ElkPt_thickness

Type File Geodatabase Feature Class

Tags potash resources, drill holes, thickness, wells, stratabound salt

Summary

ElkPt_thickness -- Spatial database of drill-hole and well data for thickness of the various members of the Prairie Evaporite in the Elk Point Basin, Canada.

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 spatial database.

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 -111.873496 East -101.042063
North 55.530824 South 48.248114

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_thickness
Alternate titles Thickness of the various members of the Prairie Evaporite, from well or drill-hole data.

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

Credits
Mark Cocker interpreted the data and is responsible for the scientific content.
Pamela Dunlap processed the digital data and built the spatial database.

ArcGIS item properties
Name ⇔ ElkPt_thickness
Location ⇔ file://\\IGSWZEWMWSPDUN2\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 ⇔ -111.873496
East longitude ⇔ -101.042063
North latitude ⇔ 55.530824
South latitude ⇔ 48.248114
Extent contains the resource ⇔ Yes

Extent in the item's coordinate system
westBL ⇔ -1006756.154300
eastBL ⇔ -369110.764300
southBL ⇔ 1003657.556000
northBL ⇔ 1731163.915800
exTypeCode ⇔ Yes

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_thickness
Object type ⇔ point
Object count ⇔ 1522

ArcGIS Feature Class Properties ►
Feature class name ElkPt_thickness
Feature type ⇔ Simple
Geometry type ⇔ Point
Has topology ⇔ FALSE
Feature count ⇔ 1522
Spatial index ⇔ TRUE
Linear referencing ⇔ FALSE

Lineage ►

Lineage statement
Total thickness was determined from drill hole data published by Yang and others (2009), Eccles (2009), and Bannatyne (1983), as well as from additional data from Chao Yang (unpublished data, January 20, 2010) and Mark D. Cocker (unpublished data, February 26, 2010). Data for the United States were derived from Anderson and Swinehart (1979). These data were then used to construct isopach maps of each member (see the feature classes BP_isopach, ES_isopach, PL_isopach, and WB_isopach).

Process step ►
When the process occurred 2011-10-27 00:00:00

Source data ►
Description
Anderson, S.B., and Swinehart, R.P., 1979, Potash salts in the Williston Basin, U.S.A.: Economic Geology, v. 74, p. 358–376. (Also available at http://dx.doi.org/10.2113/gsecongeo.74.2.358.)

Source medium name hardcopy—printing on paper

Source data ►
Description
Bannatyne, B.B., 1983, Devonian potash deposits in Manitoba: Manitoba Department of Energy and Mines, Mineral Resources Division Open-File Report OF83-3, 27 p.

Source medium name hardcopy—printing on paper

Source data ►
Description
Eccles, D.R., Al-Souqi, M., Grattan, K., and Dufresne, M.B., 2009, Preliminary investigation of potash potential in Alberta: Energy Resources Conservation Board/Alberta Geological Survey Open File Report 2009–20, 29 p. (Also available at http://www.ags.gov.ab.ca/publications/OFR/PDF/OFR_2009_20.pdf.)

Source medium name hardcopy—printing on paper

Source data ►
Description
Yang, C., Jensen, G.K.S., and Berenyi, J., 2009, Isopach and salt-back thickness maps of the Patience Lake, Esterhazy, and Belle Plaine members of the Prairie Evaporite Formation (isopach and formation tops data included): Saskatchewan Ministry of Energy and Resources Open Files 2009-24 to 29, accessed April 7, 2014, at http://www.publications.gov.sk.ca/details.cfm?p=27288.

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 ⇔ 0.041

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_thickness ▶
Type ⇔ Feature Class
Row count ⇔ 1522
Definition
Esri FGDB feature class of well and drill-hole data for thickness of the Patience Lake, Belle Plaine, White Bear, and Esterhazy Members of the Prairie Evaporite (Elk Point Group), Alberta, Manitoba, and Saskatchewan, Canada

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 WELL_ID ►
Alias ⇔ WELL_ID
Data type ⇔ String
Width ⇔ 22
Precision ⇔ 0
Scale ⇔ 0

Field description
WELL IDENTIFIER -- Identifier for well or drill hole

Field LATITUDE ►
Alias ⇔ LATITUDE
Data type ⇔ Double
Width ⇔ 8
Precision ⇔ 0
Scale ⇔ 0

Field description
LATITUDE -- Latitude; positive value represents latitude north of the equator.

Range of values
Units of measure decimal degrees

Field LONGITUDE ►
Alias ⇔ LONGITUDE
Data type ⇔ Double
Width ⇔ 8
Precision ⇔ 0
Scale ⇔ 0

Field description
LONGITUDE -- Longitude; negative value represents longitude west of the Greenwich meridian.

Range of values
Units of measure decimal degrees

Field THK_PL_M ►
Alias ⇔ THK_PL_M
Data type ⇔ Double
Width ⇔ 8
Precision ⇔ 0
Scale ⇔ 0

Field description
THICKNESS PATIENCE LAKE in METERS -- Total thickness of the Patience Lake Member.

Range of values
Minimum value 0
Maximum value 31.6
Units of measure meters

Field THK_BP_M ►
Alias ⇔ THK_BP_M
Data type ⇔ Double
Width ⇔ 8
Precision ⇔ 0
Scale ⇔ 0

Field description
THICKNESS BELLE PLAINE in METERS -- Total thickness of the Belle Plaine Member

Range of values
Minimum value 0
Maximum value 23.1
Units of measure meters

Field THK_WB_M ►
Alias ⇔ THK_WB_M
Data type ⇔ Double
Width ⇔ 8
Precision ⇔ 0
Scale ⇔ 0

Field description
THICKNESS WHITE BEAR in METERS -- Total thickness of the White Bear Member

Range of values
Minimum value 0
Maximum value 9.6
Units of measure meters

Field THK_ES_M ►
Alias ⇔ THK_ES_M

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

Field description
THICKNESS ESTERHAZY in METERS -- Total thickness of the Esterhazy Member

Range of values
Minimum value 0
Maximum value 25.6
Units of measure meters

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

Created in ArcGIS for the item 2010-09-12 13:48:15
Last modified in ArcGIS for the item 2023-09-12 14:27:29

Automatic updates
Have been performed Yes
Last update 2014-04-07 15:11:51

Metadata Contacts ►

Metadata contact - author
Individual's name Pamela Dunlap
Organization's name U.S. Geological Survey
Contact's position Geologist

Contact information ►
Phone
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Type postal
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Country US
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Metadata Maintenance ►

Maintenance

Update frequency not planned

Thumbnail and Enclosures ►

Thumbnail

Thumbnail type

Image file