Meewasin Valley-wide Resource Management Plan

2017 - 2027

Meewasin

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Meewasin Valley Authority

Created in 1979 by an Act of the Province of Saskatchewan, *the Meewasin Valley Authority Act*, Meewasin is a conservation agency dedicated to conserving the cultural and natural resources of the South Saskatchewan River Valley. It is the means by which the three participating parties (City of Saskatoon, Government of Saskatchewan, and University of Saskatchewan) have chosen to best manage the Meewasin Valley in the South Saskatchewan River Basin. The creation of Meewasin is based on the concept that the partners working together through a single agency – Meewasin – can accomplish more than they could individually.

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Acknowledgements

Meewasin respectfully acknowledges that its jurisdiction is located on Treaty 6 Territory and the Homeland of the Métis.

Meewasin acknowledges the valuable advice and ideas provided by the Meewasin Valley-wide Resource Management Plan Steering Committee, Technical Advisory Committee and stakeholders.

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Over 60 people attended two workshops in Saskatoon and contributed their expertise and on the ground experience to the development of the plan. During the writing process other experts were consulted for data or further refinement including:

- Michelle Hanson, Quaternary Research Geologist, Saskatchewan Geological Survey, Ministry of Economy
- Jennifer Merkowsky, Senior Fisheries Ecologist, Fisheries Management Section, Fisheries Unit, Fish Wildlife and Lands Branch, Ministry of Environment
- Pam Minifie, Environmental and Municipal Management Services Division, Water Security Agency
- Jennifer Thompson, Archaeologist/GIS Specialist, Heritage Conservation Branch, Ministry of Parks, Culture and Sport
- Mike Watmough, Canadian Wildlife Service, Environment and Climate Change Canada

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Canada

NATURE CONSERVANCY CANADA | CONSERVATION DE LA NATURE CANADA

Glossary and Acronyms

Biodiversity (biological diversity) – The variety of life in the world, an ecosystem or habitat.

Conservation Target (Biodiversity Target) – An element of biodiversity, which can be a species, habitat, or ecological system that the project has chosen to focus on. All targets should collectively represent the biodiversity of the project (Conservation Measures Partnership 2013).

COSEWIC – Committee on the Status of Endangered Wildlife in Canada.

Key Ecological Attributes (KEAs) – "Aspect of a target's biology or ecology that if present, define a healthy target and if missing or altered, would lead o the outright loss or extreme degradation of that target over time" (Conservation Measures Partnership 2013).

Hydro-riparian Areas – Rivers and creeks (flowing water bodies) from the stream bed up to top of bank including the riparian vegetation.

Land Trust – an organization (non-profit) that conserves land through land or conservation easement acquisition or by stewardship of the land.

Miradi – adaptive management software for conservation projects (Miradi 2016).

Meewasin RMP – abbreviated Meewasin Valley-wide Resource Management Plan.

NACP – abbreviated Natural Area Conservation Plan, the plans created by the Nature Conservancy of Canada. Similar to Meewasin's Resource Management Plans.

NCC – abbreviated Nature Conservancy of Canada. Most often referring to the Nature Conservancy of Canada – Saskatchewan Region in this document.

RMP – abbreviated Resource Management Plan, a plan to inform and guide conservation activities within the Meewasin Valley.

Open Standards – a model for conservation planning that "brings together common concepts, approaches, and terminology in conservation project design, management, and monitoring in order to help practitioners improve the practice of conservation" (Conservation Measures Partnership 2013).

Planning Area (project scope) – Meewasin's jurisdiction (within the City of Saskatoon and R.M. of Corman Park) with a 15 kilometer buffer applied.

Post-glacial channel scar (swale) – a remnant of glaciation consisting of glacial features such as ridges, glacial till and a series of wetlands (and high water table) resulting from the glacial meltwater channelizing to form an ancient river.

Resource Management (natural resource management) – is the management of land, water, air and species to achieve scenarios that are the most beneficial for the ecology of the region.

R.M. – Rural Municipality.

SARA – *Species At Risk Act*.

Swale – See Post-glacial channel scar.

Executive Summary

Project Team and Purpose of Report

This project was completed in partnership with the Nature Conservancy of Canada – Saskatchewan Region (NCC). Meewasin's Vision Document (2014-2024) identified the need for a comprehensive resource management plan for the Meewasin Valley. Funding was provided by Environment and Climate Change Canada's Habitat Stewardship Program – Prevention Stream grant. During the early planning stages, it became apparent that the Nature Conservancy of Canada's Saskatoon Prairie Natural Areas Conservation Plan was due for an update from its original 2008 version. A partnership was formed and this project utilized The Nature Conservancy's Conservation Planning Model. Meewasin went through the process with NCC including stakeholder workshops, research, writing and presentations. Key differences in the organizations has lead to two plans: 1) the Nature Conservancy of Canada's Saskatoon Prairie Natural Area Conservation Plan, which encompasses a large scope that uses ecodistricts as boundaries and within which lies Meewasin's project scope; and 2) the Meewasin Valley-wide Resource Management Plan whose scope of a 15 kilometer buffer of Meewasin's jurisdiction is much smaller and more urban than NCC's plan. Not only are the scopes different, but each agency has a different mission and mandate and so the plans were focused to each agency's purpose.

Meewasin intends to use this as a living document with updates captured as new information is received including six month data reviews and an annual update. The annual update will include a summary report on the work plan, detailed budgets, monitoring plan and actions check list, and updates to the viability assessment including any new data or status changes. This annual report will be presented to the Technical Advisory Committee and Meewasin's Conservation Advisory Committee and communicated to the public.

Methodology

Open Standards for the Practice of Conservation

The Open Standards for the Practice of Conservation were developed to standardize conservation project management. Standardization of conservation terms, definitions and categories of project components like strategies, targets, or threats allows projects to be more consistent, easily understood by all those involved (current and future project planners) and provide case studies for others in conservation planning. Many organizations have adopted the Open Standards model for conservation planning including The Nature Conservancy (U.S), the Nature Conservancy of Canada, World Wildlife Fund, the U.S. Fish and Wildlife Service, and Conservation International (CMP). The Open Standards model is continually improving and gives guidance to project planners in all stages of planning, no matter the scale of the plan.

The Open Standards model follows a five step process: 1) conceptualize; 2) plan actions and monitoring; 3) implement actions and monitoring; 4) analyze, use, adapt; and 5) capture and share learning (Conservation Measures Partnership 2013).

Figure 1: The Open Standards model follows a five step process in guiding conservation planning practitioners (Miradi 2016)

Miradi

"Miradi – a Swahili word meaning "project" or "goal" – is a user friendly software program that allows nature conservation practitioners to design, manage, monitor, and learn from their projects to more effectively meeting their conservation goals, following a process laid out in the Open Standards for the Practice of Conservation" (Miradi 2016). Miradi is the software program that the Nature Conservancy of Canada uses, and that Meewasin is now using, to go through the Open Standards steps to complete the conservation plan. Miradi allows us to visually organize the conceptual model and threat and result chains. The real value of Miradi is that it allows an organization to input information (as little or comprehensive as they choose) and update their plans at any stage in the process.

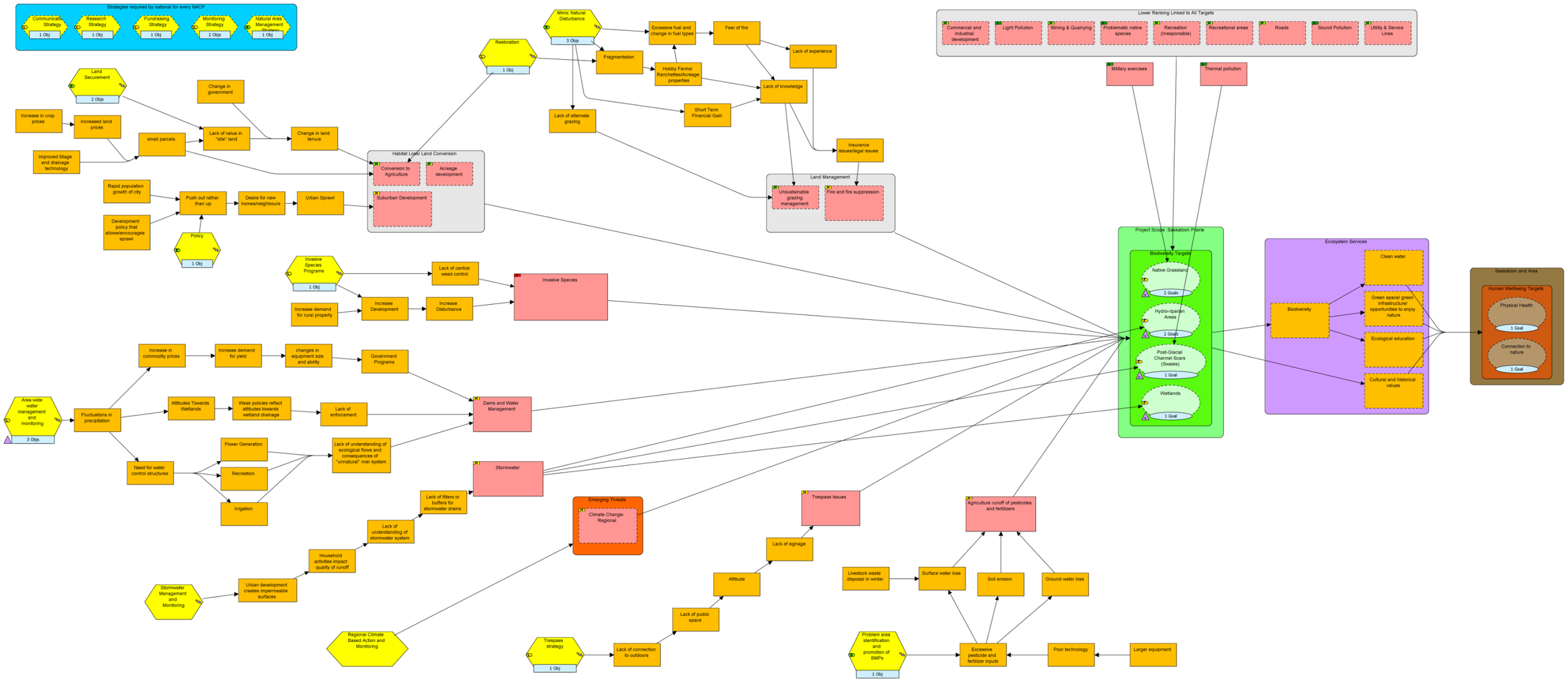

Figure 2: Conceptual Model for the Meewasin Valley-wide RMP as Depicted in Miradi

The conceptual model is used as a sort of mind map to explore the relationships between all of the components of the conservation planning process. Each box is able to be opened and contains more information including summaries, actions, objectives, indicators, etc. within the Miradi software. This is another way of thinking about the project and is included here as an example of Miradi's capabilities. These relationships are explained in more detail throughout the Meewasin Valley-wide Resource Management Plan.

Workshops and Stakeholder Input

Over 60 different people attended two full-day workshops led by Meewasin and the Nature Conservancy of Canada. Representatives from over 30 agencies were invited to attend to help determine the direction of the plans. Workshops were held in the fall of 2015: Workshop 1 at Saskatoon Wildlife Federation (October 23) and Workshop 2 at Wanuskewin Heritage Park (November 27). Workshop 1 focused on developing a list of conservation targets, key ecological features and indicators of those targets and threats to those targets. Workshop 2 reviewed the work done at the first workshop and built upon it, identifying top threats, goals, opportunities and constraints of conservation in the region, the conservation activities already in play, intervention points, and gaps (both in knowledge and work done by conservation groups).

Findings from the workshops were discussed in monthly meetings with the core team leaders who focused target definitions, refined threat rankings and expanded suggested activities. Both a technical advisory group and a steering committee reviewed the findings periodically and provided suggestions and comments that improved clarity.

See Appendix B for "Stakeholders, Conservation Agencies, and Opportunities in Partnership"

Meewasin's Vision

The Meewasin Valley Authority exists 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 has and will continue to apply the following five fundamental principles in planning the Valley:

- Valley's resources are accessible to everyone;
- Conserve natural and heritage resources;
- Recreation and development balanced with conservation;
- Diverse activities for a varied and changing demographic; and
- Public participation in decision making.

Vision Statement for the Meewasin Valley-wide Resource Management Plan

Meewasin is the premier conservation agency and land trust in the region. Meewasin is a leader in the active conservation and enhancement of biodiversity, native species, habitats, and ecosystems through a strong and integrated resource management program. Awareness is created about the physical and mental health benefits provided through the conservation of these natural areas with increased opportunities for the citizens and visitors of the Meewasin Valley to connect with nature. Meewasin successfully partners with all jurisdictions, agencies, non-government organizations, volunteer groups, landowners, and the general public through a shared vision and united goal to enhance and maintain these ecologically connected landscapes of the region. Meewasin's resource management program is regionally, provincially, nationally and internationally recognized for its success in conserving the Meewasin Valley.

Goals for the Plan

Table 1: Future Status Goals of the Meewasin Valley-wide Resource Management Plan on Targets

Goal
Awareness and education of conservation targets, threats and resource management activities are increased within the Saskatoon Region and provincially through successful completion of outreach activities.
Continue to ensure proposed developments are appropriately integrated into the Meewasin Valley by balancing human use and conservation through the *Meewasin Valley Authority Act's* Development Review Process.
Ecological health of conservation targets on Meewasin Conservation sites have improved by 20%, as determined through ecological health assessments, with progress underway in the Meewasin Conservation Zone.
Invasive species on Meewasin Conservation sites have significant reduction in cover and density (percent reduction depending on invasive species type), with progress underway in the Meewasin Conservation Zone.
Natural disturbance regimes including fire and grazing are employed on key Meewasin Conservation sites with a minimal goal of 15% disturbance per site per year.
Public access to nature and conservation of biodiversity habitat is improved with the addition of Conservation sites (5 additional sites, one site expanded) and an expanded Meewasin Conservation Zone.
Restoration of ecological integrity on Meewasin Conservation sites is continued with the development and implementation of site-specific restoration plans to address historically degraded conservation targets.

Summary of Targets and Threats

See section 2.3 for the full threat analysis.

Table 2: Threats to Conservation Targets within the Meewasin Valley-wide Resource Management Plan Scope

Threats	Conservation Targets			
	Hydro-riparian Areas	Post-Glacial Channel Scars (Swales)	Native Grassland	Wetlands
Acreage development	✓	✓	✓	✓
Climate Change-Regional	✓	✓	✓	✓
Commercial and industrial development	✓	✓	✓	✓
Conversion to Agriculture	✓	✓	✓	✓
Dams and Water Management	✓	✓	✓	✓
Fire and fire suppression	✓	✓	✓	✓
Gathering of Plants	✓	✓	✓	✓
Invasive Species	✓	✓	✓	✓
Light Pollution	✓	✓	✓	✓
Military exercises	✓		✓	
Mining & Quarrying	✓	✓	✓	✓
Problematic native species	✓	✓	✓	✓
Recreation (Irresponsible)	✓	✓	✓	✓
Recreational areas	✓	✓	✓	✓
Roads	✓	✓	✓	✓
Runoff of pesticides and fertilizers	✓	✓	✓	✓
Sound Pollution	✓	✓	✓	✓
Stormwater	✓	✓		✓
Suburban Development	✓	✓	✓	✓
Thermal pollution	✓	✓		
Trespass Issues	✓	✓	✓	✓
Urban Riverbank Slumping and Slope Instability	✓			
Unsustainable grazing management	✓	✓	✓	✓
Utility & Service Lines	✓	✓	✓	✓

1. Background

1.1 Ecological Context

1.1.1 Location and Size

Meewasin's Valley-wide Resource Management Plan is based on a 15 kilometre buffer of Meewasin's jurisdiction. Meewasin's jurisdiction is approximately 6,700 hectares, and with the 15 kilometre buffer, this brings the area of the planning scope to 294,184 hectares. Meewasin's jurisdiction is predominantly urban, centered in the City of Saskatoon and stretching outwards into the Rural Municipality of Corman Park.

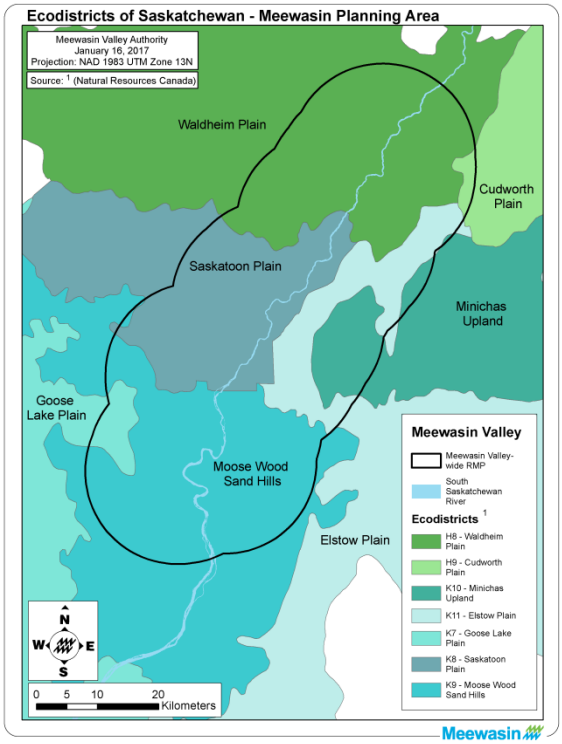

Figure 3: Ecodistricts of the planning area

The planning area is located within the Prairie ecozone and is dominated by glacial land formations. The Aspen Parkland ecoregion and the Moist Mixed Grassland ecoregion are located within the Prairie ecozone (Padbury et. al. 1998). The Aspen Parkland region, a mosaic of fescue grasslands and aspen groves, contains the Cudworth Plain and Waldheim Plain ecodistricts. The Moist Mixed Grassland, characterized by short and mid-grasses in mixed stands, contains the Elstow Plain, Goose Lake Plain, Minichinas Uplands, Moose Wood Sand Hills and Saskatoon Plain ecodistricts.

The planning area includes several ecodistricts (Goose Lake Plain, Saskatoon Plain) that are nearly level or gently undulating and glacial lacustrine deposits in origin (Padbury et. al. 1998). The majority of remaining native vegetation is found on the slopes of drainages. Some of the ecodistricts (Elstow Plain) are relatively level with some morainal landscape creating hummocky relief, where native vegetation may be found on the steepest of slopes or where the soil is too rocky for cultivation. These areas also contain numerous wetlands ringed by willows and sedges. The ecodistricts within the planning area with the most topographical relief include the Moose Wood Sand Hills and Minichinas Uplands (Padbury et. al. 1998). The majority of the native vegetation is found on the pastures and rangelands of the stabilized sand dunes of the Moose Wood Sand Hills with a small amount of native vegetation found on the steeper parts of the morainal upland of the Minichinas Upland. Other large blocks of native vegetation are found on community pastures in various ecodistricts; generally on the sandiest and, occasionally, very rocky soils. Throughout the planning area, ecodistricts are often described as having aspen where the water table is close to the surface (Padbury et. al. 1998).

See Appendix 1: Map 3

1.1.2 Ecological Significance

Figure 4: Blue Grama Grass (*Bouteloua gracilis*) with Dotted Blazing Star (*Liatris punctata*)

According to Meewasin's "State of the Valley 2013 Assessment Report" the land within the Meewasin jurisdiction (with a 2 kilometre buffer) has lost 2.9% of habitat or potential for habitat lands over the past 15 years, while developed or disturbed lands have increased by 1.7%. Grasslands are the "world's most endangered ecosystem" (Kraus 2016). Grassland ecosystems represent 31-43% of the earth's terrestrial surface and have historically been one of the most productive and diverse terrestrial ecosystems (Gauthier and Reimer 2003). Human activity has modified these ecosystems to the point where all types of grasslands are now the most imperilled ecosystem on the planet (Gauthier and Reimer 2003). Native grasslands remain intact within this area only where soil types and slope steepness have limited agricultural development. With development pressure from increasing urbanization and demand for arable land increasing, natural habitats are being converted. Much of the large eolian deposits within the Moose Wood Sand Hills ecodistrict are vegetated with a mixed of native grasses and shrubs. These sandy soils have little value for arable agriculture, but are readily susceptible to development of acreages. To the north and east of Saskatoon, where the land is flatter and the soil texture finer, most of the easily cultivated land has been converted to arable agriculture; however, moraine deposits have limited cropping in some areas and remnant parcels of native habitat exist.

Within the planning area, a unique subset of Moist Mixed Prairie and Aspen Parkland called Fescue Prairie is considered to be one of the most threatened ecosystems in the Canadian Prairies (World Wildlife Fund 1988) and less than 5% of original Fescue Prairie in Saskatchewan remains (Grilz and Romo 1995). Fescue grasslands continue to disappear due to cultivation, tree encroachment and urban sprawl (Bailey and Anderson 1978). It has been suggested that Plains Rough Fescue (*Festuca altaica halli*) may be critically endangered (Lamb 2016). Remnant parcels of Fescue Prairie remain in the north and south of the planning area. The Conservation Blueprint for Canada's Prairies and Parklands (Riley *et al.* 2007) identified the grassland/shrubland and sand hills of the Moose Wood Sand Hills and Goose Lake Plain ecodistricts, the moraine plain of the Minichinas Upland ecodistrict, and the glacial fluvial deposits of the Saskatoon Plains ecodistrict as ecologically significant. The Conservation Blueprint evaluated ecological systems on the landscape based on criteria of condition, diversity, ecological function, and special features. Those highest scoring ecological systems represent the best remaining ecological systems, and together with protected areas and conservation lands make the Conservation Blueprint portfolio. The Moose Wood Sand Hills ecodistrict has over 62% remaining natural cover and 41% of the ecodistrict lies within the Meewasin Valley-wide RMP scope (Riley *et al.* 2007). This ecodistrict has the highest percentage of natural cover in the Moist Mixed Grassland ecoregion of Saskatchewan. The sand hills south of Saskatoon were identified as one of the top ten scoring ecological systems for the entire Conservation Blueprint study area. Other ecodistricts of note in the planning area

include the Goose Lake Plain ecodistrict with 28% remaining native cover and the Minichinas Upland ecodistrict with 24% native cover. Other ecodistricts within the scope have between 22% and 13% native cover remaining.

Hydro-riparian areas, such as the South Saskatchewan River, provide significant ecological services to the surrounding ecosystems and value to humans in their role to provide clean water for drinking and recreation. According to the World Wildlife Fund, the South Saskatchewan River is one of the most threatened rivers in Canada, both in environmental flows (Swainson 2011) and overall health (World Wildlife Fund Canada 2016). “Environmental flows describe the quantity, timing and quality of water flows required to sustain freshwater and estuarine ecosystems and the human livelihoods and well-being that depend on these ecosystems” and it is with this definition that the South Saskatchewan River has rated as poor in environmental flows (Swainson 2011). Overall health of the Lower South Saskatchewan River watershed (within Saskatchewan) rated as very poor based on a set of four metrics: 1) water flow (very poor), 2) water quality (fair), 3) fish (data deficient) and 4) benthic invertebrates (fair) (World Wildlife Fund Canada 2015).

Figure 5: Children learning about the importance of swales and wetlands at a Meewasin Ecoblitz (2012)

Wetlands in Saskatchewan are lost at an alarming rate of 11.3 hectares (28 acres) per day (Hanbidge 2016). This has resulted in the total loss of 250,000 hectares of wetlands across the prairie pothole region of Saskatchewan in the last 50 years (Hanbidge 2016). “In some areas of the province, 90 per cent of wetland habitat is gone” (Ducks Unlimited Canada – Saskatchewan 2016). Remaining wetlands cover 1,757,514 hectares (Hanbidge 2016). This devastating blow is even more notable when we consider the benefits that wetlands provide including habitat for breeding and nesting birds, flood prevention (captures surface runoff), filtration of pollutants, and sources of water for wildlife. Post-glacial channels scars are equally significant, if not more so, as they are a complex of both native grasslands and wetlands and are somewhat rare in their occurrence.

Table 3: Ecodistricts within the Meewasin Valley-wide RMP scope and estimated natural areas (%) remaining

Ecodistrict	Total Area Within Scope (ha)	Total Area of Ecodistrict (ha)	% of Ecodistrict in Meewasin RMP	Estimated Natural Cover Left in Ecodistrict (%)	Estimated Natural Area Within Scope (ha)	Estimated Ecodistrict Natural Cover (%) in Meewasin RMP Scope
Moose Wood Sand Hills (K9)	89,508	216,067	41.4%	62.0%	55,495	18.9%
Waldheim Plain (H8)	81,155	412,250	19.7%	19.0%	15,419	5.2%
Saskatoon Plain (K8)	63,930	107,424	59.5%	22.0%	14,065	4.8%
Elstow Plain (K11)	32,435	482,448	6.7%	13.0%	4,216	1.4%
Minichinas Uplands (K10)	17,692	97,021	18.2%	24.0%	4,246	1.4%
Goose Lake Plain (K7)	7,113	511,442	1.4%	28.0%	1,992	0.7%
Cudworth Plain (H9)	2,351	232,563	1.0%	19.0%	447	0.2%
Total	294,184	2,059,215			95,880	32.6%

1.2 Key Conservation Data

1.2.1 Land Cover

Data for the ecosystem summary of land cover were obtained from Natural Resources Canada (Natural Resources Canada, 2009a). The data were clipped to the planning area and appropriate land cover types were dissolved into fewer categories (e.g. all the forest types combined into one treed cover category), reducing 17 land cover types to 10. The land cover type “Exposed” was added to “Barren/non-veg” as the ecological difference between the two was insignificant for the purposes of the plan. The land cover types “coniferous forest”, “deciduous forest”, “deciduous forest: dense”, “deciduous forest: open”, and “mixed forest: open” were combined into one land cover type called “treed cover”. Based on the location and observations from NCC, it seemed unlikely that there were significant differences between the various treed cover types to warrant separate classes. The “Wetland” and “Wetland Herb” cover types were combined into “Wetland” because the ecological difference between the two was insignificant for the purposes of the plan. The final step was to calculate the area for each new landcover category.

See Appendix A Map 4

Table 4: Land Cover Types within the Planning Area

Land-cover type	Area (ha)	Estimated Proportion of Meewasin's Planning Area
Annual Cropland	139,153.1	47.3%
Barren/Non-vegetated/Exposed	1,033.8	0.4%
Treed Cover	8,124.3	2.8%
Developed	12,776.5	4.3%
Grassland	33,565.4	11.4%
Herb	9,854.6	3.3%
Perennial Cropland & Pasture	71,213.6	24.2%
Shrubs	11,311.3	3.8%
Water	4,204.6	1.4%
Wetland	2,946.8	1.0%
Total	**294,184.0**	**100.0%**

1.2.2 Significant Species and Communities

Data for significant species and communities were obtained from a combination of observations recorded by staff, element occurrences provided by the Saskatchewan Conservation Data Centre (CDC) (Saskatchewan Conservation Data Centre, 2014), and outside experts. Species were sorted by COSEWIC status, species type, and common name. The COSEWIC status, G-rank, N-rank, S-rank, Provincial legal status and Federal legal status of each species were noted along with any special concerns. Of the total 114 species listed as significant in the area there are 2 amphibians, 31 birds, 1 fish, 2 invertebrates, 5 mammals, and 73 vascular plants. Within the framework of COSEWIC there are 6 species listed as endangered, 12 threatened, 9 special concern, and 1 data deficient. Each species list was assigned to an associated target using the best available literature, external technical review committee, and internal expert review. All species were determined to be sufficiently represented with existing conservation targets.

Figure 6: Northern Leopard Frog (*Lithobates pipiens*) at Wilson Island in the South Saskatchewan River (2015)

See Appendix A Map 27

See Appendix C "Rare and Endangered Species"

1.2.3 Conservation Agencies and Opportunities

Within both Meewasin and the Nature Conservancy of Canada – Saskatchewan Region's planning scopes, there are a wide variety of other agencies carrying out work that benefits conservation in the region. Many of these agencies also hold land within the area.

Figure 7: Aerial view of the Meewasin Northeast Swale (2015)

The following is a list of agencies or stakeholders that hold land for the purpose of conservation within the region:

- Agriculture and Agri-food Canada;
- City of Saskatoon;
- Ducks Unlimited Canada;
- Department of National Defense;
- Environment and Climate Change Canada, Canadian Wildlife Services;
- Indigenous lands and communities;
- Meewasin Valley Authority;
- Ministry of Agriculture;
- Ministry of Environment;
- Ministry of Parks, Culture and Sport;
- Private landowners holding conservation easements;
- Rural municipalities;
- Saskatchewan Wildlife Federation and Saskatoon Wildlife Federation;
- University of Saskatchewan;
- Wanuskewin Heritage Park;
- Water Security Agency.

See Appendix 1 Map 5

2. Biodiversity Analysis

2.1 Conservation Targets

Four conservation targets were selected for the Meewasin Valley-wide Resource Management Plan and Saskatoon Prairie Natural Areas Conservation Plan including Native Grasslands, Hydro-riparian Areas, Post-Glacial Channel Scars (Swales), and Wetlands. Human well-being targets of Physical Health and Connection to Nature were also selected. The Prairie and Parklands Conservation Blueprint identifies native grasslands and wetlands as major components of the area. The ecosystem conservation targets identified occur at a variety of scopes, represent the major ecosystem types within the planning area and provide habitat for the nine G1-G3G4 species listed within our scope. Five conservation targets were proposed during the initial workshop, but following the second workshop, the proposed target of Northern Leopard Frogs was removed from the list of targets because it was deemed sufficiently nested within other targets. The proposed human well-being targets of urban green space and cultural heritage were introduced, but not explored during the workshops. These targets were subsequently reclassified as ecosystem services upon further research and new human well-being targets of Physical Health and Connection to Nature were proposed. The final targets were reviewed by Meewasin's Technical Advisory Committee who confirmed that they adequately represent the biodiversity of the area.

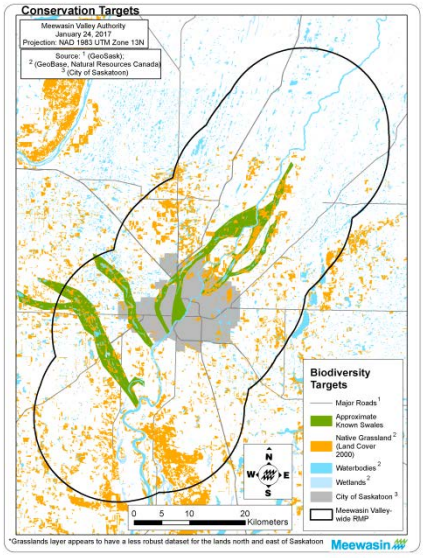

Figure 8: Map of Conservation Targets in the Meewasin planning area

See Appendix A Map 12

<u>Conservation Target: Native Grasslands</u>

Target definition: Includes moist-mixed prairie, fescue prairie, eolian grasslands, shrub-lands with a mixture of native species, and marginal aspen forests. Each of these ecosystems has a similar set of species and varies mainly by soil texture and landscape complexity. Target is spatially delineated as native vegetation (provincially significant wetlands, evaluated wetlands and unevaluated wetlands).

Figure 9: Prairie crocus (*Anemone patens*) at Wanuskewin Heritage Park (2015)

Habitat type: Grassland – Temperate; Shrubland – Temperate

Ecological justification: The grasslands of North America have become one of the most threatened ecosystems on the continent (Gauthier and Wiken 2003) as native grasslands continue to be under threat from practices such as conversion to cropland, development activity, and degradation. Native Grasslands support rare species of plants and birds and ecosystem functions within the area. There are many high quality representations in the project scope including large patches of Rudy-Rosedale community pasture [former Prairie Farm Rehabilitation Administration (PFRA) pasture], the Canadian Forces Base Dundurn military base and smaller parcels of private land where soil or landscape prevent or delay cultivation and conversion. These grasslands provide important connectivity to wide-ranging mammals and migrating birds. The approximately 40% loss of grassland bird species over the last 40 years is attributed to the "continuing loss and degradation of native prairie through expansion of cropland, overgrazing, and invasion by alien vegetation" (White 2013). There are opportunities within the area to improve connectivity of existing grasslands by prioritizing converted arable parcels for restoration.

Conservation Target: Hydro-riparian Areas

Target definition: Includes named and unnamed streams, some of which may be ephemeral, which feed into the South Saskatchewan River. The target includes the bed of the stream or river, the land and vegetation adjacent to the bed that is influenced by the water and some of the area that may have been influenced by water in the hydro-riparian zone, but has since been converted to agriculture or domestic forages. These damaged riparian areas may still provide habitat or corridors to species in need of conservation. The riparian vegetation includes important species and community types such as the Eastern Cottonwood (*Populus deltoides*) and Green Ash (*Fraxinus pennsylvanica*) forests. The elevation within the planning area is relatively constant; therefore the morphology of the target does not change dramatically throughout the area. Stream targets change in size depending on their distance from the river. The South Saskatchewan River flows from the south to north through the project's scope with size, shape and vegetation remaining relatively consistent. There is a significant barrier upstream (Gardiner Dam) and a smaller barrier (Saskatoon weir) within Saskatoon. Likewise, Opimihaw Creek and Brightwater Creek (two major streams within the planning area) are also dammed before entering the South Saskatchewan River. The target is spatially delineated as secondary, primary streams, and river as designated by the province's Water Security Agency.

Figure 10: White-tailed deer (*Odocoileus virginianus*) at Chief Whitecap Park (2014) – Photo courtesy of Kneale Quayle Photography

Habitat type: Rivers, Streams, Creeks – Permanent; Rivers, Streams, Creeks – Seasonal/ Intermittent / Irregular; Riparian Areas

Ecological justification: Creeks and rivers within the planning area provide valuable and unique connected habitat in an area that is dominated by fragmentation and land conversion. Other important functions include maintaining and developing shorelines, reducing erosion and sedimentation, and filtering nutrients and contaminants (LaForge 2004). In terrestrial environments, riparian areas are the most productive type of habitat benefiting the largest number of species (Abouguendia 2001). They provide variable plant community structure, high spatial variability and corridors for migrating animals. Riparian areas provide nesting and foraging sites for migratory songbirds and critical habitat for wildlife.

Conservation Target: Post-Glacial Channel Scars (Swales)

Target definition: Post-glacial channel scares (swales) are a mixture of native prairie and wetland that have resulted from the scouring of glacial drainage. Post-glacial channel scars are defined by the deposition of glacial till resulting in rocky ridges and a high water table producing wet depressions in the landscape. This combination has deterred cultivation. The native prairie portions of these swales may include moist-mixed prairie, fescue prairie, shrub-lands with a mixture of native species, and marginal aspen forests. Each of these ecosystems has a similar set of species and varies mainly by soil texture and landscape. The target has begun to be spatially delineated through a series of studies by the City of Saskatoon and Meewasin, as well as partnering organizations, with boundaries established for the Small Swale and the Meewasin Northeast Swale (within Saskatoon City Limits). Many of these swales have been significantly impacted by agriculture, industrial and urban development.

Figure 11: Meewasin Northeast Swale (2015)

Habitat type: Wetlands – Seasonal / Intermittent Freshwater Pools; Wetlands – Permanent Freshwater Pools, Grassland – Temperate; Shrubland – Temperate

Ecological justification: The swales in and around Saskatoon serve many of the same ecological functions as wetlands and native grasslands. They provide necessary habitat for a variety of plant and animal species and provide forage for many different grazers. Additionally, swales act as corridors to move wildlife to and from the South Saskatchewan River.

Conservation Target: Wetlands

Target definition: Most of the wetlands within the planning area are fresh water with some saline. Both permanent and seasonal wetlands are present within the scope, with seasonal wetlands being dependent upon yearly local precipitation and snow melt. Wetlands are dominated in some areas by cattails, sedges, and rushes with shrubs such as willows and snowberry in others. The difference may have more to do with landscape position and past disturbance than changes in climate or soil. Wetlands may exist in a matrix of cultivated fields, domestic pasture or hay land, and in native vegetation. Each of these ecosystems has a similar set of species and varies mainly by soil texture and landscape. The target is spatially delineated as native vegetation, provincially significant wetlands, evaluated wetlands and unevaluated wetlands.

Figure 12: Horned Grebes (*Podiceps auritus*)
Credit: May Haga

Habitat type: Wetlands – Seasonal / Intermittent Freshwater Pools; Wetlands – Permanent Freshwater Pools; Wetlands – Permanent Saline, Brackish, or Alkaline Pools; Wetlands – Seasonal/ Intermittent Saline, Brackish, or Alkaline Pools

Ecological justification: Wetlands provide important functions for the landscape including maintaining shorelines, reducing erosion and sedimentation, filtering nutrients and contaminants, and increasing biodiversity (LaForge 2004). Above ground vegetation in wetlands filters sediments and pollutants found in run-off. Root systems filter the underground movement of pesticide and fertilizer residues from cultivated uplands. Nutrients in runoff are often used in wetland plant growth and in some situations can slow the build-up of nutrients in the water and reduce the instances of dense algae blooms. Wetland areas typically have high biodiversity and support an array of terrestrial and aquatic species, notably waterfowl like ducks and geese. Southeast of Saskatoon, Ducks Unlimited Canada reports that there are as many as 23 breeding pairs per square kilometer in the Allan and Dana Hills and nearly 70% of North American's waterfowl migrate through Saskatchewan (Ducks Unlimited Canada – Saskatchewan 2016).

Human Well-being Target: Physical Health

Target definition: Human health depends on clean water and clean air provided by the ecosystem as represented by the targets identified within the planning area. "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (World Health Organization, 2016). According to the Conservation Measures Partnership, health is defined as including "being strong, feeling well, and having a healthy physical environment" (Conservation Measures Partnership, 2012).

Habitat type: All

Ecological justification: Meewasin and NCC support the provision of clean air and clean water for people by securing nature habitat and modified landscapes to conserve targets identified in the planning area. Conserving biodiversity targets provides ecosystem services such as carbon sequestration and pollination (providing and conserving pollinator habitat). Specific to human health, some of these ecological services include clean water, clean air and improvements to the physical health of the people within the planning area through passive recreation opportunities.

Figure 13: Passive recreation: cross country skiers at Beaver Creek Conservation Area

See Appendix A Map 14

<u>Human Well-being Target: Connection to Nature</u>

Target definition: Accessing nature to view and experience native vegetation, animals, and ecological processes is available for people of all genders, races, abilities, and economic backgrounds because of the ongoing conservation work carried out by Meewasin and NCC.

Figure 14: A Black-capped Chickadee (*Poecile atricapillus*) enjoys some bird seed from a visitor to Beaver Creek Conservation Area

Habitat type: All

Ecological justification: Meewasin and NCC provide access to native habitat for people to view plants and animals, and Meewasin provides numerous trails and interpretative opportunities by securing natural habitat and constructing green infrastructure (trails, picnic areas, naturalized parks, etc.) by conserving targets identified in the Meewasin Valley. Nature is important for both physical health (exercise, fresh air, Vitamin D) and mental health for all people. Conserving biodiversity targets provides ecosystem services of native habitat that improve human health by reducing nature deficit disorder, defined as the growing disconnection between people and nature with increasing negative impacts including rising rates of attention disorders, obesity rates, both physical and mental illnesses as well as a lack of understanding of the natural world (Louv 2008). Green space or green infrastructure aids in human wellbeing and the conservation of biodiversity

targets provide such places. Examples of green infrastructure include city parks, conservation sites, community gardens, street trees, residential yards, green roofs, school yards, rain gardens, bioswales, and more.

See Appendix A Map 13, Map 14

Table 5: Meewasin Sites and the Conservation Targets that are Present at each Site

Meewasin and Associated Sites	Hydro-riparian Areas	Native Grassland	Post-Glacial Channel Scars	Wetlands	Access to Nature (Human Well-being)	Physical Health (Human Well-being)
Beaver Creek Conservation Area	✓	✓			✓	✓
Chappell Marsh		✓	✓	✓	✓	✓
Chief Whitecap Park	✓	✓			✓	✓
Cranberry Flats Conservation Area	✓	✓			✓	✓
Crocus Prairie	✓	✓			✓	✓
Floodplain Flats	✓				✓	✓
Fred Heal Canoe Launch	✓				✓	✓
Guenther Prairie	✓	✓			✓	✓
Maple Grove	✓				✓	✓
Meewasin Northeast Swale		✓	✓	✓	✓	✓
Meewasin Conservation Easements		✓	✓	✓	✓	✓
Meewasin Trail	✓				✓	✓
Paradise Beach	✓				✓	✓
Peggy McKercher Conservation Area	✓		✓	✓	✓	✓
Peturrson's Ravine	✓		✓		✓	✓
Poplar Bluffs Canoe Launch	✓				✓	✓
Saskatoon Natural Grasslands		✓		✓	✓	✓
Sutherland Beach	✓				✓	✓
University of Saskatchewan	✓				✓	✓
University of Saskatchewan Reclamation Land		✓	✓		✓	✓
Urban Riverbank	✓				✓	✓
Wanuskewin Heritage Park	✓	✓			✓	✓
Wilson Island	✓				✓	✓
Yorath Island	✓				✓	✓

2.2 Viability Assessment

To determine the current status or health of the conservation targets, a viability assessment was conducted. The identification of key ecological attributes (KEAs), defined as the "aspect of a target's biology or ecology that if present, define a healthy target and if missing or altered, would lead to the outright loss or extreme degradation of that target over time" (Conservation Measures Partnership 2013), allowed Meewasin and NCC to develop a list of indicators to measure the status of the KEAs. Indicators must be measurable, precise, consistent and sensitive (Conservation Measures Partnership 2013). In the viability assessment indicators, KEAs and targets have their status ranked as poor, fair, good or very good. These status ratings are dependent on the thresholds set for the indicator, but general definitions for the status ratings are as follows:

> "Very Good - The target is functioning in an ecologically desirable manner and requires little management.
>
> Good – The conservation target is within the acceptable range of variation; some intervention may be required for maintenance.
>
> Fair – The conservation target is outside the acceptable range of variation and requires human intervention. If no intervention occurs, the conservation target will be vulnerable to serious degradation.
>
> Poor - Restoration is increasingly difficult. Current conditions may result in extirpation of the conservation target if the condition persists." (Conservation Measures Partnership 2013).

See *Appendix D* for the full Viability Assessment including the thresholds.

Hydro-riparian areas rated as fair in health. Key ecological attributes of connectivity, ecosystem health and fish population rate fair, while water quality rated as good health. All indicators are to be maintained for future status objectives except for the riparian health assessment, which aims to improve from poor to fair and the percent buffer in permanent cover in which the objective is to improve to good from fair.

Native grasslands' status rates as fair with connectivity (fair), ecosystem health (fair) and natural disturbance regime (poor) as the KEAs. Future improvements to indicators include filling the data gap in grassland bird population change (%) and increasing the annual extent of burning on agency land to fair from poor.

The viability assessment rates post-glacial channel scars' health as fair with connectivity (fair) and ecosystem health (poor) indicators. All indicators should aim to maintain their status, except percent of swales with healthy amounts of permanent cover, which should have an objective to increase its percent within the poor category or improve to fair.

Wetlands rated as in fair health in the viability assessment. KEAs include density of wetlands (fair), diversity of wetland types (unknown) and ecosystem health (poor). Data gaps for

expected distribution of wetland types and aquatic invertebrate population need to be determined. All other indicators have future status improvements: annual rate of wetland loss from fair to good, percent of wetlands with healthy amounts of permanent cover from poor to fair, and the wetland health assessment ratings from poor to fair.

See Appendix D "Key Ecological Attributes"

Table 6: Status of Key Ecological Attributes by Conservation Target

Target	Key Ecological Attribute	Indicator	Status (Poor, Fair, Good, or Very Good)
Hydro-riparian Areas	Connectivity	Average length of undisturbed riparian areas	Fair
	Ecosystem health	Percent buffer in permanent cover	**Fair**
		Riparian health assessment	**Poor**
	Fish population	Presence data (% of baseline species present)	Fair
	Water Quality	Water Quality Index	Good
Native Grassland	Connectivity	Fragmentation of landscape with linear disturbances	Fair
	Ecosystem health	Percent change in population of grassland birds	*Unknown*
		Range health	**Fair**
	Natural disturbance regime	Annual extent of burning on Meewasin and conservation lands	**Poor**
Post-Glacial Channel Scars (Swales)	Connectivity	Fragmentation of swales with linear disturbances	Fair
		Percent of swales with healthy amounts of permanent cover	Fair
	Ecosystem Health	Percent of land cover in native habitat	Poor
Wetlands	Density of wetlands	Annual rate of wetland area loss	**Fair**
	Diversity of wetland types	Expected distribution of types of wetlands	*Unknown*
	Ecosystem health	Aquatic invertebrate population	*Unknown*
		Percent of wetlands with healthy amounts of permanent cover	**Poor**
		Wetland health assessment	**Poor**

2.3 Threats

A list of threats for this plan was based on the first generation NCC Saskatoon Prairie Natural Area Conservation Plan threats, several brain-storming sessions by the team members and the workshops held in Saskatoon in Fall 2015. During the first workshop, participants in different conservation target groups ranked the scope, severity and irreversibility of each threat on their target. Miradi software was used to convert those ratings into an overall project rating. The final package of threats and rankings was reviewed and approved by the Meewasin Technical Advisory Committee consisting of representatives from the conservation community. In focusing the project to Meewasin's scope, threats were re-evaluated from NCC's original threat rankings as the threats became more urban in nature with a smaller scope.

From the Open Standards for the Practice of Conservation:

> "Scope - Most commonly defined spatially as the proportion of the target that can reasonably be expected to be affected by the threat within ten years given the continuation of current circumstances and trends. For ecosystems and ecological communities, measured as the proportion of the target's occurrence. For species, measured as the proportion of the target's population.
>
> Severity - Within the scope, the level of damage to the target from the threat that can reasonably be expected given the continuation of current circumstances and trends. For ecosystems and ecological communities, typically measured as the degree of destruction or degradation of the target within the scope. For species, usually measured as the degree of reduction of the target population within the scope.
>
> Irreversibility - The degree to which the effects of a threat can be reversed and the target affected by the threat restored." (Conservation Measures Partnership 2013).

Threat rankings can be summarized based on the following:

Low – the threat is likely to slightly degrade or is narrow in scope (1-10% across occurrence) or easily reversed at low cost to restore (0-5 years). These threats can have easily attainable actions or objectives associated with them or may simply become less of a priority for the conservation plan.

Medium – the threat is likely to moderately degrade or is restricted in scope (11-30%) or is reversible with a reasonable commitment to restore (6-20 years).

High – the threat is widespread or will seriously degrade target (31-70%) or may be technically reversed, but may not be technically affordable to restore (21-100 years).

Very High – the threat is pervasive or may destroy the target (71-100%) and cannot be reversed and unlikely to be restored (100+ years) (Conservation Measures Partnership 2013).

Table 7: Threat Ranking Summary for each Conservation Target

Threats	Hydro-riparian Areas	Post-Glacial Channel Scars (Swales)	Native Grassland	Wetlands	Summary Threat Rating
Invasive Species	Very High	High	High	High	Very High
Climate Change-Regional	Very High	Low	Low	Medium	High
Dams and Water Management	Very High	High	Low	High	High
Fire and fire suppression	Low	High	High	Low	High
Runoff of pesticides and fertilizers	High	High	Low	High	High
Stormwater	High	High		Low	High
Suburban Development	Medium	Very High	Medium	Low	High
Trespass Issues	High	High	Medium	Medium	High
Acreage development	Medium	High	Medium	Low	Medium
Commercial and industrial development	Medium	High	Low	Low	Medium
Conversion to Agriculture	Medium	Low	Low	Medium	Medium
Mining & Quarrying	Low	High	Medium	Medium	Medium
Recreation (Irresponsible)	High	Medium	Medium	Low	Medium
Recreational areas	Medium	Medium	Low	Low	Medium
Road and Rail	Medium	High	Medium	Low	Medium
Thermal pollution	Medium	Medium			Medium
Unsustainable grazing management	Low	Medium	Medium	Medium	Medium
Utility & Service Lines	Medium	Medium	Low	Low	Medium
Light Pollution	Low	Medium	Low	Low	Low
Military exercises	Low		Low		Low
Problematic native species	Low	Low	Low	Low	Low
Sound Pollution	Low	Low	Low	Low	Low
Urban Riverbank Slumping and Slope Instability	Low				Low

Very High Threats

Invasive Species

Invasive species are species that are not native to a specific location, are accidentally or intentionally introduced; have a tendency to spread; and may cause damage to the environment, economy or human health. Invasive species can include plants, animals, insects, invertebrates, fungi, bacteria and diseases. Not all introduced species are invasive; it is estimated that between 5% to 20% of introduced species may become problematic (IUCN, n.d.). The International Union for the Conservation of Nature ranks invasive species as the second largest threat to biodiversity globally, after habitat loss and fragmentation. Invasive species can have detrimental effects on society, the economy and the environment through: negative impacts on biodiversity; species decline and extinction; soil degradation and erosion; alteration of fire cycles; disease; human or animal suffering; reduction of land and water recreational opportunities; significant control and management costs incurred; reduced productivity in forestry, agricultural, and fishing sectors; export and import trade restrictions; and reduction of property values (Environment and Climate Change Canada). In Saskatchewan, the Ministry of Agriculture's *Weed Control Act* and the Ministry of Environment's *Fisheries Act* and their associated regulations identify and list invasive species that are prohibited from entering the province, species identified for eradication and control, and requirements of municipalities and landowners to deal with noxious weeds. Many invasive species have invaded and have a significant impact to the conservation targets within the planning area and Meewasin's Conservation Zone. Some significant invasive species found within the region include Wild Boar (*Sus scrofa*), Leafy Spurge (*Euphorbia esula*), Purple Loosestrife (*Lythrum salicaria*), Scentless Camomile (*Matricaria perforata*), Common Tansy (*Tanacetum vulgare*), Ox-eyed Daisy (*Leucanthemum vulgare*), Absinthe (*Artemisia absinthium*), European Buckthorn (*Rhamnus cathartica*), Kentucky Bluegrass (*Poa pratensis*), Smooth Brome (*Bromus inermis*), Wild Parsnip (*Pastinaca sativa*) and Crested Wheatgrass (*Agropyron cristatum*). New and emerging invasive species threats that are found outside of the region but are spreading towards the area include: Zebra mussels (*Dreissena polymorpha*), Quagga mussels (*Dreissena bugensis*), Prussian Carp (*Carassius gibelio*), Dutch Elm Disease, Emerald Ash Borer (*Agrilus planipennis*), Diffuse Knapweed (*Centaurea diffusa*), Russian Knapweed (*Centaurea repens*), Flowering Rush (*Butomus umbellatus*), and Downy Brome (*Bromus tectorum*). Saskatchewan Conservation Data Centre's iMap Invasives Program has been established to document and track invasive species in the province.

Figure 15: Leafy Spurge (*Euphorbia esula*)

As native grasslands, wetlands and hydro-riparian areas are more widespread, the scope of the threat is rated as high. However, the scope of the threat to post-glacial channel scars is ranked as very high, suggesting that invasive species will affect the target across much of its

occurrence. Additionally, a scope ranking of high was determined for post-glacial channel scars due to the smaller number of known swales and their proximity to the fringe between urban and rural. This interface provides the potential for both agricultural and ornamental invasive species. Severity was ranked as high for all conservation targets, suggesting that invasive species will seriously degrade the target over the next decade. Irreversibility was ranked as high for native grasslands, wetlands and swales, proposing that the threat may technically be reversed. This reversal may be cost-prohibitive and can take anywhere from 21-100 years to achieve. However, the irreversibility of invasive species on hydro-riparian areas was ranked as very high signifying that it is either irreversible, unlikely to be reversed or may take over 100 years to do so. Removal of aquatic and riparian invasive species can prove very difficult and for some species, may require drainage of the river or tributary. This would be impossible for a river like the South Saskatchewan River, especially since the largest city in the province relies on it for all of its water needs (drinking, bathing, support of power generation, etc.) and Saskatchewan relies on it to operate the Coteau Creek Hydroelectric Station at the Gardiner Dam.

See Appendix A Map 15

<u>High Threats</u>

Climate Change - Regional (Emerging Threat)

Figure 16: Crowfoot Violet (*Viola pedatifida*), a rare species, in the Meewasin Northeast Swale (2013)

The impact of climate change on the ecosystems and natural processes within the scope of the management plan is difficult to measure and rank, but likely to be a serious issue in the next fifty years and was therefore designated an emerging threat. Some predicted changes include milder, short winters with more precipitation in the form of rain; earlier summers; and a longer autumn (Sauchyn and Kulshreshtha 2008). Summers will be generally drier with less surface and soil moisture and weather events like droughts and flooding will be more frequent and severe (Sauchyn and Kulshreshtha 2008). Ecozone and ecoregion shift may occur with the forest and grassland boundaries edging northward (Sauchyn and Kulshreshtha 2008). Additionally, Saskatchewan will be at increased risk for exotic invasive species (Thorpe 2011). Climate change adaptation will be an overarching theme of the work Meewasin does within the Meewasin Valley as we learn more about its impact on Saskatchewan and the world.

Dams and Water Management

All rivers and major creeks within the scope of the Meewasin Valley-wide Resource Management Planning Area have been dammed or diverted in some way. The dams are used primarily for water retention in the reservoirs (Lake Diefenbaker, Brightwater Creek Reservoir, and Saskatoon weir) and for hydroelectric power generation. Uses of the Lake Diefenbaker reservoir include recreation, diversion to the Qu'Appelle River, human use for drinking and household use, and for diversion to crop irrigation. Wetlands are frequently drained and diverted in our scope as well; mostly for agricultural production and new housing developments. Historically, natural flows on the South Saskatchewan River pre-dam (1967) would have had peaks in April-May (prairie snowmelt and ice break up) and in June (melt of the glacial headwaters and mountain snowpack) (Pomeroy et. al. 2009). With the controlled flow regime, the natural flooding cycles that provide channel maintenance or flushing flow are removed (Reiser et. al. 1990). These flushing flows help to regenerate riparian vegetation such as Eastern Cottonwoods (*Populus deltoides*) (Begg 1997), clean the silt out of the gravel/cobble beds for fish spawning, and back-flooding to allow aquatic organisms to travel up the various creeks such as Opimihaw Creek and Brightwater Creek (Reiser et. al. 1990). With predicted increased variability in climate (Pomeroy et. al. 2009) and expected population growth, demand for water for irrigation, power generation and human use may increase.

The scope of this threat for wetlands and post-glacial channel scars (swales) is high as most in scope are affected and low for native grasslands. However, scope of hydro-riparian areas is very high as all are affected by water management controls in some form. Severity is high for both wetlands and swales as drainage or diversion would cause significant disturbance. The rating is very high for hydro-riparian areas and low for native grasslands as they are less likely to be damaged (all rivers and creeks are already dammed and native grasslands are not as likely to be flooded out). Irreversibility is high for hydro-riparian areas, wetlands and native grasslands (hydro-riparian areas unlikely to ever be un-dammed or unmanaged, flooded grasslands will have a vegetation shift to wetland/riparian vegetation types, and prairie species are adapted to drought). Swales may be more likely to recover because early seral aquatic vegetation establishes easily and so irreversibility is medium.

See Appendix A Map 22

Figure 17: Meewasin's Resource Management Officer, Renny Grilz, lights up native prairie with the drip torch during a prescribed burn (November 2016)

Fire and Fire Suppression

The threat of excessive fire and fire suppression is defined as times when the frequency of fire on a conservation target is outside the natural fire return interval; i.e. when burning occurs more or less often than expected with a natural fire regime. This

threat manifests itself in the planning area most often when ephemeral wetlands are burned every year or when pastures are never burned. The impacts of an altered fire regime include encroachment of shrubs and trees, leading to a lack of variety in habitat structure for wildlife of the area (Gross and Romo 2010); a buildup of fuel, resulting in an increased risk of catastrophic wildfire; and reduced habitat for some bird species (Richardson et al 2014).

The scope of this threat is considered very high for native grasslands, post glacial channel scars and hydro-riparian areas and medium for wetlands because very little prescribed fire is currently applied in the planning area. The majority of burns are occurring on ephemeral wetlands either before seeding or after harvest of adjacent crops. Severity is rated as high for post glacial channel scars and native grasslands and medium for all others. Lack of fire has allowed aspen (*Populus tremuloides*) and shrub to encroach on the few patches of remaining fescue prairie within the planning area (Bailey and Anderson 1978, Romo 2003). This changes the composition of these sites from grassland to a higher percentage of woody species, thus changing the microclimate from a drier to wetter microsite. The irreversibility is medium for post glacial channel scars and native grasslands and low for hydro-riparian areas and wetlands. There is some evidence that a one-time return of fire can significantly alter the plant species composition, structure, and diversity of the burned area in as little as three years after burn (Antos, 1983), but there is no clear indication if pre-settlement conditions are restored. Overall this threat is rated as high.

Runoff of Pesticides and Fertilizers

Runoff was defined as nutrients, pesticides, and soil sediments that originate on or were intended for arable cropped fields and waste materials that escape livestock operations. These materials leave fields through the erosion of soil particles, runoff with dissolved nutrients or pesticides, or drift of pesticides during application. Impacts of this threat may be cumulative and impact hydro-riparian areas downstream of the pollution source. The impacts of this threat on the targets within the scope were also assumed to impact the waterfowl production of wetlands through the pathways mentioned. Other species that rely on the primary productivity of these targets were also assumed to be impacted by this threat.

The scope of runoff of pesticides and fertilizers was rated high for all of the targets except native grasslands, which ranked as low. Conventional agriculture is the most common land use in the natural area. Up to 91% of wetlands sampled in the prairie cropland region by Main et. al (2014) tested positive for pesticides. Severity of this threat was rated as high for all targets except native grasslands, which ranked as medium. Pesticides impact production of invertebrates and amphibians by killing the plants they eat (Forsyth et al., 1997), changing the behaviour of invertebrates (Hamilton 1993), and reducing the population of amphibians (Relyea, 2005). Excess nutrients from agricultural fields and livestock operations increases primary production, resulting in algal blooms which ultimately reduce oxygen content in the water (Sharpley et al., 2001). The irreversibility of threat was ranked as medium presumably because the materials

from agricultural runoff would be metabolized within 6 to 20 years from when they were no longer applied. The summary threat rating for this threat is high.

Stormwater

Stormwater outfalls are largely an urban issue. Storm drains collect pollutants such as motor oil, pesticides and road salts, as well as litter and weed seeds along with the rainfall runoff from impermeable surfaces. This is then emptied into stormwater retention ponds or the South Saskatchewan River within our scope, mostly untreated, aside from a grate system to prevent large debris from entering the water bodies. Though this issue rated high for swales, due to their current and projected use as stormwater management systems for adjacent neighbourhoods (specifically the Northeast Swale), the scope of this threat pertains to Saskatoon and does not pose a great threat to the planning area overall. However, stormwater from upstream communities such as Calgary, Red Deer, Lethbridge or Medicine Hat would have an impact on the downstream quality of the South Saskatchewan River that reaches Saskatoon.

Scope rated high for hydro-riparian areas, very high for swales and low for wetlands within our scope. Most known swales immediately surround the City of Saskatoon and are being used or explored for their use as stormwater management systems. Severity is high for both hydro-riparian areas and swales and ranked medium for wetlands. Irreversibility has ranked high for all of the targets except for native grasslands, in which the threat of stormwater was deemed not applicable and was not linked.

Suburban Development

Suburban development is the outward expansion of residential and mixed use neighbourhoods of cities into the surrounding landscape, resulting in a conversion of native or agricultural ecosystems to suburban development and an increase in city footprint. These suburban neighbourhoods are *typically* defined by lower population density housing, car-dependency, and some sort of visual standard for housing (Forsyth 2012), though Saskatoon's newer neighbourhoods are encouraging higher density. Suburban development poses a threat to those ecosystems and species that stand in the way, increasing fragmentation of the land and destruction of habitat through the conversion of native prairie habitat and wetlands or conversion of agricultural landscapes (which hold some value in terms of biodiversity).

Figure 18: A sign to remind visitors to the Meewasin Northeast Swale of its importance. Suburban development is anticipated to fully surround the site within Saskatoon City limits.

Additionally, these suburban developments continue to have an impact on adjacent landscapes through pollution (light, sound, pesticide runoff, etc.), pets (e.g. cats and associated grassland bird mortality), and human presence.

As this is an urban issue, scope is very high for swales as most of the known swales surround Saskatoon and are presently impacted by suburban sprawl. Scope for hydro-riparian areas ranks as medium and low for both native grasslands and wetlands. Severity was ranked as medium for hydro-riparian areas (South Saskatchewan River) as this target has some protection from development through various agencies (including Meewasin). Projects with a significant impact would require mitigation; severity for all others was ranked as high. Irreversibility was ranked as very high for both native grasslands and swales (which have a native grassland component) due to the difficulty in restoration and outright loss of the endangered ecosystem (McKinney 2002). Hydro-riparian areas and wetlands may have more resiliency and were ranked as high.

Trespass Issues

The threat of trespassing is defined as all unwanted activities that result from unauthorized access to the native grasslands, wetlands, swales, and hydro-riparian areas in the planning area. This includes new unsanctioned trails (hiking, cycling, vehicle), garbage dumping, baiting, hunting-blind construction and ecosystem damage resulting from these activities. This threat includes instances of unsustainable hunting, plant collecting and birding on conservation lands. Garbage dumping is the most obvious aspect of this threat, but new trail creation is also increasing.

Figure 19: Volunteers clean up garbage at the Richard St. Barbe Baker Afforestation Site (July 2016)

The scope of this threat is ranked high for post-glacial channel scars and hydro-riparian areas and medium for native grasslands and wetlands. Post-glacial channel scars surround the city resulting in intense pressure for recreational space, while people pressure on all targets decreases further from the city. Severity is rated as high for hydro-riparian areas and post-glacial channel scars and medium for native grasslands and wetlands. The factors that affect threat severity include biodiversity value of the area, erodibility, timing of the activity, and total area size (Pickering, 2010). Irreversibility is medium for all targets. The summary threat rating is high. New trails increase soil compaction and the amount of bare ground, which increases the risk of introducing invasive species thereby decreasing wildlife habitat quality (Havlick et al, 2016). Trails are also associated with decreased density of some bird species (Thompson, 2015) and a change in species composition (Trulio and Sokal, 2008) with some research showing trails increase the predation of nests (Miller et al., 1998).

Medium Threats

Acreage and Exurban Development

Acreage development is the development of housing and accompanying land development outside of urban centres or low density rural home development. This includes country residential multi-parcel subdivisions and farms. The development of these properties is usually associated with the conversion of land from agriculture or native ecosystems to housing, which requires the development and provision of services including electricity, natural gas, water lines or wells, and household sewage storage systems. Human activity on and surrounding acreage development (ATVs, pets, sound pollution, light pollution, control of “nuisance” animals threatening property, etc.) can have serious negative consequences for the surrounding conservation targets and the species associated with them.

The scope of this threat is low for wetlands, medium for hydro-riparian areas and native grasslands, and high for swales. Much of the most easily developed areas in the planning area have been converted to acreage developments so new development is likely to be lower in scope except for the swales and grasslands close to Saskatoon. Severity was ranked as medium for hydro-riparian areas and wetlands due to their inherent resiliency and high for native grasslands and swales as desire for development of these areas are higher than for water bodies. Irreversibility is high for all as, once developed, it is unlikely that they would be restored back. The effect of this threat is conversion of native ecosystems or arable farmland to acreages, which reduces connectivity and increases fragmentation.

Commercial and Industrial Development

As the population grows within the planning scope, the demand for more goods and services increases resulting in the need for more commercial and industrial developments. Examples include gas stations, office buildings and strip malls, business districts, industrial districts and parks, warehouses, hotels, shopping centres, airports, auto-malls, technology and research centres, and expansions of all such developments. The more urbanized population centres become, the more outward urban centres sprawl as land is consumed for residential properties and commercial and industrial developments are developed on the fringes. The threat of commercial and industrial development to targets includes conversion of habitat and habitat fragmentation, pollution and the introduction of invasive species due to land disturbance and construction activities.

Scope for hydro-riparian areas and wetlands ranked as medium, while scope was low for both swales and native grasslands. Severity was ranked as medium for hydro-riparian areas and high for wetlands, swales and native grasslands. Irreversibility was ranked as high for all of the targets as it was unlikely the development or impact would be reversed within in reasonable time frame.

Conversion to Agriculture

The threat of conversion to agriculture is defined as the cultivation and clearing of native vegetation and conversion to arable agriculture, including perennial non-native forages. Conversion of native grasslands to agriculture destroys habitat and reduces biodiversity of plants and animals compared to even small remnants of native prairie (Godwin et al. 1998).The scope is ranked as medium for all hydro-riparian areas and wetlands and low for swales and native grasslands. An estimate of mapped post-glacial channel scars shows that roughly 5% are within Meewasin's jurisdiction leaving the rest with little protection. The estimated remaining native vegetation within the Moist Mixed Grassland Ecoregion, in which the majority of the Meewasin Valley-wide RMP lies, was 14% in 1999 (James et al., 1999). Severity is rated as very high for post-glacial scars and native grasslands and high for hydro-riparian areas and wetlands. Cultivation completely destroys affected native grasslands and post-glacial channel scars, while wetlands and hydro-riparian areas retain some of their functionality when converted to agriculture, especially when planted to perennial forages. Irreversibility is high for all targets. Restoration is possible in all of these cases, but takes time and significant resources. The summary threat rating is medium.

Figure 20: Sharp-tailed Grouse (*Tympanuchus phasianellus*), a male pictured here in the mating dance, are residents of the Meewasin Valley and found on many Meewasin conservation sites – Photo courtesy of May Haga

Mining & Quarrying

The threat of mining is defined as the direct impact of mining and quarrying on the land where operations occur. Mining activity in the planning area includes potash, oil and gas, and gravel. Impacts include destruction of habitat during extraction or disposal of tailings, dust, noise, associated traffic, ascetic displacement, and potential release of contaminants into the surrounding environment. In some cases, nearby water tables must be lowered to prevent flooding of mines (United Nations Environment Program and International Fertilizer Association 2001).

The scope of this threat for hydro-riparian areas, native grasslands, and wetlands is ranked low and medium for post glacial channel scars. Some post glacial channel scars contain deposits of gravel and other aggregates that could be mined and one of the swales is severely impacted by a potash mine site (extraction, site construction, use of swale's wetlands as tailings ponds). Severity is rated as high for hydro-riparian areas, native grasslands, and swales and medium for wetlands. Mining removes most of the vegetation from the area, though in cases of gravel

extraction some of the functionality of the wetland remains because sites become wetlands after operations cease. Irreversibility is high for hydro-riparian areas and very high for all other targets as substrate is removed and tailings piles are permanent. The summary threat rating is medium.

See Appendix A Map 23

Recreation (Irresponsible)

Irresponsible recreation is recreational activities that cause harm or damage to ecosystems and their inhabitants, or in this case, conservation targets. These activities include the creation of unsanctioned trails for hiking, cycling or for all-terrain or off-road vehicle use; littering; site vandalism; intentionally disturbing wildlife (picking flowers, chasing animals, etc.); poaching; starting fires; creating large wakes on the river (power boats too close to the banks can lead to bank erosion) and more. These types of activities reduce or damage habitat and make areas undesirable for wildlife. Irresponsible recreation on natural lands sets precedence for the way other natural lands are treated. This summary threat rating is medium to all targets.

Scope is high for swales and hydro-riparian areas, medium for native grasslands and low for wetlands (these are based on the most publicly used targets within the scope). Swales, native grasslands and wetlands all have a low severity ranking, while hydro-riparian areas have a high ranking. Irreversibility is medium for all as most damage can be reversed by cleaning up and taking measures to stop the activity like increased security for sites, more effective signage or public awareness.

Figure 21: Meewasin's Canoe Program at Beaver Creek Conservation Area

Recreational Areas

Recreational areas are those that have been identified for human use for leisure activities. They may hold some natural value, but have been altered to fit their use as a recreation site. These include golf courses, picnicking areas, trail systems, beaches with amenities, campgrounds, etc. These sites are usually adjacent or very near to natural landscapes, which put these natural areas at risk from recreational activities. Disturbance to adjacent natural sites include construction (through clearing vegetation and introducing invasive species), invasive species (via intentional planting or unknowingly carrying seeds on clothing) that spread off of recreational areas, litter blown or carried off site, erosion, pet and human waste, trampling of vegetation, and soil compaction from off-target hiking. The presence of humans and pets decreases the desirability for wildlife to use the site (Sime 1999) and, presumably, adjacent natural areas. Increased population increases the risk of conversion of natural areas to recreational sites. Scope is high for hydro-riparian areas, medium for swales, and low for native grasslands and wetlands (based

on popularity of natural area sites within and surrounding Saskatoon, beaches being most popular). Swales and native grasslands have a high severity ranking and the severity rankings are medium for hydro-riparian areas and wetlands. Finally, irreversibility is medium for hydro-riparian areas and high for the other three targets.

Road and Rail

With the largest rural road system in Canada, Saskatchewan's roads pose a threat to the conservation targets within the planning area (Stewart, 2016). The biggest impact is habitat fragmentation, which is the largest threat to biodiversity in the world (International Union for Conservation of Nature, 2016). This threat also includes bridges (vehicular: 5 existing bridges, 1 under construction and 1 proposed within the project scope; rail: 3 existing), ferry crossings (2 within the planning area), and rail. The reduction of connectivity profoundly impacts the movement of species across the landscape, creating barriers for native species and vectors for invasive species (Trombulak & Frissell 2000). Roads also increase the occurrence of road salts, gravel and dust, litter and wildlife mortality in addition to increasing access to previously remote areas. Another aspect to consider is the risk of accidental spills or damage to conservation targets as a result of an accident (car, ferry or rail). Scope is low for wetlands, medium for hydro-riparian areas and wetlands, and very high for swales, due to the relative number of conservation targets in the project scope (more wetlands, not many swales). Severity is rated as medium for native grasslands and hydro-riparian areas as many have some protection or are already impacted by roads, but is high for wetlands and swales due to the footprint of the roads and impact on these targets (filling in wetlands, changing hydrology and introducing contaminants). Irreversibility is high as roads are unlikely to be decommissioned and car-centric culture in Saskatchewan creates more demand as the population grows.

See Appendix A Map 24, Map 25

Thermal Pollution

The threat of thermal pollution is defined as the ecosystem changes associated with the input of excess heat into the South Saskatchewan River. The main source of thermal pollution within the project scope is the Queen Elizabeth Power Station on the South Saskatchewan River within Saskatoon. This station disposes waste heat from the production of electricity into the river, which prevents a significant portion of the river in Saskatoon from freezing over in the winter. Other sources of thermal pollution include stormwater (runoff from sun-heated pavement), the water treatment plant, and the wastewater treatment plant (output may not be same temperature as the South Saskatchewan River). The increase in temperature above what would have occurred naturally can have significant effects on biodiversity (Brock 1975). This threat is specific to the hydro-riparian target in a relatively small area of the scope (Saskatoon) and thus, the overall threat of thermal pollution to the planning area is rated as low. Scope is high and severity and irreversibility are medium.

Unsustainable Grazing Management

The threat of unsustainable grazing management is defined as the impact of continuous heavy grazing or exclusion of grazing. Unsustainable grazing management occurs when management is unaltered and unchanged for years on end. In other words: grazing frequency, intensity, duration or livestock type is not changed from year to year. Unsustainable grazing often results in extremely short vegetation from overgrazing and excessive standing dead plant material with under-grazing. Potential impacts of unsustainable grazing include increased potential for invasive species, decreased habitat quality for species using the target habitats, increased shrubs and woody species, increased fire hazard in ungrazed areas and increased soil erosion in overgrazed areas (Mapfumo et al. 2002).

The scope of the threat of unsustainable grazing management is ranked medium for hydro-riparian areas and wetlands and high for post-glacial channel scars and native grasslands. Threat severity is rated as medium for post-glacial channel scars, native grasslands, and wetlands and high for hydro-riparian areas. Severity is ranked high for hydro-riparian areas due to sensitivity to overgrazing and loitering, which can easily damage the slope and cause erosion (LaForge 2004). Ranellucci et al. (2012) compared impacts of continuous grazing with twice-over rotational grazing on bird populations and postulated that continuous grazing provided greater habitat diversity for songbirds. Irreversibility of the threat is low for hydro-riparian areas, and medium for all other targets. The summary threat rating is medium.

Figure 22: Shepherd Jared Epp (with dog Bryn) demonstrates how to safely check a sheep's health at Beaver Creek Conservation Area (2013) during a conservation grazing demonstration. Meewasin uses sheep grazing to manage native prairie.

Utility & Service Lines

The threat of utility and service lines includes all disturbances associated with the installation of above and belowground utility lines and pipelines. This infrastructure and the associated right-of-ways threaten conservation targets by fragmenting habitat and introducing invasive species in disturbed lands (right-of-ways are often converted to tame forages, which can introduce invasive species). Additional disturbances from this threat include noise pollution from transmission lines, installation and maintenance (which disturbs wildlife), visual degradation of the landscape, risk to birds (fences and wires are flight-barriers and cause tangling or electrocution), and potential for pollution or contamination if a pipeline were to leak or burst. The summary threat ranking on this threat is medium. Scope is ranked as medium for hydro-riparian areas and post-glacial channel scars and low for native grasslands and wetlands. Severity and irreversibility is medium for all targets except for swales in which irreversibility is high.

See Appendix A Map 26

Low Threats

Light Pollution

Light pollution is created by artificial light for human use. This includes light from street lighting, commercial buildings and homes. Light pollution is most severe in urban centres and can be measured by the visibility of the night sky. Some species require a view of the night sky, which light pollution blocks. Other effects include the disturbance of the day-night cycles of a variety of species, accelerated flowering times and growing season (response to availability of sunlight due to angle of Earth), and disruption to nocturnal species. As a largely urban issue and site specific issue, the summary threat ranking is low. Scope is medium for hydro-riparian areas, high for swales (proximity to Saskatoon), and low for native grasslands and wetlands. Hydro-riparian areas and swales have a medium severity ranking (proximity to urban centre) and a low ranking is given to native grasslands and wetlands (more widely dispersed throughout the planning area). Irreversibility is low for all conservation targets.

Military Exercises

Military exercises include the Canadian Forces Base Dundurn military base and any other activities carried out by the Department of National Defence (such as flight training). Most of the activity is concentrated on the Canadian Forces Base Dundurn military base and, therefore, is a low threat to the linked targets of hydro-riparian areas (Brightwater Creek flows through the site) and native grasslands (on which the site is situated and adjacent to). The use of the site for training has, in fact, spared the site from development or conversion from native prairie and some parts of the site have seen a disturbance regime of fire from ordnance. Scope for both targets is low and scope and severity are both ranked as medium.

Problematic Native Species

Problematic native species are those native species that threaten biodiversity or disrupt human activities in the planning area. Examples include beavers (e.g. cutting down city or park trees), mosquitoes (e.g. West Nile and other diseases), mice and rats (e.g. Hanta Virus, etc.), Canada Geese (e.g. aesthetic - feces in parks and golf courses), deer (e.g. eating trees, road mortality), poisonous plants (e.g. Western Water Hemlock), etc. While of minimal threat to ecosystems, these were listed as a threat due to the resource management work (for Meewasin, the City of Saskatoon, and local RMs) required to deal with issues that arise. The summary threat ranking of these problematic native species is low. Scope is medium for hydro-riparian areas and post-glacial channel scars (South Saskatchewan River within Saskatoon, more

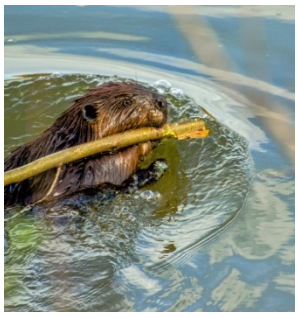

Figure 23: The North American Beaver (*Castor canadensis*) – Photo courtesy of Kneale Quayle Photography

publicly accessible sites are of these targets) and low for native grasslands and wetlands. Severity of this threat is medium for wetlands (beavers, plants, birds, and mosquito habitat) and low for the other three targets. Irreversibility is low for wetlands and medium for all others.

Sound Pollution

Sound pollution is noise created from various human activities including construction, vehicular traffic, residential neighbourhoods, transmission lines, and other ambient noise created from daily human life. Sound pollution can cause wildlife to avoid the source and may disrupt breeding by masking mating calls. Overall, this threat is low in the planning area; the irreversibility is low and its effects are typically short-lived (stops when the noise does, site specific and can be somewhat easily mitigated). Scope is low for native grasslands and wetlands, medium for the creeks and their vegetation, and high for swales (sound pollution is concentrated in more urban areas). Severity is low for grasslands and wetlands and medium for hydro-riparian areas and swales. Irreversibility is low for all.

Urban Riverbank Slumping and Slope Instability

Within the City of Saskatoon and all along its length, the South Saskatchewan River sees slumping of its banks due to the natural processes of a meandering, braided river channel and the movement of large volumes of water. However, within Saskatoon the process is exacerbated by removal of vegetation through landscaping and development (roots keep banks stable), increased weight loads (of housing, asphalt and development), and increased groundwater movement and volumes (impermeable street surfaces cause larger amounts of water to infiltrate into smaller permeable areas – flash flooding infiltrating into sandy soils will cause movement of that soil). Though slumping is a natural phenomenon, the erosion and instability within the urban area causes issue to infrastructure and human safety both economically and environmentally. Reclamation or remediation is required to reduce risks of collapse of infrastructure (roads, housing, and bridges) both for safety and usability, but also to prevent debris from entering the South Saskatchewan River in the case of a massive slumping event or smaller slumps over a number of years. Additionally, invasive species may be both a product and cause of bank slumping. Current invasions by species such as European Buckthorn or Kentucky Bluegrass, both shallow rooted species, may increase the risk of bank instability due to their ability to create monocultures of vegetation (which all have the same characteristics such as root depth, nutrient needs, etc.). Bare soils caused by slumping invite weedier species to colonize such as annuals which offer no long term bank stability. Related only to hydro-riparian areas, the low threat was categorized as low in scope, medium in severity and high in irreversibility.

3. Situation Analysis

3.1 Situation Analysis

Indigenous People have lived in the Saskatoon area almost continuously for the past 6,000 years as documented by Wanuskewin Heritage Park, which conserves pre-contact sites including Plains Bison kill sites, tipi rings and a medicine wheel. Early settlers and fur traders established agriculture in this area in the late 1800s. The majority of the early settlers in the area were part of the Temperance Colonization Society, who were led by John Lake in 1882 (Delainey 2007). The Colony's land grant was on both sides of the river from Clarke's Crossing in the north to Moose Woods (now Whitecap Dakota First Nation) in the south (City of Saskatoon, 2007). The railway arrived in 1890 and in 1906 Saskatoon became a city (City of Saskatoon, 2007). The largest Indigenous community within the scope is the Whitecap Dakota Reserve, historically known as the Moose Wood Sioux Reserve, and is located in an area of sand dunes approximately twenty-five kilometres south of Saskatoon. The City of Saskatoon is the largest community within our planning area and is Saskatchewan's largest city. Other large communities include Martensville, Warman, Hague, Rosthern, Aberdeen, Grandora and Vanscoy. The South Saskatchewan River, the only major river, bisects the planning area. In 2011, the population of Saskatoon was 222,189; a 9.8% increase since 2006 (Statistics Canada 2011a). The population of the Saskatoon Region was 260,600 in 2011 (Statistics Canada 2011a).

Figure 24: Dancers at Wanuskewin Heritage Park – Photo courtesy of Tourism Saskatoon

See Appendix A Map 13

Major land uses in the planning area include arable agriculture with a significant portion of the province's dairy farms located near the city to supply a dairy processing facility within Saskatoon (Huynh 2006). There are several potash mines in the Saskatoon vicinity with access to almost two-thirds of the world's recoverable potash reserves (Huynh 2006, Saskatoon Regional Economic Development Authority Inc. 2008). There are also many gravel and sand extraction sites within the Saskatoon region for materials for building and highway construction (Huynh 2006). Smaller towns outside of Saskatoon are expanding, as well as acreage development areas.

Recent rapid growth has led to a marked increase in residential and non-residential construction within the city and the surrounding areas (Saskatoon Regional Economic Development Authority 2007). The availability of land, affordability, and short commutes drive population growth in the area (Saskatoon Regional Economic Development Authority 2007). The economy of the city and surrounding area is considered as diverse as most mid-size Canadian cities (Saskatoon Regional Economic Development Authority 2015) with health, education, retail, construction, transportation, agriculture and mining among the major employers in the city (Saskatoon Regional Economic Development Authority 2016).

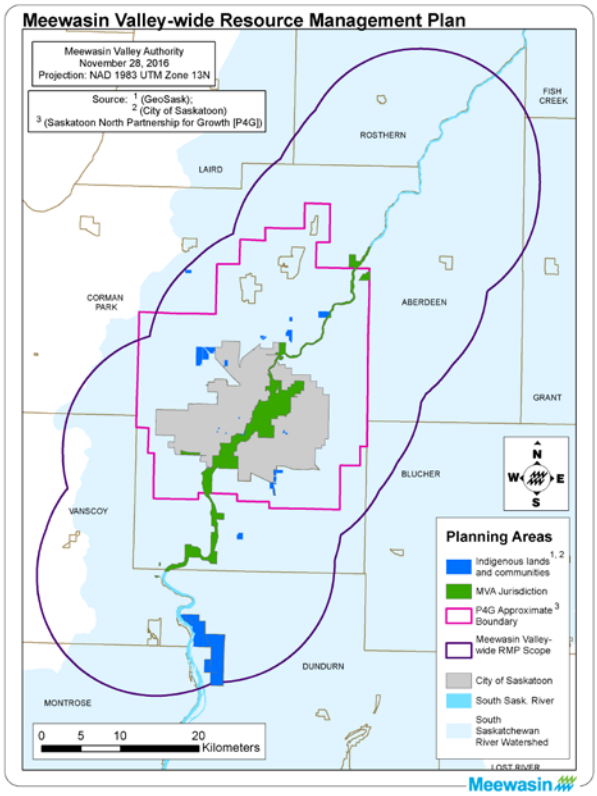

Figure 25: Overlap of Planning Areas

The City of Saskatoon is surrounded by the R.M. of Corman Park, which is the most populated R.M. in the planning area and has the highest farm count and total farm revenue of any rural municipality in Saskatchewan (Huynh 2006). This R.M. is seeing increasing demands for recreation, including golf courses close to Saskatoon (Huynh 2006). Within the R.M. of Corman Park, the highest population density is to the north and north-east of Saskatoon (Huynh 2006). According to the 2011 Census of Agriculture, the average age of farmers within the planning area is 54.5 years (Statistics Canada 2011b). Farmers approaching retirement are more likely to sell their land to developers (Huynh 2006), which may increase the rate of conversion of native habitat. The Whitecap Dakota First Nation has diversified economically with the creation of a golf course and a casino on former native habitat. Also located within the planning area is Canadian Forces Base Dundurn Located on the southern portion of Dundurn community pasture (former Prairie Farm Rehabilitation Administration). The area was cleared and burned in 1927 and it was first used for military training in 1928.

See Appendix A Map 2

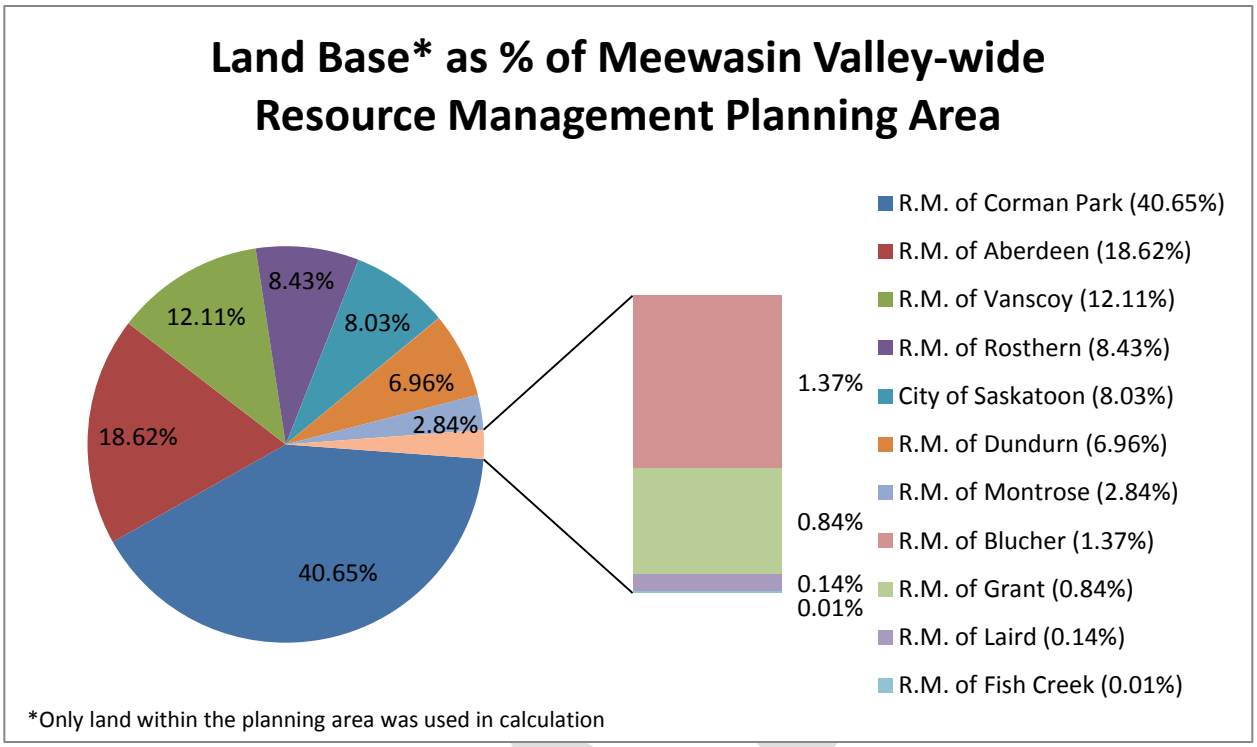

Figure 26: Interactions of the Various Jurisdictions within the Meewasin Valley-wide Resource Management Plan

Table 8: Population Statistics for the Jurisdictions within the Meewasin Valley-wide RMP scope

Population	2006	2011	Trend (% Increase)
Saskatoon	202,408	222,189	9.8%
R.M. of Corman Park	8,266	8,354	1.1%
R.M. of Aberdeen	765	1,016	32.8%
R.M. of Vanscoy	2,629	2,714	3.2%
R.M. of Rosthern	1,840	2,015	9.5%
R.M. of Dundurn	632	1,148	81.6%
R.M. of Montrose	648	712	9.9%
R.M. of Blucher	1,588	1,787	12.5%
R.M. of Grant	406	425	4.7%
R.M. of Laird	1,136	1,240	9.2%
R.M. of Fish Creek	307	304	-1.0%
Total	**220,625**	**241,904**	**9.6%**

Current Planning Activities Underway in the Region (December 2016)

The past decade of rapid growth of Saskatoon and surrounding area has spurred several planning initiatives. The City of Saskatoon has initiated or are participating in several development planning projects including Growing Forward!, a Green Infrastructure Plan and Saskatoon North Partnership for Growth (P4G). The P4G project also includes the R.M. of Corman Park and cities of Martensville, Warman and the Town of Osler. The Pike Lake Cottage and Watershed Association are developing a Pike Lake Watershed Plan, the University of Saskatchewan is working on implementing their Vision 2057, and the South Saskatchewan River Watershed Stewards Inc. is working on a Water Futures Program. All of these plans encourage various forms of public input through open houses, agency interviews and presentation, and online comments. There is a need for conservation agencies to participate in these planning exercises from a science-based perspective. Other agencies that are connected to Meewasin and NCC either by formal partnerships or professional relationships include Nature Saskatchewan, Saskatoon Nature Society, Native Plant Society of Saskatchewan, Ducks Unlimited Canada, Saskatchewan Environmental Society, Saskatchewan Invasive Species Council, Saskatchewan Prairie Conservation Action Plan (PCAP), Saskatchewan Wildlife Federation and Saskatoon Wildlife Federation, Saskatchewan Polytechnic, South Saskatchewan River Watershed Stewards Inc., University of Saskatchewan, and Wanuskewin Heritage Park. The community of scientists, naturalists, landowners, professionals and public connected by similar conservation interests are generally well integrated and willing to work together.

The situation analysis was developed based on the previous generation Saskatoon Prairie Natural Areas Conservation Plan (NCC) with updated information from Statistics Canada, the Saskatoon Regional Economic Development Authority, and various participants at the two workshops. Additional information and comments were solicited from the experts taking part in Meewasin's Technical Advisory Committee for this project.

4. Strategic Plan

4.1 Meewasin Valley-wide RMP Goals

Goals are a "formal statement detailing a desired impact of a project such as the desired future status of a target" (Conservation Measures Partnership 2013). To have a good goal, they must be linked to the conservation targets, be impact oriented, measurable, achievable within a certain time period and specific (Conservation Measures Partnership 2013).

Table 9: Future Status Goals as Linked to Meewasin Valley-wide RMP Conservation Targets

Goal	Targets
Awareness and education of conservation targets, threats and resource management activities are increased within the Saskatoon Region and provincially through successful completion of outreach activities.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands, Connection to Nature, Physical Health
Continue to ensure proposed developments are appropriately integrated into the Meewasin Valley by balancing human use and conservation through the *Meewasin Valley Authority Act's* Development Review Process.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands, Physical Health
Ecological health of conservation targets on Meewasin Conservation sites have improved by 20%, as determined through ecological health assessments, with progress underway in the Meewasin Conservation Zone.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands, Physical Health
Invasive species on Meewasin Conservation sites have significant reduction in cover and density (percent reduction depending on invasive species type), with progress underway in the Meewasin Conservation Zone.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands, Physical Health
Natural disturbance regimes including fire and grazing are employed on key Meewasin Conservation sites with a minimal goal of 15% disturbance per site per year.	Native Prairie, Swales, Connection to Nature
Public access to nature and conservation of biodiversity habitat is improved with the addition of Conservation sites (5 additional sites, one site expanded) and an expanded Meewasin Conservation Zone.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands, Connection to Nature, Physical Health
Restoration of ecological integrity on Meewasin Conservation sites is continued with the development and implementation of site-specific restoration plans to address historically degraded conservation targets.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands, Connection to Nature, Physical Health

4.2 Strategies and Key Intervention Points

Strategies

The targets in this planning area aim to maintain native upland, wetland and riparian habitat, while the threats to these habitats come from development in various forms. The expertise of

the people involved drove the development of the strategic plan. This expertise includes control of invasive species, management and restoration of native habitat and many aspects of wetland and riparian ecology. The planning process included staff and an advisory committee from Meewasin, a group dedicated not only to the conservation of natural spaces, but human well-being targets as well and, therefore, the strategies endorsed in the process include methods of improving human interaction with the natural world. Broad strategies were identified and endorsed during the two Saskatoon workshops attended by a variety of professionals, experts, stakeholders, and both Meewasin and NCC staff.

Specific activities for strategies were also identified and discussed during the meetings. These activities were researched, expanded on, written formally and reviewed by professionals in the fields of each target the activities impacted. Once combined with information from the first generation NCC NACP, final strategies and activities were reviewed and confirmed for the plan by the Project Team Leads, as well as Meewasin's technical advisory committee and NCC's internal reviewers. In addition, standard strategies and their activities included in every NACP were included and expanded on in the NCC Natural Areas Conservation Plan including communications, research, fundraising, monitoring and overall natural area management.

The resulting list of strategies was rated using Miradi's system of identifying the potential impact and feasibility based on an estimate of its potential to impact the target and how technically, ethically and economically feasible the action was to carry out. This generated a ranking for each strategy of not effective, less effective, effective or very effective. All threats ranked very high and high and targets with poor or fair viability were addressed with specific strategies or actions. Several strategies were ranked as less effective, but will be included as critical actions. For instance, restoration ranked as less effective, but will be pursued because it builds on current actions undertaken by Meewasin and NCC. Other actions such as sharing expertise, allowing public access and encouraging landowner interactions also ranked as less effective, but are still an important part of the work plan because they increase public awareness of conservation. During this process several knowledge gaps were identified and recorded.

Key Intervention Points

Key Intervention Points were developed from the first generation NCC's NACP, conversations with stakeholders and experts at the workshops, and meetings with the Meewasin Technical Advisory Committee. After the group meetings, input and relevant ideas were vetted with appropriate experts. While strategies and activities were being researched and rewritten for clarity, results chains were created and the appropriate intervention point was identified and graphically displayed in Miradi. These results chains were the discussed and researched by core team members. These key intervention points are identified by where we have linked strategies (yellow box) to the results chain. The purple box is the threat reduction result we wish to see as the outcome.

Results Chains Showing Strategies and Key Intervention Points (Identified by link of strategy to results chain)

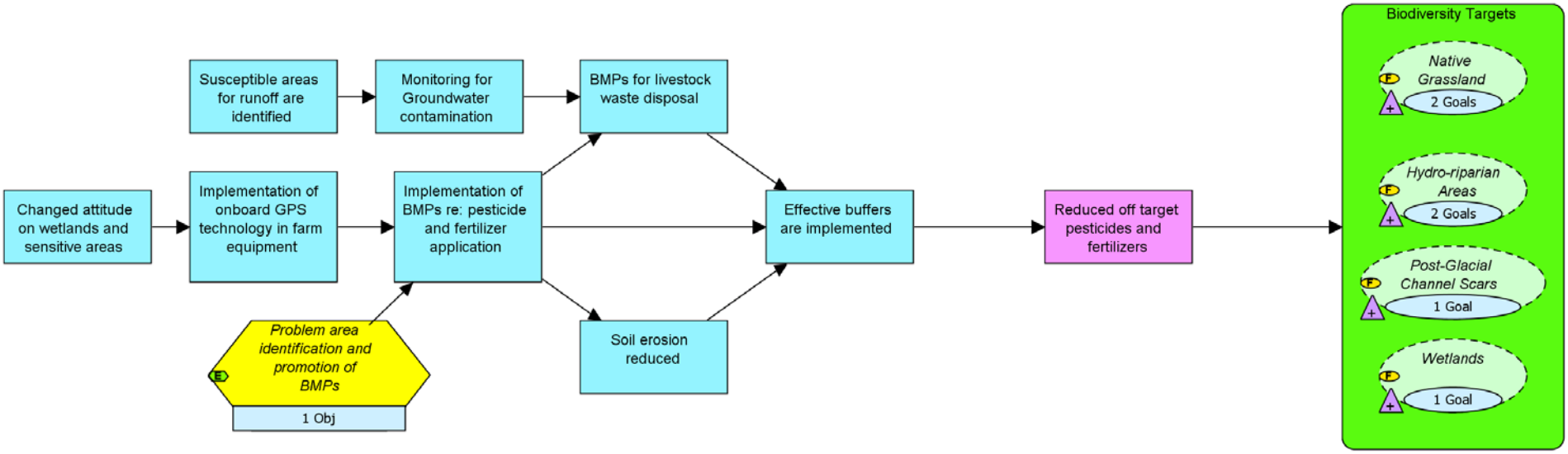

Figure 27: Results Chain: Agricultural Runoff - Best Management Practices

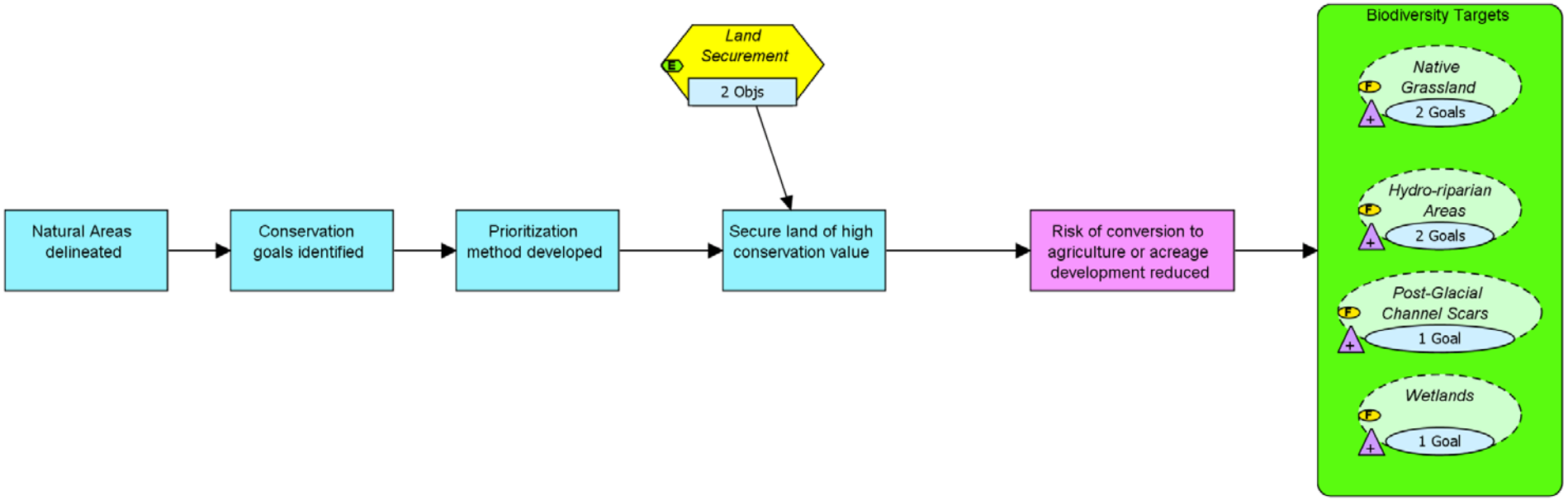

Figure 28: Results Chain: Conversion of Land - Land Securement

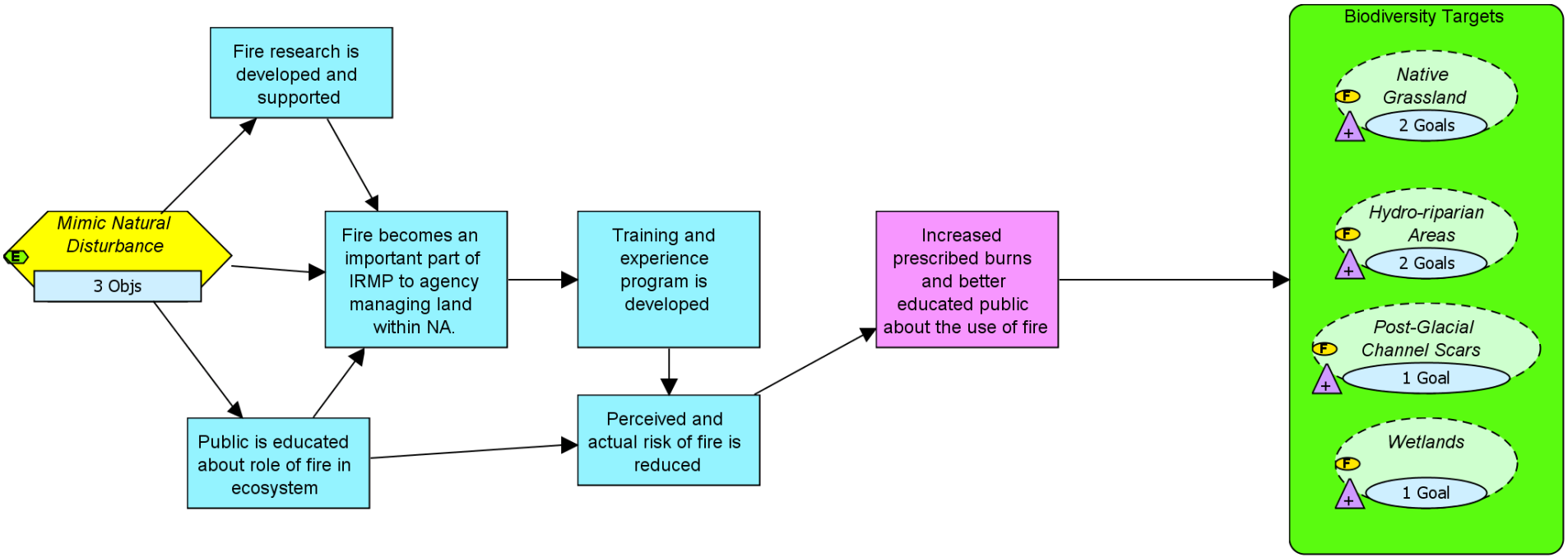

Figure 29: Results Chain: Fire and Fire Suppression - Natural Disturbance Regimes

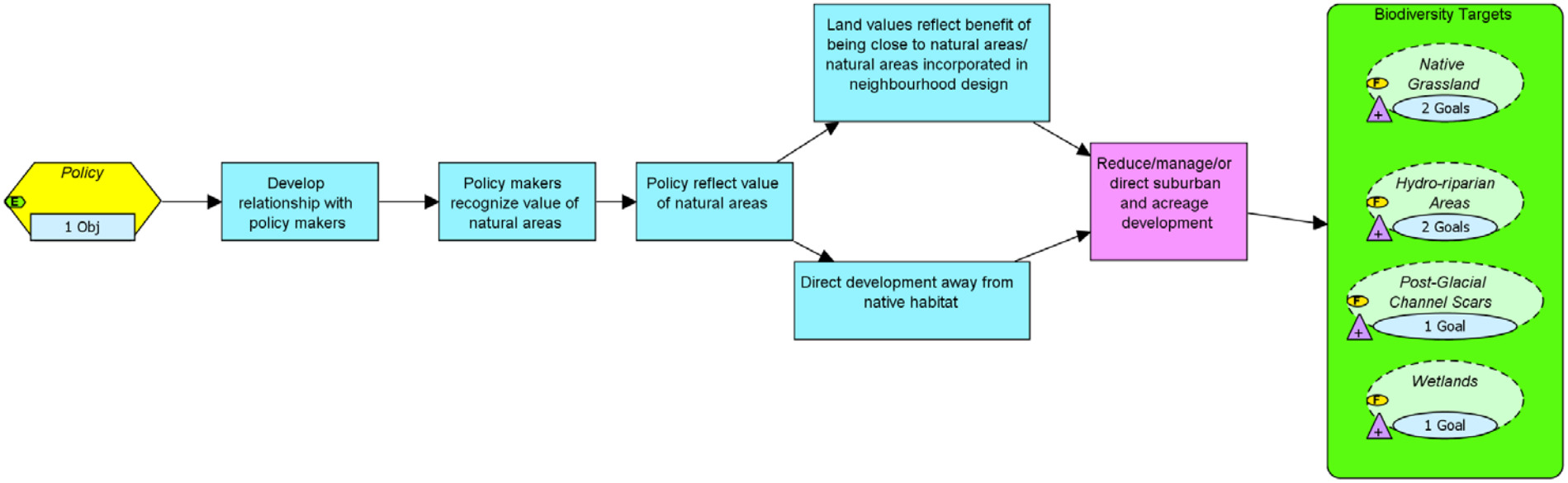

Figure 30: Results Chain: Development or Conversion of Land – Policy

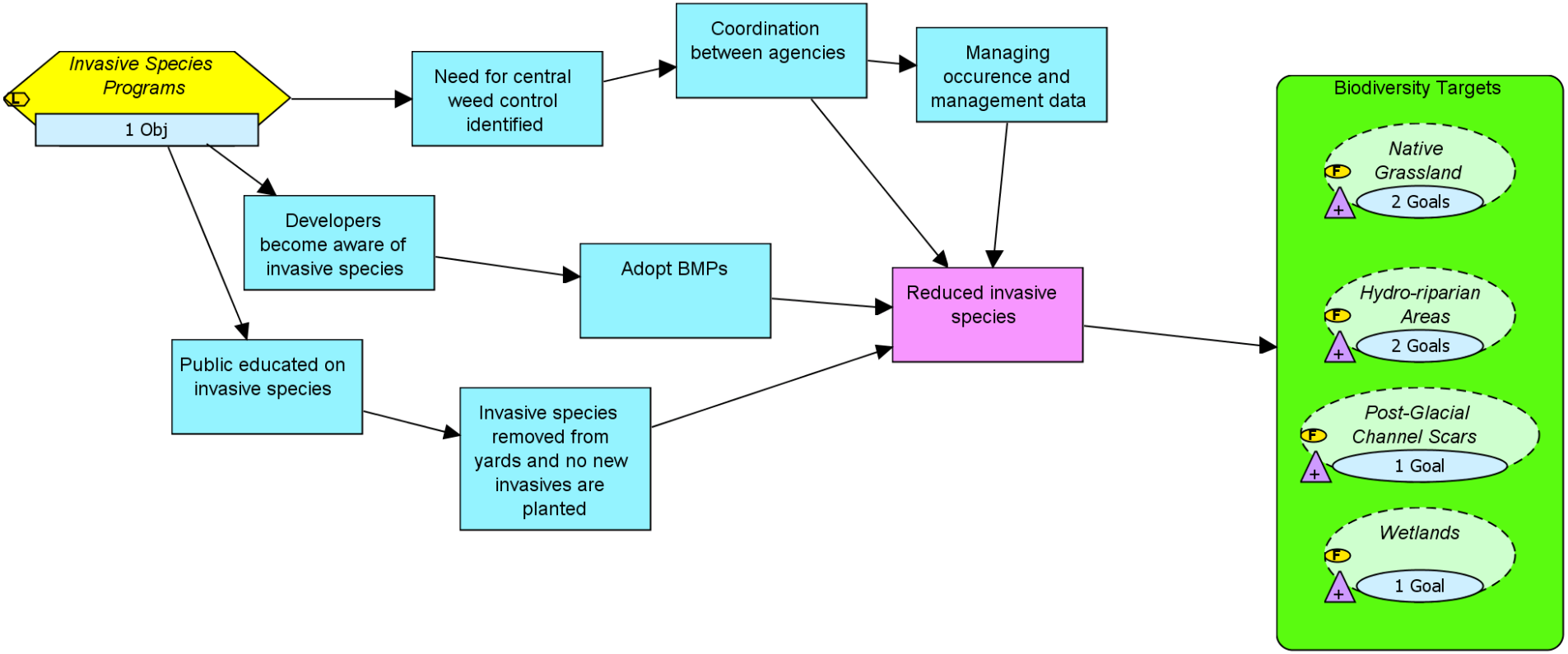

Figure 31: Results Chain: Invasive Species Programs

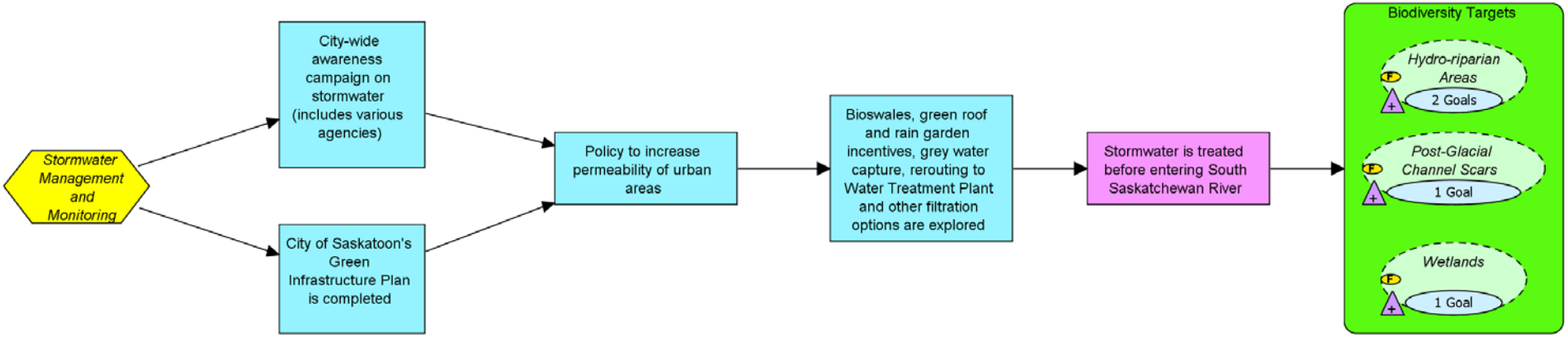

Figure 32: Results Chain: Stormwater Management

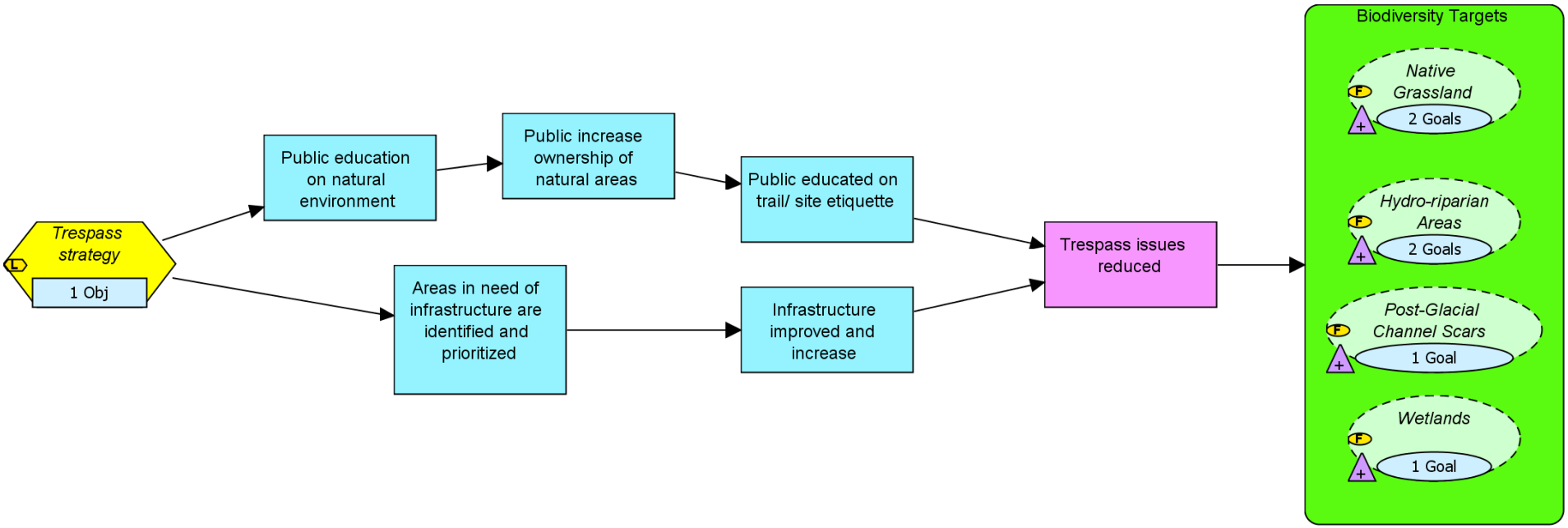

Figure 33: Results Chain: Trespass Issues Strategy

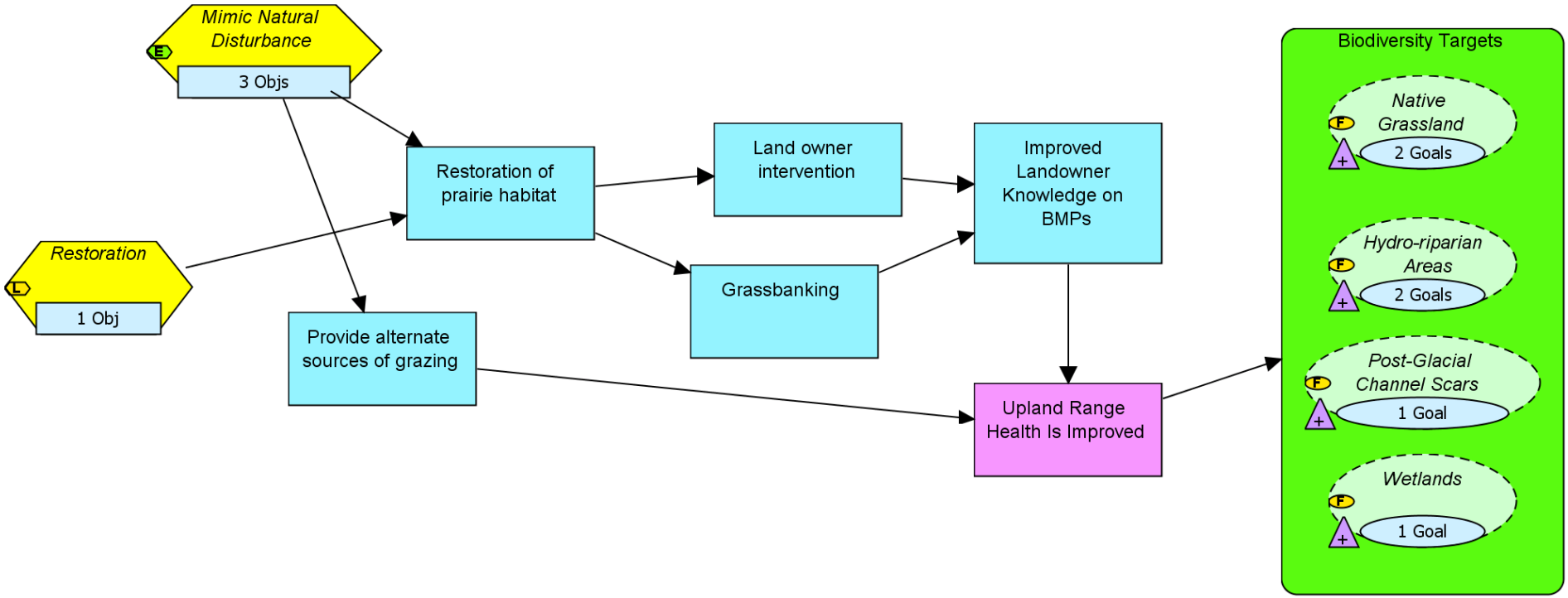

Figure 34: Results Chain: Unsustainable Grazing - Natural Disturbance Regime and Restoration

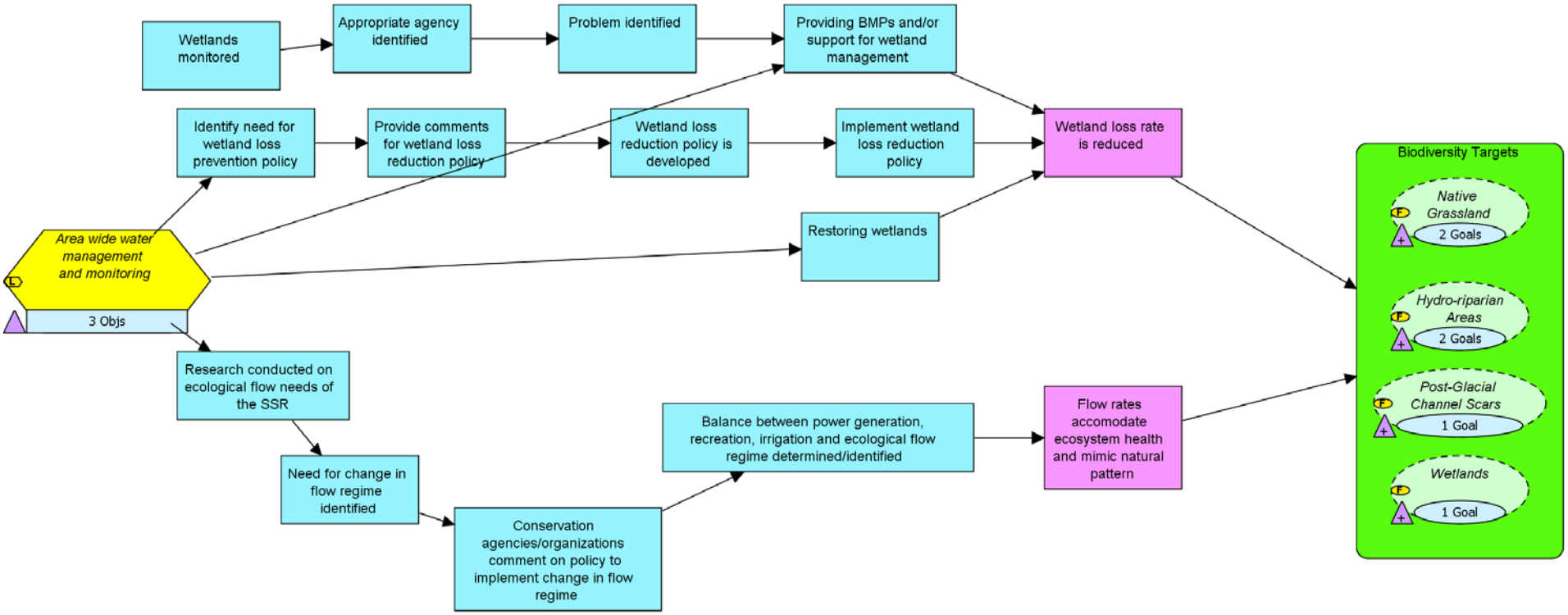

Figure 35: Results Chain: Water Management

4.3 Recommendations

4.3.1 Actions and Initiatives

Actions are the activities or tasks that conservation practitioners use to achieve their conservation planning objectives and goals. Strategies are made up of a group of actions with a common focus or goal. An example of this is the strategy of Restoration. This strategy is made up of all of the restoration based actions. Actions are a very important component of a project as this is the on-the-ground work that moves the conservation practitioner towards their goals to improve the status of their conservation targets. International Union for the Conservation of Nature (IUCN) categorizes actions in order to standardize conservation-based activities.

Table 10: List of IUCN Categories and Subcategories that the Meewasin Valley-wide RMP Actions Fall Under

Category	Subcategory
1.0 Land / Water Management	1.1 Site/Area Stewardship
	1.2 Ecosystem & Natural Process (Re)Creation
2.0 Species Management	2.1 Species Stewardship
	2.2 Species Re-Introduction & Translocation
	2.3 Ex-Situ Conservation
3.0 Awareness Raising	3.1 Outreach & Communications
4.0 Law Enforcement & Prosecution	4.1 Detection & Arrest
	4.3 Non-Criminal Legal Action
5.0 Livelihood, Economic and Moral Incentives	5.2 Better Products and Management Practices
6.0 Conservation Designation & Planning	6.1 Protected Area Designation and/or Acquisition
	6.2 Easements & Resource Rights
	6.3 Land/Water Use Zoning & Designation
	6.4 Conservation Planning
	6.5 Site Infrastructure
7.0 Legal & Policy Frameworks	7.1 Laws, Regulations & Codes
	7.2 Policies & Guidelines
8.0 Research & Monitoring	8.1 Basic Research & Status Monitoring
	8.2 Evaluation, Effectiveness Measures & Learning
9.0 Education & Training	9.1 Formal Education
	9.2 Training & Individual Capacity Development
10.0 Institutional Development	10.1 Internal Organizational Development & Support
	10.2 External Organizational Development & Support
	10.3 Alliance & Partnership Development
	10.4 Financing Conservation

See Appendix E "Action Plan" for the full list of actions

The Meewasin Valley-wide Resource Management Plan includes a list of over 180 recommended actions to be carried out over the next 10 years (2017-2027) (included in *Appendix E "Action Plan"*). These will form the basis of the annual work plan for Meewasin and involves many partnerships, which are the key to success of this plan. Not only do these partnerships include other agencies, but also include inter-departmental cooperation within Meewasin to carry out the various actions. An example of this is the creation and delivery of a Master Plan for a site, which includes Design and Development, Fund Development, Planning and Conservation, and Community Development. It is important to note that much of the work identified in the Action Plan is work that Meewasin is currently undertaking and may include expansions to that work (See "current initiative status" in the table below). The following table is a summary of the key initiatives and actions that Meewasin has identified as part of the Meewasin Valley-wide Resource Management Plan.

Table 11: Meewasin Key Initiatives 2017-2017 Summary

Key Initiatives	Key Actions - Summarized	IUCN Action Categories	Current Initiative Status
Awareness and Outreach	Conservation volunteers program developed and implemented	3.1	Existing and Expanded Initiatives
	Awareness of various resource management topics (invasive species, conservation programs (prescribed burning, grazing), poisonous and/or harmful plants and animals, storm water management, best management practices (agricultural and landscaping), river bank slumping) through various mechanism (signage, website, social media, presentations, publications, and tours)	3.1, 1.1, 5.2	Existing and Expanded Initiatives
	Awareness regarding Meewasin bylaws	3.1, 4.1	Existing and Expanded Initiatives
	Engage youth, university students and the general public in resource management concepts through public programs, tours, events and other forms of engagement	9.1	Existing and Expanded Initiatives
	Meewasin is the regional hub for training resource management practitioners	9.2	New Initiative
Clean-up / Pollution Mitigation	Abandoned water well decommissioning on Meewasin Conservation sites	1.1	New Initiatives
	Emergency spill planning and assistance for the South Saskatchewan River	1.1	Existing and Expanded Initiatives

Key Initiatives	Key Actions - Summarized	IUCN Action Categories	Current Initiative Status
Clean-up / Pollution Mitigation	Illegal dumping and littering awareness, clean-up and enforcement	1.1, 3.1	Existing and Expanded Initiatives
	Riverbank Clean-up Campaign coordination and delivery	1.1	Existing and Expanded Initiatives
	Storm water management utilization of natural and created wetlands	1.2	Existing and Expanded Initiatives
Conservation Planning	Develop and implement site-specific Resource Management Plans for Meewasin Conservation sites	6.4	Existing and Expanded Initiatives
	Define, delineate and inventory swales in the Saskatoon Region	6.4	New Initiative
	Delineate and inventory natural systems (e.g. grasslands, wetlands) in the Saskatoon Region	6.4	Existing and Expanded Initiatives
	Develop a monitoring and management strategy for Aquatic Invasive Species	6.4	Existing and Expanded Initiatives
	Develop a riverbank slope stability feasibility framework with the City of Saskatoon	6.4	Existing and Expanded Initiatives
	Develop and update Master Plans for new and existing Meewasin sites	6.4	Existing and Expanded Initiatives
	Green Infrastructure Strategy developed with the City of Saskatoon	6.4	Existing and Expanded Initiatives
	State of the Valley Report is updated in 2018 and 2023	6.4	Existing and Expanded Initiatives
	Evaluate implementation of Meewasin Valley-Wide Resource Management Plan annually	8.2	New Initiative
	Evaluate implementation of Meewasin site-specific resource management plans annually	8.2	Existing and Expanded Initiatives
	Baseline inventories are completed or update for all Meewasin Conservation sites	8.1	Existing and Expanded Initiatives
Habitat Conservation - Securement and Designation	Expand Meewasin's Conservation Zone according to Meewasin's Land Policy	6.1, 6.2, 6.3	Existing and Expanded Initiatives
	Investigate UNESCO Biosphere Reserve designation for Meewasin NE Swale, Small Swale, Meewasin Valley, and Wanuskewin Heritage Park	6.3	New Initiative
	Heritage Rivers designation for the South Saskatchewan River in partnership with the Partners FOR Saskatchewan River Basin	6.3	Existing and Expanded Initiatives

Key Initiatives	Key Actions - Summarized	IUCN Action Categories	Current Initiative Status
Habitat Conservation - Securement and Designation	Partner with other land trusts on habitat conservation	6.1, 6.2, 6.3	Existing and Expanded Initiatives
	Priority conservation lands within the City of Saskatoon and Meewasin's Conservation Zone are incorporated as Meewasin Conservation Sites	6.1, 6.2, 6.3	Existing and Expanded Initiatives
	Protective designation for conservation sites within City of Saskatoon	6.3	Existing and Expanded Initiatives
	Secure conservation priority lands in Fee Simple or with Conservation Easements through purchase or donation options	6.1, 6.2	Existing and Expanded Initiatives
	UNSECO Heritage Site designation for Wanuskewin Heritage Park	6.3	Existing and Expanded Initiatives
Habitat Enhancement	Bird and bat house placement for habitat enhancement	2.1	Existing and Expanded Initiatives
	Enhancement activities to improve grassland bird habitat	1.1	Existing and Expanded Initiatives
	Enhancement activities to improve habitat for species at risk	1.1	Existing and Expanded Initiatives
	Enhancement activities to improve Plains Rough Fescue habitat	1.1	Existing and Expanded Initiatives
	Enhancement activities to improve the ecological health of native grasslands, wetlands and riparian areas	1.1	Existing and Expanded Initiatives
	Enhancement of native grasslands with prescribed burning and conservation grazing programs	1.2	Existing and Expanded Initiatives
	Enhancement projects to improve fish habitat along the South Saskatchewan River and tributaries	2.1	Existing and Expanded Initiatives
	Protection of select urban forest trees from beaver activity	1.1	Existing and Expanded Initiatives
Habitat Restoration	Continuation of Meewasin's native plant greenhouse and nursery program	1.2	Existing and Expanded Initiatives
	Drained wetland restoration	1.2	New Initiatives
	Eastern cottonwood forest restoration	1.2	New Initiatives
	Native grassland restoration	1.2	Existing and Expanded Initiatives
	Restoration of snow dump site in the Small Swale	1.2	New Initiatives
	Riparian and wetland buffer restoration	1.2	New Initiatives
	Stormwater pond restoration at the Meewasin Northeast Swale	1.2	Existing and Expanded Initiatives

Key Initiatives	Key Actions - Summarized	IUCN Action Categories	Current Initiative Status
Habitat Restoration	Utilization of locally sourced native plant material on restoration projects on Meewasin Conservation sites and within the Meewasin Conservation Zone	1.2	Existing and Expanded Initiatives
Invasive Species	Aquatic invasive species awareness, monitoring and control	1.1, 3.1	Existing and Expanded Initiatives
	Early detection, rapid response for new invasive species occurrences	1.1, 3.2	Existing and Expanded Initiatives
	European Buckthorn awareness, monitoring and control	1.1, 3.2	Existing and Expanded Initiatives
	Invasive wildlife awareness, monitoring and control	1.1, 3.2	New Initiatives
	Non-native tree, shrub, grass and ornamental invasive species awareness, monitoring, and control	1.1, 3.1	Existing and Expanded Initiatives
	Provincially designated noxious and prohibited weed awareness, monitoring and control	1.1, 3.1	Existing and Expanded Initiatives
Meewasin Capacity Building	Fundraise for the Meewasin Conservation endowment fund to ensure long-term conservation and stewardship of Meewasin Conservation sites	10.4	Existing and Expanded Initiatives
	Fundraise to implement Valley-wide Resource Management Plan	10.4	Existing and Expanded Initiatives
Monitoring	Develop a monitoring framework for the Meewasin Valley	8.1	New Initiative
	Develop, foster and continue partnerships with other agencies and the public regarding monitoring	8.1	Existing and Expanded Initiatives
	Implement, expand and continue ecological monitoring and citizen science programs (water quality, vegetation, wildlife, birds, invasive species, dark sky quality, etc.) as part of the monitoring framework	8.1	Existing and Expanded Initiatives
	Report, to various databases and agencies, information collected through monitoring program	1.1, 8.1	Existing and Expanded Initiatives
Partnerships	Foster, develop and continue working relationships and partnership opportunities with local, regional and provincial NGOs, government agencies and special interest groups related to conservation, resource management, and land trust activities in the Saskatoon region	10.2, 10.3	Existing and Expanded Initiatives

Key Initiatives	Key Actions - Summarized	IUCN Action Categories	Current Initiative Status
Partnerships	Conservation Directory development	10.3	New Initiative
	Foster, develop and continue working relationships and partnership opportunities with the academic institutions including University of Saskatchewan and Saskatchewan Polytechnic.	10.3	Existing and Expanded Initiatives
	Foster, develop and continue working relationships and partnership opportunities with the agricultural community	10.3	Existing and Expanded Initiatives
	Partner and work collaboratively with City of Saskatoon's Parks Naturalization Program	10.3	Existing and Expanded Initiatives
	Develop and implement a Cooperative Weed Management Area partnership agreement with the City of Saskatoon and RM of Corman Park	10.3	New Initiative
	Engage various stakeholders and user groups utilizing the South Saskatchewan River and Meewasin Valley	10.3	Existing and Expanded Initiatives
Policies and Regulations	Conservation Offsets to mitigate the loss of habitat in the Saskatoon region is examined and developed	7.2	New Initiative
	Continuation of Meewasin's Development Review process	7.1	Existing and Expanded Initiatives
	Dark Skies Policy developed and implemented with the City of Saskatoon	7.2	Existing and Expanded Initiatives
	Enforce, review and update Meewasin bylaws	4.1	Existing and Expanded Initiatives
	Meewasin's Land Policy, Northeast Policy, and Development Review policies implemented	7.2	Existing and Expanded Initiatives
	Partner with local enforcement agencies	4.1	Existing and Expanded Initiatives
	Wetland Policy is implemented with the City of Saskatoon	7.2	Existing and Expanded Initiatives
Site Infrastructure	Dark-sky friendly lighting is installed adjacent to and within Meewasin Conservation sites	6.5	Existing and Expanded Initiatives
	Infrastructure installed, as required, to restrict off-highway vehicle access to ecologically sensitive areas	6.5	Existing and Expanded Initiatives

Key Initiatives	Key Actions - Summarized	IUCN Action Categories	Current Initiative Status
Site Infrastructure	Wildlife-friendly fencing designed and installed on Meewasin Conservation sites	6.5	Existing and Expanded Initiatives
	Wildlife-friendly movement designs in road construction adjacent and through Meewasin Conservation sites is designed and implemented	6.5	Existing and Expanded Initiatives
Species Stewardship and Management	Beaver management strategy for the urban forest and Wanuskewin Heritage Park	2.1	New Initiatives
	Collection of native plant diversity (plant specimens and seed) for inclusion in the WP Fraser Herbarium and Plant Gene Resources of Canada's Seed Bank	2.3	New Initiative
	Delayed mowing and haying until July 15th for grassland birds on Meewasin Conservation sites	2.1	Existing and Expanded Initiatives
	Feasibility study to determine the reintroduction of species to Meewasin Conservation sites	2.2	New Initiatives
	Management of the fish ladder at the weir	2.1	Existing and Expanded Initiatives
	Plains Bison reintroduction at Wanuskewin Heritage Park	2.2	New Initiatives
	Rehabilitated injured wildlife are released at Meewasin Conservation sites	2.3	Existing and Expanded Initiatives

5. Monitoring and Implementation Plan

"Effective monitoring uses the minimum amount of financial and human resources to provide you with the minimum credible information needed to determine if your project is on track and achieving stated objectives" (Conservation Measures Partnership 2013). In other words, monitoring is used to judge whether or not we are doing what we intended to do and determine if we are being effective and efficient. The measurement of success and failures helps conservation planners to learn from their mistakes and correct their course to achieve their objectives and goals. There are two types of monitoring that will be done as a result of this plan: 1) status monitoring and 2) effectiveness monitoring. Status monitoring is done in conjunction with the viability assessment and allows us to update our information to best reflect the current status of our conservation targets to understand trends and data gaps. Effectiveness monitoring tells us whether or not we are getting the job done and completing actions. Both types of monitoring will be done annually and reported in the "Annual Update" for accountability.

See Appendix E for "Action Plan" for monitoring activities

Table 12: Example Action Progress Report for Monitoring to be Updated Annually within Miradi Software

Action	Date to Be Completed By	Partnerships	Progress
6.5.2 Existing fences at Meewasin Conservation sites are updated to ensure fencing is wildlife friendly.	By 2027, all fencing on Meewasin Conservation sites is updated to wildlife-friendly fencing standards.	City of Saskatoon, Saskatoon Nature Society, Northeast Swale Watchers	Underway
5.2.2 Partner with the Ministry of Agriculture and the agricultural community to utilize Meewasin Conservation sites for promotion of best management practices for native prairie management.	By 2021, an annual event is hosted on a Meewasin Conservation site to promote best management practices to the agricultural community.	Ministry of Agriculture, PCAP, Saskatchewan Stock Growers Association, Livestock groups	Not started

6. Risk Assessment

6.1 Risk Assessment

The purpose of the risk assessment is to identify risks that will have an impact on the implementation of this plan and its associated actions. As with most risks, implementation relies heavily on funding opportunities and so financial risks dominate the risk assessment.

See Appendix B for "Stakeholders, Conservation Agencies and Opportunities in Partnership" for opportunities for plan implementation

Table 13: Risks to Conservation or Implementation of the Meewasin Valley-wide Resource Management Plan

Risk	Key Assumptions	Probability of Occurrence	Potential Impact	Mitigation Strategy	Likelihood of Success
Meewasin loses current funding.	Provincial funding under review at time of writing.	Low to medium	Parts of plan would not be implemented. General freeze on conservation in the area.	Public concern might prevent or reverse funding cuts. Meewasin may become more dependent on the City of Saskatoon. Meewasin continues to apply for funding grants.	Low to medium
Drastic rise in land prices.	This makes securement much more difficult.	Medium	Key corridors are not conserved.	Prioritize land securement away from areas of high likelihood of city growth.	Low to medium
Area planning exercises ignore or downplay conservation needs.	This could make it difficult to secure land or enact programs.	Medium	Decrease in ecosystem health across the planning area.	Attend meetings as requested and maintain contact with City of Saskatoon, local RMs and planning groups	Medium to high

Risk	Key Assumptions	Probability of Occurrence	Potential Impact	Mitigation Strategy	Likelihood of Success
Funding sources decrease for conservation agencies.	Agencies have fewer programs to offer making them less effective partners. This will make it difficult for partner agencies to be effective and we require some of their program to help.	High	Less benefits to all residents and visitors of Saskatchewan from conservation agencies due to decreased capacity (education programs, natural sites, best management practices programs, etc.)	Continue using other agency information and make sure we acknowledge the importance of the info in any publications produced. Include agencies in grants, projects and land securement opportunities.	Medium
Loss of data sources.	Budget cuts may make it more difficult to get up-to-date data (from all agencies) that this plan assumes will be present.	Low to medium	Decisions cannot be made or are not made with the best information.	Continue to request, use, and cite data from ministries that produce and maintain it.	Low to medium
Change in economic conditions.	This could have a huge ripple effect on land use because of an increase in city growth.	Low to medium	City growth would impact identified targets and increase pressure on ecosystem services.	Prioritize actions where land is most affordable. Continue to comment on land planning activities as opportunities arise.	Low to medium

7. Communications Plan

In 2015, Meewasin received funding from Environment and Climate Change Canada through the Habitat Stewardship Program - Prevention Stream to develop a Meewasin Valley-wide Resource Management Plan. Meewasin currently has some site specific Resource Management Plans, however, this new plan will connect the entire region by developing over-arching conservation goals and strategies. Concurrent to our planning window, the Nature Conservancy of Canada - Saskatchewan Region (NCC) was preparing to update their 2008 Saskatoon Prairie Natural Areas Conservation Plan and so a partnership was born. Meewasin has partnered with the NCC and used their conservation planning method, the Open Standards of Conservation Planning. This is an internationally recognized model for conservation planning and has been adopted by The Nature Conservancy, World Wildlife Fund, and the United States Fish and Wildlife Service. The deliverables of this plan will be the identification of conservation goals, the prioritization of conservation targets, the ranking of the greatest threats to conservation in the planning region, and strategies and partnerships to mitigate these threats. Additionally, a work plan and monitoring plan will be developed and implemented.

Desired Outcome: An adaptive over-arching Resource Management Plan for the Meewasin Valley with work plan, implementation and monitoring for the next 10 years with opportunity to revisit plan every 2 years.

Want to Avoid: A static document that is not fully adopted / supported by all staff, field work activities, funding opportunities or partnerships.

Goals of a Communications Plan: The Meewasin Valley-wide Resource Management Plan will demonstrate that Meewasin is a regional, provincial and Canada-wide leader in conservation. This recognition of the value of Meewasin's work will increase funding sources and enhance Meewasin's legacy.

Audience of the Meewasin Valley-wide RMP: Other conservation agencies (world-wide), participating parties (City of Saskatoon, Government of Saskatchewan and University of Saskatchewan), donors, the general public, and for use in grant applications.

Report distribution and Advertisement:

- Meewasin documents including the Annual Report;
- Social media including Facebook, Twitter, LinkedIn, and Instagram;
- Key stakeholders and Meewasin committees to spread the word;
- Meewasin's website;
- Through Meewasin's newsletter, the Explorer;
- Meewasin site tours ; and
- By Meewasin staff to the public.

8. Summary

Figure 36: Cranberry Flats Conservation Area aerial (2009)

The Meewasin Valley-wide Resource Management Plan is a 10 year conservation plan for the area encompassing the Meewasin Valley. This plan is a living document that allows updates and new information to be added as it is acquired. Annual updates will reflect the Open Standards Model and will include the yearly work plan, detailed budgets, what we have learned from the previous work of the plan (successes and failures), and updates to the viability assessment including any new information and status changes.

The conservation targets of hydro-riparian areas (rivers, creeks and the riparian vegetation surrounding them), post-glacial channel scars (swales), native grasslands and wetlands make up most of the complex ecosystems within the Meewasin Valley-wide Resource Management planning area. The key ecological attributes focus on connectivity and ecosystem health (also includes density, diversity, population size and natural disturbance regime). Viability was rated as fair for all conservation targets with the data available. The viability assessment acknowledges some data gaps, which are to be filled as new information becomes available. Threats to the conservation targets are many and varied, but invasive species stand out as the greatest threat to conservation within the planning area (very high threat). Other high threats include climate change, dams and water management, runoff of pesticides and fertilizers, trespass issues, stormwater, and fire and fire suppression. The list of actions (and their associated strategies) to improve the health of the targets is lengthy, but partnerships make these objectives manageable.

The goals and objectives are reflected by the vision and purpose of this report. The results of the Meewasin Valley-wide Resource Management Plan and the conservation work that Meewasin carries out as a result of the plan will continue to position Meewasin as a leading conservation agency and land trust in the Meewasin Valley. Meewasin engages in the active conservation and enhancement of biodiversity, native species, habitats, and ecosystems through its strong and integrated resource management program. Awareness is created about the physical and mental health benefits provided through the conservation of these natural areas and there are increased opportunities for the citizens and visitors of the Meewasin Valley to access and connect with nature. Meewasin has many successful partners within all jurisdictions (that Meewasin's jurisdiction intersects) and many different agencies, non-government organizations, volunteer groups, landowners, and the general public through a united goal to enhance and maintain these ecologically connected landscapes of the Meewasin Valley. Meewasin's resource management program is regionally, provincially, nationally and internationally recognized for its success in conserving the Meewasin Valley.

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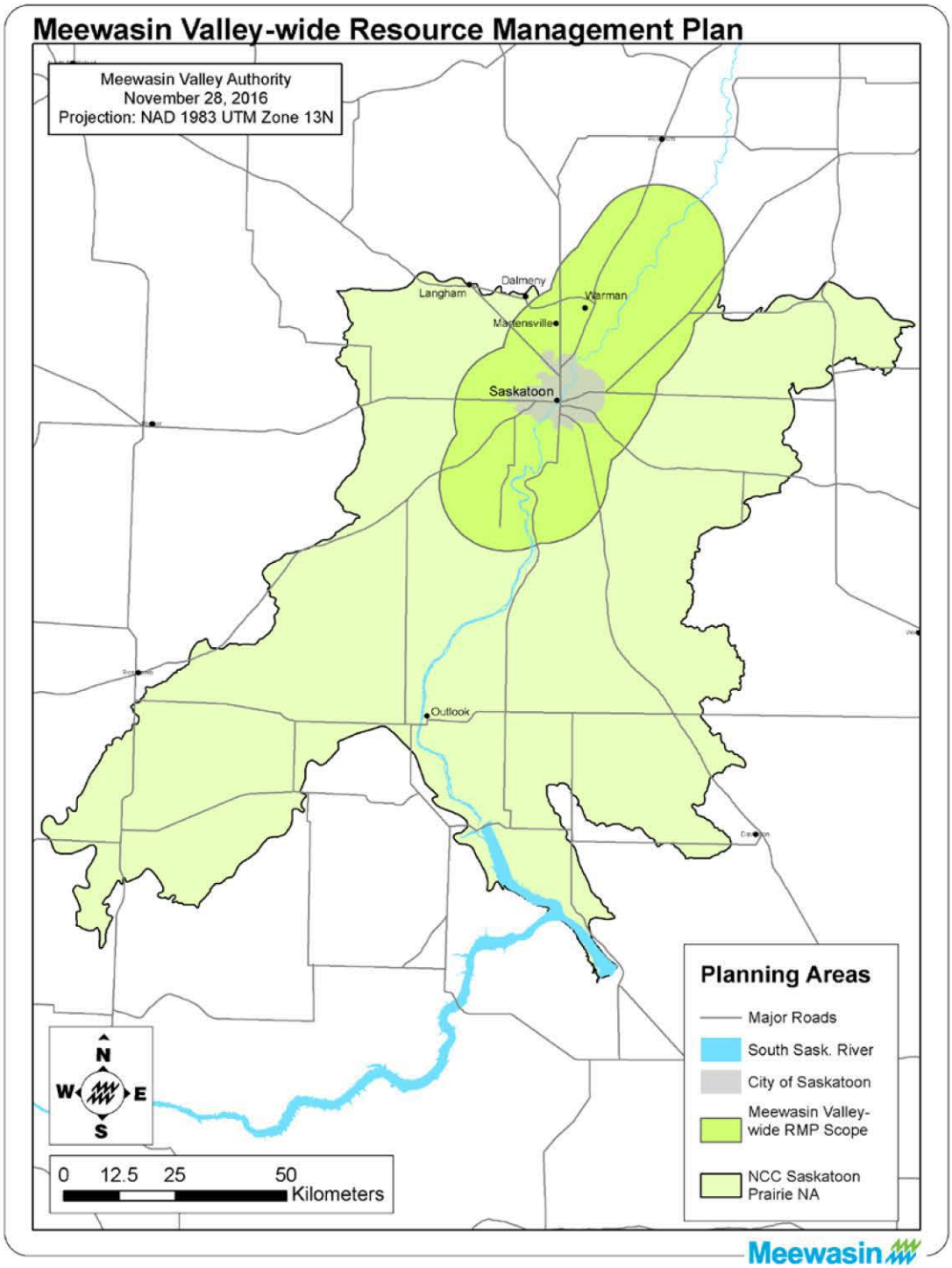
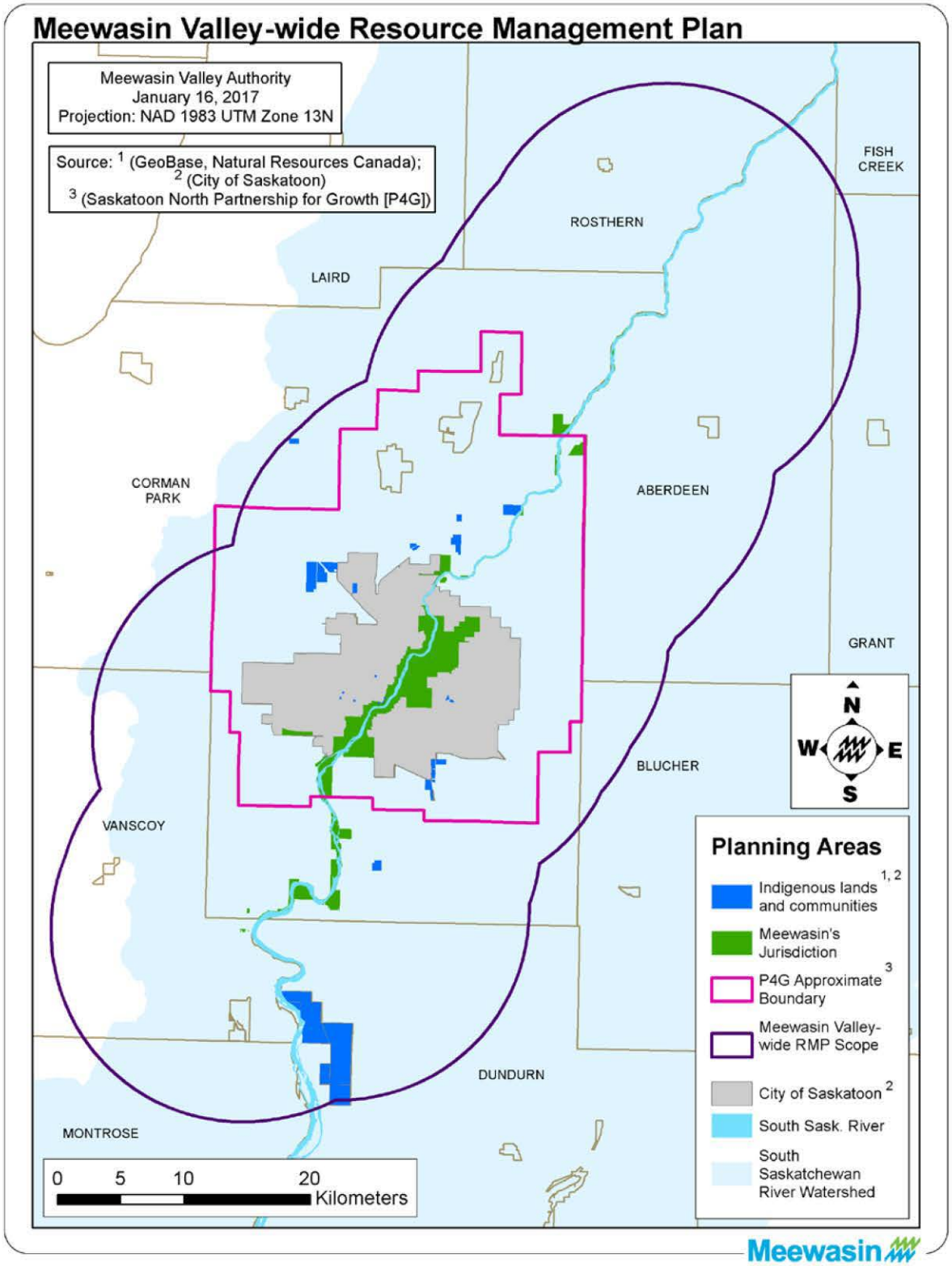
Appendix A - Maps

Scope and Context

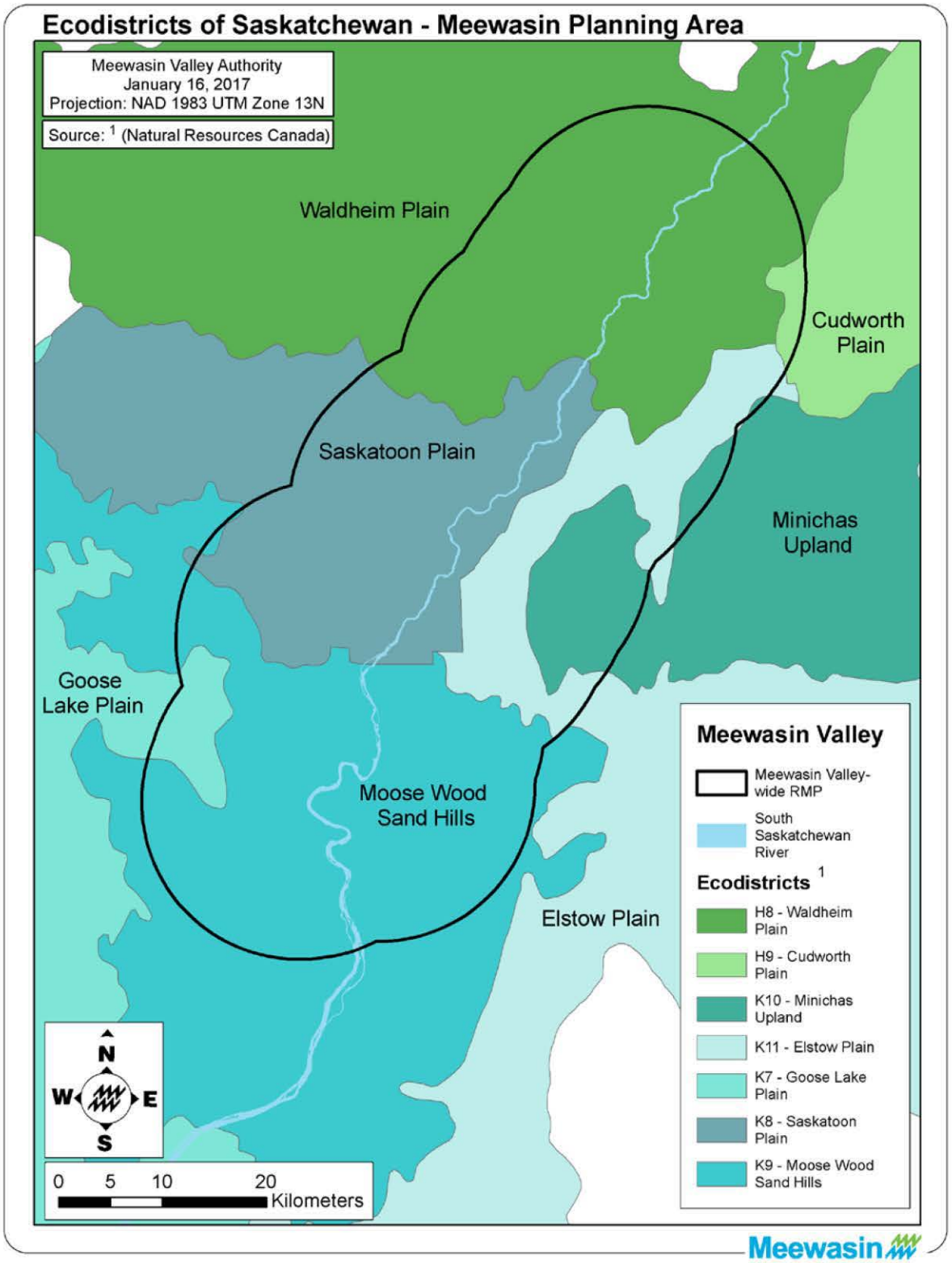
Map 1: Meewasin Valley-wide Resource Management Planning Area



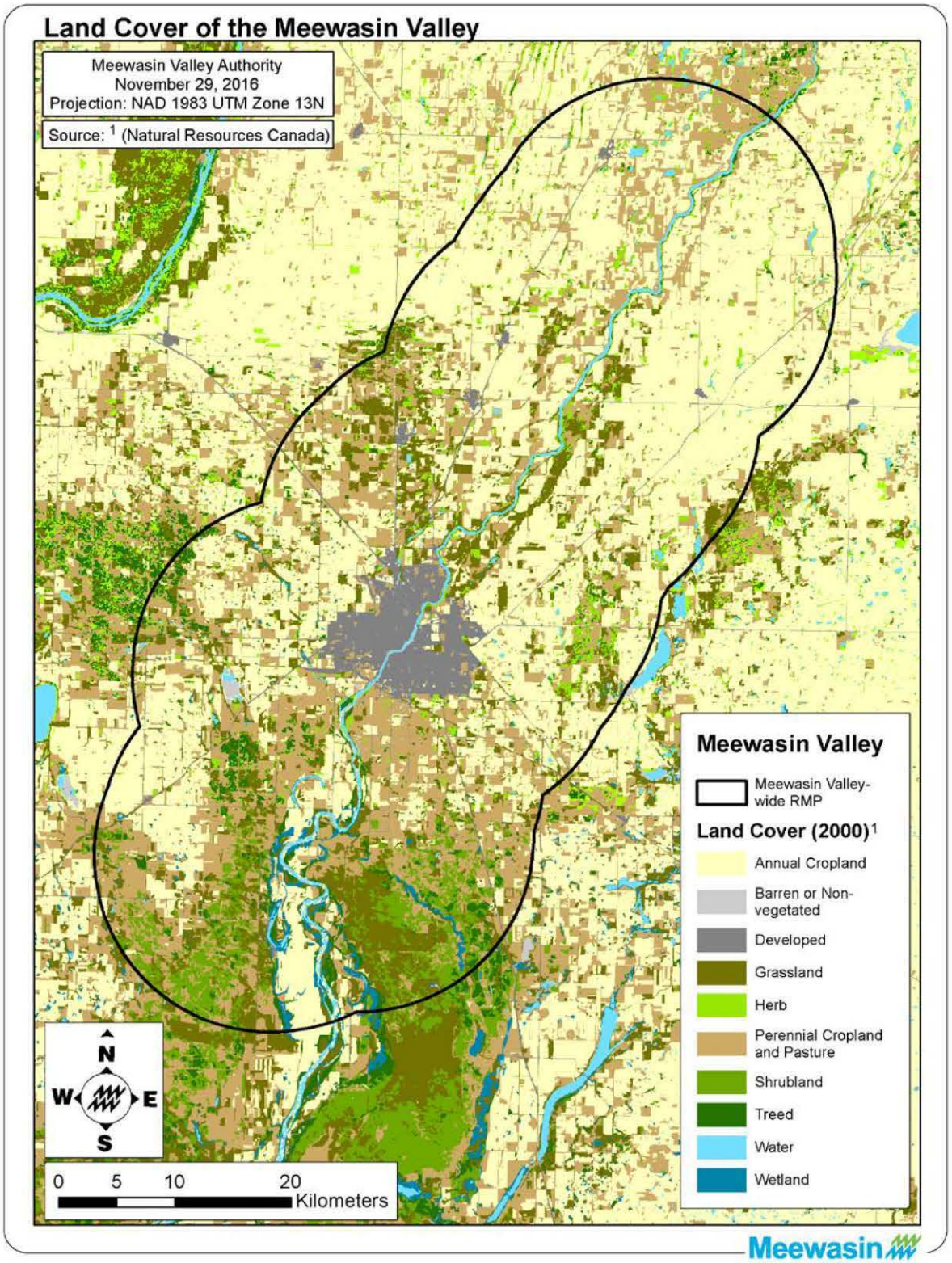
Map 2: Meewasin Valley Planning Areas Overlap



Map 3: Ecodistricts of the Region

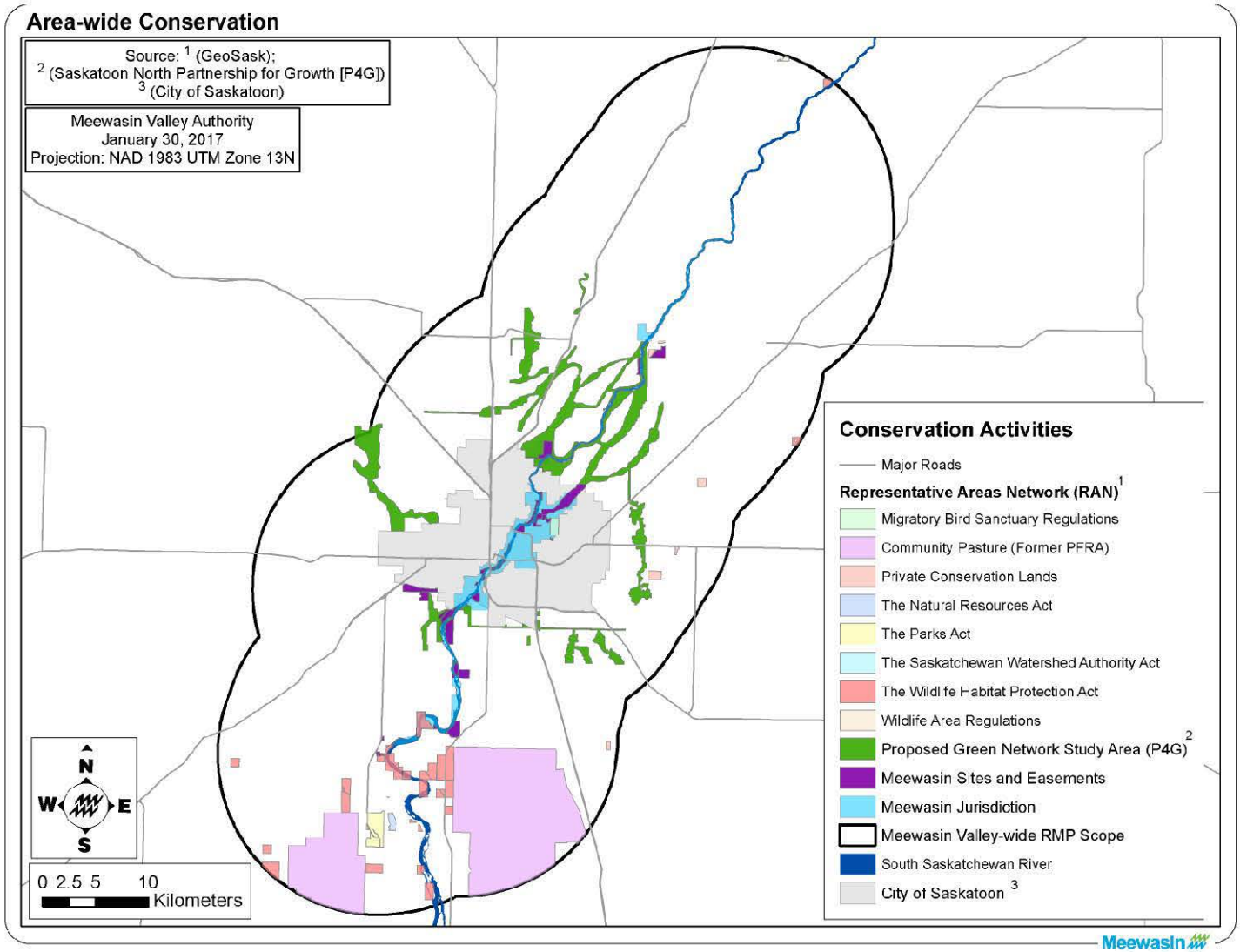


Map 4: Land Cover Classifications of the Region

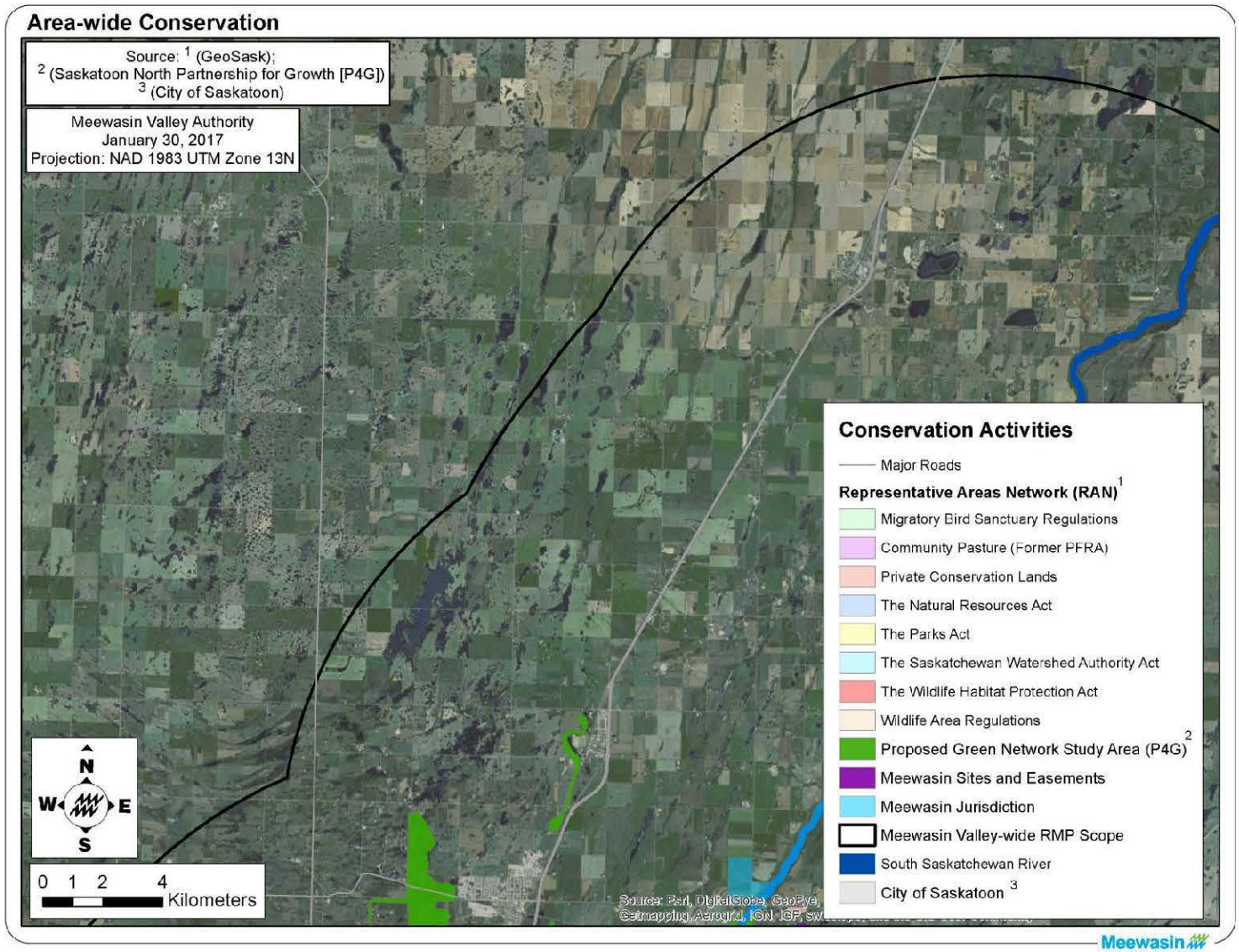


Conservation

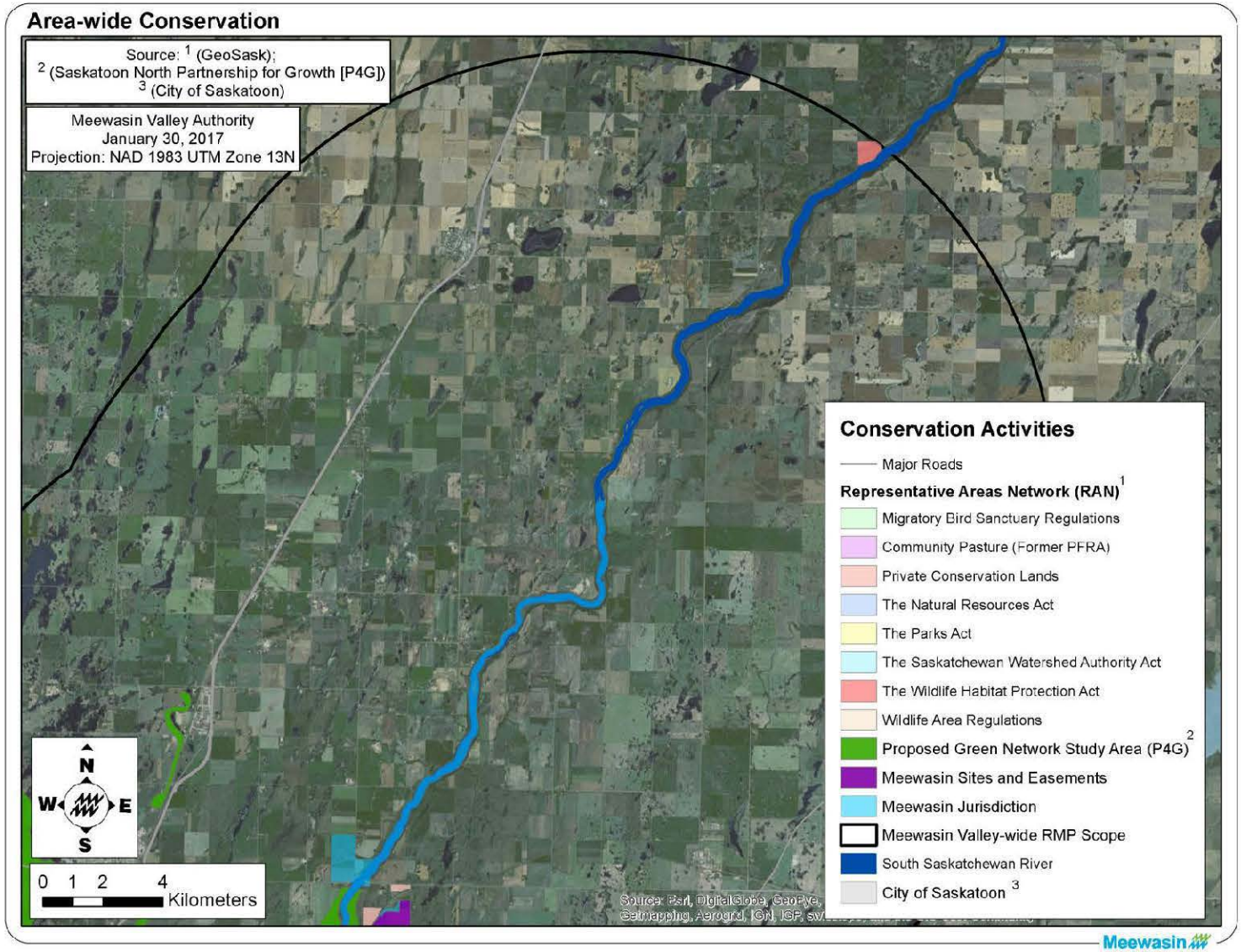
Map 5: Conservation Activities in the Region (All)



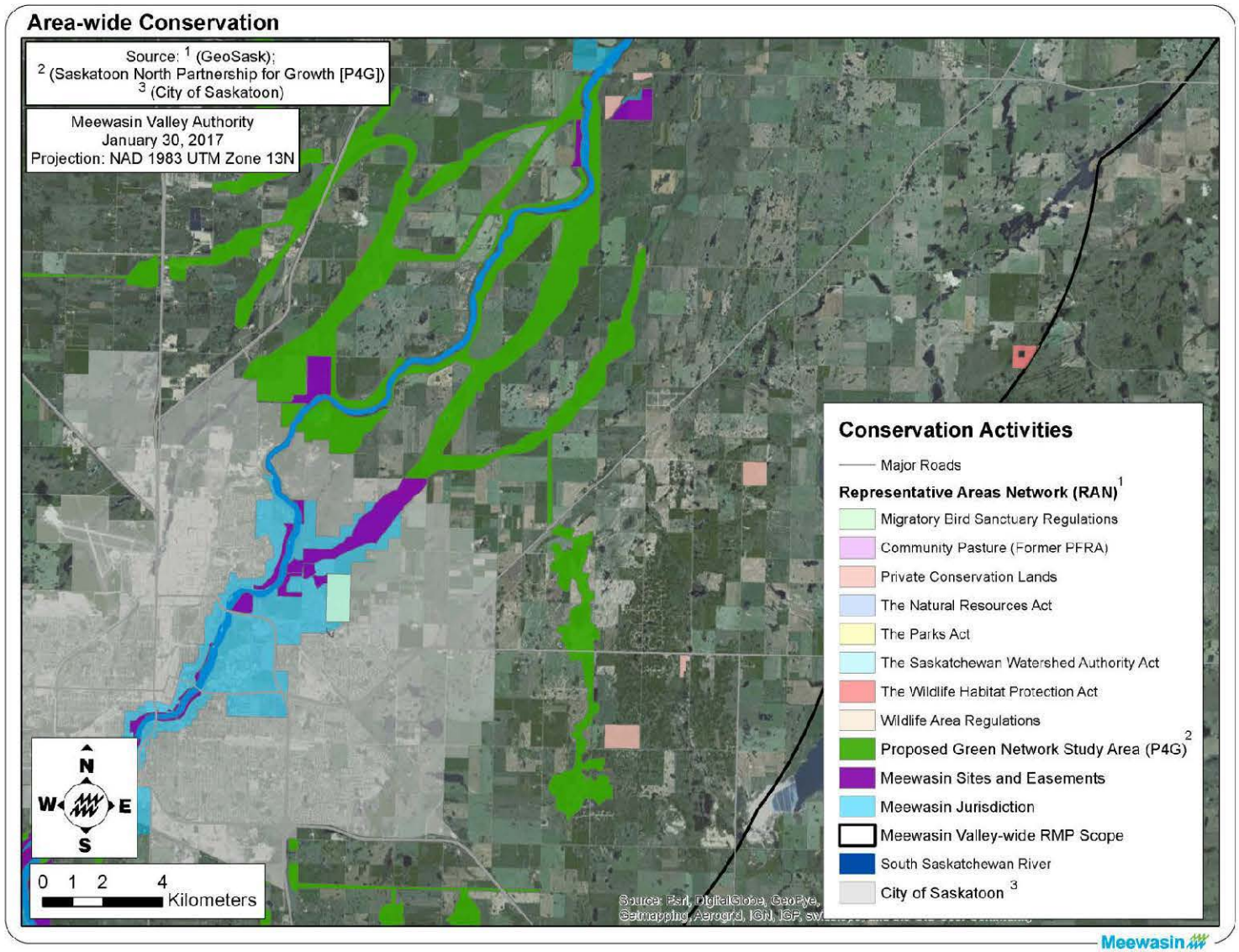
Map 6: Conservation Activities in the Region (Northwest)



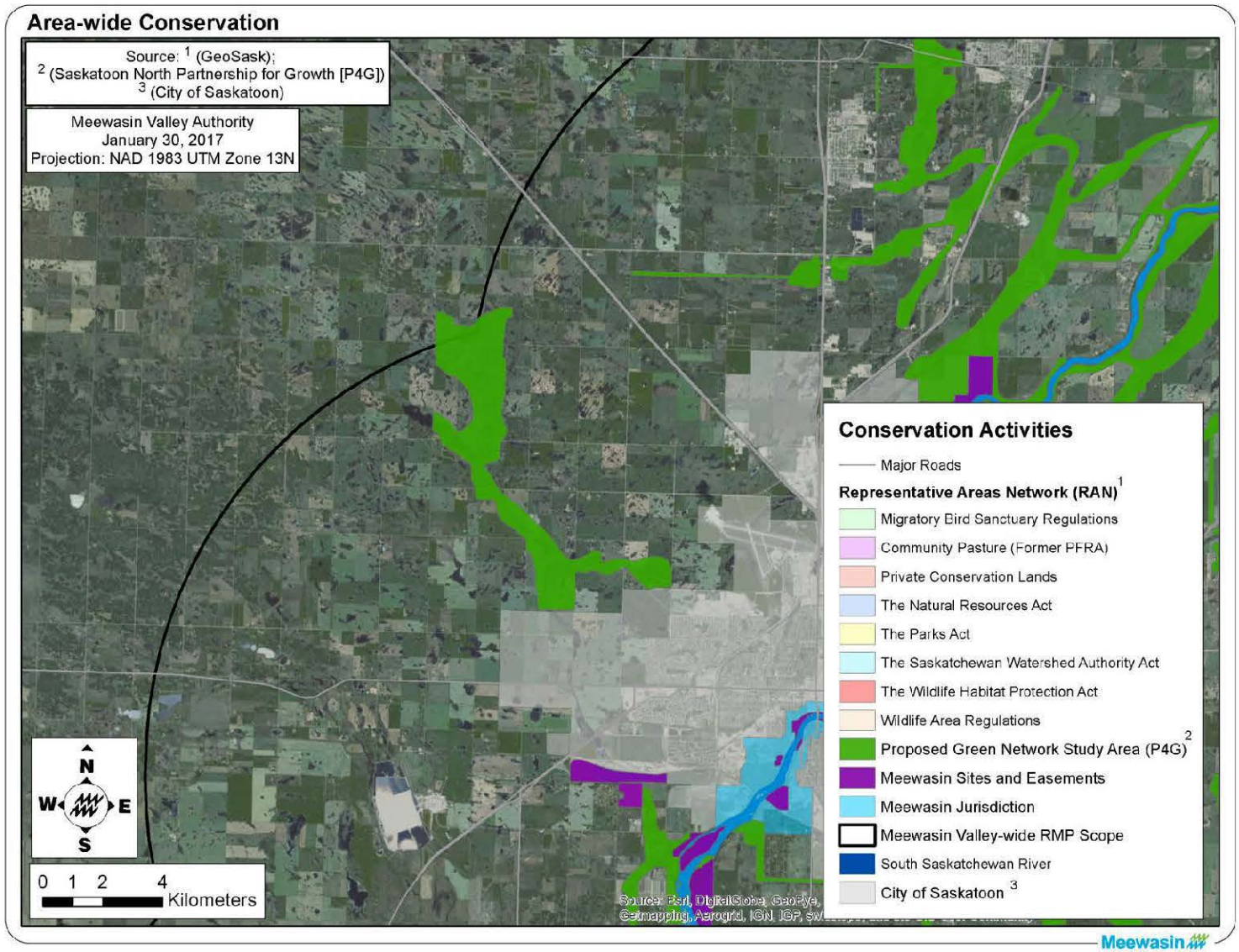
Map 7: Conservation Activities in the Region (Northeast)



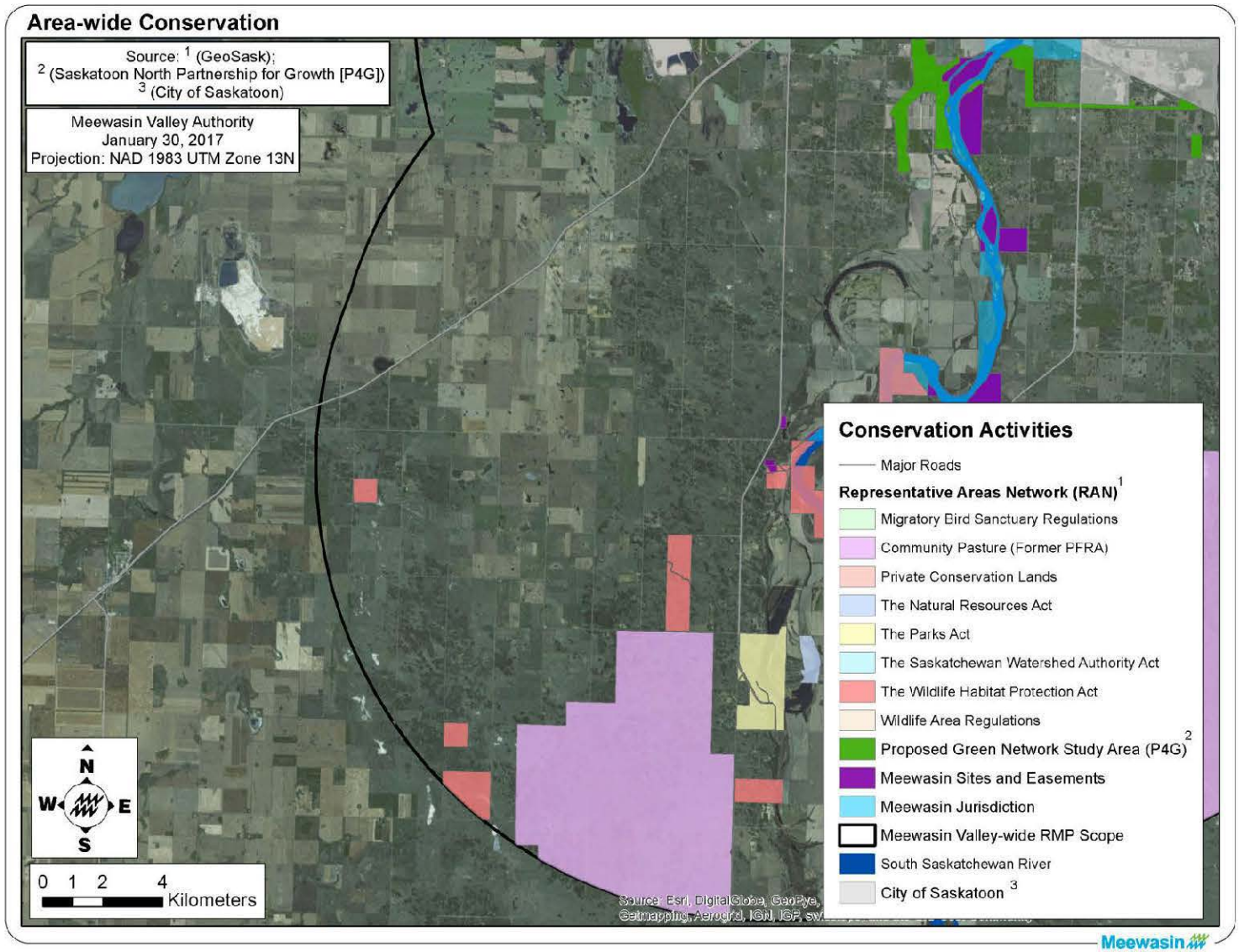
Map 8: Conservation Activities in the Region (Central - East)



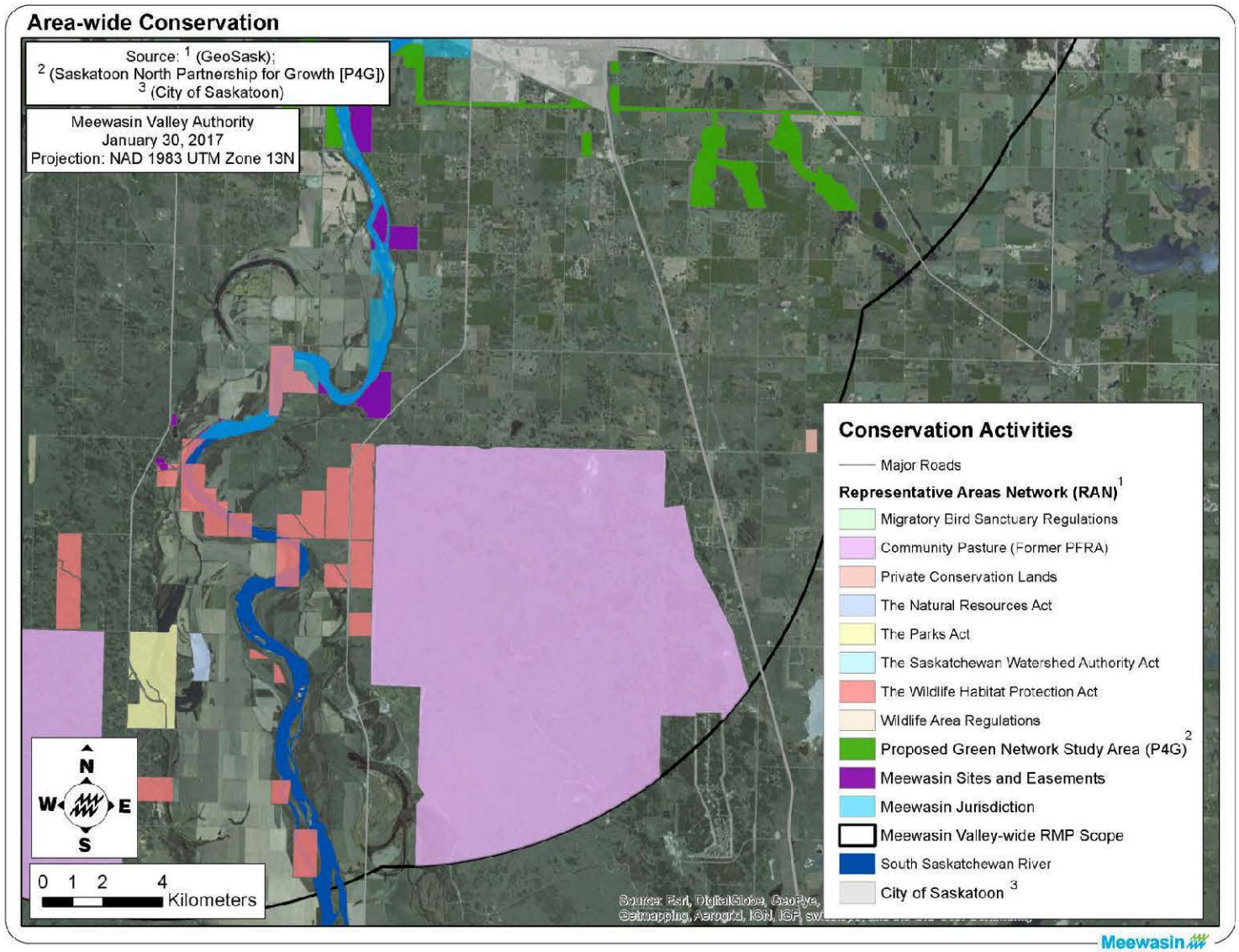
Map 9: Conservation Activities in the Region (Central - West)



Map 10: Conservation Activities in the Region (Southwest)

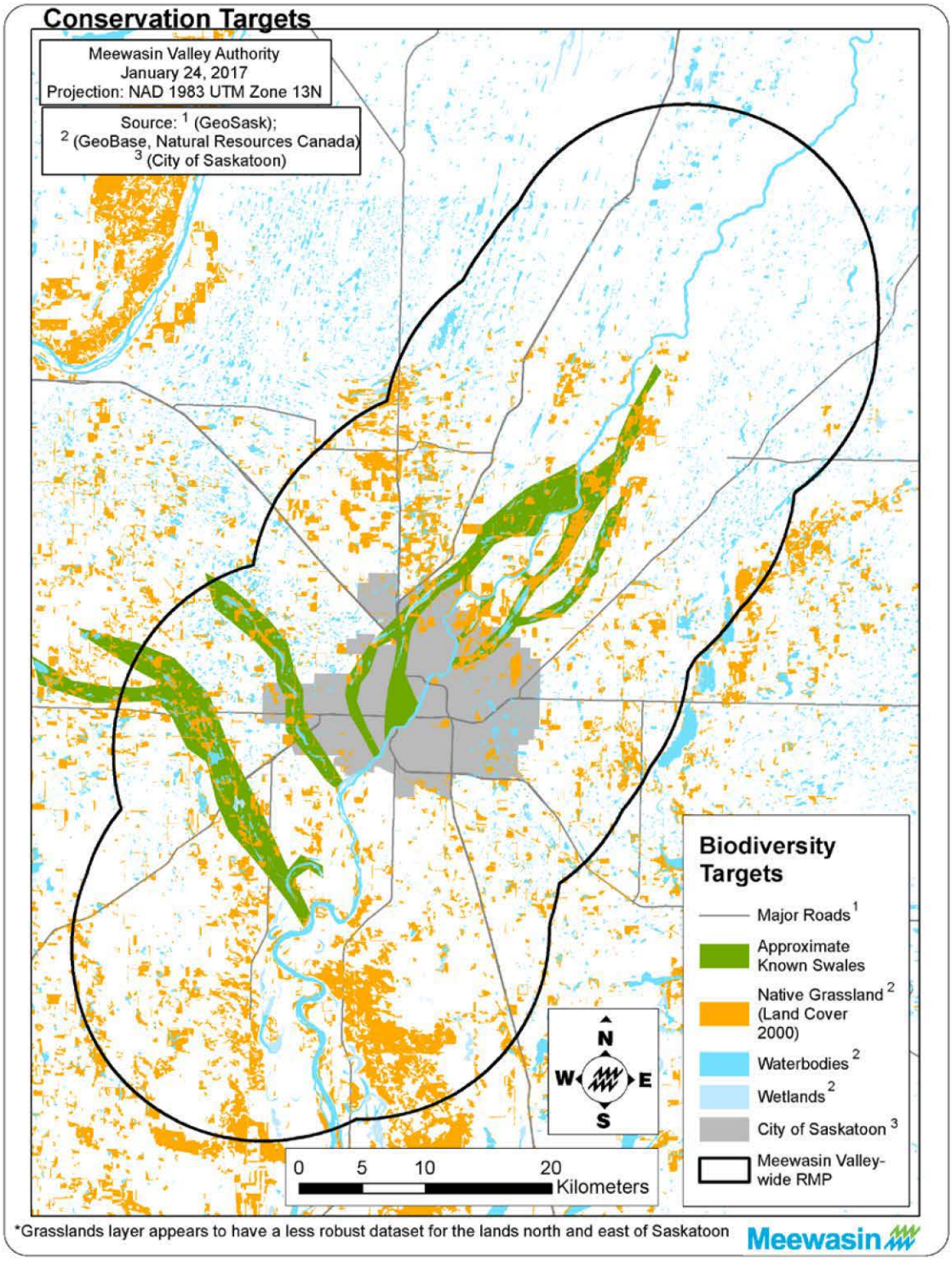


Map 11: Conservation Activities in the Region (Southeast)



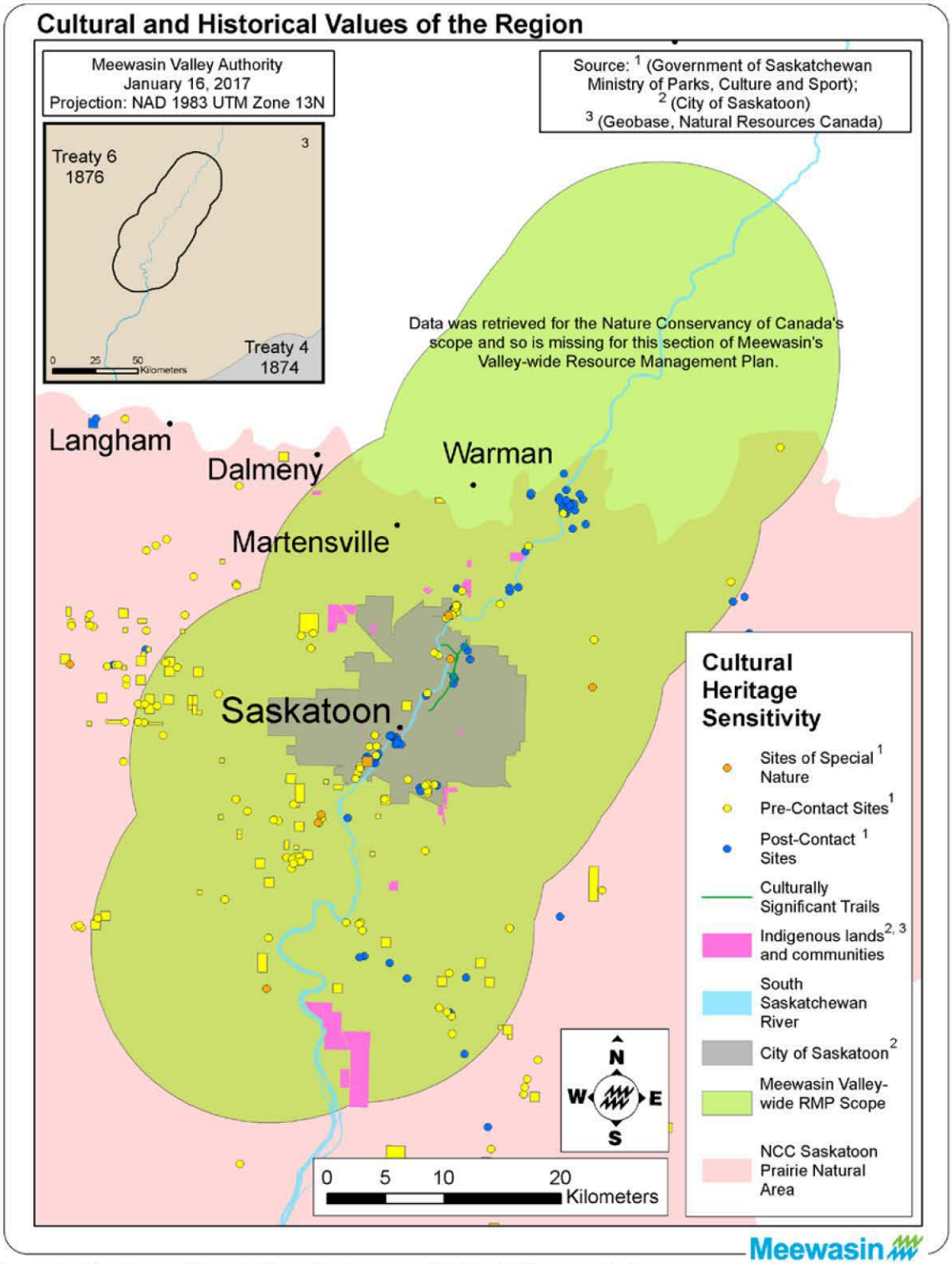
Targets

Map 12: Meewasin Valley-wide RMP Conservation Targets



Map 13: Meewasin Valley-wide RMP Cultural and Historical Values*

***Not all sites may be reported within the provincial database. This map should not be used for navigation or legal purposes. It is intended for general reference use only.**



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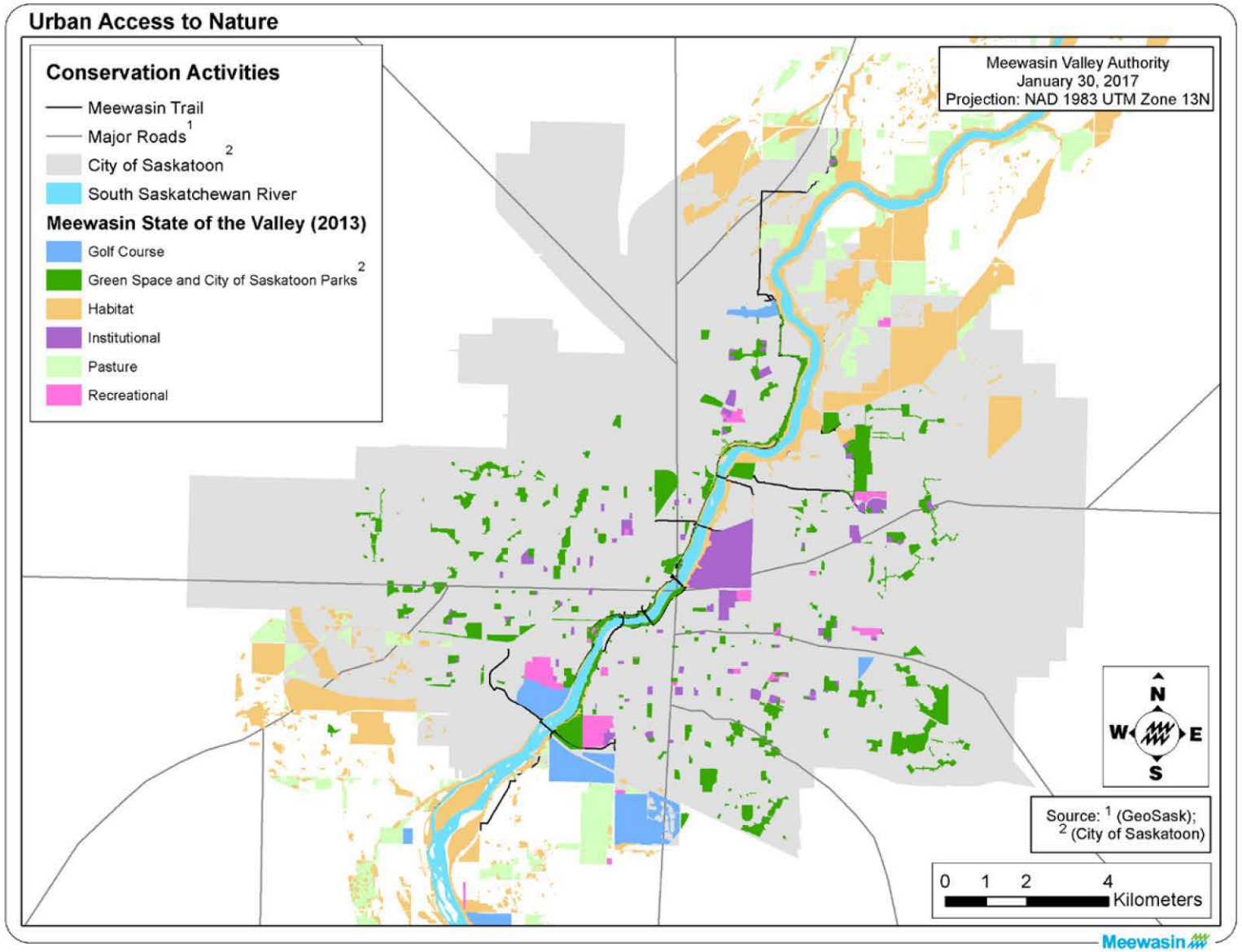
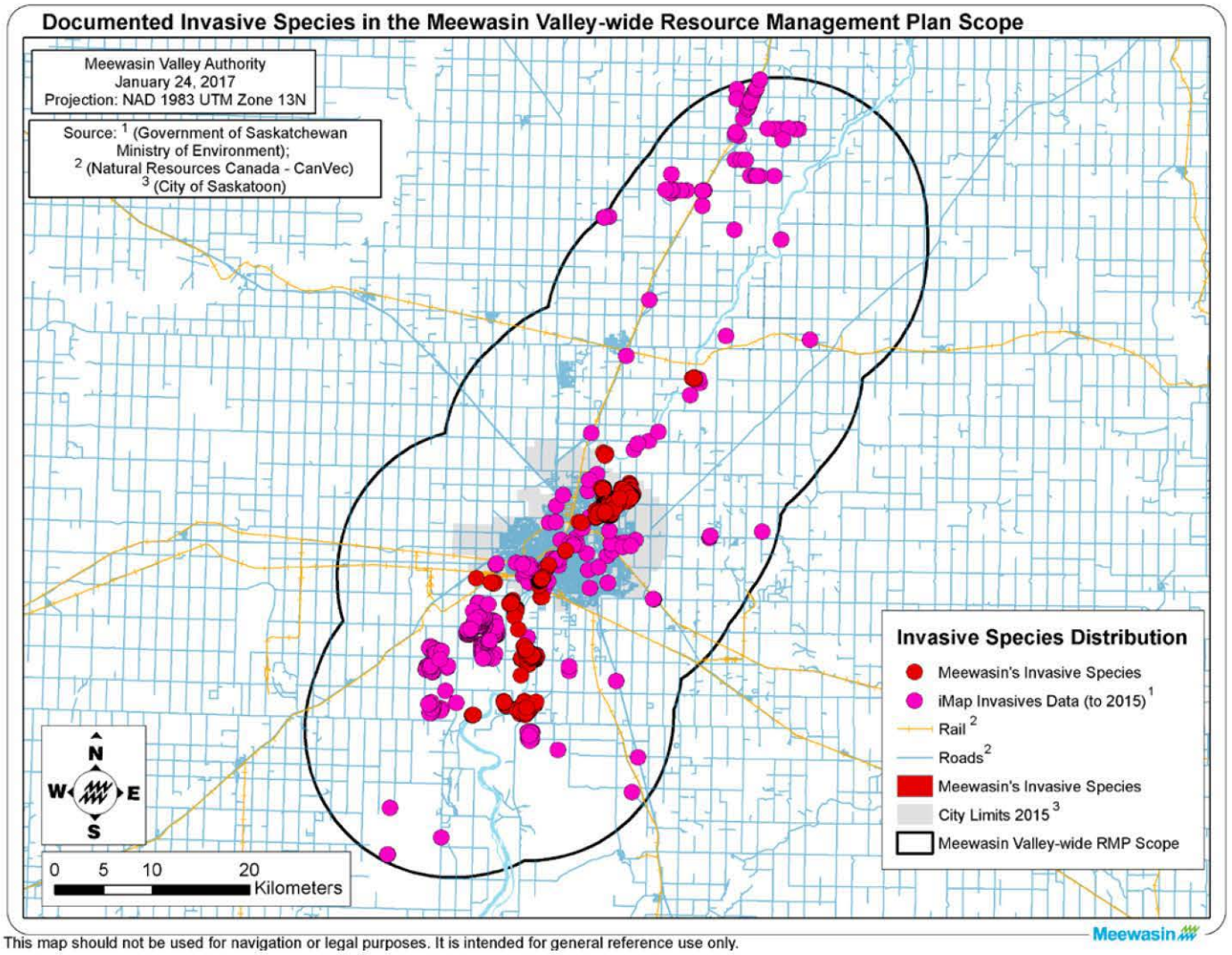
Map 14: Saskatoon Region: Opportunities to Connect to Nature

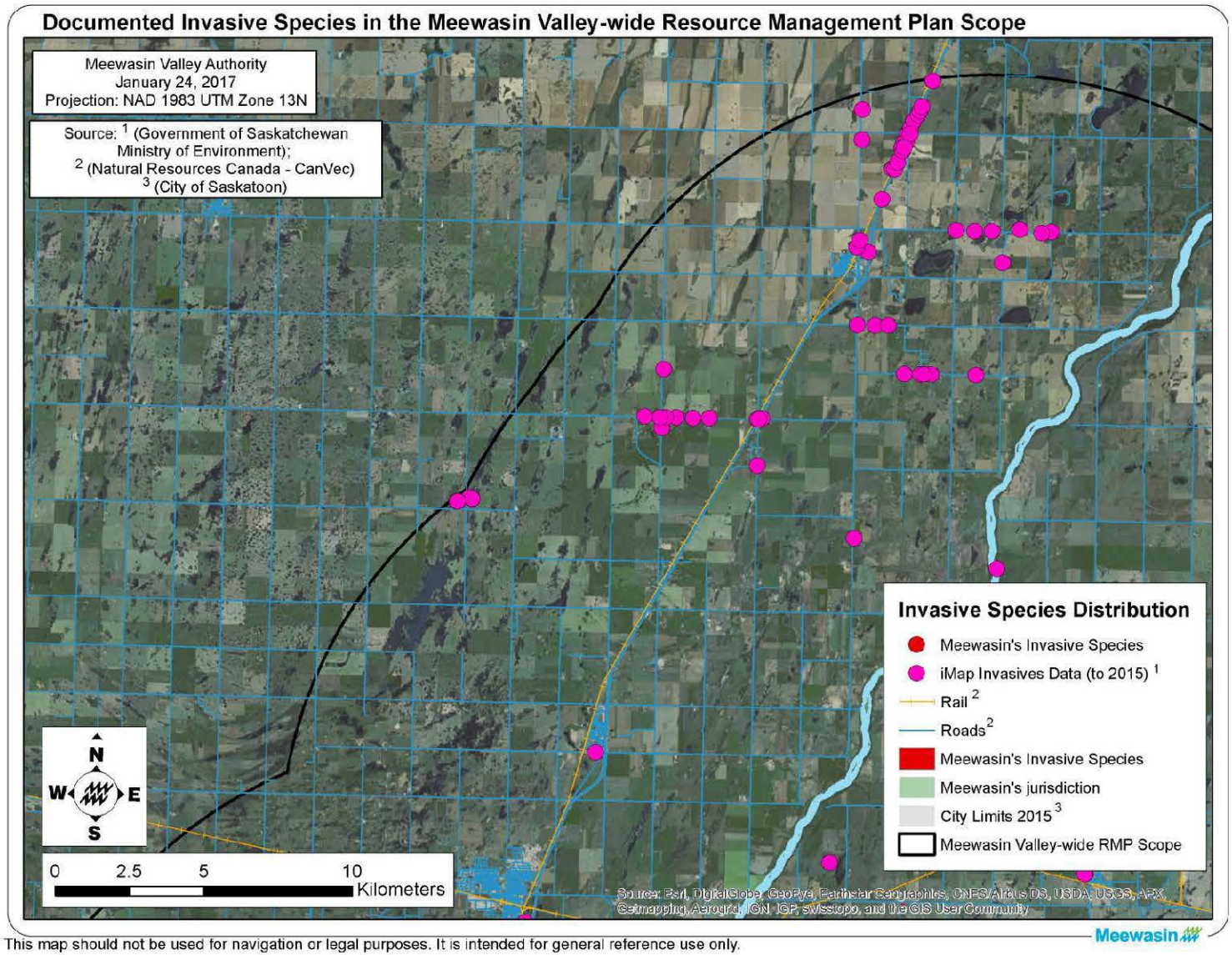


Threats

Map 15: Invasive Species Occurrences* in the Region (All) *Not all occurrences may be reported within Meewasin or in the iMap Invasive Species Database

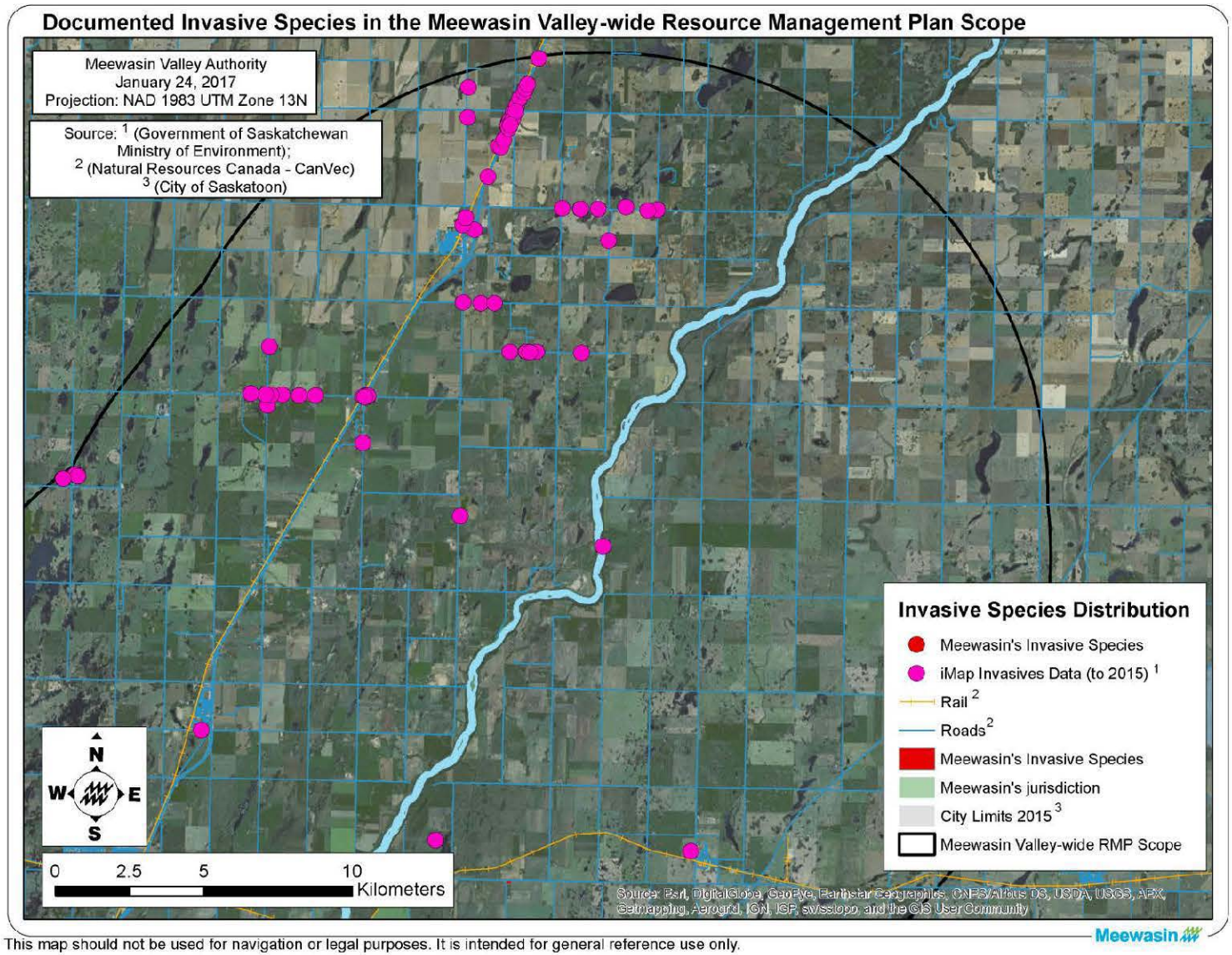


Map 16: Invasive Species Occurrences in the Region (Northwest)



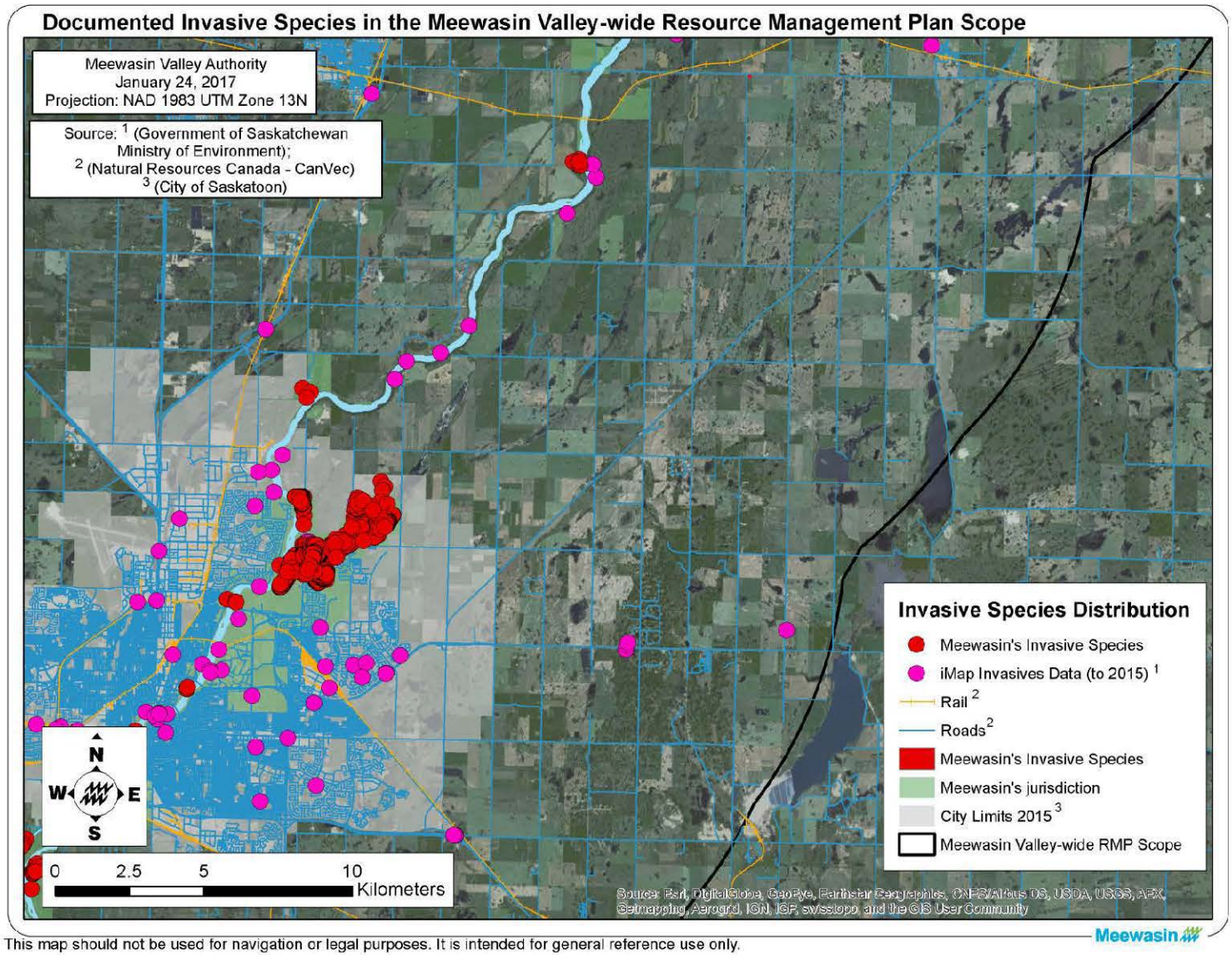
This map should not be used for navigation or legal purposes. It is intended for general reference use only.

Map 17: Invasive Species Occurrences in the Region (Northeast)



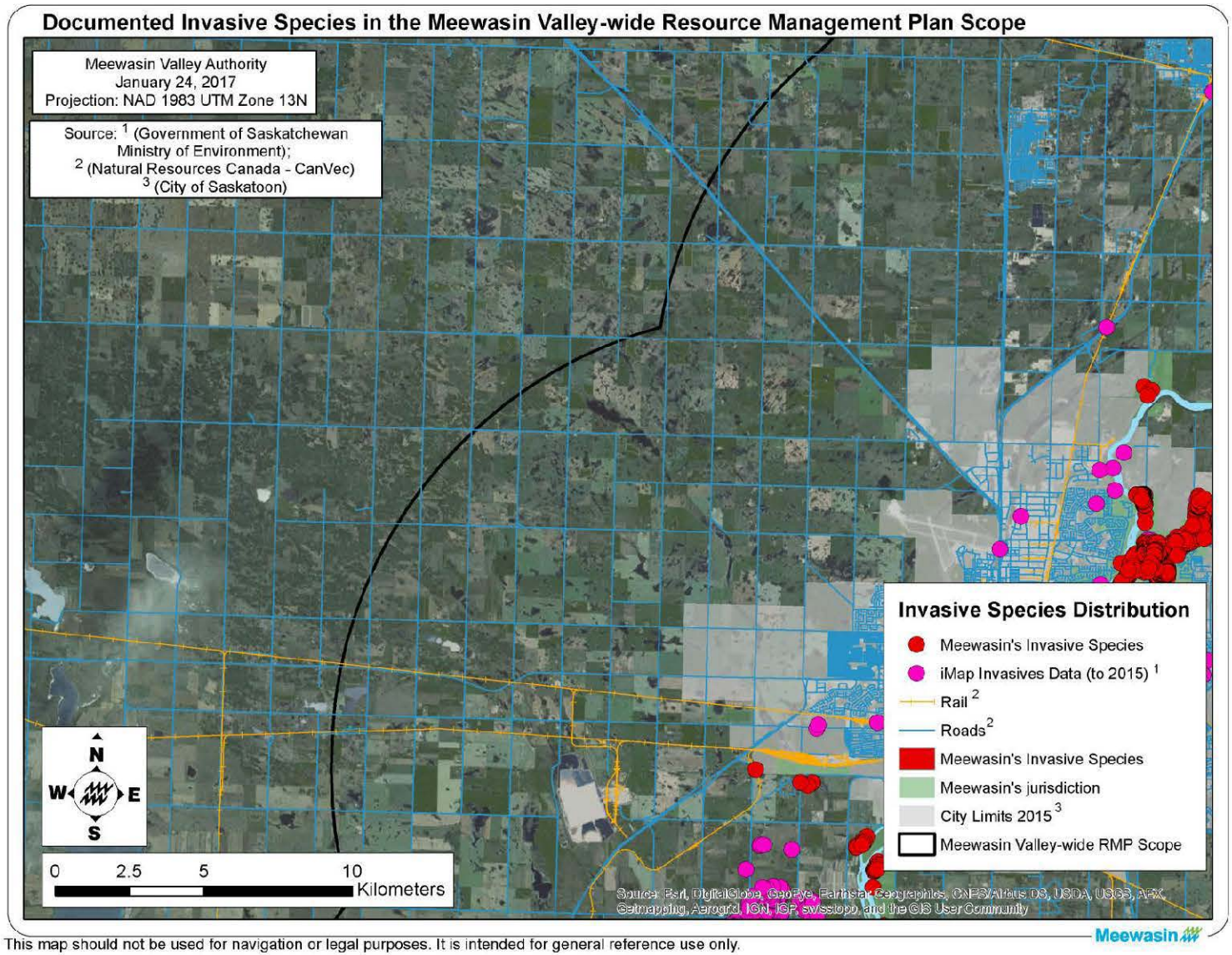
This map should not be used for navigation or legal purposes. It is intended for general reference use only.

Map 18: Invasive Species Occurrences in the Region (Central-East)



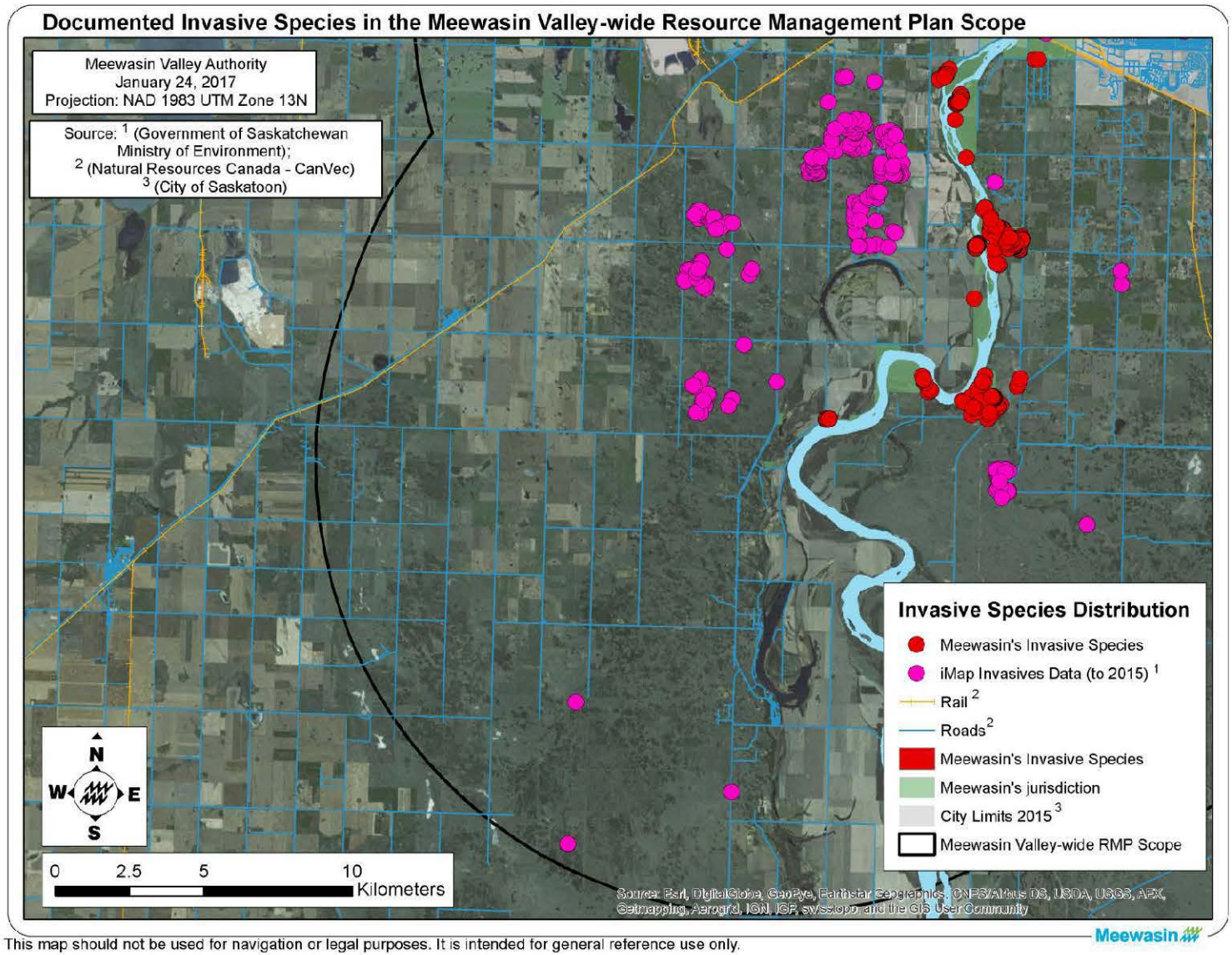
This map should not be used for navigation or legal purposes. It is intended for general reference use only.

Map 19: Invasive Species Occurrences in the Region (Central-West)



This map should not be used for navigation or legal purposes. It is intended for general reference use only.

Map 20: Invasive Species Occurrences in the Region (Southwest)



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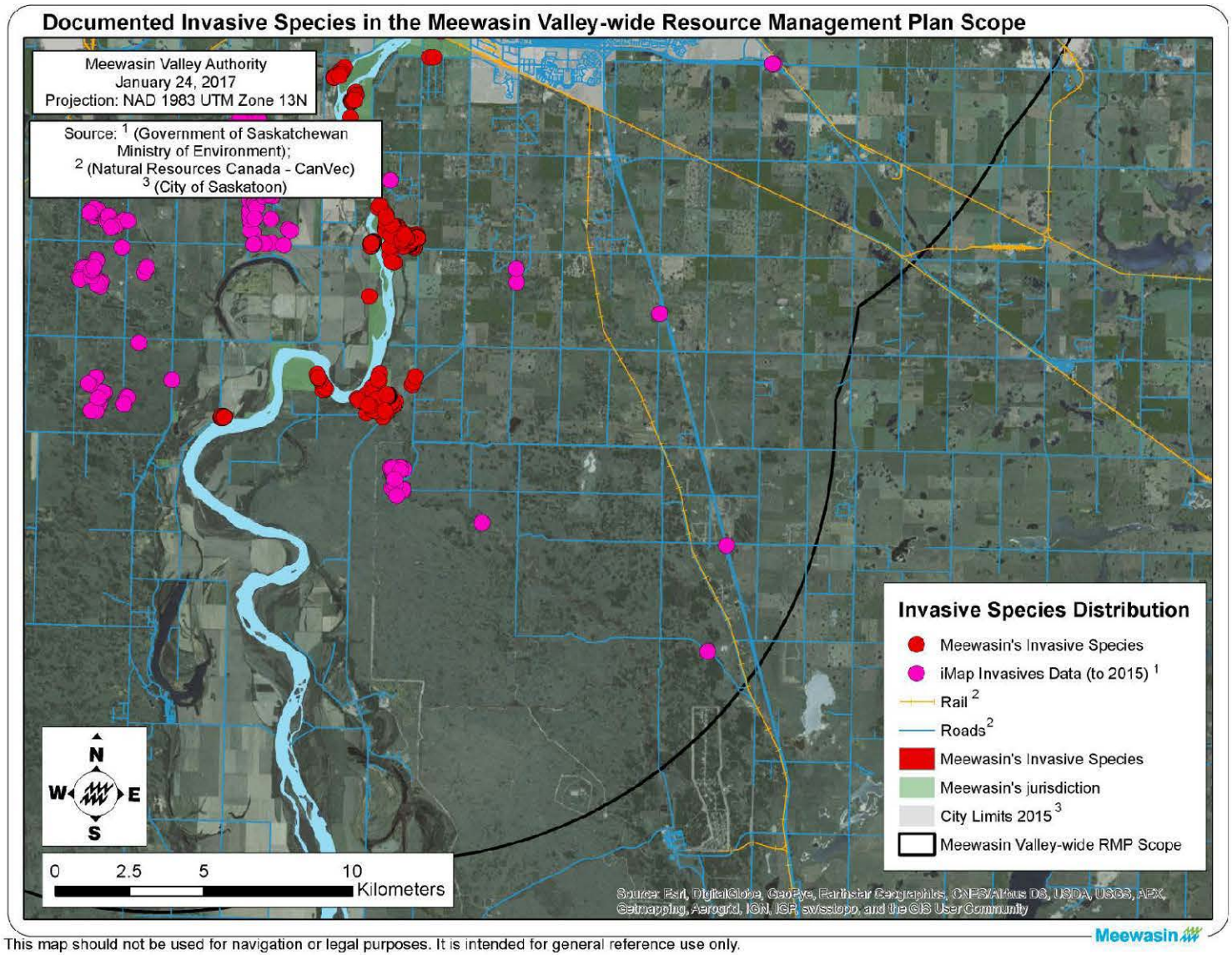
Map 21: Invasive Species Occurrences in the Region (Southeast)



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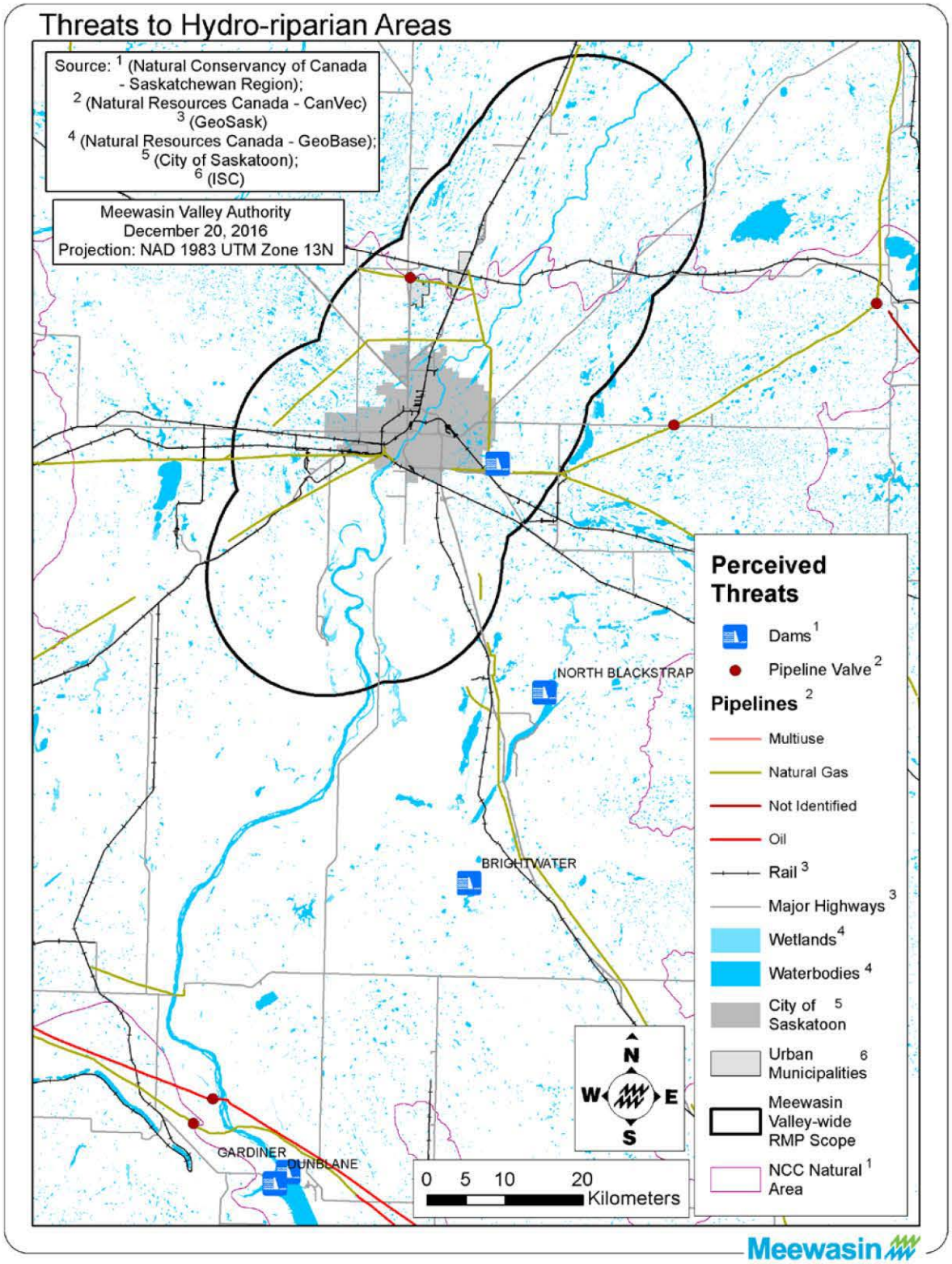
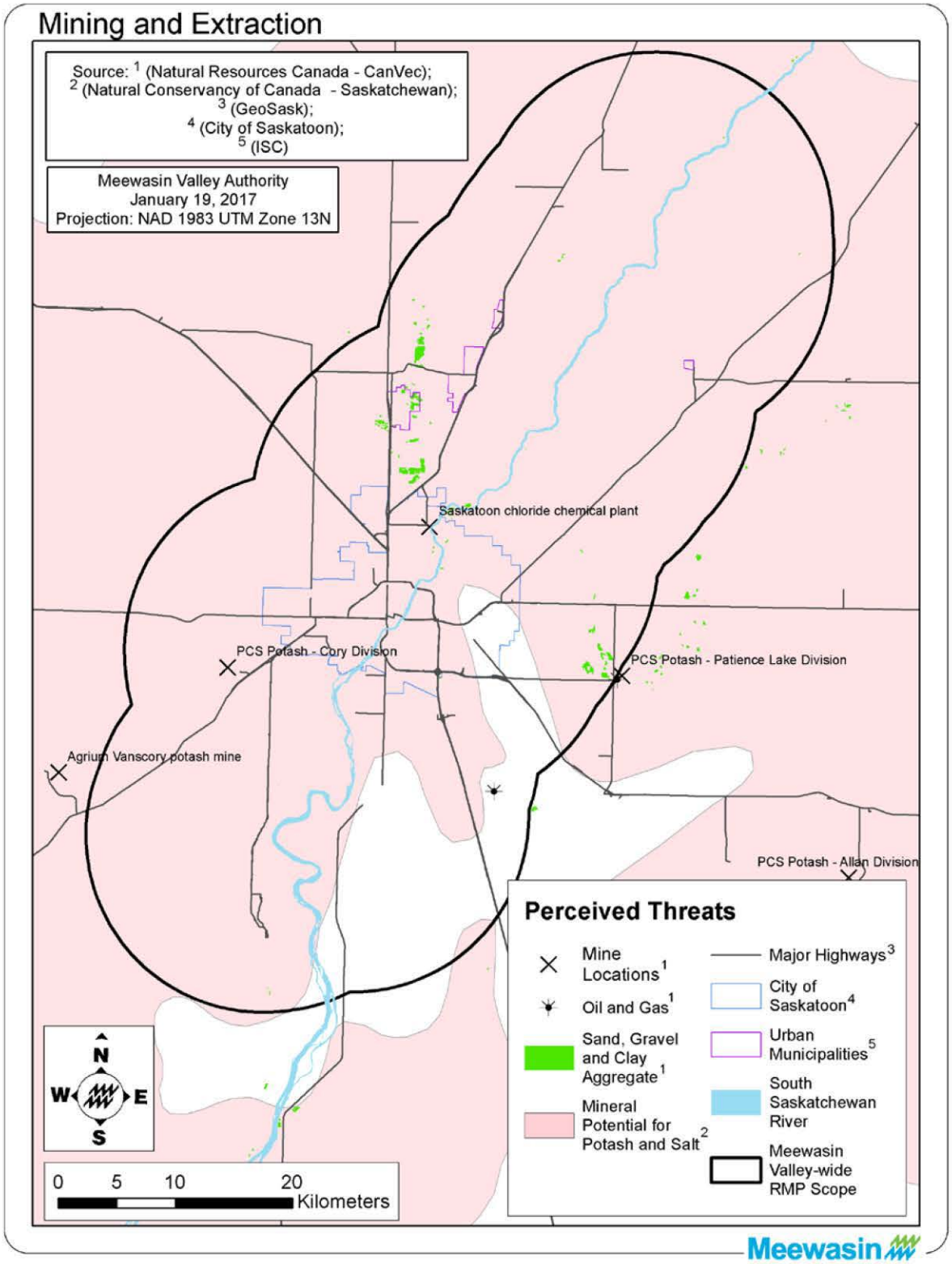
Map 22: Dams and Pipelines as a Threat to Hydro-riparian Areas in the Planning Area

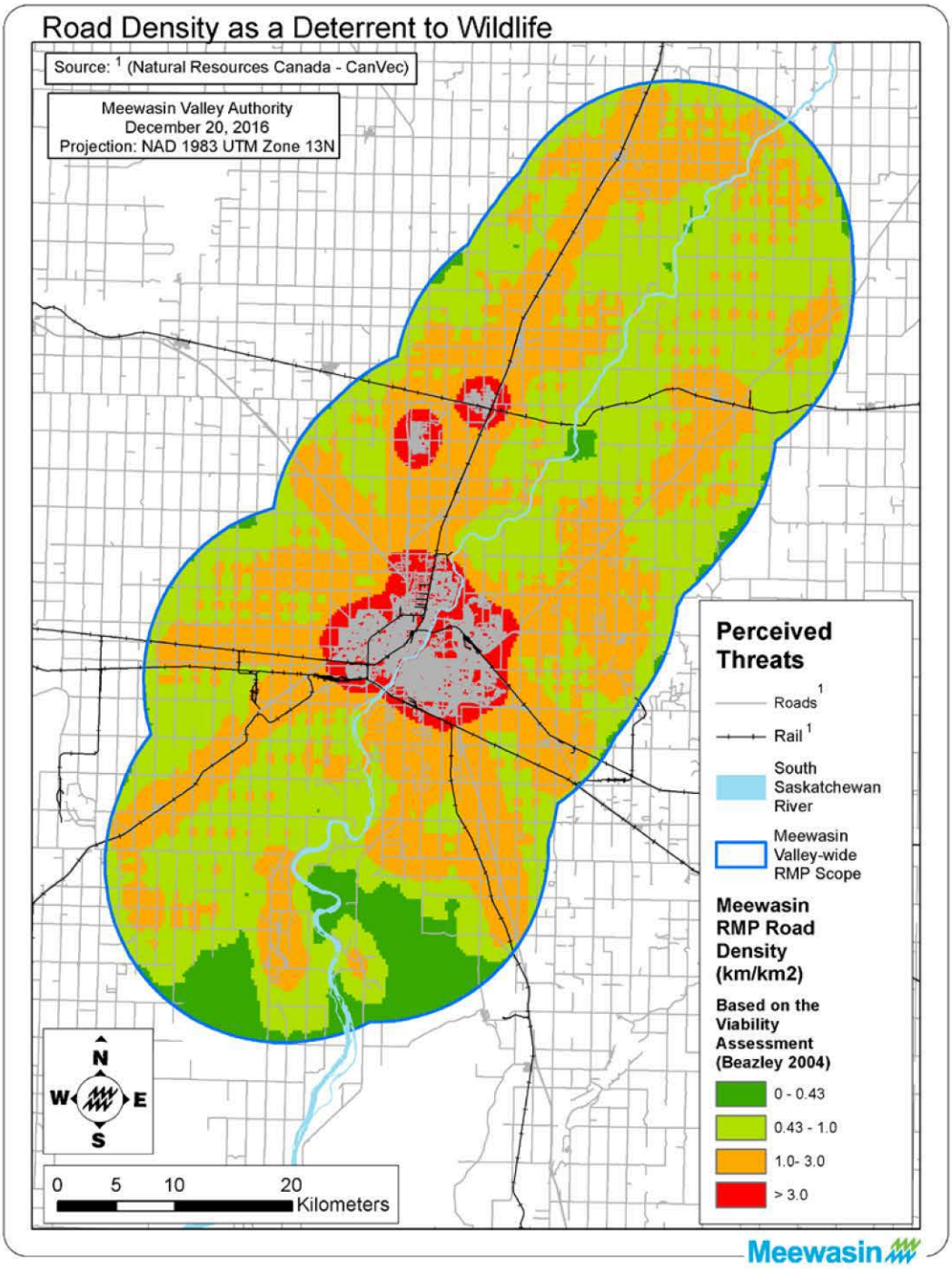


Map 23: Mining and Extraction in the Planning Area



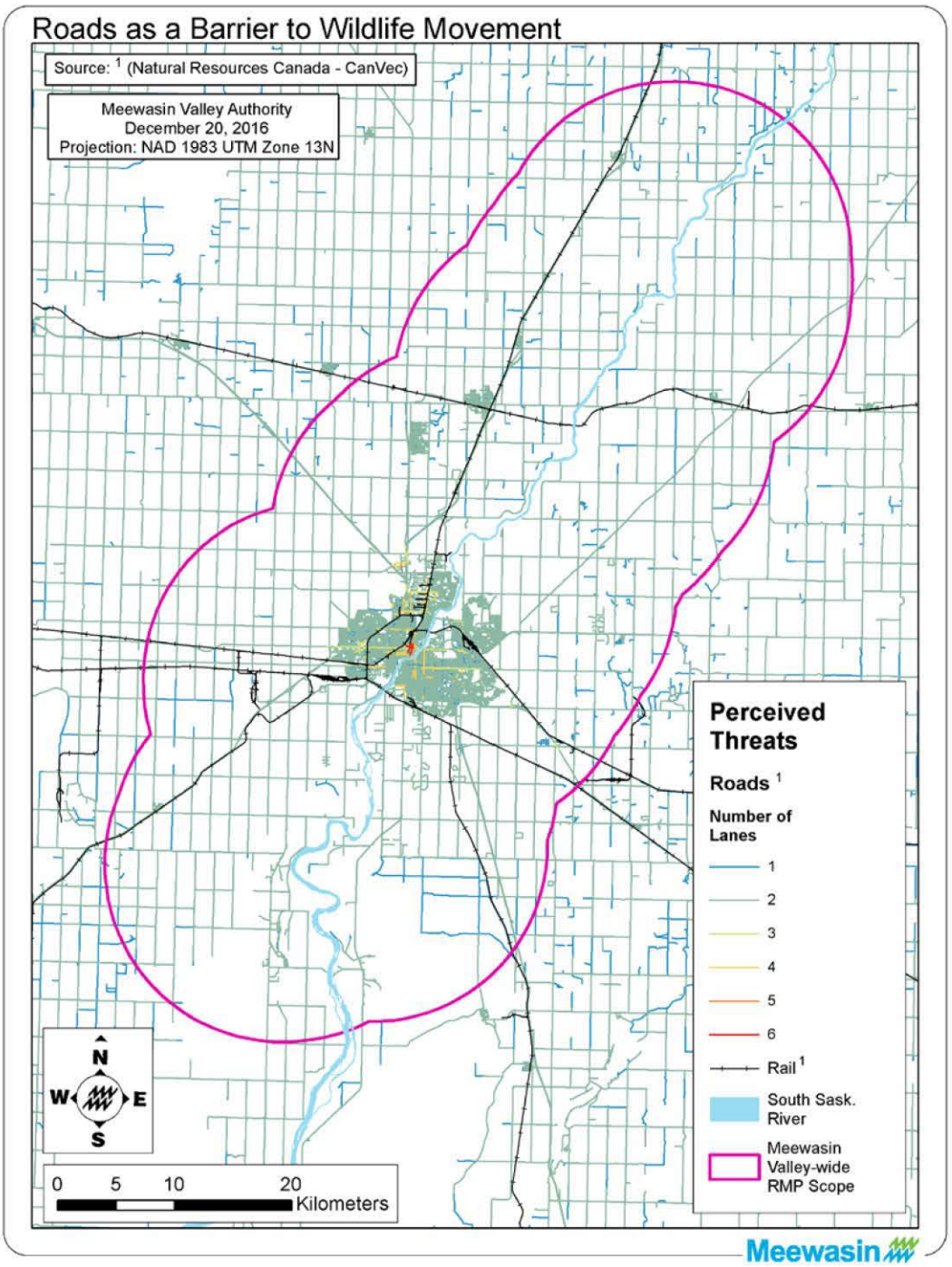
Map 24: Road Density within the Planning Area

Road density was based on Beazley et al. (2004). Road density is used to measure thresholds for wildlife survival as higher road density values are more likely to have a higher mortality rate for wildlife trying to cross.



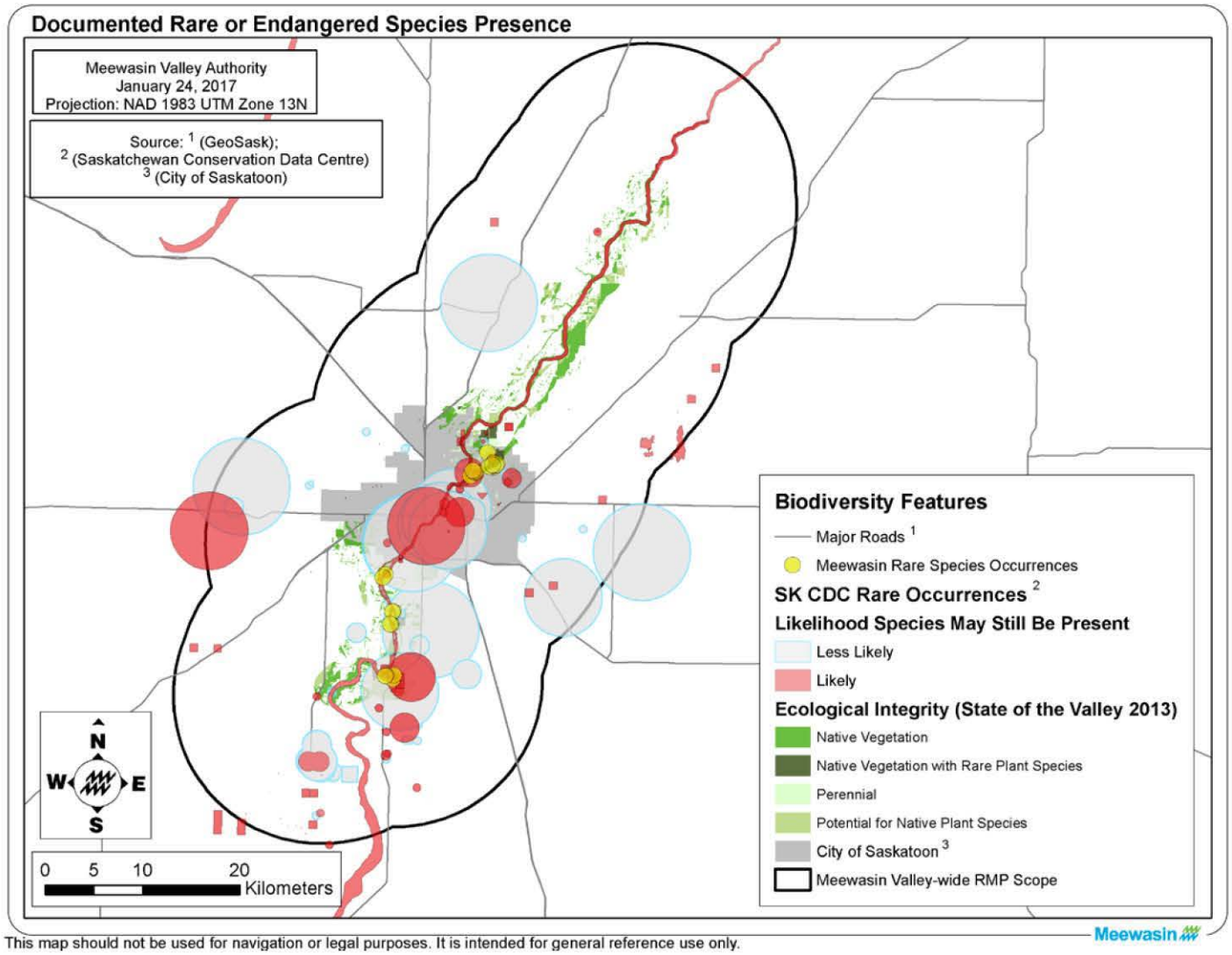
Map 25: Road and Rail as Barriers to Wildlife Movement

The higher the number of lanes, the less likely wildlife will be able to safely cross the road. Thus, higher number of lanes can mean higher wildlife mortality rates.



Miscellaneous

Map 26: Rare or Endangered Species Occurrences* Within the Region * Not all rare or endangered species occurrences may be recorded within Meewasin and Saskatchewan Conservation Data Centre's database



Appendix B – Stakeholders, Conservation Agencies, and Opportunities in Partnership

Stakeholders to conservation activities in the region and the opportunities and constraints of partnerships with those stakeholders (i.e. potential partnership opportunities).

Stakeholder Name	Description	Opportunity	Constraint
Archaeological Society of Saskatchewan	Archaeological conservation and awareness group	If land has archaeological value, good partner for protecting and interpretation?	Biodiversity & conservation science not a focus of group
Brightwater Science & Environmental Centre	Environmental education center offered by Saskatoon Public Schools	Adjacent to Meewasin's Beaver Creek Conservation Area (upstream)	Public school site, education primary focus
Canada North Environmental Services	Consulting company	Technical expertise	Consultant: likely need to be paid for their time, unless an individual can volunteer
City of Saskatoon	The governing body of the City of Saskatoon and services to residents	Land owner of many Meewasin sites	Participating Party for Meewasin
City of Saskatoon: Parks		Frequent partner of Meewasin	
City of Saskatoon: Environmental and Corporate Initiatives		Frequent partner of Meewasin	
Canadian Parks and Wilderness Society (CPAWS) - Saskatchewan	Non-profit conservation organization dedicated to establishment of protected areas	Voice for existing parks in province and for conservation	Area within scope may be too degraded or small as they focus on creating park space (preserving wilderness)
Ducks Unlimited Canada	Non-profit organization focused on managing and conserving wetlands and associated habitats for waterfowl	Partner for land securement	Focus on wetland ecosystems
EcoFriendly Sask	Create awareness and provide small scale funding	Awareness group, online support, weekly newsletter, small grants for local environmental projects	Cannot do much more than awareness

Stakeholder Name	Description	Opportunity	Constraint
Golder Associates	Consulting company	Technical expertise	Consultant: likely need to be paid for their time, unless an individual can volunteer
Government of Canada: Department of National Defence	National Defence	Can help us to understand conservation activities on Canadian Forces Base Dundurn base site, conserve a large tract of land, interested in joining prescribed burning committee	Their interest in activities outside of the Dundurn base may be limited
Government of Canada: Environment and Climate Change Canada	Government of Canada ministry concerned with environment and climate change	Federal government, expert knowledge	May be limited by federal government activity
Government of Canada: Parks Canada	National Parks system and ecology	Federal government, expert knowledge	No national parks within scope of NA
Government of Canada: Agriculture and Agri-food Canada	In charge of, among other things, federal community pastures.	Federal government, expert knowledge	May be limited by federal government activity
Landowners, Producers & Ranchers	Local stakeholders that are landowners, producers or ranchers in the planning area	Know the land, partnerships as grazers or easement opportunities	May lack technical or expert knowledge, conservation not their primary interest
Living Sky Wildlife Rehabilitation	Wildlife rehabilitation group & centre in Saskatoon	Partner for animal-based conservation activities and awareness, data collection	Primary focus is animal rehab
Meewasin & Meewasin Committees	Conservation agency dedicated to the stewardship of the South Saskatchewan River in Saskatoon and the RM of Corman Park through development, education and conservation.	Well established network of professionals, experts, and passionate public that understand and appreciate Meewasin's work.	Jurisdiction is smaller than scope of NA and focus is broader than biological conservation.
Native Plant Society of Saskatchewan (NPSS)	Group focused on education and awareness of native species and their conservation	Conservation and awareness of native plants makes NPSS a good partner, NPSS a supporter of Meewasin, data collection	Limited by funding,

Stakeholder Name	Description	Opportunity	Constraint
The Nature Conservancy of Canada (NCC)	NCC is a land conservancy agency that purchases fee simple properties and grants conservation easements and conducts programing to conserve biodiversity in the province.	NCC's network within the province is large and they are willing to partner on conservation initiatives beyond projects focused on individual pieces of land	NCC's focus is on biodiversity and they lack the experience and internal structure to work much outside of the conservation of biodiversity
Nature Saskatchewan	Conservation through research and land securement and awareness through education and outreach.	Possible source for data; possible opportunity for easements or partner to protect lands (e.g. in land policy)	Limited by funding
Northeast Swale Watchers	Saskatoon-based advocacy group for the Northeast Swale and other natural areas	Supporter of Meewasin and Meewasin's conservation efforts	Volunteer based (time may be limited and strong opinions may not be shared by all members)
Partners FOR the Saskatchewan River Basin (PFSRB)	Watershed-based education and awareness of sustainability and stewardship.	Have partnerships established across the prairie provinces, close partnership with Meewasin	Watershed focused
Government of Saskatchewan	Funding for various aspects of conservation work	Public servants have expertise, connections and drive required for many projects to happen. Participating Party for Meewasin	May be constrained by the mission of their ministry
Government of Saskatchewan: Ministry of Agriculture	Provincial government ministry responsible for agriculture	Meewasin and NCC partner with forage agrologists, Meewasin spreads awareness about *Weed Act* (helps bring awareness to agricultural invasives)	Ministry of Agriculture tends to be focused on higher intensity production
Government of Saskatchewan: Ministry of Economy	Provincial government ministry responsible for the economy	Data sharing	May not see the value in the data required for conservation work.
Government of Saskatchewan: Ministry of Environment	Provincial government ministry responsible for the environment	Data sharing, expert knowledge, partnership opportunities, on ground partnerships	May not be able to meet large and evolving data needs
Government of Saskatchewan: Parks, Culture and Sport	Provincial government ministry responsible for parks, culture and sports	Data sharing, expert knowledge, partnership opportunities, on ground partnerships, Ministry responsible for Meewasin	Ministry responsible for Meewasin, currently reviewing Meewasin's statutory funding

Stakeholder Name	Description	Opportunity	Constraint
Public	Residents and visitors of Saskatoon and surrounding R.M.s	Volunteer base, more free to speak up on issues	Some members of the public may not value conservation, conservation not most important sector to them
R.M. of Corman Park	rural municipality	R.M. weed inspector partners with Meewasin, opportunity to conserve land or add land to Meewasin jurisdiction in RM of Corman Park, Meewasin has properties and easements in RM, Provide partnership opportunities to protect the South Saskatchewan River	Development of native habitat seen as increasing tax base
R.M.s of Aberdeen, Blucher, Dundurn, Fish Creek, Grant, Laird, Montrose, Rosthern and Vanscoy	rural municipalities	Could create development policy that reduces conversion of native habitat	Development of native habitat seen as increasing tax base, not in Meewasin's jurisdiction
Saskatchewan Association of Watersheds	Collective of watershed groups in Saskatchewan	Greater voice for the South Saskatchewan River and water issues; allows for a holistic (i.e. upstream and downstream) perspective for the watershed	Province-wide thinking may highlight more urgent issues in other watersheds, watershed based
Saskatchewan Eco Network	Website promoting networking of environmentally focused groups in Saskatchewan	Provides links to conservation agencies for public	Website only (may not be updated in a timely fashion), funding issues
Saskatchewan Environmental Society	The Saskatchewan Environmental Society is a non-profit, registered charity whose mandate is to work towards a world in which all needs can be met in sustainable ways. Sustainability requires healthy ecosystems, livelihoods, and communities	Provide education such as water conservation and boreal watershed educational programs.	Focus is education and awareness.

Stakeholder Name	Description	Opportunity	Constraint
Saskatchewan Forage Council	Provincial council group to address forage issues and awareness within Saskatchewan	Invasive species of high concern, great partner for awareness of invasive species and native species	Production of domestic forages and pastures primary focus
Saskatchewan Invasive Species Council (SISC)	Non-profit association of professionals to promote awareness and coordination of efforts to combat invasive species in Saskatchewan	Invasive species of high concern, great partner for awareness of invasive species and native species, data collection	Funding may limit activity, invasive species primary focus, difficult to operate on private land
Saskatchewan Wildlife Federation	Non-profit wildlife conservation organization focused on hunting and fishing	Can also issue conservation easements, some funding opportunities for conservation activities, large member group = strong voice to Government	Hunting/fishing primary focus
Saskatoon Heritage Society	Non-profit group focused on the history and preservation of heritage in Saskatoon	Sites with heritage may give potential for partnership, active members on Meewasin committees (CAC, EAC)	Biodiversity and conservation science not a focus of group
Saskatoon Nature Society	Local naturalist organization	Voice for conservation, data collection (bird observations), partner for awareness activities (nature tours, etc.), member on Meewasin committee (CAC)	Volunteer based (time may be limited and opinions may not be shared by all members), scope limited to Saskatoon area
Saskatoon North Partnership for Growth	Regional planning partnership lead by City of Saskatoon and including RM of Corman Park, Martensville, Osler, and Warman	Opportunity to plug into process as stakeholders (and potentially experts), created a regional plan for green corridors	May not fully appreciate value of biodiversity and conservation science when planning growth
Saskatchewan Research Council	Consulting organization	Data collection and processing; Saskatchewan Geospatial Imagery Collaborative (SGIC) partnership	Consultant: likely need to be paid for their time, unless an individual can volunteer

Stakeholder Name	Description	Opportunity	Constraint
Saskatchewan Soil Conservation Association	Group promoting agricultural soil conservation	Understand the importance of permanent land cover when conserving soil	Soil focused
Saskatoon Wildlife Federation	Local chapter of Saskatchewan Wildlife Federation: non-profit wildlife conservation organization focused on hunting and fishing	Can also issue conservation easements, some funding opportunities for conservation activities, large member group = strong voice to Government	Hunting/fishing primary focus
Saskatoon Zoo Society	Environmental education focused on animals based out of the Saskatoon Forestry Farm and Zoo	Awareness and education about conservation (specifically to children), Young Naturalists program utilizes Meewasin sites	Education and awareness
SaskOutdoors	Outdoor and environmental education	Awareness and education about conservation (specifically to children), may use agency sites for activities	Education and awareness
SaskPower	Power utility service provider (Crown corporation)	Data sharing, willing to be at the table to discuss issue of importance to conservation community	Responsible for creating and maintaining infrastructure that contributes to dissection of habitats, power generation main focus, crown corporation
Saskatchewan Prairie Conservation Action Plan (PCAP)	Multi stakeholder partnership dedicated to conservation and awareness (education programs)	Partner, opportunity to present at their conference, awareness about conservation	Limited funding and possibly more focused on southern prairie habitat
Society for Ecological Restoration - Western Canada	Network of professionals and practitioners dedicated to restoring natural ecosystems	Events, research and data,	Limited ability to act as a body on a particular issue
Society for Range Management - Prairie Parkland Chapter	Professional organization dedicated to conservation of range management and professional development	Awareness of conservation issues in native prairie management	Limited ability to act as a body on a particular issue
South Saskatchewan River Watershed Stewards Inc. (SSRWSI)	Local watershed group focused on protecting the SSR watershed for both people and the natural environment through awareness and research	Partner often, data collection and sharing, invasive species and pollution great concerns	Focused on watershed based activities

Stakeholder Name	Description	Opportunity	Constraint
Stantec	Consulting company	Technical expertise	Consultant: likely need to be paid for their time, unless an individual can volunteer
Students	Post-secondary students (primarily from the University of Saskatchewan)	Data collection, volunteer time, student projects	Volunteer based (time may be limited and opinions may not be shared by all members)
The Royal Astronomical Society of Canada - Saskatoon Centre	Collective of astronomers, both amateur and professional, also creating awareness	Dark Skies - light pollution primary focus in regards to conservation	Biodiversity and conservation science not a focus of group
University of Saskatchewan	Public, research university - largest university in Saskatchewan	Data collection and sharing, voice for Meewasin, opportunities for research (Ag, Biol, SENS), land planning resources	Meewasin Participating Party, balance and integration of conservation and development
Wanuskewin Heritage Park	Non-profit park organization focused on Indigenous history and cultural values using education and conservation of the land	In Meewasin Conservation Zone, Meewasin created Wanuskewin, frequent partner, Indigenous perspective	Conservation of biodiversity is not the focus of the park
Water Security Agency	Provincial government agency responsible for water	Data collection and sharing, some protection for waterbodies within scope	Provincial agency, water issues primary focus
The Western Development Museum	Museum organization focused on Saskatchewan's history	Education of Saskatchewan's history - would touch on themes of native prairie, Indigenous people's movement across the land, and our relationship with the land	Biodiversity and conservation science not a focus of group, static location
Western Heritage	Consulting company	Technical expertise	Consultant: likely need to be paid for their time, unless an individual can volunteer
Wild About Saskatoon	Collective promoting education and awareness of urban ecology and conservation through events	Highlight conservation activities of Meewasin and Meewasin sites during Nature City Festival, education and awareness of conservation	Only activity appears to be for the Nature City festival

Appendix C – Rare and Endangered Species That May Be Present within the Project Scope

COSEWIC, Provincial Status, and SARA Status

NAR Not at Risk

SC Special Concern

T Threatened

E Endangered

XT Extirpated (Canada) or Extinct

DD Data Deficient

Guidelines for Assessment: http://www.cosewic.gc.ca/eng/sct0/assessment_process_e.cfm

Nature Serve Ranking (G,N,S)

X Presumed Extinct (species)/Eliminated (ecological communities and systems) — Species not located despite intensive searches and virtually no likelihood of rediscovery. Ecological community or system eliminated throughout its range, with no restoration potential.

H Possibly Extinct (species)/ Eliminated (ecological communities and systems) — Known from only historical occurrences but still some hope of rediscovery. There is evidence that the species may be extinct or the ecosystem may be eliminated throughout its range, but not enough to state this with certainty.

1 Critically Imperiled—At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.

2 Imperiled—At high risk of extinction or elimination due to very restricted range, very few populations, steep declines, or other factors.

3 Vulnerable—At moderate risk of extinction or elimination due to a restricted range, relatively few populations, recent and widespread declines, or other factors.

4 Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.

5 Secure—Common; widespread and abundant.

NR	Unranked, not yet assessed
U	Unrankable, due to lack of information or due to substantially conflicting information about status or trends
x#x#	Range Rank, a numeric rank used to indicate a range of uncertainty about the status
?	Denotes uncertainty of numeric rank
B	Breeding Qualifier, status only applies to breeding population
N	Nonbreeding Qualifier, status only applies to non-breeding population
M	Migrant, status applies to migrant species
T#	Identifies the status of an infraspecific taxa (subspecies or varieties)

IUCN RedList

EX	*Extinct* - A species group is Extinct when there is no reasonable doubt that the last individual has died
EW	*Extinct in the Wild* - A species group is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range
CR	*Critically Endangered* - A species group is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (see Section V), and it is therefore considered to be facing an extremely high risk of extinction in the wild
EN	*Endangered* - A species group is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (see Section V), and it is therefore considered to be facing a very high risk of extinction in the wild
VU	*Vulnerable* - A species group is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see Section V), and it is therefore considered to be facing a high risk of extinction in the wild
NT	*Near Threatened* - A species group is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future
LC	*Least Concern* - A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened
DD	*Data Deficient* - A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status

NE *Not Evaluated* - A taxon is Not Evaluated when it has not yet been evaluated against the criteria

Table 14: Endangered or Rare Species Possibly Present Within the Meewasin Valley

Species common name	Species scientific name	Species type	COSEWIC status	Provincial status	G-rank	N-rank	S-rank	SARA Status	Associated targets			
									Native Grasslands	Hydro-riparian	Swales	Wetlands
Northern Leopard Frog	*Lithobates pipiens*	Amphibian	SC		G5TNR	N4	S3	SC	x	x	x	x
Plains Spadefoot	*Spea bombifrons*	Amphibian	NAR		G5	N3N4	S3			x	x	x
Burrowing Owl	*Athene cunicularia*	Bird	E	E	G4	N2B	S2B	E	x			
Mountain Plover	*Charadrius montanus*	Bird	E		G3	N1B	S1B	E		x	x	x
Piping Plover	*Charadrius melodus circumcinctus*	Bird	E	E	G3T3	N3B	S3B	E		x	x	x
Whooping Crane	*Grus americana*	Bird	E	E	G1	N1B	SXB,S1M	E	x	x	x	x
Bank Swallow	*Riparia riparia*	Bird	T		G5	N5B	S5B, S5M		x	x		
Barn Swallow	*Hirundo rustica*	Bird	T		G5	N4N5B	S5B,S5M		x			
Bobolink	*Dolichonyx oryzivorus*	Bird	T		G5	N4N5B	S5B		x		x	x
Chestnut-collared Longspur	*Calcarius ornatus*	Bird	T		G5	N5B	S5B	T	x		x	
Common Nighthawk	*Chordeiles minor*	Bird	T		G5	N4B	S4B,S4M	T	x			
Ferruginous Hawk	*Buteo regalis*	Bird	T		G4	N4B	S4B,S4M	T	x			
Loggerhead Shrike	*Lanius ludovicianus excubitorides*	Bird	T		G4T4	N3B	S3B	T	x		x	
Sprague's Pipit	*Anthus spragueii*	Bird	T		G4	N3N4B	S3B	T	x		x	

Species common name	Species scientific name	Species type	COSEWIC status	Provincial status	G-rank	N-rank	S-rank	SARA Status	Associated targets			
									Native Grasslands	Hydro-riparian	Swales	Wetlands
Baird's Sparrow	*Ammodramus bairdii*	Bird	SC		G4	N4B	S4B		x		x	
Horned Grebe	*Podiceps auritus*	Bird	SC		G5	N5B	S5B				x	x
Long-billed Curlew	*Numenius americanus*	Bird	SC		G5	N3N4B	S3B,S4M	SC	x			
Red-necked Phalarope	*Phalaropus lobatus*	Bird	SC		G4G5	N4N5B	S4B,S3M		x		x	
Short-eared Owl	*Asio flammeus*	Bird	SC		G5	N4B, N3N	S3B,S2N	SC	x		x	
Western Grebe	*Aechmophorus occidentalis*	Bird	SC		G5	N5B, N3N	S5B			x	x	x
American White Pelican	*Pelecanus erythrorhynchos*	Bird	NAR		G4	N3N4B	S3B			x		
Bald Eagle	*Haliaeetus leucocephalus*	Bird	NAR		G5	N5B, N5N	S5B,S4M,S4N		x		x	
Boreal Owl	*Aegolius funereus*	Bird	NAR		G5	N5	S3		x			
Northern Harrier	*Circus cyaneus*	Bird	NAR		G5	N5B, N4N	S5B,S4M,S2N		x		x	
Forster's Tern	*Sterna forsteri*	Bird	DD		G5	N4B	S4B			x	x	x
American Wigeon	*Anas americana*	Bird			G5	N5B, N5N	S5B,S5M,S2N				x	x
Canada Goose	*Branta canadensis*	Bird			G5	N5B, N5N	S5B,S5M,S2N				x	x
Franklin's Gull	*Leucophaeus pipixcan*	Bird			G4G5	N5B	S4B,S4M				x	x
Great Blue Heron	*Ardea herodias*	Bird			G5	N5B	S3B				x	x
Sandhill Crane	*Grus canadensis*	Bird			G5	N5B	S2B,S4M			x	x	x
Sharp-tailed Grouse	*Tympanuchus phasianellus*	Bird			G5	N5	S5		x			
Short-billed Dowitcher	*Limnodromus griseus*	Bird			G5	N5B	S1B,S4M				x	x

Species common name	Species scientific name	Species type	COSEWIC status	Provincial status	G-rank	N-rank	S-rank	SARA Status	Associated targets			
									Native Grasslands	Hydro-riparian	Swales	Wetlands
Turkey Vulture	*Cathartes aura*	Bird			G5	N5B	S2B,S2M,S2N		x	x		
Lake Sturgeon	*Acipenser fulvescens*	Fish	E		G3G4	N3N4	S2			x		
Monarch	*Danaus plexippus*	Invertebrate	SC		G4	N5B	S3B	SC	x	x	x	
Speyer's Cucullia Moth	*Cucullia speyeri*	Invertebrate			G4	NNR	SNR		x			
Swift Fox	*Vulpes velox*	Mammal	T	E	G3	N1N2	S1	T	x		x	
American Badger	*Taxidea taxus taxus*	Mammal	SC		G5T5	N4	S3		x		x	
Bobcat	*Lynx rufus*	Mammal			G5	N5	S3		x	x		
Olive-backed Pocket Mouse	*Perognathus fasciatus*	Mammal			G5	N3N4	S3		x			
Pronghorn	*Antilocapra americana*	Mammal			G5	N4	S3		x			
Small-flowered Sand-verbena	*Tripterocalyx micranthus*	Vascular plant	E	E	G5	N1N2	S2	E	x			
Hairy Prairie Clover	*Dalea villosa* var. *villosa*	Vascular plant	T	E	G5T5	N2N3	S2	T	x			
Smooth Arid Goosefoot	*Chenopodium subglabrum*	Vascular plant	T		G3G4	N3	S3	T	x			
Western Spiderwort	*Tradescantia occidentalis* var. *occidentalis*	Vascular plant	T	E	G5T5	N2	S1	T	x			
American Bugseed	*Corispermum americanum* var. *americanum*	Vascular plant			G5?T5?	N3N4	S3		x	x		x
Awned Cyperus	*Cyperus squarrosus*	Vascular plant			G5	NNR	S3			x	x	x
Beaked Annual Skeleton-weed	*Shinnersoseris rostrata*	Vascular plant			G5?	N2N3	S2		x			
Beaked Ditch-grass	*Ruppia maritima*	Vascular plant			G5	N3N5	S3			x	x	x

Species common name	Species scientific name	Species type	COSEWIC status	Provincial status	G-rank	N-rank	S-rank	SARA Status	Associated targets			
									Native Grasslands	Hydro-riparian	Swales	Wetlands
Bird's-eye Primrose	*Primula mistassinica*	Vascular plant			G5	N5	S3		x			
Blue Wild Rye	*Elymus glaucus* ssp. *glaucus*	Vascular plant			G5T5	N5	S3		x			
Blueflag	*Iris versicolor*	Vascular plant			G5	N5	S1		x		x	
Bristle-leaved Sedge	*Carex eburnea*	Vascular plant			G5	N5	S3		x	x	x	x
Bristly Gooseberry	*Ribes oxyacanthoides* ssp. *setosum*	Vascular plant			G5T4T5	N2	S2		x			
Bur Ragweed	*Ambrosia acanthicarpa*	Vascular plant			G5	N2N3	S2		x			
Bushy Cinquefoil	*Potentilla paradoxa*	Vascular plant			G5	N4	S2		x			
Carolina Whitlow-grass	*Draba reptans*	Vascular plant			G5	N3	S1			x	x	x
Chaffweed	*Anagallis minima*	Vascular plant			G5	N3N4	S3		x			
Columbia Needlegrass	*Achnatherum nelsonii* ssp. *dorei*	Vascular plant			G5T5?	N4N5	S3		x			
Crawe's Sedge	*Carex crawei*	Vascular plant			G5	NNR	S3		x	x	x	x
Crowfoot	*Viola pedatifida*	Vascular plant			G5	N4	S3		x			
Curved Yellow-cress	*Rorippa curvipes*	Vascular plant			G5	NNR	S3		x			
Downy Gentian	*Gentiana puberulenta*	Vascular plant			G4G5	N2	SH			x	x	x
Dry Goosefoot	*Chenopodium desiccatum*	Vascular plant			G5	N3N4	S3		x			
Dwarf Clubrush	*Trichophorum pumilum*	Vascular plant			G5	N3	S1			x	x	x

Species common name	Species scientific name	Species type	COSEWIC status	Provincial status	G-rank	N-rank	S-rank	SARA Status	Associated targets			
									Native Grasslands	Hydro-riparian	Swales	Wetlands
Dwarf Spike-rush	*Eleocharis coloradoensis*	Vascular plant			GNR	N2	S2			x	x	x
Engelmann's Spike-rush	*Eleocharis engelmannii*	Vascular plant			G4G5	N2	S3			x	x	x
Few-flowered Aster	*Almutaster pauciflorus*	Vascular plant			G4	NNR	S3		x			
Five-fingered Cinquefoil	*Potentilla rubricaulis*	Vascular plant					S3					
Flat-stemmed Spike-rush	*Eleocharis elliptica* var. *elliptica*	Vascular plant			G5	N5	S3			x	x	x
Flexible Naiad	*Najas flexilis*	Vascular plant			G5	N5	S3		x			
Flowering Quillwort	*Lilaea scilloides*	Vascular plant			G5?	N2N3	S1		x			
Hairy Bugseed	*Corispermum villosum*	Vascular plant			G4?	N3N4	S2		x	x		x
Hairy Germander	*Teucrium canadense* var. *occidentale*	Vascular plant			G5T5?	NNR	S3		x			
Hooker's Bugseed	*Corispermum hookeri* var. *hookeri*	Vascular plant			G4G5T4T5	N4N5	S2		x	x		x
Idaho Fescue	*Festuca idahoensis*	Vascular plant			G5	N5	S1		x			
Indian Milk-vetch	*Astragalus australis*	Vascular plant			G5	N5	S3		x			
Least Mousetail	*Myosurus minimus*	Vascular plant			G5	N4	S3		x			
Lesser Bladderwort	*Utricularia minor*	Vascular plant			G5	N5	S2			x	x	x
Longstem Water-wort	*Elatine triandra*	Vascular plant			G5	N3N4	S2			x	x	x

Species common name	Species scientific name	Species type	COSEWIC status	Provincial status	G-rank	N-rank	S-rank	SARA Status	Associated targets			
									Native Grasslands	Hydro-riparian	Swales	Wetlands
Low Pussytoes	*Antennaria dimorpha*	Vascular plant			G5	N4	S2		x			
Macoun's Cryptantha	*Cryptantha celosioides*	Vascular plant			G5	NNR	S2		x	x		x
Marsh Felwort	*Lomatogonium rotatum*	Vascular plant			G5	N5?	S3		x			
Menzies' Catchfly	*Silene menziesii*	Vascular plant			G5	N5	S3			x	x	x
Mingan Moonwort	*Botrychium minganense*	Vascular plant			G4G5	N4	S1		x			
Moss Gentian	*Gentiana fremontii*	Vascular plant			G3G4	N2N3	S3			x	x	x
Mucronate Blue-eyed-grass	*Sisyrinchium mucronatum*	Vascular plant			G5	N4N5	S3		x			
Narrow-leaved Water Plantain	*Alisma gramineum*	Vascular plant			G5	N4	S3		x	x	x	x
Nodding Onion	*Allium cernuum* var. *cernuum*	Vascular plant			G5	N5	S1		x			
Northern Blue-eyed-grass	*Sisyrinchium septentrionale*	Vascular plant			G3G4	N3N4	S3		x			
Northern Buttercup	*Ranunculus pedatifidus* var. *affinis*	Vascular plant			G5T5	N4	S3		x		x	x
Pale Bulrush	*Scirpus pallidus*	Vascular plant			G5	NNR	S3				x	x
Pallas' Bugseed	*Corispermum pallasii*	Vascular plant			G4?	N3N4	S2		x	x		x
Pepperwort	*Marsilea vestita*	Vascular plant			G5	N2N3	S3		x			
Porcupine Sedge	*Carex hystericina*	Vascular plant			G5	N5	S3		x	x	x	x
Prairie Dunewort	*Botrychium campestre*	Vascular plant			G3G4	N2	S2		x			

Species common name	Species scientific name	Species type	COSEWIC status	Provincial status	G-rank	N-rank	S-rank	SARA Status	Associated targets			
									Native Grasslands	Hydro-riparian	Swales	Wetlands
Prostrate Alpen-cress	*Hornungia procumbens*	Vascular plant			G5	N3	S3			x	x	x
Pursh's Milk-vetch	*Astragalus purshii* var. *purshii*	Vascular plant			G5T5	N5	S3		x			
Red Bulrush	*Blysmopsis rufa*	Vascular plant			G5	N4	S3		x	x	x	x
Red Elderberry	*Sambucus racemosa* ssp. *pubens*	Vascular plant			G5	N5	S2		x			
Rocky Mountain Pincushion-Plant	*Navarretia saximontana*	Vascular plant			G4?	NNR	S3		x			
Sand-dune Wheatgrass	*Elymus lanceolatus* ssp. *psammophilus*	Vascular plant			G5T3	N3	S2		x			
Schweinitz's Flatsedge	*Cyperus schweinitzii*	Vascular plant			G5	NNR	S3			x	x	x
Small Dropseed	*Sporobolus neglectus*	Vascular plant			G5	N5	S2		x			
Small Lupine	*Lupinus pusillus* ssp. *pusillus*	Vascular plant			G5T5	NNR	S3		x			
Smooth Wild Rose	*Rosa blanda*	Vascular plant			G5	N5	S1		x			
Striped Coral-root	*Corallorhiza striata* var. *striata*	Vascular plant			G5T5	N5	S3		x	x		x
Tall Beggar's-ticks	*Bidens frondosa*	Vascular plant			G5	N5	S3		x			
Tall Blue Lettuce	*Lactuca biennis*	Vascular plant			G5	N5	S3		x		x	
Upright Narrow-leaved Pondweed	*Potamogeton strictifolius*	Vascular plant			G5	N4	S3		x			
Western Smooth Cliff-brake	*Pellaea glabella* ssp. *occidentalis*	Vascular plant			G5T4	N3	S1		x			
White Milkwort	*Polygala alba*	Vascular plant			G5	N3	S3		x			

Species common name	Species scientific name	Species type	COSEWIC status	Provincial status	G-rank	N-rank	S-rank	SARA Status	Associated targets			
									Native Grasslands	Hydro-riparian	Swales	Wetlands
Yellow Touch-me-not	*Impatiens noli-tangere*	Vascular plant			G4G5	N4	S2			x	x	x
Yellow-rattle	*Rhinanthus minor* ssp. *minor*	Vascular plant			G5T5	N4N5	S2		x			

**Values in this table are reflective of data available on NatureServe, COSEWIC, IUCN, and ACIMS databases as of March 2016

Key Ecological Attributes	Indicator	Status	Type	Poor	Fair	Good	Very Good	Source	Progress
Hydro-riparian Areas		Fair							
Connectivity		Fair	Landscape Context						
	Average length of undisturbed riparian areas	Fair		<1.6 km	1.6 to 3.2 km	>3.2 km		Rough Guess	
	Rating				2.23			Rapid Assessment	
Future Status Objective: Maintain					X				
Ecosystem health		Fair	Condition						
	Percent buffer in permanent cover	**Fair**		0 - 25%	25 - 75%	75 - 100%		Expert Knowledge	
	Rating				49.8			Rapid Assessment	
Future Status Objective: Improve to Good						**X**			
	riparian health assessment	**Poor**		0-60%	60-80%	80-100%		External Research	
	Rating			Unhealthy					
Future Status Objective: Improve to Fair					**X**				
Fish population		Fair	Condition						
	Presence data (% of baseline species present)	Fair		<80%	80 to 95%	95 to 100%	<100%	Rough Guess	
	Rating				88			Sampling Based	
Future Status Objective: Maintain					X				
Water Quality		Good	Condition						
	Water Quality Index	Good		<45	45 - 79	80 - 100		External Research	
	Rating					Healthy		External Research	
Future Status Objective: Maintain						X			

Key Ecological Attributes	Indicator	Status	Type	Poor	Fair	Good	Very Good	Source	Progress
Native Grassland		Fair							
Connectivity		Fair	Landscape Context						
	Fragmentation of landscape with linear disturbances	Fair		>3 km/km2	1 - 3 km/km2	0.43 - 1.0 km/km2	<0.43 km/km2	External Research	
	Rating				1.06			Intensive Assessment	
Future Status Objective: Maintain					X				
Ecosystem health		Fair	Condition						
	Percent change in population of grassland birds	*Unknown*		<-1%	-1 to 1%	>1%		External Research	
	Rating								
Future Status Objective: Fill knowledge gap									
	Range health	**Fair**		<50%	50 - 74%	75 - 100%		Expert Knowledge	
	Rating				Healthy With Problems			Expert Knowledge	
Future Status Objective: Improve to Good						**X**			
Natural disturbance regime		**Poor**	Condition						
	Annual extent of burning on Meewasin and conservation lands	**Poor**		0 to 1%/yr or more than 80%/yr	1 to 5%/yr or 20% to 80%/yr	5 to 20%/yr		External Research	
	Rating			below 1%				Rapid Assessment	
Future Status Objective: Improve to Fair					**X**				

Key Ecological Attributes	Indicator	Status	Type	Poor	Fair	Good	Very Good	Source	Progress
Post-Glacial Channel Scars (Swales)		Fair							
Connectivity		Fair	Landscape Context						
	Fragmentation of Swales with linear disturbances	Fair		>3 km/km2	1-3 km/km2	0.43-1.0 km/km2	<0.43 km/km2	Expert Knowledge	
	Rating				2.65			Intensive Assessment	
Future Status Objective: Maintain					X				
	Percent of Swales with healthy amounts of permanent cover	Fair		<25 %	25-74.9 %	>75 %		Expert Knowledge	
	Rating				46.4			Rapid Assessment	
Future Status Objective: Maintain					X				
Ecosystem Health		Poor	Unknown						
	Percent of land cover in native habitat	Poor		<50%	50 to 75	>75%	100%	Expert Knowledge	
	Rating			34.5				Intensive Assessment	
Future Status Objective: Maintain				X					

Key Ecological Attributes	Indicator	Status	Type	Poor	Fair	Good	Very Good	Source	Progress
Wetlands		Fair							
Density of wetlands		Fair	Size						
	Annual rate of wetland area loss	**Fair**		<-1.0 %	-0.5 to 0 %	0%	>0 %	Expert Knowledge	
	Rating				-0.11			Sampling Based	
Future Status Objective: Improve to Good						**X**			
Diversity of wetland types		*Unknown*	Condition						
	Expected distribution of types of wetlands	*Unknown*							
	Rating								
Future Status Objective: Fill knowledge gap									
Ecosystem health		Poor	Condition						
	Aquatic invertebrate population	*Unknown*			absent	present		Expert Knowledge	
	Rating								
Future Status Objective: Fill knowledge gap									
	Percent of wetlands with healthy amounts of permanent cover	**Poor**		< 25%	25 to 74.9%	> 75%		External Research	
	Rating			5%				Intensive Assessment	
Future Status Objective: Improve to Fair					**X**				
	Wetland health assessment	**Poor**		0-60%	60-80%	80-100%		Expert Knowledge	
	Rating			Unhealthy				Expert Knowledge	
Future Status Objective: Improve to Fair					**X**				

Appendix E – Action Plan

Acronym	Organization	Acronym	Organization
ASUPCA	Association of Saskatchewan Urban Parks and Conservation Agencies	CoS	City of Saskatoon
DFO	Fisheries and Oceans Canada	DUC	Ducks Unlimited Canada
ECCC	Environment and Climate Change Canada	GoS	Government of Saskatchewan
MoA	Ministry of Agriculture	MoE	Ministry of Environment
MoH	Ministry of Highways and Infrastructure	NPSS	Native Plant Society
PCAP	Prairie Conservation Action Plan	RM	Rural Municipality of Corman Park
SaskPoly	SaskPolytechnic	SES	Saskatchewan Environmental Society
SISC	Saskatchewan Invasive Species Council	SNS	Saskatoon Nature Society
SPS		SSGA	Saskatchewan Stock Growers Association
SSRWSI	South Saskatchewan River Watershed Stewards Inc.	SW	Northeast Swalewatchers
SWF	Saskatchewan Wildlife Federation or Saskatoon Wildlife Federation	U of S	University of Saskatchewan
WHP	Wanuskewin Heritage Park	WRSS	
WSA	Water Security Agency		

Conservation Action Planning				Targets Addressed					
Category	Subcategory	Conservation Action	Measure of Success	Biodiversity	Human Well-Being	Threats Addressed	Potential Key Partners	Action Priority	Meewasin Departments
1.0 Land / Water Management	1.1 Site/Area Stewardship	1.1.1 Continue the European Buckthorn Eradication Project in the Meewasin Valley.	By 2027, an additional 2,000,000 European Buckthorn stems are controlled in the Meewasin Valley with European Buckthorn under control on Meewasin Conservation sites and City of Saskatoon Parks, with cover and density reduced by 75%, and progress underway in the river valley.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species, Urban Riverbank Slumping & Slope Instability	CoS, DUC, ECCC, MoA, MoE, NPSS, PCAP, RM, SISC, WHP	Critical	P&C
		1.1.2 Continue the integrated control of provincially designated noxious weeds in the Meewasin Valley.	By 2027, Leafy Spurge, Purple Loosestrife, Common Tansy, Absinthe and Baby's Breath on Meewasin Conservation sites are under control with cover and density reduced by 75%, and progress is underway in the river valley, other provincially designated noxious weeds have progress underway for control on Meewasin sites and the river valley.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species, Urban Riverbank Slumping & Slope Instability	CoS, DUC, ECCC, MoA, MoE, NPSS, PCAP, RM, SISC, WHP	Critical	P&C
		1.1.3 Continue the integrated control of non-native invasive trees in the Meewasin Valley.	By 2027, non-native invasive trees including Tartarian Honeysuckle, Cotoneaster, Siberian Elm and Caragana are under control, with cover and density reduced by 75%, on Meewasin Conservation sites with progress underway in the Meewasin Valley.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species, Urban Riverbank Slumping & Slope Instability	CoS, DUC, ECCC, MoA, MoE, NPSS, PCAP, RM, SISC, WHP	Critical	P&C
		1.1.4 Continue the integrated control of non-native grasses on Meewasin Conservation sites.	By 2027, a 10% reduction in cover and density of non-native grasses including Smooth Brome, Kentucky Bluegrass, Crested Wheatgrass and Reed Canary Grass on Meewasin Conservation sites.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species	CoS, DUC, ECCC, MoA, MoE, NPSS, RM, SISC, SSRWSI, WSA	Critical	P&C

		1.1.5 As aquatic invasive species and prohibited fish species are discovered in the Meewasin Valley, work with the various partners to reduce the impact and spread of these species.	When aquatic invasive species (aquatic invasive mussels, invasive fish species, invasive plant species, prohibited fish species) are discovered in the Meewasin Valley and the City of Saskatoon, work with the appropriate partners to ensure the impact and spread of the species is reduced and eliminate the species from Meewasin Conservation sites.	Hydro-riparian Areas, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species	CoS, DUC, ECCC, MoA, MoE, NPSS, PCAP, RM, SISC, WHP	Critical	P&C
		1.1.6 Continue the integrated control of potentially invasive "escaped" ornamental species on Meewasin Conservation sites and in the Meewasin Valley.	By 2027, non-native and potentially invasive "escaped" ornamentals such as Himalayan Balsam, Creeping Bellflower, Bouncing Bet and Yellow Clematis, are under control, with cover and density reduced by 75%, on Meewasin Conservation sites with progress underway in the Meewasin Valley.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species	CoS, DUC, ECCC, MoA, MoE, NPSS, RM, SISC, WHP	Critical	P&C
		1.1.7 As invasive animal species (e.g. Wild Boar) are discovered in the Meewasin Valley, work with the various partner agencies to reduce the impact and spread of these species.	When invasive animal species (e.g. Wild Boar) are discovered in the Meewasin Valley and Meewasin Conservation sites, work with the appropriate partners to ensure the impact and spread of the species is reduced throughout the Valley and eliminated from Meewasin Conservation sites.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species	CoS, DUC, ECCC, MoA, MoE, NPSS, RM, SISC, WHP	Critical	P&C
		1.1.8 As provincially designated prohibited weeds are discovered in the Meewasin Valley, Meewasin will lead the eradication of these species.	When prohibited noxious weeds are discovered in the Meewasin Valley and the City of Saskatoon, Meewasin will lead the eradication of these species to eliminate spread and impact to ecological systems.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species	CoS, MoA, MoE, RM, SISC	Critical	P&C
		1.1.9 Enhance grassland bird habitat on Meewasin Conservation sites through an integrated native prairie management approach.	By 2027, a 50% reduction in shrub cover and a 20% improvement in grassland ecological health through ongoing resource management activities to enhance grassland bird habitat on Meewasin Conservation sites.	Native Prairie, Swales	Physical Health, Connection to Nature	Fire Suppression, Invasive Species, Unsustainable Grazing Management	CoS, DUC, ECCC, MoA, NPSS, SISC, WHP	Critical	P&C
		1.1.10 Enhance Plains Rough Fescue habitat on Meewasin Conservation sites through an integrated native prairie management approach.	By 2027, a 10% increase in Plains Rough Fescue patch size and density through ongoing resource management and restoration activities on Meewasin Conservation sites with existing Plains Rough Fescue patches.	Native Prairie, Swales	Physical Health, Connection to Nature	Fire Suppression, Invasive Species, Unsustainable Grazing Management	ECCC, MoA, NPSS, SISC, WHP, UofS	Critical	P&C
		1.1.11 On Meewasin sites, all abandoned water wells are capped following Water Security Agency best management practices, to protect ground water resources.	By 2022, conduct an inventory of all wells on Meewasin sites and by 2027, all abandoned water wells are capped following best management practice procedure.	Hydro-riparian Areas, Swales, Wetlands	Physical Health	Dams & Water Management, Runoff - Pesticide and Fertilizer, Storm Water	SSRWSI, WSA	Critical	D&D, P&C
		1.1.12 Enhance habitat for species at risk and rare species on Meewasin Conservation sites through an integrated management approach.	By 2027, rare and species at risk flora and fauna have a 10% increase in populations through habitat enhancement activities on Meewasin Conservation sites.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Fire Suppression, Invasive Species, Unsustainable Grazing Management	ECCC, DUC, NPSS, SNS, WHP	Critical	P&C
		1.1.13 Enhance the ecological health of riparian areas and wetlands on Meewasin Conservation sites through resource management activities.	By 2027, the ecological health of riparian areas and wetlands will improve by 20% through integrated resource management activities.	Hydro-riparian Areas, Swales, Wetlands	Physical Health, Connection to Nature	Fire Suppression, Invasive Species, Unsustainable Grazing Management	DUC, ECCC, PCAP, SSRWSI	Critical	P&C

		1.1.14 Enhance the ecological health of native prairie on Meewasin Conservation sites through resource management activities.	By 2027, the ecological health of native prairie will improve by 20% through integrated resource management activities.	Native Prairie, Swales	Physical Health, Connection to Nature	Fire Suppression, Invasive Species, Unsustainable Grazing Management	DUC, ECCC, PCAP, UofS	Critical	P&C
		1.1.15 As emergency spills occur within the South Saskatchewan River, Meewasin will work with the various government agencies on containment, clean-up, restoration and monitoring of the situation.	When emergency spills occur within the South Saskatchewan River, Meewasin will work with the various government agencies on containment, clean-up, restoration and monitoring.	Hydro-riparian Areas, Swales, Wetlands	Physical Health, Connection to Nature	Roads, Utility & Service Lines, Storm Water	DFO, MoE, SSRWSI, WSA	Critical	P&C
		1.1.16 Continue the Meewasin Riverbank Clean-up Campaign, working jointly with the Great Canadian Shoreline Clean-up initiative.	The Meewasin Riverbank Clean-up Campaign is delivered by Meewasin along the Meewasin Valley and Meewasin Conservation sites, in conjunction with the Great Canadian Shoreline Clean-up initiative.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Trespass Issues	CoS, SES	Critical	CD, P&C
		1.1.17 Work with the City of Saskatoon on protecting significant trees along the riverbank and Meewasin Trail from beaver activity.	By 2022, historically wrapped trees along the riverbank have wire removed and/or upgraded to protect trees along the riverbank from beaver activity.	Hydro-riparian Areas	Connection to Nature	Problematic Native Species	CoS	Necessary	P&C
		1.1.18 Address ongoing littering and illegal dumping on Meewasin Conservation sites through regular site maintenance, signage and enforcement.	Ongoing site maintenance, signage and enforcement on Meewasin Conservation sites regarding littering and illegal dumping.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Trespass Issues, Recreation Areas, Irresponsible Recreation	CoS, MoE, RCMP, RM	Critical	CD, D&D, P&C
		1.1.19 Employ early detection and rapid response measures for new infestations of invasive species found on Meewasin Conservation sites.	Ongoing implementation of early detection and rapid response measures are employed on new infestation of invasive species that occupy patches less than 100 m^2, recording and documenting the occurrences as they occur.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species	CoS, MoE, SSISC, RM	Critical	P&C
		1.1.20 Work with landowners on the creation of a minimum of 40 meter riparian area buffers along hydro-riparian areas and wetlands.	By 2019, hydro-riparian and wetland buffers are mapped within the planning area. By 2027, impacted riparian buffers have been restored to 40 meters buffer on 75% of the lands within the Meewasin Conservation Zone and 20% within the planning area.	Hydro-riparian Areas, Swales, Wetlands	Physical Health, Connection to Nature	Runoff - Pesticide and Fertilizers, Conversion to Agriculture	MoA, RM, SSRWSI	Necessary	P&C
	1.2 Ecosystem & Natural Process (Re)Creation	1.2.1 On Meewasin Conservation sites, restore drained wetlands to recreate ecological function and diversity.	By 2027, all drained wetlands on Meewasin Conservation sites are restored with drained wetlands in the Conservation Zone identified and plans in place to restore them.	Swales, Wetlands	Physical Health, Connection to Nature	Conversion to Agriculture, Acreage Development, Suburban Development, Invasive Species	DUC, SSRWSI, WSA	Critical	P&C
		1.2.2 On Meewasin Conservation sites, begin the process of restoring previously cultivated hay land / pastureland to native species either through outright breaking and restoring or enhancing by adding additional native species.	By 2022, all known previously cultivated sites are documented and restoration plans are developed with restoration underway on all Meewasin Conservation sites by 2027.	Native Prairie	Physical Health, Connection to Nature	Conversion to Agriculture, Invasive Species	NPSS, PCAP	Critical	P&C

	1.2.3 At the Meewasin Northeast Swale, restore the dry and wet storm retention ponds to native species.	By 2018, the restoration process begins of the dry and wet storm retention ponds in the Northeast Swale.	Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Storm Water, Dams & Water Management, Invasive Species	CoS, DUC, NPSS, PCAP, SSRWSI	Critical	P&C
	1.2.4 Develop an inter-agency native seed co-operative to share native grass, wildflower and shrub seeds for restoration projects.	By 2018, several agencies develop a native seed co-operative for agency restoration projects.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Conversion to Agriculture, Suburban Development, Recreation Areas	CoS, ECCC, NCC, NPSS, PCAP, WHP	Beneficial	D&D, P&C
	1.2.5 Establish a native seed nursery and a native aquatic pond on a Meewasin site to sustainably harvest native grass and wildflower seed for restoration projects on Meewasin Conservation sites.	By 2020, a Meewasin native seed nursery and a native aquatic pond is established.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Conversion to Agriculture, Suburban Development, Recreation Areas	CoS, NPSS, NCC, PCAP, WHP	Necessary	D&D, P&C
	1.2.6 Continue and expand Meewasin's native plant propagation program.	By 2020, all native shrubs, wildflowers, aquatics and native grass plugs are sourced locally or grown by Meewasin.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Conversion to Agriculture, Suburban Development, Recreation Areas	CoS, NPSS, NCC, PCAP, WHP	Necessary	D&D, P&C
	1.2.7 Locally sourced native plant materials are used on restoration and landscape plantings within the Conservation Zone.	By 2025, all restoration and landscape plantings, lead by Meewasin within the Conservation Zone, use locally sourced native plant materials.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Conversion to Agriculture, Suburban Development, Recreation Areas	CoS, NCC, NPSS, PCAP, WHP	Necessary	D&D, P&C
	1.2.8 Expand the conservation grazing program to include other grazers and additional Meewasin Conservation sites.	By 2020, the conservation grazing program includes livestock, sheep and goats to manage Meewasin Conservation sites with a minimum of three Conservation sites grazed annually and an annual minimal grazing disturbance regime of 10% of each site.	Native Prairie, Swales	Physical Health, Connection to Nature	Invasive Species, Unsustainable Grazing Management	MoA, PCAP, SSGA, Livestock Groups, WHP	Critical	P&C
	1.2.9 Continue the prescribed burning program on Meewasin Conservation sites.	By 2018, annually conduct prescribed burns on a minimum of 4 Meewasin Conservation sites with an objective of 5% of each site burned.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Fire Suppression, Invasive Species	CoS, ECCC, NCC, NPSS, PCAP, SPS, UofS, WHP	Critical	P&C
	1.2.10 Work with the City of Saskatoon on the development and utilization of naturalized wetlands as part of storm water management forebays prior to entering various swales and the South Saskatchewan River.	By 2025, naturalized wetlands are developed and utilized as part of storm water management forebays prior to entering various swales and the South Saskatchewan River.	Hydro-riparian Areas, Swales, Wetlands	Physical Health, Connection to Nature	Storm Water, Dams & Water Management	CoS, DUC, SNS, SSRWSI, WSA	Necessary	D&D, P&C
	1.2.11 Assist Wanuskewin Heritage Park with the restoration of cropland to native prairie species for Plains Bison habitat.	By 2025, the cropland at Wanuskewin Heritage Park is restored to native prairie species.	Native Prairie	Physical Health, Connection to Nature	Conversion to Agriculture, Invasive Species, Unsustainable Grazing	CoS, NCC, NPSS, PCAP, WHP	Necessary	P&C

		1.2.12 Continue to restore the St. Joseph's High School - Natural Grassland Project to improve the diversity of native species at the site.	By 2025, the St. Joseph's High School - Natural Grassland Project has an 80% reduction in non-native grasses and forbs with a 75% increase in native grass, forb and shrub diversity.	Native Prairie	Physical Health, Connection to Nature	Invasive Species, Suburban Development,	CoS, NPSS	Necessary	CD, D&D, P&C
		1.2.13 Work with the City of Saskatoon to develop a restoration plan and begin implementation to restore the snow dump located in the Small Swale	By 2027, restoration of the snow dump in the Small Swale is underway	Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species, Storm Water, Dams / Water Management	CoS	Urgent	D&D, P&C
		1.2.14 Develop and implement a strategy to begin the restoration of Eastern Cottonwood forests along the South Saskatchewan River.	By 2026, a restoration strategy is developed and implemented for Eastern Cottonwood forests along the South Saskatchewan River.	Hydro-riparian Areas	Physical Health, Connection to Nature	Dams & Water Management, Urban Riverbank Slumping & Slope Instability	CoS, SaskPower, WSA	Necessary	P&C
2.0 Species Management	2.1 Species Stewardship	2.1.1Delayed haying and conservation mowing of Meewasin Conservation sites between May 1st and July 15th to minimize the impact to ground nesting grassland birds and waterfowl.	Haying and conservation mowing, for native shrub control, of Meewasin Conservation sites is delayed between May 1st and July 15th annually.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Unsustainable Grazing Management, Fire Suppression	ECCC, DUC, SNS	Critical	P&C
		2.1.2 Develop a beaver management strategy with the City of Saskatoon and Wanuskewin Heritage Park that balances sustainable populations of beavers, healthy riparian areas and the protection of urban planted trees.	By 2020, a beaver management strategy is developed and implemented.	Hydro-riparian areas, Swales, Wetlands	Physical Health, Connection to Nature	Problematic Native Species	CoS, RM, WHP	Necessary	D&D, P&C
		2.1.3 Inspect and maintain the fish ladder at the weir to allow for safe passage of fish species in the South Saskatchewan River.	Annually work with Fire Protection Services, Ministry of Environment, Water Security Agency and Department of Fisheries and Oceans to ensure the fish ladder at the weir is functioning properly.	Hydro-riparian Areas	Physical Health, Connection to Nature	Dams & Water Management	CoS, DFO, MoE, SSRWSI, WSA	Necessary	P&C
		2.1.4 Develop and implement fish habitat enhancement projects along the South Saskatchewan River and Beaver Creek that will enhance fish spawning habitat.	By 2027, three fish habitat enhancement projects are implemented.	Hydro-riparian Areas	Physical Health, Connection to Nature	Dams & Water Management	CoS, DFO, MoE, SSRWSI, WSA	Necessary	P&C
		2.1.5 Install nesting and roosting structures to enhance bird and bat habitat on Meewasin Conservation sites and along the Meewasin Valley to provide natural insect control.	By 2027, 300 tree swallow / mountain bluebird bird houses, 200 bat boxes, 20 purple marten houses and other structures are installed on Meewasin Conservation sites and along the Meewasin Valley.	Hydro-riparian areas, Swales, Wetlands	Physical Health, Connection to Nature	Problematic Native Species, Light Pollution, Sound Pollution	CoS, DUC, SNS	Beneficial	CD, P&C
	2.2 Species Re-Introduction & Translocation	2.2.1 Plains Bison are re-introduced to Wanuskewin Heritage Park.	By 2021, genetically pure Plains Bison are reintroduced to Wanuskewin Heritage Park.	Native Prairie	Physical Health, Connection to Nature	Unsustainable Grazing Management, Fire Suppression, Conservation to Agriculture	NCC, Parks Canada, WHP	Critical	P&C

	2.2.2 An evaluation of the potential and feasibility to reintroduce species to Meewasin Conservation sites is conducted.	By 2025, an evaluation is conducted to determine the potential and feasibility to reintroduce native species back to Meewasin Conservation sites that may have been locally extirpated.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Acreage Development, Conversion to Agriculture, Commercial & Industrial Development, Suburban Development, Recreational Areas	ECCC, SNS, UofS	Beneficial	P&C
2.3 Ex-Situ Conservation	2.3.1 Work with the Living Sky Wildlife Rehabilitation Center and the Wildlife Rehabilitation Society of Saskatchewan to use the various Meewasin Conservation sites, with prior approval, for reintroduction of rehabilitated native wildlife.	Continue to work with the local and provincial wildlife rehabilitation organizations to release rehabilitated native wildlife on Meewasin Conservation sites.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Acreage Development, Suburban Development, Roads	LSWRC, SNS, UofS	Necessary	CD, P&C
	2.3.2 Work with the Plant Gene Resource Center of Canada to collect a representative sample of seed genetic diversity from Meewasin Conservation sites for long-term conservation in the seed bank.	By 2027, over 200 different species of native plant seeds, from Meewasin Conservation sites are housed in the seed bank.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Acreage Development, Conversion to Agriculture, Suburban Development, Roads	AgCanada, ECCC, SNS, NPSS, UofS	Beneficial	P&C
	2.3.3 Work with the W.P. Fraser Herbarium to collect and house herbarium samples of the plant diversity from Meewasin Conservation sites.	By 2027, over 300 different plant species, native and non-native, are collected and added to the collection at the herbarium.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Connection to Nature	Acreage Development, Conversion to Agriculture, Suburban Development, Roads	ECCC, NPSS, SNS, UofS	Beneficial	P&C
3.0 Awareness Raising	3.1 Outreach & Communications	3.1.1 At each Meewasin Conservation site and along the Meewasin Valley, site specific invasive species awareness signage is implemented as part of the overall signage strategy as part of the Trails Master Plan.	By 2019, awareness signage is installed at each Meewasin Conservation site and along the Meewasin Valley regarding invasive species utilizing templates provided by the Play, Clean, Go Campaign.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species	CoS, MoA, RM, SISC	Necessary	CD, D&D, P&C
		3.1.2 Develop and implement a Conservation Volunteers - like program to engage the general public and citizen scientists in resource management and ecological monitoring activities.	By 2017, a Conservation Volunteers - like program is developed with a minimum of 10 volunteer events delivered annually.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species, Fire Suppression, Problematic Native Species, Irresponsible Recreation, Sound Pollution, Trespass Issues, Unsustainable Grazing Management	CoS, NPSS, SNS	Necessary	CD, D&D, FD, P&C

		3.1.3 Promote awareness that Meewasin is a regional land trust that can purchase land in fee simple, accept land donations and has the ability to hold conservation easements on private land.	By 2017, Meewasin promotes that the organization is a regional land trust with various tools to conserve land including fee simple purchase, land donations, and conservation easements.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Acreage Development, Commercial & Industrial Development, Suburban Development, Conversion to Agriculture	ECCC, DUC, NCC, SWF	Necessary	CD, FD, P&C
		3.1.4 Promote awareness of Meewasin's conservation grazing program.	Annually promote conservation grazing program with a minimum of one public and media event, social media awareness, signage and public / professional presentations and tours.	Native Prairie, Swales	Physical Health, Connection to Nature	Unsustainable Grazing Management, Invasive Species	MoA, NPSS, PCAP, SSRWSI, UofS	Beneficial	CD, FD, P&C
		3.1.5 Promote awareness of Meewasin's prescribed burning program.	Annually promote the prescribed burning program with social media awareness, signage, and public / professional presentations and tours.	Native Prairie, Swales	Physical Health, Connection to Nature	Fire Suppression, Invasive Species	MoA, NPSS, PCAP, SSRWSI, UofS	Beneficial	CD, FD, P&C
		3.1.6 Promote awareness of Meewasin's integrated invasive species program.	Annually promote the integrated invasive species program with social media awareness, signage and public / professional presentations and tours.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species, Fire Suppression, Unsustainable Grazing Management	MoA, NPSS, PCAP, SSRWSI, UofS	Beneficial	CD, D&D, FD, P&C
		3.1.7 Create awareness of poisonous and dangerous species including poisonous plants and dangerous wildlife that maybe found on Meewasin Conservation sites and along the Meewasin Valley, is implemented as part of the overall signage strategy as part of the Trails Master Plan.	By 2020, awareness signage is installed at each Meewasin Conservation site and along the Meewasin Valley regarding potentially poisonous plants and dangerous wildlife that maybe present.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Problematic Native Species, Invasive Species	NPSS, SISC, UofS	Necessary	D&D, P&C
		3.1.8 Partner with the City of Saskatoon to annually host landscaping best management practice events to promote biodiversity within the city and adjacent to natural areas.	By 2019, annual events are held to promote landscaping best management practices to promote biodiversity.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species, Sound Pollution, Storm Water	CoS, NPSS, SES, SNS	Beneficial	D&D, P&C
		3.1.9 Within Meewasin's Conservation Zone, install Don't Let It Go signage.	By 2018, Don't Let It Go signage is installed along Meewasin Conservation Zone within the City and at Meewasin Conservation sites.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species, Storm Water, Dams / Water Management	CoS, MoE, SISC	Necessary	P&C
		3.1.10 Engage landowners within the various swales and on adjacent lands to Meewasin Conservation sites and the Meewasin Conservation Zone regarding conservation opportunities, invasive species, and best management practices.	By 2020, Meewasin begins to engage landowners within the various Swales and on adjacent lands to Conservation Areas.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Acreage Development, Invasive Species, Unsustainable Grazing Management, Fire Suppression	MoA, PCAP, SSRWSI	Necessary	CD, P&C
		3.1.11 Maximize Meewasin's social media and website to promote conservation and resource management.	Expand the use of social media and the Meewasin website to showcase the value of conservation and resource management in the Meewasin Valley.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	All Threats		Necessary	CD, P&C

		3.1.12 Host an annual invasive species tour and/or workshop on a Meewasin Conservation site.	Continue to host an annual invasive species tour for local weed inspectors, landowners and producers.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species	CoS, NCC, NPSS, PCAP, RM, SISC, SSRWSI, SWF	Beneficial	P&C
		3.1.13 Create awareness regarding the impact domestic pets can have on wildlife and natural systems.	By 2019, awareness signage is installed at each Meewasin Conservation site regarding the impact domestic pets can have on wildlife and natural systems.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species	CoS, SISC, SES, SNS	Necessary	CD, D&D, P&C
		3.1.14 Install aquatic invasive species awareness signage along the Meewasin Valley and on Meewasin Conservation sites.	Continue the installation of aquatic invasive species awareness signage.	Hydro-riparian Areas, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species, Storm Water, Dams / Water Management	CoS, MoE, SISC, WSA	Necessary	P&C
		3.1.15 Adequately sign Meewasin Conservation sites regarding Meewasin Bylaws.	By 2019, update signage at all Meewasin Conservation sites regarding Meewasin Bylaws.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Recreation Areas, Irresponsible Recreation, Trespass Issues, Gathering of Plants	CoS	Necessary	P&C
		3.1.16 Work with partners to deliver beneficial management practices (BMPs) to landowners within the Meewasin Conservation Zone and adjacent to Meewasin Conservation sites.	By 2018, work with partners to deliver beneficial management practices (BMPs) to landowners within Meewasin's Conservation Zone and adjacent to Meewasin Conservation sites to improve ecological health of the conservation targets.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Conversion to Agriculture, Runoff - Pesticide and Fertilizers, Unsustainable Grazing Management, Invasive Species	MoA, SSRWSI, RM	Beneficial	P&C
		3.1.17 Promote and participate in various partner programs related to stormwater management.	Continue to be involved with various programs like the Yellow Fish Road program and become engaged in additional partner programs including bioswales and green roofs to improve stormwater quality.	Hydro-riparian Areas, Swales, Wetlands	Physical Health, Connection to Nature	Storm Water	CoS, PFRSBC, SW, SSRWSI	Beneficial	CD, D&D, P&C
		3.1.18 Create awareness about slope stability and slumping and its role as a natural process along the South Saskatchewan River, and how residents of Saskatoon can mitigate its effects.	By 2019, work with the City of Saskatoon and various partners to create awareness about slope stability and slumping and its role as a natural process along the South Saskatchewan River, and how residents of Saskatoon can mitigate its effects.	Hydro-riparian Areas	Physical Health, Connection to Nature	Urban Riverbank Slumping and Slope Stability, Invasive Species	CoS, DUC, SSRWSI	Beneficial	CD, D&D, P&C
		3.1.19 Participate in initiatives to create awareness and monitor the impacts windows have on birds and bats.	By 2017, create awareness regarding the impacts windows have on birds and bats and by 2018, participate in the monitoring of bird strikes.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Suburban Development, Light Pollution	CoS, NS, SNS, WRSS	Beneficial	C&D, P&C
4.0 Law Enforcement & Prosecution	4.1 Detection & Arrest	4.1.1 Review and update Meewasin's bylaws regarding littering and river sandbar vehicle usage and where necessary, develop additional bylaws as required.	Bylaws are updated and reviewed every 5 years, starting in 2018.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Irresponsible Recreation, Trespass Issues	CoS, MoE, RCMP, RM	Necessary	P&C

		4.1.2 Develop a memorandum of understanding with the Saskatoon Police Service, Corman Park Police Service, Conservation Officers and the RCMP to provide the various policing agencies the ability to enforce Meewasin bylaws.	By 2018, a Memorandum of Understanding is signed with the RCMP, Saskatoon Police Service, Conservation Officers and Corman Park Police Service regarding enforcement of Meewasin bylaws.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Irresponsible Recreation, Trespass Issues	CoS, MoE, RCMP, RM	Critical	P&C
		4.1.3 A committee of local police agencies (Saskatoon Police Service, Corman Park Police Service and the RCMP), Conservation Officers and Meewasin meet on an annual basis to discuss enforcement opportunities in the Meewasin Valley.	Starting in 2017, the committee of local police agencies meets on an annual basis.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Irresponsible Recreation, Trespass Issues	CoS, MoE, RCMP, RM	Necessary	P&C
		4.1.4 Incidents of Meewasin bylaw infractions and breaches of various laws including the Wildlife Act are reported in a timely fashion to the responsible enforcement agency.	Infractions are reported to the responsible enforcement agency within 24 hours of confirmation by Meewasin Resource Management staff.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Irresponsible Recreation, Trespass Issues	CoS, MoE, RCMP, RM	Necessary	P&C
	4.3 Non-Criminal Legal Action	4.3.1 Determine the feasibility for Meewasin's Resource Management staff to hold Weed Inspector status within the Meewasin Conservation Zone.	By 2018, determine if Meewasin can enforce the *Weed Control Act* and if so, Resource Management staff are declared as Weed Inspectors within the Conservation Zone by 2019.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species	CoS, MoA, RM, SISC	Necessary	P&C
		4.3.2 Incorporate Meewasin Conservation sites with the RM of Corman Park's Rural Watch Program initiative.	By 2018, Meewasin Conservation sites are included with the RM of Corman Park's Rural Watch Program initiative.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Irresponsible Recreation, Trespass Issues	MoE, RCMP, RM	Necessary	P&C
5.0 Livelihood, Economic and Moral Incentives	5.2 Better Products and Management Practices	5.2.1 Develop, in partnership with the City of Saskatoon, landscaping best management practices to enhance biodiversity within the City and adjacent to natural areas.	By 2022, landscaping best management practices are developed to enhance biodiversity.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species, Sound Pollution, Storm Water	CoS, NPSS, PCAP, SES, SNS, UofS	Beneficial	CD, D&D, P&C
		5.2.2 Partner with the Ministry of Agriculture and the agricultural community to utilize Meewasin Conservation sites for promotion of best management practices for native prairie management.	By 2021, an annual event is hosted on a Meewasin Conservation sites to promote best management practices to the agricultural community.	Native Prairie, Swales	Physical Health, Connection to Nature	Fire Suppression, Invasive Species, Runoff - Pesticide and Fertilizers, Unsustainable Grazing Management	MoA, PCAP, SSGA, Livestock Groups	Beneficial	P&C
6.0 Conservation Designation & Planning	6.1 Protected Area Designation and/or Acquisition	6.6.1 Secure priority conservation lands in Fee Simple, through purchase and/or donation, and where appropriate, in partnership with other conservation organizations.	By 2027, two additional Conservation sites are secured, by Meewasin, through fee simple.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Acreage Development, Commercial & Industrial Development, Conservation to Agriculture, Suburban Development	DUC, MoE, NCC, SWF	Necessary	FD, P&C

	6.1.2 As the City limits expand, additional portions of the Northeast Swale are incorporated into the Meewasin Northeast Swale.	Within 2 years of City of Saskatoon boundaries changing, additional portions of the Northeast Swale are incorporated into the Meewasin Northeast Swale.	Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Acreage Development, Commercial & Industrial Development, Conservation to Agriculture, Suburban Development	CoS	Critical	D&D, P&C
	6.1.3 Refer priority conservation lands that may fit the requirement of other conservation organizations.	As referrals occur, they are passed onto other conservation organizations.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Acreage Development, Commercial & Industrial Development, Conservation to Agriculture, Suburban Development	DUC, MoE, NCC, SWF	Critical	P&C
	6.1.4 Work with Wanuskewin Heritage Park on the establishment of a UNESCO World Heritage Site.	By 2020, Wanuskewin Heritage Park is designated as an UNESCO World Heritage Site.	Hydro-riparian Areas, Native Prairie	Physical Health, Connection to Nature	Suburban Development	CoS, WHP	Necessary	FD, P&C
6.2 Easements & Resource Rights	6.2.1 Secure priority conservation lands through donated, purchased and/or split-receipt Conservation Easements.	By 2027, two additional Conservation sites are secured, by Meewasin, through conservation easements.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Acreage Development, Commercial & Industrial Development, Conservation to Agriculture, Suburban Development	DUC, MoE, NCC, SWF	Necessary	FD, P&C
	6.2.2 The University of Saskatchewan's Kernen Prairie and Biddulf Prairie sites are conserved with a conservation easement.	By 2020, Kernen Prairie and Biddulf Prairie have conservation easements placed on them.	Native Prairie	Physical Health, Connection to Nature	Acreage Development, Commercial & Industrial Development, Conservation to Agriculture, Suburban Development	NCC, UofS	Critical	FD, P&C
	6.2.3 Meewasin held Conservation Easements are annually monitored, meeting best management practice requirements set for by the EcoGift Program and the Canadian Land Trust Alliance.	On an annual basis, Meewasin Conservation Easements are monitored.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Acreage Development, Commercial & Industrial Development, Conservation to Agriculture, Suburban Development	ECCC, NCC	Necessary	P&C

	6.2.4 Defend and enforce Meewasin's Conservation Easement agreements, if required.	As infractions occur on Conservation Easements, enforce and defend conservation easements as required.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Acreage Development, Commercial & Industrial Development, Conservation to Agriculture, Suburban Development	ECCC, NCC	Critical	P&C
	6.2.5 Partner with other land trusts and agricultural special interest groups to examine the feasibility and potentially develop legislation for the creation of Agriculture Conservation Easements in Saskatchewan.	By 2027, Agricultural Conservation Easement legislation is available in Saskatchewan.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Acreage Development, Commercial & Industrial Development, Conservation to Agriculture, Suburban Development	DUC, ECCC, MoA, MoE, NCC, SWF, Agricultural Groups	Beneficial	P&C
	6.2.6 Work with conservation partners to conserve aquifer sources for the various Swales in the Meewasin Valley.	By 2027, two properties are conserved that help protect the aquifer of various Swales in the Meewasin Valley.	Hydro-riparian Areas, Swales, Wetlands	Physical Health, Connection to Nature	Acreage Development, Commercial & Industrial Development, Conservation to Agriculture, Suburban Development	DUC, MoE, NCC, SWF	Necessary	P&C
6.3 Land/Water Use Zoning & Designation	6.3.1 Work with the City of Saskatoon to establish a protective designation for priority conservation lands within City Limits.	By 2020, a protective designation is created and applied to priority conservation lands within City limits.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Commercial & Industrial Development, Suburban Development, Dams & Water Management, Storm Water, Light Pollution, Sound Pollution, Utility and Service Lines	CoS, DUC, SW, SNS	Critical	P&C
	6.3.2 As priority conservation lands become available within City limits, those lands are incorporated as Meewasin Conservation sites.	As priority conservation lands become available within City limits, those lands are incorporated as Meewasin Conservation sites.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Acreage Development, Commercial & Industrial Development, Suburban Development	CoS	Critical	P&C
	6.3.3 Explore the creation of a Biosphere Reserve, incorporating the Meewasin Northeast Swale, Small Swale and Wanuskewin Heritage Park.	By 2025, if feasible, explore the creation of a Biosphere Reserve for the Northeast Swale, Small Swale and Wanuskewin Heritage Park.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Suburban Development	CoS, DUC, SW, SNS, WHP	Beneficial	P&C

	6.3.4 The Small Swale is incorporated into the Meewasin Conservation Zone and becomes a Meewasin Conservation site within the City limits.	By 2018, the Small Swale is incorporated into Meewasin's Conservation Zone and by 2020 becomes a Meewasin Conservation site.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Acreage Development, Commercial & Industrial Development, Suburban Development	CoS, SW	Critical	P&C
	6.3.5 Expand Meewasin's Conservation Zone as the City Limits expand, incorporating the lands meeting Meewasin's Land Policy criteria.	By 2018, Meewasin's Conservation Zone is expanded to include lands within the City limits that meet Meewasin's Land Policy criteria.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Acreage Development, Commercial & Industrial Development, Suburban Development	CoS	Critical	P&C
	6.3.6 Expand Meewasin's Conservation Zone within RM Corman Park boundaries, incorporating the lands meeting Meewasin's Land Policy criteria.	By 2025, Meewasin's Conservation Zone is expanded within R.M. Corman Park that meets Meewasin's Land Policy criteria.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Acreage Development, Commercial & Industrial Development, Suburban Development	RM	Critical	P&C
	6.3.7 Work with the Partners FOR the Saskatchewan River Basin on the designation of the South Saskatchewan River as a Canadian Heritage River System.	By 2020, the South Saskatchewan River is declared a Heritage River.	Hydro-riparian Areas	Physical Health, Connection to Nature		PFSRBC, SSRWSI	Necessary	FD, P&C
	6.3.8 The Small Swale, West Swale, Hudson Bay Slough and other identified Swales within the City limits are incorporated into Meewasin's Conservation Zone.	By 2020, the various Swales located within the City limits, and are incorporated into Meewasin's Conservation Zone.	Native Grasslands, Swales, Wetlands	Physical Health, Connection to Nature	Acreage Development, Commercial & Industrial Development, Suburban Development	CoS, SW	Critical	P&C
	6.3.9 Work with the Partnership For Growth (P4G) planning committee to incorporate priority conservation areas into their planning.	By 2017, priority conservation areas are incorporated into the P4G planning process.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Acreage Development, Commercial & Industrial Development, Suburban Development	CoS, RM	Necessary	D&D, P&C
	6.3.10 Kernen Prairie and Biddulf Prairie are added to Meewasin's Conservation Zone.	By 2018, Kernen Prairie and Biddulf Prairie are added to Meewasin's Conservation Zone.	Native Prairie	Physical Health, Connection to Nature	Acreage Development, Commercial & Industrial Development, Suburban Development	UofS	Critical	P&C

6.4 Conservation Planning	6.4.1 Update Resource Management Plans for Meewasin Conservation sites, based upon the Valley-Wide Resource Management Plan.	Each year, a minimum of one site-specific Resource Management Plans are updated or developed with all completed by 2027.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	All Threats	CoS, DUC, NCC, NPSS, SNS	Critical	P&C
	6.4.2 Work with the City of Saskatoon on the development and implementation of a Green Infrastructure strategy.	By 2018, the City of Saskatoon's Green Infrastructure Strategy is completed and implementation begins.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Suburban Development, Storm Water	CoS	Necessary	D&D, P&C
	6.4.3 Work with Wanuskewin Heritage Park on the development and implementation of a Resource Management Plan.	By 2018, Wanuskewin's Resource Management Plan is completed and implementation begins.	Hydro-riparian Areas, Native Prairie, Wetlands	Physical Health, Connection to Nature	Invasive Species, Fire Suppression, Unsustainable Grazing Management, Recreation Areas, Irresponsible Recreation	WHP	Necessary	P&C
	6.4.4 Update the State of the Valley Report in 2018 and 2023.	The State of the Valley Report is updated in 2018 and 2023.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Acreage Development, Suburban Development, Roads	CoS, MoE, SNS	Necessary	P&C
	6.4.5 Define swale characteristics to make identification of swales easier and consistent.	By 2017, define the characteristics of a swale to provide a consistent definition.	Swales, Wetlands	Physical Health, Connection to Nature	Acreage Development, Suburban Development, Storm Water	CoS, NCC, UofS	Critical	P&C
	6.4.6 Delineate the various swales located within and adjacent to Meewasin's jurisdiction.	By 2018, all swales within the planning area are delineated.	Native Grasslands, Swales, Wetlands	Physical Health, Connection to Nature	Acreage Development, Suburban Development, Storm Water	CoS, ECCC, MoE, SNS, SW, UofS	Critical	P&C
	6.4.7 Conduct a detailed inventory of all native prairie, wetlands, forests, and swales within a 30 km radius of the Meewasin Conservation Zone in partnership with various agencies.	By 2020, a detailed inventory of all native prairie, wetlands, forests, and swales is created including detailed classifications and mapping which is shared with the public and partners.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Acreage Development, Suburban Development, Conversion to Agriculture, Dams / Water Management, Storm Water, Invasive Species	DUC, ECCC, MoA, MoE, NPSS, PCAP, RM, SPS, SNS, SSRWSI, UofS	Critical	P&C

6.4.8 Work with the Water Security Agency, Ducks Unlimited Canada and the South Saskatchewan River Watershed Stewards on a wetland and drainage inventory within and adjacent to Meewasin's Conservation Zone.	By 2020, Meewasin has assisted the various partners on an inventory of wetlands and drainage in the Saskatoon region.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Acreage Development, Suburban Development, Conversion to Agriculture, Unstainable Grazing Management, Invasive Species, Fire Suppression	DUC, ECCC, MoA, MoE, NPSS, RM, SPS, SNS, SSRWSI, UofS, WSA	Beneficial	P&C
6.4.9 Develop Master Plans for Richard St. Barbe Baker Afforestation Area and Maple Grove.	By 2020, Master Plans are developed for Richard St. Barbe Baker and Maple Grove.	Hydro-riparian Areas, Swales, Wetlands	Physical Health, Connection to Nature	Recreation Areas, Irresponsible Recreation, Trespass Issues	CoS, DUC, SNS, SW, Various Stakeholders	Necessary	D&D, P&C
6.4.10 As additional swales and extension of the Northeast Swale are incorporated into Meewasin's Conservation Zone, the Meewasin Northeast Swale Master Plan is updated to incorporate these new areas.	The Meewasin Northeast Swale Master Plan is updated as additional swale areas are incorporated into Meewasin's Conservation Zone.	Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Recreation Areas, Irresponsible Recreation, Trespass Issues	CoS, SW	Necessary	D&D, P&C
6.4.11 Conduct a river users access study, identifying areas to increase access to the river while minimizing ecological impact to the river ecosystem.	By 2018, a river access study is completed.	Hydro-riparian Areas	Physical Health, Connection to Nature	Recreation Areas, Irresponsible Recreation, Trespass Issues	CoS, Various Stakeholders	Necessary	P&C
6.4.12 A comprehensive and integrated invasive species management strategy is developed and implemented for the Meewasin Valley.	By 2020, a comprehensive and integrated invasive species management strategy is developed and implemented in the Meewasin Valley.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species, Fire Suppression, Unsustainable Grazing Management	CoS, DUC, ECCC, MoA, MoE, NPSS, SISC, WHP	Critical	P&C
6.4.13 Continue to collect data, analyze, map and update information on conservation targets and threats within the Meewasin Conservation Zone and the planning area.	Ongoing collection, analysis, mapping and updating of conservation target and threat data occurs with Miradi software updated bi-annually.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	All Threats	CoS, DUC, ECCC, MoA, MoE, NCC, NPSS, NS, PCAP, SNS, SSRWSI, WSA	Necessary	P&C
6.4.14 Develop and implement restoration plans, as part of the site-specific Resource Management Plans, to restore degraded conservation targets.	By 2027, Resource Management Plans are completed with restoration planning for degraded conservation targets included and implementation begins.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	All Threats	CoS, DUC, ECCC, MoA, MoE, NPSS, PCACP, SNS	Necessary	P&C
6.4.15 Develop a climate change adapation and mitigration strategy for the Meewasin Valley.	By 2027, a climate change adaptation and mitigation strategy for the Meewasin Valley is developed.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Climate Change	CoS, SES, MoA, MoE, SSRWSI, UofS	Beneficial	CD, D&D, FD, P&C
6.4.16 Work with the City of Saskatoon on the development for a slope stability feasibility framework for the City of Saskatoon.	By 2019, the City of Saskatoon and Meewasin have developed a slope stability framework for the city.	Hydro-riparian Areas	Physical Health, Connection to Nature	Urban Riverbank Slumping and Slope Stability	CoS	Urgent	D&D, P&C

	6.4.17 Work with partners to develop an Aquatic Invasive Mussels management strategy for the Meewasin Valley and the City of Saskatoon.	By 2018, an evaluation of the potential impacts Aquatic Invasive Mussels have on the Meewasin Valley and the City of Saskatoon is complete. By 2020, a management strategy for Aquatic Invasive Mussels is completed and implemented if invasion occurs.	Hydro-riparian, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species	CoS, DUC, ECCC, MoE, SISC, SSRWSI, WSA	Critical	P&C
6.5 Site Infrastructure	6.5.1 When Meewasin Conservation sites are fenced; wildlife friendly fence designs are installed.	All new fences meet current best management practices for wildlife friendly fencing.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Unsustainable Grazing Management, Trespass Issues, Recreation Areas, Irresponsible Recreation	CoS, SNS, SW	Critical	D&D, P&C
	6.5.2 Existing fences at Meewasin Conservation sites are updated to ensure fencing is wildlife friendly.	By 2027, all fencing on Meewasin Conservation sites is updated to wildlife-friendly fencing standards.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Unsustainable Grazing Management, Trespass Issues, Recreation Areas, Irresponsible Recreation	CoS, SNS, SW	Critical	D&D, P&C
	6.5.3 Work with the City of Saskatoon, Saskatchewan Ministry of Highways, developers, and other agencies to adopt dark sky-friendly lighting infrastructure adjacent, near and within Meewasin Conservation sites.	By 2020, all new lighting infrastructure installed adjacent or on Meewasin Conservation sites will be dark sky-friendly.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Light Pollution, Suburban Development, Roads	CoS, MoH, SNS, SW	Critical	CD, D&D, P&C
	6.5.4 Work with the City of Saskatoon, Ministry of Highways, developers and other agencies to incorporate wildlife-friendly movement designs into road construction when crossing the Meewasin Conservation Zone and Meewasin Conservation sites.	By 2020, all new road construction will take wildlife movement designs into consideration when crossing the Meewasin Conservation Zone and Meewasin Conservation sites.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Roads, Suburban Development	CoS, MoH, SNS, SW	Critical	D&D, P&C
	6.5.5 All Meewasin Conservation sites are adequately signed to identify Meewasin and City bylaws for each site.	By 2021, all Meewasin Conservation sites are adequately signed showing applicable bylaws.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Recreation Areas, Irresponsible Recreation, Trespass Issues, Gathering of Plants	CoS	Necessary	D&D, P&C
	6.5.6 As new sections of the Meewasin Trail are designed and developed, they are done using techniques to reduce impact to native vegetation and wildlife habitat.	By 2020, Meewasin Trail design standards incorporate additional techniques to reduce impacts to native vegetation and wildlife habitat through consultation with Resource Management.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Recreation Areas, Invasive species	CoS, UofS	Critical	D&D, P&C
	6.5.7 Portable interpretive signage is developed to be placed on Meewasin Conservation sites to interpret various resource management activities.	By 2018, a series of portable and temporary interpretive signage is developed and implemented on various Meewasin Conservation sites as resource management activities are implemented including invasive species management, prescribed burning and conservation grazing.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species, Fire Suppression, Unsustainable Grazing Management	CoS, NPSS, PCAP, SISC	Necessary	CD, D&D, P&C

		6.5.8 Infrastructure is installed to restrict access for off-highway vehicles into sensitive areas, if issues arise, on Meewasin Conservation sites.	As access issues arise of Meewasin Conservation sites, infrastructure is installed to restrict access for off-highway vehicles into sensitive areas.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Recreation Areas, Irresponsible Recreation, Trespass Issues	CoS	Critical	D&D, P&C
		6.5.9 Maintain the Meewasin Trail and secondary trails in a manner to reduce the spread of invasive species.	Annually, regularly mow and control invasive species along the Meewasin Trail and secondary trails to reduce the spread of invasive species.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species, Irresponsible Recreation	CoS	Critical	D&D, P&C
7.0 Legal & Policy Frameworks	7.1 Laws, Regulations & Codes	7.1.1 As part of the *Meewasin Valley Authority Act*, Development Review process for development projects within the Meewasin Valley is continued.	Development Review process is ongoing for development projects within the Meewasin Valley.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	All Threats	CoS, GoS, UofS	Critical	P&C
		7.1.2 Meewasin's Bylaws, under the *Meewasin Valley Authority Act* are reviewed, updated and enforced.	Bylaws are updated and reviewed every 5 years, starting in 2018.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	All Threats	CoS, GoS, UofS	Critical	P&C
		7.1.3 Work with the Saskatchewan Invasive Species Council and the Ministry of Agriculture and Ministry of Environment to update the *Weed Control Act* regulations and the *Fisheries Act* regulations to incorporate additional invasive species that are creating an issue in the Meewasin Valley.	By 2019, the *Weed Control Act* regulations and by 2025 the *Fisheries Act* regulations are updated with invasive species that Meewasin has identified as being of concern in the Meewasin Valley.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species	CoS, ECCC, MoA, MoE, RM, NPSS, SISC	Critical	P&C
	7.2 Policies & Guidelines	7.2.1 Examine the potential to develop Conservation Offsets to mitigate the loss of habitat in the Saskatoon region.	By 2022, the concept of Conservation Offsets is examined with a strategy for implementation.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Commercial & Industrial Development, Suburban Development, Dams & Water Management, Storm Water, Light Pollution, Sound Pollution, Utility and Service Lines	COS, DUC, MoE, NCC, SES, SWF	Beneficial	FD, P&C
		7.2.2 Work with the City of Saskatoon and various stakeholders to develop and implement a Dark Skies Policy for the city.	By 2020, a Dark Skies policy is developed and implemented.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Light Pollution, Suburban Development, Roads	CoS, DUC, SNS, SW	Necessary	CD, D&D, P&C
		7.2.3 Work with the City of Saskatoon on the implementation of the Wetland Policy.	By 2018, the Wetland Policy is implemented.	Swales, Wetlands	Physical Health, Connection to Nature	Commercial & Industrial Development, Suburban Development, Dams & Water Management, Roads, Utility and Service Lines	CoS, DUC, SNS, SW	Necessary	P&C

		7.2.4 Implement Meewasin's Land Policy, Northeast Policy and Development Review policies.	Implementation of the Land, Northeast, and Development Review policies with a review of these policies in 2026.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Acreage Development, Conversion to Agriculture, Commercial & Industrial Development, Suburban Development, Recreational Areas	CoS, GoS, UofS	Critical	P&C
8.0 Research & Monitoring	8.1 Basic Research & Status Monitoring	8.1.1 Continue the annual MAPS (Monitoring Avian Productivity and Survivorship) program at Beaver Creek Conservation Area and expand the program to the Meewasin Northeast Swale.	By 2017, MAPS is reinstated at Beaver Creek Conservation Area and by 2020, MAPS is expanded to the Meewasin Northeast Swale.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Light Pollution, Sound Pollution, Suburban Development, Acreage Development, Roads, Fire Suppression, Conservation to Agriculture, Unsustainable Grazing Management, Recreation Areas	ECCC, NS, SNS, UofS	Necessary	CD, P&C
		8.1.2 Annually conduct amphibian surveys at the Meewasin Northeast Swale, Chappell Marsh Conservation Area, and Beaver Creek Conservation Area.	By 2018, annual amphibian surveys are conducted on key Meewasin Conservation sites.	Hydro-riparian Areas, Swales, Wetlands	Physical Health, Connection to Nature	Light Pollution, Sound Pollution, Suburban Development, Acreage Development, Roads, Fire Suppression, Conservation to Agriculture, Unsustainable Grazing Management, Recreation Areas	ECCC, NS, SNS, UofS	Necessary	CD, P&C

		8.1.3 Annually provide species information (flora, fauna, species at risk, invasive species) to the various databases including the Saskatchewan Conservation Data Centre, iMap Invasives, iNaturalist and other sources.	Continued sharing of species information with the various external databases.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Light Pollution, Sound Pollution, Suburban Development, Acreage Development, Roads, Fire Suppression, Conservation to Agriculture, Unsustainable Grazing Management, Recreation Areas	MoE	Critical	CD, P&C
		8.1.4 Establish permanent long-term monitoring plots on all Meewasin Conservation sites to measure, document, and monitor the impact of resource management activities and public use have on the biodiversity of each site including riparian areas, wetlands, swales, native grasslands and forested areas.	By 2027, each Meewasin Conservation site has permanent long-term monitoring plots on each site.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species, Fire Suppression, Unsustainable Grazing, Problematic Native Species, Trespass Issues, Recreation Areas, Irresponsible Recreation	ECCC, NPSS, SNS, UofS	Critical	P&C
		8.1.5 Implement long-term monitoring on Meewasin Conservation sites based upon the monitoring plan and long-term monitoring plots established for each site.	As permanent long-term monitoring plots are established, begin monitoring of each site.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species, Fire Suppression, Unsustainable Grazing, Problematic Native Species, Trespass Issues, Recreation Areas, Irresponsible Recreation	ECC, NPSS, SNS, UofS	Critical	P&C
		8.1.6 Continue the relationship with the University of Saskatchewan to conduct research projects on Meewasin Conservation sites that better understand the effects of resource management and ecological monitoring.	Minimum one research project per year is conducted on Meewasin Conservation sites in partnership with the University of Saskatchewan.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species, Fire Suppression, Unsustainable Grazing, Problematic Native Species, Trespass Issues, Recreation Areas, Irresponsible Recreation	ECCC, NCC, NPSS, SNS, UofS	Beneficial	CD, P&C
		8.1.7 Participate in research projects regarding invasive species management and control.	By 2027, Meewasin has participated in three research projects related to invasive species management and control.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species	AgCanada, ECCC, MoA, MoE, NCC, NPSS, PCAP, SISC, UofS	Necessary	P&C

		8.1.8 Develop and implement a long-term snow monitoring program on Meewasin Conservation sites, in partnership with the University of Saskatchewan, to measure various biotic factors influencing ground and surface runoff.	By 2019, a long-term snow monitoring program on three Meewasin Conservation sites is established and monitoring begins.	Hydro-riparian Areas, Swales, Wetlands	Physical Health, Connection to Nature	Agriculture Runoff, Dams & Water Management, Storm Water	CoS, ECCC, SSRWSI, WSA, UofS	Beneficial	CD, P&C
		8.1.9 Continue and expand benthic invertebrate monitoring, in partnership with the University of Saskatchewan, to measure the health and diversity in the Meewasin Northeast Swale and expanded to other sites.	Continue the ongoing monitoring in the Meewasin Northeast Swale and expand to other sites by 2020.	Hydro-riparian Areas, Swales, Wetlands	Physical Health, Connection to Nature	Runoff - Pesticide and Fertilizers, Dams & Water Management, Storm Water, Thermal Pollution	CoS, DUC, ECCC, SSRWSI, SW, WSA, UofS	Necessary	CD, P&C
		8.1.10 Partner with the University of Saskatchewan to develop a ground water monitoring program at the Meewasin Northeast Swale and other swales in the Saskatoon region.	By 2019, ground water monitoring begins in the Meewasin Northeast Swale with other swale monitoring occurring as added to the Meewasin Conservation Zone.	Hydro-riparian Areas, Swales, Wetlands	Physical Health, Connection to Nature	Runoff - Pesticide and Fertilizers, Dams & Water Management, Storm Water, Thermal Pollution	CoS, DUC, ECCC, SSRWSI, WSA, UofS	Necessary	CD, P&C
		8.1.11 Develop a monitoring protocol for invasive species including monitoring and sampling techniques.	By 2018, an invasive species monitoring protocol is established for Meewasin Conservation sites and the Meewasin Conservation Zone.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species	CoS, ECCC, MoA, MoE, NCC, NPSS, RM, SISC, SPS	Necessary	P&C
		8.1.12 Participate in substrate sampling and shoreline surveys in the South Saskatchewan River, Brightwater Creek, storm ponds in the Meewasin Northeast Swale, and wetlands on Meewasin Conservation sites, as part of the larger provincial collective on aquatic invasive mussels monitoring program.	Continue with the ongoing monitoring of aquatic invasive mussels at a minimum of 2 locations along Brightwater Creek, 5 along the South Saskatchewan River and 4 in the Meewasin Northeast Swale.	Hydro-riparian Areas, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species	CoS, MoE, SISC, SSRWSI, WSA	Critical	CD, P&C
		8.1.13 Archeological, paleontological and historical artifacts and sites along the Meewasin Valley and Meewasin Conservation sites are documented, and where possible, conserved for future generations.	By 2025, archeological, paleontological and historical artifacts and sites along the Meewasin Valley and Meewasin Conservation sites are documented and conserved.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Acreage Development, Commercial & Industrial Development, Suburban Development, Roads, Utility / Service Lines	CoS, GoS, UofS	Necessary	P&C
		8.1.14 Continue and expand water quality monitoring on Meewasin Conservation sites and along the South Saskatchewan River with various partners.	Annually conduct water quality monitoring programs on 4 Meewasin Conservation sites and along 10 locations along the South Saskatchewan River.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Runoff - Pesticide and Fertilizers, Dams & Water Management, Storm Water, Thermal Pollution	CoS, ECCC, SSRWSI, UofS, WSA	Necessary	CD, P&C

		8.1.15 Research is conducted on the ecological flows and natural disturbance regime of the South Saskatchewan River.	By 2025, the ecological flows and natural disturbance regime of the South Saskatchewan River is researched.	Hydro-riparian Areas	Physical Health, Connection to Nature	Dams & Water Management	CoS, NCC, SSRWSI, WSA, UofS	Beneficial	P&C
		8.1.16 Map riparian zones and bank of South Saskatchewan River and tributaries using aerial photography and digital elevation models.	By 2020, riparian zones and the bank of the South Saskatchewan River and its tributaries are mapped.	Hydro-riparian Areas	Physical Health, Connection to Nature	Dams & Water Management	CoS, NCC, SSRWSI, WSA, UofS	Beneficial	P&C
		8.1.17 Assess tributary, creek and swale crossings for impediment and effectiveness of water flow.	By 2020, tributary, creek and swale crossing are assessed for impediment and effectiveness of water flow, with removal process beginning in 2024.	Hydro-riparian Areas, Swales	Physical Health, Connection to Nature	Dams & Water Management	CoS, MoA, MoE, SSRWSI, WSA	Beneficial	P&C
		8.1.18 Baseline inventories of Meewasin Conservation sites are completed to document conservation targets, unique species, and threats to each site.	By 2024, baseline inventories are completed or updated for all Meewasin Conservation sites.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	All Threats	CoS, NCC, SNS	Necessary	P&C
		8.1.19 Update and conduct slope stability studies along the South Saskatchewan River through the City of Saskatoon.	By 2025, conduct and update slope stability studies along the South Saskatchewan River through the City of Saskatoon, if identified in the slope stability framework.	Hydro-riparian Areas	Physical Health, Connection to Nature	Urban Riverbank Slumping and Slope Stability	CoS, WSA	Necessary	D&D, P&C
		8.1.20 Develop a monitoring framework for the Meewasin Valley-wide Resource Management Plan	By 2018, a monitoring framework is developed for the Meewasin Valley-wide Resource Management Plan	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	All Threats	CoS, ECCC, MoA, MoE, SNS, SSRWSI, UofS	Urgent	P&C
		8.1.21 Participate in various citizen science monitoring programs, engaging volunteers and Meewasin staff, on the collection and reporting of citizen science data from Meewasin Conservation sites and the Conservation Zone .	Annual participation in various citizen science programs including, but not limited to: Frog Watch, Ice Watch, Plant Watch, Christmas Bird Count, and Breeding Bird Survey, etc.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	All Threats	ECCC, NS, SNS, UofS	Necessary	C&D, P&C
	8.2 Evaluation, Effectiveness Measures & Learning	8.2.1 Evaluate the implementation of the Valley-wide Resource Management Plan to determine its effectiveness on conserving and reducing the threats to the conservation targets and adapt as necessary to improve effectiveness and deal with emerging threats	Annually evaluate the effectiveness of the implementation of the Resource Management Plan with a 90% successful implementation by 2027.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	All Threats		Necessary	P&C
		8.2.2 Evaluate the implementation of various programs initiated from the Valley-wide Resource Management Plan to determine the programs effectiveness on conserving and reducing the threats to the conservation targets and adapt as necessary to improve effectiveness.	Annually evaluate the effectiveness of the implementation of various programs initiated from the Valley-wide Resource Management Plan with a 90% successful implementation by the end of each program or by 2027.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	All Threats		Necessary	P&C

		8.2.3 Evaluate the implementation of site-specific resource management plans to determine its effectiveness on conserving and reducing the threats to the biodiversity targets, adapt as necessary to improve effectiveness and deal with emerging threats.	Annually evaluate the effectiveness of the implementation of site-specific resource management plans with a 90% successful implementation by the end of the term for each plan.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	All Threats		Necessary	P&C
		8.2.4 Develop indicator species / community types for Meewasin Conservation sites as part of site-specific Resource Management Plans.	By 2027, as site-specific Resource Management Plans are developed, indicator species / community types are incorporated.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	All Threats	CoS, ECCC, NCC, SNS, SSRWSI	Necessary	P&C
		8.2.5 Develop annual reports for the various resource management programs and for each Meewasin Conservation site.	Annually develop annual reports for each resource management program and for each Meewasin Conservation site, based upon resource management plan implementation and integration with GIS.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	All Threats		Necessary	P&C
9.0 Education & Training	9.1 Formal Education	9.1.1 Engage youth in resource management concepts through public outreach programs at Beaver Creek Conservation Area, Saskatoon Natural Grasslands and the Meewasin Northeast Swale.	By 2017, public outreach programs engage school groups and youth in their programs on the land, in classrooms, and on the river regarding resource management activities and concepts with 150 classes and 4,500 students engaged annually.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species, Fire Suppression, Unsustainable Grazing Management	SNS, UofS	Necessary	CD, P&C
		9.1.2 Engage university and college students in resource management concepts.	By 2019, 6 university classes are engaged on Meewasin Conservation sites and 4 classroom lectures regarding resource management concepts annually.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species, Fire Suppression, Unsustainable Grazing Management	UofS, SaskPoly	Necessary	CD, P&C
	9.2 Training & Individual Capacity Development	9.2.1 Meewasin becomes the regional hub for the training of resource management practitioners on resource management activities including conservation grazing, prescribed burning, citizen science and invasive species management.	By 2022, Meewasin is recognized as the regional training hub for resource management practitioners.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species, Fire Suppression, Unsustainable Grazing Management	DUC, ECCC, MoA, MoE, NCC, NPSS, PCAP, SaskPoly, SISC, SNS, SPS, UofS	Beneficial	P&C
		9.2.2 Increase awareness and knowledge transfer regarding invasive species, conservation grazing and prescribed burning to other resource management practitioners at workshops, conferences and tours.	Continue to create awareness and transfer knowledge to other resource management practitioners at a minimum of a dozen workshops, conferences and tours annually.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species, Fire Suppression, Unsustainable Grazing Management	DUC, ECCC, MoA, MoE, NCC, NPSS, PCAP, SaskPoly, SISC, SNS, SPS, UofS	Necessary	P&C
10.0 Institutional Development	10.1 Internal Organizational Development & Support	10.1.1 Engage the Meewasin Conservation Advisory Committee to provide guidance and support on resource management activities.	Continue meeting with the Meewasin Conservation Advisory Committee on a minimum of twice / year expanding to quarterly to better engage the committee on guidance and support.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	All Threats	CoS, ECCC, MoA, UofS	Critical	P&C
		10.1.2 Engage the Technical Advisory Committee for the Valley-wide Resource Management Plan to provide guidance and support on the implementation of the plan.	Continue meeting with the RMP Technical Advisory Committee on a minimum annual basis to review implementation of RMP actions and update viability assessment of targets and threats.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	All Threats	CoS, ECCC, NPSS, MoA, MoE, UofS, SNS	Necessary	P&C

		10.1.3 Engage the Meewasin Valley Authority Board of Directors in resource management.	Provide monthly reports, two annual presentations and one annual tour to the Meewasin Valley Authority Board of Directors regarding resource management activities.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	All Threats	CoS, GoS, UofS	Critical	P&C
	10.2 External Organizational Development & Support	10.2.1 Initiate opportunities for local volunteer stewardship groups and community associations to assist Meewasin with resource management activities.	On an ongoing basis, initiate opportunities for interested volunteer stewardship groups and community associations to work with Meewasin on resource management activities including site maintenance, invasive species management, monitoring and other roles.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	All Threats	SNS, SW	Necessary	CD, D&D, FD, P&C
		10.2.2 Support and become involved in special interest working groups established by partners related to resource management activities.	On an ongoing basis, become engaged in special interest working groups that are established by partners related to resource management activities including invasive species, grazing management, prescribed burning and other activities.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	All Threats	DUC, ECCC, MoA, MoE, NCC, NPSS, PCAP, SaskPoly, SISC, SSRWS, SNS, SPS, WSA, UofS	Necessary	P&C
	10.3 Alliance & Partnership Development	10.3.1 All conservation NGOs and government agencies (federal, provincial and municipal) involved in regional conservation efforts in the Saskatoon region meet annually to discuss their various programs for the year and to explore partnership opportunities.	By 2018, all conservation NGOs and government agencies meet annually to provide updates to each group and to explore partnership opportunities.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	All Threats	DUC, ECCC, MoA, MoE, NCC, NPSS, PCAP, SaskPoly, SISC, SNS, SPS, SSRWSI, SWF, UofS	Beneficial	P&C
		10.3.2 All agencies in Saskatchewan that conduct prescribed burns meet annually to discuss upcoming prescribed burning activities, joint training and shared resource opportunities.	By 2017, agencies that conduct prescribed burns in Saskatchewan meet annually, participate in joint projects and training opportunities and share mapping of completed prescribed burns.	Native Prairie, Swales	Physical Health, Connection to Nature	Fire Suppression, Invasive Species	DUC, ECCC, NCC, PC, SPS, UofS	Necessary	P&C
		10.3.3 Continue participation with the Saskatchewan Invasive Species Council through representation and membership on the Council to share information and resources on invasive species management.	Continued involvement in the Saskatchewan Invasive Species Council.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species	CoS, ECCC, MoA, MoE, MoH, RM, SISC	Necessary	P&C
		10.3.4 Continue participation with the Partners FOR the Saskatchewan River Basin through representation and membership, to share information and resources on stewarding the Saskatchewan River system.	Continued involvement with Partners FOR the Saskatchewan River Basin.	Hydro-riparian Areas	Physical Health, Connection to Nature	All Threats	DUC, PFSRBC, WSA, UofS	Necessary	FD, P&C
		10.3.5 Continue participation with the South Saskatchewan River Watershed Stewards, Inc. through representation, membership and project partnership.	Continued involvement with the South Saskatchewan River Watershed Stewards, Inc.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	All Threats	CoS, MoA, RM, SSRWSI, WSA	Necessary	P&C

10.3.6 Participate in the development of a Conservation Directory for Saskatchewan.	By 2020, a Conservation Directory is created for Saskatchewan.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	All Threats	DUC, ECCC, MoA, MoE, NCC, NPSS, PCAP, SaskPoly, SISC, SNS, SPS, SSRWSI, SWF, UofS	Beneficial	P&C
10.3.7 Develop working relationships with the various Indigenous organizations that have an interest in the Meewasin Valley.	By 2020, an Indigenous committee is established within Meewasin.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	All Threats	WHP	Beneficial	CD, D&D, FD, P&C
10.3.8 Develop working relationships with the agricultural community in the Saskatoon region to provide opportunities for partnerships in resource management on and adjacent to the Meewasin Conservation Zone.	By 2020, partnerships with the agriculture community begin to develop related resource management.	Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Conversion to Agriculture, Invasive Species, Acreage Development, Unsustainable Grazing Management, Fire Suppression,	MoA, SSGA	Necessary	P&C
10.3.9 Continue partnership and research opportunities with the various programs at the University of Saskatchewan to conduct research and use Meewasin Conservation sites as a living classroom / laboratory for students and researchers.	Annually, a minimum of a dozen university classes use Meewasin Conservation sites as a living classroom and one research project is undertaken.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species, Unsustainable Grazing Management, Fire Suppression, Recreation Areas	UofS	Beneficial	CD, P&C
10.3.10 Continue to partner with conservation groups on Meewasin Conservation sites to conduct tours and collect species observations.	Continue to partner with groups including the Saskatoon Nature Society and the Native Plant Society of Saskatchewan.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	All Threats	NPSS, SNS, SW	Necessary	CD, P&C
10.3.11 Meewasin becomes an active member of the Saskatchewan Prairie Conservation Action Plan.	By 2018, Meewasin is a member of the Saskatchewan Prairie Conservation Action Plan.	Native Prairie	Physical Health, Connection to Nature	Conversion to Agriculture, Acreage Development, Fire Suppression, Invasive Species, Unsustainable Grazing Development, Suburban Development	DUC, ECCC, MoA, MoE, NCC, NPSS, PCAP, SNS, SPS, SSRWSI, SWF, UofS, WSA, WHP	Necessary	P&C
10.3.12 Establish a Co-operative Weed Management Area between Meewasin, City of Saskatoon, RM of Corman Park, adjacent RMs, and various government agencies including the development and implementation of a cooperative weed management plan.	By 2018, a Co-operative Weed Management Area is created around the Meewasin Valley including the City of Saskatoon, RM Corman Park, adjacent RMs, and various government agencies and NGOs. By 2022, a co-operative weed management plan is developed and implemented.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species	CoS, MoA, MoE, MoH, RM	Critical	P&C

		10.3.13 Partner and work collaboratively with the City of Saskatoon's Naturalized Parks Program on resource management activities.	Continue to partner with the City of Saskatoon Naturalized Parks Program on resource management activities.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species, Fire Suppression, Unsustainable Grazing Management, Trespass Issues, Irresponsible Recreation	CoS	Necessary	P&C
		10.3.14 Promote and support the Master Naturalist Program.	Continued support of the Master Naturalist Program with Meewasin partnering with program development, volunteer training, and volunteer events and activities.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species, Fire Suppression, Unsustainable Grazing Management, Trespass Issues, Irresponsible Recreation	DUC, ECCC, MoE, NCC, NPSS, PCAP, SNS	Necessary	CD, P&C
		10.3.15 Formalize partnerships for research and stewardship in the Meewasin Northeast Swale and other conservation areas.	By 2019, a formalized partnership for research and stewardship is established for the Meewasin Northeast Swale and by 2024, all other Meewasin Conservation sites have formal partnerships.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species, Fire Suppression, Unsustainable Grazing Management, Trespass Issues, Irresponsible Recreation	NPSS, SNS, SW, UofS	Necessary	CD, P&C
		10.3.16 Become a member of the Clean, Play, Go and Don't Let It Loose awareness campaigns regarding invasive species awareness.	By 2018, Meewasin has signed on and has become a partner with the Clean, Play, Go and Don't Let It Loose invasive species awareness campaigns.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species, Irresponsible Recreation	CoS, MoA, MoE, MoH, RM, SISC, WSA	Necessary	P&C
		10.3.17 Develop relationships with the various recreational users of the river valley secondary trails to increase communication, collaboration and potential joint projects.	By 2020, the various recreational user groups using the secondary trails along the river valley meet together to discuss opportunities to work together collaboratively.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species, Irresponsible Recreation	CoS, Various Stakeholders	Necessary	CD, D&D, P&C
		10.3.18 Engage Environment and Climate Change Canada on opportunities to partner with the stewardship of the Sutherland Migratory Bird Sanctuary.	By 2018, Meewasin and ECCC have investigated opportunities to partner on the stewardship of the Sutherland Migratory Bird Sanctuary.	Swales, Wetlands	Physical Health, Connection to Nature	Invasive Species, Irresponsible Recreation, Light Pollution, Sound Pollution	CoS, ECCC, SNS	Beneficial	P&C

		10.3.18 Develop partnership opportunities with the various land trusts in Saskatchewan to share ideas, resources, and best management practices.	By 2018, the various land trusts in Saskatchewan meet annually to discuss partnership ideas, resources and best management practices.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Acreage Development, Conservation to Agriculture, Commercial & Industrial Development, Recreation Areas, Invasive Species, Unsustainable Grazing, Fire Suppression	DUC, ECCC, MoA, MoA, NCC, NS, SPS, SWF	Beneficial	P&C
		10.3.19 Become an active member of the Canadian Land Trust Alliance.	When the new form of the Canadian Land Trust Alliance is created, Meewasin becomes an active member.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	Acreage Development, Conservation to Agriculture, Commercial & Industrial Development, Recreation Areas	DUC, NCC	Beneficial	P&C
		10.3.20 Engage the various stakeholders and user groups utilizing the South Saskatchewan River through the Meewasin Valley.	Annually host a meeting of the various stakeholder user groups who utilize the South Saskatchewan River through the Meewasin Valley.	Hydro-riparian Areas	Physical Health, Connection to Nature	Irresponsible Recreation, Trespass Issues, Recreation Areas	CoS, SWF, Various Stakeholders	Necessary	CD, D&D, FD, P&C
		10.3.21 Continue to be an active member of the Association of Saskatchewan Urban Parks and Conservation Areas and engage the association in resource management.	Meewasin is an active member of ASUPCA and has engaged the members in the value of resource management.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	All Threats	ASUPCA	Necessary	CD, P&C
	10.4 Financing Conservation	10.4.1 Establish a Stewardship / Conservation endowment fund to ensure the long-term conservation and stewardship of Meewasin Conservation sites and Conservation Easements into the future.	By 2027, an endowment fund is successfully created with all necessary funds in place to maintain, steward and conserve Meewasin Conservation sites and Easements into the future.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	All Threats	CoS, GoS, UofS	Necessary	FD, P&C
		10.4.2 Fundraise to implement the Meewasin Valley-wide Resource Management Plan	Ongoing fundraising to implement the Meewasin Valley-wide Resource Management Plan	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	All Threats		Urgent	FD, P&C
		10.4.3 As new Meewasin Conservation sites are added to Meewasin's portfolio, additional funds are raised in the endowment fund.	Ongoing, as new Meewasin Conservation sites are added, sufficient endowment funds are raised.	Hydro-riparian Areas, Native Prairie, Swales, Wetlands	Physical Health, Connection to Nature	All Threats	CoS, GoS, UofS	Necessary	FD, P&C

Appendix F - Citizen Science Apps and Websites*

Citizen science or publicly collected data helps to inform Meewasin and other conservation agencies about a variety of ecological monitoring initiatives.

General Species Recording
- iNaturalist www.iNaturalist.ca
- Saskatchewan Conservation Data Center www.biodiversity.sk.ca/OnlineRep.htm

Amphibians
- Frog Watch www.naturewatch.ca/frogwatch

Birds
- eBird www.ebird.org
- Christmas Bird Count www.birdscanada.org/volunteer/cbc
- Feeder Watch www.birdscanada.org/volunteer/pfw
- Great Backyard Bird Count www.birdscanada.org/volunteer/gbbc
- Project Nest Watch www.birdscanada.org/volunteer/pnw
- Canadian Lakes Loon Survey www.birdscanada.org/volunteer/clls

Climate
- Ice Watch www.naturewatch.ca/icewatch
- Rink Watch www.rinkwatch.org

Insects
- Bumblebee Watch http://bumblebeewatch.org
- North American Butterfly Association www.naba.org/butter_counts
- eButterfly www.e-butterfly.org
- Lost Lady Bug Project www.lostladybug.org
- Dragonflies: Odonata Central http://odonatacentral.org/

Invasive Species
- iMap Invasives Saskatchewan http://imapinvasives.org/skimi
- EDDS Maps Prairie Region https://www.eddmaps.org/prairieregion/

Light Pollution
- Dark Sky Meter http://www.darkskymeter.com/

Plants
- Plant Watch www.naturewatch.ca/plantwatch

Water
- Love Your Lake http://www.loveyourlake.ca/

Worms
- Worm Watch www.naturewatch.ca/wormwatch

*This list is not comprehensive.