OCS Report
BOEM 2013-01160

Outer Continental Shelf

Estimated Oil and Gas Reserves Gulf of Mexico OCS Region December 31, 2009

U.S. Department of the Interior
Bureau of Ocean Energy Management
Gulf of Mexico OCS Region

ON COVER- Shell-operated Perdido Regional Development Spar (moored in 7,817 ft of water) arrived at Alaminos Canyon Block 857 in August 2008. In March 2009, Shell Oil Company completed the installation of the drilling and production platform. Photo courtesy of Shell.

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ABBREVIATIONS AND ACRONYMS

AAPG	American Association of Petroleum Geologists
AL	Alabama
Bbbl	Billion barrels
Bbl	barrels
BBO	billion barrels of oil
BBOE	billion barrels of oil equivalent
Bcf	billion cubic feet
BOE	barrels of oil equivalent
BOEM	Bureau of Ocean Energy Management
BOEMRE	Bureau of Ocean Energy Management, Regulation and Enforcement
CFR	Code of Federal Regulations
DOCD	Development Operations Coordination Document
DOI	U.S. Department of the Interior
DPP	Development and Production Plan
^{0}F	degrees Fahrenheit
FL	Florida
ft	feet
GOM	Gulf of Mexico
GOMR	Gulf of Mexico Region
GOR	gas oil ratio
LA	Louisiana
MMbbl	million barrels
MMBOE	million barrels of oil equivalent
MMcf	million cubic feet
MMS	Minerals Management Service
MS	Mississippi
N	north
OAP	Offshore Atlas Project
OCS	Outer Continental Shelf
PDN	proved developed non-producing
PDP	proved developed producing
psia	pounds per square inch absolute
PU	proved undeveloped
P/Z	pressure/gas compressibility factor
RE	Resource Evaluation
SCF/STB	standard cubic feet per stock tank barrel
SPE	Society of Petroleum Engineers
SPE-PRMS	Society of Petroleum Engineers Petroleum Resources Management System
SPEE	Society of Petroleum Evaluation Engineers
Tcf	trillion cubic feet
TVDSS	true vertical depth subsea
TX	Texas
U.S.	United States
USGS	United States Geological Survey
WPC	World Petroleum Council

ABSTRACT

This is the annual publication that presents the Bureau of Ocean Energy Management (BOEM) estimates of oil and gas reserves in the Gulf of Mexico Outer Continental Shelf. This Estimated Oil and Gas Reserves report is presented in an abbreviated format.

As of December 31, 2009, it is estimated that the Original Proved Reserves are 21.20 billion barrels of oil and 190.2 trillion cubic feet of gas from 1,278 proved fields. Original Proved Reserves are the total of the Cumulative Production plus Proved Reserves. This number includes 9 proved fields that were added during 2009. It also includes the 387 proved fields that have produced and expired. Reserves estimates are derived for individual reservoirs from geologic and engineering evaluations. Cumulative Production from the proved fields accounts for 16.53 billion barrels of oil and 176.8 trillion cubic feet of gas. Proved Reserves are estimated to be 4.67 billion barrels of oil and 13.3 trillion cubic feet of gas. These reserves are recoverable from 891 proved active fields. For any field spanning State and Federal waters, reserves are estimated for the Federal portion only.

Reserves Justified for Development are estimated to be 0.29 billion barrels of oil and 1.1 trillion cubic feet of gas. These reserves are associated with 125 active fields. In total, there are 896 proved and justified for development active fields located in Federal waters. The Reserves Justified for Development are not added to Original Proved Reserves because of decreasing levels of economic certainty and hydrocarbon assurance.

In addition to the Proved Reserves and the Reserves Justified for Development discussed above, there are an estimated 6.31 billion barrels of oil and 16.3 trillion cubic feet of gas resources that are not presented in the tables and figures of this report. These resources include oil and gas fields where the lessee has not made a formal commitment to develop the project. They can be found in proved fields and in fields justified for development; or in leases that have not yet qualified and have not been placed in a field; or in fields that expired, relinquished, or terminated without production. As additional drilling and development occur, additional hydrocarbon volumes will become reportable, and BOEM anticipates future proved reserves and reserves justified for development to increase.

The estimates of reserves for this report were completed in February 2013 and represent the combined efforts of engineers, geologists, geophysicists, paleontologists, petrophysicists, and other personnel of the BOEM Gulf of Mexico Region, Office of Resource Evaluation, in New Orleans, Louisiana.

INTRODUCTION

This report supersedes the *Estimated Oil and Gas Reserves, Gulf of Mexico OCS Region, December 31, 2008* (Crawford et al., 2012). It presents estimated Original Proved Reserves, Cumulative Production, Proved Reserves, and Reserves Justified for Development as of December 31, 2009, for the Gulf of Mexico (GOM). **Figure 1** represents the percentages of Cumulative Production, Proved Reserves, Reserves Justified for Development, and Contingent Resources in the GOM. Estimates of reserves growth (an observed phenomenon that occurs when there is an incremental increase through time in the estimates of proved reserves) as well as undiscovered and known resources are not presented in detail in this report.

As of December 31, 2009, the 1,278 proved oil and gas fields in the federally regulated part of the Gulf of Mexico Outer Continental Shelf (GOM OCS) contained Original Proved Reserves estimated to be 21.20 billion barrels of oil (BBO) and 190.2 trillion cubic feet (Tcf) of gas. Cumulative Production from the proved fields accounts for 16.53 BBO and 176.8 Tcf of gas. Proved Reserves are estimated to be 4.67 BBO and 13.3 Tcf of gas for the 891 proved active fields. Proved oil reserves have decreased 11.6 percent and the proved gas reserves have decreased 19.9 percent from the 2008 report. Reserves Justified for Development in the federally regulated part of the GOM OCS are estimated to be 0.29 BBO and 1.1 Tcf of gas.

Additionally, the Contingent Resources are an estimated 6.31 BBO and 16.3 Tcf of gas. The Contingent Resources are not presented in the tables and figures of this report. These resources include oil and gas fields where the lessee has not made a formal commitment to develop the project. They can be found in proved fields and in fields justified for development; or in leases that have not yet qualified and have not been placed in a field; or in fields that expired, relinquished, or terminated without production. As additional drilling and development occur, additional hydrocarbon volumes will become reportable, and BOEM anticipates future proved reserves and reserves justified for development to increase.

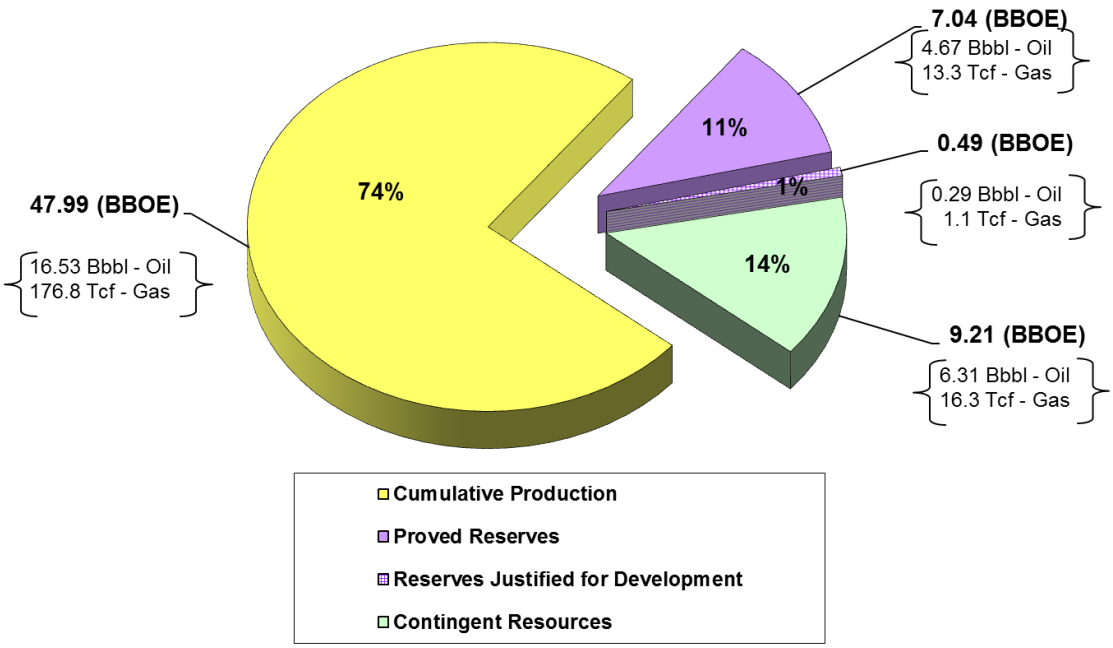

Figure 1. BOEM GOM production, reserves, and resources.

BACKGROUND

Classification of Resources and Reserves

Starting with the 2008 OCS reserves report, BOEM revised its classification system to align with the Petroleum Resources Management System (SPE-PRMS) sponsored by the Society of Petroleum Engineers, the American Association of Petroleum Geologists, the World Petroleum Council, and the Society of Petroleum Evaluation Engineers (SPE/AAPG/WPC/SPEE 2007). Definitions for each reserves category are presented in **Appendix A**.

The BOEM classification process under SPE-PRMS is shown in **Figure 2**. At the point in time a discovery is made, the identified accumulation of hydrocarbons is classified a Contingent Resource, as a development project has not yet been identified. When the lessee makes a formal commitment to develop and produce the accumulation, it is classified as a Reserves Justified for Development. During the period when infrastructure is being constructed and installed, the accumulation is classified as Proved Undeveloped Reserves. After the equipment is in place and production of the accumulation has begun, the status becomes Proved Developed Producing Reserves. All hydrocarbons produced and sold are included in Cumulative Production category. Should the development and production be abandoned at any phase of the project, the remaining hydrocarbons will be re-categorized to Contingent Resources category.

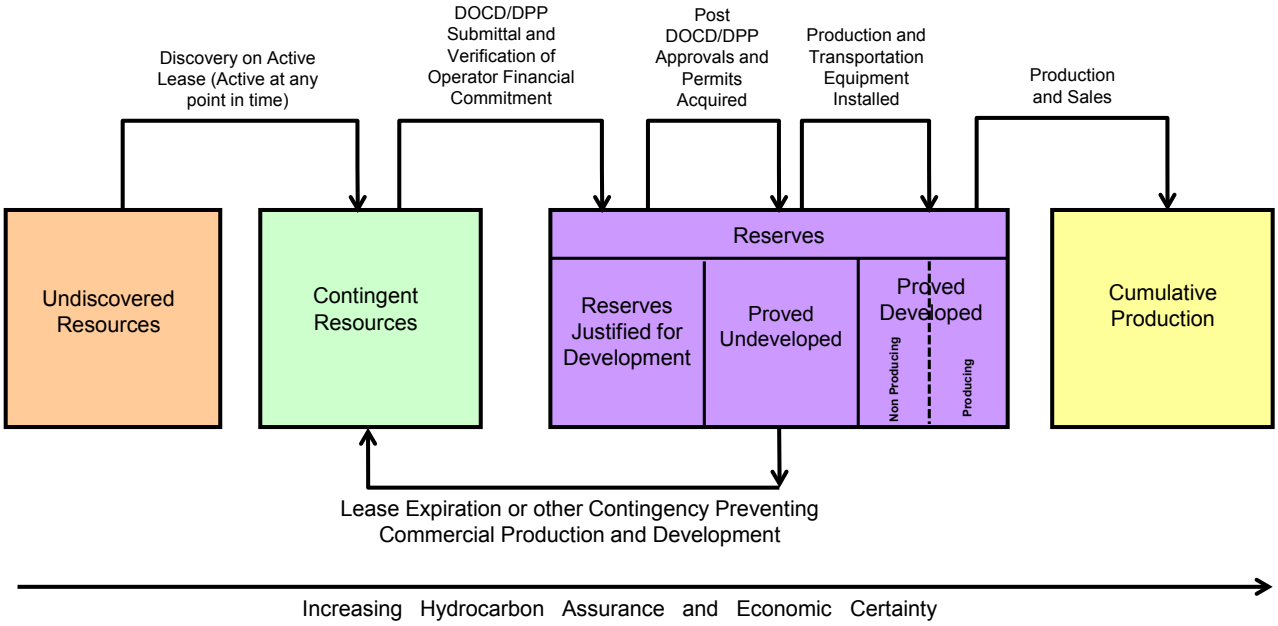

Figure 2. BOEM reserves classification process.

Methods Used for Estimating Reserves

The Reserves inventory component of the Resource Evaluation (RE) Program assigns new producible leases to fields and establishes field limits**.** The RE Program also develops independent estimates of original amounts of natural gas and oil in discovered fields by conducting field reserve studies and reviews of fields, sands, and reservoirs on the OCS. The Program periodically revises the estimates of natural gas and oil to reflect new discoveries, development information and annual production. This report, *Estimated Oil and Gas Reserves, Gulf*

of Mexico OCS Region, December 31, 2009, is based on aggregation of BOEM internal field studies completed at the reservoir and sand levels. All of the reservoir level data have been linked to the sand, pool, play, chronozone, and series level to support the Offshore Atlas Project (OAP).

Additional reports address GOM reserves. The Minerals Management System (MMS) OCS Report, *Atlas of Gulf of Mexico Gas and Oil Sands as of January 1, 1999* (Bascle et al., 2001) provides a detailed geologic reporting of oil and gas reserves. A brief summary of the Atlas is available on the BOEM's Web site at http://www.boem.gov/BOEM-Newsroom/Library/Publications/Gulf-of-Mexico-OCS-Region-Publications.aspx%23ATLASES%23ATLASES#ATLASES. The MMS OCS Report, *2000 Assessment of Conventionally Recoverable Hydrocarbon Resources of the Gulf of Mexico and Atlantic Outer Continental Shelf as of January 1, 1999* (Lore et al., 2001) also known as the National Assessment, and its update, *Assessment of Undiscovered Technically Recoverable Oil and Gas Resources of the Nation's Outer Continental Shelf, 2006* (Lore, 2006*)* address reserves, reserves appreciation, and undiscovered resources. For more information visit BOEM's Web site at http://www.boem.gov/Oil-and-Gas-Energy-Program/Resource-Evaluation/Resource-Assessment/index.aspx

Reserve estimates from geological and engineering analyses have been completed for the 1,278 proved fields. Reserves accountability is dependent on the drilling and development phases of fields. The accuracy of the reserve estimate improves as more reservoir data become available to geoscientists and engineers. Well logs, well file data, seismic data, and production data are periodically analyzed to improve the accuracy of the reserve estimate. As a field is depleted and/or abandoned, the Proved Reserves of productive reservoirs are assigned a value equal to the amount produced and the unrecovered reserve volumes are converted to Contingent Resources. Currently, there are 387 proved expired, depleted fields.

Methods used for estimating reserves can be categorized into three groups: analog, volumetric, and performance. Reserve estimates in this report are based primarily on volumetric and performance methods. Reserve estimates are reported deterministically, providing a single "best estimate" based on known geological, engineering, and economic data.

Production data are the metered volumes of raw liquids and gas reported to the BOEM by Federal unit and lease operators. Continuously measured volumes from production platforms and/or leases are allocated to individual wells and reservoirs on the basis of periodic well test gauges. These procedures introduce approximations in both production and remaining reserves data.

Oil and gas volume measurements and reserves are corrected to reference standard conditions of 60°F and one atmosphere (14.73 pounds per square inch absolute [psia]). Prior to September 1998, gas was reported at 15.025 psia. Beginning with the production month of September 1998, gas production was reported at a pressure base of 14.73 psia. BOEM has completed the process of converting all historical gas production to the 14.73 pressure base. This conversion is reflected in the *Summary and Conclusions* Section of this report, Tables 5 and 6.

RESERVES AND RELATED DATA BY PLANNING AREA

The GOM OCS is divided into three planning areas for administrative purposes (**Figure 3**). Each planning area is subdivided into protractions, which in turn are divided into numbered blocks. Fields in the GOM are identified by the protraction area name and block number of discovery – for example, East Cameron Block 271 (EC 271) Field. As the field is developed, the limits may expand into adjacent blocks and areas. These adjacent blocks are then identified as part of the original field and are given that field name. Statistics in this report are presented as area totals compiled under each field name. All of the data associated with EC 271 Field are therefore included in the East Cameron totals, although part of the field extends into the adjacent area of Vermilion. There are four exceptions: Tiger Shoal and Lighthouse Point, included in South Marsh Island; Coon Point, included in Ship Shoal; and Bay Marchand, included in South Timbalier.

Through December 31, 2009, there were 896 proved and justified for development fields active in the federally regulated part of the GOM. A list, updated quarterly, of the active and expired fields can be found in the *OCS Operations Field Directory*. There were 891 proved, active (producing and non-producing) fields and 5 justified for development active fields studied. Included are the 387 proved expired, depleted fields, abandoned after producing 4.3 percent barrels oil equivalent (BOE) of the total cumulative oil and gas production. Seventy-three fields expired, relinquished, or terminated without production. These fields may be included in the *Indicated Hydrocarbon List*. Reserves data are presented as area totals in **Table 1.**

Table 1.Estimated oil and gas reserves for 1,278 proved fields by area, December 31, 2009.

Area(s) (Fig. 3)	Number of fields					Original Proved Reserves			Cumulative Production through 2009			Proved Reserves			Reserves Justified for Development		
	Proved active prod	Proved active nonprod	Proved expired depleted	Justified active	Expired nonprod	Oil (MMbbl)	Gas (Bcf)	BOE (MMbbl)	Oil (MMbbl)	Gas (Bcf)	BOE (MMbbl)	Oil (MMbbl)	Gas (Bcf)	BOE (MMbbl)	Oil (MMbbl)	Gas (Bcf)	BOE (MMbbl)
Western Planning Area																	
Alaminos Canyon	3	2	0	0	4	289	468	372	70	117	90	219	351	282	151	113	171
Brazos	19	1	18	0	0	10	3,736	675	10	3,584	648	0	152	27	0	0	0
East Breaks	16	1	3	1	3	286	2,333	700	219	1,873	552	67	460	148	4	6	6
Galveston	21	2	27	0	1	64	2,260	466	58	2,092	430	6	168	36	0	0	0
Garden Banks	3	2	2	0	1	47	348	109	27	295	80	20	53	29	0	0	0
High Island and Sabine Pass	61	8	59	0	5	418	15,630	3,200	393	15,104	3,081	25	526	119	0	0	0
Matagorda Island	17	1	11	0	1	25	5,332	973	24	5,179	945	1	153	28	0	0	0
Mustang Island	9	2	18	0	2	9	1,808	331	7	1,751	319	2	57	12	0	0	0
N.& S.Padre Island	9	0	10	0	0	0	633	113	0	603	108	0	30	5	0	0	0
West Cameron and Sabine Pass	15	4	7	0	0	35	2,942	559	34	2,892	548	1	50	11	0	0	0
Western Planning Area (Other)*	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Western Planning Area Subtotal	***173***	***23***	***155***	***1***	***18***	***1,183***	***35,490***	***7,498***	***842***	***33,490***	***6,801***	***341***	***2,000***	***697***	***155***	***119***	***177***
Central Planning Area																	
Atwater Valley	5	1	0	0	4	52	699	177	11	260	58	41	439	119	0	0	0
Chandeleur	4	1	8	1	0	0	383	68	0	376	67	0	7	1	0	6	1
East Cameron	33	10	24	0	0	353	11,069	2,322	336	10,779	2,254	17	290	68	0	4	1
Eugene Island	63	8	18	0	3	1,676	20,157	5,264	1,625	19,567	5,107	51	590	157	25	144	50
Ewing Bank	13	5	0	0	2	373	726	502	301	608	409	72	118	93	0	0	0
Garden Banks	21	3	7	0	3	771	4,147	1,509	558	3,309	1,148	213	838	361	0	46	8
Grand Isle	14	1	7	0	0	999	5,021	1,892	968	4,806	1,823	31	215	69	14	101	32
Green Canyon	27	8	6	1	15	2,635	3,766	3,305	1,196	2,580	1,655	1,439	1,186	1,650	53	117	74
Main Pass and Breton Sound	58	6	26	0	4	1,145	6,967	2,385	1,077	6,575	2,247	68	392	138	4	15	7
Mississippi Canyon	39	6	3	1	4	3,811	10,050	5,599	2,000	7,241	3,288	1,811	2,809	2,311	15	261	61
Mobile	20	4	10	0	2	1	2,353	419	0	2,050	365	1	303	54	0	9	2
Ship Shoal	49	8	12	0	2	1,433	12,604	3,675	1,373	12,157	3,536	60	447	139	12	107	31
South Marsh Island	37	5	9	0	0	974	15,129	3,667	901	14,262	3,439	73	867	228	0	6	1
South Pass	8	1	4	0	1	1,116	4,497	1,917	1,070	4,374	1,848	46	123	69	1	6	2
South Pelto	8	0	1	0	0	163	1,218	379	154	1,136	356	9	82	23	1	6	2
South Timbalier	43	2	17	0	1	1,611	10,426	3,467	1,529	9,867	3,285	82	559	182	0	0	0
Vermilion	50	7	27	0	1	573	16,676	3,541	540	16,278	3,437	33	398	104	0	0	0
Viosca Knoll	31	2	19	0	6	626	3,578	1,263	492	3,149	1,053	134	429	210	5	35	11
West Cameron and Sabine Pass	54	9	31	0	0	199	18,832	3,550	184	17,945	3,377	15	887	173	0	1	0
West Delta	19	2	3	0	1	1,453	5,696	2,466	1,368	5,572	2,359	85	124	107	7	47	16
Central Planning Area (Other)**	7	3	0	1	5	48	676	168	0	438	78	48	238	90	2	58	12
Central Planning Area Subtotal	***603***	***92***	***232***	***4***	***54***	***20,012***	***154,670***	***47,535***	***15,683***	***143,329***	***41,189***	***4,329***	***11,341***	***6,346***	***139***	***969***	***311***
Eastern Planning Area Subtotal***	***0***	***0***	***0***	***0***	***1***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***
GOM Total:	***776***	***115***	***387***	***5***	***73***	***21,195***	***190,160***	***55,033***	***16,525***	***176,819***	***47,990***	***4,670***	***13,341***	***7,043***	***294***	***1,088***	***488***
	1,278																

*Western Planning Area (Other) includes Corpus Christi, portions of Keathley Canyon, and Port Isabel.
**Central Planning Area (Other) includes Lund,Walker Ridge, and portions of Destin Dome, Desoto Canyon, Keathley Canyon, Lloyd Ridge, and others.
***Eastern Planning Area includes portions of DeSoto Canyon, Destin Dome, Lloyd Ridge, and others.

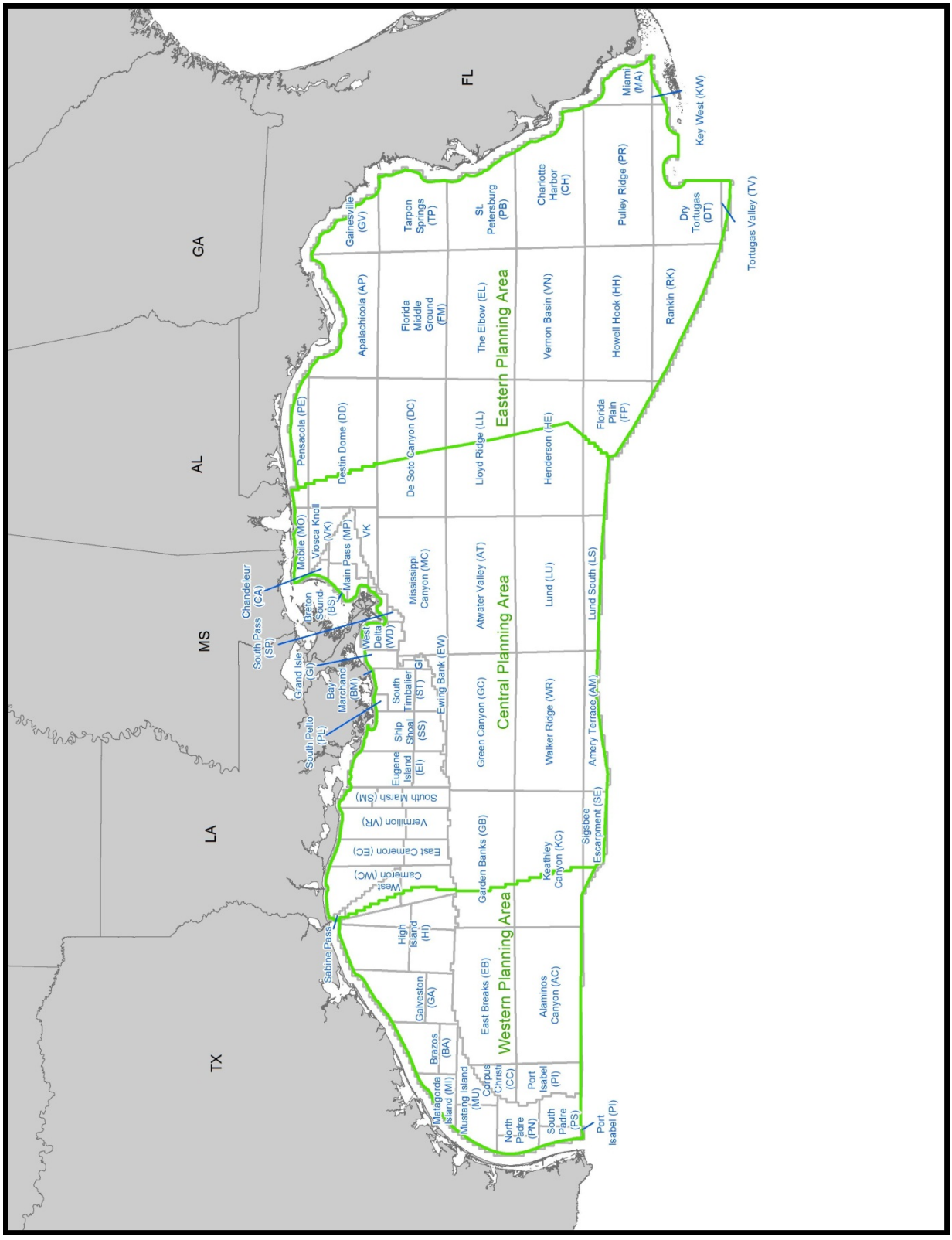

Figure 3. BOEM GOM OCS Planning Areas and Protraction Areas.

FIELD-SIZE DISTRIBUTION

Reserve sizes are expressed in terms of BOE. Gas reserves are converted to BOE and added to the liquid reserves for the convenience of comparison. The conversion factor of 5,620 standard cubic feet of gas equals 1 BOE is based on the average heating values of domestic hydrocarbons. A geometric progression, developed by the United States Geological Survey (USGS) (Attanasi, 1998), was selected for field-size (deposit-size) distribution ranges (**Table 2**).

In this report, fields are classified as either oil or gas; some fields do produce both products, making a field type determination difficult. Generally, fields with a gas/oil ratio (GOR) less than 9,700 standard cubic feet per stock tank barrel (SCF/STB) are classified as oil.

Table 2. Description of deposit-size classes.

Class	Deposit-size range*	Class	Deposit-size range*	Class	Deposit-size range*
1	0.031 - 0.062	10	16 - 32	18	4,096 - 8,192
2	0.062 - 0.125	11	32 -64	19	8,192 - 16,384
3	0.125 - 0.25	12	64 - 128	20	16,384 - 32,768
4	0.25 - 0.50	13	128 - 256	21	32,768 - 65,536
5	0.50 - 1.00	14	256 - 512	22	65,536 - 131,072
6	1 - 2	15	512 - 1,024	23	131,072 - 262,144
7	2 - 4	16	1,024 - 2,048	24	262,144 - 524,288
8	4 - 8	17	2,048 - 4,096	25	524,288 - 1,048,576
9	8 - 16	*Million Barrels of Oil Equivalent (MMBOE)			

The field-size distribution based on Original Proved Reserves (in BOE) for 1,278 proved fields is shown in **Figure 4(a)**. Of the 1,278 proved oil and gas fields, there are 238 proved oil fields represented in **Figure 5(a)** and 1,040 gas fields shown in **Figure 6(a)**. The Western Gulf of Mexico field-size distributions are displayed on **Figures 4(b)**, **5(b)**, and **6(b)**. **Figures 4(c)**, **5(c)**, and **6(c)** present the Central GOM field-size distributions of Original Proved Reserves. The field-size distribution, derived from the 125 fields containing Reserves Justified for Development, is shown in **Figure 7(a)**. There are 60 oil fields in **Figure 7(b)** and 65 gas fields containing Reserves Justified for Development in **Figure 7(c)**.

Analysis of the 1,278 proved oil and gas fields indicates that the GOM is historically a gas-prone basin. The cumulative GOR of the 238 proved oil fields is 2,553 SCF/STB. The GOR of the 60 oil fields containing Reserves Justified for Development is 2,017 SCF/STB. The yield (condensate divided by gas) for the 1,040 proved gas fields is 24.0 barrels (Bbl) of condensate per million cubic feet (MMcf) of gas. The yield of the 65 gas fields containing Reserves Justified for Development is 33.6 Bbl of condensate per MMcf.

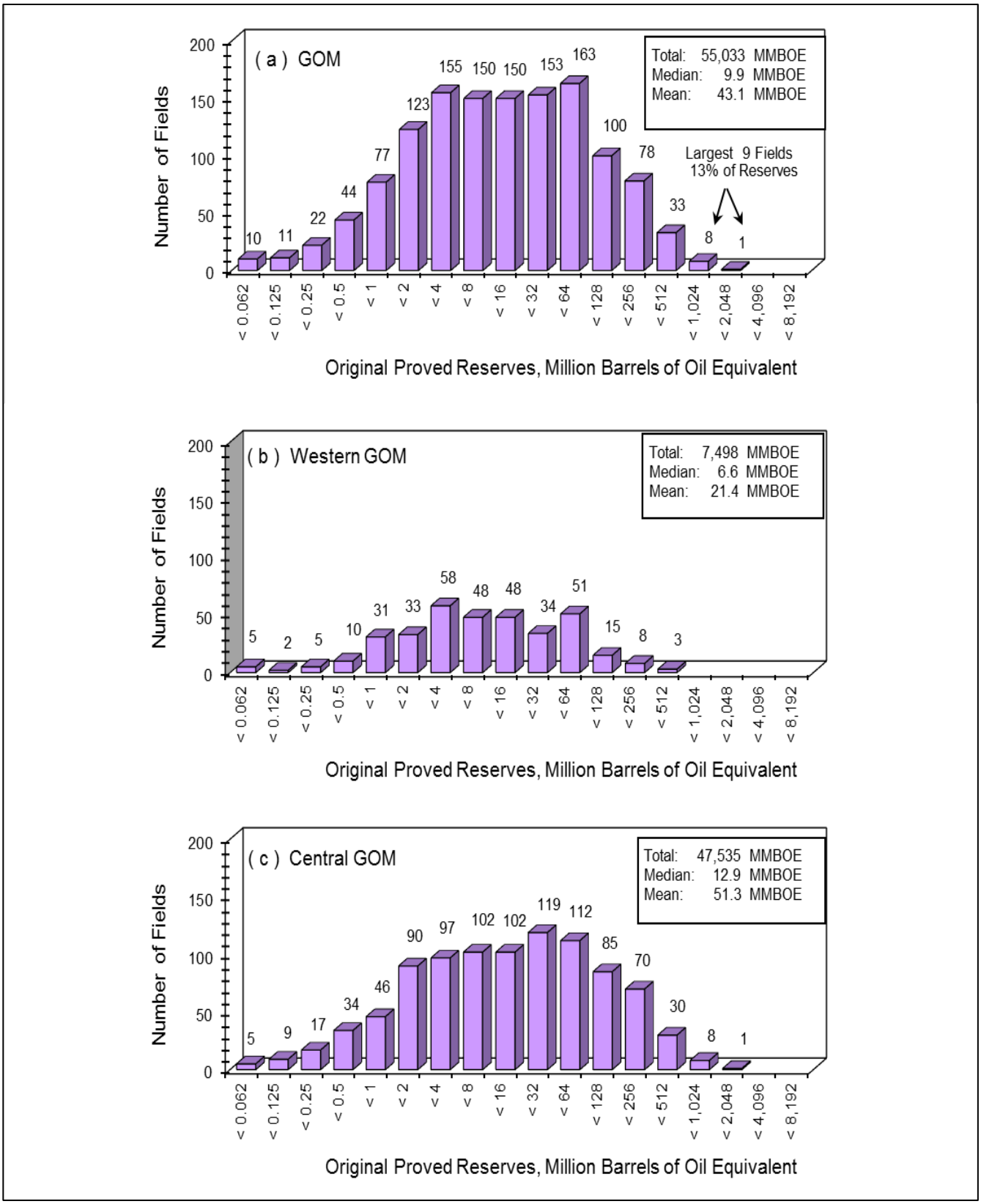

Figure 4. Field-size distribution of proved fields: (a) GOM, 1,278 fields; (b) Western GOM, 351 fields; (c) Central GOM, 927 fields.

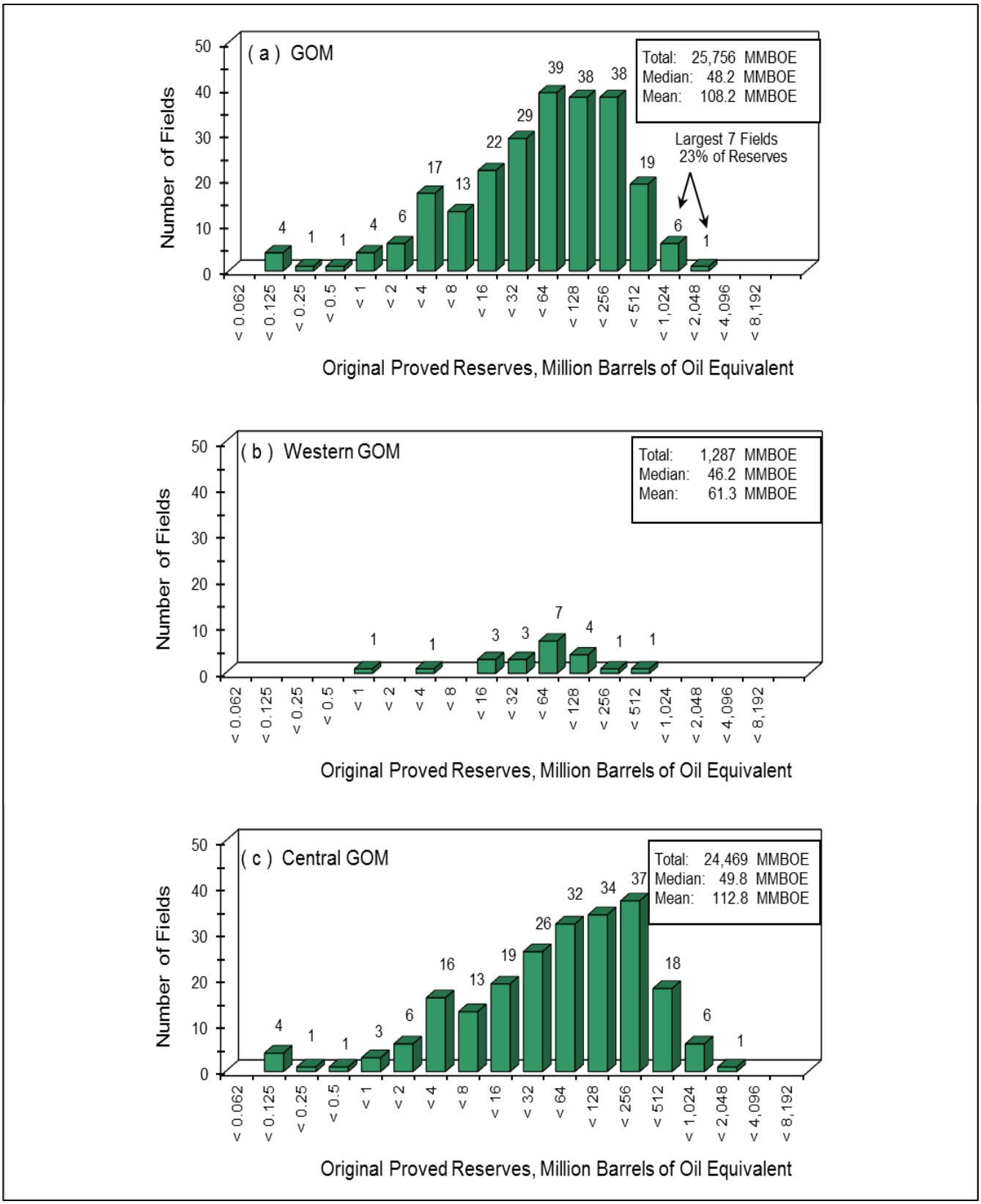

Figure 5. Field-size distribution of proved oil fields: (a) GOM, 238 fields; (b) Western GOM, 21 fields; (c) Central GOM, 217 fields.

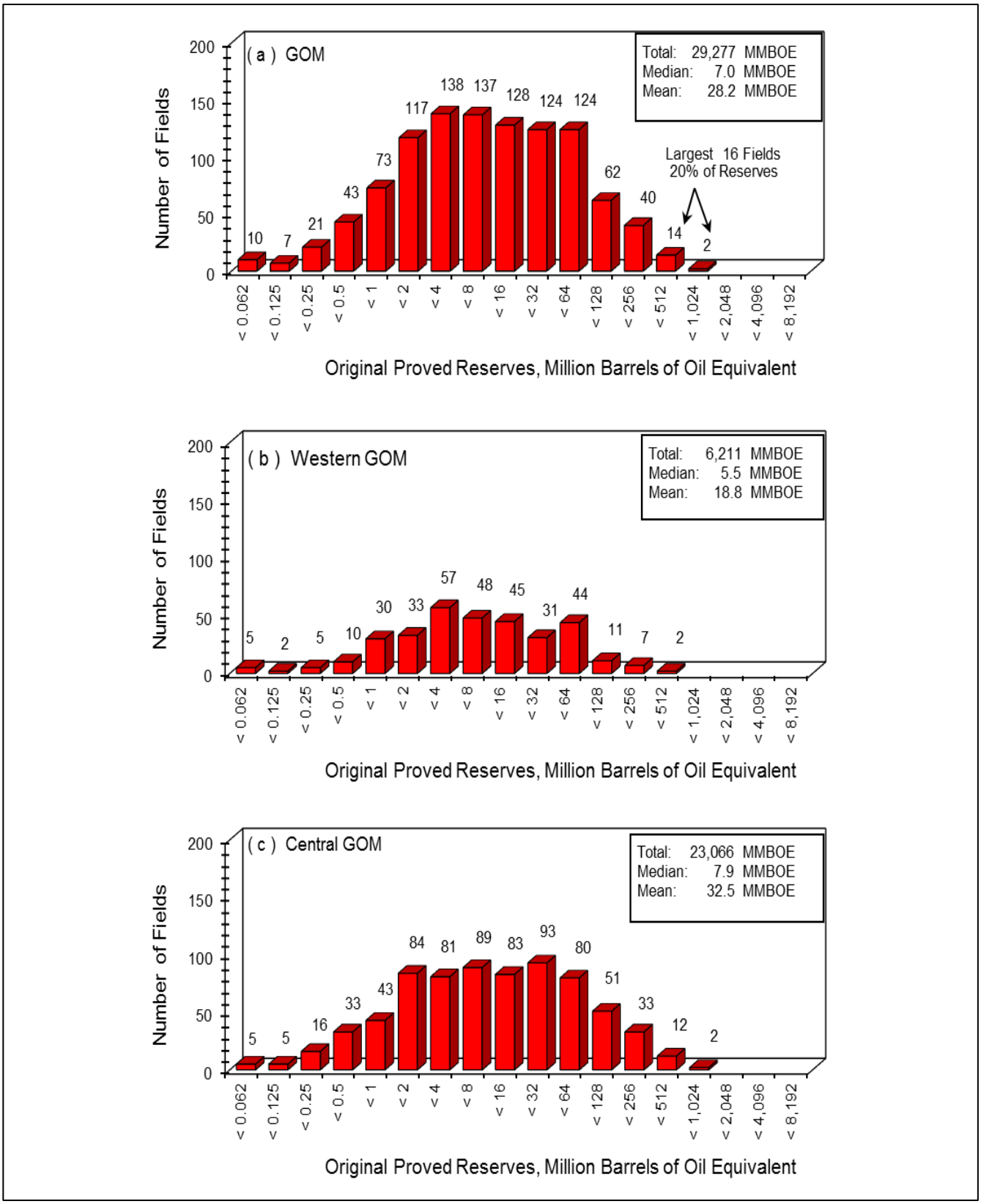

Figure 6. Field-size distribution of proved gas fields: (a) GOM, 1,040 fields; (b) Western GOM, 330 fields; (c) Central GOM, 710 fields.

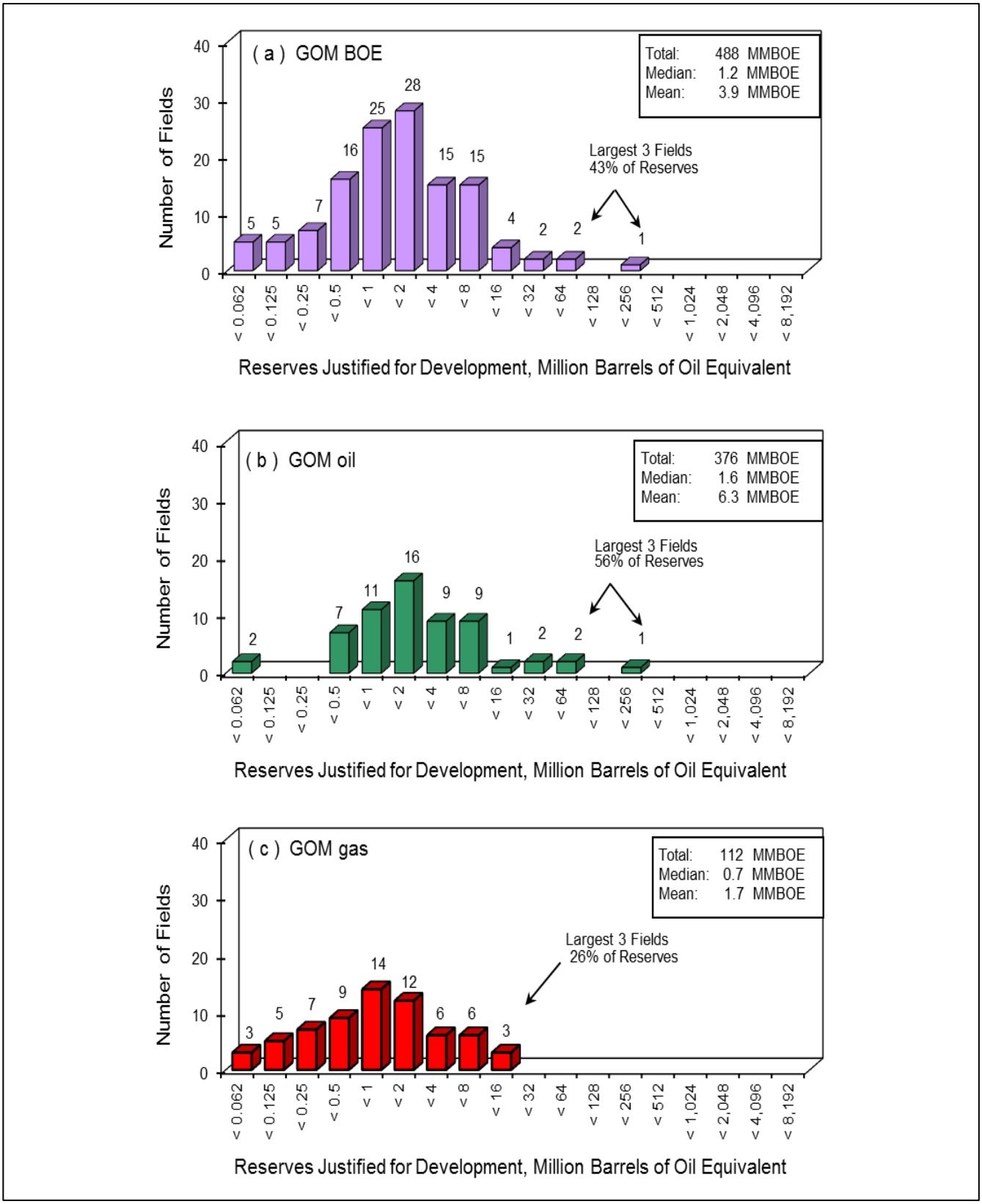

Figure 7. Field-size distribution of fields containing Reserves Justified for Development: (a) GOM BOE, 125 oil and gas fields; (b) GOM oil, 60 fields; (c) GOM gas, 65 fields.

Figure 8 shows the cumulative percent distribution of Original Proved Reserves in billion barrels of oil equivalent (BBOE), by field rank. All 1,278 proved fields in the GOM OCS are included in this figure. A phenomenon often observed in hydrocarbon-producing basins is a rapid drop-off in size from that of largest known field to smallest. Twenty-five percent of the Original Proved Reserves are contained in the 25 largest fields. Fifty percent of the Original Proved Reserves are contained in the 87 largest fields. Ninety percent of the Original Proved Reserves are contained in the 427 largest fields.

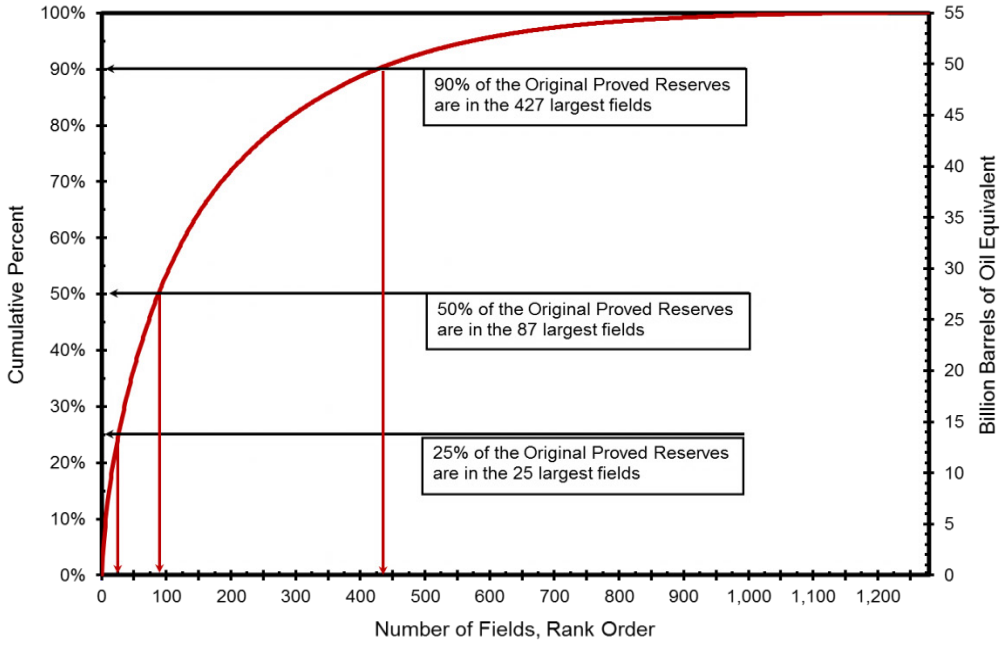

Figure 8. Cumulative percent total reserves versus rank order of field size for 1,278 proved fields.

Table 3 shows the distribution of the number of fields and reserves by water depth. A field's water depth is determined by averaging the water depth of the wells drilled in the field. The water depth ranges used in this figure are less than 500 ft, 500-999 ft, 1,000-1,499 ft, 1,500-4,999 ft, 5,000-7,499 ft and greater than or equal to 7,500 ft. Proved Reserves, reported in MMBOE, are associated with the 1,278 proved fields. Proved Reserves located in greater than or equal to 1500 ft of water accounts for 71 percent of the total GOM Proved Reserves.

Table 3. Field and reserves distribution by water depth.

Water Depth Range (Feet)	Number of Proved Fields	Proved Reserves (MMBOE)	Number of Fields with Reserves Justified for Development	Reserves Justified for Development (MMBOE)
< 500	1,075	1,781	81	148
500 - 999	54	78	2	3
1,000 - 1,499	24	188	7	14
1,500 - 4,999	89	2,549	22	112
5,000 - 7,499	21	2,026	8	34
>= 7,500	15	421	5	177
Totals:	1,278	7,043	125	488

Figure 9 shows the largest 20 fields ranked in order by Proved Reserves. Seventeen of the 20 fields lie in water depths of greater than or equal to 1,500 ft and account for 53 percent of the Proved Reserves in the GOM.

The trend of increasing estimates of Original Proved Reserves in water depths greater than 500 ft is expected to continue with additional exploration and development. Of the 203 proved fields in water depths greater than 500 ft, 147 are producing, 25 are depleted, and 31 have yet to produce.

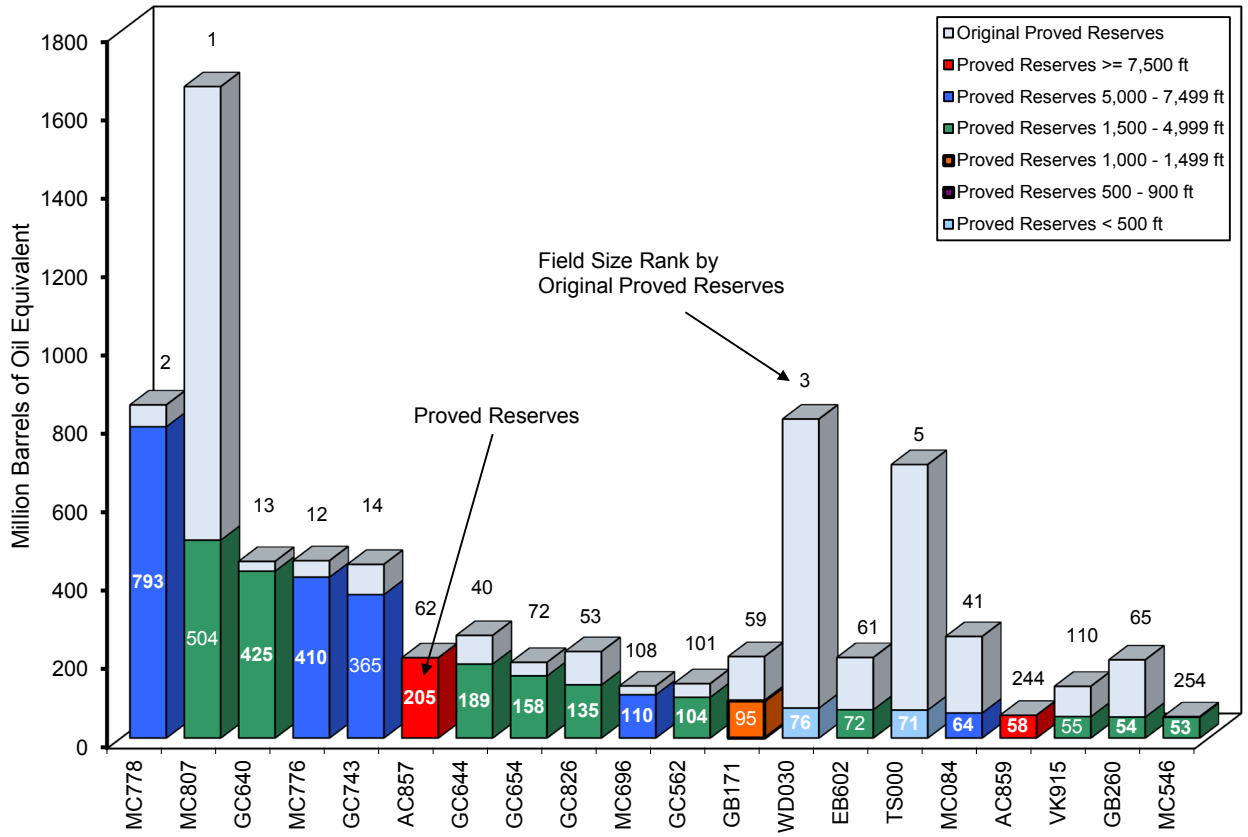

Figure 9. Largest 20 fields, with associated water depths, ranked by Proved Reserves and compared to Original Proved Reserves.

Table 4 lists the 50 largest proved fields ranked by Original Proved Reserves expressed in BOE. Rank, field name, field nickname, discovery year, water depth, field classification, field type, field GOR, original proved reserves, cumulative production through 2009, and proved reserves are presented. A complete listing of all 1,278 proved fields, ranked by proved reserves, is available on the BOEM Web site at: http://www.data.boem.gov/homepg/data_center/field/estimated2009.asp.

Table 4. Proved fields by rank order, based on original proved BOE reserves, top 50 fields.

(Field class: PDP - Proved Developed Producing; PDN - Proved Developed Non-Producing; PU - Proved Undeveloped)
(Field type: O - Oil; G - Gas)

Rank	Field name	Field Nickname	Disc year	Water depth (feet)	Field class	Field type	Field GOR SCF/STB)	Original Proved Reserves			Cumulative Production through 2009			Proved Reserves		
								Oil (MMbbl)	Gas (Bcf)	BOE (MMbbl)	Oil (MMbbl)	Gas (Bcf)	BOE (MMbbl)	Oil (MMbbl)	Gas (Bcf)	BOE (MMbbl)
1	MC807	MARS-URSA	1989	3,335	PDP	O	1,411	1,325.9	1,871.4	**1,658.9**	938.5	1,215.7	1,154.8	387.4	655.7	504.0
2	MC778	THUNDER HORSE	1999	6,078	PDP	O	883	733.1	647.7	**848.4**	48.8	37.7	55.5	684.4	610.0	792.9
3	WD030		1949	48	PDP	O	1,505	640.7	964.5	**812.3**	570.4	930.4	735.9	70.3	34.1	76.4
4	EI330		1971	247	PDP	O	4,283	433.6	1,856.9	**764.0**	427.9	1,847.6	756.7	5.7	9.4	7.3
5	TS000		1958	13	PDP	G	80,830	45.3	3,660.1	**696.5**	39.0	3,294.8	625.2	6.3	365.3	71.3
6	GI043		1956	140	PDP	O	4,400	383.6	1,687.1	**683.8**	367.4	1,591.5	650.6	16.2	95.6	33.2
7	BM002		1949	50	PDP	O	1,065	535.7	570.3	**637.2**	528.5	555.3	627.3	7.2	15.0	9.9
8	VR014		1956	26	PDP	G	65,345	48.1	3,142.6	**607.3**	47.9	3,121.8	603.4	0.2	20.8	3.9
9	MP041		1956	43	PDP	O	5,724	266.7	1,526.4	**538.3**	258.4	1,492.6	524.0	8.2	33.9	14.3
10	VR039		1948	38	PDP	G	81,176	31.8	2,544.0	**484.5**	31.0	2,526.9	480.7	0.7	17.0	3.8
11	SS208		1960	102	PDP	O	6,294	222.7	1,401.6	**472.1**	217.7	1,371.5	461.7	5.0	30.1	10.3
12	MC776	N.THUNDER HORSE	2000	5,665	PDP	O	1,003	383.1	385.4	**451.7**	36.0	33.3	41.9	347.1	352.0	409.8
13	GC640	TAHITI	2002	4,312	PDP	O	487	414.0	201.6	**449.9**	22.6	12.3	24.8	391.4	189.3	425.1
14	GC743	ATLANTIS	1998	6,297	PDP	O	638	397.2	253.3	**442.3**	69.1	43.7	76.8	328.1	209.6	365.4
15	GB426	AUGER	1987	2,846	PDP	O	3,657	244.5	900.5	**404.7**	224.0	815.5	369.1	20.5	85.0	35.6
16	WD073		1962	177	PDP	O	2,524	265.2	669.4	**384.3**	263.4	661.6	381.2	1.8	7.8	3.1
17	SP061		1967	220	PDP	O	1,875	284.8	534.1	**379.9**	264.6	520.8	357.3	20.2	13.4	22.6
18	GI016		1948	54	PDP	O	1,294	304.3	393.6	**374.3**	301.3	386.8	370.1	3.0	6.8	4.2
19	EI238		1964	147	PDP	G	16,305	94.5	1,540.2	**368.5**	88.4	1,477.2	351.3	6.0	63.0	17.2
20	ST172		1962	98	PDP	G	141,304	13.6	1,928.3	**356.8**	11.8	1,883.5	347.0	1.8	44.7	9.8
21	SP089		1969	422	PDP	O	4,449	194.4	865.0	**348.3**	190.8	855.2	343.0	3.6	9.7	5.4
22	WC180		1961	49	PDP	G	138,983	13.4	1,868.1	**345.8**	13.0	1,829.8	338.6	0.4	38.3	7.2
23	ST021		1957	46	PDP	O	1,650	264.5	436.4	**342.1**	253.0	418.4	327.4	11.5	18.0	14.7
24	SS169		1960	63	PDP	O	5,380	166.5	896.0	**326.0**	159.4	862.2	312.9	7.1	33.8	13.1
25	SM048		1961	101	PDP	G	56,727	28.6	1,621.2	**317.1**	27.9	1,550.7	303.8	0.7	70.6	13.3
26	MC194	COGNAC	1975	1,022	PDP	O	4,166	182.1	758.4	**317.0**	178.3	753.6	312.4	3.7	4.9	4.6
27	ST176		1963	127	PDP	G	14,556	88.3	1,285.3	**317.0**	83.5	1,227.4	301.9	4.8	57.9	15.1
28	EC064		1957	50	PDP	G	59,093	27.4	1,617.1	**315.1**	26.9	1,586.6	309.2	0.5	30.5	5.9
29	EI292		1964	212	PDP	G	80,225	20.5	1,648.5	**313.9**	18.7	1,644.0	311.2	1.9	4.4	2.7
30	EC271		1971	171	PDP	G	19,143	70.6	1,351.6	**311.1**	68.6	1,338.7	306.8	2.0	12.9	4.3
31	SS176		1956	101	PDP	G	19,825	66.4	1,316.6	**300.7**	64.6	1,299.5	295.8	1.8	17.1	4.9
32	WC587		1971	210	PDP	G	118,266	13.4	1,589.7	**296.3**	13.2	1,569.9	292.6	0.2	19.7	3.7
33	SP027	EAST BAY	1954	64	PDP	O	5,306	152.1	807.0	**295.7**	150.8	779.9	289.6	1.3	27.1	6.1
34	ST135		1956	129	PDP	O	3,680	170.2	625.3	**281.5**	166.8	606.0	274.7	3.4	19.3	6.9
35	EI296		1971	214	PDP	G	70,707	20.7	1,461.9	**280.8**	20.5	1,451.2	278.7	0.2	10.7	2.1
36	WC192		1954	57	PDP	G	60,902	23.6	1,439.0	**279.7**	22.8	1,398.5	271.7	0.8	40.5	8.0
37	WD079		1966	123	PDP	O	3,874	163.8	634.7	**276.8**	161.6	624.8	272.7	2.3	9.9	4.0
38	MI623		1980	83	PDP	G	101,832	14.3	1,454.0	**273.0**	13.5	1,379.8	259.0	0.8	74.2	14.0
39	HI573A		1973	340	PDP	O	7,574	115.8	877.1	**271.9**	110.3	870.0	265.1	5.5	7.1	6.7
40	GC644	HOLSTEIN	1999	4,341	PDP	O	1,181	215.9	255.0	**261.3**	61.7	62.5	72.8	154.2	192.5	188.5
41	MC084	KING/HORN MT.	1993	5,300	PDP	O	1,135	215.1	244.2	**258.6**	162.9	179.4	194.8	52.3	64.7	63.8
42	GC244	TROIKA	1994	2,795	PDP	O	1,900	192.8	366.4	**258.0**	163.3	325.1	221.2	29.5	41.2	36.8
43	GI047		1955	88	PDP	O	3,791	152.4	577.9	**255.3**	147.9	558.9	247.4	4.5	19.0	7.9
44	VK956	RAM-POWELL	1985	3,238	PDP	O	9,391	92.3	866.4	**246.4**	87.8	837.0	236.8	4.4	29.4	9.7
45	SP078		1972	202	PDP	G	11,318	81.0	916.7	**244.1**	76.6	908.8	238.3	4.4	8.0	5.8
46	SM023		1960	82	PDP	G	39,386	30.0	1,182.0	**240.3**	29.7	1,170.2	237.9	0.4	11.8	2.5
47	PL020		1951	33	PDP	O	5,758	117.4	675.9	**237.6**	111.6	642.7	225.9	5.8	33.2	11.7
48	SM130		1973	214	PDP	O	1,384	189.2	261.9	**235.8**	184.6	251.7	229.4	4.6	10.2	6.4
49	SM066		1963	124	PDP	G	260,991	4.9	1,287.6	**234.0**	4.8	1,252.5	227.7	0.1	35.0	6.4
50	VR076		1949	31	PDP	G	143,270	8.7	1,252.7	**231.6**	8.0	1,213.1	223.8	0.8	39.6	7.8

RESERVOIR-SIZE DISTRIBUTION

The size distributions of the proved reservoirs are shown in **Figures 10**, **11**, and **12**. The size ranges are based on Original Proved Reserves and are presented on a geometrically progressing horizontal scale. These sizes correspond with the USGS deposit-size ranges shown in **Table 2** with a modification to reflect small reservoirs in a finer distribution. For **Figures 11** and **12**, the Original Proved Reserves are presented in million barrels (MMbbl) and billion cubic feet (Bcf), respectively. The number of reservoirs in each size grouping, shown as percentages of the total, is presented on a linear vertical scale. For the combination reservoirs (saturated oil rims with associated gas caps), shown in **Figure 10**, gas is converted to BOE and added to the liquid reserves.

Figure 10 shows the reservoir-size distribution, on the basis of original proved BOE, for 2,308 proved combination reservoirs. The median is 0.9 MMBOE and the mean is 3.0 MMBOE. The cumulative GOR for the oil portion of the reservoirs is 1,182 SCF/STB, and the cumulative yield for the gas cap is 22.2 Bbl of condensate per MMcf of gas.

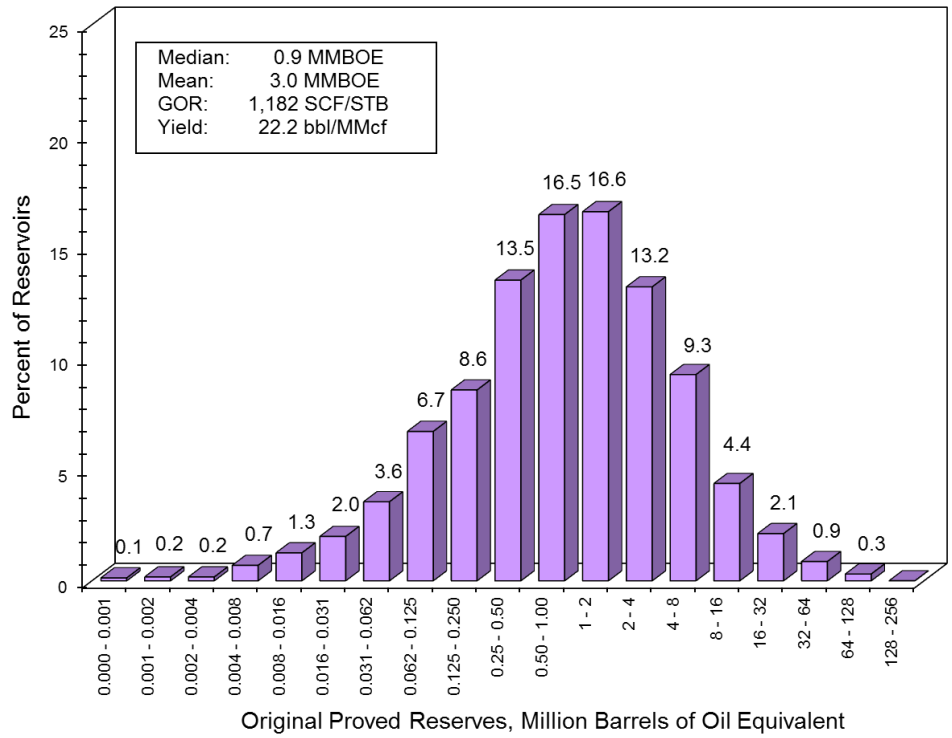

Figure 10. Reservoir-size distribution, 2,308 proved combination reservoirs.

Figure 11 shows the reservoir-size distribution, on the basis of original proved oil, for 8,228 proved undersaturated oil reservoirs. The median is 0.3 MMbbl, the mean is 1.9 MMbbl, and the cumulative GOR is 1,233 SCF/STB. **Figure 12** shows the reservoir-size distribution, on the basis of original proved gas, for 18,257 gas reservoirs. The median is 2.1 Bcf of gas, the mean is 8.5 Bcf, and the cumulative yield is 12.0 Bbl of condensate per MMcf of gas.

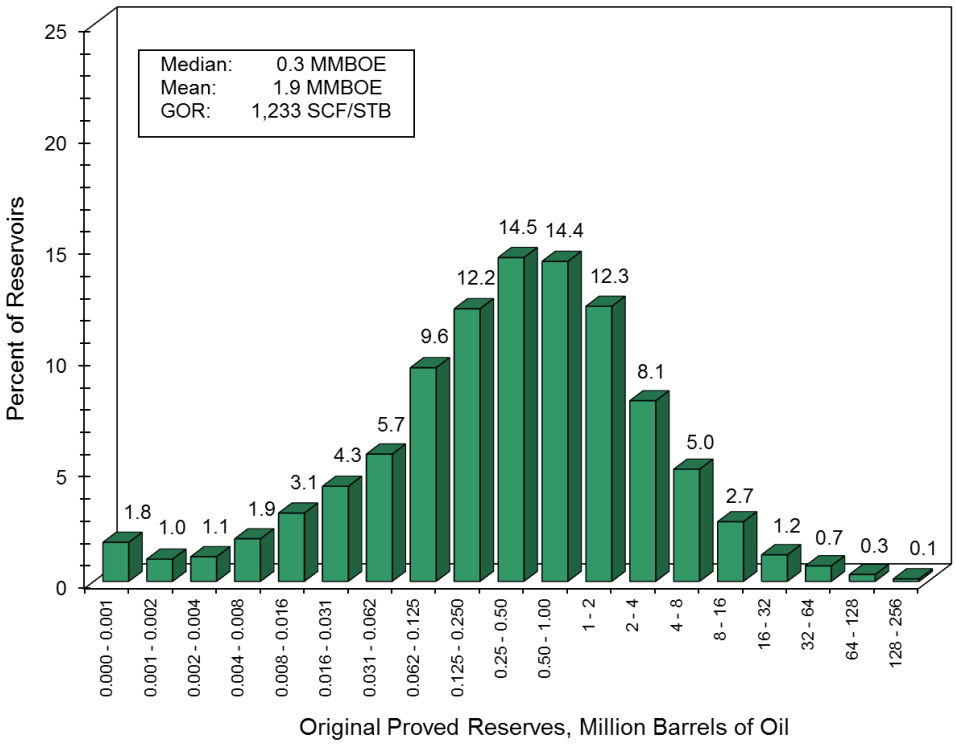

Figure 11. Reservoir-size distribution, 8,228 proved oil reservoirs.

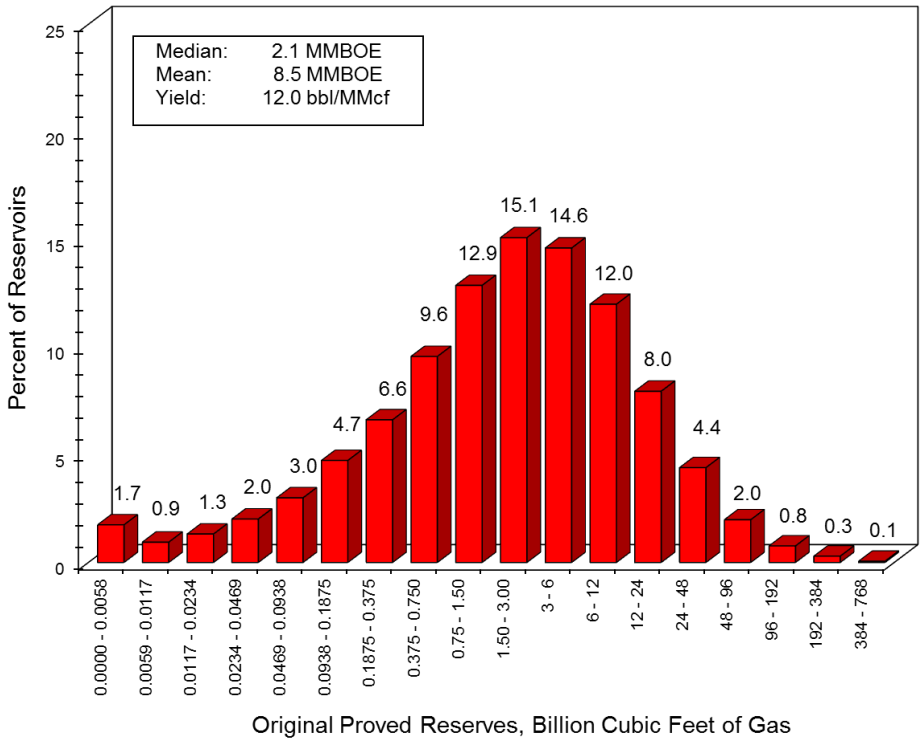

Figure 12. Reservoir-size distribution, 18,257 proved gas reservoirs.

DRILLING AND PRODUCTION TRENDS

Figure 13 presents the number of exploratory wells drilled each year by water depth category. The plot shows an increase of drilling in deeper water, but also illustrates a continued decrease in exploratory drilling in water depths less than 500 ft. The total footage drilled in 2009 was 2.66 million ft compared to 4.25 million ft in 2008.

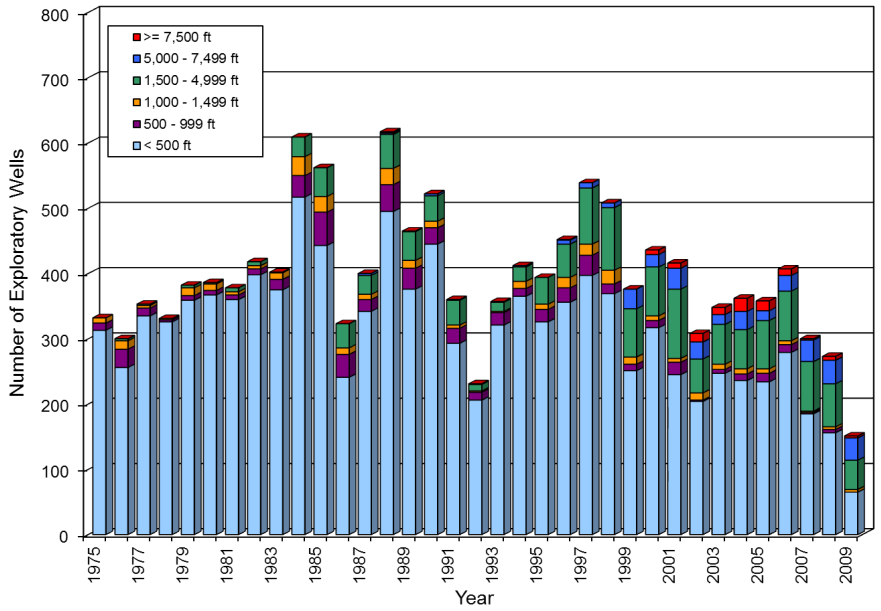

Figure 13. Number of exploratory wells drilled by water depth.

Figure 14 presents the number of development wells drilled each year by water depth category. The number of development wells drilled per year continues to decrease; however, from 2008 to 2009 the number of development wells drilled in water depths greater than 1,000' increased 60 percent. The total footage drilled in 2009 was 2.32 million ft compared to 3.70 million ft in 2008.

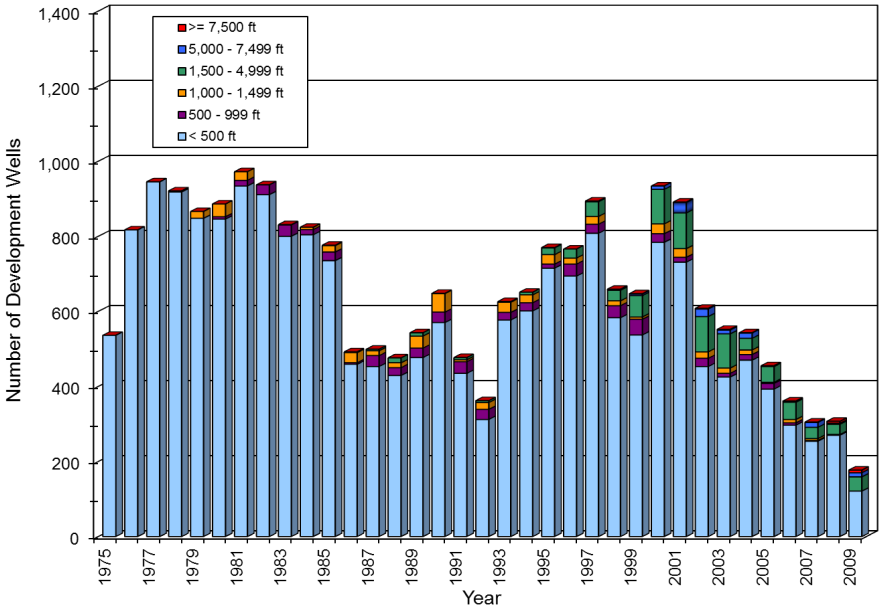

Figure 14. Number of development wells drilled by water depth.

Figure 15 presents Original Proved Reserves in BBOE for water depth categories by reservoir discovery year. From 1999 through 2004, the majority of reserves discovered occurred in greater than 1,000 ft of water. From 2005 through 2008, the majority of reserve discoveries were located in less than 1,000 ft of water. In 2009, the majority were located in greater than 1,000 ft of water.

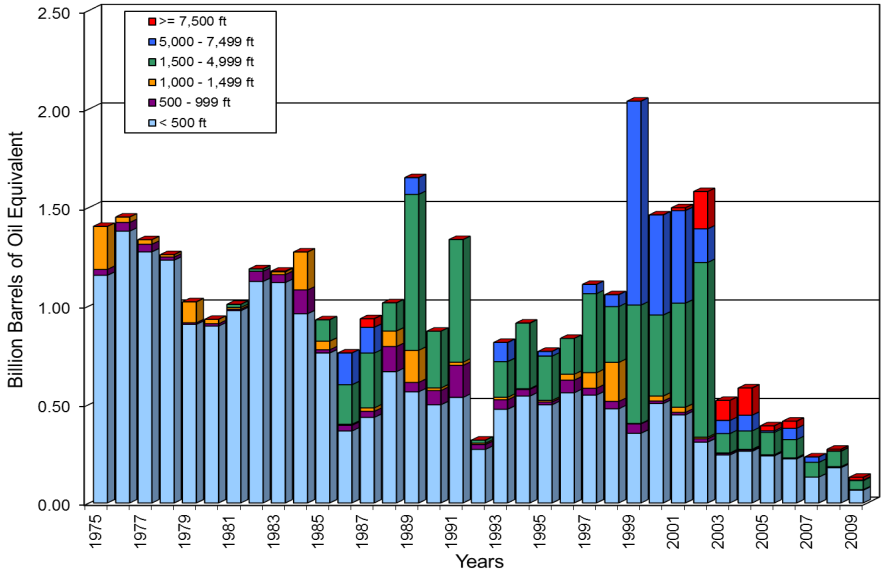

Figure 15. Original Proved Reserves categorized by water depth and reservoir discovery year.

Annual production in the GOM is shown in **Figure 16**. The oil plot includes condensate and the gas plot includes casinghead gas. Annual production for oil and gas is presented as a total, in shallow water (less than 1,000 ft), and in deepwater (greater than 1,000 ft). From 2008 to 2009 annual oil production increased 34 percent to 568 MMbbl and annual gas production increased 5 percent to 2.4 Tcf. The mean daily production in the GOM during 2009 was 1.39 MMbbl of crude oil, 0.16 MMbbl of gas condensate, 1.55 Bcf of casinghead gas, and 5.13 Bcf of gas-well gas. The mean GOR of oil wells was 1,110 SCF/STB, and the mean yield from gas wells was 31.76 Bbl of condensate per MMcf of gas.

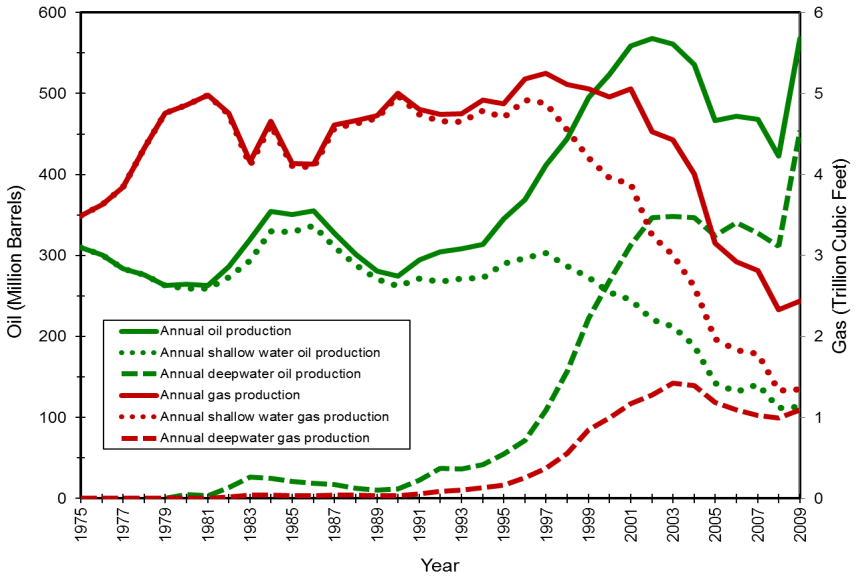

Figure 16. Annual oil and gas production.

SUMMARY AND CONCLUSIONS

A summary of the Proved Reserve estimates for 2009 and a comparison with estimates from the previous year's report (December 31, 2008) are shown in **Table 5**. There were 9 proved fields added during 2009 (4 oil fields and 5 gas fields), which are summarized and tabulated as increases to Original Proved Reserves. Eight of the proved fields added were discovered prior to 2009.

Comparison of Proved Reserves

Proved reserve estimates may increase or decrease with additional information (e.g. additional wells are drilled, leases are added to fields, reservoirs are depleted, or leases expire). Complete re-evaluations of existing field studies are conducted on the basis of changes in field development and/or production history. Revisions of Original Proved Reserves are summarized and presented as changes in **Table 5**. Based on periodic reviews and revisions of field studies conducted since the 2008 report, including a one-time conversion of the gas pressure base to 14.73 (see *Background*), the reserves revisions have resulted in a net decrease. A net change in the reserve estimates is a result of combining the discoveries and the revisions.

Table 5 demonstrates that the 2009 proved oil and gas discoveries and field revisions did not exceed production, resulting in a net decrease in Proved Reserves. The Proved Reserves decreased 11.6 percent for oil and decreased 19.9 percent for gas since the 2008 report.

Table 5. Summary and comparison of GOM proved oil and gas reserves as of December 31, 2008, and December 31, 2009.

	Oil (billion bbl)	Gas (trillion cu ft)	BOE (billion bbl)
Original Proved reserves:			
Previous estimates, as of 12/31/2008	**21.24**	**188.4**	**54.76**
Discoveries	0.01	0.2	0.04
Revisions	-0.05	1.6*	0.23
Estimate, as of 12/31/2009 (this report)	**21.20**	**190.2**	**55.03**
Cumulative production:			
Previous estimates, as of 12/31/2008	**15.96**	**171.8**	**46.53**
Revisions	0.00	2.6*	0.00
Production during 2009	0.57	2.4	1.46
Estimate, as of 12/31/2009 (this report)	**16.53**	**176.8**	**47.99**
Proved reserves:			
Previous estimates, as of 12/31/2008	**5.28**	**16.6**	**8.23**
Discoveries	0.01	0.2	0.04
Revisions	-0.05	-1.0*	0.23
Production during 2009	-0.57	-2.4	-1.46
Estimate, as of 12/31/2009 (this report)**	**4.67**	**13.3**	**7.04**

*Value includes one-time conversion of pressure base to 14.73.
**Summation of individual values may differ from total values due to rounding.

Table 6 presents all previous reserve estimates by year. Because of adjustments and corrections to production data submitted by Gulf of Mexico OCS operators, the difference between historical cumulative production for successive years does not always equal the annual production for the latter year.

Table 6. Proved oil and gas reserves and cumulative production at end of year, 1975-2009.

"Oil" includes crude oil and condensate; "gas" includes associated and nonassociated gas. Proved reserves estimated as of December 31 each year.

Year	Number of fields included	Original Proved Reserves			Historical Cumulative Production			Proved Reserves		
		Oil (Bbbl)	Gas (Tcf)	BOE (Bbbl)	Oil (Bbbl)	Gas (Tcf)	BOE (Bbbl)	Oil (Bbbl)	Gas (Tcf)	BOE (Bbbl)
1975	255	6.61	59.9	17.27	3.82	27.2	8.66	2.79	32.7	8.61
1976	306	6.86	65.5	18.51	4.12	30.8	9.60	2.74	34.7	8.91
1977	334	7.18	69.2	19.49	4.47	35.0	10.70	2.71	34.2	8.80
1978	385	7.52	76.2	21.08	4.76	39.0	11.70	2.76	37.2	9.38
1979 *	417	7.71	82.2	22.34	4.83	44.2	12.69	2.88	38.0	9.64
1980	435	8.04	88.9	23.86	4.99	48.7	13.66	3.05	40.2	10.20
1981	461	8.17	93.4	24.79	5.27	53.6	14.81	2.90	39.8	9.98
1982	484	8.56	98.1	26.02	5.58	58.3	15.95	2.98	39.8	10.06
1983	521	9.31	106.2	28.21	5.90	62.5	17.02	3.41	43.7	11.19
1984	551	9.91	111.6	29.77	6.24	67.1	18.18	3.67	44.5	11.59
1985	575	10.63	116.7	31.40	6.58	71.1	19.23	4.05	45.6	12.16
1986	645	10.81	121.0	32.34	6.93	75.2	20.31	3.88	45.8	12.03
1987	704	10.76	122.1	32.49	7.26	79.7	21.44	3.50	42.4	11.04
1988 †	678	10.95	126.7	33.49	7.56	84.3	22.56	3.39	42.4	10.93
1989	739	10.87	129.1	33.84	7.84	88.9	23.66	3.03	40.2	10.18
1990	782	10.64	129.9	33.75	8.11	93.8	24.80	2.53	36.1	8.95
1991	819	10.74	130.5	33.96	8.41	98.5	25.94	2.33	32.0	8.02
1992	835	11.08	132.7	34.69	8.71	103.2	27.07	2.37	29.5	7.62
1993	849	11.15	136.8	35.49	9.01	107.7	28.17	2.14	29.1	7.32
1994	876	11.86	141.9	37.11	9.34	112.6	29.38	2.52	29.3	7.73
1995	899	12.01	144.9	37.79	9.68	117.4	30.57	2.33	27.5	7.22
1996	920	12.79	151.9	39.82	10.05	122.5	31.85	2.74	29.4	7.97
1997	957	13.67	158.4	41.86	10.46	127.6	33.17	3.21	30.8	8.69
1998	984	14.27	162.7	43.22	10.91	132.7	34.52	3.36	30.0	8.70
1999	1,003	14.38	161.3	43.08	11.40	137.7	35.90	2.98	23.6	7.18
2000	1,050	14.93	167.3	44.70	11.93	142.7	37.32	3.00	24.6	7.38
2001	1,086	16.51	172.0	47.11	12.48	147.7	38.77	4.03	24.3	8.35
2002	1,112	18.75	176.8	50.21	13.05	152.3	40.15	5.71	24.6	10.09
2003	1,141	18.48	178.2	50.19	13.61	156.7	41.49	4.87	21.5	8.70
2004	1,172	18.96	178.4	50.70	14.14	160.7	42.73	4.82	17.7	7.97
2005	1,196	19.80	181.8	52.15	14.61	163.9	43.77	5.19	17.9	8.38
2006	1,229	20.30	183.6	52.97	15.08	166.7	44.74	5.22	16.9	8.23
2007	1,251	20.43	184.6	53.28	15.55	169.5	45.71	4.88	15.1	7.57
2008	1,270	21.24	188.4	54.76	15.96	171.8	46.53	5.28	16.6	8.23
2009 **	1,278	21.20	190.2	55.03	16.53	176.8	47.99	4.67	13.3	7.04

* Gas plant liquids dropped from system
\+ Basis of reserves changed from demonstrated to SPE proved.
** Conversion of historical gas production to 14.73 pressure base.

Conclusions

As of December 31, 2009, the 1,278 proved oil and gas fields in the federally regulated part of the GOM OCS contained Original Proved Reserves estimated to be 21.20 BBO and 190.2 Tcf of gas. Cumulative Production from the proved fields accounts for 16.53 BBO and 176.8 Tcf of gas (this includes an approximate 2% increase due to the gas pressure revision). Proved Reserves are estimated to be 4.67 BBO and 13.3 Tcf of gas for the 891 proved active fields. Proved oil reserves have decreased 11.6 percent and the proved gas reserves have decreased 19.9 percent from the 2008 report. Reserves Justified for Development in the federally regulated part of the GOM OCS are estimated to be 0.29 BBO and 1.1 Tcf of gas in 125 active fields.

Additionally, the Contingent Resources are an estimated 6.31 BBO and 16.3 Tcf of gas. The Contingent Resources are not presented in the tables and figures of this report. These resources include oil and gas fields where the lessee has not made a formal commitment to develop the project. They can be found in proved fields and in fields justified for development; or in leases that have not yet qualified and have not been placed in a field; or in fields that expired, relinquished, or terminated without production. As additional drilling and development occur, additional hydrocarbon volumes will become reportable, and BOEM anticipates future proved reserves and reserves justified for development to increase.

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REFERENCES

Attanasi, E.D., 1998, *Economics and the National Assessment of United States Oil and Gas Resources*, U.S. Geological Survey Circular 1145, United States Government Printing Office, Washington, D.C.,Table A-4, p. 29.

Bascle, B.J., L.D. Nixon, and K.M. Ross, 2001, *Atlas of Gulf of Mexico Gas and Oil Sands as of January 1, 1999*, U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Regional Office, Office of Resource Evaluation, OCS Report MMS 2001-086, New Orleans, 342 p.

Crawford, T.G., G.L. Burgess, S.M. Haley, H.A. Karrigan, C.J. Kinler, G.D. Klocek, D.M. Maclay, O.S. Racicot, and N.K. Shepard, 2012, *Estimated Oil and Gas Reserves, Gulf of Mexico OCS Region, December 31, 2008,* U. S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region, OCS Report BOEM 2012-103, New Orleans, 69 p. Web site: http://www.boem.gov/BOEM-Newsroom/Library/Publications/2012/BOEM-2012-103.aspx

Lore, G.L., D.A. Marin, E. C. Batchelder, W. C. Courtwright, R. P. Desselles, Jr., and R. J. Klazynski, 2001, *2000 Assessment of Conventionally Recoverable Hydrocarbon Resources of the Gulf of Mexico and Atlantic Outer Continental Shelf as of January 1, 1999*, U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region, Office of Resource Evaluation, OCS Report MMS 2001-087, New Orleans, 652 p.

Lore, G.L. 2006, *Assessment of Undiscovered Technically Recoverable Oil and Gas Resources of the Nation's Outer Continental Shelf, 2006*, U.S. Department of the Interior, Minerals Management Service, Resource Evaluation Division, 6 p. Web site: http://www.boem.gov/Oil-and-Gas-Energy-Program/Resource-Evaluation/Resource-Assessment/2006-RA-Assessments.aspx

Office of the Federal Register, National Archives and Records Administration, 2012, *Code of Federal Regulations, 30 CFR, Mineral Resources,* U.S. Government Printing Office, Washington, D.C. Web site: http://www.gpo.gov/fdsys/pkg/CFR-2012-title30-vol2/pdf/CFR-2012-title30-vol2.pdf

Society of Petroleum Engineers (SPE), American Association of Petroleum Geologists (AAPG), World Petroleum Council (WPC), and Society of Petroleum Evaluation Engineers (SPEE), 2007, *Petroleum Resource Management System*, 49 p. Web site: http://www.spe.org/spe-app/spe/industry/reserves/prms.htm

APPENDIX A: Definitions of Field, Resource and Reserves Terms

The following definitions as used in this report have been modified from SPE-PRMS and other sources where necessary to conform to requirements of the BOEM Reserves Inventory Program.

Field

A *Field* is an area consisting of a single reservoir or multiple reservoirs all grouped on, or related to, the same general geologic structural feature and/or stratigraphic trapping condition. There may be two or more reservoirs in a field that are separated vertically by impervious strata, laterally by local geologic barriers, or by both. The area may include one OCS lease, a portion of an OCS lease, or a group of OCS leases with one or more wells that have been approved as producible by the BOEM pursuant to the requirements of Title 30 Code of Federal Regulations (CFR) 550.115/116, Determination of Well Producibility (*Federal Register, 2012*). A field is usually named after the area and block on which the discovery well is located. Field names and/or field boundaries may be changed when additional geologic and/or production data initiate such a change. Using geological criteria, BOEM designates a new producible lease as a new field or assigns it to an existing field. http://www.boem.gov/BOEM-Newsroom/Offshore-Stats-and-Facts/Gulf-of-Mexico-Region/Field-Naming-Handbook---March-1996.aspx.

Project

A *Project* represents the link between the petroleum accumulation and the decision-making process, including budget allocation. A project, for BOEM's classification of Resources and Reserves, is the Field (see also Field).

Resources

Resources encompass all quantities of petroleum (recoverable and unrecoverable) naturally occurring on or within the Earth's crust, discovered and undiscovered, plus those quantities already produced. Further, it includes all types of petroleum whether currently considered conventional or unconventional.

Undiscovered Resources

Resources postulated, on the basis of geologic knowledge and theory, to exist outside of known fields or accumulations. Included also are resources from undiscovered pools within known fields to the extent that they occur within separate plays. BOEM assesses two types of undiscovered resources, *Undiscovered Technically Recoverable Resources (UTRR)* and *Undiscovered Economically Recoverable Resources (UERR)*.

Discovered Resources

Hydrocarbons whose location and quantity are known or estimated from specific geologic evidence are *Discovered Resources*. Included are *Contingent Resources* and *Reserves* depending upon economic, technical, contractual, or regulatory criteria.

Contingent Resources

Those quantities of petroleum estimated, as of a given date, to be potentially recoverable from known accumulations by application of development projects but which are not currently considered to be commercially recoverable due to one or more contingencies.

Unrecoverable

The portion of discovered or undiscovered petroleum-initially-in-place quantities which are estimated, as of a given date, not to be recoverable. A portion of these quantities may become recoverable in the future as commercial circumstances change, technological developments occur, or additional data are acquired.

Reserves

Reserves are those quantities of petroleum anticipated to be commercially recoverable by application of development projects to known accumulations from a given date forward under defined conditions. *Reserves* must further satisfy four criteria: They must be

discovered, recoverable, commercial, and remaining (as of a given date) based on the development project(s) applied. *Reserves* are further sub-classified based on economic certainty.

Original Proved Reserves

Original Proved Reserves are the total of the *Cumulative Production* plus *Proved Reserves*, as of a specified date.

Reserves Justified for Development

The lowest level of reserves certainty. Implementation of the development project is justified on the basis of reasonable forecast commercial conditions at the time of reporting and that there are reasonable expectations that all necessary approvals/contracts will be obtained.

Proved Reserves

Proved Reserves are those quantities of petroleum which, by analysis of geoscience and engineering data, can be estimated with reasonable certainty to be commercially recoverable, from a given date forward, from known reservoirs and under defined economic conditions, operating methods, and government regulations. *Proved Reserves* are classified as *Proved Undeveloped Reserves* or *Proved Developed Reserves*.

Proved Undeveloped Reserves

Proved Undeveloped Reserves are those *Proved Reserves* that are expected to be recovered from future wells and facilities, including future improved recovery projects which are anticipated with a high degree of certainty in reservoirs which have previously shown favorable response to improved recovery projects.

Proved Developed Reserves

Proved Developed Reserves can be expected to be recovered through existing wells and facilities and by existing operating methods. Improved recovery reserves can be considered as *Proved Developed Reserves* only after an improved recovery project has been installed and favorable response has occurred or is expected with a reasonable degree of certainty. Developed reserves are expected to be recovered from existing wells, including reserves behind pipe. Improved recovery reserves are considered developed only after the necessary equipment has been installed, or when the costs to do so are relatively minor. *Proved Developed Reserves* may be sub-categorized as *Producing* or *Non-producing*.

Proved Developed Non-producing Reserves

Proved Non-producing Reserves are precluded from producing due to being *shut-in* or *behind-pipe*. *Shut-in* includes (1) completion intervals which are open at the time of the estimate, but which have not started producing, (2) wells which were shut-in for market conditions or pipeline connections, or (3) wells not capable of production for mechanical reasons. *Behind-pipe* refers to zones in existing wells which will require additional completion work or future re-completion prior to the start of production. In both cases, production can be initiated or restored with relatively low expenditure compared to the cost of drilling a new well.

Proved Developed Producing Reserves

Proved Developed Producing Reserves are expected to be recovered from completion intervals that are open and producing at the time of the estimate. Improved recovery reserves are considered producing only after the improved recovery project is in operation.

Cumulative Production

Cumulative Production is the sum of all produced volumes of oil and gas prior to a specified date.

Notice

This report, *Estimated Oil and Gas Reserves, Gulf of Mexico, December 31, 2009,* has undergone numerous changes over the last few years. We are continually striving to provide meaningful information to the users of this document. Suggested changes, additions, or deletions to our data or statistical presentations are encouraged so we can publish the most useful report possible. Please contact the Reserves Section Chief at (504) 736-2891 at the Bureau of Ocean Energy Management, 1201 Elmwood Park Boulevard, MS GM773E, New Orleans, Louisiana 70123-2394, to communicate your ideas for consideration in our next report. An overview of the Reserves Inventory Program is available on BOEM's Website.

For free publication and digital data, visit the Gulf of Mexico Web site. The report can be accessed as an Acrobat .pdf (portable document format) file, which allows you to view, print, navigate, and search the document with the free downloadable Acrobat Reader 9.0. Digital data used to create the tables and figures presented in the document are also accessible as Excel 97 spreadsheet files (.xls; using Microsoft's Excel spreadsheet viewer, a free file viewer for users without access to Excel). These files are made available in a zipped format, which can be unzipped with the downloadable WinZip program.

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The Department of the Interior Mission

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities and for people who live in island communities.

The Bureau of Ocean Energy Management

The Bureau of Ocean Energy Management (BOEM) works to manage the exploration and development of the nation's offshore resources in a way that appropriately balances economic development, energy independence, and environmental protection through oil and gas leases, renewable energy development and environmental reviews and studies.