

Completed and on-going USGS studies in the Williston Basin. September, 2014

Abbreviations: COWSC, Colorado Water Science Center; NDWSC, North Dakota Water Science Center; SD, South Dakota Water Science Center; WY-MTWSC, Wyoming-Montana Water Science Center; CGGC, Crustal Geophysics and Geochemistry Center; NRMSC, Northern Rocky Mountain Science Center; CERSC, Central Energy Resources Science Center; NPWRC, Northern Prairie Wildlife Research Center

Project number	Mission Area(s)	Start year	Projected/actual end year	Project Title	USGS author(s)/contact(s)	Published paper, data source, on-going study, etc.	Relevant information	Keywords	Linkage to other research topics?	URL to project	URL to product(s)
Topic 1. Understanding the Scale and Nature of UOG Resources											
1.1											
Topic 2. Water Quality											
Topic 2.1. Multi-Research Topic - overarching studies with multiple sub-components											
2.1.1											
Topic 2.2. Groundwater											
2.2.1	Water	2013	2014	Williston Basin Baseline Water-Quality Assessment - Upper Fort Union	Peter McMahon, COWSC; Jill Frankforter, WY-MTWSC; Joel Galloway, NDWSC; Greg Delzer, SDWSC	Paper in review at the journal 'Groundwater'	Characterize baseline water-quality conditions in the Upper Fort Union aquifer within the Williston Basin, Montana and North Dakota	Energy Development, Williston Basin, Water Quality, Baseline	3		
Topic 2.3. Surface Water											
2.3.1											
Topic 2.4. Groundwater and Surface Water											
2.4.1	Water	2003	present	Delineation of brine contamination in and near the East Poplar oil field, Fort Peck Indian Reservation, northeastern Montana	Joanna Thamke, WY-MTWSC; Zell Peterman, CGGC; Bruce Smith, CGGC; Todd Preston, NRMSC	USGS OFR 2006-1216; USGS OFR 2010-1326, USGS SIR 2014-5024; journal article in preparation	Project assesses brine contamination to the shallow aquifers and surface water. Uses combination of hydrology, geochemistry, and geophysics to delineate areas of groundwater contamination.	Energy Development, Williston Basin, Brine contamination, Groundwater, Surface Water, East Poplar oil field, Fort Peck Indian Reservation	3, 6	http://wy-mt.water.usgs.gov/projects/east_poplar/index.html	http://pubs.er.usgs.gov/publication/wri034214 http://pubs.usgs.gov/of/2006/1216/ http://pubs.usgs.gov/of/2010/1326/ http://pubs.usgs.gov/sir/2014/5024/
2.4.2	Water	2013	2014	Analyses of water-quality data and resources on the Fort Berthold Reservation, North Dakota	Tony Ranalli, COWSC; Joel Galloway, NDWSC	On-going study, publication in preparation	Analyses of water-quality data and resources on the Fort Berthold Reservation, North Dakota		3, 6		
Topic 2.5. Produced Water											
2.5.1	Energy and Minerals, Water	2012	present	Baseline Chemical and Isotopic Data for Produced Water from the Bakken Formation, Williston Basin	Zell Peterman, Crustal Geophysics and Geochemistry Science Center; Rod Caldwell, WY-MTWSC; Joel Galloway, NDWSC	Data available in USGS National Water Information System at http://mt.water.usgs.gov/	Characterize Bakken Formation water	Energy Development, Williston Basin, Bakken Formation, Strontium Isotopes	3, 6		
2.5.2	Energy and Minerals, Water	2013	present	Isotopic Indications of Fluid Flow in the Bakken Formation, Williston Basin	Zell Peterman and Kiyoto Futa, Crustal Geophysics and Geochemistry Science Center; Thomas Oliver, CERSC	On-going study	Sr isotopic characterization of pore salts in members of the Bakken Formation to evaluate flow amount units	Energy Development, Williston Basin, flow in Bakken Fm	3, 6		
2.5.3	Energy and Minerals, Water	2014	2015	Refined Methodology and Safety Analysis for the Collection of Produced Waters: Field Evaluation in the Williston Basin (a spin-off from project proposal 2.5.1).	Rod Caldwell, WY-MTWSC; Tanya Gallegos, ERP; Greg Delzer, SDWSC	On-going study	Characterization of produced waters from the Bakken and Three Forks fm. Comparison of waters sampled from wells and separator.	Produced water, field protocol evaluation, Bakken, Three Forks		Workplan methods eval v 3-21	
Topic 3. Water Availability											
Topic 3.1. Multi-Research Topic Proposal(s)											

Completed and on-going USGS studies in the Williston Basin. September, 2014

Abbreviations: COWSC, Colorado Water Science Center; NDWSC, North Dakota Water Science Center; SD, South Dakota Water Science Center; WY-MTWSC, Wyoming-Montana Water Science Center; CGGC, Crustal Geophysics and Geochemistry Center; NRMSC, Northern Rocky Mountain Science Center; CERSC, Central Energy Resources Science Center; NPWRC, Northern Prairie Wildlife Research Center

Project number	Mission Area(s)	Start year	Projected/actual end year	Project Title	USGS author(s)/contact(s)	Published paper, data source, on-going study, etc.	Relevant information	Keywords	Linkage to other research topics?	URL to project	URL to product(s)
3.1.1											
Topic 3.2. Groundwater											
3.2.1	Water	2012	2015	Williston and Powder River basins groundwater availability	Joanna Thamke and Tim Bartos, WY-MTWSC; Andrew Long and Kyle Davis, SDWSC	Bednar, 2013, South Dakota School of Mines Thesis; Aurand, 2013, South Dakota School of Mines Thesis; USGS SIR 2014-5047; USGS SIR 2014-5055	Groundwater availability determined for current and projected energy development	Energy Development, Williston Basin, Powder River Basin, Groundwater Availability	2	http://mt.water.usgs.gov/projects/WaPR/	
Topic 3.3. Surface Water											
3.3.1											
Topic 3.4 Groundwater and Surface Water											
3.4.1	Ecosystems, Water	2010	present	Water Balances for Energy Resource Production	Seth Haines, CERSC; Joanna Thamke, WY-MTWSC	USGS Fact Sheet 2014-3010; USGS SIR in preparation	Water availability	Energy Development, Williston Basin, Groundwater, Surface Water	2, 6	http://energy.usgs.gov/EnvironmentalAspects/EnvironmentalAspectsOfEnergyProductionandUse/ProducedWaters.aspx	
3.4.2	Water	2013	2014	Quantifying water-use requirements for the variable conditions and processes associated with hydraulic fracturing within North Dakota, South Dakota, and Montana	Kyle Blasch, WY-MTWSC	On-going study	Quantifying water-use requirements for the variable conditions and processes associated with hydraulic fracturing within North Dakota, South Dakota, and Montana	Energy development, Williston Basin, Bakken Formation, Three Forks Formation, hydraulic fracturing, water-use requirements	2, 6		
Topic 4. Air Quality and Greenhouse Gas Emissions											
4.1											
Topic 5. Effects on Human Health and Communities											
5.1											
Topic 6. Ecological Effects											
Topic 6.1. Multi-Research Topic Proposal(s)											
6.1.1											
Topic 6.2. Spatial Data Sets and GIS											
6.2.1	Ecosystems	2008	present	Brine Contamination to Prairie Potholes from Energy Development in the Williston Basin	Robert Gleason, NPWRC; Joanna Thamke, WY-MTWSC; Brian Tangen, NPWRC; Todd Preston, NRMSC; Tara Chesley-Preston, NRMSC; Bruce Smith, CGGC	USGS FS 2011-3047; Applied Geochemistry August 24, 2012; USGS OFR 2012-1149; Preston, 2011, Montana State University Thesis; USGS SIR 2014-5017	Water-quality impacts of brine spills, spatial data on wells, decision analysis findings	Energy Development, Williston Basin, Brine Contamination, Prairie Potholes, Wetlands, Groundwater	2	http://pubs.usgs.gov/fs/2011/3047/	http://pubs.usgs.gov/of/2012/1149/

