations:

- *Seventeen opportunities are available to amend Provincial Crown Land Sand and Gravel Policy to enhance RMs' ability to access gravel resources.*
- *Eleven amendment opportunities are regulatory in nature including fees, charges, reclamation security requirements and disposition (lease and permit) approval requirements. The opportunities provide administrative streamlining and consistency between the two (2) policies, but are less effective in providing greater access to gravel.*
- *One amendment opportunity - "Priority Rights to Gravel" - provides greater certainty to RMs on their "fair share" of Crown gravel by eliminating their current subordinate position to the Ministry of Highways and Infrastructure. It also provides commercial and private contractors with a level of certainty of access to Crown gravel that may*

result in a moderating overall gravel costs by increasing gravel supply through a more balanced private investment opportunity between Crown-owned and privately-owned gravel.

- *Two amendment opportunities - “Agriculture Leaseholder Compensation” - provides for documentation of current Ministry of Agriculture practices for mediating unresolved access and compensation issues between gravel lessees and permittees and agricultural lessees. While the issue is not perceived as significant at the current time, the amendment will provide a current resolution to possible future issues.*
- *Three “Other Amendment Opportunities” provide non-critical, general enhancements to RMs’ abilities to access gravel that can be completed to compliment a comprehensive review of the two primary policies.*

Priority Rights to Gravel

An opportunity exists to clarify and establish a minimum “fair split” interest in Crown-owned gravel between gravel clients (Ministry of Highways and Infrastructure, RMs and Commercial and Private Contractors) to provide greater certainty to all gravel clients and to provide a better balance of private investment between Crown-owned land and privately-owned land.

Refer to Opportunity 1 – Appendix 4

Background: Priority rights to crown sand and gravel for “public works purposes” is an important and dominant feature of the two Provincial Policies. Both Policies confirm priority rights to crown sand and gravel to the Ministry of Highways and Infrastructure and RMs, with dominant rights provided to the former in all cases. Commercial and private contractors’ rights to crown sand and gravel are variable between the two policies but are subordinate to both the Ministry of Highways and Infrastructure and RMs.

In their subordinate position to the Ministry of Highways and Infrastructure, RMs have moderately restricted and uncertain access to crown sand and gravel, reducing their ability to establish longer term, strategic sources of gravel.

In their subordinate position to both the Ministry of Highways and Infrastructure and RMs, commercial and private contractors have highly restricted and highly uncertain access to crown sand and gravel, increasing their risk to invest in development on crown land and re-directing their efforts to private land.

RMs report their sources of sand and gravel include:

- 57% from private land
- 27% from commercial and private contractors, of which it is reasonably assumed that no less than 50% comes from private land
- 12% from pits they manage on crown land
- 2% from the Ministry of Highways and Infrastructure

It is clear that private land sources of sand and gravel have a significant role in providing RMs with gravel. Further, it is clear that commercial and private contractors have, and will continue to

have, a significant role in providing RMs with gravel. At issue is the “affordability” of the resource to RMs.

As commercial and private contractors continue to direct the majority of their efforts and investments to private land gravel, overall costs to RMs is likely to increase as competition for the resource increases. At the same time, highly restricted access to crown sand and gravel continues to present a barrier to commercial and private contractors from making high risk investment in exploration and development of gravel on crown land. While it is likely that the majority of gravel will continue to be sourced from private and crown land in southern Saskatchewan, reduced investment in exploration and development of potential sand and gravel resources on crown land in northern Saskatchewan may, over the longer term, further reduce the ability of RMs to access affordable gravel.

Agriculture Leaseholder Compensation

An opportunity exists for the Ministry of Agriculture to “head off” any potential future conflicts and concerns between RMs and agricultural leaseholders when negotiating for access consent and compensation for damages by:

- Providing expectations to agricultural leaseholders regarding the priority use of crown sand and gravel for “public works purposes”
- Documenting the Ministry of Agriculture’s current practice to mediate unresolved permit and lease consent and compensation issues between RMs and agricultural leaseholders.

Refer to Opportunities 6, 12 – Appendix 4

Background: For agriculture crown land, if the land is subject to an existing agricultural lease, all gravel permit and lease applicants are required to obtain the consent and conditions of entry from the agricultural lessee. Further, the gravel permit and lease applicant is responsible for negotiating compensation for any damages directly with the agricultural lessee.

RMs have reported some concerns where agricultural lessees are requesting unreasonable compensation payments for damages or requiring unreasonable conditions of entry. Unresolved consent and/or compensation issues between agricultural lessees and RMs may result in delays to access and development, increased costs, and decreased utilization of crown sand and gravel resources.

The Ministry of Agriculture confirms that when agricultural lessee’s demands are unreasonable, they will mediate the issue and ultimately provide authority if the lessee remains unreasonable.

The issue is not currently perceived by RMs and the Ministry of Agriculture to be significant. However, as competition for sand and gravel on agricultural leases increases and as agricultural lessees become more aware of their advantageous negotiating position, there is potential for increasing adversarial relationships to develop between agricultural lessee ratepayers and RMs.

Fees, Charges and Security Requirements

An opportunity exists to establish consistent requirements for fees, charges and reclamation security requirements for sand and gravel located on provincial crown land and used by the Ministry of Highways and Infrastructure and RMs for “public works purposes”, including that they are exempted from fees and charges and that “irrevocable letters of undertaking” may be provided in lieu of reclamation deposits.

An opportunity also exists to establish consistent requirements for fees, charges and reclamation security requirements for sand and gravel located on provincial crown land and used by commercial and private contractors.

Refer to Opportunities 3, 4, 10, 11, 13, 14, 16 – Appendix 4

Background: The two policies include highly variable amounts for fees, charges and security amounts. The respective policies do not reveal any imperative for the variations. Many of the requirements are regulatory in nature, that is they are imbedded in legislation, and any amendments to them will necessarily require that a legally prescribed legislative amendment process be followed. For example, the policies include the variations presented in Table 13.

Table 13: Examples of Policy Variations

Fees, Charges, Security Requirements			
Requirement	Client Group	Crown Land Type	
		Agriculture Crown Land	Crown Resource Land
Lease and Permit Fees	MHI	No	No
	RM	Yes	No
	Commercial/Private	Yes	Yes
Reclamation Security	MHI	No	Yes
	RM	No – conditional on providing an “irrevocable letter of undertaking” to reclaim	Yes
	Commercial/Private	Yes	Yes

MHI – Ministry of Highways and Infrastructure RM – Rural Municipalities

Permit and Lease Approval Requirements

An opportunity exists to establish consistent approval requirements for gravel exploration permits and gravel leases on provincial crown land.

Opportunities 2, 5, 8, 9 - Appendix 4

Background: The two policies include highly variable permit and lease approval requirements. The respective policies do not reveal any imperative for the variations. Many of the requirements are regulatory in nature, that is, they are imbedded in legislation and any amendments to them will necessarily require that a legally prescribed legislative amendment process be followed.

For example, the policies include the following variations:

- TERM (Table 14)
- SIZE (Table 15)

Table 14: Policy Changes - Term

Lease and Permit Requirements TERM (approval period)			
Disposition Type	Client Group	TERM by Crown Land Type	
		Agriculture Crown Land	Crown Resource Land
Permits	MHI	365 days	30 days
	RM	365 days	30 days
	Commercial/Private	365 days	30 days
Leases	MHI	21 years	21 years
	RM	21 years	21 years
	Commercial/Private	5 years	10 years

MHI – Ministry of Highways and Infrastructure RM – Rural Municipalities

Table 15: Policy Changes -Size

Lease and Permit Requirements SIZE			
Disposition Type	Client Group	SIZE by Crown Land Type (maximum)	
		Agriculture Crown Land	Crown Resource Land
Permits	MHI	2500 acres (1012 ha)	247 acres (100 ha)
	RM	2500 acres (1012 ha)	247 acres (100 ha)
	Commercial/Private	2500 acres (1012 ha)	247 acres (100 ha) – limit of ONE permit at a time
Leases	MHI	No limits (Policy is silent)	No size limitations when MHI does exploration and intended use is for public
	RM	640 acres (259 ha) – limited to 1280 acres (518 ha) at any one time	No size limitations when RM does exploration and intended use is for public
	Commercial/Private	640 acres (259 ha) – limited to 1280 acres (518 ha) at any one time	160 acres (65 ha)

MHI – Ministry of Highways and Infrastructure RM – Rural Municipalities

Other Opportunities

Other opportunities (all listed in Appendix 4) exist to enhance RMs' ability to access affordable crown gravel resources, including:

Opportunity 7 - Ensure that other compatible dispositions issued overtop exploration permits on Crown resource lands are conditional on future sand and gravel development of the area to avoid potential future conflicts

Opportunity 15 - Consolidate the reclamation/restoration criteria for Crown-owned land into a single policy

Opportunity 17 - Expand the availability of the respective "*Road Construction Material Permits Program*" (agriculture crown land) and the "*Small Quantity Permits Program*" (crown resource land) to all provincial crown land to satisfy respective needs of gravel clients

Chapter 8: Summary

SARM initiated the Got Gravel? - Aggregate Management Strategies for Rural Municipalities in Saskatchewan project to better understand:

- The current state of aggregate resources in Saskatchewan,
- Areas where gravel related policies could be improved to benefit the RMs,
- Specific gaps and issues, and
- Best management practices.

A better understanding of these items was accomplished through consultation with municipal, provincial, landowner and special interest stakeholders, in addition to extensive literature reviews.

Subject to a better understanding, recommendations are made in this report to better manage, plan for and secure reasonable quantities of gravel reserves for use in future public works projects. Since the late 1980s, the value of gravel in Saskatchewan has increased by approximately 300%. This trend can be expected to continue because gravel is a non-renewable resource and is scarce in many parts of the province. Costs will escalate as demand increases and haul distances increase. Gravel is required for every construction project whether it be for roads, buildings or other infrastructure. Securing gravel reserves today can benefit Saskatchewan RMs into the future by ensuring affordable gravel is available near areas of demand.

Ten recommendations are made in this report, summarized in Table 16. For each, there is an indication of the priority, urgency, benefit to taxpayers and an indication of the level of resources required to implement the recommendation. Ratings are simply based on a low, moderate and high rating system.

Table 16 Summary of Recommendations by priority, urgency, benefit and level of resources required.

Recommendation	Priority	Urgency	Benefit	Resources
1. A gravel exploration unit be developed under SARM to lead the exploration and establishment of gravel reserves on a Planning Division basis on behalf on RMs	H	H	H	H
2. SARM collaborates with the Ministry of Highways, the Saskatchewan Shortline Rail Association and the Transportation Planning Committee to fully understand near and longer-term needs and economics of transporting gravel by rail to those RMs in short supply	H	M	H	M
3. SARM includes the need for additional funding, to accommodate exploration and acquisition of gravel reserves and reflect the actual cost of road maintenance, within the current review of grants being conducted by the Saskatchewan government	H	H	H	L

Recommendation	Priority	Urgency	Benefit	Resources
4. RMs having extensive gravel deposits and development should issue Development Permits as a means to properly manage the development and assure ratepayer interests are balanced with the need to conserve and utilize gravel resources responsibly	M	M	H	M
5. SARM develops a common set of conditions specific to gravel pit development and operations that all RMs can use as a basis for permitting gravel operations subject to local needs	M	M	H	M
6. SARM develops basic road construction and maintenance guidelines specific to road Classes 4 through 7 for use by Rural Municipalities	M	M	H	M
7. SARM designate 'entities' as the lead for providing training to RMs for road construction and maintenance standards, best management practices, gravel acquisition and gravel pit management	H	H	H	M
8. RMs should purchase private land having good gravel reserves as part of their portfolio of a strategic supply	H	M	H	H
9. Where Crown Land is within or nearby RMs, investment should be made in exploring for gravel sources and reserving known sources for future use, where gravel development is an appropriate use of the land	H	H	H	M
10. SARM should consider advocating for the following 5 policy changes within government: <ul style="list-style-type: none"> 1. Priority Rights to Gravel 2. Agriculture Leaseholder Compensation 3. Fees, Charges, Security Requirements 4. Permit and Lease Approval Requirements 5. Other Opportunities 	H	M	M	L

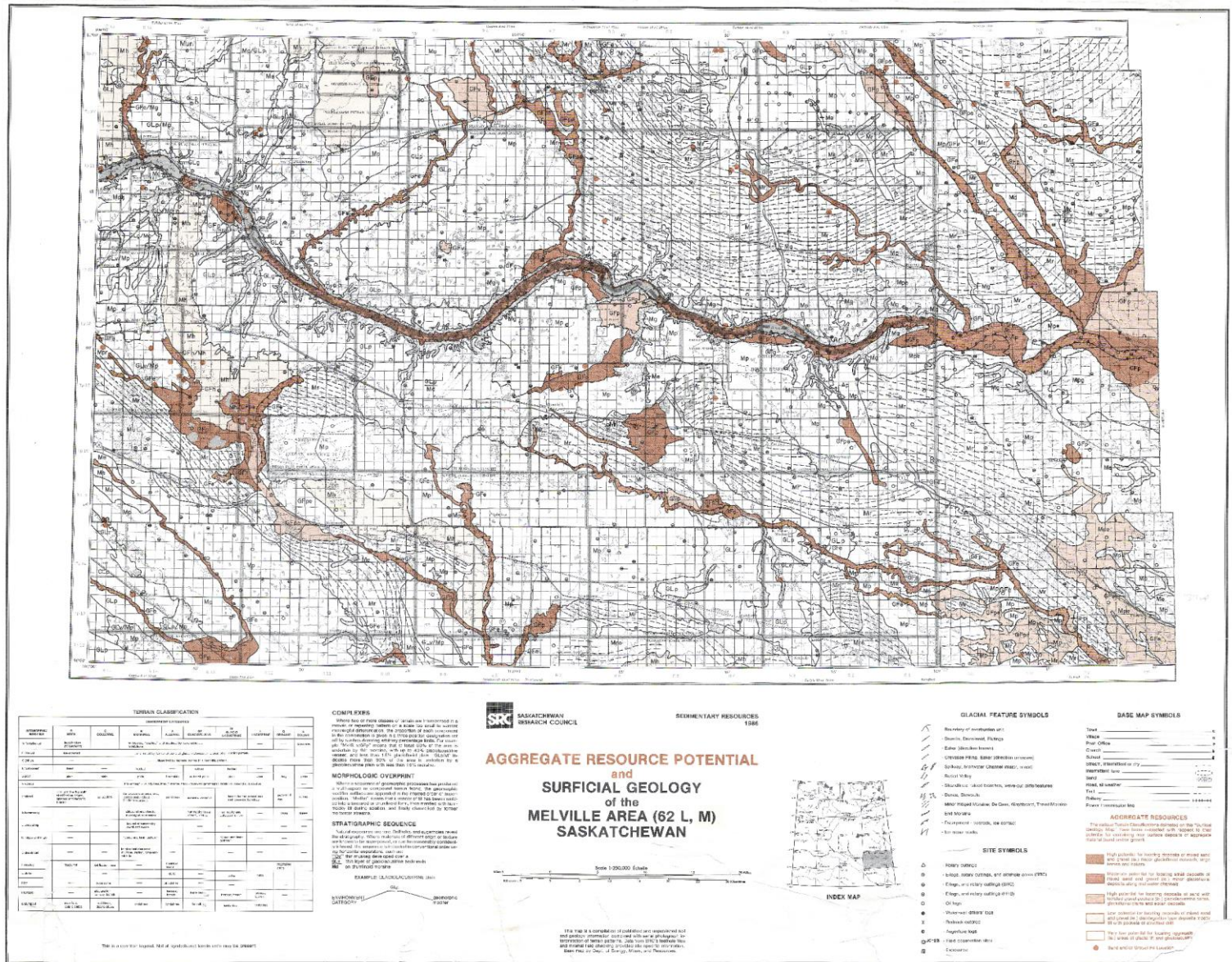
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Appendix 1: Example of an SRC Aggregate Potential Map



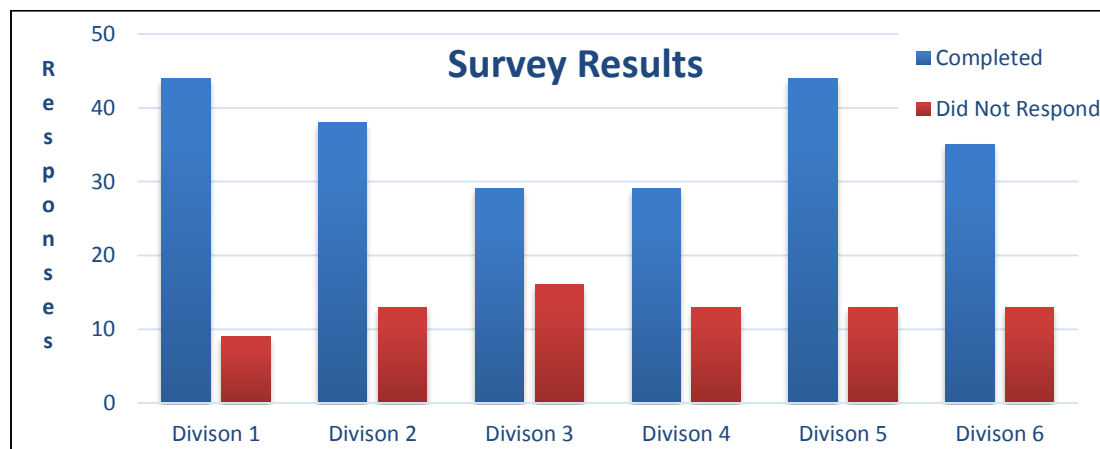
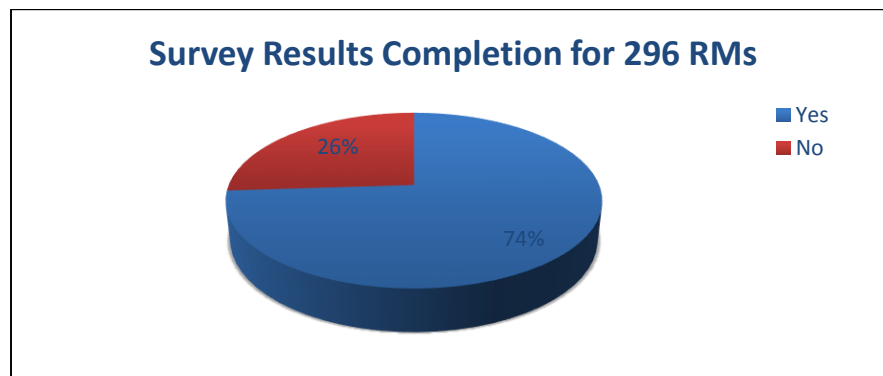
Appendix 2: Online Survey Results

The following is a detailed report of the Rural Municipal web-based gravel survey. The survey was designed to inform upon:

- Whether rural municipalities are having difficulty securing reliable gravel reserves.
- A strategic gravel plan and supplies for future road construction and maintenance.
- Abundance of gravel within the Rural Municipality boundaries.
- Gravel uses and volumes required on an annual basis.
- Gravel hauling distance and cost.
- The use of Best Management Practices and Alternatives.
- Collaboration between rural municipalities to share gravel resources.
- Public and Private land gravel sources.
- Whether any issues are realised in obtaining provincial government approvals.

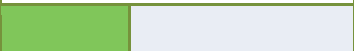

Open ended questions were also included enabling municipalities to provide feedback and details on both the positive and negative elements of their experiences securing gravel supply.

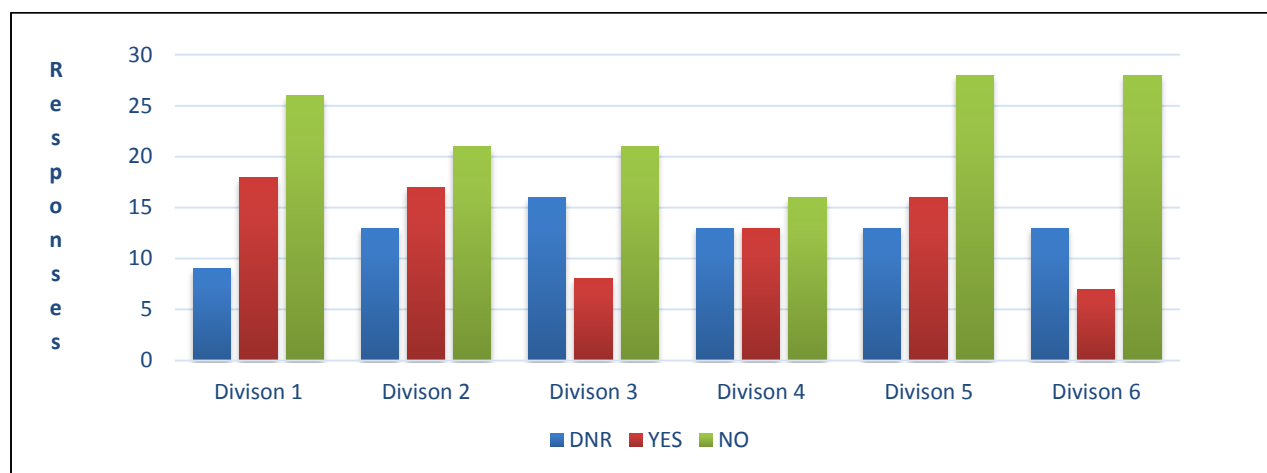
Completion rate was 74%. Those that did not respond are noted as Did Not Respond or DNR.



Status of Gravel in Rural Municipalities

1. Does your RM have any problems securing reliable gravel supplies for road construction and maintenance?

Response	Chart	Percentage	Count
Yes		36.1%	79
No		63.9%	140
Total Responses			219

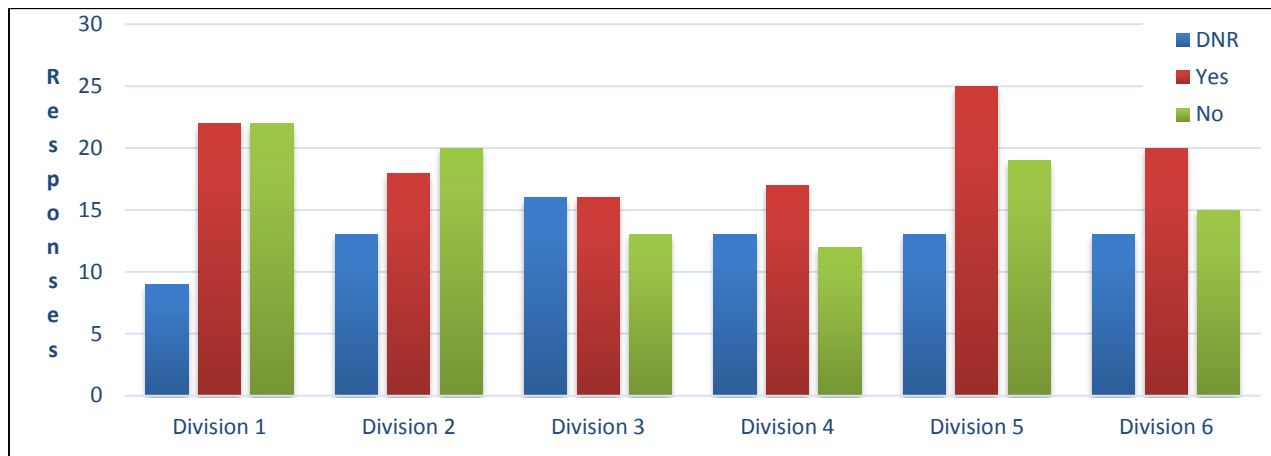


1. (a) You have selected yes. What problems does your RM face when securing reliable gravel?






Respondents were encouraged to elaborate on the problems they encounter when securing a reliable gravel source. Approximately 41% of responses indicated that the quality of gravel in their RM was of poor quality; high in sand and clay mix, what good quality gravel available was limited and depleting fast. 28% of responses indicated that their RM had no source of gravel within their boundaries therefore they have high cost associated with purchasing outside their boundaries and long hauling distances. 25% of responses indicated that the increasing industry in Saskatchewan has been driving the cost of gravel and potential land purchases too high for RMs to compete. 4% of responses indicated that their RM is dependent on MHI and other government pits. The remaining responses did not properly address the question.

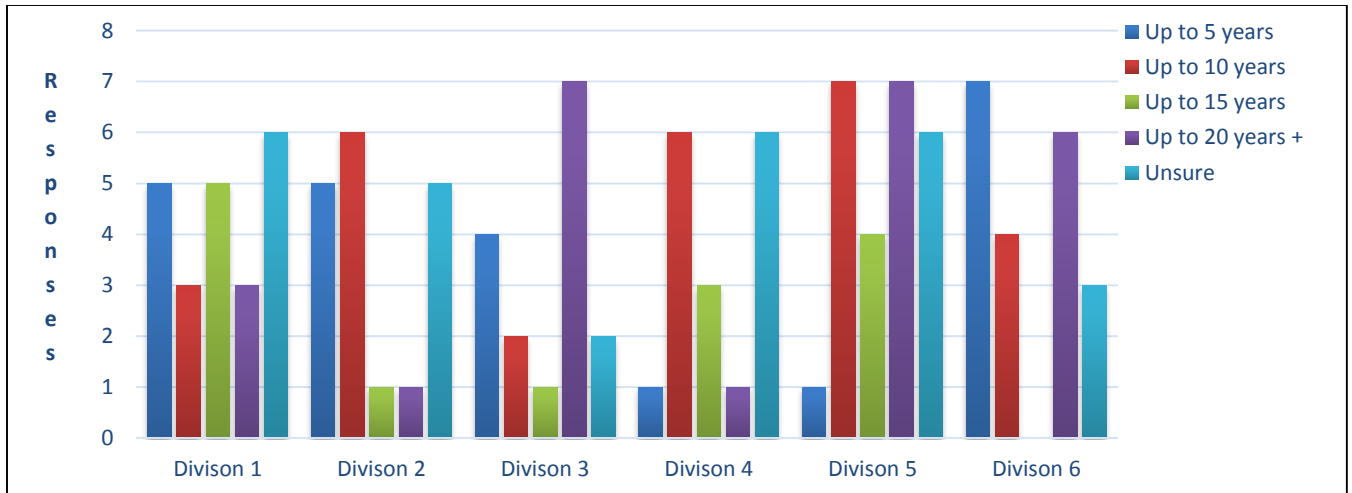
2. Does your RM have a strategic gravel supply reserve to fulfill future road construction and maintenance needs?

Response	Chart	Percentage	Count
Yes		53.9%	118
No		46.1%	101
Total Responses			219



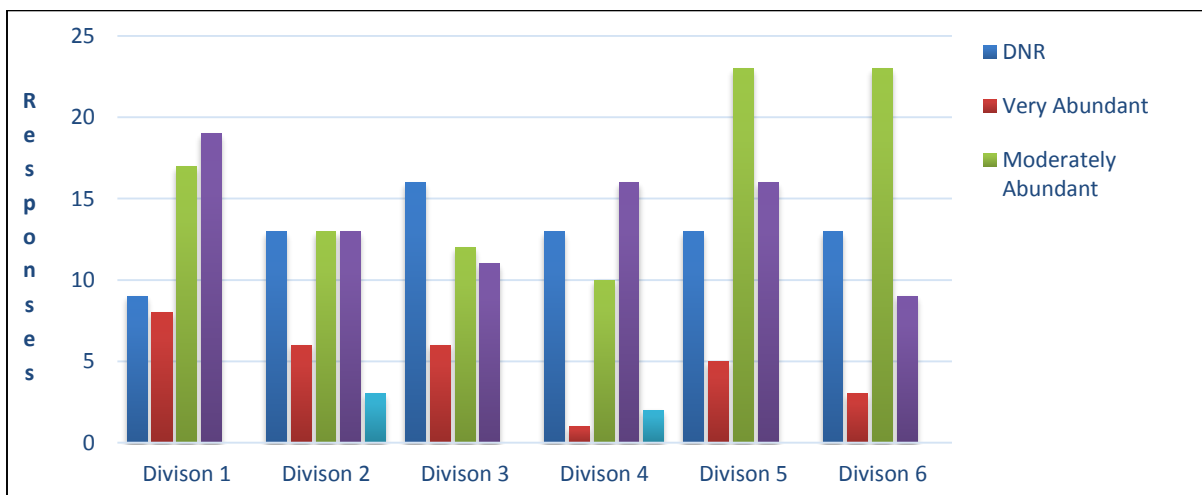
2. (a) You have selected yes. Approximately how many years of gravel reserves does your RM have available?

Response	Chart	Percentage	Count
Up to 5 years		20.2%	23
Up to 10 years		23.5%	28
Up to 15 years		11.8%	14
Up to 20 + years		21.0%	25
Unsure, we do not have an accurate volume inventory		23.5%	28
Total Responses			118



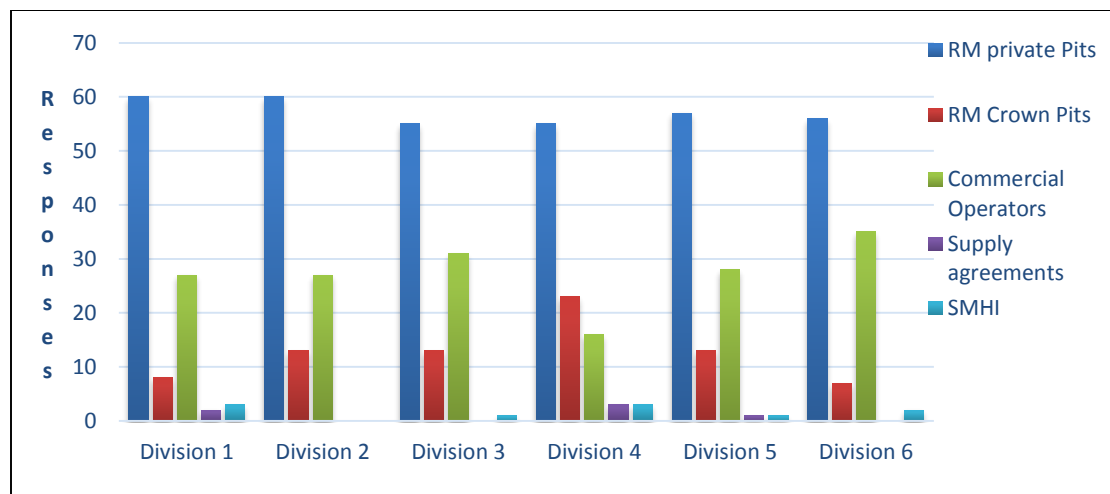
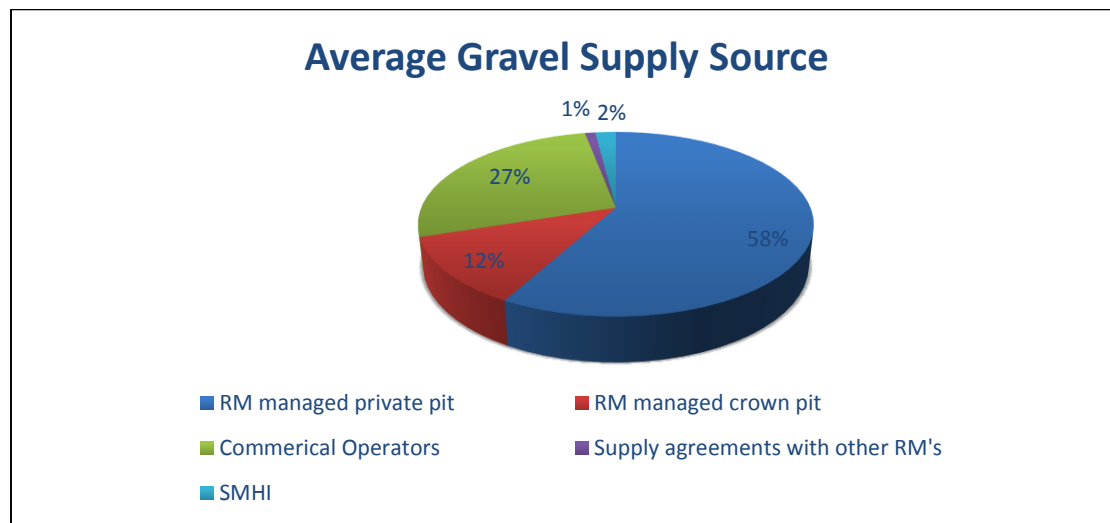
3. How abundant is the gravel supply within the boundary of your RM?

Response	Chart	Percentage	Count
Very abundant (supply exceeds local demands)		14.6%	32
Moderately abundant (supply capable of meeting local demands)		44.7%	98
Low abundance (supply does not meet local demand - gravel is commonly imported)		38.4%	84
I don't know		2.3%	5
Total Responses			219

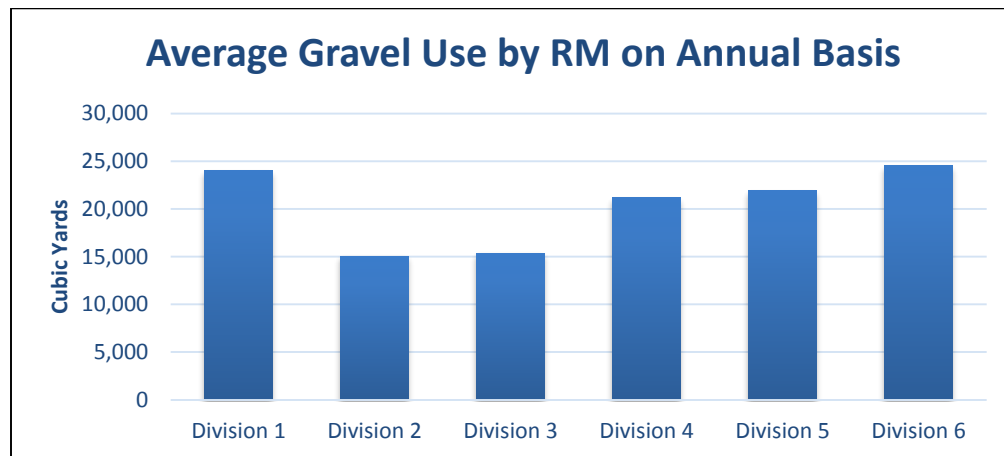


Rural Municipality Gravel Usage

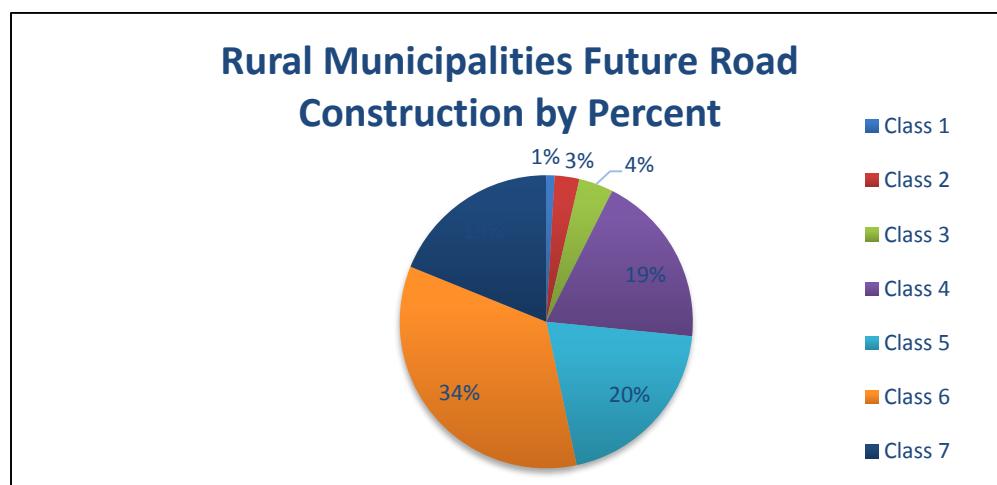
4. What percentage of gravel comes from the following sources?

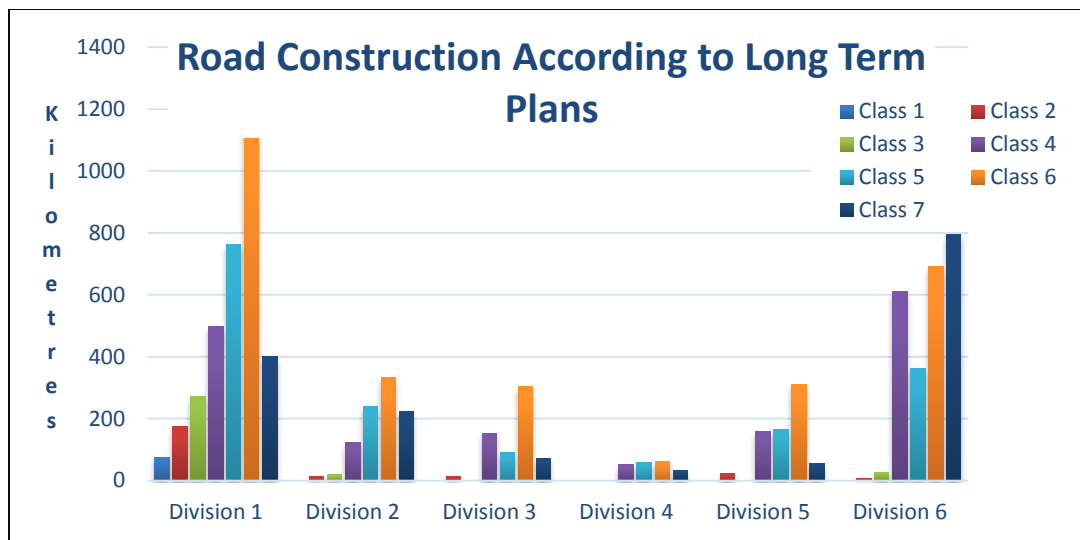


5. On average, what volume of gravel does your RM use on annual basis (e.g. average of last 5-year gravel use)?



6. Based on your RMs capital plan, how many kilometer of new road, by road class, is your RM planning on constructing in the next 20 years?



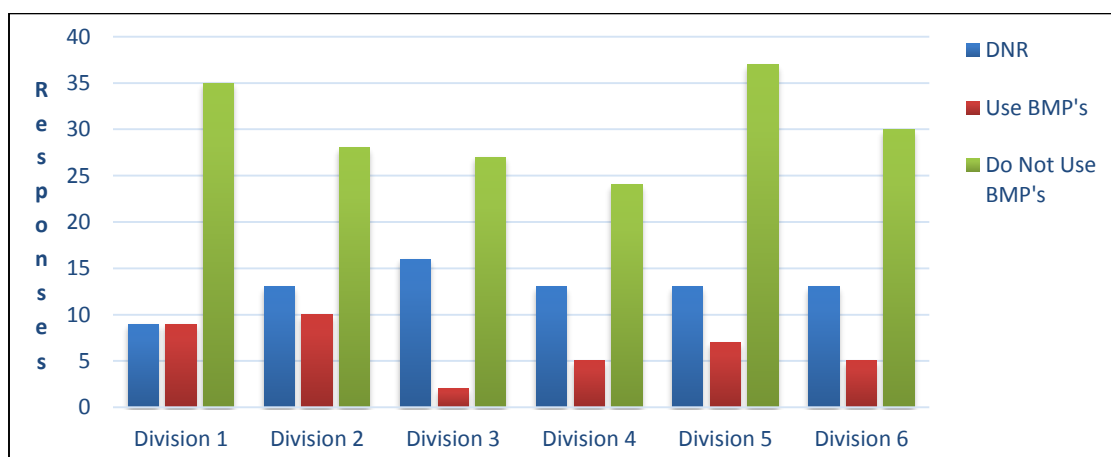


Rural Municipality Gravel Management

7. Gravel Best Management Practices are methods, techniques, standards that are found to be effective and practical in managing use of gravel resources in a manner that optimizes their use while minimizing environmental impacts.

Does your RM currently use gravel Best Management Practices (BMP's)?

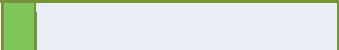

Response	Chart	Percentage	Count
Yes		17.4%	38
No		82.6%	181
Total Responses			219

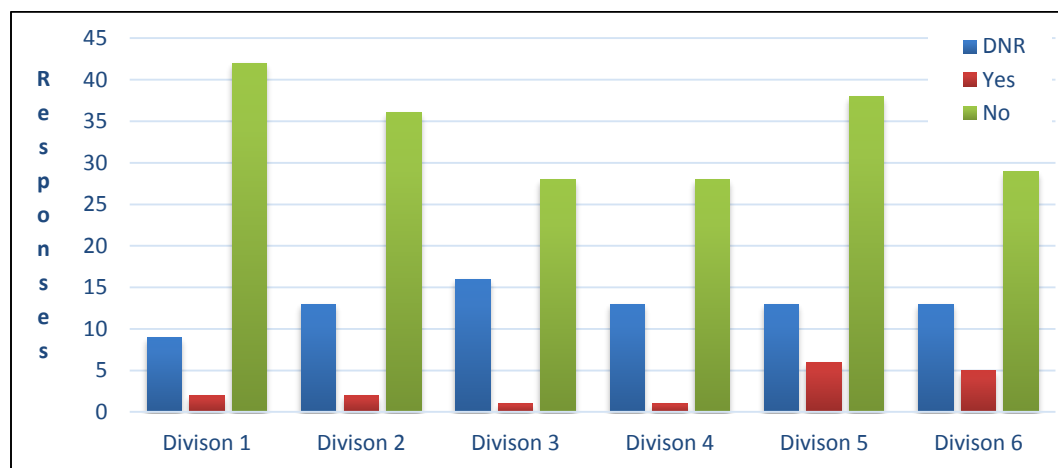


7. (a) You indicated your RM uses gravel BMP's. Briefly describe those gravel BMP's (e.g. recycling road gravel, use of chemical surface binders)

Respondents were encouraged to elaborate on the Best Management Practices that their RM currently uses. 76% of the respondents said they pull shoulders in the fall and recycle gravel from the road side in spring in order to conserve and reuse gravel which falls into the ditches. 18% of response use surface chemical binders. 13% of response change blades and blading technique including operator training. The remaining responses included dust control, mulching, stockpiling reject gravel, speed limit control and replacing gravel on primary roads first secondary and farm roads less frequent or when needed.

8. Does your RM currently use alternatives to traditional gravel such as recycled concrete, crushed limestone, gravel lock or clay-crete?

Response	Chart	Percentage	Count
Yes		7.8%	17
No		92.2%	202
Total Responses			219



8. (a) You have selected yes. What alternatives do you currently use?

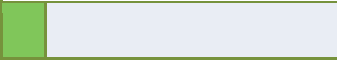

Respondents were asked to elaborate on alternatives their RM currently uses. 35% of responses used recycled/crushed concrete. 24% of responses used recycled asphalt/pavement. 18% of responses used gravel lock. 18% of responses used calcium chloride. The remaining responses included crusher dust, potash tailings, mixed aggregate and shredded tires.

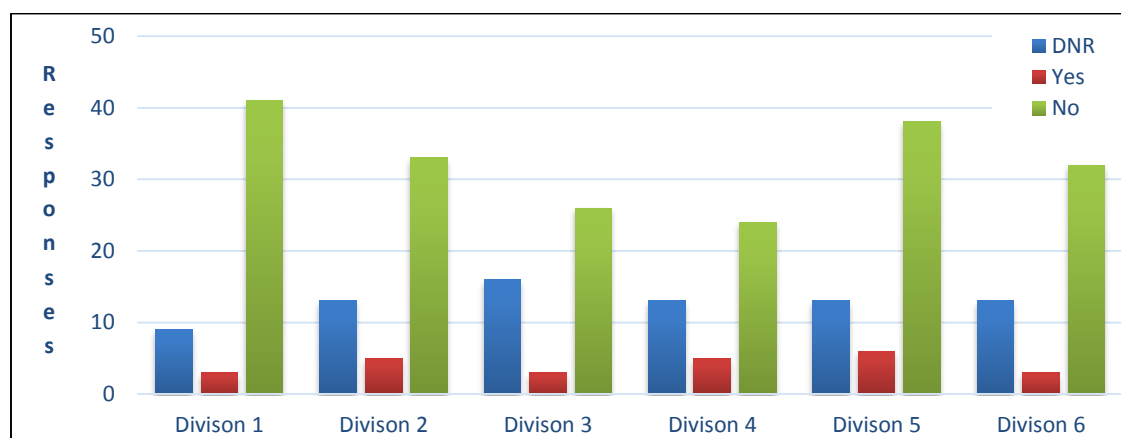
8. (b) You have selected no. What are the barriers to use of alternatives?

Respondents were encouraged to elaborate on the barriers to use of alternatives in their RM. Approximately 35% of responses indicated that the cost and availability of alternative products in their area where barriers to use. 34% of responses indicated that their RM has a sufficient

amount of gravel within their boundaries and have not had to use or explore alternatives at the current time. Roughly 25% of responses indicated the lack of knowledge of what alternatives to use and their effectiveness where barriers to use of alternatives to traditional gravel.

9. Does your RM partner with surrounding Municipalities to share gravel resources (e.g. sharing a common gravel pit, cost-sharing operations such as crushing, sharing equipment)?

Response	Chart	Percentage	Count
Yes		11.4%	25
No		88.6%	194
Total Responses			219



9. (a) You have selected yes. Please provide a brief description on what or how you are partnering with other RMs.

The respondents were encouraged to elaborate on how they partner with other RMs to share in gravel resources. 36% of responses indicated they share a gravel pit with a neighbouring RM, they do not share any additional costs associated. 28% of responses indicated they share a pit with a neighbouring RM as well as crushing, hauling, stockpiling and reclamation cost. 24% of RMs indicated they partner with surrounding municipalities to share exploration cost as well as coordinating crushing mobilization services, these RMs do not share a gravel pit. 11% of respondents indicate that they allow an adjacent RMs with no gravel resources to operate a pit within their boundaries and haul through their RM.

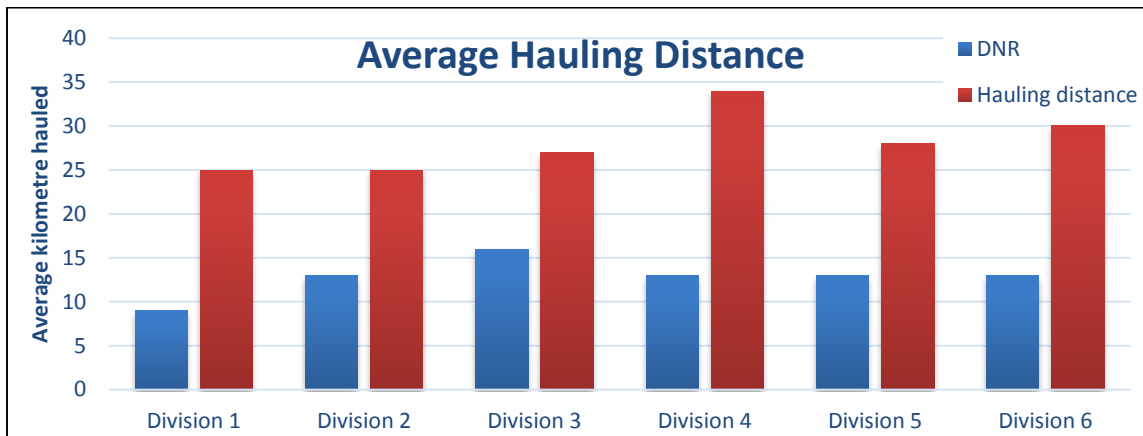
9. (b) You have selected no. Please provide a brief description on why you have not partnering with adjacent RMs.

Respondents were encouraged to elaborate on why they have not partnered with adjacent RMs. Approximately 34% of responses indicated that their RM and adjacent RMs have a sufficient supply of gravel within their boundaries and have not had the need to pursue a partnership at the current time. 23% of responses indicated that their RM or adjacent RMs have limited gravel

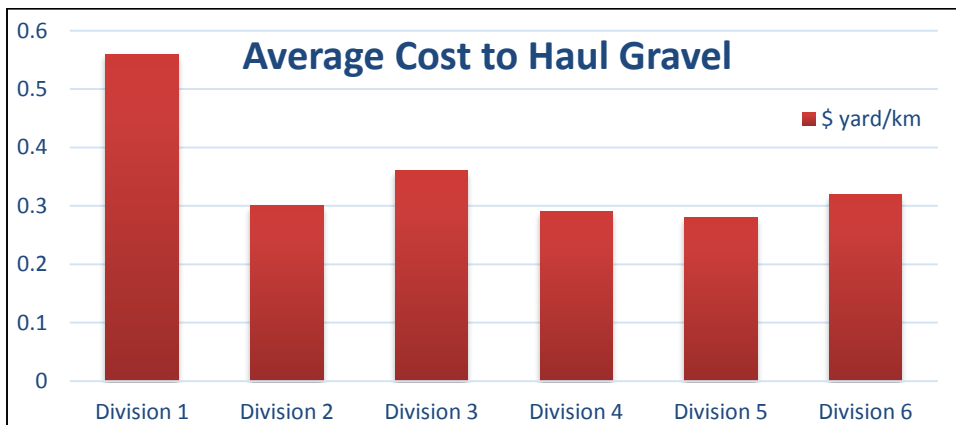
to no gravel within their boundaries and because gravel supplies are limited and costly; they aren't in a position to share their gravel with their competitors. Near 20% of responses indicated that their RM has never considered the idea of partnering with their adjacent RMs. 15% of responses indicated that they get their gravel supplies and crushing, hauling services through private pit contractors; private pit gravel is closer to their RM and is of better quality than the surrounding RMs have to offer. 5% of responses indicated that geographical the cost of hauling to and from adjacent RMs would be too high.

General Gravel Construction and Costing

10. (a) What is your RMs average gravel hauling distance in kilometers?

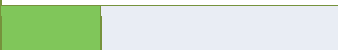



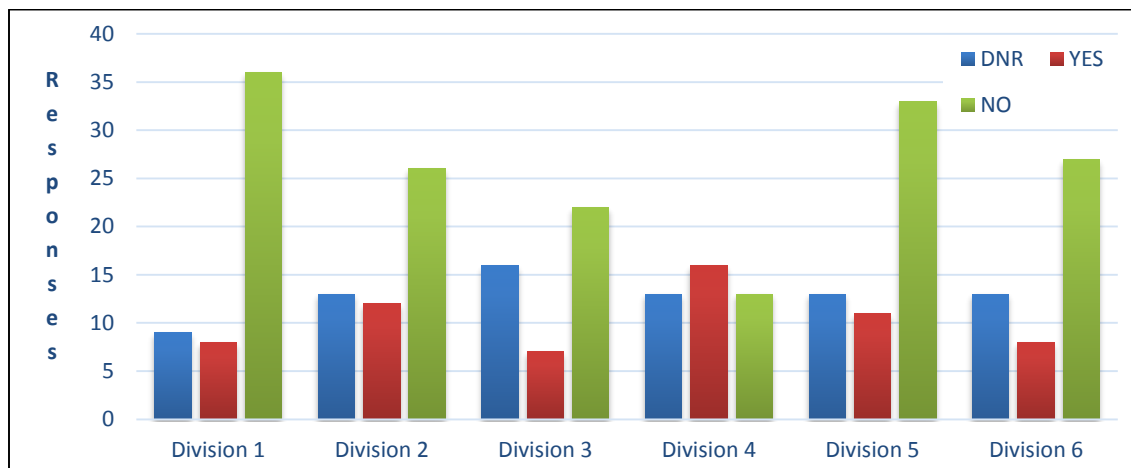
10. (b) What is the average cost to haul gravel per kilometer?



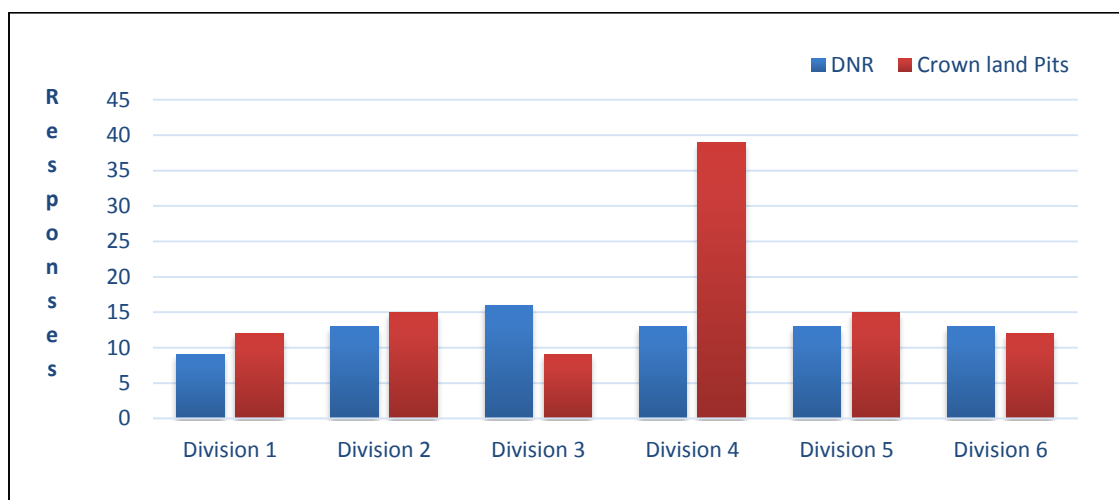
Crown Land Gravel Sources

11. Does your RM manage pits on Crown Lands?




Response	Chart	Percentage	Count
Yes		28.3%	62
No		71.7%	157
Total Responses			219

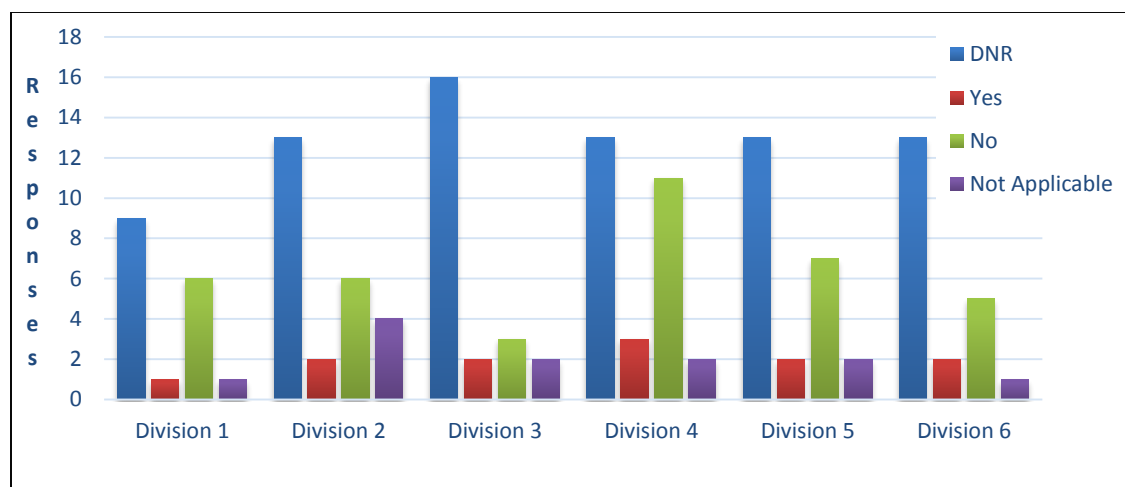


11. (a) You have selected yes. How many gravel pits on Crown lands does your RM operate?



12. For Exploration Permits on Crown lands, has your RM encounter any delays in obtaining approvals?




Response	Chart	Percentage	Count
Yes		19%	12
No		62%	38
Not Applicable		19%	12
Total Responses			62

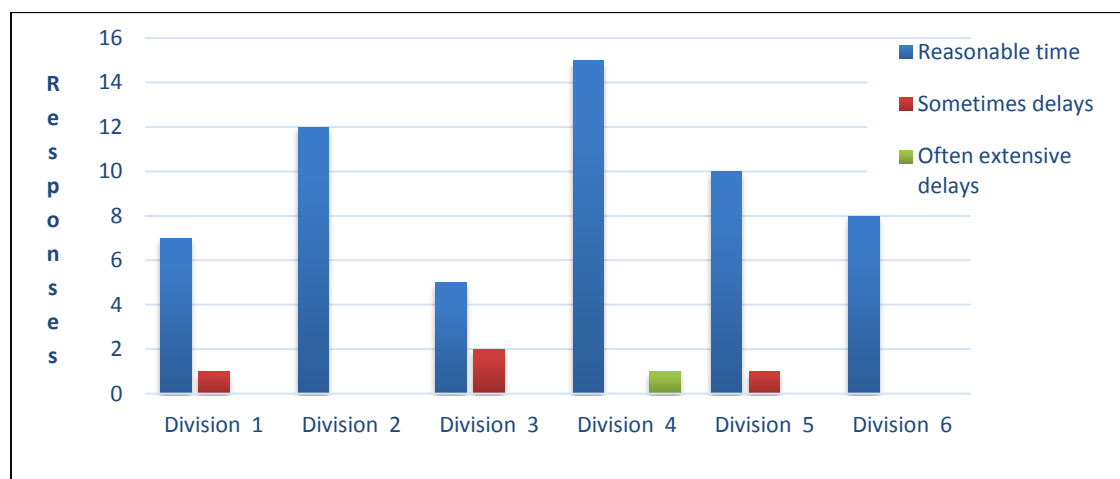


12. (a) You have indicated that your RM has experienced delays in obtaining approvals for Exploration Permits on Crown lands. Please describe the delays you have encountered.

For the 12 “yes” responses to this question, two themes emerged. 75% indicated that government (provincial or federal) processing of applications; wildlife and environmental restrictions were the main reason for delays. The remaining 25% indicated that the Ministry of Highways first right for refusal has caused delays in obtaining approvals for exploration permits.

13. For RM Managed pits on Crown lands, do you encounter any delays in obtaining approval of the Sand and Gravel Leases from the time of application?

Response	Chart	Percentage	Count
Routinely obtain approvals within reasonable time-lines		92.1%	57
Sometimes experience delays (6 - 12 months)		6.3%	4
Often encounter delays (12 months plus)		1.6%	1
Total Responses			62





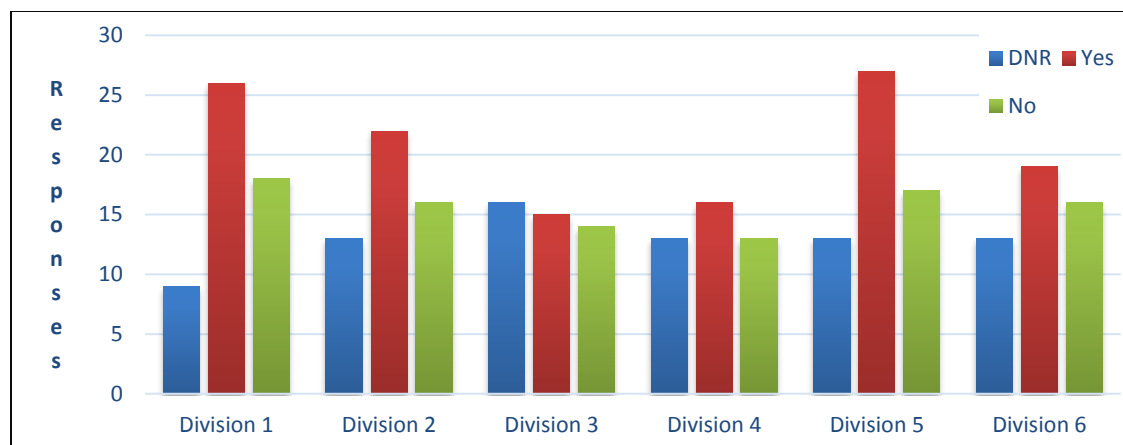
13. (a) You have indicated that your RM has experienced delays in obtaining approval of Sand and Gravel Leases. Please describe the delays you have encountered.

Of the 5 respondents that indicated they sometime or often experienced delays when obtaining leases on Crown land, one response indicated that the lessee did not return the signed consent form. Another RM indicated they tried to renew before the lease expired but had to wait closer to due date to receive renewal. The remaining responses did not properly answer the question.

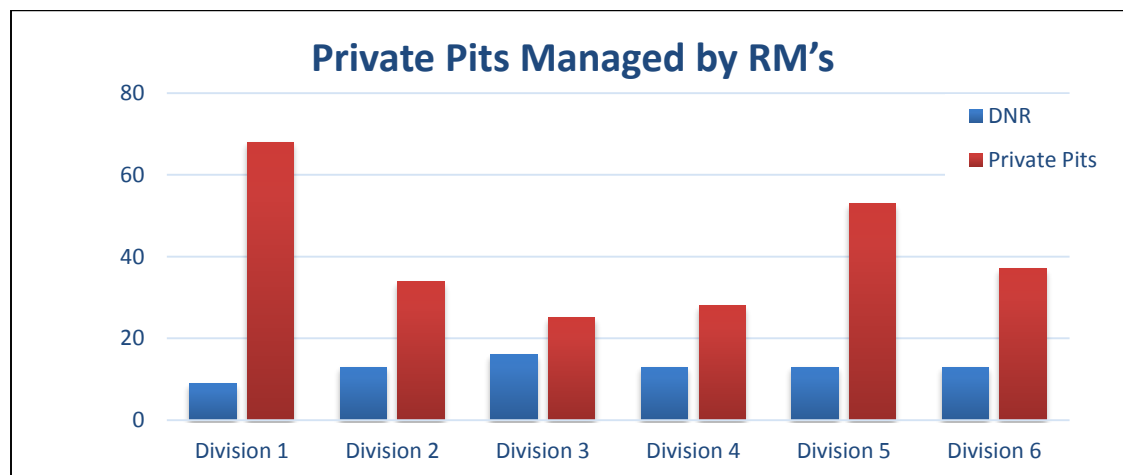
Private Land Gravel Sources

14. Does your RM manage pits on Private lands?

Response	Chart	Percentage	Count
Yes		57.1%	125
No		42.9%	94
Total Responses			219



14. (a) You have selected yes. How many gravel pits on Private lands does your RM operate?



15. Does your RM encounter any barriers when acquiring and accessing gravel on Private lands?

Respondents were encouraged to elaborate on the barriers they encountered when acquiring and accessing gravel on Private land. 57% of responses indicated that they did not encounter any barriers when acquiring and accessing gravel on Private land. 21% of responses indicate that due to the lack of accessibly gravel and the increase of industry in Saskatchewan contractors are driving the price of gravel and land sales too high for RMs to compete. 12% of responses indicated that getting access to the gravel through road use agreements and permits were barriers. 8% of responses indicated that private land owner's conditions on when the gravel is to be removed and short term leases were barriers to acquiring gravel on private land. The remaining responses did not properly address the question.

Opinion about Policy and Process

16. With respect to acquiring gravel on Crown land (provincial or federal) what works well within the existing allocation process?

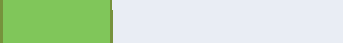

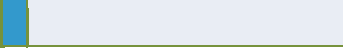
219 responses were provided and are summarized in Chapter 3: Rural Municipality Online Survey Summary.

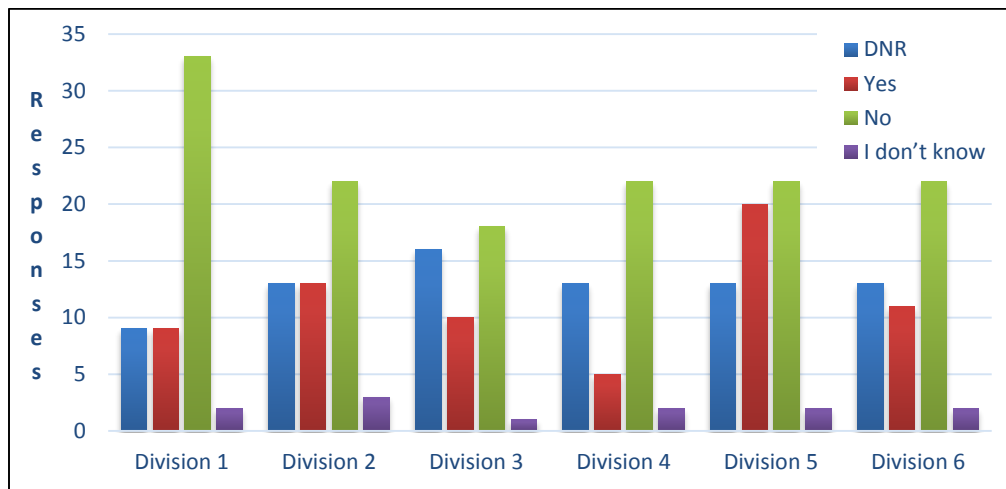
Not only is it important to understand population changes of RMs, it is also necessary to understand where the population is moving. It is apparent that people are trending towards urban living, however great increases in population of the urban-rural interface areas can also be seen; RMs who surround cities are increasing in population as well (Figure 13). This becomes a complex issue, as those RMs decreasing in population still in need to fund aggregate for their roads, and those who are increasing may need larger volumes of aggregate to accommodate the demand increase.

Chapter 3: Rural Municipality Online Survey Summary *17. What policy or allocation process improvements could be made to help secure RMs access to gravel on Crown land?*

219 responses were provided and are summarized. Not only is it important to understand population changes of RMs, it is also necessary to understand where the population is moving. It is apparent that people are trending towards urban living, however great increases in population of the urban-rural interface areas can also be seen; RMs who surround cities are increasing in population as well (Figure 13). This becomes a complex issue, as those RMs decreasing in population still in need to fund aggregate for their roads, and those who are increasing may need larger volumes of aggregate to accommodate the demand increase.

Chapter 3: Rural Municipality Online Survey Summary 18. Does your RM issue development permits (or other approvals) for gravel leases on private lands?

Response	Chart	Percentage	Count
Yes		31.1%	68
No		63.5%	139
I don't know		5.5%	12
Total Responses			219



19. Is there any other information or comments you would like to provide?

Respondents were encouraged (not mandatory) to provide additional feedback, 47 responses were received and are summarized in Chapter 3: Rural Municipality Online Survey Summary.

Appendix 3: References for Gravel Road Maintenance and Management

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2. Federation of Canadian Municipalities. Green Municipal Fund. Tools and Reports. 5/12/2012. 1. Dust Control for Unpaved Roads. 2. Reuse and Recycling of Road construction and Maintenance Materials. 3. Timely Preventative Maintenance for Municipal Roads <http://www.fcm.ca/home/programs/green-municipal-fund/resources/transportation-resources/tools-and-reports.htm>
3. Government of Alberta, 2010. Best Management Practices User Manual for Aggregate Operators on Public Land. Version 1. Sustainable Resource Development. <http://esrd.alberta.ca/forms-maps-services/publications/documents/BestMgmtPracticesManualAggregateOpPL-2010.pdf>
4. Government of British Columbia. March 31, 2009. Fraser Valley Regional District Aggregate Pilot Project. Recommendations Report.
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6. Government Relations – Roads and Street Construction and Maintenance <https://www.saskatchewan.ca/government/municipal-administration/tools-guides-and-resources/roads-and-streets-construction-and-maintenance>
7. Government Relations – General Municipal Administration Information Page <https://www.saskatchewan.ca/government/municipal-administration>
8. Government of Ontario. February 2010. State of the Aggregate Resource in Ontario Study. Ministry of Natural Resources. <http://files.ontario.ca/environment-and-energy/aggregates/aggregate-resource-in-ontario-study/286996.pdf>
9. Government of Saskatchewan. 2015. Model Number B-6 High Purity Limestone. <http://www.economy.gov.sk.ca/depositmodels>
10. Henning, Theuns. Kadar, Peter. Bennett, Christopher R. May 2006. Surfacing Alternatives for Unsealed Rural Roads. Transportation Notes. TRN-33. Roads and Rural Transport Thematic Group. The World Bank. Washington, DC.
11. Saskatchewan Association of Rural Municipalities. Municipal Roads for the Economy Program – <http://sarm.ca/programs/administered-programs/mrep>
12. Saskatchewan Municipal Asset Management – Rural Road costing and excel sheets <http://assetmanagementsk.ca/tca>
13. Saskatchewan Mineral Deposit Models (for S&G, Limestone, etc.) <http://economy.gov.sk.ca/depositmodels>.
14. Saskatchewan Municipal Policy Manual Example <https://www.saskatchewan.ca/~media/files/government%20relations/policy/mid/municipal%20policy%20manual%20example.pdf>.
15. Saskatchewan Ministry of Highways, Standards Specification Manuals <http://www.highways.gov.sk.ca/standard-spec/>

16. Saskatchewan Ministry of Government Relations – Municipal Maps
<http://www.infomaps.gov.sk.ca/website/MA/MFISmaps.html>
17. Saskatchewan Ministry of Government Relations – Maps showing which RMs have Community Planning and Zoning <https://www.saskatchewan.ca/government/municipal-administration/maps-for-municipalities#saskmunimaps>
18. Skorseth, Ken. Selim, Ali. Gravel Roads Maintenance and Design Manual. November 2000. South Dakota Local Transportation Assistance Program. U.S. Department of Transportation
19. Sas, Wojciech. Gluchowski, Andrzej. Radziemska, Maja. et. al. 2015. Environmental and Geotechnical Assessment of the Steel Slags as a Material for Road Structure. Materials. Vol 8. 4857-4875

Appendix 4: Provincial Crown Sand and Gravel Policy – Opportunities for Amendment

CROWN LAND SAND AND GRAVEL MANAGEMENT - SASKATCHEWAN				
TOPIC	POLICY DOCUMENTS		GAPS	OPPORTUNITIES and BENEFITS TO RURAL MUNICIPALITIES
	Ministry of Agriculture (MAgr) <i>“Sand and Gravel Policy”</i> Nov. 1, 1999 (reviewed May 2013)	Ministry of Environment (MEnv) <i>“Sand and Gravel Exploration, Extraction and Reclamation on Crown Resource Land”</i> Nov. 15, 2003		
PRIORITY RIGHTS	<p>The Ministry of Highways and Infrastructure (MHI) and RMs (RMs) have priority rights to <u>all</u> sand and gravel deposits located on agricultural crown land.</p> <p>Private contractors are accommodated when RMs and MHI have declined their respective priority rights.</p>	<p>RMs and MHI priority rights are limited to maximum 50% of sand and gravel deposits located by private contractors.</p> <p>Private contractors retain rights to minimum 50% of all deposits they locate.</p>	<p>RMs priority rights are subordinate to MHI on both Agricultural Crown Land and Crown Resource Land.</p> <p>There are no apparent criteria/guidelines in either Policy to clarify the scope of RM's subordinate rights to MHI for sand and gravel development such as:</p> <ul style="list-style-type: none"> • a “fair split” between agencies, • priority rankings between provincial vs. local projects • other <p>Various restrictions/limitations imposed on private contractors for sand and gravel development on Crown-owned land is likely leading to decreased private investment on Crown-owned land in favour of privately-owned land.</p>	<p>1. OPPORTUNITY: Establish a minimum “fair split” interest in Crown-owned gravel between gravel clients (MHI, RMs, private contractors) to provide greater certainty to all gravel clients and to provide a better balance of private investment between Crown-owned land and privately-owned land. A DRAFT example of “fair split” criteria is presented below:</p> <ul style="list-style-type: none"> • Establish a 50-50 split between government and private contractor gravel rights • Retain first rights to gravel to MHI and RMs for public works projects - MHI to retain priority rights over RMs, subject to review of respective agencies short and long term forecasts for gravel. • Establish a new “fair split” of minimum 25% of available gravel to each of MHI and RMs. • Retain private contractors' rights to gravel NOT claimed by either MHI or RMs <p>BENEFIT TO RMs:</p> <ul style="list-style-type: none"> • Provides greater certainty to RMs on their level of priority rights • Establishes greater certainty in RMs longer term sources of supply • Contributes to moderating RMs gravel costs by increasing gravel supply

				through a more balanced private investment opportunity between Crown-owned gravel, particularly Agriculture crown land, and privately-owned gravel.
PERMITS (EXPLORATION)	<p>Permit term: 365 days (Regulation)</p> <p>Permit size: one legal subdivision up to maximum 2500 ac (1012 ha) in one contiguous parcel (Regulation)</p> <p>Permit Fees: (Regulation)</p> <ul style="list-style-type: none"> • permit fee - \$40 • land use fee - \$0.50/ac • test hole fees - \$5 per backhoe or auger hole; \$10 per dragline hole • MHI is exempt from fees at the Minister's discretion <p>Consent and conditions of entry are required where land is already under an agricultural lease. Compensation for damages is negotiated with the agricultural lessee. When lessee's demands are unreasonable, the MAgr will mediate and ultimately provide authority if lessees remain unreasonable.</p> <p>No restrictions on eligibility or number of permits</p> <p>RMs multiple applications are subject to priority of MHI</p> <p>For private contractors who find gravel, MHI and the RM where the gravel is found have first rights to those deposits. MHI and RMs are allowed to exercise their rights of first refusal to the deposits covered by the private contractors' permit area. When RMs and MHI concede their priority rights to the gravel,</p>	<p>Permit term: 30 days</p> <p>Permit size: maximum 247 ac (100 ha)</p> <p>Permit Fees: (Regulation)</p> <ul style="list-style-type: none"> • Private Contractors - permit fee \$1.40/ha (\$0.56/ac), rental fee: \$110/ha (\$44/ac) • RMs, MHI – no charge <p>Permittees have exclusive rights to explore, but other compatible dispositions may be issued on the same land.</p> <p>Private contractors are allowed only ONE permit at a time.</p> <p>RMs and MHI are allowed multiple permits at a time.</p>	<p>Inconsistent permit terms (duration) are created resulting from different Regulations (<i>Provincial Land Regulations</i> and <i>Crown Resource Land Regulations</i>).</p> <p>For MEnv policy, a 30-day permit term creates a relatively short operating window and may lead to unintended environmental and/or financial issues resulting from "rushed/forced" project completions.</p> <p>For MEnv's permit size, a maximum of 250 ac may be considered too small in comparison to the relatively low success rate at locating commercial quantities of good quality sand and gravel, particularly in the case of private contractors as they are allowed only ONE permit at a time.</p> <p>No remedy is documented in the "Sand and Gravel Policy" (Policy) for unsuccessful negotiations between RM's and agriculture leaseholders for access for gravel exploration. However, Ministry of Agriculture current practise is to mediate when lessees make unreasonable demands. The Ministry ultimately has the authority to grant consent if the lessee remains unreasonable.</p> <p>Unresolved consent issues between prior leaseholders and RMs may result in access and development delays, increased costs, and decreased utilization of sand and gravel resources.</p> <p>For MEnv's policy, approving other compatible dispositions on permit areas may create future gravel development issues.</p> <p>Inconsistent fee schedules are created resulting from different Regulations</p>	<p>NOTE: Priority rights issues associated with permits is discussed in Opportunity #1</p> <p>2. OPPORTUNITY: Establish a consistent exploration permit term of 365 days for all Crown-owned gravel.</p> <p>BENEFIT to RMs:</p> <ul style="list-style-type: none"> • Provides operational consistency between MAgr lands and MEnv lands • Provides a more realistic, season and weather-tolerant time frame for completion of exploration operations • Potentially stabilizes RM costs by reducing the "rushed" nature of shorter term operating periods <p>3. OPPORTUNITY: Exempt RMs from paying the regulatory permit fees for public works gravel on Agricultural crown land.</p> <p>BENEFIT to RMs:</p> <ul style="list-style-type: none"> • Provides a consistent and predictable fee schedule to RMs for public works projects. <p>4. OPPORTUNITY: Establish a single permit fee schedule for private contractors operating on Crown-owned land</p> <p>BENEFIT to RMs:</p> <ul style="list-style-type: none"> • Benefits are directed primarily to private contractors • Provides certainty to private contractors • Benefits to RMs may be the contribution to moderating gravel costs by increasing gravel supply through a more balanced private investment opportunity between Crown-owned gravel and privately-owned gravel.

	<p>private contractors are accommodated.</p> <p>Reclamation is required. Reclamation deposit is not required.</p>		<p>(Provincial Land Regulations and Crown Resource Land Regulations).</p>	<p>5. OPPORTUNITY: Increase the maximum allowable exploration permit size on Crown resource lands to better align with the (regulated) size allowance on Agriculture crown land, with continuing consideration for forestry land use objectives for Crown resource land areas.</p> <p>BENEFIT to RMs:</p> <ul style="list-style-type: none"> • Provides for a more realistic sized area for exploration, particularly in areas of known scarcity • Eliminates the need for multiple applications by RMs <p>6. OPPORTUNITY: Clarify and document MAgr current practice to mediate unresolved <u>permit</u> consent issues with prior agriculture leaseholders.</p> <p>BENEFIT TO RMs:</p> <ul style="list-style-type: none"> • Provides an officially-recognized process to resolve unsuccessful negotiations • Potentially moderates RM costs for public land gravel • Potentially decreases conflicts between RMs and lessees through use of mediation, particularly for unpleasant or laborious negotiations <p>7. OPPORTUNITY: Amend Policy to ensure that other compatible dispositions issued overtop exploration permits on Crown resource lands are conditional on future sand and gravel development of the area.</p> <p>BENEFIT to RMs:</p> <ul style="list-style-type: none"> • Eliminates with certainty any future potential issues with use and development of Crown-owned sand and gravel
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<p>LEASES</p>	<p>Lease size:</p> <ul style="list-style-type: none"> Maximum 640 ac (259 ha) For RMs and commercial/private contractors - no more than 1280 ac (518 ha) under lease at any one- time For MHI – no apparent size limitations at any one time (Policy is silent) <p>Lease terms:</p> <ul style="list-style-type: none"> Private contractors – usually 5 years RMs and MHI – up to 21 years <p>Lease fees: (Regulation)</p> <ul style="list-style-type: none"> MHI is exempt from fees and royalties at the Minister's discretion RMs/Private contractors: <ul style="list-style-type: none"> \$200 lease preparation fee \$2/acre annual holding fee <p>RMs/Private contractors are exempt from royalties when gravel is used for public works</p> <p>Lease use: within 1 year of issuance and every year thereafter, failing which the lease may be cancelled (Regulation)</p> <p>Royalty Payment: (Regulation)</p> <ul style="list-style-type: none"> \$0.20/cubic metre required for commercial and private use NOT required for public use <p>Consent and conditions of entry are required where land is already under an agricultural lease. Compensation for damages is negotiated with the</p>	<p>Lease size:</p> <p>Private Contractors - 160 ac (65 ha)</p> <p>RMs, MHI – No size limitations, subject to:</p> <ul style="list-style-type: none"> Size of area is determined through their <u>own</u> exploration Gravel to be used only for public works <p>Lease terms:</p> <ul style="list-style-type: none"> Private Contractors - 10 years RMs, MHI – up to 21 years <p>Lease fees: (Regulation)</p> <ul style="list-style-type: none"> RMs and MHI – no charges Private Contractors (rental): <ul style="list-style-type: none"> Developed area – \$410/ha (\$164/ac) Undeveloped area - \$110/ha (\$44/ac) Minimum rental - \$110/ha (\$44/ac) <p>Royalty Payment: (Regulation)</p> <ul style="list-style-type: none"> Private contractors - \$0.20/cubic metre (no apparent exemption for public works gravel) RMs, MHI are exempt from fees payment <p>RMs gravel can be located outside of their respective RM boundaries, subject to:</p> <ul style="list-style-type: none"> Demonstration of need Favourable review by Environment, including consultation with other RMs 	<p>Inconsistencies exist between Policies for:</p> <ul style="list-style-type: none"> individual lease size maximum lease holdings lease terms <p>Inconsistent fee schedules are created resulting from different Regulations (<i>Provincial Land Regulations</i> and <i>Crown Resource Land Regulations</i>)</p> <p>Inconsistent reclamation fee schedules and security requirements are created resulting from different Regulations (<i>Provincial Land Regulations</i> and <i>Crown Resource Land Regulations</i>).</p> <p>MHI's superior right to gravel creates uncertainty for RMs wishing to complete long term strategic planning for gravel.</p> <p>No remedy is documented in the “<i>Sand and Gravel Policy</i>” (Policy) for unsuccessful negotiations between RM's and agriculture leaseholders for access for gravel exploration. However, Ministry of Agriculture current practise is to mediate when lessees make unreasonable demands. The Ministry ultimately has the authority to grant consent if the lessee remains unreasonable.</p>	<p>NOTE: Priority rights issues associated with leases is discussed in Opportunity #1</p> <p>8. OPPORTUNITY: Establish a more consistent size allowance for leases to MHI, RMs and private contractors on Crown-owned lands to provide greater certainty and consistency and to reduce barriers to private investment in gravel development on Crown-owned land. A DRAFT example based on “use” versus “client” is presented below:</p> <ul style="list-style-type: none"> Maximum lease size to MHI and RMs <u>for public works projects only</u> – 640 ac (256 ha) Maximum lease size <u>for non-public works projects</u> – 160 ac (65 ha) Maximum area under lease at any one time – 1280 ac (512 ha) <p>BENEFIT to RMs:</p> <ul style="list-style-type: none"> Establishes certainty of priority of gravel to be used for public works projects Contributes to moderating RMs gravel costs by increasing gravel supply through a more balanced investment opportunity between Crown-owned gravel and privately-owned gravel. <p>9. OPPORTUNITY: Establish consolidated, consistent lease terms for Crown-owned gravel.</p> <ul style="list-style-type: none"> MHI and RMs – 21 years for leases <u>for public works projects only</u> Private Contractors and leases for <u>non-public works projects</u> – 10 years <p>BENEFIT to RMs:</p> <ul style="list-style-type: none"> Enables establishment of “Gravel Reserves” for public works projects Increases certainty of supply over a longer term Potentially encourages longer term, innovative partnerships between RMs,
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	<p>agricultural lessee. When lessee's demands are unreasonable, the MAgr will mediate and ultimately provide authority if lessees remain unreasonable.</p> <p>Priority Rights: MHI and RMs, respectively, have priority rights to all gravel deposits for public use (RMs are subordinate to MHI)</p> <p>If private contractors did <u>not</u> complete prior exploration, MHI and RMs are allowed to exercise their rights of first refusal to land in the lease application area. When RMs and MHI concede their priority rights to the gravel, private contractors are accommodated.</p> <p>RMs who obtain gravel by exercising their priority rights will be issued a lease in their name, conditional on:</p> <ul style="list-style-type: none"> Gravel will be used only for road works within their RM Gravel will not be removed by a third party or used for commercial purposes <p>All lease applications are subject to review by:</p> <ul style="list-style-type: none"> Environment – for environmental concerns Economy – for possible impact with other quarrying or mining RMs – for possible road issues due to hauling 	<p>Priority Rights: MHI and RMs have priority rights to up to maximum 50% of sand and gravel deposits found by private contractors. Private operators are allowed a minimum 50% of deposits they find, subject to increased amounts when MHI or RMs do not require it for their use.</p>		<p>between RMs and MHI, and between RMs and private contractors for public works project gravel requirements.</p> <p>10. OPPORTUNITY: Exempt RMs from paying the regulatory <u>lease</u> fees charged for public works gravel on Agricultural crown land – coincidental with Opportunity #3.</p> <p>11. OPPORTUNITY: Establish a single lease fee schedule for private contractors operating on Crown-owned land – coincidental with Opportunity #4.</p> <p>12. OPPORTUNITY: Clarify and document MAgr current practice to mediate unresolved <u>lease</u> consent issues with prior agriculture leaseholders – coincidental with Opportunity #6.</p>
REMOVAL AUTHORITY	<p>A <i>Removal Authorization</i> is required prior to removal of gravel from an approved Lease on Agriculture crown land, subject to regulated requirements:</p>	<p>An approved Lease only is required prior to removal of gravel on Crown Resource land.</p>	<p>Both types of land (Agriculture crown land and Crown resource land) have varied, but inconsistent, regulated rates for acres disturbed/undisturbed and active/inactive.</p> <p>Further to compensation for damages negotiated with the agricultural lessee to</p>	<p>13. OPPORTUNITY: Establish a single fee schedule for disturbed/undisturbed and developed/undeveloped acres for all Crown-owned land.</p> <p>BENEFIT to RMs:</p>

	<ul style="list-style-type: none"> Plan showing access and extraction area Copy of leaseholder consent Reclamation plan with security deposit (see Reclamation Fees below) <p>Removal fees: (Regulation)</p> <ul style="list-style-type: none"> MHI is exempt from fees and royalties at the Minister's discretion. RMs and private contractors: <ul style="list-style-type: none"> \$10/ac annual rental \$150/ac disturbed acreage charge \$200 plus \$10/ac for first 10 ac, \$20 for each additional ac as a one-time payment to leaseholders 		<p>obtain a Lease approval, an additional one- time payment is made to the agricultural lessee for a <i>Removal Authorization</i>.</p> <p>On agriculture crown land, it appears that two separate payments are made to agricultural lessees for gravel development;</p> <ul style="list-style-type: none"> payment negotiated prior to lease approval payment required for removal authorization 	<ul style="list-style-type: none"> Benefits are directed primarily to private contractors when MHI and RMs are exempt from fees Contributes to moderating RMs gravel costs by increasing gravel supply through a more balanced private investment opportunity between Crown-owned gravel, and privately-owned gravel.
RECLAMATION	<p>Reclamation is required, including development of a reclamation plan.</p> <p>Refundable reclamation deposit: (Regulation)</p> <ul style="list-style-type: none"> Private contractors: <ul style="list-style-type: none"> \$2500 - minimum up to first 5 ac \$500 - each additional ac MHI is exempt from fees and royalties at the Minister's discretion RMs are exempt from reclamation deposits conditional on providing an "irrevocable letter of undertaking" to reclaim <p>Reclamation/restoration guidelines and procedures for agricultural crown rangelands are provided in the Ministry of Agriculture May 2012, "Restoration of Saskatchewan's Agricultural Crown Rangelands" document. The main measure of</p>	<p>Reclamation is required.</p> <p>Reclamation Security – Leaseholders are required to provide a refundable surety bond or other security including:</p> <ul style="list-style-type: none"> \$5000 for sites up to 1 ha (2.5 ac) \$3000 for each additional 0.5 ha (1.25 ac) <p>Standard reclamation requirements are outlined in the Provincial guidelines, "Reclamation Guidelines for Sand and Gravel Operators (May, 2003)". Copies of the requirements are provided to all leaseholders.</p> <p>(Copy of the guidelines is attached – website address is unknown)</p>		<p>14. OPPORTUNITY: Establish a consistent reclamation assurance/security requirement for MHI and RMs for all Crown-owned land by amending Crown resource land requirements to coincide with Agriculture crown land requirements ("irrevocable letter of undertaking")</p> <p>BENEFITS to RMs:</p> <ul style="list-style-type: none"> Reduces costs to RMs Provides consistency in administration of Crown-owned land <p>15. OPPORTUNITY: Consolidate the reclamation/restoration criteria for Crown-owned land into a single policy, while maintaining the respective distinctive, predominant land use objectives for Agriculture crown land and Crown resource land.</p> <p>BENEFITS to RMs:</p> <ul style="list-style-type: none"> Consolidates reclamation criteria for all users.

	<p>restoration is the comparison to pre-development site conditions including soils, landscape and vegetation criteria.</p> <p>Refer to website: http://www.agriculture.gov.sk.ca/Default.aspx?DN=c109f706-5139-4c52-acf7-fae3b6a182c6</p>			<ul style="list-style-type: none"> May serve to advance consistent reclamation approaches between RMs and between MAgr and MEnv. <p>16. OPPORTUNITY: Establish a single, consistent reclamation security deposit amount for private contractors for all Crown-owned land.</p> <p>BENEFIT to RMs:</p> <ul style="list-style-type: none"> Benefits are directed primarily to private contractors Contributes to moderating RMs gravel costs by increasing gravel supply through a more balanced private investment opportunity between Crown-owned gravel, and privately-owned gravel.
PERMITS (OTHER)	<p><i>Road Construction Material Permits</i> are issued subject to:</p> <ul style="list-style-type: none"> site plans reclamation plans <p>NOTE: Road construction material is NOT generally considered to be sand or gravel (Refer to <i>Provincial Land Regulations</i>, Part III.1 Sand and Gravel, Section 27 where respective materials are itemized separately).</p> <p>Permit Term: 365 days (Regulation)</p> <p>Permit Fees: (Regulation)</p> <ul style="list-style-type: none"> \$40 permit fee \$150/ac disturbed acre charge <p>Consent and conditions of entry are required where land is already under an agricultural lease. Compensation for damages is negotiated with the agricultural lessee</p>	<p><i>Small Quantity Permits</i> are issued subject to:</p> <ul style="list-style-type: none"> Maximum volume - 350 cubic metres Maximum area – 0.5 ha (1.25 ac) <p>Permit Term: generally 3 month maximum</p> <p>Royalty Fees: (Regulation)</p> <ul style="list-style-type: none"> \$0.20/cubic metre RMs and MHI are exempt from fees payment <p>Where practical, in areas of high demand or where gravel deposits are limited, small quantity permits are first referred to existing local suppliers to avoid issuing new permits</p> <p>Reclamation is required. No reclamation security deposit is required.</p>	<p>No apparent "GAPS" are evident between Ministry Policies as the respective PERMIT programs satisfy 2 distinct objectives:</p> <ul style="list-style-type: none"> MAgr PERMIT program satisfies a need to acquire road construction material NOT including sand and gravel MEnv PERMIT program satisfies a need to acquire smaller quantities of sand and gravel 	<p>17. OPPORTUNITY: Review the need for and value of expanding the 2 PERMIT programs to be available for all Crown-owned gravel lands so that the 2 distinct needs of gravel users can be met, no matter their location.</p> <p>BENEFIT to RMs:</p> <ul style="list-style-type: none"> Allows RMs to obtain material from Crown-owned land, regardless of where the material is located.

	<p>Reclamation is required. No reclamation security deposit is required.</p> <p>Guidelines and procedures for restoration of agricultural crown rangelands are provided in the Ministry of Agriculture May 2012, <i>"Restoration of Saskatchewan's Agricultural Crown Rangelands"</i> document. The main measure of restoration is the comparison to pre-development site conditions including soils, landscape and vegetation criteria.</p> <p>Refer to website: http://www.agriculture.gov.sk.ca/Default.aspx?DN=c109f706-5139-4c52-acf7-fae3b6a182c6</p>	<p>All permit holders must meet reclamation requirements outlined in the in the Provincial guidelines, <i>"Reclamation Guidelines for Sand and Gravel Operators (May, 2003)"</i></p>		
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