

# ElkPt\_tracts

**Type** File Geodatabase Feature Class



**Tags** spatial database, GIS, potash, permissive tract, mineral resources, Elk Point Basin, Canada, United States

## Summary

ElkPt\_tracts -- A spatial database for permissive tracts for undiscovered resources of potash (with quantitative assessment data and results) in the Elk Point Basin, Canada and U.S. (in Esri file geodatabase feature class format).

The spatial database was created for use in a geographic information system (GIS) as part of a global potash resource assessment by the U.S. Geological Survey.

## Description

The Elk Point Basin is an evaporite basin of Middle Devonian age that contains a significant portion of the world's potash resources. Potash-bearing salt is concentrated in the upper 100 meters of the Prairie Evaporite in the Patience Lake, Belle Plaine, White Bear, and Esterhazy Members. Known potash mineralization is concentrated in the southeastern portion of the Elk Point Basin mainly in Saskatchewan and extending short distances into adjacent parts of Alberta, Manitoba, North Dakota, and Montana.

Permissive tracts were delineated by the extent of each member of the Prairie Evaporite where the member is at least 1 meter in thickness and less than 3 kilometers from the surface.

Potash resources were assessed for each tract using a method based on an enhanced geometric analysis of the likely spatial distribution of potash mineralization. We used Monte Carlo simulations to estimate missing or incomplete variables such as density, average grade, and geologic loss due to salt dissolution to calculate the distribution and abundance of estimated undiscovered potash (as K<sub>2</sub>O). Potash grades were calculated using both historic (1950s and 1960s) and recent (2007–2011) drill hole analyses. The mean estimated undiscovered K<sub>2</sub>O resource (which includes sylvite and carnallite) in these tracts is 864 billion metric tons.

Preferred reference:

Cocker, M.D., Orris, G.J., Dunlap, P., Yang, C., and Bliss, J.D., 2023, Geology and undiscovered resource assessment of the potash-bearing, Middle Devonian (Givetian), Prairie Evaporite, Elk Point Basin, Canada and United States: U.S. Geological Survey Scientific Investigations Report 2010–5090–CC, 145 p. and data files, <https://doi.org/10.3133/sir20105090cc>.

## Credits

Mark Cocker interpreted the data and is responsible for the scientific content.

Pamela Dunlap processed the digital data, built the spatial database, and generated volume data.

Deborah A. Briggs rectified scanned images of paper maps to produce georectified TIFF images (GeoTIFFs) for use in a GIS.

Leila Gass digitized areas of known salt solutioning from the GeoTIFF images and assisted in digitizing revisions to isopachs.

## Use limitations

None. The U.S. Geological Survey (USGS) provides these geographic data "as is." The USGS makes no guarantee or warranty concerning the accuracy of information contained in the geographic data. The USGS further makes no warranties, either expressed or implied as to any other matter whatsoever, including, without limitation, the condition of the product, or its fitness for any particular purpose. The burden for determining fitness for use lies entirely with the user. Although these data have been processed successfully on computers of the USGS, no warranty, expressed or implied, is made by the USGS regarding the use of these data on any other system, nor does the fact of distribution constitute or imply such warranty.

## Extent

West -111.251179    East -100.979260  
North 53.459829    South 47.724778

## Scale Range

Maximum (zoomed in) 1:5,000  
Minimum (zoomed out) 1:150,000,000

## Topics and Keywords ►

Content type ⇔ Downloadable Data

## Citation ►

Title ⇔ ElkPt\_tracts

Alternate titles Permissive tracts for potash in the Prairie Evaporite

Presentation formats ⇔ digital map

FGDC geospatial presentation format map

### Series

Name Scientific Investigations Report

Issue 2010-5090-CC

Collection title Geology and undiscovered resource assessment of the potash-bearing, Middle Devonian (Givetian), Prairie Evaporite, Elk Point Basin, Canada and United States

### Other citation details

Cocker, M.D., Orris, G.J., Dunlap, P., Yang, C., and Bliss, J.D., 2023, Geology and undiscovered resource assessment of the potash-bearing, Middle Devonian (Givetian), Prairie Evaporite, Elk Point Basin, Canada and United States: U.S. Geological Survey Scientific Investigations Report 2010–5090–CC, 145 p. and data files, <https://doi.org/10.3133/sir20105090cc>.

## Resource Details ►

Dataset languages ⇔ English (UNITED STATES)

Dataset character set utf8 - 8 bit UCS Transfer Format

Spatial representation type ⇔ vector

Processing environment ⇔ Microsoft Windows 7 Version 6.1 (Build 7601) Service Pack 1; Esri ArcGIS 10.2.1.3497

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#### ArcGIS item properties

Name ⇔ ElkPt\_tracts

Size ⇔ 0.383

Location ⇔ file://\IGSWZEWMMWSPDUN2\E\$\ElkPoint\_revised2014April\ElkPoint\ElkPoint\_potash.gdb

Access protocol ⇔ Local Area Network

#### Extents ►

##### Extent

###### Geographic extent

###### Bounding rectangle

###### Extent type

###### Extent used for searching

West longitude ⇔ -111.251179

East longitude ⇔ -100.979260

North latitude ⇔ 53.459829

South latitude ⇔ 47.724778

Extent contains the resource ⇔ Yes

##### Extent in the item's coordinate system

westBL ⇔ -111.251179

eastBL ⇔ -100.979260

southBL ⇔ 47.724778

northBL ⇔ 53.459829

exTypeCode ⇔ Yes

#### Resource Maintenance ►

##### Resource maintenance

Update frequency not planned

#### Resource Constraints ►

##### Constraints

###### Limitations of use

None. The U.S. Geological Survey (USGS) provides these geographic data "as is." The USGS makes no guarantee or warranty concerning the accuracy of information contained in the geographic data. The USGS further makes no warranties, either expressed or implied as to any other matter whatsoever, including, without limitation, the condition of the product, or its fitness for any particular purpose. The burden for

determining fitness for use lies entirely with the user. Although these data have been processed successfully on computers of the USGS, no warranty, expressed or implied, is made by the USGS regarding the use of these data on any other system, nor does the fact of distribution constitute or imply such warranty.

## Spatial Reference ►

ArcGIS coordinate system

Type ⇔ Geographic

Geographic coordinate reference ⇔ GCS\_WGS\_1984

Coordinate reference details ⇔

GeographicCoordinateSystem

WKID 4326

XOrigin -399.99999999999989

YOrigin -399.99999999999989

XYScale 1000000000.0000001

ZOrigin -100000

ZScale 10000

MOrigin -100000

MScale 10000

XYTolerance 8.9831528411952133e-009

ZTolerance 0.001

MTolerance 0.001

HighPrecision true

LeftLongitude -180

LatestWKID 4326

WKT

GEOGCS["GCS\_WGS\_1984",DATUM["D\_WGS\_1984",SPHEROID["WGS\_1984",6378137.0,298.257223563]],PRI

Reference system identifier

Value ⇔ 4326

Codespace ⇔ EPSG

Version ⇔ 8.2.6

## Spatial Data Properties ►

Vector ►

Level of topology for this dataset ⇔ geometry only

Geometric objects

Feature class name ElkPt\_tracts

Object type ⇔ composite

Object count ⇔ 4

ArcGIS Feature Class Properties ►

Feature class name ElkPt\_tracts

Feature type ⇔ Simple

Geometry type ⇔ Polygon

Has topology ⇔ FALSE

Feature count ⇔ 4

Spatial index ⇔ TRUE

Linear referencing ⇔ FALSE

## Lineage ▶

### Lineage statement

Tract extents were defined by the 1-m isopach (thickness), by known and estimated areas of salt solutioning, and in some cases, by a line representing the 3-km depth limit for the Prairie Evaporite in the United States.

### Process step ▶

When the process occurred 2011-11-14 00:00:00

#### Description

Areal extents of the four isopach map feature classes were used to define the permissive tracts.

### Source data ▶

#### Description

BP\_isopach, ES\_isopach, PL\_isopach, and WB\_isopach feature classes in the file geodatabase ElkPoint\_potash.gdb.

Source medium name online link

## Distribution ▶

### Distributor ▶

#### Contact information -

Organization's name U.S. Geological Survey

#### Contact information ▶

##### Phone

Voice 1-888-275-8747

Voice 1-888-ASK-USGS

##### Address

Type postal

Delivery point Denver Federal Center, P.O. Box 25286

City Denver

Administrative area Colorado

Postal code 80225

e-mail address [infoservices@usgs.gov](mailto:infoservices@usgs.gov)

### Transfer options

Transfer size ⇔ 0.383

### Online source

Online location (URL) ⇔ <https://doi.org/10.3133/sir20105090cc>

Connection protocol ⇔

Description ⇔

Function performed download

### Distribution format

Name ⇔ File Geodatabase Feature Class

Version ArcGIS 10

Specification GIS\_ElkPt\_potash.zip

File decompression technique To open a zipped file, double-click on the zipped file listed in My Computer or Windows Explorer, drag and drop the zipped file onto WINZIP, or use the standard Open dialogue box.

Format information content ElkPt\_potash.gdb and metadata

## Fields ►

### Details for object ElkPt\_tracts ►

Type ⇔ Feature Class

Row count ⇔ 4

Definition

Permissive tracts for stratabound potash in the Elk Point Basin, Canada and United States

### Field OBJECTID ►

Alias ⇔ OBJECTID

Data type ⇔ OID

Width ⇔ 4

Precision ⇔ 0

Scale ⇔ 0

Field description ⇔

Internal feature number.

Description source ⇔

ESRI

Description of values ⇔

Sequential unique whole numbers that are automatically generated.

### Field Shape ►

Alias ⇔ Shape

Data type ⇔ Geometry

Width ⇔ 0

Precision ⇔ 0

Scale ⇔ 0

Field description

Feature geometry.

Description source

ESRI

Description of values

Coordinates defining the features.

### Field Coded\_ID ►

Alias ⇔ Coded\_ID  
Data type ⇔ String  
Width ⇔ 15  
Precision ⇔ 0  
Scale ⇔ 0

Field description  
Coded, unique identifier assigned to permissive tract

#### List of values

Value 003sbK0001a  
Description Patience Lake permissive tract for stratabound potash in the Elk Point Basin, North America

Value 003sbK0001b  
Description Belle Plaine permissive tract for stratabound potash in the Elk Point Basin, North America

Value 003sbK0001c  
Description White Bear permissive tract for stratabound potash in the Elk Point Basin, North America

Value 003sbK0001d  
Description Esterhazy permissive tract for stratabound potash in the Elk Point Basin, North America

#### Field Tract\_name ►

Alias ⇔ Tract\_name  
Data type ⇔ String  
Width ⇔ 254  
Precision ⇔ 0  
Scale ⇔ 0

Field description  
Informal name of permissive tract

#### List of values

Value Patience Lake

Value Belle Plaine

Value White Bear

Value Esterhazy

#### Field Unregcode ►

Alias ⇔ Unregcode  
Data type ⇔ String  
Width ⇔ 254  
Precision ⇔ 0  
Scale ⇔ 0

Field description  
Three-digit United Nations code for the region that underlies most of the permissive tract

Description source

<http://unstats.un.org/unsd/methods/m49/m49regin.htm>

List of values

Value 003

Description North America

Field Country ►

Alias ⇔ Country

Data type ⇔ String

Width ⇔ 254

Precision ⇔ 0

Scale ⇔ 0

Field description

Country(ies) in which permissive tract is located

List of values

Value Canada-United States

Description List of countries (hyphen-delimited)

Field Commodity ►

Alias ⇔ Commodity

Data type ⇔ String

Width ⇔ 254

Precision ⇔ 0

Scale ⇔ 0

Field description

Primary commodity being assessed

List of values

Value K

Description potash

Field Dep\_type ►

Alias ⇔ Dep\_type

Data type ⇔ String

Width ⇔ 254

Precision ⇔ 0

Scale ⇔ 0

Field description

Name of the deposit type assessed

List of values

Value stratabound potash-bearing salt

#### Field Unit ►

Alias ⇔ Unit  
Data type ⇔ String  
Width ⇔ 254  
Precision ⇔ 0  
Scale ⇔ 0

Field description  
Name of stratigraphic unit

#### List of values

Value Patience Lake Member of the Prairie Evaporite, Elk Point Group

Value Belle Plaine Member of the Prairie Evaporite, Elk Point Group

Value White Bear Member of the Prairie Evaporite, Elk Point Group

Value Esterhazy Member of the Prairie Evaporite, Elk Point Group

#### Field Age ►

Alias ⇔ Age  
Data type ⇔ String  
Width ⇔ 254  
Precision ⇔ 0  
Scale ⇔ 0

Field description  
Age of geologic feature assessed

#### List of values

Value Devonian

#### Field Geology ►

Alias ⇔ Geology  
Data type ⇔ String  
Width ⇔ 254  
Precision ⇔ 0  
Scale ⇔ 0

Field description  
Geologic feature assessed

#### Field Asmt\_date ►

Alias ⇔ Asmt\_date  
Data type ⇔ Double  
Width ⇔ 8  
Precision ⇔ 0  
Scale ⇔ 0

Field description  
Year assessment was conducted

List of values  
Value 2011

Field Asmt\_methd ►

Alias ⇔ Asmt\_methd  
Data type ⇔ String  
Width ⇔ 254  
Precision ⇔ 0  
Scale ⇔ 0

Field description  
Name of assessment method

List of values  
Value Adaptive geometric estimation

Field Asmt\_depth ►

Alias ⇔ Asmt\_depth  
Data type ⇔ Double  
Width ⇔ 8  
Precision ⇔ 0  
Scale ⇔ 0

Field description  
Maximum depth beneath the Earth's surface used for the assessment

Range of values  
Units of measure kilometers  
Minimum value 3  
Maximum value 3

Field Area\_km2 ►

Alias ⇔ Area\_km2  
Data type ⇔ Double  
Width ⇔ 8  
Precision ⇔ 0  
Scale ⇔ 0

Field description  
AREA in SQUARE KILOMETERS -- Area of permissive tract.

Range of values  
Units of measure square kilometers

#### Field Thickness ►

Alias ⇔ Thickness  
Data type ⇔ String  
Width ⇔ 254  
Precision ⇔ 0  
Scale ⇔ 0

#### Field description

How thickness variation was determined.

#### List of values

Value drill hole, isopach  
Description Thickness derived from drill hole data and isopach map for unit.

#### Field Volume\_km3 ►

Alias ⇔ Volume\_km3  
Data type ⇔ String  
Width ⇔ 254  
Precision ⇔ 0  
Scale ⇔ 0

#### Field description

Volume of tract for areas of carnallite and areas of non-carnallite in the format TRRN(min,max,mode) where TRRN is SYSTAT code for triangular distribution, min = minimum value, max = maximum value, mode = mode or average value.

#### Range of values

Units of measure cubic kilometers

#### Field Density ►

Alias ⇔ Density  
Data type ⇔ String  
Width ⇔ 50  
Precision ⇔ 0  
Scale ⇔ 0

#### Field description

Specific gravity used in calculations

#### List of values

Value variable with grade

#### Field Tonnage ►

Alias ⇔ Tonnage  
Data type ⇔ String  
Width ⇔ 254  
Precision ⇔ 0  
Scale ⇔ 0

#### Field description

Tonnage of mineralized rock, in the format TRRN(min,max,mode) where TRRN is SYSTAT code for triangular distribution; min = minimum value, max = maximum value, mode = mode or average value.

#### Range of values

Units of measure   billions of metric tons (gigatonnes)

#### Field K2O\_grade ►

Alias   ↔ K2O\_grade

Data type   ↔ String

Width   ↔ 254

Precision   ↔ 0

Scale   ↔ 0

#### Field description

K2O grade (as percent K2O) for areas of carnallite and areas of non-carnallite; distribution specified in the format ZRN(mean,s.d.) where ZRN is SYSTAT code for normal distribution and s.d. = standard deviation.

#### List of values

Value   Carnallite: ZRN(15.87,4.98); Non-carnallite: ZRN(20.22,4.45)

Value   Carnallite: ZRN(13.05,3.93); Non-carnallite: ZRN(19.55,4.58)

Value   Carnallite: ZRN(8.16,2.81); Non-carnallite: ZRN(10.66,2.81)

Value   Carnallite: ZRN(13.36,4.30); Non-carnallite: ZRN(16.01,3.87)

#### Field Embayments ►

Alias   ↔ Embayments

Data type   ↔ String

Width   ↔ 254

Precision   ↔ 0

Scale   ↔ 0

#### Field description

Embayments (as percent of area); distribution specified in the format TRRN(min,max,mode) where TRRN is SYSTAT code for triangular distribution, min = minimum value, max = maximum value, mode = mode or average value.

#### List of values

Value   NULL

Description   Null valued indicates no data.

#### Field Anomalies ►

Alias   ↔ Anomalies

Data type   ↔ String

Width   ↔ 254

Precision   ↔ 0

Scale ⇔ 0

#### Field description

Anomalies (as percent of area); distribution specified in the format TRRN(min,max,mode) where TRRN is SYSTAT code for triangular distribution, min = minimum value, max = maximum value, mode = mode or average value.

#### List of values

Value estimated, TRRN(5,15,10)

#### Field Other\_adj ►

Alias ⇔ Other\_adj

Data type ⇔ String

Width ⇔ 254

Precision ⇔ 0

Scale ⇔ 0

#### Field description

OTHER ADJUSTMENTS -- other needed adjustments

#### List of values

Value none

Description No other adjustments were used.

#### Field K2O\_known ►

Alias ⇔ K2O\_known

Data type ⇔ Double

Width ⇔ 8

Precision ⇔ 0

Scale ⇔ 0

#### Field description

Known resources of potash

#### Range of values

Units of measure billions of metric tons (gigatonnes)

Minimum value 0

Maximum value 11.9

#### Field K2O\_median ►

Alias ⇔ K2O\_median

Data type ⇔ Double

Width ⇔ 8

Precision ⇔ 0

Scale ⇔ 0

#### Field description

Median of undiscovered resources of contained potash

#### Range of values

Units of measure billions of metric tons (gigatonnes)

Minimum value 33.5

Maximum value 385

#### Field K2O\_mean ►

Alias ⇔ K2O\_mean

Data type ⇔ Double

Width ⇔ 8

Precision ⇔ 0

Scale ⇔ 0

#### Field description

Mean of undiscovered resources of contained potash

#### Range of values

Units of measure billions of metric tons (gigatonnes)

Minimum value 33.9

Maximum value 386

#### Field K2O\_densit ►

Alias ⇔ K2O\_densit

Data type ⇔ Double

Width ⇔ 8

Precision ⇔ 0

Scale ⇔ 0

#### Field description

K2O DENSITY -- Mean of undiscovered resources of contained potash /area of permissive tract

#### Range of values

Units of measure Millions of metric tons of K2O per square kilometer

Minimum value 0.625

Maximum value 2.78

#### Field Estimators ►

Alias ⇔ Estimators

Data type ⇔ String

Width ⇔ 254

Precision ⇔ 0

Scale ⇔ 0

#### Field description

Names of people on the estimation team

#### List of values

Value James D. Bliss, Mark D. Cocker, Pamela Dunlap, Greta J. Orris, Chao Yang

### Field Shape\_Length ▶

Alias ↔ Shape\_Length

Data type ↔ Double

Width ↔ 8

Precision ↔ 0

Scale ↔ 0

Field description ↔

Length of feature in internal units.

Description source ↔

ESRI

Description of values ↔

Positive real numbers that are automatically generated.

### Field Shape\_Area ▶

Alias ↔ Shape\_Area

Data type ↔ Double

Width ↔ 8

Precision ↔ 0

Scale ↔ 0

Field description ↔

Area of feature in internal units squared.

Description source ↔

ESRI

Description of values ↔

Positive real numbers that are automatically generated.

## Metadata Details ▶

Metadata language ↔ English (UNITED STATES)

Metadata character set ↔ 8859part1 - Latin alphabet No. 1

Scope of the data described by the metadata ↔ dataset

Scope name ↔ dataset

Last update ↔ 2023-09-12

### ArcGIS metadata properties

Metadata format ArcGIS 1.0

Standard or profile used to edit metadata FGDC

Metadata style FGDC CSDGM Metadata

Created in ArcGIS for the item 2011-11-14 08:44:15

Last modified in ArcGIS for the item 2023-09-12 14:30:01

## Automatic updates

Have been performed Yes

Last update 2014-04-07 15:12:34

## Metadata Contacts ▶

### Metadata contact - author

Individual's name Pamela Dunlap

Organization's name U.S. Geological Survey

Contact's position Geologist

### Contact information ▶

#### Phone

Voice 1-520-670-5573

#### Address

Type postal

Delivery point 520 N Park Ave., Ste. 355

City Tucson

Administrative area Arizona

Postal code 85719

Country US

e-mail address [pdunlap@usgs.gov](mailto:pdunlap@usgs.gov)

## Metadata Maintenance ▶

### Maintenance

Update frequency not planned

## Thumbnail and Enclosures ▶

### Thumbnail

Thumbnail type

Image file