

STATE OF THE VALLEY 2013 ASSESSMENT REPORT

Notes:

Published by the Meewasin Valley Authority December 2016

Data is as of December 2013¹ unless otherwise noted

Photos by Meewasin unless otherwise noted

Population figures are from the Canadian Census and are a total of the City of Saskatoon and R.M. of Corman Park. The 2011 Census data (230,543 persons))was used for this report and the 2006 data (210,674) was used in reference to the 2008 *State of the Valley Report*.

¹ Publication date due to delay in availability of some of the required remote sensing data

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Executive Summary

Meewasin's mission is to “ensure a healthy and vibrant river valley, with a balance between human use and conservation by: providing leadership in the management of its resources; promoting understanding, conservation and beneficial use of the Valley; and undertaking programs and projects in River Valley development and conservation, for the benefit of present and future generations” (Meewasin Valley Authority, 2009, p. 2). The State of the Valley Report is an assessment of outcomes resulting from the approach the Meewasin Valley Authority takes to stewardship of the natural and cultural heritage resources of the Meewasin Valley. The report represents a snapshot of the Valley in 2013 and reflects trends since 1993.

The results of the assessment assist with:

- identifying priorities for action;
- creating benchmarks for future assessments;
- providing a framework and data for project level assessment, planning and management;
- gaining foresight on potential consequences of decisions affecting ecosystems;
- identifying response options to achieve conservation, education and development goals;
- helping build individual and institutional capacity to understand integrated ecosystems; and
- guiding future research.

The components of the State of the Valley are Health, Fit, Balance, and Vibrancy. Details on each are listed below and a summary of the Indicators, expectations and grades for each is listed in Table i.

The overall **Health** of the Meewasin Valley in 2013 is “Meets Expectations”. The indicators used to measure Health were: amount of habitat, amount of protected land, and ecological integrity. Findings on each indicator are summarized below.

Amount of Habitat: 1,411 hectares (3,487 acres) of the Meewasin Valley was habitat, which represented 21% of the total land base. Over the past 15 years, there was a 1.9% reduction in the amount of habitat.

Protected Land: The Meewasin Valley covers 6,696 hectares (16,547 acres) and an additional 28 hectares (69.91 acres) of habitat land is under public protection outside the Meewasin Valley. One new parcel of land, the 54.91 hectare (146.81 acre) Chappell Marsh Conservation Area was added to the Conservation Zone in 2011. There are however, areas along the river valley, particularly within the new City of Saskatoon limits that are not currently protected.

Ecological Integrity: Since the 2008 assessment, there has been a 2% increase in land that is classified as native, native vegetation with rare plant species, or potential for native plant species. This accounts for an increase in 2,943 hectares (7272 acres) for these lands. There are occurrences of rare and endangered species throughout the Meewasin Valley. Meewasin has established long-term grazing, prescribed burning and native plant restoration programs on natural areas throughout the Meewasin Valley.

The overall **Fit** of the Meewasin Valley is “Meets Expectations”. Fit recognizes the relationship between the individual and social health of the river and the people within the Meewasin Valley. It is “the principle of working in harmony with natural processes and with people” (Raymond Moriyma Architects and Planners, 1979). Indicators and results are: over 90% of surveyed respondents believed that Meewasin should continue its work, 87% believe that Meewasin contributes to quality of life, 84% believed that Meewasin helps attract visitors and 87% believe that Meewasin is a good investment of tax dollars. This is consistent with the responses from the 2008 survey.

The overall **Balance** of the Meewasin Valley is “Meets Expectations”. Balance recognizes the need for prioritization when planning for health and fit. It is not simply the equal ratio of conservation, recreation or development within the Meewasin Valley, but rather achievement of the direction set out in *The Meewasin Valley Project*, where different areas of the Meewasin Valley are focused, to varying degrees, on education, development and conservation (Raymond Moriyma Architects and Planners, 1979). The indicators for a balanced Meewasin Valley are: the amount of public shoreline, the number and distribution of public access points, the amount of trail, and land use mix. Findings are summarized below.

Amount of the shoreline: Within the City of Saskatoon, 82% (28 kilometres or 17.4 miles) of the shoreline is public. The percentage has decreased, as compared with 2008, due to City of Saskatoon boundary alterations, which brought private land along the river into the city limits. Conversely, the percentage within the R.M. of Corman Park has increased as there is less private shoreline in the rural municipality. As subdivision and urban development occur within the newly added City of Saskatoon land, the shoreline will most likely become public. Within the R.M. of Corman Park 38% (39 kilometres or 24.2 miles) of the shoreline is public. Total public shoreline in the Meewasin Valley is 67 kilometres (41.6 miles), as compared with 59 kilometres (36.7 miles) in 2008. There are 0.29 metres (0.95 feet) of public shoreline/person.

Number and distribution of public access points: no additional river access points have been created in the past five years. The existing points continue to be heavily concentrated south of Saskatoon.

Amount of trail: The Meewasin Trail has continued to expand and grow throughout the Meewasin Valley. Since the 2008 *State of the Valley Report*, 12.7 kilometres (7.9 miles) of new Meewasin Trail have been constructed. There was a reduction in casual trail but this does not diminish expectations set out for 2013 since some of these trails were formalized into the Meewasin Trail. Upgrades and refurbishments of existing trails are not included in the assessment.

Amount of land and land use mix of protected land in the Meewasin Valley: Although half of the Meewasin Valley, including the South Saskatchewan River, is classified as habitat, fragmentation of this habitat has been increasing. The size and connectivity of habitat parcels is important for the conservation and health of the Meewasin Valley. There has been an increase in the amount of land with conservation potential; however, this has not increased at the same rate as the habitat lost to encroaching development.

The overall **Vibrancy** of the Meewasin Valley in 2013 is “Meets Expectations”. Vibrancy refers to the interaction people have with the cultural and natural environment that is the Meewasin Valley. Increasing vibrancy is possible by providing sites and amenities to allow people to access and enjoy the Meewasin Valley (Meewasin Valley Authority, 2003, p. ii). The following indicators were used to measure vibrancy: amount of public Green Space, Continuum of Uses, and Community Capacity.

Amount of Green Space: The amount of Green Space has increased by 152 hectares (375 acres) since 2008. This is in small part due to park development in the new neighbourhoods of Willowgrove and Evergreen, but more so due to the reclassification of land. Much of the land now classified as Green Space had previously been classified as Habitat (e.g. Cosmopolitan Park), Urban (e.g. neighbourhood parks in College Park and Erindale) and Institutional (e.g. grounds in the immediate area of the Wanuskewin Heritage Park interpretive centre). Increasing actual Green Space within the study area is challenging as a large part of the river valley is already urban park and it is only as new neighbourhoods are developed that additional park space is developed. With little growth or potential growth in Green Space and an increase in population of 19,869 over five years, the amount of Green Space per person has decreased.

Continuum of Uses Facilitated: A broad scope of both active and passive recreational uses have been facilitated, covering all four seasons, both water and land-based. Meewasin’s 2013 public opinion survey has indicated a continued desire for more riverbank and community connection trails, picnicking opportunities and nature experience areas. Meewasin has made strides to address this over the past five years with a Meewasin Trail connection to Wanuskewin Heritage Park and a master plan for the Meewasin Northeast Swale that includes picnicking and nature experience areas.

Some unintentional uses, such as off-road biking, ATVing and unauthorized trail development are or have the potential to cause damage to natural and cultural heritage areas. A method for addressing these unintended uses has not been fully developed.

Community Capacity: The number of people participating in both structured activities and unstructured visits to Meewasin’s interpretive centres each represent more than one in every 10 Saskatoon residents engaged with Meewasin and its work. The number of development review applications shows the level of interest in development within the Meewasin Valley. It also provides opportunities for the public to become involved in the Authority’s decision making through the public hearing process. The number of memberships and board/committee seats held by Meewasin staff and board members show that it has achieved considerable depth in engaging with the broader community.

Table i - Summary of Indicators, Expectations, and Grades

Indicator	Expectation	Grade
Health: Wildlife habitat	No net loss of habitat.	Needs Improvement
Health: Protected land	Increase acres under public protection.	Needs Improvement
Health: Ecological integrity / conservation of nature	Maintain ecological integrity.	Meets Expectations
Fit: Public support	The general public believes Meewasin balances conservation and development well.	Meets Expectations
Balance: Public shoreline	Public can access the entire shoreline within City limits. Public and private shoreline within the R.M. of Corman Park is proportional.	Meets Expectations
Balance: Public access points	Balance the number of public access points to the river.	Needs Improvement
Balance: Trail	Provide a trail system within and connecting to the Valley to accommodate a variety of users.	Meets Expectations
Balance: Land use mix	Balance human use and conservation through land use.	Meets Expectations
Vibrancy: Green space and Trail	Ensure adequate green space and trail to access and enjoy green space.	Meets Expectations
Vibrancy: Continuum of uses facilitated	Provide for both active and passive recreational use of the Meewasin Valley.	Meets Expectations
Vibrancy: Community Capacity	Meewasin is integrated within the larger community and this integration increases capacity of both Meewasin and the community at large, with regard to Meewasin's mandates of conservation, development, and education.	Meets Expectations

1. Introduction

The Meewasin Valley is comprised of the land both directly and indirectly impacting and impacted by the South Saskatchewan River as it runs through the City of Saskatoon and the R.M. of Corman Park. The Meewasin Valley is located on Treaty 6 territory, the traditional territory of Cree peoples, and on the homeland of the Métis Nation.

Meewasin's mission is to "ensure a healthy and vibrant river valley, with a balance between human use and conservation by: providing leadership in the management of its resources; promoting understanding, conservation and beneficial use of the Valley; and undertaking programs and projects in river valley development and conservation, for the benefit of present and future generations" (Meewasin Valley Authority, 2009, p. 2). The State of the Valley Report is an assessment of outcomes resulting from the approach the Meewasin Valley Authority takes to stewardship of the natural and cultural heritage resources of the Meewasin Valley. The report represents a snapshot of the Valley in 2013 and reflects trends since 1993.

The Meewasin Valley Project, (Raymond Moriyama Architects and Planners, 1979) directs Meewasin's stewardship approach as follows:

- The adoption of the broad concept of health and fit;
- The adoption of the theme of *linkage* with the river as a *spine*;
- The adoption of the principle of *balance*;
- The acceptance of the *natural system* as a base for planning; and
- The *general objectives* to be:
 - the conservation of nature;
 - the improvement of water quality and reduction of pollution;
 - the enlargement of educational and research opportunities;
 - the improvement of rural-urban links and relationships;
 - the advancement of the cultural arts; and
 - the improvement and extension of recreational opportunities.

The results of the assessment assist with:

- identifying priorities for action;
- creating benchmarks for future assessments;
- providing a framework and data for project level assessment, planning and management;
- gaining foresight on potential consequences of decisions affecting ecosystems;
- identifying response options to achieve conservation, education and development goals;
- helping build individual and institutional capacity to understand integrated ecosystems; and
- guiding future research.

2. Indicators

The report uses indicators to measure the four components of the State of the Valley Report: Health, Fit, Balance and Vibrancy. The following sources were used to develop the indicators used in this and previous State of the Valley Reports:

- ***The Meewasin Valley Project – 100 Year Conceptual Master Plan (1979).*** Meewasin's foundation document, *The Meewasin Valley Project* (Raymond Moriyama Architects and Planners, 1979), guides Meewasin's overall development plan. It emphasizes three outcomes, health, fit, and balance, which have helped frame all of the State of the Valley reports.
- ***1993, 1998, 2003 and 2008 State of the Valley Reports.*** These reports were published by the Meewasin Valley Authority in 1998, 1999, 2003 and 2009 respectively.
- ***Meewasin Valley Authority Strategic Plan.*** The strategic plan provides the vision for what Meewasin should be and what it should achieve.
- ***Meewasin Valley Authority Development Plan.*** The Development Plan provides policy direction that guides decision making.

The indicators used in the report can be found in Table 1.

Table 1 - Indicators

Component	Indicator
Health	Amount: wildlife habitat
	Amount: protected land
	Ecological Integrity / conservation of nature
Fit	Public support
Balance	Amount of publicly accessible shoreline
	Number of public access points to the river
	Amount and type of Meewasin Trail (links)
	Land use mix/change
Vibrancy	Amount of green space and trail
	Continuum of uses facilitated
	Community capacity

As in previous State of the Valley Reports, each indicator is assigned a grade based on its value relative to the previous State of the Valley Report. The grades are based as follows:

- **Needs Improvement** – indicator is *less than* the results in the previous State of the Valley Report.
- **Meets Expectations** – indicator is *equal to or not improved* from the results from the previous State of the Valley Report.
- **Exceeds Expectations** –indicator is *greater than* the results from the previous State of the Valley Report.

3. Health

The Meewasin Valley Project uses the World Health Organization's definition which states that health is "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity". It encompasses the idea that a holistic perspective is required for the physical health of the river. This includes features such as creeks, coulees, ravines, swales, aquifers, land and air (Raymond Moriyama Architects and Planners, 1979).

Health is measured using the following indicators:

- Wildlife Habitat;
- Protected Land; and
- Ecological Integrity.

Land Use Classification

In order to measure the outcomes for health, a land use classification for the Meewasin Valley was conducted. The areas analyzed included the Meewasin Valley and a 2-kilometre buffer around it. This allows for a holistic perspective, recognizing that although there are legal boundaries representing the Meewasin Valley, the system is a whole organism that extends past these boundaries. The land use classification was prepared with a Geographic Information System (GIS) utilizing 2013 and 2014 aerial imagery. The definition for each land use is based on classifications used in previous State of the Valley Reports. The definitions can be found in Section 8.

Maps 1, 2, and 3, in Appendix A, show land use classifications for the Meewasin Valley and 2-kilometre buffer.

Land Use Change

The State of the Valley Reports have created an accumulation of 20 years of data on land use, which makes possible a review of changes over time.

Due to such large areas of unclassified land use in 1993 data, only the past 15 years of land use data has been analyzed. The total area analyzed has changed over time partly due to changes in the Meewasin Valley jurisdiction and partly to data available. As such, land use change is best compared using percentage rather than area.

Table 2 summarizes the results of the land use classifications over the past 15 years. Land with a habitat function or that has the potential for habitat comprises 32% of the area within the Meewasin Valley. The South Saskatchewan River comprises another 27% of the Meewasin Valley. The remaining 41% of the Meewasin Valley is land that has been developed or disturbed.

Table 2 - Summary of Land Use Classification

Land Use Classification	2013		2008		2003		1998		Change over 15 years	
	%	Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)
Developed or Disturbed	39.3	2,630	40.9	2,587	37.5	2,505	37.6	2,512	1.7	117
Habitat or Potential for Habitat	30.0	2,007	32.3	2,045	34.0	2,274	32.9	2,201	(2.9)	(194)
River	30.8	2,059	26.9	1,700	28.5	1,907	29.5	1,973	1.2	86
Total		6,696		6,332		6,686		6,686		

Table 3 lists the detailed results of the land classification of the Meewasin Valley. Note that the boundaries of the Meewasin Valley used for the State of the Valley Report have not necessarily been consistent from report to report. These inconsistencies are due to:

- Air photo/satellite imagery coverage availability;
- In 2008, the portion of the Meewasin Valley north of Clark's Crossing was not included in the analysis. This area is all riverbed and covers approximately 300 hectares (741 acres); and
- The area for some developed land classifications, such as urban, road and rail, and institutional was more finely detailed over time as the method for analyzing land use moved from manual digitalization to automated classification. For example, in past reports, the residential and commercial areas of Saskatoon have been classified as all urban. In the 2013 report the lands within Saskatoon were classified into finer detail and all city roads have been identified separately as roads rather than as urban areas.

Table 3 - Detailed Land Use Classification

Land Use Classification*	2013		2008		2003		1998		Change over 15 years (%)
	%	Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	
Agricultural Production	12.7	851	16.2	1,028	15.0	1,001	16.4	1,098	(3.7)
Country Residential	0.3	19	0.2	14	0.3	19	0.2	10	0.1
Disturbed	1.4	91	0.8	51	0.6	42	0.6	37	0.8
Golf Course	2.9	194	3.5	225	3.5	235	3.3	224	(0.5)
Green Space	4.5	301	5.6	356	6.5	431	5.7	378	(1.2)
Habitat	21.1	1,411	21.6	1,369	23.6	1,575	23.0	1,539	(1.9)
Industrial	2.5	167	2.0	126	0.0	0	0.0	0	2.5
Institutional	3.8	252	3.9	250	0.0	2	0.2	12	3.6
Pasture	1.5	101	1.5	95	0.5	33	0.9	61	0.6
Recreational	1.9	125	1.9	119	1.6	104	0.3	18	1.6
River	30.8	2,059	26.9	1,700	28.5	1,907	29.5	1,973	1.2

Road and Rail	6.8	452	3.6	228	2.1	143	2.6	176	4.1
Urban	10.0	673	12.2	771	17.9	1,194	17.4	1,160	(7.3)
Total		6,696		6,332		6,686		6,686	

* See section 8 for definition of each class

3.1 Wildlife Habitat

Habitat is classified as areas that are suitable for wildlife habitat and that are in a relatively natural state (i.e. native vegetation or non-native vegetation which has been undisturbed long enough to retain a semi-natural state). It does not include areas that, with proper integrated resource management, would be suitable for habitat.

Table 4 - Wildlife Habitat as an Indicator for Measuring Health

Indicator	Status	Trend
Total land in habitat	1,411 hectares (3,487 acre) or 21% of the land-base of the Meewasin Valley is habitat.	Due to the areas being different sizes, percentage will be assessed. 1.9% of habitat has been lost over the past 15 years. This totals 128 hectares (316 acres).
Land in habitat parcels >50 acres in size	1,249 hectares (3,085 acre) of this habitat exists in 22 parcels that are of a sustainable size (≥50 acres).	The number of sustainable habitat parcels has slightly decreased since 2008; however the total acreage of sustainable parcels has remained consistent. In 2008 there were 23 parcels totaling 2045 hectares. Over the past 15 years, both the number and hectares of sustainable parcels has increased. In 1998 there were nine parcels totaling 1,126 hectares.

EXPECTATION: No net loss of habitat.

ASSESSMENT: While Meewasin has been working to improve and conserve the quality and sustainability of habitat, habitat loss continues to occur.

GRADE: Needs Improvement.

3.2 Protected Land

Protected land includes those areas in the Conservation Zone and Buffer Zone, as outlined in *The Meewasin Valley Authority Act's* Schedule A and B, and any land that Meewasin owns or holds a Conservation Easement on (Meewasin Valley Authority, 2003, p. 8). The purpose of protecting land is to meet the goals and objectives set out in the *Meewasin Valley Project* and Meewasin's Mission Statement.

Protected land includes habitat land, recreation land, development land and cultural heritage land. Cultural heritage illustrates the human connection to the land and recognizes First Nations and Aboriginal heritage throughout the Meewasin Valley. This helps to provide an



Photo courtesy of the City of Saskatoon

understanding of the natural history of the landscape, including how both humans and other species moved across the landscape and how they interacted with their environment.

Map 4, in Appendix A, shows cultural heritage sites throughout the Meewasin Valley. This includes paleontological sites, pre-contact and post-contact archaeology (examples include burial sites, artifact scatters, and homesteads), historical trails (Moose Woods - Batoche Trail), and First Nations communities and Aboriginal land holdings.

EXPECTATION: Increase area under protection.

ASSESSMENT: 6,696 hectares (16,547 acres) are now part of the Meewasin Valley. An additional 28 hectares (69.91 acres) of habitat land is under public protection outside the Meewasin Valley. One new parcel of land, the 54.91 hectare (146.81 acres) Chappell Marsh Conservation Area was added to the Conservation Zone in 2011. There has been an increase of 133 (329) hectares of protected land since 1998. There are however, areas along the river valley, particularly within the newly adjusted City of Saskatoon limits that are not currently protected.

Through Meewasin's *Development Review Exemption Bylaw #3* (Meewasin Valley Authority, 2013), 1,344 hectares (3,321 acres) of land was exempted from Meewasin's Development Review approval process. These lands remain a part of the Meewasin Valley but are no longer subject to Meewasin approval for improvements.

Map 5, in Appendix A, shows lands under protection.

GRADE: Needs Improvement

3.3 Ecological Integrity/Conservation of Nature

The State of the Valley Report primarily contains quantitative data. This indicator attempts to capture more qualitative components of the Meewasin Valley's health. Generally, undertaking processes that mimic the conditions that an ecosystem evolved under, such as grazing and wildfire, will enhance biodiversity and the health of that ecosystem. There are a number of factors that affect ecological integrity and conservation of nature. The primary ones are assessed in the sub-sections below. A final grade for Ecological Integrity/Conservation of Nature is found at the end of this section.

3.3.1 Ecological Integrity

Ecological integrity is based on the *2008 State of the Valley Report's* ecological integrity vegetation classification with some modifications for added clarity. Meewasin-classified ecological integrity parcels are based on the following criteria:

- **Native Vegetation:** Habitat parcels which do not have rare plant species;
- **Native Vegetation with Rare Plant Species:** Habitat parcels with rare plant species (based on Saskatchewan Conservation Data Centre 2012 data);
- **Perennial:** Pasture parcels likely planted to domestic forage crops (aerial photo analysis and ground truth knowledge), Golf Courses, and Green Space parcels that are not naturalized parks;

- **Potential for Native Plant Species:** Green Space parcels that contain naturalized parks and Pasture parcels that are likely to utilize native vegetation. Grasslands Land Cover data was used to determine likelihood that pastures contained native plants (Natural Resources Canada Land Cover, 2000);
- **River:** South Saskatchewan River (below high water mark); and
- **Disturbed or Developed:** Agricultural production, Country residential, Disturbed, Industrial, Institutional, Recreational, Road and Rail, and Urban (previously included Green Space and Golf Course).

Table 5 below shows the breakdown of these classifications. The data is represented both as area and as a percentage of the Meewasin Valley to account for the different Meewasin Valley boundaries utilized in different years as discussed on page 4.

Table 5 - Ecological Integrity within the Meewasin Valley and 2-Kilometre Buffer

Vegetation Classification	2013			2008			Difference (Over 5 Years)	
	%	Area (ha)	Area (ac)	%	Area (ha)	Area (ac)	%	Area (ha)
Native	14.8	6,170	15,247	14.4	4,556	11,259	0.4	1,614
Native Vegetation with Rare Plant Species	2.5	1,045	2,583	3.1	996	2,460	(0.6)	49
Perennial	5.5	2,288	5,655	2.3	726	1,794	3.2	1,562
Potential for Native Plant Species	5.5	2,283	5,640	3.2	1,003	2,479	2.3	1,279
River	5.4	2,296	5,673	5.5	1,756	4,340	(0.1)	539
Disturbed or Developed	66.3	27,748	68,566	71.5	22,658	55,990	(5.2)	5,089
Total	100	41,830	103,364	100	31,696	78,322		10,134

Maps 6, 7 and 8, in Appendix A, show the ecological integrity of the Meewasin Valley with a 2-kilometre buffer.

EXPECTATION: Natural & diverse vegetation.

ASSESSMENT: Since the 2008 assessment, there has been a 2% increase in land that is classified as, native, native vegetation with rare plant species, or potential for native plant species. This accounts for an increase in 2,943 hectares (7,272 acres) for these lands.

EXPECTATION: Habitat parcels within the Meewasin Valley have sufficient size & connectivity to be sustainable.

ASSESSMENT: 1,249 hectares (3,085 ac) has sufficient connectivity (89% of all habitat parcels) to be of a sustainable size (≥ 50 ac). This is a decrease of 3% from the 2008 data.

3.3.2 Rare or Endangered Species

Areas that contain rare or endangered species are more likely to have high biodiversity, providing the site is still intact. Using data from the Saskatchewan Conservation Data Centre (SCDC) (2012), some assumptions can be made on diversity in those areas that have rare or endangered species.

Maps 9, 10, and 11, in Appendix A, show reported rare or endangered species.



EXPECTATION: the Meewasin Valley will contain rare and/or endangered species.

ASSESSMENT: Based on data from the SCDC, there are occurrences of rare and endangered species throughout the Meewasin Valley. The SCDC data is collected through voluntary submission of findings. Other rare and endangered species may exist in the Meewasin Valley that have not been recorded.

3.3.3 Grazing

Grazing is used to mimic the natural disturbance impact of grazers such as the Plains Bison. Grazing pushes back encroaching shrubby vegetation and exotic species. Grazing also helps to invigorate native species through hoof action and fertilization.

EXPECTATION: The health of natural areas will be enhanced through a grazing program that mimics the natural disturbance that would have occurred during the pre-contact period in which they evolved.

ASSESSMENT: Meewasin has established a long-term grazing program on natural areas throughout the Meewasin Valley.

Table 6 summarizes the grazing activity, by site, from 2009-2013.



Table 6 - Conservation Grazing Sites, 2009-2013

Year	Site	Area (hectares)
2009	Crocus Prairie	1.154
2009	Saskatoon Natural Grasslands	1.96
2010	Meewasin Northeast Swale	not recorded
2010	Saskatoon Natural Grasslands	not recorded
2013	Beaver Creek Conservation Area	3.669
2013	Meewasin Northeast Swale	13.174
Total		>19.96

3.3.4 Burning

Prescribed burning mimics the natural disturbance of wildfire. Patchy burns of varying intensity and size help to control exotic vegetation and shrubby encroachment into native grasslands. Many native prairie plants evolved with fire and increase in number post-fire. Native plants may rely on fire to release seeds, reduce competition from other plants (such as non-native plants) and take up nutrients from the ash.

Table 7 summarizes the burning activity, by site, from 2009-2013.



Table 7 - Prescribed Burning and Wildfire Sites 2009-2013

Year	Site	Area (hectares)	Type
2009	Beaver Creek Conservation Area	1.659	Prescribed
2009	Cranberry Flats Conservation Area	0.781	Prescribed

2009	Crocus Prairie	1.580	Prescribed
2009	Meewasin Northeast Swale	8.217	Prescribed
2010	Beaver Creek Conservation Area	0.219	Prescribed
2010	Cranberry Flats Conservation Area	2.645	Wildfire
2010	Crocus Prairie	not recorded	Prescribed
2010	Meewasin Northeast Swale	2.635	Prescribed
2010	Saskatoon Natural Grasslands	14.466	Wildfire
2010	Wanuskewin Heritage Park	74.103	Wildfire
2011	Meewasin Northeast Swale	21.105	Prescribed
2012	Beaver Creek Conservation Area	3.256	Prescribed
2013	Beaver Creek Conservation Area	1.564	Prescribed
2013	Cranberry Flats Conservation Area	1.366	Prescribed
2013	Meewasin Northeast Swale	12.028	Prescribed
Total		>145.624	

EXPECTATION: The health of natural areas will be enhanced with a prescribed burning program that mimics the wildfires that would have occurred during the pre-contact period in which they evolved.

ASSESSMENT: Meewasin has established a long-term burning program on natural areas throughout the Meewasin Valley.

3.3.5 Native Plant Species Restoration

On public land or on private land that Meewasin provides integrated resource management services, such as exotic vegetation control or reseeding of a disturbed landscape, seeding and planting should be limited to species native to the region.

EXPECTATION: Natural areas will be dominated by native plant species, even after a disturbance event.

ASSESSMENT: Meewasin has established a seed mix criteria and planting program. The sites planted with this mix are shown in Table 8. The number of hectares restored has not been recorded.

Table 8 - Meewasin Restoration Sites 2009-2013

Year	Site
2010	Beaver Creek Conservation Area
2010	Cranberry Flats Conservation Area
2013	Beaver Creek Conservation Area

GRADE (Ecological Integrity/Conservation of Nature): Meets Expectations

4. Fit

Fit recognizes the relationship between the individual and social health of the river and the people within the Meewasin Valley. It is “the principle of working in harmony with natural processes and with people” (Raymond Moriyama Architects and Planners, 1979).

4.1 Public Support

Since the early 1980s, Meewasin has commissioned a statistically-valid telephone public opinion study in five-year intervals. The most recent survey occurred in 2013. As shown in Table 9 below, support for Meewasin consistently remains high.

Table 9 - Indicators of Public Support for Meewasin

Indicator	Status
Meewasin should continue its work	90% agree, consistent with 2008 results where 91% agreed
Meewasin contributes to quality of life	87% agree, consistent with 2008 results where 88% agreed
Meewasin helps attract visitors to the region	84% agree, consistent with 2008 results where 84% agreed
Meewasin is a good investment of tax dollars	87% agree, consistent with 2008 results where 84% agreed

EXPECTATION: The general public believes Meewasin balances conservation and development well.

ASSESSMENT: Public opinion about Meewasin and its work remain positive and strong.

GRADE: Meets Expectations

5. Balance

Balance recognizes the need for prioritization when planning for health and fit. Balance is not simply the equal ratio of conservation, recreation or development within the Meewasin Valley, but rather the achievement direction set out in *The Meewasin Valley Project*, where different areas of the Meewasin Valley are focused, to varying degrees, on education, development and conservation (Raymond Moriyama Architects and Planners, 1979). These areas are described by *Links* and *Nodes* which provide access to and along the river for a range of activities and needs. Links provide connections between “the city and rural communities”, “the river and the land” and “the north and the south” (Raymond Moriyama Architects and Planners, 1979). They also provide a spiritual and temporal link between the past, present and future. Nodes are focal areas within the continuous system of links where people can gather for conservation, research, education, urban-rural interface, cultural arts and recreation (Raymond Moriyama Architects and Planners, 1979).

5.1 Public Shoreline

Public shoreline is that which borders parcels of land that are either owned by, or have had easements granted to Meewasin or one of its Participating Parties (Government of Saskatchewan University of Saskatchewan, and City of Saskatoon). Private shoreline is that which borders on private property where the owner has not opened the land to the public.

Map 12, in Appendix A, shows public and private shoreline.

EXPECTATION: Public can access almost the entire shoreline within City limits. The current exceptions to this are along Saskatchewan Crescent West and newly annexed land on the north edge of Saskatoon. There is a combination of public and private shoreline within the R.M. of Corman Park.

ASSESSMENT Within the City of Saskatoon, 82% (28 kilometres or 17.4 miles) of the shoreline is public. The percentage has decreased, as compared with 2008, due to City of Saskatoon boundary alterations, which brought private land along the river into the city limits. Conversely, the percentage within the R.M. of Corman Park has increased as there is less private shoreline in the rural municipality. As subdivision and urban development occur within the newly added City of Saskatoon land, the shoreline will most likely become public. Within the R.M. of Corman Park 38% (39 kilometres or 24.2 miles) of the shoreline is public. Total public shoreline in the Meewasin Valley is 67 kilometres (41.6 miles), as compared with 59 kilometres (36.7 miles) in 2008.

There are 0.29 metres (0.95 feet) of public shoreline/person. This has remained steady since 2008, with the increase in public shoreline keeping pace with the population growth (note that there is an error in the 2008 report, which shows 0.57 metres/per person, rather than the actual value of 0.29 metres/person).

GRADE: Meets Expectations



5.2 Public Access Points

The *Meewasin Valley Project* called for reduced pressure on sensitive areas south of the City of Saskatoon and greater development of recreation opportunities to the north. The number and distribution of public access points is used to assess the attainment of this goal.

Public access points are considered those along public land, open road allowances terminating at the river and any private land allowing access to the river (usually for agricultural purposes).

Map 13, in Appendix A, shows public access areas and Meewasin sites.

EXPECTATION: Balance the number of public access points to the river between the areas north and south of Saskatoon.

ASSESSMENT: There are 34 public access points. No new points have been created in the past five years. The number has increased from 22 points in 1998. The existing points continue to be heavily concentrated south of Saskatoon.

GRADE: Needs Improvement

5.3 Trail

The Meewasin Valley Project highlighted the importance of “links and nodes”. The Meewasin Trail links “the city and rural communities”, “the river and the land”, and “the north and the south” (Raymond Moriyama Architects and Planners, 1979). Starting in 2013, work on *The Meewasin Trail Study* began, which provided a snapshot to help assess the current and future state of the Meewasin Trail (Meewasin Valley Authority, 2014). Through *The Meewasin Trail Study* new classifications for trail, as shown in Table 10, were determined.

Table 10 - Trail by Type

Type	Length	Trend 2009-2013
Meewasin Trail	59.1 kilometres (36.7 miles)	12.7 kilometres (7.9 miles) of additional trail in the southeast (Diefenbaker Park and Circle Drive South), northeast (Crocus Prairie, Peggy McKercher Conservation Area), northwest (Silverwood Factoria, Silverwood Park), River Landing Phase 2 and upgrade to Victoria Park (Previously labeled as Primary and Interpretive Trail)
Casual Trail	6.7 kilometres (4.2 miles)	3.5 kilometre (2.2 mile) reduction of casual trail as the Crocus Prairie casual trail was formalized (Previously labeled as Intentional Footpath)
Equestrian Trail	8.1 kilometres (5.0 miles)	No change
Cross Country Ski Trails	18.3 kilometres (11.4 miles)	New designation: Diefenbaker Park, Forestry Farm and Forest Park, Holiday Park Golf Course, Meewasin Park

Map 14, in Appendix A, shows trails by type.

EXPECTATION: Provide a trail system within and connecting to the Meewasin Valley to accommodate a variety of users.

ASSESSMENT: The Meewasin Trail has continued to expand and grow throughout the Meewasin Valley. Since the *2008 State of the Valley Report*, there has been 12.7 kilometres (7.9 miles) of new Meewasin Trail constructed. The reduction in casual trail does not diminish expectations set out for 2013 since some of these trails were formalized into Meewasin Trail. Upgrades and refurbishments of existing trails are not included in the assessment.

GRADE: Meets Expectations



Photo Courtesy of Tourism Saskatoon

5.4 Land Use Mix

Maintaining a healthy ecosystem is strongly correlated to habitat size. Meewasin has been tracking the amount of habitat, size of habitat parcels, and connectivity between parcels since 1993. Table 11 provides a summary of the proportion of habitat within the Meewasin Valley, as well as the Meewasin Valley and surrounding areas.

Table 12 summarizes the factors, encroaching development and changes to conservation value that have led to the changes in habitat area over the previous five years.

Maps 16 and 17, in Appendix A, show land use change from encroaching development and increasing conservation value respectively.

Table 11 - Habitat

Indicator	Status	Trend
Proportion of land in habitat (including the river) in the Meewasin Valley	Approximately 51% of the land base within the Valley is dedicated to habitat	Up from 49% since 2008 but down from 53% 15 years ago.
Proportion of land in habitat (including the river) within a 500-metre buffer of the Meewasin Valley	Approximately 34% of the land base is habitat	Down from 36% 15 years ago.
Proportion of land in habitat (including the river) within a 1-kilometre buffer of the Meewasin Valley	Approximately 28% of the land base is habitat	Down from 29% 15 years ago.
Proportion of land in habitat (including the river) within a 2-kilometre buffer of the Meewasin Valley	Approximately 23% of the land base is habitat	No change over the past 15 years
Fragmentation of habitat in the Meewasin Valley	73% of habitat parcels are less than 20.25 hectares (50 acres) in size. This accounts for 162 hectares (400 acres) or 12% of total habitat.	Up from 56% of parcels <20.25 hectares (50 acres) over the past fifteen years. This accounts for 69 hectares (170 acres) or 4% of total habitat. Habitat parcels ≥20.25 hectares (50 acres) decreased by 223 hectares (551 acres).
Fragmentation of habitat within a 2-kilometre buffer of the Meewasin Valley	96% of habitat parcels were < 20.25 hectares (50 acres) which makes up 23% of total habitat. This accounts for 1,639 hectares (4050 acres) of habitat.	Up from 92% of habitat parcels being <20.25 hectares (50 acres) 15 years ago. This accounted for 16% of total habitat and 1,147 hectares (2834 acres). This is a difference of 492 hectares (1216 acres) of habitat. Area of habitat for parcels ≥20.25 hectares (50 acres) decreased by 259 hectares (640 acres) over 15 years.

Table 12 – Factors Affecting Habitat Changes, Meewasin Valley and Surrounding 2-Kilometres

Factor	Status	Trend
Encroaching development	3,492 hectares (8,630 acres) of land now categorized as development had a different land use in 2008. This includes 810 hectares (2,002 acres) that had been habitat.	Continued loss to agricultural production, residential and industrial development.
Increasing conservation values	1465 hectares (3620 acres) of land previously classified as disturbed or developed is now classified as undeveloped.	The amount of land with conservation potential has increased. This land is not land within the Meewasin Valley but it is within two kilometres of it.

EXPECTATION: Land use reflects a balance of human use and conservation.

ASSESSMENT: Although half of the Meewasin Valley, including the South Saskatchewan River, is classified as habitat, fragmentation of this habitat has been increasing both within the Meewasin Valley and within two kilometres of the Meewasin Valley. The size and connectivity of habitat parcels is important for the conservation and health of the Meewasin Valley. There has been an increase in the amount of land with conservation potential; however, this has not increased at the same rate as the habitat lost to encroaching development.

GRADE: Meets Expectations

6. Vibrancy

Vibrancy refers to the interaction people have with the cultural and natural environment that is the Meewasin Valley. Increasing vibrancy is possible by providing sites and amenities to allow people to access and enjoy the Meewasin Valley (Meewasin Valley Authority, 2003, p. ii).

6.1 Green Space and Meewasin Trail

The long term conservation of the Meewasin Valley requires a stewardship ethic among citizens and visitors. People learn to respect and protect the natural world when they have opportunities to interact with nature and have positive outdoor experiences. At the same time, extensive human use can disrupt and damage natural areas. For this reason, improving and extending recreational opportunities, on land capable of absorbing human impact, was identified in *The Meewasin Valley Project* (Raymond Moriyama Architects and Planners, 1979).

Green Space, as a land use, encompasses parks, land set aside as open space for recreational programming, trail or other corridors and similar open spaces, but does not include habitat.

EXPECTATION: Adequate Green Space and trail to access and enjoy Green Space.

ASSESSMENT: As shown in Table 13, the amount of Green Space increased by 152 hectares (375 acres) since 2008. This is in small part due to park development in the new neighbourhoods of Willowgrove and Evergreen, but more so due to the reclassification of land. Much of the land now classified as Green Space had previously been classified as Habitat (e.g. Cosmopolitan Park), Urban (e.g. neighbourhood parks in College Park and Erindale) and Institutional (e.g. grounds in the immediate area of the Wanuskewin Heritage Park interpretive centre). Increasing actual Green Space within the study area is challenging as a large part of the river valley is already urban park and it is only as new neighbourhoods are developed that additional park space is developed. With little growth or potential growth in Green Space and a population increase of 19,869 over five years, the amount of Green Space per person has decreased.

Table 13 - Green Space

Indicator	Status*	Trend
Amount of green space	620 hectares (1531 acres)	Increase of 152 hectares (375 acres) over the past 15 years
User ratio: green space/person	26 m ² /person (287.5 ft ² /person)	Increasing compared with 5 years previous which was: 22 m ² /person (240 ft ² /person)

As shown in Table 14, the total length of the Meewasin Trail was 92.21 kilometres (57.3 miles), an increase of 9.19 kilometres (5.71 miles). The amount of Meewasin Trail (linear metres) per person has increased from 0.31 to 0.4. This is a positive step in meeting Meewasin's goals, as stated in its *Trail System Plan*, of providing a gap-free, accessible, integrated trail system that links the city with attractions in rural areas, other trail systems and interpretive opportunities.

Table 14 – Meewasin Trail Length per Person

Indicator	Status	Trend
User ratio: Meewasin Trail length/person	0.4 linear metres/person (1.3 feet/person	Increase from 0.31 metres/person (1.0 feet/person) in 2008

GRADE: Meets Expectations



Photo Courtesy of the City of Saskatoon

6.2 Continuum of Uses Facilitated

Table 15 outlines a listing of intentional and unintentional passive and active uses within the Meewasin Valley. Intentional uses are those which the *Meewasin Valley Project* and *Meewasin Development Plan* has envisioned occurring and have been condoned through infrastructure development and/or policy. Unintentional uses are those which were either not envisioned or were intended not to occur through either lack of infrastructure development or policy.

Table 15 - Continuum of Uses

Type	Status
Intentional Passive Uses	Site analysis indicates the following uses are facilitated: strolling, bird-watching, fishing, limited picnicking, wildlife viewing, passive contemplation, historical and cultural connection, art appreciation and, river views.
Passive Uses Observed (un-intentional)	Public opinion survey responses indicate there is greater demand for the following: community trail connections, picnicking, and nature experience areas. Site use analysis indicates the following uses could be better facilitated: picnicking, river access, interpretation of flora/fauna and ecological function and, hiking.
Intentional Active Uses	Site analysis indicates the following uses are facilitated: cycling, running, limited cross-country skiing, limited hiking, dog-walking, casual sporting activities, canoeing/kayaking, limited power boating, limited tobogganing, skating and, equestrian.
Active Uses Observed (unintentional)	Public opinion survey responses indicate there is greater demand for the following: community trail connections, and expanded trail. Site use analysis indicates the following uses could be better facilitated: hiking, cross-country skiing, off-road biking, skate boarding/longboarding, snow-boarding, and tobogganing. Some uses, such as ATVing, and unauthorized trail development need to be curtailed.

EXPECTATION: The Meewasin Valley accommodates both active and passive recreational uses.

ASSESSMENT: A broad scope of both active and passive recreational uses have been facilitated, covering all four seasons, both water and land-based. Meewasin's 2008 public opinion survey has indicated a continued desire for more riverbank and community connection trails, picnicking opportunities and nature experience areas. Meewasin has made strides to address this over the past five years with a Meewasin Trail connection to Wanuskewin Heritage Park and a master plan for the Meewasin Northeast Swale that includes picnicking and nature experience areas.

Some unintentional uses, such as off-road biking, ATVing and unauthorized trail development are or have the potential to cause damage to natural and cultural heritage areas. A method for addressing these unintended uses has not been fully developed.

GRADE: Meets Expectations





Photo Courtesy of Tourism Saskatoon

6.3 Community Capacity

Meewasin operates within a complex community composed of individuals, businesses, multiple levels of government, institutions, and not-for-profit organizations. The value of the Meewasin Valley can, in part, be demonstrated through Meewasin's engagement with this broad community. The community capacity indicators will help measure the level of this engagement.

EXPECTATION: Meewasin is integrated within the larger community and this integration increases capacity of both Meewasin and the community at large, with regard to Meewasin's mandates of conservation, development, and education.

ASSESSMENT: As shown in Table 16 and Table 17, the number of people participating in both structured activities and unstructured visits to Meewasin's interpretive centres each represent more than one in every 10 residents engaged with Meewasin and its work. The number of development review applications shows the level of interest in development within the Meewasin Valley. It also provides opportunities for the public to become involved in the Authority's decision making through the public hearing process. The number of memberships and board/committee seats held by Meewasin staff and board members show that it has achieved considerable depth in engaging with the broader community.

Table 16 - Level of Engagement from the Community

2013 (fiscal year)	Status
Number of Participants in Meewasin Programs and Structured Activities*	34,993
Number of visitors to Meewasin Interpretive Centres**	26,962
Number of Participants on Meewasin Committees and Board***	77
Number of Development Review Applications received	16

* River Cinema, Interpretive Canoe Tour, Pelican Watch, Clean-Up Campaign, Elementary School program

** Meewasin Valley Interpretive Centre, Beaver Creek Conservation Area

*** Meewasin Valley Authority Board, Education Advisory, Conservation Advisory, Development Advisory, River Users Group, Plant-A-Tree, Fund Development

Table 17 - Level of Engagement in the Community

2013 (fiscal year)	Status
Number of memberships Meewasin has in other organizations	12
Number of Boards and Committee Meewasin has a seat on	10

GRADE: Meets Expectations



7. Future Assessment

The following outlines additional analysis and indicators that could be incorporated into future State of the Valley assessments.

Additional analysis

To provide more clarity on trends over time, longitudinal data from previous reports could be utilized along with indicators for aspects such as rate of change. Targets could be set for acceptable rates of change.

A quantitative rating system, with associated criteria could be added to provide a more rigorous evaluation system for the grading of each indicator.

Qualitative assessment for habitat, beyond a simple measure of parcel size, could be added. For example, while there is an indicator for wildlife habitat, with an expectation of no net loss of habitat, this expectation has challenges in that urban growth will continue and may impact land designated as habitat. An additional indicator that reflects the quality of the habitat may provide a more robust reflection of the Wildlife Habitat component of Health and be reflective of Meewasin's integrated resource management efforts.

Additional Indicators

To provide a fuller, broader evaluation of the State of the Valley, some or all of the following indicators could be included.

Health

- Water Quality/Source Water Protection
- Biodiversity
- Habitat Connectivity
- Contaminated Sites

Balance/Fit

- public's perception of ability to experience natural areas (measured by survey)
- level of appreciation of natural and cultural heritage resources (measured by survey and participation numbers)

Only indicators that Meewasin has a degree of control over should be included in the State of the Valley assessment. This could be through the powers granted through the *Meewasin Valley Authority Act* and/or other partnerships or organizations Meewasin participates in.

8. Definitions

Agricultural Production (Land Use) – All areas used for agricultural purposes, including crops, areas mowed for hay, and agricultural buildings if they are associated with an agricultural activity nearby (e.g. silos will be associated with the nearby crop if they are in the same field).

Country Residential (Land Use) – Residential land in rural areas including roadways if the road connects only to the residence (i.e. driveway). If the road connects to several separate residential areas, it is classified as Road and Rail. In addition, buildings used for agricultural purposes will be included in this category if they are on the homestead lot.

Disturbed (Land Use) – Areas where the natural land has been disturbed, but which do not fall into any other category. This includes areas used as parking lots, dugouts and access roads (not included in Road and Rail category because these roads are not maintained and are often seasonal).

Ecological Integrity - The level of disturbance and stress affecting the natural function of an ecosystem can be described as ecological integrity. An area with high integrity has little stress and exhibits a high level of biodiversity including mostly native species in good condition in a geographic location that is expected.

Golf Course (Land Use) – Golf courses, including any associated buildings.

Green Space (Land Use) – Areas which provide little value as habitat areas for wildlife, but which are vegetated. This includes urban parks.

Habitat (Land Use) – Areas which are suitable as wildlife habitat and which are in a relatively natural state (i.e. native vegetation or non-native vegetation which has been undisturbed long enough to retain a semi-natural state).

Industrial (Land Use) – Areas with Light or Heavy Industrial Uses, including manufacturing, wholesaling and storage.

Institutional (Land Use) – School lands, including university, elementary and high schools. Interpretive centres are also included in this category if they are used for educational purposes. Camps which provide occasional educational uses are not included in this category because they are used solely for recreational purposes at other times of the year.

Meewasin Valley – The area described in Schedule A and B of *The Meewasin Valley Authority Act*; subject to any alterations made to those schedules pursuant to section 13 of the *Act*; the lands in and under the waters of the South Saskatchewan River bounded in the north by Section 10, in Township 40, in Range 3, west of the Third Meridian and in the south by the portion of Section 4, in Township 35, in Range 6, West of the Third Meridian, lying west of the river (i.e. the boundary of the Rural Municipality of Corman Park); and the shores of the South Saskatchewan River adjacent to the lands described above by legal land descriptions (Chapter M-11.1 of the Statutes of Saskatchewan, 1979, p. 6).

Pasture (Land Use) – Areas which are actively used as pasture for livestock, or areas which have been left in a natural state (such as fallow fields left for two or more years) long enough to provide some value for wildlife, but which are not “natural” enough to be classified as habitat. If the pasture has been mowed for aesthetic purposes or harvested for forage, it is classified as country residential (lawns) or agricultural production (harvested).

Recreational (Land Use) – Lands used for recreational purposes, including race tracks, camps and riding stables.

River (Land Use) – the South Saskatchewan River channel.

Road and Rail (Land Use) – Road and railways which are currently being maintained and are used year round. This includes railway and road allowances.

Urban (Land Use) – Any land uses which are urban areas, such as residential and commercial, but are not institutional, industrial or green space.

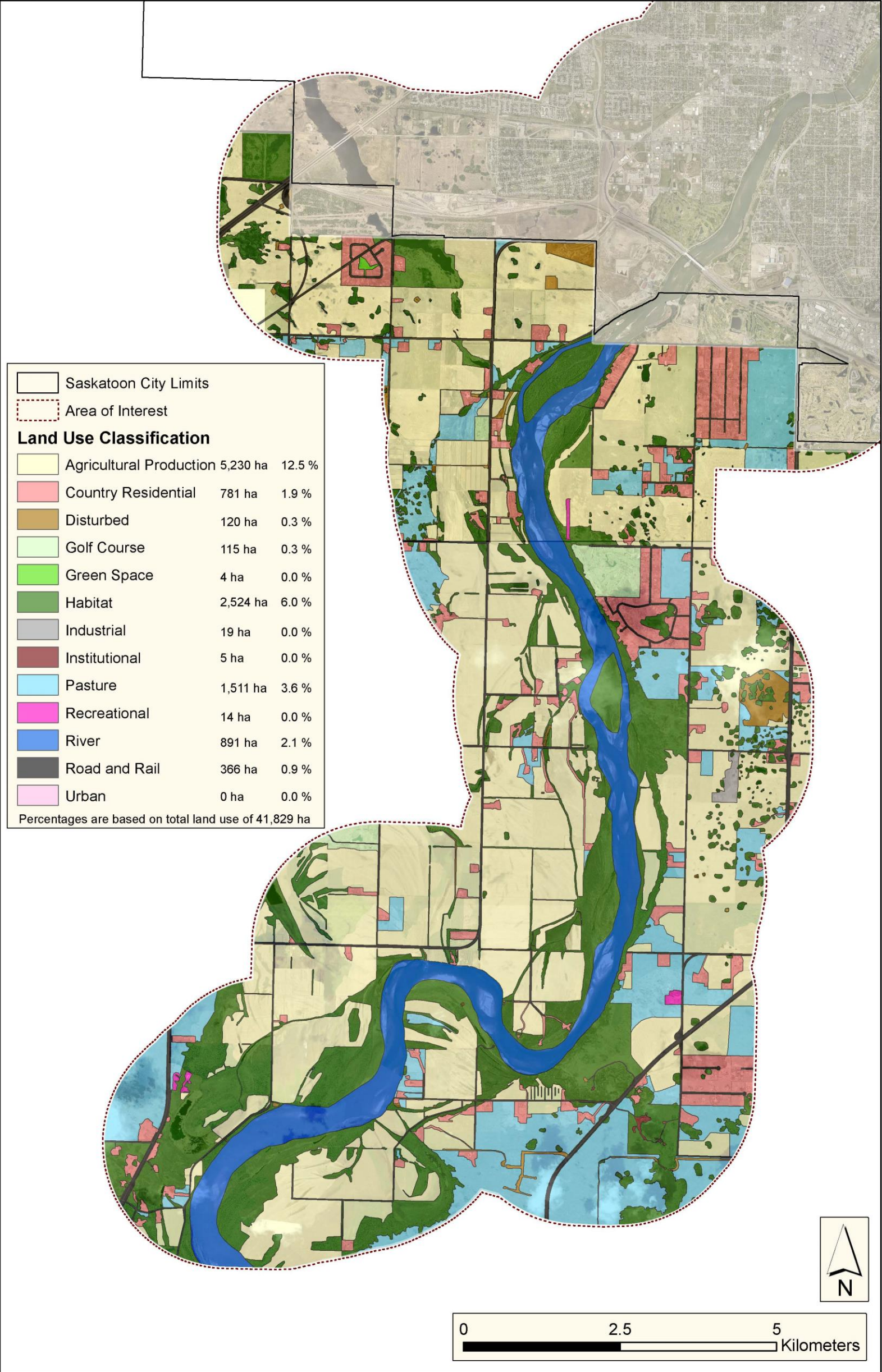
Vibrancy – Vitality characterized by thriving, diverse and animated people and places.

References

- Chapter M-11.1 of the Statutes of Saskatchewan. (1979). *The Meewasin Valley Authority Act*. Regina: Queen's Printer.
- Meewasin Valley Authority. (2003). *State of the Valley Report*. Saskatoon: Meewasin Valley Authority.
- Meewasin Valley Authority. (2009). *Meewasin Five Year Strategic Plan 2009 to 2013*. Saskatoon: Meewasin Valley Authority.
- Meewasin Valley Authority. (2013). *Bylaw 003: The Development Review Exemption Bylaw*. Saskatoon: Meewasin Valley Authority.
- Meewasin Valley Authority. (2014). *The Meewasin Trail Study*. Saskatoon: Meewasin Valley Authority.
- Raymond Moriyama Architects and Planners. (1979). *The Meewasin Valley Project*. Toronto.

Appendix A – Maps

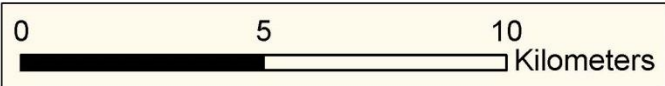
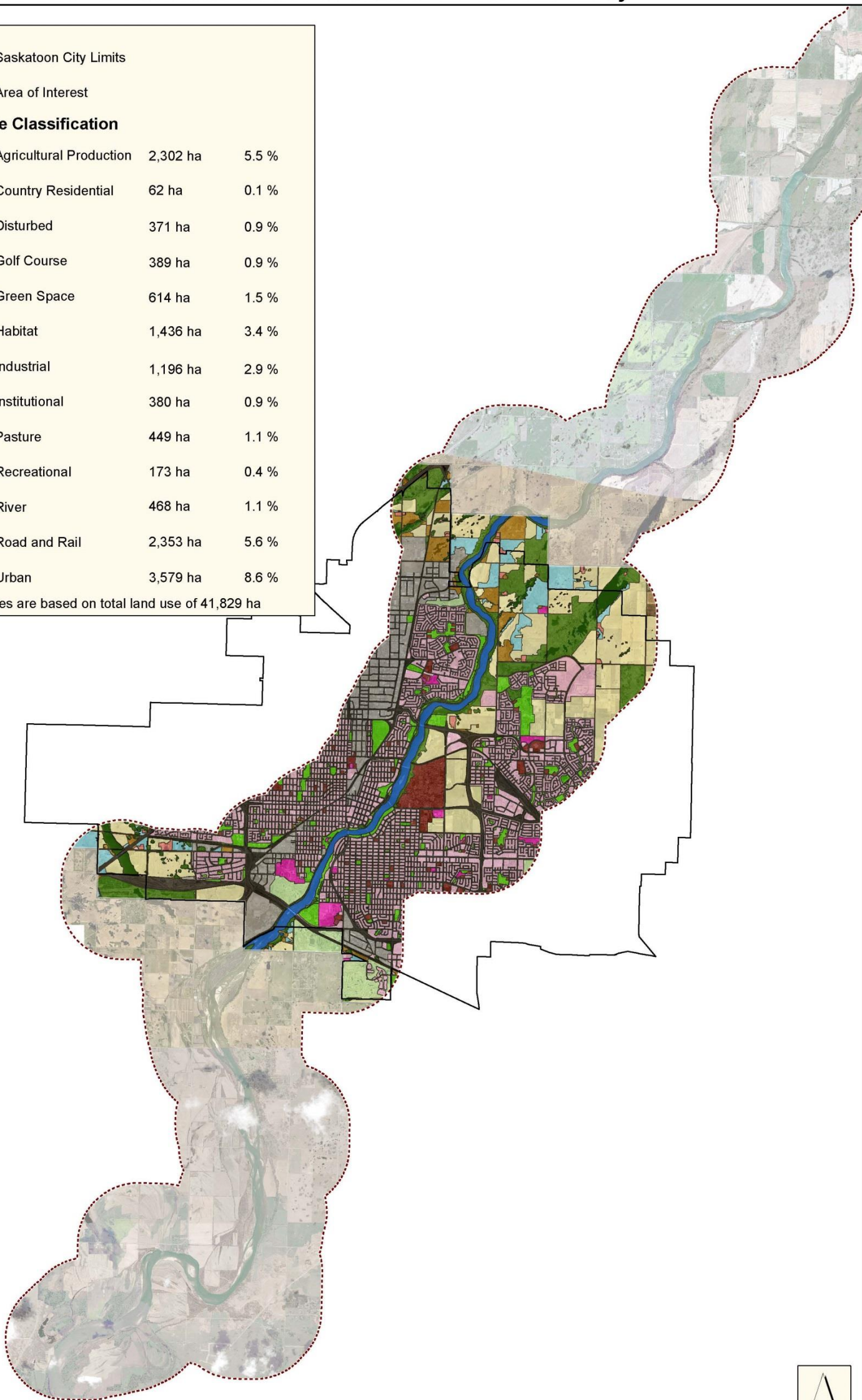
Map 1. Land Use - 2-kilometre Buffer of South Meewasin Valley



September 25, 2016 Meewasin Valley Authority Projection: NAD 1983 CSRS UTM Zone 13N
Aerial Imagery Courtesy of the City of Saskatoon and the Saskatchewan Geospatial Imagery Collaborative

Meewasin

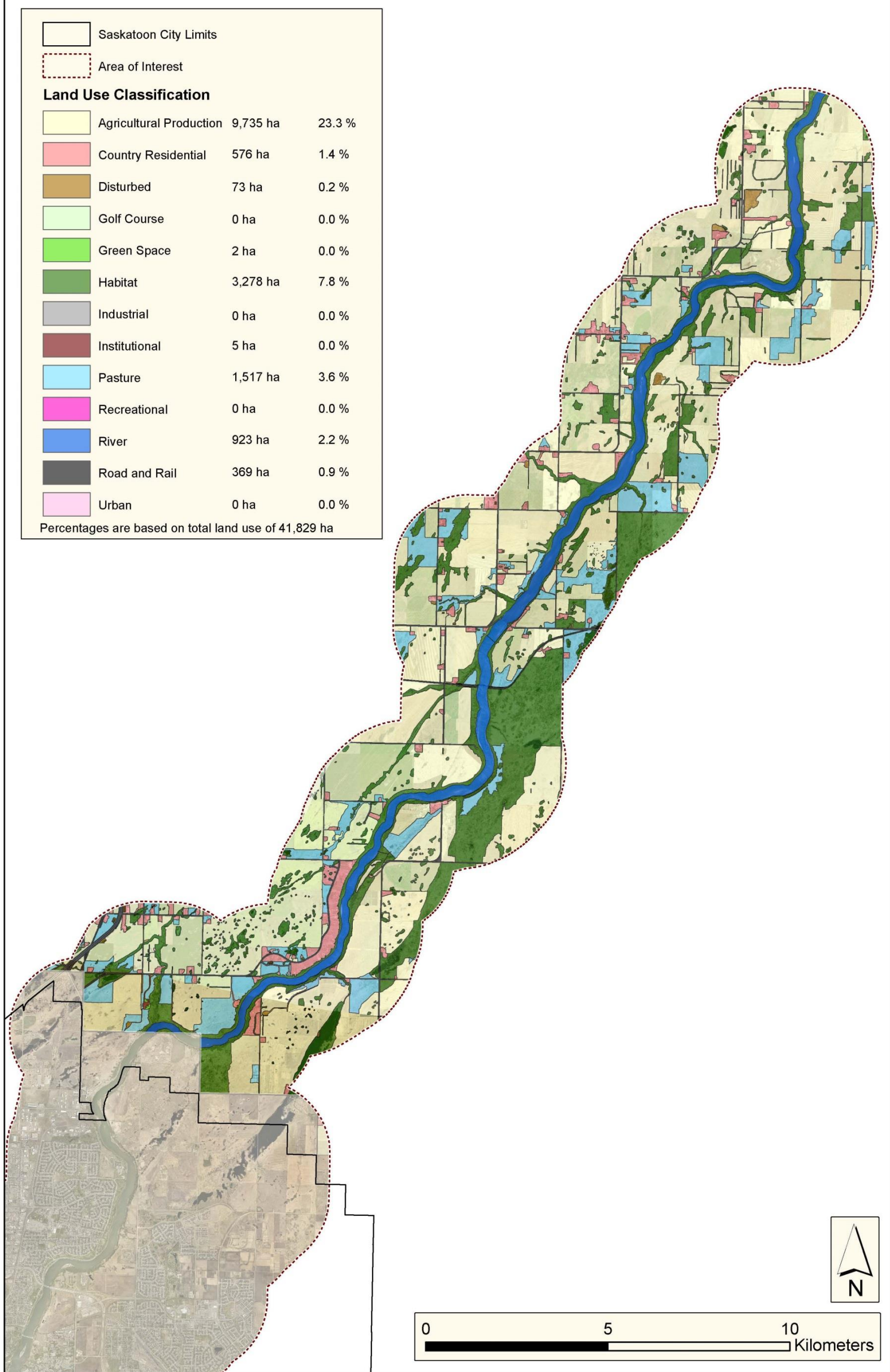
Map 2. Land Use - 2-kilometre Buffer of Central Meewasin Valley



September 25, 2016 Meewasin Valley Authority
Projection: NAD 1983 CSRS UTM Zone 13N Source: Data from Meewasin Trail Study (2014)

Meewasin

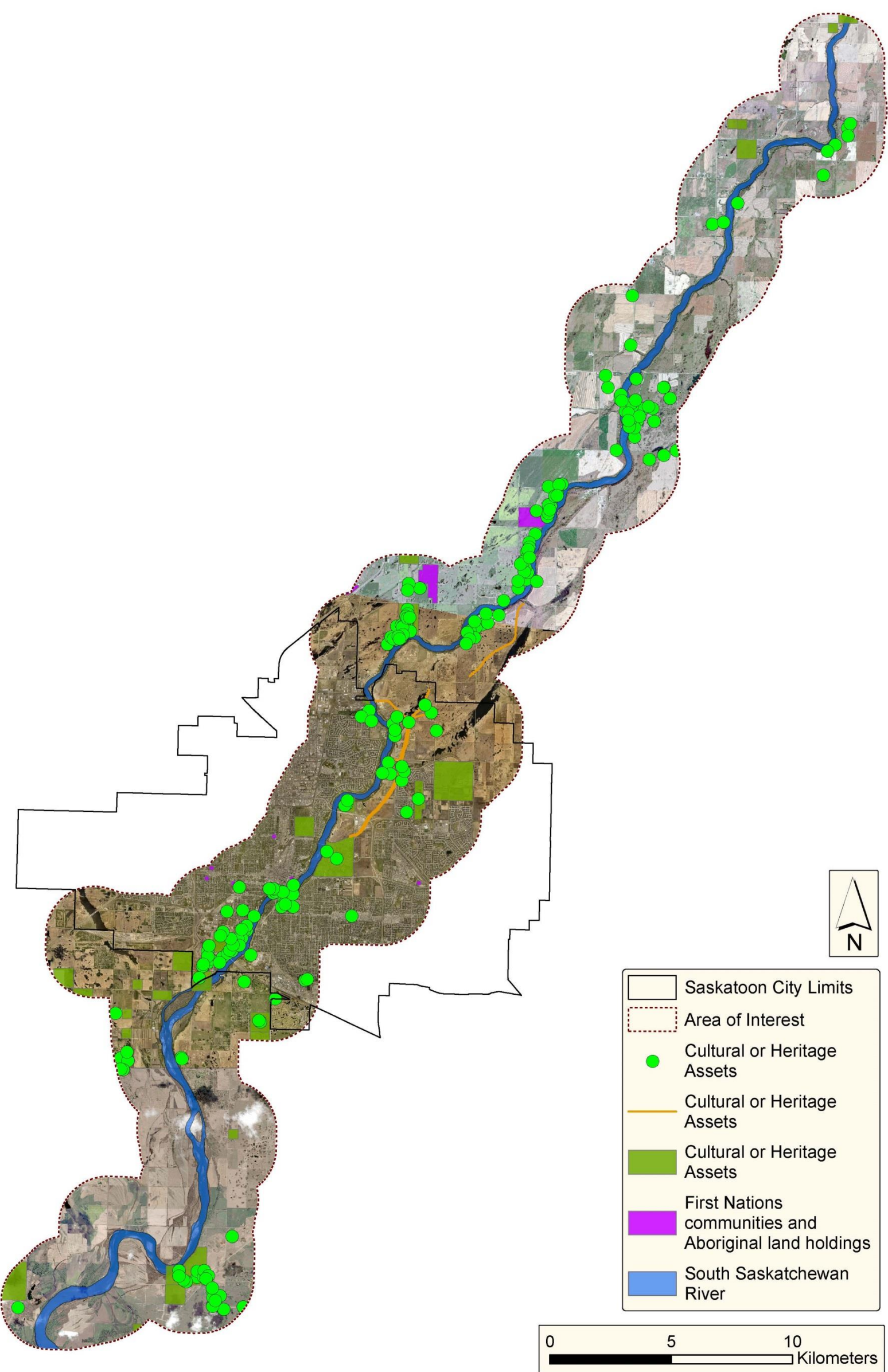
Map 3. Land Use - 2-kilometre Buffer of North Meewasin Valley



September 25, 2016 Meewasin Valley Authority Projection: NAD 1983 CSRS UTM Zone 13N
Aerial Imagery Courtesy of the City of Saskatoon and the Saskatchewan Geospatial Imagery Collaborative

Meewasin

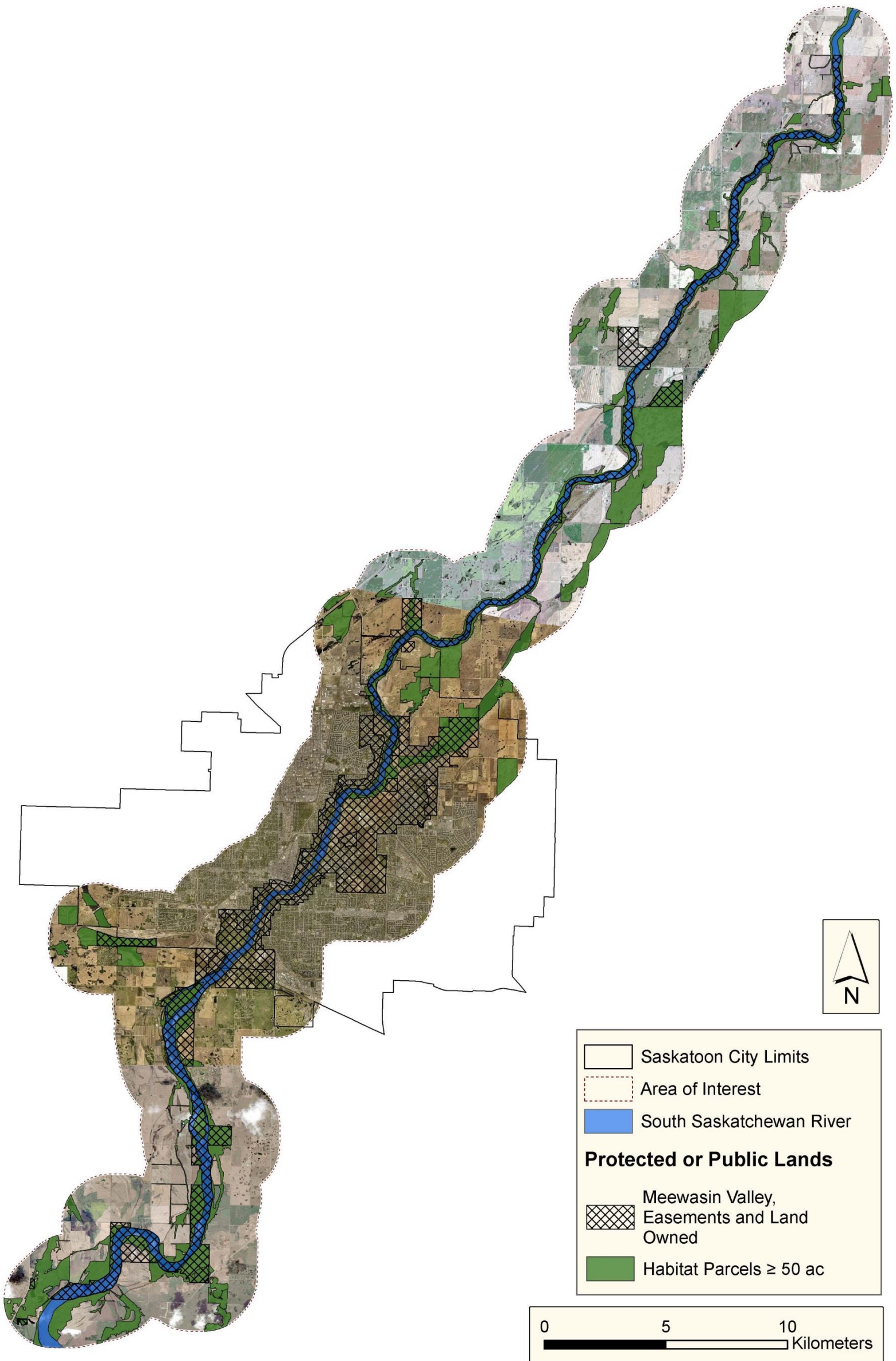
Map 4. Cultural Heritage Values



September 25, 2016 Meewasin Valley Authority Projection: NAD 1983 CSRS UTM Zone 13N
Source: Data from Government of Saskatchewan (2016), City of Saskatoon (2012, 2016) and Stantec (2012)

Meewasin

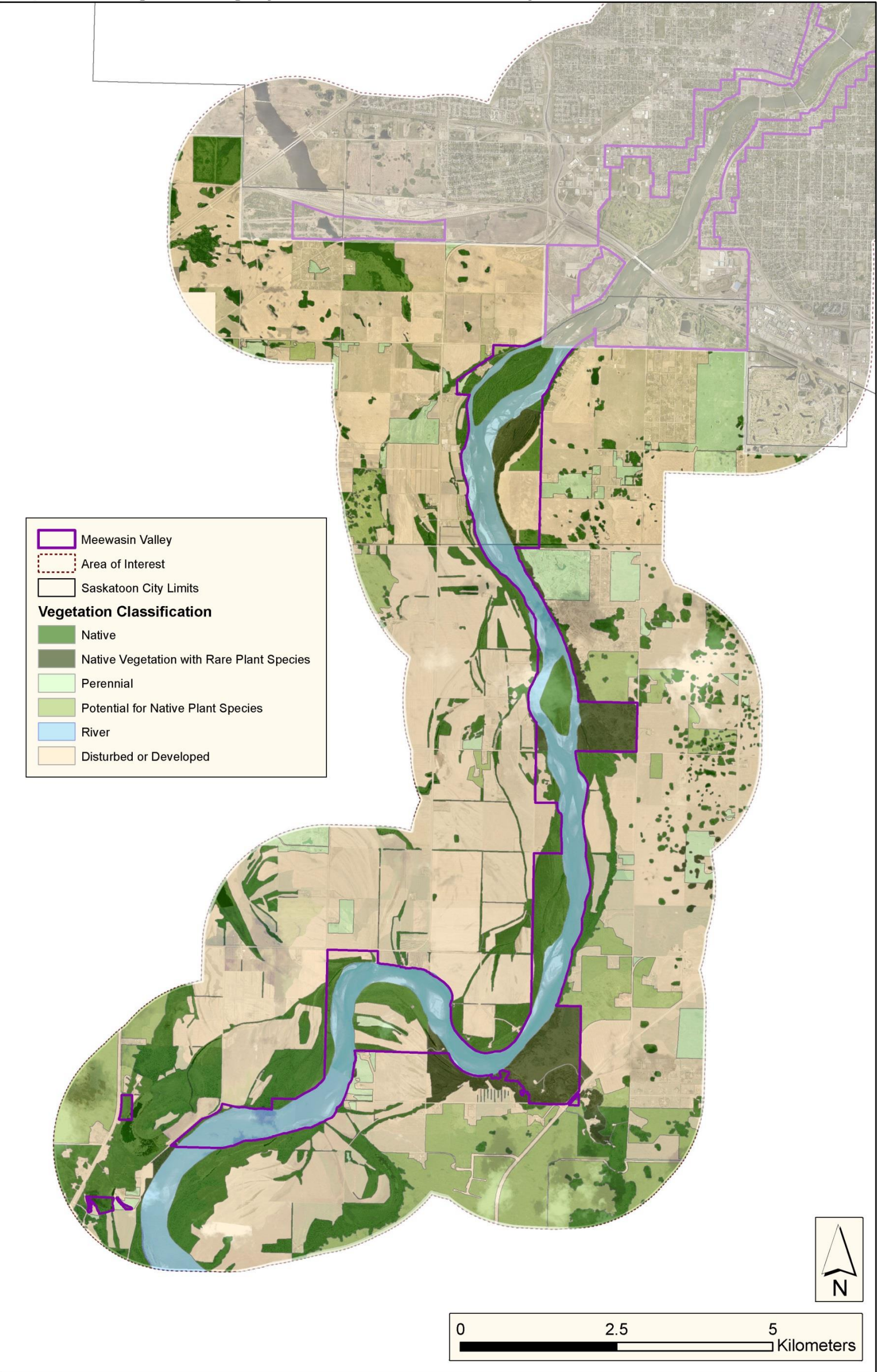
Map 5. Protected or Public Lands



September 25, 2016 Meewasin Valley Authority Projection: NAD 1983 CSRS UTM Zone 13N
Aerial Imagery Courtesy of the City of Saskatoon and the Saskatchewan Geospatial Imagery Collaborative

Meewasin

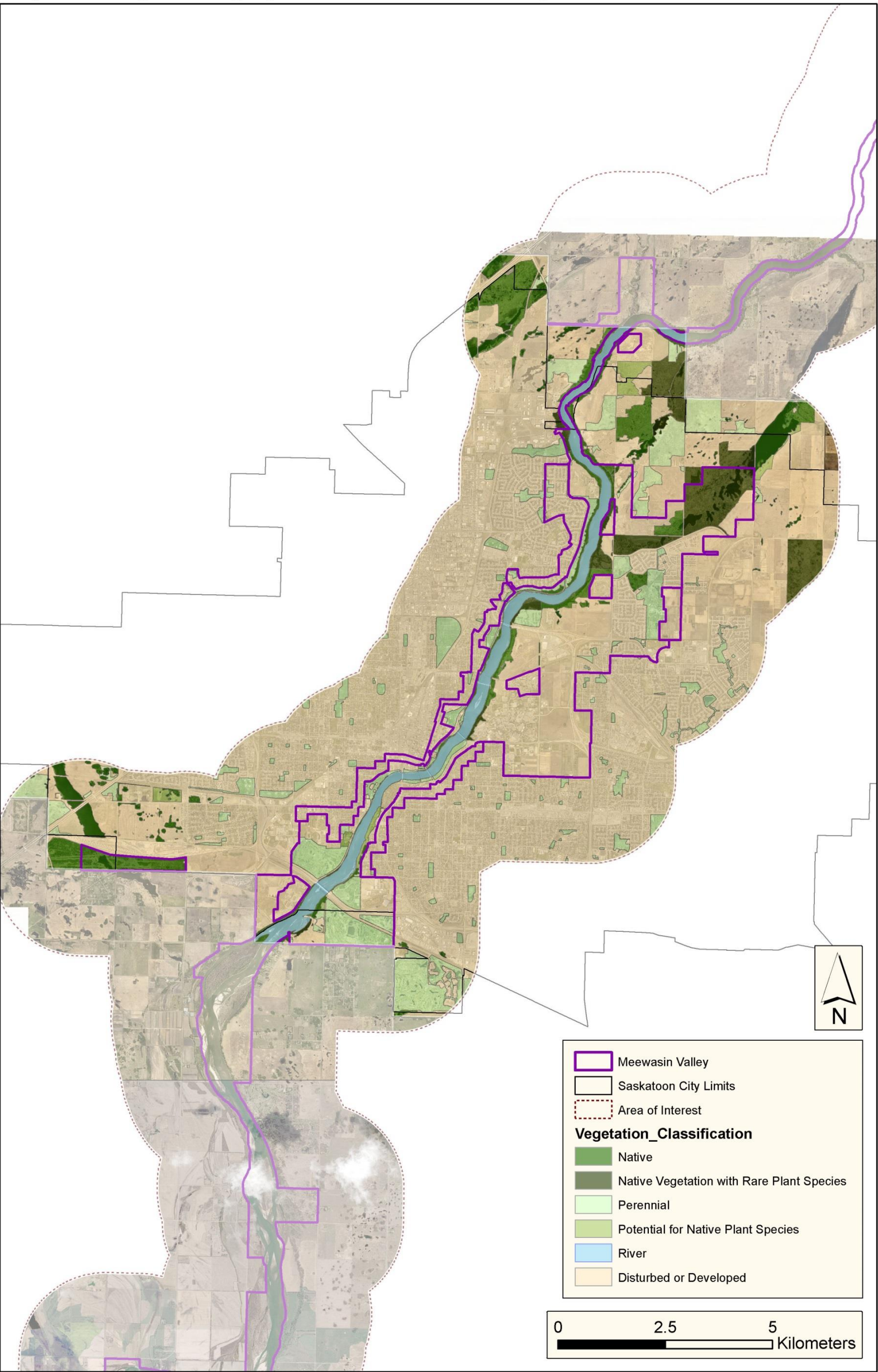
Map 6. Ecological Integrity - South Meewasin Valley



September 25, 2016 Meewasin Valley Authority Projection: NAD 1983 CSRS UTM Zone 13N
Aerial Imagery Courtesy of the City of Saskatoon and the Saskatchewan Geospatial Imagery Collaborative

Meewasin

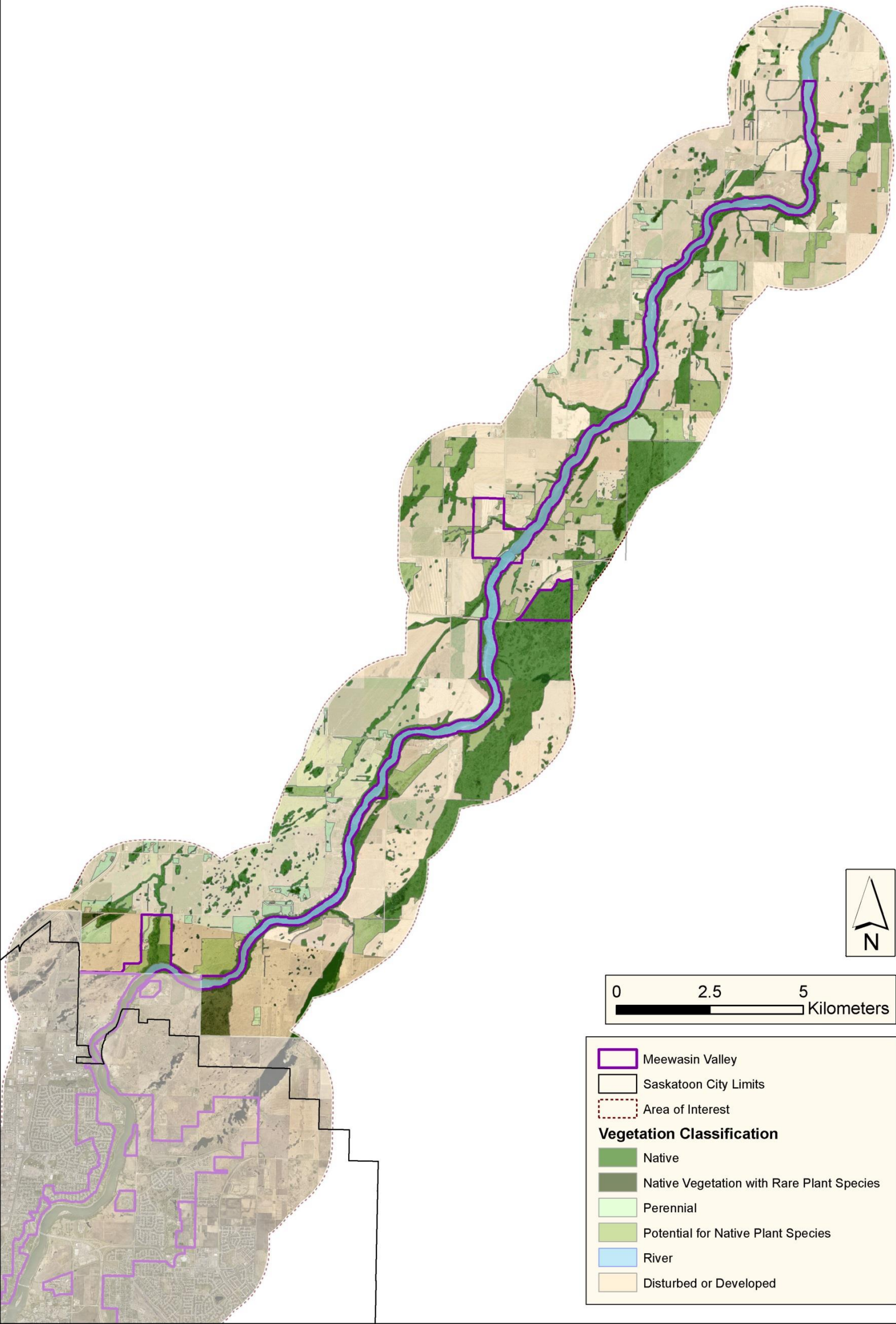
Map 7. Ecological Integrity - Central Meewasin Valley



September 25, 2016 Meewasin Valley Authority Projection: NAD 1983 CSRS UTM Zone 13N
Aerial Imagery Courtesy of the City of Saskatoon and the Saskatchewan Geospatial Imagery Collaborative

Meewasin

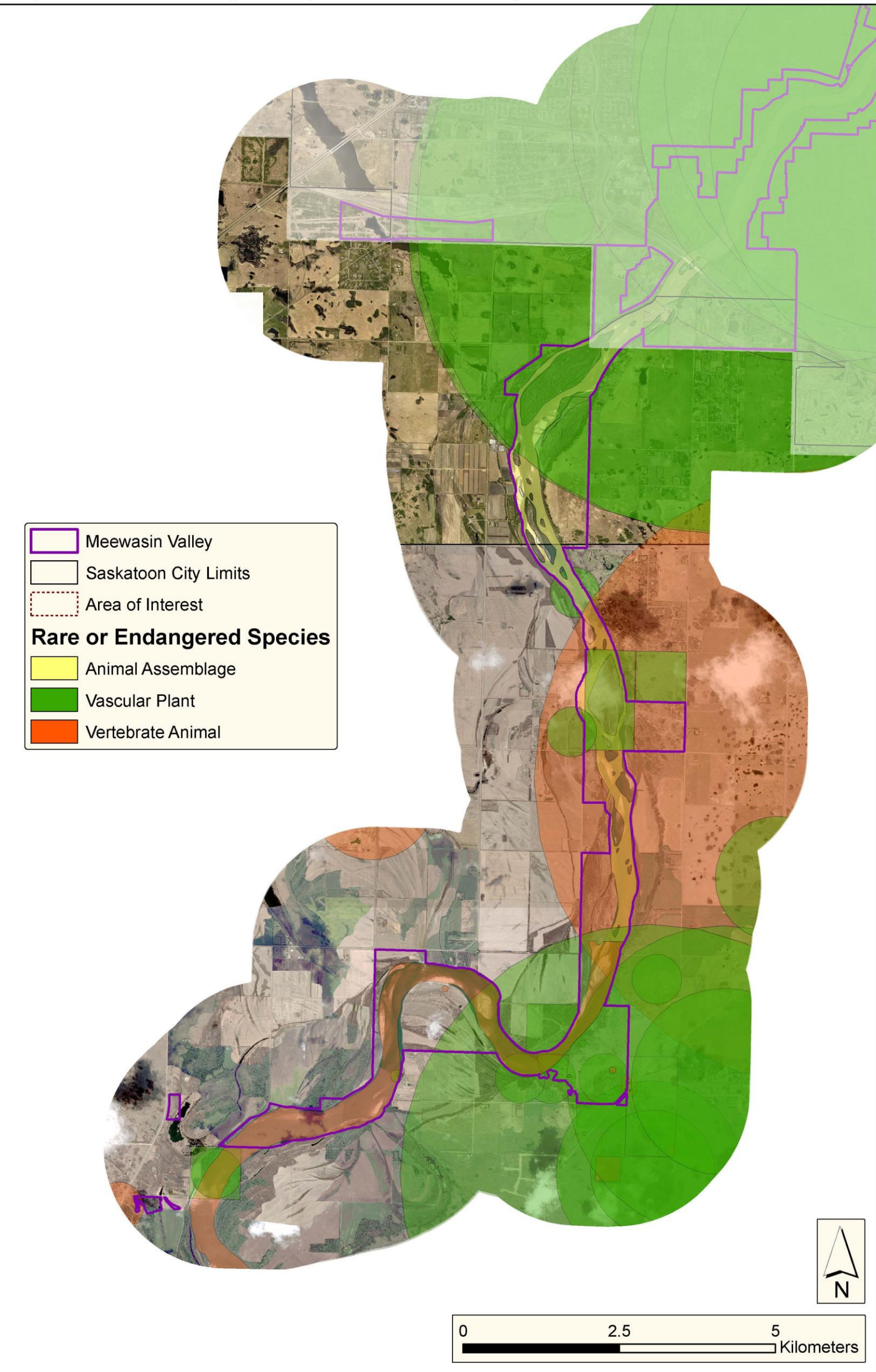
Map 8. Ecological Integrity - North Meewasin Valley



September 25, 2016 Meewasin Valley Authority Projection: NAD 1983 CSRS UTM Zone 13N
Aerial Imagery Courtesy of the City of Saskatoon and the Saskatchewan Geospatial Imagery Collaborative

Meewasin

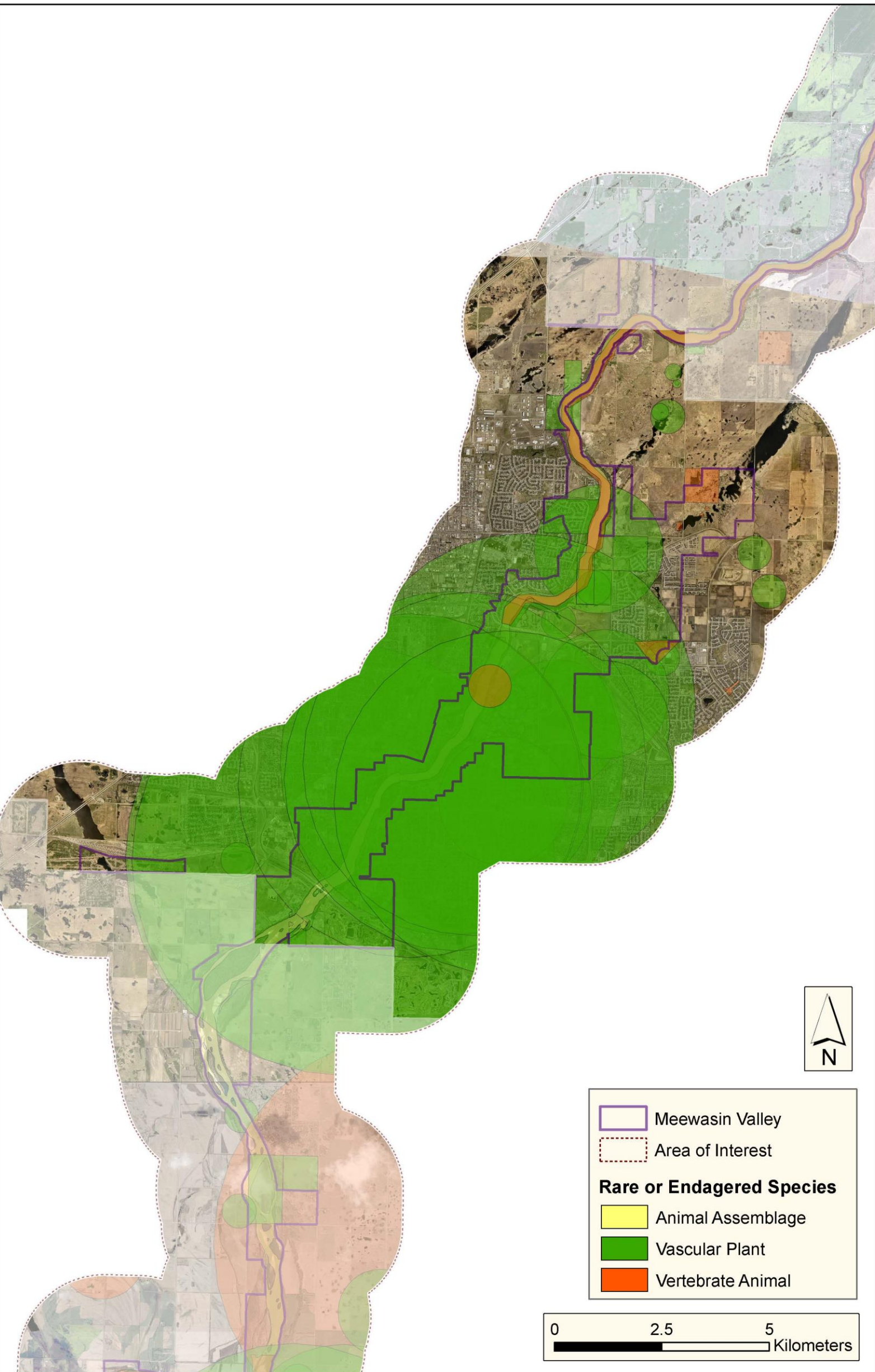
Map 9. Rare or Endangered Species - South Valley



September 25, 2016 Meewasin Valley Authority
Projection: NAD 1983 CSRS UTM Zone 13N Source: Data from SK Conservation Data Centre (2012)

Meewasin

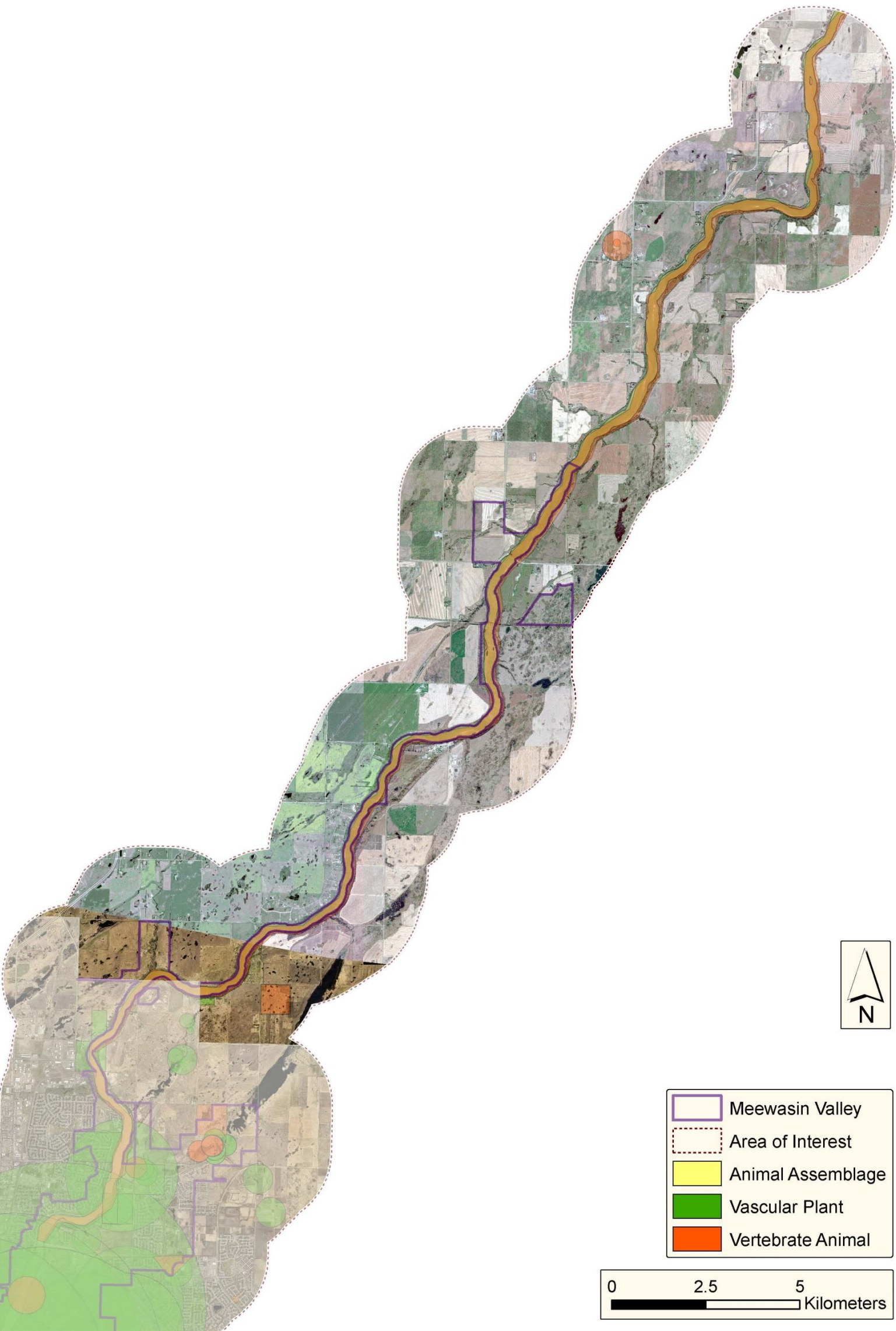
Map 10. Rare or Endangered Species - Central Meewasin Valley



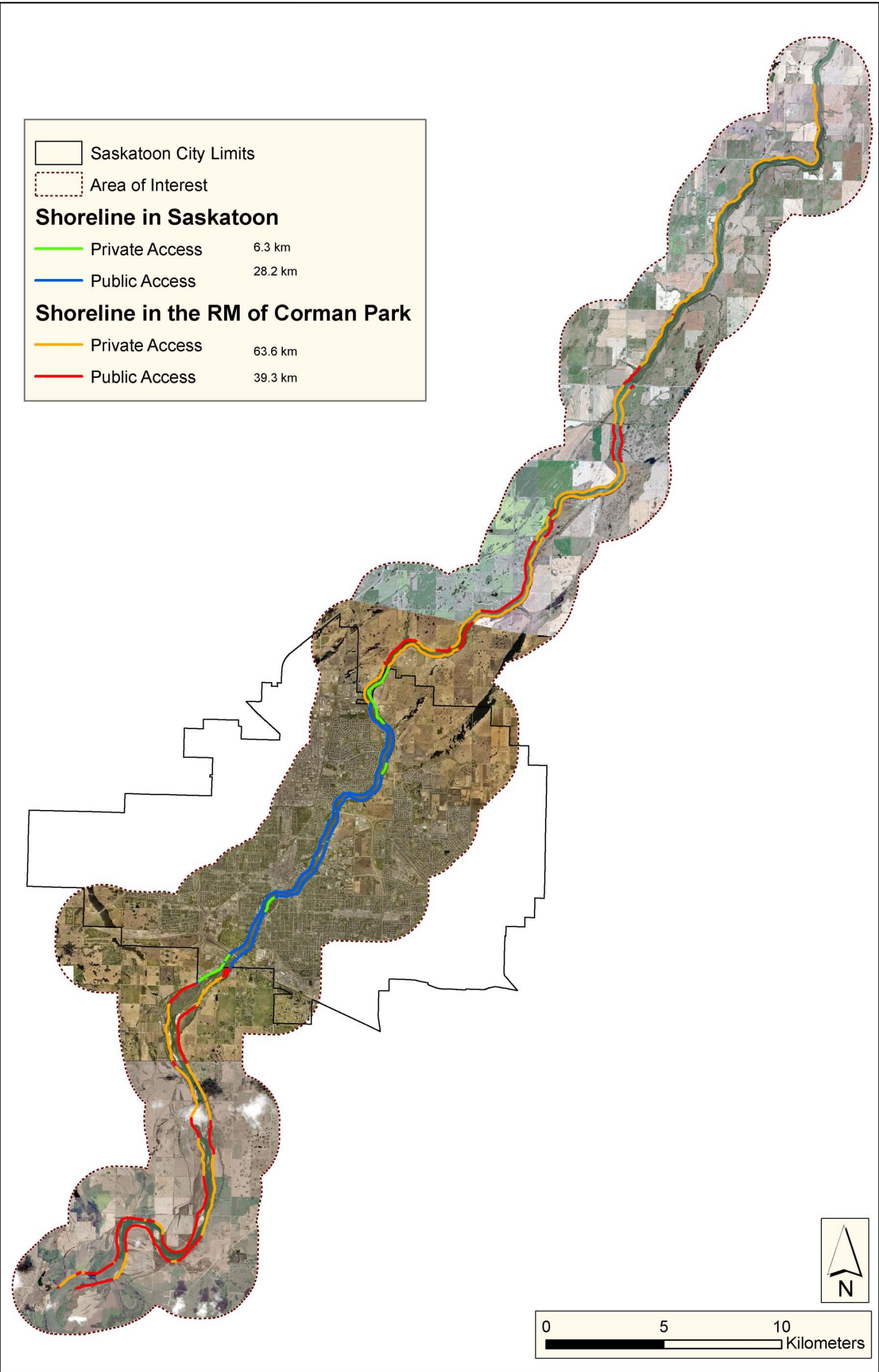
September 25, 2016 Meewasin Valley Authority
Projection: NAD 1983 CSRS UTM Zone 13N Source: Data from SK Conservation Data Centre (2012)

Meewasin

Map 11. Rare or Endangered Species - North Meewasin Valley



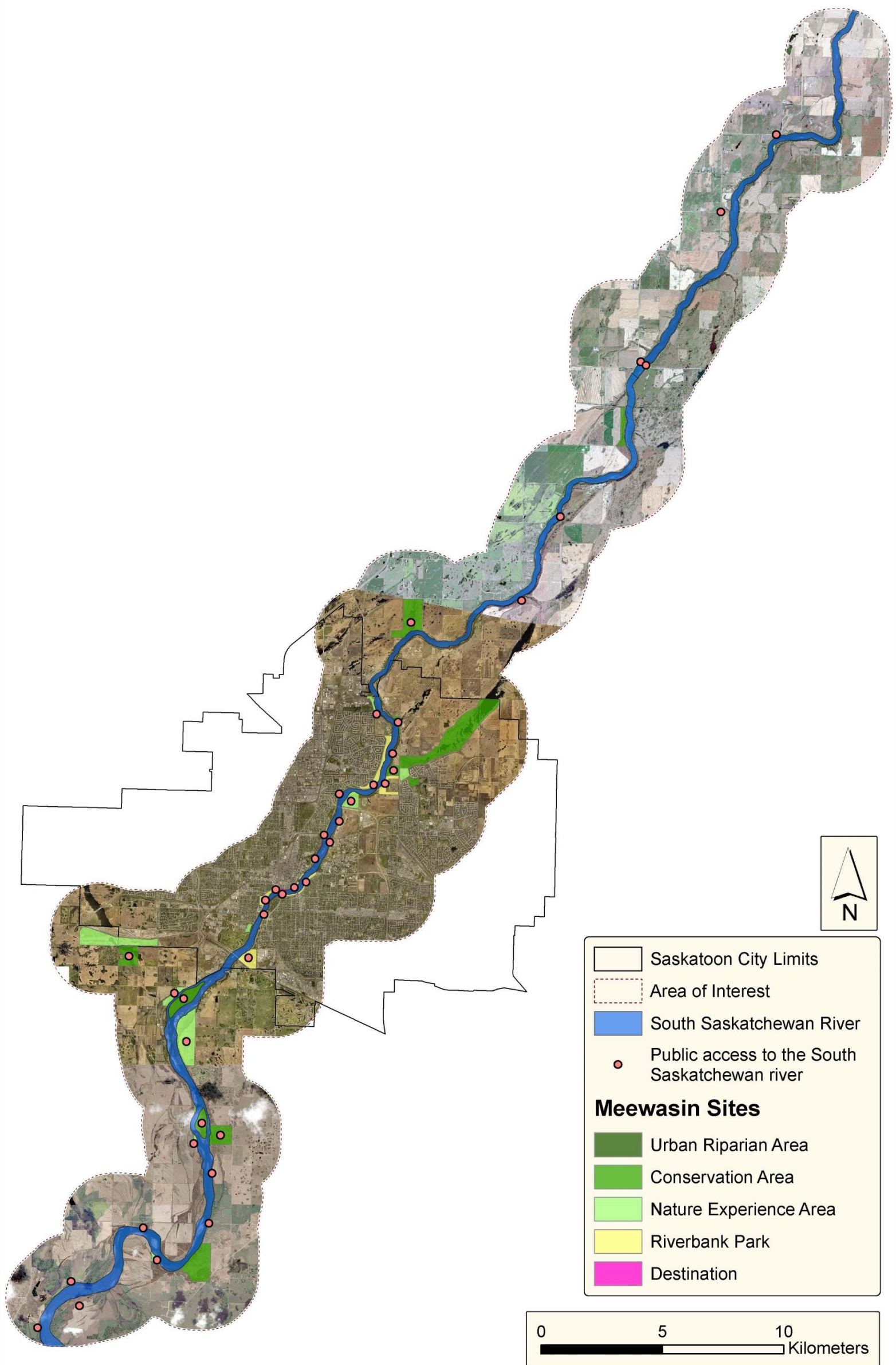
Map 12. Shoreline Access Types



September 25, 2016 Meewasin Valley Authority Projection: NAD 1983 CSRS UTM Zone 13N
Aerial Imagery Courtesy of the City of Saskatoon and the Saskatchewan Geospatial Imagery Collaborative



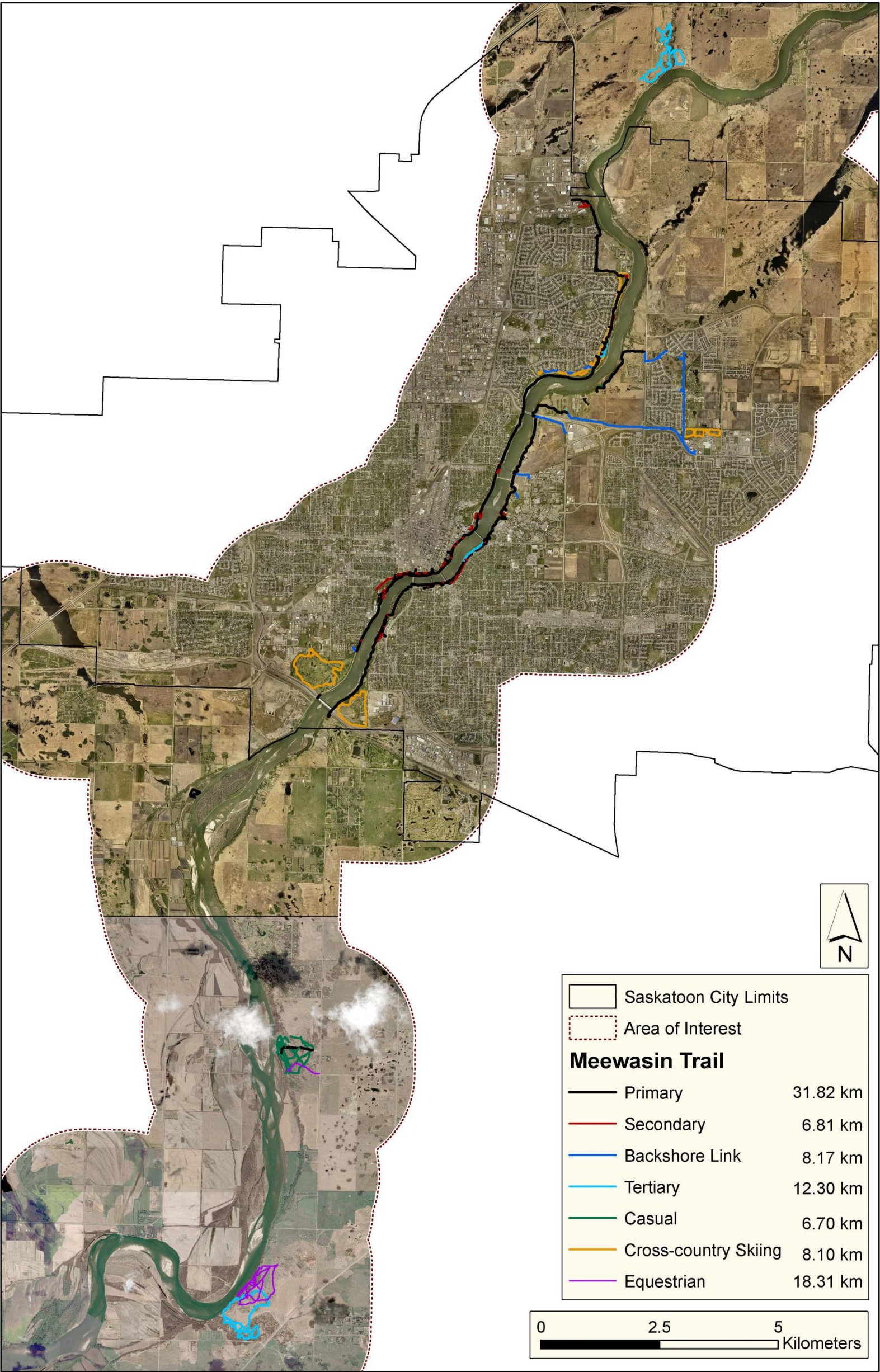
Map 13. Public Access Areas and Meewasin Sites



September 25, 2016 Meewasin Valley Authority Projection: NAD 1983 CSRS UTM Zone 13N
Aerial Imagery Courtesy of the City of Saskatoon and the Saskatchewan Geospatial Imagery Collaborative

Meewasin

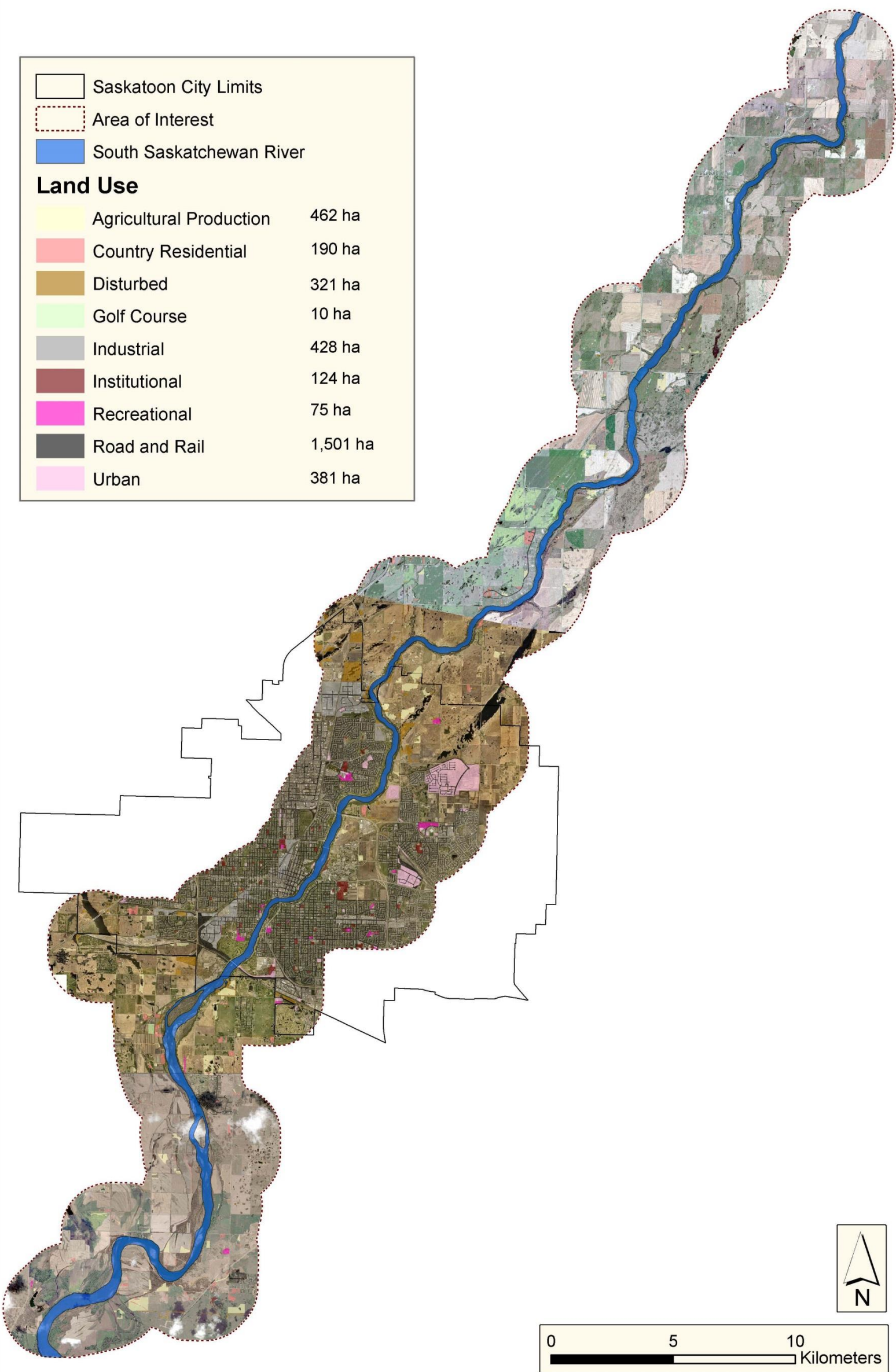
Map 14. Meewasin Trail



September 25, 2016 Meewasin Valley Authority
Projection: NAD 1983 CSRS UTM Zone 13N Source: Data from Meewasin Trail Study (2014)



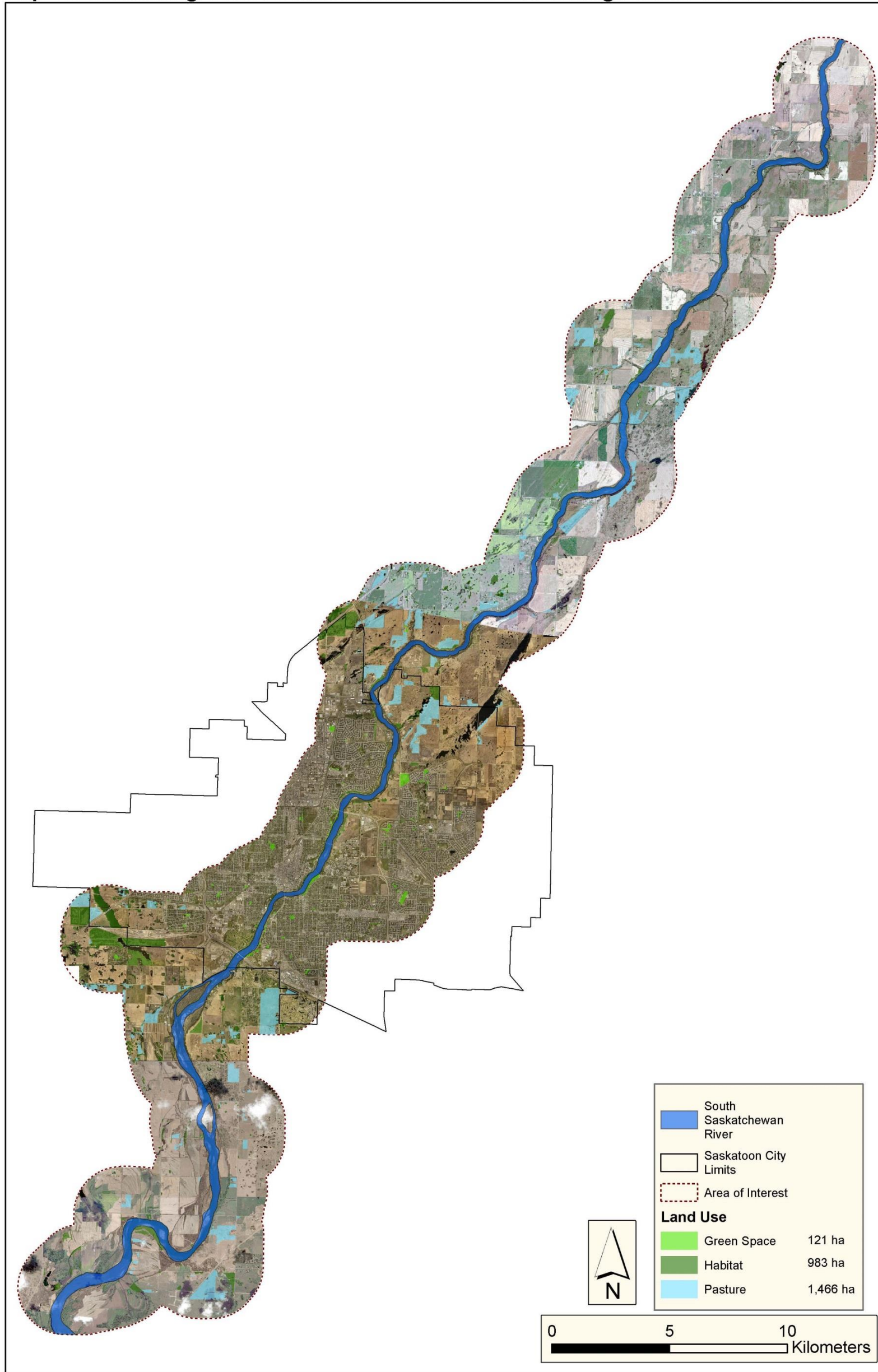
Map 15. Encroaching Development - Land Use Change from 2009 to 2013



September 25, 2016 Meewasin Valley Authority Projection: NAD 1983 CSRS UTM Zone 13N
Aerial Imagery Courtesy of the City of Saskatoon and the Saskatchewan Geospatial Imagery Collaborative

Meewasin

Map 16. Increasing Conservation Values - Land Use Change from 2009 to 2013



September 25, 2016 Meewasin Valley Authority Projection: NAD 1983 CSRS UTM Zone 13N
Aerial Imagery Courtesy of the City of Saskatoon and the Saskatchewan Geospatial Imagery Collaborative



