

Wyoming-Montana Water Science Center

Delineation of Brine Contamination in and near the East Poplar Oil Field, Fort Peck Indian Reservation, Northeastern Montana

Brine is a byproduct of crude oil production. Handling and disposal of brine during the last 50 years in the East Poplar oil field has resulted in contamination of not only the shallow Quaternary aquifers, but also the Poplar River. Previous investigations have documented and partially delineated the extent of brine contamination in the East Poplar oil field during the early 1990s. In the 10 years since the last USGS study ended, the extent of contamination has changed and may have grown larger. Brine-plume migration is toward the nearby City of Poplar, which, at present, relies on the shallow Quaternary aquifers as its sole source of water.

Status - Active



Contacts

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Explore More Science:

East Poplar energy development Brine Montana Streamflow and Groundwater Availability Water Quality Characterizing Groundwater



Water Used for Energy Development Water-Quality Samples Energy Development and Hydrology Water

The objective of this project is to more fully delineate brine contamination in shallow aquifers in and near the East Poplar oil field. The project area includes the entire East Poplar oil field, much of the Northwest Poplar oil field and the City of Poplar. Results of the study are detailed in Thamke and Smith, 2014.

Below are other science projects associated with this project.



Date published: DECEMBER 10, 2018 Status: Active

Science Team about Energy and Plains and Potholes Environments (STEPPE)

Brine Contamination to Plains and Potholes Environments from Energy Development in the Williston Basin

Contacts: Joanna Thamke, Brian Tangen, Robert Gleason, Bruce D Smith, Todd Preston, Max Post van der Burg, Seth Haines, Aida Farag, Ph.D., Dave Harper *Attribution: Ecosystems, Water Resources, Fisheries Program, Region 5: Missouri Basin, Geology, Geophysics, and Geochemistry Science Center, Northern Prairie Wildlife* Research Center, Northern Rocky Mountain Science Center, Wyoming-Montana Water Science Center

Below are publications associated with this project.



Year Published: 2017

Characterization and origin of brines from the Bakken-Three Forks petroleum system in the Williston Basin, USA

Brine (also referred to as 'produced water') samples were collected from 28 wells producing oil from the Late Devonian-Early Mississippian Bakken and Three Forks Formations in the Williston Basin of eastern Montana and western North Dakota. The samples were analyzed for major ions, trace metals, stable isotopes, and strontium isotopes. The brines...

Peterman, Zell; Thamke, Joanna N.; Futa, Kiyoto; Oliver, Thomas A. *Attribution:* Central Energy Resources Science Center, Energy Resources Program, Region 7: Upper Colorado Basin

View Citation V



Year Published: 2016

Chemical and isotopic changes in Williston Basin brines during longterm oil production: An example from the Poplar dome, Montana

Brine samples were collected from 30 conventional oil wells producing mostly from the Charles Formation of the Madison Group in the East and Northwest Poplar oil fields on the Fort Peck Indian Reservation, Montana. Dissolved concentrations of major ions, trace metals, Sr isotopes, and stable isotopes (oxygen and hydrogen) were analyzed to compare...

Peterman, Zell; Thamke, Joanna N. *Attribution:* Central Energy Resources Science Center, Energy Resources Program, Region 7: Upper Colorado Basin



Year Published: 2014

Delineation of brine contamination in and near the East Poplar oil field, Fort Peck Indian Reservation, northeastern Montana, 2004-09

The extent of brine contamination in the shallow aquifers in and near the East Poplar oil field is as much as 17.9 square miles and appears to be present throughout the entire saturated zone in contaminated areas. The brine contamination affects 15–37 billion gallons of groundwater. Brine contamination in the shallow aquifers east of the Poplar...

Thamke, Joanna N.; Smith, Bruce D.

Attribution: Energy, Water, Geology, Geophysics, and Geochemistry Science Center, Wyoming-Montana Water Science Center, Water Resources, , Montana, United States of America

View Citation V

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Borehol Area, Fo Montana	e Geophysical Data for the East Poplar Oil Fie et Peck Indian Reservation, Northeastern a, 1993, 2004, and 2005
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Open-File Res Version 1.1.1	por 2013-1266 inventive 2020
12 200	1,/ De harar

Year Published: 2014

Borehole geophysical data for the East Poplar oil field area, Fort Peck Indian Reservation, northeastern Montana, 1993, 2004, and 2005

Areas of high electrical conductivity in shallow aquifers in the East Poplar oil field area were delineated by the U.S. Geological Survey (USGS), in cooperation with the Fort Peck Assiniboine and Sioux Tribes, in order to interpret areas of saline-water contamination. Ground, airborne, and borehole geophysical data were collected in the East...

Smith, Bruce D.; Thamke, Joanna N.; Tyrrell, Christa *Attribution:*, Geology, Minerals, Energy, and Geophysics Science Center, Geology, Geophysics, and Geochemistry Science Center, Region 7: Upper Colorado Basin View Citation

™USGS
in cooperation with the Fact Pack Tribes Office of Environmental Protection
Strontium Isotope Detection of Brine Contamination in the East Poplar Oil Field, Montana
Open-File Report 2010-1326
U.I. Department of the Interior U.I. Keningkod Torony

Year Published: 2010

Strontium isotope detection of brine contamination in the East Poplar oil field, Montana

Brine contamination of groundwater in the East Poplar oil field was first documented in the mid-1980s by the U.S. Geological Survey by using hydrochemistry, with an emphasis on chloride (CI) and total dissolved solids concentrations. Supply wells for the City of Poplar are located downgradient from the oil field, are completed in the same shallow...

Peterman, Zell E.; Thamke, Joanna N.; Futa, Kiyoto; Oliver, Thomas A. *Attribution:*, Geology, Minerals, Energy, and Geophysics Science Center, Geology, Geophysics, and Geochemistry Science Center, Region 7: Upper Colorado Basin View Citation



Year Published: 2006

Helicopter electromagnetic and magnetic survey maps and data, East Poplar Oil Field area, August 2004, Fort Peck Indian Reservation, northeastern Montana

This report is a data release for a helicopter electromagnetic and magnetic survey that was conducted during August 2004 in a 275-square-kilometer area that includes the East Poplar oil field on the Fort Peck Indian Reservation. The electromagnetic equipment consisted of six different coil-pair orientations that measured resistivity at separate...

Smith, Bruce D.; Thamke, Joanna N.; Cain, Michael J.; Tyrrell, Christa; Hill, Patricia L. View Citation Year Published: 2003



Ground-water quality for two areas in the Fort Peck Indian Reservation, northeastern Montana, 1993-2000

Thamke, Joanna N.; Midtlyng, Karen S. <u>View Citation</u> V



Year Published: 1997

Saline-water contamination in Quaternary deposits and the Poplar River, East Poplar Oil Field, northeastern Montana

The extent of saline-water contamination in Quaternary deposits in and near the East Poplar oil field may be as much as 12.4 square miles and appears to be present throughout the entire saturated zone. The saline-water contamination affects 9-60 billion gallons of ground water. Saline- contaminated water moves westward through Quaternary glacial...

Thamke, J.N.; Craigg, S.D.

View Citation V



Year Published: 1996

Hydrologic data for the East Poplar oil field, Fort Peck Indian Reservation, Northeastern Montana

This report presents selected hydrologic data for the East Poplar oil field, located in the south-central part of the Fort Peck Indian Reservation in northeastern Montana. Data about the occurrence, quantity, and quality of ground and surface water are presented in tabular form. The tables contain records of privately owned wells (active and...

Thamke, J.N.; Craigg, S.D.; Mendes, T.M. <u>View Citation</u>

Below are news stories associated with this project.



Date published: OCTOBER 28, 2014

Low-flying Helicopter Surveying Groundwater and Geology in the Poplar River Valley Area, Montana

■USGS

Citizens should not be alarmed if they see a low-flying helicopter towing a large wire-loop contraption hanging from a cable in the Poplar, Montana area during the next couple of weeks.

Attribution: Energy and Minerals, Region 5: Missouri Basin, Geology, Geophysics, and Geochemistry Science Center

Date published: APRIL 2, 2014

East Poplar Brine-Contaminated Groundwater Plumes Continue to Move

A new report by the U.S. Geological Survey describes the extent and movement of contamination in the East Poplar oil field area in northeastern Montana.

Attribution: Region 5: Missouri Basin

Below are partners associated with this project.

Fort Peck Tribes