

WORKBOOK

Regional Evaluation Process (REP)

Workshop 3 - Elbow

Elbow, Saskatchewan,
March 21, 2023

Environmental

Indicators

01. Federal Critical Habitat
02. Federal Critical Habitat Proximity
03. Managed Lands
04. Protected Lands
05. Protected Lands Proximity
06. Rare/Endangered Species
07. TWHI Wildlife Habitat
08. Waterbodies
09. Watercourses
10. Wetlands



FEDERAL CRITICAL HABITAT

Avoid areas with sensitive species



SOURCE

Environment and Climate Change Canada



LAYER PRE-PROCESSING AND COMMENTS

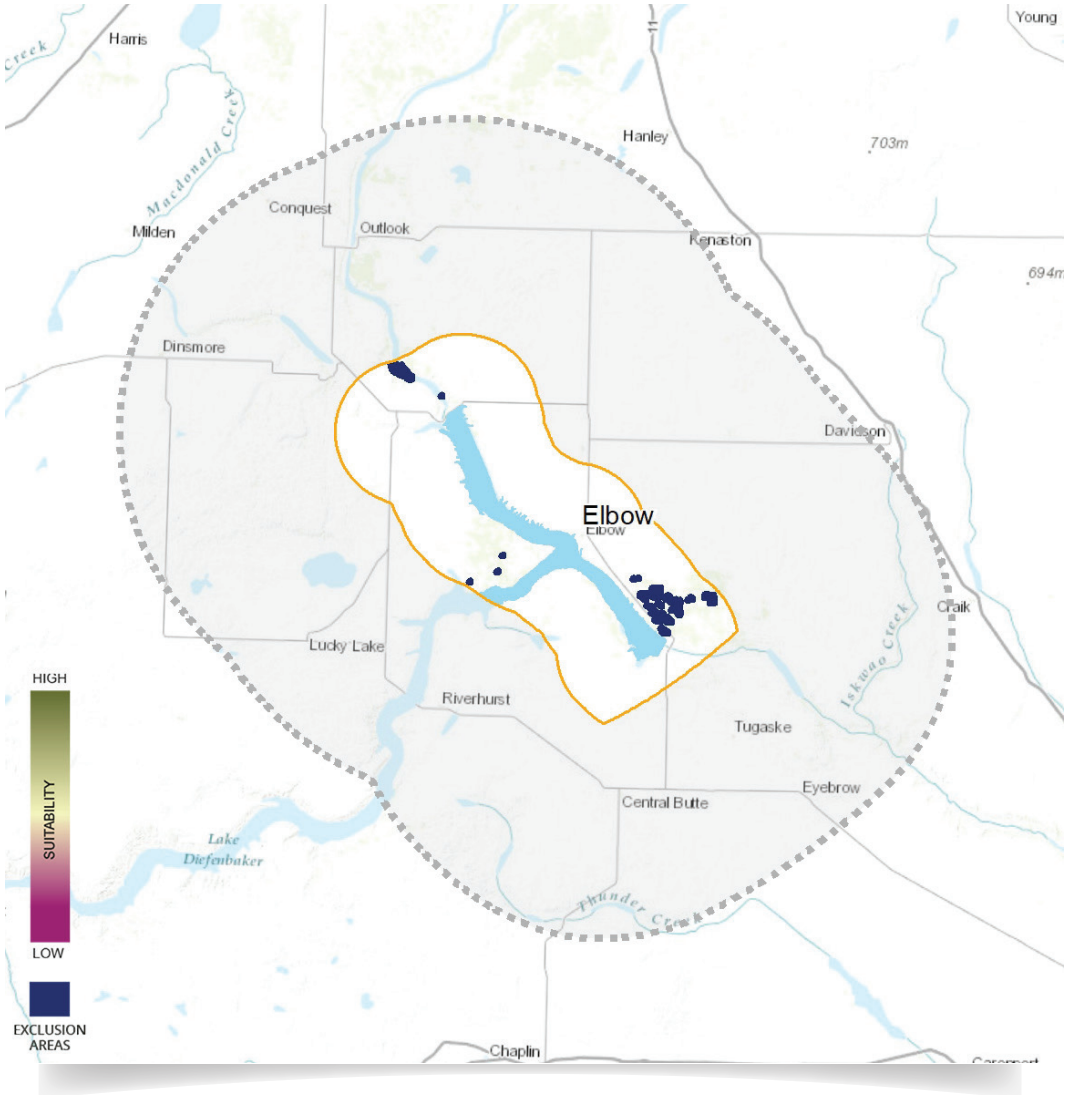
Exclusion, no buffer added.



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

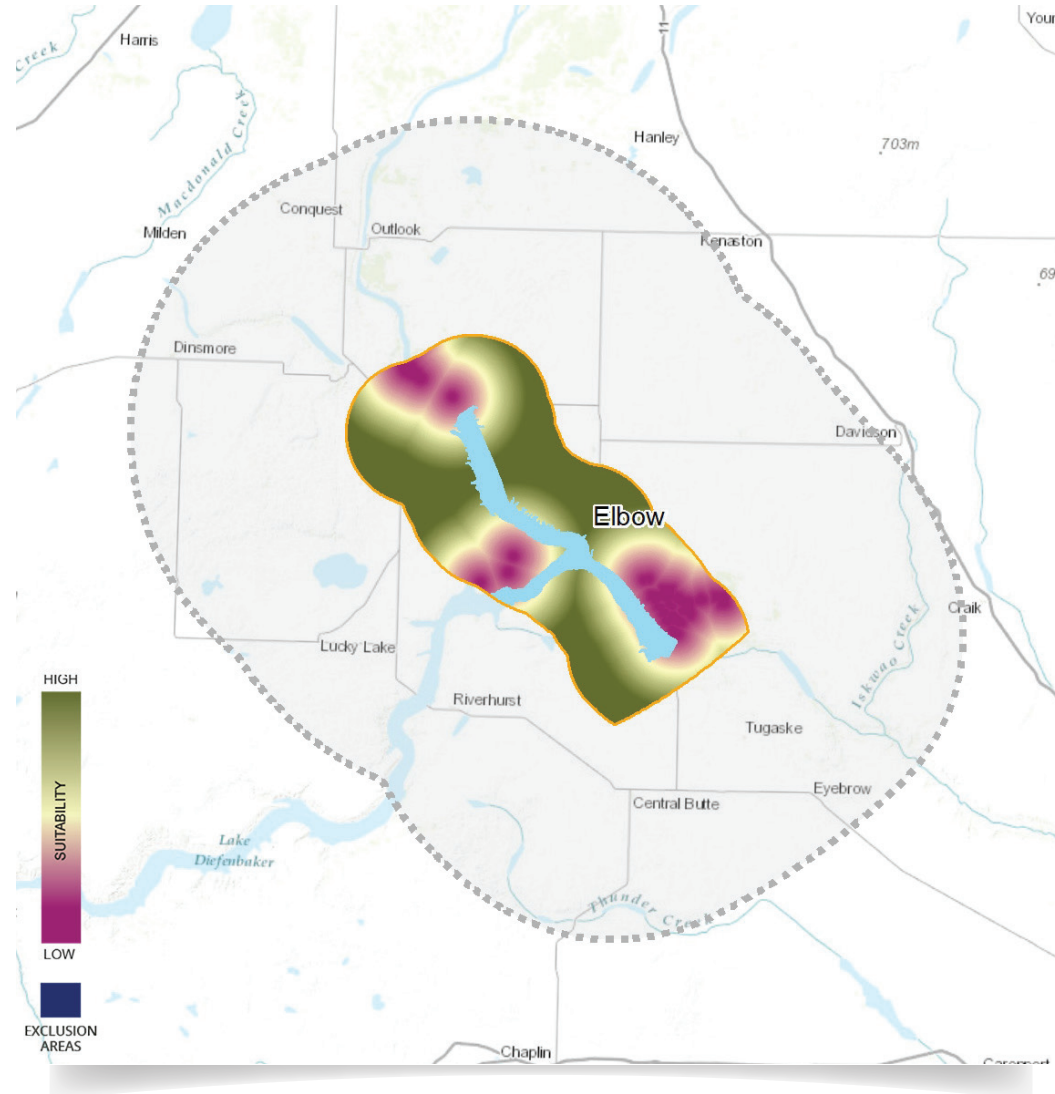
0 to 10 km distance decay buffer added.



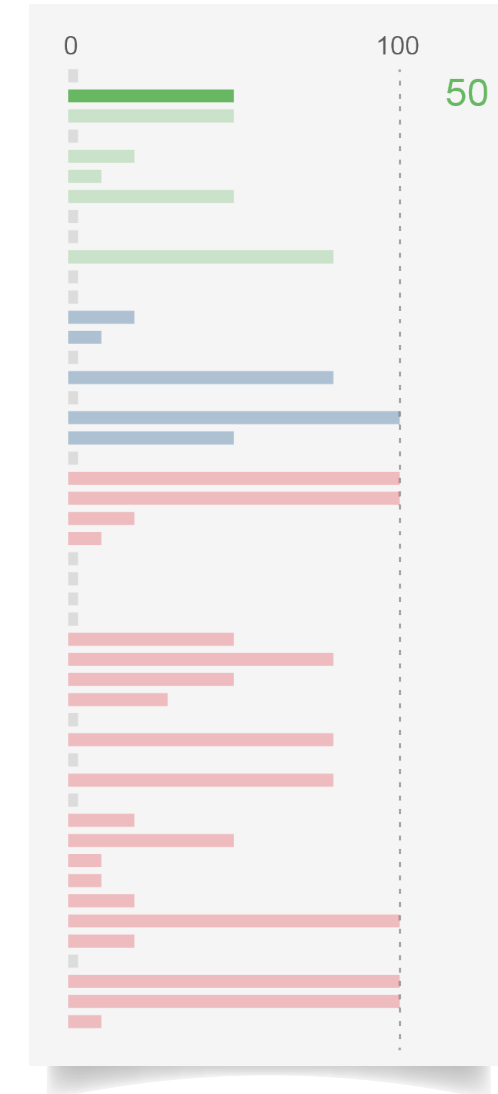
DESCRIPTION

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



WEIGHT FOR SMR SITING



MANAGED LANDS

Minimize encroachment on managed lands



SOURCE

Saskatchewan Ministry of Environment



LAYER PRE-PROCESSING AND COMMENTS

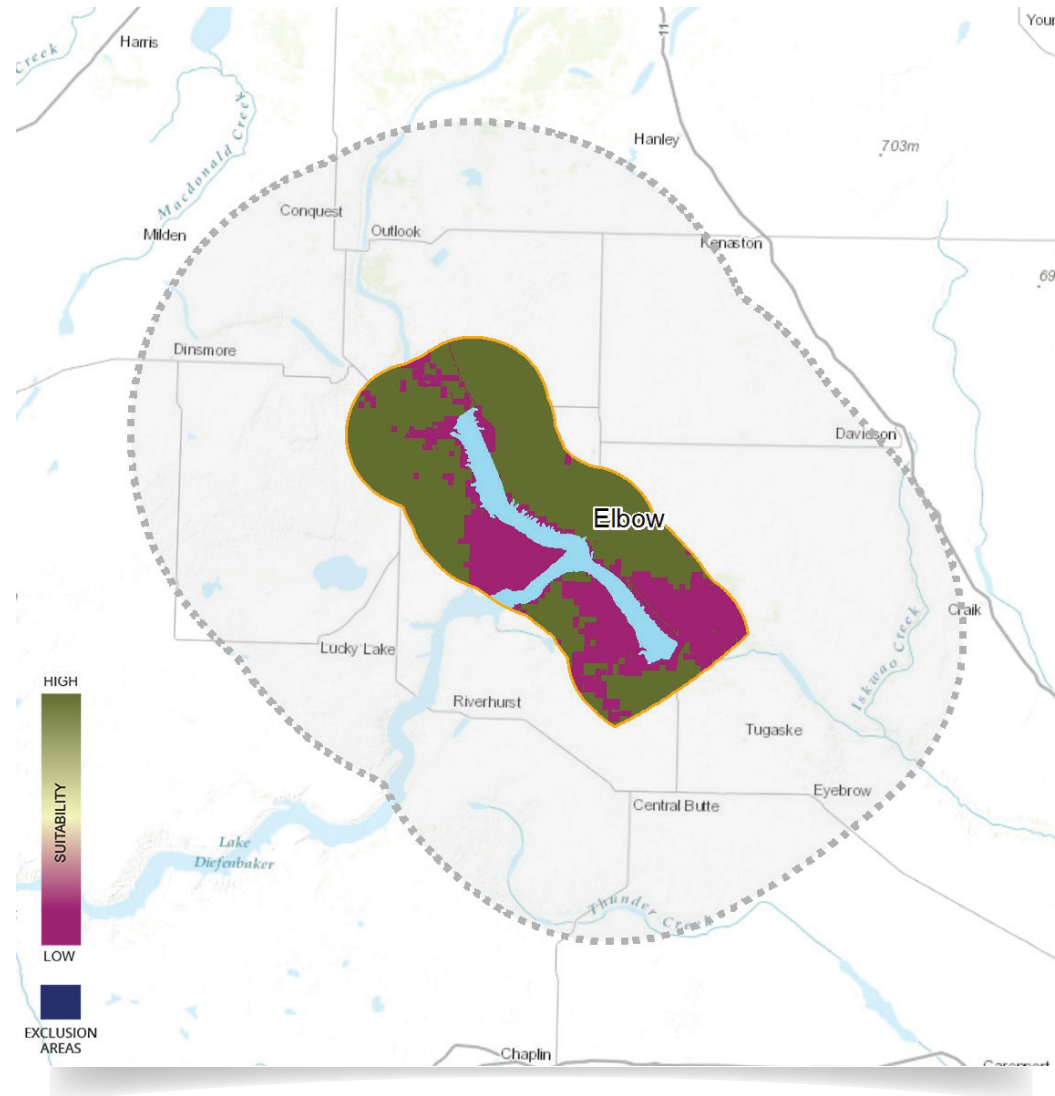
No buffer added.



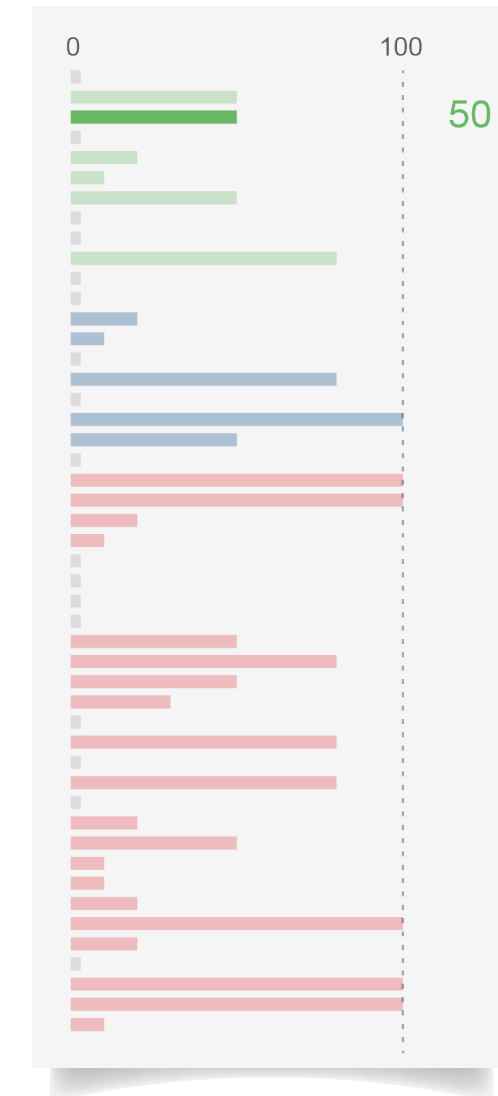
DESCRIPTION

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

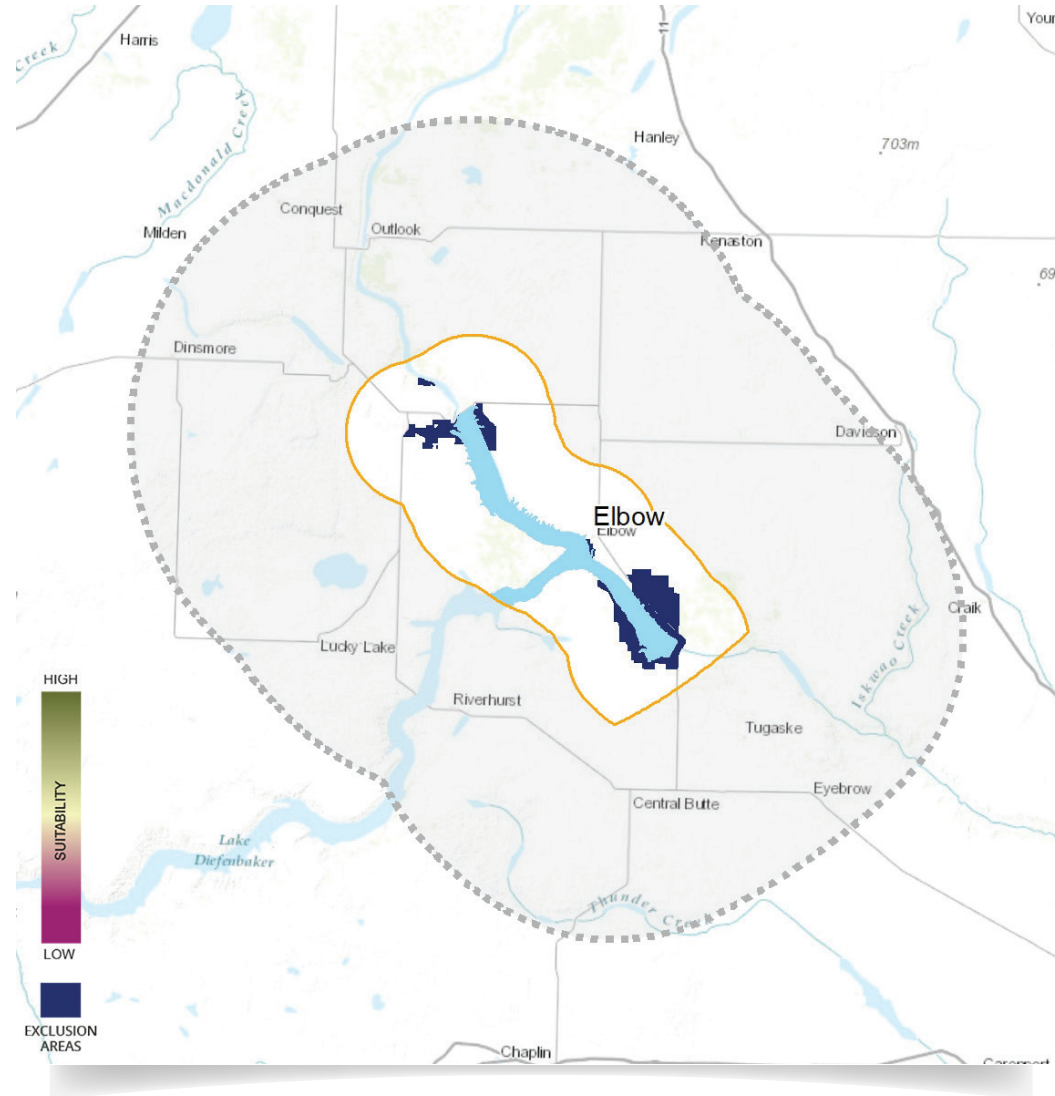
No buffer added.



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

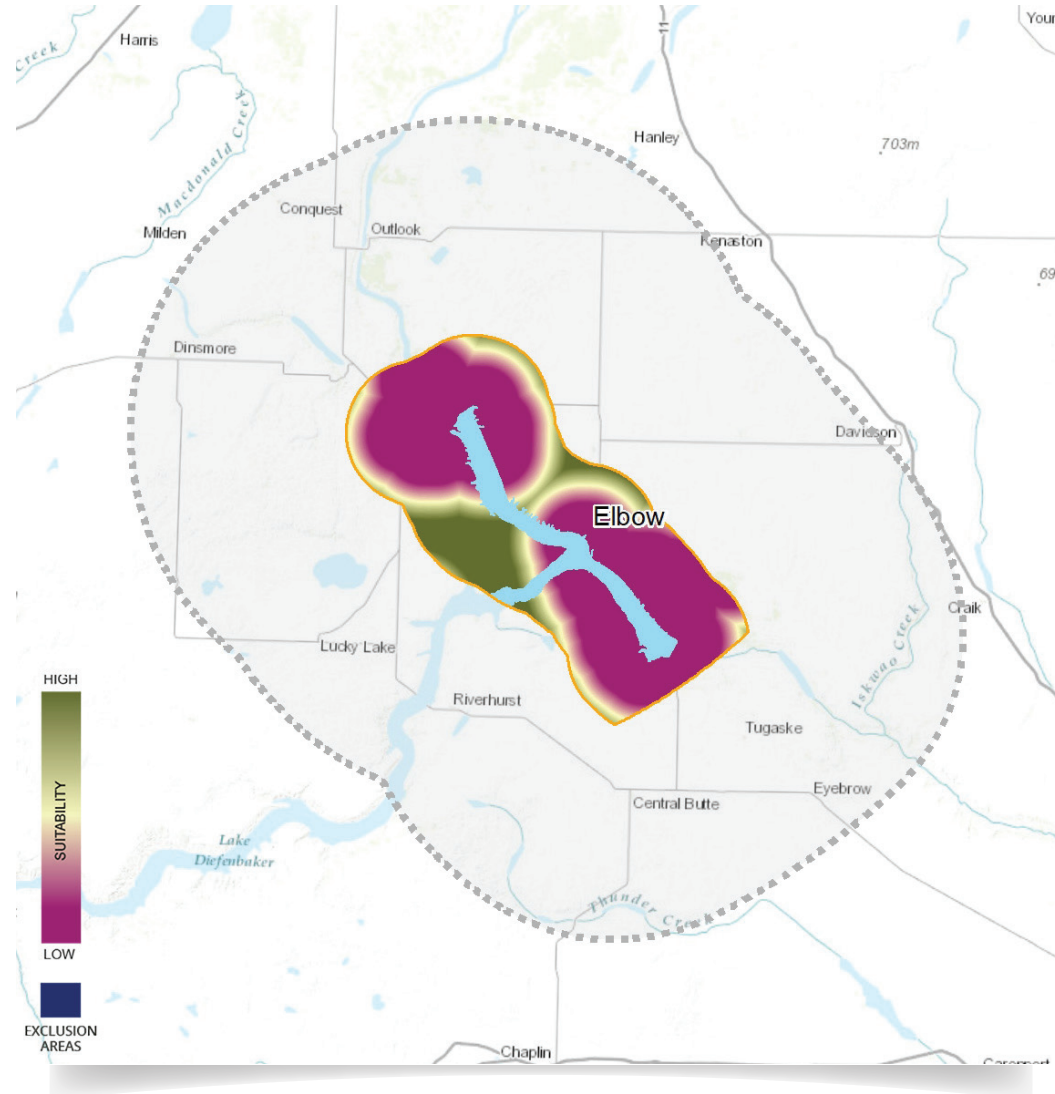
0-5 km low suitability, 5-10 km distance decay.



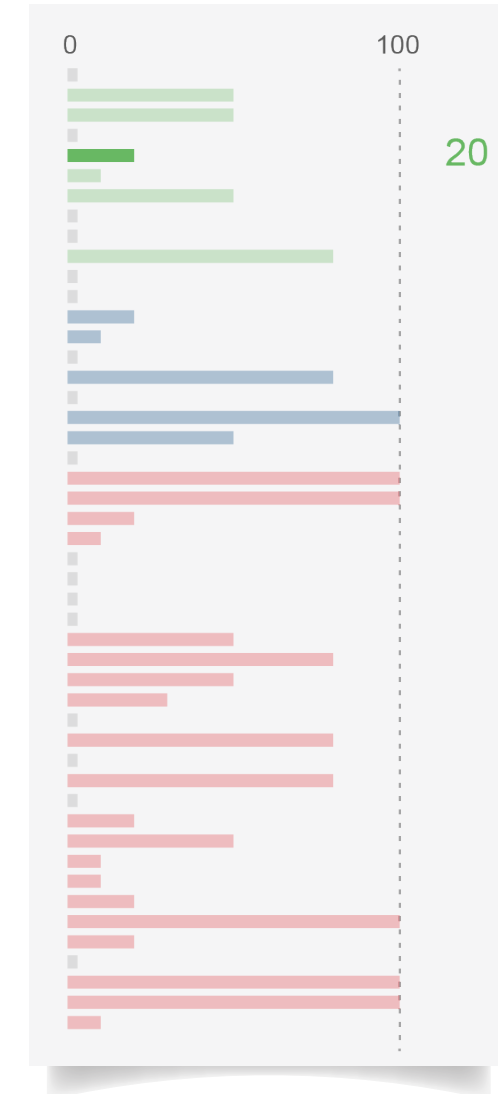
DESCRIPTION

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



RARE/ENDANGERED SPECIES

Avoid rare and endangered species



SOURCE

Saskatchewan Conservation Data Centre (SKCDC)



LAYER PRE-PROCESSING AND COMMENTS

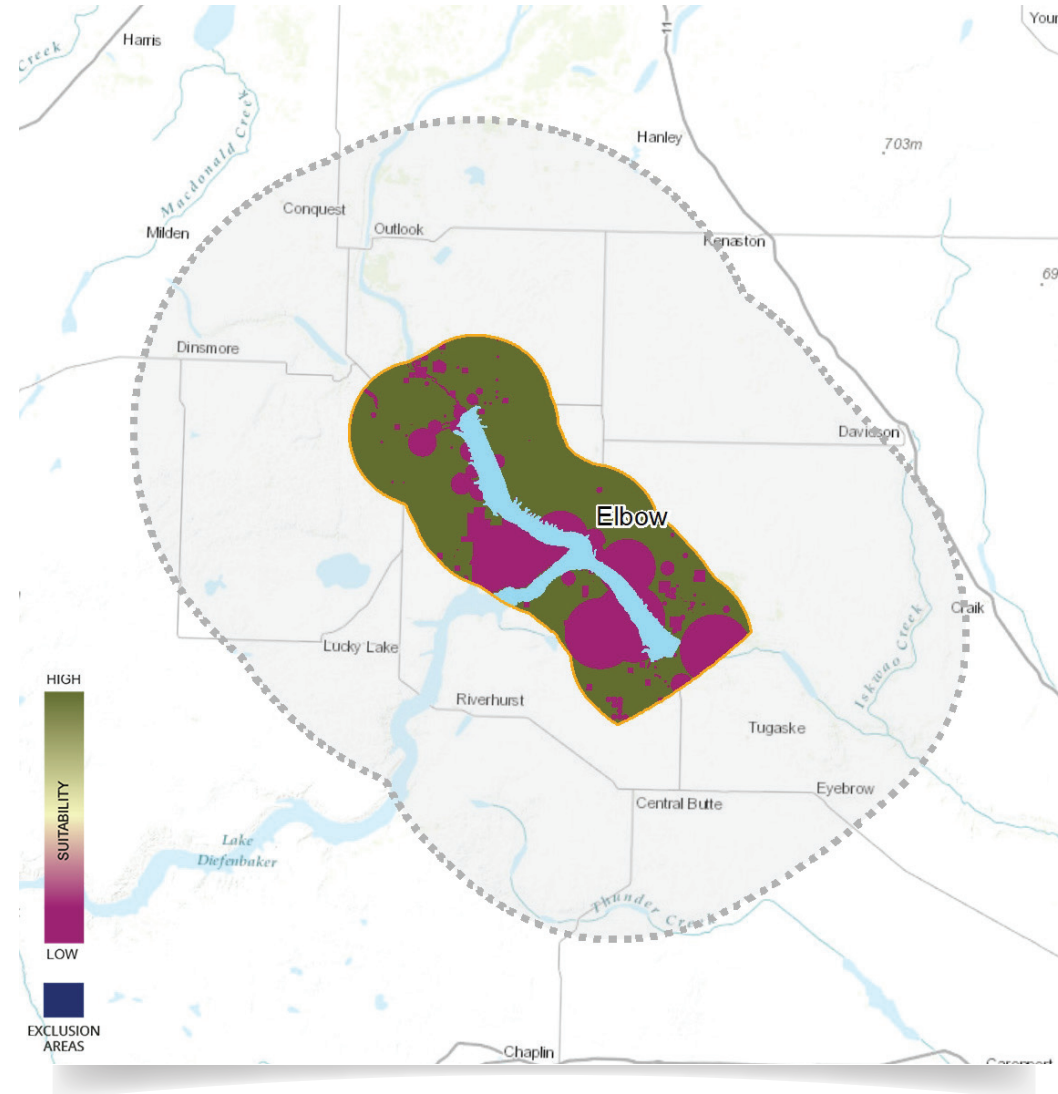
No buffer added.



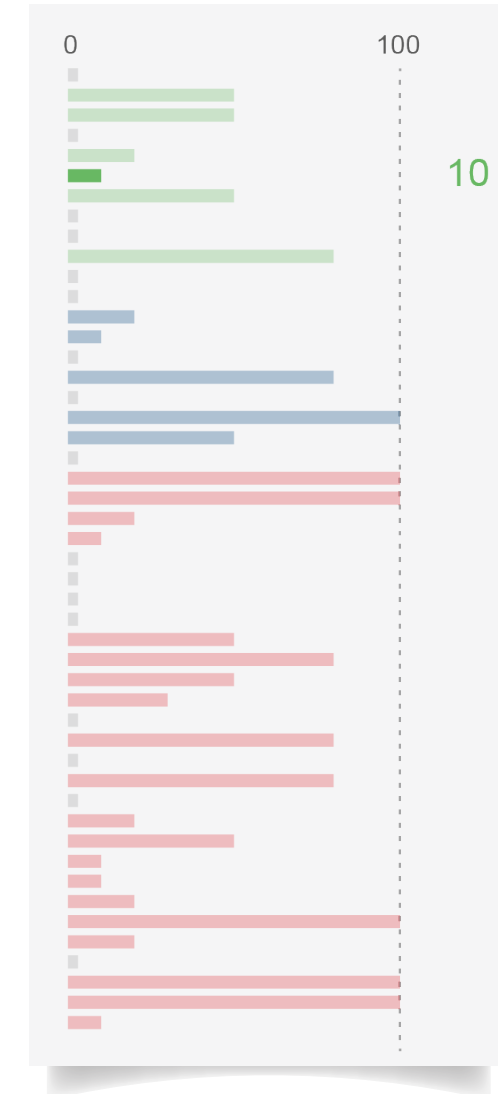
DESCRIPTION

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



WEIGHT FOR SMR SITING



TWHI WILDLIFE HABITAT

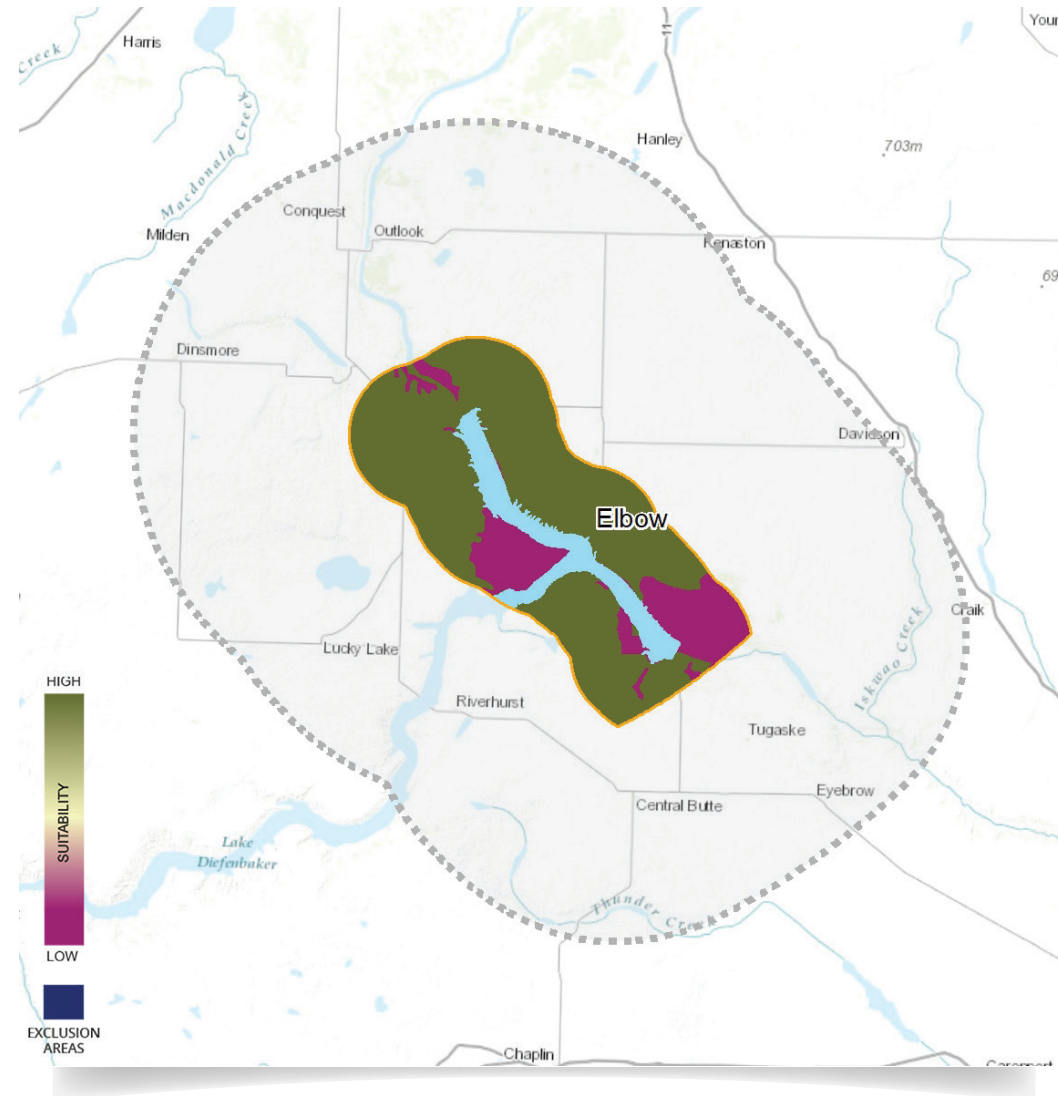
Minimize encroachment on Terrestrial Wildlife Habitat Inventory (TWHI) areas

SOURCE
Wildlife Branch, Saskatchewan Ministry of Environment

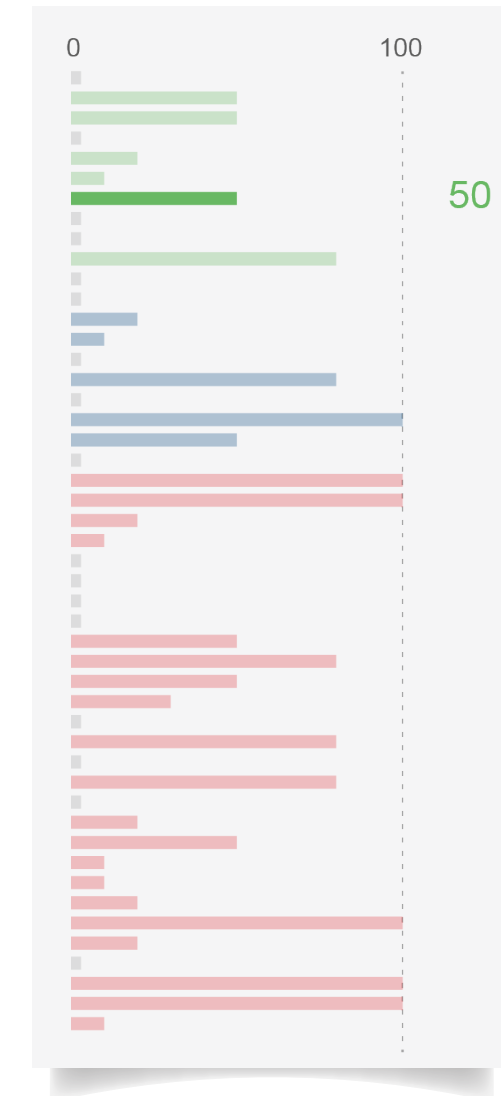
LAYER PRE-PROCESSING AND COMMENTS
No buffer

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

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



WATERBODIES

Avoid development on permanent waterbodies

SOURCE

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

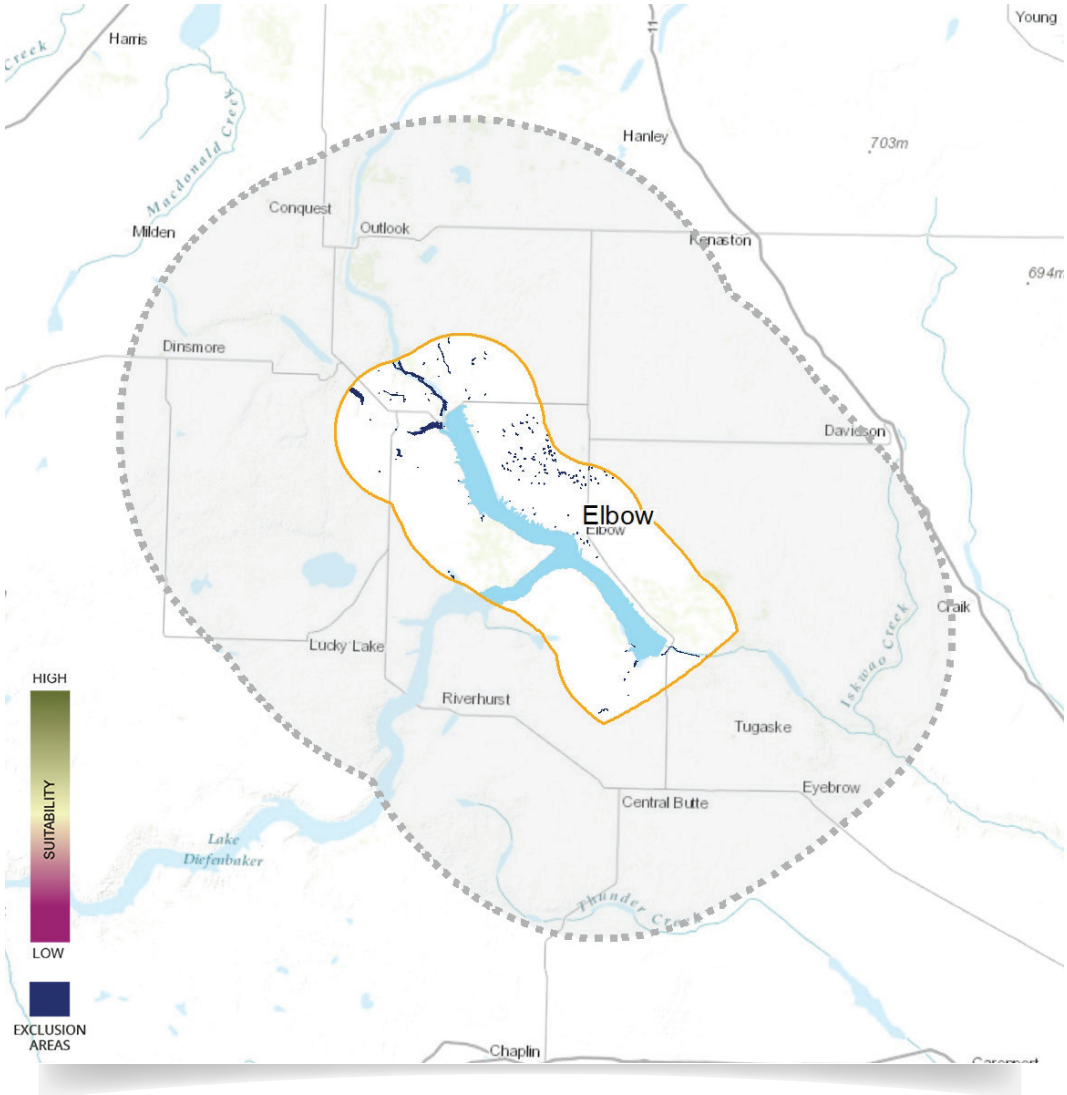
LAYER PRE-PROCESSING AND COMMENTS

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

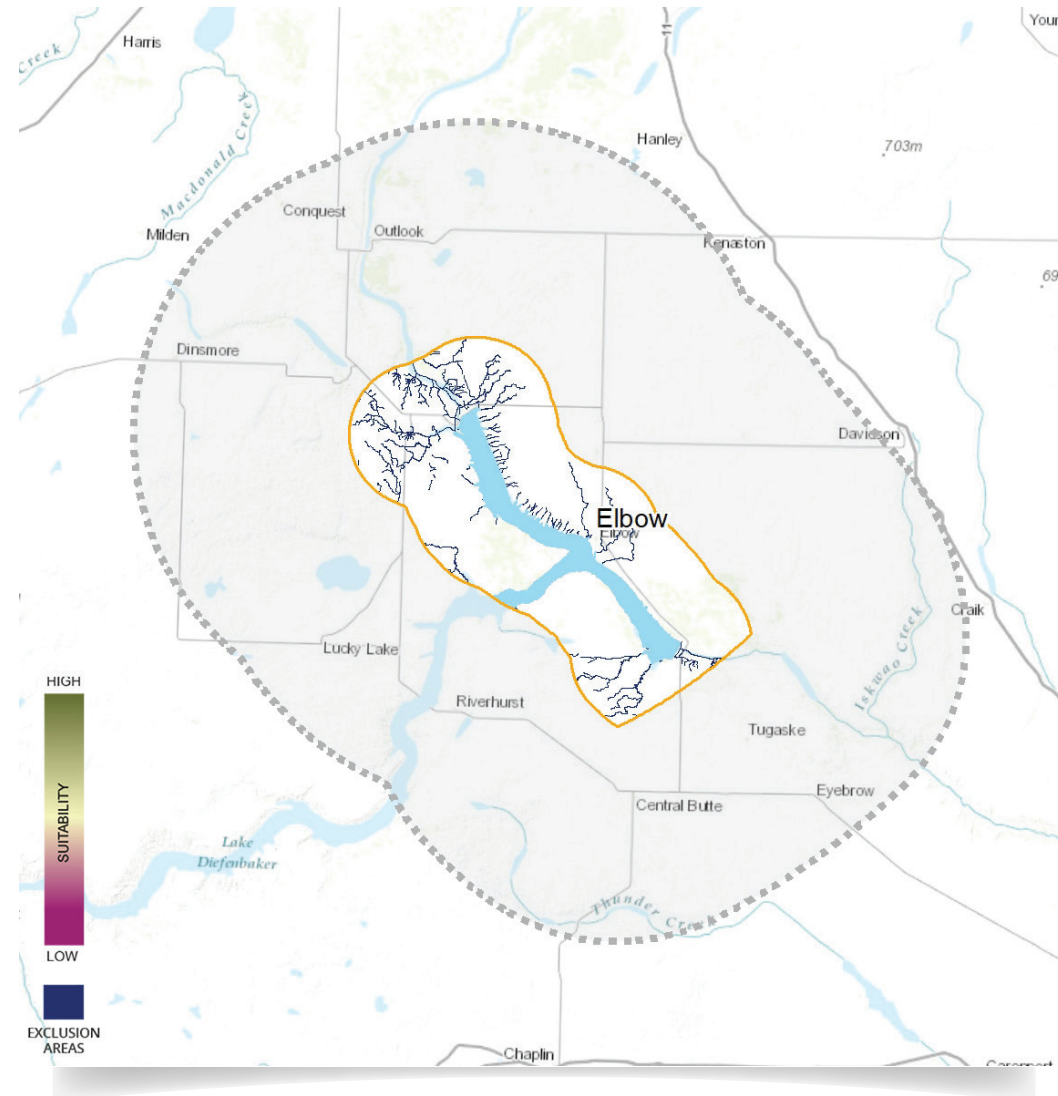
Exclusion, 50 m buffer added.



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

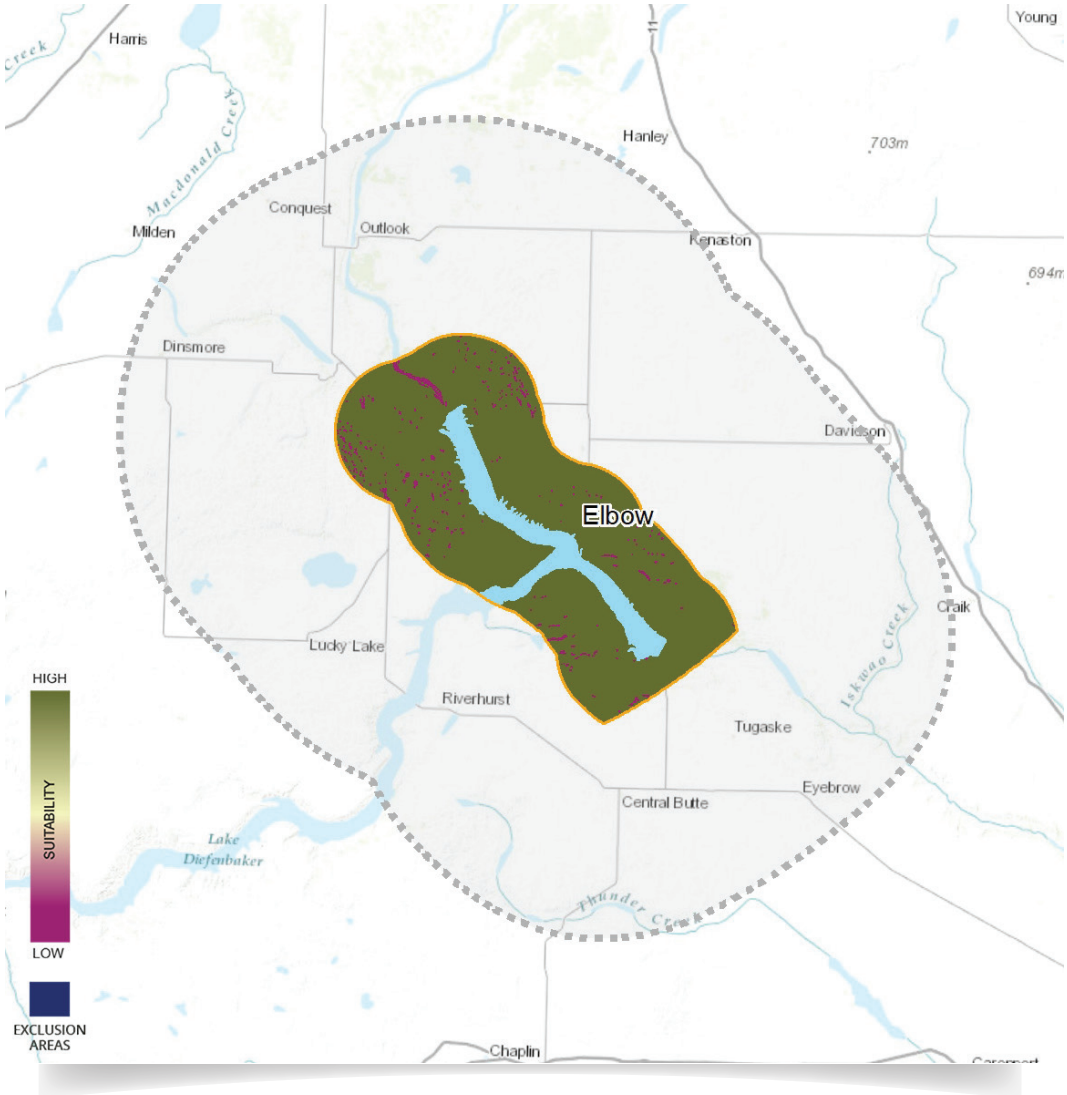
Add Intermittent waterbodies. No buffer added.



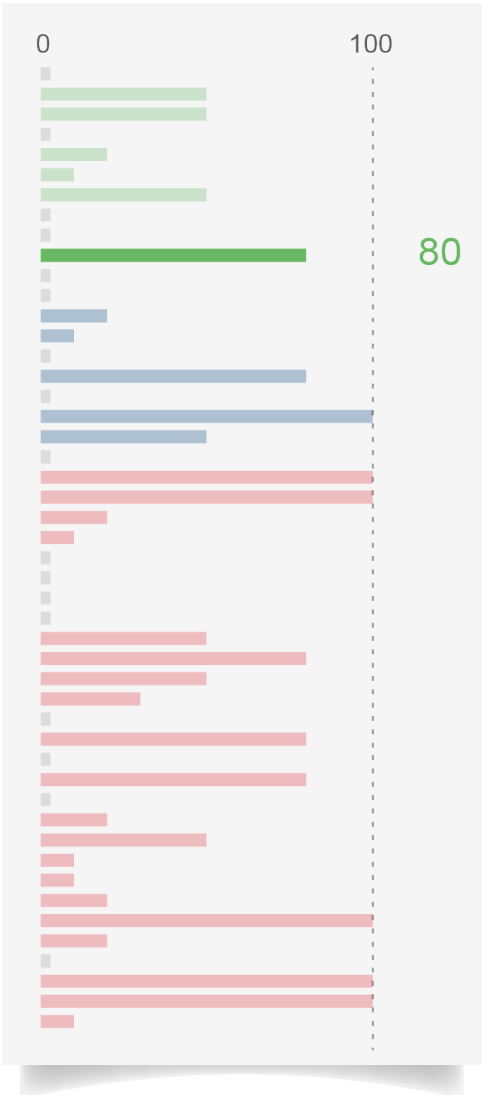
DESCRIPTION

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



Social/Cultural

Indicators

11. Cemeteries
12. First Nations Reserves
13. Future Urban Development
14. Heritage Sensitivity
15. International Border
16. Population Density
17. Population Density > 200
18. Proximity to Workforce
19. SaskPower Lands
20. Urban Municipal Areas



CEMETERIES

Avoid quarter sections with cemeteries

SOURCE

Saskatchewan Cemeteries Project
Saskatchewan Information Services Corporation

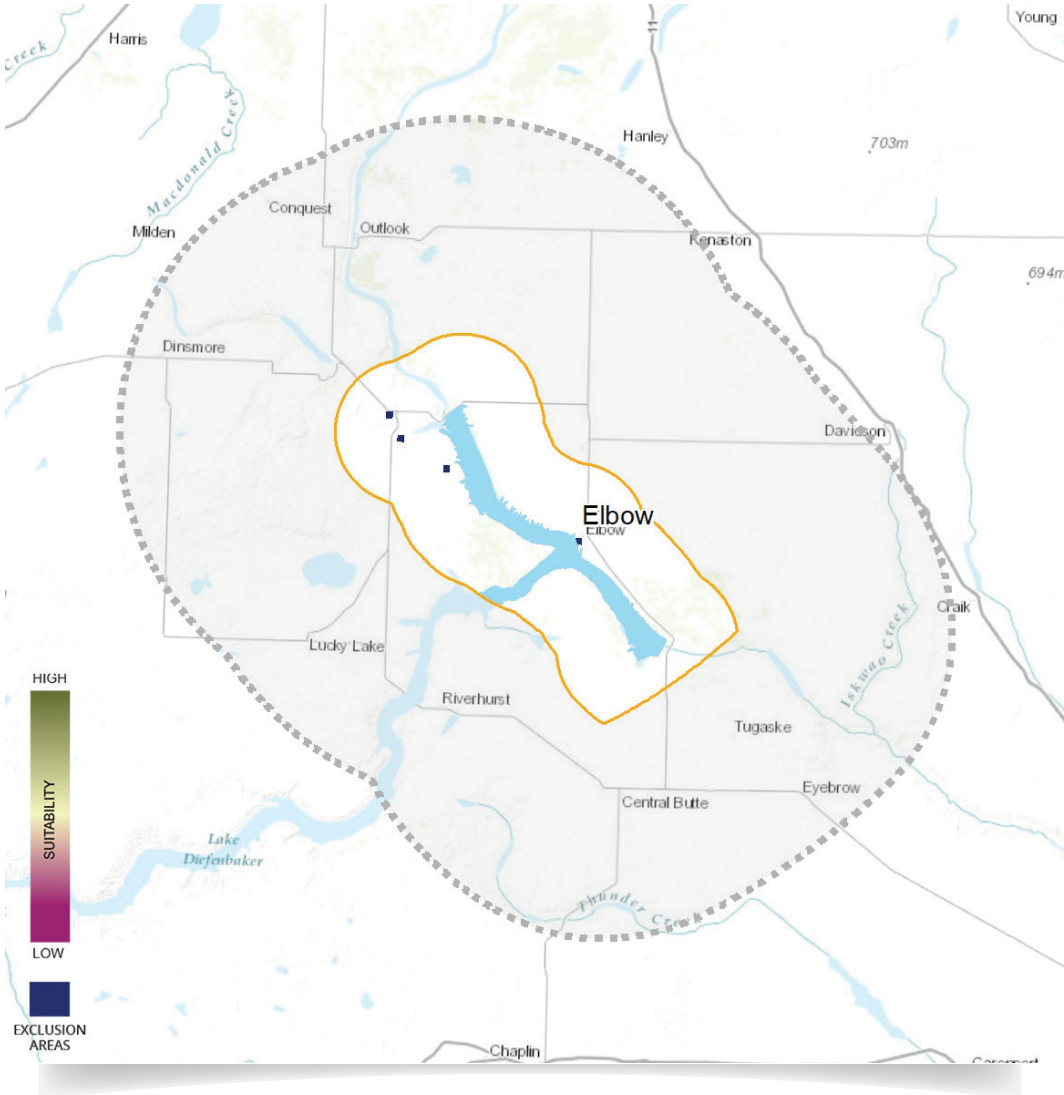
LAYER PRE-PROCESSING AND COMMENTS

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



FIRST NATIONS RESERVES

First Nations Land will be considered case by case



SOURCE

Geogratis, Natural Resources Canada (NRCan)



LAYER PRE-PROCESSING AND COMMENTS

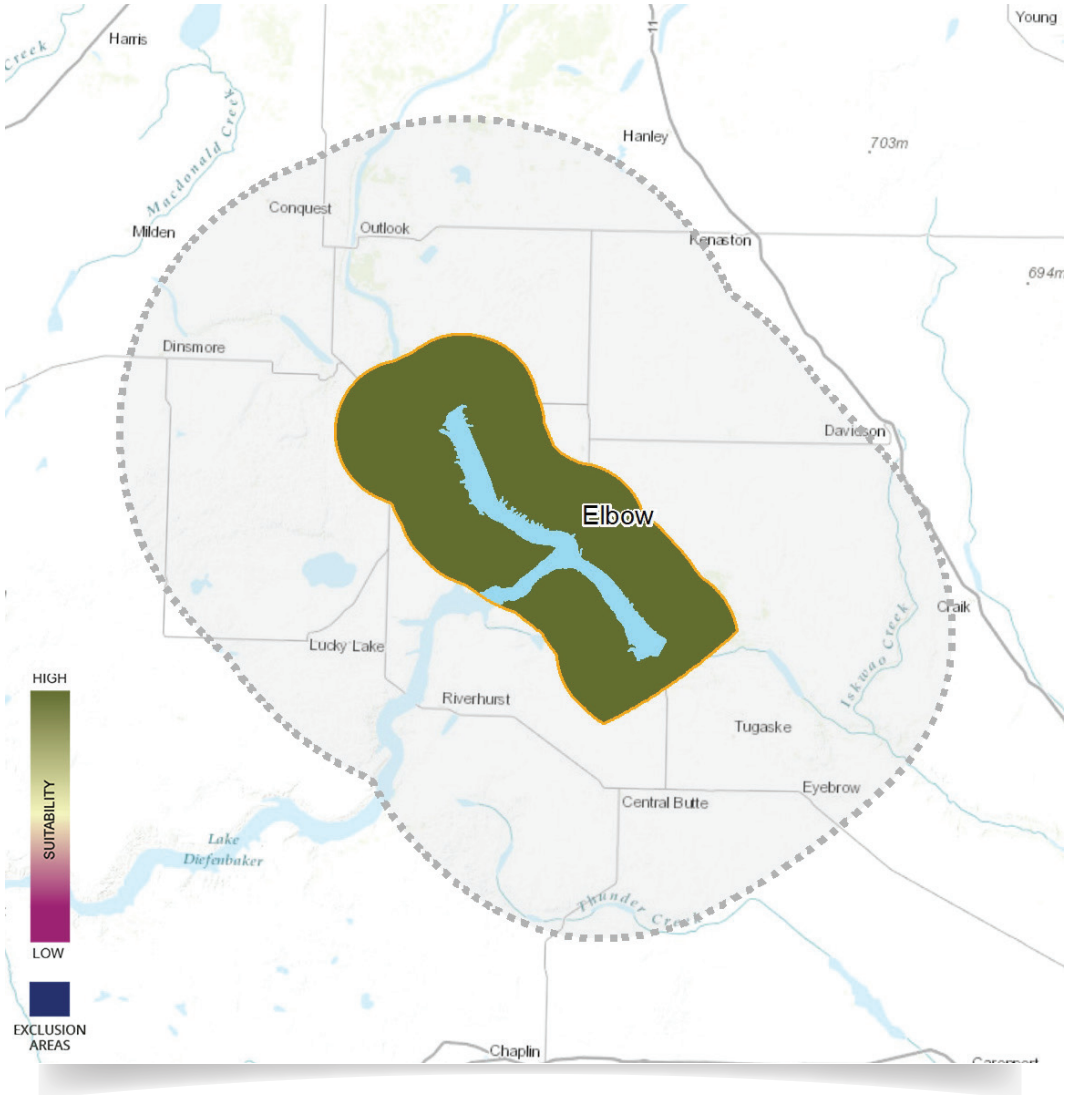
No buffer added.



DESCRIPTION

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

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



FUTURE URBAN DEVELOPMENT

Minimize encroachment on future development lands



SOURCE

Information Services Corporation (ISC)



LAYER PRE-PROCESSING AND COMMENTS

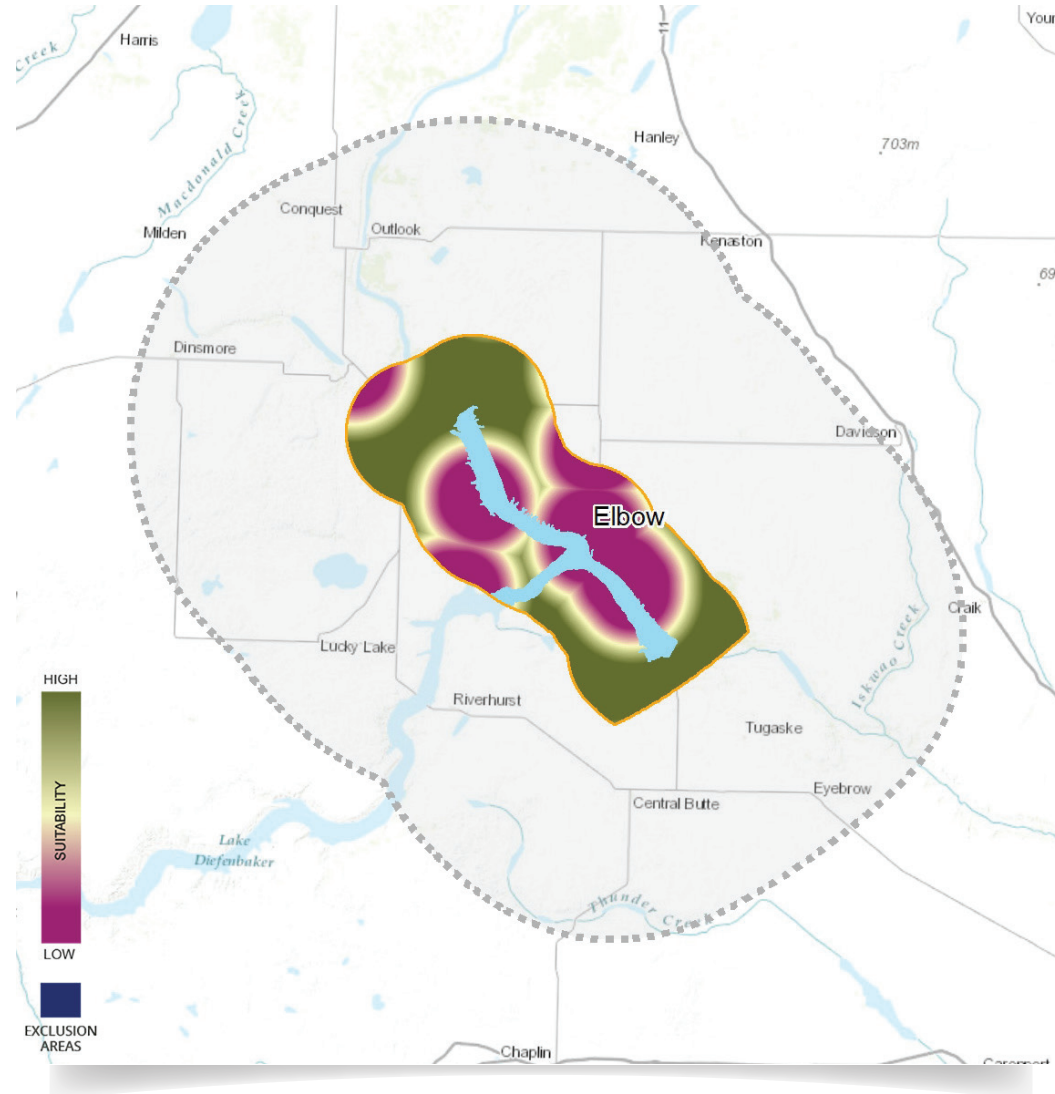
1 km exclusion area added beyond municipal boundary. Buffer of 0 to 5 km of low suitability from municipal boundary, distance decay added from 5 to 10 km from low to high suitability.



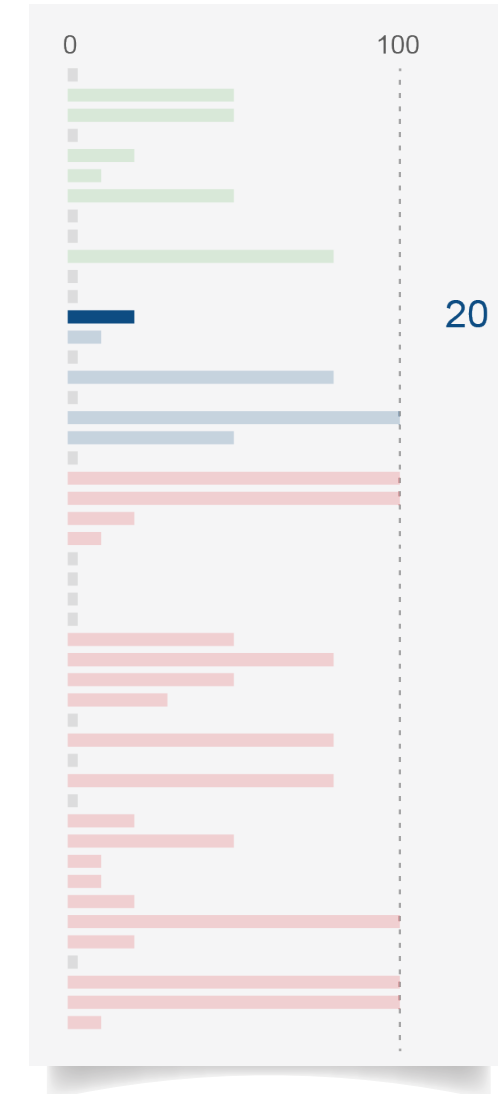
DESCRIPTION

Encroachment on land adjacent to urban municipality boundaries should be minimized to provide flexibility for future urban development. An additional 1 km exculsion (no-go) zone has been added to municipal boundaries. 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

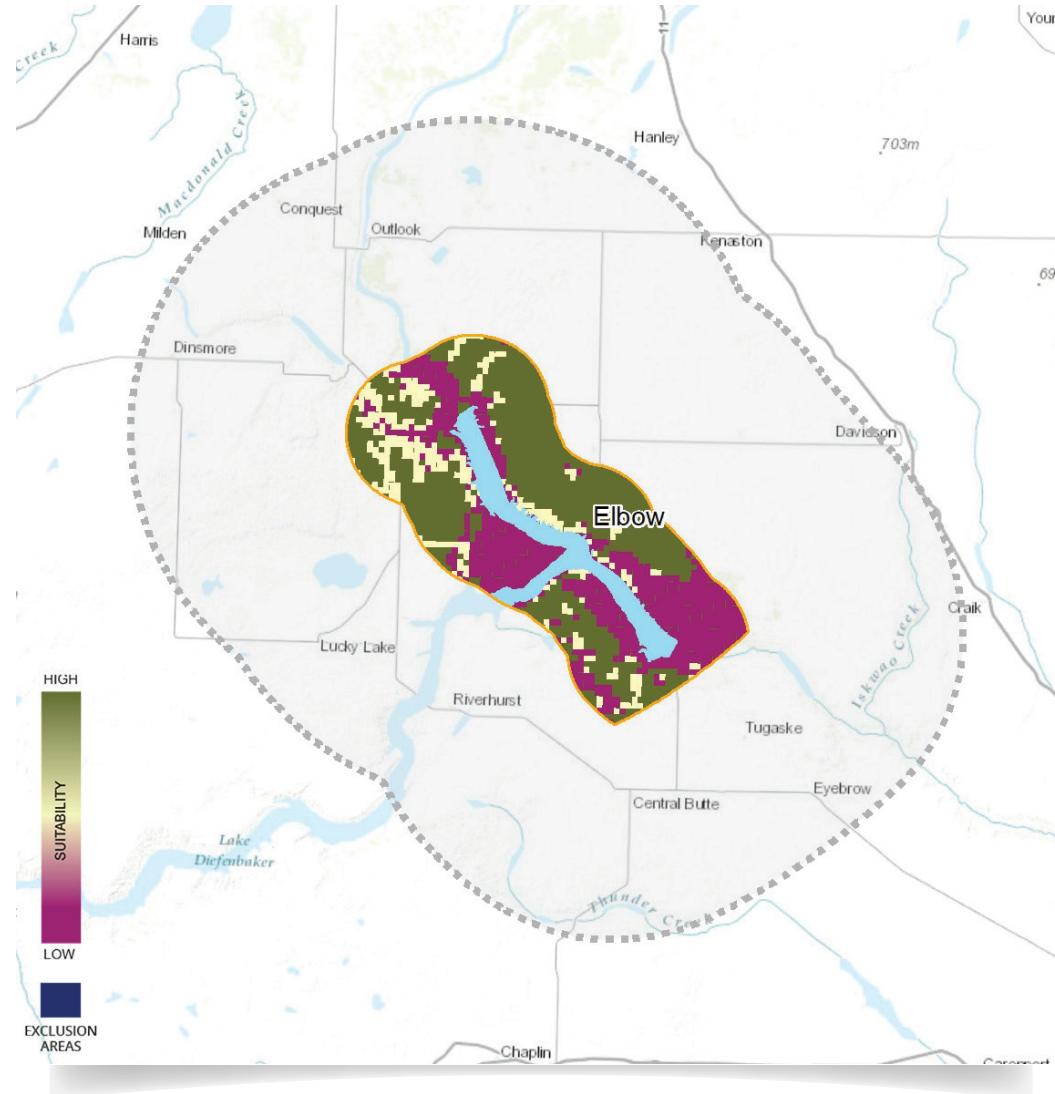
Non-sensitive land or Null = 100 (highest suitability) Conditionally Sensitive = 50 Sensitive = 0 (lowest suitability).



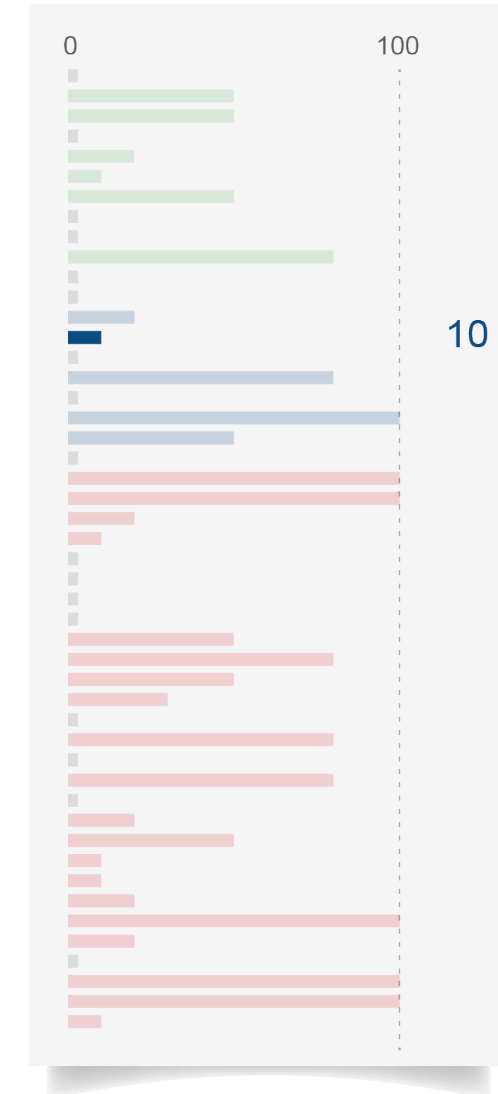
DESCRIPTION

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

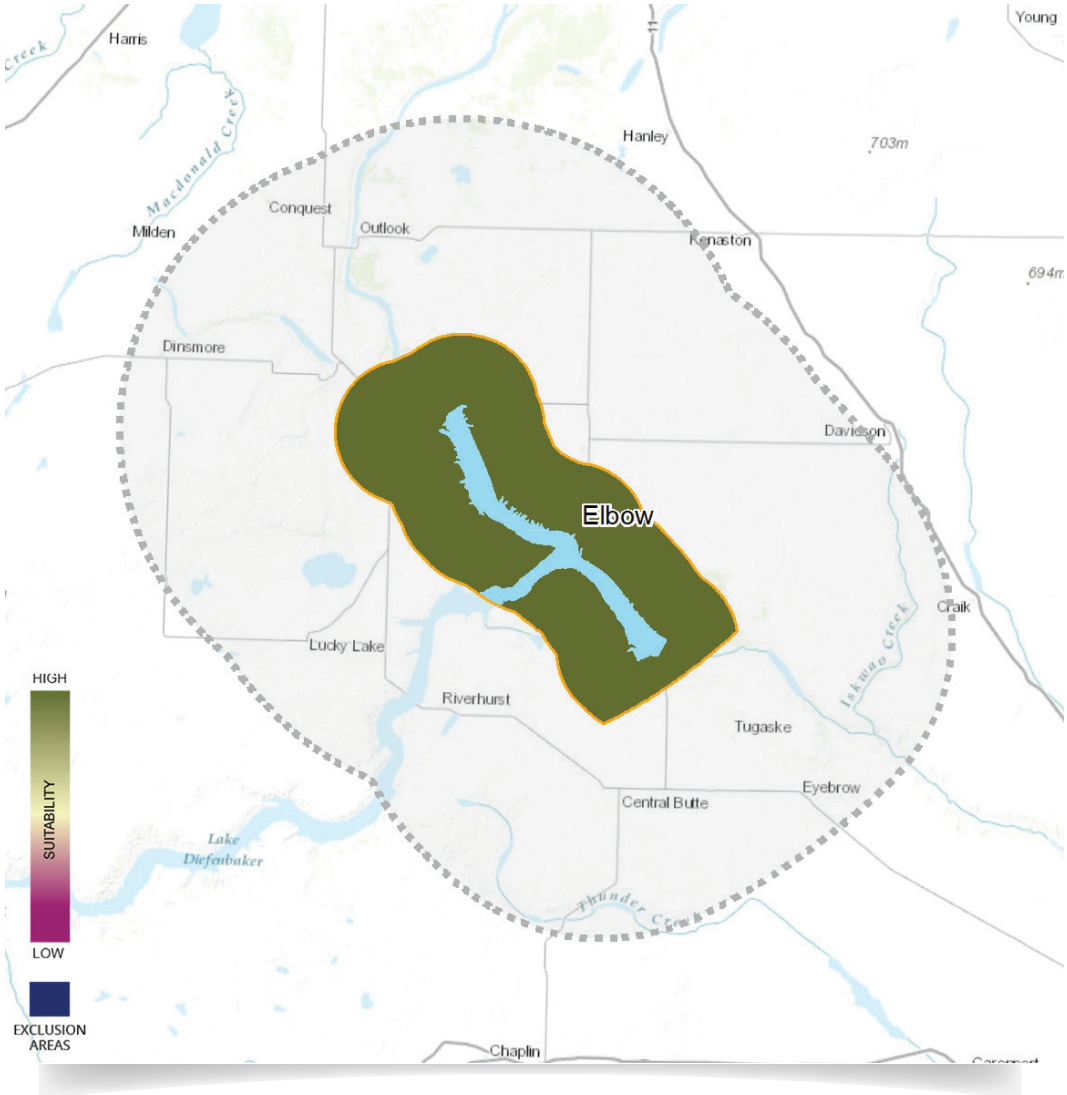
0 - 25 km distance decay buffer added.



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



POPULATION DENSITY

Minimize encroachment of moderate population density



SOURCE

Stats Canada 2021 Census data



LAYER PRE-PROCESSING AND COMMENTS

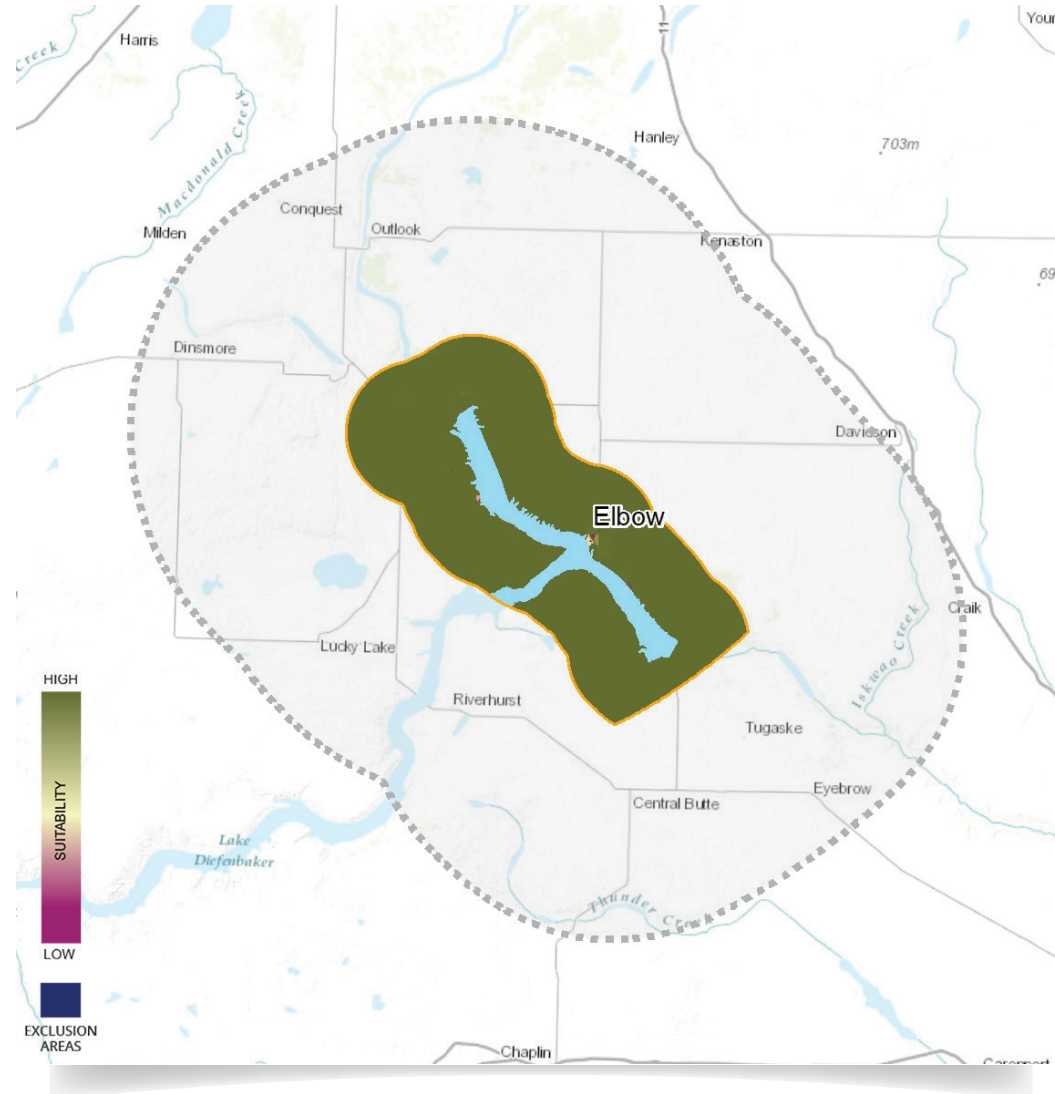
Indicator processed with a linear, increasing scale of suitability from 200 people per square km to 0.



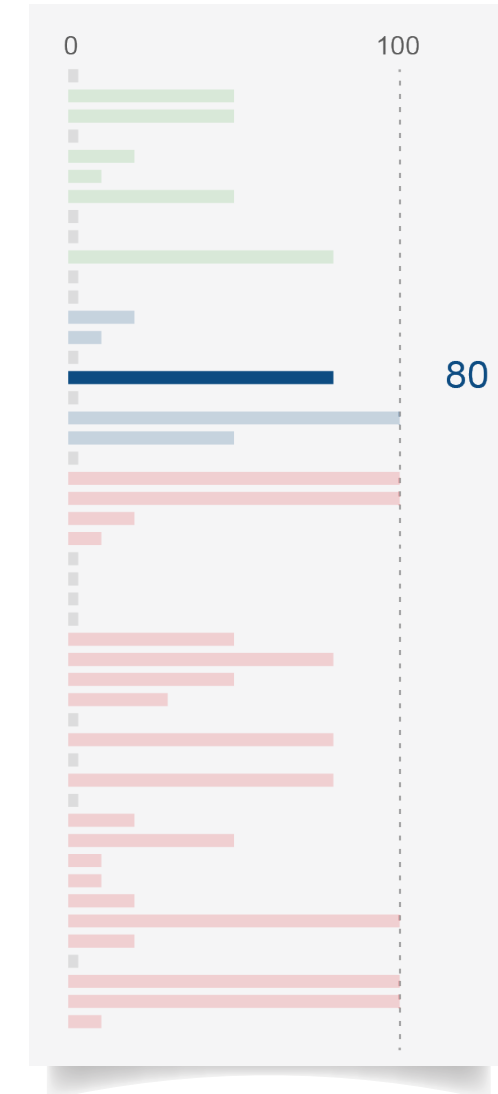
DESCRIPTION

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

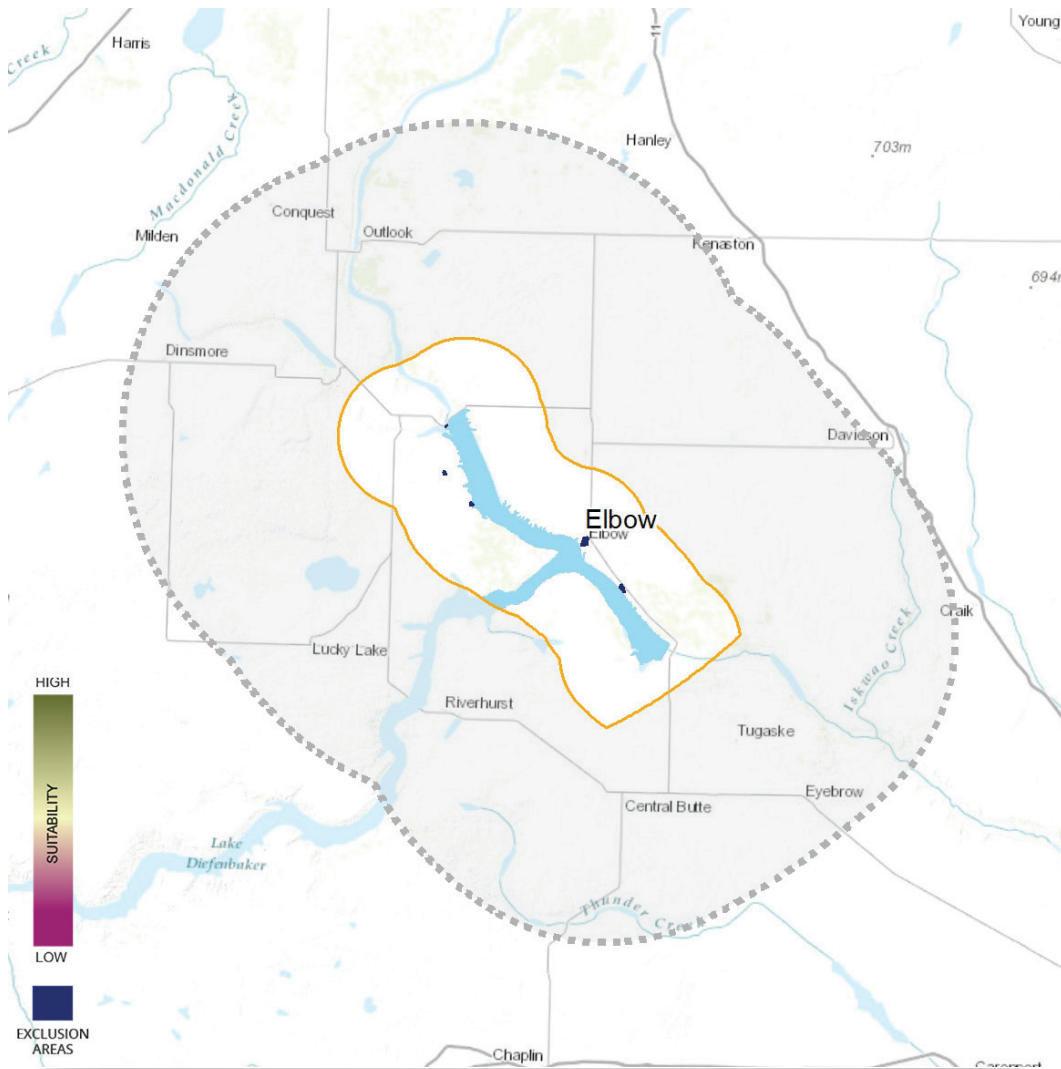
Avoid areas of high population density

SOURCE
Stats Canada 2021 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 100 km of settlements > 2,000 people



SOURCE

Stats Canada 2021 Census data



LAYER PRE-PROCESSING AND COMMENTS

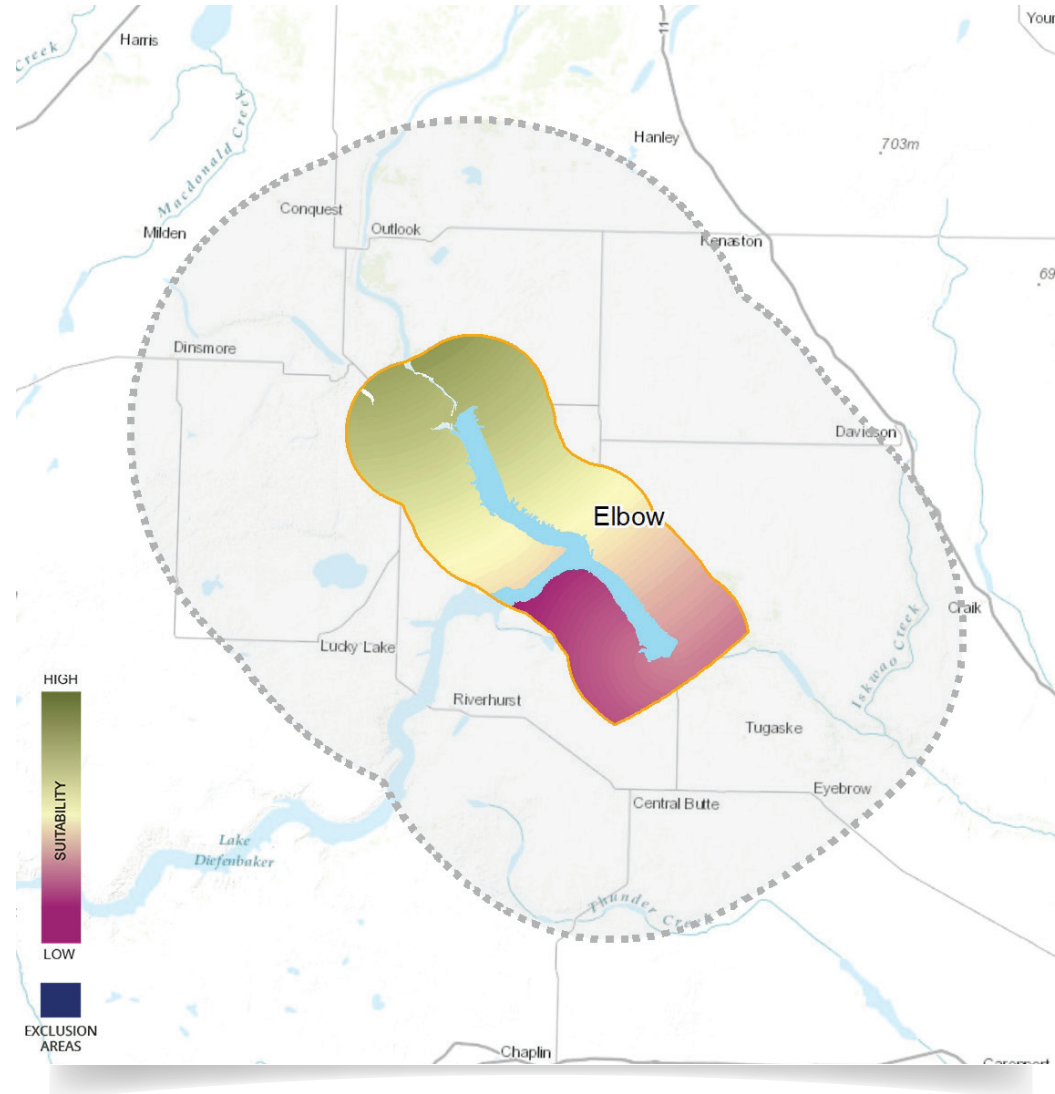
Calculate population of populated areas by adding the population of dissemination blocks within them. Distance decay buffer added from 0 to 100 km. Lakes and Reservoirs blocked except for bridges.



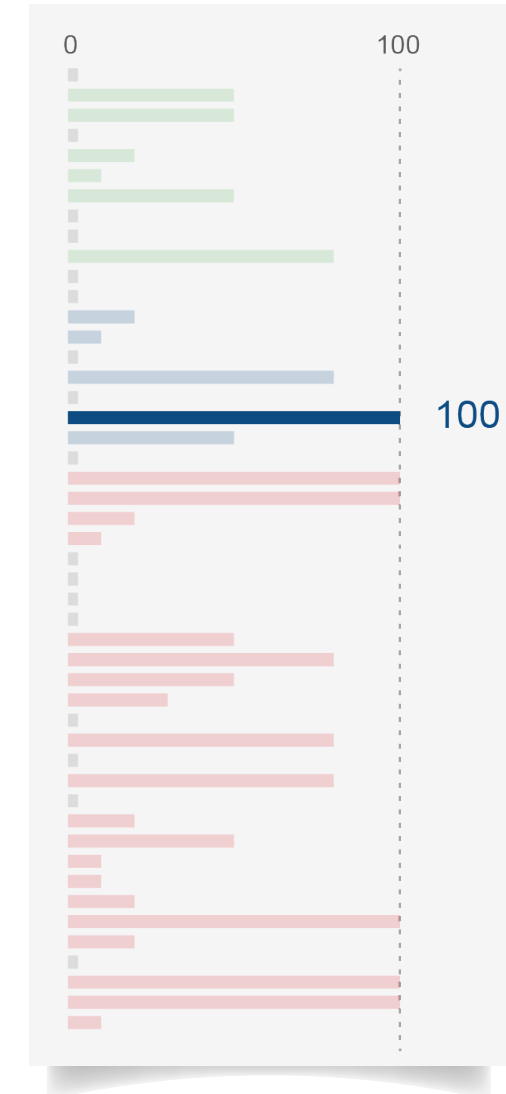
DESCRIPTION

Population centers greater than 2,000 people provide a localized workforce and access to emergency services (e.g., hospitals, fire, police and EMS). The 2021 Statistics Canada Census data was used for communities above 2,000 people.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



SASKPOWER LANDS

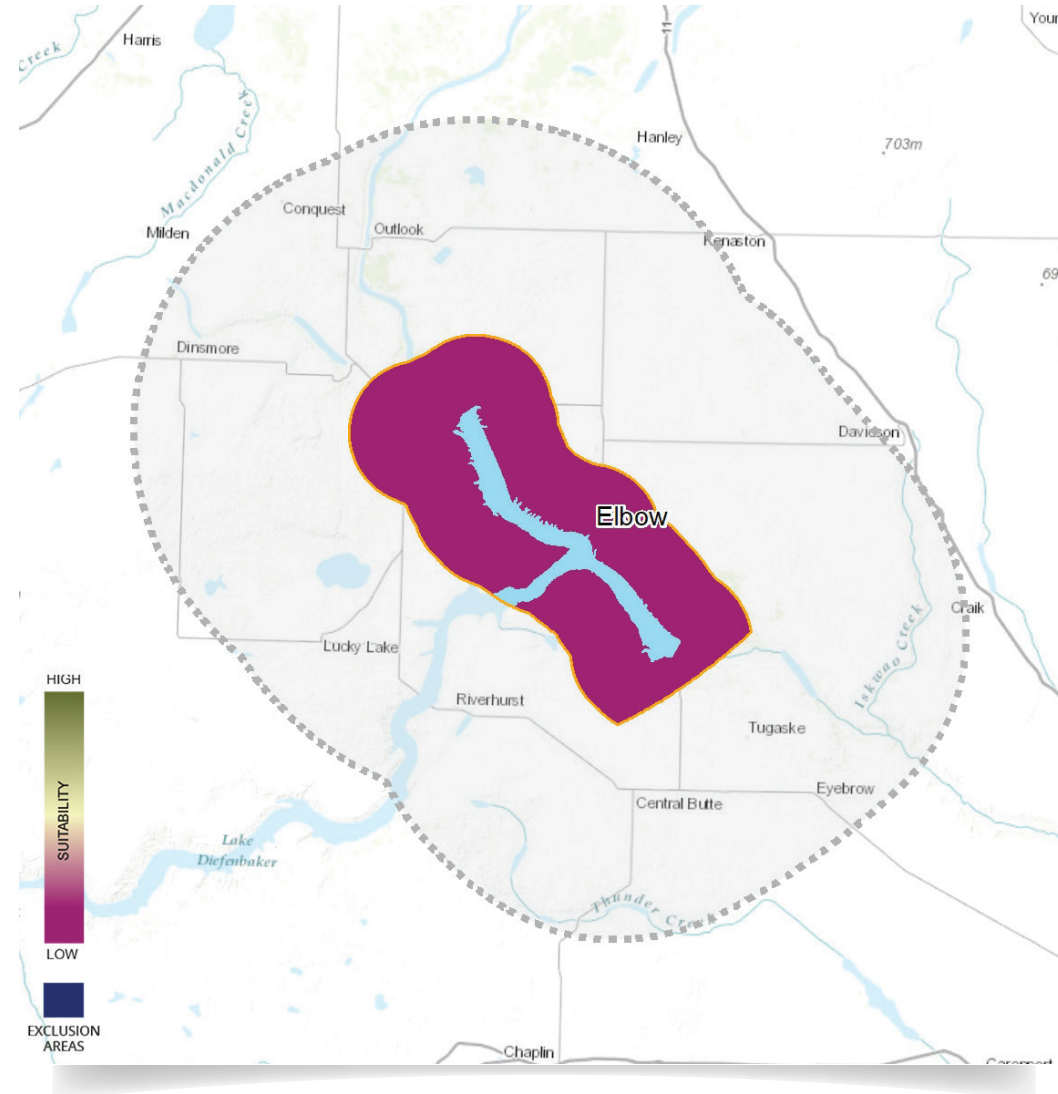
Prefer sites on land already owned by SaskPower.

SOURCE
SaskPower

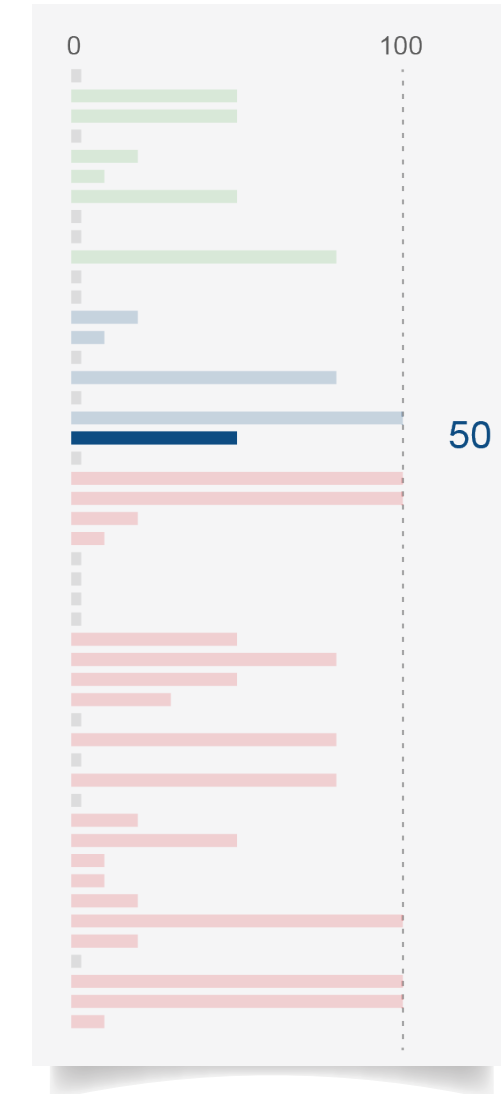
LAYER PRE-PROCESSING AND COMMENTS
No buffer added.

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)
Geografis, Natural Resources Canada (NRCan)



LAYER PRE-PROCESSING AND COMMENTS

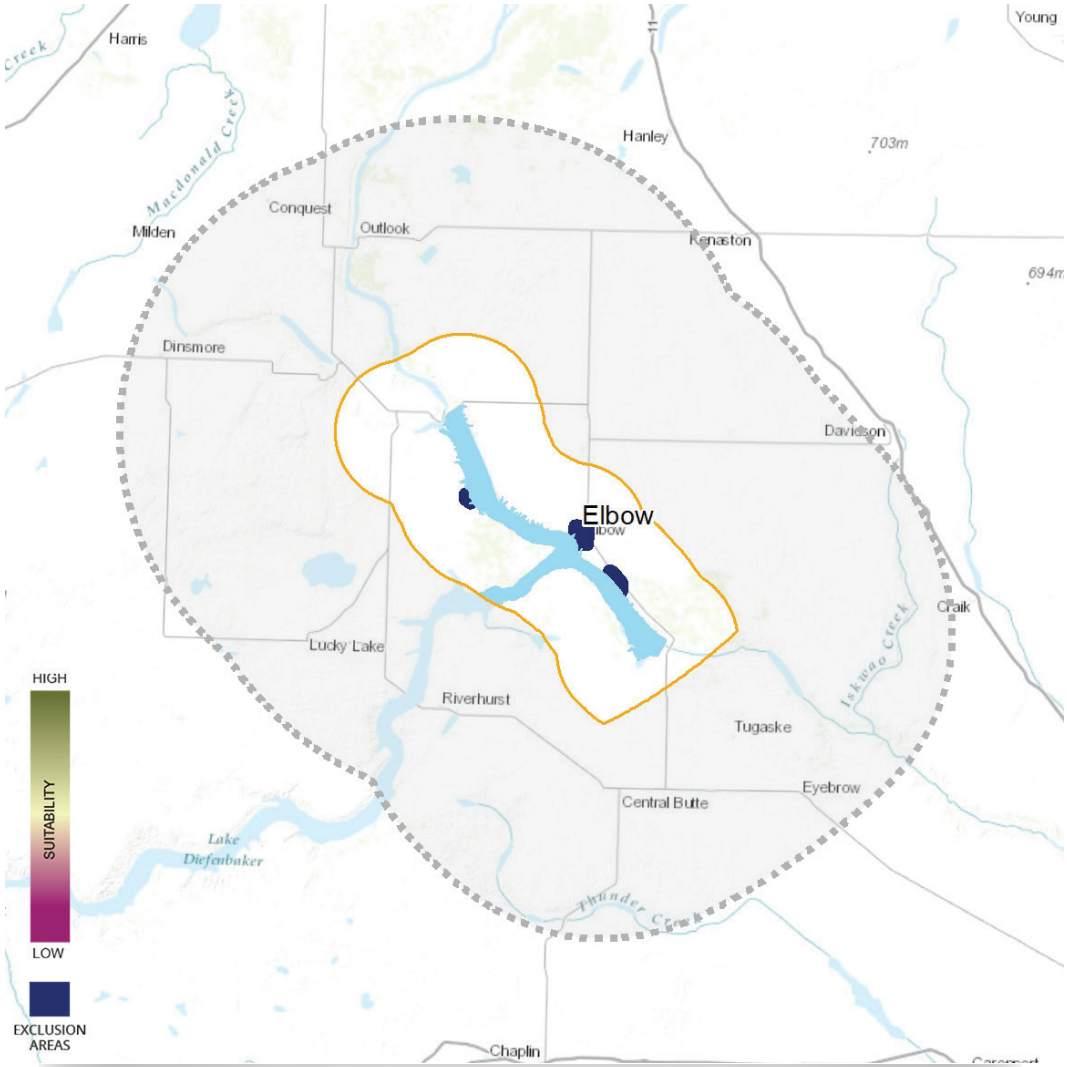
1 km buffer on urban municipalities.



DESCRIPTION

Avoid siting within 1 km of the legal boundary of urban municipalities.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



Technical

Indicators

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

AERODROME - SMALL

Aerodrome airspace with radius of less than 6 km

SOURCE
NavCanada

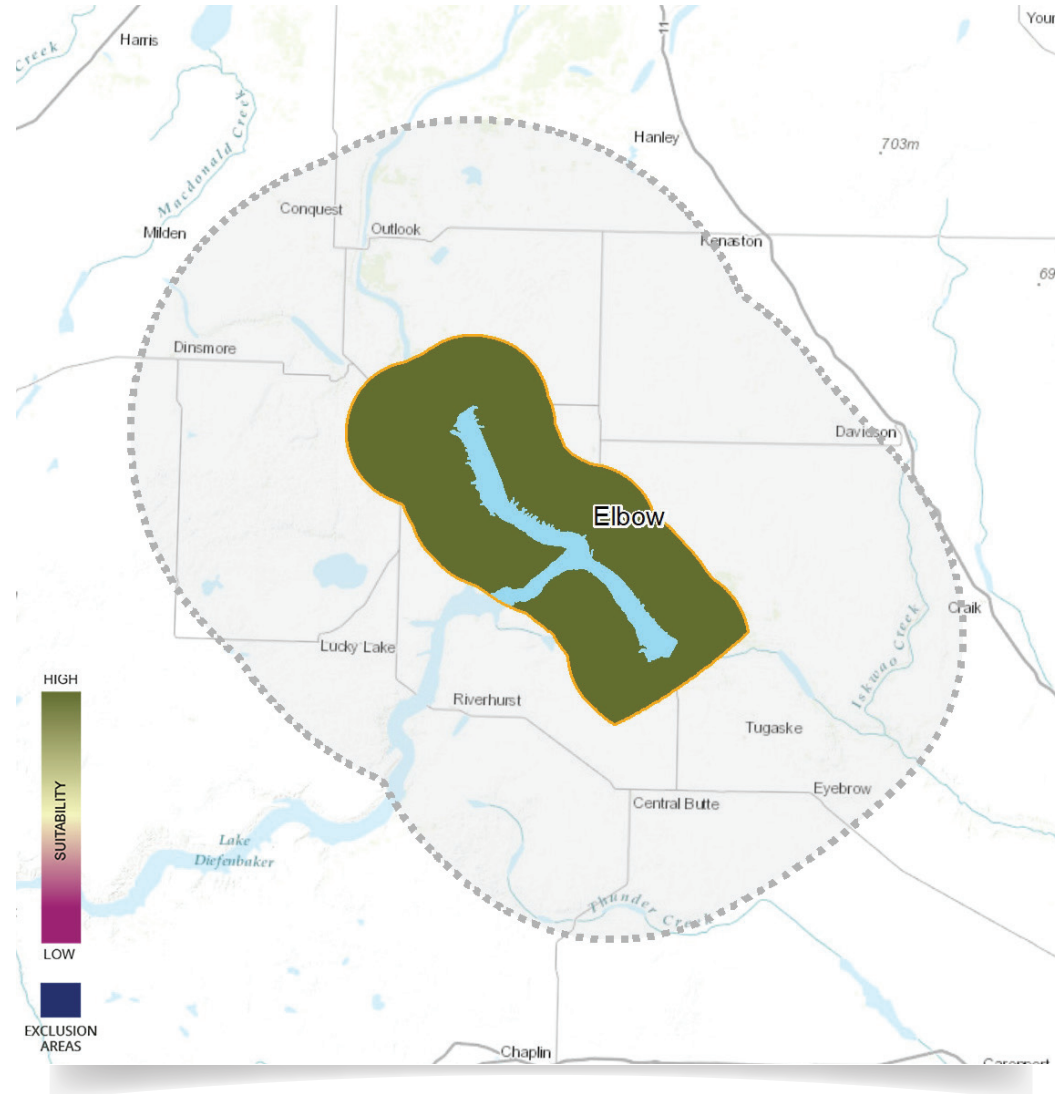
LAYER PRE-PROCESSING AND COMMENTS

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

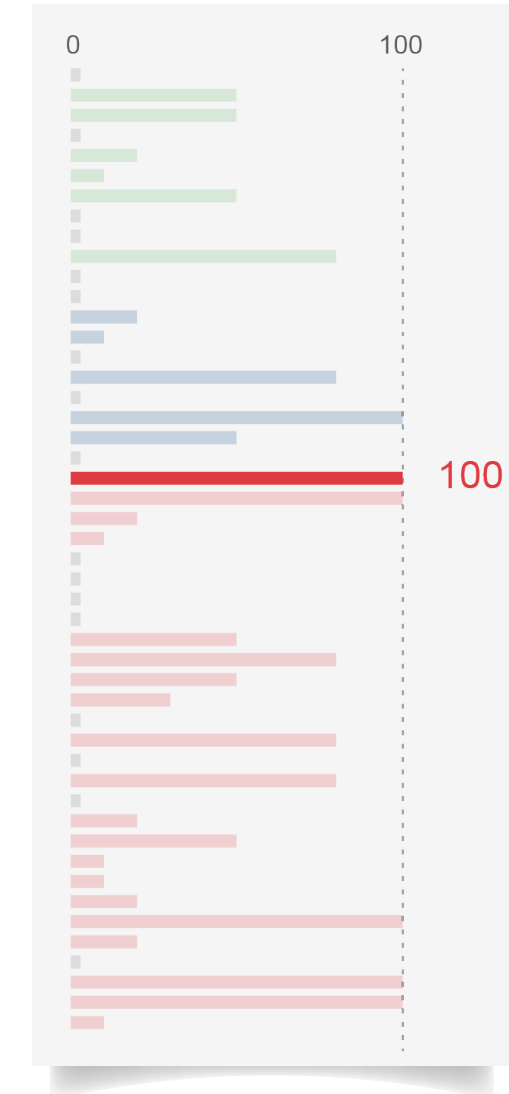
DESCRIPTION

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

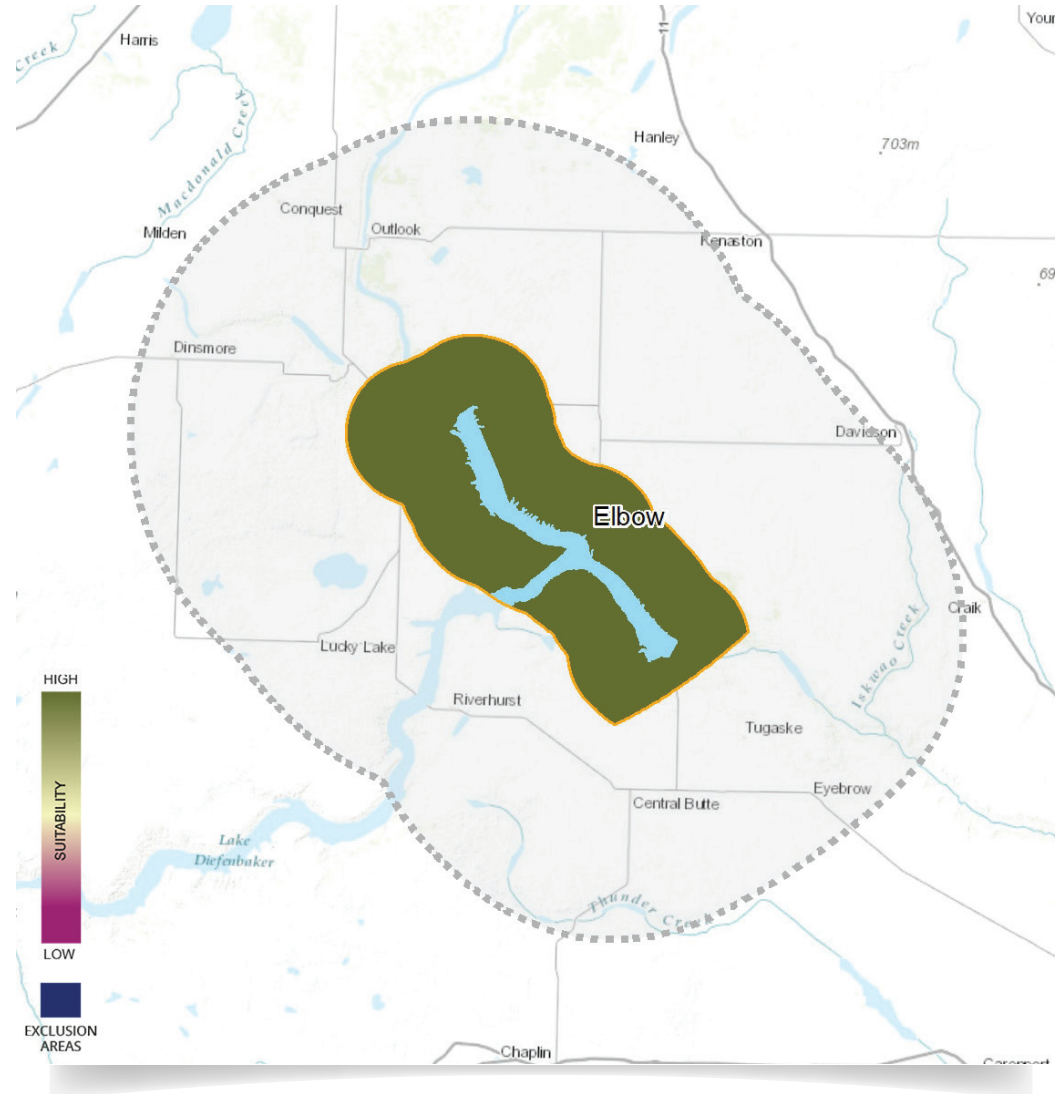
Query CYA, no buffer added.



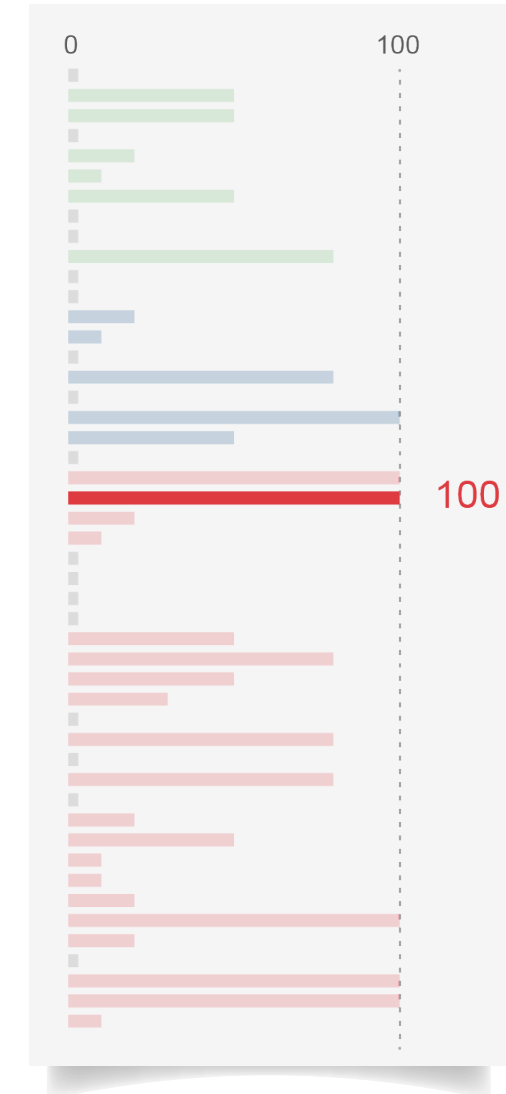
DESCRIPTION

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



AQUIFERS

Avoid interaction with groundwater aquifers



SOURCE

Water Security Agency (WSA)



LAYER PRE-PROCESSING AND COMMENTS

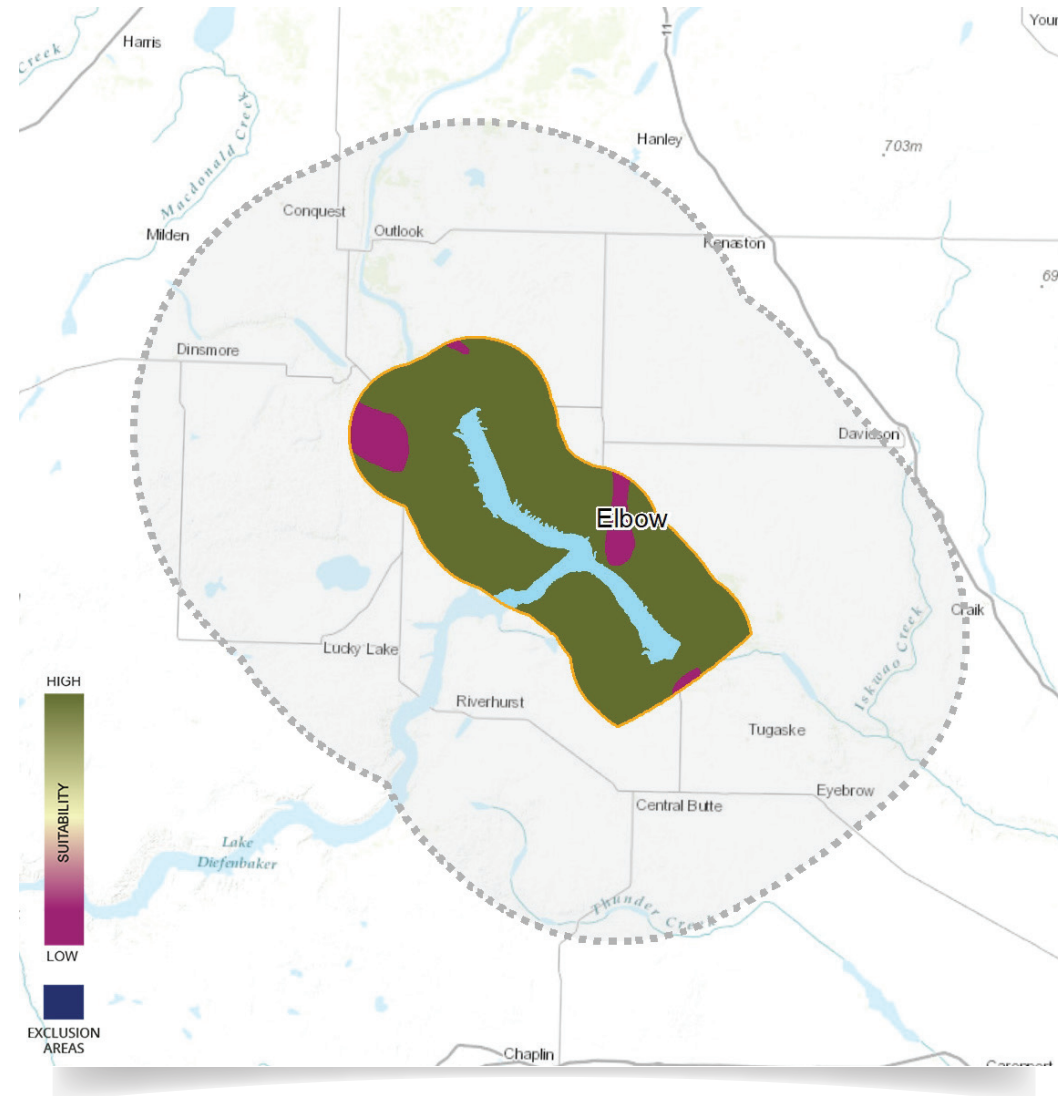
No buffer added.



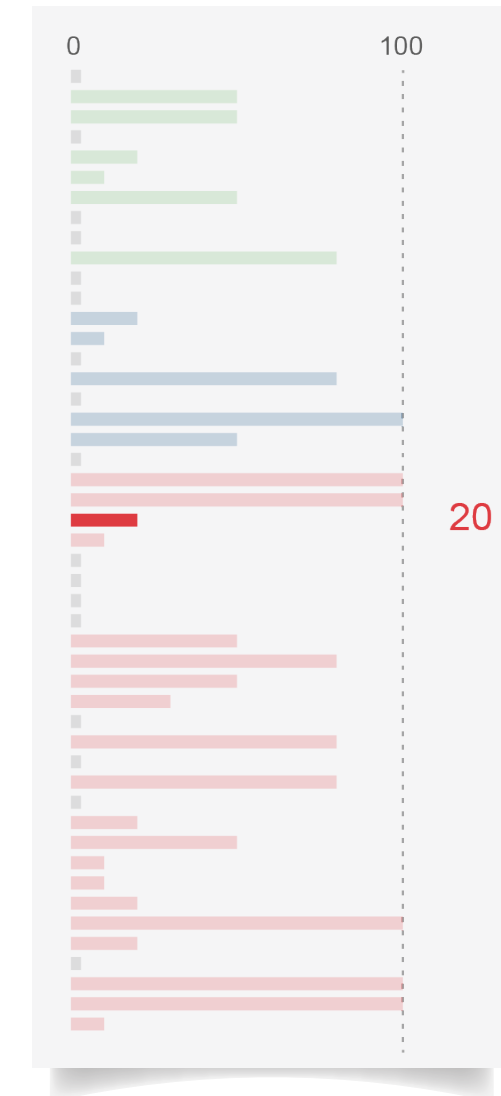
DESCRIPTION

Regionally extensive major aquifers such as the Estevan Valley aquifer Empress Group are less favorable for SMR siting to reduce the potential for project related interactions. Less extensive and more localized drift aquifers such as the Interill, Sutherland and Saskatoon Groups will also be considered at a local siting level. There are uncertainties in the aquifer boundary data used at this scale. Other data sources can be used at the site specific scale to better define the presence of aquifers. Additional data can also be collected through detailed, site specific hydrogeological investigations to support siting evaluations.

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



DAMS

Avoid proximity to dam sites



SOURCE

Water Security Agency (WSA)



LAYER PRE-PROCESSING AND COMMENTS

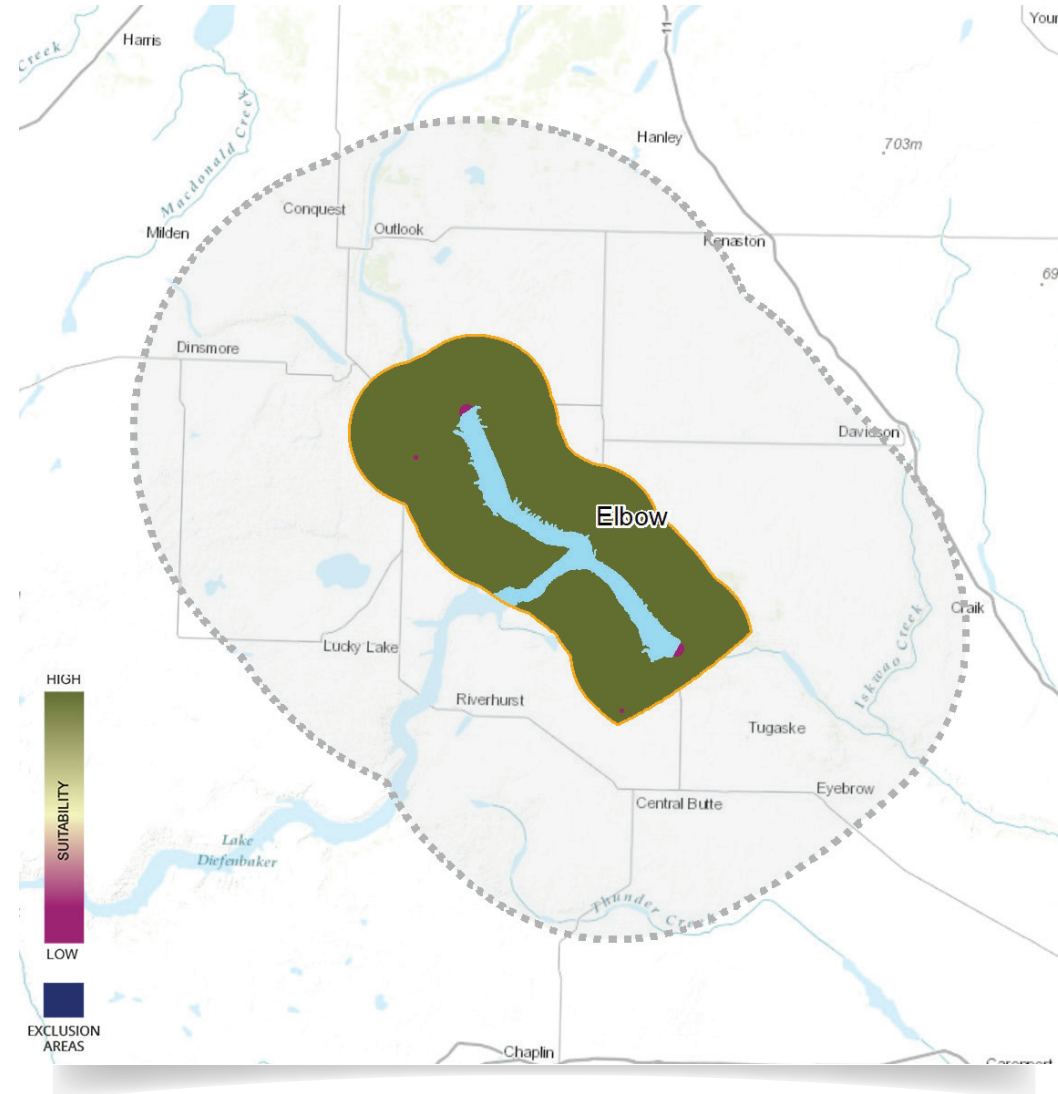
Combine "WSA Dams" and "Dams" datasets. Consider major or non major WSA dams, owner of other dams and imagery to assign 250 m, 500 m or 1 km setback.



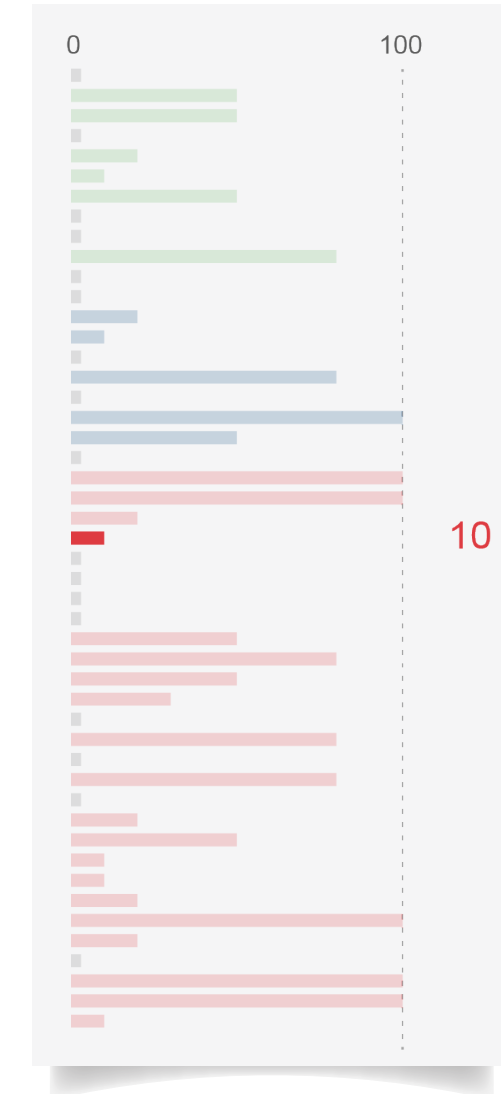
DESCRIPTION

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



EXISTING POWER PLANTS

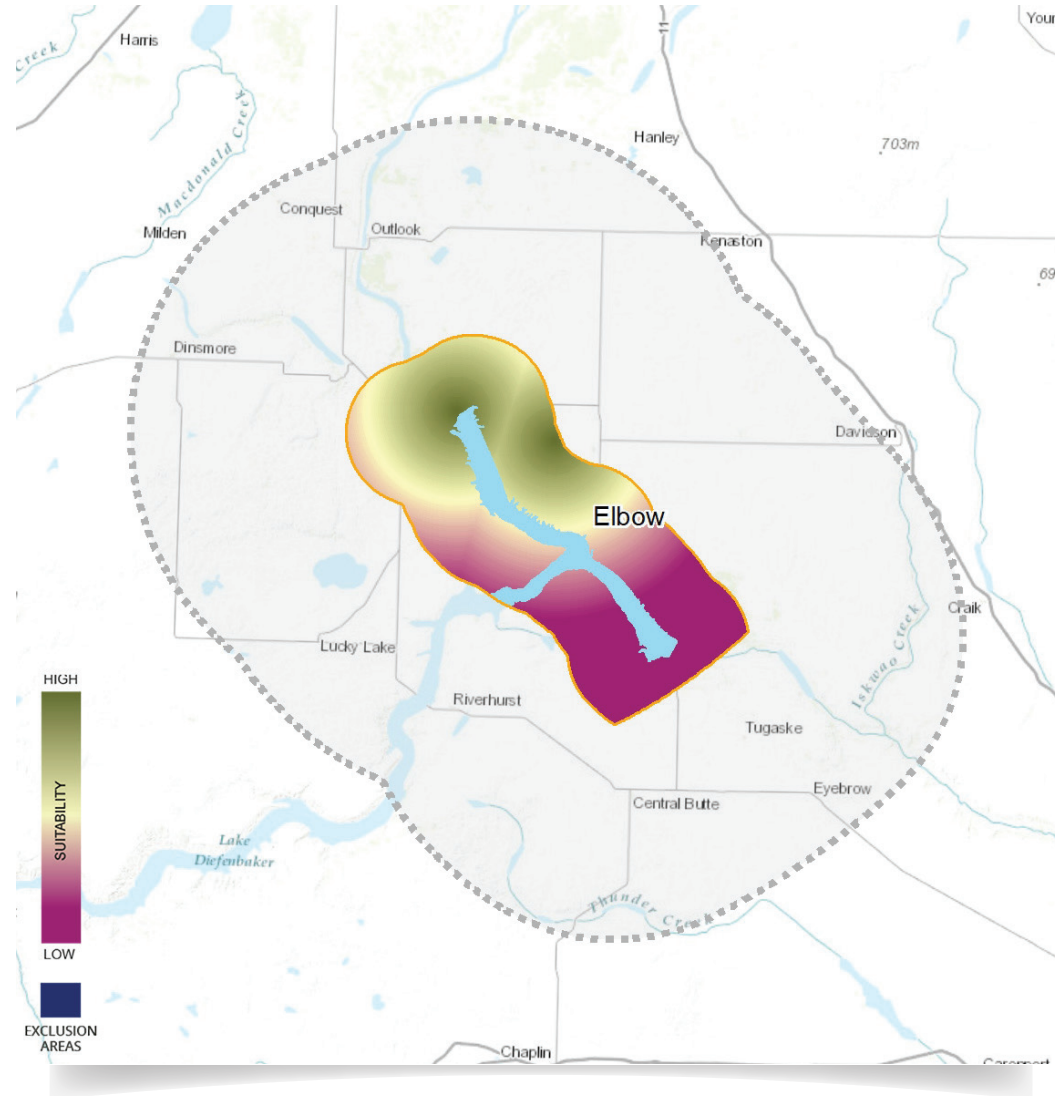
Prefer sites closer to existing power plants

SOURCE
SaskPower

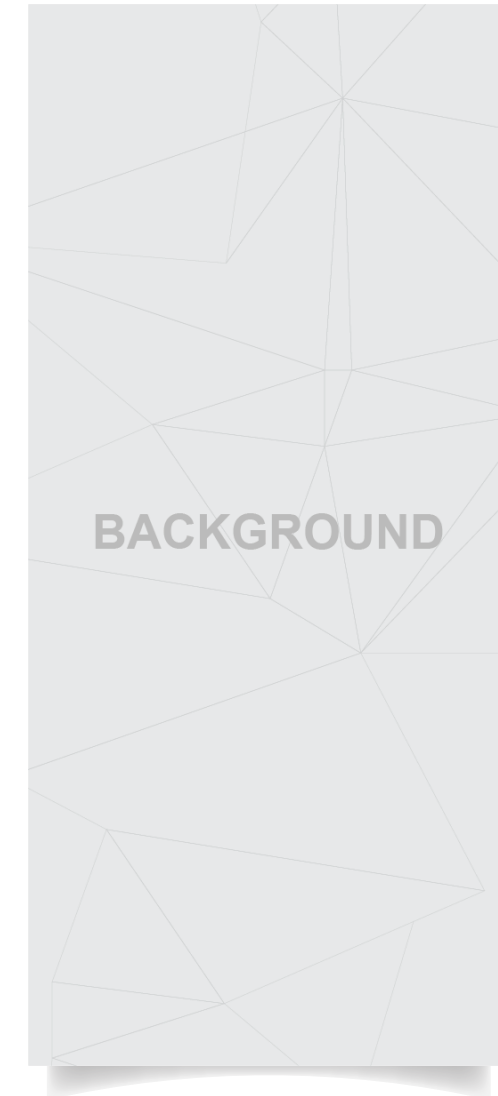
LAYER PRE-PROCESSING AND COMMENTS
Zero - 25 km distance decay buffer added.

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

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



FAULTS

Avoid areas with active faults



SOURCE

Saskatchewan Mining and Petroleum GeoAtlas,
Faults 250K



LAYER PRE-PROCESSING AND COMMENTS

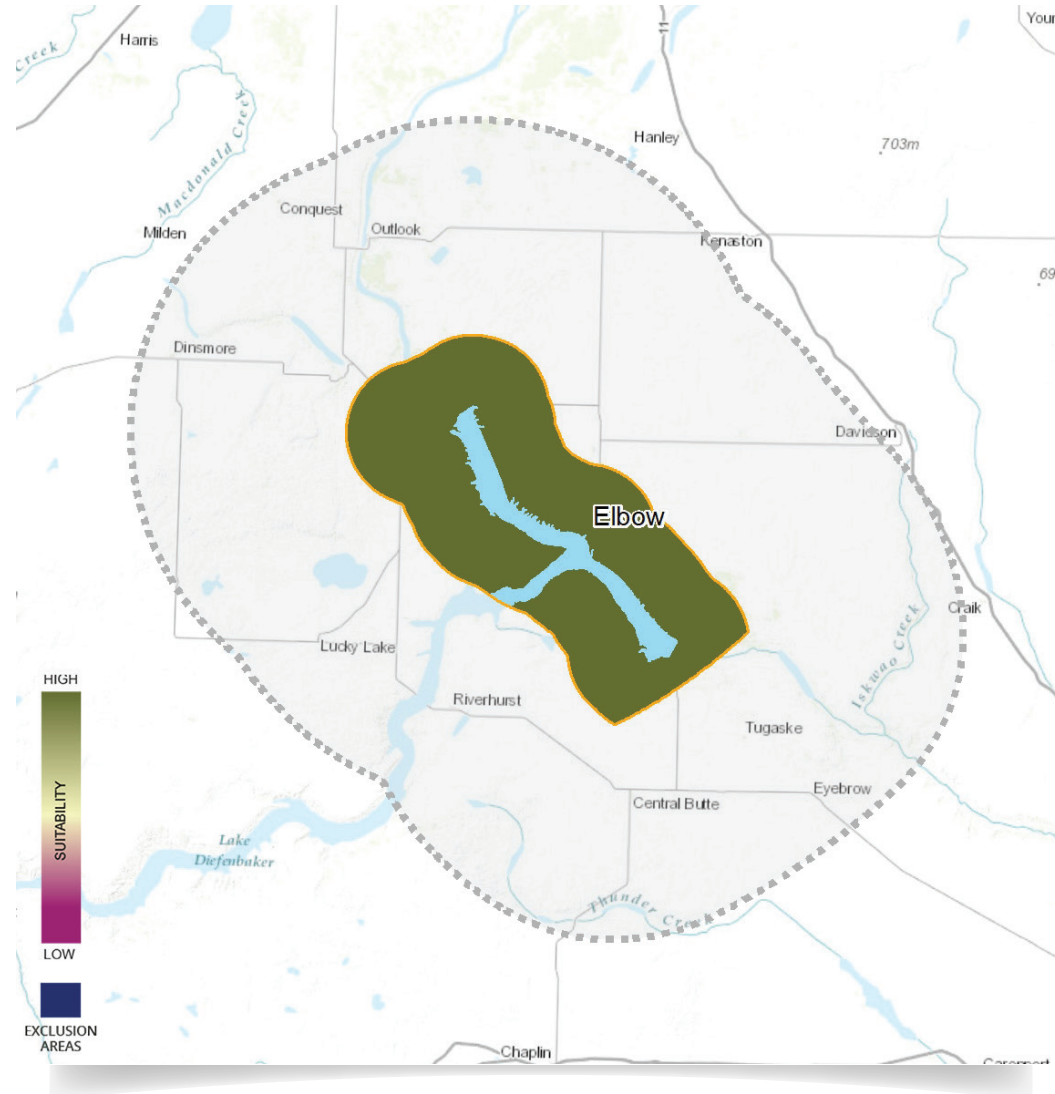
Neutral



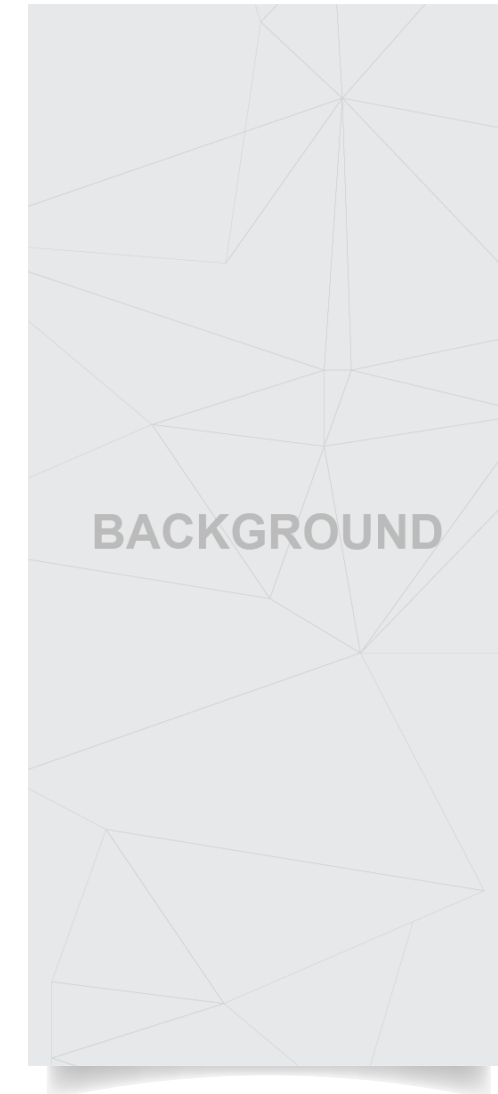
DESCRIPTION

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



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.

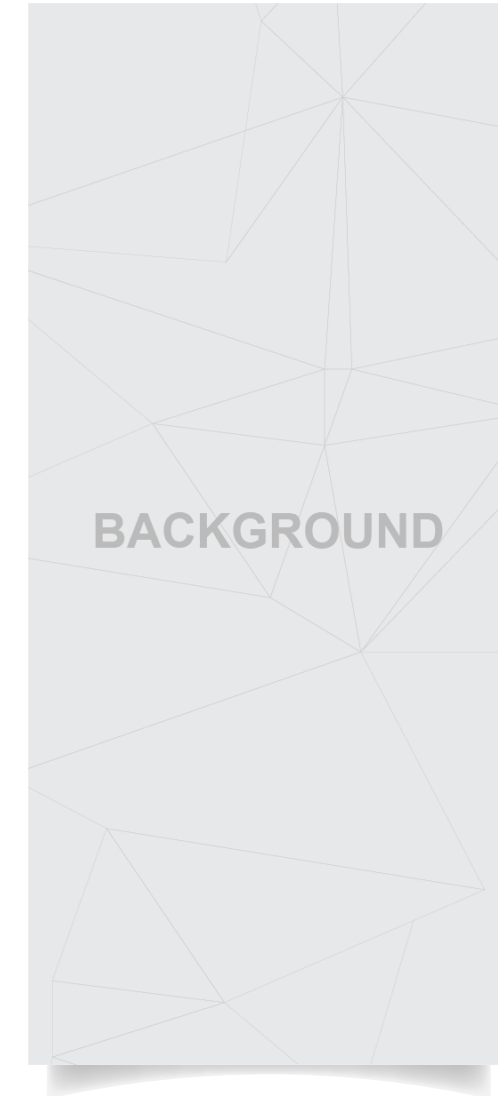


DESCRIPTION

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

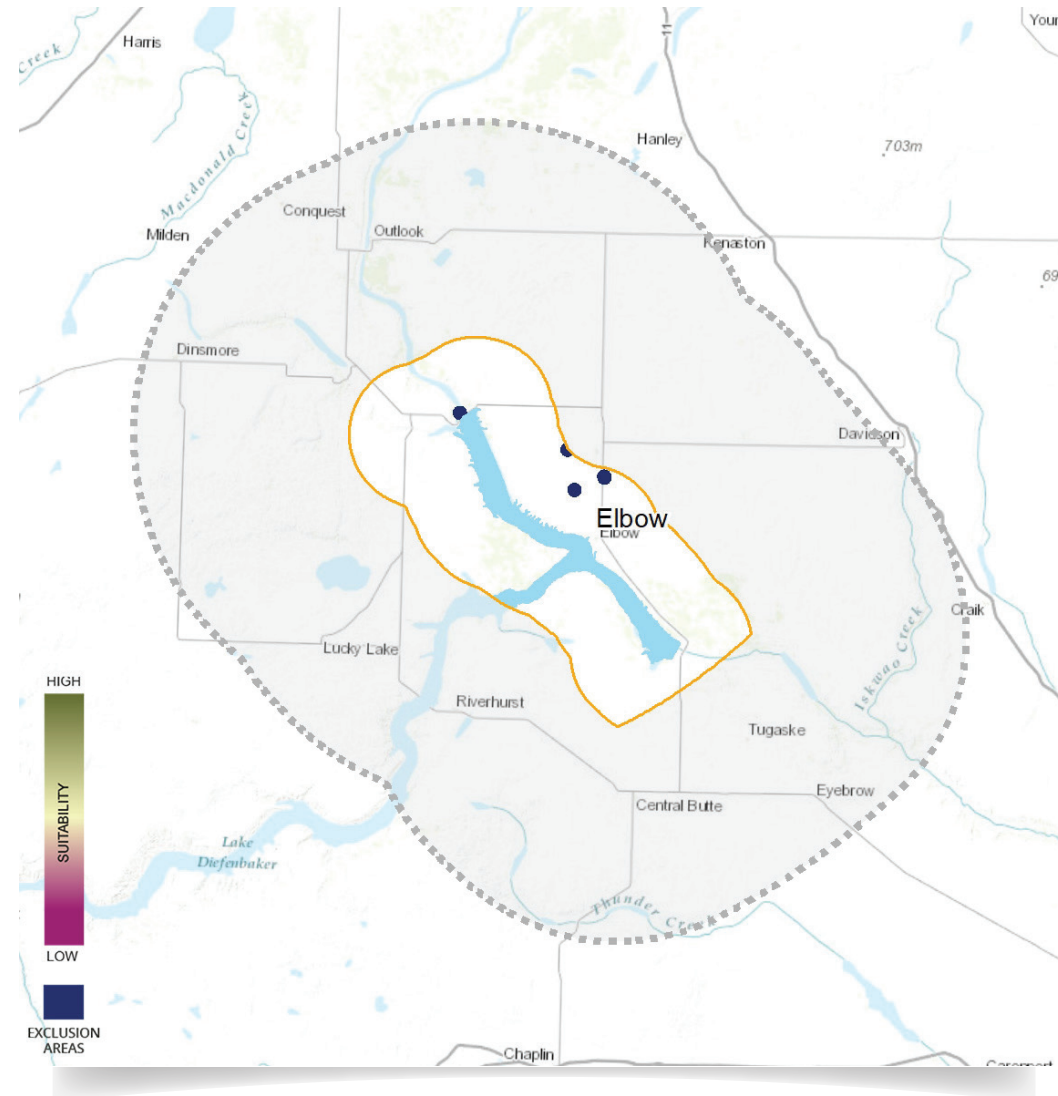
1 km buffer



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

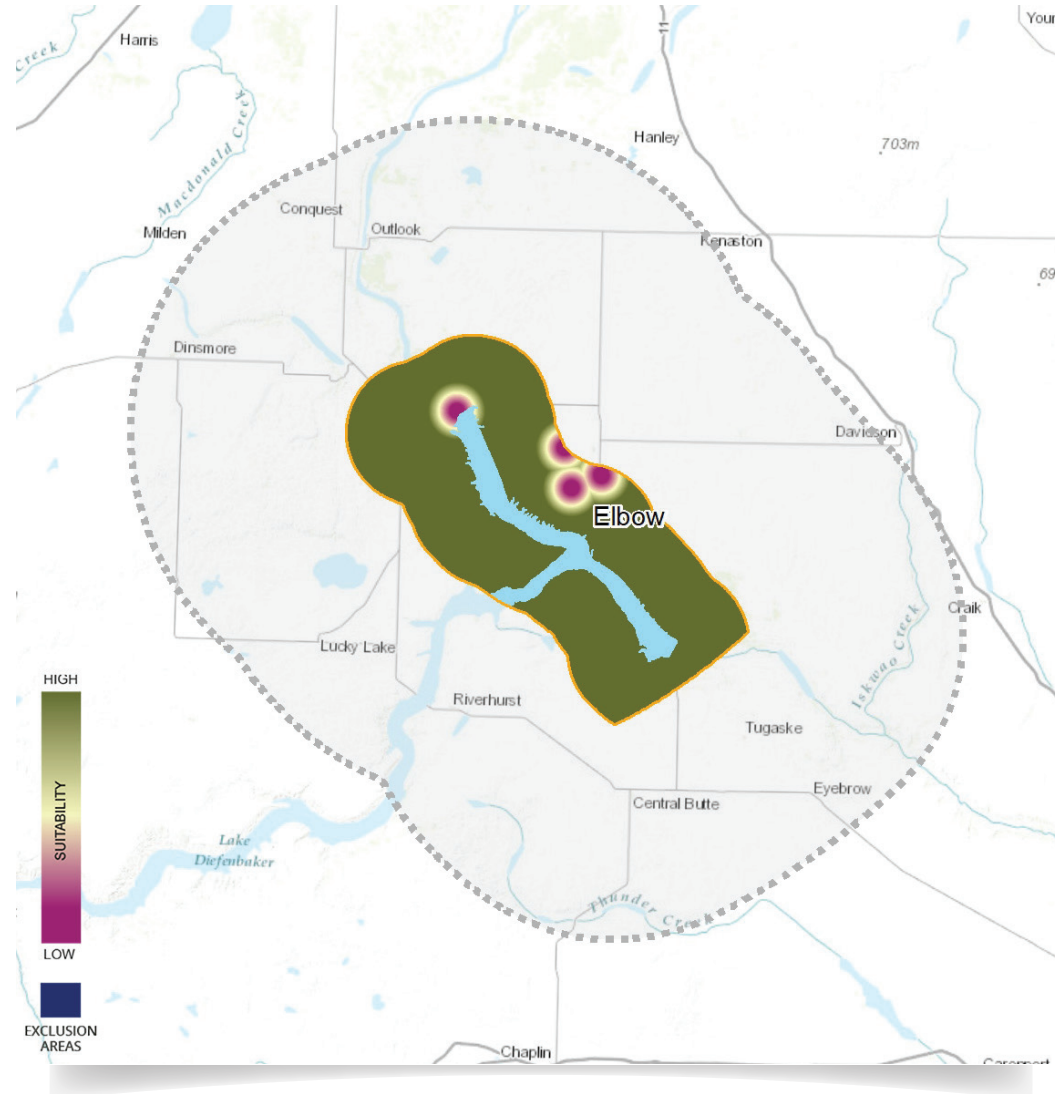
4 km distance decay.



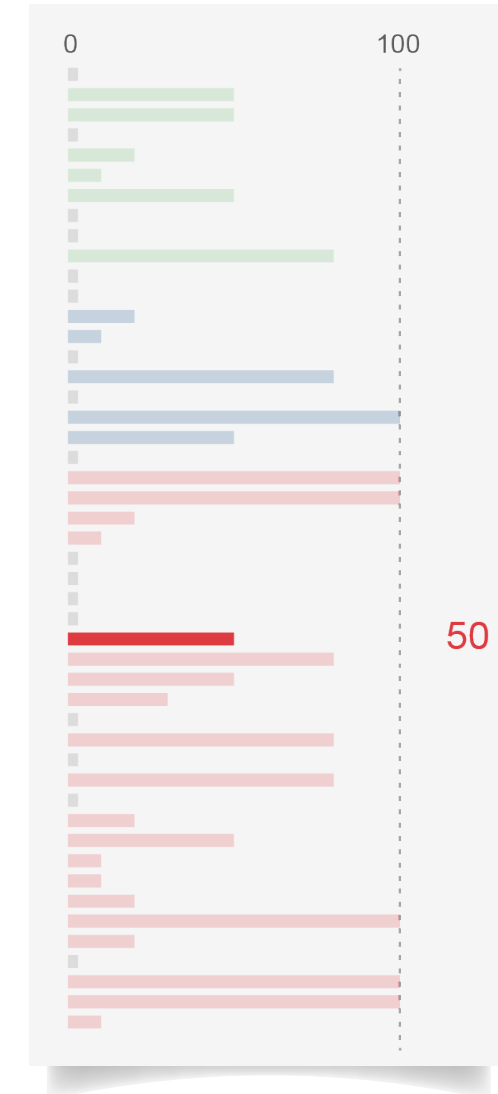
DESCRIPTION

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

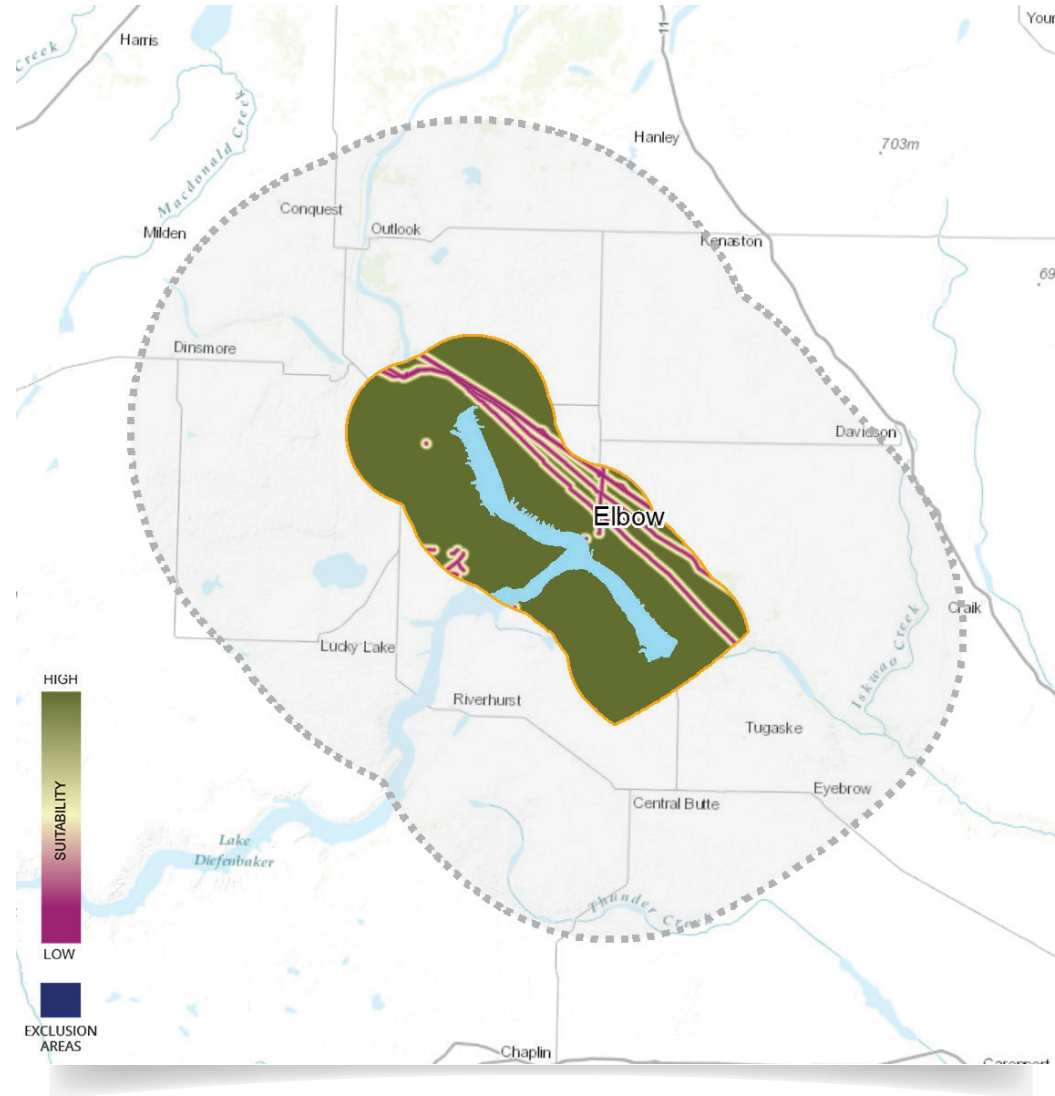
Avoid proximity to high pressure pipelines

SOURCE
IHS Markit Canada ULC

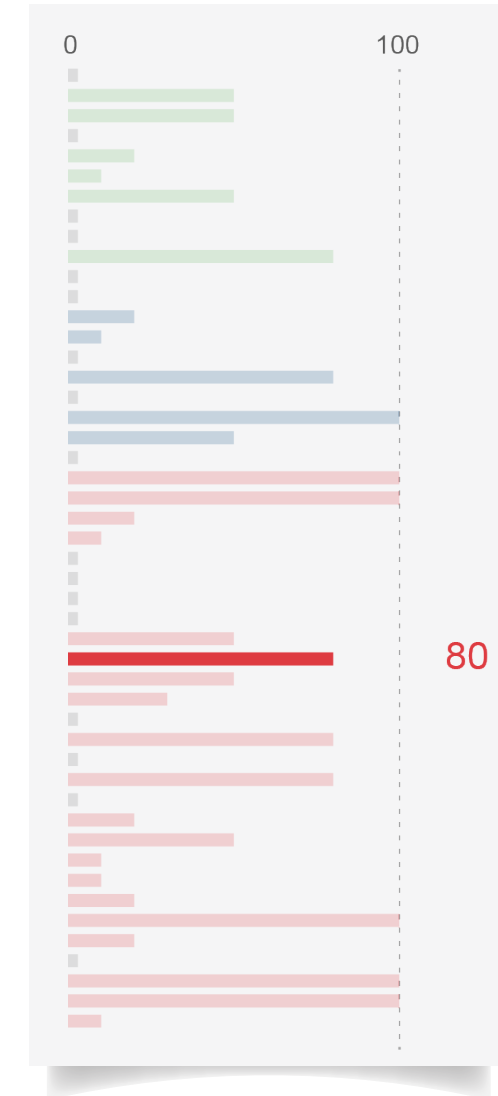
LAYER PRE-PROCESSING AND COMMENTS
Distance decay buffer to 1 km added.

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

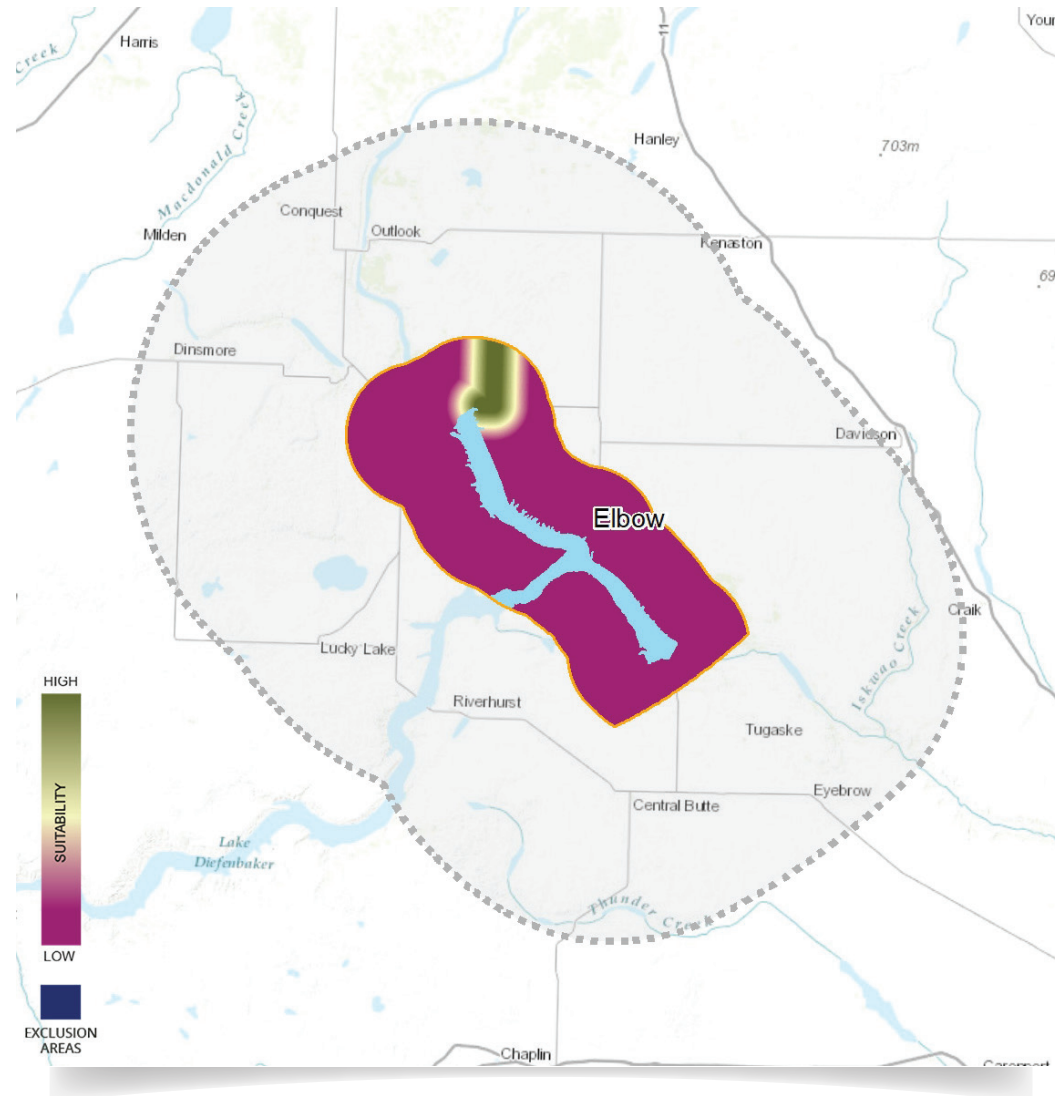
Classify highways based on 2021 weight classification map. Only include Primary Weight and Primary Weight by Ministerial Order. Suitability from 0-1 km is high (100), 1 - 5 km distance decay buffer added.



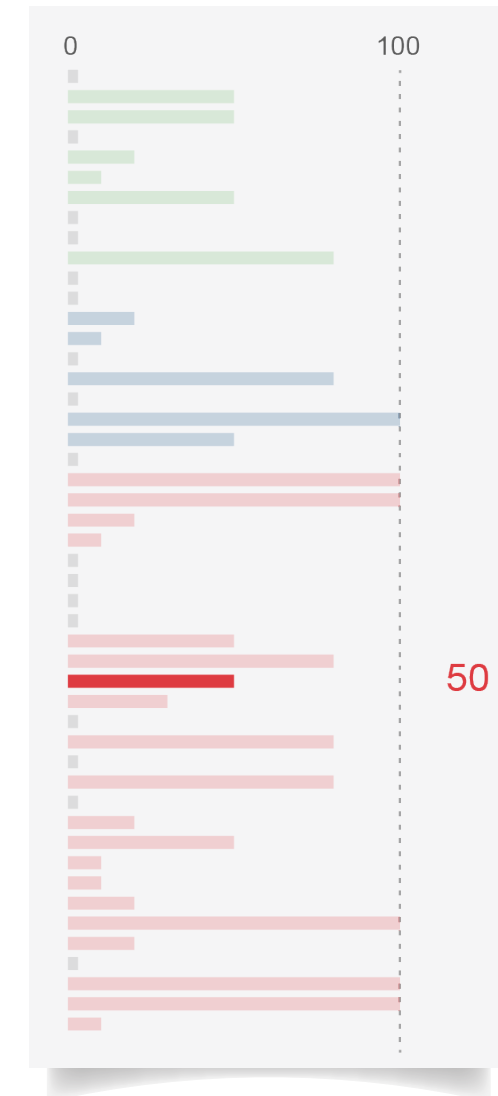
DESCRIPTION

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

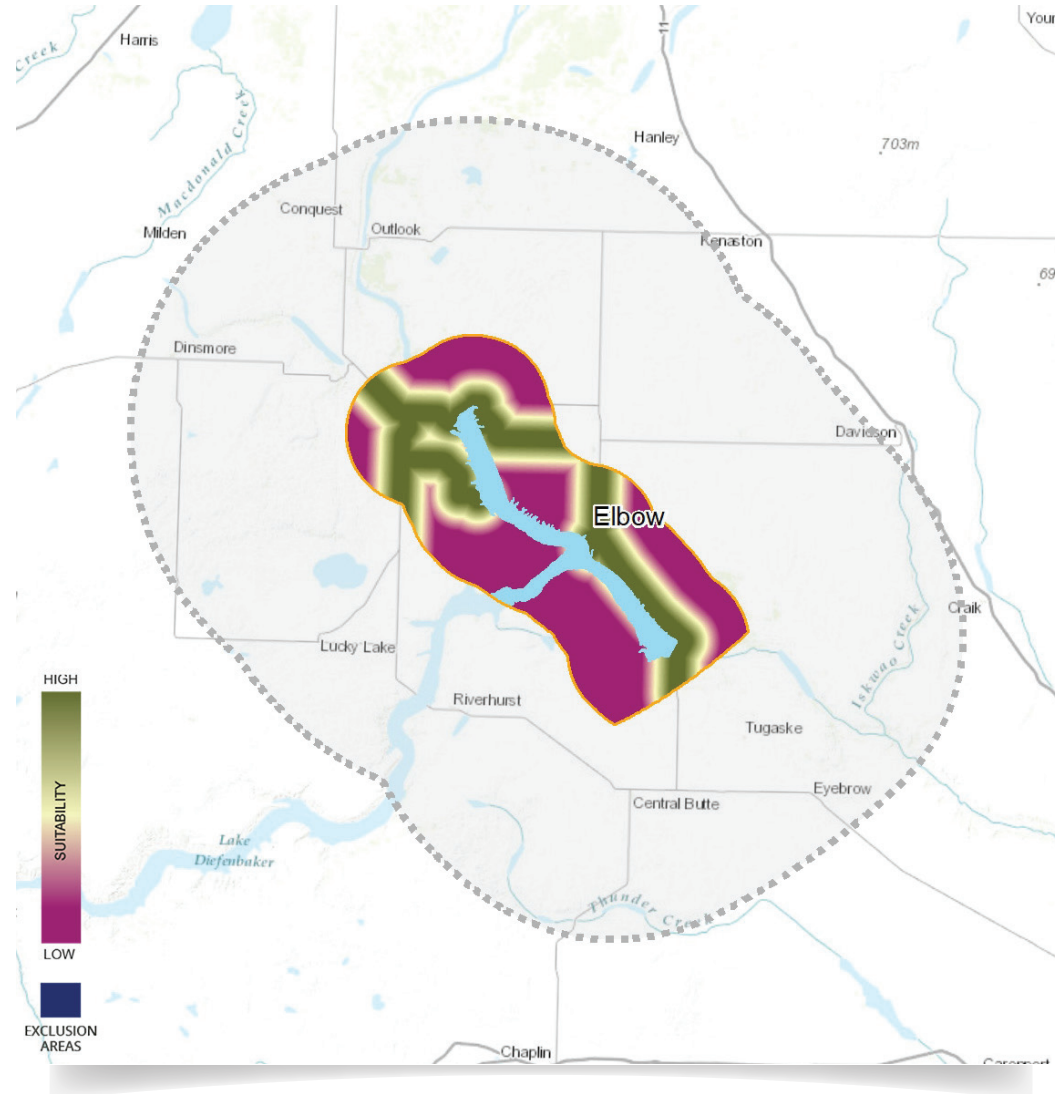
Only include secondary weight highways, 9-month primary weight highways, and 8,000 kg restricted highways. Suitability from 0-1 km is high (100), 1-5 km distance decay buffer added.



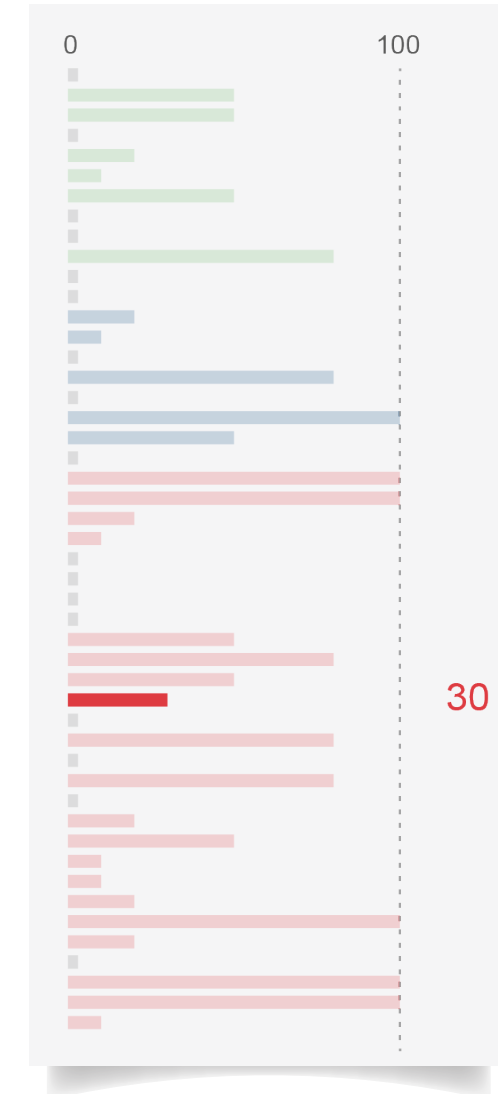
DESCRIPTION

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



LINEAR INFRASTRUCTURE

Avoid siting on existing linear infrastructure



SOURCE

Saskatchewan Ministry of Highways Geogratix,
Natural Resources Canada (NRCAN) SaskPower



LAYER PRE-PROCESSING AND COMMENTS

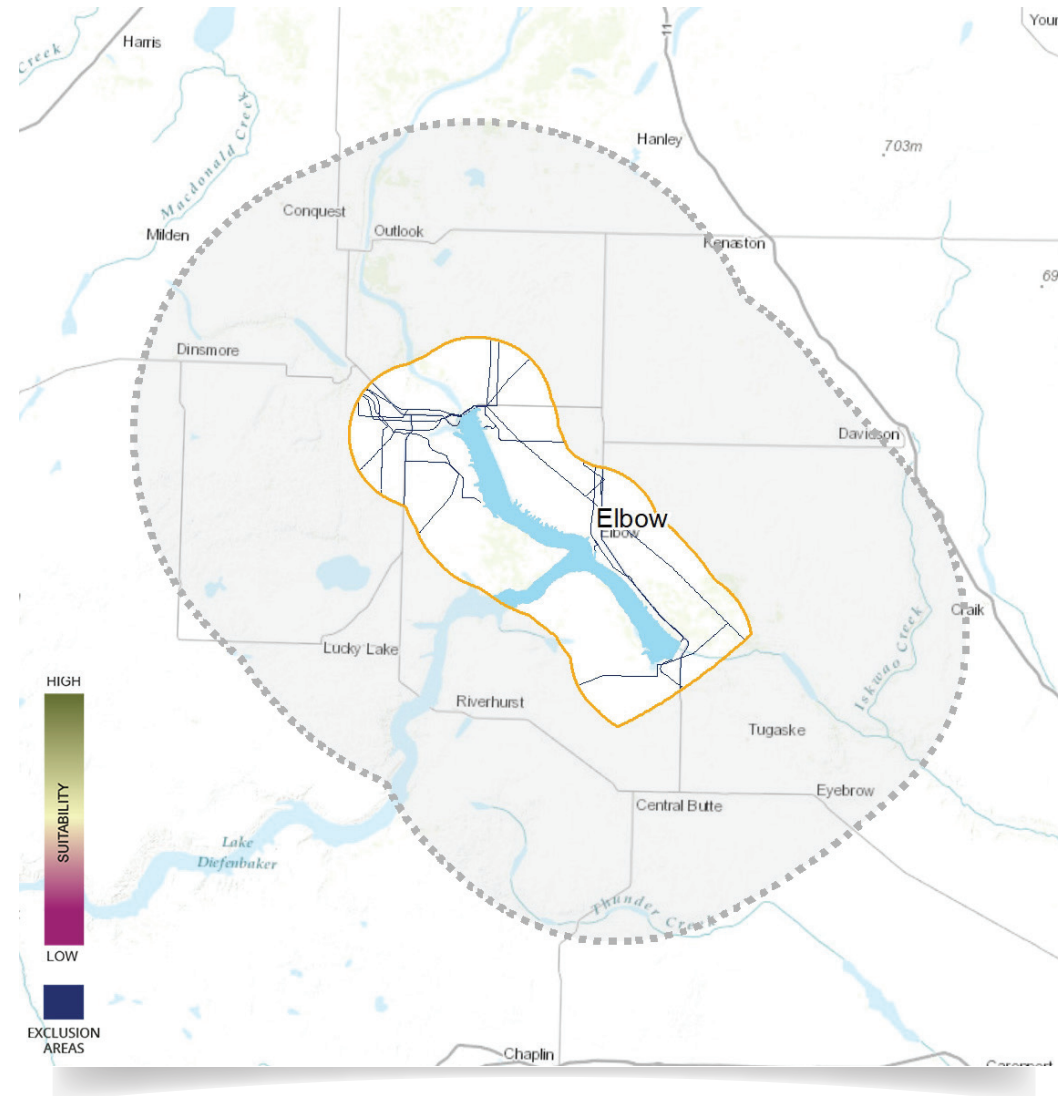
Combine data sources. No buffer added to exclusion.



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

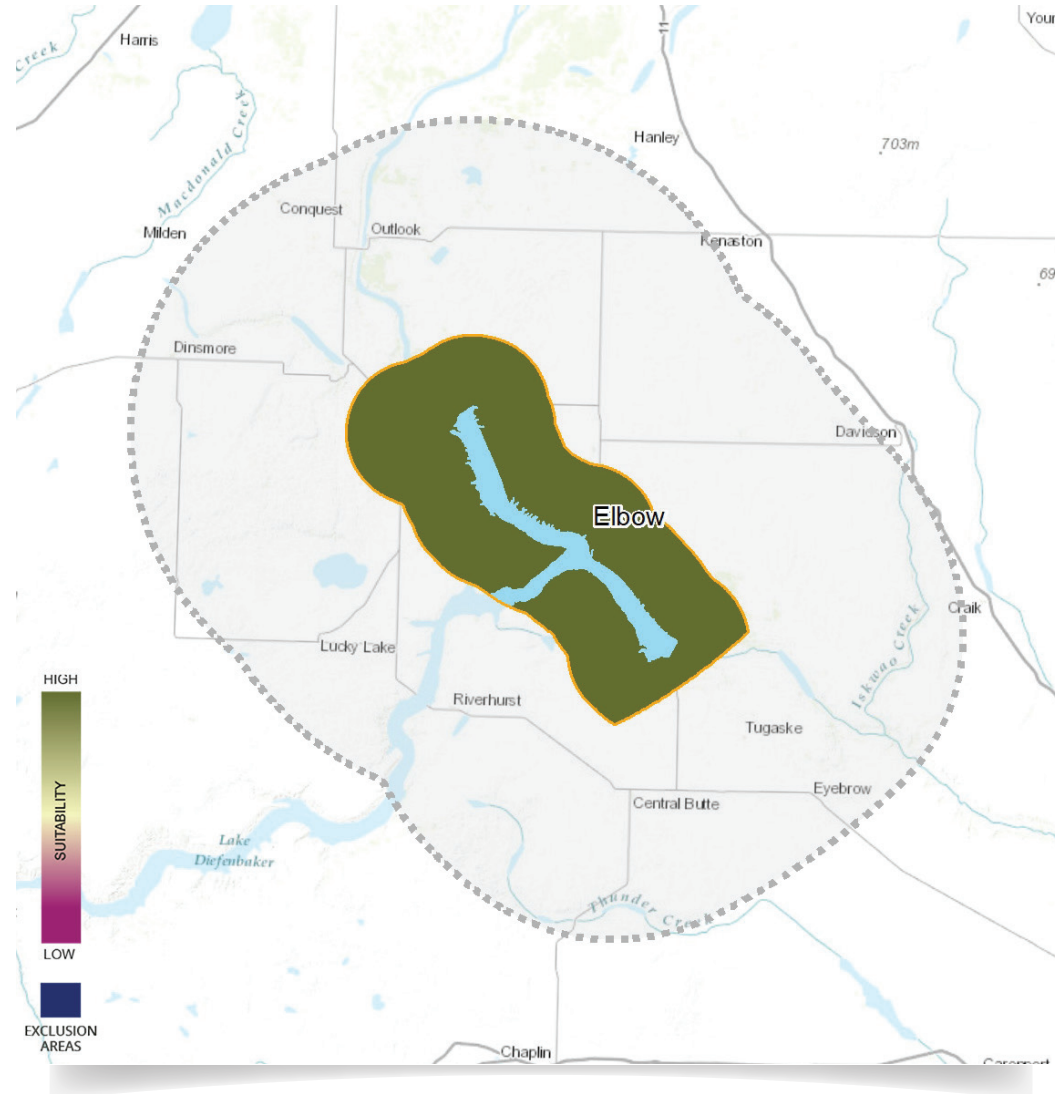
Avoid proximity to Mines

SOURCE
SaskPower

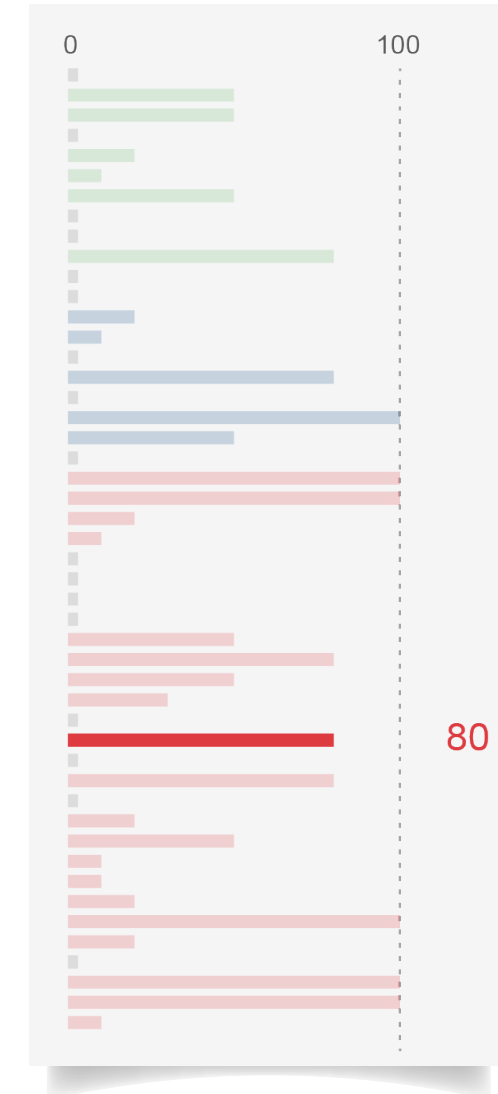
LAYER PRE-PROCESSING AND COMMENTS
No buffer added

DESCRIPTION
The site should not be situated on current mining areas or mined and remediated areas.

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

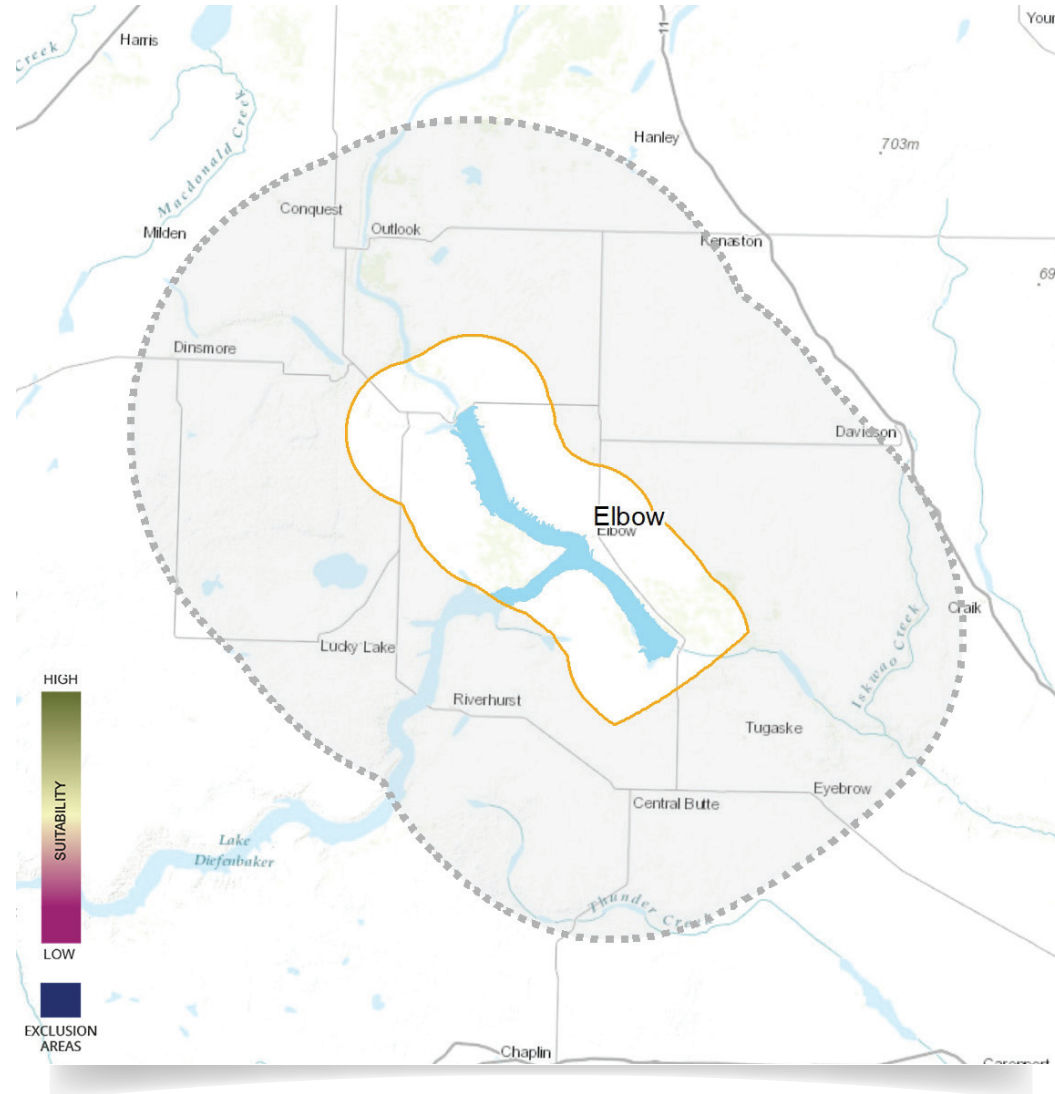
Use surface location for non-vertical wells. Retain these status fields: Active, Downhole, Planned, Suspended and Re-entered. A 500 m buffer added to exclusion.



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

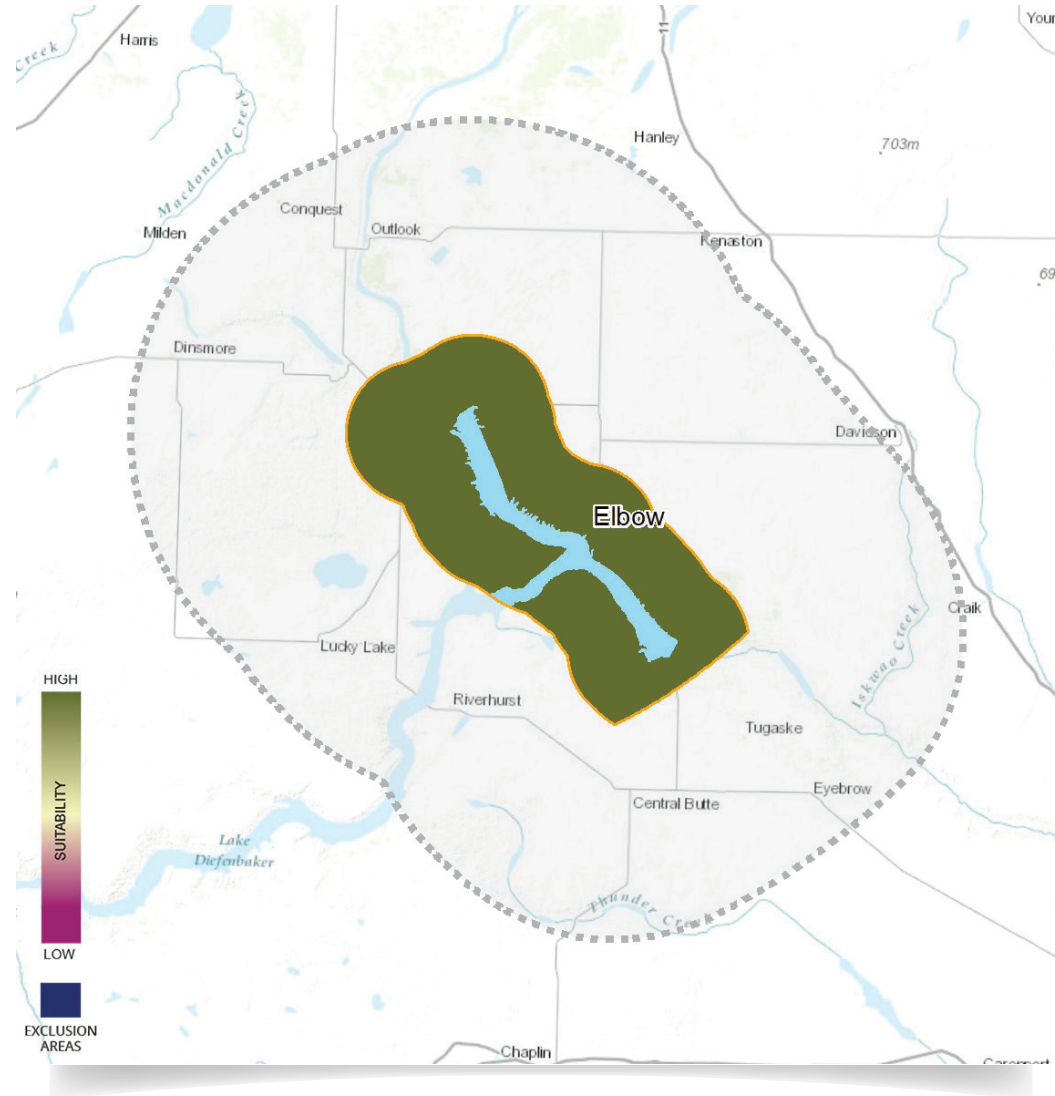
Avoid proximity to oil and gas wells

SOURCE
IHS Markit Canada ULC Saskatchewan WMS

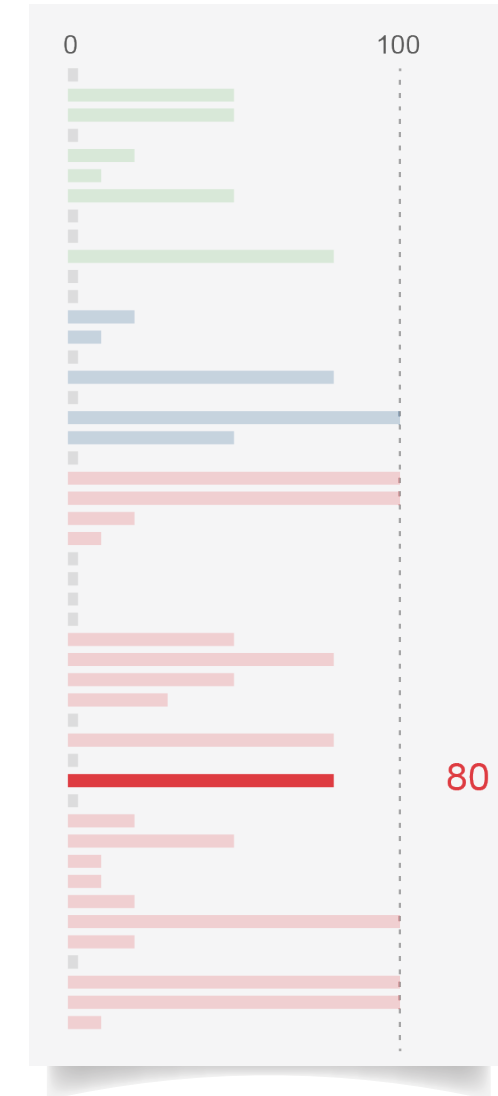
LAYER PRE-PROCESSING AND COMMENTS
Distance decay to 1 km buffer added.

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

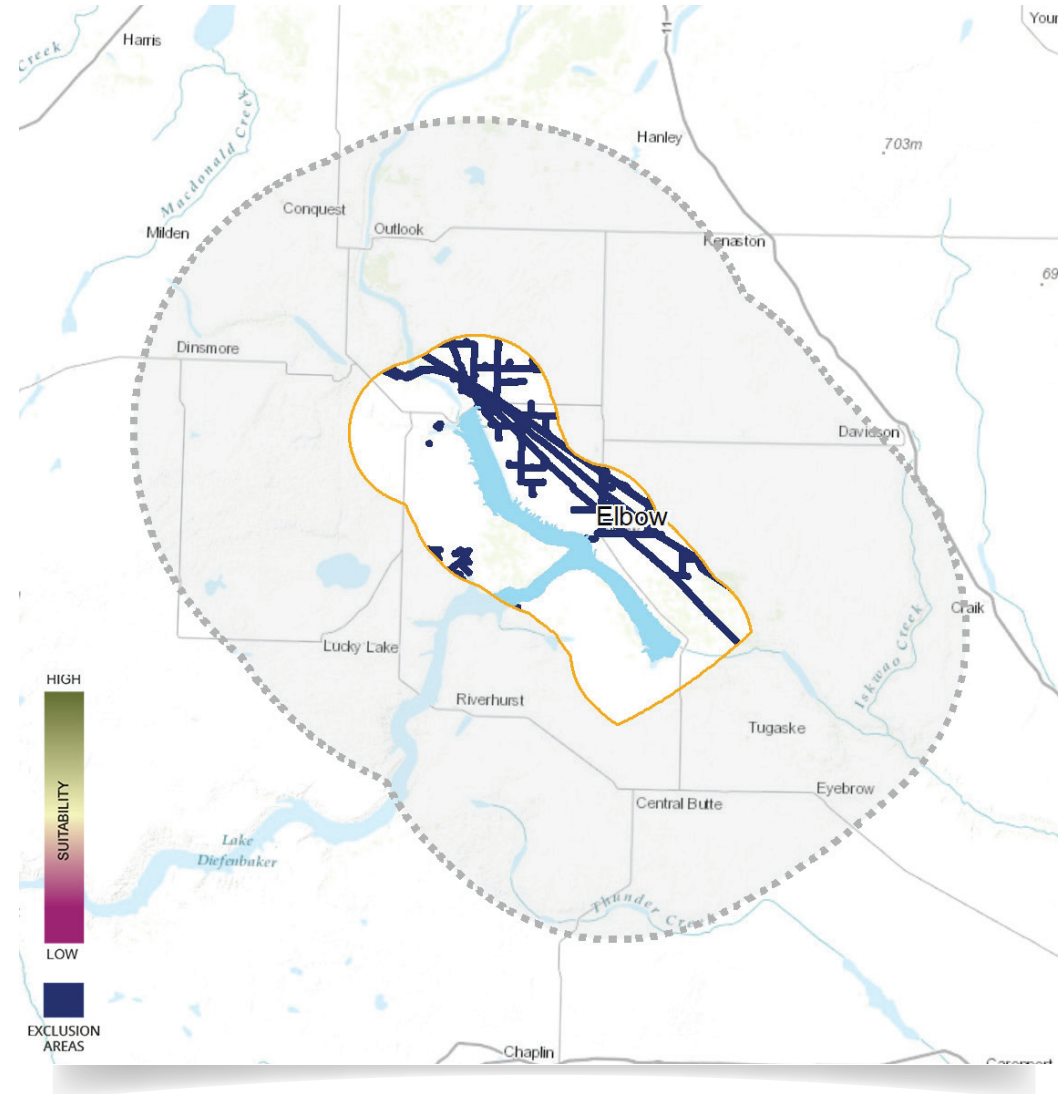
Exclusion. 500 m buffer added.



DESCRIPTION

The site should not be near high pressure hydrocarbon 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

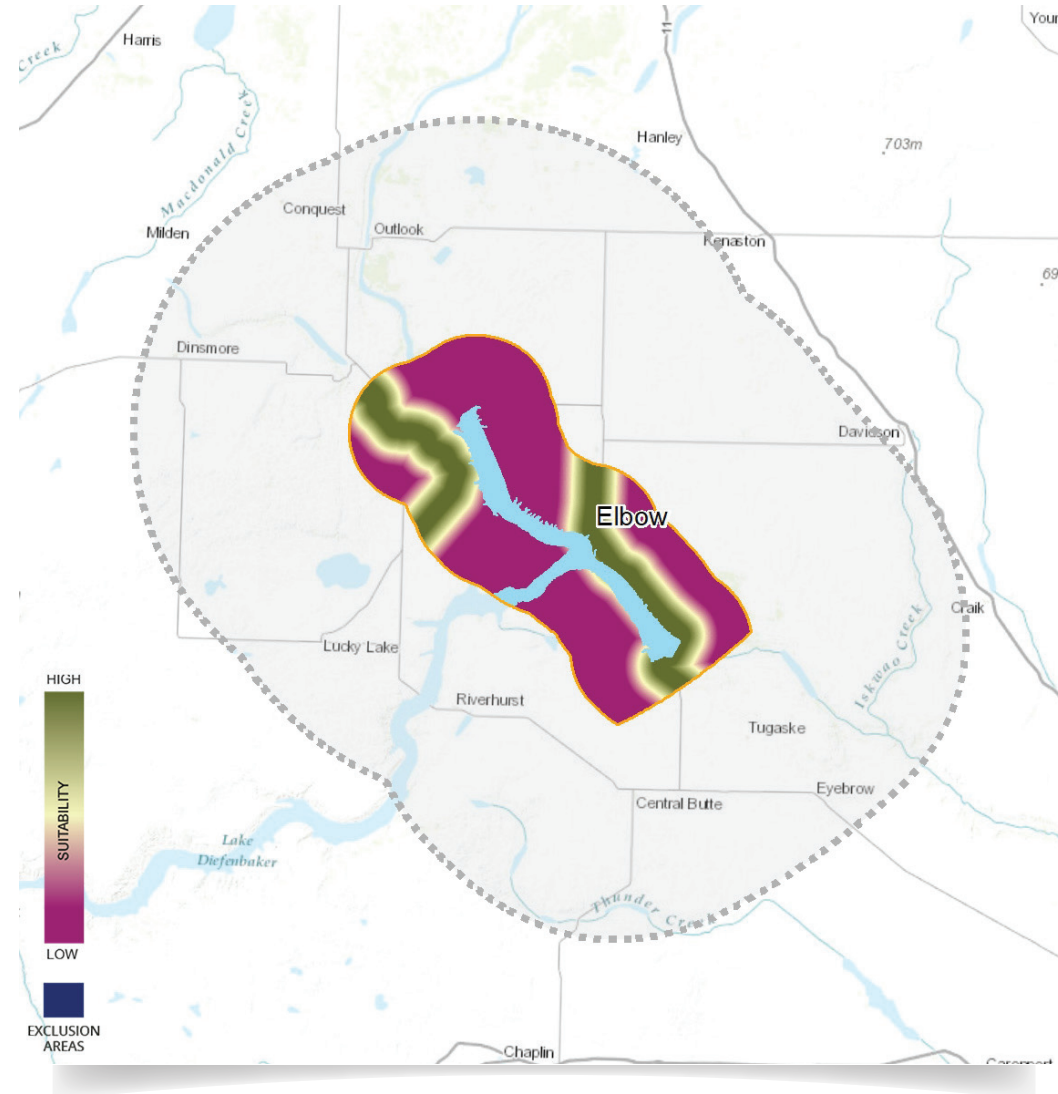
Remove "discontinued" fields and spurs.
Suitability from 0-1 km is high (100), 1 - 5 km distance decay buffer added.



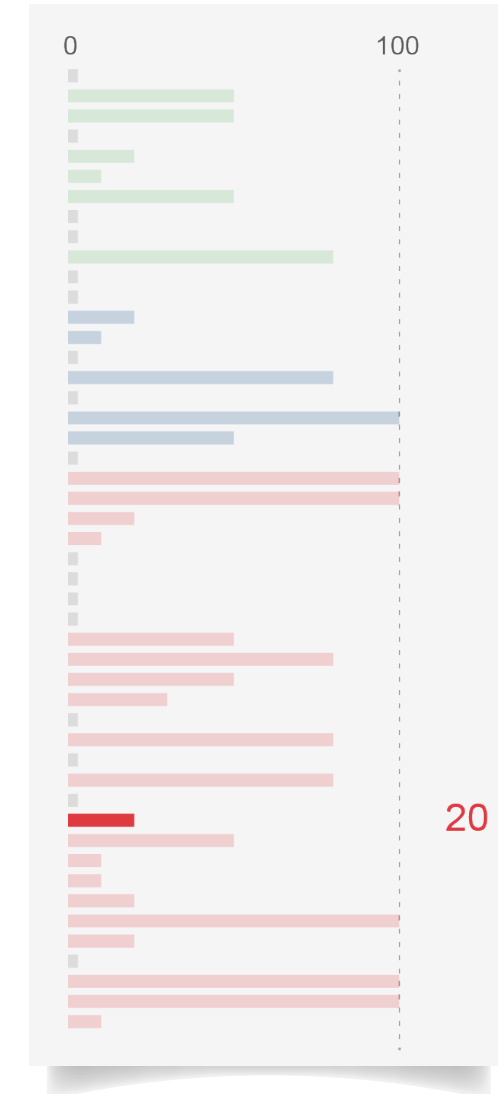
DESCRIPTION

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

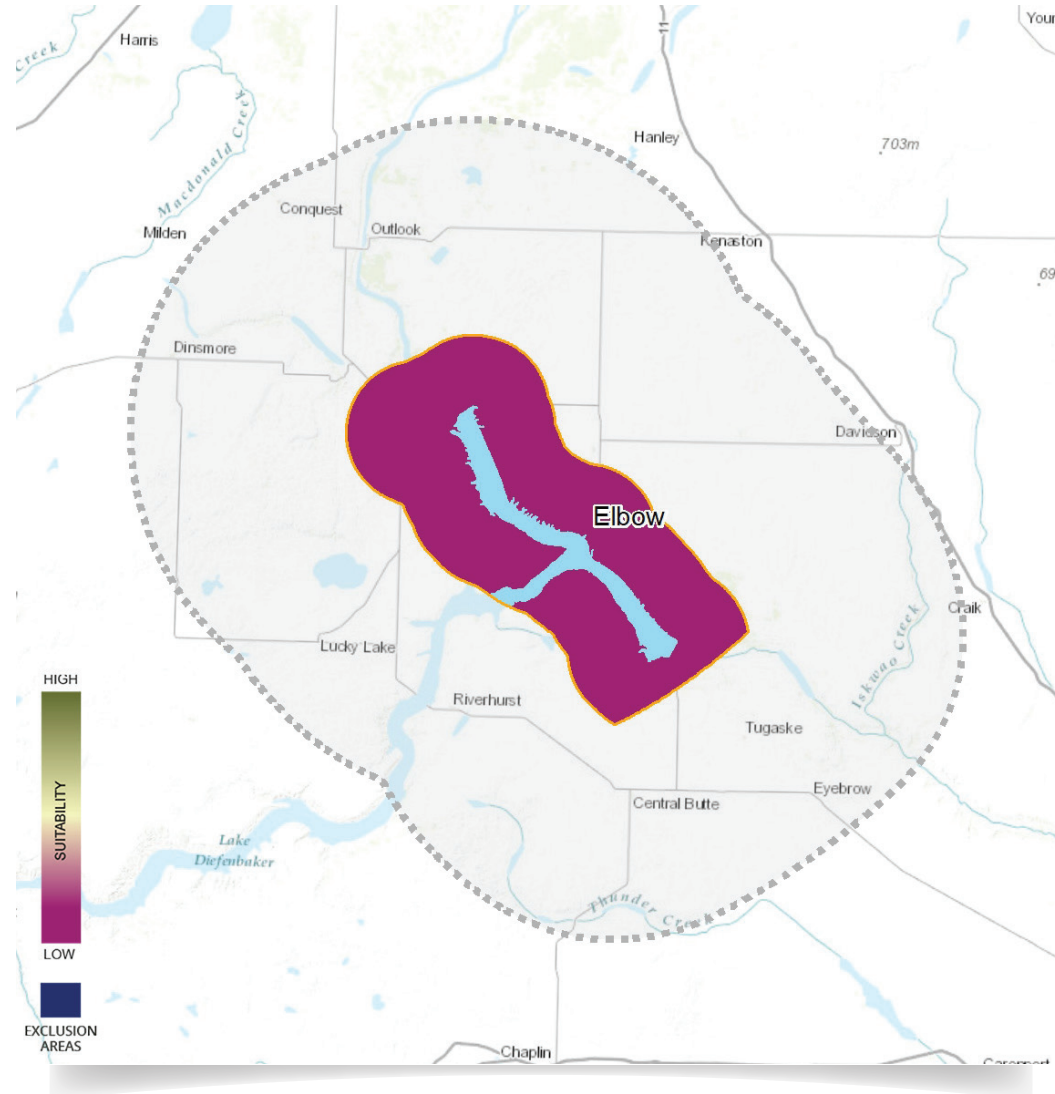
Remove "discontinued" fields and retain spurs. Suitability from 0-1 km is high (100), 1 - 5 km distance decay buffer added.



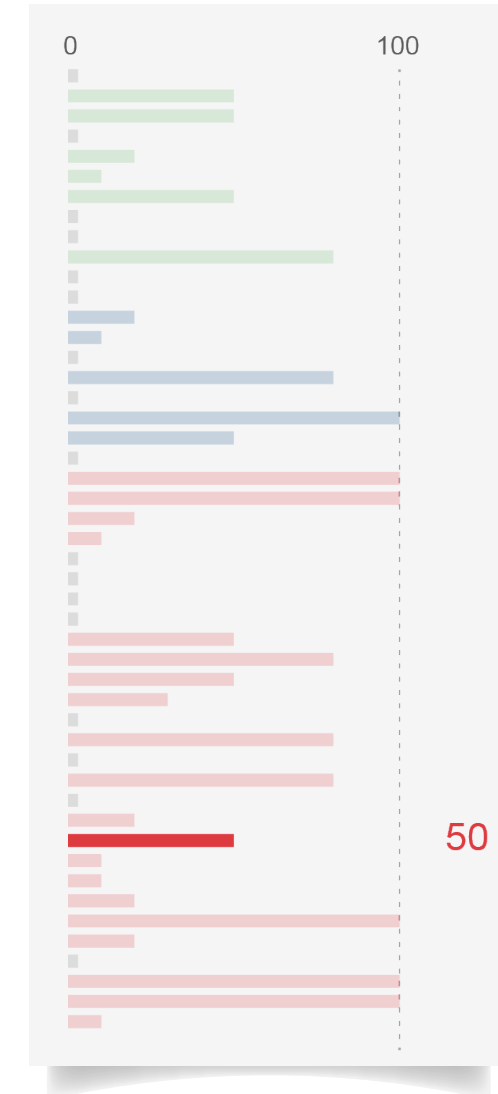
DESCRIPTION

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

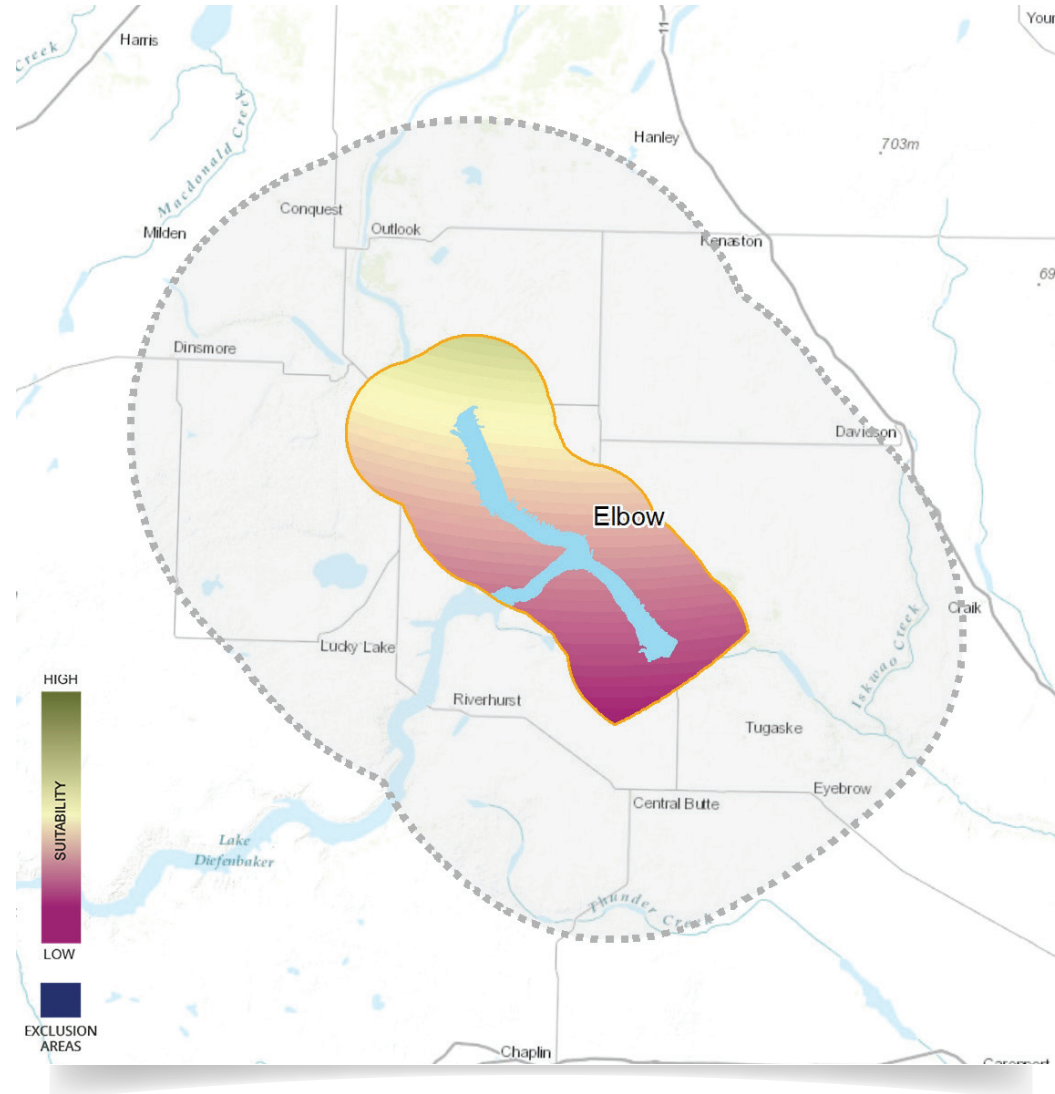
Include Regina, Saskatoon, Estevan, Coronach and Weyburn from Urban Municipal Areas. High suitability within 50 km. Distance decay to 200 km.



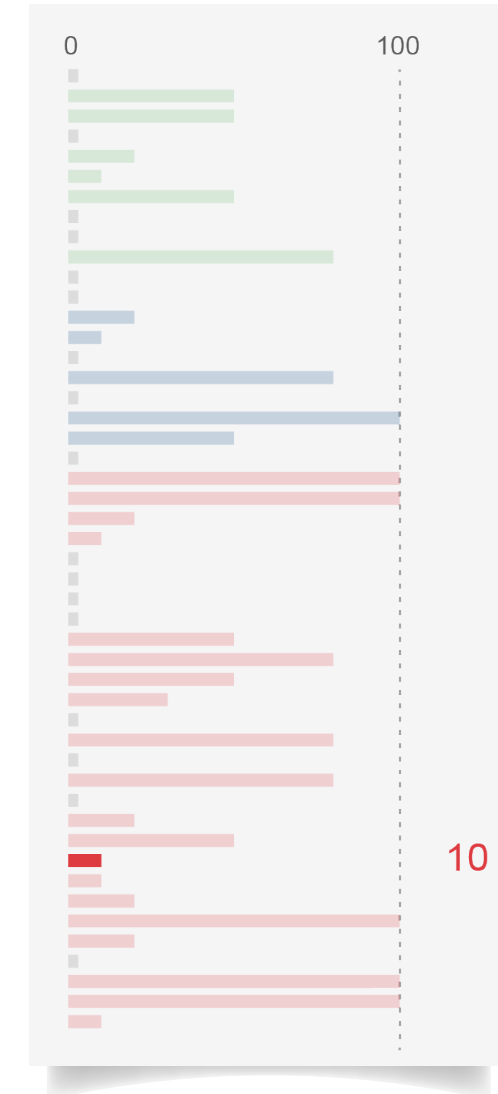
DESCRIPTION

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

Geogatis, Natural Resources Canada (NRCan)



LAYER PRE-PROCESSING AND COMMENTS

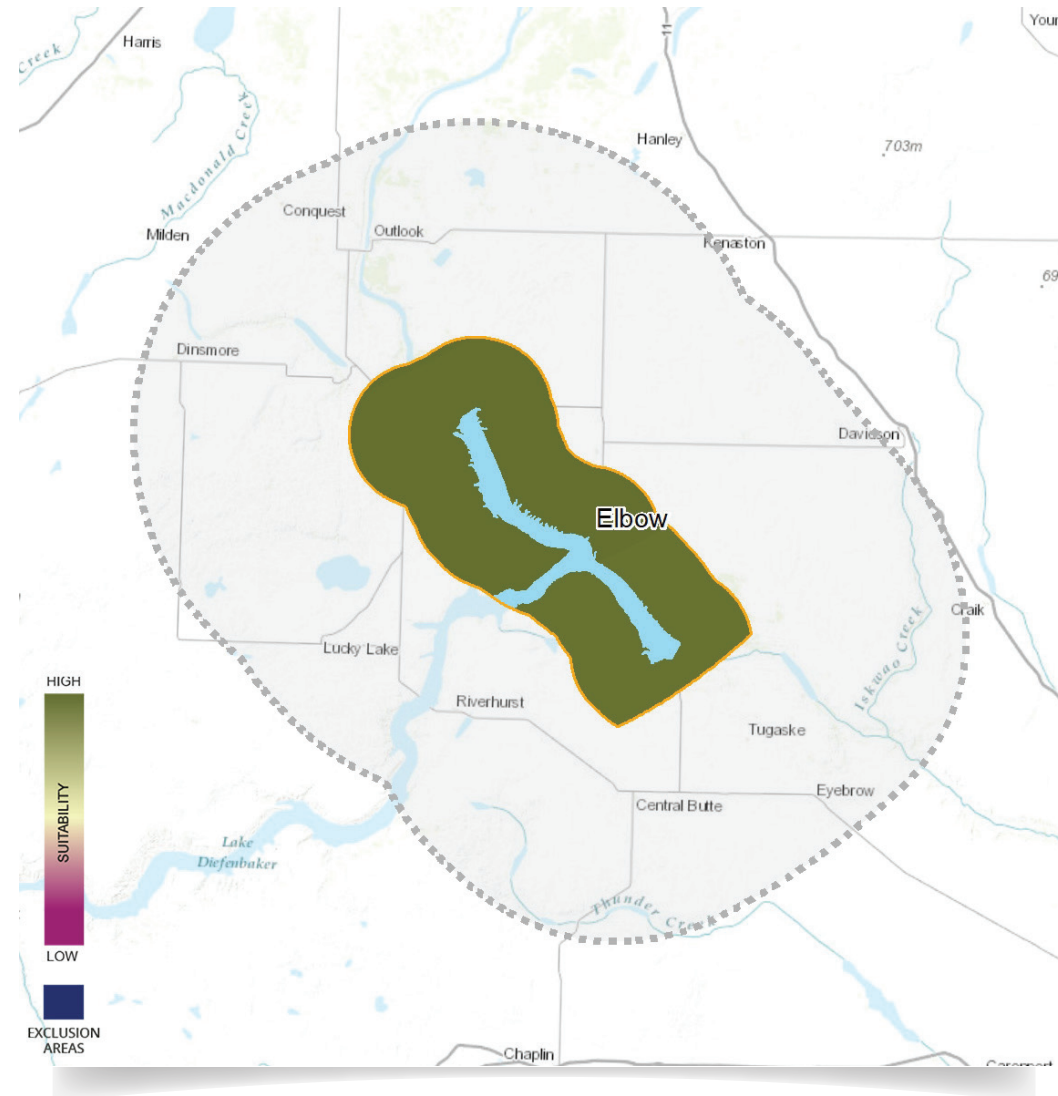
Larger peak ground accelerations (PGA) values are less suitable.



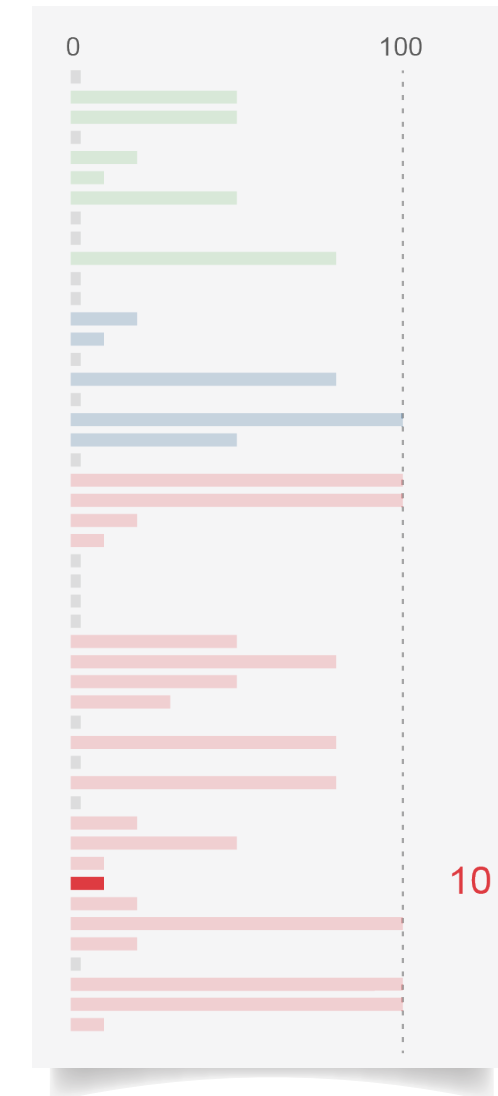
DESCRIPTION

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

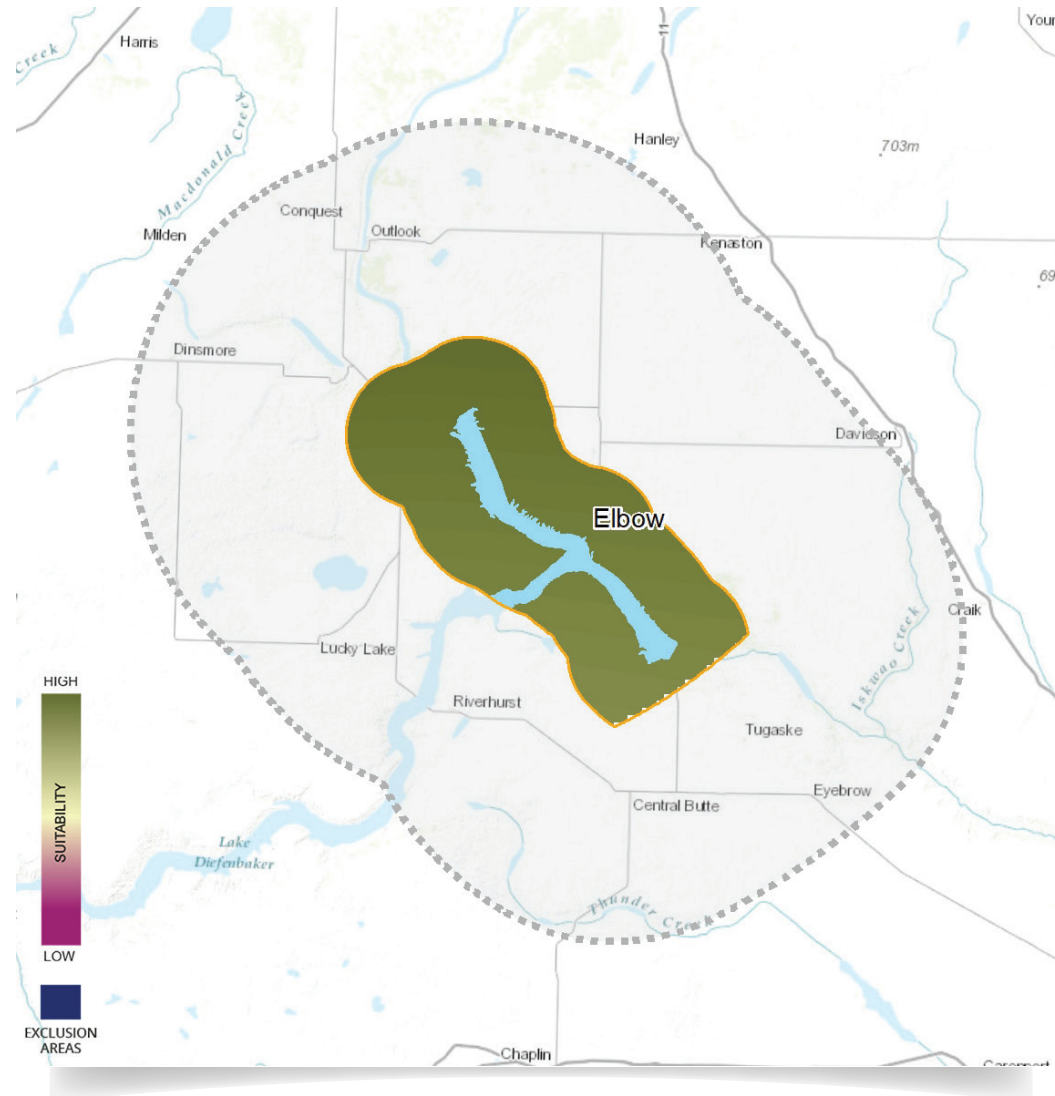
Larger probable maximum precipitation (PMP) values are less suitable.



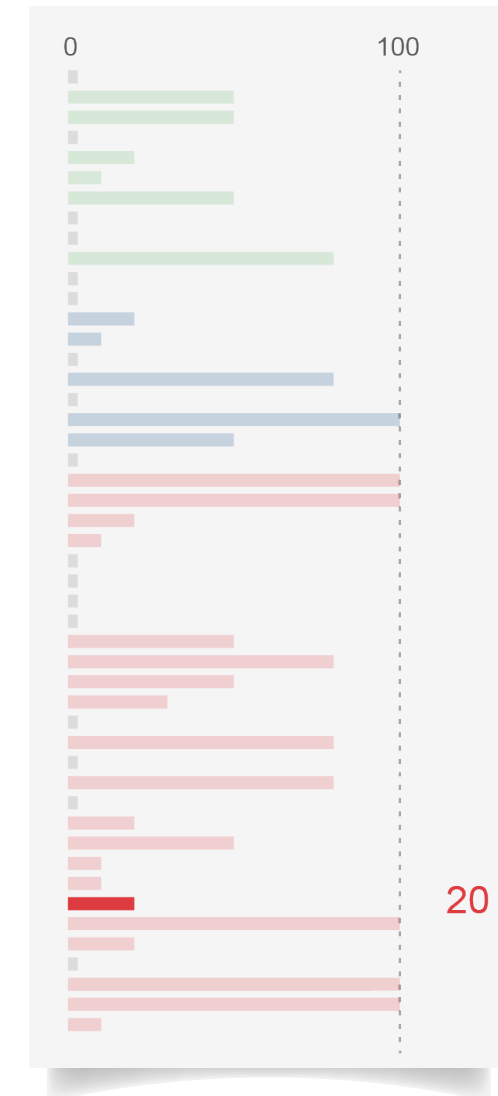
DESCRIPTION

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

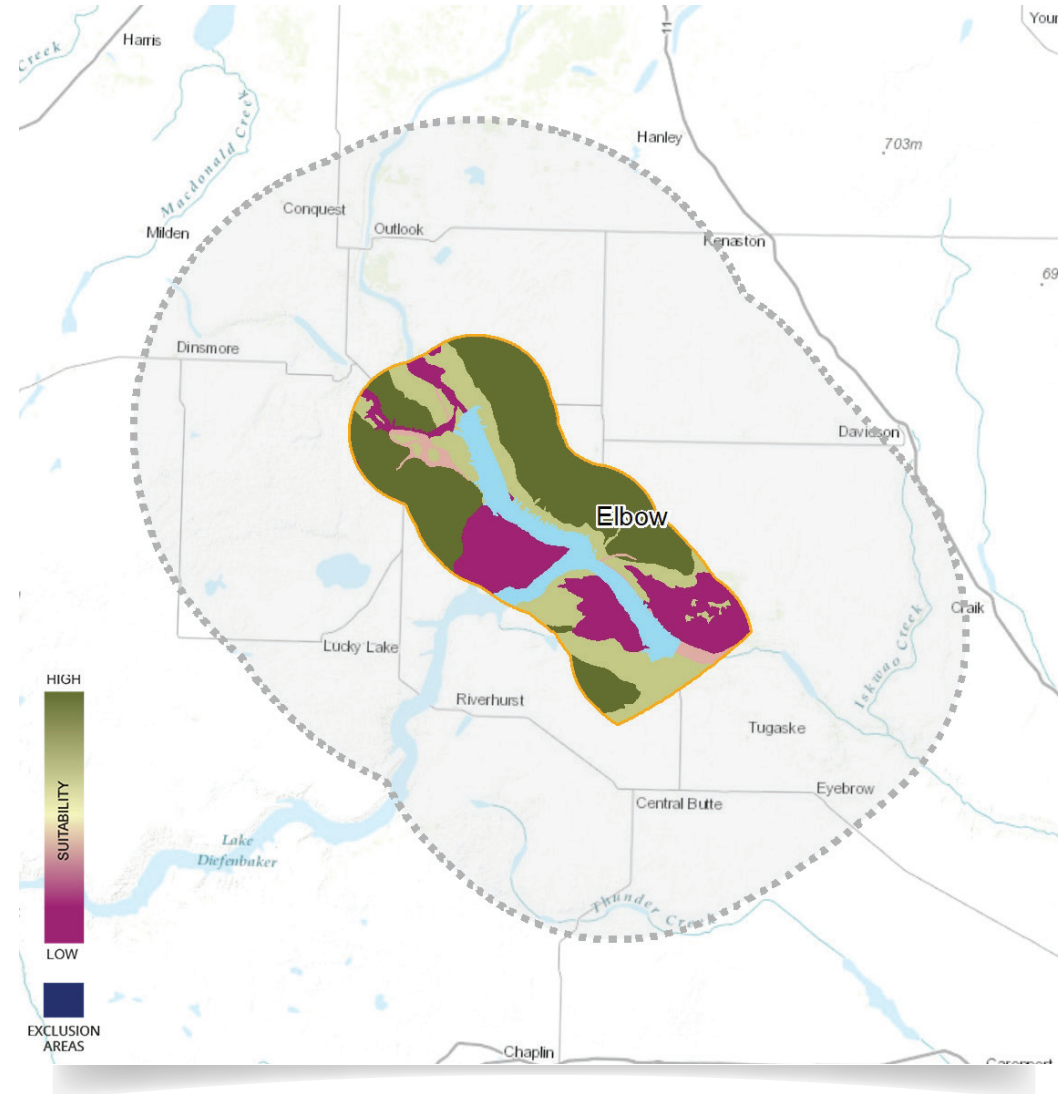
Geotechnical team scored surficial geology types
and linear landform types for siting suitability.
When no subtype is available, classify manually
within Local Study Area. Buffer linear landforms by
500 m and use instead where they exist.



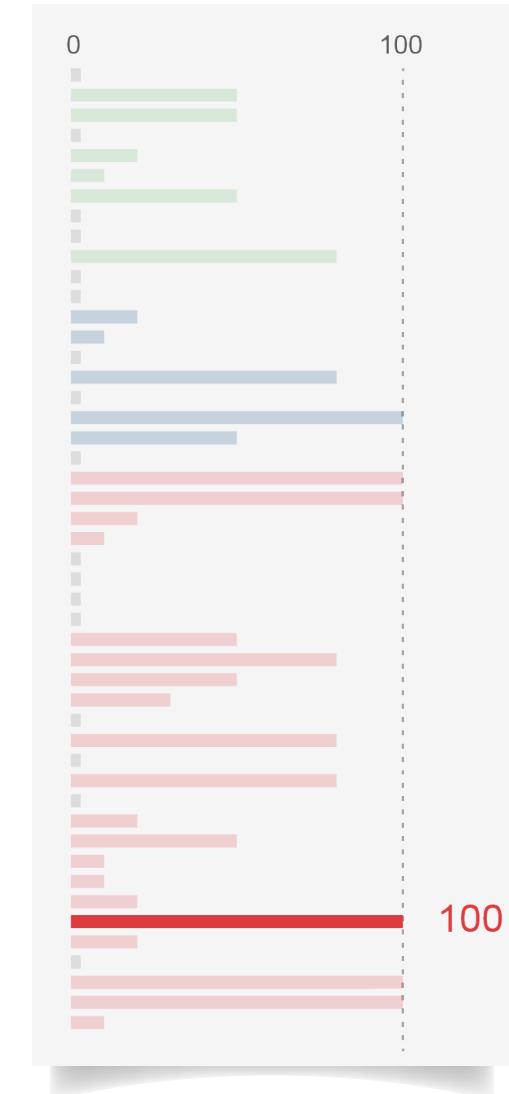
DESCRIPTION

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

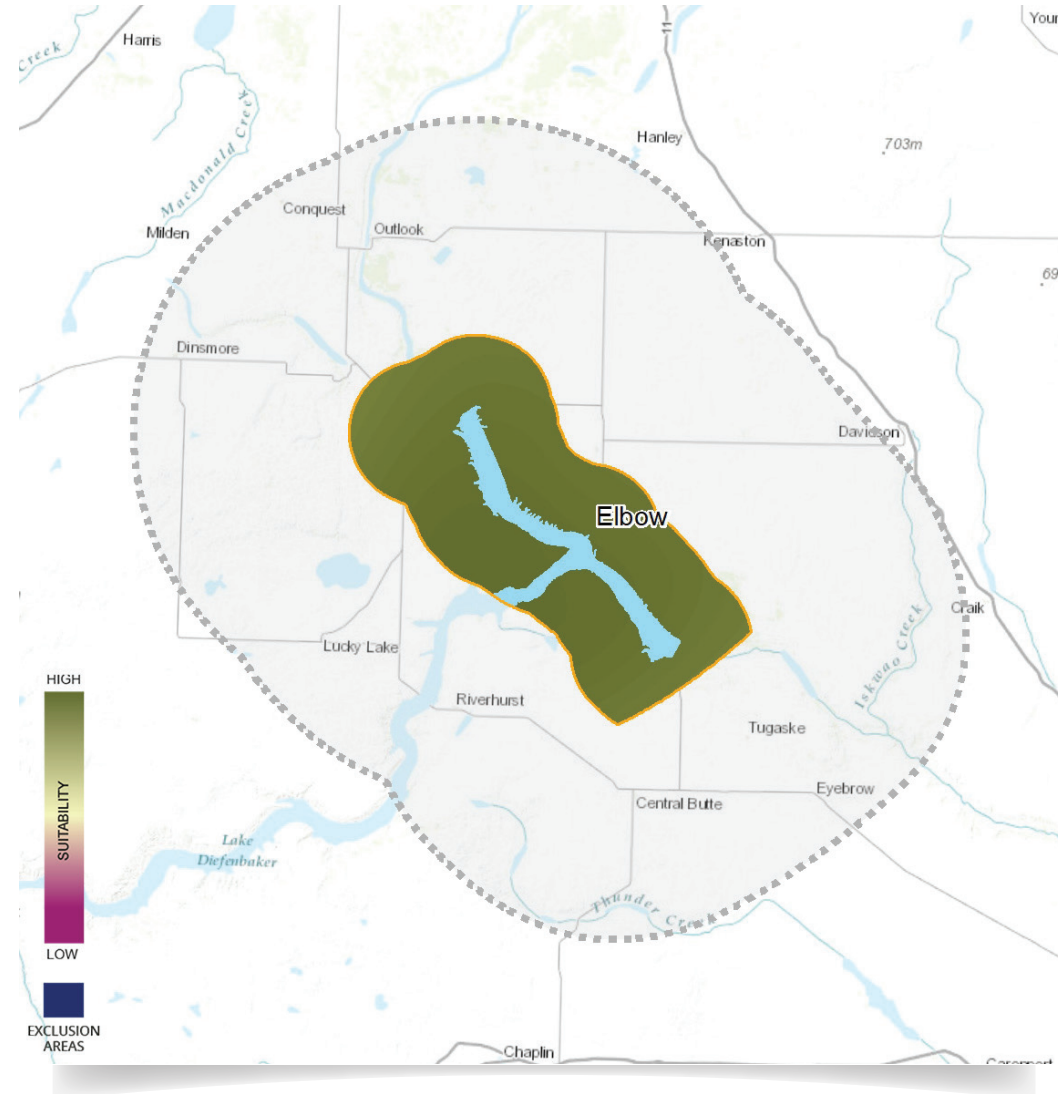
Calculate density of tornadoes based on previous, known, historical tornado occurrences.



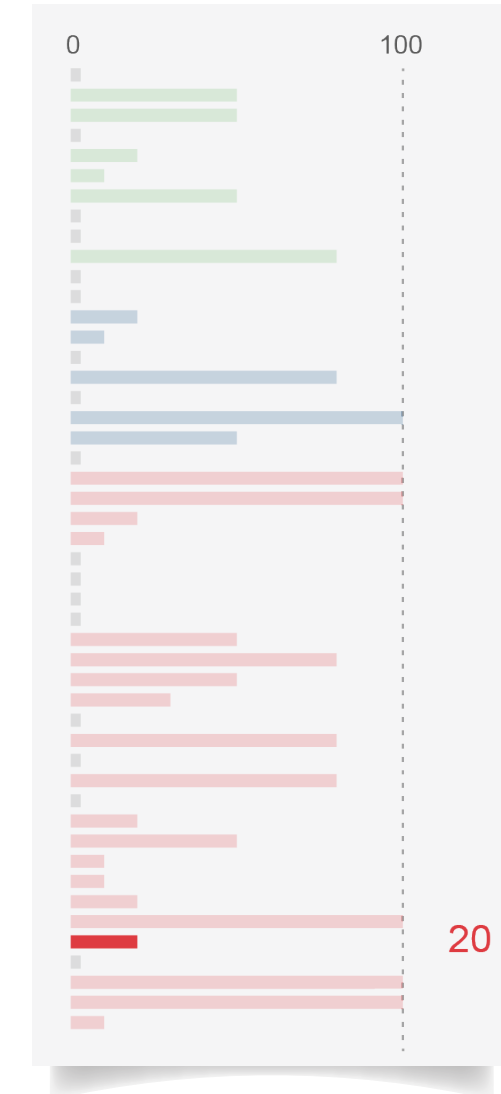
DESCRIPTION

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

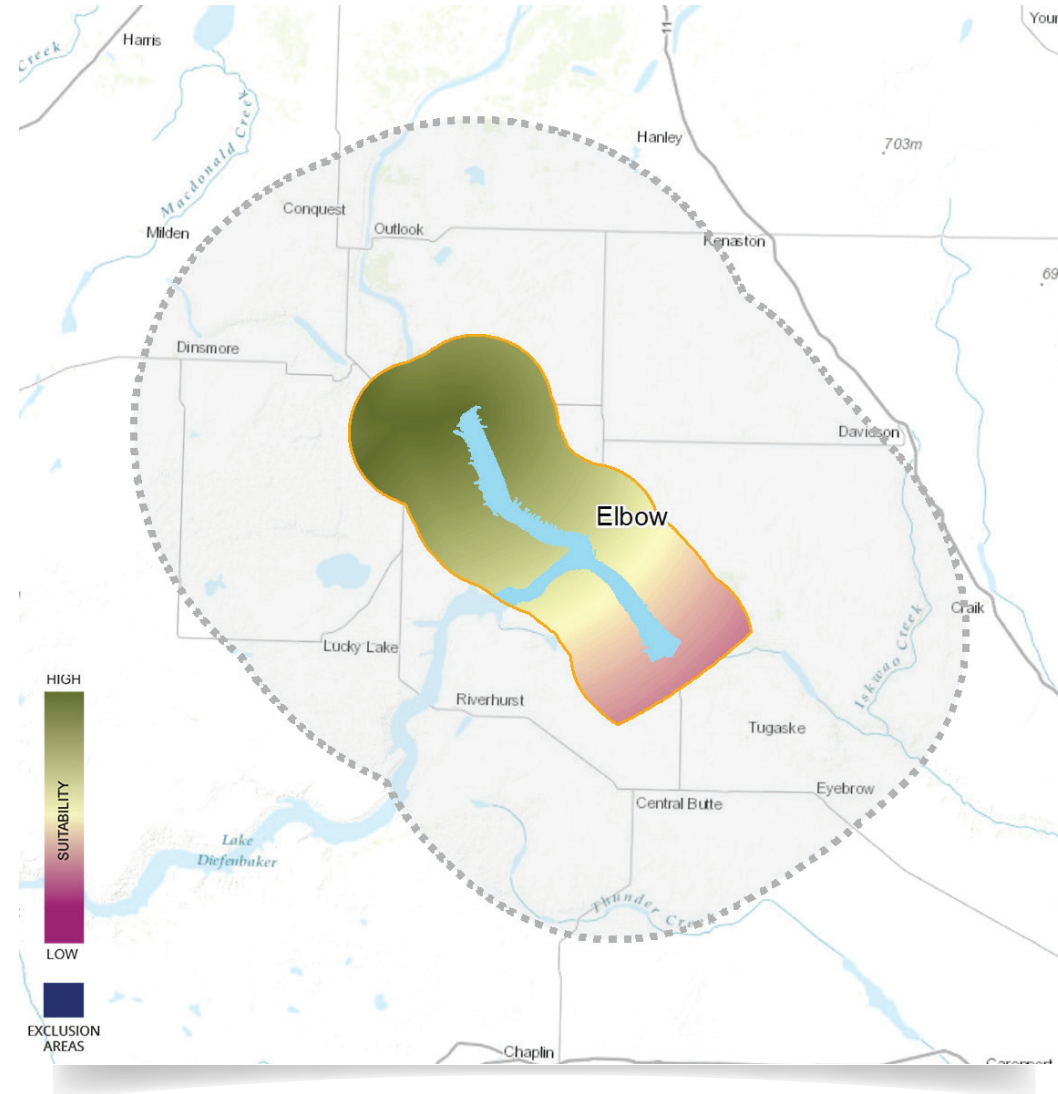
Prefer sites closer to the 230 kV transmission grid

SOURCE
SaskPower

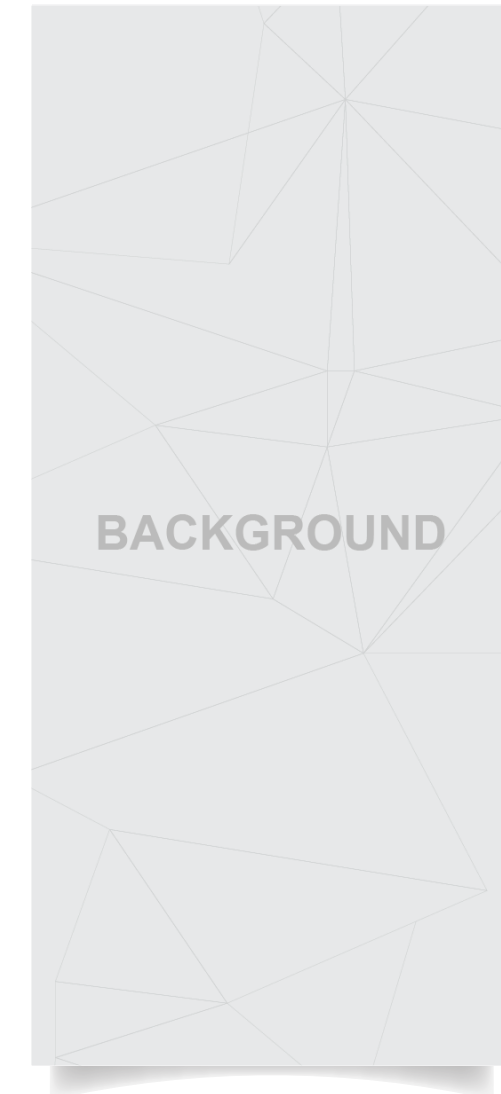
LAYER PRE-PROCESSING AND COMMENTS
Neutral

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

GEOGRAPHIC EXTENT



WEIGHT FOR SMR SITING



WATER SOURCES

Prefer sites within 10 km of highly suitable water sources



SOURCE

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



LAYER PRE-PROCESSING AND COMMENTS

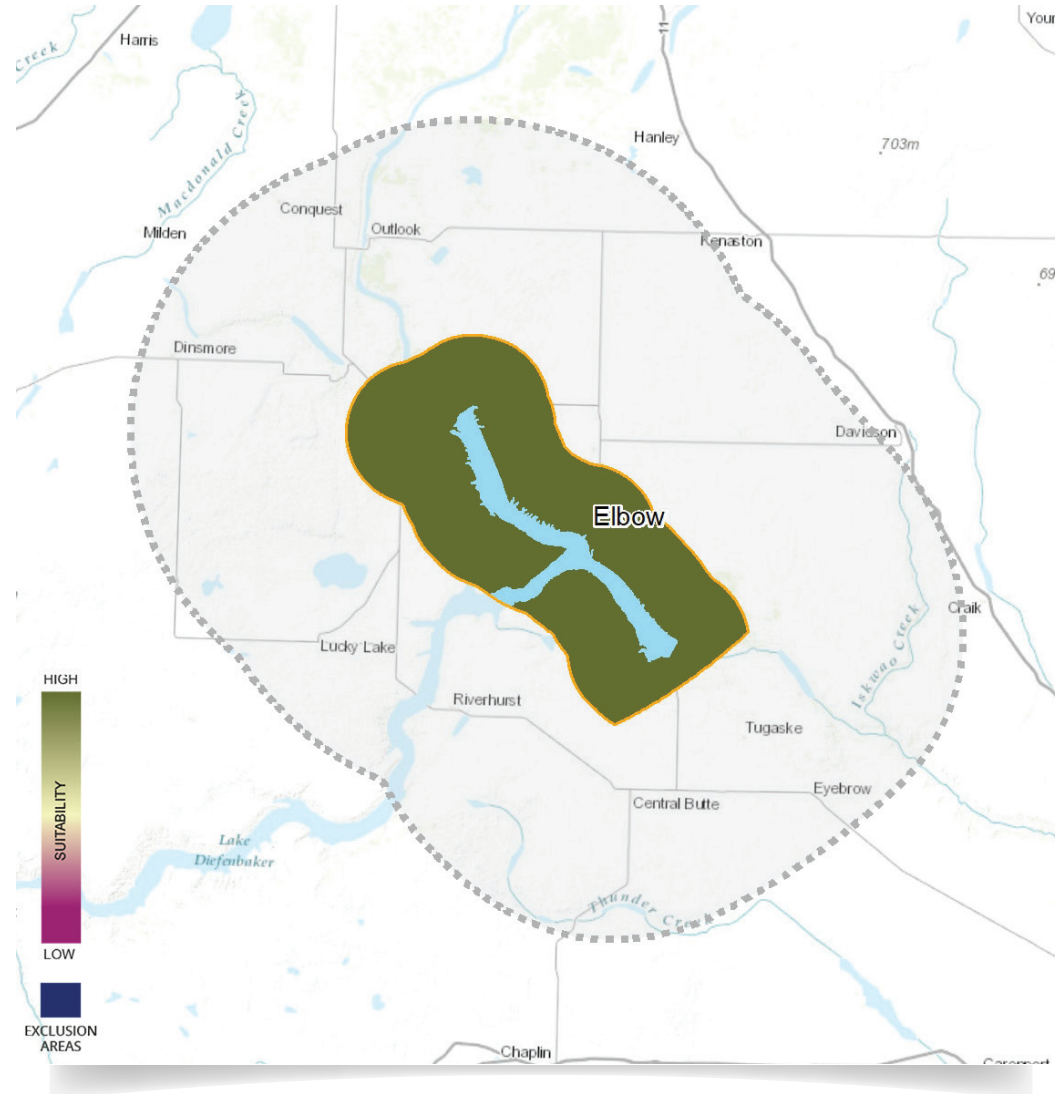
Water resources created a suitability index with a 10 km buffer added. Use highest suitability where buffers overlap.



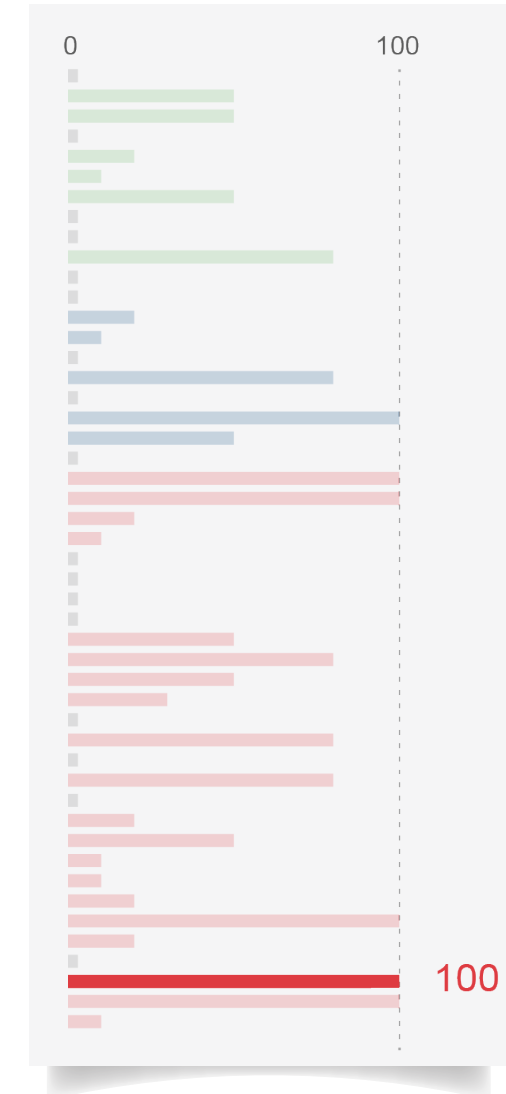
DESCRIPTION

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, Geografis, Natural Resources Canada (NRCan)



LAYER PRE-PROCESSING AND COMMENTS

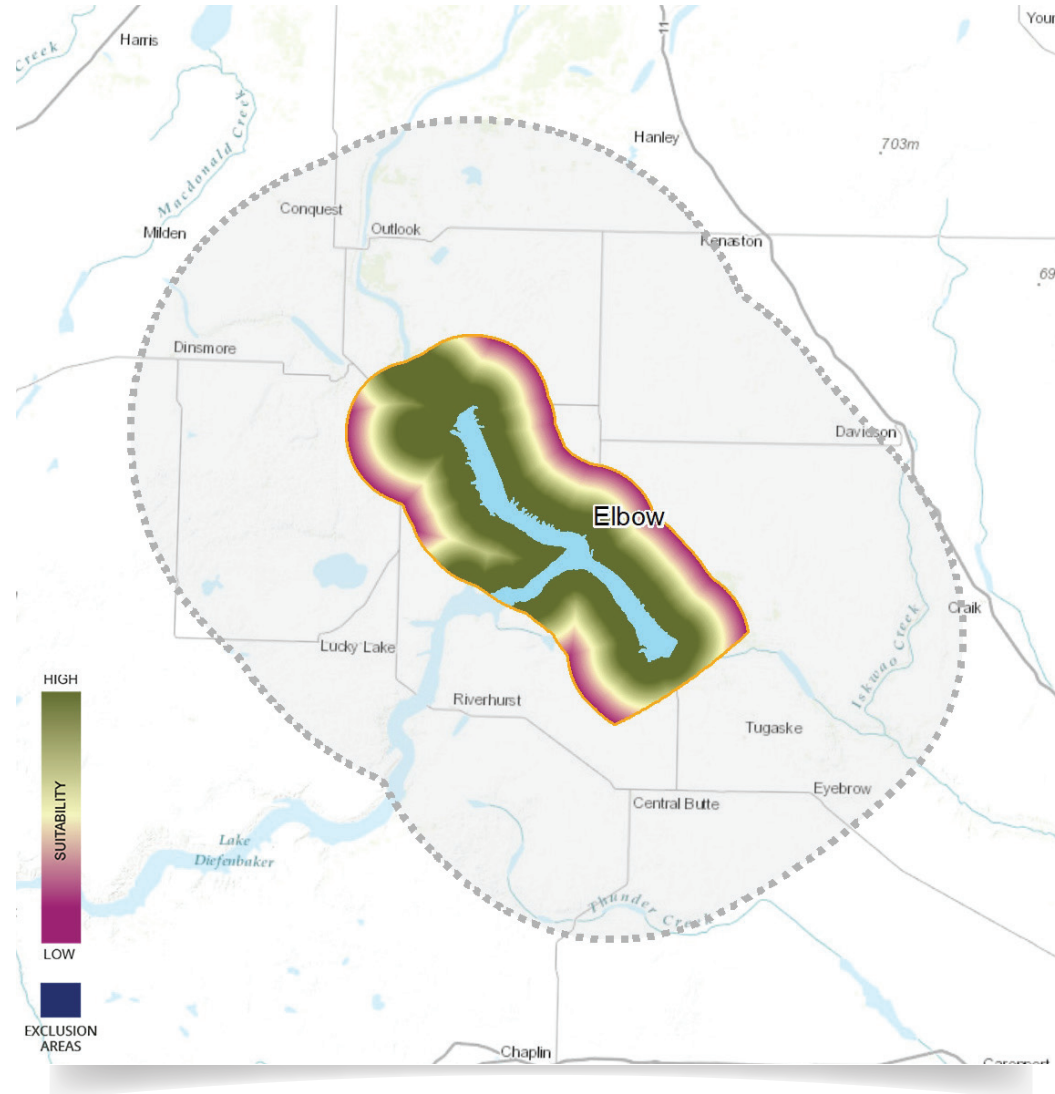
Suitability from 0-3 km is high (100), 3 - 10 km distance decay buffer added.



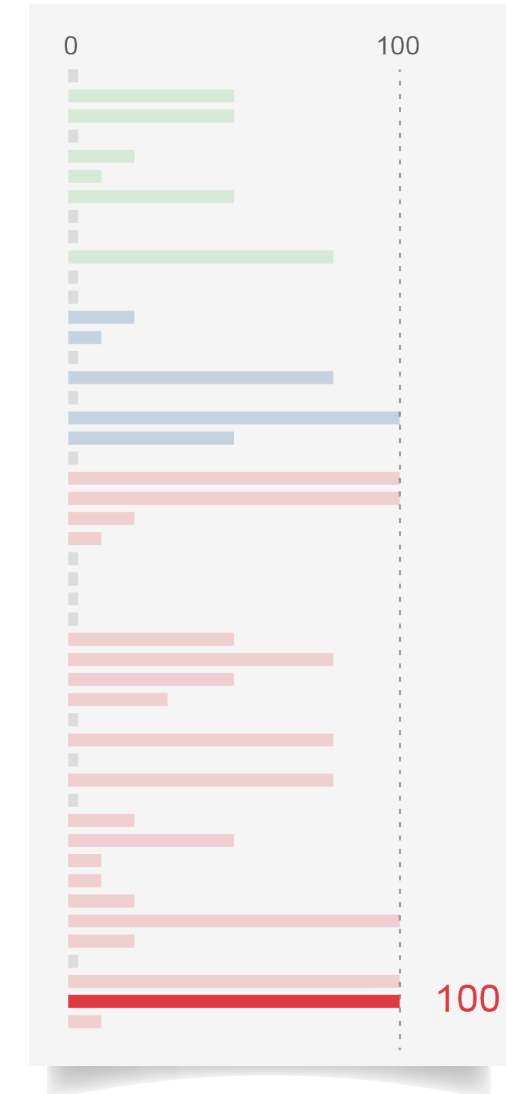
DESCRIPTION

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

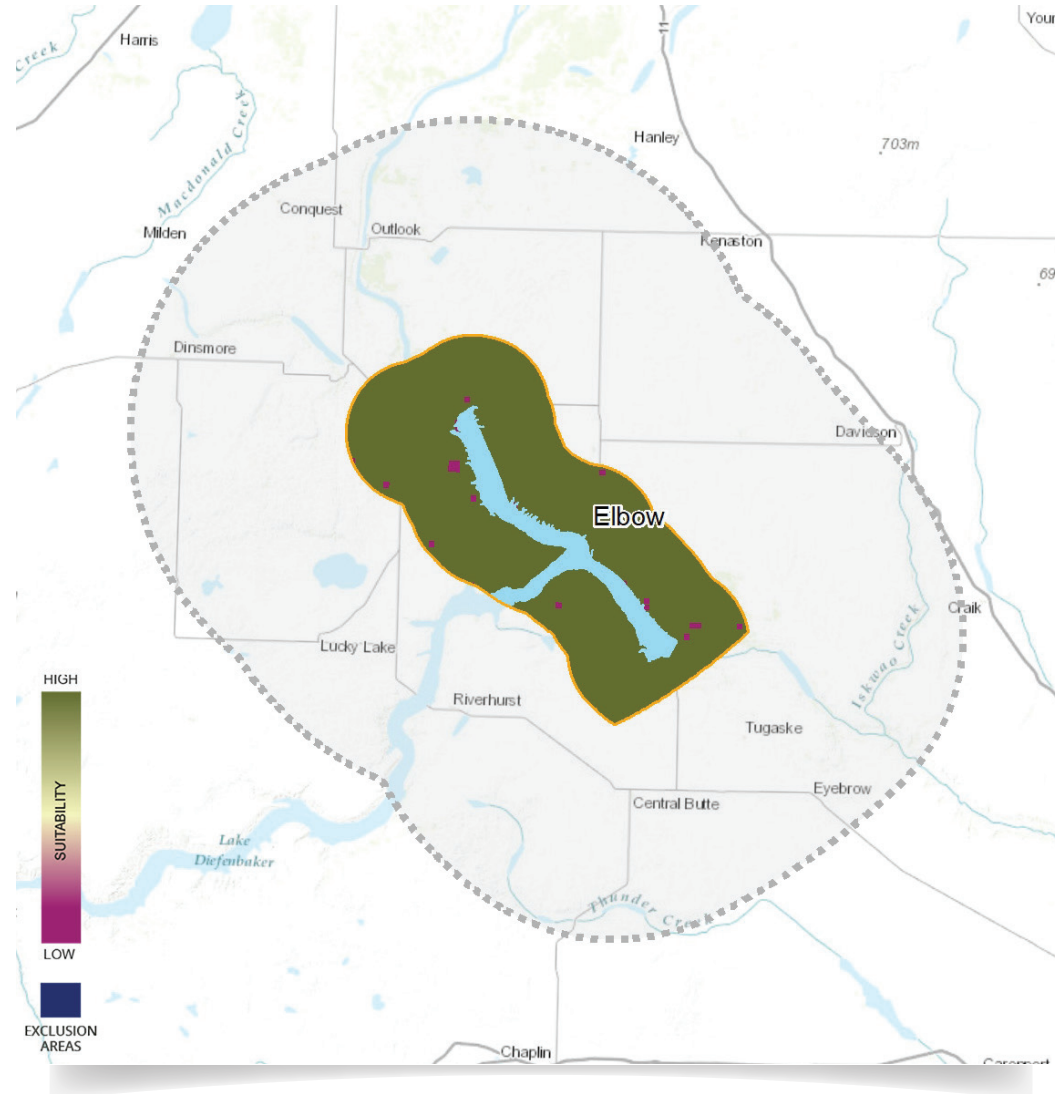
Remove domestic wells. Only include quality monitoring, recharge waste disposal, unknown and withdrawal well uses. Apply to full quarter section boundary.



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

