



**Cover:** Dipping beds of the Mowry Shale at the east end of Irish Canyon, Colorado. Photo by Christopher J. Schenk, June 7, 2004.











## Tables

1. List of files included in this report.....	1
2. Input data for estimated area of cells (drainage areas) for United States shale-gas assessment units, values in acres .....	15
3. Input data for estimated area of cells (drainage areas) for United States coalbed-gas assessment units, values in acres .....	16
4. Input data for estimated area of cells (drainage areas) for United States tight-gas assessment units, values in acres .....	17
5. Input data for estimated area of cells (drainage areas) for United States continuous-oil assessment units, values in acres .....	18
6. Input data for estimated percent of untested area in sweet spots for United States shale-gas assessment units .....	19
7. Input data for estimated percent of untested area in sweet spots for United States coalbed-gas assessment units .....	20
8. Input data for estimated percent of untested area in sweet spots for United States tight-gas assessment units .....	21
9. Input data for estimated percent of untested area in sweet spots for United States continuous-oil assessment units .....	22
10. Input data for estimated ultimate recovery distributions for United States shale-gas assessment units, values in billions of cubic feet of natural gas .....	22
11. Input data for estimated ultimate recovery distributions for United States coalbed-gas assessment units, values in billions of cubic feet of natural gas.....	23
12. Input data for estimated ultimate recovery distributions for United States tight-gas assessment units, values in billions of cubic feet of natural gas .....	24
13. Input data for estimated ultimate recovery distributions for United States continuous-oil assessment units, values in millions of barrels of oil.....	25

# U.S. Geological Survey Assessments of Continuous (Unconventional) Oil and Gas Resources, 2000 to 2011

By U.S. Geological Survey U.S. Continuous Resources Assessment Team

## Abstract

From 2000 to 2011, the U.S. Geological Survey conducted 139 quantitative assessments of continuous (unconventional) oil and gas accumulations within the United States. This report documents those assessments more fully than previously done by providing detailed documentation of both the assessment input and output. This report also compiles the data into spreadsheet tables that can be more readily used to provide analogs for future assessments, especially for hypothetical continuous accumulations.

These assessments were previously documented in a series of publications, the list of which is presented in Appendix 1. For some of the assessments, the only previous documentation was a summary of the results in a short USGS Fact Sheet. The present report provides more extensive documentation for those assessments than was previously available.

Since 2011, the USGS has continued to assess continuous oil and gas resources in the United States and internationally. These assessments, however, used a different methodology (Charpentier and Cook, 2010) that has been modified from the methodology that was used previously. None of these newer assessments are included in this report.

## Introduction

The U.S. Geological Survey (USGS) conducted 139 quantitative assessments of oil and gas potential in continuous (unconventional) accumulations from 2000 to 2011. This report provides documentation of the input and output for those assessments in one place and in a more complete fashion than previously published. All of these assessments units (AUs) were for areas within the United States, excepting one that was an extension of a coalbed methane trend into northeast Mexico.

All the assessments documented in this report were conducted using the same quantitative methodology. The basic model for this methodology is explained in Schmoker (2003). The input form and operational procedure can be found in Klett and Schmoker (2003). The program itself is available and extensively documented in Crovelli (2012). Additional information is given in Klett and Charpentier (2003).

## Data Resources

This report contains extensive documentation of the USGS assessments of continuous accumulations of oil and gas resources. Both the input and output information of the assessments are included. The data are in a collection of spreadsheet tables (table 1), in both Microsoft Excel format and tab-delimited format. Descriptions of the variables in each table are presented in Appendix 2.

The geographic boundaries of 184 AUs are included in this report as a set of GIS (geographic information system) files. Two AUs (50310261, the Winnipeg-Icebox Continuous Gas AU, and 50640561, the Elvins Shale Gas AU) did not have geographic boundaries established and thus are not included.

**Table 1.** List of files included in this report.

Microsoft Excel File Name	Tab-delimited File Name	Contents
Main Input.xlsx	Main Input.tab	Data from input forms
Ecosystem Allocations.xlsx	Ecosystem Allocations.tab	Allocations to ecosystem
Federal Land Allocations.xlsx	Federal Land Allocations.tab	Allocations to Federal agency
Land Ownership Allocations.xlsx	Land Ownership Allocations.tab	Allocations to land ownership category
State Allocations.xlsx	State Allocations.tab	Allocations to state
Continuous Results.xlsx	Continuous Results.tab	Assessment results
Code List.xlsx	Code List.tab	Main code list
Ecosystem Codes.xlsx	Ecosystem Codes.tab	Code list for ecosystem names
Cloud Plots.xlsx	Cloud Plots.tab	Data for constructing cloud plots

## Input Form and Calculation Program Versions

These assessments took place over the course of more than a decade, and refinements to both the input form and calculation program were made during the same period. The input form was changed more frequently than the program. In 2003, the input form was revised to accommodate the change in parameter inputs from median values to modal values. Other changes to the input form were primarily made to include additional ancillary variables.

The program for calculating the estimates is named “ACCESS,” and several versions exist (Crovelli, 2012). The unnumbered version, originally described in Crovelli (2000), was not used for any official USGS assessments. The first version actually used for assessments is herein termed “version 1,” which was used from 2000 to 2002. Version 1 differed from the previous ACCESS version in that it included a variable for “Percentage of total assessment-unit area that is untested.” Each triangular distribution (used to describe the probability distribution of an input variable) was described by the minimum, median, and maximum values. ACCESS version 2 was used from 2003 to 2008. Each triangular distribution was described by the minimum, mode, and maximum values. ACCESS version 3 was used from 2009 to 2011. An error was identified in version 2: gas-oil ratio inputs in continuous oil AUs were set as a triangle with minimum, mode, and maximum as 240, 320, and 960, and the program ignored any other input. The error correction was the only change made in version 3. Because the error only affected coproduct volumes and only in oil AUs, there was only minor effect in a few assessments.

Both the input form version and the version of the program used to run the calculations (for AUs that were quantitatively assessed) are documented in Microsoft Excel and tab-delimited files named “Main Input.” File Main Input includes all the variables for each version of the input form. Thus, some variables will not be populated in file Main Input for a specific AU because that variable was not on the input form used in that assessment.

## Corrections

Corrections were made to some values in the data tables. Some of these were minor and corrected typographical errors or enforced consistency in naming conventions. The list of codes used in these assessments is included as file “Code List.” Codes in the various original files were checked and changed for consistency where necessary.

Changes were also made to the data tables to ensure that allocation percentages added up correctly. The sum of the land ownership allocations should be 100 percent, and the sum of the Federal land allocations should be the percent of Federal land in file “Land Ownership Allocations.”

A few corrections were more significant, and these are highlighted in green in the Microsoft Excel versions of the spreadsheets. The most significant corrections are for

those values on the original input forms that were different from those values actually used in the resource calculations. Almost all of these are a result of the error in version 2 of the ACCESS program, as explained above.

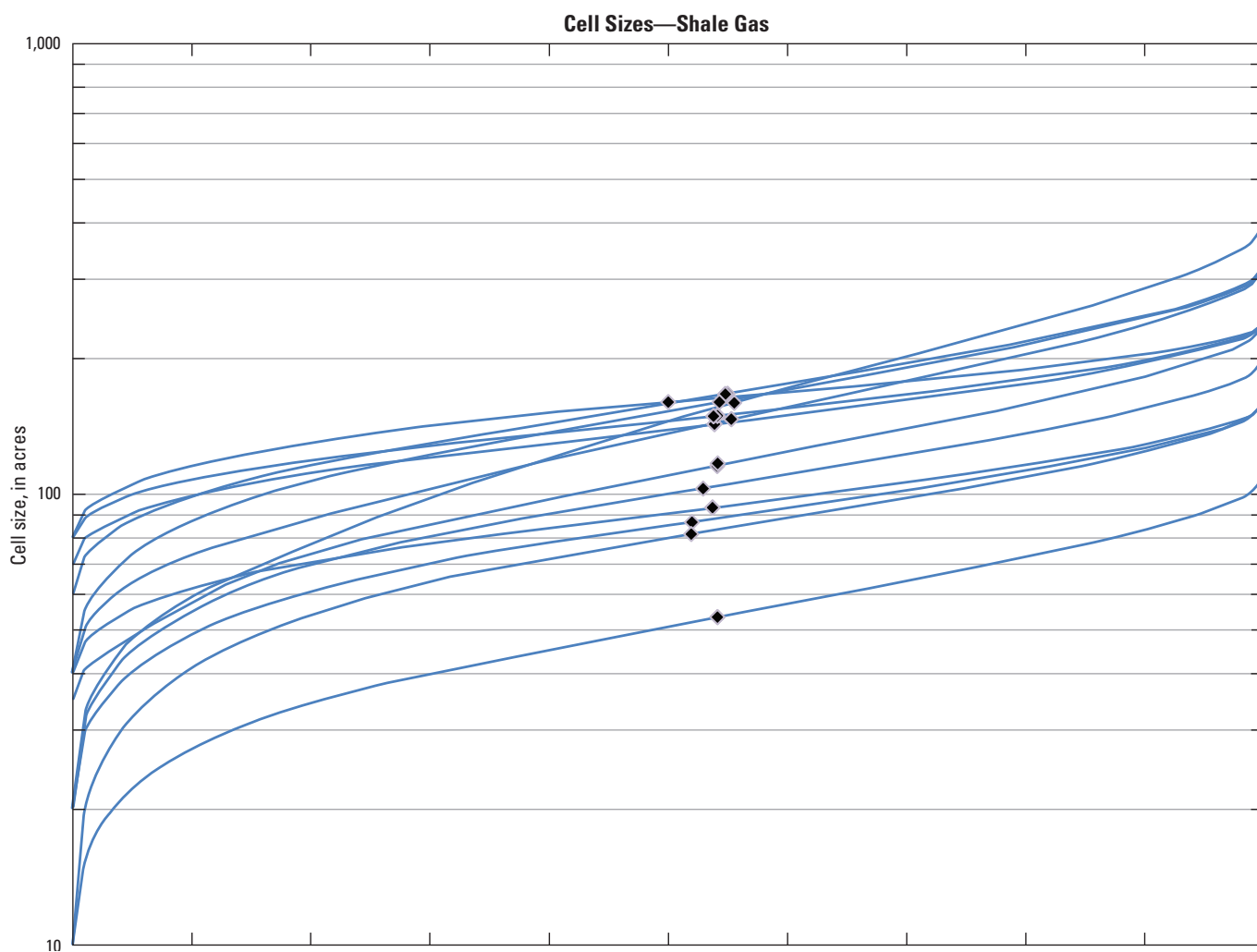
AUs that were defined but not quantitatively assessed are included in the “Main Input” and allocation-related files, but not in the “Continuous Results” or “Cloud Plots” files. These unassessed AUs are highlighted in purple in the Microsoft Excel versions of the spreadsheets. Although some of the original input forms for these unassessed AUs had some values filled in (such as allocation unit names and area percentages), these values were never checked as they would have been for a quantitative assessment. Therefore, these values are not included in the Main Input file. Only the header information for unassessed AUs is included in the Main Input file.

## Use as Analogs

This report is not only intended to more fully document the assessments of continuous oil and gas resources, but also to provide the information in such a way as to facilitate its use as analog data for subsequent assessments. U.S. Geological Survey Oil and Gas Assessment Team (2012) documented the variability of estimated ultimate recovery (EUR) distributions from these assessments to provide a set of analogs for EURs. In that report, the data were presented in two forms: in tables and in graphs termed “cloud plots.” These two forms of data presentation are also provided herein, not only for estimated EUR distributions but also for estimated cell sizes and estimations of the percent of undrilled areas that would be both successful and in sweet spots.

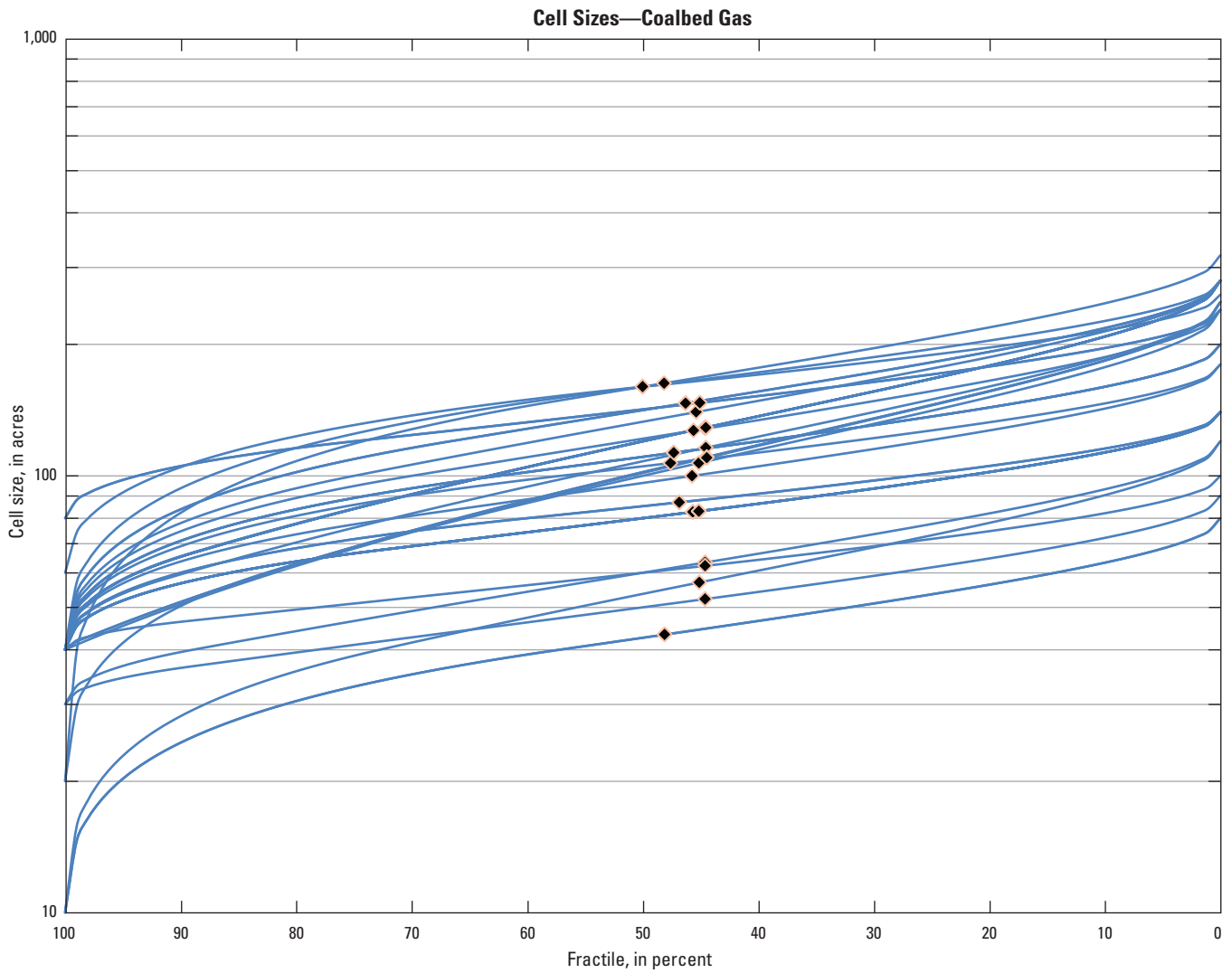
Use of these data for analogs necessitates several cautionary statements. All the distributions are taken from the assessment input distributions. They represent the estimated distributions for undrilled portions of the AU in question. Generally, the distributions for undrilled portions were closely based on data for the drilled portions. Changes from the drilled to the undrilled portions could, however, result from changes in drilling/completion practice or differences in the geology between drilled and undrilled areas. The undrilled portions of the AU were estimated as if drilled using what was the current “best practice” at the time of the assessment. (Dates of the assessments can be found in the “Main Input” file.) Whereas the wells drilled prior to the assessment may have been a mixture of vertical and horizontal wells, the undrilled areas would be estimated as if drilled by either vertical or horizontal wells, whichever was the “best practice” at the time of the assessment.

The three variables most useful as analogs are EUR distributions, cell sizes, and percent of undrilled areas that would be both successful and in sweet spots. For each of these variables, the 139 AUs are divided into four groups by reservoir type (shale gas, coalbed gas, tight gas, and continuous oil). Twelve cloud plots (figs. 1 to 12) and 12 tables (tables 2 to 13) summarizing these data are provided in the next sections of this report. The data for the plots are in the Cloud Plots file in the Excel folder of the online [downloads directory](#).

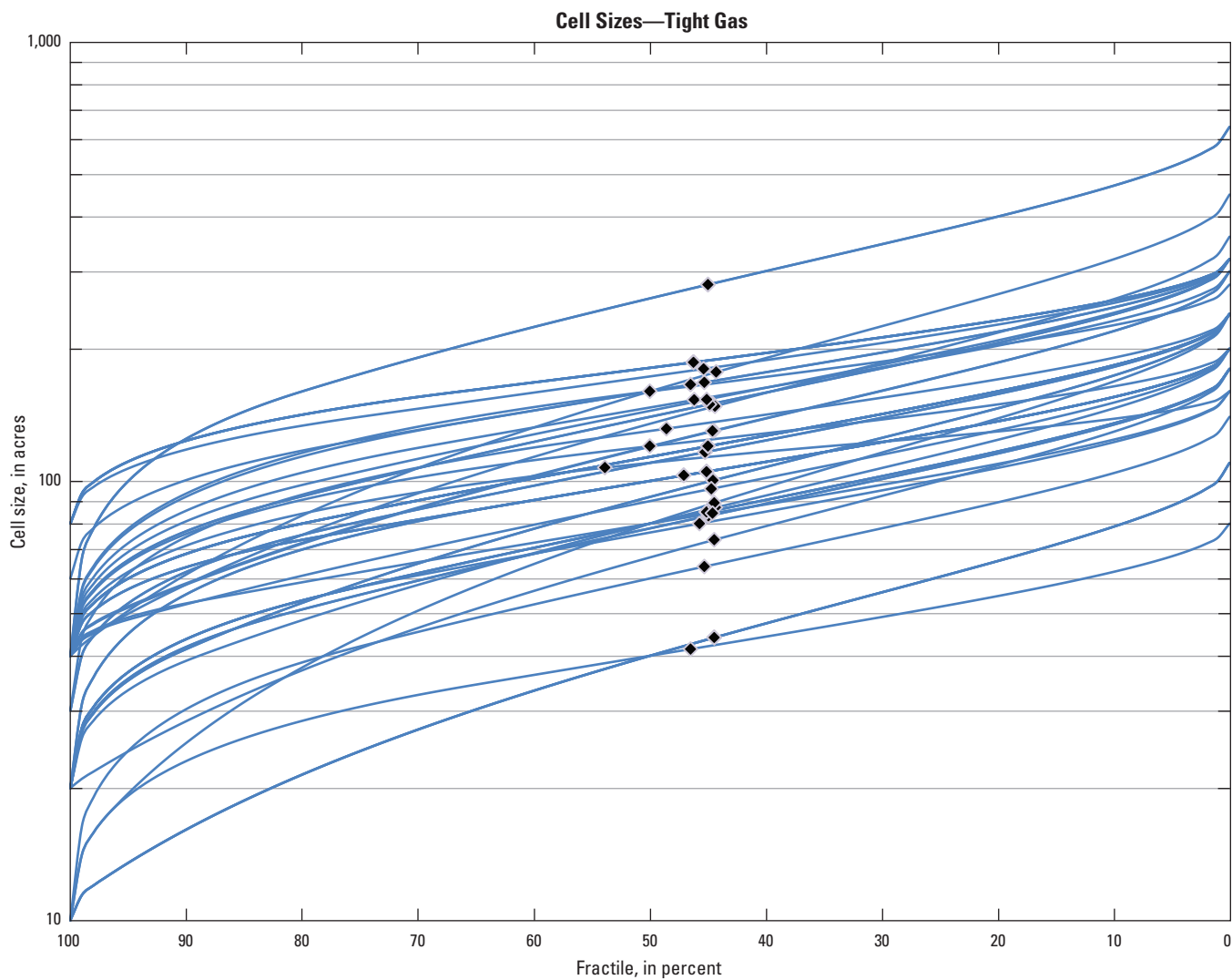


**Figure 1.** Cloud plot for estimated area of cells (drainage areas) in United States shale-gas assessment units. Each curve represents one assessment unit and is based on the input data in table 2. Black diamonds show the mean value for each curve.

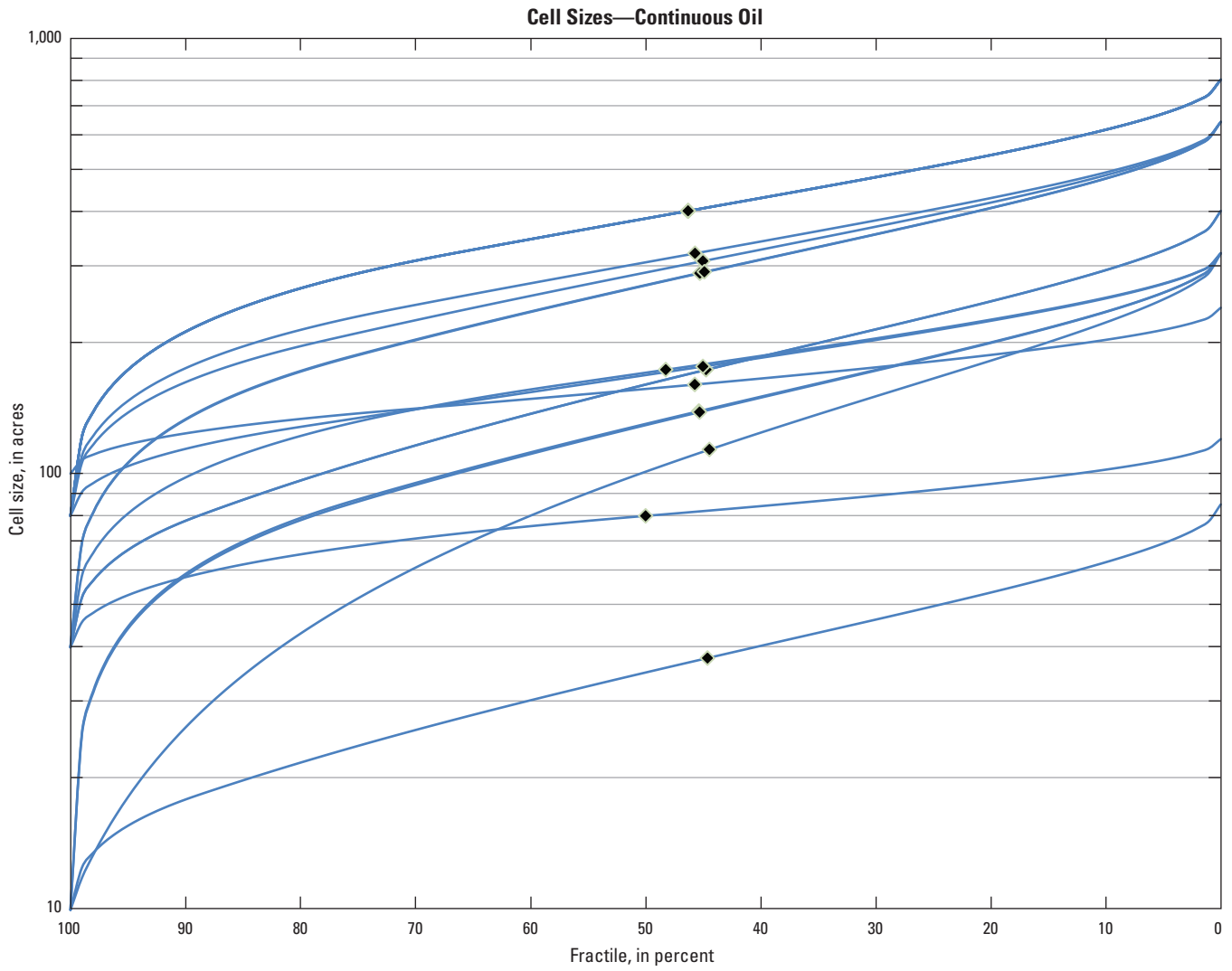
4 U.S. Geological Survey Assessments of Continuous (Unconventional) Oil and Gas Resources, 2000 to 2011



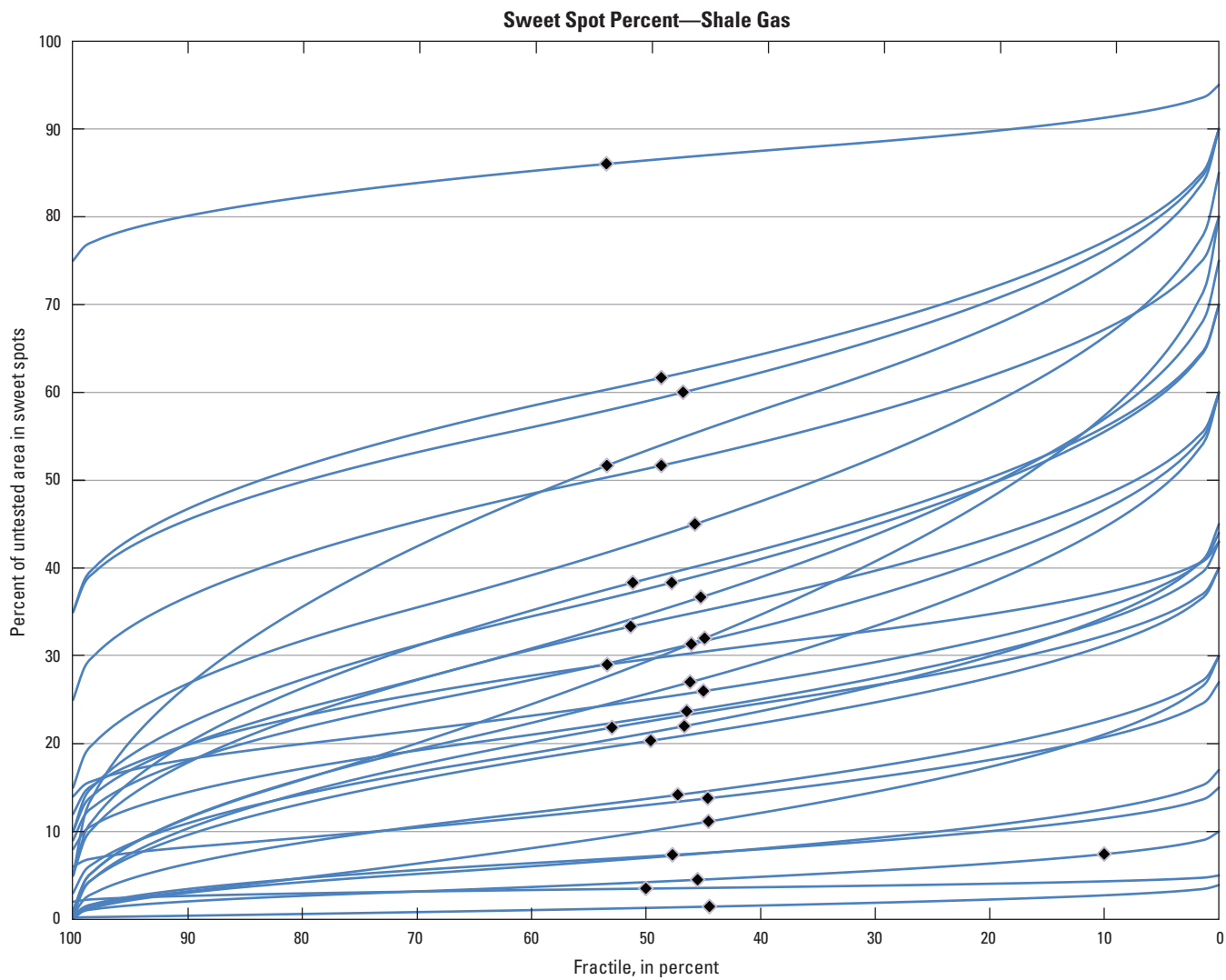
**Figure 2.** Cloud plot for estimated area of cells (drainage areas) in United States coalbed-gas assessment units. Each curve represents one assessment unit and is based on the input data in table 3. Black diamonds show the mean value for each curve.



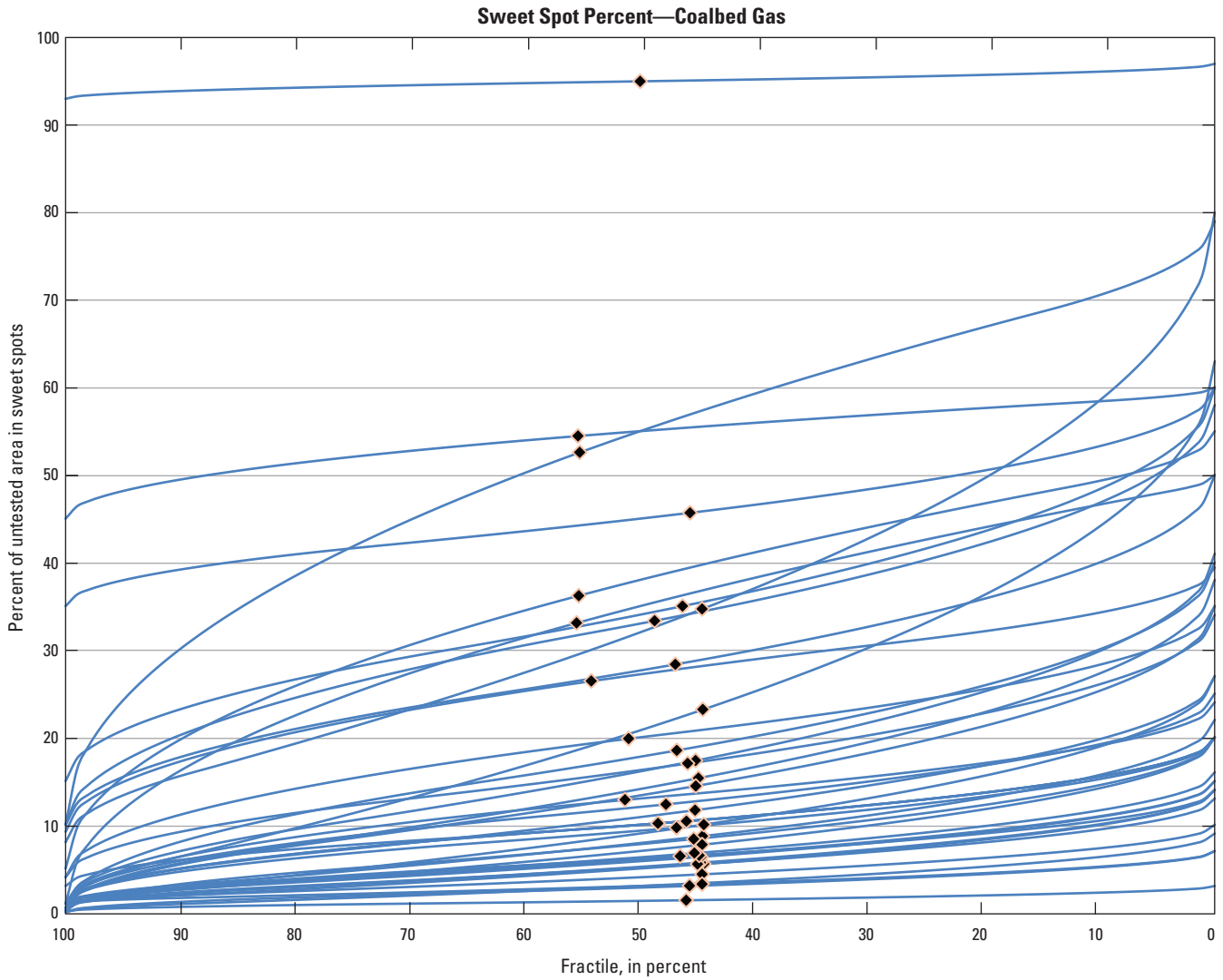
**Figure 3.** Cloud plot for estimated area of cells (drainage areas) in United States tight-gas assessment units. Each curve represents one assessment unit and is based on the input data in table 4. Black diamonds show the mean value for each curve.



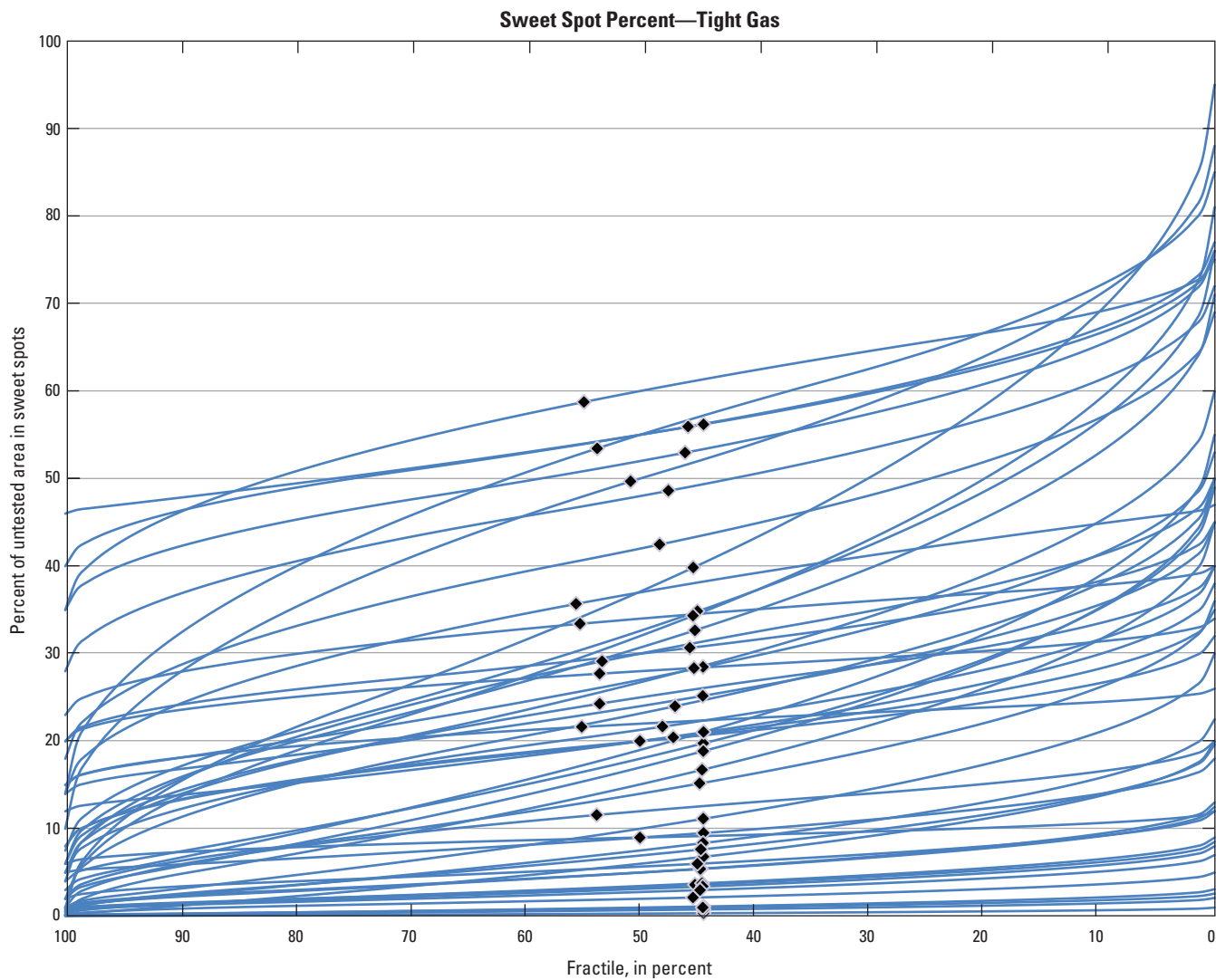
**Figure 4.** Cloud plot for estimated area of cells (drainage areas) in United States continuous-oil assessment units. Each curve represents one assessment unit and is based on the input data in table 5. Black diamonds show the mean value for each curve.



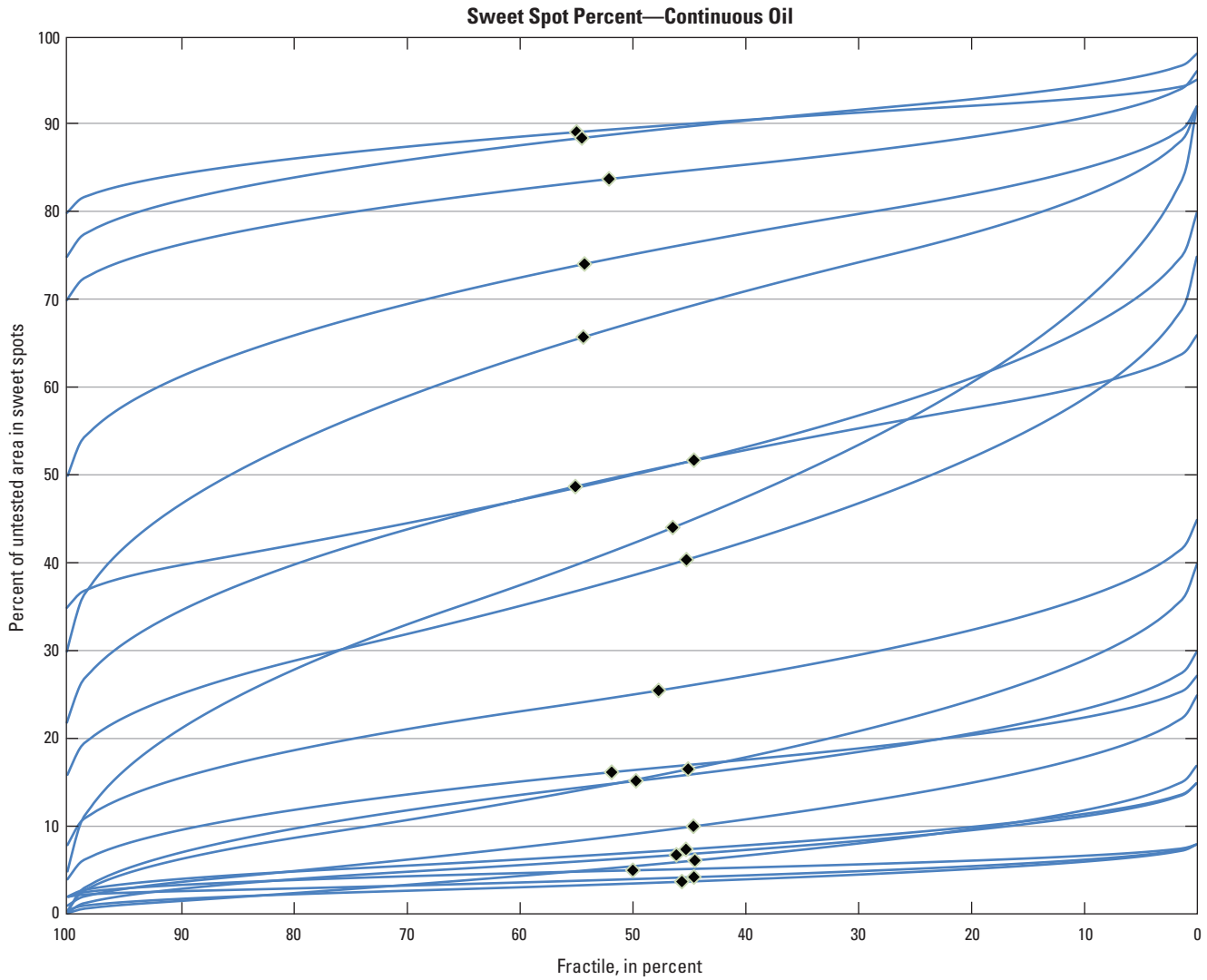
**Figure 5.** Cloud plot for estimated percent of untested area in sweet spots in United States shale-gas assessment units. Each curve represents one assessment unit and is based on the input data in table 6. Black diamonds show the mean value for each curve.



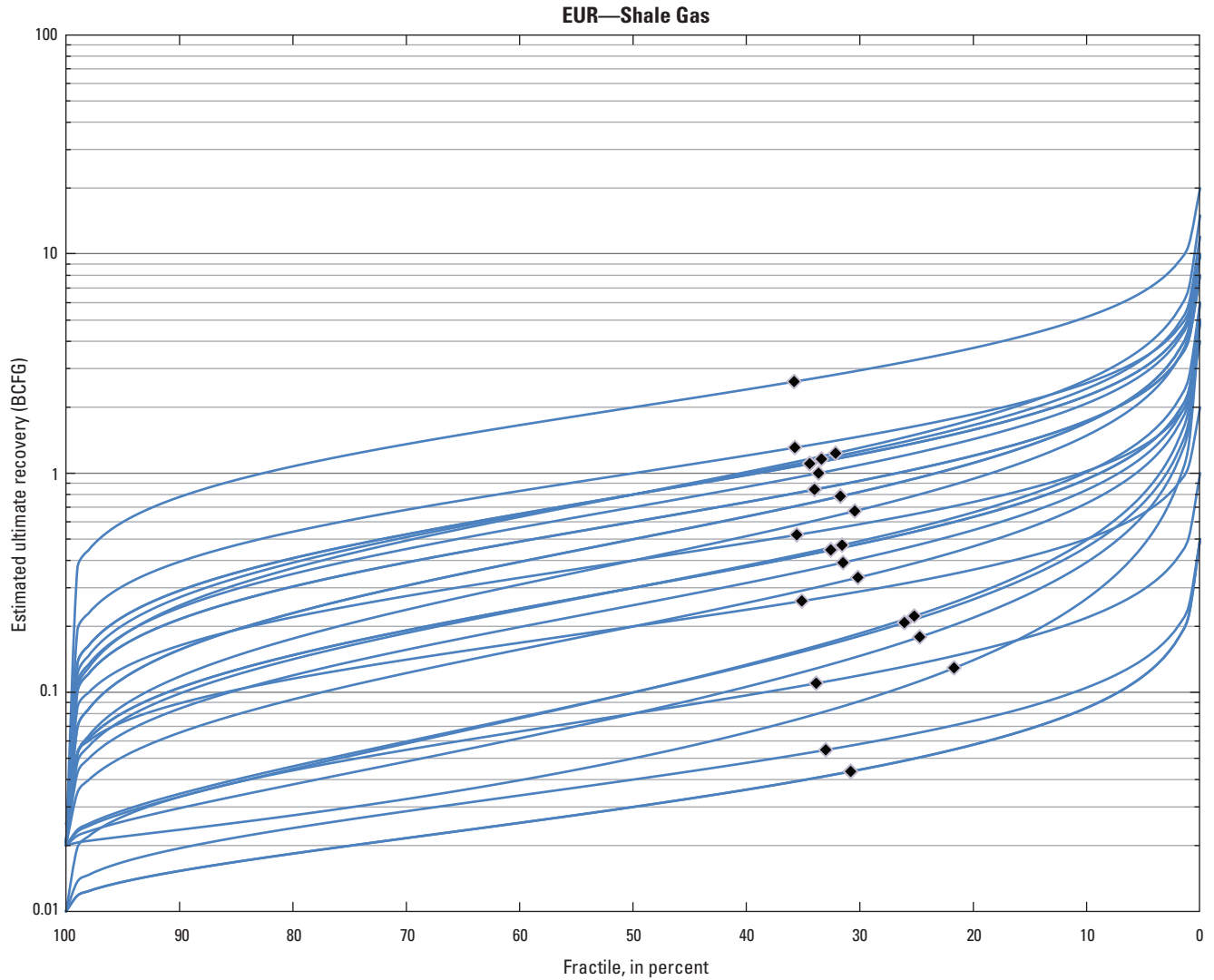
**Figure 6.** Cloud plot for estimated percent of untested area in sweet spots in United States coalbed-gas assessment units. Each curve represents one assessment unit and is based on the input data in table 7. Black diamonds show the mean value for each curve.



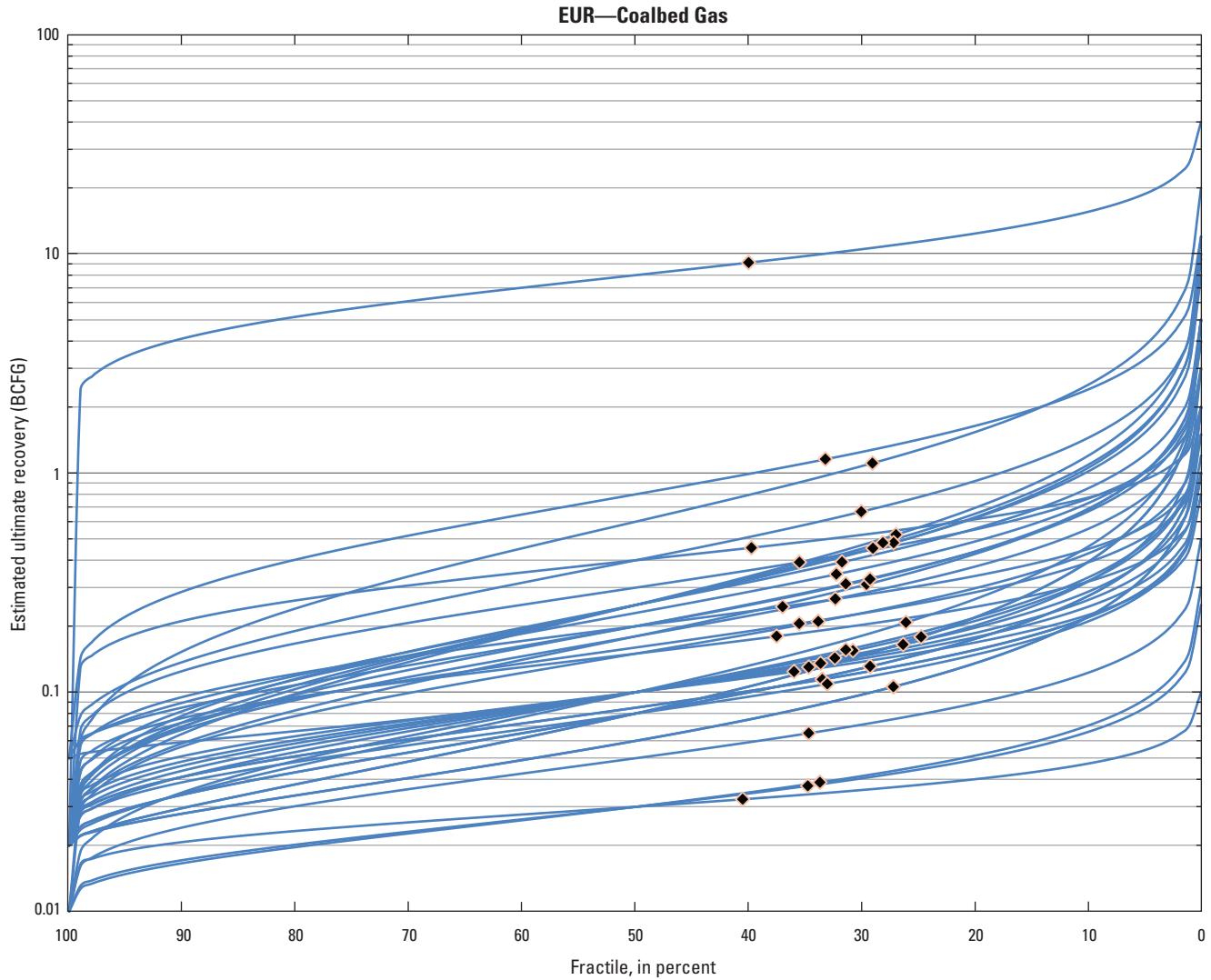
**Figure 7.** Cloud plot for estimated percent of untested area in sweet spots in United States tight-gas assessment units. Each curve represents one assessment unit and is based on the input data in table 8. Black diamonds show the mean value for each curve.



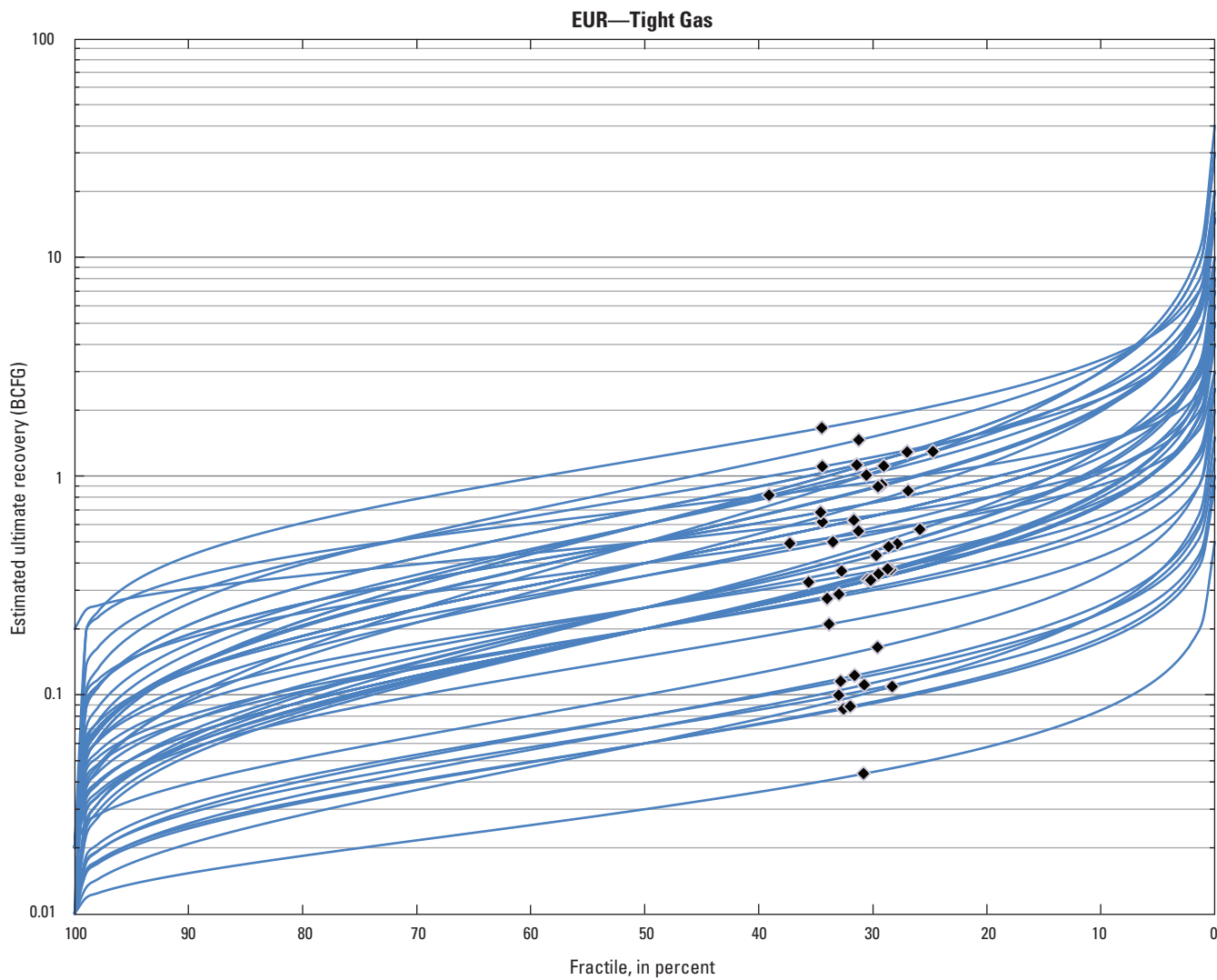
**Figure 8.** Cloud plot for estimated percent of untested area in sweet spots in United States continuous-oil assessment units. Each curve represents one assessment unit and is based on the input data in table 9. Black diamonds show the mean value for each curve.



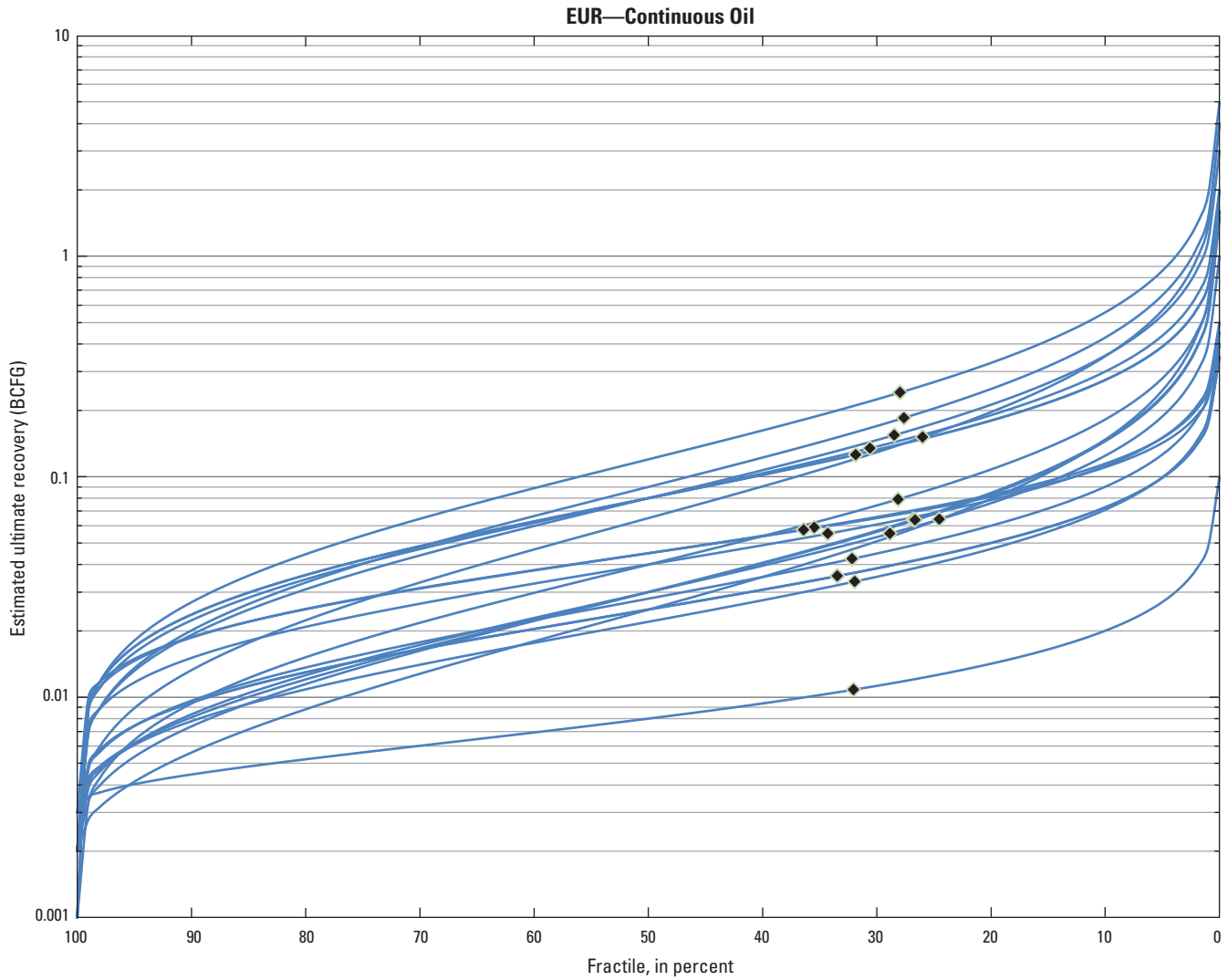
**Figure 9.** Cloud plot for EURs in United States shale-gas assessment units. Each curve represents one assessment unit and is based on the input data in table 10. Black diamonds show the mean value for each curve. [EUR, estimated ultimate recovery; BCFG, billions of cubic feet of gas]



**Figure 10.** Cloud plot for EURs in United States coalbed-gas assessment units. Each curve represents one assessment unit and is based on the input data in table 11. Black diamonds show the mean value for each curve. [EUR, estimated ultimate recovery; BCFG, billions of cubic feet of gas]



**Figure 11.** Cloud plot for EURs in United States tight-gas assessment units. Each curve represents one assessment unit and is based on the input data in table 12. Black diamonds show the mean value for each curve. [EUR, estimated ultimate recovery; BCFG, billions of cubic feet of gas]



**Figure 12.** Cloud plot for EURs in United States continuous-oil assessment units. Each curve represents one assessment unit and is based on the input data in table 13. Black diamonds show the mean value for each curve. [EUR, estimated ultimate recovery; MMBO, millions of barrels of oil]

**Table 2.** Input data for estimated area of cells (drainage areas) for United States shale-gas assessment units, values in acres.

[AU, assessment unit]

<b>AU number</b>	<b>AU name</b>	<b>Province</b>	<b>Year assessed</b>	<b>Minimum cell area</b>	<b>Mode of cell area</b>	<b>Maximum cell area</b>	<b>Mean cell area</b>
50580161	Woodford Shale Gas	Anadarko Basin	2010	60	120	320	166.67
50580261	Thirteen Finger Limestone-Atoka Shale Gas	Anadarko Basin	2010	60	120	320	166.67
50620261	Woodford Shale Gas	Arkoma Basin	2010	60	120	320	166.67
50620262	Chattanooga Shale Gas	Arkoma Basin	2010	60	120	320	166.67
50620364	Caney Shale Gas	Arkoma Basin	2010	40	120	320	160.00
50640361	Devonian to Mississippian New Albany Continuous Gas	Illinois Basin	2007	80	160	240	160.00
50390761	Niobrara Chalk	Denver Basin	2001	35	43.70	400	159.57
50490161	Haynesville Sabine Platform Shale Gas	Gulf Coast Mesozoic	2010	80	128	240	149.33
50490163	Mid-Bossier Sabine Platform Shale Gas	Gulf Coast Mesozoic	2010	80	128	240	149.33
50490165	Maverick Basin Pearsall Shale Gas	Gulf Coast Mesozoic	2010	80	128	240	149.33
50490167	Eagle Ford Shale Gas	Gulf Coast Mesozoic	2010	80	128	240	149.33
50670467	Foldbelt Marcellus	Appalachian Basin	2011	80	128	240	149.33
50670468	Interior Marcellus	Appalachian Basin	2011	80	128	240	149.33
50620362	Fayetteville Shale Gas-High Gamma-Ray Depocenter	Arkoma Basin	2010	40	80	320	146.67
50620363	Fayetteville Shale Gas-Western Arkansas Basin Margin	Arkoma Basin	2010	40	80	320	146.67
50210362	Cane Creek Shale Gas	Paradox Basin	2011	70	120	240	143.33
50210364	Gothic, Chimney Rock, Hovenweep Shale Gas	Paradox Basin	2011	70	120	240	143.33
50670469	Western Margin Marcellus	Appalachian Basin	2011	20	90	240	116.67
50670463	Devonian Siltstone and Shale	Appalachian Basin	2002	20	86.36	240	115.45
50670464	Marcellus Shale	Appalachian Basin	2002	20	88.89	200	102.96
50440161	Delaware/Pecos Basins Woodford Continuous Shale Gas	Permian Basin	2007	40	80	160	93.33
50440162	Delaware/Pecos Basins Barnett Continuous Shale Gas	Permian Basin	2007	40	80	160	93.33
50440163	Midland Basin Woodford/Barnett Continuous Gas	Permian Basin	2007	40	80	160	93.33
50630561	Devonian Antrim Continuous Gas	Michigan Basin	2004	20	80	160	86.67
50670462	Northwestern Ohio Shale	Appalachian Basin	2002	10	74.67	160	81.56
50450161	Greater Newark East Frac-Barrier Continuous Barnett Shale Gas	Bend Arch-Fort Worth Basin	2003	10	40	110	53.33
50450162	Extended Continuous Barnett Shale Gas	Bend Arch-Fort Worth Basin	2003	10	40	110	53.33

**16 U.S. Geological Survey Assessments of Continuous (Unconventional) Oil and Gas Resources, 2000 to 2011**

**Table 3.** Input data for estimated area of cells (drainage areas) for United States coalbed-gas assessment units, values in acres.

[AU, assessment unit]

<b>AU number</b>	<b>AU name</b>	<b>Province</b>	<b>Year assessed</b>	<b>Minimum cell area</b>	<b>Mode of cell area</b>	<b>Maximum cell area</b>	<b>Mean cell area</b>
50220181	Fruitland Fairway Coalbed Gas	San Juan Basin	2002	20	149.33	320	163.11
50620481	Arkoma Coalbed Gas	Arkoma Basin	2010	40	160	280	160.00
50640481	Desmoinesian-Virgilian Coalbed Gas	Illinois Basin	2007	60	160	260	160.00
50350281	Mesaverde Coalbed Gas	Wind River Basin	2005	40	120	280	146.67
50350282	Meeteetse Coalbed Gas	Wind River Basin	2005	40	120	280	146.67
50410181	Raton Coalbed Gas	Raton Basin-	2004	80	120	240	146.67
		Sierra Grande Uplift					
50410182	Vermejo Coalbed Gas	Raton Basin-	2004	80	120	240	146.67
		Sierra Grande Uplift					
50010181	Nanushuk Formation Coalbed Gas	Northern Alaska	2006	40	100	280	140.00
50210581	Kaiparowits Plateau	Paradox Basin	2011	40	67	280	129.00
50200181	Northern Coal Fairway/Drunkards Wash	Uinta-Piceance	2000	40	66.67	280	128.89
50200281	Uinta Basin Blackhawk Coalbed Gas	Uinta-Piceance	2000	40	66.67	280	128.89
50200282	Mesaverde Group Coalbed Gas	Uinta-Piceance	2000	40	66.67	280	128.89
50220381	Menefee Coalbed Gas	San Juan Basin	2002	40	66.67	280	128.89
50370581	Mesaverde Coalbed Gas	Southwestern Wyoming	2002	40	66.67	280	128.89
50370681	Mesaverde Coalbed Gas	Southwestern Wyoming	2002	40	66.67	280	128.89
50340281	Mesaverde-Meeteetse Formation Coalbed Gas	Big Horn Basin	2008	40	100	240	126.67
50200183	Southern Coal Fairway	Uinta-Piceance	2000	40	57.96	250	115.99
50010182	Prince Creek–Tuluvak Formations Coalbed Gas	Northern Alaska	2006	40	100	200	113.33
50010183	Sagavanirktok Formation Coalbed Gas	Northern Alaska	2006	40	100	200	113.33
50340282	Fort Union Formation Coalbed Gas	Big Horn Basin	2008	40	100	200	113.33
50200182	Central Coal Fairway/Buzzards Bench	Uinta-Piceance	2000	40	41.39	250	110.46
50200185	Southern Coal Outcrop	Uinta-Piceance	2001	40	41.39	250	110.46
50360281	Frontier-Adaville-Evanston Coalbed Gas	Wyoming Thrust Belt	2003	40	40	250	110.00
50220182	Basin Fruitland Coalbed Gas	San Juan Basin	2002	20	61.82	240	107.27
50311081	Fort Union Coalbed Gas	Williston Basin	2008	40	100	180	106.67
50040381	Eocene Coalbed Gas	Western Oregon-	2009	40	80	180	100.00
		Washington					
50030281	Cook Inlet Coalbed Gas	Southern Alaska	2011	40	80	140	86.67
50350283	Fort Union Coalbed Gas	Wind River Basin	2005	40	80	140	86.67
50330181	Wasatch Formation	Powder River Basin	2000	40	68	140	82.67
50330182	Upper Fort Union Formation	Powder River Basin	2000	40	68	140	82.67
50330183	Lower Fort Union-Lance Formations	Powder River Basin	2000	40	68	140	82.67
50370682	Fort Union Coalbed Gas	Southwestern Wyoming	2002	40	68	140	82.67
50370881	Lance Coalbed Gas	Southwestern Wyoming	2002	40	68	140	82.67
50370882	Fort Union Coalbed Gas	Southwestern Wyoming	2002	40	68	140	82.67
50370981	Wasatch-Green River Coalbed Gas	Southwestern Wyoming	2002	40	68	140	82.67
50650281	Warrior Basin	Warrior Basin	2002	30	40	120	63.33
50670581	Pocahontas Basin	Appalachian Basin	2002	40	46.67	100	62.22
50470381	Wilcox Coalbed Gas	Gulf Coast Cenozoic	2007	10	40	120	56.67
50670582	Eastern Dunkard Basin	Appalachian Basin	2002	30	36.67	90	52.22
50470281	Cretaceous Olmos Coalbed Gas	Gulf Coast Cenozoic	2007	10	40	80	43.33
53000281	Rio Escondido Basin Olmos Coalbed Gas	Burgos Basin	2007	10	40	80	43.33

**Table 4.** Input data for estimated area of cells (drainage areas) for United States tight-gas assessment units, values in acres.

[AU, assessment unit]

AU number	AU name	Province	Year assessed	Minimum cell area	Mode of cell area	Maximum cell area	Mean cell area
50340263	Cody Sandstone Continuous Gas	Big Horn Basin	2008	40	160	640	280.00
50350262	Cody Sandstones Continuous Gas	Wind River Basin	2005	40	160	640	280.00
50280162	Eagle Sandstone and Claggett Shale East	North-Central Montana	2000	80	158.99	320	186.33
50280163	Eagle Sandstone and Claggett Shale West	North-Central Montana	2000	80	158.99	320	186.33
50280165	Greenhorn-Lower Belle Fourche	North-Central Montana	2000	80	158.99	320	186.33
50280166	Greenhorn-Upper Belle Fourche	North-Central Montana	2000	80	158.99	320	186.33
50030161	Tuxedni-Naknek Continuous Gas	Southern Alaska	2011	80	140	320	180.00
50370561	Almond Continuous Gas	Southwestern Wyoming	2002	40	40.58	449	176.53
50200161	Deep (6,000 feet plus) Coal and Sandstone Gas	Uinta-Piceance	2000	60	123.08	320	167.69
50330461	Shallow Continuous Biogenic Gas	Powder River Basin	2002	40	137.14	320	165.71
50280161	Judith River Formation	North-Central Montana	2000	40	160	280	160.00
50350261	Frontier-Muddy Continuous Gas	Wind River Basin	2005	40	120	300	153.33
50620161	Arkoma-Ouachita Foredeep Continuous	Arkoma Basin	2010	40	100	320	153.33
50220361	Mesaverde Central-Basin Continuous Gas	San Juan Basin	2002	40	88.57	320	149.52
50280164	Niobrara-Carlile	North-Central Montana	2000	40	88.57	320	149.52
50220363	Dakota-Greenhorn Continuous Gas	San Juan Basin	2002	40	43.59	360	147.86
50200363	Uinta-Piceance Transitional and Migrated Gas	Uinta-Piceance	2000	30	124.76	240	131.59
50370261	Mowry Continuous Gas	Southwestern Wyoming	2002	40	50.77	300	130.26
50340261	Muddy-Frontier Sandstone and Mowry Fractured Shale Continuous Gas	Big Horn Basin	2008	40	50	300	130.00
50050161	Columbia Basin Continuous Gas	Eastern Oregon-Washington	2006	40	120	200	120.00
50700161	Taylorville Basin Continuous Gas	Atlantic Coastal Plain	2011	40	80	240	120.00
50700261	Richmond Basin Continuous Gas	Atlantic Coastal Plain	2011	40	80	240	120.00
50700361	South Newark Basin Continuous Gas	Atlantic Coastal Plain	2011	40	80	240	120.00
50700461	Deep River Basin Continuous Gas	Atlantic Coastal Plain	2011	40	80	240	120.00
50701061	Dan River-Danville Basin Continuous Gas	Atlantic Coastal Plain	2011	40	80	240	120.00
50200361	Piceance Basin Continuous Gas	Uinta-Piceance	2000	30	79.05	240	116.35
50200362	Uinta Basin Continuous Gas	Uinta-Piceance	2000	30	79.05	240	116.35
50280167	Bowdoin Dome	North-Central Montana	2000	40	121.67	160	107.22
50220261	Lewis Continuous Gas	San Juan Basin	2002	40	75	200	105.00
50220362	Mancos Sandstones Continuous Gas	San Juan Basin	2002	40	75	200	105.00
50370661	Mesaverde-Lance-Fort Union Continuous Gas	Southwestern Wyoming	2002	40	75	200	105.00
50370761	Lewis Continuous Gas	Southwestern Wyoming	2002	20	88.89	200	102.96
50670461	Greater Big Sandy	Appalachian Basin	2002	20	88.89	200	102.96
50200261	Uinta Basin Continuous Gas	Uinta-Piceance	2000	20	40.87	240	100.29
50200262	Uinta Basin Transitional Gas	Uinta-Piceance	2000	20	40.87	240	100.29
50220161	Pictured Cliffs Continuous Gas	San Juan Basin	2002	40	48.75	200	96.25
50390662	Dakota Group Basin-Center Gas	Denver Basin	2001	10	17.39	240	89.13
50370861	Lance-Fort Union Continuous Gas	Southwestern Wyoming	2002	20	40	200	86.67
50200264	Piceance Basin Transitional Gas	Uinta-Piceance	2000	20	55	180	85.00
50370461	Hilliard-Baxter-Mancos Continuous Gas	Southwestern Wyoming	2002	20	55	180	85.00
50370562	Rock Springs-Ericson Continuous Gas	Southwestern Wyoming	2002	20	55	180	85.00
50670364	Tuscarora Basin Center	Appalachian Basin	2002	40	53.33	160	84.44
50340264	Mesaverde Sandstone Continuous Gas	Big Horn Basin	2008	20	50	180	83.33
50350264	Mesaverde-Meeteetse Sandstone Gas	Wind River Basin	2005	20	50	180	83.33
50350265	Lance-Fort Union Sandstone Gas	Wind River Basin	2005	20	60	160	80.00
50200263	Piceance Basin Continuous Gas	Uinta-Piceance	2000	20	20.39	180	73.46
50670465	Catskill Sandstones and Siltstones	Appalachian Basin	2002	10	41.54	140	63.85
50670361	Clinton-Medina Basin Center	Appalachian Basin	2002	10	12	110	44.00
50670362	Clinton-Medina Transitional Northeast	Appalachian Basin	2002	10	12	110	44.00
50670363	Clinton-Medina Transitional	Appalachian Basin	2002	10	12	110	44.00
50670466	Berea Sandstone	Appalachian Basin	2002	10	34.29	80	41.43















**Table 13.** Input data for estimated ultimate recovery distributions for United States continuous-oil assessment units, values in millions of barrels of oil.

[AU, assessment unit; EUR, estimated ultimate recovery]

<b>AU number</b>	<b>AU name</b>	<b>Province</b>	<b>Year assessed</b>	<b>Minimum EUR</b>	<b>Median EUR</b>	<b>Maximum EUR</b>	<b>Mean EUR</b>
50310164	Eastern Expulsion Threshold	Williston Basin	2008	0.002	0.12	5	0.241
50310163	Nesson-Little Knife Structural	Williston Basin	2008	0.002	0.09	4	0.185
50210361	Cane Creek Shale Oil	Paradox Basin	2011	0.002	0.08	3	0.154
50310165	Northwest Expulsion Threshold	Williston Basin	2008	0.002	0.065	4	0.151
50310161	Elm Coulee-Billings Nose	Williston Basin	2008	0.002	0.08	2	0.135
50270561	Marias River Shale Continuous Oil	Montana Thrust Belt	2002	0.001	0.08	1.6	0.126
50370361	Niobrara Continuous Oil	Southwestern Wyoming	2002	0.001	0.08	1.6	0.126
50300361	Niobrara Continuous Oil	Hanna, Laramie, Shirley Basins	2005	0.001	0.04	1.6	0.079
50310162	Central Basin-Poplar Dome	Williston Basin	2008	0.002	0.025	2	0.064
50210363	Gothic, Chimney Rock, Hovenweep Shale Oil	Paradox Basin	2011	0.002	0.03	1.5	0.064
50580162	Woodford Shale Oil	Anadarko Basin	2010	0.003	0.03	1.5	0.064
50200561	Deep Uinta Overpressured Continuous Oil	Uinta-Piceance	2000	0.003	0.045	0.45	0.059
50440165	Spraberry Continuous Oil	Permian Basin	2007	0.001	0.045	0.4	0.057
50490170	Eagle Ford Shale Oil	Gulf Coast Mesozoic	2010	0.002	0.03	1	0.055
50490168	Austin Pearsall-Giddings Area Oil	Gulf Coast Mesozoic	2010	0.002	0.04	0.5	0.055
50330361	Niobrara Continuous Oil	Powder River Basin	2002	0.002	0.028	0.5	0.042
50330261	Mowry Continuous Oil	Powder River Basin	2002	0.002	0.025	0.35	0.035
50340262	Mowry Fractured Shale Continuous Oil	Big Horn Basin	2008	0.002	0.025	0.35	0.035
50390261	Fractured Niobrara Limestone (Silo Field Area)	Denver Basin	2001	0.002	0.022	0.4	0.033
50390661	Niobrara-Codell (Wattenberg Area)	Denver Basin	2001	0.003	0.008	0.1	0.011









































The **Code List** file contains the USGS numeric codes for provinces (4 digits), total petroleum systems (6 digits), and assessment units (8 digits). Codes for ecosystem names are in the Ecosystem Codes file. This table contains 3 columns. Data columns are as follows:

1. Code: USGS code number
2. Name: USGS area name
3. Name, Unit, and Code: the USGS area name, comma, space, the hierarchical unit name (province, total petroleum system, or assessment unit), and the USGS code number

The **Ecosystem Codes** file contains the USGS codes for ecosystem names. This table contains 3 columns. Data columns are as follows:

1. Ecosystem Code: USGS four-letter code
2. Ecosystem Name: ecosystem name
3. Ecosystem Name and Code: the ecosystem name followed by the USGS code in parentheses

The **Cloud Plots** file contains 110 columns. There are three records for each of the 139 AUs that were quantitatively assessed (one record for each of three variables: cell size, estimated ultimate recovery, and sweet spot percent). The .tab

file includes the data variables described below. The Microsoft Excel version includes not only a worksheet with the variables described below but also separate worksheets and plots for the 12 combinations of reservoir type and variable. In the plots, each blue line represents the distribution for a single assessment unit and the black diamond represents the mean of the distribution. Data columns for these files are as follows:

1. AU Number: USGS assessment-unit code number.
2. AU: USGS assessment unit name
3. Province Number: province code number.
4. Province: province name.
5. Reservoir Type: shale gas, coalbed gas, tight gas, or continuous oil.
6. Date: date of assessment.
7. Variable: cell size, EUR (estimated ultimate recovery), or sweet spot percent.
8. Fractile for Mean: the fractile that corresponds to the mean value of the distribution.
9. Mean: the mean value of the distribution.
- 10–110. F100 to F0: fractiles of the distribution. F95 represents a 95 percent chance of at least the amount tabulated. Other fractiles are defined similarly.

Central Energy Resources Science Center

Publishing support provided by:  
Denver Publishing Service Center

For more information concerning this publication, contact:  
Center Director, USGS Central Energy Resources Science Center  
Box 25046, Mail Stop 939  
Denver, CO 80225  
(303) 236-1647

Or visit the Central Energy Resources Science Center Web site at:  
<http://energy.usgs.gov/>

This publication is available online at:  
<http://dx.doi.org/10.3133/ds69MM>

