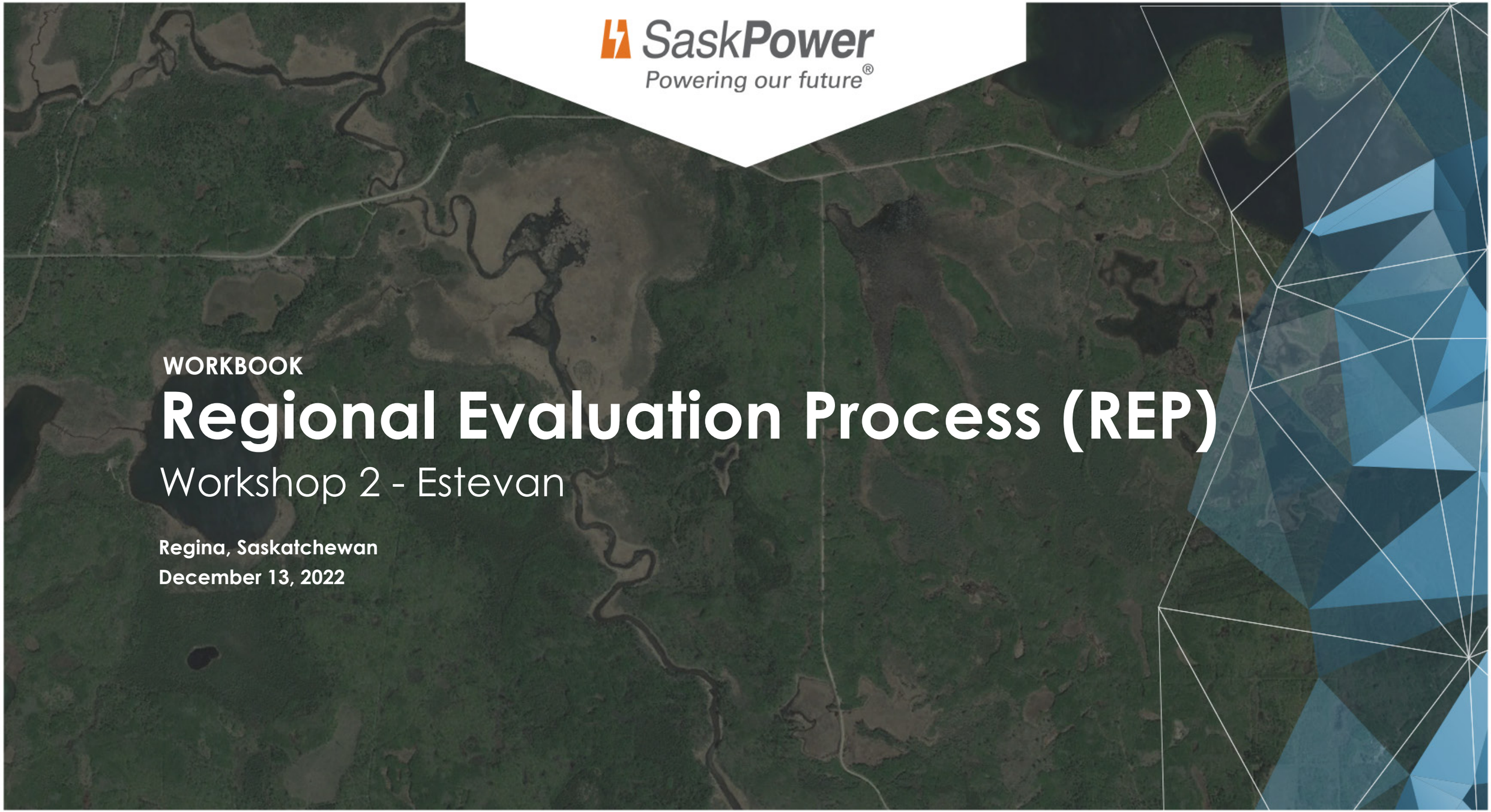


SaskPower
Powering our future®

WORKBOOK

Regional Evaluation Process (REP)

Workshop 2 - Estevan

Regina, Saskatchewan
December 13, 2022

Environmental

Indicators

01. Aquatic Species at Risk Range
02. Federal Critical Habitat
03. Federal Critical Habitat Proximity
04. Managed Lands
05. Protected Lands
06. Protected Lands Proximity
07. Rare/Endangered Species
08. TWHI Wildlife Habitat
09. Waterbodies
10. Watercourses
11. Wetlands
12. Woodland Caribou Habitat

AQUATIC SPECIES AT RISK RANGE

Minimize encroachment on aquatic Species at Risk (SAR) distribution range

SOURCE

Fisheries and Oceans Canada's (DFO)

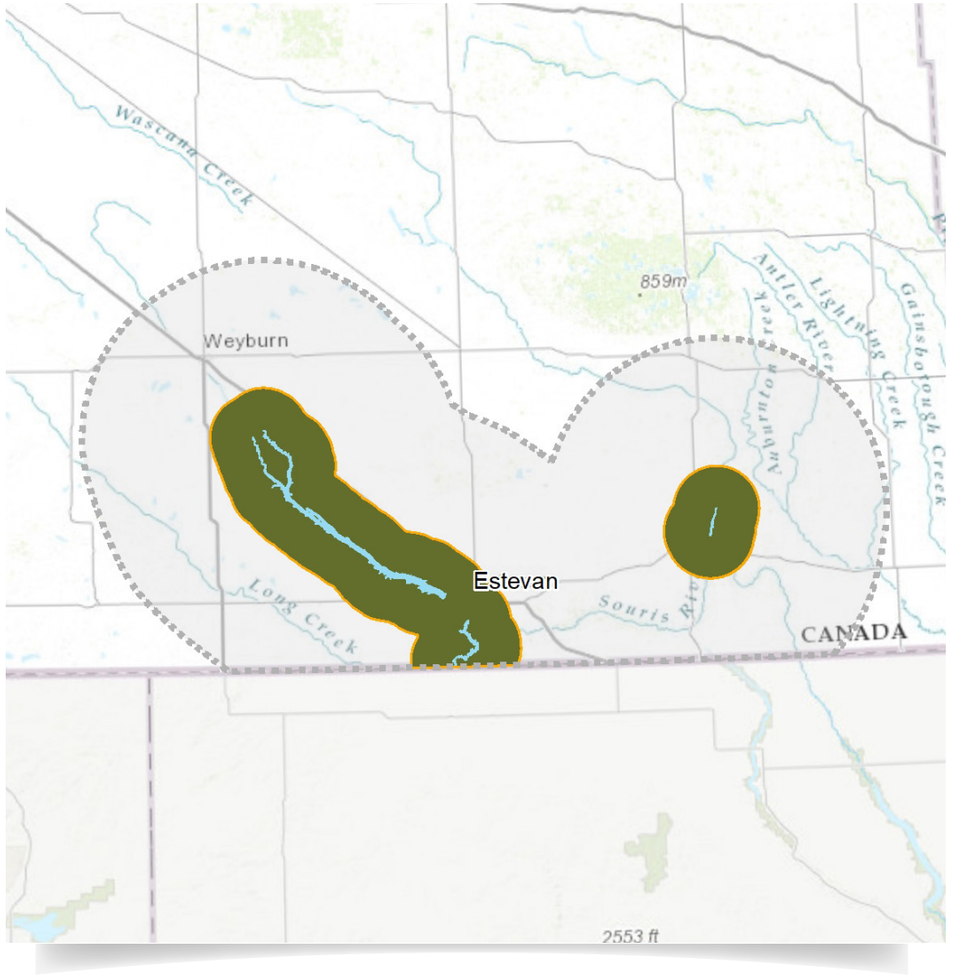
LAYER PRE-PROCESSING AND COMMENTS

10 km buffer added.

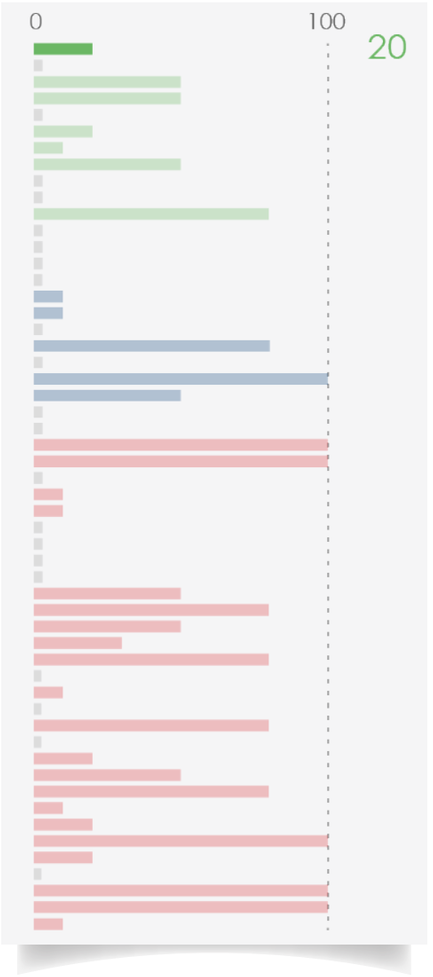
DESCRIPTION

Includes the aquatic Species at Risk Act (SARA) distribution (range). Bigmouth Buffalo and Mountain Sucker species are included. Development in these areas may be hindered by increased social scrutiny and regulatory concerns.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



FEDERAL CRITICAL HABITAT

Avoid areas with sensitive species

SOURCE

Environment and Climate Change Canada

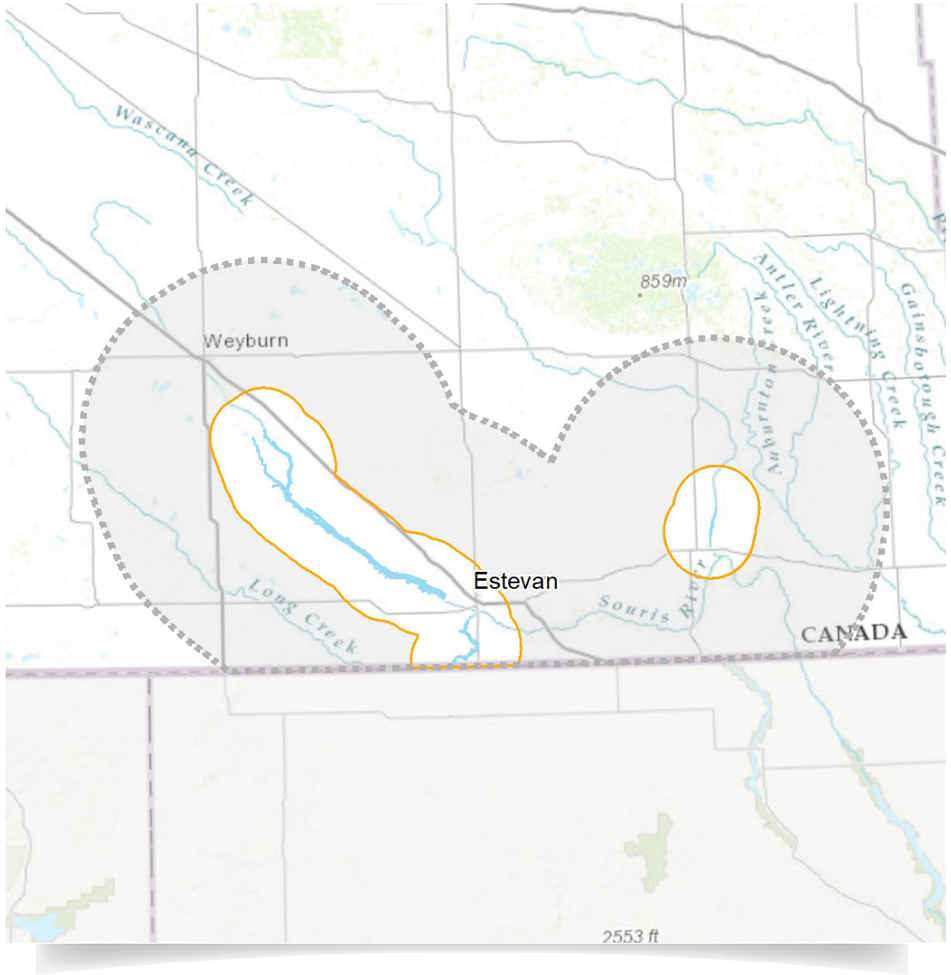
LAYER PRE-PROCESSING AND COMMENTS

Exclusion, no buffer added.

DESCRIPTION

Critical habitat, and important habitat for species at risk listed on Schedule 1 of the federal Species at Risk Act (SARA) occurs in Saskatchewan. Not all of the area within these boundaries is necessarily critical habitat and should be considered in conjunction with the complementary species' recovery document. Both proposed and final areas are included.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING

FEDERAL CRITICAL HABITAT PROXIMITY

Minimize proximity to areas with sensitive species

SOURCE

Environment and Climate Change Canada

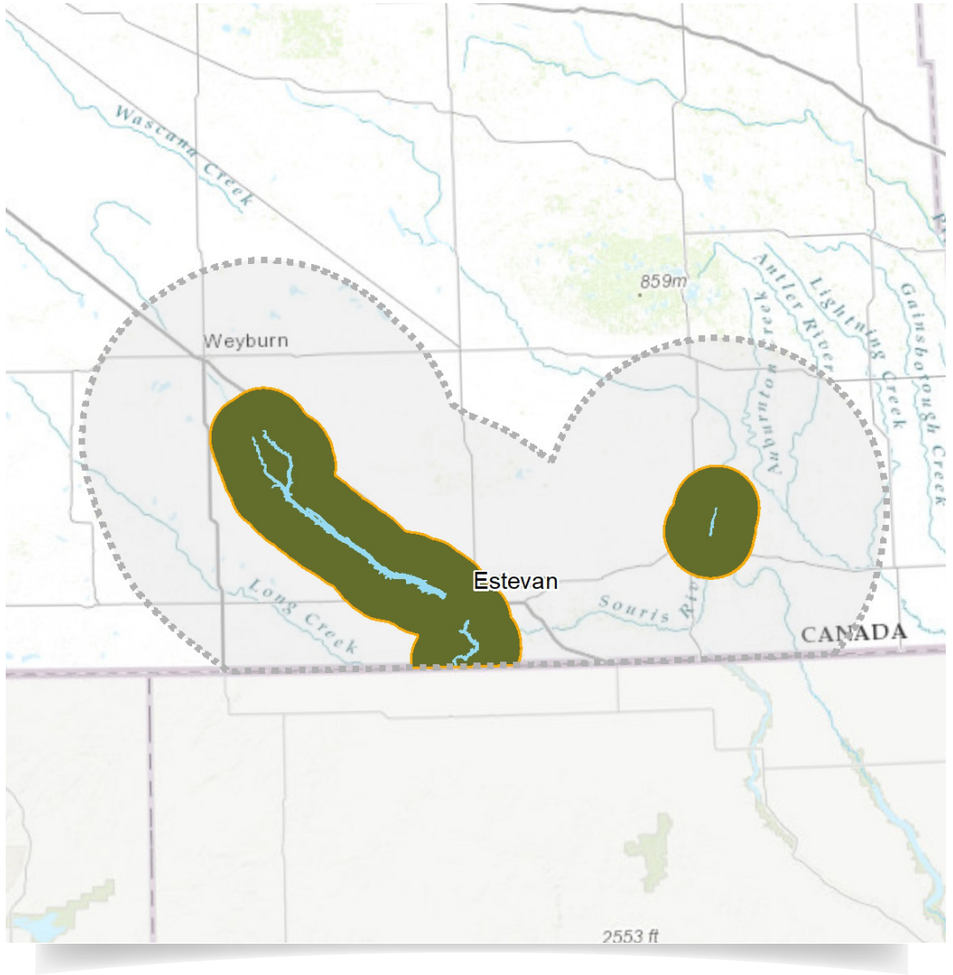
LAYER PRE-PROCESSING AND COMMENTS

0 to 10 km distance decay buffer added.

DESCRIPTION

Critical habitat and important habitat for species at risk listed on Schedule 1 of the federal Species at Risk Act (SARA) occurs in Saskatchewan. These areas should be considered in conjunction with the complementary species' recovery document(s). Both proposed and final areas are included.

GEOGRAPHIC EXTENT



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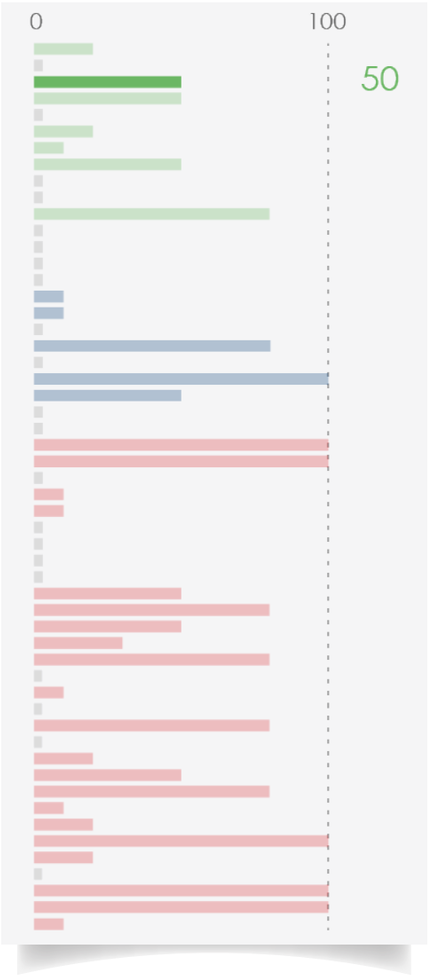


MANAGED LANDS

Minimize encroachment on managed lands

SOURCE

Saskatchewan Ministry of Environment

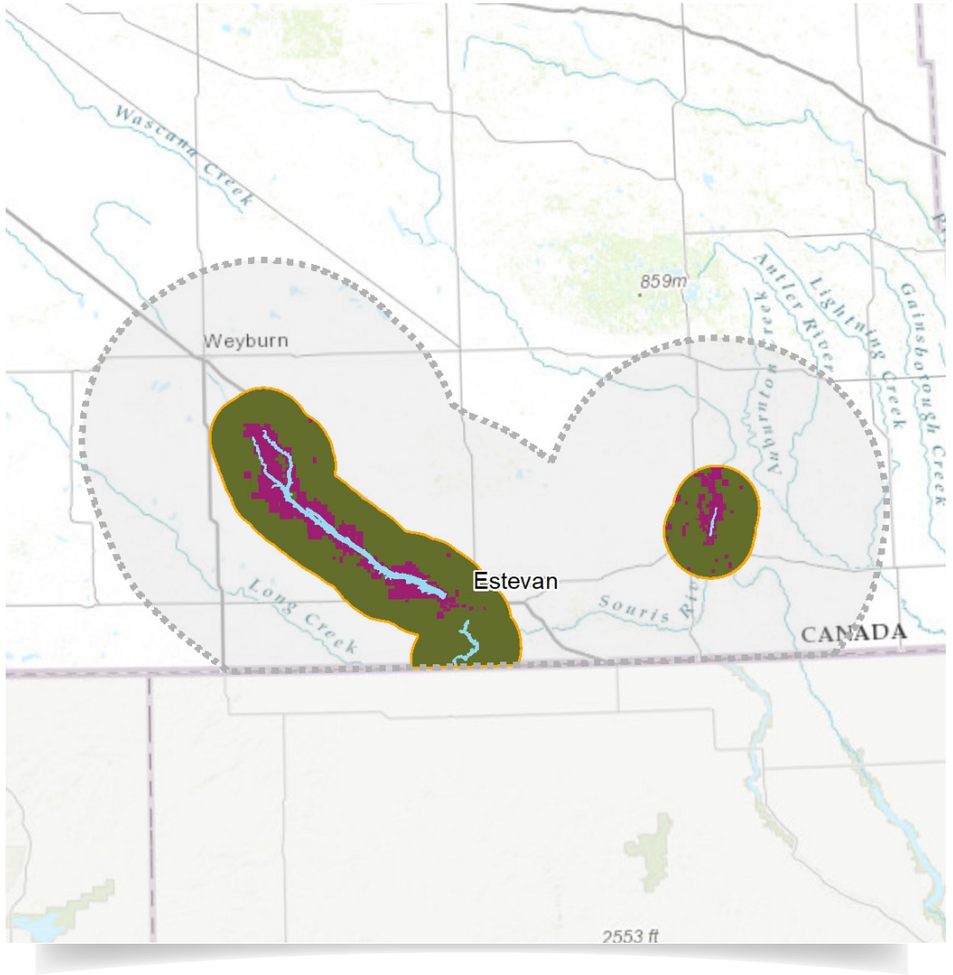
LAYER PRE-PROCESSING AND COMMENTS

No buffer added.

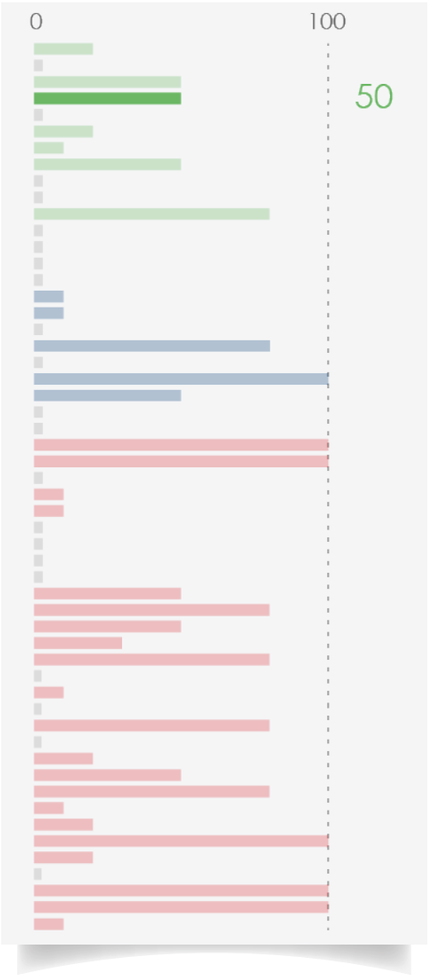
DESCRIPTION

Managed lands include the representative areas network, agricultural crown land, game preserves, conservation easements, ecological reserves, special management areas, wildlife habitat protection lands, wildlife refuges, land claim selections, crown conservation easements, protected and conserved area network lands, parks/sports fields, federal pastures and crown land subdivisions.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



PROTECTED LANDS

Avoid encroachment on protected lands

SOURCE

Saskatchewan Ministry of Environment (data includes federal lands)

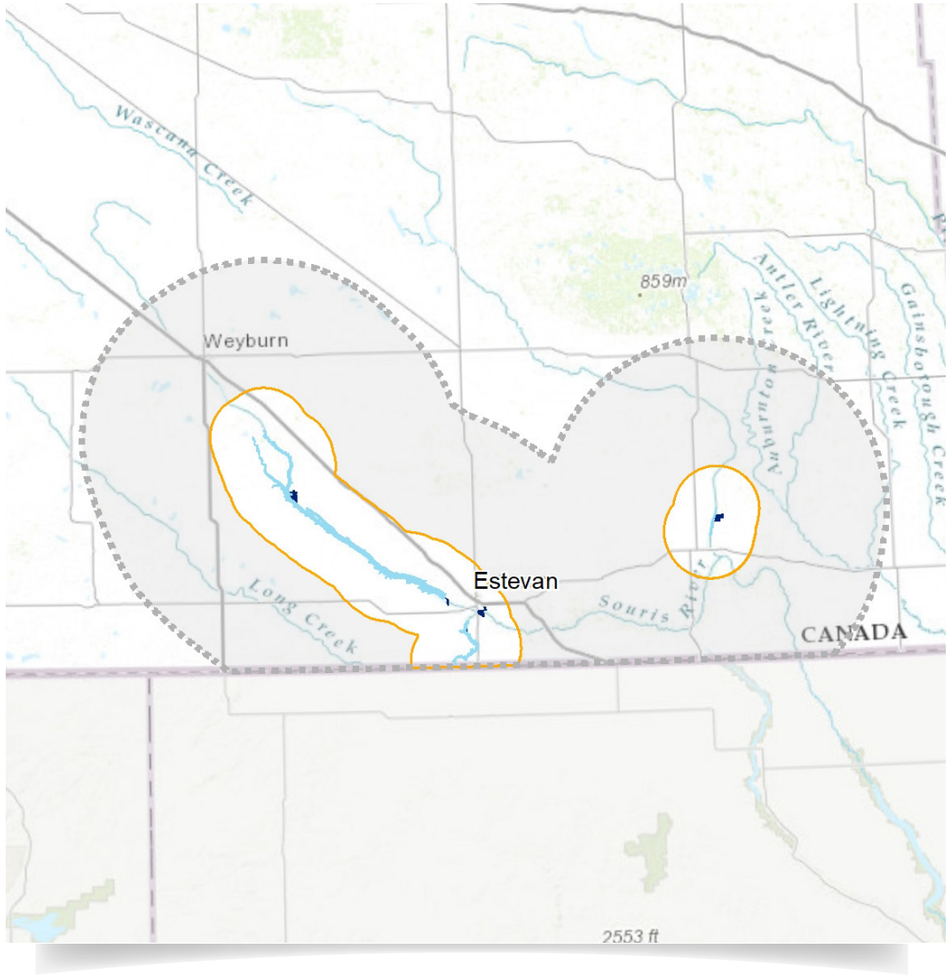
LAYER PRE-PROCESSING AND COMMENTS

Exclusion, no buffer added.

DESCRIPTION

Protected lands include national wildlife areas, migratory bird sanctuaries, national parks, provincial parks, recreation sites, regional parks, parks authority lands, parks historic sites, fish & wildlife development fund lands and representative areas.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING

PROTECTED LANDS PROXIMITY

Minimize proximity to protected lands

SOURCE

Saskatchewan Ministry of Environment

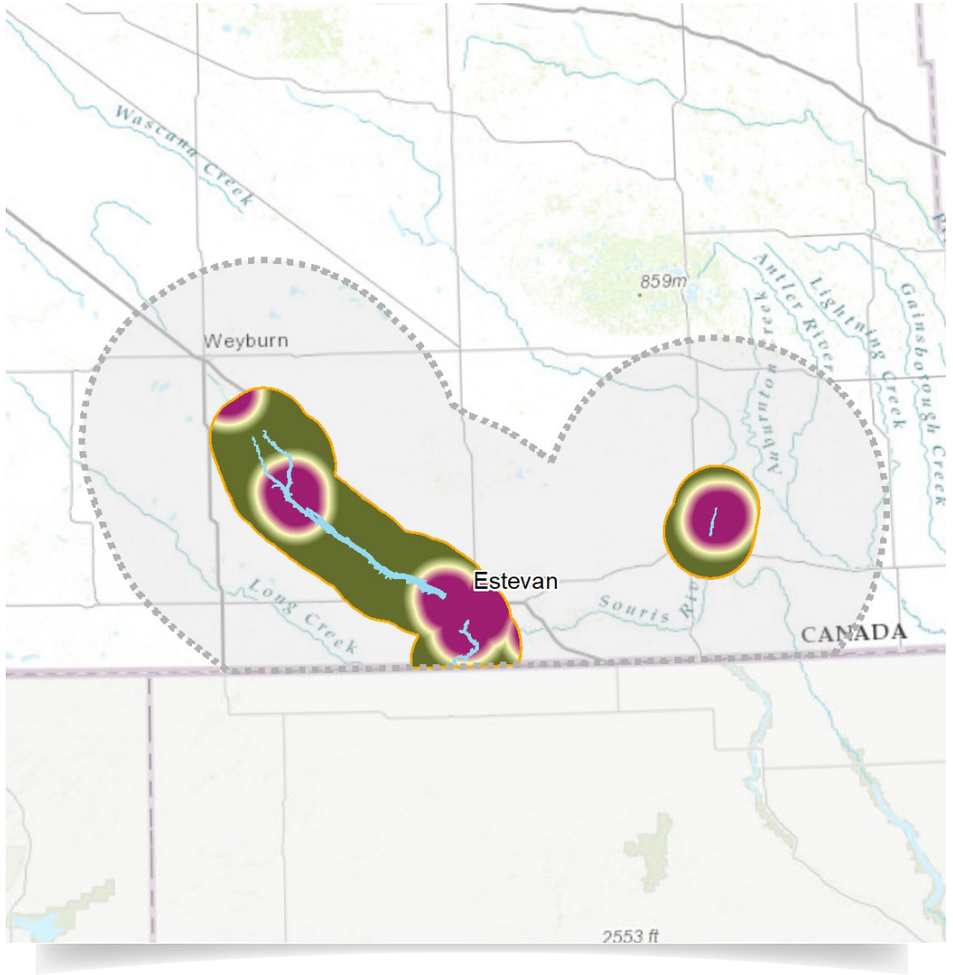
LAYER PRE-PROCESSING AND COMMENTS

0-5 km low suitability, 5-10 km distance decay buffer.

DESCRIPTION

Protected lands include national wildlife areas, migratory bird sanctuaries, national parks, provincial parks, recreation sites, regional parks, parks authority lands, parks historic sites, fish & wildlife development fund lands and representative areas.

GEOGRAPHIC EXTENT



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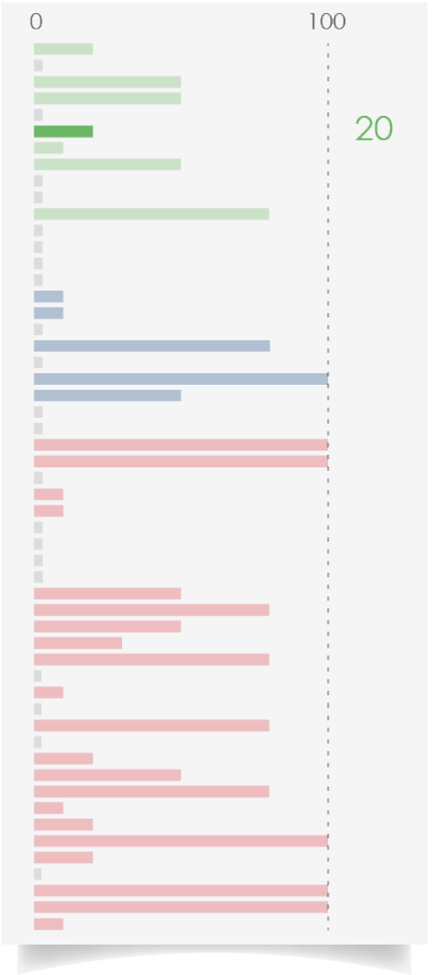


RARE/ENDANGERED SPECIES

Avoid rare and endangered species

SOURCE

Saskatchewan Conservation Data Centre (SKCDC)

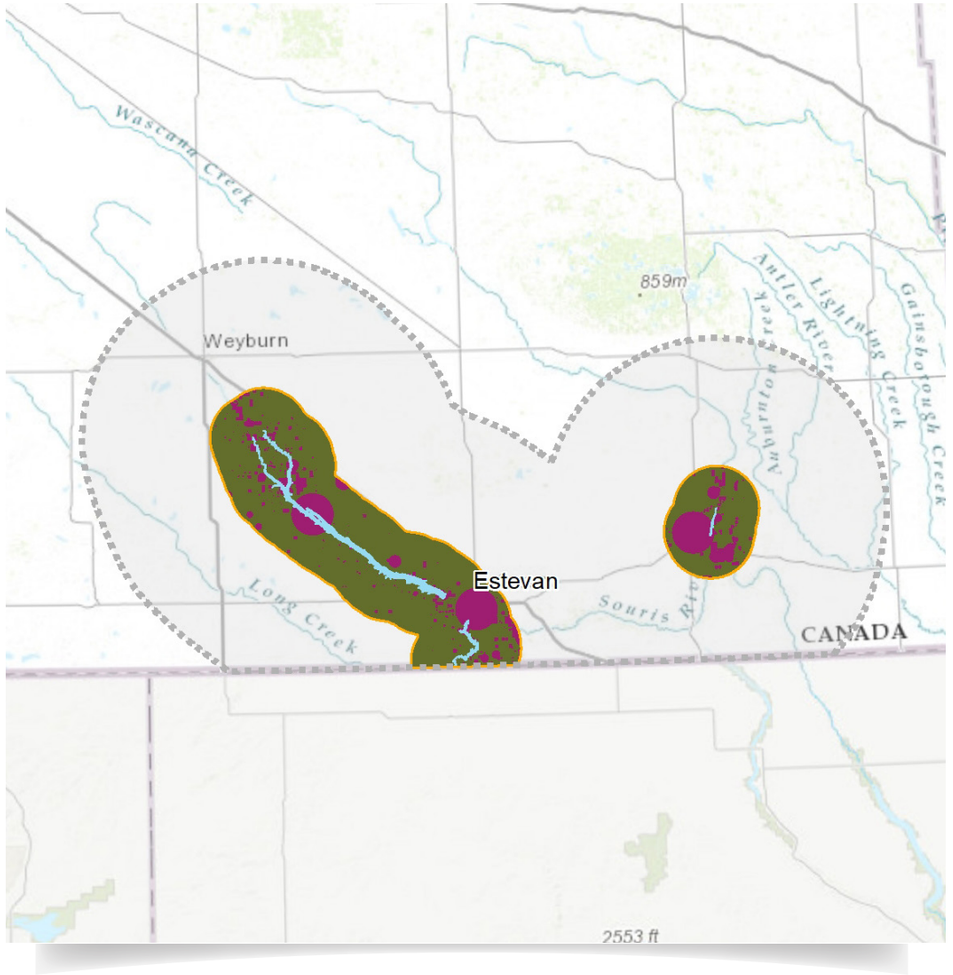
LAYER PRE-PROCESSING AND COMMENTS

No buffer added.

DESCRIPTION

Development in areas with rare and endangered species may be hindered by increased social scrutiny and regulatory concerns. Note, these data have been assigned a lower weight in the siting model because they are largely based on observed occurrence versus habitat. Observations may be sporadic and geographically inconsistent over time; whereas habitat distribution is a more reliable measure of the range over which species may occur. See Terrestrial Wildlife Habitat Inventory (Indicator 8).

GEOGRAPHIC EXTENT



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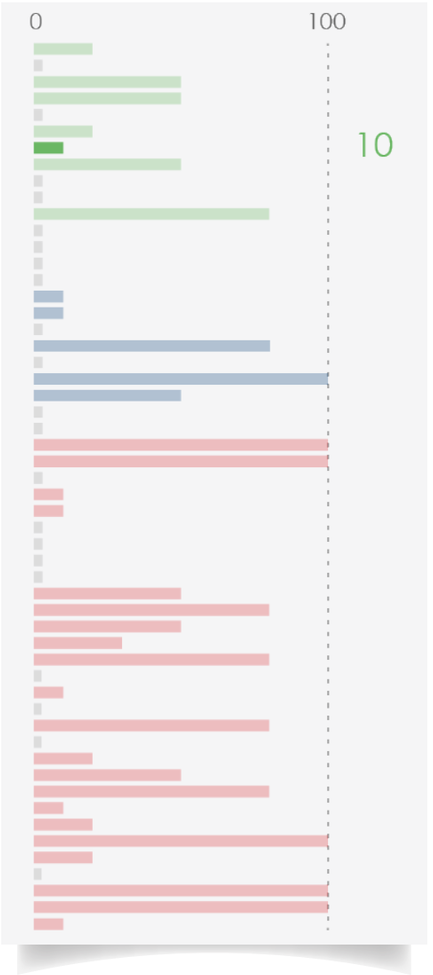


TWHI WILDLIFE HABITAT

Minimize encroachment on Terrestrial Wildlife Habitat Inventory (TWHI) areas

SOURCE

Wildlife Branch, Saskatchewan Ministry of Environment

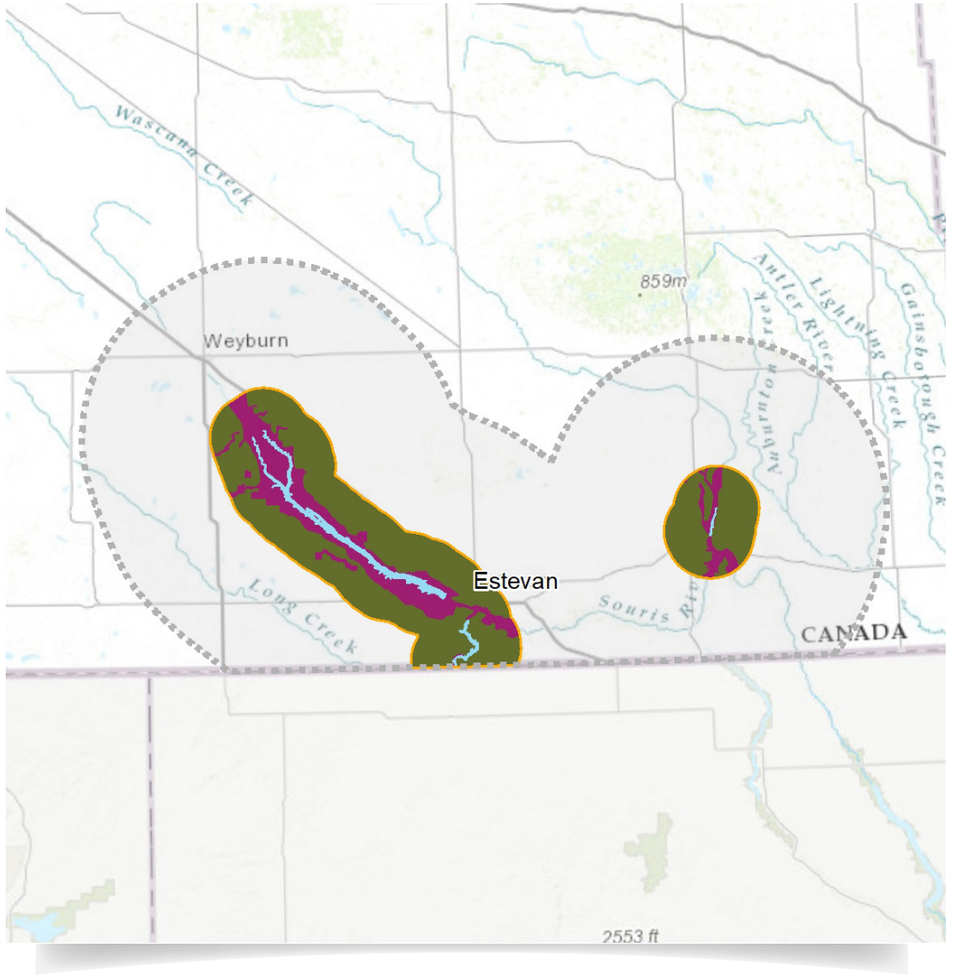
LAYER PRE-PROCESSING AND COMMENTS

No buffer

DESCRIPTION

Development in areas identified by the Terrestrial Wildlife Habitat Inventory may be hindered by increased social scrutiny and regulatory concerns.

GEOGRAPHIC EXTENT



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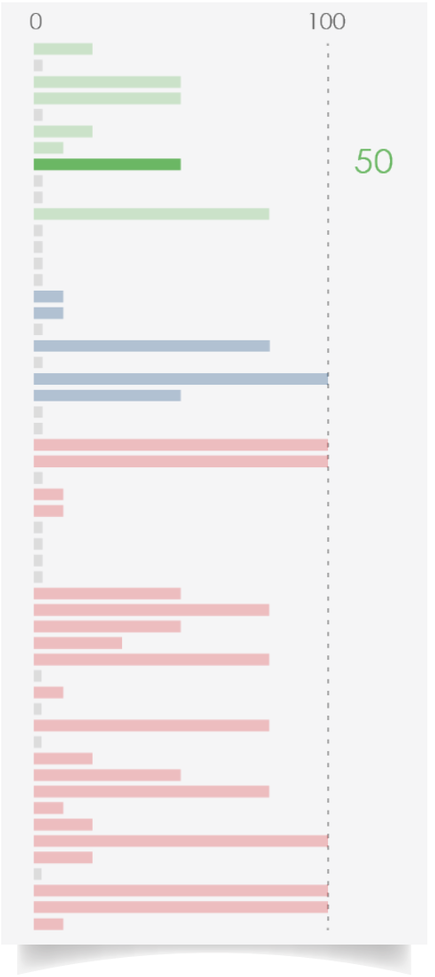


WATERBODIES

Avoid development on permanent waterbodies

SOURCE

CanVec, Geogratis, Natural Resources Canada (NRCan) / Sask Power

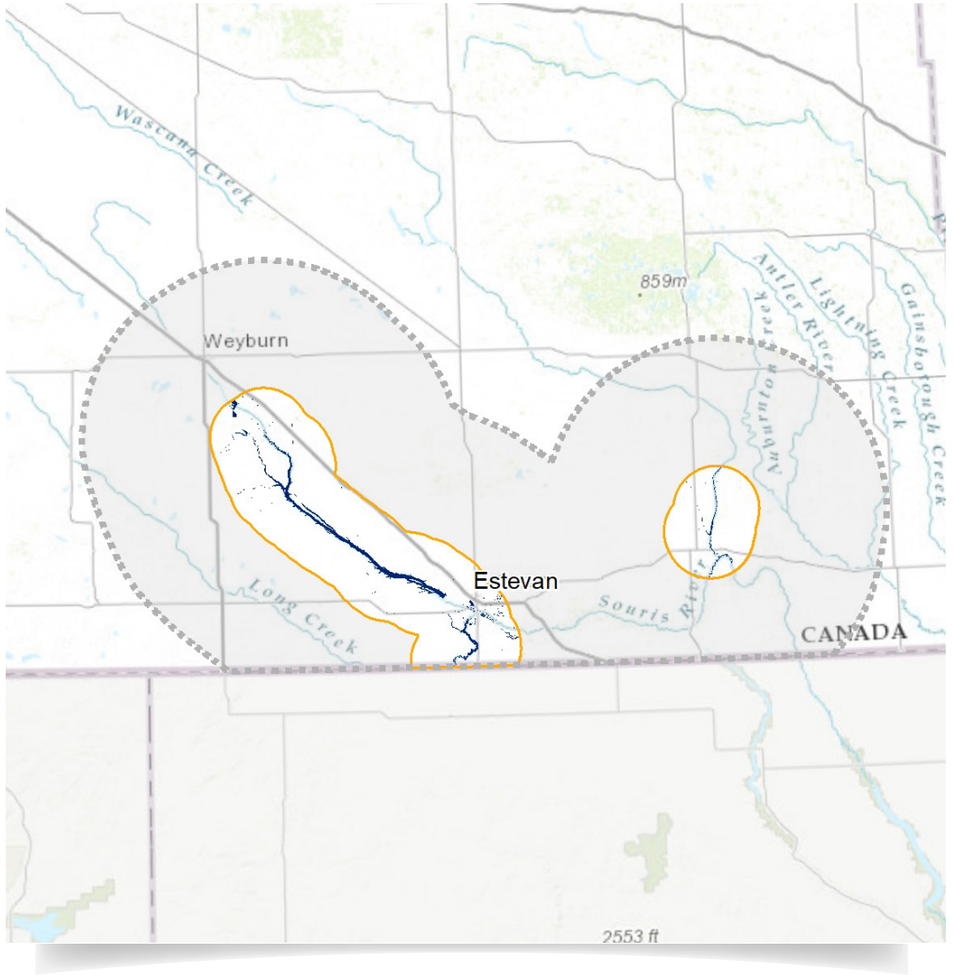
LAYER PRE-PROCESSING AND COMMENTS

Added selected waterbodies from SaskPower and removed intermittent waterbodies. Added a 50 m buffer to the exclusion.

DESCRIPTION

Encroachment on permanent waterbodies including an appropriate setback distance must be avoided.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING

WATERCOURSES

Avoid development on permanent watercourses

SOURCE

CanVec, Geogratis, Natural Resources Canada (NRCan)

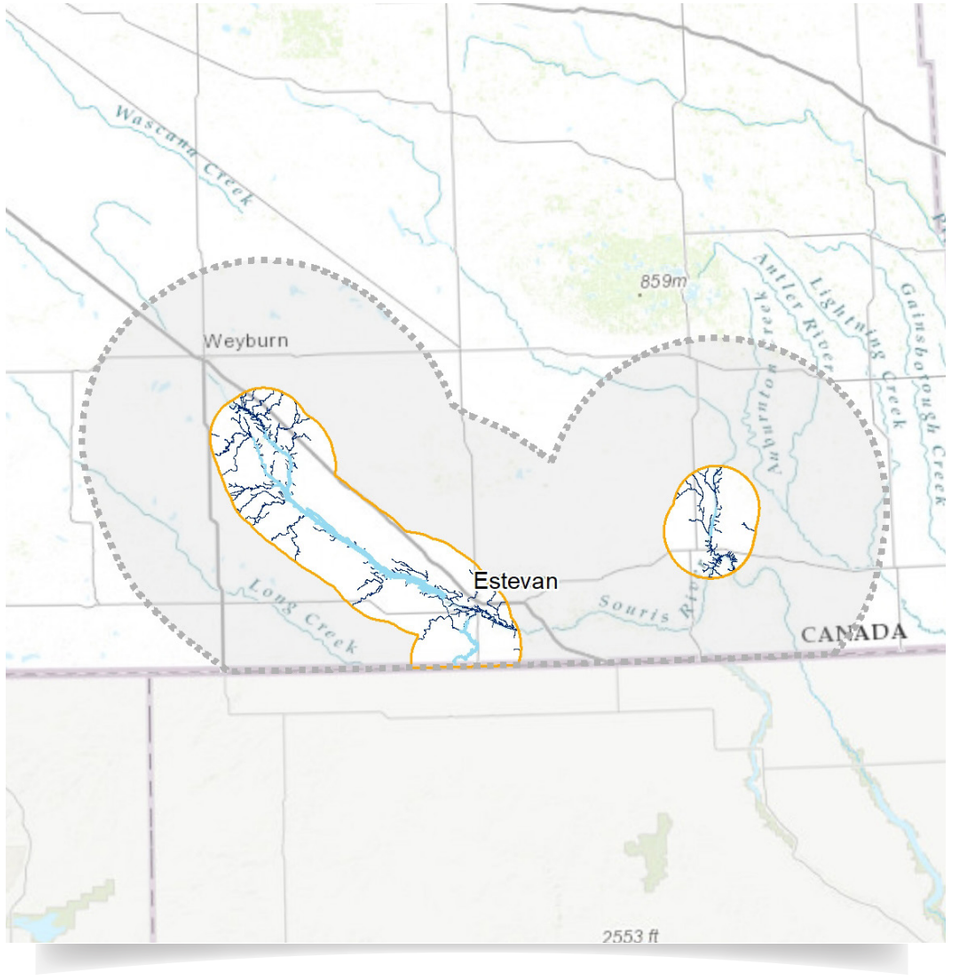
LAYER PRE-PROCESSING AND COMMENTS

Exclusion, 50 m buffer added.

DESCRIPTION

Encroachment on permanent watercourses including an appropriate setback distance must be avoided.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING

WETLANDS

Avoid development on wetlands

SOURCE

CanVec, Geogratis, Natural Resources Canada (NRCan)

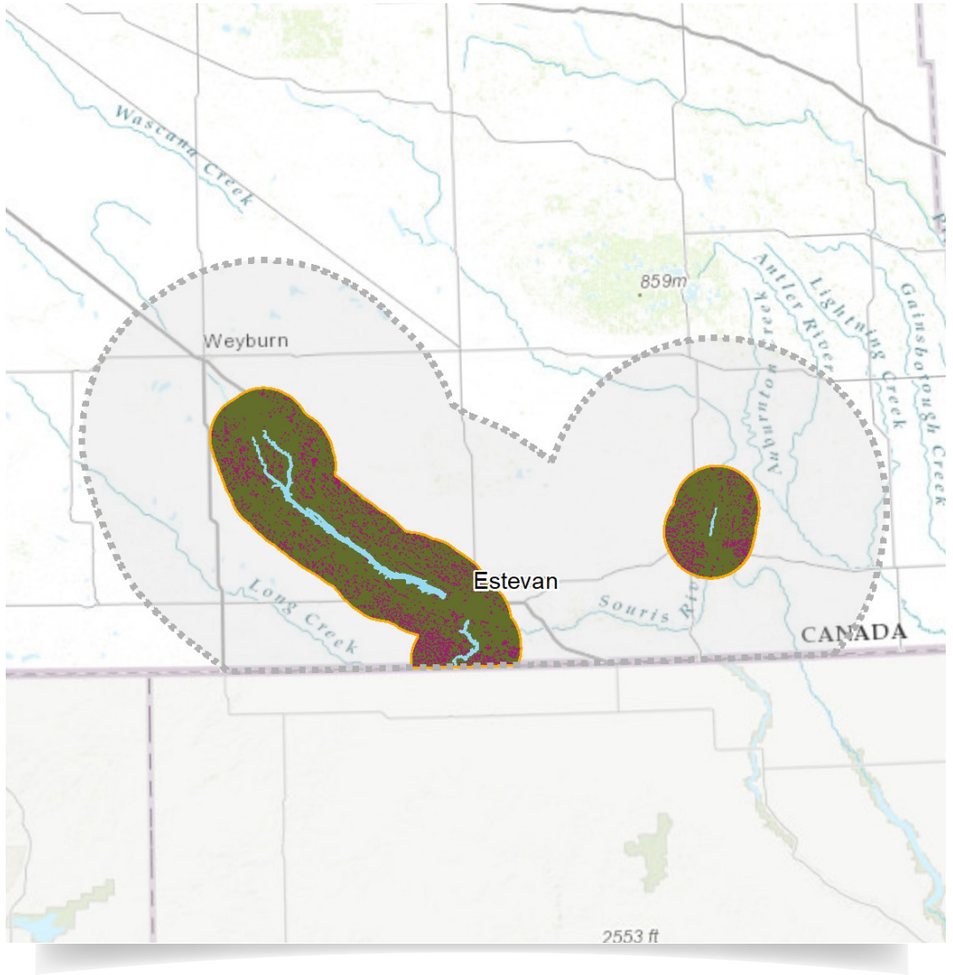
LAYER PRE-PROCESSING AND COMMENTS

Add Intermittent waterbodies. No buffer added.

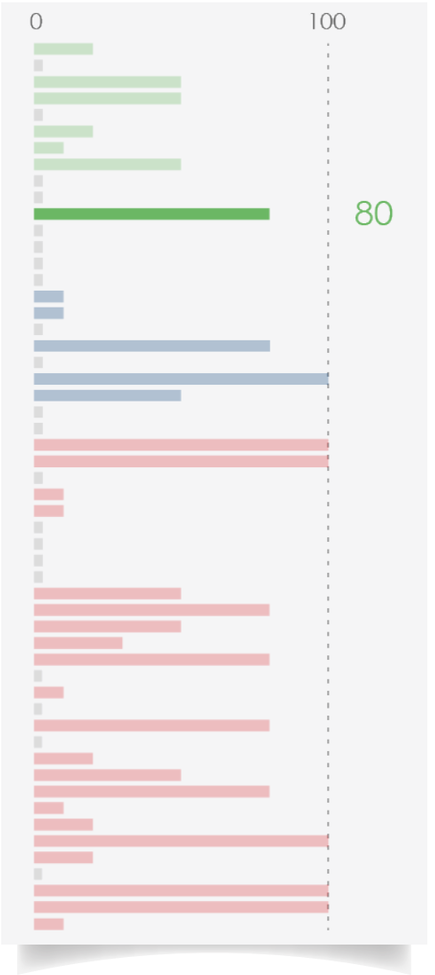
DESCRIPTION

Encroachment on wetlands should be avoided. Includes CanVec intermittent waterbodies defined as a body of water coming and going at intervals and saturated soils defined as areas with vegetation requiring a significant amount of water.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



WOODLAND CARIBOU HABITAT

Avoid encroachment in caribou habitat

SOURCE

Saskatchewan Ministry of Environment

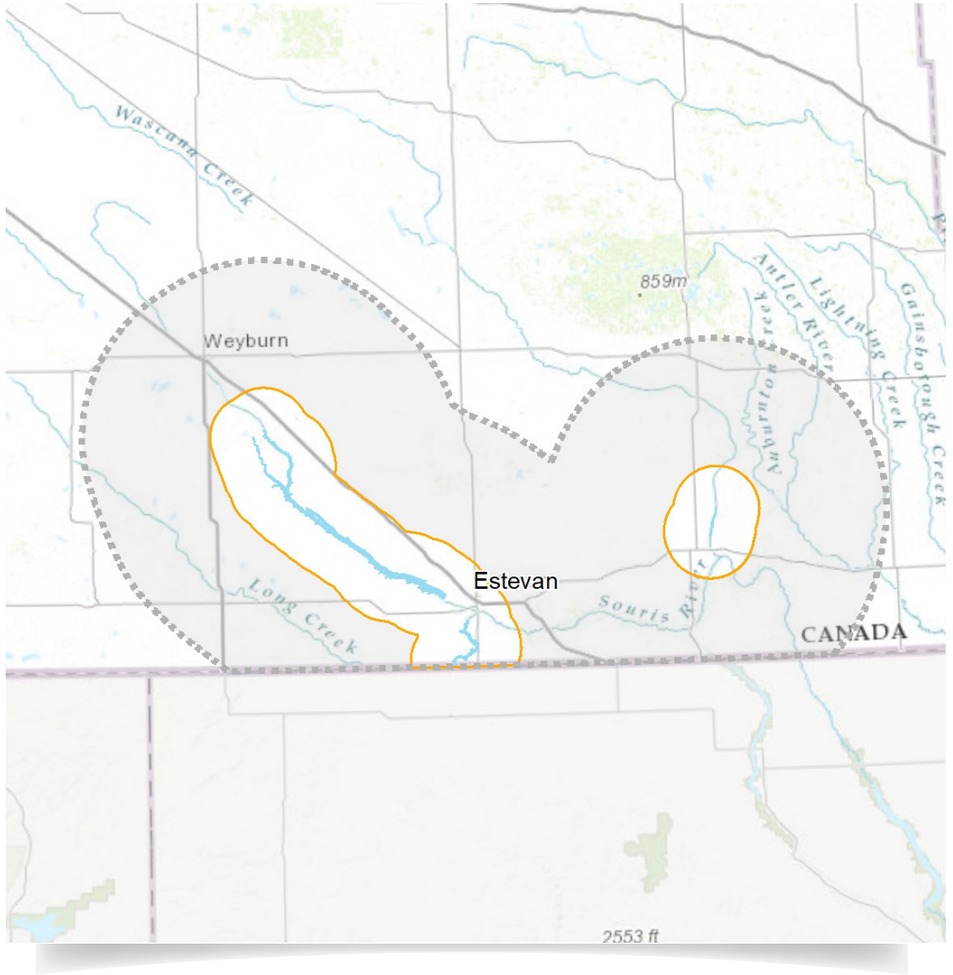
LAYER PRE-PROCESSING AND COMMENTS

Exclusion, no buffer added.

DESCRIPTION

Draft Caribou Habitat Management Areas (CHMAs) are based on known woodland caribou use and habitat potential mapping, including Tier 1, 2 and 3 areas. Development in these areas may be hindered by increased social scrutiny and regulatory concerns.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING

Social/Cultural

Indicators

13. Cemeteries
14. Department of National Defense (DND) Military Lands
15. First Nations Reserves
16. Future Urban Development
17. Heritage Sensitivity
18. International Border
19. Population Density
20. Population Density > 200
21. Proximity to Workforce
22. SaskPower Lands
23. Urban Municipal Areas

CEMETERIES

Avoid quarter sections with cemeteries

SOURCE

Saskatchewan Cemeteries Project
Saskatchewan Information Services Corporation

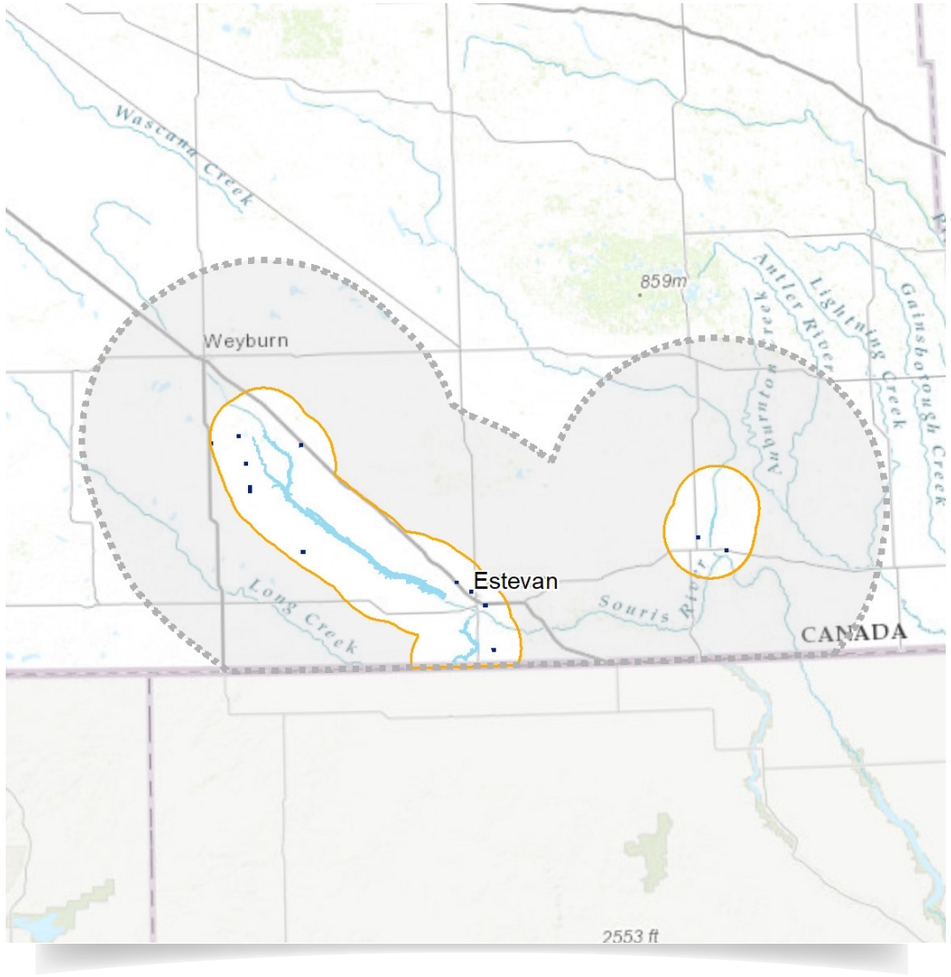
LAYER PRE-PROCESSING AND COMMENTS

Link table of quarter sections from website (https://www.saskgenealogy.com/index.php/saskatchewan-cemeteries/) to quarter section land data. Include only quarter sections with cemeteries.

DESCRIPTION

Encroachment on quarter sections with cemeteries should be avoided due to their social and cultural sensitivity.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING

EXCLUSION

DEPARTMENT OF NATIONAL DEFENSE (DND) MILITARY LANDS

Avoid proximity to military bases and airspace

SOURCE

IHS Markit Canada ULC

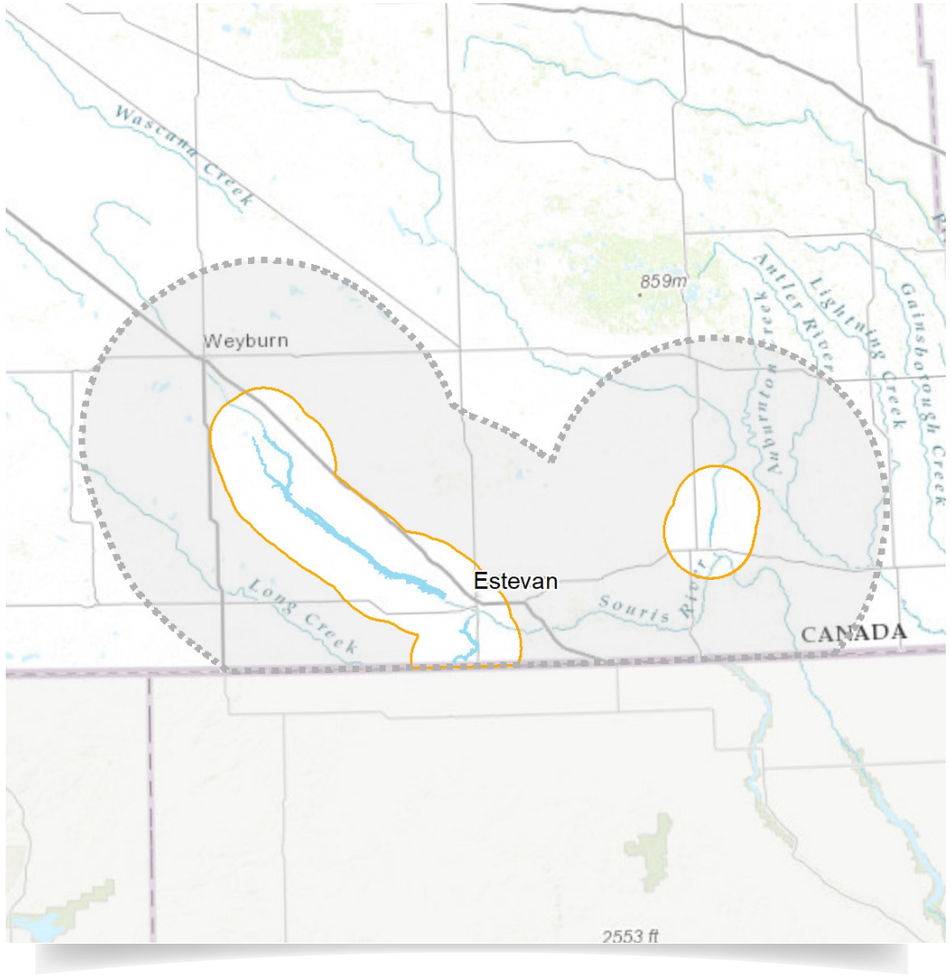
LAYER PRE-PROCESSING AND COMMENTS

Exclusion, 8 km buffer added.

DESCRIPTION

Department of National Defence (DND) Military Lands conduct activities and store explosives, weapons and other equipment which are not compatible with the location of a SMR. The EPRI "Advanced Nuclear Technology: Site Selection and Evaluation Criteria for New Nuclear Power Generation Facilities (Siting Guide)" (2015) recommends an exclusion setback of 5 miles, or 8 km.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING

FIRST NATIONS RESERVES

First Nations Land will be considered case by case

SOURCE

Geogratis, Natural Resources Canada (NRCan)

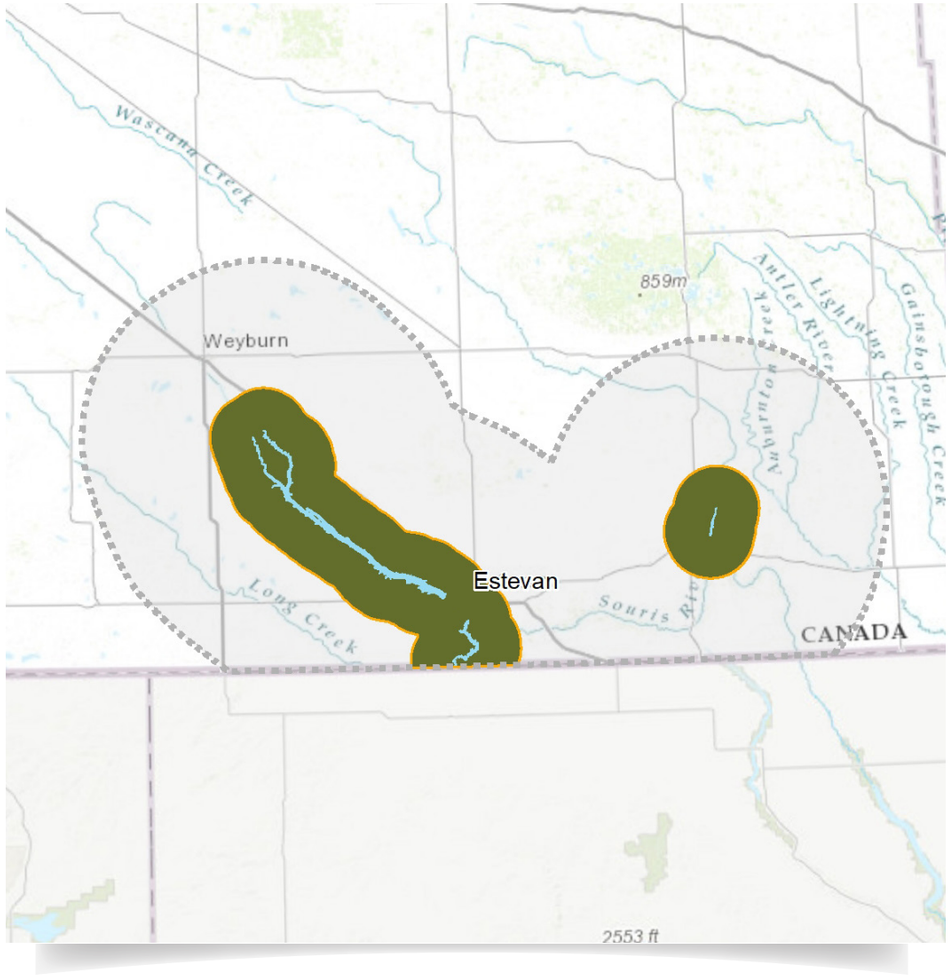
LAYER PRE-PROCESSING AND COMMENTS

No buffer added.

DESCRIPTION

The effect of this indicator is neutral (placeholder) to the model results.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING

BACKGROUND

FUTURE URBAN DEVELOPMENT

Minimize encroachment on future development lands

SOURCE

Information Services Corporation (ISC)

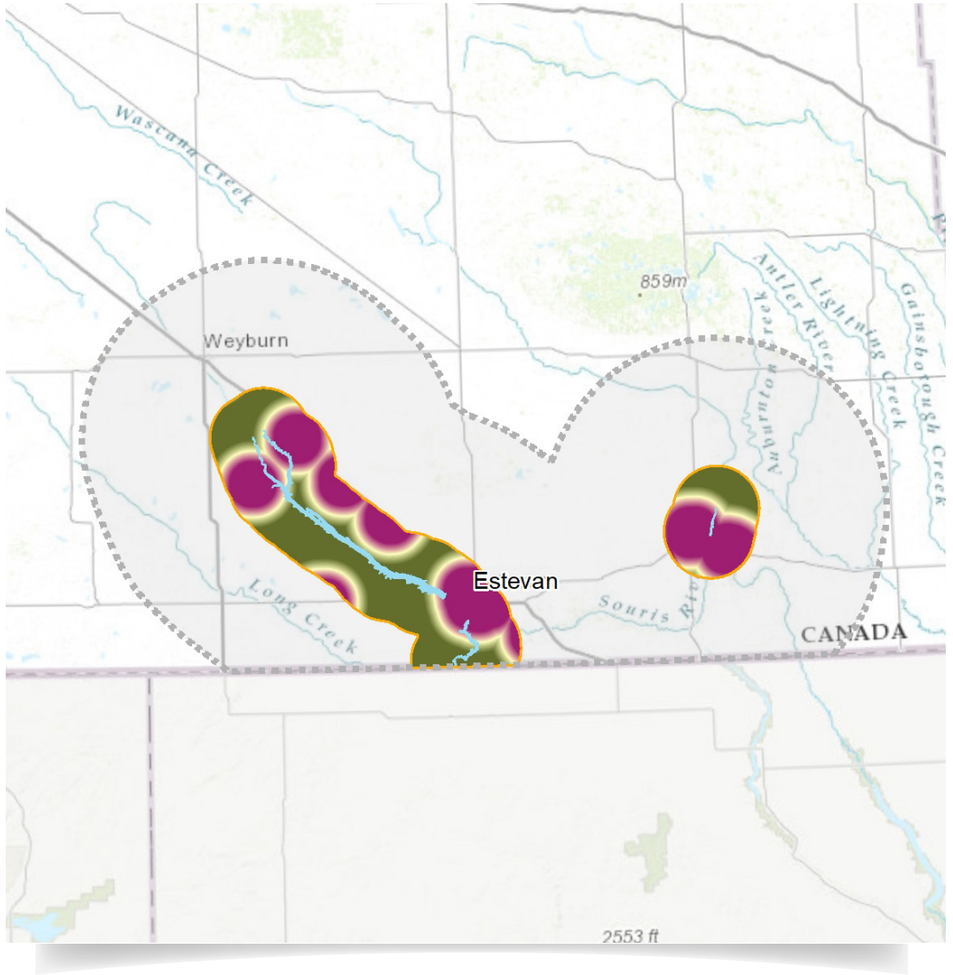
LAYER PRE-PROCESSING AND COMMENTS

Zero to 5 km is low suitability, from 5 to 10 km distance decay is from low to high from urban municipalities. A 500 m buffer added to areas within First Nations reserves with a population density > 50 people/km2

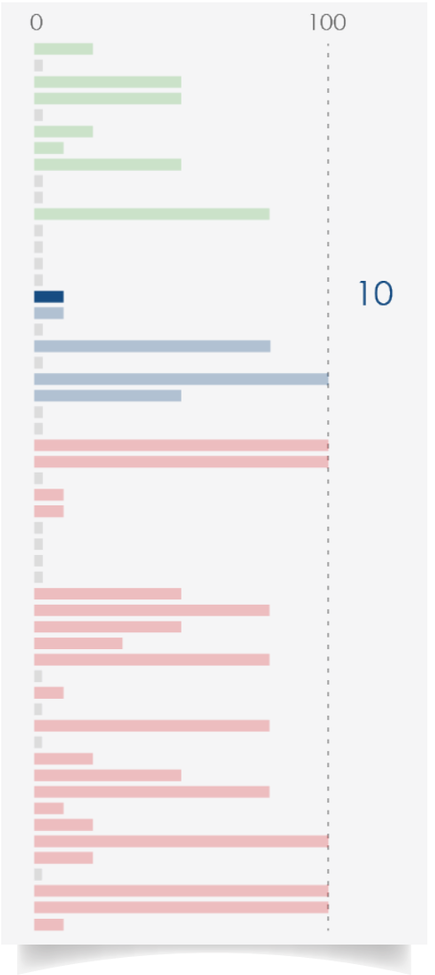
DESCRIPTION

Encroachment on land adjacent to urban municipality boundaries and First Nations communities should be minimized. Area beyond 5 km of communities is assumed to have a lower risk of high-density development in the next 60 years.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



HERITAGE SENSITIVITY

Avoid sensitive heritage resources

SOURCE

Heritage Conservation Branch, Saskatchewan Ministry of Parks, Culture and Sport

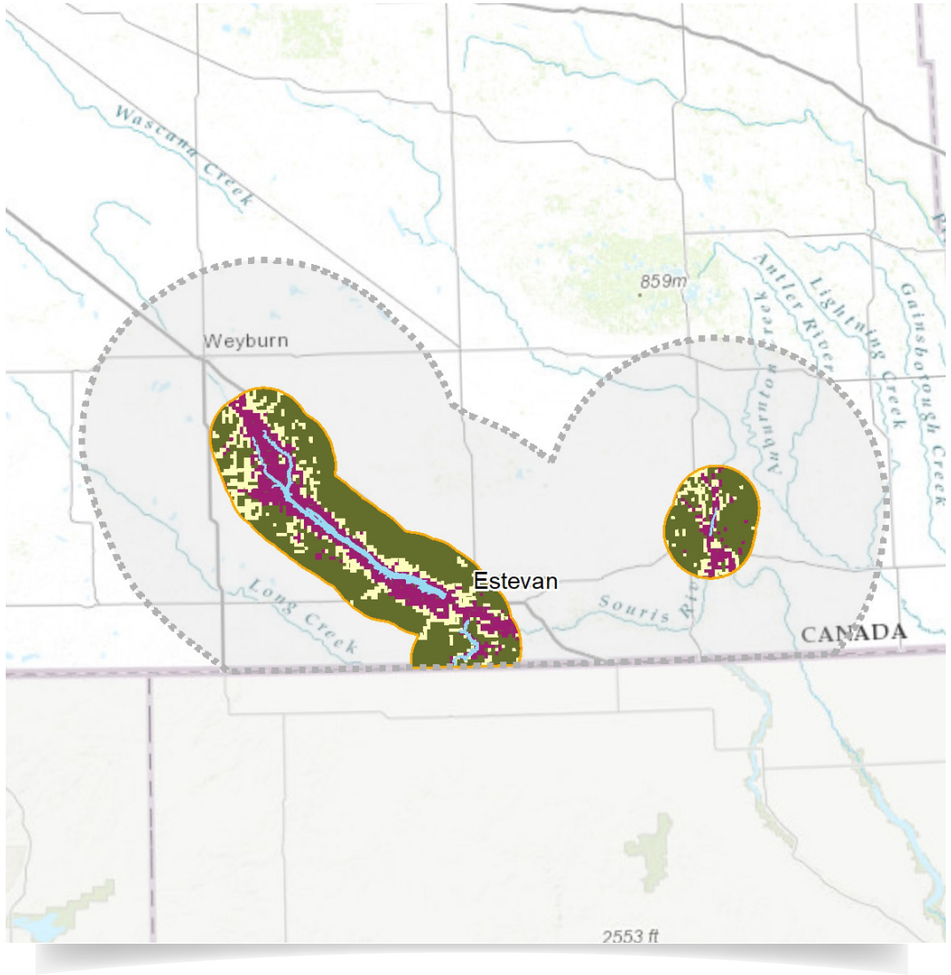
LAYER PRE-PROCESSING AND COMMENTS

Non-sensitive land or Null = 100 (highest suitability) Conditionally Sensitive = 50 Sensitive = 0 (lowest suitability).

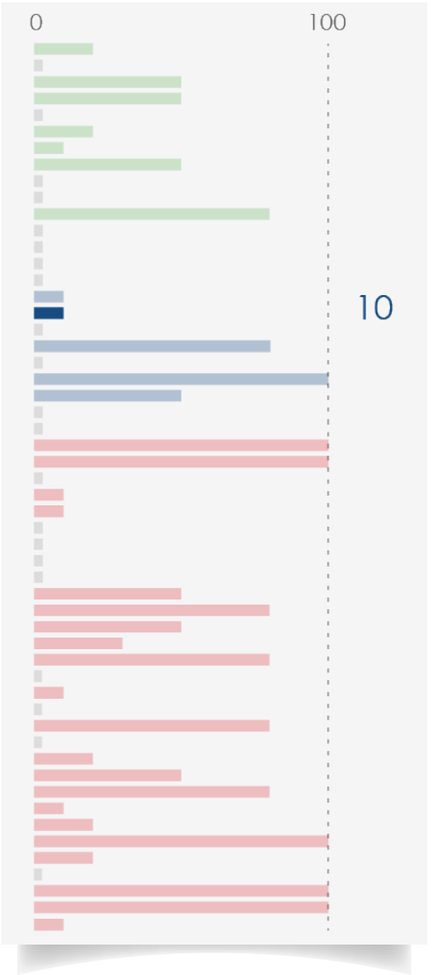
DESCRIPTION

Heritage sensitive describes the potential of a quarter section to contain intact archaeological and/or paleontology sites. This includes Conditionally Sensitive and Sensitive lands. Detailed cultural, archeological and paleontological investigations will be conducted at the local siting level.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



INTERNATIONAL BORDER

Avoid proximity to international border

SOURCE

International Boundary Commission

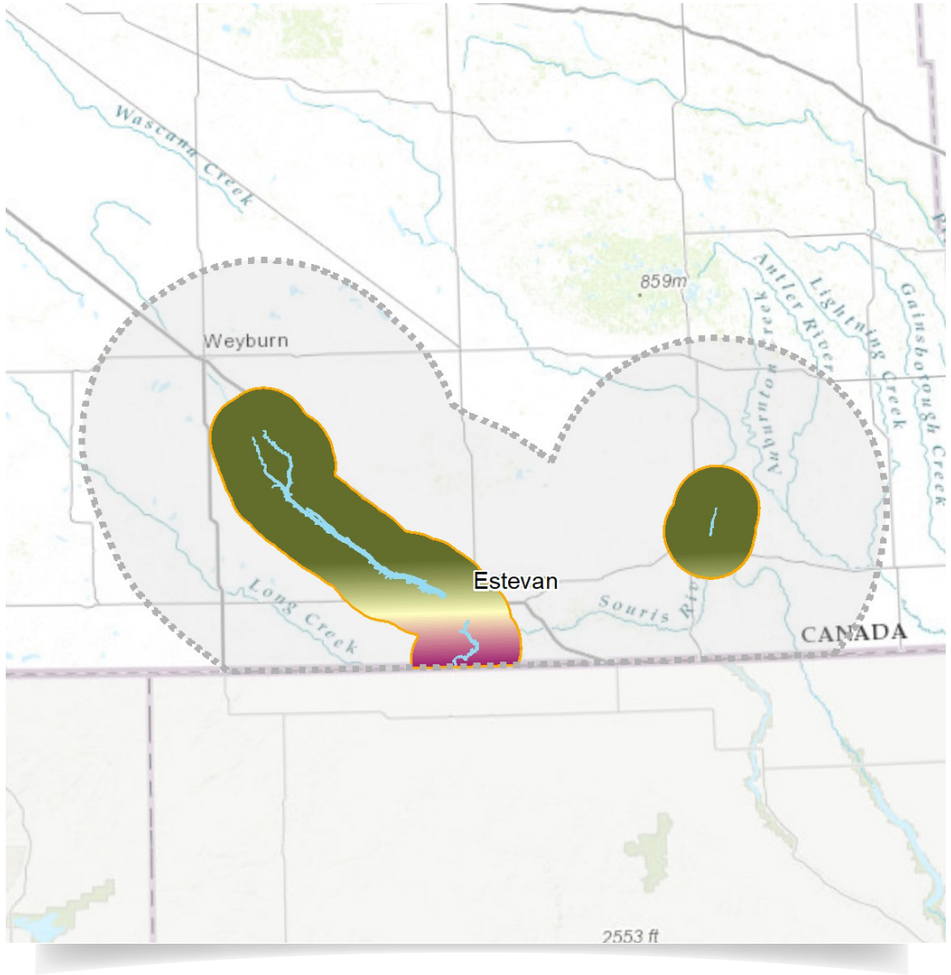
LAYER PRE-PROCESSING AND COMMENTS

0 - 25 km distance decay buffer added.

DESCRIPTION

Proximity to international borders should be considered as there may be legal and/or treaty considerations. The effect of this indicator is neutral (placeholder) to the model results.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING

BACKGROUND

POPULATION DENSITY

Minimize encroachment of moderate population density

SOURCE

Stats Canada 2016 Census data

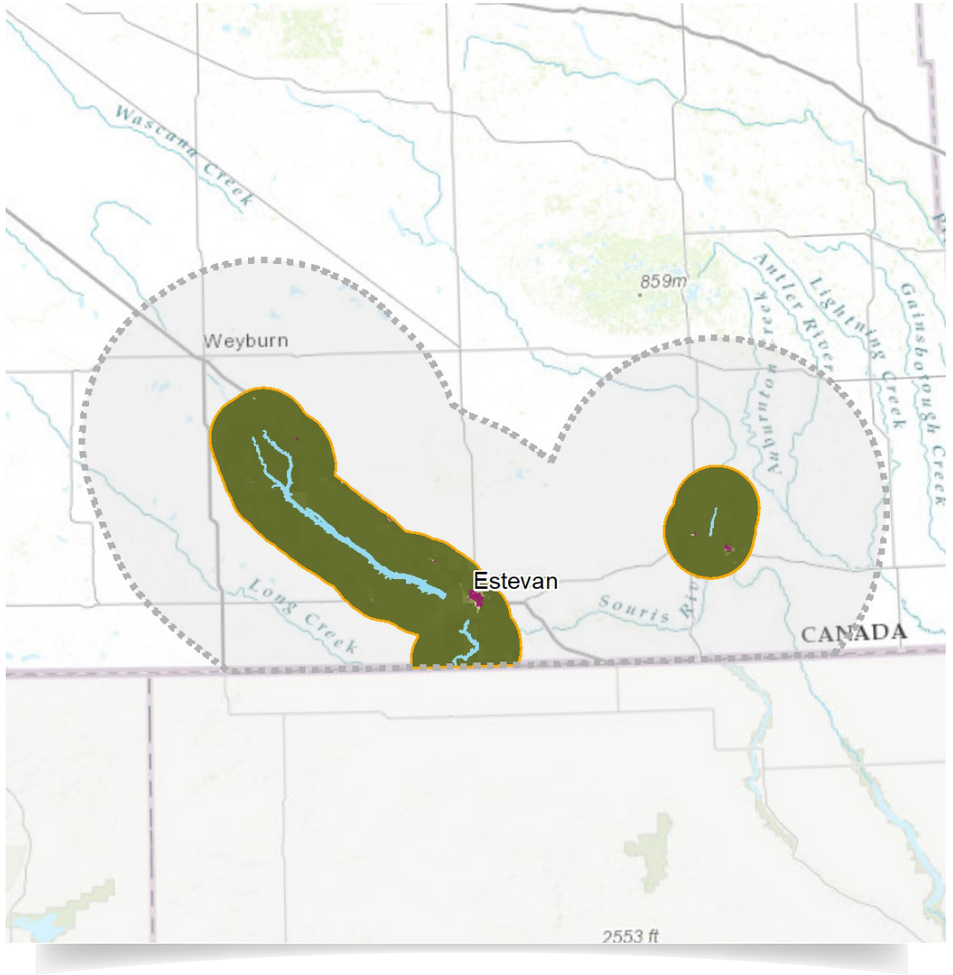
LAYER PRE-PROCESSING AND COMMENTS

Indicator processed with a linear, increasing scale of suitability from 200 people per square km to 0.

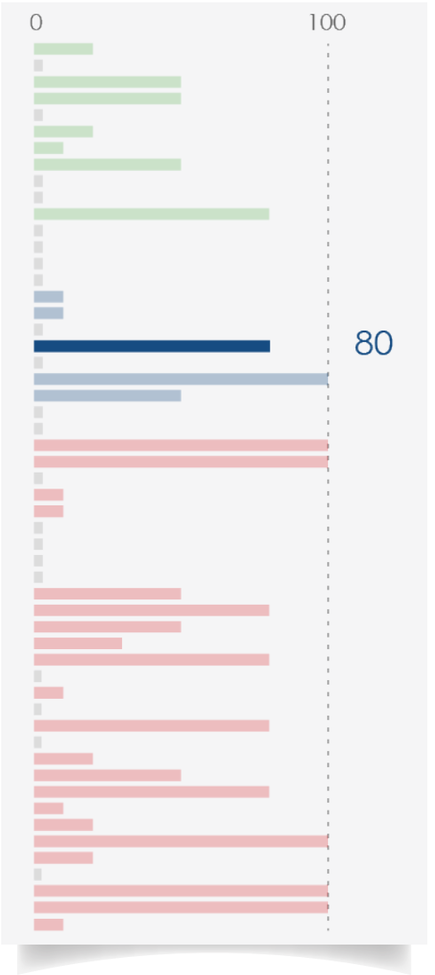
DESCRIPTION

Land with higher population density is less suitable. This can be a proxy for socially sensitive areas such as residences, local parks, urban infrastructure and emergency services.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



POPULATION DENSITY > 200

Avoid areas of high population density

SOURCE

Stats Canada 2016 Census data

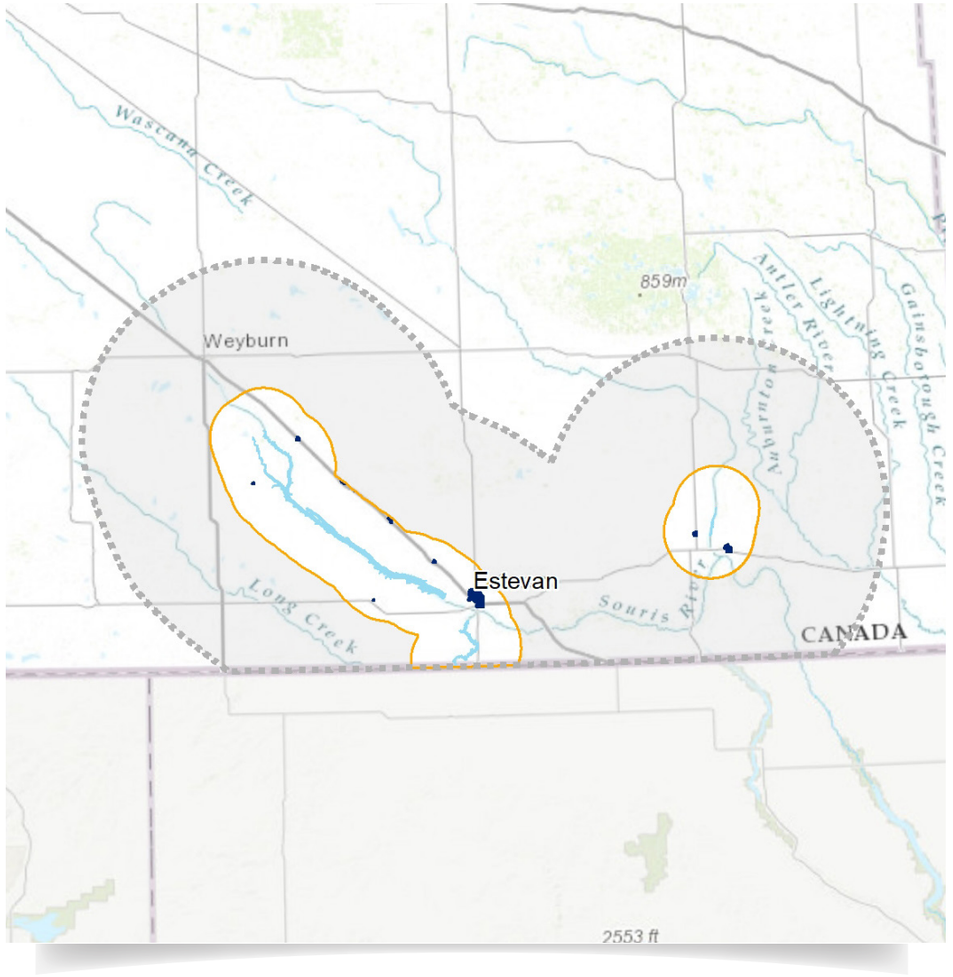
LAYER PRE-PROCESSING AND COMMENTS

Join population to dissemination blocks and use area to calculate population density; query > 200.

DESCRIPTION

Land with a population density greater than 200 people per square km is excluded. This can be a proxy for socially sensitive areas such as residences, local parks, urban infrastructure and emergency services.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING

PROXIMITY TO WORKFORCE

Prefer sites within 75 km of settlements > 2,000 people

SOURCE

Stats Canada 2016 Census data

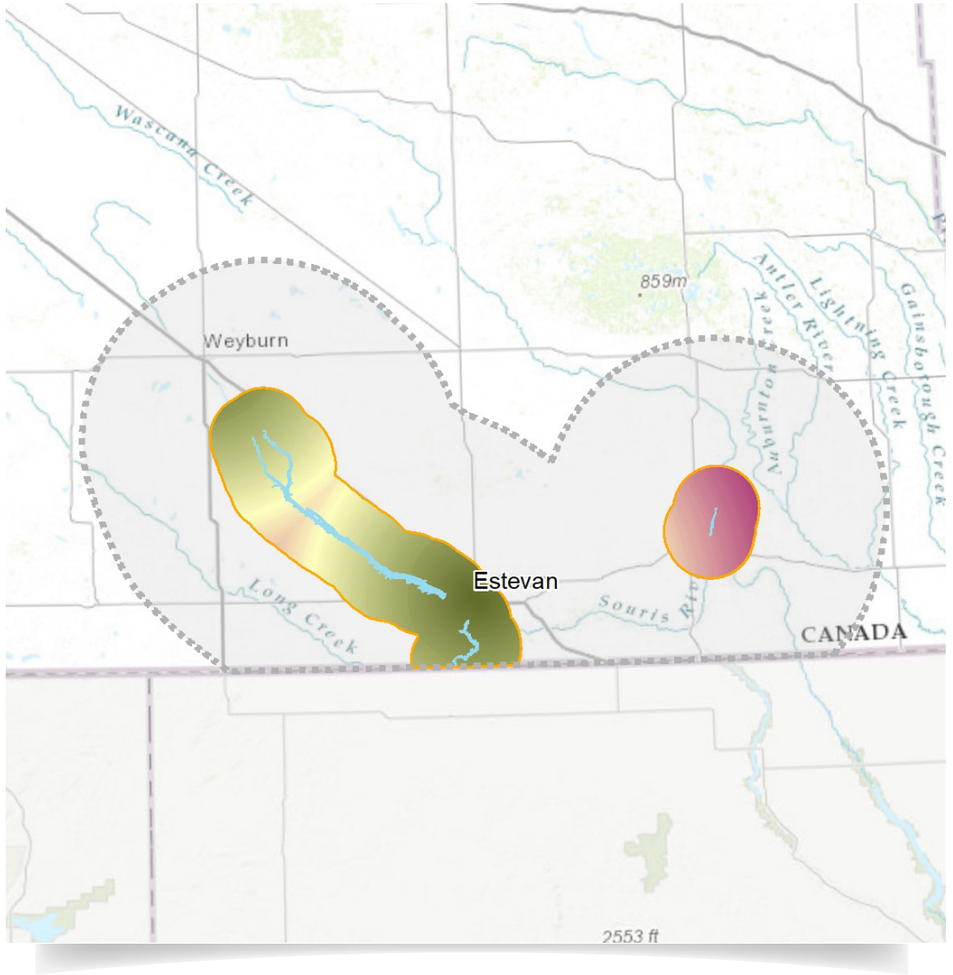
LAYER PRE-PROCESSING AND COMMENTS

Calculate population of populated areas by adding the population of dissemination blocks within them. Distance decay buffer added from 0 to 75 km.

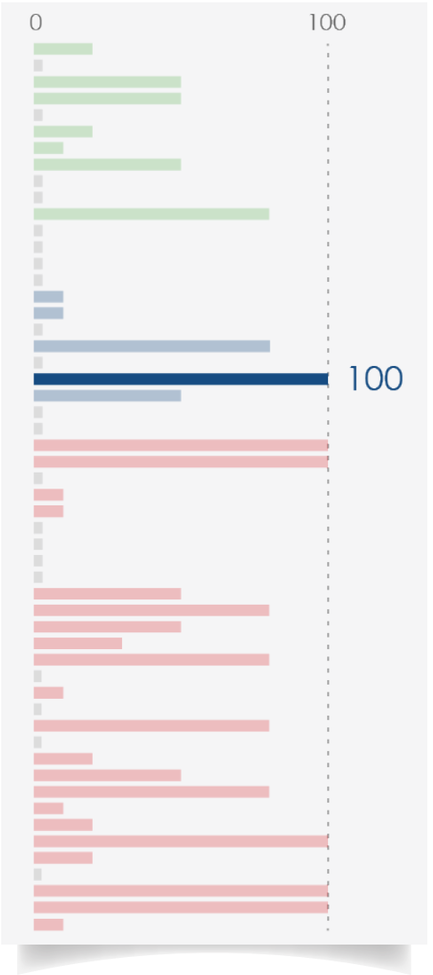
DESCRIPTION

Population centers greater than 2,000 people provide a localized workforce and access to emergency services (e.g., hospitals, fire, police and EMS). The 2016 Statistics Canada Census data was used for communities above 1,800 people to which a 2% annual compounded growth rate was applied.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



SASKPOWER LANDS

Prefer sites on land already owned by SaskPower.

SOURCE

SaskPower

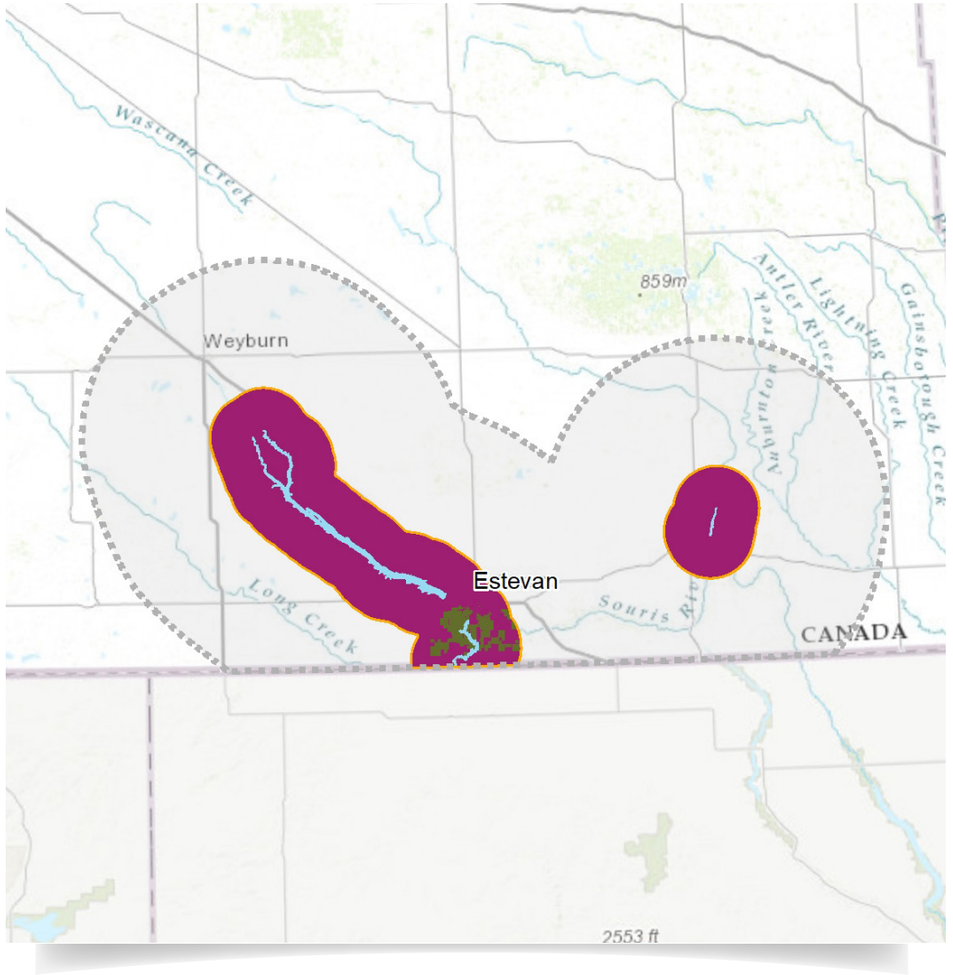
LAYER PRE-PROCESSING AND COMMENTS

No buffer added.

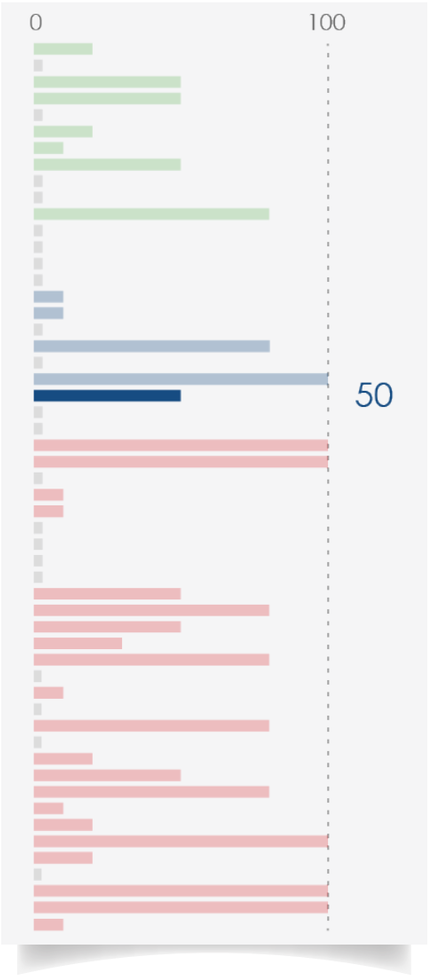
DESCRIPTION

It is preferable to site the SMR on lands owned by SaskPower.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



URBAN MUNICIPAL AREAS

Avoid encroaching on urban areas

SOURCE

Information Services Corporation (ISC) Stats Canada 2016 Census data Geogratis, Natural Resources Canada (NRCan)

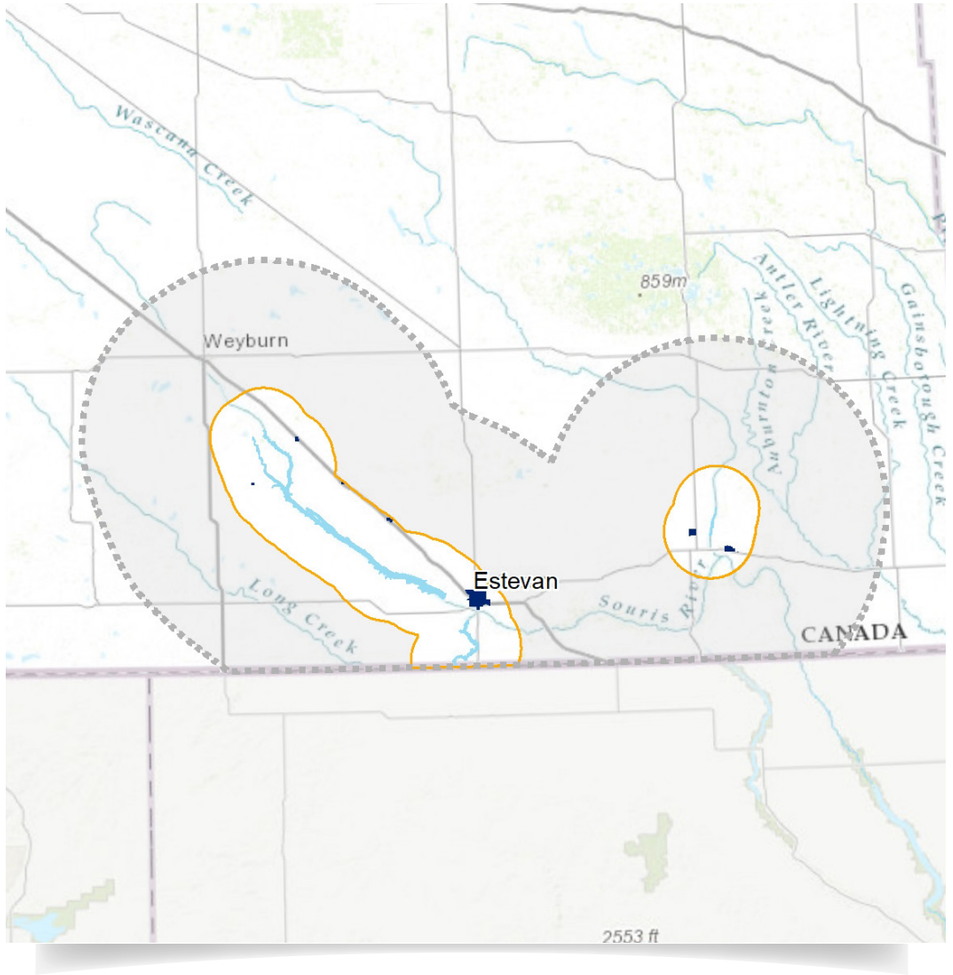
LAYER PRE-PROCESSING AND COMMENTS

No buffer added on urban municipalities. 500 m exclusion buffer added to areas within First Nations reserves with a population density > 50 ppl / sq km.

DESCRIPTION

Avoid siting within the legal boundary of urban municipalities and First Nations communities. An additional buffer of 500 m was added to small First Nations settlements where settlement boundaries were uncertain.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING

Technical

Indicators

24. Aerodrome - Large
25. Aerodrome - Small
26. Airspace - Advisory
27. Airspace - Restricted
28. Dams
29. Drought Potential
30. Existing Power Plants
31. Faults
32. Gas Storage
33. Hazardous Facilities
34. Hazardous Facilities Proximity
35. High Pressure Pipeline Proximity
36. Highway Proximity - Primary
37. Highway Proximity - Secondary
38. Historical Fires
39. Linear Infrastructure
40. Mining
41. Oil and Gas Wells
42. Oil and Gas Wells Proximity
43. Pipelines
44. Railway Proximity - Mainline
45. Railway Proximity - Spurs
46. Regional Power Demand
47. Seismic Hazard
48. Severe Precipitation
49. Surficial Geology
50. Tornado Potential
51. Transmission Grid 230 kV
52. Water Sources
53. Water Sources Proximity
54. Water Wells

AERODROME - LARGE

Aerodrome airspace with radius of greater than 6 km

SOURCE

NavCanada

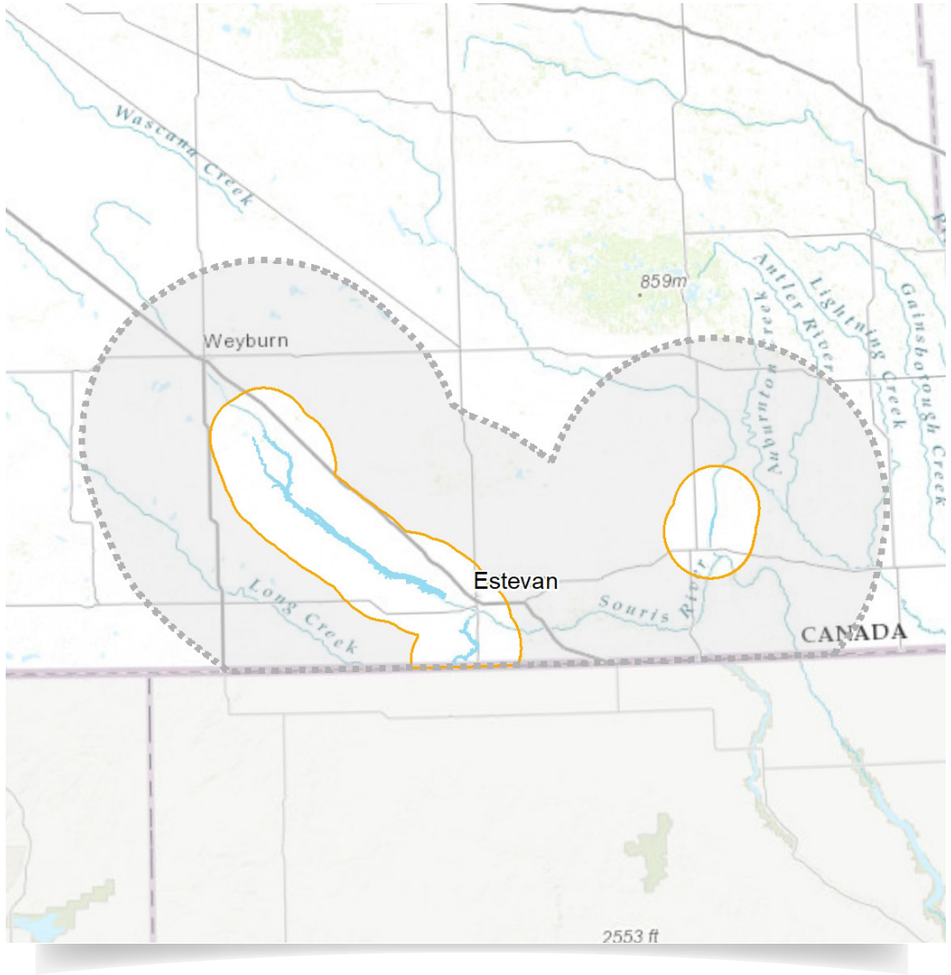
LAYER PRE-PROCESSING AND COMMENTS

Query radius of aerodromes. Remove features with a radius less than 6 km. No additional buffer added. Indicator is an exclusion.

DESCRIPTION

The site must not be within airspace with a radius of greater than 6 km. Commercial airports, non-commercial service airports and aerodromes are included. Aerodrome Airspace areas from the Saskatchewan Government web mapping service were used.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING

AERODROME - SMALL

Aerodrome airspace with radius of less than 6 km

SOURCE

NavCanada

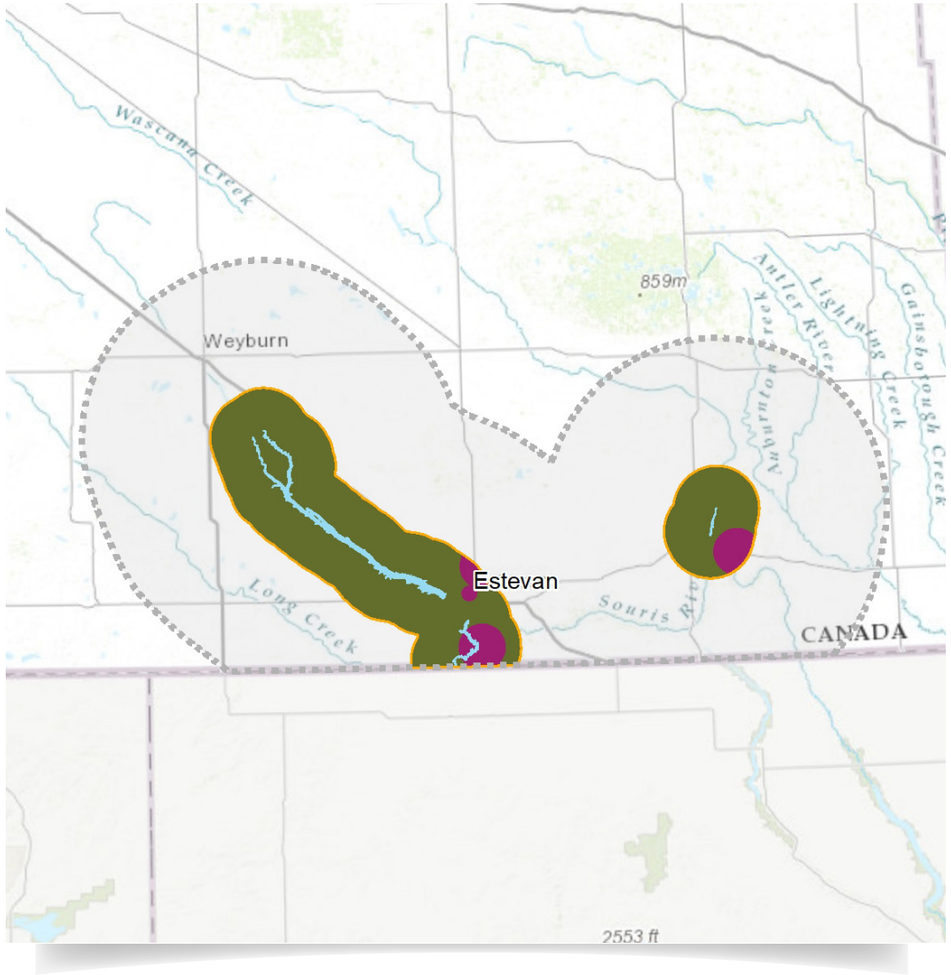
LAYER PRE-PROCESSING AND COMMENTS

Query radius of aerodromes. Remove features with a radius greater than 6 km. No additional buffer added.

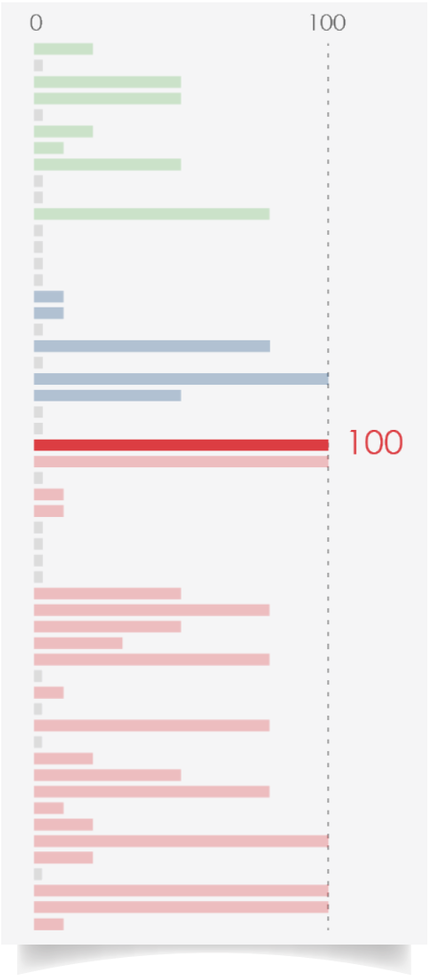
DESCRIPTION

The site should not be within airspace with a radius of less than 6 km. Commercial airports and non-commercial service airports, aerodromes, and heliports are included. Aerodrome Airspace areas from the Saskatchewan Government web mapping service were used.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



AIRSPACE - ADVISORY

Minimize encroachment on advisory restricted airspace (CYA)

SOURCE

Saskatchewan Ministry of Environment Nav Canada 2016

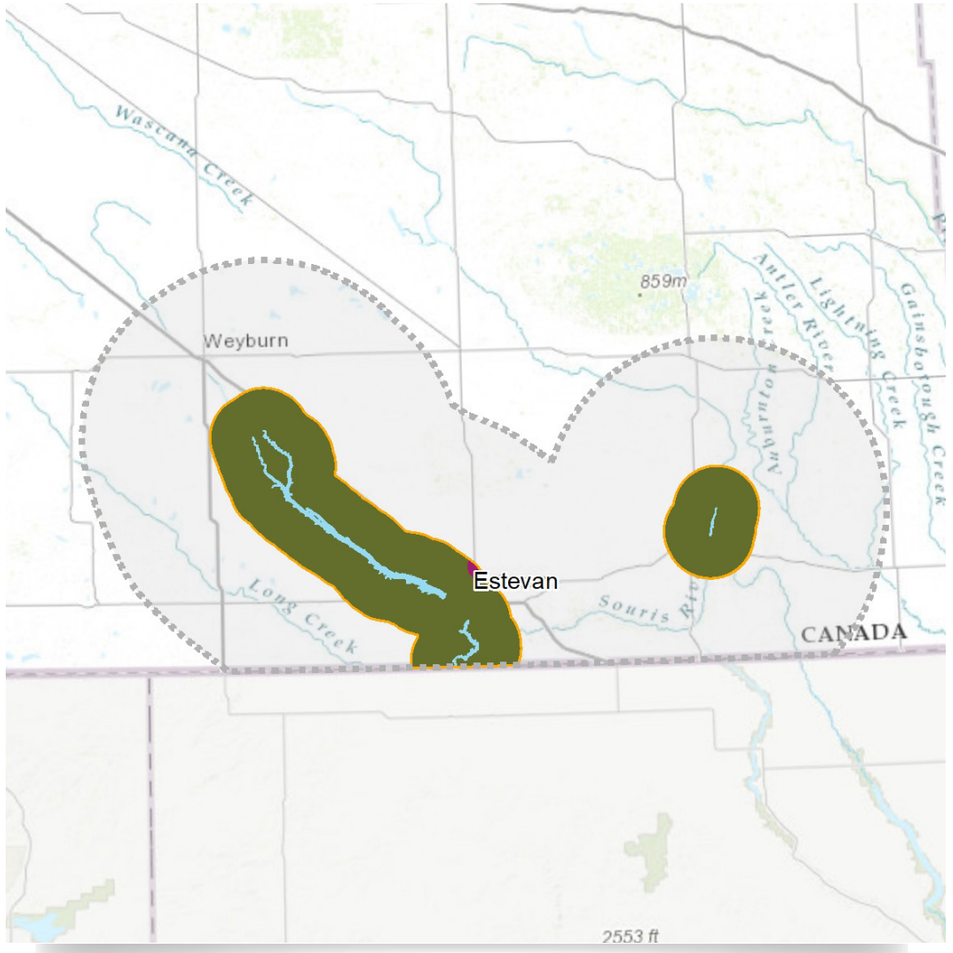
LAYER PRE-PROCESSING AND COMMENTS

Query CYA, no buffer added.

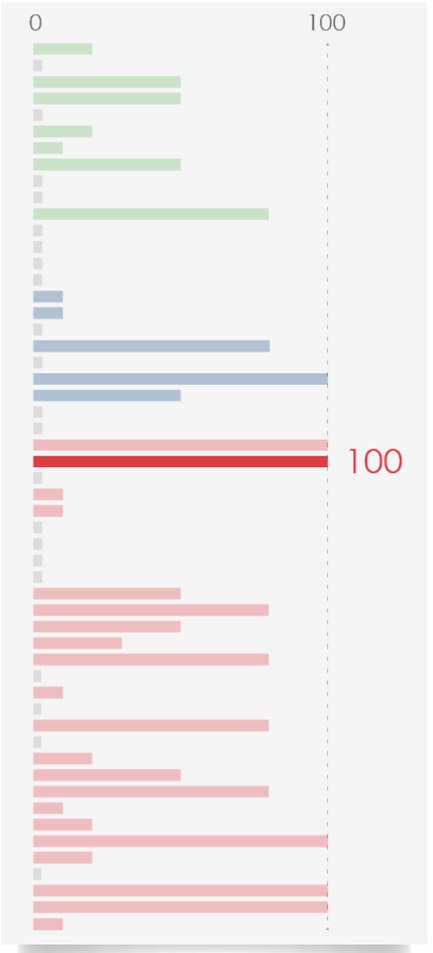
DESCRIPTION

Includes Class F federal airspace advisory (CYA) airspace reserved for civilian pilot training, emergency services and/or air ambulance operations.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



AIRSPACE - RESTRICTED

Avoid encroaching on federally restricted airspace (CYR)

SOURCE

Saskatchewan Ministry of Environment Nav Canada 2016

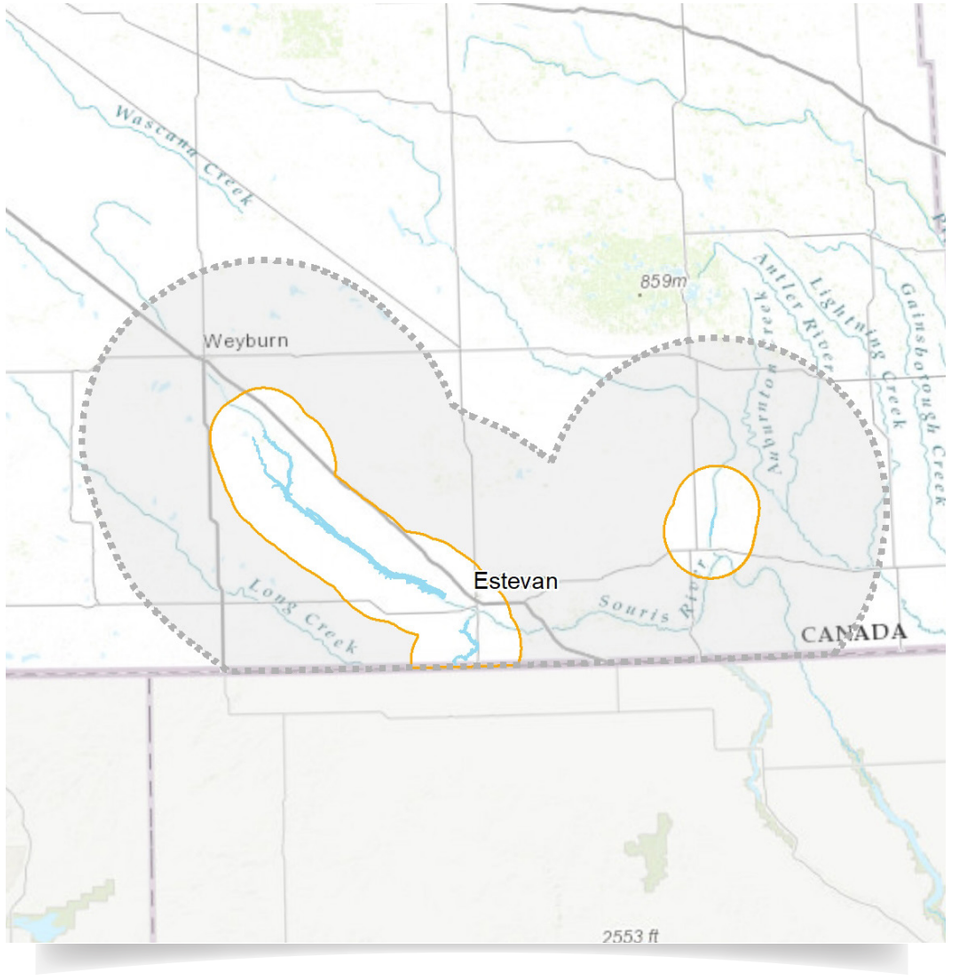
LAYER PRE-PROCESSING AND COMMENTS

Query CYR. Exclusion, no buffer added.

DESCRIPTION

Includes federally restricted Class F airspace (CYR) for military training, correctional services, emergency services and within 3 nautical miles (5.6 km) of airports or any certified airport listed in the Canadian Flight Supplement.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING

DAMS

Avoid proximity to dam sites

SOURCE

Water Security Agency (WSA)

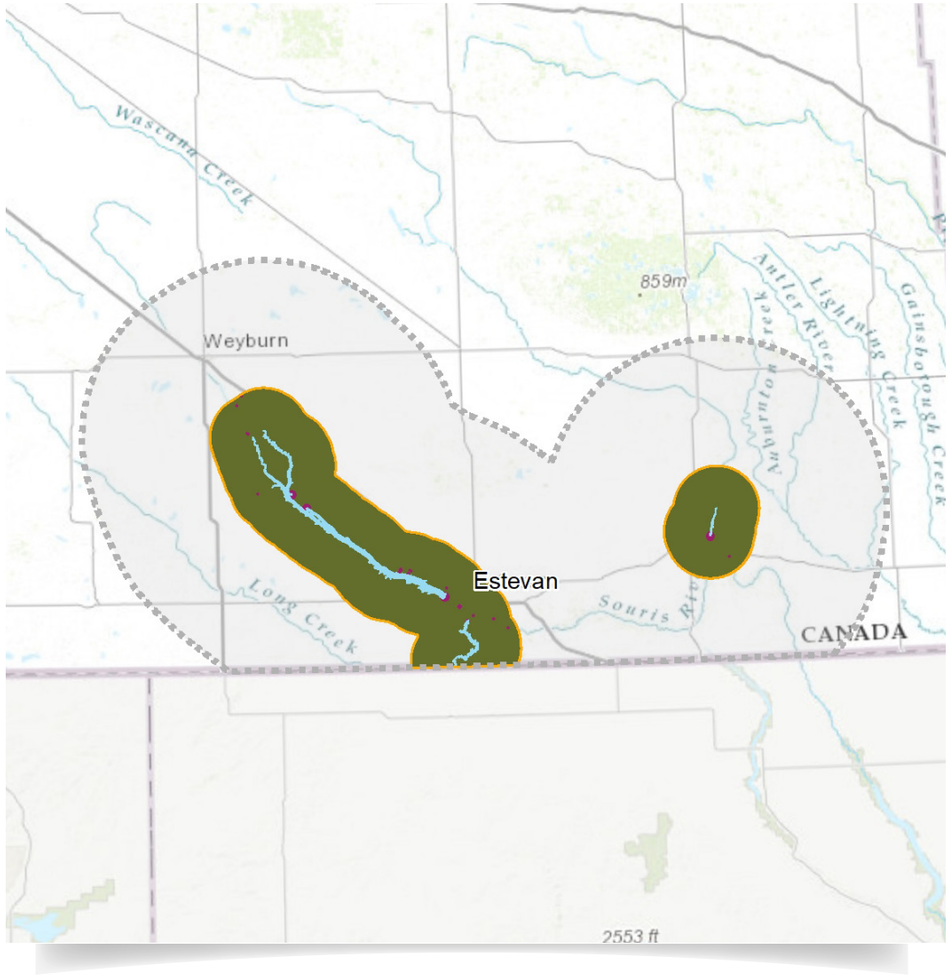
LAYER PRE-PROCESSING AND COMMENTS

Combine “WSA Dams” and “Dams” datasets. Consider major or non major WSA dams, owner of other dams and imagery to assign 250 m, 500 m or 1 km setback.

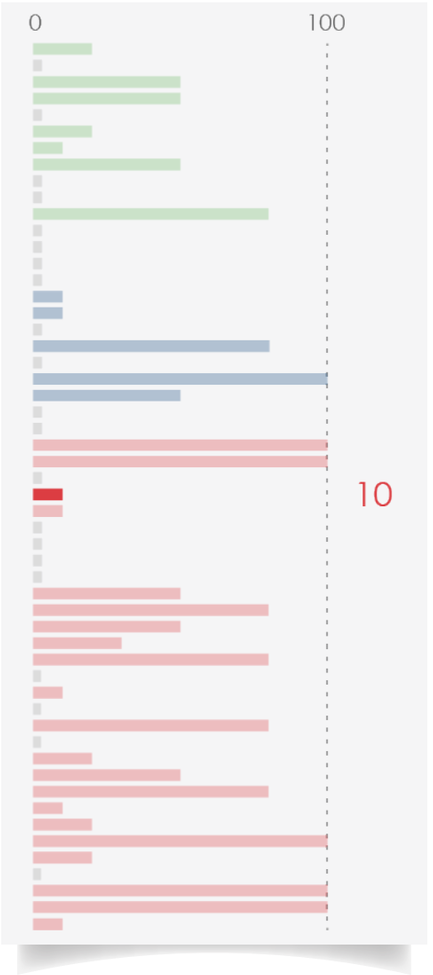
DESCRIPTION

SMR can be sited within a few km of dams on reservoirs but not in close proximity. Dams were categorized for different setback distances by a subject matter expert knowledgeable of Saskatchewan dams. More detailed hazard evaluations should be done to assess risk. Additional guidance on establishing minimum distances from these sites is provided in the US NRC Regulatory Guide 1.91 [23]

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



DROUGHT POTENTIAL

Avoid areas with drought potential

SOURCE

Environment and Climate Change Canada
Canadian Climate Normals 1981 - 2010

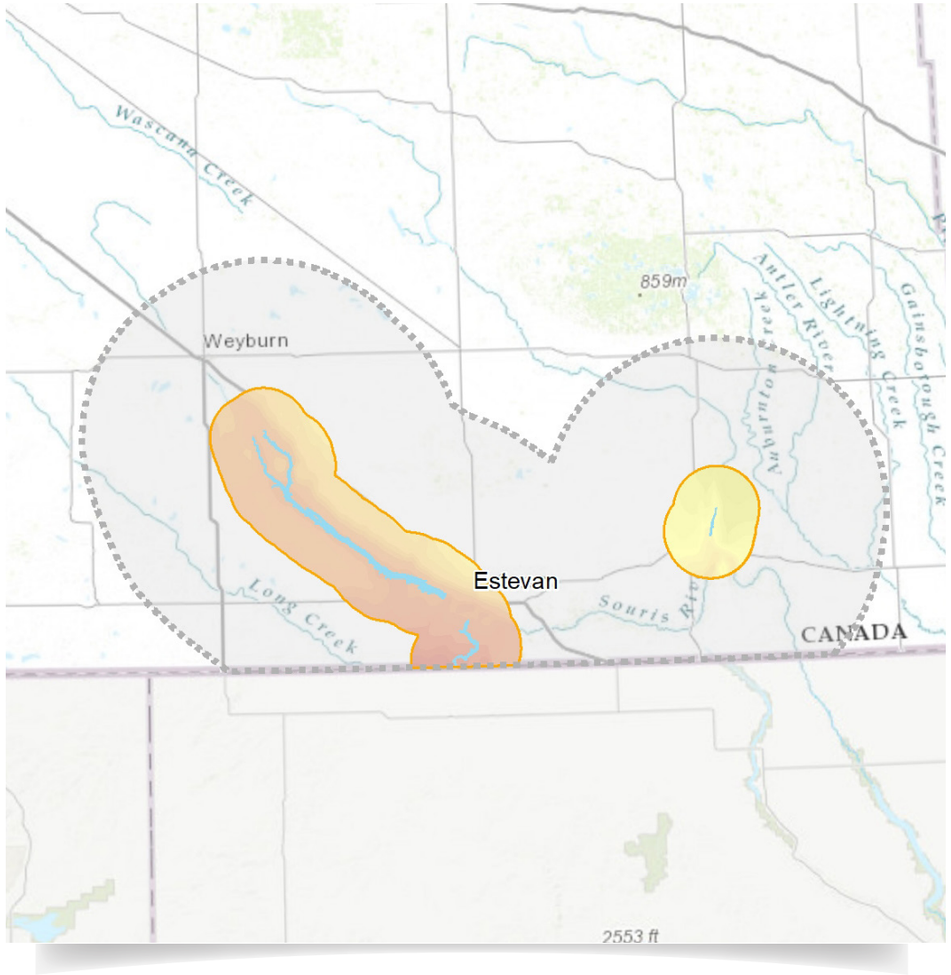
LAYER PRE-PROCESSING AND COMMENTS

Larger Climate Moisture Index (CMI) values are more suitable.

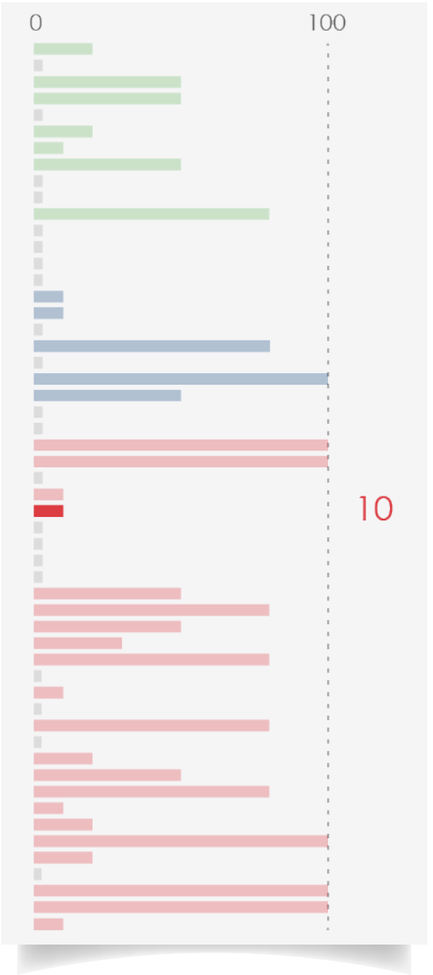
DESCRIPTION

Site shall not be situated in an area with high drought frequency. The Climate Moisture Index (CMI) was calculated as the difference between annual precipitation and potential evapotranspiration (PET) – the potential loss of water vapour from a landscape covered by vegetation. Positive CMI values indicate wet or moist conditions. Negative CMI values indicate dry conditions. The CMI is well suited to evaluating moisture conditions in dry regions such as the Prairie Provinces and has been used for other ecological studies. This indicator may be representative of the long term climate risk due to climate change.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



EXISTING POWER PLANTS

Prefer sites closer to existing power plants

SOURCE

SaskPower

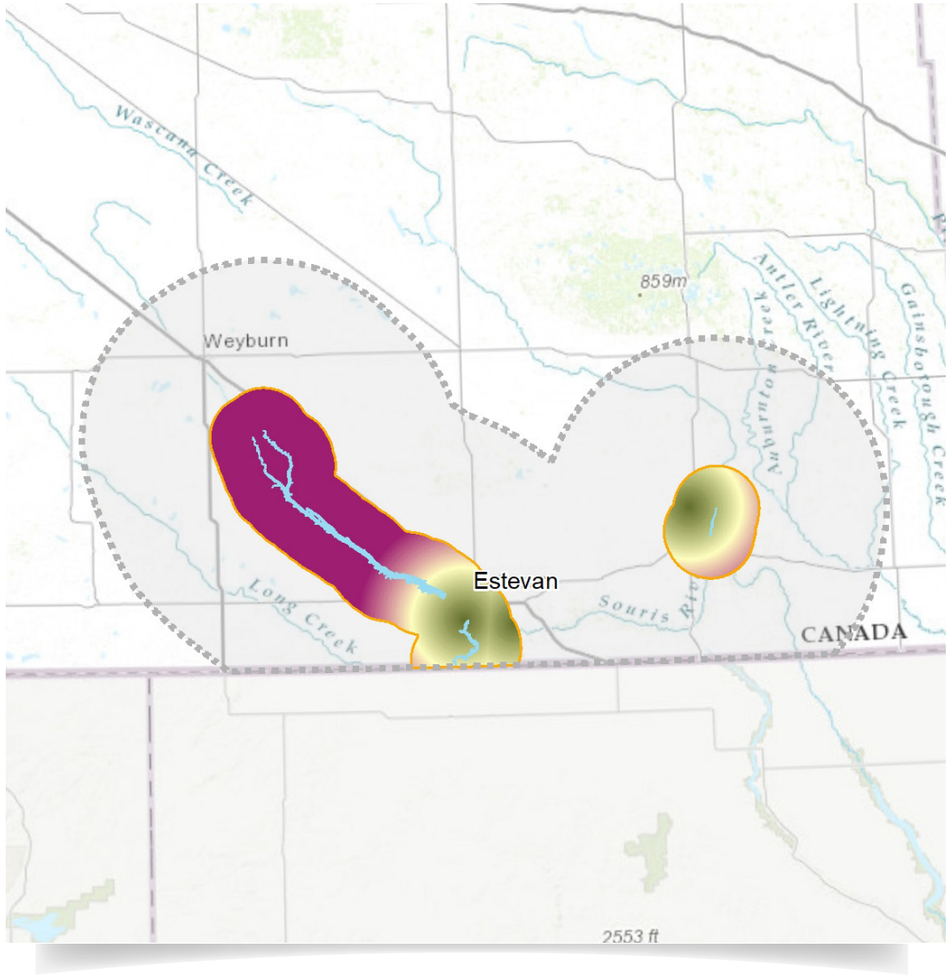
LAYER PRE-PROCESSING AND COMMENTS

Zero - 25 km distance decay buffer added.

DESCRIPTION

This indicator is neutral (a placeholder) to the model results. Assessment needed.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING

BACKGROUND

FAULTS

Avoid areas with active faults

SOURCE

Saskatchewan Mining and Petroleum GeoAtlas, Faults 250K

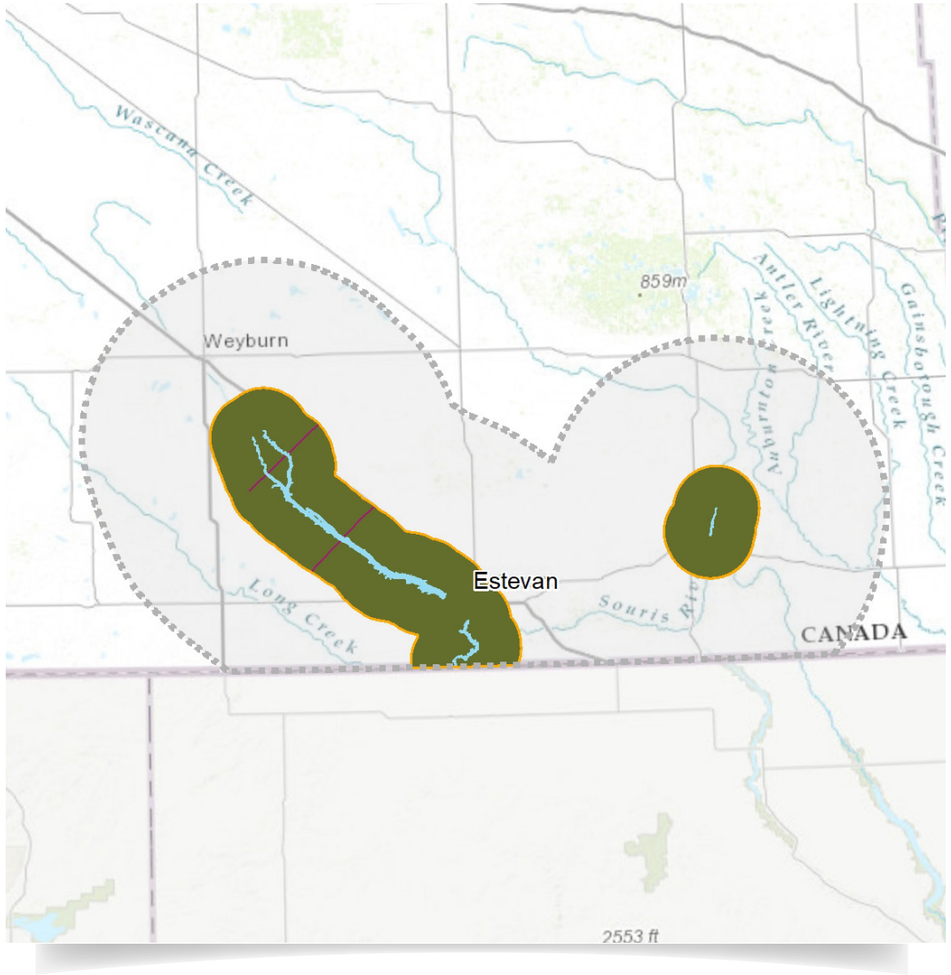
LAYER PRE-PROCESSING AND COMMENTS

Neutral

DESCRIPTION

The US NRC Appendix A to Part 100 includes Table 1 which presents the minimum length of faults to be considered as a function of distance from site. Detailed studies are required during local siting to determine actual fault data to be used.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING

BACKGROUND

GAS STORAGE

Avoid areas of gas storage in salt caverns

SOURCE

SaskEnergy, confidential data

LAYER PRE-PROCESSING AND COMMENTS

Confidential data to be screened separately.

DESCRIPTION

Storage of hydrocarbons and CO2 occur at certain locations in underground reservoirs and salt caverns. These locations are not suitable for locating an SMR. Map image is intentionally left blank.

GEOGRAPHIC EXTENT

WEIGHT FOR SMR SITING

HAZARDOUS FACILITIES

Avoid siting adjacent to hazardous facilities

SOURCE

IHS Markit Canada ULC Environment and Climate Change Canada, National Pollutant Release Inventory (NPRI)

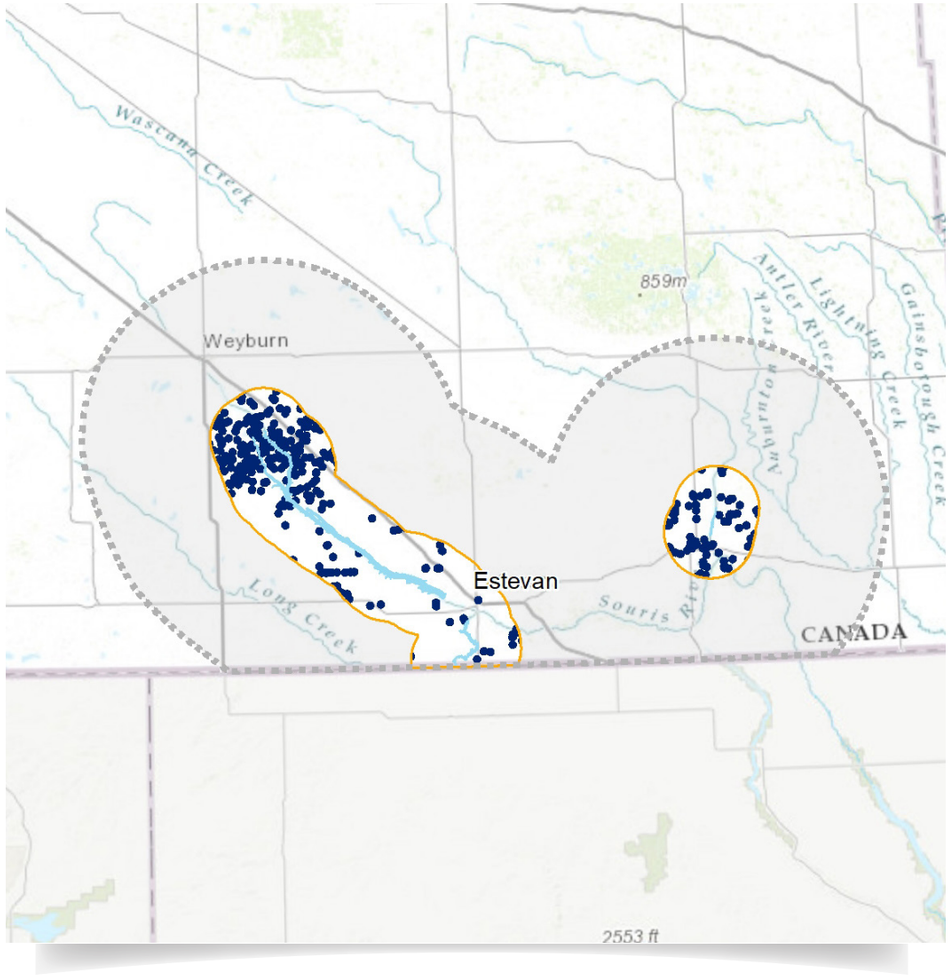
LAYER PRE-PROCESSING AND COMMENTS

1 km buffer

DESCRIPTION

Major facilities include manufacturing, chemical, petrochemical, agricultural, refining, and mining. Exclude existing power generation facilities. Exclude industrial solid depot, domestic waste and liquid waste.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING

HAZARDOUS FACILITIES PROXIMITY

Avoid proximity to hazardous facilities

SOURCE

IHS Markit Canada ULC Environment and Climate Change Canada, National Pollutant Release Inventory (NPRI)

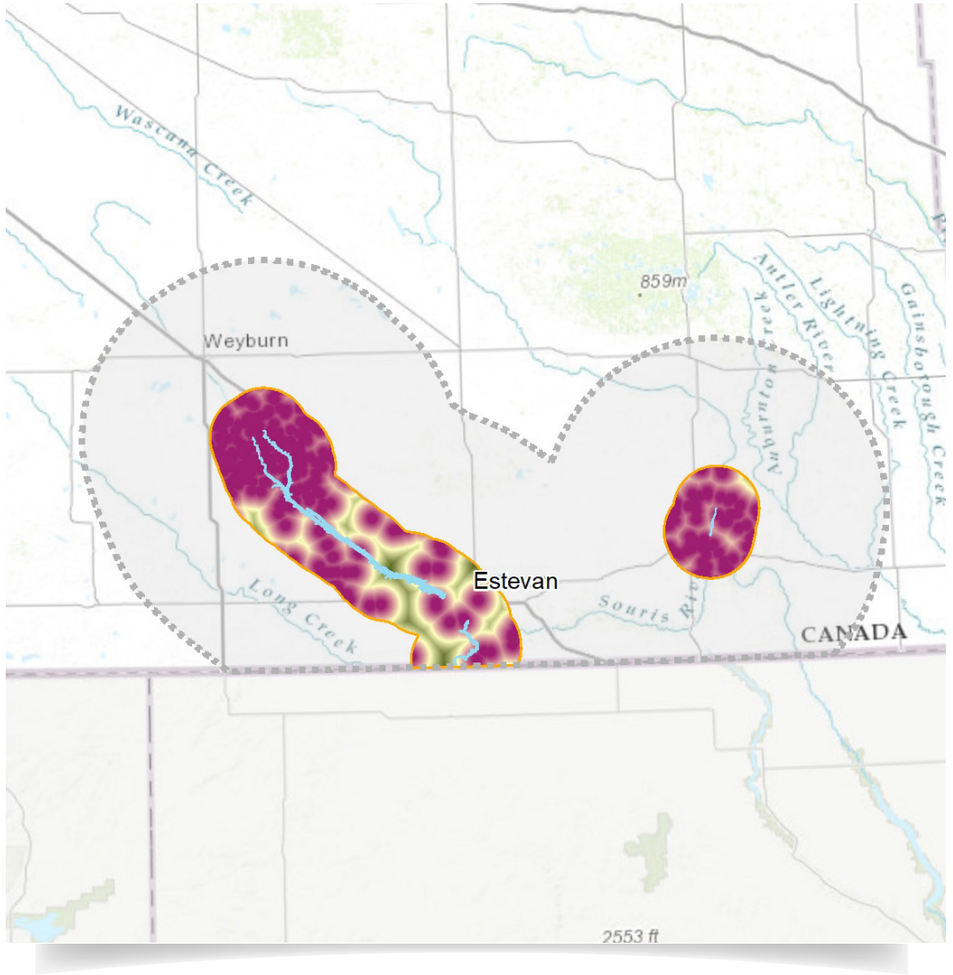
LAYER PRE-PROCESSING AND COMMENTS

8 km distance decay.

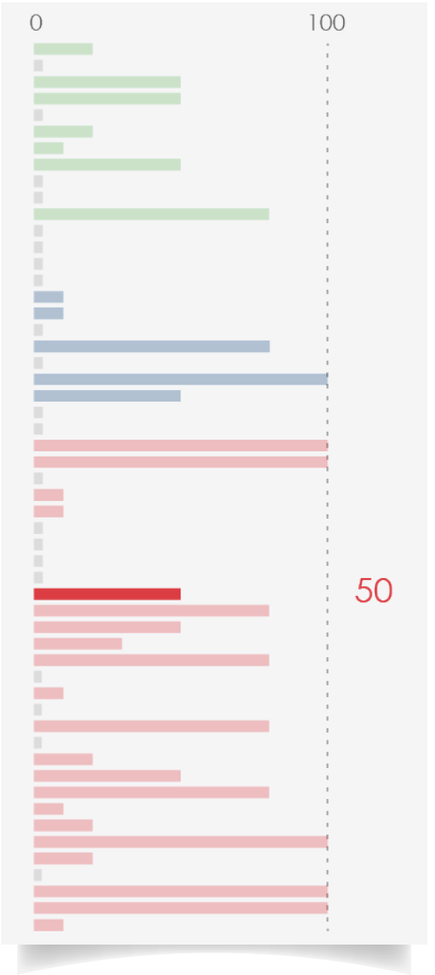
DESCRIPTION

Major facilities include manufacturing, chemical, petrochemical, agricultural, refining, and mining. Exclude existing power generation facilities. Exclude industrial solid depot, domestic waste and liquid waste.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



HIGH PRESSURE PIPELINE PROXIMITY

Avoid proximity to high pressure pipelines

SOURCE

IHS Markit Canada ULC Water Security Agency (WSA), Geomatics unit.

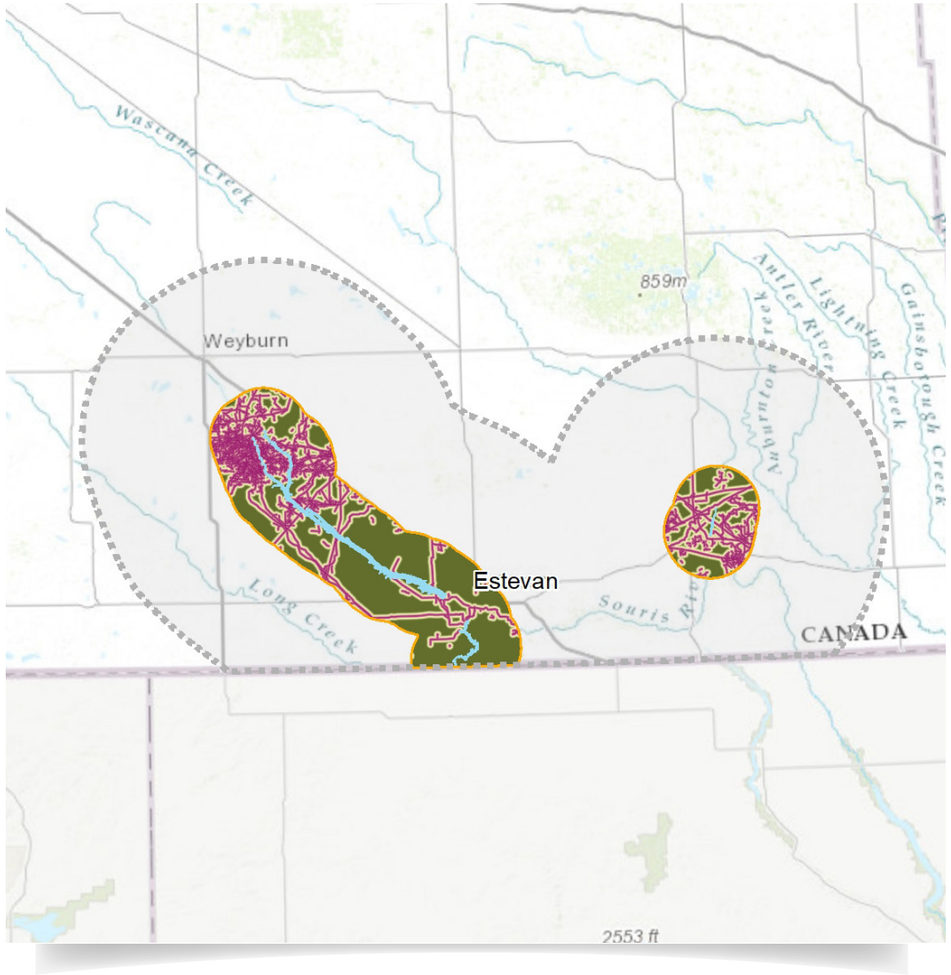
LAYER PRE-PROCESSING AND COMMENTS

Distance decay buffer to 1 km added.

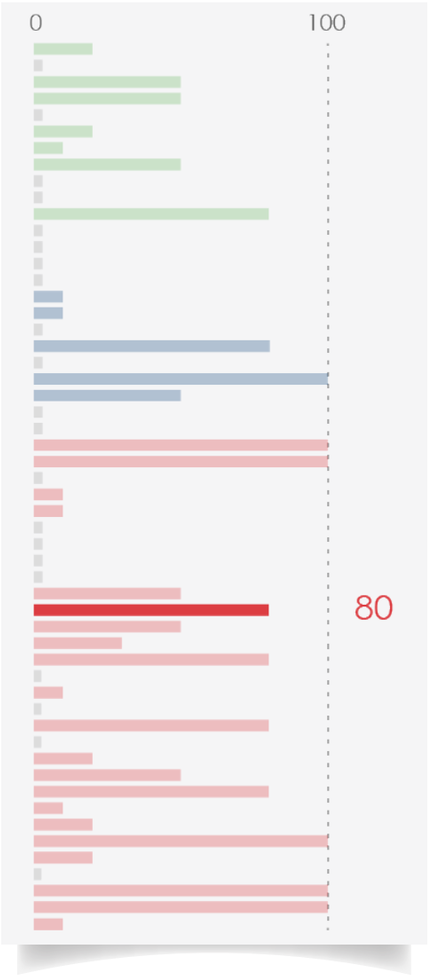
DESCRIPTION

The site should not be in proximity to high pressure hydrocarbon pipelines.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



HIGHWAY PROXIMITY - PRIMARY

Prefer areas within 1 km of primary weight highways

SOURCE

Saskatchewan Ministry of Highways

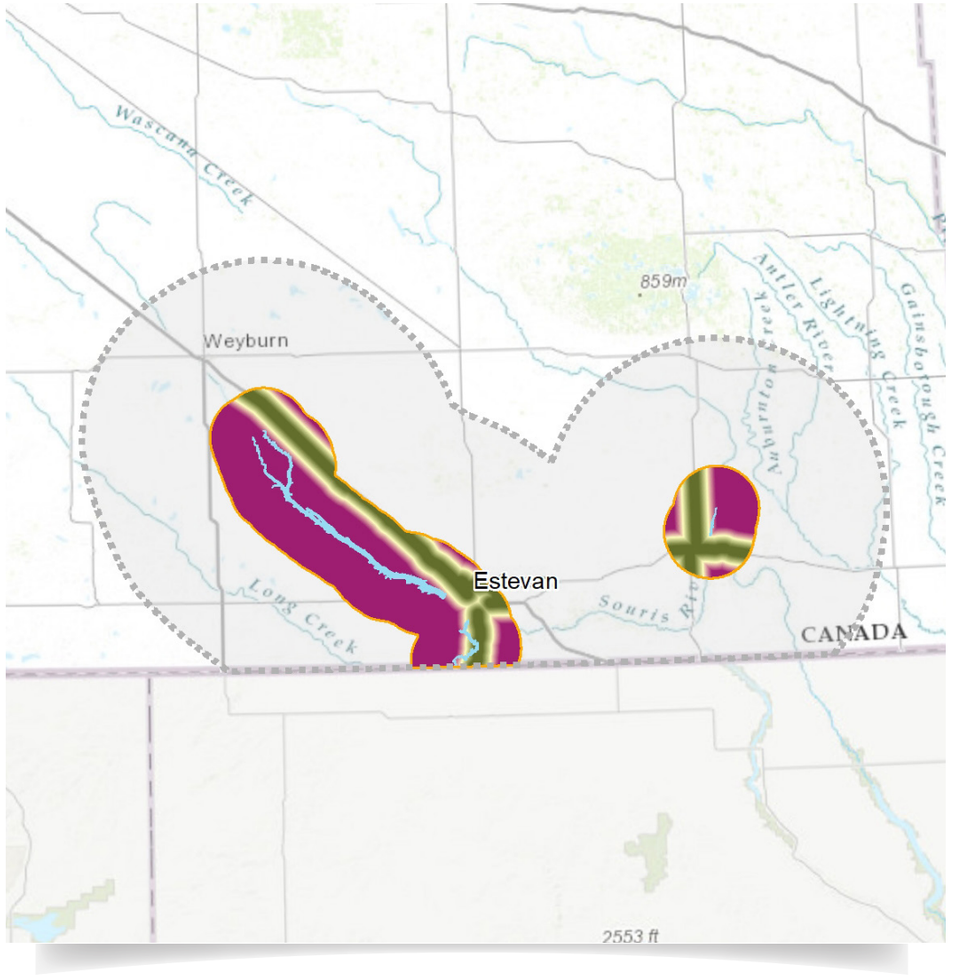
LAYER PRE-PROCESSING AND COMMENTS

Classify highways based on 2021 weight classification map. Only include Primary Weight and Primary Weight by Ministerial Order. Suitability from 0-1 km is high (100), 1 - 5 km distance decay buffer added.

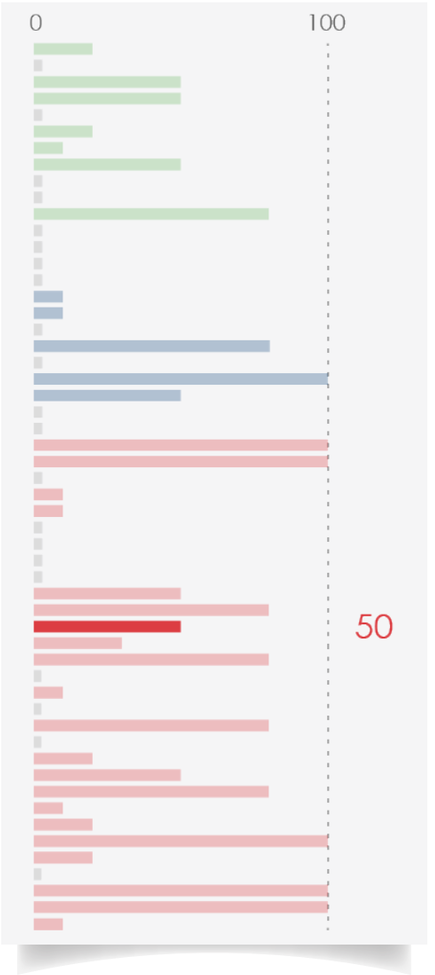
DESCRIPTION

The site has multimodal transportation infrastructure access for heavy equipment during all life cycles of the project. Roads should be designed to withstand heaviest shipment loads from the SMR facility, which will be during construction. Only year round primary weight highways are considered. These are also favorable as they are less prone to flooding.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



HIGHWAY PROXIMITY - SECONDARY

Prefer areas within 1 km of secondary weight highways

SOURCE

Saskatchewan Ministry of Highways

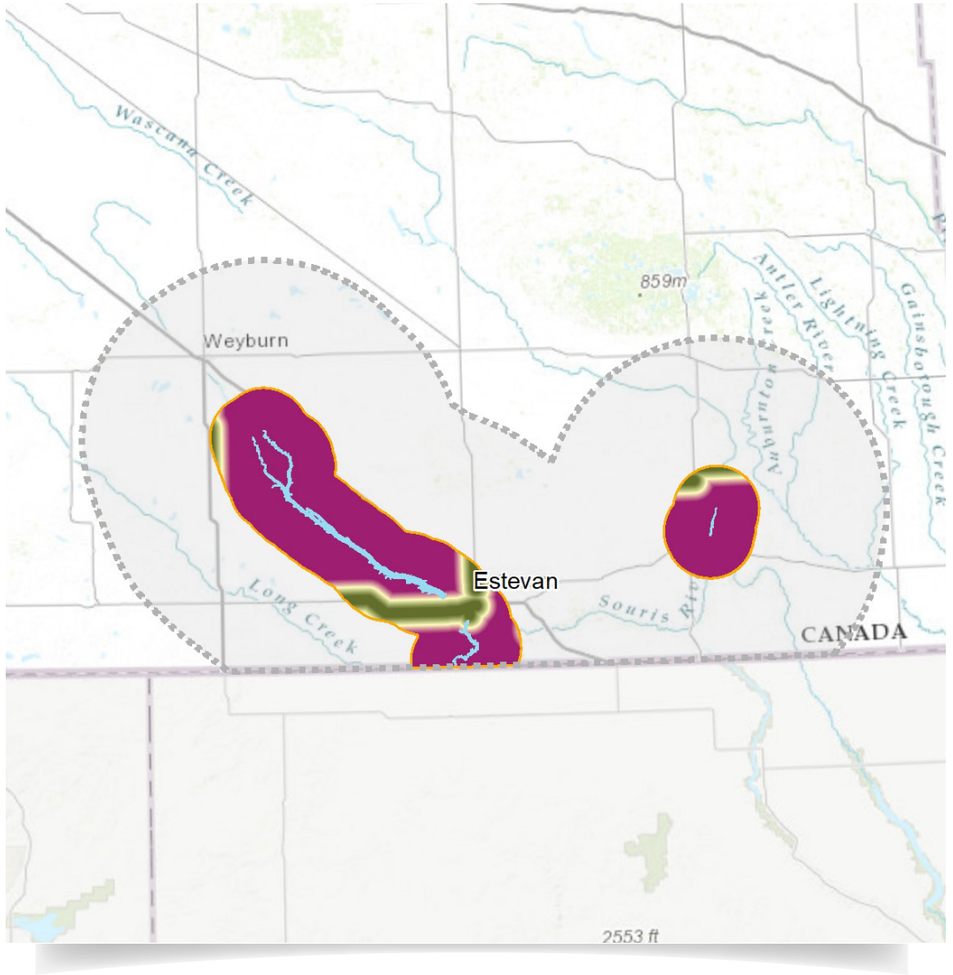
LAYER PRE-PROCESSING AND COMMENTS

Only include secondary weight highways, 9-month primary weight highways, and 8,000 kg restricted highways. Suitability from 0-1 km is high (100), 1-5 km distance decay buffer added.

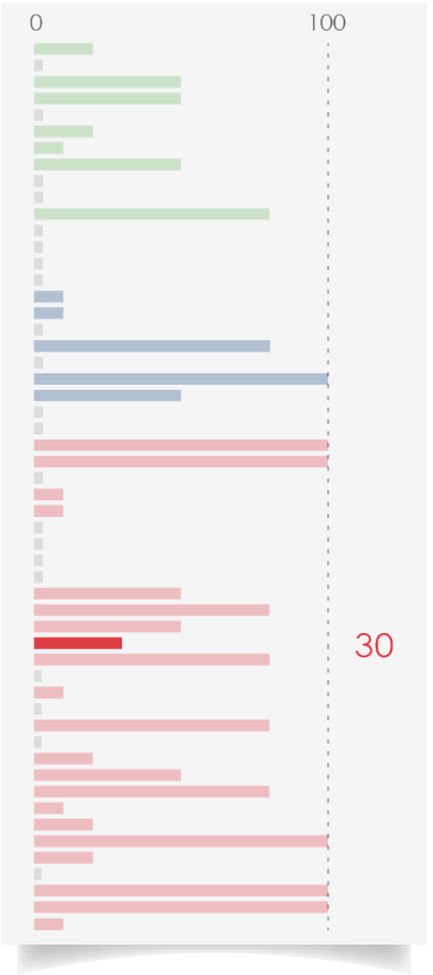
DESCRIPTION

Secondary roads are important for access during operation and during states of emergency. Secondary weight highways, 9 month primary weight highways and 8,000 kg restricted highways would be in better condition than highways not included on the weight classification map.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



HISTORICAL FIRES

Avoid areas with high potential for severe fires

SOURCE

Saskatchewan Public Safety Agency (SPSA)
Saskatchewan Ministry of Environment, Wildfire Management Branch

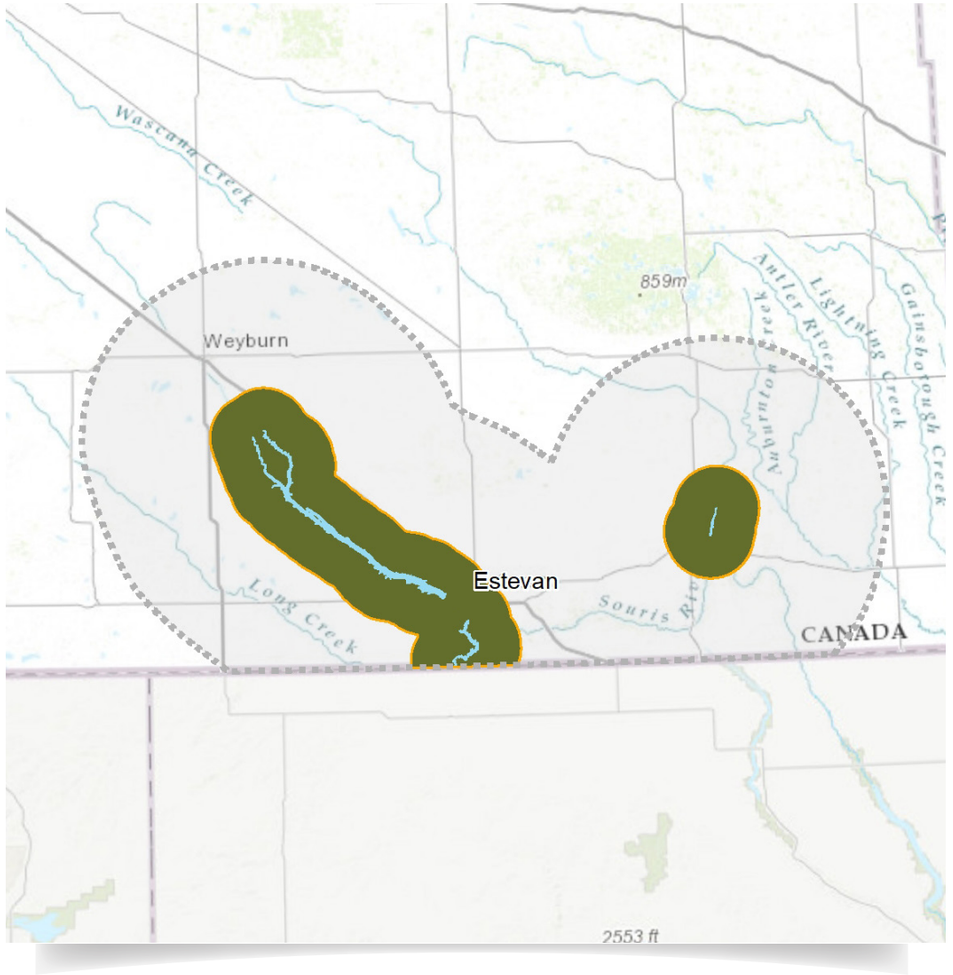
LAYER PRE-PROCESSING AND COMMENTS

Dissolve historical wildfires. Kernel density on historical wildfire outlines.

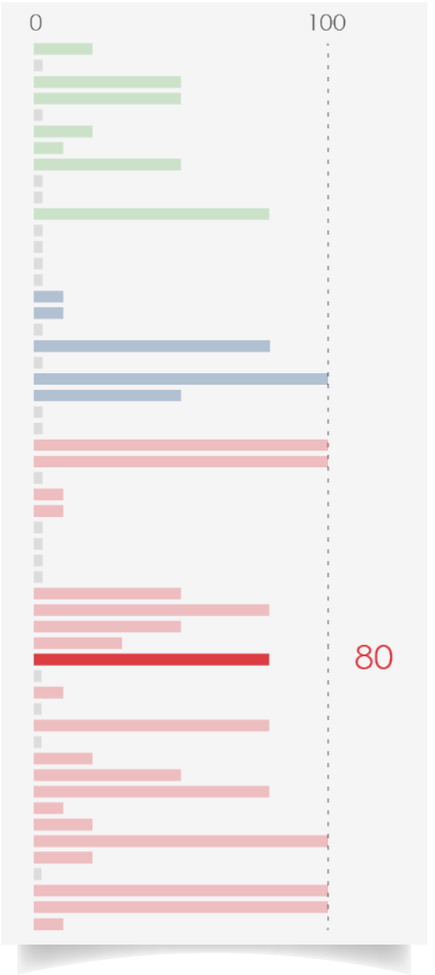
DESCRIPTION

The site should not be situated in an area with high fire frequency as indicated by previous, historical fire activity.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



LINEAR INFRASTRUCTURE

Avoid siting on existing linear infrastructure

SOURCE

Saskatchewan Ministry of Highways Geogratis, Natural Resources Canada (NRCan) SaskPower

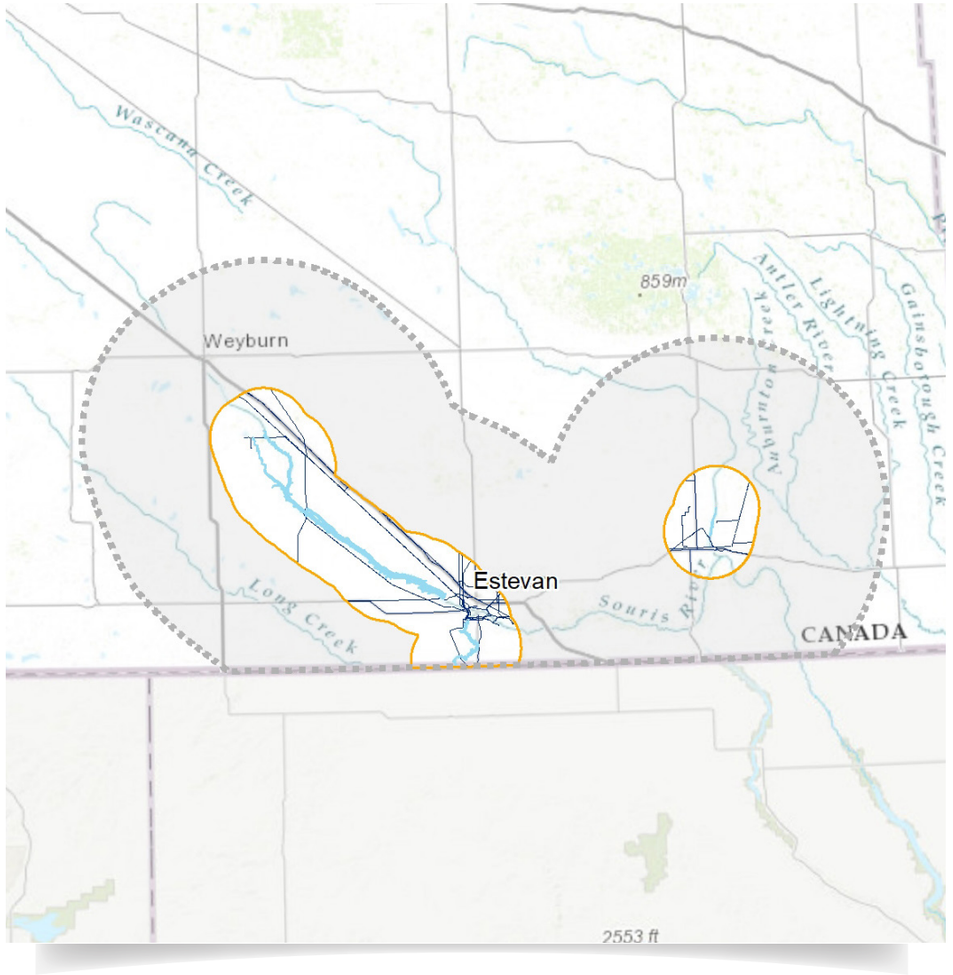
LAYER PRE-PROCESSING AND COMMENTS

Combine data sources. No buffer added to exclusion.

DESCRIPTION

The site should not be situated on top of existing linear infrastructure. Primary and secondary highways, railways and 72 kV and higher transmission lines are included.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING

MINING

Avoid proximity to Mines

SOURCE

Natural Resources Canada (NRCan), Lands and Minerals Sector, Saskatchewan Mining and Petroleum GeoAtlas, Saskatchewan Mining WMS

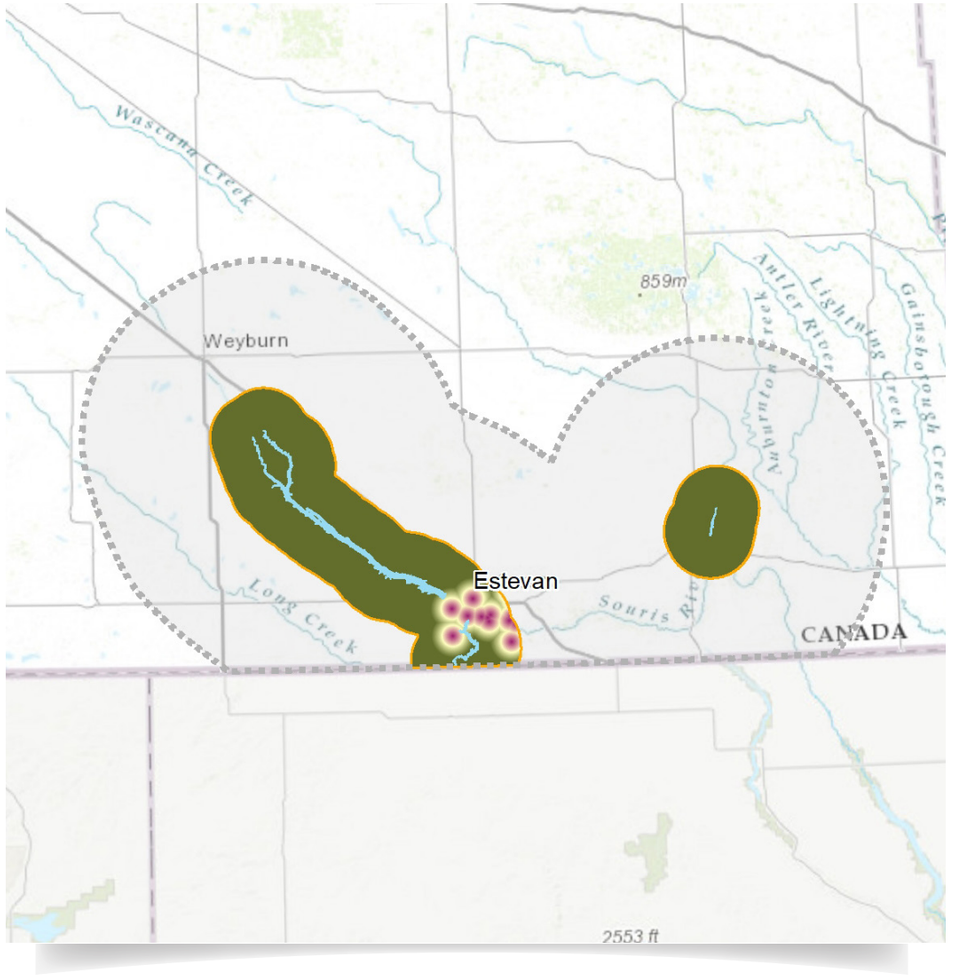
LAYER PRE-PROCESSING AND COMMENTS

5 km distance decay buffer added.

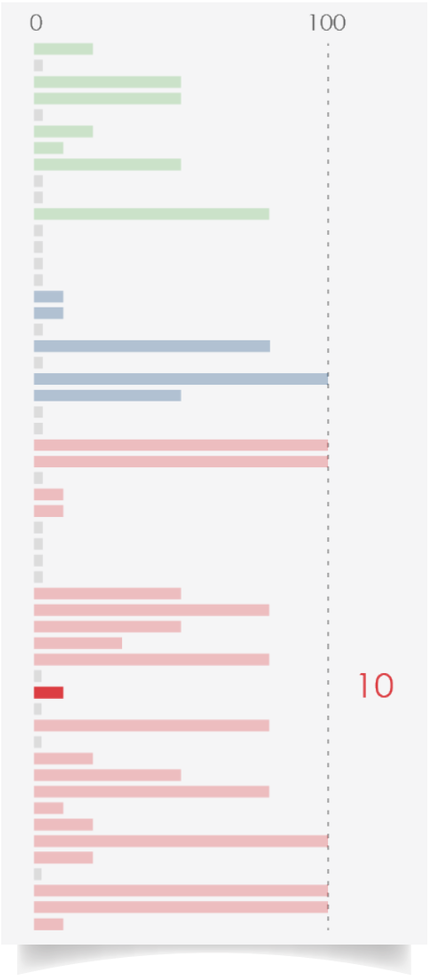
DESCRIPTION

The site should not be situated on or near active, abandoned, transitional or operating mines.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



OIL AND GAS WELLS

Avoid siting on oil and gas wells

SOURCE

IHS Markit Canada ULC Saskatchewan WMS

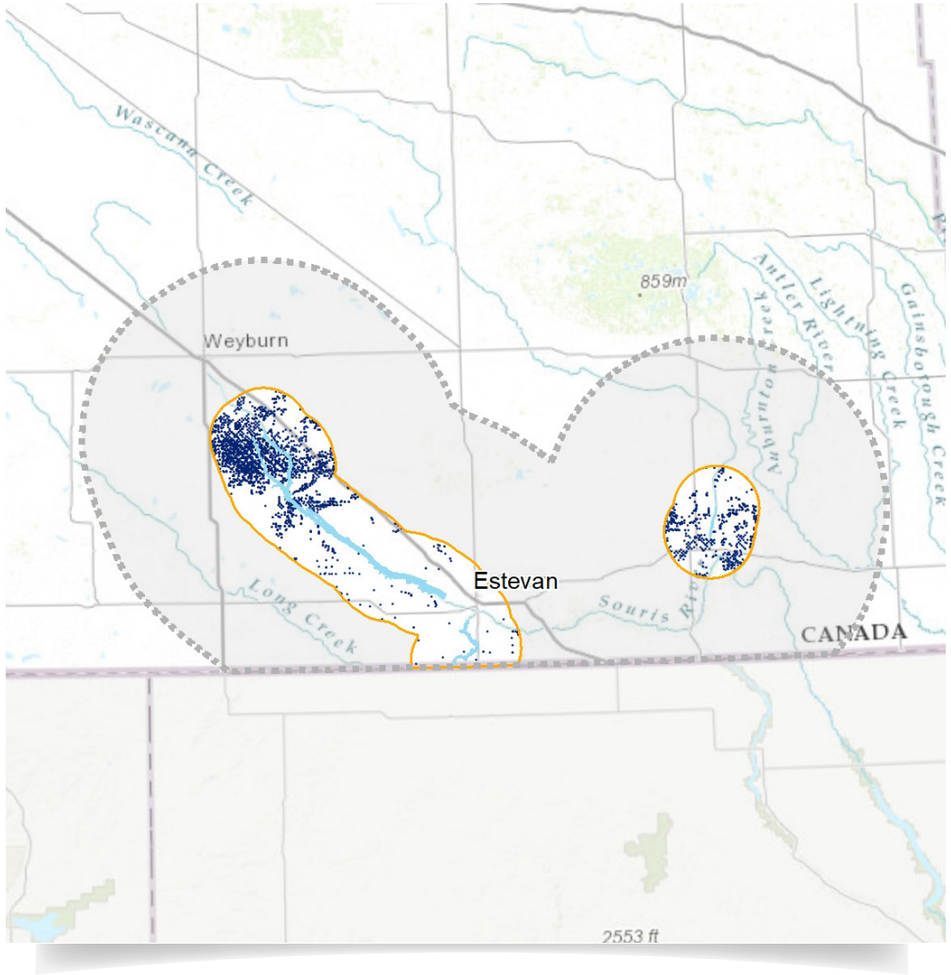
LAYER PRE-PROCESSING AND COMMENTS

Use surface location for non-vertical wells. Retain these status fields: Active, Downhole, Planned, Suspended and Re-entered. A 500 m buffer added to exclusion.

DESCRIPTION

Oil and gas developments Including processing facilities, wells and disposal wells are not suitable for locating an SMR.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING

OIL AND GAS WELLS PROXIMITY

Avoid proximity to oil and gas wells

SOURCE

IHS Markit Canada ULC Saskatchewan WMS

LAYER PRE-PROCESSING AND COMMENTS

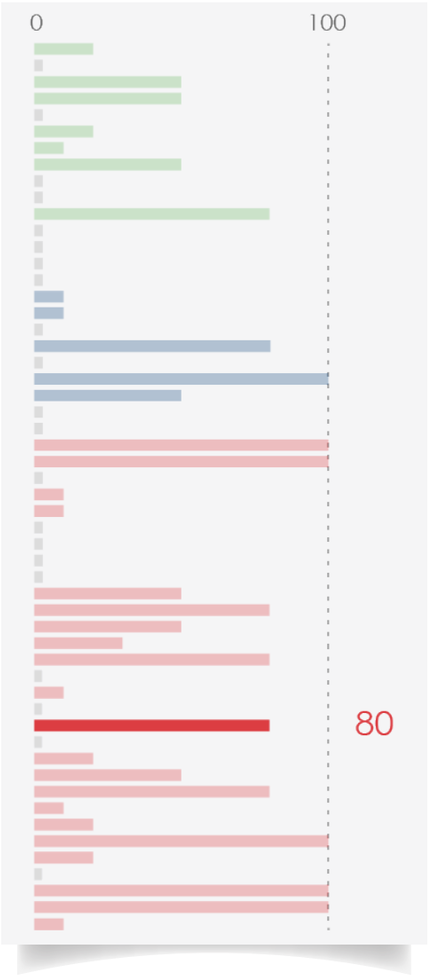
Distance decay to 1 km buffer added.

DESCRIPTION

The site should not be in close proximity to oil and gas wells.

GEOGRAPHIC EXTENT

WEIGHT FOR SMR SITING



PIPELINES

Avoid siting on high pressure and water pipelines

SOURCE

IHS Markit Canada ULC Water Security Agency (WSA), Geomatics unit.

LAYER PRE-PROCESSING AND COMMENTS

Exclusion. 500 m buffer added.

DESCRIPTION

The site should not be near high pressure hydrocarbon or water pipelines.

GEOGRAPHIC EXTENT

WEIGHT FOR SMR SITING

RAILWAY PROXIMITY - MAINLINE

Prefer sites closer to railway access

SOURCE

Geogratis, Natural Resources Canada (NRCan)

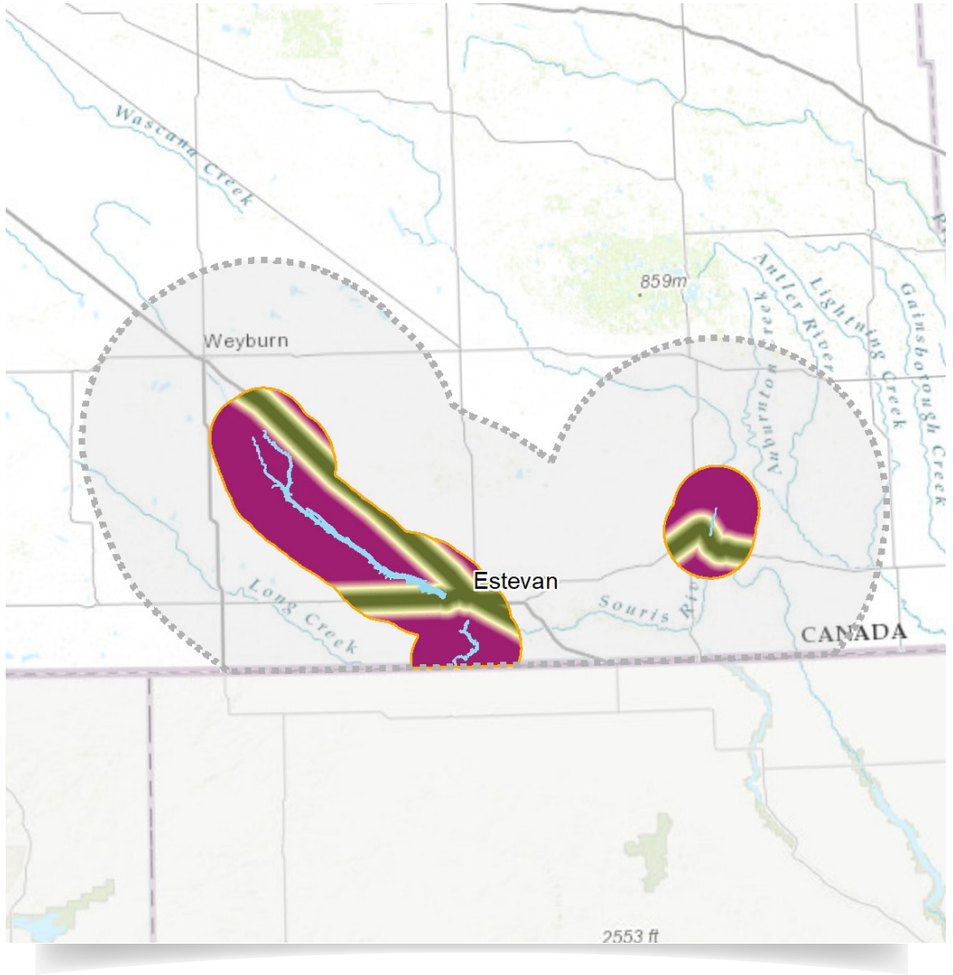
LAYER PRE-PROCESSING AND COMMENTS

Remove "discontinued" fields and spurs. Suitability from 0-1 km is high (100), 1 - 5 km distance decay buffer added.

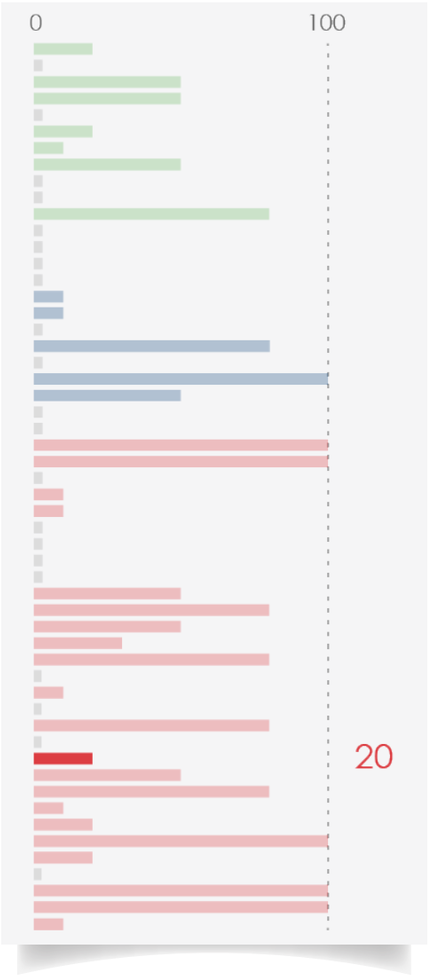
DESCRIPTION

The site should have multimodal transportation infrastructure access for heavy equipment during all life cycles of the project; roads and railways are within 2 km of the site. Interprovincial railways are less preferred than spurs.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



RAILWAY PROXIMITY - SPURS

Prefer sites closer to railway access

SOURCE

Geogratis, Natural Resources Canada (NRCan)

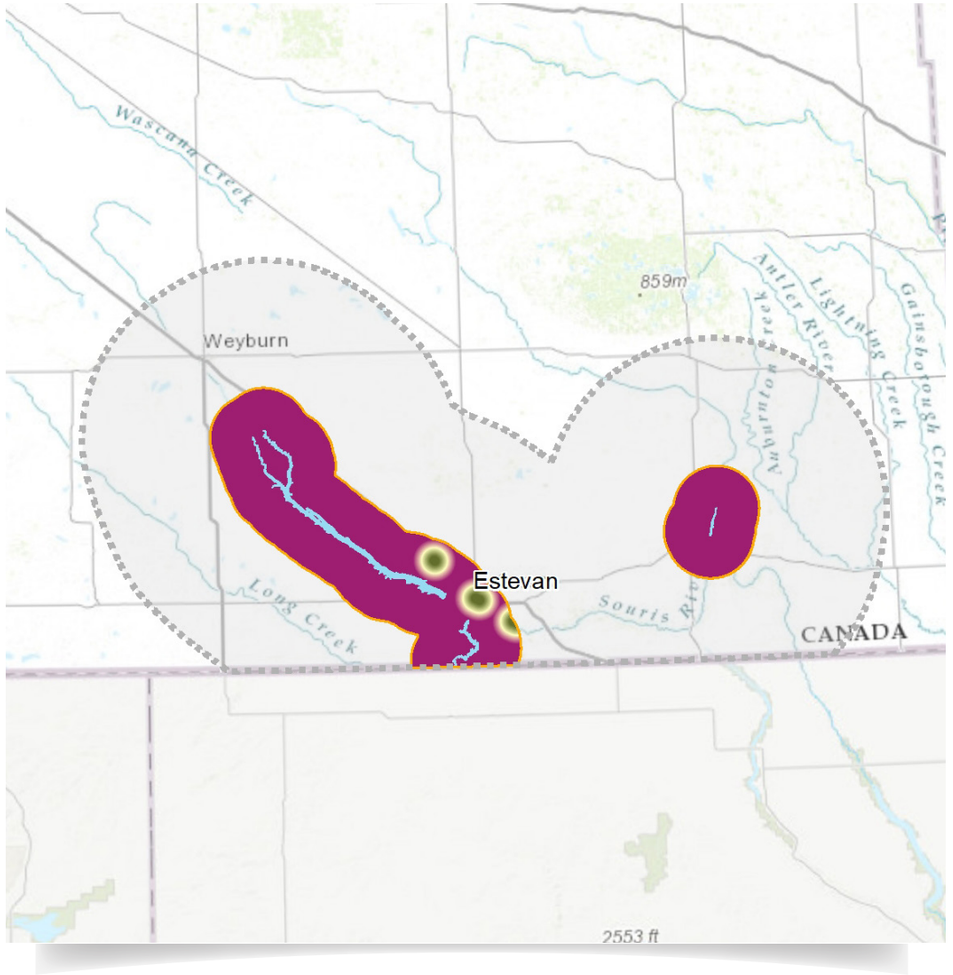
LAYER PRE-PROCESSING AND COMMENTS

Remove "discontinued" fields and retain spurs. Suitability from 0-1 km is high (100), 1 - 5 km distance decay buffer added.

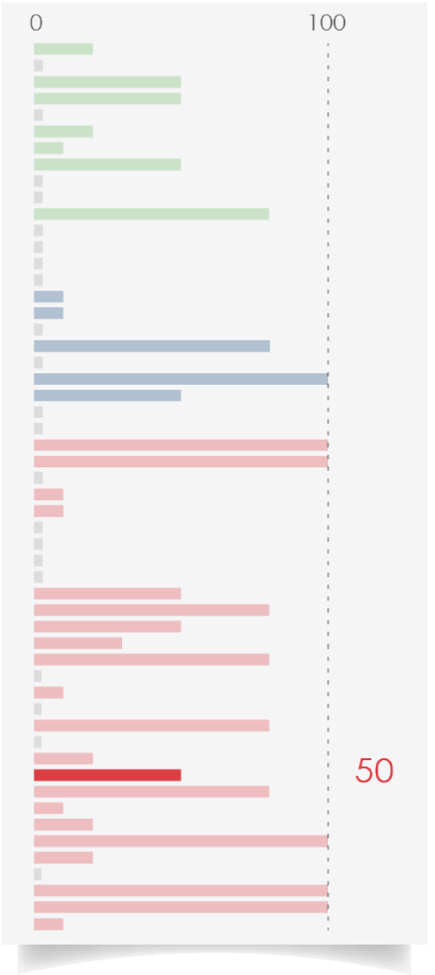
DESCRIPTION

The site should have multimodal transportation infrastructure access for heavy equipment during all life cycles of the project; roads and railways are within 2 km of the site. Railway spurs (lines with dead-ends) are preferred.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



REGIONAL POWER DEMAND

Prefer sites closer to regional demand for power

SOURCE

Information Services Corporation (ISC)

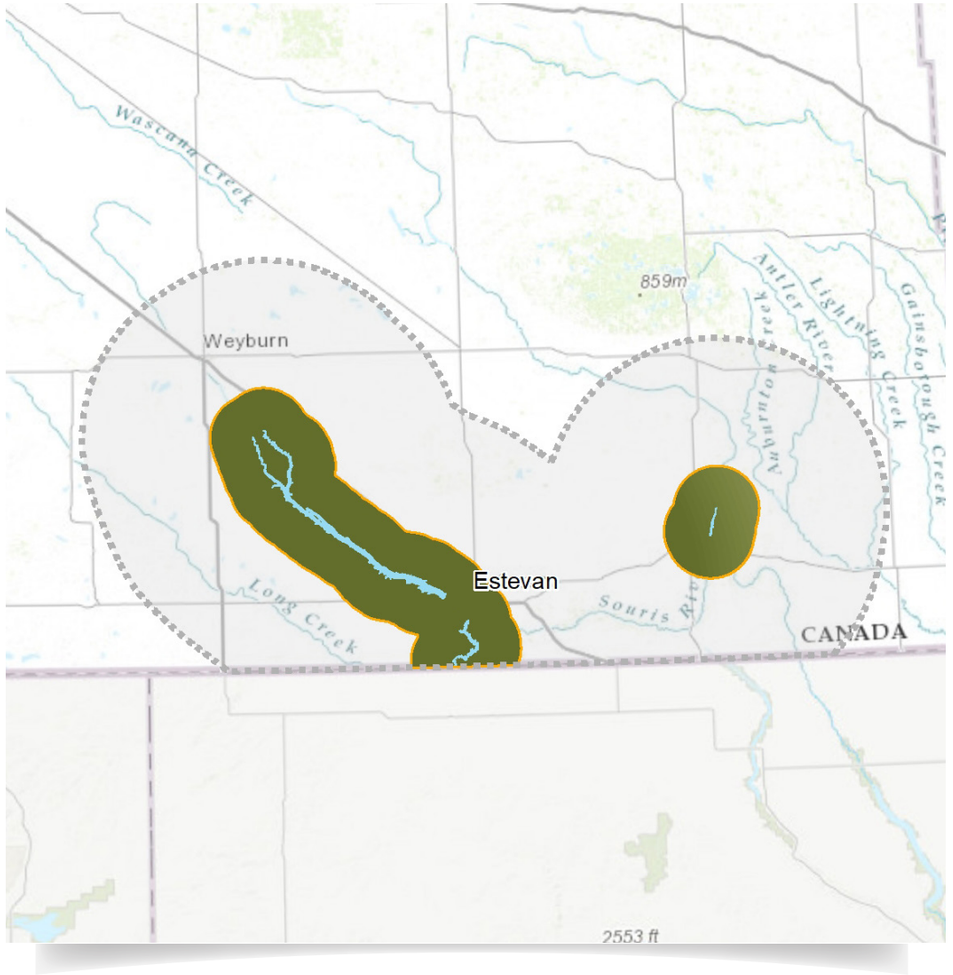
LAYER PRE-PROCESSING AND COMMENTS

Include Regina, Saskatoon, Estevan, Coronach and Weyburn from Urban Municipal Areas. High suitability within 50 km. Distance decay to 200 km.

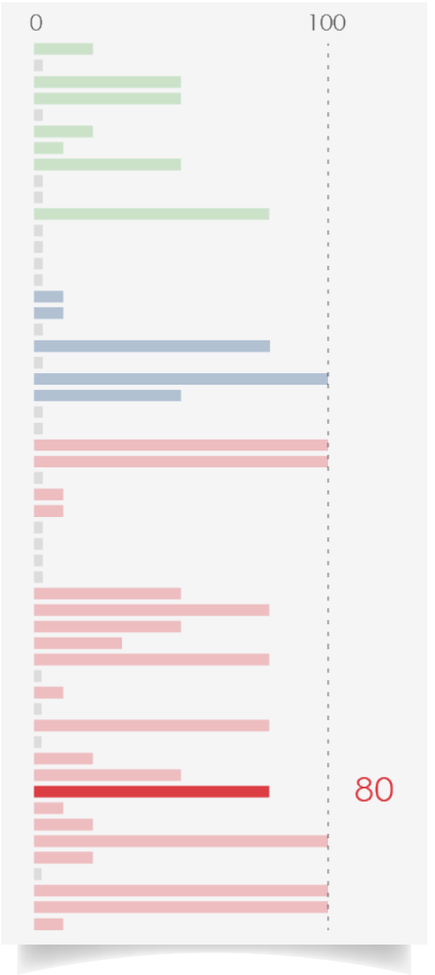
DESCRIPTION

Prefer sites with close proximity to major load centres and/or areas with significant planned generation retirement.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



SEISMIC HAZARD

Avoid areas of moderate to high seismic hazard

SOURCE

Geogratis, Natural Resources Canada (NRCan)

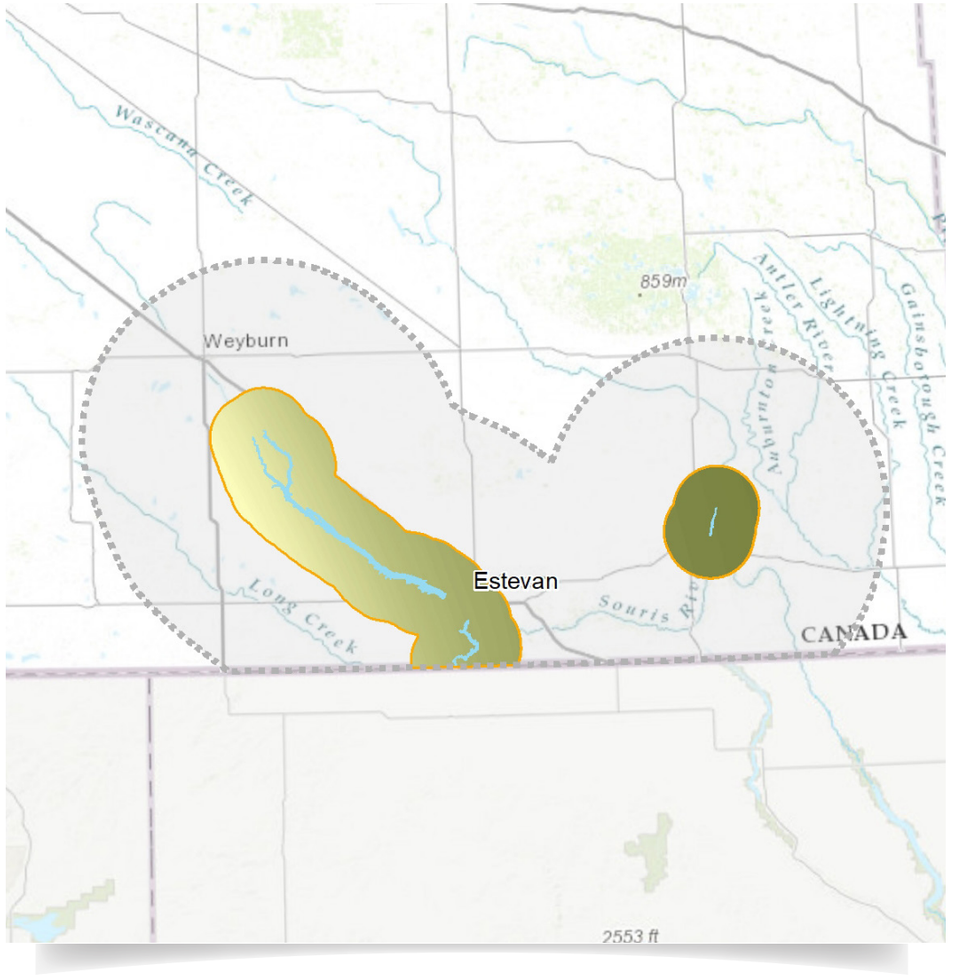
LAYER PRE-PROCESSING AND COMMENTS

Larger peak ground accelerations (PGA) values are less suitable.

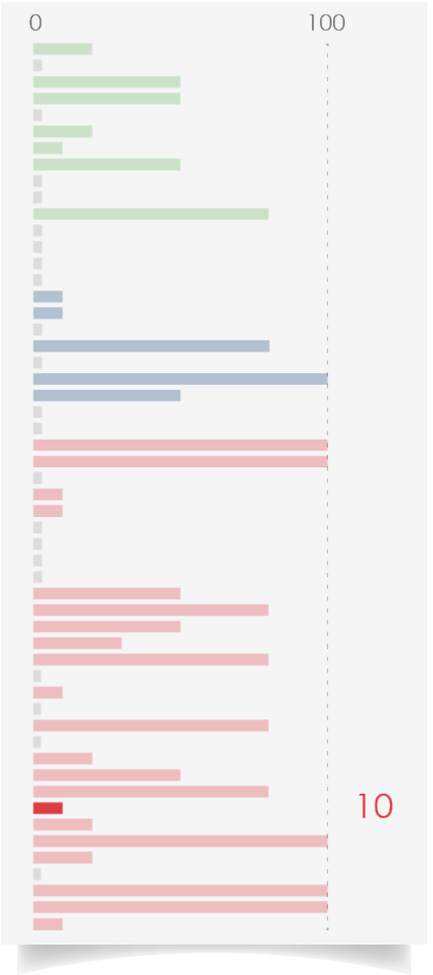
DESCRIPTION

Areas where regional hazard mapping shows peak ground accelerations (PGAs) exceeding 0.30 g at a probability of exceedance of 2% in 50 years shall be excluded. The largest PGA within 10 km of a potential water source in Saskatchewan is about 0.14 g.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



SEVERE PRECIPITATION

Avoid areas of high precipitation exceeding design amounts

SOURCE

Environment Canada R. F. Hopkinson 1999

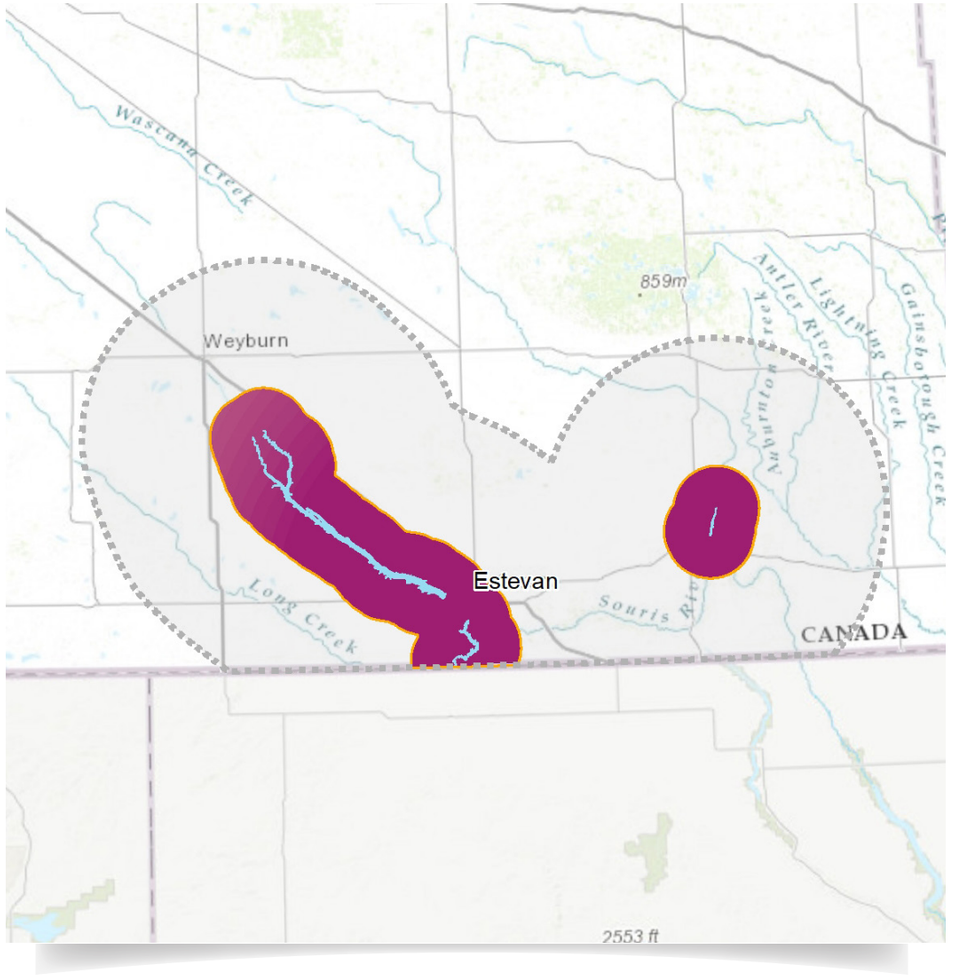
LAYER PRE-PROCESSING AND COMMENTS

Larger probable maximum precipitation (PMP) values are less suitable.

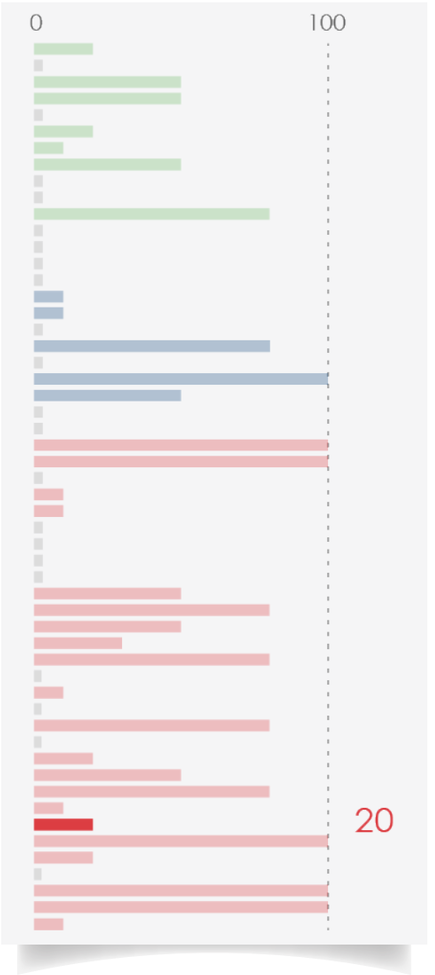
DESCRIPTION

Probable maximum precipitation (PMP) is used as a proxy for sever precipitation.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



SURFICIAL GEOLOGY

The site should be geotechnically stable

SOURCE

Saskatchewan Mining and Petroleum GeoAtlas, Surficial Geology 250K

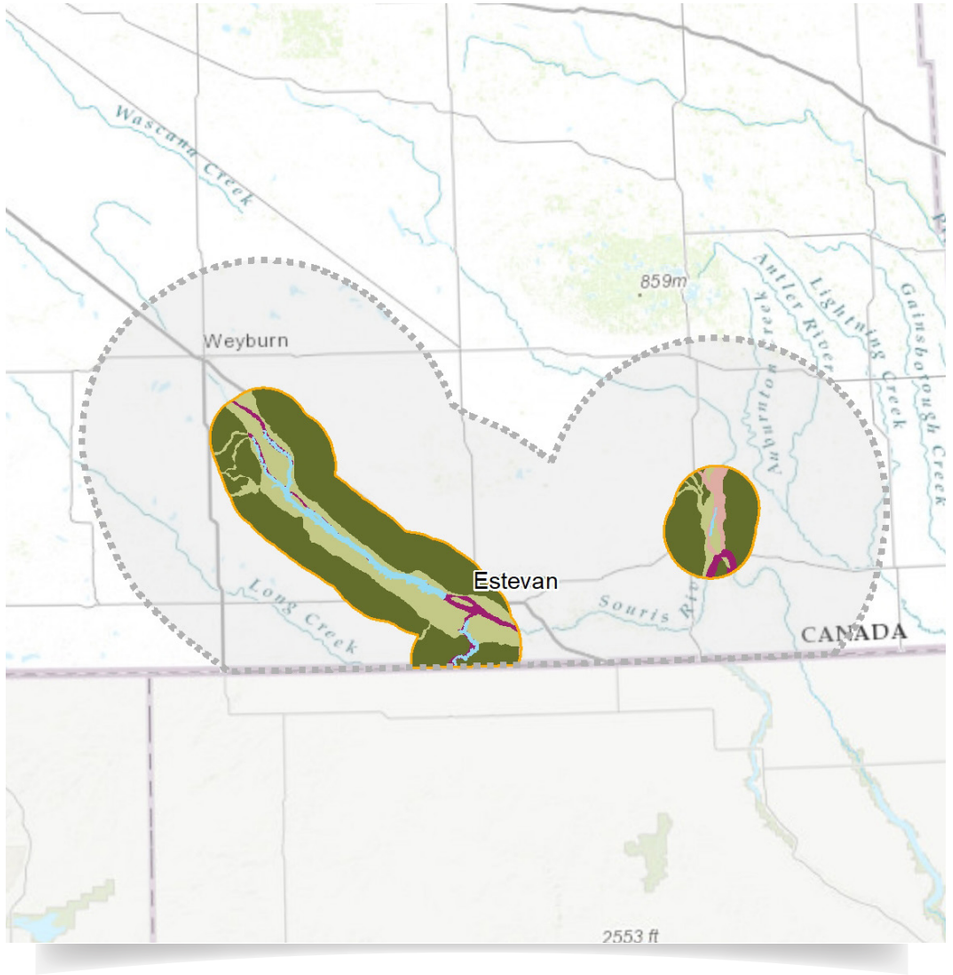
LAYER PRE-PROCESSING AND COMMENTS

Geotechnical team scored surficial geology types and linear landform types for siting suitability. When no subtype is available, classify manually within Local Study Area. Buffer linear landforms by 500 m and use instead where they exist.

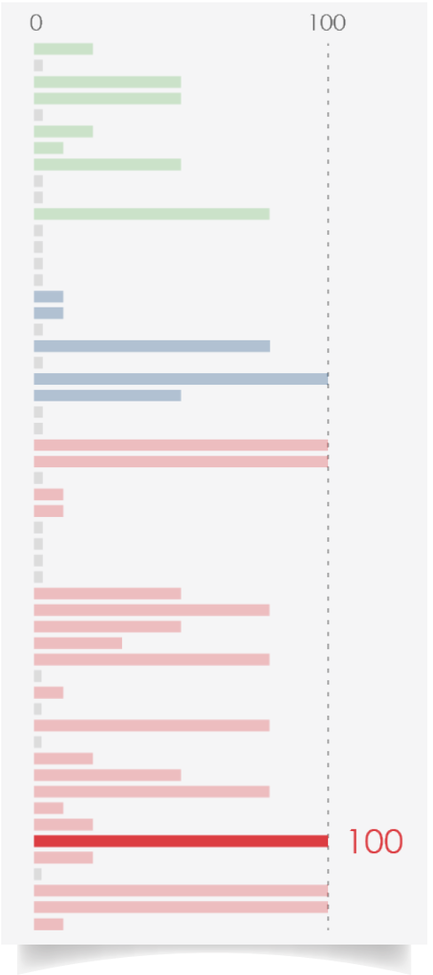
DESCRIPTION

Surficial geology should be suitable for building infrastructure on. Some linear landforms are unsuitable for infrastructure.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



TORNADO POTENTIAL

Avoid areas with high potential for tornadoes

SOURCE

Environment and Climate Change Canada
Tornado Database (1980-2009)

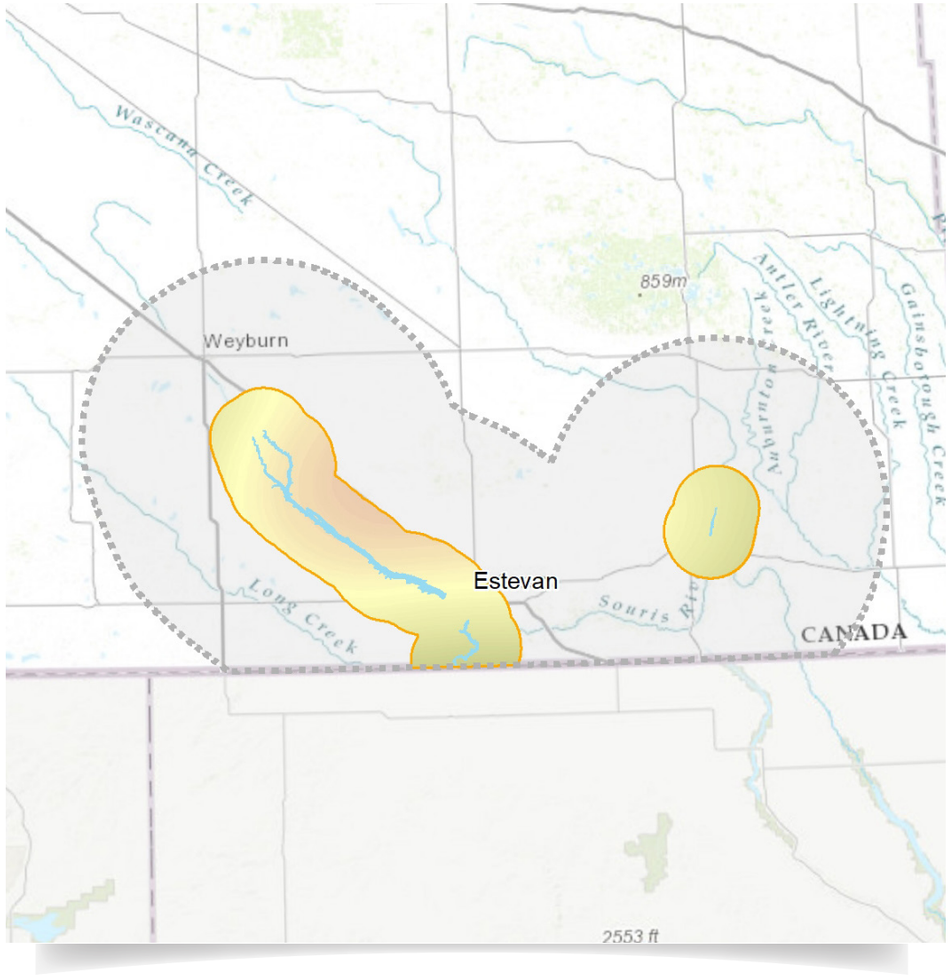
LAYER PRE-PROCESSING AND COMMENTS

Calculate density of tornadoes based on previous, known, historical tornado occurrences.

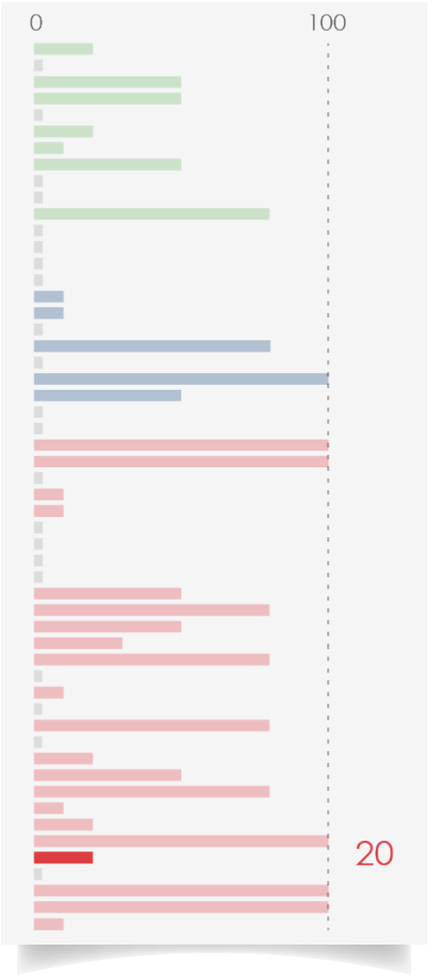
DESCRIPTION

Tornadoes historically occur throughout the southern portion of Saskatchewan but occur in some locations more frequently based on past observations. It is assumed that tornadoes will continue to occur on a more frequent basis in locations where they have been frequent in the past. Further detailed studies will be required to determine specific site risk(s).

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



TRANSMISSION GRID 230 KV

Prefer sites closer to the 230 kV transmission grid

SOURCE

SaskPower

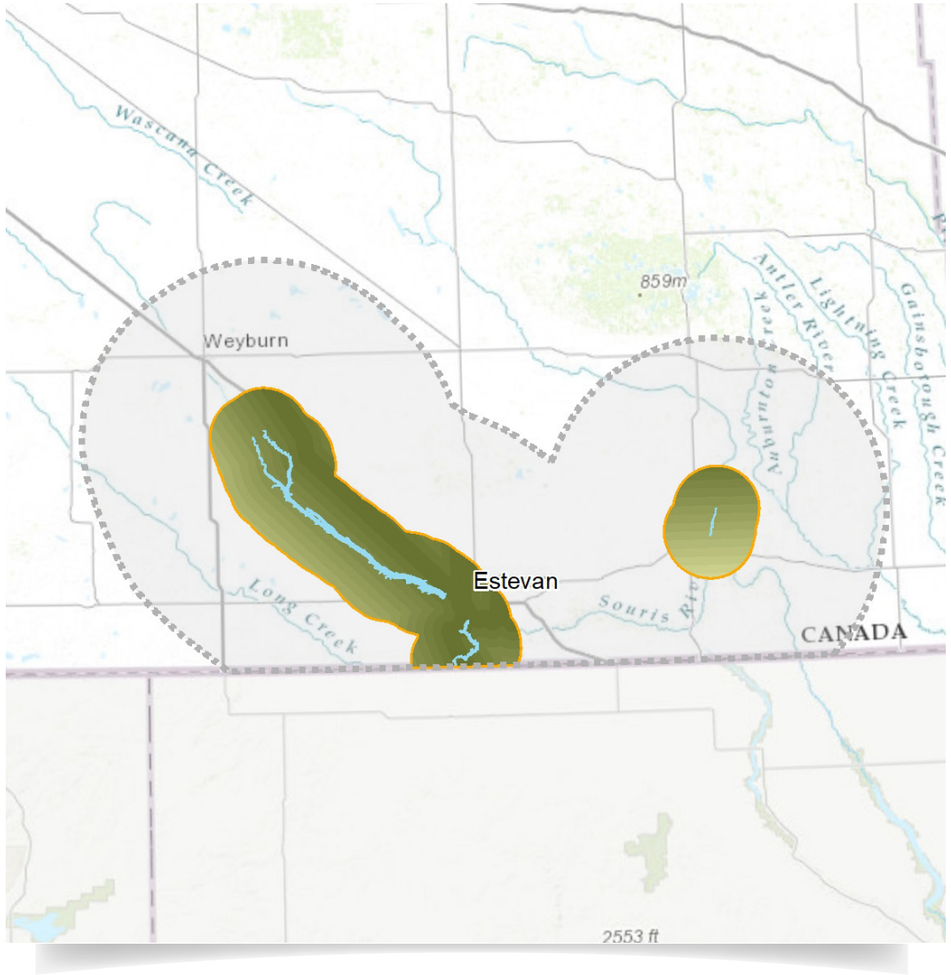
LAYER PRE-PROCESSING AND COMMENTS

Neutral

DESCRIPTION

This indicator is neutral (a placeholder) to the model results. Assessment needed.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING

BACKGROUND

WATER SOURCES

Prefer sites within 10 km of highly suitable water sources

SOURCE

SaskPower, Golder, CanVec, Geogratis, Natural Resources Canada (NRCan)

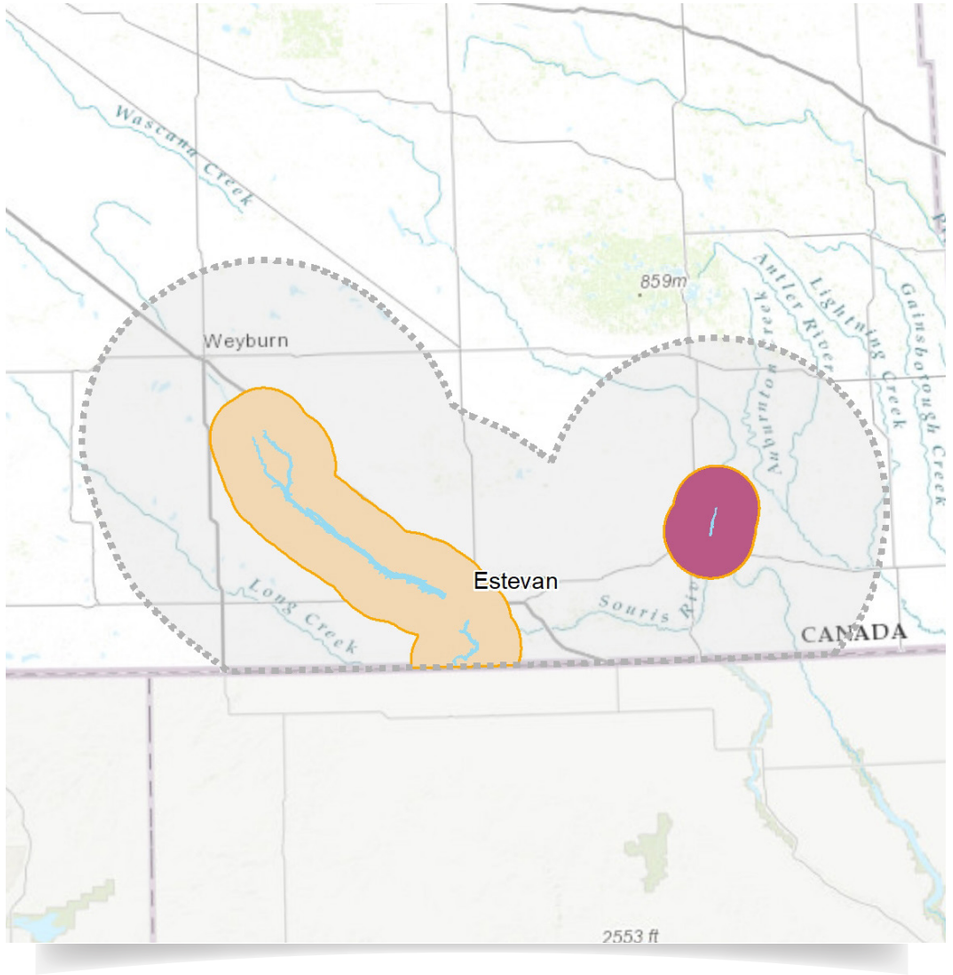
LAYER PRE-PROCESSING AND COMMENTS

Water resources created a suitability index with a 10 km buffer added. Use highest suitability where buffers overlap.

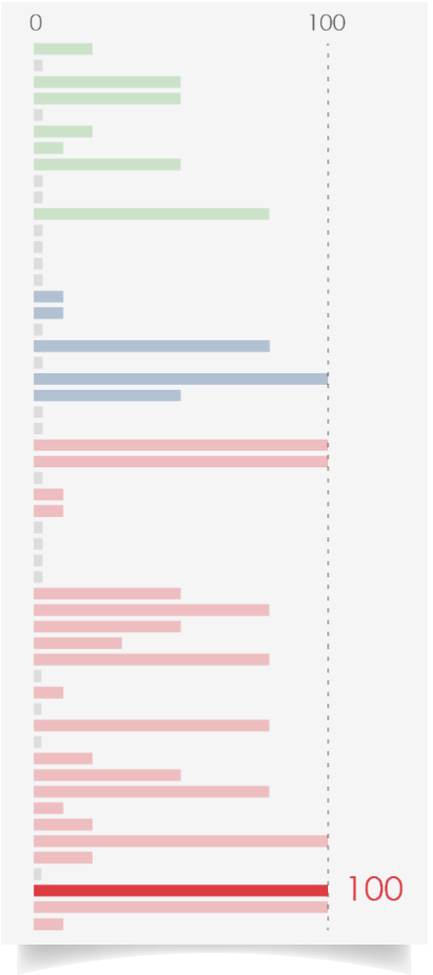
DESCRIPTION

The site should be within 10 km of a suitable water source. Water availability factors, water quality factors and physical water body characteristics have been considered.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



WATER SOURCES PROXIMITY

Suitable water sources should be located within 3 km

SOURCE

SaskPower, Golder, CanVec, Geogratis, Natural Resources Canada (NRCan)

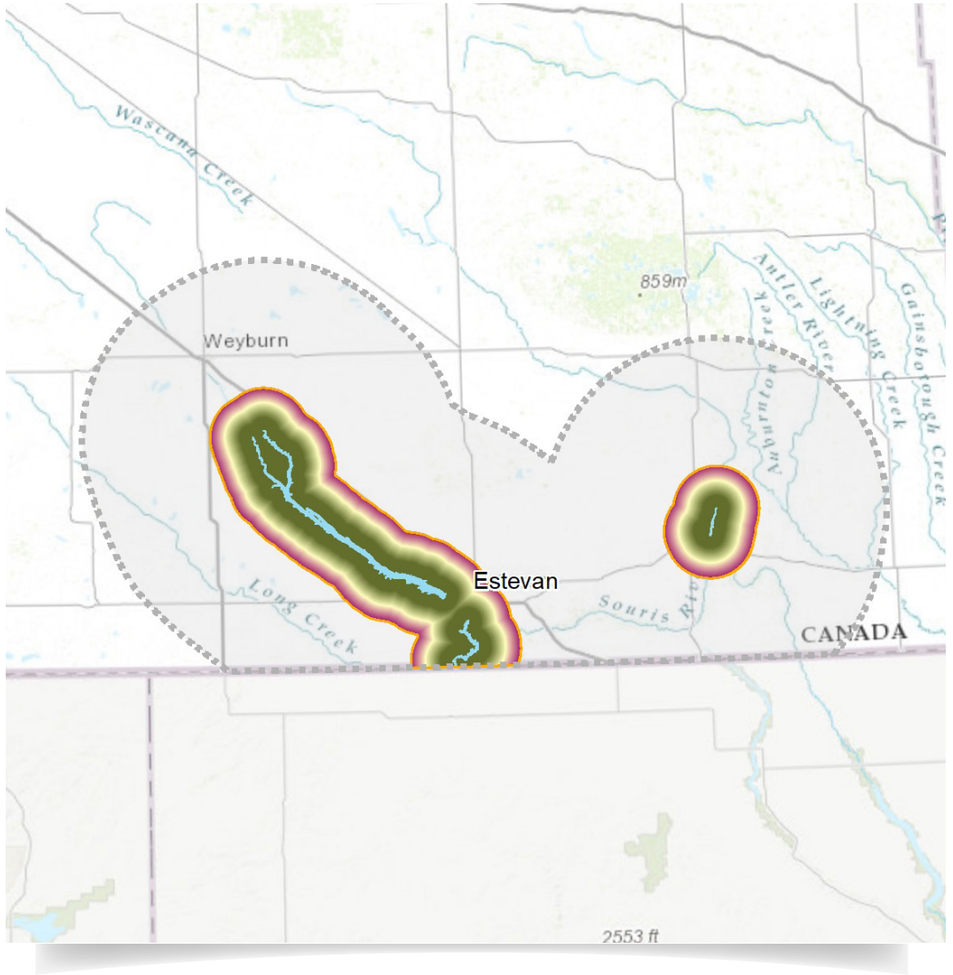
LAYER PRE-PROCESSING AND COMMENTS

Suitability from 0-3 km is high (100), 3 - 10 km distance decay buffer added.

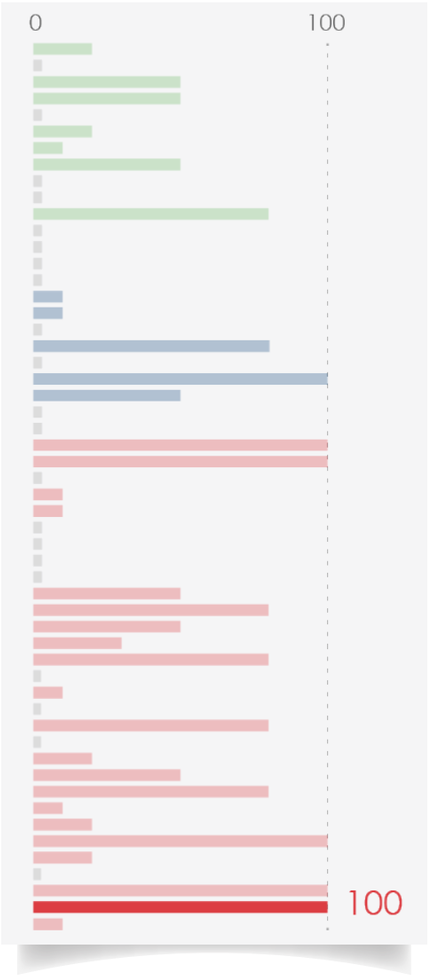
DESCRIPTION

Although other references have indicated 10 km as an acceptable distance, the SMR regional assessment study has chosen a lower distance to address potential water supply delivery and cost risks (e.g., 3 km or less distance).

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



WATER WELLS

Avoid proximity to water wells

SOURCE

Water Security Agency (WSA)

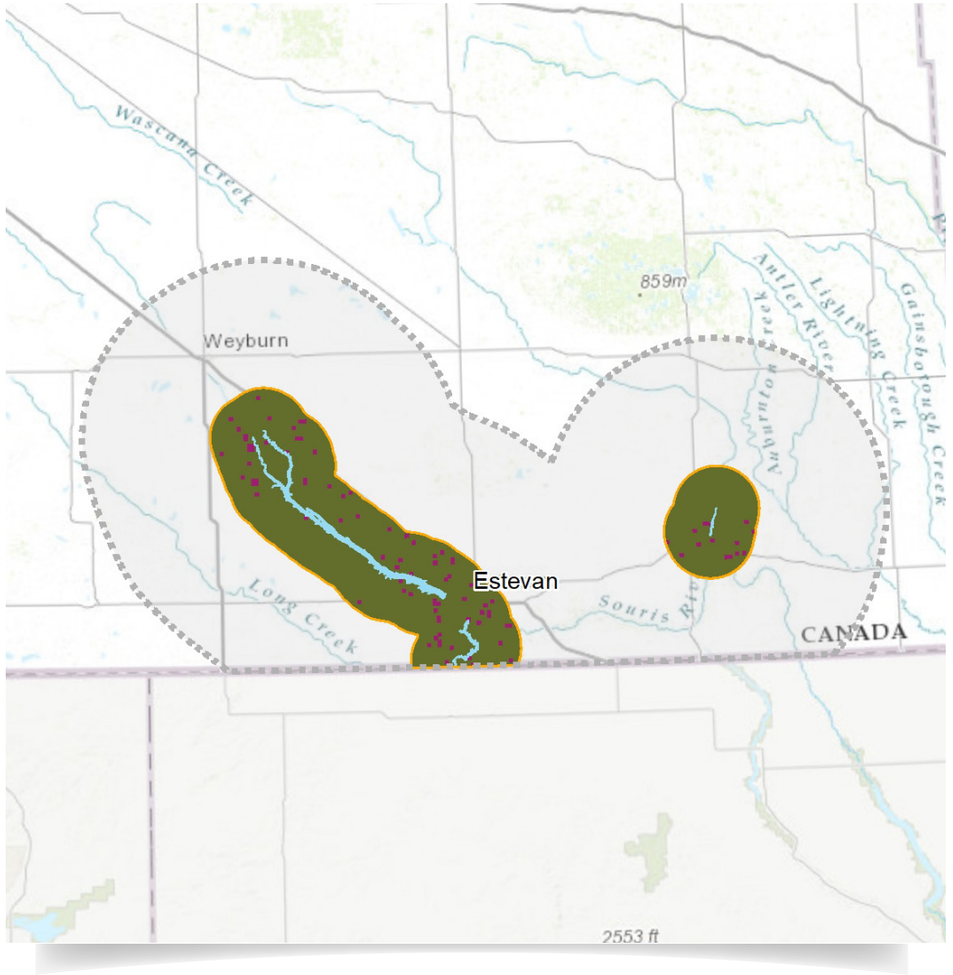
LAYER PRE-PROCESSING AND COMMENTS

Remove domestic wells. Only include quality monitoring, recharge waste disposal, unknown and withdrawal well uses. Apply to full quarter section boundary.

DESCRIPTION

Water wells should be avoided for siting the SMR. These include all water uses except domestic which will be considered on a site by site basis. Quality monitoring, recharge waste disposal and withdrawal well uses are included. Due to uncertainty in the well location based on the spatial data available, the entire quarter section was used as an extent if a well is present.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING