

ElkPt_carnallite

Type File Geodatabase Feature Class



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

Summary

ElkPt_carnallite -- Spatial database for occurrence of carnallite within permissive tracts 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 K₂O). Potash grades were calculated using both historic (1950s and 1960s) and recent (2007–2011) drill hole analyses. The mean estimated undiscovered K₂O 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 and built the final spatial database.

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

in a GIS. She also digitized initial areas for extent of carnallite.
Leila Gass digitized areas of known salt solutioning from the GeoTIFF images.

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 -110.394290 East -101.273483
North 53.670877 South 48.333745

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_carnallite

Alternate titles Extent of carnallite mineralization in permissive tracts for potash in the Elk Point Basin

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)

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_carnallite

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 ⇔ -110.394290

East longitude ⇔ -101.273483

North latitude ⇔ 53.670877

South latitude ⇔ 48.333745

Extent contains the resource ⇔ Yes

Extent in the item's coordinate system

westBL ⇔ -955171.834500

eastBL ⇔ -386170.735200

southBL ⇔ 1003018.142100

northBL ⇔ 1522911.851900

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 ⇔ Projected

Geographic coordinate reference ⇔ GCS_North_American_1983

Projection ⇔ Canada_Albers_Equal_Area_Conic

Coordinate reference details ⇔

ProjectedCoordinateSystem

WKID 102001

XOrigin -13825800

YOrigin -7913700

XYScale 10000

ZOrigin -100000

ZScale 10000

MOrigin -100000

MScale 10000

XYTolerance 0.001

ZTolerance 0.001

MTolerance 0.001

HighPrecision true

LatestWKID 102001

WKT

PROJCS["Canada_Albers_Equal_Area_Conic",GEOGCS["GCS_North_American_1983",DATUM["D_North_Amer

Reference system identifier

Value ⇔ 102001

Codespace ⇔ ESRI

Version ⇔ 10.2.1

Spatial Data Properties ►

Vector ►

Level of topology for this dataset ⇔ geometry only

Geometric objects

Feature class name ElkPt_carnallite

Object type ⇔ composite

Object count ⇔ 4

ArcGIS Feature Class Properties ►

Feature class name ElkPt_carnallite

Feature type ⇔ Simple

Geometry type ⇔ Polygon

Has topology ⇔ FALSE

Feature count ⇔ 4

Spatial index ⇔ TRUE

Linear referencing ⇔ FALSE

Lineage ►

Lineage statement

The data were derived from Fuzesy (1982, figs. 6a, b) and revised so as to not extend beyond the boundaries of the permissive tracts.

Process step ►

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

Source data ►

Description

Fuzesy, Anne, 1982, Isopach maps of the Patience Lake and Belle Plaine Members, fig. 6a in Potash in Saskatchewan: Saskatchewan Geological Survey Report 181, 44 p.

Source medium name hardcopy—printing on paper

Source data ►

Description

Fuzesy, Anne, 1982, Isopach maps of the White Bear and Esterhazy Members, fig. 6b in Potash in Saskatchewan: Saskatchewan Geological Survey Report 181, 44 p.

Source medium name hardcopy—printing on paper

Distribution ►

Distributor ►

Contact information - distributor

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

Country US

e-mail address infoservices@usgs.gov

Transfer options

Transfer size ⇔ 0.013

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_carnallite ►

Type ⇔ Feature Class

Row count ⇔ 4

Definition

ESRI polygon shapefile

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 Unit ►

Alias ⇔ Unit
Data type ⇔ String
Width ⇔ 100
Precision ⇔ 0
Scale ⇔ 0

Field description

Unit within the Prairie Evaporite that contains carnallite mineralization

List of values

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

Value Esterhazy Member of the Prairie Evaporite, Elk Point Group

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

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

Field Area_km2 ►

Alias ⇔ Area_km2
Data type ⇔ Double
Width ⇔ 8
Precision ⇔ 0
Scale ⇔ 0

Field description

Area of mineralization

Range of values

Minimum value 6560
Maximum value 24500
Units of measure square kilometers

Field Vol_km3 ►

Alias ⇔ Vol_km3
Data type ⇔ SmallInteger
Width ⇔ 2
Precision ⇔ 0
Scale ⇔ 0

Field description

Volume of carnallite mineralization, based upon average thickness of unit.

Range of values

Minimum value 24
Maximum value 203
Units of measure cubic kilometers

Field Short_Ref ►

Alias ⇔ Short_Ref
Data type ⇔ String
Width ⇔ 30
Precision ⇔ 0
Scale ⇔ 0

Field description

Abbreviated source reference, author and year.

List of values

Value Fuzesy (1982)
Description Fuzesy, Anne, 1982, Potash in Saskatchewan: Saskatchewan Geological Survey Report 181, 44 p.

Field Reference ►

Alias ⇔ Reference
Data type ⇔ String
Width ⇔ 250
Precision ⇔ 0
Scale ⇔ 0

Field description

Source reference for extent of carnallite.

List of values

Value Fuzesy, Anne, 1982, Isopach maps of the Patience Lake and Belle Plaine Members, fig. 6a in Potash in Saskatchewan: Saskatchewan Geological Survey Report 181, 44 p.

Value Fuzesy, Anne, 1982, Isopach maps of the White Bear and Esterhazy Members, fig. 6b in Potash in Saskatchewan: Saskatchewan Geological Survey Report 181, 44 p.

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 ⇔ utf8 - 8 bit UCS Transfer Format

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 08:54:46

Last modified in ArcGIS for the item 2023-09-12 14:15:46

Automatic updates

Have been performed Yes

Last update 2014-04-07 15:10:10

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

Metadata Maintenance ►

Maintenance

Update frequency not planned

Thumbnail and Enclosures ►

Thumbnail

Thumbnail type

Image file