Smackover

The Upper Jurassic (Oxfordian) Smackover Formation (**Table 3**), named after the *Smackover* Oil Field in southern Arkansas, is a carbonate unit deposited during a major marine transgression and highstand across the northern rim of the GOM. In Federal waters, the formation is located primarily in the Pensacola, Apalachicola, De Soto Canyon, Florida Middle Ground, and The Elbow Areas (**Figure 14**). To the north, the Smackover extends onshore where it is productive, while to the south, the play grades into nonporous carbonate mudstones and shales. *Alveosepta jaccardi* is a common biostratigraphic marker found in the formation (**Table 4**). No Smackover fields have been declared in Federal waters.

The upper Smackover section consists of inner ramp, high-energy, oolitic grainstones alternating with carbonate mudstones. Localized thrombolitic reefs and grainstone shoals developed over (1) basement highs, (2) salt pillow structures, and (3) topographic highs related to large sand dunes of the underlying Norphlet Formation. Porosity in the grainstones is enhanced by dolomitization and subaerial leaching of carbonate cements. The downdip and lower Smackover section consists of laminated lime mudstones, wackestones, some porous packstones, siliciclastic siltstones, and shales. Any paleostructural highs that favored reef and grainstone shoal development are drilling objectives. Later faulting along the flanks of these highs created fault traps, although most Smackover traps possess a strong stratigraphic component. Basal anhydrites of the overlying Buckner Formation create seals at the top of the Smackover section, while carbonate mudstones, anhydrites, and shales form seals within the formation. The Smackover is self-sourcing, with hydrocarbons being derived from the low-energy, algal-rich, laminated carbonate mudstones located near the base of the section. For a detailed discussion, see Petty (2010).

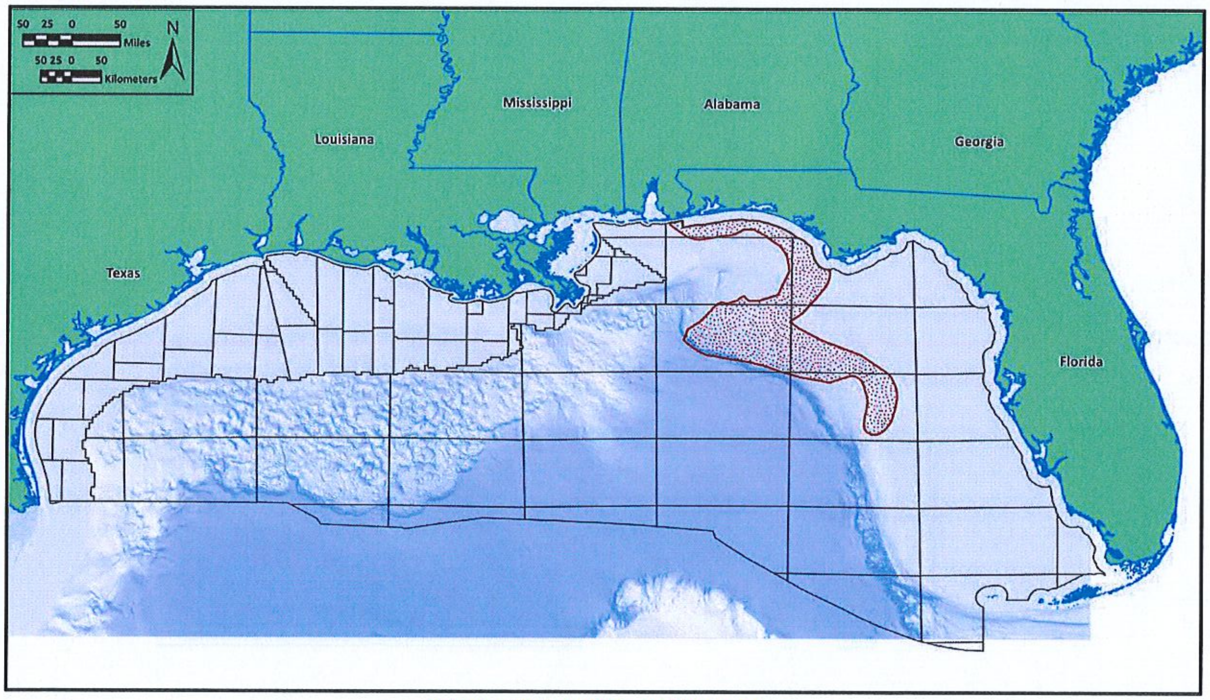

Figure 14. Smackover Play area.

Norphlet

The Norphlet and Salt Roller/High-Relief Salt Structure Plays were extensively described (including references) in Lore et al. (2001). These plays have been combined based on the identification of Norphlet reservoirs in the previously undrilled deepwater area of the Salt Roller/High-Relief Salt Structure Play. Norphlet Formation (**Table 3**) (Late Jurassic–Oxfordian) aeolian dune and interdune facies define the play, which covers all or part of a number of protraction areas (**Figure 15**). The north and northeast play boundaries generally coincide with the updip depositional limit of the Jurassic Louann Salt (**Figure 4**). To the west, the occurrence of high-relief salt-cored structures (salt canopies, salt domes, salt diapirs, salt-floored minibasins, and salt-cored compressional folds) defines the play limits. The south and southwest play boundary is interpreted to coincide with the downdip depositional limit of the Louann Salt. Over its history, the established Norphlet Play evolved from onshore Mississippi, Alabama, and Florida into Alabama State waters, shallow waters of the OCS shelf, and recently into deepwater areas.

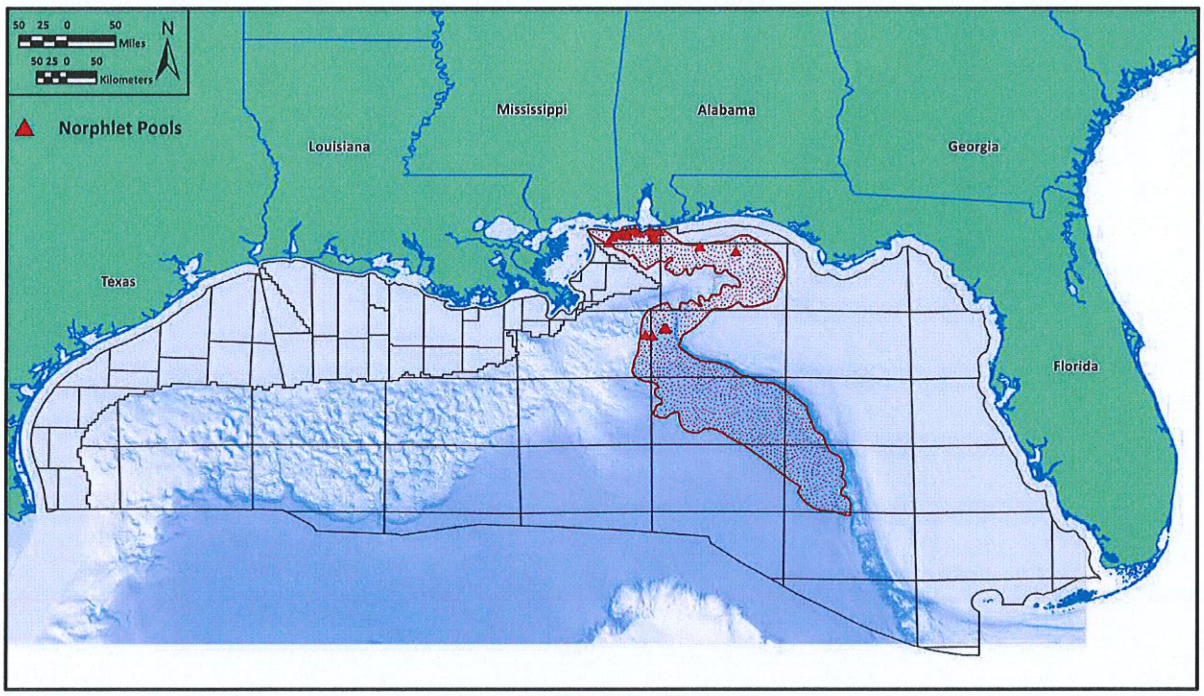

Figure 15. Norphlet Play area.

The Smackover-Norphlet is a closed petroleum system. Laminated, algal-rich lime mudstones of the overlying lower Smackover Formation (Late Jurassic, Oxfordian) are geochemically typed as the source rocks for the Norphlet (Sassen, 1990) and provide the overlying top seal for Norphlet reservoirs (Mankiewicz et al., 2009). With the exception of a few onshore fields, the Norphlet is only productive where there is no porosity in the upper Smackover. Where there is porosity in the upper Smackover, the Norphlet only contains commercial volumes of hydrocarbons after all available Smackover porosity has been hydrocarbon-filled.

Norphlet reservoirs in the GOM consist of aeolian dunes. Sand-thickness isopachs, based on 3D seismic data proximate to the Mobile Bay area, show Norphlet dune fields in that area consist of northwest to southeast oriented, subparallel, elongate sand bodies up to 800 ft (244 m) thick, and 5,000 ft (1,524 m) across (Ajdukiewicz et al., 2010). These thicknesses are thought to be less than the original topography because of post-depositional sediment compaction (Ajdukiewicz et al., 2010). The generally elongate Norphlet dunes have a similar morphology and scale to modern linear dunes of the Namib

Desert, where elongate dune complexes consisting of seif and star dunes (**Figure 16**) and are up to 1,060 ft (323 m) high (Mankiewicz et al., 2009). Dunes are separated from each other by areas with sand thickness less than a seismic resolution of 300 ft (91 m), and are interpreted to be interdune areas (Ajdukiewicz et al. 2010). Although post-depositional sediment compaction, structuring, and salt tectonics have distorted the original dune configuration, Story (1998) notes that overlying Smackover and lower Haynesville carbonates thin over Norphlet dune crests and thicken over interdune areas, indicating dune topography was present when the carbonates were deposited (Ajdukiewicz et al., 2010).

Whole core examination from wells drilled in the De Soto Canyon and Mississippi Canyon areas used in conjunction with the analysis of their associated well logs have established a dune type change in the aeolian deposits from the individual seif (longitudinal) and star dune setting in the north to an area with barchan (horned) dunes in a coalesced or erg type environment in the south (**Figure 16**) (Godo et al., 2011). In addition to the two sequences of barchan dunes (both sinuous and straight-crested forms), these core and log analyses also identified three additional large scale depositional intervals: 1) interbedded lacustrine mudrocks, 2) stacked aeolian sheetsand or sheetflood facies, and 3) mixed coastal sand sheets with some waterlain sabkha facies (Godo et al., 2011).

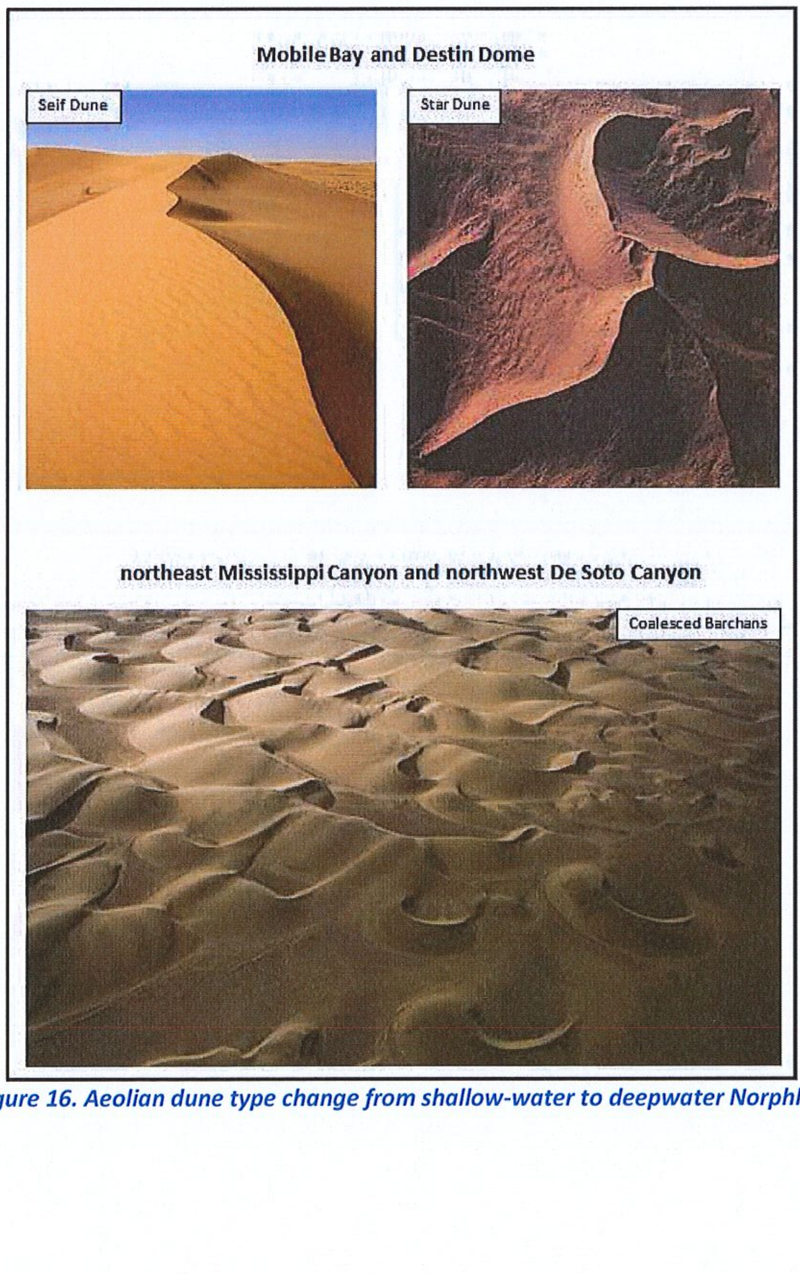

Figure 16. Aeolian dune type change from shallow-water to deepwater Norphlet.

Along with the change in dune geometry, the primary hydrocarbon associated with the play also changes. The gas with associated liquids in the shallow waters of the northern part of the play changes to oil with associated gas in the deeper water to the south. As of this study's cutoff date, the Norphlet Play in the OCS waters contains 20 discovered pools. Sixteen are associated with the shallow-water, gas-prone portion of the play, and four are in deepwater, with oil as the primary hydrocarbon. Discoveries in the deepwater oil portion of the play include *Appomattox* (Mississippi Canyon 392) and *Vicksburg "B"* (De Soto Canyon 353). Shell Offshore and their partners have submitted a preliminary development plan for the *Appomattox-Vicksburg* complex. The plan calls for 44 total wells to be drilled over a 10-year period starting in 2016 (4 exploratory, 24 development, and 16 pressure maintenance injectors).

Within the deepwater area, primary play risks found to date include the presence of a reservoir, reservoir quality, and hydrocarbon properties including the presence of asphaltenes, which can restrict hydrocarbon flow. Additional risks include timing (trap creation relative to hydrocarbon creation and expulsion) and trap seal (vertical and horizontal) for hydrocarbon preservation.

Non-Assessed Plays

Knowles Carbonate

The Cotton Valley Group (**Table 3**) in Federal OCS waters consists of siliciclastics and carbonates ("Knowles") and ranges in age from Upper Jurassic (Tithonian) to Lower Cretaceous (Valanginian). Within the group, the Knowles Carbonate Play is composed of Tithonian/Berriasian ramps and Valanginian platforms. The Valanginian platforms cap the assessed Cotton Valley Clastic Play (**Figure 13**).

Carbonate development initiated along the Tithonian shelf edge. Reefs grew along the shelf edge into the Berriasian, while clastics were deposited in backreef shelf areas. Penecontemporaneously, clastics prograded beyond the Tithonian/Berriasian shelf edge extending the shelf seaward. Three carbonate platforms developed over the seaward prograding clastic wedge during the early Valanginian, with the uppermost platform extending 100 mi (161 km) landward of the shelf edge. This extensive marker was later subaerially exposed. The packstones and grainstones of the three platforms are separated by intra-platform gray shales and gray mudstones. Each ramp and platform is thicker along the prograding shelf edge and interfingers landward with delta plain clastics. Combined thickness of the carbonates ranges from 2,200 ft (670 m) at the shelf edge to zero over the Destin Anticline (**Figure 4**). Shoreward, carbonates have less-developed SP signatures in all inner ramps and platforms, reflecting a change from the better-developed SP outer ramp and platform bioclasts to less-developed SP inner ramp and platform mudstones (Finneran et al., 1984; Cregg and Ahr, 1983). The best development of the outer ramp and platform bioclasts is in the Viosca Knoll and western Destin Dome Areas (**Figure 17**).

There has been no production from the Knowles Carbonate Play in the Federal offshore. The nearest production to the OCS extends onshore from the southern Arkansas-northern Louisiana area to the southwestern edge of the East Texas Basin (Cregg and Ahr, 1983). Even though there are no commercial discoveries thus far in the Federal OCS, gas shows have been encountered (e.g., Main Pass block 154 well no. 1 and Viosca Knoll block 202 well no. 1). However, because it has been explored without significant volumes of oil and gas found, undiscovered resources were not assessed for the Knowles Carbonate Play. For a detailed discussion, see Petty (2008).

Tuscaloosa Marine Shale

The Tuscaloosa Marine Shale of southern Louisiana and Mississippi, along with the Eagle Ford and Woodbine Shales of southern Texas, is part of a trend of Upper Cretaceous shale units that trend parallel behind the Lower Cretaceous shelf edge. The Tuscaloosa Marine Shale extends into Federal waters in the Mobile and Viosca Knoll Protraction Areas (**Figure 18**). This marine shale is depositionally younger than the assessed sandstones in the Lower Tuscaloosa Play (**Table 3** and **Figure 8**).

ASSESSMENT RESULTS

UNDISCOVERED TECHNICALLY RECOVERABLE RESOURCES

Starting with a database of discovered resources (reserves, which include cumulative production, and contingent resources) estimated at 26.685 Bbbl of oil and 204.751 Tcf of gas (total of 63.117 BBOE), the Gulf of Mexico OCS is assessed to contain undiscovered technically recoverable resources of 48.464 Bbbl of oil and 141.765 Tcf of gas (total of 73.689 BBOE) at the mean level (**Figure 19**).

Figure 20 ranks the assessed assessment units/plays in the GOM based on mean-level UTRR in BBOE. Relative to the thoroughly-explored, mature plays on the modern shelf, plays on the modern slope and abyssal plain are estimated to have the most undiscovered resources, with Lower Tertiary sediments containing the highest potential for future discoveries. Of the Mesozoic-aged plays, Norphlet dunes are estimated to have the greatest potential for future discoveries, mainly in the immature portion located in the eastern Gulf of Mexico in ultra-deepwater (≥2,400 m).

Table 5 and **Table 6** present detailed UTRR values by individual play and planning area/water-depth categories, respectively, at the 95th, mean, and 5th percentiles.

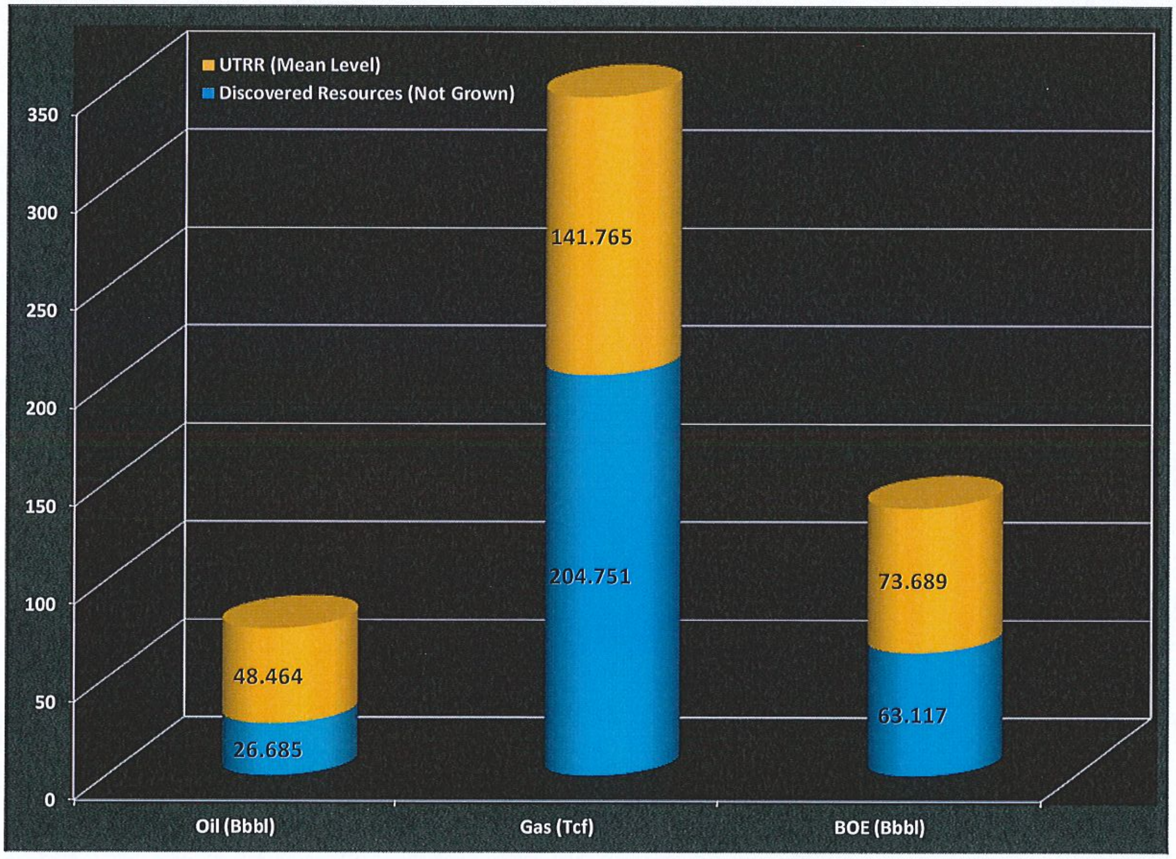

Figure 19. Estimated discovered resources and UTRR of the Gulf of Mexico OCS.

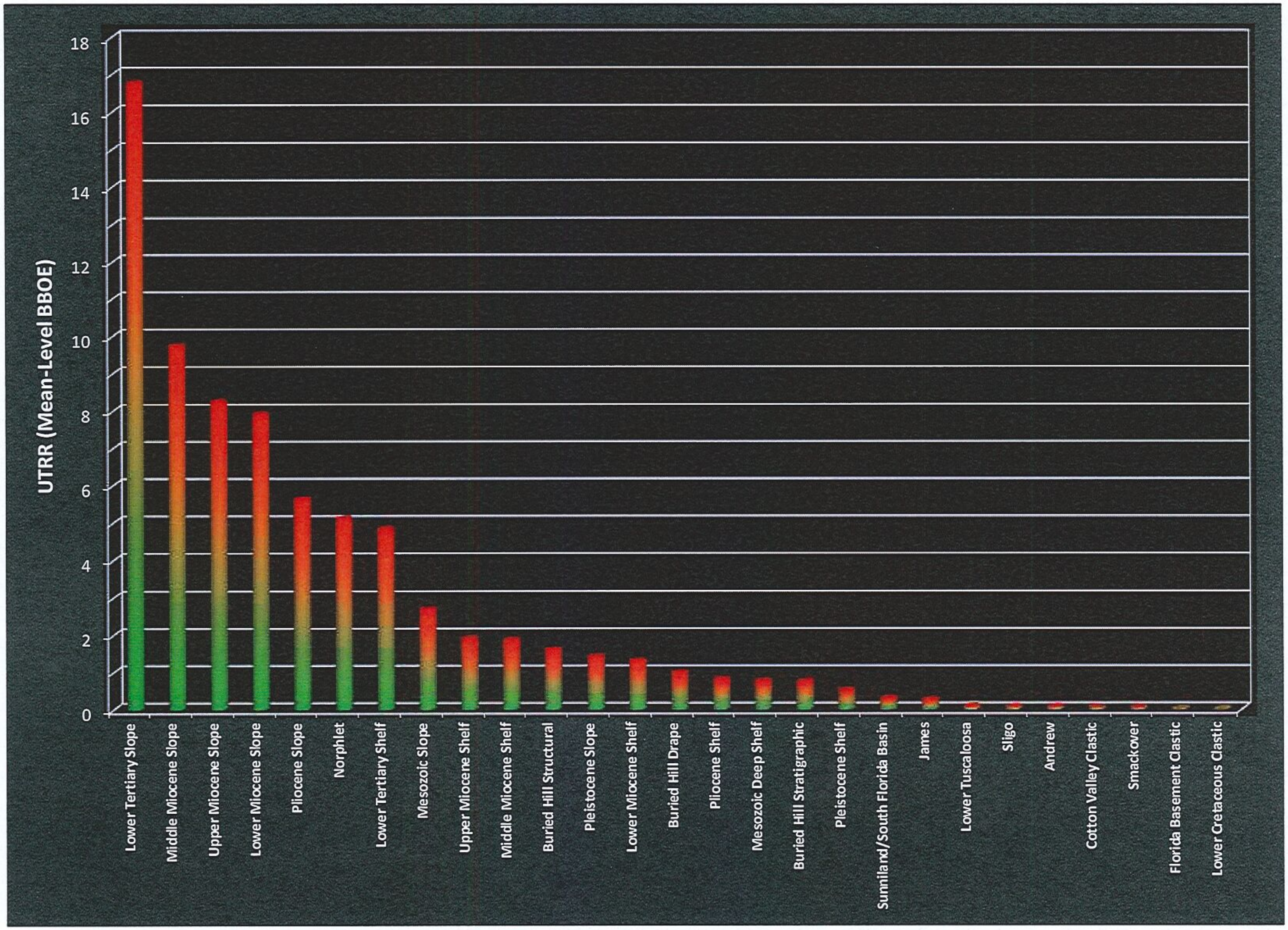

Figure 20. Assessment units/plays ranked by mean-level UTRR.

Table 5. UTRR by assessment unit/play.

Gulf of Mexico OCS Region		Number of Pools		Undiscovered Technically Recoverable Resources (UTRR)								
Era	Assessment Unit/Play	Discovered	Undiscovered	Oil (Bbbl)			Gas (Tcf)			BOE (Bbbl)		
			Mean	95%	Mean	5%	95%	Mean	5%	95%	Mean	5%
Cenozoic	Pleistocene Shelf	373	149	0.030	0.103	0.247	0.648	2.324	5.406	0.145	0.516	1.209
	Pleistocene Slope	76	111	0.228	0.507	0.796	2.358	5.110	8.215	0.647	1.416	2.258
	Pliocene Shelf	506	201	0.077	0.238	0.707	1.002	3.126	8.138	0.255	0.794	2.155
	Pliocene Slope	121	181	0.748	3.584	6.932	2.360	11.368	21.676	1.168	5.607	10.789
	Upper Miocene Shelf	470	261	0.447	0.853	1.436	3.140	5.975	10.891	1.006	1.916	3.374
	Upper Miocene Slope	86	226	3.121	5.274	7.639	9.562	16.637	24.355	4.822	8.234	11.973
	Middle Miocene Shelf	245	140	0.047	0.279	0.557	1.517	8.908	18.516	0.317	1.864	3.851
	Middle Miocene Slope	72	213	4.399	7.385	11.274	7.713	13.154	20.231	5.771	9.726	14.874
	Lower Miocene Shelf	158	113	0.008	0.132	0.335	0.376	6.622	16.525	0.075	1.311	3.275
	Lower Miocene Slope	9	117	1.765	7.264	13.251	0.959	3.595	6.306	1.936	7.903	14.373
	Lower Tertiary Shelf	3	140	0.123	0.237	0.336	13.345	25.844	40.959	2.497	4.835	7.624
	Lower Tertiary Slope	23	366	6.800	15.627	26.977	2.839	6.380	10.484	7.305	16.762	28.842
Mesozoic	Mesozoic Deep Shelf	0	5	0.000	0.001	0.003	0.000	4.335	18.620	0.000	0.772	3.316
	Mesozoic Slope	0	25	0.696	1.638	2.853	2.550	5.834	10.200	1.150	2.676	4.668
	Lower Tuscaloosa	0	4	0.000	0.044	0.163	0.000	0.242	0.753	0.000	0.087	0.297
	Andrew	2	5	0.003	0.050	0.111	0.008	0.121	0.293	0.004	0.071	0.163
	James	10	40	0.025	0.051	0.088	0.503	1.148	1.939	0.114	0.256	0.433
	Sligo	0	5	0.000	0.036	0.110	0.000	0.208	0.691	0.000	0.073	0.233
	Lower Cretaceous Clastic	0	5	0.000	0.007	0.022	0.000	0.038	0.139	0.000	0.014	0.047
	Florida Basement Clastic	0	10	0.000	0.005	0.014	0.000	0.081	0.251	0.000	0.019	0.059
	Buried Hill Stratigraphic	0	6	0.000	0.488	2.153	0.000	1.462	6.500	0.000	0.748	3.310
	Buried Hill Structural	0	10	0.000	1.232	5.330	0.000	2.073	8.690	0.000	1.601	6.876
	Buried Hill Drape	0	12	0.000	0.536	2.381	0.000	2.469	10.162	0.000	0.975	4.189
	Norphlet	20	60	0.996	2.579	4.447	6.810	14.168	23.613	2.208	5.100	8.649
	Smackover	0	40	0.017	0.035	0.058	0.063	0.132	0.222	0.028	0.059	0.097
	Cotton Valley Clastic	0	15	0.007	0.032	0.078	0.033	0.177	0.407	0.013	0.063	0.150
	Sunniland/South Florida Basin	0	40	0.126	0.249	0.403	0.118	0.238	0.371	0.147	0.291	0.469
	Total Gulf of Mexico OCS	**2,174**	**2,500**	**39.481**	**48.464**	**58.528**	**124.007**	**141.765**	**159.627**	**61.546**	**73.689**	**86.931**

Table 6. UTRR by planning area and water depth.

Gulf of Mexico OCS Region	Undiscovered Technically Recoverable Resources (UTRR)								
Planning Area	Oil (Bbbl)			Gas (Tcf)			BOE (Bbbl)		
Water Depth	95%	Mean	5%	95%	Mean	5%	95%	Mean	5%
Total Gulf of Mexico OCS	**39.481**	**48.464**	**58.528**	**124.007**	**141.765**	**159.627**	**61.546**	**73.689**	**86.931**
0 - 200 m	2.105	2.484	2.960	47.694	63.978	83.126	10.591	13.868	17.751
200 - 800 m	4.916	6.331	7.829	10.244	12.627	15.207	6.738	8.578	10.535
800 - 1,600 m	12.225	15.824	19.707	21.727	25.141	28.278	16.091	20.297	24.739
1,600 - 2,400 m	9.479	12.737	16.523	15.217	17.995	20.473	12.187	15.939	20.166
> 2,400 m	8.349	11.087	14.468	15.744	22.023	28.982	11.150	15.006	19.625
Western Gulf of Mexico OCS	**8.204**	**11.566**	**15.557**	**32.094**	**38.988**	**45.646**	**13.915**	**18.504**	**23.679**
0 - 200 m	0.513	0.749	0.981	15.812	24.941	35.657	3.327	5.187	7.325
200 - 800 m	1.215	1.822	2.535	1.879	2.475	3.076	1.549	2.262	3.083
800 - 1,600 m	3.642	5.500	7.680	5.635	7.208	8.975	4.644	6.783	9.277
1,600 - 2,400 m	1.412	2.167	3.032	2.195	2.720	3.440	1.803	2.651	3.644
> 2,400 m	0.863	1.327	1.882	1.263	1.645	2.043	1.088	1.620	2.246
Central Gulf of Mexico OCS	**24.669**	**33.252**	**42.735**	**77.722**	**91.274**	**105.646**	**38.499**	**49.493**	**61.534**
0 - 200 m	1.043	1.363	1.707	23.562	36.038	52.455	5.235	7.776	11.041
200 - 800 m	3.131	4.362	5.704	6.159	8.513	10.978	4.227	5.877	7.657
800 - 1,600 m	7.327	10.263	13.489	14.065	17.565	21.226	9.829	13.388	17.266
1,600 - 2,400 m	7.360	10.538	14.161	12.818	15.191	18.006	9.641	13.241	17.365
> 2,400 m	4.415	6.726	9.494	8.934	13.966	20.693	6.005	9.211	13.176
Eastern Gulf of Mexico OCS	**2.349**	**3.633**	**5.276**	**7.150**	**11.487**	**16.200**	**3.622**	**5.677**	**8.158**
0 - 200 m	0.214	0.364	0.523	1.012	2.989	6.072	0.394	0.896	1.604
200 - 800 m	0.083	0.143	0.225	0.773	1.634	2.780	0.220	0.433	0.720
800 - 1,600 m	0.038	0.061	0.090	0.232	0.368	0.518	0.079	0.126	0.182
1,600 - 2,400 m	0.007	0.032	0.073	0.020	0.084	0.175	0.011	0.047	0.104
> 2,400 m	1.810	3.034	4.632	3.300	6.412	10.006	2.397	4.175	6.412
Straits of Florida Gulf of Mexico OCS	**0.007**	**0.013**	**0.020**	**0.008**	**0.016**	**0.024**	**0.008**	**0.016**	**0.025**
0 - 200 m	0.004	0.008	0.012	0.005	0.010	0.015	0.005	0.009	0.015
200 - 800 m	0.003	0.005	0.008	0.003	0.006	0.010	0.003	0.006	0.010

UNDISCOVERED ECONOMICALLY RECOVERABLE RESOURCES

Undiscovered economically recoverable resources are presented with a gas market value adjustment of 0.3 using three different oil/gas price pairs—$40/bbl and $2.14/Mcf, $100/bbl and $5.34/Mcf, and $160/bbl and $8.54/Mcf. **Figure 21** compares mean-level values of UERR for each price pair with UTRR for the entire Gulf of Mexico OCS. **Figure 22** illustrates these same values delineated by OCS planning area. The historically-prolific Central Gulf of Mexico OCS Planning Area contains by far the most undiscovered-resource potential under any price-pair scenario. **Table 7** presents complete economic results under each price-pair scenario at the 95th, mean, and 5th percentiles.

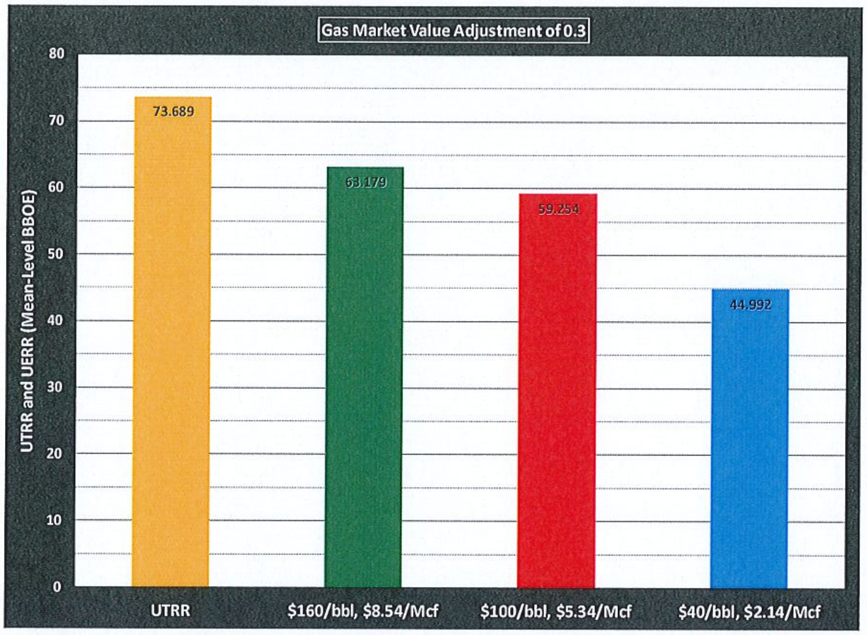

Figure 21. Portions of UTRR that are economic under three price pairs for the Gulf of Mexico OCS.

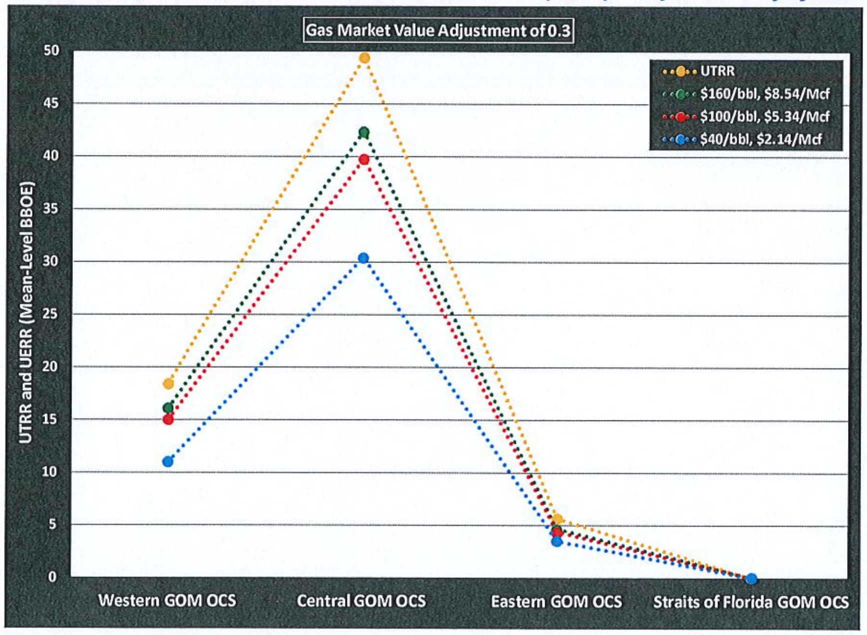

Figure 22. Portions of UTRR that are economic under three price pairs for each planning area.

Table 7. UERR with a gas market value adjustment of 0.3.

Gulf of Mexico OCS Region	Undiscovered Economically Recoverable Resources (UERR)																										
	Gas Market Value Adjustment of 0.3																										
Planning Area	$40/bbl, $2.14/Mcf									$100/bbl, $5.34/Mcf									$160/bbl, $8.54/Mcf								
	oil (Bbbl)			gas (Tcf)			BOE (Bbbl)			oil (Bbbl)			gas (Tcf)			BOE (Bbbl)			oil (Bbbl)			gas (Tcf)			BOE (Bbbl)		
Water Depth	95%	mean	5%	95%	mean	5%	95%	Mean	5%	95%	mean	5%	95%	mean	5%	95%	mean	5%	95%	mean	5%	95%	mean	5%	95%	mean	5%
Total Gulf of Mexico OCS	**27.962**	**35.011**	**42.949**	**47.601**	**56.091**	**65.942**	**36.432**	**44.992**	**54.683**	**34.603**	**42.877**	**52.200**	**78.727**	**92.037**	**105.466**	**48.611**	**59.254**	**70.966**	**36.250**	**44.769**	**54.363**	**89.104**	**103.466**	**117.780**	**52.105**	**63.179**	**75.320**
0 - 200 m	1.438	1.757	2.166	20.011	28.825	38.249	4.999	6.886	8.972	1.798	2.173	2.615	36.747	50.979	67.001	8.337	11.244	14.537	1.869	2.257	2.706	41.105	56.368	74.489	9.183	12.287	15.960
200 - 800 m	3.385	4.422	5.543	3.099	3.972	5.043	3.936	5.129	6.440	4.238	5.505	6.871	4.933	6.287	7.810	5.116	6.624	8.260	4.453	5.779	7.189	5.782	7.342	9.076	5.481	7.085	8.804
800 - 1,600 m	8.520	11.292	14.229	6.640	8.064	9.377	9.701	12.727	15.898	10.645	13.946	17.497	10.691	12.753	14.609	12.547	16.215	20.096	11.184	14.596	18.264	12.455	14.847	16.963	13.400	17.237	21.282
1,600 - 2,400 m	6.727	9.215	12.109	5.242	6.531	7.634	7.659	10.378	13.467	8.333	11.309	14.772	8.072	9.873	11.446	9.769	13.066	16.809	8.722	11.809	15.388	9.279	11.286	13.070	10.373	13.817	17.714
> 2,400 m	6.116	8.324	11.147	5.310	8.699	13.343	7.061	9.872	13.521	7.420	9.944	13.099	7.905	12.144	17.337	8.827	12.105	16.184	7.730	10.329	13.573	9.139	13.623	19.156	9.356	12.753	16.982
Western Gulf of Mexico OCS	**5.683**	**8.206**	**11.230**	**12.295**	**15.881**	**19.421**	**7.871**	**11.031**	**14.686**	**7.134**	**10.205**	**13.846**	**21.877**	**27.233**	**32.614**	**11.027**	**15.050**	**19.649**	**7.500**	**10.683**	**14.454**	**24.796**	**30.531**	**36.189**	**11.912**	**16.115**	**20.893**
0 - 200 m	0.378	0.584	0.775	6.062	11.258	17.318	1.457	2.588	3.856	0.481	0.707	0.928	11.948	20.006	29.636	2.607	4.267	6.202	0.496	0.728	0.956	13.508	22.152	32.207	2.900	4.669	6.687
200 - 800 m	0.822	1.276	1.799	0.500	0.730	0.978	0.911	1.406	1.973	1.043	1.593	2.238	0.842	1.187	1.539	1.193	1.805	2.512	1.100	1.672	2.344	1.001	1.399	1.808	1.278	1.921	2.666
800 - 1,600 m	2.489	3.856	5.443	1.606	2.232	3.027	2.775	4.253	5.982	3.146	4.817	6.772	2.614	3.567	4.653	3.611	5.451	7.600	3.310	5.053	7.098	3.077	4.173	5.381	3.858	5.795	8.056
1,600 - 2,400 m	0.978	1.540	2.199	0.730	0.994	1.266	1.108	1.717	2.424	1.225	1.913	2.701	1.165	1.507	1.980	1.432	2.181	3.053	1.289	2.002	2.817	1.333	1.720	2.268	1.526	2.309	3.220
> 2,400 m	0.600	0.950	1.369	0.458	0.667	0.911	0.682	1.068	1.531	0.754	1.174	1.685	0.704	0.966	1.260	0.879	1.346	1.909	0.791	1.228	1.752	0.796	1.087	1.408	0.933	1.421	2.003
Central Gulf of Mexico OCS	**17.590**	**24.216**	**31.562**	**28.741**	**35.024**	**40.710**	**22.704**	**30.448**	**38.805**	**21.693**	**29.561**	**38.220**	**48.444**	**57.826**	**68.112**	**30.313**	**39.850**	**50.339**	**22.687**	**30.838**	**39.818**	**54.938**	**65.208**	**76.336**	**32.462**	**42.441**	**53.400**
0 - 200 m	0.720	0.999	1.320	9.558	15.816	24.089	2.421	3.813	5.606	0.916	1.227	1.565	17.753	28.683	43.660	4.075	6.331	9.334	0.948	1.268	1.605	20.061	31.728	47.416	4.518	6.913	10.042
200 - 800 m	2.170	3.085	4.103	1.671	2.449	3.350	2.468	3.521	4.700	2.720	3.825	5.054	2.754	4.038	5.440	3.210	4.544	6.022	2.861	4.012	5.280	3.300	4.771	6.355	3.448	4.861	6.411
800 - 1,600 m	5.128	7.409	9.932	4.284	5.691	7.354	5.890	8.422	11.241	6.406	9.093	12.074	6.929	8.995	11.258	7.639	10.694	14.077	6.721	9.503	12.565	8.063	10.459	12.998	8.155	11.364	14.878
1,600 - 2,400 m	5.203	7.657	10.449	4.344	5.497	7.013	5.976	8.635	11.697	6.455	9.373	12.722	6.840	8.317	10.221	7.672	10.853	14.541	6.762	9.781	13.219	7.816	9.513	11.638	8.153	11.474	15.290
> 2,400 m	3.198	5.066	7.391	2.762	5.570	9.831	3.690	6.057	9.140	3.904	6.042	8.624	4.247	7.794	12.807	4.660	7.429	10.903	4.081	6.274	8.925	4.945	8.738	14.119	4.961	7.829	11.437
Eastern Gulf of Mexico OCS	**1.552**	**2.584**	**3.986**	**2.694**	**5.181**	**8.215**	**2.031**	**3.506**	**5.448**	**1.937**	**3.104**	**4.635**	**3.812**	**6.971**	**10.735**	**2.615**	**4.345**	**6.545**	**2.033**	**3.239**	**4.806**	**4.286**	**7.718**	**11.584**	**2.796**	**4.612**	**6.867**
0 - 200 m	0.080	0.171	0.280	0.394	1.747	3.956	0.150	0.482	0.984	0.120	0.235	0.382	0.588	2.286	4.932	0.225	0.641	1.259	0.138	0.256	0.405	0.667	2.483	5.290	0.257	0.698	1.347
200 - 800 m	0.026	0.060	0.116	0.226	0.791	1.671	0.066	0.200	0.414	0.039	0.083	0.152	0.334	1.059	2.068	0.099	0.271	0.520	0.045	0.091	0.164	0.393	1.169	2.249	0.115	0.299	0.564
800 - 1,600 m	0.013	0.026	0.047	0.069	0.141	0.231	0.026	0.051	0.088	0.020	0.036	0.060	0.099	0.191	0.299	0.037	0.070	0.114	0.022	0.040	0.065	0.115	0.215	0.338	0.043	0.078	0.125
1,600 - 2,400 m	0.002	0.019	0.053	0.004	0.039	0.098	0.003	0.026	0.070	0.003	0.023	0.061	0.006	0.049	0.117	0.005	0.032	0.082	0.004	0.025	0.063	0.007	0.053	0.126	0.005	0.034	0.086
> 2,400 m	1.313	2.309	3.661	0.906	2.462	4.756	1.474	2.747	4.507	1.597	2.727	4.214	1.400	3.384	6.087	1.846	3.330	5.297	1.667	2.827	4.353	1.646	3.798	6.716	1.960	3.503	5.548
Straits of Florida Gulf of Mexico OCS	**0.002**	**0.005**	**0.009**	**0.001**	**0.005**	**0.010**	**0.002**	**0.006**	**0.011**	**0.003**	**0.008**	**0.013**	**0.003**	**0.007**	**0.014**	**0.004**	**0.009**	**0.015**	**0.004**	**0.009**	**0.014**	**0.004**	**0.009**	**0.016**	**0.004**	**0.010**	**0.017**
0 - 200 m	0.001	0.003	0.006	0.001	0.003	0.006	0.001	0.004	0.007	0.002	0.005	0.008	0.002	0.004	0.008	0.002	0.005	0.009	0.002	0.005	0.009	0.002	0.005	0.009	0.003	0.006	0.010
200 - 800 m	0.001	0.002	0.004	0.000	0.002	0.004	0.001	0.002	0.004	0.001	0.003	0.005	0.001	0.003	0.005	0.001	0.004	0.006	0.002	0.003	0.006	0.001	0.003	0.006	0.002	0.004	0.007